HP Network Node Manager i Software Smart Plug-in for IP Multicast

For the Windows®, HP-UX, Linux, and Solaris operating systems

Software Version: 9.00

Online Help

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HP Network Node Manager i Software Smart Plug for IP Multicast

The HP Network Node Manager (NNM) i Software Smart Plug-in for IP Multicast (NNMi iSPI for IP Multicast) provides real-time data that enables you to monitor the health of your multicast network.

The iSPI for IP Multicast integrates and uses the properties of NNMi to gather information and monitor the traffic passing through the Multicast-enabled nodes and Protocol Independent Multicast (PIM) interfaces. The iSPI for IP Multicast workspace helps you monitor the multicast traffic and gives you the ability to perform fault analysis.

Examples of the following applications using an IP Multicast IP Multicast is a technology that efficiently sends data to a group of receivers, which saves network bandwidth. It is ideal for applications where the source transmits a large set of data efficiently to many destinations at one time. network:

- Video or audio delivered through the network

- Distance learning, webcasts or video conferencing

- Inventory, pricing or stock data delivered to many destinations simultaneously

The requirement of these applications is the need for sufficient bandwidth or prioritization to prevent duplicate, dropped or out-of-sequence packets. This requires the monitoring and management of multicast traffic.

The iSPI for IP Multicast, in conjunction with NNMi, performs the following tasks:

- Monitoring the IP Multicast routing topology in the management network.

- Monitoring the health of Multicast-enabled nodes, PIM interfaces, and neighbors.

- Troubleshooting the network by using the IP Multicast map views. Navigate to the Forwarding Tree, Reverse Path, and Neighbor View.

- Monitoring the IP Multicast traffic flow rate available in the map views. The performance data is only available if you install the iSPI Performance for Metrics.

- Monitoring the IP Multicast Inventory from the Global Network Manager and Regional Manager.

- Monitoring the incidents based on IP Multicast activity to enable rapid identification of faults in the network.

- Integrating the iSPI for IP Multicast with the iSPI for MPLS to help you monitor the Multicast-VPN network.

- Integrating the iSPI for IP Multicast with the iSPI Performance for Metrics. View the multicast reports and the performance data on the map views.

Related Topics:

Monitoring Your Network with IP Multicast Inventory

Monitoring Your Network with IP Multicast Forms

Monitoring the Multicast Network

Viewing the IP Multicast Incidents

Using the iSPI for IP Multicast

The iSPI for IP Multicast enables you to quickly monitor, detect, and troubleshoot abnormal behavior in your multicast network.

After you install (and configure) the iSPI for IP Multicast on the NNMi management server, you can monitor and troubleshoot the problems in your Multicast network by using the IP Multicast views. The iSPI for IP Multicast discovers the multicast-enabled nodes, PIM interfaces, multicast neighbors, and multicast flows (S, G) in the topology.

The following table shows the ways the iSPI for IP Multicast helps you monitor and troubleshoot your network and the associated help topics:

Task	Help Topics
View an IP Multicast inventory	Monitoring Your IP Multicast Inventory
View the details of the multicast nodes, interfaces, and flows	Accessing Forms
Troubleshoot the multicast topology by using the map views	Viewing the Network Connectivity
Monitor the multicast network	Monitoring Your Multicast Network
View the multicast incidents	IP Multicast Incidents

Monitoring Your Network with IP Multicast Inventory

After the regular discovery of the multicast nodes and PIM interfaces in NNMi topology, you can access the IP Multicast views to monitor the status and check the attributes of the Multicast devices.

The iSPI for IP Multicast adds a new workspace to the NNMi console—the **IP Multicast** workspace. You can access all the IP Multicast views from the **IP Multicast** workspace. The Multicast views provide the comprehensive list of all the discovered Multicast nodes, PIM interfaces, and multicast flows (S, G) in the network. In addition, you can present device details in tables and you can navigate and open the IP Multicast forms and map views from the IP Multicast views to access the device details.

Types of Multicast views

View Type	Purpose
IP Multicast Nodes View	Provides a list of the Multicast-enabled nodes in the network.
IP Multicast Interfaces View	Provides a list of the Protocol Independent Multicast (PIM) interfaces in the network.
IP Multicast Flows View	Provides a list of active multicast flows (S, G) in the network.

To start the IP Multicast views, follow these steps:

1. From the **Workspaces** navigation panel, click **IP Multicast**.

2. Click the inventory of your interest. For example, IP Multicast Nodes inventory.

The following additional features are available in the views:

- To view details about an IP Multicast object, click the 📂 **Open** icon.

- To view object attributes, click the 📄 **Quick view** icon.

- Filter the columns in the table views to categorize and view the relevant information. You can filter the table view using more than one column.

- Sort the attributes in ascending or descending order. Sorting is available for limited columns.

Related Topics:

IP Multicast Nodes View

IP Multicast Interfaces View

IP Multicast Flows View

IP Multicast Nodes View

The IP Multicast Nodes view provides a list of available multicast-enabled nodes in the network.

Use the IP Multicast Nodes view for the following tasks:

- Monitor the IP Multicast nodes.

- View the status of the IP Multicast node. Sort the inventory by **Status** to view the critical problems in the node view.

- Navigate to the node form to check the other attributes of the node.

- Navigate to the Neighbor map view to find the PIM neighbor topology of the selected node.

Basic Attributes

Attribute	Description
Status	The status of the selected multicast-enabled node. The node state and interface status associated with the selected node contribute in the node status. Possible values are:
	⬤ **No status** - If a node is not polled, the status of the node is No status.
	⬤ **Normal** - The status of the multicast-enabled node is Normal if the node state is enabled and the status of all PIM interfaces on the node is Normal.
	▱ **Disabled** - The status of the multicast-enabled node is Disabled if the node state is Disabled.
	⬤ **Unknown** - If there is no SNMP response for the selected node, the status of the multicast-enabled node is Unknown. This is only possible when either the selected node is not managed or not reachable at the time of polling.
	⚠ **Minor** -The status of the node is Minor if the node state is enabled and at least the status of one of the interface is Critical or Warning.

Attribute	Description
	❌ **Critical** - The status of the node is Critical if the status of all the interfaces on the node is either Critical or Warning or Unknown.
Name	The name of the multicast node. You cannot modify the name in the IP Multicast Node view.
Hostname	The fully-qualified hostname currently stored in the database for this device (according to any hostname resolution strategy currently used in your network environment. For example, DNS).
Device Profile	The name of the device that determines how the devices of this type are managed.
Num (Nbr)	The count of multicast PIM neighbors for the selected node.
Num (S, G)	The count of multicast (source, group) for the selected node.
State	The state of the polled multicast routers. Possible values are: • **Enabled** - If the selected node is a multicast router, value is Enabled. • **Disabled** - If the node is not a multicast router, value is Disabled. • **Unknown** - If there is no SNMP response for the selected node and not able to determine the state of the node, value is Unknown. • **Not Polled** - If the selected node is not polled on the basis of the configuration settings, value is Not Polled. • **No Polling Policy** - If no policy is found to poll the node, value is No Polling Policy.
Management Server	The Management server attribute helps you identify the selected node is part of the Regional or Global Network Manager. Possible values are: • **Local**- The NNMi and iSPI for IP Multicast management server you are currently signed into. When the management server is a Regional Manager, value is local. • **Name** - The name of the Regional Manager. The name is assigned by the administrator while configuring the Regional Manager. A <name> value means that you are currently signed into a Global Manager, and other NNMi and iSPI for IP Multicast management servers report to this NNMi and iSPI for IP Multicast management server.

Sort the following attributes in ascending or descending order:

• Status
• Name
• Hostname
• Device Profile
• State

Filter an IP Multicast Nodes View

You can perform the filtering action on the attributesStatus, Name, Hostname, Num (Nbr), Num (SG), State, and Management Server available in the IP Multicast Interfaces view.

To create, modify or remove filter in the IP Multicast Nodes view, follow the steps:

1. Right-click the column from the IP Multicast Nodes view.

2. Select any one of the following filters:

   ■ Is not empty

   ■ Is empty

   ■ Create filter

   The filtered list appears in the view. To create a new filter, select **Create Filter**. Select an option from the following list:

   ■ Starts with

   ■ Contains

   ■ Matches

   ■ less than or equal

   ■ greater than or equal

   ■ Is not empty

   ■ Is empty

   Type the value in the box. Click **Apply.**

   The filtered list appears in the view. The filters configured on the IP Multicast Node view are restored when the views are opened again. This is very useful as you do not have to configure the filtering option again. After viewing the filtered list, you can remove the filter.

