

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
- BGP Configuration
- BGP Status
- BGP Address-Family Synchronization
- BGP Address Family Configuration
- BGP Address-Family Status
- OSPF Configuration
- OSPF Status

Launching the Routing Windows

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

<u>Note</u>

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)	
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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
- BGP Details Tab—Detailed Description
- Enabling BGP on a Chassis
- Enable BGP Window—Detailed Description
- Modifying BGP on a Chassis
- BGP Modify Window—Detailed Description
- Disabling BGP on a Chassis
- Viewing the Network Tab on the BGP Configuration Window
- Network Tab—Detailed Description
- BGP Network Configuration
- BGP Network Configuration Window—Detailed Description
- Viewing the Neighbor Tab on the BGP Configuration Window
- Neighbor Tab—Detailed Description
- BGP Neighbor Configuration
- BGP Neighbor Configuration Window—Detailed Description
- Viewing the Redistribution Tab on the BGP Configuration Window
- Redistribution Tab—Detailed Description
- BGP Redistribute Configuration
- BGP Redistribute Configuration—Detailed Description

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.



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



-	BGP Configu	uration		· 🗆
File Options Window Actions				<u>H</u> elp
XIS ≡⊡√ ? 0				
Chassis	BGP-Details Network Neighbor Re BGP General Local Autonomous System	adistribution	Enañla	Disable
	BGP Information	145.50.2.1	BGP Version	4
	Synchronization	DISABLED	Auto-Summary	4 DISABLED
	BGP Log Neighbour-Changes	YES	Default-Metric	0
	BGP Default IPV4-Unicast	YES		
		Modify		
Status: CiscoRoutingFunctionality (no	ormal)		Dyn	amic updates are enabled

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.



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

-	Enable BGP	•
File Options Window Actions		<u>H</u> elp
Image: Chassis GSR12008-10.76.82.141	Local Autonomous System	
Status: CiscoRoutingFunctionality Status as of Fri Mar 21 18:01:26 2		nabled

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 1Open 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.



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.

	BGP Modify	r [
File Options Window		<u>H</u> elp
1 S 📥 🗏 🗗 🖌 💡 🤇		
Chassis		
GSR12012-10.76.82.139	Local AS	200
	BGP Identifier	100 . 19 . 18 . 10
	Synchronization	DISABLED <u>Y</u>
	Auto-Summary	DISABLED <u>_</u>
	BGP Log Neighbor Changes	YES <u>Y</u>
	BGP Default IPV4-Unicast	YES
	BGP Default Metric	2
Status: CiscoRoutingFunctionality (no	rmal)	Dynamic updates are enabled

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.



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.



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.



te 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.



e 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 1Right click on the chassis object and choose Configuration>BGP>BGPConfiguration. 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.

File Options Window Actions				He
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Chassis	BGP-Details Network Neighbo	or Redistribution		
GSR12016-10.76.82.138	, ,			
	BGP Network Information			
	Neighbor IP Address	Network Mask	Network Address	Path Origin
	0.0.0.0	32	2,2,2,2	incomplete
	0.0.0.0	32	9,9,9,89	incomplete
	0.0.0.0	27	10.76.82.128	incomplete
	0.0.0.0	24	11.11.11.0	incomplete
	0.0.0.0	24	12,55,55,0	incomplete
	0.0.0.0	32	45.45.45.1	incomplete
	0.0.0.0	32	70.70.70.1	incomplete
	0.0.0.0	24	125.50.2.0	incomplete
	0.0.0.0	32	130.30.3.3	incomplete 📈
			Add/Remove Net	work
-				
J.M.				
catus: CiscoRoutingFunctionality (nor	mal)		Dynar	nic updates are enabled
tatus as of Mon Apr 14 12:47:37 2003	 			

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.

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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.

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:

Actions

L

Step 1	BGP (the BGP Configuration window. See "Viewing the BGP Details Tab on the Configuration Window" section on page 14-4 for further details. Click on etwork tab.
Step 2	side o	se the chassis, for which you want to configure the BGP path, from the left f 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.

	GP Network Configurati	on r 🗆
File Options Window Actions		Help
i 🖇 🗏 🖪 🖌 💡 🤇		
Chassis		
GSR12016-10.76.82.138	Local AS	100
	Network Address	10.10.0
	Network Mask	
	Add N	letwork Entry
	Remov	e Network Entry
Status: CiscoRoutingFunctionality	(normal)	enabled

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.

