



3PAR Remote Copy[®] 2.3.1 User's Guide

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Revision Notice

This is the first release of this manual. A complete revision history is provided at the end of this document.

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Table of Contents

1 Introduction

1.1 Audience	1.2
1.2 Related Documentation	1.2
1.3 Organization	1.3
1.4 Typographical Conventions	1.4
1.5 Advisories	1.5

2 Remote Copy Overview

2.1 Overview	2.3
2.2 Remote Copy Terms and Concepts	2.3
2.2.1 Remote Copy Terms	2.3
2.2.2 Remote Copy Concepts	2.4
2.3 Remote Copy Volume Groups	2.6
2.4 Remote Copy Pairs	2.6
2.5 Remote Copy Configuration	2.7
2.5.1 Bidirectional Configurations	2.7
2.5.2 Unidirectional Configurations	2.8
2.5.3 N-to-1 Configurations	2.9
2.5.4 1-to-N Configurations	2.11
2.5.5 Synchronous Long Distance Configuration	2.12

2.6	Remote Copy Targets	2.15
2.6.1	Target Definitions	2.15
2.7	Remote Copy Links	2.17
2.7.1	Sending Links	2.17
2.7.2	Receiving Links	2.18
2.8	Remote Copy Connections	2.18
2.8.1	IP Networks	2.19
2.8.2	Fibre Channel Networks	2.20
2.8.3	Fibre Channel over IP Networks	2.20
2.9	Remote Copy Operation	2.20
2.9.1	Volume Group Modes	2.22
2.9.1.1	Synchronous Mode	2.23
2.9.1.2	Asynchronous Periodic Mode	2.24
2.9.2	Synchronization Types	2.25
2.9.2.1	Asynchronous Periodic Mode Volume Groups	2.25
2.9.2.2	Synchronous Mode Volume Groups	2.28
2.9.3	Resynchronization Period	2.28
2.9.4	Manual Resynchronization	2.29
2.9.5	Concurrent Synchronization Limits	2.29
2.9.6	Throughput Limiting Option	2.30
2.9.7	Role Reversal	2.30
2.10	Remote Copy and 3PAR Virtual Domains	2.30
2.11	Use of Virtual Copy Snapshots	2.31
2.11.1	In Synchronous Mode	2.31
2.11.2	In Asynchronous Periodic Mode	2.32
2.12	Remote Copy and Thin Provisioning	2.33
2.12.1	Snapshots and Common Provisioning Groups	2.33
2.12.2	Thinly Provisioned Virtual Volumes	2.34
2.12.3	Fully Provisioned Virtual Volumes	2.35
2.13	Error Handling	2.35
2.13.1	Single Link Failure	2.35

2.13.2	Double Link Failure	2.36
2.13.2.1	Synchronous Volume Groups	2.36
2.13.2.2	Asynchronous Periodic Groups	2.37
2.13.3	Remote Copy Failure Timeouts	2.37
2.13.4	Storage Server Failures	2.38
2.13.4.1	Failure of a Target	2.38
2.13.4.2	Failure of a Secondary Target	2.38
2.13.5	Write Errors	2.38
2.13.6	Read Errors	2.39
2.14	Requirements and Restrictions	2.41
2.14.1	N-to-1 Restrictions	2.43
2.14.2	1-to-N Restrictions	2.44
2.14.3	Synchronous Long Distance Restrictions	2.45

3 Remote Copy Setup

3.1	Available Setup Methods	3.2
3.2	Preparing for Setup	3.2
3.3	Gathering Necessary Information	3.3
3.4	Setting the Remote Copy Transport Layer	3.8
3.4.1	Setting Up Remote Copy Over IP	3.8
3.4.2	Setting Up the Remote Copy Interface for RCIP	3.9
3.4.2.1	Setting the Gateway	3.9
3.4.2.2	Verifying Connectivity	3.10
3.4.2.3	Increasing MTU (Optional)	3.11
3.4.3	Setting Up Remote Copy Over Fibre Channel	3.13
3.4.3.1	Setting Up the Remote Copy Interface for RCFC	3.14
3.4.4	Setting Up RCFC Over an IP Network	3.15
3.5	Setting Up Remote Copy	3.16
3.5.1	Setting Up Unidirectional Remote Copy	3.17
3.5.1.1	Setting Up the Primary Server	3.18
3.5.1.2	Setting Up the Backup Server	3.19

3.5.1.3	Creating Remote Copy Volume Groups	3.21
3.5.1.4	Start Copying	3.23
3.5.1.5	Setting Up Additional Remote Copy Pairs	3.25
3.5.2	Setting Up Bidirectional Remote Copy	3.25
3.6	Synchronous Long Distance Remote Copy Setup	3.28
3.6.1	Setting Up the Primary Server	3.31
3.6.2	Setting Up the Backup Servers	3.32
3.6.3	Verifying Synchronous Long Distance Remote Copy Setup	3.34
3.6.4	Creating Synchronous Long Distance Remote Copy Volume Groups	3.36
3.7	Initial Synchronization Using Tape Backup	3.38
3.7.1	Synchronizing Volume Groups	3.38
4	Using Remote Copy	
4.1	Management	4.2
4.2	Reversing Target Designations	4.2
4.3	Changing Remote Copy Mode for a Volume Group	4.3
4.4	Setting Remote Copy Volume Group Policies	4.4
4.5	Manual Resynchronization	4.5
4.6	Viewing Synchronization Details	4.5
4.7	Converting Standard Virtual Volumes	4.8
4.8	Modifying Virtual Volumes	4.9
4.8.1	Growing a Virtual Volume	4.9
4.8.2	Renaming a Virtual Volume	4.9
4.9	Limiting Throughput	4.10
4.10	Stopping Remote Copy	4.11
4.11	Remote Copy Commands	4.11
5	Performance and Scripting Considerations	
5.1	Performance Notes for RCIP Configuration	5.1
5.1.1	Gigabit Ethernet Links	5.1
5.1.2	Initial Synchronization	5.2

5.1.3	Distance	5.2
5.1.4	MTU Size	5.2
5.1.5	Autonegotiation	5.3
5.1.6	Remote Copy Mode	5.3
5.1.6.1	Asynchronous Periodic	5.3
5.1.6.2	Synchronous Mode	5.4
5.2	Performance Notes for RCFC Configuration	5.5
5.2.1	RCFC Links	5.5
5.2.2	Initial Sync	5.5
5.2.3	Distance	5.5
5.2.4	Remote Copy Mode	5.5
5.3	Scripting Notes	5.5
A Quick Setup Guide		
A.1	Setting Up the Remote Copy Transport Layer for RCIP	A.2
A.2	Setting Up the Remote Copy Transport Layer for RCFC	A.3
A.3	Setting Up Remote Copy	A.3
A.4	Setting Up Synchronous Long Distance Remote Copy	A.7
B Remote Copy Commands		
	admitrcopylink	B.3
	admitrcopytarget	B.5
	admitrcopyvv	B.7
	controlport	B.9
	creatercopygroup	B.18
	creatercopytarget	B.20
	dismissrcopylink	B.23
	dismissrcopytarget	B.25
	dismissrcopyvv	B.27
	growvv	B.29

removercopygroup	B.31
removercopytarget	B.33
setrcopygroup	B.35
setrcopytarget	B.43
setv	B.47
showport	B.52
showrcopy	B.57
showrctransport	B.62
startrcopy	B.66
startrcopygroup	B.67
statport	B.69
statrcopy	B.74
stoprcopy	B.77
stoprcopygroup	B.79
syncrcopy	B.81

C Example Setup and Disaster Recovery

C.1 Remote Copy Setup Examples	C.2
C.2 Bidirectional Synchronous Disaster Recovery Example	C.4
C.3 N-to-1 Asynchronous Periodic Disaster Recovery Example	C.15
C.4 1-to-N Unidirectional Asynchronous Periodic Disaster Recovery Example	C.27
C.5 Synchronous Long Distance Remote Copy Disaster Recovery Example	C.38
C.5.1 Synchronous Backup Server Assumes Role of Primary Server	C.43
C.5.2 Asynchronous Backup Server Assumes Role of Primary Server	C.59
C.5.3 Asynchronous Backup Server Assumes Role of Primary Server - No Data Transfer from the Synchronous Backup Server	C.80
C.6 Synchronous Long Distance Remote Copy for Data Migration	C.96

D Comparing MTU Speeds

Index

RH Revision History

1

Introduction

In this chapter

1.1 Audience	1.2
1.2 Related Documentation	1.2
1.3 Organization	1.3
1.4 Typographical Conventions	1.4
1.5 Advisories	1.5

This guide provides the information you need to configure and use 3PAR Remote Copy. It also discusses special usage scenarios and how to handle problems.

3PAR Remote Copy is a product that allows you to copy virtual volumes from one InServ storage server to another. The copy can be used for disaster recovery, for backup, or for data migration.

3PAR Remote Copy requires that you use the InForm® CLI. Refer to the *InForm OS Command Line Interface Reference* for complete instructions on using the InForm CLI. See [Appendix B, Remote Copy Commands](#) for information on the use of specific CLI commands relevant for Remote Copy.

1.1 Audience

This guide is for System and Storage Administrators who monitor and direct system configurations and resource allocation for 3PAR InServ® Storage Systems.

1.2 Related Documentation

The following documents also provide information related to InServ® Storage Servers and the InForm® Operating System:

For Information About...	Read the...
InServ Storage Server concepts and terminology	<i>3PAR InForm OS Concepts Guide</i>
CLI commands and their usage	<i>3PAR InForm OS Command Line Interface Reference</i>
Using the InForm Management Console (IMC) to configure and administer InServ Storage Servers	<i>3PAR InForm OS Management Console Online Help</i>
Using the InForm Command Line Interface (CLI) to configure and administer InServ Storage Servers	<i>3PAR InForm OS CLI Administrator's Manual</i>
Storage server hardware configurations, component numbering and layout, and system cabling	<i>3PAR InServ E-Class/F-Class Storage Server and Third-Party Rack Physical Planning Manual</i>
	<i>3PAR InServ S-Class/T-Class Storage Server Physical Planning Manual</i>
Identifying storage server components and detailed alert information	<i>3PAR InForm OS Messages and Operator's Guide</i>

1.3 Organization

This guide is organized as follows:

- [Chapter 1, *Introduction*](#), (this chapter), provides an overview of this guide, including information on audience, related documentation, and typographical conventions.
- [Chapter 2, *Remote Copy Overview*](#), gives an overview of 3PAR Remote Copy, that discusses important terminology and concepts from a theoretical perspective.
- [Chapter 3, *Remote Copy Setup*](#), walks you through the process of setting up and configuring Remote Copy on InServ Storage Servers. This chapter also describes how to perform the initial synchronization using tape backup instead of the Remote Copy links.
- [Chapter 4, *Using Remote Copy*](#), provides instructions on using 3PAR Remote Copy, including how to set Remote Copy group and target policies, how to limit throughput, and how to stop Remote Copy operations.
- [Chapter 5, *Performance and Scripting Considerations*](#), gives best practice recommendations for the use of 3PAR Remote Copy. The performance impact of Remote Copy is also discussed in this chapter.
- [Appendix A, *Quick Setup Guide*](#), provides a summary for expert users on how to prepare storage servers to use 3PAR Remote Copy to set up the Remote Copy connections between the storage server pair(s) and to then start using 3PAR Remote Copy.
- [Appendix B, *Remote Copy Commands*](#), provides detailed information about the InForm CLI commands used with Remote Copy. The format is the same as that of the *InForm OS Command Line Interface Reference*.
- [Appendix C, *Example Setup and Disaster Recovery*](#), walks you through several example setup and disaster recovery scenarios.
- [Appendix D, *Comparing MTU Speeds*](#), shows you how to configure a test volume group and measure the initial volume synchronization throughput to measure the difference between the 1500 and 9000 byte MTU settings.

This guide also contains a revision history and an index for your reference.

1.4 Typographical Conventions

This guide employs the following typographical conventions:

Typeface	Meaning	Example
ABCDabcd	Used for dialog elements such as titles, button labels, and other screen elements.	When prompted, click Finish to complete the installation.
ABCDabcd	Used for paths, file names, and screen output.	Open the file <code>\gui\windows\setup.exe</code>
ABCDabcd	Used to differentiate user input from screen output.	# cd /opt/3par/gui
<ABCDabcd>	Used for variables in file names, paths, and screen output.	Modify the content string by adding the <code>-P<x></code> option after <code>-jar inform.jar</code>
< ABCDabcd >	Used for variables in user input.	# ./java -jar inform.jar -P<x>

1.5 Advisories

To avoid injury to people or damage to data and equipment, be sure to observe the cautions and warnings in this guide. ***Always be careful when handling any electrical equipment.***



NOTE: Notes are reminders, tips, or suggestions that supplement the procedures included in this guide.



CAUTION: Cautions alert you to actions that can cause damage to equipment, software, or data.



WARNING: Warnings alert you to actions that can cause injury to people or irreversible damage to data or the operating system.

2

Remote Copy Overview

In this chapter

2.1 Overview	2.3
2.2 Remote Copy Terms and Concepts	2.3
2.3 Remote Copy Volume Groups	2.6
2.4 Remote Copy Pairs	2.6
2.5 Remote Copy Configuration	2.7
2.5.1 Bidirectional Configurations	2.7
2.5.2 Unidirectional Configurations	2.8
2.5.3 N-to-1 Configurations	2.9
2.5.4 1-to-N Configurations	2.11
2.5.5 Synchronous Long Distance Configuration	2.12
2.6 Remote Copy Targets	2.15
2.7 Remote Copy Links	2.17
2.8 Remote Copy Connections	2.18
2.9 Remote Copy Operation	2.20
2.9.1 Volume Group Modes	2.22

2.9.2	Synchronization Types	2.25
2.9.3	Resynchronization Period	2.28
2.9.4	Manual Resynchronization	2.29
2.9.5	Concurrent Synchronization Limits	2.29
2.9.6	Throughput Limiting Option	2.30
2.9.7	Role Reversal	2.30
2.10	Remote Copy and 3PAR Virtual Domains	2.30
2.11	Use of Virtual Copy Snapshots	2.31
2.11.1	In Synchronous Mode	2.31
2.11.2	In Asynchronous Periodic Mode	2.32
2.12	Remote Copy and Thin Provisioning	2.33
2.12.1	Snapshots and Common Provisioning Groups	2.33
2.12.2	Thinly Provisioned Virtual Volumes	2.34
2.12.3	Fully Provisioned Virtual Volumes	2.35
2.13	Error Handling	2.35
2.13.1	Single Link Failure	2.35
2.13.2	Double Link Failure	2.36
2.13.3	Remote Copy Failure Timeouts	2.37
2.13.4	Storage Server Failures	2.38
2.13.5	Write Errors	2.38
2.13.6	Read Errors	2.39
2.14	Requirements and Restrictions	2.41

2.1 Overview

3PAR Remote Copy is a product that allows you to copy virtual volumes from one InServ Storage Server to another. The copy can be used for disaster recovery, for backup, or for data migration.

3PAR Remote Copy requires that you use the InForm CLI. Refer to the *InForm OS Command Line Interface Reference* and the *InForm OS CLI Administrator's Manual* for complete instructions on using the InForm CLI. See [Appendix B, Remote Copy Commands](#) for additional instructions on the use of specific Remote Copy commands.



NOTE: All examples in this chapter show how to use 3PAR Remote Copy with the default policies enabled. The default policies allow you to run most configuration commands only on the primary storage system. See [Setting Remote Copy Volume Group Policies](#) on page 4.4 and [Remote Copy Commands](#) on page 4.11 for additional information.



NOTE: 3PAR Remote Copy requires 3PAR Remote Copy licenses for all storage servers participating in a Remote Copy replication. Refer to the *3PAR InForm OS Concepts Guide* for additional information on licensing and features.

2.2 Remote Copy Terms and Concepts

This section provides an overview of the common Remote Copy terms and concepts used throughout this manual.

2.2.1 Remote Copy Terms

Before using Remote Copy, review the following terms:

- **Remote Copy pair** – the pair of storage servers on which Remote Copy operations are performed. See [Remote Copy Pairs](#) on page 2.6 for additional information.
- **Remote Copy volume group** – a group of virtual volumes that are logically related and for which there is a cross-volume ordering of writes. Primary volume groups reside on the

local or *primary server* and secondary volume groups reside on the remote or *backup server*. See [Remote Copy Volume Groups](#) on page 2.6 for additional information.



NOTE: Cross-volume ordering of writes refers to the preservation of related writes. For example:

- a A volume group contains volumes V1 and V2.
- b The host application writes VV1 to V1 and then writes VV2 to V2.
- c When mirrored with Remote Copy, VV1 is written to first, then VV2.

- **primary volume group** – the set of volumes on the storage server to be copied.
- **secondary volume group** – the set of copied volumes on the storage server.
- **local or primary server** – the storage server on which the primary volume groups originate.
- **remote or backup server** – the storage server on which the copied volume groups reside.
- **target definition (target)** – the description of a Remote Copy system on one server in the Remote Copy pair. Each server in a Remote Copy pair must have a target definition for the other server. Refer to [Remote Copy Targets](#) on page 2.15 for additional information.
- **Remote Copy links** – the method by which information is sent and received between Remote Copy targets. See [Remote Copy Links](#) on page 2.17 for detailed information.

2.2.2 Remote Copy Concepts

As stated earlier, 3PAR Remote Copy is a product that allows you to copy virtual volumes from one InServ Storage Server to another. Generally, Remote Copy operations require at least two storage servers (discussed in [N-to-1 Configurations](#) on page 2.9). For overview purposes, this section focuses on a single pair of storage servers, or *Remote Copy pair*.

When setting up Remote Copy on the Remote Copy pair, the pair is set up in *bidirectional* Remote Copy mode. In a bidirectional Remote Copy setup, both servers in the Remote Copy pair serve as primary and backup servers in relation to one other. This relationship is illustrated in [Figure 2-1](#) that follows.

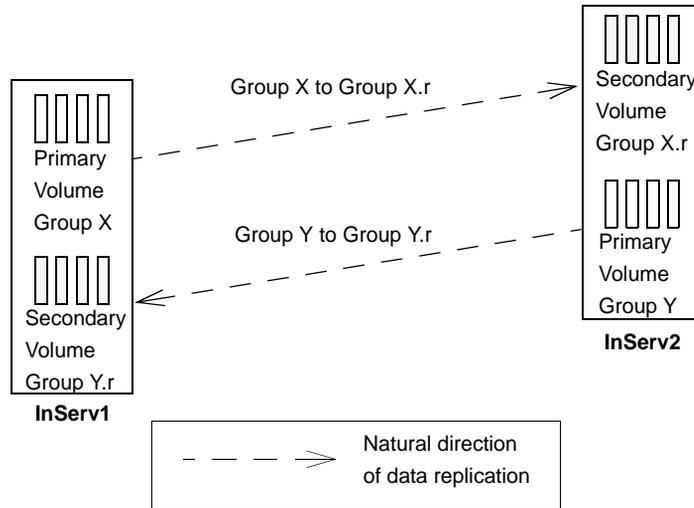


Figure 2-1. Relationship of Primary Versus Secondary Volume Groups on Primary and Backup Storage Servers

In [Figure 2-1](#), **InServ1** and **InServ2** act as both primary and backup servers. The following relationships are established:

- **Volume Group X** (the primary volume group on storage server **InServ1**) is copied to storage server **InServ2** and exists there as the secondary volume group **Volume Group X.r**. **InServ2** acts as a backup server to **InServ1** (the primary server).
- **Volume Group Y** (the primary volume group on storage server **InServ2**) is copied to storage server **InServ1** and exists there as the secondary volume group **Volume Group Y.r**. **InServ1** acts as a backup server to **InServ2** (the primary server).
- In Remote Copy, the storage server on which you initially created a volume group is identified as the local or primary server. The natural direction of data replication (the copy) originates from that server. In the previous figure, Remote Copy was set up on **InServ1**. Therefore the natural direction of the copy is from **InServ1** to **InServ2** for **Volume Group X**.

2.3 Remote Copy Volume Groups

Remote Copy operations are performed on groups of virtual volumes called *Remote Copy volume groups*. A Remote Copy volume group is a group of volumes on the same storage system that are logically related and for which there is a cross-volume ordering of writes. Volume groups are used when data needs to be consistent across a group of volumes in order for database or other applications to process data correctly.

Remote Copy uses volume groups to define a set of volumes for which applications might issue dependent writes.

Remote Copy ensures that the data in the volumes within a group maintain write consistency. When Remote Copy operations are started or stopped, this is done for the whole group. When point-in-time snapshots of such volumes are created, writes to all volumes in the group are blocked to assure a consistent point-in-time copy of the whole volume group.

2.4 Remote Copy Pairs

Remote Copy configurations are based on the relationship between a storage server pair, also known as the *Remote Copy pair*. Within this pair, the *primary* storage server is the server that holds the volumes that are copied to a backup server, also known as a remote storage server.

As described in *N-to-1 Restrictions* on page 2.43, a maximum of four primary storage servers can use the same backup storage server. In such configurations, the backup storage server participates in multiple pairs, one for each primary storage server. See [Figure 2-4](#) for an example of a configuration that uses multiple Remote Copy pairs.



NOTE: For any configuration, the backup storage server might be at the same location as the primary storage server or servers, or it might reside at a remote location. Disaster recovery applications often require that the backup storage server reside at a remote location relative to the primary storage servers.

2.5 Remote Copy Configuration

As stated previously, Remote Copy configurations are based on the relationship between a pair of InServ Storage Servers (Remote Copy pair). The storage servers in the Remote Copy pair play multiple roles at the same time. Both storage servers can function as both the primary and backup servers and can hold primary and secondary volume groups. This configuration is referred to as a *bidirectional* Remote Copy configuration. Conversely, a Remote Copy setup where all groups are primary on one server and all groups are secondary on the other server is referred to as *unidirectional*. A combination of bidirectional (for one Remote Copy pair) and unidirectional configurations can be used in multi-Remote Copy pair setups (*N-to-1* or *1-to-N* configurations). Each configuration is discussed further in the sections that follow.

2.5.1 Bidirectional Configurations

In a bidirectional Remote Copy pair, each storage server provides backup for the other, but only for selected volume groups. [Figure 2-2](#) illustrates how this configuration might work with a single Remote Copy pair.

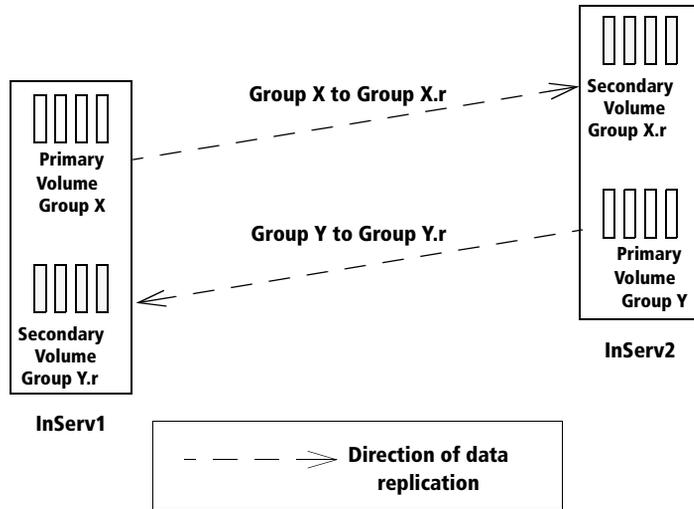


Figure 2-2. Bidirectional Remote Copy

2.5.2 Unidirectional Configurations

In a unidirectional Remote Copy configuration, each storage server in the pair plays either the role of the primary server or the backup server. In this configuration, the primary storage server or servers holds all primary volume groups and the backup storage server holds all secondary volume groups.

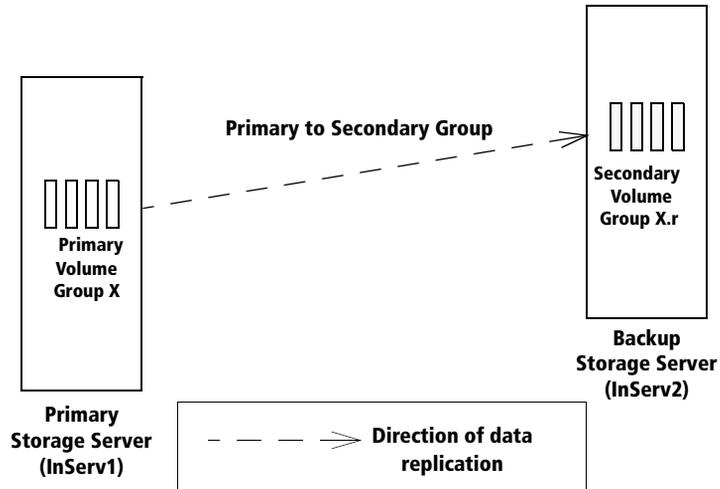


Figure 2-3. Unidirectional Remote Copy

2.5.3 N-to-1 Configurations

In N-to-1 Remote Copy configurations, a maximum of four primary storage servers use the same secondary (backup) storage server. N-to-1 Remote Copy configurations can operate in either a combination of bidirectional (for one Remote Copy pair) and unidirectional functionality (as shown in [Figure 2-4](#)), or in complete unidirectional functionality. In the following figure, unidirectional Remote Copy is maintained between Remote Copy pairs **InServ1** and **InServ4**, and Remote Copy pairs **InServ2** and **InServ4**. Bidirectional Remote Copy is maintained between Remote Copy pair **InServ3** and **InServ4**.



NOTE: In an N-to-1 Remote Copy configuration, only one link can be bidirectional. The secondary storage server must have four or more controller nodes.

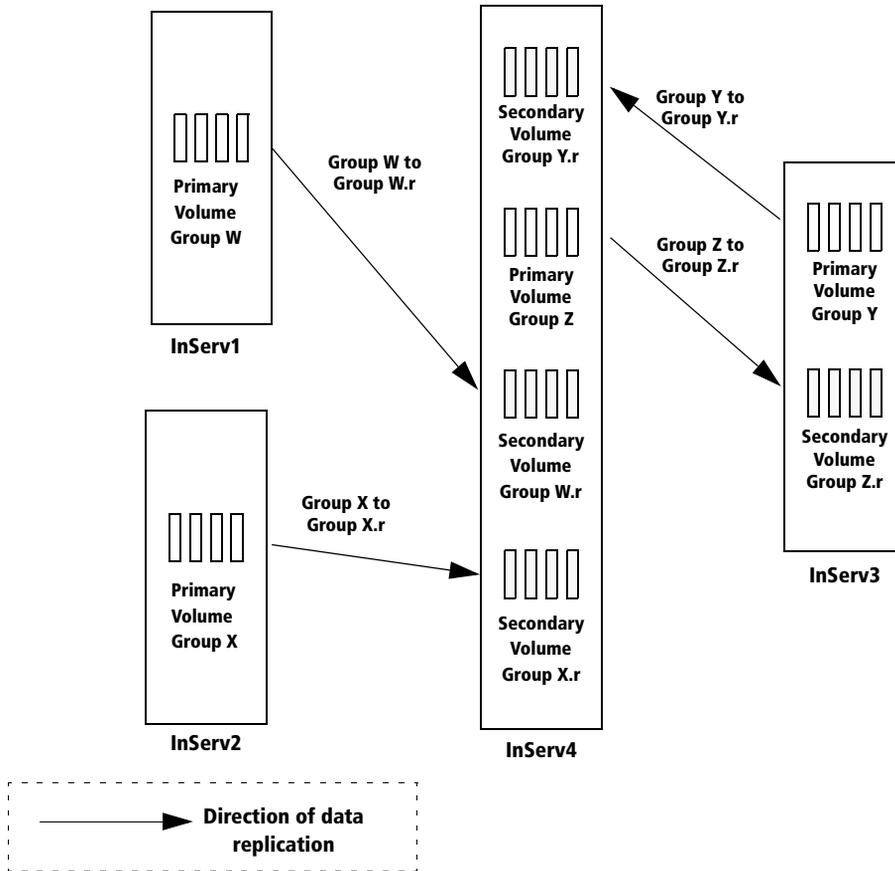


Figure 2-4. N-to-1 Remote Copy

2.5.4 1-to-N Configurations

In a 1-to-N Remote Copy configuration, a single primary storage server can use multiple InServ Storage Servers as backup servers. For the current release, a 1-to-N Remote Copy configuration has a maximum of two secondary (backup) targets. Like N-to-1 Remote Copy configurations, 1-to N Remote Copy configurations can operate in either a combination of bidirectional (for one Remote Copy pair) and unidirectional functionality (as shown in [Figure 2-5](#)), or in complete unidirectional functionality. In the following figure, unidirectional Remote Copy is maintained between Remote Copy pairs **InServ1** and **InServ3**. Bidirectional Remote Copy is maintained between Remote Copy pair **InServ1** and **InServ2**.

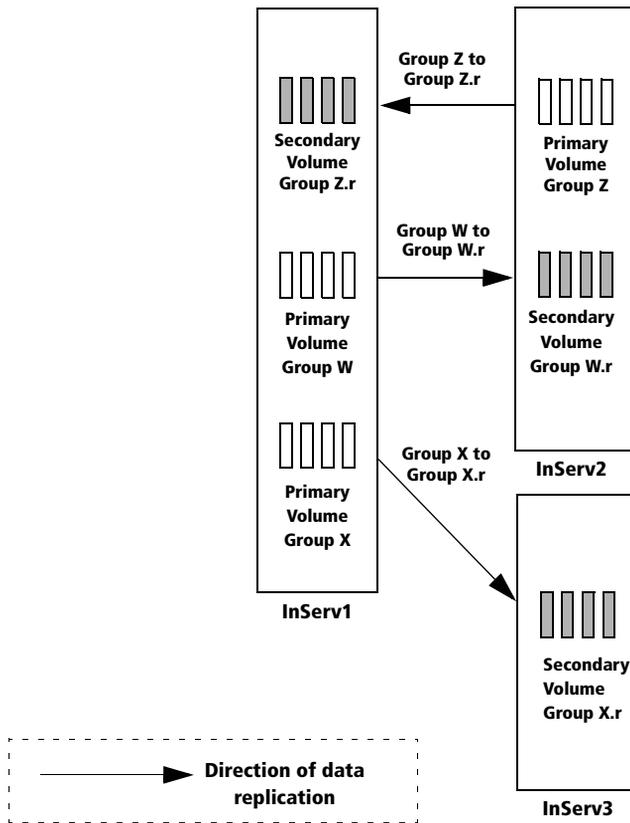


Figure 2-5. 1-to-N Remote Copy

2.5.5 Synchronous Long Distance Configuration

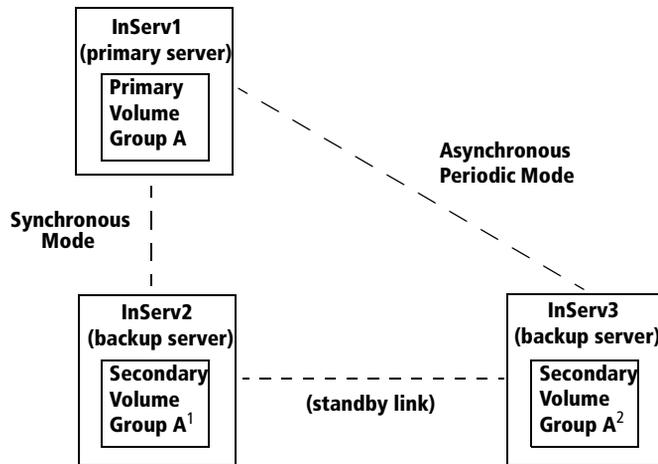
In Synchronous Long Distance Remote Copy configurations, a single volume group is copied directly to volumes on two other servers by admitting the volumes to groups with two targets. Synchronous mode Remote Copy is used between the primary server and backup server that are physically closer to each other where a high bandwidth/low latency connection is shared, and asynchronous periodic mode Remote Copy is used between the primary server and backup server that are physically farther apart sharing a lesser connection (see [Synchronization Types](#) on page 2.25 for details about synchronous and asynchronous periodic modes). The synchronous connection must be a Fibre Channel connection while the asynchronous periodic connections can be either all Fibre Channel (over an IP network) or all IP.

In a Synchronous Long Distance Remote Copy configuration, if one backup server fails, Remote Copy can still continue between the primary server and the second backup server. As shown in [Figure 2-6](#), when the backup server **InServ2** fails, Remote Copy in asynchronous periodic mode still continues between the primary server **InServ1** and second backup server **InServ3**. Conversely, if **InServ3** failed, Remote Copy in synchronous mode would still continue between **InServ1** and **InServ2**.



NOTE: Synchronous Long Distance Remote Copy links cannot be bidirectional.

① Prior to InServ2 Failure



② InServ2 Failure

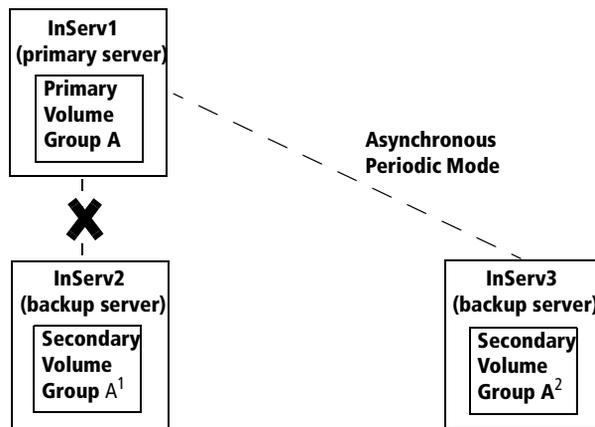


Figure 2-6. Synchronous Long Distance Remote Copy - One Backup Server Failure

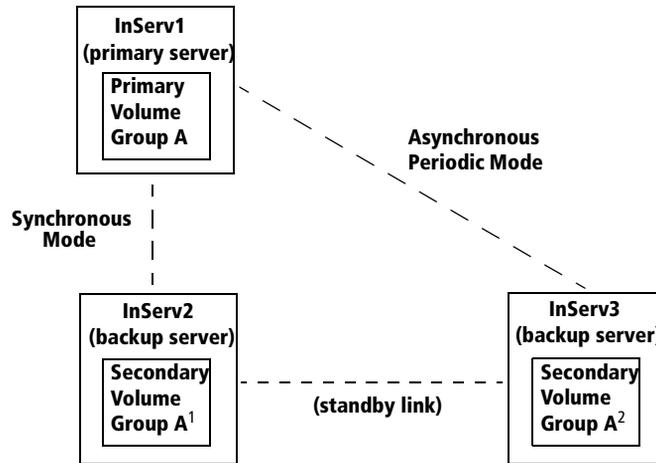
Upon restoration of **InServ2**, data is transferred from **InServ1** to **InServ2** and synchronous mode Remote Copy is restored between **InServ1** and **InServ2**.

In the event of an primary server failure, one of the backup servers (typically the backup server sharing a synchronous Remote Copy connection with the primary server) assumes the role of the primary server and the second backup server then serves as the backup of the new primary system. The volume on the new primary server is updated periodically on the backup server. As shown in [Figure 2-7](#), when the primary server **InServ1** goes down, **InServ2** becomes the primary server and **InServ3** becomes the backup server to **InServ2**.



NOTE: Either backup server can be set up to assume the role of the primary server in the event of failover. See [Chapter 3, Remote Copy Setup](#) for information.

① Prior to InServ1 Failure



② InServ1 Failure

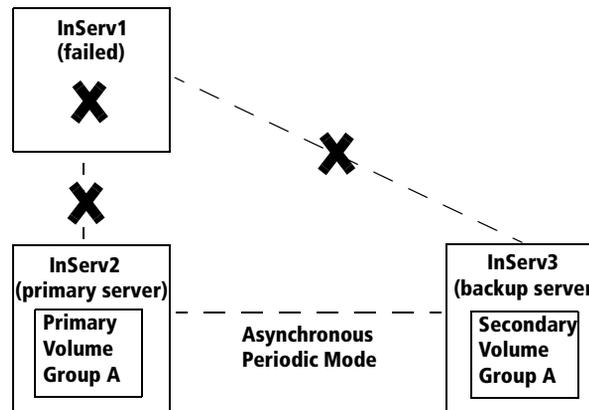


Figure 2-7. Synchronous Long Distance Remote Copy - Primary Server Failure

Upon restoration of **InServ1**:

- Data is transferred from **InServ2** to **InServ1**, and **InServ1** is restored to the primary server.
- **InServ2** and **InServ3** are restored as backup servers.
- Synchronous mode Remote Copy is restored between **InServ1** and **InServ2**.

- Asynchronous periodic mode Remote Copy is restored between **InServ1** and **InServ3**.

Additionally, Synchronous Long Distance Remote Copy can also be used for data migration when replacing an InServ Storage Server in an existing Remote Copy configuration (see [Appendix C, Example Setup and Disaster Recovery](#)).

2.6 Remote Copy Targets

While using Remote Copy, the relationship between primary and backup storage servers is not always static. For example, [Appendix C, Example Setup and Disaster Recovery](#) illustrates disaster recovery scenarios that require you to temporarily reverse the primary and backup roles played by the storage servers.



NOTE: For more information about how the relationship between storage servers can be reversed so that the primary storage server becomes the backup and vice versa, see [Remote Copy Operation](#) on page 2.20 and [Appendix C, Example Setup and Disaster Recovery](#).

In addition, as described in [Remote Copy Configuration](#) on page 2.7, using bidirectional Remote Copy can complicate the distinction between primary and backup storage servers because each storage server plays both roles.

Because the relationship between primary and backup storage servers is not always simple, Remote Copy uses the term *Remote Copy target system*, to refer to the other storage server in a Remote Copy pair. For example, in [Figure 2-2](#) and [Figure 2-3](#), the target system for **InServ1** is **InServ2** and vice versa.

2.6.1 Target Definitions

As part of the Remote Copy setup process (described in detail in [Chapter 3, Remote Copy Setup](#)), you must create target definitions on each Remote Copy system. The target definitions are descriptions that exist on one system in order to identify a Remote Copy system. In short, the InServ Storage Servers in the Remote Copy pair are each defined as targets, relative to each other, for Remote Copy operations.

[Figure 2-8](#) illustrates how target definitions might work with a bidirectional pair that has two primary volume groups.

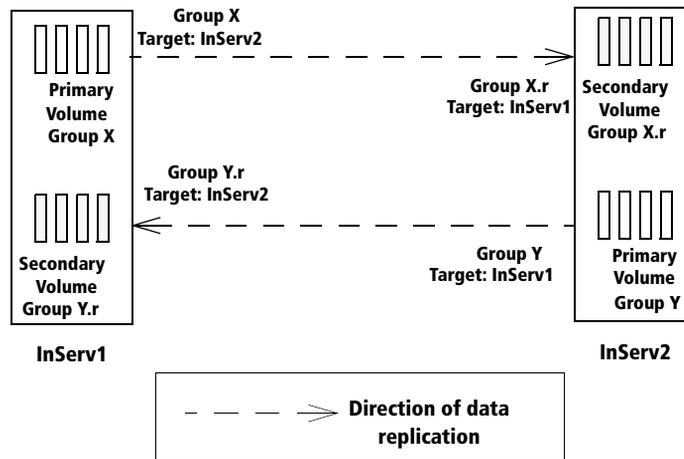


Figure 2-8. Target Definitions (Single Pair, Bidirectional)

In the previous figure,

- the Remote Copy target system is **InServ2** for the **Volume Group X** on **InServ1**.
- the Remote Copy target system is **InServ1** for the replicated volume group **Volume Group X.r** on **InServ2**.
- the Remote Copy target system is **InServ1** for the **Volume Group Y** on **InServ2**.
- the Remote Copy target system is **InServ2** for the replicated volume group **Volume Group Y.r** on **InServ1**.
- the target definitions are simply the names of the storage servers (**InServ1** and **InServ2**) in relation to each other.



NOTE: The target name is not required to match the system name.

The relationship between target definitions and the server pairs described previously holds true for all valid Remote Copy configurations (bidirectional, unidirectional, N-to-1, 1-to-N, and synchronous long distance). The server on which the volume groups originate (the primary server), defines the target as its backup server.

2.7 Remote Copy Links

Remote copy links are divided into two main types, sending links and receiving links. Sending links are created manually during the Remote Copy setup by using the `creatercopytarget` or `admitrcopylink` commands. Receiving links are automatically created on all nodes that have sending links configured.

2.7.1 Sending Links

Sending links are used to transmit data to a Remote Copy target system, and are associated with target definitions, with one set of links per defined target.

For each configured IP interface, the Remote Copy link uses TCP port 5785 to transmit data and commands from the primary server to the backup server.

It is only possible to configure one sending link per target definition per node. For example, either of the configurations illustrated in [Figure 2-9](#) are supported, but Remote Copy does not support both of these connection methods at the same time:

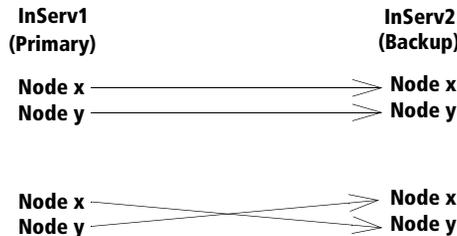


Figure 2-9. Sending Link Connection Methods

All examples in this guide use the connection method as illustrated in the previous figure.

When setting up Remote Copy links between a Remote Copy pair, you must create one set of sending links on the primary storage server and one set of sending links on the backup storage server ([Figure 2-10](#)). Additional targets require the creation of additional link sets. These links are created as part of the Remote Copy setup described in [Setting Up Remote Copy](#) on page 3.16.

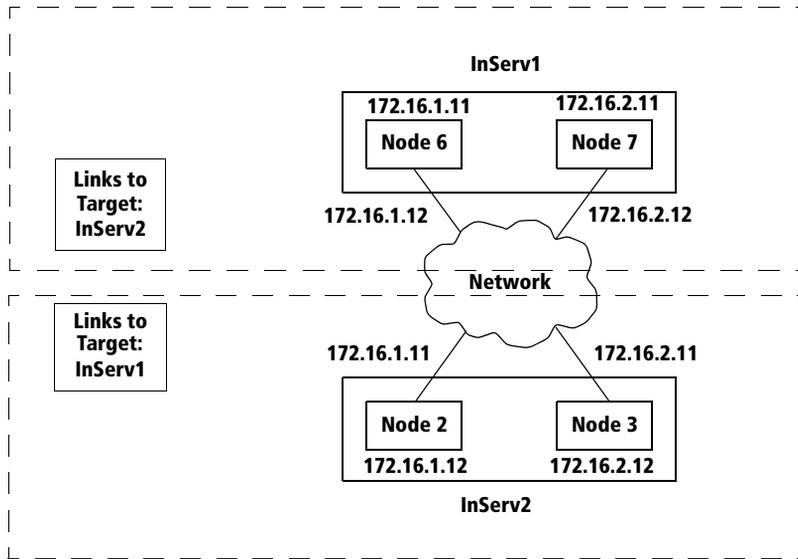


Figure 2-10. Sending Links for a Remote Copy Pair

2.7.2 Receiving Links

While sending links are used to transmit data, receiving links are used to listen. The receiving links read Remote Copy data and commands and send them to the appropriate Remote Copy process for processing. Unlike sending links, there is only a single link of a given type per node, regardless of the number of sending links of that type.

2.8 Remote Copy Connections

When using Remote Copy for disaster recovery, the backup storage server should reside at a remote site some distance from the primary server(s) so that the two sites are unlikely to be affected by the same disaster. The latency of Remote Copy writes increases with distance.

Storage servers in a Remote Copy pair are connected through a dedicated link or through a network (see [Figure 2-16 on page 2.41](#)). You should choose a specific topology based on several factors, including the distance between the servers and the required bandwidth of the connection.



NOTE: Remote Copy over IP (RCIP) configurations can fully utilize both 1Gbps links during the synchronization process. If lower throughput networks are used, throughput between systems running Remote Copy might be capped by the network.

Connections between servers in the same room could be provided as direct Gigabit Ethernet (GigE) links or through GigE switches, or through Fibre Channel networks. Longer distances require other topologies.



NOTE: A GigE-capable interface is required for RCIP configurations.



NOTE: The 3PAR Remote Copy solution includes two separate network connections between storage servers. The Remote Copy software balances the load and manages the failover between these connections. For optimal availability, the two connections should be connected to separate network equipment.

More than one link must be used to connect storage servers to maintain availability. When there are multiple physical links between the storage servers, Remote Copy uses all the available links to transmit data in parallel.

2.8.1 IP Networks



CAUTION: When configuring the GigE interfaces, the GigE interface and the management Ethernet port of an InServ Storage Server controller node should be on different IP subnets. If they are configured on the same subnet, Remote Copy packets might go over the management port and would not be available to the Remote Copy software.

Before configuring Remote Copy, you need a good understanding of the IP network that will be used to connect the storage servers. When more than one storage server is used at the same location, it is possible that they are in the same subnet. However, it is much more likely that the

storage servers in the proposed configuration are separated by a large distance and have been placed on different IP subnets. If the storage servers are on different subnets, each storage server must be connected to a gateway router or switch on that subnet and there must be an IP cloud between their gateways.

2.8.2 Fibre Channel Networks

Remote Copy over Fibre Channel is supported on storage servers communicating over Fibre Channel Storage Area Networks (FC SAN). Each storage server should have a pair of Host Bus Adapters (HBAs) installed. This HBA pair must be dedicated to Remote Copy. The HBA pair is required for load sharing and fault tolerance. The HBAs in each storage server connect these systems through FC SAN using Fibre Channel cable connections.

Before configuring Remote Copy, you need a good understanding of the FC SAN that will be used to connect the storage servers. They must be configured to be in the same FC SAN and Zone.

2.8.3 Fibre Channel over IP Networks



NOTE: RCFC over IP networks is only allowed for Remote Copy in asynchronous periodic mode.

Remote Copy over Fibre Channel is also supported on storage servers communicating over an IP network. In this type of setup, the primary and backup InServ Storage Servers use Fibre Channel connections, which pass through routers to cross an IP network.

2.9 Remote Copy Operation

As described previously in *Remote Copy Volume Groups* on page 2.6, in order to maintain write consistency, Remote Copy operations are performed on groups of virtual volumes called Remote Copy volume groups.

Another use of volume groups with Remote Copy is to simplify administration. For example, the number of commands that need to be executed can be reduced by using volume groups. A single `start/stop/setrcopygroup` command applies to all volumes in a group. This can reduce the number of CLI commands that need to be run to configure and operate Remote Copy. Even when the volumes do not need write consistency, if the volumes are added to a single group, Remote Copy treats them as related volumes.



NOTE: Although the benefits of using volume groups are considerable, one drawback is that the I/O to all volumes in the group is blocked while taking snapshots. If the number of volumes in the group is very large (the current supported limit is 100 volumes per group), the blocking of the I/O might result in some host writes timing out.

For bidirectional configurations, both storage servers can hold primary and secondary volume groups. For a bidirectional Remote Copy pair, each storage server provides backup for the other, but only for the selected volume groups (Figure 2-11).

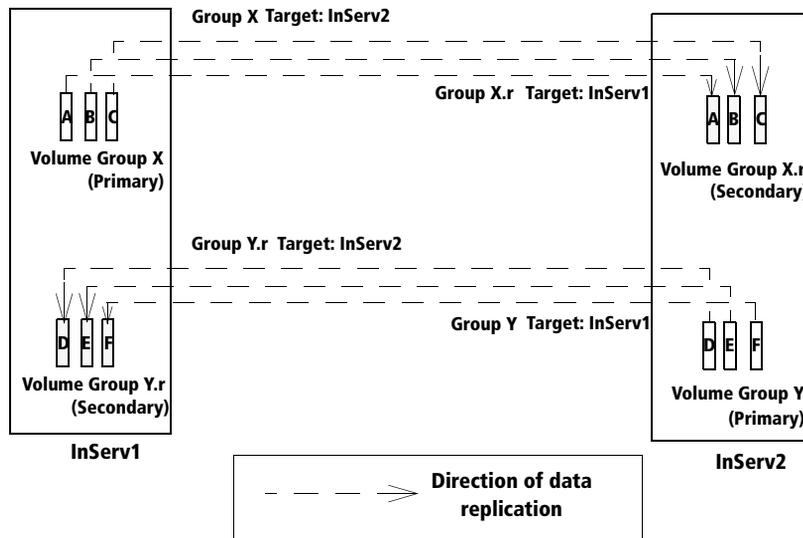


Figure 2-11. Mapping of Volumes Between a Bidirectional Remote Copy Pair

For unidirectional Remote Copy, each virtual volume in a Remote Copy group on the primary server is mapped to a virtual volume in a corresponding secondary group on the backup storage server (Figure 2-12).

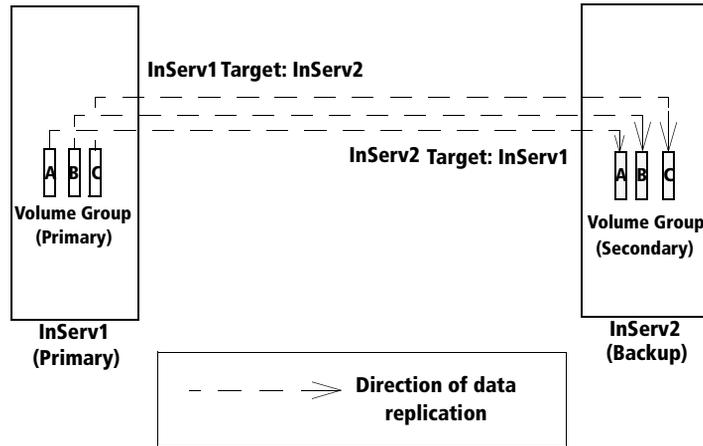


Figure 2-12. Mapping of Volumes Between Primary and Backup Storage Server

In both cases, any primary volume can be mapped to any secondary volume that belongs to the corresponding Remote Copy group on the target system, with the restriction that the secondary volume be the same size as the primary volume.



NOTE: All volumes used with Remote Copy must be Thinly Provisioned Virtual Volumes (TPVVs) with snapshot space., or fully provisioned virtual volumes as discussed in [Remote Copy and Thin Provisioning](#) on page 2.33. However, snapshot volumes in Remote Copy groups are not supported.

2.9.1 Volume Group Modes

There are two modes used by Remote Copy volume groups: *synchronous* and *asynchronous periodic*.

- *Synchronous mode volume groups* stay synchronized at all times. See [Synchronous Mode](#) on page 2.23 for a detailed description of this Remote Copy mode.
- *Asynchronous periodic mode volume groups* undergo resynchronization periodically, either at a scheduled interval or when resynchronization is manually initiated. For a detailed description of this Remote Copy mode, see [Asynchronous Periodic Mode](#) on page 2.24.

2.9.1.1 Synchronous Mode

In *synchronous mode*, a host-initiated write is performed on both the primary and the backup storage servers before acknowledging the host write. On the primary storage server, data is written to the caches of two nodes. This redundancy is in place in case one node fails before the write can be copied to a disk. Concurrently, the write request is sent to the backup storage server through a communication link. The backup storage server writes the same information into its cache (again, on two nodes) and then sends an acknowledgement to the primary system. The host write is acknowledged after the active cache update completes and the backup acknowledgement is received (Figure 2-13).

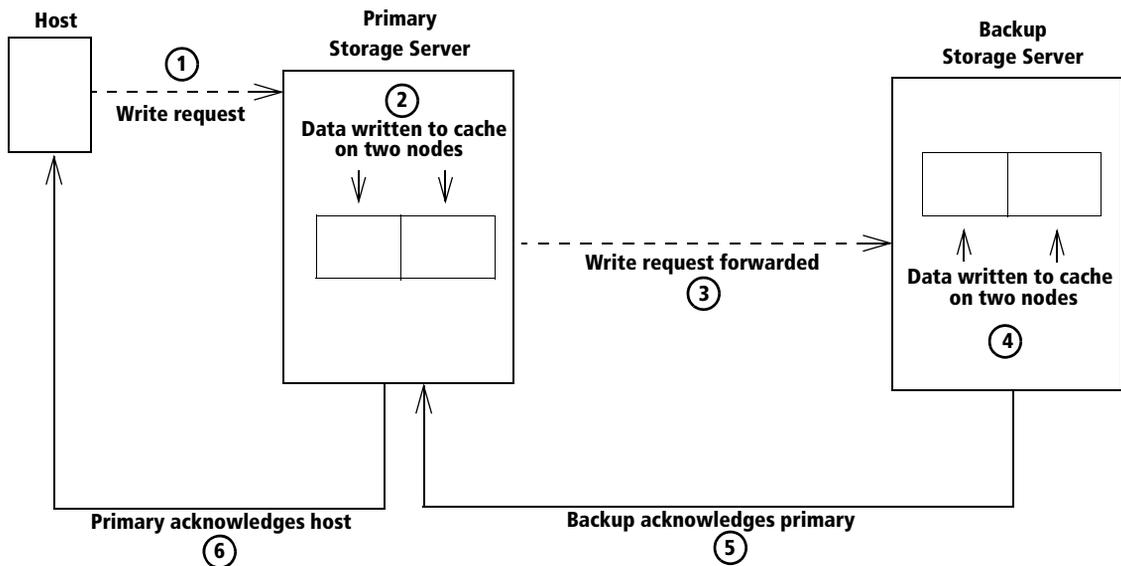


Figure 2-13. Synchronous Mode Remote Copy

Synchronous copying keeps the primary and backup storage servers synchronized at all times and provides a higher level of data integrity compared to the asynchronous periodic mode (explained in the following sections). No acknowledged I/O is lost even if the primary storage server, the backup storage server, or the communication links go down. In the case of a disaster affecting the primary storage server, the copy stored on the backup storage server at the remote site is an exact replica and can be immediately used to continue the application.

2.9.1.1.1 Latency

Synchronous mode adds more latency to the write because the I/O needs to be sent to the backup server over the IP network or SAN and then an acknowledgement must be received from the backup server before acknowledging the host. As the distance between the primary and backup storage servers increases, the latency also increases. For example, a one-way distance of 100 miles adds approximately two milliseconds to the write latency. Even with the primary and backup storage systems side-by-side, Remote Copy running in synchronous mode adds some latency to a host write.

2.9.1.2 Asynchronous Periodic Mode

In the *asynchronous periodic mode*, host writes are performed only on the primary server and the host write is acknowledged as soon as the data is written into cache on the primary storage server (Figure 2-14).

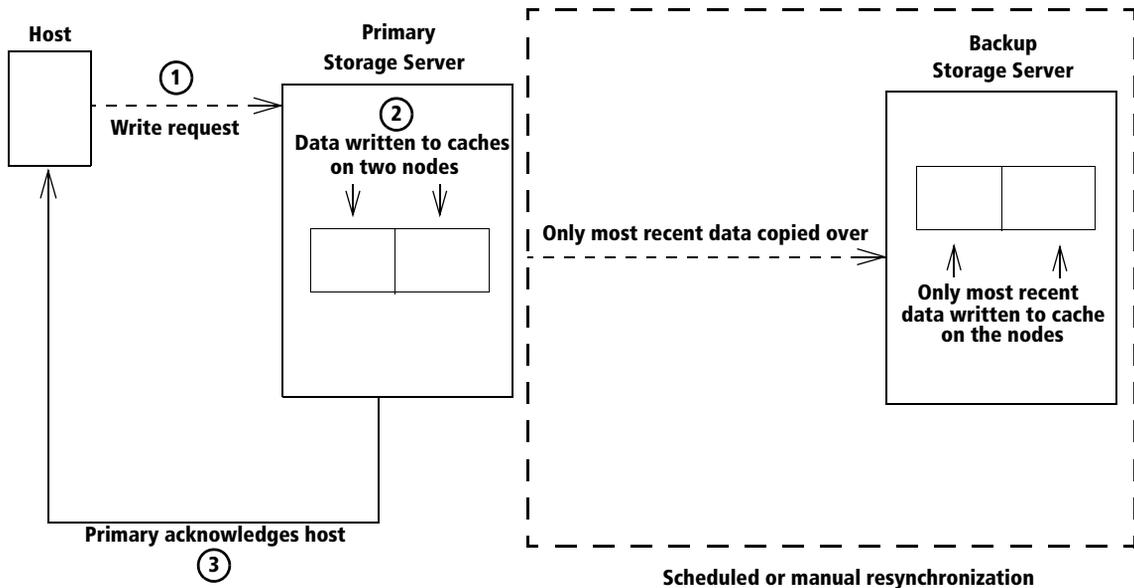


Figure 2-14. Remote Copy in Asynchronous Periodic Mode

The primary and backup volumes are resynchronized periodically, for example, when scheduled or when resynchronization is manually initiated through the `syncrcopy` command.

If, between two resynchronizations, an area of the volume is written to multiple times, only the last write needs to be sent over to the other storage server. Therefore, when using Remote Copy in asynchronous periodic mode, less data is transferred relative to the synchronous mode.

2.9.2 Synchronization Types

There are two types of synchronizations that are performed on volume groups: *full synchronizations* and *resynchronizations*.

A *full synchronization* copies the primary volume in its entirety, whereas a *resynchronization* copies only what has changed after the previously completed synchronization. A new volume group always requires a full synchronization at first, whether it is an asynchronous periodic volume group or a synchronous volume group (see [Volume Group Modes](#) on page 2.22 to understand the difference).

When a synchronization is initiated, with the exception of the initial synchronization, snapshots are created on the backup storage server. This stage is required to ensure that the backup system maintains a valid point-in-time copy at all times. The system must always maintain a valid point-in-time copy because a failed synchronization attempt could leave the base volumes in an inconsistent state.

2.9.2.1 Asynchronous Periodic Mode Volume Groups

For the asynchronous periodic mode volume groups, after the snapshots are created on the backup storage server, all volumes in the primary volume group (on the primary storage server) accept new writes, but hold the acknowledgement. While new writes are held, the primary system creates snapshots of all volumes within the group. After creating these snapshots, the system allows I/O to resume and acknowledges any writes that were held ([Figure 2-15](#)).



NOTE: Any writes sent from the host are accepted, but not committed or acknowledged until after the snapshots are completed. This is to ensure that the host will not see any I/O failure.

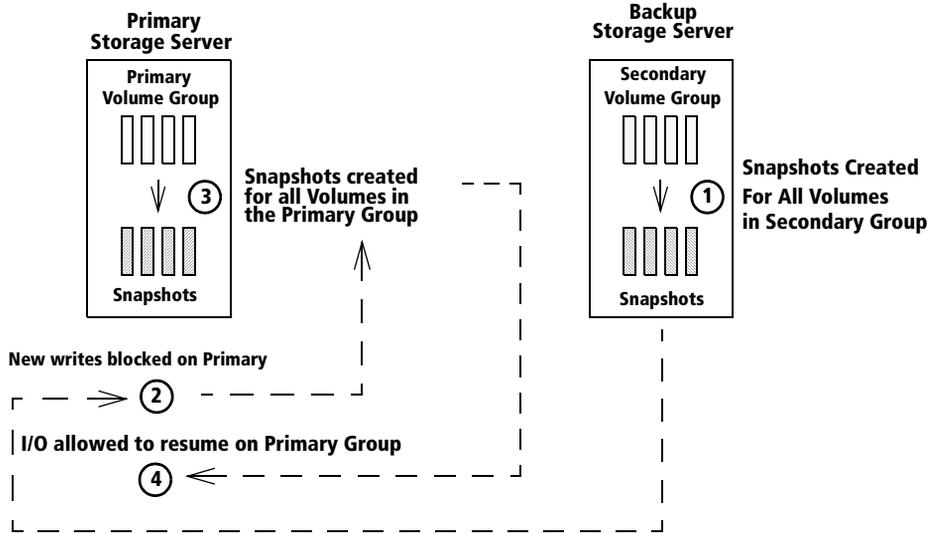


Figure 2-15. Snapshot Creation Prior to Resynchronization (Asynchronous Periodic)

After the system has successfully created all snapshots, the synchronization process can begin. The synchronizations are done individually for each volume. If the primary volume has never been synchronized (or if no valid resynchronization snapshot exists), the system performs a full synchronization. In a full synchronization, all data on the snapshot is transmitted to the backup volume. After the synchronization is complete, the active snapshot is saved in order to perform a fast resynchronization at a later point in time (Figure 2-16).

