EIGRP

The Enhanced Interior Gateway Routing Protocol (EIGRP) is an enhanced version of the Interior Gateway Routing Protocol (IGRP) developed by Cisco. The convergence properties and the operating efficiency of EIGRP have improved substantially over IGRP, and IGRP is now obsolete.

The convergence technology of EIGRP is based on an algorithm called the Diffusing Update Algorithm (DUAL). The algorithm guarantees loop-free operation at every instant throughout a route computation and allows all devices involved in a topology change to synchronize. Devices that are not affected by topology changes are not involved in recomputations.

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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. An account on Cisco.com is not required.
Information About Configuring EIGRP

EIGRP Features

- Increased network width--With IP Routing Information Protocol (RIP), the largest possible width of your network is 15 hops. When EIGRP is enabled, the largest possible width is increased to 100 hops, and the EIGRP metric is large enough to support thousands of hops.

- Fast convergence--The DUAL algorithm allows routing information to converge as quickly as any currently available routing protocol.

- Partial updates--EIGRP sends incremental updates when the state of a destination changes, instead of sending the entire contents of the routing table. This feature minimizes the bandwidth required for EIGRP packets.

- Neighbor discovery mechanism--This simple protocol-independent hello mechanism is used to learn about neighboring devices.

- Scaling--EIGRP scales to large networks.

EIGRP Autonomous System Configuration

Configuring the `router eigrp` command with the `autonomous-system-number` argument creates an EIGRP configuration called the EIGRP autonomous system configuration, or EIGRP classic mode. The EIGRP autonomous system configuration creates an EIGRP routing instance that can be used for exchanging routing information.

In EIGRP autonomous system configurations, EIGRP VPNs can be configured only under IPv4 address family configuration mode. A virtual routing and forwarding (VRF) instance and a route distinguisher must be defined before the address family session can be created.

When the address family is configured, we recommend that you configure an autonomous system number either by using the `autonomous-system-number` argument with the `address-family` command or by using the `autonomous-system` command.

EIGRP Named Configuration

Configuring the `router eigrp` command with the `virtual-instance-name` argument creates an EIGRP configuration referred to as the EIGRP named configuration or EIGRP named mode. An EIGRP named configuration does not create an EIGRP routing instance by itself; it is a base configuration that is required to define address-family configurations that are used for routing.

In EIGRP named configurations, EIGRP VPNs can be configured in IPv4 and IPv6 named configurations. A VRF instance and a route distinguisher must be defined before the address family session can be created.

A single EIGRP routing process can support multiple VRFs. The number of VRFs that can be configured is limited only by the available system resources on the device, which is determined by the number running processes and available memory. However, only a single VRF can be supported by each VPN, and redistribution between different VRFs is not supported.
EIGRP Neighbor Relationship Maintenance

Neighbor relationship maintenance is the process that devices use to dynamically learn of other devices on their directly attached networks. Devices must also discover when their neighbors become unreachable or inoperative. Neighbor relationship maintenance is achieved with low overhead by devices when they periodically send small hello packets to each other. As long as hello packets are received, the Cisco software can determine whether a neighbor is alive and functioning. After the status of the neighbor is determined, neighboring devices can exchange routing information.

The reliable transport protocol is responsible for the guaranteed, ordered delivery of Enhanced Interior Gateway Routing Protocol (EIGRP) packets to all neighbors. The reliable transport protocol supports intermixed transmission of multicast and unicast packets. Some EIGRP packets (such as updates) must be sent reliably; this means that the packets require acknowledgment from the destination. For efficiency, reliability is provided only when necessary. For example, on a multiaccess network that has multicast capabilities, hello packets need not be sent reliably to all neighbors individually. Therefore, EIGRP sends a single multicast hello packet with an indication in the packet informing receivers that the packet need not be acknowledged. The reliable transport protocol can send multicast packets quickly when unacknowledged packets are pending, thereby ensuring that the convergence time remains low in the presence of varying speed links.

Some EIGRP remote unicast-listen (any neighbor that uses unicast to communicate) and remote multicast-group neighbors may peer with any device that sends a valid hello packet, thus causing security concerns. By authenticating the packets that are exchanged between neighbors, you can ensure that a device accepts packets only from devices that know the preshared authentication key.

Neighbor Authentication

The authentication of packets being sent between neighbors ensures that a device accepts packets only from devices that have the same preshared key. If this authentication is not configured, you can intentionally or accidentally add another device to the network or send packets with different or conflicting route information onto the network, resulting in topology corruption and denial of service (DoS).

Enhanced Interior Gateway Routing Protocol (EIGRP) authentication is configurable on a per-interface basis; packets exchanged between neighbors connected through an interface are authenticated. EIGRP supports message digest algorithm 5 (MD5) authentication to prevent the introduction of unauthorized information from unapproved sources. MD5 authentication is defined in RFC 1321.

DUAL Finite State Machine

The DUAL finite state machine embodies the decision process for all route computations. It tracks all routes advertised by all neighbors. DUAL uses the distance information (known as the metric) to select efficient, loop-free paths. DUAL selects routes to be inserted into a routing table based on feasible successors. A successor is a neighboring device (used for packet forwarding) that has the least-cost path to a destination that is guaranteed not to be part of a routing loop. When there are no feasible successors but only neighbors advertising the destination, a recomputation must occur to determine a new successor. The time required to recompute the route affects the convergence time. Recomputation is processor-intensive, and unnecessary recomputation must be avoided. When a topology change occurs, DUAL will test for feasible successors. If there are feasible successors, DUAL will use any feasible successors it finds to avoid unnecessary recomputation.
Protocol-Dependent Modules

Protocol-dependent modules are responsible for network-layer protocol-specific tasks. An example is the EIGRP module, which is responsible for sending and receiving EIGRP packets that are encapsulated in the IP. The EIGRP module is also responsible for parsing EIGRP packets and informing DUAL about the new information received. EIGRP asks DUAL to make routing decisions, but the results are stored in the IP routing table. Also, EIGRP is responsible for redistributing routes learned from other IP routing protocols.

Goodbye Message

The goodbye message is a feature designed to improve EIGRP network convergence. The goodbye message is broadcast when an EIGRP routing process is shut down to inform adjacent peers about an impending topology change. This feature allows supporting EIGRP peers to synchronize and recalculate neighbor relationships more efficiently than would occur if the peers discovered the topology change after the hold timer expired.

The following message is displayed by devices that run a supported release when a goodbye message is received:

*Apr 26 13:48:42.523: %DUAL-5-NBRCHANGE: IP-EIGRP(0) 1: Neighbor 10.1.1.1 (Ethernet0/0) is down: Interface Goodbye received

A Cisco device that runs a software release that does not support the goodbye message can misinterpret the message as a K-value mismatch and display the following error message:

*Apr 26 13:48:41.811: %DUAL-5-NBRCHANGE: IP-EIGRP(0) 1: Neighbor 10.1.1.1 (Ethernet0/0) is down: K-value mismatch

The receipt of a goodbye message by a nonsupporting peer does not disrupt normal network operation. The nonsupporting peer terminates the session when the hold timer expires. The sending and receiving devices reconverge normally after the sender reloads.

EIGRP Metric Weights

You can use the metric weights command to adjust the default behavior of Enhanced Interior Gateway Routing Protocol (EIGRP) routing and metric computations. EIGRP metric defaults (K values) have been carefully selected to provide optimal performance in most networks.

Note

Adjusting EIGRP metric weights can dramatically affect network performance. Because of the complexity of this task, we recommend that you do not change the default K values without guidance from an experienced network designer.

By default, the EIGRP composite cost metric is a 32-bit quantity that is the sum of segment delays and the lowest segment bandwidth (scaled and inverted) for a given route. The formula used to scale and invert the bandwidth value is $10^7$/minimum bandwidth in kilobits per second. However, with the EIGRP Wide Metrics feature, the EIGRP composite cost metric is scaled to include 64-bit metric calculations for EIGRP named mode configurations.
For a network of homogeneous media, this metric reduces to a hop count. For a network of mixed media (FDDI, Gigabit Ethernet (GE), and serial lines running from 9600 bits per second to T1 rates), the route with the lowest metric reflects the most desirable path to a destination.

**Mismatched K Values**

EIGRP K values are the metrics that EIGRP uses to calculate routes. Mismatched K values can prevent neighbor relationships from being established and can negatively impact network convergence. The example given below explains this behavior between two EIGRP peers (Device-A and Device-B).

The following configuration is applied to Device-A. The K values are changed using the `metric weights` command. A value of 2 is entered for the \( k1 \) argument to adjust the bandwidth calculation. A value of 1 is entered for the \( k3 \) argument to adjust the delay calculation.

```bash
Device(config)# hostname Device-A
Device-A(config)# interface serial 0
Device-A(config-if)# ip address 10.1.1.1 255.255.255.0
Device-A(config-if)# exit
Device-A(config)# router eigrp name1
Device-A(config-router)# address-family ipv4 autonomous-system 4533
Device-A(config-router-af)# network 10.1.1.0 0.0.0.255
Device-A(config-router-af)# metric weights 0 2 0 1 0 0 1
```

The following configuration is applied to Device-B, and the default K values are used. The default K values are 1, 0, 1, 0, 0, and 0.

```bash
Device(config)# hostname Device-B
Device-B(config)# interface serial 0
Device-B(config-if)# ip address 10.1.1.2 255.255.255.0
Device-B(config-if)# exit
Device-B(config)# router eigrp name1
Device-B(config-router)# address-family ipv4 autonomous-system 4533
Device-B(config-router-af)# network 10.1.1.0 0.0.0.255
Device-B(config-router-af)# metric weights 0 1 0 1 0 0 0
```

The bandwidth calculation is set to 2 on Device-A and set to 1 (by default) on Device-B. This configuration prevents these peers from forming a neighbor relationship.

The following error message is displayed on the console of Device-B because the K values are mismatched:

```text
*Apr 26 13:48:41.811: %DUAL-5-NBRCHANGE: IP-EIGRP(0) 1: Neighbor 10.1.1.1 (Ethernet0/0) is down: K-value mismatch
```

The following are two scenarios where the above error message can be displayed:

- Two devices are connected on the same link and configured to establish a neighbor relationship. However, each device is configured with different K values.
- One of two peers has transmitted a "peer-termination" message (a message that is broadcast when an EIGRP routing process is shut down), and the receiving device does not support this message. The receiving device will interpret this message as a K-value mismatch.

**Routing Metric Offset Lists**

An offset list is a mechanism for increasing incoming and outgoing metrics to routes learned via EIGRP. Optionally, you can limit the offset list with either an access list or an interface.
Offset lists are available only in IPv4 configurations. IPv6 configurations do not support offset lists.

### EIGRP Cost Metrics

When EIGRP receives dynamic raw radio link characteristics, it computes a composite EIGRP cost metric based on a proprietary formula. To avoid churn in the network as a result of a change in the link characteristics, a tunable dampening mechanism is used.

EIGRP uses metric weights along with a set of vector metrics to compute the composite metric for local RIB installation and route selections. The EIGRP composite cost metric is calculated using the formula:

\[
EIGRP \text{ composite cost metric} = 256*\left( K_1 \times \frac{Bw}{256 - \text{Load}} + \frac{K_2 \times \text{Delay}}{256 - \text{Load}} + \frac{K_3 \times \text{Delay} \times K_5}{\text{Reliability} + K_4}\right)
\]

EIGRP uses one or more vector metrics to calculate the composite cost metric. The table below lists EIGRP vector metrics and their descriptions.

**Table 1: EIGRP Vector Metrics**

<table>
<thead>
<tr>
<th>Vector Metric</th>
<th>Description</th>
</tr>
</thead>
</table>
| bandwidth          | The minimum bandwidth of the route, in kilobits per second. It can be 0 or any positive integer. The bandwidth for the formula is scaled and inverted by the following formula: 
\[\frac{10^7}{\text{minimum bandwidth (Bw) in kilobits per second}}\] |
| delay              | Route delay, in tens of microseconds. |
| delay reliability   | The likelihood of successful packet transmission, expressed as a number between 0 and 255, where 255 means 100 percent reliability and 0 means no reliability. |
| load               | The effective load of the route, expressed as a number from 0 to 255 (255 is 100 percent loading). |
| mtu                | The minimum maximum transmission unit (MTU) size of the route, in bytes. It can be 0 or any positive integer. |

EIGRP monitors metric weights on an interface to allow the tuning of EIGRP metric calculations and indicate the type of service (ToS). The table below lists the K values and their defaults.
Table 2: EIGRP K-Value Defaults

<table>
<thead>
<tr>
<th>Setting</th>
<th>Default Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>K1</td>
<td>1</td>
</tr>
<tr>
<td>K2</td>
<td>0</td>
</tr>
<tr>
<td>K3</td>
<td>1</td>
</tr>
<tr>
<td>K4</td>
<td>0</td>
</tr>
<tr>
<td>K5</td>
<td>0</td>
</tr>
</tbody>
</table>

Most configurations use the delay and bandwidth metrics, with bandwidth taking precedence. The default formula of $256 \times (Bw + Delay)$ is the EIGRP metric. The bandwidth for the formula is scaled and inverted by the following formula:

$\left(\frac{10^7}{\text{minimum Bw in kilobits per second}}\right)$

You can change the weights, but these weights must be the same on all devices.

For example, look at a link whose bandwidth to a particular destination is 128 k and the delay is 84,000 microseconds.

