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Hitachi Volume Shadow Copy Services (VSS) Hardware Provider for AMS/WMS/SMS Arrays

Companion Guide for VSS Applications

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MK-09DF8197-04

Contents

Preface

This document describes how to use the Hitachi VSS Hardware Provider for AMS/WMS/SMS Arrays.

This preface includes the following information:

- ☐ Intended Audience
- ☐ Software Version
- ☐ Document Revision Level
- ☐ Getting Help
- ☐ Comments

Notice: The use of Hitachi VSS Hardware Provider for AMS/WMS/SMS Arrays and all other Hitachi products is governed by the terms of your agreement(s) with Hitachi Ltd.

Intended Audience

This document provides information for System Administrators that install and configure the Hitachi VSS Hardware Provider.

Software Version

This document revision applies to Hitachi VSS Hardware Provider for AMS/WMS/SMS Arrays version 04.0.0 for AMS/WMS/SMS Storage arrays.

Document Revision Level

Revision	Date	Description
MK-09DF8197-00	March 2009	Preliminary Release
MK-09DF8197-01	August 2009	Revision 01, supersedes and replaces MK-09DF8197-00
MK-09DF8197-02	December 2009	Revision 02, supersedes and replaces MK-09DF8197-01
MK-09DF8197-03	February 2010	Revision 03, supersedes and replaces MK-09DF8197-02
MK-09DF8197-04	April 2010	Revision 04, supersedes and replaces MK-09DF8197-03

Referenced Documents

The following Hitachi referenced documents are also available for download from the Hitachi Data Systems Support Web Site:

http://www.hds.com/services/support/

- *Hitachi Storage Navigator Modular 2 Storage Features Reference Guide for AMS MK-97DF8148*
- *Hitachi Storage Navigator Modular 2 Storage Features Reference Guide for SMS MK-97DF8147*
- *Storage Navigator Modular 2 Command Line Interface (CLI) User's Guide MK-97DF8089*
- *Hitachi Storage Navigator Modular 2 Advanced Settings User's Guide*

MK-97DF8039

- *Hitachi Storage AMS 2000 Family Dynamic Provisioning Configuration Guide MK-09DF8201*

Document Conventions

This document uses the following typographic conventions:

Convention	Description
Bold	Indicates text on a window, other than the window title, including menus, menu options, buttons, fields, and labels. Example: Click **OK**.
Italic	Indicates a variable, which is a placeholder for actual text provided by the user or system. Example: copy *source-file target-file* ***Note:*** Angled brackets (< >) are also used to indicate variables.
screen/code	Indicates text that is displayed on screen or entered by the user. Example: `# pairdisplay -g oradb`
< > angled brackets	Indicates a variable, which is a placeholder for actual text provided by the user or system. Example: `# pairdisplay -g <group>` ***Note:*** Italic font is also used to indicate variables.
[ ] square brackets	Indicates optional values. Example: [a | b] indicates that you can choose a, b, or nothing.
{ } braces	Indicates required or expected values. Example: { a | b } indicates that you must choose either a or b.
| vertical bar	Indicates that you have a choice between two or more options or arguments. Examples: [a | b] indicates that you can choose a, b, or nothing. { a | b } indicates that you must choose either a or b.

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

Icon	Label	Description
	Note	Calls attention to important and/or additional information.
	Tip	Provides helpful information, guidelines, or suggestions for performing tasks more effectively.
	Caution	Warns the user of adverse conditions and/or consequences (e.g., disruptive operations).
	WARNING	Warns the user of severe conditions and/or consequences (e.g., destructive operations).

Convention for Storage Capacity Values

Physical storage capacity values (e.g., disk drive capacity) are calculated based on the following values:

Physical Capacity Unit	Value
1 KB	1,000 bytes
1 MB	$1,000^2$ bytes
1 GB	$1,000^3$ bytes
1 TB	$1,000^4$ bytes
1 PB	$1,000^5$ bytes
1 EB	$1,000^6$ bytes

Logical storage capacity values (e.g., logical device capacity) are calculated based on the following values:

Logical Capacity Unit	Value
1 KB	1,024 (2^{10}) bytes
1 MB	1,024 KB or $1,024^2$ bytes
1 GB	1,024 MB or $1,024^3$ bytes
1 TB	1,024 GB or $1,024^4$ bytes
1 PB	1,024 TB or $1,024^5$ bytes
1 EB	1,024 PB or $1,024^6$ bytes
1 BLOCK	512 BYTES

Getting Help

The Hitachi Data Systems Support Center staff is available 24 hours a day, seven days a week. To reach us, please visit the support Web site for current telephone numbers and other contact information: http://www.hds.com/services/support/. If you purchased this product from an authorized HDS reseller, contact that reseller for support.

Before calling the Hitachi Data Systems Support Center, please provide as much information about the problem as possible, including:

- The circumstances surrounding the error or failure.
- The exact content of any error message(s) displayed on the host system(s).

Comments

Please send us your comments on this document: doc.comments@hds.com. Include the document title, number, and revision, and refer to specific section(s) and paragraph(s) whenever possible.

Thank you! (All comments become the property of Hitachi Data Systems Corporation.)

Setting Up and Configuring the VSS Provider

This document explains how to set up and configure the Hitachi VSS Hardware Provider for AMS/WMS/SMS Arrays. The following topics are discussed:

Overview of the Hitachi VSS Provider

The Volume Shadow Copy Service (VSS) is part of the Microsoft Storage services framework and provides the backup infrastructure for the Windows Operating Systems. VSS in the context of storage hardware provides the ability to perform consistent point-in-time copies using Storage assisted technologies (like Hitachi ShadowImage technology). The consistent point-in-time copies are also called Shadow Copies. VSS hardware provider is a vendor-supplied component invoked during a VSS backup process.

Each VSS backup scenario consists of creating one or many shadow copies, called a Snapshot Set. The Snapshot set is identified by a globally unique identifier (GUID).

Each Shadow Copy in the Snapshot set is identified by a SnapshotID. The IDs will be used as reference for performing various VSS commands after the VSS backup is created.

The VSS Hardware provider sends management commands to the Hitachi Storage using TCP/IP. Any servers that have the VSS Hardware provider installed should have access to the management port of the Hitachi Storage.

Supported Operating Systems

- Microsoft Windows Server 2003 SP2
- Microsoft Windows Server 2003 R2 SP2
- Microsoft Windows Server 2008
- Microsoft Windows Server 2008 SP2
- Microsoft Windows Server 2008 R2

Supported Arrays

- AMS
- WMS
- SMS

Array Prerequisites

Before installing and configuring the provider, perform the tasks below on the array to prepare it for installation.

Configuring the Command Device

You must configure a command device for each array that is presented to the host server. You can configure the command devices from the Storage Navigator Modular (in Maintenance Mode).

For more information on configuring the array, see the documents in the Referenced Documents section.

Configuring the Differential Management LU

For AMS/WMS arrays, configure two 10 GB Differential Management LU (DM-LU) on the Array using SNM. For the SMS array, DM-LU is already configured on the array. For more information on configuring the array, see the documents in the Referenced Documents section.

Enabling Access mode – Host Group/Target Security

The Host Group/Target Security must be enabled for all the ports. Set this option using Storage Navigator Modular (SNM). For more information on configuring the array, see the documents in the Referenced Documents section.

