



IP Enhanced IGRP Commands

Use the commands in this chapter to configure and monitor IP Enhanced IGRP. For configuration information and examples, refer to the “Configuring IP Enhanced IGRP” chapter of the *Network Protocols Configuration Guide, Part 1*.

auto-summary

To restore the default behavior of automatic summarization of subnet routes into network-level routes, use the **auto-summary** router configuration command. To disable this feature and transmit 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.

Default

Enabled (the software summarizes subprefixes to the classful network boundary when crossing classful network boundaries).

Command Mode

Router configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

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

By default, BGP does not accept subnets redistributed from IGP. To advertise and carry subnet routes in BGP, use an explicit **network** command or the **no auto-summary** command. If you disable auto-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.

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

Example

The following example disables automatic summarization for process eigrp 109:

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

Related Commands

You can use the master indexes or search online to find documentation of related commands.

ip summary-address eigrp

clear ip eigrp neighbors

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

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

Syntax Description

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

Command Mode

EXEC

Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

Example

The following example removes the neighbor whose address is 160.20.8.3:

```
clear ip eigrp neighbors 160.20.8.3
```

Related Commands

You can use the master indexes or search online to find documentation of related commands.

show ip eigrp interfaces

default-information

To control the candidate default routing information between IGRP or Enhanced IGRP processes, use the **default-information** router configuration command. To suppress IGRP or Enhanced IGRP candidate information in incoming updates, use the **no default-information in** command. To suppress IGRP or Enhanced IGRP candidate information in outbound updates, use the **no default-information out** command.

```
default-information { in | out } { access-list-number | name }  
no default-information { in | out }
```

Syntax Description

in	Allows IGRP or Enhanced IGRP exterior or default routes to be received by an IGRP process.
out	Allows IGRP or Enhanced IGRP exterior routes to be advertised in updates.
<i>access-list-number</i> <i>name</i>	Number or name of an access list. It can be a number in the range 1 to 99 or an access list name.

Default

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

Command Mode

Router configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 10.0. The *access-list-number* and *name* arguments first appeared in Cisco IOS Release 11.2.

The default network of 0.0.0.0 used by RIP cannot be redistributed by IGRP or 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 IP Enhanced IGRP exterior or default routes to be received by the IP Enhanced IGRP process in autonomous system 23:

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

default-metric (IGRP and Enhanced IGRP)

To set metrics for IGRP or Enhanced IGRP, use this form of the **default-metric** router configuration command. 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 kilobits per second. 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 between 0 and 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 0 or any positive integer.

Default

Only connected routes and interface static routes can be redistributed without a default metric.

Command Mode

Router configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

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

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

Keeping the same metrics is supported only when redistributing from IGRP, Enhanced IGRP, or static routes.

Example

The following example takes redistributed 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 131.108.0.0
 redistribute rip
 default-metric 1000 100 250 100 1500
```

Related Commands

You can use the master indexes or search online to find documentation of related commands.

redistribute

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** router configuration command. 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 Enhanced IGRP internal routes. Internal routes are those that are learned from another entity within the same autonomous system. It can be a value from 1 to 255.

external-distance Administrative distance for Enhanced IGRP external routes. External routes are those for which the best path is learned from a neighbor external to the autonomous system. It can be a value from 1 to 255.

Default

internal-distance: 90
external-distance: 170

Command Mode

Router configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

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 between 0 and 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 Enhanced IGRP or if some internal routes should really be preferred by Enhanced IGRP.

Table 38 lists the default administrative distances.

Table 38 Default Administrative Distances

Route Source	Default Distance
Connected interface	0
Static route	1
Enhanced IGRP summary route	5
External BGP	20
Internal Enhanced IGRP	90
IGRP	100

Table 38 Default Administrative Distances (Continued)

Route Source	Default Distance
OSPF	110
IS-IS	115
RIP	120
EGP	140
EIGRP external route	170
Internal BGP	200
Unknown	255

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

Example

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 192.31.7.0 and 128.88.0.0. The first **distance** router configuration command sets the default administrative distance to 255, which instructs the Cisco IOS software to ignore all routing updates from routers for which an explicit distance has not been set. The second **distance** router configuration command sets the administrative distance for all routers on the Class C network 192.31.7.0 to 90. The third **distance** router configuration command sets the administrative distance for the router with the address 128.88.1.3 to 120.