By using a cut-down formula, you can simplify the EIGRP metric calculation to $256 \times (Bw + Delay)$, thus resulting in the following value:

Metric = $256 \times (10^7/128 + 84000/10) = 256 \times 86525 = 22150400$

To calculate route delay, divide the delay value by 10 to get the true value in tens of microseconds.

When EIGRP calculates the delay for Mobile Ad Hoc Networks (MANET) and the delay is obtained from a device interface, the delay is always calculated in tens of microseconds. In most cases, when using MANET, you will not use the interface delay, but rather the delay that is advertised by the radio. The delay you will receive from the radio is in microseconds, so you must adjust the cut-down formula as follows:

Metric = $(256 \times (10^7/128) + (84000 \times 256)/10) = 20000000 + 2150400 = 22150400$

**Route Summarization**

You can configure EIGRP to perform automatic summarization of subnet routes into network-level routes. For example, you can configure subnet 172.16.1.0 to be advertised as 172.16.0.0 over interfaces that have been configured with subnets of 192.168.7.0. Automatic summarization is performed when two or more network router configuration or address family configuration commands are configured for an EIGRP process. This feature is enabled by default.

Route summarization works in conjunction with the `ip summary-address eigrp` command available in interface configuration mode for autonomous system configurations and with the `summary-address` (EIGRP) command for named configurations. You can use these commands to perform additional summarization.
automatic summarization is in effect, there usually is no need to configure network-level summaries using the **ip summary-address eigrp** command. Sometimes, EIGRP summary route might be incorrectly promoted in the topology table when the metric of the summary route and the externally received route match. This occurs if a similar route with a mask is received as external and the same summary prefix or length that originates internally via the summary-address on the interface and sent to next hop neighbors. configure the summary-metric command to increase or decrease the metric of the summary route.

**Summary Aggregate Addresses**

You can configure a summary aggregate address for a specified interface. If there are specific routes in the routing table, EIGRP will advertise the summary address of the interface with a metric equal to the minimum metric of the specific routes.

**Floating Summary Routes**

A floating summary route is created by applying a default route and an administrative distance at the interface level or address family interface level. You can use a floating summary route when configuring the **ip summary-address eigrp** command for autonomous system configurations or the **summary-address** command for named configurations. The following scenarios illustrate the behavior of floating summary routes.

The figure below shows a network with three devices, Device-A, Device-B, and Device-C. Device-A learns a default route from elsewhere in the network and then advertises this route to Device-B. Device-B is configured so that only a default summary route is advertised to Device-C. The default summary route is applied to serial interface 0/1 on Device-B with the following autonomous system configuration:

```
Device-B(config)# interface Serial 0/1
Device-B(config-if)# ip summary-address eigrp 100 0.0.0.0 0.0.0.0
```

The default summary route is applied to serial interface 0/1 on Device-B with the following named configuration:

```
Device-B(config)# Router eigrp virtual-name1
Device-B(config-router)# address-family ipv4 unicast vrf vrf1 autonomous-system 1
```
Device-B(config-router-af)# interface serial 0/1
Device-B(config-router-af-interface)# summary-address 192.168.0.0 255.255.0.0 95

**Figure 1: Floating Summary Route Applied to Device-B**

The configuration of the default summary route on Device-B sends a 0.0.0.0/0 summary route to Device-C and blocks all other routes, including the 10.1.1.0/24 route, from being advertised to Device-C. However, this configuration also generates a local discard route—a route for 0.0.0.0/0 on the null 0 interface with an administrative distance of 5—on Device-B. When this route is created, it overrides the EIGRP-learned default route. Device-B will no longer be able to reach destinations that it would normally reach through the 0.0.0.0/0 route.

This problem is resolved by applying a floating summary route to the interface on Device-B that connects to Device-C. The floating summary route is applied by configuring an administrative distance for the default summary route on the interface of Device-B with the following statement for an autonomous system configuration:

Device-B(config-if)# ip summary-address eigrp 100 0.0.0.0 0.0.0.0 250

The floating summary route is applied by configuring an administrative distance for the default summary route on the interface of Device-B with the following statement for a named configuration:

Device-B(config-if)# ip summary-address eigrp 100 0.0.0.0 0.0.0.0 250

The floating summary route is applied by configuring an administrative distance for the default summary route on the interface of Device-B with the following statement for a named configuration:

Device-B(config-router)# router eigrp virtual-name1
Device-B(config-router-af)# address-family ipv4 unicast vrf vrf1 autonomous-system 1
Device-B(config-router-af)# af-interface serial0/1
Device-B(config-router-af-interface)# summary-address eigrp 100 0.0.0.0 0.0.0.0 250

The administrative distance of 250, applied in the summary-address command, is now assigned to the discard route generated on Device-B. The 0.0.0.0/0, from Device-A, is learned through EIGRP and installed in the local routing table. Routing to Device-C is restored.

If Device-A loses the connection to Device-B, Device-B will continue to advertise a default route to Device-C, which allows traffic to continue to reach destinations attached to Device-B. However, traffic destined to networks connected to Device-A or behind Device-A will be dropped when the traffic reaches Device-B.

The figure below shows a network with two connections from the core, Device-A and Device-D. Both Device-B and Device-E have floating summary routes configured on the interfaces connected to Device-C. If the
connection between Device-E and Device-C fails, the network will continue to operate normally. All traffic will flow from Device-C through Device-B to hosts attached to Device-A and Device-D.

Figure 2: Floating Summary Route Applied for Dual-Homed Remotes

However, if the link between Device-A and Device-B fails, the network may incorrectly direct traffic because Device-B will continue to advertise the default route (0.0.0.0/0) to Device-C. In this scenario, Device-C still forwards traffic to Device-B, but Device-B drops the traffic. To avoid this problem, you should configure the summary address with an administrative distance only on single-homed remote devices or areas that have only one exit point between two segments of the network. If two or more exit points exist (from one segment of the network to another), configuring the floating default route can result in the formation of a black hole route (a route that has quick packet dropping capabilities).

Hello Packets and the Hold-Time Intervals

You can adjust the interval between hello packets and the hold time. Hello packets and hold-time intervals are protocol-independent parameters that work for IP and Internetwork Packet Exchange (IPX).

Routing devices periodically send hello packets to each other to dynamically learn of other devices on their directly attached networks. This information is used to discover neighbors and to learn when neighbors become unreachable or inoperative.

By default, hello packets are sent every 5 seconds. The exception is on low-speed, nonbroadcast multiaccess (NBMA) media, where the default hello interval is 60 seconds. Low speed is considered to be a rate of T1 or slower, as specified with the bandwidth interface configuration command. The default hello interval remains 5 seconds for high-speed NBMA networks. Note that for the purposes of EIGRP, Frame Relay and Switched Multimegabit Data Service (SMDS) networks may or may not be considered to be NBMA. These networks are considered NBMA only if the interface has not been configured to use physical multicasting.
You can configure the hold time on a specified interface for a particular EIGRP routing process designated by the autonomous system number. The hold time is advertised in hello packets and indicates to neighbors the length of time they should consider the sender valid. The default hold time is three times the hello interval or 15 seconds. For slow-speed NBMA networks, the default hold time is 180 seconds.

On very congested and large networks, the default hold time might not be sufficient for all devices to receive hello packets from their neighbors. In such cases, you may want to increase the hold time.

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**Note**

Do not adjust the hold time without informing your technical support personnel.

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**Split Horizon**

Split horizon controls the sending of EIGRP update and query packets. Split horizon is a protocol-independent parameter that works for IP and IPX. When split horizon is enabled on an interface, update and query packets are not sent to destinations for which this interface is the next hop. Controlling update and query packets in this manner reduces the possibility of routing loops.

By default, split horizon is enabled on all interfaces.

Split horizon blocks route information from being advertised by a device out of any interface from which that information originated. This behavior usually optimizes communications among multiple routing devices, particularly when links are broken. However, with nonbroadcast networks (such as Frame Relay and SMDS), situations can arise for which this behavior is less than ideal. In such situations and in networks that have EIGRP configured, you may want to disable split horizon.

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**EIGRP Dual DMVPN Domain Enhancement**

The EIGRP Dual DMVPN Domain Enhancement feature supports the `no next-hop self` command on dual Dynamic Multipoint VPN (DMVPN) domains in both IPv4 and IPv6 configurations.

EIGRP, by default, sets the local outbound interface as the next-hop value while advertising a network to a peer, even when advertising routes out of the interface on which the routes were learned. This default setting can be disabled by using the `no ip next-hop-self` command in autonomous system configurations or the `no next-hop-self` command in named configurations. When the `next-hop self` command is disabled, EIGRP does not advertise the local outbound interface as the next hop if the route has been learned from the same interface. Instead, the received next-hop value is used to advertise learned routes. However, this functionality only evaluates the first entry in the EIGRP table. If the first entry shows that the route being advertised is learned on the same interface, then the received next hop is used to advertise the route. The `no next-hop-self` configuration ignores subsequent entries in the table, which may result in the `no-next-hop-self` configuration being dishonored on other interfaces.

The EIGRP Dual DMVPN Domain Enhancement feature introduces the `no-ecmp-mode` keyword, which is an enhancement to the `no next-hop-self` and `no ip next-hop-self` commands. When this keyword is used, all routes to a network in the EIGRP table are evaluated to check whether routes advertised from an interface were learned on the same interface. If a route advertised by an interface was learned on the same interface, the `no next-hop-self` configuration is honored and the received next hop is used to advertise this route.
Link Bandwidth Percentage

By default, EIGRP packets consume a maximum of 50 percent of the link bandwidth when configured with the `bandwidth` interface configuration command for autonomous system configurations and with the `bandwidth-percent` command for named configurations. You might want to change the bandwidth value if a different level of link utilization is required or if the configured bandwidth does not match the actual link bandwidth (which may have been configured to influence route metric calculations). This is a protocol-independent parameter that works for IP and IPX.

EIGRP vNETs

The EIGRP vNET feature uses Layer 3 routing techniques to provide limited fate sharing (the term fate sharing refers to the failure of interconnected systems; that is, different elements of a network are interconnected in such a way that they either fail together or not at all), traffic isolation, and access control with simple configurations. EIGRP virtual network (vNET) configurations are supported in both autonomous-system configurations and named configurations.

The vNET feature allows you to have multiple virtual networks by utilizing a single set of routers and links provided by the physical topology. Routers and links can be broken down into separate virtual networks using separate routing tables and routing processes by using vNETs and VRF configuration commands. The virtual networks facilitate traffic isolation and limited fate sharing. EIGRP’s primary role in vNETs is to populate routing tables used by each vNET so that appropriate forwarding can take place. In the vNET model, each vNET effectively has its own complete set of EIGRP processes and resources, thus minimizing the possibility of actions within one vNET affecting another vNET.

The vNET feature supports command inheritance that allows commands entered in interface configuration mode to be inherited by every vNET configured on that interface. These inherited commands, including EIGRP interface commands, can be overridden by vNET-specific configurations in vNET submodes under the interface.

The following are some of the limitations of EIGRP vNETs:

- EIGRP does not support Internetwork Packet Exchange (IPX) within a vNET.
- vNET and VRF configurations are mutually exclusive on an interface. Both VRFs and vNETs can be configured on the router, but they cannot both be defined on the same interface. A VRF cannot be configured within a vNET and a vNET cannot be configured within a VRF.
- Each vNET has its own routing table, and routes cannot be redistributed directly from one vNET into another. EIGRP uses the route replication functionality to meet the requirements of shared services and to copy routes from one vNET Routing Information Base (RIB) to other vNET RIBs.
- Bidirectional Forwarding Detection (BFD) is not supported with EIGRP mode vNET.

EIGRP vNET Interface and Command Inheritance

A vNET router supports two types of interfaces: Edge interface and core (shared) interface.

An edge interface is an ingress point for vNET-unaware networks and is restricted to a single VRF. Use the `vrf forwarding` command to associate the edge interface with a VRF. The `vrf forwarding` command also allows entry into VRF submodes used to define interface settings on a per-VRF basis.
A vNET core interface is used to connect vNET-aware systems and can be shared by multiple vNETs. Use the `vnet trunk` command to enable a core interface.

When the `vnet trunk` command exists on an interface, with or without a VRF list, any EIGRP interface commands on that interface will be applied to the EIGRP instance for every vNET on that interface, including the instance running on the base or the global RIB. If the `vnet trunk` command is deleted from the interface, EIGRP interface commands will remain on and apply to only the global EIGRP instance. If an EIGRP interface command is removed from the main interface, the command will also be removed from every vNET on that interface.

End systems or routing protocol peers reached through an edge interface are unaware of vNETs and do not perform the vNET tagging done in the core of the vNET network.

EIGRP also supports the capability of setting per-vNET interface configurations, which allow you to define interface attributes that influence EIGRP behavior for a single vNET. In the configuration hierarchy, a specific vNET interface setting has precedence over settings applied to the entire interface and inherited by each vNET configured on that interface.

EIGRP provides interface commands to modify the EIGRP-specific attributes of an interface, and these interface commands can be entered directly on the interface for EIGRP autonomous system configurations, or in address family interface configuration mode for the EIGRP named mode configurations.

## How to Configure EIGRP

### Enabling EIGRP Autonomous System Configuration

Perform this task to enable EIGRP and create an EIGRP routing process. EIGRP sends updates to interfaces in specified networks. If you do not specify the network of an interface, the interface will not be advertised in any EIGRP update.

