Dell PowerVault MD34XX and MD38XX Series Storage Arrays
SMI-S Provider Installation Guide

Notes, Cautions, and Warnings

NOTE: A NOTE indicates important information that helps you make better use of your computer.

CAUTION: A CAUTION indicates either potential damage to hardware or loss of data and tells you how to avoid the problem.

WARNING: A WARNING indicates a potential for property damage, personal injury, or death.

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SMI-S Provider Installation Guide

Introduction

The Dell PowerVault MD Series storage arrays provide an industry-standard Application Programming Interface (API) called the Storage Management Initiative Specification (SMI-S). This interface enables third party SMI-S client applications to manage MD Series storage arrays in a multi-vendor storage area network (SAN) environment.

SMI-enabled management applications are known as Common Information Model (CIM) clients. To allow clients to manage a storage device, an SMI-S Provider (also called SMI-S Agent or CIM Agent) is required. SMI-S Providers can be implemented as:

- A proxy interface that translates the existing API of a device to an SMI-S compliant interface. This implementation is the quickest path to SMI-S compliance, but a proxy provider and a Common Information Model Object Manager (CIMOM) must be installed on a server. A CIMOM is a CIM/WBEM infrastructure that receives, validates, and authenticates CIM requests from the client application. The CIMOM directs the requests to the appropriate device provider.
- A native feature of the storage device API. This implementation is sometimes referred to as an *embedded agent*.

Dell MD Series SMI-S Provider is implemented as a proxy interface. The Dell SMI-S Provider, referred to as SMI-S Provider, runs on a server on the storage network. OpenPegasus CIMOM is installed during the installation of this SMI-S Provider.

The SMI-S Provider provides the SMI-S interface to the Dell PowerVault MD Series storage arrays. The provider uses the proxy CIM Agent model and is supported on Microsoft Windows and Linux platforms only. For more information about the platform versions, see the Support Matrix for the MD Series storage arrays at **dell.com/powervaultmanuals**.

Version Information

The following table lists the version details of the components.

Component	Version
SMI-S	1.4
SMI-S Provider	10.30
OpenPegasus CIMOM	2.9.1

Name Space

EXTERNAL_NAMESPACE=root/DCIM/MDStorageArray13

Supported Profiles And Sub-Profiles

SMI-S Provider version 10.30 supports the following profiles and sub-profiles:

- Block storage views
- Thin provisioning
- Replication services
- Physical package
- Profile registration

- Device credentials
- Proxy server system management
- Multiple computer system
- Block services
- Disk drive lite
- Copy services
- Job control
- Extent composition
- Disk sparing
- Initiator port (SAS and SATA)
- Target port (SAS)
- iSCSI target port
- Access points
- Indications
- Masking and mapping
- Location
- Software inventory
- Software update
- Erasure
- Battery
- Storage asymmetry
- Message log
- Block server performance

> **NOTE:** Block server performance statistics are not available for controller firmware versions prior to 7.10.

Installing And Uninstalling The SMI-S Provider

System Requirements For SMI-S Provider

The following are the system requirements to install and run the SMI-S Provider.

System Component	Requirement
Memory	1 GB minimum (2 GB recommended).
Connectivity	Ethernet with 100BASE-T minimum (Gigabit Ethernet preferred) and TCP/IP.
Port	TCP port 5988 or 5989, or any other available port if these ports are not available.
Storage array password	The device credentials profile requires the storage array password (SharedSecret) to modify operations. The SMI-S Provider persistently tracks an instance of the SharedSecret per storage array.
Scalability	There is no limit on the number of storage systems that can be supported by a single provider instance. The recommended maximum is 10 for moderately to fully configured storage systems per provider, or a total of around 5000 volumes. In large configurations, deploy additional providers on different servers in your storage network to manage additional storage systems.

