

Introduction to SMI-S for HP Systems Insight Manager

The Storage Management Initiative Specification (SMI-S) is a Storage Networking Industry Association (SNIA) standard that enables interoperable management for storage networks and storage devices. HP Systems Insight Manager (HP SIM) uses this standard to discover and manage the storage systems it supports.

About SMI-S

SMI-S replaces multiple disparate managed object models, protocols, and transports with a single object-oriented model for each type of component in a storage network. The specification was created by SNIA to standardize storage management solutions. SMI-S enables management applications (such as HP SIM) to support storage devices from multiple vendors quickly and reliably because they are no longer proprietary. SMI-S detects and manages storage elements by type, not by vendor.

Key components

The key SMI-S components are:

- Common Information Model (CIM)
- Web-based Enterprise Management (WBEM)
- Service Location Protocol (SLP)

CIM

CIM, the data model for WBEM, provides a common definition of management information for systems, networks, applications and services, and allows for vendor extensions. SMI-S is the interpretation of CIM for storage. It provides a consistent definition and structure of data, using object-oriented techniques. The standard language used to define elements of CIM is Managed Object Format (MOF). Unified Modeling Language (UML) is used to create a graphical representation (using boxes and lines) of objects and relationships.

WBEM

WBEM is a set of management and internet standard technologies developed to unify the management of enterprise computing environments. WBEM includes the following specifications:

- xmlCIM: defines XML elements, conforming to Document Type Definition (DTD), which can be used to represent CIM classes and instances
- CIM Operations over HTTP: defines a mapping of CIM operations onto HTTP; used as a transport mechanism

SLP

SLP enables computers and other devices to find services in a local area network without prior configuration. SLP has been designed to scale from small, unmanaged networks to large enterprise networks.

Profiles

SMI-S is organized around profiles, which describe objects relevant for a class of storage subsystem. SMI-S includes profiles for arrays, Fibre Channel host bus adapters (HBAs), Fibre Channel switches, and tape libraries. Other storage devices (for example, NAS heads) are expected to be added in the future. Profiles are registered with the CIM server and advertised to clients using SLP. HP SIM determines which profiles it intends to manage, and then uses the CIM model to discover the actual configurations and capabilities.

SMI-S implementation

SMI-S is implemented with the following components:

- CIM server (called a CIM Object Manager or CIMOM), which listens for WBEM requests (CIM operations over HTTP) from a CIM client, and responds.
- CIM provider, which actually communicates to a particular type of managed resource (for example, HP MSA arrays), and provides the CIMOM with information about them. In theory, providers for multiple types of devices (for example, HP MSA arrays and Brocade switches) can be plugged into the same CIMOM. However, in practice, all storage vendors provide the CIMOM and a single provider together, and they do not co-exist well with solutions from other vendors.

These components may be provided in several different ways:

- Embedded agent: The hardware device has an embedded SMI-S agent. No other installation of software is required to enable management of the device.
- SMI solution: The hardware or software ships with an agent that is installed on a host. The agent needs to connect to the device and obtain unique identifying information. This is the method used by all HP storage devices and most SAN devices.

Clients, servers, and providers

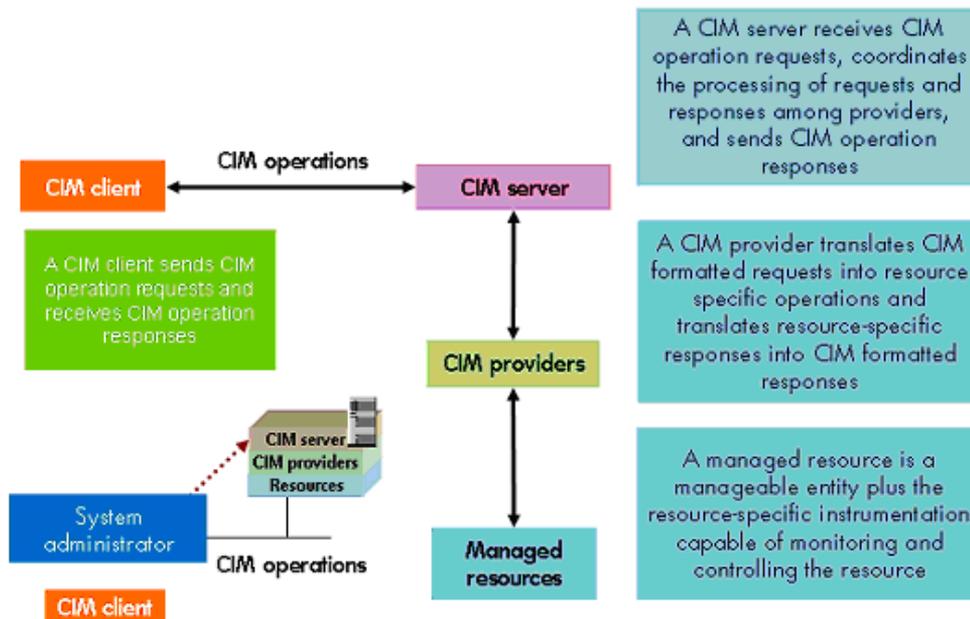


Figure 1 Clients, servers and providers

The system administrator uses the CIM client to communicate with the CIM server. The CIM server communicates with CIM providers, which manage resources.