Enabling LU mapping mode

The LU Mapping mode must be enabled. Set this option using Storage Navigator Modular (SNM). For more information on configuring the array, see the documents in the Referenced Documents section.

Verifying the Licenses

Verify that you have a SHADOWIMAGE and SNAPSHOT license installed on the array. Optionally, ACCOUNT and D_PROVISIONING can be added to allow array authentication and Hitachi Dynamic Provisioning features respectively. You can find the license under the **License Key** option of Storage Navigator Modular. For more information on configuring the array, see the documents in the Referenced Documents section.

Using the Provider

The VSS Provider supports two methods of taking a consistent copy of production volumes using **ShadowImage** and **SnapShot (CoW)** Technology. These technologies create a copy of a volume (logical unit) in a subsystem to another volume in the same subsystem. For more information on local replication, see the documents in the Referenced Documents section.

ShadowImage and SnapShot are optional storage features and require licenses to be installed and/or enabled before they can be used. For more information on setting up optional storage features, see the documents in the Referenced Documents section.

Before using the provider for performing ShadowImage copies, note the following:

You must create a ShadowImage pair before performing a VSS-based backup scenario. This provider installation provides two mechanisms to create the initial ShadowImage pair using a CLI or a GUI.

- An SVOL is ready for a VSS based backup if its pair status is PAIR. The SVOL status changes to PSUS after a VSS create backup scenario is successfully completed.
- A VSS delete backup scenario will change the SVOL status to PAIR, making the SVOL ready for another backup.

The VSS provider will create a host group called “HITACHI-VSS-HG” for FC arrays (or a target “Hitachi-VSS-TARGET” for iSCSI arrays). This host group/target will be used to host all the SVOL LUs created by the provider.

In addition, if the host group meets the following conditions, the host group is also deleted:

- The deleted LUN mapping is the last LUN mapping in the host group.
- The name of the host group contains "HITACHI-HG"

Note: Do not edit/delete this host group/Target.

Snapshot (CoW):

Before using the provider for performing Snapshot copies, note the following:

- Data Pools must be created on the Subsystem before performing any Snapshot operation. For more information on how to configure Data pools, see the documents in the Referenced Documents section.
- The PVOLs **must not** exist on a RAID Group with RAID 0.
- Snapshot (COW) operations do not support PVOLs that are HDP Pool.

Configuring the Provider

Hitachi supports two provider configurations: Simple setup and Transportable set up. The configuration you choose depends on how you initially configured other software applications for using the provider. This section provides a brief overview of both configurations.

Note: Before choosing a configuration, read the documentation that came with your application software to verify the best configuration for your needs.

Simple Setup

Figure 1 illustrates a simple setup for performing a VSS backup.

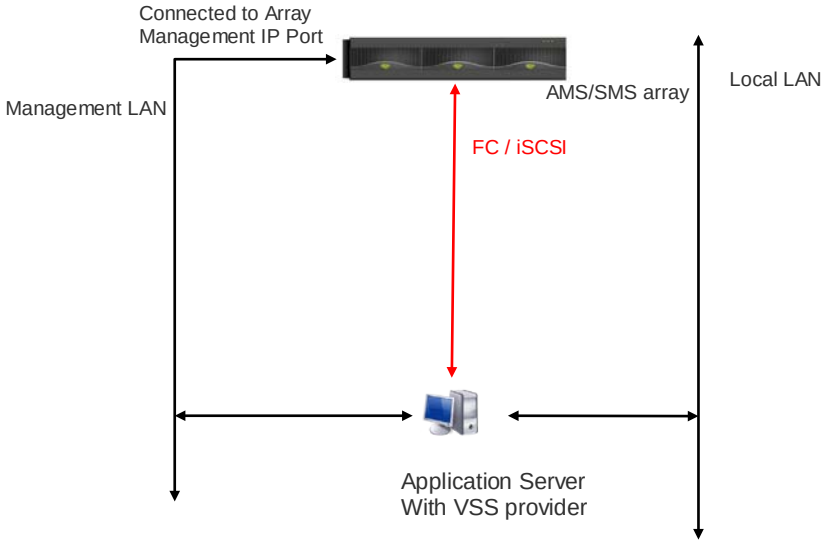

Figure 1 Simple Set Up for a VSS Backup

Transportable setup

Figure 2 illustrates the configuration to perform a transportable VSS backup scenario.

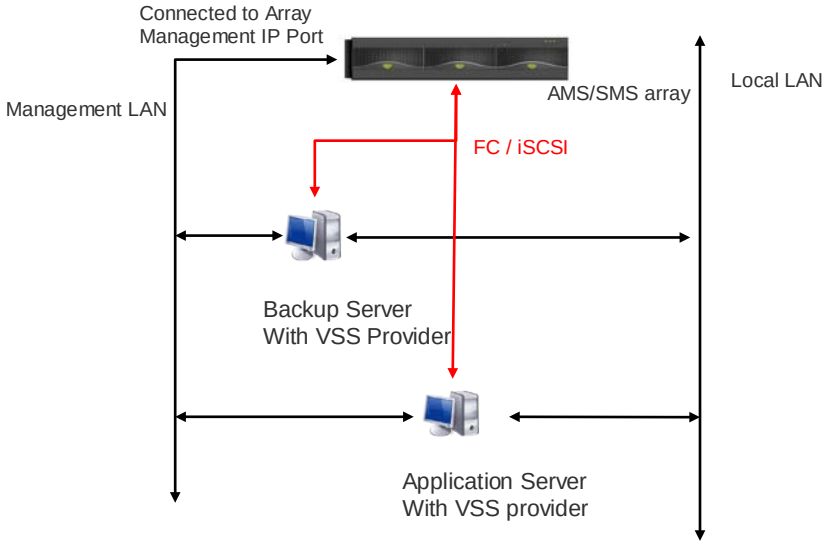

Figure 2 Transportable Setup

If the backup application resides on a different server, install the VSS provider on both servers.

Installing the Hitachi VSS Hardware Provider

To install the provider, run the `.msi` file. The binaries will be installed in the default directory:

```
C:\Program Files\Hitachi\VSSProvider
```

Account Authentication

Account Authentication is a function that ensures disk array security by protecting the array from menace and attacks that may jeopardize security, such as illegal break-in and illegal operation through the management LAN interface. Information on the disk array configuration and user data is also protected.

The account information includes user ID, password, role, and validity/invalidity of the account that is to be registered in the disk array beforehand to access the disk array in which Account Authentication has been installed. On the basis of the information, the disk array authenticates a user at the time of the log in and judges whether or not to allow the user to refer to or update the resources after the log in.

For more information, refer to the *Hitachi Adaptable Modular Storage Account Authentication User's Guide.*

Using the GUI for Account Authentication

Before you use the Hitachi VSS Hardware Provider Configuration GUI you must create a user account on the array that has Storage Administrator (View and Modify) permission. This account allows the user to log in to the array, create a LUN, and map to the host as PVOL.

Adding a Subsystem

1. From the **Start** menu, launch **Hitachi VSS Hardware Provider Configuration**.

2. Click on the **Add Subsystem** button. Enter the subsystem controller IPs, User Name, and Password. User Name and Password are not required for non-authenticated subsystem.

