HP Business Service Management

for the Windows operating system

Software Version: 9.01

RTSM Best Practices

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Contents

1 Introduction

The goal of this document is to provide best practices for using RTSM (Run-Time Service Model) and synchronizing the RTSM and CMS (Configuration Management System) or with another RTSM. The document does not provide explanation regarding the basic concepts or detailed information for each data synchronization and other integration flows. It is recommended to use HP BSM documentation for more detailed information.

2 What is RTSM?

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

The Run-time Service Model (RTSM) is a key component of the BSM 9 platform which delivers the unique 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 delivers at its core the ability for enterprise management deployments.

A CMDB (Configuration Management Data Base) is a repository of information related to all the components of an information system. In the ITIL context, a CMDB represents the authorized configuration of the significant components of the IT environment. A CMDB helps an organization understand the relationships between these components and tracks their configuration. CMDB implementations often involve federation (the inclusion of data from other sources into the CMDB).

Like a CMDB, the RTSM reconciles and stores Configuration items (CIs). Because of these similarities, the RTSM leverages the same core technology as HP UCMDB – the product used to implement a standard CMDB. In other words, the RTSM is a CMDB instance embedded in BSM. RTSM is designed to serve a distinctly different purpose from a traditional CMDB, since it serves as an operational repository within the BSM platform. RTSM leverages the same core CMDB technology and is used in a variety of ways by the BSM platform and BSM applications. Configuration items (CIs) discovered by different BSM data sources are reconciled and stored in the RTSM. Plus the RTSM also models/records operational data like downtime, alerts, SLAs or the configuration of APM monitors .

RTSM serves a specific set of use cases supporting the requirements of "Services and Operations Bridge". This differs significantly from the traditional role fulfilled by a CMDB and its associated use cases. The bottom line is that the RTSM and the traditional CMDB complement each other and should be considered, along with Discovery technologies, to be elements of a complete CMS ecosystem.

Note: the monitoring products that form the BSM offering implement discovery services which are limited in range and scope by the function that they serve. All together they can be used to assemble a topological representation of the managed resources in the RTSM. But other use cases which revolve around the traditional CMDB require advanced Discovery and Dependency Mapping (DDM) services. When an end-to-end solution is deployed, DDM services are typically used to populate the CMDB while the RTSM gets to leverage richer data from the CMDB where applicable.

RTSM is used in the Services 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 instrumentation sources against managed services to articulate 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 and service as an input source of environmental changes to the parent CMS systems.

RTSM is a UCMDB instance that is managed by BSM and is integral part of the BSM Platform. The separation of RTSM from the rest of the CMS eco-system allows for independent management of downtime or the upgrade of BSM deployments without affecting CMS and the rest of the BTO products that are integrated on top of CMS. The RTSM class model is an extension of the CMS class model and allows for the management of the BSM private class model extensions that are required for BSM operational use cases. The RTSM is a highly optimized service model, created for the high performance needs of the BSM use cases, and as such, includes the CI's which are required for complete and accurate monitoring. All other CI data should be held in the CMS instance.

RTSM is an integral part of the BSM Platform and is installed as part of BSM. BSM cannot use any other CMDB instance as its internal CI repository. The topologies of RTSM and other CMDB instances can be synchronized using the CMDB multi-instance topology synchronization solution.

2.1 RTSM Capabilities

The RTSM capabilities include:

- A service model that 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 all of your monitored environment.
- Automated creation: The service model is automatically discovered and created using native BSM operational solutions, such as BPM, RUM, Diagnostics, TV, SiteScope, OM SPIs, NNMi etc.
- Up-to-date maintenance: The service model is kept up-to-date in near real-time using BSM operational solutions