To update and change the filter, right-click the attribute and click **Modify filter**.

To remove the filter, right-click the attribute and click **Remove Filter**.

For more information, see *NNMi Help, Filter a Table View and Select Filter Values.*

IP Multicast Interfaces View

The IP Multicast Interfaces view provides you a list of available interfaces on the multicast-enabled nodes.

Use the IP Multicast Interfaces view for the following tasks:

● Monitor the IP Multicast Interfaces inventory.

● Monitor the health of each of the IP Multicast interface on the multicast-enabled node. Sort the inventory by the **Status** attribute.

● Access the Neighbor map view to find the PIM Neighbor topology.

● View the list of the interfaces available on the multicast node. Sort the inventory by the **Hosted on Node** attribute.

● Navigate to the Interface form to view the incidents associated with the selected interface.

Basic Attributes

Attribute	Description
Status	The overall status of the current interface of the Multicast node. The Interface and Neighbor state associated with the selected interface contribute in the health of

Attribute	Description
	the interface. Possible values are:
	No Status - The status of the interface is No status if the interface state is not polled.
	Normal - The status of the interface is Normal if the Interface state is Active and the Neighbor state is Normal.
	Unknown - The status of the interface is Unknown If there is no SNMP response from the node. This is only possible when the node is not managed or not reachable at the time of polling.
	Warning- The status of the node is Warning in the following conditions:
	• Interface state is Active and Neighbor state is invalid.
	• Interface state is in transient state as reported by PIMInterfaceStatus MIB.
	Critical - The status of the node is Critical in the following conditions:
	• Interface state is NotInService.
	• Interface state is inconsistent.
Hosted on Node	The node name on which the selected Multicast interface resides.
PIM IfName	The name of the PIM interface.
PIM IP Address	The IP Address of the PIM interface.
PIM IfAlias	The PIM IfAlias assigned to the interface.
State	The state of the PIM interface. The State Poller does the polling and updates in the view. Possible values are: • **Active** - The interface is normal and operational condition. • **NotInService** - The interface is down or critical. • **Transient** - The interface is in transient state as reported by PIMInterfaceStatus MIB. • **NotPolled** - The interface is not polled based on the configuration settings. • **No Polling Policy** - No policy is set up to poll the interfaces.

Sort the following attributes in ascending or descending order:

- Status
- Hosted on Node
- PIM IfName
- PIM IP Address
- State

Filter an IP Multicast Interfaces view

You can perform the filtering action on the attributesStatus, Hosted on Node, PIM IfName, PIM IP Address, PIM IfAlias, and State available in the IP Multicast Interfaces view.

To create, modify or remove filter in the IP Multicast Interfaces view, follow the steps:

1. Right-click the column from the IP Multicast Interfaces view.

2. Select any one of the following filters:

   - Is not empty

   - Is empty

   - Create filter

   The filtered list appears in the view. To create a new filter, select **Create Filter**. Select an option from the following list:

   - Starts with

   - Contains

   - Matches

   - less than or equal

   - greater than or equal

   - Is not empty

   - Is empty

   Type the value in the box. Click **Apply.**

   The filtered list appears in the view. The filters configured on the IP Multicast view are restored when the views are opened again. This is very useful as you do not have to configure the filtering option again.

To update and change the filter, right-click the column name and select **Modify filter**.

To remove the filter, right-click the column name and select **Remove filter**.

For more information, see *NNMi Help, Filter a Table View and Select Filter Values.*

IP Multicast Flow View

The IP Multicast Flow view provides a list of available multicast traffic flows passing through the selected (source, group) in the network.

Use the IP Multicast Flow view for the following tasks:

- Monitor the IP Multicast Flow inventory.

- Access the Forwarding Tree map view.

- Access the Reverse Path map view.

- Monitor the flow rate of the selected flow. Find out the reason for the degraded flow rate. Navigate to the map views. The flow rate is only available if the iSPI Performance for Metrics is installed and running.

Basic Attributes

Attribute	Description
Source	The hostname or IP Address of the multicast source router. If the source IP address is 0.0.0.0, multicast routing uses (*, G) entry for the group.
Group	The name of the group or group IP address.
Flow Mode	The type of multicast flow such as Sparse, Dense, pimSparseMode, or SparseDense to transmit data packets.
RP Address	The IP address of the RP node of the flow.
Flow Rate	The number of flows passing per second from the selected (S,G).
Num (Routers)	The number or routers participating in the selected flow.

To monitor and troubleshoot the traffic flows in your network, you can start the forwarding tree and reverse path view from the IP Multicast Flow view. For more information, see Forwarding Tree view and Reverse Path view.

Sort the following attributes in ascending or descending order:

- Source

- Group

- Flow Mode

- RP Address

Filter an IP Multicast Flow view

You can perform the filtering action on the attributesSource, Group, Flow Mode, RP Address, Flow Rate, and Num (Routers) available in the IP Multicast Flow view.

To create, modify or remove filter in the IP Multicast Flow view, follow these steps:

1. Right-click the column from the IP Multicast Flow view.

- Select any one of the following filters:

    - Is not empty

    - Is empty

    - Create filter

    The filtered list appears in the view. To create a new filter, select **Create Filter**. Select an option from the following list:

    - Starts with

    - Contains

    - Matches

    - less than or equal

    - greater than or equal

- Is not empty

- Is empty

Type the value in the box. Click **Apply.** The filtered list appears in the view. The iSPI for IP Multicast saves filters per user so that the filters you specify are maintained during subsequent user sessions.

To update and change the filter, right-click the column name and select **Modify filter**.

To remove the filter, right-click the column name and select **Remove filter**.

For more information, see *NNMi Help, Filter a Table View and Select Filter Values*

Monitoring Your Network with IP Multicast Forms

The iSPi for IP Multicast provides forms that help you easily view all details associated with the managed object such as multicast-enabled node, interface, or multicast flow (S, G). In addition, the iSPI for IP Multicast provides a quick view that shows information about the multicast-enabled node, interface or flow.

Use the iSPI for IP Multicast forms to complete the following tasks:

- Determine the health of the multicast objects. Check the status and incident tabs.

- Access a multicast map view.

- Navigate to the tabs associated with the multicast node, PIM interface, and multicast flow (S, G).

The following forms are available from the IP Multicast workspace:

Form Name	Description
IP Multicast Node	Provides details about the selected Multicast node. For more information, see IP Multicast Node Form.
IP Multicast Interface	Provides details about the selected PIM interface. For more information, see IP Multicast Interface Form.
IP Multicast Flow	Provides details about the selected Multicast flow (S, G) in the network. For more information, see IP Multicast Flow Form.

To launch the IP Multicast form, follow these steps:

1. From the Workspaces navigation pane, select the **IP Multicast -> IP Multicast Nodes Inventory**. The IP Multicast Nodes view opens in the right pane.

2. Click the **Open** icon to view the detailed information about a specific object. The form shows information about the multicast node.

The following additional features are available in the views:

- Filter the columns in the table views to categorize and view the relevant information. You can filter the table view using more than one column.

- Sort the attributes in ascending or descending order.

IP Multicast Node Form

The IP Multicast Node form provides details about the selected multicast node. This form provides details about the Multicast PIM interfaces and incidents associated with the selected multicast node.

Basic Attributes

Attribute	Description
Name	The name of the Multicast-enabled node.
Status	The status values are same as available in the IP Multicast Node inventory. For more information, see IP Multicast Node View.
Management Address	The iSPI for IP Multicast uses the selected IP Address to communicate with the node through SNMP. This address is derived from NNMi.
Hosted on Node	The node on which the Multicast interface resides. Click the LookUp icon to access the node details.

IP Multicast Node State

Attribute	Description
State	The state of the polled multicast nodes. Possible values are: **Enabled** - If a node is the Multicast router, value is Enabled. **Disabled** - If a node is not the Multicast router, value is Disabled. **Unknown** - The SNMP agent is not responding and not able to determine the state of the node, value is Unknown. **Not Polled** - The node is not polled on the basis of the configuration settings. **No-Polling Policy** - No policy is found to poll the device, state is No Polling Policy.
Last Polled	The time when the selected node was last polled.

