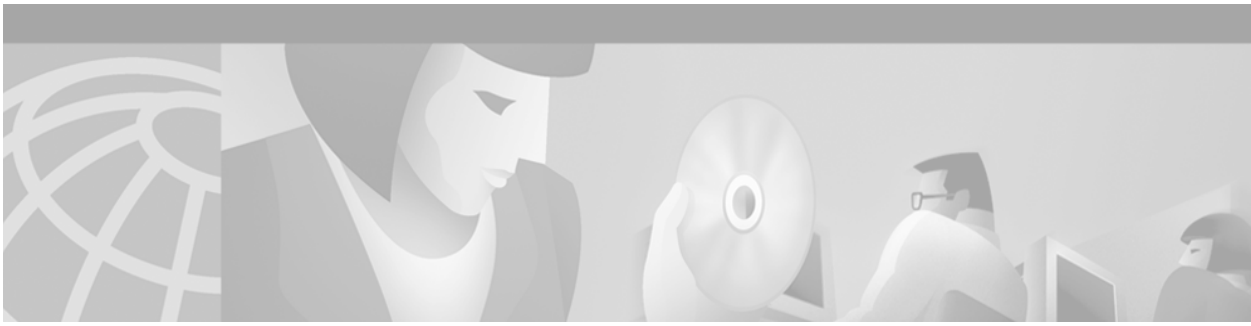

# EIGRP Commands

Use the commands in this chapter to configure and monitor Enhanced Interior Gateway Routing Protocol (EIGRP). For EIGRP configuration information and examples, refer to the "Configuring IP EIGRP" chapter of the *Cisco IOS IP Configuration Guide*.

# auto-summary (EIGRP)

To restore the default behavior of automatic summarization of subnet routes into network-level routes, use the **auto-summary** command in router configuration mode. To disable this function and send subprefix routing information across classful network boundaries, use the **no** form of this command.

**auto-summary**

**no auto-summary**

## Syntax Description

This command has no arguments or keywords.

## Defaults

The behavior of this command is enabled by default (the software summarizes subprefixes to the classful network boundary when crossing classful network boundaries).

## Command Modes

Router configuration

## Command History

| Release | Modification |
|---|---|
| 10.0 | This command was introduced. |

## Usage Guidelines

Route summarization reduces the amount of routing information in the routing tables.

By default, Border Gateway Protocol (BGP) does not accept subnets redistributed from an Interior Gateway Protocol (IGP). To advertise and carry subnet routes in BGP, use an explicit **network** command or the **no auto-summary** command. If you disable automatic summarization and have not entered a **network** command, you will not advertise network routes for networks with subnet routes unless they contain a summary route.

Enhanced Interior Gateway Routing Protocol (EIGRP) summary routes are given an administrative distance value of 5. You cannot configure this value.

Routing Information Protocol (RIP) Version 1 always uses automatic summarization. If you are using RIP Version 2, you can turn off automatic summarization by specifying the **no auto-summary** command. Disable automatic summarization if you must perform routing between disconnected subnets. When automatic summarization is off, subnets are advertised.

## Examples

The following example disables automatic summarization for EIGRP process 1:

```
router eigrp 1
 no auto-summary
```

## Related Commands

| Command | Description |
|---|---|
| **ip summary-address eigrp** | Configures a summary aggregate address for a specified interface. |

# clear ip eigrp neighbors

To delete entries from the neighbor table, use the **clear ip eigrp neighbors** command in EXEC mode.

**clear ip eigrp neighbors** [*ip-address* | *interface-type interface-number*]

## Syntax Description

| | |
|---|---|
| *ip-address* | (Optional) Address of the neighbor. |
| *interface-type interface-number* | (Optional) Interface type and number. Specifying these arguments removes the specified interface type from the neighbor table that all entries learned via this interface. |

## Command Modes

EXEC

## Command History

| Release | Modification |
|---|---|
| 10.0 | This command was introduced. |

## Examples

The following example removes the neighbor whose address is 172.16.8.3:

```
Router# clear ip eigrp neighbors 172.16.8.3
```

## Related Commands

| Command | Description |
|---|---|
| **show ip eigrp interfaces** | Displays information about interfaces configured for EIGRP. |

# default-information

To control the candidate default routing information between IGRP or Enhanced Interior Gateway Routing Protocol (EIGRP) processes, use the **default-information** command in router configuration mode. To suppress IGRP or EIGRP candidate information in incoming or outbound updates, use the **no default-information in** command.

**default-information** {**in** | **out**} {*access-list-number* | *access-list-name*}

**no default-information** {**in** | **out**}

## Syntax Description

| | |
|---|---|
| **in** | Allows IGRP or EIGRP exterior or default routes to be received by an IGRP process. |
| **out** | Allows IGRP or EIGRP exterior routes to be advertised in updates. |
| *access-list-number* \| *access-list-name* | Number or name of an access list. It can be a number in the range from 1 to 99 or an access list name. |

## Defaults

Normally, exterior routes are always accepted and default information is passed between IGRP or EIGRP processes when redistribution occurs.

## Command Modes

Router configuration

## Command History

| Release | Modification |
|---|---|
| 10.0 | This command was introduced. |
| 11.2 | The *access-list-number* and *access-list-name* arguments were added. |

## Usage Guidelines

The default network of 0.0.0.0 used by Routing Information Protocol (RIP) cannot be redistributed by IGRP but can be redistributed by EIGRP.

## Examples

The following example allows IGRP exterior or default routes to be received by the IGRP process in autonomous system 1:

```
router igrp 1
 default-information in
```

The following example allows EIGRP exterior or default routes to be received by the EIGRP process in autonomous system :

```
router eigrp 1
 default-information in
```

# default-metric (EIGRP)

To set metrics for IGRP or Enhanced Interior Gateway Routing Protocol (EIGRP), use the **default-metric** command in router configuration mode. To remove the metric value and restore the default state, use the **no** form of this command.

**default-metric** *bandwidth delay reliability loading mtu*

**no default-metric** *bandwidth delay reliability loading mtu*

## Syntax Description

| | |
|---|---|
| *bandwidth* | Minimum bandwidth of the route in kilobits per second. It can be from 1 to 4294967295. |
| *delay* | Route delay in tens of microseconds. It can be 1 or any positive number that is a multiple of 39.1 nanoseconds. |
| *reliability* | Likelihood of successful packet transmission expressed as a number between 0 and 255. The value 255 means 100 percent reliability; 0 means no reliability. |
| *loading* | Effective bandwidth of the route expressed as a number from 1 to 255 (255 is 100 percent loading). |
| *mtu* | Minimum maximum transmission unit (MTU) size of the route in bytes. It can be from 1 to 65535. |

## Defaults

Only connected routes can be redistributed without a default metric. the metric of redistributed Connected routes is set to 0.

## Command Modes

Router configuration

## Command History

| Release | Modification |
|---|---|
| 10.0 | This command was introduced. |

## Usage Guidelines

A default metric is required to redistribute a protocol into IGRP or EIGRP, unless you use the **redistribute** command. Automatic metric translations occur between IGRP and EIGRP. You do not need default metrics to redistributed IGRP or EIGRP into itself.

**Note** The default metric command does not affect EIGRP-to-EIGRP or IGRP-to-EIGRP distribution. To configure EIGRP-to-EIGRP or IGRP-to-EIGRP distribution, use route maps.

Metric defaults have been carefully set to work for a wide variety of networks. Take great care when changing these values. Keeping the same metrics is supported only when redistributing from IGRP, EIGRP, or static routes.