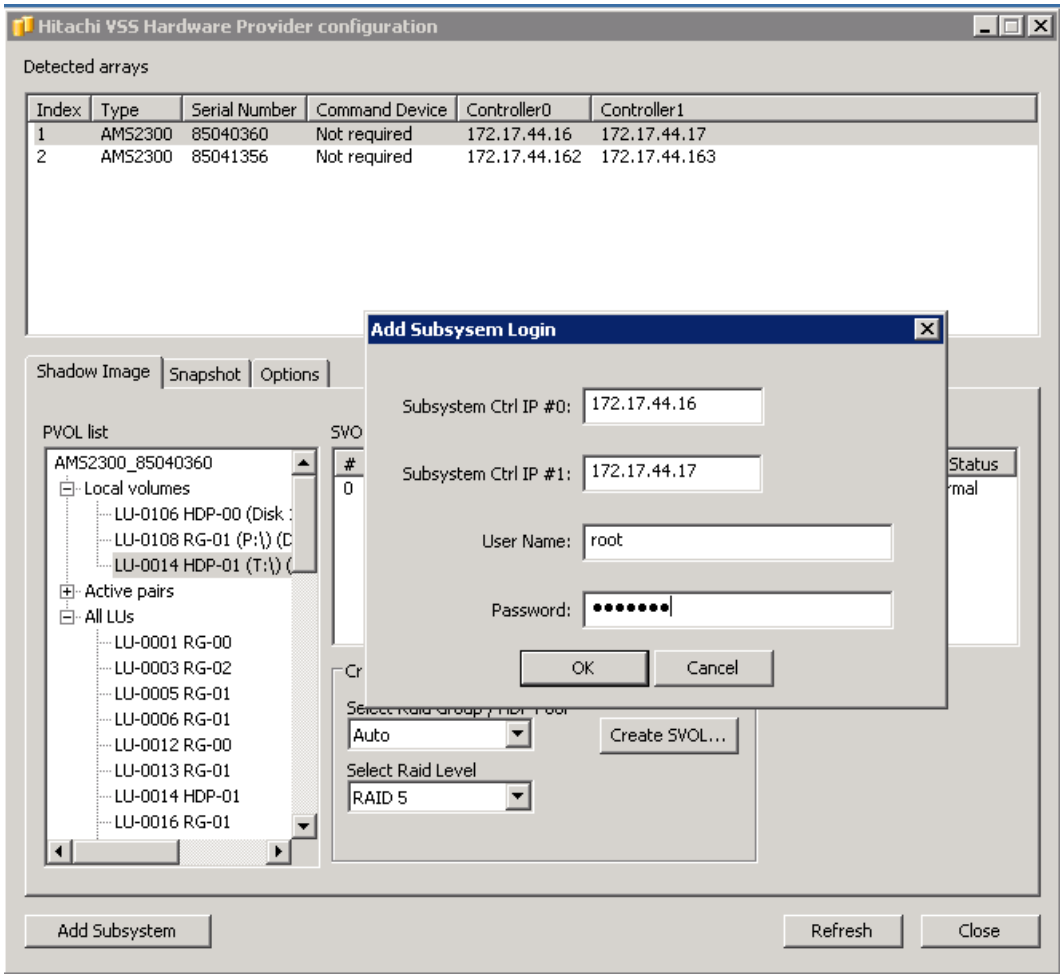

Figure 3 Adding a Subsystem

3. After the account is authenticated for the first time, the log in information will be persistent in the system and the account will authenticate automatically the next time the program is launched.

Note: When array authentication is enabled, you must manually refresh (click Refresh button) **before** any view or modify operation is performed.

Removing the Subsystem

Removing the Subsystem requires manual removal of the subsystem's IP Addresses of the `hiconfig.txt` file located in the VSS installation directory.

Uninstalling the Hitachi VSS Hardware Provider

1. Open **Add/Remove Programs**.
2. Select the application **Hitachi VSS Hardware Provider**.
3. Click on **Remove**.

Provider Configuration File

The VSS Hardware provider sends commands to the Hitachi Storage using the controller management IP port. When the user adds a subsystem for the first time the Hitachi VSS Hardware Provider UI will create the configuration file (`hiconfig.txt`) in the installation directory of the provider (defaults to `C:\Program Files\Hitachi\VSSProvider`) and stores the IP address in the configuration file. Subsequent additions to the subsystem will append the IP address in the configuration file. The user can remove discovered subsystems by deleting the IP pairs from hiconfig.txt.

The Provider Configuration File is also where various option settings are made. These options are in the [name=value] format on a separate line enclosed in straight brackets. They can be placed anywhere in the file. Available options are documented elsewhere in the user guide.

Using the CLI

Note: CLI operations do not support DP Volumes in the HDP Pool.

To use the CLI:

1. Launch the command prompt from:

   ```
   All Programs/ Hitachi/ VSS Hardware Provider / shortcut to
   command prompt
   ```

2. Type `hishadowcmd.exe ?` to display the usage summary.

The example below shows the CLI syntax:

```
Usage :
hishadowcmd.exe   <command> <command options>
```

CheckConfig

This command loads all the device information and checks if the array and the server are configured properly for performing VSS operations.

Syntax

```
/CheckConfig
```

CreateSVOL

This command creates the SVOL for a given PVOL. There are two variations of this command:

- The user can specify the PVOL volume or mount point on the local server.
- The user can specify the PVOL using the array serial number, and LU number.

Optionally, the user can also specify the RAID type and the RAID Group number.

Syntax

```
/CreateSVOL    /PVOL [/RG | /RAID] [/WAIT]
               /SERIAL /LU [/RG | /RAID] [/WAIT]
```

QuerySvol

This command displays the list of SVOLs for a given PVOL.

Syntax

```
/QuerySVOL     /PVOL
               /SERIAL /LU
```

IsSVOLReady

This command returns 0 if there exists a valid SVOL for performing a shadow copy backup operation.

Syntax

```
 /IsSVOLReady  /PVOL
               /SERIAL /LU
```

Command Option Description

Table 1 lists command options:

Table 1 Command Option Descriptions

Option	Description
/PVOL=*string*	*string* is a drive letter or mount point
/SERIAL=*num*	*num* is the Array Serial Number in decimal integer
/LU=*num*	*num* is the LU Number in decimal integer
/RG=*num*	*num* is the RAIDGroup Number in decimal integer
/RAID=*num*	*num* is the RAID Type (0,1,5,6,10)
/WAIT	wait for operation complete

CLI Error Codes

Table 2 lists Error Codes and their descriptions.

Table 2 CLI Error Codes

Error Code	Description
0	Command completed successfully.
1	Generic failure.
2	Invalid command passed as argument.
3	Invalid command option passed as argument.
4	Unexpected command option.
5	Unable to find any command device volume.
6	The Array device cannot be found.
7	The controller IP list configuration file is not found.
8	The controller IP list configuration file is not valid.
9	PVOL volume is not valid.
10	The PVOL LU is not valid.
11	Creation of SVOL has failed.

Error Code	Description
12	Query list of SVOL has failed.
13	SVOL is not ready for shadow copy.
14	There are no valid SVOLs for shadow copy.
1000	Unknown error

Using the GUI

To start the GUI, navigate to:

Start/Programs/ Hitachi/VSS Hardware provider/VSS Hardware provider configuration

Figure 4 shows the first page of the GUI.