```
router eigrp 109
 network 192.31.7.0
 network 128.88.0.0
 distance 255
!
! use caution when executing the next two commands!
!
 distance 90 192.31.7.0 0.0.0.255
 distance 120 128.88.1.3 0.0.0.0
```

Related Commands

You can use the master indexes or search online to find documentation of related commands.

show ip protocols

eigrp log-neighbor-changes

To enable the logging of changes in Enhanced IGRP neighbor adjacencies, use the **eigrp log-neighbor-change** router configuration command. To disable the logging of changes in Enhanced IGRP neighbor adjacencies, use the **no** form of this command.

eigrp log-neighbor-changes
no eigrp log-neighbor-changes

Syntax Description

This command has not arguments or keywords.

Default

No adjacency changes are logged.

Command Mode

Router configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 11.2.

Enables the logging of neighbor adjacency changes to monitor the stability of the routing system and to help detect problems.

Example

The following configuration will log neighbor changes for Enhanced IGRP process 209:

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

ip authentication key-chain eigrp

To enable authentication of IP Enhanced IGRP packets, use the **ip authentication key-chain eigrp** interface configuration command. To disable such authentication, use the **no** form of this command.

ip authentication key-chain eigrp *autonomous-system key-chain*
no ip authentication key-chain eigrp *autonomous-system key-chain*

Syntax Description

autonomous-system Autonomous system to which the authentication applies.

key-chain Name of the authentication key chain.

Default

No authentication is provided for Enhanced IGRP packets.

Command Mode

Interface configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 11.2 F.

Example

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

You can use the master indexes or search online to find documentation of related commands.

accept-lifetime
ip authentication mode eigrp
key
key chain
key-string
send-lifetime

ip authentication mode eigrp

To specify the type of authentication used in IP Enhanced IGRP packets, use the **ip authentication mode eigrp** interface configuration command. To disable that type of authentication, use the **no** form of this command.

```
ip authentication mode eigrp autonomous-system md5  
no ip authentication mode eigrp autonomous-system md5
```

Syntax Description

autonomous-system Autonomous system number.

md5 Keyed MD5 authentication.

Default

No authentication is provided for IP Enhanced IGRP packets.

Command Mode

Interface configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 11.2 F.

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 Enhanced IGRP packet in the specified autonomous system.

Example

The following example configures the interface to use MD5 authentication in Enhanced IGRP packets in autonomous system 10:

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

Related Commands

You can use the master indexes or search online to find documentation of related commands.

```
accept-lifetime  
ip authentication key-chain eigrp  
key  
key chain  
key-string  
send-lifetime
```

ip bandwidth-percent eigrp

To configure the percentage of bandwidth that may be used by Enhanced IGRP on an interface, use the **ip bandwidth-percent eigrp** interface configuration command. 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 Enhanced IGRP may use.

Default

50 percent

Command Mode

Interface configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 11.2.

Enhanced IGRP 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; this may be useful if the bandwidth is set artificially low for other reasons.

Example

The following example allows Enhanced IGRP 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

You can use the master indexes or search online to find documentation of related commands.

bandwidth

ip hello-interval eigrp

To configure the hello interval for the Enhanced IGRP routing process designated by an autonomous system number, use the **ip hello-interval eigrp** interface configuration command. To restore the default value, use the **no** form of this command.

