HP Business Service Management

For the Windows and Linux operating systems

Software Version: 9.23

HP NNMi – HP BSM Topology Integration Best Practices

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Acknowledgements

This product includes software developed by the Apache Software Foundation (www.apache.org).

This product includes software developed by the JDOM Project (www.jdom.org).

This product includes software developed by the MX4J project (mx4j.sourceforge.net).

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Contents

Chapter 1: Executive Summary

The purpose of this document is to provide details about topology integration between NNMi and BSM, beyond what is documented in the product manuals. This document focuses on BSM 9.10 and higher, and NNMi 9.10.

There are two ways to populate BSM with Layer 2 network topology from NNMi: the historical UCMDB Probe-based "pull" integration method, and the newer NNMi - BSM topology "push" integration method. This best practices document compares these two methods, and then focuses on the NNMi - BSM topology integration method, while addressing the following:

- How to configure the integration.

- The topology that NNMi creates in BSM.

- Configuring views to consume the network topology within BSM.

- How the CIs in BSM are maintained when NNMi objects are added, updated and removed.

Chapter 2: NNMi Integration to BSM: Which Method to Use?

NNMi is the authoritative source for Layer 2 network topology. There are two methods for integrating NNMi topology into BSM/UCMDB:

- NNMi – BSM topology integration ("push" to BSM).

- NNMi – UCMDB integration ("pull" from NNMi).

This document focuses on the NNMi - BSM topology "push" integration method. Each method has advantages and disadvantages, as described in "Appendix A: Comparing Methods of Integrating NNMi with BSM/UMCDB" on page 19.

Note that if your environment does not have other data collectors to refine the NNMi data, all CIs will be of type Node. In this case the Data Flow Probe "pull" integration method is more useful for BSM, where functionality is based on more specific "strong type" CITs - sub-types of the Node CIT.

- The NNMi - BSM topology "push" integration method is documented in the NNMi Deployment Reference.

- The Probe-based "pull" integration method is documented in the HP Universal CMDB Discovery and Integration Content Guide.

Chapter 3: Configuring the NNMi – BSM Topology Integration

This section summarises how to configure the NNMi – BSM topology integration and expands on some key points. Refer to the NNMi 9.10 Deployment Reference for details.

In the NNMi console, open the HP NNMi – HP BSM Topology Integration Configuration form (**Integration Module Configuration > HP BSM Topology**). Select the **Enable Integration** check box and complete the form.

When connecting NNMi to a multi-server BSM deployment, the **BSM Host** field needs to point to the BSM Gateway server.

Please note that although the fields in the form are labelled **BSM User** and **BSM Password**, these fields are actually the **RTSM User** and **RTSM Password**. RTSM users are different from BSM users; the RTSM user and password are used for RTSM integrations. By default, installing BSM 9.1x creates an RTSM user called admin, with the password set to admin.

To perform the NNMi – BSM topology integration, create and use a new RTSM user for better accountability and auditing. For details, see "Appendix B: Creating a New RTSM User" on page 21.

The CIs that are created or updated by this integration set the attributes `Created By` and `Updated By`. By using a different user for the integration, these attributes will be set to `UCMDB: User:<integration_user>` instead of the more generic `UCMDB: User:admin`, making it easier to discern the source responsible for the CI.

The NNMi 9.10 Deployment Reference suggests setting the Interface CI display label to prefer `interface_name` over `mac_address`. This results in a more user friendly display. To make this change, open the CI Type Manager in RTSM Administration, and select the Interface CI Type. Select the Default Label tab and set the format to:

```
interface_name | mac_address
```

> **Note:** Although the NNMi 9.10 Deployment Reference suggests changing the Node Name Resolution order to `First Choice = Full DNS Name` and `Second Choice = Short DNS Name`, this cannot be done in NNMi 9.10 (see QCCR1B90169). You can use the default Node Name Resolution order.

http://wynand.rose.hp.com/ - HP NNMi–HP BSM Topology Integration Configuration

HP NNMi–HP BSM Topology Integration Configuration

Enable Integration: ☑   Help

NNMi SSL Enabled: ☐

NNMi Host: wynand.rose.hp.com

NNMi User: system

NNMi Password: ••••••••

BSM SSL Enabled: ☐

BSM Host: galt.rose.hp.com

BSM Port: 80

BSM User: NNMi_wynand

BSM Password: ••••••••

Topology Filter Node Group: [▼]

