



EIGRP Commands

address-family ipv4 (EIGRP)

To enter IPv4 address family configuration mode to configure an Enhanced Interior Gateway Routing Protocol (EIGRP) Virtual Private Network (VPN), use the **address-family ipv4** command in address family configuration mode. To remove the address family from the EIGRP configuration, use the **no** form of this command.

address-family ipv4 [**unicast**] [**vrf** *vrf-name*]

no address-family ipv4 [**unicast**] [**vrf** *vrf-name*]

Syntax Description

unicast	(Optional) Specifies the unicast address family.
vrf <i>vrf-name</i>	(Optional) Specifies the name of the VRF.

Command Default

A default VRF is automatically created when this command is entered without the **vrf** keyword.

Command Modes

Address family configuration

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 12.2(18)S.
12.2(27)SBC	This command was integrated into 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

The **address-family ipv4** command is used to configure IPv4 address family sessions under EIGRP. To leave address family configuration mode without removing the address family configuration, use the **exit-address-family** command.

EIGRP VPNs can be configured only under IPv4 address family configuration mode. A virtual routing and forwarding instance (VRF) and route distinguisher must be defined before the address family session can be created.

A single EIGRP routing process can support multiple VRFs. The number of VRFs that can be configured is limited only by available system resources on the router, which is determined by the number of VRFs, running processes, and available memory. However, only a single VRF can be supported by each VPN, and redistribution between different VRFs is not supported.

MPLS VPN support between PE and CE routers is configured only on PE routers that provide VPN services over the service provider backbone. The customer site does not require any changes to equipment or configurations to support the EIGRP VPN. A metric must be configured for routes to be advertised to the CE router. The metric can be configured using the **redistribute (IP)** command or configured with the **default-metric (EIGRP)** command.

Examples

The following example, starting in global configuration mode, configures an IPv4 address family session for the VRF named RED:

```
Router(config)# ip vrf RED
Router(config-vrf)# rd 1:1
Router(config-vrf)# exit
Router(config)# router eigrp 1
Router(config-router)# address-family ipv4 vrf RED
Router(config-router-af)# autonomous-system 101
Router(config-router-af)# network 172.16.0.0
Router(config-router-af)# default-metric 10000 100 255 1 1500
Router(config-router-af)# exit-address-family
```

Related Commands

Command	Description
default-metric (EIGRP)	Sets metric for EIGRP.
exit-address-family	Exits from address family configuration mode.
network (EIGRP)	Specifies a list of networks for the EIGRP routing process.
redistribute (IP)	Redistributes routes from one routing domain into another routing domain.

autonomous-system (EIGRP)

To configure an Enhanced Interior Gateway Routing Protocol (EIGRP) routing process to run within a VPN routing and forwarding (VRF) instance, use the **autonomous-system** command in address family configuration mode. To remove an EIGRP routing process from within a VPN VRF instance, use the **no** form of this command.

autonomous-system *autonomous-system-number*

no autonomous-system *autonomous-system-number*

Syntax Description *autonomous-system-number* Specifies the autonomous system number of the EIGRP routing process.

Command Default An EIGRP routing process does not run within a VRF.

Command Modes Address family configuration

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

Usage Guidelines This command can only be configured if a VRF name is specified when entering address family configuration mode.

Examples The following example shows how to configure an EIGRP routing process within a VRF:

```
router eigrp 65200
 address-family ipv4 vrf VRF2
 autonomous-system 65500
```

Related Commands	Command	Description
	address-family ipv4 (EIGRP)	Enters address family configuration mode for EIGRP.

auto-summary (EIGRP)

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

auto-summary

no auto-summary

Syntax Description

This command has no arguments or keywords.

Command Default

The behavior of this command is disabled by default (the software sends subprefix routing information across classful network boundaries).