	BGP C	onfiguration			•	
File Options Window Actions					<u>H</u> elp	
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Chassis						
GSR12016-10.76.82.138	BGP-Details Network Neighb	or Redistribution			(
	BGP Neighbor Informatio	BGP Neighbor Information				
	Neighbor IP Address	Neighbor ID	State	Negotiated Version		
	10.76.82.135	0.0.0.0	active	4		
					3	
			Add/	Remove Neighbor		
		_				
JJM						
atus: CiscoRoutingFunctionality (r	normal)			Dynamic updates are en	abled	
atus as of Mon Apr 14 12:48:28 20	07					

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).
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.

Actions

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.



te 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.

-	BGP Neighbor Configuration	•
File Options Window Actions		Help
i 🕄 🗏 🖪 🗸 💡 🔍		
Chassis		
GSR12016-10.76.82.138	Local AS 100	
	Neighbor IP Address 10 . 76 . 82 . 135	
	Neighbor Remote AS 200	
	Update-Source NO 🖂	
	Loopback	
	Add Neighbor Entry	
	Remove Neighbor Entry	
Status: CiscoRoutingFunctionality (no	rmal) Dyna	amic updates are enabled
		-
Status: CiscoRoutingFunctionality (no	rmal) Iyna	amic updates are enabled

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.

		BGP Configur	ation		•
ile Options Window Actions					Help
I 🚳 🔳 📑 🗸 🦿 🤨					
Chassis	BGP-Details Netwo	de Externational Roo	listribution		
GSR12016-10.76.82.138					1
		tion Information –			_
	Protocol	AS/Tag	IS-IS Routing Level	Redistribution Metric	_
	connected	none	none	123	
	isis	abcd	LEVEL-2	4567890	
	ospf	100	none	890	
	dvmrp	none	none	0	
					_
					≥
			Add/Remove	Redistribute	
tus: CiscoRoutingFunctionality (n	ormal)			Dynamic updates are er	abled

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.

	BGP Redistribute	e Configuration	• 🗆
File Options Window Actions			Help
XI 😂 🗏 📮 🖌 💡 🔍			
Chassis			
GSR12016-10.76.82.138	Local AS	100	
	Protocol	connected 🗵	
	Source ID		
	IS-IS Routing Level	X	
	Redistribution Metric	100]	
	[Add Redistribute Entry	
	-	Remove Redistribute Entry	
Status: CiscoRoutingFunctionality (n	ormal)	Dynamic updates are enabled	

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.

-	BGP Sta	tus		· []			
File Options Window				Help			
1 S = 🗗 🗸 💡 🔍							
Chassis GSR12012-10.76.82.139	BGP-Details Network Neighbor Re	edistribution					
	BGP General						
	Local Autonomous System	100					
	BGP Information						
	BGP Identifier	145.50.2.1	BGP Version	4			
	Synchronization	DISABLED	Auto-Summary	DISABLED			
	BGP Log Neighbour-Changes	YES	Default-Metric	0			
	BGP Default IPV4-Unicast	YES					
Status: CiscoRoutingFunctionality (no	Status: CiscoRoutingFunctionality (normal) Dynamic updates are enabled						
Status as of Tue Apr 15 10:13:46 200	3						

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.

e Options Window		9 Status		r He
				<u></u>
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Chassis	BGP-Details Network Neighbo	or Redistribution		
GSR12016-10.76.82.138				
	BGP Network Information			
	Neighbor IP Address	Network Mask	Network Address	Path Origin
	0.0.0	32	2,2,2,2	incomplete
	0.0.0	32	9.9.9.89	incomplete
	0.0.0.0	27	10.76.82.128	incomplete
	0.0.0.0	24	11.11.11.0	incomplete
	0.0.0	24	12,55,55,0	incomplete
	0.0.0	32	45.45.45.1	incomplete
	0.0.0	32	70.70.70.1	incomplete
	0.0.0	24	125.50.2.0	incomplete
	0.0.0	32	130,30,3,3	incomplete 📈

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.

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ile Options <u>W</u> indow					<u>H</u> elp
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	(
Chassis GSR12016-10.76.82.138	BGP-Details Network Neighbo	Pr Redistribution			
	BGP Neighbor Information	ı			
	Neighbor IP Address	Neighbor ID	State	Negotiated Version	
	172,138,66,1	60,60,60,1	established	4	
	192,168,50,3	78.9.9.0	established	4	
					3
$\overline{\nabla}$					
tus: CiscoRoutingFunctionality (normal)			Dynamic updates are ena	bled

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.

