



## BGP—Selective Route Download

The BGP—Selective Route Download feature allows a network administrator to selectively download some or none of the BGP routes into the Routing Information Base (RIB). The primary application for this feature is to suppress the unnecessary downloading of certain BGP routes to the RIB or Forwarding Information Base (FIB) on a dedicated route reflector, which propagates BGP updates without carrying transit traffic. The feature thereby helps to maximize resources available and to improve routing scalability and convergence on the dedicated route reflector.

- [Information About BGP—Selective Route Download, on page 1](#)
- [How to Selectively Download BGP Routes, on page 2](#)
- [Configuration Examples for BGP—Selective Route Download, on page 5](#)
- [Additional References for Selective Route Download, on page 7](#)
- [Feature Information for Selective Route Download, on page 7](#)

## Information About BGP—Selective Route Download

### Dedicated Route Reflector Does Not Need All Routes

The role of a dedicated route reflector (RR) is to propagate BGP updates without participating in the actual forwarding of transit traffic. That means the RR does not need to have all BGP routes downloaded into its RIB or FIB. It is beneficial for the RR to preserve its resources by not processing and storing those routes.

By default, BGP routes are downloaded to the RIB. To save resources on a dedicated route reflector, such downloading can be reduced or prevented by configuring a table map. A table map is so named because it controls what is put into the BGP routing table.

A table map references a route map, in this context to control the downloading of routes. A table map can be used in other features, such as the BGP Policy Accounting Output Interface Accounting feature.

It is important to understand the use of the **filter** keyword in the **table-map** command.

- When the **table-map** command is used *without* the **filter** keyword, the route map referenced in the **table-map** command is used to set certain properties (such as the traffic index) of the routes for installation into the RIB. The route is always downloaded, regardless of whether it is permitted or denied by the route map.

- When the **table-map** command is used *with* the **filter** keyword, the route map referenced is also used to control whether a BGP route is to be downloaded to the RIB (hence the filter). A BGP route is not downloaded to the RIB if it is denied by the route map.

Note that the Selective Route Download feature is not applicable to Multiprotocol Label Switching (MPLS) Layer 3 VPN because the route download is already automatically suppressed on a route reflector.

## Benefits of Selective Route Download

The BGP—Selective Route Download feature allows a network administrator to selectively download some or none of the BGP routes into the Routing Information Base (RIB). The primary application for this feature is to suppress the unnecessary downloading of certain BGP routes to the RIB or Forwarding Information Base (FIB) on a dedicated route reflector, which propagates BGP updates without carrying transit traffic. The feature thereby helps to maximize resources available and to improve routing scalability and convergence on the dedicated route reflector.

## How to Selectively Download BGP Routes

### Suppressing the Downloading of All BGP Routes on a Dedicated RR

Perform this task on a dedicated route reflector (RR) to prevent all BGP routes from being downloaded to the RIB, and thereby save resources.

#### SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **route-map** *route-map-name* **deny** [*sequence-number*]
4. **exit**
5. **router bgp** *as-number*
6. **address-family ipv4 unicast**
7. **table-map** *route-map-name* **filter**
8. **end**
9. **clear ip bgp ipv4 unicast table-map**

#### DETAILED STEPS

##### Procedure

|        | Command or Action                                          | Purpose                                                                                                                   |
|--------|------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|
| Step 1 | <b>enable</b><br><br><b>Example:</b><br><br>Router> enable | Enables privileged EXEC mode.<br><br><ul style="list-style-type: none"> <li>• Enter your password if prompted.</li> </ul> |

|               | Command or Action                                                                                                             | Purpose                                                                                                                                                                                                                                                                                              |
|---------------|-------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Step 2</b> | <b>configure terminal</b><br><b>Example:</b><br><br>Router# configure terminal                                                | Enters global configuration mode.                                                                                                                                                                                                                                                                    |
| <b>Step 3</b> | <b>route-map route-map-name deny [sequence-number]</b><br><b>Example:</b><br><br>Router(config)# route-map bgp-to-rib deny 10 | Enters route map configuration mode to configure a route map.<br><br>• In this example, the route map named bgp-to-rib denies all routes.                                                                                                                                                            |
| <b>Step 4</b> | <b>exit</b><br><b>Example:</b><br><br>Router(config-route-map)# exit                                                          | Exits route-map configuration mode and enters global configuration mode.                                                                                                                                                                                                                             |
| <b>Step 5</b> | <b>router bgp as-number</b><br><b>Example:</b><br><br>Router(config)# router bgp 100                                          | Enters router configuration mode and creates a BGP routing process.                                                                                                                                                                                                                                  |
| <b>Step 6</b> | <b>address-family ipv4 unicast</b><br><b>Example:</b><br><br>Router(config-router)# address-family ipv4 unicast               | Enters address family configuration mode to configure BGP peers to accept address-family-specific configurations.                                                                                                                                                                                    |
| <b>Step 7</b> | <b>table-map route-map-name filter</b><br><b>Example:</b><br><br>Router(config-router-af)# table-map bgp-to-rib filter        | Specifies a route map that filters what goes into the BGP routing table (the Routing Information Base [RIB]).<br><br>• The routes that are permitted by the route map are downloaded into the RIB.<br>• The routes that are denied by the route map are filtered from (not downloaded into) the RIB. |
| <b>Step 8</b> | <b>end</b><br><b>Example:</b><br><br>Router(config-router-af)# end                                                            | Exits address family configuration mode and enters privileged EXEC mode.                                                                                                                                                                                                                             |
| <b>Step 9</b> | <b>clear ip bgp ipv4 unicast table-map</b><br><b>Example:</b><br><br>Router# clear ip bgp ipv4 unicast table-map              | Reloads the BGP RIB after the table map or the route map is configured or changed in order to put the changes into effect.                                                                                                                                                                           |