Command Modes

Router configuration

Command History

Release	Modification
10.0	This command was introduced.
12.2(8)T	Command default behavior changed to disabled.
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

Route summarization reduces the amount of routing information in the routing tables. By default, Border Gateway Protocol (BGP) does not accept subnets redistributed from an Interior Gateway Protocol (IGP). To allow the software to create summary subprefixes to the classful network boundary when crossing classful network boundaries, use the **auto-summary** command.

To advertise and carry subnet routes in BGP, use an explicit **network** command because automatic summarization is disabled by default. If you have not entered a **network** command, you will not advertise network routes for networks with subnet routes unless they contain a summary route.

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

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

Examples

The following example enables automatic summarization for EIGRP process 109:

```
router eigrp 109
 auto-summary
```

Related Commands

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

clear ip eigrp neighbors

To delete entries from the Enhanced Interior Gateway Routing Protocol (EIGRP) neighbor table, use the **clear ip eigrp neighbors** command in privileged EXEC mode.

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

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

Command Modes Privileged 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.

Usage Guidelines Specifying the *interface-type* and *interface-number* arguments removes the specified interface from the neighbor table that all entries learned via this interface.

Examples The following example removes the neighbor whose address is 172.16.8.3:

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

Related Commands	Command	Description
	show ip eigrp interfaces	Displays information about interfaces configured for EIGRP.

clear ip eigrp vrf neighbor

To clear neighbor entries of the specified Enhanced Interior Gateway Routing Protocol (EIGRP) virtual routing and forwarding instance (VRF) from the Routing Information Base (RIB), use the **clear ip eigrp vrf** command in privileged EXEC mode.

```
clear ip eigrp vrf vrf-name autonomous-system-number neighbor [interface-number]
```

Syntax Description

<i>vrf-name</i>	Specifies the name of the VRF whose EIGRP neighbors will be cleared. The * keyword can be used as a wild card to specify all VRFs.
<i>autonomous-system-number</i>	Specifies the autonomous system number of the VRF whose neighbors will be cleared.
<i>interface-number</i>	(Optional) Specifies the interface that VRF neighbors were learned through. The exact interface is specified by interface number with the <i>interface-number</i> argument.

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.
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 example shows how to clear EIGRP neighbors reached through the VRF named RED in autonomous system 45000:

```
Router# clear ip eigrp vrf RED 45000 neighbor
```

The following example shows how to clear EIGRP neighbors reached through the VRF named GREEN in autonomous-system 101 learned through Ethernet interface 0/0:

```
Router# clear ip eigrp vrf GREEN 45000 neighbor ethernet 0/0
```

Related Commands

Command	Description
show ip eigrp vrf interfaces	Displays EIGRP interfaces that are defined under the specified VRF.
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.

Command	Description
show ip eigrp vrf traffic	Displays EIGRP VRF traffic statistics.
show ip route vrf	Displays routing protocol information that is associated with a VRF.

default-information

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

default-information { **allowed** { **in** | **out** } | **in** | **out** } [*acl-number* | *acl-name*]

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

Syntax Description		
allowed		Configures EIGRP to accept default routing information.
in		Configures EIGRP to accept exterior or default routing information.
out		Configures EIGRP to advertise external routing information.
<i>acl-number</i>	(Optional)	Standard access list number from 1 to 99 or an expanded standard access list from 1300 to 1999.
<i>acl-name</i>	(Optional)	Named standard access list.

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

Command Modes Router configuration

Command History	Release	Modification
	10.0	This command was introduced.
	11.2	The <i>access-list-number</i> and <i>access-list-name</i> arguments were added.
	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 default network of 0.0.0.0 used by Routing Information Protocol (RIP) can be redistributed by EIGRP.

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

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

default-metric (EIGRP)

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

default-metric *bandwidth delay reliability loading mtu*

no default-metric *bandwidth delay reliability loading mtu*

Syntax Description

<i>bandwidth</i>	Minimum bandwidth of the route in kilobytes per second. It can be from 1 to 4294967295.
<i>delay</i>	Route delay in tens of microseconds. It can be 1 or any positive number that is a multiple of 39.1 nanoseconds.
<i>reliability</i>	Likelihood of successful packet transmission expressed as a number from 0 through 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 1 to 255 (255 is 100 percent loading).
<i>mtu</i>	The smallest allowed value for the maximum transmission unit (MTU), expressed in bytes. It can be from 1 to 65535.

