CHAPTER 14

Routing

This chapter describes the Border Gateway Protocol and the Open Shortest Path First Routing Protocol. Border Gateway Protocol is an exterior gateway routing protocol that addresses the task of path determination. The Cisco 12000/10720 Router Manager supports Configuration and Fault Management of BGP routing processes and BGP address families. The Open Shortest Path First is a link-state, interior gateway routing protocol. It is designed to operate in Transmission Control Protocol/Internet Protocol networks and to address the shortcomings of the Routing Information Protocol. The Cisco 12000/10720 Router Manager supports the Configuration and Fault Management of OSPF processes and areas on the routers.

This chapter contains the following information:

Launching the Routing Windows

Table 14-1 displays the Routing windows that can be launched from each object type.

Note Table 14-1 lists the menu options to launch the Routing windows from the site level.

Table 14-1 Launching the Routing Windows

Cisco 12000/10720 Router Manager Window/Task	Objects (that can be selected) to Open the Window					Menu Options to Select to Open Window
	Site	Chassis 12000 Series	Chassis 10720	Module	Interface	
BGP Configuration	Yes	Yes	Yes	No	No	Cisco 12000/10720 Manager> Configuration>Chassis>BGP> BGP Configuration
BGP Status	Yes	Yes	Yes	No	No	Cisco 12000/10720 Manager>Fault> Chassis>BGP>BGP Status
BGP Address-Family Synchronization	Yes	Yes	Yes	No	No	Cisco 12000/10720 Manager> Configuration>Chassis>BGP> BGP Address-Family Synchronization
BGP Address Family Configuration	Yes	Yes	Yes	No	No	Cisco 12000/10720 Manager> Configuration>Chassis>BGP> BGP Address-Family Configuration
BGP Address-Family Status	Yes	Yes	Yes	No	No	Cisco 12000/10720 Manager>Fault> Chassis>BGP>BGP Address-Family Status

Table 14-1 Launching the Routing Windows (continued)

OSPF Configuration	Yes	Yes	Yes	No	No	Cisco 12000/10720 Manager> Configuration>Chassis>OSPF >OSPF Configuration
OSPF Status	Yes	Yes	Yes	No	No	Cisco 12000/10720 Manager>Fault> Chassis>OSPF>OSPF Status

Note The routing windows cannot be opened when multiple objects are selected (the menu options to open the windows are grayed out). Available menu options can be launched from a site object containing the required objects, when required.

BGP Management

BGP is an interautonomous system routing protocol that is used to exchange routing information for the internet. The customers connect to the Internet Service Providers (ISPs), and the ISPs use BGP to exchange customer and ISP routing information. When BGP is used between autonomous systems (AS), the protocol is referred to as External BGP (EBGP). If a service provider is using BGP to exchange routes within an AS, then the protocol is referred to as Interior BGP (IBGP).

BGP uses the Transmission Control Protocol (TCP) as its transport protocol. Any two routers that have opened a TCP connection to each other for the purpose of exchanging routing information are known as peers or neighbor.

BGP Configuration

The BGP Configuration window allows the user to enable, modify and disable a BGP process in the device. The BGP Configuration window also allows the user to configure a BGP Network, BGP Neighbor and BGP Redistribute protocol.

The BGP Configuration section covers the following:

Viewing the BGP Details Tab on the BGP Configuration Window

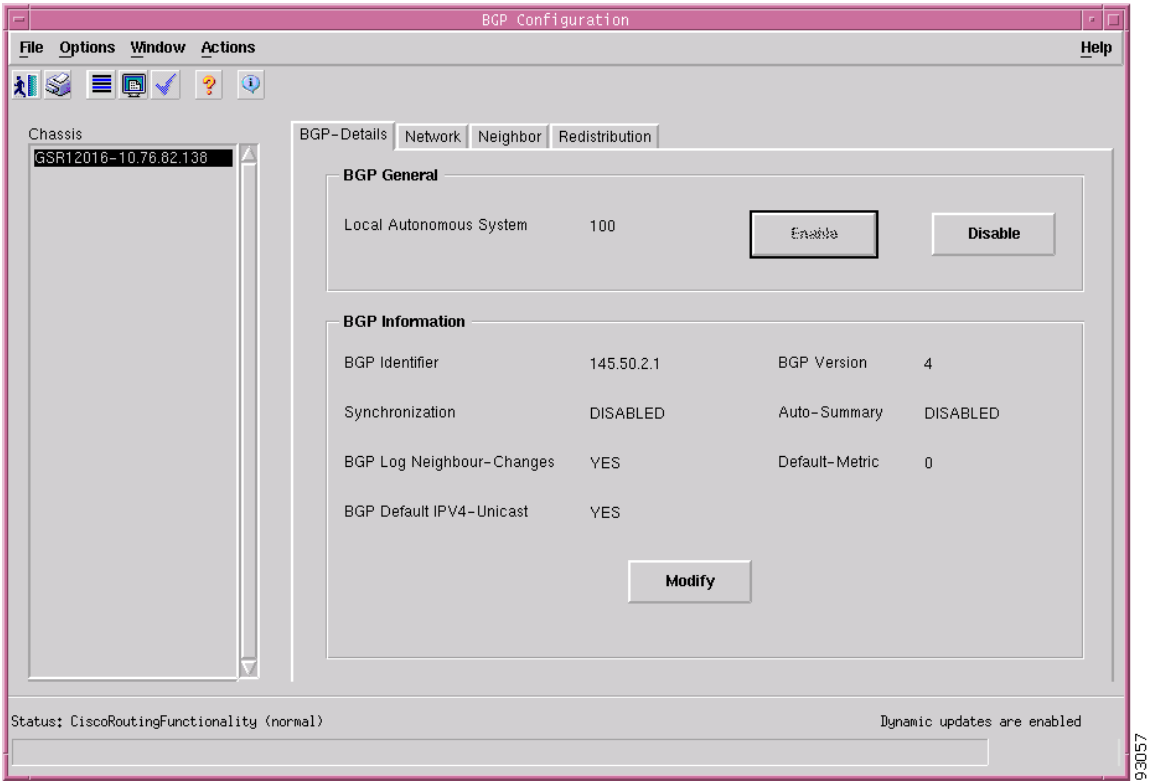
The BGP Details tab displays the BGP information. The user can enable, disable or modify BGP running on the device.

To view the BGP Configuration window for a chassis, proceed as follows:

Step 1 Right click on the chassis object and choose **Configuration>BGP>BGP Configuration**. See Table 14-1 on page 14-2 for information on which objects allow you to launch the BGP Configuration window.

Note The BGP Details tab is always displayed upon launching the BGP Configuration window.

Figure 14-1 BGP Configuration Window—BGP Details



Step 2 Choose the chassis from the left side of the window.

BGP Details Tab—Detailed Description

The BGP-Details tab displays two areas: BGP General and BGP Information

BGP General

Local Autonomous System—The id of the BGP process running in the device. If the value is 0 it means no BGP process is running on the device.

Actions

Enable—The Enable action button is active when there is no BGP running on the device. Clicking Enable action button opens the BGP Enable window through which the user can create a new BGP process in the device. For more details on enabling BGP on a chassis, see "Enabling BGP on a Chassis" section on page 7.

Disable—The Disable action button is active when there is a BGP process running in the device. Clicking Disable action button removes the BGP process running in the device. For more details on disabling BGP, see "Disabling BGP on a Chassis" section on page 11.

BGP Information

BGP Identifier—It is the Router Identifier for the BGP speaking router. By default, BGP Identifier is set to IP address of the loopback interface if it is configured otherwise it is the highest IP address configured for a physical interface on that router.

BGP Version— It displays the supported BGP version.

BGP Synchronization—It displays whether BGP synchronization with IGP is enabled or disabled.

BGP Auto-Summary—It displays whether Automatic network number summarization for BGP is enabled or disabled.

BGP Log Neighbor-Changes—It displays whether logging of BGP neighbor resets is enabled or disabled.

Default-Metric—It displays the default-metric value set for redistributed routes.

BGP Default IPV4-Unicast—It displays whether the IP version 4 (IPv4) unicast for peers is enabled or disabled on the router.

Action

Modify—The Modify action button is active only when there is BGP running in the device. Clicking the Modify action button opens the BGP Modify window through which the user can modify the General BGP parameters. For more details on modifying BGP, see "Modifying BGP on a Chassis" section on page 9.

Enabling BGP on a Chassis

The Enable BGP window allows the user to enable a BGP process on the device. To enable a BGP process, proceed as follows:

Step 1 Open the BGP Configuration window. See "Viewing the BGP Details Tab on the BGP Configuration Window" section on page 14-4 for further details.

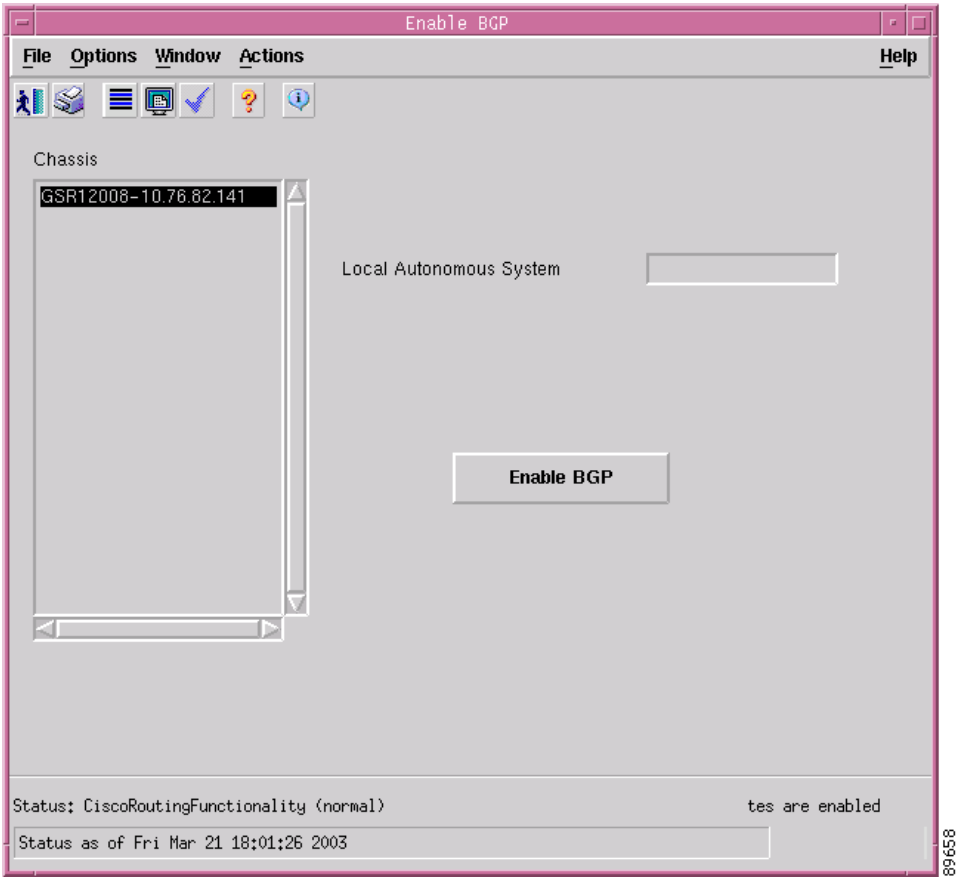
Step 2 Choose a chassis from the left side of the window.

Note You can choose multiple chassis (from the chassis list) which allows you to launch the Enable BGP window for the selected chassis.

Step 3 Click on the Enable button. The Enable BGP window appears.

Note The Enable button is active only when there is no BGP running on the device.

Figure 14-2 Enable BGP Window



Step 4 Choose the chassis from the left side of the window.

Step 5 Enter a value for the BGP AS Number.

Step 6 Choose the Enable BGP button.

Enable BGP Window—Detailed Description

Local Autonomous System—The id of the BGP process to be created on the device.

Action

Enable BGP—Clicking on the Enable BGP button creates the BGP process on the device.

Modifying BGP on a Chassis

The BGP Modify Window allows the user to modify the BGP Configurations on the device. To modify a BGP process, proceed as follows:

Step 1 Open the BGP Configuration window. See "Viewing the BGP Details Tab on the BGP Configuration Window" section on page 14-4 for further details.

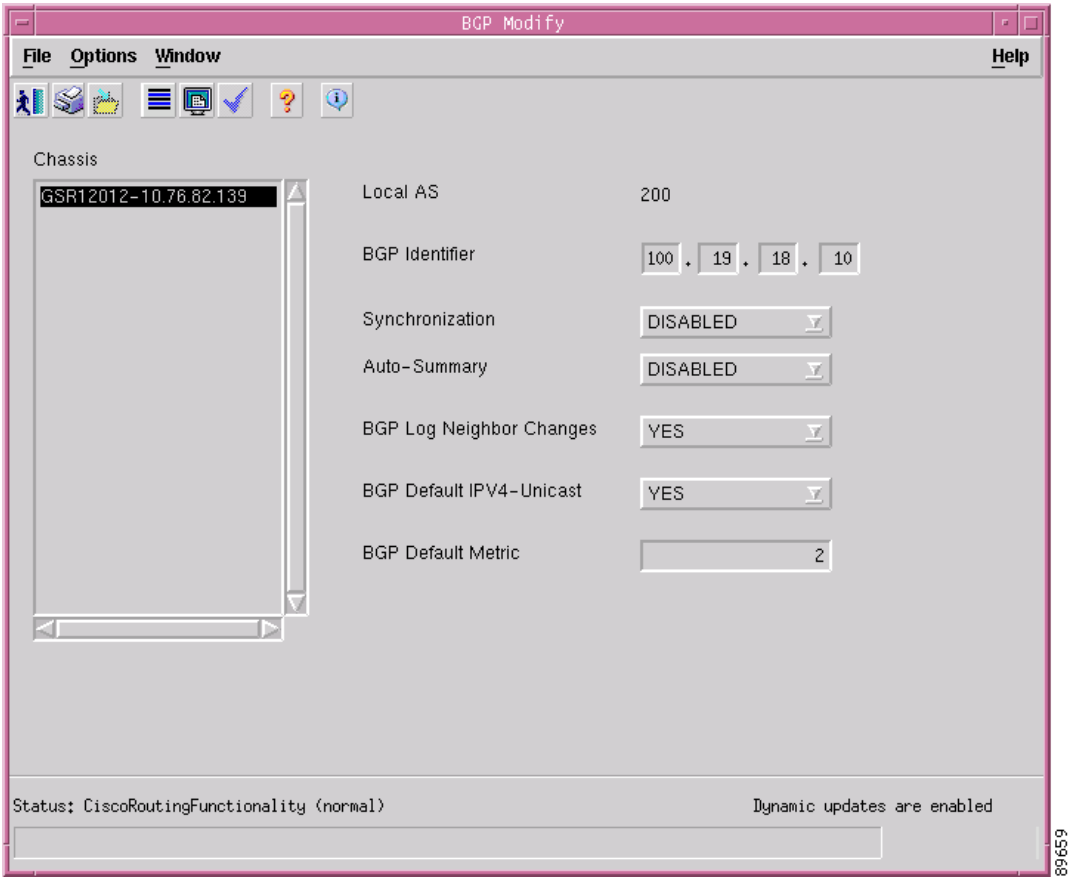
Step 2 Choose a chassis from the left side of the window.

Note You can choose multiple chassis (from the chassis list) which allows you to launch the BGP Modify window for the selected chassis.

Step 3 Click on the Modify button. The BGP Modify window appears.

Note The Modify button is active only when there is BGP running on the device.

Figure 14-3 BGP Modify Window



Step 4 Choose the chassis from the left side of the window.

Step 5 Modify the values of the fields and save the changes.

BGP Modify Window—Detailed Description

The BGP Modify window displays the following:

Local AS—The Autonomous System number in the router.

BGP Identifier—Used to configure the Router Identifier for the BGP speaking router.

Note Peering sessions are reset if the router ID is changed.

BGP Synchronization—This is used to Enable or Disable BGP synchronization with Interior Gateway Protocol (IGP).

BGP Auto-Summary—This is used to Enable or Disable Automatic network number summarization for BGP

BGP Log Neighbor-Changes—This is used to set logging of BGP neighbor resets. This value can be set to “Yes” or “No”.

BGP Default IPV4-Unicast—This is used to set the default as the IP version 4 (IPv4) unicast for BGP peers on the router.

BGP Default-Metric—This is used to configure the default-metric value for redistributed routes.

Note If this attribute is set to zero, then the default metric is removed from the device.

Disabling BGP on a Chassis

This section describes the procedure to disable a BGP process running in the device. To disable a BGP process, proceed as follows:

Step 1 Open the BGP Configuration window. See “Viewing the BGP Details Tab on the BGP Configuration Window” section on page 14-4 for further details.

Step 2 Choose the chassis for which you want to disable BGP from the left side of the window.

Note You can choose multiple chassis (from the chassis list) which allows you to disable BGP for the selected chassis.

Step 3 Click on the Disable button.

Note The Disable button is active only when there is BGP running on the device.

Figure 14-4 Disable BGP—Alert

Step 4 Click Yes to disable BGP on the chassis.

Step 5 Click No to abort the Disable BGP operation.

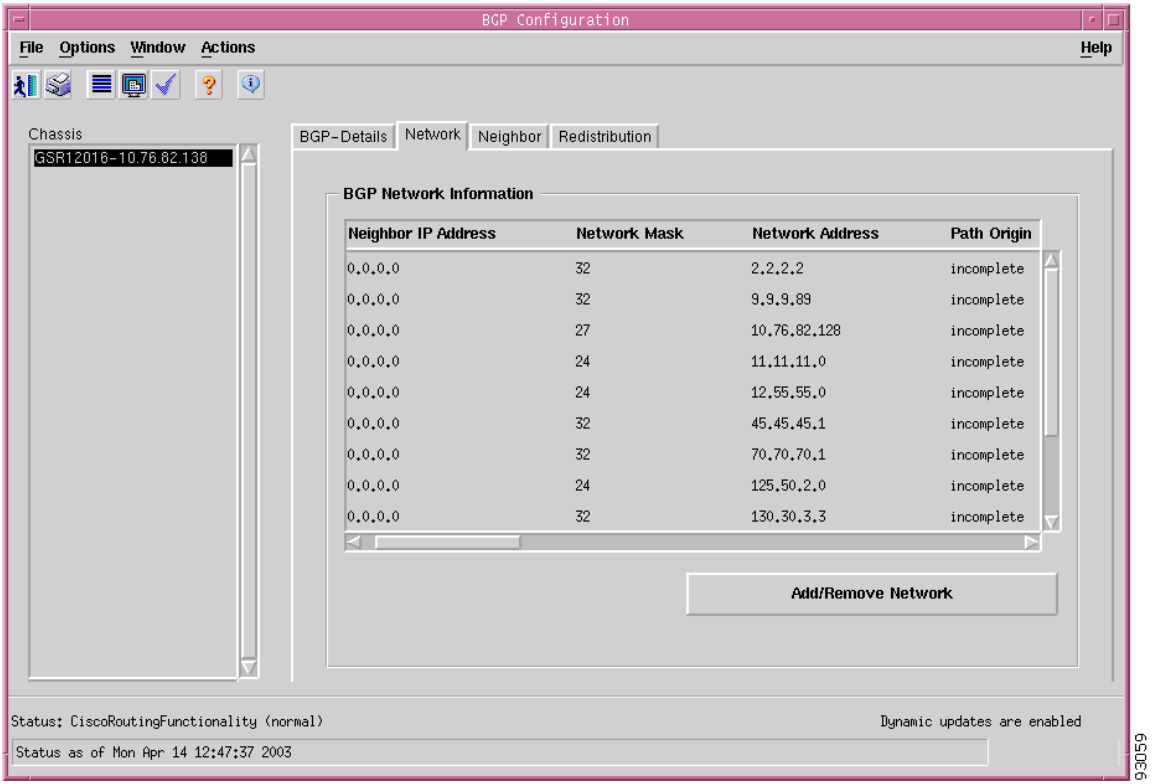
Viewing the Network Tab on the BGP Configuration Window

The Network tab displays the information about paths to destination networks from all the BGP4 Peers. The user can add or remove a BGP network on the device. To view the Network tab on the BGP Configuration window for a chassis, proceed as follows:

Step 1 Right click on the chassis object and choose **Configuration>BGP>BGP Configuration**. See Table 14-1 on page 14-2 for information on which objects allow you to launch the BGP Configuration window.

Step 2 Click on the Network tab.

Figure 14-5 BGP Configuration Window—Network Tab



Step 3 Choose the chassis from the left side of the window.

Network Tab—Detailed Description

The Network tab displays a single area, BGP Network Information.

BGP Network Information

Neighbor IP Address—The IP address of the peer where the path information was learnt.

Network Mask—Length in bits of the IP address prefix in the Network Layer Reachability Information field.

Network Address—An IP address prefix in the Network Layer Reachability Information field. This object is an IP address containing the prefix with the length specified by the Network Mask attribute. Any bits beyond the length specified by Network Mask attribute are zeroed.

Path Origin—The ultimate origin of the path information.

Border Router IP Address—The address of the border router that should be used for the destination network.

Best Path—Indicates whether the BGP4 route is the best chosen or not.

Multiple Exit Point Discriminate Metric—This metric is used to discriminate between multiple exit points to an adjacent autonomous number. A value of -1 indicates the absence of this attribute.

Degree of Preference—The originating BGP4 speaker's degree of preference for an advertised route. A value of -1 indicates the absence of this attribute.

Calculated Degree of Preference—The degree of preference calculated by the receiving BGP4 speaker for an advertise route.

Less Specific Route Selected—Indicates whether or not the local system has selected a less specific route without selecting a more specific route.

Router Aggregator AS—The AS number of the last BGP4 speaker that performed route aggregation. When the value is zero, it indicates the absence of this attribute.

Route Aggregator IP Address—The IP address of the last BGP4 speaker that performed route aggregation.