```
ip hello-interval eigrp autonomous-system-number seconds  
no ip hello-interval eigrp autonomous-system-number seconds
```

Syntax Description

<i>autonomous-system-number</i>	Autonomous system number.
<i>seconds</i>	Hello interval, in seconds.

Defaults

For low-speed, NBMA networks: 60 seconds
For all other networks: 5 seconds

Command Mode

Interface configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

The default of 60 seconds applies only to low-speed, nonbroadcast, multiaccess (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 Enhanced IGRP, Frame Relay and SMDS networks may or may not 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.

Example

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

You can use the master indexes or search online to find documentation of related commands.

ip hold-time eigrp

ip hold-time eigrp

To configure the hold time for a particular Enhanced IGRP routing process designated by the autonomous system number, use the **ip hold-time eigrp** interface configuration command. To restore the default value, use the **no** form of this command.

ip hold-time eigrp *autonomous-system-number seconds*
no ip hold-time eigrp *autonomous-system-number seconds*

Syntax Description

autonomous-system-number Autonomous system number.
seconds Hold time, in seconds.

Defaults

For low-speed, NBMA networks: 180 seconds
For all other networks: 15 seconds

Command Mode

Interface configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

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, nonbroadcast, multiaccess (NBMA) media. Low speed is considered to be a rate of T1 or slower, as specified with the **bandwidth** interface configuration command.

Example

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

You can use the master indexes or search online to find documentation of related commands.

ip hello-interval eigrp

ip split-horizon eigrp

To enable Enhanced IGRP split horizon, use the **ip split-horizon eigrp** interface configuration command. To disable split horizon, use the **no** form of this command.

```
ip split-horizon eigrp autonomous-system-number  
no ip split-horizon eigrp autonomous-system-number
```

Syntax Description

autonomous-system-number Autonomous system number.

Default

Enabled

Command Mode

Interface configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

For networks that include links over X.25 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, it is recommended 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.

Example

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
```

Related Commands

You can use the master indexes or search online to find documentation of related commands.

ip split-horizon
neighbor (IGRP, RIP)

ip summary-address eigrp

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

ip summary-address eigrp *autonomous-system-number address mask*
no ip summary-address eigrp *autonomous-system-number address mask*

Syntax Description

<i>autonomous-system-number</i>	Autonomous system number.
<i>address</i>	IP summary aggregate address to apply to an interface.
<i>mask</i>	Subnet mask.

Default

No summary aggregate addresses are predefined.

Command Mode

Interface configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

Enhanced IGRP summary routes are given an administrative distance value of 5. You cannot configure this value.

Example

The following example sets the IP summary aggregate address for Ethernet interface 0:

```
interface ethernet 0
 ip summary-address eigrp 109 192.1.0.0 255.255.0.0
```

Related Commands

You can use the master indexes or search online to find documentation of related commands.

auto-summary

metric weights

To allow the tuning of the IGRP or Enhanced IGRP metric calculations, use the **metric weights** router configuration command. 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. Currently, it must always be zero.
<i>k1–k5</i>	Constants that convert an IGRP or enhanced IGRP metric vector into a scalar quantity.

Defaults

```
tos: 0
k1: 1
k2: 0
k3: 1
k4: 0
k5: 0
```

Command Mode

Router configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

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 Enhanced IGRP 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 done:

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

Bandwidth is inverse minimum bandwidth of the path in bits per second 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. This gives a range of 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. This gives a range of 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 39 lists the default values used for several common media.

Table 39 Bandwidth Values by Media Type

Media Type	Delay	Bandwidth
Satellite	5120 (2 seconds)	5120 (500 Mbits)
Ethernet	25600 (1 ms)	256000 (10 Mbits)
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.

Example

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

```
router igrp 109
 network 131.108.0.0
 metric weights 0 2 0 2 0 0
```

Related Commands

You can use the master indexes or search online to find documentation of related commands.

- bandwidth**
- delay**
- metric holddown**
- metric maximum-hops**

network (IGRP and Enhanced IGRP)

To specify a list of networks for the Enhanced IGRP routing process, use this form of the **network** router configuration command. To remove an entry, use the **no** form of this command.

```
network network-number  
no network network-number
```

Syntax Description

network-number IP address of the directly connected networks.

Default

No networks are specified.

Command Mode

Router configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

The network number specified must not contain any subnet information. There is no limit to the number of **network** commands you can use on the router.

IGRP or Enhanced IGRP sends updates to the interfaces in the specified network(s). Also, if an interface's network is not specified, it will not be advertised in any IGRP or Enhanced IGRP update.

Example

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 131.108.0.0  
  network 192.31.7.0
```

Related Commands

You can use the master indexes or search online to find documentation of related commands.