Command Default

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

Command Modes

Router configuration

Command History

Release	Modification
10.0	This command was introduced.
12.0(22)S	Address family support was added.
12.2(15)T	Address family support was added.
12.2(18)S	Address family support was added.
12.4(6)T	Support for IPv6 was added.
12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB.
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

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

**Note**

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

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

Default metrics are supported only when you are redistributing from IGRP, EIGRP, or static routes.

Examples

The following example shows how the redistributed Routing Information Protocol (RIP) metrics are translated into EIGRP metrics with values as follows: bandwidth = 1000, delay = 100, reliability = 250, loading = 100, and MTU = 1500:

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

Related Commands

Command	Description
ipv6 router eigrp	Configures the EIGRP IPv6 routing process.
redistribute (IP)	Redistributes routes from one routing domain into another routing domain.
redistribute (IPv6)	Redistributes IPv6 routes from one routing domain into another routing domain.

distance eigrp

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

distance eigrp *internal-distance external-distance*

no distance eigrp

Syntax Description

<i>internal-distance</i>	Administrative distance for Enhanced Internal Gateway Routing Protocol (EIGRP) internal routes. Internal routes are those that are learned from another entity within the same autonomous system. The distance can be a value from 1 to 255. The default administrative distance for EIGRP internal routes is 90.
<i>external-distance</i>	Administrative distance for EIGRP external routes. External routes are those for which the best path is learned from a neighbor external to the autonomous system. The distance can be a value from 1 to 255. The default administrative distance for EIGRP external routes is 170.

Command Default

internal-distance: 90
external-distance: 170

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

An administrative distance is a rating of the trustworthiness of a routing information source, such as an individual router or a group of routers. Numerically, an administrative distance is an integer from 0 to 255. In general, the higher the value, the lower the trust rating. An administrative distance of 255 means the routing information source cannot be trusted at all and should be ignored.

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

Table 65 lists the default administrative distances.

Table 65 *Default Administrative Distances*

Route Source	Default Distance
Connected interface	0
Static route	1
EIGRP summary route	5
External BGP	20
Internal EIGRP	90
Open Shortest Path First (OSPF)	110
Intermediate System-to-Intermediate System (IS-IS)	115
Routing Information Protocol (RIP)	120
EIGRP external route	170
Internal Border Gateway Protocol (BGP)	200
Unknown	255

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

Examples

In the following example, the **router eigrp** global configuration command sets up EIGRP routing in autonomous system number 109. The **network** router configuration commands specify EIGRP routing on networks 192.168.7.0 and 172.16.0.0. The **distance eigrp** command sets the administrative distance of all EIGRP internal routes to 80 and all EIGRP external routes to 130.

```
router eigrp 109
 network 192.168.7.0
 network 172.16.0.0
 distance eigrp 80 130
```

Related Commands

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

eigrp event-log-size

To set the size of the Enhanced Interior Gateway Routing Protocol (EIGRP) event log, use the **eigrp event-log-size** command in router configuration mode. To reset the size of the EIGRP event log to its default value, use the **no** form of this command.

eigrp event-log-size *size*

no eigrp event-log-size

Syntax Description	<i>size</i>	Size of the EIGRP event log; valid values are from 0 to 4294967295. Default value is 500.
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Command Default	This command is enabled.
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Command Modes	Router configuration (config-router)
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Command History	Release	Modification
	12.2(18)SXF	This command was introduced in Cisco IOS Release 12.2(18)SXF.

