offset-list (RIP)

To add an offset to incoming and outgoing metrics to routes learned via Routing Information Protocol (RIP), 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

access-list-number	Standard access list number to be applied. Access list number 0 indicates all access lists. If *offset* is 0, no action is taken.
access-list-name	Standard access list name to be applied.
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.
interface-type	(Optional) Interface type to which the offset list is applied.
interface-number	(Optional) Interface number to which the offset list is applied.

Defaults

This command is disabled by default.

Command Modes

Router configuration

Command History

Release	Modification
10.0	This command was introduced.
10.3	The *interface-type* and *interface-number* arguments were added.
11.2	The *access-list-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 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 a 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
```

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

access-list-number | *access-list-name*	Standard access list number or name to be applied. Access list number 0 indicates all access lists. If the *offset* value is 0, no action is taken.
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.
interface-type	(Optional) Interface type to which the offset list is applied.
interface-number	(Optional) Interface number to which the offset list is applied.

Defaults

This command is disabled by default.

Command Modes

Router configuration

Command History

Release	Modification
10.0	This command was introduced.
10.3	The *interface-type* and *interface-number* arguments were added.
11.2	The *access-list-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 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
```

output-delay

To change the interpacket delay for Routing Information Protocol (RIP) updates sent, use the **output-delay** command in router configuration mode. To remove the delay, use the **no** form of this command.

output-delay *delay*

no output-delay

Syntax Description

delay	Delay between packets in a multiple-packet RIP update (in milliseconds). The range is from 8 to 50. The default is 0.

Defaults

0 milliseconds

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.

Usage Guidelines

Consider using this command if you have a high-end router that is sending at high speed to a low-speed router that might not be able to receive at the high speed. Configuring this command will help prevent the routing table from losing information.

Examples

The following example sets the interpacket delay to 10 milliseconds:

```
router rip
 output-delay 10
```

partition avoidance

To cause an IS-IS Level 1-2 border router to stop advertising the Level 1 area prefix into the Level 2 backbone when full connectivity is lost between the border router, all adjacent Level 1 routers, and end hosts, use the **partition avoidance** command in router configuration mode. To disable this output format, use the **no** form of the command.

partition avoidance *area-tag*

no partition avoidance *area-tag*

Syntax Description

area-tag	Meaningful name for a routing process. If it is not specified, a null tag is assumed and the process is referenced with a null tag. This name must be unique among all IP or Connectionless Network Service Protocol (CLNS) router processes for a given router. Required for multiarea IS-IS configuration. Optional for conventional IS-IS configuration.

Defaults

This command is disabled by default.

Command Modes

Router configuration

Command History

Release	Modification
12.0(5)T	This command was introduced.

Usage Guidelines

When the **partition avoidance** command is enabled, a multiarea router withdraws a Level 1 area prefix from the Level 2 backbone when it no longer has any active adjacencies to that Level 1 area. This withdrawal prevents the Level 1 area from appearing to be partitioned within the Level 2 backbone.

In International Standards Organization (ISO) CLNS networks using a redundant topology, it is possible for an area to become “partitioned” when full connectivity is lost between a Level 1-2 border router, all adjacent Level 1 routers, and end hosts. In such a case, multiple Level 1-2 border routers advertise the Level 1 area prefix into the backbone area, even though any one router can reach only a subset of the end hosts in the Level 1 area.

When enabled, the **partition avoidance** command prevents this partitioning by causing the border router to stop advertising the Level 1 area prefix into the Level 2 backbone. This command displays the output from different areas as a string or additional white space.

Other cases of connectivity loss within the Level 1 area itself are not detected or corrected by the border router, and this command will have no effect.

Examples

The following example causes the routing process named Finance to stop advertising the prefix for the area named area1 when the router no longer has any active adjacencies to area1:

```
router isis Finance
 partition avoidance area1
```

Related Commands

Command	Description
is-type	Configures the routing level for an instance of the IS-IS routing process.
router isis	Enables the IS-IS routing protocol and specifies an IS-IS process.

passive-interface

To disable sending routing updates on an interface, use the **passive-interface** command in router configuration mode. To reenable the sending of routing updates, use the **no** form of this command.

passive-interface [**default**] {*interface-type interface-number*}

no passive-interface *interface-type interface-number*

Syntax Description

default	(Optional) All interfaces become passive.
interface-type	Interface type.
interface-number	Interface number.

Defaults

Routing updates are sent on the interface.

Command Modes

Router configuration

Command History

Release	Modification
10.0	This command was introduced.
12.0	The **default** keyword was added.

Usage Guidelines

If you disable the sending of routing updates on an interface, the particular subnet will continue to be advertised to other interfaces, and updates from other routers on that interface continue to be received and processed.

The **default** keyword sets all interfaces as passive by default. You can then configure individual interfaces where adjacencies are desired using the **no passive-interface** command. The **default** keyword is useful in Internet service provider (ISP) and large enterprise networks where many of the distribution routers have more than 200 interfaces.

For the Open Shortest Path First (OSPF) protocol, OSPF routing information is neither sent nor received through the specified router interface. The specified interface address appears as a stub network in the OSPF domain.

For the Intermediate System-to-Intermediate System (IS-IS) protocol, this command instructs IS-IS to advertise the IP addresses for the specified interface without actually running IS-IS on that interface. The **no** form of this command for IS-IS disables advertising IP addresses for the specified address.

