



Configuring 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 referred to as 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 255 hops, and the EIGRP metric is large enough to support thousands of hops. The default maximum number of EIGRP hops is 100.
- Fast convergence—The DUAL algorithm allows routing information to converge quickly.
- Partial updates—EIGRP sends incremental updates (instead of sending the entire contents of the routing table) when the state of a destination changes. This feature minimizes the bandwidth required for EIGRP packets.
- Neighbor discovery mechanism—This is a simple, protocol-independent hello mechanism used to learn about neighboring devices.
- Variable-Length Subnet Masks (VLSMs).
- Arbitrary route summarization.
- 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
```



Note

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.

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.



Note

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:

$$\text{EIGRP composite cost metric} = 256 * ((K1 * Bw) + (K2 * Bw) / (256 - \text{Load}) + (K3 * \text{Delay}) * (K5 / (\text{Reliability} + K4)))$$

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

Vector Metric	Description
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: (10 ⁷ /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

Setting	Default Value
K1	1
K2	0

Setting	Default Value
K3	1
K4	0
K5	0

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

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


Note

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 $256*(Bw + Delay)$, thus resulting in the following value:

$$\text{Metric} = 256*(10^7/128 + 84000/10) = 256*86525 = 22150400$$

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:

$$\text{Metric} = (256*(10^7/128) + (84000*256)/10) = 20000000 + 2150400 = 22150400$$

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. If automatic summarization is in effect, there usually is no need to configure network-level summaries using the **ip summary-address eigrp** command.

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.

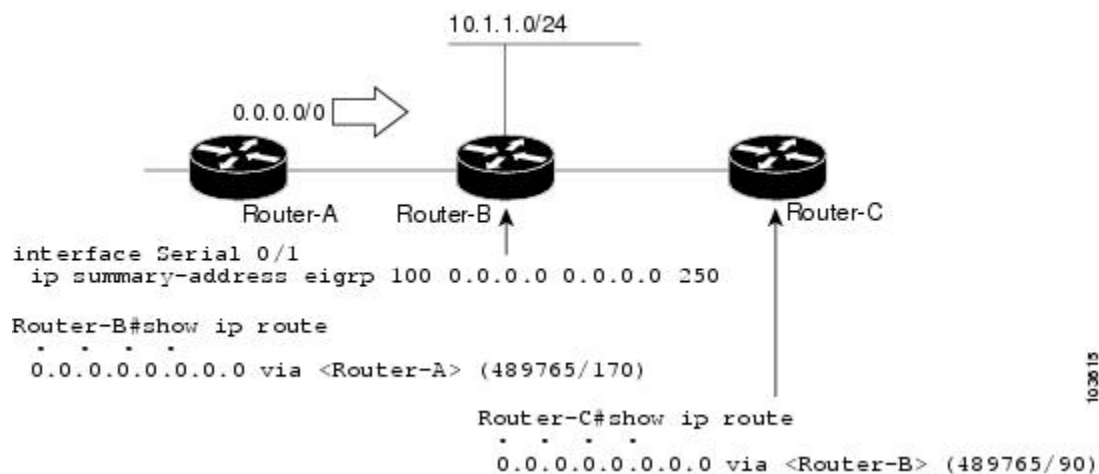
The figure below shows a network with three devices, Device-A, Device-B, and Device-C. Device-A learns a default route from elsewhere in the network and then advertises this route to Device-B. Device-B is configured so that only a default summary route is advertised to Device-C. The default summary route 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:

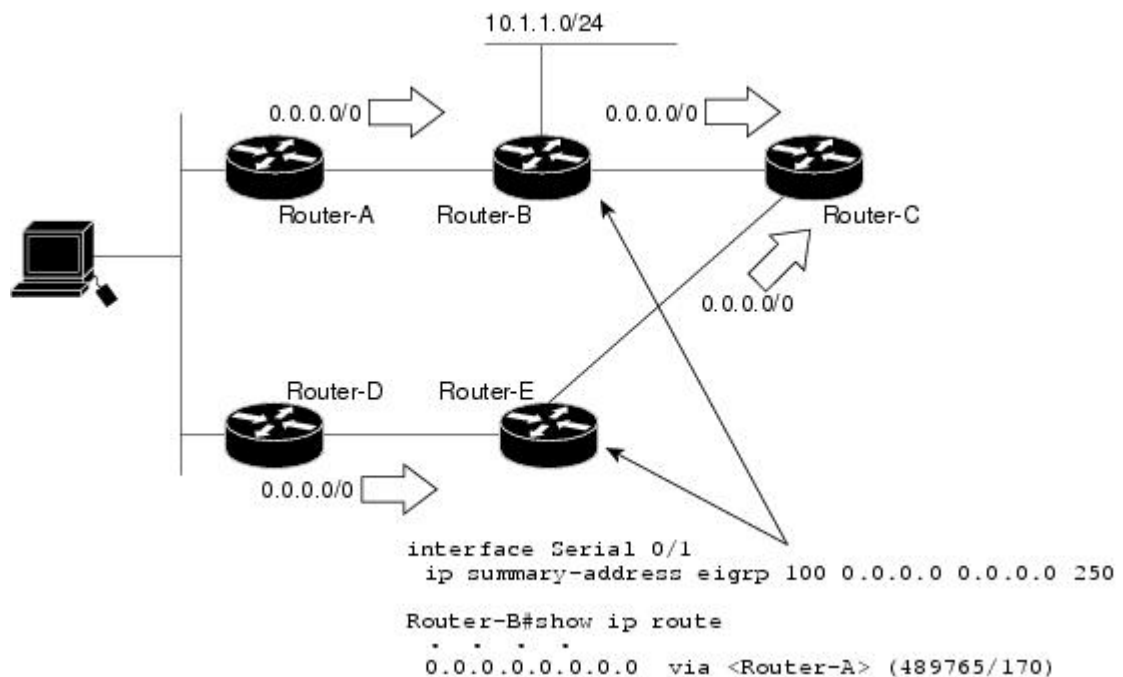
```
Device-B(config)# router eigrp virtual-name1
Device-B(config-router)# address-family ipv4 unicast vrf vrf1 autonomous-system 1
Device-B(config-router-af)# af-interface serial0/1
Device-B(config-router-af-interface)# summary-address eigrp 100 0.0.0.0 0.0.0.0 250
```

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.

**Note**

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

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.

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 Stub Routing Leak Map Support

In EIGRP stub routing configurations where there is a remote site with more than one device, only one of the remote devices can be configured as the stub device. If you have two distribution layer devices and two devices at a remote site, there is no way to declare both remote devices as stub devices. If one remote device is configured as a stub device, the other remote device can neither learn routes towards the network core if the link between the stub device and the distribution layer device fails nor route around the failed link.

The stub device cannot readvertise routes learned from any neighboring EIGRP device. To resolve this issue, a leak map configuration that allows a selected set of learned routes to be readvertised to other peers can be added to the EIGRP stub routing feature. The set of routes allowed through the stub device are specified using a standard route map so that routes can be matched based on tags, prefixes, or interfaces. These routes are marked using the site-of-origin code mechanism, which prevents routes permitted through the stub from being readvertised into the core of the network.

Use the **eigrp stub leak-map** command to configure the EIGRP stub routing feature to reference a leak map that identifies routes that are allowed to be advertised on an EIGRP stub device that would normally have been suppressed.

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

	Command or Action	Purpose
Step 1	enable Example: Device> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> • Enter your password if prompted.
Step 2	configure terminal Example: Device# configure terminal	Enters global configuration mode.
