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Hitachi HiCommand™ Device Manager ShadowImage/TrueCopy Setup Guide

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Document Revision Level

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MK-93HC043-P	January 2004	Preliminary Release
MK-93HC043-00	April 2004	Initial Release, supersedes and replaces MK-93HC043-P
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Changes for this Revision

- Specified that Device Manager Agent must be installed on the targeted hosts.
- Added section 1.2, Managing Copy Pairs Either Locally or Centrally.

Referenced Documents

- *Hitachi Lightning 9900™ V Series Hitachi Remote Console – Storage Navigator User's Guide*, MK-92RD101
- *Hitachi Lightning 9900™ V Series and Lightning 9900™ Command Control Interface (CCI) User and Reference Guide*, MK-90RD011
- *Hitachi Lightning 9900™ V Series User and Reference Guide,* MK-92RD100
- *Hitachi Lightning 9900™ V Series TrueCopy User's Guide,* MK-92RD108
- *Hitachi Lightning 9900™ V Series ShadowImage User's Guide,* MK-92RD110
- *HiCommand™ Device Manager Server Installation and Configuration Guide,* MK-91HC002
- *HiCommand™ Device Manager Agent Installation Guide,* MK-92HC019
- *Hitachi Thunder 9500™ V Series Resource Manager 9500V User's Guide for CLI,* MK-92DF603
- *Hitachi Thunder 9500™ V Series Resource Manager 9500V User's Guide for GUI,* MK-92DF603
- *Hitachi Thunder 9500™ V Series ShadowImage User's Guide*, MK-92DF607
- *Hitachi Freedom Storage™ Thunder 9200 ShadowImage User's Guide*, MK-910F541

Preface

This document provides instructions for using Hitachi HiCommand™ Device Manager to manage ShadowImage and TrueCopy functions. This user's guide assumes that:

- the user has a background in data processing and understands direct-access storage device subsystems and their basic functions,
- the user is familiar with the Hitachi Lightning 9900 V Series, the Hitachi Lightning 9900, the Hitachi Thunder 9500V, and the Hitachi Thunder 9200,
- The user is familiar with the HiCommand™ Device Manager software product, and
- The user is familiar with the operating system (OS) which hosts the HiCommand™ Device Manager client software (e.g., Windows NT® OS, Solaris™ OS).

  Note: The term "9900V" refers to the entire Hitachi 9900V subsystem family, unless otherwise noted. Please refer to the *Lightning 9900™ V Series User and Reference Guide* (MK-92RD100) for further information on the 9900V disk array subsystems, or contact your Hitachi Data Systems account team. For further information on the Lightning 9900™ V Storage Navigator, please refer to the *Lightning 9900™ V Series Remote Console - Storage Navigator User's Guide* (MK-92RD101), or contact your Hitachi Data Systems account team.

  Note: The Hitachi Data Systems representative must use the appropriate maintenance manuals during all applicable installation and configuration activities. Follow all precautions and procedures in the maintenance manual, and always check all specifications to ensure proper installation and configuration.

  Note: Throughout this manual, the DAMP (e.g., DAMP 2, DAMP 3) refers to the Resource Manager 9500V program.

  Note: The use of ShadowImage and TrueCopy software and all other Hitachi Data Systems products is governed by the terms of your license agreement(s) with Hitachi Data Systems.

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Chapter 1 Managing ShadowImage and TrueCopy Functions with HiCommand™ Device Manager

1.1 Overview of ShadowImage and TrueCopy Functions using Device Manager

The Hitachi HiCommand™ Device Manager enables users to create, modify, and delete ShadowImage and TrueCopy copy pairs in collaboration with Hitachi Command Control Interface (CCI, sometimes also called RAID Manager) and Hitachi Device Manager Agent. Device Manager-Agent allows external CCI scripts to access to pair volumes managed by Device Manager-Agent.

Additionally, the Device Manager and the Storage Navigator provide pair volume life cycle management functions (Create, Split, Sync, and Delete).

Note: Device Manager Agent must be installed on the targeted hosts before using the functions described in this document For detailed information about these products, please refer to the *Hitachi Lightning 9900™ V Series and 9900 Command Control Interface (CCI) User and Reference Guide*, MK-90RD011, and the *HiCommand™ Device Manager Agent Installation Guide*, MK-92HC019.

CCI is usually installed under /HORCM, and a symbolic link is created. When you change directories (cd) to /HORCM, you will automatically go to CCI wherever you actually installed it. An example would be `/var/opt/HORCM` or whatever name you typed in during the CCI install. The HORCM.conf files must be moved to `/etc`, so that is where the actual config for HORCM resides

1.2 Managing Copy Pairs Either Locally or Centrally

You can use Device Manager to mange copy pairs either locally or centrally.

In local management, each host has Command Control Interface (CCI) installed. Each host manages the copy pairs for the LUs that it recognizes. See Figure 1.1.

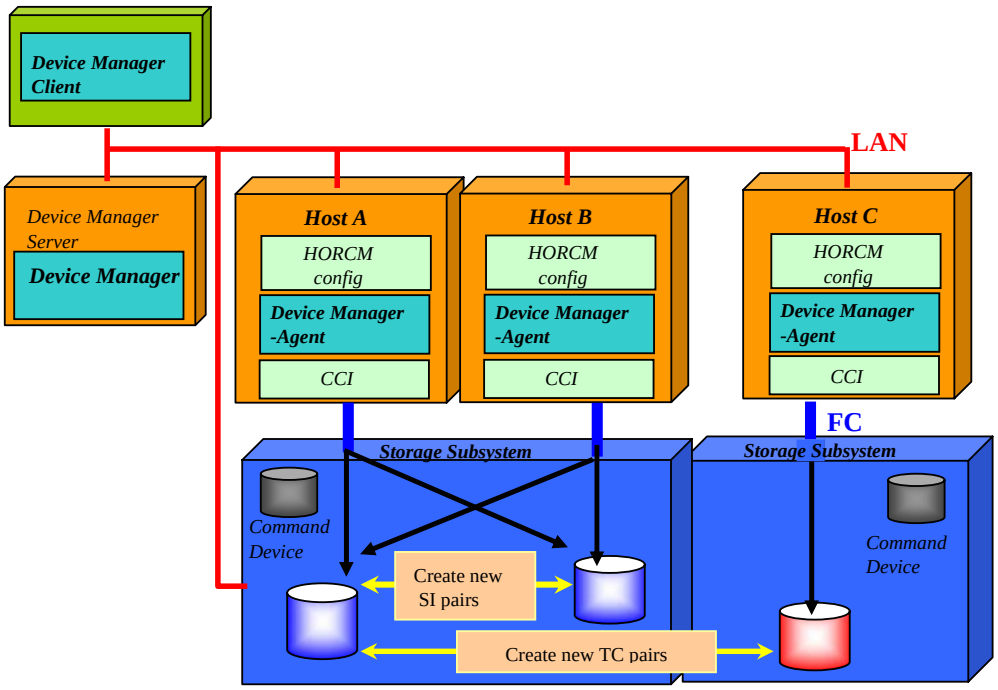


Figure 1.1 Local Management of Copy Pairs

In central management, a CCI server manages all copy pairs for the LUs recognized by multiple hosts. See Figure 1.2.

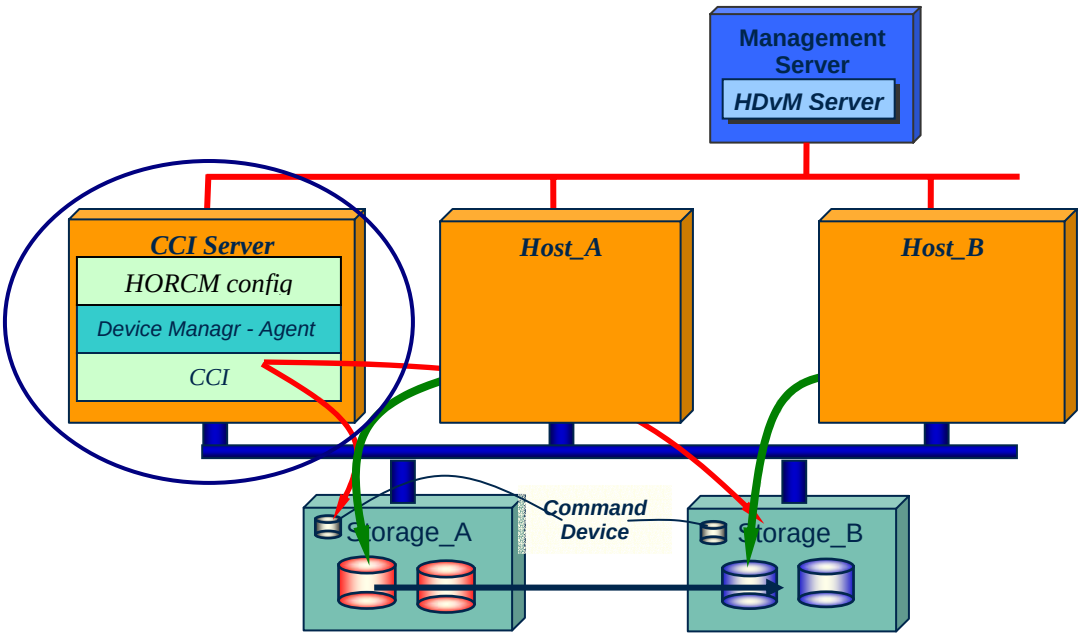


Figure 1.2 Central Management of Copy Pairs

Chapter 2 Preparing to use ShadowImage and TrueCopy with Device Manager

2.1 Prerequisites

Before the copy pair functionality of ShadowImage and TrueCopy can be utilized with Device Manager, the appropriate software must be installed on the subsystems and the proper system parameters must be set accordingly. For example, when TrueCopy is used, you must register the hardware configuration for a remote copy connection, a remote copy connection, the port settings, and the connection information of the target device.

This chapter lists the prerequisites and steps for using the copy pair functionality of ShadowImage and TrueCopy on the Lightning 9900V, the Lightning 9900, the Thunder 9500V, and the Thunder 9200.

Note: A software license key is required for using Hitachi ShadowImage and TrueCopy. For license information, please contact your Hitachi Data Systems representative.

2.1.1 Using TrueCopy on the Lightning 9900V

Note: When TrueCopy is used, you must register the hardware configuration for a remote copy connection, a remote copy connection, the port settings, and the connection information of the target device.

To use TrueCopy on the Lightning 9900V, complete the following steps:

1. Confirm that the cache and non-volatile storage (NVS) of the RAID device are sufficient, and increase if necessary.
2. Install the Hitachi TrueCopy or TrueCopy Asynchronous software license key.

   For information about installation and the software license key, please contact your Hitachi Data Systems representative or refer to the *Hitachi 9900 V Series TrueCopy User's Guide*, MK-92RD108.
3. Change the MCU port for an M-R path to **Initiator**.
4. Change the RCU port for an M-R path to **RCU Target**. Confirm the port configuration.

   Refer to Appendix A for further details.
5. Launch the Storage Navigator.

   If you have installed Device Manager, you may launch Storage Navigator from Physical View on the Device Manager Web Client if you have already discovered the subsystem.
6. From the Storage Navigator main panel, select the **TrueCopy** button ().
7. Change the mode to **Modify**.
8. Select the **RCU** Operations tab. Then select **Port** in the frame **Display**.
9. Confirm the status of the port configuration.

   For more information, refer to Appendix A.
10. Register the RCU and the M-R path in the MCU port.

2.1.2 Using TrueCopy on the Lightning 9900

To use TrueCopy on the Lightning 9900, complete the following steps:

1. Confirm that the cache and non-volatile storage (NVS) of the RAID device sufficient, and add if necessary.

   Note: Use Storage Navigator to confirm the cache of the RAID device or NVS. Use SVP to add the cache of the RAID device or NVS.

2. Install the Hitachi Open Remote Copy (HORCM) or Hitachi Open Remote Copy Asynchronous (HORCMA) software license key.

   For information about installation and the software license key, please contact your Hitachi Data Systems representative or refer to the *Hitachi 9900 V Series TrueCopy User's Guide*, MK-92RD108.

3. Change the MCU port for an M-R path Initiator.

4. Change the RCU port for an M-R path to **RCU Target**. If different than expected, contact Customer Engineer.

   Refer to Appendix A for a screen illustration.

5. Launch the Storage Navigator.

   If you have installed Device Manager, you may launch Storage Navigator from Physical View on the Device Manager Web Client if you have already discovered the subsystem.

6. Select the TrueCopy button () from Storage Navigator.

7. Change mode to **Modify**.

8. Select the **RCU Operations** tab. Then select **Port** in the frame **Display**.

9. Confirm the port's configuration status.

   For more information, please refer to Appendix A.

10. Register the RCU and the M-R path in the MCU port.

    Note: Use Storage Navigator to confirm the cache of the RAID device or NVS. Use SVP when adding the cache of the RAID device or NVS.

    For more information about M-R path setup, please refer to Appendix A.

2.1.3 ShadowImage on the Lightning 9500V

To use ShadowImage on the Lightning 9500V, complete the following steps:

1. Install the Hitachi ShadowImage software license key.
2. Set the start attribute to **Dual Active Mode**.
3. Set the SCSI ID/Port ID Take-over mode to "Do not use" (it is usually deactivated).
   It is recommended that the data share mode be set to **Use**.

2.1.4 ShadowImage on the Lightning 9200

To use ShadowImage on the Thunder 9200, complete the following steps:

1. Install the MRCF-Lite license key.
2. Configure the stripe size to 64KB.
3. Confirm that the start attribute is **Dual Active Mode**.
4. Set the SCSI ID/Port ID Take-over mode to **Do not use**.
   It is recommended that the data share mode be set to **Use**.
5. Enable **Standard INQUIRY data expand mode** in the host mode 2 to the ports.

For further information, refer to *Hitachi Storage Freedom Thunder 9200 ShadowImage User's Guide*, MK-910F541.

2.1.5 Using TrueCopy on the Lightning 9500V

To use TrueCopy on the Thunder 9500V, complete the following steps:

1. Install the Hitachi TrueCopy software license key.
2. Define the command device for the CCI instance on the attached host.
3. Configure the TrueCopy path.
4. Set the start attribute to **Dual active mode**.
5. Set the SCSI ID/Port ID Take-over mode to **Do not use**.
   It is recommended that the data share mode be set to **Use**.

2.1.6 TrueCopy on the 9200

To use TrueCopy on the Thunder 9200, complete the following steps:

1. Install the Hitachi TrueCopy software license key.
2. Define the command device for the CCI instance on the attached host.
3. Configure the path of the synchronous remote copy.
4. Set the start attribute to **Dual active mode**.
5. Set the SCSI ID/Port ID Take-over mode to "Do not use" (it is usually deactivated).

   It is recommended that the data share mode be set to **Use**.
6. Enable "Standard INQUIRY data expand mode" in the host mode 2 to the ports.

For further 9200 information, please refer to Appendix B.

You must configure the storage subsystem so that it can be operated using Device Manager. For information, please refer to the *Hitachi HiCommand™ Device Manager Server Installation and Configuration Guide*.

2.2 ShadowImage and TrueCopy Requirements for the Command Device and for Volumes

For details on the system configuration required to display the ShadowImage and TrueCopy settings for the storage subsystems, see the *HiCommand™ Device Manager Server Installation and Configuration Guide*.

The requirements for the command device are:

- The target host must recognize it.
- LUN security for it must be set for the target host.

2.2.1 General Requirements for P-VOLs (SP-VOLs)

The requirements for the LDEV that will be the P-VOL (or SP-VOL) of a copy pair are:

- The Device Manager Agent must recognize the LDEV. If the **Last Updated** column displays a date and time, it means that the Device Manager Agent recognizes the LDEV.
- LUN security must be set for the target host.
- The LDEV must be an OPEN system LDEV.
- The LDEV must not be a command device.
- The storage subsystem containing the LDEV must have a valid command device.
- For the Thunder 9500V and 9200, LU cache management must be specified.

2.2.2 General Requirements for S-VOLs

The requirements for the LDEV that will be the S-VOL of a copy pair are:

- The LDEV must be recognized by Device Manager Agent and is not mounted. If the LDEV is not mounted, the File system column for the LDEV is blank.
- The LDEV cannot be assigned to any other copy pairs.
- The LDEV cannot be a command device.
- LUN security must be set for the selected host.
- The LDEV's capacity must be the same as the selected P-VOL's capacity.
- The device emulation type (9900V/9900) must be the same as the selected P-VOL.
- For a 9900V/9900 LUSE volume, the number of LDEVs contained in the LUSE must be the same for the P-VOL and the S-VOL.
- For the Thunder 9500V and 9200, the number of data disks in the P-VOL and S-VOL must be the same.
- For the Thunder 9500V and 9200, LU cache management must be specified.

2.2.3 Additional TrueCopy Requirements

Note: A TrueCopy pair cannot be created within the same subsystem.

The requirements for the 9900V/9900 LDEV that will be a TrueCopy P-VOL are:

- The LDEV cannot be a TrueCopy P-VOL or S-VOL.

