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Preface

This guide provides instructions for setting up, planning, and operating Hitachi ShadowImage® for Mainframe on the Hitachi Virtual Storage Platform G1000 (VSP G1000) storage system.

Please read this document carefully to understand how to use this product, and maintain a copy for reference purposes.

- Intended audience
- Product version
- Release notes
- Document revision level
- Changes in this revision
- Referenced documents
- Document conventions
- Convention for storage capacity values
- Accessing product documentation
- Getting help
- Comments
Intended audience

This document is intended for system administrators, Hitachi Data Systems representatives, and authorized service providers who install, configure, and operate the Hitachi Virtual Storage Platform G1000 storage system.

Readers of this document should be familiar with the following:

- Data processing and RAID storage systems and their basic functions.
- The Hitachi Virtual Storage Platform G1000 storage system and the *Hitachi Virtual Storage Platform G1000 Product Overview*.

Product version

This document revision applies to Hitachi Virtual Storage Platform G1000 microcode 80-02-4x or later.

Release notes

The Hitachi Virtual Storage Platform G1000 Release Notes are available on the Hitachi Data Systems Portal: [https://portal.hds.com](https://portal.hds.com). Read the release notes before installing and using this product. They may contain requirements or restrictions that are not fully described in this document or updates or corrections to this document.

Document revision level

<table>
<thead>
<tr>
<th>Revision</th>
<th>Date</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MK-92RD8020-00</td>
<td>April 2014</td>
<td>Initial release.</td>
</tr>
</tbody>
</table>

Changes in this revision

- Added ALU and SLU attribute information in Appendix C, ShadowImage for Mainframe GUI reference on page C-1.
- Support for Extended Address volumes greater than 1 TB.
- Updated differential table information in several sections.
Updated screenshots in several sections.

Referenced documents

Hitachi Virtual Storage Platform G1000 documents:

- *Command Control Interface Command Reference*, MK-90RD7009
- *Hitachi Compatible FlashCopy® User Guide*, MK-92RD8010
- *Hitachi Device Manager - Storage Navigator Messages*, MK-92RD8017

Document conventions

This document uses the following terminology conventions:

<table>
<thead>
<tr>
<th>Convention</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hitachi Virtual Storage Platform G1000, VSP G1000</td>
<td>Unless otherwise noted, these terms refer to all models of the Hitachi Virtual Storage Platform G1000 storage system.</td>
</tr>
<tr>
<td>FCSE</td>
<td>Hitachi Compatible Software for IBM® FlashCopy® SE</td>
</tr>
<tr>
<td>FCv2</td>
<td>Compatible FlashCopy® V2</td>
</tr>
<tr>
<td>GAD</td>
<td>Global-active device</td>
</tr>
<tr>
<td>HDP</td>
<td>Hitachi Dynamic Provisioning</td>
</tr>
<tr>
<td>SI</td>
<td>ShadowImage</td>
</tr>
<tr>
<td>SIz</td>
<td>ShadowImage for Mainframe</td>
</tr>
<tr>
<td>TC</td>
<td>TrueCopy</td>
</tr>
<tr>
<td>TCz</td>
<td>TrueCopy for Mainframe</td>
</tr>
<tr>
<td>HTI</td>
<td>Hitachi Thin Image</td>
</tr>
<tr>
<td>UR</td>
<td>Universal Replicator</td>
</tr>
<tr>
<td>URz</td>
<td>Universal Replicator for Mainframe</td>
</tr>
</tbody>
</table>

This document uses the following typographic conventions.
<table>
<thead>
<tr>
<th>Convention</th>
<th>Description</th>
</tr>
</thead>
</table>
| Regular text bold  | In text: keyboard key, parameter name, property name, hardware label, hardware button, hardware switch  
In a procedure: user interface item |
| *Italic*           | Variable, emphasis, reference to document title, called-out term             |
| Screen text        | Command name and option, drive name, file name, folder name, directory name, code, file content, system and application output, user input |
| < > (angle brackets)| Variable (used when italic is not enough to identify variable)              |
| [ ] (square brackets)| Optional value                                                                |
| { } (braces)       | Required or expected value                                                   |
| | (vertical bar)    | Choice between two or more options or arguments                              |

This document uses the following icons to draw attention to information.

<table>
<thead>
<tr>
<th>Icon</th>
<th>Meaning</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="#" alt="Tip" /></td>
<td>Tip</td>
<td>Provides helpful information, guidelines, or suggestions for performing tasks more effectively.</td>
</tr>
<tr>
<td><img src="#" alt="Note" /></td>
<td>Note</td>
<td>Calls attention to important and/or additional information.</td>
</tr>
<tr>
<td><img src="#" alt="Caution" /></td>
<td>Caution</td>
<td>Warns the user of adverse conditions and/or consequences, such as disruptive tasks.</td>
</tr>
<tr>
<td><img src="#" alt="WARNING" /></td>
<td>WARNING</td>
<td>Warns the user of severe conditions and/or consequences, such as destructive tasks.</td>
</tr>
</tbody>
</table>

### Convention for storage capacity values

Physical storage capacity values (for example, disk drive capacity) are calculated based on the following values:

<table>
<thead>
<tr>
<th>Physical capacity unit</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 kilobyte (KB)</td>
<td>1,000 (10^3) bytes</td>
</tr>
<tr>
<td>1 megabyte (MB)</td>
<td>1,000 KB or 1,000(^2) bytes</td>
</tr>
<tr>
<td>1 gigabyte (GB)</td>
<td>1,000 MB or 1,000(^3) bytes</td>
</tr>
<tr>
<td>1 terabyte (TB)</td>
<td>1,000 GB or 1,000(^4) bytes</td>
</tr>
<tr>
<td>1 petabyte (PB)</td>
<td>1,000 TB or 1,000(^5) bytes</td>
</tr>
<tr>
<td>1 exabyte (EB)</td>
<td>1,000 PB or 1,000(^6) bytes</td>
</tr>
</tbody>
</table>
Logical storage capacity values (for example, logical device capacity) are calculated based on the following values:

<table>
<thead>
<tr>
<th>Logical capacity unit</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 block</td>
<td>512 bytes</td>
</tr>
<tr>
<td>1 cylinder (cyl)</td>
<td>Open-systems:</td>
</tr>
<tr>
<td></td>
<td>• OPEN-V: 960 KB</td>
</tr>
<tr>
<td></td>
<td>• Other than OPEN-V: 720 KB</td>
</tr>
<tr>
<td></td>
<td>Mainframe: 870 KB</td>
</tr>
<tr>
<td>1 kilobyte (KB)</td>
<td>1,024 (2^{10}) bytes</td>
</tr>
<tr>
<td>1 megabyte (MB)</td>
<td>1,024 KB or 1,024(^2) bytes</td>
</tr>
<tr>
<td>1 gigabyte (GB)</td>
<td>1,024 MB or 1,024(^3) bytes</td>
</tr>
<tr>
<td>1 terabyte (TB)</td>
<td>1,024 GB or 1,024(^4) bytes</td>
</tr>
<tr>
<td>1 petabyte (PB)</td>
<td>1,024 TB or 1,024(^5) bytes</td>
</tr>
<tr>
<td>1 exabyte (EB)</td>
<td>1,024 PB or 1,024(^6) bytes</td>
</tr>
</tbody>
</table>

**Accessing product documentation**

The Hitachi Virtual Storage Platform G1000 user documentation is available on the Hitachi Data Systems Portal: [https://portal.hds.com](https://portal.hds.com). Please check this site for the most current documentation, including important updates that may have been made after the release of the product.

**Getting help**

The Hitachi Data Systems customer support staff is available 24 hours a day, seven days a week. If you need technical support, log on to the Hitachi Data Systems Portal for contact information: [https://portal.hds.com](https://portal.hds.com)

**Comments**

Please send us your comments on this document: doc.comments@hds.com. Include the document title and number, including the revision level (for example, -07), and refer to specific sections and paragraphs whenever possible. All comments become the property of Hitachi Data Systems Corporation.

**Thank you!**
ShadowImage for Mainframe overview

Hitachi ShadowImage® for Mainframe (SIz) uses local mirroring technology to create and maintain a full copy of a data volume within a Hitachi Virtual Storage Platform G1000 (VSP G1000) storage system.

Using SIz volume copies (for example, as backups, with secondary host applications, for data mining, for testing) allows you to continue seamless business operations without stopping host application input/output (I/O) to the production volume.

- Hardware and software components
- Initial and update copy operations
Hardware and software components

A typical configuration consists of a Virtual Storage Platform G1000 storage system, a mainframe host connected to the VSP G1000 storage system, the Siz software, a primary or source volume (P-VOL), one or more secondary or target volumes (S-VOLs), and interface tools for operating Siz.

The following image shows a typical configuration.

Interface tools

Interface tools used to operate ShadowImage for Mainframe include the following:

- Business Continuity Manager (BCM)
  For more information, see Business Continuity Manager on page 1-3.
- IBM Peer-to-Peer Remote Copy (PPRC) host software functions
  For more information about the Siz pair tasks you can perform using IBM PPRC, see Appendix A, Performing ShadowImage for Mainframe pair tasks using IBM PPRC and ICKDSF commands on page A-1.
  For more information about usage of PPRC software functions in general, see the IBM documentation.
- IBM DFSMSdss host software functions
  For more information, see the Hitachi Business Continuity Manager User Guide.
- HDvM - SN graphical user interface (GUI)
Business Continuity Manager

Business Continuity Manager (BCM) runs in the mainframe under z/OS providing operation, monitoring, and scripting for SIz. In addition, BCM provides the ability to perform an ATTIME Suspend.

For more information about BCM, see Using Business Continuity Manager and IBM PPRC on page 2-15.

Device Manager - Storage Navigator

Use HDvM - SN to perform the following tasks:

- Install the SIz license key, which enables it.
- Configure the VSP G1000 storage system.
- Perform the initial and update copy operations.
- Monitor, maintain, and troubleshoot the VSP G1000 storage system.

HDvM - SN communicates with the VSP G1000 storage system over defined TCP/IP connections. HDvM - SN is LAN-attached to the storage system.

For more information about using HDvM - SN, see the Hitachi Command Suite User Guide or the Hitachi Virtual Storage Platform G1000 System Administrator Guide.

The Command Control Interface

The CCI is a tool that uses the command line interface to run commands that perform most of the same tasks you can do with HDvM - SN. You can either run pair commands directly from a separate open system host by using a configured open system command device, or you can script CCI commands on the open system host. CCI does not provide any control or monitoring capability directly from the mainframe operating environment.

For more information about using the CCI, see the Command Control Interface User and Reference Guide.

Consistency groups

Use a consistency group (CTG) to perform tasks on the SIz pairs in the group at the same time, including CTG pair-split tasks. Using a CTG to perform tasks ensures the consistency of the pair status for all pairs in the group.
Volume pairs

A volume pair consists of a P-VOL and one to three S-VOLs.

Because S-VOLs are updated asynchronously, the P-VOL and S-VOLs might not be identical except immediately after a split. If a pair is split, any further updates to the P-VOL will not be reflected in the S-VOL.

Splitting or deleting a pair allows the host access to the S-VOL.

Related topics

• ShadowImage for Mainframe pair creation on page 5-3
• ShadowImage for Mainframe pair splitting on page 5-15
• ShadowImage for Mainframe pair resynchronization on page 5-22
• ShadowImage for Mainframe pair deletion on page 5-29

Initial and update copy operations

Creating a pair causes VSP G1000 to start the initial copy. During the initial copy, the P-VOL remains available for read and write operations from the host. After the initial copy, VSP G1000 periodically copies the differential data in the P-VOL to the S-VOL. Subsequent write operations to the P-VOL are regularly duplicated to the S-VOL. The data in the P-VOL is copied to the S-VOL.

Initial copy workflow

Initial copy is an operation VSP G1000 performs when you create a copy pair. Data on the P-VOL is copied to the S-VOL for the initial copy using the following workflow.

VSP G1000 goes through the following workflow to create an initial copy:

1. The S-VOLs are not paired. You create the copy pair.

   Note: VSP G1000 accepts read/write for unpaired volumes.

2. The initial copy is in progress (PENDING status). VSP G1000 copies the P-VOL data to the S-VOL.

3. The initial copy is complete and the volumes are paired (DUPLEX status).
Note: Data consistency is not ensured for SI pairs in DUPLEX status.

A P-VOL continues receiving updates from the host during the initial copy. The following image shows the initial copy operation.

![Diagram showing initial copy operation]

Related topics
- [ShadowImage for Mainframe pair creation on page 5-3](#)

**Update copy workflow**

Update copy is an operation VSP G1000 performs to asynchronously copy new data (differential data) from the P-VOL of a copy volume to the S-VOL. VSP G1000 goes through the following process to create an update copy:

1. VSP G1000 marks I/O to the P-VOL in DUPLEX status as differential data and stores the location of the data in bitmaps for transfer to the S-VOL.
2. After there are write I/O operations to a P-VOL, VSP G1000 starts the update copy operation.
Note: The timing of the update copy operation is based on the amount of differential data that accumulates and the elapsed time since the previous update.

The following image shows the update copy operation.

Related topics
- [ShadowImage for Mainframe pair splitting on page 5-15](#)
ShadowImage for Mainframe system requirements and planning

This chapter describes system requirements and planning tasks for SIz storage systems.

- ShadowImage for Mainframe system requirements
- Pair volumes and emulation types
- ShadowImage for Mainframe licensed capacity requirements
- Determining the maximum number of ShadowImage for Mainframe pairs
- Performance planning for ShadowImage for Mainframe
- Using consistency groups to split pairs
- Using Business Continuity Manager and IBM PPRC
# ShadowImage for Mainframe system requirements

The following table describes minimum requirements for S Iz.

<table>
<thead>
<tr>
<th>Item</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>S Iz license capacity</td>
<td>The installed license capacity must be greater than or equal to the combined size of all P-VOLs and S-VOLs. For more information about license capacity requirements, see ShadowImage for Mainframe licensed capacity requirements on page 2-4.</td>
</tr>
<tr>
<td>License key</td>
<td>Must be installed.</td>
</tr>
<tr>
<td>RAID level</td>
<td>RAID 1, RAID 5, RAID 6</td>
</tr>
<tr>
<td>HDvM - SN</td>
<td>Required.</td>
</tr>
<tr>
<td>BCM/IBM PPRC</td>
<td>Use Business Continuity Manager (BCM) or IBM PPRC, but not both interface tools. If you use BCM, a command device is required for remote array operations. For more information about preparing BCM and IBM PPRC, see Using Business Continuity Manager and IBM PPRC on page 2-15.</td>
</tr>
<tr>
<td>CCI</td>
<td>Required if you are running commands through an in-band Fibre Channel connection. Otherwise, the CCI is not required. For more information about the CCI and running commands through an in-band Fibre Channel connection, see the Command Control Interface User and Reference Guide.</td>
</tr>
</tbody>
</table>
| Pair volumes          | The pair volumes. Values:  
                         • **Number of P-VOLs per S-VOL**: One  
                         • **Number of S-VOLs per P-VOL**: Range: At least one and a maximum of three.  
                         • **Volume Capacity**: The P-VOL and S-VOLs must have the same capacity.  
                         • **Supported emulation types**. For more information about the supported emulation types, see Pair volumes and emulation types on page 2-3.  
                         • **Supported volume types**:  
                           o Internal volumes.  
                           **Note**: Universal Volume Manager license is required.  
                           o External volumes configured as mainframe volumes.  
                           o Custom-sized volumes.  
                           **Note**: VLVI is required. Pair volumes must have the same capacity and emulation type.  
                         • **Mirror Unit number (MU number)**: Values:  
                           o (For HDvM - SN and the CCI) 0, 1, or 2  
                           o (For BCM or IBM PPRC) Not specified |
<table>
<thead>
<tr>
<th>Item</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>You can share volumes with other software applications (see <a href="#">Chapter 3, Sharing ShadowImage for Mainframe volumes on page 3-1</a>). You cannot use the following volumes as pair volumes:</td>
<td></td>
</tr>
<tr>
<td>• URz journal volumes</td>
<td></td>
</tr>
<tr>
<td>• Command devices for BCM</td>
<td></td>
</tr>
<tr>
<td>• TSE volumes</td>
<td></td>
</tr>
<tr>
<td>• Volumes that have an emulation type of 3390-V</td>
<td>For more information about supported emulation types, see <a href="#">Pair volumes and emulation types on page 2-3</a>.</td>
</tr>
<tr>
<td>Maximum number of pairs</td>
<td>Per VSP G1000 storage system: 32,768 pairs (if you pair one S-VOL per P-VOL). <strong>Note:</strong> The maximum is dependent on the amount of installed shared memory. For more information about installed shared memory, see <a href="#">Maximum number of tables based on installed shared memory on page 2-5</a>. For more information about determining the number of pairs your VSP G1000 configuration will support, see <a href="#">Determining the maximum number of ShadowImage for Mainframe pairs on page 2-4</a>.</td>
</tr>
<tr>
<td>Consistency groups</td>
<td>Maximum per VSP G1000 storage system: 256 (including SI, SIz, and Thin Image (HTI)) <strong>Note:</strong> You cannot place SI, SIz, and HTI pairs in the same CTG. Maximum SIz pairs per CTG: 8,192 You can only use CTGs reserved for BCM/IBM PPRC in BCM/IBM PPRC. You can only use CTGs that you created using the CCI in the CCI. For more information about the requirements for CTGs in BCM, see the <a href="#">Hitachi Business Continuity Manager User Guide</a>. For more information about how to manage CTG IDs, including how to reserve CTGs, see <a href="#">Managing consistency group IDs for ShadowImage for Mainframe using HDvM - SN on page 4-2</a>.</td>
</tr>
</tbody>
</table>

**Pair volumes and emulation types**

The pair’s P-VOL and S-VOLs must share the same emulation type. A volume's emulation type affects the number of differential and pair tables you will need for SIz. To create a pair, the P-VOL and S-VOL must be the same size and emulation type (for example, both 3390-3).

**Related topics**

- [Determining the maximum number of ShadowImage for Mainframe pairs on page 2-4](#)
- [ShadowImage for Mainframe pair creation on page 5-3](#)
ShadowImage for Mainframe licensed capacity requirements

The total capacity of all P-VOLs and S-VOLs must be less than or equal to the installed license capacity. Volume capacity is counted only once, even if you use the volume more than once. You do not need to multiply the capacity by the number of times a volume is used (For example, a P-VOL used as the source volume for three pairs is counted only once).

After you start performing pair tasks, monitor your capacity requirements to keep the used capacity within the capacity of the installed license.

You can continue using Siz volumes in pairs for 30 days after licensed capacity is exceeded. After 30 days, the only allowed operation is pair deletion.

For more information about licensed capacity, see the Hitachi Command Suite User Guide or the Hitachi Virtual Storage Platform G1000 System Administrator Guide.

Related topics

- Sharing volumes with Dynamic Provisioning for Mainframe and Dynamic Tiering for Mainframe on page 3-4

Determining the maximum number of ShadowImage for Mainframe pairs

Complete the following steps to determine the maximum number of Siz pairs that you can create in your VSP G1000 storage system:

1. Determine the number of differential and pair tables your storage system needs to create Siz pairs:
   - Query the number of differential tables required to create ShadowImage (SI) pairs.
   - Calculate the number of tables for Siz.
2. Determine the maximum number of Siz pairs that you can create on your storage system.

Related topics

- Differential tables and pair tables on page 2-5
- Maximum number of tables based on installed shared memory on page 2-5
- Calculating the number of tables for ShadowImage for Mainframe only on page 2-6
- Calculating the number of tables for ShadowImage for Mainframe when sharing tables on page 2-6
• Calculating the maximum number of ShadowImage for Mainframe pairs on page 2-7

Differential tables and pair tables

Differential tables and pair tables are required to create SIz pairs. Differential tables are tables that manage the differential bitmaps, and pair tables are tables that contain the information needed to manage SIz pairs. Create enough tables to handle the SIz pairs you plan to create.

The VSP G1000 storage system uses a single pair table for up to 36 differential tables.

Software applications that use tables

The following VSP G1000 software applications use differential tables:

• ShadowImage
• Volume Migration

The following VSP G1000 software applications use pair tables:

• ShadowImage
• Volume Migration (using migration plans)

Maximum number of tables based on installed shared memory

The maximum number of differential tables and pair tables in a VSP G1000 storage system depends on the amount of installed shared memory. Ensure that you have sufficient shared memory to handle the number of SIz pairs you plan to create.

The following table describes the maximum amounts of differential and pair tables and system volumes you can create based on the amount of installed shared memory.

<table>
<thead>
<tr>
<th>Shared memory</th>
<th>Differential table limit</th>
<th>Pair table limit</th>
<th>System volume limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base (No additional shared memory)</td>
<td>57,600</td>
<td>8,192</td>
<td>16,384</td>
</tr>
<tr>
<td>Extension</td>
<td>419,200</td>
<td>32,768</td>
<td>65,536</td>
</tr>
</tbody>
</table>

The maximum number of SIz pairs you can create is half the number of system volumes in the table if the P-VOLs and S-VOLs are in a one-to-one relationship.

For example, if you have only the base shared memory installed and the maximum amount of system volumes you can create is 16,384, then you can only create 8,192 SIz pairs. If there are more S-VOLs than P-VOLs, then the number of allowed SIz pairs decreases.

The maximum number of pair tables when shared memory is extended is always 32,768, regardless of the system volumes limit.
Calculating the number of tables for ShadowImage for Mainframe when sharing tables

You can calculate the number of differential and pair tables your VSP G1000 storage system needs to create SIz pairs.

1. Use the following formula:
   Maximum number of pair which VSP G1000 storage system has available is approximately =< (the total number of differential and pair tables in the VSP G1000 storage system - the number of tables other software applications are using, such as Compatible FlashCopy®)

**Note:** You can use CCI `inqraid` command to query the number of the differential tables required when you create SI pairs, though not for creating SIz pairs. For SI, you can also query the number of differential tables not used in the storage system with this command. For more information about the `inqraid` command, see the Command Control Interface User and Reference Guide.

Calculating the number of tables for ShadowImage for Mainframe only

You can calculate the number of differential and pair tables your VSP G1000 storage system needs to create SIz pairs.

**Note:** This calculation assumes that you are only using SIz in the system.

**Note:** Differential tables are not used if a volume exceeds 223 GB (262,668 cyl), so in this case, no calculation is required.

1. Use the following formula:
   Total number of the differential tables per pair = ((the number of cylinders in a volume) + (management area capacity as number of cylinders)) × 15 ÷ (20,448)
   - For management area capacity as number of cylinders, see the table that describes control cylinders per emulation type in the *Hitachi Virtual Storage Platform G1000 Provisioning Guide for Mainframe Systems*.
   - 20,448 here is the number of the slots that a differential table can manage.

2. Round up the total number to the nearest whole number.

For example, if the emulation type is 3390-3 and if the number of the cylinders of the volume is 3,339, the calculation is as follows:

\[(3,339 + 6) \times 15 \div 20,448 = 2.4537\]

Round up 2.4537 to the nearest whole number, 3. In this example, you will need three differential tables and one pair table.
Calculating the maximum number of ShadowImage for Mainframe pairs

You can calculate the maximum number of SIZ pairs your VSP G1000 storage system can support. In the calculation, you use the results of calculating the number of differential and pair tables.

1. Use the following formula:
   \[ \sum \{(\alpha) \times (\text{the number of SIZ pairs})\} \leq (\beta) \text{ and } \sum \{(\gamma) \times (\text{the number of SIZ pairs})\} \leq (\delta) \]

   where:
   - (\alpha): The required number of differential tables per pair (per previous calculation).
   - (\beta): The number of differential tables available in the system.
     For more information about differential tables, see Maximum number of tables based on installed shared memory on page 2-5.
   - (\gamma): The required number of pair tables per pair.
     For more information about determining the number of differential and pair tables your storage system needs to create SIZ pairs, see Determining the maximum number of ShadowImage for Mainframe pairs on page 2-4.
   - (\delta): The number of pair tables available in the system.
     For more information about pair tables, see Maximum number of tables based on installed shared memory on page 2-5.

Note: The values for (\beta) and (\delta) in the calculation are dependent on the amount of installed shared memory.
For more information about installed shared memory, see Maximum number of tables based on installed shared memory on page 2-5.

For example, if you plan to create 10 SIZ pairs of 3390-3 volumes and 20 SIZ pairs of 3390-L volumes in a VSP G1000 storage system that has 26,176 differential tables, use the following formula:

\[ (3 \times 10) + (24 \times 20) = 510, \text{ which is } \leq 26,176 \]

If the emulation type is 3390-3, you will need three differential tables and one pair table.

If the emulation type is 3390-L, you will need 24 differential tables and one pair table.

Apply these numbers to the following formula:

\[ (3 \times 10) + (24 \times 20) = 510 \leq 26,176 \]

and

\[ (1 \times 10) + (1 \times 20) = 30 \leq 8,192 \]

Thus, you can create 10 SIZ pairs of 3390-3 volumes and 20 SIZ pairs of 3390-L volumes.
Performance planning for ShadowImage for Mainframe

Performing pair tasks, such as creating, splitting, and resynchronizing SIZ pairs, can affect host I/O performance on the VSP G1000 storage system.

Consider the following items for performance planning:

- Host I/O performance and number of SIZ pairs.
  - Compare the importance of host I/O performance with the number of SIZ pairs and the copy pace.
  - Assigning multiple S-VOLs to a P-VOL uses more system resources and lowers the potential performance.

- Load sharing on parity groups.
  - S-VOLs and P-VOLs should be assigned to different parity groups in case of failure. Make sure that enough parity groups are used to provision the P-VOLs and S-VOLs and provide the performance capability desired.
  - P-VOLs and S-VOLs should be distributed across the appropriate parity groups. If you plan to have multiple copies of the same P-VOLs, consider placing the S-VOLs in different combinations of parity groups.
  - SIZ can create high levels of internal activity in your VSP G1000. Make sure the configuration is appropriate for the internal and host workload. Items that might help are additional parity groups, cache adapters, cache, DKAs, and MPBs.
  - Limit the number of volumes performing initial copy operations provisioned in the same parity group.

- Quick Restore. You can maximize performance when you restore pairs using Quick Restore (see Maximizing Quick Restore performance on page 2-9).

For more information about the guidelines for maximizing host I/O performance while performing pair operations, see Maximizing host I/O performance on page 2-9.

Related topics

- System options that affect performance on page 4-7
- ShadowImage for Mainframe pair creation on page 5-3
- ShadowImage for Mainframe pair splitting on page 5-15
- Resynchronizing or restoring ShadowImage for Mainframe pairs on page 5-26
- System and device maintenance on page 6-17
- Sharing volumes with Cache Residency Manager on page 3-2
- Types of pair resynchronization on page 5-23
Maximizing host I/O performance

Creating, splitting, and resynchronizing pairs can affect host I/O performance.

Use the following suggestions to minimize the impact of pair operations on host I/O performance:

- If you are creating SIz pairs, try one or both of the following:
  - Create the pair when the I/O load is light.
    For more information about checking I/O performance-related information, see the Hitachi Command Suite User Guide or the Hitachi Virtual Storage Platform G1000 System Administrator Guide.
  - Limit the number of pairs that you simultaneously create.

- If you are creating, splitting, or resynchronizing SIz pairs, select a slower copy pace. You can enable the system option for copy pace or you can select a specific copy pace while performing the task.

Related Topics

- For more information about enabling the system option for copy pace, see Enabling system options on page 4-5.
- For more information about selecting a copy pace while creating SIz pairs, see Creating ShadowImage for Mainframe pairs on page 5-4.
- For more information about selecting a copy pace while splitting SIz pairs, see ShadowImage for Mainframe pair splitting on page 5-17.
- For more information about selecting a copy pace while resynchronizing SIz pairs, see Resynchronizing or restoring ShadowImage for Mainframe pairs on page 5-26.

Maximizing Quick Restore performance

1. Use the same RAID level and HDD device type for the P-VOL and S-VOL. For more information about HDD and HDD device types, see the Hitachi Command Suite User Guide or the Hitachi Virtual Storage Platform G1000 System Administrator Guide.

2. Perform one of the following steps:
   - If the P-VOL and S-VOLs are in different partitions, place them into the same cache partition.
   - If Cache Residency Manager is being used, release specific data areas on the LDEV from the Cache Residency Manager cache, and then place the LDEVs into cache using Cache Residency Manager.
     For more information about Cache Residency Manager, including how to place LDEVs into cache and release specific data areas on LDEVs from cache, see the Hitachi Virtual Storage Platform G1000 Performance Guide.

3. Restore the pairs using Quick Restore.
4. Resume the original RAID levels if they were changed by a reverse resynchronization action.

**Related topics**
- [Reverse resynchronization on page 5-23](#)
- [Setting the RAID level on page 5-29](#)

**Using consistency groups to split pairs**

A consistency group (CTG) lets you perform tasks and change pair status on a group of SIz pairs. With CTG pair-split, you can simultaneously split all of the pairs in a CTG.

**Using consistency group pair-split with shared volumes**

If you share SIz P-VOLs in a VSP G1000 storage system with TCz or URz S-VOLs, you can use consistency group (CTG) pair-split to keep SIz S-VOLs consistent.

The following images illustrate CTG pair-split with TCz.

The following images illustrate CTG pair-split with URz.
When you perform a CTG pair-split on shared URz P-VOLs, the following operations occur:

1. URz restores the journal data that was created before you restored the split time to URz S-VOLs (SIz P-VOLs).

Note: If an SIz pair is suspended due to a failure, the split time and the actual task start time must be the same in order to restore URz journal data that you created before the split time to the URz/SIz volume after the split. The task start time is determined by the amount of journal data in the journal volume at the time of the split. For example, if the journal volume contains data that needs one hour to be restored, the starting time of the split operation delays for an hour.

2. URz detects restore journal (R-JNL) data with a time stamp later than the registered split time and suspends R-JNL operations.

3. The SIz pair is split.

4. URz resumes the suspended R-JNL operations.

Requirements, restrictions, and guidelines for using consistency group pair-split with shared volumes

You can share SIz P-VOLs with TCz or URz S-VOLs but there are requirements, restrictions, and guidelines for using consistency group (CTG) pair-split in these cases.
Requirements

If you are sharing SIz P-VOLs with TCz or URz S-VOLs, CTG pair-split has the following requirements:

- All pair operations must be performed using the CCI, Business Continuity Manager (BCM), or IBM PPRC commands. The examples in this manual assume you are using BCM.
- You must share SIz P-VOLs with the TCz or URz S-VOLs.
- The TCz or URz S-VOLs that you are sharing with the SIz CTG pairs must have the same status.
- If you are sharing SIz volumes with URz volumes, the pair status must be the following:
  - (For URz) DUPLEX.
  - (For SIz) DUPLEX or PENDING.
- If you are sharing SIz volumes with TCz volumes, the pair status must be the following:
  - (For TCz) DUPLEX, "Suspended S-VOL by operator", or Suspend/SUSPER.
  - (For SIz) DUPLEX or PENDING.

Restrictions

If you are sharing SIz P-VOLs with TCz or URz S-VOLs, CTG pair-split has the following restrictions:

- You can perform one split operation for each SIz CTG.
- You can:
  - Split each URz journal up to three times (equivalent to three SIz CTGs).
  - Quick Split or Steady Split the pairs.
    For more information about the methods you can use to split pairs, see Pair splitting methods on page 5-16.

Guidelines

If you are sharing SIz P-VOLs with TCz or URz S-VOLs, use the following guidelines when performing a CTG pair-split:

- Make sure that the SIz S-VOLs are in a consistent state.
  For more information about maintaining consistent backups of volumes, see Maintaining consistent ShadowImage for Mainframe secondary volume backups on page 5-21.
- Ensure that all SIz pairs in the CTG are in DUPLEX or PENDING status.

Note: If you share SIz pair P-VOLs with URz S-VOLs and you include SIz pairs in a status other than DUPLEX or PENDING in the CTG, you cannot maintain SIz S-VOL consistency.
Supported pair statuses for consistency group pair-split

The pair status for all of the SIz pairs in the CTG determines if you can perform a consistency group (CTG) pair-split. If all of the SIz pairs in the CTG are paired (DUPLEX status), you can perform a CTG pair-split.

The following table describes when you can perform a CTG pair-split, based on the SIz pairs in the CTG that are not paired (a status other than DUPLEX), and the resulting pair status after you perform the pair-split.

<table>
<thead>
<tr>
<th>The status of the pairs in the CTG that have a status other than DUPLEX</th>
<th>Can you perform a CTG pair-split?</th>
<th>Status after you perform a CTG pair-split</th>
</tr>
</thead>
<tbody>
<tr>
<td>PENDING</td>
<td>YES</td>
<td>Split/SUSPOPOP</td>
</tr>
<tr>
<td>SP-Pend/TRANS</td>
<td>YES&lt;sup&gt;2&lt;/sup&gt;</td>
<td>Split/SUSPOPOP</td>
</tr>
<tr>
<td>V-Split/SUSPVS</td>
<td>YES&lt;sup&gt;2&lt;/sup&gt;</td>
<td>Split/SUSPOPOP</td>
</tr>
<tr>
<td>Split/SUSPOPOP</td>
<td>YES&lt;sup&gt;2&lt;/sup&gt;</td>
<td>Split/SUSPOPOP</td>
</tr>
<tr>
<td>Resync/PENDING</td>
<td>NO</td>
<td>The pair statuses remain the same.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The command ends abnormally and shows the following information: [EX_CMDRJE] An order to the control/command device was rejected&lt;sup&gt;1&lt;/sup&gt;</td>
</tr>
<tr>
<td>Resync-R/REVRSY</td>
<td>NO</td>
<td>The pair statuses remain the same.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The command ends abnormally and shows the following information: [EX_CMDRJE] An order to the control/command device was rejected&lt;sup&gt;1&lt;/sup&gt;</td>
</tr>
<tr>
<td>Suspend/SUSPER</td>
<td>NO</td>
<td>The pair statuses remain the same.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The command ends abnormally and shows the following information: [EX_CMDRJE] An order to the control/command device was rejected</td>
</tr>
</tbody>
</table>

**Notes:**

1. If you share a URz S-VOL and an SIz P-VOL, the command might end normally after you perform a CTG pair-split. Ensure the status of the pairs within the CTG have changed to Split/SUSPOPOP (use the pairdisplay command).

2. Consistency is guaranteed only for SIz pairs in DUPLEX or PENDING status.

The following are examples of when you can perform a CTG pair-split based on status of the SIz pairs in the CTG:

- **Example 1**
  The are six SIz pairs in a CTG. Two of the pairs are paired (DUPLEX status), two are in PENDING status, and two are in Split/SUSPOPOP status.
In this case, you can perform a CTG pair-split, and doing so changes the status of all of the pairs in the CTG to Split/SUSPOP. However, the S-VOLs that were in Split/SUSPOP might not be consistent with the other volumes in the CTG.

- Example 2
  There are two SIz pairs in a CTG and one is paired (DUPLEX status) and the other is in the process of being resynchronized (Resync/PENDING status). In this case, you cannot perform a CTG pair-split.

- Example 3
  There are six SIz pairs in a CTG. Two of the pairs are paired (DUPLEX status), two are in the process of Quick Split (V-Split/SUSPVS status), and two are in Suspend/SUSPER status. In this case, the CTG pair-split ends abnormally and the status of all of the pairs in the CTG remains the same.

**Using ATTIME Suspend to split consistency group pairs**

With ATTIME Suspend (sometimes referred to as ATTIME Split), you can define a specific time to simultaneously split all the pairs in a consistency group (CTG) and copy data from the P-VOLs to the S-VOLs.

The following image illustrates the use of ATTIME Suspend.
Using Business Continuity Manager and IBM PPRC

You can use Business Continuity Manager (BCM) or IBM PPRC to perform the S1z pair tasks. IBM PPRC and BCM are independent functions; you must use one or the other. There is no guard logic to prevent using both at the same time. Simultaneous use can cause unexpected results and errors, because commands might be issued when states are not as expected.

Related topics

- For more information about the system requirements for BCM and IBM PPRC, see ShadowImage for Mainframe system requirements on page 2-2.
- For more information about BCM, see the Hitachi Business Continuity Manager User Guide.
- For more information about IBM PPRC, see the IBM documentation.
- For more information about the CCI, see The Command Control Interface on page 1-3.

Workflow for preparing Business Continuity Manager command devices

Business Continuity Manager (BCM) command devices are required when performing operations on VSP G1000 systems that are not locally connected to the host.

BCM command devices cannot be used as CCI command devices, nor CCI command devices as BCM command devices. BCM command devices must be 3390 emulation devices and offline to the host. BCM command devices cannot be replicated.

For more information about BCM command devices, assigning volumes as BCM command devices, and MIH values for volumes used as BCM command devices, see the Hitachi Business Continuity Manager User Guide.

Related topics

- The Command Control Interface on page 1-3
- Appendix A, Performing ShadowImage for Mainframe pair tasks using IBM PPRC and ICKDSF commands on page A-1
Sharing ShadowImage for Mainframe volumes

You can share SIz volumes with other Hitachi software application volumes. This topic discusses the requirements, restrictions, and guidelines for sharing volumes.

☐ Types of volumes you can share ShadowImage for Mainframe volumes with

☐ Sharing volumes with Cache Residency Manager

☐ Sharing volumes with Compatible FlashCopy®

☐ Sharing volumes with Compatible XRC

☐ Sharing volumes with Concurrent Copy

☐ Sharing volumes with Dynamic Provisioning for Mainframe and Dynamic Tiering for Mainframe

☐ Sharing volumes with Resource Partition Manager

☐ Sharing volumes with TrueCopy for Mainframe

☐ Sharing volumes with Universal Replicator for Mainframe

☐ Sharing volumes with Universal Volume Manager

☐ Sharing volumes with Hitachi Volume Migration

☐ Sharing volumes and Volume Retention Manager access attributes
Types of volumes you can share ShadowImage for Mainframe volumes with

You can share SIz volumes with the following VSP G1000 software applications:

- Cache Residency Manager.
- Compatible FlashCopy®.
- Compatible FlashCopy® SE.
  For more information about sharing volumes with Compatible FlashCopy® SE, see the Hitachi Compatible FlashCopy® User Guide.
- Compatible XRC.
- Concurrent Copy.
- Dynamic Provisioning for Mainframe and Dynamic Tiering for Mainframe.
- Resource Partition Manager.
- TrueCopy for Mainframe.
- Universal Replicator for Mainframe.
- Universal Volume Manager
- Virtual LVI.
  You can assign Virtual LVI volumes to SIz pairs. The S-VOL must have the same capacity as the P-VOL.
  For more information about Virtual LVI, see the Hitachi Virtual Storage Platform G1000 Provisioning Guide for Mainframe Systems.
- Volume Migration.
- Volume Retention Manager.

Sharing volumes with Cache Residency Manager

You can use volumes with Cache Residency Manager settings as SIz P-VOLs and S-VOLs. The Cache Residency Manager settings can affect the performance of restoring pairs using Quick Restore.