Note For IS-IS you must keep at least one active interface and configure the interface with the **ip router isis** command.

Enhanced Interior Gateway Routing Protocol (EIGRP) is disabled on an interface that is configured as passive although it advertises the route.

Examples

The following example sends EIGRP updates to all interfaces on network 10.108.0.0 except Ethernet interface 1:

```
router eigrp 109
 network 10.108.0.0
 passive-interface ethernet 1
```

The following configuration enables IS-IS on Ethernet interface 1 and serial interface 0 and advertises the IP addresses of Ethernet interface 0 in its link-state protocol data units (PDUs):

```
router isis Finance
 passive-interface Ethernet 0
interface Ethernet 1
 ip router isis Finance
interface serial 0
 ip router isis Finance
```

The following example sets all interfaces as passive, then activates Ethernet interface 0:

```
router ospf 100
passive-interface default
no passive-interface ethernet0
network 10.108.0.1 0.0.0.255 area 0
```

prc-interval

To customize IS-IS throttling of partial route calculations (PRC), use the **prc-interval** command in router configuration mode. To restore default values, use the **no** form of this command.

prc-interval *prc-max-wait* [*prc-initial-wait prc-second-wait*]

no prc-interval

Syntax Description

prc-max-wait	Indicates the maximum interval (in seconds) between two consecutive PRC calculations. Value range is 1 to 120 seconds. The default is 5 seconds.
prc-initial-wait	(Optional) Indicates the initial PRC calculation delay (in milliseconds) after a topology change. The range is 1 to 120,000 milliseconds. The default is 2000 milliseconds.
prc-second-wait	(Optional) Indicates the hold time between the first and second PRC calculation (in milliseconds). The range is 1 to 120,000 milliseconds. The default is 5000 milliseconds (5 seconds).

Defaults

prc-max-wait: 5 seconds
prc-initial-wait: 2000 milliseconds
prc-second-wait: 5000 milliseconds

Command Modes

Router configuration

Command History

Release	Modification
12.1	This command was introduced.

Usage Guidelines

PRC is the software's process of calculating routes without performing an SPF calculation. This is possible when the topology of the routing system itself has not changed, but a change is detected in the information announced by a particular IS or when it is necessary to attempt to reinstall such routes in the RIB.

The following description will help you determine whether to change the default values of this command:

- The *prc-initial-wait* argument indicates the initial wait time (in milliseconds) before generating the first LSP.
- The *prc-second-wait* argument indicates the amount of time to wait (in milliseconds) between the first and second LSP generation.

- Each subsequent wait interval is twice as long as the previous one until the wait interval reaches the *prc-max-wait* interval specified, so this value causes the throttling or slowing down of the PRC calculation after the initial and second intervals. Once this interval is reached, the wait interval continues at this interval until the network calms down.
- After the network calms down and there are no triggers for 2 times the *prc-max-wait* interval, fast behavior is restored (the initial wait time).

Examples

The following example configures intervals for SPF calculations, PRC, and LSP generation:

```
router isis
 spf-interval 5 10 20
 prc-interval 5 10 20
 lsp-gen-interval 2 50 100
```

redistribute (BGP to ISO IS-IS)

To redistribute routes from a Border Gateway Protocol (BGP) autonomous system into an International Organization for Standardization (ISO) Intermediate System-to-Intermediate System (IS-IS) routing process, use the **redistribute** command in router configuration mode. To remove the **redistribute** command from the configuration file and restore the system to its default condition where the software does not redistribute routes, use the **no** form of this command.

redistribute *protocol as-number* [*route-type*] [**route-map** *map-tag*]

no redistribute *protocol as-number* [*route-type*] [**route-map** *map-tag*]

Syntax Description

protocol	Source protocol from which routes are being redistributed. It must be the **bgp** keyword. The **bgp** keyword is used to redistribute dynamic routes.
as-number	The autonomous system number of the BGP routing process.
route-type	(Optional) The type of route to be redistributed. It can be one of the following keywords: **clns** or **ip**. The default is **ip.** The **clns** keyword is used to redistribute BGP routes with network service access point (NSAP) addresses into IS-IS. The **ip** keyword is used to redistribute BGP routes with IP addresses into IS-IS.
route-map *map-tag*	(Optional) Identifier of a configured route map. The route map should be examined to filter the importation of routes from this source routing protocol to IS-IS. If not specified, all routes are redistributed. If the keyword is specified, but no route map tags are listed, no routes will be imported.

Defaults

Route redistribution is disabled.

protocol: No source protocol is defined.
route-type: **ip**
route-map *map-tag*: If the **route-map** argument is not entered, all routes are redistributed; if no *map-tag* value is entered, no routes are imported.

Command Modes

Router configuration

Command History

Release	Modification
12.2(8)T	The **clns** keyword was added.

Usage Guidelines

The **clns** keyword must be specified to redistribute NSAP prefix routes from BGP into an ISO IS-IS routing process. This version of the **redistribute** command is used only under router configuration mode for IS-IS processes.