  Note: If you want to use a ShadowImage S-VOL as the P-VOL for a TrueCopy copy pair, the status of the ShadowImage copy pair must be set to Split.

- The MCU-RCU path must have already been defined through the Storage Navigator-Remote Console software or the SVP.

The requirements for a 9500V/9200 LDEV that will be a TrueCopy P-VOL are:

- The LDEV cannot be a TrueCopy P-VOL or S-VOL.
- The LDEV cannot be a ShadowImage S-VOL.
- The RAID level cannot be RAID-5.
- The LDEV must not be a LUSE volume.

Requirements for a TrueCopy S-VOL

The requirements for an LDEV that will be a TrueCopy S-VOL are:

- The selected P-VOL must not already be assigned to a TrueCopy copy pair.
- For the Lightning 9900V or 9900, the RCU of the S-VOL must be specified for the MCU of the selected P-VOL. For details on RCU settings (remote copy connection, ports, MCU-RCU paths), please refer to the HiCommand™ *Device Manager Server Installation and Configuration Guide*.
- For the Thunder 9500V and 9200, paths for TrueCopy must be configured for the LDEV.
- For the Thunder 9500V and 9200, the selected S-VOL must not be a LUSE volume.

The requirements for the storage subsystems that contain the selected LDEVs are:

- For the Thunder 9500V, the P-VOL and S-VOL must both be in 9500V subsystems. For the Thunder 9200, the P-VOL and S-VOL must be in 9200 subsystems. The Lightning 9900V and 9900 support mixed-subsystem pairs (for example, 9900V-to-9900).
- For the Thunder 9500V and 9200, the copy type cannot be TrueCopy Async.
- For the Thunder 9500V and 9200, the RAID level for the P-VOL and S-VOL must be RAID5 (2D + 1P ~ 15D + 1P).

2.2.4 Additional ShadowImage Requirements

The requirements for the 9900V/9900 LDEV that will be a ShadowImage P-VOL (or SP-VOL) are:

- The LDEV must not be a ShadowImage leaf volume (second layer S-VOL).
- If the LDEV is a ShadowImage P-VOL, there must not be more than two S-VOLs.
- If the LDEV is a ShadowImage SP-VOL, there must not be more than one S-VOL.

The requirements for a ShadowImage P-VOL in the 9500V or 9200 is:

- The LDEV must not be a ShadowImage P-VOL or S-VOL (cascade functionality is on the 9900V/9900 only).

Requirements for a ShadowImage S-VOL

The requirements for an LDEV that will be a ShadowImage S-VOL are:

- The LDEV must reside in the same storage subsystem as the selected P-VOL.
- For the Lightning 9900V and 9900, there must not be more than two S-VOLs already assigned to the selected P-VOL. If an SP-VOL is selected as the P-VOL, there must not be more than one S-VOL already assigned to the selected SP-VOL.
- For the Thunder 9500V and 9200, the LDEV cannot be a ShadowImage P-VOL or S-VOL.
- For the Thunder 9500V and Thunder 9200, the default controller must be the same as that for the selected P-VOL.

2.3 Recommended Configurations

Table 2.1 lists and explains three recommended configurations for using ShadowImage and TrueCopy functions with the Device Manager.

Table 2.1 Recommended Configurations

No.	Example Name	Target User
1	Create and Give	Device Manager is used for the initial setup of TrueCopy and ShadowImage. From there, external CCI scripts manage the pair volumes throughout their lifecycles.
2	Read and Modify	Device Manager manages all the pair volumes throughout their lifecycles. CCI is used for reading the current status of the pair volumes.
3	Separation	The pair volumes are managed only by Device Manager or by external CCI scripts.

For detailed information about CCI, the Device Manager Server and the Device Manager Agent, refer to the *Hitachi Lightning 9900™ V Series and 9900 Command Control Interface (CCI) User and Reference Guide*, the *HiCommand™ Device Manager Server Installation and Configuration Guide*, and the *HiCommand™ Device Manager- Agent Installation Guide*.

Before setting up any of the following three examples, the following prerequisites must be met:

- The Device Manager Agent and the CCI must be installed on the host system that the pair volume will be associated with.
- The command device in the subsystem may be shared by Host Agent and CCI script.

2.3.1 Example #1 “Create and Give”

The Create and Give scenario allows both the Device Manager and the external CCI scripts to manage pair volumes in a collaborative manner. The Device Manager defines the pair volume by creating the HORCM configuration file automatically, and then executes the initial copy. The user-developed CCI scripts then take over the HORCM configuration file and manage the pair volume for operations such as split and re-sync. The Device Manager will “create” the pair volumes and “give” them to the external CCI scripts as illustrated in Figure 2.1.

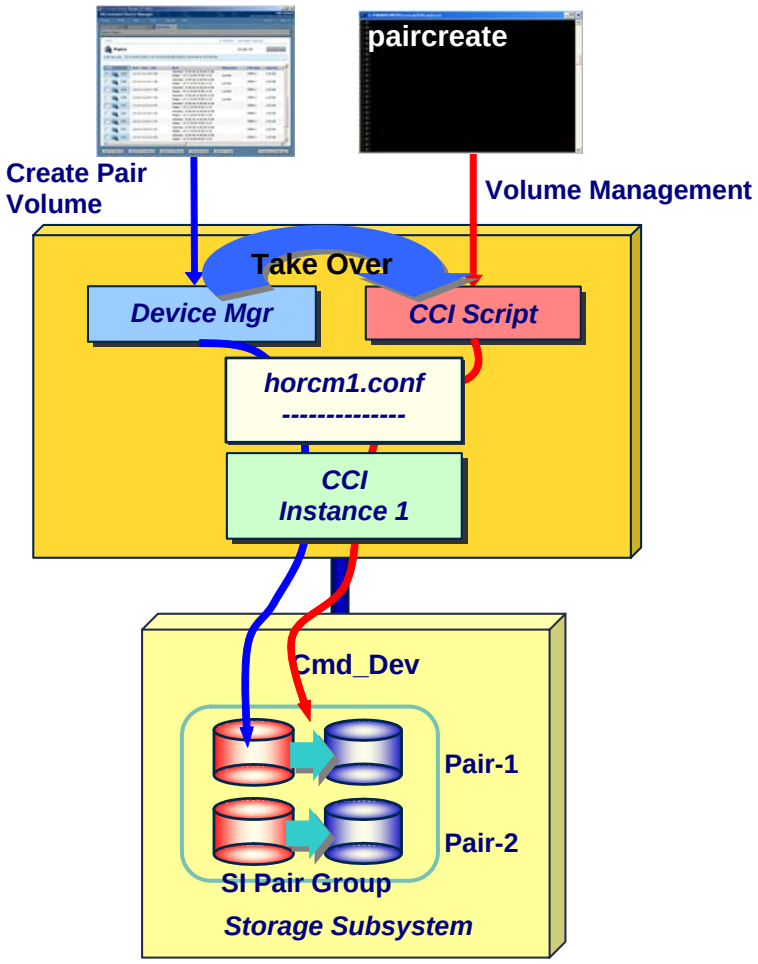


Figure 2.1 Example of “Create and Give” Scenario

To set up and configure a “Create and Give” scenario, complete the following steps:

1. Install CCI.
2. Install the Device Manager Server.
3. Install the Device Manager Agent.

   If the CCI is not installed on the default directory, the Device Manager Agent properties file **server.agent.rm.location** or **server.agent.rmxp.location** must be edited to notify the Device Manager Agent of the location.

   Note: If in a Windows environment, you must change the Logon ID for the Device Manager Agent.

After the Device Manager Agent has been installed on a Windows system, you must change the Agent logon ID to enable shared access to the pair volumes by the Device Manager and the external CCI scripts. Note that:

- The specified user account must match the ID that the external CCI scripts use.
- The actual logon ID may be different from Administrator login.

  Note: If in a UNIX environment, no additional procedures are necessary.

To change the agent logon ID to enable shared access to the pair volumes by the Device Manager and external CCI scripts, complete the following steps:

1. From the control panel, open **Services**, then **Management Tools**.
2. Choose **hdvmagt**, and then select **Property** by right clicking the mouse button.

   The hdvmagt Properties panel appears.
3. Select the **Log On** tab for the hdvmagt properties.
4. Select **Log On as This account** and specify **Administrator** logon ID and password as shown in Figure 2.2.
5. Click **Apply** and close the window.
6. Restart the hdvmagt service manually.

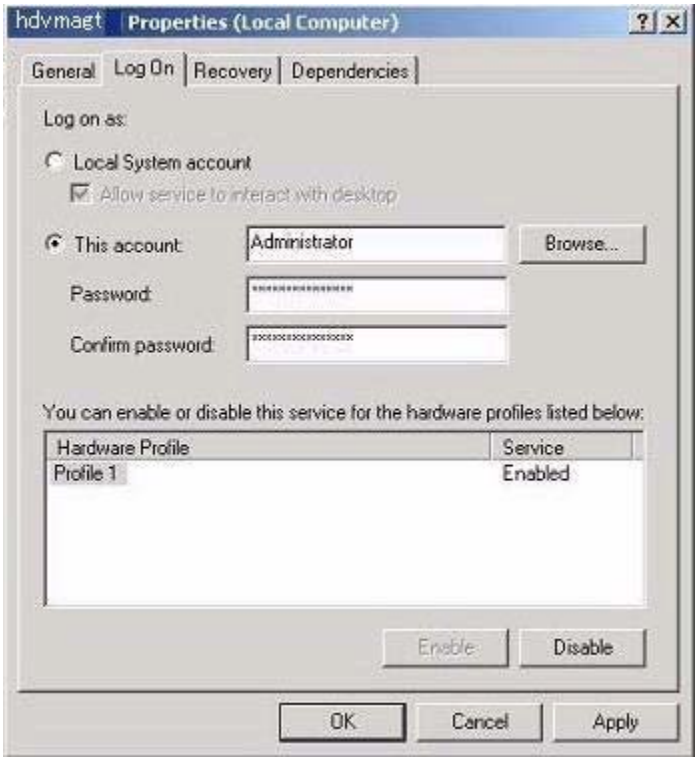


Figure 2.2 Changing the Log On ID of Device Manager Agent Service

Pair Volume Operations

1. Create the pair volumes on Device Manager client GUI.
2. Set the created pair instances out of Device Manager control by editing the property file.
3. Check the HORCM instance number of the CCI managing the copy pair.

   To protect the pair volumes from accidental modification by the Device Manager, the pair instance will be excluded from the control of Device Manager. It is necessary to edit and specify the following property in the Device Manager Agent property file **server.properties**.

   Property name: server.agent.rm.exclusion.instance

   Example:

   server.agent.rm.exclusion.instance=0, 1, 2

   The **server.agent.rm.exclusion.instance** lists the HORCM instance numbers that should be excluded from Device Manager control. Separate HORCM instances by commas (,) if you want to enter multiple HORCM instances.

   For information about modifying **server.agent.rm.exclusion.instance** for pair volume read-only status, refer to the *Hitachi HiCommand Device Manager Agent Installation Guide*.
4. Restart the Device Manager Agent.
5. To return control of the Pair management back to Device Manager, delete the instance number in the property file, and then restart the Device Manager Agent.

2.3.2 Example #2 “Read & Modify”

The Read and Modify scenario enables the Device Manager to manage pair volumes throughout their lifecycles (Create, Split, Resync, and Delete operations) as shown in Figure 2.3. In this case, external CCI commands or scripts are used only for reading the current status of the pair volume.

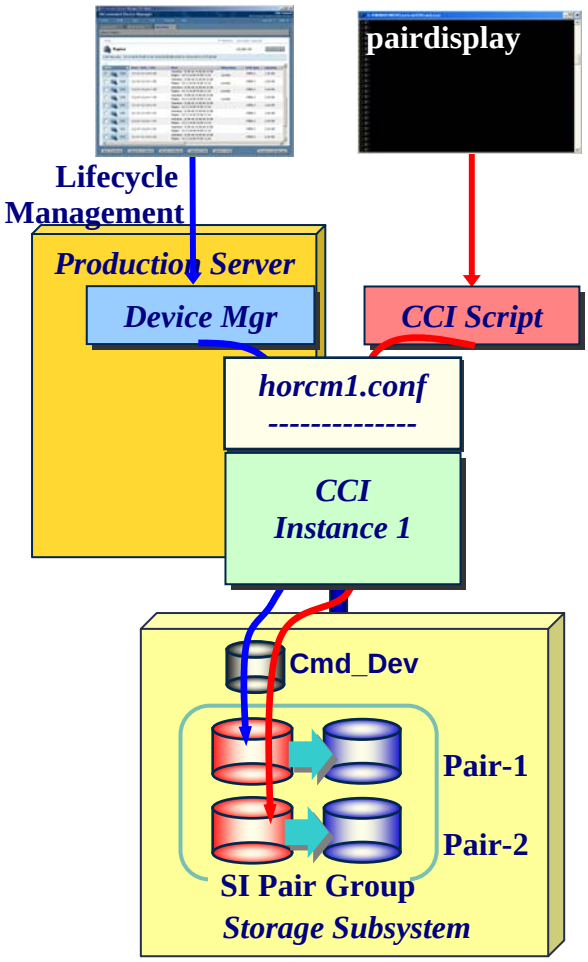


Figure 2.3 Example of “Read & Modify”

Note the following:

- Only CCI commands that do not change the status of pair volume, such as **pairdisplay** or **raidscan**, are applicable for this scenario.
- The user is responsible for the consistency of the pair volume status, and must not modify the pair status using the CCI command or scripts.

To set up and configure a “Read and Modify” scenario, complete the following steps:

1. Install CCI.
2. Install the Device Manager Server.
3. Install the Device Manager Agent.
4. If the CCI is not installed on the default directory, the Device Manager Agent properties **server.agent.rm.location** or **server.agent.rmxp.location** must be edited to notify the Device Manager Agent of the location.
5. Change the Logon ID for the Device Manager - Agent for the Windows environment.

   Refer to section 2.3.1 for logon ID change information.
6. Start the agent.

Pair Volume Operations

1. Create the new pair volumes using the Device Manager GUI.
2. Check the HORCM instance number and use this number to see the pair status using the CCI commands such as **pairdisplay** or **raidscan**.

2.3.3 Example #3 “Separation”

The Separation scenario enables either the Device Manager or external CCI scripts to manage all the pair volumes as shown in Figure 2.4. Pair volumes are not managed by both the Device Manager and the external CCI scripts, so the user must define a managing entity for each pair volume.

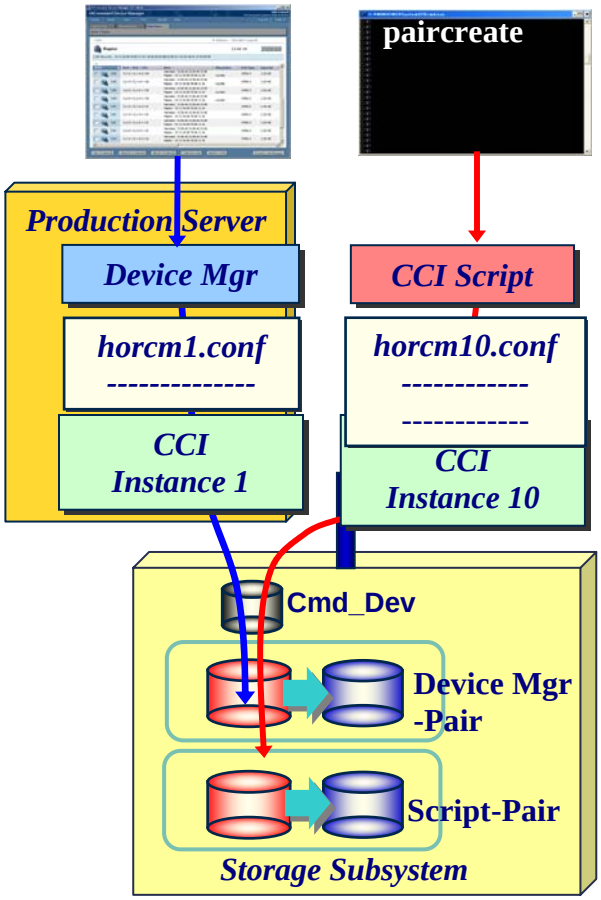


Figure 2.4 Example of “Separation” Scenario

Note the following:

- The storage administrator must define what pairs are to be managed by the Device Manager and what pairs are to be managed by external CCI scripts.
- Pairs managed by external CCI scripts may be protected from Device Manager access by modifying the property file.
- The Device Manager may only see the status of the pair volumes that are managed by external CCI scripts.
- The user is responsible for the consistency of the pair volume status and must not modify the pair status using the CCI commands or scripts.

To set up and configure a “Separation” scenario, complete the following steps:

1. Install CCI.
2. Install the Device Manager Server.
3. Install the Device Manager Agent.
4. If the CCI is not installed on the default directory, the Device Manager Agent properties **server.agent.rm.location** or **server.agent.rmxp.location** must be edited to notify the Device Manager Agent of the location.
5. Change the Logon ID for the Device Manager - Agent for the Windows environment.