For more information about how to avoid performance impact when restoring pairs using Quick Restore, see Maximizing Quick Restore performance on page 2-9.

Related topics

- Reverse resynchronization on page 5-23

Sharing volumes with Compatible FlashCopy®

You can share an SIz P-VOL with a Compatible FlashCopy® source volume only.
If you share an SIz P-VOL with a Compatible FlashCopy® source volume, you are limited to the following SIz tasks:

- Add pairs
- Split pair
- Suspend Pair
- Resync pair
- Delete pair

You can establish and delete Compatible FlashCopy® relationships only on source volumes that you share with SIz. To establish or delete relationships, the SIz pair cannot be in the process of being reverse resynchronized (Resync-R/REVRSY status).

If you share an SIz P-VOL with a Compatible FlashCopy® source volume, you can only create the following maximum number of pairs for each software application:

- SIz: 3
- Compatible FlashCopy®: 16

For more information about Compatible FlashCopy®, see the *Hitachi Compatible FlashCopy® User Guide*.

### Sharing volumes with Compatible XRC

You can share an SIz P-VOL with a Compatible XRC primary volume (P-VOL). If you share a volume with Compatible XRC, you cannot perform a Reverse Copy or Quick Restore operation.

⚠️ **Note:** Do not use Compatible XRC secondary volumes (S-VOLs) for SIz volumes.

**Related topics**

- Reverse resynchronization on page 5-23.

### Sharing volumes with Concurrent Copy

You can share SIz S-VOLs with a Concurrent Copy primary volume (P-VOL). If you share a volume with Concurrent Copy, you cannot perform a Reverse Copy or Quick Restore operation.

⚠️ **Note:** Do not use Concurrent Copy secondary volumes (S-VOLs) for SIz volumes.

**Related topics**

- Reverse resynchronization on page 5-23
Sharing volumes with Dynamic Provisioning for Mainframe and Dynamic Tiering for Mainframe

Volumes created using Hitachi Dynamic Provisioning for Mainframe (HDPz) or Hitachi Dynamic Tiering for Mainframe software (HDTz) can be used as SIz P-VOLS or S-VOLS.

If you are using an HDP volume as an SIz P-VOL or S-VOL, the capacity of the HDP pool allocated to the volume is added to the SIz licensed capacity.

Restrictions

The following restrictions apply:

- If only the P-VOL or S-VOL uses HDPz or HDTz, you cannot Quick Restore. The S-VOL consumes the same amount of the pool capacity as the P-VOL. If you plan to Quick Restore, you must use HDPz or HDTz volumes for both the P-VOL and S-VOL.
- You cannot perform SIz pair tasks while increasing HDPz or HDTz volume capacity.

Related topics

- ShadowImage for Mainframe licensed capacity requirements on page 2-4

Sharing volumes with Resource Partition Manager

You can share SIz P-VOLS and S-VOLS with Resource Partition Manager by specifying them in a Resource Partition Manager resource group.

For more information about Resource Partition Manager, see the Hitachi Virtual Storage Platform G1000 Provisioning Guide for Mainframe Systems.

Prerequisite: The resource group must be assigned to a user group for which you have privileges.

⚠️ Note: You can only access one resource group from a host. Therefore, make sure that the resource group volumes you use as P-VOLS and S-VOLS are in the group that the host can access.

Sharing volumes with TrueCopy for Mainframe

You can share both SIz P-VOLS and S-VOLS with TCz P-VOLS and S-VOLS. However, you cannot share SIz S-VOLS with TCz S-VOLS.

The write operation on the TCz P-VOL takes more time when you share an SIz P-VOL with a TCz S-VOL. This is particularly true when the SIz pair is in the process of being Quick Split (V-Split/SUSPVS status) because of the SIz pair copying time.
Note: If you are using IBM PPRC, the storage system cannot distinguish pairs that you have split (Split/SUSPOP status) from pairs that are in the process of being Quick Split (V-Split/SUSPVS status). Check the pair status using one of the following methods:

- From a command prompt, run the following command: `CSUSPEND`  
  To Steady Split, specify MFS00 for the PRIM parameter. In this case, the pair is not in the process of being Quick Split (V-Split/SUSPVS status).
- Use HDvM - SN.

For more information about the methods you can use to split pairs, see Pair splitting methods on page 5-16.

Restrictions

The following restrictions apply:

- If you plan to Quick Restore the SIz pair, you must first suspend the TCz pair.
- If the SIz P-VOL's emulation type is 3390 and the SIz S-VOL and TCz P-VOL are also shared, you cannot create another SIz pair using the SIz P-VOL.
- You can perform a CTG pair-split on SIz pairs that share volumes with TCz S-VOLs.
  For more information about CTG pair-split for shared volumes, see Using consistency group pair-split with shared volumes on page 2-10.

Sharing volumes with Universal Replicator for Mainframe

You can share SIz P-VOLs with URz P-VOLs and S-VOLs.

- If you plan to Quick Restore the SIz pair, do not suspend the URz pair. For more information about Quick Restore, see Reverse resynchronization on page 5-23.
- The system reports SIz status when you query pair status for SIz and URz shared volumes using IBM PPRC. Use Business Continuity Manager (BCM) to query URz's pair status.
  For more information about using BCM, see the Hitachi Business Continuity Manager User Guide.
- You can perform a CTG pair-split on SIz pairs that share volumes with URz S-VOLs.
  For more information about using CTG pair-split on pairs with shared volumes, see Using consistency group pair-split with shared volumes on page 2-10.
For more information about sharing SIZ and URz volumes, see the related appendix in the *Hitachi Universal Replicator for Mainframe User Guide*.

**Sharing volumes with Universal Volume Manager**

You can create SIZ pairs using Universal Volume Manager external volumes. For more information about Universal Volume Manager external volumes, see the *Hitachi Universal Volume Manager User Guide*.

**Sharing volumes with Hitachi Volume Migration**

You can assign the following SIZ volumes to volumes reserved for Volume Migration:

- L1 P-VOL with up to two S-VOLs.
- L2 P-VOL with an S-VOL.

**Workflow for assigning ShadowImage for Mainframe volumes to volumes reserved for Volume Migration**

1. If you are assigning SIZ volumes other than the ones you can assign to volumes reserved for Volume Migration, delete the SIZ pair. Otherwise, skip this step.
2. Perform one of the following tasks:
   - Assign the SIZ volumes to a volume reserved for Volume Migration.
   - Migrate the volumes.
3. If you assigned the SIZ volumes to a volume reserved for Volume Migration, complete the following steps:
   a. Release the pair volumes from the volume reserved for Volume Migration.
   b. Perform SIZ pair tasks.

**Sharing volumes and Volume Retention Manager access attributes**

You can create SIZ pairs using volumes for which you set access attributes using Volume Retention Manager (VRM).

**Setting up to use volumes in ShadowImage for Mainframe pairs**

Complete the following steps to set up to use volumes in SIZ pairs for which you set access attributes using VRM:

1. Use VRM to set the volume's access attributes.
2. Perform SIz pair tasks and reserve attribute change tasks for the volumes.

Related topics
- Setting ShadowImage for Mainframe volume access attributes using Volume Retention Manager on page 3-7
- ShadowImage for Mainframe pair tasks determined by access attribute settings on page 3-7

Setting ShadowImage for Mainframe volume access attributes using Volume Retention Manager

You can use VRM to set the following P-VOL and S-VOL access attributes:
- Read/Write
- Read Only
- Protect

For use with SIz, Read/Write access is required for the S-VOLs and for the P-VOLs for a reverse resync.

Note: To prevent the copy processing or pair suspension from ending abnormally, do not set the Read Only or Protect attribute.

ShadowImage for Mainframe pair tasks determined by access attribute settings

The access attribute setting determines which SIz pair tasks and change tasks you can perform.

Note: If you use volumes for which you set access attributes using VRM, the SIz tasks you perform do not change the volume’s VRM access attributes.

The following table lists which actions you can perform for SIz volumes when VRM attributes are set.

<table>
<thead>
<tr>
<th>Volume access attributes specified for the SIz pair</th>
<th>SIz pair tasks</th>
</tr>
</thead>
<tbody>
<tr>
<td>P-VOL</td>
<td>S-VOL</td>
</tr>
<tr>
<td>Read/Write</td>
<td>Read/Write or Read Only</td>
</tr>
<tr>
<td></td>
<td>Protect</td>
</tr>
<tr>
<td>Read Only</td>
<td>Read/Write or Read Only</td>
</tr>
<tr>
<td></td>
<td>Protect</td>
</tr>
<tr>
<td>P-VOL</td>
<td>S-VOL</td>
</tr>
<tr>
<td>-------</td>
<td>----------------</td>
</tr>
<tr>
<td>Protect</td>
<td>Read/Write, Read Only, or Protect</td>
</tr>
</tbody>
</table>

**Related topics**
- [Reverse resynchronization on page 5-23](#)
This chapter provides instructions for configuring SIZ.

- **Workflow for setting up ShadowImage for Mainframe**
- **Managing consistency group IDs for ShadowImage for Mainframe using HDvM - SN**
- **Releasing reserved mainframe consistency groups**
- **Enabling system options**
Workflow for setting up ShadowImage for Mainframe

Set up SIZ before you create the copy pair. You must have Storage Administrator (Local Copy) role to perform SIZ operations.

Use the following workflow to set up SIZ:

1. (Optional) If you have created CTGs, manage the CTG IDs (see Managing consistency group IDs for ShadowImage for Mainframe using HDvM - SN on page 4-2).
2. Release the reserved mainframe consistency groups (see Releasing reserved mainframe consistency groups on page 4-4).
3. (Optional) Enable the system options (see Enabling system options on page 4-5).

Managing consistency group IDs for ShadowImage for Mainframe using HDvM - SN

1. If you plan to use CTGs in Business Continuity Manager (BCM) or IBM PPRC, reserve the CTGs for SIZ so that you can perform tasks on the pairs in the group. Otherwise, skip this step.
2. Perform one of the following tasks:
   - If you are using BCM or IBM PPRC to create CTGs, assign the same CTG ID to all of the SIZ pairs in the group. Use a CTG value that was reserved in step 1.
     You can use CTG ID 00 to 7F (or 0 to 127) for SI, SIZ, and HTI. The VSP G1000 storage system exclusively uses CTG IDs 80 to FF (or 128 to 255) for HTI.
   - If you are using BCM or IBM PPRC to run commands, create the SIZ pair and assign it to a CTG.

Related topics

- For more information about creating CTGs using BCM or IBM PPRC, see the Hitachi Business Continuity Manager User Guide.
- For information about setting up CTGs and performing pair tasks using CCI, see the Command Control Interface User and Reference Guide and the Command Control Interface Command Reference.
- For more information about the minimum CTG requirements for SIZ, see ShadowImage for Mainframe system requirements on page 2-2.
- For more information about CTG pair-split, see Splitting pairs in a consistency group on page 5-20.
- Reserving consistency groups using HDvM - SN on page 4-3
- Releasing reserved mainframe consistency groups on page 4-4.
- Creating ShadowImage for Mainframe pairs on page 5-4
- Reserve Mainframe CTGs wizard on page C-50.
Reserving consistency groups using HDvM - SN

If you plan to use CTGs in BCM or IBM PPRC, use HDvM - SN to reserve the CTGs, which includes specifying the CTG ID.

1. In Hitachi Command Suite:
   a. On the Resources tab, click Storage Systems, expand the storage system tree, right-click the target storage system, and then select Local Replication.

In Device Manager - Storage Navigator:
   a. In the Explorer pane, click Storage Systems, expand the storage system tree, and then click Replication > Local Replication.

2. In the Local Replication window, select the Consistency Groups tab.

3. On the Consistency Groups tab, click Reserve Mainframe CTGs.

4. In the Reserve Mainframe CTGs window of the Reserve Mainframe CTGs wizard, from the Available Consistency Groups table, select the CTG you want to reserve, and then click Add. The CTG is moved to the Selected Consistency Groups table.

5. Click Finish.
6. In the **Confirm** window of the Reserve Mainframe CTGs wizard, for **Task Name**, type a name for the task, and then click **Apply**. The CTG is reserved.

**Releasing reserved mainframe consistency groups**

1. In Hitachi Command Suite:
   
a. On the **Resources** tab, click **Storage Systems**, expand the storage system tree, right-click the target storage system, and then select **Local Replication**.
   
In Device Manager - Storage Navigator:
   
a. In the **Explorer** pane, click **Storage Systems**, expand the storage system tree, and then click **Replication > Local Replication**.

2. In the **Local Replication** window, select the **Consistency Groups** tab.

3. On the **Consistency Groups** tab, select the reserved mainframe CTG you want to release and click **Release Reserved Mainframe CTGs**.
4. In the **Release Reserved Mainframe CTGs** window, for **Task Name**, type a name for the task, and then click **Apply**. The reserved CTG is released.

**Enabling system options**

You can enable and disable the system options that affect performance.

1. In Hitachi Command Suite:
   a. On the **Resources** tab, click **Storage Systems**, expand the storage system tree, right-click the target storage system, and then select **Replication Dashboard**.
   In Device Manager - Storage Navigator:
   a. In the **Explorer** pane, click **Storage Systems**, expand the storage system tree, and then click **Replication**.
2. In the Replication window, click Edit Options > Local Replication.

3. In the Edit Local Replica Options window of the Edit Local Replica Options wizard, complete the following steps, and then click Finish:
   a. For System Type, ensure Mainframe is selected. The default setting is Open.
   b. From the SIMF/FCv2/FCSE System Options table, select the system option you want to enable, click Enable.
In the Confirm window of the **Edit Local Replica Options** wizard, for **Task Name**, type a name for the task, and then click **Apply**. The system options are set.

**System options that affect performance**

You can use HDvM - SN to enable and disable the following system options that affect performance:

- **Swap & Freeze.** Enable this system option to suppress copy operations (the S-VOLs to remain unchanged) during pair restoration using Quick Restore. Differential data is not copied to the new S-VOL.

- **HOST I/O Performance.** Enable this system option to reduce the impact of copy operations regardless of the workload and to maximize I/O performance.

  **Note:** This system option increases the copy time, which slows copy operations.

- **Copy Threshold.** (For SI/HTI, SIz, Compatible FlashCopy®, and Volume Migration) Enable this system option to temporarily reduce the impact of copy operations when the VSP G1000 storage system’s workload is heavy and to maximize host I/O performance during peak periods.

  **Note:** A service representative must enable this system option.

- **Copy Pace.** Enable this system option to determine the rate at which the VSP G1000 storage system copies data, to suppress copy processing, and to maximize host I/O performance.

  Use one of the following processing-suppression/performance-improvement levels:

  - (FCv2 and FCSE only) **FC Slower Copy1**
  - (FCv2 and FCSE only) **FC Slower Copy2**
- **Copy Pace Ext. Slower1.** This is the third most effective processing-suppression/performance-improvement level.
- **Copy Pace Ext. Slower2.** This is the second most effective processing-suppression/performance-improvement level.
- **Copy Pace Ext. None.** This is the most effective processing-suppression/performance-improvement level. This level stops copy processing.

**Note:** This processing-suppression/performance-improvement level requires more time to synchronize when you split a pair, which prolongs the time that the pair is in the process of being Quick Split (V-Split/SUSPVS status) or Steady Split (SP-Pend/TRANS status). If this is a problem, perform one of the following actions:

- Minimize the time that the pair status is DUPLEX.
- Use one of the other copy pace processing-suppression/performance-improvement levels.

For more information about the methods you can use to split pairs, see [Pair splitting methods on page 5-16](#).

**Related topics**

- [Pair splitting methods on page 5-16](#)
- [Enabling system options on page 4-5](#)
- [Types of pair resynchronization on page 5-23](#)
Managing ShadowImage for Mainframe pairs

This chapter provides information on ATTIME Suspend using Business Continuity Manager, instructions for completing Siz pair tasks using HDvM - SN, and for splitting pairs by consistency group using the CCI.

- Workflow for managing ShadowImage for Mainframe pairs
- ShadowImage for Mainframe pair creation
- Suspending ShadowImage for Mainframe pair creation
- Changing ShadowImage for Mainframe pair options
- ShadowImage for Mainframe pair splitting
- ShadowImage for Mainframe pair resynchronization
- ShadowImage for Mainframe pair deletion
Workflow for managing ShadowImage for Mainframe pairs

During most pair tasks, the P-VOL remains available to the host for I/O operations. You must have the Storage Administrator (Local Copy) role to perform SIZ pair tasks.

Use the following workflow to complete pair tasks:

1. Check the SIZ pair status to determine if you can perform a task.
2. Create the SIZ pairs.
3. (Optional) Suspend SIZ pair creation.
4. (Optional) Suppress update copy operations during pair restoration.
5. Split the pairs. You can do the following:
   1. Split SIZ pairs.
   2. Split SIZ pairs in a CTG.
6. Resynchronize or restore the SIZ pairs.
7. (Optional) If you have performed a Quick Resync on the pair (DUPLEX status), suppress copy processing.
8. Delete the SIZ pairs, which ends the pair relationship between the pair volumes.

It might be a long time before a ShadowImage for Mainframe copy operation starts, because differential tables are initialized for the relevant pairs, one pair at a time, before the copy operation starts. Especially when the pairs use a large volume of data, initialization can be a very long process.

Related topics

- Managing consistency group IDs for ShadowImage for Mainframe using HDvM - SN on page 4-2
- ShadowImage for Mainframe pair creation on page 5-3
- Suspending ShadowImage for Mainframe pair creation on page 5-12
- Suppressing update copy operations during pair restoration on page 5-29
- ShadowImage for Mainframe pair splitting on page 5-17
- Splitting pairs in a consistency group on page 5-20
- Resynchronizing or restoring ShadowImage for Mainframe pairs on page 5-26
- Supressing update copy operations during pair restoration on page 5-29
- Deleting ShadowImage for Mainframe pairs on page 5-30
- For more information about pair status definitions and instructions for finding pair status, see Monitoring the ShadowImage for Mainframe system on page 6-2.
- For more information about the tasks that you can perform based on pair status, see Pair status and available pair tasks on page 6-7.

For more information about pair status definitions and instructions for finding pair status, see Monitoring the ShadowImage for Mainframe system on page 6-2.

For more information about the tasks that you can perform based on pair status, see Pair status and available pair tasks on page 6-7.
ShadowImage for Mainframe pair creation

When you create a pair, the VSP G1000 storage system performs an initial copy to copy data in the P-VOL to the S-VOL. You can create the SIZ pair and immediately split the pair so that you can access the S-VOL. You can also create a cascaded pairs.

Creating an SIZ pair causes the MP blade that is responsible for processing the P-VOL LDEV's I/O to also assume processing responsibility for the S-VOL LDEV's I/O operations.

Related topics

- Prerequisites for creating ShadowImage for Mainframe pairs on page 5-3
- Creating ShadowImage for Mainframe pairs on page 5-4
- Initial copy workflow on page 1-4
- Update copy workflow on page 1-5
- Create SI Pairs wizard on page C-26
- MP blades and pair deletion on page 5-32

Workflow for creating ShadowImage for Mainframe pairs

Use the following workflow to create an SIZ pair:

1. Select the volume that you want to duplicate. This becomes the primary volume (P-VOL).

   **Note:** In Device Manager - Storage Navigator (HDvM - SN), the source volume is called "P-VOL" and the destination volume is called "S-VOL."

   You cannot use volumes in use by SIZ as destination volumes.

2. Identify the volume that will contain the copy. This becomes the secondary volume (S-VOL).
   If you are setting up pair configurations for SIZ, specify the pair configuration settings (see Setting up pair configurations for ShadowImage for Mainframe on page 5-9).

3. Create the pair by associating the P-VOL and the S-VOLs (see Creating ShadowImage for Mainframe pairs on page 5-4).
   The VSP G1000 storage system starts the initial copy (see Initial copy workflow on page 1-4).

4. (Optional) Suppress copy processing (see Suppressing update copy operations on page 5-9).

Prerequisites for creating ShadowImage for Mainframe pairs

The following are prerequisites for creating SIZ pairs:

- The P-VOL and S-VOL are unpaired.
• If the P-VOL is already paired with other S-VOLs (DUPLEX status), you have determined that the status of existing S-VOLs is the status that is required to create the new pair.
For more information about S-VOL status, see Unaffected S-VOL status and pair tasks on page 6-8.
• If you are concerned with host I/O performance, make sure that the I/O load is light.
For more information about checking I/O performance, see the *Hitachi Command Suite User Guide* or the *Hitachi Virtual Storage Platform G1000 System Administrator Guide*.

**Creating ShadowImage for Mainframe pairs**

Creating an SIz pair copies the P-VOL to the S-VOL.

If your VSP G1000 has encryption DKAs, you can copy an encrypted volume to an unencrypted volume. There is no guard logic to enforce copying encrypted P-VOLs to only encrypted S-VOLs. Unless there is a specific reason for the data to become unencrypted, make sure you maintain the encryption by using only encrypted S-VOLs.

1. In Hitachi Command Suite:
   a. On the **Resources** tab, click **Storage Systems**, expand the storage system tree, right-click the target storage system, and then select **Local Replication**.
   
   In Device Manager - Storage Navigator:
   a. In the **Explorer** pane, click **Storage Systems**, expand the storage system tree, and then click **Replication > Local Replication**.

2. In the **Local Replication** window, select the **SI Pairs** tab.

3. On the **SI Pairs** tab, click **Create SI Pairs**.
4. In the **Select Pair Configuration** window, complete the following steps, and then click **Next**:

- For **Copy Type**, select **ShadowImage for Mainframe**.
- For **Emulation Type**, select the emulation type.
  For more information about the emulation types that are supported, see Pair volumes and emulation types on page 2-3.
- For **Number of Secondary Volumes**, type the number of S-VOLs according to the P-VOL with the highest number of S-VOLs that you want to set up.
  For more information about how to configure pairs for S1z, see Setting up pair configurations for ShadowImage for Mainframe on page 5-9.
- For **Initial MU Number**, select an initial MU number.
- For **Split Type**, select how you want to split the pair.
  Values:
  - **Non Split**: The pair is not split.
  - **Quick Split** (default): Splits the new pair, and then copies the data so that the S-VOL is immediately available for read and write I/O. The VSP G1000 storage system copies the remaining differential data to the S-VOL in the background.
- **Steady Split**: Copies the differential data to the S-VOL, and then splits the new pair.

- For **Copy Pace**, select the rate at which you want the VSP G1000 storage system to copy data.
  
  Values:
  
  - **Slower**: Improved host I/O performance but slower processing speed.
  
  - **Medium** (default): Average processing speed and host I/O performance.
  
  - **Faster**: Faster processing speed but slower host I/O performance.

**Note:** The pace you select affects processing speed and host I/O performance.

For more information about performance, see **Performance planning for ShadowImage for Mainframe** on page 2-8.

5. In the **Select Primary Volumes** window of the **Create SI Pairs** wizard, complete the following steps:

   a. In the **Available LDEVs** table, select the LDEV you want to be the P-VOL, and then click **Add**.

**Note:** You can select multiple LDEVs.

   The LDEV is moved to the **Selected LDEVs** table.

   b. Click **Next**.
6. In the **Select Secondary Volumes** window of the **Create SI Pairs** wizard, assign LDEVs as S-VOL to the specified P-VOL LDEV (or LDEVs). Complete the following steps, and then click **Finish**:

- If you specified one P-VOL, select a secondary LDEV from the **Available LDEVs** table, and click **Set**. Repeat this step to assign additional S-VOLs.
- If you specified multiple P-VOLs, select an LDEV from the **Available LDEVs** table, and then select a P-VOL LDEV from the **Selected Pairs** table, and click **Set**. Repeat this step as many times as needed to make all your pairings.

**Note:** If you do not select a P-VOL from the **Selected Pairs** table, the S-VOL you select and set is assigned to P-VOLs in the order they are listed in the table.

- (Optional) To sort the **Available LDEVs** and **Selected Pairs** tables according to the capacity, for **Capacity**, choose a capacity item by which to sort the tables.

  **The remaining number you have to select** refers to the P-VOLs that do not have an assigned S-VOL, as seen in the **Selected Pairs** table.

- (Optional) To change the split type and the rate at which data is copied, which applies to all new pairs, change the pair options (see **Changing ShadowImage for Mainframe pair options on page 5-14**).

- (Optional) To change MU numbers, do the following:
a. Select the line for the LDEV in the **Selected Pairs** table.
b. Click **Edit Mirror Units**.
c. In the **Edit Mirror Units** dialog box, specify the S-VOL's L1mirror unit number, and click **OK**.
   - (Optional) Change the pair options (see *Changing ShadowImage for Mainframe pair options on page 5-14*).
   - (Optional) To remove an unwanted LDEV or pair from the **Selected Pairs** table, select the line for the LDEV or pair you want to remove and click **Remove**.

For more information about removing rows to alter pair configuration, see *Setting up pair configurations for ShadowImage for Mainframe on page 5-9*.

7. In the **Confirm** window of the **Create SI Pairs** wizard, complete the following steps, and then click **Apply**:
   - For **Task Name**, type a name for the task.
     Default: `date-window name`
     Character and symbol limit: 32 alphanumeric except `/ : , ; * ? " < > |`
     Case sensitive: Yes
   - If you want to open the **Tasks** window, select the **Go to tasks window for status** check box.

The SIz pair is created and the status is PAIR.

**Related topics**
- [Pair splitting methods on page 5-16](#)
- [Changing ShadowImage for Mainframe pair options on page 5-14](#)
- [Viewing pair information for local replication on page 6-2](#)
Suppressing update copy operations

You can suppress update copy operations after you create pairs. Suppressing update copy operations keeps the P-VOL and S-VOL unsynchronized and reduces the effect on host I/O performance.

Prerequisite: The pair status is DUPLEX.

1. Enable the **Swap & Freeze** system option.

**Related topics**

- [Enabling system options on page 4-5](#)
- [System options that affect performance on page 4-7](#)

**Setting up pair configurations for ShadowImage for Mainframe**

1. Create pairs with different numbers of S-VOLs.
   
   Open the **Select Pair Configuration** window of the **Create Pairs** wizard.

   ![Create Pairs window](image)

   For **Number of Secondary Volumes**, select the number according to the pair with the highest number of S-VOLs, even when some pairs do not have many S-VOLs.

2. Remove the unwanted volumes.
Example 1
If you want to create a pair using one P-VOL and one S-VOL, set the **Number of Secondary Volumes** to 1.

If you want to use one P-VOL and three S-VOLs (the maximum), set the **Number of Secondary Volumes** to 3.

Example 2
If you want to add a new S-VOL to an existing pair, as illustrated in the following image, select 2 for **Number of Secondary Volumes**.

Example 3
If you want to create one pair with two S-VOLs, and another pair with one S-VOL at the same time, set the **Number of Secondary Volumes** at 2. In this case, the system operates as if you are creating two pairs, each having two S-VOLs.

Related topics
- Creating ShadowImage for Mainframe pairs on page 5-4

Creating pairs with different numbers of S-VOLs
Use this procedure to simultaneously create one pair with two S-VOLs, and another pair with one S-VOL.

1. Open the **Select Pair Configuration** window of the **Create Pairs** wizard.
2. For **Number of Secondary Volumes**, select 2, and then click **Next**.
   It is assumed that you are creating two pairs, each having two S-VOLs.

3. In the **Select Primary Volumes** window of the **Create SI Pairs** wizard, select the two LDEVs you want to use as the P-VOLs, and then click **Next**.
4. In the **Select Secondary Volumes** window of the **Create SI Pairs** wizard, complete the following steps, and then click **Next**:
   a. In the **Available LDEVs** table, select the three LDEVs you want to use as the S-VOLS for the pairs and click **Set**.
   b. In the **Selected Pairs** table, remove the unwanted LDEV.

**Suspending ShadowImage for Mainframe pair creation**

Suspending a pair creation copies the entire P-VOL to the S-VOL. The P-VOL continues accepting write I/O operations from the hosts, and host data written to the P-VOL after the suspend is issued will be marked as differential data.

The VSP G1000 storage system automatically suspends a pair in the following cases:
- It detects an error condition related to an update copy operation.
- It cannot keep the pair mirrored.

1. In Hitachi Command Suite:
   a. On the **Resources** tab, click **Storage Systems**, expand the storage system tree, right-click the target storage system, and then select **Local Replication**.

In Device Manager - Storage Navigator:
a. In the **Explorer** pane, click **Storage Systems**, expand the storage system tree, and then click **Replication > Local Replication**.

2. In the **Local Replication** window, select the **SI Pairs** tab.

3. On the **SI Pairs** tab, select the pair that you do not want to create and click **More Actions > Suspend Pairs**.

4. In the **Suspend Pairs** window, complete the following steps, and then click **Apply**:

   - For **Task Name**, type a name for the task.
     
     Default: *date-window name*
     
     Character and symbol limit: 32 alphanumeric except / : , ; * ? " < > |
     
     Case sensitive: Yes

   - If you want to open the **Tasks** window, select the **Go to tasks window for status** check box.

The pair is suspended (Suspend/SUSPER status).
Changing ShadowImage for Mainframe pair options

You can change the default setting for the Split Type and Copy Pace system options for all new pairs that you create.

1. Open the Select Secondary Volumes window of the Create SI Pairs wizard.

2. In the Select Secondary Volumes window of the Create SI Pairs wizard, click Change Options.
3. In the **Change Options** dialog box, complete the following steps, and then click **OK**:

- For **Split Type**, select a split type.
  - **Non Split** (default): The pair is not split.
  - **Quick Split**: The pair is split, and then the differential data is copied so that the S-VOL is immediately available for read and write I/O. Any remaining differential data is copied to the S-VOL in the background.
  - **Steady Split**: Differential data is copied, and then the pair is split.

- For **Copy Pace**, select the rate at which you want the VSP G1000 storage system to copy data.
  - **Slower**: Improved host I/O performance but slower processing speed.
  - **Medium** (default): Average processing speed and host I/O performance.
  - **Faster**: Faster processing speed but slower host I/O performance.

**Related topics**

- [Initial copy workflow on page 1-4](#)
- [Pair splitting methods on page 5-16](#)
- [Performance planning for ShadowImage for Mainframe on page 2-8](#)

**ShadowImage for Mainframe pair splitting**

Splitting an SIz pair suspends the pairing of the P-VOL and S-VOLs until a resync or delete operation is performed. Host updates to the P-VOL continue and are tracked as delta tracks in the bitmap. The S-VOL data is available and can be accessed.

Splitting an SIz pair ensures data consistency and that the data in the S-VOL at the time of the split is usable. The S-VOL contains a mirror image of the original volume at that point in time, and it is available for read/write access by secondary host applications.
The P-VOL for a split pair continues to be updated, but the S-VOL remains unchanged. The differential data that accrues while the pair is split is stored in the differential bitmaps. Changes to the P-VOL and S-VOLS are managed in these differential bitmaps. The differential data accrues until you resynchronize the pair, which copies the differential data to the S-VOL.

If you have assigned an SIZ P-VOL or S-VOL to a volume reserved for Volume Migration, splitting the volume cancels migration.

If you are splitting SIZ pairs with shared TCz or URz volumes, see the restrictions (see Requirements, restrictions, and guidelines for using consistency group pair-split with shared volumes on page 2-11).

If you are sharing SIZ S-VOLS with URz P-VOLS and the R-JNL has a timeout period that ends after the split time, the storage system might not detect the journal data. In this case, the SIZ split operation runs after the timeout period.

You set the timeout value according to your requirements.

Default: 6 hours

For more information about the timeout period, see the Hitachi Business Continuity Manager User Guide.

**Related topics**

- [Pair splitting methods on page 5-16](#)
- [Prerequisites for splitting ShadowImage for Mainframe pairs on page 5-17](#)
- [ShadowImage for Mainframe pair splitting on page 5-17](#)
- [Splitting pairs in a consistency group on page 5-20](#)
- [ShadowImage for Mainframe pair resynchronization on page 5-22](#)
- [Sharing volumes with Hitachi Volume Migration on page 3-6](#)
- [Split Pairs wizard on page C-38](#)

**Pair splitting methods**

You can use one of the following methods to split pairs:

- **Steady Split**: Copies the differential data to the S-VOL, and then splits the pair. The split S-VOL is identical to the P-VOL at the time of the split.

  **Note**: You cannot Steady Split pairs that are assigned to a consistency group (CTG).

- **Quick Split**: The pair is split prior to data copy so that the S-VOL is immediately available for read and write I/O. Any remaining differential data is copied to the S-VOL in the background.

  This method can only be used with BCM.
- **Consistency group pair-split**: Simultaneously split all of the pairs in a CTG. You can use this method with the CCI, Business Continuity Manager (BCM), or IBM PPRC.
  (For BCM) You can Quick Split and Steady Split.
  For more information about the methods you can use to split pairs using BCM, see the *Hitachi Business Continuity Manager User Guide*.
- **ATTIME Suspend**: Simultaneously splits all of the pairs in a CTG at a specific time. This method can only be used with BCM.

**Related topics**

- Splitting pairs using CSUSPEND and PPRCOPY SUSPEND on page A-8
- Appendix A, Performing ShadowImage for Mainframe pair tasks using IBM PPRC and ICKDSF commands on page A-1
- Splitting pairs in a consistency group on page 5-20
- Using ATTIME Suspend to split consistency group pairs on page 2-14

**Prerequisites for splitting ShadowImage for Mainframe pairs**

The following are the prerequisites for splitting SIZ pairs:

- The pair status must be one of the following:
  - If you are splitting an existing pair, the pair status must be DUPLEX or PENDING.
  - If you are creating and then immediately splitting a pair, the volumes are unpaired (SIMPLEX).
  - The status of all pairs in a CTG that you want to Quick Split must be DUPLEX.
- Check the I/O load to ensure that it will not affect host performance.
  For more information about checking I/O performance, see the *Hitachi Command Suite User Guide* or the *Hitachi Virtual Storage Platform G1000 System Administrator Guide*.

**Related topics**

- Maximizing host I/O performance on page 2-9

**Splitting pairs quickly**

1. Stop host access to the P-VOL.
2. Split the pair (see ShadowImage for Mainframe pair splitting on page 5-17).

**ShadowImage for Mainframe pair splitting**

1. In Hitachi Command Suite:
a. On the **Resources** tab, click **Storage Systems**, expand the storage system tree, right-click the target storage system, and then select **Local Replication**.

In Device Manager - Storage Navigator:

a. In the **Explorer** pane, click **Storage Systems**, expand the storage system tree, and then click **Replication > Local Replication**.

2. In the **Local Replication** window, select the **SI Pairs** tab.

3. On the **SI Pairs** tab, select the pair you want to split, and then click **Split Pairs**.

4. In the **Split Pairs** window of the **Split Pairs** wizard, complete the following steps, and then click **Finish**:
   - For **Split Type**, select the split type.
     - Values:
- **Quick Split** (default): Splits the new pair, and then copies the data so that the S-VOL is immediately available for read and write I/O. The VSP G1000 storage system copies the remaining differential data to the S-VOL in the background.

- **Steady Split**: Copies the differential data to the S-VOL, and then splits the new pair.

For more information about the methods you can use to split pairs, see *Pair splitting methods on page 5-16.*

- For **Copy Pace**, select the rate at which you want the VSP G1000 storage system to copy data.
  
  Values:
  - **Slower**: Improved host I/O performance but slower processing speed.
  - **Medium** (default): Average processing speed and host I/O performance.
  - **Faster**: Faster processing speed but slower host I/O performance.

**Note:** The pace you select affects processing speed and host I/O performance.

For more information about performance, see *Performance planning for ShadowImage for Mainframe on page 2-8.*

5. In the **Confirm** window of the **Split Pairs** wizard, complete the following steps, and then click **Apply**:

   - For **Task Name**, type a name for the task.
     
     Default: *date-window name*
     
     Character and symbol limit: 32 alphanumeric except / : , ; * ? “ < > |
     
     Case sensitive: Yes
If you want to open the **Tasks** window, select the **Go to tasks window for status** check box.

The SIz pair is split and the pair status changes from V-Split/SUSPVS or SP-Pend/TRANS to Split/SUSPOP. The snapshot data is consistent with the P-VOL data and is ready to use in SIz pair tasks.

**Related topics**

- Pair splitting methods on page 5-16
- Splitting pairs in a consistency group on page 5-20
- HDvM - SN pair status names and descriptions on page 6-4

### Splitting pairs in a consistency group

You can use consistency group (CTG) pair-split to simultaneously split all the SIz pairs in a CTG. If you use Business Continuity Manager (BCM), you can also use ATTIME Suspend to split the pairs at a specified time. If you use the CCI or IBM PPRC commands, you can simultaneously split the pairs in a CTG, but without time specification.

1. Define a CTG to which you want to assign the SIz pairs using BCM, IBM PPRC, or CCI.
2. Ensure that all the SIz pairs you want to be consistent are assigned to the same SIz CTG.
   
   For more information about assigning SIz pairs to CTGs, see Assigning pairs to consistency groups on page A-15.
3. Use the ATTIME Suspend feature and use BCM to register the split time for the SIz CTG to indicate the time when you want to mirror the P-VOL data in the S-VOL.
   
   For more information about registering split times, see the *Hitachi Business Continuity Manager User Guide*.

   The split type changes to **Quick Split** and the SIz pairs are simultaneously split at the scheduled time. The registered split time remains in the storage system after the SIz pairs have been split. You can register a new split time.

**Note:** When the scheduled operation is in a secondary storage system, discontinuing use of the secondary storage system or turning off its power cancels the pair-split operation.

For more information about registering a new split time for the SIz CTG, see Registering new split times for ShadowImage for Mainframe consistency groups on page 5-22.

4. If the pair-split operation fails, perform troubleshooting for CTG pair-split failures (see Consistency group pair-split failures on page 7-2).
5. If you have specified a split time and you are splitting pairs with shared volumes, complete the following steps:
   
   a. Delete the split time for the SIz pair that has an S-VOL related to the R-JNL.
b. Restore the pair.
   - If you are using HDvM - SN, see Workflow for restoring ShadowImage for Mainframe pairs on page 5-25.
   - If you are using the CCI, use the pairresync -restore command on the URz pair. For more information about this command, see the Command Control Interface User and Reference Guide.

6. Create the pairs.

Related topics

- Restrictions for consistency group pair-split on page 5-21
- Requirements, restrictions, and guidelines for using consistency group pair-split with shared volumes on page 2-11
- Pair splitting methods on page 5-16
- For more information about splitting SIz pairs in a CTG using IBM PPRC, see Splitting pairs using CSUSPEND and PPRCOPY SUSPEND on page A-8.

Restrictions for consistency group pair-split

Consistency group (CTG) pair-split has the following restrictions:

- To perform a CTG pair-split on SIz pairs, the pairs must have been created using BCM, IBM PPRC, or CCI. You cannot use CTG pair-split if the pairs were created using the HDvM - SN.
- To perform a CTG pair-split more than once, the status of all pairs in the CTG must have changed to the status specified by the BCM YKENAIT command.
  For more information about this command, see the Hitachi Business Continuity Manager User Guide.

