



## BFD IPv6 Encapsulation Support

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Bidirectional Forwarding Detection for IPv6 encapsulations are described within a session information structure. These session information structures are defined by BFDv6 for the protocols supported. BFDv6 uses information from the session information structures to determine the correct encapsulation for BFDv6 packets on that session.

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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.

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.

## Prerequisites for BFD IPv6 Encapsulation Support

When using Bidirectional Forwarding Detection over IPv6 (BFDv6), IPv6 Cisco Express Forwarding and IPv6 unicast routing must be enabled on all participating routers.

## Restrictions for BFD IPv6 Encapsulation Support

- BFDv6 supports only global IPv6 neighbor addresses if a global IPv6 address is configured on the interface.
- Only asynchronous mode is supported. In asynchronous mode, either BFDv6 peer can initiate a BFDv6 session.

## Information About BFD IPv6 Encapsulation Support

### Overview of the BFDv6 Protocol

This section describes the BFDv6 protocol, how it is different from BFD for IPv4, and how it works with BFD for IPv4. BFD is a detection protocol designed to provide fast forwarding path failure detection times for all media types, encapsulations, topologies, and routing protocols. In addition to fast forwarding path failure detection, BFD provides a consistent failure detection method for network administrators. BFDv6 provides IPv6 support by accommodating IPv6 addresses and provides the ability to create BFDv6 sessions.

### BFDv6 Registration

BFD clients register with BFD using a registry application program interface (API). The registry arguments include protocol type and the address and interface description block (IDB) of the route to be monitored. These APIs and arguments are all assumed by BFD to be IPv4.

BFDv6 has registries from which these arguments have been removed, and the protocol and encapsulation are described within a session information structure. These session information structures are defined by BFDv6 for the protocols supported. BFDv6 uses information from the session information structures to determine the correct encapsulation for BFDv6 packets on that session.

### BFDv6 Global and Link-Local Addresses

BFDv6 supports both global and link-local IPv6 addresses for neighbor creation. BFDv6 sessions select source addresses to match the neighbor address types (for example, global IPv6 address neighbors must be paired with global IPv6 source addresses and link-local IPv6 address neighbors must be paired with link-local IPv6 source addresses). The table below shows the address pairings that BFDv6 supports.

**Table 1: BFDv6 Address Pairings for Neighbor Creation**

| Source Address | Destination Address | Status        |
|----------------|---------------------|---------------|
| Global         | Global              | Supported     |
| Global         | Link local          | Not supported |
| Link local     | Global              | Not supported |

| Source Address | Destination Address | Status    |
|----------------|---------------------|-----------|
| Link local     | Link local          | Supported |

Because all IPv6-enabled interfaces have a link-local address and BFDv6 selects the source address, link-local address neighbors are always paired with a link-local interface address. The link-local source address with global destination address is not supported by Cisco Express Forwarding. Therefore, a global IPv6 address must be configured on an interface before a session with a global address neighbor may be established in BFDv6. BFDv6 rejects any sessions in which the neighbor address is global and no global address is configured on the interface.



**Note** The behavior of a unique local address (ULA) in BFDv6 is the same as a global address.

## BFD for IPv4 and IPv6 on the Same Interface

BFD supports multiple IPv4 and IPv6 sessions per interface, with no restriction on the protocol of those sessions.

# How to Configure BFD IPv6 Encapsulation Support

## Configuring BFD Session Parameters on the Interface

The steps in this procedure show how to configure BFD on the interface by setting the baseline BFD session parameters on an interface. Repeat the steps in this procedure for each interface over which you want to run BFD sessions to BFD neighbors.

### SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. Perform one of the following steps:
  - **ip address** *ipv4-address mask*
  - **ipv6 address** *ipv6-address/mask*
4. **bfd interval** *milliseconds* **min\_rx** *milliseconds* **multiplier** *interval-multiplier*
5. **end**

## DETAILED STEPS

|        | Command or Action  | Purpose   |
|--------|--|---|
| Step 1 | <p><b>enable</b></p> <p><b>Example:</b></p> <pre>Device&gt; enable</pre>   | <p>Enables privileged EXEC mode.</p> <ul style="list-style-type: none"> <li>• Enter your password if prompted.</li> </ul>   |
| Step 2 | <p><b>configure terminal</b></p> <p><b>Example:</b></p> <pre>Device# configure terminal</pre>  | <p>Enters global configuration mode.</p>  |
| Step 3 | <p>Perform one of the following steps:</p> <ul style="list-style-type: none"> <li>• <b>ip address</b> <i>ipv4-address mask</i></li> <li>• <b>ipv6 address</b> <i>ipv6-address/mask</i></li> </ul> <p><b>Example:</b></p> <p>Configuring an IPv4 address for the interface:</p> <pre>Device(config-if)# ip address 10.201.201.1 255.255.255.0</pre> <p>Configuring an IPv6 address for the interface:</p> <pre>Device(config-if)# ipv6 address 2001:db8:1:1::1/32</pre> | <p>Configures an IP address for the interface.</p>  |
| Step 4 | <p><b>bfd interval</b> <i>milliseconds min_rx milliseconds multiplier interval-multiplier</i></p> <p><b>Example:</b></p> <pre>Device(config-if)# bfd interval 50 min_rx 50 multiplier 5</pre>  | <p>Enables BFD on the interface.</p> <p>The bfd interval configuration is removed when the subinterface on which it is configured is removed.</p> <p>The bfd interval configuration is not removed when:</p> <ul style="list-style-type: none"> <li>• an IPv4 address is removed from an interface</li> <li>• an IPv6 address is removed from an interface</li> <li>• IPv6 is disabled from an interface</li> <li>• an interface is shutdown</li> <li>• IPv4 CEF is disabled globally or locally on an interface</li> <li>• IPv6 CEF is disabled globally or locally on an interface</li> </ul> |
| Step 5 | <p><b>end</b></p> <p><b>Example:</b></p> <pre>Device(config-if)# end</pre>   | <p>Exits interface configuration mode and returns to privileged EXEC mode.</p>  |