IP Multicast Node Form: General Tab

The IP Multicast Node form provides details about the selected multicast node.

Node Attributes

Attribute	Description
General Attributes	The attributes listed in the General tab are same as available in the IP Multicast Node view. For more information, see **IP Multicast Nodes View**

IP Multicast Node Form: PIM Interfaces Tab

The IP Multicast Node form provides details about the selected multicast node. The PIM Interfaces tab provides details about all the PIM interfaces on the node.

Attribute	Description
Status	The status of the current PIM interface on the node. For information about how the current status is calculated, see IP Multicast Interface form.
Hosted on Node	The node on which the Multicast interface resides.
PIM IfName	The name of the PIM interface.
PIM IP Address	The IP Address of the PIM interface.
PIM IfAlias	The PIM IfAlias assigned to the interface.
State	The state of the PIM interface. For information, see IP Multicast Interface form.

IP Multicast Node Form: Groups Tab

The IP Multicast Node form provides details about the selected multicast node.

The Groups tab provides a list of available multicast groups for the selected node. Each row has a unique source and group for the selected node. The group tab can contain multiple rows for one node as the multicast node can participate in more than one group

The Groups tab contains a list of available multicast traffic flows and control flows in the network. The IP Multicast traffic flows are the active flows in the multicast topology. The IP Multicast control flows are the standard multicast group defined by Internet Assigned Numbers Authority (IANA) in the range of (224.0.0.0 - 224.0.0.0 - 224.0.0.255 reserved and not forwarded). The control flows use the reserved range of addresses to use the routing protocols and other topology discovery such as RP node discovery or maintenance protocols.

Basic Attributes

Attribute	Description
Source	The hostname or IP Address of the multicast source router.
Group	The name of the group or group IP address.
Protocol	The IP Multicast nodes uses the following protocols: • pimSparseDense • pimSparseMode • pimDenseMode • other
RPF Interface	The RPF (Reverse Path Forwarding) interface of the router. The RPF interface helps you find the reverse path back to the source.
RPF Neighbor	The upstream neighbor of the selected RPF interface.
RP (Rendezvous Point) Address	The IP address of the RP node.
RP State	The state of the RP node.
RP Last Modified Time	Date and time of the selected RP node participating in the group was last mod-

Attribute	Description
	ified.

IP Multicast Node Form: Incidents Tab

The IP Multicast Node form provides details about the selected multicast node. The Incident tab is useful for providing a quick summary of the problem description for the multicast nodes.

Attribute	Description
Incidents Attributes	The attributes listed in the incidents tab are same as available in the NNMi Incidents form. For more information, see the Help for *NNMi Incidents Form.*

For more information about the IP Multicast incidents, see Multicast Incidents.

IP Multicast Node Form: Status Tab

The IP Multicast Node form provides details about the selected multicast node. The Status tab is useful for providing a quick summary of the multicast-enabled node.

Status Table

Attribute	Description
Status	The status of the selected multicast-enabled node. The node state and interface status associated with the selected node contribute in the node status. Possible values are: **No status** - If a node is not polled, the status of the node is No status. **Normal** - The status of the multicast-enabled node is Normal if the node state is enabled and the status of all PIM interfaces on the node is Normal. **Disabled** - The status of the multicast-enabled node is Disabled if the node state is Disabled. **Unknown** - If there is no SNMP response for the selected node, the status of the multicast-enabled node is Unknown. This is only possible when either the node is not managed or is not reachable at the time of polling. **Minor** - The status of the node is Minor if the node state is enabled and at least the status of one of the interface is Critical or Warning. **Critical** - The status of the node is Critical if the status of all the interfaces on the node is either Critical or Warning or Unknown.
Last Modified	Date and time when status was last set.

Status History

Attribute	Description
Status History	List of last thirty status updates for the selected node. For more information, see *NNMi Status tab.*

IP Multicast Node Form: Conclusions Tab

The IP Multicast Node Form provides details about the selected multicast node. The Conclusion tab is useful for providing a quick summary of the status and conclusions for the selected node.

Basic Attributes

Attribute	Description
Status	The overall status of the Multicast node. For information about how the current status is determined, see IP Multicast Node Form.
Time Stamp	Current status is set by Causal Engine. The Time Stamp data is the time when the status of the node is last updated.
Conclusion	Conclusions are set by the Causal Engine after the status calculation. Possible conclusions are: ● MulticastNodeNotPolled ● MulticastNodeUnknown ● MulticastNodeNormal ● MulticastNodeDisable ● PIMInterfaceNotNormalInMCNode ● PIMNeighborNotNormalInMCNode ● AllPIMInterfaceNotNormalInMCNode

IP Multicast Group Form

The IP Multicast Group form provides details about the selected source and group pair. This form provides information about the selected multicast node participating in the source and group pair.

Basic Attributes

Attribute	Description
Source	The hostname or IP Address of the multicast source router of the selected multicast flow.
Group	The name of the group or group IP address of the selected multicast flow.

IP Multicast Group Form: General Tab

The IP Multicast Group form provides details about the selected Group (S, G). The General tab provides the additional details about the multicast group.

Group Attributes

Attribute	Description
Source Address	The IP Address of the source.

Attribute	Description
Group Address	The IP Address of the group. All the Multicast groups have the IP address which starts from 224.0.0.0 to 239.255.255.255.
Mask	The IP address of the Source, Group (S, G) pair route.
RP Address	The IP Address of the RP node.
Flow Mode	The IP Multicast nodes uses the following protocols: • pimSparseDense • pimSparseMode • pimDenseMode • other

IP Multicast Interface Form

The IP Multicast Interface form provides details about the selected PIM interface. This form provides details about the neighbors, status, and the incidents associated with the interface.

Basic Attributes

Attribute	Description
Name	The name of the interface available on the Multicast node.
Status	The status values are same as available in the IP Multicast Interface inventory. For more information, see IP Multicast Interface View.

PIM Interface State

Attribute	Description
State	The state of the PIM interface on the selected interface. The State Poller polls the interface and updates the IP Multicast Interface view. Possible values are: **Active** - The status of the interface is normal and in operational condition. **NotInService** - The status of the interface is down or critical. **Transient state** - The interface is in transient state (NotReady, CreateAndGo, or CreateAndWait, Destroy) as reported by the pimInterfaceStatus MIB. **NotPolled** - The interface is not polled based on the configuration settings. **No Polling Policy** - No policy is set up to poll the interfaces.
Last Polled	The date and time the PIM Interface was polled.

IP Multicast Interface Form: General Tab

The Interface Form provides details about the selected Multicast interface. The General tab provides details about the selected PIM interface. These attributes are the values inherited from NNMi. For more information, see *NNMi Interface Form*.

General SNMP Values

Attribute	Description
PIM IfName	The name of the PIM interface.
PIM IfAlias	The PIM IfAlias assigned to the interface.
PIM IP Address	The IP Address of the PIM interface.
IfIndex	The index value of the PIM interface.
Designated Router	The IP Address of the PIM designated router.

IP Multicast Interface Form: Neighbors Tab

The Interface form provides details about the selected Multicast interface. The Neighbors tab provides details about all the PIM (Protocol Independent Multicast) neighbors of the selected Multicast interface.

Basic Attributes

Attribute	Description
PIMNeighbor	The IP Address of the PIM neighbor.
Hosted On Node	The node on which the Multicast PIM neighbor resides.
State	The neighbor state of the multicast interface. The neighbor state is derived when the multicast neighbor and interface recognize each other as the PIM neighbors. Possible values are: • **Invalid** - The state is Invalid if the designated multicast interface is not able to locate the PIM neighbor. • **Normal** - The state is Normal if the Multicast interface recognizes the PIM neighbor. • **Inconsistent** - The state is Inconsistent if the Multicast interface does not recognize the PIM neighbor.

IP Multicast Interface Form: Incidents Tab

The Interface form provides details about the selected Multicast Interface. The Incidents tab is useful for providing a quick summary of the problem description for the Multicast interfaces.

Attribute	Description
Incidents Attributes	The attributes listed in the incidents tab are same as available in the NNMi Incidents form. For more information, see Help for *NNMi Incidents Form.*

For more information about incidents, see Multicast Incidents.

Interface Form: Conclusions Tab

The Interface form provides details about the selected Multicast interface. The Conclusions tab is useful for providing a quick summary of the status and conclusions for the interface.