Examples

The following example configures NSAP prefix routes from BGP autonomous system 64500 to be redistributed into the IS-IS routing process called osi-proc-17:

```
router isis osi-proc-17
 redistribute bgp 64500 clns
```

Related Commands

Command	Description
network (BGP and multiprotocol BGP)	Specifies the list of networks for the BGP routing process.
route-map (IP)	Defines the conditions for redistributing routes from one routing protocol into another.
show route-map	Displays all route maps configured or only the one specified.

redistribute (IP)

To redistribute routes from one routing domain into another routing domain, use the **redistribute** command in router configuration mode. To disable redistribution, use the **no** form of this command.

redistribute *protocol* [*process-id*] {**level-1** | **level-1-2** | **level-2**} [*as-number*] [**metric** {*metric-value* | **transparent**}] [**metric-type** *type-value*] [**match** {**internal** | **external 1** | **external 2**}] [**tag** *tag-value*] [**route-map** *map-tag*] [**subnets**]

no redistribute *protocol* [*process-id*] {**level-1** | **level-1-2** | **level-2**} [*as-number*] [**metric** {*metric-value* | **transparent**}] [**metric-type** *type-value*] [**match** {**internal** | **external 1** | **external 2**}] [**tag** *tag-value*] [**route-map** *map-tag*] [**subnets**]

Syntax Description

protocol	Source protocol from which routes are being redistributed. It can be one of the following keywords: **bgp**, **connected**, **eigrp**, **isis**, **mobile**, **ospf**, **static** [**ip**], or **rip**. The **static** [**ip**] keyword is used to redistribute IP static routes. The optional **ip** keyword is used when redistributing into the Intermediate System-to-Intermediate System (IS-IS) protocol. The **connected** keyword refers to routes that are established automatically by virtue of having enabled IP on an interface. For routing protocols such as Open Shortest Path First (OSPF) and IS-IS, these routes will be redistributed as external to the autonomous system.
process-id	(Optional) For the **bgp** or **eigrp** keyword, this is an autonomous system number, which is a 16-bit decimal number. For the **isis** keyword, this is an optional *tag* value that defines a meaningful name for a routing process. You can specify only one IS-IS process per router. Creating a name for a routing process means that you use names when configuring routing. For the **ospf** keyword, this is an appropriate OSPF process ID from which routes are to be redistributed. This identifies the routing process. This value takes the form of a nonzero decimal number. For the **rip** keyword, no *process-id* value is needed.
level-1	Specifies that for IS-IS Level 1 routes are redistributed into other IP routing protocols independently.
level-1-2	Specifies that for IS-IS both Level 1 and Level 2 routes are redistributed into other IP routing protocols.
level-2	Specifies that for IS-IS Level 2 routes are redistributed into other IP routing protocols independently.
as-number	(Optional) Autonomous system number for the redistributed route.
metric *metric-value*	(Optional) When redistributing from one OSPF process to another OSPF process on the same router, the metric will be carried through from one process to the other if no metric value is specified. When redistributing other processes to an OSPF process, the default metric is 20 when no metric value is specified.

transparent	(Optional) Causes RIP to use the routing table metric for redistributed routes as the RIP metric.
metric-type *type-value*	(Optional) For OSPF, the external link type associated with the default route advertised into the OSPF routing domain. It can be one of two values: • **1**—Type 1 external route • **2**—Type 2 external route If a **metric-type** is not specified, the Cisco IOS software adopts a Type 2 external route. For IS-IS, it can be one of two values: • **internal**—IS-IS metric that is < 63. • **external**—IS-IS metric that is > 64 < 128. The default is **internal**.
match {**internal** | **external 1** | **external 2**}	(Optional) For the criteria by which OSPF routes are redistributed into other routing domains. It can be one of the following: • **internal**—Routes that are internal to a specific autonomous system. • **external 1**—Routes that are external to the autonomous system, but are imported into OSPF as Type 1 external route. • **external 2**—Routes that are external to the autonomous system, but are imported into OSPF as Type 2 external route.
tag *tag-value*	(Optional) 32-bit decimal value attached to each external route. This is not used by OSPF itself. It may be used to communicate information between Autonomous System Boundary Routers (ASBRs). If none is specified, then the remote autonomous system number is used for routes from Border Gateway Protocol (BGP) and Exterior Gateway Protocol (EGP); for other protocols, zero (0) is used.
route-map	(Optional) Route map that should be interrogated to filter the importation of routes from this source routing protocol to the current routing protocol. If not specified, all routes are redistributed. If this keyword is specified, but no route map tags are listed, no routes will be imported.
map-tag	(Optional) Identifier of a configured route map.
subnets	(Optional) For redistributing routes into OSPF, the scope of redistribution for the specified protocol.

Command Default

Route redistribution is disabled.
protocol: No source protocol is defined.
process-id: No process ID is defined.
metric *metric-value*: 0
metric-type *type-value*: Type 2 external route
match internal | **external**: Internal, external 1, external 2
external: Internal
tag *tag-value*: If no value is specified, the remote autonomous system number is used for routes from

BGP and EGP; for other protocols, the default is 0.
route-map *map-tag*: If the **route-map** keyword is not entered, all routes are redistributed; if no *map-tag* value is entered, no routes are imported.
subnets: No subnets are defined.

