BGP 4 Soft Configuration

BGP4 soft configuration allows BGP4 policies to be configured and activated without clearing the BGP session, hence without invalidating the forwarding cache.

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Finding Feature Information

Your software release may not support all the features documented in this module. For the latest caveats and feature information, see Bug Search Tool and the release notes for your platform and software release. To find information about the features documented in this module, and to see a list of the releases in which each feature is supported, see the feature information table at the end of this module.

Use Cisco Feature Navigator to find information about platform support and Cisco software image support. To access Cisco Feature Navigator, go to www.cisco.com/go/cfn. An account on Cisco.com is not required.

Information About BGP 4 Soft Configuration

BGP Session Reset

Whenever the routing policy changes due to a configuration change, BGP peering sessions must be reset by using the clear ip bgp command. Cisco software supports the following three mechanisms to reset BGP peering sessions:

- Hard reset—A hard reset tears down the specified peering sessions including the TCP connection and deletes routes coming from the specified peer.

- Soft reset—A soft reset uses stored prefix information to reconfigure and activate BGP routing tables without tearing down existing peering sessions. Soft reconfiguration uses stored update information, at the cost of additional memory for storing the updates, to allow you to apply new BGP policy without disrupting the network. Soft reconfiguration can be configured for inbound or outbound sessions.
• Dynamic inbound soft reset—The route refresh capability, as defined in RFC 2918, allows the local
device to reset inbound routing tables dynamically by exchanging route refresh requests to supporting
peers. The route refresh capability does not store update information locally for nondisruptive policy
changes. It instead relies on dynamic exchange with supporting peers. Route refresh must first be advertised
through BGP capability negotiation between peers. All BGP devices must support the route refresh
capability. To determine if a BGP device supports this capability, use the **show ip bgp neighbors**
command. The following message is displayed in the output when the device supports the route refresh
capability:

```
Received route refresh capability from peer.
```

The **bgp soft-reconfig-backup** command was introduced to configure BGP to perform inbound soft
reconfiguration for peers that do not support the route refresh capability. The configuration of this command
allows you to configure BGP to store updates (soft reconfiguration) only as necessary. Peers that support the
route refresh capability are unaffected by the configuration of this command.

# How to Configure BGP 4 Soft Configuration

## Configuring Inbound Soft Reconfiguration When Route Refresh Capability Is Missing

Perform this task to configure inbound soft reconfiguration using the **bgp soft-reconfig-backup** command
for BGP peers that do not support the route refresh capability. BGP peers that support the route refresh
capability are unaffected by the configuration of this command. Note that the memory requirements for storing
the inbound update information can become quite large.

### SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **router bgp autonomous-system-number**
4. **bgp log-neighbor-changes**
5. **bgp soft-reconfig-backup**
6. **neighbor {ip-address | peer-group-name} remote-as autonomous-system-number**
7. **neighbor {ip-address | peer-group-name} soft-reconfiguration [inbound]**
8. **neighbor {ip-address | peer-group-name} route-map map-name {in | out}**
9. Repeat Steps 6 through 8 for every peer that is to be configured with inbound soft reconfiguration.
10. **exit**
11. **route-map map-name [permit | deny] [sequence-number]**
12. **set ip next-hop ip-address**
13. **end**
14. **show ip bgp neighbors [neighbor-address]**
15. **show ip bgp [network] [network-mask]**
<table>
<thead>
<tr>
<th>Step</th>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
</table>
| **Step 1** | enable | Enables privileged EXEC mode.  
  Example:  
  Device> enable  
  * Enter your password if prompted. |
| **Step 2** | configure terminal | Enters global configuration mode.  
  Example:  
  Device# configure terminal |
| **Step 3** | router bgp **autonomous-system-number** | Enters router configuration mode for the specified routing process.  
  Example:  
  Device(config)# router bgp 45000 |
| **Step 4** | bgp log-neighbor-changes | Enables logging of BGP neighbor resets.  
  Example:  
  Device(config-router)# bgp log-neighbor-changes |
| **Step 5** | bgp soft-reconfig-backup | Configures a BGP speaker to perform inbound soft reconfiguration for peers that do not support the route refresh capability.  
  Example:  
  Device(config-router)# bgp soft-reconfig-backup  
  * This command is used to configure BGP to perform inbound soft reconfiguration for peers that do not support the route refresh capability. The configuration of this command allows you to configure BGP to store updates (soft reconfiguration) only as necessary. Peers that support the route refresh capability are unaffected by the configuration of this command. |
| **Step 6** | neighbor {ip-address | peer-group-name} remote-as **autonomous-system-number** | Adds the IP address of the neighbor in the specified autonomous system to the IPv4 multiprotocol BGP neighbor table of the local device.  
  Example:  
  Device(config-router)# neighbor 192.168.1.2 remote-as 40000 |
| **Step 7** | neighbor {ip-address | peer-group-name} soft-reconfiguration [inbound] | Configures the Cisco software to start storing updates.  
  Example:  
  Device(config-router)# neighbor 192.168.1.2 soft-reconfiguration inbound  
  * All the updates received from this neighbor will be stored unmodified, regardless of the inbound policy. When inbound soft reconfiguration is done later, the stored information will be used to generate a new set of inbound updates. |
### Purpose