3 RTSM Integration Strategy

RTSM is designed to support BSM operational use cases only. For topology-based integrations between BSM and other BTO centers, it is recommended to install a central CMDB instance that will serve as the CMS instead of integrating directly with the RTSM instance. It is also recommended to connect DDM (Discovery and Dependency Mapping) to the central CMDB instance and then synchronize the topology relevant to operational use cases to BSM/RTSM if needed. BSM is providing a set of data synchronization TQLs for pulling the topology from CMS to BSM that should cover all out-of-the-box operational use cases.
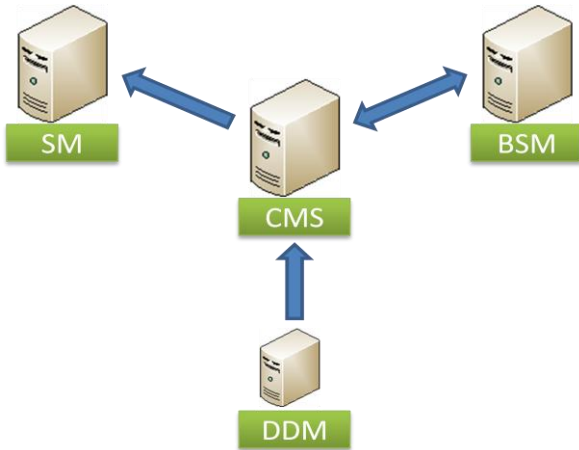
Configuration management products (such as Release Control) are not directly supported by the RTSM and require the installation of CMS or of a dedicated CMDB instance.

3.1 Global ID

The global ID is a unique CI ID, generated by the CMS, which identifies that CI across the entire portfolio, making it easier to work in multiple CMDB environments. Once a global ID is available, it can be used as shared context for point to point integration between BTO centers (for example, open a new incident in SM when an event is received for a CI).
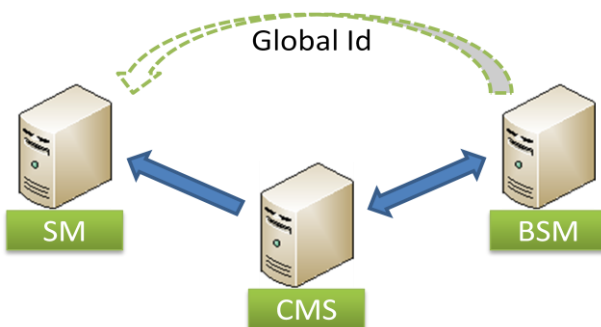
Configuring Global ID Generation

1) Launch the Web browser and enter the following address:
   http://<BSM DPS server>:21212/jmx-console.
2) Click UCMDB:service=Multiple CMDB Instances Services to open the JMX MBEAN View page.
3) Click one of the following methods and enter values as required:
   - setAsGlobalIdGenerator - specifies that the CMDB will act as the global ID generator for all locally existing scopes.
   - setAsGlobalIdGeneratorForScopes - specifies the scopes for which global IDs will be generated.
   - setAsNonGlobalIdGenerator - stops the CMDB from acting as the global ID generator for all scopes.
4) Click Invoke.

3.2 Population, Data Push and Federation

There are three types of integrations supported by UCMDB: population, data push and federation. These are core capabilities of UCMDB that exist in RTSM as well.

- An integration of type Population performs a scheduled retrieval of data from an external repository and creates a persistent copy of the data in the CMDB.
- An integration of type Federation performs on-demand retrieval of data from an external repository and creates a transient image of the data in the CMDB.
- An integration of type Data Push copies data from the CMDB to an external repository where the latter typically record a persistent copy of the data.

At a high level, it is recommended to use Population and Federation integration types for topology integrations between CMS and BSM or between BSM instances.

Specifically, it is recommended to use a Population integration type to synchronize the topology from CMS to RTSM or from one RTSM to another (see "BSM Hierarchical Deployment", below). BSM provides an out-of-the-box integration point for topology population. It is recommended to start with this integration point and modify the configuration based on specific customer requirements. See "Set Up Integrations between CMS and RTSM" in *RTSM Data Flow Management* guide for more details.

The main motivation for using a Population integration type instead of a Data Push integration type is the following: The Population integration type allows each center to control the scope of the topology that is pulled from the source UCMDB system. The BSM administrator is responsible for defining the scope of the topology that is pulled from CMS or from other BSM instances. The CMS administrator is responsible for defining which information should be retrieved from its satellite CMDB instances (for example, RTSM) to CMS.

A Federation integration type is used when BSM needs to retrieve information from other BTO centers that are integrated with CMS, without replicating the data (i.e. incidents from SM or planned changes from Release Control). For those use cases there is no point in replicating the data since BMS does not control its lifecycle .

