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# HPE Network Node Manager iSPI for IP Multicast Software

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for the Windows® and Linux® operating systems

Online Help

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# HPE Network Node Manager iSPI for IP Multicast Software

The HPE Network Node Manager iSPI for IP Multicast Software (NNM iSPI for IP Multicast) enables you to monitor the health of your multicast network.

IP multicast is a technology that efficiently sends data to a group of receivers in a single transmission to save network bandwidth. It is ideal for applications where the source transmits a large set of data to many destinations at one time.

The NNM iSPI for IP Multicast works in conjunction with NNMi to gather information about your multicast network. The NNM iSPI for IP Multicast monitors the multicast flows passing through the multicast-enabled nodes and Protocol Independent Multicast (PIM) interfaces.

Examples of the applications using an IP Multicast network:

- Webcasts or audiocasts
- Distance learning or video conferencing
- Inventory, pricing, or stock data delivered to many destinations simultaneously

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

The NNM iSPI for IP Multicast, in conjunction with NNMi, enables you to perform the following tasks:

- Discover and monitor the IP multicast routing topology in your network management environment.
- Monitor the health of multicast-enabled nodes, PIM interfaces, and neighbors.
- Monitor the flows against the expected flow topology.
- View the list of receivers of a particular multicast flow.
- Troubleshoot the network by using the IP multicast map views such as [Forwarding Trees](#), [Reverse Paths](#), [Neighbor Views](#), and [Snapshots](#).
- Monitor the IP multicast Inventories from the Global Network Manager and Regional Manager.
- Monitoring the incidents based on IP multicast activity to enable rapid identification of faults on the network.
- Troubleshoot the IP Multicast-VPN network by integrating with the HPE Network Node Manager iSPI for MPLS Software.
- Generate the IP multicast reports using the NNM iSPI Performance for Metrics.
- Monitor the IP multicast traffic **flow rate**<sup>1</sup> available in the map views.

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<sup>1</sup>The amount of multicast data (in bps, kbps, or mbps) passing through the PIM interfaces of the participating routers.

The traffic flow rate is available only if you deploy the HPE Network Node Manager iSPI Performance for Metrics Software.

# Help for NNM iSPI for IP Multicast Operators

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

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

The following table shows a list of tasks that you can perform with the NNM iSPI for IP Multicast to monitor and troubleshoot your network:

Task	Help Topics
View an IP Multicast inventory	<a href="#">Monitoring Your Network with the IP Multicast Inventory</a>
View the details of the multicast nodes, interfaces, and flows	<a href="#">Monitoring Your Network with IP Multicast Forms</a>
Troubleshoot the multicast topology by using the map views	<a href="#">Viewing the Network Connectivity</a>
Monitor the multicast network	<a href="#">Monitoring Multicast Network Health</a>
View the multicast incidents	<a href="#">Incidents Related to IP Multicast Nodes and Interfaces</a> or <a href="#">Incidents Related to IP Multicast Flows</a>

## Monitoring Your Network with the IP Multicast Inventories

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

In addition, you can use IP multicast inventories to perform the following functions as well:

- See device details in tables
- Navigate and open the IP multicast forms and map views

The NNM iSPI for IP Multicast adds a new workspace to the NNMi console—the **IP Multicast** workspace. You can access all the IP multicast inventories from the **IP Multicast** workspace. The IP multicast inventories provide a comprehensive list of all the discovered multicast nodes, PIM interfaces, and multicast flows (S, G) on the network.


#### Types of IP Multicast Inventories

Inventory Name	Purpose
IP Multicast Nodes Inventory	Provides a list of the multicast-enabled nodes on the network.
IP Multicast Interfaces Inventory	Provides a list of the PIM interfaces on the network.
IP Multicast Flows Inventory	Provides a list of flows along with the monitoring status.

To view the IP Multicast inventories:

1. From the Workspaces navigation panel, click IP Multicast
2. Click the inventory of your interest. For example, IP Multicast Nodes inventory

You can also perform the following actions from the inventories:

- View details about an IP multicast object by clicking  (the **Open** 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 only for select columns.

#### Related Topics:

[IP Multicast Nodes View](#)

[IP Multicast Interfaces View](#)

[IP Multicast Flows View](#)






### IP Multicast Nodes Inventory







The IP Multicast Nodes view provides a list of multicast nodes that are accessible to you.

Use the IP Multicast Nodes view for the following tasks:

- Monitor the IP multicast-enabled nodes.
- View the status of an IP multicast-enabled node. Sort the inventory by **Status** to view the critical multicast nodes.
- Navigate to the node form or analysis pane 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	<p>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:</p> <ul style="list-style-type: none"> <li> No status - If a node is not polled or not managed, the status of the node is No status. The newly discovered nodes waiting for the first polling and the nodes that are down (out of service) also display No status.</li> <li> Normal - The status of the multicast-enabled node is Normal if the node is polled and the status of each PIM interface on the node is Normal.</li> <li><input checked="" type="checkbox"/> Disabled - The status of the node is Disabled if the multicast capability on the node is disabled.</li> <li> Unknown - If there is no SNMP response for the selected node, the status of the multicast-enabled node is Unknown. This is possible only when the selected node is not reachable at the time of polling.</li> <li> Minor - The status of the node is Minor if the node is polled and at least the status of one of the PIM interfaces is Critical or Warning.</li> <li> 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.</li> </ul>
Name	The name assigned to the multicast-enabled node.
Hostname	The fully-qualified hostname for the device. currently stored in the NNMi database for this device.
Tenant	A tenant is the top-level organization to which a node belongs.  If you change the name of a tenant in the NNMi, the new name will appear in this inventory only if you do a manual configuration poll on the node or after the next scheduled discovery of the node in the NNM iSPI for IP Multicast.
Device Profile	The name of the device profile that determines how the devices of this type are managed.
Num (Nbr)	The count of multicast PIM neighbors for the node.
Num (S, G)	The count of multicast groups present in the node.
State	<p>The state of the polled multicast routers. Possible values are:</p> <ul style="list-style-type: none"> <li>○ <b>Enabled</b> - The multicast capability on the node is enabled.</li> <li>○ <b>Disabled</b> - The multicast capability on the node is disabled.</li> <li>○ <b>Unknown</b> - If there is no SNMP response for the selected node and the NNM iSPI for IP Multicast is not able to determine the state of the node, the value is Unknown.</li> <li>○ <b>Not Polled</b> - If the selected node is not polled on the basis of the con-</li> </ul>

Attribute	Description
Management Server	<p>figuration settings, value is Not Polled.</p> <ul style="list-style-type: none"> <li>◦ <b>No Polling Policy</b> - Indicates the node is being polled, but no polling policy exists in Monitoring Configuration settings for this monitored object.</li> </ul> <p>The Management server attribute helps you identify whether the selected node is part of the Regional Manager or Global Network Manager. Possible values are:</p> <ul style="list-style-type: none"> <li>• <b>Local</b> - The node is managed by the same NNMi management server you are currently signed into.</li> <li>• <b>Name</b> - The name of the Regional Manager. The name is assigned by the administrator while configuring the Regional Manager. A &lt;name&gt; value means that you are currently signed into a Global Manager, and other NNMi management servers report to this NNMi management server.</li> </ul> <p>Indicates whether the node is being managed by NNMi or not. This field also informs you if the node is temporarily out of service. Possible values are:</p>
NNM Management Mode	<ul style="list-style-type: none"> <li>•  Managed - Indicates the node is managed by NNMi.</li> <li>•  Not Managed - Indicates the node is not managed by NNMi.</li> <li>•  Out of Service – Indicates a node is unavailable because it is inactive or down.</li> </ul> <p>Indicates whether the node is being managed by the NNM iSPI for IP Multicast or not. Possible values are:</p>
SPI Management Mode	<ul style="list-style-type: none"> <li>•  Managed - Indicates the node is managed by the NNM iSPI for IP Multicast.</li> <li>•  Not Managed - Indicates the node is not managed by the NNM iSPI for IP Multicast. The NNM iSPI for IP Multicast does not monitor these nodes and you cannot perform any action except Neighbor View on them.</li> <li>•  Not Applicable – Indicates a node is not managed by NNMi or out of service. The NNM iSPI for IP Multicast cannot manage these nodes.</li> </ul> <p>If your role permits, you can change the management mode settings by performing the actions <b>Manage</b> and <b>Not Managed</b>. You cannot sort this field. For more information, see <a href="#">Managing and Stop Managing Nodes</a>.</p>

### Filtering IP Multicast Nodes from the IP Multicast Nodes View



You can filter the nodes through attributes<sup>1</sup> available in the IP Multicast Nodes view.

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

1. Right-click any column from the IP Multicast Nodes view.
2. Select any one of the following filters:
  - Is not empty
  - Is empty
  - Create filter
3. To create a new filter, select **Create Filter**.
4. Select an option from the list.
5. Type the value in the text box if required. Click **Apply**.

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

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


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

In addition, you can view the specific IP Multicast enabled nodes from the NNMi Node Group of your choice. To select the node group, follow these steps:

- From the **Workspaces** navigation pane, click **IP Multicast -> IP Multicast Nodes**
- Click the  NNMi Node Group filter drop down option. The auto-complete feature is available for this field. For more information on autocomplete feature, see *Use Autocomplete* section under the *HPE NNMi Online Help for Administrators*.
- Choose a node group from the drop down list that you want
- The IP Multicast enabled nodes belonging to the selected NNMi Node Group will be displayed

### **Analysis Pane**

The Analysis Pane displays related information about a selected node. The name of the selected node, the name of the tenant to which the selected node belongs, and the status of the node appear in the left panel. The right panel displays some of the important details of the selected node like the conclusions, management address, list of interfaces, and so on.

**Note:** The Analysis Pane remains blank until an object is selected. If you select multiple objects or clear a selection, the NNM iSPI for IP Multicast clears the Analysis Pane's contents. Click  (the **Refresh** icon) in the Analysis Pane to manually refresh the contents of the pane.




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<sup>1</sup>Status, Name, Hostname, Device Profile, Num (Nbr), Num (SG), State, Management Server, and so on

## Managing and Stop Managing Nodes

The NNM iSPI for IP Multicast manages all multicast-enabled nodes by default if they are managed by NNMi. The NNM iSPI for IP Multicast provides you an option of managing or stop managing the nodes that are managed by NNMi. You can select the nodes that you do not want to manage and perform the action **Not Managed**. The nodes that are unmanaged by the NNM iSPI for IP Multicast may still be managed by NNMi.



If your NNMi console is a Global Manager and the selected object is being managed by a Regional Manager, you cannot change the Management Mode setting unless you log on to the Regional Manager.

In the SPI Management Mode column, the managed nodes display the icon -  Managed and unmanaged nodes display the icon -  Not Managed. If the nodes are Not Managed by NNMi or if they are Out of Service, NNM iSPI for IP Multicast cannot manage them and the nodes display the icon -  Not Applicable.

In case of an unmanaged node, note the following:

- Configuration poll and status poll do not take place on the unmanaged node and its interfaces.
- The node's interfaces and multicast groups are excluded from fault and performance polling.
- The status of a node is set to No Status.
- You cannot perform any action except Neighbor View on an unmanaged node.
- The NNM iSPI for IP Multicast does not update the information on the unmanaged nodes. However, the NNM iSPI for IP Multicast displays all previous data, which is based on the last discovery results.
- If the forwarding tree and reverse path pass through an unmanaged node, the path after the unmanaged node may not be visible to you. The NNM iSPI for IP Multicast displays a warning message when the forwarding tree or reverse path encounters any unmanaged node.
- If the number of managed routers participating in a multicast flow becomes zero, the NNM iSPI for IP Multicast deletes the flow from the inventory.
- Your license points are not consumed for the unmanaged nodes.



### To stop managing nodes:

1. From the **Workspaces** navigation pane, click **IP Multicast -> IP Multicast Nodes**. The IP Multicast Nodes view appears.
2. In the IP Multicast Nodes view, select the nodes that you want to un-manage and select **Actions -> IP Multicast -> Not Managed**. A message confirms that you are not managing the selected nodes.
3. Click  (the **Refresh** icon). The icon -  Not Managed appears under Managed Mode column for the selected nodes.

This action does not have any impact on the nodes that are already unmanaged by the NNM iSPI

for IP Multicast or NNMi.

### To manage nodes:

1. From the **Workspaces** navigation pane, click **IP Multicast -> IP Multicast Nodes**. The IP Multicast Nodes view opens.
2. In the IP Multicast Nodes view, select the nodes that you want to manage and select **Actions-> IP Multicast -> Manage**. A message confirms that you are managing the selected nodes.
3. Click  (the **Refresh** icon). The icon -  Managed appears under Managed Mode column for the selected nodes.


### IP Multicast Node Discovery filter

In addition, you can use the IP Multicast Node discovery filter option to exclude the nodes that you do not want to discover. To exclude the nodes, follow these steps:

1. Create a node group for IP Multicast enabled devices with the name MCASTNoDiscover.
2. Add the devices that you do not want to be discovered to this group.

For more information, see *Create Node groups* in *HPE NNMi Online Help for Administrators*

To view the excluded nodes, follow these steps:

- From the **Workspaces** navigation pane, click **NNMi Inventory-> Nodes**.
- Click the  NNMi Node Group filter drop down option.
- Choose MCASTNoDiscover from the drop down list.
- The excluded nodes will be displayed.

This will ensure that in the next discovery, nodes belonging to the MCASTNoDiscover group will not be discovered. Also, these nodes will no longer be the part of IP Multicast database.

This action does not have any impact on the nodes that are already managed by the NNM iSPI for IP Multicast.

### Discover Groups


The action Discover Groups enables you to discover the multicast groups on demand. You can start a real-time check to poll the multicast groups on the nodes. This is in addition to the normal group discovery that takes place in the NNM iSPI for IP Multicast. See [Configure the Group Discovery](#).