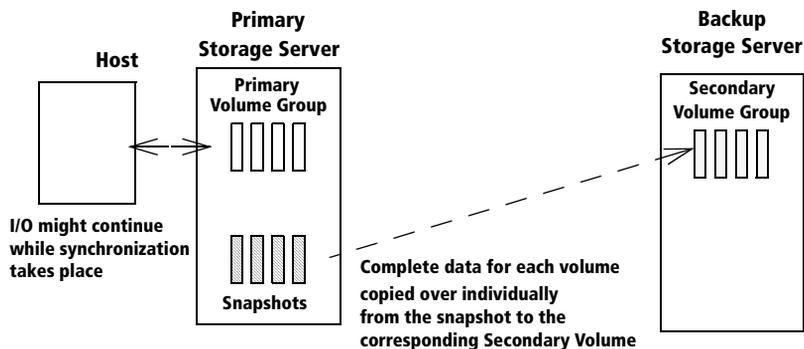


Figure 2-16. Full Synchronization Using Snapshots of Primary Volumes (Asynchronous Periodic)

If the primary volume has been previously synchronized, and a resynchronization snapshot exists, then a fast resynchronization is performed. The two snapshots (the resynchronization snapshot and the current synchronization snapshot) are compared to determine what changes have occurred between the creation of each snapshot. The system transmits only these changes to the secondary volume (Figure 2-17).

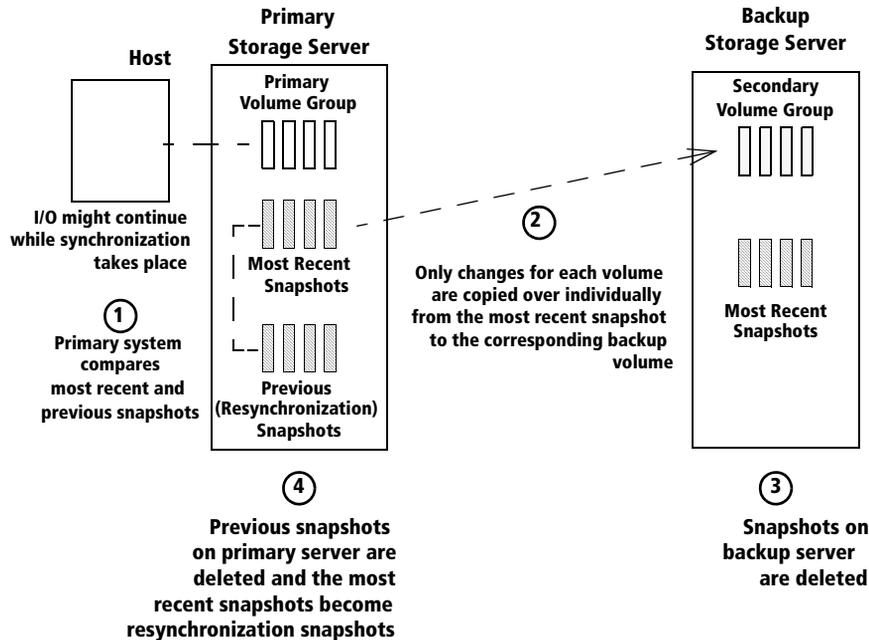


Figure 2-17. Fast Resynchronization Using Resynchronization Snapshots



NOTE: Because of the use of multiple snapshots, adequate virtual volume space must be available. See [Remote Copy and Thin Provisioning](#) on page 2.33 for important information about space allocation and deleted snapshots.

After the entire volume group has been synchronized with the secondary group, the snapshots that were created on the backup system are deleted, as the base volumes now represent a valid point-in-time copy. After a resynchronization is complete, the old resynchronization snapshot is deleted, and the newer snapshot is saved for future resynchronization.

2.9.2.2 Synchronous Mode Volume Groups

Rather than creating snapshots on the primary volume group for synchronous mode volume groups, the I/O is taken directly from the base volume when synchronization begins. Synchronous mode volume groups resynchronize automatically when they are stopped and restarted. When stopped, the system takes snapshots that are used for resynchronization.

2.9.3 Resynchronization Period

In order for resynchronizations to be performed automatically with asynchronous periodic mode volume groups, you must configure the synchronization period for the volume group. There is no default synchronization period; it must be set using the `setrcopygroup` command as described in [Setting Remote Copy Volume Group Policies](#) on page 4.4. This command can be issued any time after the group is created, even after Remote Copy operations have started for the group. When the resynchronization period is set for the primary volume group, by default it is mirrored to the secondary.



CAUTION: The resynchronization period should be set to allow sufficient time for the group to complete synchronizing. If too little time is specified, it is possible that the group will continuously synchronize.

The length of the synchronization period should be chosen based on the tolerance for data concurrency (the amount of delay that can be tolerated in updating the backup storage server).

The minimum synchronization period supported by Remote Copy is five minutes. Because of the overhead involved in creating and deleting snapshots when starting and stopping a resynchronization, the period you select should be long enough to allow the previous resynchronization to complete. If a resynchronization is still taking place before the next scheduled resynchronization, the new resynchronization starts briefly after the previous resynchronization has completed. Future resynchronizations use the new schedule, starting one period after the delayed resynchronization took place.

2.9.4 Manual Resynchronization

Additional manual resynchronizations might be initiated for asynchronous periodic or synchronous mode volume groups using the `syncrcopy` command. When using this command, only the changes to the primary volume group after the last resynchronization point are sent over the network to the backup storage server. Use the `syncrcopy -ovrd` command to force a synchronous mode volume group to synchronize. This causes a full synchronization.



NOTE: To schedule a synchronization to take place at a particular time (for example, 12:00 pm daily), use a host-based script and manual resynchronization.

2.9.5 Concurrent Synchronization Limits

To limit the performance impact of Remote Copy on the rest of the InServ Storage Server, the number of volumes that are concurrently synchronizing is limited to 20 volumes. This limit is not user-configurable and applies to the initial synchronization as well as subsequent resynchronizations for the synchronous as well as the asynchronous periodic groups. See [Synchronous Mode](#) on page 2.23 and [Asynchronous Periodic Mode](#) on page 2.24 for additional information about synchronous and asynchronous periodic groups.

For example, if there are 30 volumes in the asynchronous periodic mode that are being resynchronized, you might notice that 10 volumes do not start synchronizing until some of the first 20 complete. This can be seen by monitoring the `SyncStatus` column of the `showrcopy` command output (see [showrcopy](#) on page B.57 for example output).



NOTE: For complete details on the `showrcopy` command, including valid synchronization, link, and group states, see [showrcopy](#) on page B.57.

To ensure volume group consistency, all snapshots for the asynchronous periodic group are maintained on the secondary server until all of the volumes in that group have completed synchronization.

2.9.6 Throughput Limiting Option

For asynchronous periodic mode Remote Copy (see [Asynchronous Periodic Mode](#) on page 2.24), it might be useful to use the throughput limiting option when setting up links over leased lines. This option limits the maximum throughput that Remote Copy will utilize for a link. This is useful, for example, if the leased line charges are based on the bit rate utilized. If this option is not used, Remote Copy attempts to send data as fast as it can on both links. If the limit is set, the data is metered and sent out at a rate less than or equal to the set limit. For instructions on setting this limit, see [Limiting Throughput](#) on page 4.10.

2.9.7 Role Reversal

While using Remote Copy, it is possible to reverse the roles of the volume groups. By reversing roles, the primary becomes the backup and vice versa. To correct the reversal, you must change the roles once again. See [Reversing Target Designations](#) on page 4.2 for specific instructions on role reversal. [Error Handling](#) on page 2.35 also discusses role reversal.

2.10 Remote Copy and 3PAR Virtual Domains



NOTE: 3PAR Virtual Domains requires a 3PAR Virtual Domains license. For additional information about the license, see the *3PAR InForm OS Concepts Manual*.

Remote Copy checks for 3PAR Virtual Domains (domains) on the remote system to ensure the virtual volume is mirrored to the same domain name as the local domain name. The domain needs to be called a correct domain name. See the *3PAR InForm OS Concepts Guide* for detailed information about domains, and see the *3PAR InForm OS CLI Administrator's Manual* for instructions on setting up domains.

2.11 Use of Virtual Copy Snapshots

Remote Copy uses virtual copy snapshots (point-in-time virtual copies) of a virtual volume to minimize the amount of data that needs to be sent over the network to resynchronize volumes that were previously synchronized. There are several scenarios where snapshots are used.

2.11.1 In Synchronous Mode

In synchronous mode, a snapshot is created only under error or recovery situations or when a group is manually stopped. If the backup storage server fails, or all communication links to the backup server fail, the primary storage server stops the replication of all volume groups. It also takes snapshots of all volumes that were completely synchronized. If a volume was still undergoing the initial full synchronization when the failure happened, a snapshot is not taken of that volume. That volume fully synchronizes when Remote Copy is restarted.

When the backup storage server comes back up, Remote Copy must be manually restarted using the `startrcopygroup` command for all volume groups, unless the `auto_recover` policy is in use (see [Setting Remote Copy Volume Group Policies](#) on page 4.4). When restarted, Remote Copy first looks for a valid resynchronization snapshot for a volume. If the resynchronization snapshot exists, Remote Copy resynchronizes the secondary volume by sending only the differences between that snapshot and the current data in the primary base volume. But before this resynchronization is started, the system takes snapshots of all the secondary volumes that were previously synchronized. While the resynchronization is taking place, the state of the secondary volume becomes `syncing`. During that time, the secondary volume is not in a consistent state because the updates are written by location order rather than by time order. When the resynchronization completes, the snapshots on the primary and the backup servers are deleted.



NOTE: See [Remote Copy and Thin Provisioning](#) on page 2.33 for important information about space allocation and deleted snapshots.

If the primary server fails during the resynchronization, the secondary base volumes are left in an inconsistent state, but the snapshots of the secondary volumes are left behind. When the primary server comes back, the next resynchronization brings the secondary volumes back in synchronization with the primary volumes.

If the primary server fails during a resynchronization and the backup server needs to be used to access data, it is necessary to issue failover commands (such as those promoting the snapshots to the base volumes using the `promotesv` command) before reversing the targets.

If, during disaster recovery or as part of a planned role-reversal, the backup storage server is converted to a primary storage server, a snapshot is also taken on that server. This snapshot is used to resynchronize the former primary storage server (now converted to backup) after the former primary server and the links are brought back up and the Remote Copy operations are resumed. To see an example disaster recovery scenario that illustrates this process, see [Appendix C, Example Setup and Disaster Recovery](#).

2.11.2 In Asynchronous Periodic Mode

In asynchronous periodic mode, a snapshot is created as part of the normal storage system operation. Snapshots are used to locate the data written between two synchronizations. During the initial synchronization, a snapshot is taken of the primary volume and the data in that snapshot is sent over to initialize the secondary volume. Later, at the next scheduled resynchronization time or whenever the `syncrcopy` command is issued, new snapshots are taken of the secondary and primary volumes. The differences between the old primary snapshot and the new primary snapshot are sent over to resynchronize the secondary base volume.

Just as in synchronous mode, the secondary base volume is not consistent while the resynchronization is taking place. If the primary server fails during the resynchronization, the snapshot taken on the backup server is used to recover the consistent state prior to the beginning of the resync operation. Such recovery is accomplished by automatically promoting the snapshot to the base volume, an operation whose duration is proportional to the amount of data changed during the failed resynchronization. If some of the volumes in the group fail during the synchronization and others succeed, only the failed snapshots on the secondary server are automatically promoted. The successful synchronizations are not.

After the resynchronization operation completes successfully, the secondary snapshot and the old primary snapshot are removed. Now the base volume on the backup storage server matches the new snapshot on the primary storage server. The new primary snapshot then becomes available for use in the next resynchronization operation.

If, during disaster recovery or as part of a planned role-reversal, the backup storage server is converted to a primary storage server, a snapshot is also taken on the backup storage server. This snapshot is used to resynchronize the former primary storage server (now converted to the backup) after the former primary server and the links are brought back up and the Remote Copy operations are resumed. When a primary group changes to a secondary group, the most

recent snapshot is promoted. To see an example disaster recovery scenario that illustrates this process, see [Appendix C, Example Setup and Disaster Recovery](#).

2.12 Remote Copy and Thin Provisioning

Remote Copy makes extensive use of point-in-time snapshots. The main use of these snapshots is to keep track of the updates to the primary volume when the data is not being sent to the secondary volume over the communication links. The amount of snapshot space that is required depends on the kind of replication being used. For example, if a volume's snapshot space is insufficient and a Remote Copy snapshot becomes stale as a result, a full resynchronization might be needed to bring the primary and secondary volumes back in synchronization. For this reason, Remote Copy should only be used with virtual volumes that automatically draw space from a Common Provisioning Group (CPG); a user-created storage pool available to all volumes associated with it. For instructions on taking existing virtual volumes and associating them with a CPG so that they might be used with Remote Copy, see [Converting Standard Virtual Volumes](#) on page 4.8.

There are two types of virtual volumes, which draw spaces from CPGs that can be used with Remote Copy: Thinly Provisioned Virtual Volumes (TPVVs) and fully provisioned virtual volumes. For TPVVs, all data and snapshot space is allocated on demand from a CPG. For fully provisioned virtual volumes, only the snapshot space is allocated on demand from the CPG.

2.12.1 Snapshots and Common Provisioning Groups

A Common Provisioning Group (CPG) is a virtual pool of logical disks that allows multiple volumes to share the CPG's resources and allocate space on demand. However, CPGs still require careful planning and monitoring to prevent them from becoming so large that they set off the system's built-in safety mechanisms. These safety mechanisms are designed to prevent a CPG from consuming all free space on the system, but they only work properly on systems that are planned carefully and monitored closely.



CAUTION: Refer to the *3PAR InForm OS Concepts Guide* for a complete list of warnings and cautions regarding CPGs.



NOTE: While it is possible for a CPG to have up to 4095 volumes, it is strongly recommended that no more than 32 volumes be associated with a single CPG. The reasons for this limit are as follows:

- Virtual volumes in the same CPG can share the same logical disk. In the unlikely event that the logical disk is damaged (because of multiple simultaneous disk failures, for example), all the volumes associated with that logical disk will be unavailable.
- Virtual volume performance might suffer from too much interleaving within the logical disks.

For example, when Remote Copy requires that the system create a new snapshot of a volume, the volume's CPG might need to allocate additional space to that volume. That space is drawn from the system's common storage pool, at which point it is placed into the CPG's individual pool and then allocated to the volume. After the resynchronization takes place and the snapshot is no longer useful, Remote Copy deletes the snapshot from the system. At that time, the space formerly allocated for that snapshot is returned to the volume's free space. Contiguous free snapshot data space can be reclaimed and returned to the CPG using 3PAR Thin Copy Reclamation. Refer to the *InForm OS Concepts Guide* for information about 3PAR Thin Copy Reclamation.

2.12.2 Thinly Provisioned Virtual Volumes



NOTE: Thinly Provisioned Virtual Volumes (TPVVs) do not have snapshot space by default. In order to use TPVVs with Remote Copy, you must create TPVVs with snapshot space.

Thinly Provisioned Virtual Volumes (TPVVs) associated with the same CPG, draw space from that pool as necessary, by allocating space on demand in small increments. As the volumes that draw from the CPG require additional storage, the system automatically creates additional logical disks and adds them to the pool until the CPG reaches the user-defined allocation limit that restricts its maximum size.

Before creating a TPVV, you must first create a CPG as described in the *3PAR InForm OS CLI Administrator's Manual*. After the CPG is established, use the instructions in the *3PAR InForm OS CLI Administrator's Manual* to create volumes that draw from that pool.



NOTE: When a TPVV is configured as a primary Remote Copy volume, the initial synchronization of the primary volume sends only the allocated data pages to the backup storage server.



NOTE: When a TPVV is configured as a primary volume in a Remote Copy group, the secondary volume should have no data written to it prior to adding it the Remote Copy group, or it must match the primary volume in order for the primary and secondary volumes to match during initial synchronization.

2.12.3 Fully Provisioned Virtual Volumes

Fully provisioned virtual volumes can also draw resources from a CPG. However, whereas a TPVV draws all space from a CPG's logical disk pool, fully provisioned virtual volumes only draws snapshot data space from the pool.

Before creating a fully provisioned virtual volume, you must first create a CPG as described in the *3PAR InForm OS CLI Administrator's Manual*. After the CPG is established, use the instructions in the *3PAR InForm OS CLI Administrator's Manual* to create volumes that draw from that pool.

2.13 Error Handling

The following sections describe how Remote Copy handles various failures.



NOTE: For a complete disaster recovery scenario for both synchronous and asynchronous periodic mode Remote Copy, see [Appendix C, Example Setup and Disaster Recovery](#).

2.13.1 Single Link Failure

For redundancy, two communication links should be configured between InServ Storage Servers in each Remote Copy pair. When both links are active, both links carry data. Data for a specific I/O is sent over a single link, but data for a different I/O can be sent over different links, particularly when there are multiple volumes being replicated.

When a link between storage servers is broken, an alert is issued on each storage system as soon as the link failure is detected. If the other link remains active, all data is sent on that remaining link, though a reduction in throughput (bandwidth) might occur. No other noticeable errors should occur.

2.13.2 Double Link Failure

When both links between InServ Storage Servers in a Remote Copy pair are broken, the two storage systems cannot communicate. As a result, both storage systems declare each other down and both systems generate alerts to indicate the failure of the other system. Systems handle double link failures differently according to whether they are being used for synchronous or asynchronous periodic remote copies.



NOTE: See [Volume Group Modes](#) on page 2.22 for descriptions of synchronous and asynchronous periodic volume groups.

2.13.2.1 Synchronous Volume Groups

- If the `no_fail_wrt_on_err` policy is enabled for a synchronous volume group (this is the default), replication is stopped for the group and the system creates snapshots (virtual copies) of all the primary volumes that have completed the initial synchronization.

The `no_fail_wrt_on_err` (default) will not display in the `showrcopy` command output, but is displayed with `fail_wrt_on_err`.

When the links are restored, Remote Copy automatically brings the links back into service, but does not restart the replication for the volume groups with the `no_fail_wrt_on_err` policy. The `startcopygroup` command must be issued to restart the replication for such volume groups unless the `auto_recover` policy is set (see [Setting Remote Copy Volume Group Policies](#) on page 4.4).



NOTE: For synchronous groups, when the links are restored, you can copy any writes from the primary to the secondary groups by issuing the `startcopygroup` command on the system that holds the primary group to automatically resynchronize the primary and secondary groups.

- Snapshots are created for all primary volumes, but no snapshots are created for secondary volumes while replication is stopped.

In addition to taking snapshots, the offset and length of the I/O will fail to complete on the secondary volumes because the link failures were recorded in the nonvolatile memory. The failed I/O must be recorded separately because the snapshot is taken after that I/O has been written for the primary volumes but before it was acknowledged and completed on the secondary. When replication is restarted for the volume, the failed I/O is read from the primary volume and sent to the system that holds the secondary volume. In addition, all differences between the base volume and the snapshot taken when the replication was stopped are also sent over in order to resynchronize the secondary volume with the primary volume.

- If the `fail_wrt_on_err` policy is enabled for a synchronous volume group, failing host writes does not cause the mirror to become out of sync. A write error is returned to all host writes as long as the links are down. When the links come back up, the writes are completed normally. This policy can be enabled with the `setrcopygroup` command.

2.13.2.2 Asynchronous Periodic Groups

For asynchronous periodic groups, when a double-link failure occurs, replication is stopped on both storage servers. No new snapshots are created. If a resynchronization was in progress when the failure occurred, the snapshots on the secondary system are automatically promoted.



NOTE: For asynchronous periodic groups, when the links are restored, replication can be restarted by issuing the `startrcopygroup` command. The volumes are resynchronized at the next scheduled resynchronization time. To resynchronize prior to the next scheduled time, use the `syncrcopy` command to manually initiate immediate resynchronization.

2.13.3 Remote Copy Failure Timeouts

There are two primary timeouts used by Remote Copy regarding link failures:

- a *link heartbeat timeout*, which is used to declare an unresponsive link as down.
- a *target timeout*, which is used to declare a target system down after all links have gone down.

The value of these timeouts varies depending on the mode of the groups per target. If the Remote Copy configuration contains asynchronous periodic mode volume groups, then the link heartbeat timeout is 60 seconds and the target timeout is 200 seconds. If the Remote Copy configuration contains synchronous mode volume groups, the target timeout is 15 seconds and the heartbeat timeout is 10 seconds.

When synchronous replication is used, low timeout values are used in an attempt to ensure that replication is stopped before the host I/O begins to time out in case of a network failure. If the network used by Remote Copy has transient problems, the lower timeout values can result in repeated link failure alerts and the stopping of all Remote Copy volume groups. If asynchronous periodic volume groups are in use, then this increased sensitivity is unnecessary and the longer timeout values allow Remote Copy to continue in the presence of transient network problems.

2.13.4 Storage Server Failures

If one of the storage servers in a Remote Copy pair fails, it is detected by the other storage server as a concurrent failure of both communication links and is treated the same as a [Double Link Failure](#), as described on [page 2.36](#). When such a failure is detected, the storage server generates an alert.

2.13.4.1 Failure of a Target

When a target has failed and the data on the secondary volumes needs to be accessed, the role of the groups containing those volumes must be reversed.

2.13.4.2 Failure of a Secondary Target

The failure of a secondary target in a Remote Copy pair is indistinguishable from the failure of all communication links to the remote site. The treatment of this error condition is the same as the handling of a complete network failure or a double link failure, as described in [Double Link Failure](#) on page 2.36. After the secondary target comes back up, if any updates were made while the target was down, those updates are synchronized after replication is restarted by issuing the `startrcopygroup` command on the storage server.

2.13.5 Write Errors

When a write encounters an error on the primary volume, the error is returned to the host as an I/O failure. If a write completes successfully on the primary storage server but a write error occurs on the backup volume, it is handled based on the replication mode and the error handling policy for the volume group.



NOTE: See [Volume Group Modes](#) on page 2.22 for descriptions of synchronous and asynchronous periodic volume groups.

- If the `no_fail_wrt_on_err` policy is enabled for a synchronous volume group (this is the default), the host I/O completes without error. Replication is stopped for the volume group and a snapshot is taken of each volume in the volume group. In addition, the offset and length of the I/O that failed is recorded in nonvolatile memory. An alert is generated to indicate the I/O error on the secondary storage server and to report the stopping of the volume group.

The failed I/O needs to be recorded separately because the snapshot is taken after the I/O was written on the primary volume but before it could be completed on the backup volume. When replication is restarted for the volume, the failed I/O is read from the primary volume and sent to the backup. In addition, all differences between the base volume and the snapshot taken when the replication was stopped are also sent over to resynchronize the backup volume with the primary volume.

- If the `fail_wrt_on_err` policy is enabled for a synchronous volume group, then a write error is returned to the host when either the primary or the backup volume reports an I/O error, but the replication is not stopped. If the host retries the failed write and subsequent host writes continue to encounter errors while writing to the backup volume, errors continue to be returned to the host.
- `auto_recover` does not automatically recover from stopped groups as a result of write errors. It only automatically recovers from link failures.

2.13.6 Read Errors

During the initial synchronization of a backup volume with its primary volume, Remote Copy either reads the base volume (for synchronous volume groups) or creates a read-only snapshot of the base volume (for asynchronous periodic volume groups). If a read request fails for any reason, the synchronization process cancels and the secondary volume is marked `NotSynced`. An alert is issued, indicating that the synchronization has failed. However, this does not stop the replication. To get the volumes back in synchronization, manually issue the `syncrcopy` command for synchronous volume groups as well as asynchronous periodic groups.

When a synchronous volume group is stopped and started after it has been fully synced, a resynchronization is automatically started. This process compares a read-only snapshot taken when the group was stopped with the current base volume. Any changed pages are read from the base volume and sent over to the secondary. This type of read failure also results in the cancellation of the resynchronization process with the secondary volume marked `NotSynced`. The group is not stopped. To recover from this, you can manually issue the `syncrcopy` command.

As long as you have set the synchronization period using the `setrcopygroup` command, an asynchronous periodic volume group is automatically resynchronized at the scheduled synchronization interval. When you set the resynchronization period for the primary group, it is automatically mirrored to the secondary.



NOTE: There is no default synchronization period. Therefore, if you have not specified a synchronization period using the `setrcopygroup` command, automatic resynchronizations will not take place. The minimum interval for periodic resynchronization is five minutes.

During the resynchronization, two read-only snapshots of the primary volume are compared and any pages that are different are read from the newer snapshot. A failure of such a read results in the cancellation of the resynchronization process, with the backup volume marked `Stale`. At this point, the snapshots on the secondary volume are automatically promoted. The `Stale` state indicates that the secondary has a valid point-in-time copy of the primary, however the last attempt at synchronization failed. If there is no error during the next scheduled synchronization and it completes successfully, the volume state becomes `Synced`. If you need to synchronize the volumes immediately rather than waiting for the next scheduled synchronization time, you can manually issue the `syncrcopy` command.

Other synchronization states might be indicated as follows:

- ◆ New - Remote copy for the volume has not started.
- ◆ Syncing - The secondary volume is currently being synchronized with the primary.
- ◆ Synced - The primary and secondary volumes are currently in sync (for periodic mode volumes this indicates the last synchronization).
- ◆ NotSynced - The primary and secondary volumes are not in sync.
- ◆ Stopped - The primary and secondary volumes were in sync the last time the group was started, but now may not be due to the group being stopped.
- ◆ Stale - The secondary has a valid point-in-time copy of the primary, however the last attempt at synchronization failed.

2.14 Requirements and Restrictions

Remote Copy requires the use of a minimum of two InServ Storage Servers.

- For Remote Copy over IP (RCIP), each storage server in the Remote Copy configuration must have two nodes with 3PAR-supported GigE PCI adapters (a maximum of one adapter per node and two adapters per system). Two adapters are required for each storage server in order to support redundant TCP/IP links between systems. This limitation does not apply to 1-to-N Remote Copy. For 1-to-N Remote Copy, the primary storage server can have four RCIP interfaces; two to one secondary system and two to the other secondary system.
- For Remote Copy over Fibre Channel (RCFC), each storage server should have a pair of Host Bus Adapters (HBAs) installed. The HBA pair is required for load sharing and fault tolerance. These adapters must be reserved for exclusive use by Remote Copy. The HBAs in each storage server connect those systems through FC SAN using Fibre Channel cable connections (see [Figure 2-18](#)).

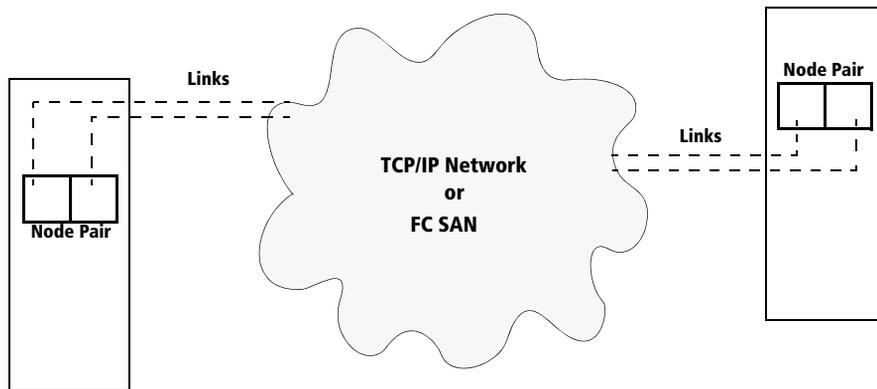


Figure 2-18. Remote Copy Links

- For RCIP configurations, the management interface cannot reside on the same network as the RCIP network.
- The maximum delay times are as follows:
 - ◆ RCIP - 150 seconds
 - ◆ RCFC - 1.5 milliseconds
 - ◆ RCFC over IP - 60 milliseconds

Systems used by Remote Copy must adhere to the following restrictions:

- All storage servers in the configuration must be configured at the same InForm OS level.
- Each storage server is limited to two Remote Copy interfaces.

This limitation does not apply to 1-to-N Remote Copy. For 1-to-N Remote Copy, the primary storage server can have four RCIP interfaces; two to one secondary system and two to the other secondary system.

- RCFC over IP networks is only allowed for Remote Copy in asynchronous periodic mode.

In addition, the following general restrictions apply to the use of Remote Copy:

- Self-mirroring configurations are not supported. In other words, a storage server cannot be used to replicate its own primary volumes.
- Multihop configurations are not supported. In other words, a primary volume group cannot be replicated to a backup system and then replicated again from the backup system to a third storage server.
- Under normal operating conditions, one system can only be the primary server for one other system.

This limitation applies mainly to N-to-1, 1-to-N, and bidirectional configurations. See [N-to-1 Restrictions](#) on page 2.43 and [1-to-N Restrictions](#) on page 2.44 for additional details. An exception to this rule is granted for situations where targets must be reversed during disaster recovery.

- All volumes used with Remote Copy must be Thinly Provisioned Virtual Volumes (TPVVs) with snapshot space or fully provisioned virtual volumes. In addition, the following restrictions apply:
 - ◆ The maximum number of mirrored volumes system-wide in synchronous mode is 800.
 - ◆ The maximum number of mirrored volumes system-wide in asynchronous periodic mode is 2400.
 - ◆ The maximum number of volumes per Remote Copy group in synchronous and asynchronous periodic mode is 100.
 - ◆ The maximum number of volumes per Remote Copy group in asynchronous periodic mode is 2400.
 - ◆ The maximum size of a mirrored volume is 16 TB.

2.14.1 N-to-1 Restrictions

In addition to those requirements and restrictions described in [Requirements and Restrictions](#) on page 2.41, the following also apply to N-to-1 Remote Copy configurations:

- In an N-to-1 configuration, one remote storage server participates in a maximum of four pairs, one for each primary storage server ([Figure 2-19](#)). One of these pairs might also be bidirectional.

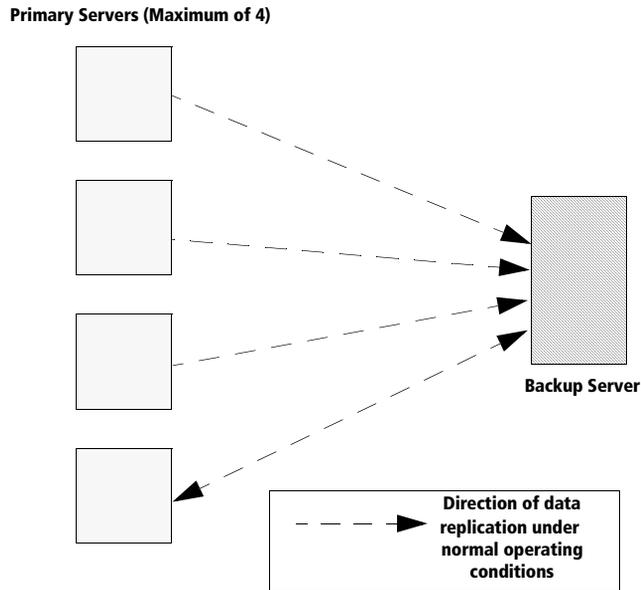


Figure 2-19. N-to-1 Maximum Supported Configuration

- N-to-1 Remote Copy can be used in both Remote Copy over IP (RCIP) and Remote Copy over Fibre Channel (RCFC) configurations.
- Any storage server acting as a backup for two or more storage servers (acting as primary systems) must have at least four controller nodes.
- The backup server in the N-to-1 configuration must use only S-Class (P4) or T-Class controller nodes. E-Class and two node F-Class controller nodes cannot be used.
- Only asynchronous periodic mode volume groups are supported.

2.14.2 1-to-N Restrictions

In addition to those requirements and restrictions described in [Requirements and Restrictions](#) on page 2.41, the following also apply 1-to-N Remote Copy configurations:

- In a 1-to-N configuration, one primary storage server participates in a maximum of two pairs, one for each backup storage server ([Figure 2-20](#)). One of these pairs might also be bidirectional.

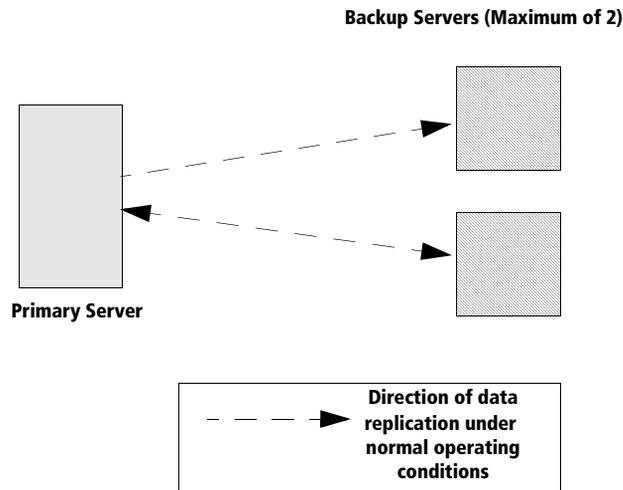


Figure 2-20. 1-to-N Maximum Supported Configuration

- 1-to-N Remote Copy can be used in either Remote Copy over IP (RCIP) and Remote Copy over Fibre Channel (RCFC) configurations.
- For RCFC configurations, any storage server acting as a primary must have at least four controller nodes. For RCIP configurations, the primary and backup servers must have a minimum of two controller nodes each.
- Primary systems with only two controller nodes must be InServ S, T, or F-Class Storage Servers.
- InServ E-Class Storage Servers can only serve as backup servers.

2.14.3 Synchronous Long Distance Restrictions

For Synchronous Long Distance Remote Copy configurations, a maximum of two storage servers can be used as backup servers for one primary storage server. Additionally, the following restrictions apply to Synchronous Long Distance Remote Copy configurations:

- All storage servers must have at least four controller nodes each.
- Only unidirectional functionality allowed between Remote Copy pairs.
- Only one synchronous and one asynchronous periodic target is allowed.
- Only two targets are allowed.

3

Remote Copy Setup

In this chapter

3.1 Available Setup Methods	3.2
3.2 Preparing for Setup	3.2
3.3 Gathering Necessary Information	3.3
3.4 Setting the Remote Copy Transport Layer	3.8
3.4.1 Setting Up Remote Copy Over IP	3.8
3.4.2 Setting Up the Remote Copy Interface for RCIP	3.9
3.4.2.1 Setting the Gateway	3.9
3.4.2.2 Verifying Connectivity	3.10
3.4.2.3 Increasing MTU (Optional)	3.11
3.4.3 Setting Up Remote Copy Over Fibre Channel	3.13
3.4.4 Setting Up RCFC Over an IP Network	3.15
3.5 Setting Up Remote Copy	3.16
3.5.1 Setting Up Unidirectional Remote Copy	3.17
3.5.2 Setting Up Bidirectional Remote Copy	3.25
3.6 Synchronous Long Distance Remote Copy Setup	3.28

3.1 Available Setup Methods

This chapter explains how to set up and configure 3PAR Remote Copy. Use these instructions if you are setting up Remote Copy for the first time. However, depending on your level of experience, there are three methods you can choose to set up a Remote Copy configuration:

- If this is your first experience with setting up Remote Copy, particularly for N-to-1 or 1-to-N configurations, or when N-to-1 or 1-to-N and bidirectional Remote Copy configurations are planned, you might consider using the [Preparing for Setup](#) and [Gathering Necessary Information](#) sections that follow.
- Users familiar with 3PAR's Remote Copy setup can use the *3PAR Remote Copy Setup Tool for RCIP (320-1461)* or the *3PAR Remote Copy Setup Tool for RCFC (320-1472)* for a 1-to-1 configuration to help configure, test and visualize the setup for Remote Copy over IP (RCIP) and Remote Copy over Fibre Channel (RCFC), respectively. See the Document Control System (DCS) to obtain these documents and follow the directions found in the document that best suits your configuration.
- Expert users might prefer to use [Appendix A, Quick Setup Guide](#).

The final section of this chapter demonstrates how to perform an initial synchronization when using tape rather than synchronizing a secondary volume with the primary volume over the Remote Copy links.

3.2 Preparing for Setup

Before proceeding with Remote Copy setup, review [Requirements and Restrictions](#) on page 2.41. The following guidelines and restrictions also apply to Remote Copy setup:

- Synchronous mode replication is recommended for distances no greater than a Metropolitan Area Network (MAN). A MAN is a region larger than that covered by a Local Area Network (LAN) but smaller than that covered by a Wide Area Network (WAN).
- The physical connections between all storage servers used with Remote Copy must be through an IP-capable network, point to point, or an FC SAN network.

- When configuring the Gigabit Ethernet (GigE) interface, the GigE interface and the management Ethernet port of an InServ Storage Server controller node should be on different IP subnets. If they are configured on the same subnet, Remote Copy packets might go over the management port and will not be available to the Remote Copy software.
- All virtual volumes used with Remote Copy must be Thinly Provisioned Virtual Volumes (TPVVs) with snapshot space, which require the use of 3PAR Thin Provisioning, or fully provisioned virtual volumes. Both of these volume types draw space from a Common Provisioning Group (CPG). See [Remote Copy and Thin Provisioning](#) on page 2.33 and the *3PAR InForm OS Concepts Guide* for details about TPVVs, fully provisioned virtual volumes, and CPGs.
- You must create the volumes on each storage system in the Remote Copy configuration separately by using the normal volume creation commands before creating volume groups for use with Remote Copy. The volumes on the primary server must be the same size as those on the backup server. See the *3PAR InForm OS CLI Administrator's Manual* for instructions on creating volumes.

3.3 Gathering Necessary Information

Determine the setup that best meets your desired configuration (N-to-1, 1-to-N, bidirectional, unidirectional, and so on) and use [Figure 3-1](#) through [Figure 3-4](#) to help gather the necessary information to continue your Remote Copy setup as described in the sections that follow.

For 1-to-N and N-to-1 configurations, or when N-to-1 and bidirectional Remote Copy are used within the same configuration, you can use [Figure 3-3](#) or [Figure 3-4](#) (depending on Remote Copy transport layer) to supply information for additional systems. You might want to make a copy of [Figure 3-3](#) or [Figure 3-4](#) (depending on the Remote Copy transport layer) in order to fill in information for all links.

In preparation for setting up Remote Copy, obtain the IP addresses or 64-bit World Wide Name (WWN) address information for the interfaces of the storage servers from your network administrator and be prepared to provide 3PAR technicians with other details about the network connections, as necessary. Contact your network administrator to obtain the gateway IP addresses, netmask, and IP addresses for each link. In addition, you must verify that the firewall settings allow access to port 5785 between the Remote Copy systems.

After the Remote Copy configuration is complete, you can use the InForm CLI `showport -rcip` command or the `showport -rcfc` command to confirm the addresses you specified during the setup.

Use the following figures to help visualize and organize your desired Remote Copy configuration:

Basic Remote Copy Pair Information:

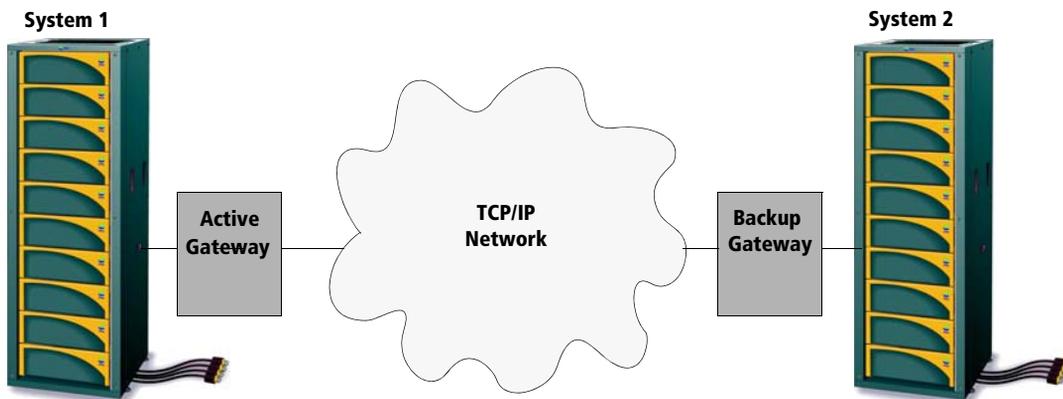


Figure 3-1. Network and Remote Copy Over IP Setup Information (Initial Pair)

1. Remote Copy Pair Transport Layer:

System 1:					Speed of Gigabit Interface: <input type="text"/>
	IP Address	Gateway IP	Netmask	N:S:P	MTU
Left HBA:	<input type="text"/>				
Right HBA:	<input type="text"/>				
System 2:					Speed of Gigabit Interface: <input type="text"/>
	IP Address	Gateway IP	Netmask	N:S:P	MTU
Left HBA:	<input type="text"/>				
Right HBA:	<input type="text"/>				

2. Remote Copy Pair Link Configuration:

Use the information gathered from the previous boxes to populate the following boxes.

System 1:	Node*	Target Interface IP
Target Name: <input type="text"/>	<input type="text"/>	<input type="text"/>
(e.g. System 2)		(e.g. System 2 Left HBA IP)
System 2:	Node*	Target Interface IP
Target Name: <input type="text"/>	<input type="text"/>	<input type="text"/>
(e.g. System 1)		(e.g. System 1 Left HBA IP)
	<input type="text"/>	<input type="text"/>
		(e.g. System 1 Right HBA IP)

***The Node from which the Link Originates.**

Figure 3-2. Network and Remote Copy Over IP Setup Information (Initial Pair)

1. Remote Copy Transport Information for Additional Systems:

				Speed of Gigabit Interface	<input type="text"/>
System 3:	IP Address	Gateway IP	Netmask	N:S:P	MTU
Left HBA:	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Right HBA:	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
				Speed of Gigabit Interface	<input type="text"/>
System 4:	IP Address	Gateway IP	Netmask	N:S:P	MTU
Left HBA:	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Right HBA:	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
				Speed of Gigabit Interface	<input type="text"/>
System 5:	IP Address	Gateway IP	Netmask	N:S:P	MTU
Left HBA:	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Right HBA:	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

2. Additional Link Configuration:

Use the information gathered from the previous boxes to populate the following boxes.

System: ____ (e.g. System 1)
 Target Name:
 (e.g. System 3)

System: ____ (e.g. System 3)
 Target Name:
 (e.g. System 1)

System: ____ (e.g. System 1)
 Target Name:
 (e.g. System 4)

System: ____ (e.g. System 4)
 Target Name:
 (e.g. System 1)

(and so on for System 5)

*The Node from which the Link Originates.

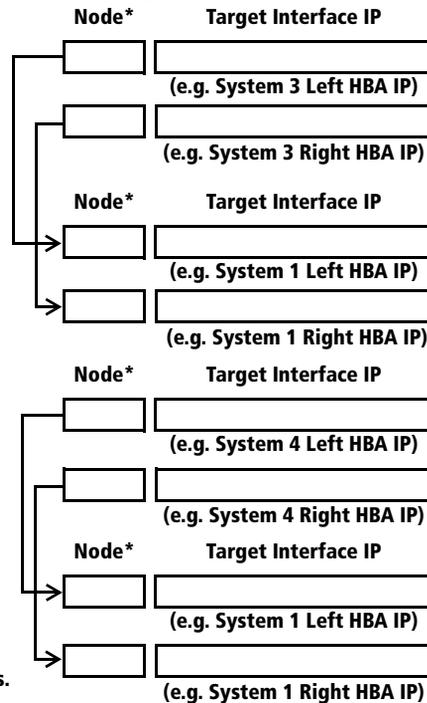
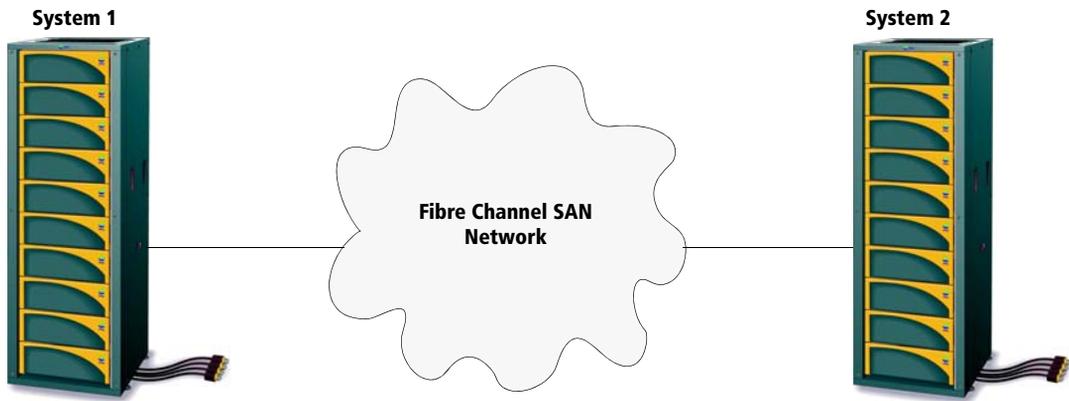


Figure 3-3. Network and Remote Copy Over IP Setup Information (Additional Systems)

Basic Remote Copy Pair Information:



1. Remote Copy Pair Transport Layer:

	System 1:			System 2:	
	WWN	N:S:P		WWN	N:S:P
Left HBA	<input type="text"/>	<input type="text"/>	Left HBA	<input type="text"/>	<input type="text"/>
Right HBA	<input type="text"/>	<input type="text"/>	Right HBA	<input type="text"/>	<input type="text"/>

2. Remote Copy Pair Link Configuration:

Use the information gathered from the previous boxes to populate the following boxes.

<p>System 1:</p> <p>Target Name: <input type="text"/> e.g. System 2</p> <p>System 2:</p> <p>Target Name: <input type="text"/> e.g. System 1</p>	<table border="0"> <tr> <td style="text-align: center;">N:S:P</td> <td style="text-align: center;">Target Interface WWN</td> </tr> <tr> <td><input type="text"/></td> <td><input type="text"/> e.g. System 2 Left HBA WWN</td> </tr> <tr> <td style="text-align: center;">N:S:P</td> <td style="text-align: center;">Target Interface WWN</td> </tr> <tr> <td><input type="text"/></td> <td><input type="text"/> e.g. System 2 Right HBA WWN</td> </tr> <tr> <td style="text-align: center;">N:S:P</td> <td style="text-align: center;">Target Interface WWN</td> </tr> <tr> <td><input type="text"/></td> <td><input type="text"/> e.g. System 1 Left HBA WWN</td> </tr> <tr> <td style="text-align: center;">N:S:P</td> <td style="text-align: center;">Target Interface WWN</td> </tr> <tr> <td><input type="text"/></td> <td><input type="text"/> e.g. System 1 Right HBA WWN</td> </tr> </table>	N:S:P	Target Interface WWN	<input type="text"/>	<input type="text"/> e.g. System 2 Left HBA WWN	N:S:P	Target Interface WWN	<input type="text"/>	<input type="text"/> e.g. System 2 Right HBA WWN	N:S:P	Target Interface WWN	<input type="text"/>	<input type="text"/> e.g. System 1 Left HBA WWN	N:S:P	Target Interface WWN	<input type="text"/>	<input type="text"/> e.g. System 1 Right HBA WWN
N:S:P	Target Interface WWN																
<input type="text"/>	<input type="text"/> e.g. System 2 Left HBA WWN																
N:S:P	Target Interface WWN																
<input type="text"/>	<input type="text"/> e.g. System 2 Right HBA WWN																
N:S:P	Target Interface WWN																
<input type="text"/>	<input type="text"/> e.g. System 1 Left HBA WWN																
N:S:P	Target Interface WWN																
<input type="text"/>	<input type="text"/> e.g. System 1 Right HBA WWN																

Figure 3-4. Network and Remote Copy Over Fibre Channel Setup Information

3.4 Setting the Remote Copy Transport Layer

Prior to setting up Remote Copy, you must set up the Remote Copy transport layer as described in this section. The method for setting the RC transport layer differs depending on whether the configuration uses Remote Copy over IP (RCIP) or Remote Copy over Fibre Channel (RCFC). However, note that this is the only part of the Remote Copy setup that differs between RCIP or RCFC.

3.4.1 Setting Up Remote Copy Over IP

For RCIP configurations, each link between a Remote Copy pair is a physical link between a controller node on one storage server and a controller node on the other storage server in the pair. These physical links use a GigE port from each of the two nodes in the storage servers that belong to the Remote Copy pair. Typically, these ports are configured during the initial setup of the storage system.

If setup did not occur, or the configuration has changed, you will need to reconfigure the ports before you can begin setting up Remote Copy. Ports are configured using the `controlport rcip` command. See [Appendix B, Remote Copy Commands](#) for more information on this command. See the *InForm OS Command Line Interface Reference* for complete information on using this command.



CAUTION: When configuring the GigE interfaces, the GigE interface and the management Ethernet port of an InServ Storage Server controller node should be on different IP subnets. If they are configured on the same subnet, Remote Copy packets might go over the management port and would not be available to the Remote Copy software.

3.4.2 Setting Up the Remote Copy Interface for RCIP

For RCIP, you must set up the Remote Copy GigE interfaces for each storage server in the Remote Copy configuration.

Set the Remote Copy interface for all systems based on the information gathered from [Figure 3-1](#) as follows:

- 1 To set up the Remote Copy interfaces, use the following command for the Ethernet ports on each storage server:

```
# controlport rcip addr <port_IP> <netmask> <N:S:P>
Are you sure you want to change the address for <N:S:P>?
select q=quit y=yes n=no: y
Remote copy interface change successful.
```

In order to issue this command on a storage server, you will need an IP address assigned to the Ethernet port (<port_IP>), the netmask to be assigned (<netmask>), and the location of an primary server Ethernet port, expressed as node:slot:port (<N:S:P>).



NOTE: Remember to set the interfaces for both ports on each storage server to be used in the Remote Copy configuration.

- 2 Issue the `showport -rcip` command again on each system to verify that the IP addresses and netmask are set correctly.

```
# showport -rcip
N:S:P State ---HwAddr--- IPAddr Netmask Gateway MTU
Rate Duplex AutoNeg
0:3:1 ready 000423CBF68C 10.100.24.107 255.255.255.0 -- 1500
1Gbps Full Yes
1:3:1 ready 000423CBF693 10.101.24.107 255.255.255.0 -- 1500
1Gbps Full Yes
```

3.4.2.1 Setting the Gateway

If all of the storage servers to be used in the Remote Copy configuration are on the same subnet, skip to [Verifying Connectivity](#) on page 3.10.

If the storage servers are not on the same subnet (the most common situation), you need to set the gateways for each system as described in the steps that follow.

- 1 Use the following command to set the system gateways for the Ethernet ports on storage server:

```
# controlport rcip gw <gateway_IP> <N:S:P>
Are you sure you want to change the gateway for <N:S:P>?
select q=quit y=yes n=no: y
Remote Copy interface change successful.
```

In order to issue this command on a storage server, you will need the gateway IP address to assign to the local Ethernet port (<gateway_IP>) and the location of a local Ethernet port (<N:S:P>).



NOTE: Remember to set the interfaces for both ports on each storage server to be used in the Remote Copy configuration.

- 2 For each storage server in the Remote Copy configuration, verify that the gateways have been set correctly by checking the Gateway column in the `showport -rcip` command output:

```
# showport -rcip
N:S:P State ---HwAddr--- IPAddr Netmask Gateway MTU
Rate Duplex AutoNeg
0:3:1 ready 000423CBF68C 10.100.24.107 255.255.255.0 10.100.24.1 1500
1Gbps Full Yes
1:3:1 ready 000423CBF693 10.101.24.107 255.255.255.0 10.101.24.1 1500
1Gbps Full Yes
```

3.4.2.2 Verifying Connectivity

After you have set the Remote Copy interfaces between the two storage servers by configuring the GigE ports, verify connectivity from any storage server as follows:

```
# controlport rcip ping 10.101.24.108 0:3:1
PING 10.101.24.108 (10.101.24.108) from 10.100.24.107 : 56(84) bytes of
data.
64 bytes from 10.101.24.108: icmp_seq=1 ttl=253 time=0.325 ms

--- 10.101.24.108 ping statistics ---
1 packets transmitted, 1 received, 0% packet loss, time 0ms
rtt min/avg/max/mdev = 0.325/0.325/0.325/0.000 ms
```

This command performs a ping from the specified interface (<N:S:P>) to the specified IP address on the target system (<IP_address>). Issue this command twice (once for each interface), for each system in the configuration.



NOTE: Because of the spanning tree and MAC address learning, you might need to ping each server several times before all tables are updated and the ping succeeds.

If the `controlport rcip ping` command does not work:

- ◆ Verify that the GigE cards are all in the `ready` state using the `showport -rc` command.
- ◆ Verify all IP addresses, netmasks, gateways, and physical connections.
- ◆ Use `controlport rcip ping` to test connectivity between both IP interfaces on both systems.
- ◆ Verify the MTU settings are correct. See [Increasing MTU \(Optional\)](#) on page 3.11 for more information.
- ◆ Verify the `controlport rcip speed` settings. See [controlport](#) on page B.9 for details.

If the pings do not succeed, seek help from a Network Administrator.



CAUTION: Do not proceed with the rest of the Remote Copy setup until pings succeed between the GigE ports in the two storage servers.

3.4.2.3 Increasing MTU (Optional)

Depending on the network setup, you might be able to increase the maximum transmission unit (MTU) size of the GigE interfaces to increase throughput between storage servers. The throughput and CPU utilization of GigE adapters can be improved if the adapters are configured to use jumbo frames (9000-bytes frames) rather than the default 1500-byte frames. When supported by the network, use an MTU value of 9000. However, note that this setting requires that the IP network support jumbo frames end-to-end (along the entire path between the two storage servers).



NOTE: Depending on workload, you might see as much as a 50 percent increase in throughput by using a 9000 byte MTU setting as opposed to a 1500 byte MTU setting.

If the MTU value of 9000 is supported by the network, increase the MTU as follows:

- 1 For the GigE ports on each storage server, increase the MTU size to 9000 as follows:

```
# controlport rcip mtu 9000 <N:S:P>  
Remote Copy change successful.
```

where <N:S:P> represents the location of a GigE port, expressed as node:slot:port.



NOTE: Remember to change the MTU setting for both ports in each storage server to be used in the Remote Copy configuration.

- 2 After setting the MTU to 9000 bytes for all GigE ports, verify that the network supports the increased MTU size from any storage server as follows:

```
# controlport rcip ping -s 8972 -pf <IP_address> <N:S:P>
```

This command performs a ping from the specified interface (<N:S:P>) to the specified IP address on the target system (<IP_address>) while specifying a packet size of 8972 and preventing fragmentation of packets. Issue this command twice (once for each interface), for each system in the configuration.



NOTE: Because of the spanning tree and MAC address learning, you might need to ping each server several times before all tables are updated and the ping succeeds.

- ◆ If the pings succeed, the network supports the new setting. Proceed to [Setting Up Remote Copy](#) on page 3.16.

- ◆ If the pings fail, issue another set of pings without specifying a size. If this second attempt succeeds, the new setting is not supported and you should revert to 1500 MTU before continuing on to [Setting Up Remote Copy](#) on page 3.16.

3.4.3 Setting Up Remote Copy Over Fibre Channel

For Remote Copy over Fibre Channel (RCFC) configurations, each link between a Remote Copy pair is a physical link between a controller node on one storage server and a controller node on the other storage server in the pair. These physical links use up to a 4 Gbps Fibre Channel adaptor port from each of the two nodes in the storage servers that belong to the Remote Copy pair. Typically, these ports are configured during the initial setup of the storage system.

If the setup did not occur, or the configuration has changed, you will need to reconfigure the ports before you can begin setting up Remote Copy. Ports are configured using the `controlport rcfc` command. See [Appendix B, Remote Copy Commands](#) for more information on this command. See the *InForm OS Command Line Interface Reference* for complete information on using this command.



CAUTION: Each pair of Remote Copy over Fiber Channel links must exist in an exclusive zone. Fabric zones cannot be shared.

RCFC requires a dedicated node pair per target. Each fibre channel interface on each node in the primary InServ Storage Server must connect to a dedicated fibre channel interface on each node in the backup InServ Storage Server. For example, in [Figure 3-5](#):

- Fibre channel interfaces on nodes 0 and 1 on the **Primary InServ** connect to fibre channel interfaces on **Backup InServ1** nodes 0 and 1, respectively.
- Fibre channel interfaces on nodes 2 and 3 on the **Primary InServ** connect to fibre channel interfaces on **Backup InServ2** nodes 0 and 1, respectively.

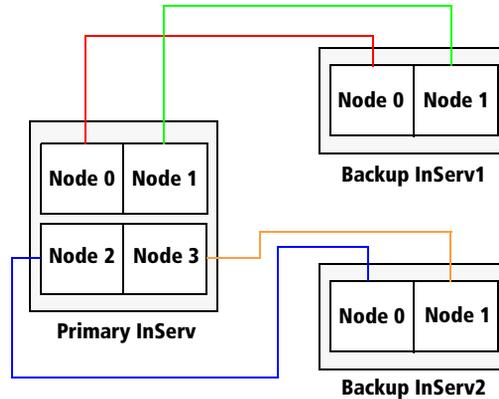


Figure 3-5. Remote Copy over Fibre Channel Dedicated Node Pairs

3.4.3.1 Setting Up the Remote Copy Interface for RCFC

For Remote Copy over Fibre Channel (RCFC), you must set up the Remote Copy interface for each storage server in the Remote Copy configuration.

Set the Remote Copy interface for all systems based on the information gathered from [Figure 3-4](#) as follows:

- 1 Set the connection type for each Fibre Channel adaptor port on the primary and backup storage servers as shown in the following example:

```
# controlport config rcfc -ct point -f <N:S:P>
```

The Fibre Channel adaptor port, as specified by <N:S:P> (Node:Slot:Port), is configured as an RCFC connection (`config rcfc`) in point-to-point mode (`-ct point`). See the *InForm OS Command Line Interface Reference* for details about the `controlport config` command.

- 2 Issue the `showport -rcfc` command to obtain the RCFC port positions.

```
# showport -rcfc
```

Repeat steps 1 and 2 for each storage server to obtain all four RCFC port positions to be used in the Remote Copy configuration. Record this information in [Figure 3-4](#) on [page 3.7](#).