   Refer to section 2.3.1 for logon ID change information.
6. Remove the created pair instances out of Device Manager control by editing the property file.
7. Restart the Device Manager Agent service (daemon).

Chapter 3 Best Practices

This chapter describes recommended practices for pair volume management with Device Manager.

3.1 Pair Volume Lifecycle Management

Figure 3.1 shows timelines of pair volume management procedures.

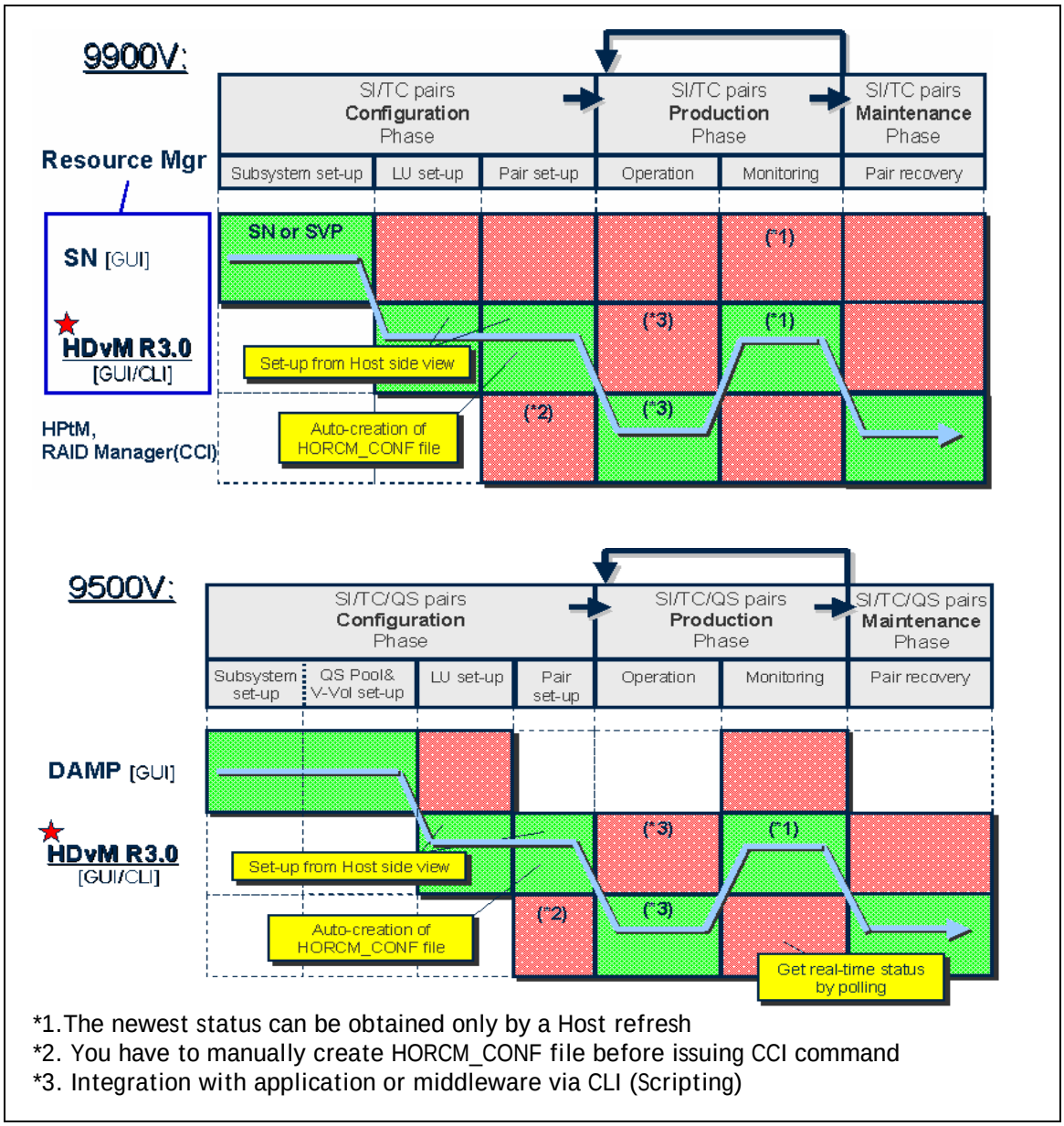


Figure 3.1 Pair Volume Lifecycle Management for Hitachi 9900V and 9500V

3.2 Requirements for Best Practices

The best practices require the following:

- The Device Manager - Agent and Command Control Interface (abbreviated as CCI and sometimes called RAID Manager) must be installed on the host system that associates with the pair volume.
- The command device in the subsystem may be shared by Host Agent and the CCI script.

3.3 Best Practice: Collaborative Management with External CCI Scripts

In this best practice, Device Manager and external CCI scripts collaborate to manage pair volumes:

1. Device Manager defines the pair volume by creating the HORCM configuration file automatically.
2. Device Manager executes the initial copy.
3. The user-developed CCI scripts take over the HORCM configuration file and manage the pair volume for the operations, such as split and re-sync.
4. Device Manager creates the pair volumes and gives them to the external CCI scripts.

Figure 3.2 illustrates the collaborative management:

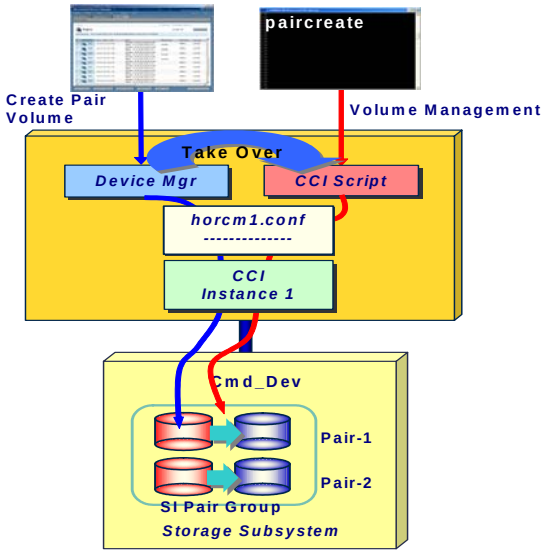


Figure 3.2 Collaborative Management with External CCI Scripts

Advantages of this best practice include:

- Streamlines creation of pair volumes for different types of storage subsystems
- Avoids errors that can occur with manual operations
- Can be customized to workflow

3.3.1 Creating New Pairs

When defining TrueCopy pairs with Device Manager (HDvM) GUI:

- HDvM automatically discovers a Command Device and creates a new HORCM_CONF file
- When you change pair configuration with HDvM GUI/CLI, HDvM Agent modifies the HORCM_CONF file on each Host.

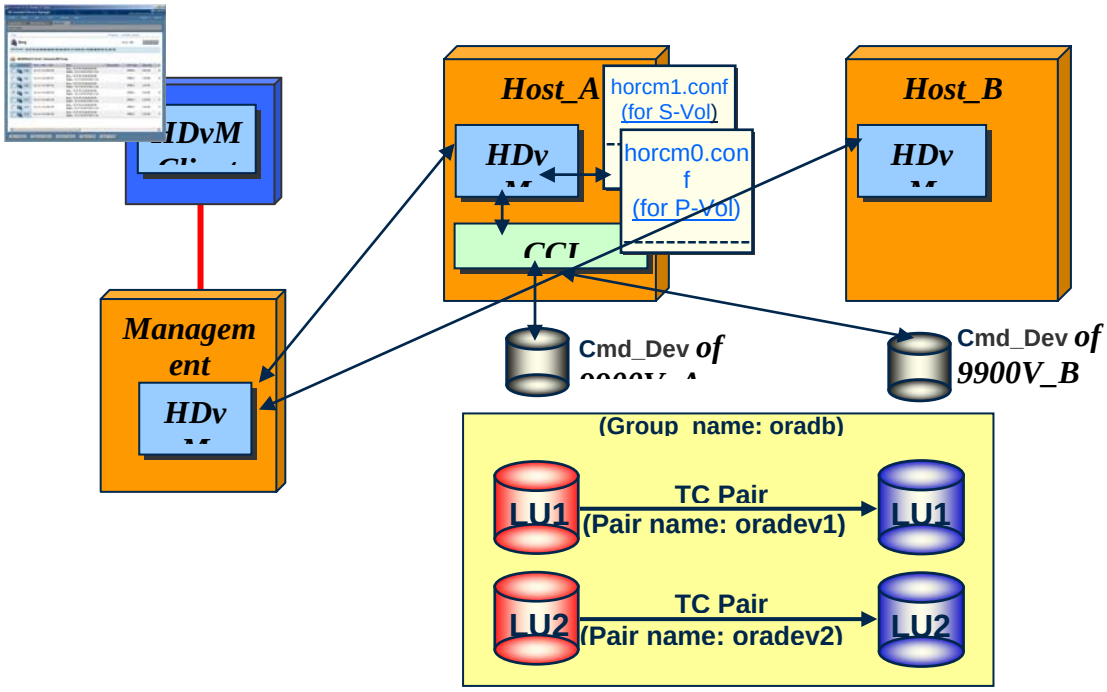
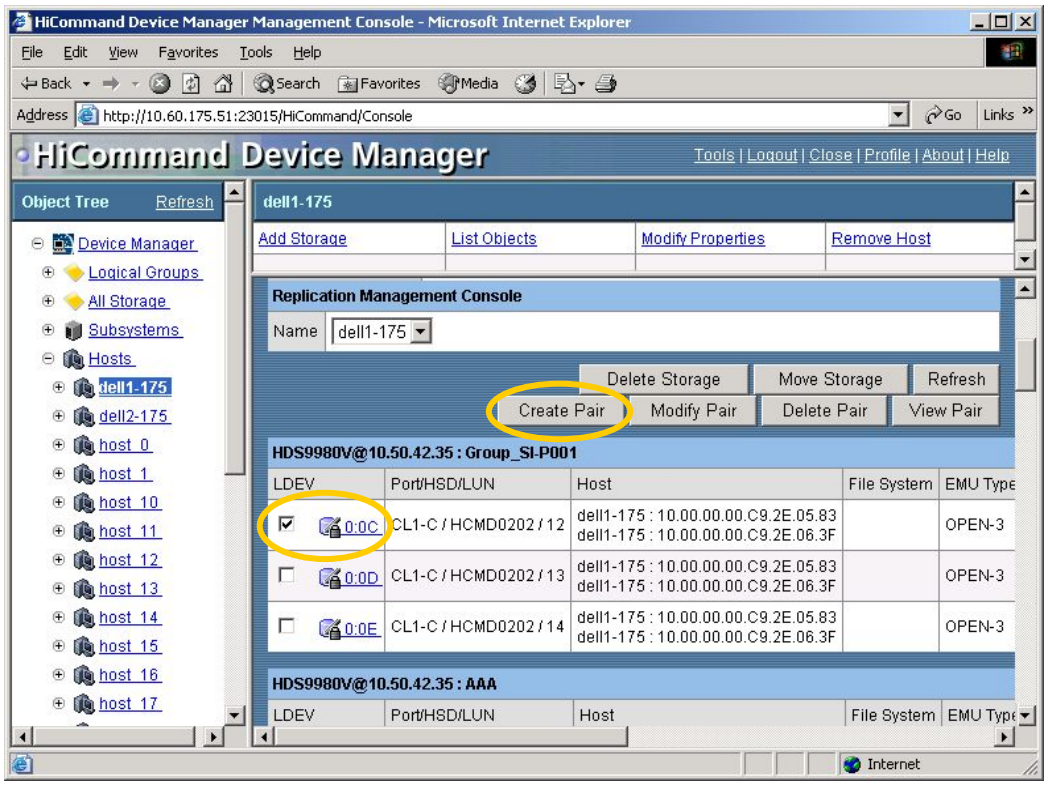


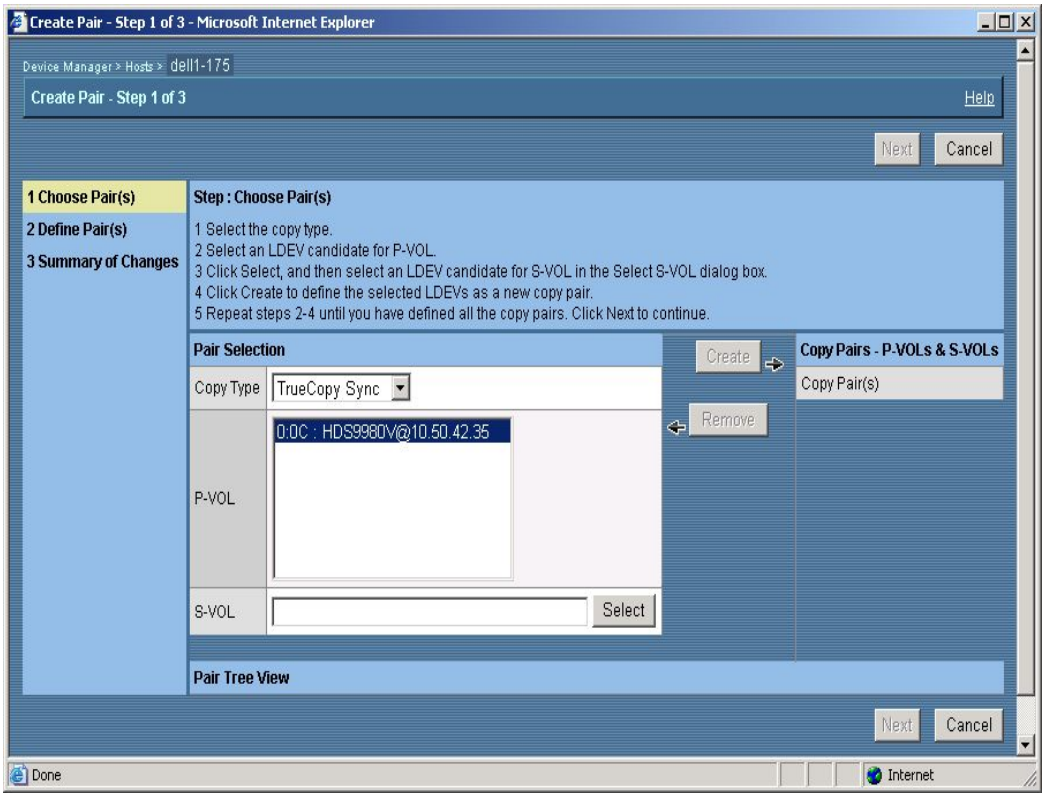
Figure 3.3 Defining TrueCopy Pairs with Device Manager

To create new pairs:

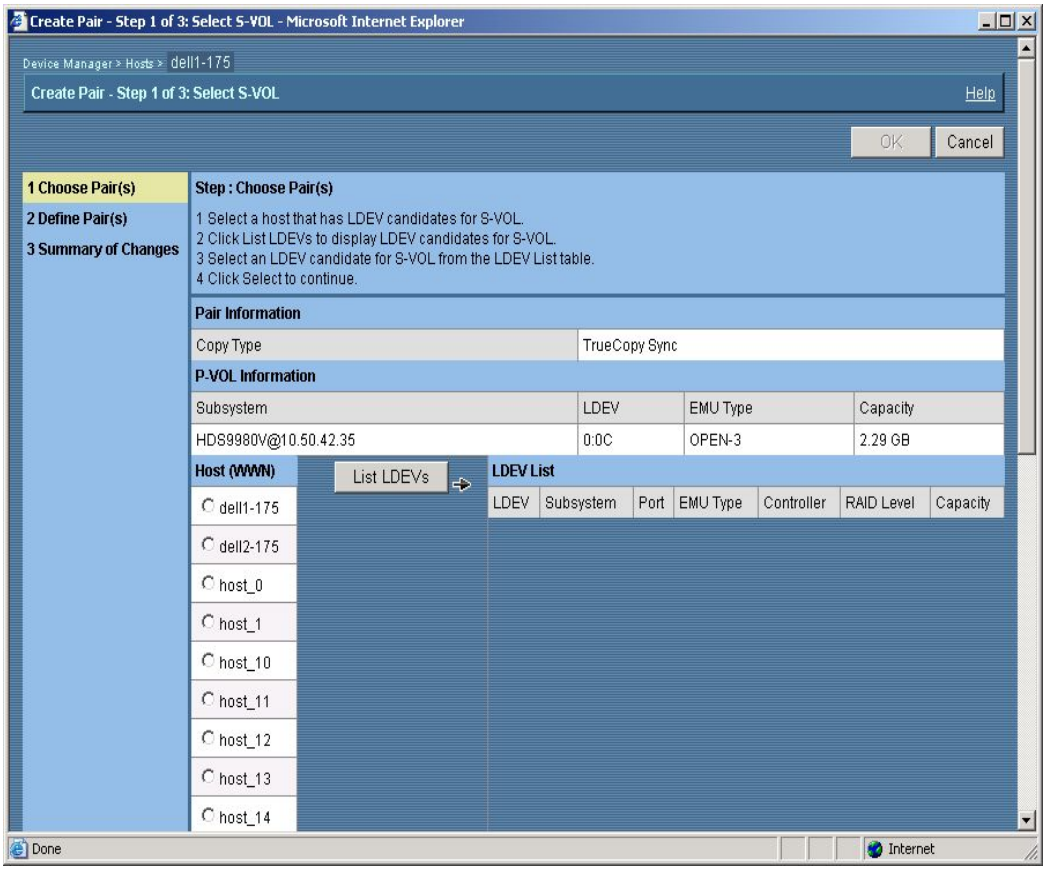
1. Move to the Show properties - Host screen and do the following:
   a) In the LDEV column, select one or more P-Vols.
   b) Click **Create Pair**.



