IGRP Commands

Use the commands in this chapter to configure and monitor Internet Gateway Routing Protocol (IGRP). For IGRP configuration information and examples, refer to the "Configuring IGRP" chapter of the *Network Protocols Configuration Guide, Part 1*.

ip split-horizon (IGRP)

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

ip split-horizon

no ip split-horizon

Syntax Description

This command has no arguments or keywords.

Defaults

Varies with media

Command Modes

Interface configuration

Command History

Release	Modification
10.0	This command was introduced.

Usage Guidelines

For all interfaces except those for which either Frame Relay or SMDS encapsulation is enabled, the default condition for this command is **ip split-horizon**; in other words, the split horizon feature is active. If the interface configuration includes either the **encapsulation frame-relay** or **encapsulation smds** commands, then the default is for split horizon to be disabled. Split horizon is not disabled by default for interfaces using any of the X.25 encapsulations.

Note For networks that include links over X.25 PSNs, the **neighbor** router configuration command can be used to defeat the split horizon feature. You can as an alternative *explicitly* specify the **no ip split-horizon** command in your configuration. However, if you do so you *must* similarly disable split horizon for all routers in any relevant multicast groups on that network.

If split horizon has been disabled on an interface and you wish to enable it, use the **ip split-horizon** command to restore the split horizon mechanism.

Note In general, changing the state of the default for the **ip split-horizon** command is not recommended, unless you are certain that your application requires a change in order to properly advertise routes. 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 simple example disables split horizon on a serial link. The serial link is connected to an X.25 network:

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

Related Commands

Command	Description
network (IGRP)	Specifies a list of networks for the IGRP or Enhanced IGRP routing process.

metric holddown

To keep new IGRP routing information from being used for a certain period of time, use the **metric holddown** router configuration command. To disable this feature, use the **no** form of this command.

metric holddown

no metric holddown

Syntax Description

This command has no arguments or keywords.

Defaults

Disabled

Command Modes

Router configuration

Command History

Release	Modification
10.0	This command was introduced.

Usage Guidelines

Holddown keeps new routing information from being used for a certain period of time. This can prevent routing loops caused by slow convergence. It is sometimes advantageous to disable holddown to increase the network's ability to quickly respond to topology changes; this command provides this function.

Use the **metric holddown** command if other routers or access servers within the IGRP autonomous system are not configured with **no metric holddown**. If all routers are not configured the same way, you increase the possibility of routing loops.

Examples

The following example disables metric holddown:

```
router igrp 15
 network 131.108.0.0
 network 192.31.7.0
 no metric holddown
```

Related Commands

Command	Description
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).
metric weights (IGRP and Enhanced IGRP)	Allows the tuning of the IGRP or IP Enhanced IGRP metric calculations.
timers basic (IGRP)	Adjusts IGRP network timers.

metric maximum-hops

To have the IP routing software to advertise as unreachable those routes with a hop count higher than is specified by the command (IGRP only), use the **metric maximum-hops** router configuration command. To reset the value to the default, use the **no** form of this command.

metric maximum-hops *hops*

no metric maximum-hops *hops*

Syntax Description

hops	Maximum hop count (in decimal). The default value is 100 hops; the maximum number of hops that can be specified is 255.

Defaults

100 hops

Command Modes

Router configuration

Command History

Release	Modification
10.0	This command was introduced.

Usage Guidelines

This command provides a safety mechanism that breaks any potential *count-to-infinity* problems. It causes the IP routing software to advertise as unreachable routes with a hop count greater than the value assigned to the *hops* argument.

Examples

In the following example, a router in autonomous system 71 attached to network 15.0.0.0 wants a maximum hop count of 200, doubling the default. The network administrators decided to do this because they have a complex WAN that can generate a large hop count under normal (nonlooping) operations.

```
router igrp 71
 network 15.0.0.0
 metric maximum-hops 200
```

Related Commands

Command	Description
metric holddown	Keeps new IGRP routing information from being used for a certain period of time.
metric weights (IGRP and Enhanced IGRP)	Allows the tuning of the IGRP or IP Enhanced IGRP metric calculations.

neighbor (IGRP)

To define a neighboring router with which to exchange routing information, use this form of the **neighbor** router configuration command. To remove an entry, use the **no** form of this command.

neighbor *ip-address*

no neighbor *ip-address*

Syntax Description

ip-address	IP address of a peer router with which routing information will be exchanged.

Defaults

No neighboring routers are defined.

Command Modes

Router configuration

Command History

Release	Modification
10.0	This command was introduced.

Usage Guidelines

This command permits the point-to-point (nonbroadcast) exchange of routing information. When used in combination with the **passive-interface** router configuration command, routing information can be exchanged between a subset of routers and access servers on a LAN.

Multiple **neighbor** commands can be used to specify additional neighbors or peers.

Examples

In the following example, IGRP updates are sent to all interfaces on network 131.108.0.0 except interface Ethernet 1. However, in this case a **neighbor** router configuration command is included. This command permits the sending of routing updates to specific neighbors. One copy of the routing update is generated per neighbor.

```
router igrp 109
 network 131.108.0.0
 passive-interface ethernet 1
 neighbor 131.108.20.4
```

Related Commands

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

network (IGRP)

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

network *network-number*

no network *network-number*

Syntax Description

network-number	IP address of the directly connected networks.