### To discover groups, follow the steps:

1. From the **Workspaces** navigation pane, click **IP Multicast -> IP Multicast Nodes**. The IP Multicast Nodes view appears.
2. In the IP Multicast Nodes view, select the node on which you want to discover groups, and then select **Actions -> IP Multicast -> Discover Groups**.

## IP Multicast Groups Discovery filter

You can use the Groups discovery filter option to exclude groups that you do not want to discover. To exclude the groups, follow these steps:

1. From the **Workspaces** navigation pane, click **IP Multicast -> IP Multicast Nodes**
2. Select a node from the inventory and click  (the **Open** icon).
3. Click the Groups tab. You can view the list of Groups IP address.
4. Using the command line interface, navigate to the following path:

*On Linux:*

```
$NnmDataDir/shared/multicast/conf
```

*On Windows:*

```
%NnmDataDir%/multicast/conf
```

NNMi installation process creates system environment variable `NnmDataDir`, that is available to all users.

Open the `mcast-group-nodiscover.conf` file and enter the Groups IP address that you do not want to discover in the following format:

- 1.1.1.\*
- 2.2.2.\*
- 3.3.3.\*

Make sure that groups belonging to the groups IP address you entered is not monitored in the flows inventory.

5. Save the configuration.

To exclude the existing groups from the inventory, follow [step 1](#) to [step 5](#). If you have the list of Groups IP address for the groups that you do not want in discovery, you can directly follow from [step 4](#).

In the next group discovery cycle or demand discovery, all groups entered in the `mcast-group-nodiscover.conf` file will not be discovered. These groups will no longer be the part of IP Multicast database.

Also, if you remove those Group IP address from the `mcast-group-nodiscover.conf` file, they will be discovered in the next discovery cycle.

### Related Topics:

[Actions Available in the NNM iSPI for IP Multicast](#)







## IP Multicast Interfaces Inventory

The IP Multicast Interfaces view provides you with a list of PIM interfaces on the multicast nodes that are accessible to you.

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.
- View the list of interfaces available on the multicast node.
- Navigate to the Interface form to view the incidents associated with the selected interface.

### Basic Attributes

Attribute	Description
Status	<p>The overall status of the current interface of the multicast node. The Interface state and the state of the Neighbor associated with the selected interface contribute to the health of the interface. Possible values are:</p> <ul style="list-style-type: none"> <li>  No Status - Indicates one of the following:                             <ul style="list-style-type: none"> <li>◦ The interface is not managed or not polled.</li> <li>◦ The interface has just been added to the NNMi database and the Causal Engine has not yet determined the status of the interface.</li> <li>◦ The interface is down (out of service)</li> </ul> </li> <li>  Normal - The status of the interface is Normal if the Interface state is Active and the Neighbor state is Normal.                             </li> <li>  Disabled - The status of the interface is Disabled if the multicast capability on the interface is disabled.                             </li> <li>  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 reachable at the time of polling.                             </li> <li>  Warning- The status of the interface is Warning in the following conditions:                             <ul style="list-style-type: none"> <li>• The interface state is Active and the Neighbor state is invalid.</li> <li>• The interface state in the transient state as reported by <i>PIMInterfaceStatus</i> MIB.</li> </ul> </li> <li>  Critical - The status of the interface is Critical in the following conditions:                             <ul style="list-style-type: none"> <li>• The interface state is NotInService.</li> <li>• The PIM neighbor of the interface is inconsistent.</li> </ul> </li> </ul>
Hosted on Node	The name of the node where the selected multicast interface resides.
PIM IfName	The name of the PIM interface

Attribute	Description
PIM IP Address	The IP Address of the PIM interface
PIM IfAlias	The alias assigned to the PIM interface
State	<p>The state of the PIM interface. The State Poller does the polling and updates the view. Possible values are:</p> <ul style="list-style-type: none"> <li>◦ <b>Active</b> - The interface is in the normal and operational condition.</li> <li>◦ <b>Not In Service</b> - The interface is down or critical.</li> <li>◦ <b>Transient state</b>- The interface is in the transient state (Not Ready, Create And Go, or Create And Wait, Destroy) as reported by the <i>pimInterfaceStatus</i> MIB.</li> <li>◦ <b>Not Polled</b> - The interface is not polled based on the configuration settings.</li> <li>◦ <b>Unknown</b> - The SNMP agent is not responding and not able to determine the state of the interface.</li> <li>◦ <b>NoPollingPolicy</b> - No policy is set up to poll the interfaces.</li> </ul>

### Filtering IP Multicast Interfaces from IP Multicast Interfaces view

You can perform the filtering action on the attributes<sup>1</sup> available in the IP Multicast Interfaces view.

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

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
3. To create a new filter, select **Create Filter**.
4. Select an option from the list.
5. Type the value in the box if applicable and click **Apply**.

The filtered list appears in the view. The filters configured in 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 then select **Modify filter**.

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


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

### Analysis Pane

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<sup>1</sup>Status, Hosted on Node, PIM IfName, PIM IP Address, PIM IfAlias, and State

The Analysis Pane displays related information about a selected interface. The name of the selected interface and the status appear in the left panel. The right panel displays some of the important details of the selected interface like the conclusions, IP address, time of last polling, and so on.

The Analysis Pane remains blank until an object is selected. If you select multiple objects or clear a selection, the NNM iSPI for IP Multicast clears the Analysis Pane's contents. Click  Refresh in the Analysis Pane to manually refresh the contents of the pane.



## IP Multicast Flows Inventory

The IP Multicast Flow view provides a list of multicast traffic flows active on the network as well as inactive multicast flows, which are marked for monitoring. In multi-tenancy environment, only the administrators can see the inactive flows in the inventory. You can see the multicast flows in this view if you are authorized to monitor at least one of the nodes through which a particular flow passes. For more information, see [Controlling Access to the NNM iSPI for IP Multicast](#).

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**<sup>1</sup> of the selected flow. The flow rate is only available if the NNM iSPI Performance for Metrics is installed and running.
- Set a **baseline snapshot**<sup>2</sup> and monitor your flows against this baseline snapshot to find out the rate deviation, RP change, and topology changes (addition or deletion of nodes) if any.
- Monitor the flows instantly by performing the *Instant Monitoring* action.
- See the number of routers and receivers participating in the flow.
- See the [Snapshots](#).

### Basic Attributes

Attribute	Description
Status	<p>The status indicator of the multicast flow. Possible status indicators are:</p> <ul style="list-style-type: none"> <li> No status - Indicates one of the following: <ul style="list-style-type: none"> <li>• The flow is not monitored.</li> <li>• The NNM iSPI for IP Multicast flow has not completed a single monitoring cycle for the flow.</li> <li>• The flow is not managed.</li> </ul> </li> <li> Normal - The flow is present. All the receiver routers receive the multicast data and there is no deviation between the baseline snapshot and the snapshot collected for this flow during each monitoring cycle.</li> </ul>

<sup>1</sup>The amount of multicast data (in bps, kbps, or mbps) passing through the PIM interfaces of the participating routers.

<sup>2</sup>The snapshot of the standard flow, which is used as a basis for comparison.


Attribute	Description
	<p> Warning - The status of the multicast flow is Warning in any of the following conditions:</p> <ul style="list-style-type: none"> <li>• The <b>baseline</b><sup>1</sup> creation fails</li> <li>• The last snapshot creation fails.</li> </ul> <p> Critical - The status of the flow is Critical in any of the following conditions:</p> <ul style="list-style-type: none"> <li>• One or more nodes in the baseline snapshot no longer receive the multicast traffic for this flow</li> <li>• Some additional nodes, which were not in the baseline snapshot, are receiving the multicast data now</li> <li>• Flow rate deviation is more than the threshold set by the administrator</li> <li>• Change in the RP</li> </ul>
Source	The host name or IP Address of the multicast source. If the source IP address is 0.0.0.0, multicast routing uses (*, G) entry for the group.
Group	The name or IP address of the group
Tenant	The name of the tenant to which the routers participating in the flow are associated.
Flow Mode	The type of multicast flow such as Sparse, Dense, pimSparseMode, or SparseDense
RP Address	The IP address of the RP node of the flow.
Flow Rate	The amount of multicast data (in bps, kbps, or mbps) passing through the PIM interfaces of the participating routers.
Num(Routers)	The flow rate displayed in this column is taken from the PIM interfaces of the starting router.
Num(Receivers)	The number of managed routers participating in the selected flow.
Active	The number of receivers receiving the flow. If the flow is not monitored, the number of receivers is not available. The NNM iSPI for IP Multicast displays -1 as the value for all flows that are not monitored.
Monitored	Presence of a <input checked="" type="checkbox"/> check mark indicates active multicast traffic. The NNM iSPI for IP Multicast retains only those inactive flows for which monitoring is enabled. See <a href="#">Enable Monitoring</a> .
Management Mode	<p>The <input checked="" type="checkbox"/> check mark in this column shows whether the flow is being monitored or not.</p> <p>Indicates whether the flow is being managed by the NNM iSPI for IP Multicast or not. Possible values are:</p> <ul style="list-style-type: none"> <li>•  Managed - Indicates the flow is managed by the NNM iSPI for IP Multicast.</li> </ul>

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<sup>1</sup>The standard flow, which is used as a basis for comparison.



**Attribute****Description**

-  Not Managed - Indicates the flow is not managed by the NNM iSPI for IP Multicast. The NNM iSPI for IP Multicast does not generate any incident for the unmanaged flows.

If your role permits, you can change the settings by performing the actions Manage and Not Managed. For more information, see [Managing and Stop Managing Flows](#).

**Filtering IP Multicast Flows from IP Multicast Flows view**

You can perform the filtering action on the attributes<sup>1</sup> available in the IP Multicast Flows view.

**To create, modify, or remove filter in the IP Multicast Flow view:**

1. Right-click the column from the IP Multicast Flows view.
2. Select any one of the following filters:
  - Is not empty
  - Is empty
  - Create filter

The filtered list appears in the view.

3. To create a new filter, select **Create Filter**.
4. Select an option from the list.
5. Type the value in the box if required and click **Apply**.


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

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

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

**Analysis Pane**

The Analysis Pane displays related information about a selected flow. The group address of the selected flow and the status appears in the left panel. The right panel displays some of the important details of the selected flow like the source address, RP address, flow mode, management mode, active, monitored, and so on.



The Analysis Pane remains blank until a flow is selected. If you select multiple flows or clear a selection, the NNM iSPI for IP Multicast clears the Analysis Pane's contents. Click  Refresh in the Analysis Pane to manually refresh the contents of the pane.

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<sup>1</sup>Status, Source, Group, Flow Mode, RP Address, Flow Rate, Num (Routers), and so on

## Managing and Stop Managing Flows



The NNM iSPI for IP Multicast discovers all active flows as well as the inactive flows marked for monitoring by default. The NNM iSPI for IP Multicast manages all these flows by default. You can perform the action **Not Managed** if you decide not to manage a few of these discovered flows. The NNM iSPI for IP Multicast does not consume license points for the flows that are not managed.

In the Management Mode column, the managed flows display the icon -  Managed and unmanaged flows display the message -  Not Managed.

In case of an unmanaged flow, note the following:

- You cannot perform the actions related to flow monitoring and forwarding tree launch on an unmanaged flow. The NNM iSPI for IP Multicast displays the previous **baseline snapshot**<sup>1</sup> and last snapshot of the unmanaged flow, which is based on the last discovery results.
- The status of unmanaged flow is set to No Status.
- The NNM iSPI for IP Multicast does not generate any incident for an unmanaged flow even if the flow is marked for monitoring. The NNM iSPI for IP Multicast closes all the existing incidents of the unmanaged flows automatically.
- The NNM iSPI for IP Multicast does not delete an unmanaged flow from the flow inventory. In case you need to manage this flow at a later stage, you can manage it.

### To stop managing flows:

1. From the **Workspaces** navigation pane, click **IP Multicast -> IP Multicast Flows**. The IP Multicast Flows inventory opens.
2. In the IP Multicast Flows inventory, select the flows that you do not want to manage and select **Actions -> IP Multicast -> Not Managed**. A message confirms that you are not managing the selected flows.
3. Click  (the **Refresh** icon). The icon -  Not Managed appears under Management Mode column for the selected flows.

This action does not have any impact on the flows that are already unmanaged by the NNM iSPI for IP Multicast.

### To manage flows:

1. From the **Workspaces** navigation pane, click **IP Multicast -> IP Multicast Flows**. The IP Multicast Flows inventory appears.
2. In the IP Multicast Flows inventory, select the flows that you want to manage and select **Actions -> IP Multicast -> Manage**. A message confirms that you are managing the selected flows.

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<sup>1</sup>The snapshot of the standard flow, which is used as a basis for comparison.

3. Click  (the **Refresh** icon). The icon -  Managed appears under Management Mode column for the selected flows.

This action does not have any impact on the flows that are already managed by the NNM iSPI for IP Multicast.

## Monitoring Your Network with IP Multicast Forms

The NNM 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 Analysis Pane of the NNM iSPI for IP Multicast shows information about the multicast-enabled node, interface or flow.

Use the NNM 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).
- See the information about the selected multicast-enabled node, interface, or flow using the Analysis pane.

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 <a href="#">IP Multicast Node Form</a> .
IP Multicast Interface	Provides details about the selected PIM interface. For more information, see <a href="#">IP Multicast Interface Form</a> .
IP Multicast Flow	Provides details about the selected Multicast flow (S, G) in the network. For more information, see <a href="#">IP Multicast Flow Form</a> .

You can launch the NNM iSPI for IP Multicast forms by selecting a node, interface or flow from the NNM iSPI for IP Multicast inventories available in the Workspace navigation pane. For example:

To launch the IP Multicast Node 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.

### 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, groups, 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 <a href="#">IP Multicast Nodes View</a> .
Management Address	The NNM iSPI for IP Multicast uses the selected IP Address to communicate with the node through SNMP. This address is derived from NNMi.
NNM Management Mode	Indicates whether the node is being managed by NNMi or not. The possible values are <b>Managed</b> , <b>Not Managed</b> , and <b>Out Of Service</b> .
iSPI Management Mode	Indicates whether the node is being managed by the NNM iSPI for IP Multicast or not. The possible values are <b>Managed</b> , <b>Not Managed</b> , and <b>Not Applicable</b> . For more information, see <a href="#">IP Multicast Nodes View</a> .
Tenant	The name of the tenant to which the selected node belongs.
Hosted on Node	The multicast node discovered by NNMi. Click  to access the node details.