Step 3	router eigrp <i>autonomous-system-number</i> Example: Device(config)# router eigrp 1	Configures an EIGRP routing process and enters router configuration mode. <ul style="list-style-type: none"> • A maximum of 30 EIGRP routing processes can be configured.
Step 4	network <i>network-number</i> Example: Device(config-router)# network 172.16.0.0	Associates a network with an EIGRP routing process.
Step 5	end Example: Device(config-router)# end	Exits router configuration mode and returns to privileged EXEC mode.

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

	Command or Action	Purpose
Step 1	enable Example: Device> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> • Enter your password if prompted.
Step 2	configure terminal Example: Device# configure terminal	Enters global configuration mode.
Step 3	router eigrp <i>virtual-instance-name</i> Example: Device(config)# router eigrp virtual-name1	Configures the EIGRP routing process and enters router configuration mode.
Step 4	Enter one of the following: <ul style="list-style-type: none"> • address-family ipv4 [multicast] [unicast] [vrf vrf-name] autonomous-system <i>autonomous-system-number</i> • address-family ipv6 [unicast] [vrf vrf-name] autonomous-system <i>autonomous-system-number</i> 	Enters address family configuration mode to configure an EIGRP IPv4 or IPv6 routing instance.

	Command or Action	Purpose
	<p>Example:</p> <pre>Device(config-router)# address-family ipv4 autonomous-system 45000 Device(config-router)# address-family ipv6 autonomous-system 45000</pre>	
Step 5	<p>network <i>ip-address</i> [<i>wildcard-mask</i>]</p> <p>Example:</p> <pre>Device(config-router-af)# network 172.16.0.0</pre>	Specifies a network for the EIGRP routing process.
Step 6	<p>end</p> <p>Example:</p> <pre>Device(config-router-af)# end</pre>	Exits address family configuration mode and returns to privileged EXEC mode.

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

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

	Command or Action	Purpose
	<p>Example:</p> <pre>Device> enable</pre>	<ul style="list-style-type: none"> Enter your password if prompted.
Step 2	<p>configure terminal</p> <p>Example:</p> <pre>Device# configure terminal</pre>	Enters global configuration mode.
Step 3	<p>router eigrp <i>autonomous-system</i></p> <p>Example:</p> <pre>Device(config)# router eigrp 1</pre>	<p>Enables an EIGRP routing process and enters router configuration mode.</p> <ul style="list-style-type: none"> A maximum of 30 EIGRP routing processes can be configured.
Step 4	<p>network <i>ip-address</i> [<i>wildcard-mask</i>]</p> <p>Example:</p> <pre>Device(config-router)# network 172.16.0.0</pre>	Associates networks with an EIGRP routing process.
Step 5	<p>passive-interface [default] [<i>interface-type interface-number</i>]</p> <p>Example:</p> <pre>Device(config-router)# passive-interface</pre>	(Optional) Suppresses EIGRP hello packets and routing updates on interfaces while still including the interface addresses in the topology database.
Step 6	<p>offset-list [<i>access-list-number</i> <i>access-list-name</i>] {in out} <i>offset</i> [<i>interface-type interface-number</i>]</p> <p>Example:</p> <pre>Device(config-router)# offset-list 21 in 10 gigabitethernet 0/0/1</pre>	(Optional) Applies an offset to routing metrics.
Step 7	<p>metric weights <i>tos k1 k2 k3 k4 k5</i></p> <p>Example:</p> <pre>Device(config-router)# metric weights 0 2 0 2 0 0</pre>	<p>(Optional) Adjusts the EIGRP metric or K value.</p> <ul style="list-style-type: none"> EIGRP uses the following formula to determine the total metric to the network: $\text{EIGRP Metric} = 256 * ((K1 * Bw) + (K2 * Bw) / (256 - \text{Load}) + (K3 * \text{Delay}) * (K5 / (\text{Reliability} + K4)))$ <p>Note If K5 is 0, then (K5 / (Reliability + K4)) is defined as 1.</p>
Step 8	no auto-summary	(Optional) Disables automatic summarization.

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

	Command or Action	Purpose
Step 1	enable Example: Device> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> • Enter your password if prompted.
Step 2	configure terminal Example: Device# configure terminal	Enters global configuration mode.
Step 3	router eigrp <i>virtual-instance-name</i> Example: Device(config)# router eigrp virtual-name1	Enables an EIGRP routing process and enters router configuration mode.
Step 4	Enter one of the following: <ul style="list-style-type: none"> • address-family ipv4 [unicast] [vrf vrf-name] [multicast] autonomous-system <i>autonomous-system-number</i> • address-family ipv6 [unicast] [vrf vrf-name] autonomous-system <i>autonomous-system-number</i> Example: Device(config-router)# address-family ipv4 autonomous-system 45000 Device(config-router)# address-family ipv6 autonomous-system 45000	Enters address family configuration mode to configure an EIGRP IPv4 or IPv6 routing instance.