Related topics

- Requirements, restrictions, and guidelines for using consistency group pair-split with shared volumes on page 2-11

Maintaining consistent ShadowImage for Mainframe secondary volume backups

If you are sharing SIz P-VOLs with TCz or URz S-VOLs, use the following procedure to maintain a consistent backup of SIz S-VOLs:

1. Assign URz pairs to the same journal group.
   For more information about assigning SIz pairs to journals, see the Hitachi Universal Replicator for Mainframe User Guide.
2. Register the journal group data volumes in an SIz CTG that is not already being used.
Registering new split times for ShadowImage for Mainframe consistency groups

If you have registered a split time for the SIz CTG, you must delete the split time before you can add, resume, or suspend pairs from BCM. To prevent the TCz command to resume split pairs from being rejected, pair the SIz volumes (DUPLEX status) before resuming the pairs that you have split (Split/SUSPOP status).

Complete the following steps to register a new split time for the SIz CTG:
1. Delete the current registered split time.
2. Register the new split time.

For more information about registering split times, see the *Hitachi Business Continuity Manager User Guide*.

ShadowImage for Mainframe pair resynchronization

You can resynchronize split (Split/SUSPOP status) or suspended (Suspend/SUSPER status) pairs. Resynchronization changes the status of the split volume pairs to DUPLEX. Resynchronizing a split pair copies the P-VOL’s differential data to the S-VOL and again pairs the S-VOL with the P-VOL. Resynchronizing a suspended pair copies the entire P-VOL to the S-VOL and takes the same amount of time as the initial copy operation.

**Note:** Resynchronizing a pair does not ensure data consistency. Data in the two volumes is consistent only if the following conditions exist:
- The P-VOL is offline.
- The pair is split (the S-VOL status is Split/SUSPOP).

For more information about pair status, see *HDvM - SN pair status names and descriptions on page 6-4*.

**Note:** If you perform a Quick Restore for a pair consisting of an encrypted volume and an unencrypted volume, the encryption statuses of the volumes are reversed.

Related topics
- [Types of pair resynchronization on page 5-23](#)
- [Workflow for resynchronizing ShadowImage for Mainframe pairs on page 5-24](#)
- [Resynchronizing or restoring ShadowImage for Mainframe pairs on page 5-26](#)
- [Volume pairs on page 1-4](#)
- [Initial and update copy operations on page 1-4](#)
Types of pair resynchronization

You can forward or reverse resynchronize pairs. A forward resynchronization resynchronizes from the P-VOL to the S-VOL. A reverse resynchronization restores pairs by resynchronizing from the S-VOL to the P-VOL.

Related topics

- Forward resynchronization on page 5-23
- Reverse resynchronization on page 5-23

Forward resynchronization

You can use one of the following methods to forward resynchronize pairs:

- **Normal Copy (Primary > Secondary)**: A full forward resynchronization from the P-VOL to the S-VOL. During a Normal Copy, only the P-VOL is accessible to hosts for read/write operations.

- **Quick Resync (Primary > Secondary)**: A forward resynchronization from the P-VOL to the S-VOL where data is not copied or resynchronized. The volumes are paired (DUPLEX status). The update copy operation copies the differential data to the S-VOL.

  During a Quick Resync, the P-VOL is accessible to hosts for read/write operations. The S-VOL is inaccessible to all hosts. Quick Resync does not ensure data consistency, even if there is no host I/O during the resynchronization.

Related topics

- ShadowImage for Mainframe pair splitting on page 5-15

Reverse resynchronization

You can use one of the following methods to restore pairs:

- **Reverse Copy (Secondary > Primary)**: A full restoration from the S-VOL to the P-VOL. The differential data is updated to the P-VOL.

  During a Reverse Copy you can delete or suspend the pairs, but you cannot create, split, or resynchronize pairs that share the same P-VOL. The P-VOL is inaccessible to hosts.

  If you are sharing a TCz or URz volume with an SIz volume, you cannot create a TCz or URz pair with the shared volume.

  You cannot use Reverse Copy with the following pairs:

  - A P-VOL shared with an FCv2/FCSE volume.
  - An SIz S-VOL shared with a Compatible XRC or Concurrent Copy source volume.

  For more information about sharing volumes with Compatible XRC or Concurrent Copy, see Sharing volumes with Compatible XRC on page 3-3 or Sharing volumes with Concurrent Copy on page 3-3, respectively.
• **Quick Restore (Secondary > Primary):** A partial restoration that does not copy the data but does the following:
  
  - Swaps the P-VOL and S-VOLs including their RAID levels, HDD types, and Cache Residency Manager settings.
  - Pairs the volumes (DUPLEX status).
  - Exchanges the P-VOL and S-VOL encryption statuses if an SIz pair consists of encrypted volumes and a nonencrypted volume.

  **Caution:** To prevent the two volumes from being swapped, the P-VOL and S-VOLs must be assigned to the same cache partition (CLPR).

  During a Quick Restore, the P-VOL and S-VOL are inaccessible. After a Quick Restore, the P-VOL is accessible.

  **Best Practice:** If you have a small amount of differential data, use Reverse Copy instead of Quick Restore, since Reverse Copy completes faster.

  If you use volumes for which you set VRM access attributes, Quick Restore does not exchange the P-VOL and S-VOL access attributes.

  For more information about using volumes for which you set VRM access attributes, see sharing volumes and Volume Retention Manager access attributes on page 3-6.

  **Note:** HDvM - SN can show outdated information after a Quick Restore. To show the latest information, click Refresh View.

  **Note:** To minimize the time it takes to Quick Restore an SIz pair, do not perform LDEV maintenance while the Quick Restore is processing.

  You can delete or suspend the pair while you are restoring the pair using Quick Restore but you cannot do the following:

  - Create, split, or resynchronize pairs that share the same P-VOL.
  - Create a TCz or URz pair with a volume shared by SIz.

  You cannot Quick Restore the following pairs:

  - A pair volume for which you are formatting either internal volume using Quick Format.

  For more information about formatting volumes using Quick Format, see the Hitachi Virtual Storage Platform G1000 Provisioning Guide for Mainframe Systems.

  - A pair in which one volume is a DP-VOL, though not both.
  - An SIz pair that has a shared P-VOL with an FCv2/HCFCS volume.

**Workflow for resynchronizing ShadowImage for Mainframe pairs**

Use the following workflow to resynchronize SIz pairs:

1. Place the S-VOL offline.
2. Split or suspend the pair.

⚠️ **Note:** The pair can also be in the process of being Quick Split (V-Split/SUSPVS status).

3. (Optional) If you are concerned about host I/O performance, check to make sure the I/O load is light.

   For more information about checking I/O performance, see the *Hitachi Command Suite User Guide* or the *Hitachi Virtual Storage Platform G1000 System Administrator Guide*.

4. Resynchronize the pair (see [Resynchronizing or restoring ShadowImage for Mainframe pairs on page 5-26](#)).

**Related topics**

- [System options that affect performance on page 4-7](#)
- [Maximizing host I/O performance on page 2-9](#)
- [Forward resynchronization on page 5-23](#)
- [Pair splitting methods on page 5-16](#)

### Workflow for restoring ShadowImage for Mainframe pairs

Use the following workflow to restore SIz pairs:

1. Place the P-VOL offline.
2. Split or suspend the pair.

   If you plan to restore pairs using Reverse Copy, split or suspend the pairs sharing the same P-VOL.

   If the SIz pair you plan to restore shares a volume with TCz or URz, suspend the TCz or URz pair.

   For more information about splitting or suspending pairs, see [ShadowImage for Mainframe pair splitting on page 5-17](#) or [Suspending ShadowImage for Mainframe pair creation on page 5-12](#), respectively.

3. Restore the pair (see [Resynchronizing or restoring ShadowImage for Mainframe pairs on page 5-26](#)).

**Related topics**

- [System options that affect performance on page 4-7](#)
- [Reverse resynchronization on page 5-23](#)
- [Pair splitting methods on page 5-16](#)
- For more information about sharing SIz volumes with TCz or URz, see [Sharing volumes with TrueCopy for Mainframe on page 3-4](#) or [Sharing volumes with Universal Replicator for Mainframe on page 3-5](#), respectively.
Resynchronizing or restoring ShadowImage for Mainframe pairs

Use this task to resynchronize or restore split or suspended pairs.

Resynchronizing split pairs typically takes less time than resynchronizing suspended pairs (Suspend/SUSPER status). Split pairs typically contain much less accumulated differential data than the total amount of data in the P-VOL.

Prerequisites:
- After performing a Quick Split, wait 20 seconds before a Normal Copy or Quick Resync resynchronization, otherwise the operation might end abnormally.

If you are using the CCI to run commands, run the following command to resynchronize split pairs (Split/SUSPOP status):

```
pairresync
```

1. In Hitachi Command Suite:
   a. On the Resources tab, click Storage Systems, expand the storage system tree, right-click the target storage system, and then select Local Replication.

In Device Manager - Storage Navigator:
   a. In the Explorer pane, click Storage Systems, expand the storage system tree, and then click Replication > Local Replication.

2. In the Local Replication window, select the SI Pairs tab.

3. On the SI Pairs tab, select the pair you want to resynchronize, and then click Resync Pairs.
4. In the **Resync Pairs** window of the **Resync Pairs** wizard, complete the following steps, and then click **Finish**:

- **Resync Type**: select the type of resynchronization you want to perform.
  
  Values:
  - **Normal Copy (Primary > Secondary)** (default): A full forward resynchronization.
  - **Quick Resync (Primary > Secondary)**: A partial forward resynchronization.
  - **Reverse Copy (Secondary > Primary)**: A full restoration of the P-VOL from the S-VOL.
  - **Quick Restore (Secondary > Primary)**: A partial restoration of the P-VOL from the S-VOL.
  
  For more information about the types of SIZ pair resynchronization you can use, including complete descriptions of the types, see [Types of pair resynchronization on page 5-23](#).

- **Copy Pace**: select the rate at which you want the VSP G1000 storage system to copy data.
  
  Values:
  - **Slower**: Improved host I/O performance but slower processing speed.
  - **Medium** (default): Average processing speed and host I/O performance.
  - **Faster**: Faster processing speed but slower host I/O performance.
Note: The pace you select affects processing speed and host I/O performance.
For more information about performance, see Performance planning for ShadowImage for Mainframe on page 2-8.

5. In the Confirm window of the Resync Pairs wizard, complete the following steps, and then click Apply:
   - For Task Name, type a name for the task.
     Default: date-window name
     Character and symbol limit: 32 alphanumeric except / : , ; * ? " < > |
     Case sensitive: Yes
   - If you want to open the Tasks window, select the Go to tasks window for status check box.

The pairs are resynchronized and the volumes are paired (DUPLEX status).

Note: If you are reverse resynchronizing and the task ends abnormally, the pair is suspended (Suspend/SUSPER status).
For more information about the Suspend/SUSPER status, see HDvM - SN pair status names and descriptions on page 6-4.

Related topics
- Resync Pairs wizard on page C-42
- Types of pair resynchronization on page 5-23
- System options that affect performance on page 4-7
Suppressing update copy operations during pair restoration

You can suppress update copy operations when you restore pairs using Quick Restore. Suppressing update copy operations keeps the P-VOL and S-VOL unsynchronized and reduces the effect on host I/O performance.

Prerequisite: The pair status is DUPLEX.

1. Enable the **Swap & Freeze** system option.

**Related topics**
- [Enabling system options on page 4-5](#)
- [System options that affect performance on page 4-7](#)

Setting the RAID level

Complete the following steps to return to the original RAID level for the S-VOL and P-VOL after a Quick Restore when the RAID levels of the volumes are different.

1. Split the pair.
2. Restore the pair using Quick Restore.

**Related topics**
- [ShadowImage for Mainframe pair splitting on page 5-17](#)
- [Resynchronizing or restoring ShadowImage for Mainframe pairs on page 5-26](#)

ShadowImage for Mainframe pair deletion

Delete the SIz pairs that you no longer need. Deleting a pair unpairs the P-VOL and S-VOL but does not delete their data. You can use the volumes of deleted pairs in another pair.

If you are sharing SIz S-VOLs with URz P-VOLs and you plan to perform a CTG pair-split, register the split time for an SIz CTG before you delete the pair. The registered split time is deleted when you delete the following pairs:

- The SIz pairs that are assigned to the SIz CTG.
- The URz pairs that are assigned to the URz R-JNL, which is the journal volume on the secondary storage system associated to the S-VOL.

**Related topics**
- [Prerequisites for deleting ShadowImage for Mainframe pairs on page 5-30](#)
- [Deleting ShadowImage for Mainframe pairs on page 5-30](#)
Prerequisites for deleting ShadowImage for Mainframe pairs

The pair must be unpaired and not in the process of being deleted and the volumes are not in the process of being unpaired (Deleting/TRANS status).

Workflow for deleting ShadowImage for Mainframe pairs

Use the following workflow to delete an SIz pair:

1. Ensure that all of the write I/O operations to the P-VOL have completed and that all secondary host applications that access the P-VOL have stopped.
2. Set the P-VOL offline.
3. Verify that the SIz pair is unpaired and not in the process of being unpaired (Deleting/TRANS status) using Business Continuity Manager (BCM), IBM PPRC, HDvM - SN, or CCI.
4. Split the SIz pair.
5. Delete the SIz pair.

Related topics

- ShadowImage for Mainframe pair splitting on page 5-17
- Deleting ShadowImage for Mainframe pairs on page 5-30

Deleting ShadowImage for Mainframe pairs

1. In Hitachi Command Suite:
   a. On the Resources tab, click Storage Systems, expand the storage system tree, right-click the target storage system, and then select Local Replication.
   In Device Manager - Storage Navigator:
   a. In the Explorer pane, click Storage Systems, expand the storage system tree, and then click Replication > Local Replication.
2. In the Local Replication window, select the SI Pairs tab.
3. On the SI Pairs tab, select the pair you want to delete and click More Actions > Delete Pairs.

4. In the Delete Pairs window, complete the following steps, and then click Apply:
   - For Task Name, type a name for the task.
     Default: date-window name
     Character and symbol limit: 32 alphanumeric except / : , ; * ? “ < > |
     Case sensitive: Yes
   - If you want to open the Tasks window, select the Go to tasks window for status check box.

**Note:** To prevent the task from ending abnormally, wait until the P-VOL and S-VOL are unpaired (about 10 seconds) before completing another pair task, such as creating pairs, or event waiting.

The pair is deleted and the P-VOL and S-VOL are unpaired.
Related topics

- Prerequisites for deleting ShadowImage for Mainframe pairs on page 5-30
- Delete Pairs window on page C-48
- Viewing pair information for local replication on page 6-2

MP blades and pair deletion

Creating a pair allocates the MP blade assigned to the P-VOL's I/O operations to also be allocated to the I/O operations for the S-VOL. Deleting the pairs returns the allocation of processor responsibility to the state it was before the pairs were created.
Monitoring and maintaining ShadowImage for Mainframe

This chapter provides information and instructions to monitor and maintain the SIz system.

- Monitoring the ShadowImage for Mainframe system
- Maintaining the ShadowImage for Mainframe system
Monitoring the ShadowImage for Mainframe system

Monitor the S1z system on an ongoing basis to keep track of pairs and volumes and their current and past conditions.

You can monitor the system in the following ways:

- **Viewing pair information for local replication on page 6-2.**
- **Monitoring ShadowImage for Mainframe pair activity and status on page 6-3.** This includes the status definitions and the pair tasks that you can complete based on the status.
- **Monitoring ShadowImage for Mainframe pair and volume details on page 6-9.**
- **Monitoring ShadowImage for Mainframe pair synchronization rates on page 6-10.**
- **Monitoring consistency groups on page 6-12.**
- **Monitoring pair task history on page 6-14.**

### Viewing pair information for local replication

You can view pair information for local replication in the Replication window and in the summary section of the Local Replication window. These windows show information such as the number of pairs in the storage system.

**Note:** If the information in the summary section is not up to date, the system has not completed processing the information. Click the refresh icon to refresh the information in the window.

1. In Hitachi Command Suite:
   a. On the Resources tab, click Storage Systems, expand the storage system tree, right-click the target storage system, and then select Replication Dashboard.

In Device Manager - Storage Navigator:

a. In the Explorer pane, click Storage Systems, expand the storage system tree, and then click Replication.
2. The Replica LDEVs tab in the Replication window shows a list of LDEVs. From this window, you can perform the following tasks:
   - Click the LDEV ID for a specific replica LDEV and open the LDEV Properties window.
   - View information for a list of replica LDEVs for the selected LDEV.

Monitoring ShadowImage for Mainframe pair activity and status

You can monitor the activity and status of S1z pairs using Business Continuity Manager (BCM), IBM PPRC, z/OS console messages, and HDvM - SN. This section explains how to use HDvM - SN to monitor S1z pairs.

The status of pairs displayed by HDvM - SN changes as the pairs status change in the storage system and the displayed state is refreshed by HDvM - SN. If you want the HDvM - SN displayed information to refresh sooner than it regularly does, click the refresh icon.

Note: Unpaired P-VOLs and S-VOLs are not shown in HDvM - SN.

1. In Hitachi Command Suite:
   a. On the Resources tab, click Storage Systems, expand the storage system tree, right-click the target storage system, and then select Local Replication.
   In Device Manager - Storage Navigator:
a. In the **Explorer** pane, click **Storage Systems**, expand the storage system tree, and then click **Replication > Local Replication**.

2. In the **Local Replication** window, select the **SI Pairs** tab.

3. In the summary section of the **Local Replication** page, view license information.
   
   If the information in the window is not up to date, click the refresh icon to refresh the information in the window.

4. On the **SI Pairs** tab, locate the pair whose status you want to review, and then check the **Status** column.
   
   HDvM - SN and the BCM pair status names are shown in the **Status** column in the format of **HDvM - SN status/Business Continuity Manager status**, unless the names are the same. If they are the same, only the HDvM - SN status is shown.
   
   For more information about the items on this tab, see **Monitoring ShadowImage for Mainframe pair and volume details on page 6-9**.

5. (Optional) Click **More Actions > View Pair Properties** to view more details for a selected pair.

**Related topics**

- **HDvM - SN pair status names and descriptions on page 6-4**
- **Command Control Interface pair status names on page 6-7**
- **Pair status and available pair tasks on page 6-7**
- **Unaffected S-VOL status and pair tasks on page 6-8**
- **Local Replication window on page C-5**
- **Monitoring ShadowImage for Mainframe pair and volume details on page 6-9**

**HDvM - SN pair status names and descriptions**

**Note:** Running the **DEVSERVE** command on a read/write disabled volume returns the INTERVENTION REQUIRED message. To return a normal value, create the pairs with online volumes, and then issue the command.
The following table lists HDvM - SN pair status names and their descriptions, including the level of host, P-VOL, and S-VOL access.

<table>
<thead>
<tr>
<th>Pair status</th>
<th>Description</th>
<th>Host status</th>
<th>P-VOL access</th>
<th>S-VOL access</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIMPLEX</td>
<td>The volume is not part of a pair.</td>
<td>P-VOL = SIMPLEX S-VOL = SIMPLEX</td>
<td>Read/write enabled</td>
<td>Read/write enabled</td>
</tr>
<tr>
<td>Deleting/TRANS</td>
<td>The pair is being deleted and the volumes are being unpaired.</td>
<td>P-VOL = SIMPLEX S-VOL = SIMPLEX</td>
<td>Read/write enabled³</td>
<td>Read/write disabled</td>
</tr>
<tr>
<td>PENDING ²</td>
<td>The pair is being created and the initial copy is in progress. The VSP G1000 storage system continues to accept read/write to the P-VOL but stops write operations to the S-VOL. The VSP G1000 storage system does not perform update copy operations.</td>
<td>P-VOL = &quot;PPRIMARY&quot; S-VOL = &quot;PSECONDRY&quot;</td>
<td>Read/write enabled</td>
<td>Read/write disabled</td>
</tr>
<tr>
<td>DUPLEX</td>
<td>The initial copy operation has completed and the volumes are paired. The VSP G1000 storage system starts the update copy as needed. Data consistency is not ensured in this status.</td>
<td>P-VOL = &quot;PPRIMARY&quot; S-VOL = &quot;PSECONDRY&quot;</td>
<td>Read/write enabled</td>
<td>Read/write disabled</td>
</tr>
<tr>
<td>SP-Pend/TRANS ²</td>
<td>The pair is in the process of being Steady Split. Differential data is copied to the S-VOL, and then the pair is split. For more information about the Steady Split method of splitting pairs, see Pair splitting methods on page 5-16.</td>
<td>P-VOL = &quot;PPRIMARY&quot; S-VOL = &quot;PSECONDRY&quot;</td>
<td>Read/write enabled</td>
<td>Read/write disabled</td>
</tr>
<tr>
<td>V-Split/SUSPVS ²</td>
<td>The pair is in the process of being Quick Split. The differential data is copied to the S-VOL only in the background. For more information about the Quick Split method of splitting pairs, see Pair splitting methods on page 5-16.</td>
<td>P-VOL = &quot;PPRIMARY&quot; S-VOL = &quot;PSECONDRY&quot;</td>
<td>Read/write enabled</td>
<td>Read/write enabled</td>
</tr>
<tr>
<td>Split/SUSPOP</td>
<td>The pair has been split. The VSP G1000 storage system stops performing update copy operations from the P-VOL to the S-VOL. Write I/Os are accepted for S-VOL. The VSP G1000 storage system keeps track of updates to split P-VOL and S-VOL so that you can Quick Resync.</td>
<td>P-VOL = &quot;PPRIMARY&quot; S-VOL = Unpaired</td>
<td>Read/write enabled</td>
<td>Read/write enabled</td>
</tr>
<tr>
<td>Pair status</td>
<td>Description</td>
<td>Host status</td>
<td>P-VOL access</td>
<td>S-VOL access</td>
</tr>
<tr>
<td>----------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>------------------------</td>
<td>-----------------</td>
<td>-----------------</td>
</tr>
<tr>
<td>Resync/PENDING</td>
<td>The <code>pairresync</code> CCI command is in progress.¹ The VSP G1000 storage system does not accept write I/Os for S-VOL and does not perform update copy operations. For more information about resynchronizing pairs, see ShadowImage for Mainframe pair resynchronization on page 5-22.</td>
<td>P-VOL = &quot;PPRI-PNDG&quot;</td>
<td>Read/write enabled</td>
<td>Read/write disabled</td>
</tr>
<tr>
<td>Resync-R/REVRSY</td>
<td>The <code>reverse pairresync</code> CCI command is in progress.¹ The VSP G1000 storage system copies only S-VOL differential data to the P-VOL. The VSP G1000 storage system does not perform update copy operations during the Reverse Copy or Quick Restore. Write I/O operations to the S-VOL are rejected.</td>
<td>P-VOL = &quot;PPRI-PNDG&quot;</td>
<td>Read/write disabled</td>
<td>Read/write disabled</td>
</tr>
</tbody>
</table>
| Suspend/SUSPER   | The VSP G1000 storage system does the following:  
  • Suspends the pair.  
  • Continues accepting read and write I/Os to the P-VOL.  
  • Stops update copy operations to the S-VOL.  
  • Marks the P-VOL as differential data.  
  Resynchronizing a pair copies the P-VOL to the S-VOL.  
  The status of other pairs sharing the same P-VOL does not change.  
  Data consistency is not ensured in this status. | P-VOL = "PPRI-PNDG"    | Read/write enabled | Read/write disabled |

Notes:
1. The starting time of the copy depends on the numbers of pairs and the VSP G1000 storage system environment.
2. The pair status is displayed in the format of `screen pair status/Business Continuity Manager pair status`.
3. If the status was Read/write enabled before the transition to Deleting/TRANS, it is Read/write enabled.
Related topics
- Command Control Interface pair status names on page 6-7

Command Control Interface pair status names

The BCM pair status names can match HDvM - SN pair status names.

The following table lists the HDvM - SN pair status names and the corresponding pair status name in BCM. SIMPLEX status will not be displayed on the Local Replication window SI Pairs tab because volumes in SIMPLEX state are not listed.

<table>
<thead>
<tr>
<th>HDvM - SN pair status name</th>
<th>BCM pair status name</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIMPLEX</td>
<td>SIMPLEX</td>
</tr>
<tr>
<td>PENDING COPY</td>
<td>COPY</td>
</tr>
<tr>
<td>DUPLEX</td>
<td>DUPLEX</td>
</tr>
<tr>
<td>SP-Pend/TRANS</td>
<td>COPY</td>
</tr>
<tr>
<td>V-Split/SUSPVS</td>
<td>Split/SUSPOP</td>
</tr>
<tr>
<td>Split/SUSPOP</td>
<td>(P-VOL) Split/SUSPOP</td>
</tr>
<tr>
<td></td>
<td>(S-VOL) SSUS</td>
</tr>
<tr>
<td>Resync/PENDING</td>
<td>COPY</td>
</tr>
<tr>
<td>Resync-R/REVRSY</td>
<td>RCPY</td>
</tr>
<tr>
<td>Suspend/SUSPER</td>
<td>Suspend/SUSPER</td>
</tr>
</tbody>
</table>

Related topics
- HDvM - SN pair status names and descriptions on page 6-4

Pair status and available pair tasks

A pair's status determines the actions you can perform.

The following table lists the required pair status for each task.

<table>
<thead>
<tr>
<th>Pair task</th>
<th>SIMPLEX</th>
<th>PENDING</th>
<th>DUPLEX</th>
<th>SP-Pend/TRANS</th>
<th>V-Split/SUSPVS</th>
<th>Split/SUSPOP</th>
<th>Resync/PENDING</th>
<th>Resync-R/REVRSY</th>
<th>Suspend/SUSPER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Create pairs</td>
<td>YES</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>Split pairs</td>
<td>NO</td>
<td>YES</td>
<td>YES</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>Suspend pairs</td>
<td>NO</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>Resynchronize pairs</td>
<td>NO</td>
<td>NO</td>
<td>NO^1,2</td>
<td>NO</td>
<td>YES</td>
<td>YES</td>
<td>NO^1,2,3</td>
<td>NO</td>
<td>YES</td>
</tr>
<tr>
<td>Pair task</td>
<td>SIMPLE</td>
<td>PENDING</td>
<td>DUPLEX</td>
<td>SP-Pend/TRANS</td>
<td>V-Split/SUSPVS</td>
<td>Split/SUSPO</td>
<td>Resync/PENDING</td>
<td>Resync-R/REVRSY</td>
<td>Suspend/SUSPER</td>
</tr>
<tr>
<td>-----------</td>
<td>--------</td>
<td>---------</td>
<td>--------</td>
<td>---------------</td>
<td>---------------</td>
<td>-------------</td>
<td>----------------</td>
<td>----------------</td>
<td>---------------</td>
</tr>
<tr>
<td>(Normal Copy)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resynchronize pairs (Reverse Copy)</td>
<td>NO</td>
<td>NO</td>
<td>NO²</td>
<td>NO</td>
<td>NO</td>
<td>YES</td>
<td>NO</td>
<td>NO²</td>
<td>NO</td>
</tr>
<tr>
<td>Delete pairs</td>
<td>NO</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>NO</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
</tr>
</tbody>
</table>

1. You can run the BCM command but the pair is not resynchronized and the pair status does not change.
2. You can run the PPRC TSO command but the pair is not resynchronized and the pair status does not change.

**Note:** To prevent the command from ending abnormally with CC = 8, do not specify YES in the MSGREQ parameter.

To prevent the command from ending abnormally with CC = 12, do not run the ICKDSF PPRCOPY command.

3. To prevent the PPRC TSO command from ending abnormally with CC = 8, do not Steady Split a suspended pair (Suspend/SUSPER status).

**Related topics**

- [Unaffected S-VOL status and pair tasks on page 6-8](#)

**Unaffected S-VOL status and pair tasks**

The SIz pair tasks you can perform depend on the pair's status and the status of unaffected S-VOLs.

The following table lists the pair tasks you can perform based on the status of S-VOLs related to the P-VOL in other pairs.

<table>
<thead>
<tr>
<th>Status of unaffected S-VOLs</th>
<th>Create pairs</th>
<th>Split pairs</th>
<th>Resynchronize pairs (Normal Copy)</th>
<th>Resynchronize pairs (Reverse Copy)</th>
<th>Suspend pairs</th>
<th>Delete pairs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deleting/TRANS</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>PENDING</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>NO</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>DUPLEX</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>NO</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>SP-Pend/TRANS</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>NO</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>V-Split/SUSPVS</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>NO</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Split/SUSPOP</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
</tr>
</tbody>
</table>
### Status of unaffected S-VOLs

<table>
<thead>
<tr>
<th>Status of unaffected S-VOLs</th>
<th>Create pairs</th>
<th>Split pairs</th>
<th>Resynchronize pairs (Normal Copy)</th>
<th>Resynchronize pairs (Reverse Copy)</th>
<th>Suspend pairs</th>
<th>Delete pairs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resync/PENDING</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>NO</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Resync-R/REVRSY</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Suspend/SUSPER</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
</tr>
</tbody>
</table>

### Monitoring ShadowImage for Mainframe pair and volume details

You can review the data related to pairs and their volumes, including volume capacity, pair status, P-VOL and S-VOL, and identifiers.

1. In Hitachi Command Suite:
   a. On the Resources tab, click Storage Systems, expand the storage system tree, right-click the target storage system, and then select Local Replication.
   In Device Manager - Storage Navigator:
   a. In the Explorer pane, click Storage Systems, expand the storage system tree, and then click Replication > Local Replication.

2. In the Local Replication window, select the SI Pairs tab.

3. On the SI Pairs tab, select the pair, and then click More Actions > View Pair Properties.
4. In the View Pair Properties window, view the pair properties.
Related topics

- Monitoring ShadowImage for Mainframe pair activity and status on page 6-3
- View Pair Properties window on page C-14
- Local Replication window on page C-5

Monitoring ShadowImage for Mainframe pair synchronization rates

You can view the percentage of synchronized data between the P-VOL and S-VOL from the View Pair Synchronization Rate window.

1. In Hitachi Command Suite:
   a. On the Resources tab, click Storage Systems, expand the storage system tree, right-click the target storage system, and then select Local Replication.

In Device Manager - Storage Navigator:
In the Explorer pane, click Storage Systems, expand the storage system tree, and then click Replication > Local Replication.

2. In the Local Replication window, select the SI Pairs tab.

3. On the SI Pairs tab, select the pair, and then click More Actions > View Pair Synchronization Rate.

4. On the View Pair Synchronization Rate window, click Refresh to show the latest synchronization rate.

Note: If you close the window, information in the Local Replication window might not be up to date. Click the refresh icon to refresh the information in the window.

Related topics
• View Pair Synchronization Rate window on page C-18
Monitoring consistency groups

You can view the number of consistency groups (CTGs) and the details and individual properties for CTGs from the following section and tabs in the **Local Replication** window:

- The summary section. Use this section to view the number of CTGs and the number of pairs.
- The **SI Pairs** tab. Use this tab to:
  - View a list of SIz pairs.
  - Monitor pair activity and status (see Monitoring ShadowImage for Mainframe pair activity and status on page 6-3).
  - Monitor pair synchronization rates (see Monitoring ShadowImage for Mainframe pair synchronization rates on page 6-10).
- The **TI Primary Volumes** tab. Use this tab to view a list of HTI pairs (see Viewing a list of Thin Image pairs on page 6-13).
- The **Consistency Groups** tab. Use this tab to:
  - View a list of CTGs.
  - View CTG properties (see Viewing consistency group properties on page 6-12).

The following figure shows the **Local Replication** window displaying the summary section and the **SI Pairs** tab.

**Related topics**
- Local Replication window on page C-5

**Viewing consistency group properties**

1. In Hitachi Command Suite:
   a. On the **Resources** tab, click **Storage Systems**, expand the storage system tree, right-click the target storage system, and then select **Local Replication**.

In Device Manager - Storage Navigator:
a. In the Explorer pane, click Storage Systems, expand the storage system tree, and then click Replication > Local Replication.

2. In the Local Replication window, select the Consistency Groups tab.

3. On the Consistency Groups tab, click the CTG ID for the CTG you want to view properties.

4. In the Consistency Group Properties window, view the CTG's properties, such as group information for local replication.

**Viewing a list of Thin Image pairs**

You can view a list of HTI pairs on the TI Primary Volumes tab in the Local Replication window.
1. In Hitachi Command Suite:
   a. On the Resources tab, click Storage Systems, expand the storage system tree, right-click the target storage system, and then select Local Replication.

   In Device Manager - Storage Navigator:
   a. In the Explorer pane, click Storage Systems, expand the storage system tree, and then click Replication > Local Replication.

2. In the Local Replication window, select the TI Primary Volumes tab.

3. On the TI Primary Volumes tab, view the list of HTI pairs.

Related topics
- Local Replication window on page C-5

Monitoring pair task history

You can review a history of the tasks you have completed on a pair from the History window. This window shows up to 16,384 pair tasks. The VSP G1000 storage system stores a history of up to 1,024,000 of the last tasks.

1. In Hitachi Command Suite:
   a. On the Resources tab, click Storage Systems, expand the storage system tree, right-click the target storage system, and then select Replication Dashboard.

   In Device Manager - Storage Navigator:
   a. In the Explorer pane, click Storage Systems, expand the storage system tree, and then click Replication.
2. In the Replication window, click View History, then click Local Replication.
3. In the **History** window, for **Copy Type**, select **SIz**.

The **Description** column in the **History** table displays the pair tasks that you have completed.

The following table describes the codes.

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>4710</td>
<td>DUPLEX START</td>
<td>The initial copy has started.</td>
</tr>
<tr>
<td>4720</td>
<td>DUPLEX END</td>
<td>The initial copy has completed and the pair status is DUPLEX.</td>
</tr>
<tr>
<td>4730</td>
<td>Split/SUSPOP START</td>
<td>The pair is being split.</td>
</tr>
<tr>
<td>4740</td>
<td>Split/SUSPOP END</td>
<td>The pair has been split and the pair status is Split/SUSPOP.</td>
</tr>
<tr>
<td>4750</td>
<td>Resync/PENDING START</td>
<td>The pair resync CCI command has started.</td>
</tr>
<tr>
<td>4751</td>
<td>Resync-R/REVRSY START</td>
<td></td>
</tr>
<tr>
<td>4760</td>
<td>Resync/PENDING END</td>
<td>The pair resync CCI command has completed and the volumes are paired (DUPLEX status).</td>
</tr>
<tr>
<td>4761</td>
<td>Resync-R/REVRSY END</td>
<td></td>
</tr>
<tr>
<td>4780</td>
<td>Unpaired</td>
<td>The pair is deleted and the volumes are unpaired.</td>
</tr>
<tr>
<td>4790</td>
<td>Suspend/SUSPER</td>
<td>The pair is suspended.</td>
</tr>
<tr>
<td>47D0</td>
<td>COPY ABNORMAL END</td>
<td>Copy processing has ended abnormally for reasons other than the ones stated previously in this table.</td>
</tr>
<tr>
<td>47E9</td>
<td>INITIALIZE START</td>
<td>The initialization processing has started.</td>
</tr>
<tr>
<td>47EA</td>
<td>INITIALIZE END</td>
<td>The initialization processing completed.</td>
</tr>
<tr>
<td>47EB</td>
<td>INITIALIZE ENDED ABNORMAL</td>
<td>The initialization processing has ended abnormally.</td>
</tr>
</tbody>
</table>

**Related topics**

- [History window on page C-21](#)

**Maintaining the ShadowImage for Mainframe system**

Some maintenance tasks are a response to behavior discovered while monitoring the system. Other tasks are completed to keep the system in tune with your changing requirements.

Perform the following steps to maintain the system:

1. Keep the system in tune with your changing requirements.
2. If you discover behavior while monitoring the system, maintain the system.
System and device maintenance

The following maintenance activities do not affect SIz replication pairs:

- Cache maintenance can reduce overall performance and should be scheduled during times of low system activity.
- Performing maintenance of physical disk drives that provision LDEVs used by SIz can be performed without impacting SIz.
- If a physical device failure occurs, the pair status is not affected because of the RAID architecture.
- If a physical device failure requires the VSP G1000 storage system to utilize dynamic sparing or automatic correction copy, the pair status is not be affected.
- If an LDEV failure occurs, the VSP G1000 storage system suspends the pair.
- If an SIz pair is using an LDEV, certain activities are not allowed. You can only block (for maintenance), format, or restore an LDEV that is in use by only a pair in Suspend/SUSPER status.

Related topics

- Performance planning for ShadowImage for Mainframe on page 2-8
Troubleshooting ShadowImage for Mainframe

This topic provides SIZ troubleshooting information.

- **ShadowImage for Mainframe pair issues and corrective actions**
- **Consistency group pair-split failures**
- **Pinned track recovery**
- **Extended copy time causes and corrective actions**
- **ShadowImage for Mainframe service information messages**
- **Interpreting error codes using the Command Control Interface or Business Continuity Manager**
- **Contacting Hitachi Data Systems customer support**
ShadowImage for Mainframe pair issues and corrective actions

The following table lists issues and suggested corrective actions for troubleshooting SIz pairs.

<table>
<thead>
<tr>
<th>Issue</th>
<th>Corrective action</th>
</tr>
</thead>
</table>
| HDvM - SN hangs, or SIz pair tasks are not properly performed.        | • Make sure all SIz requirements and restrictions are met.  
• Make sure the VSP G1000 storage system is powered on and fully functional.  
• Make sure the input values and parameters on the SIz windows are correct. |
| The volume pairs are not displaying correctly.                        | Select the correct volumes.                                                                                                                                                                                     |
| An SIz error message is displayed in HDvM - SN during a task.          | In HDvM - SN, check if there is an error message for the failed task.  
**Note:** You can use HDvM - SN to set up email notifications of errors that occur during pair tasks.  
For more information about managing your tasks and setting up email notifications, see the *Hitachi Command Suite User Guide* or the *Hitachi Virtual Storage Platform G1000 System Administrator Guide*.  
For a list of error codes and corrective actions, see *Hitachi Device Manager - Storage Navigator Messages*. |

Consistency group pair-split failures

If a consistency group (CTG) pair-split fails, note the following:

- The pairs in the CTG are suspended (Suspend/SUSPER status).
- If you are using a URz S-VOL as an SIz P-VOL and you are using the CCI to run commands and the status for some pairs that are assigned to a CTG are not changed, some pairs remain unsplit in the CTG and pair consistency is not guaranteed after you run the `pairsplit` command.

The following are possible reasons why the status for some pairs that are assigned to a CTG are not changed:

- The URz pair is assigned to a CTG and the P-VOL and S-VOL have the same content. The journal volumes for this pair are full.
- The SIz license is invalid.
- The SIz pair volumes are blocked.
- The SIz pair is in a status that does not allow you to run the `pairsplit` CCI command.

For more information about pair status, see *Monitoring ShadowImage for Mainframe pair activity and status on page 6-3*. 