Installing SMI-S Provider

The SMI-S Provider is packaged as an archive file for UNIX-based operating system servers and as an executable installation file for Microsoft Windows-based operating system servers.

Installing SMI-S Provider For Windows-Based Operating Systems

To install the SMI-S Provider:

1. Move the SMI-S Provider installation executable file on the server where you want to install the SMI-S Provider.
2. Double-click the installation executable icon and follow the instructions on the screen.

   NOTE: The installation prompts you to enter an IP address for the storage array that you want to use. The installation opens a text file in Notepad. Follow the instructions in the text file. After you have added the storage array and closed Notepad, the installation program continues normally.

The SMI-S Provider is installed on your system. After the installation, you can delete the installation executable file.

Installing SMI-S Provider For Linux-Based Operating Systems

To install the SMI-S Provider:

1. Move the SMI-S Provider RPM package file into the file system on the server where you want to install SMI-S Provider.
2. Run the following command: `rpm –ivh <rpm package name> .rpm`

To change the **OpenPegasus CIMOM** configuration, see Configuring CIM Server.

Configuring CIM Server

Use the following commands to perform basic CIM server configuration operations.

Function	Command
To set an http port	`# cimconfig -s httpPort=<port> -p`
To set an https port	`# cimconfig -s httpsPort==<port> -p`
To enable or disable the http connection	`# cimconfig -s enableHttpConnection={true	false} -p`
To enable or disable the https connection	`# cimconfig -s enableHttpsConnection={true	false} -p`
To enable or disable authentication	`# cimconfig -s enableAuthentication={false	true} –p`
To add a user for defining the credentials for CIM client to authenticate with the CIM server	`cimuser –a –u username -w password`
To remove a user	`# cimuser –r –u username –w password`

Function	Command
To enable or disable service location protocol (SLP)	`# cimconfig -s slp={true | false} -p` **NOTE:** If SLP is enabled, see the table below for additional settings information. **NOTE:** Commands are of the following format: `cimconfig -s <propertyName>={true|false} -p` where *<propertyName>* is a column heading in the following table.

Table 1. Additional Setting Information if SLP is Enabled

propertyName				Behavior
`runinternal PegasusSLP`	`runinternal PegasusSLP`	`registerExter nal PegasusSLP`	`register Multiple SLP`	
true	false	false	false	Internal Pegasus SLP is started when cimserver starts.
false	true	false	false	External Pegasus SLP registration runs in cimserver with a default registration timeout set to 3 hours (same as the SLP default timeout).
false	false	true	false	External OpenSLP registration is run in CIM server.
false	false	true	true	External OpenSLP registration is attempted and falls back to external Pegasus SLP registration if it fails (default setting).
false	true	false	true	External Pegasus SLP registration is attempted and falls back to external OpenSLP registration if it fails.

NOTE: All other combinations of the SLP property values have undefined behavior.

For more information, see the documentation available in the source release archive at **openpegasus.org**.

Uninstalling SMI-S Provider

Uninstalling SMI-S Provider For Windows-Based Operating Systems

1. Navigate to the **Control Panel**.
2. Click **Add or Remove Programs**.
3. Double-click **Dell SMI-S Provider** to uninstall it.

The uninstallation procedure may leave files (such as trace files, repository files, and other administrative files) that were created by SMI-S Provider after the installation was complete. Manually delete these files to completely remove SMI-S Provider.

Uninstalling SMI-S Provider For Linux-Based Operating Systems

1. In a terminal window, run the command: `rpm -e <package name>`
   The un-installation process may leave files that were not part of the original installation.
2. Manually delete the original installation files to completely remove SMI-S Provider.

