

HP Business Service Management

for the Windows and Linux operating systems

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RTSM Best Practices

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1 Introduction

The goal of this document is to provide best practices for integrating the HP BSM Run-time Service Model (RTSM) with other products, or with other BSM deployments. It describes synchronizing the RTSM with an external Configuration Management Database (CMDB), or with another RTSM.

The document does not provide explanation regarding the basic concepts, or detailed information for each data synchronization or for other integration flows. It is recommended to use the *RTSM Data Flow Management* guide, available as part of the HP BSM Documentation Library, for more detailed information.

2 The Role of the RTSM

For an IT enterprise to be properly aligned with business objectives, it must be focused on ensuring the health and availability of specific IT services. To maintain service health effectively in today's dynamic environments, it is critical that enterprise management technologies be equally dynamic.

BSM delivers the ability to capture and leverage data collected from a variety of data sources, and apply it to the challenges of maintaining service health, event correlation, and event reduction in real time. The RTSM is a key component in this process.

The RTSM is an instance of HP's CMDB product, the HP Universal CMDB (UCMDB), embedded in BSM. This UCMDB instance performs the expected functions of a CMDB, reconciling and storing configuration items (CIs) that represent the IT environment components, to help organizations understand the relationships between these components, and track their configuration.

The RTSM is a UCMDB instance that is managed by BSM and is an integral part of the BSM Platform. The RTSM leverages the same core technology as the UCMDB, but also serves a different purpose, as the RTSM serves as an operational repository within BSM. The various functions performed by the RTSM mean that its role differs significantly from the traditional role fulfilled by a CMDB and its associated use cases. The RTSM reconciles and stores CIs discovered by the different BSM data sources; but in addition, the RTSM models operational data like downtime, alerts, SLAs, and data related to the configuration of Application Performance Management (APM) capabilities in BSM.

RTSM also serves a specific set of use cases supporting the requirements of consolidated event management, provided by BSM's Service and Operations Bridge capabilities.

The RTSM is used in the Service and Operations Bridge context to:

- a) Drive event processing on top of a dynamic, near-real-time model of the IT infrastructure.
- b) Correlate various monitoring sources against managed services to provide a comprehensive view of the health of the service.
- c) Serve as a central repository for dynamic changes discovered during the course of real-time operations to facilitate cases (a) and (b), above.

The RTSM is installed as part of BSM; BSM cannot use any other CMDB instance as its internal CI repository. However, the topologies held in the RTSM can be synchronized with other CMDB instances using the UCMDB multi-instance topology synchronization solution. For details, see "UCMDB-BSM Topology Synchronization."

2.1 RTSM Capabilities

RTSM capabilities include:

- **Service model:** The service model encompasses the entire physical and virtual service infrastructure, including transactions, applications, servers, storage, and networks, fully integrated to present a complete view of each IT service and business service for your entire monitored environment.
- **Automated creation:** The service model is automatically discovered and created using native BSM operational solutions, such as BPM, RUM, Diagnostics, TransactionVision, SiteScope, HPOM SPIs, NNMi, and so on.
- **Up-to-date maintenance:** The service model is kept up-to-date in near real-time using BSM operational solutions.

2.2 Enriching RTSM Data

The various monitoring products included in BSM implement discovery services, but this is limited in range and scope by the function that they serve. The combined monitoring information can be used to assemble a topological representation of the managed resources within the RTSM, but this may not give a complete picture of the IT environment.

RTSM supports integration with other CMDBs as part of a configuration management system (CMS) to synchronize CI topology data. The CMS helps create a coherent, logical model of the IT organization's infrastructure. The RTSM and the HP Universal CMDB complement each other and should be considered, along with Discovery technologies, to be elements of a CMS.

Within the CMS, a UCMDb instance acts as the central CMDB (this is the CMDB that generates the global IDs – for more information, see “Global ID”). Other UCMDb instances (including the RTSM) are referred to as citizen CMDBs. CMDB implementations often involve federation (the inclusion of data from other sources into the CMDB).

The use of an RTSM that is separate from the rest of the CMS allows for independent management of downtime, and the upgrade of BSM deployments, without affecting the UCMDb and the rest of the HP products that are integrated into the CMS. The RTSM class model is an extension of the UCMDb class model, and allows for the management of the BSM private class model extensions that are required for BSM operational use cases.

Other use cases, which revolve around traditional CMDB services such as configuration and change management, may require Discovery and Dependency Mapping (DDMA) services. When an end-to-end solution is deployed, DDMA services are typically used to populate a central UCMDb, and the RTSM can leverage richer data from the UCMDb where applicable.

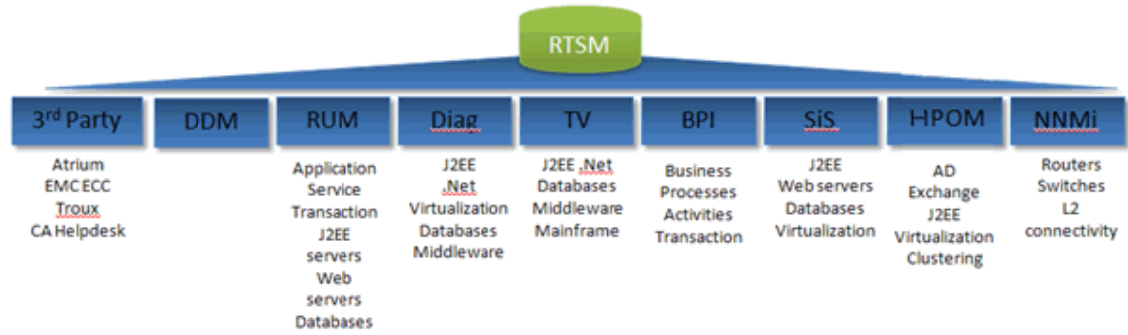
The RTSM is a highly optimized service model, created for the high performance needs of the BSM use cases, and as such, includes the CIs that are required for complete and accurate monitoring. All other CI data should be stored in the central UCMDb instance. The RTSM can also service as an input source of environmental changes to the parent CMS system.

3 RTSM Population Methods

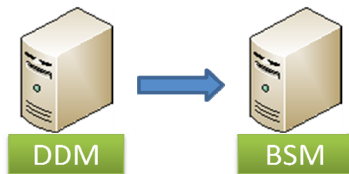
Note: RTSM is designed to support BSM operational use cases only. It is recommended that only the topology that is relevant to these operational use cases is populated to the RTSM.

There are several ways for providing the data in an RTSM:

- BSM data sources report topology changes in near real time, keeping the RTSM up-to-date. See “Appendix: Classes Reported by BSM Data Sources” for a complete list of classes reported by BSM data sources.



- Discovery and Dependency Mapping (DDMA) can be connected directly to an RTSM to report the topology that is relevant for operational use cases only. For example, running DDMA basic Discovery of infrastructure and middleware can help when deciding where to install the monitoring sources, and which types of monitors to configure. For more details see “Discovery for Provisioning of Monitors”.