2. Select P-VOL and S-VOL to create TRUECOPY pairs.
3. Follow the Choose Pair(s) instructions on the screen.
   a) Select the copy type.
   b) Select an LDEV candidate for P-VOL.
   c) Click **Select**.

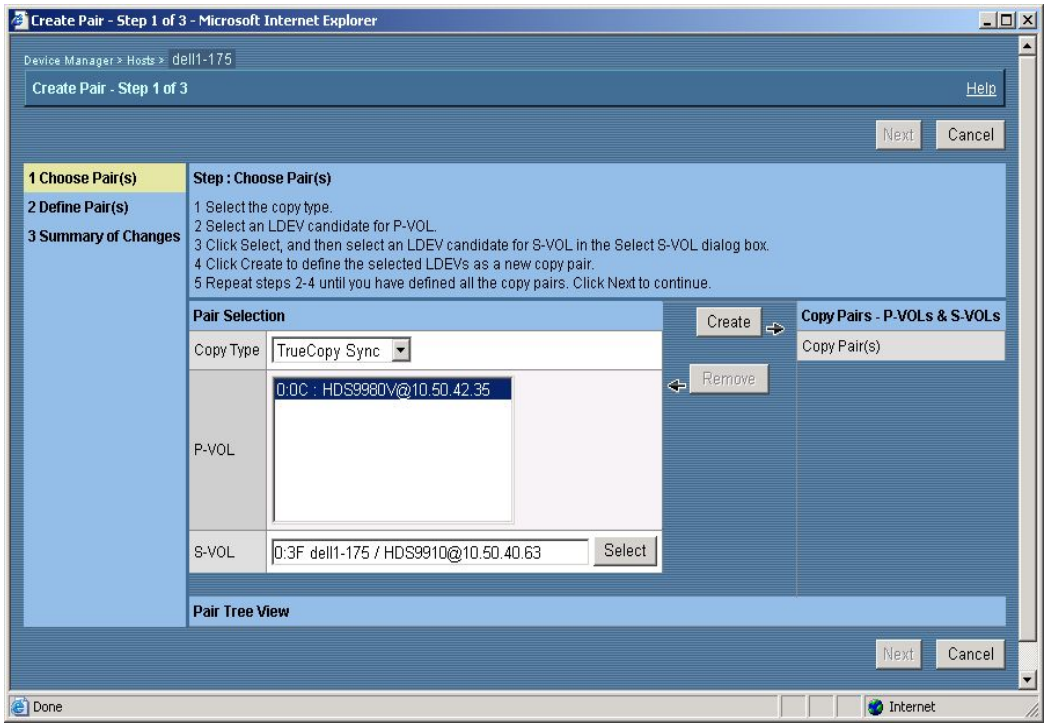


The Select S-VOL dialog box appears.



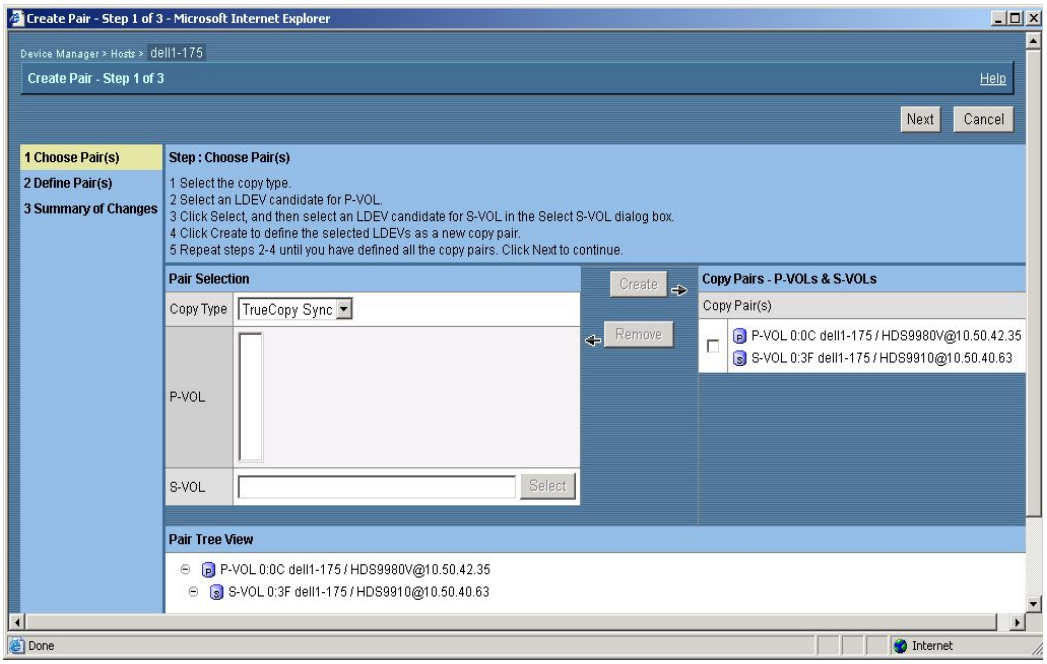
4. In the Select S-VOL dialog box, do the following:
   a) Under Host (WWN), select a host that has LDEV candidates for S-VOL.
   b) Click **List LDEVs** to display LDEV candidates for S-VOL.
   c) Select an LDEV candidate for S-VOL in the LDEV List.
   d) Click **Select**.

   The Pair Selection information appears in the dialog box.



5. Click **Create** to define the selected LDEVs as a new copy pair.

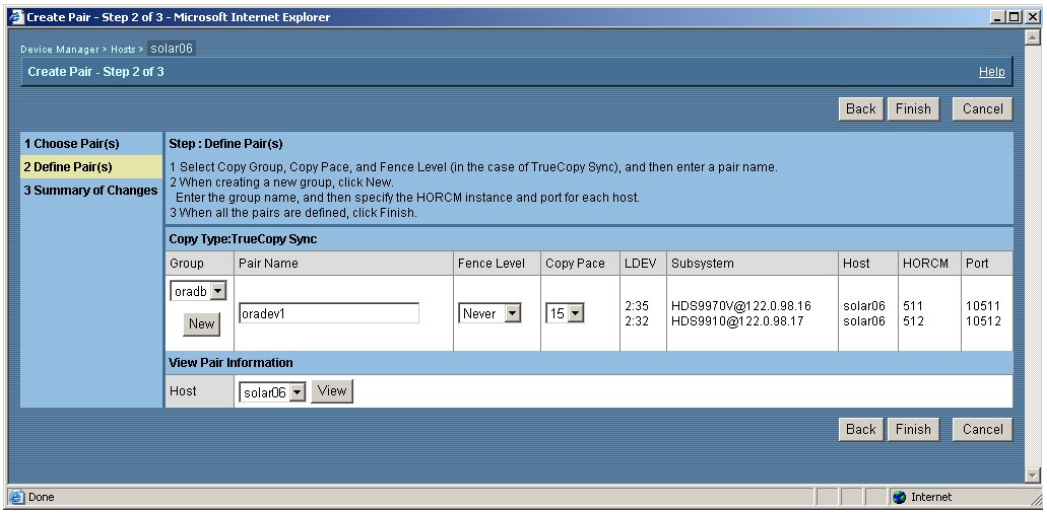
   The new copy pairs appear under the Pair Tree View area.



6. Repeat steps as needed to define additional copy pairs.

7. When all copy pairs are defined, click **Next**.

   The dialog box shows the Define Pairs step.

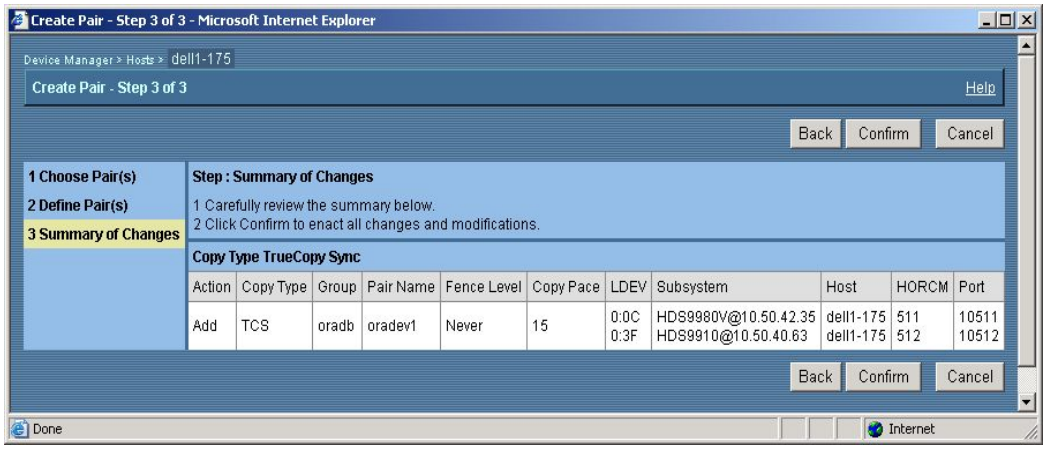


8. Follow the Define Pairs(s) instructions on the screen.

   Note: When specifying HORCM information for new groups, remember that one HORCM instance can manage multiple groups.

9. When all pairs are defined, click **Finish**.

   The dialog box shows the Summary of Changes step.



10. Carefully review the summary.

    To make any changes, click **Back**.

11. If the summary is correct, click **Confirm**.

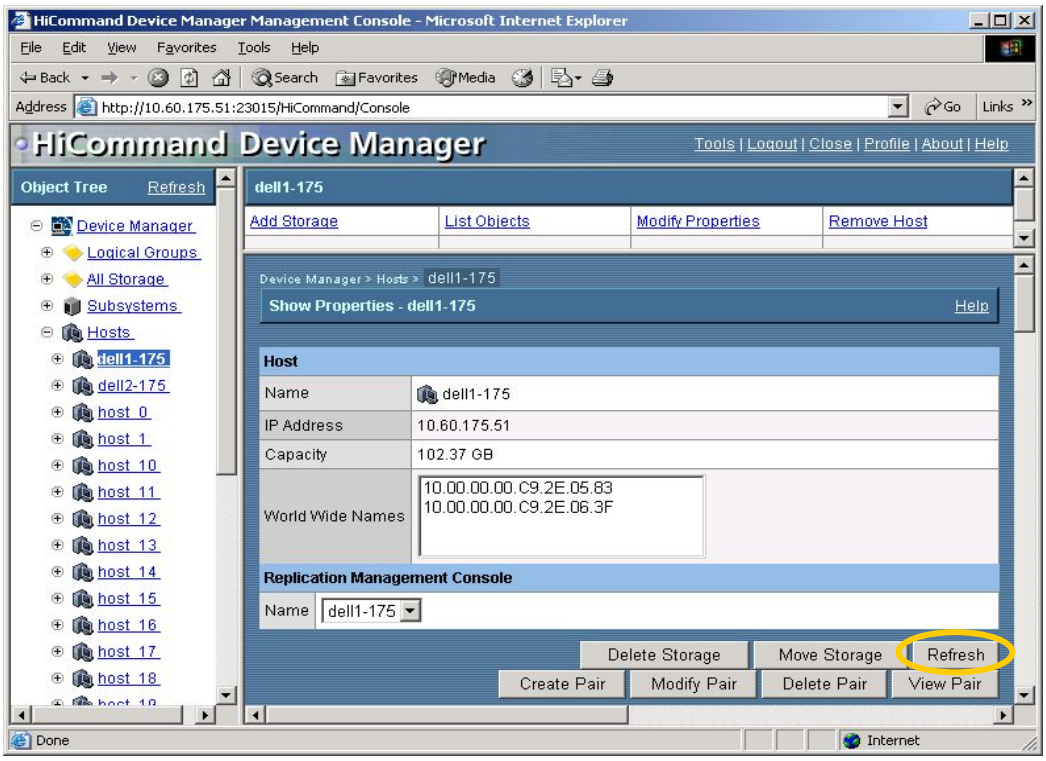
    A warning indicates that data will be lost on the specified secondary volume. If it is not OK to overwrite the volume, click **Back** to make changes or click **Cancel** to end the process.

12. To create the new pairs, click **Confirm**.

    HDvM does the following:

    – Creates a HORCM file or modifies a pre-existing file
    – Requests the subsystem to create new pairs via CCI
    – Starts an initial copy asynchronously

    The screen shows the pair status.



    To view an updated status, click **Refresh**.

13. Protect the Pair Instance (Optional).

    Note: In this step, the pair volume status is changed to read only. This is helpful if you use HDvM only for creating the HORCM config file and for the initial copy processing. All succeeding pair volume management operations are handled by the external CCI scripts.

    a) Specify the pair volume instance number in the property file on the host.

    – File Name :

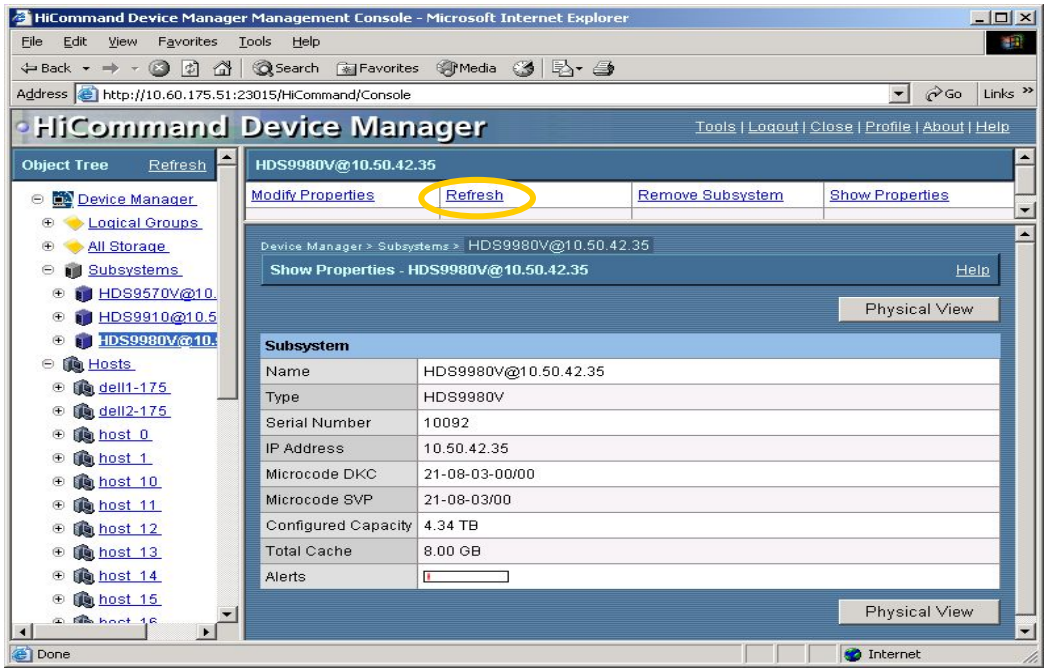
      <Agent Install directory> \HDVM\agent\config\server.properties

    – Property Name :

      server.agent.rm.exclusion.instance=<Pair Volume Instance#>

    b) Restart HDvM Agent.

    c) Refresh the subsystem on the HDvM to confirm that the exclusion successfully applied.



3.3.2 Defining Additional Pairs

In this procedure, the existing HORCM config file is modified in order to add new pair volumes to an existing pair group.

To define additional pairs:

1. Prepare to edit the HORCM file:
   a) Stop the job (application or script).

      Important: Ensure that there is no access to the pair volumes defined in the HORCM config file while you are editing the file.

   b) Unprotect the pair (HORCM File):

      Delete the exclusion instance number in the property file in order to make enable to edit HORCM config file by Device Manager.

      File Name:

      <HDvM Agent Install directory> \HDVM\agent\config\server.properties

      Property Name:

      server.agent.rm.exclusion.instance

   c) Restart HDvM agent:

      Read the new property file to the agent.

