IP Routing Protocols Commands

This chapter describes the function and displays the syntax of each IP routing command. For more information about defaults and usage guidelines, see the corresponding chapter of the *Router Products Command Reference* publication.

[**no**] **aggregate-address** *address mask* [**as-set**] [**summary-only**] [**suppress-map** *map-name*] [**advertise-map** *map-name*] [**attribute-map** *map-name*]

To create an aggregate entry in a BGP routing table, use the **aggregate-address** router configuration command. To disable this feature, use the **no** form of this command.

address	Aggregate address.
mask	Aggregate mask.
as-set	(Optional) Generate autonomous system set path information.
summary-only	(Optional) Filters more specific routes from updates.
suppress-map *map-name*	(Optional) Name of route map used to select the routes to be suppressed.
advertise-map *map-name*	(Optional) Name of route map used to select the routes to create AS-SET origin communities.
attribute-map *map-name*	(Optional) Name of route map used to set the attribute of the aggregate route.

area *area-id* **authentication** [**message-digest**]
no area *area-id* **authentication**
no area *area-id*

To enable authentication for an OSPF area, use the **area authentication** router configuration command. To remove an area's authentication specification or a specified area from the router's configuration, use the **no** form of this command.

area-id	Identifier of the area for which authentication is to be enabled. The identifier can be specified as either a decimal value or an IP address.
message-digest	(Optional) Enables MD5 authentication on the area specified by *area-id*.

[**no**] **area** *area-id* **default-cost** *cost*

To specify a cost for the default summary route sent into a stub area, use the **area default-cost** router configuration command. To remove the assigned default route cost, use the **no** form of this command.

area-id	Identifier for the stub area. The identifier can be specified as either a decimal value or as an IP address.
cost	Cost for the default summary route used for a stub area. The acceptable value is a 24-bit number. The default cost is 1.

area-password *password*
no area-password [*password*]

To configure the IS-IS area authentication password, use the **area-password** r**o**uter configuration command. To disable the password, use the **no** form of this command.

password	Password you assign.

[**no**] **area** *area-id* **range** *address mask*

To consolidate and summarize routes at an area boundary, use the **area range** router configuration command. To disable this function, use the **no** form of this command.

area-id	Identifier of the area about which routes are to be summarized. It can be specified as either a decimal value or as an IP address.
address	IP address.
mask	IP mask.

area *area-id* **stub** [**no-summary**]
no area *area-id* **stub**

To define an area as a stub area, use the **area stub** router configuration command. To disable this function, use the **no** form of this command.

area-id	Identifier for the stub area. The identifier can be either a decimal value or an IP address.
no-summary	(Optional) Prevents an Area Border Router from sending summary link advertisements into the stub area.

[**no**] **area** *area-id* **virtual-link** *router-id* [**hello-interval** *seconds*] [**retransmit-interval** *seconds*] [**transmit-delay** *seconds*] [**dead-interval** *seconds*] [[**authentication-key** *key*] | [**message-digest-key** *keyid* **md5** *key*]]

To define an OSPF virtual link, use the **area virtual-link** router configuration command with the optional parameters. To remove a virtual link, use the **no** form of this command.

area-id	Area ID assigned to the transit area for the virtual link. This can be either a decimal value or a valid IP address. There is no default.

router-id	Router ID associated with the virtual link neighbor. The router ID appears in the **show ip ospf** display. It is internally derived by each router from the router's interface IP addresses. This value must be entered in the format of an IP address. There is no default.
hello-interval *seconds*	(Optional) Time in seconds between the Hello packets that the router sends on an interface. Unsigned integer value to be advertised in the router's hello packets. The value must be the same for all routers attached to a common network. The default is 10 seconds.
retransmit-interval *seconds*	(Optional) Time in seconds between link state advertisement retransmissions for adjacencies belonging to the interface. Expected round-trip delay between any two routers on the attached network. The value must be greater than the expected round-trip delay. The default is 5 seconds.
transmit-delay *seconds*	(Optional) Estimated time in seconds it takes to transmit a link state update packet on the interface. Integer value that must be greater than zero. Link state advertisements in the update packet have their age incremented by this amount before transmission. The default value is 1 second.
dead-interval *seconds*	(Optional) Time in seconds that a router's Hello packets are not seen before its neighbors declare the router down. Unsigned integer value. The default is four times the Hello interval. As with the Hello interval, this value must be the same for all routers attached to a common network.