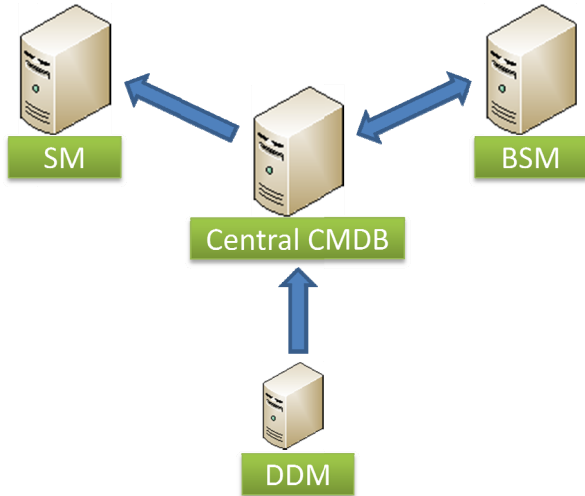
- For other use cases, including change and configuration management, it is recommended to integrate topology via a dedicated UCMDb instance as part of a CMS, instead of integrating directly on top of an RTSM. For more details, see “RTSM Integration Strategy”.
- RTSM supports Population, Data Push, and Federation integration types. Any of these three integration types can be used to provide relevant topological data in an RTSM. The data source can be either another CMDb instance (dedicated UCMDb or another RTSM), or external data sources (for example, BMC Atrium). For more details, see “Population, Data Push, and Federation.”

All topology populated to the RTSM goes through the reconciliation engine, providing one consistent service model, regardless of the topology integration method.

4 RTSM Integration Strategy

For topology-based integrations between BSM and other HP centers (for example, HP Service Manager), it is recommended to install a central UCMDb instance as part of a CMS, rather than integrate the other HP center directly with the RTSM. It is also recommended to connect DDMA to the central UCMDb instance, and then synchronize the topology relevant for BSM operational use cases with BSM, as necessary.

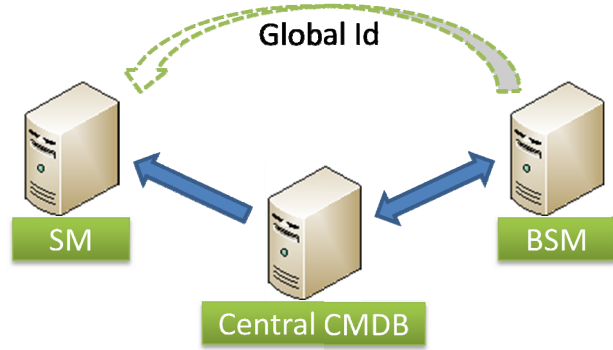
BSM provides a set of data synchronization TQLs for pulling the topology from the central UCMDb to BSM; these TQLs generally cover all out-of-the-box operational use cases.



Direct integration with configuration management products (such as HP Release Control) is not supported by the RTSM and requires the installation of a CMS or dedicated UCMDb instance.

4.1 Global ID

The global ID is a unique CI ID, generated by the central UCMDb, which identifies that CI across the entire portfolio, making it easier to work in multiple UCMDb environments. Once a global ID is available, it can be used as a shared context for point-to-point integrations between HP centers (for example, a new incident is opened in HP Service Manager when an event is received for a CI).



The UCMDb is configured by default to act as the global ID generator. In certain cases, you may need to change this so that the RTSM acts as the global ID generator; a use case for this may be a BSM hierarchical deployment with no CMS, where the top instance of the RTSM is required as the global ID generator. For details on configuring the RTSM to act as the global ID generator, refer to the *RTSM Data Flow Management* guide.

4.2 Population, Data Push, and Federation

There are three types of supported integrations: Population, Data Push, and Federation. These are core integration capabilities in RTSM and UCMDb.

- **Population.** Performs a scheduled retrieval of data from the external repository and creates a persistent copy of the data in the local CMDB.
- **Federation.** Performs an on-demand retrieval of data from the external repository and creates a transient image of the data in the local CMDB.
- **Data Push.** Copies data from the local CMDB to an external repository, where the latter typically records a persistent copy of the data.

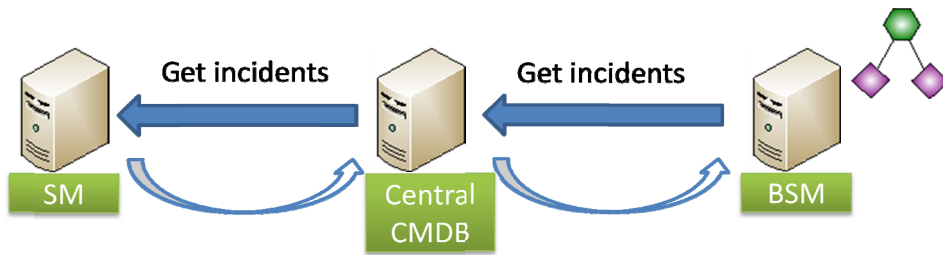
Either Population or Federation integration type should generally be used for topology integrations between a central UCMDb and the RTSM, or between RTSM instances. Specifically, it is recommended to use the Population integration to synchronize the topology from the central UCMDb to the RTSM, or from one RTSM to another (see “BSM Hierarchical Deployment”, below).

Population integration is preferred for topology synchronization rather than Data Push, because Population integration allows each center to control the scope of the topology that is retrieved. The BSM administrator is responsible for defining the scope of the topology that is pulled from the central UCMDb or from other BSM instances. The central UCMDb administrator is responsible for defining which information should be retrieved from the citizen CMDB instances (i.e., the RTSM) to the central UCMDb.

A Federation integration type is used when BSM needs to retrieve information from other HP centers that are integrated with the central UCMDb, without replicating the data; for example, incidents from HP Service Manager, or planned changes from HP Release Control. For these use cases, there is no reason to replicate the data as BSM does not control the data lifecycle.

Both the Federation and Population integration types can be configured using the same integration point. BSM provides an out-of-the-box integration point that includes all required configuration for out-of-the-box BSM flows. It is recommended to start with this integration point, and modify the configuration based on specific customer requirements. For more details, see “Set Up Integrations between CMS and BSM” in the *RTSM Data Flow Management* guide.

A Federation configuration of the BSM integration point defines that incidents/planned changes/KPIs are federated from the external UCMDb (the central UCMDb). This means that when BSM applications or users query for those configuration types, the query is forwarded to the external UCMDb.

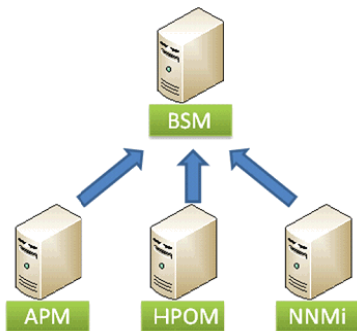


All out-of-the-box integration adapters provided by the UCMDB are also available as part of RTSM. For other third-party integrations, administrators can develop their own integration adapter using the Population, Federation, or Data Push integrations. The information regarding available third-party integrations can be found in the BSM documentation and HP Live Community.