```
router igrp  
router eigrp
```

offset-list

To add an offset to incoming and outgoing metrics to routes learned via Enhanced IGRP, use the **offset-list** router configuration command. To remove an offset list, use the **no** form of this command.

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

Syntax Description

<i>access-list-number</i> <i>name</i>	Standard access list number or name to be applied. Access list number 0 indicates all access lists. If <i>offset</i> 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.
<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>type</i>	(Optional) Interface type to which the offset-list is applied.
<i>number</i>	(Optional) Interface number to which the offset-list is applied.

Default

Disabled

Command Mode

Router configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 10.0. The *type* and *number* arguments first appeared in Cisco IOS Release 10.3. The *name* argument first appeared in Cisco IOS Release 11.2.

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 extended offset-list's offset is added to the metric.

Examples

In the following example, the router applies an offset of 10 to the router's delay component 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 routing process, use the **router eigrp** global configuration command. To shut down a routing process, use the **no** form of this command.

router eigrp *autonomous-system*
no router eigrp *autonomous-system*

Syntax Description

autonomous-system Autonomous system number that identifies the routes to the other Enhanced IGRP routers. It is also used to tag the routing information.

Default

Disabled

Command Mode

Global configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

Example

The following example shows how to configure an Enhanced IGRP routing process and assign process number 109:

```
router eigrp 109
```

Related Commands

You can use the master indexes or search online to find documentation of related commands.

network (IGRP and Enhanced IGRP)

set metric

To set the metric value for IP Enhanced IGRP 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 kilobits per second. It can be in the range 0 to 4294967295.
<i>delay</i>	Route delay in tens of microseconds. It can be in the range 0 to 4294967295.
<i>reliability</i>	Likelihood of successful packet transmission expressed as a number between 0 and 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 0 to 4294967295.

Default

No metric will be set in the route-map.

Command Mode

Route-map configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

Note 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 a route map's match criteria are met. When all match criteria are met, all set actions are performed.

Example

In the following example, the bandwidth is set to 10,000, the delay is set to 10, the reliability is set to 255, the loading is set to 1, and the MTU is set to 1500:

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

show ip eigrp interfaces

To display information about interfaces configured for Enhanced IGRP, use the **show ip eigrp interfaces** EXEC command.

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

Syntax Description

<i>type</i>	(Optional) Interface type.
<i>number</i>	(Optional) Interface number.
<i>as-number</i>	(Optional) Autonomous system number.

Command Mode

EXEC

Usage Guidelines

This command first appeared in Cisco IOS Release 11.2.

Use the **show ip eigrp interfaces** command to determine on which interfaces Enhanced IGRP is active, and to find out information about Enhanced IGRP relating to those interfaces.

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

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

Sample Display

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  Mean   Pacing Time  Multicast    Pending
            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 40 describes the fields in the display.

Table 40 Show IP EIGRP Interfaces Field Descriptions

Field	Description
Interface	Interface over which Enhanced IGRP is configured.
Peers	Number of directly connected Enhanced IGRP neighbors.

Table 40 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 SRTT in seconds.
Pacing Time Un/Reliable	Pacing time used to determine when Enhanced IGRP packets should be sent out the interface (Unreliable and Reliable packets).
Multicast Flow Timer	Maximum number of seconds in which router will send multicast Enhanced IGRP packets.
Pending Routes	Number of routes in the packets sitting in the transmit queue waiting to be sent.

Related Commands

You can use the master indexes or search online to find documentation of related commands.

show ip eigrp neighbors

show ip eigrp neighbors

To display the neighbors discovered by Enhanced IGRP, use the **show ip eigrp neighbors EXEC** command.

show ip eigrp neighbors [*type number*]

Syntax Description

type (Optional) Interface type.

number (Optional) Interface number.

Command Mode

EXEC

Usage Guidelines

This command first appeared in Cisco IOS Release 10.3.

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.

Sample Display

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)
160.89.81.28           Ethernet1     13        0:00:41   0      11   4     20
160.89.80.28           Ethernet0     14        0:02:01   0      10  12     24
160.89.80.31           Ethernet0     12        0:02:02   0       4   5     20
```

Table 41 explains the fields in the output.

Table 41 Show IP Enhanced IGRP Neighbors Field Descriptions

Field	Description
process 77	Autonomous system number specified in the router configuration command.
Address	IP address of the enhanced IGRP 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, it will be reflected here.
Uptime	Elapsed time, in hours, minutes, and seconds, since the local router first heard from this neighbor.
Q Count	Number of Enhanced IGRP packets (Update, Query, and Reply) that the software is waiting to send.