Command Modes

Router configuration
Address family configuration

Command History

Release	Modification
10.0	This command was introduced.
12.0(5)T	Address family configuration mode was added.
12.0(22)S	Address family support under EIGRP was added in Cisco IOS Release 12.0(22)S.
12.2(15)T	Address family support under EIGRP was added in Cisco IOS Release 12.2(15)T.
12.2(18)S	Address family support under 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.

Usage Guidelines

Changing or disabling any keyword will not affect the state of other keywords.

A router receiving a link-state protocol with an internal metric will consider the cost of the route from itself to the redistributing router plus the advertised cost to reach the destination. An external metric only considers the advertised metric to reach the destination.

Routes learned from IP routing protocols can be redistributed at Level 1 into an attached area or at Level 2. The **level-1-2** keyword allows both Level 1 and Level 2 routes in a single command.

Redistributed routing information must be filtered by the **distribute-list out** router configuration command. This guideline ensures that only those routes intended by the administrator are passed along to the receiving routing protocol.

Whenever you use the **redistribute** or the **default-information** router configuration commands to redistribute routes into an OSPF routing domain, the router automatically becomes an ASBR. However, an ASBR does not, by default, generate a *default route* into the OSPF routing domain.

When routes are redistributed into OSPF from protocols other than OSPF or BGP, and no metric has been specified with the **metric-type** keyword and *type-value* argument, OSPF will use 20 as the default metric. When routes are redistributed into OSPF from BGP, OSPF will use 1 as the default metric. When routes are redistributed from one OSPF process to another OSPF process, Autonomous system (AS) external and not-so-stubby-area (NSSA) routes will use 20 as the default metric. When intra-area and inter-area routes are redistributed between OSPF processes, the internal OSPF metric from the redistribution source process is advertised as the external metric in the redistribution destination process. (This is the only case in which the routing table metric will be preserved when routes are redistributed into OSPF.)

When routes are redistributed into OSPF, only routes that are not subnetted are redistributed if the **subnets** keyword is not specified.

Routes configured with the **connected** keyword affected by this **redistribute** command are the routes not specified by the **network** router configuration command.

You cannot use the **default-metric** command to affect the metric used to advertise **connected** routes.

Note The **metric** value specified in the **redistribute** command supersedes the **metric** value specified using the **default-metric** command.

Default redistribution of IGPs or EGP into BGP is not allowed unless the **default-information originate** router configuration command is specified.

Examples

The following example shows how OSPF routes are redistributed into a BGP domain:

```
router bgp 109
 redistribute ospf
```

The following example causes Enhanced Interior Gateway Routing Protocol (EIGRP) routes to be redistributed into an OSPF domain:

```
router ospf 110
 redistribute eigrp
```

The following example causes the specified EIGRP process routes to be redistributed into an OSPF domain. The EIGRP-derived metric will be remapped to 100 and RIP routes to 200.

```
router ospf 109
 redistribute eigrp 108 metric 100 subnets
 redistribute rip metric 200 subnets
```

The following example configures BGP routes to be redistributed into IS-IS. The link-state cost is specified as 5, and the metric type will be set to external, indicating that it has lower priority than internal metrics.

```
router isis
 redistribute bgp 120 metric 5 metric-type external
```

In the following example, network 172.16.0.0 will appear as an external link-state advertisement (LSA) in OSPF 1 with a cost of 100 (the cost is preserved):

```
interface ethernet 0
 ip address 172.16.0.1 255.0.0.0
 ip ospf cost 100
interface ethernet 1
 ip address 10.0.0.1 255.0.0.0
!
router ospf 1
 network 10.0.0.0 0.255.255.255 area 0
 redistribute ospf 2 subnet
router ospf 2
 network 172.16.0.0 0.255.255.255 area 0
```

Related Commands

Command	Description
address-family ipv4 (BGP)	Places the router in address family configuration mode for configuring routing sessions such as BGP, RIP, or static routing sessions that use standard IPv4 address prefixes.
address-family vpnv4	Places the router in address family configuration mode for configuring routing sessions such as BGP, RIP, or static routing sessions that use standard VPNv4 address prefixes.
default-information originate (BGP)	Allows the redistribution of network 0.0.0.0 into BGP.
default-information originate (IS-IS)	Generates a default route into an IS-IS routing domain.
default-information originate (OSPF)	Generates a default route into an OSPF routing domain.
distribute-list out (IP)	Suppresses networks from being advertised in updates.
route-map (IP)	Defines the conditions for redistributing routes from one routing protocol into another, or enables policy routing.
show route-map	Displays all route maps configured or only the one specified.

redistribute (ISO ISIS to BGP)

To redistribute routes from an International Organization for Standardization (ISO) Intermediate System-to-Intermediate System (IS-IS) routing process into a Border Gateway Protocol (BGP) autonomous system, use the **redistribute** command in router configuration mode. To remove the **redistribute** command from the configuration file and restore the system to its default condition where the software does not redistribute routes, use the **no** form of this command.

redistribute *protocol* [*process-id*] [*route-type*] [**route-map** *map-tag*]

no redistribute *protocol* [*process-id*] [*route-type*] [**route-map** *map-tag*]

