Configuring BFD-EIGRP Support

- Prerequisites for BFD-EIGRP Support, on page 1
- Information About BFD-EIGRP Support, on page 1
- How to Configure BFD - EIGRP Support, on page 1
- Configuration Example for BFD in an EIGRP Network with Echo Mode Enabled by Default, on page 3

Prerequisites for BFD-EIGRP Support

- Enhanced Interior Gateway Routing Protocol (EIGRP) must be running on all participating routers.
- The baseline parameters for Bidirectional Forwarding Detection (BFD) sessions on the interfaces over which you want to run BFD sessions to BFD neighbors must be configured using the **bfd** command.

Information About BFD-EIGRP Support

The BFD-EIGRP Support feature configures Bidirectional Forwarding Detection (BFD) feature for Enhanced Interior Gateway Routing Protocol (EIGRP) so that EIGRP registers with the BFD sessions on the routing interfaces, and receives forwarding path detection failure messages from BFD.

Use **bfd interval** *milliseconds* **min_rx** *milliseconds* **multiplier** *interval-multiplier* command to enable BFD on any interface. Use the **bfd all-interfaces** command in router configuration mode to enable BFD for all of the interfaces where EIGRP routing is enabled. Use the **bfd interface** *type number* command in router configuration mode to enable BFD for a subset of the interfaces where EIGRP routing is enabled.

How to Configure BFD - EIGRP Support

To configure BFD-EIGRP support, perform this procedure:

Procedure

	Command or Action	Purpose
Step 1	**enable**	Enables privileged EXEC mode.

	Command or Action	Purpose
	Example: `Device>enable`	Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Device#configure terminal`	Enters global configuration mode.
Step 3	**router eigrp** *as-number* **Example:** `Device(config)#router eigrp 123`	Configures the EIGRP routing process and enters router configuration mode.

Step 4	Do one of the following:
	• **bfd all-interfaces**
	• **bfd interface** *type number*
	Example:
	`Device(config-router)#bfd all-interfaces`
	Example:
	`Device(config-router)#bfd interface gigabitethernet 1/1`
		Enables BFD globally on all interfaces that are associated with the EIGRP routing process.
		or
		Enables BFD on a per-interface basis for one or more interfaces that are associated with the EIGRP routing process.

Step 5	**end** **Example:** `Device(config-router)#end`	Exits router configuration mode and returns the device to privileged EXEC mode.
Step 6	**show bfd neighbors** [**details**] **Example:** `Device#show bfd neighbors details`	(Optional) Verifies that the BFD neighbor is active and displays the routing protocols that BFD has registered.
Step 7	**show ip eigrp interfaces** [*type number*] [*as-number*] [**detail**] **Example:** `Device#show ip eigrp interfaces detail`	(Optional) Displays the interfaces for which BFD support for EIGRP has been enabled.

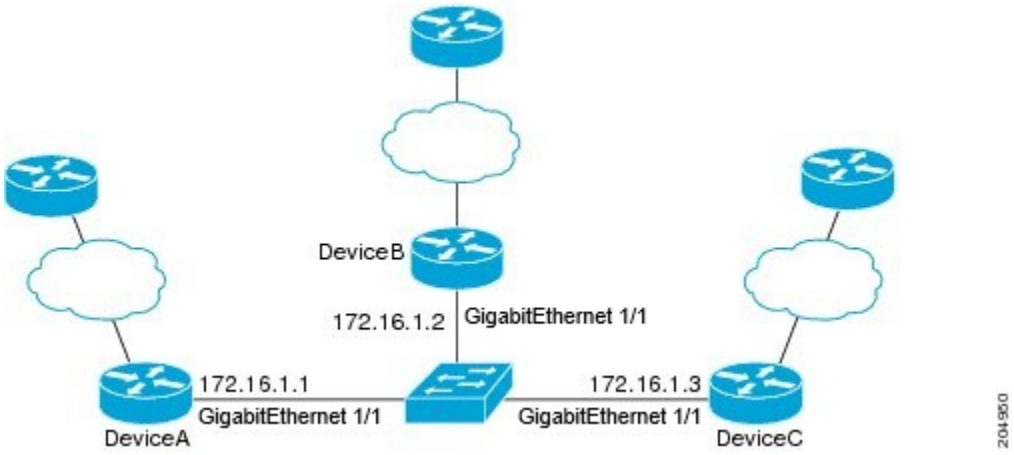
Configuration Example for BFD in an EIGRP Network with Echo Mode Enabled by Default