- 3 Verify the Fibre Channel transports are present on the Fibre Channel adaptor ports on each system and the State column displays `ready` by issuing the `showrcctransport -rcfc` command.

```
# showrcctransport -rcfc
N:S:P      Peer_Node_WWN      Peer_Port_WWN State
3:2:1 2FF70002AC00005F 23410002AC00005F new
1:4:1 2FF70002AC00005F 21510002AC00005F new
```

- 4 Initialize the Fibre Channel adaptor ports on each storage server as shown in the following example:

```
# controlport rcfc init -f <N:S:P>
```

- 5 Issue the `showrcctransport -rcfc` command on each system again to verify that the Fibre Channel adaptor ports are ready to begin setting up Remote Copy.

```
# showrcctransport -rcfc
```

- 6 If any port displays that the RCFC State is `incomplete` or `new`, repeat steps 3 and 4 until the State column displays `ready` as shown in the following example.

```
# showrcctransport -rcfc
N:S:P      Peer_Node_WWN      Peer_Port_WWN State
3:2:1 2FF70002AC00005F 23410002AC00005F ready
1:4:1 2FF70002AC00005F 21510002AC00005F ready
```

3.4.4 Setting Up RCFC Over an IP Network



NOTE: RCFC over IP networks is only allowed for Remote Copy in asynchronous periodic mode. See [Asynchronous Periodic Mode](#) on page 2.24.

To set up RCFC connections communicating over an IP network:

- 1 Set up Fibre Channel over IP on your network switches. Refer to your switch manufacturer's documentation for instructions.
- 2 Set up the InServ Storage Servers as described in [Setting Up Remote Copy Over Fibre Channel](#) on page 3.13.

3.5 Setting Up Remote Copy

The following sections describe the steps involved in configuring the Remote Copy connections between storage servers in a Remote Copy configuration and then starting the Remote Copy function. This setup process differs according to the type of Remote Copy configuration to be used. However, the instructions for setting up a basic unidirectional Remote Copy pair, located in [Setting Up Unidirectional Remote Copy](#) on page 3.17, are the basis for more advanced configurations that employ bidirectional Remote Copy or multiple Remote Copy pairs (also known as N-to-1 and 1-to-N configurations).

Unidirectional and bidirectional:

Setting up targets and links for unidirectional and bidirectional Remote Copy configurations are identical. These configurations differ in their volume configuration setup.

- For a unidirectional Remote Copy configuration follow the instructions in [Setting Up Unidirectional Remote Copy](#) on page 3.17 to set up Remote Copy between an primary and backup storage server.
- For a bidirectional Remote Copy configuration, follow the instructions in [Setting Up Bidirectional Remote Copy](#) on page 3.25.

N-to-1:

For configurations that use multiple Remote Copy pairs (up to four primary storage servers sharing a single backup server):

- Follow the instructions in [Setting Up Unidirectional Remote Copy](#) on page 3.17, or the instructions in [Setting Up Bidirectional Remote Copy](#) on page 3.25 to set up the first pair in the configuration.
- Repeat the instructions in [Setting Up Unidirectional Remote Copy](#) on page 3.17 for each additional pair.
- You can have a maximum of four pairs. Note that all pairs must share the same backup storage server.

1-to-N:

For configurations that use multiple Remote Copy pairs (a single primary storage server with up to two backup storage servers):

- Follow the instructions in [Setting Up Unidirectional Remote Copy](#) on page 3.17, or the instructions in [Setting Up Bidirectional Remote Copy](#) on page 3.25 to set up the first pair in the configuration.
- Repeat the instructions in [Setting Up Unidirectional Remote Copy](#) on page 3.17 for the second pair.
- You can have a maximum of two pairs. Note that all pairs must share the same primary storage server. The primary server must have a minimum of four controller nodes.

3.5.1 Setting Up Unidirectional Remote Copy

Use the instructions in this section to set up a Remote Copy pair.

In this section, as illustrated by [Figure 3-6 on page 3.18](#)

- The primary system is an eight-node cluster called **InServ1** and the backup system is a four-node cluster called **InServ2**.
- **InServ1** is the primary storage system
 - ◆ System ID: 112
 - ◆ Remote copy nodes: **6** and **7**
 - ◆ Target name: **InServ2**
 - ◆ Links:
 - IP address **172.16.1.12**
 - IP address **172.16.2.12**
- **InServ2** is the backup storage system
 - ◆ System ID: 125.
 - ◆ Remote copy nodes: **2** and **3**
 - ◆ Target name: **InServ1**
 - ◆ Links:
 - IP address **172.16.1.11**
 - IP address **172.16.2.11**
- A virtual volume on **InServ1** called **vv1** is the only member of **Group1**.

- A virtual volume on **InServ2** is called **vv1_remote** and is the only member of **Group1.r112**, the secondary group that is automatically created at the same time as **Group1**.

Note that **vv1** and **vv1_remote** must be the same size.

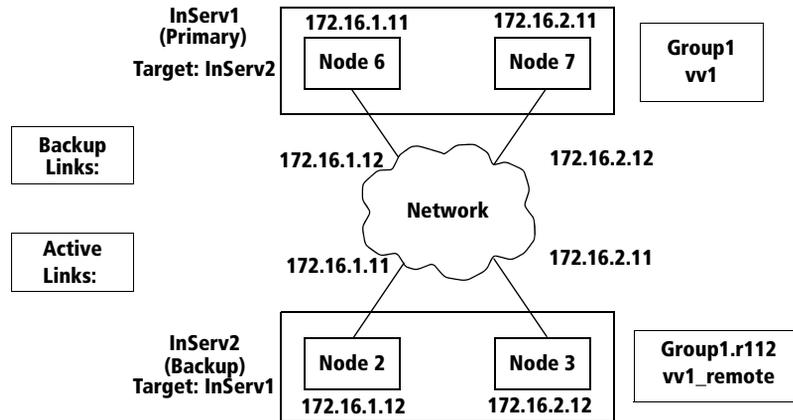


Figure 3-6. Configuring Unidirectional Remote Copy Connections

3.5.1.1 Setting Up the Primary Server

To set up the primary storage server (**InServ1**)

- 1 Start Remote Copy as follows:

```
On InServ1:
# startrcopy
```

- 2 Define a target on **InServ1**:

```
On InServ1:
# creatercopytarget <target_name> IP <n:s:p>:<link_IP_addr>
<N:S:P>:<link_IP_addr>
```

- ◆ <target_name> is the target name (for example, **InServ2**)
- ◆ IP states that this is an IP link.
- ◆ <n:s:p> specifies the node on **InServ1** that contains the IP connections to the target.

- ◆ `<link_IP_addr>` is the link IP address for the target system (for example, **172.16.1.12** and **172.16.2.12**).



NOTE: The command for RCFC target creation is:

```
#creatercopytarget <target_name> FC <node_WWN> <n:s:p:WWN>
<n:s:p:WWN>
```



NOTE: You can only configure one link per target definition per node. All examples in this guide use the first pattern illustrated in [Figure 2-9 on page 2.17](#), where links are created between the lowest numbered node in each member of the Remote Copy pair and the highest numbered node in each member of the Remote Copy pair.

3.5.1.2 Setting Up the Backup Server

The commands used to set up the backup storage server (**InServ2**) are the same as those used to set up the primary server (**InServ1**), except that they create the links in the opposite direction.

To set up the backup storage server (**InServ2**)

- 1 Start Remote Copy as follows:

```
On InServ2:
# startrcopy
```

- 2 Define a target for **InServ2**:

```
On InServ2:
# creatercopytarget <target_name> IP <n:s:p>:<link_IP_addr>
<node>:<link_IP_addr>
```

- ◆ `<target_name>` is the target name (in this example, **InServ1**)
- ◆ `IP` states that this is an IP link.
- ◆ `<n:s:p>` specifies the node that contains the IP connections to the target.

- ◆ <link_IP_addr> is the link IP address for the target system (for example, **172.16.1.11 and 172.16.2.11**).
- 3 Check that the links have come up between the primary and backup storage servers by using the `showrcopy` command on each storage server:



NOTE: For complete details on the `showrcopy` command, including valid synchronization, link, and group states, see [showrcopy](#) on page B.57.

```
On InServ2:
# showrcopy

Remote Copy System Information
Status: Started, Normal

Target Information

Name ID Type Status Options Policy
108 32 IP ready mirror_config

Link Information

Target Node Address Status Options
108 0 10.100.24.108 Up
108 1 10.101.24.108 Up
receive 0 10.100.24.108 Up
receive 1 10.101.24.108 Up

Group Information

Name Target Status Role Mode Options
group1 108 Started Primary Sync
auto_recover, fail_wrt_on_err
LocalVV ID RemoteVV ID SyncStatus LastSyncTime
vv0.0 1974 vv0.0 498 Synced NA
vv0.1 1975 vv0.1 499 Synced NA
vv0.2 1976 vv0.2 500 Synced NA
vv0.3 1977 vv0.3 501 Synced NA
vv0.4 1978 vv0.4 502 Synced NA
```

It might take several minutes for the links to come up between the two storage servers. When the **Target Information** shows a **Status** of **ready**, and the **Link Information**

returns a **Status** of **Up**, the links have come up. Be sure to check that links are up on both systems (the previous example shows output for **InServ2** only).



NOTE: If there are any problems with the way that the links were created, use the `dismissrcopylink <target_name> <node>:<IP_address>` command to remove links and then try again.

After all links come up between the Remote Copy pair, you can proceed with creating volume groups on the systems.

3.5.1.3 Creating Remote Copy Volume Groups

Before creating volume groups, you must create volumes on each storage server separately through the normal volume creation commands. The volumes must be the same size, though they can have different RAID levels and availability levels (e.g., **Cage** versus **Magazine**). In addition, they must be TPVVs or fully provisioned virtual volumes. See the *3PAR InForm OS CLI Administrator's Manual* for instructions on creating volumes.



NOTE: When a TPVV is configured as a primary volume in a Remote Copy group, the secondary volume should have no data written to it prior to adding it the Remote Copy group, or it must match the primary volume in order for the primary and secondary volumes to match during initial synchronization.

Follow these steps to create the Remote Copy volume groups on the primary and backup storage servers.

- 1 Set up a volume group on the primary storage server as follows:

```
On InServ1:
# creatercopygroup <group_name> <target_name>:<mode>
```

In order to use this command, you must specify a `<group_name>` (for example, **Group1**), the `<target_name>` (for example, **InServ2**) and a mode (`sync` for synchronous or `periodic` for asynchronous periodic).



NOTE: For N-to-1 configurations, only asynchronous periodic mode volume groups are supported.

The `creatercopygroup` command creates a volume group on the primary storage server (**InServ1**). At the same time, it also creates a corresponding secondary group (**Group1.r112**) on the target system (**InServ2**). The corresponding secondary group uses the naming convention `<primary_group_name>.r<sys_ID>`.



NOTE: When issuing commands that are mirrored from one system to another, there is a five minute timeout limit. After five minutes, if the other system does not respond to a command, the following error message appears:

```
target system <sys_name> could not be contacted
```



NOTE: You can create groups and add volumes to groups without disrupting host access to volumes. In addition, stopping a Remote Copy volume group does not prevent a host from accessing the volumes in that group.

- 2 (Optional). If you chose `periodic` mode in [step 1](#), you might want to set up automatic synchronization by specifying a resynchronization period as follows. Do not set a resynchronization period if you plan to perform the initial synchronization using a tape backup, as described on [page 3.38](#).

On **InServ1**:

```
# setrcopygroup period <value> <target_name> <group_name>
```

- ◆ `<value>` is the resynchronization period, followed by **s** to denote seconds, **m** to denote minutes, **h** to denote hours, or **d** to denote days.
- ◆ `<target_name>` is the target name (**InServ2**).
- ◆ `<group_name>` is the name of the primary volume group (**Group1**).

- 3 On the primary storage server, add pre-existing virtual volumes to the newly created volume group, **Group1**, as follows:

On **InServ1**:

```
# admitrcopyvv <VV_name> <group_name> <target_name:sec_VV_name>
```

<VV_name> is the name of the virtual volume (**vv1**) to be added to the primary volume group (**Group1**) specified by the <group_name> variable. You also need to specify the <target_name> (for example, **InServ2**) and the name of the corresponding volume on the target system (for this example, **vv1_remote**).

The `admitrcopyvv` command adds the specified volume (**vv1**) to the primary volume group (**Group1**). At the same time, it adds the specified volume on the target system (**vv1_remote**) to the corresponding secondary volume group created in [step 1 on page 3.21 \(Group1.r112\)](#).

3.5.1.4 Start Copying

The final step in setting up unidirectional Remote Copy for a single Remote Copy pair is to start replication for the volume groups.



NOTE: To perform the initial synchronization using tape backup, use the `--nosync` option of the `startcopygroup` command. This command assumes that the volumes are already synchronized. This command can also be used for newly created volumes that have not yet been exported to the hosts. See [Initial Synchronization Using Tape Backup](#) on page 3.38 for complete instructions.

- 1 On the primary storage server, start replication for a volume group as follows:

On **InServ1**:

```
# startcopygroup <group_name>
```

where <group_name> is the name of the primary volume group (**Group 1**).

The `startcopygroup` command is mirrored from **InServ1** to **InServ2** and begins the copying of data. Because this is the first time this command has been run for this volume group, the existing data is copied from the primary to the secondary volume group.

- 2 Issue the `showrcopy` command again to verify that the groups are synchronizing. The groups are completely synchronized after the **SyncStatus** is **Synced**.

On **InServ1**:

```
# showrcopy
```

```
...
```

Group Information

Name	Target	Status	Role	Mode	Options
sync_group_1	InServ2	Started	Primary	Sync	
LocalVV	ID	RemoteVV	ID	SyncStatus	LastSyncTime
localvv.0	391	remotevv.0	351	Synced	NA
localvv.1	392	remotevv.1	352	Synced	NA

3.5.1.5 Setting Up Additional Remote Copy Pairs

For configurations that use multiple Remote Copy pairs (also known as N-to-1 or 1-to-N type configurations), after following the instructions in [Setting Up Unidirectional Remote Copy](#) on page 3.17, repeat the entire process for each additional pair, up to a maximum of two (for 1-to-N configurations) or four (for N-to-1 configurations) Remote Copy pairs.

Note that for N-to-1 configurations all pairs must share the same secondary storage server, and for 1-to-N configurations all pairs must share the same primary storage server. See [N-to-1 Restrictions](#) on page 2.43 and [1-to-N Restrictions](#) on page 2.44 for additional information and restrictions regarding configurations with multiple Remote Copy pairs.



NOTE: The transport layer only needs to be set once per system. However, you should verify the connectivity for each pair in the configuration.

3.5.2 Setting Up Bidirectional Remote Copy

In this section, as illustrated by [Figure 3-7 on page 3.26](#):

- The members of the Remote Copy pair are an eight-node cluster called **InServ1** and a four-node cluster called **InServ2**.
- A virtual volume on **InServ1** called **vv1** is the only member of **Group1**.
- A virtual volume on **InServ2** is called **vv1_remote** and is the only member of **Group1.r112**, the secondary group that is automatically created at the same time as **Group1**.

Note that **vv1** and **vv1_remote** must be the same size.

- A virtual volume on **InServ2** called **vv2** is the only member of **Group2**.
- A virtual volume on **InServ1** is called **vv2_remote** and is the only member of **Group2.r125**, the secondary group that is automatically created at the same time as **Group2**.

Note that **vv2** and **vv2_remote** must be the same size.

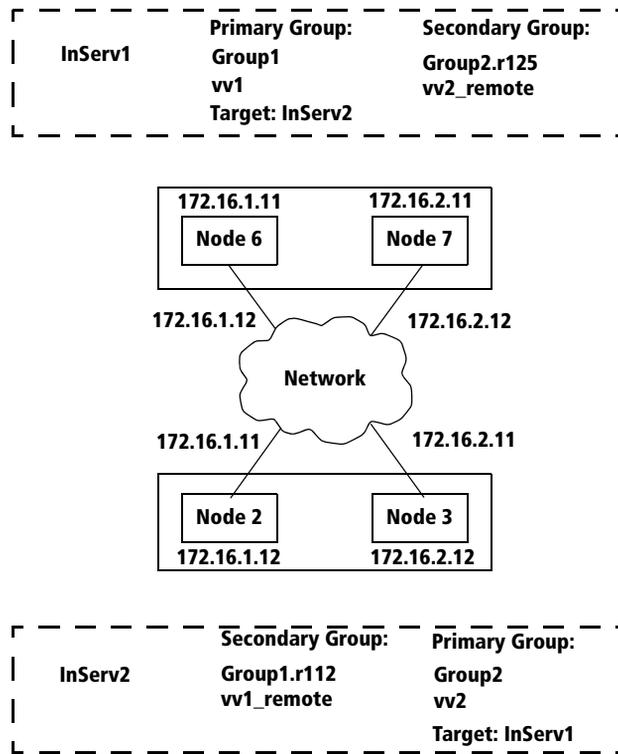


Figure 3-7. Configuring Bidirectional Remote Copy Connections



NOTE: The following steps are very similar to setting up a unidirectional Remote Copy, only in this configuration, **InServ2** will be the primary server.

To set up volume groups for bidirectional configuration:

- 1 Issue the following command to create a primary volume group on **InServ2**:

```
On InServ2 :
# creatercopygroup <group_name> <target_name>:<mode>
```



NOTE: For N-to-1 configurations, only asynchronous periodic mode volume groups are supported.

In order to use this command, you must specify a `<group_name>` (for example, **Group2**), the `<target_name>` (for example, **InServ1**) and a mode (`sync` for synchronous or `periodic` for asynchronous periodic).

The `creatercopygroup` command creates a primary volume group on the primary storage server, the storage server on which the command is issued (in this case, **InServ2**). At the same time, it also creates a corresponding secondary group (**Group2.r125**) on the target system (**InServ1**). The corresponding secondary group uses the naming convention `<primary_group_name>.r<sys_ID>`.



NOTE: You can create groups and add volumes to groups without disrupting host access to volumes. In addition, stopping a Remote Copy volume group does not prevent a host from accessing the volumes in that group.

- 2 (Optional). If you chose `periodic` mode in [step 1](#), you might want to set up automatic synchronization by specifying a resynchronization period as follows. Do not set a resynchronization period if you plan to perform the initial synchronization using tape backup, as described beginning on [page 3.38](#).

On **InServ2**:

```
# setrcopygroup period <value> <target_name> <group_name>
```

where `<value>` is the resynchronization period, followed by **s** to denote seconds, **m** to denote minutes, **h** to denote hours, or **d** to denote days, `<target_name>` is the target name (**InServ1**), and `<group_name>` is the name of the primary volume group on **InServ2** (**Group2**).

- 3 On **InServ2**, add pre-existing virtual volumes to the newly created primary volume group (**Group2**) as follows:

On **InServ2**:

```
# admitrcopyvv VV_name group_name target_name:sec_VV_name
```

where `<VV_name>` is the name of the virtual volume (**vv2**) to be added to the primary volume group (**Group2**). You also need to specify the target name `<target_name>` for that volume group (**InServ1**) and the name of the secondary volume (**vv2.remote**).

The `admitrcopyvv` command adds the specified volume (**vv2**) to the primary volume group (**Group2**). At the same time, it also adds the secondary volume (**vv2.remote**) to the corresponding secondary volume group on the target system (**Group2.r125**).

- 4 Start replication for the volume groups created in [step 1](#):

```
On InServ2:  
# startrcopygroup <group_name>
```

where `<group_name>` is the name of the primary volume group (**Group2**).

The `startrcopygroup` command begins the copying of data. Because this is the first time this command has been run for this volume group, the existing data is copied from the primary to the secondary volume group.

3.6 Synchronous Long Distance Remote Copy Setup

Use the procedures described in this section to set up Synchronous Long Distance Remote Copy on your storage servers. See [Synchronous Long Distance Configuration](#) on page 2.12 and [Requirements and Restrictions](#) on page 2.41 for information about Synchronous Long Distance Remote Copy setups.

In this section, as illustrated by [Figure 3-8](#):

- The primary system is a four-node cluster called **InServA** and the backup systems are four-node clusters called **InServB** and **InServC**.
- **InServA** is the primary storage system
 - ◆ Target name: **InServB**
 - ◆ Links:
 - ◆ Node 2 IP address **10.100.33.195**
 - ◆ Node 3 IP address **10.101.33.195**
 - ◆ Target name: **InServC**
 - ◆ Links:
 - ◆ Node 2 IP address: **10.100.33.63**
 - ◆ Node 3 IP address: **10.101.33.63**

- **InServB** is the backup storage system
 - ◆ Target name: **InServA**
 - ◆ Links:
 - ◆ Node 2 IP address **10.100.33.96**
 - ◆ Node 3 IP address **10.101.33.96**
 - ◆ Target name: **InServC**
 - ◆ Links:
 - ◆ Node 0 IP address **10.100.33.63**
 - ◆ Node 1 IP address **10.101.33.63**
- **InServC** is the backup storage system
 - ◆ Target name: **InServA**
 - ◆ Links:
 - ◆ Node 2 IP address **10.100.33.96**
 - ◆ Node 3 IP address **10.101.33.96**
 - ◆ Target name: **InServB**
 - ◆ Links:
 - ◆ Node 2 IP address **10.100.33.195**
 - ◆ Node 3 IP address **10.101.33.195**
- Synchronous Remote Copy is used between **InServA** and **InServB**. The following WWNs are used:
 - ◆ **InServA:**
 - ◆ Node WWN: **2FF70002AC000060**
 - ◆ Node 0 WWN: **20110002AC000060**
 - ◆ Node 1 WWN: **21320002AC000060**
 - ◆ **InServB:**
 - ◆ Node WWN: **2FF70002AC0000C3**

- ◆ Node 0 WWN: **20210002AC0000C3**
- ◆ Node 1 WWN: **21210002AC0000C3**

■ Asynchronous Periodic Remote Copy is used between **InServA** and **InServC**.

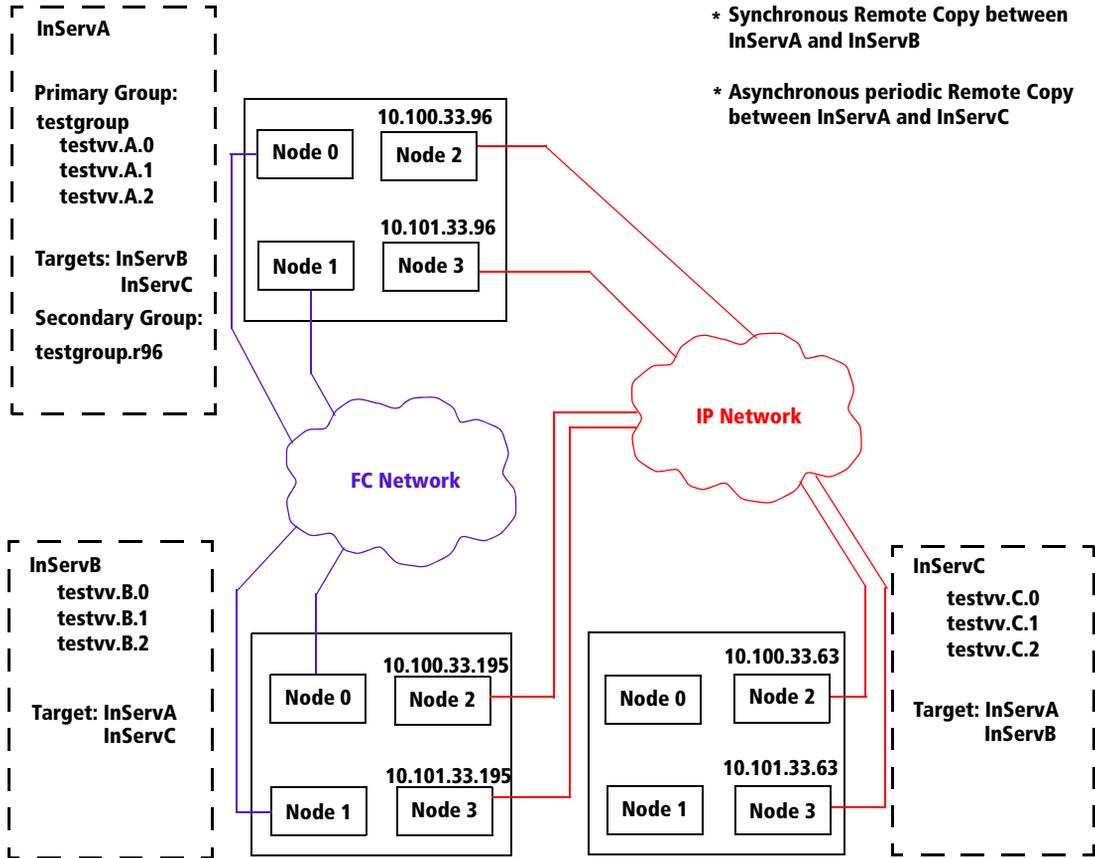


Figure 3-8. Configuring Synchronous Long Distance Remote Copy Connections

3.6.1 Setting Up the Primary Server

To set up the primary storage server (**InServA**):

- 1 Start Remote Copy as follows:

```
On InServA:
# startrcopy
```



NOTE: In the following step, the `creatercopytarget` command must be issued twice, once for **InServB** and once for **InServC**.

- 2 Define the targets on **InServA**:

```
On InServA:
# creatercopytarget <target_name> FC <node_wwn> <N:S:P>:<WWN> <N:S:P>:<WWN>
# creatercopytarget <target_name> IP <N:S:P>:<IP_addr> <N:S:P>:<IP_addr>
```

- ◆ `<target_name>` is the name of the Remote Copy target (for example, **InServB** and **InServC**).
- ◆ `FC` states a Fibre Channel link.
- ◆ `IP` states an IP link.

For FC setup:

- ◆ `<node_wwn>` specifies the WWN of the target node (for example, **2FF70002AC0000C3** for **InServB**).
- ◆ `<N:S:P>:<WWN>` specifies the node, slot, and port of the Fibre Channel adapter port on the primary system **InServA** and the WWN of the peer port on the target system **InServB** (for example, **0:1:1:20210002AC0000C3** and **1:3:2:21210002AC0000C3**).

For IP setup:

- ◆ `<N:S:P>:<IP_addr>` specifies the node on **InServA** that contains the IP connections to the target (for example, **2:4:1** and **3:4:1**) and the IP address (`<IP_addr>`) for the target system (for example, **10.100.33.63** and **10.101.33.63** for **InServC**).

3.6.2 Setting Up the Backup Servers

The commands used to set up the backup storage servers (**InServB** and **InServC**) are nearly the same as those used to set up the primary server (**InServA**), except that they create the links in the opposite direction and create a second target for failover purposes.

To set up the backup storage servers (**InServB** and **InServC**):

- 1 Start Remote Copy on **InServB** as follows:

```
On InServB:
# startrcopy
```

- 2 Define a target for **InServB**:

```
On InServB:
# creatercopytarget <target_name> FC <node_WWN> <N:S:P>:<WWN> <N:S:P>:<WWN>
# creatercopytarget <target_name> IP <N:S:P>:<IP_addr> <N:S:P>:<IP_addr>
```

- ◆ <target_name> is the name of the Remote Copy target (for example, **InServA** and **InServC**).
- ◆ FC states a Fibre Channel link.
- ◆ IP states an IP link.

For FC setup:

- ◆ <node_WWN> specifies the WWN of the target node (for example, **2FF70002AC0000C3** for **InServA**).
- ◆ <N:S:P>:<WWN> specifies the node, slot, and port of the Fibre Channel adapter port on the primary system **InServA** and the WWN of the peer port on the target system **InServA** (for example, **0:1:1:20110002AC000060** and **1:3:2:21320002AC000060**).

For IP setup:

- ◆ <N:S:P>:<IP_addr> specifies the node, slot, and port on **InServB** that contains the IP connections to the target (for example, **2:4:1** and **3:4:1**) and the IP address (<IP_addr>) for the target system (for example, **10.100.33.63** and **10.101.33.63** for **InServC**).

3 Define a second target for **InServB**:

On **InServB**:

```
# creatercopytarget <target_name> IP <N:S:P>:<link_IP_addr>
<N:S:P>:<link_IP_addr>
```

- ◆ <target_name> is the name of the Remote Copy target (for example, **InServC**).
- ◆ IP states that this is an IP link.
- ◆ <node> specifies the node that contains the IP connections to the target (for example **2:4:1** and **3:4:1**).
- ◆ <link_IP_addr> is the link IP address for the target system (for example, **10.100.33.96** and **10.101.33.96**).

4 Start Remote Copy on **InServC** as follows:

On **InServC**:

```
# startrcopy
```

5 Define a target for **InServC**:

On **InServC**:

```
# creatercopytarget <target_name> IP <N:S:P>:<IP_addr> <N:S:P>:<IP_addr>
```

- ◆ <target_name> is the name of the Remote Copy target (for example, **InServA**).
- ◆ IP states that this is an IP link.
- ◆ <N:S:P> specifies the node that contains the IP connections to the target (for example **0:2:1** and **1:2:1**).
- ◆ <IP_addr> is the link IP address for the target system (for example, **10.100.33.96** and **10.101.33.96**).

6 Define a second target for **InServC**:

On **InServC**:

```
# creatercopytarget <target_name> IP <N:S:P>:<IP_addr> <N:S:P>:<IP_addr>
```

- ◆ <target_name> is the name of the Remote Copy target (for example, **InServB**).

- ◆ IP states that this is an IP link.
- ◆ <node> specifies the node that contains the IP connections to the target (for example **0:1:1** and **1:3:2**).
- ◆ <IP_addr> is the link IP address for the target system (for example, **10.100.33.195** and **10.101.33.195**).

3.6.3 Verifying Synchronous Long Distance Remote Copy Setup

- ▶ To verify the Synchronous Long Distance Remote Copy setup on the primary and backup servers, issue the `showrcopy` command on **InServA**, **InServB**, and **InServC**.
 - ◆ On **InServA**:

```
# showrcopy
Remote Copy System Information
Status: Started, Normal

Target Information

Name      ID Type Status Options          Policy
InServB 6  FC  ready 2FF70002AC0000C3 mirror_config
InServC 7  IP  ready                mirror_config

Link Information

Target Node Address          Status Options
InServB 0:1:1 20210002AC0000C3 Up
InServB 1:3:2 21210002AC0000C3 Up
InServC 2:4:1 10.100.33.63      Up
InServC 3:4:1 10.101.33.63     Up
receive 0:1:1 20210002AC0000C3 Up
receive 1:3:2 21210002AC0000C3 Up
receive 2:4:1 receive      Up
receive 3:4:1 receive      Up
```

◆ On **InServB**:

```
# showrcopy
Remote Copy System Information
Status: Started, Normal

Target Information

Name      ID Type Status Options          Policy
InServA 4  FC  ready  2FF70002AC000060 mirror_config
InServC 5  IP  ready                mirror_config

Link Information

Target  Node Address          Status Options
InServA 0:2:1 20110002AC000060 Up
InServA 1:2:1 21320002AC000060 Up
InServC 2:4:1 10.100.33.63      Up
InServC 3:4:1 10.101.33.63      Up
receive 0:2:1 20110002AC000060 Up
receive 1:2:1 21320002AC000060 Up
receive 2:4:1 receive      Up
receive 3:4:1 receive      Up
```

◆ On **InServC**:

```
# showrcopy
Remote Copy System Information
Status: Started, Normal

Target Information

Name      ID Type Status Options          Policy
InServA 3  IP  ready                mirror_config
InServB 4  IP  ready                mirror_config

Link Information

Target  Node Address          Status Options
InServA 0:2:1 10.100.33.96      Up
InServA 1:2:1 10.101.33.96      Up
InServB 0:1:1 10.100.33.195     Up
InServB 1:3:2 10.101.33.195     Up
receive 0:2:1 receive      Up
receive 1:2:1 receive      Up
```

3.6.4 Creating Synchronous Long Distance Remote Copy Volume Groups



NOTE: In the following procedure, it is assumed that the volumes `testvv.A.x` have already been created on **InServA**, volumes `testvv.B.x` have already been created on **InServB**, and volumes `testvv.C.x` have already been created on **InServC**.



NOTE: In the following procedure, two target are used, **InServB** and **InServC**, which define the configuration as Synchronous Long Distance Remote Copy.

- 1 Create and admit the volume group and targets on **InServA**:

```
# creatercopygroup testgroup InServB:sync InServC:periodic
# admitrcopyvv testvv.A.0 testgroup InServB:testvv.B.0 InServC:testvv.C.0
# admitrcopyvv testvv.A.1 testgroup InServB:testvv.B.1 InServC:testvv.C.1
# admitrcopyvv testvv.A.2 testgroup InServB:testvv.B.2 InServC:testvv.C.2
```

In the example above:

- ◆ `testvv.A.0`, `testvv.A.1`, and `testvv.A.2` are admitted for the volume group `testgroup`.
- ◆ Servers **InServB** and **InServC** are admitted as the targets of server **InServA**.
- ◆ Volumes `testvv.B.x` and `testvv.C.x` are admitted as secondary volumes for the primary volumes `testvv.A.x`.

- 2 Start the Remote Copy groups on **InServB** and **InServC**.

```
# startrcopygroup testgroup
```

The Remote Copy groups are synchronized.

- 3 Issue the `showrcopy groups` command on each server to verify the groups are synchronized.

◆ On InServA:

```
# showcgroup groups
Group Information

Name          Target      Status      Role      Mode      Options
testgroup     InServB    Started    Primary   Sync
  LocalVV     ID RemoteVV  ID SyncStatus LastSyncTime
  testvv.A.0  100 testvv.B.0 200 Synced    2008-09-11 17:52:49 PDT
  testvv.A.1  101 testvv.B.1 201 Synced    2008-09-11 17:52:49 PDT
  testvv.A.2  102 testvv.B.2 202 Synced    2008-09-11 17:52:48 PDT

Name          Target      Status      Role      Mode      Options
testgroup     InServC    Started    Primary   Periodic  Last-Sync 2008-09-11
17:52:17 PDT , over_per_alert
  LocalVV     ID RemoteVV  ID SyncStatus LastSyncTime
  testvv.A.0  100 testvv.C.0 300 Synced    2008-09-11 17:52:58 PDT
  testvv.A.1  101 testvv.C.1 301 Synced    2008-09-11 17:53:01 PDT
  testvv.A.2  102 testvv.C.2 302 Synced    2008-09-11 17:53:00 PDT
```

◆ On InServB:

```
# showcgroup groups
Group Information

Name          Target      Status      Role      Mode      Options
testgroup.r96 InServA    Started    Secondary Sync
  LocalVV     ID RemoteVV  ID SyncStatus LastSyncTime
  testvv.B.0  200 testvv.A.0 100 Synced    2008-09-11 17:52:49 PDT
  testvv.B.1  201 testvv.A.1 101 Synced    2008-09-11 17:52:49 PDT
  testvv.B.2  202 testvv.A.2 102 Synced    2008-09-11 17:52:48 PDT

Name          Target      Status      Role      Mode      Options
testgroup.r96 InServC    Backup     Secondary Periodic  over_per_alert
  LocalVV     ID RemoteVV  ID SyncStatus LastSyncTime
  testvv.B.0  200 testvv.C.0 300 Synced    2008-09-11 17:52:58 PDT
  testvv.B.1  201 testvv.C.1 301 Synced    2008-09-11 17:53:01 PDT
  testvv.B.2  202 testvv.C.2 302 Synced    2008-09-11 17:53:00 PDT
```

◆ On **InServC**:

```
# showrcopy groups
Group Information
```

Name	Target	Status	Role	Mode	Options
testgroup.r96	InServA	Started	Secondary	Periodic	over_per_alert
LocalVV	ID	RemoteVV	ID	SyncStatus	LastSyncTime
testvv.C.0	300	testvv.A.0	100	Synced	2008-09-11 17:52:58 PDT
testvv.C.1	301	testvv.A.1	101	Synced	2008-09-11 17:53:01 PDT
testvv.C.2	302	testvv.A.2	102	Synced	2008-09-11 17:53:00 PDT

Name	Target	Status	Role	Mode	Options
testgroup.r96	InServB	Backup	Secondary	Periodic	over_per_alert
LocalVV	ID	RemoteVV	ID	SyncStatus	LastSyncTime
testvv.C.0	300	testvv.B.0	200	Synced	2008-09-11 17:52:49 PDT
testvv.C.1	301	testvv.B.1	201	Synced	2008-09-11 17:52:50 PDT
testvv.C.2	302	testvv.B.2	202	Synced	2008-09-11 17:52:48 PDT

As shown in the examples above, once the synchronization completes, the primary and secondary volumes' `SyncStatus` should show a status of `Synced`.

3.7 Initial Synchronization Using Tape Backup

For a very large volume, it might be faster to perform the initial synchronization of the backup server with the primary server by backing up the primary volume group to tape and then restoring the secondary volume group from tape rather than synchronizing the volume groups over the Remote Copy links.

To perform the initial synchronization using tape backup, follow the procedures described in this chapter for setting up Remote Copy. However, when issuing `startcopygroup <group_name>` on the primary server (as described in [Start Copying](#) on page 3.23), be sure to use the `-nosync` option. This option indicates that the volumes do not need to be synchronized, and marks them as `Synced`.

3.7.1 Synchronizing Volume Groups

If the primary volume group needs to be used for writes before the secondary volume group is initialized from the tape backup, use the following procedure to bring the primary and secondary volume groups into synchronization and to start Remote Copy operations for the storage server pair.

To bring the primary and secondary volume groups into synchronization and start Remote Copy operations:

1 Start Remote Copy on **InServ1**:

```
On InServ1:
# startrcopy
```

2 Define a target for **InServ1**:

```
On InServ1:
# creatercopytarget <target_name> IP <node_number>:IP_address...
```

- ◆ <target_name> is the target name (for example, **InServ2**)
- ◆ IP states that this is an IP link.
- ◆ <node_number> specifies the node that contains the IP connections to the target.
- ◆ <IP_addr> is the link IP address for the target system (for example, **172.100.33.11** and **172.101.33.11**).



NOTE: The process of creating a volume group as described in the following step is provided only for this example and would not normally be required. When synchronizing volume groups, your volume groups should already be created.

3 Create a volume group on **InServ1**:

```
On InServ1:
# createvv -snp_cpg <snp_CPG> -cnt <nb_of_VV> <usr_cpg> <VV_name>
<size>g
```

- ◆ -snp_cpg <snp_CPG> is the name of the common provisioning group that is used for the snapshot space.
- ◆ -cnt <nb_of_VV> is the number of identical virtual volumes to create (for example **2**).
- ◆ <usr_cpg> is the name of the common provisioning group that is used for the user space.
- ◆ <VV_name> is the name of the created virtual volume (for example **localvv**).

- ◆ `<size>g` is the size of the created volume in gigabytes (for example **5g**).

4 Start Remote Copy on **InServ2**:

```
On InServ2:
# startrcopy
```

5 Define a target for **InServ2**:

```
On InServ2:
# creatercopytarget <target_name> IP <node_number>:IP_address...
```

- ◆ `<target_name>` is the target name (for example, **InServ1**).
- ◆ `IP` states that this is an IP link.
- ◆ `<node_number>` specifies the node that contains the IP connections to the target.
- ◆ `<IP_addr>` is the link IP address for the target system (for example, **172.100.33.96** and **172.101.33.96**).



NOTE: The process of creating a volume group as described in the following step is provided only for this example and would not normally be required. When synchronizing volume groups, your volume groups should already be created.

6 Create a volume group on **InServ2**:

```
On InServ2:
# createvv -snp_cpg <snap_CPG> -pct <prc> -cnt <nb_of_VV> <usr_CPG>
<VV_name> <size>g
```

- ◆ `-snp_cpg <snap_CPG>` is the name of the CPP used for snapshot space.
- ◆ `-pct <prc>` is the size of the snapshot volume (for example **100**).
- ◆ `-cnt <nb_of_VV>` is the number of identical virtual volumes to create (for example **2**).
- ◆ `<usr_CPG>` is the name of the CPG used for user space.
- ◆ `<VV_name>` is the name of the created virtual volume (for example **remotevv**).
- ◆ `<size>g` is the size of the created volume in gigabytes (for example **5g**).

7 Create a synchronous Remote Copy group on **InServ1**:

On **InServ1**:

```
# creatercopygroup <group_name> <target_name>:<mode>
```

- ◆ <group_name> is the name of the created Remote Copy group (for example **sync_group_1**).
- ◆ <target_name> is the Remote Copy target (for example **InServ2**).
- ◆ <mode> is either synchronous (sync) or periodic (for example **sync**).

8 Admit the volume to the Remote Copy volume group:

On **InServ1**:

```
# admitrcopyvv VV_name group_name target_name:sec_VV_name
```

- ◆ <VV_name> is the name of the virtual volume added to the Remote Copy group (for example **localvv.0** and **localvv.1**).
- ◆ <group_name> is the name of the Remote Copy volume group (for example **sync_group_1**).
- ◆ <target_name> is the name of the Remote Copy target system on which the backup volume for <VV_name> resides (for example **InServ2**).
- ◆ <sec_VV_name> is the name of the backup volume created for <VV_name> (for example **remotevv.0** and **remotevv.1**).

Repeat the `admitrcopyvv` step for each volume that will be part of the group:

9 Activate Remote Copy for the Remote Copy volume group created on **InServ1**:

On **InServ1**:

```
# startrcopygroup -nosync <group_name>
```

- ◆ `-nosync` indicates that an initial synchronization of the specified group is not performed and the group's virtual volumes are set to synchronized state.
- ◆ <group_name> is the name of the started Remote Copy volume group (for example **sync_group_1**).

10 Stop Remote Copy for the Remote Copy volume group on InServ1:

```
On InServ1:  
# stoprcopygroup <group_name>
```

where <group_name> is the Remote Copy volume group (for example **sync_group_1**).

This command creates a snapshot on the system that is the primary server for this volume group. The snapshot is named `rcpy.<GID>.<VID>.<TID>.<x>`, where <GID> is an internally assigned group ID, <VID> is the volume ID, <TID> is an internally assigned target ID, and <x> is an integer.

You can use the `copy of` field in `showvv` output to verify that the snapshot belongs to the correct volume.

The snapshot is copied to tape and then copied to the volumes on system **InServ2**.

11 Reverse the direction of the volumes on InServ2 to allow the volumes to accept writes:

```
On InServ2:  
# setrcopygroup reverse -local -current -nosnap <group_name>
```

where <group_name> is the name of the secondary volume group (for example **sync_group_1.r96**) that accepts writes.

The tape(s) containing data from InServ1 can now be copied to the volumes on **InServ2**.

12 Restore the original direction of the volumes on InServ2:

```
On InServ2:  
# setrcopygroup reverse -local -current -nopromote <group_name>
```

where <group_name> is the name of the secondary volume group (for example **sync_group_1.r96**) whose original direction is restored.

- 13 Start the group on **InServ1** to synchronize any changes that were made after the snapshots were created:

```
On InServ1:  
# startrcopygroup <group_name>
```

where <group_name> is the started Remote Copy volume group (for example **sync_group_1**).

4

Using Remote Copy

In this chapter

4.1	Management	4.2
4.2	Reversing Target Designations	4.2
4.3	Changing Remote Copy Mode for a Volume Group	4.3
4.4	Setting Remote Copy Volume Group Policies	4.4
4.5	Manual Resynchronization	4.5
4.6	Viewing Synchronization Details	4.5
4.7	Converting Standard Virtual Volumes	4.8
4.8	Modifying Virtual Volumes	4.9
4.9	Limiting Throughput	4.10
4.10	Stopping Remote Copy	4.11
4.11	Remote Copy Commands	4.11

This chapter describes how to use 3PAR Remote Copy, including how to display information about the system configuration, set policies, and reverse target designations. A list of all Remote Copy commands is provided at the end of this chapter.



NOTE: When issuing commands that are mirrored from one system to another, there is a five minute timeout limit. After five minutes, if the other system does not respond to a command, the following error message appears:

```
target system <target_name> could not be contacted
```

4.1 Management

Use the `showrcopy` command to display information about the system's configuration and the `statrcopy` command to display link throughput statistics. See [Appendix B, Remote Copy Commands](#) for complete instructions on using these commands.

4.2 Reversing Target Designations

If you experience problems with the server or volume group that is designated as the primary system, the volume group targets can be reversed to enable a volume export. While it is possible to export secondary volumes at any point, these volumes will be read-only. If the primary server fails and the backup server needs to be used to export read-write volumes, you must first reverse the targets using the `setrcopygroup` command.

Reversing server designations is required for disaster recovery, as illustrated in [Appendix C, Example Setup and Disaster Recovery](#).

- To enable I/O to the secondary groups for a target, issue the `setrcopygroup failover -t <target_name>` command on the system with secondary groups. See [Appendix B, Remote Copy Commands](#) for detailed information about this command.

This command reverses the direction of all secondary groups for the designated target thus allowing the volumes to become primary.

- To reverse the primary and backup designations for a single volume group, use the `setrcopygroup failover <group_name>` command.



NOTE: See [Appendix C, Example Setup and Disaster Recovery](#) for more information on reversing server designations, including examples of full disaster recovery cycles for unidirectional and bidirectional Remote Copy pairs.

4.3 Changing Remote Copy Mode for a Volume Group

Use the `setrcopygroup mode` command to change the Remote Copy mode of a volume group. This allows you to convert a synchronous volume group to an asynchronous periodic volume group or vice versa.



NOTE: Only one mode (synchronous or asynchronous periodic) per target is allowed.

Follow these steps to change the Remote Copy mode for an existing volume group.

- 1 Stop the primary group, leaving the resynchronization snapshots on the system.

```
# stoprcopygroup <group_name>
```

- 2 Change the Remote Copy mode of the volume group as follows:

```
# setrcopygroup mode <mode_value> <target_name> <group_name>
```

- ◆ `<mode_value>` is the new Remote Copy mode (`sync` or `periodic`).
- ◆ `<target_name>` is the name of the target name for the volume group.
- ◆ `<group_name>` is the name of the Remote Copy volume group.

- 3 Start the primary volume group as follows:

```
# startrcopygroup <group_name>
```

- 4 If converting a synchronous volume group to an asynchronous periodic volume group, set the synchronization period using the following command:

```
# setrcopygroup period <value> <target_name> <group_name>
```

where `<value>` is the new resynchronization period followed by `s` to denote seconds, `m` to denote minutes, `h` to denote hours, or `d` to denote days.



CAUTION: There is no default synchronization period. Therefore, if you do not specify a synchronization period using the `setrcopygroup` command, automatic resynchronizations will not take place.

4.4 Setting Remote Copy Volume Group Policies

In addition to switching the target for a volume group, the `setrcopygroup` command can also be used to set Remote Copy policies for volume groups.

There are four policies that can be applied to volume groups. The `fail_wrt_on_err` and `no_fail_wrt_on_err` policies apply to synchronous Remote Copy only.



NOTE: When you set group policies for a primary volume group using `setrcopygroup`, this command is automatically mirrored to the secondary volume group.

- `fail_wrt_on_err` The `fail_wrt_on_err` group policy ensures that the two copies are always in synchronization by refusing to write changes to a volume group on one server when the links between the members of the Remote Copy pair are broken for any reason. This prevents the primary and secondary volume groups from becoming out of synchronization with each other.

This policy can be set for disaster recovery applications where the Remote Copy must be up-to-date at all times and where an application outage for a brief period can be tolerated (for example if the links or one member of the Remote Copy pair fails).

- `no_fail_wrt_on_err` (default policy) The `no_fail_wrt_on_err` group policy allows writes to a primary volume group even though the link between the systems in the Remote Copy pair is broken. Continuing to write changes despite a broken link leads to a loss of synchronization between primary and secondary volume groups.

The `no_fail_wrt_on_err` policy is used when you would rather keep the applications that are writing the data running, even when the Remote Copy has failed and become out of sync. After the error that caused the broken link is resolved, you must manually restart the Remote Copy operation between the members of the Remote Copy pair to bring the Remote Copy in sync again.

- `auto_recover` The `auto_recover` group policy allows a group that was stopped as a result of a double link failure to automatically restart after a connection to its target system is established. In other cases where the group was stopped by the system (for example as a result of I/O errors occurring), groups will still need to be manually restarted.
- `no_auto_recover` The `no_auto_recover` group policy prevents a group from being automatically restarted and specifies that the group must always be manually restarted (using the `startrcopygroup` command), regardless of the cause of the failure. This is the default behavior for Remote Copy.

4.5 Manual Resynchronization

Manual resynchronization of volume groups can be initiated using the `syncrcopy` command. When using this command, changes occur only on the primary volume because the last resynchronization points are sent over the network to the backup storage server. For a synchronous mode volume group, using the `-ovrd` option forces a full synchronization between the primary and secondary groups.

4.6 Viewing Synchronization Details

You can view details about ongoing and completed Remote Copy synchronizations using the task management commands available through the InForm CLI in addition to the `showrcopy` command. This is true for all synchronizations and resynchronizations, whether they are initiated manually (by using the `syncrcopy` command), or automatically (such as when the system performs a scheduled resynchronization of an asynchronous periodic mode volume group).

When a volume synchronization or resynchronization takes place on a system running under Remote Copy, the system creates tasks to track the resynchronization operation. For example, when you use the `startrcopygroup` command to start a Remote Copy volume group for the first time, the system creates a task for each primary volume being synchronized in order to track the initial synchronization of the primary and secondary volume groups.



NOTE: With asynchronous periodic mode volume groups, the `startcopygroup` command starts synchronizations only the first time it is issued because subsequent instances of the command do not initiate resynchronizations. With synchronous mode volume groups, the `startcopygroup` command prompts resynchronization each time it is used.



NOTE: For asynchronous periodic synchronization tasks, instead of creating a new task for each resynchronization, the task is kept active for as long as the group is started. The task details are updated as resynchronizations occur.

To see a list of all tasks on a system that have been active within the last 24 hours, use the `showtask` command, as shown in the following example:

```
# showtask
Id Type Name Status Phase Step -----StartTime----- -----FinishTime-----
71 remote_copy_sync vv.1 active 2/3 256/1024 Wed Mar 30 14:33:10 PST 2005 -
72 remote_copy_sync vv.0 active 2/3 256/1024 Wed Mar 30 14:33:10 PST 2005 -
73 remote_copy_sync vv.3 active 2/3 0/1024 Wed Mar 30 14:33:19 PST 2005 -
74 remote_copy_sync vv.2 active 2/3 0/1024 Wed Mar 30 14:33:19 PST 2005
```

In this example, there are four active tasks currently in progress, one for each primary volume undergoing initial synchronization after starting the Remote Copy volume group with the `startcopygroup` command.



NOTE: Use the `showtask -t <hours>` option to see older tasks. To learn more about the `showtask` command, including all available options, see the *InForm OS Command Line Interface Reference*.

The columns in the previous example are identified as follows:

- Id - The task ID for the displayed task.
- Type - The task type, which for Remote Copy synchronizations is `remote_copy_sync`. Additional task types are described in the *InForm OS Administrator's Guide*.
- Name - The name of the volume being synchronized.

- **Status** - The task state. Task states are as follows:
 - ◆ **done** - The task has completed successfully.
 - ◆ **active** - The task is still in process.
 - ◆ **failed** - The task failed to complete because of a reason other than user cancellation.
- **Phase** - For Active tasks, indicates the number of completed phases and the total number of phases `<#completed_phase>/<#total_phases>`. Note that each step is composed of an arbitrary number of phases.
- **Step** - For Active Remote Copy synchronization tasks, indicates the completed and total volume size, in MB, using the format: `<completed_size>/<total_size>`
- **Start Time** - Indicates the time when the task was started.
- **Finish Time** - For Done, Cancelled, and Failed tasks, indicates the time when the task stopped because of completion, cancellation, or failure.



NOTE: For Remote Copy synchronizations, the finish time for the resynchronization task might not match the **LastSync** column in the `showrcopy` command output for the system holding the primary volumes. This is because the times are taken at different points. The task time is set by the task subsystem when it is marked as `completed`, whereas the `LastSync` time is set when Remote Copy completes the sync. These two times should be similar, but could differ by up to a few seconds.

To see detailed output for a particular task, use the `showtask` command with the `-d` option and task ID as follows:

```
# showtask -d 71
Id Type           Name Status Phase Step -----Start_Time----- -----Finish_Time---
----
71 remote_copy_sync vv.1 Done   0/0  0/0 Wed Mar 30 14:33:10 PST 2005 Wed Mar 30 14:33:53 PST 2005

Detailed status:
{Wed Mar 30 14:33:10 PST 2005} Startup adding full sync of volume vvnorm.5126.p.1 in
group periodic.1 to the synchronization list
{Wed Mar 30 14:33:10 PST 2005} Started full sync of volume vvnorm.5126.p.1 in group
periodic.1 has started.
{Wed Mar 30 14:33:53 PST 2005} Completed sync of volume vvnorm.5126.p.1 in group
periodic.1
```

Table 4-1 summarizes the InForm CLI task management commands relevant to Remote Copy volume synchronizations.

Table 4-1. Task Management Commands

Command	Description	Domain: Privilege Level
removetask	Removes information about one or more tasks and their details.	all: Super, Edit, Service
showtask	Displays information about tasks on the system.	all: Super, Edit, Browse specified: Edit, Browse none: Service
waittask	Asks the CLI to wait for a task to complete before proceeding.	all: Super, Edit, Browse specified: Edit, Browse none: Service

For additional details on these commands, see the *InForm OS Command Line Interface Reference*. For additional details on task management, see the *InForm OS Concepts Guide*.

4.7 Converting Standard Virtual Volumes

In some cases it might be desirable to convert existing standard virtual volumes to fully provisioned virtual volumes so that they might be used with Remote Copy. To assign a standard virtual volume to a Common Provisioning Group (CPG) for auto snapshot-growth, use the following command:

```
# setvv -snp_cpg <snp_CPG> <VV_name>
```

where <snp_CPG> is the name of the Common Provisioning Group from which the snapshot space is allocated and <VV_name> is the name of the virtual volume.

This command transforms a standard virtual volume into a fully provisioned virtual volume.



NOTE: If the virtual volume shares snapshot admin or snapshot data space with any other virtual volume, this operation will fail.

4.8 Modifying Virtual Volumes

In addition to converting virtual volumes, you can also increase the size and rename virtual volumes in Remote Copy groups.

4.8.1 Growing a Virtual Volume

To increase the size of a virtual volume, use the following commands:

- 1 Stop the Remote Copy group, as specified with `<group_name>`, containing the volume to be grown.

```
# stoprcopygroup <group_name>
```

- 2 Issue the `growvv` command to grow the volume.

```
# growvv <VV_name> <size>[g|G|t|T]
```

where `<VV_name>` is the name of the virtual volume you are growing and `<size>` is the size in MB to be added to the volume's user space. You can optionally specify `g`, `G`, `t`, or `T` to indicate the growth size as gigabytes or terabytes, respectively.



NOTE: The `growvv` command must be issued against the primary and secondary volumes. The secondary volume's new size must match that of the primary volume.

4.8.2 Renaming a Virtual Volume

To rename a virtual volume, use the following command:

```
# setvv -name <new_name> <VV_name>
```

where `-name <new_name>` is the new name you are assigning to the volume and `<VV_name>` is the volume being changed.

4.9 Limiting Throughput

For asynchronous periodic mode Remote Copy (see *Asynchronous Periodic Mode* on page 2.24), it might be useful to use the throughput limiting option when setting up links over leased lines. This option limits the maximum throughput that Remote Copy utilizes for a link. This is useful, for example, if the leased line charges are based on the bit-rate utilized. If this option is not used, Remote Copy tries to send data as fast as it can on both links. If the limit is set, the data is metered and sent out at a rate less than or equal to the set limit. The rate can be specified in units of gigabytes, megabytes, or kilobytes per second, as follows: .

```
# setrcopytarget tput <throughput> <target_name>
```

- ◆ <throughput> is the throughput limit, followed by **g** or **G** to indicate gigabytes per second, **m** or **M** to indicate megabytes per second, or **k** or **K** to indicate kilobytes per second (if not specified, the default is kilobytes per second).
- ◆ <target_name> specifies the target name



NOTE: Limiting the throughput results in higher latency for the host writes to the primary volumes, therefore it is not advisable to set to synchronous mode.

If you wish to remove the throughput limit, issue the setrcopytarget command as described above and specify the throughput value as 0, for example, `setrcopytarget tput 0g <target_name>`.

4.10 Stopping Remote Copy

- ▶ If you want to stop using Remote Copy, issue the `stoprcopy` command as follows:

```
# stoprcopy -stopgroups
```

- ▶ To stop using Remote Copy functionality on all volume groups, delete all Remote Copy configuration data, and release all resources used by Remote Copy, add the `-clear` option to the `stoprcopy` command as follows:

```
# stoprcopy -stopgroups -clear
```



NOTE: See [Remote Copy and Thin Provisioning](#) on page 2.33 for important information about space allocation and deleted snapshots.

Without the `-clear` argument, this command only stops the Remote Copy. You can restart that copy later using the `startrcopy` command.

4.11 Remote Copy Commands

Table 4-2 contains a list of tasks and their associated commands. Enter Remote Copy commands using the InForm CLI. Refer to the *InForm OS Command Line Interface Reference* for detailed instructions on using the CLI. For details about each command, refer to [Appendix B, Remote Copy Commands](#).



NOTE: When issuing commands that are mirrored from one system to the other, there is a five minute timeout limit. After five minutes, if the other system does not respond to a command, the following error message appears:

```
target system <target_name> could not be contacted
```



NOTE: As long as you are using 3PAR Remote Copy with the default group policy enabled (see [Setting Remote Copy Volume Group Policies](#) on page 4.4), the configuration commands, in the following table, followed by an asterisk (*) need only be issued on the primary storage system, as they are automatically mirrored to the secondary system.

Table 4-2. Remote Copy Tasks and Associated Commands

Task	Command
Creates a link to a target system.	<code>admitrcopylink</code>
Adds a target to an InServ Storage Server.	<code>admitrcopytarget *</code>
Adding an existing virtual volume to an existing Remote Copy volume group.	<code>admitrcopyvv *</code>
Sets Remote Copy interface information.	<code>controlport rcip rcfc</code> <code>controlport config</code>
Creates a Remote Copy volume group (can be run by users with Edit privileges.)	<code>creatercopygroup *</code>
Identifies the targets within a Remote Copy pair and makes additional links.	<code>creatercopytarget</code>
Removes a sending link that was created with the <code>admitrcopylink</code> command.	<code>dismissrcopylink</code>
Removes a target from an InServ Storage Server.	<code>dismissrcopytarget</code>
Removes a virtual volume from a Remote Copy volume group.	<code>dismissrcopyvv *</code>
Increases the size of a virtual volume.	<code>growvv</code>
Deletes a Remote Copy volume group. (Can be run by users with Edit privileges.)	<code>removercopygroup *</code>

Table 4-2. Remote Copy Tasks and Associated Commands *(continued)*

Task	Command
Removes target designation from a Remote Copy system and removes all links affiliated with that target definition.	<code>removercopytarget</code>
Sets a Remote Copy volume group's policies, data transfer direction, resynchronization period, and mode.	<code>setrcopygroup *</code>
Sets a Remote Copy target's name and policies, and the target link's throughput definition.	<code>setrcopytarget</code>
Changes the properties of a virtual volume.	<code>setvv</code>
Displays Remote Copy port information.	<code>showport</code>
Displays Remote Copy configuration details.	<code>showrcopy</code>
Displays the status and information about end-to-end Remote Copy transport.	<code>showrctransport</code>
Enables Remote Copy on an InServ Storage Server.	<code>startrcopy</code>
Enables Remote Copy for a Remote Copy volume group.	<code>startrcopygroup *</code>
Displays I/O statistics for Remote Copy ports.	<code>statport -rc</code>
Displays statistics for Remote Copy volume groups.	<code>statrcopy</code>
Stops Remote Copy functionality for any started Remote Copy volume groups.	<code>stoprcopy</code>

Table 4-2. Remote Copy Tasks and Associated Commands *(continued)*

Task	Command
Stops Remote Copy functionality for a specified Remote Copy volume group.	<code>stoprcopygroup *</code>
Synchronizes Remote Copy volume groups.	<code>syncrcopy</code>

5

Performance and Scripting Considerations

In this chapter

- 5.1 Performance Notes for RCIP Configuration **5.1**
- 5.2 Performance Notes for RCFC Configuration **5.5**
- 5.3 Scripting Notes **5.5**

This chapter discusses performance considerations for using 3PAR Remote Copy. At the end of the chapter, scripting notes are also provided.