Syntax Description

protocol	Source protocol from which routes are being redistributed. It can be one of the following keywords: **isis** or **static**. The **isis** keyword is used to redistribute dynamic routes. The **static** keyword is used to redistribute static routes.
process-id	(Optional) When IS-IS is used as a source protocol, this argument defines a meaningful name for a routing process. The *process-id* argument identifies from which IS-IS routing process routes will be redistributed. Routes can be redistributed only from IS-IS routing processes that involve Level 2 routes, including IS-IS Level 1-2 and Level 2 routing processes. The *process-id* argument is not used when the protocol keyword is **static**.
route-type	(Optional) The type of route to be redistributed. It can be one of the following keywords: **clns** or **ip**. The default is **ip**. The **clns** keyword is used to redistribute Connectionless Network Service (CLNS) routes with network service access point (NSAP) addresses into BGP. The **ip** keyword is used to redistribute IS-IS routes with IP addresses into BGP.
route-map *map-tag*	(Optional) Identifier of a configured route map. The route map should be examined to filter the importation of routes from this source routing protocol to BGP. If no route map is specified, all routes are redistributed. If the keyword is specified, but no route map tags are listed, no routes will be imported.

Defaults

Route redistribution is disabled.

protocol: No source protocol is defined.
route-type: **ip**
route-map *map-tag*: If the **route-map** argument is not entered, all routes are redistributed; if no *map-tag* value is entered, no routes are imported.

Command Modes

Router configuration

Command History

Release	Modification
12.2(8)T	The **clns** keyword was added.

Usage Guidelines

The **clns** keyword must be specified to redistribute NSAP prefix routes from an ISO IS-IS routing process into BGP. This version of the **redistribute** command is used only under router configuration mode for BGP processes.

Examples

The following example configures CLNS NSAP routes from the IS-IS routing process called osi-proc-6 to be redistributed into BGP:

```
router bgp 64352
 redistribute isis osi-proc-6 clns
```

Related Commands

Command	Description
network (BGP and multiprotocol BGP)	Specifies the list of networks for the BGP routing process.
route-map (IP)	Defines the conditions for redistributing routes from one routing protocol into another.
show route-map	Displays all route maps configured or only the one specified.

redistribute dvmrp

To configure redistribution of Distance Vector Multicast Routing Protocol (DVMRP) routes into multiprotocol BGP, use the **redistribute dvmrp** command in address family or router configuration mode. To stop such redistribution, use the **no** form of this command.

redistribute dvmrp [**route-map** *map-name*]

no redistribute dvmrp [**route-map** *map-name*]

Syntax Description

route-map *map-name*	(Optional) Name of the route map that contains various BGP attribute settings.

Defaults

DVMRP routes are not redistributed into multiprotocol BGP.

Command Modes

Address family configuration

Router configuration

Command History

Release	Modification
11.1(20)CC	This command was introduced.
12.0(7)T	Address family configuration mode was added.

Usage Guidelines

Use this command if you have a subset of DVMRP routes in an autonomous system that you want to take the multiprotocol BGP path. Define a route map to further specify which DVMRP routes get redistributed.

Examples

The following router configuration mode example redistributes DVMRP routes to BGP peers that match access list 1:

```
router bgp 109
 redistribute dvmrp route-map dvmrp-into-mbgp
route-map dvmrp-into-mbgp
 match ip address 1
```

The following address family configuration mode example redistributes DVMRP routes to multiprotocol BGP peers that match access list 1:

```
router bgp 109
address-family ipv4 multicast
 redistribute dvmrp route-map dvmrp-into-mbgp

route-map dvmrp-into-mbgp
 match ip address 1
```

route-map (IP)

To define the conditions for redistributing routes from one routing protocol into another, or to enable policy routing, use the **route-map** command in global configuration mode and the **match** and **set** command in route-map configuration modes. To delete an entry, use the **no** form of this command.

route-map *map-tag* [**permit** | **deny**] [*sequence-number*]

no route-map *map-tag* [**permit** | **deny**] [*sequence-number*]

Syntax Description

map-tag	Defines a meaningful name for the route map. The **redistribute** router configuration command uses this name to reference this route map. Multiple route maps may share the same map tag name.
permit	(Optional) If the match criteria are met for this route map, and the **permit** keyword is specified, the route is redistributed as controlled by the set actions. In the case of policy routing, the packet is policy routed. If the match criteria are not met, and the **permit** keyword is specified, the next route map with the same map tag is tested. If a route passes none of the match criteria for the set of route maps sharing the same name, it is not redistributed by that set. The **permit** keyword is the default.
deny	(Optional) If the match criteria are met for the route map and the **deny** keyword is specified, the route is not redistributed. In the case of policy routing, the packet is not policy routed, and no further route maps sharing the same map tag name will be examined. If the packet is not policy routed, the normal forwarding algorithm is used.
sequence-number	(Optional) Number that indicates the position a new route map will have in the list of route maps already configured with the same name. If given with the **no** form of this command, the position of the route map should be deleted.

Defaults

No default is available.

Command Modes

Global configuration

Command History

Release	Modification
10.0	This command was introduced.

Usage Guidelines

Use route maps to redistribute routes or to subject packets to policy routing. Both purposes are described in this section.

Redistribution

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 **match** route-map configuration command has multiple formats. The **match** commands can be given in any order, and all **match** commands must "pass" to cause the route to be redistributed according to the *set actions* given with the **set** commands. The **no** forms of the **match** commands remove the specified match criteria.