Actions

Add/Remove Network—Clicking this button opens the BGP Network Configuration window. For more details, see "BGP Network Configuration" section on page 14.

BGP Network Configuration

The BGP Network Configuration window allows the user to add or remove a network entry to be advertised through the BGP Network. To configure the BGP Network, proceed as follows:

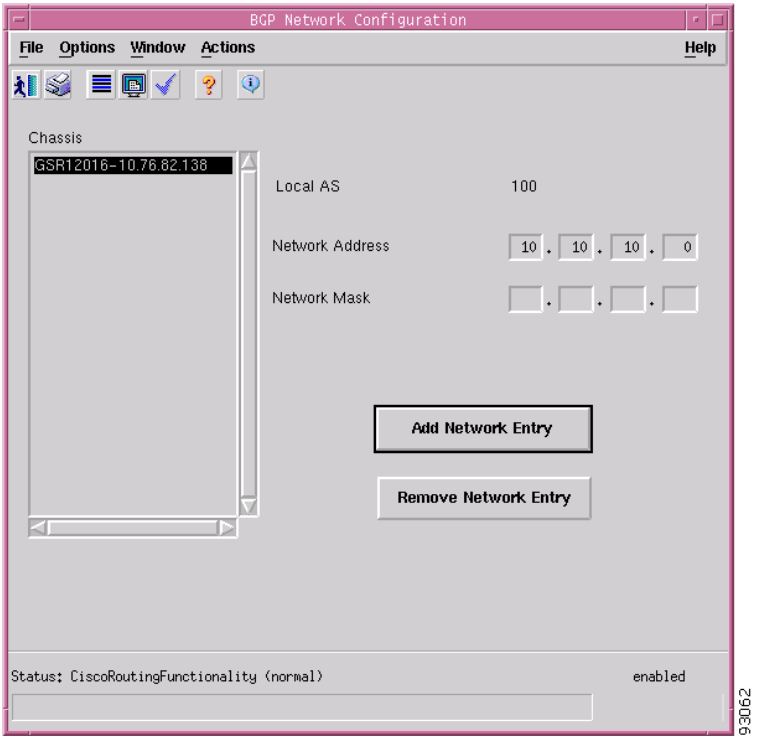
Step 1 Open the BGP Configuration window. See "Viewing the BGP Details Tab on the BGP Configuration Window" section on page 14-4 for further details. Click on the Network tab.

Step 2 Choose the chassis, for which you want to configure the BGP path, from the left side of the window.

Note You can choose multiple chassis (from the chassis list) which allows you to launch the BGP Network Configuration window for the selected chassis.

Step 3 Click Add/Remove Network. The BGP Network Configuration window appears.

Figure 14-6 BGP Network Configuration Window



Step 4 Edit the fields displayed in the window, as required.

BGP Network Configuration Window—Detailed Description

The BGP Network Configuration window displays the following:

Local AS—The Autonomous System number in the router.

Network Address—The is used to configure the IP address of a network to be advertised through BGP.

Network Mask—This is used to configure the subnet mask of the network to be advertised.

Action

Add Network Entry—Clicking on the Add Network Entry button, adds the network entry on the device. Thus, the user is able to add the networks associated with the BGP routing process.

Remove Network Entry—Clicking on the Remove Network Entry button, removes the network entry from the device. Thus, the user is able to remove the networks associated with the BGP routing process.

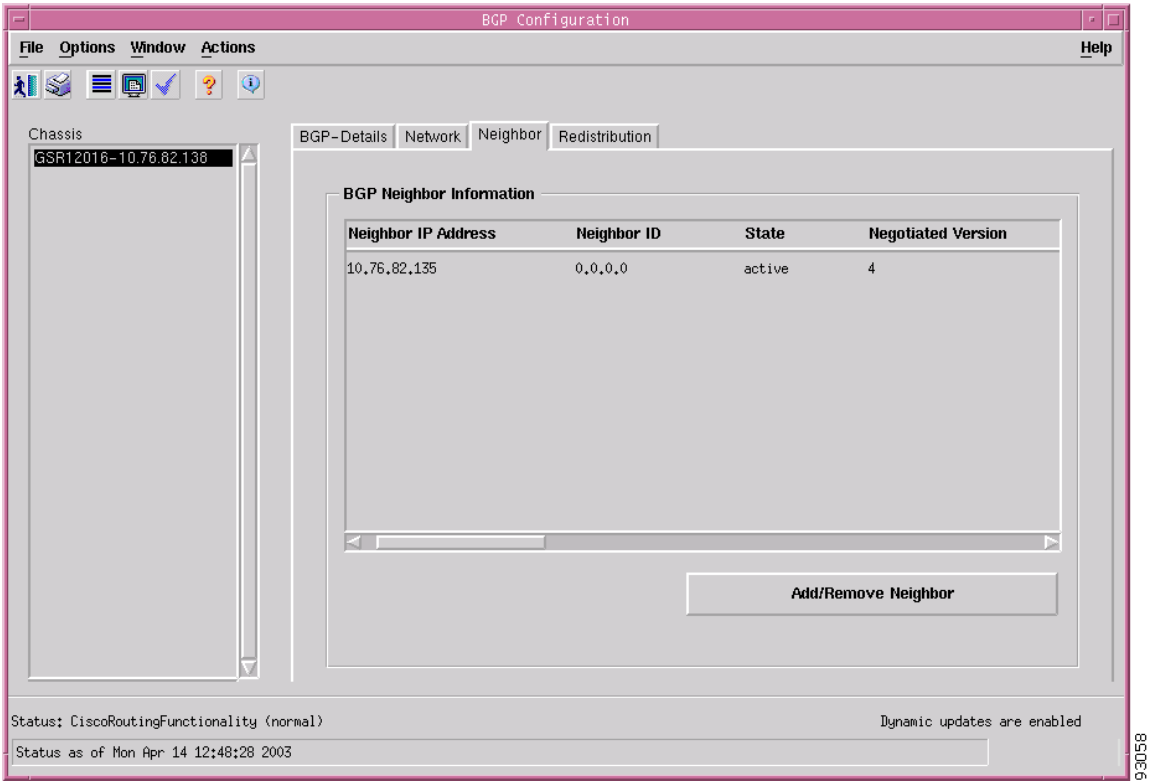
Viewing the Neighbor Tab on the BGP Configuration Window

The Neighbor tab displays the connection related information for the BGP Neighbors. Each entry corresponds to a BGP Neighbor. The user can add or remove the neighbor configurations on the device. To view the Neighbor tab on the BGP Configuration window for a chassis, proceed as follows:

Step 1 Right click on the chassis object and choose **Configuration>BGP>BGP Configuration**. See Table 14-1 on page 14-2 for information on which objects allow you to launch the BGP Configuration window.

Step 2 Click on the Neighbor tab.

Figure 14-7 BGP Configuration Window—Neighbor Tab



Step 3 Choose the chassis from the left side of the window.

Neighbor Tab—Detailed Description

The Neighbor tab displays a single area, BGP Neighbor Information.

BGP Neighbor Information

Neighbor IP Address—Specifies the IP address of the neighbor router.

Neighbor ID—Indicates the BGP identifier of the BGP peer entry.

State—Specifies the state of the neighbor router that can be one of Idle, Active, Established, Opensent, Connect or Openconfirm.

Negotiated Version—Specifies the negotiated version of BGP running between the two peers.

Remote AS—Specifies the neighbor routers autonomous system number which can be from 1-65535.

Received Update Messages—The number of BGP Update messages received on this connection.

Transmitted Update Messages—The number of BGP Update messages transmitted on this connection.

Total Received Messages—The total number of messages received from the remote peer on this connection.

Total Transmitted Messages—The total number of messages transmitted to the remote peer on this connection.

Hold Time—The Hold Timer established with the peer (in seconds).

KeepAlive Time—The KeepAlive timer established with the peer (in seconds).

Configured Hold Time—The Hold Time configured for this BGP speaker with this peer (in seconds).

Configured KeepAlive Time—The KeepAlive timer configured for this BGP speaker with this peer (in seconds).

Actions

Add/Remove Neighbor—Clicking on the Add/Remove Neighbor action button opens the BGP Neighbor Configuration window. For more details, see "BGP Neighbor Configuration" section on page 18.

BGP Neighbor Configuration

The BGP Neighbor Configuration window allows the user to add or remove neighbor configurations for BGP address families.

To configure the BGP Neighbor, proceed as follows:

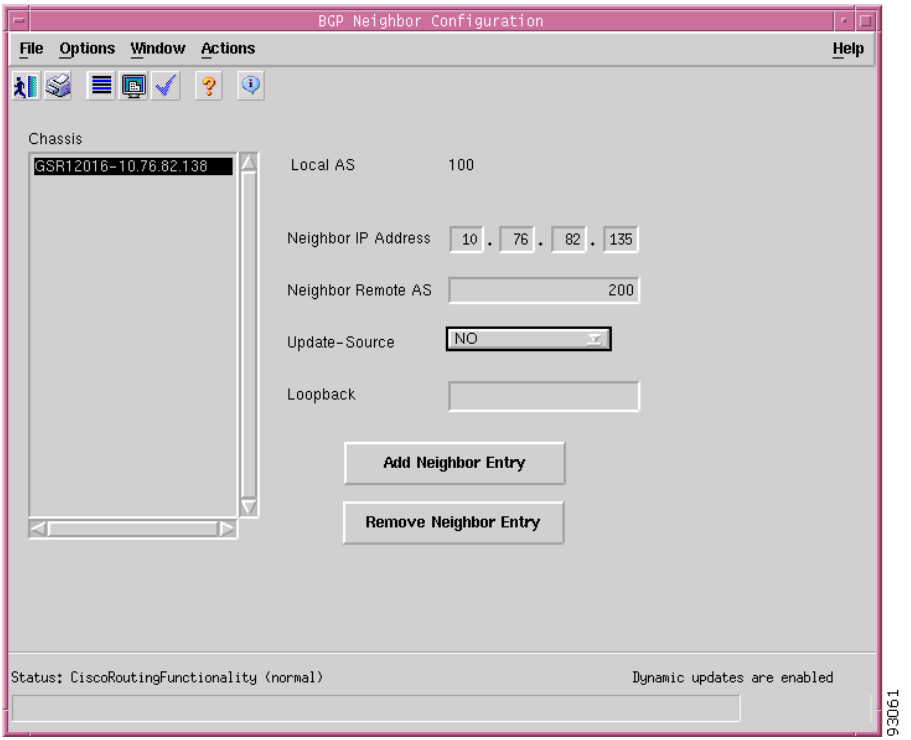
Step 1 Open the BGP Configuration window. See "Viewing the BGP Details Tab on the BGP Configuration Window" section on page 14-4 for further details. Click on the Neighbor tab.

Step 2 Choose the chassis, for which you want to configure the BGP Neighbor, from the left side of the window.

Note You can choose multiple chassis (from the chassis list) which allows you to launch the BGP Neighbor Configuration window for the selected chassis.

Step 3 Click on the Add/Remove Neighbor button. The BGP Neighbor Configuration window appears.

Figure 14-8 BGP Neighbor Configuration Window



Step 4 Edit the fields displayed in the window, as required.

BGP Neighbor Configuration Window—Detailed Description

The BGP Neighbor Configuration window displays the following:

Local AS—The Autonomous System number in the router.

Neighbor IP Address—This is used to configure the IP address of the neighbor router.

Neighbor Remote AS—This is used to configure the neighbor routers AS number with the values ranging from 1 to 65535.

Update-Source—This is used to set the BGP sessions to use a specific operational interface for TCP connections.

Note The Update Source command in the device can specify any interface (physical, virtual, loopback) to be used as source IP address of the BGP session with the neighbor; but in the EM only the loopback interface can be specified.

Loopback—This is used to configure Router's Loopback Interface Number. This is valid only if Update-Source is set to YES.

Action

Add Neighbor Entry—Clicking on the Add Neighbor Entry action button adds the neighbor entry in the device.

Remove Neighbor Entry—Clicking on the Remove Neighbor Entry action button removes the neighbor entry from the device.

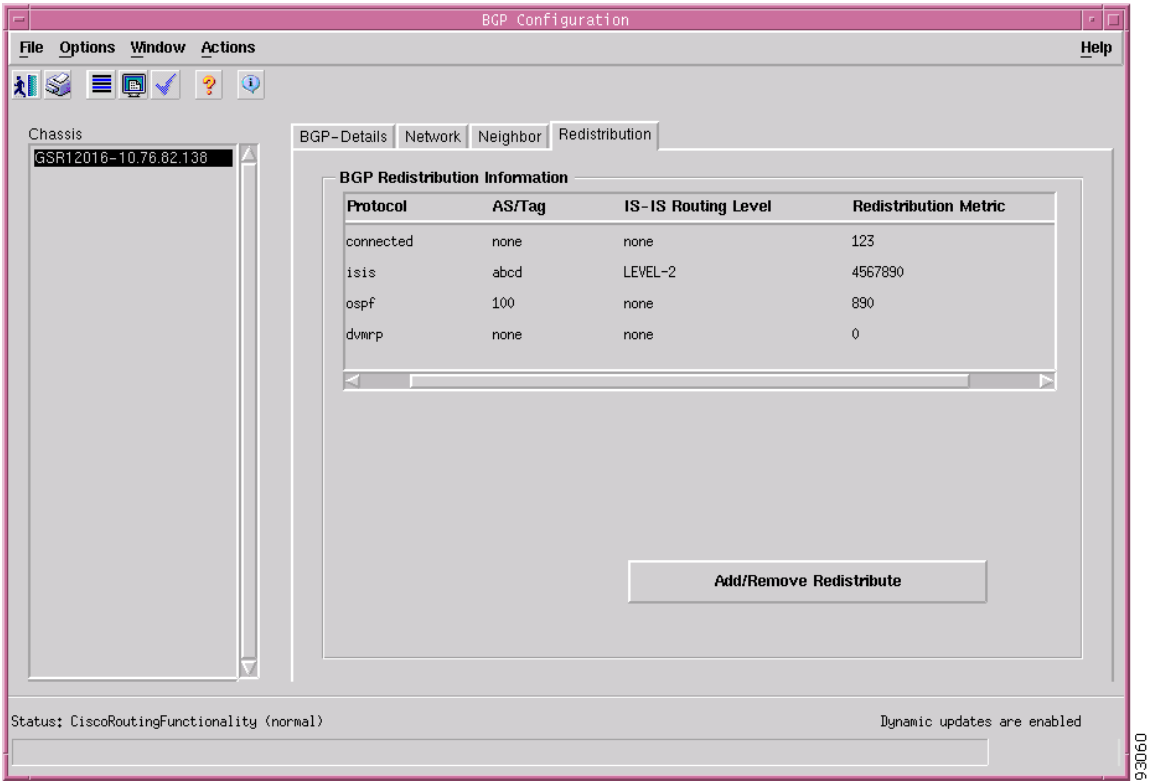
Viewing the Redistribution Tab on the BGP Configuration Window

The Redistribution tab displays the redistributed information from other routing protocols. The user can add or remove the redistributed protocol entries on the device. To view the Redistribution tab on the BGP Configuration window for a chassis, proceed as follows:

Step 1 Right click on the chassis object and choose **Configuration>BGP>BGP Configuration**. See Table 14-1 on page 14-2 for information on which objects allow you to launch the BGP Configuration window.

Step 2 Click on the Redistribution tab.

Figure 14-9 BGP Configuration Window—Redistribution Tab



Step 3 Choose the chassis from the left side of the window.

Redistribution Tab—Detailed Description

The Redistribution tab displays a single area, BGP Redistribution Information.

BGP Redistribution Information

Protocol—This displays the protocol whose routes are redistributed by BGP. The redistribute configuration causes the corresponding routes to be redistributed into BGP.

AS/Tag—A Process ID of the redistributed protocol

IS-IS Routing Level—Routing level of ISIS Protocol

Redistribution Metric—Specifies the metric used for redistributed routes.

Actions

Add/Remove Redistribute—Clicking the Add/Remove Redistribute action button opens the BGP Redistribute Configuration window. For more details, see "BGP Redistribute Configuration" section on page 23.

BGP Redistribute Configuration

The BGP Redistribute Configuration window allows the user to add or remove a redistribution entries from the device. To configure the BGP Redistribute protocol, proceed as follows:

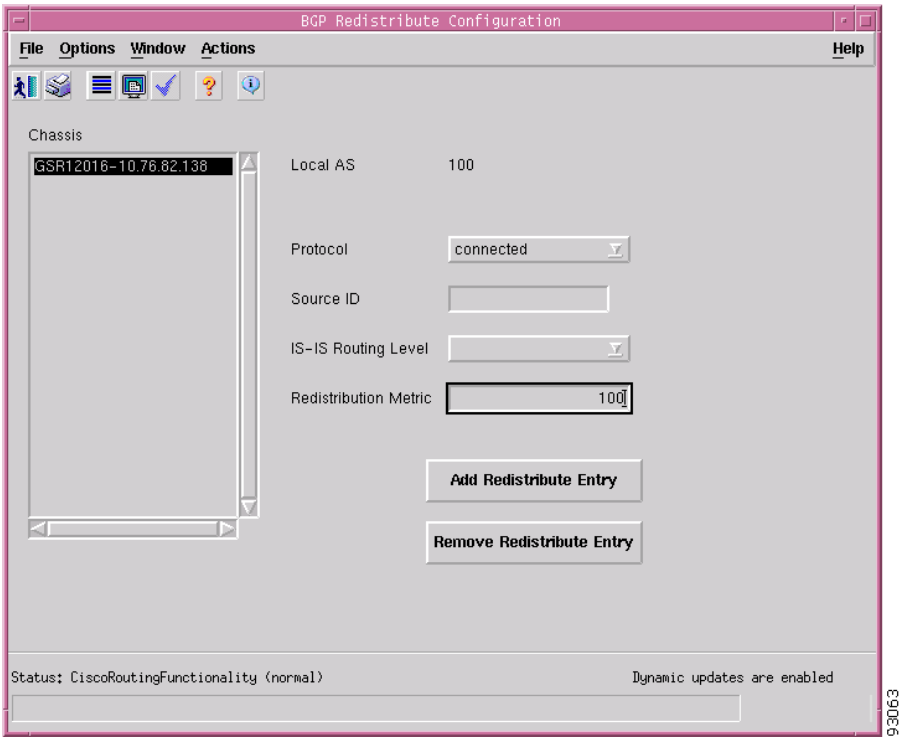
Step 1 Open the BGP configuration window. See "Viewing the BGP Details Tab on the BGP Configuration Window" section on page 14-4 for further details. Click on the Redistribution tab.

Step 2 Choose the chassis, for which you want to configure the BGP Redistribute, from the left side of the window.

Note You can choose multiple chassis (from the chassis list) which allows you to launch the BGP Redistribute Configuration window for the selected chassis.

Step 3 Click on the Add/Remove Redistribute button. The BGP Redistribute Configuration window appears.

Figure 14-10 BGP Redistribute Configuration Window



Step 4 Edit the fields displayed in the window, as required.

BGP Redistribute Configuration—Detailed Description

The BGP Redistribute Configuration window displays the following:

Local AS—The Autonomous System number in the router.

Protocol—Specifies the protocol to be redistributed into BGP. Valid Protocol Names that can be redistributed are connected, static, ospf, isis, igrp, eigrp, egp, rip, mobile, odr, dvmrp.

Source ID—Indicates the Process ID of the redistributed protocol. A Positive Integer will indicate the process id of the redistributed protocol; a character string will indicate the ISO routing area tag. In case of protocols like CONNECTED and STATIC this attribute cannot be configured.

IS-IS Routing Level—Specifies the routing level of ISIS Protocol. The values for this field are: level-1, level-2 or level-1-2 when protocol is IS-IS.

Redistribution Metric—Specifies the metric used for redistributed routes.

Action

Add Redistribute Entry—Clicking on the Add Redistribute action button adds the redistribution entry to the device.

Remove Redistribute Entry—Clicking on the Remove Redistribute Entry action button removes the redistribution entry from the device.

BGP Status

The BGP Status window displays the BGP configurations existing on the device including basic BGP information, path information, peer information and redistribution information.