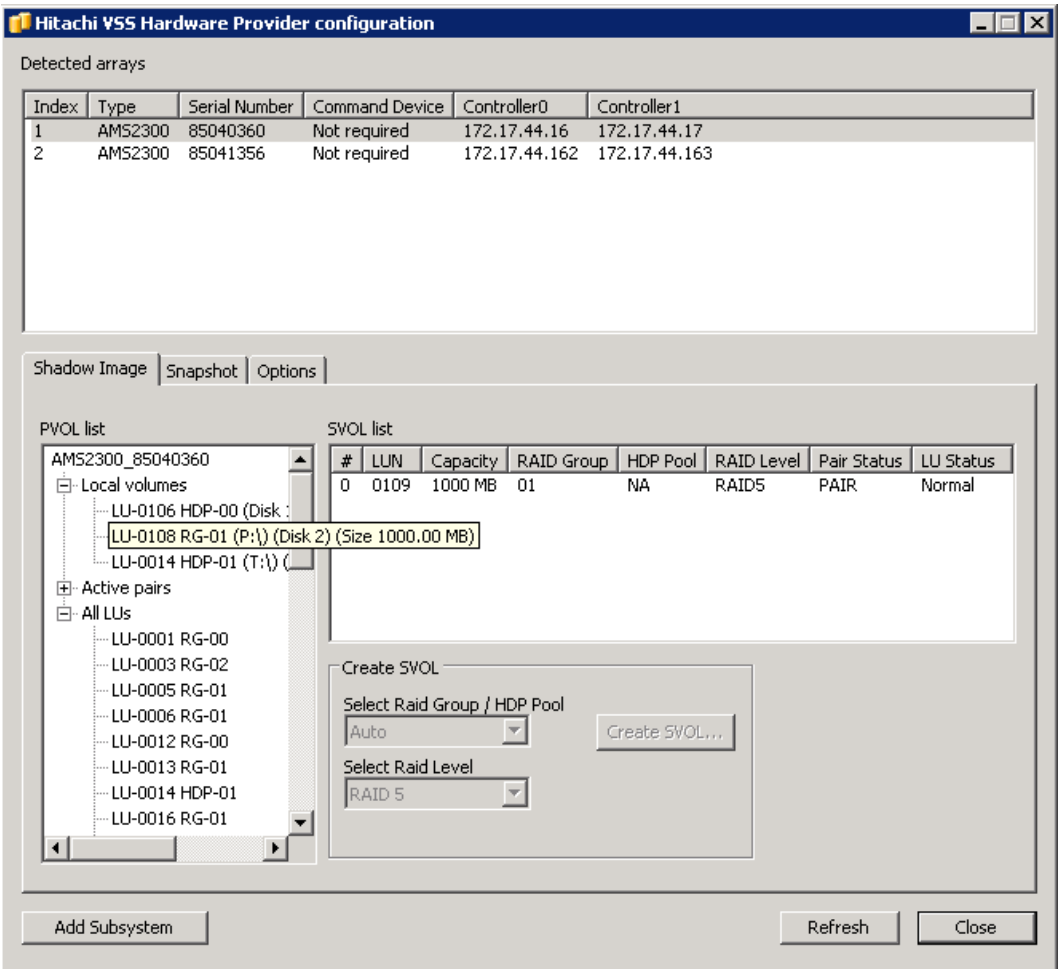

Figure 4 Provider GUI

The detected arrays are displayed. Select each entry to refresh the contents of the PVOL list entries.

The PVOL list has three entries for Shadow Image. Hitachi VSS Hardware Provider supports RAID Groups and HDP Pool for both PVOL and SVOL.

- Local Volumes – lists all the volumes configured on the local server.
- Active pairs – lists all the active shadow image pairs on the array.
- All LUs – list all the volumes that can be a valid PVOL.

Creating a ShadowImage Pair

To create a ShadowImage Pair:

1. Select the PVOL item from the tree list.
2. Choose the RAID group/HDP Pool and choose the RAID level.
3. Click on **Create SVOL**. This will create an SVOL LU.
4. Create the initial pair. See Figure 5.

The default **RAID group/HDP Pool** option for SVOL is **Auto**. This option automatically allocates space on the same RAID group/HDP Pool as the PVOL was created on if there is enough space in the pool to accommodate it. If there is no RAID group with the specified RAID level (for example, RAID 10, Raid 6) it will automatically create a New RAID group from the available free drives and creates an SVOL in it.