		BGP Stat	us		P
le Options <u>W</u> indow					Help
I 🏐 🗏 💽 🖌 💡 🔍					
Chassis GSR12016-10.76.82.138	BGP-Details Netwo	rk Neighbor Rec	listribution		
33KT2016-10.76.02.130	BGP Redistribu	tion Information –			
	Protocol	AS/Tag	IS-IS Routing Level	Redistribution Metric	
	connected	none	none	0	
	isis	abcd	LEVEL-2	4567890	
	ospf	100	none	890	
	dvmrp	none	none	0	
					_
$\overline{\nabla}$					
cus: CiscoRoutingFunctionality (n	ormal)			Dynamic updates are er	abled

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.



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.

	BCP Address-Family Synchronization	• 🗆
File Options Window Actions		Help
X 😂 🗏 🖸 🗸 🔍	Address Family Synchronization Synchronization Status Synchronization	Help
Chassis		
Status: CiscoRoutingFunctionality (normal Invoking controller action 'CiscoBgpAFSy		ed .

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

-	Action Report 🛛 🔽
ŀ	BGP Address-Family Synchronization Summary
:	Started Address Family Synchronization on 1 objects
	The following objects are in managed state ComponentManaged:/Site-1/GSR12410-10.76.82.143 : normal
	Action Summary: Synchronization was done successfully on the following objects: ComponentManaged:/Site-1/GSR12410-10.76.82.143
	Synchronization failed on the following objects
- 11	none Action Completed
F	
	Save

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

C BCP Address-Family Synchronization	· []
File Options Window Actions	<u>H</u> elp
Image: Signal State Image: Synchronization Synchronization Synchronization Synchronization Status BGP Address-Family Synchronization Summary Synchronization Issued on Chassis: GSR12016-10.76.82.138 Number of BGP Address-Families Present in Device: 44 Number of BGP Address-Families Present in CEMF: 47	
	updates are enabled
Status as of Mon Apr 14 12:13:52 2003	

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.

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Synchronization Status—Displays the status of the synchronization process.

Action

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



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-Redistribute Tab on the BGP Address-Family Configuration Window
- AF-Redistribute Tab—Detailed Description
- BGP Address Family—Redistribute Configuration
- BGP Address Family-Configure Redistribute Protocol—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.



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



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

	BGP Addres	s-Family Configuratio	n	- <u>-</u>
File Options Window Actions				<u>H</u> elp
t 🕄 🗏 📮 🗸 💡 🍳				
GSR12016-10.76.82.138	-General AF-Network	AF-Neighbor AF-Redis	stribute	
	Local Autonomous S	System 100		
	— BGP Address Family	Information		
Chassis	Address Family	ipv4 multicast	VRF Name	
10.76.82.138/jpv4 multicast 10.76.82.138/jpv4 unicast 10.76.82.138/jpv4 vrf %vrf-1 10.76.82.138/jpv4 vrf 88	Auto Summary Default Metric	Disabled 0	Synchronization	Disabled
10.76.82.138/ipv4 vrf JKJ 10.76.82.138/ipv4 vrf NYPD 10.76.82.138/ipv4 vrf Sanju-				
10.76.82.138/ipv4 vrf Shiva- 🗸	Мо	dify Address Family	Add/Remove Addre:	ss Family
Address Family				
Status: CiscoRoutingFunctionality (normal))		I	Dynamic updates are enabled
Status as of Mon Apr 14 12:23:36 2003				

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.



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.



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.

File Options Window Actions Help (1) £ 😫 Add/Remove Address Family Chassis GSR12016-10.76.82.138 Address Family ipv4 multicast Neighbor IP Address 12.12.12.1 Remote AS Send Community extended Update Source Loopback No Add Address Family **Remove Address Family** Status: CiscoRoutingFunctionality (normal) Dynamic updates are enabled 93071

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.



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.



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.



te 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.

-	BGP Address Fa	mily — Modify Address Famil	y Parameters	• []
File Options Window				<u>H</u> elp
1 🖇 🎦 🔳 💽 🖌 💡	٩			
Chassis	Address Family pv4 unicast Modify Address Family Address Family Auto Summary Synchronization	/ Parameters ipv4 unicast Disabled	VRF Name Default Metric	20
Status: CiscoRoutingFunctionality	(normal)		Dynamic	updates are enabled

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.