5.1 Performance Notes for RCIP Configuration

The following sections contain performance notes for Remote Copy over IP (RCIP) configuration.

5.1.1 Gigabit Ethernet Links

Remote Copy uses two GigE links to send data from the primary to the backup storage server. Both links are used simultaneously to achieve the maximum throughput (MB/s). A single host write I/O is sent on a single link, but different I/Os can be sent on different links. In a four-node, six-node, or eight-node storage server configuration, only two nodes can have these GigE links.



NOTE: This limitation does not apply to 1-to-N Remote Copy. For 1-to-N Remote Copy, the primary storage server can have four RCIP interfaces; two to one secondary system and two to the other secondary system.

After sending the I/O over a local GigE link, (which is more efficient than sending over a link in another node), the host writes coming into the nodes with the GigE links are preferentially sent over the local link. If a node does not have a GigE link, then host writes to that node are sent equally on the two nonlocal links. Because of this, depending on how the host writes to the nodes are distributed, the two GigE links might not always have the same traffic rate.

5.1.2 Initial Synchronization

In general, when running Remote Copy on a pair of InServ Storage Servers, the highest link throughput (MB/s) is achieved during the initial synchronization of the primary and secondary volumes. During initial synchronization, throughput might be as high as 70 MB per second on a single GigE link or 125 MB per second on both links when there are multiple volumes synchronizing.



NOTE: For instructions on performing the initial synchronization using tape backup instead of the Remote Copy links, see [Initial Synchronization Using Tape Backup](#) on page 3.38.

5.1.3 Distance

As the physical distance between the storage servers in the Remote Copy pair increases, there might be an increase in latency and a decrease in throughput.

Low bandwidth with high latency and low bandwidth with low latency can be optimized by using the `setrcopytarget tunelinks` command. See [Appendix B, Remote Copy Commands](#) for information about the `setrcopytarget tunelinks` command.

5.1.4 MTU Size

The throughput (MB/s) over GigE networks is affected by the Maximum Transmission Unit (MTU) size. Remote Copy supports the use of 9000 byte jumbo Ethernet frames, which result in significantly better throughput and lessens CPU usage on the primary server when compared to using the default 1500 byte MTU. Depending on workload, you might see as much as a 50 percent increase by using a 9000 byte MTU setting as opposed to a 1500 byte MTU setting.

Because the MTU needs to be supported by all the switches and routers in the IP network, the default MTU of the GigE interfaces is 1500 bytes, which is supported by all vendor hardware. If your network supports 9000 byte MTU, it is recommended that you set the 3PAR GigE adapter's MTU to 9000 bytes. See [Increasing MTU \(Optional\)](#) on page 3.11 for detailed instructions on increasing MTU, verifying that the increased MTU size is supported by the network, and comparing the throughput of 1500 byte and 9000 byte MTU settings.

5.1.5 Autonegotiation

The InServ Storage Server uses autonegotiation for the GigE interfaces as a default. There are cases where autonegotiation does not work correctly and the storage server GigE port and the local switch port use different duplex or speed configurations. This causes a significant impact to performance and can prevent the Remote Copy links from coming up. To correct an autonegotiation problem, you can force the duplex and speed settings of both the local and InServ Storage Server GigE ports. The InServ Storage Server port is set using the InForm CLI `controlport` command. See [controlport](#) on page B.9 or the *InForm OS Command Line Interface Reference* for details on using this command. Refer to your switch manufacturer's documentation to identify how to change the switch port settings.

The preferred option is to set both the local switch port and the storage server GigE ports to full duplex and to specify the maximum supported speed of your network (such as 1000 Mbps). If you are using unmanaged switches or are otherwise unable to change the local switch port settings, then setting the storage server GigE ports to match the local switch port settings should resolve any auto negotiation issues.

5.1.6 Remote Copy Mode

The Remote Copy mode (synchronous or asynchronous periodic) also impacts performance. For a detailed description of synchronous and asynchronous periodic modes, see [Remote Copy Operation](#) on page 2.20.

5.1.6.1 Asynchronous Periodic

Under normal operation, snapshots are created in asynchronous periodic mode. The presence of snapshots might decrease write performance due to the copying of the old data to the snapshot space.

5.1.6.2 Synchronous Mode

Synchronous mode adds more latency to host writes because the write has to be committed on both primary and backup storage servers. The host service time increases because the write operation has to be sent to the secondary server over the IP network and an acknowledgement must be sent back through this network before the host is acknowledged.

5.2 Performance Notes for RCFC Configuration

The following sections contain performance notes for Remote Copy over Fibre Channel (RCFC) configuration.

5.2.1 RCFC Links

For Remote Copy over Fibre Channel configurations, each link between a Remote Copy pair is a physical link between a controller node on one storage server and a controller node on the other storage server in the pair. These physical links can use a 4 Gbps Fibre Channel adaptor port from each of the two nodes in the storage servers that belong to the Remote Copy pair. Remote Copy over Fibre Channel (RCFC) uses a maximum of one RCFC link per node and a maximum of two RCFC links per system. For 1-to-N Remote Copy, the primary server can have a maximum of two RCFC links. For 1-to-N Remote Copy where there are two backup servers, the primary storage server can have a maximum of four RCFC interfaces.

5.2.2 Initial Sync

In general, when running Remote Copy on a pair of InServ Storage Servers, the highest link throughput (MB/s) is achieved during the initial synchronization of the primary and secondary volumes.

5.2.3 Distance

As the physical distance between the storage servers in the Remote Copy pair increases, there might be an increase in latency and a decrease in throughput.

5.2.4 Remote Copy Mode

Remote Copy over Fibre Channel supports synchronous and asynchronous periodic modes. See [Remote Copy Operation](#) on page 2.20 for additional information about each mode.

5.3 Scripting Notes

If a script is used to create the Remote Copy configuration and links are added using the `creatercopytarget` command, be aware that after the `admitrcopylink` command is invoked to configure the communication links, it takes some time for the TCP/IP connections to be established. It can take as long as two minutes for the links to be marked **Up** and the target marked **Ready**.

A

Quick Setup Guide

This Quick Setup Guide summarizes the commands required to set up storage server pairs for the use of 3PAR Remote Copy.

Refer to [Chapter 3, Remote Copy Setup](#) or [Chapter 4, Remote Copy in Domains](#) for detailed setup instructions and to [Appendix B, Remote Copy Commands](#) for command syntax.

This guide is divided into four sections:

- [Setting Up the Remote Copy Transport Layer for RCIP](#) on page A.2 summarizes how to configure the Remote Copy transport layer for Remote Copy over IP (RCIP).
- [Setting Up the Remote Copy Transport Layer for RCFC](#) on page A.3 summarizes how to configure the Remote Copy transport layer for Remote Copy over Fibre Channel (RCFC).
- [Setting Up Remote Copy](#) on page A.3 summarizes how to set up Remote Copy connections between the storage server pair and then start the use of Remote Copy.
- [Setting Up Synchronous Long Distance Remote Copy](#) on page A.7 summarizes how to set up Synchronous Long Distance Remote Copy connections between the storage server pairs and then start the use of Remote Copy.

A.1 Setting Up the Remote Copy Transport Layer for RCIP

Table A-1 summarizes how to configure the Remote Copy pair for RCIP.

Table A-1. RCIP Setup

Step	Reference	Primary System	Backup System
1	Setting Up the Remote Copy Interface for RCIP on page 3.9	<code>showport -rc</code>	<code>showport -rc</code>
2	"	For each port: <code>controlport rcip addr [-f] <port_IP> <netmask> <N:S:P></code>	For each port: <code>controlport rcip addr [-f] <port_IP> <netmask> <N:S:P></code>
3	Setting the Gateway on page 3.9	For each port: <code>controlport rcip gw [-f] <gateway_IP> <N:S:P></code>	For each port: <code>controlport rcip gw [-f] <gateway_IP> <N:S:P></code>
4	"	<code>showport -rcip</code>	<code>showport -rcip</code>
5	Verifying Connectivity on page 3.10	For each port: <code>controlport rcip ping <target_IP> <N:S:P></code>	--
6 (optional)	Increasing MTU (Optional) on page 3.11	For each port: <code>controlport rcip mtu 9000 <N:S:P></code>	For each port: <code>controlport rcip mtu 9000 <N:S:P></code>
7 (optional)	"	For each port: <code>controlport rcip ping -s 8972 -pf <target_IP> <N:S:P></code>	--

A.2 Setting Up the Remote Copy Transport Layer for RCFC

Table A-2 summarizes how to configure the Remote Copy pair for RCFC.

Table A-2. RCFC Setup

Step	Reference	Primary System	Backup System
1	Setting Up the Remote Copy Interface for RCFC on page 3.14	For each Fibre Channel adaptor port: <code>controlport config rcfc -ct point -f <N:S:P></code>	For each Fibre Channel adaptor port: <code>controlport config rcfc -ct point -f <N:S:P></code>
2	"	<code>showrctransport -rcfc</code>	<code>showrctransport -rcfc</code>
3	"	For each Fibre Channel adaptor port: <code>controlport rcfc init -f <N:S:P></code>	For each Fibre Channel adaptor port: <code>controlport rcfc init -f <N:S:P></code>
4	"	<code>showrctransport -rcfc</code>	<code>showrctransport -rcfc</code>

A.3 Setting Up Remote Copy

Table A-3 summarizes how to set up a bidirectional Remote Copy pair and to then begin using the Remote Copy software.

- For unidirectional configurations, follow steps 1 through 10 in Table A-3. If necessary, repeat the steps for each additional Remote Copy pair up to a maximum of four pairs.
- For N-to-1 Remote Copy configurations, follow steps 1 through 10 in Table A-3 to set up the first pair in the configuration. Repeat the entire process for each additional pair up to a maximum of four pairs.



NOTE: For N-to-1 Remote Copy, all Remote Copy pairs must share the same secondary storage server.

- For 1-to-N Remote Copy configurations, follow steps 1 through 10 in [Table A-3](#) to set up the first pair in the configuration. Repeat the entire process for each additional pair up to a maximum of two pairs.



NOTE: For 1-to-N Remote Copy, all Remote Copy pairs must share the same primary storage server.

For detailed instructions on setting up Remote Copy, refer to [Chapter 3, Remote Copy Setup](#) or [Chapter 4, Remote Copy in Domains](#).

Table A-3. Remote Copy Setup

Step	Reference	Primary System	Backup System
1	Setting Up the Primary Server on page 3.18	startrcopy	--
2	"	For RCIP: creatercopytarget <target_name> IP <node>:<IP_addr> For RCFC: creatercopytarget <target_name> FC <node_wwn> <N:S:P:WWN>	--
3	Setting Up the Backup Server on page 3.19	--	startrcopy

Table A-3. Remote Copy Setup (*continued*)

Step	Reference	Primary System	Backup System
4	"	--	For RCIP: <code>creatercopytarget</code> <code><target_name> IP</code> <code><node>:<IP_addr></code> For RCFC: <code>creatercopytarget</code> <code><target_name> FC</code> <code><node_wwn> <N:S:P:WWN></code>
5	"	<code>showrcopy</code>	<code>showrcopy</code>
6	<i>InForm OS CLI Administrator's Manual</i>	Create virtual volumes	Creates virtual volumes the same size as the primary servers.
7	Creating Remote Copy Volume Groups on page 3.21	<code>creatercopygroup</code> <code><group_name></code> <code><target_name>:<mode></code>	--
8 (optional) asynchronous periodic mode only	"	<code>setrcopygroup</code> <code>period <value></code> <code><target_name></code> <code><group_name></code>	--
9	"	<code>admitrcopyvv</code> <code>VV_name</code> <code>group_name</code> <code>target_name:sec_V</code> <code>V_name</code>	--
10	Start Copying on page 3.23	<code>startrcopygroup</code> <code><group_name></code>	--

Table A-3. Remote Copy Setup (*continued*)

Step	Reference	Primary System	Backup System
11 (for bidirectional Remote Copy)	Setting Up Bidirectional Remote Copy on page 3.25	--	<code>creatercopygroup <group_name> <target_name>:<mode></code>
12 (optional) <i>asynchronous periodic mode only</i>	"	--	<code>setrcopygroup period <value> <target_name> <group_name></code>
13	"	--	<code>admitrcopyvv <VV_name> <group_name> <target_name: sec_VV_name></code>
14	"	--	<code>startrcopygroup <group_name></code>

A.4 Setting Up Synchronous Long Distance Remote Copy

Table A-4 summarizes how to set up Synchronous Long Distance Remote Copy pairs and to then begin using the Remote Copy software.

Table A-4. Synchronous Long Distance Remote Copy Setup

Step	Reference	Primary System	Backup System 1 (synchronous)	Backup System 2 (asynchronous periodic)
1	Setting Up the Primary Server on page 3.31	<code>startrcopy</code>	--	--
2	*	For backup system 1: <code>creatercopytarget</code> <code><target_name></code> FC <code><node_wwn></code> <code><N:S:P></code>	--	--
3	*	For backup system 2: <code>creatercopytarget</code> <code><target_name></code> IP <code><node></code> : <code><link_IP_addr></code> <code><node></code> : <code><link_IP_addr></code>	--	--
4	Setting Up the Backup Servers on page 3.32	--	<code>startrcopy</code>	--

Table A-4. Synchronous Long Distance Remote Copy Setup (*continued*)

Step	Reference	Primary System	Backup System 1 (synchronous)	Backup System 2 (asynchronous periodic)
5	*	--	Define target 1 (primary system): <code>creatercopytarget</code> <target_name> FC <node_wwn>: <N:S:P>	--
6	*	--	Define target 2 (backup system 2): <code>creatercopytarget</code> <target_name> IP <node>: <link_IP_addr> <node>: <link_IP_addr>	--
7	*	--	--	<code>startrcopy</code>
8	*	--	--	Define target 1 (primary system): <code>creatercopytarget</code> <target_name> IP <node>: <link_IP_addr> <node>: <link_IP_addr>

Table A-4. Synchronous Long Distance Remote Copy Setup (*continued*)

Step	Reference	Primary System	Backup System 1 (synchronous)	Backup System 2 (asynchronous periodic)
9	*	--	--	Define target 2 (backup system 1): <code>creatercopytarget</code> <code><target_name></code> IP <code><node></code> : <code><link_IP_addr></code> <code><node></code> : <code><link_IP_addr></code>
10	Verifying Synchronous Long Distance Remote Copy Setup on page 3.34	<code>showrcopy</code>	<code>showrcopy</code>	<code>showrcopy</code>
11	<i>InForm OS CLI Administrator's Manual</i>	Create virtual volumes	Creates virtual volumes the same size as the primary servers.	Creates virtual volumes the same size as the primary servers.
11	Creating Synchronous Long Distance Remote Copy Volume Groups on page 3.36	<code>creatercopygroup</code> <code><group_name></code> <code><target1>:sync</code> <code><target2></code> : <code>periodic</code>	--	--

Table A-4. Synchronous Long Distance Remote Copy Setup (*continued*)

Step	Reference	Primary System	Backup System 1 (synchronous)	Backup System 2 (asynchronous periodic)
12	*	For each virtual volume created in step 11: <code>admitrcopyvv</code> <code><VV_name></code> <code><group_name></code> <code><backupsystem 1>:</code> <code><VV_name></code> <code><backupsystem 2>:</code> <code><VV_name></code>	--	--
13	*	<code>startrcopygroup</code> <code><group_name></code>	--	--
14	*	<code>showrcopy groups</code>	<code>showrcopy groups</code>	<code>showrcopy groups</code>

B

Remote Copy Commands

In this appendix

admitrcopylink	B.3
admitrcopytarget	B.5
admitrcopyvv	B.7
controlport	B.9
creatercopygroup	B.18
creatercopytarget	B.20
dismissrcopylink	B.23
dismissrcopytarget	B.25
dismissrcopyvv	B.27
growvv	B.29
removercopygroup	B.31
removercopytarget	B.33
setrcopygroup	B.35
setrcopytarget	B.43
setvv	B.47

showport	B.52
showrcopy	B.57
showrctransport	B.62
startrcopy	B.66
startcopygroup	B.67
statport	B.69
statrcopy	B.74
stoprcopy	B.77
stopcopygroup	B.79
syncrcopy	B.81

COMMAND

`admitrcopylink`

DESCRIPTION

The `admitrcopylink` command adds one or more links (connections) to a Remote Copy target system.

SYNTAX

- For Remote Copy over IP (RCIP), the syntax for the `admitrcopylink` command is as follows:

```
admitrcopylink <target_name> <N:S:P:IP_address>...
```

- For Remote Copy over fibre channel (RCFC), the syntax for the `admitrcopylink` command is as follows:

```
admitrcopylink <target_name> <N:S:P:WWN>...
```

AUTHORITY

Service



NOTE: You need access to all domains in order to run this command.

OPTIONS

None.

SPECIFIERS

`<target_name>`

The target name, as specified with the `creatercopytarget` command (see [creatercopytarget](#) on page B.20).

`<N:S:P:IP_address>...`

Specifies the node, slot, and port of the Ethernet port on the primary system and an IP address on the target system.

`<N:S:P:WWN>...`

Specifies the node, slot, and port of the Fibre Channel adaptor port on the primary system and a world wide name (WWN) address on the target system.

RESTRICTIONS

Functionality of this command requires the 3PAR Remote Copy license. Contact your local service provider for more information.

EXAMPLES

The following example adds a link on `System2` (<target_name>), using the node, slot, and port information of node 1, slot 1, port 1 of the Ethernet port on the primary system. The IP address 193.1.2.11 specifies the address on the target system:

```
cli% admitcopylink System2 1:1:1:193.1.2.11
```

The following WWN creates an RCFC link to target `System2`, which connects to the local 5:3:2 (N:S:P) in the target system:

```
cli% admitcopylink System2 FC 5:3:2:20010002AC000060
```

NOTES

- The mode (RCIP or RCFC) is set using the `creatercopytarget` command. See [creatercopytarget](#) on page B.20.
- This command concludes by returning a list of one or more links to be admitted.
- For IP targets this list is made up of pairs composed of the node of the ethernet port on the local system and an IP address of the peer port on the target system.
- For FC targets this list is made up of sets with the node, slot, and port of the FC port on the local system and WWN of the peer port on the target system.
- The specifier <node:IP_address> has been deprecated.

COMMAND

`admitrcopytarget`

DESCRIPTION

The `admitrcopytarget` command adds a target to a Remote Copy volume group.

SYNTAX

```
admitrcopytarget <target_name> <mode> <group_name>
[ <pri_VV_name>:<sec_VV_name> ] . . .
```

AUTHORITY

Service



NOTE: You need access to all domains in order to run this command.

OPTIONS

None.

SPECIFIERS

`<target_name>`

Specifies the name of the target that was previously created with the `creatercopytarget` command (see [page B.20](#)).

`<mode>`

Specifies the mode of the target as either synchronous (`sync`) or asynchronous periodic (`periodic`).

`<group_name>`

Specifies the name of the existing Remote Copy volume group created with the `creatercopygroup` command (see [page B.18](#)), to which the target will be added.

`[<pri_VV_name>:<sec_VV_name>] . . .`

Specifies the mapping between the names of a volume in the primary group and the corresponding volume on the added target. This specifier must be included for every volume in the primary volume group. This specifier is not required only if the group contains no volumes.

RESTRICTIONS

Functionality of this command requires the 3PAR Remote Copy license. Contact your local service provider for further information.

EXAMPLES

In the following example, the `admitrcopytarget` command adds the target `target1` in synchronous mode to volume group `Group1`.

```
cli% admitrcopytarget target1 sync Group1
```

NOTES

None.

COMMAND

```
admitrcopyvv
```

DESCRIPTION

The `admitrcopyvv` command adds an existing virtual volume to an existing Remote Copy volume group.

SYNTAX

```
admitrcopyvv <VV_name> <group_name> [<target_name>:<sec_VV_name>]
```

AUTHORITY

Service



NOTE: You need access to the domain of the specified group (*<group_name>*) in order to run this command.

OPTIONS

None.

SPECIFIERS

<VV_name>

Specifies the name of the existing virtual volume to be admitted to an existing Remote Copy volume group that was created with the `creatercopygroup` command (see [page B.18](#)).

<group_name>

Specifies the name of the existing Remote Copy volume group created with the `creatercopygroup` command (see [page B.18](#)), to which the volume will be added.

<target_name>:<sec_VV_name>

The target name associated with this group, as set with the `creatercopygroup` command (see [page B.18](#)). The target is created with the `creatercopytarget` command (see [page B.20](#)). *<sec_VV_name>* specifies the name of the secondary volume on the target system. In a Synchronous Long Distance Remote Copy setup, this specifier is required for every target of the group.

RESTRICTIONS

Functionality of this command requires the 3PAR Remote Copy license. Contact your local service provider for further information.

EXAMPLES

In the following example, the `admitcopyvv` command adds the volume `vv1` to the primary volume group `Group1`. At the same time, it adds the volume on the target system `InServ1_in` to the corresponding secondary volume group `Group1.r<sys_ID>` that was previously created by issuing the `creatercopygroup` command:

```
cli% admitcopyvv vv1 Group1 InServ1_in:Group1.r<sys_ID>
```

NOTES

- A secondary volume mapping must be provided for each target in the group.
- If a group's target has the `mirror_config` policy set and the group is a primary group, then this command is mirrored to that target and the volume is added to the secondary volume group. If the policy is set and the group is a secondary, this command fails.
- For multiple target Remote Copy groups, in addition to adding the primary/secondary mapping on the target systems, the relevant mapping between the target systems will be added to the backup groups.

COMMAND

controlport

DESCRIPTION

The `controlport` command controls all aspects of a Fibre Channel or Remote Copy port, including the port's connection type and data rate. The `controlport rcip` and `controlport rcfc` commands are required in setting up Remote Copy interfaces.

SYNTAX

The syntax for the `controlport rcip` and `rcfc` commands can be one of the following:

- `controlport config <connmode> [-ct <ctval>] [-unique_nwwn enable|disable] [-f] <node:slot:port>...`
- `controlport rst [-m <mode>|-l|-i] [-f] <node:slot:port>...`
- `controlport offline <node:slot:port>...`
- `controlport lip [-c <cagename>] [-f] <node:slot:port>...`
- `controlport ct <ctval> [-f] <node:slot:port>...`
- `controlport cl2 <cl2val> [-f] <node:slot:port>...`
- `controlport rate <rateval> [-f] <node:slot:port>...`
- `controlport vcn <vcnval> [-f] <node:slot:port>...`
- `controlport nssync [-f] <node:slot:port>...`
- `controlport intcoal <intcoalval> [-f] <node:slot:port>...`
- `controlport rcip addr [-f] <IP_address> <netmask> <node:slot:port>...`
- `controlport rcip gw [-f] <gateway_address> <node:slot:port>...`
- `controlport rcip delete [-f] <node:slot:port>...`
- `controlport rcip mtu <MTU_size> <node:slot:port>...`
- `controlport rcip state up|down [-f] <node:slot:port>...`
- `controlport rcip speed <value> half|full <node:slot:port>...`
- `controlport rcip speed auto <node:slot:port>...`

- `controlport rcip ping [-c <count>|-w <wait>|-s <size>|-pf] <IP_address> <node:slot:port>...`
- `controlport rcfc init [-f] <node:slot:port>`
- `controlport rcfc delete [-f] <node:slot:port>`

AUTHORITY

Super, Service



NOTE: You need access to all domains in order to run this command.

SUBCOMMANDS

`config`

Sets the specified connection mode and type on FC ports. Also allows setting the unique node WWN option for the port. When `unique_nwwn` is enabled, the port presents a unique node name on the connection and this is needed by certain initiators such as ONTAP.

`rst`

Resets a port.

`offline`

Holds the specified port offline indefinitely. Issue `controlport rst` to bring the port back online.

`lip`

Specifies that a Loop Initialization Primitive (LIP) command is issued from the port if there is a private loop topology. If the `-c` option is specified, then the LIP command is issued through the specified drive cage. If there is a point-to-point topology, then the link is reset. If there is a public loop or fabric topology, then a Registered State Change Notification is issued to the fabric controller.

`ct`

Sets the connection type. The specified port will be reset. Note that this option is deprecated and will be removed in a subsequent release.

`c12`

Specifies the Fibre Channel Class-2 parameter of the port. The specified port will be reset. Note that this option is deprecated and will be removed in a subsequent release.

`rate`

Specifies the data rate of the Fibre Channel port. The specified port will be reset.

`vcn`

Sets the VLUN Change Notification (VCN) generation support (enable or disable). When VCN generation support is enabled with a public loop or fabric topology, a Registered State Change Notification (RSCN) message is issued to the fabric controller whenever a VLUN is created or removed. In addition, if enabled with a public loop topology, a Loop Initialization (LIP) is issued from the port whenever a VLUN is created or removed.

`persona`

Port personas have been removed and this command no longer sets them. As port personas have been replaced by host personas, this command will print the host persona commands to use instead. See `createhost` and `sethost` for setting host personas and `controlport config` for setting port parameters.

`nssync`

Verifies current port database against the Name Server when a fabric is attached. Entries present in the database but missing from the Name Server are removed. Using this command is not required under normal circumstances.

`rcip addr`

Sets the Remote Copy interface to use the specified IP address and netmask. Refer to [Specifiers](#) on page B.14 for parameters required to issue this subcommand.

`rcip gw`

Sets the gateway for one or more Remote Copy interfaces. Only for RCIP ports. Refer to [Specifiers](#) on page B.14 for parameters required to issue this subcommand.

`rcip delete`

Deletes the configuration for one or more specified Remote Copy interfaces. Refer to [Specifiers](#) on page B.14 for parameters required to issue this subcommand.

`rcip mtu`

Sets the Maximum Transfer Unit (MTU) size for the specified Remote Copy interface(s), overriding the default of 1500. The largest supported value is 9000 and the smallest is 100. Only for RCIP ports. Refer to [Specifiers](#) on page B.14 for parameters required to issue this subcommand.

`rcip state up|down`

Sets the specified Remote Copy interface(s) as either up or down. Only for RCIP ports. Refer to [Specifiers](#) on page B.14 for parameters required to issue this subcommand.

`rcip speed`

Sets the specified Remote Copy interface(s) to use the specified speed and duplex, or to auto negotiate speed and duplex. The default is `auto`. Only for RCIP ports. Refer to [Specifiers](#) on page B.14 for parameters required to issue this subcommand.

`rcip ping`

Performs a ping from the specified interface to the specified address. Only for RCIP ports. See [Specifiers](#) on page B.14 for parameters required to issue this subcommand. Use with the `-pf` option to prevent fragmentation of packets (see [Options](#) on page B.12).

`rcfc init`

Initializes the Fibre Channel interface on the specified port. Refer to [Specifiers](#) on page B.14 for parameters required to issue this subcommand.

`rcfc delete`

Deletes the Fibre Channel interface on the specified port. Refer to [Specifiers](#) on page B.14 for parameters required to issue this subcommand.

`intcoal`

Enables or disables interrupt coalescing. The specified port will be reset.

OPTIONS

`-m <mode>`

This option can only be used with the `rst` subcommand. Resets the mode of the port. The port can be reset to a target or initiator mode. If not specified, the port is reset to its current mode. If the port's mode change value is prohibited, this command fails when attempting to reset to a different mode. Use `showport -c` to see whether mode change is allowed or prohibited for a particular port. See NOTES for additional information regarding port pair protection. This option is deprecated and will be removed in a later release. Use `controlport config` to set target (host) or initiator (disk) modes.

-l

Forces the port to reload firmware. This option can only be used with the `rst` subcommand and cannot be used with the `-i` option.

-c

When used with the `lip` subcommand:

-c < cage_name >

If using a private loop topology, a Loop Initialization Primitive (LIP) command is issued from the port. If a cage is specified using the < cage_name > argument, the LIP is issued through the cage controller.

If using a point-to-point topology, the link is reset. If using a public loop or fabric topology, a Registered State Change Notification (RSCN) message is issued to the fabric controller.

When used with the `rcip ping` subcommand:

-c < count >

Specifies the number of replies accepted by the system before terminating the command. The default is 1; the maximum value is 25.

-f

Specifies that the command is forced. If this option is not used, the command requires confirmation before proceeding with its operation.

-i

Forces a mode change for a port even if the port's mode change value is prohibited. The partner port's mode is changed with this option as well. Use with the `controlport rst` command. This option cannot be used with the `-l` option.

-w < wait >

Specifies the maximum amount of time to wait for replies. The default is the number of requested replies plus 5. The maximum value is 30. If a number is not specified, the option and argument can be used with the `rcip ping` subcommand.

-s < size >

Specifies the packet size. If no size is specified, the option defaults to 64. This option and argument can only be used with the `rcip ping` subcommand.

`-pf`

Prevents fragmentation of the packets when issuing the `controlport rcip ping` command.

`-unique_nwwn enable|disable`

Enable or disable the use of a unique node WWN on the specified port

SPECIFIERS

`<ctval>`

Specifies the connection parameter of the port. Parameters can be `loop`, or `point`. The `loop` parameter sets the port to arbitrated loop mode, the `point` parameter sets the port to point-to-point mode. This specifier must be provided when issuing the `ct` subcommand.

`<cl2val>`

Specifies the Fibre Channel Class-2 parameter of the port. Parameters can be one of `ack0`, `ack1`, or `disable`. This specifier must be provided when issuing the `cl2` subcommand.

`<rateval>`

Specifies the data rate of the Fibre Channel port. Rates can be `1`, `2`, `4`, or `auto`. `1` sets the data rate to 1 Gbps, `2` sets the data rate to 2 Gbps, and `4` sets the data rate to 4 Gbps. The `auto` parameter sets the port to auto detect the data rate. This specifier must be used when issuing the `rate` subcommand.

`<vcnval>`

Specifies the value of the VCN. The VCN value can be set to `enable` or `disable`. This specifier must be used when issuing the `vcn` subcommand.

`<impval>`

Specifies the IMP port attribute. The IMP value can be set as `enable` or `disable`. This specifier must be used when issuing the `imp` subcommand.

`<intcoalval>`

Specifies if interrupt coalescing is enabled or disabled. The value can be set as `enable` or `disable`. This specifier must be used with the `intcoal` subcommand.

`<node:slot:port>`

Specifies the port to be controlled.

`node`

Specifies the node number using a number from 0 to 7.

slot

Specifies the PCI bus slot in the specified node using a number from 0 to 6.

port

Specifies the Fibre Channel adaptor port number of the PCI card in the specified PCI bus slot using 1 to 4.

<IP_address>

Specifies the IP address for a Remote Copy interface.

<gateway_address>

Specifies the gateway address for a Remote Copy interface.

<netmask>

Specifies the netmask for a Remote Copy interface.

<MTU_size>

Specifies the MTU size for a Remote Copy interface using an integer from 100 through 9000. If no integer is specified, the value defaults to 1500.

<speed> half | full

Use only with the `rcip speed` subcommand. Specifies the speed setting (10, 100, or 1000) and duplex setting (half or full) for a Remote Copy interface. In addition to this specifier, you must also specify an interface using `<node:slot:port>`. If no speed or duplex settings are specified, or if you specify `auto` with the `rcip speed` subcommand, the system auto-negotiates the speed and duplex.

<connmode>

Specifies whether the port is used for a disk, host, or RCFC connection. This specifier must be used when issuing the `config` command.

RESTRICTIONS

- See the *InForm OS Command Line Interface Reference* for a complete list of restrictions.
- The `controlport rcip addr` command is only allowed for node/slot/port combinations where there is an interface installed.

EXAMPLES

The following example shows how to increase MTU to 9000 on Gigabit Ethernet port 1 in node 6, slot 3:

```
cli% controlport rcip mtu 9000 6:3:1
Remote Copy change successful.
```

The following example shows how to set Remote Copy interface 172.16.1.11 on a GigE port 1 in node 6, slot 3 using a netmask of 255.255.255.0:

```
cli% controlport rcip addr 172.16.1.11 255.255.255.0 6:3:1
Are you sure you want to change the address for 6:3:1?
select q=quit y=yes n=no: y
Remote Copy interface change successful.
```

The following example shows how to set the gateway for Gigabit Ethernet port 1 in node 6, slot 3 using a gateway address of 172.16.1.1:

```
cli% controlport rcip gw 172.16.1.1 6:3:1
Are you sure you want to change the gateway for 6:3:1?
select q=quit y=yes n=no: y
Remote Copy interface change successful.
```

NOTES

- The `-f` option forces the operation. Without the option, the command will prompt for confirmation. In some cases the command will ask for confirmation even if the `-f` option is specified because the operation might disrupt system operation.
- The `-m <mode>` option for the `rst` subcommand cannot be specified if there are active connections already using the port (port online) except as noted in the following section under port pair protection. Port pair protection:
 - ◆ For dual-port LSI Fibre Channel adapters, both ports in the pair must use the same mode (initiator or target).
 - ◆ For quad-port LSI Fibre Channel adapters, each port pair (ports 1 and 2, ports 3 and 4) must use the same mode.
 - ◆ Changing the mode of one port in a pair (for example, from initiator to target) causes the other port in the pair to undergo a mode change as well.

- If there are active hosts or physical disks when issuing the `controlport rst` or `offline` commands, a warning is returned and you are prompted for confirmation to complete the execution of the commands.
- When issuing the `controlport ct`, `cl2`, `rate`, or `rscn` commands, if there are active disks on the port, an error is returned. If there are active hosts on the port, the `-f` option is overridden (if specified), a warning is returned, and you are prompted for confirmation to complete the execution of the commands.
- The `controlport rcip addr` command is only allowed for node/slot/port combinations where there is an interface installed.
- `controlport config` mode changes are not allowed when ports are online.
- The `ct`, `cl2`, or `rate` subcommands automatically reset the port for the changes to take effect.
- Issue the `showport` command with either the `-i` or `-par` options to verify the success of the `controlport` command.
- Resetting a port causes a momentary dip in throughput, but no loss of connectivity.
- Use caution when changing modes for ports in LSI Fibre Channel adapters. Changing the mode of one port in a pair (for example, from initiator to target) causes the other port in the pair to also undergo a mode change. In the case where one port in the pair is offline (and therefore a mode change can be allowed), but the partner port is online, changing the mode of the offline port causes the online partner port to undergo mode change as well. This results in loss of use of the partner port because it is no longer online.
- Issuing the `controlport rst -l` command affects both ports of a port pair. Only use this command when irreversible damage has been done to a port or port pair.

COMMAND

`creatercopygroup`

DESCRIPTION

The `creatercopygroup` command creates a Remote Copy volume group.

SYNTAX

```
creatercopygroup [options] <group_name> [<target_name>:<mode>...]
```

AUTHORITY

Super, Edit

OPTIONS

`-domain <domain>`

Creates the Remote Copy group in the specified domain. The volume group must be created by a member of a particular domain with Super or Edit privileges.

SPECIFIERS

`<group_name>`

Specifies the name of the volume group, using up to 22 characters if the `mirror_config` policy is set, or up to 31 characters otherwise. This name is assigned with this command.

`[<target_name>:<mode>...]`

In a Synchronous Long Distance Remote Copy setup, this specifier is required for every target of the group. This specifier can be repeated to specify multiple targets.

`<target_name>`

Specifies the target name associated with this group. This name should have already been assigned using the `creatercopytarget` command (see [creatercopytarget](#) on page B.20).

`<mode>`

Specifies that the mode of the created group is either kept in synchronization at all times (`sync`) or synchronized only periodically (`periodic`), either on command or by setting an automatic resynchronization period through the `setrcopygroup` command. See [setrcopygroup](#) on page B.35 for details.

RESTRICTIONS

This command requires the 3PAR Remote Copy license. Contact your local service provider for further information.

EXAMPLES

The following example creates an asynchronous periodic mode volume group named `Group1` whose target system is `InServ2` (target name `InServ2_out`):

```
cli% creatercopygroup Group1 InServ2_out:periodic
```

If using domains, the syntax would appear as:

```
cli% creatercopygroup -domain domain2 Group1 InServ2_out:periodic
```

NOTES

- If the `mirror_config` policy is set for this group's target and the group is a primary group, then the `creatercopygroup` command will be mirrored to the target and a corresponding secondary volume group will also be created. The secondary group uses the same group name with `.r<Sys ID>` added as a suffix, for example `.r129` for `InServ 1000129`. If the `mirror_config` policy is set and the group is a secondary group, then this command will fail.
- The maximum length of the group is 22 characters if the `mirror_config` option policy is set for the specified target. If it is not set, the maximum length is 31 characters.
- For multiple target Remote Copy groups, when creating a group with multiple targets, the groups created on those targets will also be created with a backup target between the secondary groups.

COMMAND

`creatercopytarget`

DESCRIPTION

The `creatercopytarget` command creates a Remote Copy target definition.

SYNTAX

The syntax for the `creatercopytarget` command can be one of the following:

- Syntax for Remote Copy over IP (RCIP) is as follows:

```
creatercopytarget [options] <target_name> IP  
[<node:slot:port:IP_address>]...
```

- Syntax for Remote Copy over Fibre Channel (FCFC) is as follows:

```
creatercopytarget [options] <target_name> FC <node_wwn>  
[<node:slot:port:WWN>]...
```

AUTHORITY

Super, Edit



NOTE: You need access to all domains in order to run this command.

OPTIONS

`-disabled`

Creates the target in disabled mode.

SPECIFIERS

`<target_name>`

The name of the target definition to be created, specified by using up to 31 characters.

`<node_wwn>`

The node's World Wide Name (WWN) on the target system (Fibre Channel target only).

`[<node:slot:port:IP_address>]...`

Specifies the node, slot, and port of the Ethernet port on the local system and an IP address of the peer port on the target system. This specifier can be repeated.

```
[<node:slot:port:WWN>]...
```

Specifies the node, slot, port of the Fibre Channel adaptor port on the primary system and World Wide Name (WWN) of the peer port on the target system. This specifier can be repeated.

RESTRICTIONS

Functionality of this command requires the 3PAR Remote Copy license. Contact your local service provider for more information.

EXAMPLES

The following example creates a target definition named `InServ2` on the primary system, where the node numbers of the primary server's Ethernet ports are located at `0:3:1` and `1:3:1` and the corresponding IP addresses on the backup server are `10.1.1.11` and `10.1.2.11`:

```
cli% creatercopytarget InServ2 IP 0:3:1:10.1.1.11 1:3:1:10.1.2.11
```

The following example creates a primary target definition named `InServ1` on the backup system, where the node numbers of the backup system's Ethernet ports are located at `2:3:1` and `3:3:1` and the corresponding IP addresses on the primary server are `10.1.1.96` and `10.1.2.96`:

```
cli% creatercopytarget InServ1 IP 2:3:1:10.1.1.96 3:3:1:10.1.2.96
```

The following example creates a target definition named `InServ2` on the local system where the node WWN of the target system is `20010002AC000060`:

```
cli% creatercopytarget InServ2 FC 20010002AC000060 0:4:1:22410002AC000060  
1:4:1:23410002AC000060
```

NOTES

- IP targets are made up of pairs composed of the node, slot and port of the ethernet port on the local system and an IP address of the peer port on the target system.
- FC targets are made up of sets with the node, slot, and port of the FC port on the local system and WWN of the peer port on the target system.

COMMAND

```
dismissrcopylink
```

DESCRIPTION

The `dismissrcopylink` command removes one or more links (connections) created with the `admitrcopylink` command to a target system.

SYNTAX

- Syntax for Remote Copy over IP (RCIP) is as follows:

```
dismissrcopylink <target_name> <N:S:P:IP_address>...
```

- For Remote Copy over Fibre Channel (RCFC):

```
dismissrcopylink <target_name> <N:S:P:WWN>...
```

AUTHORITY

Service



NOTE: You need access to all domains in order to run this command.

OPTIONS

None.

SPECIFIERS

<target_name>

The target name, as specified with the `creatercopytarget` command (see [creatercopytarget](#) on page B.20).

<node:slot:port:IP_address> . . .

Specifies the node, slot, and port of the Ethernet port on the local system and an IP address of the peer port on the target system. This specifier can be repeated.

<node:slot:port:WWN> . . .

Specifies the node, slot, and port of the Fibre Channel adaptor port on the primary system and a World Wide Name (WWN) of the peer port on the target system. This specifier can be repeated.

RESTRICTIONS

- This command requires a 3PAR Remote Copy license. Contact your local service provider for further information.
- This command should only be used to remove sending links. See [Remote Copy Links](#) on page 2.17 for details on sending and receiving links.
- This command cannot be used to remove the last link of a target system with started groups.

EXAMPLES

The following example removes the link from the Ethernet port located at 2:2:2 of System 2:

```
cli% dismissrcopylink System2 2:2:2:193.1.2.11
```

NOTES

- This command is finished with a list of one or more links to be dismissed.
- For IP targets, this list is made up of pairs composed of the node containing the Ethernet port on the primary system and an IP address on the backup system.
- For Fibre Channel targets, this list is made up of sets with the node, slot, and port of the Fibre Channel adaptor port on the primary system and a WWN address on the backup system.

COMMAND

```
dismissrcopytarget
```

DESCRIPTION

The `dismissrcopytarget` command removes a Remote Copy target from a Remote Copy volume group.

SYNTAX

```
dismissrcopytarget <target_name> <group_name>
```

AUTHORITY

Service



NOTE: You need access to all domains in order to run this command.

OPTIONS

None.

SPECIFIERS

<target_name>

The name of the target to be removed.

<group_name>

The name of the group that currently includes the target.

RESTRICTIONS

- This command requires the 3PAR Remote Copy license. Contact your local service provider for further information.
- The `dismissrcopytarget` command will not allow the removal of a group's last target.

EXAMPLES

The following example removes target `Target1` from `Group1`:

```
cli% dismissrcopytarget Target1 Group1
```

NOTES

None.

COMMAND

```
dismissrcopyvv
```

DESCRIPTION

The `dismissrcopyvv` command removes a virtual volume from a Remote Copy volume group.

SYNTAX

```
dismissrcopyvv <VV_name> <group_name>
```

AUTHORITY

Edit, Service



NOTE: You need access to the domain of the specified group (`<group_name>`) in order to run this command.

OPTIONS

None.

SPECIFIERS

`<VV_name>`

The name of the volume to be removed. Volumes are added to a group with the `admitrcopyvv` command.

`<group_name>`

The name of the group that currently includes the virtual volume.

RESTRICTIONS

- This command requires the 3PAR Remote Copy license. Contact your local service provider for further information.
- A volume cannot be removed from a group that is not currently stopped.

EXAMPLES

The following example removes virtual volume `vv1` from `Group1`:

```
cli% dismissrcopyvv vv1 Group1
```

NOTES

- The `dismissrcopyvv` command removes any Remote Copy synchronization snapshots affiliated with the removed volume.
- If a group's target has the `mirror_config` policy set and the group is a primary group, then this command will be mirrored to that target and the volume will be removed from the corresponding secondary group. If the policy is set and the group is a secondary, then this command will fail.

COMMAND

growvv

DESCRIPTION

The `growvv` command increases the size of a virtual volume.

SYNTAX

```
growvv <VW_name> <size>[g|G|t|T]
```

AUTHORITY

Edit, Service



NOTE: You need access to the domain of the specified group (<group_name>) in order to run this command.

OPTIONS

None.

SPECIFIERS

<VW_name>

The name of the volume to be grown.

<size>[g|G|t|T]

The size to be added to the volume's user space. The size is specified in multiples of 256 MB. You can optionally specify the grow size in gigabytes (g or G) or in terabytes (t or T).

RESTRICTIONS

- In order to grow a virtual volume in a Remote Copy group, that group must first be stopped.
- You must grow the corresponding virtual volume on the secondary system by the same amount or the Remote Copy group will not restart.

EXAMPLES

The following example increases the size of virtual volume `vv1` by two terabytes:

```
cli% growvv vv1 2t
```

NOTES

Ensure that there is sufficient space to mirror the grow of the volume on the secondary server before growing the volume on the primary server.

COMMAND

`removercopygroup`

DESCRIPTION

The `removercopygroup` command removes a Remote Copy volume group.

SYNTAX

`removercopygroup <group_name>`

AUTHORITY

Edit

OPTIONS

None.

SPECIFIERS

`<group_name>`

The name of the group to be removed.

RESTRICTIONS

- This command requires the 3PAR Remote Copy license. Contact local service provider for further information.
- This is not allowed if Remote Copy is in progress; the system will generate an error. The group must be stopped using the `stoprcopygroup` command.
- You need access to the domain of the specified group (`<group_name>`) in order to run this command.

EXAMPLES

CAUTION: Ensure that the correct group to be removed has been selected before executing this command.

The following example removes Group1 from a Remote Copy system:

```
cli% removercopygroup Group1
```

NOTES

- If the `mirror_config` policy is set for this group's target system and the group is a primary group, then this command will be mirrored to the target and the corresponding secondary group will also be removed. If the policy is set and the group is a secondary group, then this command will fail
- The `removercopygroup` command removes all the associations configured in the specified group and removes the group name and any Remote Copy synchronization snapshots affiliated with volumes in the group.

COMMAND

```
removercopytarget
```

DESCRIPTION

The `removercopytarget` command removes target designation from a Remote Copy system and removes all links affiliated with that target definition.

SYNTAX

```
removercopytarget [options] <target_name>
```

AUTHORITY

Edit



NOTE: You need access to all domains in order to run this command.

OPTIONS

`-cleargroups`

Remove all groups that have no other targets or dismiss this target from groups with additional targets. All groups that contain this target must be stopped before this can be issued.

`-f`

Do not ask for confirmation when `-cleargroups` is specified.

SPECIFIERS

`<target_name>`

The target name for the target definition to be removed.

RESTRICTIONS

- This command requires the 3PAR Remote Copy license. Contact your local service provider for further information.
- A target definition cannot be deleted if it is being used by any group.

EXAMPLES

The following example removes targets InServ1 and InServ2 from the primary and backup servers in a Remote Copy pair:

```
cli% removercopytarget InServ1  
cli% removercopytarget InServ2
```

NOTES

None.

COMMAND

`setrcopygroup`

DESCRIPTION

The `setrcopygroup` command does the following:

- Sets the policy of the Remote Copy volume group for dealing with I/O failure and error handling.
- Switches the direction of transfer between volume groups.
- Sets a resynchronization period for volume groups in asynchronous periodic mode.
- Sets the group's mode.

SYNTAX

The syntax for the `setrcopygroup` command can be one of the following:

- `setrcopygroup pol [options] <policy> <group_name>`
- `setrcopygroup period <period_value> <target_name> <group_name>`
- `setrcopygroup mode <mode_value> <target_name> <group_name>`
- `setrcopygroup <dr_operation> [options] <target_name|group_name>...`

AUTHORITY

Edit

SUBCOMMANDS

`pol`

Sets the policy of the Remote Copy volume group for dealing with I/O failure and error handling.

`period`

Specifies that groups in asynchronous periodic mode should be periodically synchronized in accordance with the specified with the `<period_value>` specifier.

`mode`

Specifies the mode to which the volume group will be set.

OPTIONS

-t

Specifies that the `setrcopygroup <dr_operations>` command be applied to all relevant groups of the indicated target. If no group names are specified, then all groups in that target that are in the correct state for the specified subcommand will have it applied to them. For groups with multiple targets, this option must be specified for the `recover`, `restore`, `reverse`, and `pol` subcommands.

-f

Does not ask for confirmation for disaster recovery commands.

-nostart

Specifies that groups are not started after the role reversal is completed through the `recover` and `restore` specifiers.

-nosync

Specifies that groups are not synced after the role reversal is completed through the `recover` and `restore` specifiers.

-discard

Specifies that if a group has multiple targets that group does not check with its other targets to see if newer data should be pushed from them. This option is only valid if `failover` is used as the `<dr_operation>` specifier.

-nopromote

Specifies that the synchronized snapshot of groups that are switched from primary to secondary with the `reverse` specifier not be promoted to the base volume. This option is only valid for the `reverse` specifier. When used with the `failover` specifier it indicates that snapshots of groups that are switched from secondary to primary should not be promoted to the base volume in the case where all volumes of the group were not synced to the same time point. The incorrect use of this option can lead to the primary and secondary volumes not being consistent.

-nosnap

Specifies that snapshots are not taken of groups that are switched from secondary to primary. Additionally, existing snapshots are not deleted if groups are switched from primary to secondary.

-stopgroups

Specifies that groups are stopped before running the indicated `reverse` or `restore` values of the `<dr_operation>` specifier.

-local

When issuing the command with *reverse* as the value of the <dr_operation> specifier, only the group's direction is changed on the system where the command is issued.

-natural

When issuing the command with the *reverse* as the value of the <dr_operation> specifier, only the natural direction of the groups is reversed, leaving the current direction unchanged.

-current

When issuing the command with the *reverse* as the value of the <dr_operation> specifier, only the current direction of the groups is reversed, leaving the natural direction unchanged.

-waittask

Wait for all tasks created by the *setrcopygroup* command to complete before returning. This option applies to the *failover*, *recover*, *restore*, and *reverse* <dr_operation> specifier.

SPECIFIERS

<policy>

Specifies the policy to assign to the group. Valid policies are:

fail_wrt_on_err

Specifies that if Remote Copy is started for the volume group and a write to the secondary system fails, then an I/O error is returned to the host.

no_fail_wrt_on_err

Specifies that if Remote Copy is started for the volume group and a write to the secondary system fails, then the Remote Copy operation is stopped and an I/O error is not returned to the host (default).

auto_recover

Specifies that if the Remote Copy is stopped as a result of the Remote Copy links going down, the group will be restarted automatically after the links come back up. If this policy is enabled for a group while the group is stopped after link failures it will be only be started when the links come up for the failed target. If the links are already up at the time the policy is set then the group will not be restarted at that time.

`no_auto_recover`

Specifies that if the Remote Copy is stopped as a result of the Remote Copy links going down, the group must be restarted manually after the links come back up (default).

`over_per_alert`

If a synchronization of a periodic Remote Copy group takes longer to complete than its synchronization period, an alert will be generated. This is the default behavior.

`no_over_per_alert`

If a synchronization of a periodic Remote Copy group takes longer to complete than its synchronization period then an alert will not be generated.

If no policy is specified, the `no_fail_wrt_on_err` and `no_auto_recover` policies are implemented by default.



NOTE: When issuing the `setrcopygroup <dr_operation>` command, either the `<group_name>` specifier or the `<target_name>` specifier must be specified.

`<dr_operation>`

Specifies the operation of the group(s). Valid operations are:

`reverse`

Changes the natural and current direction of all specified groups. The operation is mirrored resulting in a direction change on both systems.



NOTE: The `reverse` specifier is not to be used as part of the normal disaster recovery process. See [Chapter C, Example Setup and Disaster Recovery](#) for disaster recovery procedures.

`failover`

Changes secondary volume groups to primary volume groups on the primary system in the event of a server failure. If the group has multiple targets it will also attempt to pull more recent data from other targets and start Remote Copy to those targets when complete.

recover

Used for groups on which the `failover` operation has already been run. Changes matching primary volume groups on the backup system to secondary volume groups and then starts and synchronizes all groups.

restore

Used on groups on which the `recover` operation has already been run. Returns all groups to their natural direction and starts them.

<group_name>

Specifies the name of the volume group whose policy is to be set, or whose target designation is to be switched.

<target_name>

Specifies the target name for the target definition created with the `creatercopytarget` command (see [creatercopytarget](#) on page B.20).

<period_value>s|m|h|d

Specifies the time period in units of seconds (s), minutes (m), hours (h), or days (d), for automatic resynchronization (e.g. 14h for 14 hours). The time must be longer than or equal to five minutes and not more than one year in duration, or set to zero to indicate that no period should be used. This specifier can only be used with the `period` subcommand.

<mode_value>

Specifies the mode, `sync` or `periodic`, to which the group is set. This specifier can only be used with the `mode` subcommand.

RESTRICTIONS

- This command requires the 3PAR Remote Copy license. Contact your local service provider for further information.
- When issuing the `setrcopygroup <dr_operation>` command, either the `<group_name>` specifier or the `<target_name>` specifier must be specified.
- Reversing the direction of primary volumes will result in the loss of any data changed after the group was stopped.
- The period can be set only for groups whose mode is asynchronous periodic (see [creatercopygroup](#) on page B.18).

- The reverse value of the `<dr_operation>` is not to be used as part of the normal disaster recovery process.

EXAMPLES

The following example sets the group policy for Group1:

```
cli% setrcopygroup pol fail_wrt_on_err Group1
```

The following example reverses the current direction of secondary group Group1 on InServ2 (the secondary system) so that I/O might be applied to the group after disaster recovery:

```
cli% setrcopygroup failover Group1.r121
```

The following example sets Group1 to be automatically synchronized every 30 minutes to InServ2:

```
cli% setrcopygroup period 30m InServ2 Group1
```

NOTES

- An earlier version of this command provided a `target` subcommand. This subcommand was deprecated in InForm OS release 2.2.3.
- Reversing the direction of primary volumes will result in the loss of any data changed after the group was stopped.
- There is no default resynchronization period. For groups whose mode is asynchronous periodic, you must specify a resynchronization period using `setrcopygroup period <value>` or resynchronizations will not automatically take place.
- The minimum interval for periodic resynchronizations is five minutes.
- If the `mirror_config` policy is set for this group's target and the group is a primary group, then the `setrcopygroup` command will be mirrored to the target when the `period` and `pol` subcommands are used.
- Use the `-nosnap` option when the primary server has failed or where the disks are ruined or in an unknown state. For example, an uncontrolled shutdown can result in loss of data. If you suspect that the primary volumes are not in a known good state, you should use this option to force a FULL RESYNC when the primary system is restored.

- The `-nosnap` option can be used when making a secondary group take over as the primary after a disaster takes down the primary (`setrcopygroup failover -nosnap...`). This option indicates that no incremental resynchronization of the primary group is possible while the primary system is coming back online. Without this option, a snapshot is taken when the secondary server takes over as the primary. That snapshot is used to do an INCREMENTAL synchronization of the primary after it is restored. This assumes that there was no loss of data in the primary volumes when the primary server went down.

COMMAND

`setrcopytarget`

DESCRIPTION

The `setrcopytarget` command sets the name, policies, or throughput definition for the target's links.

SYNTAX

The syntax for the `setrcopytarget` command can be one of the following:

- `setrcopytarget pol <policy> <target_name>`
- `setrcopytarget name <new_name> <target_name>`
- `setrcopytarget tput <tput_value> <target_name>`
- `setrcopytarget tunelinks <bandwidth> <latency> <target_name>`
- `setrcopytarget enable|disable <target_name>`

AUTHORITY

Edit



NOTE: You need access to all domains in order to run this command.

SUBCOMMANDS

`pol`

Sets the policy option for the specified target.

`name`

Changes the name of the indicated target.

`tput`

Sets the maximum throughput value for each of the target's links using the `<tput_value>` specifier.

`tunelinks`

Adjust performance values for the target's links using the `<bandwidth>` and `<latency>` specifiers.

enable|disable

Enables or disables the target.

OPTIONS

None.

SPECIFIERS

<target_name>

Specifies the target name for the target definition previously created with the `creatercopytarget` command (see [creatercopytarget](#) on page B.20).

<policy>

This specifier can only be used with the `pol` subcommand. The policy can be one of the following:

mirror_config|no_mirror_config

Specifies that all configuration commands (`creatercopygroup`, `removercopygroup`, `admitrcopyvv`, `dismissrcopyvv`, `setrcopygroup pol/period`, `startrcopygroup`, and `stoprcopygroup`) involving the specified target are duplicated (`mirror_config`) or not duplicated (`no_mirror_config`). If not specified, all configuration commands are duplicated.



NOTE: The `no_mirror_config` specifier should only be used to allow recovery from an unusual error condition and only used after consulting your 3PAR representative.

<new_name>

The new name for the indicated target. This specifier can only be used with the `name` subcommand.

<tput_value>

Specifies the maximum throughput for the indicated target's links, and is used to limit the total throughput of the links. The throughput value can take a `[g|G]` suffix (gigabytes), `[m|M]` suffix (megabytes) or `[k|K]` suffix (kilobytes) to indicate size (with no space between the specified value and size type). The default is kilobytes. Specifying a value of 0 removes the throughput. This specifier can only be used with the `tput` subcommand.

<bandwidth>

The measured bandwidth of the connection to the target, specified in kilobytes (kB) per second. This specifier can only be used with the `tunelinks` subcommand.

<latency>

The measured round-trip latency of the connection to the target, specified in milliseconds (ms). This specifier can only be used with the `tunelinks` subcommand.

RESTRICTIONS

- This command requires the 3PAR Remote Copy license. Contact your local service provider for further information.
- If the `mirror_config` policy is set and the `setrcopytarget` command is issued with the `pol` subcommand, the duplicated configuration commands cannot be issued on the secondary. Doing so results in an error.
- The name and `tput` subcommands cannot be used on a target with started groups.
- There must be an active connection between the systems in the Remote Copy pair in order to issue commands on the primary server to be mirrored to the backup server. If there is no connection, the commands will return an error.

EXAMPLES

The following example turns off configuration mirroring from InServ1 to InServ2, where InServ2_out is a secondary target on InServ1 that points at InServ2:

```
On InServ1:
cli% setrcopytarget pol no_mirror_config InServ2_out
```

NOTES

- The `setrcopytarget` command requires the groups associated with it be stopped prior to using the following options:
 - ◆ `setrcopytarget name <new_name> <target_name>`
 - ◆ `setrcopytarget tput <throughput> <target_name>`
- The `setrcopytarget` command with the following arguments can be run without bringing down its Remote Copy groups:
 - ◆ `setrcopytarget pol <policy> <target_name>`

- ◆ `setrcopytarget tunelinks <bandwidth> <latency> <target_name>`
- Under normal operating conditions the `mirror_config` policy should never be changed to `no_mirror_config`. This policy option is included only as a method to correct several unusual error conditions that might occur in the course of operation which result in a mismatch in configuration between the two sides of a Remote Copy pair. For instance, it is possible for a group to be created, or a volume to be added to a group, only on one side of the pair if the operation is interrupted by a network failure. In such cases it might be necessary to temporarily change the policy to `no_mirror_config` in order to bring the configurations into alignment. After being corrected the `mirror_config` policy should be immediately restored. Such operations should generally only be undertaken on the advice of a 3PAR representative.

COMMAND

```
setvv
```

DESCRIPTION

The `setvv` command changes the properties associated with a virtual volume. Use the `setvv` command to modify volume names, volume policies, allocation warning and limit levels, and the volume's controlling common provisioning group (CPG).

SYNTAX

```
setvv [options <arg>] <VV_name|pattern>...
```

AUTHORITY

Edit

OPTIONS

At least one of the following options must be specified:

`-clrrsv`

Specifies that all reservation keys (i.e. registrations) and all persistent reservations on the virtual volume are cleared.