Additional Connections Node Group: [▼]

Topology Synchronization Interval (hrs): 24

Submit   Cancel

Chapter 4: BSM Topology Created by NNMi

The NNMi - BSM topology integration creates the following CIs:

- Node

- Interface

- IpAddress

- IpSubnet

- Layer2Connection

- HardwareBoard

- PhysicalPort

Devices such as switches, routers, and servers are all defined as Node CI Types. The device type is identified by the Node CI's **NodeRole** attribute. In NNMi 9.10, the **NodeRole array** attribute is set to one or more of these values: `hub`, `load_balancer`, `printer`, `router`, `server`, `lan_switch`, `voice_gateway` and/or `desktop`. This is because it is possible for a network device to change its role (such as from a switch to a switch-router), and this method provides simple tracking via the CI's **NodeRole** attribute.

A single node can have multiple node roles. NNMi decides, based on the node's Device Category and the node's capabilities as discovered by NNMi, which NodeRole(s) to set. The following table shows the mapping of NNMi Device Category to **NodeRole** attribute.

NNMi Device Category	NodeRole Attribute
Hub	hub
LoadBalancer	load_balancer
Printer	printer
Router	router
Server	server
Switch	lan_switch
Switch_Router	router, lan_switch
Voice Gateway	voice_gateway
Workstation	desktop

In addition to the Device Category mapping, if a node has IP forwarding capability (`com.hp.nnm.capability.node.ipforwarding`), the NodeRole `router` is applied. If a node has

switching capability (`com.hp.nnm.capability.node.lan_switching`), the NodeRole `lan_switch` is applied.

The NNMi - BSM topology integration creates the following relationships:

- Membership: IpSubnet -> IpAddress

- Membership: Layer2Connection -> Interface

- Composition: Node -> Interface

- Containment: Node -> IpAddress

- Composition: Node -> HardwareBoard

- Composition: HardwareBoard -> HardwareBoard

- Composition: HardwareBoard -> PhysicalPort

- Realization: PhysicalPort -> Interface

Refer to "Appendix C: NNMi - CI Attribute Mapping" on page 22 for the mapping of NNMi attributes to the equivalent CI attributes for each CI type.

Chapter 5: Network Topology Views

The network topology views in BSM 9.1x are designed to work with the historical NNMi – UCMDB integration method. This is because the TQLs includes a Net Device CI type or a Computer CI type, whereas the NNMi - BSM topology integration creates nodes as Node CIs only, setting the **NodeRole** attribute to identify the device types as servers, switches, and so forth.

Until the views are updated in the product, you can easily modify them to work with the NNMi populated network topology. The following sections describe how to modify views to suit modeling with RTSM, Service Health and Operations Management (OMi).

Layer 2 Topology View

The **Layer 2 by NNMi** view in BSM 9.1x can be easily modified to work with the topology created by the BSM – NNMi topology integration. One way to do this is as follows:

- Open the **Layer 2 by NNMi** view and save it as **Layer 2 by NNMi 9.10**.

- Modify the **Layer 2 by NNMi 9.10** view as follows:

  - Delete the Net Device CI Type, and in its place add another Node CI Type.

  - Add a Composition relationship between this new Node CI and its Interface CI.

  - Re-establish the folding rule (fold Interface under Node).

  - For the Node CI, specify that the **NodeRole** attribute must contain `lan_switch` or `router` to restrict the results to network devices.

  - (Optional) You can further restrict the results by specifying the Node CI name(s) to match in order to view the equivalent of a **Layer 2 Neighbor** view.

The following two screenshots show the results, comparing an NNMi 9.10 **Layer 2 Neighbor View** with the equivalent **Layer 2 by NNMi 9.10** view in BSM. The third screenshot shows the **Layer 2 by NNMi** view in UCMDB using the historical NNMi – UCMDB integration method, to show that the results are equivalent.