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.

Options Window Actions				
3 🔳 🗊 🖌 💡 🔍				
SR12016-10.76.82.138	AF-General AF-Network	AF-Neighbor AF-R	distribute	
	- Network Information -			
	Network Address	Prefix Len	Path Origin	Next Hop Ip Address
	2,2,2,2	32	incomplete	0.0.0.0
	9.9.9.89	32	incomplete	0.0.0
	10,76,82,128	27	incomplete	0.0.0.0
	11,11,11,0	24	incomplete	0.0.0.0
sis	12,55,55,0	24	incomplete	0.0.0.0
1.76.82.138/ipv4 multicast 🛛 🛆	45.45.45.1	32	incomplete	0.0.0.0
1.76.82.138/ipv4 unicast	70.70.70.1	32	incomplete	0.0.0.0
.76.82.138/ipv4 vrf 88				
.76.82.138/ipv4 vrf JKJ .76.82.138/ipv4 vrf NYPD				
.76.82.138/ipv4_vrf Sanju-				
.76.82.138/ipv4 vrf Shiva- 🗸				
			Add/Remove AF	Network
ess Family				
CiscoRoutingFunctionality (norm	al)			Dynamic updates are enabl

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

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.



- te 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.

-		BGP Address	s Family — Network Configurat	tion	• 🗆
File Options Wind	low <u>A</u> ctions				Help
Chassis	/ ? 0	Address Family ipv4 unicast			
		<			
		Add/Remove Network			
		Address Family	ipv4 unicast	VRF Name	
		Network Number	12.12.0.0	Network Mask	255 . 255 . 0 . 0
	Ā		Add Network Entry	Remove Ne	etwork Entry
tatus: CiscoRouting	Functionality (n	ormal)			Dynamic updates are enabled

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.

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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

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.

-	BGP Address—F	amily Configuration	n		•
File Options Window Actions					Help
GSR12016-10.76.82.138	AF-General AF-Network AF	-Neighbor AF-Redist	tribute		
	Neighbor Information				-
	Neighbor IP Address	Remote AS	Activate	Neighbor Send Communi	
	10,76,82,135	0	enabled	extended	
Chassis					
10.76.82.138/jpv4 multicast 10.76.82.138/jpv4 unicast 10.76.82.138/jpv4 vrf %vrf-1 10.76.82.138/jpv4 vrf 88 10.76.82.138/jpv4 vrf JKJ 10.76.82.138/jpv4 vrf NYPD 10.76.82.138/jpv4 vrf Sanju- 10.76.82.138/jpv4 vrf Shiva-				4	
Address Family			Add/Remove AF	Neighbor	
tatus: CiscoRoutingFunctionality (nc	'			Dynamic updates are enabl	ed

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.

-	BGP Address	s Family — Neighbor Configurati	on	• 🗆
File Options Window Actions				Help
λI 😂 ≡ 📴 🖌 💡 Φ				
Chassis	Address Family			
GSR12016-10.76.82.138	ipv4 unicast			
	Add/Remove Neighbor -			
	Address Family	ipv4 unicast	VRF Name	
	Neighbor IP Address	11 . 12 . 12 . 11	Remote AS	100
	Send Community	standard 🗵	Update Source	YES
	Loopback No	0		
		Add Neighbor Entry	Remove Neighb	or Entry
Status: CiscoRoutingFunctionality (n	ormal)		Dy	namic updates are enabled

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.



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.



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.

le Options Window Actions					Hel
IS I D 🗸 ? 🔍					
GSR12016-10.76.82.138	AF-General AF-Ne		oor AF-Redistribute		
	Protocol	AS/Tag	IS-IS Route Level	Redistribution Metric	
	connected	none	none	123	
	isis	abcd	level-2	4567890	
	dvmrp	none	none	0	
Chassis					
10.76.82.138/ipv4 multicast					
10.76.82.138/ipv4 unicast 10.76.82.138/ipv4 vrf %vrf-1					
10.76.82.138/ipv4 vrf 88					
10.76.82.138/ipv4 vrf JKJ 10.76.82.138/ipv4 vrf NYPD					
10.76.82.138/ipv4 vrf Sanju-					
10.76.82.138/ipv4 vrf Shiva- 🗸					
			Add/Remove	AF Redistribute	
Address Family					
and Charlen Dankin English and in the				Dynamic updates are e	nabled
atus: CiscoRoutingFunctionality (norm					

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.