Use route maps when you want detailed control over how routes are redistributed between routing processes. The destination routing protocol is the one you specify with the **router** global configuration command. The source routing protocol is the one you specify with the **redistribute** router configuration command. See the "Examples" section for an illustration of how route maps are configured.

When you are passing routes through a route map, a route map can have several parts. Any route that does not match at least one **match** clause relating to a **route-map** command will be ignored; that is, the route will not be advertised for outbound route maps and will not be accepted for inbound route maps. If you want to modify only some data, you must configure a second route map section with an explicit match specified.

Policy Routing

Another purpose of route maps is to enable policy routing. Use the **ip policy route-map** command, in addition to the **route-map** command, and the **match** and **set** commands to define the conditions for policy routing packets. The **match** commands specify the conditions under which policy routing occurs. The **set** commands specify the routing actions to perform if the criteria enforced by the **match** commands are met. You might want to policy route packets some way other than the obvious shortest path.

The *sequence-number* argument works as follows:

1. If no entry is defined with the supplied tag, an entry is created with the *sequence-number* argument set to 10.
2. If only one entry is defined with the supplied tag, that entry becomes the default entry for the following **route-map** command. The *sequence-number* argument of this entry is unchanged.
3. If more than one entry is defined with the supplied tag, an error message is printed to indicate that the *sequence-number* argument is required.

If the **no route-map** *map-tag* command is specified (with no *sequence-number* argument), the whole route map is deleted.

Examples

The following example redistributes Routing Information Protocol (RIP) routes with a hop count equal to 1 into Open Shortest Path First (OSPF). These routes will be redistributed into OSPF as external link-state advertisements (LSAs) with a metric of 5, metric type of Type 1, and a tag equal to 1.

```
router ospf 109
 redistribute rip route-map rip-to-ospf

route-map rip-to-ospf permit
 match metric 1
 set metric 5
 set metric-type type1
 set tag 1
```

Related Commands

Command	Description
ip policy route-map	Identifies a route map to use for policy routing on an interface.
match as-path	Matches a BGP autonomous system path access list.
match community	Matches a BGP community.
match interface (IP)	Distributes any routes that have their next hop out one of the interfaces specified.
match ip address	Distributes any routes that have a destination network number address that is permitted by a standard or extended access list, and performs policy routing on packets.
match ip next-hop	Redistributes any routes that have a next hop router address passed by one of the access lists specified.
match ip route-source	Redistributes routes that have been advertised by routers and access servers at the address specified by the access lists.
match length	Bases policy routing on the Level 3 length of a packet.
match metric (IP)	Redistributes routes with the metric specified.
match route-type (IP)	Redistributes routes of the specified type.
match tag	Redistributes routes in the routing table that match the specified tags.
set as-path	Modifies an autonomous system path for BGP routes.
set automatic-tag	Automatically computes the tag value.
set community	Sets the BGP communities attribute.
set default interface	Indicates where to output packets that pass a match clause of a route map for policy routing and have no explicit route to the destination.
set interface	Indicates where to output packets that pass a match clause of a route map for policy routing.
set ip default next-hop verify-availability	Indicates where to output packets that pass a match clause of a route map for policy routing and for which the Cisco IOS software has no explicit route to a destination.
set ip next-hop	Indicates where to output packets that pass a match clause of a route map for policy routing.
set level (IP)	Indicates where to import routes.
set local-preference	Specifies a preference value for the autonomous system path.
set metric (BGP, OSPF, RIP)	Sets the metric value for a routing protocol.
set metric-type	Sets the metric type for the destination routing protocol.
set next-hop	Specifies the address of the next hop.
set tag (IP)	Sets a tag value of the destination routing protocol.
set weight	Specifies the BGP weight for the routing table.
show route-map	Displays all route maps configured or only the one specified.

router bgp

To configure the BGP routing process, use the **router bgp** command in global configuration mode. To remove a routing process, use the **no** form of this command.

router bgp *as-number*

no router bgp *as-number*

Syntax Description

as-number	Number of an autonomous system that identifies the router to other BGP routers and tags the routing information passed along.

Defaults

No BGP routing process is enabled by default.

Command Modes

Global configuration

Command History

Release	Modification
10.0	This command was introduced.

Usage Guidelines

This command allows you to set up a distributed routing core that automatically guarantees the loop-free exchange of routing information between autonomous systems.

Examples

The following example configures a BGP process for autonomous system 120:

```
router bgp 120
```

Related Commands

Command	Description
network (BGP and multiprotocol BGP)	Specifies the list of networks for the BGP routing process.
timers bgp	Adjusts BGP network timers.

router eigrp

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

router eigrp *as-number*

no router eigrp *as-number*

Syntax Description

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

Defaults

This command is disabled by default.

Command Modes

Global configuration

Command History

Release	Modification
10.0	This command was introduced.

Examples

The following example configures an EIGRP routing process and assigns process number 109:

```
router eigrp 109
```

Related Commands

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

router isis

To enable the Intermediate System-to-Intermediate System (IS-IS) routing protocol and to specify an IS-IS process, use the **router isis** command in global configuration mode. To disable IS-IS routing, use the **no** form of this command.

router isis *area-tag*

no router isis *area-tag*

Syntax Description

area-tag	Meaningful name for a routing process. If it is not specified, a null tag is assumed and the process is referenced with a null tag. This name must be unique among all IP or Connectionless Network Service (CLNS) router processes for a given router. Required for multiarea IS-IS configuration. Optional for conventional IS-IS configuration.