NNMi Layer 2 neighbor view:
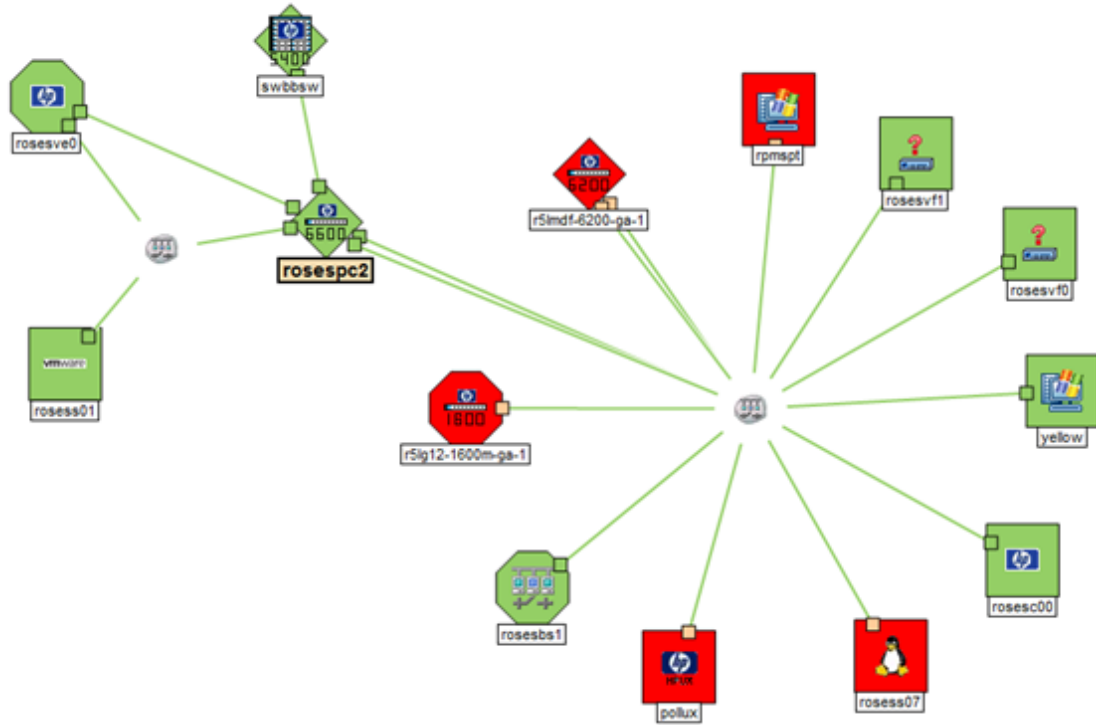
BSM 9.1x Layer 2 by NNMi 9.10 view:
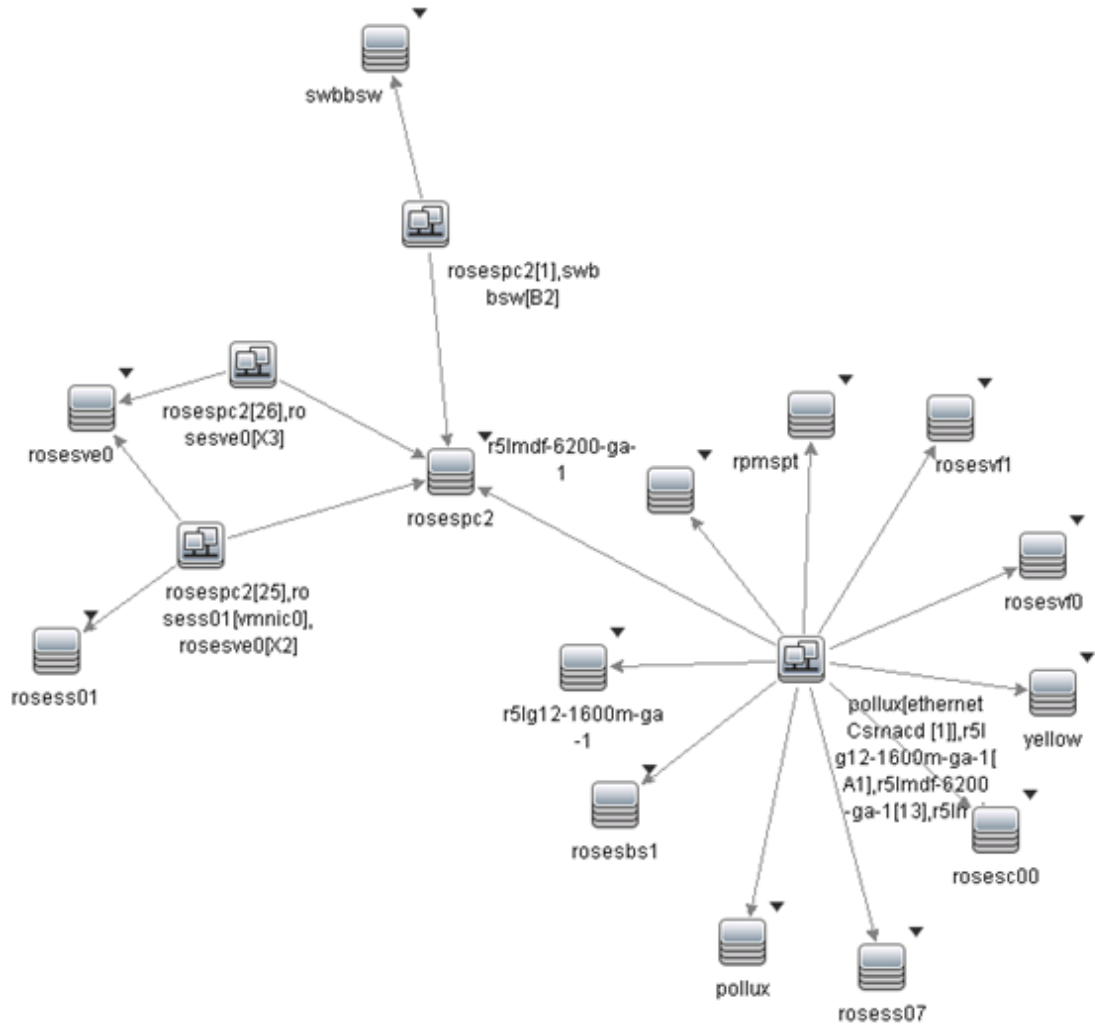
UCMDB 9.03 Layer 2 by NNMi view:
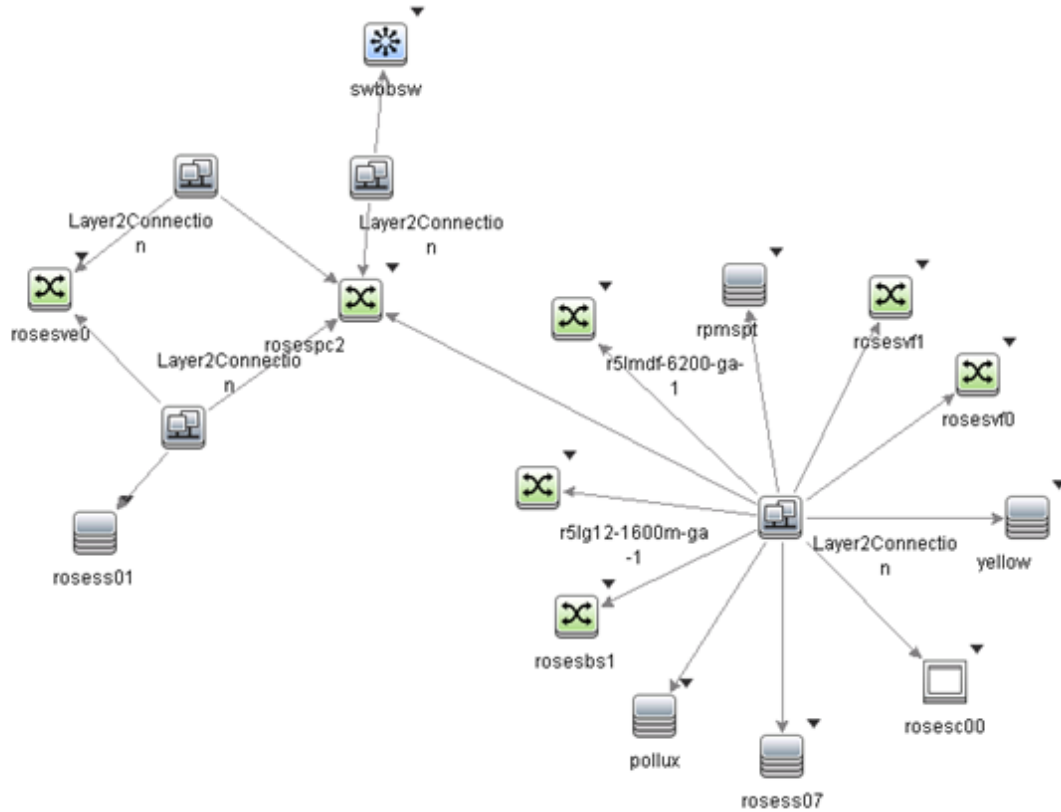
This type of view (**Layer 2 by NNMi 9.10**) is primarily useful as a basis for a TBEC rule, or to filter OMi events in View Selector. It is not optimal for use in Service Health; refer to the Service Health Views section for recommendations on creating views that include network devices. However, if you do want to display this view in Service Health, you need to modify the View Definition Properties and set the Bundles to `Service_Health`.