**Command or Action**

| Step 8 | neighbor {ip-address | peer-group-name} route-map map-name {in | out} | Applies a route map to incoming or outgoing routes.  
  • In this example, the route map named LOCAL will be applied to incoming routes. |
<table>
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<tr>
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</thead>
<tbody>
<tr>
<td>Example:</td>
<td>Device(config-router)# neighbor 192.168.1.2 route-map LOCAL in</td>
<td></td>
</tr>
<tr>
<td>Step 9</td>
<td>Repeat Steps 6 through 8 for every peer that is to be configured with inbound soft reconfiguration.</td>
<td></td>
</tr>
<tr>
<td>Step 10</td>
<td>exit</td>
<td>Exits router configuration mode and enters global configuration mode.</td>
</tr>
<tr>
<td>Example:</td>
<td>Device(config-router)# exit</td>
<td></td>
</tr>
</tbody>
</table>
| Step 11 | route-map map-name [permit | deny] [sequence-number] | Configures a route map and enters route-map configuration mode.  
  • In this example, a route map named LOCAL is created. |
| Example: | Device(config)# route-map LOCAL permit 10 |  |
| Step 12 | set ip next-hop ip-address | Specifies where output packets that pass a match clause of a route map for policy routing.  
  • In this example, the ip address is set to 192.168.1.144. |
| Example: | Device(config-route-map)# set ip next-hop 192.168.1.144 |  |
| Step 13 | end | Exits route-map configuration mode and enters privileged EXEC mode. |
| Example: | Device(config-route-map)# end |  |
| Step 14 | show ip bgp neighbors [neighbor-address] | (Optional) Displays information about the TCP and BGP connections to neighbors. |
| Example: | Device# show ip bgp neighbors 192.168.1.2 | **Note** Only the syntax applicable to this task is used in this example. For more details, see the *Cisco IOS IP Routing: BGP Command Reference*. |
| Step 15 | show ip bgp [network] [network-mask] | (Optional) Displays the entries in the BGP routing table. |
| Example: | Device# show ip bgp | **Note** Only the syntax applicable to this task is used in this example. For more details, see the *Cisco IOS IP Routing: BGP Command Reference*. |
Examples

The following partial output from the `show ip bgp neighbors` command shows information about the TCP and BGP connections to the BGP neighbor 192.168.2.1. This peer supports route refresh.

BGP neighbor is 192.168.1.2, remote AS 40000, external link
Neighbor capabilities:
  Route refresh: advertised and received(new)

The following partial output from the `show ip bgp neighbors` command shows information about the TCP and BGP connections to the BGP neighbor 192.168.3.2. This peer does not support route refresh so the soft-reconfig inbound paths for BGP peer 192.168.3.2 will be stored because there is no other way to update any inbound policy updates.

BGP neighbor is 192.168.3.2, remote AS 50000, external link
Neighbor capabilities:
  Route refresh: advertised

The following sample output from the `show ip bgp` command shows the entry for the network 172.17.1.0. Both BGP peers are advertising 172.17.1.0/24, but only the received-only path is stored for 192.168.3.2.

