


maximum-prefix

To limit the number of prefixes that are accepted under an address family by an Enhanced Interior Gateway Routing Protocol (EIGRP) process, use the **maximum-prefix** command in address family configuration mode. To disable this function, use the **no** form of this command.

```
maximum-prefix maximum [threshold] [[dampened] [reset-time minutes] [restart minutes]
[restart-count number] | [warning-only]]
```

```
no maximum-prefix
```

Syntax Description	
<i>maximum</i>	Maximum number of prefixes allowed under an address-family. The range for this argument is a number from 1 to 4294967295. Note The number of prefixes that can be configured is limited only by the available system resources on the router.
<i>threshold</i>	(Optional) Configures the router to generate syslog warning messages when the specified percentage of the <i>maximum-prefix</i> limit has been exceeded. The prefix percentage number that can be configured for the <i>threshold</i> argument is from 1 to 100. The default is 75 percent.
dampened	(Optional) Configures a decay penalty to be applied to the restart-time period each time the <i>maximum-prefix</i> limit is exceeded. The half-life for the decay penalty is 150% of the default or user-defined restart-time value in minutes. This keyword is disabled by default.
reset-time <i>minutes</i>	(Optional) Configures the router to reset the restart count to 0 after the default or user-defined reset-time period has expired. The range of values that can be applied with the <i>minutes</i> argument is from 1 to 65535 minutes. The default reset-time period is 15 minutes.
restart <i>minutes</i>	(Optional) Configures a time period in which the router will not form adjacencies or accept redistributed routes from the RIB after the <i>maximum-prefix</i> limit has been exceeded. The value for the <i>minutes</i> argument is from 1 to 65535 minutes. The default restart-time period is 5 minutes.
restart-count <i>number</i>	(Optional) Configures the number of times a peering session can be automatically be reestablished after the peering session has been torn down or after the a redistribute route has been cleared and relearned because the <i>maximum-prefix</i> limit has been exceeded. The default restart-count limit is 3.  Warning Once the restart count threshold has been crossed, you will need to enter the clear ip route * or clear ip eigrp neighbor command to reestablish normal peering and/or redistribution.
warning-only	(Optional) Configures the router to only generate syslog messages when the <i>maximum-prefix limit</i> is reached, instead of suspending peering session or route redistribution. This keyword is disabled by default.

Command Default *threshold*: 75 percent
 reset-time: 15 minutes
 restart: 5 minutes
 restart-count: 3

Command Modes Address family IPv4 VRF

Command History	Release	Modification
	12.0(29)S	This command was introduced.
	12.3(14)T	This command was integrated into Cisco IOS Release 12.3(14)T.

Usage Guidelines The **maximum-prefix** is used to configure an EIGRP process to limit the number prefixes that are accepted from all sources. When the maximum-prefix limit is exceeded, sessions with remote peers are torn down, all routes learned from remote peers and through redistribution are removed from the topology and routing tables, and redistribution and peering is suspended for the default or user-defined time period.

Inherited Timer Values

Default or user-defined **restart**, **restart-count**, and **reset-time** values for the process-level configuration of this feature, configured with the **maximum-prefix** command, are inherited by the **redistribute maximum-prefix** and **neighbor maximum-prefix** command configurations by default. If a single peer is configured with the **neighbor maximum-prefix** command, a process-level configuration or a configuration that is applied to all neighbors will be inherited.

Examples The following example, starting in global configuration mode, configures the maximum prefix limit for an EIGRP process, which includes routes learned through redistribution and routes learned through EIGRP peering sessions. The maximum limit is set to 50000 prefixes. When the number of prefixes learned through redistribution reaches 37500 (75 percent of 50000), warning messages will be displayed in the console. When the maximum prefix limit is exceeded, all peering sessions will be reset, the topology and routing tables will be cleared and redistributed routes and all peering sessions will be placed in a penalty state.

```
Router(config)# router eigrp 100
Router(config-router)# address-family ipv4 vrf RED
Router(config-router-af)# maximum-prefix 50000
Router(config-router-af)# end
```

Related Commands	Command	Description
	clear ip eigrp neighbors	Deletes neighbor entries from the routing table.
	clear ip eigrp vrf neighbor	Deletes neighbor entries from the VRF table.
	clear ip route	Deletes routes from the IP routing table.

metric maximum-hops

To have the IP routing software advertise as unreachable those routes with a hop count higher than is specified by the command (Enhanced Interior Gateway Routing Protocol [EIGRP] only), use the **metric maximum-hops** command in router configuration mode. To reset the value to the default, use the **no** form of this command.

metric maximum-hops *hops-number*

no metric maximum-hops *hops-number*

Syntax Description	<i>hops-number</i>	Maximum hop count (in decimal). The default value is 100 hops; the maximum number of hops that can be specified is 255.
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Defaults	100 hops
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Command Modes	Router configuration
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Command History	Release	Modification
	10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.	
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.	

Usage Guidelines	This command provides a safety mechanism that breaks any potential <i>count-to-infinity</i> problems. It causes the IP routing software to advertise as unreachable routes with a hop count greater than the value assigned to the <i>hops-number</i> argument.
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Examples	In the following example, a router in autonomous system 71 attached to network 10.0.0.0 wants a maximum hop count of 200, doubling the default. The network administrators configured the router hop count to 200 because they have a complex WAN that can generate a large hop count under normal (nonlooping) operations.
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```
router eigrp 71
 network 172.16.0.0
 metric maximum-hops 200
```

Related Commands	Command	Description
	metric weights (EIGRP)	Allows the tuning of the EIGRP metric calculations.

metric weights (EIGRP)

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

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

```
no metric weights
```

Syntax Description

<i>tos</i>	Type of service must always be zero.
<i>k1 k2 k3 k4 k5</i>	Constants that convert an EIGRP metric vector into a scalar quantity. Can be 0 or 1.

Command Default

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

Command Modes

Router configuration (config-router)

Command History

Release	Modification
10.0	This command was introduced.
12.4(6)T	Support for IPv6 was added.
12.2(33)SRB	This command was integrated into Cisco IOS Release 12.2(33)SRB.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

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

If *k5* equals 0, the composite 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 66 lists the default values used for several common media.

Table 66 Bandwidth Values by Media Type

Media Type	Delay	Bandwidth
Satellite	51,200,000 (2 seconds)	5120 (500 megabits)
Ethernet	25600 (1 millisecond [ms])	256,000 (10 megabits)
1.544 Mbps	51,200,000 (20 ms)	1,657,856 bits
64 kbps	51,200,000 (20 ms)	40,000,000 bits
56 kbps	51,200,000 (20 ms)	45,714,176 bits
10 kbps	51,20,000 (20 ms)	256,000,000 bits
1 kbps	51,200,000 (20 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 eigrp 109
 network 192.168.0.0
 metric weights 0 2 0 2 0 0
```