Step 5	network <i>ip-address</i> [<i>wildcard-mask</i>] Example: Device(config-router-af)# network 172.16.0.0	Specifies a network for the EIGRP routing process.
Step 6	metric weights <i>tos k1 k2 k3 k4 k5 k6</i> Example: Device(config-router-af)# metric weights 0 2 0 2 0 0 0	(Optional) Adjusts the EIGRP metric or K value. <ul style="list-style-type: none"> • EIGRP uses the following formula to determine the total 32-bit metric to the network: $\text{EIGRP Metric} = 256 * ((K1 * Bw) + (K2 * Bw) / (256 - Load) + (K3 * Delay) * (K5 / (Reliability + K4)))$ • EIGRP uses the following formula to determine the total 64-bit metric to the network: $\text{EIGRP Metric} = 256 * ((K1 * Throughput) + (K2 * Throughput) / (256 - Load) + (K3 * Latency) + (K6 * Extended Attributes)) * (K5 / (Reliability + K4))$

	Command or Action	Purpose
		Note If K5 is 0, then (K5/ (Reliability + K4)) is defined as 1.
Step 7	af-interface <i>interface-type interface-number</i> } Example: Device(config-router-af) # af-interface gigabitethernet 0/0/1	Enters address family interface configuration mode and configures interface-specific EIGRP commands.
Step 8	passive-interface Example: Device(config-router-af-interface) # passive-interface	Suppresses EIGRP hello packets and routing updates on interfaces while still including the interface addresses in the topology database.
Step 9	bandwidth-percent <i>maximum-bandwidth-percentage</i> Example: Device(config-router-af-interface) # bandwidth-percent 75	Configures the percentage of bandwidth that may be used by an EIGRP address family on an interface.
Step 10	exit-af-interface Example: Device(config-router-af-interface) # exit-af-interface	Exits address family interface configuration mode.
Step 11	topology { base <i>topology-name tid number</i> } Example: Device(config-router-af) # topology base	Configures an EIGRP process to route IP traffic under the specified topology instance and enters address family topology configuration mode.
Step 12	offset-list [<i>access-list-number access-list-name</i>] { in out } <i>offset [interface-type interface-number]</i> Example: Device(config-router-af-topology) # offset-list 21 in 10 gigabitethernet 6/2	(Optional) Applies an offset to routing metrics.
Step 13	no auto-summary Example: Device(config-router-af-topology) # no auto-summary	(Optional) Disables automatic summarization. Note Automatic summarization is enabled by default.
Step 14	end Example: Device(config-router-af-topology) # end	Returns to privileged EXEC mode.

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

	Command or Action	Purpose
Step 1	enable Example: Device> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> • Enter your password if prompted.
Step 2	configure terminal Example: Device# configure terminal	Enters global configuration mode.

	Command or Action	Purpose
Step 3	<p>router eigrp <i>autonomous-system</i></p> <p>Example:</p> <pre>Device(config)# router eigrp 1</pre>	<p>Enables an EIGRP routing process and enters router configuration mode.</p> <ul style="list-style-type: none"> • A maximum of 30 EIGRP routing processes can be configured.
Step 4	<p>network <i>ip-address [wildcard-mask]</i></p> <p>Example:</p> <pre>Device(config-router)# network 172.16.0.0</pre>	<p>Associates networks with an EIGRP routing process.</p>
Step 5	<p>redistribute <i>protocol</i></p> <p>Example:</p> <pre>Device(config-router)# redistribute rip</pre>	<p>Redistributes routes from one routing domain into another routing domain.</p>
Step 6	<p>distance eigrp <i>internal-distance external-distance</i></p> <p>Example:</p> <pre>Device(config-router)# distance eigrp 80 130</pre>	<p>Allows the use of two administrative distances—internal and external.</p>
Step 7	<p>default-metric <i>bandwidth delay reliability loading mtu</i></p> <p>Example:</p> <pre>Device(config-router)# default-metric 1000 100 250 100 1500</pre>	<p>Sets metrics for EIGRP.</p>
Step 8	<p>end</p> <p>Example:</p> <pre>Device(config-router)# end</pre>	<p>Exits router configuration mode and returns to privileged EXEC mode.</p>

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** *kpbs*
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

	Command or Action	Purpose
Step 1	enable Example: Device> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> • Enter your password if prompted.
Step 2	configure terminal Example: Device# configure terminal	Enters global configuration mode.
Step 3	router eigrp <i>autonomous-system</i> Example: Device(config)# router eigrp 101	Enables an EIGRP routing process and enters router configuration mode. <ul style="list-style-type: none"> • A maximum of 30 EIGRP routing processes can be configured.
Step 4	no auto-summary Example: Device(config-router)# no auto-summary	Disables automatic summarization of subnet routes into network-level routes
Step 5	exit Example: Device(config-router)# exit	Exits router configuration mode.