`-exp <time> d|D|h|H`

Specifies the relative time from the current time that volume will expire. `<time>` is a positive integer value and in the range of 0 to 43800 hours (1825 days). Time can be specified in days or hours providing either the `d` or `D` for day and `h` or `H` for hours following the entered time value.

`-comment <comment>`

Specifies any additional information up to 511 characters for the volume. Use `-comment " "` to remove the comments.



NOTE: The `-retain` option requires the 3PAR Virtual Lock license. Contact your local service provider for more information.

`-retain <time> d|D|h|H`

Specifies the amount of time, relative to the current time, that the volume will be retained. `<time>` is a positive integer value and in the range of 1 to 43800 hours (1825 days). Time can be specified in days or hours providing either `d` or `D` for day and `h` or `H` for hours following the entered time value.



NOTE: If the volume is not in any domain, then its retention time cannot exceed the value of the system's maximum VV retention time. The default value for the system's maximum VV retention time is 14 days. If the volume belongs to a domain, then its retention time cannot exceed the value of the domain's maximum VV retention time, if set. The retention time cannot be removed or reduced once it is set. If the volume has its retention time set, it cannot be removed within its retention time. If both expiration time and retention time are specified, then the retention time cannot be longer than the expiration time.

`-name <new_name>`

Specifies that the name of the virtual volume be changed to a new name (as indicated by the `<new_name>` argument) that uses up to 31 characters.

`-snp_cpg <snp_cpg>`

Specifies that the volume snapshot space is to be provisioned from the specified CPG. This option moves all the logical disks currently contained in the snapshot space for these volumes into the CPG. This is permitted only when none of the logical disks are shared with other volumes that are not specified in this option. If the `<snp_CPG>` specifier is specified as `" "`, the volume snapshot space is longer provisioned from a CPG and the existing snapshot space logical disks are removed from the CPG. This is permitted only when the existing snapshot logical disks are exclusively used by the volumes specified in this option.

`-snp_aw <percent>`

Indicates a snapshot space allocation warning. Through this option you can generate a warning alert when the snapshot space of the virtual volume exceeds the indicated percentage of the virtual volume size.

`-snp_al <percent>`

Indicates a snapshot space allocation limit. The snapshot space of the virtual volume is prevented from growing beyond the indicated percentage of the virtual volume size.

```
-pol <policy>[, <pol>...]
```

Specifies the policy is implemented by a virtual volume. Valid policies are as follows:

`stale_ss`

Specifies that invalid (stale) snapshot volumes are permitted. Failures to update snapshot data occur when there is not sufficient administration or snapshot space. Failures to update snapshot data does not affect the write to the base volume. However, the snapshot is considered invalid.

`no_stale_ss`

Specifies that stale snapshot volumes are not permitted. A failure to update a snapshot is considered a failure to write to the base volume. Existing stale snapshots remain stale.

`one_host`

Constrains the export of a volume to one host or one host cluster (when cluster names may be used as a host name).

`no_one_host`

This policy should only be used when exporting a virtual volume to multiple hosts for use by a cluster-aware application, or when "port presents" VLUNs are used. This is the default policy setting.

`tp_bzero`

Specifies that if a host write results in the allocation of a new data page that is only partially filled by the host write, then a zero-fill is performed on the unwritten portion of the data page to ensure that the host cannot read data from deleted volumes or snapshot. The default allocation page size is 16 KB.

`no_tp_bzero`

Specifies that the zero-fill operation is bypassed on the allocation of partially written data pages.

`zero_detect`

Enables the InServ Storage Server to scan for zeros in the incoming write data. When used during a physical copy to a Thinly Provisioned Virtual Volume (TPVV) avoids allocating space for blocks containing zero. When used with a Thin Persistence license, reclaims allocated space when zero blocks are written to a TPVV. This policy is applicable for base TPVVs.

`no_zero_detect`

Disables the InServ Storage Server to scan for zeros in the incoming write data to reclaim allocated space on the volume.

Multiple policies can be specified and are separated with commas. If a policy is not specified, the policy defaults to `stale_ss`.

The following options can only be used on Thinly Provisioned Virtual Volumes (TPVVs):

`-usr_aw <percent>`

This option returns a user space allocation warning. It generates a warning alert when the user space of the TPVV exceeds the specified percentage of the virtual volume size.

`-usr_al <percent>`

This option returns the user space allocation limit. The user space of the TPVV is prevented from growing beyond the indicated percentage of the virtual volume size. After this size is reached, any new writes to the virtual volume will fail.

`-spt <sectors_per_track>`

Defines the virtual volume geometry sectors per track value that is reported to the hosts through the SCSI mode pages. The valid range is from 4 to 8192. The default value is 304.

`-hpc <heads_per_cylinder>`

Defines the virtual volume geometry heads per cylinder value that is reported to the hosts through the SCSI mode pages. The valid range is from 1 to 1024. The default value is 8.

The following options can only be used on fully provisioned volumes:

`-usr_cpg <user_CPG>`

Specifies that the volume user space that is to be provisioned from the specified CPG. This option moves all the logical disks currently contained in the user space for these volumes into the CPG. This is permitted only when none of the logical disks are shared with other volumes that are not specified with this option. If the `<usr_CPG>` specifier is specified as "", the volume user space is no longer provisioned from a CPG and the existing user space logical disks will be removed from the CPG. This is permitted only when the existing user's logical disks are exclusively being used by the volumes specified with this option.

SPECIFIERS

<VV_name|pattern>...

Specifies the virtual volume name or all virtual volumes that match the pattern specified, using up to 31 characters. The patterns are glob-style patterns. Valid characters include alphanumeric characters, periods, dashes, and underscores.

RESTRICTIONS

At least one option must be specified.

EXAMPLES

The following example sets the policy of virtual volume `vv1` to `no_stale_ss`.

```
cli% setvv -pol no_stale_ss vv1
```

NOTES

- Use the `setvv` command to associate a standard virtual volume with a common provisioning group (CPG) for use with Remote Copy, as described in [Converting Standard Virtual Volumes](#) on page 4.8.
- To view policies assigned to the system's virtual volumes, issue the `showvv -pol` command.
- Changing the CPG for a TPVV is not allowed.
- See the *3PAR InForm Management Console Online Help* or the *3PAR InForm OS CLI Administrator's Guide* for instructions on creating CPGs and volumes.

COMMAND

```
showport
```

DESCRIPTION

The `showport` command displays information about ports in the system.

SYNTAX

The syntax of the `showport` command can be one of the following:

```
■ showport [options] [-failed] [-sortcol <col>[,<dir>]]
```

AUTHORITY

Super, Service, Edit, Browse

OPTIONS

`-i`

Shows port hardware inventory information.

`-c`

Displays all devices connected to each loop (by position on the loop). Position 0 is the cage connected directly to the node on this loop. Position n is the $(n + 1)$ cage on the loop. Thus a "pos" value of 1 means this cage is the second cage away from the node on the loop.

`-par`

Displays a parameter listing such as the configured data rate of a port and the maximum data rate that the card supports. Also shown is the type of attachment (Direct Connect or Fabric Attached) and whether the unique WWN and VCN capabilities are enabled.

`-rc`

Displays information that is specific to the Remote Copy ports.

`-rcfc`

Displays information that is specific to the Remote Copy Fibre Channel (RCFC) ports.

`-rcip`

Displays information specific to the Ethernet Remote Copy ports.

`-iscsi`

Displays information about iSCSI ports.

`-iscsiname`

Displays iSCSI names associated with iSCSI ports.

`-sfp`

Displays information about the SFPs attached to ports.

`-ddm`

Displays information about the SFPs DDM. This option must be used with the `-sfp` option.

`-d`

Displays detailed information about the SFPs attached to ports. This option is used with the `-sfp` option.

`-failed`

Shows only failed ports.

`-state`

Displays the detailed state information.

`-s`

Displays the detailed state information.

`-sortcol <col>[, <dir>][:<col>[, <dir>]...]`

Sorts command output based on column number (<col>). Columns are numbered from left to right, beginning with 0. At least one column must be specified. In addition, the direction of sorting (<dir>) can be specified as follows:

`inc`

Sort in increasing order (default).

`dec`

Sort in decreasing order.

Multiple columns can be specified and separated by a colon (:). Rows with the same information in them as earlier columns will be sorted by values in later columns.

SPECIFIERS

None.

RESTRICTIONS

None.

EXAMPLES

The following example displays information about all Remote Copy ports:

```
cli% showport -rc
N:S:P State          HwAddr      Rate Type
5:3:2 ready 25320002AC000006 2Gbps rcip
4:1:1 ready 24110002AC000006 2Gbps rcip
0:5:1 ready      0002B39B2013 100Mbps rcip
```

The columns in the previous example are identified as follows:

- N:S:P. The physical position of the port, in the syntax node:slot:port.
- State. State of the port.
 - ◆ ready. The port is online and ready for use.
 - ◆ loss_sync. The port is not physically connected to anything.
 - ◆ config_wait. Firmware has yet to be initialized.
 - ◆ login_wait. Fibre Channel adapter is attempting port and process logins with all loop ports.
 - ◆ error. Fibre Channel adapter has experienced an unrecoverable error.
 - ◆ non_participate. Port is logically isolated from the Fibre Channel loop.
 - ◆ offline. The port is offline.
- HwAddr. A unique identifier of the port hardware used for Remote Copy connection. For an RCIP port, it is the MAC address of the port.
- Rate. Data transfer rate (bitrate) for the Remote Copy interface.
- Type. Indicates the port connection type.
 - ◆ rcip. Port is used for Remote Copy over IP (RCIP).

The following example displays information about RCIP ports:

```
cli% showport -rcip
N:S:P   State ---HwAddr--- IPAddr Netmask Gateway MTU Rate Duplex AutoNeg
0:1:1  offline 000423C21B72   -      -      -      - n/a   n/a   n/a
0:1:1  offline 000423C21B73   -      -      -      - n/a   n/a   n/a
1:2:1  offline 000423ADE95E   -      -      -      - n/a   n/a   n/a
1:2:1  offline 000423ADE95F   -      -      -      - n/a   n/a   n/a
```

The columns in the previous example are identified as follows:

- N:S:P. The physical position of the port, in the syntax `node:slot:port`.
- State. State of the port.
 - ◆ `ready`. The port is online and ready for use.
 - ◆ `loss_sync`. The port is not physically connected to anything.
 - ◆ `config_wait`. Firmware has yet to be initialized.
 - ◆ `login_wait`. Fibre Channel adapter is attempting port and process logins with all loop ports.
 - ◆ `error`. Fibre Channel adapter has experienced an unrecoverable error.
 - ◆ `non_participate`. Port is logically isolated from the Fibre Channel loop.
 - ◆ `offline`. The port is offline.
- HwAddr. A unique identifier of the port hardware used for Remote Copy connection. For an RCIP port, it is the MAC address of the port.
- IPAddr. The IP address of the Remote Copy interface.
- Netmask. Netmask for the Ethernet port.
- Gateway. Gateway address for the Remote Copy interface.
- MTU. Maximum Transfer Unit (MTU) size for the specified Remote Copy interface (default is 1500). The largest supported value is 9000 and the smallest is 100.
- Rate. Data transfer rate for the Remote Copy interface.
- Duplex. Values can be either `Full` or `Half`.
- AutoNeg. Autonegotiate.

NOTES

For full `showport` command information and additional usage examples, refer to the *InForm OS Command Line Interface Reference*.

COMMAND

`showrcopy`

DESCRIPTION

The `showrcopy` command displays details of the Remote Copy configuration.

The `showrcopy` command also displays the group's domain names if the global `-listdom` option is used or if the `TPDLISTDOM` environment variable is set.

SYNTAX

The syntax for the `showrcopy` command can be one of the following:

- `showrcopy [options <arg>] [links]`
- `showrcopy [options <arg>] [groups [<name_or_pattern>]]`
- `showrcopy [options <arg>] [targets [<name_or_pattern>]]`

AUTHORITY

Super, Service, Edit, Browse

OPTIONS

`-d`

Displays more detailed configuration information.

`-domain <domainname_or_pattern>[, <domainname_or_pattern>...]`

Shows only Remote Copy links whose virtual volumes are in domains with names that match one or more of the specified domain name or pattern. This option does not allow listing objects within a domain of which the user is not a member.

SPECIFIERS

`links`

Specifies all Remote Copy links.

`groups [<name_or_pattern>]`

Specifies either all Remote Copy volume groups or a specific Remote Copy volume group by name or by glob-style pattern.

targets [<name_or_pattern>]

Specifies either all target definitions or a specific target definition by name or by glob-style pattern.

RESTRICTIONS

This command requires the 3PAR Remote Copy license. Contact your local service provider for further information.

EXAMPLES

The following example displays output from the `showrcopy` command:

```
cli% showrcopy
Remote Copy System Information
Status: Started, Normal

Target Information

Name      ID Type Status Options Policy
InServ2 9  IP  ready          mirror_config

Link Information

Target  Node Address      Status Options
InServ2 0    10.100.33.11 Up
InServ2 1    10.101.33.11 Up
receive 0    10.100.33.11 Up
receive 1    10.101.33.11 Up

Group Information

Name          Target      Status      Role      Mode      Options
sync_group_1 InServ2     Started     Primary   Sync
  LocalVV     ID RemoteVV   ID SyncStatus LastSyncTime
  localvv.0   391 remotevv.0 351 Syncing (25%) Thu Dec 14 17:37:40 PST 2006
  localvv.1   392 remotevv.1 352 Syncing (40%) Thu Dec 14 17:37:40 PST 2006

Name          Target      Status      Role      Mode      Options
sync_group_2.r11 InServ2     Started     Secondary Sync
  LocalVV     ID RemoteVV   ID SyncStatus LastSyncTime
  remotevv.0  401 localvv.0  361 Syncing      NA
  remotevv.1  402 localvv.1  362 Syncing      NA
```

The following values can appear in the Target Information Status field:

- new. The target's link have yet to come up.
- ready. The target has connected links.

- unsupported. The target system's TPD version is not compatible with this system's version.
- failing. The target's links have all failed, but its groups have not been stopped.
- failed. The target's links have all failed and its groups have been stopped.

The following values can appear in the `Link Information Status` field:

- Not Started. Link is not started or is being started, such as when its node is down or Remote Copy is stopped (through the `stoprcopy` command).
- Down. Link is down and will attempt to restart.
- Up. Link is up and running.

The following values can appear in the `Group Information Syncstatus` field:

- New. Volume is configured, but has not yet been started.
- Syncing. Volume is currently synchronizing.
- NotSynced. The volume is not synchronized, likely the result of an initial sync failure or some other failure.
- Stopped. The volume was synced the last time the group was started, but the group is currently stopped. There might be writes that have not been sent to the secondary site.
- Stale. Volume was previously synchronized, but a previous synchronization attempt failed. Thus, the secondary has a valid copy, just not a valid copy from the last synchronization attempt.

The following example displays output from the `showrcopy groups <pat>` command, where `<pat>` is specified as `b*` and `l*`:

```
cli% showrcopy groups b* l*

Remote Copy System Information
Status: Started, Normal

Group Information

Name          Target    Status  Role    Mode    Options
bart          bf_mirror Started Primary Periodic Last-Sync Tue Jul 18 14:12:59 PDT 2006 , Period 30m
  LocalVV    ID RemoteVV ID SyncStatus LastSyncTime
  bart-tp-ws 9  bart-ws 3924 Synced Tue Jul 18 14:13:09 PDT 2006

Name          Target    Status  Role    Mode    Options
lisa          bf_mirror Started Primary Periodic Last-Sync Tue Jul 18 14:09:44 PDT 2006 , Period 30m,
over_per_alert
  LocalVV    ID RemoteVV ID SyncStatus LastSyncTime
  lisa-ws    2  lisa-ws 3922 Synced Tue Jul 18 14:10:32 PDT 2006
```

In the example above:

- Name. The name of the group.
- Target. The target to which the group is mirrored.
- Status. The following values can appear in the group `Status` field:
 - ◆ New. Group that has not yet been started.
 - ◆ Starting. Currently attempting to start the group.
 - ◆ Started. Group is started (has Remote Copy running).
 - ◆ Stopped. Group was stopped.
- Role. The role of the group as either Primary or Secondary.
- Mode. The mode of the group as either Periodic or Synchronous.
- Options. The options set for the group.
- LocalVV and ID. The name and ID of this system.
- RemoteVV and ID. The name and ID of the target system.
- SyncStatus. The following values can appear in the `SyncStatus` field:
 - ◆ New. Volume is configured as a primary volume, but has not yet been started.
 - ◆ Syncing. Volume is currently synchronizing.
 - ◆ Synced. The primary and secondary volumes are in sync.
 - ◆ NotSynced. The volume is not synchronized, likely the result of an initial sync failure or some other failure.
 - ◆ Stopped. The volumes were previously synchronized, but may be out of sync due to a group being stopped.
 - ◆ Stale. Volume was previously synchronized, but a previous synchronization attempt failed. Thus the secondary has a valid copy, just not a valid copy from the last synchronization attempt.
- LastSyncTime. The time at which the last volume synchronization was completed. Applies only to asynchronous periodic groups. Synchronous groups display N/A if they have been started and are actively replicating.

NOTES

- If the `showrcopy` command is used with no specifiers, all configuration information is displayed.
- The `showrcopy` command also displays the group's domain names if the global `-listdom` option is used or if the `TPDLISTDOM` environment variable is set.
- If `showrcopy link|group|target` is used without specifying a name, information for all links, groups, or targets is displayed.
- To limit the performance impact of Remote Copy on the rest of the InServ storage system, the number of volumes that are concurrently synchronizing is limited to 20 volumes.

This limit is not user-configurable and applies to the initial synchronization as well as subsequent resynchronizations for synchronous as well as asynchronous periodic groups. For example, if there are 30 volumes in asynchronous periodic mode that are being resynchronized, you might notice that 10 volumes do not start synchronizing until the first 20 have completed. This can be seen by monitoring the `Sync%` column of the `showrcopy` command output.

- A Domain column may be included by using the `setclienv` command to set the `listdom` option to 1. The `listdom` option is also set to 1 if the CLI was started with the `-listdom` option or if the CLI was started with the `TPDLISTDOM` environment variable set.

COMMAND

```
showrctransport
```

DESCRIPTION

The `showrctransport` command shows status and information about end-to-end transport for Remote Copy in the system.

SYNTAX

```
showrctransport [options]
```

AUTHORITY

Super, Service, Edit, Browse

OPTIONS

```
-rcfc
```

Show information about Fibre Channel end-to-end transport.

```
-rcip
```

Show information about Ethernet end-to-end transport.

SPECIFIERS

None.

RESTRICTIONS

None.

EXAMPLES

The following example displays status and information about the end-to-end transport for all Remote Copy configured ports:

```
cli% showrctransport
N:S:P Peer_Address      Address  State Type
0:5:1          - 172.100.5.87  new rcip
1:5:1          - 172.101.6.87  new rcip
```

The columns in the previous example are identified as follows:

- N:S:P. The physical position of the port, in the syntax `node:slot:port`.

- **Peer_Address.** IP address of the Remote Copy storage server port connected to this Remote Copy port.
- **Address.** IP address of the Remote Copy storage server port.
- **State.** Remote copy end-to-end transport state. Can include one of the following results:
 - ◆ **new.** Configuration is not completed on this port.
 - ◆ **incomplete.** Configuration is not yet completed on the peer port.
 - ◆ **ready.** Configuration is completed on this port and the peer port; transport is ready for use.
 - ◆ **missing.** A configured transport was disconnected.
- **Type.** Indicates the port connection type.
 - ◆ **rcip.** Port is used for Remote Copy over IP (RCIP).
 - ◆ **rcfc.** Port is used for Remote Copy over FC (RCFC).

The following example displays status and information about the end-to-end transport for RCIP ports:

```
cli% showctransport -rcip
N:S:P State      HwAddr      IPAddress PeerIPAddress      Netmask Gateway  MTU  Rate Duplex
0:1:1  new  000423C21B72 192.168.25.226 - 255.255.255.0 - 1500 1Gbps Full
0:1:1  new  000423C21B73 192.168.25.226 - 255.255.255.0 - 1500  n/a  Half
1:2:1  new  000423ADE95E 192.168.25.227 - 255.255.255.0 - 1500 1Gbps Full
1:2:1  new  000423ADE95F 192.168.25.227 - 255.255.255.0 - 1500  n/a  Half
```

The columns in the previous example are identified as follows:

- **N:S:P.** The physical position of the port, in the syntax `node:slot:port`.
- **State.** Remote copy end-to-end transport state. Can include one of the following results:
 - ◆ **new.** Configuration is not completed on this port.
 - ◆ **incomplete.** Configuration is not yet completed on the peer port.
 - ◆ **ready.** Configuration is completed on this port and the peer port; transport is ready for use.
 - ◆ **missing.** A configured transport was disconnected.
- **HwAddr.** Hardware address of the Ethernet port indicated in the `N:S:P` column.

- **IPAddress.** IP address of the Ethernet port indicated in the N:S:P column.
- **PeerIPAddress.** IP address of the peer Ethernet port to which the port indicated in the N:S:P column is connected.
- **Netmask.** Netmask for the IP address.
- **Gateway.** Address of the gateway.
- **MTU.** Maximum Transfer Unit (MTU) size for the specified Remote Copy interface (default is 1500). The largest supported value is 9000 and the smallest is 100.
- **Rate.** Actual bit rate of the port indicated in the N:S:P column.
- **Duplex.** Values can be either Full or Half.

The following example displays status and information about the end-to-end transport for RCFC ports:

```
cli% showrctransport -rcfc
N:S:P Remote_Node_WWN Remote_Port_WWN State
5:3:2 2FF70002AC000029 21110002AC000029 ready
4:1:1 2FF70002AC000029 20020002AC000029 ready
```

The columns in the previous example are identified as follows:

- **N:S:P.** The physical position of the port, in the format node:slot:port.
- **Remote_Node_WWN.** World Wide name of the node to which the port indicated in the N:S:P column connects.
- **Remote_Port_WWN.** World Wide name of the target port to which the port indicated in the N:S:P column connects.
- **State.** Indicates whether the end-to-end transport is ready to be used for Remote Copy. Can be one of the following:
 - ◆ **new.** The target port is newly discovered and has not yet been used for Remote Copy.
 - ◆ **incomplete.** Port indicated in the N:S:P column is activated and ready, but the target port is not yet enabled.
 - ◆ **ready.** Remote copy link is activated and ready for use.
 - ◆ **missing.** Ready link was disconnected.

NOTES

None.

COMMAND`startrcopy`**DESCRIPTION**

The `startrcopy` command enables Remote Copy.

SYNTAX`startrcopy`**AUTHORITY**

Super, Edit



NOTE: You need access to all domains in order to run this command.

OPTIONS

None.

SPECIFIERS

None.

RESTRICTIONS

This command requires the 3PAR Remote Copy license. Contact your local service provider for further information.

EXAMPLES

The following example starts Remote Copy on a system:

```
cli% startrcopy
```

NOTES

- The `startrcopy` command must be executed before any other Remote Copy command.
- An older version of this command used `primary`, `secondary`, and `both` specifiers to designate the system on which Remote Copy is started. This syntax was deprecated in InForm OS release 2.2.3.

COMMAND

```
startrcopygroup
```

DESCRIPTION

The `startrcopygroup` command turns on Remote Copy for the specified Remote Copy volume group.

SYNTAX

```
startrcopygroup [options <arg>] <group_name>
```

AUTHORITY

Super, Edit

OPTIONS

`-wait`

Specifies that the command blocks until the initial synchronization is complete. The system generates an event when the synchronization is complete.

`-nosync`

Prevents the initial synchronization and sets the volumes to a synchronized state.

`-t <target_name>`

Indicates that only the group on the specified target is started. If this option is not used, by default, the `startrcopygroup` command will affect all of a group's targets.

SPECIFIERS

`<group_name>`

The name of the Remote Copy volume group. Can be obtained using the `showrcopy` command.

RESTRICTIONS

This command requires the 3PAR Remote Copy license. Contact your local service provider for further information.

EXAMPLES

The following example starts Remote Copy for Group1:

```
cli% startrcopygroup Group1
```

NOTES

- If a group's target has the `mirror_config` policy set and the group is a primary group, then this command will be mirrored to that target and the corresponding secondary group will be started. If the policy is set and the group is a secondary, then this command will fail.
- If the `mirror_config` policy is not set, then the corresponding secondary group must already be started or this command will fail.
- Synchronous groups are automatically synchronized when started. Asynchronous periodic volume groups are synchronized only on the first time they are started. When volumes are added to existing asynchronous periodic groups their first sync occurs the next time the entire group synchronizes.
- You must enter this command on the secondary server before entering it on the primary if the `mirror_config` policy is not set.
- When a secondary group says that it is in the started state, it does not necessarily mean that the group is receiving data from the primary server. The primary group might be stopped, or its system might even be down. The fact that the group is started only indicates that the group is ready to receive writes from the primary group. To determine if writes to the volumes of the primary group are being mirrored to the secondary group, the status of the primary group must be examined.

COMMAND

statport

DESCRIPTION

The statport command displays read and write (I/O) statistics for ports.

SYNTAX

```
statport [options <arg>] |-rcfc|-rcip
```

AUTHORITY

Super, Service, Edit, Browse

OPTIONS

-data|-ctl|-both

Show data transfers only (-data), control transfers only (-ctl), or both data and control transfers (-both). If no option is included on the command line, the command shows data transfers only.

-nodes <node_list>

Displays statistics for ports attached to the nodes from the node_list. The node_list is specified as a series of integers separated by commas (for example 1,2,3). The list can also consist of a single integer (for example 1).

-slots <slot_list>

Displays statistics for ports attached to the slots from the slot_list. The slot_list is specified as a series of integers separated by commas (for example 1,2,3). The list can also consist of a single integer (for example 1).

-ports <port_list>

Displays statistics for ports from the port_list. The port_list is specified as a series of integers separated by commas (for example 1,2,3). The list can also consist of a single integer (for example 1).

-host|-disk|-rcfc

Includes only statistics for the host-connected (target) ports (-hosts), disk-connected (initiator) ports (-disk), or Remote Copy over Fibre Channel (RCFC) configured ports (-rcfc).

-rcip

Includes only statistics for the Remote Copy IP configured ports.

`-rw`

Display reads and writes separately. If this option is not used, then the total of reads plus writes is displayed.

`-d <secs>`

Sets the interval, in seconds, that statistics are sampled using an integer from 1 through 2147483. If no interval is specified, the option defaults to an interval of two seconds.

`-iter <number>`

Specifies that I/O statistics are displayed a specified number of times as indicated by the `num` argument using an integer from 1 through 2147483647.

`-idlep`

Specifies the percent of idle columns in the output.

`-begin`

Computes I/O averages from the system start time. If not specified, the average is computed since the first iteration of the command.

`-sortcol <col> [, <dir>] [: <col> [, <dir>] . . .]`

Sorts command output based on column number `<col>`. Columns are numbered from left to right, beginning with 0. You must specify a column number. In addition, you can specify the direction of sorting `<dir>` as follows:

`inc`

Sort in increasing order (default).

`dec`

Sort in decreasing order.

Multiple columns can be specified separated by a colon (:), and rows that have the same earlier columns will be sorted by the values in the later columns.

`-filt <fspec>`

Specifies that statistics that fall below the threshold as specified by the `<fspec>` arguments where `<fspec>` is `<type>`, `<op>`, `<meas>`, `<val>`, are filtered out and not displayed. The `type`, `operation`, `meas`, and `value` arguments are separated with one comma.

`<type>`

The `type` argument can be specified with one of the following arguments:

`curs`

Specifies that only current statistics are displayed.

`avgs`

Specifies that only averages are displayed.

`maxs`

Specifies that only statics for maximum values are displayed.

`<op>`

The `operation` argument can be specified with one of the following arguments:

`r`

Specifies that read-only statistics are displayed.

`w`

Specifies that write-only statistics are displayed.

`t|rw`

Specifies that statistics for read and write totals are displayed.

`<meas>`

The `measure` argument can be specified with one of the following arguments:

`iops`

Specifies that I/O operations per second are displayed. If this argument is used, the minimum threshold value must be specified using the `value` argument.

`bw`

Specifies that statistics for bandwidth in bytes per second are displayed. If this argument is used, the minimum threshold value must be specified using the `value` argument.

`svct`

Specifies that statistics for service time in milliseconds are displayed.

`size`

Specifies that statistics for I/O operations in bytes are displayed.

`<val> [k|K] | [m|M] | [g|G]`

Specifies the minimum threshold using any integer. The integer can be optionally followed with `k` or `K` to indicate a multiple of 1000, `m` or `M` to indicate a multiple of 1000000, or `g` or `G` to indicate a multiple of 1000000000.

An example of this option in use is `-filt curs,r,iops,10k` that indicates that statistics for a device that has more than 10,000 current read-only I/O operations are displayed.

`-ni`

Shows only nonidle devices. This option is shorthand for the option `-filt curs,t,iops,0`.

SPECIFIERS

None.

RESTRICTIONS

The `-filt` option applies to data transfers only.

EXAMPLE

The following example displays one iteration of I/O statistics for all ports:

```
cli% statport -iter 1
11:32:25 06/01/07 r/w I/O per second KBytes per sec Svt ms IOSz KB
  Port      D/C      Cur  Avg  Max  Cur  Avg  Max  Cur  Avg  Cur  Avg  Qlen
  0:0:1     Data    t    0   0   0    0   0   0  0.0 0.0 0.0 0.0   0
  0:0:2     Data    t    0   0   0    0   0   0  0.0 0.0 0.0 0.0   0
  0:2:1     Data    t    0   0   0    0   0   0  0.0 0.0 0.0 0.0   0
  0:2:2     Data    t    0   0   0    0   0   0  0.0 0.0 0.0 0.0   0
  0:3:1     Data    t    0   0   0    0   0   0  0.0 0.0 0.0 0.0   0
  0:3:2     Data    t    0   0   0    0   0   0  0.0 0.0 0.0 0.0   0
  1:0:1     Data    t    0   0   0    0   0   0  0.0 0.0 0.0 0.0   0
  1:0:2     Data    t    0   0   0    0   0   0  0.0 0.0 0.0 0.0   0
  1:3:1     Data    t    0   0   0    0   0   0  0.0 0.0 0.0 0.0   0
  1:3:2     Data    t    0   0   0    0   0   0  0.0 0.0 0.0 0.0   0
-----
  total     Data    t    0   0           0   0           0.0 0.0 0.0 0.0   0
```

The columns in the example above are identified as follows:

- Port. The port ID.
- D/C. The Data or Control transfers.
- r/w. The I/O type. Values can be read (r), write (w), or read and write (t).

- I/O per second Cur. The current number of I/O per second.
- I/O per second Avg. The average number of I/O per second.
- KBytes per Max. The maximum number of KB per second.
- KBytes per Cur. The current number of KB per second.
- KBytes per Avg. The average number of KB per second.
- Svt ms Max. The maximum service time in milliseconds.
- Svt ms Cur. The current service time in milliseconds.
- Svt ms Avg. The average service time in milliseconds.
- IOSz KB Cur. The current I/O size in KB.
- IOSz KB Avg. The average I/O size in KB.
- Qlen. The queue length.
- Util % Cur. The percentage of current use.
- Util % Avg. The percentage of average use.

NOTES

See the *InForm OS Command Line Interface Reference* for additional information for this command, including additional options, restrictions, and examples.

COMMAND

`statrcopy`

DESCRIPTION

The `statrcopy` command displays statistics for Remote Copy volume groups.

SYNTAX

`statrcopy [options <arg>]`

AUTHORITY

Super, Service, Edit, Browse

OPTIONS

`-d <seconds>`

Specifies the interval, in seconds, in which statistics are sampled using an integer from 1 to 2147483. If no interval is specified, the option defaults to an interval of two seconds.

`-iter <number>`

Specifies that I/O statistics are displayed a specified number of times as indicated by the `num` argument using an integer from 1 to 2147483647.

`-u k|m|g`

Displays statistics as kilobytes (k), megabytes (m), or gigabytes (g). If no unit is specified, the default is kilobytes.

`-hb`

Specifies that the heartbeat round-trip time of the links should be displayed in addition to the link throughput.

SPECIFIERS

None.

RESTRICTIONS

This command requires the 3PAR Remote Copy license. Contact your local service provider for further information.

EXAMPLES

The following example shows statistics for sending links link0 and link1:

```
cli% statrcopy
17:37:01 05/17/07
-Throughput(KBytes per sec)-
Target  Node  Address      IPC      Total(KBytes)      Current      Average
-----
amp1    0     10.100.33.96 Rcs041    404761.15         4.95         4.95
amp1    1     10.101.33.96 Rcs142    404661.63         3.30         3.30
-----
amp1                                809422.78         8.25         8.25

amp2    0     10.100.33.11 Rcs037    86845920.00      24612.95      24612.95
amp2    1     10.101.33.11 Rcs138    85299712.32      23217.30      23217.30
-----
amp2                                172145632.32     47830.26      47830.26

receive 0  receive  RCr039    983110.14         27.32         27.32
receive 1  receive  RCr140    823292.09         23.37         23.37
-----
Receive                                1806402.23         50.69         50.69
Send                                172955055.10      47838.51      47838.51
-----
Total                                174761457.34     47889.20      47889.20

Press the enter key to stop...
```

The columns in this example provide the following information:

- **Target.** The system name of the actual link process that is running.
- **Node.** The node that the link is running on.
- **Address.** The IP address of the remote node.
- **IPC.** The mode of the Remote Copy link (r) Receive or (s) Send.
- **Total KBytes.** The amount of data that has been transmitted since the link was started, in KB.
- **Throughput (KBs).** The throughput on the link after the last iteration.
- **Current.** The amount of current transmitted since the last statrcopy iteration, in KB.
- **Average.** The average speed of the data transmission, in KB/s.

NOTES

- This command repeats until directed to stop.
- Within the context of this command, KB is 1000 bytes, MB is 1000KB, and GB is 1000MB.
- The numbers displayed by this command might be somewhat less than those displayed with `statport`, as `statrcopy` output does not include TCP/IP overhead.

COMMAND

`stoprcopy`

DESCRIPTION

The `stoprcopy` command disables the Remote Copy functionality for any started Remote Copy volume groups.

AUTHORITY

Super, Edit



NOTE: You need access to all domains in order to run this command.

SYNTAX

`stoprcopy [options]`

OPTIONS

`-f`

Specifies that any started copy will not ask for confirmation for the `-clear` option.

`-stopgroups`

Specifies that any started Remote Copy volume groups are stopped.

`-clear`

Specifies that configuration entries affiliated with the stopped mode are deleted.



CAUTION: Issuing the `stoprcopy -clear` command completely removes the Remote Copy setup and is NOT reversible.

SPECIFIERS

None.

RESTRICTIONS

None.

EXAMPLES

The following example disables the Remote Copy functionality of all Remote Copy volume groups:

```
cli% stoprcopy -stopgroups
```

NOTES

- If the `-stopgroups` option is not used, all groups must already be stopped.
- An older version of this command provided specifiers to disable the primary or backup systems. These specifiers were deprecated in InForm OS release 2.2.3.
- Unless the `-stopgroups` option is used, the command will fail if there are any Remote Copy groups that are started. If the `-clear` option has been used, the configuration is completely erased. Consequently, Remote Copy operations can not be restarted using only the `startrcopy` command. The configuration must be rebuilt. Therefore, the `-clear` option requires confirmation with the `-f` option, the `TPDFORCE` environment variable, or by interactively typing, `y`. Refer to the *InForm OS CLI Administrator's Manual* for information about using environment variables.

COMMAND

stoprcopygroup

DESCRIPTION

The `stoprcopygroup` command stops the Remote Copy functionality for the specified Remote Copy volume group.

SYNTAX

`stoprcopygroup [option <arg>] <group_name>`

AUTHORITY

Super, Edit

OPTIONS

`-nosnap`

In synchronous mode, this option turns off the creation of snapshots. This is useful if `removercopygroup` is to be run to remove Remote Copy. In asynchronous periodic mode, this option deletes any current synchronization snapshots.

`-t <target_name>`

Indicates that only the group on the specified target is stopped. If this option is not used, by default, the `stoprcopygroup` command will affect all of a group's targets.

SPECIFIERS

`<group_name>`

The name of the Remote Copy volume group to stop.

RESTRICTIONS

This command requires the 3PAR Remote Copy license. Contact your local service provider for further information.

EXAMPLES

The following example stops Remote Copy for Group1:

```
cli% stoprcopygroup Group1
```

NOTES

- If a group's target has the `mirror_config` policy set and the group is a primary group, then this command will be mirrored to that target and the corresponding secondary group will be stopped. If the `mirror_config` policy is set and the group is a secondary, then this command will fail.
- If the `mirror_config` policy is not set and this command is issued on a secondary group, then the corresponding primary group will also be stopped as a result of this command.
- In `sync` mode, this command creates snapshots that are used for synchronizing the primary and secondary groups if `startcopygroup` is run later.

COMMAND`syncrcopy`**DESCRIPTION**

The `syncrcopy` command manually synchronizes Remote Copy volume groups.

SYNTAX`syncrcopy [options <arg>] <group_name>`**AUTHORITY**

Super, Edit

OPTIONS

`-w`

Wait for synchronization to complete before returning to a command prompt.

`-n`

Do not save resynchronization snapshot. This option is only relevant for asynchronous periodic mode volume groups.



NOTE: Using the `-n` option requires a full synchronization at the next sync.

`-ovrd`

Force synchronization without prompting for confirmation, even if volumes are already synchronized. This option is only relevant for synchronous mode volume groups and can be used to resynchronize volumes that have become inconsistent.

`-t <target_name>`

Indicates that only the group on the specified target is synchronized. If this option is not used, by default, the `syncrcopy` command will affect all of a group's targets.

SPECIFIERS

`<group_name>`

Specifies the name of the Remote Copy volume group to be synchronized. This name can be obtained using the `showrcopy` command.

RESTRICTIONS

This command requires the 3PAR Remote Copy license. Contact your local service provider for further information.

EXAMPLES

The following example specifies that Remote Copy volume group `Group1` should be synchronized with its corresponding secondary volume group:

```
cli% syncrcopy Group1
Synchronization request issued for group Group1
```

NOTES

- Mode (synchronous or asynchronous periodic) is set using the `creatercopygroup` command. For information about modes and creating Remote Copy volume groups, refer to [creatercopygroup](#) on page B.18.
- For information about setting targets, refer to [creatercopytarget](#) on page B.20.

C

Example Setup and Disaster Recovery

In this chapter

C.1 Remote Copy Setup Examples	C.2
C.2 Bidirectional Synchronous Disaster Recovery Example	C.4
C.3 N-to-1 Asynchronous Periodic Disaster Recovery Example	C.15
C.4 1-to-N Unidirectional Asynchronous Periodic Disaster Recovery Example	C.27
C.5 Synchronous Long Distance Remote Copy Disaster Recovery Example	C.38
C.5.1 Synchronous Backup Server Assumes Role of Primary Server	C.43
C.5.2 Asynchronous Backup Server Assumes Role of Primary Server	C.59
C.5.3 Asynchronous Backup Server Assumes Role of Primary Server - No Data Transfer from the Synchronous Backup Server	C.80
C.6 Synchronous Long Distance Remote Copy for Data Migration	C.96

This chapter contains examples of supported configurations and disaster recovery scenarios for 3PAR Remote Copy. The first section illustrates the supported Remote Copy configurations as explained in [Chapter 3, Remote Copy Setup](#). The second section illustrates disaster recovery cycles for a bidirectional Remote Copy pair using synchronous mode volume group, an N-to-1 type configuration using asynchronous periodic mode volume groups, and a Synchronous Long Distance Remote Copy configuration.

C.1 Remote Copy Setup Examples

The following figures depict supported Remote Copy configurations. For detailed setup instructions for each configuration, refer to [Setting Up Remote Copy](#) on page 3.16 in [Chapter 3, Remote Copy Setup](#).

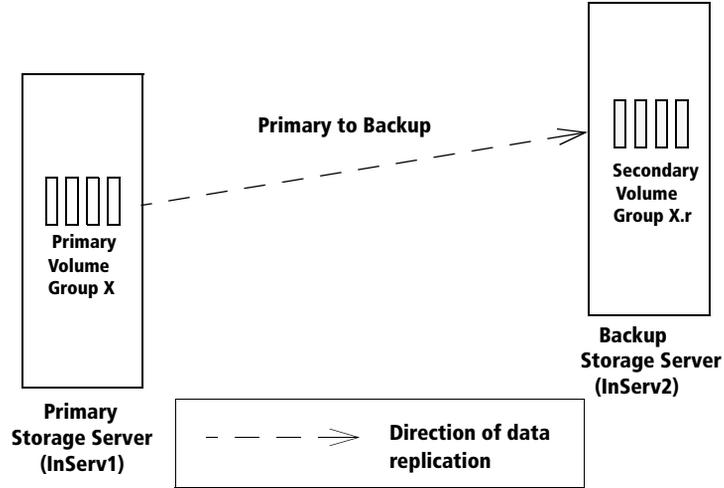


Figure C-1. Unidirectional Remote Copy

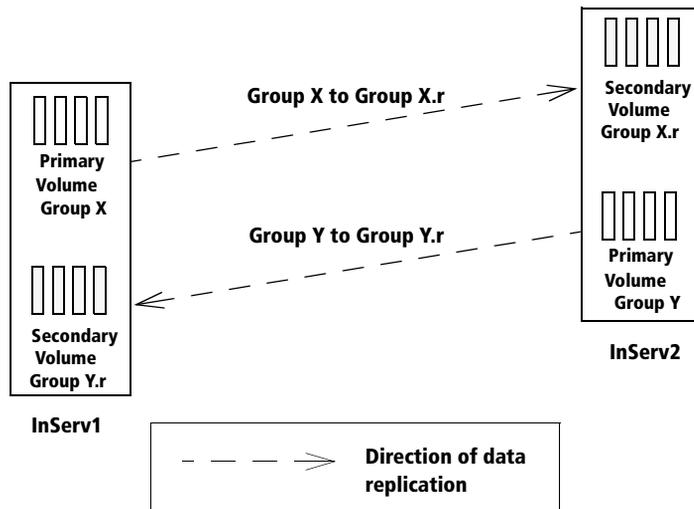


Figure C-2. Bidirectional Remote Copy

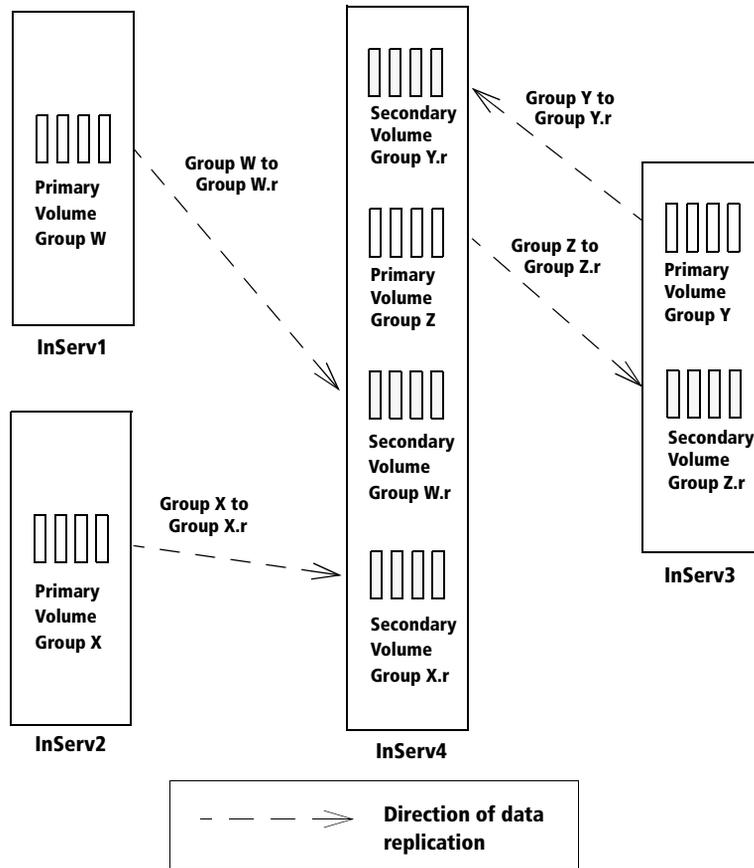


Figure C-3. N-to-1 Remote Copy



NOTE: When issuing commands that are mirrored from one system to another, there is a five minute timeout limit. After five minutes, if the other system does not respond to a command, the following error message appears:

```
target system <target_name> could not be contacted
```



NOTE: Mixing of synchronous and asynchronous periodic volume groups on the same Remote Copy pair is not supported.

C.2 Bidirectional Synchronous Disaster Recovery Example

The following example contains a disaster recovery cycle for a bidirectional Remote Copy pair (**InServ1/InServ2**) with synchronous mode volume groups. The following information applies to this bidirectional disaster recovery example:

- The members of the Remote Copy pair are an eight-node cluster called **InServ1** and a four-node cluster called **InServ2**.
- Information for **InServ1** is as follows:
 - ◆ System ID: 96
 - ◆ Links:
 - IP address **172.1.1.96**
 - IP address **172.1.2.96**
 - ◆ Remote copy nodes: **0** and **1**
- Information for **InServ2** is as follows:
 - ◆ System ID: 11
 - ◆ Links:
 - IP address **172.1.1.11**
 - IP address **172.1.2.11**
 - ◆ Remote copy nodes: **0** and **1**
- Two virtual volumes on **InServ1** called **localvv.0** and **localvv.1** are the only members of **sync_group_1**.
- Two virtual volumes on **InServ2** called **remotevv.0** and **remotevv.1** are the only members of **sync_group_1.r96**, the secondary group that is automatically created at the same time as **sync_group_1**.
- Two virtual volumes on **InServ2** called **localvv.0** and **localvv.1** are the only members of **sync_group_2**.
- Two virtual volumes on **InServ1** called **remotevv.0** and **remotevv.1** are the only members of **sync_group_2.r11**, the secondary group that is automatically created at the same time as **sync_group_2**.

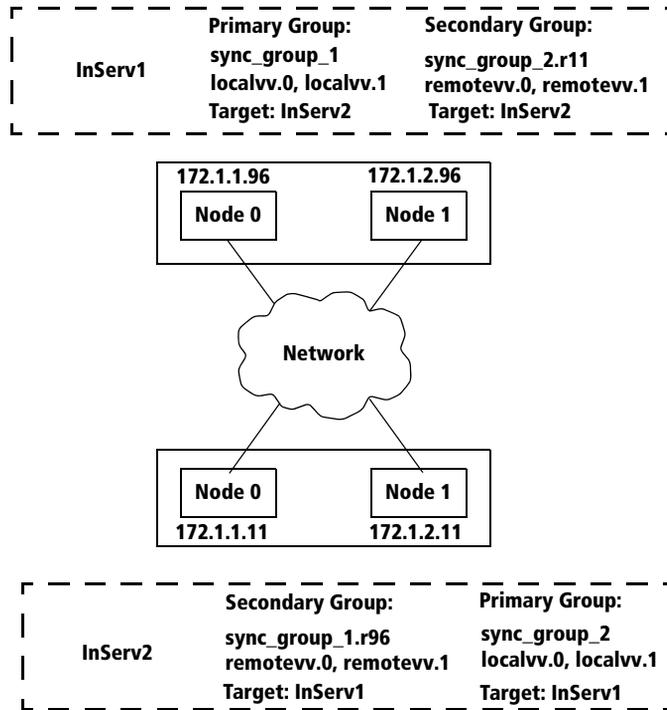


Figure C-4. Bidirectional Remote Copy Example

The following `showrcopy` command output displays status for **InServ1** and **InServ2** under normal operation of bidirectional synchronous mode Remote Copy:

```

On InServ1:

# showrcopy

Remote Copy System Information

Status: Started, Normal

Target Information

Name      ID Type Status Options Policy
InServ2 9  IP   ready          mirror_config

Link Information

Target  Node Address      Status Options
InServ2 0    10.100.33.11 Up
InServ2 1    10.101.33.11 Up
receive 0    10.100.33.11 Up
receive 1    10.101.33.11 Up

Group Information

Name          Target      Status  Role      Mode      Options
sync_group_1 InServ2     Started Primary   Sync
  LocalVV     ID  RemoteVV  ID  SyncStatus  LastSyncTime
  localvv.0   413 remotevv.0 375 Syncing (10%) NA
  localvv.1   414 remotevv.1 376 Syncing (15%) NA

Name          Target      Status  Role      Mode      Options
sync_group_2.r11 InServ2     Started Secondary Sync
  LocalVV     ID  RemoteVV  ID  SyncStatus  LastSyncTime
  remotevv.0  423 localvv.0 385 Syncing      NA
  remotevv.1  424 localvv.1 386 Syncing      NA

```

On **InServ2**:

showcrcopy

Remote Copy System Information

Status: Started, Normal

Target Information

Name	ID	Type	Status	Options	Policy
InServ1	2	IP	ready		mirror_config

Link Information

Target	Node	Address	Status	Options
InServ1	0	10.100.33.96	Up	
InServ1	1	10.101.33.96	Up	
receive	0	10.100.33.96	Up	
receive	1	10.101.33.96	Up	

Group Information

Name	Target	Status	Role	Mode	Options
sync_group_1.r96	InServ1	Started	Secondary	Sync	
LocalVV	ID	RemoteVV	ID	SyncStatus	LastSyncTime
remotevv.0	375	localvv.0	413	Syncing	NA
remotevv.1	376	localvv.1	414	Syncing	NA
Name	Target	Status	Role	Mode	Options
sync_group_2	InServ1	Started	Primary	Sync	
LocalVV	ID	RemoteVV	ID	SyncStatus	LastSyncTime
localvv.0	385	remotevv.0	423	Syncing (20%)	NA
localvv.1	386	remotevv.1	424	Syncing (20%)	NA



NOTE: For complete details on the showcrcopy command, including synchronization, link, and group states, see [showrcopy](#) on page B.57.

For a Remote Copy pair with synchronous mode volume groups, when a failure occurs (for example **InServ1** becomes unavailable) such that all links between the storage servers are broken, after 20 seconds the system marks the sending links as **Down**. After another 20 seconds, the system marks the targets as **failed**.

The following example displays `showrcopy` output on **InServ2** 60 seconds after **InServ1** has become unavailable:

```

On InServ2:
# showrcopy

Remote Copy System Information

Status: Started, Normal

Target Information

Name      ID Type Status Options Policy
InServ1 2  IP   failed          mirror_config

Link Information

Target  Node Address      Status Options
InServ1 0   10.100.33.96 Down
InServ1 1   10.101.33.96 Down
receive 0   10.100.33.96 Up
receive 1   10.101.33.96 Up

Group Information

Name              Target      Status  Role      Mode      Options
sync_group_1.r96 InServ1     Stopped Secondary Sync
  LocalVV      ID  RemoteVV  ID  SyncStatus  LastSyncTime
  remotevv.0   375 localvv.0  413 Stopped      Thu Dec 14 17:50:53 PST 2006
  remotevv.1   376 localvv.1  414 Stopped      Thu Dec 14 17:50:52 PST 2006
Name              Target      Status  Role      Mode      Options
sync_group_2     InServ1     Stopped Primary   Sync
  LocalVV      ID  RemoteVV  ID  SyncStatus  LastSyncTime
  localvv.0    385 remotevv.0  423 Stopped      Thu Dec 14 17:51:48 PST 2006
  localvv.1    386 remotevv.1  424 Stopped      Thu Dec 14 17:51:44 PST 2006

```

To initiate disaster recovery for a bidirectional Remote Copy pair with synchronous volume groups:

- 1 On the failover system, make all secondary groups primary by reversing the direction of the failed targets for each group. Issuing the `setrcopygroup failover` command switches every secondary group for the specified target. For this example, this is done by reversing the failed target **InServ1** for the secondary group **sync_group_1.r96** on **InServ2** using the `setrcopygroup failover` command as follows:

On **InServ2**:

```
# setrcopygroup failover -t InServ1
```



NOTE: At this point, you can export read-write volumes from the secondary. Any volumes already exported can now accept writes.

- 2 On the failover system, verify the reversal by using the `showrcopy` command and checking that the **Role** for the group is now **Primary-Rev**, as shown in bold in the following example:

On **InServ2**:

```
# showrcopy
```

```
Remote Copy System Information
```

```
Status: Started, Normal
```

```
Target Information
```

```
Name      ID Type Status Options Policy
InServ1 2  IP  failed          mirror_config
```

```
Link Information
```

```
Target Node Address      Status Options
InServ1 0    10.100.33.96 Down
InServ1 1    10.101.33.96 Down
receive 0    10.100.33.96 Up
receive 1    10.101.33.96 Up
```

```
Group Information
```

```
Name          Target      Status  Role      Mode      Options
sync_group_1.r96 InServ1    Stopped Primary-Rev Sync
  LocalVV      ID RemoteVV  ID  SyncStatus  LastSyncTime
  remotevv.0  375 localvv.0  413 Stopped      Thu Dec 14 17:50:53 PST 2006
  remotevv.1  376 localvv.1  414 Stopped      Thu Dec 14 17:50:52 PST 2006
```

```
Name          Target      Status  Role      Mode      Options
sync_group_2 InServ1    Stopped Primary    Sync
  LocalVV      ID RemoteVV  ID  SyncStatus  LastSyncTime
  localvv.0    385 remotevv.0  423 Stopped      Thu Dec 14 17:51:48 PST 2006
  localvv.1    386 remotevv.1  424 Stopped      Thu Dec 14 17:51:44 PST 2006
```

- 3 After the remote system (**InServ1**) has been restored and the target is ready, issue the `setrcopygroup recover` command on the failover system to resynchronize the servers.

On **InServ2**:

```
# setrcopygroup recover -t InServ1
```

- 4 Issue the `showrcopy` command and verify that the target displays **ready**, the sending links display **Up**, and that the volumes are **Syncing** as shown in bold in the following example:

```

On InServ2 :
Remote Copy System Information
Status: Started, Normal

Target Information

Name      ID Type Status Options Policy
InServ1 2  IP  ready          mirror_config

Link Information

Target  Node Address      Status Options
InServ1 0    10.100.33.96 Up
InServ1 1    10.101.33.96 Up
receive 0    10.100.33.96 Up
receive 1    10.101.33.96 Up

Group Information

Name          Target      Status  Role      Mode      Options
sync_group_1.r96 InServ1    Started Primary-Rev Sync
  LocalVV      ID  RemoteVV  ID  SyncStatus  LastSyncTime
  remotevv.0   375 localvv.0  413 Syncing (20%) Thu Dec 14 17:58:25 PST 2006
  remotevv.1   376 localvv.1  414 Syncing (25%) Thu Dec 14 17:58:25 PST 2006

Name          Target      Status  Role      Mode      Options
sync_group_2 InServ1    Stopped Primary    Sync
  LocalVV      ID  RemoteVV  ID  SyncStatus  LastSyncTime
  localvv.0    385 remotevv.0  423 Stopped    Thu Dec 14 17:51:48 PST 2006
  localvv.1    386 remotevv.1  424 Stopped    Thu Dec 14 17:51:44 PST 2006

```

- 5 On the restored system (**InServ1**), issue the `showrcopy` command and verify that the target displays **ready**, the sending links display **Up**, the volumes are **Syncing**, and the group is displayed as **-Rev** as shown in bold in the following example:

```

On InServ1:
# showrcopy
Remote Copy System Information
Status: Started, Normal

Target Information

Name      ID Type Status Options Policy
InServ2 9  IP  ready          mirror_config

Link Information

Target  Node Address      Status Options
InServ2 0    10.100.33.11 Up
InServ2 1    10.101.33.11 Up
receive 0    10.100.33.11 Up
receive 1    10.101.33.11 Up

Group Information

Name          Target      Status  Role          Mode      Options
sync_group_1 InServ2     Started Secondary-Rev Sync
  LocalVV     ID RemoteVV   ID SyncStatus  LastSyncTime
  localvv.0   413 remotevv.0 375 Syncing    Thu Dec 14 17:58:25 PST 2006
  localvv.1   414 remotevv.1 376 Syncing    Thu Dec 14 17:58:25 PST 2006

Name          Target      Status  Role          Mode      Options
sync_group_2.r11 InServ2     Stopped Secondary      Sync
  LocalVV     ID RemoteVV   ID SyncStatus  LastSyncTime
  remotevv.0  423 localvv.0  385 Stopped      Thu Dec 14 17:51:49 PST 2006
  remotevv.1  424 localvv.1  386 Stopped      Thu Dec 14 17:51:44 PST 2006

```

After the synchronization is verified, restore the direction of each system.



CAUTION: The group must be started at the time the `setrcopygroup restore` command is issued. Issue the `showrcopy groups <groupname>` command to confirm the group has been started. If it has not been started then issue the `startrcopygroup <groupname>` command and wait for any synchronizations that are started to complete before issuing the `setrcopygroup restore` command.

- 6 Restore the direction of the system by issuing the `setrcopygroup restore` command on the failover system.

On InServ2:

```
# setrcopygroup restore -t InServ1
```

- 7 Issue the `showrcopy` command to verify that the direction of **InServ2** has been restored and group **sync_group_1.r96** displays as **Secondary**, as shown in bold in the following example:

On InServ2:

```
# showrcopy
```

```
Remote Copy System Information
Status: Started, Normal
```

Target Information

```
Name      ID Type Status Options Policy
InServ1 2  IP  ready          mirror_config
```

Link Information

```
Target  Node Address      Status Options
InServ1 0    10.100.33.96 Up
InServ1 1    10.101.33.96 Up
receive 0    10.100.33.96 Up
receive 1    10.101.33.96 Up
```

Group Information

```
Name              Target      Status  Role      Mode      Options
sync_group_1.r96 InServ1    Started Secondary Sync
  LocalVV          ID  RemoteVV  ID  SyncStatus  LastSyncTime
  remotevv.0       375 localvv.0  413 Synced      Thu Dec 14 18:01:12 PST 2006
  remotevv.1       376 localvv.1  414 Synced      Thu Dec 14 18:01:13 PST 2006
```

```
Name              Target      Status  Role      Mode      Options
sync_group_2      InServ1    Stopped Primary    Sync
  LocalVV          ID  RemoteVV  ID  SyncStatus  LastSyncTime
  localvv.0        385 remotevv.0  423 Stopped     Thu Dec 14 17:51:48 PST 2006
  localvv.1        386 remotevv.1  424 Stopped     Thu Dec 14 17:51:44 PST 2006
```

- 8 Issue the `showrcopy` command to verify that the direction of **InServ1** has been restored and group **sync_group_1** displays as **Primary**, as shown in bold in the following example:

```

On InServ1:
# showrcopy

Remote Copy System Information
Status: Started, Normal

Target Information

Name      ID Type Status Options Policy
InServ2  9  IP  ready          mirror_config

Link Information

Target  Node Address      Status Options
InServ2 0    10.100.33.11 Up
InServ2 1    10.101.33.11 Up
receive 0    10.100.33.11 Up
receive 1    10.101.33.11 Up

Group Information

Name          Target      Status      Role      Mode      Options
sync_group_1 InServ2    Started    Primary   Sync
  LocalVV      ID RemoteVV   ID SyncStatus LastSyncTime
  localvv.0    413 remotevv.0 375 Synced    Thu Dec 14 18:01:13 PST 2006
  localvv.1    414 remotevv.1 376 Synced    Thu Dec 14 18:01:13 PST 2006

Name          Target      Status      Role      Mode      Options
sync_group_2.r11 InServ2    Stopped    Secondary Sync
  LocalVV      ID RemoteVV   ID SyncStatus LastSyncTime
  remotevv.0   423 localvv.0   385 Stopped    Thu Dec 14 17:51:49 PST 2006
  remotevv.1   424 localvv.1   386 Stopped    Thu Dec 14 17:51:44 PST 2006

```

C.3 N-to-1 Asynchronous Periodic Disaster Recovery Example

The following example contains a disaster recovery cycle for an N-to-1 configuration with two Remote Copy pairs (**InServ1/InServ2** and **InServ1/InServ3**) with asynchronous periodic mode volume groups. [Figure C-5](#) illustrates the relationship between primary servers **InServ2** and **InServ3** with backup server **InServ1**.