authentication-key *key*	(Optional) Password to be used by neighboring routers. Any continuous string of characters that you can enter from the keyboard up to 8 bytes long. This string acts as a key that will allow the authentication procedure to generate or verify the authentication field in the OSPF header. This key is inserted directly into the OSPF header when originating routing protocol packets. A separate password can be assigned to each network on a per-interface basis. All neighboring routers on the same network must have the same password to be able to route OSPF traffic. The password is encrypted in the configuration file if the **service password-encryption** command is enabled. There is no default value.
message-digest-key *keyid* **md5** *key*	(Optional) Key identifier and password to be used by neighboring routers and this router for MD5 authentication. The *keyid* is a number in the range 1 through 255. The *key* is an alphanumeric string of up to 16 characters. All neighboring routers on the same network must have the same key identifier and key to be able to route OSPF traffic. There is no default value.

[**no**] **autonomous-system** *local-as*

To specify the local autonomous system that the router resides in for EGP, use the **autonomous-system** global configuration command. To remove the autonomous system number, use the **no** form of this command.

local-as	Local autonomous system number to which the router belongs.

[**no**] **auto-summary**

To restore the default behavior of automatic summarization of subnet routes into network-level routes, use the **auto-summary** router configuration command. To disable this feature, use the **no** form of this command.

[**no**] **bgp always-compare-med**

To allow the comparison of the Multi Exit Discriminator (MED) for paths from neighbors in different autonomous systems, use the **bgp always-compare-med** router configuration command. To disallow the comparison, use the **no** form of this command.

[[**no**] **bgp confederation identifier** *autonomous-system*

To specify a BGP confederation identifier, use the **bgp confederation identifier** router configuration command. To remove the confederation identifier, use the **no** form of this command.

autonomous-system	Autonomous system number that internally includes multiple autonomous systems.

[**no**] **bgp confederation peers** *autonomous-system* [*autonomous-system* ...]

To configure the autonomous systems that belong to the confederation, use the **bgp confederation peers** router configuration command. To remove an autonomous system from the confederation, use the **no** form of this command.

autonomous-system	Autonomous system number.

[**no**] **bgp default local-preference** *value*

To change the default local preference value, use the **bgp default local-preference** command. To return to the default setting, use the **no** form of this command.

value	Local preference value. Higher is more preferred. Integer from 0 through 4294967295.

[**no**] **bgp fast-external-fallover**

To immediately reset the BGP sessions of any directly adjacent external peers if the link used to reach them goes down, use the **bgp fast-external-fallover** router configuration command. To disable this feature, use the **no** form of this command.

clear arp-cache

To remove all dynamic entries from the ARP cache and to clear the fast-switching cache, use the **clear arp-cache** EXEC command.

clear ip bgp {***** | *address*}

To reset a BGP connection, use the **clear ip bgp** EXEC command at the system prompt.

*****	Resets all current BGP sessions.
address	Resets only the identified BGP neighbor.

clear ip bgp peer-group *tag*

To remove all of the members of a BGP peer group, use the **clear ip bgp peer-group** EXEC command.

tag	Name of the BGP peer group to clear.

clear ip dvmrp route {***** | *route*}

To delete routes from the DVMRP routing table, use the **clear ip dvmrp route** EXEC command.

*****	Clears all routes.
route	Clears the longest matched route. Can be an IP address or a network number.

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

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

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

clear ip igmp group [*group-name* | *group-address* | *type number*]

To delete entries from the IGMP cache, use the **clear ip igmp group** privileged EXEC command.

group-name	(Optional) Name of the multicast group, as defined in the DNS hosts table or with the **ip host** command.
group-address	(Optional) Address of the multicast group. This is a multicast IP address in four-part dotted notation.

type	(Optional) Interface type.
number	(Optional) Interface number.

clear ip mroute {***** | *group* [*source*]}

To delete entries from the IP multicast routing table, use the **clear ip mroute** EXEC command.

*****	Deletes all entries from the IP multicast routing table.
group	Can be either one of the following: • Name of the multicast group, as defined in the DNS hosts table or with the **ip host** command. • IP address of the multicast group. This is a multicast IP address in four-part dotted notation.
source	(Optional) If you specify a group name or address, you can also specify a name or address of a multicast source that is transmitting to the group. A source does not need to be a member of the group.

clear ip route {*network* [*mask*] | *****}

To delete entries from the IP routing table, use the **clear ip route** EXEC command.

network	Network or subnet address to remove.
mask	(Optional) Subnet mask to remove.
*****	Removes all routing table entries.

clear ip sd [*group-address* | **"***session-name***"**]

To delete a session directory cache entry, use the **clear ip sd** EXEC command.

group-address	(Optional) All sessions associated with the IP group address are deleted.
"*session-name***"**	(Optional) Only the session directory entry by this name is deleted. The session name is enclosed in quotation marks.