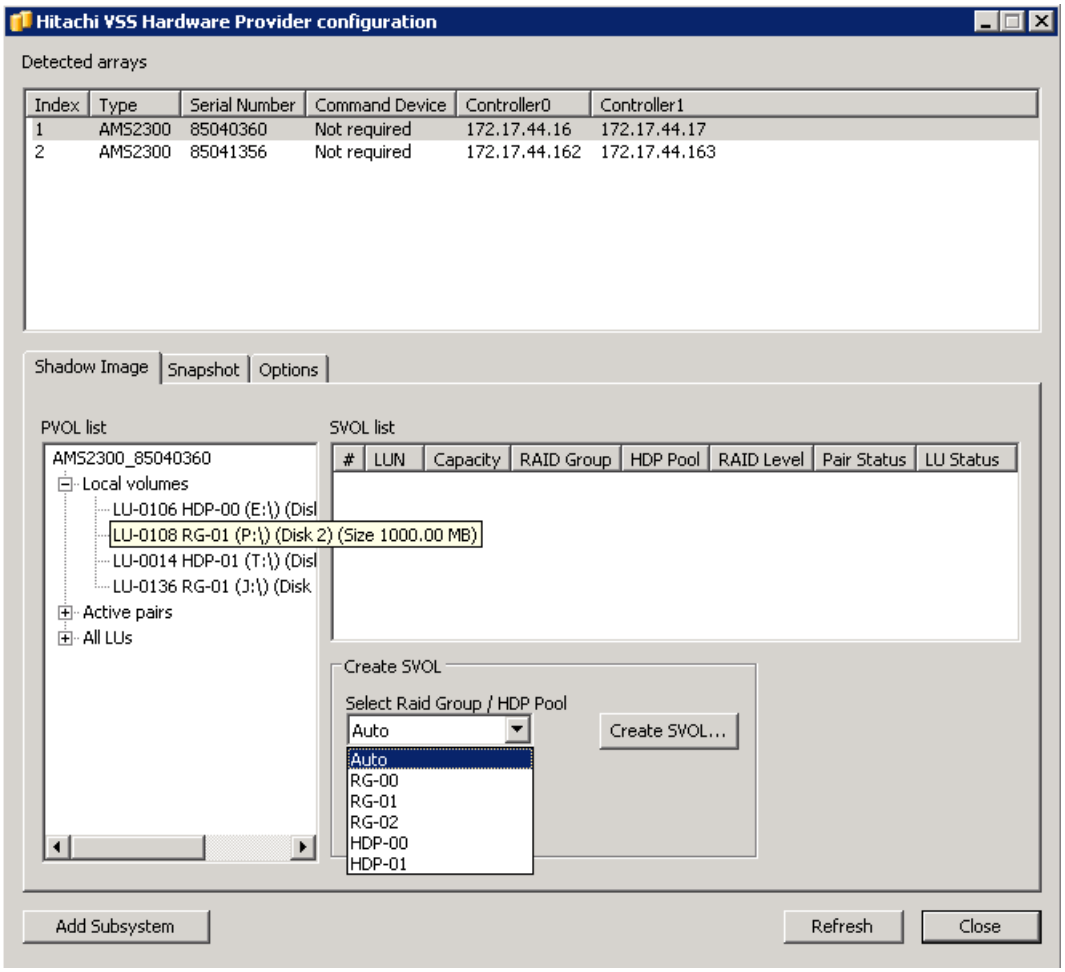

Figure 5 Select RAID Group / HDP Pool

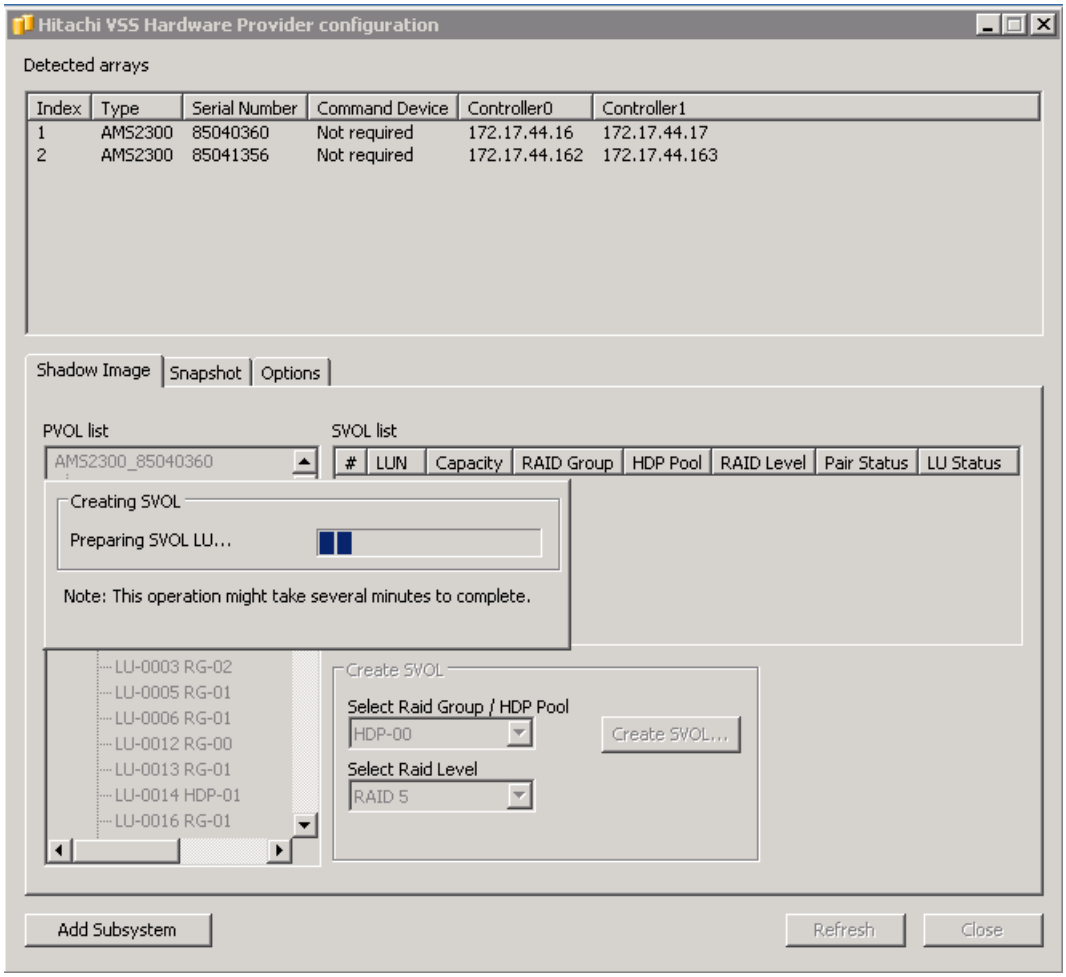

Figure 6 Creating SVOL

Viewing SVOL Pair Status

To view the pair status, select the PVOL item from the tree list. The status of the pair displays in the SVOL List View. See Figure 7.

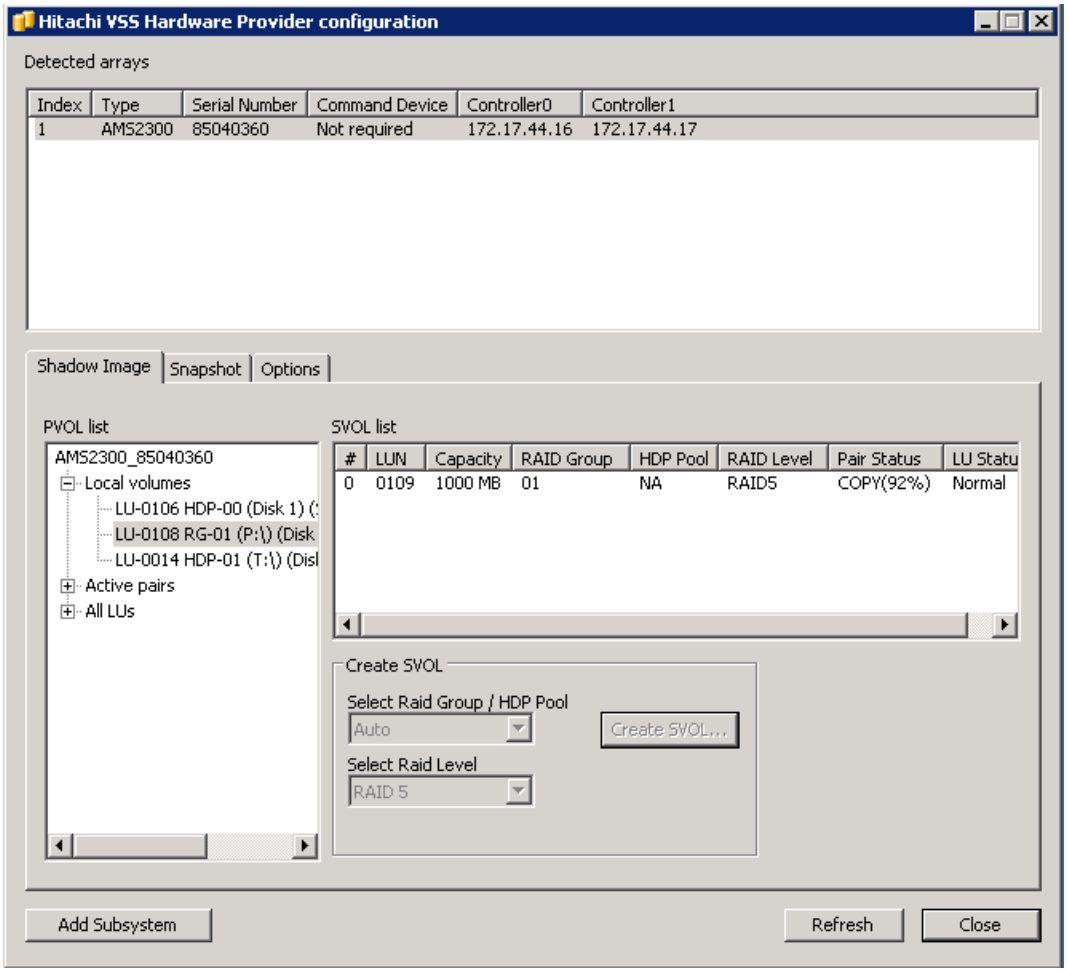

Figure 7 SVOL List

Deleting an SVOL LU

To Delete an SVOL LU:

1. Select the SVOL item from the SVOL list.
2. Right click the SVOL item. This displays the **Delete LU** menu.
3. Click on the item to delete the SVOL LU permanently.