Attribute	Description
Status	The overall status of the selected interface of the Multicast node. The Interface and Neighbor state contribute to the Interface status. For information, see Multicast Interface Form.
Time Stamp	Current status is set by Causal Engine. The Time Stamp data is the time when the status of the interface is last updated.
Conclusion	Conclusions are set by the Causal Engine after the status calculation. Possible conclusions are: **PIMInterfaceNormal** **PIMInterfaceUnknown** **PIMInterfaceNotPolled** **PIMInterfaceTransient** **PIMNeighborInvalid** **PIMInterfaceNotInService** **PIMNeighborInconsistent**

IP Multicast Flow Form

The IP Multicast flow form provides details about the selected multicast flow (S, G) in the network. In addition, the flow form provides the general information, PIM neighbors, and Conclusions tab associated with the selected flow.

Basic Attributes

Attribute	Description
Attributes	The attributes listed in the Flow form are same as available in the IP Multicast Flow view. For more information, see IP Multicast Flow view.

IP Multicast Group Form: General Tab

The IP Multicast Group form provides details about the selected Group (S, G). The General tab provides the additional details about the multicast group.

Group Attributes

Attribute	Description
Source Address	The IP Address of the source.
Group Address	The IP Address of the group. All the Multicast groups have the IP address which starts from 224.0.0.0 to 239.255.255.255.
Mask	The IP address of the Source, Group (S, G) pair route.
RP Address	The IP Address of the RP node.
Flow Mode	The IP Multicast nodes uses the following protocols: • pimSparseDense • pimSparseMode • pimDenseMode • other

IP Multicast Neighbor Form

The IP Multicast PIM Neighbor form provides details about the selected PIM neighbor of the selected interface.

Basic Attributes

Attribute	Description
Attributes	The attributes listed in the PIM Neighbor are same as available in the Multicast Interface form. For more information, see IP Multicast Interface Form.

Monitoring Your Network by using the iSPI for IP Multicast Global Network Manager

The iSPI for IP Multicast uses the capabilities of NNMi Global Network Manager (NNMi GNM) and provides a centralized view to monitor the multiple sites. The iSPI for IP Multicast allows you to configure the Regional Manager connections by using the **IP Multicast Configuration** workspace. After the connection is established, view and monitor the IP Multicast nodes from the iSPI for IP Multicast inventory (GNM).

Use the iSPI for IP Multicast (GNM) for the following tasks:

• Monitor the multicast-enabled routers in the network.

• View the problems in the network. Check the status of the multicast nodes, interfaces, and neighbors.

• Access the Multicast forms to check the other attributes of the multicast object.

• Access the map views of the network.

• Access the available multicast reports.

The iSPI for IP Multicast Regional Manager monitors and sends the topology update to the iSPI for IP Multicast (GNM). The Regional Manager sends the updated information as per the polling interval set for the multicast nodes and interfaces at the regional level.

The iSPI for IP Multicast inventory (GNM) gets updated as per the polling interval set for the multicast objects in the Regional Manager inventory. If the polling interval for the multicast nodes in the Regional Manager connection is 10 minutes, the multicast nodes in the iSPI for IP Multicast inventory (GNM) gets updated in every 10 minutes.

To verify that the Regional Manager connection is working*, see NNMi Help, Determine the State of the Connection to a Regional Manager.*

Related Topics:

Configure the Regional Manager Connections

IP Multicast Processes and Services

After you install the iSPI for IP Multicast, start all the IP Multicast services and processes. The IP Multicast processes are:

Process Name	Description
mcastjboss	The process that controls the jboss Application Server that contains all of the Multicast services.
nmsdbmgr	IP Multicast database

The iSPI for IP Multicast does not show the status of the Oracle database. There is no check done if the Oracle database is running. If the Oracle database is configured, you must start the database.

To verify that all the Multicast processes and services are running**,** use any *one* of the following:

- For basic information, at the command line, type **ovstatus -c mcastjboss**

- For detailed information, at the command line, type **ovstatus -v mcastjboss**

To start the Multicast services and processes:

At the command line, type **ovstart -c mcastjboss.**

You can start all NNMi services at the same time. You cannot stop an individual service. This command starts the Multicast processes and also checks whether the NNMi processes (ovjboss, nmsdbmgr) are running or not. If the NNMi processes are not running, manually start the NNMi and Multicast processes.

To stop the Multicast services:

At the command line, type **ovstop -c mcastjboss**. This command stops the Multicast processes and not the NNMi processes (ovjboss, nmsdbmgr).

Viewing the Network Connectivity

With the iSPI for IP Multicast, you can view the complete connectivity of the Multicast network by using the map views. The iSPI for IP Multicast presents the additional map views that help you construct the multicast flow path in upstream or downstream direction. You can access the views by using the **Actions** menu from the console.

The iSPi for IP Multicast includes the following map views:

- Forwarding Tree View
- Reverse Path View
- Neighbor View

Use the map views for the following tasks:

- Troubleshoot and investigate the loss in PIM adjacency for the selected node in the network. Check the Neighbor View.

- Find the reason for the multicast flow to be disrupted and not able to reach the intended destination. Check the Reverse Path.

- Find the complete multicast flow (*, G) and (S, G) in the network. Identify the nodes connected to the receivers of the selected flow. Check the Forwarding Tree.

- Monitor the IP Multicast traffic flow rate available on the map views. The performance data is only available after you install the iSPI Performance for Metrics.

The iSPI for IP Multicast uses the default map settings of NNMi to show the number of nodes on the map views. If you want to change the settings, use the NNMi console. For more information, see *Configure Default Map Settings*.

The iSPI for IP Multicast uses NNMi capability to export the current map view to Visio documents for later use. For more information, see *Help for NNMi, Monitor with Map Views.*

For more information about the map views, see IP Multicast Map Symbols.

Forwarding Tree map view

The Forwarding Tree map view shows the available multicast routing distribution trees for a specific (source, group) pair that a packet can take to reach the interested receivers. The map view shows the real-time traffic path from the Source node or Rendezvous Point (RP) node to all the downstream receivers.

All the downstream trees (towards the receivers) are available from the starting-point on the map view. The iSPI for IP Multicast Forwarding Tree uses arrows for the direction of data flow, thickness of connection lines, and color to indicate the following:

- Forwarding Tree based upon source-specific trees (Shortest Path Tree). The thin pink-colored connection lines are used to show the Shortest Path Tree (S, G). The shortest tree always starts from the node.

- Forwarding Tree based upon shared trees (*.G). The thick orange-colored connection lines are used to show the shared tree (*, G). The shared tree starts from the Rendezvous Point (RP) node.

The iSPI for IP Multicast introduces the multicast-specific icons on the map views. For more information, see IP Multicast Map Symbols. The quick view option is not available for the receiver icons on the map view.

Use the Forwarding Tree map view for the following tasks:

- Find the IP Multicast traffic flow in the downstream direction.

- Monitor the Multicast traffic flow rate.

- Find the Shortest Path Tree and Shared Tree from the map view.

- Troubleshoot the cause of congestion or loss of connectivity in the multicast traffic flow. For example, if the multicast flows passing through the nodes is more than the expected value.Check the IP Multicast report.

- Find the nodes and interfaces receiving the degraded flow. Check the flow rate available on the map view.

- Find the Rendezvous Point (RP) node in the multicast flow.

Messages in the map views

You can troubleshoot your network by checking the messages listed on the map views. The messages are categorized as follows:

- Long messages

- Tool Tip

Example of the message appearing on the map views:

The starting node is not available in the topology. This message appears when you select a node that is not discovered in the IP Multicast topology.

Related Topics:

About Map Symbols

Accessing the Forwarding Tree map view

Accessing the Forwarding Tree map view

You can access the forwarding tree map view for the selected (Source, Group) to find out the nodes and interfaces participating in the active flow.

To start a Forwarding Tree map view, follow the steps:

1. From the **Workspaces** navigation pane, click **IP Multicast-> IP Multicast Flow**. The IP Multicast flow view opens in the right pane.