Usage Guidelines	When the configured size (number of lines) of the event log is exceeded, the last configured number of lines is retained, and the log becomes a rolling number of events with the most recent at the top of the log.
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Examples	The following example shows how to set the size of the EIGRP event log to 5000010:
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```
Router# configure terminal
Router(config)# router eigrp 2
Router (config-router)# eigrp event-log-size 5000010
Router (config-router)#
```

Related Commands	Command	Description
	clear ip eigrp event	Clears the IP EIGRP event log.

eigrp interface

To set a threshold value to minimize hysteresis in a router-to-radio configuration, use the **eigrp interface** command in interface configuration mode. To reset the hysteresis threshold to the default value, use the **no** form of this command.

eigrp *vmi-interface-number* **interface** [**dampening-change** *value*] [**dampening-interval** *value*]

no eigrp *vmi-interface-number* **interface** [**dampening-change** *value*] [**dampening-interval** *value*]

Syntax Description

<i>vmi-interface-number</i>	The number assigned to the VMI interface.
<i>dampening-change value</i>	(Optional) Value used to minimize the effect of frequent routing changes in router-to-radio configurations. Percent interface metric must change to cause update. Value range is 1 to 100.
dampening-interval <i>value</i>	(Optional) Specifies the time interval in seconds to check the interface metrics at which advertising of routing changes occurs. The default value is 30 seconds. Value range is 1 to 65535

Defaults

Default for change-based dampening is 50 percent of the computed metric.

Default for interval-based dampening is 30 seconds.

Command Modes

Interface configuration

Command History

Release	Modification
12.4(15)XF	This command was introduced.
12.4(15)T	This command was integrated into Cisco IOS Release 12.4(15)T.

Usage Guidelines

This command advertises routing changes for EIGRP traffic only.

The REPLY sent to any QUERY will always contain the latest metric information. Exceptions which will result in immediate UPDATE being sent:

- A down interface
- A down route
- Any change in metric which results in the router selecting a new next hop

Change-based Dampening

The **default** value for the change tolerance will be 50% of the computed metric. It can be configured in the range from 0 to 100 percent. If the metric change of the interface is not greater (or less) than the current metric plus or minus the specified amount, the change will not result in a routing change, and no update will be sent to other adjacencies.

Interval-based Dampening

The **default** value for the update intervals is 30 seconds. It can be configured in the range from 0 to 64535 seconds. If this option is specified, changes in routes learned through this interface, or in the interface metrics, will not be advertised to adjacencies until the specified interval is met. When the timer expires, any changes detected in any routes learned through the interface, or the metric reported by the interfaces will be sent out.

Examples

Change-based Dampening Example

The following example sets the threshold to 50 percent tolerance routing updates involving VMI interfaces and peers:

```
interface vmi1
 ip address 10.2.2.1 255.255.255.0
 ipv6 address 2001:0DB1:2::1/96
 ipv6 enable
 eigrp 1 interface dampening-change 50
 physical-interface Ethernet0/0
```

Interval-based Dampening Example

The following example sets the interval to 30 seconds at which updates occur for topology changes that affect VMI interfaces and peers:

```
interface vmi1
 ip address 10.2.2.1 255.255.255.0
 ipv6 address 2001:0DB1:2::1/96
 ipv6 enable
 eigrp 1 interface dampening-interval 30
 physical-interface Ethernet0/0
```

Related Commands

Command	Description
debug vmi	Displays debugging output for virtual multipoint interfaces (VMIs)
eigrp interface	Sets a threshold value to minimize hysteresis in a router-to-radio configuration.
interface vmi	Creates a virtual multipoint interface (VMI) that can be configured and applied dynamically.

eigrp log-neighbor-changes

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

eigrp log-neighbor-changes

no eigrp log-neighbor-changes

Syntax Description This command has no arguments or keywords.

Command Default Adjacency changes are logged.

Command Modes Router configuration

Command History

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

Examples

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

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

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

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

eigrp log-neighbor-warnings

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

eigrp log-neighbor-warnings [*seconds*]

no eigrp log-neighbor-warnings

Syntax Description	<i>seconds</i>	(Optional) The time interval (in seconds) between repeated neighbor warning messages. The range of seconds is from 1 to 65535.
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Command Default	Neighbor warning messages are logged.
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Command Modes	Router configuration
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Command History	Release	Modification
	12.0(5)	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	When neighbor warning messages occur, they are logged by default. With this command, you can disable and enable neighbor warning messages, and configure the interval between repeated neighbor warning messages.
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Examples	The following command will log neighbor warning messages for EIGRP process 209 and repeat the warning messages in 5-minute (300 seconds) intervals:
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```
router eigrp 209
 eigrp log-neighbor-warnings 300
```