The BGP Status section covers the following:

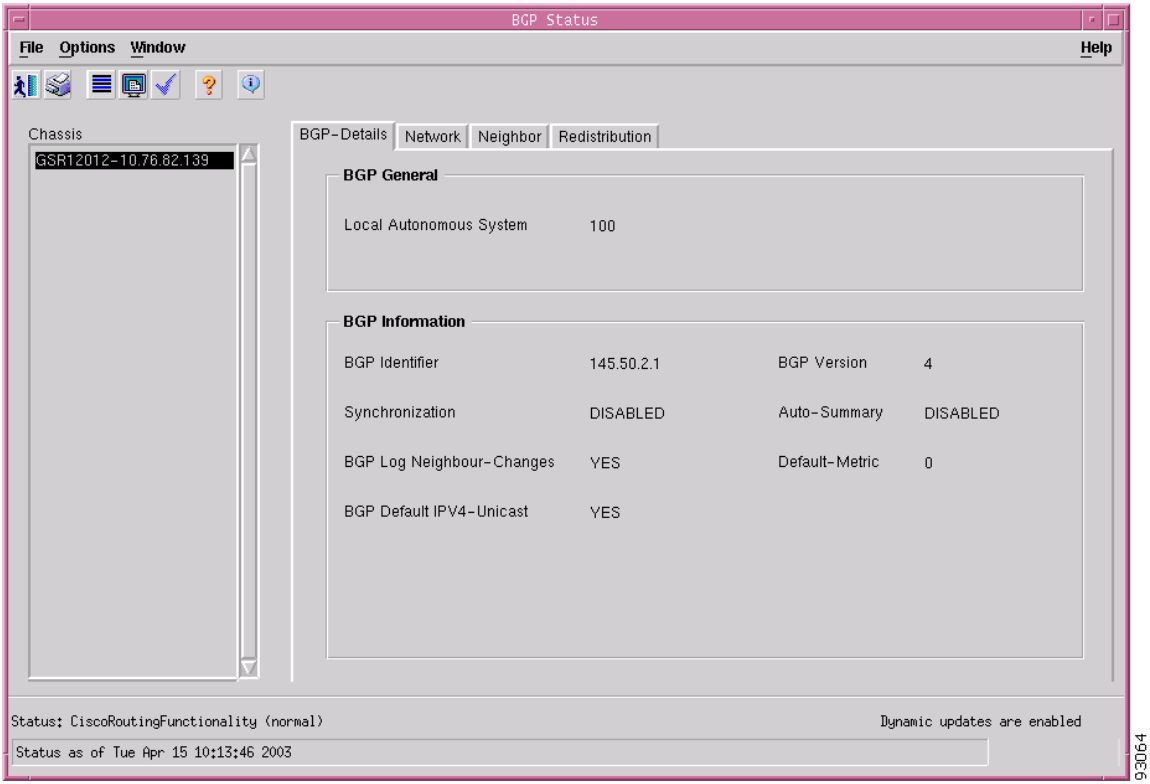
- Viewing the BGP Status Window
- BGP Status Window—Detailed Description

Viewing the BGP Status Window

To view the BGP Status window, proceed as follows:

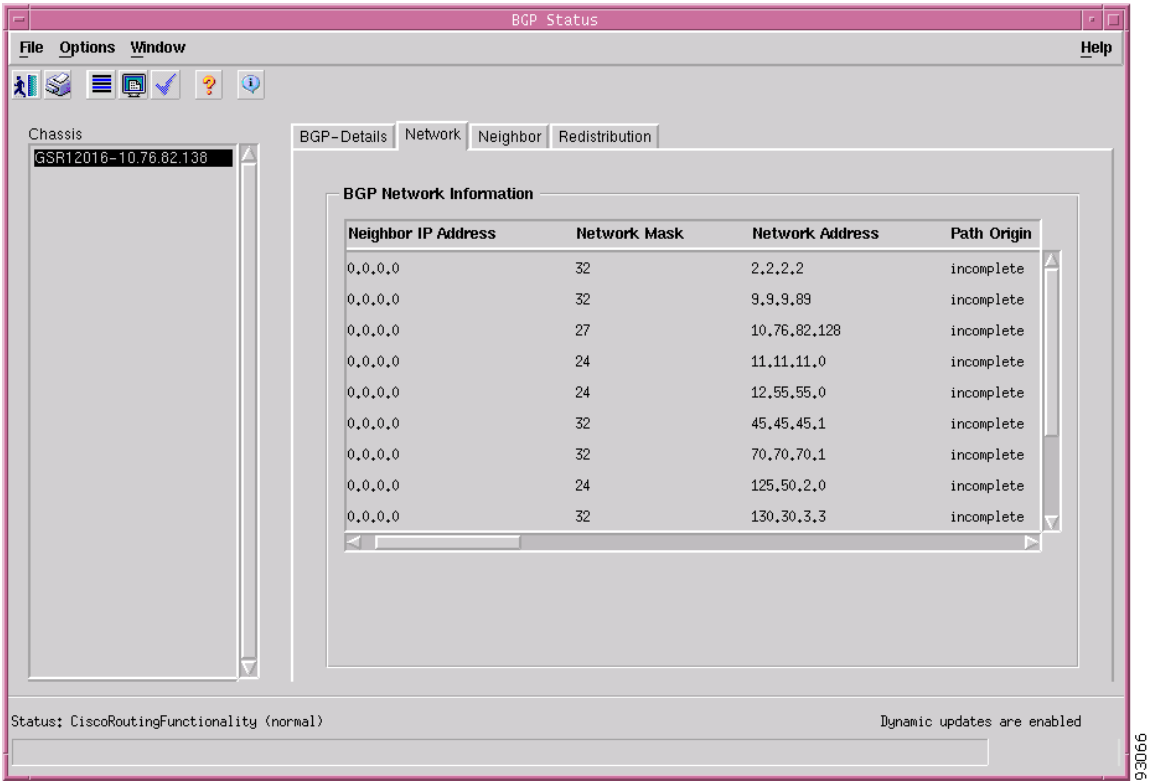
Step 1 Right click on the chassis and choose **Fault>BGP>BGP Status**. See Table 14-1 on page 14-2 for information on which objects allow you to launch the BGP Status window. The BGP Detail tab displays the BGP information.

Figure 14-11 BGP Status Window



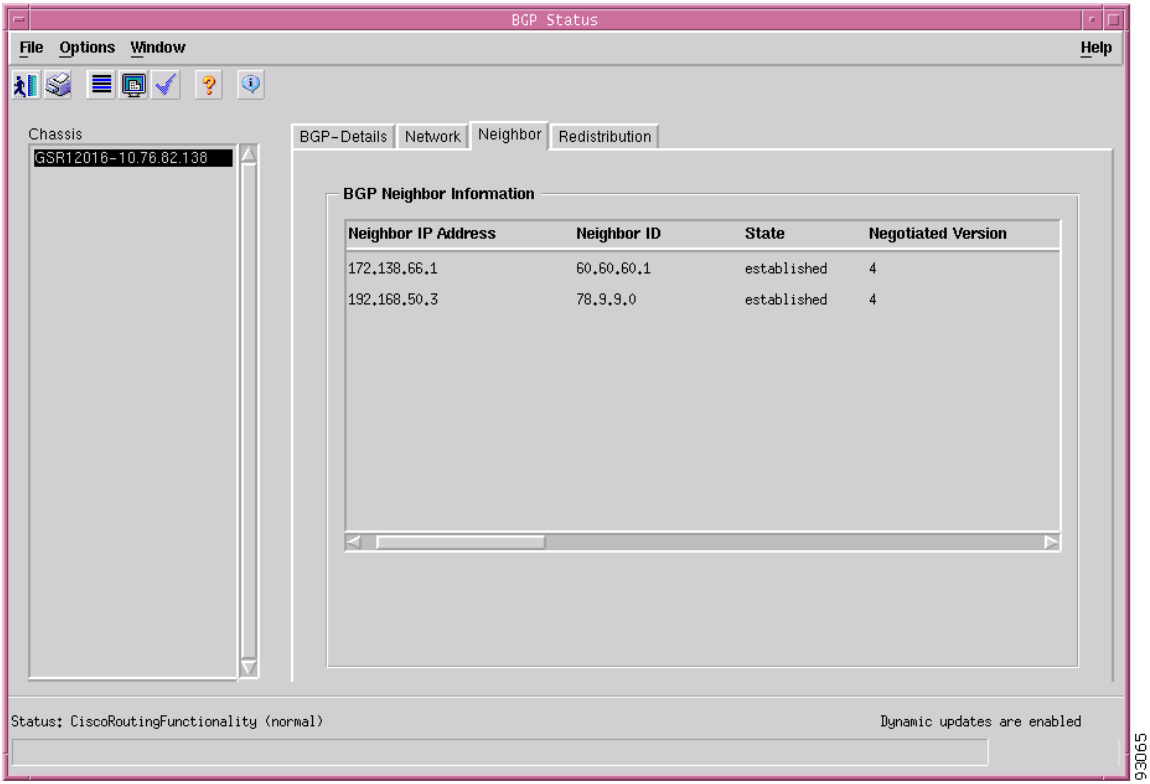
Step 2 Choose a Chassis from the list box displayed on the left side of the window. Choose the Network tab, if required. The Network tab displays the information about paths to destination networks from all the BGP4 Peers.

Figure 14-12 BGP Status—Network Tab



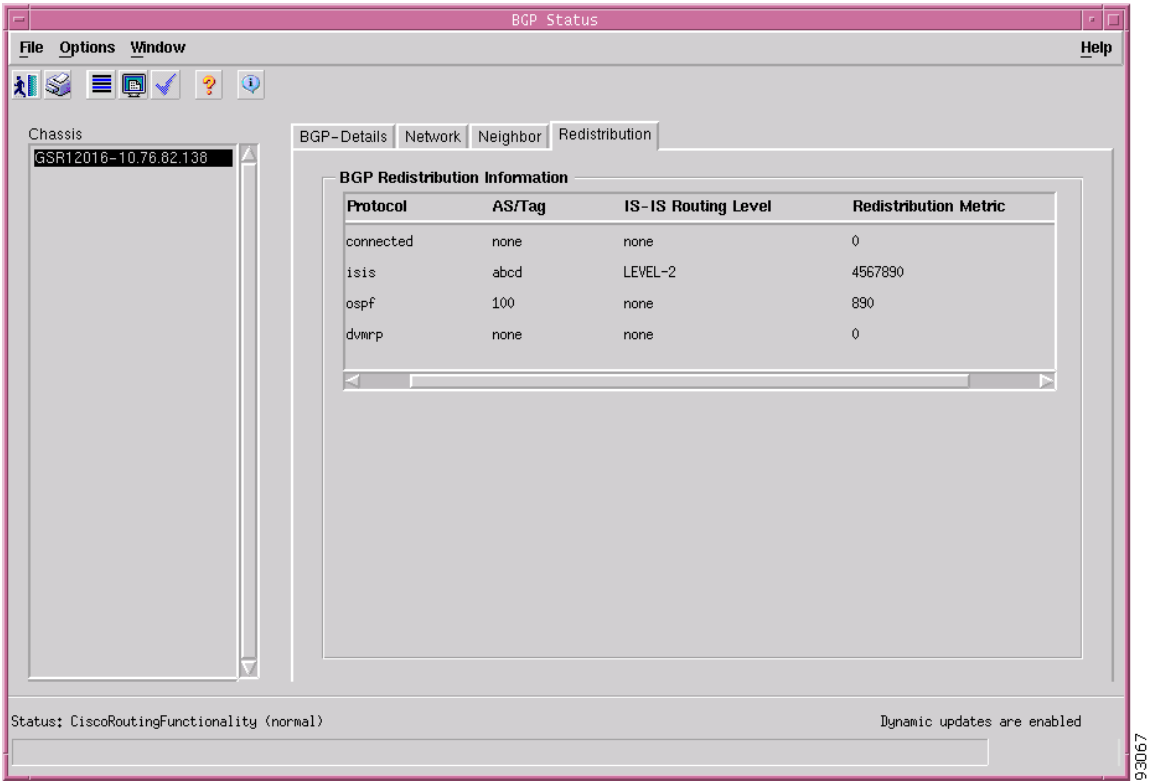
Step 3 Choose the Neighbor tab, if required. The Neighbor tab displays the information about BGP Peers and it contains one entry per BGP Peer, information about the connections with BGP Peers.

Figure 14-13 BGP Status—Neighbor Tab



Step 4 Choose the Redistribution tab, if required. The Redistribution tab displays the redistributed information from other routing protocols.

Figure 14-14 BGP Status—Redistribution Tab



BGP Status Window—Detailed Description

The BGP Status window displays four tabs: BGP-Details, Network, Neighbor and Redistribution.

BGP-Details

The BGP-Details tab displays two areas: BGP General and BGP Information.

BGP General

Local Autonomous System—The id of the BGP process running in the device. If the value is 0 it means no BGP process is running on the device.

BGP Information

BGP Identifier—It is the Router Identifier for the BGP speaking router. By default, BGP Identifier is set to IP address of the loopback interface if it is configured otherwise it is the highest IP address configured for a physical interface on that router.

BGP Version—It displays the supported BGP version.

BGP Synchronization—It displays whether BGP synchronization with IGP is enabled or disabled.

BGP Auto-Summary—It displays whether Automatic network number summarization for BGP is enabled or disabled.

BGP Log Neighbor-Changes—It displays whether logging of BGP neighbor resets is enabled or disabled.

Default-Metric—It displays the default-metric value set for redistributed routes.

BGP Default IPV4-Unicast—It displays whether the IP version 4 (IPv4) unicast for peers is enabled or disabled on the router.

Network

The Network tab displays a single area, BGP Network Information

BGP Network Information

Neighbor IP Address—The IP address of the peer where the path information was learnt.

Network Mask—Length in bits of the IP address prefix in the Network Layer Reachability Information field

Network Address—An IP address prefix in the Network Layer Reachability Information field. This object is an IP address containing the prefix with the length specified by the Network Mask attribute. Any bits beyond the length specified by Network Mask attribute are zeroed.

Path Origin—The ultimate origin of the path information

Border Router IP Address—The address of the border router that should be used for the destination network.

Best Path—Indicates whether the BGP4 route is the best chosen or not.

Multiple Exit Point Discriminate Metric—This metric is used to discriminate between multiple exit points to an adjacent autonomous number. A value of -1 indicates the absence of this attribute.

Degree of Preference—The originating BGP4 speaker's degree of preference for an advertised route. A value of -1 indicates the absence of this attribute.

Calculated Degree of Preference—The degree of preference calculated by the receiving BGP4 speaker for an advertise route.

Less Specific Route Selected—Indicates whether or not the local system has selected a less specific route without selecting a more specific route.

Router Aggregator AS—The AS number of the last BGP4 speaker that performed route aggregation. When the value is zero, it indicates the absence of this attribute.

Route Aggregator IP Address—The IP address of the last BGP4 speaker that performed route aggregation.

Neighbor

The Neighbor tab displays a single area, BGP Neighbor Information.

BGP Neighbor Information

Neighbor IP Address—Specifies the IP address of the neighbor router.

Neighbor ID—Indicates the BGP identifier of the BGP peer entry

State—Specifies the state of the neighbor router that can be one of Idle, Active, Established, Opensent, Connect or Openconfirm.

Negotiated Version—Specifies the negotiated version of BGP running between the two peers.

Remote AS—Specifies the neighbor routers autonomous system number which can be from 1-65535.

Received Update Messages—The number of BGP Update messages received on this connection.

Transmitted Update Messages—The number of BGP Update messages transmitted on this connection.

Total Received Messages—The total number of messages received from the remote peer on this connection.

Total Transmitted Messages—The total number of messages transmitted to the remote peer on this connection.

Hold Time—The Hold Timer established with the peer (in seconds).

KeepAlive Time—The KeepAlive timer established with the peer (in seconds).

Configured Hold Time—The Hold Time configured for this BGP speaker with this peer (in seconds).

Configured KeepAlive Time—The KeepAlive timer configured for this BGP speaker with this peer (in seconds).

Redistribution

The Redistribution tab displays a single area, BGP Redistribution Information.

BGP Redistribution Information

Protocol—Specifies the protocol to be redistributed into BGP. Valid Protocol Names that can be redistributed are connected, static, ospf, isis, igrp, eigrp, egp, rip, mobile, odr, dvmrp.

Source ID—Indicates the Process ID of the redistributed protocol. A Positive Integer will indicate the process id of the redistributed protocol; a character string will indicate the ISO routing area tag. In case of protocols like CONNECTED and STATIC this attribute cannot be configured.

IS-IS Routing Level—Specifies the routing level of ISIS Protocol. The values for this field are: level-1, level-2 or level-1-2 when protocol is IS-IS.

Redistribution Metric—Specifies the metric used for redistributed routes.

BGP Address-Family Synchronization

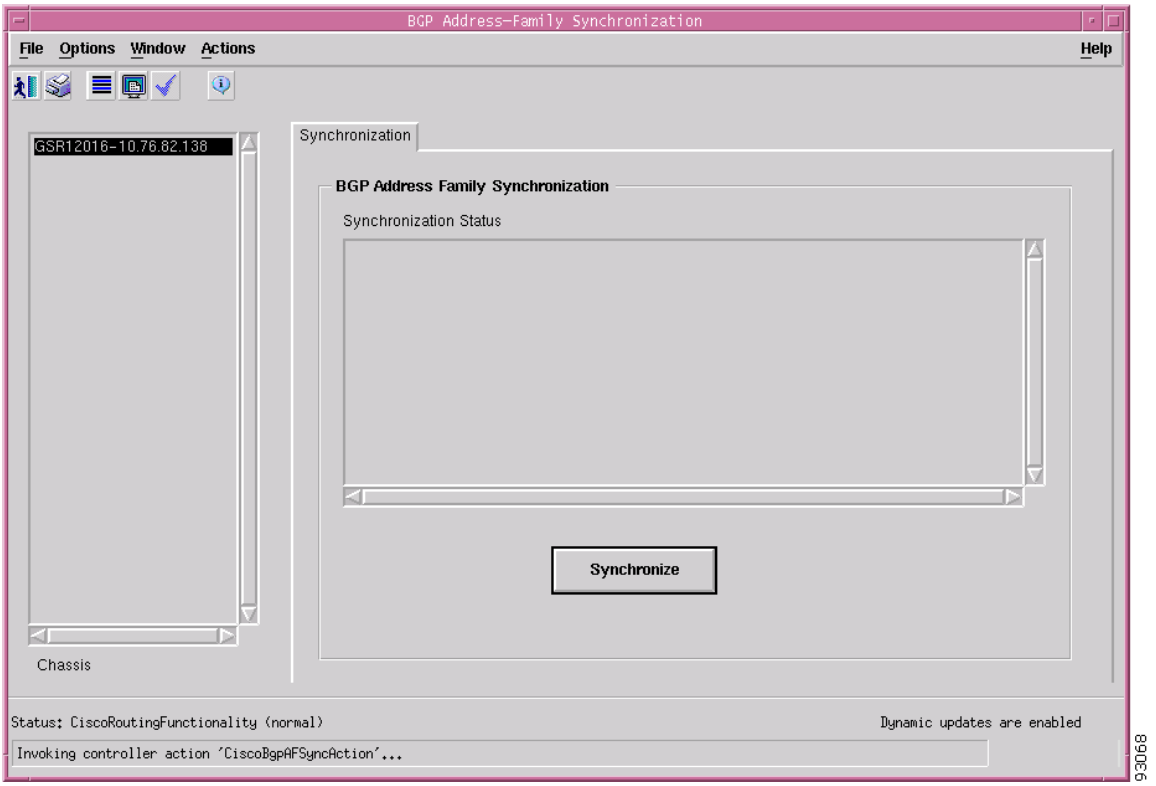
BGP, by default, carries the routing information only for IPv4 unicast addresses. Address family is used to enable BGP to carry the routing information for multiple address types (ipv4 multicast,ipv4 unicast,ipv4 vrf,vpnv4 unicast). BGP Address Family synchronization is provided to synchronize BGP Address Families configured on the device with the EM. When the synchronization process is initiated for the first time on the chassis, the address families in the device are uploaded to the EM. For the subsequent synchronizations, only the new address families configured on the device are uploaded to the EM and the address families that are removed from the device are deleted from the EM.

To synchronize the BGP address families, proceed as follows:

Step 1 Right click on a chassis and choose **Configuration>BGP>BGP Address-Family Synchronization**. See Table 14-1 on page 14-2 for information on which objects allow you to launch the BGP Address-Family Synchronization window.

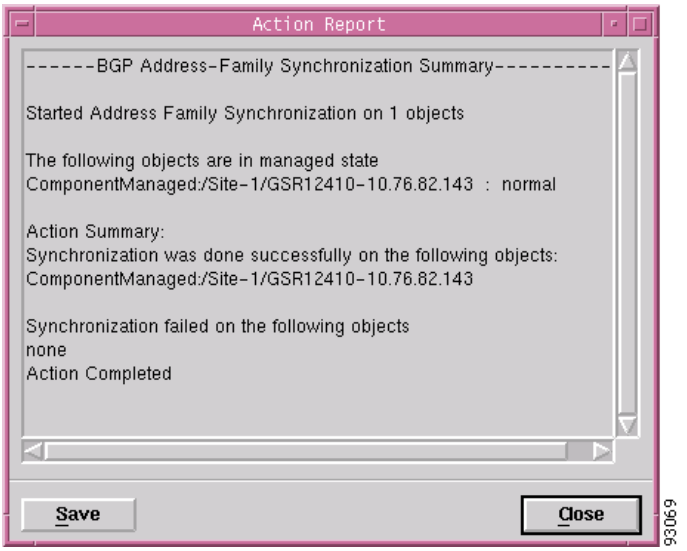
Note You can choose multiple chassis (from the chassis list displayed in the left side of the BGP Address-Family Synchronization window) which allows you to synchronize all the selected chassis simultaneously.

Figure 14-15 BGP Address-Family Synchronization Window



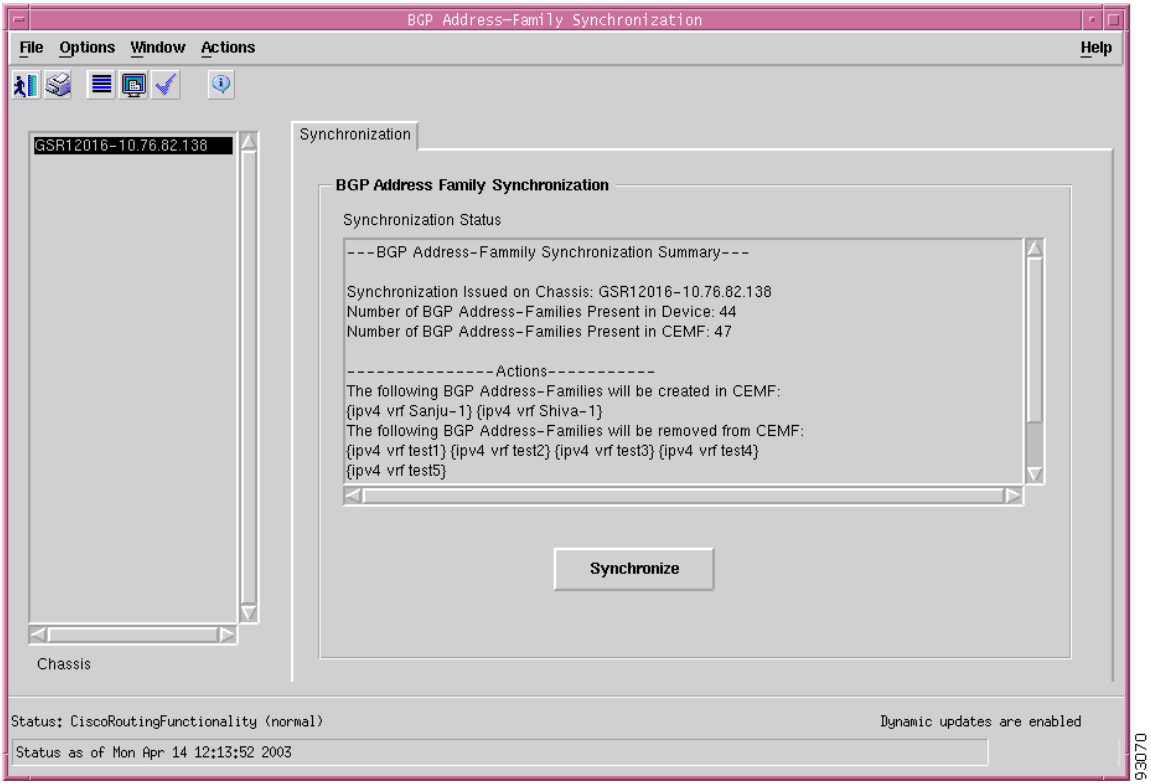
Step 2 Choose Synchronize to initiate the synchronization process. An Action Report appears summarizing the synchronization process.