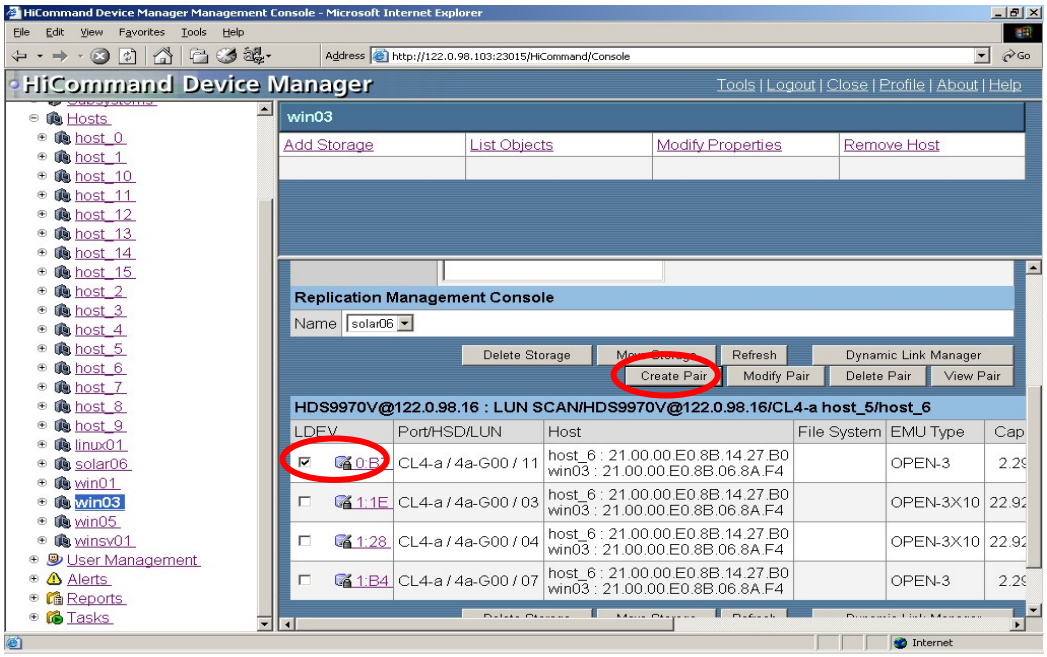
   d) Refresh the subsystem.

      The Device Manager GUI recognizes the new protection status.

2. Edit the existing HORCM instance to add a new SI pair volume.

3. Create the new SI Pair volumes:

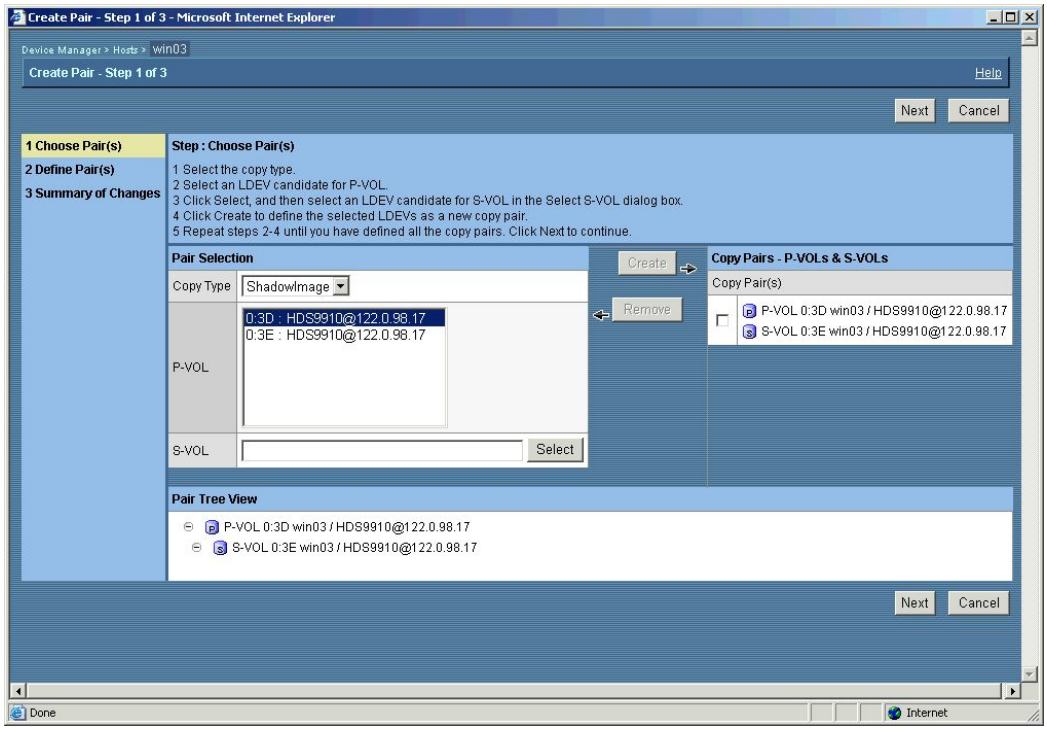
   a) Go to the Show properties - Host screen.



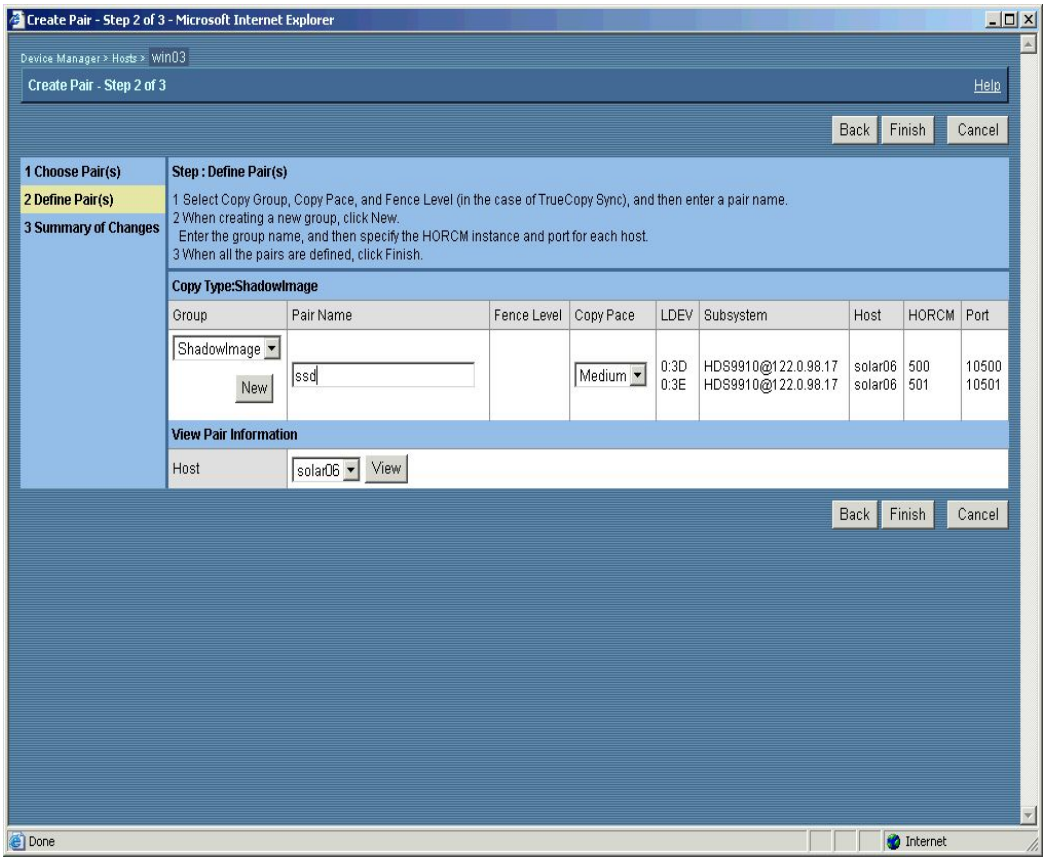
   b) Select one or more unpaired volumes as P-Vol candidates.

   c) Click **Create Pair**. The Choose Pair(s) screen appears.

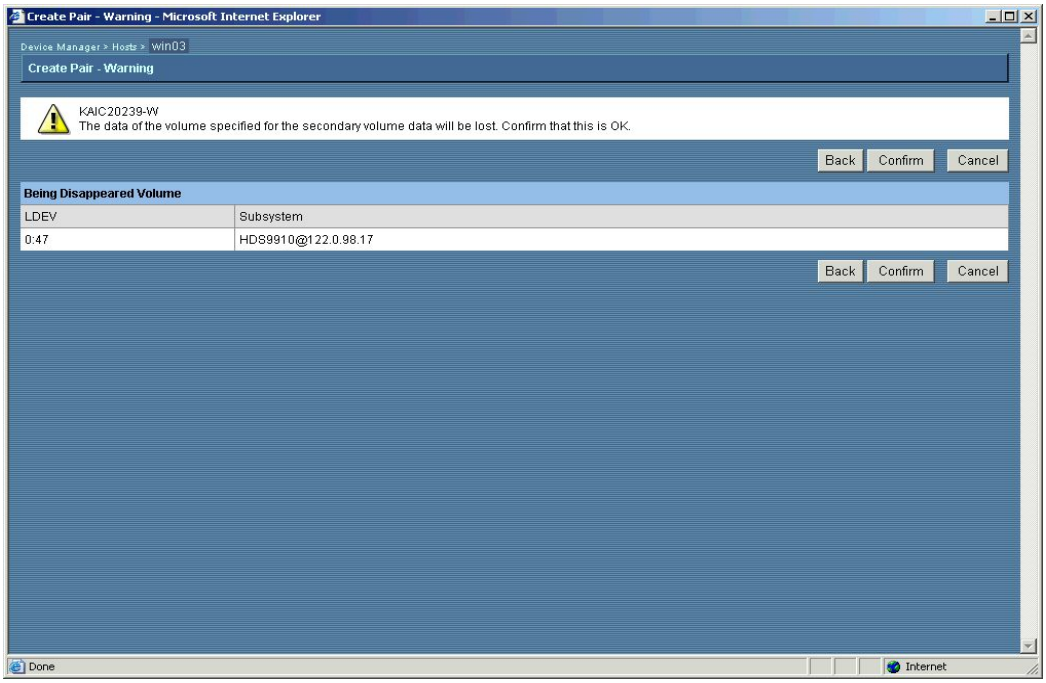
4. Follow the on-screen instructions under Choose Pairs(s).



5. Follow the on-screen instructions under Define Pair(s):


Create Pair - Step 2 of 3 - Microsoft Internet Explorer
Device Manager > Hosts > win03
Create Pair - Step 2 of 3
Help
Back
Finish
Cancel
1 Choose Pair(s)
2 Define Pair(s)
3 Summary of Changes
Step : Define Pair(s)
1 Select Copy Group, Copy Pace, and Fence Level (in the case of TrueCopy Sync), and then enter a pair name.
2 When creating a new group, click New.
Enter the group name, and then specify the HORCM instance and port for each host.
3 When all the pairs are defined, click Finish.
Copy Type:ShadowImage
Group
Pair Name
Fence Level
Copy Pace
LDEV
Subsystem
Host
HORCM
Port
ShadowImage
New
ssd
Medium
0:3D
0:3E
HDS9910@122.0.98.17
HDS9910@122.0.98.17
solar06
solar06
500
501
10500
10501
View Pair Information
Host
solar06
View
Back
Finish
Cancel
Done
Internet

6. In the Summary of Changes screen, carefully review the summary.



7. If the summary is correct, click **Confirm**.

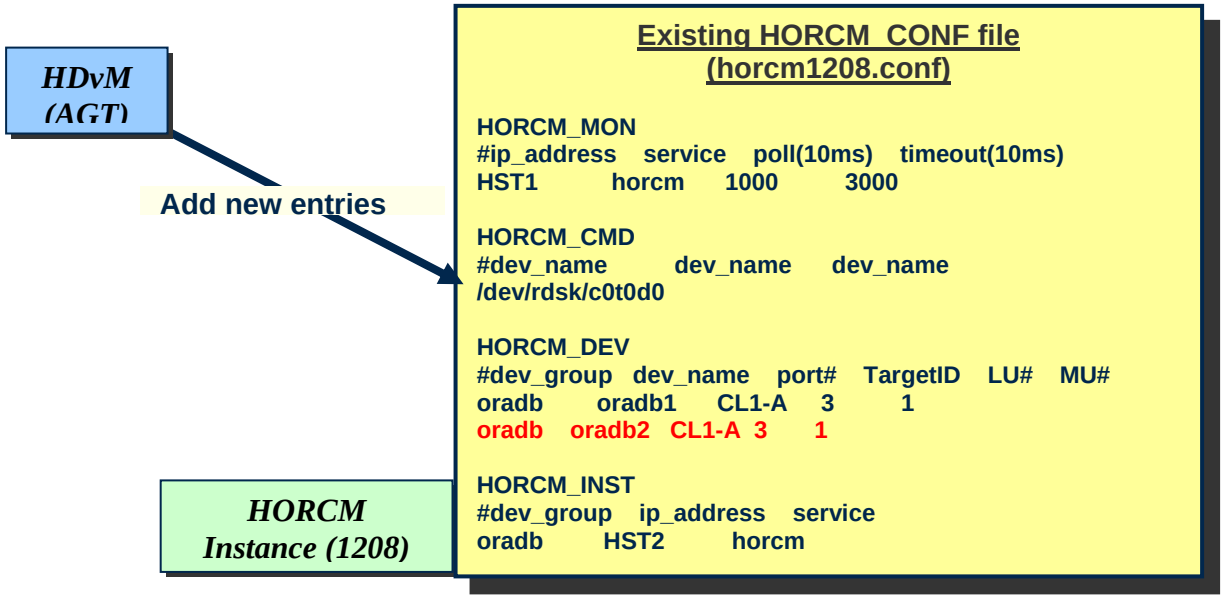
   A warning indicates that data will be lost on the specified secondary volume. If it is not OK to overwrite the volume, click **Back** to make changes or click **Cancel** to end the process.

8. To create the new pairs, click **Confirm**.

   The following occurs:

   a) The Device Manager Agent automatically modifies the existing HORCM_CONF file on both Hosts.

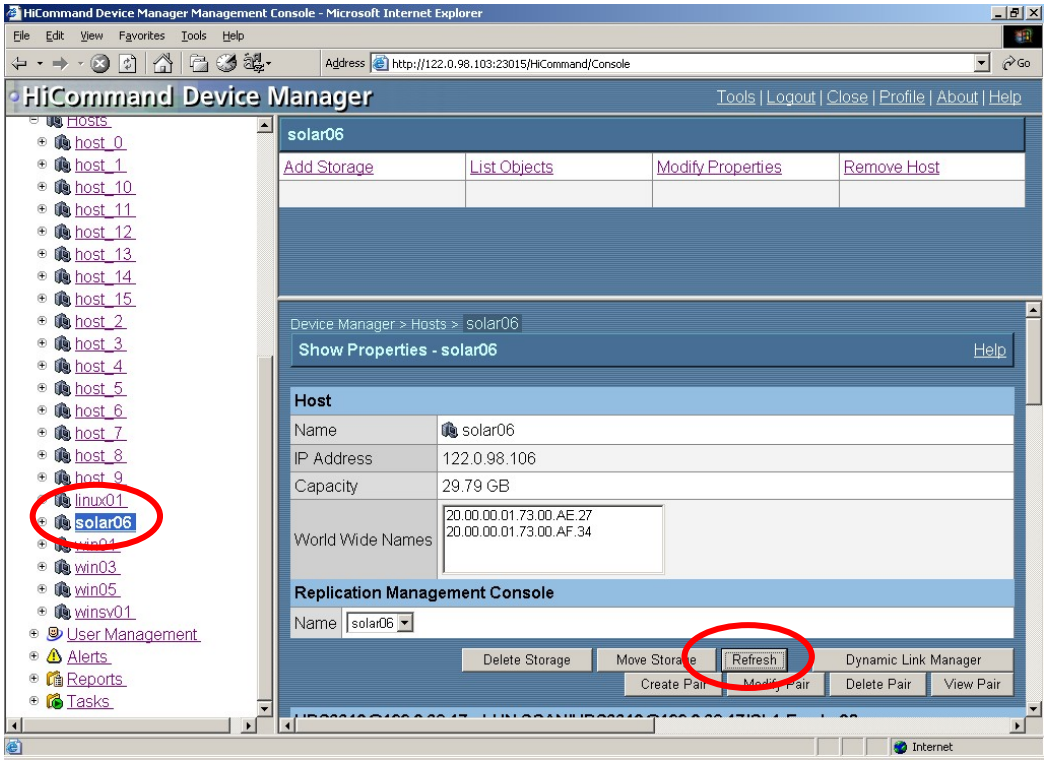
      Note: HDvM will restart only the HORCM instance associated with the existing HORCM_CONF file.



   b) HDvM requests the subsystem to create a new pair via CCI.

   c) The initial copy is started.

The screen shows the pair status.



To view an updated status, click **Refresh**.

9. Protect the pair volume:

   After the initial copy is finished (ensure that the pair status is *Pair*), protect the pair volume so that only the external the CCI script controls the pair volume.

   a) Edit the property file and add the HORCM instance number:

      File Name:

      <HDvM Agent Install directory> \HDVM\agent\config\server.properties

      Property Name:

      server.agent.rm.exclusion.instance

   b) Restart the Device Manager agent to read the new property file.

   c) Refresh subsystem to update the Web GUI.