eigrp router-id

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

eigrp router-id *ip-address*

no eigrp router-id *ip-address*

Syntax Description

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

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

Command Modes

Address family configuration
Router configuration

Command History

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

Examples

The following example configures 172.16.1.3 as a fixed router ID:

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

eigrp stub

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

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

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

Syntax Description

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

Command Default

Stub routing is not enabled by default.

Command Modes

Router configuration

Command History

Release	Modification
12.0(7)T	This command was introduced.
12.0(15)S	This command was integrated into Cisco IOS Release 12.0(15)S.
12.2	The redistributed keyword 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

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

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

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

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

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

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

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


Note

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

Examples

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

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

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

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

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

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

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

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

exit-address-family

To exit from address family configuration mode, use the **exit-address-family** command in address family configuration mode.

exit-address-family

Syntax Description This command has no arguments or keywords.

Command Default No default behavior or values

Command Modes Address family configuration

Command History	Release	Modification
	12.0(5)T	This command was introduced.
	12.0(22)S	Enhanced Interior Gateway Routing Protocol (EIGRP) support was added in Cisco IOS Release 12.0(22)S.
	12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
	12.2(15)T	EIGRP support was added in Cisco IOS Release 12.2(15)T.
	12.2(18)S	EIGRP support was added.
	12.2(17b)SXA	This command was integrated into Cisco IOS Release 12.2(17b)SXA.
	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.

Usage Guidelines This command is used to exit address family configuration mode.
This command can be abbreviated to **exit**.

Examples In the following example, the router is configured to exit address family configuration mode:

```
Router(config-router-af)# exit-address-family
```

Related Commands

Command	Description
address-family ipv4	Enters IPv4 address family configuration mode.
address-family ipv6	Enters IPv6 address family configuration mode.
address-family nsap	Enters CLNS address family configuration mode.
address-family vpnv4	Enters VPNv4 address family configuration mode.

interface vmi

To create a virtual multipoint interface (VMI) that can be configured and applied dynamically, use the **interface vmi** command in global configuration mode. To remove a VMI interface, use the **no** form of this command.

interface vmi *interface-number*

no interface vmi *interface-number*

Syntax Description

<i>interface-number</i>	Number assigned to the VMI. The value range for VMI interface numbers is from 1 to 2147483647
-------------------------	---

Defaults

No VMI is defined.

Command Modes

Global configuration (config)

Command History

Release	Modification
12.4(15)XF	This command was introduced.
12.4(15)T	This command was integrated into Cisco IOS Release 12.4(15)T.

Usage Guidelines

VMI Interface Aggregation Point

The VMI interface acts as an aggregation point for multiple PPPoE connections from one or more radios over one or more physical interfaces.

OSPFv3 and EIGRP Route Advertisements

All OSPFv3, EIGRPv4, and EIGRPv6 route advertisements that are received over the PPPoE connections are reported to the routing protocol as coming from a single interface, thus simplifying the routing protocol topology table and providing scalability benefits of each of the routing protocols.

Examples

The following example shows how to create a VMI interface:

```
interface vmi 1
 ip address 10.2.1.1 255.255.255.0
 no ip redirects
 no ip split-horizon eigrp 1
 load-interval 30
 ipv6 address 2001:0DB8:1:1:FFFF:FFFF:FFFF:FFFE/64
 ipv6 enable
 no ipv6 redirects
 ipv6 eigrp 1
 no ipv6 split-horizon eigrp 1
 physical-interface GigabitEthernet 0/0
 end
```

Related Commands

Command	Description
debug vmi	Displays debugging output for virtual multipoint interfaces (VMIs).
eigrp interface	Sets a threshold value to minimize hysteresis in a router-to-radio configuration.
mode bypass	Enables virtual multipoint interfaces (VMIs) to support multicast traffic.
physical interface	Creates a physical subinterface to be associated with the virtual multipoint interfaces (VMIs) on a router.

ip authentication key-chain eigrp

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

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

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

Syntax Description

<i>as-number</i>	Autonomous system number to which the authentication applies.
<i>key-chain</i>	Name of the authentication key chain.