Configuring the `router eigrp autonomous-system-number` command creates an EIGRP autonomous system configuration that creates an EIGRP routing instance, which can be used for tagging routing information.

**SUMMARY STEPS**

1. `enable`
2. `configure terminal`
3. `router eigrp autonomous-system-number`
4. `network  network-number`
5. `end`

**DETAILED STEPS**

<table>
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<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong></td>
<td></td>
</tr>
<tr>
<td><code>enable</code></td>
<td>Enables privileged EXEC mode.</td>
</tr>
<tr>
<td>Example:</td>
<td>• Enter your password if prompted.</td>
</tr>
<tr>
<td><code>Device&gt; enable</code></td>
<td></td>
</tr>
<tr>
<td>Step</td>
<td>Command or Action</td>
</tr>
<tr>
<td>------</td>
<td>------------------</td>
</tr>
<tr>
<td>2</td>
<td><code>configure terminal</code></td>
</tr>
<tr>
<td></td>
<td>Example: Device# configure terminal</td>
</tr>
<tr>
<td>3</td>
<td><code>router eigrp autonomous-system-number</code></td>
</tr>
<tr>
<td></td>
<td>Example: Device(config)# router eigrp 1</td>
</tr>
<tr>
<td>4</td>
<td><code>network network-number</code></td>
</tr>
<tr>
<td></td>
<td>Example: Device(config-router)# network 172.16.0.0</td>
</tr>
<tr>
<td>5</td>
<td><code>end</code></td>
</tr>
<tr>
<td></td>
<td>Example: Device(config-router)# end</td>
</tr>
</tbody>
</table>

### Enabling the EIGRP Named Configuration

Perform this task to enable EIGRP and to create an EIGRP routing process. EIGRP sends updates to interfaces in specified networks. If you do not specify the network of an interface, the interface will not be advertised in any EIGRP update.

Configuring the `router eigrp virtual-instance-name` command creates an EIGRP named configuration. The EIGRP named configuration does not create an EIGRP routing instance by itself. The EIGRP named configuration is the base configuration, which is required to define address family configurations used for routing.
### SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **router eigrp virtual-instance-name**
4. Enter one of the following:
   - `address-family ipv4 [multicast] [unicast] [vrf vrf-name] autonomous-system autonomous-system-number`
   - `address-family ipv6 [unicast] [vrf vrf-name] autonomous-system autonomous-system-number`
5. **network ip-address [wildcard-mask]**
6. **end**

### DETAILED STEPS

<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong></td>
<td><strong>enable</strong></td>
</tr>
<tr>
<td>Example:</td>
<td>Device&gt; enable</td>
</tr>
<tr>
<td><strong>Step 2</strong></td>
<td><strong>configure terminal</strong></td>
</tr>
<tr>
<td>Example:</td>
<td>Device# configure terminal</td>
</tr>
<tr>
<td><strong>Step 3</strong></td>
<td><strong>router eigrp virtual-instance-name</strong></td>
</tr>
<tr>
<td>Example:</td>
<td>Device(config)# router eigrp virtual-instance1</td>
</tr>
<tr>
<td><strong>Step 4</strong></td>
<td>Enter one of the following:</td>
</tr>
<tr>
<td></td>
<td>• <code>address-family ipv4 [multicast] [unicast] [vrf vrf-name] autonomous-system autonomous-system-number</code></td>
</tr>
<tr>
<td></td>
<td>• <code>address-family ipv6 [unicast] [vrf vrf-name] autonomous-system autonomous-system-number</code></td>
</tr>
</tbody>
</table>
Configuring Optional EIGRP Parameters in an Autonomous System Configuration

Perform this task to configure optional EIGRP parameters, which include applying offsets to routing metrics, adjusting EIGRP metrics, and disabling automatic summarization in an EIGRP autonomous system configuration.

SUMMARY STEPS

1. enable
2. configure terminal
3. router eigrp autonomous-system
4. network ip-address [wildcard-mask]
5. passive-interface [default] [interface-type interface-number]
6. offset-list [access-list-number | access-list-name] {in | out} offset [interface-type interface-number]
7. metric weights tos k1 k2 k3 k4 k5
8. no auto-summary
9. end

DETAILED STEPS

<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td>enable</td>
</tr>
<tr>
<td></td>
<td>Enables privileged EXEC mode.</td>
</tr>
<tr>
<td>Command or Action</td>
<td>Purpose</td>
</tr>
<tr>
<td>------------------</td>
<td>---------</td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td></td>
</tr>
<tr>
<td>Device&gt; enable</td>
<td>- Enter your password if prompted.</td>
</tr>
<tr>
<td><strong>Step 2</strong></td>
<td>Enters global configuration mode.</td>
</tr>
<tr>
<td>configure terminal</td>
<td></td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td></td>
</tr>
<tr>
<td>Device# configure terminal</td>
<td></td>
</tr>
<tr>
<td><strong>Step 3</strong></td>
<td>Enables an EIGRP routing process and enters router configuration mode.</td>
</tr>
<tr>
<td>router eigrp autonomous-system</td>
<td>- A maximum of 30 EIGRP routing processes can be configured.</td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td></td>
</tr>
<tr>
<td>Device(config)# router eigrp 1</td>
<td></td>
</tr>
<tr>
<td><strong>Step 4</strong></td>
<td>Associates networks with an EIGRP routing process.</td>
</tr>
<tr>
<td>network ip-address [wildcard-mask]</td>
<td></td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td></td>
</tr>
<tr>
<td>Device(config-router)# network 172.16.0.0</td>
<td></td>
</tr>
<tr>
<td><strong>Step 5</strong></td>
<td>(Optional) Suppresses EIGRP hello packets and routing updates on interfaces while still including the interface addresses in the topology database.</td>
</tr>
<tr>
<td>passive-interface [default] [interface-type interface-number]</td>
<td></td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td></td>
</tr>
<tr>
<td>Device(config-router)# passive-interface</td>
<td></td>
</tr>
<tr>
<td><strong>Step 6</strong></td>
<td>(Optional) Applies an offset to routing metrics.</td>
</tr>
<tr>
<td>offset-list [access-list-number</td>
<td>access-list-name] {in</td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td></td>
</tr>
<tr>
<td>Device(config-router)# offset-list 21 in 10 gigabitethernet 0/0/1</td>
<td></td>
</tr>
<tr>
<td><strong>Step 7</strong></td>
<td>(Optional) Adjusts the EIGRP metric or K value.</td>
</tr>
<tr>
<td>metric weights tos k1 k2 k3 k4 k5</td>
<td>- EIGRP uses the following formula to determine the total metric to the network: EIGRP Metric = 256*((K1<em>Bw) + (K2</em>Bw)/(256-Load) + (K3<em>Delay)</em>(K5/(Reliability + K4)))</td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td></td>
</tr>
<tr>
<td>Device(config-router)# metric weights 0 2 0 2 0</td>
<td></td>
</tr>
<tr>
<td><strong>Step 8</strong></td>
<td>(Optional) Disables automatic summarization.</td>
</tr>
<tr>
<td>no auto-summary</td>
<td></td>
</tr>
</tbody>
</table>
### Purpose

- **Command or Action**
  - Example:
    
    ```
    Device(config-router)# no auto-summary
    ```

- **Purpose**
  - **Note** Automatic summarization is enabled by default.

### Step 9

- **end**

- **Example:**
  
  ```
  Device(config-router)# end
  ```

  Exits router configuration mode and returns to privileged EXEC mode.

---

**Configuring Optional EIGRP Parameters in a Named Configuration**

Perform this task to configure optional EIGRP named configuration parameters, which includes applying offsets to routing metrics, adjusting EIGRP metrics, setting the RIB-scaling factor, and disabling automatic summarization.

**SUMMARY STEPS**

1. **enable**
2. **configure terminal**
3. **router eigrp** `virtual-instance-name`
4. Enter one of the following:
   - **address-family ipv4 [unicast] [vrf vrf-name] [multicast] autonomous-system autonomous-system-number**
   - **address-family ipv6 [unicast] [vrf vrf-name] autonomous-system autonomous-system-number**
5. **network** `ip-address` `[wildcard-mask]`
6. **metric weights** `tos k1 k2 k3 k4 k5 k6`
7. **af-interface** `interface-type interface-number`
8. **passive-interface**
9. **bandwidth-percent** `maximum-bandwidth-percentage`
10. **exit-af-interface**
11. **topology** `{base | topology-name tid number}`
12. **offset-list** `[access-list-number | access-list-name]` `{in | out} offset [interface-type interface-number]`
13. **no auto-summary**
14. **end**
## DETAILED STEPS

<table>
<thead>
<tr>
<th>Step</th>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td><strong>enable</strong></td>
<td>Enables privileged EXEC mode.</td>
</tr>
<tr>
<td>Example:</td>
<td>Device&gt; enable</td>
<td>- Enter your password if prompted.</td>
</tr>
<tr>
<td>Step 2</td>
<td><strong>configure terminal</strong></td>
<td>Enters global configuration mode.</td>
</tr>
<tr>
<td>Example:</td>
<td>Device# configure terminal</td>
<td></td>
</tr>
<tr>
<td>Step 3</td>
<td><strong>router eigrp virtual-instance-name</strong></td>
<td>Enables an EIGRP routing process and enters router configuration mode.</td>
</tr>
<tr>
<td>Example:</td>
<td>Device(config)# router eigrp virtual-name1</td>
<td></td>
</tr>
<tr>
<td>Step 4</td>
<td>Enter one of the following:</td>
<td>Enters address family configuration mode to configure an EIGRP IPv4 or IPv6 routing instance.</td>
</tr>
<tr>
<td>• address-family ipv4 [unicast] [vrf vrf-name] [multicast] autonomous-system autonomous-system-number</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• address-family ipv6 [unicast] [vrf vrf-name] autonomous-system autonomous-system-number</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Example:</td>
<td>Device(config-router)# address-family ipv4 autonomous-system 45000 Device(config-router)# address-family ipv6 autonomous-system 45000</td>
<td></td>
</tr>
<tr>
<td>Step 5</td>
<td><strong>network ip-address [wildcard-mask]</strong></td>
<td>Specifies a network for the EIGRP routing process.</td>
</tr>
<tr>
<td>Example:</td>
<td>Device(config-router-af)# network 172.16.0.0</td>
<td></td>
</tr>
<tr>
<td>Step 6</td>
<td><strong>metric weights</strong> <em>tos k1 k2 k3 k4 k5 k6</em></td>
<td>(Optional) Adjusts the EIGRP metric or K value.</td>
</tr>
<tr>
<td>Example:</td>
<td>Device(config-router-af)# metric weights 0 2 0 2 0 0 0</td>
<td></td>
</tr>
</tbody>
</table>

---

Example: EIGRP uses the following formula to determine the total 32-bit metric to the network:

\[
\text{EIGRP Metric} = 256^6 \left( (K1 \times \text{Bw}) + (K2 \times \text{Bw})/(256-\text{Load}) + (K3 \times \text{Delay}) \times (K5/(\text{Reliability} + K4)) \right)
\]

Example: EIGRP uses the following formula to determine the total 64-bit metric to the network:

\[
\text{EIGRP Metric} = 256^6 \left( (K1 \times \text{Throughput}) + (K2 \times \text{Throughput})/(256-\text{Load}) + (K3 \times \text{Latency}) + (K6 \times \text{Extended Attributes}) \times (K5/(\text{Reliability} + K4)) \right)
\]
<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 7</strong> af-interface interface-type interface-number</td>
<td>Enters address family interface configuration mode and configures interface-specific EIGRP commands.</td>
</tr>
<tr>
<td><strong>Example:</strong> Device(config-router-af)# af-interface gigabitethernet 0/0/1</td>
<td></td>
</tr>
<tr>
<td><strong>Step 8</strong> passive-interface</td>
<td>Suppresses EIGRP hello packets and routing updates on interfaces while still including the interface addresses in the topology database.</td>
</tr>
<tr>
<td><strong>Example:</strong> Device(config-router-af-interface)# passive-interface</td>
<td></td>
</tr>
<tr>
<td><strong>Step 9</strong> bandwidth-percent maximum-bandwidth-percentage</td>
<td>Configures the percentage of bandwidth that may be used by an EIGRP address family on an interface.</td>
</tr>
<tr>
<td><strong>Example:</strong> Device(config-router-af-interface)# bandwidth-percent 75</td>
<td></td>
</tr>
<tr>
<td><strong>Step 10</strong> exit-af-interface</td>
<td>Exits address family interface configuration mode.</td>
</tr>
<tr>
<td><strong>Example:</strong> Device(config-router-af-interface)# exit-af-interface</td>
<td></td>
</tr>
<tr>
<td><strong>Step 11</strong> topology {base</td>
<td>topology-name tid number}</td>
</tr>
<tr>
<td><strong>Example:</strong> Device(config-router-af)# topology base</td>
<td></td>
</tr>
<tr>
<td><strong>Step 12</strong> offset-list [access-list-number</td>
<td>access-list-name] {in</td>
</tr>
<tr>
<td><strong>Example:</strong> Device(config-router-af-topology)# offset-list 21 in 10 gigabitethernet 6/2</td>
<td></td>
</tr>
<tr>
<td><strong>Step 13</strong> no auto-summary</td>
<td>(Optional) Disables automatic summarization.</td>
</tr>
<tr>
<td><strong>Example:</strong> Device(config-router-af-topology)# no auto-summary</td>
<td>Note: Automatic summarization is enabled by default.</td>
</tr>
<tr>
<td><strong>Step 14</strong> end</td>
<td>Returns to privileged EXEC mode.</td>
</tr>
<tr>
<td><strong>Example:</strong> Device(config-router-af-topology)# end</td>
<td></td>
</tr>
</tbody>
</table>
Configuring the EIGRP Redistribution Autonomous System Configuration

Perform this task to configure redistribution of non-EIGRP protocol metrics into EIGRP metrics and to configure the EIGRP administrative distance in an EIGRP autonomous system configuration.