🗁 BCP Address Family - Redistribute Configuration	• 🗆
File Options Window Actions	Help
치 😂 ≡ 🗊 🖌 💡 🔍	
Chassis Address Family	
GSR12016-10.76.82.138	
Add/Remove Redistribution Information	
Address Family ipv4 unicast VRF Name	
Protocol Ospf Z IS-IS Routing Level Z	
Source ID 100 Metric 890	
Add Redistribute Entry Remove Redistribute Entry	
Status: CiscoRoutingFunctionality (normal) Dynamic updates are enable	d

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.



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.

-	BGP Address-	-Family Status		· 🗆
File Options <u>Wi</u> ndow				Help
	AF-General AF-Network AF-N	eighbor AF-Redistrib	ute	
GSR12016-10.76.82.138	BGP General Local Autonomous System BGP Address Family Inform			
Chassis	Address Family Auto Summary Default Metric	ipv4 unicast Disabled 0	VRF Name Synchronization	Disabled
Status: CiscoRoutingFunctionality (norm Status as of Mon Apr 14 13:46:26 2003	al)		Dynar	nic updates are enabled
Juanus as of Hori Hpr. 14 13;40;20 2003				

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.

	BGP Add	ress-Family Status			
ile Options <u>W</u> indow					Hel
I 😂 🗏 📮 🖌 💡 🍳					
GSR12016-10.76.82.138	AF-General AF-Network	AF-Neighbor AF-R	edistribute		
	- Network Information -				
	Network Address	Prefix Len	Path Origin	Next Hop Ip Address	
	2,2,2,2	32	incomplete	0.0.0.0	
	9,9,9,89	32	incomplete	0.0.0.0	
	10,76,82,128	27	incomplete	0.0.0.0	
	11,11,11,0	24	incomplete	0.0.0.0	
Chassis	12,55,55,0	24	incomplete	0.0.0	
ipv4 multicast	45.45.45.1	32	incomplete	0.0.0	
ipv4 unicast ipv4 vrf %vrf-12	70.70.70.1	32	incomplete	0.0.0.0	
ipv4 vrf 88					
ipv4 vrf JKJ					
ipv4 vrf NYPD ipv4 vrf Sanju-1					
ipv4 vrf Shiva-1 🗸					
Address Family					
atus: CiscoRoutingFunctionality (norm	al)			Dynamic updates are enab	led
tatus as of Mon Apr 14 13:45:26 2003					

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.

	BGP Addres	s-Family Status			
e Options <u>Wi</u> ndow					Help
I 🏐 🔳 💽 🖌 💡 🔍					
GSR12016-10.76.82.138	AF-General AF-Network AF-	-Neighbor AF-Redist	ribute		
G3AT2016-10.76.02.130	Neighbor Router Information	on			
	Neighbor IP Address	Remote AS	Activate	Neighbor Send Communi	
	1,2,3,4	45	enabled	extended	
	192,168,50,3	200	enabled	extended	
Chassis					
ipv4 multicast					
ipv4 unicast					
ipv4 vrf %vrf-12 ipv4 vrf 88					
ipv4 vrf JKJ					
ipv4 vrf NYPD					
ipv4 vrf Sanju-1					
ipv4 vrf Shiva-1 🕎					
Address Family					
ridarcoo r anniy					
atus: CiscoRoutingFunctionality (nor				Dynamic updates are enab.	lad
acus; ciscokoucingFunctionality (nor	10017			bynamic updates are enab.	reu

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.

	l.	3GP Address—Fami	ly Status		· · [
ile Options <u>Wi</u> ndow					Help
I 😂 🔳 🖬 🖌 💡 🔍					
	AF-General AF-Ne	twork AF-Neight	oor AF-Redistribute		
GSR12016-10.76.82.138	– Redistribute Inf				
	Protocol	AS/Tag	IS-IS Route Level	Redistribution Metric	
	connected	none	none	0	
	isis	abcd	level-2	4567890	
	ospf	100	none	890	
	dvmrp	none	none	0	
Chassis					
ipv4 multicast					
ipv4 unicast					
ipv4 vrf 88					
ipv4 vrf JKJ					
ipv4 vrf NYPD ipv4 vrf Sanju-1					
ipv4 vrf Shiva-1					
Address Family					
Address Family					
atus: CiscoRoutingFunctionality (norm	al)			Dynamic updates are e	nabled

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.