**Note** When enabled, the **default-metric** command applies a metric value of 0 to redistributed connected routes. The **default-metric** command does not override metric values that are applied with the **redistribute** command.

## Examples

The following example takes redistributed Routing Information Protocol (RIP) metrics and translates them into EIGRP metrics with values as follows: bandwidth = 1000, delay = 100, reliability = 250, loading = 100, and MTU = 1500.

```
router eigrp 1
 network 172.16.0.0
 redistribute rip
 default-metric 1000 100 250 100 1500
```

## Related Commands

| Command | Description |
|---|---|
| **redistribute (IP)** | Redistributes routes from one routing domain into another routing domain. |

# distance eigrp

To allow the use of two administrative distances—internal and external—that could be a better route to a node, use the **distance eigrp** command in router configuration mode. To reset these values to their defaults, use the **no** form of this command.

**distance eigrp** *internal-distance external-distance*

**no distance eigrp**

## Syntax Description

| | |
|---|---|
| *internal-distance* | Administrative distance for EIGRP internal routes. Internal routes are those that are learned from another entity within the same autonomous system. The distance can be a value from 1 to 255. |
| *external-distance* | Administrative distance for EIGRP external routes. External routes are those for which the best path is learned from a neighbor external to the autonomous system. The distance can be a value from 1 to 255. |

## Defaults

*internal-distance*: 90

*external-distance*: 170

## Command Modes

Router configuration

## Command History

| Release | Modification |
|---|---|
| 10.0 | This command was introduced. |

## Usage Guidelines

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.

Use the **distance eigrp** command if another protocol is known to be able to provide a better route to a node than was actually learned via external EIGRP, or if some internal routes should really be preferred by EIGRP.

Table 19 lists the default administrative distances.

***Table 19 Default Administrative Distances***

| Route Source | Default Distance |
|---|---|
| Connected interface | 0 |
| Static route | 1 |
| EIGRP summary route | 5 |
| External BGP | 20 |

*Table 19 Default Administrative Distances (continued)*

| Route Source | Default Distance |
|---|---|
| Internal EIGRP | 90 |
| IGRP | 100 |
| Open Shortest Path First (OSPF) | 110 |
| Intermediate System-to-Intermediate System (IS-IS) | 115 |
| Routing Information Protocol (RIP) | 120 |
| Exterior Gateway Protocol (EGP) | 140 |
| EIGRP external route | 170 |
| Internal Border Gateway Protocol (BGP) | 200 |
| Unknown | 255 |

To display the default administrative distance for a specified routing process, use the **show ip protocols** EXEC command.

## Examples

In the following example, the **router eigrp** global configuration command sets up EIGRP routing in autonomous system number 1. The **network** router configuration commands specify EIGRP routing on networks 192.168.7.0 and 172.16.0.0. The **distance eigrp** command sets the administrative distance of all EIGRP internal routes to 80 and all EIGRP external routes to 130.

```
Router(config)# router eigrp 1
Router(router-config)# network 192.168.7.0
Router(router-config)# network 172.16.0.0
Router(router-config)# distance eigrp 80 130
```

**Note** You cannot set the administrative distance in EIGRP against certain routes or sources, as you can with other protocols. The command does not work this way with EIGRP.

## Related Commands

| Command | Description |
|---|---|
| **show ip protocols** | Displays the parameters and current state of the active routing protocol process. |

# distribute-list in (RIP, IGRP, EIGRP)

To filter networks received in updates, use the **distribute-list in** command in address family or router configuration mode. To disable this function, use the **no** form of this command.

**distribute-list** {*access-list-number* | **prefix** *prefix-list-name* [**gateway** *prefix-list-name*]} **in** [*interface-type interface-number*]

**no distribute-list** {*access-list-number* | **prefix** *prefix-list-name* [**gateway** *prefix-list-name*]} **in** [*interface-type interface-number*]

## Syntax Description

| | |
|---|---|
| *access-list-number* | Standard IP access list number. The list defines which networks are to be received and which are to be suppressed in routing updates. |
| **prefix** *prefix-list-name* | Name of a prefix list. The list defines which networks are to be received and which are to be suppressed in routing updates, based upon matching the network prefix to the prefixes in the list. |
| **gateway** *prefix-list-name* | (Optional) Name of the prefix list to be applied to the gateway of the prefix being updated. |
| **in** | Applies the access list to incoming routing updates. |
| *interface-type* | (Optional) Interface type. |
| *interface-number* | (Optional) Interface number on which the access list should be applied to incoming updates. If no interface is specified, the access list will be applied to all incoming updates. |

## Defaults

This command is disabled by default.

## Command Modes

Address family configuration

Router configuration

## Command History

| Release | Modification |
|---|---|
| 10.0 | This command was introduced. |
| 11.2 | The *access-list-number*, *interface-type*, and *interface-number* arguments were added. |
| 12.0 | The *prefix-list-name* argument was added. |
| 12.0(7)T | Address family configuration mode was added. |

## Usage Guidelines

This command is not supported in Intermediate System-to-Intermediate System (IS-IS) or Open Shortest Path First (OSPF).

Using a prefix list allows filtering based upon the prefix length, making it possible to filter either on the prefix list, the gateway, or both for incoming updates.

Specify either an access list or a prefix list with the **distribute-list in** command.

Use the **gateway** keyword only with the **prefix-list** keyword.

To suppress networks from being advertised in updates, use the **distribute-list out** command.

## Examples

In the following example, the BGP routing process accepts only two networks—network 0.0.0.0 and network 172.18.0.0:

```
access-list 1 permit 0.0.0.0
access-list 1 permit 172.18.0.0
access-list 1 deny 0.0.0.0 255.255.255.255
router bgp 5000
 network 172.18.0.0
 distribute-list 1 in
```

In the following example, The RIP process accepts only prefixes with prefix lengths of /8 to /24:

```
ip prefix-list max24 seq 5 permit 0.0.0.0/0 ge 8 le 24
router rip
 network 172.18.0.0
 distribute-list prefix max24 in
```

In the following example, the RIP process filters on packet length and accepts routing updates from address 192.168.1.1 only:

```
ip prefix-list max24 seq 5 permit 0.0.0.0/0 ge 8 le 24
ip prefix-list allowlist seq5 permit 192.168.1.1/32
router rip
 network 172.18.0.0
 distribute-list prefix max24 gateway allowlist in
```

## Related Commands

| Command | Description |
|---|---|
| **access-list (IP extended)** | Defines an extended IP access list. |
| **distribute-list out (RIP, IGRP, EIGRP)** | Suppresses networks from being advertised in updates. |
| **ip prefix-list** | Creates an entry in a prefix list. |
| **redistribute (IP)** | Redistributes routes from one routing domain into another routing domain. |

# distribute-list out (RIP, IGRP, EIGRP)

To suppress networks from being advertised in updates, use the **distribute-list out** command in address family or router configuration mode. To disable this function, use the **no** form of this command.