For a view that is used in the View Selector to filter OMi events, you might want to include all CIs that may have network events associated with them. NNMi events resolve to Node, Interface, Layer 2 Connection or IP Address CI Types; you therefore might add IP Address to the view. The following two screenshots show an example view containing the network elements associated with the "OBA1" business application.

Example of Layer 2 topology applied to a business application:
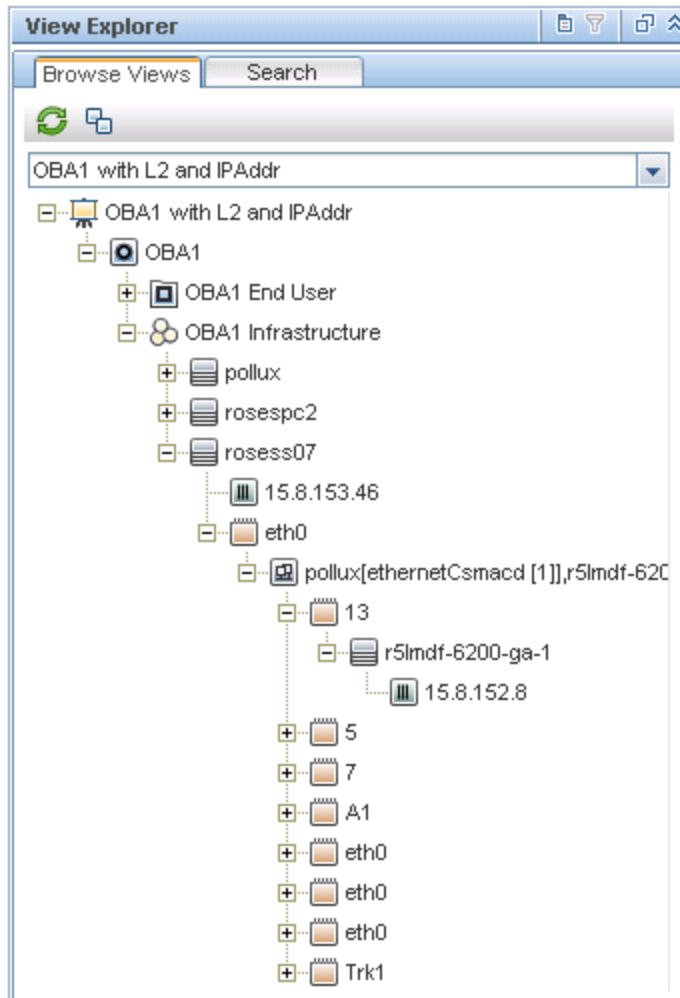
View definition:
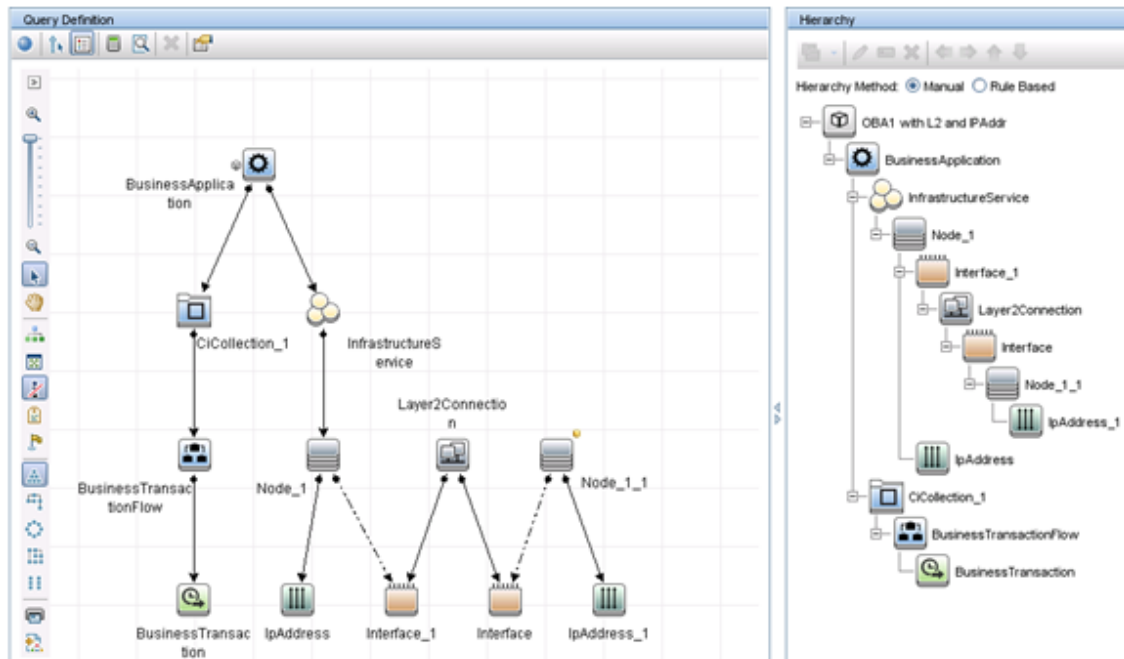
Service Health Views