[**no**] **default-information allowed** {**in** | **out**} [**route-map** *map-tag*]

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

in	Allows IGRP or Enhanced IGRP exterior or default routes to be received by an IGRP or Enhanced IGRP process.
out	Allows IGRP or Enhanced IGRP exterior routes to be advertised in updates.
route-map *map-tag*	(Optional) Indicates that the route map should be interrogated to filter the importation of routes from this source routing protocol to the current routing protocol. The argument *map-tag* is the identifier of a configured route map. If you specify **route-map** without specifying *map-tag*, no routes are imported. If you omit **route-map**, all routes are redistributed.

[**no**] **default-information originate**

To allow the redistribution of network 0.0.0.0 into BGP, use the **default-information originate** router configuration command. To disable this feature, use the **no** form of this command.

[**no**] **default-information originate**

To explicitly configure EGP to generate a default route, use the **default-information originate** router configuration command. To disable this feature, use the **no** form of this command.

[**no**] **default-information originate** [**route-map** *map-name*]

To generate a default route into an IS-IS routing domain, use the **default-information originate** router configuration command. To disable this feature, use the **no** form of this command.

route-map *map-name*	(Optional) Routing process will generate the default route if the route map is satisfied.

[**no**] **default-information originate** [**always**] [**metric** *metric-value*] [**metric-type** *type-value*] {**level-1** | **level-1-2** | **level-2**} [**route-map** *map-name*]

To generate a default route into an OSPF routing domain, use the **default-information originate** router configuration command. To disable this feature, use the **no** form of this command.

originate	For OSPF, causes the router to generate a default external route into an OSPF domain if the router already has a default route and you want to propagate to other routers. For IS-IS, originates the default route whether or not it resides in the routing table.
always	(Optional) For OSPF, the default route always will be advertised whether or not the router has a default route.

metric *metric-value*	(Optional) Metric used for generating the default route. If a value is not specified for this option, and no value is specified using the **default-metric** router configuration command, the default metric value is 10. The value used is specific to the protocol.
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 router adopts a Type 2 external route. For IS-IS, it can be one of two values: **internal**—IS-IS metric which is < 63. **external**—IS-IS metric which is > 64 < 128. The default is **internal**.
level-1	For IS-IS only, Level 1 routes are redistributed into other IP routing protocols independently. It specifies if IS-IS advertises network 0.0.0.0 into the Level 1 area.
level-1-2	For IS-IS only, both Level 1 and Level 2 routes are redistributed into other IP routing protocols. It specifies if IS-IS advertises network 0.0.0.0 into both levels in a single command.
level-2	For IS-IS only, Level 2 routes are redistributed into other IP routing protocols independently. It specifies if IS-IS advertises network 0.0.0.0 into the Level 2 subdomain.
route-map *map-name*	(Optional) Routing process will generate the default route if the route-map is satisfied.

[**no**] **default-metric** *number*

To set default metric values for the BGP, EGP, OSPF, and RIP routing protocols, use this form of the **default-metric** router configuration command. To return to the default state, use the **no** form of this command.

number	Default metric value appropriate for the specified routing protocol

[**no**] **default-metric** *bandwidth delay reliability loading mtu*

To set metrics for IGRP or Enhanced IGRP, use this form of the **default-metric** router configuration command. To remove the metric value and return to the default state, use the **no** form of this command.

bandwidth	Minimum bandwidth of the route in kilobits per second. It can be 0 or any positive integer.
delay	Route delay in tens of microseconds. It can be 0 or any positive number that is a multiple of 39.1 nanoseconds.
reliability	Likelihood of successful packet transmission expressed as a number between 0 and 255. The value 255 means 100 percent reliability, and the value 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 0 or any positive integer.