**distribute-list** {*access-list-number* | **prefix** *prefix-list-name* [**gateway** *prefix-list-name*]} **out** [*interface-name* | *routing-process* | *as-number*]

**no distribute-list** {*access-list-number* | **prefix** *prefix-list-name* [**gateway** *prefix-list-name*]} **out** [*interface-name* | *routing-process* | *as-number*]

## Syntax Description

| | |
|---|---|
| *access-list-number* | Standard IP access list number. The list defines which networks are to be received and which are to be suppressed in routing updates. |
| **prefix** *prefix-list-name* | Name of a prefix list. The list defines which networks are to be received and which are to be suppressed in routing updates, based upon matching the network prefix to the prefixes in the list. |
| **gateway** *prefix-list-name* | (Optional) Name of the prefix list to be applied to the gateway of the prefix being updated. |
| **out** | Applies the access list to outgoing routing updates. |
| *interface-name* | (Optional) Name of a particular interface. |
| *routing-process* | (Optional) Name of a particular routing process, or the keyword **static** or **connected**. |
| *as-number* | (Optional) Autonomous system number. |

## Defaults

This command is disabled by default.

## Command Modes

Address family configuration

Router configuration

## Command History

| Release | Modification |
|---|---|
| 10.0 | This command was introduced. |
| 11.2 | The *access-list-number* argument was added. |
| 12.0 | The *prefix-list-name* argument was added. |
| 12.0(7)T | Address family configuration mode was added. |

## Usage Guidelines

When redistributing networks, a routing process name can be specified as an optional trailing argument to the **distribute-list** command. Specifying an argument causes the access list or prefix list to be applied to only those routes derived from the specified routing process. After the process-specific access list or prefix list is applied, any access list or prefix list specified by a **distribute-list** command without a process name argument will be applied. Addresses not specified in the **distribute-list** command will not be advertised in outgoing routing updates.

Specify either an access list or a prefix list with the **distribute-list in** command.

Use the **gateway** keyword only with the **prefix-list** keyword.

**Note** To filter networks received in updates, use the **distribute-list in** command.

## Examples

The following example causes only one network (network 172.18.0.0) to be advertised by a RIP routing process:

```
access-list 1 permit 172.18.0.0
access-list 1 deny 0.0.0.0 255.255.255.255
router rip
 network 172.18.0.0
 distribute-list 1 out
```

## Related Commands

| Command | Description |
|---|---|
| **access-list (IP extended)** | Defines an extended IP access list. |
| **distribute-list in (RIP, IGRP, EIGRP)** | Filters networks received in updates. |
| **ip prefix-list** | Creates an entry in a prefix list. |

# eigrp log-neighbor-changes

To enable the logging of changes in Enhanced Interior Gateway Routing Protocol (EIGRP) neighbor adjacencies, use the **eigrp log-neighbor-changes** command in router configuration mode. To disable the logging of changes in EIGRP neighbor adjacencies, use the **no** form of this command.

**eigrp log-neighbor-changes**

**no eigrp log-neighbor-changes**

## Syntax Description

This command has no arguments or keywords.

## Defaults

Adjacency changes are logged.

## Command Modes

Router configuration

## Command History

| Release | Modification |
|---|---|
| 11.2 | This command was introduced. |

## Usage Guidelines

This command enables the logging of neighbor adjacency changes to monitor the stability of the routing system and to help detect problems. Logging is enabled by default. To disable the logging of neighbor adjacency changes, use the **no** form of this command.

## Examples

The following configuration disables logging of neighbor changes for EIGRP process 1:

```
router eigrp 1
 no eigrp log-neighbor-changes
```

The following onfiguration enables logging of neighbor changes for EIGRP process 1:

```
router eigrp 1
 eigrp log-neighbor-changes
```

# eigrp log-neighbor-warnings

To enable the logging of Enhanced Interior Gateway Routing Protocol (EIGRP) neighbor warning messages, use the **eigrp log-neighbor-warnings** command in router configuration mode. To disable the logging of EIGRP neighbor warning messages, use the **no** form of this command.

**eigrp log-neighbor-warnings** [*seconds*]

**no eigrp log-neighbor-warnings**

## Syntax Description

| | |
|---|---|
| *seconds* | (Optional) The time interval (in seconds) between repeated neighbor warning messages. The range of seconds is from 1 to 65535. |

## Defaults

Neighbor warning messages are logged.

## Command Modes

Router configuration

## Command History

| Release | Modification |
|---|---|
| 12.0(5) | This command was introduced. |

## Usage Guidelines

When neighbor warning messages occur, they are logged by default. With this command, you can disable and enable neighbor warning messages, and configure the interval between repeated neighbor warning messages.

## Examples

The following command will log neighbor warning messages for EIGRP process 1 and repeat the warning messages in 5-minute (300 seconds) intervals:

```
router eigrp 1
 eigrp log-neighbor-warnings 300
```

# eigrp router-id

To set the router ID used by Enhanced Interior Gateway Routing Protocol (EIGRP) when communicating with its neighbors, use the **eigrp router-id** command in router configuration mode. To remove the configured router ID, use the **no** form of this command.

**eigrp router-id** *ip-address*

**no eigrp router-id** *ip-address*

## Syntax Description

| | |
|---|---|
| *ip-address* | Router ID in dotted decimal notation. |

## Defaults

EIGRP automatically selects an IP address to use as the router ID when an EIGRP process is started. The highest local IP address is selected and loopback interfaces are preferred. The router ID is not changed unless the EIGRP process is removed with the **no router eigrp** command or if the router ID is manually configured with the **eigrp router-id** command.

## Command Modes

Address family configuration
Router configuration

## Command History

| Release | Modification |
|---|---|
| 12.1 | This command was introduced. |

## Usage Guidelines

The router ID is used to identify the originating router for external routes. If an external route is received with the local router ID, the route is discarded. The router ID can be configured with any IP address with two exceptions; 0.0.0.0 and 255.255.255.255 are not legal values and cannot be entered. A unique value should be configured for each router.

## Examples

The following example configures 172.16.1.3 as a fixed router ID:

```
router eigrp 1
 eigrp router-id 172.16.1.3
```

# eigrp stub

To configure a router as a stub using Enhanced Interior Gateway Routing Protocol (EIGRP), use the **eigrp stub** command in router configuration mode. To disable the EIGRP stub routing feature, use the **no** form of this command.

**eigrp stub** [**receive-only | connected | static | summary | redistributed**]

**no eigrp stub** [**receive-only | connected | static | summary | redistributed**]

## Syntax Description

| | |
|---|---|
| **receive-only** | (Optional) Sets the router as a receive-only neighbor. |
| **connected** | (Optional) Advertises connected routes. |
| **static** | (Optional) Advertises static routes. |
| **summary** | (Optional) Advertises summary routes. |
| **redistributed** | (Optional) Advertises redistributred routes from other protocols and autonomous systems. |

## Defaults

Stub routing is not enabled by default.

## Command Modes

Router configuration

## Command History

| Release | Modification |
|---|---|
| 12.0(7)T | This command was introduced. |
| 12.0(15)S | This command was integrated into Cisco IOS Release 12.0(15)S. |
| 12.2 | Keyword **redistributed** was added. |

## Usage Guidelines

Use the **eigrp stub** command to configure a router as a stub where the router directs all IP traffic to a distribution router.

The **eigrp stub** command can be modified with several options, and these options can be used in any combination except for the **receive-only** keyword. The **receive-only** keyword will restrict the router from sharing any of its routes with any other router in that EIGRP autonomous system, and the **receive-only** keyword will not permit any other option to be specified because it prevents any type of route from being sent. The four other optional keywords (**connected**, **static**, **summary**, and **redistributed**) can be used in any combination but cannot be used with the **receive-only** keyword.

If any of these four keywords is used with the **eigrp stub** command, only the route types specified by the particular keyword(s) will be sent. Route types specified by the non-used keyword(s) will not be sent.