5 BSM Hierarchical Deployment

BSM supports a hierarchical deployment of BSM instances that enables the forwarding of events and topology from one BSM instance to another. The main motivations for building a hierarchical deployment are:

- **Scale.** When a hierarchy of BSM deployments is defined to deal with a very large number of events. The upper instances of the deployment get only the “important” summary events.
- **Geographical distribution.** When there are several data centers in different geographical locations, each managing their own BSM instance. In this use case, the data from different geographical locations can be consolidated in one central instance, the Manager of Managers (MoM).
- **Organizational structure.** When the structure of the organization includes multiple business units or departments, each with its own BSM instance. The consolidated picture is achieved either by two-way synchronization between BSM instances, or by defining one central MoM instance.
- **Functional structure.** When the IT Department chooses to manage applications and infrastructure separately, by creating separate BSM instances for application owners and for infrastructure owners. In this deployment scenario, there can be several BSM instances, each one operated by domain experts, for example, APM (performed by BSM), NNMi, HPOM.



- **Different consumers.** When multi-tenancy is implemented by multiple instances of BSM.
- **Organizational mergers and acquisitions.** When there are several BSM instances as a result of mergers and acquisitions. Consolidation can be achieved by synchronizing the data to one central instance.

The topology between two BSM instances is synchronized using the UCMDB multi-instance technology. Guidelines and recommendations are described in “UCMDB-BSM Topology Synchronization6.”

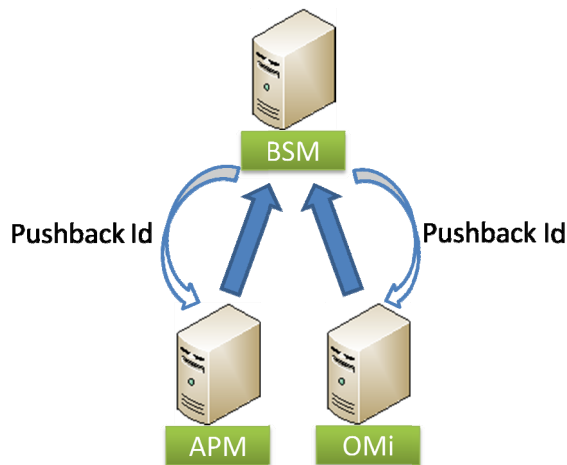
For details on how to set up the NNMi-BSM integration, refer to the “NNMi-BSM Topology Integration - Best Practices” PDF, in the BSM Documentation Library.

5.1 Global ID in Hierarchical Deployments

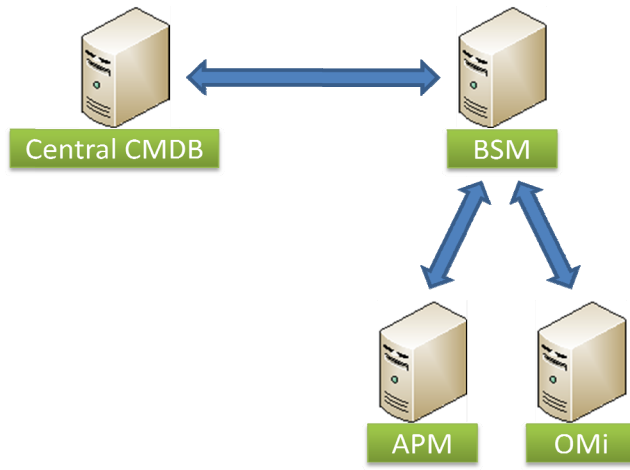
One of the main motivations for synchronizing the topology in hierarchical deployments is to provide a topological context for the forwarded events. To resolve the incoming event, and find the associated CI, the information available in the event is used. Part of this information is the global CI ID that provides the shared topological context between two BSM instances.

The global CI ID can be obtained in one of the following ways: **pushback of IDs** or **two-way topology synchronization**.

- **Deployment with no central UCMDB.** When the deployment does not include a central UCMDB, it is recommended to configure the top BSM instance as a global CI ID generator and use pushback of IDs towards each of the child BSM instances. This approach is simpler than configuring a two-way synchronization because:
 - It requires the installation of only one Data Flow Probe (as opposed to two Data Probes for two-way synchronization).
 - It is easier to control the scope of the synchronization since the top instance pushes back the IDs only for the pulled CIs.



- **Deployment includes central UCMDB.** When the deployment includes a central UCMDB, it is recommended to configure a two-way synchronization between the central UCMDB and the top BSM instance, and between the top BSM instance and its child BSMs.



- **Central UCMDB added to existing deployment.** When the initial deployment does not include a central UCMDB, and then one is added, the central UCMDB must generate new global IDs for all the CIs. The new global IDs are broadcast from the central UCMDB to the top BSM instance, and then from the top BSM instance to its child BSMs. This entails a full synchronization between the central UCMDB and the top BSM instance, and again between the top BSM instance and its child BSMs.

Note: The central UCMDB is by default the global CI ID generator. The UCMDB cannot generate global IDs for BSM private classes (such as the End User Group class) when they do not exist in the central UCMDB. This is relevant for the use case above, when the central UCMDB is now acting as the global ID generator in place of the top BSM instance.

5.2 Topology Discovery in a Manager of Managers Hierarchy

A Manager of Managers hierarchy consists of a top BSM instance (MoM), and its child BSMs. The following steps describe the sequence in which topology is discovered by the top BSM instance, and is then reported outwards to the child BSM instances:

1. The global BSM Probe (MoM) pulls the topology from the local (child) BSMs.
2. The central CMDB (CMS) pulls the topology from the global BSM, and generates global IDs.
3. The global BSM pulls the topology from the central CMDB.
4. The local BSMs pull topology from the global BSM.
5. Events can now be forwarded, and correct CIs are assigned.

Note: Each integration path (pulling topology from BSM to CMS) is configured independently of the other paths with ongoing data synchronization; there is no need to configure any special task scheduling for the described sequence to occur. This sequence simply illustrates how data is transferred from one CMDB to another, and which information is added at each step.

6 UCMDB-BSM Topology Synchronization

The topology stored in the RTSM can be synchronized with the central UCMDB (or another UCMDB instance) using the UCMDB multi-instance synchronization technology.

Topology synchronization is supported between the following versions:

<i>BSM version</i>	<i>UCMDB version</i>
BSM 9.0	UCMDB 9.0x
BSM 9.01	UCMDB 9.0x
BSM 9.12 or 9.10	UCMDB 9.0x

6.1 When to Use UCMDB-BSM Synchronization?

The following sections describe use cases for topology synchronization.

Synchronizing the Topology from UCMDB to BSM

One of the main use cases for synchronizing topology from the UCMDB to BSM is to obtain global CI IDs that can be used later for integrations between BSM and other HP centers.