Both the Federation and Population integration types can be configured using the same integration point. The out-of-the-box integration point provided by BSM includes all required configuration for out-of-the-box BSM flows. A Federation configuration of the BSM integration point defines that incidents/planned changes/KPIs are federated from the external CMDB (CMS). This means that when BSM Applications or users query for those configuration types, the query is forwarded to the external CMDB.
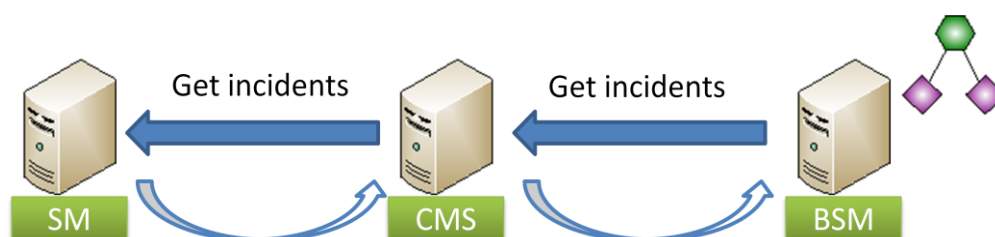
3.3   BSM Hierarchical Deployment

BMS supports a hierarchical deployment that allows to forward events and topology from one BSM instance to another. The main motivations for building 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 "important" summary events.
- **Geographical distribution**. When several Data Centers in different geographical locations manage their own BSM instance. In this use case, the data from different geographical locations can be consolidated in one central instance (**M**anager **O**f **M**anagers).
- **Organizational structure**. When the structure of the organization includes several BSM instance for each Business Unit/Department. The consolidated picture is achieved either by synchronizing those instances two ways or by defining one central MoM (Manager of Managers) instance.
- **Functional structure**. When the IT Department chooses to manage separately Applications and Infrastructure by creating two separate BSM instances for Application owners and Infrastructure owners. In this deployment there can be several BSM instances, each one operated by domain experts – APM (Application Performance Management performed by BSM), NNMi, or OM.
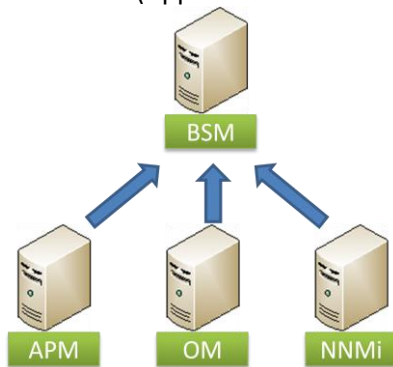
- **Different consumers**. When the multi-tenancy is implemented by multiple instances of BSM.
- **Organizational mergers and acquisitions**. Sometimes there are several BSM instances as a result of mergers and acquisitions. Consolidation can be achieved by synchronizing the data to one central instance.

The topology between two BSM instances is synchronized using the CMDB multi-instance technology. Guidelines and recommendations are described in the next section.

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 Configuration Item (CI), the information available in the event is used. Part of this information is the Global ID that provides the shared topological context between two BSM instances.

The global ID can be obtained in two ways:

1) Pushback of IDs
2) Two-way topology synchronization

When the configuration does not include a CMS, it is recommended to configure the top BSM instance as a Global 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 Probe (vs. 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.
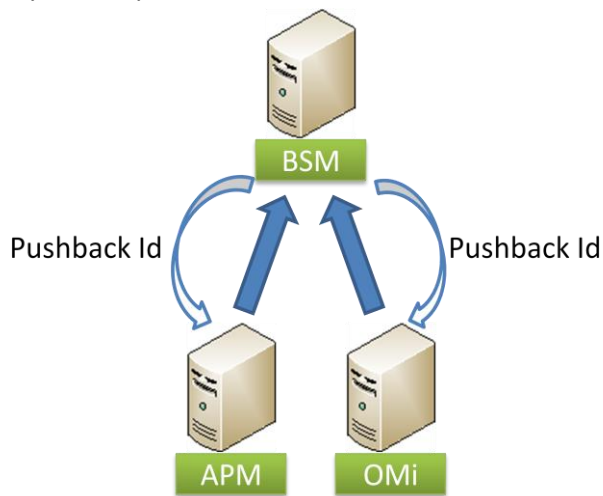
When the configuration includes a CMS, it is recommended to configure a two-way synchronization between the CMS and the top BSM instance and between the top BSM instance and its child BSMs.
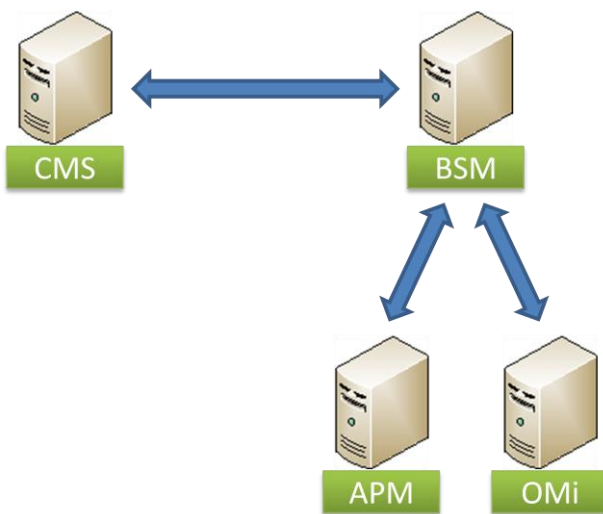
When the configuration does not include a CMS, and then you add a CMS to the deployment, the CMS must generate new Global IDs for all the CIs and must broadcast them from the CMS to the top BSM instance, and then from the top BSM instance to its child BSMs. A full synchronization must be performed between CMS and the top BSM instance and then between the top BSM instance and its child BSMs.

Known limitation: Since a CMS is the only CMDB allowed to generate Global IDs, Global IDs cannot be generated for BSM private classes (for example, the End User Group) when they do not exist in the CMS. This is relevant for the second use case (above) when a real CMS is used and the top BSM instance cannot act as the CMS (meaning cannot be the Global ID generator) anymore.

4 CMS-BSM Topology Synchronization

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

Topology synchronization between the following versions is supported:

BSM version	CMDB version of CMS
BSM 9.0	CMDB 9.02, CMDB 9.01, CMDB 9.0
BSM 9.01	CMDB 9.02, CMDB 9.01, CMDB 9.0

4.1 When to Use CMS-BSM Synchronization?

4.1.1 Synchronizing the Topology from CMS to BSM

One of the main use cases for synchronizing the topology from a CMS to BSM is to obtain a Global ID that can be used later on for integrations between BSM and other BTO centers.

There are additional use cases when CMS-BSM synchronization is required:

1) BSM flows that are integrated with topology reported by DDM:
   a) **Vertical Solutions**: Application Management for SAP, Application Management for Siebel, Application Management for SOA.
   b) **Monitoring Deployment Wizard (MDW) in SiteScope**: The Monitoring Deployment Wizard uses the topology discovered by DDM when configuring SiteScope monitors. MDW retrieves the relevant information from CIs reported by DDM to help configure the monitors and assigns the monitors to the selected CIs.
   c) **Consume DDM credentials**: Once DDM connects to the discovered source using credentials, the references to the credentials are stored on the reported CIs. Credentials can then be used in several BSM flows: MDW, integration with Operations Orchestration, monitors assignment for vertical solutions.
2) Enrich the topology in BSM:
   Some BSM data collectors report "shallow" topology. Synchronizing topology discovered by DDM or other CMS topology reporting sources enriches the CIs reported by BSM. For example BSM collectors can report the hosts using IP. Once those hosts are discovered by DDM, additional information is available (that is, DNS name, OS, OS version, and more.). This can help BSM users manage their CIs in RTSM.
3) There are different practices for modeling of logical CIs (such as Business Services, Business Applications, and so on.). Any CI that is populated to CMS can be synchronized to RTSM reducing the cost of manually redefining logical CIs.

4.1.2 Synchronizing the Topology from BSM to CMS

The following use cases should be considered when synchronizing the topology from BSM to CMS:

1) BSM data sources (RUM, Diagnostics, and TV) have the unique ability to discover the relationships between Business Applications or Business Transactions and its underlying infrastructure.

These relationships can be synchronized to complete Business Service definition in CMS and avoid tedious manual modeling steps.

2) BSM data sources can serve as additional sources populating CMS. The topology can be utilized when building a CLIP (Closed Loop Incident Process) solution or as complimentary topology source for DDM — BSM discovers shallow topology that can be used as a trigger for DDM deep discovery.