Figure 14-16 Action Report



Step 3 The status of the synchronization process is displayed in the Synchronization Status area in the BGP Address-Family Synchronization window.

Figure 14-17 BGP Address-Family Synchronization—Status Report



BGP Address-Family Synchronization—Detailed Description

The BGP Address-Family Synchronization window displays a single tab: Synchronization.

Synchronization Tab

The Synchronization tab consists of a single area: BGP Address Family Synchronization.

Synchronization Status—Displays the status of the synchronization process.

Action

Synchronize—Uploads the existing BGP address families in the device to the EM.

Note The uploaded BGP address families are listed in the "Address Family List" in the BGP Address-Family Configuration window.

BGP Address Family Configuration

The BGP Address Family Configuration window allows the user to create, remove and configure BGP address families. This section covers the following topics:

- Viewing the AF-General Tab on the BGP Address-Family Configuration Window
- AF-General Tab—Detailed Description
- Configuring Address Family
- Configure Address Family—Detailed Description
- Modifying BGP Address Family
- BGP Address Family-Modify Address Family Parameters—Detailed Description
- Viewing the AF-Network Tab on the BGP Address-Family Configuration Window
- AF-Network Tab—Detailed Description
- BGP Address Family—Network Configuration
- BGP Address Family-Network Configuration—Detailed Description
- Viewing the AF-Neighbor Tab on the BGP Address-Family Configuration Window
- AF-Neighbor Tab—Detailed Description
- BGP Address Family—Neighbor Configuration
- BGP Address Family-Neighbor Configuration—Detailed Description

Viewing the AF-General Tab on the BGP Address-Family Configuration Window

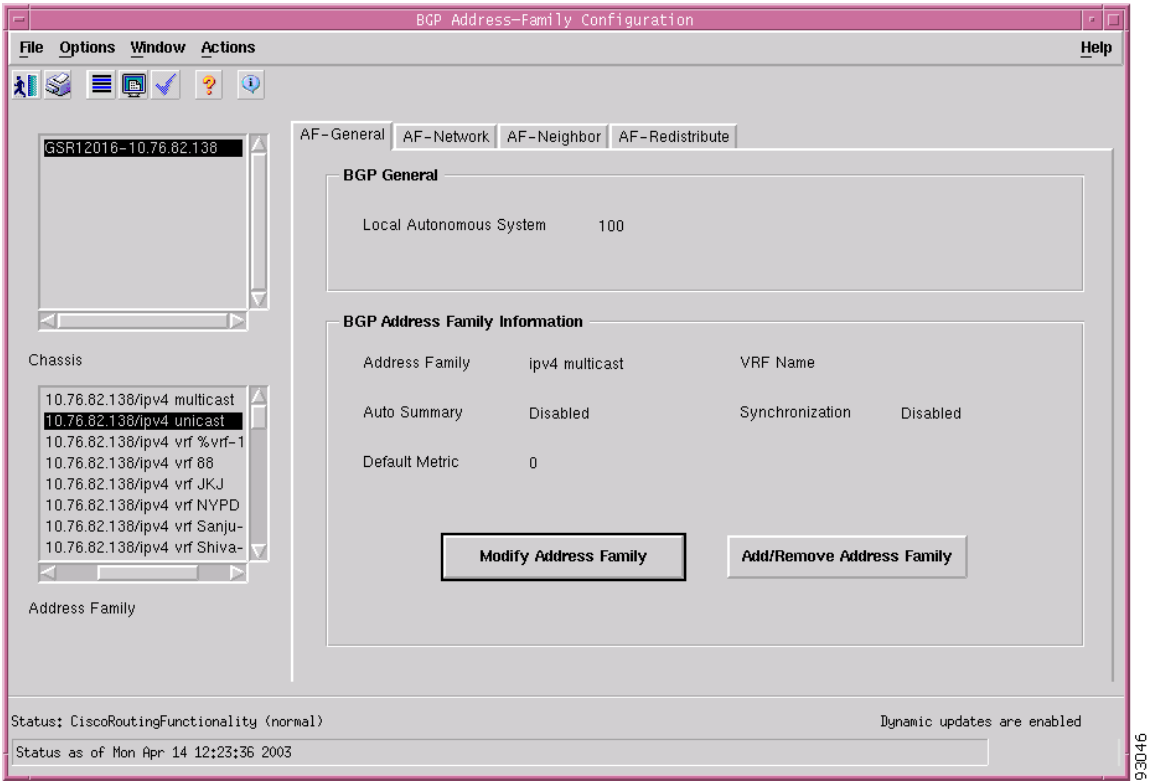
The AF-General tab displays the BGP address family parameters. The user can create, remove or modify the BGP Address Family Parameters. To view the AF-General tab on the BGP Address Family Configuration window for a chassis, proceed as follows:

Step 1 Right click on the chassis object and choose **Configuration>BGP>BGP Address-Family Configuration**. See Table 14-1 on page 14-2 for information on which objects allow you to launch the BGP Address-Family Configuration window.

Note When the BGP Address-Family Configuration window is launched, the AF-General tab is displayed by default.

Note The action buttons are greyed when there is no BGP configured on the device.

Figure 14-18 BGP Address-Family Configuration Window



Step 2 Choose the Chassis and the Address Family List from the left side of the window.

AF-General Tab—Detailed Description

The AF-General tab displays two areas: BGP General and BGP Address Family Information.

BGP General

Local Autonomous System—The id of the BGP process running in the device. If the value is 0 it means no BGP process is running on the device.

BGP Address Family Information

Address Family—Unique identifier of the address family type.

VRF Name—Identifier of the VRF Name if the address family type is ipv4 vrf.

Auto Summary—Displays whether the automatic network number summarization is enabled/disabled for the address family.

Synchronization—Displays whether the BGP synchronization with IGP is enabled/disabled for the address family.

Note This field is applicable only for the ipv4 unicast and ipv4 vrf address families.

Default Metric—Displays the default metric value set for redistributed routes of the address family.

Action

Modify Address Family—Clicking on the "Modify Address Family" button, opens the BGP Address Family - Modify Address Family Parameters window.

Add/Remove Address Family—Clicking on the "Add/Remove Address Family" button, opens the Configure Address Family window.

Configuring Address Family

The Configure Address Family window allows the user to create or remove BGP address families. To add or remove a BGP address family, proceed as follows:

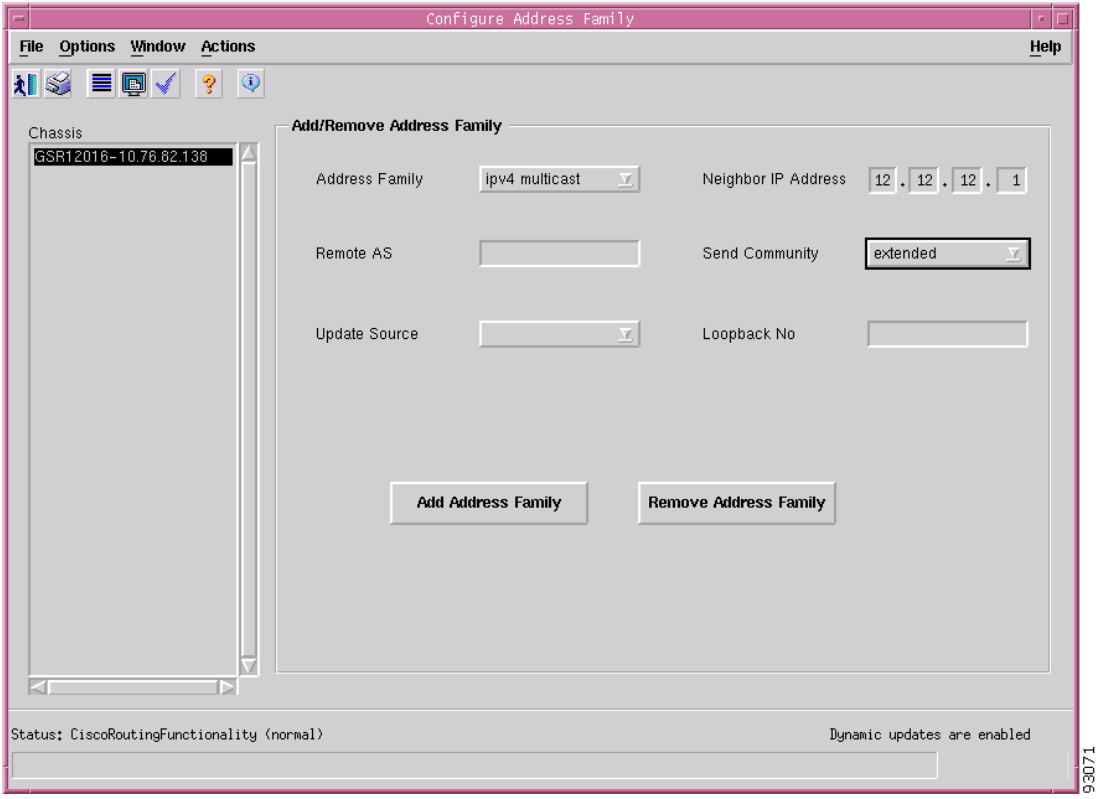
Step 1 Open the BGP Address-Family Configuration window. See "Viewing the AF-General Tab on the BGP Address-Family Configuration Window" section on page 14-38 for further details. Click on the AF-General Tab.

Step 2 Choose the chassis from the left side of the window.

Note You can choose multiple chassis (from the chassis list) which allows you to launch the Configure Address Family window for the selected chassis.

Step 3 Click on the Add/Remove Address Family button to open the Configure Address Family window.

Figure 14-19 Configure Address Family Window



Step 4 Choose the chassis from the Chassis list for which you want to configure the BGP address family.

Step 5 Edit the fields displayed in the window, as required.

Configure Address Family—Detailed Description

The Configure Address Family window displays a single area: Add/Remove Address Family.

Add Address Family

Address Family—Unique identifier of the address family type. The available options are: ipv4 unicast, ipv4 multicast and vpnv4 unicast.

Note In Cisco 12000/10720 Router Manager Release 3.1, the ipv4 vrf address family type is not configurable through the EM.

Neighbor IP Address—Specifies the IP address of the neighbor router for the address family

Remote AS—Specifies the neighbor router's autonomous system number. This value can range from 1 to 65535.

Note This attribute is configurable only for the ipv4 unicast and ipv4 vrf address families.

Send Community—Specifies the community attribute sent in the route updates to a peer. The available options are: both, extended and standard. However, the default is not to send community attribute in route updates.

Update Source—To enable or disable BGP sessions to use a specific operational interface for TCP connections.

Note The Update Source command in the device can specify any interface (physical, virtual, loopback) to be used as source IP address of the BGP session with the neighbor; but in the EM only the loopback interface can be specified. This attribute is configurable only for the ipv4 unicast and ipv4 vrf address families.

Loopback No—This is used to configure Router's Loopback Interface Number. This is valid only if Update-Source is set to YES.

Note This attribute is configurable only for the ipv4 unicast and ipv4 vrf address families.

Action

Add Address Family—Clicking on the “Add Address Family” button, adds the address family to the device.

Remove Address Family—Clicking on the “Remove Address Family” button, removes the address family from the device.

Modifying BGP Address Family

The BGP Address Family- Modify Address Family Parameters allows the user to modify the basic parameters for BGP address families.

To modify the BGP Address Family, proceed as follows:

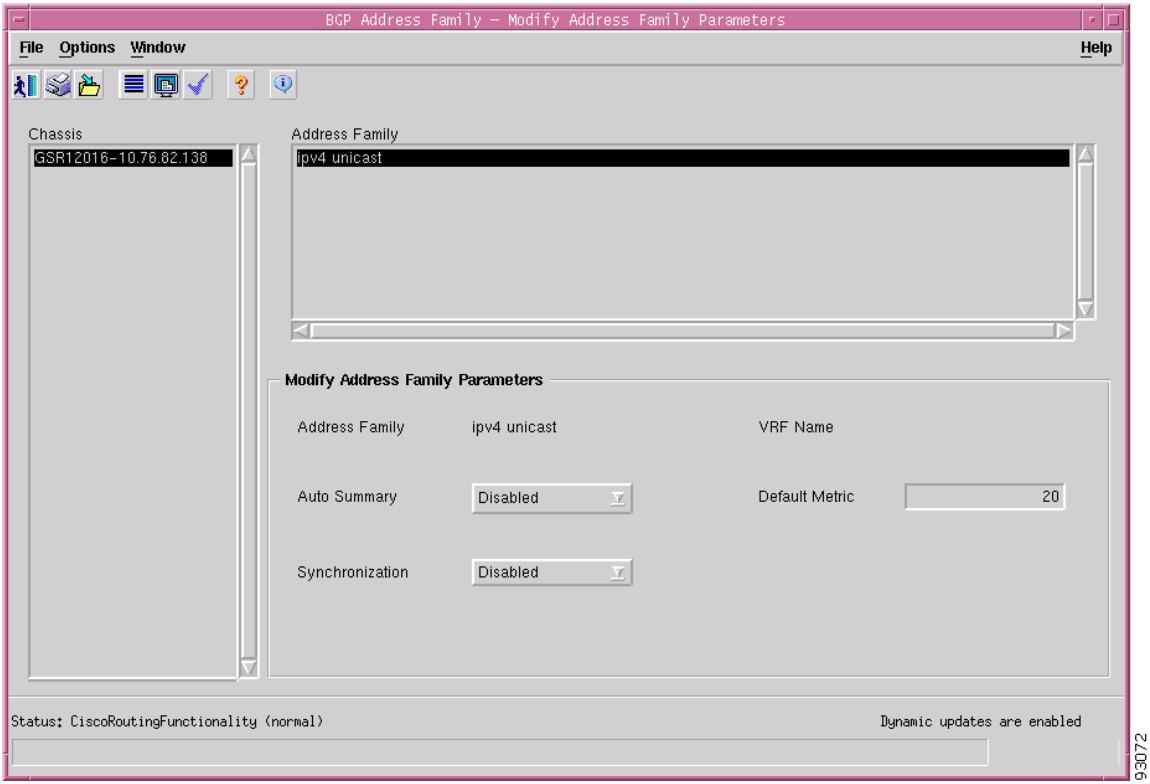
Step 1 Open the BGP Address-Family Configuration window. See "Viewing the AF-General Tab on the BGP Address-Family Configuration Window" section on page 14-38 for further details. Click on the AF-General Tab.

Step 2 Choose a chassis and the address family from the left side of the window.

Note You can choose multiple chassis and address families (from the list provided at the left side of the window) which allows you to launch the BGP Address Family - Modify Address Family Parameters window for the selected chassis.

Step 3 Click on the Modify Address Family button to open the BGP Address Family - Modify Address Family Parameters window.

Figure 14-20 BGP Address Family—Modify Address Family Parameters Window



Step 4 Choose the chassis from the Chassis list and the address family from the Address Family list for which you want to modify the BGP address family parameters.

Step 5 Edit the fields displayed in the window, as required and save the changes.

BGP Address Family-Modify Address Family Parameters—Detailed Description

The BGP Address Family - Modify Address Family Parameters window displays a list of the Address Family and an area: Modify Address Family Parameters.

Modify Address Family Parameters

Address Family—Unique identifier of the address family type

VRF Name—Identifier of the VRF Name if the address family type is IPv4 VRF

Auto Summary—This is used to enable/disable the automatic network number summarization for the address family.

Default Metric—This is used to set the value for the redistributed routes for the address family.

Note This attribute is not configurable only for the vpnv4 unicast address families. If this attribute is set to zero, then the default metric is removed from the device for that address family.

Synchronization—This is used to enable/disable the BGP synchronization with IGP for the address family.

Note This field is applicable only for the ipv4 unicast and ipv4 vrf address families.

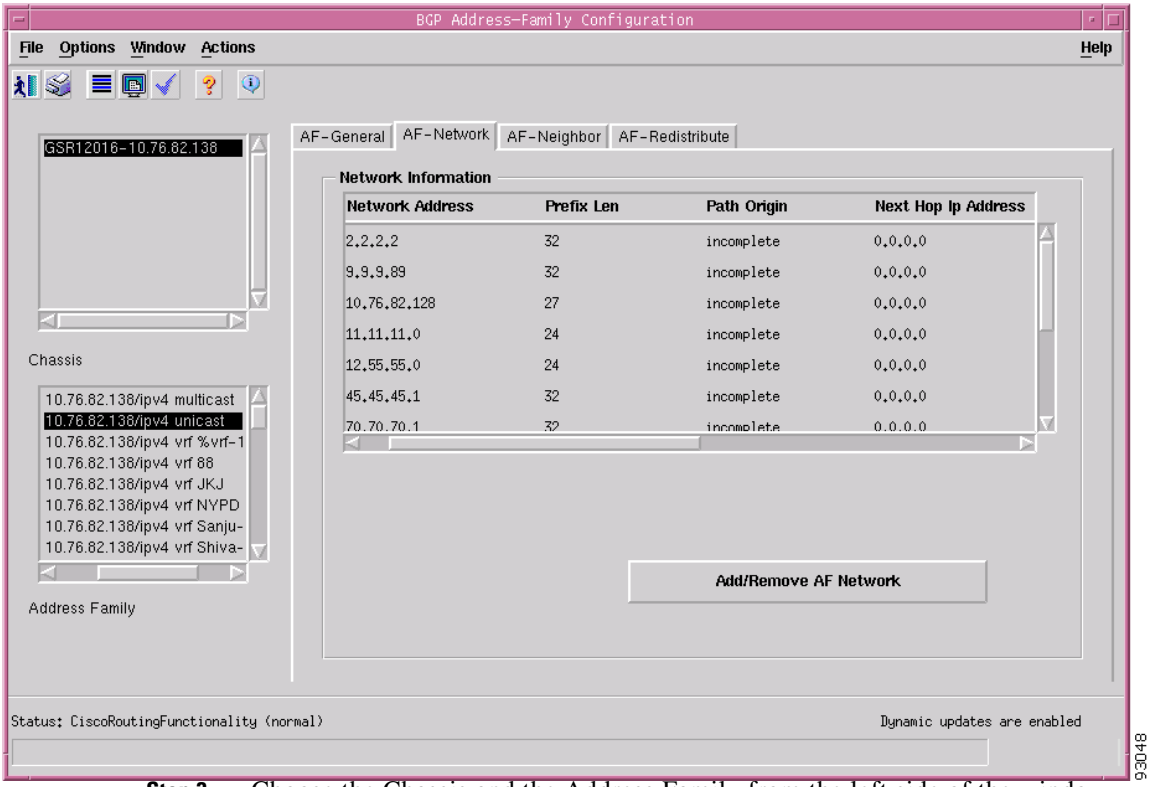
Viewing the AF-Network Tab on the BGP Address-Family Configuration Window

The AF-Network tab displays the network paths and the associated path information for the BGP address family. The user can add or remove network paths for an address family. To view the AF-Network tab on the BGP Address-Family Configuration window for a chassis, proceed as follows:

Step 1 Open the BGP Address-Family Configuration window. See "Viewing the AF-General Tab on the BGP Address-Family Configuration Window" section on page 14-38 for further details.

Step 2 Click on the AF-Network tab.

Figure 14-21 BGP Address-Family Configuration Window—AF-Network Tab



Step 3 Choose the Chassis and the Address Family from the left side of the window.

AF-Network Tab—Detailed Description

The AF-Network tab displays a single area: Network Information

Network Information

Network Address—An IP address prefix in the Network Layer Reachability Information field. This object is an IP address containing the prefix with the length specified by the Prefix Len attribute. Any bits beyond the length specified by Network Mask attribute are zeroed.

Prefix Len—Length in bits of the IP address prefix in the network layer reachability information field.

Path Origin—The ultimate origin of the network path information.

Next Hop Ip Address—The address of the border router that should be used for the destination network.

Metric—This metric is used to discriminate between multiple exit points to an adjacent autonomous number. A value of -1 indicates the absence of this attribute.

Degree of Preference—The originating BGP4 speaker's degree of preference for an advertised route. A value of -1 indicates the absence of this attribute.

Weightage—Specifies the BGP weight for the routing table.

Best Route—Specifies whether the network path is the best possible route. When set to true, it indicates that the network path is the best route for the router.

Action

Add/Remove AF Network—Clicking on the “Add/Remove AF Network” opens the BGP Address Family - Network Configuration window.