## Selectively Downloading BGP Routes on a Dedicated RR

Perform this task on a dedicated route reflector (RR) to selectively download BGP routes to the RIB. When the externally connected routes are carried in BGP, it is necessary to download these routes to the RIB for

next hop resolution on the RR. One scalable approach to accomplish the selective route download is to use a BGP community to identify the externally connected routes. That is, attach a designated BGP community during the redistribution of the externally connected routes on the ASBRs, and then on the RR, filter the route download based on the BGP community. This task illustrates the configuration of the RR using a route map that matches on a community list to control which routes are downloaded.

## SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **ip community-list *standard-list-number* permit AA:NN**
4. **route-map *route-map-name* permit [sequence-number]**
5. **match community *standard-list-number***
6. **exit**
7. **router bgp *as-number***
8. **address-family ipv4 unicast**
9. **table-map *route-map-name* filter**
10. **end**
11. **clear ip bgp ipv4 unicast table-map**

## DETAILED STEPS

### Procedure

|               | Command or Action                                                                                                                                         | Purpose                                                                                                                                                                                                                       |
|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Step 1</b> | <b>enable</b><br><b>Example:</b><br><pre>Router&gt; enable</pre>                                                                                          | Enables privileged EXEC mode.<br><ul style="list-style-type: none"> <li>• Enter your password if prompted.</li> </ul>                                                                                                         |
| <b>Step 2</b> | <b>configure terminal</b><br><b>Example:</b><br><pre>Router# configure terminal</pre>                                                                     | Enters global configuration mode.                                                                                                                                                                                             |
| <b>Step 3</b> | <b>ip community-list <i>standard-list-number</i> permit AA:NN</b><br><b>Example:</b><br><pre>Router(config)# ip community-list 100 permit 65510:100</pre> | Creates a standard community list and specifies an autonomous system and network number allowed in the community list.                                                                                                        |
| <b>Step 4</b> | <b>route-map <i>route-map-name</i> permit [sequence-number]</b><br><b>Example:</b><br><pre>Router(config)# route-map bgp-to-rib permit 10</pre>           | Enters route-map configuration mode to configure a route map.<br><ul style="list-style-type: none"> <li>• The route map named bgp-to-rib permits routes that match the community list identified in the next step.</li> </ul> |

|                | Command or Action                                                                                                                           | Purpose                                                                                                                    |
|----------------|---------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|
| <b>Step 5</b>  | <b>match community</b> <i>standard-list-number</i><br><b>Example:</b><br><pre>Router(config-route-map)# match community 100</pre>           | Matches on routes that are permitted by community list 100.                                                                |
| <b>Step 6</b>  | <b>exit</b><br><b>Example:</b><br><pre>Router(config-route-map)# exit</pre>                                                                 | Exits route-map configuration mode and enters global configuration mode.                                                   |
| <b>Step 7</b>  | <b>router bgp</b> <i>as-number</i><br><b>Example:</b><br><pre>Router(config)# router bgp 65510</pre>                                        | Enters router configuration mode and creates a BGP routing process.                                                        |
| <b>Step 8</b>  | <b>address-family ipv4 unicast</b><br><b>Example:</b><br><pre>Router(config-router)# address-family ipv4 unicast</pre>                      | Enters address family configuration mode to configure BGP peers to accept address family-specific configurations.          |
| <b>Step 9</b>  | <b>table-map</b> <i>route-map-name</i> <b>filter</b><br><b>Example:</b><br><pre>Router(config-router-af)# table-map bgp-to-rib filter</pre> | Specifies a route map that filters what goes into the BGP routing table (the Routing Information Base [RIB]).              |
| <b>Step 10</b> | <b>end</b><br><b>Example:</b><br><pre>Router(config-router-af)# end</pre>                                                                   | Exits address family configuration mode and enters privileged EXEC mode.                                                   |
| <b>Step 11</b> | <b>clear ip bgp ipv4 unicast table-map</b><br><b>Example:</b><br><pre>Router# clear ip bgp ipv4 unicast table-map</pre>                     | Reloads the BGP RIB after the table map or the route map is configured or changed in order to put the changes into effect. |

## Configuration Examples for BGP—Selective Route Download

### Examples: Selective Route Download

The role of a dedicated route reflector (RR) is to propagate BGP updates without participating in the actual forwarding of transit traffic. In some cases, the dedicated RR may need only selected routes downloaded; in some cases it may not need any routes downloaded.