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Troubleshooting ShadowImage for Mainframe
Hitachi Virtual Storage Platform G1000 Hitachi ShadowImage® for Mainframe User Guide
You are using an SIz pair volume in a TCz or URz pair and the TCz or URz pair is in a status that does not allow you to run the `pairsplit` CCI command.

If you cannot change the status, the `pairsplit` CCI command can end abnormally with the error code EX_EWSTOT, which indicates timeout occurrence. You cannot change the pair status during a timeout.

Remove these factors, and then complete the following steps:

a. Resynchronize the pairs.

b. Split the pairs.

**Related topics**

- Managing consistency group IDs for ShadowImage for Mainframe using HDvM - SN on page 4-2

**Pinned track recovery**

If a pinned track occurs on an SIz P-VOL or S-VOL, the VSP G1000 storage system suspends the pair. Contact your HDS representative for assistance in recovering pinned tracks.

**Extended copy time causes and corrective actions**

The following table describes some causes and possible responses in the case of extended copy times.

<table>
<thead>
<tr>
<th>Cause</th>
<th>Corrective action</th>
</tr>
</thead>
<tbody>
<tr>
<td>A processor with an MP usage rate that exceeds 80% exists within the MP blade to which the P-VOL and S-VOL are allocated.</td>
<td>Examine the configuration. For information about checking the MP usage rate, see the Hitachi Virtual Storage Platform G1000 Performance Guide.</td>
</tr>
<tr>
<td>The HOST I/O Performance option is enabled.</td>
<td>Disable the option (see System options that affect performance on page 4-7).</td>
</tr>
<tr>
<td>The S-VOL’s HDD or external storage performance is lower than the P-VOL’s.</td>
<td>Make the configuration of the S-VOL’s HDD or external storage the same as the P-VOL’s.</td>
</tr>
<tr>
<td>The P-VOL’s HDD or external storage has an error.</td>
<td>Review the error and make the necessary correction.</td>
</tr>
<tr>
<td>The S-VOL’s HDD or external storage has an error.</td>
<td>Review the error and make the necessary correction.</td>
</tr>
</tbody>
</table>

**ShadowImage for Mainframe service information messages**

The Virtual Storage Platform G1000 storage system generates a service information message (SIM) to notify users of events that have occurred in the
storage system. The VSP G1000 storage system’s channel and storage path microprocessors or the service processor (SVP) can generate SIMs. The SVP reports all SIMs related to SIz tasks. The SIMs reported to the zSeries and S/390 host are logged in the SYS1.LOGREC dataset of the host operating system.

SIMs are classified according to the following severities: service, moderate, serious, or acute. The larger the SIM number, the more important the message.

All SIMs are recorded on the Virtual Storage Platform G1000 SVP and can be viewed in HDvM - SN by clicking the Alert link at the top of the HDvM - SN window. The color next to the Alert link changes to provide an indication of array internal status.

The following image shows a typical 32-byte SIM from the Virtual Storage Platform G1000. The host console shows SIMs by reference code (RC) and severity. The six-digit RC (composed of bytes 22, 23, and 13) identifies the possible error and determines the severity. The SIM type (byte 28) indicates the component which experienced the error.

The following table describes the disk controller (DKC) SIM (byte 28 = F1) reference codes related to SIz tasks.

<table>
<thead>
<tr>
<th>Reference code</th>
<th>Importance level</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SSB22 SSB23</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| dx 47          | Moderate         | Copying ends abnormally and the pair is suspended (Suspend/SUSPER status).
|                |                  | • x indicates the last digit of the P-VOL’s CU number (00 to fe).
|                |                  | • "SSB13" indicates the S-VOL’s LDEV number. |
| e7 47          | Moderate         | The pair is suspended (Suspend/SUSPER status). |

**Interpreting error codes using the Command Control Interface or Business Continuity Manager**

You can use the CCI or Business Continuity Manager (BCM) operation logs to troubleshoot tasks that you have performed. The following procedure describes the CCI or BCM error codes and how to locate and interpret them.

1. View the operation log by performing one of the following actions:
○ The CCI or BCM window.
○ The CCI or BCM operation log file.

2. In the log that is displayed, locate the log entry or error code you are investigating. You can use the SSB1/SSB2 error code combination to determine the cause of the error. The error codes are shown to the right of the equal symbol (=) in the log. The SSB1 code is the last four alphanumeric characters to the left of the comma (,). The SSB2 code is the last four alphanumeric characters to the right of the comma (,).

○ CCI window sample log entry:
  It was rejected due to SKEY=0x05, ASC=0x20, SSB=0xB9E1, 0xB901 on Serial#(64015)
  SSB1 code: B9E1
  SSB2 code: B901

○ CCI or BCM operation log file sample error code:
  11:06:03-37897-10413- SSB = 0xb9a0,2089
  SSB1 code: b9a0
  SSB2 code: 2089

3. Locate the description of the SSB2 error code in the following table.

For more information about the errors that are not described in the table, contact Hitachi Data Systems customer support (see Contacting Hitachi Data Systems customer support on page 7-13).

<table>
<thead>
<tr>
<th>SSB2 code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-</td>
<td>An error occurred during an SIz pair task.</td>
</tr>
<tr>
<td>200D</td>
<td>The pair task was rejected because the specified HDP or HDT V-VOL is not associated with a pool.</td>
</tr>
<tr>
<td>201B</td>
<td>The CTG pair-split was rejected because the URz pair is suspended (Suspend/SUSPER status), unpaired, or is not split (Split/SUSPOP status). The URz S-VOL was the SIz P-VOL included in the CTG on which the pair-split is being performed.</td>
</tr>
<tr>
<td>2026</td>
<td>The Quick Restore was rejected because the cache mode of the specified P-VOL is different from the cache mode of the external S-VOL.</td>
</tr>
<tr>
<td>2043</td>
<td>The volume you specified as a P-VOL was a volume using two mirrors included in a 3-URz DC multi-target or cascade configuration. The operation was rejected because the volume was used as a URz data volume.</td>
</tr>
<tr>
<td>2044</td>
<td>The volume you specified as an S-VOL was a volume using two mirrors included in a 3-URz DC multi-target or cascade configuration. The operation was rejected because the volume was used as a URz data volume.</td>
</tr>
<tr>
<td>2047</td>
<td>The pair task was rejected because the current microcode version does not support the specified P-VOL capacity.</td>
</tr>
<tr>
<td>2048</td>
<td>The pair task was rejected because the current microcode version does not support the specified S-VOL capacity.</td>
</tr>
<tr>
<td>SSB2 code</td>
<td>Description</td>
</tr>
<tr>
<td>-----------</td>
<td>-------------</td>
</tr>
<tr>
<td>204F</td>
<td>The pair task was rejected because the volume you specified as the S-VOL is the volume for Volume Migration, and the transfer process could not be interrupted. Retry the operation after the Volume Migration transfer process has completed.</td>
</tr>
<tr>
<td>205B</td>
<td>The pair was not created because the specified MU number is in use.</td>
</tr>
<tr>
<td>2060</td>
<td>The volume you specified as an SIz P-VOL was a volume of a URz pair. The pair task was rejected because the status of the URz pair is not in the required status. For more information about the required status for each pair task, see <a href="#">Pair status and available pair tasks on page 6-7</a>.</td>
</tr>
<tr>
<td>2061</td>
<td>The volume you specified as an SIz S-VOL was a volume of a URz pair. The pair task was rejected because the status of the URz pair is not in the required status. For more information about the required status for each pair task, see <a href="#">Pair status and available pair tasks on page 6-7</a>.</td>
</tr>
<tr>
<td>2067</td>
<td>Volumes of the specified pair are shared by TCz and URz. The reverse resynchronization was rejected because the TCz or URz pair is not split (Split/SUSPOP status).</td>
</tr>
<tr>
<td>2071</td>
<td>The pair task was rejected because the volume you specified as the P-VOL is the volume for Volume Migration, and the transfer process could not be interrupted. Retry the operation after the Volume Migration transfer process has completed.</td>
</tr>
</tbody>
</table>
| 2078      | Because the specified P-VOL was also a URz P-VOL for delta resync, one of the following errors occurred:  
- The Reverse Copy was rejected because the URz pair status is not Split/SUSPOP.  
- The Quick Restore was rejected. |
<p>| 2079      | The pair task was rejected because the specified S-VOL was also a URz P-VOL for delta resync. |
| 2086      | The pair task was rejected because the initialization process is being performed. |
| 2089      | The Quick Restore was rejected because you are formatting the volume you specified as a P-VOL using Quick Format. For more information about formatting volumes using Quick Format, see the <a href="#">Hitachi Virtual Storage Platform G1000 Provisioning Guide for Mainframe Systems</a>. |
| 208A      | The Quick Restore was rejected because you are formatting the volume you specified as an S-VOL using Quick Format. For more information about formatting volumes using Quick Format, see the <a href="#">Hitachi Virtual Storage Platform G1000 Provisioning Guide for Mainframe Systems</a>. |
| 208C      | The pair task was rejected because the volume you specified as the S-VOL is a Mainframe Fibre Data Migration volume. |</p>
<table>
<thead>
<tr>
<th>SSB2 code</th>
<th>Description</th>
</tr>
</thead>
</table>
| 2097      | The Quick Restore was rejected because of one of the following reasons:  
            • The P-VOL is also an HDP V-VOL, but the S-VOL is a normal volume.  
            • The P-VOL is a normal volume, but the S-VOL also an HDP V-VOL. |
| 209E      | The pair task was rejected because the volume you specified as the P-VOL is 
            a Mainframe Fibre Data Migration volume. |
| 20A2      | The create pair task was rejected because the P-VOL is an HDP or HDT V- 
            VOL for which the capacity is increasing. |
| 20A3      | The pair was not created because the S-VOL is an HDP or HDT V-VOL for 
            which capacity is increasing. |
| 20A9      | The pair task was rejected because HTI is using the specified CTG number. |
| 20AA      | The create pair task was rejected because the volume you specified as the 
            P-VOL is an HDP or HDT V-VOL and its zero pages were being reclaimed. |
| 20AB      | The create pair task was rejected because the volume you specified as the 
            S-VOL is an HDP or HDT V-VOL and its zero pages were being reclaimed. |
| 20B0      | The pair task was rejected because the volume you specified as the P-VOL is 
            an HDP or HDT V-VOL and its capacity is increasing. |
| 20B1      | The pair task was rejected because the volume you specified as the S-VOL is 
            an HDP or HDT V-VOL and its capacity is increasing. |
| 20B4      | The pair task was rejected because the volume you specified as the P-VOL is 
            an HDP or HDT V-VOL, which is not associated with a pool. |
| 20B5      | The pair task was rejected because the volume you specified as the S-VOL is 
            an HDP or HDT V-VOL, which is not associated with a pool. |
| 20BD      | The pair task was rejected because the emulation type of the volume you 
            specified as the P-VOL is 3390-V. |
| 20BE      | The pair task was rejected because the emulation type of the volume you 
            specified as the S-VOL is 3390-V. |
| 20C5      | The command was rejected because you were in the process of turning off 
            the storage system's power. |
| 20C9      | The emulation type of the P-VOL was 3390-A, and the pair task is rejected 
            because of one of the following reasons:  
            • Mainframe Fibre CHA is not mounted.  
            • Mainframe Fibre CHA is all blocked. |
| 20CA      | The S-VOL's emulation type was 3390-A, and the pair task was rejected 
            because of one of the following reasons:  
            • Mainframe Fibre CHA is not mounted.  
            • Mainframe Fibre CHA is all blocked. |
| 20D0      | The P-VOL rejected the paircreate CCI command because the DP pool is 
            initializing in the HDP or HDT V-VOL. |
| 20D1      | The S-VOL rejected the paircreate CCI command because the DP pool is 
            initializing in the HDP or HDT V-VOL. |
<table>
<thead>
<tr>
<th>SSB2 code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>20D6</td>
<td>The pair task was rejected because Compatible FlashCopy® SE is using the P-VOL or the P-VOL is a TSE volume. For more information about pair volume requirements, see ShadowImage for Mainframe system requirements on page 2-2.</td>
</tr>
<tr>
<td>20D7</td>
<td>The pair task was rejected because the S-VOL is a TSE volume. For more information about pair volume requirements, see ShadowImage for Mainframe system requirements on page 2-2.</td>
</tr>
<tr>
<td>20DC</td>
<td>You cannot use the specified P-VOL for SIz, because it is being used in SI.</td>
</tr>
<tr>
<td>20DF</td>
<td>The volume which was specified as the S-VOL cannot be used, because the volume is undergoing online data migration.</td>
</tr>
<tr>
<td>20E4</td>
<td>The command was rejected because if sharing volume between UR S-VOL and SI P-VOL, ShadowImage CTG pair created by BCM or IBM PPRC and ShadowImage CTG pair created by CCI cannot coexist.</td>
</tr>
<tr>
<td>20E6</td>
<td>The CTG pair split function cannot be used from CCI for CTG reserved on Device Manager - Storage Navigator.</td>
</tr>
<tr>
<td>20E9</td>
<td>The pair task was rejected because the volume you specified as the P-VOL is a S-VOL for an existing pair, and the volume you specified as the S-VOL is the P-VOL for another existing pair.</td>
</tr>
<tr>
<td>22F6</td>
<td>The pair task was rejected because the volume you specified as the P-VOL is a Compatible FlashCopy® T-VOL.</td>
</tr>
<tr>
<td>22F7</td>
<td>The pair task was rejected because the volume you specified as the S-VOL is a Compatible FlashCopy® S-VOL or T-VOL.</td>
</tr>
<tr>
<td>22F9</td>
<td>The pair was not restored because the volume you specified as the S-VOL is a Compatible FlashCopy® S-VOL or T-VOL.</td>
</tr>
<tr>
<td>2301</td>
<td>The pair task was rejected because there is not a sufficient amount of installed shared memory or SIz is not installed.</td>
</tr>
<tr>
<td>2306</td>
<td>The pair task was rejected because the LBA size of the specified P-VOL is not the same as the size of the specified S-VOL.</td>
</tr>
<tr>
<td>2309</td>
<td>The pair was not created because the number of pairs exceeded the maximum number of pairs.</td>
</tr>
<tr>
<td>230A</td>
<td>The pair was not created because the volume you specified as the S-VOL is the P-VOL of the SIz pair that has an MU number of 0.</td>
</tr>
<tr>
<td>230B</td>
<td>The pair task was rejected because the pair is being suspended or deleted.</td>
</tr>
</tbody>
</table>
| 2310      | One of the following occurred:  
- Pair creation was rejected because the specified CTG number had already been used for an L1 pair.  
- Pair creation was rejected because the specified CTG number had already been used for an L2 pair.  
- Pair creation was rejected because the volume you specified as the P-VOL is the S-VOL of the pair which is in the process of being Quick Split.  
- The Quick Restore was rejected because the VLL setting of the P-VOL is different from that of the S-VOL. |
<table>
<thead>
<tr>
<th>SSB2 code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2312</td>
<td>The pair task was rejected because the volume you specified as the S-VOL is online to the host.</td>
</tr>
<tr>
<td>2314</td>
<td>The pair was not created because the volume you specified as the S-VOL is the S-VOL of another pair that has been split (Split/SUSPOP status).</td>
</tr>
<tr>
<td>231F</td>
<td>The pair was not restored because the P-VOL of the specified pair is online to the host.</td>
</tr>
<tr>
<td>2322</td>
<td>The pair task was rejected because there is not a sufficient amount of installed shared memory or initialization is not completed.</td>
</tr>
<tr>
<td>2324</td>
<td>The pair task was rejected because the number of slots of the volume you specified as the P-VOL exceeded the upper limit.</td>
</tr>
<tr>
<td>2325</td>
<td>The pair task was rejected because the number of slots of the volume you specified as the S-VOL exceeded the upper limit.</td>
</tr>
<tr>
<td>2326</td>
<td>The pair was not created because the volume you specified as the P-VOL had already had three S-VOLs.</td>
</tr>
<tr>
<td>2327</td>
<td>The pair was not created because the node volume specified as the P-VOL had already had two S-VOLs.</td>
</tr>
<tr>
<td>2328</td>
<td>The pair task was rejected because the pair configuration exceeded the number of the layers of the cascade configuration.</td>
</tr>
<tr>
<td>2329</td>
<td>The pair task was rejected because the volume you specified as the S-VOL is the S-VOL of an existing pair.</td>
</tr>
<tr>
<td>232A</td>
<td>The pair was not created because pairs that would exceed the license capacity were going to be created.</td>
</tr>
<tr>
<td>232F</td>
<td>The pair task was rejected because the volume you specified as the P-VOL is allocated as the destination of the Volume Migration.</td>
</tr>
<tr>
<td>2331</td>
<td>The pair task was rejected because the capacity of the specified P-VOL is not the same as the capacity of the S-VOL.</td>
</tr>
<tr>
<td>2332</td>
<td>The pair was not created because the volume you specified as the P-VOL had already had three S-VOLs.</td>
</tr>
<tr>
<td>2333</td>
<td>The pair task was rejected because the volume you specified as the P-VOL is not the P-VOL of the existing pair.</td>
</tr>
</tbody>
</table>
| 2334      | One of the following occurred:  
  - The pair task was rejected because the volume you specified as the P-VOL had an emulation type that BCM could not handle.  

<table>
<thead>
<tr>
<th>SSB2 code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2335</td>
<td>The pair task was rejected because the volume you specified as the S-VOL had an emulation type that could not be handled by BCM.</td>
</tr>
<tr>
<td>2336</td>
<td>The pair task was rejected because the emulation type of the specified P-VOL is different from the emulation type of the S-VOL. For more information about pair volumes and supported emulation types, see Pair volumes and emulation types on page 2-3.</td>
</tr>
<tr>
<td>2337</td>
<td>The pair operation was rejected because the volume you specified as the P-VOL had already been an S-VOL.</td>
</tr>
<tr>
<td>233A</td>
<td>The pairresync CCI command was rejected because the volume you specified as the P-VOL is not an SIz P-VOL.</td>
</tr>
<tr>
<td>233B</td>
<td>The pair task was rejected because the volume you specified as the S-VOL is a root volume.</td>
</tr>
<tr>
<td>233C</td>
<td>The pair task was rejected because the volume you specified as the S-VOL is a node volume, and the volume you specified as the P-VOL is not the P-VOL for the specified S-VOL.</td>
</tr>
<tr>
<td>233D</td>
<td>The pairsplit CCI command was rejected because the specified P-VOL and S-VOLS were a L2 pair, and the L1 pair is not split (Split/SUSPOP status).</td>
</tr>
<tr>
<td>233E</td>
<td>The pair task was rejected because the volume you specified as the P-VOL is being used as another SIz P-VOL, and also that pair's S-VOL is used as a TCz P-VOL.</td>
</tr>
<tr>
<td>233F</td>
<td>The pair task was rejected because the volume you specified as the S-VOL is the TCz P-VOL, and the pair is not split (Split/SUSPOP status) or suspended (Suspend/SUSPER status).</td>
</tr>
<tr>
<td>2342</td>
<td>The pair task was rejected because the volume you specified as the S-VOL is the destination of the Volume Migration.</td>
</tr>
<tr>
<td>2343</td>
<td>The pair was not created because the volume you specified as the S-VOL had already been an S-VOL.</td>
</tr>
<tr>
<td>2344</td>
<td>The pair task was rejected because the volume you specified as the S-VOL for SIz pair tasks is not an S-VOL.</td>
</tr>
<tr>
<td>2346</td>
<td>The volume you specified as an SIz S-VOL is a TCz P-VOL. The pair task was rejected because the TCz pair is not in the required status. For more information about the required status for each pair task, see Pair status and available pair tasks on page 6-7.</td>
</tr>
<tr>
<td>2347</td>
<td>The volume you specified as an SIz S-VOL was a TCz S-VOL. The pair task was rejected because the TCz pair is not in the required status. For more information about the required status for each pair task, see Pair status and available pair tasks on page 6-7.</td>
</tr>
<tr>
<td>234A</td>
<td>The pair creation for the cascade configuration was rejected because the volume you specified as the S-VOL is an intermediate volume.</td>
</tr>
<tr>
<td>234B</td>
<td>The pair task was rejected because the volume you specified as the S-VOL is the volume of the Volume Migration.</td>
</tr>
<tr>
<td>SSB2 code</td>
<td>Description</td>
</tr>
<tr>
<td>-----------</td>
<td>-------------</td>
</tr>
<tr>
<td>2350</td>
<td>The pair task was rejected because the specified P-VOL and the S-VOL for SIz pair tasks is not a pair.</td>
</tr>
<tr>
<td>2351</td>
<td>The pair task was rejected because the volume you specified as the P-VOL and the volume you specified as the S-VOL are the same.</td>
</tr>
<tr>
<td>2352</td>
<td>The pair was not restored because the specified P-VOL and S-VOLs is online to the host.</td>
</tr>
<tr>
<td>2353</td>
<td>The pair was not deleted because the specified P-VOL and S-VOLs are in the process of being Quick Split.</td>
</tr>
<tr>
<td>2354</td>
<td>The pairresync CCI command was rejected because the P-VOL and S-VOLs is in the process of being Steady Split.</td>
</tr>
<tr>
<td>2357</td>
<td>The pair was not deleted because the specified P-VOL and S-VOLs is in the process of being Quick Split.</td>
</tr>
<tr>
<td>2358</td>
<td>The pair was not deleted because the specified P-VOL and S-VOLs are in the process of being Steady Split.</td>
</tr>
<tr>
<td>235B</td>
<td>The volume you specified as a P-VOL is a TCz P-VOL. The reverse resynchronization was rejected because the TCz pair is not suspended (Suspend/SUSPER status) or split (Split/SUSPOP status).</td>
</tr>
<tr>
<td>235C</td>
<td>The volume you specified as a P-VOL is a TCz S-VOL. The reverse resynchronization was rejected because the TCz pair is not suspended (Suspend/SUSPER status) or split (Split/SUSPOP status).</td>
</tr>
<tr>
<td>235D</td>
<td>The volume you specified as an S-VOL was a TCz P-VOL. The reverse resynchronization was rejected because the TCz pair is not suspended (Suspend/SUSPER status) or split (Split/SUSPOP status).</td>
</tr>
<tr>
<td>236C</td>
<td>The reverse resynchronization was rejected because the volume you specified as the P-VOL has the S-VOL Disable attribute assigned by the Data Retention Utility.</td>
</tr>
<tr>
<td>236D</td>
<td>The pair task was rejected because the volume you specified as the S-VOL has the S-VOL Disable attribute assigned by the Data Retention Utility.</td>
</tr>
<tr>
<td>2370</td>
<td>The pair task was rejected because the volume you specified as the P-VOL is not mounted.</td>
</tr>
<tr>
<td>2371</td>
<td>The pair task was rejected because the volume you specified as the P-VOL is blocked.</td>
</tr>
<tr>
<td>2372</td>
<td>The pair task was rejected because the volume you specified as the P-VOL is being formatted or shredded.</td>
</tr>
<tr>
<td>2373</td>
<td>The pair task was rejected because the volume you specified as the P-VOL is a command device.</td>
</tr>
<tr>
<td>2380</td>
<td>The pair task was rejected because of one of the following reasons:</td>
</tr>
<tr>
<td>2381</td>
<td>The pair task was rejected because the volume you specified as the S-VOL is not mounted.</td>
</tr>
<tr>
<td></td>
<td>The MU number is 3 or greater.</td>
</tr>
<tr>
<td></td>
<td>The S-VOL is blocked.</td>
</tr>
<tr>
<td>SSB2 code</td>
<td>Description</td>
</tr>
<tr>
<td>-----------</td>
<td>-------------</td>
</tr>
<tr>
<td>2382</td>
<td>The pair task was rejected because the volume you specified as the S-VOL is being formatted or shredded.</td>
</tr>
<tr>
<td>2383</td>
<td>The pair task was rejected because the volume you specified as the S-VOL is a command device.</td>
</tr>
<tr>
<td>2387</td>
<td>The pair was not created because the volume you specified as the P-VOL is the volume for Volume Migration.</td>
</tr>
<tr>
<td>2394</td>
<td>The pair was not registered in the CTG because the number of the pairs assigned to the CTG has exceeded the defined maximum number of pairs.</td>
</tr>
<tr>
<td>2395</td>
<td>The pair task was rejected because you are reverse resynchronizing the pair sharing the specified volume as the P-VOL.</td>
</tr>
<tr>
<td>2396</td>
<td>The pair task was rejected because you are reverse resynchronizing the L1 pair sharing the specified P-VOL as the root volume.</td>
</tr>
<tr>
<td>2397</td>
<td>The pair task was rejected because you are reverse resynchronizing the L2 pair sharing the specified P-VOL or S-VOL as the node volume.</td>
</tr>
<tr>
<td>2398</td>
<td>The reverse resynchronization was rejected because the pair is not split (Split/SUSPOP status) or suspended (Suspend/SUSPER status).</td>
</tr>
<tr>
<td>2399</td>
<td>The reverse resynchronization was rejected because some of the pairs sharing the specified volume as the P-VOL are not in split (Split/SUSPOP status) or suspended (Suspend/SUSPER status).</td>
</tr>
<tr>
<td>239D</td>
<td>The pair was not created because you have set the Protect attribute for the volume you specified as the P-VOL using BCM.</td>
</tr>
<tr>
<td>239E</td>
<td>The pair was not created because you set the Protect attribute for the volume you specified as the S-VOL using BCM.</td>
</tr>
<tr>
<td>23A8</td>
<td>The reverse resynchronization was rejected because the volume you specified is the P-VOL for XRC.</td>
</tr>
<tr>
<td>23A9</td>
<td>The pair was not restored because the volume you specified is the P-VOL for CC.</td>
</tr>
<tr>
<td>23AA</td>
<td>The pair task was rejected because the volume you specified as the S-VOL is the P-VOL for XRC.</td>
</tr>
<tr>
<td>23AB</td>
<td>The pair task was rejected because the volume you specified as the S-VOL is the P-VOL for CC.</td>
</tr>
<tr>
<td>23AF</td>
<td>The pair was not registered in the CTG because IBM PPRC/BCM has reserved the specified CTG number.</td>
</tr>
<tr>
<td>23BB</td>
<td>The pair was not created because the volume you specified as the S-VOL could not be used as the S-VOL because of Volume Security settings.</td>
</tr>
<tr>
<td>23EF</td>
<td>The pair was not deleted because the P-VOL and S-VOL are in the process of being Quick Split.</td>
</tr>
<tr>
<td>23F5</td>
<td>The pair task was rejected because you set a split time for the CTG.</td>
</tr>
<tr>
<td>23F1</td>
<td>The pair was not created because the CTG identifier you specified is not supported.</td>
</tr>
<tr>
<td>9100</td>
<td>You cannot run the command because the system did not authenticate your user information.</td>
</tr>
<tr>
<td>SSB2 code</td>
<td>Description</td>
</tr>
<tr>
<td>----------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>B911</td>
<td>The pair task was rejected because the specified volume did not exist.</td>
</tr>
<tr>
<td>B912</td>
<td>The pair was not created because the specified S-VOL does not exist.</td>
</tr>
<tr>
<td>B913</td>
<td>The pair task was rejected because the mirror ID is invalid.</td>
</tr>
</tbody>
</table>

**Related topics**

- [Consistency group pair-split failures on page 7-2](#)

**Contacting Hitachi Data Systems customer support**

If you need to contact Hitachi Data Systems customer support, provide as much information about the problem as possible, including the following:

- The circumstances surrounding the error or failure.
- The content of the error messages displayed on the host systems.
- The content of the error messages displayed in HDvM - SN.
- HDvM - SN configuration information (use the Dump Tool).
- The service information messages (SIMs), including reference codes and severity levels, that HDvM - SN displays.

The HDS customer support staff is available 24 hours a day, seven days a week. If you need technical support, log on to the HDS Support Portal for contact information: [https://hdssupport.hds.com](https://hdssupport.hds.com).
Performing ShadowImage for Mainframe pair tasks using IBM PPRC and ICKDSF commands

This appendix includes IBM PPRC requirements, commands, and examples. You can perform S1z pair tasks using PPRC TSO and ICKDSF PPRCOPY commands.

**Note:** This appendix does not include all instructions for using the PPRC and ICKDSF commands.

For more information about these commands and using IBM PPRC and ICKDSF, see the IBM user documentation.

- **Supported PPRC and PPRCOPY commands**
- **PPRC command prerequisites**
- **How PSF commands interact with ShadowImage for Mainframe pairs**
- **Performing pair operations using PPRC commands when S-VOL is online**
- **Creating pairs using CESTPAIR and PPRCOPY ESTPAIR**
- **Splitting pairs using CSUSPEND and PPRCOPY SUSPEND**
- **Resynchronizing pairs with CESTPAIR and PPRCOPY ESTPAIR**
- **Deleting pairs with CDELPAR and DELPAIR**
- **Performing consistency group pair tasks using PPRC commands**
Showing pair status and volume information with CQUERY TSO and QUERY ICKDSF.
**Supported PPRC and PPRCOPY commands**

You can use PPRC and PPRCOPY commands to perform the following SIz pair tasks:

- Add pairs.
- Add and split pairs.
- Split the pairs.
- Resynchronize pairs.
- Delete pairs.
- Show pair status and other information.

The following table describes the PPRC TSO and ICKDSF PPRCOPY commands that SIz supports.

<table>
<thead>
<tr>
<th>PPRC TSO command</th>
<th>ICKDSF PPRCOPY command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CESTPAIR</td>
<td>PPRCOPY ESTPAIR</td>
<td>Creates a pair, starts the initial copy operation, and changes the status to DUPLEX.</td>
</tr>
<tr>
<td>CESTPAIR</td>
<td>PPRCOPY ESTPAIR</td>
<td>Adds and simultaneously splits a pair.</td>
</tr>
<tr>
<td>CSUSPEND</td>
<td>PPRCOPY SUSPEND</td>
<td>Splits a pair, and then starts a Quick Split.</td>
</tr>
<tr>
<td>CSUSPEND</td>
<td>PPRCOPY SUSPEND</td>
<td>Splits a pair, and then starts a Steady Split.</td>
</tr>
<tr>
<td>CESTPAIR</td>
<td>PPRCOPY ESTPAIR</td>
<td>Resynchronizes a pair, and then starts a Normal Copy.</td>
</tr>
<tr>
<td>CESTPAIR</td>
<td>PPRCOPY ESTPAIR</td>
<td>Resynchronizes a pair, and then starts a Quick Resync.</td>
</tr>
<tr>
<td>CESTPAIR</td>
<td>PPRCOPY ESTPAIR</td>
<td>Resynchronizes a pair, and then starts a Reverse Copy.</td>
</tr>
<tr>
<td>CESTPAIR</td>
<td>PPRCOPY ESTPAIR</td>
<td>Resynchronizes the pair and starts Quick Restore.</td>
</tr>
<tr>
<td>CDELPAIR</td>
<td>PPRCOPY DELPAIR</td>
<td>Deletes the pair and the volumes are unpaired.</td>
</tr>
<tr>
<td>CQUERY</td>
<td>PPRCOPY QUERY</td>
<td>Shows detailed pair status information.</td>
</tr>
</tbody>
</table>

You can complete certain pair tasks with HDvM - SN that you cannot perform with PPRC, including the following:

- Set or reset the S-VOL reserve attribute.
- Suspend pairs.

**PPRC command prerequisites**

- SIz must be installed and enabled on the Virtual Storage Platform G1000 storage system.
The serial numbers of the P-VOL and the S-VOL must be defined using one of the following methods:

- Use the same serial number for both the P-VOL and S-VOL.
- Use the serial number for the S-VOL, and enter an additional parameter instead of the serial number for the P-VOL.

SIz and TCz both support PPRC, so a failure to meet these requirements can result in a command being run on a TCz pair instead.

**How PSF commands interact with ShadowImage for Mainframe pairs**

With Perform Storage System Function (PSF) commands, you can run PPRC commands and user requests in the VSP G1000 storage system.

The following table describes how PSF commands interact with SIz pairs.

<table>
<thead>
<tr>
<th>PSF commands</th>
<th>Interaction with SIz pairs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Device pair status</td>
<td>For more information about device pair status, see PSF and DEVSERV command results on page A-4.</td>
</tr>
<tr>
<td>Rate of synchronization</td>
<td>The differential bitmap format is different than TCz's. This PSF command is not available with SIz pairs.</td>
</tr>
<tr>
<td>Primary volume with 2 or more S-VOLs</td>
<td>Shows information for the pair with an S-VOL that has the lowest LDEV ID.</td>
</tr>
<tr>
<td>Path status</td>
<td>Active.</td>
</tr>
<tr>
<td>Path number</td>
<td>If the volume is not part of a TCz pair, 1 is shown with TCz information.</td>
</tr>
</tbody>
</table>

**PSF and DEVSERV command results**

The following table lists the PSF and DEVSERV command results.

<table>
<thead>
<tr>
<th>Pair status</th>
<th>PSF Read Subsystem Data</th>
<th>DEVSERV Sense Subsystem Status</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>P-VOL</td>
<td>S-VOL</td>
</tr>
<tr>
<td>Pending</td>
<td>PPRI-PNDG</td>
<td>PSEC-PNDG</td>
</tr>
<tr>
<td>Duplex</td>
<td>PPRIMARY</td>
<td>PSECONDRY</td>
</tr>
<tr>
<td>SP-Pend/TRANS</td>
<td>PPRI-PNDG</td>
<td>PSEC-PNDG</td>
</tr>
<tr>
<td>V-Split/SUSPVS</td>
<td>PPRI-SUSP</td>
<td>PSEC-SUSP</td>
</tr>
<tr>
<td>Split/SUSPOP</td>
<td>PPRI-SUSP</td>
<td>PSEC-SUSP</td>
</tr>
<tr>
<td>Suspend/SUSPER</td>
<td>PPRI-SUSP</td>
<td>PSEC-SUSP</td>
</tr>
</tbody>
</table>
### Pair status

<table>
<thead>
<tr>
<th>Pair status</th>
<th>PSF Read Subsystem Data</th>
<th>DEVSERV Sense Subsystem Status</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>P-VOL</td>
<td>S-VOL</td>
</tr>
<tr>
<td>Resync/PENDING</td>
<td>PPRI-PNDG</td>
<td>PSEC-PNDG</td>
</tr>
</tbody>
</table>

**Note:** PPRI-MARY and PSEONDARY indicate that the volume status is DUPLEX.

The following image shows an example of the DEVSERV command:

![Example DEVSERV Command](image)

### Performing pair operations using PPRC commands when S-VOL is online

Pair split and pair deletion operations can be done using PPRC commands when an S-VOL is online, but whether you can perform pair creation and pair resync operations depends on the ONLINSEC parameter.

The following table indicates whether pair creation and resync operations are possible using PPRC commands when an S-VOL is online.

<table>
<thead>
<tr>
<th>Pair operation</th>
<th>ONLINSEC parameter</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>YES</td>
</tr>
<tr>
<td>Pair create</td>
<td>Yes</td>
</tr>
<tr>
<td>Pair resync</td>
<td>Yes</td>
</tr>
</tbody>
</table>

### Creating pairs using CESTPAIR and PPRCOPY ESTPAIR

**Prerequisite:** The S-VOL must be offline.

1. Issue one of the following commands to the P-VOL:
   - (For PPRC) **CESTPAIR**
   - (For PPRCOPY) **PPRCOPY ESTPAIR**

#### CESTPAIR parameters

The following table describes the PPRC CESTPAIR command parameters used for creating pairs.
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEVN</td>
<td>Device number</td>
<td>NA</td>
</tr>
<tr>
<td>PRIM</td>
<td>Primary volume: SSID, serial number, channel connection address, and CU number.</td>
<td>To request the split directly, specify MSF00 instead of a serial number. <strong>Note:</strong> This parameter is valid for MODE(COPY) or MODE(NOCOPY) only. To assign a pair to a CTG, specify MA ann 0 instead of a serial number, where nn is a CTG ID. You must use these parameters to successfully run the command.</td>
</tr>
<tr>
<td>SEC</td>
<td>Secondary volume: SSID, serial number, channel connection address, and CU number.</td>
<td>NA</td>
</tr>
<tr>
<td>MODE</td>
<td>COPY</td>
<td>The VSP G1000 storage system recognizes only COPY for the MODE parameter, even if NOCOPY is specified.</td>
</tr>
<tr>
<td>PACE</td>
<td>Any number</td>
<td>Copy speed is medium, regardless what you specify for the PACE parameter.</td>
</tr>
<tr>
<td>CRIT</td>
<td>Not applicable</td>
<td>Not used by SIZ.</td>
</tr>
<tr>
<td>MSGREQ</td>
<td>YES²</td>
<td>MSGREQ function is applicable. <strong>Note:</strong> Do not specify YES for this parameter when you request the split directly. If you specify YES for this parameter, the command is rejected and ends abnormally (reporting CC = 8).</td>
</tr>
<tr>
<td></td>
<td>NO</td>
<td>MSGREQ function is not applicable.</td>
</tr>
<tr>
<td>ONLINSEC¹</td>
<td>YES</td>
<td>The pair is created whether the S-VOL is online or not.</td>
</tr>
<tr>
<td></td>
<td>NO</td>
<td>If the S-VOL is online, the pair is not created.</td>
</tr>
</tbody>
</table>

1. Not specifying and specifying NO for this parameter have the same affect.  
2. If you specify NOCOPY as the MODE parameter and YES as the MSGREQ parameter, the CESTPAIR PPRC command ends before the copy operation is completed.

The following image shows an example of the CESTPAIR command:

```
CESTPAIR DEVN (X 'DEB0') PRIM (X '0060', '30158', X '00') SEC (X '0060', '30158', X '01') 
MODE (COPT) PACE (15)
```

**PPRCOPY ESTPAIR parameters**

The following table describes the PPRCOPY ESTPAIR command parameters.
<table>
<thead>
<tr>
<th>Parameters</th>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
</table>
| DDNAME, SYSNAME, or UNITADDRESS | DDNAME = dname  
SYSTYPE = sysxxx  
UNITADDRESS = ccuu | Only one of the three parameters can be specified. The italic term is the arbitrary name, where dname is the JCL statement identifying the volume, sysxxx is the SYSNAME of the ASSGN system control statement, and ccuu is the device number. |
| PRI                 | Primary volume: SSID, serial number, channel connection address. | To request the Split directly, specify MSF00 instead of a serial number.  
**Note:** This parameter is valid for MODE(COPY) or MODE(NOCOPY) only.  
To assign a pair to a CTG, specify MA0nn0 instead of a serial number, where nn is a CTG ID.  
You must use these parameters to successfully run the command. |
| SEC                 | Secondary volume: SSID, serial number, channel connection address. | NA                                                                                                                                 |
| MODE                | COPY                           | The system recognizes only COPY for the MODE parameter, even if NOCOPY is specified.                                                                 |
|                     | NOCOPY                         |                                                                                                                                            |
| PACE                | 1-255                          | Copy speed is medium, regardless what is specified for the PACE parameter.                                                                   |
| CRIT                | Not applicable                 | Not used by SIZ.                                                                                                                             |
| MSGREQ              | YES                            | MSGREQ function is applicable. Do not specify this parameter in the following cases:  
• When MODE(RESYNC) is specified.  
If you specify YES for this parameter, the command is rejected and ends abnormally (reporting CC = 12)  
• When you request a Split directly.  
If you specify YES for this parameter, MSGREQ might be ignored.  
NO                              | MSGREQ function is not applicable.                                                                                                             |
| LSS                 | P-VOL or S-VOL CU number.      | NA                                                                                                                                 |
| ONLINSEC*           | YES                            | The pair is created whether the S-VOL is online or not.                                                                                     |
### Parameters Table

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>NO</td>
<td></td>
<td>If the S-VOL is online, the pair is not created.</td>
</tr>
</tbody>
</table>

* Not specifying and specifying NO for this parameter has the same effect.