You must use a default metric to redistribute a protocol into EIGRP, unless you use the `redistribute` command.

### Note

Metric defaults have been carefully set to work for a wide variety of networks. Take great care when changing these values.

Default metrics are supported only when you are redistributing from EIGRP or static routes.

An administrative distance is a rating of the trustworthiness of a routing information source, such as an individual router or a group of routers. Numerically, an administrative distance is an integer from 0 to 255. In general, the higher the value the lower the trust rating. An administrative distance of 255 means the routing information source cannot be trusted at all and should be ignored.

### SUMMARY STEPS

1. `enable`
2. `configure terminal`
3. `router eigrp autonomous-system`
4. `network ip-address [wildcard-mask]`
5. `redistribute protocol`
6. `distance eigrp internal-distance external-distance`
7. `default-metric bandwidth delay reliability loading mtu`
8. `end`

### DETAILED STEPS

<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
</table>
| **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. |
<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 3</strong></td>
<td>Enables an EIGRP routing process and enters router configuration mode.</td>
</tr>
<tr>
<td>Example:</td>
<td>Device(config)# router eigrp 1</td>
</tr>
<tr>
<td><strong>Step 4</strong></td>
<td>Associates networks with an EIGRP routing process.</td>
</tr>
<tr>
<td>Example:</td>
<td>Device(config-router)# network 172.16.0.0</td>
</tr>
<tr>
<td>Example:</td>
<td>Device(config-router)# redistribute rip</td>
</tr>
<tr>
<td>Example:</td>
<td>Device(config-router)# distance eigrp 80 130</td>
</tr>
<tr>
<td>Example:</td>
<td>Device(config-router)# default-metric 1000 100 250 100 1500</td>
</tr>
<tr>
<td>Example:</td>
<td>Device(config-router)# end</td>
</tr>
</tbody>
</table>

### Configuring the EIGRP Route Summarization Autonomous System Configuration

Perform this task to configure EIGRP to perform automatic summarization of subnet routes into network-level routes in an EIGRP autonomous system configuration.
### SUMMARY STEPS

1. enable  
2. configure terminal  
3. router eigrp autonomous-system  
4. no auto-summary  
5. exit  
6. interface type number  
7. no switchport  
8. bandwidth kbps  
9. ip summary-address eigrp as-number ip-address mask [admin-distance] [leak-map name]  
10. ip bandwidth-percent eigrp as-number percent  
11. end

### DETAILED STEPS

<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
</table>
| **Step 1** enable | Enables privileged EXEC mode.  
| Example: Device> enable |  
| **Step 2** configure terminal | Enters global configuration mode.  
| Example: Device# configure terminal |  
| **Step 3** router eigrp autonomous-system | Enables an EIGRP routing process and enters router configuration mode.  
| Example: Device(config)# router eigrp 101 |  
| **Step 4** no auto-summary | Disables automatic summarization of subnet routes into network-level routes  
| Example: Device(config-router)# no auto-summary |  
| **Step 5** exit | Exits router configuration mode.  
| Example: Device(config-router)# exit |
### Configuring the EIGRP Route Summarization Named Configuration

Perform this task to configure EIGRP to perform automatic summarization of subnet routes into network-level routes in an EIGRP named configuration.

<table>
<thead>
<tr>
<th>Step</th>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 6</strong></td>
<td><code>interface type number</code></td>
<td>Enters interface configuration mode.</td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td><code>Device(config)# interface Gigabitethernet 1/0/3</code></td>
<td></td>
</tr>
<tr>
<td><strong>Step 7</strong></td>
<td><code>no switchport</code></td>
<td>Puts an interface into Layer 3 mode</td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td><code>Device(config-if)# no switchport</code></td>
<td></td>
</tr>
<tr>
<td><strong>Step 8</strong></td>
<td><code>bandwidth kbps</code></td>
<td>Sets the inherited and received bandwidth values for an interface</td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td><code>bandwidth 56</code></td>
<td></td>
</tr>
<tr>
<td><strong>Step 9</strong></td>
<td><code>ip summary-address eigrp as-number ip-address mask [admin-distance] [leak-map name]</code></td>
<td>(Optional) Configures a summary aggregate address.</td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td><code>Device(config-if)# ip summary-address eigrp 100 10.0.0.0 0.0.0.0</code></td>
<td></td>
</tr>
<tr>
<td><strong>Step 10</strong></td>
<td><code>ip bandwidth-percent eigrp as-number percent</code></td>
<td>(Optional) Configures the percentage of bandwidth that may be used by EIGRP on an interface.</td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td><code>Device(config-if)# ip bandwidth-percent eigrp 209 75</code></td>
<td></td>
</tr>
<tr>
<td><strong>Step 11</strong></td>
<td><code>end</code></td>
<td>Exits interface configuration mode and returns to privileged EXEC mode.</td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td><code>Device(config-if)# end</code></td>
<td></td>
</tr>
</tbody>
</table>
SUMMARY STEPS

1. enable
2. configure terminal
3. router eigrp virtual-instance-name
4. Enter one of the following:
   - address-family ipv4 [multicast] [unicast] [vrf vrf-name] autonomous-system autonomous-system-number
   - address-family ipv6 [unicast] [vrf vrf-name] autonomous-system autonomous-system-number
5. af-interface {default | interface-type interface-number}
6. summary-address ip-address mask [administrative-distance [leak-map leak-map-name]]
7. exit-af-interface
8. topology {base | topology-name tid number}
9. summary-metric network-address subnet-mask bandwidth delay reliability load mtu
10. end

DETAILED STEPS

<table>
<thead>
<tr>
<th>Step</th>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td>enable</td>
<td>Enables privileged EXEC mode.</td>
</tr>
<tr>
<td>Example:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Device&gt; enable</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Step 2</td>
<td>configure terminal</td>
<td>Enters global configuration mode.</td>
</tr>
<tr>
<td>Example:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Device# configure terminal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Step 3</td>
<td>router eigrp virtual-instance-name</td>
<td>Enables an EIGRP routing process and enters router configuration mode.</td>
</tr>
<tr>
<td>Example:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Device(config)# router eigrp virtual-name1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Step 4</td>
<td>Enter one of the following:</td>
<td></td>
</tr>
<tr>
<td>• address-family ipv4 [multicast] [unicast] [vrf vrf-name] autonomous-system autonomous-system-number</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• address-family ipv6 [unicast] [vrf vrf-name] autonomous-system autonomous-system-number</td>
<td>Enters address family configuration mode to configure an EIGRP IPv4 or IPv6 routing instance.</td>
<td></td>
</tr>
<tr>
<td>Command or Action</td>
<td>Purpose</td>
<td></td>
</tr>
<tr>
<td>-------------------</td>
<td>---------</td>
<td></td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Device(config-router)# address-family ipv4 autonomous-system 45000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Device(config-router)# address-family ipv6 autonomous-system 45000</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Step 5</strong></td>
<td>af-interface {default</td>
<td>interface-type interface-number}</td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Device(config-router-af)# af-interface gigabitethernet 0/0/1</td>
<td>Enters address family interface configuration mode and configures interface-specific EIGRP commands.</td>
<td></td>
</tr>
<tr>
<td><strong>Step 6</strong></td>
<td>summary-address ip-address mask [administrative-distance [leak-map leak-map-name]]</td>
<td></td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Device(config-router-af-interface)# summary-address 192.168.0.0 255.255.0.0</td>
<td>Configures a summary address for EIGRP.</td>
<td></td>
</tr>
<tr>
<td><strong>Step 7</strong></td>
<td>exit-af-interface</td>
<td></td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Device(config-router-af-interface)# exit-af-interface</td>
<td>Exits address family interface configuration mode.</td>
<td></td>
</tr>
<tr>
<td><strong>Step 8</strong></td>
<td>topology {base</td>
<td>topology-name tid number}</td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Device(config-router-af)# topology base</td>
<td>Configures an EIGRP process to route IP traffic under the specified topology instance and enters address family topology configuration mode.</td>
<td></td>
</tr>
<tr>
<td><strong>Step 9</strong></td>
<td>summary-metric network-address subnet-mask bandwidth delay reliability load mtu</td>
<td></td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Device(config-router-af-topology)# summary-metric 192.168.0.0/16 10000 10 255 1 1500</td>
<td>(Optional) Configures a fixed metric for an EIGRP summary aggregate address.</td>
<td></td>
</tr>
<tr>
<td><strong>Step 10</strong></td>
<td>end</td>
<td></td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Device(config-router-af-topology)# end</td>
<td>Exits address family topology configuration mode and returns to privileged EXEC mode.</td>
<td></td>
</tr>
</tbody>
</table>
### Configuring the EIGRP Event Logging Autonomous System Configuration

#### SUMMARY STEPS

1. enable
2. configure terminal
3. router eigrp autonomous-system
4. eigrp event-log-size size
5. eigrp log-neighbor-changes
6. eigrp log-neighbor-warnings [seconds]
7. end

#### DETAILED STEPS

<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong> enable</td>
<td>Enables privileged EXEC mode.</td>
</tr>
<tr>
<td>Example:</td>
<td>• Enter your password if prompted.</td>
</tr>
<tr>
<td>Device&gt; enable</td>
<td></td>
</tr>
<tr>
<td><strong>Step 2</strong> configure terminal</td>
<td>Enters global configuration mode.</td>
</tr>
<tr>
<td>Example:</td>
<td></td>
</tr>
<tr>
<td>Device# configure terminal</td>
<td></td>
</tr>
<tr>
<td><strong>Step 3</strong> router eigrp autonomous-system</td>
<td>Enables an EIGRP routing process and enters router configuration mode.</td>
</tr>
<tr>
<td>Example:</td>
<td>• A maximum of 30 EIGRP routing processes can be configured.</td>
</tr>
<tr>
<td>Device(config)# router eigrp 101</td>
<td></td>
</tr>
<tr>
<td><strong>Step 4</strong> eigrp event-log-size size</td>
<td>(Optional) Sets the size of the EIGRP event log.</td>
</tr>
<tr>
<td>Example:</td>
<td></td>
</tr>
<tr>
<td>Device(config-router)# eigrp event-log-size 5000010</td>
<td></td>
</tr>
<tr>
<td><strong>Step 5</strong> eigrp log-neighbor-changes</td>
<td>(Optional) Enables logging of EIGRP neighbor adjacency changes.</td>
</tr>
<tr>
<td>Example:</td>
<td>• By default, the system logs EIGRP neighbor adjacency changes to help you monitor the stability of the routing system and detect problems.</td>
</tr>
<tr>
<td>Device(config-router)# eigrp log-neighbor-changes</td>
<td></td>
</tr>
</tbody>
</table>
### Configuring the EIGRP Event Logging Named Configuration

#### SUMMARY STEPS

1. `enable`
2. `configure terminal`
3. `router eigrp virtual-instance-name`
4. Enter one of the following:
   - `address-family ipv4 [multicast] [unicast] [vrf vrf-name] autonomous-system autonomous-system-number`
   - `address-family ipv6 [unicast] [vrf vrf-name] autonomous-system autonomous-system-number`
5. `eigrp log-neighbor-warnings [seconds]`
6. `eigrp log-neighbor-changes`
7. `topology {base | topology-name tid number}`
8. `eigrp event-log-size size`
9. `end`

#### DETAILED STEPS

<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong></td>
<td>Enables privileged EXEC mode.</td>
</tr>
<tr>
<td><code>enable</code></td>
<td></td>
</tr>
<tr>
<td>Example: Device&gt; enable</td>
<td></td>
</tr>
<tr>
<td><strong>Step 6</strong></td>
<td>(Optional) Enables the logging of EIGRP neighbor warning messages.</td>
</tr>
<tr>
<td><code>eigrp log-neighbor-warnings [seconds]</code></td>
<td></td>
</tr>
<tr>
<td>Example: Device(config-router)# eigrp log-neighbor-warnings 300</td>
<td></td>
</tr>
<tr>
<td><strong>Step 7</strong></td>
<td>Exits router configuration mode and returns to privileged EXEC mode.</td>
</tr>
<tr>
<td><code>end</code></td>
<td></td>
</tr>
<tr>
<td>Example: Device(config-router)# end</td>
<td></td>
</tr>
<tr>
<td>Step</td>
<td>Command or Action</td>
</tr>
<tr>
<td>-------</td>
<td>-------------------</td>
</tr>
<tr>
<td><strong>Step 2</strong></td>
<td>configure terminal</td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td>Device# configure terminal</td>
</tr>
<tr>
<td><strong>Step 3</strong></td>
<td>router eigrp virtual-instance-name</td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td>Device(config)# router eigrp virtual-name1</td>
</tr>
</tbody>
</table>
| **Step 4** | Enter one of the following:  
• address-family ipv4 [multicast] [unicast] [vrf vrf-name] autonomous-system autonomous-system-number  
• address-family ipv6 [unicast] [vrf vrf-name] autonomous-system autonomous-system-number | Enters address family configuration mode to configure an EIGRP IPv4 or IPv6 routing instance. |
| **Example:** | Device(config-router)# address-family ipv4 autonomous-system 45000  
Device(config-router)# address-family ipv6 autonomous-system 45000 |
| **Step 5** | eigrp log-neighbor-warnings [seconds] | (Optional) Enables the logging of EIGRP neighbor warning messages. |
| **Example:** | Device(config-router-af)# eigrp log-neighbor-warnings 300 |
| **Step 6** | eigrp log-neighbor-changes | (Optional) Enables logging of EIGRP neighbor adjacency changes.  
• By default, the system logs EIGRP neighbor adjacency changes to help you monitor the stability of the routing system and detect problems. |
| **Example:** | Device(config-router-af)# eigrp log-neighbor-changes |
| **Step 7** | topology {base | topology-name tid number} | Configures an EIGRP process to route IP traffic under the specified topology instance and enters address family topology configuration mode. |
| **Example:** | Device(config-router-af)# topology base |
Step 8
<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>eigrp event-log-size size</code></td>
<td>(Optional) Sets the size of the EIGRP event log.</td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td></td>
</tr>
<tr>
<td><code>Device(config-router-af-topology)# eigrp event-log-size 10000</code></td>
<td></td>
</tr>
</tbody>
</table>