[**no**] **distance** *weight* [*address mask* [*access-list-number*]] [**ip**]

To define an administrative distance, use the **distance** router configuration command. To remove a distance definition, use the **no** form of this command.

weight	Administrative distance. This can be an integer from 10 to 255. (The values 0 through 9 are reserved for internal use.) Used alone, the argument *weight* specifies a default administrative distance that the router uses when no other specification exists for a routing information source. Routes with a distance of 255 are not installed in the routing table.
address	(Optional) IP address in four-part dotted notation.
mask	(Optional) IP address mask in four-part dotted-decimal format. A bit set to 1 in the *mask* argument instructs the router to ignore the corresponding bit in the address value.
access-list-number	(Optional) Number of a standard IP access list to be applied to incoming routing updates.
ip	(Optional) IP-derived routes for IS-IS. It can be applied independently for IP routes and ISO CLNS routes.

distance bgp *external-distance internal-distance local-distance*
no distance bgp

To allow the use of external, internal, and local administrative distances that could be a better route to a node, use the **distance bgp** router configuration command. To return to the default values, use the **no** form of this command.

external-distance	Administrative distance for BGP external routes. External routes are routes for which the best path is learned from a neighbor external to the autonomous system. Acceptable values are from 1 to 255. The default is 20. Routes with a distance of 255 are not installed in the routing table.

internal-distance Administrative distance for BGP internal routes. Internal routes are those routes that are learned from another BGP entity within the same autonomous system. Acceptable values are from 1 to 255. The default is 200. A distance of 255 is the maximum possible distance, and any route with that distance will not be installed in the routing table.

local-distance Administrative distance for BGP local routes. Local routes are those networks listed with a **network** router configuration command, often as back doors, for that router or for networks that are being redistributed from another process. Acceptable values are from 1 to 255. The default is 200. A distance of 255 is the maximum possible distance, and any route with that distance will not be installed in the routing table.

distance eigrp *internal-distance external-distance*
no distance eigrp

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

internal-distance Administrative distance for IP Enhanced IGRP internal routes. Internal routes are those that are learned from another entity within the same autonomous system. It can be a value from 1 to 255.

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

[**no**] **distribute-list** *access-list-number* **in** [*interface-name*]

To filter networks received in updates, use the **distribute-list in** router configuration command. To change or cancel the filter, use the **no** form of this command.

access-list-number	Standard IP access list number. The list explicitly specifies which networks are to be received and which are to be suppressed.
in	Applies the access list to incoming routing updates.
interface-name	(Optional) Interface on which the access list should be applied to incoming updates. If no interface is specified, the access list will be applied to all incoming updates.

[**no**] **distribute-list** *access-list-number* **out** [*interface-name* | *routing-process* | *autonomous-system-number*]

To suppress networks from being advertised in updates, use the **distribute-list out** router configuration command. To cancel this function, use the **no** form of this command.

access-list-number	Standard IP access list number. The list explicitly specifies which networks are to be sent and which are to be suppressed in routing updates.
out	Applies the access list to outgoing routing updates.
interface-name	(Optional) Name of a particular interface.
routing-process	(Optional) Name of a particular routing process, or the keyword **static** or **connected**.
autonomous-system-number	(Optional) Autonomous system number.

[**no**] **domain-password** [*password*]

To configure the IS-IS routing domain authentication password, use the **domain-password** router configuration command. To disable a password, use the **no** form of this command.

password	Password you assign.

[**no**] **ip as-path access-list** *access-list-number* {**permit** | **deny**} *as-regular-expression*

To define a BGP-related access list, use the **ip as-path access-list** global configuration command. To disable use of the access list, use the **no** form of this command.

access-list-number	Integer from 1 to 199 that indicates the regular expression access list number.
permit	Permits access for matching conditions.
deny	Denies access to matching conditions.
as-regular-expression	Autonomous system in the access list using a regular expression. See the "Regular Expressions" appendix of the *Router Products Command Reference* publication for information about forming regular expressions.

ip community-list *community-list-number* {**permit** | **deny**} *community-number*
no ip community-list *community-list-number*

To create a community list for BGP and control access to it, use the **ip community-list** global configuration command. To delete the community list, use the **no** form of this command.

community-list-number	Integer 1 through 99 that identifies one or more permit or deny groups of communities.
permit	Permits access for a matching condition.
deny	Denies access for a matching condition.

community-number	Community number configured by a **set community** command. Valid value is one of the following: • 1 through 4294967200. You can specify a single number or multiple numbers separated by a space. • **internet**—The Internet community. • **no-export**—Do not advertise this route to an EBGP peer. • **no-advertise**—Do not advertise this route to any peer (internal or external).

[**no**] **ip default-network** *network-number*

To select a network as a candidate route for computing the gateway of last resort, use the **ip default-network** global configuration command. To remove a route, use the **no** form of this command.

network-number	Number of the network.