3) RTSM contains up-to-date topology that is updated at near real time and can provide a more current picture than other CMS data sources (such as DDM).

4.2 Data Probe Installation and Deployment

Topology synchronization requires installation of the Data Probe. The same Data Probe can be used for pulling the topology from multiple UCMDB sources. For example when using hierarchical deployment the same Data Probe can be used to pull the topology from several child BSM instances.

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

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

Data Probe can be downloaded from Admin > Platform > Setup and Maintenance > Downloads and is available to anyone who has purchased BSM without requiring an additional license.

4.3 Handling Class Model Differences

The topology synchronization mechanism assumes that the class model that is used for defining the synchronization scope is identical in the source and destination. Having additional attributes/classes/relationship on either the source or destination CMDB is allowed as long as they are not part of the data synchronization scope defined by the data synchronization TQLs.

This means that if you have extended class A on source CMDB 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 CMDB source instance.

CMDB 9.02 or later is capable of ignoring the class model differences when pulling the topology from BSM. This capability is not part of BSM 9.0\9.01 and the class model extensions should be excluded specifically when pulling the topology from CMDB to BSM as explained above.

4.4 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 be disastrous and can badly affect existing SLAs/alerts/downtime/etc. configuration.

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 RTSM.

5   RTSM Population Methods

RTSM is designed to support BSM operational use cases only (see "What is RTSM?", above, for more details).

There are several ways for providing the data in RTSM:

1) BSM data sources are reporting topology changes almost at real time keeping the run-time service model up-to-date. See "Appendix A: Classes Reported by BSM Data Sources" for a complete list of classes reported by BSM data sources.
2) DDM can be connected directly to RTSM to report the topology that is relevant to operational use cases only. For all other use cases including change management and configuration management, it is recommended to install a dedicated UCMDB instance instead of integrating directly on top of RTSM. For more details, see "RTSM Integration Strategy", above.
3) RTSM supports population, federation and data push. (For more details, see "Population, Data Push and Federation", above.) Any of the three integration types can be used to provide relevant topological data in RTSM. The data source can be either another UCMDB instance (i.e., CMS or another RTSM) or external data sources (such as Atrium). All out-of-the-box integration adapters provided by UCMDB are available as part of RTSM as well. For other 3rd party integrations, a customer can develop his own integration adapter using population, federation or data push integrations.
   The information regarding available 3rd party integration can be found in BSM documentation and HP Live Community.

It is recommended to populate in RTSM the topology that is relevant to operational use cases only.

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

3rd Party	DDMa	RUM	Diag	TV	BPI	SiS	OM	NNMi
Atrium EMC ECC Troux CA Helpdesk		Application Service Transaction J2EE servers Web servers Databases	J2EE .Net Virtualization Databases Middleware	J2EE .Net Databases Middleware Mainframe	Business Processes Activities Transaction	J2EE Web servers Databases Virtualization	AD Exchange J2EE Virtualization Clustering	Routers Switches L2 connectivity

Appendix A: Classes Reported by BSM Data Sources

The following table contains the list of all classes reported by BSM data sources.

Supperclass is a parent class of the class defined in Class Name column according to the CMDB classes hierarchy. You need to be aware of the hierarchy since some BSM sources may report the children class but not the parent class. For example Oracle inherits from Database class and SiS reports specific Oracle class and not generic Database class.

Class Name	Description	Superclass	SiS	OM	RUM	Diag-nostics	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	Directory-Server		✓				
Agent	virtual class to all agents	Running-Software	✓					
BridgeHead-Server	Bridgehead Servers are the contact point for the exchange of directory information between sites.	Domain-Controller-Role		✓				

Class Name	Description	Superclass	SiS	OM	RUM	Diag-nostics	TV	NNMi
BusinessAp-plication	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.	Busines-sElement	✓		✓	✓	✓	
BusinessSer-vice	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 anoth-er 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	✓					
BusinessTran-saction	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, us-er, time and location, etc.) and a technical profile.	Busines-sElement			✓	✓	✓	
BusinessTran-sactionFlow		CiCollec-tion			✓	✓	✓	
ClusterRe-sourceGroup	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		✓				
ClusterSoft-ware	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)	Running-Software		✓				
Computer	This class represents a general purpose machine which has an IP address, such as Windows, Unix, Mainframe	Node	✓	✓				
Configura-tionDocu-ment	A document that contains a block of arbitrary information, or resource for stor-ing 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 com-puter programs.	NodeEle-ment		✓				