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

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.

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

	Command or Action	Purpose
Step 1	enable Example: Device> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> • Enter your password if prompted.
Step 2	configure terminal Example: Device# configure terminal	Enters global configuration mode.
Step 3	router eigrp <i>virtual-instance-name</i> Example: Device(config)# router eigrp virtual-name1	Enables an EIGRP routing process and enters router configuration mode.
Step 4	Enter one of the following: <ul style="list-style-type: none"> • address-family ipv4 [multicast] [unicast] [vrf vrf-name] autonomous-system <i>autonomous-system-number</i> • address-family ipv6 [unicast] [vrf vrf-name] autonomous-system <i>autonomous-system-number</i> 	Enters address family configuration mode to configure an EIGRP IPv4 or IPv6 routing instance.

	Command or Action	Purpose
	<p>Example:</p> <pre>Device(config-router)# address-family ipv4 autonomous-system 45000 Device(config-router)# address-family ipv6 autonomous-system 45000</pre>	
Step 5	<p>af-interface {default <i>interface-type interface-number</i>}</p> <p>Example:</p> <pre>Device(config-router-af)# af-interface gigabitethernet 0/0/1</pre>	Enters address family interface configuration mode and configures interface-specific EIGRP commands.
Step 6	<p>summary-address <i>ip-address mask</i> [<i>administrative-distance</i> [<i>leak-map leak-map-name</i>]]</p> <p>Example:</p> <pre>Device(config-router-af-interface)# summary-address 192.168.0.0 255.255.0.0</pre>	Configures a summary address for EIGRP.
Step 7	<p>exit-af-interface</p> <p>Example:</p> <pre>Device(config-router-af-interface)# exit-af-interface</pre>	Exits address family interface configuration mode.
Step 8	<p>topology {base <i>topology-name tid number</i>}</p> <p>Example:</p> <pre>Device(config-router-af)# topology base</pre>	Configures an EIGRP process to route IP traffic under the specified topology instance and enters address family topology configuration mode.
Step 9	<p>summary-metric <i>network-address subnet-mask bandwidth delay reliability load mtu</i></p> <p>Example:</p> <pre>Device(config-router-af-topology)# summary-metric 192.168.0.0/16 10000 10 255 1 1500</pre>	(Optional) Configures a fixed metric for an EIGRP summary aggregate address.
Step 10	<p>end</p> <p>Example:</p> <pre>Device(config-router-af-topology)# end</pre>	Exits address family topology configuration mode and returns to privileged EXEC mode.

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

	Command or Action	Purpose
Step 1	enable Example: Device> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> • Enter your password if prompted.
Step 2	configure terminal Example: Device# configure terminal	Enters global configuration mode.
Step 3	router eigrp <i>autonomous-system</i> Example: Device(config)# router eigrp 101	Enables an EIGRP routing process and enters router configuration mode. <ul style="list-style-type: none"> • A maximum of 30 EIGRP routing processes can be configured.
Step 4	eigrp event-log-size <i>size</i> Example: Device(config-router)# eigrp event-log-size 5000010	(Optional) Sets the size of the EIGRP event log.
Step 5	eigrp log-neighbor-changes Example: Device(config-router)# eigrp log-neighbor-changes	(Optional) Enables logging of EIGRP neighbor adjacency changes. <ul style="list-style-type: none"> • By default, the system logs EIGRP neighbor adjacency changes to help you monitor the stability of the routing system and detect problems.

	Command or Action	Purpose
Step 6	eigrp log-neighbor-warnings [<i>seconds</i>] Example: <pre>Device(config-router)# eigrp log-neighbor-warnings 300</pre>	(Optional) Enables the logging of EIGRP neighbor warning messages.
Step 7	end Example: <pre>Device(config-router)# end</pre>	Exits router configuration mode and returns to privileged EXEC mode.

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

	Command or Action	Purpose
Step 1	enable Example: <pre>Device> enable</pre>	Enables privileged EXEC mode. <ul style="list-style-type: none"> • Enter your password if prompted.

	Command or Action	Purpose
Step 2	<p>configure terminal</p> <p>Example:</p> <pre>Device# configure terminal</pre>	Enters global configuration mode.
Step 3	<p>router eigrp <i>virtual-instance-name</i></p> <p>Example:</p> <pre>Device(config)# router eigrp virtual-name1</pre>	Enables an EIGRP routing process and enters router configuration mode.
Step 4	<p>Enter one of the following:</p> <ul style="list-style-type: none"> • address-family ipv4 [multicast] [unicast] [vrf <i>vrf-name</i>] autonomous-system <i>autonomous-system-number</i> • address-family ipv6 [unicast] [vrf <i>vrf-name</i>] autonomous-system <i>autonomous-system-number</i> <p>Example:</p> <pre>Device(config-router)# address-family ipv4 autonomous-system 45000 Device(config-router)# address-family ipv6 autonomous-system 45000</pre>	Enters address family configuration mode to configure an EIGRP IPv4 or IPv6 routing instance.
