



Labeled BGP Support

This feature module describes how to add label mapping information to the Border Gateway Protocol (BGP) message that is used to distribute the route on the Cisco ASR 903 Series Aggregation Services Routers.

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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.

Prerequisites for Labeled BGP Support

Starting Cisco IOS XE Release 3.6.0S or later that supports Labeled BGP must be installed previously on the Cisco ASR 903 Series Aggregation Services Router.

Restrictions for Labeled BGP Support

- The ASR 903 router supports only the client functionality of RFC 3107 and not its area border router (ABR) functionality.
- The ASR 903 router does not support two label-pop (Label pop is the process of removing label header).

Overview of Labeled BGP Support

The Labeled BGP Support feature provides the option to use the BGP update message (that is used to distribute the route) to re-distribute Multiprotocol Label Switching (MPLS) label mapped to that route. The label mapping information is added (using send-label option of RFC 3107) to the same BGP message that is used to distribute the route. This process is useful in inter-domain routing, and the message that is used to distribute the route. This process is useful in inter-domain routing, and the Cisco ASR 903 router supports this functionality as well as the virtual private network (VPN) and virtual routing and forwarding (VRF) over Labeled BGP functionality.

VPN/VRF over RFC 3107

The VPN/VRF over Labeled BGP is a 3-label imposition process (VRF Label, BGP label, interior gateway protocols [IGP] label). The innermost label is VRF, followed by BGP (for RFC 3107), and IGP. This functionality allows the Cisco ASR 903 router to support a VRF over labeled BGP session with an ABR.

Configuring Labeled BGP Support

SUMMARY STEPS

1. enable
2. configure terminal
3. router bgp *as-number*
4. address family ipv4
5. neighbor peer-group-name send-community
6. neighbor peer-group-name next-hop-self
7. neighbor peer-group-name activate

DETAILED STEPS

	Command or Action	Purpose
Step 1	enable Example: Router> enable	Enables privileged EXEC mode. • Enter your password if prompted.

	Command or Action	Purpose
Step 2	configure terminal Example: Router# configure terminal	Enters global configuration mode.
Step 3	router bgp <i>as-number</i> Example: Router(config)# router bgp 100	Enters router configuration mode. • <i>as-number</i> —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 from 1 to 65535.
Step 4	address family ipv4 Example: Router(config-router)# address family ipv4	Configures the address family as IPv4 using standard IPv4 address prefixes.
Step 5	neighbor peer-group-name send-community Example: Router(config-router)# neighbor 172.16.70.23 send-community	Specifies that the communities attribute be sent to the neighbor at this IP address. • <i>peer-group-name</i> —Name of a BGP peer group.
Step 6	neighbor peer-group-name next-hop-self Example: Router(config-router)# neighbor 172.16.70.23 next-hop-self	Configures the router as the next hop for a BGP-speaking neighbor or peer group.
Step 7	neighbor peer-group-name activate Example: Router(config-router)# neighbor 172.16.70.23 activate	Enables the exchange of information with a neighboring BGP router.

Configuration Example for Labeled BGP Support

>

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

!

```
router bgp 1000
  bgp router-id 100.111.13.23
  neighbor pan peer-group
  neighbor pan remote-as 1000
```

```

neighbor pan update-source Loopback0
neighbor 100.111.14.3 peer-group pan
!
address-family ipv4
  neighbor pan send-community
  neighbor pan next-hop-self
  neighbor pan send-label
!The send-label option is used to associate a BGP label to the prefix.
  neighbor 100.111.14.3 activate
exit-address-family
!
address-family vpnv4
  neighbor pan send-community extended
  neighbor 100.111.14.3 activate
exit-address-family
!
address-family ipv4 vrf LTE12
  redistribute connected
exit-address-family
!

```

Verifying Labeled BGP Support

To verify the Labeled BGP Support on the ASR 903 router, use the **show** commands given below:

```
Router# show bgp ipv4 unicast labels
```

Network	Next Hop	In label/Out label
1.0.0.0	0.0.0.0	imp-null/nolabel
10.13.22.2/31	0.0.0.0	imp-null/nolabel
10.13.23.0/31	0.0.0.0	imp-null/nolabel
10.70.1.0/30	0.0.0.0	imp-null/nolabel
100.100.10.1/32	100.111.14.4	nolabel/558
	100.111.14.3	nolabel/560
100.100.13.23/32	0.0.0.0	imp-null/nolabel
100.101.13.23/32	0.0.0.0	imp-null/nolabel
100.111.13.23/32	0.0.0.0	imp-null/nolabel
100.111.13.26/32	100.111.14.3	nolabel/534
	100.111.14.4	nolabel/68

```
100.111.15.1/32 100.111.14.3 nolabel/25
```

```
Router# show ip bgp labels
```