[**no**] **ip dvmrp accept-filter** *access-list-number* [*distance*]

To configure an acceptance filter for incoming DVMRP reports, use the **ip dvmrp accept-filter** interface configuration command. To disable this feature, use the **no** form of this command.

access-list-number	Number of a standard IP access list. This can be a number from 0 to 99. A value of 0 means that all sources are accepted with the configured distance.
distance	(Optional) Administrative distance to the destination.

ip dvmrp default-information {**originate** | **only**}
no ip dvmrp default-information {**originate** | **only**}

To advertise network 0.0.0.0 to DVMRP neighbors on an interface, use the **ip dvmrp default-information** interface configuration command. To prevent the advertisement, use the **no** form of this command.

originate	Other routes more specific than 0.0.0.0 can also be advertised.
only	No DVMRP routes other than 0.0.0.0 are advertised.

[**no**] **ip dvmrp metric** *metric* [**list** *access-list-number*] [*protocol process-id*]

To configure the metric associated with a set of destinations for DVMRP reports, use the **ip dvmrp metric** interface configuration command. To disable this function, use the **no** form of this command.

metric	Metric associated with a set of destinations for DVMRP reports. It can be a value from 0 to 32. A value of 0 means that the route is not advertised. A value of 32 is equivalent to infinity (unreachable).
list *access-list-number*	(Optional) Number of an access list. If you specify this argument, only the multicast destinations that match the access list are reported with the configured metric. Any destinations not advertised because of split horizon do not use the configured metric.
protocol	(Optional) Name of unicast routing protocol. It can be **bgp**, **egp**, **eigrp**, **igrp**, **isis**, **ospf**, **rip**, or **static**. (Note that these are the protocol names you can specify with a **router** *protocol* command.) If you specify these arguments, only routes learned by the specified routing protocol are advertised in DVMRP report messages.

process-id	(Optional) Process ID number of the unicast routing protocol.
dvmrp	(Optional) Allows routes from the DVMRP routing table to be advertised with the configured *metric* or filtered.

ip gdp [**priority** *number* | **reporttime** *seconds* | **holdtime** *seconds*]
no ip gdp

To enable GDP routing on an interface, use the **ip gdp** interface configuration command. To disable GDP routing, use the **no** form of this command.

priority *number*	(Optional) Alters the GDP priority; default is a priority of 100. A larger number indicates a higher priority. The default is 100.
reporttime *seconds*	(Optional) Alters the GDP reporting interval; the default is 5 seconds for broadcast media such as Ethernets, and never for nonbroadcast media such as X.25. The default is 5 for broadcast media; 0 for nonbroadcast media.
holdtime *seconds*	(Optional) Alters the GDP default hold time of 15 seconds. The default is 15 seconds.

[**no**] **ip hello-interval eigrp** *autonomous-system-number seconds*

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

autonomous-system-number	Autonomous system number.
seconds	Hello interval, in seconds.

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

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

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

[**no**] **ip igmp access-group** *access-list-number*

To control the multicast groups that hosts on the subnet serviced on an interface can join, use the **ip igmp access-group** interface configuration command. To disable groups on an interface, use the **no** form of this command.

access-list-number	Number of a standard IP access list. This can be a number from 1 to 99.

[**no**] **ip igmp join-group** *group-address*

To have the router join a multicast group, use the **ip igmp join-group** interface configuration command. To cancel membership in a multicast group, use the **no** form of this command.

group-address	Address of the multicast group. This is a multicast IP address in four-part dotted notation.

ip igmp query-interval *seconds*
no ip igmp query-interval

To configure the frequency at which the router sends IGMP host-query messages, use the **ip igmp query-interval** interface configuration command. To return to the default frequency, use the **no** form of this command.

seconds	Frequency, in seconds, at which to transmit IGMP host-query messages. The can be a number from 0 to 65535. The default is 60 seconds.

ip irdp [**multicast** | **holdtime** *seconds* | **maxadvertinterval** *seconds* | **minadvertinterval** *seconds* | **preference** *number* | **address** *address* [*number*]]
no ip irdp

To enable ICMP Router Discovery Protocol (IRDP) processing on an interface, use the **ip irdp** interface configuration command. To disable IRDP routing, use the **no** form of this command.