Defaults

No authentication is provided for EIGRP packets.

Command Modes

Interface configuration

Command History

Release	Modification
11.2F	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 example applies authentication to autonomous system 2 and identifies a key chain named SPORTS:

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

Related Commands

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

ip authentication mode eigrp

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

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

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

Syntax Description

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

Defaults

No authentication is provided for EIGRP packets.

Command Modes

Interface configuration

Command History

Release	Modification
11.2F	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

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

Examples

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

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

Related Commands

Command	Description
accept-lifetime	Sets the time period during which the authentication key on a key chain is received as valid.
ip authentication key-chain eigrp	Enables authentication of EIGRP packets.
key	Identifies an authentication key on a key chain.
key chain	Enables authentication of routing protocols.

Command	Description
key-string (authentication)	Specifies the authentication string for a key.
send-lifetime	Sets the time period during which an authentication key on a key chain is valid to be sent.

ip bandwidth-percent eigrp

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

ip bandwidth-percent eigrp *as-number percent*

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

Syntax Description	<i>as-number</i>	Autonomous system number.
	<i>percent</i>	Percent of bandwidth that EIGRP may use.

Defaults 50 percent

Command Modes Interface configuration

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

Examples The following example allows EIGRP to use up to 75 percent (42 kbps) of a 56-kbps serial link in autonomous system 209:

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

Related Commands	Command	Description
	bandwidth (interface)	Sets a bandwidth value for an interface.

ip hello-interval eigrp

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

ip hello-interval eigrp *as-number seconds*

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

Syntax Description

<i>as-number</i>	Autonomous system number.
<i>seconds</i>	Hello interval (in seconds). The range is from 1 to 65535.

Defaults

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

For all other networks: 5 seconds

Command Modes

Interface configuration

Command History

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

Examples

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

```
interface ethernet 0
 ip hello-interval eigrp 109 10
```

Related Commands

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

ip hold-time eigrp

To configure the hold time for an Enhanced Interior Gateway Routing Protocol (EIGRP) process, use the **ip hold-time eigrp** command in interface configuration mode. To restore the default value, use the **no** form of this command.

ip hold-time eigrp *as-number seconds*

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

Syntax Description

<i>as-number</i>	Autonomous system number.
<i>seconds</i>	Hold time (in seconds). The range is from 1 to 65535.

Defaults

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

For all other networks: 15 seconds

Command Modes

Interface configuration

Command History

Release	Modification
10.0	This command was introduced.
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

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

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

Increasing the hold time delays route convergence across the network.

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

Examples

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

```
interface ethernet 0
 ip hold-time eigrp 109 40
```

Related Commands

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

ip next-hop-self eigrp

To instruct EIGRP that the IP next hop is itself, use the **ip next-hop-self eigrp** command in interface configuration mode. To instruct EIGRP to use the received next hop rather than itself, use the **no** form of this command.

ip next-hop-self eigrp *autonomous-system-number*

no ip next-hop-self eigrp *autonomous-system-number*

Syntax Description

autonomous-system-number Autonomous system number.

Command Default

EIGRP always sets the IP next-hop value to be itself.

Command Modes

Interface configuration

Command History

Release	Modification
12.3	This command was introduced.