2. In the IP Multicast Flow view, select one of the (Source, Group) pair from the available multicast flows.

3. Select **Actions-> IP Multicast-> Forwarding Tree**. The forwarding tree graph opens in a new window.

4. Select an option from the Forwarding Tree map view toolbar. See Options.

5. Click the ⟳ **Compute** icon.

Options available in map view toolbar

Option	Description
Tree From Source	A tree view that starts from the starting-point router as a source towards the receivers. The forwarding tree uses arrows to indicate direction of data flow.
Tree From Rendezvous Point	A tree view that starts from the Rendezvous Point (RP) node of the group towards the receiver. The tree proceeds downstream (towards the receivers) from the starting-point as the RP node. The forwarding tree map view from the RP node is always a shared tree (*, G).
Tree From Router	A tree view from the specified router. Type the router's hostname or the IP Address to view the forwarding tree map view. The forwarding tree map view from a node is always a shortest tree (S, G).

The Forwarding Tree map view shows the following:

- Node name and status

- PIM interface and status

- Source node

- Receivers connected to the node

- RP node

- Long and short messages if the map view is not complete or not able to start.

- Flow rate

- Direction of the arrow

- Shortest tree and Shared tree

- Total number of map objects such as node, source, and receiver

- Quick View

- Last update time and date

Troubleshooting the network connectivity from the Forwarding Tree view, follow the steps:

1. Navigate to the **IP Multicast Forwarding Tree view.**

2. Check the flow rate available on the PIM interface.

3. To open the node or interface, use any *one* of the following:

   - Double-click the node or interface whose status is down.

   - Select the node, click the ⌂ **Open** icon.

4. Navigate to the **Incidents** tab to view the incident and troubleshoot the cause of loss of network connectivity.

Related Topics:

About Map Symbols

Reverse Path View

The Reverse Path map view shows the multicast routing path that a packet takes from a receiver or the selected router to reach the source or the Rendezvous Point (RP) node.

All the upstream paths (towards the source) are available from a receiver on the map view. The map view shows nodes and interfaces participating in the upstream path (towards the source). The Reverse Path map view uses NNMi shapes and status color for the nodes. In addition, shows the arrows for the direction of traffic flow. The iSPI for IP Multicast introduces the icons, color of the connection lines to indicate the following:

- Reverse Path based on source-specific trees (Shortest Path Tree). The thin pink-colored connection lines are used to show the Shortest Path Tree (S, G).

- Reverse Path based on Shared Tree. The thick orange-colored connection lines are used to show the Shared Tree (*, G).

The iSPI for IP Multicast introduces the multicast-specific icons on the map views. For more information, see IP Multicast Map Symbols. The quick view option is not available for the receiver icons on the map view.

Use the Reverse Path map view for the following tasks:

- Find the IP Multicast traffic flow from a receiver or router in the upstream direction.

- Navigate to the Multicast Node form or PIM interface form.

- Diagnosing the connectivity problems. Reverse Path view shows the nodes and PIM interfaces participating in the current path. You can quickly identify problematic interfaces or nodes where the flow rate is degrading. The flow rate is available if the iSPI Performance for Metrics is installed and running.

- Monitor the Multicast traffic flow rate if the iSPI Performance for Metrics is installed.

- Navigate to the neighbor view to check and compare the network topology.

- Find the RP node in the multicast traffic flow.

Messages in the map views

You can troubleshoot your network by checking the messages listed on the map views. The messages are categorized as follows:

- Long messages that appear when you start the map or when the map view is incomplete.

- Tool Tip appears on the map views.

Example of the message appearing on the map views:

The RP Node is not available in the discovered multicast topology. This message appears when the RP node is either not managed by NNMi or currently out of service.

Related Topics:

Map Symbols

Accessing the Reverse Path map view

Accessing the Reverse Path View

You can access the reverse path view for the selected (Source, Group) to find out the nodes and PIM interfaces participating in the current path.

To launch a Reverse Path map view, follow the steps:

1. From the **Workspaces** navigation pane, click **IP Multicast-> IP Multicast Flow**. The IP Multicast flow view opens in the right pane.

2. In the IP Multicast Flow view, select any one of the IP Multicast flow, and then click **Actions->Multicast-> Reverse Path**. The reverse path map view appears in a new window.

3. Select an option from the Reverse Path map view toolbar. See Options.

4. Click the ⟳ **Compute** icon.

Options available in map view toolbar

Type	Description
Path To Source	Select **Source** from the list. After you chose an option, the map view appears from the receiver or the router towards the source node.
Path To RP	Select **Rendezvous Point** from the list. After you chose the option, the map view appears from the receiver or the router towards the Rendezvous Point node.
Starting From Receiver	Select Receiver from the list. After you chose an option, the map view appears from the receiver to the source or the RP node.
From Router	Starts a map view from the specified router to source. Specify the router's name to view the reverse path view.

Troubleshooting the network connectivity from the Reverse Path map view, follow these steps:

1. Navigate to the **IP Multicast Reverse Path map view.**

2. Check the flow rate available on the multicast-enabled node.

3. To open the node or interface, use any *one* of the following:

   - Double-click the node or interface whose status is down.

   - Select the node, click the △ **Open** icon.

4. Navigate to the **Incidents** tab to view the incident and troubleshoot the cause of loss of network connectivity.

Related Topics:

Map Symbols

IP Multicast Neighbor View

The Neighbor view provides the PIM neighbors topology associated with the selected node. With the iSPI for IP Multicast, you can launch the neighbor view of the selected node. In addition, the Neighbor view shows the neighboring relationships of the multicast-enabled interfaces in the subnet.

The iSPI for IP Multicast introduces the multicast-specific icons on the map views. For more information on map symbols, see IP Multicast Map Symbols.

Use the Neighbor map view for the following tasks:

- Find the PIM neighbor topology of the selected node or interface.

- Find the PIM neighbor adjacency of the selected node. Understand the node connectivity between your devices.

- Troubleshoot the cause of congestion or disruption in the multicast traffic flow by checking the neighbor topology and compare the forwarding tree view or reverse path with the neighbor view.

The Neighbor View provides the following information:

- PIM neighbor topology of the selected node. The selected node appears in the bold text on the map view.

- Number of hops in the topology. The maximum number of hops available in a neighbor view is 9. You can select the hops from the map view toolbar.

- Shows the node and interface status. Double-click the node or interface to view the node or interface form.

- Shows the performance data such as percentage utilization in and out for each PIM interface. The Utilization In and Out metrics help you find out the incoming and outgoing multicast traffic from the PIM interfaces. This performance data is only available if the iSPI Performance for Metrics is installed and running.

- Quick View option is available for the multicast nodes and interfaces.

- Messages appear when the neighbor view does not appear as per the requirement.

Related Topics:

About Map Symbols

Accessing the Neighbor map view

Accessing the Neighbor map view

You can access the map view for the selected node or interface to find the neighbor topology:

To launch a Neighbor map view:

1. From the **Workspaces** navigation pane, click **IP Multicast-> IP Multicast Nodes** view The IP Multicast Node view opens in the right pane.

2. Click the ☑ selection box to select a node of interest to view the neighbor topology. Select **Actions-> IP Multicast->Neighbor View**.

3. From the map view toolbar, select the number of hops. The default number of hops is 1 for the Neighbor view. The Neighbor view appears.

To launch a Neighbor view from the Reverse Path or Forwarding Tree View:

1. Navigate to the Forwarding Tree view. From the **Workspaces** navigation pane, click **IP Multicast->**

IP Multicast Flow view. The IP Multicast flow view appears.

2. Click the ☑selection box to select a flow of your interest to view the forwarding tree or reverse path map view. Select **Actions-> IP Multicast->Forwarding Tree View**. The forwarding tree appears.

3. Select a node from the tree or path view and click **Actions-> IP Multicast->Neighbor View.**

4. From the map view toolbar, select the number of hops. The default number of hops is 1 for the Neighbor view. The Neighbor View appears.

You can access the map view for the selected node or interface to find out the PIM neighbor topology.

IP Multicast Map Symbols

The iSPI for IP Multicast uses NNMi shapes and symbols for the nodes and interfaces. The iSPI for IP Multicast introduces the new map symbols to represent the IP Multicast objects such as source and receiver nodes on the map views. Similar to NNMi, the background shape indicates the type of the device and the color of the background shape indicates the current health of the device.

Symbols

Icon	Description
	Shows the source node of the selected IP Multicast flow (S, G).
	Shows the receiver node of the selected IP Multicast flow (S, G).
	Shows the subnet icon. The subnet icon appears on the Neighbor view.