Related Commands

Command	Description
bandwidth (interface)	Sets a bandwidth value for an interface.
delay (interface)	Sets a delay value for an interface.
ipv6 router eigrp	Configures the EIGRP for IPv6 routing process.
metric holddown	Keeps new EIGRP routing information from being used for a certain period of time.
metric maximum-hops	Causes the IP routing software to advertise as unreachable those routes with a hop count higher than is specified by the command (IGRP only).

neighbor (EIGRP)

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

neighbor {*ip-address* | *ipv6-address*} *interface-type* *interface-number*

no neighbor {*ip-address* | *ipv6-address*} *interface-type* *interface-number*

Syntax Description

<i>ip-address</i>	IP address of a peer router with which routing information will be exchanged.
<i>ipv6-address</i>	IPv6 address of a peer router with which routing information will be exchanged.
<i>interface-type</i>	Interface through which peering is established.
<i>interface-number</i>	Number of the interface or subinterface.

Command Default

No neighboring routers are defined.

Command Modes

Router configuration

Command History

Release	Modification
10.0	This command was introduced.
12.4(6)T	The <i>ipv6-address</i> argument was added.
12.2(33)SRB	This command was integrated into Cisco IOS Release 12.2(33)SRB.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

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



Note

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

Examples

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

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

Related Commands

Command	Description
ipv6 router eigrp	Configures the EIGRP for IPv6 routing process.
passive-interface	Disables sending routing updates on an interface.

neighbor maximum-prefix (EIGRP)

To limit the number of prefixes that are accepted from a single Enhanced Interior Gateway Protocol (EIGRP) neighbor or from all EIGRP neighbors, use the **neighbor maximum-prefix** command in address-family IPv4 VRF configuration mode. To disable this function, use the **no** form of this command.

Single Neighbor Configuration

neighbor *ip-address* **maximum-prefix** *maximum* [*threshold*] [**warning-only**]

no neighbor *ip-address* **maximum-prefix**

All Neighbor Configuration

neighbor maximum-prefix *maximum* [*threshold*] [[**dampened**] [**reset-time** *minutes*] [**restart** *minutes*] [**restart-count** *number*] | [**warning-only**]]

no neighbor maximum-prefix

Syntax Description		
<i>ip-address</i>		IP address of a single peer.
<i>maximum</i>		Maximum number of prefixes accepted. The range for this argument is a number from 1 to 4294967295.
	Note	The number of prefixes that can be configured is limited only by the available system resources on the router.
<i>threshold</i>		(Optional) Configures the router to generate syslog warning messages when the specified percentage of the maximum-prefix limit has been reached. The prefix percentage number that can be configured for the <i>threshold</i> argument is from 1 to 100. The default is 75 percent.
warning-only		(Optional) Configures the router to generate syslog messages only when the maximum-prefix limit is reached, instead of terminating the peering session. This keyword is disabled by default.
dampened		(Optional) Configures a decay penalty to be applied to the restart-time period each time the maximum-prefix limit is reached. The half-life for the decay penalty is 150 percent of the default or user-defined restart-time value in minutes. This keyword is disabled by default.
reset-time <i>minutes</i>		(Optional) Configures the router to reset the restart count to 0 after the default or configured reset-time period has expired. The value for the <i>minutes</i> argument is from 1 to 65535 minutes. The default reset-time period is 15 minutes.

restart <i>minutes</i>	(Optional) Configures a time period in which the router will not form adjacencies or accept redistributed routes from the RIB after the maximum-prefix limit has been reached. The value for the <i>minutes</i> argument is from 1 to 65535 minutes. The default restart-time period is 5 minutes.
restart-count <i>number</i>	(Optional) Configures the number of times a peering session can be automatically reestablished after the peering session has been torn down or after the a redistribute route has been cleared and relearned because the maximum-prefix limit has been reached. The default restart-count limit is 3.

**Warning**

Once the restart count threshold has been crossed, you will need to enter the `clear ip route *` or `clear ip eigrp neighbor` command to reestablish normal peering and/or redistribution.

Command Default

The number of prefixes that can be configured is limited only by the available system resources on the router.

Command Modes

Address-family IPv4 VRF configuration (config-router-af)#

Command History

Release	Modification
12.0(29)S	This command was introduced.
12.3(14)T	This command was integrated into Cisco IOS Release 12.3(14)T.

Usage Guidelines

The **neighbor maximum-prefix** command can be configured to protect an individual peering session or to protect all peering sessions. When this feature is enabled and the maximum-prefix limit has been reached, the router will tear down the peering session, clear all routes that were learned from the peer, and then place the peer in a penalty state for the default or user-defined time period. After the penalty time period expires, normal peering will be reestablished.

**Note**

In EIGRP, **neighbor** commands have been traditionally used to configure static neighbors. In the context of this feature, however, the **neighbor maximum-prefix** command can be used to configure the maximum-prefix limit for both statically configured neighbors and dynamically discovered neighbors.

When configuring the **neighbor maximum-prefix** command to protect a single peering session, only the maximum-prefix limit, the percentage threshold, the warning-only configuration options can be configured. Session dampening, restart, and reset timers are configured on a global basis

Inherited Timer Values

Default or user-defined **restart**, **restart-count**, and **reset-time** values for the process-level configuration of this feature, configured with the **maximum-prefix** command, are inherited by the **redistribute maximum-prefix** and **neighbor maximum-prefix** command configurations by default. If a single peer is configured with the **neighbor maximum-prefix** command, a process-level configuration or a configuration that is applied to all neighbors will be inherited.