BGP routing table entry for 172.17.1.0/24, version 11
Paths: (3 available, best #3, table Default-IP-Routing-Table, RIB-failure(4))
Flag: 0x820
Advertised to update-groups:
  1
  50000
  192.168.3.2 from 192.168.3.2 (172.17.1.0)
    Origin incomplete, metric 0, localpref 200, valid, external
  50000, (received-only)
  192.168.3.2 from 192.168.3.2 (172.17.1.0)
    Origin incomplete, metric 0, localpref 100, valid, external
  40000
  192.168.1.2 from 192.168.1.2 (172.16.1.0)
    Origin incomplete, metric 0, localpref 200, valid, external, best

Configuration Examples for BGP 4 Soft Configuration

Examples: BGP Soft Reset

The following examples show two ways to reset the connection for BGP peer 192.168.1.1.

Example: Dynamic Inbound Soft Reset

The following example shows the command used to initiate a dynamic soft reconfiguration in the BGP peer 192.168.1.1. This command requires that the peer support the route refresh capability.

```
clear ip bgp 192.168.1.1 soft in
```
**Example: Inbound Soft Reset Using Stored Information**

The following example shows how to enable inbound soft reconfiguration for the neighbor 192.168.1.1. All the updates received from this neighbor will be stored unmodified, regardless of the inbound policy. When inbound soft reconfiguration is performed later, the stored information will be used to generate a new set of inbound updates.

```
router bgp 100
  neighbor 192.168.1.1 remote-as 200
  neighbor 192.168.1.1 soft-reconfiguration inbound
```

The following example clears the session with the neighbor 192.168.1.1:

```
clear ip bgp 192.168.1.1 soft in
```

**Additional References**

**Related Documents**

<table>
<thead>
<tr>
<th>Related Topic</th>
<th>Document Title</th>
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<tbody>
<tr>
<td>Cisco IOS commands</td>
<td>Cisco IOS Master Command List, All Releases</td>
</tr>
<tr>
<td>BGP commands</td>
<td>Cisco IOS IP Routing: BGP Command Reference</td>
</tr>
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**Standards and RFCs**

<table>
<thead>
<tr>
<th>Standard/RFC</th>
<th>Title</th>
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<tbody>
<tr>
<td>RFC 2918</td>
<td>Route Refresh Capability for BGP-4</td>
</tr>
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**Technical Assistance**

<table>
<thead>
<tr>
<th>Description</th>
<th>Link</th>
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<tbody>
<tr>
<td>The Cisco Support and Documentation website provides online resources to</td>
<td><a href="http://www.cisco.com/cisco/web/support/index.html">http://www.cisco.com/cisco/web/support/index.html</a></td>
</tr>
<tr>
<td>download documentation, software, and tools. Use these resources to install</td>
<td></td>
</tr>
<tr>
<td>and configure the software and to troubleshoot and resolve technical issues</td>
<td></td>
</tr>
<tr>
<td>with Cisco products and technologies. Access to most tools on the Cisco</td>
<td></td>
</tr>
<tr>
<td>Support and Documentation website requires a Cisco.com user ID and password.</td>
<td></td>
</tr>
</tbody>
</table>

**Feature Information for BGP 4 Soft Configuration**

The following table provides release information about the feature or features described in this module. This table lists only the software release that introduced support for a given feature in a given software release train. Unless noted otherwise, subsequent releases of that software release train also support that feature.
Use Cisco Feature Navigator to find information about platform support and Cisco software image support. To access Cisco Feature Navigator, go to http://www.cisco.com/go/cfn. An account on Cisco.com is not required.

**Table 1: Feature Information for BGP 4 Soft Configuration**

<table>
<thead>
<tr>
<th>Feature Name</th>
<th>Releases</th>
<th>Feature Information</th>
</tr>
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<tbody>
<tr>
<td>BGP 4 Soft Configuration</td>
<td>Cisco IOS XE Release 2.1</td>
<td>BGP 4 Soft Configuration allows BGP4 policies to be configured and activated without clearing the BGP session, hence without invalidating the forwarding cache. This feature was introduced on the Cisco ASR 1000 Series Routers.</td>
</tr>
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</table>