



ORF Support for BGP Labeled Unicast

Table 1: Feature History

Feature Name	Release Information	Feature Description
Outbound Route Filtering (ORF) Support for BGP Labeled Unicast	Cisco IOS XE Cupertino 17.8.1	This feature uses BGP ORF send and receive capabilities to minimize the number of BGP updates that are sent between BGP peers. It can also filter out unwanted routing updates at the source to reduce the amount of system resources that are required for generating and processing routing updates.

This feature module describes how to configure BGP Prefix-Based Outbound Route Filtering (ORF) for BGP labeled unicast.

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Overview of ORF Support for BGP Labeled Unicast

In earlier releases, BGP does not negotiate the labeled IPv4 unicast address family separately from the unlabeled IPv4 unicast address family. This results in outbound route filtering (ORF) negotiation failure when peering with other operating systems in the network.

Starting from Cisco IOS XE Cupertino 17.8.1, BGP uses the **label-unicast unique** mode. Unlabeled and labeled unicast BGP-prefixed sessions are treated separately. This improves the interoperability with other operating systems.

The BGP prefix-based ORF is enabled through the advertisement of ORF capabilities to peer routers. The advertisement of the ORF capability indicates that a BGP peer accepts a prefix list from a neighbor and applies the prefix list to locally configured ORFs (if any exist).

This feature uses BGP ORF send and receive capabilities to minimize the number of BGP updates that are sent between BGP peers. It can also filter out unwanted routing updates at the source to reduce the amount of system resources that are required for generating and processing routing updates.

Configure ORF Support for BGP Labeled Unicast

Before you begin

Enable this feature using the following command:

```
Router(config)# license boot level metroaggrservices
```

Step 1 enable

Example:

```
Router> enable
```

Enables privileged EXEC mode.

- Enter your password if prompted.

Step 2 configure terminal

Example:

```
Router# configure terminal
```

Enters global configuration mode.

Step 3 router bgp *as-number*

Example:

```
Router(config)# router bgp 100
```

Enters router configuration mode.

- *as-number*—Number of an autonomous system that identifies the router to other BGP routers and tags the routing information that is passed along. The valid values range 1–65535.

Step 4 neighbor *ip-address* update out labeled-unicast unique

Example:

```
Router(config-router)# neighbor 3.3.3.3 update out labeled-unicast unique
```

Separates outbound processing for the two SAFIs (Subsequent Address Family Identifier). It creates two neighbor topologies to use ORF. Having the two neighbor topologies means you can negotiate the ORF capability separately per address-family.

Step 5 neighbor *ip-address* update in labeled-unicast unique

Example:

```
Router(config-router)# neighbor 3.3.3.3 update in labeled-unicast unique
```

Allows the router to accept one labeled path and one unlabeled path.

Step 6 address family ipv4 unicast

Example:

```
Router(config-router)# address family ipv4 unicast
```

Specifies the IPv4 unicast address family and enters address family configuration mode.

Step 7 **bgp mpls-local-label**

Example:

```
Router(config-router-af)# bgp mpls-local-label
```

Enables BGP local label installation for unadvertised /32 prefixes.

Step 8 **neighbor ip-address send-label**

Example:

```
Router(config-router-af)# neighbor 3.3.3.3 send-label
```

Associates a BGP label to the prefix.

Step 9 **neighbor ip-address capability orf prefix-list [send|receive|both]**

Example:

```
Router(config-router-af)# neighbor 3.3.3.3 capability orf prefix-list both
```

Note The options **send**, **receive**, and **both** are supported only for individual neighbors under the **address-family-ipv4**. These options are not supported if a peer group is configured.

Enables the ORF capability on the local router, and enables ORF capability advertisement to the BGP peer specified with the *ip-address* argument.

- The **send** keyword configures a router to advertise ORF send capabilities.
- The **receive** keyword configures a router to advertise ORF receive capabilities.
- The **both** keyword configures a router to advertise send and receive capabilities.
- The remote peer must be configured to either send or receive ORF capabilities before outbound route filtering is enabled.
- The example configures the router to advertise send and receive capabilities to the 3.3.3.3 neighbor.

Configuration Example of ORF Support for BGP Labeled Unicast

The following is a sample configuration of the ORF Support for BGP Labeled Unicast feature.

```
router bgp 100
  neighbor 3.3.3.3 remote-as 100
  neighbor 3.3.3.3 update out labeled-unicast unique
  neighbor 3.3.3.3 update in labeled-unicast unique
  address-family ipv4 unicast
    bgp mpls-local-label
    neighbor 3.3.3.3 activate
    neighbor 3.3.3.3 send-label
    neighbor 3.3.3.3 capability orf prefix-list send|receive|both
    neighbor 3.3.3.3 prefix-list orf-prefix-list
  ip prefix-list orf-prefix-list seq 10 permit 0.0.0.0/0
```

Verify the Configuration of ORF Support for BGP Labeled Unicast

To verify the configuration of ORF Support for BGP Labeled Unicast, use the following **show** command:

```
Router#show ip bgp ipv4 unicast neighbors 3.3.3.3
----Trimmed output ----
  Inbound updates with label-unicast (SAFI 4) considered unique respect unicast (SAFI 1):
  Outbound updates with label-unicast (SAFI 4) considered unique respect unicast (SAFI 1):

For address family: IPv4 Label-Unicast
Session: 3.3.3.3
BGP table version 1, neighbor version 1/0
Output queue size : 0
Index 6, Advertise bit 1
6 update-group member
Inbound soft reconfiguration allowed
NEXT_HOP is always this router for all paths
Community attribute sent to this neighbor
Extended-community attribute sent to this neighbor
AF-dependant capabilities:
  Outbound Route Filter (ORF) type (128) Prefix-list:
    Send-mode: advertised, received
    Receive-mode: advertised, received
Incoming update prefix filter list is PL_ORF
Sending Prefix & Label
Slow-peer detection is disabled
Slow-peer split-update-group dynamic is disabled

Prefix activity:
          Sent      Rcvd
-----
Prefixes Current:      0      0
Prefixes Total:        0      0
Implicit Withdraw:     0      0
Explicit Withdraw:     0      0
Used as bestpath:      n/a     0
Used as multipath:     n/a     0
Used as secondary:     n/a     0
```

Use the following command on BGP peer which receives the prefix list from its neighbor.

```
Router#show ip bgp ipv4 unicast neighbors 10.0.0.1 received prefix-filter
Address family: IPv4 Unicast
ip prefix-list 10.0.0.1: 1 entries
seq 5 permit 23.23.23.23/32
```