Class Name	Description	Superclass	SiS	OM	RUM	Diagnostics	TV	NNMi
DB2	A database from IBM that serve a number of different operating system platforms.	Database	✓					
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.	Running-Software				✓		
Datacenter	Represents a Data center entity	BusinessElement		✓				
Diagnostics Probe	A Diagnostics probe deployed on a host	Monitor				✓		
Diagnostics Probe Group	A logical group of Diagnostics Probes	CiCollection				✓		
Directory-Server	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.	Running-Software		✓				
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.	Directory-Server		✓				
DomainController Resource	DomainController Resource	Application Resource		✓				
DomainControllerRole	DomainController Role	DomainController Resource		✓				

Class Name	Description	Superclass	SiS	OM	RUM	Diag-nostics	TV	NNMi
DomainNa-mingMaster	The domain naming master domain controller controls the addition or removal of domains in the forest.	Domain-Controller-Role		✓				
EMS Group	EMS group	Group	✓					
EMS Mea-surement	EMS event	System Monitor	✓					
EMS Monitor	EMS Monitor	System Monitor	✓					
End User Group	Logic group which separates content from the monitors	Busines-sElement			✓			
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 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 simi-lar to the bridgehead server in an Exchange 2000/2003 organization. The Hub Transport server is installed on member server(s) in an Active Directory do-main. 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	Exchange Transport Server		✓				

Class Name	Description	Superclass	SiS	OM	RUM	Diag-nostics	TV	NNMi
	from AD.							
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 Da-tabase	Exchange storage group - a logical container for Exchange databases and their associated system and transaction log files.	Microsoft Exchange Resource		✓				
Exchange Or-ganization	This class represents Exchange Organization.	Exchange		✓				
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 Mes-saging Server	This server role enables Unified Messaging for an Exchange 2007 organization. Unified Messaging lets users access their Exchange 2007 mailbox over any tel-ephone for e-mail, voice mail, fax messages, and calendaring and contact in-formation. The Unified Messaging role is responsible for merging VOIP infra-structure with Exchange organization. It provides the capability to: - combined voice, fax, and mail in one inbox - access to voice, fax and mail via multiple in-terfaces	Exchange role		✓				
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 Mes-saging	Microsoft Exchange Resource		✓				

Class Name	Description	Superclass	SiS	OM	RUM	Diagnostics	TV	NNMi
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		✓				
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		✓				
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.	DomainControllerRole		✓				
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		✓				
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					✓	

Class Name	Description	Superclass	SiS	OM	RUM	Diag-nostics	TV	NNMi
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	Failover-Cluster					✓	
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					✓	
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	Messaging-Server				✓	✓	
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				✓		

Class Name	Description	Superclass	SiS	OM	RUM	Diagnostics	TV	NNMi
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.	DomainControllerRole		✓				
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		✓		✓	✓	

Class Name	Description	Superclass	SiS	OM	RUM	Diag-nostics	TV	NNMi
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.	Applica-tionServer		✓		✓	✓	
JBoss AS	The Jboss Application Server	J2EE Server	✓			✓		
JDBC Data Source	Represents JDBC connector to data source. JDBC Data Source provides database connectivity through a pool of JDBC connections	Application Resource		✓				
JMS Destina-tion	jms destination	JMS Re-source					✓	
JMS Server	jms server	JMS Re-source					✓	
Layer2Conne-ction	Represents a ISO Layer-2 connection between 2 or more interfaces.	Networ-kEntity						✓
LogicalVo-lume	Key Attributes: 1. Name (data_name) - JVM 2. Container (root_container) - The container Software Element	J2EE Ma-naged Ob-ject		✓				
LogicalVo-lume	A region of storage on which a FileSystem can be created	NodeEle-ment		✓				
MQ Queue	A Queue is a container of messages in the MQ Infrastructure	Message Queue Re-source				✓		
MS Cluster	Microsoft cluster server provides a clustering technology that keeps server-based applications available, regardless of individual component failures	Failover-Cluster		✓				
MSSQL Data-base	SQL Data Base from Microsoft	Database Schema				✓		
Mainframe	Main computer which can serve many users	Computer					✓	
MicrosoftEx-changeServer	This class represents Microsoft Exchange server software installed on some host.	MailServer		✓				
NTCMD	xcmd or pstools	Shell	✓					
Net Device	The Net Device class represents a specific purpose machines such as Routers, Switches, Printers	Node		✓				

