

Dell PowerVault
Modular Disk 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 potential damage to hardware or loss of data if instructions are not followed.



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

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Introduction

The Dell PowerVault Modular Disk (MD) 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 storage arrays in a multi-vendor storage area network (SAN) environment.

SMI-enabled management applications are known as 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 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 Modular Disk storage array family. 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 storage arrays at support.dell.com/manuals.

Version Information

Table 1-1 lists the version details of the components.

Table 1-1. Version Information

Component	Version
SMI-S	1.4
SMI-S Provider	10.15
OpenPegasus CIMOM	2.9.1

Supported Profiles and Sub-Profiles

SMI-S Provider version 10.15 supports the following profiles and sub-profiles:

- 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

- Block server performance



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

- Erasure
- Battery
- Storage asymmetry
- Message log

Installing and Uninstalling the SMI-S Provider

System Requirements

The system requirements to install and run the SMI-S Provider include:

- Memory—1 GB minimum (2 GB preferred).
- Connectivity—Ethernet with 100BASE-T minimum (Gigabit Ethernet preferred) and TCP/IP.
- Port—TCP port 5988 or TCP port 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 moderately to fully configured storage systems per provider, or around 5000 volumes total. 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.

To install the provider standalone binary, follow the instructions below depending on the operating system where the provider needs to be installed.

Windows-Based Operating Systems

The SMI-S Provider is packaged as an installation executable file. 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.

Linux-Based Operating Systems

The SMI-S Provider is packaged as an archive file. 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" on page 11.

Configuring CIM Server

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



NOTE: Restart the OpenPegasus server after executing any of the following commands.

- 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
```

- To enable or disable service location protocol (SLP):

```
# cimconfig -s slp={true | false} -p
```

If SLP is enabled, see Table 2-1 for additional settings information. Commands are of the following format

```
cimconfig -s <propertyName>={true|false} -p
```

where <propertyName> is a column heading in Table 2-1.

Table 2-1. Additional Setting Information if SLP is Enabled

propertyName				Behavior
runinternal PegasusSLP	registerExternal PegasusSLP	registerExternal OpenSLP	registerMultiple 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

Windows-Based Operating Systems

- 1 Click Start→ Control Panel→ Add or Remove Programs (or Programs and Features for Microsoft Windows Server 2008).
- 2 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. These files might include trace files, repository files, and other administrative files. Manually delete these files to completely remove SMI-S Provider.

Linux-Based Operating Systems

Run the command `rpm -e <package name>`

The un-installation process may leave files that were not part of the original installation. Manually delete these files to completely remove SMI-S Provider.

Managing the SMI-S Provider

Starting and Stopping the OpenPegasus CIM Server

Windows-Based Operating Systems

To start or stop the OpenPegasus CIM server:

- Open the Services window and locate the `cimserver` service. Right-click `cimserver` service and select **start** or **stop**.

Or

- In the command prompt type:
`net start cimserver` to start a service
`net stop cimserver` to stop a service

Linux-Based Operating Systems

To start or stop the OpenPegasus CIM server, on a terminal window type:

```
cimserver to start a service  
cimserver -s to stop a service
```


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:
 - For Windows: <%Program Files%>/Dell/pegasus/provider/array
 - For Linux: /opt/dell/pegasus/array
- 2 Edit **providerTraceLog.properties** file in a text file editor.
Remove the pound sign (#) from the lines containing **File**, **Level**, and **Events**. You can edit the file name in the field **File** and directory you want. This file contains the trace messages.
- 3 Save **providerTraceLog.properties** file and exit the text editor.
- 4 Stop and start the OpenPegasus CIM server. See "Starting and Stopping the OpenPegasus CIM Server" on page 15.

Troubleshooting the SMI-S Provider

Table 4-1 lists some of the common issues and their resolutions.

Table 4-1. Common Issues and Resolutions

Issue	Recommended Action
<p>The following message is displayed if SMI-S Provider is installed on a system that previously did not have the SMI-S Provider installed:</p> <pre>cimserver not started: Bind failed: Failed to bind socket on port 5989: Address already in use (error code 125).</pre>	<p>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.</p> <p>To select a different port:</p> <ol style="list-style-type: none"> 1 Stop the CIM server. 2 Set the new ports using the following commands: <pre>cimconfig -s httpPort=<HTTP PORT> -p cimconfig -s httpsPort=<HTTPS PORT> -p</pre> 3 Start the CIM server.
<p>CIMOM default port in use is not reported in the Microsoft Windows operating system.</p>	<p>In Windows, if the default ports 5988 and 5989 are already in use during the SMI-S Provider installation, no message is displayed to state that the ports are in use.</p> <p>To resolve the conflict:</p> <ol style="list-style-type: none"> 1 Edit the <code>cimserver_current.conf</code> and <code>cimserver_planned.conf</code> files. 2 Specify the open ports. 3 Start the CIM server.
<p>Service Location Protocol Service Agents (SLP SA) in multi-CIMOM environments.</p>	<p>Only one SLP SA per individual server can be active because SAs require the fixed port 477.</p> <p>NOTE: If the operation started on a non-standard port, dynamic SLP discovery of the CIM service is not possible.</p>

Table 4-1. Common Issues and Resolutions (continued)

Issue	Recommended Action
The CIM client methods fail due to authentication error or "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.