Step 9
<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>end</code></td>
<td>Exits address family topology configuration mode and returns to privileged EXEC mode.</td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td></td>
</tr>
<tr>
<td><code>Device(config-router-af-topology)# end</code></td>
<td></td>
</tr>
</tbody>
</table>

### Configuring Equal and Unequal Cost Load Balancing Autonomous System Configuration

#### SUMMARY STEPS

1. `enable`
2. `configure terminal`
3. `router eigrp autonomous-system`
4. `traffic-share balanced`
5. `maximum-paths number-of-paths`
6. `variance multiplier`
7. `end`

#### DETAILED STEPS

<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong></td>
<td>Enables privileged EXEC mode.</td>
</tr>
<tr>
<td><code>enable</code></td>
<td></td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td></td>
</tr>
<tr>
<td><code>Device&gt; enable</code></td>
<td></td>
</tr>
</tbody>
</table>

<p>| <strong>Step 2</strong> | Enters global configuration mode. |
| <code>configure terminal</code> | |
| <strong>Example:</strong> | |
| <code>Device# configure terminal</code> | |</p>
<table>
<thead>
<tr>
<th>Step 3</th>
<th><strong>Command or Action</strong></th>
<th><strong>Purpose</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>router eigrp</strong> <em>autonomous-system</em></td>
<td>Enables an EIGRP routing process and enters router configuration mode.</td>
</tr>
<tr>
<td></td>
<td><strong>Example:</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Device(config)# router eigrp 101</td>
<td>• A maximum of 30 EIGRP routing processes can be configured.</td>
</tr>
<tr>
<td>Step 4</td>
<td><strong>traffic-share</strong> <em>balanced</em></td>
<td>Controls how traffic is distributed among routes when multiple routes for the same destination network have different costs.</td>
</tr>
<tr>
<td></td>
<td><strong>Example:</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Device(config-router)# traffic-share balanced</td>
<td></td>
</tr>
<tr>
<td>Step 5</td>
<td><strong>maximum-paths</strong> <em>number-of-paths</em></td>
<td>Controls the maximum number of parallel routes that an IP routing protocol can support.</td>
</tr>
<tr>
<td></td>
<td><strong>Example:</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Device(config-router)# maximum-paths 5</td>
<td></td>
</tr>
<tr>
<td>Step 6</td>
<td><strong>variance</strong> <em>multiplier</em></td>
<td>Controls load balancing in an internetwork based on EIGRP.</td>
</tr>
<tr>
<td></td>
<td><strong>Example:</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Device(config-router)# variance 1</td>
<td></td>
</tr>
<tr>
<td>Step 7</td>
<td><strong>end</strong></td>
<td>Exits router configuration mode and returns to privileged EXEC mode.</td>
</tr>
<tr>
<td></td>
<td><strong>Example:</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Device(config-router)# end</td>
<td></td>
</tr>
</tbody>
</table>
**Configuring Equal and Unequal Cost Load Balancing Named Configuration**

**SUMMARY STEPS**

1. **enable**
2. **configure terminal**
3. **router eigrp virtual-instance-name**
4. Enter one of the following:
   - address-family ipv4 {multicast} [unicast] [vrf vrf-name] autonomous-system autonomous-system-number
   - address-family ipv6 [unicast] [vrf vrf-name] autonomous-system autonomous-system-number
5. **topology** {base | topology-name tid number}
6. **traffic-share** balanced
7. **maximum-paths** number-of-paths
8. **variance** multiplier
9. **end**

**DETAILED STEPS**

<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong></td>
<td>Enables privileged EXEC mode.</td>
</tr>
<tr>
<td>enable</td>
<td>Enables privileged EXEC mode.</td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td>Enter your password if prompted.</td>
</tr>
<tr>
<td>Device&gt; enable</td>
<td></td>
</tr>
<tr>
<td><strong>Step 2</strong></td>
<td>Enters global configuration mode.</td>
</tr>
<tr>
<td>configure terminal</td>
<td>Enters global configuration mode.</td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td></td>
</tr>
<tr>
<td>Device# configure terminal</td>
<td></td>
</tr>
<tr>
<td><strong>Step 3</strong></td>
<td>Enables an EIGRP routing process and enters router configuration mode.</td>
</tr>
<tr>
<td>router eigrp virtual-instance-name</td>
<td>Enables an EIGRP routing process and enters router configuration mode.</td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td></td>
</tr>
<tr>
<td>Device(config)# router eigrp virtual-name1</td>
<td></td>
</tr>
<tr>
<td><strong>Step 4</strong></td>
<td>Enters address family configuration mode to configure an EIGRP IPv4 or IPv6 routing instance.</td>
</tr>
<tr>
<td>Enter one of the following:</td>
<td>Enters address family configuration mode to configure an EIGRP IPv4 or IPv6 routing instance.</td>
</tr>
<tr>
<td>• address-family ipv4 {multicast} [unicast] [vrf vrf-name] autonomous-system autonomous-system-number</td>
<td></td>
</tr>
<tr>
<td>• address-family ipv6 [unicast] [vrf vrf-name] autonomous-system autonomous-system-number</td>
<td></td>
</tr>
<tr>
<td>Command or Action</td>
<td>Purpose</td>
</tr>
<tr>
<td>-------------------</td>
<td>---------</td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td></td>
</tr>
<tr>
<td>Device(config-router)# address-family ipv4 autonomous-system 45000</td>
<td></td>
</tr>
<tr>
<td>Device(config-router)# address-family ipv6 autonomous-system 45000</td>
<td></td>
</tr>
<tr>
<td><strong>Step 5</strong> topology {base</td>
<td>topology-name tid number}</td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td></td>
</tr>
<tr>
<td>Device(config-router-af)# topology base</td>
<td></td>
</tr>
<tr>
<td><strong>Step 6</strong> traffic-share balanced</td>
<td>Controls how traffic is distributed among routes when multiple routes for the same destination network have different costs.</td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td></td>
</tr>
<tr>
<td>Device(config-router-af-topology)# traffic-share balanced</td>
<td></td>
</tr>
<tr>
<td><strong>Step 7</strong> maximum-paths number-of-paths</td>
<td>Controls the maximum number of parallel routes that an IP routing protocol can support.</td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td></td>
</tr>
<tr>
<td>Device(config-router-af-topology)# maximum-paths 5</td>
<td></td>
</tr>
<tr>
<td><strong>Step 8</strong> variance multiplier</td>
<td>Controls load balancing in an internetwork based on EIGRP.</td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td></td>
</tr>
<tr>
<td>Device(config-router-af-topology)# variance 1</td>
<td></td>
</tr>
<tr>
<td><strong>Step 9</strong> end</td>
<td>Exits address family topology configuration mode and returns to privileged EXEC mode.</td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td></td>
</tr>
<tr>
<td>Device(config-router-af-topology)# end</td>
<td></td>
</tr>
</tbody>
</table>

**Adjusting the Interval Between Hello Packets and the Hold Time in an Autonomous System Configuration**

**Note** Cisco recommends not to adjust the hold time.
## SUMMARY STEPS

1. `enable`
2. `configure terminal`
3. `router eigrp autonomous-system-number`
4. `exit`
5. `interface type number`
6. `no switchport`
7. `ip hello-interval eigrp autonomous-system-number seconds`
8. `ip hold-time eigrp autonomous-system-number seconds`
9. `end`

## DETAILED STEPS

<table>
<thead>
<tr>
<th>Step</th>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
</table>
| **Step 1** | `enable` | Enables privileged EXEC mode.  
• Enter your password if prompted. |
| **Example:** | Device> enable | |
| **Step 2** | `configure terminal` | Enters global configuration mode. |
| **Example:** | Device# configure terminal | |
| **Step 3** | `router eigrp autonomous-system-number` | Enables an EIGRP routing process and enters router configuration mode.  
• A maximum of 30 EIGRP routing processes can be configured. |
| **Example:** | Device(config)# router eigrp 101 | |
| **Step 4** | `exit` | Exits to global configuration mode. |
| **Example:** | Device(config-router)# exit | |
| **Step 5** | `interface type number` | Enters interface configuration mode. |
| **Example:** | Device(config)# interface Gigabitethernet 1/0/9 | |
| **Step 6** | `no switchport` | Puts an interface into Layer 3 mode |
| **Example:** | Device(config-if)# no switchport | |
### Purpose

#### Command or Action

<table>
<thead>
<tr>
<th>Step</th>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 7</td>
<td><code>ip hello-interval eigrp autonomous-system-number seconds</code></td>
<td>Configures the hello interval for an EIGRP routing process.</td>
</tr>
<tr>
<td>Example:</td>
<td>Device(config-if)# ip hello-interval eigrp 109 10</td>
<td></td>
</tr>
<tr>
<td>Step 8</td>
<td><code>ip hold-time eigrp autonomous-system-number seconds</code></td>
<td>Configures the hold time for an EIGRP routing process.</td>
</tr>
<tr>
<td>Note</td>
<td>Do not adjust the hold time without consulting your technical support personnel.</td>
<td></td>
</tr>
<tr>
<td>Example:</td>
<td>Device(config-if)# ip hold-time eigrp 109 40</td>
<td></td>
</tr>
<tr>
<td>Step 9</td>
<td><code>end</code></td>
<td>Exits interface configuration mode and returns to privileged EXEC mode.</td>
</tr>
<tr>
<td>Example:</td>
<td>Device(config-if)# end</td>
<td></td>
</tr>
</tbody>
</table>

### Adjusting the Interval Between Hello Packets and the Hold Time in a Named Configuration

**Note**

Do not adjust the hold time without consulting your technical support personnel.

### SUMMARY STEPS

1. `enable`
2. `configure terminal`
3. `router eigrp virtual-instance-name`
4. Enter one of the following:
   - `address-family ipv4 [multicast] [unicast] [vrf vrf-name] autonomous-system autonomous-system-number`
   - `address-family ipv6 [unicast] [vrf vrf-name] autonomous-system autonomous-system-number`
5. `af-interface {default | interface-type interface-number}`
6. `hello-interval seconds`
7. `hold-time seconds`
8. `end`
### DETAILED STEPS

<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong></td>
<td>Enable privileged EXEC mode.</td>
</tr>
<tr>
<td><code>enable</code></td>
<td>• Enter your password if prompted.</td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td></td>
</tr>
<tr>
<td><code>Device&gt; enable</code></td>
<td></td>
</tr>
</tbody>
</table>

| **Step 2**        | Enters global configuration mode. |
| `configure terminal` | |
| **Example:**      | |
| `Device# configure terminal` | |

| **Step 3**        | Enables an EIGRP routing process and enters router configuration mode. |
| `router eigrp virtual-instance-name` | |
| **Example:**      | |
| `Device(config)# router eigrp virtual-name1` | |

| **Step 4**        | Enters address family configuration mode to configure an EIGRP IPv4 or IPv6 routing instance. |
| Enter one of the following: | |
| • `address-family ipv4 [multicast] [unicast] [vrf vrf-name] autonomous-system autonomous-system-number` | |
| • `address-family ipv6 [unicast] [vrf vrf-name] autonomous-system autonomous-system-number` | |
| **Example:**      | |
| `Device(config-router)# address-family ipv4 autonomous-system 45000` | |
| `Device(config-router)# address-family ipv6 autonomous-system 45000` | |

| **Step 5**        | Enters address family interface configuration mode and configures interface-specific EIGRP commands. |
| `af-interface {default | interface-type interface-number}` | |
| **Example:**      | |
| `Device(config-router-af)# af-interface gigabitethernet 0/0/1` | |

| **Step 6**        | Configures the hello interval for an EIGRP address family named configuration. |
| `hello-interval seconds` | |
| **Example:**      | |
| `Device(config-router-af-interface)# hello-interval 10` | |
### Purpose

#### Command or Action

<table>
<thead>
<tr>
<th>Step 7</th>
<th>hold-time  seconds</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Configures the hold time for an EIGRP address family named configuration.</td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td>Device(config-router-af-interface)# hold-time 50</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Step 8</th>
<th>end</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Exits address family interface configuration mode and returns to privileged EXEC mode.</td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td>Device(config-router-af-interface)# end</td>
<td></td>
</tr>
</tbody>
</table>

### Disabling the Split Horizon Autonomous System Configuration

Split horizon controls the sending of EIGRP updates and query packets. When split horizon is enabled on an interface, updates and query packets are not sent for destinations for which this interface is the next hop. Controlling updates and query packets in this manner reduces the possibility of routing loops.