-	USPF Configuration	· L
File Options Window Actions		Help
	Config Network Add OSPF Process ID OSPF Process OSPF Process OSPF Process Coder cosp 10 router cosp 777 router cosp 756 router cosp 73 router cosp 12	
Chassis	Remove OSPF Processes	
Chassis		
Status: CiscoRoutingFunctionality (nabled
Status as of Tue Apr 8 23:40:03 2	003	nabieu .

Figure 14-31 OSPF Configuration Window

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

Config Tab—Detailed Description

chassis.

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

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 1Open 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
--------	-------	--------	--------

Action Report	· 🗆
Result of Adding OSPF on the selected devices	
Action Summary: No of Object Processed: 1	
Successes: 1	
Failures : 0	
The Following object succeeded:	
ComponentManaged:/Site-1/GSR12406-10.76.82.142	2
The following objects failed:	
None	
Action Completed	
	L.
<u>S</u> ave	Close



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

Action Report	
ocesses Removed : 1	Δ
ct succeeded:	
d:/Site-1/GSR12406-10.76.82.1	42
is failed:	
	Gose
	Objects Processed : 1 ocesses Removed : 1 : 0 :t succeeded:



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.

		OSPF Configuration			• •
File Options Window Actions					Help
XI SS 📮 🖌 📍 🔍					
GSR12406-10.76.82.142	Config Network				
	Ospf Network —				
	Process ID	Network Number	Network Mask	Area ID	
	10	10,10,10,0	0.0.0.255	10	
		Configu	ire Network		
Chassis					
Status: CiscoRoutingFunctionality (no	rmal)			Dynamic updates are	enabled

Figure 14-35 OSPF Configuration Window—Network Tab

Network Tab—Detailed Description

The Network tab displays a single area, Ospf Network.



Ospf Network

Action

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.

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.

Configure Network	• 🗆
File Options Window Actions	Help
≵∎≪⊈ ? 0	
GSR12008-141	
Process ID 10 Network Number 10 . 10 . 0	
Network Mask 255 , 255 , 0 Area ID 10	
Add Network	
Remove Network	
Status: CiscoRoutingFunctionality (normal) Dynamic updates are enab	ed

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
--------	-------	--------	--------

Action Report	• •
Result of Enabling OSPF on the selected devices Action Summary: No of Object Processed: 1 Successes: 1 Failures : 0	
The Following object succeeded: ComponentManaged:/Site-1/GSR12406-10.76.82.14	2
The following objects failed: None Action Completed	$\overline{\nabla}$
Save	Close

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
--------	-------	--------	--------

-	Action Report 🔤
F	esult of Removing Network for an OSPF process on the selected devi 🖾
- -	Action Summary:
N	lumber Of Chassis Objects Processed : 1
	lumber of OSPF Networks Removed : 1 lumber of Failures : 0
Т	he Following object succeeded:
	ComponentManaged:/Site=1/GSR12406=10.76.82.142
	he fellowing shieds feiled.
	he following objects failed: lone
A	ction Completed
-	
	Save

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 1Right 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.

		OSPF Status		r [
le Options <u>Wi</u> ndow				<u>H</u> elp
S 🖸 🖌 💡 🔍				
GSR12012-10.76.82.133	General Group Process In	ormation Area I	nterface Neighbor Link State Host	
GSR12016-10.76.82.132 GSR12406-10.76.82.135 GSR12416-10.76.82.131	General			
	Router	ID	33.3.3.3	
	Versio	1	2	
	TOS S	upport	false	
	Extern	al LSA Count	0	
	Origin	ted New LSA Cour	nt O	
	Admin	Status	enabled	
	Receiv	ed New LSA Count	. 0	
	AS Bo	der Router	No	
	Area E	order Router	No	
V	Extern	alLSA Checksum	0	
Chassis				
cus: CiscoRoutingFunctionality (normal)		Dynami	c updates are enabled
tus: LiscoKoutingFunctionality (normal)		Dynami	c updates are enabled

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).

