



## Enhanced IGRP Commands

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Use the commands in this chapter to configure and monitor Enhanced IGRP (EIGRP). For EIGRP configuration information and examples, refer to the “Configuring IP Enhanced IGRP” chapter of the *Cisco IOS IP Configuration Guide*.

# auto-summary (Enhanced IGRP)

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.

IP Enhanced IGRP 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 process eigrp 109:

```
router eigrp 109
no auto-summary
```

Related Commands	Command	Description
	<b>ip summary-address</b> <b>eigrp</b>	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*]

<b>Syntax Description</b>	<i>ip-address</i>	(Optional) Address of the neighbor.
	<i>interface-type</i> <i>interface-number</i>	(Optional) Interface type and number. Specifying these arguments removes the specified interface type from the neighbor table that all entries learned via this interface.

<b>Command Modes</b>	EXEC
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<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	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
```

<b>Related Commands</b>	<b>Command</b>	<b>Description</b>
	<b>show ip eigrp interfaces</b>	Displays information about interfaces configured for EIGRP.

# default-information

To control the candidate default routing information between IGRP or Enhanced IGRP processes, use the **default-information** command in router configuration mode. To suppress IGRP or Enhanced IGRP 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

<b>in</b>	Allows IGRP or EIGRP exterior or default routes to be received by an IGRP process.
<b>out</b>	Allows IGRP or EIGRP exterior routes to be advertised in updates.
<i>access-list-number</i>   <i>access-list-name</i>	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 <i>access-list-number</i> and <i>access-list-name</i> 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 Enhanced IGRP.

## Examples

The following example allows IGRP exterior or default routes to be received by the IGRP process in autonomous system 23:

```
router igrp 23
 default-information in
```

The following example allows EIGRP exterior or default routes to be received by the EIGRP process in autonomous system 23:

```
router eigrp 23
 default-information in
```

## default-metric (Enhanced IGRP)

To set metrics for IGRP or Enhanced IGRP (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	
<i>bandwidth</i>	Minimum bandwidth of the route in kbps. It can be 0 or any positive integer.
<i>delay</i>	Route delay (in tens of microseconds). It can be 0 or any positive number that is a multiple of 39.1 nanoseconds.
<i>reliability</i>	Likelihood of successful packet transmission expressed as a number from 0 to 255. The value 255 means 100 percent reliability; 0 means no reliability.
<i>loading</i>	Effective bandwidth of the route expressed as a number from 0 to 255 (255 is 100 percent loading).
<i>mtu</i>	Maximum transmission unit (MTU) size of the route in bytes. It can be 0 or any positive integer.

### Defaults

Only connected routes and interface static routes can be redistributed without a default metric. The metric of redistributed connected and static 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 redistribute 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 IGRP metrics with values as follows: bandwidth = 1000, delay = 100, reliability = 250, loading = 100, and MTU = 1500.

```
router igrp 109
 network 172.16.0.0
 redistribute rip
 default-metric 1000 100 250 100 1500
```

**Related Commands**

Command	Description
<b>redistribute (IP)</b>	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

<i>internal-distance</i>	Administrative distance for Enhanced IGRP (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.
<i>external-distance</i>	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
Enhanced IGRP summary route	5
External BGP	20

*Table 19 Default Administrative Distances (continued)*

Route Source	Default Distance
Internal Enhanced IGRP	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 Enhanced IGRP routing in autonomous system number 109. The **network** router configuration commands specify Enhanced IGRP 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 109
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
<b>show ip protocols</b>	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		
<i>access-list-number</i>	Standard IP access list number. The list defines which networks are to be received and which are to be suppressed in routing updates.	
<b>prefix</b> <i>prefix-list-name</i>	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.	
<b>gateway</b> <i>prefix-list-name</i>	(Optional) Name of the prefix list to be applied to the gateway of the prefix being updated.	
<b>in</b>	Applies the access list to incoming routing updates.	
<i>interface-type</i>	(Optional) Interface type.	
<i>interface-number</i>	(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 <i>access-list-number</i> , <i>interface-type</i> , and <i>interface-number</i> arguments were added.
	12.0	The <i>prefix-list-name</i> 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 131.108.0.0:

```
access-list 1 permit 0.0.0.0
access-list 1 permit 131.108.0.0
access-list 1 deny 0.0.0.0 255.255.255.255
router bgp
 network 131.108.0.0
 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 131.108.0.0
 distribute-list prefix max24 in
```

In the following example, the RIP process filters on packet length and accepts routing updates from address 192.1.1.1 only:

```
ip prefix-list max24 seq 5 permit 0.0.0.0/0 ge 8 le 24
ip prefix-list allowlist seq5 permit 192.1.1.1/32
router rip
 network 131.108.0.0
 distribute-list prefix max24 gateway allowlist in
```

**Related Commands**

Command	Description
<b>access-list (IP extended)</b>	Defines an extended IP access list.
<b>distribute-list out (RIP, IGRP, EIGRP)</b>	Suppresses networks from being advertised in updates.
<b>ip prefix-list</b>	Creates an entry in a prefix list.
<b>redistribute (IP)</b>	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		
<i>access-list-number</i>	Standard IP access list number. The list defines which networks are to be received and which are to be suppressed in routing updates.	
<b>prefix</b> <i>prefix-list-name</i>	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.	
<b>gateway</b> <i>prefix-list-name</i>	(Optional) Name of the prefix list to be applied to the gateway of the prefix being updated.	
<b>out</b>	Applies the access list to outgoing routing updates.	
<i>interface-name</i>	(Optional) Name of a particular interface.	
<i>routing-process</i>	(Optional) Name of a particular routing process, or the keyword <b>static</b> or <b>connected</b> .	
<i>as-number</i>	(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 <i>access-list-number</i> argument was added.
	12.0	The <i>prefix-list-name</i> 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**

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

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**Examples**

The following example causes only one network (network 131.108.0.0) to be advertised by a RIP routing process:

```
access-list 1 permit 131.108.0.0
access-list 1 deny 0.0.0.0 255.255.255.255
router rip
 network 131.108.0.0
 distribute-list 1 out
```

---

**Related Commands**

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

# eigrp log-neighbor-changes

To enable the logging of changes in Enhanced IGRP (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.

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**Defaults** Adjacency changes are logged.

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**Command Modes** Router configuration

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Release	Modification
11.2	This command was introduced.

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**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.

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**Examples** The following configuration disables logging of neighbor changes for EIGRP process 209:

```
router eigrp 209
no eigrp log-neighbor-changes
```

The following configuration enables logging of neighbor changes for EIGRP process 209:

```
router eigrp 209
eigrp log-neighbor-changes
```

# eigrp log-neighbor-warnings

To enable the logging of Enhanced IGRP (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
<i>seconds</i>	(Optional) The time interval (in seconds) between repeated neighbor warning messages. The range of seconds is from 1 to 65535.

Defaults	Description
	Neighbor warning messages are logged.

Command Modes	Description
	Router configuration

Command History	Release	Modification
	12.0(5)	This command was introduced.

Usage Guidelines	Description
	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	Description
	The following command will log neighbor warning messages for EIGRP process 209 and repeat the warning messages in 5-minute (300 seconds) intervals:

```
router eigrp 209
 eigrp log-neighbor-warnings 300
```

# eigrp router-id

To set the router ID used by Enhanced IGRP (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*

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## Syntax Description

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<i>ip-address</i>	Router ID in dotted decimal notation.
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## 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.

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## Command Modes

Address family configuration  
Router configuration

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## Command History

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Release	Modification
12.1	This command was introduced.

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## 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.

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## Examples

The following command will set a fixed router ID:

```
router eigrp 209
 eigrp router-id 172.16.1.3
```

# eigrp stub

To configure a router as a stub using Enhanced IGRP (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**]

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

Syntax Description	receive-only	(Optional) Sets the router as a receive-only neighbor.
	<b>connected</b>	(Optional) Advertises connected routes.
	<b>static</b>	(Optional) Advertises static routes.
	<b>summary</b>	(Optional) Advertises summary routes.

**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.

**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 three other optional keywords (**connected**, **static**, and **summary**) can be used in any combination but cannot be used with the **receive-only** keyword. If any of these three keywords is used individually with the **eigrp stub** command, connected and summary routes will not be sent automatically.

The **connected** keyword will permit 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 will permit 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 will permit 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.

**Note**

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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.

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**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
```

# ip authentication key-chain eigrp

To enable authentication of Enhanced IGRP (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

<i>as-number</i>	Autonomous system number to which the authentication applies.
<i>key-chain</i>	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
<b>accept-lifetime</b>	Sets the time period during which the authentication key on a key chain is received as valid.
<b>ip authentication mode eigrp</b>	Specifies the type of authentication used in EIGRP packets.
<b>key</b>	Identifies an authentication key on a key chain.
<b>key chain</b>	Enables authentication of routing protocols.
<b>key-string (authentication)</b>	Specifies the authentication string for a key.
<b>send-lifetime</b>	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 IGRP (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**

<b>Syntax Description</b>	<i>as-number</i>	Autonomous system number.
	<b>md5</b>	Keyed Message Digest 5 (MD5) authentication.

**Defaults** No authentication is provided for EIGRP packets.

**Command Modes** Interface configuration

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	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 10:

```
ip authentication mode eigrp 10 md5
```

<b>Related Commands</b>	<b>Command</b>	<b>Description</b>
	<b>accept-lifetime</b>	Sets the time period during which the authentication key on a key chain is received as valid.
	<b>ip authentication key-chain eigrp</b>	Enables authentication of EIGRP packets.
	<b>key</b>	Identifies an authentication key on a key chain.
	<b>key chain</b>	Enables authentication of routing protocols.
	<b>key-string (authentication)</b>	Specifies the authentication string for a key.
	<b>send-lifetime</b>	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 IGRP (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	<i>as-number</i>	Autonomous system number.
	<i>percent</i>	Percent of bandwidth that EIGRP may use.

Defaults 50 percent

Command Modes Interface configuration

Command History	Release	Modification
	11.2	

**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 209:

```
interface serial 0
 bandwidth 56
 ip bandwidth-percent eigrp 209 75
```

Related Commands	Command	Description
	<b>bandwidth (interface)</b>	Sets a bandwidth value for an interface.

# ip hello-interval eigrp

To configure the hello interval for the 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	
<i>as-number</i>	Autonomous system number.
<i>seconds</i>	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 <b>bandwidth</b> interface configuration command. Note that for the purposes of Enhanced IGRP, 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 109 10
```

Related Commands	Command	Description
	<b>bandwidth (interface)</b>	Sets a bandwidth value for an interface.
	<b>ip hold-time eigrp</b>	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 IGRP (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

<i>as-number</i>	Autonomous system number.
<i>seconds</i>	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 109 40
```

## Related Commands

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

# ip split-horizon eigrp

To enable Enhanced IGRP (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*

<b>Syntax Description</b>	<i>as-number</i>	Autonomous system number.
---------------------------	------------------	---------------------------

<b>Defaults</b>	The behavior of this command is enabled by default.
-----------------	---

<b>Command Modes</b>	Interface configuration
----------------------	-------------------------

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	10.0	This command was introduced.

<b>Usage Guidelines</b>	For networks that include links over X.25 packet-switched networks (PSNs), you can use the <b>neighbor</b> router configuration command to defeat the split horizon feature. As an alternative, you can explicitly specify the <b>no ip split-horizon eigrp</b> 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.

<b>Examples</b>	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
```

<b>Related Commands</b>	<b>Command</b>	<b>Description</b>
	<b>ip split-horizon (IGRP)</b>	Enables the split horizon mechanism.
	<b>neighbor (IGRP)</b>	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

<i>as-number</i>	Autonomous system number.
<i>network-address</i>	IP summary aggregate address to apply to an interface.
<i>subnet-mask</i>	Subnet mask.
<i>admin-distance</i>	(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 <i>admin-distance</i> 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 109 192.168.0.0 255.255.0.0 95
```

## Related Commands

Command	Description
<b>auto-summary (Enhanced IGRP)</b>	Restores the default behavior of automatic summarization of subnet routes into network-level routes.