WBEM communication

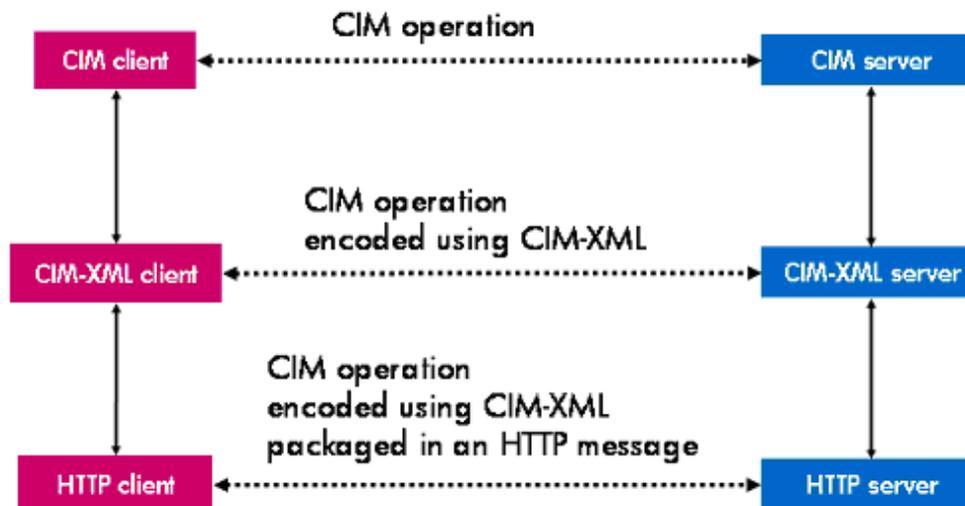


Figure 2 WBEM Services

Communication between a CIM client and a CIM server (CIM OM) occurs on three different levels as defined in the CIM/WBEM specification, and as shown in the figure above.

Installation and configuration overview

You must have a storage system's WBEM SMI-S provider installed and configured in order for HP SIM to discover it. This includes storage devices such as Fibre Channel disk arrays, switches, tape libraries, or hosts (with Fibre Channel host bus adapters).

Below are the high-level steps for installing and configuring a storage system's WBEM SMI-S provider. For device-specific instructions, go to the [HP Systems Insight Manager SMI-S Providers](#) website.

- 1. Obtain the SMI-S provider.** Each storage vendor is responsible for the delivery of the SMI-S provider for its storage system. Providers are typically delivered using one of the following mechanisms:
 - Website (HP or 3rd party vendor)
 - Integrated with device manager
- 2. Install the SMI-S Provider.** Depending on the device you are installing the provider for, this may require a unique installation of the provider or it may be integrated as part of a device manager installation.
- 3. Verify SSL.** HP SIM requires that Secure Socket Layer (SSL) is enabled for the SMI-S provider in order to discover and manage the storage network device that the provider supports. SSL is required by HP SIM for security reasons; it protects your passwords from exposure on the LAN.

Verify that SSL is enabled for each SMI-S provider. Most SMI-S solutions for HP storage devices enable SSL operation by default when they are installed. For other vendors, see the documentation supplied with the SMI-S solution to enable SSL. The default port for a CIMOM using SSL is 5989.

4. Configure SMI-S Providers. Occasionally, it may be necessary to modify an SMI-S provider's port number or password. For example, if two SMI-S providers are installed on the same host and they do not share the same CIMOM, then you must configure the providers to use different ports to communicate with the HP SIM central management server (CMS). For example, if the host does not have SLP running, you must modify the `wbemportslist.xml` file on the CMS.

5. Configure HP SIM to discover storage systems. After verifying that each storage system's SMI-S provider is installed and configured, configure HP SIM to discover the storage systems.

a. Enter the user name and password for each provider's SMI CIMOM in the **Default WBEM settings** section on the Setting Global Protocols page.

b. Add each SMI CIMOM IP address to the **System Automatic Discovery** task or create a new discovery task. Refer to the Editing a Discovery Task or Creating a New Discovery Task online help topic for instructions.

HP SIM discovers the storage systems after the next automatic discovery task. If you want to discover your storage systems immediately, run the discovery task as described in the Running a Discovery Task online help topic.

Additional Information

The following websites include additional information regarding this topic.

- HP Storage Management Initiative Specification
<http://h18006.www1.hp.com/storage/smis.html>
- CIM Tutorial
<http://www.wbemsolutions.com/tutorials/CIM>
- Storage Networking Industry Association
<http://www.snia.org>