3.4 Best Practice: Managing Pair Volumes with Device Manager

In this best practice:

- Device Manager controls Create, Split, Resync, and Delete operations to manage all pair volumes throughout their lifecycles.
- External CCI scripts are used only to reading the current pair volume status.

Advantages of this best practice include:

- Streamlines creating pair volumes for different types of storage subsystems
- Avoids errors that can occur with manual operations

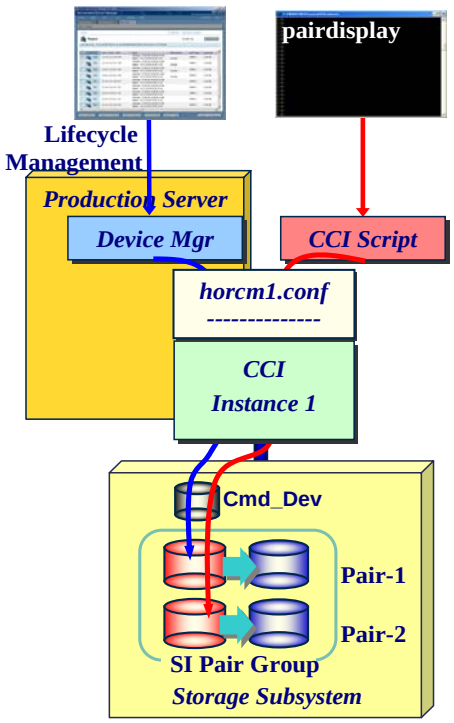


Figure 3.4 Example of Managing Pair Volumes with Device Manager

Important:

- Only CCI commands that do not change the status of pair volume, such as `pairdisplay` or `raidscan`, apply to this best practice.
- The user is responsible for the consistency of the pair volume status, and must not modify the pair status using the CCI command or scripts.

To perform pair volume operations:

1. Create the new pair volumes using the Device Manager GUI.
2. To view the pair status, check the HORCM instance number and use it with CCI commands such as `pairdisplay` or `raidscan`.

3.5 Best Practice: Management of Choice

In this best practice, you have two choices to manage each pair volume: either Device Manager or external CCI scripts. For each pair volume, choose one method or the other, but not both. For example, some pair volumes could be controlled by Device Manager, and others by scripts.

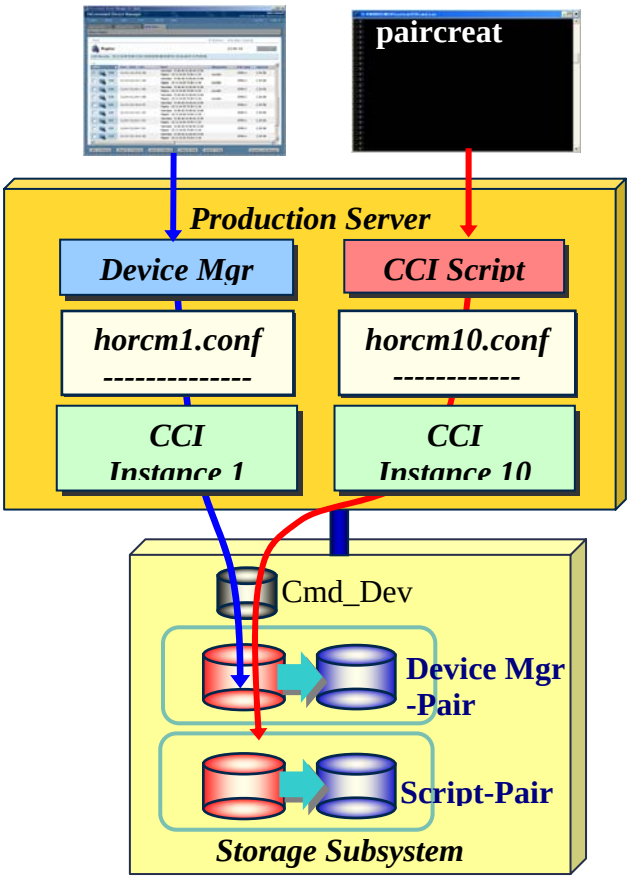


Figure 3.5 Example of Management of Choice

Notes:

- The storage administrator must define pairs that are managed either by Device Manager or by external CCI scripts.
- Pairs managed by external CCI scripts may be protected from Device Manager access by modifying the property file.
- Device Manager may determine the status of the pair volumes that are managed by external CCI scripts.
- The user is responsible for the consistency of the pair volume status. In other words, the user must not modify the pair status using the CCI command or scripts.

Chapter 4 Troubleshooting

4.1 Troubleshooting

Table 4.1 provides general troubleshooting instructions for ShadowImage operations.

Table 4.1 General ShadowImage Troubleshooting (continues on next page)

Error	Probable Cause	Corrective Action
Unable to define a TrueCopy pair volume.	No appropriate secondary volume met the prerequisites. For example, no LDEVs were recognized by Device Manager Agent.	Check the prerequisites for performing pair creation. If all prerequisites are met and the problem persists, contact Technical Support.
CCI commands cannot access any pair volumes. On a Windows platform, the CCI commands cannot access HORCM instances. The “Can’t access to HORCM instance” message appears.	The Device Manager Agent is not being used with the appropriate user ID. The user ID of Device Manager Agent (hdvmagt) must match the ID that executes CCI commands.	Change the log on user ID of the Device Manager Agent. Refer to section 2.3.1 for information about changing the Device Manager Agent log on user ID.
Command device volume creation is not recognized during Pair creation. The pair volume creation produced the error “the command device is not recognized”, when only one command device exists on the subsystem. This may happen with 9900V and 9500V in Solaris platforms.	After LUs and a command device are installed, a Solaris platform requires a reboot for the new LU to be recognized by the system.	Run HiScan. If this does not fix the problem, reboot Solaris. If the problem persists, collect the data described in the section 4.2 and send it to Technical Support.
TrueCopy pairs cannot be created on the Thunder 9500V subsystem. A TrueCopy pair volume could not be created on the hot system. The CCI command reported that the command device was not found.	After HostAgent created the HORCM configuration file automatically, the configuration file may have been inappropriately modified.	Check the HORCM configuration file and correct any errors. If the problem persists, verify that all prerequisites have been met. If the problem still persists, collect data as described in section 4.2 and send it to Technical Support.

Table 4.1 General ShadowImage Troubleshooting (continued)

Error	Probable Cause	Corrective Action
There is an inconsistent display for the pair status on the GUI such as: Pair volume status does not match in each window, or Pair volume status information does not show up on the window, or Pair volume status does not match with other storage utilities, such as Storage Navigator or DAMP (Disk Array Management Program).	There may be a problem with the Device Manager client program. Some messages, such as “Out of Memory” or “Exception”, may occur if the system has been continuously running and a user has not logged out. There may also be problems regarding the Java Runtime Environment (JRE) such as the wrong version or a JRE version mismatch between Device Manager and other programs.	Re-install and setup the correct JRE version. For further information, refer to *Hitachi HiCommand™ Device Manager Web Client User’s Guide*, MK-91HC001-7.
Users are unable to select a volume as the S-Vol of ShadowImage pair.	When attempting to create ShadowImage pair volumes on the 9200 or 9500V, the S-VOL may not have been activated on the Device Manager GUI.	Verify that all prerequisites have been met for performing pair creation. If the problem persists, collect data as described in section 4.2 and send it to Technical Support.
The host view and target host view do not display the Create Pair button.	The prerequisites for displaying the "pair creation" button have not been met. For example, there may be no path for the command device.	Verify that all prerequisites have been met for displaying the Create Pair button. The prerequisites are: CCI and Device Manager - Agent R2.4 (or higher) is installed on a host, and A command device is assigned to a host. If the problem persists, collect data as described in section 4.2 and send it to Technical Support.

4.2 Calling the Support Center

If you need to call the Hitachi Data Systems Support Center, make sure to provide as much information about the problem as possible, including:

- The 9900V Storage Navigator configuration information saved on diskette using the FD Dump Tool (see the *Hitachi Lightning 9900™ V Series Hitachi Remote Console – Storage Navigator User's Guide,* MK-92RD101 for instructions),
- The circumstances surrounding the error or failure
- The exact content of any error messages displayed on the host system(s)
- The ShadowImage (or other) error code(s) displayed by the 9900V Storage Navigator software
- The reference codes and severity levels of the recent service information messages (SIMs)
- Storage subsystem model name, firmware, and IP address
- Network configuration diagram (including server OS, Web Client OS, storage subsystem, proxy server, firewalls, OS patches, service packs, etc.)
- Device Manager version and build number

The following logs and data, where applicable:

- Device Manager – Server Logs and database

  This data can be collected using the Trouble Information Acquisition (TIA) tool. For detail, refer to the *Hitachi HiCommand™ Device Manager Server Installation and Configuration Guide*.

- Device Manager – Agent logs

  Refer to the *Hitachi HiCommand™ Device Manager Agent Installation Guide*, MK-92HC019-2.

- CCI Logs

  Refer to Hitachi Freedom Storage™ Lightning 9900™ V Series and Lightning 9900™ *Command Control Interface (CCI) User and Reference Guide*, MK-90RD011.

  Note: The Hitachi Data Systems representative must use the appropriate maintenance manuals during all applicable installation and configuration activities. Follow all precautions and procedures in the maintenance manual, and always check specifications to ensure proper installation and configuration.

The worldwide Hitachi Data Systems Support Centers are:

- Hitachi Data Systems North America/Latin America
  San Diego, California, USA
  1-800-348-4357
- Hitachi Data Systems Europe
  Contact Hitachi Data Systems Local Support
- Hitachi Data Systems Asia Pacific
  North Ryde, Australia
  61-2-9325-3300

Appendix A Setting up a TrueCopy M-R Path

A.1 Setting up a TrueCopy M-R Path on a Lightning 9900V

Before setting up a TrueCopy M-R path on the Lightning 9900V, note the following:

- LDEVs must be set to ports used by TrueCopy.
- Verify the subsystem's serial number on the main panel of Storage Navigator as shown in Figure A.1.
- Use the Storage Navigator main panel to change the mode to **Modify** ( ).

  You must operate the 9900V Storage Navigator software in modify mode to perform TrueCopy operations. Users in view mode can only view TrueCopy information.
- Determine the SSID of CU that you want to setup for TrueCopy.
- You may use the LUN Manger panel to determine the CU of LDEV as shown in Figure A.2.

To set up a TrueCopy M-R Path on a Lightning 9900V, complete the following steps:

1. From the LUN Manager Main panel, select the **RCU Operations** tab.

   The RCU Operations window appears as shown in Figure A.3.
2. From the Storage Navigator main panel, select the TrueCopy button ( ).

   The TrueCopy main panel appears as shown in A.3.
3. Select **Port** in the Display area.
5. Select the port for the copy target.
6. Select the setup for copy by right clicking on the selected copy port.
7. Change the MCU port for a M-R path to **Initiator** as shown in Figure A.4.
8. Change the RCU port for an M-R path to **RCU Target**.
9. When done, click **Apply**.
10. Select the CU for TrueCopy from the subsystem tree and right click as shown in Figure A.5.
11. Select **RCU Operations**, and **then Add RCU(Fibre)**.

    The Add RCU(Fibre) panel appears as shown in Figure A.6.

    The information includes:

- **RCU S/N** allows you to enter the five-digit serial number of the RCU being added.
- **Controller ID** allows you to enter the controller ID (subsystem family ID) of the RCU being added. For fibre-channel interface, the controller ID for 9900V is **3**, and the controller ID for the 9900 is **2**.
- **Logical Adr.(RCU CU#)** allows you to enter the CU number (0-1F) of the RCU being added.

- **SSID** allows you to enter the SSID(s) of the RCU being added. The 9900V uses one SSID for each set of 256 volumes and four SSIDs per CU image. SSID is 4-FFFE (hexadecimal).
- **MCU-RCU Path** displays different boxes depending on the channel interface type (fibre or serial).
  - **MCU Port**: allows you to select the MCU port number. Initiator ports and RCPs are listed.
  - **RCU Port**: allows you to select the RCU port number (fibre only). You must select RCU target ports.
- The **Option** button opens the RCU Option panel as shown in Figure A.7. The **Cancel** button cancels the settings you made on the Add RCU panel and closes the panel.

  If necessary, set values on the RCU Option(Fibre) panel. It is recommended that the default settings be accepted.

12. When done, Click **Set**.
13. Click **Apply** after confirmation of the RCU operations panel.

    The changes are displayed.