Step 5	<p>eigrp log-neighbor-warnings [<i>seconds</i>]</p> <p>Example:</p> <pre>Device(config-router-af)# eigrp log-neighbor-warnings 300</pre>	(Optional) Enables the logging of EIGRP neighbor warning messages.
Step 6	<p>eigrp log-neighbor-changes</p> <p>Example:</p> <pre>Device(config-router-af)# eigrp log-neighbor-changes</pre>	<p>(Optional) Enables logging of EIGRP neighbor adjacency changes.</p> <ul style="list-style-type: none"> • By default, the system logs EIGRP neighbor adjacency changes to help you monitor the stability of the routing system and detect problems.
Step 7	<p>topology {base <i>topology-name</i> tid <i>number</i>}</p> <p>Example:</p> <pre>Device(config-router-af)# topology base</pre>	Configures an EIGRP process to route IP traffic under the specified topology instance and enters address family topology configuration mode.

	Command or Action	Purpose
Step 8	eigrp event-log-size <i>size</i> Example: Device(config-router-af-topology)# eigrp event-log-size 10000	(Optional) Sets the size of the EIGRP event log.
Step 9	end Example: Device(config-router-af-topology)# end	Exits address family topology configuration mode and returns to privileged EXEC mode.

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

	Command or Action	Purpose
Step 1	enable Example: Device> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> • Enter your password if prompted.
Step 2	configure terminal Example: Device# configure terminal	Enters global configuration mode.

	Command or Action	Purpose
Step 3	router eigrp <i>autonomous-system</i> Example: Device(config)# router eigrp 101	Enables an EIGRP routing process and enters router configuration mode. <ul style="list-style-type: none"> • A maximum of 30 EIGRP routing processes can be configured.
Step 4	traffic-share balanced Example: Device(config-router)# traffic-share balanced	Controls how traffic is distributed among routes when multiple routes for the same destination network have different costs.
Step 5	maximum-paths <i>number-of-paths</i> Example: Device(config-router)# maximum-paths 5	Controls the maximum number of parallel routes that an IP routing protocol can support.
Step 6	variance <i>multiplier</i> Example: Device(config-router)# variance 1	Controls load balancing in an internetwork based on EIGRP.
Step 7	end Example: Device(config-router)# end	Exits router configuration mode and returns to privileged EXEC mode.

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

	Command or Action	Purpose
Step 1	enable Example: Device> enable	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	configure terminal Example: Device# configure terminal	Enters global configuration mode.
Step 3	router eigrp <i>virtual-instance-name</i> Example: Device(config)# router eigrp virtual-name1	Enables an EIGRP routing process and enters router configuration mode.
Step 4	Enter one of the following: <ul style="list-style-type: none"> • address-family ipv4 [multicast] [unicast] [vrf vrf-name] autonomous-system <i>autonomous-system-number</i> • address-family ipv6 [unicast] [vrf vrf-name] autonomous-system <i>autonomous-system-number</i> 	Enters address family configuration mode to configure an EIGRP IPv4 or IPv6 routing instance.

	Command or Action	Purpose
	<p>Example:</p> <pre>Device(config-router)# address-family ipv4 autonomous-system 45000 Device(config-router)# address-family ipv6 autonomous-system 45000</pre>	
Step 5	<p>topology {<i>base</i> <i>topology-name</i> tid <i>number</i>}</p> <p>Example:</p> <pre>Device(config-router-af)# topology base</pre>	Configures an EIGRP process to route IP traffic under the specified topology instance and enters address family topology configuration mode.
Step 6	<p>traffic-share balanced</p> <p>Example:</p> <pre>Device(config-router-af-topology)# traffic-share balanced</pre>	Controls how traffic is distributed among routes when multiple routes for the same destination network have different costs.
Step 7	<p>maximum-paths <i>number-of-paths</i></p> <p>Example:</p> <pre>Device(config-router-af-topology)# maximum-paths 5</pre>	Controls the maximum number of parallel routes that an IP routing protocol can support.
Step 8	<p>variance <i>multiplier</i></p> <p>Example:</p> <pre>Device(config-router-af-topology)# variance 1</pre>	Controls load balancing in an internetwork based on EIGRP.
Step 9	<p>end</p> <p>Example:</p> <pre>Device(config-router-af-topology)# end</pre>	Exits address family topology configuration mode and returns to privileged EXEC mode.

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

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