In the following example, the EIGRP network contains DeviceA, DeviceB, and DeviceC. Interface GigabitEthernet 1/1 on DeviceA is connected to the same network as Interface GigabitEthernet 1/2 on DeviceB. Interface GigabitEthernet 1/2 on DeviceB is connected to the same network as Interface GigabitEthernet 1/1 on DeviceC.

DeviceA and DeviceB are running BFD Version 1, which supports echo mode, and DeviceC is running BFD Version 0, which does not support echo mode. The BFD sessions between DeviceC and its BFD neighbors are said to be running echo mode with asymmetry because echo mode will run on the forwarding path for DeviceA and DeviceB, and their echo packets will return along the same path for BFD sessions and failure detections, while their BFD neighbor DeviceC runs BFD Version 0 and uses BFD controls packets for BFD sessions and failure detections.

The figure below shows a large EIGRP network with several devices, three of which are BFD neighbors that are running EIGRP as their routing protocol.

Figure 1: BFD Process on a Network Configured with EIGRP



The example, starting in global configuration mode, shows the configuration of BFD.

Configuration for DeviceA

```
interface gigabitethernet 1/1
ip address 172.16.1.1 255.255.255.0
bfd interval 50 min_rx 50 multiplier 3

duplex auto
speed auto
!
router eigrp 11
network 172.16.0.0
bfd all-interfaces
auto-summary
!
no ip http server
!
```

```
logging alarm informational
!
control-plane
!
line con 0
exec-timeout 30 0
stopbits 1
line aux 0
stopbits 1
line vty 0 4
login
!
!
end
```

Configuration for DeviceB

```
!
interface gigabitethernet 1/1

ip address 10.4.9.34 255.255.255.0
duplex auto
speed auto
!
iinterface gigabitethernet 1/2
ip address 172.16.1.2 255.255.255.0
bfd interval 50 min_rx 50 multiplier 3
no shtdown
duplex auto
speed auto
!
router eigrp 11
network 172.16.0.0
bfd all-interfaces
auto-summary
!
no ip http server
!
logging alarm informational
!
control-plane
!
line con 0
exec-timeout 30 0
stopbits 1
line aux 0
stopbits 1
line vty 0 4
login
!
!
end
```

Configuration for DeviceC

```
!
!
interface gigabitethernet 1/1

ip address 10.4.9.34 255.255.255.0
duplex auto
```

```
speed auto
!
interface gigabitethernet 1/2
ip address 172.16.1.2 255.255.255.0
bfd interval 50 min_rx 50 multiplier 3

duplex auto
speed auto
!
router eigrp 11
network 172.16.0.0
bfd all-interfaces
auto-summary
!

no ip http server
!
logging alarm informational
!
control-plane
!
line con 0
exec-timeout 30 0
stopbits 1
line aux 0
stopbits 1
line vty 0 4
login
!
!
end
```