### IP Multicast Node State

Attribute	Description
State	<p>The state of the polled multicast nodes. Possible values are:</p> <ul style="list-style-type: none"> <li>◦ <b>Enabled</b>- If a node is the Multicast router, value is Enabled.</li> <li>◦ <b>Disabled</b>- If a node is not the Multicast router, value is Disabled.</li> <li>◦ <b>Unknown</b>- The SNMP agent is not responding and not able to determine the state of the node, value is Unknown.</li> <li>◦ <b>Not Polled</b> - The node is not polled on the basis of the configuration settings.</li> <li>◦ <b>No-Polling Policy</b> - No policy is found to poll the device, state is No Polling Policy.</li> </ul>
Last Polled	The time when the selected node was last polled.

### Analysis Pane

The Analysis Pane displays related information about the selected node. The name of the selected node, the name of the tenant to which the selected node belongs, and the status of the node appear in the left panel. The right panel displays some of the important details of the selected node like the conclusions, management address, list of interfaces, and so on.

### IP Multicast Node Form: General Tab

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

### Node Attributes

Attribute	Description
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(SG)	The count of multicast groups present in the selected node.
Management Address	The NNM iSPI for IP Multicast uses this IP Address to communicate with the node through SNMP. This address is derived from NNMi.
Last Discovered	The date and time when the node was last discovered by the NNM iSPI for IP Multicast.

### 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 <a href="#">IP Multicast Interface form</a> .
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 alias assigned to the PIM interface.
State	The state of the PIM interface. For information, see <a href="#">IP Multicast Interface form</a> .

### 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 active 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 - 224.0.0.255 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.

In addition, you can launch the Multicast Forwarding Tree and Reverse Path for the selected node by using the Actions menu from the console. To launch from the Groups tab, follow these steps:

- Select the group, click  (the **Open** icon).
- Click **Actions** -> **IP Multicast** -> **Launch Forwarding Tree** or **Reverse Path**. The forwarding tree or reverse path is displayed.




### Basic Attributes




Attribute	Description
Source	The hostname or IP Address of the multicast source.
Group	The name of the group or group IP address The IP Multicast nodes uses the following protocols:
Protocol	<ul style="list-style-type: none"> <li>◦ pimSparseDense</li> <li>◦ pimSparseMode</li> <li>◦ pimDenseMode</li> <li>◦ other</li> </ul>
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.
Last Modified Time	Date and time when the group was last modified.
Last Discovered	Date and time when the group was last discovered on the node.

### 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.

#### Overall Status Table

Attribute	Description
Status	<p>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:</p> <ul style="list-style-type: none"> <li> No status - If a node is not polled or not managed, the status of the node is No status. The newly discovered nodes waiting for the first polling and the nodes that are down (out of service) also display No status.</li> <li> Normal - The status of the multicast-enabled node is Normal if the multicast capability on the node is enabled and the status of all PIM interfaces on the node is Normal.</li> <li> Disabled - The status of the multicast-enabled node is Disabled if the</li> </ul>

Attribute	Description
Status Last Modified	<p data-bbox="472 247 1230 279">multicast capability on the node is administratively Disabled.</p> <p data-bbox="472 310 1357 426">  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 the node is not reachable at the time of polling.                 </p> <p data-bbox="472 457 1414 573">  Minor - The status of the node is Minor if the multicast capability on the node is enabled and at least the status of one of the interfaces is Critical or Warning.                 </p> <p data-bbox="472 604 1377 680">  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.                 </p>

#### Status History

Attribute	Description
Status History	<p data-bbox="509 827 1409 934">List of last thirty status updates along with the time stamps for the selected node. For more information, see <i>NNMi Help, Node Form: Status Tab</i>.</p>

### 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	<p data-bbox="456 1199 1391 1306">The attributes listed in the incidents tab are same as available in the NNMi Incidents form. For more information, see the Help for <i>NNMi Incidents Form</i>.</p>

For more information about the IP Multicast incidents, see [Incidents Related to IP Multicast Nodes and Interfaces](#).

### 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	<p data-bbox="440 1707 1391 1782">The overall status of the Multicast node. For information about how the current status is determined, see <a href="#">IP Multicast Node Form</a>.</p>
Time Stamp	<p data-bbox="440 1791 1417 1866">Current status is set by Causal Engine. The Time Stamp data is the time when the status of the node is last updated.</p>
Conclusion	<p data-bbox="440 1925 1409 2001">Conclusions are set by the Causal Engine after the status calculation. Possible conclusions are:</p>

Attribute	Description
	<ul style="list-style-type: none"> <li>• MulticastNodeNotPolled</li> <li>• MulticastNodeUnknown</li> <li>• MulticastNodeNormal</li> <li>• MulticastNodeDisable</li> <li>• PIMInterfaceNotNormalInMCNode</li> <li>• PIMNeighborNotNormalInMCNode</li> <li>• AllPIMInterfaceNotNormalInMCNode</li> </ul>

## IP Multicast Group Form

The IP Multicast Group form provides details about the selected source and group pair.

### To launch the Group Form:

1. From the **Workspaces** navigation pane, click **IP Multicast** -> **IP Multicast Nodes**. The IP Multicast Nodes view opens in the right pane.
2. In the IP Multicast Nodes view, select a node, and then click  (the **Open** icon). IP Multicast Node form opens.
3. Click the **Groups** tab. You can see the list of available groups for the selected node.
4. Select a group and click  (the **Open** icon). The Group Form opens.

### Basic Attributes

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

You can see the details of end receivers for the selected multicast group address from this form if you perform the action View Receivers. For more information, see [Flow Receivers](#).

### Analysis Pane

The Analysis Pane displays related information about the selected group. The group address appears in the left panel. The right panel displays some of the important details of the selected flow like the source address, group address, flow type, and so on.

### 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
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.
Source	The IP Address of the source.



Attribute	Description
Address	
Mask	The mask of the source IP address.
RP Address	The IP Address of the RP node The IP Multicast nodes use the following protocols:
Protocol	<ul style="list-style-type: none"> <li>◦ pimSparseDense</li> <li>◦ pimSparseMode</li> <li>◦ pimDenseMode</li> <li>◦ other</li> </ul>
Flow Type	The type of data that the flow contains.
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 Address	The IP address of the RP (Rendezvous Point) node.
RP State	The condition of the RP node. The possible values are Up and Down. The values are displayed only for the Shared Tree (*, G) groups only, not for the Shortest Path Tree (S, G) groups.
RP Last Modified Time	Date and time of the RP node participating in the group was last modified.
Last Modified Time	Date and time when the group was last modified.
Last Discovered	Date and time when the group was last discovered on the node.

### Flow Receivers



You can see the details of all end receivers of the selected multicast flow on a specified node.

The NNM iSPI for IP Multicast displays the following details:

- **Host Name:** The host name of the receiver. If the hostname of the receiver is not available, its IP address is displayed.
- **Receiver Up Time:** The time duration (in x days, hh:mm:ss format) for which the receiver has been receiving the flow.
- **IGMP Protocol Version:** The version of Internet Group Management Protocol (IGMP) configured on the interface to which this receiver is connected.
- **Interface of Leaf Router:** The name of the interface on the router. The receiver establishes a connection with the multicast router through this interface.

You can access this window from the Group form by performing the action **View Receivers**.

**To see the details of end receivers of a multicast flow on a node:**

1. From the **Workspaces** navigation pane, click **IP Multicast -> IP Multicast Nodes**. The IP Multicast Nodes view opens in the right pane.
2. In the IP Multicast Nodes view, select a node and click  (the **Open** icon). IP Multicast Node form opens.
3. Click **Groups** tab. You can see the list of available groups for the selected node.
4. Select a group and click  (the **Open** icon). IP Multicast Group form opens.
5. Select **Actions -> IP Multicast -> View Receivers**. You can see the details of all end receivers of the selected flow on the specified node.

**Related Topics:**

[Actions Available in the NNM iSPI for IP Multicast](#)

**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 <a href="#">IP Multicast Interface View</a> .

**PIM Interface State**

Attribute	Description
State	<p>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:</p> <p><b>Active</b> - The status of the interface is normal and in operational condition.</p> <p><b>Not In Service</b>- The status of the interface is down or critical.</p> <p><b>Transient state</b> - The interface is in transient state (Not Ready, Create And Go, or Create And Wait, Destroy) as reported by the <i>pimInterfaceStatus</i> MIB.</p> <p><b>Unknown</b>- The SNMP agent is not responding and not able to determine the state of the interface, value is Unknown.</p> <p><b>Not Polled</b>- The interface is not polled based on the configuration settings.</p> <p><b>NoPollingPolicy</b> - No policy is set up to poll the interfaces.</p>
Last Polled	The date and time the PIM Interface was last polled.

**Analysis Pane**

The Analysis Pane displays related information about the selected interface. The name of the selected interface, status, and hosted on node (the name of the node on which the interface is hosted) appear in the left panel. The right panel displays some of the important details of the selected interface like the conclusions, PIM IP address, time of last polling, and so on.

**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 Help, Interface Form*.

**General SNMP Values**

<b>Attribute</b>	<b>Description</b>
PIM IfName	The name of the PIM interface.
PIM IfAlias	The alias assigned to the PIM 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**

<b>Attribute</b>	<b>Description</b>
PIMNeighbor	The IP Address of the PIM neighbor.
Hosted On Node	The node on which the Multicast PIM neighbor resides.
State	<p>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:</p> <ul style="list-style-type: none"> <li>• <b>Invalid</b>- The state is Invalid if the designated multicast interface is not able to locate the PIM neighbor.</li> <li>• <b>Normal</b>- The state is Normal if the Multicast interface recognizes the PIM neighbor.</li> <li>• <b>Inconsistent</b>- The state is Inconsistent if the Multicast interface does not recognize the PIM neighbor.</li> </ul>

## IP Multicast Interface Form: Status Tab

The IP Multicast Interface form provides details about the PIM interface. The Status tab is useful for providing a quick summary of the NNM iSPI for IP Multicast interface status.

### Overall Status Table

Attribute	Description
Status	<p>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 the interface. Possible values are:</p> <ul style="list-style-type: none"> <li> No Status - Indicates one of the following: <ul style="list-style-type: none"> <li>◦ The interface is not managed or not polled.</li> <li>◦ The interface has just been added to the NNMi database and the Causal Engine has not yet calculated its health.</li> <li>◦ The interface is down (out of service)</li> </ul> </li> <li> Normal - The status of the interface is Normal if the Interface state is Active and the Neighbor state is Normal.</li> <li> Disabled - The status of the multicast-enabled interface is Disabled if the interface is administratively disabled.</li> <li> Unknown - The status of the interface is Unknown if there is no SNMP response from the node. This is only possible when the interface is not reachable at the time of polling.</li> <li> Warning- The status of the interface is Warning in the following conditions: <ul style="list-style-type: none"> <li>• Interface state is Active and Neighbor state is invalid.</li> <li>• Interface state is in transient state (Not Ready, Create And Go, or Create And Wait, Destroy) as reported by <i>PIMInterfaceStatus</i> MIB.</li> </ul> </li> <li> Critical - The status of the interface is Critical in the following conditions: <ul style="list-style-type: none"> <li>• Interface state is Not In Service.</li> <li>• Neighbor state is inconsistent.</li> </ul> </li> </ul>
Status Last Modified	Date and time when status was last set.

### Status History

Attribute	Description
Status History	List of last thirty status updates along with the time stamps for the selected Multicast object. For more information, see <i>NNMi Help, Interface Form: Status Tab</i> .

## 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 <i>NNMi Incidents Form</i> .

For more information about incidents, see [Incidents Related to IP Multicast Nodes and Interfaces](#).

## 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 <a href="#">Multicast Interface Form</a> .
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: <ul style="list-style-type: none"> <li>• <b>PIMInterfaceNormal</b></li> <li>• <b>PIMInterfaceUnknown</b></li> <li>• <b>PIMInterfaceNotPolled</b></li> <li>• <b>PIMInterfaceTransient</b></li> <li>• <b>PIMNeighborInvalid</b></li> <li>• <b>PIMInterfaceNotInService</b></li> <li>• <b>PIMNeighborInconsistent</b></li> </ul>

Status History	
Attribute	Description
Status History	List of last thirty status updates along with the time stamps for the selected interface.

## Incidents Related to IP Multicast Nodes and Interfaces

You can check the NNM iSPI for IP Multicast incidents from the forms IP Multicast objects or NNMi Incidents Browsing workspace. For information about the incidents related to IP multicast flows, see [Incidents Related to IP Multicast Flows](#). An incident notifies you that something important has occurred on the multicast network that may require your attention. After the incidents are generated, check the inventory views for the updated status. You can see the multicast incidents

only if the source node of the incident belongs to any of the security groups that are accessible to you. For more information, see [Controlling Access to the NNM iSPI for IP Multicast](#).




The following incidents related to multicast-enabled nodes and interfaces might appear in the console:

### Incidents Related to IP Multicast Nodes and Interfaces


IP Multicast Incident Name	Description
PIMNeighborInvalid	Appears when the state of the PIM neighbor is Invalid.
PIMNeighborInconsistent	Appears when the state of the PIM 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 PIM interfaces on the node is not normal.
PIMNeighborNotNormalInMCNode	Appears when the state of one of the neighbors is not normal.
AllPIMInterfaceNotNormalInMCNode	Appears when the status of every interface is not normal.

You can view the multicast incidents in the following ways:

To access the incidents related to IP Multicast nodes and interfaces from the **NNMi Incident Browsing** workspace:

1. From the incidents view, [filter the incidents using the Family column](#)<sup>1</sup>.
2. Select an incident and click  (the **Open** icon) to view the details of the selected incident.
3. From the left pane, click  (the **Source Object Lookup** icon), and then click  (the **Open** icon) to view the occurrence of the incidents.