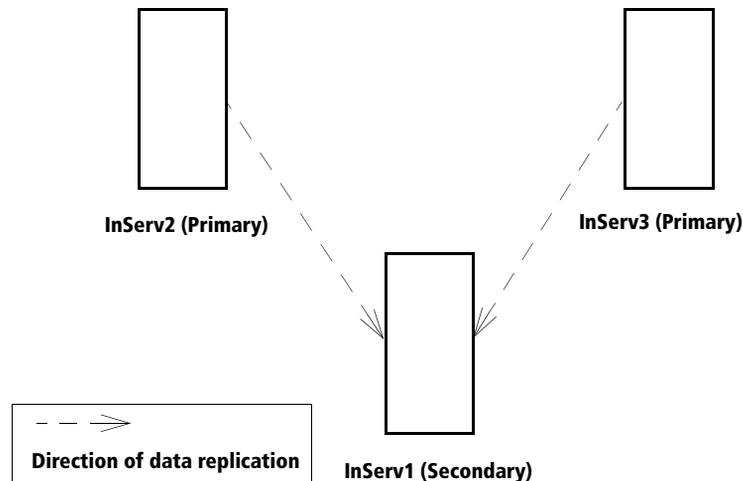


Figure C-5. Example N-to-1 Remote Copy Configuration

- Information for **InServ1** is as follows:
 - ◆ System ID: 61
 - ◆ Links:
 - IP address **172.100.33.61**
 - IP address **172.101.33.61**
 - ◆ Remote copy nodes: **0** and **1**
- Information for **InServ2** is as follows:
 - ◆ System ID: 96
 - ◆ Links:
 - IP address **172.100.33.96**
 - IP address **172.101.33.96**

- ◆ Remote copy nodes: **0** and **1**
- Information for **InServ3** is as follows:
 - ◆ System ID: 11
 - ◆ Links:
 - IP address **172.100.33.11**
 - IP address **172.101.33.11**
 - ◆ Remote copy nodes: **0** and **1**
- Two virtual volumes on **InServ1** called **remotevv.0** and **remotevv.1** are the members of **periodic_group_1.r96**, the secondary group that is automatically created at the same time as **periodic_group_1**.
- Two virtual volumes on **InServ1** called **remotevv.2** and **remotevv.3** are the members of **periodic_group_2.r11**, the secondary group that is automatically created at the same time as **periodic_group_2**.
- Two virtual volumes on **InServ2** called **localvv.0** and **localvv.1** are the only members of **periodic_group_1**.
- Two virtual volumes on **InServ3** called **localvv.0** and **localvv.1** are the only members of **periodic_group_2**.

The following `showrcopy` command output displays status for **InServ1**, **InServ2**, and **InServ3** under normal operation of asynchronous periodic mode Remote Copy:

```

On InServ1:
# showrcopy

Remote Copy System Information
Status: Started, Normal

Target Information

Name      ID Type Status Options Policy
InServ2  7  IP  ready          mirror_config
InServ3  8  IP  ready          mirror_config

Link Information

Target  Node Address      Status Options
InServ2 0    10.100.33.96 Up
InServ2 1    10.101.33.96 Up
InServ3 0    10.100.33.11 Up
InServ3 1    10.101.33.11 Up
receive 0    10.100.33.96 Up
receive 1    10.101.33.96 Up

Group Information

Name                Target      Status  Role      Mode      Options
periodic_group_1.r96 InServ2    Started Secondary Periodic over_per_alert
  LocalVV          ID RemoteVV   ID  SyncStatus LastSyncTime
  remotevv.0      21 localvv.0  413 Syncing   NA
  remotevv.1      22 localvv.1  414 Syncing   NA

Name                Target      Status  Role      Mode      Options
periodic_group_2.r11 InServ3    Started Secondary Periodic over_per_alert
  LocalVV          ID RemoteVV   ID  SyncStatus LastSyncTime
  remotevv.2      23 localvv.0  385 Syncing   NA
  remotevv.3      24 localvv.1  386 Syncing   NA

```

On InServ2:

```
# showrcopy
```

```
Remote Copy System Information
```

```
Status: Started, Normal
```

```
Target Information
```

Name	ID	Type	Status	Options	Policy
InServ1	11	IP	ready		mirror_config

```
Link Information
```

Target	Node	Address	Status	Options
InServ1	0	10.100.33.63	Up	
InServ1	1	10.101.33.63	Up	
receive	0	10.100.33.63	Up	
receive	1	10.101.33.63	Up	

```
Group Information
```

Name	Target	Status	Role	Mode	Options
periodic_group_1	InServ1	Started	Primary	Periodic	Last-Sync Thu Dec 14 18:19:17 PST 2006 , over_per_alert
LocalVW	ID	RemoteVW	ID	SyncStatus	LastSyncTime
localvv.0	413	remotevv.0	21	Syncing (10%)	NA
localvv.1	414	remotevv.1	22	Syncing (15%)	NA

On InServ3:

showcropy

Remote Copy System Information

Status: Started, Normal

Target Information

Name	ID	Type	Status	Options	Policy
InServ1	4	IP	ready		mirror_config

Link Information

Target	Node	Address	Status	Options
InServ1	0	10.100.33.63	Up	
InServ1	1	10.101.33.63	Up	
receive	0	10.100.33.63	Up	
receive	1	10.101.33.63	Up	

Group Information

Name	Target	Status	Role	Mode	Options
periodic_group_2	InServ1	Started	Primary	Periodic	Last-Sync Thu Dec 14 18:19:12 PST 2006 , over_per_alert
LocalVW	ID	RemoteVW	ID	SyncStatus	LastSyncTime
localvv.0	385	remotevv.2	23	Syncing (15%)	NA
localvv.1	386	remotevv.3	24	Syncing (15%)	NA

For a Remote Copy pair with asynchronous periodic mode volume groups, when a failure occurs (for example **InServ2** becomes unavailable) such that all links between the storage servers are broken, after 60 seconds the system marks the sending links as **Down**. After another 200 seconds, the system marks the targets and groups as **failed**.

The following example displays the `showrcopy` command output on **InServ1** 300 seconds after **InServ2** has become unavailable:

```

On InServ1:
# showrcopy

Remote Copy System Information
Status: Started, Normal

Target Information

Name      ID Type Status Options Policy
InServ2  7  IP  failed          mirror_config
InServ3  8  IP  ready           mirror_config

Link Information

Target  Node Address      Status Options
InServ2 0    10.100.33.96 Down
InServ2 1    10.101.33.96 Down
InServ3 0    10.100.33.11 Up
InServ3 1    10.101.33.11 Up
receive 0    10.100.33.96 Up
receive 1    10.101.33.96 Up

Group Information

Name                Target      Status  Role      Mode      Options
periodic_group_1.r96 InServ2    Stopped Secondary Periodic over_per_alert
  LocalVV          ID RemoteVV   ID SyncStatus LastSyncTime
  remotevv.0      21 localvv.0  413 Stopped   Thu Dec 14 18:23:52 PST 2006
  remotevv.1      22 localvv.1  414 Stopped   Thu Dec 14 18:23:52 PST 2006

Name                Target      Status  Role      Mode      Options
periodic_group_2.r11 InServ3    Started Secondary Periodic over_per_alert
  LocalVV          ID RemoteVV   ID SyncStatus LastSyncTime
  remotevv.2      23 localvv.0  385 Synced   Thu Dec 14 18:23:45 PST 2006
  remotevv.3      24 localvv.1  386 Synced   Thu Dec 14 18:23:44 PST 2006

```

To initiate disaster recovery for a Remote Copy pair with asynchronous periodic volume groups:

- 1 On the failover system, make all secondary groups primary by reversing the direction of the failed targets for each group. Issuing the `setrcopygroup failover` command switches every secondary group for the specified target. For this example, this is done by reversing

the failed target **InServ1** for the secondary group **primary_group_1.r96** on **InServ2** using the `setrcopygroup failover` command as follows:

On InServ1:

```
# setrcopygroup failover -t InServ2
```

- 2 On the failover system, verify the reversal by issuing the `showrcopy` command and checking that the **Role** for the group is now **Primary-Rev**, as shown in bold in the following example:

On InServ1:

```
# showrcopy
```

```
Remote Copy System Information
Status: Started, Normal
```

Target Information

Name	ID	Type	Status	Options	Policy
InServ2	7	IP	failed		mirror_config
InServ3	8	IP	ready		mirror_config

Link Information

Target	Node	Address	Status	Options
InServ2	0	10.100.33.96	Down	
InServ2	1	10.101.33.96	Down	
InServ3	0	10.100.33.11	Up	
InServ3	1	10.101.33.11	Up	
receive	0	10.100.33.96	Up	
receive	1	10.101.33.96	Up	

Group Information

Name	Target	Status	Role	Mode	Options
periodic_group_1.r96	InServ2	Stopped	Primary-Rev	Periodic	over_per_alert
LocalVV	ID	RemoteVV	ID	SyncStatus	LastSyncTime
remotevv.0	21	localvv.0	413	Stopped	Thu Dec 14 18:23:52 PST 2006
remotevv.1	22	localvv.1	414	Stopped	Thu Dec 14 18:23:52 PST 2006

Name	Target	Status	Role	Mode	Options
periodic_group_2.r11	InServ3	Started	Secondary	Periodic	over_per_alert
LocalVV	ID	RemoteVV	ID	SyncStatus	LastSyncTime
remotevv.2	23	localvv.0	385	Synced	Thu Dec 14 18:23:45 PST 2006
remotevv.3	24	localvv.1	386	Synced	Thu Dec 14 18:23:44 PST 2006

- 3 After the failed system (**InServ2**) has been restored, issue the `setrcopygroup recover` command on the failover system to resynchronize the servers.

On InServ1:

```
# setrcopygroup recover -t InServ2
```

- 4 Issue the `showrcopy` command and verify that the target (**InServ2**) displays **ready**, the sending links display **Up**, and that the volumes are **Syncing** as shown in bold in the following example:

On InServ1:

```
# showrcopy
```

```
Remote Copy System Information
Status: Started, Normal
```

Target Information

Name	ID	Type	Status	Options	Policy
InServ2	7	IP	ready		mirror_config
InServ3	8	IP	ready		mirror_config

Link Information

Target	Node	Address	Status	Options
InServ2	0	10.100.33.96	Up	
InServ2	1	10.101.33.96	Up	
InServ3	0	10.100.33.11	Up	
InServ3	1	10.101.33.11	Up	
receive	0	10.100.33.96	Up	
receive	1	10.101.33.96	Up	

Group Information

Name	Target	Status	Role	Mode	Options
periodic_group_1.r96	InServ2	Started	Primary-Rev	Periodic	Last-Sync Thu Dec 14 18:39:03 PST 2006 , over_per_alert
LocalVV	ID	RemoteVV	ID	SyncStatus	LastSyncTime
remotevv.0	21	localvv.0	413	Syncing (40%)	Thu Dec 14 18:23:52 PST 2006
remotevv.1	22	localvv.1	414	Syncing (50%)	Thu Dec 14 18:39:03 PST 2006
Name	Target	Status	Role	Mode	Options
periodic_group_2.r11	InServ3	Started	Secondary	Periodic	over_per_alert
LocalVV	ID	RemoteVV	ID	SyncStatus	LastSyncTime
remotevv.2	23	localvv.0	385	Synced	Thu Dec 14 18:23:45 PST 2006
remotevv.3	24	localvv.1	386	Synced	Thu Dec 14 18:23:44 PST 2006

- 5 On the restored system (**InServ2**), issue the `showrcopy` command and verify that the target (**InServ1**) displays **ready**, the sending links display **Up**, and the volumes are **Syncing** as shown in bold in the following example:

On **InServ2**:

```
# showrcopy
```

```
Remote Copy System Information
```

```
Status: Started, Normal
```

```
Target Information
```

Name	ID	Type	Status	Options	Policy
InServ1	11	IP	ready		mirror_config

```
Link Information
```

Target	Node	Address	Status	Options
InServ1	0	10.100.33.63	Up	
InServ1	1	10.101.33.63	Up	
receive	0	10.100.33.63	Up	
receive	1	10.101.33.63	Up	

```
Group Information
```

Name	Target	Status	Role	Mode	Options
periodic_group_1	InServ1	Started	Secondary-Rev	Periodic	Last-Sync Thu Dec 14 18:19:17 PST 2006 , over_per_alert
LocalVV	ID	RemoteVV	ID	SyncStatus	LastSyncTime
localvv.0	413	remotevv.0	21	Syncing	Thu Dec 14 18:40:14 PST 2006
localvv.1	414	remotevv.1	22	Syncing	Thu Dec 14 18:39:03 PST 2006

If I/O is continuing to be applied to the volumes on storage server **InServ1**, you must stop I/O and perform a final manual synchronization before the original setup can be restored as shown in the following example:

On **InServ1**:

```
# syncrcopy periodic_group_1.r96
```

After the synchronization is verified, restore the direction of each system.



CAUTION: The group must be started at the time the `setrcopygroup restore` command is issued. Issue the `showrcopy groups <groupname>` command to confirm the group has been started. If it has not been started then issue the `startrcopygroup <groupname>` command and wait for any synchronizations that are started to complete before issuing the `setrcopygroup restore` command.

- 6 Restore the direction of the system by issuing the `setrcopygroup restore` command.

On **InServ1**:

```
# setrcopygroup restore -t InServ2
```

- 7 Issue the `showrcopy` command to verify that the direction of **InServ2** has been restored and group **periodic_group_1.r96** displays as **Secondary**, as shown in bold in the following example:

```

On InServ1:
# showrcopy

Remote Copy System Information
Status: Started, Normal

Target Information

Name      ID Type Status Options Policy
InServ2  7 IP  ready          mirror_config
InServ3  8 IP  ready          mirror_config

Link Information

Target  Node Address      Status Options
InServ2 0    10.100.33.96 Up
InServ2 1    10.101.33.96 Up
InServ3 0    10.100.33.11 Up
InServ3 1    10.101.33.11 Up
receive 0    10.100.33.96 Up
receive 1    10.101.33.96 Up

Group Information

Name          Target  Status  Role    Mode  Options
periodic_group_1.r96 InServ2  Started Secondary Periodic Last-Sync Thu Dec 14
18:39:03 PST 2006 , over_per_alert
  LocalVV      ID  RemoteVV  ID  SyncStatus  LastSyncTime
  remotevv.0   21  localvv.0  413 Stale        Thu Dec 14 18:40:14 PST 2006
  remotevv.1   22  localvv.1  414 Stale        Thu Dec 14 18:39:03 PST 2006

Name          Target  Status  Role    Mode  Options
periodic_group_2.r11 InServ3  Started  Secondary Periodic over_per_alert
  LocalVV      ID  RemoteVV  ID  SyncStatus  LastSyncTime
  remotevv.2   23  localvv.0  385 Synced     Thu Dec 14 18:23:45 PST 2006
  remotevv.3   24  localvv.1  386 Synced     Thu Dec 14 18:23:44 PST 2006

```

- 8 Issue the `showrcopy` command to verify that the direction of **InServ1** has been restored and group **periodic_group_1** displays as **Primary**, as shown in bold in the following example:

```

On InServ2:
# showrcopy

Remote Copy System Information
Status: Started, Normal

Target Information

Name      ID Type Status Options Policy
InServ1 11 IP   ready          mirror_config

Link Information

Target  Node Address      Status Options
InServ1 0      10.100.33.63 Up
InServ1 1      10.101.33.63 Up
receive 0      10.100.33.63 Up
receive 1      10.101.33.63 Up

Group Information

Name          Target  Status Role    Mode  Options
periodic_group_1 InServ1 Started Primary Periodic Last-Sync Thu Dec 14 18:19:17
PST 2006 , over_per_alert
  LocalVV      ID  RemoteVV  ID  SyncStatus  LastSyncTime
  localvv.0    413 remotevv.0 21  Synced      Thu Dec 14 18:40:14 PST 2006
  localvv.1    414 remotevv.1 22  Synced      Thu Dec 14 18:39:03 PST 2006

```

C.4 1-to-N Unidirectional Asynchronous Periodic Disaster Recovery Example

The following example contains a disaster recovery cycle for a 1-to-N unidirectional configuration with two Remote Copy pairs (**InServ1/InServ2** and **InServ1/InServ3**) with asynchronous periodic mode volume groups. [Figure C-6](#) illustrates the relationship between primary server **InServ1** and its two backup servers, **InServ2** and **InServ3**.

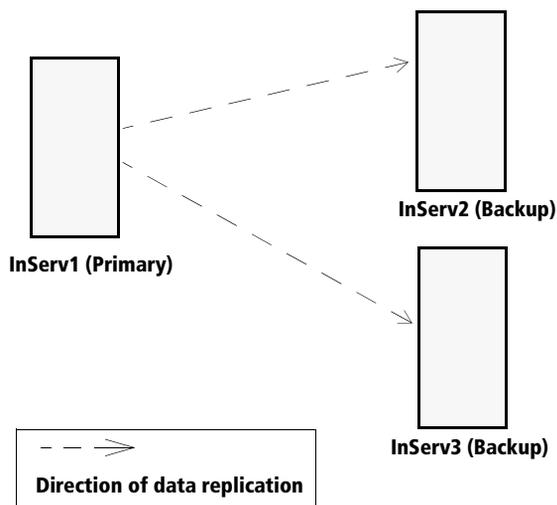


Figure C-6. Example 1-to-N Configuration (Asynchronous Periodic)

- Information for **InServ1** is as follows:
 - ◆ System ID: 61
 - ◆ Links:
 - IP address **172.100.33.61**
 - IP address **172.101.33.61**
 - ◆ Remote Copy nodes: **0** and **1**
- Information for **InServ2** is as follows:
 - ◆ System ID: 96
 - ◆ Links:

IP address **172.100.33.96**

IP address **172.101.33.96**

- ◆ Remote Copy nodes: **0** and **1**
- Information for **InServ3** is as follows:
 - ◆ System ID: 11
 - ◆ Links:
 - IP address **172.100.33.11**
 - IP address **172.101.33.11**
 - ◆ Remote Copy nodes: **0** and **1**
- Two virtual volumes on **InServ1** called **localvv.0** and **localvv.1** are the only members of **periodic_group_1**.
- Two virtual volumes on **InServ1** called **localvv.2** and **localvv.3** are the only members of **periodic_group_2**.
- Two virtual volumes on **InServ2** called **remotevv.0** and **remotevv.1** are the members of **periodic_group_1.r96**, the secondary group that is automatically created at the same time as **periodic_group_1**.
- Two virtual volumes on **InServ3** called **remotevv.0** and **remotevv.1** are the members of **periodic_group_2.r11**, the secondary group that is automatically created at the same time as **periodic_group_2**.

The following `showrcopy` command output displays status for **InServ1**, **InServ2**, and **InServ3** under normal operation of asynchronous periodic mode Remote Copy:

On InServ1:

```
# showrcopy
```

```
Remote Copy System Information
```

```
Status: Started, Normal
```

```
Target Information
```

Name	ID	Type	Status	Options	Policy
InServ2	7	IP	ready		mirror_config
InServ3	8	IP	ready		mirror_config

```
Link Information
```

Target	Node	Address	Status	Options
InServ2	0	10.100.33.96	Up	
InServ2	1	10.101.33.96	Up	
InServ3	0	10.100.33.11	Up	
InServ3	1	10.101.33.11	Up	
receive	0	10.100.33.96	Up	
receive	1	10.101.33.96	Up	

```
Group Information
```

Name	Target	Status	Role	Mode	Options
periodic_group_1	InServ2	Started	Primary	Periodic	over_per_alert
LocalVV	ID	RemoteVV	ID	SyncStatus	LastSyncTime
localvv.0	21	remotevv.0	413	Syncing	NA
localvv.1	22	remotevv.1	414	Syncing	NA

Name	Target	Status	Role	Mode	Options
periodic_group_2	InServ3	Started	Primary	Periodic	over_per_alert
LocalVV	ID	RemoteVV	ID	SyncStatus	LastSyncTime
localvv.2	23	remotevv.0	385	Syncing	NA
localvv.3	24	remotevv.1	386	Syncing	NA

On InServ2:

```
# showrcopy
```

```
Remote Copy System Information
Status: Started, Normal
```

Target Information

```
Name      ID Type Status Options Policy
InServ1 11 IP   ready          mirror_config
```

Link Information

```
Target  Node Address      Status Options
InServ1 0    10.100.33.63 Up
InServ1 1    10.101.33.63 Up
receive 0    10.100.33.63 Up
receive 1    10.101.33.63 Up
```

Group Information

```
Name          Target      Status Role      Mode      Options
periodic_group_1.r96 InServ1    Started Secondary Periodic Last-Sync Thu Dec
14 18:19:17 PST 2006 , over_per_alert
  LocalVV      ID  RemoteVV  ID  SyncStatus  LastSyncTime
  remotevv.0   413 localvv.0  21  Syncing (10%) NA
  remotevv.1   414 localvv.1  22  Syncing (15%) NA
```

On InServ3:

```
# showrcopy
```

```
Remote Copy System Information
```

```
Status: Started, Normal
```

```
Target Information
```

Name	ID	Type	Status	Options	Policy
InServ1	4	IP	ready		mirror_config

```
Link Information
```

Target	Node	Address	Status	Options
InServ1	0	10.100.33.63	Up	
InServ1	1	10.101.33.63	Up	
receive	0	10.100.33.63	Up	
receive	1	10.101.33.63	Up	

```
Group Information
```

Name	Target	Status	Role	Mode	Options
periodic_group_2.r11	InServ1	Started	Secondary	Periodic	Last-Sync Thu Dec 14 18:19:12 PST 2006 , over_per_alert
LocalVV	ID	RemoteVV	ID	SyncStatus	LastSyncTime
remotevv.0	385	localvv.2	23	Syncing (15%)	NA
remotevv.1	386	localvv.3	24	Syncing (15%)	NA

For a Remote Copy pair with asynchronous periodic mode volume groups, when a failure occurs (for example **InServ1** becomes unavailable) such that all links between the storage servers are broken, after 60 seconds the system marks the sending links as **Down**. After another 200 seconds, the system marks the targets and groups as **failed**.

The following example displays the `showrcopy` command output on **InServ2** 300 seconds after **InServ1** has become unavailable:

```

On InServ2:
# showrcopy

Remote Copy System Information
Status: Started, Normal

Target Information

Name      ID Type Status Options Policy
InServ1 7  IP  failed          mirror_config

Link Information

Target  Node Address      Status Options
InServ1 0    10.100.33.61 Down
InServ1 1    10.101.33.61 Down
receive 0    10.100.33.61 Down
receive 1    10.101.33.61 Down

Group Information

Name                Target      Status  Role      Mode      Options
periodic_group_1.r96 InServ1 Stopped Secondary Periodic over_per_alert
  LocalVV          ID RemoteVV  ID SyncStatus LastSyncTime
  remotevv.0      21 localvv.0  413 Stopped   Thu Dec 14 18:23:52 PST 2006
  remotevv.1      22 localvv.1  414 Stopped   Thu Dec 14 18:23:52 PST 2006

```

To initiate disaster recovery for a Remote Copy pair with asynchronous periodic volume groups:

- 1 On the failover system, make all secondary groups primary by reversing the direction of the failed targets for each group. Issuing the `setrcopygroup failover` command switches every secondary group for the specified target. For this example, this is done by reversing the failed target **InServ1** for the primary group **primary_group_1** on **InServ2** using the `setrcopygroup failover` command as follows:

```

On InServ2:
# setrcopygroup failover -t InServ1

```

- 2 On the failover system, verify the reversal by issuing the `showrcopy` command and checking that the **Role** for the group is now **Primary-Rev**, as shown in bold in the following example:

On InServ2:

```
# showrcopy
```

```
Remote Copy System Information
```

```
Status: Started, Normal
```

```
Target Information
```

Name	ID	Type	Status	Options	Policy
InServ1	7	IP	failed		mirror_config

```
Link Information
```

Target	Node	Address	Status	Options
InServ1	0	10.100.33.61	Down	
InServ1	1	10.101.33.61	Down	
receive	0	10.100.33.61	Down	
receive	1	10.101.33.61	Down	

```
Group Information
```

Name	Target	Status	Role	Mode	Options
periodic_group_1.r96	InServ1	Stopped	Primary-Rev	Periodic	over_per_alert
LocalVV	ID	RemoteVV	ID	SyncStatus	LastSyncTime
remotevv.0	21	localvv.0	413	Stopped	Thu Dec 14 18:23:52 PST 2006
remotevv.1	22	localvv.1	414	Stopped	Thu Dec 14 18:23:52 PST 2006

- 3 After the failed system (**InServ1**) has been restored, issue the `setrcopygroup recover` command on the failover system to resynchronize the servers.

On InServ2:

```
# setrcopygroup recover -t InServ1
```

- 4 Issue the `showrcopy` command and verify that the target (**InServ1**) displays **ready**, the sending links display **Up**, and that the volumes are **Syncing** as shown in bold in the following example:

```

On InServ2:
# showrcopy

Remote Copy System Information
Status: Started, Normal

Target Information

Name      ID Type Status Options Policy
InServ1 7  IP  ready          mirror_config

Link Information

Target  Node Address      Status Options
InServ1 0    10.100.33.61 Up
InServ1 1    10.101.33.61 Up
receive 0    10.100.33.61 Up
receive 1    10.101.33.61 Up

Group Information

Name                Target    Status  Role      Mode      Options
periodic_group_1.r96 InServ1  Started Primary-Rev Periodic Last-Sync Thu Dec 14
18:39:03 PST 2006 , over
_per_alert
  LocalVV      ID  RemoteVV      ID  SyncStatus  LastSyncTime
  remotevv.0   21  localvv.0     413 Syncing (40%) Thu Dec 14 18:23:52 PST 2006
  remotevv.1   22  localvv.1     414 Syncing (50%) Thu Dec 14 18:39:03 PST 2006

```

- 5 On the restored system (**InServ1**), issue the `showrcopy` command and verify that the target (**InServ2**) displays **ready**, the sending links display **Up**, and the volumes are **Syncing** as shown in bold in the following example:

On InServ1:

```
# showrcopy
```

```
Remote Copy System Information
```

```
Status: Started, Normal
```

```
Target Information
```

Name	ID	Type	Status	Options	Policy
InServ2	11	IP	ready		mirror_config
InServ3	12	IP	ready		mirror_config

```
Link Information
```

Target	Node	Address	Status	Options
InServ2	0	10.100.33.63	Up	
InServ2	1	10.101.33.63	Up	
InServ3	0	10.100.33.11	Up	
InServ3	1	10.101.33.11	Up	
receive	0	10.100.33.63	Up	
receive	1	10.101.33.63	Up	

```
Group Information
```

Name	Target	Status	Role	Mode	Options
periodic_group_1	InServ2	Started	Secondary-Rev	Periodic	Last-Sync Thu Dec 14 18:19:17 PST 2006 , over_per_alert
LocalVV	ID	RemoteVV	ID	SyncStatus	LastSyncTime
localvv.0	413	remotevv.0	21	Syncing	Thu Dec 14 18:40:14 PST 2006
localvv.1	414	remotevv.1	22	Syncing	Thu Dec 14 18:39:03 PST 2006
periodic_group_2	InServ3	Started	Primary	Periodic	over_per_alert
LocalVV	ID	RemoteVV	ID	SyncStatus	LastSyncTime
localvv.2	23	remotevv.0	385	Syncing	NA
localvv.3	24	remotevv.1	386	Syncing	NA

If I/O is continuing to be applied to the volumes on storage server **InServ2**, you must stop I/O and perform a final manual synchronization before the original setup can be restored as shown in the following example:

On InServ2:

```
# syncrcopy periodic_group_1
```

After the synchronization is verified, restore the direction of each system.



CAUTION: The group must be started at the time the `setrcopygroup restore` command is issued. Issue the `showrcopy groups <groupname>` command to confirm the group has been started. If it has not been started then issue the `startrcopygroup <groupname>` command and wait for any synchronizations that are started to complete before issuing the `setrcopygroup restore` command.

- 6 Restore the direction of the system by issuing the `setrcopygroup restore` command.

On **InServ2**:

```
# setrcopygroup restore -t InServ1
```

- 7 Issue the `showrcopy` command to verify that the direction of **InServ1** has been restored and group **periodic_group_1** displays as **Primary**, as shown in bold in the following example:

```

On InServ1:
# showrcopy

Remote Copy System Information
Status: Started, Normal

Target Information

Name      ID Type Status Options Policy
InServ2  7 IP  ready          mirror_config
InServ3  8 IP  ready          mirror_config

Link Information

Target  Node Address      Status Options
InServ2 0    10.100.33.96 Up
InServ2 1    10.101.33.96 Up
InServ3 0    10.100.33.11 Up
InServ3 1    10.101.33.11 Up
receive 0    10.100.33.96 Up
receive 1    10.101.33.96 Up

Group Information

Name          Target  Status Role      Mode  Options
periodic_group_1 InServ2  Started Primary Periodic Last-Sync Thu Dec 14 18:39:03
PST 2006 , over_per_alert
  LocalVV      ID  RemoteVV  ID  SyncStatus  LastSyncTime
  localvv.0    21  remotevv.0  413 Stale        Thu Dec 14 18:40:14 PST 2006
  localvv.1    22  remotevv.1  414 Stale        Thu Dec 14 18:39:03 PST 2006

Name          Target  Status Role      Mode  Options
periodic_group_2 InServ3  Started Secondary Periodic over_per_alert
  LocalVV      ID  RemoteVV  ID  SyncStatus  LastSyncTime
  remotevv.2    23  localvv.0  385 Synced      Thu Dec 14 18:23:45 PST 2006
  remotevv.3    24  localvv.1  386 Synced      Thu Dec 14 18:23:44 PST 2006

```

- 8 Issue the `showrcopy` command to verify that the direction of **InServ2** has been restored and group **periodic_group_1.r96** displays as **Secondary**, as shown in bold in the following example:

```

On InServ2:
# showrcopy

Remote Copy System Information
Status: Started, Normal

Target Information

Name      ID Type Status Options Policy
InServ1 11 IP   ready          mirror_config

Link Information

Target  Node Address      Status Options
InServ1 0    10.100.33.61 Up
InServ1 1    10.101.33.61 Up
receive 0    10.100.33.61 Up
receive 1    10.101.33.61 Up

Group Information

Name          Target  Status Role    Mode  Options
periodic_group_1.r96 InServ1 Started Secondary Periodic Last-Sync Thu Dec 14
18:19:17 PST 2006 , over_per_alert
  LocalVV      ID RemoteVV  ID   SyncStatus  LastSyncTime
  remotevv.0   413 localvv.0  21   Synced      Thu Dec 14 18:40:14 PST 2006
  remotevv.1   414 localvv.1  22   Synced      Thu Dec 14 18:39:03 PST 2006

```

C.5 Synchronous Long Distance Remote Copy Disaster Recovery Example

For Synchronous Long Distance Remote Copy set ups, there are three common failover scenarios where the primary server fails and one of the backup servers assumes the role of the primary server until the original primary server is brought back online. These scenarios are as follows:

- The primary server goes down and the synchronous backup server assumes the role of the primary server. See [Synchronous Backup Server Assumes Role of Primary Server](#) on page C.43.
- The primary server goes down and the asynchronous periodic backup server assumes the role of the primary server after data has been transferred from the synchronous backup

server to the asynchronous backup server. See [Asynchronous Backup Server Assumes Role of Primary Server](#) on page C.59.

- The primary server goes down and the asynchronous periodic backup server assumes the role of the primary server with no data transferred from the synchronous backup server. See [Asynchronous Backup Server Assumes Role of Primary Server - No Data Transfer from the Synchronous Backup Server](#) on page C.80

The following diagram displays the general Synchronous Long Distance Remote Copy setup on which the disaster recovery examples in the preceding sections are based:

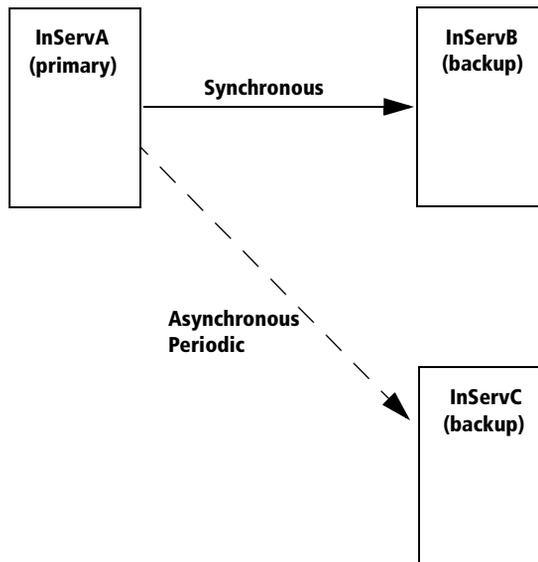


Figure C-7. Synchronous Long Distance Remote Copy Server Setup

Prior to the failure of **InServA**, issuing `showrcopy` on the Synchronous Long Distance Remote Copy systems **InServA**, **InServB**, and **InServC** appears as follows:

■ On InServA:

```
# showrcopy
```

```
Remote Copy System Information
```

```
Status: Started, Normal
```

```
Target Information
```

Name	ID	Type	Status	Options	Policy
InServB	58	FC	ready	2FF70002AC0000C3	mirror_config
InServC	59	IP	ready		mirror_config

```
Link Information
```

Target	Node	Address	Status	Options
InServB	0:2:1	20210002AC0000C3	Up	
InServB	1:2:1	21210002AC0000C3	Up	
InServC	0:3:1	10.100.33.63	Up	
InServC	1:3:1	10.101.33.63	Up	
receive	0:2:1	20210002AC0000C3	Up	
receive	1:2:1	21210002AC0000C3	Up	
receive	0:3:1	receive	Up	
receive	1:3:1	receive	Up	

```
Group Information
```

Name	Target	Status	Role	Mode	Options
multi.1	InServB	Started	Primary	Sync	
LocalVV	ID	RemoteVV	ID	SyncStatus	LastSyncTime
testvv.0	100	testvv.0	200	Synced	NA
testvv.1	101	testvv.1	201	Synced	NA
testvv.2	102	testvv.2	202	Synced	NA
testvv.3	103	testvv.3	203	Synced	NA
testvv.4	104	testvv.4	204	Synced	NA
testvv.5	105	testvv.5	205	Synced	NA

Name	Target	Status	Role	Mode	Options
multi.1	InServC	Started	Primary	Periodic	Last-Sync 2009-06-29 12:00:20 PDT , Period 5m, over_per_alert
LocalVV	ID	RemoteVV	ID	SyncStatus	LastSyncTime
testvv.0	100	testvv.0	300	Synced	2009-06-29 12:01:01 PDT
testvv.1	101	testvv.1	301	Synced	2009-06-29 12:01:07 PDT
testvv.2	102	testvv.2	302	Synced	2009-06-29 12:01:02 PDT
testvv.3	103	testvv.3	303	Synced	2009-06-29 12:01:05 PDT
testvv.4	104	testvv.4	304	Synced	2009-06-29 12:01:06 PDT
testvv.5	105	testvv.5	305	Synced	2009-06-29 12:01:06 PDT

■ On InServB:

```
# showrcopy
```

```
Remote Copy System Information
```

```
Status: Started, Normal
```

```
Target Information
```

Name	ID	Type	Status	Options	Policy
InServA	46	FC	ready	2FF70002AC000060	mirror_config
InServC	47	IP	ready		mirror_config

```
Link Information
```

Target	Node	Address	Status	Options
InServA	0:2:1	20210002AC000060	Up	
InServA	1:2:1	21210002AC000060	Up	
InServC	0:4:1	10.100.33.63	Up	
InServC	1:4:1	10.101.33.63	Up	
receive	0:2:1	20210002AC000060	Up	
receive	1:2:1	21210002AC000060	Up	
receive	0:4:1	receive	Up	
receive	1:4:1	receive	Up	

```
Group Information
```

Name	Target	Status	Role	Mode	Options
multi.1.r96	InServA	Started	Secondary	Sync	
LocalVV	ID	RemoteVV	ID	SyncStatus	LastSyncTime
testvv.0	200	testvv.0	100	Synced	NA
testvv.1	201	testvv.1	101	Synced	NA
testvv.2	202	testvv.2	102	Synced	NA
testvv.3	203	testvv.3	103	Synced	NA
testvv.4	204	testvv.4	104	Synced	NA
testvv.5	205	testvv.5	105	Synced	NA

Name	Target	Status	Role	Mode	Options
multi.1.r96	InServC	Backup	Secondary	Periodic	Period 5m, over_per_alert
LocalVV	ID	RemoteVV	ID	SyncStatus	LastSyncTime
testvv.0	200	testvv.0	300	Synced	2009-06-29 12:01:01 PDT
testvv.1	201	testvv.1	301	Synced	2009-06-29 12:01:07 PDT
testvv.2	202	testvv.2	302	Synced	2009-06-29 12:01:01 PDT
testvv.3	203	testvv.3	303	Synced	2009-06-29 12:01:05 PDT
testvv.4	204	testvv.4	304	Synced	2009-06-29 12:01:06 PDT
testvv.5	205	testvv.5	305	Synced	2009-06-29 12:01:06 PDT

■ On InServC:

```
# showrcopy

Remote Copy System Information
Status: Started, Normal

Target Information

Name      ID Type Status Options Policy
InServA  42 IP  ready          mirror_config
InServB  44 IP  ready          mirror_config

Link Information

Target  Node Address      Status Options
InServA 0   10.100.33.96 Up
InServA 1   10.101.33.96 Up
InServB 0   10.100.33.195 Up
InServB 1   10.101.33.195 Up
receive 0   receive      Up
receive 1   receive      Up

Group Information

Name      Target      Status  Role      Mode      Options
multi.1.r96 InServA    Started Secondary Periodic Period 5m,
over_per_alert
  LocalVV  ID RemoteVV  ID SyncStatus LastSyncTime
  testvv.0 300 testvv.0 100 Synced      2009-06-29 12:01:01 PDT
  testvv.1 301 testvv.1 101 Synced      2009-06-29 12:01:07 PDT
  testvv.2 302 testvv.2 102 Synced      2009-06-29 12:01:02 PDT
  testvv.3 303 testvv.3 103 Synced      2009-06-29 12:01:05 PDT
  testvv.4 304 testvv.4 104 Synced      2009-06-29 12:01:06 PDT
  testvv.5 305 testvv.5 105 Synced      2009-06-29 12:01:06 PDT

Name      Target      Status  Role      Mode      Options
multi.1.r96 InServB    Backup  Secondary Periodic Period 5m,
over_per_alert
  LocalVV  ID RemoteVV  ID SyncStatus LastSyncTime
  testvv.0 300 testvv.0 200 Synced      2009-06-29 12:00:40 PDT
  testvv.1 301 testvv.1 201 Synced      2009-06-29 12:00:39 PDT
  testvv.2 302 testvv.2 202 Synced      2009-06-29 12:00:40 PDT
  testvv.3 303 testvv.3 203 Synced      2009-06-29 12:00:41 PDT
  testvv.4 304 testvv.4 204 Synced      2009-06-29 12:00:35 PDT
  testvv.5 305 testvv.5 205 Synced      2009-06-29 12:00:36 PDT
```

C.5.1 Synchronous Backup Server Assumes Role of Primary Server

In this scenario, the primary server has gone down and the synchronous backup server is put into failover mode to assume the role of the primary server.

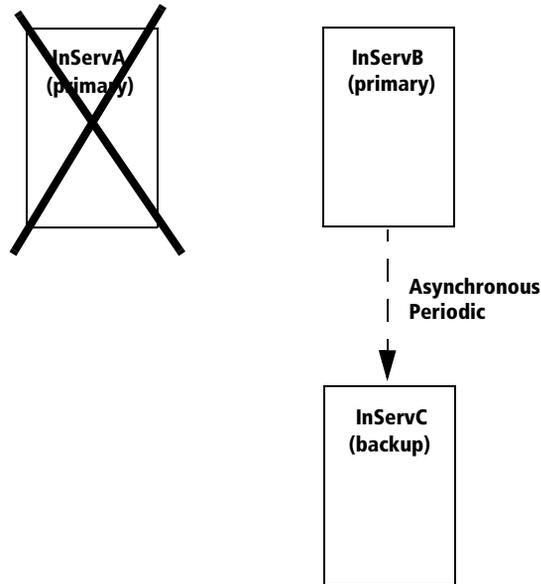


Figure C-8. Synchronous Periodic Server Assumes the Role of the Primary Server

When **InServA** goes down, issuing `showrcopy` on the backup servers **InServB** and **InServC** appears as follows:

■ On InServB:

```
# showrcopy
Remote Copy System Information
Status: Started, Normal
Target Information
Name      ID Type Status Options          Policy
InServA  46 FC   failed 2FF70002AC000060 mirror_config
InServC  47 IP   ready 2FF70002AC000060 mirror_config

Link Information

Target  Node  Address          Status Options
InServA 0:2:1 20210002AC000060 Down
InServA 1:2:1 21210002AC000060 Down
InServC 0:4:1 10.100.33.63     Up
InServC 1:4:1 10.101.33.63     Up
receive 0:2:1 20210002AC000060 Up
receive 1:2:1 21210002AC000060 Up
receive 0:4:1 receive      Up
receive 1:4:1 receive      Up

Group Information

Name      Target      Status      Role      Mode      Options
multi.1.r96 InServA     Stopped     Secondary Sync
  LocalVV  ID RemoteVV  ID SyncStatus LastSyncTime
  testvv.0 200 testvv.0 100 Stopped 2009-06-29 12:12:16 PDT
  testvv.1 201 testvv.1 101 Stopped 2009-06-29 12:12:16 PDT
  testvv.2 202 testvv.2 102 Stopped 2009-06-29 12:12:16 PDT
  testvv.3 203 testvv.3 103 Stopped 2009-06-29 12:12:16 PDT
  testvv.4 204 testvv.4 104 Stopped 2009-06-29 12:12:16 PDT
  testvv.5 205 testvv.5 105 Stopped 2009-06-29 12:12:16 PDT

Name      Target      Status      Role      Mode      Options
multi.1.r96 InServC     Backup      Secondary Periodic Period 5m,
over_per_alert
  LocalVV  ID RemoteVV  ID SyncStatus LastSyncTime
  testvv.0 200 testvv.0 300 Synced 2009-06-29 12:07:51 PDT
  testvv.1 201 testvv.1 301 Synced 2009-06-29 12:07:51 PDT
  testvv.2 202 testvv.2 302 Synced 2009-06-29 12:07:51 PDT
  testvv.3 203 testvv.3 303 Synced 2009-06-29 12:07:51 PDT
  testvv.4 204 testvv.4 304 Synced 2009-06-29 12:07:51 PDT
  testvv.5 205 testvv.5 305 Synced 2009-06-29 12:07:51 PDT
```

■ On InServC:

```
# showrcopy

Remote Copy System Information
Status: Started, Normal

Target Information

Name      ID Type Status Options Policy
InServA  42 IP   failed          mirror_config
InServB  44 IP   ready          mirror_config

Link Information

Target  Node Address      Status Options
InServA 0    10.100.33.96 Down
InServA 1    10.101.33.96 Down
InServB 0    10.100.33.195 Up
InServB 1    10.101.33.195 Up
receive 0    receive      Up
receive 1    receive      Up

Group Information

Name      Target      Status Role      Mode      Options
multi.1.r96 InServA    Stopped Secondary Periodic Period 5m,
over_per_alert
  LocalVV  ID RemoteVV  ID SyncStatus LastSyncTime
  testvv.0 300 testvv.0 100 Stopped 2009-06-29 12:07:51 PDT
  testvv.1 301 testvv.1 101 Stopped 2009-06-29 12:07:51 PDT
  testvv.2 302 testvv.2 102 Stopped 2009-06-29 12:07:51 PDT
  testvv.3 303 testvv.3 103 Stopped 2009-06-29 12:07:51 PDT
  testvv.4 304 testvv.4 104 Stopped 2009-06-29 12:07:51 PDT
  testvv.5 305 testvv.5 105 Stopped 2009-06-29 12:07:51 PDT

Name      Target      Status Role      Mode      Options
multi.1.r96 InServB    Backup Secondary Periodic Period 5m,
over_per_alert
  LocalVV  ID RemoteVV  ID SyncStatus LastSyncTime
  testvv.0 300 testvv.0 200 Synced 2009-06-29 12:00:40 PDT
  testvv.1 301 testvv.1 201 Synced 2009-06-29 12:00:39 PDT
  testvv.2 302 testvv.2 202 Synced 2009-06-29 12:00:40 PDT
  testvv.3 303 testvv.3 203 Synced 2009-06-29 12:00:41 PDT
  testvv.4 304 testvv.4 204 Synced 2009-06-29 12:00:35 PDT
  testvv.5 305 testvv.5 205 Synced 2009-06-29 12:00:36 PDT
```

- 1 Initiate disaster recovery to the synchronous backup server, **InServB**, by issuing the `setrcopygroup failover` command on **InServB**.

```
# setrcopygroup failover -f -t InServA
failover started with tasks: 5745

root@xnodee594:~/bin# waittask -v 5745
  Id Type                Name                Status Phase Step -----StartTime-----
-----FinishTime-----
5745 remote_copy_failover multi.1.r96 done    ---  --- 2009-06-29 12:16:31
PDT 2009-06-29 12:16:39 PDT

Detailed status:
2009-06-29 12:16:31 PDT Created    task.
2009-06-29 12:16:31 PDT Begin      Failover operation on group multi.1.r96
started.
2009-06-29 12:16:32 PDT Switched   Group multi.1.r96 was switched from
secondary to primary.
2009-06-29 12:16:34 PDT Starting  Starting group multi.1.r96 to target
InServC.
2009-06-29 12:16:39 PDT Started   Remote copy was started for group
multi.1.r96 and target InServC.
2009-06-29 12:16:39 PDT Completed Group multi.1.r96 failover completed.
```

By issuing `setrcopygroup` as shown in the example above:

- ◆ The disaster recovery operation is run against all groups that were secondary groups to **InServA**.
- ◆ All tasks required for each group to be processed are displayed as is the status of each task. This can take several minutes to complete.



NOTE: Because failover of individual groups can still fail, these tasks should be checked for successful completion.

- ◆ Groups are started on **InServC** and **InServB** assumes the role of the primary storage server and begins mirroring to **InServC**. All groups are started and synchronized in this direction. Any newer data that was sent to **InServB** since the last synchronization between **InServA** and **InServB** (prior to **InServA** failing) is copied to **InServC**.

2 Issue showrcopy on **InServB** to verify it has become the primary system.

```
# showrcopy
Remote Copy System Information
Status: Started, Normal
Target Information

Name      ID Type Status Options          Policy
InServA 46 FC   failed 2FF70002AC000060 mirror_config
InServC 47 IP   ready          mirror_config

Link Information

Target  Node  Address          Status Options
InServA 0:2:1 20210002AC000060 Down
InServA 1:2:1 21210002AC000060 Down
InServC 0:4:1 10.100.33.63     Up
InServC 1:4:1 10.101.33.63     Up
receive 0:2:1 20210002AC000060 Up
receive 1:2:1 21210002AC000060 Up
receive 0:4:1 receive      Up
receive 1:4:1 receive      Up

Group Information

Name      Target      Status  Role          Mode          Options
multi.1.r96 InServA     Stopped Primary-Rev Sync
  LocalVV  ID RemoteVV  ID SyncStatus  LastSyncTime
  testvv.0 200 testvv.0 100 Stopped      2009-06-29 12:12:16 PDT
  testvv.1 201 testvv.1 101 Stopped      2009-06-29 12:12:16 PDT
  testvv.2 202 testvv.2 102 Stopped      2009-06-29 12:12:16 PDT
  testvv.3 203 testvv.3 103 Stopped      2009-06-29 12:12:16 PDT
  testvv.4 204 testvv.4 104 Stopped      2009-06-29 12:12:16 PDT
  testvv.5 205 testvv.5 105 Stopped      2009-06-29 12:12:16 PDT

Name      Target      Status  Role          Mode          Options
multi.1.r96 InServC     Started Primary-Rev Periodic Last-Sync 2009-06-29
12:16:39 PDT , Period 5m, over_per_alert
  LocalVV  ID RemoteVV  ID SyncStatus  LastSyncTime
  testvv.0 200 testvv.0 300 Synced      2009-06-29 12:16:39 PDT
  testvv.1 201 testvv.1 301 Synced      2009-06-29 12:16:39 PDT
  testvv.2 202 testvv.2 302 Synced      2009-06-29 12:16:39 PDT
  testvv.3 203 testvv.3 303 Synced      2009-06-29 12:16:39 PDT
  testvv.4 204 testvv.4 304 Synced      2009-06-29 12:16:40 PDT
  testvv.5 205 testvv.5 305 Synced      2009-06-29 12:16:39 PDT
```

- 3 Issue `showrcopy` on **InServC** to verify it is now the backup server to **InServB** and its volumes are synchronized with **InServB**.

```
# showrcopy
Remote Copy System Information
Status: Started, Normal
Target Information

Name      ID Type Status Options Policy
InServA  42 IP   failed           mirror_config
InServB  44 IP   ready            mirror_config

Link Information

Target  Node Address      Status Options
InServA 0    10.100.33.96 Down
InServA 1    10.101.33.96 Down
InServB 0    10.100.33.195 Up
InServB 1    10.101.33.195 Up
receive 0    receive      Up
receive 1    receive      Up

Group Information

Name      Target      Status      Role      Mode      Options
multi.1.r96 InServA     Backup      Secondary Periodic Period 5m,
over_per_alert
  LocalVV      ID RemoteVV      ID SyncStatus      LastSyncTime
  testvv.0     300 testvv.0      100 Synced           2009-06-29 12:07:51 PDT
  testvv.1     301 testvv.1      101 Synced           2009-06-29 12:07:51 PDT
  testvv.2     302 testvv.2      102 Synced           2009-06-29 12:07:51 PDT
  testvv.3     303 testvv.3      103 Synced           2009-06-29 12:07:51 PDT
  testvv.4     304 testvv.4      104 Synced           2009-06-29 12:07:51 PDT
  testvv.5     305 testvv.5      105 Synced           2009-06-29 12:07:51 PDT

Name      Target      Status      Role      Mode      Options
multi.1.r96 InServB     Started     Secondary Periodic Period 5m,
over_per_alert
  LocalVV      ID RemoteVV      ID SyncStatus      LastSyncTime
  testvv.0     300 testvv.0      200 Synced           2009-06-29 12:16:39 PDT
  testvv.1     301 testvv.1      201 Synced           2009-06-29 12:16:39 PDT
  testvv.2     302 testvv.2      202 Synced           2009-06-29 12:16:39 PDT
  testvv.3     303 testvv.3      203 Synced           2009-06-29 12:16:39 PDT
  testvv.4     304 testvv.4      204 Synced           2009-06-29 12:16:40 PDT
  testvv.5     305 testvv.5      205 Synced           2009-06-29 12:16:39 PDT
```

4 When InServA has recovered, issue the `setrcopygroup recover` command on InServB.

```
# setrcopygroup recover -f -t InServA
recover started with tasks: 5752
root@xnodee594:~/bin# waittask -v 5752
  Id Type           Name           Status Phase Step -----StartTime----- -FinishTime-
5752 remote_copy_recover multi.1.r96 active   2/4  0/1 2009-06-29 12:30:54 PDT -

Detailed status:
2009-06-29 12:30:54 PDT Created      task.
2009-06-29 12:30:54 PDT Begin        Recover operation on group multi.1.r96 started.
2009-06-29 12:30:54 PDT Switched     Target InServA of group multi.1.r96 was switched from
primary to secondary.
2009-06-29 12:30:54 PDT Waiting      Wait for target InServA of group multi.1.r96 to complete
snapshot promotions.
2009-06-29 12:31:33 PDT Starting     Starting group multi.1.r96 to target InServA.
2009-06-29 12:31:33 PDT Started       Remote copy was started for group multi.1.r96 and target
InServA.
2009-06-29 12:31:33 PDT Completed    Group multi.1.r96 recover completed.

* Volumes on InServA promoting:

root@xnodeed28:~/bin# showvv
-----Rsvd(MB)----- -(MB)-
  Id Name           Prov Type CopyOf  BsId Rd -Detailed_State- Adm  Snp  Usr  VSize
  0  admin           full base ---      0  RW normal         0   0 10240 10240
100 testvv.0        cpvv base ---      100 RW normal        512 2048 1024 1024
5810 rcpy.222.100.59.1 snp vcopy testvv.0 100 RO normal         --  --  -- 1024
5816 rcpy.222.100.58 snp vcopy testvv.0 100 RO normal         --  --  -- 1024
101 testvv.1        cpvv base ---      101 RW normal        512 2048 1024 1024
5811 rcpy.222.101.59.1 snp vcopy testvv.1 101 RO normal         --  --  -- 1024
5817 rcpy.222.101.58 snp vcopy testvv.1 101 RO normal         --  --  -- 1024
102 testvv.2        cpvv base ---      102 RW promoting    512 2048 1024 1024
5812 rcpy.222.102.59.1 snp vcopy testvv.2 102 RO normal         --  --  -- 1024
5818 rcpy.222.102.58 snp vcopy testvv.2 102 RO normal         --  --  -- 1024
103 testvv.3        cpvv base ---      103 RW promoting    512 2048 1024 1024
5813 rcpy.222.103.59.1 snp vcopy testvv.3 103 RO normal         --  --  -- 1024
5819 rcpy.222.103.58 snp vcopy testvv.3 103 RO normal         --  --  -- 1024
104 testvv.4        cpvv base ---      104 RW promoting    512 2048 1024 1024
5814 rcpy.222.104.59.1 snp vcopy testvv.4 104 RO normal         --  --  -- 1024
5820 rcpy.222.104.58 snp vcopy testvv.4 104 RO normal         --  --  -- 1024
105 testvv.5        cpvv base ---      105 RW promoting    256 1024 1024 1024
5815 rcpy.222.105.59.1 snp vcopy testvv.5 105 RO normal         --  --  -- 1024
5821 rcpy.222.105.58 snp vcopy testvv.5 105 RO normal         --  --  -- 1024
```

In the example above:

- ◆ Tasks are launched for each group that has already been failed over.

- ◆ Groups on **InServA** temporarily switch to secondary mode, thereby promoting the Remote Copy snapshots to bring **InServA** and **InServB** to the same starting point. Once completed, Remote Copy is started between **InServA** and **InServB** and synchronization of the two system's groups occurs.
- 5 When recovery completes, issue the `showrcopy` command on all systems to verify that **InServA** appears `Up`.

◆ On InServA:

```
# showrcopy
```

```
Remote Copy System Information
```

```
Status: Started, Normal
```

```
Target Information
```

Name	ID	Type	Status	Options	Policy
InServB	58	FC	ready	2FF70002AC0000C3	mirror_config
InServC	59	IP	ready		mirror_config

```
Link Information
```

Target	Node	Address	Status	Options
InServB	0:2:1	20210002AC0000C3	Up	
InServB	1:2:1	21210002AC0000C3	Up	
InServC	0:3:1	10.100.33.63	Up	
InServC	1:3:1	10.101.33.63	Up	
receive	0:2:1	20210002AC0000C3	Up	
receive	1:2:1	21210002AC0000C3	Up	
receive	0:3:1	receive	Up	
receive	1:3:1	receive	Up	

```
Group Information
```

Name	Target	Status	Role	Mode	Options
multi.1	InServB	Started	Secondary-Rev	Sync	
LocalVV	ID	RemoteVV	ID	SyncStatus	LastSyncTime
testvv.0	100	testvv.0	200	Synced	NA
testvv.1	101	testvv.1	201	Synced	NA
testvv.2	102	testvv.2	202	Synced	NA
testvv.3	103	testvv.3	203	Synced	NA
testvv.4	104	testvv.4	204	Synced	NA
testvv.5	105	testvv.5	205	Synced	NA

Name	Target	Status	Role	Mode	Options
multi.1	InServC	Backup	Secondary-Rev	Periodic	Period 5m, over_per_alert
LocalVV	ID	RemoteVV	ID	SyncStatus	LastSyncTime
testvv.0	100	testvv.0	300	Synced	2009-06-29 12:32:26 PDT
testvv.1	101	testvv.1	301	Synced	2009-06-29 12:32:28 PDT
testvv.2	102	testvv.2	302	Synced	2009-06-29 12:32:27 PDT
testvv.3	103	testvv.3	303	Synced	2009-06-29 12:32:27 PDT
testvv.4	104	testvv.4	304	Synced	2009-06-29 12:32:29 PDT
testvv.5	105	testvv.5	305	Synced	2009-06-29 12:32:15 PDT

◆ On InServB:

```
# showrcopy

Remote Copy System Information
Status: Started, Normal

Target Information

Name      ID Type Status Options          Policy
InServA 46 FC   ready 2FF70002AC000060 mirror_config
InServC 47 IP   ready                mirror_config

Link Information

Target Node Address          Status Options
InServA 0:2:1 20210002AC000060 Up
InServA 1:2:1 21210002AC000060 Up
InServC 0:4:1 10.100.33.63      Up
InServC 1:4:1 10.101.33.63     Up
receive 0:2:1 20210002AC000060 Up
receive 1:2:1 21210002AC000060 Up
receive 0:4:1 receive      Up
receive 1:4:1 receive      Up

Group Information

Name          Target      Status      Role          Mode          Options
multi.1.r96  InServA    Started     Primary-Rev   Sync
LocalVV      ID RemoteVV   ID SyncStatus  LastSyncTime
testvv.0    200 testvv.0   100 Synced       NA
testvv.1    201 testvv.1   101 Synced       NA
testvv.2    202 testvv.2   102 Synced       NA
testvv.3    203 testvv.3   103 Synced       NA
testvv.4    204 testvv.4   104 Synced       NA
testvv.5    205 testvv.5   105 Synced       NA

Name          Target      Status      Role          Mode          Options
multi.1.r96  InServC    Started     Primary-Rev   Periodic Last-Sync 2009-06-29
12:32:14 PDT , Period 5m, over_per_alert
LocalVV      ID RemoteVV   ID SyncStatus  LastSyncTime
testvv.0    200 testvv.0   300 Synced       2009-06-29 12:32:27 PDT
testvv.1    201 testvv.1   301 Synced       2009-06-29 12:32:28 PDT
testvv.2    202 testvv.2   302 Synced       2009-06-29 12:32:27 PDT
testvv.3    203 testvv.3   303 Synced       2009-06-29 12:32:28 PDT
testvv.4    204 testvv.4   304 Synced       2009-06-29 12:32:29 PDT
testvv.5    205 testvv.5   305 Synced       2009-06-29 12:32:15 PDT
```

◆ On InServC:

```
# showrcopy
```

```
Remote Copy System Information
```

```
Status: Started, Normal
```

```
Target Information
```

Name	ID	Type	Status	Options	Policy
InServA	42	IP	ready		mirror_config
InServB	44	IP	ready		mirror_config

```
Link Information
```

Target	Node	Address	Status	Options
InServA	0	10.100.33.96	Up	
InServA	1	10.101.33.96	Up	
InServB	0	10.100.33.195	Up	
InServB	1	10.101.33.195	Up	
receive	0	receive	Up	
receive	1	receive	Up	

```
Group Information
```

Name	Target	Status	Role	Mode	Options
multi.1.r96	InServA	Backup	Secondary	Periodic	Period 5m, over_per_alert
LocalVV	ID	RemoteVV	ID	SyncStatus	LastSyncTime
testvv.0	300	testvv.0	100	Synced	2009-06-29 12:31:44 PDT
testvv.1	301	testvv.1	101	Synced	2009-06-29 12:31:47 PDT
testvv.2	302	testvv.2	102	Synced	2009-06-29 12:31:45 PDT
testvv.3	303	testvv.3	103	Synced	2009-06-29 12:31:45 PDT
testvv.4	304	testvv.4	104	Synced	2009-06-29 12:31:46 PDT
testvv.5	305	testvv.5	105	Synced	2009-06-29 12:31:34 PDT

Name	Target	Status	Role	Mode	Options
multi.1.r96	InServB	Started	Secondary	Periodic	Period 5m, over_per_alert
LocalVV	ID	RemoteVV	ID	SyncStatus	LastSyncTime
testvv.0	300	testvv.0	200	Synced	2009-06-29 12:32:26 PDT
testvv.1	301	testvv.1	201	Synced	2009-06-29 12:32:28 PDT
testvv.2	302	testvv.2	202	Synced	2009-06-29 12:32:27 PDT
testvv.3	303	testvv.3	203	Synced	2009-06-29 12:32:27 PDT
testvv.4	304	testvv.4	204	Synced	2009-06-29 12:32:29 PDT
testvv.5	305	testvv.5	205	Synced	2009-06-29 12:32:15 PDT



CAUTION: The group must be started at the time the `setrcopygroup restore` command is issued. Issue the `showrcopy groups <groupname>` command to confirm the group has been started. If it has not been started then issue the `startrcopygroup <groupname>` command and wait for any synchronizations that are started to complete before issuing the `setrcopygroup restore` command.