Examples

Configuring the Maximum Prefix Limit for a Single Peer

The following example, starting in global configuration mode, configures the maximum prefix limit for a single peer. The maximum limit is set to 1000 prefixes, and the warning threshold is set to 80 percent. When the maximum prefix limit is reached for the configured neighbor, adjacency with this neighbor will be brought down and all routes learned from it will be cleared. The neighbor will be placed in a penalty state for 4 minutes (user-defined penalty value). This function will not affect the relationship with any other neighbor.

```
Router(config)# router eigrp 100
Router(config-router)# address-family ipv4 vrf RED
Router(config-router-af)# neighbor 10.0.0.1 maximum-prefix 1000 80
Router(config-router-af)# end
```

Configuring the Maximum Prefix Limit for All Peers

The following example, starting in global configuration mode, configures the maximum prefix limit for all peers. The maximum limit is set to 10,000 prefixes, the warning threshold is set to 90 percent, the restart timer is set to 4 minutes, a decay penalty is configured for the restart timer with the **dampened** keyword, and all timers are configured to be reset to 0 every 60 minutes. When the maximum prefix limit is reached for any neighbor, adjacency with this neighbor will be brought down and all routes learned from it will be cleared. This function will not affect the relationship with any other neighbor. The offending peer will be placed in a penalty state for 4 minutes (user-defined penalty value). A dampening exponential decay penalty will also be applied.

```
Router(config)# router eigrp 100
Router(config-router)# address-family ipv4 vrf RED
Router(config-router-af)# neighbor maximum-prefix 10000 90 dampened reset-time 60 restart4
Router(config-router-af)# end
```

Related Commands

Command	Description
clear ip eigrp neighbors	Deletes neighbor entries from the routing table.
clear ip eigrp vrf neighbor	Deletes neighbor entries from the VRF table.
clear ip route	Deletes routes from the IP routing table.
redistribute maximum-prefix	Limits the number of prefixes redistributed into Open Shortest Path First (OSPF).
neighbor maximum-prefix	Controls how many prefixes can be received from a neighbor.

network (EIGRP)

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

network *ip-address* [**wildcard-mask**]

no network *ip-address* [**wildcard-mask**]

Syntax Description

<i>ip-address</i>	IP address of the directly connected network.
wildcard-mask	(Optional) Wildcard mask.

Command Default

No networks are specified.

Command Modes

Address family configuration
Router configuration

Command History

Release	Modification
10.0	This command was introduced.
12.0(4)T	The <i>network-mask</i> argument was added.
12.0(22)S	Address family support for EIGRP was added.
12.2(15)T	Address family support for EIGRP was added.
12.2(18)S	Address family support for EIGRP was added.
12.2(27)SBC	This command was integrated into Cisco IOS Release 12.2(27)SBC.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

When the **network** command is configured for an EIGRP routing process, the router matches one or more local interfaces. The **network** command matches only local interfaces that are configured with addresses that are within the same subnet as the address that has been configured with the **network** command. The router then establishes neighbors through the matched interfaces. There is no limit to the number of network statements (**network** commands) that can be configured on a router.

Examples

The following example configures EIGRP autonomous system 1 and establishes neighbors through network 172.16.0.0 and 192.168.0.0:

```
router eigrp 1
 network 172.16.0.0
 network 192.168.0.0
```

offset-list (EIGRP)

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

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

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

Syntax Description

<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.
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>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.

Command Default

No offset values are added to incoming or outgoing metrics to routes learned via EIGRP.

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.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

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
```

redistribute maximum-prefix (EIGRP)

To limit the number of prefixes redistributed into an Enhanced Interior Gateway Routing Protocol (EIGRP) process, use the **redistribute maximum-prefix** command in address-family configuration mode. To disable this function, use the **no** form of this command.

redistribute maximum-prefix *maximum* [*threshold*] [[**dampened**] [**reset-time** *minutes*] [**restart** *minutes*] [**restart-count** *number*] | [**warning-only**]]

no redistribute maximum-prefix

Syntax Description		
<i>maximum</i>	Maximum number of prefixes that are redistributed into EIGRP under an address-family. The range for this argument is a number from 1 to 4294967295.	Note The number of prefixes that can be configured is limited only by the available system resources on the router.
<i>threshold</i>	(Optional) Configures the router to generate syslog warning messages when the specified percentage of the <i>maximum-prefix</i> limit has been exceeded. The prefix percentage number that can be configured for the <i>threshold</i> argument is from 1 to 100. The default is 75 percent.	
warning-only	(Optional) Configures the router to only generate syslog messages when the <i>maximum-prefix</i> limit is reached, instead of suspending redistribution. This keyword is disabled by default.	
restart <i>minutes</i>	(Optional) Configures a time period in which the router will not form adjacencies or accept redistributed routes from the RIB after the <i>maximum-prefix</i> limit has been exceeded. The value for the <i>minutes</i> argument is from 1 to 65535 minutes. The default restart-time period is 5 minutes.	
restart-count <i>number</i>	(Optional) Configures the number of times a peering session can be automatically be reestablished after the peering session has been torn down or after the a redistribute route has been cleared and relearned because the <i>maximum-prefix</i> limit has been exceeded. The default restart-count limit is 3.	 <p>Warning Once the restart count threshold has been crossed, you will need to enter the clear ip route * or clear ip eigrp neighbor command to reestablish normal peering and/or redistribution.</p>
reset-time <i>minutes</i>	(Optional) Configures the router to reset the restart count to 0 after the default or configured reset-time period has expired. The value for the <i>minutes</i> argument is from 1 to 65535 minutes. The default reset-time period is 15 minutes.	
dampened	(Optional) Configures a decay penalty to be applied to the restart-time period each time the <i>maximum-prefix</i> limit is exceeded. The half-life for the decay penalty is 150% of the default or user-defined restart-time value in minutes. This keyword is disabled by default.	

Defaults

threshold: 75 percent
 reset-time: 15 minutes
 restart: 5 minutes
 restart-count: 3

Command Modes

Address-family (IPv4 VRF)

Command History

Release	Modification
12.0(29)S	This command was introduced.
12.3(14)T	This command was integrated into Cisco IOS Release 12.3(14)T.

Usage Guidelines

The **redistribute maximum-prefix** command is used to configure limit prefixes learned through redistribution. When the maximum-prefix limit is exceeded, all routes learned from the Routing Information Base (RIB) will be discarded and redistribution will be suspended for the default or user-defined time period. The maximum-prefix limit that can be configured for redistributed prefixes is limited only by the available system resources on the router.

Inherited Timer Values

Default or user-defined **restart**, **restart-count**, and **reset-time** values for the process-level configuration of this feature, configured with the **maximum-prefix** command, are inherited by the **redistribute maximum-prefix** and **neighbor maximum-prefix** command configurations by default. If a single peer is configured with the **neighbor maximum-prefix** command, a process-level configuration or a configuration that is applied to all neighbors will be inherited.

Examples

The following example, starting in global configuration mode, configures the maximum prefix limit for routes learned through redistribution. The maximum limit is set to 5000 prefixes and the warning threshold is set to 95percent. When the number of prefixes learned through redistribution reaches 4750 (95 percent of 5000), warning messages will be displayed in the console. Because the **warning-only** keyword was configure, the topology and routing tables will not be cleared and route redistribution will not be placed in a penalty state.