multicast	(Optional) Use the multicast address (224.0.0.1) instead of IP broadcasts.
holdtime *seconds*	(Optional) Length of time in seconds advertisements are held valid. The default is three times the **maxadvertinterval** value. Must be greater than **maxadvertinterval** and cannot be greater than 9000 seconds.
maxadvertinterval *seconds*	(Optional) Maximum interval in seconds between advertisements. The default is 600 seconds.
minadvertinterval *seconds*	(Optional) Minimum interval in seconds between advertisements. The default is 0.75 times the **maxadvertinterval**. If you change the **maxadvertinterval** value, this value defaults to three-quarters of the new value.

preference *number*	(Optional) Router's preference value. The allowed range is -2^{31} to 2^{31}. The default is 0. A higher value increases the router's preference level. You can modify a particular router so that it will be the preferred router to which others home. The default is 0.
address *address* [*number*]	(Optional) IP address (*address*) to proxy-advertise, and optionally, its preference value (*number*).

[**no**] **ip mroute** *source mask* [*protocol as-number*] {*rpf-address* | *type number*} [*distance*]

To configure a multicast static route (mroute), use the **ip mroute** global configuration command. To remove the route, use the **no** form of this command.

source	IP address of the multicast source.
mask	Mask on the IP address of the multicast source.
protocol	(Optional) Unicast routing procotol that you are using.
as-number	(Optional) Autonomous system number of the routing protocol you are using, if applicable.
rpf-address	Incoming interface for the mroute. If the Reverse Path Forwarding address *rpf-address* is a PIM neighbor, PIM Joins, Grafts, and Prunes are sent to it. The *rpf-address* can be a host IP address of a directly connected system or a network/subnet number. When it is a route, a recursive lookup is done from the unicast routing table to find a directly connected system. If *rpf-address* is not specified, the interface *type number* is used as the incoming interface.
type number	Interface type and number for the mroute.

distance	(Optional) Determines whether a unicast route, a DVMRP route, or a static mroute should be used for the RPF lookup. The lower distances have better preference. If the static mroute has the same distance as the other two RPF sources, the static mroute will take precedence. The default is 0.

[**no**] ip mroute-cache

To configure IP multicast fast switching, use the **ip mroute-cache** interface configuration command. To disable IP multicast fast switching, use the **no** form of this command.

[**no**] **ip multicast rate-limit** {**in** | **out**} [**group-list** *access-list*] [**source-list** *access-list*] *kbps*

To control the rate a sender from the source-list can send to a multicast group in the group-list, use the **ip multicast rate-limit** interface configuration command. To remove the control, use the **no** form of this command.

in	Only packets at the rate of *kbps* or slower are accepted on the interface.
out	Only a maximum of *kbps* will be transmitted on the interface.
group-list *access-list*	(Optional) Specifies the access list number that controls which multicast groups are subject to the rate limit.
source-list *access-list*	(Optional) Specifies the access list number that controls which senders are subject to the rate limit.
kbps	Kilobits per second transmission rate.

[**no**] **ip multicast-routing**

To enable IP multicast routing on the router, use the **ip multicast-routing** global configuration command. To disable IP multicast routing, use the **no** form of this command.

ip multicast ttl-threshold *ttl*
no ip multicast ttl-threshold [*ttl*]

To configure the time-to-live (TTL) threshold of packets being forwarded out an interface, use the **ip multicast ttl-threshold** interface configuration command. To return to the default TTL threshold, use the **no** form of this command.

ttl	Time-to-live value, in hops. It can be a value from 0 to 255. The default value is 0, which means that all multicast packets are forwarded out the interface.

ip ospf authentication-key *password*
no ip ospf authentication-key

To assign a password to be used by neighboring routers that are using OSPF's simple password authentication, use the **ip ospf authentication-key** interface configuration command. To remove a previously assigned OSPF password, use the **no** form of this command.

password	Any continuous string of characters, up to 8 bytes long, that can be entered from the keyboard.

ip ospf cost *cost*
no ip cost

To explicitly specify the cost of sending a packet on an interface, use the **ip ospf cost** interface configuration command. To reset the path cost to the default value, use the **no** form of this command.

cost	Unsigned integer value expressed as the link state metric. It can be a value in the range 1 to 65535.

ip ospf dead-interval *seconds*
no ip ospf dead-interval

To set how long a router's Hello packets must not have been seen before its neighbors declare the router down, use the **ip ospf dead-interval** interface configuration command. To return to the default time, use the **no** form of this command.

seconds	Unsigned integer that specifies the interval in seconds; the value must be the same for all nodes on the network. The default is four times the interval set by the **ip ospf hello-interval** command.