The following image shows an example of the **PPRCOPY ESTPAIR** command:

```
//PAIR JOB  
//      EXEC PGM=ICKDSF  
//SYSPRINT DD SYSOUT=*  
//DD1 DD UNIT=SYSA,DISP=SHR,_VOL=S0HDT80  
//STIN DD *  
PPRCOPY ESTPAIR DDNAME(DD1) DRI 00'080',30158','00'  
SRO 00'800',30158','01'  
MODE(COPY) freshmen(15)  
/*  
```

### Splitting pairs using CSUSPEND and PPRCOPY SUSPEND

The P-VOL and its associated S-VOLs for pairs in DUPLEX status are typically not identical since update copy operations are asynchronous.

Splitting the pair allows the host access to the S-VOL. If the pair is not split (Split/SUSPOP status), the host can access the nonreserved S-VOL. You cannot access reserved volumes that are unpaired.

**Prerequisite:** The volumes must be paired or you have performed Quick Resync on the pair (DUPLEX status).

1. Issue one of the following commands to the P-VOL:
   - (For PPRC) **CSUSPEND**
     For information about the parameters for splitting pairs with this command, see [CSUSPEND parameters on page A-8](#).
   - (For PPRCOPY) **PPRCOPY SUSPEND**
     For information about the parameters for splitting pairs with this command, see [PPRCOPY SUSPEND parameters on page A-9](#).

### CSUSPEND parameters

The following table describes the PPRC **CSUSPEND** command parameters used for splitting pairs.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEVN</td>
<td>Device number</td>
<td>NA</td>
</tr>
<tr>
<td>PRIM</td>
<td>Primary volume: SSID, serial number, channel connection address, and CU number.</td>
<td>You can specify MPS00 or MAxx0 instead of a serial number, where xx is a CTG ID. Use MPS00 for a steady split request.</td>
</tr>
</tbody>
</table>
**Parameter** | **Value** | **Description**
--- | --- | ---
 |  | Use MA\textit{nn}0 to Quick Split all pairs in a CTG. If you specify parameters other than the serial number, MPS00, or MA\textit{nn}0, the command is rejected.

**SEC** | Secondary volume: SSID, serial number, channel connection address, and CU number. | NA

**PRIMARY** | Not Applicable | Not used by SIz.

* When executing Quick Split for all the pairs in a CTG, make sure that the status of every pair is DUPLEX. If you are copying the pair (PENDING status), Quick Split can end abnormally (reporting CC = 12). If this occurs, wait until the copy operation ends. For more information about the prerequisites for Quick Split, see Pair splitting methods on page 5-16.

The following image shows an example of running the \texttt{CSUSPEND} command:

```
CSUSPEND DDNM (X 'D80') PRII (X '0080' ,30158,X '00') SEC (X '0080',30158,X '01')
```

**PPRCOPY SUSPEND parameters**

The following table describes the \texttt{PPRCOPY SUSPEND} command parameters used to split pairs.

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
</table>
| DDNAME, SYSNAME, or UNITADDRESS | DDNAME = \textit{dname}  
SYSNAME = \textit{sysxxx}  
UNITADDRESS = \textit{ccuu} | Only one of the three parameters can be specified. The italic term is the arbitrary name, where \textit{dname} is the JCL statement identifying the volume, \textit{sysxxx} is the SYSNAME of the ASSGN system control statement, and \textit{ccuu} is the device number. |
| PRI | Primary volume: SSID, serial number, channel connection address. | You can specify MPS00 or MA\textit{nn}0 instead of a serial number, where \textit{nn} is a CTG ID.  
MPS00 is used for a steady split request.  
Use MA\textit{nn}0 to Quick Split all pairs in a CTG.*  
If you specify parameters other than the serial number, MPS00, or MA\textit{nn}0, the command is rejected. |
<p>| SEC | Secondary volume: SSID, serial number, channel connection address. | NA |</p>
<table>
<thead>
<tr>
<th>Parameters</th>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRIMA</td>
<td>Not Applicable</td>
<td>Not used by SIZ.</td>
</tr>
<tr>
<td>LSS</td>
<td>P-VOL or S-VOL CU number.</td>
<td>NA</td>
</tr>
</tbody>
</table>

* When executing Quick Split for all the pairs in a CTG, make sure that the status of every pair is DUPLEX. If you are in the process of copying the pair (PENDING status), Quick Split can end abnormally (reporting CC = 12). If this occurs, wait until the copy operation ends. For more information about the prerequisites for Quick Split, see Pair splitting methods on page 5-16.

The following image shows an example of running the `PPRCOPY SUSPEND` command:

```bash
//EDPJR JOB
// EDG PDM=ICKDSF
//SYSPRINT ND SYSOUT=*
//DD1 ID UNIT=SYSDA,DISP=SHR, VOL=SHR=OVR,D=0
//SISN ID *
PPRCOPY SUSPEND DYNAM(D1) PRI('0080',30158,X'00') SEC('0080',30158,X'0L')
/*
```

**Resynchronizing pairs with CESTPAIR and PPRCOPY ESTPAIR**

Prerequisite: The pair must be split (Split/SUSPOP status) or suspended (Suspend/SUSPER status).

Issue one of the following commands to the P-VOL:

- (For PPRC) `CESTPAIR`
- (For PPRCOPY) `PPRCOPY ESTPAIR`

**CESTPAIR parameters**

The following table describes the PPRC `CESTPAIR` command parameters used for resynchronizing pairs.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEVN</td>
<td>Device number</td>
<td>NA</td>
</tr>
</tbody>
</table>
| PRIM      | Primary volume: SSID, serial number, channel connection address, and CU number. | You can specify the following additional parameters corresponding to each request instead of a serial number. If you do not specify an additional parameter, the request triggers a normal copy:
  * For a Quick Resync, specify MRF00. |
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SEC</td>
<td>Secondary volume: SSID, serial number, channel connection address, and CU number.</td>
<td>NA</td>
</tr>
<tr>
<td>MODE</td>
<td>RESYNC</td>
<td>Re-establish a split or suspended volume pair. This parameter is required.</td>
</tr>
<tr>
<td>PACE</td>
<td>Any number</td>
<td>Copy speed is medium, regardless what is specified for the PACE parameter.</td>
</tr>
<tr>
<td>CRIT</td>
<td>Not applicable</td>
<td>Not used by S1z.</td>
</tr>
<tr>
<td>MSGREQ</td>
<td>YES</td>
<td>MSGREQ function is applicable. <strong>Note:</strong> Do not specify YES for this parameter when you request resync on all pairs in a CTG. If you specify YES for this parameter, the command ends abnormally (reporting CC = 8). NO MSGREQ function is not applicable.</td>
</tr>
<tr>
<td>ONLINSEC*</td>
<td>YES</td>
<td>You can Normal Copy when the S-VOL is online and offline. You can reverse resynchronize the pair when the P-VOL and S-VOL are online and offline. NO</td>
</tr>
</tbody>
</table>

* Not specifying and specifying NO for this parameter has the same effect.
The following image shows an example of running the **CESTPAIR** command with MODE(RESYNC):

```
CESTPAIR DSN (X 'DH80') PRIM (X '0080',X '3018',X '00') SEC (X '0080',X '3018',X '01')
MODE (RESYNC) PAGE (15)
```

## PPRCOPY ESTPAIR parameters

The following table describes the **PPRCOPY ESTPAIR** command parameters used to resynchronize pairs.

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
</table>
| DDNAME, SYSNAME, or UNITADDRESS | DDNAME = *dname*  
SYSNAME = *sysxxx*  
UNITADDRESS = *ccuu* | Only one of the three parameters can be specified. The italic term is the arbitrary name, where *dname* is the JCL statement identifying the volume, *sysxxx* is the SYSNAME of the ASSGN system control statement, and *ccuu* is the device number. |
| PRI                      | Primary volume: SSID, serial number, channel connection address. | You can specify the following additional parameters corresponding to each request instead of a serial number. If you do not specify an additional parameter, the request triggers a normal copy:  
- For a Quick Resync, specify MRF00.  
  This parameter is valid for MODE(RESYNC) only.  
- For a Quick Restore, specify MRQ00.  
  This parameter is valid for MODE(RESYNC) only.  
- For a Reverse Copy, specify MRR00.  
  This parameter is valid for MODE(RESYNC) only.  
- To resync all pairs in a CTG, specify MANnn, where nn is a CTG ID.  
  You can execute resync by specifying this parameter.  
You must use these parameters to successfully run the command. |
<table>
<thead>
<tr>
<th>Parameters</th>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SEC</td>
<td>Secondary volume: SSID, serial number, channel connection address.</td>
<td>NA</td>
</tr>
<tr>
<td>MODE</td>
<td>RESYNC</td>
<td>Re-establish a split or suspended pair.</td>
</tr>
<tr>
<td>PACE</td>
<td>1-255</td>
<td>Copy speed is medium, regardless what is specified for the PACE parameter.</td>
</tr>
<tr>
<td>CRIT</td>
<td>Not applicable</td>
<td>Not used by SIZ.</td>
</tr>
<tr>
<td>MSGREQ</td>
<td>YES</td>
<td>To prevent the command from ending abnormally (reporting CC = 12), do not specify the parameter if MODE(RESYNC) is set.</td>
</tr>
<tr>
<td>LSS</td>
<td>P-VOL or S-VOL CU number.</td>
<td>NA</td>
</tr>
<tr>
<td>ONLINSEC*</td>
<td>YES</td>
<td>You can Normal Copy when the S-VOL is online or offline. You can reverse resynchronize the pair when the P-VOL and S-VOL are online or offline.</td>
</tr>
<tr>
<td></td>
<td>NO</td>
<td>You can Normal Copy when the S-VOL is online. You can reverse resynchronize the pair when the P-VOL and S-VOL are online. The ICKDSF job ends abnormally (reporting CC = 12). <strong>Note:</strong> Although an error does not occur if you specify YES for this parameter, the copy operation is performed. The storage system does not check to see if the volume is online.</td>
</tr>
</tbody>
</table>

* Not specifying and specifying NO for this parameter has the same effect.

The following image shows an example of running the `PPRCOPY ESTPAIR` command with MODE(RESYNC):

```
/EPAIR JOB
  EXEC PGM=ICKDSF
  //SYSIN DD SYSIN=**
  //DD0 DD UNIT=SYSDA,DISP=SHR,vol=SER=MFODS0
  //DD0 DD *
  PPRCOPY ESTPAIR DNAME(DD1) PRI('X'0080','30158,'X'00') SRC('X'0080','30158,'X'01')
  MODE(RESYNC) PACE(15)
/*
```

Performing ShadowImage for Mainframe pair tasks using IBM PPRC and ICKDSF commands
Deleting pairs with CDELPair and DELPAIR

Prerequisite: The pairs are split (Split/SUSPOP status), which ensures S-VOL data integrity.

1. Issue one of the following commands to the P-VOL:
   - (For PPRC) CDELPair
   - (For PPRCOPY) PPRCOPY DELPAIR

Related topics
- Splitting pairs using CSUSPEND and PPRCOPY SUSPEND on page A-8

CDELPair parameters

The following table describes the PPRC CDELPair command parameters used for deleting pairs.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEVN</td>
<td>Device number</td>
<td>NA</td>
</tr>
<tr>
<td>PRIM</td>
<td>Primary volume: SSID, serial number, channel connection address, and CU number.</td>
<td>To delete all pairs in a CTG, set this parameter to MA+n0, where nn is the CTG ID. You must use these parameters to successfully run the command.</td>
</tr>
<tr>
<td>SEC</td>
<td>Secondary volume: SSID, serial number, channel connection address, and CU number.</td>
<td>NA</td>
</tr>
</tbody>
</table>

The following image shows an example of running the CDELPair command:

```
CDELPair DEVN (X ‘D800’) PRIM (X ‘0090’, 30159, X ‘00’) SEC (X ‘0090’, 30159, X ‘01’)
```

PPRCOPY DELPAIR parameters

The following table describes the PPRCOPY DELPAIR command parameters used to delete pairs.

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DDNAME, SYSNAME, or UNITADDRESS</td>
<td>DDNAME = dname</td>
<td>Only one of the three parameters can be specified. The italic term is the arbitrary name, where dname is the JCL statement identifying the volume, sysxxx is the SYSNAME of the ASSGN system control statement, and ccuu is the device number.</td>
</tr>
<tr>
<td></td>
<td>SYSNAME = sysxxx</td>
<td></td>
</tr>
<tr>
<td></td>
<td>UNITADDRESS = ccuu</td>
<td></td>
</tr>
<tr>
<td>Parameters</td>
<td>Value</td>
<td>Description</td>
</tr>
<tr>
<td>------------</td>
<td>-----------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>PRI</td>
<td>Primary volume: SSID, serial number, channel connection address.</td>
<td>To delete all pairs in a CTG, set this parameter to MANn0, where ( nn ) is the CTG ID. You must use these parameters to successfully run the command.</td>
</tr>
<tr>
<td>SEC</td>
<td>Secondary volume: SSID, serial number, channel connection address.</td>
<td>NA</td>
</tr>
<tr>
<td>LSS</td>
<td>P-VOL or S-VOL CU number.</td>
<td>NA</td>
</tr>
</tbody>
</table>

The following image shows an example of running the **PPRCOPY DELPAIR** command:

```
//PAIR JOB
// CEC PSM-ICKDSF
//SYSPRINT DD SYSOUT=*
//DD1 DD UNIT=STDASD,DISP=SHR,VolSet=SHR,DISPO=SHR
//SYSIN DD *
PPRCOPY DELPAIR DNAM(
  DD1) PRI('0080',30158,X'00') SEC('0080',30158,X'01')
*/
```

**Performing consistency group pair tasks using PPRC commands**

With PPRC, you can set up, split, resynchronize, and delete pairs in a consistency group, which performs the pair task on all the pairs at the same time.

**Assigning pairs to consistency groups**

You can use Business Continuity Manager (BCM), PPRC, or CCI commands to assign multiple SIZ pairs to a consistency group (CTG).

Complete the following steps to assign pairs to CTGs using PPRC commands:

1. If you plan to use CTGs with PPRC, use HDVM - SN to reserve a CTG for SIZ so that you can perform tasks on the pairs in the group, such as CTG pair-split. Otherwise, skip this step.
2. Create the pairs by running one of the following commands:
   - (For PPRC) **CESTPAIR**
   - (For PPRCOPY) **PPRCOPY ESTPAIR**
3. In HDVM - SN, in the **Local Replication** window, verify that the pairs are assigned to the CTG.
Splitting pairs in consistency groups

Split pairs in the consistency group (CTG) so that hosts can access the S-VOL.

1. Issue one of the following commands to the pair:
   - (For PPRC) CSUSPEND
   - (For PPRCOPY) PPRCOPY SUSPEND
   All of the pairs in the CTG are split (Split/SUSPOP status).

2. Check the pair status to make sure the pair is split (Split/SUSPOP status) by running one of the following commands:
   - (For PPRC) CQUERY
   - (For PPRCOPY) PPRCOPY QUERY

Resynchronizing pairs in consistency groups

1. Resynchronize the pair by running one of the following commands:
   - (For PPRC) CESTPAIR
   - (For PPRCOPY) PPRCOPY ESTPAIR
   All of the pairs in the consistency group (CTG) are resynchronized.

2. Check the pair status by running one of the following commands:
   - (For PPRC) CQUERY
   - (For PPRCOPY) PPRCOPY QUERY
   The VSP G1000 storage system checks the pair status to make sure that it has changed to PENDING or DUPLEX.

Deleting pairs in consistency groups

Complete the following steps to delete all of the pairs in a consistency group (CTG).

1. Delete all of the pairs in the CTG by running one of the following commands:
   - (For PPRC) CDELPAIR
   - (For PPRCOPY) PPRCOPY DELPAIR
   All of the pairs in the CTG are deleted.

2. Check the pair status to make sure that the volumes are unpaired by running one of the following commands:
Showing pair status and volume information with CQUERY TSO and QUERY ICKDSF

You can run the commands to the P-VOL or S-VOL. If the P-VOL is paired with more than one S-VOL, the status that is shown is for the pair that has an S-VOL with the lowest LDEV ID. To show the status for a pair that has another S-VOL, run the command to the desired S-VOL.

If the storage system contains both SIz and TCz pairs, the commands show the TCz pair status. To show the SIz status, run the command on the SIz S-VOL. If you are sharing SIz and TCz volumes, path status shows for TCz. If they do not share volumes, path status for the SIz pair shows as FFFF FFFF.

1. Issue one of the following commands to the P-VOL or the S-VOL:

   - (For PPRC) `CQUERY TSO`
     For information about the parameters for this command, see `CQUERY TSO parameters on page A-17`.

   - (For PPRCOPY) `QUERY ICKDSF`
     For information about the parameters for this command, see `QUERY ICKDSF parameters on page A-18`.

CQUERY TSO parameters

The following table lists PPRC `CQUERY TSO` command parameters used to show pair information.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEVN</td>
<td>Device number</td>
</tr>
</tbody>
</table>

The following image shows an example of running the `CQUERY TSO` command:
If you run the **QUERY TSO** command on the S-VOL in a CTG, the SECONDARY serial number is shown in the following format:

```
00|S|@|000|30158
```

where:

- **S** indicates that it is assigned to a CTG.
- **@** indicates CTG pair-split.
- **30158** is the serial number.

**QUERY ICKDSF parameters**

The following table describes the PPRCOPY **QUERY ICKDSF** command parameters used to show pair information.

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DDNAME, SYSNAME, or</td>
<td>DDNAME = dname</td>
<td>Only one of the three parameters can be specified. The italic term is</td>
</tr>
<tr>
<td>UNITADDRESS</td>
<td>SYSNAME = sysxxx</td>
<td>the arbitrary name, where <strong>dname</strong> is the JCL statement identifying the</td>
</tr>
<tr>
<td></td>
<td>UNITADDRESS = ccuu</td>
<td>volume, <strong>sysxxx</strong> is the SYSNAME of the ASSGN system control statement, and</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>ccuu</strong> is the device number.</td>
</tr>
</tbody>
</table>

The following image shows an example of running the **QUERY ICKDSF** command:
The following table describes the fields in the output of the PPRC CQUERY TSO and PROCOPY QUERY ICKDSF commands.

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEVICE</td>
<td>Device number of the volume on which the CQUERY command is issued.</td>
</tr>
<tr>
<td>LEVEL</td>
<td>PRIMARY indicates that the volume is a P-VOL. SECONDARY indicates that the volume is a S-VOL.</td>
</tr>
<tr>
<td>STATE</td>
<td>Pair status</td>
</tr>
<tr>
<td>PATH STATUS</td>
<td>Invalid for SI; Active is shown.</td>
</tr>
<tr>
<td>CRIT</td>
<td>Invalid for SI; NO is shown.</td>
</tr>
<tr>
<td>CTGRPLB</td>
<td>Invalid for SI; NO is shown.</td>
</tr>
<tr>
<td>PRIMARY-SSID</td>
<td>SSID of the P-VOL CU</td>
</tr>
<tr>
<td>PRIMARY-CCA</td>
<td>P-VOL LDEV number</td>
</tr>
<tr>
<td>PRIMARY-LSS</td>
<td>P-VOL CU number</td>
</tr>
<tr>
<td>PRIMARY-serial</td>
<td>P-VOL serial number</td>
</tr>
<tr>
<td>SECONDARY-SSID</td>
<td>SSID of the S-VOL CU</td>
</tr>
<tr>
<td>SECONDARY-CCA</td>
<td>S-VOL LDEV number</td>
</tr>
<tr>
<td>SECONDARY-LSS</td>
<td>S-VOL CU number</td>
</tr>
<tr>
<td>Field</td>
<td>Description</td>
</tr>
<tr>
<td>-----------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| SECONDARY-Serial S-VOL serial number. | Run the `QUERY TSO PPRC` command for the S-VOL to show the following information:  
  00ab000nnnn  
  where "a" indicates that the pair is defined as a CTG and "b" indicates that you split the pair using CTG pair-split. "0" indicates otherwise. "nnnnn" is the S-VOL serial number. |
| PATHS                 | Invalid for SI; 1 is shown.                                                                                                               |
| SAID DEST STATUS      | Invalid for SI; FFFF FFFF is shown.                                                                                                        |
| DESCRIPTION           | Invalid for SI; PATH ESTABLISH is shown.                                                                                                   |
| PERCENT OF COPY COMPLETE | Invalid for SI; 100% is shown.                                                                                                             |
| SUBSYSTEM             | Invalid for SI, not valid content.                                                                                                         |
| WWN                   | Invalid for SI, not valid content.                                                                                                         |
| LIC LEVEL             | Invalid for SI, not valid content.                                                                                                         |

When the MCU-RCU path for TCz is created on the CU where an SIz pair exists, MCU-RCU path information is shown.
Interface support for ShadowImage for Mainframe pair tasks and options

This appendix lists S1z pair tasks and options, and the interfaces that support them.

- Supported Business Continuity Manager and IBM PPRC actions and options
- Supported ShadowImage for Mainframe consistency group actions and options
### Supported Business Continuity Manager and IBM PPRC actions and options

The following table lists the SIz pair tasks and options that Business Continuity Manager (BCM) and IBM PPRC support.

The following table lists the pair tasks by user interface.

<table>
<thead>
<tr>
<th>Pair task</th>
<th>BCM System option</th>
<th>BCM TSO command</th>
<th>BCM ICKDSF command</th>
<th>IBM PPRC System option</th>
<th>IBM PPRC TSO command</th>
<th>IBM PPRC ICKDSF command</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reserve volume as S-VOL</td>
<td>No options</td>
<td>NO</td>
<td>NO</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Cancel the S-VOL reservation</td>
<td>No options</td>
<td>NO</td>
<td>NO</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Change system options</td>
<td>No options</td>
<td>NO</td>
<td>NO</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Create pairs</td>
<td>No options</td>
<td>YKMAKE</td>
<td>CESTPAIR</td>
<td>PPRCOPY</td>
<td>ESTPAIR</td>
<td>PPRCOPY</td>
</tr>
<tr>
<td>MU number</td>
<td>No options</td>
<td>NO</td>
<td>NO</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Copy pace</td>
<td>YES(^2)</td>
<td>NO(^1)</td>
<td>NO(^1)</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Steady Split</td>
<td>NO</td>
<td>CESTPAIR</td>
<td>PPRCOPY ESTPAIR</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quick Split</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>MSGREQ</td>
<td>NO</td>
<td>CESTPAIR</td>
<td>PPRCOPY ESTPAIR</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ONLINSEC</td>
<td>YES(^1)</td>
<td>CESTPAIR</td>
<td>PPRCOPY ESTPAIR</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Split pairs</td>
<td>No options</td>
<td>YKSUSPND</td>
<td>CSUSPEND</td>
<td>PPRCOPY SUSPEND</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Copy pace</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Steady Split</td>
<td>YKSUSPND</td>
<td>CSUSPEND</td>
<td>PPRCOPY SUSPEND</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quick Split</td>
<td>YKSUSPND</td>
<td>CSUSPEND</td>
<td>PPRCOPY SUSPEND(^3)</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Resynchronize pairs</td>
<td>No options</td>
<td>YKRESYNC</td>
<td>CESTPAIR</td>
<td>PPRCOPY ESTPAIR</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Copy pace</td>
<td>YKRESYNC(^2)</td>
<td>NO(^1)</td>
<td>No(^1)</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Normal Copy</td>
<td>YKRESYNC</td>
<td>CESTPAIR</td>
<td>PPRCOPY ESTPAIR</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quick Resync</td>
<td>YKRESYNC</td>
<td>CESTPAIR</td>
<td>PPRCOPY ESTPAIR</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reverse Copy</td>
<td>YKRESYNC</td>
<td>CESTPAIR</td>
<td>PPRCOPY ESTPAIR</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quick Restore</td>
<td>YKRESYNC</td>
<td>CESTPAIR</td>
<td>PPRCOPY ESTPAIR</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ONLINSEC</td>
<td>YKRESYNC</td>
<td>CESTPAIR</td>
<td>PPRCOPY ESTPAIR</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Suspend pairs</td>
<td>No options</td>
<td>NO</td>
<td>NO</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Delete pairs</td>
<td>No options</td>
<td>YKDELETE</td>
<td>CDELPAIR</td>
<td>PPRCOPY DELPAIR</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**

1. The system uses **Medium** speed regardless of what you specify.
2. You can only select **Slow** or **Normal** speed. **Normal** is the default.
3. If you do not specify an option, the system uses Quick Split.
## Supported ShadowImage for Mainframe consistency group actions and options

The following table lists the SIZ consistency group (CTG) actions and options supported by HDvM - SN and CCI.

<table>
<thead>
<tr>
<th>CTG action</th>
<th>System option</th>
<th>HDvM - SN</th>
<th>CCI</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Command</td>
<td>Option</td>
</tr>
<tr>
<td>Reserve CTG</td>
<td>No options</td>
<td>YES</td>
<td>Not necessary</td>
</tr>
<tr>
<td>Cancel the CTG reservation</td>
<td>No options</td>
<td>YES</td>
<td>Not necessary</td>
</tr>
<tr>
<td>Assign pairs to a CTG</td>
<td>No options</td>
<td>NO</td>
<td>paircreate -m grp [CTGID]</td>
</tr>
<tr>
<td></td>
<td>MU number</td>
<td>NO</td>
<td>paircreate Uses MU# in HORCM.conf file</td>
</tr>
<tr>
<td></td>
<td>Copy pace</td>
<td>NO</td>
<td>paircreate -m grp [CTGID] -c &lt;size&gt;</td>
</tr>
<tr>
<td></td>
<td>User specifies the CTG ID</td>
<td>NO</td>
<td>paircreate -m grp xx (xx = CTGID)</td>
</tr>
<tr>
<td></td>
<td>System allocates the CTG ID</td>
<td>NO</td>
<td>paircreate -m grp (CTGID is omitted)</td>
</tr>
<tr>
<td>CTG pair-split (undefined split time)</td>
<td>No options</td>
<td>NO</td>
<td>pairsplit Not applicable</td>
</tr>
<tr>
<td></td>
<td>Copy pace</td>
<td>NO</td>
<td>pairsplit -c &lt;size&gt;</td>
</tr>
<tr>
<td></td>
<td>Steady Split</td>
<td>NO</td>
<td>pairsplit -fq normal</td>
</tr>
<tr>
<td></td>
<td>Quick Split</td>
<td>NO</td>
<td>pairsplit -fq quick</td>
</tr>
<tr>
<td></td>
<td>UR-SI combination (Steady Split)</td>
<td>NO</td>
<td>pairsplit -fq normal</td>
</tr>
<tr>
<td></td>
<td>UR-SI combination (Quick Split)</td>
<td>NO</td>
<td>pairsplit -fq quick</td>
</tr>
<tr>
<td>Resynchronize pairs</td>
<td>No options</td>
<td>NO</td>
<td>pairresync* Not applicable</td>
</tr>
<tr>
<td></td>
<td>Copy pace</td>
<td>NO</td>
<td>pairresync* -c &lt;size&gt;</td>
</tr>
<tr>
<td></td>
<td>Normal Copy</td>
<td>NO</td>
<td>pairresync* -fq normal</td>
</tr>
<tr>
<td></td>
<td>Quick Resync</td>
<td>NO</td>
<td>pairresync* -fq quick</td>
</tr>
<tr>
<td></td>
<td>Reverse Copy</td>
<td>NO</td>
<td>pairresync* -fq normal - restore</td>
</tr>
</tbody>
</table>
The following table lists the CTG actions and options supported by Business Continuity Manager (BCM) and IBM PPRC.

<table>
<thead>
<tr>
<th>CTG action</th>
<th>System option</th>
<th>BCM</th>
<th>IBM PPRC</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>TSO command</td>
<td>ICKDSF command</td>
</tr>
<tr>
<td>Reserve CTG</td>
<td>No options</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>Cancel the CTG reservation</td>
<td>No options</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>Assign pairs to a CTG</td>
<td>No options</td>
<td>YKMAKE</td>
<td>CESTPAIR</td>
</tr>
<tr>
<td></td>
<td>MU number</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td></td>
<td>Copy pace</td>
<td>YKMAKE</td>
<td>NO</td>
</tr>
<tr>
<td></td>
<td>User specifies the CTG ID</td>
<td>YKMAKE</td>
<td>CESTPAIR</td>
</tr>
<tr>
<td></td>
<td>System allocates the CTG ID</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>ATTIME Suspend</td>
<td>No options</td>
<td>YKXSUSPND</td>
<td>NO</td>
</tr>
<tr>
<td>Steady Split</td>
<td>YKXSUSPND</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>Quick Split</td>
<td>YKXSUSPND</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>(If you share SIz volumes with UR) Steady Split</td>
<td>YKXSUSPND</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>(If you share SIz volumes with UR) Quick Split</td>
<td>YKXSUSPND</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>Cancel ATTIME Suspend</td>
<td>No options</td>
<td>YKXSUSPND</td>
<td>NO</td>
</tr>
<tr>
<td>CTG pair-split (undefined split time)</td>
<td>No options</td>
<td>YKXSUSPND</td>
<td>CSUSPEND$^2$</td>
</tr>
<tr>
<td></td>
<td>Copy pace</td>
<td>NO</td>
<td>NO$^3$</td>
</tr>
<tr>
<td></td>
<td>Steady Split</td>
<td>YKXSUSPND</td>
<td>NO</td>
</tr>
<tr>
<td></td>
<td>Quick Split</td>
<td>YKXSUSPND</td>
<td>NO</td>
</tr>
</tbody>
</table>

* You must use a CCI pair group to run the command on pairs in a CTG.
<table>
<thead>
<tr>
<th>CTG action</th>
<th>System option</th>
<th>BCM</th>
<th>IBM PPRC</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>TSO command</td>
<td>ICKDSF command</td>
</tr>
<tr>
<td>(If you share SI volumes with UR)</td>
<td>Steady Split</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td></td>
<td>Quick Split</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>Resynchronize pairs</td>
<td>No options</td>
<td>YKRESYNC</td>
<td>CESTPAIR(^5)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>PPRCOPY ES2TPAIR(^5)</td>
</tr>
<tr>
<td>Copy pace</td>
<td>YKRESYNC(^1)</td>
<td>NO(^3)</td>
<td>NO(^3)</td>
</tr>
<tr>
<td>Normal Copy</td>
<td>YKRESYNC</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>Quick Resync</td>
<td>YKRESYNC</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>Reverse Copy</td>
<td>YKRESYNC</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>Quick Restore</td>
<td>YKRESYNC</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>ONLINSEC</td>
<td>YKRESYNC</td>
<td>CESTPAIR</td>
<td>PPRCOPY ES2TPAIR</td>
</tr>
<tr>
<td>Delete pairs</td>
<td>No options</td>
<td>YKDELETE(^4)</td>
<td>CDELPAIR</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>PPRCOPY DELPAIR</td>
</tr>
</tbody>
</table>

**Notes:**

1. Values: **Slow** or **Normal**. **Normal** is the default.
2. **Quick Split** is used regardless of what you specify.
3. **Medium** speed is used regardless of what you specify.
4. You must use a CCI pair group to run the command for the CTG.
5. **Normal Resync** is used regardless of what you specify.
Interface support for ShadowImage for Mainframe pair tasks and options

Hitachi Virtual Storage Platform G1000 Hitachi ShadowImage® for Mainframe User Guide
ShadowImage for Mainframe GUI reference

This appendix describes SIZ windows and dialog boxes in HDvM - SN.

- Replication window
- Local Replication window
- View Pair Properties window
- View Pair Synchronization Rate window
- History window
- Consistency Group Properties window
- Create SI Pairs wizard
- Split Pairs wizard
- Resync Pairs wizard
- Suspend Pairs window
- Delete Pairs window
- Edit Mirror Units dialog box
- Change Options dialog box
- Reserve Mainframe CTGs wizard
Release Reserved Mainframe CTGs window

Edit Local Replica Options wizard

Edit SCP Time window
Replication window

Use this window to view pair information for local replication.

This window contains the following section and tab:

- Summary section
- Replica LDEVs tab

The following image shows this window, with the summary section and Replica LDEVs tab in view.

Summary section

The following table describes the items in this section of the Replication window.

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Licensed Capacity</td>
<td>The amount of used and licensed capacity of each software application.</td>
</tr>
<tr>
<td>Number of Replica LDEVs</td>
<td>The number of LDEVs used for all local replication pairs.</td>
</tr>
<tr>
<td>Number of FCv2/FCSE Relationships</td>
<td>The number of Compatible FlashCopy® V2 and Compatible FlashCopy® SE relationships in use.</td>
</tr>
<tr>
<td>Number of Differential Tables</td>
<td>The number of differential tables in use and the differential table limit, for local replication. Differential tables in use for remote replication are not included.</td>
</tr>
</tbody>
</table>
Because differential tables are not used for all operations, the number of differential tables does not change when you execute the following operations:

- Thin Image pair operations.
- SI pair operations for a DP-VOL that exceeds 4 TB.
- SIz pair operations for a DP-VOL that exceeds 262,668 cylinders.
- Compatible FlashCopy® V2 or Compatible FlashCopy® SE relationship operations.

**View History button**
Click to show options.
Options:

- **Local Replication**: Click to open the History window for local replication.
- **Remote Replication**: Click to open the History window for remote replication.

**Edit Options button**
Click to show options.
Options:

- **Local Replication**: Click to open the Edit Local Replica Options wizard.
- **Remote Replication**: Click to open the Edit Remote Replica Options window.

For more information about how to use this window, see the Hitachi TrueCopy® for Mainframe User Guide.

- **SCP Time**: Click to open the Edit SCP Time window.

---

### Replica LDEVs tab

The following table describes the items on this tab of the Replication window.

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>LDEV ID</td>
<td>Selected LDEV's identifier. Click to open the LDEV Properties window, which contains additional information for the selected replica LDEV.</td>
</tr>
<tr>
<td>LDEV Name</td>
<td>The selected LDEV's name.</td>
</tr>
<tr>
<td>Emulation Type</td>
<td>The selected LDEV's emulation type.</td>
</tr>
<tr>
<td>Capacity</td>
<td>The selected LDEV's capacity.</td>
</tr>
<tr>
<td>Copy Type</td>
<td>The copy type. Values:</td>
</tr>
<tr>
<td></td>
<td><strong>SI-L1</strong>: ShadowImage L1 P-VOL or S-VOL</td>
</tr>
<tr>
<td></td>
<td><strong>SI-L2</strong>: ShadowImage L2 P-VOL or S-VOL</td>
</tr>
<tr>
<td></td>
<td><strong>TI</strong>: Thin Image P-VOL or S-VOL</td>
</tr>
<tr>
<td></td>
<td><strong>SI MF</strong>: ShadowImage for Mainframe P-VOL or S-VOL</td>
</tr>
<tr>
<td></td>
<td><strong>FCv2</strong>: Compatible FlashCopy® V2 relationship</td>
</tr>
<tr>
<td>Item</td>
<td>Description</td>
</tr>
<tr>
<td>------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>FCSE</td>
<td>Compatible FlashCopy® SE relationship</td>
</tr>
<tr>
<td>TC</td>
<td>TrueCopy P-VOL or S-VOL</td>
</tr>
<tr>
<td>UR</td>
<td>Universal Replicator P-VOL or S-VOL</td>
</tr>
<tr>
<td>TCMF</td>
<td>TrueCopy for Mainframe P-VOL or S-VOL</td>
</tr>
<tr>
<td>URMF</td>
<td>Universal Replicator for Mainframe P-VOL or S-VOL</td>
</tr>
<tr>
<td>GAD</td>
<td>Global-active device P-VOL or S-VOL</td>
</tr>
</tbody>
</table>

Virtual Storage Machine*

Information about the virtual storage machine to which the LDEV belongs.
Values:
- **Model/Serial Number**: The model type and serial number of the virtual storage machine.
- **LDEV ID**: The identification number of the volume's virtual LDEV. If no virtual LDEV ID is assigned, a blank is displayed.
- **Device Name**: The name of the volume's virtual device, in a combined format of virtual emulation type, number of virtual LUSE volumes, and virtual CVS attribute. Each of these three items is displayed only if it is specified. If none of them are specified, a blank is displayed.
- **SSID**: The virtual SSID of the volume. If no virtual SSID is specified, a blank is displayed.

Export button

Click to open a dialog for downloading table information to a tab-separated values (TSV) file.

* These items are not shown in the table by default. You must add them using the Column Settings window.

For more information about how to add items to a table using this window, see the Hitachi Command Suite User Guide or the Hitachi Virtual Storage Platform G1000 System Administrator Guide.

---

**Local Replication window**

Use this window to perform the following tasks:

- Viewing SIz pair, HTI pair, and CTG information for local replication.
- Creating ShadowImage for Mainframe pairs on page 5-4
- ShadowImage for Mainframe pair splitting on page 5-17
- Resynchronizing or restoring ShadowImage for Mainframe pairs on page 5-26
- Deleting ShadowImage for Mainframe pairs on page 5-30

This window contains the following section and tabs:

- Summary section
- **SI Pairs** tab
- **TI Primary Volumes** tab
- **Consistency Groups** tab
- **Snapshot Groups** tab

The following image shows the **SI Pairs** tab in this window.

### Summary section

The following table describes the items in this section of the **Local Replication** window.

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Pairs</td>
<td>The number of pairs for each local replication software type.</td>
</tr>
<tr>
<td>Snapshot Estimated Manageable Capacity*</td>
<td>The estimated HTI pair capacity. The icon is shown if the value is less than 128 TB. For more information about snapshot estimated manageable capacity, see the <em>Hitachi Thin Image User Guide</em>.</td>
</tr>
<tr>
<td>Number of Consistency Groups</td>
<td>The number of consistency groups (CTGs) that have a status other than Free, and the maximum number of CTGs allowed.</td>
</tr>
<tr>
<td>Number of Snapshot Groups</td>
<td>The number of snapshot groups that are in use, and the maximum number of snapshot groups allowed.</td>
</tr>
</tbody>
</table>
| Number of Pair Tables               | The number of pair tables in use, and the maximum number of pair tables allowed. Values:  
- **SI/SIMF/Volume Migration**: SI, SIZ, Volume Migration  
- **TI**: HTI |
| Number of Differential Tables       | The number of differential tables in use, and the maximum number of differential tables allowed. Because differential tables are not used for all operations, the number of differential tables does not change when you execute the following operations: |
**Thin Image pair operations.**
- SI pair operations for a DP-VOL that exceeds 4 TB.
- SIz pair operations for a DP-VOL that exceeds 262,668 cylinders.