To access the incident from the **IP Multicast** workspace, follow these steps:

1. From the IP Multicast views, click  (the **Open** icon) to open the specific NNM iSPI for IP Multicast form.
2. Click the **Incidents** tab to view all the incidents related to the IP Multicast nodes and interfaces.

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<sup>1</sup>1. Right-click the column, select Filter, and then click Create Filter. 2. Select Multicast Node and PIM Interface. 3. Click Apply to filter the incidents related to multicast nodes and PIM interfaces.

## 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, status, incidents, and conclusions associated with the selected flow. You can launch IP Multicast flow form from the IP Multicast flows inventory.

### 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 <a href="#">IP Multicast Flows view</a> .

### Analysis Pane

The Analysis Pane displays related information about a selected flow. The group address of the selected flow and the status appears in the left panel. The right panel displays some of the important details of the flow like the source address, RP address, flow mode, management mode, active, monitored, and so on.

### IP Multicast Flow 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.

### Flow Attributes

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.
Source Address	The IP Address of the source.
Mask	The mask of the source IP address.
RP Address	The IP Address of the RP node.
Flow Mode	The IP Multicast groups use the following protocols: <ul style="list-style-type: none"> <li>○ pimSparseDense</li> <li>○ pimSparseMode</li> <li>○ pimDenseMode</li> <li>○ other</li> </ul>
Starting Router	The IP address of the router which the NNM iSPI for IP Multicast uses as starting point for tree calculations of this flow.
Flow Rate	The amount of multicast data passing per second through a PIM interface for the multicast flow.  The <b>flow rate</b> <sup>1</sup> displayed in this column is taken from the PIM inter-

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<sup>1</sup>The amount of multicast data (in bps, kbps, or mbps) passing through the PIM interfaces of the participating routers.

Attribute	Description
	faces of the starting router.
Num(Routers)	The number of managed routers participating in the selected flow.
Num(Receivers)	The number of receivers receiving the flow.
Baseline Timestamp	The time when the <b>baseline snapshot</b> <sup>1</sup> was taken.
Last Sampled Timestamp	The time when the last snapshot was taken.
Active	The presence of a ✓ check mark indicates active multicast traffic. The check mark disappears if the flow is not active.
Monitored	If the Monitored ✓ check mark appears, the particular flow is monitored against the baseline snapshot to ensure that all the important receivers receive the multicast data.

### IP Multicast Flow Form: Status Tab

The Status tab is useful for providing a quick summary of the health of the multicast flow.

Attribute	Status Table Description
Status	<p>The status of the selected multicast flow. The possible statuses indicators are as follows:</p> <p><b>No status</b> - Indicates one of the following:</p> <ul style="list-style-type: none"> <li>• The flow is not monitored.</li> <li>• The flow has not completed a single monitoring cycle.</li> <li>• The flow is not managed.</li> </ul> <p><b>Normal</b> - The flow is constantly monitored without any interruption. All the receiver routers receive the multicast data and there is no deviation between the <b>baseline snapshot</b><sup>2</sup> and the snapshot collected for this flow during each monitoring cycle.</p> <p><b>Warning</b> - The status of the multicast flow is Warning in one of the following conditions:</p> <ul style="list-style-type: none"> <li>• The <b>baseline</b><sup>3</sup> creation failed.</li> <li>• The last snapshot creation failed.</li> </ul> <p><b>Critical</b> - The status of the flow is marked Critical in any of the following conditions:</p> <ul style="list-style-type: none"> <li>• Deletion of nodes, which were part of the flow's baseline snapshot, from the flow.</li> </ul>

<sup>1</sup>The snapshot of the standard flow, which is used as a basis for comparison.

<sup>2</sup>The snapshot of the standard flow, which is used as a basis for comparison.

<sup>3</sup>The standard flow, which is used as a basis for comparison.



Attribute	Description
	<ul style="list-style-type: none"> <li>• Addition of nodes, which were not part of the flow's baseline snapshot, to the flow.</li> <li>• Deviation in the <b>flow rate</b><sup>1</sup> beyond the configured threshold value.</li> <li>• Change in the Rendezvous Point (RP).</li> </ul>

Status History	
Attribute	Description
Status History	List of last thirty status updates along with the time stamps for the selected multicast flow.

### IP Multicast Flow Form: Incidents Tab

The Incident tab provides a quick summary of the problem description for the multicast flow.

Attribute	Description
Incidents Attributes	The attributes listed in the Incidents tab are same as the attributes available on the NNMi Incidents form. For more information, see the Help for <i>NNMi Incidents Form</i> .

For more information about the incidents related to IP Multicast flows, see [The Incidents Related to IP Multicast Flows](#).

### IP Multicast Flow Form: Conclusions Tab

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

Basic Attributes	
Attribute	Description
Status	The overall status of the Multicast flow. For information about how the current status is determined, see <a href="#">IP Multicast Flows View</a> .
Time Stamp	Current status is set by Causal Engine. The Time Stamp data is the time when the status of the flow is last updated.
Conclusion	<p>Conclusions are set by the Causal Engine after the status calculation. Possible conclusions are:</p> <ul style="list-style-type: none"> <li>■ MulticastFlowMonitorSuccess</li> <li>■ MulticastFlowMonitorFailure</li> <li>■ MulticastFlowTopoChange</li> <li>■ MulticastFlowTopoExtended</li> <li>■ MulticastFlowRateDeviationOutOfRange</li> </ul>

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<sup>1</sup>The amount of multicast data (in bps, kbps, or mbps) passing through the PIM interfaces of the participating routers.

**Attribute****Description**

- MulticastFlowRPCChange
- MulticastFlowBaseliningFailed
- MulticastFlowSnapshotFailed

**Incidents Related to IP Multicast Flows**

The NNM iSPI for IP Multicast generates an incident for a monitored flow when a change is observed in the flow in comparison with its **baseline snapshot**<sup>1</sup>. The change can occur due to any of the following reasons:

- Deviation in **flow rate**<sup>2</sup> beyond the specified threshold
- Addition of nodes to this flow
- Deletion of nodes from this flow
- Change in the Rendezvous Point (RP)

The NNM iSPI for IP Multicast also generates incidents when the creation of **baseline**<sup>3</sup> and last snapshot fail.

You can check the incidents related to IP Multicast Flows from the IP Multicast Flow forms or NNMi Incidents Browsing workspace. If you do not have access to the starting router of a flow or the starting router belongs to another security group, you cannot see the incidents related to that flow.

The following IP Multicast incidents related to IP Multicast Flows appear on the console:

**The Incidents Related to IP Multicast Flows**

IP Multicast Incident Name	Description	Severity of the Incident
MulticastFlowMonitorFailure	Appears when any of the four incidents namely MulticastFlowTopoChange, MulticastFlowTopoExtended, MulticastFlowRateDeviationOutOfRange, or MulticastFlowRPCChange occurs. This is a parent incident that includes the listed correlated children incidents.	Critical
MulticastFlowTopoChange	Appears when there is a change in the topology due to the deletion of nodes. Some nodes in the baseline snapshot no	Critical

<sup>1</sup>The snapshot of the standard flow, which is used as a basis for comparison.

<sup>2</sup>The amount of multicast data (in bps, kbps, or mbps) passing through the PIM interfaces of the participating routers.

<sup>3</sup>The standard flow, which is used as a basis for comparison.



IP Multicast Incident Name	Description	Severity of the Incident
MulticastFlowTopoExtended	longer receive multicast traffic for this Flow. Appears when there is an addition of nodes. Some additional nodes, which were not in the baseline snapshot, have started receiving multicast traffic for this flow.	Warning
MulticastFlowRateDeviationOutOfRange	Appears when there is a flow rate deviation more than the configured threshold value. The default deviation rate is 20%, which can be changed for each flow.	Critical
MulticastFlowRPCChange	Appears when there is a change in the RP in the multicast flow.	Critical
MulticastFlowBaseliningFailed	Appears when baseline creation fails. The flows cannot be compared without a baseline.	Warning
MulticastFlowSnapshotFailed	Appears when the last snapshot creation fails.	Warning

The NNM iSPI for IP Multicast generates an incident for a particular type of fault or failure only once for a specific flow. If the failures of the same type occur again, NNM iSPI for IP Multicast does not generate the incident for the subsequent failures of the same type.

For example, the NNM iSPI for IP Multicast generates an incident namely MulticastFlowTopoChange, when a particular node does not receive the multicast data. If two more nodes do not receive the data over a period of time before you close this incident, the NNM iSPI for IP Multicast does not generate additional incidents for the next two nodes as MulticastFlowTopoChange incident already exists for the particular flow.

You can launch the incidents related to IP Multicast flows in the following ways:


To access the incidents from the **Incident Browsing** workspace, follow these steps:

1. From the Incident Browsing - All Incidents view, [filter the incidents using the Family column](#)<sup>1</sup>
2. Select an incident and click  (the **Open** icon).
3. From the left pane, source object attribute, click  (the **Open** icon) to see more information about the IP Multicast Flow associated with the particular incident.

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<sup>1</sup>1. Right click the column, select Filter, and click Create Filter. 2. Select Multicast Flow. 3. Click Apply to filter the incidents related to multicast flows.



To access the incident from the **IP Multicast** workspace, follow these steps:

1. From the **Workspaces** navigation pane, click **IP Multicast -> IP Multicast Flow**. The IP Multicast flow view appears.
2. Click  (the **Open** icon) to open the specific IP Multicast flow.
3. Click the **Incidents** tab to view all the incidents related to the IP Multicast flow.

## IP Multicast Neighbor Form

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

### To launch the Neighbor Form:

1. From the **Workspaces** navigation pane, click **IP Multicast -> IP Multicast Interfaces**. The IP Multicast Interfaces view opens in the right pane.
2. In the IP Multicast Interfaces view, select an interface, and then click  (the **Open** icon). IP Multicast Interface form opens.
3. Click **Neighbors** tab. You can see the list of neighbors of the selected interface.
4. Select a neighbor and click  (the **Open** icon). The Neighbor Form opens.

### 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 <a href="#">IP Multicast Interface Form</a> .

## The NNM iSPI for IP Multicast in Global Network Management Environment

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

The NNM iSPI for IP Multicast Regional Manager discovers, monitors, and sends the topology update to the NNM iSPI for IP Multicast (GM). The NNM iSPI for IP Multicast inventory (GM) gets updated as per the polling interval set for the multicast objects in the Regional Manager inventory.

Use the NNM iSPI for IP Multicast (GM) for the following tasks:

- Monitor all multicast-enabled routers in the network spread over multiple sites or locations.
- See the problems in the entire network. Check the status of all multicast nodes, interfaces, and neighbors.

- Get consolidated and complete map views of the entire network.
- Access consolidated multicast reports for multiple regions.

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 NNM iSPI for IP Multicast Regional Manager](#)

## IP Multicast Processes and Services

After you install the NNM 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	The Database Manager that controls the embedded database of NNMi and the IP Multicast.

The NNM iSPI for IP Multicast does not show the status of the Oracle database. There is no check done to verify if the Oracle database is running or not. 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. This command starts the Multicast processes and also checks whether the NNMi processes 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.

## Viewing the Network Connectivity

With the NNM iSPI for IP Multicast, you can view the complete connectivity of the Multicast network by using the map views. The NNM 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 NNM iSPI for IP Multicast includes the following map views:

- [Forwarding Tree View](#)
- [Reverse Path View](#)
- [Neighbor View](#)
- [Snapshots View \(Baseline Snapshot, Last Snapshot, and Deviation Tree Snapshot\)](#)

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**<sup>1</sup> available on the map views. The performance data is only available after you install the NNM iSPI Performance for Metrics. Check the Forwarding Tree or Reverse Path.
- Monitor the Multicast distribution tree. You can also see the **baseline snapshot**<sup>2</sup> against which you monitor a particular flow. Check View Snapshots.
- When you get an incident related to the IP Multicast flows (See [The Incidents Related to IP Multicast Flows](#)), you can verify or troubleshoot the problem reported in the incident using the pictorial representation of the flow. Check View Snapshots.

The NNM 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 NNM 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 View

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

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<sup>1</sup>The amount of multicast data (in bps, kbps, or mbps) passing through the PIM interfaces of the participating routers.

<sup>2</sup>The snapshot of the standard flow, which is used as a basis for comparison.

The NNM iSPI for IP Multicast displays the Forwarding Tree including multiple sites or WANs if your distribution tree spreads across multiple sites or WANs. This is possible only if you have correctly configured the PIM interfaces across WANs that connect to each other. See, [Configure Multi-site Multicast Connectivity](#) to know more about the configuration of multicast WAN neighbors. A cloud represents the connectivity between two interfaces connected across WANs.

You cannot see the forwarding tree beyond any unmanaged node. The NNM iSPI for IP Multicast displays a warning message when the forwarding tree encounters any unmanaged node.

The NNM iSPI for IP Multicast displays the entire connections if you have access to at least a single node involved in the forwarding tree. If you do not have access to a particular node in the forwarding tree, you cannot see the full details of that node and its interfaces. However, you can see the names of such nodes and interfaces.

All the downstream trees (towards the receivers) are available from the starting-point on the map view. The 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 source 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.

If the same RP address is configured on multiple interfaces, the NNM iSPI for IP Multicast does not draw the forwarding tree from RP.

The NNM iSPI for IP Multicast displays the multicast-specific icons on the map views. For more information, see [IP Multicast Map Symbols](#).

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**<sup>1</sup> if the NNM iSPI Performance for Metrics is installed and running.

Flow rate value appears as zero in the Forwarding Tree view when the NNM iSPI Performance for Metrics is not enabled. The correct value appears when the NNM iSPI Performance for Metrics is installed and running.

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

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<sup>1</sup>The amount of multicast data (in bps, kbps, or mbps) passing through the PIM interfaces of the participating routers.