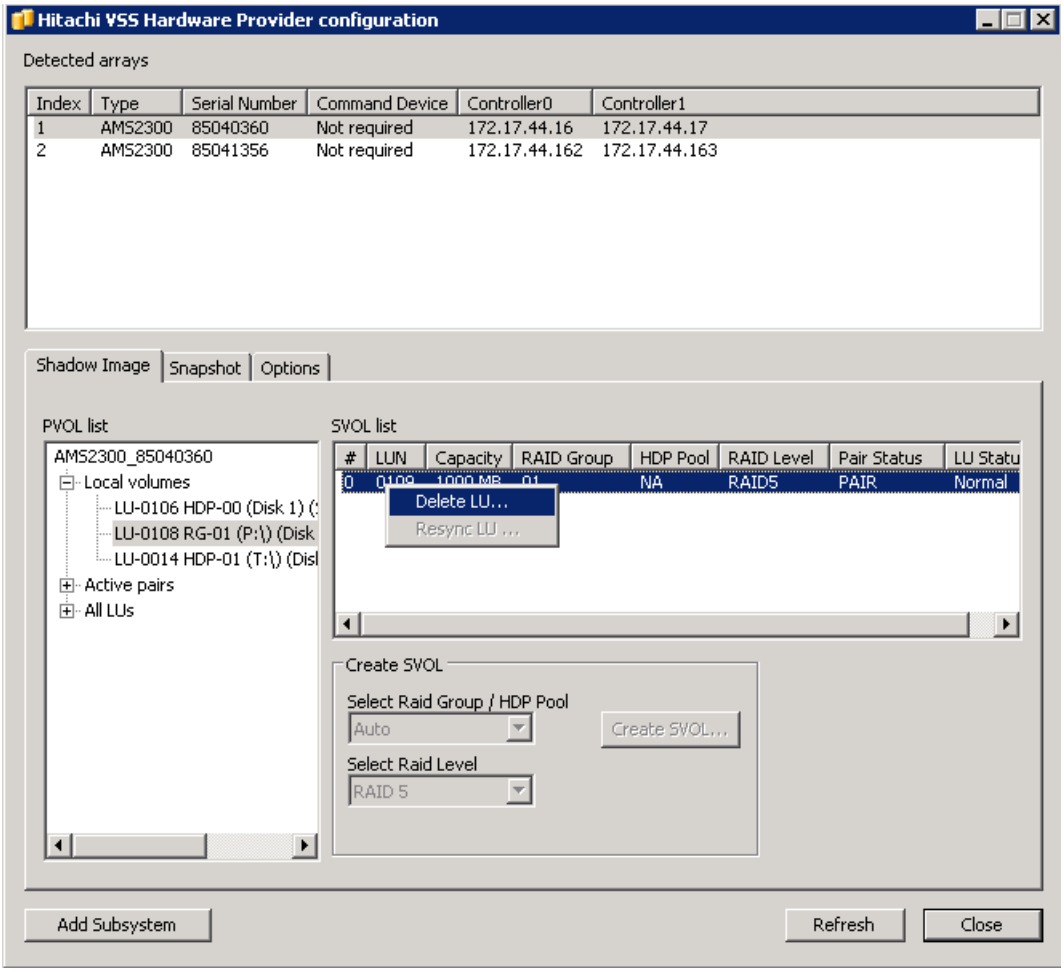

Figure 8 Delete LU

Resync an SVOL LU

To Resync an SVOL LU from PVOL the pair status must be "PSUS":

1. Select the SVOL item from the SVOL list.
2. Right click the SVOL item. This displays the **Resync LU** menu.
3. Click on the item to Resync an SVOL LU from the PVOL.

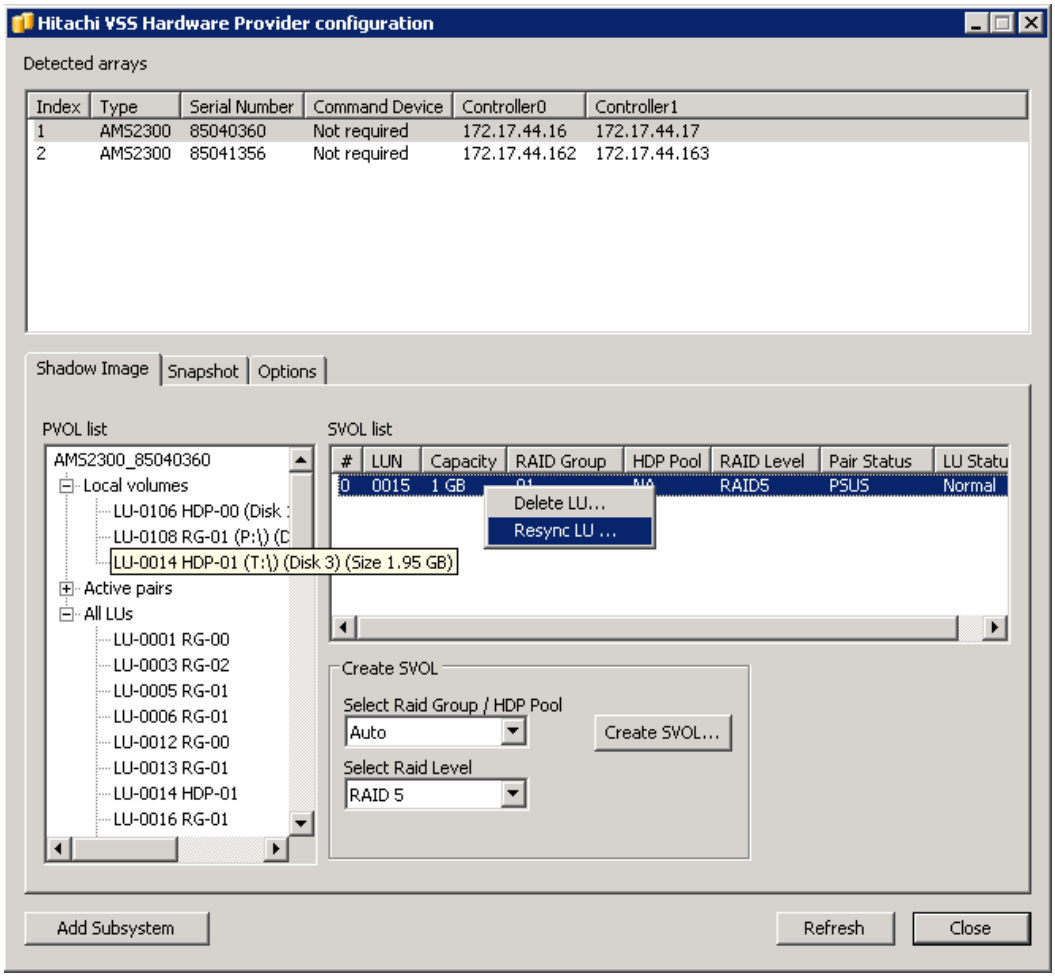

Figure 9 Resync LU

Viewing Snapshot Pair Status

The PVOL list has only one entry for Snapshot:

- Local Volumes – lists all the volumes configured on the local server.