Connection Lines

Type	Description
Thick lines	Shows the shared tree (*, G) on the map view.
Thin lines	Shows the shortest path (S, G) on the map view.

Colors of the Connection Lines

Type	Description
Pink	Used to show the shortest path on the map view.
Orange	Used to show the shared tree on the map view.

Related Topics:

Forwarding Tree View

Using the Map View Toolbar

The iSPI for IP Multicast provides the map view toolbar to help you customize your map views for the following tasks:

- Shows the Forwarding tree from the source or RP or the router.

- Shows the Reverse path from the receiver or the router.

The map view toolbar contains the NNMi icons such as Open, Refresh, Status Refresh, Find, and Quick view. For more information, see *NNMi Help, Using the View Toolbars.*

The following table lists the iSPI for IP Multicast forwarding tree icons:

Forwarding Tree Map Toolbar Options

Option	Description
Tree From	Select the Source or RP from the list to show the forwarding tree. The forwarding tree starts from the selected source or RP node.
Hostname/ IP address	Specify the router name or IP address from where you want to view the forwarding tree.

The following table lists the iSPI for IP Multicast reverse path icons:

Reverse Path Map Toolbar Options

Icon	Description
Path To	Select an option **Source** or **RP** to draw the reverse path.
Starting From	Select an option from the list to start the Reverse Path view. The available options are: **Router** - Specify the name or IP address in the map view. **Receiver** - Select the option to start the reverse path.
Hostname/ IP address	Specify the router name or IP address from where you want to view the reverse path.

The following table lists the iSPI for IP Multicast Neighbor view icons:

Neighbor View Map Toolbar Options

Option	Description
Number of Hops	Select the value from the hop drop-down box. For example, select the value 5. The neighbor view appears with the 5 hops.

IP Multicast Incidents

You can check the iSPI for IP Multicast incidents from the IP Multicast inventory or NNMi Incidents Browsing workspace. An incident notifies you that something important has occurred on the Multicast network that requires your attention. An incident occurs if any fault or change is detected in the Multicast network. After the incidents are generated, check the inventory views for the updated status.

The following IP Multicast incidents appear on the console:

IP Multicast Incidents

IP Multicast Incident Name	Description
PIMNeighborInvalid	Appears when the state of the neighbor is Invalid.
PIMNeighborInconsistent	Appears when the state of the neighbor is Inconsistent.
PIMInterfaceNotInService	Appears when the state of the PIM interface is NotInService.
PIMInterfaceTransient	Appears when the state of the PIM interface is transient.(NotReady or CreateAndGo or CreateAndWait or Destroy state)
MulticastNodeDisable	Appears when the state of the Multicast-enabled node is disabled.
PIMInterfaceNotNormalInMCNode	Appears when the state of one of the interface on the node is not normal.
PIMNeighborNotNormalInMCNode	Appears when the state of one of the neighbor is not normal.
AllPIMInterfaceNotNormalInMCNode	Appears when the status of all interfaces is not normal.

You can launch the Multicast incidents in the following ways:

To access the incidents from the **NNMi Incident Browsing** workspace:

1. From the incidents view, click the **Open** icon in the iSPI for IP Multicast specific row to view the details of the selected incident.

2. From the left pane, source object attribute, click the **Open** icon to view the occurrence of the incidents.

To access the incident from the **IP Multicast** workspace:

1. From the IP Multicast views, click the **Open** icon to open the specific iSPI for IP Multicast form.

2. Click the **Incidents** tab to view all the incidents related to the IP Multicast node and interfaces.

Actions Available in the iSPI for IP Multicast

With the iSPI for IP Multicast, you can view the complete connectivity of the Multicast network that you want to monitor. If you logon to the NNMi console with an operator (level 1 or level 2) or guest or administrator credentials, you can view your Multicast network by using additional user actions.

The iSPI for IP Multicast presents three additional views—**Forwarding Tree**, **Reverse Path**, and **Neighbor view**—that help you construct the multicast flow path in upstream or downstream direction and view the PIM neighbor topology. With the iSPI for IP Multicast, you can perform tasks using the following actions:

Actions Available with the iSPI for IP Multicast

Action	Description
Discover Groups	Starts a real-time check to poll the Multicast Reserved Groups.
Forwarding Tree	Shows the forwarding tree map view from the source node to the active receivers in the IP Multicast network. This action is available from the IP Multicast Flow view. For more information, see Forwarding Tree view.
Reverse Path	Shows the path from the receiver node to the source node in the network. This action is available from the IP Multicast Flow view. For more information, see Reverse Path view.
Neighbor View	Shows the PIM neighbor view from the selected node or interface. For more information, see Neighbor view.

Integration of the iSPI for IP Multicast with the iSPI for MPLS

The iSPI for IP Multicast helps you monitor the multicast services in the network. If the multicast services are used over an MPLS cloud to monitor the Multicast-VPN topology, the integration of the iSPI for IP Multicast and MPLS provides the collaborative monitoring of an MVPN topology.

The iSPI for MPLS helps you monitor the Provider Edge (PE) nodes in the L3 VPN topology. The PE routers are configured with multicast-enabled VRF (MVRF). The PE routers use the multicast services to transmit data from one PE router to another PE router by using an MPLS cloud. Monitor the multicast flows passing through the core network (PE-PE) by using the iSPI for IP Multicast and the MVPN inventory from the iSPI for MPLS.

For more information about monitoring an MVPN network, see *Help for the iSPI for MPLS*.

Introduction to the iSPI for IP Multicast Administrator

As an administrator, you can perform the following tasks

- Configure the Polling Interval
- Configure the Group Discovery Interval
- Connect to the iSPI for IP Multicast Regional Manager Connection

You can extend the NNMi capabilities and perform the following tasks for the iSPI for IP Multicast:

Manage and Unmanage Nodes

You can manage and unmanage the nodes by performing the specific tasks from the NNMi inventory views. For more information, see *Actions provided by NNMi*. You cannot specifically manage or unmanage the Multicast nodes as the management mode attribute for any multicast node is inherited from NNMi.

The iSPI for Multicast discovery process does not discover any unmanaged nodes. However, if the unmanaged node is changed into the managed mode, the scheduled discovery process updates the management mode of the iSPI for IP Multicast nodes. In addition, you can start the configuration poll for the selected nodes.

Backup and Restore Actions

You can perform the Backup and Restore Actions for iSPI for IP Multicast from NNMi. The backup and restore command for NNMi does the backup and restore for iSPI for IP Multicast. This is supported only with the embedded database and the iSPI for Multicast and NNMi are located in same management station.

You can check the multicast file in the location provided for backup and with the extension .pgd file.

Example: C*:/tmp/nnm-bak-20080924095922-multicastdb.pgd.*

For more information about the Back up and Restore operation, see *Back Up and Restore NNMi.*

Configuration Poll

(After changing the community string, select the node, and click **Action-> Configuration Poll**. For more information, see the NNMi Help, *Actions: Configuration Poll command.*

Log on to IP Multicast Workspace

After installing NNMi, use the URL to log on to the NNMi console. For more information, see*Configure Sign-In Access*.

After installing NNMi, the iSPI for IP Multicast installation process prompts you to set up the login and password for the Web Service Client user. To change the password, run the following command:

`EncryptSPIUserPasswd.ovpl`

Updating the NNMi System Password

The iSPI for IP Multicast should be configured to use same system password as NNMi. After installing the iSPI for IP Multicast, if the system password for NNMi is modified, the iSPI for IP Multicast should be updated with the new system password.

Run the following command to copy the NNMi password:

encryptmulticastpasswd.ovpl -c <domain>

where:

c - NNMi jboss to iSPI jboss communication

domain - multicast (case insensitive)

After updating the password, restart the iSPI for IP Multicast to use the new system credentials.

Updating the iSPI for IP Multicast (NNMi WebService Password)

The iSPI for IP Multicast should be configured with Web Service Client Username and Password to communicate with NNMi. Add the user in NNMi with the role of Web Service Client user and use the script to update the password.

Note: Avoid *system* role for NNMi - iSPI for IP Multicast communication. Only user having root permission can run this script.

Use the `encryptmulticastpasswd.ovpl` command to update the iSPI for IP Multicast password. This script updates the iSPI for IP Multicast password. Avoid using the System password of NNMi.