The following are additional use cases where UCMDB to BSM synchronization may be required:

- BSM flows that are integrated with topology reported by DDMA:
 - a) **Vertical Solutions:** Application Management for SAP, Application Management for Siebel, Application Management for SOA.
 - b) **Monitoring Deployment Wizard (MDW) in SiteScope:** The MDW uses the topology discovered by DDMA when configuring SiteScope monitors. The MDW retrieves relevant information from CIs reported by DDMA, and use it to help configure the monitors and assign the monitors to the relevant CIs.
 - c) **Consume DDMA credentials:** Once DDMA connects to a discovered source using credentials, the reference to the credentials is stored on the reported CIs. The credentials are then used in several BSM flows: MDW, integration with Operations Orchestration, monitor assignment for vertical solutions.
- Enrich the topology in BSM:

Some BSM data collectors report “shallow” topology. Synchronizing topology discovered by DDMA, or other UCMDB topology reporting sources, enriches the CIs reported by BSM. For example, BSM data collectors can report the hosts using IP. Once those same hosts are discovered by DDMA, additional information is available, such as DNS name, OS, OS version, and so forth. This can help BSM users manage their CIs in the RTSM.
- There are different practices for the modeling of logical CIs (such as Business Services, Business Applications, and so forth). Any CI that is populated to the UCMDB can be synchronized with RTSM, thus reducing the overhead of manually redefining logical CIs.

Synchronizing the Topology from BSM to UCMDB

The following are use cases where BSM to UCMDB synchronization may be required:

- BSM data sources (such as RUM, Diagnostics, TransactionVision) have the ability to discover the relationships between Business Applications and Transactions, and their underlying infrastructure. These relationships can be synchronized to complete the Business Service definition in the UCMDB, avoiding the need for manual modeling.
- BSM data sources can serve as additional sources populating the UCMDB. The topology is then utilized when building a CLIP (Closed Loop Incident Process) solution, or as a complimentary topology source for DDMA: BSM discovers a more “shallow” topology that is used as a trigger for DDMA deep discovery.
- RTSM contains up-to-date topology that is updated at runtime and can provide a more current picture than other UCMDB data sources (such as DDMA).

6.2 Data Flow Probe Installation and Deployment

Topology synchronization requires installation of the HP Data Flow Probe. A single Data Flow Probe can be used to pull the topology from multiple UCMDB sources. For example, when using a hierarchical BSM deployment, the same Data Flow Probe can be used to pull the topology from several child BSM instances.

The Data Flow Probe can report topology to only one destination. This means that, when configuring a two-way topology synchronization, two separate Data Flow Probes must be used.

Although technically, the same Data Flow Probe can be used for running both data synchronization and Discovery jobs, we recommend having a dedicated Data Flow Probe for data synchronization flow. The Data Flow Probe that is used for data synchronization can be installed on one of the BSM server machines. If a customer has a two-server BSM deployment (Gateway and Data Processing), it is recommended that the Data Flow Probe is installed on the Gateway machine. If there are several Gateway machines, the probe should be installed on one of them.

The Data Flow Probe can be downloaded from the BSM Downloads page (Select **Admin > Platform > Setup and Maintenance > Downloads**), and does not require an additional license.

6.3 Handling Class Model Differences

The topology synchronization mechanism assumes that the class model used for defining the synchronization scope is identical at both the source and the destination. It is permissible to have additional attributes/classes/relationships on either the source or destination RTSM/UCMDB, as long as the additions are not part of the data synchronization scope defined by the data synchronization TQLs.

- If you pull the topology from UCMDB to BSM 9.12 or 9.10, all class model differences are ignored.
- If you pull the topology from BSM to UCMDB 9.02 or later, all class model differences are ignored.
- For all other versions, class extensions should be specifically excluded from the data synchronization TQL. This means that if you have extended class A on source UCMDB by creating class B that inherits from A, you can no longer synchronize class A without specifically excluding class B from the data synchronization TQL.

Note that data synchronization TQLs should be configured and deployed on the UCMDB source instance.

6.4 Deletion Policy

Deletion policy is part of the data synchronization configuration. It defines what to do when a CI that has been part of the data synchronization scope is deleted. Because BSM has a tight integration with its service model, the deletion of some of the CIs can badly affect existing configurations of SLAs, alerts, downtime, and more.

The default deletion policy provided in the RTSM synchronizes the deletion of infrastructure CIs and containment relationships only. The default behavior can be modified by editing the configuration provided as part of the CmdbAdapter that is deployed in the RTSM.

7 Discovery for Provisioning of Monitors

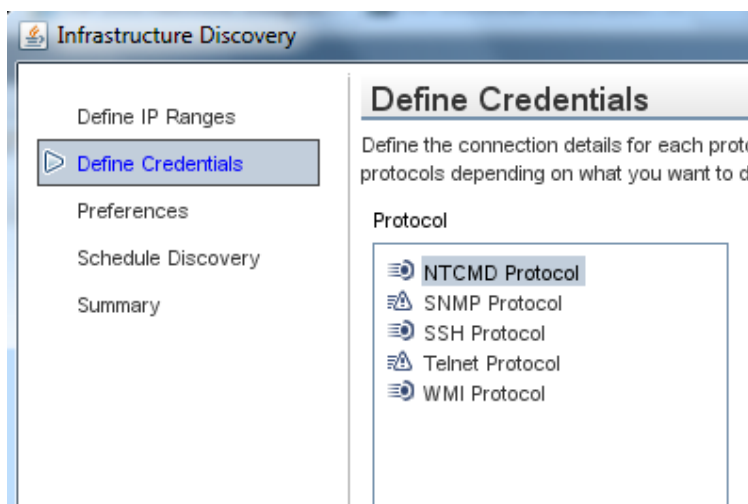
One of the first steps when using BSM is configuration of different BSM and third-party monitoring sources. Basic dependency mapping by DDMA, or information from other topology reporting sources, can be leveraged to help determine where to install the monitoring sources and which types of monitors to configure.

The following procedure describes how to activate Discovery via Data Flow Management, in order to map basic infrastructure and middleware, and use the information for provisioning of BSM agents or probes, and for monitor configuration.

1. In **RTSM Administration > Data Flow Management > Discovery Control Panel**, run Infrastructure Discovery using Basic Mode.