By default, split horizon is enabled on all interfaces.

**SUMMARY STEPS**

1. enable
2. configure terminal
3. interface type number
4. no ip split-horizon eigrp autonomous-system-number
5. end

**DETAILED STEPS**

<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong> enable</td>
<td>Enables privileged EXEC mode.</td>
</tr>
<tr>
<td><strong>Example:</strong> Device&gt; enable</td>
<td></td>
</tr>
<tr>
<td><strong>Step 2</strong> configure terminal</td>
<td>Enters global configuration mode.</td>
</tr>
<tr>
<td><strong>Example:</strong> Device# configure terminal</td>
<td></td>
</tr>
<tr>
<td>Command or Action</td>
<td>Purpose</td>
</tr>
<tr>
<td>-------------------</td>
<td>---------</td>
</tr>
<tr>
<td><strong>Step 3</strong></td>
<td></td>
</tr>
<tr>
<td><code>interface type number</code></td>
<td>Configures an interface and enters interface configuration mode.</td>
</tr>
<tr>
<td>Example:</td>
<td></td>
</tr>
<tr>
<td>Device(config)# interface gigabitethernet 0/1</td>
<td></td>
</tr>
</tbody>
</table>

| **Step 4**        |         |
| `no ip split-horizon eigrp autonomous-system-number` | Disables split horizon. |
| Example:           |         |
| Device(config-if)# no ip split-horizon eigrp 101 | |

| **Step 5**        |         |
| `end`             | Exits interface configuration mode and returns to privileged EXEC mode. |
| Example:           |         |
| Device(config-if)# end | |

### Disabling the Split Horizon and Next-Hop-Self Named Configuration

EIGRP, by default, sets the next-hop value to the local outbound interface address for routes that it is advertising, even when advertising those routes back from the same interface from where they were learned. Perform this task to change this default setting and configure EIGRP to use the received next-hop value when advertising these routes. Disabling next-hop-self is primarily useful in DMVPN spoke-to-spoke topologies.

By default, split horizon is enabled on all interfaces.

### SUMMARY STEPS

1. `enable`
2. `configure terminal`
3. `router eigrp virtual-instance-name`
4. Enter one of the following:
   - `address-family ipv4 [multicast] [unicast] [vrf vrf-name] autonomous-system autonomous-system-number`
   - `address-family ipv6 [unicast] [vrf vrf-name] autonomous-system autonomous-system-number`
5. `af-interface {default | interface-type interface-number}`
6. `no split-horizon`
7. `no next-hop-self [no-ecmp-mode]`
8. `end`
## Detailed Steps

<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong></td>
<td></td>
</tr>
<tr>
<td><code>enable</code></td>
<td>Enables privileged EXEC mode.</td>
</tr>
<tr>
<td>Example:</td>
<td>• Enter your password if prompted.</td>
</tr>
<tr>
<td>Device&gt; enable</td>
<td></td>
</tr>
</tbody>
</table>

| **Step 2**        |         |
| `configure terminal` | Enters global configuration mode. |
| Example:          | Device# configure terminal |

| **Step 3**        |         |
| `router eigrp virtual-instance-name` | Enables an EIGRP routing process and enters router configuration mode. |
| Example:          | Device(config)# router eigrp virtual-instance-name |

| **Step 4**        |         |
| Enter one of the following: | Enters address family configuration mode to configure an EIGRP IPv4 or IPv6 routing instance. |
| - `address-family ipv4 [multicast] [unicast] [vrf vrf-name] autonomous-system autonomous-system-number` | |
| - `address-family ipv6 [unicast] [vrf vrf-name] autonomous-system autonomous-system-number` | |
| Example:          | Device(config-router)# address-family ipv4 autonomous-system 45000 |
|                   | Device(config-router)# address-family ipv6 autonomous-system 45000 |

| **Step 5**        |         |
| `af-interface {default | interface-type interface-number}` | Enters address family interface configuration mode and configures interface-specific EIGRP commands. |
| Example:          | Device(config-router-af)# af-interface gigabitethernet 0/0/1 |

<p>| <strong>Step 6</strong>        |         |
| <code>no split-horizon</code> | Disables EIGRP split horizon. |
| Example:          | Device(config-router-af)# no split-horizon |</p>
<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
</table>
| **Step 7** no next-hop-self [no-ecmp-mode] | (Optional) Instructs an EIGRP router to use the received next hop rather than the local outbound interface address as the next hop.  
  - The **no-ecmp-mode** keyword is an enhancement to the **no next-hop-self** command. When this optional keyword is enabled, all paths to a network in the EIGRP table are evaluated to check whether routes advertised from an interface were learned on the same interface. |

**Example:**
```
Device(config-router-af-interface)# no next-hop-self no-ecmp-mode
```

<table>
<thead>
<tr>
<th><strong>Step 8</strong> end</th>
<th>Exits address family interface configuration mode and returns to privileged EXEC mode.</th>
</tr>
</thead>
</table>

**Example:**
```
Device(config-router-af-interface)# end
```

---

**Monitoring and Maintaining the EIGRP Autonomous System Configuration**

This task is optional. Use the commands in any order desired to monitor and maintain EIGRP autonomous system configuration.

**SUMMARY STEPS**

1. enable
2. show ip eigrp [vrf {vrf-name | *}] [autonomous-system-number] accounting
3. show ip eigrp events [starting-event-number ending-event-number] [type]
4. show ip eigrp interfaces [vrf {vrf-name | *}] [autonomous-system-number] [type number] [detail]
5. show ip eigrp [vrf {vrf-name | *}] [autonomous-system-number] topology [ip-address [mask]] | [name] [active | all-links | detail-links | pending | summary | zero-successors]
6. show ip eigrp [vrf {vrf-name | *}] [autonomous-system-number] topology [ip-address [mask]] | [name] [active | all-links | detail-links | pending | summary | zero-successors]
7. show ip eigrp [vrf {vrf-name | *}] [autonomous-system-number] traffic

**DETAILED STEPS**

**Step 1** enable

Enables privileged EXEC mode. Enter your password if prompted.
Example:

Device# enable

Step 2  show ip eigrp [vrf {vrf-name | *}] [autonomous-system-number] accounting
Displays prefix accounting information for EIGRP processes.

Example:
Device# show ip eigrp vrf VRF1 accounting

Step 3  show ip eigrp events [starting-event-number ending-event-number] [type]
Displays information about interfaces that are configured for EIGRP.

Example:
Device# show ip eigrp events

Step 4  show ip eigrp interfaces [vrf {vrf-name | *}] [autonomous-system-number] [type number] [detail]
Displays neighbors discovered by EIGRP.

Example:
Device# show ip eigrp interfaces

Step 5  show ip eigrp [vrf {vrf-name | *}] [autonomous-system-number] topology [ip-address [mask]] | [name] [active | all-links
| detail-links | pending | summary | zero-successors]
Displays neighbors discovered by EIGRP.

Example:
Device# show ip eigrp neighbors

Step 6  show ip eigrp [vrf {vrf-name | *}] [autonomous-system-number] topology [ip-address [mask]] | [name] [active | all-links
| detail-links | pending | summary | zero-successors]
Displays entries in the EIGRP topology table.

Example:
Device# show ip eigrp topology

Step 7  show ip eigrp [vrf {vrf-name | *}] [autonomous-system-number] traffic
Displays the number of EIGRP packets sent and received.

Example:
Device# show ip eigrp traffic
Monitoring and Maintaining the EIGRP Named Configuration

This task is optional. Use the commands in any order desired to monitor and maintain the EIGRP named configuration.

SUMMARY STEPS

1. enable
2. show eigrp address-family {ipv4 | ipv6} [vrf vrf-name] [autonomous-system-number] [multicast] accounting
3. show eigrp address-family {ipv4 | ipv6} [vrf vrf-name] [autonomous-system-number] [multicast] events [starting-event-number ending-event-number] [errmsg [starting-event-number ending-event-number]] [sia [starting-event-number ending-event-number]] [type]
4. show eigrp address-family {ipv4 | ipv6} [vrf vrf-name] [autonomous-system-number] [multicast] interfaces [detail] [interface-type interface-number]
5. show eigrp address-family {ipv4 | ipv6} [vrf vrf-name] [autonomous-system-number] [multicast] neighbors [static] [detail] [interface-type interface-number]
6. show eigrp address-family {ipv4 | ipv6} [vrf vrf-name] [autonomous-system-number] [multicast] timers
7. show eigrp address-family {ipv4 | ipv6} [vrf vrf-name] [autonomous-system-number] [multicast] topology [topology-name] [active] [all-links] [detail-links] [pending] [summary] [zero-successors] [route-type {connected | external | internal | local | redistributed | summary | vpn}]
8. show eigrp address-family {ipv4 | ipv6} [vrf vrf-name] [autonomous-system-number] [multicast] traffic
9. show eigrp plugins [plugin-name] [detailed]
10. show eigrp protocols [vrf vrf-name]

DETAILED STEPS

Step 1 enable
Enables privileged EXEC mode. Enter your password if prompted.

Example:
Device# enable

Step 2 show eigrp address-family {ipv4 | ipv6} [vrf vrf-name] [autonomous-system-number] [multicast] accounting
Displays prefix accounting information for EIGRP processes.

Example:
Device# show eigrp address-family ipv4 22 accounting

Step 3 show eigrp address-family {ipv4 | ipv6} [vrf vrf-name] [autonomous-system-number] [multicast] events [starting-event-number ending-event-number] [errmsg [starting-event-number ending-event-number]] [sia [starting-event-number ending-event-number]] [type]
Displays information about EIGRP address-family events.
Example:

Device# show eigrp address-family ipv4 3 events

Step 4  show eigrp address-family {ipv4 | ipv6} [vrf vrf-name] [autonomous-system-number] [multicast] interfaces [detail] [interface-type interface-number]
Displays information about interfaces that are configured for EIGRP.

Example:

Device# show eigrp address-family ipv4 4453 interfaces

Step 5  show eigrp address-family {ipv4 | ipv6} [vrf vrf-name] [autonomous-system-number] [multicast] neighbors [static] [detail] [interface-type interface-number]
Displays the neighbors that are discovered by EIGRP.

Example:

Device# show eigrp address-family ipv4 4453 neighbors

Step 6  show eigrp address-family {ipv4 | ipv6} [vrf vrf-name] [autonomous-system-number] [multicast] timers
Displays information about EIGRP timers and expiration times.

Example:

Device# show eigrp address-family ipv4 4453 timers

Step 7  show eigrp address-family {ipv4 | ipv6} [vrf vrf-name] [autonomous-system-number] [multicast] topology [topology-name] [ip-address] [active] [all-links] [detail-links] [pending] [summary] [zero-successors] [route-type {connected | external | internal | local | redistributed | summary | vpn}]
Displays entries in the EIGRP topology table.

Example:

Device# show eigrp address-family ipv4 4453 topology

Step 8  show eigrp address-family {ipv4 | ipv6} [vrf vrf-name] [autonomous-system-number] [multicast] traffic
Displays the number of EIGRP packets that are sent and received.

Example:

Device# show eigrp address-family ipv4 4453 traffic

Step 9  show eigrp plugins [plugin-name] [detailed]
Displays general information, including the versions of the EIGRP protocol features that are currently running on the device.
Example:
Device# show eigrp plugins

Step 10 show eigrp protocols [vrf vrf-name]
Displays further information about EIGRP protocols that are currently running on a device.