It is difficult to display traditional network topology within Service Health. A relationship of **Node -> Interface -> Layer2Connection -> Interface -> Node** is meaningless, since (for example) there is no impact relationship (that is, KPI status propagation) between Layer2Connection and Interface.

If you need to include network devices in a Service Health view, it is therefore best to show them in a flat structure rather than to attempt to reproduce a traditional network topology. Since there is an impact relationship between Interface and Node, one approach is to create a view that contains Node -> Interface, possibly grouped together as "Network"; refer to the screenshot below.

Top view:
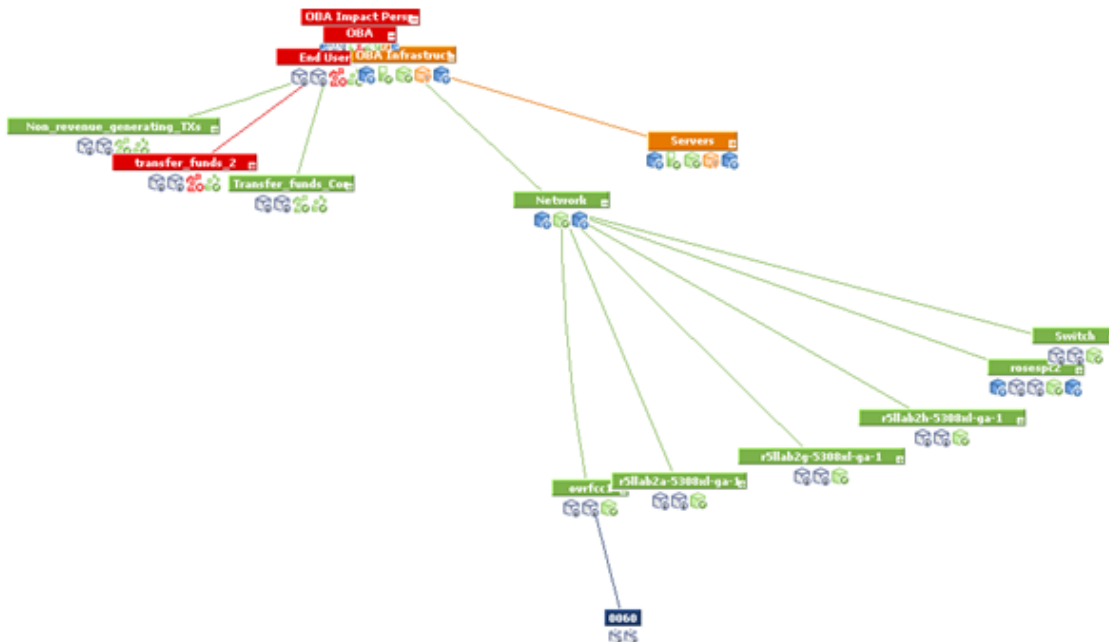
OMi Health Perspectives

In OMi Health Perspectives, the Health Top View displays a view based on the Related CI of the selected event. The default view is determined by View Mappings for the CIT.

The default View Mappings used in Health Perspectives do not work for the Node CIT and Interface CIT.

For the Node CIT, there is no default View Mapping. If you use OMi Health Perspectives, you may want to define such a view.

For the Interface CIT, the default View Mappings of **NetworkInterface_Infrastructure** and **Systems_Infrastructure** depend on a Computer CIT. Thus, for nodes that are populated from NNMi, these views will fail. You may want to modify the **NetworkInterface_Infrastructure** view to use Node CIT instead of Computer CIT.

Chapter 6: CI Lifecycle

When NNMi objects (Node, Interface, IP Address, IP Subnet, Layer 2 Connection, Card and Port) are added or changed, they are dynamically updated in BSM. In addition, the full topology is re-synchronised periodically, as specified in the user-defined **Topology Synchronization Interval (hrs)** setting in the **HP NNMi - HP BSM Topology Integration Configuration** screen. NNMi ensures that the data is processed in manageable chunks, to avoid a negative impact on the performance of NNMi or BSM.