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

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

	Command or Action	Purpose
Step 1	enable Example: Device> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> • Enter your password if prompted.
Step 2	configure terminal Example: Device# configure terminal	Enters global configuration mode.
Step 3	router eigrp <i>virtual-instance-name</i> Example: Device(config)# router eigrp virtual-name1	Enables an EIGRP routing process and enters router configuration mode.
Step 4	Enter one of the following: <ul style="list-style-type: none"> • address-family ipv4 [multicast] [unicast] [vrf vrf-name] autonomous-system <i>autonomous-system-number</i> • address-family ipv6 [unicast] [vrf vrf-name] autonomous-system <i>autonomous-system-number</i> Example: Device(config-router)# address-family ipv4 autonomous-system 45000 Device(config-router)# address-family ipv6 autonomous-system 45000	Enters address family configuration mode to configure an EIGRP IPv4 or IPv6 routing instance.
Step 5	af-interface { default <i>interface-type interface-number</i> } Example: Device(config-router-af)# af-interface gigabitethernet 0/0/1	Enters address family interface configuration mode and configures interface-specific EIGRP commands.
Step 6	hello-interval <i>seconds</i> Example: Device(config-router-af-interface)# hello-interval 10	Configures the hello interval for an EIGRP address family named configuration.

	Command or Action	Purpose
Step 7	hold-time <i>seconds</i> Example: Device(config-router-af-interface)# hold-time 50	Configures the hold time for an EIGRP address family named configuration.
Step 8	end Example: Device(config-router-af-interface)# end	Exits address family interface configuration mode and returns to privileged EXEC mode.

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

	Command or Action	Purpose
Step 1	enable Example: Device> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> • Enter your password if prompted.
Step 2	configure terminal Example: Device# configure terminal	Enters global configuration mode.

	Command or Action	Purpose
Step 3	interface <i>type number</i> Example: Device(config)# interface gigabitethernet 0/1	Configures an interface and enters interface configuration mode.
Step 4	no ip split-horizon eigrp <i>autonomous-system-number</i> Example: Device(config-if)# no ip split-horizon eigrp 101	Disables split horizon.
Step 5	end Example: Device(config-if)# end	Exits interface configuration mode and returns to privileged EXEC mode.

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

	Command or Action	Purpose
Step 1	enable Example: Device> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> • Enter your password if prompted.
Step 2	configure terminal Example: Device# configure terminal	Enters global configuration mode.
Step 3	router eigrp <i>virtual-instance-name</i> Example: Device(config)# router eigrp virtual-name1	Enables an EIGRP routing process and enters router configuration mode.
Step 4	Enter one of the following: <ul style="list-style-type: none"> • address-family ipv4 [multicast] [unicast] [vrf vrf-name] autonomous-system <i>autonomous-system-number</i> • address-family ipv6 [unicast] [vrf vrf-name] autonomous-system <i>autonomous-system-number</i> Example: Device(config-router)# address-family ipv4 autonomous-system 45000 Device(config-router)# address-family ipv6 autonomous-system 45000	Enters address family configuration mode to configure an EIGRP IPv4 or IPv6 routing instance.
Step 5	af-interface { default <i>interface-type interface-number</i> } Example: Device(config-router-af)# af-interface gigabitethernet 0/0/1	Enters address family interface configuration mode and configures interface-specific EIGRP commands.
Step 6	no split-horizon Example: Device(config-router-af-interface)# no split-horizon	Disables EIGRP split horizon.

	Command or Action	Purpose
Step 7	<p>no next-hop-self [no-ecmp-mode]</p> <p>Example:</p> <pre>Device(config-router-af-interface)# no next-hop-self no-ecmp-mode</pre>	<p>(Optional) Instructs an EIGRP router to use the received next hop rather than the local outbound interface address as the next hop.</p> <ul style="list-style-type: none"> 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.
Step 8	<p>end</p> <p>Example:</p> <pre>Device(config-router-af-interface)# end</pre>	<p>Exits address family interface configuration mode and returns to privileged EXEC mode.</p>

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] [ip-address] [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-interface)# passive-interface
Device(config-router-af-interface)# bandwidth-percent 75
Device(config-router-af-interface)# exit-af-interface
Device(config-router-af-interface)# 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
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
```