Example:
Device# show eigrp protocols

---

**Configuration Examples for EIGRP**

**Example: Enabling EIGRP—Autonomous System Configuration**

Device> enable
Device# configure terminal
Device(config)# router eigrp 1
Device(config-router)# network 172.16.0.0

**Example: Enabling EIGRP—Named Configuration**

Device> enable
Device# configure terminal
Device(config)# router eigrp virtual-name1
Device(config-router)# address-family ipv4 autonomous-system 45000
Device(config-router-af)# network 172.16.0.0

**Example: EIGRP Parameters—Autonomous System Configuration**

The following example shows how to configure optional EIGRP autonomous system configuration parameters, including applying offsets to routing metrics, adjusting EIGRP metrics, and disabling automatic summarization:

Device> enable
Device# configure terminal
Device(config)# router eigrp 1
Device(config-router)# network 172.16.0.0
Device(config-router)# passive-interface
Device(config-router)# offset-list 21 in 10 ethernet 0
Device(config-router)# metric weights 0 2 0 2 0 0
Device(config-router)# no auto-summary
Device(config-router)# exit
Example: EIGRP Parameters—Named Configuration

The following example shows how to configure optional EIGRP named configuration parameters, including applying offsets to routing metrics, adjusting EIGRP metrics, setting RIB-scaling factor, and disabling automatic summarization.

```
Device> enable  
Device# configure terminal  
Device(config)# router eigrp virtual-name1  
Device(config-router)# address-family ipv4 autonomous-system 45000  
Device(config-router-af)# network 172.16.0.0  
Device(config-router-af)# metric weights 0 2 0 2 0 0 0  
Device(config-router-af)# metric rib-scale 100  
Device(config-router-af)# af-interface gigabitethernet 0/0/1  
Device(config-router-af)# passive-interface  
Device(config-router-af)# bandwidth-percent 75  
Device(config-router-af)# exit-af-interface  
Device(config-router-af)# topology base  
Device(config-router-af-topology)# offset-list 21 in 10 gigabitethernet 0/0/1  
Device(config-router-af-topology)# no auto-summary  
Device(config-router-af-topology)# exit-af-topology
```

Example: EIGRP Redistribution—Autonomous System Configuration

The following example shows how to configure redistribution of non-EIGRP protocol metrics into EIGRP metrics and configure the EIGRP administrative distance in an EIGRP autonomous system configuration:

```
Device> enable  
Device# configure terminal  
Device(config)# router eigrp 1  
Device(config-router)# network 172.16.0.0  
Device(config-router)# redistribute rip  
Device(config-router)# distance eigrp 80 130  
Device(config-router)# default-metric 1000 100 250 100 1500
```

Example: EIGRP Route Summarization—Autonomous System Configuration

The following example shows how to configure route summarization on an interface and configure the automatic summary feature for an EIGRP autonomous system configuration. The following configuration causes EIGRP to summarize the network from Ethernet interface 0/0.

```
Device> enable  
Device# configure terminal  
Device(config)# router eigrp 101  
Device(config-router)# no auto-summary  
Device(config-router)# exit  
Device(config)# interface Gigabitethernet 1/0/1  
Device(config-if)# no switchport  
Device(config-if)# bandwidth 56  
Device(config-if)# ip summary-address eigrp 100 0.0.0.0 0.0.0.0  
Device(config-if)# ip bandwidth-percent eigrp 209 75
```
You should not use the `ip summary-address eigrp` summarization command to generate the default route (0.0.0.0) from an interface because this creates an EIGRP summary default route to the null 0 interface with an administrative distance of 5. The low administrative distance of this default route can cause this route to displace default routes learned from other neighbors through the routing table. If the default route learned from the neighbors is displaced by the summary default route, or if the summary route is the only default route present, all traffic destined for the default route will not leave the router; instead, traffic will be sent to the null 0 interface, where it is dropped. The recommended way to send only the default route out of a given interface is to use the `distribute-list` command. You can configure this command to filter all outbound route advertisements sent out from the interface with the exception of the default (0.0.0.0).

---

**Example: EIGRP Route Summarization—Named Configuration**

The following example shows how to configure route summarization on an interface and configure the automatic summary feature for an EIGRP named configuration. This configuration causes EIGRP to summarize network 192.168.0.0 only from Ethernet interface 0/0.

```plaintext
Device> enable
Device# configure terminal
Device(config)# router eigrp virtual-name1
Device(config-router)# address-family ipv4 autonomous-system 45000
Device(config-router-af)# af-interface ethernet 0/0
Device(config-router-af-interface)# summary-address 192.168.0.0 255.255.0.0
Device(config-router-af-interface)# exit-af-interface
Device(config-router-af)# topology base
Device(config-router-af-topology)# summary-metric 192.168.0.0/16 10000 10 255 1 1500
```

---

**Example: EIGRP Event Logging—Autonomous System Configuration**

The following example shows how to configure EIGRP event logging parameters, including setting the size of the EIGRP event log for an EIGRP autonomous system configuration:

```plaintext
Device> enable
Device# configure terminal
Device(config)# router eigrp 1
Device(config-router)# eigrp event-log-size 5000
Device(config-router)# eigrp log-neighbor-changes
Device(config-router)# eigrp log-neighbor-warnings 300
```

---

**Example: EIGRP Event Logging—Named Configuration**

The following example shows how to configure EIGRP event logging parameters, including setting the size of the EIGRP event log for an EIGRP named configuration:

```plaintext
Device> enable
Device# configure terminal
Device(config)# router eigrp virtual-name1
Device(config-router)# address-family ipv4 autonomous-system 45000
Device(config-router-af)# eigrp log-neighbor-warnings 300
Device(config-router-af)# eigrp log-neighbor-changes
Device(config-router-af)# topology base
Device(config-router-af-topology)# eigrp event-log-size 10000
```
Example: Equal and Unequal Cost Load Balancing—Autonomous System Configuration

The following example shows how to configure traffic distribution among routes, the maximum number of parallel routes, and load balancing in an EIGRP named configuration network:

Device> enable
Device# configure terminal
Device(config)# router eigrp 1
Device(config-router)# traffic-share balanced
Device(config-router)# maximum-paths 5
Device(config-router)# variance 1

Example: Equal and Unequal Cost Load Balancing—Named Configuration

The following example shows how to configure traffic distribution among routes, the maximum number of parallel routes, and load balancing in an EIGRP named configuration network:

Device> enable
Device# configure terminal
Device(config)# router eigrp virtual-name1
Device(config-router)# address-family ipv4 autonomous-system 45000
Device(config-router-af)# topology base
Device(config-router-af)# traffic-share balanced
Device(config-router-af-topology)# maximum-paths 5
Device(config-router-af-topology)# variance 1

Example: Adjusting the Interval Between Hello Packets and the Hold Time—Autonomous System Configuration

Device> enable
Device# configure terminal
Device(config)# router eigrp 1
Device(config-router)# exit
Device(config)# interface Gigabitethernet 1/0/9
Device(config-if)# no switchport
Device(config-if)# ip hello-interval eigrp 109 10
Device(config-if)# ip hold-time eigrp 109 40

Example: Adjusting the Interval Between Hello Packets and the Hold Time—Named Configuration

Device> enable
Device# configure terminal
Device(config)# router eigrp virtual-name1
Device(config-router)# address-family ipv4 autonomous-system 45000
Device(config-router-af)# af-interface ethernet 0/0
Device(config-router-af-interface)# hello-interval 10
Device(config-router-af-interface)# hold-time 50
Example: Disabling the Split Horizon—Autonomous System Configuration

Split horizon is enabled on all interfaces by default. The following example shows how to disable split horizon for an EIGRP autonomous system configuration:

```
Device> enable
Device# configure terminal
Device(config)# router eigrp 1
Device(config-router)# exit
Device(config)# interface Ethernet 0/1
Device(config-if)# no ip split-horizon eigrp 101
```

Example: Disabling the Split Horizon and Next-Hop-Self—Named Configuration

Split horizon is enabled on all interfaces by default. The following example shows how to disable split horizon in an EIGRP named configuration.

EIGRP, by default, sets the next-hop value to the local outbound interface address for routes that it advertises, even when advertising those routes back out of the same interface from where they were learned. The following example shows how to change this default to instruct EIGRP to use the received next-hop value when advertising these routes in an EIGRP named configuration. Disabling the next-hop-self command is primarily useful in DMVPN spoke-to-spoke topologies.

```
Device> enable
Device# configure terminal
Device(config)# router eigrp virtual-name1
Device(config-router)# address-family ipv4 autonomous-system 45000
Device(config-router-af)# af-interface ethernet 0/0
Device(config-router-af-interface)# no split-horizon
Device(config-router-af-interface)# no next-hop-self no-ecmp-mode
```

Example: Command Inheritance and Virtual Network Interface Mode Override in an EIGRP Environment

Suppose a GigabitEthernet interface is configured with the following EIGRP commands:

```
interface gigabitethernet 0/0/0
  vnet trunk
  ip address 192.0.2.1 255.255.255.0
  ip authentication mode eigrp 1 md5
  ip authentication key-chain eigrp 1 x
  ip bandwidth-percent eigrp 1 3
  ip dampening-change eigrp 1 30
  ip hello-interval eigrp 1 6
  ip hold-time eigrp 1 18
  no ip next-hop-self eigrp 1
  no ip split-horizon eigrp 1
end
```

Because a trunk is configured, a VRF subinterface is automatically created and the commands on the main interface are inherited by the VRF subinterface (g0/0/0.3, where the number 3 is the tag number from vnet tag 3.)
Use the `show derived-config` command to display the hidden subinterface. The following sample output shows that all the commands entered on GigabitEthernet 0/0/0 have been inherited by GigabitEthernet 0/0/0.3:

```
Device# show derived-config interface gigabitethernet 0/0/0.3

Building configuration...
Derived configuration : 478 bytes
  interface GigabitEthernet0/0/0.3
  description Subinterface for VNET vrf1
  vrf forwarding vrf1
  encapsulation dot1Q 3
  ip address 192.0.2.1 255.255.255.0
  ip authentication mode eigrp 1 md5
  ip authentication key-chain eigrp 1 x
  ip bandwidth-percent eigrp 1 3
  ip dampening-change eigrp 1 30
  ip hello-interval eigrp 1 6
  ip hold-time eigrp 1 18
  no ip next-hop-self eigrp 1
  no ip split-horizon eigrp 1

end
```

Use the virtual network interface mode to override the commands entered in interface configuration mode. For example:

```
Device(config)# interface gigabitethernet 0/0/0
Device(config-if)# vnet name vrf1
Device(config-if-vnet)# no ip authentication mode eigrp 1 md5
  ! disable authen for e0/0.3 only
Device(config-if-vnet)# ip authentication key-chain eigrp 1 y
  ! different key-chain
Device(config-if-vnet)# ip band eigrp 1 99
  ! higher bandwidth-percent
Device(config-if-vnet)# no ip dampening-change eigrp 1
  ! disable dampening-change
Device(config-if-vnet)# ip hello eigrp 1 7
Device(config-if-vnet)# ip hold eigrp 1 21
Device(config-if-vnet)# ip next-hop-self eigrp 1
  ! enable next-hop-self for e0/0.3
Device(config-if-vnet)# ip split-horizon eigrp 1
  ! enable split-horizon

Device(config-if-vnet)# do show running-config interface gigabitethernet 0/0/0

Building configuration...
Current configuration : 731 bytes
  !
  interface GigabitEthernet0/0/0
    vnet trunk
    ip address 192.0.2.1 255.255.255.0
    ip authentication mode eigrp 1 md5
    ip authentication key-chain eigrp 1 x
    ip bandwidth-percent eigrp 1 3
    ip dampening-change eigrp 1 30
    ip hello-interval eigrp 1 6
    ip hold-time eigrp 1 18
    no ip next-hop-self eigrp 1
    no ip split-horizon eigrp 1
    vnet name vrf1
    ip split-horizon eigrp 1
    no ip authentication mode eigrp 1 md5
    ip authentication key-chain eigrp 1 y
    ip bandwidth-percent eigrp 1 99
    no ip dampening-change eigrp 1
    ip hello-interval eigrp 1 7
    ip hold-time eigrp 1 21

end
```
Notice that g/0/0.3 is now using the override settings:

```
Device(config-if-vnet)# do show derived-config interface gigabitethernet 0/0.3
```

Building configuration...
Derived configuration : 479 bytes
!
interface GigabitEthernet0/0/0.3
description SubInterface for VNET vrf1
vrf forwarding vrf1
encapsulation dot1Q 3
ip address 192.0.2.1 255.255.255.0
no ip authentication mode eigrp 1 md5
ip authentication key-chain eigrp 1 y
ip bandwidth-percent eigrp 1 99
no ip dampening-change eigrp 1
ip hello-interval eigrp 1 7
ip hold-time eigrp 1 21
ip next-hop-self eigrp 1
ip split-horizon eigrp 1
end

Commands entered in virtual network interface mode are sticky. That is, when you enter a command in this mode, the command will override the default value configured in interface configuration mode.

The following example shows how to change the default hello interval value in vrf 1. The example also shows sample outputs of the current and derived configurations.

```
Device(config)# interface gigabitethernet 0/0/0
Device(config-if)# ip address 192.0.2.1 255.255.255.0
Device(config-if)# vnet trunk
Device(config-if)# ip hello eigrp 1 7
Device(config-if)# do show run interface gigabitethernet 0/0/2
```

Building configuration...
Current configuration : 134 bytes
!
interface GigabitEthernet0/0/0
  vnet trunk
  ip address 192.0.2.1 255.255.255.0
  ip hello-interval eigrp 1 7
ipv6 enable
vnet global
!
end

```
Device(config-if)# do show derived interface gigabitethernet 0/0/0.3
```

Building configuration...
Derived configuration : 177 bytes
!
interface Ethernet0/0.3
description SubInterface for VNET vrf1
encapsulation dot1Q 3
vrf forwarding vrf1
ip address 192.0.2.1 255.255.255.0
ip hello-interval eigrp 1 7
end

```
Device(config-if)# vnet name vrf1
Device(config-if-vnet)# ip hello-interval eigrp 1 10
Device(config-if-vnet)# do show run interface gigabitethernet 0/0/0
```

Building configuration...
Current configuration : 183 bytes
!
interface GigabitEthernet0/0/0
  vnet trunk
  ip address 192.0.2.1 255.255.255.0
  ip hello-interval eigrp 1 7
ipv6 enable
vnet name vrf1
  ip hello-interval eigrp 1 10
!
vnet global
!
end

Device(config-if-vnet)# do show derived interface gigabitethernet 0/0/0.3

Building configuration...

Derived configuration : 178 bytes
!
interface GigabitEthernet0/0/0.3
  description Subinterface for VNET vrf1
  encapsulation dot1Q 3
  vrf forwarding vrf1
  ip address 192.0.2.1 255.255.255.0
  ip hello-interval eigrp 1 10
end

Because of this sticky factor, to remove a configuration entry in virtual network interface mode, use the default form of that command. Some commands can also be removed using the no form.