Network	Next Hop	In label/Out label
1.0.0.0	0.0.0.0	imp-null/nolabel
10.13.22.2/31	0.0.0.0	imp-null/nolabel
10.13.23.0/31	0.0.0.0	imp-null/nolabel
10.70.1.0/30	0.0.0.0	imp-null/nolabel
100.100.10.1/32	100.111.14.4	nolabel/563
	100.111.14.3	nolabel/556
100.100.13.23/32	0.0.0.0	imp-null/nolabel
100.101.13.23/32	0.0.0.0	imp-null/nolabel
100.111.13.23/32	0.0.0.0	imp-null/nolabel
100.111.13.26/32	100.111.14.4	nolabel/561
	100.111.14.3	nolabel/559
100.111.15.1/32	100.111.14.4	nolabel/59
	100.111.14.3	nolabel/57
100.111.15.2/32	100.111.14.4	nolabel/62
	100.111.14.3	nolabel/52
100.112.1.1/32	100.111.14.4	nolabel/nolabel
	100.111.14.3	nolabel/nolabel
100.112.1.2/32	100.111.14.4	nolabel/nolabel
	100.111.14.3	nolabel/nolabel
100.112.1.3/32	100.111.14.4	nolabel/nolabel
	100.111.14.3	nolabel/nolabel

```
Router# show ip bgp vpnv4 all label
```

Network	Next Hop	In label/Out label
Route Distinguisher: 236:236		
154.154.236.4/30	100.154.1.1	nolabel/14002
	100.154.1.1	nolabel/14002
154.154.236.8/30	100.154.1.1	nolabel/14002
	100.154.1.1	nolabel/14002
154.154.236.12/30		
	100.154.1.1	nolabel/14002
	100.154.1.1	nolabel/14002
154.154.236.16/30		
	100.154.1.1	nolabel/14002
	100.154.1.1	nolabel/14002

```

154.154.236.20/30
                100.154.1.1      nolabel/14002
                100.154.1.1      nolabel/14002

154.154.236.24/30
                100.154.1.1      nolabel/14002
                100.154.1.1      nolabel/14002

Router# show ip vrf interface
Interface          IP-Address      VRF              Protocol
Vl100              113.23.12.1    LTE12
Router# show ip bgp vpnv4 vrf LTE12 label
      Network      Next Hop        In label/Out label
Route Distinguisher: 6666:6666 (LTE12)
  113.22.12.0/24    100.111.13.22   nolabel/51
                  100.111.13.22   nolabel/51
  113.23.12.0/24    0.0.0.0         50/nolabel (LTE12)
  113.24.12.0/24    100.111.13.24   nolabel/32
                  100.111.13.24   nolabel/32
  115.1.12.0/24     100.111.15.1    nolabel/16024
                  100.111.15.1    nolabel/16024
  154.154.236.4/30  100.154.1.1     nolabel/14002
  154.154.236.8/30  100.154.1.1     nolabel/14002
  154.154.236.12/30
                  100.154.1.1     nolabel/14002
  154.154.236.16/30
                  100.154.1.1     nolabel/14002
  154.154.236.20/30
                  100.154.1.1     nolabel/14002
  154.154.236.24/30
                  100.154.1.1     nolabel/14002

```

To verify three Label Support, use the **show ip cef vrf** command as shown in the following example.

```

Router# show ip cef vrf LTE12 113.22.12.0 internal
113.22.12.0/24, epoch 0, flags rib defined all labels, RIB[B], refcount 5, per-destination
sharing
sources: RIB
feature space:
IPRM: 0x00018000
LFD: 113.22.12.0/24  0 local labels

```

```

contains path extension list

ifnums: (none)

path 13E8A064, path list 13F49DC8, share 1/1, type recursive, for IPv4, flags
must-be-labelled, recursive-via-host

MPLS short path extensions: MOI flags = 0x0 label 51

recursive via 100.111.13.22[IPv4:Default] label 51, fib 141253D8, 1 terminal fib,
v4:Default:100.111.13.22/32

path 12520C8C, path list 13F49C38, share 1/1, type attached nexthop, for IPv4

MPLS short path extensions: MOI flags = 0x0 label 17

nexthop 100.111.14.4 Vlan10 label 17, adjacency IP adj out of Vlan10, addr 10.13.23.1
13734C80

output chain: label 22 label 51 label 17 TAG adj out of Vlan10, addr 10.13.23.1 143EDCA0

!You can see three labels in the output chain; of which 22 is VRF label, 51 is BGP label
!and 17 is LDP label

```

Additional References

Related Documents

Related Topic	Document Title
Cisco IOS XE Command Reference	Cisco IOS IP Routing: BGP Command Reference

Standards and RFCs

Standard/RFC	Title
RFC-3107	Carrying Label Information in BGP-4

MIBs

MIB	MIBs Link
NA	To locate and download MIBs for selected platforms, Cisco IOS releases, and feature sets, use Cisco MIB Locator found at the following URL: http://www.cisco.com/go/mibs

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>	http://www.cisco.com/support

Feature Information for Labeled BGP Support

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. An account on Cisco.com is not required.

Table 1: Feature Information for Labeled BGP Support

Feature Name	Releases	Feature Information
Labeled BGP Support	Cisco IOS XE Release 3.8S	<p>The Labeled BGP Support feature provides the option to use the BGP update message (that is used to distribute the route) to re-distribute Multiprotocol Label Switching (MPLS) label mapped to that route.</p> <p>In Cisco IOS XE Release 3.8S, support was added for the Cisco ASR 903 router.</p>