The **connected** keyword permits the EIGRP Stub Routing feature to send connected routes. If the connected routes are not covered by a network statement, it may be necessary to redistribute connected routes with the **redistribute connected** command under the EIGRP process. This option is enabled by default.

The **static** keyword permits the EIGRP Stub Routing feature to send static routes. Without the configuration of this option, EIGRP will not send any static routes, including internal static routes that normally would be automatically redistributed. It will still be necessary to redistribute static routes with the **redistribute static** command.

The **summary** keyword permits the EIGRP Stub Routing feature to send summary routes. Summary routes can be created manually with the **summary address** command or automatically at a major network border router with the **auto-summary** command enabled. This option is enabled by default.

The **redistributed** keyword permits the EIGRP Stub Routing feature to send other routing protocols and autonomous systems. Without the configuration of this option, EIGRP will not advertize redistributed routes.

**Note** Multi-access interfaces, such as ATM, Ethernet, Frame Relay, ISDN PRI, and X.25, are supported by the EIGRP Stub Routing feature only when all routers on that interface, except the hub, are configured as stub routers.

## Examples

In the following example, the **eigrp stub** command is used to configure the router as a stub that advertises connected and summary routes:

```
router eigrp 1
network 10.0.0.0
eigrp stub
```

In the following example, the **eigrp stub** command is issued with the **connected** and **static** keywords to configure the router as a stub that advertises connected and static routes (sending summary routes will not be permitted):

```
router eigrp 1
network 10.0.0.0
eigrp stub connected static
```

In the following example, the **eigrp stub** command is issued with the **receive-only** keyword to configure the router as a receive-only neighbor (connected, summary, and static routes will not be sent):

```
router eigrp 1
network 10.0.0.0 eigrp
eigrp stub receive-only
```

In the following example, the **eigrp stub** command is issued with the **redistributed** keyword to configure the router to advertize other protocols and autonomous systems:

```
router eigrp 1
network 10.0.0.0 eigrp
eigrp stub redistributed
```

# ip authentication key-chain eigrp

To enable authentication of Enhanced Interior Gateway Routing Protocol (EIGRP) packets, use the **ip authentication key-chain eigrp** command in interface configuration mode. To disable such authentication, use the **no** form of this command.

**ip authentication key-chain eigrp** *as-number key-chain*

**no ip authentication key-chain eigrp** *as-number key-chain*

## Syntax Description

| | |
|---|---|
| *as-number* | Autonomous system number to which the authentication applies. |
| *key-chain* | Name of the authentication key chain. |

## Defaults

No authentication is provided for EIGRP packets.

## Command Modes

Interface configuration

## Command History

| Release | Modification |
|---|---|
| 11.2 F | This command was introduced. |

## Examples

The following example applies authentication to autonomous system 2 and identifies a key chain named SPORTS:

```
ip authentication key-chain eigrp 2 SPORTS
```

## Related Commands

| Command | Description |
|---|---|
| **accept-lifetime** | Sets the time period during which the authentication key on a key chain is received as valid. |
| **ip authentication mode eigrp** | Specifies the type of authentication used in EIGRP packets. |
| **key** | Identifies an authentication key on a key chain. |
| **key chain** | Enables authentication of routing protocols. |
| **key-string (authentication)** | Specifies the authentication string for a key. |
| **send-lifetime** | Sets the time period during which an authentication key on a key chain is valid to be sent. |

# ip authentication mode eigrp

To specify the type of authentication used in Enhanced Interior Gateway Routing Protocol (EIGRP) packets, use the **ip authentication mode eigrp** command in interface configuration mode. To disable that type of authentication, use the **no** form of this command.

**ip authentication mode eigrp** *as-number* **md5**

**no ip authentication mode eigrp** *as-number* **md5**

## Syntax Description

| | |
|---|---|
| *as-number* | Autonomous system number. |
| **md5** | Keyed Message Digest 5 (MD5) authentication. |

## Defaults

No authentication is provided for EIGRP packets.

## Command Modes

Interface configuration

## Command History

| Release | Modification |
|---|---|
| 11.2 F | This command was introduced. |

## Usage Guidelines

Configure authentication to prevent unapproved sources from introducing unauthorized or false routing messages. When authentication is configured, an MD5 keyed digest is added to each EIGRP packet in the specified autonomous system.

## Examples

The following example configures the interface to use MD5 authentication in EIGRP packets in autonomous system 1:

```
ip authentication mode eigrp 1 md5
```

## Related Commands

| Command | Description |
|---|---|
| **accept-lifetime** | Sets the time period during which the authentication key on a key chain is received as valid. |
| **ip authentication key-chain eigrp** | Enables authentication of EIGRP packets. |
| **key** | Identifies an authentication key on a key chain. |
| **key chain** | Enables authentication of routing protocols. |
| **key-string (authentication)** | Specifies the authentication string for a key. |
| **send-lifetime** | Sets the time period during which an authentication key on a key chain is valid to be sent. |

# ip bandwidth-percent eigrp

To configure the percentage of bandwidth that may be used by Enhanced Interior Gateway Routing Protocol (EIGRP) on an interface, use the **ip bandwidth-percent eigrp** command in interface configuration mode. To restore the default value, use the **no** form of this command.

**ip bandwidth-percent eigrp** *as-number percent*

**no ip bandwidth-percent eigrp** *as-number percent*

## Syntax Description

| | |
|---|---|
| *as-number* | Autonomous system number. |
| *percent* | Percent of bandwidth that EIGRP may use. |

## Defaults

50 percent

## Command Modes

Interface configuration

## Command History

| Release | Modification |
|---|---|
| 11.2 | This command was introduced. |

## Usage Guidelines

EIGRP will use up to 50 percent of the bandwidth of a link, as defined by the **bandwidth** interface configuration command. This command may be used if some other fraction of the bandwidth is desired. Note that values greater than 100 percent may be configured. The configuration option may be useful if the bandwidth is set artificially low for other reasons.

## Examples

The following example allows EIGRP to use up to 75 percent (42 kbps) of a 56-kbps serial link in autonomous system 1:

```
interface serial 0
 bandwidth 56
 ip bandwidth-percent eigrp 1 75
```

## Related Commands

| Command | Description |
|---|---|
| **bandwidth (interface)** | Sets a bandwidth value for an interface. |

# ip hello-interval eigrp

To configure the hello interval for the Enhanced Interior Gateway Routing Protocol (EIGRP) routing process designated by an autonomous system number, use the **ip hello-interval eigrp** command in interface configuration mode. To restore the default value, use the **no** form of this command.

**ip hello-interval eigrp** *as-number seconds*

**no ip hello-interval eigrp** *as-number seconds*

## Syntax Description

| | |
|---|---|
| *as-number* | Autonomous system number. |
| *seconds* | Hello interval (in seconds). |

## Defaults

For low-speed, nonbroadcast multiaccess (NBMA) networks: 60 seconds

For all other networks: 5 seconds

## Command Modes

Interface configuration

## Command History

| Release | Modification |
|---|---|
| 10.0 | This command was introduced. |

## Usage Guidelines

The default of 60 seconds applies only to low-speed, NBMA media. Low speed is considered to be a rate of T1 or slower, as specified with the **bandwidth** interface configuration command. Note that for the purposes of EIGRP, Frame Relay and Switched Multimegabit Data Service (SMDS) networks may be considered to be NBMA. These networks are considered NBMA if the interface has not been configured to use physical multicasting; otherwise, they are considered not to be NBMA.