To view the pair status, select the PVOL item from the tree list. The status of the pair displays in the VVOL List View. See Figure 10.

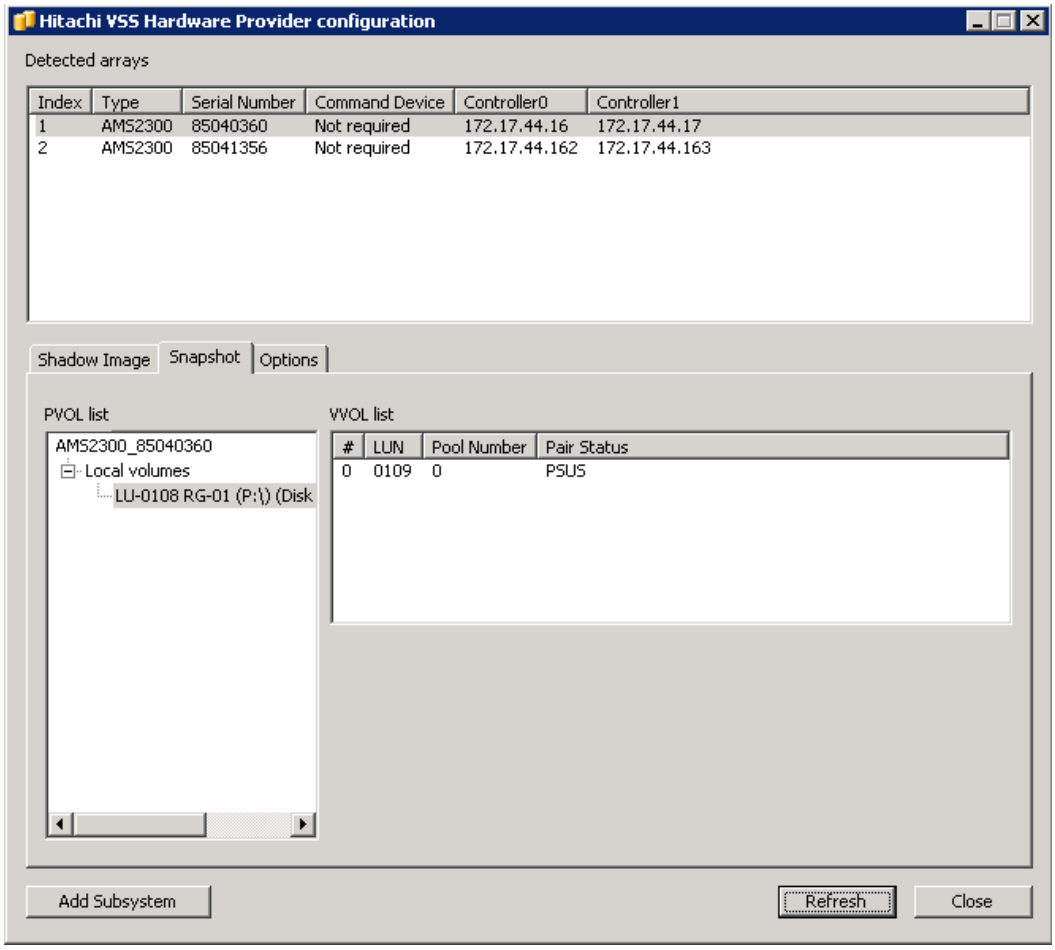

Figure 10 Viewing PVOL Status

Deleting a VVOL LU

To Delete a VVOL LU:

1. Select the VVOL item from the VVOL list.
2. Right click the VVOL item. This displays the **Delete LU** menu.
3. Click on the item to delete the VVOL LU permanently. See Figure 11.

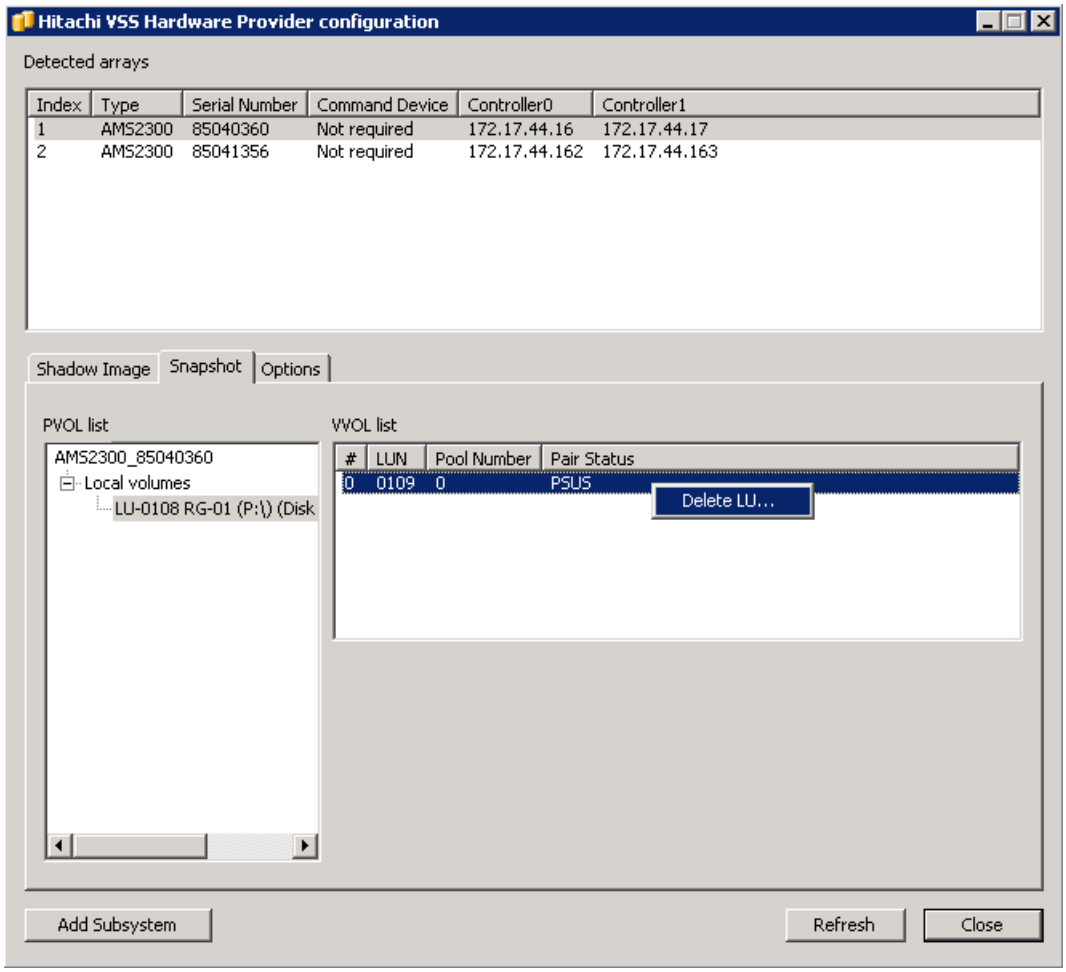

Figure 11 Deleting a VVOL LU

Viewing the Data Pool

If the **Automatically select a data pool with a highest capacity** checkbox is checked, the Hitachi VSS hardware provider will automatically select a data pool with a highest available capacity for snapshot creation. When the checkbox is not checked, the user can select a pool from the list.