Defaults

No networks are specified.

Command Modes

Router configuration

Command History

Release	Modification
10.0	This command was introduced.

Usage Guidelines

The network number specified must not contain any subnet information. You can specify multiple **network** commands.

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

Examples

The following example configures a router for IGRP and assigns autonomous system 109. The **network** commands indicate the networks directly connected to the router.

```
router igrp 109
 network 131.108.0.0
 network 192.31.7.0
```

Related Commands

Command	Description
router igrp	Configures the IGRP routing process.

offset-list (IGRP)

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

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

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

Syntax Description

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

Defaults

Disabled

Command Modes

Router configuration

Command History

Release	Modification
10.0	This command was introduced.
10.3	The following arguments were added: • *type* • *number*
11.2	The *name* argument was added.

Usage Guidelines

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

Examples

In the following example, the router applies an offset of 10 to the router's delay component only to access list 121:

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

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

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

router igrp

To configure the Interior Gateway Routing Protocol (IGRP) routing process, use the **router igrp** global configuration command. To shut down an IGRP routing process, use the **no** form of this command.

router igrp *autonomous-system*

no router igrp *autonomous-system*

Syntax Description

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

Defaults

No IGRP routing process is defined.

Command Modes

Global configuration

Command History

Release	Modification
10.0	This command was introduced.

Usage Guidelines

It is not necessary to have a registered autonomous system number to use IGRP. If you do not have a registered number, you are free to create your own. We recommend that if you do have a registered number, you use it to identify the IGRP process.

Examples

The following example configures an IGRP routing process and assign process number 109:

```
router igrp 109
```

Related Commands

Command	Description
network (IGRP)	Specifies a list of networks for the IGRP or Enhanced IGRP routing process.

set metric (IGRP)

To set the metric value for IGRP in a route-map, use the **set metric** route-map configuration command. To return to the default metric value, use the **no** form of this command.

set metric *bandwidth delay reliability loading mtu*

no set metric *bandwidth delay reliability loading mtu*

Syntax Description

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

Defaults

No metric will be set in the route-map.

Command Modes

Route-map configuration

Command History

Release	Modification
10.0	This command was introduced.

Usage Guidelines

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

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

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

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
```

timers basic (IGRP)

To adjust IGRP network timers, use the **timers basic** router configuration command. To restore the default timers, use the **no** form of this command.

timers basic *update invalid holddown flush* [*sleeptime*]

no timers basic

Syntax Description

update	Rate in seconds at which updates are sent. This is the fundamental timing parameter of the routing protocol.
invalid	Interval of time in seconds after which a route is declared invalid; it should be at least three times the value of *update*. A route becomes invalid when there is an absence of updates that refresh the route. The route then enters holddown. The route is marked inaccessible and advertised as unreachable. However, the route is still used for forwarding packets.
holddown	Interval in seconds during which routing information regarding better paths is suppressed. It should be at least three times the value of *update*. A route enters into a holddown state when an update packet is received that indicates the route is unreachable. The route is marked inaccessible and advertised as unreachable. However, the route is still used for forwarding packets. When holddown expires, routes advertised by other sources are accepted and the route is no longer inaccessible.
flush	Amount of time in seconds that must pass before the route is removed from the routing table; the interval specified must be at least the sum of *invalid* and *holddown*. If it is less than this sum, the proper holddown interval cannot elapse, which results in a new route being accepted before the holddown interval expires.
sleeptime	(Optional) Interval in milliseconds for postponing routing updates in the event of a flash update. The *sleeptime* value should be less than the *update* time. If the *sleeptime* is greater than the *update* time, routing tables will become unsynchronized.

Defaults

update is 90 seconds

invalid is 270 seconds

holddown is 280 seconds

flush is 630 seconds

sleeptime is 0 milliseconds

Command Modes

Router configuration

Command History

Release	Modification
10.0	This command was introduced.

Usage Guidelines

The basic timing parameters for IGRP are adjustable. Since this routing protocol is executing a distributed, asynchronous routing algorithm, it is important that these timers be the same for all routers and access servers in the network.

Note The current and default timer values can be seen by inspecting the output of the **show ip protocols** EXEC command. The relationships of the various timers should be preserved as described previously.

Examples

The following example sets updates to be broadcast every 5 seconds. If a router is not heard from in 15 seconds, the route is declared unusable. Further information is suppressed for an additional 15 seconds. At the end of the suppression period, the route is flushed from the routing table.

```
router igrp 109
 timers basic 5  15  15  30
```

Note that by setting a short update period, you run the risk of congesting slow-speed serial lines; however, this is not a big concern on faster-speed Ethernets and T1-rate serial lines. Also, if you have many routes in your updates, you can cause the routers to spend an excessive amount of time processing updates.

traffic-share

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

traffic-share {**balanced** | **min**}

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

Syntax Description

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

Defaults

Traffic is distributed proportionately to the ratios of the metrics.

Command Modes

Router configuration

Command History

Release	Modification
10.0	This command was introduced.

Usage Guidelines

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

Examples

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

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