# metric weights (Enhanced IGRP)

To allow the tuning of the IGRP or Enhanced IGRP (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	
<i>tos</i>	Type of service must always be zero.
<i>k1k2 k3 k4 k5</i>	Constants that convert an IGRP or EIGRP metric vector into a scalar quantity.

Defaults	
<i>tos</i> : 0	
<i>k1</i> : 1	
<i>k2</i> : 0	
<i>k3</i> : 1	
<i>k4</i> : 0	
<i>k5</i> : 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:  

$$\text{metric} = [k1 * \text{bandwidth} + (k2 * \text{bandwidth}) / (256 - \text{load}) + k3 * \text{delay}]$$

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

$$\text{metric} = \text{metric} * [k5 / (\text{reliability} + k4)]$$

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 109
 network 192.168.0.0
 metric weights 0 2 0 2 0 0
```

### Related Commands

Command	Description
<b>bandwidth (interface)</b>	Sets a bandwidth value for an interface.
<b>delay (interface)</b>	Sets a delay value for an interface.
<b>metric holddown</b>	Keeps new IGRP routing information from being used for a certain period of time.
<b>metric maximum-hops</b>	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, use the **neighbor** router configuration command. To remove an entry, use the **no** form of this command.

**neighbor** *ip-address*

**no neighbor** *ip-address*

<b>Syntax Description</b>	<i>ip-address</i>	IP address of a peer router with which routing information will be exchanged.
---------------------------	-------------------	---

<b>Defaults</b>	No neighboring routers are defined.	
-----------------	-------------------------------------	--

<b>Command Modes</b>	Router configuration	
----------------------	----------------------	--

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	10.0	This command was introduced.

<b>Usage Guidelines</b>	<p>Multiple <b>neighbor</b> commands can be used to specify additional neighbors or peers.</p> <p>With most routing protocols, the <b>passive-interface</b> command restricts outgoing advertisements only. However, when used with the Enhanced Interior Gateway Routing Protocol (EIGRP), the use of the <b>passive-interface</b> command suppresses the exchange of hello messages between two routers, which results in the loss of their neighbor relationship. This behavior stops not only routing updates from being advertised, but it also suppresses incoming routing updates.</p>
-------------------------	---

<b>Examples</b>	<p>In the following example, EIGRP permits the sending of routing updates to specific neighbors. One copy of the routing update is generated per neighbor.</p>
-----------------	--

```
router eigrp 109
 network 192.168.0.0
 neighbor 192.168.20.4
```

<b>Related Commands</b>	<b>Command</b>	<b>Description</b>
	<b>passive-interface</b>	Disables sending routing updates on an interface.

# network (Enhanced IGRP)

To specify a list of networks for the Enhanced IGRP (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	<i>network-number</i>	IP address of the directly connected networks.
	<i>network-mask</i>	(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 <i>network-mask</i> 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 IGRP and assigns autonomous system 109. The **network** commands indicate the networks directly connected to the router.