- Troubleshoot the cause of congestion or loss of connectivity in the multicast traffic flow. For example, if the multicast flow rate 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.
- Use the Analysis pane to get an overview of the object selected.

### 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 try to launch the forwarding tree from a node that is not discovered in the IP Multicast topology.

### Related Topics:


[IP Multicast Map Symbols](#)

[Accessing the Forwarding Tree map view](#)

### Accessing the Forwarding Tree View

You can access the forwarding tree map view for the selected multicast 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 **Draw Tree** icon).

Options available in map view toolbar

Tree From Source	A tree view that starts from the source towards the receivers. The forwarding tree uses arrows to indicate direction of data flow.
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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 starting from 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:

- Participating nodes and their status
- Participating PIM interfaces and their status
- Source node
- Receiver icon to represent the 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 data transfer
- Shortest tree or Shared tree
- Cloud if there is connectivity between interfaces across WANs
- Total number of map objects such as node, source, and receiver
- Last update time and date

In the forwarding tree view, the NNM iSPI for IP Multicast displays the nodes associated with a single tenant.

**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**<sup>1</sup> 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.

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<sup>1</sup>The amount of multicast data (in bps, kbps, or mbps) passing through the PIM interfaces of the participating routers.

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 NNM iSPI for IP Multicast displays 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 NNM iSPI for IP Multicast displays the Reverse Path including multiple sites or WANs if your distribution tree spreads across multiple sites or WANs. This is possible only if you have correctly configured the PIM interfaces across WANs that connect to each other. See "Configure Multi-site Multicast Connectivity" on page 79 to know more about the configuration of multicast WAN neighbors. A cloud represents the connectivity between two interfaces connected across WANs.

The NNM iSPI for IP Multicast displays the entire connections if you have access to at least a single node involved in the reverse path. If you do not have access to a particular node in the reverse path, you cannot see the details of that node. However, you can see the labels of the nodes.

The NNM iSPI for IP Multicast displays the multicast-specific icons on the map views. For more information, see [IP Multicast Map Symbols](#). The Analysis pane provides you an overview of the object selected.

You cannot see the reverse path beyond any unmanaged node. The NNM iSPI for IP Multicast displays a warning message when the reverse path encounters any unmanaged node.

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**<sup>1</sup> is degrading. The flow rate is available if the NNM iSPI Performance for Metrics is installed and running.

Flow rate value appears as zero in the Reverse Path view when the NNM iSPI Performance for Metrics is not enabled. The correct value appears when the NNM iSPI Performance for Metrics is installed and running.

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

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<sup>1</sup>The amount of multicast data (in bps, kbps, or mbps) passing through the PIM interfaces of the participating routers.

- 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 or currently out of service.

### Related Topics:


[IP Multicast 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 **Get Path** icon).

#### Options available in map view toolbar

Path To Source	Select <b>Source</b> 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 <b>Rendezvous Point</b> 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 <b>Receiver</b> 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. Type the router's name to view the reverse path view.

In the reverse path view, the NNM iSPI for IP Multicast displays the nodes associated with a single tenant.

**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**<sup>1</sup> 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 Map Symbols

The NNM iSPI for IP Multicast uses NNMi shapes and symbols for the nodes and interfaces. The NNM iSPI for IP Multicast uses the additional 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.

<b>Symbols</b>	
<b>Icon</b>	<b>Description</b>
	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.
	Shows the connectivity between interfaces connected across WANs.

<b>Connection Lines</b>	
<b>Type</b>	<b>Description</b>
Thick lines	Shows the shared tree (*, G) on the map view.
Thin lines	Shows the shortest path (S, G) on the map view.

---

<sup>1</sup>The amount of multicast data (in bps, kbps, or mbps) passing through the PIM interfaces of the participating routers.

## Colors of the Connection Lines

Type	Description
Pink	Shows the shortest path on the map view.
Orange	Shows the shared tree on the map view.

### Related Topics:

[Forwarding Tree View](#)

[Reverse Path View](#)

[Neighbor View](#)

[Using the Map View Toolbar](#)

## IP Multicast Neighbor View

The Neighbor view provides the PIM neighbor topology associated with the selected node. With the NNM 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 NNM iSPI for IP Multicast displays the Neighbor View including multiple sites or WANs if your distribution tree spreads across multiple sites or WANs. This is possible only if you have correctly configured the PIM interfaces across WANs that connect to each other. See "Configure Multi-site Multicast Connectivity" on page 79 to know more about the configuration of multicast WAN neighbors. A cloud represents the connectivity between two interfaces connected across WANs.

The NNM iSPI for IP Multicast displays all PIM neighbors of the selected node. If you do not have access to a particular node in the neighbor view, you cannot see the full details of that node and its interfaces. However, you can see the names of such nodes and interfaces.

The NNM iSPI for IP Multicast displays 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 NNM iSPI Performance for Metrics is installed and running.
- Analysis pane option is available for the multicast nodes and interfaces.
- Messages appear when the neighbor view does not appear as per the requirement.

### **Related Topics:**

[IP Multicast Map Symbols](#)

[Accessing the Neighbor map view](#)

### **Accessing the Neighbor map view**

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

#### **To launch a Neighbor map view, follow these steps:**

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

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. Select a flow of your interest to view the forwarding tree or reverse path map view. Select **Actions -> IP Multicast -> Reverse Path** or **Forwarding Tree**. The reverse path or 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.

In the neighbor path view, the NNM iSPI for IP Multicast displays the nodes associated with a

single tenant.

## Using the Map View Toolbar

The NNM 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 Rendezvous Point (RP) or the router.
- Shows the Reverse path from the receiver or the router to source or RP.
- Shows the Neighbor View of the selected nodes with the number of hops (1 to 9) selected.
- Shows snapshots of [baseline<sup>1</sup>](#) tree, last forwarding tree, and deviation tree.

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

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

### 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, router, or RP node.
Hostname/ IP address	Type the Hostname or IP address of the source, router or RP from where you want to view the forwarding tree.

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

### Reverse Path Map Toolbar Options

Icon	Description
Path To	Select an option <b>Source</b> or <b>Rendezvous Point</b> to draw the reverse path.
Starting From	Select an option from the list to start the Reverse Path view. The available options are: <b>Router</b> - Starts the reverse path from the router. <b>Receiver</b> - Starts the reverse path from the receiver.
Hostname/ IP address	Type the Hostname or IP address of the receiver or router from where you want to view the reverse path.

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

### 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.

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<sup>1</sup>The standard flow, which is used as a basis for comparison

The following table lists the NNM iSPI for IP Multicast Snapshots view options:

### Snapshots View Map Toolbar Options

Option	Description
Snapshot View	Select Baseline Snapshot, Deviation Tree Snapshot, or <a href="#">Last Snapshot</a> <sup>1</sup> to view each of them.

## Flow Monitoring

The NNM iSPI for IP Multicast enables you to monitor the flows that you need to monitor.

The flow monitoring feature helps you:

- Make sure that all routers receive the monitored flow
- Find out when [flow rate](#)<sup>2</sup> variation is more than the specified threshold
- Know the change in Rendezvous Point (RP)

If you monitor a flow, you can immediately know when there is an addition or deletion of nodes through the incidents generated by the NNM iSPI for IP Multicast. The incidents can also alert you when there is a change in the RP or if there is a [flow rate](#)<sup>3</sup> deviation more than the specified thresholds.

## Snapshots

If you enable monitoring of a flow, you can see the pictorial representation of snapshots of [baseline](#)<sup>4</sup> tree (Baseline Snapshot), the last sample forwarding tree collected ([Last Snapshot](#)<sup>5</sup>), and the [deviation tree snapshot](#)<sup>6</sup> (Deviation Snapshot). See [Enable Monitoring](#). The [baseline snapshot](#)<sup>7</sup> is the forwarding tree that you consider as the standard pattern of flow or the ideal flow for the selected (S, G) flow. The NNM iSPI for IP Multicast creates the baseline for each flow when you enable monitoring of the flow. The baseline snapshot acts as a base to compare against the forwarding tree for that particular flow at each monitoring cycle.

If Auto Baselining is enabled in the configuration form, the forwarding tree collected in the first monitoring cycle after marking a flow for monitoring is considered as the baseline snapshot. The NNM iSPI for IP Multicast determines the starting router. The baseline snapshot and the subsequent sample snapshots are always calculated from the same starting router for the particular flow. You can overwrite the baseline snapshot with the last snapshot. See [Overwrite Snapshot](#).

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<sup>1</sup>The last sample forwarding tree collected

<sup>2</sup>The amount of multicast data (in bps, kbps, or mbps) passing through the PIM interfaces of the participating routers.

<sup>3</sup>The amount of multicast data (in bps, kbps, or mbps) passing through the PIM interfaces of the participating routers.

<sup>4</sup>The standard flow, which is used as a basis for comparison.

<sup>5</sup>The last sample forwarding tree collected

<sup>6</sup>The pictorial representation of the difference between the baseline snapshot and the last snapshot

<sup>7</sup>The snapshot of the standard flow, which is used as a basis for comparison.



The nodes and interfaces, which were in the original baseline snapshot, always appear in the baseline snapshot even if you delete some of them from the inventory. You cannot get any additional information about those deleted nodes or interfaces and the actions performed on such objects do not yield any result.

If you clear the Auto Baselining check box in the IP Multicast configuration form, the NNM iSPI for IP Multicast does not create baseline snapshots. In the absence of baseline snapshot, the NNM iSPI for IP Multicast does not generate any incident related to flow monitoring. By default, Auto Baselining option is turned on.

If you enable the monitoring of a flow, the NNM iSPI for IP Multicast computes the forwarding tree and compares the new sample snapshot against the baseline snapshot in each monitoring cycle which runs at the configured monitoring interval. If the NNM iSPI for IP Multicast finds any flow rate deviation in the tree that is more than the threshold configured, it generates an incident. You can configure the percentage of flow rate deviation allowed in the IP Multicast configuration form. See [Configure the Flow Monitoring Settings](#).

The NNM iSPI for IP Multicast generates incidents in the following situations:

- Deviation in flow rate beyond the specified threshold
- Addition of nodes to a flow
- Deletion of nodes from a flow
- Change in the rendezvous point
- Baseline creation fails
- Last snapshot creation fails

The deviation tree snapshot displays the pictorial representation of the difference between the baseline snapshot and the last snapshot, which will be helpful in troubleshooting issues detected in the flows selected for monitoring. For example, if there is an incident namely **MulticastFlowTopoChange** due to the deletion of a node, the deviation tree snapshot shows you the particular node that no longer receives the multicast data for this flow.

Baseline snapshot and last snapshot are dynamic representation of multicast topology for a selected flow. Deviation tree snapshot does not represent multicast topology of a selected flow but it only captures the difference between baseline snapshot and last snapshot for that flow in map layout.

You can use the snapshots for the following tasks:

- Launch the topology of the current forwarding tree as well as the baseline snapshot. If you find the current forwarding tree better than your baseline snapshot, you can overwrite the baseline snapshot with the forwarding tree that you received in the last monitoring cycle.
- Compare the last sample tree with the baseline snapshot and identify the flow rate deviation, RP change, addition or deletion of nodes if there is any.
- See the change in topology of the baseline snapshot (through deviation tree snapshot). Identify the nodes that have been deleted or added.

The Analysis pane provides you an overview of the object selected.

## Related Topics:

[Enable Monitoring](#)

[Disable Monitoring](#)

[View Snapshots](#)

[Overwrite Snapshot](#)


[Instant Monitoring](#)

## Enable Monitoring

You can monitor your critical flows to observe the dynamics of flows. If you enable monitoring, you can see the **baseline snapshot**<sup>1</sup> and the last snapshot provided that the flow completed at least one monitoring cycle. The monitoring cycle runs based on the time that you configure in the IP Multicast configuration form as Monitoring Interval. See "Configure Flow Monitoring Settings" on page 76. You can also have flow specific monitoring settings for each monitored flow. For more information, see "Flow Specific Monitoring Settings" on page 78. The flows enabled for monitoring remain in inventory even if they become inactive.

If you turn off the Auto Baselining option in the IP Multicast configuration form, the NNM iSPI for IP Multicast does not create baseline snapshots.

### To enable monitoring:

1. From the **Workspaces** navigation pane, click **IP Multicast -> IP Multicast Flows**. The IP Multicast flow view opens.
2. In the IP Multicast Flow view, select the flows that you want to monitor and select **Actions -> IP Multicast -> Enable Monitoring**. A message confirms that you have enabled monitoring.
3. Click  (the **Refresh** icon). The check mark ( ✓ ) appears under Monitored column for the selected flows.

## Related Topics:

[Flow Monitoring](#)

[Disable Monitoring](#)

[View Snapshots](#)

[Overwrite Snapshot](#)

[Instant Monitoring](#)


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<sup>1</sup>The snapshot of the standard flow, which is used as a basis for comparison.

## Disable Monitoring

You can stop monitoring the flow at any time. If you choose to disable the monitoring, the snapshot views are not available and the status of the flow is No Status. If you disable monitoring, the NNM iSPI for IP Multicast deletes the inactive flows from the inventory.

### To disable monitoring:

1. From the **Workspaces** navigation pane, click **IP Multicast -> IP Multicast Flows**. The IP Multicast flow opens.
2. In the IP Multicast Flow view, select the flows for which you want to discontinue monitoring and select **Actions -> IP Multicast -> Disable Monitoring**. A message confirms that you have disabled monitoring.
3. Click  (the **Refresh** icon). The check mark ( ✓ ) under the Monitored column disappears.

If you disable monitoring, the NNM iSPI for IP Multicast deletes the **baseline snapshot**<sup>1</sup> and the last snapshot. All incidents associated with the flow monitoring are also closed.

### Related Topics:

[Flow Monitoring](#)

[Enable Monitoring](#)

[View Snapshots](#)

[Overwrite Snapshot](#)

[Instant Monitoring](#)

### View Snapshots

You can view the **baseline snapshot**<sup>2</sup>, the last snapshot, and the **deviation tree snapshot**<sup>3</sup> if you have already enabled monitoring of the flow and the flow has completed at least one monitoring cycle. See [Enable Monitoring](#).