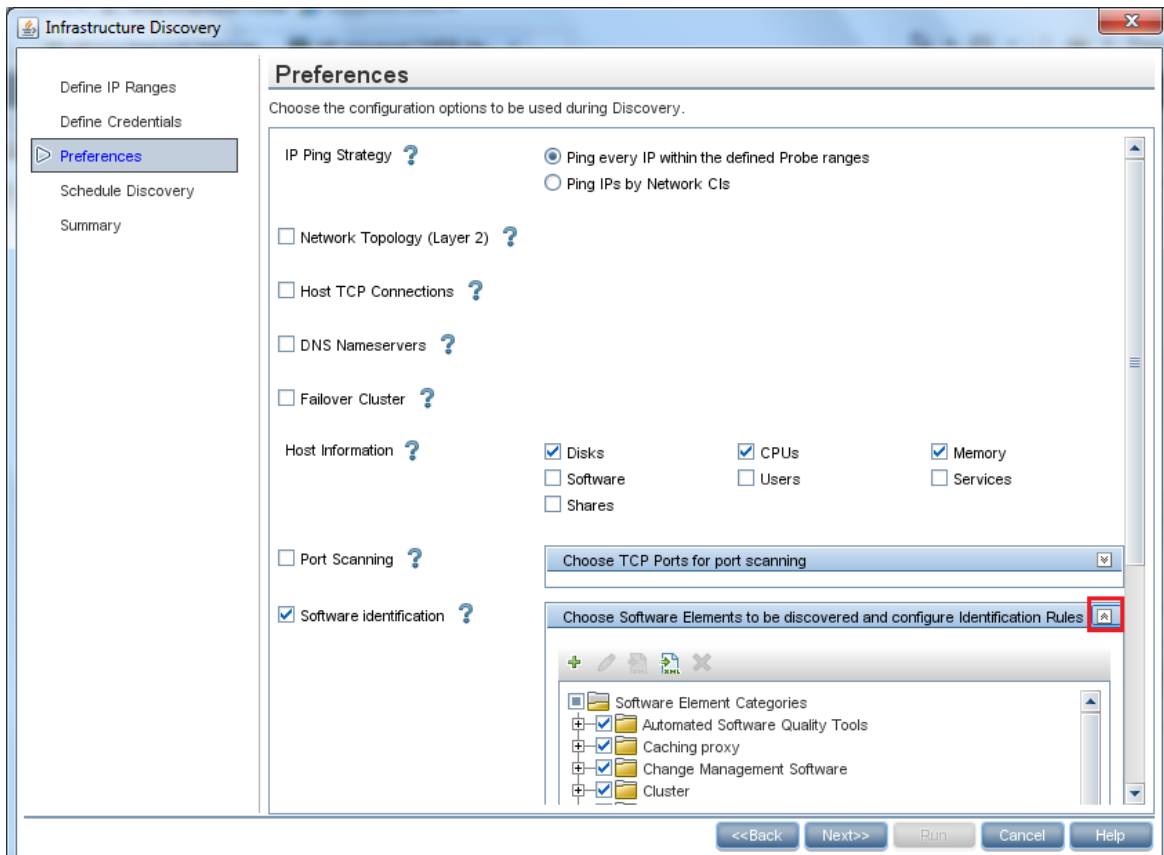


2. Click **Configure**.
3. Fill in IP ranges and credentials:
 - a. NTCMD, WMI, and SNMP for discovery of Windows environments
 - b. SSH, Telnet, and SNMP for discovery of Unix/Linux environments



4. Click **Next**.

- In the Preferences page, clear the check boxes for **Users** and **Shares**, and select the **Software identification** check box.
Expand the **Choose Software Element to be discovered and configure Identification Rules** area, in order to edit the list of software elements to be discovered.



- Click **Next** and define the schedule for running the discovery.

Note: If you are performing discovery from a number of data sources, they do not need to run in any specific order; there is no mandatory sequence for running integrations. RTSM performs ongoing, automatic reconciliation, so that when a CI is discovered by multiple integrations or data collectors, the information is resolved based on the identification rules defined in the class model.

Appendix: Classes Reported by BSM Data Sources

The following table lists all the classes reported by BSM data sources.

Superclass is the parent class of the classes defined in the Class Name column, according to the UCMDDB classes' hierarchy. Note that some BSM sources may report the child class but not the parent class. For example, Oracle inherits from Database class, and SiteScope reports a specific Oracle class and not the generic Database class.

Class Name	Description	Superclass	SiS	HPOM	RUM	Diag	TV	NNMi
.NetAppDomain	.NET AppDomain	Application Resource				✓		
Active Directory Domain	A domain is a partition in an Active Directory forest, and enables organizations to replicate data only to where it is needed. Since Active directory domains are organized in hierarchical structure Active Directory Domain CIT can have one of the two types of container: Active Directory Forest or Active Directory Domain	Active Directory		✓				
Active Directory Forest	Active Directory Forest is a logical group of Active Directory Domains.	Active Directory		✓				
Active Directory Site	A Site object in Active Directory represents a physical geographic location that hosts networks. Sites contain objects called Subnets.	Active Directory		✓				
Active Directory System	Active Directory System collection of Forests, Domains and Domain Controllers.	Active Directory		✓				
ActiveDirectoryApplicationMode	Identifies the Active Directory Application Mode software	DirectoryServer		✓				
Agent	virtual class to all agents	RunningSoftware	✓					
Archiving Server	Archiving Server enables you to archive IM communications and meeting content for compliance reasons.	Lync Server Role	✓					

Class Name	Description	Superclass	SiS	HPOM	RUM	Diag	TV	NNMi
AV Conferencing Server	A/V Conferencing Server provides A/V conferencing functionality to your deployment. It can be collocated with Front End Server, or deployed separately as a single server or A/V Conferencing Server pool.	Lync Server Role	✓					
BridgeHeadServer	Bridgehead Servers are the contact point for the exchange of directory information between sites.	DomainController Role		✓				
BusinessApplication	A collection of software components that can be managed as an independent unit that supports a particular business function. An application is a logical composition of the functionality required to manipulate the data and provide the functional requirements of underlying business processes. An application has a set of supporting infrastructure entities. Example: Call center application, trade application etc.	BusinessElement	✓		✓	✓	✓	
BusinessService	Represents business or IT service. A business service is a service that a business provides to another business (B2B) or that one organization provides to another within a business (such as payment processing). An IT service is a business service that the IT organization provides to support business services or IT's own operations.	Service	✓					
BusinessTransaction	An end-to-end service provided to end-users or to other related applications (such as stock trade, account login, product purchase or billing inquiry), in the IT realm will be provided by an application. Each business transaction has a unique profile that contains a business context (for example, activity type, user, time and location, etc.) and a technical profile.	BusinessElement			✓	✓	✓	
BusinessTransactionFlow	BusinessTransactionFlow	CiCollection		✓		✓		✓

Class Name	Description	Superclass	SiS	HPOM	RUM	Diag	TV	NNMi
Central Management Server	The Central Management Store is a centralized configuration database that is used to save configuration data for the entire Lync Server deployment.	Lync Server Role	✓					
ClusterResourceGroup	Represents a cluster resource group (Cluster Package" in MC/ServiceGuard terminology) on a failover cluster. The CRG provides a runtime environment that is similar to a virtual node (network connectivity	Node		✓				
ClusterSoftware	The software that provides failover cluster capabilities on a certain node (for example, the runtime software of MC/ServiceGuard on an HP-UX cluster node)	RunningSoftware		✓				
Computer	This class represents a general purpose machine which has an IP address, such as Windows, Unix, Mainframe	Node	✓	✓				
ConfigurationDocument	A document that contains a block of arbitrary information, or resource for storing information, which is available to a computer program and is usually based on some kind of durable storage	Application Resource	✓					
Cpu	A central processing unit (CPU) is an electronic circuit that can execute computer programs.	NodeElement		✓				
Database	A system that manages a collection of records arranged in a predefined structure and format allowing an efficient retrieval and search of data usually by key data items.	RunningSoftware				✓		
Datacenter	Represents a Data center entity	BusinessElement		✓				
DB2	A database from IBM that serve a number of different operating system platforms.	Database	✓					
Diagnostics Probe	A Diagnostics probe deployed on a host	Monitor				✓		
Diagnostics Probe Group	A logical group of Diagnostics Probes	CiCollection				✓		