Periodic topology synchronization has the effect of updating the **Last Access Time** attribute for CIs that already exist in BSM, and prevents them from becoming candidates for deletion. If an object no longer exists in NNMi, the aging mechanism in BSM deletes the corresponding CI when its **Last Access Time** exceeds the time threshold (default is 40 days).

Note: The CI may also be monitored by another application such as HP SiteScope or HP Operations Management, in which case **Last Access Time** may continue to be updated if the object remains monitored by another application.

Appendix A: Comparing Methods of Integrating NNMi with BSM/UMCDB

The following table provides a summary comparison of the two methods.

NNMi-BSM Topology "Push" Integration	Probe-based "Pull" Integration ("Layer 2 by NNM" Discovery Job)
Can filter objects to sync from NNMi to BSM based on NNMi Node Group.	Currently no ability to filter NNMi objects to sync into BSM.
Performs incremental discovery and scheduled full topology sync.	Performs full topology sync only.
Creates all NNMi nodes as Node CIs *.	Creates NNMi nodes as various CI types (Router, Switch, Switch Router, Chassis, Computer, ATM Switch, Firewall, Load Balancer, and Printer).
Creates these other CIs: Interface, IpAddress, IpSubnet, Layer2Connection, HardwareBoard, and PhysicalPort.	Creates these other CIs: Interface, IpAddress, IpSubnet, Layer2Connection, HardwareBoard+, PhysicalPort+, and VLAN +.
Node CI attributes populated by BSM but not by Probe method: ● Host is Route. ● Host is Virtual. ● **NodeModel**. ● **PrimaryDnsName**.	Node CI attributes populated by Probe but not by BSM method: ● **Description** (populated from Device Profile Description) Node CI attributes with different values from BSM method: ● **DiscoveredVendor** (more user-friendly format in BSM method; for example "Hewlett-Packard" rather than "hewlettpackard"). ● **NodeFamily** (more user-friendly format in BSM method). ● Host NNM UID. ● Host Key.