BGP Address Family—Network Configuration

The BGP Address Family - Network Configuration window allows the user to add or remove network paths for BGP address families. To configure a Network path for an address family, proceed as follows:

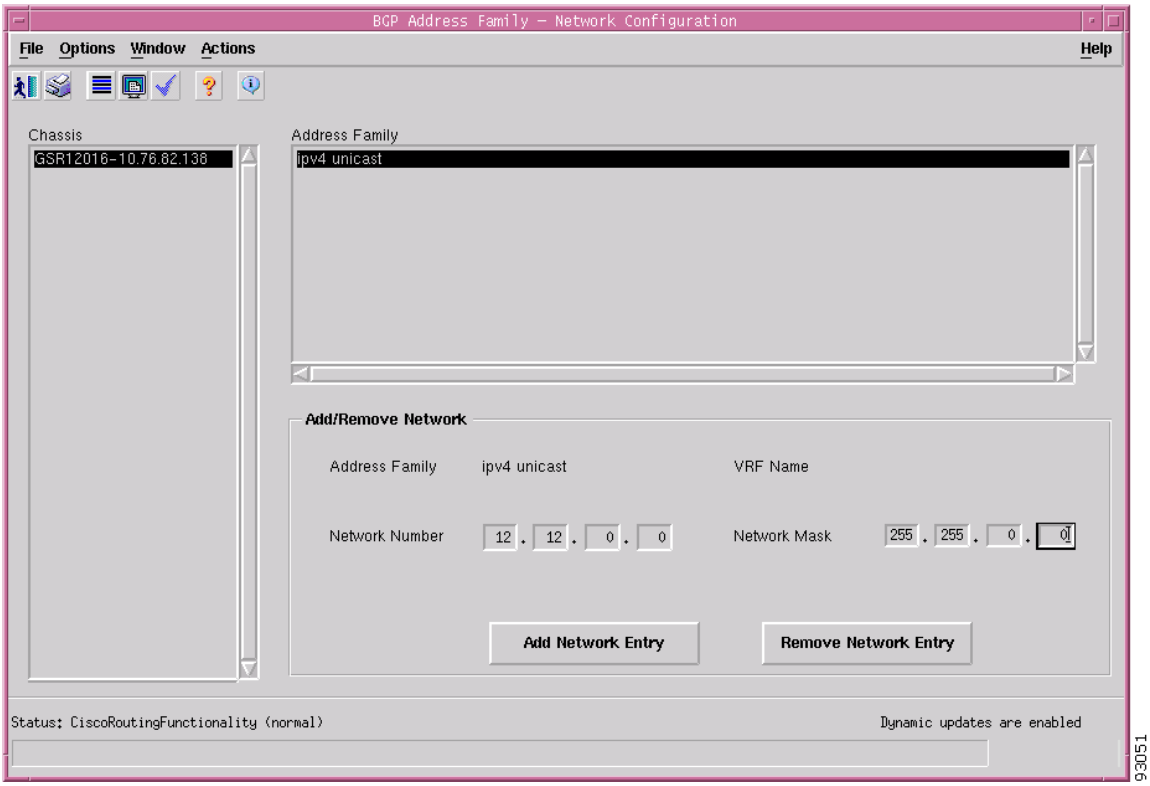
Step 1 Open the BGP Address-Family Configuration window. See “Viewing the AF-General Tab on the BGP Address-Family Configuration Window” section on page 14-38 for further details. Click on the AF-Network Tab.

Step 2 Choose a chassis and the address family from the left side of the window.

Note You can choose multiple chassis and address families (from the list provided at the left side of the window) which allows you to launch the BGP Address Family - Network Configuration window for the selected chassis.

Step 3 Click on the Add/Remove AF Network button to open the BGP Address Family - Network Configuration window.

Figure 14-22 BGP Address Family—Network Configuration Window



Step 4 Choose the chassis from the Chassis list and the address family from the Address Family List, for which you want to configure the Network path.

Step 5 Edit the fields displayed in the window, as required.

BGP Address Family-Network Configuration—Detailed Description

The Configure Network window displays a list of Address Families and an area: Add/Remove Network.

Address Family—Displays a list of the address families.

Add/Remove Network

Address Family—Unique identifier of the address family type.

VRF Name—Identifier of the VRF Name if the address family type is IPv4 VRF

Network Number—This is used to configure the IP address of a network to be advertised through BGP.

Network Mask—This is used to configure the subnet mask of the network to be advertised

Note You cannot configure a network for vpnv4 address families.

Action

Add Network Entry—Clicking the “Add Network Entry” button, adds the network entry for the address family on the device.

Remove Network Entry—Clicking the “Remove Network Entry” button, removes the network entry for the address family on the device.

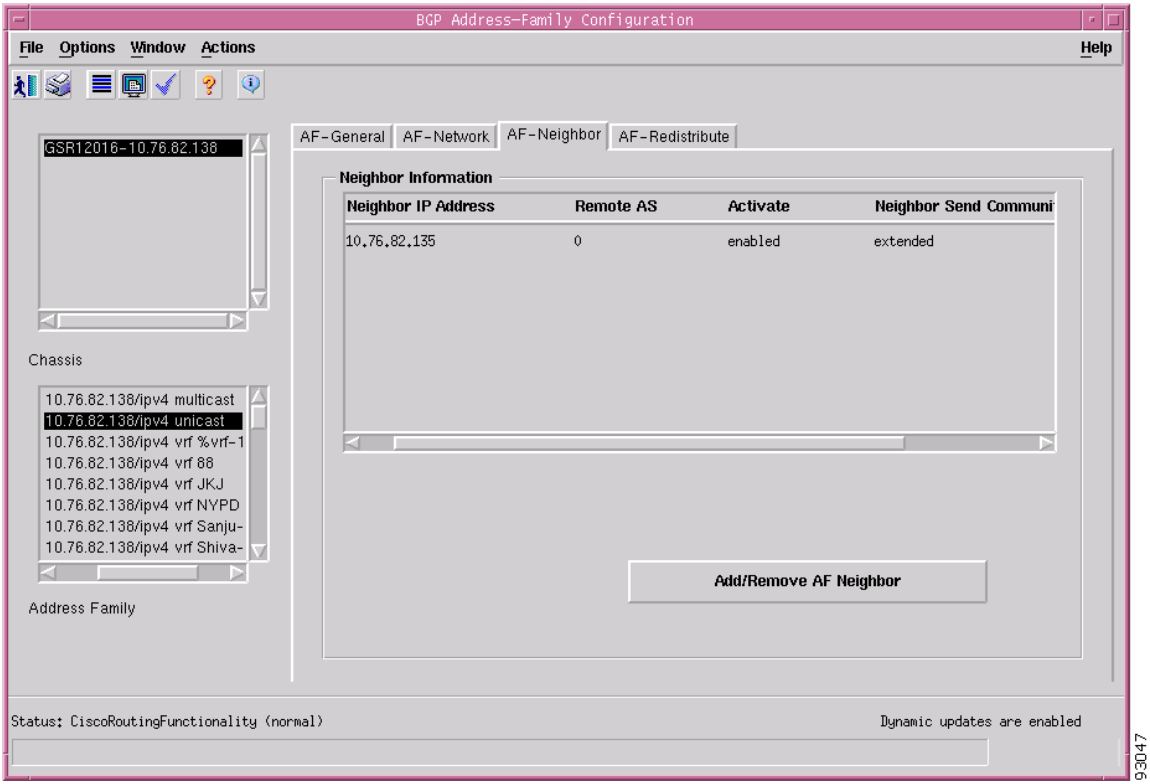
Viewing the AF-Neighbor Tab on the BGP Address-Family Configuration Window

The AF-Neighbor tab displays the neighbor information (peer) for a BGP address family. The user can add or remove neighbor entries for an address family. To view the AF-Neighbor tab on the BGP Address-Family Configuration window for a chassis, proceed as follows:

Step 1 Open the BGP Address-Family Configuration window. See "Viewing the AF-General Tab on the BGP Address-Family Configuration Window" section on page 14-38 for further details.

Step 2 Click on the AF-Neighbor tab.

Figure 14-23 BGP Address-Family Configuration Window—AF-Neighbor Tab



Step 3 Choose the Chassis and the Address Family from the left side of the window.

AF-Neighbor Tab—Detailed Description

The AF-Neighbor tab displays a single area: Neighbor Information.

Neighbor Information

Neighbor IP Address—Specifies the IP address of the neighbor router for the address family.

Remote AS—Specifies the neighbor routers autonomous system number. This value can range from1 to 65535.

Activate—Enables the neighbor to exchange prefixes for the specified family type with the local router.

Neighbor Send Community—Specifies the community attribute sent in the route updates to a peer. The default is not to send community attribute in route updates.

Action

Add/Remove AF Neighbor—Clicking on the Add/Remove AF Neighbor button opens the BGP Address Family - Neighbor Configuration window.

BGP Address Family—Neighbor Configuration

The BGP Address Family - Neighbor Configuration window allows the user to add or remove neighbor configurations for BGP address families. To configure a Neighbor for an address family, proceed as follows:

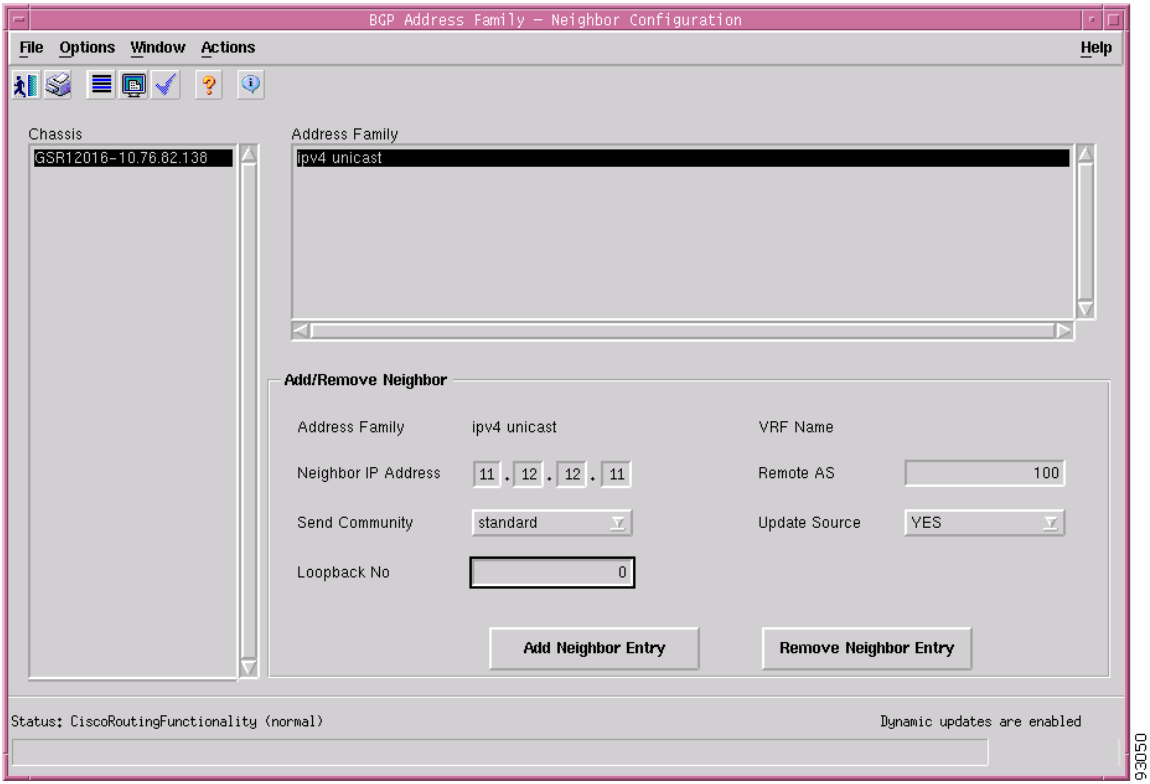
Step 1 Open the BGP Address-Family Configuration window. See "Viewing the AF-General Tab on the BGP Address-Family Configuration Window" section on page 14-38 for further details. Click on the AF—Neighbor Tab.

Step 2 Choose a chassis and the address family from the left side of the window.

Note You can choose multiple chassis and address families (from the list provided at the left side of the window) which allows you to launch the BGP Address Family - Neighbor Configuration window for the selected chassis.

Step 3 Click on the Add/Remove AF Neighbor button to open the BGP Address Family - Neighbor Configuration window.

Figure 14-24 BGP Address Family—Neighbor Configuration Window



Step 4 Choose the chassis from the Chassis list and the address family from the Address Family List, for which you want to configure the Neighbor.

Step 5 Edit the fields displayed in the window, as required.

BGP Address Family-Neighbor Configuration—Detailed Description

The Configure Neighbor window displays a list of Address Families and an area: Add/Remove Neighbor.

Address Family List—Displays a list of the address families.

Add/Remove Neighbor

Address Family—Unique identifier of the address family type.

VRF Name—Identifier of the VRF Name if the address family type is IPv4 VRF

Neighbor IP Address—This is used to configure the IP address of the neighbor router for the address family.

Remote AS—This is used to configure the neighbor router's autonomous system number. This value can range from1 to 65535.

Note This attribute is configurable only for the ipv4 unicast and ipv4 vrf address families.

Send Community—This is used to select the community attribute sent in the route updates to a peer. The default is not to send community attribute in route updates. The available options are: both, extended and standard.

Update Source—To enable or disable BGP sessions to use a specific operational interface for TCP connections. The available options are: No and Yes.

Note The Update Source command in the device can specify any interface (physical, virtual, loopback) to be used as source IP address of the BGP session with the neighbor; but in the EM only the loopback interface can be specified. This attribute is configurable only for the ipv4 unicast and ipv4 vrf address families.

Loopback No—This is used to configure Router's Loopback Interface Number. This is valid only if Update-Source is set to YES.

Note This attribute is configurable only for the ipv4 unicast and ipv4 vrf address families.

Action

Add Neighbor Entry—Clicking on the “Add Neighbor Entry” button, adds the neighbor entry for the BGP Address Family.

Remove Neighbor Entry—Clicking on the “Remove Neighbor Entry” button, removes the neighbor entry for the BGP Address Family.

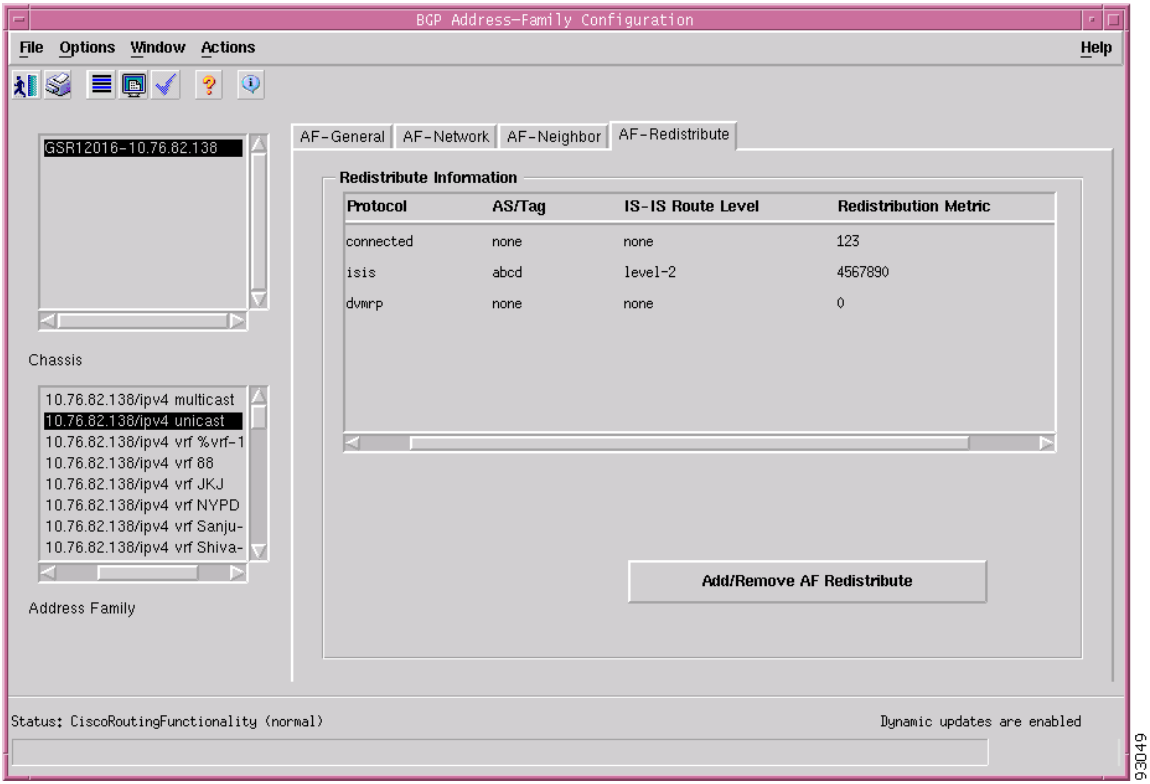
Viewing the AF-Redistribute Tab on the BGP Address-Family Configuration Window

The AF-Redistribute tab displays the information about the redistribute protocols configured for a BGP address family. The user can add or remove the redistribute entries for an address family. To view the AF-Redistribute tab on the BGP Address Family Configuration window for a chassis, proceed as follows:

Step 1 Open the BGP Address-Family Configuration window. See “Viewing the AF-General Tab on the BGP Address-Family Configuration Window” section on page 14-38 for further details.

Step 2 Click on the AF-Redistribute tab.

Figure 14-25 BGP Address-Family Configuration Window—AF-Redistribute Tab



Step 3 Choose the Chassis and the Address Family from the left side of the window.

AF-Redistribute Tab—Detailed Description

The AF-Redistribute tab displays a single area: Redistribute Information.

Redistribute Information

Protocol—Displays the protocol whose routes are redistributed by BGP. The redistribute configuration causes the corresponding routes to be redistributed into BGP.

AS/Tag—Indicates the Process ID of the redistributed protocol. A Positive Integer will indicate the process id of the redistributed protocol; a character string will indicate the ISO routing area tag.

IS-IS Route Level—Specifies the routing level of ISIS Protocol.

Redistribution Metric—Specifies the metric used for redistributed routes for this address family.

Action

Add/Remove AF Redistribute—Clicking on the "Add/Remove AF Redistribute" button opens the BGP Address Family - Redistribute Configuration window.

BGP Address Family—Redistribute Configuration

The BGP Address Family - Redistribute Configuration window allows the user to add or remove redistribute configurations for BGP address families. To configure the Redistribute protocol for an address family, proceed as follows:

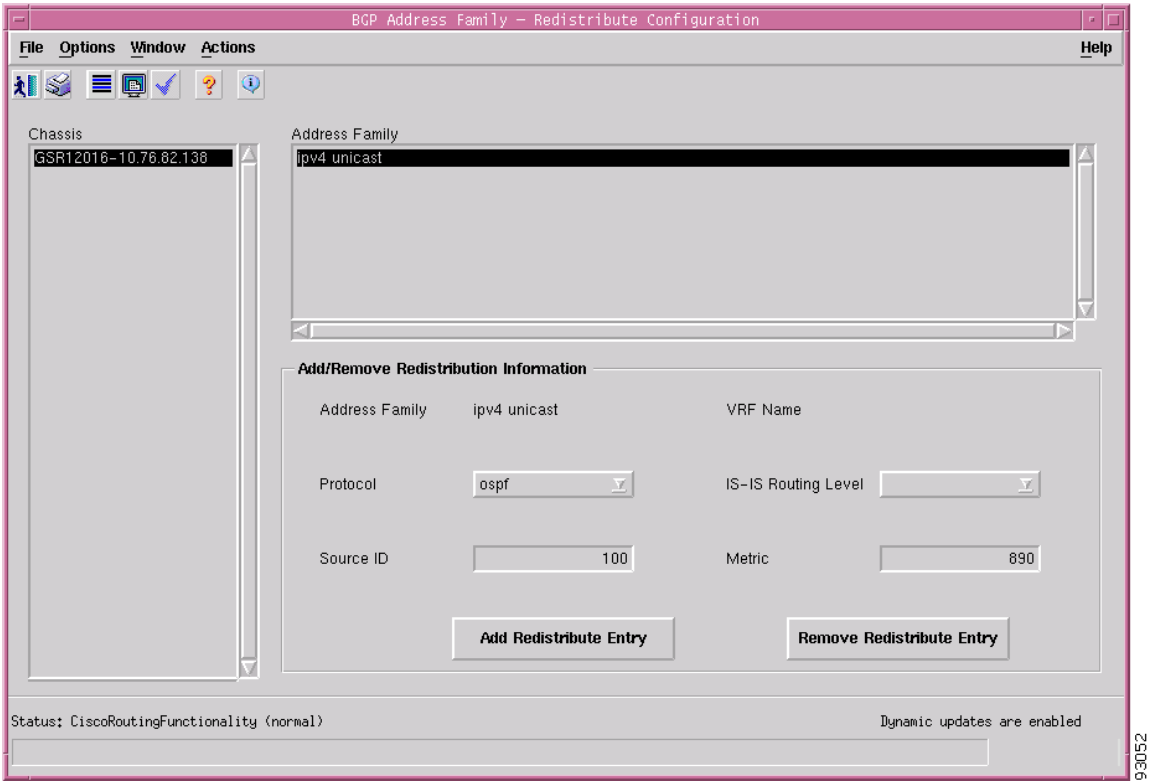
Step 1 Open the BGP Address-Family Configuration window. See "Viewing the AF-General Tab on the BGP Address-Family Configuration Window" section on page 14-38 for further details. Click on the AF—Redistribute Tab.

Step 2 Choose a chassis and the address family from the left side of the window.

Note You can choose multiple chassis and address families (from the list provided at the left side of the window) which allows you to launch the BGP Address Family - Redistribute Configuration window for the selected chassis.

Step 3 Click on the Add/Remove AF Redistribute button to open the BGP Address Family - Redistribute Configuration.

Figure 14-26 BGP Address Family—Redistribute Configuration Window



Step 4 Choose the chassis from the Chassis list and the address family from the Address Family list, for which you want to configure the Redistribution protocol.