Figure 12 shows how to view the Data Pool.

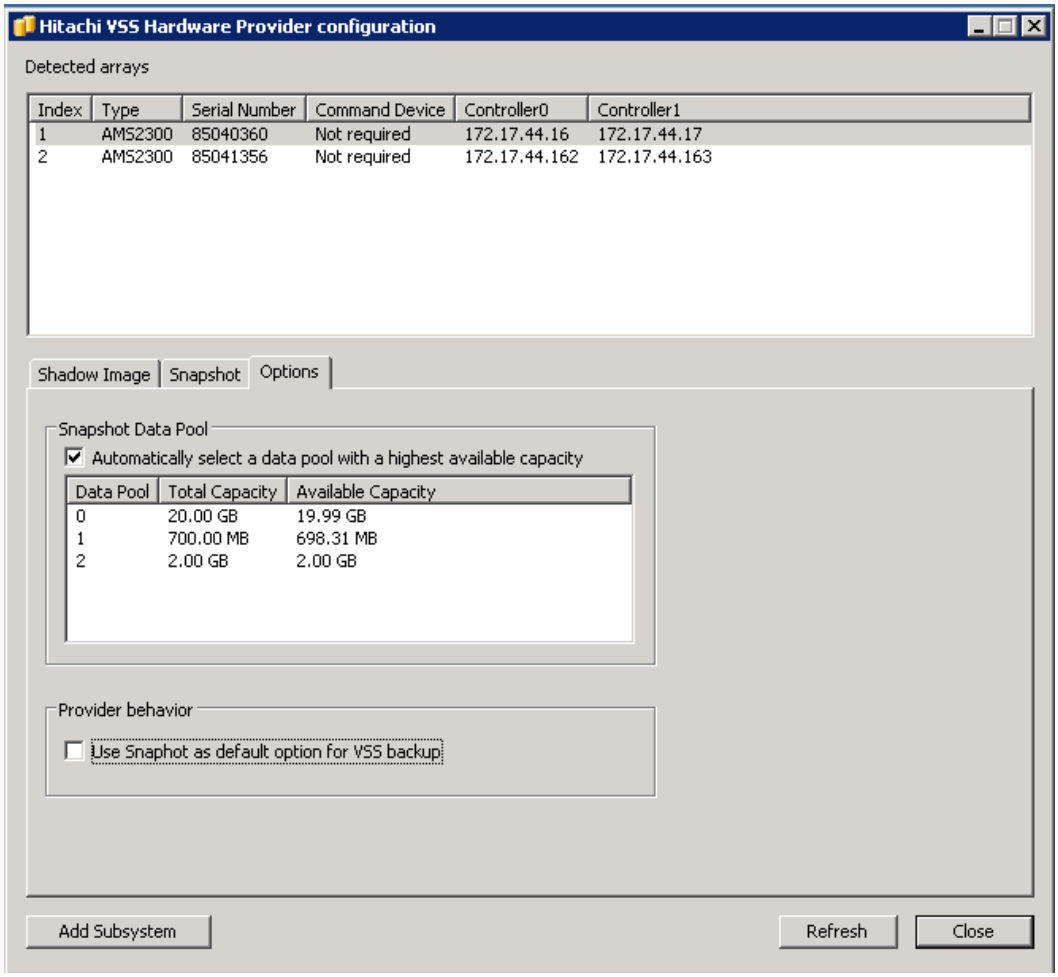

Figure 12 Viewing the Data Pool

Viewing Provider Default Behavior

If the requester does not specify a plex or differential attribute, the default provider behavior is Shadow Image. The user can change the default provider behavior to Snapshot (COW) by selecting the checkbox.

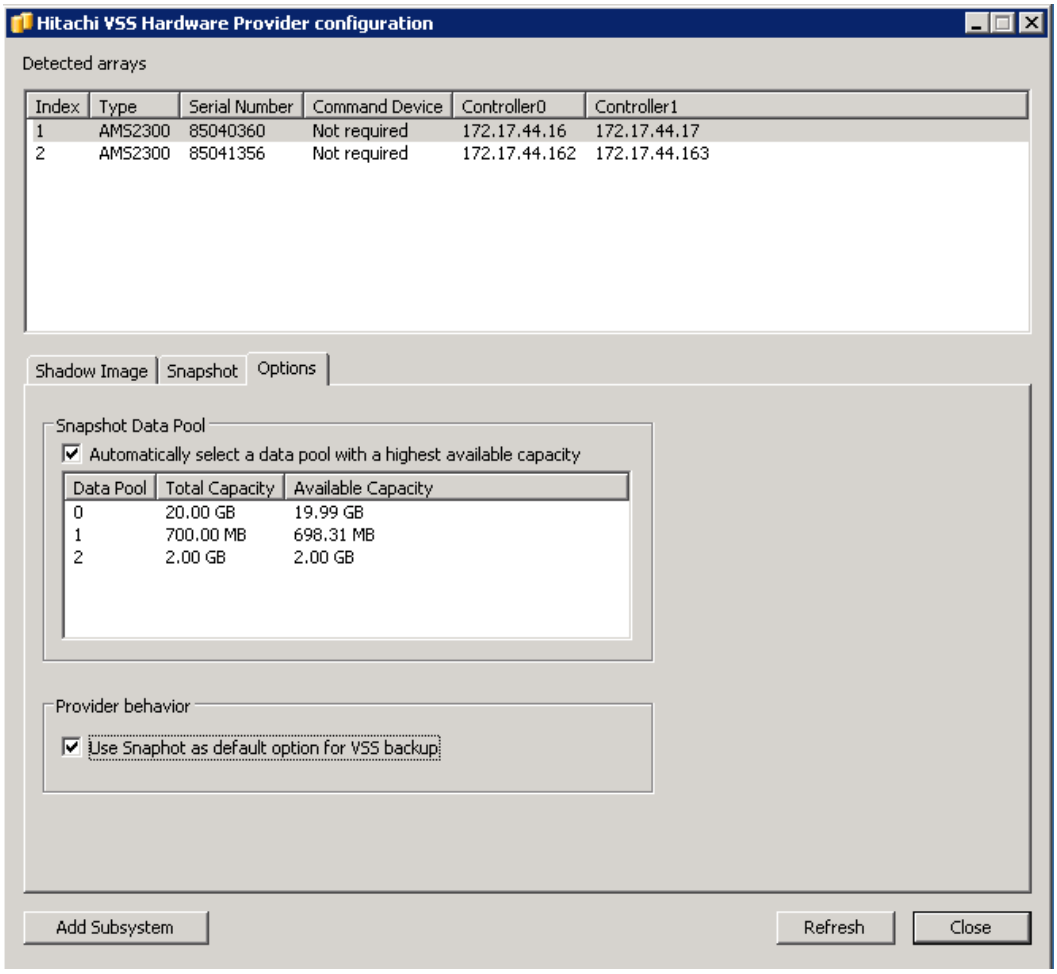

Figure 13 Provider Behavior

You can also specify the Provider Default behavior in hiconfig.txt by entering the switch in a separate line [DefaultBackupMode=ShadowImage] or [DefaultBackupMode=Snapshot]

This option overrides the GUI Options checkbox.

Troubleshooting

- If the VSS scenario fails, check the array configuration using the following command:

  ```
  hishadowcmd /CheckConfig
  ```

  This will highlight any known configuration issues on the array.

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