```
router igrp 109
 network 172.16.0.0
 network 192.168.7.0
```

Related Commands	Command	Description
	<b>router eigrp</b>	Configures the EIGRP routing process.
	<b>router igrp</b>	Configures the IGRP routing process.

## offset-list (Enhanced IGRP)

To add an offset to incoming and outgoing metrics to routes learned via Enhanced IGRP (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

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

<b>Syntax Description</b>	<i>as-number</i>	Autonomous system number that identifies the routes to the other EIGRP routers. It is also used to tag the routing information.				
<b>Defaults</b>	This command is disabled by default.					
<b>Command Modes</b>	Global configuration					
<b>Command History</b>	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>10.0</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	10.0	This command was introduced.	
Release	Modification					
10.0	This command was introduced.					
<b>Examples</b>	<p>The following example configures an EIGRP routing process and assigns process number 109:</p> <pre>router eigrp 109</pre>					
<b>Related Commands</b>	<table border="1"> <thead> <tr> <th>Command</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td><b>network (Enhanced IGRP)</b></td> <td>Specifies a list of networks for the EIGRP routing process.</td> </tr> </tbody> </table>	Command	Description	<b>network (Enhanced IGRP)</b>	Specifies a list of networks for the EIGRP routing process.	
Command	Description					
<b>network (Enhanced IGRP)</b>	Specifies a list of networks for the EIGRP routing process.					

## set metric (Enhanced IGRP)

To set the metric value for Enhanced IGRP (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	
<i>bandwidth</i>	Metric value or IGRP bandwidth of the route in kbps. It can be in the range 0 to 4294967295.
<i>delay</i>	Route delay (in tens of microseconds). It can be in the range from 0 to 4294967295.
<i>reliability</i>	Likelihood of successful packet transmission expressed as a number from 0 to 255. The value 255 means 100 percent reliability; 0 means no reliability.
<i>loading</i>	Effective bandwidth of the route expressed as a number from 0 to 255 (255 is 100 percent loading).
<i>mtu</i>	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 IGRP (EIGRP), use the **show ip eigrp interfaces** command in EXEC mode.

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

Syntax Description		
<i>interface-type</i>	(Optional)	Interface type.
<i>interface-number</i>	(Optional)	Interface number.
<i>as-number</i>	(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 109
```

Interface	Peers	Xmit Queue Un/Reliable	Mean SRTT	Pacing Time Un/Reliable	Multicast Flow Timer	Pending 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 seconds).
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
<b>show ip eigrp neighbors</b>	Displays the neighbors discovered by EIGRP.

# show ip eigrp neighbors

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

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

Syntax Description	
<i>interface-type</i>	(Optional) Interface type.
<i>as-number</i>	(Optional) Autonomous system number.
<b>static</b>	(Optional) Static routes.

**Command Modes** EXEC

Command History	Release	Modification
	10.3	This command was introduced.
	12.0(7)T	The <b>static</b> 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 <b>router</b> 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 IGRP (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		
<i>as-number</i>	(Optional)	Autonomous system number.
<i>ip-address</i>	(Optional)	IP address. When specified with a mask, a detailed description of the entry is provided.
<i>mask</i>	(Optional)	Subnet mask.
<b>active</b>	(Optional)	Displays only active entries in the EIGRP topology table.
<b>all-links</b>	(Optional)	Displays all entries in the EIGRP topology table.
<b>pending</b>	(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.
<b>summary</b>	(Optional)	Displays a summary of the EIGRP topology table.
<b>zero-successors</b>	(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 <i>n</i> of these entries, where <i>N</i> 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 IGRP (EIGRP) packets sent and received, use the **show ip eigrp traffic** command in EXEC mode.

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

<b>Syntax Description</b>	<i>as-number</i> (Optional) Autonomous system number.
---------------------------	---

<b>Command Modes</b>	EXEC
----------------------	------

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	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

<b>Field</b>	<b>Description</b>
process 77	Autonomous system number specified in the <b>ip router</b> 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	
<i>time-limit</i>	EIGRP active-time limit (in minutes). The time range is from 1 to 4294967295 minutes.
<b>disabled</b>	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 stuck in active (SIA) state.

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

```
router igrp 5
 timers active-time 200
```

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

```
router igrp 5
 timers active-time disabled
```

Related Commands	Command	Description
	<b>show ip eigrp topology</b>	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 5
 traffic-share balanced
 variance 1
```

Related Commands	Command	Description
	<b>variance (Enhanced IGRP)</b>	Controls load balancing in an EIGRP and IGRP internetwork.

## variance (Enhanced IGRP)

To control load balancing in an Enhanced IGRP-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**

<b>Syntax Description</b>	<i>multiplier</i>	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.
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<b>Defaults</b>	1 (equal-cost load balancing)
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<b>Command Modes</b>	Router configuration
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<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	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 igrp 109
 variance 4
```

■ variance (Enhanced IGRP)