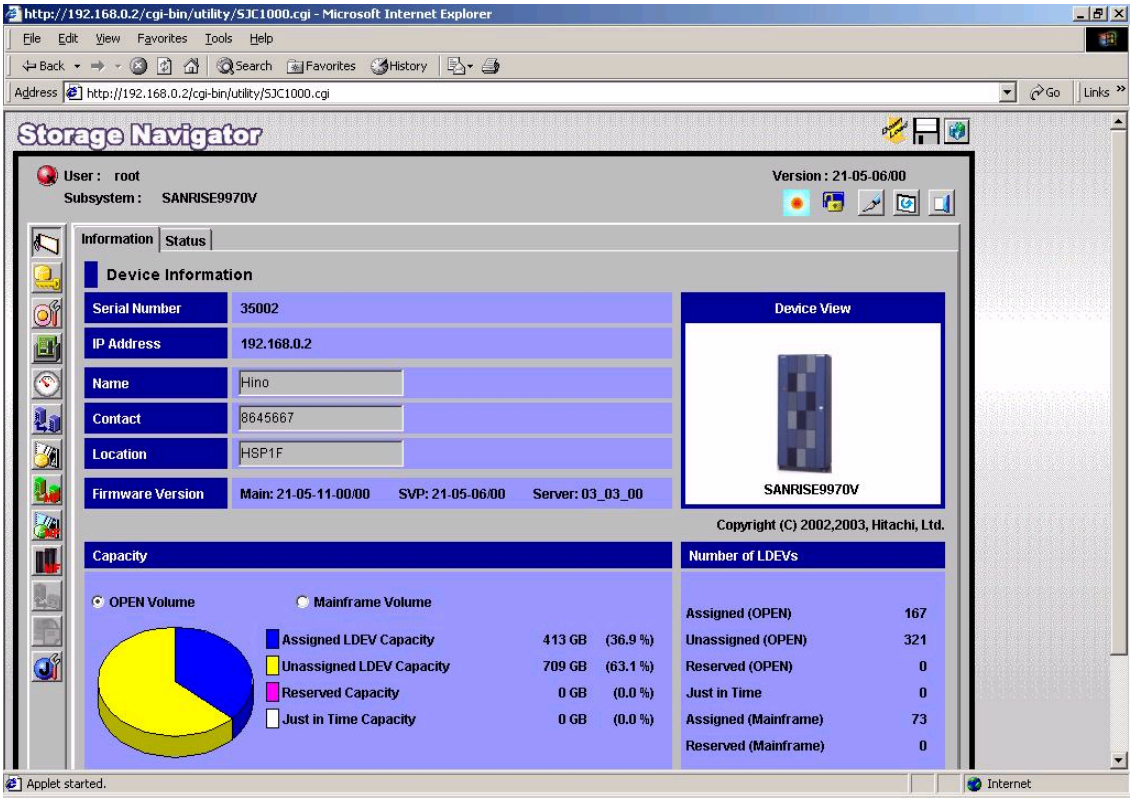


Figure A.1 Storage Navigator Main Panel

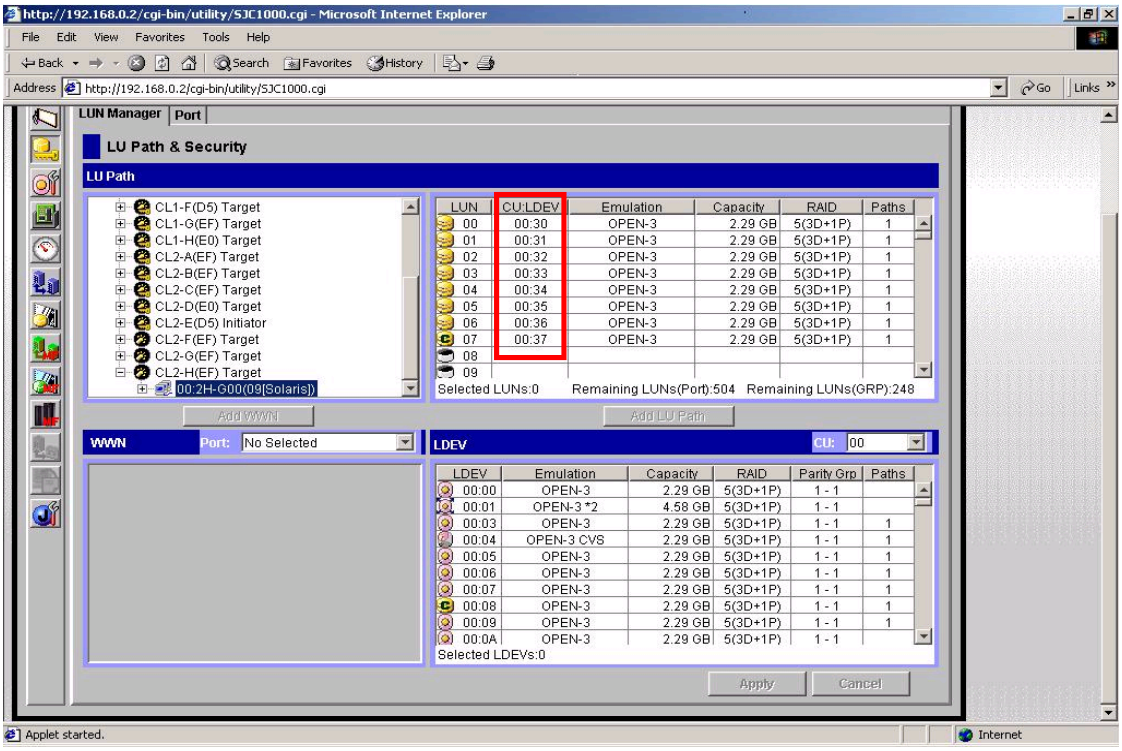


Figure A.2 LUN Manager Main Panel

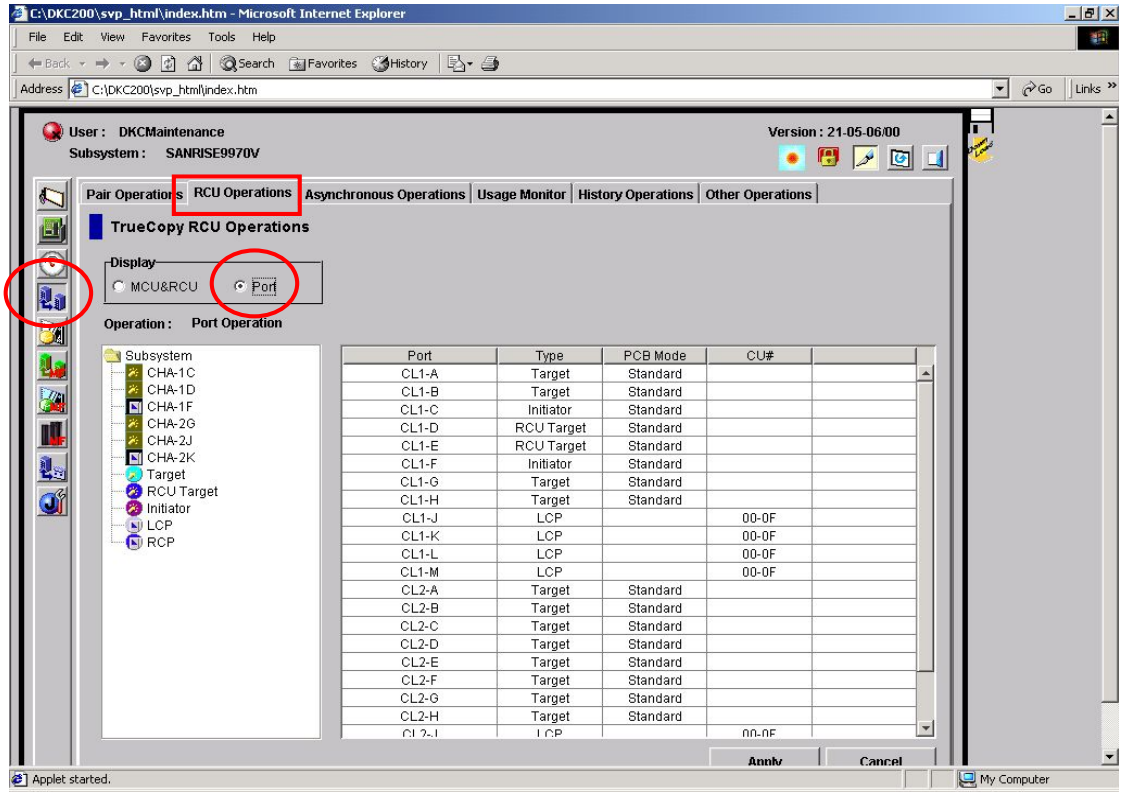


Figure A.3 Configuring the RCU Target and Initiator Ports

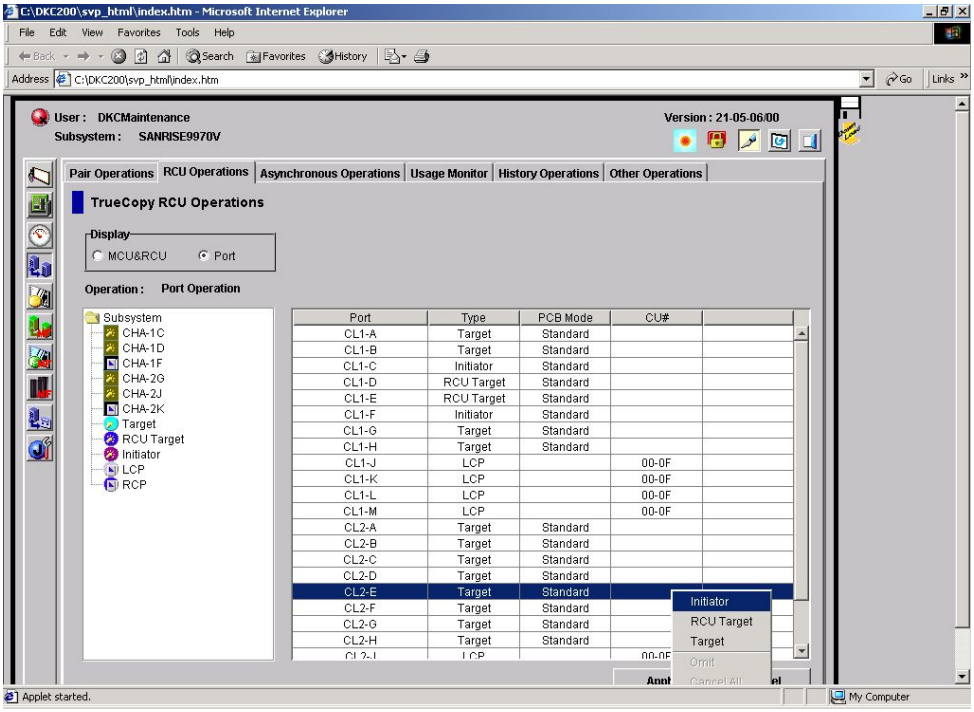


Figure A.4 RCU Operations Panel (When “Port” is chosen)

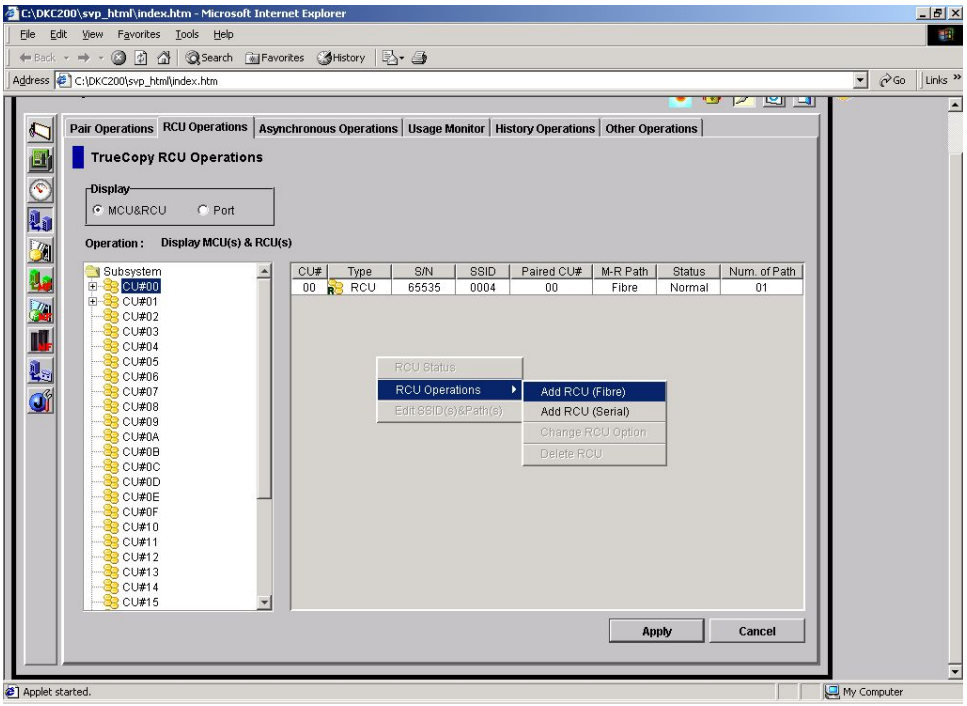


Figure A.5 RCU Operations panel (When “MCU&RCU” is chosen)

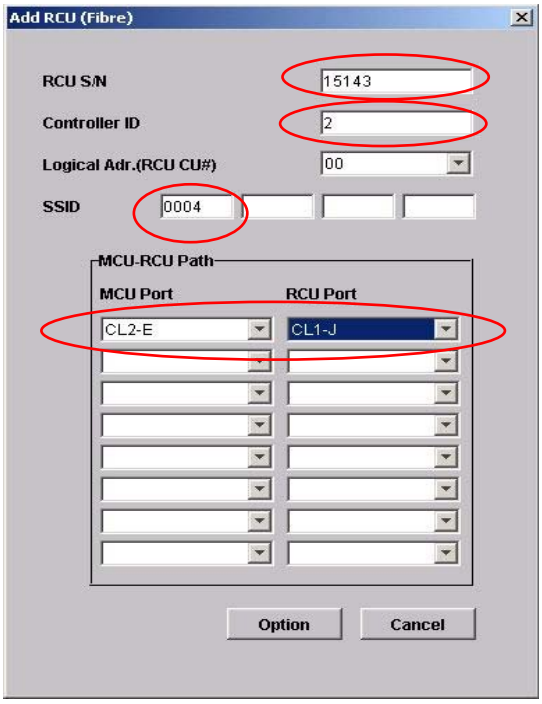


Figure A.6 Adding the RCUs

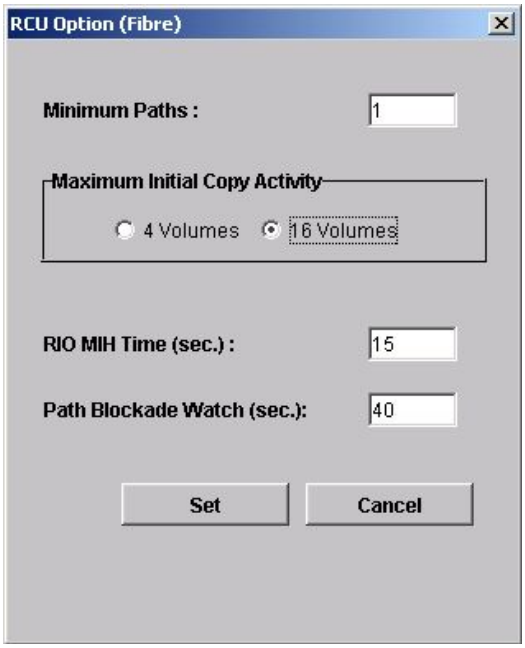


Figure A.7 Configuring the RCU Options

A.2 Setting up a TrueCopy M-R Path on a Lightning 9900

Before setting up a TrueCopy M-R path on a Lightning 9900, note the following:

- LDEVs must not be set to the port for pair.
- Verify the subsystem's serial number on the Connection Control panel accessed from the WebConsole as shown in Figure A.8.
- Determine the SSID of CU that you want to setup for TrueCopy.
- Use the LUN Manager panel to determine the CU of LDEV. You may do this by using LUN Manager view in WebConsole.

To set up a TrueCopy M-R Path on a Lightning 9900, complete the following steps:

1. Change the mode to **Modify**, then click **HORC** as shown in Figure A.10.
2. The HORC Main Control panel appears as shown in Figure A.11.
3. Click **Port**.

   The Port Change panel appears as shown in Figure A.12.
4. Select the desired port, then click **Initiator** or **RCU Target**.

   The Enter Password panel appears as shown in Figure A.13.
5. Enter your password.
6. The Port type has been changed.

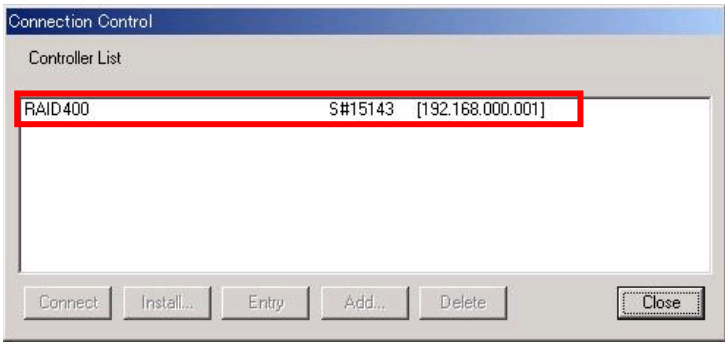


Figure A.8 Connection Control Dialog Box

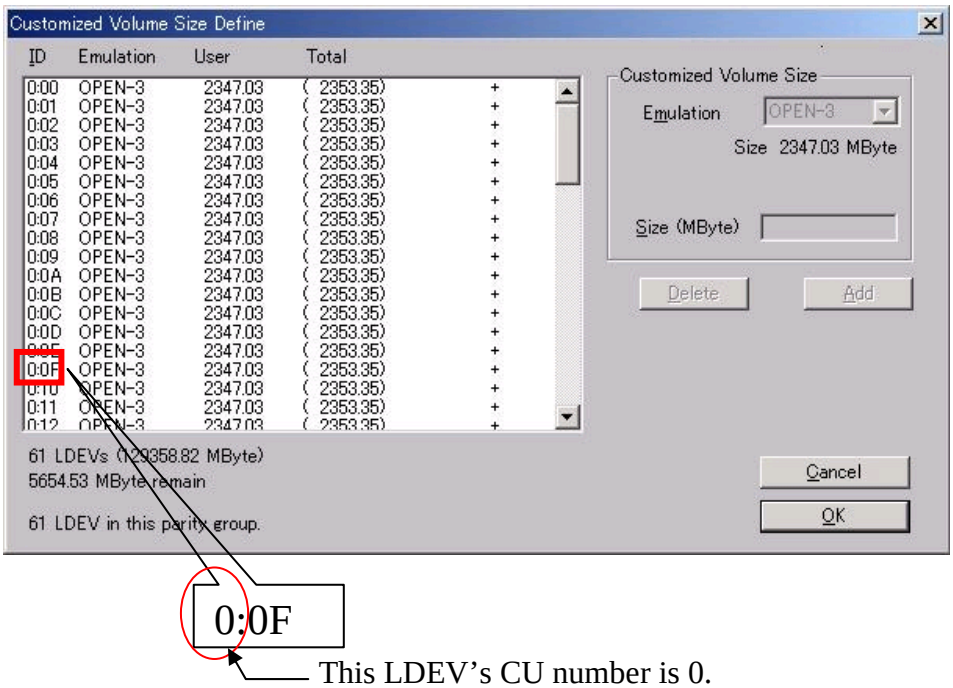


Figure A.9 Customized Volume Size Define Dialog Box

Figure A.10 Lightning 9900 Console

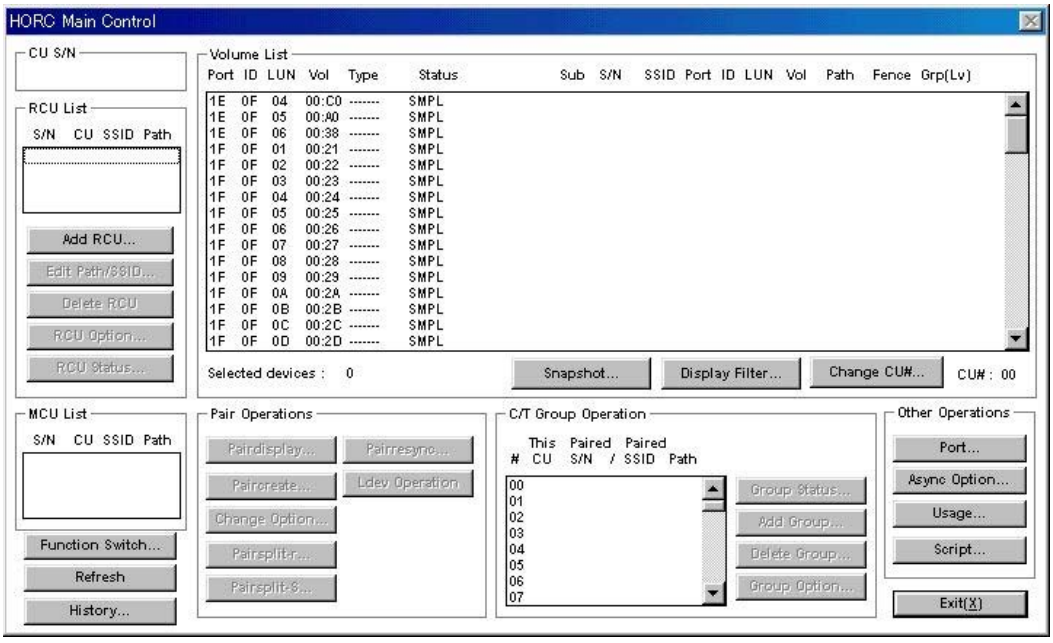


Figure A.11 HORC Main Control Panel

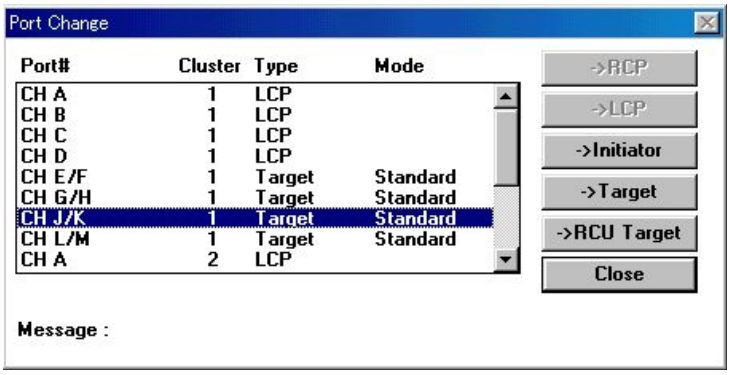


Figure A.12 Port Change Dialog Box

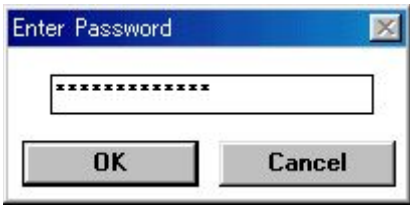


Figure A.13 Enter Password Dialog Box

Appendix B Setting up ShadowImage and TrueCopy with DAMP (Disk Array Management Program)

This appendix explains how to use DAMP(Disk Array Management Program2) Setup procedure of ShadowImage and TrueCopy for Thunder 9500V and Thunder 9200.