`$InstallDir/bin/encryptmulticastpasswd.ovpl -e <domain> <password>`

where: -e - encrypt supplied string

domain - multicast (case insensitive)

password - string to be encrypted

After updating the password, restart the iSPI for IP Multicast to use the new system credentials.

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Note: Avoid *system* role for NNMi - iSPI for IP Multicast communication. Only user having root permission can run this script.

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`$InstallDir/bin/encryptmulticastpasswd.ovpl -e <domain> <password>`

where: -e - encrypt supplied string

domain - multicast (case insensitive)

password - string to be encrypted

After updating the password, restart the iSPI for IP Multicast to use the new system credentials.

Discovering Your IP Multicast Network

 You can monitor the IP Multicast nodes, interfaces, and flows from the IP Multicast inventory after you complete the IP Multicast discovery process.

You can discover the IP Multicast nodes and objects by the following:

- Install NNMi and iSPI for IP Multicast to monitor the network.

- Install the iSPI for IP Multicast on an NNMi management server that is already managing the network.

After you install NNMi and iSPI for IP Multicast, seed the nodes from the NNMi console. The NNMi discovery process starts and discovers the nodes in the network. The iSPI for IP Multicast discovery process starts automatically after the completion of NNMi discovery process. When you add a Multicast node in the topology, NNMi discovery process detects the change in network and sends a notification to the iSPI for IP Multicast discovery process to start. Similarly, when you delete a node, NNMi discovery process detects the interfaces residing on the node and deletes the corresponding dependencies for the deleted node in all the views. By default, the discovery schedule for NNMi and iSPI for IP Multicast is set to 24 hours.

After installing the iSPI for IP Multicast on an NNMi management server, you can wait for the next discovery cycle of NNMi, or you can perform the Configuration Poll to discover the IP Multicast nodes immediately. The iSPI for IP Multicast discovery process does not discover the nodes that are already discovered by NNMi.

Monitoring Multicast Network Health

The real-time monitoring of the network helps you to check and detect the faults in the network.

You can monitor the health of your multicast network by using the iSPI for IP Multicast. Before you start monitoring the network, make sure that NNMi jboss and IP Multicast jboss are running. In addition, check all the Multicast-enabled nodes and PIM interfaces appear in the views. You can the monitor and manage the network by using services such as State Poller and Causal Engine.

State Poller

The Multicast State Poller gathers information from the discovered multicast nodes and reports the state of the devices in the database. The State Poller starts the periodic polling of the Multicast nodes, interfaces and flows. The default polling interval is 10 minutes.

You can configure the polling interval as per your requirement from the **IP Multicast Configuration** workspace.

Causal Engine

The Causal Engine gathers information about status of the multicast nodes, interfaces, flows and PIM neighbors in the Multicast topology. The Causal Engine evaluates network issues, determines the root cause, and sends the incidents to notify you of problems. Thus, Causal Engine helps you monitor the health of your network.

Configuring the iSPI for IP Multicast

With the administrative privileges to NNMi console, you can access the **IP Multicast Configuration** workspace and perform the following tasks:

- Configure the polling interval for the multicast nodes and interfaces.

- Enable the polling for the Multicast Reserved Groups by using the Group Discovery tab.

- Establish the communication between the iSPI for IP Multicast Global Network Manager and Regional Managers.

The IP Multicast Configuration workspace consists of the following tabs:

Configuration Type	Description
Polling	Sets the time in minutes between the two consecutive polls for the iSPI for IP Multicast. By default, the State Poller polls periodically every 15 minutes for the state of the multicast nodes, interfaces, and PIM neighbors.
Group Discovery	Configure to poll the Multicast Reserved Groups.
IP Multicast Regional Manager Connections	Configure the Regional Manager connections from the iSPI for IP Multicast Global Network Manager (GNM). After you configure the Regional Manager connections, you can monitor the nodes and interfaces of the Regional Manager from the iSPI for IP Multicast Inventory (GNM). For more information, see *NNMi Help, Connecting Multiple NNMi Management Servers (NNMi Advanced).*

Related Topics:

- Configure the Polling Interval

- Configure the Group Discovery Interval

- Connect to the iSPI for IP Multicast Regional Manager Connection

Configure the Polling Interval

After the iSPI for IP Multicast discovers the Multicast nodes and interfaces in the network, the polling of the Multicast nodes and interfaces occur with the default polling interval. You can set the polling interval with the help of the **IP Multicast Configuration**workspace.

To configure the polling for Multicast nodes and interfaces, follow these steps:

1. Navigate to the IP Multicast Configuration workspace. From the Workspaces navigation pane, click Configuration-> IP Multicast Configuration. The IP Multicast Configuration form opens.

2. Click the **Polling** tab and specify the following details:

Node Settings

Option	Description
Enable Polling	Set the checkbox to poll the Multicast nodes. If ☑enabled, the iSPI for IP Multicast monitors the status of the Multicast nodes.
Interval	Specify the interval (in minutes) to poll the Multicast nodes.The default polling interval is 10 minutes.

Interface Settings

Option	Description
Enable Polling	Set the checkbox to poll the Multicast interfaces. If ☑enabled, the iSPI for IP Multicast monitors the status of the Multicast interfaces on node.
Interval	Specify the interval (in minutes) to poll the Multicast interfaces. The default polling interval is 10 minutes.

Performance Settings

Option	Description
Enable Polling	Set the checkbox to poll and collect the performance data for the Multicast nodes, interfaces, and flows. If ☑enabled, the iSPI for IP Multicast collects the data and send to the iSPI Performance for Metrics. The Performance data appears on the map views only if the iSPI Performance for Metrics is installed and running. If the performance data still does not appear, check the iSPI Performance for Metrics license.
Interval	Specify the interval (in minutes) to poll and collect the performance data.The default polling interval is 10 minutes

3. Click the 💾**Save** icon.

Configure the Group Discovery

All the multicast groups in the network are dynamic and tend to change so you can start the group discovery to keep your topology up-to-date. You can enable to poll the Multicast Reserved Groups.

To enable the Multicast Reserve Groups, follow these steps:

1. Navigate to the IP Multicast Configuration. From the Workspaces navigation pane, click Configuration-> IP Multicast Configuration. The IP Multicast Configuration form opens.

2. Click the **Group Discovery Configuration** tab.

3. Set the checkbox to poll the Multicast Reserved Groups. If ☐disabled, the iSPI for IP Multicast starts the group discovery for the reserved groups.

4. Click the 💾**Save** icon.

Connect to the iSPI for IP Multicast Regional Manager

The iSPI for IP Multicast provides you **IP Multicast Configuration** workspace to connect the iSPI for IP Multicast Regional Managers to the iSPI for IP Multicast Global Manager. As an administrator, you configure the Regional Managers connections to establish communication between the iSPI for IP Multicast Global Network Manager and Regional Managers.

For more information about NNMi Global Manager and Regional Manager connections, see *NNMi Help, Connecting Multiple NNMi Management Servers.*

To establish the iSPI for IP Multicast Regional Managers connection, follow the steps:

1. Navigate to the Regional Manager form.

   a. From the workspace navigation panel, select the **IP Multicast Configuration** workspace.

   b. Select the **IP Multicast Regional Manager Connections** tab.

2. Perform the following task as per your requirement:

   - To create a new configuration, click the 📄 **New** icon.

   - To edit a configuration, select a row, click the 📂 **Open** icon.

   - DO NOT delete a configuration (the ❌ Delete icon). For more information, see NNMi Help, *Disconnect Communication with a Regional Manager.*

3. Select the **Regional Manager** form, type the basic configuration settings. For more information, see basic settings.

4. From the **Connections** tab, navigate to the **Regional Manager Connection** form. For more information, see Configure to the iSPI for IP Multicast Regional Manager.

5. Click 💾 **Save** to return to the Regional Manager form.

6. Click 💾 **Save**. The iSPI for IP Multicast Global Network Manager establishes communication with the specified Regional Manager.

Basic Settings

Attribute	Description
Name	Type a meaningful name of the Regional Manager connection. This name appears in the IP Multicast Node inventory.
	Note: The iSPI for IP Multicast Regional Manager name should be same as the NNMi Regional Manager name.
Description	Provide any description that would be useful for communication purposes within your team.

Related Topic:

Configure to the iSPI for IP Multicast Regional Manager

Configure the iSPI for IP Multicast Regional Manager

The iSPI for IP Multicast provides you **IP Multicast Configuration** workspace to connect the iSPI for IP Multicast Regional Managers to the iSPI for IP Multicast Global Manager. As an administrator, configure the iSPI for IP Multicast Global Manager to communicate with other Regional Managers across the globe.