```
Router(config)# router eigrp 100
Router(config-router)# address-family ipv4 vrf RED
Router(config-router-af)# redistribute maximum-prefix 5000 95 warning-only
Router(config-router-af)# end
```

Related Commands

Command	Description
clear ip eigrp neighbors	Deletes neighbor entries from the routing table.
clear ip eigrp vrf neighbor	Deletes neighbor entries from the VRF table.
clear ip route	Deletes routes from the IP routing table.

router eigrp

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

router eigrp *autonomous-system-number*

no router eigrp *autonomous-system-number*

Syntax Description

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

Command Default

No EIGRP processes are configured.

Command Modes

Global configuration

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(31)SB2	This command was integrated into Cisco IOS Release 12.2(31)SB2.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Examples

The following example configures EIGRP process 109:

```
router eigrp 109
```

Related Commands

Command	Description
network (EIGRP)	Specifies a list of networks for the EIGRP process.

set metric (EIGRP)

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

set metric *bandwidth delay reliability loading mtu*

no set metric *bandwidth delay reliability loading mtu*

Syntax Description

<i>bandwidth</i>	Metric value or EIGRP bandwidth of the route in kbps. The range is from 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.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

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 accounting

To display prefix accounting information for Enhanced Interior Gateway Routing Protocol (EIGRP) processes, use the **show ip eigrp accounting** command in privileged EXEC mode.

show ip eigrp accounting [*autonomous-system-number*]

Syntax Description

autonomous-system-number (Optional) Specifies the autonomous system number.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.0(29)S	This command was introduced.
12.3(14)T	This command was integrated into Cisco IOS Release 12.3(14)T.

Examples

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

```
Router# show ip eigrp accounting
IP-EIGRP accounting for AS(100)/ID(10.0.2.1) Routing Table: RED
Total Prefix Count: 4 States: A-Adjacency, P-Pending, D-Down
State Address/Source Interface Prefix Restart Restart/
Count Count Count Reset(s)
P Redistributed ---- 0 3 211
A 10.0.1.2 Et0/0 2 0 84
P 10.0.2.4 Se2/0 0 2 114
D 10.0.1.3 Et0/0 0 3 0
```



Note

Connected and summary routes are not listed individually in the output of this command but are counted in the total aggregate count per process.

[Table 67](#) describes the significant fields shown in the display.

Table 67 *show ip eigrp accounting* Field Descriptions

Field	Description
IP-EIGRP accounting for AS...	Identifies the EIGRP instance along with the AS number, Router ID and Table ID.
Total Prefix Count:	Shows to the aggregate sum of the prefixes in an EIGRP instance topology table. It includes prefixes learnt from all neighbors or from redistribution.
States: A-Adjacency, P-Pending, D-Down	A-Adjacency: Indicates a stable adjacency with the neighbor or a normal redistribution state. P-Pending: Neighbor adjacency or redistribution in suspended or in a penalized state because the maximum prefix limit has been exceeded. D-Down: Neighbor adjacency or redistribution is suspended permanently until a manually reset is performed with the clear ip route command.

Table 67 *show ip eigrp accounting Field Descriptions (continued)*

Field	Description
Address/Source	Shows the peer IP address of the redistribution source.
Prefix Count	Displays the total number of learned prefixes by source. Note Routes can be learned for the same prefix from multiple sources, and the sum of all prefix counts in this column may be greater than the figure displayed in the “Prefix Count” field.
Restart Count	Number of times a route source has exceeded the maximum-prefix limit.
Restart Reset(s)	Displays the time, in seconds, that a route source is in a P (penalized) state. If the route source is in an A (stable or normal) state, the displayed time, in seconds, is the time period until penalization history is reset.

show ip eigrp interfaces

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

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

Syntax Description	
<i>type</i>	(Optional) Interface type.
<i>number</i>	(Optional) Interface number.
<i>as-number</i>	(Optional) Autonomous system number.
detail	(Optional) Displays detailed information about the EIGRP interfaces for a specific EIGRP process.

Command Modes Privileged EXEC

Command History	Release	Modification
	11.2	This command was introduced.
	12.2(18)SXE	Support for the Bidirectional Forwarding Detection (BFD) feature was added. The detail keyword was added.
	12.0(31)S	The BFD feature was integrated into Cisco IOS Release 12.0(31)S. Support was added for the Cisco 12000 series Internet router.
	12.4(4)T	Support for the BFD feature was added. The detail keyword was added.
	12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

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 information about that interface is displayed. Otherwise, information about all interfaces on which EIGRP is running is 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

Cisco IOS Release 12.2(18)SXE

The following is sample output from the **show ip eigrp interfaces** command to verify that the BFD feature has been enabled on the EIGRP interfaces for process 123. The relevant command output is shown in bold in the output.

```
Router# show ip eigrp interfaces detail

IP-EIGRP interfaces for process 123

Interface          Peers  Xmit Queue  Mean   Pacing Time  Multicast  Pending
                  Un/Reliable SRTT    Un/Reliable  Flow Timer  Routes
IP-EIGRP interfaces for process 123

Interface          Peers  Xmit Queue  Mean   Pacing Time  Multicast  Pending
                  Un/Reliable SRTT    Un/Reliable  Flow Timer  Routes
Fa0/1              0      0/0         0      0/10         0          0
  Next xmit serial <none>
  Un/reliable mcasts: 0/0  Un/reliable ucasts: 0/0
  Mcast exceptions: 0  CR packets: 0  ACKs suppressed: 0
  Retransmissions sent: 0  Out-of-sequence rcvd: 0
  Authentication mode is not set
  BFD is enabled
Et3/0              0      0/0         0      0/10         0          0
  Next xmit serial <none>
  Un/reliable mcasts: 0/0  Un/reliable ucasts: 0/0
  Mcast exceptions: 0  CR packets: 0  ACKs suppressed: 0
  Retransmissions sent: 0  Out-of-sequence rcvd: 0
  Authentication mode is not set
  BFD is enabled
```

Table 68 describes the significant fields shown in the display.

Table 68 show ip eigrp interfaces Field Descriptions

Field	Description
Interface	Interface over which EIGRP is configured.
Peers	Number of directly connected EIGRP neighbors.
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 (in seconds) 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.
BFD is enabled	Confirmation that BFD is enabled on this interface.

Related Commands

Command	Description
show ip eigrp vrf neighbors	Displays the neighbors discovered by EIGRP.

show ip eigrp neighbors

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

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

Syntax Description	
<i>interface-type</i>	(Optional) Filters that output by interface.
<i>as-number</i>	(Optional) Filters that output by <i>autonomous system number</i> .
static	(Optional) Displays static routes.
detail	(Optional) Displays detailed neighbor information.

Command Modes EXEC

Command History	Release	Modification
	10.3	This command was introduced.
	12.0(7)T	The static keyword was added.
	12.2(15)T	Support for NSF restart operations was integrated into the output.
	12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

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

show ip eigrp neighbors Example

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

```
Router# show ip eigrp neighbors
```

```
P-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 69](#) describes the significant fields shown in the display.