The output from the **show bfd neighbors details** command from DeviceA verifies that BFD sessions are created among all three devices and that EIGRP is registered for BFD support. The first group of output shows that DeviceC with the IP address 172.16.1.3 runs BFD Version 0 and therefore does not use the echo mode. The second group of output shows that DeviceB with the IP address 172.16.1.2 runs BFD Version 1, and the 50 millisecond BFD interval parameter had been adopted. The relevant command output is shown in bold in the output.

```
DeviceA# show bfd neighbors details

OurAddr
       NeighAddr
      LD/RD  RH/RS    Holdown(mult)  State     Int
172.16.1.1    172.16.1.3
     5/3    1(RH)    150 (3 )       Up   Gi1/1
Session state is UP and not using echo function.
Local Diag: 0, Demand mode: 0, Poll bit: 0
MinTxInt: 50000, MinRxInt: 50000, Multiplier: 3
Received MinRxInt: 50000, Received Multiplier: 3
Holdown (hits): 150(0), Hello (hits): 50(1364284)
Rx Count: 1351813, Rx Interval (ms) min/max/avg: 28/64/49 last: 4 ms ago
Tx Count: 1364289, Tx Interval (ms) min/max/avg: 40/68/49 last: 32 ms ago
Registered protocols: EIGRP
Uptime: 18:42:45
Last packet: Version: 0
            - Diagnostic: 0
             I Hear You bit: 1     - Demand bit: 0
             Poll bit: 0           - Final bit: 0
             Multiplier: 3         - Length: 24
             My Discr.: 3          - Your Discr.: 5
```

```
            Min tx interval: 50000    - Min rx interval: 50000
            Min Echo interval: 0
OurAddr       NeighAddr
     LD/RD  RH/RS   Holdown(mult)  State     Int
172.16.1.1    172.16.1.2

    6/1    Up        0    (3 )   Up        Gi1/1
Session state is UP and using echo function with 50 ms interval.
Local Diag: 0, Demand mode: 0, Poll bit: 0
MinTxInt: 1000000, MinRxInt: 1000000, Multiplier: 3
Received MinRxInt: 1000000, Received Multiplier: 3
Holdown (hits): 3000(0), Hello (hits): 1000(317)
Rx Count: 305, Rx Interval (ms) min/max/avg: 1/1016/887 last: 448 ms ago
Tx Count: 319, Tx Interval (ms) min/max/avg: 1/1008/880 last: 532 ms ago
Registered protocols: EIGRP
Uptime: 00:04:30
Last packet: Version: 1

         - Diagnostic: 0
            State bit: Up         - Demand bit: 0
            Poll bit: 0           - Final bit: 0
            Multiplier: 3         - Length: 24
            My Discr.: 1          - Your Discr.: 6
            Min tx interval: 1000000    - Min rx interval: 1000000
            Min Echo interval: 50000
```