Before you configure the iSPI Regional Manager connection, make sure that NNMi Regional Manager is already configured. The name of the iSPI for IP Multicast Regional Manager should be same as NNMi Regional Manager to establish the connection.

To configure the iSPI for IP Multicast Regional Manager connection, follow these steps:

1. Navigate to the Regional Manager Connection form.

   a. From the workspace navigation panel, select the **IP Multicast Configuration** workspace.

   b. Select the **Regional Manager Connection** tab.

2. Type the connection configuration settings for the iSPI for IP Multicast Regional Manager connection. See connection configuration settings. If the Regional Manager is configured for high-availability, enter configuration settings for each server in the high-availability group (application fail-over).

3. Click 🖫 **Save** to return to the Regional Manager form.

4. Click 🖫 **Save** to return to the IP Multicast Configuration form. The iSPI for IP Multicast establishes communication with the Regional iSPI for IP Multicast management server. The Regional Manager forwards information about discovery and monitoring results.

To verify that the NNMi Regional Manager connection is working*, see NNMi Help, Determine the State of the Connection to a Regional Manager.*

Connection Configuration Settings for a Regional Manager of the iSPI for IP Multicast

Attribute	Description
Hostname	The fully-qualified hostname of the Regional iSPI for IP Multicast management server. The iSPI for IP Multicast uses this hostname for communication with the Regional iSPI for IP Multicast management server and to construct URL Actions. See *NNMi Help, Authentication Requirements for launch URLs* Access.
	Note: If you want NNMi to use secure sockets layer encryption (HTTPS) to access this Regional iSPI for IP Multicast management server, the value is case-sensitive and must match the hostname as specified in that server's SSL Certificate.
Use Encryption	If ☐ disabled, the iSPI for IP Multicast uses hypertext transfer protocol (HTTP) and plain sockets to access the iSPI for IP Multicast Regional management server.
	If ☑ enabled, the iSPI for IP Multicast uses secure sockets layer encryption (HTTPS/SSL) to access the iSPI for IP Multicast Regional management server.
HTTP(S) Port	Default value for HTTP port for the iSPI for IP Multicast is 8084.
	Default value for HTTPS port for the iSPI for IP Multicast is 14043.
	If ☐ Use Encryption is disabled (previous attribute), type the port number for HTTP access to the iSPI for IP Multicast console on the Regional management server.
	If ☑ Use Encryption is enabled (previous attribute), type the port number for HTTPS access to the iSPI for IP Multicast console on the Regional management server.
	For IP Multicast ports, check the port numbers from the `nms-multicast-ports.properties` file. Open the nms-multicast-ports.properties file from the `%NnmDataDir%\shared\multicast\conf` or `$NnmDataDir/shared/multicast/conf` directory on the management server, and then note down the iSPI for IP Multicast HTTP and HTTPS values if you are not using the default values.
User Name	Type the user name required for the iSPI for IP Multicast sign-in for the **system** account on the iSPI for IP Multicast Regional management server.

Attribute	Description
User Password	Type the password for the iSPI for IP Multicast **system** account on the iSPI for IP Multicast Regional management server.
Ordering	A numeric value. The iSPI for IP Multicast checks for configuration settings in the order you define (lowest number first). The iSPI for IP Multicast uses the first match found for each address. Provide a unique connection ordering number for each Regional Manager configuration.

Track Your IP Multicast Licenses

To assist you in tracking your IP Multicast licenses, the iSPI for IP Multicast shows a report of the current number of discovered nodes, interfaces and flows. To view the current IP Multicast licensed capacity, access **View Licensing Information** from either of the following locations:

- **Help for NNM iSPIs → iSPI for IP Multicast System Information**

- About HP Network Node Manager i Software.

The three types of the iSPI for IP Multicast licenses are:

- **Instant-on**: The Instant-on license is an evaluation license. The valid period of this license is sixty days.

- **Points Based**: The Points-based license is the actual points used the iSPI for IP Multicast. The usage of points appear in the iSPI for IP Multicast system information.

- **Migration**: The update licenses are valid only for the user updating from pervious versions (7x.x) of the Multicast SPI.

The following tabs appear in the **iSPI for IP Multicast System Information**:

Licensing Tabs

Name	Purpose
License Report	Shows the total points used by the iSPI for IP Multicast.
Topology Statistics	Shows the total number of IP Multicast objects monitored by the iSPI for IP Multicast. The IP Multicast objects are IP Multicast Nodes, PIM Interfaces, and IP Multicast Flows.

Install or Extend the iSPI for IP Multicast Licenses:

After you purchase a software license, install the iSPI for IP Multicast Software License key using any *one* of the following methods used by NNMi.

At the command prompt from the NNMi management server, use the following:

Windows:
```
%NnmInstallDir%\bin\nnmlicense.ovpl <MCSPI> -f <license_file>
```

UNIX:
```
opt/OV/bin/nnmlicense.ovpl <MCSPI> -f <license_file>
```

From the Autopass user interface, use the following:

Windows:
```
%NnmInstallDir%\bin\nnmlicense.ovpl MCSPI -gui
```

```
%NnmInstallDir%\bin\nnmlicense.ovpl MCSPI -g
```

UNIX:

```
opt/OV/bin/nnmlicense.ovpl MCSPI -gui
```

```
opt/OV/bin/nnmlicense.ovpl MCSPI -g
```

After you install your license from the Autopass user interface, close the license window. The license points appear in the iSPI for IP Multicast system information only after you close the window.

For more information, see *NNMi Help, Extend a License Capacity.*

To extend the licensed capacity, purchase and install an additional iSPI for IP Multicast License. Contact your HP Sales Representative or your Authorized Hewlett-Packard Reseller for information about the iSPI for IP Multicast licensing structure, and to learn how to add license tiers for enterprise installations.

To obtain additional license keys, go to the HP License Key Delivery Service: https://-webware.hp.com/welcome.asp.

Troubleshooting the iSPI for IP Multicast

The following list helps you troubleshoot and monitor the network by using the IP Multicast inventory:

The iSPI for IP Multicast jboss (mcastjboss) is not working.

- Check that NNMi is running.

- Check the installation log file (`HPOvMcastiSPI_09.00_HPOvInstaller.txt`).

- Check system configuration as specified in the IP Multicast Release Notes and Support Matrix.

- Check NNMi port and NNMi JNDI port are the same as specified at the time of NNMi installation in the `nnm.extended.properties` file and `nms-multicast.ports.properties` file.

- Check NNMi username and password are same as specified at the time of NNMi installation.

The iSPI for IP Multicast jboss (mcastjboss) is not able to connect to the Oracle database.

Check the Oracle database instance name, username, and password in the `nms-ds.xml` and `multicast-oracle-ds.xml` file.

The iSPI for IP Multicast jboss (mcastjboss) is not running and the log error message is Out of Memory.

Verify that the system virtual memory. Increase `Xmx`parameter for jboss as documented in Release Notes.

The iSPI for IP Multicast is not discovering the Multicast devices.

- Check that the device is responding to the SNMP queries.

- Check an SNMP configuration for NNMi such as community string and SNMP interval based on your network latency. Run `nnmsnmpwalk` command to verify that the device responds to SNMP. For further details on how to configure SNMP parameters on NNMi, see NNMi Help.

The multicast-enabled nodes are missing or deleted or unmanaged

Check if the nodes are deleted or unmanaged by NNMi. In addition, verify that the nodes are not responding to Internet /SNMP queries.

The IP Multicast Incidents are not appearing on the console.

- Check the Management Event configuration. For more information, see *Help for NNMi.*

- Check the SNMP trap service. If the service is stopped, restart the service and NNMi processes.

Discover all the iSPI for IP Multicast devices (only for an embedded database)

The following command removes all the nodes and configurations from the current installation. Avoid using the command unless required urgently.

Only for Embedded database

- Use `OV_BIN/nnmresetembdb.ovpl` to clear the iSPI for IP Multicast and NNMi topology.

- Re-seed all the nodes. This action starts the discovery process but takes significant time.

Rediscover a set of multicast nodes

Select the nodes from NNMi inventory and click **Actions-> Configuration Poll.**

Appendix B: Index