		OSPF Status			
Options <u>Window</u>					<u> </u>
🛿 📴 🖌 💡 🔍					
	General Groun Proce	ess Information Area II	terface Neighbor Li	ink State Host	
R12012-10.76.82.133	acherar aroup 1		iteridee Heighber Li		
R12406-10.76.82.135 R12416-10.76.82.131	- Process Summa	ary			
10/12/10/10/10/10/10/10/10/10/10/10/10/10/10/	Process Id	Router Id	Domain Id	No. of Areas Configure	ed Nor
	3456	4.4.4	None	0	0 💾
	334	10,76,82,132	None	0	0
	33	12,55,55,55	None	1	1 -
	333	6.7.6.7	0.0.1.77	1	1
	202	91.91.1.1	0.0.0202	0	0
	77	85,80,5,1	None	0	0
	<u></u>	<u></u>			
	Network Details	3			
	Process Id	N/w IP Address	Subnet mask	Area Id	VRF Associa
	5	52,52,52,0	0.0.0.0	5	None
	1	-	-	-	None
	4	-	-	-	None
	3	-	-	-	None
	2	2.0.0.0	0,255,255,255	100	None
	2	10,10,10,5	0.0.0.0	0	None
				LEEREN KERKER KERKER KERKER KERKER KERKER Konnen kerker kerker kerker kerker (
ssis					
: CiscoRoutingFunctionality (nor	mal)			Dynar	nic updates are enabled

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.

		OSPI	= Status					
Options <u>Window</u>								He
S 📮 🖌 💡 🔍								
SR12016-150.150.10.10	General Group	Process Information	Area Interfac	e Neighbor I	.ink State H	lost		
	Area							
	OSPF Area	ID Auth Ty	pe In	nport AS Extern	S	PF Runs	Area Borde	er Rou
	1.2.3.4	1	tr	ue	19	999	675	4
	1,2,3,5	1	tr	ue	20)52	728	
	1,2,3,6	1	tr	ue	19	336	1104	
	1,2,3,7	1	tr	ue	20)14	923	
				565655555				
	Stub Area -							
	Stub TOS	Stub Area II) Sta	ıb Metric	Stub St	atus		
	1	1.2.3.4	1		valid			
	2	1,2,3,4	1		valid			
	3	1.2.3.4	1		valid			
	4	1.2.3.4	1		valid			
	5	1971	1		bileu			∇
	Area Range							
	Area Range	ID Area R	ange Net	Area Range	Mask	Area Rang	e Status	
	1,2,3,4	1.2.3.4		1,2,3,4		valid		
	1,2,3,4	1.2.3.5		1,2,3,4		valid		
	1,2,3,4	1,2,3,6		1.2.3.4		valid		
	1.2.3.4	1,2,3,7		1.2.3.4		valid		
	1224	1 7 7 9		1971		hileu		
assis								
s: CiscoRoutingFunctionality (normal)					Dynami	c updates are e	nabled

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.

S 🗗 🖌 💡 🔍				
	General Group Process Infor	mation Area Interface Neighbo	r Link State Host	
SR12016-150.150.10.10	Interface	induon [fined]		
	Addressless Interface	Interface IP Address	Interface Area ID	Interface Type
	FastEthernet4/4	1.2.3.4	1.2.3.4	broadcast
	FastEthernet4/5	1.2.3.4	1.2.3.4	broadcast
	FastEthernet4/6	1.2.3.4	1.2.3.4	broadcast
	FastEthernet4/7	1.2.3.4	1.2.3.4	broadcast 🗸
	Interface Metric			
	Addressless Interface	Interface Metric TOS	Interface Metric IP Addr	ress Metr
	Ethernet0	1	1,2,3,4	1
	Ethernet0	2	1.2.3.4	1
	Ethernet0	3	1.2.3.4	1
	Ethernet0	4	1.2.3.4	1 🔽
				N
	Virtual Interface	15-1-1	16 L L C T	
	Vir Interface Neighbor	Vir Interface Area ID	Vir Interface Transit D	
	1.2.3.4	1.2.3.4	1	1 台
	1.2.3.5	1.2.3.4	1	1
	1,2,3,6	1,2,3,4	1	1
	1,2,3,7	1,2,3,4	1	1 7
assis				
hassis				

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.