**Note**

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.

```
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:

```
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:

```
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-topology)# 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: 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 Count Restart Count Restart/Reset (s)
P Redistributed ---- 0 3 211
A 10.0.1.2 Gi0/0 2 0 84
P 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 284700416
3 02:37:58.167 FC sat rdbmet/succmet: 284700416 0
```

```

4    02:37:58.167 FC sat nh/ndbmet: 10.0.0.2 284700416
5    02:37:58.167 Find FS: 10.0.0.0/24 284700416
6    02:37:58.167 Rcv update met/succmet: 284956416 284700416
7    02:37:58.167 Rcv update dest/nh: 10.0.0.0/24 10.0.0.1
8    02:37:58.167 Peer nsf restarted: 10.0.0.1 Tunnel0
9    02:36:38.383 Metric set: 10.0.0.0/24 284700416
10   02:36:38.383 RDB delete: 10.0.0.0/24 10.0.0.1
11   02:36:38.383 FC sat rdbmet/succmet: 284700416 0
12   02:36:38.383 FC sat nh/ndbmet: 0.0.0.0 284700416

```

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	Xmit Queue Un/Reliable	Mean SRTT	Pacing Time Un/Reliable	Multicast Flow Timer	Pending Routes
Gi0	0	0/0	0	11/434	0	0
Gi0	1	0/0	337	0/10	0	0
SE0:1.16	1	0/0	10	1/63	103	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
```

H	Address	Interface	Hold Uptime (sec)	SRTT (ms)	RTO	Q Cnt	Seq Num
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)
Hellos sent/received: 21429/2809
Updates sent/received: 22/17
Queries sent/received: 0/0
Replies 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
PDM 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 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,
       r - 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
                    : 19.00.00 : Source Component Release(rel5)
  igrp2              : 3.00.00 : 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
  ipv4-sf            : 1.01.00 : Service Distribution Support
  external-client    : 1.02.00 : Service Distribution Client Support
  ipv6-af            : 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
```



```

Distance: internal 90 external 170
Maximum path: 4
Maximum hopcount 100
Maximum metric variance 1
Total Prefix Count: 0
Total Redist Count: 0