# Configuration Examples for BFD IPv6 Encapsulation Support

## Example: Configuring BFD Session Parameters on the Interface

```

Device# show ipv6 ospf neighbor detail

Neighbor 172.16.4.4
  In the area 0 via interface POS4/0
  Neighbor: interface-id 14, link-local address FE80::205:5FFF:FED3:5406
  Neighbor priority is 1, State is FULL, 6 state changes
  Options is 0x63AD1B0D
  Dead timer due in 00:00:33
  Neighbor is up for 00:48:56
  Index 1/1/1, retransmission queue length 0, number of retransmission 1
  First 0x0(0)/0x0(0)/0x0(0) Next 0x0(0)/0x0(0)/0x0(0)
  Last retransmission scan length is 1, maximum is 1
  Last retransmission scan time is 0 msec, maximum is 0 msec
Neighbor 172.16.3.3
  In the area 1 via interface FastEthernet0/0
  Neighbor: interface-id 3, link-local address FE80::205:5FFF:FED3:5808
  Neighbor priority is 1, State is FULL, 6 state changes
  DR is 172.16.6.6 BDR is 172.16.3.3
  Options is 0x63F813E9
  Dead timer due in 00:00:33
  Neighbor is up for 00:09:00
  Index 1/1/2, retransmission queue length 0, number of retransmission 2
  First 0x0(0)/0x0(0)/0x0(0) Next 0x0(0)/0x0(0)/0x0(0)
  Last retransmission scan length is 1, maximum is 2
  Last retransmission scan time is 0 msec, maximum is 0 msec
Neighbor 172.16.5.5
  In the area 2 via interface ATM3/0
  Neighbor: interface-id 13, link-local address FE80::205:5FFF:FED3:6006
  Neighbor priority is 1, State is FULL, 6 state changes
  Options is 0x63F7D249
  Dead timer due in 00:00:38
  Neighbor is up for 00:10:01
  Index 1/1/3, retransmission queue length 0, number of retransmission 0
  First 0x0(0)/0x0(0)/0x0(0) Next 0x0(0)/0x0(0)/0x0(0)
  Last retransmission scan length is 0, maximum is 0
  Last retransmission scan time is 0 msec, maximum is 0 msec

```

## Additional References

### Related Documents

| Related Topic                    | Document Title                                      |
|----------------------------------|---|
| IPv6 addressing and connectivity | <i>Cisco IOS IPv6 Configuration Guide</i>           |
| Cisco IOS commands               | <i>Cisco IOS Master Commands List, All Releases</i> |

| Related Topic           | Document Title                                       |
|-------------------------|--|
| IPv6 commands           | <i>Cisco IOS IPv6 Command Reference</i>              |
| Cisco IOS IPv6 features | <i>Cisco IOS IPv6 Feature Mapping</i>                |
| OSPFv3 for BFD          | “ <i>Bidirectional Forwarding Detection</i> ” module |

### Standards and RFCs

| Standard/RFC  | Title     |
|---------------|-----------|
| RFCs for IPv6 | IPv6 RFCs |

### MIBs

| MIB | MIBs Link  |
|-----|--|
|     | To locate and download MIBs for selected platforms, Cisco IOS releases, and feature sets, use Cisco MIB Locator found at the following URL:<br><br><a href="http://www.cisco.com/go/mibs">http://www.cisco.com/go/mibs</a> |

### Technical Assistance

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

## Feature Information for BFD IPv6 Encapsulation 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.

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**Table 2: Feature Information for BFD IPv6 Encapsulation Support**

| Feature Name                   | Releases   | Feature Information  |
|--------------------------------|--|--|
| BFD IPv6 Encapsulation Support | 12.2(33)SRE<br>15.0(1)SY<br>15.1(1)SG<br>15.1(1)SY<br>15.1(2)T | BFDv6 encapsulations are described within a session information structure. These session information structures are defined by BFDv6 for the protocols supported. BFDv6 uses information from the session information structures to determine the correct encapsulation for BFDv6 packets on that session.<br><br>The following commands were introduced or modified: <b>bfd interval, show ipv6 ospf neighbor</b> . |