### To view the snapshots:


1. From the **Workspaces** navigation pane, click **IP Multicast -> IP Multicast Flows**. The IP Multicast flow view opens.
2. In the IP Multicast Flow view, select the flow whose snapshots you want to see and select **Actions -> IP Multicast -> View Snapshots**. The snapshots open in a new window.
3. Select an option from the Snapshot View drop down list. There are three options available:

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<sup>1</sup>The snapshot of the standard flow, which is used as a basis for comparison.

<sup>2</sup>The snapshot of the standard flow, which is used as a basis for comparison.

<sup>3</sup>The pictorial representation of the difference between the baseline snapshot and the last snapshot

- **Baseline Snapshot**: select this to see the **baseline snapshot**<sup>1</sup>.
  - **Last Snapshot**<sup>2</sup>: select this to see the last forwarding tree collected.
  - **Deviation Tree Snapshot**: select this to see the change between the baseline snapshot and the last snapshot.
4. Click  (the **Draw Tree** icon).

You can select only one flow for this action.

### Related Topics:

[Flow Monitoring](#)

[Enable Monitoring](#)

[Disable Monitoring](#)

[Overwrite Snapshot](#)

[Instant Monitoring](#)

### Overwrite Snapshot

You can overwrite **baseline**<sup>3</sup> snapshot of a flow at any time with the last snapshot collected for that flow. You can see the last snapshot collected after each monitoring cycle. If you are sure that a particular snapshot collected correctly represents your multicast network, you can use that snapshot to overwrite your **baseline snapshot**<sup>4</sup>. If you do this, the last snapshot starts to function as the baseline snapshot and all the subsequent flows collected are compared against this new baseline snapshot.

If you have disabled Auto Baselining option in the IP Multicast configuration form, you can use this action to create a baseline. The last sample snapshot collected becomes the baseline snapshot. For more information, see "Configure Flow Monitoring Settings" on page 76.

### To overwrite snapshot:

1. From the **Workspaces** navigation pane, click **IP Multicast -> IP Multicast Flows**. The IP Multicast flow view opens.
2. In the IP Multicast Flow view, select the flow whose baseline snapshot you want to overwrite and select **Actions -> IP Multicast -> Overwrite Snapshot**. A message confirms that you have overwritten the baseline snapshot of the selected flow with the last snapshot.

When you perform this action on a multicast flow, the status of the flow goes back to Normal and the NNM iSPI for IP Multicast closes all incidents related to that flow, as these incidents were

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<sup>1</sup>The snapshot of the standard flow, which is used as a basis for comparison.

<sup>2</sup>The last sample forwarding tree collected

<sup>3</sup>The standard flow, which is used as a basis for comparison.

<sup>4</sup>The snapshot of the standard flow, which is used as a basis for comparison.

generated on the basis of the previous baseline. Now the last snapshot has become the baseline snapshot and those incidents are no longer valid.

**Related Topics:**

[Flow Monitoring](#)

[Enable Monitoring](#)

[Disable Monitoring](#)

[View Snapshots](#)

[Instant Monitoring](#)

**Instant Monitoring**

You can monitor your critical flows on demand, if you have already enabled monitoring. You do not have to wait for the monitoring cycle to complete. This enables you to get the sample snapshot of the flow instantly and compare it against the **baseline snapshot**<sup>1</sup> and report the failure conditions. You can do the instant monitoring only if you enable monitoring of the flow. You can perform this action only on the active flows. See [Enable Monitoring](#).

**To perform instant monitoring:**

1. From the **Workspaces** navigation pane, click **IP Multicast -> IP Multicast Flows**. The IP Multicast flow view opens.
2. In the IP Multicast Flow view, select the flow that you want to monitor instantly and select **Actions -> IP Multicast -> Instant Monitoring**. A message confirms that you initiated an instant monitoring of the selected flow.

**Related Topics:**

[Flow Monitoring](#)

[Enable Monitoring](#)

[Disable Monitoring](#)

[View Snapshot](#)

[Overwrite Snapshot](#)

**Viewing Participating Routers and Receivers of a Flow**

You can view the participating routers and receivers of a flow using the NNM iSPI for IP Multicast. This feature helps you to ensure that all the important routers and the receivers receive a particular flow.

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<sup>1</sup>The snapshot of the standard flow, which is used as a basis for comparison.

You can see the list of participating routers and receivers of a flow if the particular flow fulfills the following criteria:

- The flow must be managed by the NNM iSPI for IP Multicast.
- The flow must be active.

**To view the list of participating routers and receivers of a flow:**

1. From the **Workspaces** navigation pane, click **IP Multicast -> IP Multicast Flows**. The IP Multicast Flows view appears.
2. In the IP Multicast Flows view, select a flow and then click **Actions -> IP Multicast -> Show Receivers. Flow Participating Routers and Receivers** window opens. You can see the Flow Information at the top of the window. The flow information includes IP address of the source, IP address of the group, and name of the tenant. In the left pane, the host names of the routers participating in the selected flow are displayed. If the hostname is not available, the IP address of the participating router is displayed.
3. Double-click a participating router of your interest. Alternatively, select a router and click the **List all receivers in downstream** button. The downstream receivers of the flow from the selected router appear in the right pane along with the following attributes:
  - **Host Name:** The host name of the receiver. If the host name of the receiver is not available, the IP address is displayed.
  - **Receiver Up Time:** The time duration (in x days, hh:mm:ss format) for which the receiver has been receiving the flow.
  - **IGMP Protocol Version:** The version of IGMP configured on the interface to which this receiver is connected.
  - **Leaf Router:** The name of the multicast router to which the receiver is connected.
  - **Interface of Leaf Router:** The name of the interface on the router. The receiver establishes a connection with the multicast router through this interface.

The receiver fetching process times out after 180 seconds with a warning message. If you select a router on the upstream side of the flow (towards the start router) the fetching request might not reach the entire list of downstream receivers. Therefore, all the downstream receivers might not appear in the right pane. In that situation, select a different router, which is on the downstream side of the flow.

**Related Topics:**

[Filtering Receivers](#)

[Managing and Stop Managing Flows](#)

[Enable Monitoring](#)


[Flow Receivers](#)

## Filtering Receivers


You can use the Define Filter icon to configure rules to filter the listed receivers in the Flow Receivers view. Apply the rules on the following attributes of the receivers to see the receivers of your choice:

- Host Name
- Receiver Up Time
- IGMP Protocol Version
- Leaf Router
- Interface of Leaf Router

### To filter the Flow Receivers view:

1. Click  (the **Define Filter** icon). This opens the Filter dialog box.
2. Select one of the following options:
  - **Match all rules:** filters and lists the receivers that fulfill all rules that you configure for filtering the listed receivers.
  - **Match any rule:** filters and lists the receivers that fulfill any of the rules that you configure for filtering the listed receivers.
3. Select a column from the drop-down list. You can apply a condition to one of the following columns:
  - Host Name
  - Receiver Up Time
  - IGMP Protocol Version
  - Leaf Router
  - Interface of Leaf Router
  - Any Column
4. Select a condition to apply to the column you selected. You can select one of the following conditions:
  - **contains:** filters and lists all the receivers that contains a value that you type in the Value text box.
  - **is:** filters and lists all the receivers that have a value that is equal to the value that you type in the Value text box.
  - **starts with:** filters and lists all the receivers that start with the value that you type in the Value text box.
  - **ends with:** filters and lists all the receivers that end with the value that you type in the Value text box.
  - **does not contain:** filters and lists all the receivers that do not contain the value that you type in the Value text box.
  - **is not:** filters and lists all the receivers that is not equal to the value that you type in the Value text box.
  - **does not start with:** filters and lists all the receivers that do not start with the value that you type in the Value text box.
  - **does not end with:** filters and lists all the receivers that do not end with the value that

you type in the Value text box.

- **is empty**: filters and lists all the receivers for which the selected column is empty.
5. Type a value in the Value text box. The filtering takes place on the selected column based on this value and the condition that you selected.
  6. Click  (the **Add Filter** icon) to add more rules.
  7. Click the **Filter** tab. The filtered list of receivers are listed.

After viewing the filtered list, always remove the filter. To remove the filter, click **Clear Filter**.

### Related Topics:

[Manage and Stop Managing Flows](#)

[Enable Monitoring](#)

[Flow Receivers](#)

## Actions Available in the NNM iSPI for IP Multicast

With the NNM iSPI for IP Multicast, you can view the complete connectivity of the Multicast network that you want to monitor. The NNM iSPI for IP Multicast presents the following views—**Forwarding Tree**, **Reverse Path**, **Neighbor view**, and **Snapshots**. These views help you to construct the multicast flow path in upstream or downstream direction, view the PIM neighbor topology, and see the snapshots of the monitored flows. You can also perform a few actions that assist you in monitoring the multicast flows effectively. You can also decide to manage or not to manage the nodes and flows as per your requirements.

You can perform some of these actions like Manage, Not Managed, Enable Monitoring, and Disable Monitoring on multiple objects. You can select up to 20 objects and perform these actions.

The views and actions that are available to you can vary depending upon the role assigned to you.

With the NNM iSPI for IP Multicast, you can perform tasks using the following actions:

Actions Available with the NNM iSPI for IP Multicast		
Action	Description	Required Role
Discover Groups	Starts a real-time check to poll the multicast groups. For more information, see <a href="#">Discover Groups</a> .	Administrator or Operator Level 2
Neighbor View	Shows the PIM neighbor view from the selected node. For more information, see <a href="#">Neighbor view</a> .	Administrator, Operator Level 2, or Operator Level 1
Manage	Starts managing the selected nodes in the NNM iSPI for IP Multicast when you perform this action from IP Multicast Nodes view. For more information, see <a href="#">Managing and Stop</a>	Administrator or Operator Level 2



Action	Description	Required Role
Not Managed	<a href="#">Managing Nodes</a> . Stops managing the selected nodes in the NNM iSPI for IP Multicast when you perform this action from IP Multicast Nodes view. For more information, see <a href="#">Managing and Stop Managing Nodes</a> .	Administrator or Operator Level 2
View Receivers	Shows the details of end receivers of the selected multicast group address on the specified node. For more information, see <a href="#">Flow Receivers</a> .	Administrator, Operator Level 2, or Operator Level 1
Forwarding Tree	Shows the forwarding tree map view from the source node to the active receivers in the IP Multicast network. For more information, see <a href="#">Forwarding Tree view</a> .	Administrator, Operator Level 2, or Operator Level 1
Reverse Path	Shows the path from the receiver node to the source node in the network. For more information, see <a href="#">Reverse Path view</a> .	Administrator, Operator Level 2, or Operator Level 1
Enable Monitoring	Starts monitoring the selected flows. For more information, see <a href="#">Enable Monitoring</a> .	Administrator or Operator Level 2
Disable Monitoring	Stops monitoring the selected flows. For more information, see <a href="#">Disable Monitoring</a> .	Administrator or Operator Level 2
View Snapshots	Enables you to view the <b>baseline snapshot</b> <sup>1</sup> , the <b>last snapshot</b> , and the <b>deviation tree snapshot</b> <sup>2</sup> . For more information, see <a href="#">View Snapshots</a> .	Administrator, Operator Level 2, or Operator Level 1
Overwrite Snapshot	Replaces the baseline snapshot with the last snapshot. For more information, see <a href="#">Overwrite Snapshot</a> .	Administrator or Operator Level 2
Instant Monitoring	Initiates monitoring of the flow immediately. For more information, see <a href="#">Instant Monitoring</a> .	Administrator or Operator Level 2
Customize Monitoring Settings	Customizes monitoring settings for the selected flow. For more information,	Administrator

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<sup>1</sup>The snapshot of the standard flow, which is used as a basis for comparison.

<sup>2</sup>The pictorial representation of the difference between the baseline snapshot and the last snapshot

Action	Description	Required Role
Show Receivers	see <a href="#">Flow Specific Monitoring Settings</a> . Shows the list of participating routers and receivers in a selected flow. For more information, see <a href="#">Monitoring Participating Routers and Receivers of a Flow</a> .	Administrator or Operator Level 2
Manage	Starts managing the selected flows when you perform this action from IP Multicast Flows view. For more information, see <a href="#">Managing and Stop Managing Flows</a> .	Administrator or Operator Level 2
Not Managed	Stops managing the selected flows when you perform this action from IP Multicast Flows view. For more information, see <a href="#">Managing and Stop Managing Flows</a> .	Administrator or Operator Level 2

You can perform the following actions from the IP Multicast Nodes view:

- Discover Groups
- Neighbor View
- Manage (Nodes)
- Not Managed (Nodes)

You can perform the following actions from the IP Multicast Flows view:

- Forwarding Tree
- Reverse Path
- Enable Monitoring
- Disable Monitoring
- View Snapshots
- Overwrite Snapshot
- Instant Monitoring
- Customize Monitoring Settings
- Show Receivers
- Manage (Flows)
- Not Managed (Flows)

You can perform the following actions from the IP Multicast Group form:

- View Receivers
- Launch Forwarding Tree
- Launch Reverse Path

## **Integration of the NNM iSPI for IP Multicast with the NNM iSPI for MPLS**

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

The NNM 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 NNM iSPI for IP Multicast and the MVPN inventory from the NNM iSPI for MPLS.

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

# Help for the NNM iSPI for IP Multicast Administrators

As an administrator, you can perform the following tasks

- [Configure the Polling Interval](#)
- [Configure the Group Discovery](#)
- [Configure the NNM iSPI for IP Multicast Regional Manager](#)
- [Configure Flow Monitoring settings](#)
- [Configure Multi-site Multicast connectivity](#)
- [Control Access to the NNM iSPI for IP Multicast](#)

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

## Manage and Not Managed Nodes

You can manage and not manage the nodes by performing the specific tasks from the NNMi inventory views. For more information, see *Actions provided by NNMi*.

The NNM iSPI for IP 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 NNM iSPI for IP Multicast nodes.