## Examples

The following example sets the hello interval for Ethernet interface 0 to 10 seconds:

```
interface ethernet 0
 ip hello-interval eigrp 1 10
```

## Related Commands

| Command | Description |
|---|---|
| **bandwidth (interface)** | Sets a bandwidth value for an interface. |
| **ip hold-time eigrp** | Configures the hold time for a particular EIGRP routing process designated by the autonomous system number. |

# ip hold-time eigrp

To configure the hold time for a particular Enhanced Interior Gateway Routing Protocol (EIGRP) routing process designated by the autonomous system number, use the **ip hold-time eigrp** command in interface configuration mode. To restore the default value, use the **no** form of this command.

**ip hold-time eigrp** *as-number seconds*

**no ip hold-time eigrp** *as-number seconds*

## Syntax Description

| | |
|---|---|
| *as-number* | Autonomous system number. |
| *seconds* | Hold time (in seconds). |

## Defaults

For low-speed, nonbroadcast multiaccess (NBMA) networks: 180 seconds

For all other networks: 15 seconds

## Command Modes

Interface configuration

## Command History

| Release | Modification |
|---|---|
| 10.0 | This command was introduced. |

## Usage Guidelines

On very congested and large networks, the default hold time might not be sufficient time for all routers and access servers to receive hello packets from their neighbors. In this case, you may want to increase the hold time.

We recommend that the hold time be at least three times the hello interval. If a router does not receive a hello packet within the specified hold time, routes through this router are considered unavailable.

Increasing the hold time delays route convergence across the network.

The default of 180 seconds hold time and 60 seconds hello interval apply only to low-speed, NBMA media. Low speed is considered to be a rate of T1 or slower, as specified with the **bandwidth** interface configuration command.

## Examples

The following example sets the hold time for Ethernet interface 0 to 40 seconds:

```
interface ethernet 0
 ip hold-time eigrp 1 40
```

## Related Commands

| Command | Description |
|---|---|
| **bandwidth (interface)** | Sets a bandwidth value for an interface. |
| **ip hello-interval eigrp** | Configures the hello interval for the EIGRP routing process designated by an autonomous system number. |

# ip split-horizon eigrp

To enable Enhanced Interior Gateway Routing Protocol (EIGRP) split horizon, use the **ip split-horizon eigrp** command in interface configuration mode. To disable split horizon, use the **no** form of this command.

**ip split-horizon eigrp** *as-number*

**no ip split-horizon eigrp** *as-number*

## Syntax Description

| | |
|---|---|
| *as-number* | Autonomous system number. |

## Defaults

The behavior of this command is enabled by default.

## Command Modes

Interface configuration

## Command History

| Release | Modification |
|---|---|
| 10.0 | This command was introduced. |

## Usage Guidelines

For networks that include links over X.25 packet-switched networks (PSNs), you can use the **neighbor** router configuration command to defeat the split horizon feature. As an alternative, you can explicitly specify the **no ip split-horizon eigrp** command in your configuration. However, if you do so, you must similarly disable split horizon for all routers and access servers in any relevant multicast groups on that network.

**Note** In general, we recommend that you not change the default state of split horizon unless you are certain that your application requires the change in order to properly advertise routes. Remember that if split horizon is disabled on a serial interface and that interface is attached to a packet-switched network, you must disable split horizon for all routers and access servers in any relevant multicast groups on that network.

## Examples

The following example disables split horizon on a serial link connected to an X.25 network:

```
interface serial 0
 encapsulation x25
 no ip split-horizon eigrp 101
```

## Related Commands

| Command | Description |
|---|---|
| **ip split-horizon (IGRP)** | Enables the split horizon mechanism. |
| **neighbor (IGRP)** | Defines a neighboring router with which to exchange routing information. |

# ip summary-address eigrp

To configure a summary aggregate address for a specified interface, use the **ip summary-address eigrp** command in interface configuration mode. To disable a configuration, use the **no** form of this command.

**ip summary-address eigrp** *as-number network-address subnet-mask* [*admin-distance*]

**no ip summary-address eigrp** *as-number network-address subnet-mask* [*admin-distance*]

## Syntax Description

| | |
|---|---|
| *as-number* | Autonomous system number. |
| *network-address* | IP summary aggregate address to apply to an interface. |
| *subnet-mask* | Subnet mask. |
| *admin-distance* | (Optional) Administrative distance. A value from 0 to 255. |

## Defaults

No summary aggregate addresses are predefined. The default administrative distance metric for EIGRP is 90.

## Command Modes

Interface configuration

## Command History

| Release | Modification |
|---|---|
| 10.0 | This command was introduced. |
| 12.0(7)T | The *admin-distance* argument was added. |

## Usage Guidelines

EIGRP summary routes are given an administrative distance value of 5. The administrative distance metric is used to advertise a summary without installing it in the routing table.

## Examples

The following example sets the IP summary aggregate address for Ethernet interface 0 with an administrative distance of 95:

```
interface ethernet 0
 ip summary-address eigrp 1 192.168.0.0 255.255.0.0 95
```

## Related Commands

| Command | Description |
|---|---|
| **auto-summary (EIGRP)** | Restores the default behavior of automatic summarization of subnet routes into network-level routes. |

# metric weights (EIGRP)

To allow the tuning of the IGRP or Enhanced Interior Gateway Routing Protocol (EIGRP) metric calculations, use the **metric weights** command in router configuration mode. To reset the values to their defaults, use the **no** form of this command.

**metric weights** *tos k1 k2 k3 k4 k5*

**no metric weights**

## Syntax Description

| | |
|---|---|
| *tos* | Type of service must always be zero. |
| *k1k2 k3 k4 k5* | Constants that convert an IGRP or EIGRP metric vector into a scalar quantity. |

## Defaults

*tos*: 0

*k1*: 1

*k2*: 0

*k3*: 1

*k4*: 0

*k5*: 0

## Command Modes

Router configuration

## Command History

| Release | Modification |
|---|---|
| 10.0 | This command was introduced. |

## Usage Guidelines

Use this command to alter the default behavior of IGRP routing and metric computation and allow the tuning of the IGRP metric calculation for a particular type of service (ToS).

If k5 equals 0, the composite IGRP or EIGRP metric is computed according to the following formula:

metric = [k1 * bandwidth + (k2 * bandwidth)/(256 - load) + k3 * delay]

If k5 does not equal zero, an additional operation is performed:

metric = metric * [k5/(reliability + k4)]

Bandwidth is inverse minimum bandwidth of the path in BPS scaled by a factor of $2.56 * 10^{12}$. The range is from a 1200-bps line to 10 terabits per second.

Delay is in units of 10 microseconds. The range of delay is from 10 microseconds to 168 seconds. A delay of all ones indicates that the network is unreachable.

The delay parameter is stored in a 32-bit field, in increments of 39.1 nanoseconds. The range of delay is from 1 (39.1 nanoseconds) to hexadecimal FFFFFFFF (decimal 4,294,967,040 nanoseconds). A delay of all ones (that is, a delay of hexadecimal FFFFFFFF) indicates that the network is unreachable.

Table 20 lists the default values used for several common media.

***Table 20 Bandwidth Values by Media Type***

| Media Type | Delay | Bandwidth |
|---|---|---|
| Satellite | 5120 (2 seconds) | 5120 (500 megabits) |
| Ethernet | 25600 (1 milliseconds [ms]) | 256000 (10 megabits) |
| 1.544 Mbps | 512000 (20,000 ms) | 1,657,856 bits |
| 64 kbps | 512000 (20,000 ms) | 40,000,000 bits |
| 56 kbps | 512000 (20,000 ms) | 45,714,176 bits |
| 10 kbps | 512000 (20,000 ms) | 256,000,000 bits |
| 1 kbps | 512000 (20,000 ms) | 2,560,000,000 bits |

Reliability is given as a fraction of 255. That is, 255 is 100 percent reliability or a perfectly stable link.