Defaults

This command is disabled by default.

Command Modes

Global configuration

Command History

Release	Modification
10.0	This command was introduced.
12.0(5)T	Multiarea functionality was added, changing the way the *tag* argument (now *area-tag*) is used.

Usage Guidelines

This command is used to enable routing for an area. An appropriate network entity title (NET) must be configured to specify the area address of the area and system ID of the router. Routing must be enabled on one or more interfaces before adjacencies may be established and dynamic routing is possible.

If you have IS-IS running and at least one International Standards Organization Interior Gateway Routing Protocol (ISO-IGRP) process, the IS-IS process and the ISO-IGRP process cannot both be configured without an area tag. The null tag can be used by only one process. If you run ISO-IGRP and IS-IS, a null tag can be used for IS-IS, but not for ISO-IGRP at the same time. However, each area in an IS-IS multiarea configuration should have a nonnull area tag to facilitate identification of the area.

You can configure only one IS-IS routing process to perform Level 2 (interarea) routing. You can configure this process to perform Level 1 (intra-area) routing at the same time. You can configure up to 29 additional processes as Level 1-only processes. If Level 2 routing is configured on any process, all additional processes are automatically configured as Level 1.

An interface cannot be part of more than one area, except in the case where the associated routing process is performing both Level 1 and Level 2 routing. On media such as WAN media where subinterfaces are supported, different subinterfaces could be configured for different areas.

If Level 2 routing is not desired for a given area, use the **is-type** command to remove Level 2. Level 2 routing can then be enabled on some other router instance.

Explicit redistribution between IS-IS instances is prohibited (prevented by the parser). In other words, you cannot issue a **redistribute isis** *area-tag* command in the context of another IS-IS router instance (**router isis** *area-tag*). Redistribution from any other routing protocol into a particular area is possible, and is configured per router instance, as in Cisco IOS software Release 12.0, using the **redistribute** and **route map** commands. By default, redistribution is into Level 2.

If multiple Level 1 areas are defined, the Target Address Resolution Protocol (TARP) behaves in the following way:

- The locally assigned target identifier gets the network service access point (NSAP) of the Level 2 area, if present.
- If only Level 1 areas are configured, the router uses the NSAP of the first active Level 1 area as shown in the configuration at the time of TARP configuration ("tarp run"). (Level 1 areas are sorted alphanumerically by tag name, with capital letters coming before lowercase letters. For example, AREA-1 precedes AREA-2, which precedes area-1.) Note that the target identifier NSAP could change following a reload if a new Level 1 area is added to the configuration after TARP is running.
- The router continues to process all Type 1 and 2 protocol data units (PDUs) that are for this router. Type 1 PDUs are processed locally if the specified target identifier is in the local target identifier cache. If not, they are "propagated" (routed) to all interfaces in the *same* Level 1 area. (The same area is defined as the area configured on the input interface.)
- Type 2 PDUs are processed locally if the specified target identifier is in the local target identifier cache. If not, they are propagated via all interfaces (all Level 1 or Level 2 areas) with TARP enabled. If the source of the PDU is from a different area, the information is also added to the local target identifier cache. Type 2 PDUs are propagated via all static adjacencies.
- Type 4 PDUs (for changes originated locally) are propagated to all Level 1 and Level 2 areas (because internally they are treated as "Level 1-2").
- Type 3 and 5 PDUs continue to be routed.
- Type 1 PDUs are propagated only via Level 1 static adjacencies if the static NSAP is in one of the Level 1 areas in this router.

After you enter the **router isis** command, you can enter the maximum number of paths. There can be from 1 to 32 paths.

Examples

The following example configures IS-IS for IP routing, with system ID 0000.0000.0002 and area ID 01.0001, and enables IS-IS to form adjacencies on Ethernet interface 0 and serial interface 0. The IP prefix assigned to Ethernet interface 0 will be advertised to other IS-IS routers.

```
router isis tag1
 net 01.0001.0000.0000.0002
 is-type level-1
!
interface ethernet 0
 ip address 10.1.1.1 255.255.255.0
 ip router isis
!
interface serial 0
 ip unnumbered ethernet0
 ip router isis
```

The following example starts IS-IS routing with the optional *area-tag* argument, where CISCO is the value for the *area-tag* argument:

```
router isis CISCO
```

The following example specifies IS-IS as an IP routing protocol for a process named Finance, and specifies that the Finance process will be routed on Ethernet interface 0 and serial interface 0:

```
router isis Finance
 net 49.0001.aaaa.aaaa.aaaa.00
interface Ethernet 0
 ip router isis Finance
interface serial 0
 ip router isis Finance
```

The following example shows usage of the **maximum-paths** option:

```
router isis
maximum-paths?
20
```

Related Commands

Command	Description
clns router isis	Enables IS-IS routing for ISO CLNS on an interface and attaches an area designator to the routing process.
ip router isis	Configures an IS-IS routing process for IP on an interface and attaches an area designator to the routing process.
net	Configures an IS-IS NET for the routing process.
redistribute (IP)	Redistribute routes from one routing domain into another routing domain.
route-map (IP)	Defines the conditions for redistributing routes from one routing protocol into another.

router odr

To configure an On-Demand Routing (ODR) process on a Cisco router, use the **router odr** command in global configuration mode. To disable the ODR process, use the **no** form of this command.

router odr

no router odr

Syntax Description

This command has no arguments or keywords

Defaults

No default behavior or values

Command Modes

Global configuration

Command History

Release	Modification
11.2	This command was introduced.