Class Name	Description	Superclass	SiS	HPOM	RUM	Diag	TV	NNMi
Director Server	Directors can authenticate Lync Server user requests, but do not home user accounts, or provide presence or conferencing services. Directors are most useful in deployments that enable external user access, where the Director can authenticate requests before sending them on to internal servers.	Lync Server Role	✓					
DirectoryServer	A directory service is the software system that stores, organizes and provides access to information in a directory. A directory service is a shared information infrastructure for locating, managing, administering, and organizing common items and network resources, which can include volumes, folders, files, printers, users, groups, devices, telephone numbers and other objects.	RunningSoftware		✓				
DiskDevice	A DiskDevice is a peripheral device used to record and retrieve information. Main implementations are hard disks, floppy disks and optical discs. They are identified by device name on a given node, such as /dev/sd0 in UNIX	NodeElement		✓				
DomainController	A domain controller is a directory server that physically store the Active Directory information. All domain controllers that belong to the same domain replicate information to each other. A domain controller which is defined as a global catalog server replicate and stores objects from all the domains that belong to the forest.	DirectoryServer		✓				
DomainController Resource	DomainController Resource	Application Resource		✓				
DomainControllerRole	DomainController Role	DomainController Resource		✓				
DomainNamingMaster	The domain naming master domain controller controls the addition or removal of domains in the forest.	DomainController Role		✓				

Class Name	Description	Superclass	SiS	HPOM	RUM	Diag	TV	NNMi
Edge Server	Edge Server enables your users to communicate and collaborate with users outside the organization's firewalls.	Lync Server Role	✓					
EMS Group	EMS group	Group	✓					
EMS Measurement	EMS event	System Monitor	✓					
EMS Monitor	EMS Monitor	System Monitor	✓					
End User Group	Logic group which separates content from the monitors	BusinessElement			✓			
End User Subgroup	End User Subgroup	End User Group			✓			
Exchange Client Access Server	The Client Access server is the server that users connect to with their mail client, mobile device, or web browser. The Client Access server handles all connections whether they come from an application such as Outlook, Outlook Express, or any other MAPI, POP3 or IMAP4 client. The Client Access server also handles connections made from mobile devices such as a Windows Mobile 5 Smartphone, or any other device using Exchange ActiveSync. This role also provides Outlook Web Access (OWA).	Exchange role		✓				
Exchange Database Availability Group	A database availability group (DAG) is a set of up to 16 Microsoft Exchange Server 2010 Mailbox servers that provide automatic database-level recovery from a database, server, or network failure. Mailbox servers in a DAG monitor each other for failures. When a Mailbox server is added to a DAG, it works with the other servers in the DAG to provide automatic, database-level recovery from database, server, and network failures.	Exchange	✓					

Class Name	Description	Superclass	SiS	HPOM	RUM	Diag	TV	NNMi
Exchange Edge Server	The Edge Transport role is installed on the edge of the network and therefore is installed on a standalone server that is not a member of the Active Directory domain. Active Directory Application Mode (ADAM) is used to sync AD with the Edge Transport server. ADAM and a component called EdgeSync are used to perform scheduled one-way synchronization of the configuration and recipient information from Active Directory. This allows the Edge Transport to perform recipient lookups and Spam filtering.	Exchange Transport Server		✓				
Exchange Hub Server	The Hub Transport role is responsible for all internal mail flow. This role is similar to the bridgehead server in an Exchange 2000/2003 organization. The Hub Transport server is installed on member server(s) in an Active Directory domain. Because it is a member of an AD domain, all its configuration information is stored in AD and any other Hub Transport servers will get their configuration from AD.	Exchange Transport Server		✓				
Exchange Mail Server	Mailbox role holds the Exchange databases within which the user mailboxes are contained. It is also home to the Public Folder databases if you enabled Public Folders.	Exchange role		✓				
Exchange Mailbox Database	Exchange storage group - a logical container for Exchange databases and their associated system and transaction log files.	Microsoft Exchange Resource		✓				
Exchange Organization	This class represents Exchange Organization.	Exchange		✓				

Class Name	Description	Superclass	SiS	HPOM	RUM	Diag	TV	NNMi
Exchange role	Role of exchange server in global scope. One exchange server can have several roles. Server roles allow an administrator to split the functions of an Exchange server and place each role, or a combination of roles, on different servers in the organization. This type is a common super-type for specific roles, which are: - Edge Transport - Hub Transport - Client Access - Mailbox - Unified Messaging	Microsoft Exchange Resource		✓				
Exchange Storage Group	Exchange storage group - a logical container for Exchange databases and their associated system and transaction log files.	Microsoft Exchange Resource		✓				
Exchange Transport Server	This CIT is a common super-type for two transport roles: Edge role and Hub role.	Exchange role		✓				
Exchange Unified Messaging Server	This server role enables Unified Messaging for an Exchange 2007 organization. Unified Messaging lets users access their Exchange 2007 mailbox over any telephone for e-mail, voice mail, fax messages, and calendaring and contact information. The Unified Messaging role is responsible for merging VOIP infrastructure with Exchange organization. It provides the capability to: - combined voice, fax, and mail in one inbox - access to voice, fax and mail via multiple interfaces	Exchange role		✓				
FailoverCluster	A FailoverCluster is a Cluster that is implemented primarily for the purpose of providing high availability of services which the cluster provides. They operate by having redundant computers or nodes which are then used to provide service when system components fail.	Cluster		✓				

Class Name	Description	Superclass	SiS	HPOM	RUM	Diag	TV	NNMi
FileSystem	A file system mounted on a Node. A file system provides the means for storing and organizing computer files and the data they contain to make it easy to find and access them. This class corresponds to the general notion of file system used by Unix, Windows, Linux, etc.	NodeElement		✓				
Front End Server	The Front End Server is the core server role, and runs many basic Lync Server functions. The Front End Server, along with the Back End Servers that provide the database, is the only server role required to be in any Lync Server Enterprise Edition deployment.	Lync Server Role	✓					
GlobalCatalogServer	The global catalog is a distributed data repository that contains a searchable, partial representation of every object in every domain in a multidomain Active Directory forest.	DomainController Role		✓				
HP Diagnostics Agent	A Diagnostics probe deployed on a host	Agent				✓		
HP Operations Agent	Key Attributes: 1. Name (data_name) - Core ID of the Operations Agent 2. Container (root_container) - The container Host Expected attributes: 1. Application IP - The primary IP that is used to communicate with the Agent 2. Application Listening Port Number - The port number that is used to communicate with the Agent (default: 383)	Agent		✓				
Hypervisor	Base class for different kinds of hypervisors (software that allows to host virtual machines)Represents the virtualization service provided by the Hypervisor, its properties and health. The Hypervisor is the link object between the virtual machine (a Node) and the physical host (a Node).	RunningSoftware		✓				