Note: Throughout this manual, the DAMP (e.g., DAMP 2, DAMP 3) refers to the Resource Manager 9500V program.

For further information on DAMP, please refer to the appropriate Hitachi documentation (*Hitachi Freedom Storage™ Thunder 9500™ V Series Resource Manager 9500V User's Guide for CLI,* MK-92DF603 and/or *Hitachi Freedom Storage™ Thunder 9500™ V Series Resource Manager 9500V User's Guide for GUI*, MK-92DF603.

Launch DAMP in accordance with the previously referenced DAMP documentation and complete the following steps:

1. Change the mode to **Management Mode**.
2. Double click on a target subsystem icon,

   The Array System Viewer is displayed as shown in Figure B.1.
3. Install the software license.
4. Open the "Parameter" window from "Array System Viewer" > settings >Configuration Settings. Select the **Options** and enter a license key.
5. Install the software license.
6. Open the "Parameter" window from "Array System Viewer" > settings >Configuration Settings. Select the **Options** and enter a license key.

   If you want to know the serial number, you can check the serial number from property window of DAMP("Array System Viewer" >"Setting" >"properties") or Device Manager.
7. Select the desired Command Device and set a Logical Unit for it.
8. Select the **Remote Path** tab. Next enter the **Serial Number**, **Equipment ID** and **Path-0** and **Path-1** information,
9. When done, click **Apply**.

   If you want to know the serial number, you can check the serial number from property window of DAMP or Device Manager.
10. Verify system parameters. Open the wizard from "Array System Viewer">"Settings" >System Parameter >"Wizard"
    - The recommended Data Share Mode is **Use**. (A)
    - The start attribute must be **Dual Active Mode**. (B)
    - Set the **SCSI ID/Port ID Take-over Mode** to **Do not use** (It is usually deactivated.).
    - For Thunder 9200 only, enable the Standard INQUIRY data expand mode in the host mode 2 to the ports for.

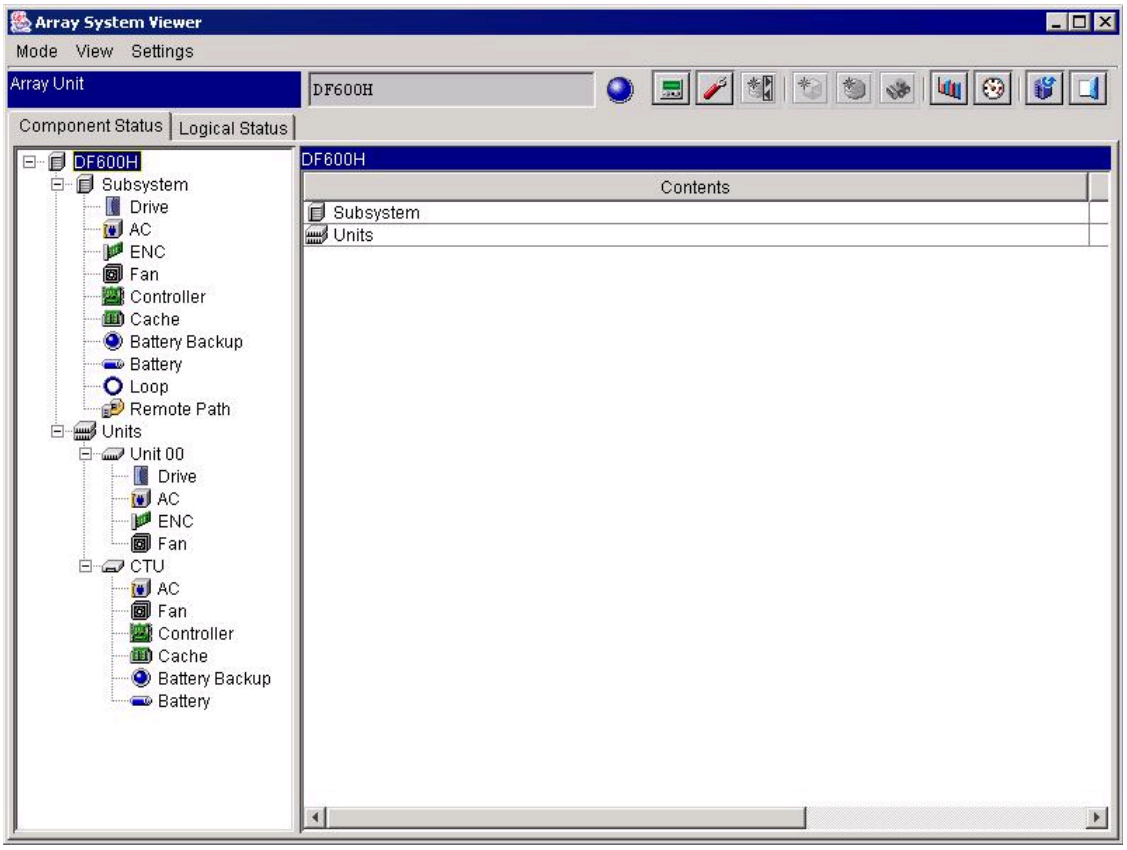


Figure B.1 Array System Viewer

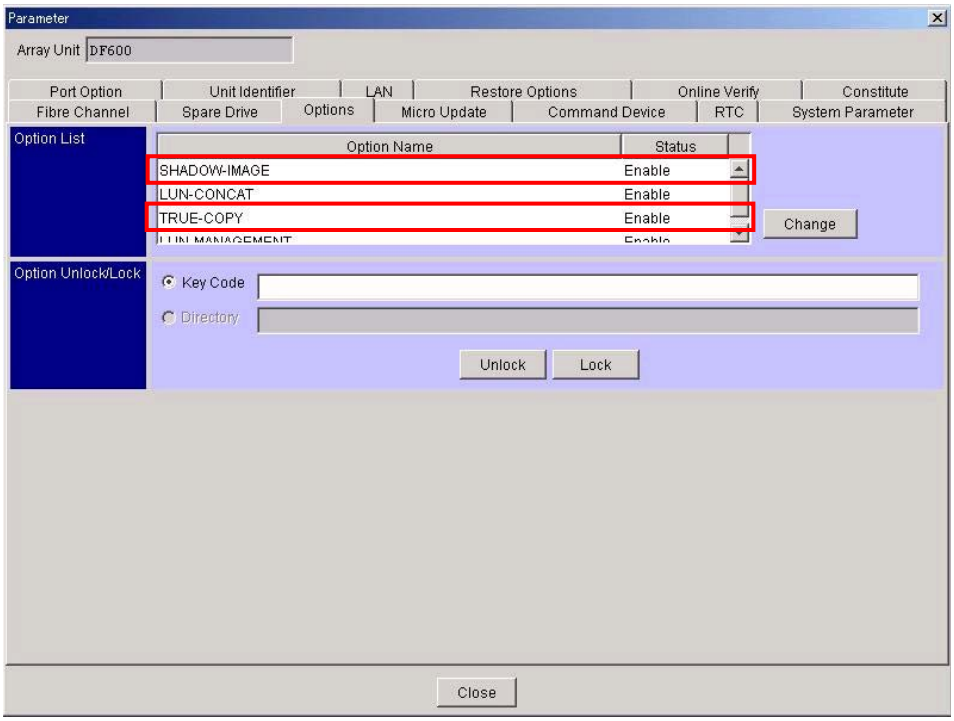


Figure B.2 Parameter Window(Options)

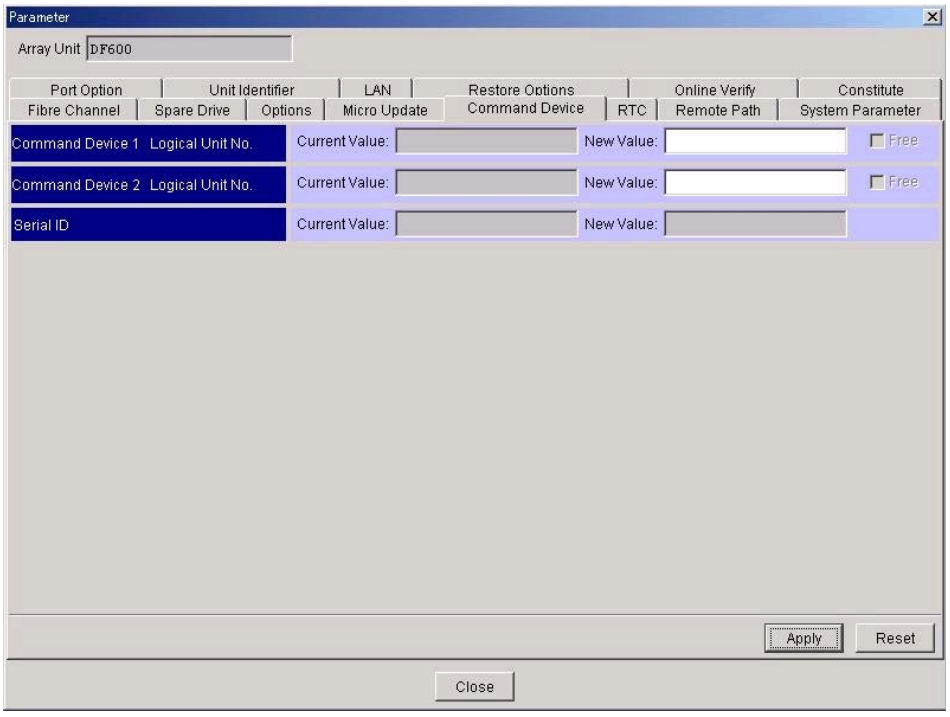


Figure B.3 Parameter window (Command Device)

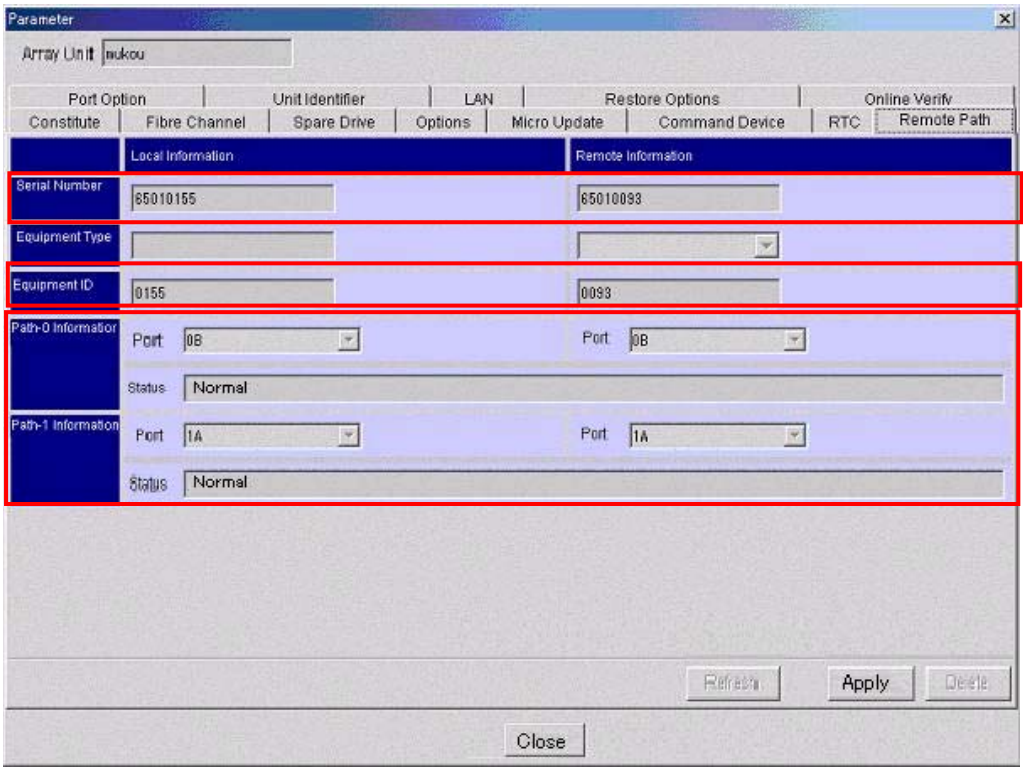


Figure B.4 Parameter Window(Remote Path)

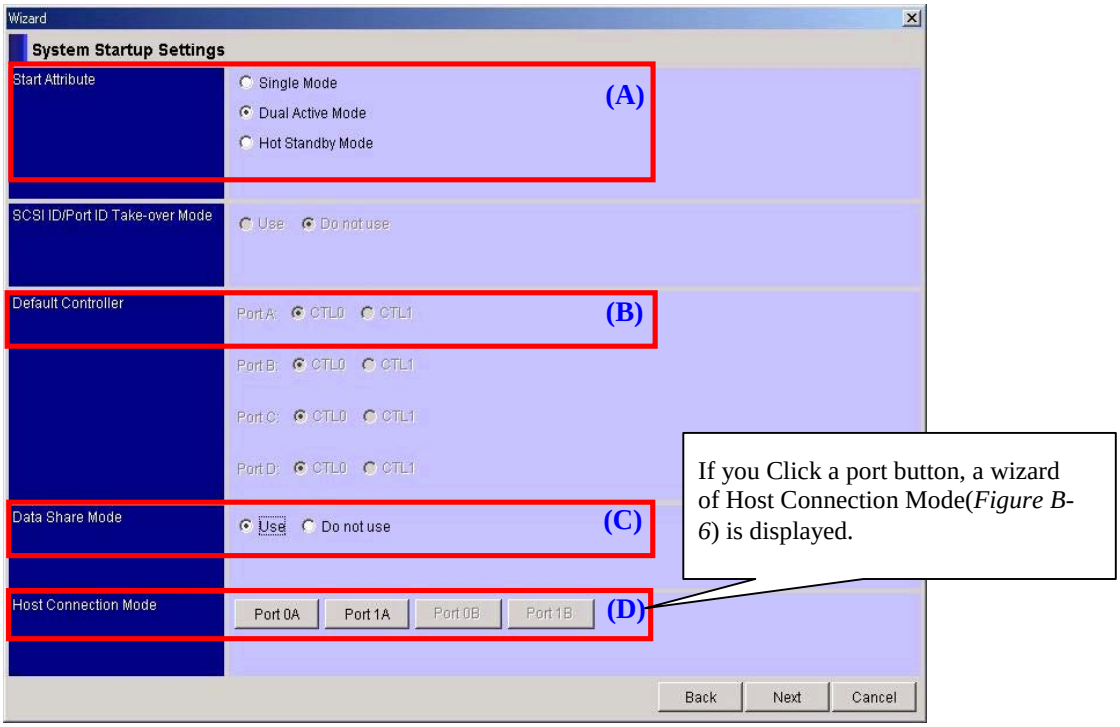


Figure B.5 System Parameter Wizard (Host Connection Mode)

Acronyms and Abbreviations

CCI	Command Control Interface
CLI	command line interface
DAMP	Disk Array Management Program
GUI	graphical user interface
LDEV	logical device
LU	logical unit
NVS	nonvolatile storage
OS	operating system
P-VOL	primary volume
SP-VOL	ShadowImage volume
S-VOL	secondary volume
SVP	service processor