Class Name	Description	Superclass	SiS	OM	RUM	Diag-nostics	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.	Infrastruc-tureEle-ment	✓		✓		✓	✓
Oracle	Oracle database	Database	✓	✓		✓		
Oracle RAC	Oracle RAC allows multiple computers to run the Oracle RDBMS software simultaneously while accessing a single database	Load Ba-lancing Cluster		✓				
Oracle iAS	The Oracle IAS Application Server	J2EE Server	✓			✓		
PrimaryDo-mainControl-lerMaster	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.	Domain-Controller-Role		✓				
Process	An instance of a program.	NodeEle-ment				✓		
RelativeID-Master	The RID master is responsible for processing RID pool requests from all domain controllers in a particular domain.	Domain-Controller-Role		✓				
Resource Pool	A generic Resource Pool	Application Resource		✓				
RunningSoft-ware	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.	Infrastruc-tureEle-ment	✓	✓	✓		✓	
SAP ABAP Application Server	SAP's integrated software solution for client/server and distributed open systems.	SapApplica-tionServer	✓			✓		
SAP J2EE Ap-plication	Represents an instance of the J2EE Application server	SapApplica-tionServer				✓		

Class Name	Description	Superclass	SiS	OM	RUM	Diag-nostics	TV	NNMi
Server								
SAP System	A logical unit, grouping together SAP-related entities (and possibly other entities as well) into one homogenous SAP deployment	Applica-tionSystem	✓					
SAP Work Process	A logical single-instance representation of a certain type of work process	SAP Re-source	✓					
SQL Server	SQL server	Database	✓	✓		✓		
SSH	ssh agent	Shell	✓					
SchemaMas-ter	The schema master domain controller controls all updates and modifications to the schema.	Domain-Controller-Role		✓				
Service Guard Cluster	A Service Guard Cluster	Failover-Cluster		✓				
Siebel Appli-cation Server	An application running the business logic tier	Applica-tionServer	✓					
Siebel Com-ponent	A process on the Siebel Application Server encapsulating some Siebel applica-tion functionality	Application Resource	✓					
Siebel Com-ponent Group	An application running on the Siebel application server.	Application Resource	✓					
Siebel Enter-prise	A logical unit, which describes a group of servers that function together to build a full-blown Siebel toolset experience	Applica-tionSystem	✓					
Siebel Gate-way	A coordinating server, which routes requests to the correct component	Applica-tionServer	✓					
Siebel Web Application	A Siebel application's location on the web server	Application Resource	✓					
Siebel Web Server Exten-sion	A server running the Web tier of Siebel	Application Resource	✓					
SiteScope Group	SiteScope Logical Group	Group	✓					
SiteScope Measure-	Represents a SiteScope measurement.	System Monitor	✓					

Class Name	Description	Superclass	SiS	OM	RUM	Diagnostics	TV	NNMi
ment								
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	✓					
Sybase	Sybase	Database	✓					
Telnet	telnet	Shell	✓					
Unix	Host with Unix Operation system.	Computer	✓	✓		✓	✓	
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	Failover-Cluster		✓				
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		✓				
Veritas Cluster	Veritas cluster server provides a clustering technology that keeps server-based applications available, regardless of individual component failures	Failover-Cluster		✓				
Virtual Management	Represents a Virtual Management Software	Running-Software		✓				

Class Name	Description	Superclass	SiS	OM	RUM	Diag-nostics	TV	NNMi
Software								
Virtualization Layer Soft-ware	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	✓	✓				
Web Service	Represent a web service	WebSer-vice Re-source	✓			✓		
Web Service Operation	Web Service Operation	WebSer-vice Re-source	✓			✓		
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'.	Running-Software	✓					
Weblogic AS	The Weblogic Application Server	J2EE Server	✓	✓		✓	✓	
Websphere AS	The Websphere Application Server	J2EE Server	✓	✓		✓	✓	
Windows	Host with Microsoft Operation system (NT)	Computer	✓	✓		✓	✓	