Step 5 Edit the fields displayed in the window, as required.

BGP Address Family-Configure Redistribute Protocol—Detailed Description

The BGP Address Family - Configure Redistribute Protocol window displays a list Address Families and an area: Add/Remove Redistribution Information.

Address Family—Displays a list of the address families.

Add/Remove Redistribution Information

Address Family—Specifies the address family type.

VRF Name—Identifier of the VRF Name if the address family type is ipv4 vrf

Protocol—This is used to set the protocol whose routes are redistributed by BGP Address Family. The redistribute configuration causes the corresponding routes to be redistributed into BGP. Valid Protocol Names that can be redistributed are connected, static, ospf, isis, igrp, eigrp, egp, rip, mobile, odr, dvmrp.

IS-IS Routing Level—This is used to choose the routing level of ISIS Protocol. The values for this field are: level-1, level-2 or level-1-2 when protocol is ‘isis’.

Source ID—This is used to configure the Process ID of the redistributed protocol. A Positive Integer will indicate the process id of the redistributed protocol; a character string will indicate the ISO routing area tag. In case of protocols like CONNECTED and STATIC this attribute cannot be configured.

Metric—This is used to configure the metric used for redistributed routes.

Note You cannot configure a redistribute protocol for vpnv4 address families.

Action

Add Redistribute Entry—Clicking on the Add Redistribute Entry button, adds the redistribution entry to the BGP Address Family on the device.

Remove Redistribute Entry—Clicking on the “Remove Redistribute Entry” button, removes the redistribution entry from the BGP Address Family on the device.

BGP Address-Family Status

The BGP Address Family Status window displays the BGP address family configurations existing on the device including basic BGP address family parameters information, path information, peer information and redistribution information. The BGP Address-Family Status section covers the following:

- Viewing the BGP Address-Family Status window
- BGP Address-Family Status Window—Detailed Description

Viewing the BGP Address-Family Status window

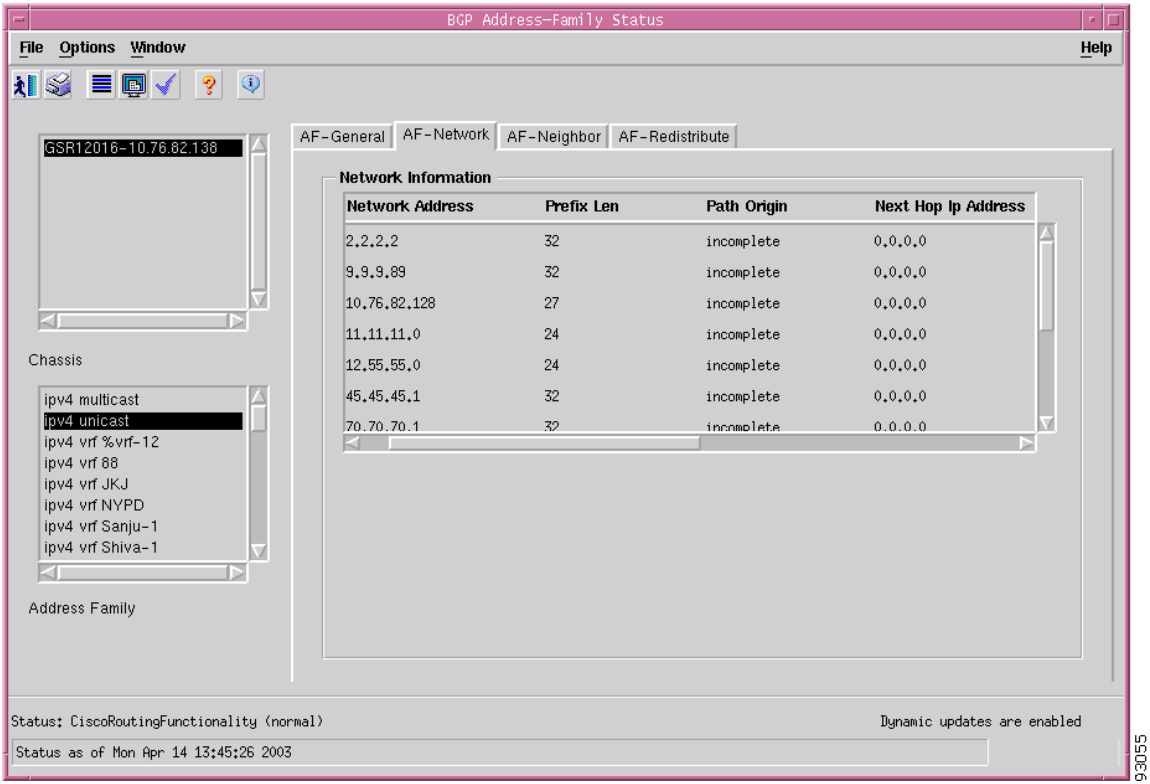
To view the BGP Address-Family Status window, proceed as follows:

Step 1 Right click on the chassis and choose **Fault>BGP>BGP Address-Family Status**. See Table 14-1 on page 14-2 for information on which objects allow you to launch the BGP Address-Family Status window. The AF-General tab displays the BGP address family parameters.

Figure 14-27 BGP Address-Family Status Window

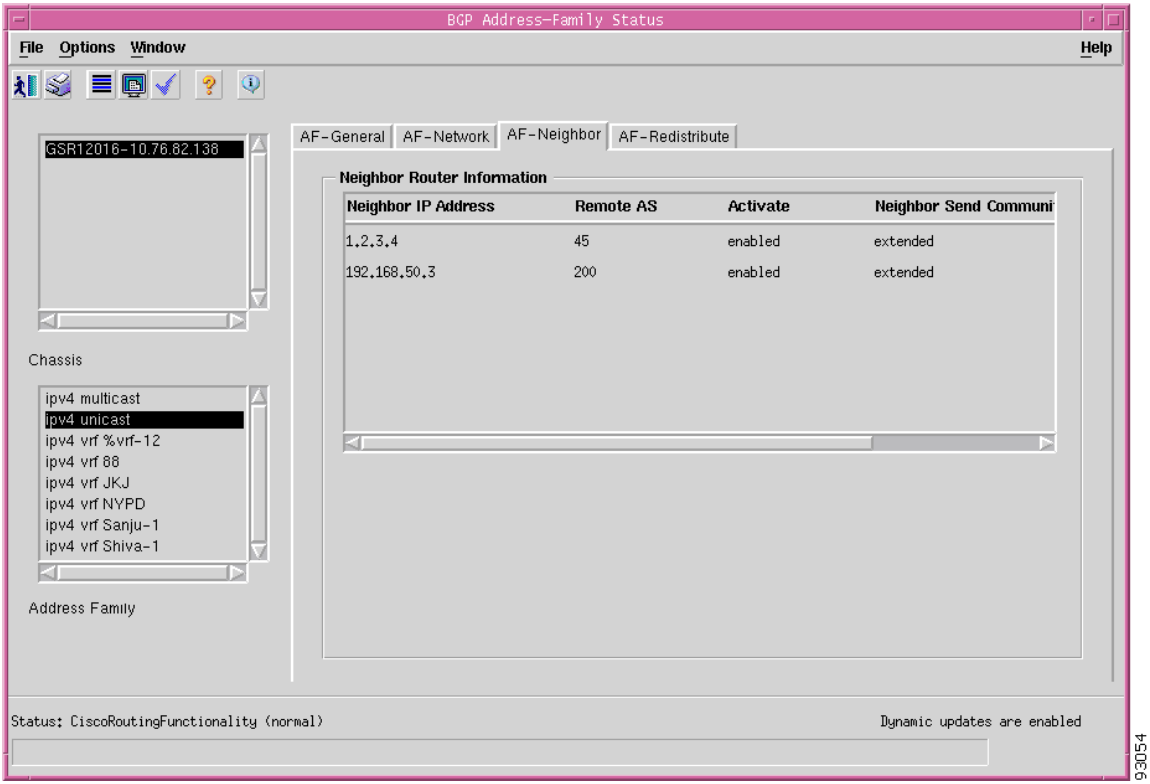
Step 2 Choose a Chassis and the address family from the list box displayed on the left side of the window. Choose the AF-Network tab, if required. The AF-Network tab displays the network paths and the associated path information for the BGP address family.

Figure 14-28 BGP Status—AF-Network Tab



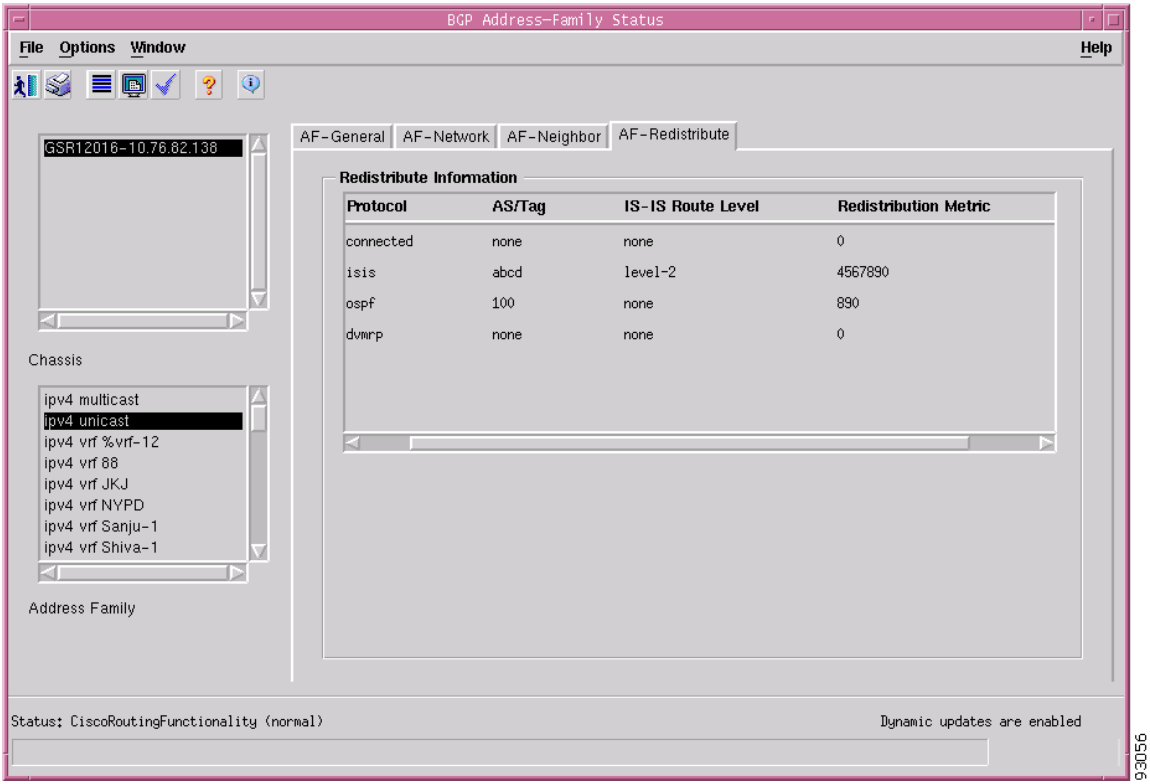
Step 3 Choose the AF-Neighbor tab, if required. The AF-Neighbor tab displays the neighbor information (peer) for a BGP address family.

Figure 14-29 BGP Status—AF-Neighbor Tab



Step 4 Choose the AF-Redistribute tab, if required. The AF-Redistribute tab displays the information about the redistribute protocols configured for a BGP address family.

Figure 14-30 BGP Status—AF-Redistribute Tab



BGP Address-Family Status Window—Detailed Description

The BGP Address-Family Status window displays four tabs: AF-General, AF-Network, AF-Neighbor and AF-Redistribute.

AF-General

The AF-General tab displays two areas: BGP General and BGP Address Family Information.

BGP General

Local Autonomous System—The id of the BGP process running in the device. If the value is 0 it means no BGP process is running on the device.

BGP Address Family Information

Address Family—Unique identifier of the address family type.

VRF Name—Identifier of the VRF Name if the address family type is ipv4 vrf.

Auto Summary—Displays whether the automatic network number summarization is enabled/disabled for the address family.

Synchronization—Displays whether the BGP synchronization with IGP is enabled/disabled for the address family.

Default Metric—Displays the default metric value set for redistributed routes of the address family.

AF-Network

The AF—Network tab displays a single area: Network Information.

Network Information

Network Address—An IP address prefix in the Network Layer Reachability Information field. This object is an IP address containing the prefix with the length specified by the Prefix Len attribute. Any bits beyond the length specified by Network Mask attribute are zeroed.

Prefix Len—Length in bits of the IP address prefix in the network layer reachability information field.

Path Origin—The ultimate origin of the network path information.

Next Hop Ip Address—The address of the border router that should be used for the destination network.P

Metric—This metric is used to discriminate between multiple exit points to an adjacent autonomous number. A value of -1 indicates the absence of this attribute.

Degree of Preference—The originating BGP4 speaker's degree of preference for an advertised route. A value of -1 indicates the absence of this attribute.

Weightage—Specifies the BGP weight for the routing table.

Best Route—Specifies whether the network path is the best possible route. When set to true, it indicates that the network path is the best route for the router.

AF-Neighbor

The AF—Neighbor tab displays a single area: Neighbor Information.

Neighbor Information

Neighbor IP Address—Specifies the IP address of the neighbor router for the address family.

Remote AS—Specifies the neighbor routers autonomous system number. This value can range from1 to 65535.

Activate—Enables the neighbor to exchange prefixes for the specified family type with the local router.

Neighbor Send Community—Specifies the community attribute sent in the route updates to a peer. The default is not to send community attribute in route updates.

AF-Redistribute

The AF—Redistribute tab displays a single area: Redistribute Information.

Redistribute Information

Protocol—Displays the protocol whose routes are redistributed by BGP. The redistribute configuration causes the corresponding routes to be redistributed into BGP.

AS/Tag—Indicates the Process ID of the redistributed protocol. A Positive Integer will indicate the process id of the redistributed protocol; a character string will indicate the ISO routing area tag.

IS-IS Route Level—Specifies the routing level of ISIS Protocol.

Redistribution Metric—Displays the metric used for redistributed routes for this address family.

OSPF Management

Open Shortest Path First (OSPF) is a TCP/IP internet routing protocol. OSPF is classified as an Interior Gateway Protocol (IGP). This means that it distributes routing information between routers belonging to a single Autonomous System (AS). The OSPF protocol is based on link-state or SPF technology based on Dijkstra's algorithm. Each OSPF router maintains an identical database describing the Autonomous System's topology. From this database, a routing table is calculated by constructing a shortest-path tree.

OSPF has been designed expressly for the TCP/IP internet environment, including explicit support for Classless Inter-Domain Routing (CIDR) and the tagging of externally-derived routing information. OSPF also provides for the authentication of routing updates, Variable Length Subnet Masks (VLSM), route summarization and utilizes IP multicast when sending/receiving the updates. OSPF recalculates routes quickly in the face of topological changes, utilizing a minimum of routing protocol traffic.

OSPF Configuration

The OSPF Configuration window allows the user to enable or remove OSPF configurations on a router. The OSPF configuration section covers the following topics:

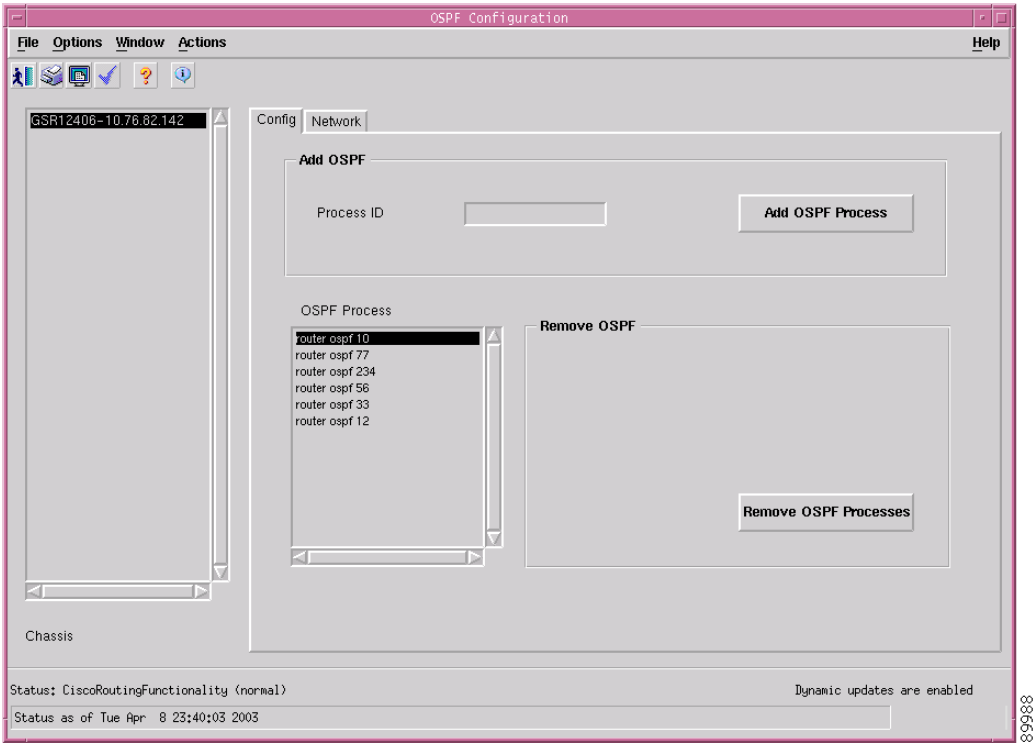
- Viewing the OSPF Configuration Window
- Config Tab—Detailed Description
- Adding an OSPF Process
- Removing an OSPF Process
- Viewing the Network Tab on the OSPF Configuration Window
- Network Tab—Detailed Description
- Configuring a Network
- Configure Network—Detailed Description

Viewing the OSPF Configuration Window

To view the Config tab on the OSPF Configuration window for a chassis, proceed as follows:

Step 1 Right click on the chassis object and choose **Configuration>OSPF>OSPF Configuration**. See Table 14-1 on page 14-2 for information on which objects allow you to launch the OSPF Configuration window.

Figure 14-31 OSPF Configuration Window



Step 2 Choose the chassis from the left side of the window.

Config Tab—Detailed Description

The Config tab displays two areas: Add OSPF, Remove OSPF and a listbox, OSPF Process.

Config

Process ID—The OSPF process ID of the selected chassis.

OSPF Process—The OSPF processes currently configured for the selected chassis.

Action

Add OSPF Process—Adds the OSPF Process and Network details (Network Number, Network Mask and Area ID) to the selected chassis.

Remove OSPF Processes—Removes the OSPF Process from the selected chassis.

Adding an OSPF Process

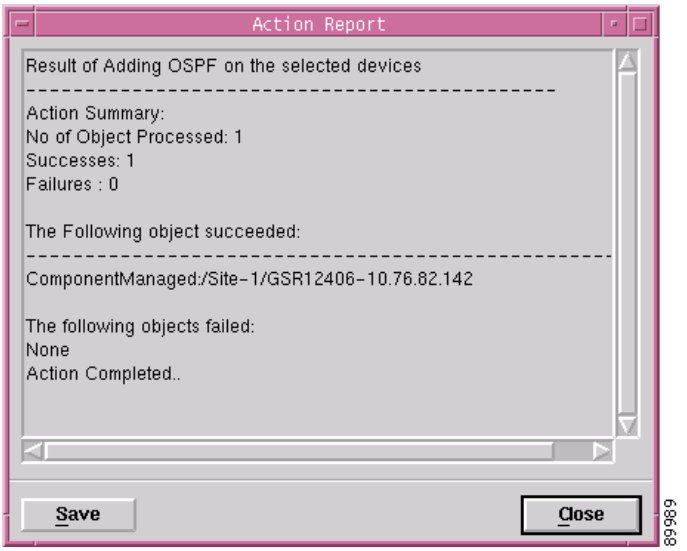
This section explains the procedure to add an OSPF process to the device. To add an OSPF process, proceed as follows:

Step 1 Open the OSPF configuration window. See "Viewing the OSPF Configuration Window" section on page 14-69 for further details.

Step 2 Enter an OSPF process id in the Process ID textbox.

Step 3 Click on the Add OSPF Process button. An action report appears.

Figure 14-32 Action Report



Note The number of OSPF processes that can be created on a device depends on the number of interfaces (with IP address) present on the device.

Removing an OSPF Process

This section explains the procedure to remove an OSPF process from the device. To remove an OSPF process, proceed as follows:

Step 1 Open the OSPF configuration window. See "Viewing the OSPF Configuration Window" section on page 14-69 for further details.

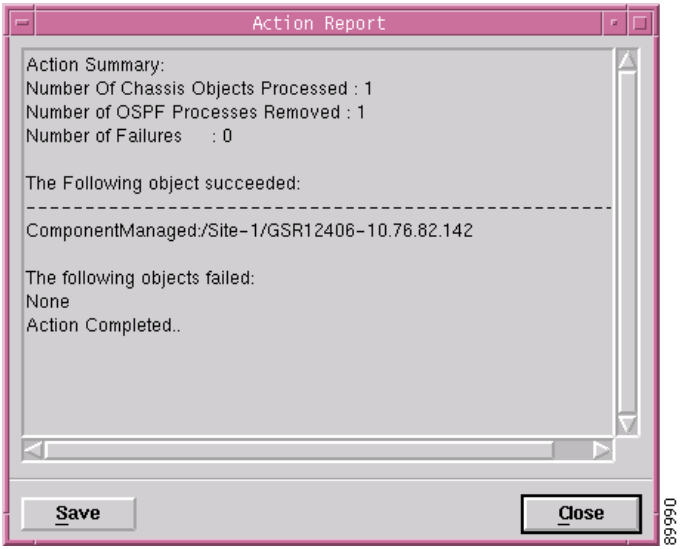
Step 2 Choose the OSPF process from the OSPF Process list.