Load is given as a fraction of 255. A load of 255 indicates a completely saturated link.

## Examples

The following example sets the metric weights to slightly different values than the defaults:

```
router igrp 1
 network 192.168.0.0
 metric weights 0 2 0 2 0 0
```

## Related Commands

| Command | Description |
|---|---|
| **bandwidth (interface)** | Sets a bandwidth value for an interface. |
| **delay (interface)** | Sets a delay value for an interface. |
| **metric holddown** | Keeps new IGRP routing information from being used for a certain period of time. |
| **metric maximum-hops** | Causes the IP routing software to advertise as unreachable those routes with a hop count higher than is specified by the command (IGRP only). |

# neighbor (EIGRP)

To define a neighboring router with which to exchange routing information on a router that is running Enhanced Interior Gateway Routing Protocol (EIGRP), use the **neighbor** command in router configuration mode. To remove an entry, use the **no** form of this command.

**neighbor** *ip-address interface-type interface-number*

**no neighbor** *ip-address interface-type interface-number*

## Syntax Description

| | |
|---|---|
| *ip-address* | IP address of a peer router with which routing information will be exchanged. |
| *interface-type* | Interface through which peering is established. |
| *interface-number* | Number of the interface or subinterface. |

## Command Default

No neighboring routers are defined.

## Command Modes

Router configuration

## Command History

| Release | Modification |
|---|---|
| 10.0 | This command was introduced. |

## Usage Guidelines

Multiple neighbor statements can be used to establish peering sessions with specific EIGRP neighbors. The interface through which EIGRP will exchange routing updates must be specified in the neighbor statement. The interfaces through which two EIGRP neighbors exchange routing updates must be configured with IP addresses from the same network.

**Note** Configuring the **passive-interface** command suppresses all incoming and outgoing routing updates and hello messages. EIGRP neighbor adjacencies cannot be established or maintained over an interface that is configured as passive.

## Examples

The following example configures EIGRP peering sessions with the 192.168.1.1 and 192.168.2.2 neighbors:

```
router eigrp 1
 network 192.168.0.0
 neighbor 192.168.1.1 Ethernet 0/0
 neighbor 192.168.2.2 Ethernet 1/1
```

## Related Commands

| Command | Description |
|---|---|
| **passive-interface** | Disables sending routing updates on an interface. |

# network (EIGRP)

To specify a list of networks for the Enhanced Interior Gateway Routing Protocol (EIGRP) routing process, use the **network** command in router configuration mode. To remove an entry, use the **no** form of this command.

**network** *network-number* [*network-mask*]

**no network** *network-number* [*network-mask*]

## Syntax Description

| | |
|---|---|
| *network-number* | IP address of the directly connected networks. |
| *network-mask* | (Optional) Network mask. |

## Defaults

No networks are specified.

## Command Modes

Router configuration

## Command History

| Release | Modification |
|---|---|
| 10.0 | This command was introduced. |
| 12.0(4)T | The *network-mask* argument was added. |

## Usage Guidelines

There is no limit to the number of **network** commands you can use on the router.

IGRP or EIGRP sends updates to the interfaces in the specified networks. Also, if the network of an interface is not specified, it will not be advertised in any IGRP or EIGRP update.

The network mask can be as specific as the interface mask.

## Examples

The following example configures a router for EIGRP and assigns autonomous system 1. The **network** commands indicate the networks directly connected to the router.

```
router eigrp 1
 network 172.16.0.0
 network 192.168.7.0
```

## Related Commands

| Command | Description |
|---|---|
| **router eigrp** | Configures the EIGRP routing process. |
| **router igrp** | Configures the IGRP routing process. |

# offset-list (EIGRP)

To add an offset to incoming and outgoing metrics to routes learned via Enhanced Interior Gateway Routing Protocol (EIGRP), use the **offset-list** command in router configuration mode. To remove an offset list, use the **no** form of this command.

**offset-list** {*access-list-number* | *access-list-name*} {**in** | **out**} *offset* [*interface-type interface-number*]

**no offset-list** {*access-list-number* | *access-list-name*} {**in** | **out**} *offset* [*interface-type interface-number*]

## Syntax Description

| | |
|---|---|
| *access-list-number* \| *access-list-name* | Standard access list number or name to be applied. Access list number 0 indicates all access lists. If the *offset* value is 0, no action is taken. For IGRP, the offset is added to the delay component only. |
| **in** | Applies the access list to incoming metrics. |
| **out** | Applies the access list to outgoing metrics. |
| *offset* | Positive offset to be applied to metrics for networks matching the access list. If the offset is 0, no action is taken. |
| *interface-type* | (Optional) Interface type to which the offset list is applied. |
| *interface-number* | (Optional) Interface number to which the offset list is applied. |

## Defaults

This command is disabled by default.

## Command Modes

Router configuration

## Command History

| Release | Modification |
|---|---|
| 10.0 | This command was introduced. |
| 10.3 | The *interface-type* and *interface-number* arguments were added. |
| 11.2 | The *access-list-name* argument was added. |

## Usage Guidelines

The offset value is added to the routing metric. An offset list with an interface type and interface number is considered extended and takes precedence over an offset list that is not extended. Therefore, if an entry passes the extended offset list and the normal offset list, the offset of the extended offset list is added to the metric.

## Examples

In the following example, the router applies an offset of 10 to the delay component of the router only to access list 21:

```
offset-list 21 out 10
```

In the following example, the router applies an offset of 10 to routes learned from Ethernet interface 0:

```
offset-list 21 in 10 ethernet 0
```

# router eigrp

To configure the Enhanced Interior Gateway Routing Protocol (EIGRP) routing process, use the **router eigrp** command in global configuration mode. To shut down a routing process, use the **no** form of this command.

**router eigrp** *as-number*

**no router eigrp** *as-number*

## Syntax Description

| | |
|---|---|
| *as-number* | Autonomous system number that identifies the routes to the other EIGRP routers. It is also used to tag the routing information. |

## Defaults

This command is disabled by default.

## Command Modes

Global configuration

## Command History

| Release | Modification |
|---|---|
| 10.0 | This command was introduced. |

## Examples

The following example configures an EIGRP routing process and assigns process number 1:

```
router eigrp 1
```

## Related Commands

| Command | Description |
|---|---|
| **network (EIGRP)** | Specifies a list of networks for the EIGRP routing process. |

# set metric (EIGRP)

To set the metric value for Enhanced Interior Gateway Routing Protocol (EIGRP) in a route map, use the **set metric** route-map configuration command. To return to the default metric value, use the **no** form of this command.

**set metric** *bandwidth delay reliability loading mtu*

**no set metric** *bandwidth delay reliability loading mtu*

## Syntax Description

| | |
|---|---|
| *bandwidth* | Metric value or EIGRP bandwidth of the route in kbps. It can be in the range 0 to 4294967295. |
| *delay* | Route delay (in tens of microseconds). It can be in the range from 0 to 4294967295. |
| *reliability* | Likelihood of successful packet transmission expressed as a number from 0 to 255. The value 255 means 100 percent reliability; 0 means no reliability. |
| *loading* | Effective bandwidth of the route expressed as a number from 0 to 255 (255 is 100 percent loading). |
| *mtu* | Minimum maximum transmission unit (MTU) size of the route, in bytes. It can be in the range from 0 to 4294967295. |

## Defaults

No metric will be set in the route map.