Usage Guidelines

The **router odr** command is used to configure a router as an ODR hub router to dynamically accept routes from stub peers. ODR provides IP routing with minimal configuration requirements. The overhead of dynamic routing protocol is avoided without incurring the configuration and management overhead of static routing.

The ODR process maintains a routing table, which is populated with information learned from ODR stub peers. Cisco Discovery Protocol (CDP) must be enabled on the hub router and stub peers. ODR timing values should be tuned based the number of peers and the speed of the links in your network. Route filtering should be applied consistently.

Examples

In the following example, an ODR process is enabled, a distribution list is configured to filter routes learned from ODR stub peers, and redistribution statement is configured under the Open Shortest Path First (OSPF) routing process:

```
Router(config)# access-list 101 permit ip host 10.0.0.1 192.168.1.0 0.0.0.255
Router(config)# access-list 101 permit ip 10.0.10.2 255.0.0.0 192.168.2.0 0.0.0.255
Router(config)# !
Router(config)# router odr
Router(config-router)# distribute-list 101 in
Router(config-router)# exit
Router(config-router)# router ospf 1
Router(config-router)# redistribute odr subnets
```

Related Commands

Command	Description
cdp timer	Specifies how often the Cisco IOS software sends CDP updates,
distance (IP)	Defines an administrative distance.
distribute-list in (IP)	Filters networks received in updates.
distribute-list out (IP)	Suppresses networks from being advertised in updates.
maximum-paths	Controls the maximum number of parallel routes an IP routing protocol can support.
timers basic (ODR)	Adjusts ODR network timers.

router ospf

To configure an Open Shortest Path First (OSPF) routing process, use the **router ospf** command in global configuration mode. To terminate an OSPF routing process, use the **no** form of this command.

router ospf *process-id* [**vrf** *vpn-name*]

no router ospf *process-id* [**vrf** *vpn-name*]

Syntax Description

process-id	Internally used identification parameter for an OSPF routing process. It is locally assigned and can be any positive integer. A unique value is assigned for each OSPF routing process.
vrf *vpn-name*	(Optional) Specifies the name of the VPN routing and forwarding (VRF) instance to associate with OSPF VRF processes.

Defaults

No OSPF routing process is defined.

Command Modes

Global configuration

Command History

Release	Modification
10.0	This command was introduced.
12.0(7)T	The **vrf** keyword and *vpn-name* arguments were added to identify a VPN.
12.0(9)ST	The **vrf** keyword and *vpn-name* arguments were added.

Usage Guidelines

You can specify multiple OSPF routing processes in each router.

After you enter the **router ospf** command, you can enter the maximum number of paths. There can be from 1 to 32 paths.

Examples

The following example configures an OSPF routing process and assign a process number of 109:

```
router ospf 109
```

This example shows a basic OSPF configuration using the **router ospf** command to configure OSPF VPN routing and forwarding (VRF) instance processes for the VRFs first, second, and third:

```
Router> enable
Router# configure terminal
Router(config)# router ospf 12 vrf first
Router(config)# router ospf 13 vrf second
Router(config)# router ospf 14 vrf third
Router(config)# exit
```

The following example shows usage of the **maximum-paths** option:

```
Router> enable
Router# configure terminal
Router(config)# router ospf
Router(config-router)# maximum-paths?
Router(config)# 20
Router(config)# exit
```

Related Commands

Command	Description
network area	Defines the interfaces on which OSPF runs and defines the area ID for those interfaces.

router rip

To configure the Routing Information Protocol (RIP) routing process, use the **router rip** command in global configuration mode. To turn off the RIP routing process, use the **no** form of this command.

router rip

no router rip

Syntax Description

This command has no arguments or keywords.

Defaults

No RIP routing process is defined.

Command Modes

Global configuration

Command History

Release	Modification
10.0	This command was introduced.

Examples

The following example shows how to begin the RIP routing process:

```
router rip
```

Related Commands

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

router-id

To use a fixed router ID, use the **router-id** command in router configuration mode. To force OSPF to use the previous OSPF router ID behavior, use the **no** form of this command.

router-id *ip-address*

no router-id *ip-address*

Syntax Description

ip-address	Router ID in IP address format.

Defaults

No OSPF routing process is defined.

Command Modes

Router configuration

Command History

Release	Modification
12.0(1)T	This command was introduced.

Usage Guidelines

You can configure an arbitrary value in the IP address format for each router. However, each router ID must be unique.

If this command is used on an OSPF router process which is already active (has neighbors), the new router-ID is used at the next reload or at a manual OSPF process restart. To manually restart the OSPF process, use the **clear ip ospf** command.

Examples

The following example specifies a fixed router-id:

```
router-id 10.1.1.1
```

Related Commands

Command	Description
clear ip ospf	Clears redistribution based on the OSPF routing process ID.
	Configures the OSPF routing process.