- Restore the original Synchronous Long Distance Remote Copy relationship between **InServA**, **InServB**, and **InServC** by issuing the `setrcopygroup restore` command on **InServB**.

```
# setrcopygroup restore -f -t InServA
restore started with tasks: 5759
root@xnodee594:~/bin# waittask -v 5759
  Id Type                Name                Status Phase Step -----StartTime-----
-- -FinishTime-
5759 remote_copy_restore multi.1.r96 active   2/4  1/2 2009-06-29 12:35:40
PDT -

Detailed status:
2009-06-29 12:35:40 PDT Created      task.
2009-06-29 12:35:40 PDT Begin        Restore operation on group multi.1.r96
started.
2009-06-29 12:35:44 PDT Syncing      Synchronization started for group
multi.1.r96 to target InServC.
2009-06-29 12:35:44 PDT Waiting      Waiting for synchronization of group
multi.1.r96 to target InServC to complete.
2009-06-29 12:36:38 PDT Stopped      Stopped remote copy of group
multi.1.r96.
2009-06-29 12:36:40 PDT Switched     Target InServA of group multi.1.r96 was
switched from secondary to primary.
2009-06-29 12:36:40 PDT Switched     Group multi.1.r96 was switched from
primary to secondary.
2009-06-29 12:36:40 PDT Waiting      Waiting for volumes in group multi.1.r96
to complete snapshot promotions.
2009-06-29 12:36:41 PDT Starting     Starting group multi.1.r96 to target
InServA.
2009-06-29 12:36:51 PDT Started      Remote copy was started for group
multi.1.r96 and target InServA.
2009-06-29 12:36:51 PDT Completed   Group multi.1.r96 restore completed.
```

In the example above:

- ◆ Tasks are started for each group that has already been recovered.
 - ◆ A final synchronization is started from **InServB** to **InServC** to ensure that **InServC** has the most recent data.
 - ◆ Groups are then stopped and the primary volumes on **InServB** are switched to secondary volumes and secondary volumes on **InServA** are switched to primary volumes.
 - ◆ Once completed, **InServA** resumes its role as the primary storage server and starts Remote Copy with **InServB** and **InServC**.
- 7 Issue `showrcopy` on all systems to verify that the original Synchronous Long Distance Remote Copy setup has been restored and is operating normally.

◆ On InServA:

```
# showrcopy
```

```
Remote Copy System Information
```

```
Status: Started, Normal
```

```
Target Information
```

Name	ID	Type	Status	Options	Policy
InServB	58	FC	ready	2FF70002AC0000C3	mirror_config
InServC	59	IP	ready		mirror_config

```
Link Information
```

Target	Node	Address	Status	Options
InServB	0:2:1	20210002AC0000C3	Up	
InServB	1:2:1	21210002AC0000C3	Up	
InServC	0:3:1	10.100.33.63	Up	
InServC	1:3:1	10.101.33.63	Up	
receive	0:2:1	20210002AC0000C3	Up	
receive	1:2:1	21210002AC0000C3	Up	
receive	0:3:1	receive	Up	
receive	1:3:1	receive	Up	

```
Group Information
```

Name	Target	Status	Role	Mode	Options
multi.1	InServB	Started	Primary	Sync	
LocalVV	ID	RemoteVV	ID	SyncStatus	LastSyncTime
testvv.0	100	testvv.0	200	Synced	NA
testvv.1	101	testvv.1	201	Synced	NA
testvv.2	102	testvv.2	202	Synced	NA
testvv.3	103	testvv.3	203	Synced	NA
testvv.4	104	testvv.4	204	Synced	NA
testvv.5	105	testvv.5	205	Synced	NA

Name	Target	Status	Role	Mode	Options
multi.1	InServC	Started	Primary	Periodic	Last-Sync 2009-06-29 12:36:56 PDT , Period 5m, over_per_alert
LocalVV	ID	RemoteVV	ID	SyncStatus	LastSyncTime
testvv.0	100	testvv.0	300	Synced	2009-06-29 12:36:57 PDT
testvv.1	101	testvv.1	301	Synced	2009-06-29 12:36:57 PDT
testvv.2	102	testvv.2	302	Synced	2009-06-29 12:36:57 PDT
testvv.3	103	testvv.3	303	Synced	2009-06-29 12:36:57 PDT
testvv.4	104	testvv.4	304	Synced	2009-06-29 12:36:57 PDT
testvv.5	105	testvv.5	305	Synced	2009-06-29 12:36:57 PDT

◆ On InServB:

```
# showrcopy
```

```
Remote Copy System Information
```

```
Status: Started, Normal
```

```
Target Information
```

Name	ID	Type	Status	Options	Policy
InServA	46	FC	ready	2FF70002AC000060	mirror_config
InServC	47	IP	ready		mirror_config

```
Link Information
```

Target	Node	Address	Status	Options
InServA	0:2:1	20210002AC000060	Up	
InServA	1:2:1	21210002AC000060	Up	
InServC	0:4:1	10.100.33.63	Up	
InServC	1:4:1	10.101.33.63	Up	
receive	0:2:1	20210002AC000060	Up	
receive	1:2:1	21210002AC000060	Up	
receive	0:4:1	receive	Up	
receive	1:4:1	receive	Up	

```
Group Information
```

Name	Target	Status	Role	Mode	Options
multi.1.r96	InServA	Started	Secondary	Sync	
LocalVV	ID	RemoteVV	ID	SyncStatus	LastSyncTime
testvv.0	200	testvv.0	100	Synced	NA
testvv.1	201	testvv.1	101	Synced	NA
testvv.2	202	testvv.2	102	Synced	NA
testvv.3	203	testvv.3	103	Synced	NA
testvv.4	204	testvv.4	104	Synced	NA
testvv.5	205	testvv.5	105	Synced	NA

Name	Target	Status	Role	Mode	Options
multi.1.r96	InServC	Backup	Secondary	Periodic	Period 5m, over_per_alert
LocalVV	ID	RemoteVV	ID	SyncStatus	LastSyncTime
testvv.0	200	testvv.0	300	Synced	2009-06-29 12:36:57 PDT
testvv.1	201	testvv.1	301	Synced	2009-06-29 12:36:57 PDT
testvv.2	202	testvv.2	302	Synced	2009-06-29 12:36:57 PDT
testvv.3	203	testvv.3	303	Synced	2009-06-29 12:36:57 PDT
testvv.4	204	testvv.4	304	Synced	2009-06-29 12:36:57 PDT
testvv.5	205	testvv.5	305	Synced	2009-06-29 12:36:57 PDT

◆ On **InServC**:

```
# showrcopy

Remote Copy System Information
Status: Started, Normal

Target Information

Name      ID Type Status Options Policy
InServA  42 IP  ready          mirror_config
InServB  44 IP  ready          mirror_config

Link Information

Target  Node Address      Status Options
InServA 0   10.100.33.96 Up
InServA 1   10.101.33.96 Up
InServB 0   10.100.33.195 Up
InServB 1   10.101.33.195 Up
receive 0   receive Up
receive 1   receive Up

Group Information

Name      Target      Status Role      Mode      Options
multi.1.r96 InServA Started Secondary Periodic Period 5m,
over_per_alert
  LocalVV ID RemoteVV ID SyncStatus LastSyncTime
  testvv.0 300 testvv.0 100 Synced 2009-06-29 12:36:57 PDT
  testvv.1 301 testvv.1 101 Synced 2009-06-29 12:36:57 PDT
  testvv.2 302 testvv.2 102 Synced 2009-06-29 12:36:57 PDT
  testvv.3 303 testvv.3 103 Synced 2009-06-29 12:36:57 PDT
  testvv.4 304 testvv.4 104 Synced 2009-06-29 12:36:57 PDT
  testvv.5 305 testvv.5 105 Synced 2009-06-29 12:36:57 PDT

Name      Target      Status Role      Mode      Options
multi.1.r96 InServB Backup Secondary Periodic Period 5m,
over_per_alert
  LocalVV ID RemoteVV ID SyncStatus LastSyncTime
  testvv.0 300 testvv.0 200 Synced 2009-06-29 12:36:51 PDT
  testvv.1 301 testvv.1 201 Synced 2009-06-29 12:36:51 PDT
  testvv.2 302 testvv.2 202 Synced 2009-06-29 12:36:51 PDT
  testvv.3 303 testvv.3 203 Synced 2009-06-29 12:36:51 PDT
  testvv.4 304 testvv.4 204 Synced 2009-06-29 12:36:51 PDT
  testvv.5 305 testvv.5 205 Synced 2009-06-29 12:36:51 PDT
```

C.5.2 Asynchronous Backup Server Assumes Role of Primary Server

In this scenario, the primary server has gone down and the asynchronous periodic backup server is put into failover mode to assume the role of the primary server. During failover, the synchronous backup server temporarily assumes the role of the primary server in order to transfer its data to the asynchronous periodic backup server. Once the data transfer has completed, the asynchronous periodic backup server assumes the role of the primary server.

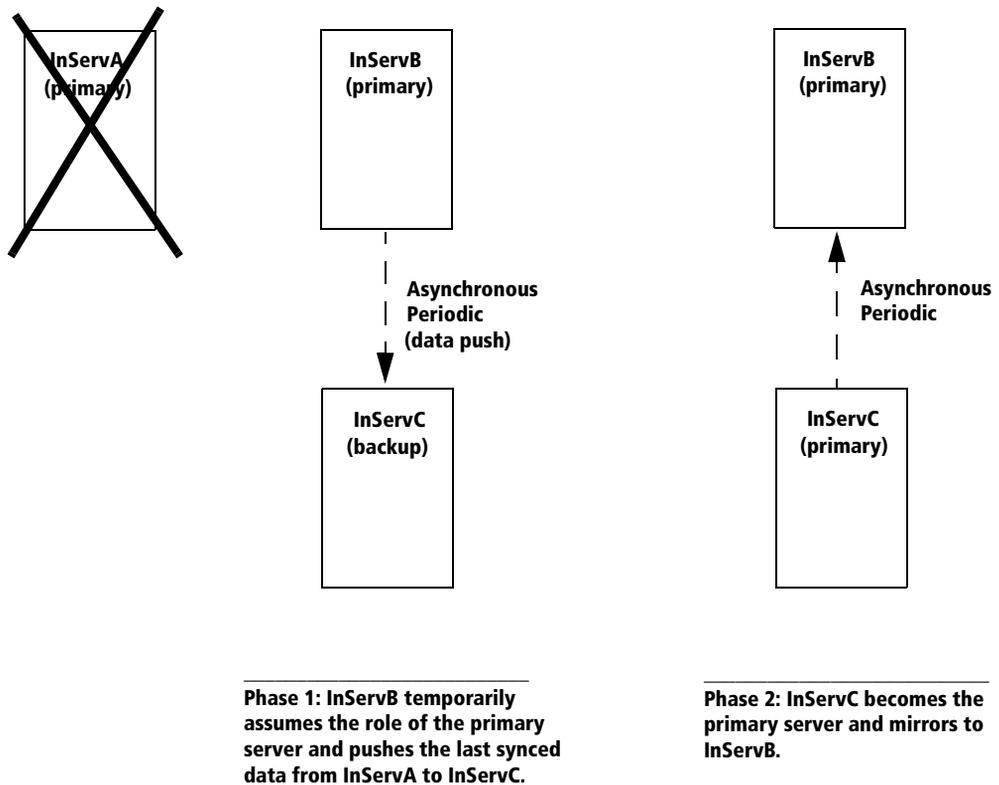


Figure C-9. Asynchronous Periodic Server become the Primary Server (after data push)

When **InServA** goes down, issuing `showrcopy` on the backup servers **InServB** and **InServC** appears as follows:

■ **On InServB:**

```
# showrcopy
root@xnodee594:~/bin# showrcopy

Remote Copy System Information
Status: Started, Normal

Target Information

Name      ID Type Status Options          Policy
InServA 46 FC   failed 2FF70002AC000060 mirror_config
InServC 47 IP   ready          mirror_config

Link Information

Target Node Address          Status Options
InServA 0:2:1 20210002AC000060 Down
InServA 1:2:1 21210002AC000060 Down
InServC 0:4:1 10.100.33.63      Up
InServC 1:4:1 10.101.33.63      Up
receive 0:2:1 20210002AC000060 Up
receive 1:2:1 21210002AC000060 Up
receive 0:4:1 receive      Up
receive 1:4:1 receive      Up

Group Information

Name          Target      Status      Role      Mode      Options
multi.1.r96  InServA     Stopped     Secondary Sync
  LocalVV    ID RemoteVV   ID SyncStatus LastSyncTime
  testvv.0   200 testvv.0   100 Stopped     2009-06-29 14:33:12 PDT
  testvv.1   201 testvv.1   101 Stopped     2009-06-29 14:33:12 PDT
  testvv.2   202 testvv.2   102 Stopped     2009-06-29 14:33:12 PDT
  testvv.3   203 testvv.3   103 Stopped     2009-06-29 14:33:12 PDT
  testvv.4   204 testvv.4   104 Stopped     2009-06-29 14:33:12 PDT
  testvv.5   205 testvv.5   105 Stopped     2009-06-29 14:33:12 PDT

Name          Target      Status      Role      Mode      Options
multi.1.r96  InServC     Backup      Secondary Periodic Period 5m,
over_per_alert
  LocalVV    ID RemoteVV   ID SyncStatus LastSyncTime
  testvv.0   200 testvv.0   300 Synced     2009-06-29 14:32:01 PDT
  testvv.1   201 testvv.1   301 Synced     2009-06-29 14:32:05 PDT
  testvv.2   202 testvv.2   302 Synced     2009-06-29 14:32:03 PDT
  testvv.3   203 testvv.3   303 Synced     2009-06-29 14:32:02 PDT
  testvv.4   204 testvv.4   304 Synced     2009-06-29 14:32:04 PDT
  testvv.5   205 testvv.5   305 Synced     2009-06-29 14:31:47 PDT
```

■ On InServC:

```
# showrcopy

Remote Copy System Information
Status: Started, Normal

Target Information

Name      ID Type Status Options Policy
InServA  42 IP   failed          mirror_config
InServB  44 IP   ready          mirror_config

Link Information

Target  Node Address      Status Options
InServA 0   10.100.33.96 Down
InServA 1   10.101.33.96 Down
InServB 0   10.100.33.195 Up
InServB 1   10.101.33.195 Up
receive 0   receive      Up
receive 1   receive      Up

Group Information

Name      Target      Status  Role      Mode      Options
multi.1.r96 InServA    Stopped Secondary Periodic Period 5m,
over_per_alert
  LocalVV  ID RemoteVV  ID SyncStatus LastSyncTime
  testvv.0 300 testvv.0 100 Stopped 2009-06-29 14:32:01 PDT
  testvv.1 301 testvv.1 101 Stopped 2009-06-29 14:32:06 PDT
  testvv.2 302 testvv.2 102 Stopped 2009-06-29 14:32:03 PDT
  testvv.3 303 testvv.3 103 Stopped 2009-06-29 14:32:02 PDT
  testvv.4 304 testvv.4 104 Stopped 2009-06-29 14:32:04 PDT
  testvv.5 305 testvv.5 105 Stopped 2009-06-29 14:31:48 PDT

Name      Target      Status  Role      Mode      Options
multi.1.r96 InServB    Backup  Secondary Periodic Period 5m,
over_per_alert
  LocalVV  ID RemoteVV  ID SyncStatus LastSyncTime
  testvv.0 300 testvv.0 200 Synced 2009-06-29 14:02:24 PDT
  testvv.1 301 testvv.1 201 Synced 2009-06-29 14:02:24 PDT
  testvv.2 302 testvv.2 202 Synced 2009-06-29 14:02:25 PDT
  testvv.3 303 testvv.3 203 Synced 2009-06-29 14:02:24 PDT
  testvv.4 304 testvv.4 204 Synced 2009-06-29 14:02:25 PDT
  testvv.5 305 testvv.5 205 Synced 2009-06-29 14:02:18 PDT
```

- 1 Initiate disaster recovery to the asynchronous periodic backup server, **InServC**, by issuing the `setrcopygroup failover` command on **InServC**.

```
# setrcopygroup failover -f -t InServA
failover started with tasks: 6740
root@xnodeeca5:~/bin# waittask -v 6740
  Id Type                Name                Status Phase Step -----StartTime-----
--- -FinishTime-
6740 remote_copy_failover multi.1.r96 active   1/3  0/1 2009-06-29 14:43:44
PDT -

Detailed status:
2009-06-29 14:43:44 PDT Created      task.
2009-06-29 14:43:44 PDT Begin       Failover operation on group multi.1.r96
started.
2009-06-29 14:43:47 PDT Pushing     Pushing newer data from target InServB
to group multi.1.r96.
2009-06-29 14:43:47 PDT Waiting     Waiting for synchronization of group
multi.1.r96 to target InServB to complete.
2009-06-29 14:44:04 PDT Pushed       Completed push of newer data from target
InServB to group multi.1.r96.
2009-06-29 14:44:05 PDT Switched    Group multi.1.r96 was switched from
secondary to primary.
2009-06-29 14:44:05 PDT Starting   Starting group multi.1.r96 to target
InServB.
2009-06-29 14:44:09 PDT Started     Remote copy was started for group
multi.1.r96 and target InServB.
2009-06-29 14:44:09 PDT Completed  Group multi.1.r96 failover completed.
```

By issuing `setrcopygroup failover` as shown in the example above:

- ◆ The disaster recovery operation is run against all groups that were secondary groups to **InServA**.
- ◆ All tasks required for each group to be processed are displayed as is the status of each task. This can take several minutes to complete.



NOTE: Because failover of individual groups can still fail, these tasks should be checked for successful completion.

- ◆ By default, the `setrcopygroup failover` command attempts to pull any newer data from the synchronous backup server (**InServB**). In doing so, **InServB** temporarily assumes the role of the primary storage server.

- ◆ Once completed, **InServB** and **InServC** are synchronized. **InServC** then assumes the role of the primary server and begins copying to **InServB**.
- 2 During the process described above, issue the `showrcopy` command on **InServB** and **InServC** to verify that the newer data is being pushed.

◆ On InServB:

```
# showrcopy

Remote Copy System Information
Status: Started, Normal

Target Information

Name      ID Type Status Options          Policy
InServA  46 FC   failed 2FF70002AC000060 mirror_config
InServC  47 IP   ready 2FF70002AC000060 mirror_config

Link Information

Target  Node  Address          Status Options
InServA 0:2:1 20210002AC000060 Down
InServA 1:2:1 21210002AC000060 Down
InServC 0:4:1 10.100.33.63     Up
InServC 1:4:1 10.101.33.63     Up
receive 0:2:1 20210002AC000060 Up
receive 1:2:1 21210002AC000060 Up
receive 0:4:1 receive      Up
receive 1:4:1 receive      Up

Group Information

Name      Target      Status      Role      Mode      Options
multi.1.r96 InServA     Stopped     Primary-Rev Sync
LocalVV   ID RemoteVV   ID SyncStatus LastSyncTime
testvv.0  200 testvv.0   100 Stopped     2009-06-29 14:33:12 PDT
testvv.1  201 testvv.1   101 Stopped     2009-06-29 14:33:12 PDT
testvv.2  202 testvv.2   102 Stopped     2009-06-29 14:33:12 PDT
testvv.3  203 testvv.3   103 Stopped     2009-06-29 14:33:12 PDT
testvv.4  204 testvv.4   104 Stopped     2009-06-29 14:33:12 PDT
testvv.5  205 testvv.5   105 Stopped     2009-06-29 14:33:12 PDT

Name      Target      Status      Role      Mode      Options
multi.1.r96 InServC     Started     Primary-Rev Periodic Last-Sync 2009-06-29
14:39:04 PDT , Period 5m, over_per_alert
LocalVV   ID RemoteVV   ID SyncStatus LastSyncTime
testvv.0  200 testvv.0   300 Syncing (0%) 2009-06-29 14:32:01 PDT
testvv.1  201 testvv.1   301 Syncing (0%) 2009-06-29 14:32:05 PDT
testvv.2  202 testvv.2   302 Syncing (0%) 2009-06-29 14:32:03 PDT
testvv.3  203 testvv.3   303 Syncing (0%) 2009-06-29 14:32:02 PDT
testvv.4  204 testvv.4   304 Syncing (0%) 2009-06-29 14:32:04 PDT
testvv.5  205 testvv.5   305 Synced     2009-06-29 14:39:05 PDT
```

◆ On InServC:

```
# showrcopy

Remote Copy System Information
Status: Started, Normal

Target Information

Name      ID Type Status Options Policy
InServA  42 IP   failed          mirror_config
InServB  44 IP   ready          mirror_config

Link Information

Target  Node Address      Status Options
InServA 0    10.100.33.96 Down
InServA 1    10.101.33.96 Down
InServB 0    10.100.33.195 Up
InServB 1    10.101.33.195 Up
receive 0    receive      Up
receive 1    receive      Up

Group Information

Name      Target      Status      Role      Mode      Options
multi.1.r96 InServA     Backup      Secondary Periodic Period 5m,
over_per_alert
  LocalVV  ID RemoteVV  ID SyncStatus LastSyncTime
  testvv.0 300 testvv.0 100 Synced      2009-06-29 14:32:01 PDT
  testvv.1 301 testvv.1 101 Synced      2009-06-29 14:32:06 PDT
  testvv.2 302 testvv.2 102 Synced      2009-06-29 14:32:03 PDT
  testvv.3 303 testvv.3 103 Synced      2009-06-29 14:32:02 PDT
  testvv.4 304 testvv.4 104 Synced      2009-06-29 14:32:04 PDT
  testvv.5 305 testvv.5 105 Synced      2009-06-29 14:31:48 PDT

Name      Target      Status      Role      Mode      Options
multi.1.r96 InServB     Started     Secondary Periodic Period 5m,
over_per_alert
  LocalVV  ID RemoteVV  ID SyncStatus LastSyncTime
  testvv.0 300 testvv.0 200 Syncing     2009-06-29 14:02:24 PDT
  testvv.1 301 testvv.1 201 Syncing     2009-06-29 14:02:24 PDT
  testvv.2 302 testvv.2 202 Syncing     2009-06-29 14:02:25 PDT
  testvv.3 303 testvv.3 203 Syncing     2009-06-29 14:02:24 PDT
  testvv.4 304 testvv.4 204 Syncing     2009-06-29 14:02:25 PDT
  testvv.5 305 testvv.5 205 Synced      2009-06-29 14:39:05 PDT
```

- 3 Once the failover operation has completed, issue `showrcopy` on **InServB** and **InServC** to verify that the volumes have synchronized and **InServC** has assumed the role of the primary server (`Primary-Rev`).

◆ On InServB:

```
# showrcopy
```

```
Remote Copy System Information
```

```
Status: Started, Normal
```

```
Target Information
```

Name	ID	Type	Status	Options	Policy
InServA	46	FC	failed	2FF70002AC000060	mirror_config
InServC	47	IP	ready		mirror_config

```
Link Information
```

Target	Node	Address	Status	Options
InServA	0:2:1	20210002AC000060	Down	
InServA	1:2:1	21210002AC000060	Down	
InServC	0:4:1	10.100.33.63	Up	
InServC	1:4:1	10.101.33.63	Up	
receive	0:2:1	20210002AC000060	Up	
receive	1:2:1	21210002AC000060	Up	
receive	0:4:1	receive	Up	
receive	1:4:1	receive	Up	

```
Group Information
```

Name	Target	Status	Role	Mode	Options
multi.1.r96	InServA	Backup	Secondary	Sync	
LocalVV	ID	RemoteVV	ID	SyncStatus	LastSyncTime
testvv.0	200	testvv.0	100	Synced	NA
testvv.1	201	testvv.1	101	Synced	NA
testvv.2	202	testvv.2	102	Synced	NA
testvv.3	203	testvv.3	103	Synced	NA
testvv.4	204	testvv.4	104	Synced	NA
testvv.5	205	testvv.5	105	Synced	NA

Name	Target	Status	Role	Mode	Options
multi.1.r96	InServC	Started	Primary-Rev	Periodic	Period 5m, over_per_alert
LocalVV	ID	RemoteVV	ID	SyncStatus	LastSyncTime
testvv.0	200	testvv.0	300	Synced	2009-06-29 14:44:09 PDT
testvv.1	201	testvv.1	301	Synced	2009-06-29 14:44:10 PDT
testvv.2	202	testvv.2	302	Synced	2009-06-29 14:44:09 PDT
testvv.3	203	testvv.3	303	Synced	2009-06-29 14:44:10 PDT
testvv.4	204	testvv.4	304	Synced	2009-06-29 14:44:09 PDT
testvv.5	205	testvv.5	305	Synced	2009-06-29 14:44:09 PDT

◆ On InServC:

```
# showrcopy

Remote Copy System Information
Status: Started, Normal

Target Information

Name      ID Type Status Options Policy
InServA  42 IP   new           mirror_config
InServB  44 IP   ready        mirror_config

Link Information

Target  Node Address      Status Options
InServA 0   10.100.33.96 Down
InServA 1   10.101.33.96 Down
InServB 0   10.100.33.195 Up
InServB 1   10.101.33.195 Up
receive 0   receive      Up
receive 1   receive      Up

Group Information

Name      Target      Status      Role      Mode      Options
multi.1.r96 InServA     Backup      Secondary Periodic Period 5m,
over_per_alert
  LocalVV      ID RemoteVV      ID SyncStatus      LastSyncTime
  testvv.0     300 testvv.0     100 Synced           2009-06-29 14:32:01 PDT
  testvv.1     301 testvv.1     101 Synced           2009-06-29 14:32:06 PDT
  testvv.2     302 testvv.2     102 Synced           2009-06-29 14:32:03 PDT
  testvv.3     303 testvv.3     103 Synced           2009-06-29 14:32:02 PDT
  testvv.4     304 testvv.4     104 Synced           2009-06-29 14:32:04 PDT
  testvv.5     305 testvv.5     105 Synced           2009-06-29 14:31:48 PDT

Name      Target      Status      Role      Mode      Options
multi.1.r96 InServB     Started     Secondary Periodic Period 5m,
over_per_alert
  LocalVV      ID RemoteVV      ID SyncStatus      LastSyncTime
  testvv.0     300 testvv.0     200 Synced           2009-06-29 14:39:42 PDT
  testvv.1     301 testvv.1     201 Synced           2009-06-29 14:39:39 PDT
  testvv.2     302 testvv.2     202 Synced           2009-06-29 14:39:41 PDT
  testvv.3     303 testvv.3     203 Synced           2009-06-29 14:39:42 PDT
  testvv.4     304 testvv.4     204 Synced           2009-06-29 14:39:40 PDT
  testvv.5     305 testvv.5     205 Synced           2009-06-29 14:39:05 PDT
```

- 4 When **InServA** has recovered, issue the `setrcopygroup recover` command on **InServC**.

```
# setcopygroup recover -f -t InServA
recover started with tasks: 6747
root@xnodeed08:~/bin# waittask -v 6747
  Id Type          Name          Status Phase Step -----StartTime----- -FinishTime-
6747 remote_copy_recover multi.1.r96 active 2/4 0/1 2009-06-29 14:52:43 PDT -

Detailed status:
2009-06-29 14:52:43 PDT Created      task.
2009-06-29 14:52:43 PDT Begin       Recover operation on group multi.1.r96 started.
2009-06-29 14:52:44 PDT Switched    Target InServA of group multi.1.r96 was switched from primary to
secondary.
2009-06-29 14:52:44 PDT Waiting    Wait for target InServA of group multi.1.r96 to complete snapshot
promotions.
2009-06-29 14:54:05 PDT Starting  Starting group multi.1.r96 to target InServA.
2009-06-29 14:54:14 PDT Started    Remote copy was started for group multi.1.r96 and target InServA.
2009-06-29 14:54:14 PDT Completed  Group multi.1.r96 recover completed.

* Volumes on InServA promoting:

root@xnodeed28:~/bin# showvv -rcopy
                                     ----Rsvd(MB)---- -(MB)-
  Id Name          Prov Type CopyOf  BsId Rd -Detailed_State- Adm  Snp  Usr  VSize RcopyStatus
RcopyGroup
  0 admin          full base ---      0 RW normal          0   0 10240 10240 none    --
  100 testvv.0     cpvv base ---      100 RW promoting     512 2048 1024 1024 secondary
multi.1
  5906 rcpy.222.100.59 snp vcopy testvv.0 100 RO normal        --  --  -- 1024 snap
multi.1
  5912 rcpy.222.100.58 snp vcopy testvv.0 100 RO normal        --  --  -- 1024 snap
multi.1
  101 testvv.1     cpvv base ---      101 RW promoting     512 2048 1024 1024 secondary
multi.1
  5907 rcpy.222.101.59 snp vcopy testvv.1 101 RO normal        --  --  -- 1024 snap
multi.1
  5913 rcpy.222.101.58 snp vcopy testvv.1 101 RO normal        --  --  -- 1024 snap
multi.1
  102 testvv.2     cpvv base ---      102 RW promoting     512 2048 1024 1024 secondary
multi.1
  5908 rcpy.222.102.59 snp vcopy testvv.2 102 RO normal        --  --  -- 1024 snap
multi.1
  5914 rcpy.222.102.58 snp vcopy testvv.2 102 RO normal        --  --  -- 1024 snap
multi.1
  103 testvv.3     cpvv base ---      103 RW promoting     512 2048 1024 1024 secondary
multi.1
  5909 rcpy.222.103.59.1 snp vcopy testvv.3 103 RO normal        --  --  -- 1024 snap
multi.1
  5915 rcpy.222.103.58 snp vcopy testvv.3 103 RO normal        --  --  -- 1024 snap
multi.1
  104 testvv.4     cpvv base ---      104 RW promoting     512 2048 1024 1024 secondary
multi.1
  5910 rcpy.222.104.59.1 snp vcopy testvv.4 104 RO normal        --  --  -- 1024 snap
multi.1
  5916 rcpy.222.104.58 snp vcopy testvv.4 104 RO normal        --  --  -- 1024 snap
multi.1
  105 testvv.5     cpvv base ---      105 RW promoting     256 1024 1024 1024 secondary
multi.1
  5911 rcpy.222.105.59 snp vcopy testvv.5 105 RO normal        --  --  -- 1024 snap
multi.1
  5917 rcpy.222.105.58 snp vcopy testvv.5 105 RO normal        --  --  -- 1024 snap
multi.1
```

In the example above:

- ◆ Tasks are launched for each group that has already been failed over.
 - ◆ Groups on **InServA** temporarily switch to secondary mode, thereby promoting the Remote Copy snapshots to bring **InServA** and **InServC** to the same starting point. Once completed, Remote Copy is started between **InServA** and **InServB** and synchronization of the two system's groups occurs.
- 5 When recovery completes, issue the `showrcopy` command on all systems to verify that **InServA** appears `Up`.

◆ On InServA:

```
# showrcopy
```

```
Remote Copy System Information
```

```
Status: Started, Normal
```

```
Target Information
```

Name	ID	Type	Status	Options	Policy
InServB	58	FC	ready	2FF70002AC0000C3	mirror_config
InServC	59	IP	ready		mirror_config

```
Link Information
```

Target	Node	Address	Status	Options
InServB	0:2:1	20210002AC0000C3	Up	
InServB	1:2:1	21210002AC0000C3	Up	
InServC	0:3:1	10.100.33.63	Up	
InServC	1:3:1	10.101.33.63	Up	
receive	0:2:1	20210002AC0000C3	Up	
receive	1:2:1	21210002AC0000C3	Up	
receive	0:3:1	receive	Up	
receive	1:3:1	receive	Up	

```
Group Information
```

Name	Target	Status	Role	Mode	Options
multi.1	InServB	Backup	Secondary-Rev	Sync	
LocalVV	ID	RemoteVV	ID	SyncStatus	LastSyncTime
testvv.0	100	testvv.0	200	Synced	NA
testvv.1	101	testvv.1	201	Synced	NA
testvv.2	102	testvv.2	202	Synced	NA
testvv.3	103	testvv.3	203	Synced	NA
testvv.4	104	testvv.4	204	Synced	NA
testvv.5	105	testvv.5	205	Synced	NA

Name	Target	Status	Role	Mode	Options
multi.1	InServC	Started	Secondary-Rev	Periodic	Period 5m, over_per_alert
LocalVV	ID	RemoteVV	ID	SyncStatus	LastSyncTime

testvv.0	100	testvv.0	300	Syncing	2009-06-29 14:32:01 PDT
testvv.1	101	testvv.1	301	Syncing	2009-06-29 14:32:06 PDT
testvv.2	102	testvv.2	302	Syncing	2009-06-29 14:32:04 PDT
testvv.3	103	testvv.3	303	Syncing	2009-06-29 14:32:02 PDT
testvv.4	104	testvv.4	304	Syncing	2009-06-29 14:32:04 PDT
testvv.5	105	testvv.5	305	Synced	2009-06-29 14:54:15 PDT

◆ On InServB:

```
# showrcopy

Remote Copy System Information
Status: Started, Normal

Target Information

Name      ID Type Status Options          Policy
InServA  46 FC   failed 2FF70002AC000060 mirror_config
InServC  47 IP   ready 2FF70002AC000060 mirror_config

Link Information

Target  Node  Address          Status Options
InServA 0:2:1 20210002AC000060 Down
InServA 1:2:1 21210002AC000060 Down
InServC 0:4:1 10.100.33.63     Up
InServC 1:4:1 10.101.33.63     Up
receive 0:2:1 20210002AC000060 Up
receive 1:2:1 21210002AC000060 Up
receive 0:4:1 receive      Up
receive 1:4:1 receive      Up

Group Information

Name          Target      Status      Role      Mode      Options
multi.1.r96  InServA    Backup     Secondary Sync
LocalVV      ID RemoteVV   ID SyncStatus LastSyncTime
testvv.0     200 testvv.0   100 Synced     NA
testvv.1     201 testvv.1   101 Synced     NA
testvv.2     202 testvv.2   102 Synced     NA
testvv.3     203 testvv.3   103 Synced     NA
testvv.4     204 testvv.4   104 Synced     NA
testvv.5     205 testvv.5   105 Synced     NA

Name          Target      Status      Role      Mode      Options
multi.1.r96  InServC    Started     Secondary Periodic Period 5m,
over_per_alert
LocalVV      ID RemoteVV   ID SyncStatus LastSyncTime
testvv.0     200 testvv.0   300 Synced     2009-06-29 14:44:09 PDT
testvv.1     201 testvv.1   301 Synced     2009-06-29 14:44:10 PDT
testvv.2     202 testvv.2   302 Synced     2009-06-29 14:44:09 PDT
testvv.3     203 testvv.3   303 Synced     2009-06-29 14:44:10 PDT
testvv.4     204 testvv.4   304 Synced     2009-06-29 14:44:09 PDT
testvv.5     205 testvv.5   305 Synced     2009-06-29 14:44:09 PDT
```

◆ On InServC:

```
# showrcopy

Remote Copy System Information
Status: Started, Normal

Target Information

Name      ID Type Status Options Policy
InServA  42 IP  ready          mirror_config
InServB  44 IP  ready          mirror_config

Link Information

Target  Node Address      Status Options
InServA 0   10.100.33.96 Up
InServA 1   10.101.33.96 Up
InServB 0   10.100.33.195 Up
InServB 1   10.101.33.195 Up
receive 0   receive      Up
receive 1   receive      Up

Group Information

Name      Target  Status Role      Mode  Options
multi.1.r96 InServA Started Primary-Rev Periodic Last-Sync 2009-06-29
14:54:14 PDT , Period 5m, over_per_alert
  LocalVV  ID RemoteVV  ID SyncStatus  LastSyncTime
  testvv.0 300 testvv.0 100 Synced      2009-06-29 14:54:54 PDT
  testvv.1 301 testvv.1 101 Synced      2009-06-29 14:54:50 PDT
  testvv.2 302 testvv.2 102 Synced      2009-06-29 14:54:51 PDT
  testvv.3 303 testvv.3 103 Synced      2009-06-29 14:54:52 PDT
  testvv.4 304 testvv.4 104 Synced      2009-06-29 14:54:53 PDT
  testvv.5 305 testvv.5 105 Synced      2009-06-29 14:54:15 PDT

Name      Target  Status Role      Mode  Options
multi.1.r96 InServB Started Primary-Rev Periodic Last-Sync 2009-06-29
14:54:28 PDT , Period 5m, over_per_alert
  LocalVV  ID RemoteVV  ID SyncStatus  LastSyncTime
  testvv.0 300 testvv.0 200 Synced      2009-06-29 14:54:38 PDT
  testvv.1 301 testvv.1 201 Synced      2009-06-29 14:54:36 PDT
  testvv.2 302 testvv.2 202 Synced      2009-06-29 14:54:41 PDT
  testvv.3 303 testvv.3 203 Synced      2009-06-29 14:54:34 PDT
  testvv.4 304 testvv.4 204 Synced      2009-06-29 14:54:34 PDT
  testvv.5 305 testvv.5 205 Synced      2009-06-29 14:54:33 PDT
```



CAUTION: The group must be started at the time the `setrcopygroup restore` command is issued. Issue the `showcopy groups <groupname>` command to confirm the group has been started. If it has not been started then issue the `startrcopygroup <groupname>` command and wait for any synchronizations that are started to complete before issuing the `setrcopygroup restore` command.

- Restore the original Synchronous Long Distance Remote Copy relationship between **InServA**, **InServB**, and **InServC** by issuing the `setrcopygroup restore` command on **InServC**.

```
# setrcopygroup restore -f -t InServA
root@xnodeed08:~/bin# waittask -v 6754
  Id Type                Name                Status Phase Step -----StartTime-----
-- -FinishTime-
6754 remote_copy_restore multi.1.r96 active   2/4  1/2 2009-06-29 14:56:49
PDT -

Detailed status:
2009-06-29 14:56:49 PDT Created      task.
2009-06-29 14:56:49 PDT Begin        Restore operation on group multi.1.r96
started.
2009-06-29 14:56:53 PDT Syncing      Synchronization started for group
multi.1.r96 to target InServA.
2009-06-29 14:56:56 PDT Syncing      Synchronization started for group
multi.1.r96 to target InServB.
2009-06-29 14:56:56 PDT Waiting      Waiting for synchronization of group
multi.1.r96 to target InServA to complete.
2009-06-29 14:56:56 PDT Waiting      Waiting for synchronization of group
multi.1.r96 to target InServB to complete.
2009-06-29 14:57:14 PDT Stopped      Stopped remote copy of group
multi.1.r96.
2009-06-29 14:57:15 PDT Switched     Target InServA of group multi.1.r96 was
switched from secondary to primary.
2009-06-29 14:57:16 PDT Switched     Group multi.1.r96 was switched from
primary to secondary.
2009-06-29 14:57:16 PDT Waiting      Waiting for volumes in group multi.1.r96
to complete snapshot promotions.
2009-06-29 14:57:17 PDT Starting     Starting group multi.1.r96 to target
InServA.
2009-06-29 14:57:25 PDT Started      Remote copy was started for group
multi.1.r96 and target InServA.
2009-06-29 14:57:25 PDT Completed   Group multi.1.r96 restore completed.
```

In the example above:

- ◆ Tasks are started for each group that has already been recovered.
 - ◆ A final synchronization is started from **InServC** to **InServB** and from **InServC** to **InServA** to ensure that **InServA** and **InServB** have the most recent data.
 - ◆ Groups are then stopped and the primary volumes on **InServC** are switched to secondary volumes and secondary volumes on **InServA** are switched to primary volumes.
 - ◆ Once completed, **InServA** resumes its role as the primary storage server and starts Remote Copy with **InServB** and **InServC**.
- 7 Issue `showrcopy` on all systems to verify that the original Synchronous Long Distance Remote Copy setup has been restored and is operating normally.

◆ On InServA:

```
# showrcopy

Remote Copy System Information
Status: Started, Normal

Target Information

Name      ID Type Status Options          Policy
InServB 58 FC   ready 2FF70002AC0000C3 mirror_config
InServC 59 IP   ready                mirror_config

Link Information

Target Node Address          Status Options
InServB 0:2:1 20210002AC0000C3 Up
InServB 1:2:1 21210002AC0000C3 Up
InServC 0:3:1 10.100.33.63      Up
InServC 1:3:1 10.101.33.63     Up
receive 0:2:1 20210002AC0000C3 Up
receive 1:2:1 21210002AC0000C3 Up
receive 0:3:1 receive      Up
receive 1:3:1 receive      Up

Group Information

Name      Target      Status      Role      Mode      Options
multi.1   InServB     Started     Primary   Sync
LocalVV   ID RemoteVV   ID SyncStatus LastSyncTime
testvv.0 100 testvv.0   200 Synced      NA
testvv.1 101 testvv.1   201 Synced      NA
testvv.2 102 testvv.2   202 Synced      NA
testvv.3 103 testvv.3   203 Synced      NA
testvv.4 104 testvv.4   204 Synced      NA
testvv.5 105 testvv.5   205 Synced      NA

Name      Target      Status      Role      Mode      Options
multi.1   InServC     Started     Primary   Periodic Last-Sync 2009-06-29
14:57:30 PDT , Period 5m, over_per_alert
LocalVV   ID RemoteVV   ID SyncStatus LastSyncTime
testvv.0 100 testvv.0   300 Synced      2009-06-29 14:57:34 PDT
testvv.1 101 testvv.1   301 Synced      2009-06-29 14:57:33 PDT
testvv.2 102 testvv.2   302 Synced      2009-06-29 14:57:35 PDT
testvv.3 103 testvv.3   303 Synced      2009-06-29 14:57:32 PDT
testvv.4 104 testvv.4   304 Synced      2009-06-29 14:57:36 PDT
testvv.5 105 testvv.5   305 Synced      2009-06-29 14:57:34 PDT
```

◆ On InServB:

```
# showrcopy
```

```
Remote Copy System Information
```

```
Status: Started, Normal
```

```
Target Information
```

Name	ID	Type	Status	Options	Policy
InServA	46	FC	ready	2FF70002AC000060	mirror_config
InServC	47	IP	ready		mirror_config

```
Link Information
```

Target	Node	Address	Status	Options
InServA	0:2:1	20210002AC000060	Up	
InServA	1:2:1	21210002AC000060	Up	
InServC	0:4:1	10.100.33.63	Up	
InServC	1:4:1	10.101.33.63	Up	
receive	0:2:1	20210002AC000060	Up	
receive	1:2:1	21210002AC000060	Up	
receive	0:4:1	receive	Up	
receive	1:4:1	receive	Up	

```
Group Information
```

Name	Target	Status	Role	Mode	Options
multi.1.r96	InServA	Started	Secondary	Sync	
LocalVV	ID	RemoteVV	ID	SyncStatus	LastSyncTime
testvv.0	200	testvv.0	100	Synced	NA
testvv.1	201	testvv.1	101	Synced	NA
testvv.2	202	testvv.2	102	Synced	NA
testvv.3	203	testvv.3	103	Synced	NA
testvv.4	204	testvv.4	104	Synced	NA
testvv.5	205	testvv.5	105	Synced	NA

Name	Target	Status	Role	Mode	Options
multi.1.r96	InServC	Backup	Secondary	Periodic	Period 5m, over_per_alert
LocalVV	ID	RemoteVV	ID	SyncStatus	LastSyncTime
testvv.0	200	testvv.0	300	Synced	2009-06-29 14:57:34 PDT
testvv.1	201	testvv.1	301	Synced	2009-06-29 14:57:32 PDT
testvv.2	202	testvv.2	302	Synced	2009-06-29 14:57:35 PDT
testvv.3	203	testvv.3	303	Synced	2009-06-29 14:57:31 PDT
testvv.4	204	testvv.4	304	Synced	2009-06-29 14:57:35 PDT
testvv.5	205	testvv.5	305	Synced	2009-06-29 14:57:33 PDT

◆ On InServC:

```
# showrcopy
```

```
Remote Copy System Information
```

```
Status: Started, Normal
```

```
Target Information
```

Name	ID	Type	Status	Options	Policy
InServA	42	IP	ready		mirror_config
InServB	44	IP	ready		mirror_config

```
Link Information
```

Target	Node	Address	Status	Options
InServA	0	10.100.33.96	Up	
InServA	1	10.101.33.96	Up	
InServB	0	10.100.33.195	Up	
InServB	1	10.101.33.195	Up	
receive	0	receive	Up	
receive	1	receive	Up	

```
Group Information
```

Name	Target	Status	Role	Mode	Options
multi.1.r96	InServA	Started	Secondary	Periodic	Period 5m, over_per_alert
LocalVV	ID	RemoteVV	ID	SyncStatus	LastSyncTime
testvv.0	300	testvv.0	100	Synced	2009-06-29 14:57:34 PDT
testvv.1	301	testvv.1	101	Synced	2009-06-29 14:57:33 PDT
testvv.2	302	testvv.2	102	Synced	2009-06-29 14:57:35 PDT
testvv.3	303	testvv.3	103	Synced	2009-06-29 14:57:32 PDT
testvv.4	304	testvv.4	104	Synced	2009-06-29 14:57:36 PDT
testvv.5	305	testvv.5	105	Synced	2009-06-29 14:57:34 PDT

Name	Target	Status	Role	Mode	Options
multi.1.r96	InServB	Backup	Secondary	Periodic	Period 5m, over_per_alert
LocalVV	ID	RemoteVV	ID	SyncStatus	LastSyncTime
testvv.0	300	testvv.0	200	Synced	2009-06-29 14:57:45 PDT
testvv.1	301	testvv.1	201	Synced	2009-06-29 14:57:46 PDT
testvv.2	302	testvv.2	202	Synced	2009-06-29 14:57:42 PDT
testvv.3	303	testvv.3	203	Synced	2009-06-29 14:57:46 PDT
testvv.4	304	testvv.4	204	Synced	2009-06-29 14:57:46 PDT
testvv.5	305	testvv.5	205	Synced	2009-06-29 14:57:26 PDT

C.5.3 Asynchronous Backup Server Assumes Role of Primary Server - No Data Transfer from the Synchronous Backup Server

In this scenario, the primary server has gone down. The data on the asynchronous periodic backup server is the most current and put into failover mode to assume the role of the primary server. Because the data on the synchronous backup server is not the most up-to-date, there is no data transfer from the synchronous backup server to the asynchronous periodic backup server before the asynchronous periodic backup server assumes the role of the primary server.

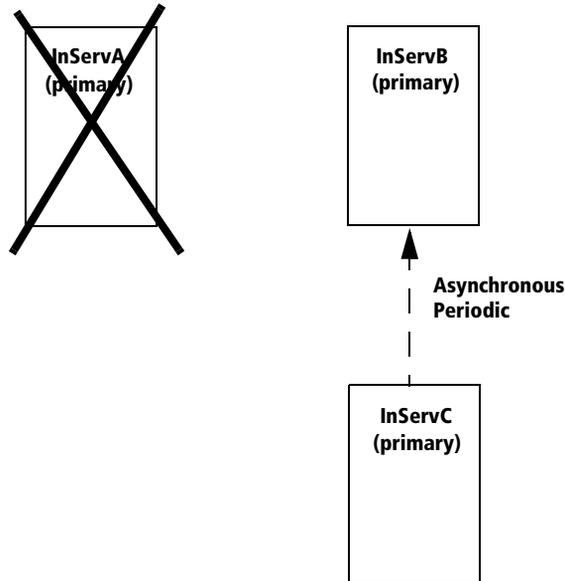


Figure C-10. Asynchronous Periodic Server becomes the Primary Server

- 1 Initiate disaster recovery to the asynchronous periodic backup server, **InServC**, by issuing the `setrcopygroup failover` command on **InServC**.

```
# setrcopygroup failover -f -t -discard InServA
failover started with tasks: 6740
root@xnodeeca5:~/bin# waittask -v 6740
  Id Type                Name                Status Phase Step -----StartTime-----
--- -FinishTime-
6740 remote_copy_failover multi.1.r96 active   1/3  0/1 2009-06-29 14:43:44
PDT -

Detailed status:
2009-06-29 14:43:44 PDT Created      task.
2009-06-29 14:43:44 PDT Begin        Failover operation on group multi.1.r96
started.
2009-06-29 14:43:47 PDT Pushing      Pushing newer data from target InServB
to group multi.1.r96.
2009-06-29 14:43:47 PDT Waiting      Waiting for synchronization of group
multi.1.r96 to target InServB to complete.
2009-06-29 14:44:04 PDT Pushed        Completed push of newer data from target
InServB to group multi.1.r96.
2009-06-29 14:44:05 PDT Switched      Group multi.1.r96 was switched from
secondary to primary.
2009-06-29 14:44:05 PDT Starting      Starting group multi.1.r96 to target
InServB.
2009-06-29 14:44:09 PDT Started        Remote copy was started for group
multi.1.r96 and target InServB.
2009-06-29 14:44:09 PDT Completed      Group multi.1.r96 failover completed.
```

By issuing `setrcopygroup failover` as shown in the example above:

- ◆ The disaster recovery operation is run against all groups that were secondary groups to **InServA**.
- ◆ All tasks required for each group to be processed are displayed as is the status of each task. This can take several minutes to complete.



NOTE: Because failover of individual groups can still fail, these tasks should be checked for successful completion.

- ◆ By default, the `setrcopygroup failover` command attempts to pull any newer data from the synchronous backup server (**InServB**). In doing so, **InServB** temporarily assumes the role of the primary storage server. Issuing the `-discard` option bypasses

this operation. **InServC** and **InServB** are synchronized, and **InServC** assumes the role of the primary server and begins copying to **InServB**.

- 2 Once the failover operation has completed, issue `showrcopy` on **InServB** and **InServC** to verify that the volumes have synchronized and **InServC** has assumed the role of the primary server (`Primary-Rev`).

◆ On InServB:

```
# showrcopy
```

```
Remote Copy System Information
```

```
Status: Started, Normal
```

```
Target Information
```

Name	ID	Type	Status	Options	Policy
InServA	46	FC	failed	2FF70002AC000060	mirror_config
InServC	47	IP	ready		mirror_config

```
Link Information
```

Target	Node	Address	Status	Options
InServA	0:2:1	20210002AC000060	Down	
InServA	1:2:1	21210002AC000060	Down	
InServC	0:4:1	10.100.33.63	Up	
InServC	1:4:1	10.101.33.63	Up	
receive	0:2:1	20210002AC000060	Up	
receive	1:2:1	21210002AC000060	Up	
receive	0:4:1	receive	Up	
receive	1:4:1	receive	Up	

```
Group Information
```

Name	Target	Status	Role	Mode	Options
multi.1.r96	InServA	Backup	Secondary	Sync	
LocalVV	ID	RemoteVV	ID	SyncStatus	LastSyncTime
testvv.0	200	testvv.0	100	Synced	NA
testvv.1	201	testvv.1	101	Synced	NA
testvv.2	202	testvv.2	102	Synced	NA
testvv.3	203	testvv.3	103	Synced	NA
testvv.4	204	testvv.4	104	Synced	NA
testvv.5	205	testvv.5	105	Synced	NA

Name	Target	Status	Role	Mode	Options
multi.1.r96	InServC	Started	Primary-Rev	Periodic	Period 5m, over_per_alert
LocalVV	ID	RemoteVV	ID	SyncStatus	LastSyncTime
testvv.0	200	testvv.0	300	Synced	2009-06-29 14:44:09 PDT
testvv.1	201	testvv.1	301	Synced	2009-06-29 14:44:10 PDT
testvv.2	202	testvv.2	302	Synced	2009-06-29 14:44:09 PDT
testvv.3	203	testvv.3	303	Synced	2009-06-29 14:44:10 PDT
testvv.4	204	testvv.4	304	Synced	2009-06-29 14:44:09 PDT
testvv.5	205	testvv.5	305	Synced	2009-06-29 14:44:09 PDT

◆ On InServC:

```
# showrcopy

Remote Copy System Information
Status: Started, Normal

Target Information

Name      ID Type Status Options Policy
InServA  42 IP   new           mirror_config
InServB  44 IP   ready        mirror_config

Link Information

Target  Node Address      Status Options
InServA 0   10.100.33.96 Down
InServA 1   10.101.33.96 Down
InServB 0   10.100.33.195 Up
InServB 1   10.101.33.195 Up
receive 0   receive      Up
receive 1   receive      Up

Group Information

Name      Target      Status      Role      Mode      Options
multi.1.r96 InServA     Backup      Secondary Periodic Period 5m,
over_per_alert
  LocalVV  ID RemoteVV  ID SyncStatus LastSyncTime
  testvv.0 300 testvv.0 100 Synced      2009-06-29 14:32:01 PDT
  testvv.1 301 testvv.1 101 Synced      2009-06-29 14:32:06 PDT
  testvv.2 302 testvv.2 102 Synced      2009-06-29 14:32:03 PDT
  testvv.3 303 testvv.3 103 Synced      2009-06-29 14:32:02 PDT
  testvv.4 304 testvv.4 104 Synced      2009-06-29 14:32:04 PDT
  testvv.5 305 testvv.5 105 Synced      2009-06-29 14:31:48 PDT

Name      Target      Status      Role      Mode      Options
multi.1.r96 InServB     Started     Secondary Periodic Period 5m,
over_per_alert
  LocalVV  ID RemoteVV  ID SyncStatus LastSyncTime
  testvv.0 300 testvv.0 200 Synced      2009-06-29 14:39:42 PDT
  testvv.1 301 testvv.1 201 Synced      2009-06-29 14:39:39 PDT
  testvv.2 302 testvv.2 202 Synced      2009-06-29 14:39:41 PDT
  testvv.3 303 testvv.3 203 Synced      2009-06-29 14:39:42 PDT
  testvv.4 304 testvv.4 204 Synced      2009-06-29 14:39:40 PDT
  testvv.5 305 testvv.5 205 Synced      2009-06-29 14:39:05 PDT
```

- 3 When **InServA** has recovered, issue the `setrcopygroup recover` command on **InServC**.



NOTE: The groups on **InServA** may start if auto recover is set. This requires a manual stop of the groups on **InServA**.

```
# setcopygroup recover -f -t InServA
recover started with tasks: 6747
root@xnodeed08:~/bin# waittask -v 6747
  Id Type          Name          Status Phase Step -----StartTime----- -FinishTime-
6747 remote_copy_recover multi.1.r96 active 2/4 0/1 2009-06-29 14:52:43 PDT -

Detailed status:
2009-06-29 14:52:43 PDT Created task.
2009-06-29 14:52:43 PDT Begin Recover operation on group multi.1.r96 started.
2009-06-29 14:52:44 PDT Switched Target InServA of group multi.1.r96 was switched from primary to secondary.
2009-06-29 14:52:44 PDT Waiting Wait for target InServA of group multi.1.r96 to complete snapshot promotions.
2009-06-29 14:54:05 PDT Starting Starting group multi.1.r96 to target InServA.
2009-06-29 14:54:14 PDT Started Remote copy was started for group multi.1.r96 and target InServA.
2009-06-29 14:54:14 PDT Completed Group multi.1.r96 recover completed.

* Volumes on InServA promoting:

root@xnodeed28:~/bin# showvv -rcopy
                                     ----Rsvd(MB)---- -(MB)-
  Id Name          Prov Type CopyOf BsId Rd -Detailed_State- Adm Snp  Usr  VSize RcopyStatus
RcopyGroup
  0 admin          full base ---      0 RW normal          0  0 10240 10240 none    --
  100 testvv.0     cpvv base ---      100 RW promoting    512 2048 1024 1024 secondary
multi.1
  5906 rcpy.222.100.59 snp vcopy testvv.0 100 RO normal      --  --  -- 1024 snap
multi.1
  5912 rcpy.222.100.58 snp vcopy testvv.0 100 RO normal      --  --  -- 1024 snap
multi.1
  101 testvv.1     cpvv base ---      101 RW promoting    512 2048 1024 1024 secondary
multi.1
  5907 rcpy.222.101.59 snp vcopy testvv.1 101 RO normal      --  --  -- 1024 snap
multi.1
  5913 rcpy.222.101.58 snp vcopy testvv.1 101 RO normal      --  --  -- 1024 snap
multi.1
  102 testvv.2     cpvv base ---      102 RW promoting    512 2048 1024 1024 secondary
multi.1
  5908 rcpy.222.102.59 snp vcopy testvv.2 102 RO normal      --  --  -- 1024 snap
multi.1
  5914 rcpy.222.102.58 snp vcopy testvv.2 102 RO normal      --  --  -- 1024 snap
multi.1
  103 testvv.3     cpvv base ---      103 RW promoting    512 2048 1024 1024 secondary
multi.1
  5909 rcpy.222.103.59.1 snp vcopy testvv.3 103 RO normal      --  --  -- 1024 snap
multi.1
  5915 rcpy.222.103.58 snp vcopy testvv.3 103 RO normal      --  --  -- 1024 snap
multi.1
  104 testvv.4     cpvv base ---      104 RW promoting    512 2048 1024 1024 secondary
multi.1
  5910 rcpy.222.104.59.1 snp vcopy testvv.4 104 RO normal      --  --  -- 1024 snap
multi.1
  5916 rcpy.222.104.58 snp vcopy testvv.4 104 RO normal      --  --  -- 1024 snap
multi.1
  105 testvv.5     cpvv base ---      105 RW promoting    256 1024 1024 1024 secondary
multi.1
  5911 rcpy.222.105.59 snp vcopy testvv.5 105 RO normal      --  --  -- 1024 snap
multi.1
  5917 rcpy.222.105.58 snp vcopy testvv.5 105 RO normal      --  --  -- 1024 snap
multi.1
```

In the example above:

- ◆ Tasks are launched for each group that has already been failed over.
 - ◆ Groups on **InServA** temporarily switch to secondary mode, thereby promoting the Remote Copy snapshots to bring **InServA** and **InServC** to the same starting point. Once completed, Remote Copy is started between **InServA** and **InServB** and synchronization of the two system's groups occurs.
- 4 When recovery completes, issue the `showrcopy` command on all systems to verify that **InServA** appears `Up`.