The NNM iSPI for IP Multicast provides you an option to not manage the multicast nodes that are managed by NNMi. You can also manage or not manage the multicast flows. For more information, see [Managing and Stop Managing Nodes](#) and [Managing and Stop Managing Flows](#).

## Backup and Restore Actions

You can perform the Backup and Restore Actions for the NNM iSPI for IP Multicast from NNMi. The backup and restore command for NNMi does the backup and restore for the NNM iSPI for IP Multicast. This is supported only with the embedded database and the NNM iSPI for IP 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

Select the node, and click **Action -> Polling -> 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 NNM iSPI for IP Multicast installation process prompts you to set up the login and password for the Web Service Client user.

### **Updating the NNMi System Password**

You can configure the NNM iSPI for IP Multicast to use same system password as NNMi. After installing the NNM iSPI for IP Multicast, if the system password for NNMi is modified, the NNM 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 NNM iSPI for IP Multicast to use the new system credentials.

### **Updating the iSPI for IP Multicast (NNMi Web Service Password)**

The NNM 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.

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

Use the `encryptmulticastpasswd.ovpl` command to update the NNM iSPI for IP Multicast password. This script updates the NNM iSPI for IP Multicast password. Avoid using the Web Service Client 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 NNM iSPI for IP Multicast to use the new 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 NNM iSPI for IP Multicast on an NNMi management server that is already managing the network.

After you install NNMi and NNM iSPI for IP Multicast, seed the nodes from the NNMi console. The NNMi discovery process starts and discovers the nodes in the network. The NNM 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 NNM 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 NNM iSPI for IP Multicast is set to 24 hours.

After installing the NNM 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 NNM iSPI for IP Multicast discovery process does not automatically discover the nodes that are already discovered by NNMi until the next discovery cycle.

## 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 NNM 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 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 NNM iSPI for IP Multicast

With the administrative privileges to NNMi console, you can [access the IP Multicast Configuration form<sup>1</sup>](#) and perform the following tasks:

- Configure the polling interval for the multicast nodes and interfaces.
- Filter the multicast reserved groups by using the Group Discovery tab.
- Establish the communication between the NNM iSPI for IP Multicast Global Manager and Regional Managers.
- Configure the flow monitoring settings to create a [baseline snapshot<sup>2</sup>](#), compare the subsequent flows against the [baseline snapshot<sup>3</sup>](#), and generate incidents when substantial deviations occur.

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 NNM iSPI for IP Multicast. By default, the State Poller polls periodically every 10 minutes for the state of the multicast nodes, interfaces, and PIM neighbors.
Group Discovery	Filter the multicast reserved groups. If you filter these groups, they do not appear in the inventory.
IP Multicast Regional Manager Connections	Configure the Regional Manager connections from the NNM iSPI for IP Multicast Global Manager (GM). After you configure the Regional Manager connections, you can monitor the nodes, interfaces, and flows of the Regional Manager from the NNM iSPI for IP Multicast Inventory Global Manager (GM). For more information, see <i>NNMi Help, Connecting Multiple NNMi Management Servers (NNMi Advanced)</i> .
Flow Monitor	Configure the monitoring parameters for the multicast flows.  Use this tab to perform the following functions: <ul style="list-style-type: none"> <li>◦ Configure the time interval between two monitoring cycles to determine change in flow.</li> <li>◦ Configure the percentage of <b>flow rate<sup>4</sup></b> deviation allowed for the</li> </ul>

<sup>1</sup>From the Workspaces navigation pane, click Configuration-> IP Multicast Configuration. The IP Multicast Configuration form opens.

<sup>2</sup>The snapshot of the standard pattern of flow or the ideal flow.

<sup>3</sup>The snapshot of the standard flow, which is used as a basis for comparison.

<sup>4</sup>The amount of multicast data (in bps, kbps, or mbps) passing through the PIM interfaces of the participating routers.

Configuration Type	Description
	flows while comparing with the baseline snapshot. If the deviation is more than the prescribed limits, the application generates an incident.
	<ul style="list-style-type: none"> <li>○ Enable or disable the Auto Baselining option.</li> <li>○ Configure the days of week and time of the day when you want to monitor the flows.</li> </ul>

**Related Topics:**

- [Configure the Polling Interval](#)
- [Configure the Group Discovery](#)
- [Configure the NNM iSPI for IP Multicast Regional Manager Connection](#)
- [Configure Flow Monitoring Settings](#)

**Configure the Polling Interval**

After the NNM 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.](#)<sup>1</sup>
2. Click the **Polling** tab and specify the following details:

Node Settings	
Option	Description
<b>Enable Polling</b>	Set the checkbox to poll the Multicast nodes. If <input checked="" type="checkbox"/> enabled, the NNM iSPI for IP Multicast monitors the status of the Multicast nodes. If you disable polling, the status of the node is No Status.
<b>Interval</b>	Type the interval (in minutes) to poll the Multicast nodes. The default polling interval is 10 minutes.
Interface Settings	
Option	Description
<b>Enable Polling</b>	Set the checkbox to poll the Multicast interfaces. If <input checked="" type="checkbox"/> enabled, the NNM iSPI for IP Multicast monitors the status of the Multicast interfaces on node. If you disable polling, the status of the interface is No Status.
<b>Interval</b>	Type the interval (in minutes) to poll the Multicast interfaces. The default polling interval is 10 minutes.


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<sup>1</sup>From the Workspaces navigation pane, click Configuration-> IP Multicast Configuration. The IP Multicast Configuration form opens.



## Performance Settings


Option	Description
<b>Enable Polling</b>	Set the checkbox to poll and collect the performance data for the Multicast nodes, interfaces, and flows. If <input checked="" type="checkbox"/> enabled, the NNM iSPI for IP Multicast collects the data and sends to the NNM iSPI Performance for Metrics. The Performance data appears on the map views only if the NNM iSPI Performance for Metrics is installed and running.
<b>Interval</b>	Type 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

The multicast group IP addresses between 224.0.0.0 and 224.0.0.255 are reserved for the use of routing protocols, protocols involved in low-level topology discovery, and maintenance protocols. You can filter these multicast reserved groups. If you filter these groups, they do not appear in the inventory. All multicast reserved groups are filtered by default.

#### To disable the filtering of Multicast Reserve Groups:

1. [Navigate to the IP Multicast Configuration.](#)<sup>1</sup>
2. Click the **Group Discovery** tab.
3. Disable the Filter Reserved Groups checkbox. If  disabled, the NNM iSPI for IP Multicast does not filter the multicast reserved groups and these groups appear in the inventory.
4. Click  (the **Save** icon).

### Connect to the NNM iSPI for IP Multicast Regional Manager

The NNM iSPI for IP Multicast provides you **IP Multicast Configuration** workspace to connect the NNM iSPI for IP Multicast Regional Managers to the NNM iSPI for IP Multicast Global Manager. As an administrator, you configure the settings to establish communication between the NNM iSPI for IP Multicast Global 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 NNM iSPI for IP Multicast Regional Managers connection, follow the steps:

1. Navigate to the Regional Manager form.
  1. From the workspace navigation panel, select the **IP Multicast Configuration** workspace.

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<sup>1</sup>From the Workspaces navigation pane, click Configuration-> IP Multicast Configuration. The IP Multicast Configuration form opens.

2. 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 NNM iSPI for IP Multicast Regional Manager](#).
5. Click  Save to return to the Regional Manager form.
6. Click  Save. The NNM 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.
Description	The NNM iSPI for IP Multicast Regional Manager name should be same as the NNMi Regional Manager name. Provide any description that would be useful for communication purposes within your team.

### Related Topic:

[Configure to the NNM iSPI for IP Multicast Regional Manager](#)

### Configure the NNM iSPI for IP Multicast Regional Manager

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

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



1. Navigate to the Regional Manager Connection form.<sup>1</sup>
2. Type the connection configuration settings for the NNM iSPI for IP Multicast Regional Manager connection. See [connection configuration settings](#). If the Regional Manager is con-

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1. From the workspace navigation panel, select the **IP Multicast Configuration** workspace.
2. Select the **IP Multicast Regional Manager Connection** tab.

figured for high-availability, enter configuration settings for each server in the high-availability group (application fail-over).

3. Click  (the **Save** icon) to return to the Regional Manager form.
4. Click  (the **Save** icon) to return to the IP Multicast Configuration form. The NNM iSPI for IP Multicast establishes communication with the Regional NNM 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 NNM iSPI for IP Multicast

Attribute	Description
Hostname	The fully-qualified hostname of the Regional NNM iSPI for IP Multicast management server. The NNM iSPI for IP Multicast uses this hostname for communication with the Regional NNM iSPI for IP Multicast management server and to construct URL Actions. See <i>NNMi Help, Authentication Requirements for launch URLs</i> Access.
Use Encryption	<p>If you want NNMi to use secure sockets layer encryption (HTTPS) to access this Regional NNM iSPI for IP Multicast management server, the value is case-sensitive and must match the hostname as specified in that server's SSL Certificate.</p> <p>If disabled (<input type="checkbox"/>) , the NNM iSPI for IP Multicast uses hypertext transfer protocol (HTTP) and plain sockets to access the NNM iSPI for IP Multicast Regional management server.</p> <p>If enabled (<input checked="" type="checkbox"/>) , the NNM iSPI for IP Multicast uses secure sockets layer encryption (HTTPS/SSL) to access the NNM iSPI for IP Multicast Regional management server. Default value for HTTP port for the NNM iSPI for IP Multicast is 8084.</p> <p>Default value for HTTPS port for the NNM iSPI for IP Multicast is 14443.</p> <p>If Use Encryption is disabled (previous attribute), type the port number for HTTP access to the NNM iSPI for IP Multicast console on the Regional management server.</p>
HTTP(S) Port	<p>If Use Encryption is enabled (previous attribute), type the port number for HTTPS access to the NNM iSPI for IP Multicast console on the Regional management server.</p> <p>For IP Multicast ports, check the port numbers from the <code>server.properties</code> file. Open the <code>server.properties</code> file from the <code>%NnmDataDir%\nmsas\multicast</code> or <code>\$NnmDataDir/nmsas/multicast</code> directory on the management server, and then note down the NNM iSPI for IP Multicast HTTP and HTTPS values if you are not using the default values.</p>
User	Type the user name required for the NNM iSPI for IP Multicast sign-in for the <b>system</b>

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

## Configure Flow Monitoring Settings

Based on the requirement, the NNM iSPI for IP Multicast provides you the flexibility to configure the flow monitoring by providing tunable parameters.

You can configure the flow monitoring at two levels:

- **Global Settings:**

Global settings act as the default flow monitoring settings for all the flows which are currently monitored and may be added for monitoring at a later stage. You can configure or modify the global settings using the **Flow Monitor** tab in the IP Multicast Configuration form. See [Global Flow Monitoring Settings](#) below.

- **Flow Specific Settings:**

Flow specific settings allow you to have distinct flow monitoring settings for each flow. You can configure or modify the flow specific settings by performing the action **Customize Monitoring Settings** from IP Multicast view. See [Flow Specific Monitoring Settings](#).

### Global Flow Monitoring Settings

You can use the **Flow Monitor** tab in the configuration form (**Configuration -> iSPI for IP Multicast Configuration -> Flow Monitor**) to configure the flow monitoring parameters. Use this tab to change the default flow monitoring parameters. The changes you make to the default parameters are applied to all flows that do not have any specific monitoring settings.

The Flow Monitor tab in the configuration form of the NNM iSPI for IP Multicast enables you to perform the following specific tasks:

- Configure the interval between the start times of two consecutive [flow monitoring cycles](#)<sup>1</sup>.
- Configure the percentage of **flow rate**<sup>2</sup> deviation allowed for the flows while comparing with the **baseline snapshot**<sup>3</sup>. If the deviation is more than the prescribed limits, the NNM iSPI for IP Multicast generates an incident.
- Enable or disable the Auto Baselining option.
- Configure the days of week and time of the day when you want to monitor the flows.

**To configure global flow monitoring settings, follow these steps:**

1. From the Workspaces navigation pane, click **Configuration -> IP Multicast Configuration**. The IP Multicast Configuration form opens.
2. Click the **Flow Monitor** tab and specify the following details:

Flow Monitor Settings	
Option	Description
<b>Auto Baselining</b>	Select the Auto Baselining check box to enable the NNM iSPI for IP Multicast to create the baseline snapshot automatically when a flow is marked for monitoring. By default, the snapshot collected in the first monitoring cycle is taken as the baseline snapshot, but you can change the baseline snapshot at any time to the last monitored flow. See <a href="#">Overwrite Snapshot</a> .
<b>Monitoring Days</b>	If you clear the Auto Baselining check box, the baseline snapshot is not created by the NNM iSPI for IP Multicast. In that case, you have to create the baseline snapshot by performing the <b>Overwrite Snapshot</b> action. Select the days of a week for which you want to monitor the flows. All days are selected by default. For example, if you want to monitor the flows only on Mondays and Tuesdays, clear the check boxes of all days except Monday and Tuesday.
<b>Monitoring Time</b>	You have to select at least one day for monitoring. Type the start time and end time of monitoring time in the 24 hour clock format of hh:mm. The default start time and end time are 00.00 hours and 24.00 hours respectively. The flows are monitored only during the period between the start time and the end time.  <b>Note:</b> The start time and end time must be based on NNMi management server's time. The actual start time and end time may slightly vary depending upon the monitoring interval. The NNM iSPI for IP Multicast starts cal-


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<sup>1</sup>Flow monitoring cycle refers to an interval of time during which the process of start router population (if it is not already done), baseline snapshot creation (if it is not there), last sample snapshot calculation, comparison of these snapshots, and incident generation (for any issues identified) take place.

<sup>2</sup>The amount of multicast data (in bps, kbps, or mbps) passing through the PIM interfaces of the participating routers.

<sup>3</sup>The snapshot of the standard flow, which is used as a basis for comparison.