R1(config-if-vnet)# default ip authentication mode eigrp 1 md5
R1(config-if-vnet)# no ip bandwidth-percent eigrp 1
R1(config-if-vnet)# no ip hello eigrp 1

R1(config-if-vnet)# do show running-config interface gigabitethernet 0/0/0

Building configuration...

Current configuration : 138 bytes
!
interface GigabitEthernet0/0/0
  vnet trunk
  no ip address
  vnet name vrf1
!
end

Example: Monitoring and Maintaining the EIGRP Autonomous System Configuration

The show ip eigrp command displays prefix accounting information for EIGRP processes. The following is sample output from this command:

Device# show ip eigrp vrf VRF1 accounting

EIGRP-IPv4 Accounting for AS(100)/ID(10.0.2.1) VRF(VRF1)
Total Prefix Count: 4 States: A-Adjacency, P-Pending, D-Down
State Address/Source Interface Prefix Restart Restart/
               Count   Count  Count   Reset(s)
P  Redistribution ---- 0   3      211
A   10.0.1.2     Gi0/0  2   0      84
F   10.0.2.4     Se2/0  0   2      114
D   10.0.1.3     Gi0/0  0   3      0

The show ip eigrp events command displays the EIGRP event log. The following is sample output from this command:

Device# show ip eigrp events
1 02:37:58.171 NSF stale rt scan, peer: 10.0.0.0
2 02:37:58.167 Metric set: 10.0.0.1/24 2847000416
3 02:37:58.167 FC sat rdbmet/succmet: 2847000416 0
The show ip eigrp interfaces command displays information about interfaces that are configured for EIGRP. The following is sample output from this command:

```
Device# show ip eigrp interfaces

EIGRP-IPv4 Interfaces for AS(60)
Interface    Peers Un/Reliable Xmit Queue   Mean Facing Time Multicast Pending Routes
Gi0          0    0/0            0/0          11/434    0/10    0   0
Gi1          1    0/0            337       0/10    0   0
Se0:1.16     1    0/0            10         1/63    103  0   0
Tu0          1    0/0            330       0/16    0   0
```

The show ip eigrp neighbors command displays neighbors discovered by EIGRP. The following is sample output from this command:

```
Device# show ip eigrp neighbors

M   Address  Interface  Hold Uptime   SRTT  RTO  Q  Seq
    (sec)    (ms)     (sec)   (ms)
0   10.1.1.2  Gi0/0     13 00:00:03 1996 5000 0 5
2   10.1.1.9  Gi0/0     14 00:02:24 206 5000 0 5
1   10.1.2.3  Gi0/1     11 00:20:39 2202 5000 0 5
```

The show ip eigrp topology command displays entries in the EIGRP topology table. The following is sample output from this command:

```
Device# show ip eigrp topology

EIGRP-IPv4 Topology Table for AS(1)/ID(10.0.0.1)
Codes: P - Passive, A - Active, U - Update, Q - Query, R - Reply,
   r - Reply status, s - sia status
P 10.0.0.0/8, 1 successors, FD is 409600
   via 10.0.0.1 (409600/128256), GigabitEthernet0/0
P 172.16.1.0/24, 1 successors, FD is 409600
   via 10.0.0.1 (409600/128256), GigabitEthernet0/0
P 10.0.0.0/8, 1 successors, FD is 281600
   via Summary (281600/0), Null0
P 10.0.1.0/24, 1 successors, FD is 281600
   via Connected, GigabitEthernet0/0
```

The show ip eigrp traffic command displays the number of EIGRP packets sent and received. The following is sample output from this command:

```
Device# show ip eigrp traffic

EIGRP-IPv4 Traffic Statistics for AS(60)
Updates sent/received: 22/17
Queries sent/received: 0/0
Acks sent/received: 16/13
SIA-Queries sent/received: 0/0
SIA-Replies sent/received: 0/0
Hello Process ID: 204
FMX Process ID: 203
Socket Queue: 0/2000/2/0 (current/max/highest/drops)
Input Queue: 0/2000/2/0 (current/max/highest/drops)
```
Example: Monitoring and Maintaining the EIGRP Named Configuration

In this example, the `show eigrp address-family` command displays prefix accounting information for EIGRP processes:

```
Device# show eigrp address-family ipv4 22 accounting

EIGRP-IPv4 VR(saf) Accounting for AS(22)/ID(10.0.0.1)
Total Prefix Count: 3 States: A-Adjacency, P-Pending, D-Down
State  Address/Source  Interface  Prefix  Restart  Restart/Count  Count
      Count  Restart  Reset(s)
A  10.0.0.2     Gi0/0    2     0     0
P  10.0.2.4     Se2/0    0     2    114
D  10.0.1.3     Gi0/0    0     3     0
```

In this example, the `show eigrp address-family` command displays information about EIGRP address-family events:

```
Device# show eigrp address-family ipv4 3 events

Event information for AS 3:
1 15:37:47.015 Change queue emptied, entries: 1
2 15:37:47.015 Metric set: 10.0.0.0/24 307200
3 15:37:47.015 Update reason, delay: new if 4294967295
4 15:37:47.015 Update sent, RD: 10.0.0.0/24 4294967295
5 15:37:47.015 Update reason, delay: metric chg 4294967295
6 15:37:47.015 Update sent, RD: 10.0.0.0/24 4294967295
7 15:37:47.015 Route installed: 10.0.0.0/24 10.0.1.2
8 15:37:47.015 Route installing: 10.0.0.0/24 10.0.1.2
```

In this example, the `show eigrp address-family` command displays information about interfaces that are configured for EIGRP:

```
Device# show eigrp address-family ipv4 4453 interfaces

EIGRP-IPv4 VR(Virtual-name) Address-family Neighbors for AS(4453)
Xmit Queue  Mean Pacing Time  Multicast  Pending
Interface Peers Un/Reliable SRTT Un/Reliable Flow Timer Services
Se0    1 0/0 28 0/15 127 0
Se1    1 0/0 44 0/15 211 0
```

In this example, the `show eigrp address-family` command displays information about the neighbors that are discovered by EIGRP:

```
Device# show eigrp address-family ipv4 4453 neighbors

EIGRP-IPv4 VR(Virtual-name) Address-family Neighbors for AS(4453)
Address Interface Hold Uptime SRTT RTO Q Seq
      (sec) (ms) (ms) Cnt Num
172.16.81.28 GigabitEthernet1/1/1 13 0:00:41 0 11 4 20
172.16.80.28 GigabitEthernet0/0/1 14 0:02:01 0 10 12 24
172.16.80.31 GigabitEthernet0/1/1 12 0:02:02 0 4 5
```

In this example, the `show eigrp address-family` command displays information about EIGRP timers and expiration times:

```
Device# show eigrp address-family ipv4 4453 timers

EIGRP-IPv4 VR(Virtual-name) Address-family Timers for AS(4453)
Hello Process
Expiration Type
| 1.022 (parent)
| 1.022 Hello (Et0/0)
Update Process
Expiration Type
| 14.984 (parent)
| 14.984 (parent)
| 14.984 Peer holding
SIA Process
Expiration Type for Topo(base)
| 0.000 (parent)
In this example, the `show eigrp address-family` command displays entries in the EIGRP topology table:

```
Device# show eigrp address-family ipv4 4453 topology
EIGRP-IPv4 VR(Virtual-name) Topology Table for AS(4453)/ID(10.0.0.1)
Codes: P - Passive, A - Active, U - Update, Q - Query, R - Reply,
       p - Reply status, s - sia Status
P 10.17.17.0/24, 1 successors, FD is 409600
   via 10.10.10.2 (409600/128256), GigabitEthernet3/0/1
P 172.16.19.0/24, 1 successors, FD is 409600
   via 10.10.10.2 (409600/128256), GigabitEthernet3/0/1
P 192.168.10.0/24, 1 successors, FD is 281600
   via Connected, GigabitEthernet3/0/1
P 10.10.10.0/24, 1 successors, FD is 281600
   via Redistributed (281600/0)
```

In this example, the `show eigrp address-family` command displays information about the number of EIGRP packets that are sent and received:

```
Device# show eigrp address-family ipv4 4453 traffic
EIGRP-IPv4 VR(Virtual-name) Address-family Traffic Statistics for AS(4453)
   Hellos sent/received: 122/122
   Updates sent/received: 3/1
   Queries sent/received: 0/0
   Replies sent/received: 0/0
   Acks sent/received: 0/3
   SIA-Queries sent/received: 0/0
   SIA-Replies sent/received: 0/0
   Hello Process ID: 128
   PDM Process ID: 191
   Socket Queue: 0/2000/1/0 (current/max/highest/drops)
   Input Queue: 0/2000/1/0 (current/max/highest/drops)
```

In this example, the `show eigrp plugins` command displays general information, including the versions of the EIGRP protocol features that are currently running on the device:

```
Device# show eigrp plugins
EIGRP feature plugins:::
   eigrp-release : 5.00.00 : Portable EIGRP Release
   igrp2 : 19.00.00 : Reliable Transport/Dual Database
   bfd : 1.01.00 : BFD Platform Support
   mtr : 1.00.01 : Multi-Topology Routing(MTR)
   eigrp-pfr : 1.00.01 : Performance Routing Support
   ipv4-af : 2.01.01 : Routing Protocol Support
   ipv6-af : 1.01.00 : Service Distribution Support
   external-client : 1.02.00 : Service Distribution Client Support
   ipv6-sf : 2.01.01 : Routing Protocol Support
   ipv6-sf : 1.01.00 : Service Distribution Support
   snmp-agent : 1.01.01 : SNMP/SNMPv2 Agent Support
```

In this example, the `show eigrp protocols` command displays general information about EIGRP protocols that are currently running on a device:

```
Device# show eigrp protocols
EIGRP-IPv4 Protocol for AS(10)
   Metric weight K1=1, K2=0, K3=1, K4=0, K5=0
   NSF-aware route hold timer is 240
   Router-ID: 10.0.1.1
   Topology : 0 (base)
   Active Timer: 3 min
   Distance: internal 90 external 170
   Maximum path: 4
   Maximum hopcount 100
   Maximum metric variance 1
EIGRP-IPv4 Protocol for AS(5) VRF(VRF1)
   Metric weight K1=1, K2=0, K3=1, K4=0, K5=0
   NSF-aware route hold timer is 240
   Router-ID: 10.1.2.1
   Topology : 0 (base)
   Active Timer: 3 min
```
Additional References for EIGRP

Related Documents

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Standards and RFCs

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<td>RFC 1321</td>
<td>The MD5 Message-Digest Algorithm</td>
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<td>RFC 2104</td>
<td>HMAC: Keyed-Hashing for Message Authentication</td>
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**Technical Assistance**

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<td>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.</td>
<td><a href="http://www.cisco.com/cisco/web/support/index.html">http://www.cisco.com/cisco/web/support/index.html</a></td>
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### Table 3: Feature Information for EIGRP Features

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<tr>
<th>Feature Name</th>
<th>Releases</th>
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<tr>
<td>EIGRP</td>
<td></td>
<td>EIGRP is an enhanced version of the IGRP developed by Cisco. EIGRP uses the same distance vector algorithm and distance information as IGRP. However, the convergence properties and the operating efficiency of EIGRP have improved substantially over IGRP, and IGRP is obsolete. The following commands were introduced or modified: auto-summary (EIGRP), clear ip eigrp neighbors, default-information, default-metric (EIGRP), distance (EIGRP), eigrp log-neighbor-changes, eigrp log-neighbor-warnings, eigrp router-id, ip bandwidth-percent eigrp, ip hello-interval eigrp, ip hold-time eigrp, ip next-hop-self eigrp, ip split-horizon eigrp, ip summary-address eigrp, metric maximum-hops, metric weights (EIGRP), neighbor (EIGRP), network (EIGRP), offset-list (EIGRP), router eigrp, set metric (EIGRP), show ip eigrp accounting, show ip eigrp interfaces, show ip eigrp neighbors, show ip eigrp topology, show ip eigrp traffic, show ip eigrp vrf accounting, show ip eigrp vrf interfaces, show ip eigrp vrf neighbors, show ip eigrp vrf topology, show ip eigrp vrf traffic, summary-metric, timers active-time, traffic-share balanced, variance (EIGRP).</td>
</tr>
<tr>
<td>Feature Name</td>
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<tr>
<td>EIGRP Dual DMVPN Domain Enhancement</td>
<td></td>
<td>The EIGRP Dual DMVPN Domain Enhancement feature supports the no next-hop-self functionality on dual DMVPN domains in both IPv4 and IPv6 configurations. The following commands were introduced or modified by this feature: ip next-hop-self eigrp, ipv6 next-hop-self eigrp, next-hop-self, show ip eigrp interfaces, show ipv6 eigrp interfaces, show ip eigrp topology, show ipv6 eigrp topology.</td>
</tr>
<tr>
<td>Named mode for EIGRP vNETs IPv4</td>
<td>Cisco IOS Release 15.2(1)SY.</td>
<td>The EIGRP vNET feature allows the creation of multiple virtual networks by utilizing a single set of routers and links provided by the physical topology. EIGRP vNET configurations are supported in both classic and named modes. In Cisco IOS Release 15.1(1)SG, EIGRP vNET configurations are supported only in the classic mode. The following command was modified: vnet.</td>
</tr>
</tbody>
</table>