*Snapshot Estimated Manageable Capacity is an estimation of Thin Image pair capacity that is calculated by subtracting shared memory used by Thin Image pools and Thin Image pairs from the shared memory capacity. Snapshot Estimated Manageable Capacity is just a reference estimation and does not guarantee that the space is available. The Snapshot Estimated Manageable Capacity value changes when Thin Image pool volumes or Thin Image pairs are added or deleted.*

**SI Pairs tab**

This tab of the **Local Replication** window shows the SI/SIz pairs for which the P-VOLs and/or S-VOLs are allocated to you.

The following image shows this tab.

![Local Replication Window](image)

The following table describes the items on this tab.

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary Volume</td>
<td>The P-VOL information.</td>
</tr>
<tr>
<td></td>
<td>Values:</td>
</tr>
<tr>
<td></td>
<td><strong>LDEV ID</strong>: The P-VOL's LDEV identifier.</td>
</tr>
<tr>
<td></td>
<td>Click to open the <strong>LDEV Properties</strong> window, which contains additional</td>
</tr>
<tr>
<td></td>
<td>information for the selected replica LDEV.</td>
</tr>
<tr>
<td></td>
<td><strong>LDEV Name</strong>: The P-VOL's LDEV name</td>
</tr>
<tr>
<td></td>
<td><strong>Port ID</strong>: The name of the P-VOL LUN path.</td>
</tr>
<tr>
<td></td>
<td>For SIz, a hyphen (-) is shown.</td>
</tr>
<tr>
<td></td>
<td><strong>Host Group Name</strong>: The P-VOL's host group name</td>
</tr>
<tr>
<td></td>
<td>For SIz, a hyphen (-) is shown.</td>
</tr>
<tr>
<td></td>
<td><strong>LUN ID</strong>: The P-VOL's LUN identifier.</td>
</tr>
<tr>
<td></td>
<td>For SIz, a hyphen (-) is shown.</td>
</tr>
<tr>
<td>Item</td>
<td>Description</td>
</tr>
<tr>
<td>------</td>
<td>-------------</td>
</tr>
<tr>
<td>• <strong>Provisioning Type</strong>*: The P-VOL's provisioning type, which can be one of the following:</td>
<td></td>
</tr>
<tr>
<td>o Basic: Internal volume</td>
<td></td>
</tr>
<tr>
<td>o DP: DP-VOL</td>
<td></td>
</tr>
<tr>
<td>o External: External volume</td>
<td></td>
</tr>
<tr>
<td>o External MF: Migration volume</td>
<td></td>
</tr>
<tr>
<td>• <strong>Emulation Type</strong>*: The P-VOL's emulation type.</td>
<td></td>
</tr>
<tr>
<td>• <strong>Capacity</strong>*: The P-VOL's volume capacity.</td>
<td></td>
</tr>
<tr>
<td>• <strong>CLPR</strong>*: The P-VOL's CLPR number.</td>
<td></td>
</tr>
<tr>
<td>• <strong>Encryption</strong>*: The P-VOL's encryption information.</td>
<td></td>
</tr>
<tr>
<td>o Enabled: Encryption of the parity group to which the P-VOL's LDEV belongs is enabled.</td>
<td></td>
</tr>
<tr>
<td>o Disabled: Encryption of the parity group to which the P-VOL's LDEV belongs is disabled.</td>
<td></td>
</tr>
<tr>
<td>If the LDEV is a DP-VOL, external volume, or migration volume, a hyphen (-) is displayed.</td>
<td></td>
</tr>
<tr>
<td>• <strong>Virtual Storage Machine</strong>*: The model type and serial number of the virtual storage machine to which the P-VOL belongs.</td>
<td></td>
</tr>
<tr>
<td>• <strong>Virtual LDEV ID</strong>*: The identification number of the P-VOL's virtual LDEV. If no virtual LDEV ID is assigned, a blank is displayed.</td>
<td></td>
</tr>
<tr>
<td>• <strong>Virtual Device Name</strong>*: The name of the P-VOL's virtual device, in a combined format of virtual emulation type, number of virtual LUSE volumes, and virtual CVS attribute. Each of these three items is displayed only if it is specified. If none of them are specified, a blank is displayed.</td>
<td></td>
</tr>
<tr>
<td>• <strong>Virtual SSID</strong>*: The virtual SSID of the P-VOL. If no virtual SSID is specified, a blank is displayed.</td>
<td></td>
</tr>
</tbody>
</table>

**Copy Type**
The pair type.
Values:
- **SI-L1**: SI L1
- **SI-L2**: SI L2
- **SIMF**: SIz

**Status**
The status of the pair.
For SIz status descriptions, see [HDvM - SN pair status names and descriptions on page 6-4](#).
For SI status descriptions, see the [Hitachi ShadowImage® User Guide](#).

**Secondary Volume**
The S-VOL information.
Values:
- **LDEV ID**: The S-VOL's LDEV identifier. Click the LDEV ID to open the **LDEV Properties** window, which contains additional information for the selected LDEV.
- **LDEV Name**: The S-VOL's LDEV name
<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Port ID</td>
<td>The name of the S-VOL LUN path. SI only. For SIz, a hyphen (-) is shown.</td>
</tr>
<tr>
<td>Provisioning Type*</td>
<td>The S-VOL's provisioning type, which can be one of the following:</td>
</tr>
<tr>
<td></td>
<td>• Basic: Internal volume</td>
</tr>
<tr>
<td></td>
<td>• DP: DP-VOL</td>
</tr>
<tr>
<td></td>
<td>• External: External volume</td>
</tr>
<tr>
<td>Emulation Type*</td>
<td>The S-VOL's emulation type</td>
</tr>
<tr>
<td>Capacity*</td>
<td>The S-VOL's capacity</td>
</tr>
<tr>
<td>CLPR*</td>
<td>The S-VOL's CLPR number</td>
</tr>
<tr>
<td>Encryption*</td>
<td>The S-VOL's encryption information.</td>
</tr>
<tr>
<td></td>
<td>• Enabled: Encryption of the parity group to which the S-VOL's LDEV belongs is enabled.</td>
</tr>
<tr>
<td></td>
<td>• Disabled: Encryption of the parity group to which the S-VOL's LDEV belongs is disabled.</td>
</tr>
<tr>
<td>Virtual Storage Machine*</td>
<td>The model type and serial number of the virtual storage machine to which the S-VOL belongs.</td>
</tr>
<tr>
<td>Virtual LDEV ID*</td>
<td>The identification number of the S-VOL's virtual LDEV. If no virtual LDEV ID is assigned, a blank is displayed.</td>
</tr>
<tr>
<td>Virtual Device Name*</td>
<td>The name of the S-VOL's virtual device, in a combined format of virtual emulation type, number of virtual LUSE volumes, and virtual CVS attribute. Each of these three items is displayed only if it is specified. If none of them are specified, a blank is displayed.</td>
</tr>
<tr>
<td>Virtual SSID*</td>
<td>The virtual SSID of the S-VOL. If no virtual SSID is specified, a blank is displayed.</td>
</tr>
<tr>
<td>Copy Pace*</td>
<td>The system option that determines the rate at which you want the VSP G1000 storage system to copy data.</td>
</tr>
<tr>
<td></td>
<td>Values:</td>
</tr>
<tr>
<td></td>
<td>• Slower: Improved host I/O performance but slower processing speed.</td>
</tr>
<tr>
<td></td>
<td>• Medium: Average processing speed and host I/O performance.</td>
</tr>
<tr>
<td></td>
<td>• Faster: Faster processing speed but slower host I/O performance.</td>
</tr>
<tr>
<td>CTG ID*</td>
<td>The identifier of the consistency group to which the SI/SIz pair is assigned.</td>
</tr>
<tr>
<td>Mirror Unit*</td>
<td>The mirror unit number.</td>
</tr>
<tr>
<td>Topology ID</td>
<td>The LDEV's topology identifier.</td>
</tr>
<tr>
<td></td>
<td>Example: 00.00.00 (MU0-MU1)</td>
</tr>
</tbody>
</table>
**Item** | **Description**
---|---
Create SI Pairs button | Click to open the Create SI Pairs wizard.
Split Pairs button | Click to open the Split Pairs wizard.
Resync Pairs button | Click to open the Resync Pairs wizard.
More Actions | Click to show options. Options:
  - View Pair Synchronization Rate: Click to open the View Pair Synchronization Rate window.
  - View Pair Properties: Click to open the View Pair Properties window.
  - Suspend Pairs: Click to open the Suspend Pairs window.
  - Delete Pairs: Click to open the Delete Pairs window.
  - Export: Click to open a dialog for downloading table information to a tab-separated values (TSV) file.

* These items are not shown in the table by default. You must add them using the Column Settings window.
For more information about how to add items to a table using this window, see the Hitachi Command Suite User Guide or the Hitachi Virtual Storage Platform G1000 System Administrator Guide.

**TI Primary Volumes tab**

Use this tab of the Local Replication window to view HTI pair information for local replication.

The following image shows this tab.

The following table describes the items on this tab.

**Item** | **Description**
---|---
LDEV ID | The P-VOL’s LDEV identifier. Click to open the LDEV Properties window. Use this window to search for P-VOL information.
<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>LDEV Name</td>
<td>The P-VOL's LDEV name.</td>
</tr>
<tr>
<td>Port ID</td>
<td>The port name of the P-VOL LDEV's LUN path.</td>
</tr>
<tr>
<td>Host Group Name</td>
<td>The P-VOL's host group name.</td>
</tr>
<tr>
<td>LUN ID</td>
<td>The LUN ID of the P-VOL LDEV's LUN path.</td>
</tr>
<tr>
<td>Capacity*</td>
<td>The P-VOL's capacity.</td>
</tr>
<tr>
<td>Encryption*</td>
<td>The P-VOL's encryption information.</td>
</tr>
<tr>
<td>• Enabled</td>
<td>Encryption of the parity group to which the P-VOL's LDEV belongs is enabled.</td>
</tr>
<tr>
<td>• Disabled</td>
<td>Encryption of the parity group to which the P-VOL's LDEV belongs is disabled.</td>
</tr>
<tr>
<td>If the LDEV is a DP-VOL or external volume, a hyphen (-) is displayed.</td>
<td></td>
</tr>
<tr>
<td>Pool Name (ID)*</td>
<td>The P-VOL's pool name and identifier.</td>
</tr>
<tr>
<td>Number of Snapshot Data</td>
<td>The number of P-VOL snapshot data.</td>
</tr>
<tr>
<td>Number of Pairs in PSUE status</td>
<td>The number of P-VOL pairs in PSUE status.</td>
</tr>
<tr>
<td>Virtual Storage Machine*</td>
<td>The Virtual Storage Machine information.</td>
</tr>
<tr>
<td>Values:</td>
<td></td>
</tr>
<tr>
<td>• Model/Serial Number</td>
<td>The model type and serial number of the virtual storage machine to which the P-VOL belongs.</td>
</tr>
<tr>
<td>• LDEV ID</td>
<td>The identification number of the P-VOL's virtual LDEV. If no virtual LDEV ID is assigned, a blank is displayed.</td>
</tr>
<tr>
<td>• Device Name</td>
<td>The name of the P-VOL's virtual device, in a combined format of virtual emulation type, number of virtual LUSE volumes, and virtual CVS attribute. Each of these three items is displayed only if it is specified. If none of them are specified, a blank is displayed.</td>
</tr>
<tr>
<td>• SSID</td>
<td>The virtual SSID of the P-VOL. If no virtual SSID is specified, a blank is displayed.</td>
</tr>
<tr>
<td>Create TI Pairs button</td>
<td>Click to open the Create TI Pairs wizard.</td>
</tr>
<tr>
<td>Operate TI Pairs button</td>
<td>Click to open the TI Pairs wizard.</td>
</tr>
<tr>
<td>View Pair Synchronization Rate button</td>
<td>Click to open the View Pair Synchronization Rate window.</td>
</tr>
<tr>
<td>More Actions</td>
<td>Click to show options.</td>
</tr>
<tr>
<td>Options:</td>
<td></td>
</tr>
<tr>
<td>• View Pair Properties</td>
<td>Click to open the View Pair Properties window.</td>
</tr>
<tr>
<td>• View LDEV Properties</td>
<td>Click to open the View LDEV Properties window.</td>
</tr>
<tr>
<td>• Split Pairs</td>
<td>Click to open the Split Pairs window.</td>
</tr>
</tbody>
</table>
### Consistency Groups tab

Use this tab of the **Local Replication** window to perform the following tasks:

- Managing consistency group IDs for ShadowImage for Mainframe using HDvM - SN on page 4-2.
- Releasing reserved mainframe consistency groups on page 4-4.

The following image shows this tab.

![Consistency Groups Tab](image)

The following table describes the items on this tab of the **Local Replication** window.

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CTG ID</td>
<td>The SIz pair's CTG identification number. Click to open the <strong>Consistency Group Properties</strong> window.</td>
</tr>
</tbody>
</table>
| Status | The status. Values:  
|        | **SI Used**: The CTG used by SI.                                            |
### Item Description

- **SIMF Used**: The CTG used for SIz pairs.
- **SIMF Used (PPRC/BCM)**: The CTG used for SIz pairs and managed with Business Continuity Manager (BCM) or IBM PPRC.
- **TI Used**: HTI pairs is using the CTG.
- **Mainframe Reserved**: The CTG is reserved for use with BCM or IBM PPRC.
- **Free**: The CTG is not being used and is not reserved.
- **(Changing...)**: The status is in the process of changing.

<table>
<thead>
<tr>
<th>Number of Pairs</th>
<th>The number of pairs assigned to the CTG.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reserve Mainframe CTGs button</td>
<td>Click to open the Reserve Mainframe CTGs window.</td>
</tr>
<tr>
<td>Release Reserved Mainframe CTGs button</td>
<td>Click to open the Release Reserved Mainframe CTGs window.</td>
</tr>
<tr>
<td>Export button</td>
<td>Click to open a dialog for downloading table information to a tab-separated values (TSV) file.</td>
</tr>
</tbody>
</table>

## Snapshot Groups tab

This tab of the **Local Replication** window shows your snapshot groups.

The following image shows this tab.

The following table describes the items on this tab of the **Local Replication** window.

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Snapshot Group</td>
<td>The snapshot group name. Click to open the HTI pairs window.</td>
</tr>
<tr>
<td>Number of Pairs</td>
<td>The number of pairs currently used by the snapshot group.</td>
</tr>
<tr>
<td>Create TI Pairs button</td>
<td>Click to open the Create TI Pairs wizard.</td>
</tr>
<tr>
<td>Item</td>
<td>Description</td>
</tr>
<tr>
<td>-------------------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Operate TI Pairs button</td>
<td>Click to open the <strong>TI Pairs</strong> wizard.</td>
</tr>
<tr>
<td>View Pair Synchronization Rate button</td>
<td>Click to open the <strong>View Pair Synchronization Rate</strong> window.</td>
</tr>
<tr>
<td>More Actions</td>
<td>Click to show options. Options:</td>
</tr>
<tr>
<td></td>
<td>• <strong>Split Pairs</strong>: Click to open the <strong>Split Pairs</strong> window.</td>
</tr>
<tr>
<td></td>
<td>• <strong>Resync Pairs</strong>: Click to open the <strong>Resync Pairs</strong> window.</td>
</tr>
<tr>
<td></td>
<td>• <strong>Assign Secondary Volumes</strong>: Click to open the <strong>Assign Secondary Volumes</strong> window.</td>
</tr>
<tr>
<td></td>
<td>• <strong>Remove Secondary Volumes</strong>: Click to open the <strong>Remove Secondary Volumes</strong> window.</td>
</tr>
<tr>
<td></td>
<td>• <strong>Delete Pairs</strong>: Click to open the <strong>Delete Pairs</strong> window.</td>
</tr>
<tr>
<td></td>
<td>• <strong>Export</strong>: Click to open a dialog for downloading table information to a tab-separated values (TSV) file.</td>
</tr>
</tbody>
</table>

**View Pair Properties window**

Use this window to review pair and volume details for local replication.

This window contains the following section and table:

- **Pair Properties** section
- **Pairs** table

For more information about this window, see Monitoring ShadowImage for Mainframe pair and volume details on page 6-9.
**Pair Properties section**

The following table describes the items in this section of the **View Pair Properties** window.

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Copy Type</td>
<td>The type of pair. Values:</td>
</tr>
<tr>
<td></td>
<td>• <strong>ShadowImage</strong>: SI pair</td>
</tr>
<tr>
<td></td>
<td>• <strong>ShadowImage for Mainframe</strong>: SIz pair</td>
</tr>
<tr>
<td></td>
<td>• <strong>Thin Image</strong>: HTI pair</td>
</tr>
<tr>
<td>Pool Name (ID)</td>
<td>HTI only. The pool name and identification number. If you have not set a</td>
</tr>
<tr>
<td></td>
<td>pool name for the pair, a blank is displayed.</td>
</tr>
<tr>
<td>Most Recent Snapshot Date</td>
<td>HTI only. The date and time you acquired the most recent snapshot.</td>
</tr>
<tr>
<td>Item</td>
<td>Description</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>If you have not acquired a snapshot, a blank is displayed.</td>
<td></td>
</tr>
<tr>
<td>LDEV ID</td>
<td>The identification number of the LDEVs for the P-VOL and S-VOLs.</td>
</tr>
<tr>
<td>LDEV Name</td>
<td>The name of the LDEVs for the P-VOL and S-VOLs.</td>
</tr>
<tr>
<td>Mirror Unit</td>
<td>The mirror unit number.</td>
</tr>
<tr>
<td>Virtual Storage Machine</td>
<td>The model type and serial number of the virtual storage machine to which the P-VOL and S-VOL belong.</td>
</tr>
<tr>
<td>Virtual LDEV ID</td>
<td>The identification number of the virtual LDEV for the P-VOL and S-VOLs.</td>
</tr>
<tr>
<td></td>
<td>If no virtual LDEV ID is assigned, a blank is displayed.</td>
</tr>
</tbody>
</table>

**Pairs table**

The following table describes the items in this table on the View Pair Properties window.

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary Volume</td>
<td>The P-VOL information.</td>
</tr>
<tr>
<td></td>
<td>Values:</td>
</tr>
<tr>
<td></td>
<td>• LDEV ID: The P-VOL's LDEV identifier.</td>
</tr>
<tr>
<td></td>
<td>• LDEV Name: The P-VOL's LDEV name.</td>
</tr>
<tr>
<td></td>
<td>• Provisioning Type: The P-VOL's provisioning type, which can be one of the following:</td>
</tr>
<tr>
<td></td>
<td>○ Basic: Internal volume</td>
</tr>
<tr>
<td></td>
<td>○ DP: DP-VOL</td>
</tr>
<tr>
<td></td>
<td>○ External: External volume</td>
</tr>
<tr>
<td></td>
<td>• Emulation Type: The P-VOL's emulation type.</td>
</tr>
<tr>
<td></td>
<td>• Capacity: The P-VOL's volume capacity.</td>
</tr>
<tr>
<td></td>
<td>• CLPR: The P-VOL's CLPR number.</td>
</tr>
<tr>
<td></td>
<td>• Encryption: The P-VOL's encryption information.</td>
</tr>
<tr>
<td></td>
<td>○ Enabled: Encryption of the parity group to which the P-VOL's LDEV belongs is enabled.</td>
</tr>
<tr>
<td></td>
<td>○ Disabled: Encryption of the parity group to which the P-VOL's LDEV belongs is disabled.</td>
</tr>
<tr>
<td></td>
<td>If the LDEV is a DP-VOL, external volume, or migration volume, a hyphen (-) is displayed.</td>
</tr>
<tr>
<td></td>
<td>• Virtual Storage Machine: The model type and serial number of the virtual storage machine to which the P-VOL belongs.</td>
</tr>
<tr>
<td></td>
<td>• Virtual LDEV ID: The identification number of the P-VOL's virtual LDEV. If no virtual LDEV ID is assigned, a blank is displayed.</td>
</tr>
<tr>
<td></td>
<td>• Virtual Device Name: The name of the P-VOL's virtual device, in a combined format of virtual emulation type, number of virtual LUSE volumes, and virtual CVS attribute.</td>
</tr>
<tr>
<td>Item</td>
<td>Description</td>
</tr>
<tr>
<td>------</td>
<td>-------------</td>
</tr>
<tr>
<td>Each of these three items is displayed only if it is specified. If none of them are specified, a blank is displayed.</td>
<td></td>
</tr>
<tr>
<td>Virtual SSID: The virtual SSID of the P-VOL. If no virtual SSID is specified, a blank is displayed.</td>
<td></td>
</tr>
<tr>
<td>Status</td>
<td>The status of the pair. For more information about pair status, see HDvM - SN pair status names and descriptions on page 6-4.</td>
</tr>
<tr>
<td>Snapshot Date</td>
<td>HTI only. The date and time the snapshot was acquired.</td>
</tr>
<tr>
<td>Secondary Volume</td>
<td>The S-VOL information. Values:</td>
</tr>
<tr>
<td>LDEV ID: The S-VOL's LDEV identifier.</td>
<td></td>
</tr>
<tr>
<td>LDEV name: The S-VOL's LDEV name.</td>
<td></td>
</tr>
<tr>
<td>Provisioning Type: The S-VOL's provisioning type, which can be one of the following:</td>
<td></td>
</tr>
<tr>
<td>Basic: Internal volume</td>
<td></td>
</tr>
<tr>
<td>DP: DP-VOL</td>
<td></td>
</tr>
<tr>
<td>External: External volume</td>
<td></td>
</tr>
<tr>
<td>Snapshot: HTI volume</td>
<td></td>
</tr>
<tr>
<td>Emulation Type: The S-VOL's emulation type.</td>
<td></td>
</tr>
<tr>
<td>Capacity: The S-VOL's volume capacity.</td>
<td></td>
</tr>
<tr>
<td>CLPR: The S-VOL's CLPR number.</td>
<td></td>
</tr>
<tr>
<td>Encryption: The S-VOL's encryption information.</td>
<td></td>
</tr>
<tr>
<td>Enabled: Encryption of the parity group to which the S-VOL's LDEV belongs is enabled.</td>
<td></td>
</tr>
<tr>
<td>Disabled: Encryption of the parity group to which the S-VOL's LDEV belongs is disabled.</td>
<td></td>
</tr>
<tr>
<td>If the LDEV is a DP-VOL, external volume, or migration volume, a hyphen (-) is displayed.</td>
<td></td>
</tr>
<tr>
<td>Secondary Volume (continued)</td>
<td>Values (continued):</td>
</tr>
<tr>
<td>Mode: Indicates whether the VSP G1000 storage system has written to the S-VOL. For SI, this item also indicates whether the VSP G1000 storage system can read the S-VOL.</td>
<td></td>
</tr>
<tr>
<td>For SI:</td>
<td></td>
</tr>
<tr>
<td>- W is shown when the VSP G1000 storage system has written data to the S-VOL. W is also shown when the VSP G1000 storage system has written data to the S-VOL and the S-VOL cannot be read when its pair status is PSUS(SP)/PSUS or PSUS.</td>
<td></td>
</tr>
<tr>
<td>- N is shown when the S-VOL cannot be read because you specified &quot;-m noread&quot; using the CCI.</td>
<td></td>
</tr>
<tr>
<td>- A hyphen (-) indicates that the VSP G1000 storage system has not written to the S-VOL.</td>
<td></td>
</tr>
<tr>
<td>For HTI:</td>
<td></td>
</tr>
</tbody>
</table>
- W is shown if the VSP G1000 storage system has written data to the S-VOL when its pair status is PSUS(SP)/PSUS or PSUS.
- A hyphen (-) indicates that the VSP G1000 storage system has not written to the S-VOL.
  - For SIZ:
    - W is shown when the VSP G1000 storage system has written data to the S-VOL when its pair status is V-Split/SUSPVS or Split/SUSPOP.
    - Protect is shown when you have set the Protect attribute using Business Continuity Manager (BCM) when the S-VOL's pair status is Split/SUSPOP, SP-Pend/TRANS, or V-Split/SUSPVS.
    - A hyphen (-) indicates that the VSP G1000 storage system has not written to the S-VOL.

- **Virtual Storage Machine**: The model type and serial number of the virtual storage machine to which the S-VOL belongs.
- **Virtual LDEV ID**: The identification number of the S-VOL's virtual LDEV. If no virtual LDEV ID is assigned, a blank is displayed.
- **Virtual Device Name**: The name of the S-VOL's virtual device, in a combined format of *virtual emulation type*, *number of virtual LUSE volumes*, and *virtual CVS attribute*. Each of these three items is displayed only if it is specified. If none of them are specified, a blank is displayed.
- **Virtual SSID**: The virtual SSID of the S-VOL. If no virtual SSID is specified, a blank is displayed.

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CTG ID</td>
<td>The identification number for the CTG to which the pair is assigned.</td>
</tr>
<tr>
<td>Copy Pace</td>
<td>SI and SIZ only. The system option that determines the rate at which you want the VSP G1000 storage system to copy data.</td>
</tr>
<tr>
<td>Mirror Unit</td>
<td>The mirror unit number.</td>
</tr>
</tbody>
</table>

**View Pair Synchronization Rate window**

Use this window to view the percentage of synchronized data between the P-VOL and S-VOL. This window contains the *Pairs* table.

For more information about using this window, see [Monitoring ShadowImage for Mainframe pair synchronization rates on page 6-10](#).

The following image shows this window.
## Pairs table

The following table describes the items in this table.

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Primary Volume</strong></td>
<td>The P-VOL information.</td>
</tr>
<tr>
<td>Values:</td>
<td></td>
</tr>
<tr>
<td>LDEV ID:</td>
<td>The P-VOL's LDEV identifier.</td>
</tr>
<tr>
<td>LDEV Name:</td>
<td>The P-VOL's LDEV name.</td>
</tr>
<tr>
<td>CLPR:</td>
<td>The P-VOL's CLPR number.</td>
</tr>
<tr>
<td>Virtual Storage Machine:</td>
<td>The model type and serial number of the virtual storage machine to which the P-VOL belongs.</td>
</tr>
<tr>
<td>Virtual LDEV ID:</td>
<td>The identification number of the P-VOL's virtual LDEV. If no virtual LDEV ID is assigned, a blank is displayed.</td>
</tr>
<tr>
<td>Virtual Device Name:</td>
<td>The name of the P-VOL's virtual device, in a combined format of virtual emulation type, number of virtual LUSE volumes, and virtual CVS attribute. Each of these three items is displayed only if it is specified. If none of them are specified, a blank is displayed.</td>
</tr>
<tr>
<td>Virtual SSID:</td>
<td>The virtual SSID of the P-VOL. If no virtual SSID is specified, a blank is displayed.</td>
</tr>
<tr>
<td><strong>Copy Type</strong></td>
<td>SI and SIz only. The pair type.</td>
</tr>
<tr>
<td>Values:</td>
<td></td>
</tr>
<tr>
<td>Item</td>
<td>Description</td>
</tr>
<tr>
<td>-------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| Item              | **SI-L1**: SI-L1  
|                   | **SI-L2**: SI-L2  
|                   | **SI MF**: SIz  |
| Status            | The status of the pair.  
|                   | For more information about pair status, see [HDvM - SN pair status names and descriptions on page 6-4](#).  |
| Synchronization Rate (%) | For SI and SIz:  
|                   | The synchronization rate (%) between P-VOL and S-VOL.  
|                   | For HTI:  
|                   | The rate at which the current S-VOL matches the next new generation of the S-VOL. If the S-VOL is the latest one, the storage system computes the synchronization rate by comparing the S-VOL and the P-VOL.  |
| Secondary Volume  | The S-VOL information.  
|                   | Values:  
|                   | **LDEV ID**: The S-VOL's LDEV identifier.  
|                   | **LDEV Name**: The S-VOL's LDEV name.  
|                   | **CLPR**: The S-VOL's CLPR number.  
|                   | **Virtual Storage Machine**: The model type and serial number of the virtual storage machine to which the S-VOL belongs.  
|                   | **Virtual LDEV ID**: The identification number of the S-VOL's virtual LDEV. If no virtual LDEV ID is assigned, a blank is displayed.  
|                   | **Virtual Device Name**: The name of the S-VOL's virtual device, in a combined format of virtual emulation type, number of virtual LUSE volumes, and virtual CVS attribute. Each of these three items is displayed only if it is specified. If none of them are specified, a blank is displayed.  
|                   | **Virtual SSID**: The virtual SSID of the S-VOL. If no virtual SSID is specified, a blank is displayed.  |
| Copy Pace         | SI and SIz only.  
|                   | The system option that determines the rate at which you want the VSP G1000 storage system to copy data.  
|                   | Values:  
|                   | **Slower**: Improved host I/O performance but slower processing speed.  
|                   | **Medium**: Average processing speed and host I/O performance.  
|                   | **Faster**: Faster processing speed but slower host I/O performance.  |
| Mirror Unit       | The mirror unit number.  |
| Refresh button    | Click to update the information in the **Pairs** table.  |
History window

Use this window to monitor the pair tasks that you have performed.

For more information about monitoring pairs, see Monitoring pair task history on page 6-14.

Setting fields

The following table describes the setting fields for this window.

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Copy Type</td>
<td>The pair type. Values:</td>
</tr>
<tr>
<td></td>
<td>• <strong>SI</strong>: SI</td>
</tr>
<tr>
<td></td>
<td>• <strong>TI</strong>: HTI</td>
</tr>
<tr>
<td></td>
<td>• <strong>SI MF</strong>: SIz</td>
</tr>
<tr>
<td></td>
<td>• <strong>FCV2/FCSE</strong>: Compatible FlashCopy® V2 and Compatible FlashCopy® SE</td>
</tr>
</tbody>
</table>

SI or SIz History table

The following table describes the items in the **SI History** or **SIz History** table.
### HTI History table

The following table describes the items in the **HTI History** table. Only tasks performed on the pairs consisting of the P-VOL or S-VOLs to which you are allocated are shown.

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date and Time</td>
<td>The date and time the operation was performed.</td>
</tr>
<tr>
<td>Primary Volume</td>
<td>The P-VOL information.</td>
</tr>
<tr>
<td></td>
<td>Values:</td>
</tr>
<tr>
<td></td>
<td>• <strong>LDEV ID</strong>: The P-VOL's LDEV identifier.</td>
</tr>
<tr>
<td></td>
<td>• <strong>Provisioning type</strong>: The P-VOL's provisioning type, which can be one of</td>
</tr>
<tr>
<td></td>
<td>the following:</td>
</tr>
<tr>
<td></td>
<td>° <strong>Basic</strong>: Internal volume</td>
</tr>
<tr>
<td></td>
<td>° <strong>DP</strong>: DP-VOL</td>
</tr>
<tr>
<td></td>
<td>° <strong>External</strong>: External volume</td>
</tr>
<tr>
<td>Secondary Volume</td>
<td>The S-VOL information.</td>
</tr>
<tr>
<td></td>
<td>Values:</td>
</tr>
<tr>
<td></td>
<td>• <strong>LDEV ID</strong>: The S-VOL's LDEV identifier.</td>
</tr>
<tr>
<td></td>
<td>• <strong>Provisioning type</strong>: The S-VOL's provisioning type, which can be one of</td>
</tr>
<tr>
<td></td>
<td>the following:</td>
</tr>
<tr>
<td></td>
<td>° <strong>Basic</strong>: Internal volume</td>
</tr>
<tr>
<td></td>
<td>° <strong>DP</strong>: DP-VOL</td>
</tr>
<tr>
<td></td>
<td>° <strong>External</strong>: External volume</td>
</tr>
<tr>
<td>Mirror Unit</td>
<td>The S-VOL's mirror unit number.</td>
</tr>
<tr>
<td>Item</td>
<td>Description</td>
</tr>
<tr>
<td>----------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Pool ID</td>
<td>The pool identifier.</td>
</tr>
<tr>
<td>Description Code</td>
<td>The code for the type of operation performed.</td>
</tr>
<tr>
<td>Description</td>
<td>The description of the operation performed.</td>
</tr>
<tr>
<td>Export button</td>
<td>Click to open a dialog for downloading table information to a tab-separated values (TSV) file.</td>
</tr>
</tbody>
</table>

**Compatible FlashCopy® V2 or Compatible Software for IBM® FlashCopy® SE history table**

The following table describes the items in the **FC History** table. Only tasks performed on the pairs consisting of the P-VOL or S-VOLs to which you are allocated are shown.

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date and Time</td>
<td>The date and time the operation was performed.</td>
</tr>
<tr>
<td>Source Volume</td>
<td>The source volume information.</td>
</tr>
<tr>
<td></td>
<td>Values:</td>
</tr>
<tr>
<td></td>
<td>• <strong>LDEV ID</strong>: The source volume’s LDEV identifier.</td>
</tr>
<tr>
<td></td>
<td>• <strong>Provisioning type</strong>: The source volume’s provisioning type, which can be one of the following:</td>
</tr>
<tr>
<td></td>
<td>◦ <strong>Basic</strong>: Internal volume</td>
</tr>
<tr>
<td></td>
<td>◦ <strong>DP</strong>: DP-VOL</td>
</tr>
<tr>
<td></td>
<td>◦ <strong>External</strong>: External volume</td>
</tr>
<tr>
<td>Target Volume</td>
<td>The target volume information.</td>
</tr>
<tr>
<td></td>
<td>Values:</td>
</tr>
<tr>
<td></td>
<td>• <strong>LDEV ID</strong>: The target volume’s LDEV identifier.</td>
</tr>
<tr>
<td></td>
<td>• <strong>Provisioning type</strong>: The target volume’s provisioning type, which can be one of the following:</td>
</tr>
<tr>
<td></td>
<td>◦ <strong>Basic</strong>: Internal volume</td>
</tr>
<tr>
<td></td>
<td>◦ <strong>DP</strong>: DP-VOL</td>
</tr>
<tr>
<td></td>
<td>◦ <strong>External</strong>: External volume</td>
</tr>
<tr>
<td>Relationship ID</td>
<td>The relationship identifier.</td>
</tr>
<tr>
<td>Description Code</td>
<td>The code for the type of operation performed.</td>
</tr>
<tr>
<td>Description</td>
<td>The description of the operation performed.</td>
</tr>
<tr>
<td>Export button</td>
<td>Click to open a dialog for downloading table information to a tab-separated values (TSV) file.</td>
</tr>
</tbody>
</table>

**Consistency Group Properties window**

Use this window to perform the following tasks:
- Viewing a list of CTGs, with information about status and number of pairs.
- Viewing CTG properties.

For more information about this window, see Monitoring consistency groups on page 6-12.

### Consistency Group Properties table

The following table describes the items in this table.

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CTG ID</strong></td>
<td>The SiZ pair's CTG identification number.</td>
</tr>
<tr>
<td><strong>Status</strong></td>
<td>The CTG status. Values:</td>
</tr>
<tr>
<td>SI Used</td>
<td>The CTG is in use by SI.</td>
</tr>
<tr>
<td>SIMF Used</td>
<td>SiZ is using the CTG.</td>
</tr>
<tr>
<td>SIMF Used (PPRC/BCM)</td>
<td>SiZ is using the CTG and you are using Business Continuity Manager (BCM) or IBM PPRC to manage the CTG.</td>
</tr>
<tr>
<td>TI Used</td>
<td>HTI is using the CTG.</td>
</tr>
<tr>
<td>Mainframe Reserved</td>
<td>The CTG is reserved for use by BCM or IBM PPRC.</td>
</tr>
<tr>
<td>Free</td>
<td>The CTG is not being used and is not reserved.</td>
</tr>
<tr>
<td>(Changing...)</td>
<td>The status is in the process of changing.</td>
</tr>
<tr>
<td>Item</td>
<td>Description</td>
</tr>
<tr>
<td>--------------------</td>
<td>--------------------------------------------------</td>
</tr>
<tr>
<td>Number of Pairs</td>
<td>The number of pairs assigned to the CTG.</td>
</tr>
</tbody>
</table>

**Pairs table**

The **Pairs** table shows pairs with a P-VOL or S-VOL allocated to you.

The following table describes the items in this table.

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary Volume</td>
<td>The P-VOL information.</td>
</tr>
<tr>
<td></td>
<td>Values:</td>
</tr>
<tr>
<td></td>
<td>• <strong>LDEV ID</strong>: The P-VOL's LDEV identifier.</td>
</tr>
<tr>
<td></td>
<td>• <strong>LDEV Name</strong>: The P-VOL's LDEV name.</td>
</tr>
<tr>
<td></td>
<td>• <strong>Emulation Type</strong>: The P-VOL's emulation type.</td>
</tr>
<tr>
<td></td>
<td>• <strong>Capacity</strong>: The P-VOL's volume capacity.</td>
</tr>
<tr>
<td></td>
<td>• <strong>CLPR</strong>: The P-VOL's CLPR number.</td>
</tr>
<tr>
<td></td>
<td>• <strong>Virtual Storage Machine</strong>: The model type and serial number of the virtual storage machine to which the P-VOL belongs.</td>
</tr>
<tr>
<td></td>
<td>• <strong>Virtual LDEV ID</strong>: The identification number of the P-VOL's virtual LDEV. If no virtual LDEV ID is assigned, a blank is displayed.</td>
</tr>
<tr>
<td></td>
<td>• <strong>Virtual Device Name</strong>: The name of the P-VOL's virtual device, in a combined format of <strong>virtual emulation type</strong>, <strong>number of virtual LUSE volumes</strong>, and <strong>virtual CVS attribute</strong>. Each of these three items is displayed only if it is specified. If none of them are specified, a blank is displayed.</td>
</tr>
<tr>
<td></td>
<td>• <strong>Virtual SSID</strong>: The virtual SSID of the P-VOL. If no virtual SSID is specified, a blank is displayed.</td>
</tr>
<tr>
<td>Copy Type</td>
<td>The pair type.</td>
</tr>
<tr>
<td></td>
<td>Values:</td>
</tr>
<tr>
<td></td>
<td>• <strong>SI-L1</strong>: SI L1</td>
</tr>
<tr>
<td></td>
<td>• <strong>SI-L2</strong>: SI L2</td>
</tr>
<tr>
<td></td>
<td>• <strong>TI</strong>: HTI</td>
</tr>
<tr>
<td></td>
<td>• <strong>SIMF</strong>: SIz</td>
</tr>
<tr>
<td>Status</td>
<td>The status of the pair.</td>
</tr>
<tr>
<td></td>
<td>For more information about pair status, see <a href="#">HDvM - SN pair status names and descriptions on page 6-4</a>.</td>
</tr>
<tr>
<td>Secondary Volume</td>
<td>The S-VOL information.</td>
</tr>
<tr>
<td></td>
<td>Values:</td>
</tr>
<tr>
<td></td>
<td>• <strong>LDEV ID</strong>: The S-VOL's LDEV identifier.</td>
</tr>
<tr>
<td></td>
<td>• <strong>LDEV Name</strong>: The S-VOL's LDEV name.</td>
</tr>
<tr>
<td></td>
<td>• <strong>Emulation Type</strong>: The S-VOL's emulation type.</td>
</tr>
<tr>
<td>Item</td>
<td>Description</td>
</tr>
<tr>
<td>----------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>Values: <strong>OPEN-V</strong></td>
</tr>
<tr>
<td></td>
<td>• <strong>Capacity</strong>: The S-VOL’s volume capacity.</td>
</tr>
<tr>
<td></td>
<td>• <strong>CLPR</strong>: The S-VOL's CLPR number.</td>
</tr>
<tr>
<td></td>
<td>• <strong>Virtual Storage Machine</strong>: The model type and serial number of the virtual storage machine to which the S-VOL belongs.</td>
</tr>
<tr>
<td></td>
<td>• <strong>Virtual LDEV ID</strong>: The identification number of the S-VOL's virtual LDEV. If no virtual LDEV ID is assigned, a blank is displayed.</td>
</tr>
<tr>
<td></td>
<td>• <strong>Virtual Device Name</strong>: The name of the S-VOL's virtual device, in a combined format of <em>virtual emulation type, number of virtual LUSE volumes, and virtual CVS attribute</em>. Each of these three items is displayed only if it is specified. If none of them are specified, a blank is displayed.</td>
</tr>
<tr>
<td></td>
<td>• <strong>Virtual SSID</strong>: The virtual SSID of the S-VOL. If no virtual SSID is specified, a blank is displayed.</td>
</tr>
</tbody>
</table>

**Copy Pace**

SI and SIz only.
The system option that determines the rate at which you want the VSP G1000 storage system to copy data.