Option	Description
<b>Monitoring Interval</b>	<p>culating monitoring time from the time when the flow gets scheduled for monitoring.</p> <p>For example, if you configure monitoring settings at 06.20 hours with the following parameters:</p> <ul style="list-style-type: none"> <li>• Start time at 07.00 hours</li> <li>• Monitoring interval is 15 minutes</li> </ul> <p>In this case, the NNM iSPI for IP Multicast tries to monitor the flows at 06.35, 06.50, 07.05, 07.20, and so on, based on the monitoring interval, which is 15 minutes. You have specified the start time for monitoring as 7.00 hours, hence the actual monitoring starts at 7.05 hours, the first monitoring cycle after 7.00 hours.</p> <p>Type the interval (in minutes) between the start times of two consecutive flow monitoring cycles. The default flow monitoring interval is 15 minutes. The value should be between 5 minutes and 60 minutes.</p>
<b>Rate Deviation</b>	<p>Type the percentage of deviation in the flow rate allowed from the baseline snapshot. Flow rate refers to the amount of multicast data passing per second through a PIM interface for a particular multicast flow. The default rate deviation is 20 percentage. When the deviation takes place more than the value specified here, the NNM iSPI for IP Multicast generates an incident.</p> <p>The flow rate data is available only if the NNM iSPI Performance for Metrics is installed and running.</p>

3. Click  (the **Save** icon).

### Flow Specific Monitoring Settings

You can have flow specific monitoring settings for monitored flows. Use the action **Customize Monitoring Settings** from the IP Multicast view to customize the flow monitoring settings of each monitored flow. If you apply the flow specific monitoring settings to a flow, these settings override the global flow monitoring settings for the flow.

Flow specific monitoring settings enable you to change the starting router manually. When you change the starting router, the baseline snapshot of the flow changes and the NNM iSPI for IP Multicast closes all incidents associated with the previous baseline snapshot automatically.

Use the Customize Monitoring Settings action to:

- Change the starting router of the flow.
- Configure monitoring interval for the flow
- Configure rate deviation thresholds for each flow.
- Specify the flow to be monitored only on specific days for specific intervals. For example,


you can monitor a flow only from Mondays to Fridays from 9.00 hours to 17.00 hours.

You can configure flow specific monitoring settings only for the monitored flows.

### To enable flow specific monitoring settings:

1. From the Workspaces navigation pane, click **IP Multicast** -> **IP Multicast Flows**. The IP Multicast flow view appears.
2. In the IP Multicast Flow view, select a monitored flow whose monitoring settings you want to change and click **Actions** -> **IP Multicast** -> **Customize Monitoring Settings**. Flow Specific Monitoring Settings form opens.
3. Change the **Starting Router** if needed. Delete the IP address of the starting router and type the IP address of the new starting router. Alternatively, you can type the hostname of the starting router as well, but the flow specific monitoring settings form displays only the IP address of the starting router.

You may not see the IP address of the starting router, if the flow has not completed a monitoring cycle. In that situation, type the IP address of the starting router or wait until a monitoring cycle is completed.

4. Change the monitoring settings for the flow.
5. Click  (the **Save** icon).

When you disable monitoring of a flow with specific monitoring settings, the specific settings are lost. If you enable monitoring of the same flow again, the flow takes the global flow monitoring settings, not the previous specific settings.

### Related Topics:

[Snapshots](#)

[Enable Monitoring](#)

[Disable Monitoring](#)

[View Snapshots](#)

[Overwrite Snapshot](#)

## Configure Multi-site Multicast Connectivity

The NNM iSPI for IP Multicast can display the connectivity between nodes and interfaces that are distributed over multiple WANs, sites, or geographical locations. To enable the NNM iSPI for IP Multicast to do this, you must configure the PIM interfaces on WANs that connect to each other. After this configuration, you can monitor the multicast connectivity across different WANs. The NNM iSPI for IP Multicast displays the nodes and interfaces spread across multiple WANs, sites, or geographical locations in the neighbor view, forwarding tree, and reverse path. In all these views, a cloud represents the connectivity between two interfaces connected across WANs.

To activate this feature in the NNM iSPI for IP Multicast, for each PIM interface you must add the information of the neighbor PIM interface which is connected to this interface across a WAN network. To add this neighbor PIM interface information, you can use the **Custom Attributes** functionality provided by NNMi.





You must configure custom attributes on all interfaces that are linked across WANs. If you do not configure the custom attributes properly, you cannot get correct neighbor views, forwarding trees, and reverse path views.

You can define the custom attributes only on NNMi objects, so you must configure the custom attributes on PIM interface objects from the NNMi inventory.

You can create custom attributes using any of the following methods:

- Open a particular interface form (see below).
- Use NNMi's `nnmloadattributes.ovpl` command line tool. For more information, see *NNMi Help, Add Custom Attributes to Multiple Nodes or Interfaces*.

**To configure WAN neighbors to an interface object in NNMi inventory, follow these steps:**

1. From the workspace navigation panel, select **Inventory** and click **Interfaces**.
2. Click  (the **Open** icon) in the row representing the interface with settings you want to edit.
3. Select the **Custom Attributes** tab.
4. Click  (the **New** icon) to create a Custom Attribute.
5. Type the name and the value for the new custom attribute in the respective boxes as follows:
  1. Type `com.hp.nnm.customattributes.iface.wan.nbrs` as the Name. The name remains constant.
  2. In the Value field, type the name of the neighbor node (on which the neighbor interface is hosted) and the interface index (ifindex) of the neighbor interface separated by a colon. You can type the details of multiple neighbors in this field separated by a semicolon.  
For example, you can type `node1:ifIndex1;node2:ifIndex2`, when you have to enter the details of two neighbors. Node1 is the name of the node on which the first interface is hosted and ifindex1 is the ifindex of the first interface. Similarly, node2 is the name of the node on which the second interface is hosted and ifindex2 is the ifindex of the second interface.
6. Click  (the **Save and Close** icon) to return to the Interface form.
7. Click  (the **Save and Close** icon) to save your changes. Follow the same steps to configure the custom attributes on the interface, which is on the other side of the WAN.

Addition of custom attribute does not change the existing status of the PIM interface.

For more information, see *NNMi Help, Add Custom Attributes to a Node or Interface Object*.

### **Adding Multicast WAN Neighbors to Multiple interfaces**



You can add multicast WAN neighbors to multiple interfaces using `nnm-loadattributes.ovpl` command line tool. This command line tool also enables you to add custom attributes to multiple interfaces from a comma-separated values (CSV) file. This feature is useful if you have information about PIM interfaces on a large number of WANs that connect to each other. You can define this information in an external data storage and load that information into the NNM iSPI for IP Multicast.

For example, the command line tool `nnmloadattributes.ovpl -t interface -s "router-1,Fa0/0,-com.hp.nnm.customattributes.iface.wan.nbrs,node2:ifIndex2"` creates a custom attribute for the interface `Fa0/0` hosted on node `router1` with the following features:

- `com.hp.nnm.customattributes.iface.wan.nbrs` as the custom attribute name
- `node2:ifIndex2` as the value

The NNM iSPI for IP Multicast treats the interface with `ifindex2` on node2 as the neighbor of interface `Fa0/0` on node `router1`.

For more information, see *NNMi Help, Add Custom Attributes to Multiple Nodes or Interfaces*.

After the configuration of the neighbor information on PIM interfaces on WANs that connect to each other, the NNM iSPI for IP Multicast discovers these neighbors in the next discovery cycle. After the completion of the discovery cycle, the NNM iSPI for IP Multicast can display the connectivity between the nodes spread across WANs in the neighbor views, forwarding trees and reverse paths. In all these views, a cloud represents the connectivity between interfaces connected across WANs.

## Controlling Access to the NNM iSPI for IP Multicast (Multi-tenancy)

As an administrator of the NNM iSPI for IP Multicast, you can control the access to multicast inventory, forwarding trees, reverse paths, neighbor views, and incidents. This feature helps to maintain privacy and security of each organization. For example, the operators must see the details of only those multicast nodes to which they have access in the inventory.

As an administrator, you can limit visibility and control to some or all operators. To do so, you must configure user groups, security groups, and optionally, tenants.

- A user group is a set of users or operators who have similar interests, goals, or concerns. Each operator account is associated with one or more user groups.
- Each multicast node is associated with a Security Group. Security Groups enable you to group objects that require the same access level.
- A tenant is the top-level organization to which a multicast node belongs.

An operator can access and control a multicast node only if one of the operator's user groups has access to the node's security group. Multicast interfaces inherit the access control from the multicast nodes. So, if the operator does not have access to a particular node, the operator cannot access the interfaces on that particular node.

As an administrator you can create, modify, or delete user groups, security groups and tenants. You can also change the security group assigned to a tenant as the default security group. You can configure user groups, security groups, and tenants from the NNMi workspace by clicking **Configuration -> Security**. Alternatively, you can also use `nnmsecurity.ovpl` command provided by NNMi to configure the user groups, security groups, and tenants.

For more information about configuring User Groups, Security Groups, and Tenants, see *NNMi Help -> Configuring Security*.

An operator can see a multicast flow if the operator has access to at least one of the nodes through which the flow passes. In the forwarding tree view, the reverse path view, and the neighbor path view, the NNM iSPI for IP Multicast displays the entire connections if the operator has access to at least a single node involved in these views, but the operator cannot see the details of the nodes that are not accessible to the operator. However, the operators can see the connecting interfaces and the names of the nodes.

In the forwarding tree view, the reverse path view, and the neighbor path view, the NNM iSPI for IP Multicast displays the nodes associated with a single tenant. If your multicast network supports multiple tenants, you may have to launch these views separately for each tenant.

The operators can see the multicast incidents only if they have access to the start router. In the case of flow monitoring, if the operators do not have access to the starting router of a multicast flow, the operators cannot see the incidents related to that particular flow.

## Configuring with Address Translation Protocols

The NNM iSPI for IP Multicast supports the networks with Network Address Translation (NAT) protocols and Port Address Translation (PAT) protocols. If your network supports NAT or PAT protocols, you must follow the instructions provided in the *NNMi Online Help, Address Translation Protocols*.

In the forwarding tree view, the reverse path view, and the neighbor path view, the NNM iSPI for IP Multicast always displays the network connectivity within a single tenant. The NNM iSPI for IP Multicast does not support the neighboring relationship across multiple tenants.

You should not have two or more nodes with the same internal (private) IP addresses in a single tenant.

## Enabling Single Sign-On with NNMi

You can configure HPE Network Node Manager i Software (NNMi) Single Sign-On (SSO) to facilitate access to the NNM iSPI for IP Multicast Configuration workspace from the NNMi

console without needing to log on again. SSO is not enabled during installation.

**To enable SSO, follow these steps:**

- For Windows:

1. Edit the `%NnmDataDir%\shared\nnm\conf\props\nms-ui.properties` file.
2. Change `com.hp.nms.ui.sso.isEnabled= "false"` to `com.hp.nms.ui.sso.isEnabled = "true"`.
3. Run the `nmssso.ovpl -reload` script.
4. Run the `nmsmulticastssoreload.ovpl` script.

- For UNIX:

1. Edit the `$NnmDataDir/shared/nnm/conf/props/nms-ui.properties` file.
2. Change `com.hp.nms.ui.sso.isEnabled="false"` to `com.hp.nms.ui.sso.isEnabled = "true"`.
3. Run the `nmssso.ovpl -reload` script.
4. Run the `nmsmulticastssoreload.ovpl` script.

For more information about SSO, see *NNMi Deployment Reference, Using Single Sign-On*.

## **NNM iSPI for IP Multicast System Health Report**

You can check the health of the NNM iSPI for IP Multicast by viewing the IP Multicast Health Report.

### **Launching the IP Multicast Health Report**

When you launch the IP Multicast health report (Select **Help-> Help for NNM iSPIs -> iSPI for IP Multicast System Health**), the user interface displays the following tabs:

- Memory Details
- CPU Usage Details
- System load Avg
- Swap and other Details
- Database Connection Details
- State Poller Health
- GNM Health

The **Memory Details** tab contains the following information:

- Name
- Status
- Used(%)
- Max(MB)
- Committed(MB)

The **CPU Usage** tab contains the following information:

- CPU Usage Details
- Load Average

The **System load Avg, Swap and other details** tab contains the following information:

- Available Processors
- Free Physical Memory
- Physical Memory
- Committed Virtual Memory
- Free Swap Space
- Total Swap Space

The **Database Connection Details** tab contains the following information:

- Connections Available
- Total Connections
- Maximum Connections in Use
- Connection created
- Connection Destroyed
- Connections in Use

The **State Poller Health** tab contains the following information:

- Collections requested in last 5 minutes
- Collections completed in last 5 minutes
- Collections in process
- Time to execute skips in last 5 minutes
- Collector Collection State Count In Last 5 minutes
- Poller result queue length 5 min(avg)

The **GNM Health** tab contains the details of the Regional Managers configured.

## Troubleshooting the NNM iSPI for IP Multicast

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

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

- Check that NNMi is running.
- Check the installation log file (`HPOvMcastiSPI_08.10, 9.00, 9.10_HPOvInstaller.txt`).
- Check system configuration as specified in the IP Multicast 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 NNM 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 NNM iSPI for IP Multicast jboss (mcastjboss) is not running and the log error message is Out of Memory.

Verify the system virtual memory. Increase `Xmx` parameter for jboss.

The NNM 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.

Remove all the NNM 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/nmresetembdb.ovpl` to clear the NNM 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 -> Polling -> Configuration Poll**.

In the IP Multicast Flows view, one of the flows managed by you appears as critical, but you cannot see any incidents.

Reason: The starting router belongs to another security group to which you do not have access.

Solution: Request your administrator to give you access to the starting router.

Baseline creation failed.

Reason 1: The starting router has stale multicast group data.

Reason 2: The starting router is not actively participating in the flow.

Solution 1: Troubleshoot the starting router to remove the stale data.

Solution 2: Disable the monitoring and enable monitoring so that a new router is selected as the starting router.

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**Feedback on Online Help (Network Node Manager iSPI for IP Multicast Software 10.30)**

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We appreciate your feedback!