NNMi-BSM Topology "Push" Integration	Probe-based "Pull" Integration ("Layer 2 by NNM" Discovery Job)
Layer 2 Connection CI attribute Display Label is set to the Layer 2 Connection Name as shown in NNMi.	Layer 2 Connection CI attribute Display Label is hard-coded to "Layer2Connection". Other CIs with different attributes when populated by Probe: • HardwareBoard CI includes **SoftwareVersion** attribute. • PhysicalPort CI includes **DuplexSetting** and **Port Name** (same value as **Name**) attributes.
Can easily adapt the out-of-the-box Layer 2 Network view.	Out-of-the-box Layer 2 Network view.

[+] NNMi 9 is required for these CIs to be created.

[*] Nodes are identified by the **NodeRole** attribute.

> **Note:** UCMDB Content Pack 9 enhances NNMi integration support of large NNMi environments, allowing you to control the number of Layer2Connections, VLANs and Nodes to get from NNMi per query.

Appendix B: Creating a New RTSM User

The following steps show how to create a new RTSM user for the NNMi – BSM topology integration.

1. Log in to the RTSM JMX Console.

2. Access **UCMDB:service=Security Services** > **createIntegrationUser**.

createIntegrationUser

Create integration user

Name	Type	Value	Description
customerID	java.lang.Integer		Customer ID
userName	java.lang.String		User Name
password	java.lang.String		Password
dataStoreOrigin	java.lang.String		Data Store Origin - Unique identifier of the application integrating with CMDB

Invoke

3. Enter the user name and password.

Use the user and password by which the integration user was created in the NNM integration configuration page.

> **Note:** The dataStoreOrigin field is not mandatory; it is only needed if a priority must be specifically defined for this integration under reconciliation priorities.

Appendix C: NNMi - CI Attribute Mapping

The following diagrams show the mapping of NNMi object attributes to the equivalent CI attributes in BSM. Note that the **Monitored By** attribute is set to include NNM for each of the CI types.

NNMi Node - Node CI Attribute Mapping

NNMi Interface - Interface CI Attribute Mapping

NNMi IP Address - IpAddress CI Attribute Mapping

NNMi IP Subnet - IpSubnet CI Attribute Mapping

NNMi Card - HardwareBoard CI Attribute Mapping

NNMi Port - PhysicalPort CI Attribute Mapping

NNMi Layer 2 Connection - Layer2Connection CI Attribute Mapping
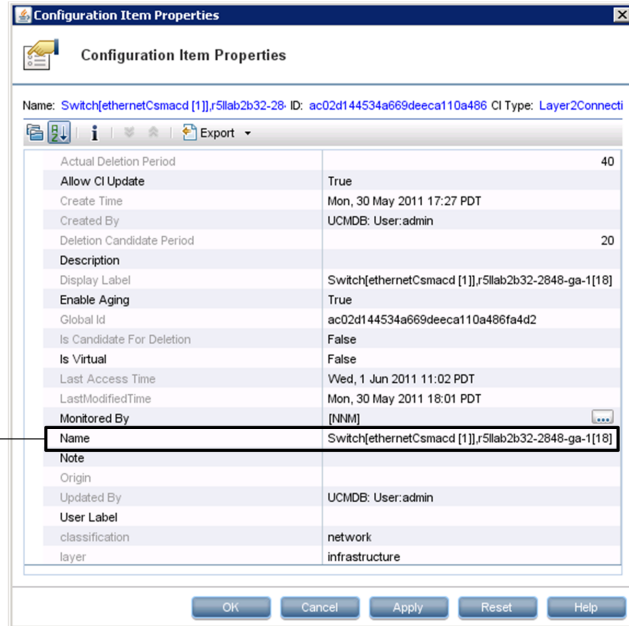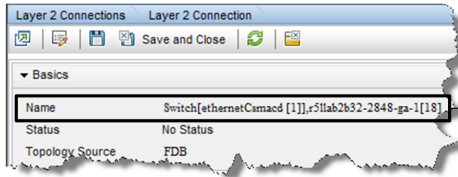
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