## Command Modes

Route-map configuration

## Command History

| Release | Modification |
|---|---|
| 10.0 | This command was introduced. |

## Usage Guidelines

We recommend you consult your Cisco technical support representative before changing the default value.

Use the **route-map** global configuration command, and the **match** and **set** route-map configuration commands, to define the conditions for redistributing routes from one routing protocol into another. Each **route-map** command has a list of **match** and **set** commands associated with it. The **match** commands specify the *match criteria*—the conditions under which redistribution is allowed for the current **route-map** command. The **set** commands specify the *set actions*—the particular redistribution actions to perform if the criteria enforced by the **match** commands are met. The **no route-map** command deletes the route map.

The **set** route-map configuration commands specify the redistribution *set actions* to be performed when all of the match criteria for a router are met. When all match criteria are met, all set actions are performed.

## Examples

The following example sets the bandwidth to 10,000, the delay to 10, the reliability to 255, the loading to 1, and the MTU to 1500:

```
set metric 10000 10 255 1 1500
```

# show ip eigrp interfaces

To display information about interfaces configured for Enhanced Interior Gateway Routing Protocol (EIGRP), use the **show ip eigrp interfaces** command in EXEC mode.

**show ip eigrp interfaces** [*interface-type interface-number*] [*as-number*]

## Syntax Description

| | |
|---|---|
| *interface-type* | (Optional) Interface type. |
| *interface-number* | (Optional) Interface number. |
| *as-number* | (Optional) Autonomous system number. |

## Command Modes

EXEC

## Command History

| Release | Modification |
|---|---|
| 11.2 | This command was introduced. |

## Usage Guidelines

Use the **show ip eigrp interfaces** command to determine on which interfaces EIGRP is active, and to learn information about EIGRP relating to those interfaces.

If an interface is specified, only that interface is displayed. Otherwise, all interfaces on which EIGRP is running are displayed.

If an autonomous system is specified, only the routing process for the specified autonomous system is displayed. Otherwise, all EIGRP processes are displayed.

## Examples

The following is sample output from the **show ip eigrp interfaces** command:

```
Router# show ip eigrp interfaces

IP EIGRP interfaces for process 1

                    Xmit Queue    Mean   Pacing Time   Multicast   Pending
Interface   Peers   Un/Reliable   SRTT   Un/Reliable   Flow Timer  Routes
Di0           0         0/0          0      11/434          0          0
Et0           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
```

Table 21 describes the significant fields shown in the display.

***Table 21 show ip eigrp interfaces Field Descriptions***

| Field | Description |
|---|---|
| Interface | Interface over which EIGRP is configured. |
| Peers | Number of directly connected EIGRP neighbors. |

*Table 21 show ip eigrp interfaces Field Descriptions (continued)*

| Field | Description |
|---|---|
| Xmit Queue Un/Reliable | Number of packets remaining in the Unreliable and Reliable transmit queues. |
| Mean SRTT | Mean smooth round-trip time (SRTT) interval (in milliseconds). |
| Pacing Time Un/Reliable | Pacing time used to determine when EIGRP packets should be sent out the interface (unreliable and reliable packets). |
| Multicast Flow Timer | Maximum number of seconds in which the router will send multicast EIGRP packets. |
| Pending Routes | Number of routes in the packets in the transmit queue waiting to be sent. |

## Related Commands

| Command | Description |
|---|---|
| **show ip eigrp neighbors** | Displays the neighbors discovered by EIGRP. |

# show ip eigrp neighbors

To display the neighbors discovered by Enhanced Interior Gateway Routing Protocol (EIGRP), use the **show ip eigrp neighbors** command in EXEC mode.

**show ip eigrp neighbors** [*interface-type* | *as-number* | **static**]

## Syntax Description

| | |
|---|---|
| *interface-type* | (Optional) Interface type. |
| *as-number* | (Optional) Autonomous system number. |
| **static** | (Optional) Static routes. |

## Command Modes

EXEC

## Command History

| Release | Modification |
|---|---|
| 10.3 | This command was introduced. |
| 12.0(7)T | The **static** keyword was added. |

## Usage Guidelines

Use the **show ip eigrp neighbors** command to determine when neighbors become active and inactive. It is also useful for debugging certain types of transport problems.

## Examples

The following is sample output from the **show ip eigrp neighbors** command:

```
Router# show ip eigrp neighbors

IP-EIGRP Neighbors for process 77
Address                 Interface     Holdtime Uptime   Q      Seq  SRTT  RTO
                                      (secs)   (h:m:s)  Count  Num  (ms)  (ms)
172.16.81.28            Ethernet1     13       0:00:41  0      11   4     20
172.16.80.28            Ethernet0     14       0:02:01  0      10   12    24
172.16.80.31            Ethernet0     12       0:02:02  0      4    5     20
```

Table 22 describes the significant fields shown in the display.

***Table 22 show ip eigrp neighbors Field Descriptions***

| Field | Description |
|---|---|
| process 77 | Autonomous system number specified in the **router** configuration command. |
| Address | IP address of the EIGRP peer. |
| Interface | Interface on which the router is receiving hello packets from the peer. |
| Holdtime | Length of time (in seconds) that the Cisco IOS software will wait to hear from the peer before declaring it down. If the peer is using the default hold time, this number will be less than 15. If the peer configures a nondefault hold time, the nondefault hold time will be displayed. |

*Table 22 show ip eigrp neighbors Field Descriptions (continued)*

| Field | Description |
|---|---|
| Uptime | Elapsed time (in hours:minutes:seconds) since the local router first heard from this neighbor. |
| Q Count | Number of EIGRP packets (update, query, and reply) that the software is waiting to send. |
| Seq Num | Sequence number of the last update, query, or reply packet that was received from this neighbor. |
| SRTT | Smooth round-trip time. This is the number of milliseconds required for an EIGRP packet to be sent to this neighbor and for the local router to receive an acknowledgment of that packet. |
| RTO | Retransmission timeout (in milliseconds). This is the amount of time the software waits before resending a packet from the retransmission queue to a neighbor. |

# show ip eigrp topology

To display entries in the Enhanced Interior Gateway Routing Protocol (EIGRP) topology table, use the **show ip eigrp topology** command in EXEC mode.

**show ip eigrp topology** [*as-number* | [[*ip-address*] *mask*]] [**active** | **all-links** | **pending** | **summary** | **zero-successors**]

## Syntax Description

| | |
|---|---|
| *as-number* | (Optional) Autonomous system number. |
| *ip-address* | (Optional) IP address. When specified with a mask, a detailed description of the entry is provided. |
| *mask* | (Optional) Subnet mask. |
| **active** | (Optional) Displays only active entries in the EIGRP topology table. |
| **all-links** | (Optional) Displays all entries in the EIGRP topology table. |
| **pending** | (Optional) Displays all entries in the EIGRP topology table that are waiting for an update from a neighbor or are waiting to reply to a neighbor. |
| **summary** | (Optional) Displays a summary of the EIGRP topology table. |
| **zero-successors** | (Optional) Displays available routes in the EIGRP topology table. |

## Command Modes

EXEC

## Command History

| Release | Modification |
|---|---|
| 10.0 | This command was introduced. |

## Usage Guidelines

The **show ip eigrp topology** command can be used without any keywords or arguments. If this command is used without any keywords or arguments, then only routes that are feasible successors are displayed. The **show ip eigrp topology** command can be used to determine Diffusing Update Algorithm (DUAL) states and to debug possible DUAL problems.

