Configuring BFD Multihop Support for IPv4 Static Routes

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BFD Multihop Support for IPv4 Static Routes

The BFD Multihop Support for IPv4 Static Routes feature enables detection of a IPv4 network failure between paths that are not directly connected. IPv4 static routes that are associated with a IPv4 static BFD configuration are added to a routing table when a BFD session is up. If the BFD session is down, the routing table removes all associated static routes from the routing table.

This feature is applicable on different kinds of interfaces such as physical, subinterface, and virtual tunnels and across intra-area and interarea topologies.

Prerequisites for BFD Multihop Support for IPv4 Static Routes

• The BFD destination, for which an IPv4 static route is to be configured, must be reachable by all devices.

• The configured device must have at least one static route, with the next-hop destination as a BFD destination, for an associated session. If not, the BFD session will not be created on the device.

Restrictions for BFD Multihop Support for IPv4 Static Route

Cisco Catalyst 9500 Series Switches (C9500-32C, C9500-32QC, C9500-48Y4C, and C9500-24Y4C models) do not support Echo mode in Multihop.

Information About BFD Multihop Support for IPv4 Static Routes

BFDv4 Associated Mode

In Bidirectional Forwarding Detection for IPv4 (BFDv4) associated mode, an IPv4 static route is automatically associated with an IPv4 static BFDv4 multihop destination address if the static route next hop exactly matches the static BFDv4 multihop destination address.

The state of the BFDv4 session determines whether the IPv4 routing information base (RIB) adds the associated IPv4 static routes. For example, IPv4 RIB adds the static routes only if the BFDv4 multihop destination is reachable. The IPv4 RIB removes the static routes if the BFDv4 multihop destination subsequently becomes unreachable.

BFDv4 Unassociated Mode

In Bidirectional Forwarding Detection for IPv4 (BFDv4), an IPv4 static BFD multihop destination can be configured in unassociated mode. In unassociated mode, a BFD neighbor is not associated with a static route. And the BFD sessions are requested if the IPv4 static BFD is configured.

Unassociated mode is useful in the following scenario:

- Absence of an IPv4 static route—This scenario occurs when a static route is on device A, and device B is the next hop. In associated mode, you must create both a static BFD multihop destination address and a static route on both devices to bring up the BFDv4 session from device B to device A. Specifying the static BFD multihop destination in unassociated mode on device B avoids the need to configure an unwanted static route.

How to Configure BFD Multihop Support for IPv4 Static Routes

Configuring BFD Multihop IPv4 Static Routes

Before you begin

- Specify a BFD destination address which is the same as the IPv4 static route next hop or gateway address.

- Configure a BFD map and a BFD multihop template for an interface on the device. The destination address and the source address that is configured for a BFD map must match the BFD static multihop configuration. The source address must be a valid IP address that is configured for an interface in the routing table.

Procedure

	Command or Action	**Purpose**
Step 1	**enable** **Example:** `Device> enable`	Enables privileged EXEC mode. - Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Device# configure terminal`	Enters global configuration mode.

Step 3	**ip route** *prefix mask ip-address*
	
	Example:
	
	`Device(config)# ip route 192.0.2.0`
	`255.255.255.0 10.1.1.2`
		Configures an IPv4 static route that BFD multihop uses to monitor static routes.

	Command or Action	Purpose
Step 4	**ip route static bfd** *multihop-destination-address* *multihop-source-address* **Example:** `Device(config)# ip route static bfd 192.0.2.1 10.1.1.1`	Configures the static IPv4 BFD multihop to be associated with a static IPv4 route.
Step 5	**ip route static bfd** *multihop-destination-address* *multihop-source-address* **unassociate** **Example:** `Device(config)# ip route static bfd 192.0.2.1 10.1.1.1 unassociate`	(Optional) Configures the static IPv4 BFD multihop to be associated with a static IPv4 route in unassociated mode.
Step 6	**end** **Example:** `Device(config)# end`	Exits global configuration mode and returns to privileged EXEC mode.

Verifying BFD Multihop Support for IPv4 Static Routes

The following show commands are used to verify IPv4 static routes for BFD multihop:

Procedure

Step 1 **show bfd neighbor**

Displays a line-by-line listing of existing BFD adjacencies.

Step 2 **show ip static route bfd**

Displays information about the IPv4 static BFD configured parameters.

Configuration Examples for BFD Multihop Support for IPv4 Static Routes

Example: Configuring BFD Multihop for IPv4 Static Routes in Associated Mode

The following example shows how to configure BFD Multihop for IPv4 Static Routes in Associated Mode:

```
Device> enable
Device# configure terminal
Device(config)# bfd map ipv4 192.0.2.1/32  10.1.1.1/32 test
Device(config)# bfd-template multi-hop test
Device(config-bfd)# interval min-tx 51 min-rx 51 multiplier 3
Device(config-bfd)# exit
```

```
Device(config)# ip route 192.0.2.0 255.255.255.0 10.1.1.2
Device(config)# interface GigabitEthernet 1/1
Device(config-if)# ip address 10.1.1.1 255.255.0.0
Device(config-if)# exit
Device(config)# ip route static bfd 192.0.2.1 10.1.1.1
Device(config)# end
```

Example: Configuring IPv4 Static Multihop for BFD in Unassociated Mode

The following example shows how to configure IPv4 Static Multihop for BFD in Unassociate Mode:

```
Device> enable
Device# configure terminal
Device(config)# bfd map ipv4 192.0.2.1/32  10.1.1.1/32 test
Device(config)# bfd-template multi-hop test
Device(config-bfd)# interval min-tx 51 min-rx 51 multiplier 3
Device(config-bfd)# exit
Device(config)# ip route 192.0.2.0 255.255.255.0 10.1.1.2
Device(config)# interface GigabitEthernet 1/1
Device(config-if)# ip address 10.1.1.1 255.255.0.0
Device(config-if)# exit
Device(config)# ip route static bfd 192.0.2.1 10.1.1.1 unassociate
Device(config)# end
```

Additional References for BFD Multihop Support for IPv4 Static Routes

Related Documents

Related Topic	Document Title
IP Routing: Protocol Independent commands	*IP Routing Protocol-Independent Command Reference*

Standards and RFCs

Standard/RFC	Title
RFC 5883	*BFD for Multihop Paths*

Feature History for BFD Multihop Support for IPv4 Static Routes

This table provides release and related information for the features explained in this module.

These features are available in all the releases subsequent to the one they were introduced in, unless noted otherwise.

Release	Feature	Feature Information
Cisco IOS XE Gibraltar 16.11.1	BFD Multihop Support for IPv4 Static Routes	The BFD Multihop Support for IPv4 Static Routes feature enables detection of a IPv4 network failure between paths that are not directly connected. Support for this feature was introduced only on the C9500-32C, C9500-32QC, C9500-48Y4C, and C9500-24Y4C models of the Cisco Catalyst 9500 Series Switches.

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