◆ On InServA:

```
# showrcopy
```

```
Remote Copy System Information
```

```
Status: Started, Normal
```

```
Target Information
```

Name	ID	Type	Status	Options	Policy
InServB	58	FC	ready	2FF70002AC0000C3	mirror_config
InServC	59	IP	ready		mirror_config

```
Link Information
```

Target	Node	Address	Status	Options
InServB	0:2:1	20210002AC0000C3	Up	
InServB	1:2:1	21210002AC0000C3	Up	
InServC	0:3:1	10.100.33.63	Up	
InServC	1:3:1	10.101.33.63	Up	
receive	0:2:1	20210002AC0000C3	Up	
receive	1:2:1	21210002AC0000C3	Up	
receive	0:3:1	receive	Up	
receive	1:3:1	receive	Up	

```
Group Information
```

Name	Target	Status	Role	Mode	Options
multi.1	InServB	Backup	Secondary-Rev	Sync	
LocalVV	ID	RemoteVV	ID	SyncStatus	LastSyncTime
testvv.0	100	testvv.0	200	Synced	NA
testvv.1	101	testvv.1	201	Synced	NA
testvv.2	102	testvv.2	202	Synced	NA
testvv.3	103	testvv.3	203	Synced	NA
testvv.4	104	testvv.4	204	Synced	NA
testvv.5	105	testvv.5	205	Synced	NA

Name	Target	Status	Role	Mode	Options
multi.1	InServC	Started	Secondary-Rev	Periodic	Period 5m, over_per_alert
LocalVV	ID	RemoteVV	ID	SyncStatus	LastSyncTime

testvv.0	100	testvv.0	300	Syncing	2009-06-29 14:32:01 PDT
testvv.1	101	testvv.1	301	Syncing	2009-06-29 14:32:06 PDT
testvv.2	102	testvv.2	302	Syncing	2009-06-29 14:32:04 PDT
testvv.3	103	testvv.3	303	Syncing	2009-06-29 14:32:02 PDT
testvv.4	104	testvv.4	304	Syncing	2009-06-29 14:32:04 PDT
testvv.5	105	testvv.5	305	Synced	2009-06-29 14:54:15 PDT

◆ On InServB:

```
# showrcopy
```

```
Remote Copy System Information
```

```
Status: Started, Normal
```

```
Target Information
```

Name	ID	Type	Status	Options	Policy
InServA	46	FC	failed	2FF70002AC000060	mirror_config
InServC	47	IP	ready		mirror_config

```
Link Information
```

Target	Node	Address	Status	Options
InServA	0:2:1	20210002AC000060	Down	
InServA	1:2:1	21210002AC000060	Down	
InServC	0:4:1	10.100.33.63	Up	
InServC	1:4:1	10.101.33.63	Up	
receive	0:2:1	20210002AC000060	Up	
receive	1:2:1	21210002AC000060	Up	
receive	0:4:1	receive	Up	
receive	1:4:1	receive	Up	

```
Group Information
```

Name	Target	Status	Role	Mode	Options
multi.1.r96	InServA	Backup	Secondary	Sync	
LocalVV	ID	RemoteVV	ID	SyncStatus	LastSyncTime
testvv.0	200	testvv.0	100	Synced	NA
testvv.1	201	testvv.1	101	Synced	NA
testvv.2	202	testvv.2	102	Synced	NA
testvv.3	203	testvv.3	103	Synced	NA
testvv.4	204	testvv.4	104	Synced	NA
testvv.5	205	testvv.5	105	Synced	NA

Name	Target	Status	Role	Mode	Options
multi.1.r96	InServC	Started	Secondary	Periodic	Period 5m, over_per_alert
LocalVV	ID	RemoteVV	ID	SyncStatus	LastSyncTime
testvv.0	200	testvv.0	300	Synced	2009-06-29 14:44:09 PDT
testvv.1	201	testvv.1	301	Synced	2009-06-29 14:44:10 PDT
testvv.2	202	testvv.2	302	Synced	2009-06-29 14:44:09 PDT
testvv.3	203	testvv.3	303	Synced	2009-06-29 14:44:10 PDT
testvv.4	204	testvv.4	304	Synced	2009-06-29 14:44:09 PDT
testvv.5	205	testvv.5	305	Synced	2009-06-29 14:44:09 PDT

◆ On InServC:

```
# showrcopy

Remote Copy System Information
Status: Started, Normal

Target Information

Name      ID Type Status Options Policy
InServA  42 IP  ready          mirror_config
InServB  44 IP  ready          mirror_config

Link Information

Target  Node Address      Status Options
InServA 0   10.100.33.96 Up
InServA 1   10.101.33.96 Up
InServB 0   10.100.33.195 Up
InServB 1   10.101.33.195 Up
receive 0   receive      Up
receive 1   receive      Up

Group Information

Name      Target Status Role      Mode Options
multi.1.r96 InServA Started Primary-Rev Periodic Last-Sync 2009-06-29
14:54:14 PDT , Period 5m, over_per_alert
  LocalVV ID RemoteVV ID SyncStatus LastSyncTime
  testvv.0 300 testvv.0 100 Synced 2009-06-29 14:54:54 PDT
  testvv.1 301 testvv.1 101 Synced 2009-06-29 14:54:50 PDT
  testvv.2 302 testvv.2 102 Synced 2009-06-29 14:54:51 PDT
  testvv.3 303 testvv.3 103 Synced 2009-06-29 14:54:52 PDT
  testvv.4 304 testvv.4 104 Synced 2009-06-29 14:54:53 PDT
  testvv.5 305 testvv.5 105 Synced 2009-06-29 14:54:15 PDT

Name      Target Status Role      Mode Options
multi.1.r96 InServB Started Primary-Rev Periodic Last-Sync 2009-06-29
14:54:28 PDT , Period 5m, over_per_alert
  LocalVV ID RemoteVV ID SyncStatus LastSyncTime
  testvv.0 300 testvv.0 200 Synced 2009-06-29 14:54:38 PDT
  testvv.1 301 testvv.1 201 Synced 2009-06-29 14:54:36 PDT
  testvv.2 302 testvv.2 202 Synced 2009-06-29 14:54:41 PDT
  testvv.3 303 testvv.3 203 Synced 2009-06-29 14:54:34 PDT
  testvv.4 304 testvv.4 204 Synced 2009-06-29 14:54:34 PDT
  testvv.5 305 testvv.5 205 Synced 2009-06-29 14:54:33 PDT
```



CAUTION: The group must be started at the time the `setrcopygroup restore` command is issued. Issue the `showrcopy groups <groupname>` command to confirm the group has been started. If it has not been started then issue the `startrcopygroup <groupname>` command and wait for any synchronizations that are started to complete before issuing the `setrcopygroup restore` command.

- Restore the original Synchronous Long Distance Remote Copy relationship between **InServA**, **InServB**, and **InServC** by issuing the `setrcopygroup restore` command on **InServC**.

```
# setrcopygroup restore -f -t InServA
root@xnodeed08:~/bin# waittask -v 6754
  Id Type                Name                Status Phase Step -----StartTime-----
-- -FinishTime-
6754 remote_copy_restore multi.1.r96 active   2/4  1/2 2009-06-29 14:56:49
PDT -

Detailed status:
2009-06-29 14:56:49 PDT Created      task.
2009-06-29 14:56:49 PDT Begin        Restore operation on group multi.1.r96
started.
2009-06-29 14:56:53 PDT Syncing      Synchronization started for group
multi.1.r96 to target InServA.
2009-06-29 14:56:56 PDT Syncing      Synchronization started for group
multi.1.r96 to target InServB.
2009-06-29 14:56:56 PDT Waiting      Waiting for synchronization of group
multi.1.r96 to target InServA to complete.
2009-06-29 14:56:56 PDT Waiting      Waiting for synchronization of group
multi.1.r96 to target InServB to complete.
2009-06-29 14:57:14 PDT Stopped      Stopped remote copy of group
multi.1.r96.
2009-06-29 14:57:15 PDT Switched     Target InServA of group multi.1.r96 was
switched from secondary to primary.
2009-06-29 14:57:16 PDT Switched     Group multi.1.r96 was switched from
primary to secondary.
2009-06-29 14:57:16 PDT Waiting      Waiting for volumes in group multi.1.r96
to complete snapshot promotions.
2009-06-29 14:57:17 PDT Starting     Starting group multi.1.r96 to target
InServA.
2009-06-29 14:57:25 PDT Started      Remote copy was started for group
multi.1.r96 and target InServA.
2009-06-29 14:57:25 PDT Completed   Group multi.1.r96 restore completed.
```

In the example above:

- ◆ Tasks are started for each group that has already been recovered.
 - ◆ A final synchronization is started from **InServC** to **InServB** and from **InServC** to **InServA** to ensure that **InServA** and **InServB** have the most recent data.
 - ◆ Groups are then stopped and the primary volumes on **InServC** are switched to secondary volumes and secondary volumes on **InServA** are switched to primary volumes.
 - ◆ Once completed, **InServA** resumes its role as the primary storage server and starts Remote Copy with **InServB** and **InServC**.
- 6 Issue `showrcopy` on all systems to verify that the original Synchronous Long Distance Remote Copy setup has been restored and is operating normally.

◆ On InServA:

```
# showrcopy

Remote Copy System Information
Status: Started, Normal

Target Information

Name      ID Type Status Options          Policy
InServB  58 FC   ready 2FF70002AC0000C3 mirror_config
InServC  59 IP   ready                mirror_config

Link Information

Target  Node  Address          Status Options
InServB 0:2:1 20210002AC0000C3 Up
InServB 1:2:1 21210002AC0000C3 Up
InServC 0:3:1 10.100.33.63     Up
InServC 1:3:1 10.101.33.63     Up
receive 0:2:1 20210002AC0000C3 Up
receive 1:2:1 21210002AC0000C3 Up
receive 0:3:1 receive         Up
receive 1:3:1 receive         Up

Group Information

Name      Target      Status      Role      Mode      Options
multi.1  InServB    Started     Primary   Sync
LocalVV  ID RemoteVV  ID SyncStatus LastSyncTime
testvv.0 100 testvv.0 200 Synced      NA
testvv.1 101 testvv.1 201 Synced      NA
testvv.2 102 testvv.2 202 Synced      NA
testvv.3 103 testvv.3 203 Synced      NA
testvv.4 104 testvv.4 204 Synced      NA
testvv.5 105 testvv.5 205 Synced      NA

Name      Target      Status      Role      Mode      Options
multi.1  InServC    Started     Primary   Periodic Last-Sync 2009-06-29
14:57:30 PDT , Period 5m, over_per_alert
LocalVV  ID RemoteVV  ID SyncStatus LastSyncTime
testvv.0 100 testvv.0 300 Synced      2009-06-29 14:57:34 PDT
testvv.1 101 testvv.1 301 Synced      2009-06-29 14:57:33 PDT
testvv.2 102 testvv.2 302 Synced      2009-06-29 14:57:35 PDT
testvv.3 103 testvv.3 303 Synced      2009-06-29 14:57:32 PDT
testvv.4 104 testvv.4 304 Synced      2009-06-29 14:57:36 PDT
testvv.5 105 testvv.5 305 Synced      2009-06-29 14:57:34 PDT
```

◆ On InServB:

```
# showrcopy
```

```
Remote Copy System Information
```

```
Status: Started, Normal
```

```
Target Information
```

Name	ID	Type	Status	Options	Policy
InServA	46	FC	ready	2FF70002AC000060	mirror_config
InServC	47	IP	ready		mirror_config

```
Link Information
```

Target	Node	Address	Status	Options
InServA	0:2:1	20210002AC000060	Up	
InServA	1:2:1	21210002AC000060	Up	
InServC	0:4:1	10.100.33.63	Up	
InServC	1:4:1	10.101.33.63	Up	
receive	0:2:1	20210002AC000060	Up	
receive	1:2:1	21210002AC000060	Up	
receive	0:4:1	receive	Up	
receive	1:4:1	receive	Up	

```
Group Information
```

Name	Target	Status	Role	Mode	Options
multi.1.r96	InServA	Started	Secondary	Sync	
LocalVV	ID	RemoteVV	ID	SyncStatus	LastSyncTime
testvv.0	200	testvv.0	100	Synced	NA
testvv.1	201	testvv.1	101	Synced	NA
testvv.2	202	testvv.2	102	Synced	NA
testvv.3	203	testvv.3	103	Synced	NA
testvv.4	204	testvv.4	104	Synced	NA
testvv.5	205	testvv.5	105	Synced	NA

Name	Target	Status	Role	Mode	Options
multi.1.r96	InServC	Backup	Secondary	Periodic	Period 5m, over_per_alert
LocalVV	ID	RemoteVV	ID	SyncStatus	LastSyncTime
testvv.0	200	testvv.0	300	Synced	2009-06-29 14:57:34 PDT
testvv.1	201	testvv.1	301	Synced	2009-06-29 14:57:32 PDT
testvv.2	202	testvv.2	302	Synced	2009-06-29 14:57:35 PDT
testvv.3	203	testvv.3	303	Synced	2009-06-29 14:57:31 PDT
testvv.4	204	testvv.4	304	Synced	2009-06-29 14:57:35 PDT
testvv.5	205	testvv.5	305	Synced	2009-06-29 14:57:33 PDT

◆ On InServC:

```
# showrcopy

Remote Copy System Information
Status: Started, Normal

Target Information

Name      ID Type Status Options Policy
InServA  42 IP  ready          mirror_config
InServB  44 IP  ready          mirror_config

Link Information

Target  Node Address      Status Options
InServA 0   10.100.33.96 Up
InServA 1   10.101.33.96 Up
InServB 0   10.100.33.195 Up
InServB 1   10.101.33.195 Up
receive 0   receive      Up
receive 1   receive      Up

Group Information

Name      Target      Status  Role      Mode      Options
multi.1.r96 InServA    Started Secondary Periodic Period 5m,
over_per_alert
  LocalVV  ID RemoteVV  ID  SyncStatus  LastSyncTime
  testvv.0 300 testvv.0 100 Synced      2009-06-29 14:57:34 PDT
  testvv.1 301 testvv.1 101 Synced      2009-06-29 14:57:33 PDT
  testvv.2 302 testvv.2 102 Synced      2009-06-29 14:57:35 PDT
  testvv.3 303 testvv.3 103 Synced      2009-06-29 14:57:32 PDT
  testvv.4 304 testvv.4 104 Synced      2009-06-29 14:57:36 PDT
  testvv.5 305 testvv.5 105 Synced      2009-06-29 14:57:34 PDT

Name      Target      Status  Role      Mode      Options
multi.1.r96 InServB    Backup  Secondary Periodic Period 5m,
over_per_alert
  LocalVV  ID RemoteVV  ID  SyncStatus  LastSyncTime
  testvv.0 300 testvv.0 200 Synced      2009-06-29 14:57:45 PDT
  testvv.1 301 testvv.1 201 Synced      2009-06-29 14:57:46 PDT
  testvv.2 302 testvv.2 202 Synced      2009-06-29 14:57:42 PDT
  testvv.3 303 testvv.3 203 Synced      2009-06-29 14:57:46 PDT
  testvv.4 304 testvv.4 204 Synced      2009-06-29 14:57:46 PDT
  testvv.5 305 testvv.5 205 Synced      2009-06-29 14:57:26 PDT
```

C.6 Synchronous Long Distance Remote Copy for Data Migration

As stated in *Synchronous Long Distance Configuration* on page 2.12, Synchronous Long Distance Remote Copy can also be used for data migration during the replacement of an InServ Storage Server in an existing Remote Copy configuration. The following data migration example shows the use of Synchronous Long Distance Remote Copy in synchronous mode.

In the following example:

- **InServA** and **InServB** are the Remote Copy pair in synchronous mode, where **InServA** is the primary storage server and **InServB** is the backup storage server.
- Remote Copy group **Group1**, consisting of the volumes **testvv.0**, **testvv.1**, **testvv.2**, **testvv.3**, and **testvv.4**, is mirrored from **InServA** to **InServB**.
- **InServA** is being replaced with **InServC**.

- Remote Copy information as displayed by the `showrcopy` command on the primary server, **InServA** is as follows:

```
# showrcopy

Remote Copy System Information
Status: Started, Normal

Target Information

Name      ID Type Status Options          Policy
InServB 13 FC  ready 2FF70002AC0000C3 mirror_config

Link Information

Target Node Address          Status Options
InServB 0:2:1 20210002AC0000C3 Up
InServB 1:2:1 21210002AC0000C3 Up
receive 0:2:1 20210002AC0000C3 Up
receive 1:2:1 21210002AC0000C3 Up

Group Information

Name          Target      Status      Role      Mode      Options
Group1       InServB    Started    Primary   Sync
  LocalVV    ID RemoteVV   ID  SyncStatus  LastSyncTime
  testvv.0   1  testvv.0   200 Synced      NA
  testvv.1   2  testvv.1   201 Synced      NA
  testvv.2   3  testvv.2   202 Synced      NA
  testvv.3   4  testvv.3   203 Synced      NA
  testvv.4   5  testvv.4   204 Synced      NA
```

- Remote Copy information as displayed by the `showrcopy` command on the backup server, **InServB** is as follows:

```
# showrcopy
Remote Copy System Information
Status: Started, Normal

Target Information

Name      ID Type Status Options          Policy
InServA 61 FC   ready 2FF70002AC000060 mirror_config

Link Information

Target Node Address          Status Options
InServA 0:2:1 20210002AC000060 Up
InServA 1:2:1 21210002AC000060 Up
receive 0:2:1 20210002AC000060 Up
receive 1:2:1 21210002AC000060 Up

Group Information

Name          Target      Status      Role      Mode      Options
Group1.r96   InServA     Started     Secondary Sync
  LocalVV     ID RemoteVV   ID  SyncStatus LastSyncTime
  testvv.0    200 testvv.0   1   Synced     NA
  testvv.1    201 testvv.1   2   Synced     NA
  testvv.2    202 testvv.2   3   Synced     NA
  testvv.3    203 testvv.3   4   Synced     NA
  testvv.4    204 testvv.4   5   Synced     NA
```

- The data migration sequence is displayed in [Figure C-11](#).

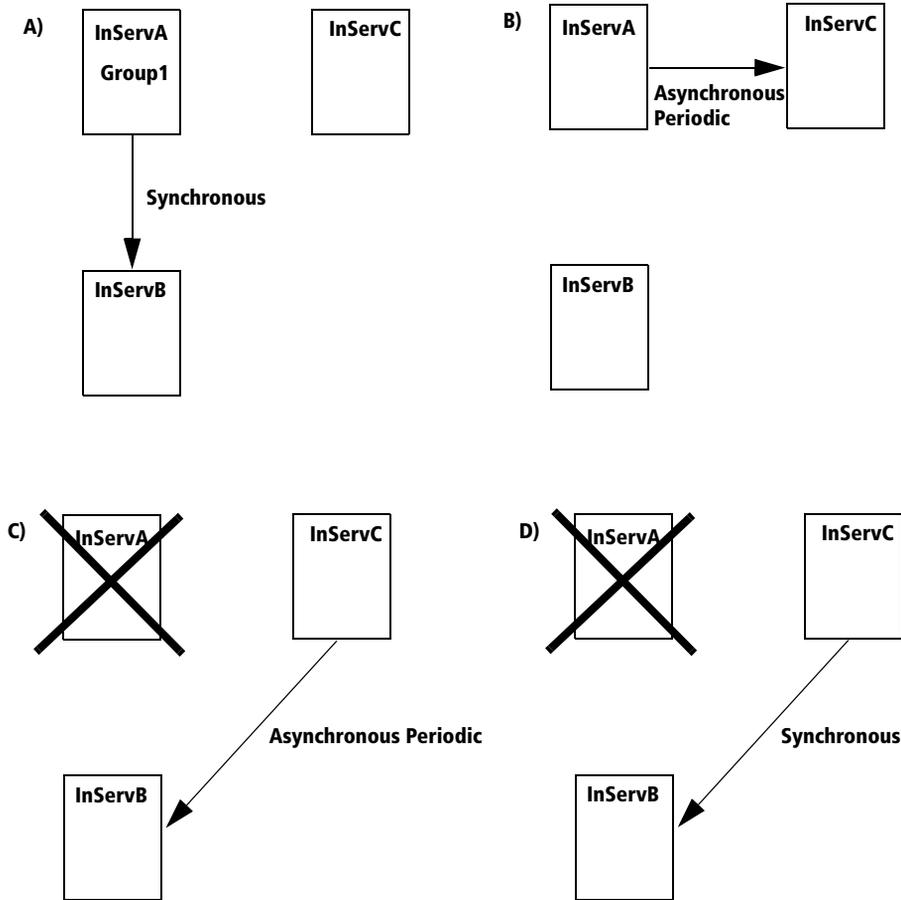


Figure C-11. Synchronous Long Distance Remote Copy Data Migration - Synchronous Mode



NOTE: Prior to beginning data migration, the replacement server, **InServC**, should already be set up for Remote Copy with targets to both **InServA** and **InServB**. Refer to [Chapter 3, Remote Copy Setup](#), for instructions on setting up primary and backup storage servers.

To begin data migration:

- 1 Create a new target (**InServC**) for **InServA** by issuing the `creatercopytarget` `<target_name> IP <N:S:P>:<IP_addr>` command on **InServA**.

```
# creatercopytarget InServC IP 0:3:1:10.100.33.63 1:3:1:10.101.33.63
```

- 2 Issue the `showrcopy` command on **InServA** to verify **InServC** has been created.

```
# showrcopy

Remote Copy System Information
Status: Started, Normal

Target Information

Name      ID Type Status Options          Policy
InServB  13 FC  ready  2FF70002AC0000C3 mirror_config
InServC  14 IP  ready                mirror_config

Link Information

Target  Node  Address          Status Options
InServB 0:2:1 20210002AC0000C3 Up
InServB 1:2:1 21210002AC0000C3 Up
InServC 0:3:1 10.100.33.63     Up
InServC 1:3:1 10.101.33.63     Up
receive 0:2:1 20210002AC0000C3 Up
receive 1:2:1 21210002AC0000C3 Up
receive 0:3:1 receive      Up
receive 1:3:1 receive      Up
...
```

- 3 Create a new target (**InServC**) for **InServB** by issuing the `creatercopytarget` `<target_name> IP <n:s:p:IP_address>` command on **InServB**.

```
# creatercopytarget InServC IP 0:4:1:10.100.33.63 1:4:1:10.101.33.63
```

4 Issue the `showrcopy` command on **InServB** to verify **InServC** has been created.

```
# showrcopy

Remote Copy System Information
Status: Started, Normal

Target Information

Name      ID Type Status Options          Policy
InServA  61 FC   ready  2FF70002AC000060 mirror_config
InServC  62 IP   ready                mirror_config

Link Information

Target  Node  Address          Status Options
InServA 0:2:1 20210002AC000060 Up
InServA 1:2:1 21210002AC000060 Up
InServC 0:4:1 10.100.33.63     Up
InServC 1:4:1 10.101.33.63     Up
receive 0:2:1 20210002AC000060 Up
receive 1:2:1 21210002AC000060 Up
receive 0:4:1 receive         Up
receive 1:4:1 receive         Up
...
```

- 5 Issue the `showrcopy` command on **InServC** and verify **InServA** and **InServB** are targets.

```
# showrcopy

Remote Copy System Information
Status: Started, Normal

Target Information

Name    ID Type Status Options Policy
InServA 60 IP  ready          mirror_config
InServB 61 IP  ready          mirror_config

Link Information

Target  Node Address      Status Options
InServA 0    10.100.33.96 Up
InServA 1    10.101.33.96 Up
InServB 0    10.100.33.195 Up
InServB 1    10.101.33.195 Up
receive 0    receive      Up
receive 1    receive      Up
```

- 6 Add **InServC** as a target for the existing Remote Copy group **Group1** and its volumes **testvv.0**, **testvv.1**, **testvv.2**, **testvv.3**, and **testvv.4** by issuing the `admitrcopytarget` `<target_name> <mode> <group_name>` `[<primary_VV_name>:<secondary_VV_name>]...` command on **InServA**.

```
# admitrcopytarget InServC periodic Group1 testvv.0:testvv.0
testvv.1:testvv.1 testvv.2:testvv.2 testvv.3:testvv.3 testvv.4:testvv.4
```

- 7 Issue the `showrcopy groups` command on **InServA** and verify that **InServC** has been added as a target for **Group1**.

```
# showrcopy groups

Remote Copy System Information
Status: Started, Normal

Group Information
```

Name	Target	Status	Role	Mode	Options
Group1	InServB	Started	Primary	Sync	
LocalVV	ID	RemoteVV	ID	SyncStatus	LastSyncTime
testvv.0	1	testvv.0	200	Synced	NA
testvv.1	2	testvv.1	201	Synced	NA
testvv.2	3	testvv.2	202	Synced	NA
testvv.3	4	testvv.3	203	Synced	NA
testvv.4	5	testvv.4	204	Synced	NA

Name	Target	Status	Role	Mode	Options
Group1	InServC	New	Primary	Periodic	over_per_alert
LocalVV	ID	RemoteVV	ID	SyncStatus	LastSyncTime
testvv.0	1	testvv.0	1	New	NA
testvv.1	2	testvv.1	2	New	NA
testvv.2	3	testvv.2	3	New	NA
testvv.3	4	testvv.3	4	New	NA
testvv.4	5	testvv.4	5	New	NA

- 8 Activate Remote Copy for **Group1** on **InServC** by issuing the `startrcopygroup -t <target_name> <group_name>` command on **InServA**.

```
# startrcopygroup -t InServC Group1
```

- 9 Synchronize **Group1** to **InServC** by issuing the `syncrcopy <group_name>` command on **InServA**. Repeat this step several times to reduce the difference period between the volume group on **InServA** and **InServC**.

```
# syncrcopy Group1
Synchronization request issued for group Group1
task ID = ...
```

- 10 When production is switched to **InServC** all host I/O should be stopped and a final synchronization initiated on **InServA** using the `syncrcopy <group_name>` command.

```
# syncrcopy Group1
Synchronization request issued for group Group1
task ID = ...
```

- 11 When the final synchronization has completed, stop **Group1** on **InServA** by issuing the `stoprcopygroup <group_name>` command on **InServA**.

```
# stoprcopygroup Group1
```

- 12 Issue the `showrcopy groups` command on **InServA** to verify the group is stopped.

```
# showrcopy groups
Remote Copy System Information
Status: Started, Normal

Group Information

Name          Target      Status      Role          Mode          Options
Group1       InServB     Stopped     Primary       Sync
  LocalVV     ID          RemoteVV    ID            SyncStatus    LastSyncTime
  testvv.0    1          testvv.0    200           Stopped       2009-08-19 14:24:00 PDT
  testvv.1    2          testvv.1    201           Stopped       2009-08-19 14:24:00 PDT
  testvv.2    3          testvv.2    202           Stopped       2009-08-19 14:24:00 PDT
  testvv.3    4          testvv.3    203           Stopped       2009-08-19 14:24:00 PDT
  testvv.4    5          testvv.4    204           Stopped       2009-08-19 14:24:00 PDT

Name          Target      Status      Role          Mode          Options
Group1       InServC     Stopped     Primary       Periodic      Last-Sync 2009-08-19
14:21:43 PDT , over_per_alert
  LocalVV     ID          RemoteVV    ID            SyncStatus    LastSyncTime
  testvv.0    1          testvv.0    1             Stopped       2009-08-19 14:21:44 PDT
  testvv.1    2          testvv.1    2             Stopped       2009-08-19 14:21:44 PDT
  testvv.2    3          testvv.2    3             Stopped       2009-08-19 14:21:43 PDT
  testvv.3    4          testvv.3    4             Stopped       2009-08-19 14:21:44 PDT
  testvv.4    5          testvv.4    5             Stopped       2009-08-19 14:21:44 PDT
```

- 13 Issue the `showrcopy groups` command on **InServB** and **InServC** to verify that the group status displays Synced.

◆ On InServB:

showrcopy groups

Remote Copy System Information

Status: Started, Normal

Group Information

Name	Target	Status	Role	Mode	Options
Group1.r96	InServA	Stopped	Secondary	Sync	
LocalVV	ID	RemoteVV	ID	SyncStatus	LastSyncTime
testvv.0	200	testvv.0	1	Stopped	2009-08-19 14:24:00 PDT
testvv.1	201	testvv.1	2	Stopped	2009-08-19 14:24:00 PDT
testvv.2	202	testvv.2	3	Stopped	2009-08-19 14:24:00 PDT
testvv.3	203	testvv.3	4	Stopped	2009-08-19 14:24:00 PDT
testvv.4	204	testvv.4	5	Stopped	2009-08-19 14:24:00 PDT

Name	Target	Status	Role	Mode	Options
Group1.r96	InServC	Backup	Secondary	Periodic	over_per_alert
LocalVV	ID	RemoteVV	ID	SyncStatus	LastSyncTime
testvv.0	200	testvv.0	1	Synced	2009-08-19 14:21:44 PDT
testvv.1	201	testvv.1	2	Synced	2009-08-19 14:21:44 PDT
testvv.2	202	testvv.2	3	Synced	2009-08-19 14:21:43 PDT
testvv.3	203	testvv.3	4	Synced	2009-08-19 14:21:44 PDT
testvv.4	204	testvv.4	5	Synced	2009-08-19 14:21:44 PDT

◆ On **InServC**:

showrcopy groups

Remote Copy System Information

Status: Started, Normal

Group Information

Name	Target	Status	Role	Mode	Options
Group1.r96	InServA	Stopped	Secondary	Periodic	over_per_alert
LocalVV	ID	RemoteVV	ID	SyncStatus	LastSyncTime
testvv.0	1	testvv.0	1	Stopped	2009-08-19 14:21:44 PDT
testvv.1	2	testvv.1	2	Stopped	2009-08-19 14:21:44 PDT
testvv.2	3	testvv.2	3	Stopped	2009-08-19 14:21:43 PDT
testvv.3	4	testvv.3	4	Stopped	2009-08-19 14:21:44 PDT
testvv.4	5	testvv.4	5	Stopped	2009-08-19 14:21:44 PDT

Name	Target	Status	Role	Mode	Options
Group1.r96	InServB	Backup	Secondary	Periodic	over_per_alert
LocalVV	ID	RemoteVV	ID	SyncStatus	LastSyncTime
testvv.0	1	testvv.0	200	Synced	NA
testvv.1	2	testvv.1	201	Synced	NA
testvv.2	3	testvv.2	202	Synced	NA
testvv.3	4	testvv.3	203	Synced	NA
testvv.4	5	testvv.4	204	Synced	NA

- 14** Begin failover on **InServC** to change the secondary volume group (**Group1.r96**) to the primary volume group by issuing the `setrcopygroup failover <group_name>` command on **InServC**.

```
# setrcopygroup failover Group1.r96
Are you sure that you wish to perform this action?
select q=quit y=yes n=no: y
failover started with tasks: 7567
root@xnodeed08:S63# waittask -v 7567
  Id Type                Name                Status Phase Step
-----StartTime----- -FinishTime-
7567 remote_copy_failover Group1.r96 active   1/3  0/1 2009-08-19 14:26:51 PDT
-

Detailed status:
2009-08-19 14:26:51 PDT Created      task.
2009-08-19 14:26:51 PDT Begin        Failover operation on group Group1.r96
started.
2009-08-19 14:26:51 PDT Push check   Check confirmed that data does need to be pushed
from target InServB to group Group1.r96.
2009-08-19 14:27:01 PDT Pushing      Pushing newer data from target InServB to
group Group1.r96.
2009-08-19 14:27:01 PDT Waiting      Waiting for synchronization of group
Group1.r96 to target InServB to complete.
2009-08-19 14:27:16 PDT Pushed       Completed push of newer data from target
InServB to group Group1.r96.
2009-08-19 14:27:18 PDT Switched     Group Group1.r96 was switched from
secondary to primary.
2009-08-19 14:27:18 PDT Starting     Starting group Group1.r96 to target InServB.
2009-08-19 14:27:22 PDT Started      Remote copy was started for group
Group1.r96 and target InServB.
2009-08-19 14:27:22 PDT Completed    Group Group1.r96 failover completed
```

This command causes all indicated secondary groups (in this example, **Group1.r96**) to become primary, thereby allowing changes to be made to all virtual volumes in the group.

- 15 Issue the `showrcopy` command on **InServC** to verify that **Group1.r96** is displayed with the role of **Primary-Rev**.

```
# showrcopy
Remote Copy System Information
Status: Started, Normal

Target Information

Name      ID Type Status Options Policy
InServA 60 IP   ready          mirror_config
InServB 61 IP   ready          mirror_config

Link Information

Target  Node Address      Status Options
InServA 0    10.100.33.96 Up
InServA 1    10.101.33.96 Up
InServB 0    10.100.33.195 Up
InServB 1    10.101.33.195 Up
receive 0    receive      Up
receive 1    receive      Up

Group Information

Name      Target      Status      Role      Mode      Options
Group1.r96 InServA     Stopped     Primary-Rev Periodic over_per_alert
  LocalVV  ID RemoteVV  ID SyncStatus LastSyncTime
  testvv.0 1 testvv.0 1 Stopped 2009-08-19 14:21:44 PDT
  testvv.1 2 testvv.1 2 Stopped 2009-08-19 14:21:44 PDT
  testvv.2 3 testvv.2 3 Stopped 2009-08-19 14:21:43 PDT
  testvv.3 4 testvv.3 4 Stopped 2009-08-19 14:21:44 PDT
  testvv.4 5 testvv.4 5 Stopped 2009-08-19 14:21:44 PDT

Name      Target      Status      Role      Mode      Options
Group1.r96 InServB     Started     Primary-Rev Periodic Last-Sync 2009-08-19
14:27:22 PDT , over_per_alert
  LocalVV  ID RemoteVV  ID SyncStatus LastSyncTime
  testvv.0 1 testvv.0 200 Synced 2009-08-19 14:27:23 PDT
  testvv.1 2 testvv.1 201 Synced 2009-08-19 14:27:23 PDT
  testvv.2 3 testvv.2 202 Synced 2009-08-19 14:27:23 PDT
  testvv.3 4 testvv.3 203 Synced 2009-08-19 14:27:23 PDT
  testvv.4 5 testvv.4 204 Synced 2009-08-19 14:27:23 PDT
```

- 16** Remove **InServA's** target and group affiliations from **InServC** by issuing the `removercopytarget -cleargroups <target_name>` command.

```
# removercopytarget -cleargroups InServA
```

- 17** Issue the `showrcopy` command on **InServC** to verify that **InServA** has been removed as a target.

```
# showrcopy
Remote Copy System Information
Status: Started, Normal

Target Information

Name   ID Type Status Options Policy
InServB 61 IP   ready          mirror_config

Link Information

Target Node Address      Status Options
InServB 0   10.100.33.195 Up
InServB 1   10.101.33.195 Up
receive 0   receive         Up
receive 1   receive         Up
...
```

- 18** Remove **InServA's** target and group affiliations from **InServB** by issuing the `removercopytarget -cleargroups <target_name>` command on **InServB**.

```
# removercopytarget -cleargroups InServA
```

- 19 Issue the `showrcopy` command on **InServB** to verify that **InServA** has been removed as a target.

```
# showrcopy
Remote Copy System Information
Status: Started, Normal

Target Information

Name    ID Type Status Options Policy
InServC 62 IP   ready          mirror_config

Link Information

Target Node Address      Status Options
InServC 0:4:1 10.100.33.63 Up
InServC 1:4:1 10.101.33.63 Up
receive 0:4:1 receive      Up
receive 1:4:1 receive      Up
...
```

- 20 On **InServC**, stop the Remote Copy group **Group1.r96** and change the group to primary.

```
# stoprcopygroup Group1.r96
# setrcopygroup reverse -natural -local Group1.r96
Are you sure that you wish to perform this action?
select q=quit y=yes n=no: y
reverse started with tasks: 7573
root@xnodeed08:S63# waittask -v 7573
   Id Type           Name           Status Phase Step -----StartTime-----
-----FinishTime-----
7573 remote_copy_reverse Group1.r96 done    ---  --- 2009-08-19 14:33:29
PDT
2009-08-19 14:33:29 PDT

Detailed status:
2009-08-19 14:33:29 PDT Created      task.
2009-08-19 14:33:29 PDT Begin        Reverse operation on group Group1.r96
started.
2009-08-19 14:33:29 PDT Switched    Group Group1.r96 switched its natural
role
from secondary to primary.
2009-08-19 14:33:29 PDT Completed  Group Group1.r96 reverse completed.
```

This changes the role of the group on **InServC** to be permanently marked **Primary**, rather than **Primary-Rev**.

- 21** Switch the mode of **InServC** to synchronous by issuing the `setrcopygroup mode sync` command.

```
# setrcopygroup mode sync InServB Group1.r96
```

- 22** Start **Group1.r96** on **InServC**.

```
# startrcopygroup Group1.r96
```

- 23** On **InServC**, issue the `showrcopy groups` command and verify that **Group1.r96** is now primary and its mode is synchronous.

```
# showrcopy groups
Remote Copy System Information
Status: Started, Normal

Group Information
```

Name	Target	Status	Role	Mode	Options
Group1.r96	InServB	Started	Primary	Sync	
LocalVV	ID	RemoteVV	ID	SyncStatus	LastSyncTime
testvv.0	1	testvv.0	200	Synced	NA
testvv.1	2	testvv.1	201	Synced	NA
testvv.2	3	testvv.2	202	Synced	NA
testvv.3	4	testvv.3	203	Synced	NA
testvv.4	5	testvv.4	204	Synced	NA

D

Comparing MTU Speeds

Depending on workload, you might see as much as a 50 percent increase by using a 9000 byte MTU setting as opposed to a 1500 byte MTU setting. To see the difference in throughput between the 1500 and the 9000 byte MTU settings for a specific system, you can configure a test volume group and measure the initial volume synchronization throughput using the `statport -rcip` command as follows:

- 1 Set the MTU to the default (1500 bytes) for each port on both the primary and backup storage servers.

```
# controlport rcip mtu 1500 <N:S:P>
```

where <N:S:P> is the port location given in Node:Slot:Port format.

- 2 On the primary storage server, configure a test volume group with a single volume of 20GB.
 - a Create a test CPG on the primary and one on the backup:

```
On InServ1:  
# createcpg <test_cpg>
```

```
On InServ2:  
# createcpg <test_cpg>
```

where <test_cpg> is the name of the CPG to be created.

- b** For both the primary and backup servers, create a 20 GB test virtual volume that belongs to the CPG created in [step 2](#)

On **InServ1**:

```
# createvv <test_cpg> <test_vv> 20g
```

On **InServ2**:

```
# createvv <test_cpg> <test_vv> 20g
```

where <test_vv> is the name of the virtual volume to be created.

- c** Create a synchronous volume group on the primary server and assign the test volume to that group.

On **InServ1**:

```
# creatercopygroup <test_group> <target_name>:sync
# admitrcopyvv <test_vv> <test_group> <target_name>:<test_vv>
```

where <test_group> is the name of the volume group to be created on the primary server, <target_name> is the backup storage server (**InServ2**), and <test_vv> is the name of the test volume created in [step 2](#).

- 3** On the primary server, start the test group created in [step 2](#).

On **InServ1**:

```
# startrcopygroup <test_group>
```

- 4** Use the `statport -rcip` command to obtain statistics on throughput

On **InServ1**:

```
# statport -rcip
```

Let the Remote Copy operation run for a while and then calculate the average throughput reported.

- 5 Stop the Remote Copy operation on the group. The `-nosnap` option in the following example prevents Remote Copy from taking a snapshot on the primary storage server:

```
On InServ1:  
# stoprcopygroup -nosnap <test_group>
```

- 6 Set the MTU to 9000 bytes for each port on both the primary and backup storage servers.

```
# controlport rcip mtu 9000 <N:S:P>  
  
Remote Copy interface change successful.
```

where `<N:S:P>` is the port location given in Node:Slot:Port format.

- 7 Start the group on the primary server.

```
On InServ1:  
# startrcopygroup <test_group>
```

where `<test_group>` is the name of the test group created in [step 2](#)

- 8 Use the `statport -rcip` command to obtain statistics on throughput.

```
On InServ1:  
# statport -rcip
```

Let the Remote Copy operation run for a while and then calculate the average throughput reported. Compare this with the results obtained in [step 4](#).

- 9 Stop the Remote Copy operation on the group.

```
On InServ1:  
# stoprcopygroup -nosnap <test_group>
```

- 10 Remove the test CPG, volume group, and virtual volume from both the primary and backup servers as follows:

On InServ1:

```
# removercopygroup <test_group>
```

```
# removevv -ld <test_vv>
```

```
Removing vv <test_vv>
```

```
Removing ld <test_vv>.usr.3
```

```
Removing ld <test_vv>.usr.2
```

```
Removing ld <test_vv>.usr.1
```

```
Removing ld <test_vv>.usr.0
```

```
# removecpg -f -ld <test_cpg>
```

```
Removing CPG <test_cpg>
```

```
Removing ld <test_cpg>.usr.3
```

```
Removing ld <test_cpg>.usr.2
```

```
Removing ld <test_cpg>.usr.1
```

```
Removing ld <test_cpg>.usr.0
```

On InServ2:

```
# removercopygroup <test_group>
```

```
# removevv -ld <test_vv>
```

```
Removing vv <test_vv>
```

```
Removing ld <test_vv>.usr.3
```

```
Removing ld <test_vv>.usr.2
```

```
Removing ld <test_vv>.usr.1
```

```
Removing ld <test_vv>.usr.0
```

```
# removecpg -ld <test_cpg>
```

```
Removing CPG <test_cpg>
```

```
Removing ld <test_cpg>.usr.3
```

```
Removing ld <test_cpg>.usr.2
```

```
Removing ld <test_cpg>.usr.1
```

```
Removing ld <test_cpg>.usr.0
```

Index

1-to-N configurations

- restrictions 2.43

1-to-N unidirectional disaster recovery

- asynchronous periodic mode C.27

3PAR

- InForm operating environment 1.2

- InServ Storage Servers 1.2

- Remote Copy License 2.3

- Thin Provisioning 2.33, 3.3

A

add

- target to group B.5

- virtual volume to group B.7

admitrcopy command 3.23, 3.27

admitrcopylink command 4.12, 5.5, B.3

admitrcopytarget command 4.12, B.5

admitrcopyvv command 3.23, 4.12, B.7

alerts 2.36, 2.39

allocation limit 2.34

asynchronous periodic mode 2.24

- full synchronization 2.25

- limiting throughput 2.30, 4.10

- resynchronization 2.25

- snapshot utilization 2.32

asynchronous periodic resynchronization 2.24, 2.28

asynchronous periodic synchronization

- types 2.25

asynchronous periodic volume groups 2.22, 2.39

audience for this guide 1.2

auto_recover group policy 4.5

auto_recover policy 4.5

automatic resynchronizations 2.28

B

backup 2.7, 2.21

- server 2.4

- site

- designate B.66

- storage server

- connect to primary storage server 2.18

- failure of 2.38

- identify B.20

bandwidth 2.18, 2.36

base volume 2.27, 2.37, 2.39

bidirectional 2.4, 2.7, C.2

bidirectional disaster recovery

- synchronous mode C.4

broken link between storage servers 2.36

C

cautions and notes 1.5

chapter summaries 1.3

command mirroring 2.3

commands

- admitrcopylink 4.12, 5.5, B.3

- admitrcopytarget 4.12, B.5

- admitrcopyvv 3.23, 4.12, B.7

- controlport 3.8, 3.9, 3.10, 3.11, 3.12, 3.13, 3.14, 4.12, 5.3, B.9
 - creatercopygroup 3.22, 4.12, B.7, B.18, B.19, B.82
 - creatercopytarget 4.12, 5.5, B.3, B.4, B.5, B.7, B.18, B.20, B.23, B.44
 - dismissrcopylink 4.12, B.23
 - dismissrcopytarget 4.12, B.25
 - dismissrcopyvv 4.12, B.27, B.28
 - growvv B.29
 - promotesv 2.32
 - removercopygroup 4.12, B.31
 - removercopytarget 4.13, B.33
 - removetask 4.8
 - setrcopygroup 2.28, 2.40, 4.2, 4.3, 4.4, 4.5, B.18, C.9, C.10, C.13, C.20, C.24, C.32, C.36
 - setrcopytarget B.43, B.45
 - setvv B.47
 - showport 3.9, 3.10, 3.11, 3.14
 - showrcopy 2.29, 3.20, 3.24, 4.2, 4.5, 4.7, B.57, B.67, C.6, C.10, C.13
 - showrctransport 3.15, B.62
 - showtask 4.6, 4.7, 4.8
 - startcopy 4.6, 4.11, B.66
 - startcopygroup 2.31, 2.36, 2.37, 2.38, 3.23, 3.38, 4.5, 4.6, B.67, B.80
 - statport B.69, D.1
 - statrcopy 4.2, B.74
 - stoprcopy 4.11, B.59
 - stoprcopygroup B.31, B.79
 - syncrcopy 2.24, 2.29, 2.32, 2.37, 2.39, 2.40, 4.5, B.81
 - use of for remote copy 4.12
 - waittask 4.8
 - See individual commands by name
 - common provisioning group (CPG) 2.33
 - maximum number of volumes 2.33
 - configuration details, display B.57
 - configuring the synchronization period 2.28
 - connect primary and backup storage servers 2.18
 - connections, Remote Copy, examples of configuring 3.16
 - consistency groups 2.6, 2.25
 - configuring the synchronization period 2.28
 - creating 3.21
 - drawbacks to using 2.21
 - loss of sync between 4.4
 - maximum number of volumes supported 2.21
 - preventing consistency groups from becoming out of sync 4.4
 - setting policies 4.4
 - synchronization of new consistency groups 2.25
 - controller node ports, install and configure 3.8, 3.13, 5.5
 - controller nodes 3.8, 3.13, 5.5
 - controlport command 5.3
 - controlport persona 3.14
 - controlport rcfc 3.13
 - controlport rcip 3.8, 4.12, B.9
 - controlport rcip addr 3.9
 - controlport rcip gw 3.10
 - controlport rcip mtu 3.12
 - controlport rcip ping 3.11
 - controlport rcip speed 3.11
 - conventions
 - typographical 1.4
 - converting standard virtual volumes to fully provisioned virtual volumes 4.8
 - create
 - group B.18
 - link to remote storage server B.3
 - creatercopygroup command 3.21, 3.22, 3.26, 4.12, B.7, B.18, B.19, B.82
 - creatercopytarget command 3.18, 3.19, 3.31, 3.32, 3.33, 4.12, 5.5, B.3, B.4, B.5, B.7, B.18, B.20, B.23, B.44
 - creating volume groups 3.21
- ## D
- data
 - integrity 2.23
 - noncurrency 2.28
 - data migration C.96
 - default policies 2.3
 - command mirroring 4.12
 - Remote Copy volume group 4.4
 - deleted snapshots 2.27
 - dependent writes 2.6
 - designate site as primary or backup B.66
 - dialog elements 1.4
 - disabling B.77
 - disaster recovery 2.35, 4.2
 - initiating C.9, C.20, C.32
 - location of primary and backup storage servers 2.18
 - Synchronous Long Distance Remote Copy C.38
 - dismissrcopylink command 4.12, B.23
 - dismissrcopytarget command 4.12, B.25
 - dismissrcopyvv command 4.12, B.27, B.28

display

- configuration details B.57
 - statistics for group B.74
- documentation, related 1.2
- double link failure 2.36

E

- enable Remote Copy B.66
- error handling 2.35

F

- fail_wrt_on_err group policy 4.4
- fail_wrt_on_err policy 2.37, 4.4
- failures
 - active storage server 2.38
 - backup storage server 2.38
 - command failure due to no mirror config C.8, C.19, C.31
 - complete network failure 2.36
 - double link 2.36
 - network failure (disaster recovery) C.8, C.19, C.31
 - primary storage server 2.38
 - read errors 2.39
 - read request failure 2.39
 - scenarios 2.35
 - single link 2.35
 - storage server 2.38
 - synchronization failure 2.39
 - volume group policies 4.4
 - write errors 2.38
- fast resynchronization 2.27
- Fibre Channel adaptor ports 3.13, 5.5
 - controlling B.9
- full synchronization 2.25, 2.26, 2.31
- fully provisioned virtual volume 2.42
- fully provisioned virtual volume, converting
 - standard volumes to fully provisioned virtual volumes 4.8
- fully provisioned virtual volumes 2.22, 2.33

G

- Gigabit Ethernet 3.8, 5.1
 - cards 2.41
 - interface 2.19, 3.8, 3.11
 - links 2.19

- switches 2.19

group

- add target to B.5
 - add virtual volume to B.7
 - create B.18
 - display statistics for B.74
 - remove B.31
 - remove virtual volume from B.27
 - turn on remove copy for B.67
- group policies
- auto_recover 4.5
 - fail_wrt_on_err 4.4
 - no_auto_recover 4.5
 - no_fail_wrt_on_err 4.4
- growv command B.29

H

- host writes timing out 2.21

I

- I/O statistics
 - ports B.69
- identify primary and backup storage servers B.20
- increasing server MTU 3.11
- InForm CLI 1.1
- initial synchronization 3.23
 - using tape backup 3.38
- initiating
 - a synchronization 2.25
 - disaster recovery C.9, C.20, C.32
 - manual resynchronization 2.29, 4.5
- install and configure controller node ports 3.8, 3.13, 5.5
- IP subnets 2.19, 3.3, 3.8

L

- latency 2.18, 2.24
- length of the synchronization period 2.28
- limiting
 - the performance impact of Remote Copy 2.29, 5.1
 - throughput 2.30, 4.10
- link
 - create to remote storage server B.3
 - remove B.23
- links 2.17, 5.5

- Gigabit Ethernet (GigE) 2.19
 - receiving links 2.18
 - sending 2.17
- loss of sync between volume groups 4.4

M

- maintaining write consistency 2.6
- managing Remote Copy 4.2
- manual resynchronization 2.24, 2.29, 4.5
- maximum transmission unit (MTU) 5.2
 - comparing speeds D.1
 - increasing 3.11, 3.13
 - verifying network support 3.13
- metering data sent over Remote Copy links 2.30
- minimum synchronization period 2.28
- mirror_config policy 2.3
- multiple physical links 2.19

N

- network topology 2.18
- new consistency groups 2.25
- no_auto_recover group policy 4.5
- no_auto_recover policy 4.5
- no_fail_wrt_on_err group policy 4.4
- no_fail_wrt_on_err policy 2.36, 2.39, 4.4
- nosnap option D.3
- nosync option 3.38
- notes and cautions 1.5
- NotSynced 2.39
- N-to-1 2.9
- N-to-1 configurations 2.42
 - restrictions 2.43, 3.26
 - setting up 3.16, 3.25
- N-to-1 disaster recovery
 - asynchronous periodic mode C.15
- number of volumes in a group 2.21

P

- performance considerations 5.1 to 5.4
- periodic resynchronization 2.28
- physical links 2.19, 3.8, 3.13, 5.5
- ports
 - controller node, install and configure 3.8, 3.13, 5.5
 - Fibre Channel
 - controlling B.9

- I/O statistics B.69
- preventing volume groups from becoming out of sync 4.4
- primary server 2.4
- primary site
 - designate B.66
- primary storage server
 - connect to backup storage server 2.18
 - failure of 2.38
 - identify B.20
- primary volume 2.22
- primary volume group 2.4
- promotesv command 2.32
- promoting 2.32

Q

- quick setup guide A.1

R

- RCFC 2.20, 3.14
 - performance 5.5
 - setup 3.14, A.3
- read-only snapshot 2.39
- receiving links 2.18
- redundancy 2.19, 2.23, 2.35
- related documentation 1.2
- Remote Copy 2.3, B.77
 - bidirectional 2.4, 2.7
 - commands B.1
 - concepts 2.4
 - defined 1.1, 2.3, 2.4
 - enable B.66
 - Fibre Channel 3.14
 - interface
 - setting up 3.9
 - links 2.4, 2.17, 2.19, 3.2
 - managing 4.2
 - N-to-1 2.9
 - operation of 2.20
 - over Fibre Channel 2.20, 3.14
 - performance 5.5
 - setup A.3
 - pairs 2.3, 2.6, 2.35
 - performanc impact 5.2
 - policies 4.4
 - ports B.9
 - problems 2.35

- reversing active and backup server designations C.32
 - reversing primary and backup server designations 4.2, C.9, C.21
 - reversing volume group primary and secondary designations 4.2
 - setting the interface 3.9, 3.14
 - stop B.79
 - Synchronous Long Distance overview 2.12
 - Synchronous Long Distance Remote Copy setup 3.28
 - Synchronous Long Distance restrictions 2.45
 - target 2.15
 - policies 2.3
 - terms 2.3
 - turn on for group B.67
 - unidirectional 2.8
 - verifying connectivity 3.10
 - virtual volumes 2.6
 - volume group 2.3
 - remote copy
 - commands, use 4.12
 - Remote Copy terms 2.3
 - remote server 2.4, 2.6
 - remove
 - group B.31
 - link B.23
 - target designation B.33
 - virtual volume from group B.27
 - removercopygroup command 4.12, B.31
 - removercopytarget command 4.13, B.33
 - removetask command 4.8
 - restoring the secondary volume from tape 3.38
 - restrictions 2.42
 - resynchronization 2.25, 2.27, 2.31
 - automatic 2.28
 - manual 2.24
 - scheduled 2.28
 - synchronization period 2.28
 - reversing roles (primary or backup) 2.15, 4.2
 - revision history RH.1
- S**
- scheduled resynchronizations 2.28
 - secondary
 - volume group 2.4, 2.22
 - sending links 2.17
 - service time 5.4
 - setrcopygroup B.35 to B.41
 - setrcopygroup command 2.28, 2.40, 4.2, 4.4, 4.5, B.18, C.9, C.10, C.13, C.20, C.24, C.32, C.36
 - mode 4.3
 - reverse command 4.2
 - setrcopytarget command B.43, B.45, B.46, C.9
 - setting a system gateway 3.9, 3.10
 - setting Remote Copy policies 4.4
 - setting the Remote Copy interface 3.9, 3.14
 - setting up
 - backup storage server 3.19, 3.32
 - primary storage server 3.18
 - RCFC 3.14
 - Remote Copy 3.2
 - Remote Copy interface 3.9
 - Remote Copy transport layer 3.8 to 3.10
 - setting up Synchronous Long Distance Remote Copy 3.28, A.7
 - setvv command
 - setvv -cpg 4.8, B.47 to B.51
 - showport B.52
 - showport command
 - showport -par 3.14
 - showport -rc 3.11
 - showport -rcip 3.9, 3.10
 - showrcopy command 2.29, 3.20, 3.24, 4.2, 4.5, 4.7, B.57, B.61, B.67, C.6, C.10, C.13
 - showrctransport command
 - showrctransport -rcfc 3.15
 - showtask command 4.6, 4.7, 4.8
 - simplifying administration 2.20
 - single link failure 2.35
 - snapshot 2.6, 2.25, 2.31, 2.33, 2.34, 2.36, 2.37, 2.39
 - data space 2.35
 - deleting 2.27
 - preventing the system from taking a snapshot D.3
 - promoting 2.32
 - snapshot space 2.33
 - start copying 3.23
 - startcopy command 3.18, 3.19, 3.31, 3.32, 3.33, 4.6, 4.11, B.66
 - startcopygroup command 2.31, 2.36, 2.37, 2.38, 3.23, 3.38, 4.5, 4.6, B.67, B.80
 - statistics
 - display for group B.74
 - I/O port B.69
 - viewing Remote Copy 4.2
 - viewing system 4.2

- statport command
 - statport -rcip D.1
- statrcopy command 4.2, B.74
- stop
 - Remote Copy 4.11
 - Remote Copy operation B.79, D.3
- stoprcopy command 4.11, B.59
- stoprcopygroup command B.31, B.79 to B.80
- supported number of volumes in a group 2.21
- switches
 - Gigabit Ethernet 2.19
- Synced 2.40
- Synced-stale 2.40
- synchronization
 - concurrent synchronization limit 2.29, B.61
 - initiating 2.25
 - period 2.28
 - configuring 2.28
 - minimum length 2.28
- Synchronous Long Distance Remote Copy 2.12
 - data migration C.96
 - disaster recovery C.38
 - overview 2.12
 - setting up
 - primary storage server 3.31
 - setting up backup servers 3.32
 - setting up volume groups 3.36
 - setup A.7
 - verifying setup 3.34
- Synchronous Long Distance Remote Copy
 - restrictions 2.45
- Synchronous Long Distance Remote Copy
 - setup 3.28
- synchronous mode 2.23
 - replication, when to use 3.2
 - snapshot utilization 2.31
- synchronous volume groups 2.22, 2.39
 - fail_wrt_on_err policy 2.37, 2.39
 - no_fail_wrt_on_err policy 2.36, 2.39
 - stopping and starting 2.39
- syncrcopy command 2.24, 2.29, 2.32, 2.37, 2.39, 2.40, 4.5, B.81 to B.82
 - syncrcopy -ovrd 2.29
- system administrators 1.2

T

- Table 4.11
- tape backup 3.38

- target 2.15
 - definition 2.4, 2.15
 - designation, remove B.33
 - policies 2.3
- TCP/IP
 - connections 5.5
 - links 2.41
- terms and concepts 2.3
- testing for MTU speed support 3.13
- thin provisioning 2.33
- thinly provisioned virtual volumes (TPVVs) 2.22, 2.33, 2.42
 - allocation limit 2.34
- throughput 2.36, 5.2, D.3
 - limiting manually 2.30, 4.10
- topology 2.18
- traffic rates 5.2
- transmitting data in parallel 2.19
- troubleshooting
 - errors returned to the host 2.39
 - host writes timing out 2.21
 - not all volumes are synchronizing
 - concurrently 2.29, B.61
 - read request failures 2.39
 - scheduled resynchronization does not occur 2.28
 - write error returned to all host writes 2.37
 - write errors 2.38
- turn on Remote Copy for group B.67
- types of asynchronous periodic
 - synchronizations 2.25
- typographical conventions 1.4

U

- unidirectional 2.8, C.2

V

- verifying Remote Copy connectivity 3.10
- virtual volumes 2.6, 2.20
 - converting standard volumes to fully provisioned virtual volumes 4.8
 - creating 3.3, 3.21
 - primary volume 2.22
 - secondary volume 2.22
- volume groups 2.6
 - configuring the synchronization period 2.28
 - creating 3.21

- drawbacks 2.21
- loss of sync between 4.4
- maximum supported number of volumes 2.21
- preventing volume groups from becoming out of sync 4.4
- primary 2.4
- secondary 2.4
- setting policies 4.4

- types 2.22

W

- waittask command 4.8
- write
 - errors 2.38
 - latency 2.24

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