I

		OSPF Status			
Options <u>Wi</u> ndow					He
S 🔁 🖌 💡 🔍					
	General Groun Process In	nformation Area Interface	Neighbor Link Sta	te Host	
SR12016-150.150.10.10					
	Neighbor				
	Neighbor IP Address	Addressless Interfa	ce Neigh	bor Router ID	Neighbor Optio
	1.2.3.4	FastEthernet4/4	1,2,3	.4	1
	1,2,3,4	FastEthernet4/5	1,2,3	.4	1
	1.2.3.4	FastEthernet4/6	1,2,3	.4	1
	1.2.3.4	FastEthernet4/7	1,2,3	.4	1
	1.2.3.4	GigabitEthernet14/0	1,2,3	.4	1
	1.2.3.4	GigabitEthernet14/1	1,2,3	.4	1
	1.2.3.4	GigabitEthernet14/2	1,2,3	.4	1
					M
	Virtual Neighbor				
	Vir Nbr Area	Vir Nbr Router ID	Vir Nbr IpAddr	Vir Nbr Optic	ons Vir
	1.2.3.4	1.2.3.4	1.2.3.4	1	dow 🗠
	1.2.3.4	1.2.3.5	1.2.3.4	1	dow
	1.2.3.4	1,2,3,6	1,2,3,4	1	dow
	1.2.3.4	1.2.3.7	1.2.3.4	1	dow
	1,2,3,4	1.2.3.8	1.2.3.4	1	dow
	1.2.3.4	1.2.3.9	1.2.3.4	1	dow
	1.2.3.4	1.2.3.10	1.2.3.4	1	dow
assis			anennan		Þ
				_	
s: CiscoRoutingFunctionality (norm	ial)			Dynamic u	pdates are enabled

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.

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le Options <u>Wi</u> ndow					He
S 🗳 💽 🖌 💡 🔍					
	General Group Proces	ss Information Area Inte	rface Neighbor Lif	k State Host	
GSR12016-150.150.10.10	General Group 110ce.	ss moniation Area me	nace Neighbor =		
	- Lsdb				
	LSDB LSID	LSDB RouterID	LSDB Type	LSDB Area ID	LSDB Sec
	1.2.3.4	1.2.3.4	routerLink	1.2.3.4	1
	1.2.3.4	1.2.3.5	routerLink	1.2.3.4	1
	1.2.3.4	1,2,3,6	routerLink	1.2.3.4	1
	1.2.3.4	1,2,3,7	routerLink	1.2.3.4	1
	1.2.3.4	1.2.3.8	routerLink	1.2.3.4	1
	1.2.3.4	1.2.3.9	routerLink	1.2.3.4	1
	1.2.3.4	1,2,3,10	routerLink	1,2,3,4	1
	1.2.3.4	1,2,3,11	routerLink	1.2.3.4	1
	1.2.3.4	1.2.3.12	routerLink	1.2.3.4	1
	1.2.3.4	1,2,3,13	routerLink	1.2.3.4	1
	1,2,3,4	1,2,3,14	routerLink	1,2,3,4	1
	1.2.3.4	1.2.3.15	routerLink	1.2.3.4	1
	1.2.3.4	1,2,3,16	routerLink	1.2.3.4	1
_	1.2.3.4	1.2.3.17	routerl ink	1.2.3.4	
hassis					
atus: CiscoRoutingFunctionality (normal)			Dynam:	ic updates are enabled

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.

		OSPI	= Status			2
e Options <u>Wi</u> ndow						<u>H</u> el
S 🔁 🖌 💡 🔍						
GSR12016-150.150.10.10	General Group	Process Information	Area Interface	Neighbor Link State	Host	
aski2016-150.150.10.10					J	
	Hosts					
	Hos	t TOS Host	IP Address	Host Metric	Host Status	
	1	1,2,3	3.4	1	valid	
	2	1.2.3	3.4	1	valid	
	3	1,2,3	3.4	1	valid	
	4	1,2,3	3.4	1	valid	
	5	1.2.3	3.4	1	valid	
	6	1,2,3	3.4	1	valid	
	7	1,2,3	3.4	1	valid	
	8	1,2,3	3.4	1	valid	
	9	1,2,3	3.4	1	valid	
	10	1,2,3	3.4	1	valid	
	11	1,2,3	3.4	1	valid	
	12	1,2,3	3.4	1	valid	
	13	1,2,3	3.4	1	valid	
	14	1,2,3	3.4	1	valid	
- V						
hassis						
us: CiscoRoutingFunctionality (nor	rmal)				Dunamic upda	ates are enabled
in the second seco					23.13.129 dpdd	

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".
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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.

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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.

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	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

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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.