Table 41 Show IP Enhanced IGRP Neighbors Field Descriptions (Continued)

Field	Description
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 it takes for an Enhanced IGRP 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 retransmitting a packet from the retransmission queue to a neighbor.

show ip eigrp topology

To display the Enhanced IGRP topology table, use the **show ip eigrp topology** EXEC command.

```
show ip eigrp topology [autonomous-system-number | [[ip-address] mask]]
```

Syntax Description

<i>autonomous-system-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.

Command Mode

EXEC

Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

Use the **show ip eigrp topology** command to determine Diffusing Update Algorithm (DUAL) states and to debug possible DUAL problems.

Sample Display

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 160.89.90.0 255.255.255.0, 2 successors, FD is 0
   via 160.89.80.28 (46251776/46226176), Ethernet0
   via 160.89.81.28 (46251776/46226176), Ethernet1
   via 160.89.80.31 (46277376/46251776), Ethernet0
P 160.89.81.0 255.255.255.0, 1 successors, FD is 307200
   via Connected, Ethernet1
   via 160.89.81.28 (307200/281600), Ethernet1
   via 160.89.80.28 (307200/281600), Ethernet0
   via 160.89.80.31 (332800/307200), Ethernet0
```

Table 42 explains the fields in the output.

Table 42 Show IP Enhanced IGRP Topology Field Descriptions

Field	Description
Codes	State of this topology table entry. Passive and Active refer to the Enhanced IGRP state with respect to this destination; Update, Query, and Reply refer to the type of packet that is being sent.
P – Passive	No Enhanced IGRP computations are being performed for this destination.
A – Active	Enhanced IGRP 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 when after the software has sent a query and is waiting for a reply.
160.89.90.0 and so on	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.
FD	Feasible distance. This value is used in the feasibility condition check. If the neighbor's reported distance (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 does not have to 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 Enhanced IGRP state that this destination is in. It can be the number 0, 1, 2, or 3. This information appears only when the destination is Active.
via	IP address of the peer who 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 Enhanced IGRP metric that represents the cost to the destination. The second number is the Enhanced IGRP metric that this peer advertised.
Ethernet0	Interface from which this information was learned.

show ip eigrp traffic

To display the number of Enhanced IGRP packets sent and received, use the **show ip eigrp traffic EXEC** command.

```
show ip eigrp traffic [autonomous-system-number]
```

Syntax Description

autonomous-system-number (Optional) Autonomous system number.

Command Mode

EXEC

Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

Sample Display

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 43 describes the fields that might be shown in the display.

Table 43 Show IP Enhanced IGRP Traffic Field Descriptions

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

timers active-time

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

```
timers active-time [1-4294967295 | disabled]  
no timers active-time
```

Syntax Description

1-4294967295

EIGRP active-time limit in minutes.

disabled

Disables the timers and permits the routing wait time to remain active indefinitely.

Command Mode

Router configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

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

Example

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

You can use the master indexes or search online to find documentation of related commands.

show ip eigrp topology

traffic-share

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** router configuration command. To disable this function, use the **no** form of the command.

```
traffic-share { balanced | min }  
no traffic share { balanced | min }
```

Syntax Description

balanced	Distributes traffic proportionately to the ratios of the metrics.
min	Uses routes that have minimum costs.

Default

Traffic is distributed proportionately to the ratios of the metrics.

Command Mode

Router configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

This command applies to IGRP and Enhanced IGRP routing protocols only. With the default setting, routes that have higher metrics represent less-preferable routes and get less traffic. Configuring **traffic-share min** causes the Cisco IOS software to only divide traffic among the routes with the best metric. Other routes will remain in the routing table, but will receive no traffic.

Example

In the following example, only routes of minimum cost will be used:

```
router igrp 5  
  traffic-share min
```

variance

To control load balancing in an Enhanced IGRP-based internetwork, use the **variance** router configuration command. 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.

Default

1 (equal-cost load balancing)

Command Mode

Router configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

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:

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

Example

The following example sets a variance value of 4:

```
router igrp 109
 variance 4
```