Values:

• **Slower**: Improved host I/O performance but slower processing speed.
• **Medium**: Average processing speed and host I/O performance.
• **Faster**: Faster processing speed but slower host I/O performance.

**Mirror Unit**
The mirror unit number.

**Detail button**
Click to open the **Pair Properties** window.

---

**Create SI Pairs wizard**

Use this wizard to create pairs and specify pair details.

This wizard contains the following windows:

- **Select Pair Configuration window on page C-27**
- **Select Primary Volumes window on page C-28**
- **Select Secondary Volumes window on page C-31**
- **Create SI Pairs confirmation window on page C-36**

For more information about using this wizard, see [Creating ShadowImage for Mainframe pairs on page 5-4](#).
Select Pair Configuration window

Use this window of the **Create SI Pairs** wizard to configure the pairs you plan to create.

The following image shows this window of the **Create SI Pairs** wizard.

The following table describes the items in this window.

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Copy Type</td>
<td>The copy type. Values:</td>
</tr>
<tr>
<td></td>
<td>• <strong>ShadowImage</strong></td>
</tr>
<tr>
<td></td>
<td>• <strong>ShadowImage for Mainframe</strong> (default)</td>
</tr>
<tr>
<td>Emulation Type</td>
<td>SI and SIZ only. The emulation type.</td>
</tr>
<tr>
<td>Number of Secondary Volumes</td>
<td>SIZ and HTI only. The total number of S-VOLs assigned to the P-VOL.</td>
</tr>
<tr>
<td></td>
<td>This value includes the volumes for pairs that you are creating, volumes in</td>
</tr>
<tr>
<td></td>
<td>existing pairs. Default: 1</td>
</tr>
<tr>
<td>Initial MU Number</td>
<td>SIZ only.</td>
</tr>
<tr>
<td>Item</td>
<td>Description</td>
</tr>
<tr>
<td>--------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>The initial MU number.</td>
<td></td>
</tr>
<tr>
<td>Split Type</td>
<td>SI and SIZ only. The split type.</td>
</tr>
<tr>
<td>Values:</td>
<td>• Non Split (default): The pair is not split.</td>
</tr>
<tr>
<td></td>
<td>• Quick Split: The pair is split, and then the data is copied so that the S-VOL is immediately available for read and write I/O. Any remaining differential data is copied to the S-VOL in the background.</td>
</tr>
<tr>
<td></td>
<td>• Steady Split: Differential data is copied, and then the pair is split.</td>
</tr>
<tr>
<td>Copy Pace</td>
<td>SI and SIZ only. The system option that determines the rate at which you want the VSP G1000 storage system to copy data. Values:</td>
</tr>
<tr>
<td></td>
<td>• Slower: Improved host I/O performance but slower processing speed.</td>
</tr>
<tr>
<td></td>
<td>• Medium (default): Average processing speed and host I/O performance.</td>
</tr>
<tr>
<td></td>
<td>• Faster: Faster processing speed but slower host I/O performance.</td>
</tr>
</tbody>
</table>

**Select Primary Volumes window**

Use this window of the **Create SI Pairs** wizard to select LDEVs that are P-VOLs.

This window contains the following tables:

- **Available LDEVs** table
- **Selected LDEVs** table

The following image shows this window of the **Create SI Pairs** wizard.
The following table describes items in this window.

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Port ID</td>
<td>SI and HTI only.</td>
</tr>
<tr>
<td></td>
<td>Filters LDEVs in the <strong>Available LDEVs</strong> table</td>
</tr>
<tr>
<td></td>
<td>according to the port ID.</td>
</tr>
<tr>
<td></td>
<td>Default: <strong>Any</strong></td>
</tr>
<tr>
<td>Host Group Name</td>
<td>SI and HTI only.</td>
</tr>
<tr>
<td></td>
<td>Filters LDEVs in the <strong>Available LDEVs</strong> table</td>
</tr>
<tr>
<td></td>
<td>according to host group name.</td>
</tr>
<tr>
<td></td>
<td>Default: <strong>Any</strong></td>
</tr>
</tbody>
</table>

**Available LDEVs table**

This table is shown on the **Select Primary Volumes** window.

The following table describes the items in this table.

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>LDEV ID</td>
<td>The LDEV's identifier.</td>
</tr>
<tr>
<td>LDEV Name</td>
<td>The LDEV's name.</td>
</tr>
<tr>
<td>Port ID</td>
<td>SI and HTI only.</td>
</tr>
<tr>
<td></td>
<td>The port name of the LDEV's LUN path.</td>
</tr>
<tr>
<td>Host Group Name</td>
<td>SI and HTI only.</td>
</tr>
<tr>
<td></td>
<td>The host group name of the LDEV's LUN path.</td>
</tr>
<tr>
<td>LUN ID</td>
<td>SI and HTI only.</td>
</tr>
<tr>
<td></td>
<td>The LUN identifier of the LDEV's LUN path.</td>
</tr>
<tr>
<td>Provisioning Type</td>
<td>The LDEV's provisioning type.</td>
</tr>
<tr>
<td></td>
<td>Values:</td>
</tr>
</tbody>
</table>

---

Hitachi Virtual Storage Platform G1000 Hitachi ShadowImage® for Mainframe User Guide
<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Basic</strong>: Internal volume</td>
<td></td>
</tr>
<tr>
<td><strong>DP</strong>: DP-VOL</td>
<td></td>
</tr>
<tr>
<td><strong>External</strong>: External volume</td>
<td></td>
</tr>
<tr>
<td><strong>ALU</strong>: Volume with ALU attribute.</td>
<td></td>
</tr>
</tbody>
</table>

**Attribute**

SI and HTI only.
The LDEV's attribute.
Values:
- **ALU**: Volume with ALU attribute.
- **SLU**: Volume with SLU attribute.
If the attribute is not set, a hyphen (-) is displayed.

**Emulation Type**

SI and SIz only.
The LDEV's emulation type.

**Capacity**

The LDEV's capacity.

**CLPR**

The LDEV's CLPR number.

**Encryption**

Encryption information.
- **Enabled**: Encryption of the parity group to which the LDEV belongs is enabled.
- **Disabled**: Encryption of the parity group to which the LDEV belongs is disabled.
If the LDEV is a DP-VOL, external volume, or migration volume, a hyphen (-) is displayed.

**Number of Secondary Volumes**

The total number of S-VOLs assigned to the P-VOL. This value includes the volumes for pairs that you are creating, volumes in existing pairs. For an L1 pair, this value does not include the number of L2 S-VOLs.

**Add button**

Click to move the selected LDEVs from the Available LDEVs table to the Selected LDEVs table.

**Remove button**

Click to move the selected LDEVs from the Selected LDEVs table to the Available LDEVs table.

**Selected LDEVs table**

This table is shown on the Select Primary Volumes window.

The following table describes the items in this table.

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>LDEV ID</td>
<td>The selected P-VOL's LDEV identifier.</td>
</tr>
<tr>
<td>LDEV Name</td>
<td>The selected P-VOL's LDEV name.</td>
</tr>
<tr>
<td>Port ID</td>
<td>SI and HTI only. The port name of the LDEV's LUN path.</td>
</tr>
<tr>
<td>Host Group Name</td>
<td>SI and HTI only.</td>
</tr>
<tr>
<td>Item</td>
<td>Description</td>
</tr>
<tr>
<td>---------------------------</td>
<td>------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>The host group name of the LDEV's LUN path.</td>
<td></td>
</tr>
<tr>
<td>LUN ID</td>
<td>SI and HTI only. The LUN identifier of the LDEV's LUN path.</td>
</tr>
<tr>
<td>Provisioning Type</td>
<td>The LDEV's provisioning type. Values:</td>
</tr>
<tr>
<td></td>
<td>• Basic: Internal volume</td>
</tr>
<tr>
<td></td>
<td>• DP: DP-VOL</td>
</tr>
<tr>
<td></td>
<td>• External: External volume</td>
</tr>
<tr>
<td></td>
<td>• ALU: Volume with ALU attribute.</td>
</tr>
<tr>
<td>Attribute</td>
<td>SI and HTI only. The LDEV's attribute. Values:</td>
</tr>
<tr>
<td></td>
<td>• ALU: Volume with ALU attribute.</td>
</tr>
<tr>
<td></td>
<td>• SLU: Volume with SLU attribute.</td>
</tr>
<tr>
<td></td>
<td>If the attribute is not set, a hyphen (-) is displayed.</td>
</tr>
<tr>
<td>Emulation Type</td>
<td>SI and S Iz only. The LDEV's emulation type.</td>
</tr>
<tr>
<td>Capacity</td>
<td>The LDEV's capacity.</td>
</tr>
<tr>
<td>CLPR</td>
<td>The LDEV's CLPR number.</td>
</tr>
<tr>
<td>Encryption</td>
<td>Encryption information.</td>
</tr>
<tr>
<td></td>
<td>• Enabled: Encryption of the parity group to which the LDEV belongs is enabled.</td>
</tr>
<tr>
<td></td>
<td>• Disabled: Encryption of the parity group to which the LDEV belongs is disabled.</td>
</tr>
<tr>
<td></td>
<td>If the LDEV is a DP-VOL, external volume, or migration volume, a hyphen (-) is displayed.</td>
</tr>
<tr>
<td>Number of Secondary Volumes</td>
<td>The total number of S-VOLs assigned to the P-VOL. This value includes the volumes for pairs that you are creating, volumes in existing pairs. For an L1 pair, this value does not include the number of L2 S-VOLs.</td>
</tr>
</tbody>
</table>

**Select Secondary Volumes window**

This window is the third window of the Create SI Pairs wizard. Use this window to select the LDEVs that are the S-VOLs and to remove unwanted pairs or LDEVs.

This window contains the following tables:

- **Available LDEVs** table
- **Selected LDEVs** table

The following image shows this window.
The following table describes the items in this window.

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capacity list</td>
<td>Click to select the capacity by which to filter the available LDEVs.</td>
</tr>
<tr>
<td>The remaining number you have to select</td>
<td>This item refers to the P-VOLs in the <strong>Selected Pairs</strong> table that do not have an assigned S-VOL.</td>
</tr>
<tr>
<td>Exclude Paired Volumes</td>
<td>SI only. &lt;br&gt; Select to hide volumes already in a pair. &lt;br&gt; Values: &lt;br&gt; • <strong>Selected</strong> (default): Paired volumes are not shown in the list. &lt;br&gt; • <strong>Cleared</strong>: Paired volumes are shown in the list.</td>
</tr>
<tr>
<td>Port ID list</td>
<td>SI and HTI only. &lt;br&gt; Filters LDEVs in the <strong>Available LDEVs</strong> table according to the port ID.</td>
</tr>
<tr>
<td>Host Group Name list</td>
<td>SI and HTI only. &lt;br&gt; Filters LDEVs in the <strong>Available LDEVs</strong> table according to the host group name. &lt;br&gt; Default: <strong>Any</strong></td>
</tr>
<tr>
<td>Set button</td>
<td>Click to move an LDEV that you have selected in the <strong>Available LDEVs</strong> table to the <strong>Selected Pairs</strong> table.</td>
</tr>
</tbody>
</table>
You can also click to configure a pair you have selected in the Available LDEVs table and a pair you have selected in the Selected Pairs table.

Clear button
- Click to return the selected S-VOL from the Selected Pairs table to the Available LDEVs table.

Sort Pairs button
- SI only.
- Click to sort the Selected Pairs table in one of the following ways:
  - **Arrange in Mirror Unit**: Data is sorted by mirror units.
  - **Arrange in Topology**: Data is sorted by topology; for example, L1 or L2 pairs.

### Available LDEVs table

The following table describes the items in this table in the Select Secondary Volumes window of the Create SI Pairs wizard.

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>LDEV ID</td>
<td>The LDEV's identifier.</td>
</tr>
<tr>
<td>LDEV Name</td>
<td>The LDEV's name.</td>
</tr>
<tr>
<td>Port ID</td>
<td>SI and HTI only. LUN path.</td>
</tr>
<tr>
<td>Host Group Name</td>
<td>SI and HTI only. Host group name of the LDEV's LUN path.</td>
</tr>
<tr>
<td>LUN ID</td>
<td>SI and HTI only. LUN identifier of the LDEV's LUN path.</td>
</tr>
<tr>
<td>Emulation Type</td>
<td>SI and SIz only. The LDEV's emulation type.</td>
</tr>
<tr>
<td>Capacity</td>
<td>The LDEV's capacity.</td>
</tr>
<tr>
<td>Provisioning Type</td>
<td>SI and SIz only. The LDEV's provisioning type.</td>
</tr>
<tr>
<td></td>
<td>Values:</td>
</tr>
<tr>
<td></td>
<td>- <strong>Basic</strong>: Internal volume</td>
</tr>
<tr>
<td></td>
<td>- <strong>DP</strong>: DP-VOL</td>
</tr>
<tr>
<td></td>
<td>- <strong>External</strong>: External volume</td>
</tr>
<tr>
<td></td>
<td>- <strong>Snapshot</strong>: HTI volume</td>
</tr>
<tr>
<td></td>
<td>- <strong>ALU</strong>: Volume with ALU attribute.</td>
</tr>
<tr>
<td>Attribute</td>
<td>SI and HTI only. The LDEV's attribute.</td>
</tr>
<tr>
<td></td>
<td>Values:</td>
</tr>
<tr>
<td></td>
<td>- <strong>ALU</strong>: Volume with ALU attribute.</td>
</tr>
<tr>
<td>Item</td>
<td>Description</td>
</tr>
<tr>
<td>------</td>
<td>-------------</td>
</tr>
</tbody>
</table>
| • **SLU**: Volume with SLU attribute.  
  If the attribute is not set, a hyphen (-) is displayed. | |
| **CLPR** | The LDEV's CLPR number. |
| **Encryption** | Encryption information. |
| • **Enabled**: Encryption of the parity group to which the LDEV belongs is enabled.  
  • **Disabled**: Encryption of the parity group to which the LDEV belongs is disabled.  
  If the LDEV is a DP-VOL, external volume, or migration volume, a hyphen (-) is displayed. | |
| **Number of Secondary Volumes** | SI only.  
  The number of S-VOLs that have been assigned to the selected P-VOL. |
| **Detail button** | Click to open the **LDEV Properties** window, which contains additional information for the selected LDEV. |

### Selected Pairs table

The following table describes the items in this table in the **Select Secondary Volumes** window of the **Create SI Pairs** wizard.

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
</table>
| **Primary Volume** | The P-VOL information.  
  Values:  
  • **LDEV ID**: The P-VOL's LDEV identifier.  
  • **LDEV Name**: The P-VOL's LDEV name.  
  • **Port ID**: The port name of the P-VOL LDEV's LUN path.  
  • **Host Group Name**: Host group name of the P-VOL LDEV's LUN path.  
  • **LUN ID**: The LUN identifier of the P-VOL LDEV's LUN path.  
  • **Emulation Type**: The P-VOL's emulation type.  
  • **Capacity**: The P-VOL's volume capacity.  
  • **Encryption**: The P-VOL's encryption information.  
    o **Enabled**: Encryption of the parity group to which the P-VOL's LDEV belongs is enabled.  
    o **Disabled**: Encryption of the parity group to which the P-VOL's LDEV belongs is disabled.  
    If the LDEV is a DP-VOL, external volume, or migration volume, a hyphen (-) is displayed.  
  For SIz, **Port ID**, **Host Group Name**, and **LUN ID** do not display. |
| **Secondary Volume** | The S-VOL information.  
  Values: |
<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>LDEV ID</td>
<td>The S-VOL's LDEV identifier. If no LDEV is assigned, a blank is displayed.</td>
</tr>
<tr>
<td>LDEV Name</td>
<td>The S-VOL's LDEV name. A hyphen (-) is displayed if no LDEV is assigned.</td>
</tr>
<tr>
<td>Port ID</td>
<td>Port name of the S-VOL LDEV's LUN path.</td>
</tr>
<tr>
<td>Host Group Name</td>
<td>Host group name of the S-VOL LDEV's LUN path.</td>
</tr>
<tr>
<td>LUN ID</td>
<td>LUN identifier of the S-VOL LDEV's LUN path.</td>
</tr>
<tr>
<td>Emulation Type</td>
<td>The S-VOL's emulation type.</td>
</tr>
<tr>
<td>Capacity</td>
<td>The S-VOL's volume capacity.</td>
</tr>
<tr>
<td>Encryption</td>
<td>The S-VOL's encryption information.</td>
</tr>
<tr>
<td></td>
<td>○ Enabled: Encryption of the parity group to which the S-VOL's LDEV belongs is enabled.</td>
</tr>
<tr>
<td></td>
<td>○ Disabled: Encryption of the parity group to which the S-VOL's LDEV belongs is disabled.</td>
</tr>
<tr>
<td></td>
<td>If the LDEV is a DP-VOL, external volume, or migration volume, a hyphen (-) is displayed.</td>
</tr>
<tr>
<td>Copy Type</td>
<td>The copy type. Values:</td>
</tr>
<tr>
<td></td>
<td>○ SI-L1: SI L1</td>
</tr>
<tr>
<td></td>
<td>○ SI-L2: SI L2</td>
</tr>
<tr>
<td></td>
<td>○ SI MF : SIz</td>
</tr>
<tr>
<td>Mirror Unit</td>
<td>SI and SIz only. The mirror unit number.</td>
</tr>
<tr>
<td>Split Type</td>
<td>SI and SIz only. The split type. Values:</td>
</tr>
<tr>
<td></td>
<td>○ Non Split: The pair is not split.</td>
</tr>
<tr>
<td></td>
<td>○ Quick Split: The pair is split, and then the data is copied so that the S-VOL is immediately available for read and write I/O. Any remaining differential data is copied to the S-VOL in the background.</td>
</tr>
<tr>
<td></td>
<td>○ Steady Split: Differential data is copied, and then the pair is split.</td>
</tr>
<tr>
<td>Copy Pace</td>
<td>SI and SIz only. The system option that determines the rate at which you want the VSP G1000 storage system to copy data. Values:</td>
</tr>
<tr>
<td></td>
<td>○ Slower: Improved host server I/O performance but slower processing speed.</td>
</tr>
<tr>
<td></td>
<td>○ Medium: Average processing speed and host server I/O performance.</td>
</tr>
</tbody>
</table>
### Create SI Pairs confirmation window

This window is the fourth and last window of the Create SI Pairs wizard. This window contains the Selected Pairs table.

The following image shows this window of the Create SI Pairs wizard.

#### Selected Pairs table

The following table describes the items in this table in the Confirm window of the Create SI Pairs wizard.

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary Volume</td>
<td>The P-VOL information. Values:</td>
</tr>
<tr>
<td></td>
<td>• <strong>LDEV ID</strong>: The P-VOL’s LDEV identifier.</td>
</tr>
<tr>
<td></td>
<td>• <strong>LDEV Name</strong>: The P-VOL’s LDEV name.</td>
</tr>
<tr>
<td>Item</td>
<td>Description</td>
</tr>
<tr>
<td>------</td>
<td>-------------</td>
</tr>
<tr>
<td><strong>Port ID</strong>:</td>
<td>Port name of the P-VOL LDEV's LUN path.</td>
</tr>
<tr>
<td><strong>Host Group Name</strong>:</td>
<td>Host group name of the P-VOL LDEV's LUN path.</td>
</tr>
<tr>
<td><strong>LUN ID</strong>:</td>
<td>LUN identifier of the P-VOL LDEV's LUN path.</td>
</tr>
<tr>
<td><strong>Emulation Type</strong>:</td>
<td>The P-VOL's emulation type.</td>
</tr>
<tr>
<td><strong>Capacity</strong>:</td>
<td>The P-VOL's volume capacity.</td>
</tr>
<tr>
<td><strong>CLPR</strong>:</td>
<td>The P-VOL's CLPR number.</td>
</tr>
<tr>
<td><strong>Encryption</strong>:</td>
<td>The P-VOL's encryption information.</td>
</tr>
<tr>
<td>o <strong>Enabled</strong>:</td>
<td>Encryption of the parity group to which the P-VOL's LDEV belongs is enabled.</td>
</tr>
<tr>
<td>o <strong>Disabled</strong>:</td>
<td>Encryption of the parity group to which the P-VOL's LDEV belongs is disabled.</td>
</tr>
<tr>
<td>If the LDEV is a DP-VOL, external volume, or migration volume, a hyphen (-) is displayed.</td>
<td></td>
</tr>
<tr>
<td><strong>For SIZ</strong>, <strong>Port ID</strong>, <strong>Host Group Name</strong>, and <strong>LUN ID</strong> do not display.</td>
<td></td>
</tr>
</tbody>
</table>

**Copy Type**
The types of pairs.
Values:
- **SI-L1**: SI L1
- **SI-L2**: SI L2
- **SIMF**: SIZ
- **TI**: HTI

**Secondary Volume**
The S-VOL information.
Values:
- **LDEV ID**: The S-VOL's LDEV identifier.
- **LDEV Name**: The S-VOL's LDEV name.
- **Port ID**: Port name of the S-VOL LDEV's LUN path.
- **Host Group Name**: Host group name of the S-VOL LDEV's LUN path.
- **LUN ID**: LUN identifier of the S-VOL LDEV's LUN path.
- **Emulation Type**: The S-VOL's emulation type.
- **Capacity**: The S-VOL's volume capacity.
- **CLPR**: The S-VOL's CLPR number.
- **Encryption**: The S-VOL's encryption information.
  - o **Enabled**: Encryption of the parity group to which the S-VOL's LDEV belongs is enabled.
  - o **Disabled**: Encryption of the parity group to which the S-VOL's LDEV belongs is disabled.
  If the LDEV is a DP-VOL, external volume, or migration volume, a hyphen (-) is displayed.
  **For SIZ**, **Port ID**, **Host Group Name**, and **LUN ID** do not display. |

**Split Type**
SI and SIZ only.
The split type.
<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Values:</strong></td>
</tr>
<tr>
<td></td>
<td>• <strong>Non Split:</strong> The pair is not split.</td>
</tr>
<tr>
<td></td>
<td>• <strong>Quick Split:</strong> The pair is split, and then the data is copied so that the S-VOL is immediately available for read and write I/O. Any remaining differential data is copied to the S-VOL in the background.</td>
</tr>
<tr>
<td></td>
<td>• <strong>Steady Split:</strong> Differential data is copied, and then the pair is split.</td>
</tr>
<tr>
<td>Copy Pace</td>
<td>SI and SIZ only. The system option that determines the rate at which you want the VSP G1000 storage system to copy data.</td>
</tr>
<tr>
<td></td>
<td><strong>Values:</strong></td>
</tr>
<tr>
<td></td>
<td>• <strong>Slower:</strong> Improved host I/O performance but slower processing speed.</td>
</tr>
<tr>
<td></td>
<td>• <strong>Medium:</strong> Average processing speed and host I/O performance.</td>
</tr>
<tr>
<td></td>
<td>• <strong>Faster:</strong> Faster processing speed but slower host I/O performance.</td>
</tr>
<tr>
<td>Mirror Unit</td>
<td>SI and SIZ only. The mirror unit number.</td>
</tr>
</tbody>
</table>

**Split Pairs wizard**

Use this wizard to split pairs.

This wizard contains the following windows:

- **Split Pairs window on page C-38**
- **Split Pairs confirmation window on page C-40**

**Split Pairs window**

Use this window of the **Split Pairs** wizard to split pairs. This window contains the **Selected Pairs** table.

For more information about using this window, see ShadowImage for Mainframe pair splitting on page 5-17.
### Selected Pairs table

The following table describes the items in this table.

**Note:** The Selected Pairs table appears on the Confirm window and the Split Pairs window of the Split Pairs wizard. The table for the items on the Confirm window is shown with that window.

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary Volume</td>
<td>The P-VOL information.</td>
</tr>
<tr>
<td></td>
<td>Values:</td>
</tr>
<tr>
<td></td>
<td>• <strong>LDEV ID</strong>: The P-VOL's LDEV identifier.</td>
</tr>
<tr>
<td></td>
<td>• <strong>LDEV Name</strong>: The P-VOL's LDEV name.</td>
</tr>
<tr>
<td></td>
<td>• <strong>Emulation Type</strong>: The P-VOL's emulation type.</td>
</tr>
<tr>
<td></td>
<td>• <strong>Capacity</strong>: The P-VOL's volume capacity</td>
</tr>
<tr>
<td></td>
<td>• <strong>CLPR</strong>: The P-VOL's CLPR number.</td>
</tr>
<tr>
<td>Copy Type</td>
<td>The types of pairs.</td>
</tr>
<tr>
<td></td>
<td>Values:</td>
</tr>
<tr>
<td></td>
<td>• <strong>SI-L1</strong>: SI L1</td>
</tr>
<tr>
<td></td>
<td>• <strong>SI-L2</strong>: SI L2</td>
</tr>
<tr>
<td></td>
<td>• <strong>SIMF</strong>: SIz</td>
</tr>
<tr>
<td></td>
<td>• <strong>TI</strong>: HTI</td>
</tr>
<tr>
<td>Status</td>
<td>The status of the pair.</td>
</tr>
<tr>
<td></td>
<td>For more information about pair status, see <a href="#">HDvM - SN pair status names and descriptions on page 6-4</a>.</td>
</tr>
<tr>
<td>Item</td>
<td>Description</td>
</tr>
<tr>
<td>----------------------</td>
<td>------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Secondary Volume</td>
<td>The S-VOL information.</td>
</tr>
<tr>
<td></td>
<td>Values:</td>
</tr>
<tr>
<td></td>
<td>• <strong>LDEV ID</strong>: The S-VOL’s LDEV identifier</td>
</tr>
<tr>
<td></td>
<td>• <strong>LDEV Name</strong>: The S-VOL's LDEV name</td>
</tr>
<tr>
<td></td>
<td>• <strong>Emulation Type</strong>: The S-VOL’s emulation type</td>
</tr>
<tr>
<td></td>
<td>• <strong>Capacity</strong>: The S-VOL’s volume capacity</td>
</tr>
<tr>
<td></td>
<td>• <strong>CLPR</strong>: The S-VOL's CLPR number</td>
</tr>
<tr>
<td>Mirror Unit</td>
<td>The mirror unit number.</td>
</tr>
<tr>
<td>Split Type list</td>
<td>The split type.</td>
</tr>
<tr>
<td></td>
<td>Values:</td>
</tr>
<tr>
<td></td>
<td>• <strong>Quick Split</strong>: The pair is split, and then the data is</td>
</tr>
<tr>
<td></td>
<td>copied so that the S-VOL is immediately available for read and write I/O.</td>
</tr>
<tr>
<td></td>
<td>Any remaining differential data is copied to the S-VOL in the background.</td>
</tr>
<tr>
<td></td>
<td>For HTI, this value is not shown.</td>
</tr>
<tr>
<td></td>
<td>• <strong>Steady Split</strong>: Splits the pair after all of the differential data is</td>
</tr>
<tr>
<td></td>
<td>copied.</td>
</tr>
<tr>
<td>Copy Pace list</td>
<td>SI and SIz only.</td>
</tr>
<tr>
<td></td>
<td>The system option that determines the rate at which you want the VSP G1000</td>
</tr>
<tr>
<td></td>
<td>storage system to copy data.</td>
</tr>
<tr>
<td></td>
<td>Values:</td>
</tr>
<tr>
<td></td>
<td>• <strong>Slower</strong>: Improved host I/O performance but slower processing speed.</td>
</tr>
<tr>
<td></td>
<td>• <strong>Medium</strong>: Average processing speed and host I/O performance.</td>
</tr>
<tr>
<td></td>
<td>• <strong>Faster</strong>: Faster processing speed but slower host I/O performance.</td>
</tr>
</tbody>
</table>

**Split Pairs confirmation window**

This window of the **Split Pairs** wizard contains the **Selected Pairs** table.

The following image shows this window.
### Selected Pairs table

The following table describes the items in this table in the **Confirm** window of the **Split Pairs** wizard.

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
</table>
| Primary Volume | The P-VOL information.  
Values:  
• **LDEV ID**: The P-VOL's LDEV identifier  
• **LDEV Name**: The P-VOL's LDEV name  
• **Emulation Type**: The P-VOL's emulation type  
• **Capacity**: The P-VOL's volume capacity  
• **CLPR**: The P-VOL's CLPR number |
| Copy Type     | The pair type.  
Values:  
• **SI-L1**: SI L1  
• **SI-L2**: SI L2  
• **SI MF**: SIz  
• **TI**: HTI |
| Status        | The status of the pair.  
For more information about pair status, see [HDvM - SN pair status names and descriptions on page 6-4](#). |
| Split Type    | The split type.  
Values: |
### Item Description

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Quick Split</strong></td>
<td>The pair is split, and then the data is copied so that the S-VOL is immediately available for read and write I/O. Any remaining differential data is copied to the S-VOL in the background.</td>
</tr>
<tr>
<td><strong>Steady Split</strong></td>
<td>Differential data is copied, and then the pair is split.</td>
</tr>
</tbody>
</table>

**Copy Pace**

SI and SIz only.

The system option that determines the rate at which you want the VSP G1000 storage system to copy data.

Values:

- **Slower**: Improved host I/O performance but slower processing speed.
- **Medium**: Average processing speed and host I/O performance.
- **Faster**: Faster processing speed but slower host I/O performance.

**Secondary Volume**

The S-VOL information.

Values:

- **LDEV ID**: The S-VOL's LDEV identifier
- **LDEV Name**: The S-VOL's LDEV name
- **Emulation Type**: The S-VOL's emulation type
- **Capacity**: The S-VOL's volume capacity
- **CLPR**: The S-VOL's CLPR number

**Mirror Unit**

The mirror unit number.

---

**Resync Pairs wizard**

Use this wizard to resynchronize pairs.

This wizard contains the following windows:

- [Resync Pairs window on page C-42](#)
- [Resync Pairs confirmation window on page C-44](#)

**Resync Pairs window**

Use this window of the **Resync Pairs** wizard to resynchronize a pair.

For more information about using this wizard, see [Resynchronizing or restoring ShadowImage for Mainframe pairs on page 5-26](#).

The following image shows this window.
### Selected Pairs table

The following table describes the items in this table in the **Resync Pairs** window of the **Resync Pairs** wizard.

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary Volume</td>
<td>The P-VOL information. Values:</td>
</tr>
<tr>
<td></td>
<td>- <strong>LDEV ID</strong>: The P-VOL’s LDEV identifier</td>
</tr>
<tr>
<td></td>
<td>- <strong>LDEV Name</strong>: The P-VOL’s LDEV name</td>
</tr>
<tr>
<td></td>
<td>- <strong>Emulation Type</strong>: The P-VOL’s emulation type</td>
</tr>
<tr>
<td></td>
<td>- <strong>Capacity</strong>: The P-VOL’s volume capacity</td>
</tr>
<tr>
<td></td>
<td>- <strong>CLPR</strong>: The P-VOL’s CLPR number</td>
</tr>
<tr>
<td>Copy Type</td>
<td>The pair type. Values:</td>
</tr>
<tr>
<td></td>
<td>- <strong>SI-L1</strong>: SI L1</td>
</tr>
<tr>
<td></td>
<td>- <strong>SI-L2</strong>: SI L2</td>
</tr>
<tr>
<td></td>
<td>- <strong>SIMF</strong>: S1z</td>
</tr>
<tr>
<td></td>
<td>- <strong>TI</strong>: HTI</td>
</tr>
<tr>
<td>Snapshot Group</td>
<td>The snapshot group name. If the pair is not a Thin Image pair, a hyphen (-) is displayed. If the pair is a Thin Image pair and the snapshot group is not set, a blank is displayed.</td>
</tr>
<tr>
<td>Status</td>
<td>The status of the pair.</td>
</tr>
<tr>
<td>Item</td>
<td>Description</td>
</tr>
<tr>
<td>-------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>For more information about pair status, see <a href="#">HDvM - SN pair status names and descriptions on page 6-4</a>.</td>
<td></td>
</tr>
<tr>
<td><strong>Snapshot Date</strong></td>
<td>HTI only. The date and time that a snapshot was acquired. If the pair is not a Thin Image pair, a hyphen (-) is displayed.</td>
</tr>
</tbody>
</table>
| **Secondary Volume**    | The S-VOL information. Values:  
  - **LDEV ID**: The S-VOL's LDEV identifier  
  - **LDEV Name**: The S-VOL's LDEV name  
  - **Emulation Type**: The S-VOL's emulation type  
  - **Capacity**: The S-VOL's volume capacity  
  - **CLPR**: The S-VOL's CLPR number |
| **Pool Name (ID)**      | The pool name and identification number. If the pair is not a Thin Image pair, a hyphen (-) is displayed.                                    |
| **Mirror Unit**         | The mirror unit number.                                                                                                                     |
| **Resync Type**         | The type of resynchronization. Values:  
  - **Normal Copy (Primary > Secondary)** (default)  
  - **Reverse Copy (Secondary > Primary)**  
  - **Quick Resync (Primary > Secondary)**  
  - **Quick Restore (Secondary > Primary)**  
  For more information about the methods you can use to resynchronize pairs, see [Types of pair resynchronization on page 5-23](#). |
| **Copy Pace**           | SI and SIZ only. The system option that determines the rate at which you want the VSP G1000 storage system to copy data. Values:  
  - **Slower**: Improved host I/O performance but slower processing speed.  
  - **Medium**: Average processing speed and host I/O performance.  
  - **Faster**: Faster processing speed but slower host I/O performance. |

**Resync Pairs confirmation window**

The following image shows this window of the **Resync Pairs** wizard.
### Selected Pairs table

The following table describes the items in this table in the **Confirm** window of the **Resync Pairs** wizard.

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
</table>
| Primary Volume   | The P-VOL information.  
                             Values:  
                             - **LDEV ID**: The P-VOL's LDEV identifier  
                             - **LDEV Name**: The P-VOL's LDEV name  
                             - **Emulation Type**: The P-VOL's emulation type  
                             - **Capacity**: The P-VOL's volume capacity  
                             - **CLPR**: The P-VOL's CLPR number |
| Copy Type        | The types of pairs.  
                             Values:  
                             - **SI-L1**: SI L1  
                             - **SI-L2**: SI L2  
                             - **SI MF**: SIz  
                             - **TI**: HTI |
| Status           | The status of the pair.  
                             For more information about pair status, see [HDvM - SN pair status names and descriptions on page 6-4](#). |
| Resync Type      | The type of resynchronization.  
                             Values:  
                             - **Normal Copy (Primary > Secondary)** (default) |
<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Reverse Copy (Secondary &gt; Primary)</td>
</tr>
<tr>
<td></td>
<td>• Quick Resync (Primary &gt; Secondary)</td>
</tr>
<tr>
<td></td>
<td>• Quick Restore (Secondary &gt; Primary)</td>
</tr>
<tr>
<td>For more information</td>
<td>see Types of pair resynchronization on page 5-23.</td>
</tr>
<tr>
<td>Copy Pace</td>
<td>SI and SIz only. The system option that determines the rate at which you</td>
</tr>
<tr>
<td></td>
<td>want the VSP G1000 storage system to copy data. Values:</td>
</tr>
<tr>
<td></td>
<td>• Slower: Improved host I/O performance but slower processing speed.</td>
</tr>
<tr>
<td></td>
<td>• Medium: Average processing speed and host I/O performance.</td>
</tr>
<tr>
<td></td>
<td>• Faster: Faster processing speed but slower host I/O performance.</td>
</tr>
<tr>
<td>Secondary Volume</td>
<td>The S-VOL information. Values:</td>
</tr>
<tr>
<td></td>
<td>• LDEV ID: The S-VOL's LDEV identifier</td>
</tr>
<tr>
<td></td>
<td>• LDEV Name: The S-VOL's LDEV name</td>
</tr>
<tr>
<td></td>
<td>• Emulation Type: The S-VOL's emulation type</td>
</tr>
<tr>
<td></td>
<td>• Capacity: The S-VOL's volume capacity</td>
</tr>
<tr>
<td></td>
<td>• CLPR: The S-VOL's CLPR number</td>
</tr>
<tr>
<td>Mirror Unit</td>
<td>The mirror unit number.</td>
</tr>
</tbody>
</table>

**Suspend Pairs window**

Use this window to suspend pair creation. This window contains the **Selected Pairs** table.

For more information about using this window, see Suspending ShadowImage for Mainframe pair creation on page 5-12.
### Selected Pairs table

The following table describes the items in this table in the **Suspend Pairs** window.