Table 69 show ip eigrp neighbors Field Descriptions

Field	Description
process 77	Autonomous system number specified in the router configuration command.
Address	IP address of the EIGRP peer.

Table 69 show ip eigrp neighbors Field Descriptions (continued)

Field	Description
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.
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 neighbors detail Example

The following is sample output from the **show ip eigrp neighbors** command when issued with the **detail** keyword:

```
Router# show ip eigrp neighbors detail

P-EIGRP neighbors for process 101
H   Address                Interface          Hold Uptime    SRTT   RTO   Q Seq Tye
   (sec)                (ms)              Cnt Num
3  1.1.1.3                 Et0/0             12 00:04:48 1832  5000  0 14
   Version 12.2/1.2, Retrans:0, Retries:0
   Restart time 00:01:05
0  10.4.9.5                 Fa0/0             11 00:04:07  768  4608  0  4  S
   Version 12.2/1.2, Retrans: 0, Retries: 0
2  10.4.9.10                Fa0/0             13 1w0d          1  3000  0  6  S
   Version 12.2/1.2, Retrans: 1, Retries: 0
1  10.4.9.6                 Fa0/0             12 1w0d          1  3000  0  4  S
   Version 12.2/1.2, Retrans: 1, Retries: 0
```

Table 70 describes the significant fields shown in the display.

Table 70 show ip eigrp neighbors Field Descriptions

Field	Description
process 77	Autonomous system number specified in the router configuration command.
H	This column lists the order in which a peering session was established with the specified neighbor. The order is specified with sequential numbering starting with 0.
Address	IP address of the EIGRP peer.
Interface	Interface on which the router is receiving hello packets from the peer.

Table 70 *show ip eigrp neighbors Field Descriptions (continued)*

Field	Description
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.
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.
Version	The software version that the specified peer is running.
Retrans	The number of times that a packet has been retransmitted.
Retries	The number of times an attempt was made to retransmit a packet.
Restart time	Elapsed time (in hours:minutes: seconds) since the specified neighbor has restarted.

show ip eigrp topology

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

```
show ip eigrp topology [autonomous-system-number | ip-address [mask] | name [interfaces]]
[active | all-links | detail-links | pending | summary | zero-successors]
```

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. The mask is entered as a slash mark followed by the prefix length.
<i>name</i>	(Optional) EIGRP-IPv4 topology table name. This name is the topology identifier and shows the topology-related information for Multi-Topology Routing (MTR).
interfaces	(Optional) Displays information about interfaces, on which EIGRP is configured, in a topology.
active	(Optional) Displays only active entries in the EIGRP topology table.
all-links	(Optional) Displays summary information about all entries in the EIGRP topology table.
detail-links	(Optional) Displays detailed information about all entries in the EIGRP topology table.
pending	(Optional) Displays all entries in the EIGRP topology table that are waiting for an update from a neighbor or are waiting to reply to a neighbor.
summary	(Optional) Displays a summary of the EIGRP topology table.
zero-successors	(Optional) Displays available routes in the EIGRP topology table.

Command Default

If this command is used without any keywords or arguments, then only routes that are feasible successors are displayed.

Command Modes

Privileged EXEC

Command History

Release	Modification
10.0	This command was introduced.
12.3(8)T	This command was enhanced to display internal and external EIGRP routes.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SRB	The <i>name</i> argument and interfaces keyword were added to support MTR.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.

Usage Guidelines

The **show ip eigrp topology** command can be used without any keywords or arguments. Use this command to determine Diffusing Update Algorithm (DUAL) states and to debug possible DUAL problems. If this command is used without any keywords or arguments, then only routes that are feasible successors are displayed. The **all-links** keyword displays all neighbors, whether feasible successors or not, and the **detail-links** keyword displays detailed information about all the neighbors.

The *name* argument option indicates that the output displayed will be for a named service topology for MTR.

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 10.16.90.0 255.255.255.0, 2 successors, FD is 0
   via 10.16.80.28 (46251776/46226176), Ethernet0
   via 10.16.81.28 (46251776/46226176), Ethernet1
   via 10.16.80.31 (46277376/46251776), Serial0
P 10.16.81.0 255.255.255.0, 1 successors, FD is 307200
   via Connected, Ethernet1
   via 10.16.81.28 (307200/281600), Ethernet1
   via 10.16.80.28 (307200/281600), Ethernet0
   via 10.16.80.31 (332800/307200), Serial0
```

In the following examples, EIGRP metrics for specified internal and external routes are displayed:

```
Router# show ip eigrp topology 10.2.1.0/24

IP-EIGRP (AS 1): Topology entry for 10.2.1.0/24

State is Passive, Query origin flag is 1, 1 Successor(s), FD is 281600 Routing Descriptor
Blocks:
0.0.0.0 (Ethernet0/0), from Connected, Send flag is 0x0 Composite metric is (281600/0),
Route is Internal !This is the internal route.
Vector metric: Minimum bandwidth is 10000 Kbit
Total delay is 1000 microseconds
Reliability is 255/255
Load is 1/255
Minimum MTU is 1500
Hop count is 0

Router# show ip eigrp topology 10.4.80.0/20

IP-EIGRP (AS 1): Topology entry for 10.4.80.0/20

State is Passive, Query origin flag is 1, 1 Successor(s), FD is 409600
Routing Descriptor Blocks:
10.2.1.1 (Ethernet0/0), from 10.2.1.1, Send flag is 0x0
Composite metric is (409600/128256), Route is External !This is the external route.
Vector metric:
Minimum bandwidth is 10000 Kbit
Total delay is 6000 microseconds
Reliability is 255/255
Load is 1/255
Minimum MTU is 1500
Hop count is 1
External data:
```

```

Originating router is 10.89.245.1
AS number of route is 0
External protocol is Connected, external metric is 0
Administrator tag is 0 (0x00000000)

```

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