Usage Guidelines

EIGRP will, by default, set the IP next-hop value to be itself for routes that it is advertising, even when advertising those routes back out the same interface where it learned them. To change this default, you must use the **no ip next-hop-self eigrp** interface configuration command to instruct EIGRP to use the received next hop value when advertising these routes. Some exceptions to this guideline follow:

- If spoke-to-spoke dynamic tunnels are not wanted, then the **no ip next-hop-self eigrp** command is not needed.
- If spoke-to-spoke dynamic tunnels are wanted, then you must use process switching on the tunnel interface on the spoke routers. Otherwise, you will need to use a different routing protocol over Dynamic Multipoint VPN (DMVPN).

Examples

The following example changes the default IP next hop value and instructs EIGRP to use the received next hop value:

```
interface serial 0
no ip next-hop-self eigrp 101
```

ip split-horizon eigrp

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

ip split-horizon eigrp *as-number*

no ip split-horizon eigrp *as-number*

Syntax Description

as-number Autonomous system number.

Defaults

The behavior of this command is enabled by default.

Command Modes

Interface configuration

Command History

Release	Modification
10.0	This command was introduced.
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

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



Note

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

Examples

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

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

Related Commands

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

ip summary-address eigrp

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

```
ip summary-address eigrp as-number ip-address mask [admin-distance] [leak-map name]
```

```
no ip summary-address eigrp as-number ip-address mask
```

Syntax Description

<i>as-number</i>	Autonomous system number.
<i>ip-address</i>	Summary IP address to apply to an interface.
<i>mask</i>	Subnet mask.
<i>admin-distance</i>	(Optional) Administrative distance. A value from 0 to 255.
leak-map <i>name</i>	(Optional) Route-map reference to configure route leaking through the summary.

Defaults

- An administrative distance of 5 is applied to Enhanced Interior Gateway Routing Protocol (EIGRP) summary routes.
- EIGRP automatically summarizes to the network level, even for a single host route.
- No summary addresses are predefined.
- The default administrative distance metric for EIGRP is 90.

Command Modes

Interface configuration

Command History

Release	Modification
10.0	This command was introduced.
12.0(7)T	The <i>admin-distance</i> argument was introduced.
12.3(14)T	The leak-map keyword 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

The **ip summary-address eigrp** command is used to configure interface-level address summarization. EIGRP summary routes are given an administrative distance value of 5. The administrative distance metric is used to advertise a summary without installing it in the routing table.

By default, EIGRP summarizes subnet routes to the network level. The **no auto-summary** command can be entered to configure subnet level summarization.

EIGRP Support for Leaking Routes

Configuring the **leak-map** keyword allows to advertise a component route that would otherwise be suppressed by the manual summary. Any component subset of the summary can be leaked. A route map and access list must be defined to source the leaked route.

The following is default behavior if an incomplete configuration is entered:

- If the **leak-map** keyword is configured to reference a nonexistent route map, the configuration of this keyword has no effect. The summary address is advertised but all component routes are suppressed.
- If the **leak-map** keyword is configured but the access-list does not exist or the route map does not reference the access list, the summary address and all component routes are sent.

Examples

The following example configures an administrative distance of 95 on interface Ethernet 0/0 for the 192.168.0.0/16 summary address:

```
Router(config)# router eigrp 1
Router(config-router)# no auto-summary
Router(config-router)# exit
Router(config)# interface Ethernet 0/0
Router(config-if)# ip summary-address eigrp 1 192.168.0.0 255.255.0.0 95
```

The following example configures the 10.1.1.0/24 subnet to be leaked through the 10.0.0.0 summary address:

```
Router(config)# router eigrp 1
Router(config-router)# exit
Router(config)# access-list 1 permit 10.1.1.0 0.0.0.255
Router(config)# route-map LEAK-10-1-1 permit 10
Router(config-route-map)# match ip address 1
Router(config-route-map)# exit
Router(config)# interface Serial 0/0
Router(config-if)# ip summary-address eigrp 1 10.0.0.0 255.0.0.0 leak-map LEAK-10-1-1
Router(config-if)# end
```

Related Commands

Command	Description
auto-summary (EIGRP)	Configures automatic summarization of subnet routes to network-level routes (default behavior).