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary Volume</td>
<td>The P-VOL information.</td>
</tr>
<tr>
<td></td>
<td>Values:</td>
</tr>
<tr>
<td></td>
<td>- <strong>LDEV ID</strong>: The P-VOL's LDEV identifier</td>
</tr>
<tr>
<td></td>
<td>- <strong>LDEV Name</strong>: The P-VOL's LDEV name</td>
</tr>
<tr>
<td></td>
<td>- <strong>Emulation Type</strong>: The P-VOL's emulation type</td>
</tr>
<tr>
<td></td>
<td>- <strong>Capacity</strong>: The P-VOL's volume capacity</td>
</tr>
<tr>
<td></td>
<td>- <strong>CLPR</strong>: The P-VOL's CLPR number</td>
</tr>
<tr>
<td>Copy Type</td>
<td>The types of pairs.</td>
</tr>
<tr>
<td></td>
<td>Values:</td>
</tr>
<tr>
<td></td>
<td>- <strong>SI-L1</strong>: SI L1</td>
</tr>
<tr>
<td></td>
<td>- <strong>SI-L2</strong>: SI L2</td>
</tr>
<tr>
<td></td>
<td>- <strong>SI MF</strong>: SIz</td>
</tr>
<tr>
<td>Status</td>
<td>The status of the pair.</td>
</tr>
<tr>
<td></td>
<td>For more information about pair status, see <strong>HDvM - SN pair status names and descriptions on page 6-4</strong>.</td>
</tr>
<tr>
<td>Secondary Volume</td>
<td>The S-VOL information.</td>
</tr>
<tr>
<td></td>
<td>Values:</td>
</tr>
<tr>
<td></td>
<td>- <strong>LDEV ID</strong>: The S-VOL's LDEV identifier</td>
</tr>
<tr>
<td></td>
<td>- <strong>LDEV Name</strong>: The S-VOL's LDEV name</td>
</tr>
<tr>
<td></td>
<td>- <strong>Emulation Type</strong>: The S-VOL's emulation type</td>
</tr>
<tr>
<td></td>
<td>- <strong>Capacity</strong>: The S-VOL's volume capacity</td>
</tr>
<tr>
<td></td>
<td>- <strong>CLPR</strong>: The S-VOL's CLPR number</td>
</tr>
<tr>
<td>Item</td>
<td>Description</td>
</tr>
<tr>
<td>--------------</td>
<td>------------------------</td>
</tr>
<tr>
<td>Mirror Unit</td>
<td>The mirror unit number.</td>
</tr>
</tbody>
</table>

**Delete Pairs window**

Use this window to delete pairs. This window contains the **Selected Pairs** table.

For more information about deleting pairs, see [Deleting ShadowImage for Mainframe pairs on page 5-30](#).

The following image shows this window.

![Delete Pairs window](image)

**Selected Pairs table**

The following table describes the items in this table in the **Delete Pairs** window.

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary Volume</td>
<td>The P-VOL information.</td>
</tr>
<tr>
<td></td>
<td>Values:</td>
</tr>
<tr>
<td></td>
<td>• <strong>LDEV ID</strong>: The P-VOL's LDEV identifier</td>
</tr>
<tr>
<td></td>
<td>• <strong>LDEV Name</strong>: The P-VOL's LDEV name</td>
</tr>
<tr>
<td></td>
<td>• <strong>Emulation Type</strong>: The P-VOL's emulation type</td>
</tr>
<tr>
<td></td>
<td>• <strong>Capacity</strong>: The P-VOL's volume capacity</td>
</tr>
<tr>
<td></td>
<td>• <strong>CLPR</strong>: The P-VOL's CLPR number</td>
</tr>
<tr>
<td>Copy Type</td>
<td>The types of pairs.</td>
</tr>
<tr>
<td></td>
<td>Values:</td>
</tr>
<tr>
<td></td>
<td>• <strong>SI-L1</strong>: SI L1</td>
</tr>
</tbody>
</table>
### Edit Mirror Units dialog box

Use this dialog box to change the S-VOL's L1 mirror unit numbers. To open the dialog box, click **Edit Mirror Units** in the **Select Secondary Volumes** window of the **Create SI Pairs** wizard.

The following image shows this dialog box.

![Edit Mirror Units dialog box](image)

The following table describes the items in this dialog box.

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mirror Unit</td>
<td>The mirror unit number.</td>
</tr>
<tr>
<td></td>
<td>For more information about the values you can set for the mirror unit number, see <a href="#">Creating ShadowImage for Mainframe pairs on page 5-4</a>.</td>
</tr>
</tbody>
</table>
Change Options dialog box

Use this dialog box to change the split type and copy pace for pairs that you create.

For information about how to navigate to this dialog box, see Changing ShadowImage for Mainframe pair options on page 5-14.

The following image shows this dialog box.

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Split Type</td>
<td>The split type. Values:</td>
</tr>
<tr>
<td></td>
<td>• <strong>Non Split</strong> (default): The pair is not split.</td>
</tr>
<tr>
<td></td>
<td>• <strong>Quick Split</strong>: The pair is split, and then the data is copied so that the S-VOL is immediately available for read and write I/O. Any remaining differential data is copied to the S-VOL in the background.</td>
</tr>
<tr>
<td></td>
<td>• <strong>Steady Split</strong>: Differential data is copied, and then the pair is split.</td>
</tr>
<tr>
<td>Copy Pace</td>
<td>The system option that determines the rate at which you want the VSP G1000 storage system to copy data. Values:</td>
</tr>
<tr>
<td></td>
<td>• <strong>Slower</strong>: Improved host I/O performance but slower processing speed.</td>
</tr>
<tr>
<td></td>
<td>• <strong>Medium</strong> (default): Average processing speed and host I/O performance.</td>
</tr>
<tr>
<td></td>
<td>• <strong>Faster</strong>: Faster processing speed but slower host I/O performance.</td>
</tr>
</tbody>
</table>

Reserve Mainframe CTGs wizard

Use this wizard to reserve CTGs for SIz.

This wizard contains the following windows:

- **Reserve Mainframe CTGs window on page C-51**
- **Reserve Mainframe CTGs confirmation window on page C-51**
**Reserve Mainframe CTGs window**

Use this window of the Reserve Mainframe CTGs wizard to reserve a CTG for SIz. This is the first window in the wizard.

This window contains the following tables:

- **Available Consistency Groups** table
- **Selected Consistency Group** table

For more information about using this window, see Managing consistency group IDs for ShadowImage for Mainframe using HDvM - SN on page 4-2.

The following image shows this window.

![Available and Selected Consistency Groups tables](image)

**Available and Selected Consistency Groups tables**

These tables are shown on the Reserve Mainframe CTGs window of the Reserve Mainframe CTGs wizard.

The following table describes the items in the Available Consistency Groups and Selected Consistency Groups tables.

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CTG ID</td>
<td>The SIz pair's CTG identification number.</td>
</tr>
</tbody>
</table>

**Reserve Mainframe CTGs confirmation window**

This window is the second and last window of the Reserve Mainframe CTGs wizard.

The following image shows this window of the Reserve Mainframe CTGs wizard.
Selected Consistency Groups table

This table is shown on the Confirm window of the Reserve Mainframe CTGs wizard.

The following table describes the items in the Selected Consistency Groups table.

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CTG ID</td>
<td>The SIz pair's CTG identification number.</td>
</tr>
<tr>
<td>Status</td>
<td>The status of the CTG that is reserved for SIz. Value: Mainframe Reserved</td>
</tr>
</tbody>
</table>

Release Reserved Mainframe CTGs window

Use this window to release reserved mainframe consistency groups (CTGs).
To open this window, click Release Reserved Mainframe CTGs on the Consistency Groups tab in the Local Replication window.

For more information about releasing reserved mainframe CTGs, see Releasing reserved mainframe consistency groups on page 4-4.

The following image shows this window.
**Selected Consistency Groups table**

The following table describes the items in this table.

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CTG ID</td>
<td>The SIz pair's CTG identification number for which you want to release the reserved status.</td>
</tr>
<tr>
<td>Status</td>
<td>The status of CTG reserved for SIz. Value: <strong>Mainframe Reserved</strong></td>
</tr>
</tbody>
</table>

**Edit Local Replica Options wizard**

Use this wizard to enable or disable options that affect host I/O performance. This wizard contains the following windows:

- [Edit Local Replica Options window on page C-53](#)
- [Edit Local Replica Options confirmation window on page C-55](#)

**Edit Local Replica Options window**

Use this window to specify options that affect host I/O performance. This is the first window of the [Edit Local Replica Options](#) wizard.

For more information, see [System options that affect performance on page 4-7](#).

The following image shows this window.
Setting fields

The following table describes the setting fields for this window.

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>System Type</td>
<td>The system type.</td>
</tr>
<tr>
<td>Values:</td>
<td></td>
</tr>
<tr>
<td>• <strong>Open</strong>: SI or HTI</td>
<td></td>
</tr>
<tr>
<td>• <strong>Mainframe</strong>: SIZ, FCv2, or FCSE</td>
<td></td>
</tr>
</tbody>
</table>

SI/TI or SIMF/FCv2/FCSE System Options table

The following table describes the items in this table.

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>System Option</td>
<td>System options that you can enable or disable.</td>
</tr>
<tr>
<td>Values:</td>
<td></td>
</tr>
<tr>
<td>• <strong>Swap &amp; Freeze</strong>:</td>
<td>Use this option to suppress the VSP G1000 storage system’s update copy operations after a Quick Restore and the pair is in DUPLEX status (for SIZ, FCV2, or FCSE) or PAIR status (for SI or HTI). The S-VOL (target volume for FCV2 or FCSE) remains unchanged, and differential data is not copied to the new S-VOL. Default status: <strong>Disabled</strong></td>
</tr>
<tr>
<td>• <strong>HOST I/O Performance</strong>:</td>
<td>Suppresses copy operations at all times, regardless of the workload. This system option increases I/O performance. Default status: <strong>Disabled</strong></td>
</tr>
<tr>
<td>• <strong>Copy Pace</strong>:</td>
<td>Maximizes host server I/O performance by suppressing copy processing only if the pair status is DUPLEX (for SIZ, FCV2, or FCSE) or PAIR (for SI or HTI).</td>
</tr>
<tr>
<td>Item</td>
<td>Description</td>
</tr>
<tr>
<td>----------------------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| Processing-suppression/performance-improvement levels: | (FCv2 and FCSE only) **FC Slower Copy1**: Reduces background copying to one half, thereby improving host I/O response.  
|                                  | (FCv2 and FCSE only) **FC Slower Copy2**: Reduces background copying to one quarter, thereby improving host I/O response.               
|                                  | (FCv2 and FCSE only) **FC Ext. Slower Copy1**: When the MP operating ratio of the MP blade to which the source volume or target volume in a Compatible FlashCopy® V2 relationship is allocated exceeds 65%, background copy operations are suppressed, thereby improving the host I/O response.  
|                                  | (FCv2 and FCSE only) **FC Ext. Slower Copy2**: When the MP operating ratio of the MP blade to which the source volume or target volume in a Compatible FlashCopy® V2 relationship is allocated exceeds 50%, background copy operations are suppressed, thereby improving the host I/O response.  
|                                  | **Copy Pace Ext. Slower1**  
|                                  | Default status: *Disabled*  
|                                  | **Copy Pace Ext. Slower2**  
|                                  | Default status: *Disabled*  
|                                  | **Copy Pace Ext. None**  
|                                  | Default status: *Disabled*  

The I/O performance of the host server is improved most effectively with Copy Pace Ext. None, followed by Copy Pace Ext. Slower2, and then Copy Pace Ext. Slower1.

For more information about the system options, see System options that affect performance on page 4-7.

<table>
<thead>
<tr>
<th>Status</th>
<th>Shows whether the option is currently enabled or disabled.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enable button</td>
<td>Click to enable the option.</td>
</tr>
<tr>
<td>Disable button</td>
<td>Click to disable the option.</td>
</tr>
</tbody>
</table>

**Edit Local Replica Options confirmation window**

The following image shows this window of the **Edit Local Replica Options** wizard.
The following table describes the items in this table.

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>System Option</td>
<td>Options that you can change.</td>
</tr>
<tr>
<td>Status</td>
<td>Shows whether the option is currently enabled or disabled.</td>
</tr>
</tbody>
</table>

**Edit SCP Time window**

State Change Pending (SCP) time is the interval that I/O for the host is suspended. SCP time is a value you set and is shared between TCz and FCv2.

The following image shows this window.

For more information about how to use this window, including how to change the SCP time, see the *Hitachi TrueCopy® for Mainframe User Guide*. 
This glossary defines the special terms used in this document. Click the letter links to navigate.

# 2DC
two-data-center. Refers to the local and remote sites, or data centers, in which TrueCopy for Mainframe (TCz) and Universal Replicator for Mainframe (URz) combine to form a remote replication configuration.
In a 2DC configuration, data is copied from a TCz P-VOL at the primary site to the URz master journal volume at an intermediate site, then is replicated to the URz S-VOL at the remote site. Since this configuration side-steps the TCz S-VOL at the intermediate site, the intermediate site is not considered a data center.

A

administrative logical unit (ALU)
An LU used for the conglomerate LUN structure, a SCSI architecture model. In the conglomerate LUN structure, all host access is through the ALU, which functions as a gateway to sort the I/Os for the subsidiary logical units (SLUs) grouped under the ALU. The host requests I/Os by using SCSI commands to specify the ALU and the SLUs grouped under the ALU. An ALU is called a Protocol Endpoint (PE) in vSphere. See also subsidiary logical unit (SLU).

alternate path
A secondary path (port, target ID, LUN) to a logical volume, in addition to the primary path, that is used as a backup in case the primary path fails.

ALU
See administrative logical unit (ALU).
array
   Another name for a VSP G1000 storage system.

array group
   See RAID group.

async
   asynchronous

ATTIME Suspend
   A CTG task in which you run a BCM command to split the pairs simultaneously at a pre-determined time.

audit log
   Files that store a history of the operations performed from Device Manager - Storage Navigator and the service processor (SVP) and commands that the storage system received from hosts.

B

base emulation type
   Emulation type that is set when drives are installed. Determines the device emulation types that can be set in the RAID group.

BC
   business continuity

BCM
   Business Continuity Manager

blade
   A computer module, generally a single circuit board, used mostly in servers.

BLK, blk
   block

bmp
   bitmap

C

C/T
   See consistency time (C/T).
cache

**cache logical partition (CLPR)**
Consists of virtual cache memory that is set up to be allocated to different hosts in contention for cache memory.

capacity
The amount of data storage space available on a physical storage device, usually measured in bytes (for example MB, GB, and TB).

CCI
Command Control Interface

CFL
Configuration File Loader. An HDvM - SN function for validating and running scripted spreadsheets.

CFW
cache fast write

CH
channel

**channel path**
The communication path between a channel and a control unit. A channel path consists of the physical channel path and the logical path.

CHAP
challenge handshake authentication protocol

CL
cluster

CLI
command line interface

CLPR
 cache logical partition

cluster
Multiple-storage servers working together to respond to multiple read and write requests.

command device
A dedicated logical volume used only by CCI and BCM to interface with the storage system. Several hosts can share the logical volume.
configuration definition file
A text file that defines the configuration, parameters, and options of Command Control Interface (CCI) operations. It also defines the connected hosts and the volumes and groups known to the CCI instance.

consistency group (CTG)
A group of pairs on which copy operations are performed simultaneously; the pairs' status changes at the same time. See also extended consistency group (EXCTG).

consistency group pair-split
Generic name for a CTG task in which you run a CCI, BCM, or PPRC command to split the pairs simultaneously.

consistency time (C/T)
Shows a time stamp to indicate how close the target volume is to the source volume. C/T also shows the time stamp of a journal and extended CTG.

controller
The component in a storage system that manages all storage functions. It is analogous to a computer and contains a processors, I/O devices, RAM, power supplies, cooling fans, and other sub-components as needed to support the task of the storage system.

copy pair
A pair of volumes in which one volume contains original data and the other volume contains the copy of the original. Copy operations can be synchronous or asynchronous, and the volumes of the copy pair can be located in the same storage system (local copy) or in different storage systems (remote copy). A copy pair can also be called a volume pair or just a pair. A pair created by Compatible FlashCopy® is called a relationship.

CTG
See consistency group (CTG).

CTL
controller

CU
control unit

currency of data
The synchronization of the volumes in a copy pair. When the data on the S-VOL is identical to the data on the P-VOL (P-VOL), the data on the S-VOL is current. When the data on the S-VOL is not identical to the data on the P-VOL, the data on the S-VOL is not current.

CYL, cyl
cylinder
**cylinder bitmap**
Indicates the differential data (updated by write I/Os) in a volume of a split or suspended copy pair. The P-VOL and S-VOLs each have their own cylinder bitmap. When you resynchronize the pair, the cylinder bitmaps are merged and the differential data is copied to the S-VOL.

**D**

**DASD**
direct-access storage device

**data consistency**
When the data on the S-VOL is identical to the data on the P-VOL.

**data path**
The physical paths used by primary storage systems to communicate with secondary storage systems in a remote replication environment.

**data pool**
One or more logical volumes designated to temporarily store original data. When a snapshot is taken of a P-VOL, the data pool is used if a data block in the P-VOL is to be updated. The original snapshot of the volume is maintained by storing the to-be-changed data blocks in the data pool.

**DB**
database

**DBMS**
database management system

**delta resync**
A disaster recovery solution in which TrueCopy and Universal Replicator systems are configured to provide a quick recovery using only differential data stored at an intermediate site.

**device**
A physical or logical unit with a specific function.

**device emulation**
Indicates the type of logical volume. Mainframe device emulation types provide logical volumes of fixed size, called logical volume images (LVIs), which contain EBCDIC data in CKD format. Typical mainframe device emulation types include 3390-9 and 3390-M.

**DEVN**
device number
DFW
DASD fast write

DHCP
dynamic host configuration protocol

differential data
Changed data in the P-VOL not yet reflected in the copy volume.

disaster recovery
Procedures to recover critical application data and processing after a disaster or other failure.

disk array
Disk array, or just array, is another name for a VSP G1000 storage system.

disk controller (DKC)
The hardware component that manages front-end and back-end storage operations. The term DKC can refer to the entire RAID storage system.

DKC
disk controller. The term DKC can refer to the RAID storage system or the controller components.

DKCMAIN
disk controller main. Refers to the microcode for the VSP G1000 storage system.

DKP
disk processor. Refers to the microprocessors on the back-end director features of the Universal Storage Platform V.

DKU
disk unit. Refers to the cabinet (floor model) or rack-mounted hardware component that contains data drives but does not have controller components.

DMP
Dynamic Multi Pathing

DRU
Hitachi Data Retention Utility

DP-VOL
Dynamic Provisioning-virtual volume. A virtual volume that does not have memory space used by Dynamic Provisioning.
**dynamic provisioning**
An approach to managing storage. Dynamic Provisioning removes capacity from the available pool when data is actually written to disk. Also called thin provisioning.

**E**

**EC**
error code

**emulation**
A VSP G1000 storage system operation that emulates the characteristics of a different storage system. For device emulation the mainframe host recognizes the logical devices on the RAID storage system as 3390-x devices. For controller emulation the mainframe host recognizes the control units (CUs) on the RAID storage system as 2107 controllers. The VSP G1000 storage system operates the same as the storage system it emulates.

**emulation group**
Device emulation types that can be intermixed within a RAID group and treated as a group.

**env.**
environment

**ERC**
error reporting communications

**ESCON**
Enterprise System Connection

**EXCTG**
See extended consistency group (ECTG).

**EXG**
external volume group

**ext.**
external

**extended consistency group (EXCTG)**
Universal Replicator for Mainframe journals in which data consistency is ensured. Journal registration in an EXCTG is required if you are performing copy operations between multiple primary and secondary systems.

**external application**
A software module that is used by a storage system but runs on a separate platform.
external port
A Fibre Channel port that is configured to be connected to an external storage system for Universal Volume Manager tasks.

external volume
A logical volume whose data resides on drives that are physically located outside the VSP G1000 storage system.

F
failback
The process of switching operations from the secondary path or host back to the primary path or host, after the primary path or host has recovered from failure. See also failover.

failover
The process of switching operations from the primary path or host to a secondary path or host when the primary path or host fails.

FBA
fixed-block architecture

FC
Fibre Channel; FlashCopy

FCA
Fibre Channel adapter

FC-AL
Fibre Channel arbitrated loop

FCIP
Fibre Channel internet protocol

FCP
Fibre Channel protocol

FCSP
Fibre Channel security protocol

FIBARC
Fibre Connection Architecture

FICON
Fibre Connectivity
**FIFO**
first in, first out

**free capacity**
The amount of storage space (in bytes) that is available for use by the host systems.

**FSW**
fibre switch

**FTP**
file-transfer protocol

**FV**
fixed-size volume

**FWD**
fast-wide differential

**G**

**GID**
group ID

**GUI**
graphical user interface

**H**

**HA**
high availability

**HACMP**
High Availability Cluster MultiProcessing

**HDLM**
Hitachi Dynamic Link Manager

**HDP**
Hitachi Dynamic Provisioning

**HDS**
Hitachi Data Systems
HDT
Hitachi Dynamic Tiering

HDvM
Hitachi Device Manager

HGLAM
Hitachi Global Link Availability Manager

H-LUN
host logical unit

HOMRCF
Hitachi Open Multi-RAID Coupling Feature. Another name for Hitachi ShadowImage.

HORC
Hitachi Open Remote Copy. Another name for Hitachi TrueCopy.

HORCM
Hitachi Open Remote Copy Manager. Another name for Command Control Interface.

host failover
The process of switching operations from one host to another host when the primary host fails.

host group
A group of hosts of the same operating system platform.

host mode
Operational modes that provide enhanced compatibility with supported host platforms. Used with Fibre Channel ports on RAID storage systems.

host mode option
Additional options for Fibre Channel ports on RAID storage systems. Provide enhanced functionality for host software and middleware.

HRC
Hitachi Remote Copy. Another name for Hitachi TrueCopy for IBM z/OS.

HRpM
Hitachi Replication Manager

HSCS
Hitachi Storage Command Suite. For this release, the suite of software applications is called the Hitachi Command Suite.
HUR
Hitachi Universal Replicator

HXRC
Hitachi Extended Remote Copy. Another name for Hitachi Compatible Replication for IBM XRC.

I

iFCP
internet Fibre Channel protocol

IML
initial microcode load; initial microprogram load

IMPL
initial microprogram load

initial copy
An initial copy operation is performed when you create a copy pair. Data on the P-VOL is copied to the S-VOL.

initiator port
A Fibre Channel port configured to send remote I/Os to an RCU target port on another storage system. See also RCU target port and target port.

in-system replication
The original data volume and its copy are located in the same storage system. SI in-system replication provides duplication of logical volumes; Thin Image in-system replication provides "snapshots" of logical volumes that are stored and managed as virtual volumes (V-VOLs). See also remote replication.

internal volume
A logical volume whose data resides on drives that are physically located within the storage system. See also external volume.

IO, I/O
input/output

IOPS
I/Os per second

IP
internet protocol
**IPL**
initial program load

**J**

**JNL**
journal

**JNLG**
journal group

**journal group (JNLG)**
In a Universal Replicator system, journal groups manage data consistency between multiple P-VOLs and S-VOLs. See also *consistency group (CTG)*.

**journal volume**
A volume that records and stores a log of all events that take place in another volume. In the event of a system crash, the journal volume logs are used to restore lost data and maintain data integrity. In Universal Replicator, differential data is held in journal volumes until you copy it to the S-VOL.

**JRE**
Java Runtime Environment

**L**

**LAN**
local-area network

**LBA**
logical block address

**LCP**
local control port; link control processor

**LCU**
logical control unit

**LDEV**
logical device

**LDKC**
See *logical disk controller (LDKC)*.
leaf volume
A level-2 S-VOL in an SI cascade configuration. The P-VOL of a layer-2 pair is called a node volume. See also cascade configuration.

LED
light-emitting diode

license key
A specific set of characters that unlocks a software application so that you can use it.

local copy
See in-system replication.

local site
See primary site.

logical device (LDEV)
An individual logical data volume (on multiple drives in a RAID configuration) in the storage system. An LDEV might or might not contain any data and might or might not be defined to any hosts. Each LDEV has a unique identifier or "address" within the storage system composed of the logical disk controller (LDKC) number, control unit (CU) number, and LDEV number. The LDEV IDs within a storage system do not change. An LDEV formatted for use by mainframe hosts is called a logical volume image (LVI).

logical disk controller (LDKC)
A group of 255 control unit (CU) images in a RAID storage system that is controlled by a virtual (logical) storage system within the single physical storage system. For example, the Universal Storage Platform V storage system supports two LDKCs, LDKC 00 and LDKC 01.

logical unit (LU)
A logical volume that is configured for use by open-systems hosts (for example, OPEN-V).

logical unit (LU) path
The path between an open-systems host and a logical unit.

logical volume
See volume.

logical volume image (LVI)
A logical volume that is configured for use by mainframe hosts (for example, 3390-9).

LU
logical unit

LUN
logical unit number
LUNM
Hitachi LUN Manager

LUSE
Hitachi LUN Expansion; Hitachi LU Size Expansion

**LUSE volume**
A combined LU composed of multiple OPEN-x devices. A LUSE device can be from 2 to 36 times larger than a fixed-size OPEN-x LU. LUSE lets the host access the data stored on the Hitachi storage system using fewer LU numbers.

LV
logical volume

M

**main control unit (MCU)**
A VSP G1000 storage system at a primary site that contains P-VOLs of TrueCopy for Mainframe remote replication pairs. The MCU is configured to send remote I/Os to one or more storage systems at the secondary or remote site, called remote control units (RCUs), that contain the S-VOLs of the remote replication pairs. See also *remote control unit (RCU)*.

**main site**
See *primary site*.

**main volume (M-VOL)**
The volume in a TrueCopy for Mainframe pair (Hitachi Virtual Storage Platform storage system and earlier models) containing the original data that is duplicated on the remote volume (R-VOL) of the pair. On the Hitachi Virtual Storage Platform G1000 system TrueCopy for Mainframe volumes are called P-VOLs and S-VOLs. See also *remote volume (R-VOL)*.

**master journal (M-JNL)**
Holds differential data on the primary Universal Replicator system until it is copied to the restore journal (R-JNL) on the secondary system. See also *restore journal (R-JNL)*.

**max.**
maximum

**MB**
megabyte

**Mb/sec, Mbps**
megabits per second
MB/sec, MBps
megabytes per second

MCU
See main control unit (MCU).

MF, M/F
mainframe

MIH
missing interrupt handler

mirror
In Universal Replicator, each pair relationship in and between journals is called a "mirror". Each pair is assigned a mirror ID when it is created. The mirror ID identifies individual pair relationships between journals.

M-JNL
main journal

modify mode
A mode of operation in Device Manager - Storage Navigator that allows changes to the storage system configuration. See also view mode.

MP
microprocessor

MP blade
A blade containing an I/O processor. Tune performance in the VSP G1000 storage system by allocating a specific MP blade to each I/O-related resource (LDEV, external volume, or journal). Specific MP blades are allocated or the VSP G1000 storage system can automatically select an MP blade.

MSCS
Microsoft Cluster Server

mto, MTO
mainframe-to-open

MU
mirror unit

multipathing
A performance and fault-tolerant technique that uses more than one physical connection between the storage system and host system. Also called multipath I/O.
M-VOL
   main volume

N

node volume
   A level-2 P-VOL in an SI cascade configuration. The S-VOL of a layer-2 pair is called a
   leaf volume. See also cascade configuration.

NUM
   number

NVS
   nonvolatile storage

O

OPEN-V
   A logical unit (LU) of user-defined size that is formatted for use by open-systems hosts.

OPEN-x
   A logical unit (LU) of fixed size (for example, OPEN-3 or OPEN-9) that is used primarily
   for sharing data between mainframe and open-systems hosts using Hitachi Cross-OS
   File Exchange.

OS
   operating system

P

pair
   Two logical volumes in a replication relationship in which one volume contains original
   data to be copied and the other volume contains the copy of the original data. The copy
   operations can be synchronous or asynchronous, and the pair volumes can be located in
   the same storage system (in-system replication) or in different storage systems
   (remote replication).

pair status
   Indicates the condition of a copy pair. A pair must have a specific status for specific
   tasks. When an task completes, the status of the pair changes to the new status.

parity group
   See RAID group.
**path failover**  
The ability of a host to switch from using the primary path to a logical volume to the secondary path to the volume when the primary path fails. Path failover ensures continuous host access to the volume in the event the primary path fails. See also *alternate path* and *failback*.

**PG**  
parity group. See *RAID group*.

**physical device**  
See *device*.

**PiT**  
point-in-time

**point-in-time (PiT) copy**  
A copy or snapshot of a volume or set of volumes at a specific point in time. A point-in-time copy can be used for backup or mirroring application to run concurrently with the system.

**pool**  
A set of volumes that are reserved for storing Hitachi Thin Image data or Dynamic Provisioning write data.

**pool volume (pool-VOL)**  
A logical volume that is reserved for storing snapshot data for Hitachi Thin Image operations or write data for Dynamic Provisioning.

**port attribute**  
Indicates the type of Fibre Channel port: target, RCU target, or initiator.

**port block**  
A group of four Fibre Channel ports that have the same port mode.

**port mode**  
The operational mode of a Fibre Channel port. The three port modes for Fibre Channel ports on the VSP G1000 storage systems are standard, high-speed, and initiator/external MIX.

**PPRC**  
An IBM Peer-to-Peer Remote Copy host software function.

**Preview list**  
The list of requested tasks in HDvM - SN.

**primary site**  
The physical location of a storage system that contains the original data to be replicated and that is connected to one or more storage systems at the remote or secondary site.
via remote copy connections. A primary site can also be called a "main site" or "local site".
The term primary site is also used for host failover operations. In that case, the primary site is the host computer where the production applications are running, and the secondary site is where the backup applications run when the applications at the primary site fail, or where the primary site itself fails.

**primary volume**
The volume in a copy pair that contains the original data to be replicated. The data in the P-VOL is duplicated synchronously or asynchronously on the secondary pairs. The following Hitachi software applications use this term: HDvM - SN, HTI, SI, SIz, TC, UR, and URz.
See also **secondary volume**.

**P-site**
primary site

**P-VOL**
See **primary volume**.

**Q**

**quick format**
A Virtual LVI feature in which the formatting of the internal volumes is done in the background. This allows system configuration (such as defining a path or creating a TrueCopy pair) before the formatting is completed.

**quick restore**
A reverse resynchronization in which data is not actually copied: the P-VOL and S-VOLs are swapped.

**quick split**
A split task in which the pair is split, and then the differential data is copied to the S-VOL. Any remaining differential data is copied to the S-VOL in the background. The benefit is that the S-VOL is immediately available for read and write I/O.

**R**

**R/W, r/w**
read/write

**RAID**
redundant array of inexpensive disks

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**RAID group**
A redundant array of inexpensive drives (RAID) that have the same capacity and are treated as one group for data storage and recovery. A RAID group contains both user data and parity information, which allows the user data to be accessed in the event that one or more of the drives within the RAID group are not available. The RAID group's RAID level determines the number of data drives and parity drives and how the data is "striped" across the drives. For RAID1, user data is duplicated within the RAID group, so parity data for RAID1 RAID groups does not exist. A RAID group can also be called an array group or a parity group.

**RAID level**
The type of RAID implementation. RAID levels include RAID0, RAID1, RAID2, RAID3, RAID4, RAID5 and RAID6.

**RCP**
remote control port

**RCU**
See *remote control unit (RCU)*.

**RCU target port**
A Fibre Channel port that is configured to receive remote I/Os from an initiator port on another VSP G1000 storage system.

**RD**
read

**remote console PC**
A previous term for the personal computer (PC) system that is LAN-connected to a VSP G1000 storage system. The current term is HDvM - SN PC.

**remote control port (RCP)**
A serial-channel (ESCON) port on a TrueCopy main control unit (MCU) that is configured to send remote I/Os to a TrueCopy remote control unit (RCU).

**remote control unit (RCU)**
A VSP G1000 storage system at a secondary or remote site that is configured to receive remote I/Os from one or more storage systems at the primary site.

**remote copy**
See *remote replication*.

**remote copy connections**
The physical paths that connect a VSP G1000 storage system at the primary site to a storage system at the secondary site. Also called data path.
remote replication
Data replication configuration in which the storage system that contains the original
data is at a primary site and the storage system that contains the copy of the original
data is at a remote site. TrueCopy and Universal Replicator provide remote replication.
See also in-system replication.

remote site
See secondary site.

remote volume (R-VOL)
The volume in a TrueCopy for Mainframe pair (Hitachi Virtual Storage Platform storage
system and earlier models) containing a copy of the original data on the main volume
(M-VOL) of the pair. On the Hitachi Virtual Storage Platform G1000 system TrueCopy for
Mainframe volumes are called P-VOLs and S-VOLs.
See also main volume (M-VOL).

restore journal (R-JNL)
Holds differential data on the secondary Universal Replicator system until it is copied to
the S-VOL.

resync
resynchronize

RF
record format

RIO
remote I/O

R-JNL
restore journal

RL
record length

RMI
Remote Method Invocation

rnd
random

root volume
A level-1 P-VOL in an SI cascade configuration. The S-VOL of a layer-1 pair is called a
node volume. See also cascade configuration.

RPO
recovery point objective
R-SIM
remote service information message

R-site
remote site (used for Universal Replicator)

RTC
real-time clock

RTO
recovery time objective

R-VOL
See remote volume (R-VOL).

S

S#
serial number

S/N
serial number

s/w
software

SAID
system adapter ID

SAN
storage-area network

SATA
serial Advanced Technology Attachment

SC
storage control

SCDS
source control dataset

SCI
state change interrupt
scripting
The use of command line scripts, or spreadsheets downloaded by Configuration File Loader, to automate storage management tasks.

SCSI
small computer system interface

secondary site
The physical location of the storage system that contains the primary volumes of remote replication pairs at the primary site. The storage system at the secondary site is connected to the storage system at the primary site via remote copy connections. The secondary site can also be called the "remote site". See also primary site.

secondary volume
The volume in a copy pair that is the copy of the original data on the primary volume (P-VOL). See also primary volume.

seq.
sequential

service information message (SIM)
SIMs are generated by a VSP G1000 storage system when it detects an error or service requirement. SIMs are reported to hosts and displayed on Device Manager - Storage Navigator.

service processor (SVP)
The computer inside a VSP G1000 storage system that hosts the Device Manager - Storage Navigator software and is used by service personnel for configuration and maintenance of the storage system.

severity level
Applies to service information messages (SIMs) and Device Manager - Storage Navigator error codes.

shared volume
A volume that is being used by more than one replication function. For example, a volume that is the primary volume of a TrueCopy pair and the primary volume of a ShadowImage pair is a shared volume.

SI
Hitachi ShadowImage®

SIZ
Hitachi ShadowImage® for Mainframe
sidefile
An area of cache memory that is used to store updated data for later integration into the copied data.

SIM
service information message

size
Generally refers to the storage capacity of a memory module or cache. Not usually used for storage of data on disk or flash drives.

SLU
See subsidiary logical unit (SLU).

SM
shared memory

SMTP
simple mail transfer protocol

SN
serial number shown in HDvM - SN

snapshot
A point-in-time virtual copy of a Thin Image P-VOL. The snapshot is maintained when you update the P-VOL by storing pre-updated data (snapshot data) in a data pool.

SNMP
can be used to manage network devices.

SOM
system option mode

source volume (S-VOL)
The volume in a copy pair containing the original data. The term is used only in the earlier version of HDvM - SN (still in use), for SIz, Dataset Replication, IBM FlashCopy.

space
Generally refers to the data storage capacity of a disk drive or flash drive.

SRM
Storage Replication Manager

SSB
sense byte
SSID
(storage) subsystem identifier. SSIDs are used as an additional way to identify a control unit on mainframe operating systems. Each group of 64 or 256 volumes requires one SSID, therefore there can be one or four SSIDs per CU image. For VSP G1000, one SSID is associated with 256 volumes.

SSL
secure socket layer

steady split
In SI, a typical pair split task in which any remaining differential data from the P-VOL is copied to the S-VOL, and then the pair is split.

subsidiary logical unit (SLU)
An LU used for the conglomerate LUN structure, a SCSI architecture model. An SLU is an LU that stores actual data. You can use a DP-VOL or snapshot data (or a V-VOL allocated to snapshot data) as an SLU. All host access to SLUs are through the administrative logical unit (ALU). An SLU is called a virtual volume (VVol) in vSphere. See also administrative logical unit (ALU).

S-VOL
See secondary volume or source volume (S-VOL).

SVP
See service processor (SVP).

sync
synchronous

system option mode (SOM)
Additional operational parameters for the VSP G1000 storage systems that enable the storage system to be tailored to unique customer operating requirements. Set SOMs on the service processor.

T
target port
A Fibre Channel port that is configured to receive and process host I/Os.

target volume (T-VOL)
The volume in a mainframe copy pair that is the copy. The term is used only in the earlier version of HDvM - SN (still in use), for SIz, Dataset Replication, Compatible FlashCopy® V2.
See also source volume (S-VOL).
TB
terabyte

TC
Hitachi TrueCopy

TCz
Hitachi TrueCopy for Mainframe

TDEVN
target device number

TGT
target; target port

THD
threshold

TID
target ID

total capacity
The aggregate amount of storage space in a data storage system.

T-VOL
See target volume (T-VOL).

U
update copy
An operation that copies differential data on the P-VOL of a copy pair to the S-VOL. Update copy operations are performed in response to write I/Os on the P-VOL after the initial copy operation is completed.

UR
Hitachi Universal Replicator

URz
Hitachi Universal Replicator for Mainframe

USP
Hitachi TagmaStore® Universal Storage Platform

USP V
Hitachi Universal Storage Platform V
**USP VM**
Hitachi Universal Storage Platform VM

**UT**
Universal Time

**UTC**
Universal Time-coordinated

**V**

**V**
version; variable length and de-blocking (mainframe record format)

**VB**
variable length and blocking (mainframe record format)

**view mode**
The mode of operation of Device Manager - Storage Navigator that allows viewing only of the storage system configuration. The two Device Manager - Storage Navigator modes are view mode and modify mode.

**virtual device (VDEV)**
A group of logical devices (LDEVs) in a RAID group. A VDEV typically consists of some fixed volumes (FVs) and some free space. The number of fixed volumes is determined by the RAID level and device emulation type.

**Virtual LVI volume**
A custom-size volume whose size is defined by the user using Virtual LVI. Also called a custom volume (CV).

**virtual volume (V-VOL)**
A logical volume in a storage system that has no physical storage space. Hitachi Thin Image uses V-VOLs as secondary volumes of copy pairs. In Dynamic Provisioning, V-VOLs are referred to as DP-VOLs.

**VLVI**
Hitachi Virtual LVI

**VM**
volume migration; volume manager

**VOL, vol**
volume
**VOLID**
volume ID

**volser**
volume serial number

**volume**
A logical device (LDEV), or concatenated LDEVs in the case of LUSE, that has been defined to one or more hosts as a single data storage unit. A mainframe volume is called a logical volume image (LVI)

**volume pair**
See *copy pair*.

**V-VOL**
virtual volume

**V-VOL management area**
Contains the pool management block and pool association information for Dynamic Provisioning, Dynamic Provisioning for Mainframe, Dynamic Tiering, Dynamic Tiering for Mainframe, and Thin Image operations. The V-VOL management area is created automatically when additional shared memory is installed.
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