ip ospf hello-interval *seconds*
no ip ospf hello-interval

To specify the interval between Hello packets that the router sends on the interface, use the **ip ospf hello-interval** interface configuration command. To return to the default time, use the **no** form of this command.

seconds	Unsigned integer that specifies the interval in seconds. The value must be the same for all nodes on a specific network. The default is 10 seconds.

ip ospf message-digest-key *keyid* **md5** *key*
no ip ospf message-digest-key *keyid*

To enable OSPF MD5 authentication, use the **ip ospf message-digest-key** interface configuration command. To remove an old MD5 key, use the **no** form of this command.

keyid	An identifier in the range 1 through 255.
key	Alphanumeric password of up to 16 bytes.

[**no**] **ip ospf name-lookup**

To configure OSPF to look up Domain Name System (DNS) names for use in all OSPF **show** EXEC command displays, use the **ip ospf name-lookup** global configuration command. To disable this feature, use the **no** form of this command.

ip ospf network {**broadcast** | **non-broadcast** | **point-to-multipoint**}
no ip ospf network

To configure the OSPF network type to a type other than the default for a given media, use the **ip ospf network** interface configuration command. To return to the default value, use the **no** form of this command.

broadcast	Sets the network type to broadcast.
non-broadcast	Sets the network type to nonbroadcast.
point-to-multipoint	Sets the network type to point-to-multipoint.

ip ospf priority *number*
no ip ospf priority

To configure the OSPF network type to a type other than the default for a given media, use the **ip ospf network** interface configuration command. To return to the default value, use the **no** form of this command.

number	8-bit unsigned integer that specifies the priority. The range is from 0 to 255. The default is 1.

ip ospf retransmit-interval *seconds*
no ip ospf retransmit-interval

To specify the number of seconds between link state advertisement retransmissions for adjacencies belonging to the interface, use the **ip ospf retransmit-interval** interface configuration command. The **no** form of this command resets the link state advertisement retransmission interval to the default value.

seconds	Time in seconds between retransmissions. It must be greater than the expected round-trip delay between any two routers on the attached network. The range is 1 to 65535 seconds. The default is 5 seconds.

ip ospf transmit-delay *seconds*
no ip ospf transmit-delay

To set the estimated time it takes to transmit a link state update packet on the interface, use the **ip ospf transmit-delay** interface configuration command. To return to the default value, use the **no** form of this command.

seconds	Time in seconds that it takes to transmit a link state update. It can be an integer in the range is 1 to 65535 seconds. The default is 1 second.

[**no**] **ip pim** {**dense-mode** | **sparse-mode**}

To enable IP multicast routing on an interface, use the **ip pim** interface configuration command. To disable the PIM multicast routing protocol on the interface, use the **no** form of this command.

dense-mode	Enables dense mode of operation.
sparse-mode	Enables sparse mode of operation.

[**no**] **ip pim nbma-mode**

To configure a multiaccess WAN interface to be in nonbroadcast, multiaccess mode, use the **ip pim nbma-mode** interface configuration command. To disable this feature, use the **no** form of this command.

ip pim query-interval *seconds*
no ip pim query-interval [*seconds*]

To configure the frequency of PIM router-query messages, use the **ip pim query-interval** interface configuration command. To return to the default interval, use the **no** form of this command.

seconds	Interval, in seconds, at which periodic PIM router-query messages are sent. It can be a number from 1 to 65535. The default is 30 seconds.

[**no**] **ip pim rp-address** *ip-address* [*access-list-number*]

To configure the address of a PIM rendezvous point (RP), use the **ip pim rp-address** global configuration command. To remove an RP address, use the **no** form of this command.

ip-address	IP address of a router to be a PIM RP. This is a unicast IP address in four-part dotted notation.
access-list-number	(Optional) Number of an access list that defines which RPs are members of the group. This is a standard IP access list. The number can be from 1 to 100.

[**no**] **ip policy route-map** *map-tag*

To identify a route map to use for policy routing on an interface, use the **ip policy route-map** interface configuration command. To disable policy routing on the interface, use the **no** form of this command.

map-tag	Name of the route map to use for policy routing. Must match a *map-tag* specified by a **route-map** command.

ip route *network* [*mask*] {*address* | *interface*} [*distance*]
no ip route

To establish static routes, use the **ip route** global configuration command. To remove static routes, use the **no** form of this command.

network	IP address of the target network or subnet.
mask	(Optional) Network mask that lets you mask network and subnetwork bits.
address	IP address of the next hop that can be used to reach that network.
interface	Network interface to use.
distance	(Optional) An administrative distance.