Managing The SMI-S Provider

Starting And Stopping The OpenPegasus CIM Server For Windows-Based Operating Systems

To start or stop the **OpenPegasus CIM** server:

1. Open the **Services** window and locate the **cimserver service**.
2. Right-click **cimserver service** and select **start** or **stop**.
3. To start a service, run the following command in the command prompt: `net start cimserver`
4. To stop a service, run the following command in the command prompt: `net stop cimserver`

Starting And Stopping The OpenPegasus CIM Server For Linux-Based Operating Systems

1. To start the OpenPegasus CIM server, run the following command on a terminal window: `cimserver`
2. To stop the OpenPegasus CIM server, run the following command on a terminal window: `cimserver`

Adding Or Removing A Storage Array From The SMI-S Provider

During installation, you are prompted to enter the IP addresses into a file. After this initial setup, the SMI-enabled client must use the SMI-S Provider proxy server system management profile to add or remove devices.

✎ **NOTE:** When a storage array is added, the IP address of only one of the management ports of the storage array must be supplied (and not both management ports). Entering the IP addresses for both management ports of a single storage array causes unpredictable behavior of the SMI-S Provider.

Changing The Debug Tracing Option

✎ **NOTE:** After changing the tracing levels, stop and start **OpenPegasus CIM server** for the changes to take effect. Turn on tracing only under the direction of your technical support representative.

To change the debug tracing option:

1. Go to the directory where SMI-S Provider is installed.

   The default install directories are:

   – **<%Program Files%>/Dell/pegasus/provider/array** for Windows.
   – **/opt/dell/pegasus/array** for Linux.

2. Edit **providerTraceLog.properties** file in a text file editor, by following the steps below:

   a) Remove the pound sign (#) from the lines containing **File**, **Level**, and **Events**.
   b) Edit the file name in the field **File**.

      This file contains the trace messages.

3. Save **providerTraceLog.properties** file and exit the text file editor.

4. Stop and start the **OpenPegasus CIM server**.

   See Starting And Stopping The OpenPegasus CIM Server.

Troubleshooting The SMI-S Provider

The following table lists some of the common issues and their resolutions.

Table 2. Common Issues and Resolutions

Issue	Recommended Action

The following message is displayed if SMI-S Provider is installed on a system for the first time:
 	
`cimserver not started: Bind failed:`
`Failed to bind socket`
`on port 5989: Address already in use`
`(error code 125).`
	This issue occurs when there is a port conflict. To resolve the conflict, remove the application that is using the port or select a different port.
	
	To select a different port:
	
	1. Stop the CIM server.
	2. Set the new ports using the following commands:
	`cimconfig -s httpPort=<HTTP PORT> -p`
	`imconfig -s httpsPort=<HTTPS PORT> -p`
	3. Start the CIM server.

CIMOM default port in use is not reported in the Microsoft Windows operating system.	In Windows, if the default TCP ports 5988 and 5989 are already in use during the SMI-S Provider installation, no message is displayed to confirm that the ports are in use. To resolve the conflict: 1. Edit the **cimserver_current.conf** and **cimserver_planned.conf** files. 2. Specify the open ports. 3. Start the CIM server.
Service Location Protocol Service Agents (SLP SA) in multi-CIMOM environments.	Only one SLP SA per individual server can be active because SAs require the fixed port 477. **NOTE:** If the operation started on a non-standard port, dynamic SLP discovery of the CIM service is not possible.

Issue	Recommended Action
The CIM client methods fail due to authentication error: `Return Code -4`	During installation, you do not run into any issues with the storage array password because the SMI-S Provider does not yet have information about the storage arrays to manage. However, after you add the storage arrays, a `Return Code -4` message is displayed for any method that runs. A specific error message is not displayed other than the return value, but the SMI-S Provider trace log shows that the method failed because of an authentication failure. Update the `Property - Secret` with the current storage array password in the `<OEM>SharedSecret` instance by using Modify Instance CIM. You can perform this operation from the client used for communicating with SMI-S Provider (for example, CIM Navigator).
The following message is displayed when you use the CIM CLI application: `roundTripTime is incorrect in ClientOpPerformanceData`	You can ignore this message when using the CIM command line interface.