Step 3 Click on the Remove OSPF Processes button. An action report appears.

Figure 14-33 Remove OSPF—Alert

Step 4 Click on Yes to remove the OSPF process. An action report summarizing the Remove OSPF operation is displayed.

Figure 14-34 Action Report



Note Multiple OSPF processes can be selected and removed from the device.

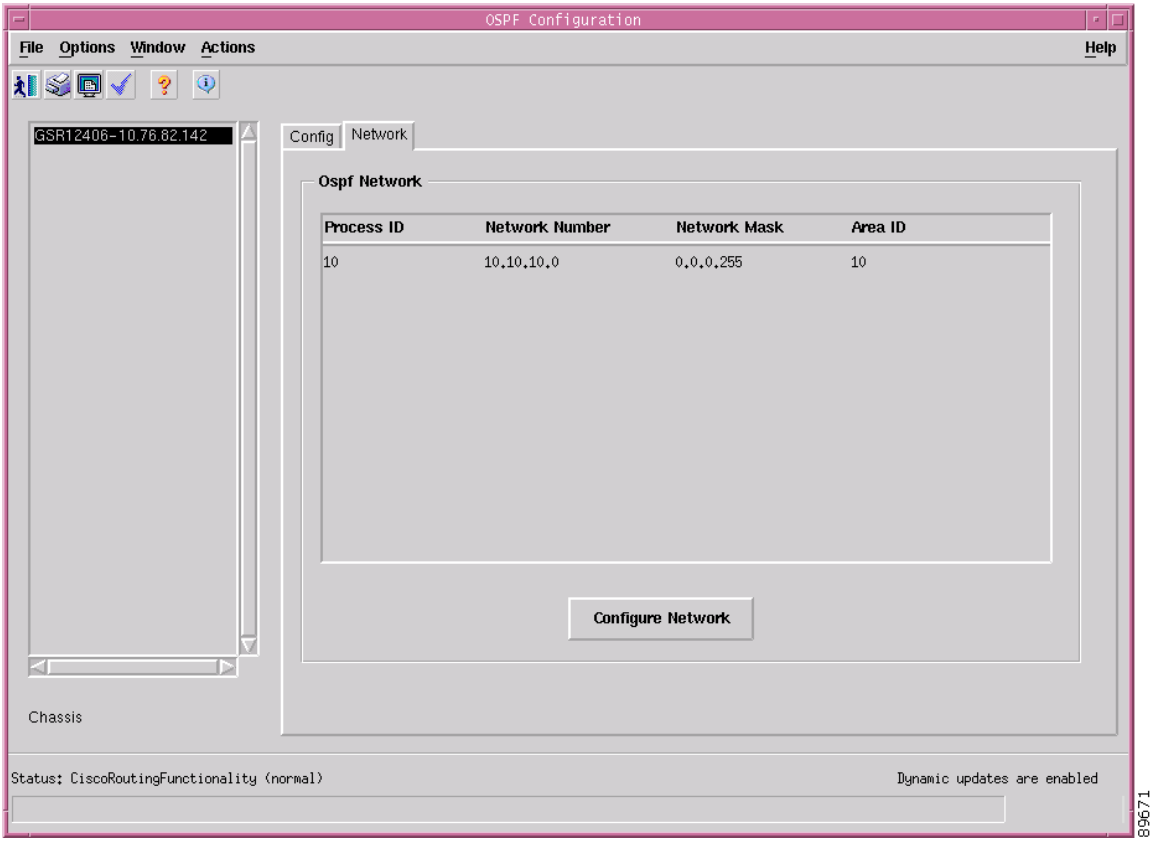
Viewing the Network Tab on the OSPF Configuration Window

The Network tab allows the use to view the network entries configured on the device. To view the Network tab on the OSPF Configuration window for a chassis, proceed as follows:

Step 1 Right click on the chassis object and choose **Configuration>OSPF>OSPF Configuration**. See Table 14-1 on page 14-2 for information on which objects allow you to launch the OSPF Configuration window.

Step 2 Click on the Network tab.

Figure 14-35 OSPF Configuration Window—Network Tab



Network Tab—Detailed Description

The Network tab displays a single area, Ospf Network.

Ospf Network

Process ID—The OSPF process ID of the selected chassis.

Network Number—The Network Number for corresponding Process ID of the selected chassis.

Network Mask—The Network Mask for corresponding Process ID of the selected chassis.

Area ID—The Area ID for corresponding Process ID of the selected chassis.

Action

Configure Network—Opens another window **Configure Network**.

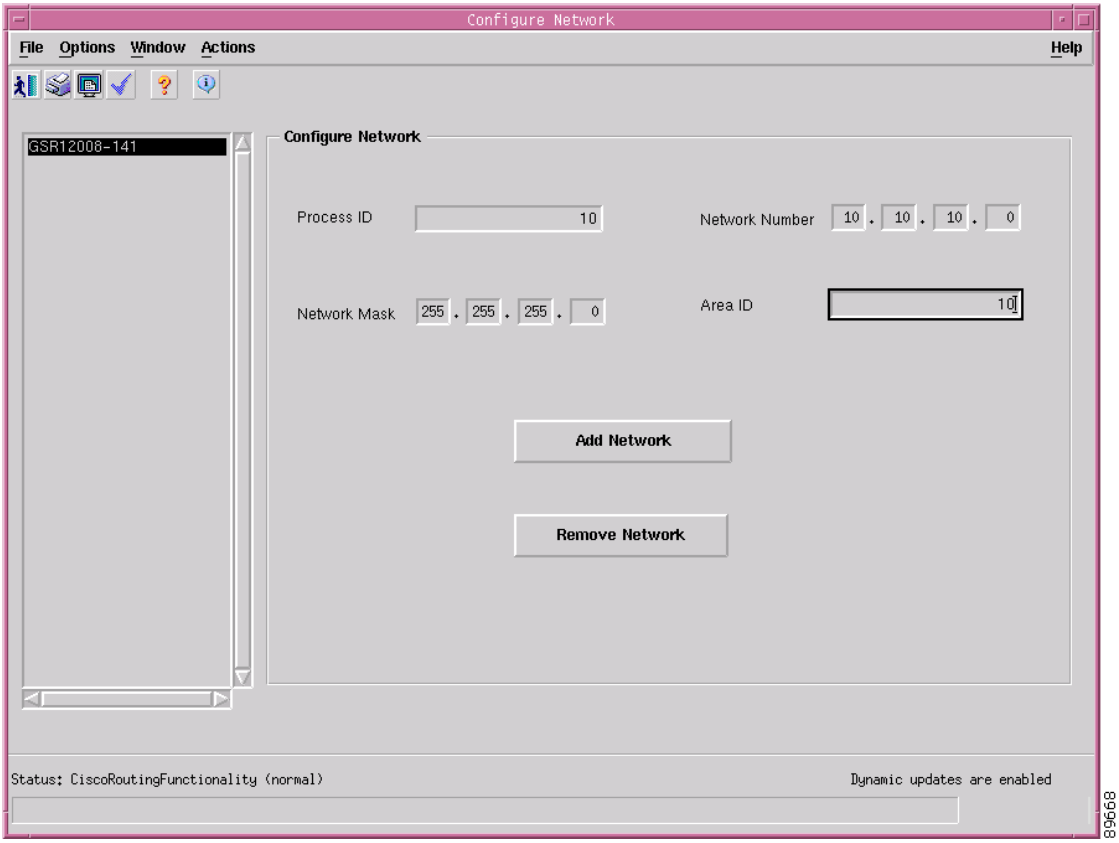
Configuring a Network

The Configure Network window allows the user to associate or disassociate a network entry (IP address of interfaces) to the areas. To configure a network, proceed as follows:

Step 1 Open the OSPF configuration window. See "Viewing the OSPF Configuration Window" section on page 14-69 for further details.

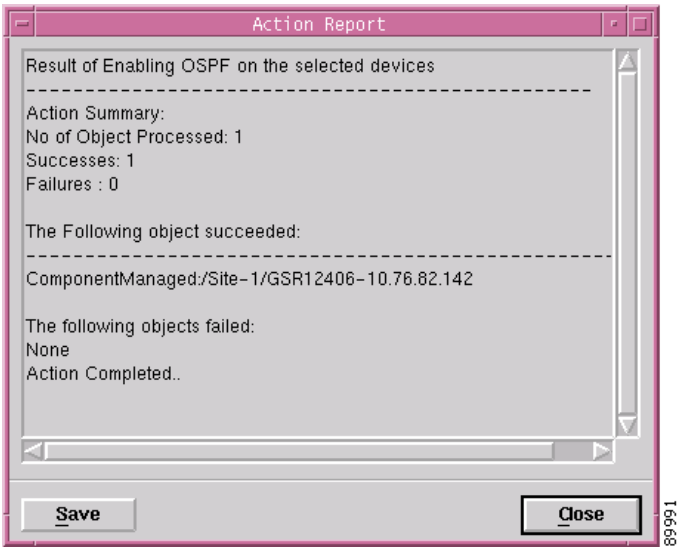
Step 2 Choose the Network tab and click on the Configure Network button, the Configure Network window appears.

Figure 14-36 Configure Network Window



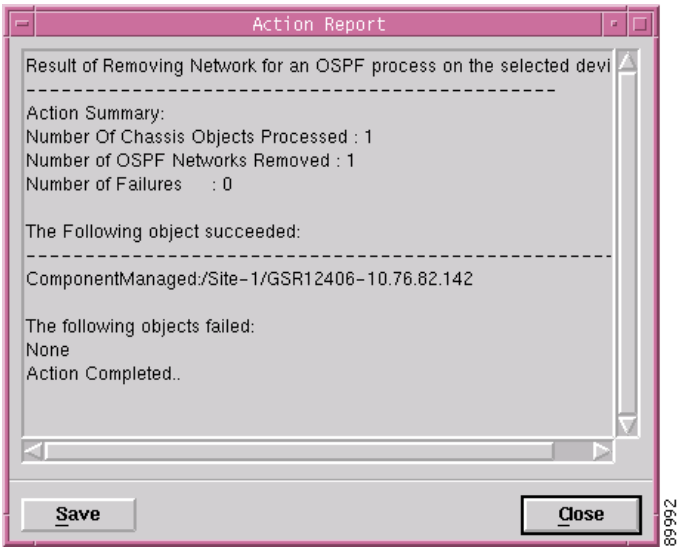
Step 3 To add a network, enter the values in the textboxes and click on the Add Network button. An action report is displayed.

Figure 14-37 Action Report



Step 4 To remove a network, enter the values in the textboxes and click on the Remove Network button. An action report is displayed.

Figure 14-38 Action Report



Configure Network—Detailed Description

The Configure Network window displays a single area: Configure Network.

Configure Network

Process ID—The OSPF process ID of the selected chassis.

Network Number—The Network Number for corresponding Process ID of the selected chassis.

Network Mask—The Network Mask for corresponding Process ID of the selected chassis.

Area ID—The Area ID for corresponding Process ID of the selected chassis.

OSPF Status

The OSPF Status window displays the OSPF configurations for a device. The OSPF Status section covers the following:

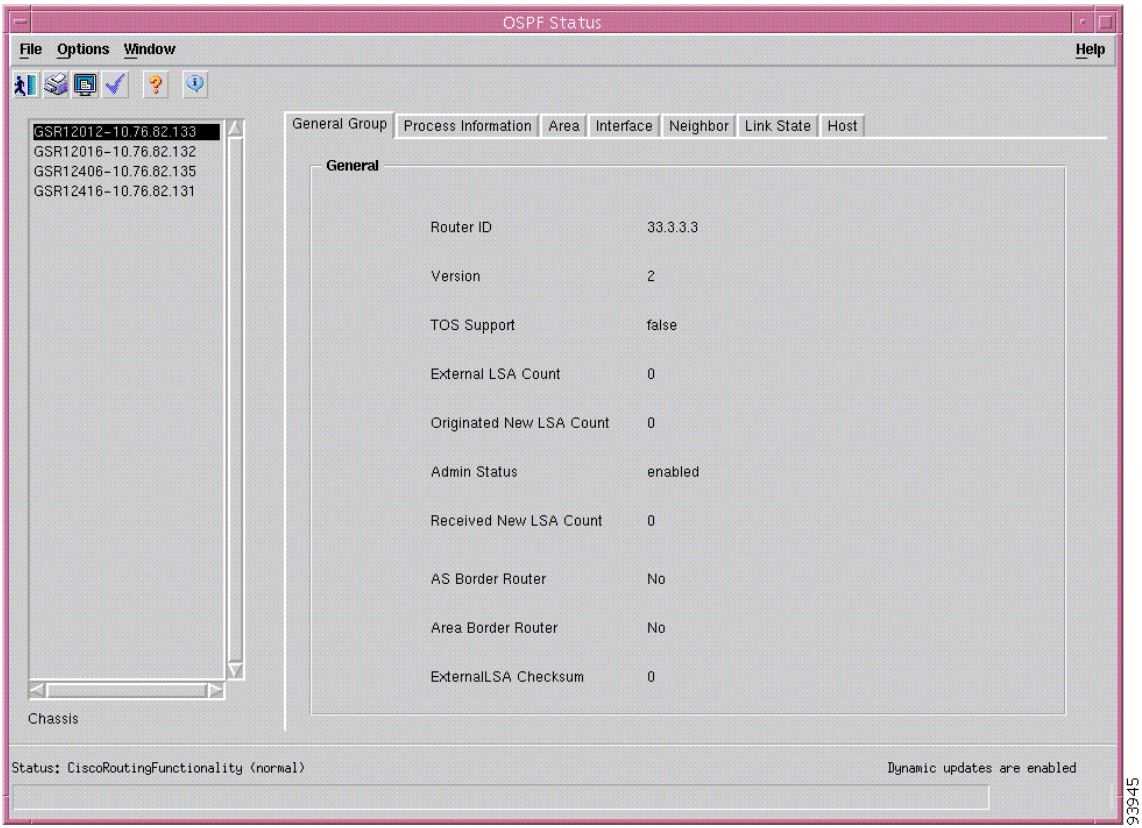
- Viewing the OSPF Status Window
- OSPF Status—Detailed Description

Viewing the OSPF Status Window

To view the OSPF status window for a chassis, proceed as follows:

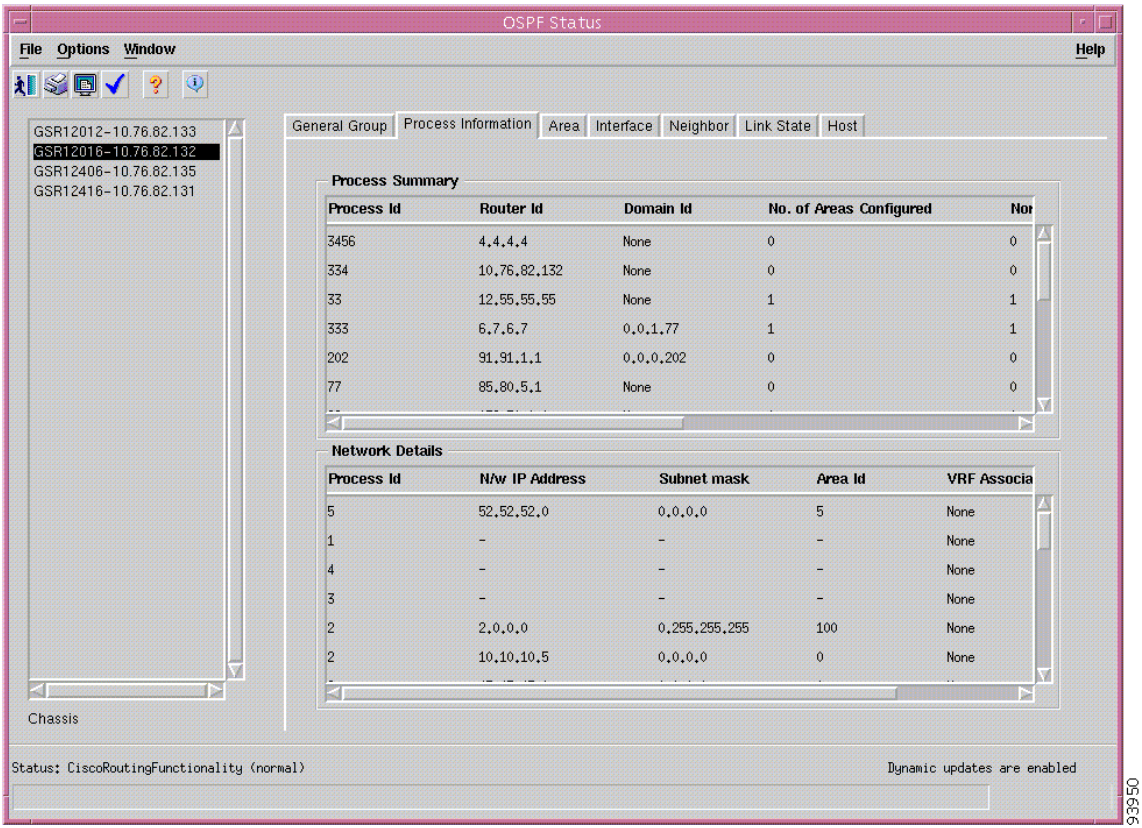
Step 1 Right click on the chassis and choose **Fault>OSPF>OSPF Status**. See Table 14-1 on page 14-2 for information on which objects allow you to launch the OSPF Status window. The OSPF Status window appears with the General Group tab displayed. The General tab displays the attributes that apply globally to the OSPF processes configured on the router.

Figure 14-39 OSPF Status Window



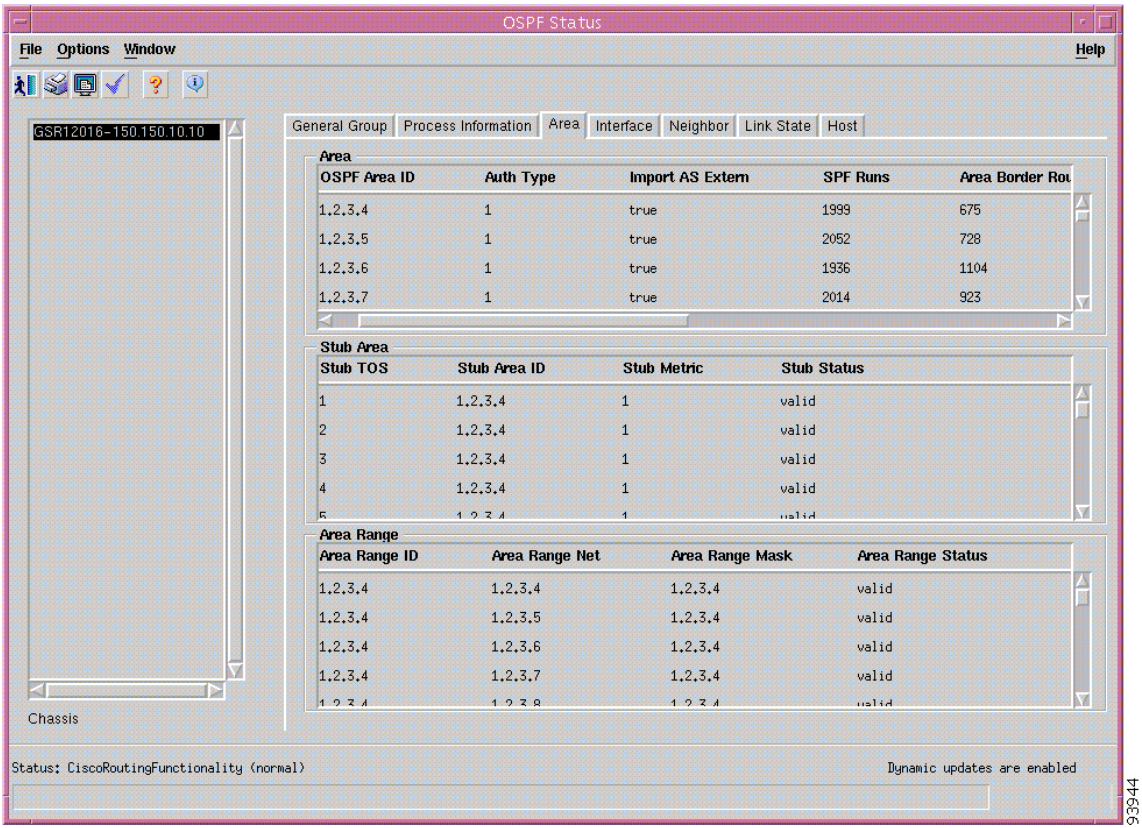
Step 2 Choose the Process Information tab, if required. The Process Information tab displays Process Information tab displays two areas, Process Summary and Network Details. The Process Summary details all processes that exist on the device. This includes its Router id, number of areas configured, number of normal areas, number of stub areas, and number of nssa areas. The Network Details lists the networks configured on OSPF processes and also VRF/VPN instance associated with OSPF process (if any). It includes associated VPN/ VRF Instance (if any), Network entries (Network number, N/w Mask, Area id).