## Examples

The following is sample output from the **show ip eigrp topology** command:

```
Router# show ip eigrp topology

IP-EIGRP Topology Table for process 77

Codes: P - Passive, A - Active, U - Update, Q - Query, R - Reply,
       r - Reply status

P 172.16.90.0 255.255.255.0, 2 successors, FD is 0
          via 172.16.80.28 (46251776/46226176), Ethernet0
          via 172.16.81.28 (46251776/46226176), Ethernet1
          via 172.16.80.31 (46277376/46251776), Serial0
P 172.16.81.0 255.255.255.0, 1 successors, FD is 307200
          via Connected, Ethernet1
```

```
via 172.16.81.28 (307200/281600), Ethernet1
via 172.16.80.28 (307200/281600), Ethernet0
via 172.16.80.31 (332800/307200), Serial0
```

Table 23 describes the significant fields shown in the display.

***Table 23 show ip eigrp topology Field Descriptions***

| Field | Description |
|---|---|
| Codes | State of this topology table entry. Passive and Active refer to the EIGRP state with respect to this destination; Update, Query, and Reply refer to the type of packet that is being sent. |
| P – Passive | No EIGRP computations are being performed for this destination. |
| A – Active | EIGRP computations are being performed for this destination. |
| U – Update | Indicates that an update packet was sent to this destination. |
| Q – Query | Indicates that a query packet was sent to this destination. |
| R – Reply | Indicates that a reply packet was sent to this destination. |
| r – Reply status | Flag that is set after the software has sent a query and is waiting for a reply. |
| 172.16.90.0 | Destination IP network number. |
| 255.255.255.0 | Destination subnet mask. |
| successors | Number of successors. This number corresponds to the number of next hops in the IP routing table. If “successors” is capitalized, then the route or next hop is in a transition state. |
| FD | Feasible distance. The feasible distance is the best metric to reach the destination or the best metric that was known when the route went active. This value is used in the feasibility condition check. If the reported distance of the router (the metric after the slash) is less than the feasible distance, the feasibility condition is met and that path is a feasible successor. Once the software determines it has a feasible successor, it need not send a query for that destination. |
| replies | Number of replies that are still outstanding (have not been received) with respect to this destination. This information appears only when the destination is in Active state. |
| state | Exact EIGRP state that this destination is in. It can be the number 0, 1, 2, or 3. This information appears only when the destination is in the Active state. |
| via | IP address of the peer that told the software about this destination. The first *n* of these entries, where N is the number of successors, are the current successors. The remaining entries on the list are feasible successors. |
| (46251776/46226176) | The first number is the EIGRP metric that represents the cost to the destination. The second number is the EIGRP metric that this peer advertised. |
| Ethernet0 | Interface from which this information was learned. |
| Serial0 | Interface from which this information was learned. |

# show ip eigrp traffic

To display the number of Enhanced Interior Gateway Routing Protocol (EIGRP) packets sent and received, use the **show ip eigrp traffic** command in EXEC mode.

**show ip eigrp traffic** [*as-number*]

## Syntax Description

| | |
|---|---|
| *as-number* | (Optional) Autonomous system number. |

## Command Modes

EXEC

## Command History

| Release | Modification |
|---|---|
| 10.0 | This command was introduced. |

## Examples

The following is sample output from the **show ip eigrp traffic** command:

```
Router# show ip eigrp traffic

IP-EIGRP Traffic Statistics for process 77
  Hellos sent/received: 218/205
  Updates sent/received: 7/23
  Queries sent/received: 2/0
  Replies sent/received: 0/2
  Acks sent/received: 21/14
```

Table 24 describes the significant fields shown in the display.

***Table 24 show ip eigrp traffic Field Descriptions***

| Field | Description |
|---|---|
| process 77 | Autonomous system number specified in the **ip router** command. |
| Hellos sent/received | Number of hello packets sent and received. |
| Updates sent/received | Number of update packets sent and received. |
| Queries sent/received | Number of query packets sent and received. |
| Replies sent/received | Number of reply packets sent and received. |
| Acks sent/received | Number of acknowledgment packets sent and received. |

# timers active-time

To adjust routing wait time, use the **timers active-time** command in router configuration mode. To disable this function, use the **no** form of the command.

**timers active-time** [*time-limit* | **disabled**]

**no timers active-time**

## Syntax Description

| | |
|---|---|
| *time-limit* | EIGRP active-time limit (in minutes). The time range is from 1to 4294967295 minutes. |
| **disabled** | Disables the timers and permits the routing wait time to remain active indefinitely. |

## Defaults

This command is disabled by default.

## Command Modes

Router configuration

## Command History

| Release | Modification |
|---|---|
| 10.0 | This command was introduced. |

## Usage Guidelines

In EIGRP, there are timers that control the time the router waits (after sending a query) before declaring the route to be in the stuck in active (SIA) state.

## Examples

In the following example, the routing wait time is 200 minutes on the specified route:

```
router eigrp 1
 timers active-time 200
```

In the following example, the routing wait time is indefinite on the specified route:

```
router eigrp 1
 timers active-time disabled
```

## Related Commands

| Command | Description |
|---|---|
| **show ip eigrp topology** | Displays the EIGRP topology table. |

# traffic-share balanced

To control how traffic is distributed among routes when there are multiple routes for the same destination network that have different costs, use the **traffic-share balanced** command in router configuration mode. To disable this function, use the **no** form of the command.

**traffic-share balanced**

**no traffic-share balanced**

## Syntax Description

This command has no arguments or keywords.

## Defaults

Traffic is distributed proportionately to the ratios of the metrics.

## Command Modes

Router configuration

## Command History

| Release | Modification |
|---|---|
| 10.0 | This command was introduced. |

## Usage Guidelines

This command applies to IGRP and EIGRP routing protocols only. With the default setting, routes that have higher metrics represent less-preferable routes and get less traffic.

## Examples

In the following example, traffic is balanced across multiple routes:

```
router eigrp 1
 traffic-share balanced
 variance 1
```

## Related Commands

| Command | Description |
|---|---|
| **variance (EIGRP)** | Controls load balancing in an EIGRP and IGRP internetwork. |

# variance (EIGRP)

To control load balancing in an Enhanced Interior Gateway Routing Protocol (EIGRP) based internetwork, use the **variance** command in router configuration mode. To reset the variance to the default value, use the **no** form of this command.

**variance** *multiplier*

**no variance**

## Syntax Description

| | |
|---|---|
| *multiplier* | Metric value used for load balancing. It can be a value from 1 to 128. The default is 1, which means equal-cost load balancing. |

## Defaults

1 (equal-cost load balancing)

## Command Modes

Router configuration

## Command History

| Release | Modification |
|---|---|
| 10.0 | This command was introduced. |

## Usage Guidelines

Setting a variance value lets the Cisco IOS software determine the feasibility of a potential route. A route is feasible if the next router in the path is closer to the destination than the current router and if the metric for the entire path is within the variance. Only paths that are feasible can be used for load balancing and included in the routing table.

If the following two conditions are met, the route is deemed feasible and can be added to the routing table:

- The local best metric must be greater than the metric learned from the next router.
- The multiplier times the local best metric for the destination must be greater than or equal to the metric through the next router.

## Examples

The following example sets a variance value of 4:

```
router eigrp 1
 variance 4
```