```

Router# show ip eigrp topology detail-links

IP-EIGRP Topology Table for AS(2000)/ID(192.168.3.1)

Codes: P - Passive, A - Active, U - Update, Q - Query, R - Reply,
       r - reply Status, s - sia Status

P 172.21.1.0/24, 1 successors, FD is 2169856, serno 3
   via Connected, Serial5/0
P 172.21.0.0/16, 1 successors, FD is 2169856, serno 6
   via Summary (2169856/0), Null0
P 172.16.0.0/16, 1 successors, FD is 2169856, serno 4
   via Summary (2169856/0), Null0
P 172.17.1.0/24, 1 successors, FD is 281600, serno 2
   via Connected, Ethernet0/0
P 172.17.0.0/16, 1 successors, FD is 281600, serno 5
   via Summary (281600/0), Null0
P 172.16.1.0/24, 1 successors, FD is 2169856, serno 1
   via Connected, Serial4/0

```

[Table 71](#) describes the significant fields shown in the displays.

Table 71 *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.
10.16.90.0	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.

Table 71 *show ip eigrp topology Field Descriptions (continued)*

Field	Description
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.
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, is the current successors. The remaining entries on the list are feasible successors.
(46251776/46226176)	The first number is the EIGRP metric that represents the cost to the destination. The second number is the EIGRP metric that this peer advertised.
Ethernet0	Interface from which this information was learned.
Serial0	Interface from which this information was learned.

show ip eigrp traffic

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

show ip eigrp traffic [*as-number*]

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

Command Modes	EXEC
----------------------	------

Command History	Release	Modification
	10.0	This command was introduced.
	12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
	12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

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 72](#) describes the significant fields shown in the display.

Table 72 *show ip eigrp traffic* Field Descriptions

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

show ip eigrp vrf accounting

To display prefix accounting information for an Enhanced Interior Gateway Routing Protocol (EIGRP) VPN routing and forwarding instance (VRF), use the **show ip eigrp vrf traffic** command in privileged EXEC mode.

```
show ip eigrp vrf {vrf-name | *} accounting [autonomous-system-number]
```

Syntax Description

<i>vrf-name</i>	Specifies the VRF name. The * keyword can be used as a wild card to display all VRFs, instead of specifying a single VRF with the <i>vrf-name</i> argument.
<i>autonomous-system-number</i>	(Optional) Specifies the autonomous system number.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.0(29)S	This command was introduced.
12.3(14)T	This command was integrated into Cisco IOS Release 12.3(14)T.

Examples

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

```
Router# show ip eigrp vrf RED accounting
IP-EIGRP accounting for AS(100)/ID(10.0.2.1) Routing Table: RED
Total Prefix Count: 4 States: A-Adjacency, P-Pending, D-Down
State Address/Source Interface Prefix Restart Restart/
Count Count Reset(s)
P Redistributed ---- 0 3 211
A 10.0.1.2 Et0/0 2 0 84
P 10.0.2.4 Se2/0 0 2 114
D 10.0.1.3 Et0/0 0 3 0
```



Note

Connected and summary routes are not listed individually in the output of this command but are counted in the total aggregate count per process.

[Table 73](#) describes the significant fields shown in the display.

Table 73 *show ip eigrp vrf accounting* Field Descriptions

Field	Description
IP-EIGRP accounting for AS...	Identifies the EIGRP instance along with the AS number, Router ID and Table ID.
Total Prefix Count:	Shows the aggregate sum of the prefixes in an EIGRP instance topology table. It includes prefixes learnt from all neighbors or from redistribution.

Table 73 *show ip eigrp vrf accounting Field Descriptions (continued)*

Field	Description
States: A-Adjacency, P-Pending, D-Down	<p>A-Adjacency: Indicates a stable adjacency with the neighbor or a normal redistribution state.</p> <p>P-Pending: Neighbor adjacency or redistribution in suspended or in a penalized state because the maximum prefix limit has been exceeded.</p> <p>D-Down: Neighbor adjacency or redistribution is suspended permanently until a manually reset is performed with the clear ip route command.</p>
Address/Source	Shows the peer IP address of the redistribution source.
Prefix Count	<p>Displays the total number of learned prefixes by source.</p> <p>Note Routes can be learned for the same prefix from multiple sources, and the sum of all prefix counts in this column may be greater than the figure displayed in the “Prefix Count” field.</p>
Restart Count	Number of times a route source has exceeded the maximum-prefix limit.
Restart/Reset(s)	Displays the time, in seconds, that a route source is in a P (penalized) state. If the route source is in an A (stable or normal) state, the displayed time, in seconds, is the time period until penalization history is reset.

show ip eigrp vrf interfaces

To display information about interfaces that carry VPN routing and forwarding (VRF) information and are configured for Enhanced Interior Gateway Routing Protocol (EIGRP), use the **show ip eigrp vrf interfaces** command in privileged EXEC mode.

```
show ip eigrp vrf {vrf-name | *} interfaces [autonomous-system-number] [interface-type] [detail
interface-type] [static interface-type]
```

Syntax Description		
<i>vrf-name</i>		Specifies the VRF name. The * keyword can be used as a wild card to display all VRFs, instead of specifying a single VRF with the <i>vrf-name</i> argument.
<i>autonomous-system-number</i>	(Optional)	Specifies the autonomous system number.
<i>interface-type</i>	(Optional)	Specifies the VRF interface for which to display EIGRP information.
detail <i>interface-type</i>	(Optional)	Displays detailed VRF peer information. The interface can be specified after this keyword is entered.
static <i>interface-type</i>	(Optional)	Displays VRF information for static neighbors. The interface can be specified after this keyword is entered. The <i>interface-type</i> argument allows you to display information about static neighbors for VRFs that are configured on specific interfaces.

Command Modes Privileged EXEC

Command History	Release	Modification
	12.0(22)S	This command was introduced.
	12.2(15)T	This command was integrated into 12.2(15)T.
	12.2(18)S	This command was integrated into Cisco IOS Release 12.2(18)S.
	12.2(27)SBC	This command was integrated into Cisco IOS Release 12.2(27)SBC.

Usage Guidelines Use the **show ip eigrp vrf interfaces** command to display EIGRP interfaces that are defined under the specified VRF. If an interface is specified with the *interface-type* argument, only the specified interface is displayed. Otherwise, all interfaces on which EIGRP is running as part of the specified VRF are displayed.

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