It is likely that the dedicated RR would have the overload bit set if the IS-IS routing protocol is being used, or an OSPF stub router would be configured if OSPF is being used.

### Example: Next Hop is Loopback Address—Filter All Routes From Being Downloaded

In this example, the ASBRs are configured with the **next-hop-self** command for iBGP sessions. (That configuration is not shown). The next hops of the BGP routes advertised to iBGP sessions are the loopback addresses carried in the IGP (either OSPF or IS-IS). There is no need to download any BGP routes to the RIB. The following configuration on the dedicated RR suppresses the downloading of all BGP routes because the **table map** command includes the **filter** keyword, and the route map that the table map references denies all routes.

```
route-map bgp-to-rib deny 10
!
router bgp 65000
 address-family ipv6 unicast
  table-map bgp-to-rib filter
```

### Example: Redistribution of Connected Routes in IGP—Filter All Routes From Being Downloaded

In this example, the next hops of the BGP routes are resolved on the externally connected routes, which are carried in an IGP, such as OSPF or IS-IS, via a prefix-list-based selective redistribution of the connected routes. The routes are received from iBGP.

Although the scenario is different from the preceding example, the configuration is the same. The following configuration on the dedicated RR suppresses the downloading of all BGP routes because the **table map** command includes the **filter** keyword, and the route map that the table map references denies all routes.

```
route-map bgp-to-rib deny 10
!
router bgp 65000
 address-family ipv6 unicast
  table-map bgp-to-rib filter
```

### Example: Redistribution of Connected Routes in BGP—Selectively Filter Routes From Being Downloaded

When the externally connected routes are carried in BGP, it is necessary to download these routes to the RIB, where the nexthop resolution on the RR can be calculated. One scalable way to achieve the selective route download is to use a BGP community on the ASBR to identify these externally connected routes. That is, on the border routers, attach a designated BGP community during the redistribution of the externally connected routes, and then on the RR, filter the route download based on the BGP community. The following shows the configuration on the ASBR and the configuration on the RR.

#### ASBR Configuration

```
router bgp 65510
 address-family ipv4 unicast
  redistribute connected route-map connected-to-bgp
!
route-map connected-to-bgp permit 10
 match ip address prefix-list extend-connected
 set community 65510:100
!
```

```
ip prefix-list extend-connected permit 192.168.1.1/30
```

### RR Configuration

```
ip community-list 100 permit 65510:100
!
route-map bgp-to-rib permit 10
  match community 100
!
router bgp 65510
  address-family ipv4 unicast
    table-map bgp-to-rib filter
```

## Additional References for Selective Route Download

### Related Documents

| Related Topic      | Document Title                                               |
|--------------------|--------------------------------------------------------------|
| Cisco IOS Commands | <a href="#">Cisco IOS Master Commands List, All Releases</a> |
| BGP Commands       | <a href="#">Cisco IOS IP Routing: BGP Command Reference</a>  |

### Technical Assistance

| Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Link                                                                    |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|
| <p>The Cisco Support website provides extensive online resources, including documentation and tools for troubleshooting and resolving technical issues with Cisco products and technologies.</p> <p>To receive security and technical information about your products, you can subscribe to various services, such as the Product Alert Tool (accessed from Field Notices), the Cisco Technical Services Newsletter, and Really Simple Syndication (RSS) Feeds.</p> <p>Access to most tools on the Cisco Support website requires a Cisco.com user ID and password.</p> | <a href="http://www.cisco.com/support">http://www.cisco.com/support</a> |

## Feature Information for Selective Route Download

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 [www.cisco.com/go/cfn](http://www.cisco.com/go/cfn). An account on Cisco.com is not required.

*Table 1: Feature Information for Selective Route Download*

| Feature Name             | Releases                  | Feature Information                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|--------------------------|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Selective Route Download | Cisco IOS XE Release 2.3S | <p>The BGP—Selective Route Download feature allows a network administrator to selectively download some or none of the BGP routes into the Routing Information Base (RIB). The primary application for this feature is to suppress the unnecessary downloading of certain BGP routes to the RIB or Forwarding Information Base (FIB) on a dedicated route reflector, which propagates BGP updates without carrying transit traffic. The feature thereby helps to maximize resources available and to improve routing scalability and convergence on the dedicated route reflector.</p> <p>The following command was modified:</p> <ul style="list-style-type: none"><li>• <b>table-map</b></li></ul> |