Figure 14-40 OSPF Status—Process Information Tab



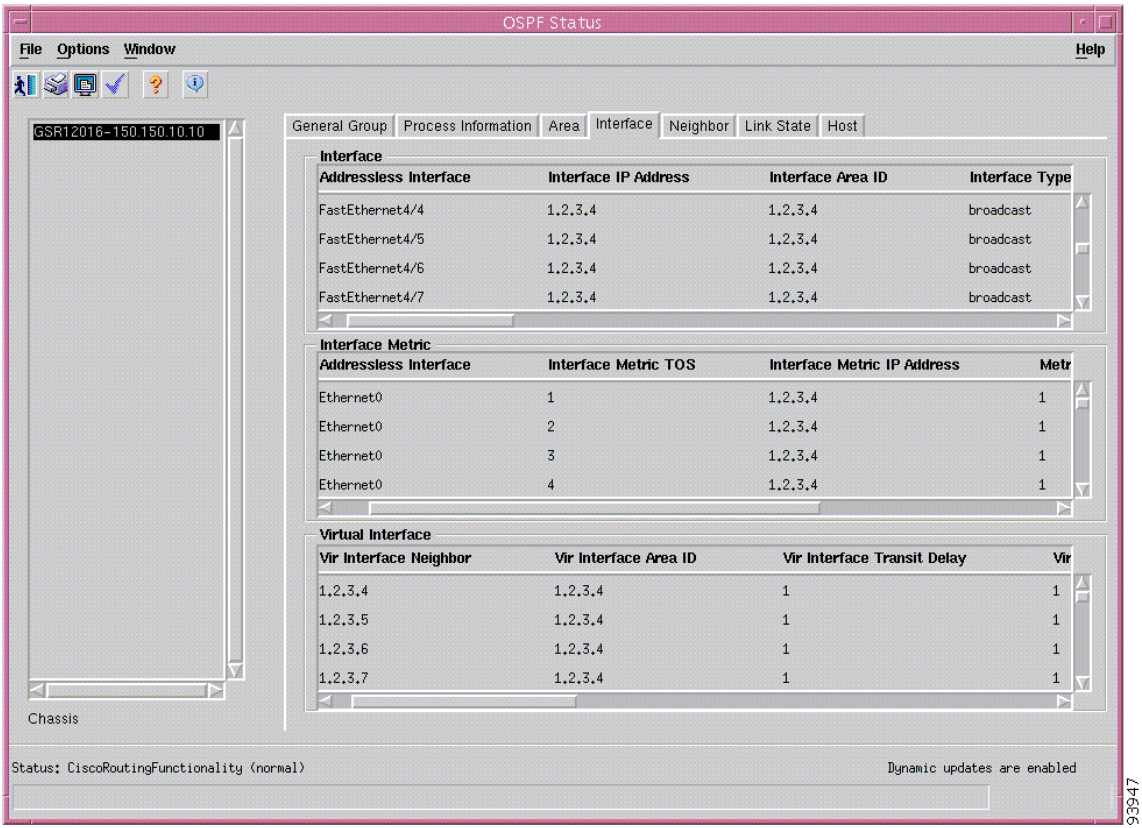
Step 3 Choose the Area tab, if required. The Area tab displays the complete information describing the configured parameters and cumulative statistics of one of the router's attached areas.

Figure 14-41 OSPF Status—Area Tab



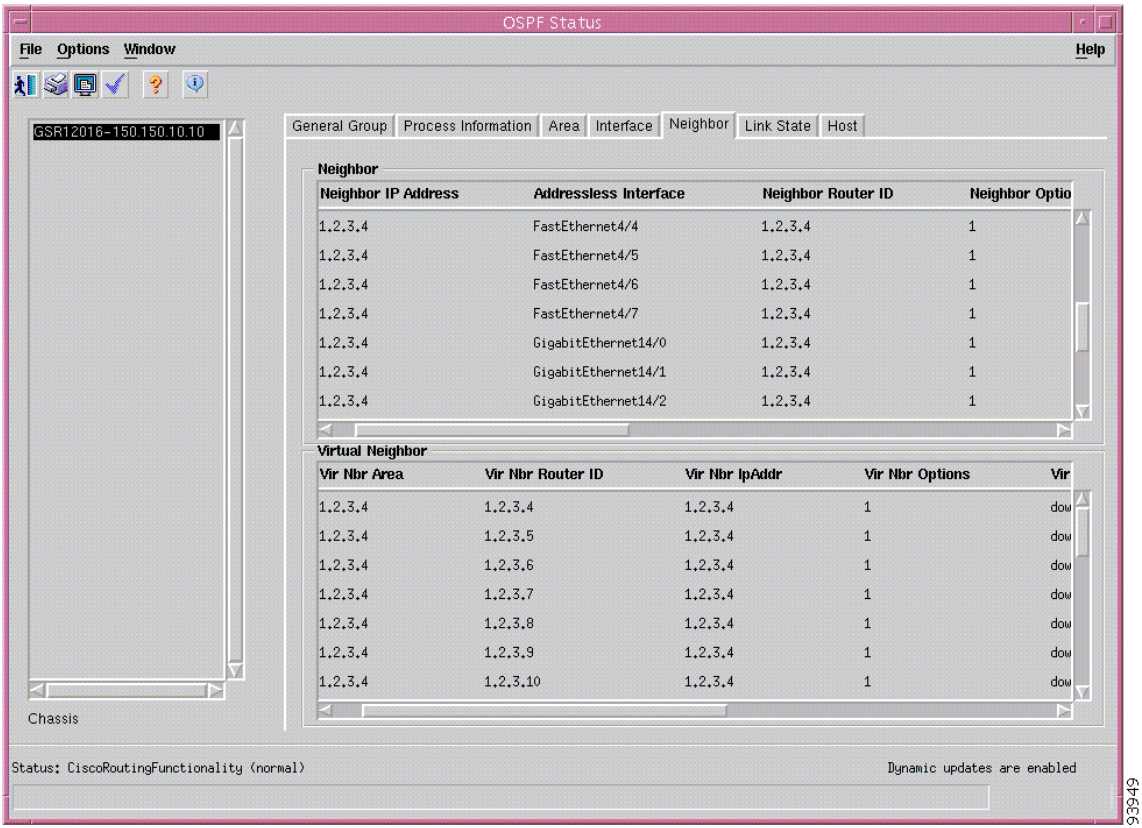
Step 4 Choose the Interface tab, if required. The Interface tab displays the complete information about the interfaces and their statistics.

Figure 14-42 OSPF Status—Interface Tab



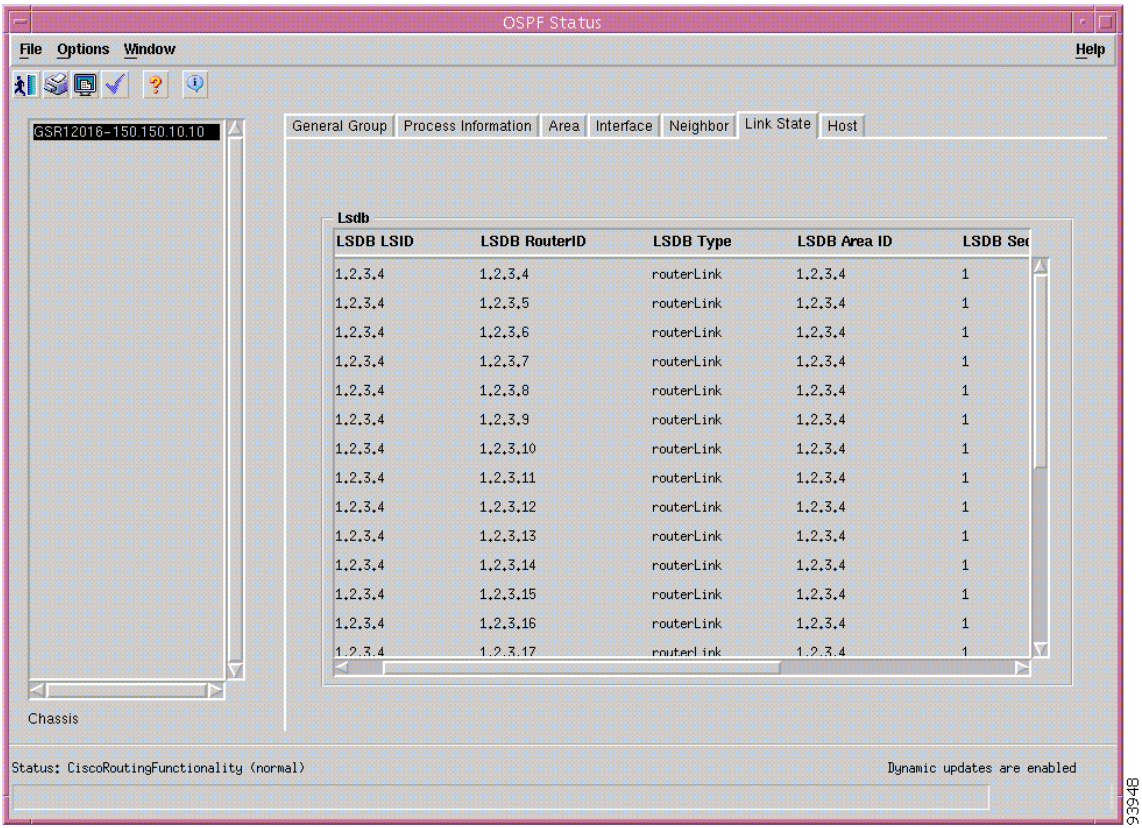
Step 5 Choose the Neighbor tab, if required. The Neighbor tab displays all the neighbors in the locality of the selected router.

Figure 14-43 OSPF Status—Neighbor Tab



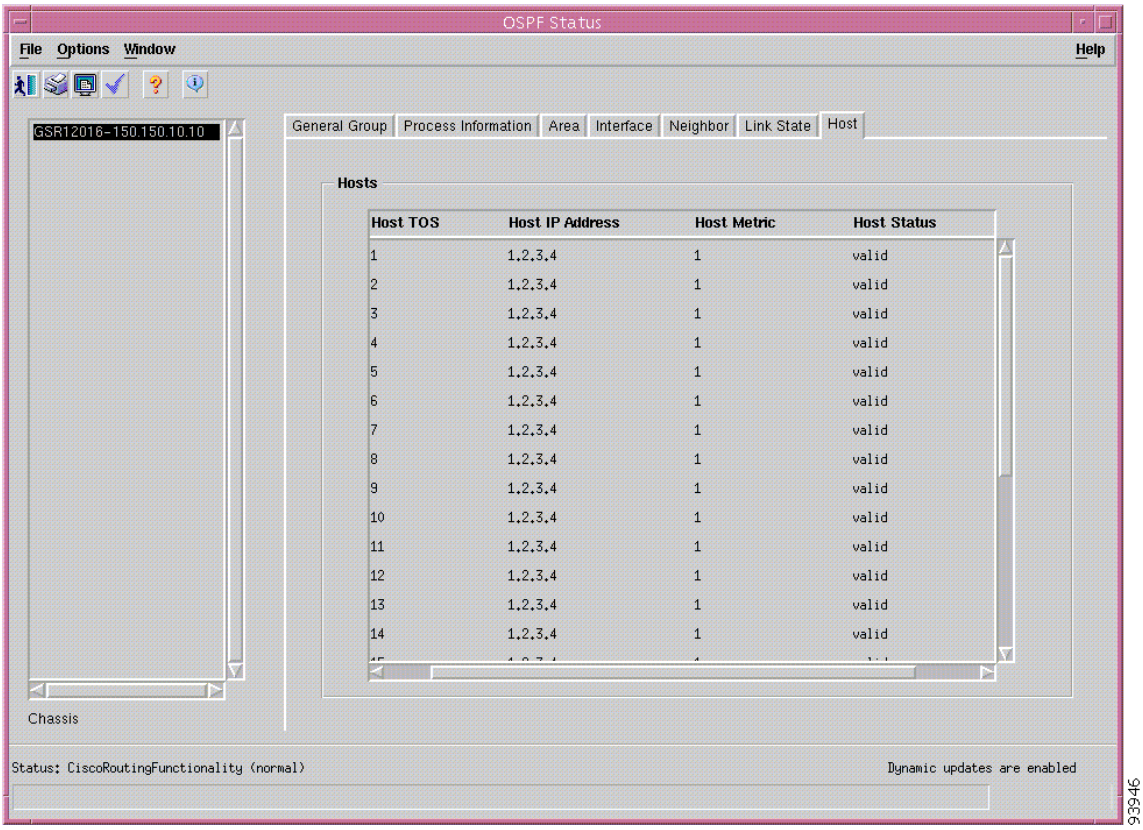
Step 6 Choose the Link State tab, if required. The Link State tab displays the Link State Advertisements from the areas that the device is attached to.

Figure 14-44 OSPF Status—Link State Tab



Step 7 Choose the Host tab, if required. The Host tab displays hosts that are directly attached to the router, and their metrics and types of service advertised for them.

Figure 14-45 OSPF Status—Host Tab



OSPF Status—Detailed Description

The OSPF Status window displays seven tabs: General Group, Process information, Area, Interface, Neighbor, Link State and Host.

General Group

The General Group tab displays a single area, General.

Router ID—Unique identifier of the router in the AS.

Version—Displays the current version number of the OSPF protocol

TOS Support—Specifies the router's support for type-of-service routing

External LSA Count—The number of external (LS type 5) link-state advertisements in the link-state database.

Originated New LSA Count—The number of new link-state advertisements that have been originated. This number is incremented each time the router originates a new LSA.

Admin Status—The administrative status of the OSPF protocol in the router. When the value is set to enabled, it signifies that the OSPF Process is active on at least one interface and when the value is set to disabled, the OSPF process is disabled on all the interfaces.

Received New LSA Count—The number of link-state advertisements received determined to be new instantiations. This number does not include newer instantiations of self-originated link-state advertisements.

AS Border Router—A flag to indicate whether this router is an Autonomous System Border router.

Area Border Router—A flag to indicate whether this router is an area border router.

ExternalLSA Checksum—LS checksums of the external link-state advertisements contained in the link-state database. This sum can be used to determine if there has been a change in a router's link state database, and to compare the link-state database of two routers.

Process Information

Process Information tab displays two areas: Process Summary and Network Details.

Process Summary

This table lists all processes that exist on the device. This includes its Router id, number of areas configured, number of normal areas, number of stub areas, and number of nssa areas.

Process Id—Unique identifier for a OSPF Process.

Router Id—Unique identifier of the router in the AS.

Domain Id—Domain Identifier, will be set when VRF is associated with this OSPF Process.

No. of Areas Configured—Displays the count of total number of areas configured on this OSPF Process.

Normal Areas—Displays the count of total number of "Normal" areas configured on this OSPF Process.

Stub Areas—Displays the count of total number of "Stub" areas configured on this OSPF Process.

Nssa Areas—Displays the count of total number of "nssa" areas configured on this OSPF Process.

Network Details

This table lists the networks configured on OSPF processes and also VRF/VPN instance associated with the OSPF process (if any). This includes associated VPN/ VRF Instance (if any), Network entries (Network number, N/w Mask, Area id).

Process Id—Unique identifier for a OSPF Process.

N/W IP Address—Network IP Address

Subnet Mask—Subnet Mask

Area Id—Area ID on which this process is configured.

VRF Associated—Associated VRF name (if any). else, "None".

Area

The Area tab displays three areas: Area, Stub Area and Area Range.

Area

OSPF Area ID—Unique identifier of the area.

Auth Type—The authentication type specified for an area. Additional authentication types may be assigned locally on a per Area basis.

Import AS Extern—The area's support for importing AS external link-state advertisements.

SPF Runs—The number of times that the intra-area route table has been calculated using this area's link-state database.

Area Border Router Count—The total number of area border routers reachable within this area.

AS Border Router Count—The total number of Autonomous System border routers reachable within this area.

Area LSA Count—The total number of link-state advertisements in this area's link-state database, excluding AS External LSA's.

Area LSA Checksum—Link-state advertisements' LS checksums contained in this area's link-state database.

Stub Area

Stub TOS—The Type of Service associated with the metric.

Stub Area ID—Unique identifier for a Stub area.

Stub Metric—The metric value applied at the indicated type of service. By default, this equals the least metric at the type of service among the interfaces to other areas.

Stub Status—This variable displays the validity or invalidity of the entry. When this value is set to invalid, it has the effect of rendering it inoperative.

Area Range

Area Range ID—The Area the Address Range is to be found within.

Area Range Net—The IP Address of the Net or Subnet indicated by the range.

Area Range Mask—The Subnet Mask that pertains to the Net or Subnet.

Area Range Status—Displays the validity or invalidity of the entry. When this value is set to invalid, it has the effect of rendering it inoperative.

Interface

The Interface tab displays three areas: Interface, Interface Metric and Virtual Interface.

Interface

Addressless Interface—Differentiates the addressless interfaces from the addressed interfaces. When the value is set to zero, it signifies that the interface has an IP address.

Interface IP Address—The IP address of the OSPF interface.

Interface Area ID—Unique identifier of the area to which the interface connects. Area ID 0.0.0.0 is used for the OSPF backbone.

Interface Type—The type of the Interface.

Interface Admin Status—The OSPF interface's administrative status. When the value is set to enabled, it signifies that the neighbor relationships may be formed on the interface, and the interface is advertised as an internal route to some area. When the value is set to disabled, it signifies that the interface is external to OSPF.

Router Priority—The priority of this interface. When the value is set to 0, it signifies that the router is not eligible to become the designated router on this particular network.

Transit Delay—The estimated number of seconds it takes to transmit a link- state update packet over this interface.

Interface Retransmit Interval—The number of seconds between the link-state advertisement retransmissions, for adjacencies belonging to this interface. This value is also used when retransmitting database description and link-state request packets.

Hello Interval—The time interval, in seconds, between the Hello packets that the router sends on the interface. This value must be the same for all the routers attached to a common network.

Router Dead interval—The time interval, in seconds, during which a router's Hello packets are not received before it's neighbors declare the router down. This is a multiple of the Hello interval. This value must be the same for all the routers attached to a common network.

Poll Interval—The larger time interval, in seconds, between the Hello packets sent to an inactive non-broadcast multi-access neighbor.

Interface State—The OSPF Interface State.

Designated Router—The IP Address of the Designated Router.

Backup Designated router—The IP Address of the Backup Designated Router.

Interface Events—The number of times this OSPF interface has changed its state, or an error has occurred.

Interface Metric

Addressless Interface—Differentiates the addressless interfaces from the addressed interfaces. When the value is set to zero, it signifies that the interface has an IP address.

Interface Metric TOS—The type of service metric being referenced.

Interface Metric IP Address—The IP address of this OSPF interface.

Metric—The metric of using this type of service on this interface. The default value of the TOS 0 Metric is 10^8 / ifSpeed.

Metric Status—Displays the validity or invalidity of the entry. Setting it to 'invalid' has the effect of rendering it inoperative.

Virtual Interface

Vir Interface Neighbor—The Router ID of the Virtual Neighbor.

Vir Interface Area ID—The Transit Area that the Virtual Link traverses.

Vir Interface Transit Delay—The estimated number of seconds it takes to transmit a link- state update packet over this interface.

Vir Interface Retransmit Interval—The number of seconds between link-state advertisement retransmissions, for adjacencies belonging to this interface. This value is also used when retransmitting the database description and link-state request packets. This value should be greater than the expected round-trip time.

Vir Interface Hello Interval—The time interval, in seconds, between the Hello packets that the router sends on the interface. This value must be the same for the virtual neighbor.

Vir Interface Router Dead Interval—The time interval, in seconds, during which a router's Hello packets are not received before it's neighbors declare the router down. This is a multiple of the Hello interval. This value must be the same for the virtual neighbor.

Vir Interface State—Signifies the OSPF virtual interface states.

Vir Interface Events—The number of state changes or error events on this virtual link.

Vir Interface Status—Displays the validity or invalidity of the entry. Setting it to 'invalid' has the effect of rendering it inoperative.

Neighbor

The Neighbor tab displays two areas: Neighbor and Virtual Neighbor.

Neighbor

Neighbor IP Address—The IP address of this Neighbor.

Addressless Interface—Differentiates the addressless interfaces from the addressed interfaces. When the value is set to zero, it signifies that the interface has an IP address.

Neighbor Router ID—Unique identifier of the neighboring router in the Autonomous System.

Neighbor Options—A bit mask corresponding to the neighbor's options field. When the value is set to 0, it indicates that the area accepts and operates on external information. If the values is zero, it signifies a stub area. When the value is set to 1, it indicates that the system operates on the type of service metrics other than TOS 0. If the value is zero, the neighbor ignores all the metrics except the TOS 0 metric.

Neighbor Priority—Signifies the priority of this neighbor in the designated router. When the value is set to 0, it signifies that the neighbor is not eligible to become the designated router on this particular network.

Neighbor State—The state of the relationship with this Neighbor.

Neighbor Events—The number of times this neighbor relationship has changed state, or an error has occurred.

Neighbor LS Retransmit Q Len—The current length of the retransmission queue.

NBMA Neighbor Status—Displays the validity or invalidity of the entry. Setting it to 'invalid' has the effect of rendering it inoperative.

Virtual Neighbor

Vir Nbr Area—The identifier of the Transit Area.

Vir Nbr Router ID—An integer that uniquely identifies the neighboring router in the Autonomous System.

Vir Nbr IPAddr—The IP address that is used by this Virtual Neighbor.

Vir Nbr Options—A bit map corresponding to the neighbor's options field. Thus, Bit 1, if set, indicates that the neighbor supports Type of Service Routing; if zero, no metrics other than TOS 0 are in use by the neighbor.

Vir Nbr State—The state of the Virtual Neighbor Relationship.

Vir Nbr Events—The number of times this virtual link has changed its state, or an error has occurred.

Vir Nbr LS Retransmit Q Len—The current length of the retransmission queue.

Link State

The Link State tab displays a single area namely, Lsdb

Lsdb

LSBD LSID—The Link State ID is an LS Type Specific field containing either a Router ID or an IP Address.

LSDB RouterID—Displays the number that uniquely identifies the originating router in the Autonomous System.

LSDB Type—The type of the link state advertisement. Each link state type has a separate advertisement format.

LSDB Area ID—Unique identifier of the Area from which the LSA was received.

LSDB Sequence—Detects the old and duplicate link state advertisements. The larger the sequence number the more recent is the advertisement.

LSDB Age—Signifies the age of the link state advertisement in seconds.

LSDB Checksum—Displays the checksum of the complete contents of the advertisement, except the age field.

Host

The Host tab displays a single area namely, Hosts.

Hosts

Host TOS—The Type of Service of the route being configured.

Host IP Address—The IP Address of the Host

Host Metric—The Metric to be advertised.

Host Status—Displays the validity or invalidity of the entry. When this value is set to invalid, it has the effect of rendering it inoperative.