```
Router# show ip eigrp vrf VRF-PINK interfaces

IP-EIGRP interfaces for process 1

Interface          Peers  Xmit Queue  Mean   Pacing Time  Multicast  Pending
                  Un/Reliable SRTT    Un/Reliable Flow Timer  Routes
Et3/0              1      0/0         131    0/10         528       0
```

Table 74 describes the significant fields shown in the display.

Table 74 *show ip eigrp vrf interfaces Field Descriptions*

Field	Description
IP-EIGRP interfaces for process...	Displays the autonomous system number for the specified VRF.
Interface	Interface over which EIGRP is configured.
Peers	Number of directly connected EIGRP neighbors.
Xmit Queue Un/Reliable	Number of packets remaining in the Unreliable and Reliable transmit queues.
Mean SRTT	Mean smooth round-trip time (SRTT) interval (in milliseconds).
Pacing Time Un/Reliable	Pacing time used to determine when EIGRP packets should be sent out the interface (unreliable and reliable packets).
Multicast Flow Timer	Maximum number of seconds in which the router will send multicast EIGRP packets.
Pending Routes	Number of routes in the packets in the transmit queue waiting to be sent.

Related Commands

Command	Description
clear ip eigrp vrf neighbor	Clears neighbor entries of the specified VRF from the RIB.
show ip eigrp vrf neighbors	Displays neighbors discovered by EIGRP that carry VRF information.
show ip eigrp vrf topology	Displays VRF entries in the EIGRP topology table.
show ip eigrp vrf traffic	Displays EIGRP VRF traffic statistics.

show ip eigrp vrf neighbors

To display Enhanced Interior Gateway Routing Protocol (EIGRP) neighbors that are on interfaces that are part of the specified Virtual Private Network (VPN) routing and forwarding instance (VRF), use the **show ip eigrp vrf neighbors** command privileged EXEC mode.

```
show ip eigrp vrf {vrf-name | *} neighbors [autonomous-system-number] [interface-type] [detail
interface-type] [static interface-type]
```

Syntax Description

<i>vrf-name</i>	Specifies the VRF name. The * keyword can be used as a wild card to display all VRFs, instead of specifying a single VRF with the <i>vrf-name</i> argument.
<i>autonomous-system-number</i>	(Optional) Specifies the autonomous system number.
<i>interface-type</i>	(Optional) Specifies the interface to display neighbor information under the specified VRF.
detail <i>interface-type</i>	(Optional) Displays detailed VRF peer information. The interface can be specified after this keyword is entered.
static <i>interface-type</i>	(Optional) Displays VRF information for static neighbors. The interface can be specified after this keyword is entered. The <i>interface-type</i> argument allows you to display information about static neighbors for VRFs that are configured on specific interfaces.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.0(22)S	This command was introduced.
12.2(15)T	This command was integrated into 12.2(15)T.
12.2(18)S	This command was integrated into Cisco IOS Release 12.2(18)S.
12.2(27)SBC	This command was integrated into Cisco IOS Release 12.2(27)SBC.

Usage Guidelines

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

Examples

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

```
Router# show ip eigrp vrf VRF-GREEN neighbors

IP-EIGRP neighbors for process 1
H   Address                Interface      Hold Uptime    SRTT   RTO   Q
Seq Type
                               (sec)         (ms)          Cnt
Num
0   10.10.10.2              Et3/0         10 1d16h      131   786   0   3
```

Table 75 describes the significant fields shown in the display.

Table 75 *show ip eigrp vrf neighbors Field Descriptions*

Field	Description
IP-EIGRP neighbors for process...	Displays the autonomous-system number for the specified EIGRP VRF.
Address	IP address of the EIGRP peer.
Interface	Interface on which the router is receiving hello packets from the peer.
Hold Uptime	Length of time (in seconds) that the Cisco IOS software will wait to hear from the peer before declaring it down, and the length in time (in seconds) since the local router first heard 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.
Q	Number of EIGRP packets (update, query, and reply) that the software is waiting to send.

show ip eigrp vrf topology

To display Virtual Private Network (VPN) routing and forwarding instance (VRF) entries in the Enhanced Interior Gateway Routing Protocol (EIGRP) topology table, use the **show ip eigrp topology** command in privileged EXEC mode.

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

Syntax Description

<i>vrf-name</i>	Specifies the VRF name. The * keyword can be used as a wild card to display all VRFs, instead of specifying a single VRF with the <i>vrf-name</i> argument.
<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.
active	(Optional) Displays only active entries in the EIGRP topology table.
all-links	(Optional) Displays all entries in the EIGRP topology table.
pending	(Optional) Displays all entries in the EIGRP topology table that are waiting for an update from a neighbor or are waiting to reply to a neighbor.
summary	(Optional) Displays a summary of the EIGRP topology table.
zero-successors	(Optional) Displays available routes in the EIGRP topology table.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.0(22)S	This command was introduced.
12.2(15)T	This command was integrated into 12.2(15)T.
12.2(18)S	This command was integrated into Cisco IOS Release 12.2(18)S.
12.2(27)SBC	This command was integrated into Cisco IOS Release 12.2(27)SBC.

Usage Guidelines

The **show ip eigrp vrf topology** command can be used without any keywords or arguments, but you must specify either a VRF name or use the * character as a wild card. If this command entered this way, only routes that are feasible successors are displayed. The **show ip eigrp vrf 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 vrf topology** command:

```
Router# show ip eigrp vrf VRF-PINK topology
```

```
IP-EIGRP Topology Table for AS(1)/ID(192.168.10.1) Routing Table:VRF-PINK
```

Codes:P - Passive, A - Active, U - Update, Q - Query, R - Reply,
r - reply Status, s - sia Status

```
P 10.17.17.0/24, 1 successors, FD is 409600
    via 10.10.10.2 (409600/128256), Ethernet3/0
P 172.16.19.0/24, 1 successors, FD is 409600
    via 10.10.10.2 (409600/128256), Ethernet3/0
P 192.168.10.0/24, 1 successors, FD is 281600
    via Connected, Ethernet3/0
P 10.10.10.0/24, 1 successors, FD is 281600
    via Redistributed (281600/0)
```

Table 76 describes the significant fields shown in the display.

Table 76 *show ip vrf 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	An update packet was sent to this destination.
Q—Query	A query packet was sent to this destination.
R—Reply	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.
s—sia Status	Flag that is set if a route is in a stuck in active state.
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	(Not shown in the output) 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	(Not shown in the output) Exact EIGRP state that this destination is in. It can be the number 0, 1, 2, or 3. This information appears only when the destination is in the active state.
via	IP address of the peer that told the software about this destination. The first N of these entries, where N is the number of successors, is the current successors. The remaining entries on the list are feasible successors.

Table 76 *show ip vrf eigrp topology Field Descriptions (continued)*

Field	Description
(409600/128256)	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.
Ethernet 3/0	Interface from which this information was learned.

show ip eigrp vrf traffic

To display sent and received statistics for Enhanced Interior Gateway Routing Protocol (EIGRP) Virtual Private Networking (VPN) routing and forwarding instance (VRF) packets, use the **show ip eigrp vrf traffic** command in privileged EXEC mode.