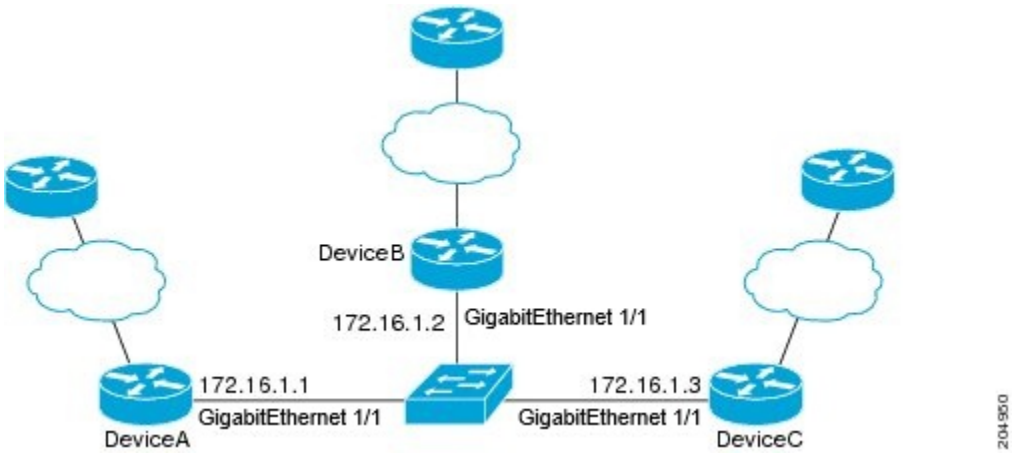
The output from the **show bfd neighbors details** command on DeviceB verifies that BFD sessions have been created and that EIGRP is registered for BFD support. As previously noted, DeviceA runs BFD Version 1, therefore echo mode is running, and DeviceC runs BFD Version 0, so echo mode does not run. The relevant command output is shown in bold in the output.

```
DeviceB# show bfd neighbors details

OurAddr       NeighAddr
     LD/RD  RH/RS   Holdown(mult)  State     Int
172.16.1.2    172.16.1.1
    1/6    Up        0    (3 )   Up        Gi1/1
Session state is UP and using echo function with 50 ms interval.
Local Diag: 0, Demand mode: 0, Poll bit: 0
MinTxInt: 1000000, MinRxInt: 1000000, Multiplier: 3
Received MinRxInt: 1000000, Received Multiplier: 3
Holdown (hits): 3000(0), Hello (hits): 1000(337)
Rx Count: 341, Rx Interval (ms) min/max/avg: 1/1008/882 last: 364 ms ago
Tx Count: 339, Tx Interval (ms) min/max/avg: 1/1016/886 last: 632 ms ago
Registered protocols: EIGRP
Uptime: 00:05:00
Last packet: Version: 1
           - Diagnostic: 0
             State bit: Up         - Demand bit: 0
             Poll bit: 0           - Final bit: 0
             Multiplier: 3         - Length: 24
             My Discr.: 6          - Your Discr.: 1
             Min tx interval: 1000000    - Min rx interval: 1000000
             Min Echo interval: 50000
OurAddr       NeighAddr

 LD/RD  RH/RS   Holdown(mult)  State     Int
172.16.1.2    172.16.1.3
     3/6    1(RH)     118  (3 )   Up        Gi1/1
Session state is UP and not using echo function.
Local Diag: 0, Demand mode: 0, Poll bit: 0
MinTxInt: 50000, MinRxInt: 50000, Multiplier: 3
```

```
Received MinRxInt: 50000, Received Multiplier: 3
Holdown (hits): 150(0), Hello (hits): 50(5735)
Rx Count: 5731, Rx Interval (ms) min/max/avg: 32/72/49 last: 32 ms ago
Tx Count: 5740, Tx Interval (ms) min/max/avg: 40/64/50 last: 44 ms ago
Registered protocols: EIGRP
Uptime: 00:04:45
Last packet: Version: 0
            - Diagnostic: 0
             I Hear You bit: 1     - Demand bit: 0
             Poll bit: 0           - Final bit: 0
             Multiplier: 3         - Length: 24
             My Discr.: 6          - Your Discr.: 3
             Min tx interval: 50000    - Min rx interval: 50000
             Min Echo interval: 0
```

The figure below shows that Interface 1/0 on DeviceB has failed. When Interface 1/0 on DeviceB is shut down, the BFD statistics of the corresponding BFD sessions on DeviceA and DeviceB are reduced.

Figure 2: BFD Process on Interfaces



When Interface GigabitEthernet 1/1 on DeviceB fails, BFD will no longer detect DeviceB as a BFD neighbor for DeviceA or for DeviceC. In this example, Interface GigabitEthernet 1/1 has been administratively shut down on DeviceB.

The following output from the **show bfd neighbors** command on DeviceA now shows only one BFD neighbor for DeviceA in the EIGRP network. The relevant command output is shown in bold in the output.

```
DeviceA# show bfd neighbors
OurAddr       NeighAddr

    LD/RD  RH/RS   Holdown(mult)  State     Int
172.16.1.1    172.16.1.3

    5/3    1(RH)     134   (3 )   Up        Gi1/1
```

The following output from the **show bfd neighbors** command on DeviceC also now shows only one BFD neighbor for DeviceC in the EIGRP network. The relevant command output is shown in bold in the output.

```
DeviceC# show bfd neighbors

OurAddr       NeighAddr

   LD/RD RH  Holdown(mult)  State     Int
```

```
172.16.1.3    172.16.1.1
    3/5  1   114  (3 )      Up         Gi1/1
```