Class Name	Description	Superclass	SiS	HPOM	RUM	Diag	TV	NNMi
IBM MQ Alias Queue	An IBM Alias Queue is simply an alias of another queue. It may be an alias of a local, remote, transmission or another alias queue. The alias queue and the queue for which it is an alias are within the same queue manager. Messages/commands issued on the alias queue are forwarded to the queue for which it is an alias	IBM MQ Queue					✓	
IBM MQ Cluster	An MQ Cluster provides a flexible approach to join multiple queue managers with minimal configuration. This allows multiple instances of the same service to be hosted through multiple queue managers which allows for higher performance, capacity and resiliency	FailoverCluster					✓	
IBM MQ Local Queue	A Local Queue is a basic message queue and container of messages. An application can place a message in it for delivery or request/retrieve a message from it	IBM MQ Queue					✓	
IBM MQ Queue	The IBM MQ Queue is a container of messages in the MQ Infrastructure and controls how messages are routed between queue managers. Queues may be setup in several configurations to control message ordering and delivery (F/LIFO, message priority, sequential delivery, guaranteed delivery, etc.) and are optimized to carry small amounts of information	MQ Queue					✓	

Class Name	Description	Superclass	SiS	HPOM	RUM	Diag	TV	NNMi
IBM MQ Queue Manager	A WebSphere MQ instance may have one or more queue managers. The queue manager is responsible for functions not directly related to data movement such as storage, timing, triggering, etc. Queue Managers use a proprietary IBM technology known as a bindings" connection to communicate with MQ objects it manages and with remote clients via a network Key Attributes: 1. Name (data_name) - The name of the MQ Queue Manager 2. Container (root_container) - The container IBM WebSphere MQ Software Element"	Message Queue Resource					✓	
IBM MQ Remote Queue	A Remote Queue is a remote or proxy instance of another queue. It may be a remote instance for a local, remote, transmission or another alias queue. The remote queue and the queue for which it is a remote may be on different queue managers	IBM MQ Queue					✓	
IBMWebSphereMQ	Represents IBM WebSphere MQSeries Software	MessagingServer				✓	✓	
IIS Application Pool	IIS Application Pool	IIS Resource				✓		
IIS Virtual Dir	IIS Virtual Dir	IIS Web Dir				✓		
IIS Web Dir	IIS Web Dir	IIS Resource				✓		
IIS Web Server	This class represents an instance of IIS web-server (Microsoft Internet Information Server).	WebServer	✓			✓		
IIS Web Service	IIS Web Service	IIS Service				✓		
IIS Web Site	IIS Web Site	IIS Resource				✓		
InfrastructureMaster	The infrastructure is responsible for updating references from objects in its domain to objects in other domains.	DomainController Role		✓				

Class Name	Description	Superclass	SiS	HPOM	RUM	Diag	TV	NNMi
InfrastructureService	An IT Service that is not directly used by the Business, but is required by the IT Service Provider so they can provide other IT Services. For example Directory Services, naming services, or communication services. Infrastructure service is a synonym for technical service in ITILv3.	Service	✓					
Interface	Describes a logical interface (Note: This is NOT a physical interface card) that supports various data link layer and other higher layer protocols such as tunnels, mpls, frame, atm, etc.	NodeElement		✓		✓	✓	✓
IpAddress	This class represents the logical network identifier of a node on the network. An IP Address can represent either an IPv4 or an IPv6 address.	NetworkEntity	✓	✓	✓	✓	✓	✓
IpServiceEndpoint	Represents any kind of a network service end point based on a variety of protocols such as UDP or TCP or more specific ones such as SMTP, SNMP etc. The class describes the IP address and network port a service end point is bound to and the type of protocol it uses to expose an end point.	CommunicationEndpoint			✓	✓	✓	
J2EE Application	J2EE application - is a deployable unit of J2EE functionality Key Attributes: 1. Name (data_name) - A unique name that identifies application in the J2EE domain. 2. Container (root_container) - The relevant J2EE Domain	J2EE Deployed Object		✓		✓	✓	
J2EE Cluster	Cluster of Java EE Servers that provides high availability, scalability and fault tolerance services	Load Balancing Cluster		✓				
J2EE Domain	Management domain of Java EE resources (such as servers, clusters, application components, etc.)	ApplicationSystem		✓		✓	✓	
J2EE Server	The J2EE server identifies the server core of one instance of a J2EE platform product as described in the Java 2 Enterprise Edition Platform specification.	ApplicationServer		✓		✓	✓	
JBoss AS	The Jboss Application Server	J2EE Server	✓			✓		

Class Name	Description	Superclass	SiS	HPOM	RUM	Diag	TV	NNMi
JDBC Data Source	Represents JDBC connector to data source. JDBC Data Source provides database connectivity through a pool of JDBC connections	Application Resource		✓				
JMS Destination	jms destination	JMS Resource					✓	
JMS Server	jms server	JMS Resource					✓	
JVM	Key Attributes: 1. Name (data_name) - JVM 2. Container (root_container) - The container Software Element	J2EE Managed Object	✓					
Layer2Connection	Represents a ISO Layer-2 connection between 2 or more interfaces.	NetworkEntity						✓
Lync Pool	A Lync Server pool is a collection of Lync Servers. All Lync Servers in the pool run exactly the same services and one server in a pool of many can go down without detribalizing the pool. A pool is defined by a full qualified domain name.	Lync	✓					
Lync Server	Microsoft Lync Server (previously Microsoft Office Communications Server) is an enterprise real-time communications server, providing the infrastructure for enterprise instant messaging, presence, file transfer, peer-to-peer and multiparty voice and video calling, ad hoc and structured conferences (audio, video and web) and PSTN connectivity.	Communication Server	✓					
Lync Server Role	Lync Server 2010 allows for role based deployment. During Lync Server 2010 installation user can select for the components to be installed on a machine. The services installed on the Lync Server identify the role on the server.	Lync Resource	✓					