```
show ip eigrp vrf {vrf-name | *} traffic [as-number]
```

Syntax Description	Parameter	Description
	<i>vrf-name</i>	Specifies the VRF name. The * keyword can be used as a wild card to display all VRFs, instead of specifying a single VRF with the <i>vrf-name</i> argument.
	<i>as-number</i>	(Optional) Specifies the autonomous system number.

Command Modes Privileged EXEC

Command History	Release	Modification
	12.0(22)S	This command was introduced.
	12.2(15)T	This command was integrated into 12.2(15)T.
	12.2(18)S	This command was integrated into Cisco IOS Release 12.2(18)S.
	12.2(27)SBC	This command was integrated into Cisco IOS Release 12.2(27)SBC.

Examples

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

```
Router# show ip eigrp vrf VRF-RED traffic
```

```
IP-EIGRP Traffic Statistics for AS 101
  Hellos sent/received: 600/585
  Updates sent/received: 23/22
  Queries sent/received: 7/0
  Replies sent/received: 0/6
  Acks sent/received: 55/42
  Input queue high water mark 0, 0 drops
```

[Table 77](#) describes the significant fields shown in the display.

Table 77 *show ip eigrp vrf traffic* Field Descriptions

Field	Description
IP-EIGRP Traffic Statistics for AS...	Displays the autonomous system number for the specified EIGRP VRF
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

Table 77 *show ip eigrp vrf traffic Field Descriptions (continued)*

Field	Description
Acks sent/received	Number of acknowledgment packets sent and received
Input queue high water mark..., ... drops	Number of received packets that are approaching the maximum receive threshold and number of dropped packets

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>	(Optional) Enhanced Interior Gateway Routing Protocol (EIGRP) active-time limit (in minutes). The time range is from 1 to 4294967295.
disabled	(Optional) 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.
	12.4(6)T	Support for IPv6 was added.
	12.2(33)SRB	This command was integrated into Cisco IOS Release 12.2(33)SRB.
	12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

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

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

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

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

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

In the following example, the routing wait time is 100 minutes on the specified route:

```
ipv6 router eigrp 1
 timers active-time 100
```

Related Commands

Command	Description
ipv6 router eigrp	Configures the EIGRP IPv6 routing process.
show ip eigrp topology	Displays the EIGRP topology table.
show ipv6 eigrp topology	Displays the IPv6 EIGRP topology table.

timers nsf route-hold

To set the route-hold timer to determine how long a nonstop forwarding (NSF)-aware router that is running Enhanced Interior Gateway Routing Protocol (EIGRP) will hold routes for an inactive peer, use the **timers nsf route-hold** command in router configuration mode. To return the route-hold timer to the default value, use the **no** form of this command.

timers nsf route-hold *seconds*

no timers nsf route-hold

Syntax Description	<i>seconds</i>	The time, in seconds, that EIGRP will hold routes for an inactive peer. The configurable time range is from 20 to 300 seconds.
---------------------------	----------------	--

Command Default	EIGRP NSF awareness is enabled by default. The default value for the route-hold timer is 240 seconds.
------------------------	---

Command Modes	Router configuration
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Command History	Release	Modification
	12.2(15)T	This command was introduced.
12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB.	
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.	
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.	

Usage Guidelines	The route-hold timer sets the maximum period of time that the NSF-aware router will hold known routes for an NSF-capable neighbor during a switchover operation or a well-known failure condition. The route-hold timer is configurable so that you can tune network performance and avoid undesired effects, such as “black holing” routes if the switchover operation takes too much time. When this timer expires, the NSF-aware router scans the topology table and discards any stale routes, allowing EIGRP peers to find alternate routes instead of waiting during a long switchover operation.
-------------------------	---

Examples	The following configuration example sets the route-hold timer value for an NSF-aware router. In the example, the route-hold timer is set to 2 minutes:
-----------------	--

```
Router(config-router)# timers nsf route-hold 120
```

Related Commands	Command	Description
	debug eigrp nsf	Displays EIGRP NSF-specific events in the console of a router.
	debug ip eigrp notifications	Displays EIGRP events and notifications in the console of the router.

Command	Description
show ip eigrp neighbors	Displays the neighbors discovered by IP EIGRP.
show ip protocols	Displays the parameters and current state of the active routing protocol process.

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.

Command Default Traffic is distributed proportionately to the ratios of the metrics.

Command Modes Router configuration

Command History	Release	Modification
	10.0	This command was introduced.
	12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
	12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines This command applies to only Enhanced Interior Gateway Routing Protocol (EIGRP). 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
	variance (EIGRP)	Controls load balancing in an EIGRP network.

variance (EIGRP)

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

variance *multiplier*

no variance

Syntax Description

<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.
-------------------	---

Defaults

1 (equal-cost load balancing)

Command Modes

Router configuration

Command History

Release	Modification
10.0	This command was introduced.
12.4(6)T	Support for IPv6 was added.
12.2(33)SRB	This command was integrated into Cisco IOS Release 12.2(33)SRB.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

Setting a variance value enables EIGRP to install multiple loop-free routes with unequal cost in a local routing table. A route learned through EIGRP must meet two criteria to be installed in the local routing table:

- The route must be loop-free. This condition is satisfied when the reported distance is less than the total distance or when the route is a feasible successor.
- The metric of the route must be lower than the metric of the best route (the successor) multiplied by the variance configured on the router.

Thus, if the variance is set to 1, only routes with the same metric as the successor are installed in the local routing table. If the variance is set to 2, any EIGRP-learned route with a metric less than 2 times the successor metric will be installed in the local routing table.



Note

EIGRP does not load-share between multiple routes; it only installs the routes in the local routing table. Then, the local routing table enables switching hardware or software to load-share between the multiple paths.

Examples

The following example sets a variance value of 4:

```
router eigrp 109
 variance 4
```

The following example sets a variance value of 2:

```
ipv6 router eigrp 11
 variance 2
```