```

Additional References

Related Documents

Related Topic	Document Title
Cisco IOS commands	Master Commands List, All Releases
EIGRP commands	IP Routing: EIGRP Command Reference
EIGRP FAQ	EIGRP Frequently Asked Questions
EIGRP L2/L3 API and Tunable Metric for Mobile Adhoc Networks feature	“Mobile Ad Hoc Networks for Router-to-Radio Communications” module of <i>the IP Mobility Configuration Guide</i>
EIGRP Technology Support	Enhanced Interior Gateway Routing Protocol
EIGRP Technology White Papers	Enhanced Interior Gateway Routing Protocol
IPv6 Routing EIGRP Support	<i>EIGRP Configuration Guide</i>
Protocol-independent features that work with EIGRP	<i>IP Routing: Protocol-Independent Configuration Guide</i>
Service Advertisement Framework	<i>Service Advertisement Framework Configuration Guide</i>
Service Advertisement Framework commands	Service Advertisement Framework Command Reference

Standards and RFCs

Standard/RFC	Title
FIPS PUB 180-2	<i>SECURE HASH STANDARD (SHS)</i>

Standard/RFC	Title
RFC 1321	<i>The MD5 Message-Digest Algorithm</i>
RFC 2104	<i>HMAC: Keyed-Hashing for Message Authentication</i>

Technical Assistance

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

Feature Information for EIGRP

The following table provides release information about the feature or features described in this module. This table lists only the software release that introduced support for a given feature in a given software release train. Unless noted otherwise, subsequent releases of that software release train also support that feature.

Use Cisco Feature Navigator to find information about platform support and Cisco software image support. To access Cisco Feature Navigator, go to www.cisco.com/go/cfn. An account on Cisco.com is not required.

Table 3: Feature Information for EIGRP Features

Feature Name	Releases	Feature Information
EIGRP	11.2(1) 12.2(33)SRA 12.2(33)SRE 12.2(33)XNE 15.0(1)M 15.0(1)S	<p>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.</p> <p>The following commands were introduced or modified:</p> <p>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).</p>

Feature Name	Releases	Feature Information

Feature Name	Releases	Feature Information
		<p>In Cisco IOS Release 12.2(33)SRE, 12.2(33)XNE, and 15.0(1)M, the following commands were introduced or modified: address-family (EIGRP), af-interface, autonomous-system (EIGRP), auto-summary (EIGRP), bandwidth percent, clear eigrp address-family neighbors, clear ip eigrp neighbors, debug eigrp address-family neighbor, debug eigrp address-family notifications, default-information (EIGRP), default-metric (EIGRP), distance (EIGRP), eigrp event-log-size, eigrp log-neighbor-changes, eigrp log-neighbor-warnings, eigrp router-id, exit-address-family, exit-af-interface, exit-af-topology, hello-interval, hold-time, match extcommunity, metric maximum-hops, metric weights, next-hop-self, offset-list (EIGRP), passive-interface (EIGRP), router eigrp, show eigrp address-family accounting, show eigrp address-family events, show eigrp address-family interfaces, show eigrp address-family neighbors, show eigrp address-family timers, show eigrp address-family topology, show eigrp address-family traffic, show eigrp plugins, show eigrp protocols, show eigrp tech-support, show ip eigrp accounting, show ip eigrp events, show ip eigrp interfaces, show ip eigrp neighbors, show ip eigrp topology, show ip eigrp traffic, shutdown (address-family), split-horizon (EIGRP), summary-address (EIGRP), timers active-time, traffic-share balanced, variance (EIGRP).</p> <p>In Cisco IOS Release 12.2(33)SRE, 12.2(33)XNE, and 15.0(1)M, the following commands were replaced: clear ip eigrp vrf neighbors, eigrp</p>

Feature Name	Releases	Feature Information
		interface, log-neighbor-warnings, 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.
EIGRP Dual DMVPN Domain Enhancement	15.2(1)S 15.2(3)T	<p>The EIGRP Dual DMVPN Domain Enhancement feature supports the no next-hop-self functionality on dual DMVPN domains in both IPv4 and IPv6 configurations.</p> <p>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.</p>
Named mode for EIGRP vNETs IPv4	15.1(1)S 15.2(1)S 15.1(1)SG 15.3(2)T Cisco IOS Release 15.2(1)SY.	<p>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.</p> <p>The following command was modified: vnet.</p>