Class Name	Description	Superclass	SiS	HPOM	RUM	Diag	TV	NNMi
Lync Site	A Lync Server site can be either a central site or a branch site. A central site contains at least one Front End pool or one Standard Edition server. A branch site is associated with exactly one central site, and the users at the branch site get most of their Lync Server functionality from the servers at the associated central site.	Lync	✓					
Mainframe	Main computer which can serve many users	Computer					✓	
Mediation Server	Mediation Server is a necessary component for implementing Enterprise Voice and dial-in conferencing. Mediation Server translates signaling and, in some configurations, media between your internal Lync Server infrastructure and an Internet Protocol/Public Switched Telephone Network (IP-PSTN) gateway or a Session Initiation Protocol (SIP) trunk.	Lync Server Role	✓					
MicrosoftExchangeServer	This class represents Microsoft Exchange server software installed on some host.	MailServer		✓				
Monitoring Server	Monitoring Server collects data about the quality of your network media, in both Enterprise Voice calls and A/V conferences.	Lync Server Role	✓					
MQ Queue	A Queue is a container of messages in the MQ Infrastructure	Message Queue Resource				✓		
MS Cluster	Microsoft cluster server provides a clustering technology that keeps server-based applications available, regardless of individual component failures	FailoverCluster		✓				
MSSQL Database	SQL Data Base from Microsoft	Database Schema				✓		
Net Device	The Net Device class represents a specific purpose machines such as Routers, Switches, Printers	Node		✓				

Class Name	Description	Superclass	SiS	HPOM	RUM	Diag	TV	NNMi
Node	The Node class represents a general purpose machine (i.e., computer). This also is a base class from which all the other classes representing devices such as virtual machines will inherit. Machines are typically reachable via the network but there are times when users model a machine even when it is not reachable via the network. Examples of machines include UNIX/Windows systems, switches, routers, firewalls etc.	InfrastructureElement	✓		✓		✓	✓
NTCMD	xcmd or pstools	Shell	✓					
Oracle	Oracle database	Database	✓	✓		✓		
Oracle iAS	The Oracle IAS Application Server	J2EE Server	✓			✓		
Oracle RAC	Oracle RAC allows multiple computers to run the Oracle RDBMS software simultaneously while accessing a single database	Load Balancing Cluster		✓				
PrimaryDomainControllerMaster	The PDC emulator is a domain controller that advertises itself as the primary domain controller (PDC) to workstations, member servers, and domain controllers that are running earlier versions of Windows.	DomainController Role		✓				
Process	An instance of a program.	NodeElement				✓		
Registrar Server	A registrar is a service that accepts register requests from Session Initiation Protocol (SIP) endpoints. Registrars then save the registration information into a location database.	Lync Server Role	✓					
RelativeIDMaster	The RID master is responsible for processing RID pool requests from all domain controllers in a particular domain.	DomainController Role		✓				
Resource Pool	A generic Resource Pool	Application Resource		✓				

Class Name	Description	Superclass	SiS	HPOM	RUM	Diag	TV	NNMi
RunningSoftware	This class represents the runtime aspects of a software system that is currently running or intended to be running on a Node. An instance of the RunningSoftware class is the place for runtime overview information such as last-startup-time and application-instance-name. The rather static characteristics of an installed software are represented by the InstalledSoftware class.	InfrastructureElement	✓	✓	✓		✓	
SAP ABAP Application Server	SAP's integrated software solution for client/server and distributed open systems.	SapApplicationServer	✓			✓		
SAP J2EE Application Server	Represents an instance of the J2EE Application server	SapApplicationServer				✓		
SAP System	A logical unit, grouping together SAP-related entities (and possibly other entities as well) into one homogenous SAP deployment	ApplicationSystem	✓					
SAP Work Process	A logical single-instance representation of a certain type of work process	SAP Resource	✓					
SchemaMaster	The schema master domain controller controls all updates and modifications to the schema.	DomainControllerRole		✓				
Service Guard Cluster	A Service Guard Cluster	FailoverCluster		✓				
Siebel Application Server	An application running the business logic tier	ApplicationServer	✓					
Siebel Component	A process on the Siebel Application Server encapsulating some Siebel application functionality	Application Resource	✓					
Siebel Component Group	An application running on the Siebel application server.	Application Resource	✓					
Siebel Enterprise	A logical unit, which describes a group of servers that function together to build a full-blown Siebel toolset experience	ApplicationSystem	✓					
Siebel Gateway	A coordinating server, which routes requests to the correct component	ApplicationServer	✓					
Siebel Web Application	A Siebel application's location on the web server	Application Resource	✓					

Class Name	Description	Superclass	SiS	HPOM	RUM	Diag	TV	NNMi
Siebel Web Server Extension	A server running the Web tier of Siebel	Application Resource	✓					
SiteScope Group	SiteScope Logical Group	Group	✓					
SiteScope Measurement	Represents a SiteScope measurement.	System Monitor	✓					
SiteScope Measurement Group	A group of measurements of the same type	Group	✓					
SiteScope Monitor	SiteScope Monitor	System Monitor	✓					
SiteScope Profile	SiteScope Profile	Group	✓					
SiteScope Profile Monitor	SiteScope Profile Monitor (Internal)	System Monitor	✓					
SiteScope Web Service Monitor	SiteScope Web Service Monitor	SiteScope Monitor	✓					
SQL Server	SQL server	Database	✓	✓		✓		
SSH	ssh agent	Shell	✓					
Sybase	Sybase	Database	✓					
Telnet	telnet	Shell	✓					
Unix	Host with Unix Operation system.	Computer	✓	✓		✓	✓	
Veritas Cluster	Veritas cluster server provides a clustering technology that keeps server-based applications available, regardless of individual component failures	FailoverCluster		✓				
Virtual Management Software	Represents a Virtual Management Software	RunningSoftware		✓				
Virtualization Layer Software	Represents the thin software layer running on bare metal. It can represent a kernel of the ESX Server's hypervisor for Vmware virtualization solution or any other hypervisor for other vendors	Hypervisor	✓	✓				

Class Name	Description	Superclass	SiS	HPOM	RUM	Diag	TV	NNMi
VMware Cluster	VMware Cluster is a collection of ESX Server hosts with shared resources and a shared management interface. When you add a host to a cluster, the host's resources become part of the cluster's resources. The cluster manages the resources of all hosts	FailoverCluster		✓				
VMware ESX Server	VMware ESX Server is a computer that uses virtualization software, such as ESX Server 3.5 or ESX Server 3i, to run virtual machines. ESX Hosts provide CPU and memory resources, access to storage, and network connectivity to virtual machines that reside on them	Computer	✓	✓				
VMware Resource Pool	VMware Resource Pool represents a pool where Virtual machines execute in, and draw their resources from	Resource Pool		✓				
Web Service	Represent a web service	WebService Resource	✓			✓		
Web Service Operation	Web Service Operation	WebService Resource	✓			✓		
Weblogic AS	The Weblogic Application Server	J2EE Server	✓	✓		✓	✓	
WebServer	A software that accepts http requests and delivers as a response web pages. WebServers allow web-clients to access the pages and resources of web-applications. Examples: 'Apache web Server' , 'IIS'.	RunningSoftware	✓					
Websphere AS	The Websphere Application Server	J2EE Server	✓	✓		✓	✓	
Windows	Host with Microsoft Operation system (NT)	Computer	✓	✓		✓	✓	