[**no**] **ip router isis** [*tag*]

To configure an IS-IS routing process for IP on an interface, use the **ip router isis** interface configuration command. To disable IS-IS for IP, use the **no** form of this command.

tag	(Optional) Defines a meaningful name for a routing process. If not specified, a null tag is assumed. It must be unique among all IP router processes for a given router. Use the same text for the argument *tag* as specified in the **router isis** global configuration command.

[**no**] ip sd listen

To enable the router to listen to session directory advertisements, use the **ip sd listen** interface configuration command. To disable this feature, use the **no** form of this command.

[**no**] ip split-horizon

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.

[**no**] ip split-horizon eigrp *autonomous-system-number*

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

autonomous-system-number	Autonomous system number.

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

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

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

isis circuit-type {**level-1** | **level-1-2** | **level-2-only**}
no isis circuit-type

To configure the type of adjacency, use the **isis circuit-type** interface configuration command. To reset the circuit type to Level l and Level 2, use the **no** form of this command.

level-1	A Level 1 adjacency may be established if there is at least one area address in common between this system and its neighbors.
level-1-2	A Level 1 and 2 adjacency is established if the neighbor is also configured as **level-1-2** and there is at least one area in common. If there is no area in common, a Level 2 adjacency is established. This is the default.
level-2-only	A Level 2 adjacency is established if and only if the neighbor is configured exclusively to be a Level 2 router.

[**no**] **isis csnp-interval** *seconds* {**level-1** | **level-2**}

To configure the IS-IS complete sequence number PDUs (CSNP) interval, use the **isis csnp-interval** interface configuration command. To restore the default value, use the **no** form of this command.

seconds	Interval of time between transmission of CSNPs on multiaccess networks. This interval only applies for the designated router. The default is 10 seconds.
level-1	Configures the interval of time between transmission of CSNPs for Level 1 independently.
level-2	Configures the interval of time between transmission of CSNPs for Level 2 independently.

isis hello-interval *seconds* {**level-1** | **level-2**}
no isis hello-interval {**level-1** | **level-2**}

To specify the length of time between Hello packets that the router sends, use the **isis hello-interval** interface configuration command. To restore the default value, use the **no** form of this command.

seconds	Unsigned integer value. A value three times the hello interval *seconds* is advertised as the *holdtime* in the hello packets transmitted. It must be the same for all routers attached to a common network. With smaller hello intervals, topological changes are detected faster, but there is more routing traffic. The default is 10 seconds.
level-1	Configures the hello interval for Level 1 independently. Use this on X.25, SMDS, and Frame Relay multiaccess networks.
level-2	Configures the hello interval for Level 2 independently. Use this on X.25, SMDS, and Frame Relay multiaccess networks.

isis metric *default-metric* [*delay-metric* [*expense-metric* [*error-metric*]]] {**level-1** | **level-2**}
no isis metric {**level-1** | **level-2**}

To configure the metric for an interface, use the **isis metric** interface configuration command. To restore the default metric value, use the **no** form of this command.

default-metric	Metric used for the redistributed route. The default metric is used as a value for the IS-IS metric. This is the value assigned when there is no QOS routing performed. Only this metric is supported by Cisco routers. You can configure this metric for Level 1 and/or Level 2 routing. The range is from 0 to 63. The default value is 10.
delay-metric	Not supported.
expense-metric	Not supported.

error-metric	Not supported.
level-1	Router acts as a station router (Level 1) only.
level-2	Router acts as an area router (Level 2) only.

isis password *password* {**level-1** | **level-2**}
no isis password {**level-1** | **level-2**}

To configure the authentication password for an interface, use the **isis password** interface configuration command. To disable authentication for IS-IS, use the **no** form of this command.

password	Authentication password you assign for an interface.
level-1	Configures the authentication password for Level 1 independently. For Level 1 routing, the router acts as a station router only.
level-2	Configures the authentication password for Level 2 independently. For Level 2 routing, the router acts as an area router only.

isis priority *value* {**level-1** | **level-2**}
no isis priority {**level-1** | **level-2**}

To configure the priority of designated routers, use the **isis priority** interface configuration command. To reset the default priority, use the **no** form of this command.

value	Sets the priority of a router and is a number from 0 to 127. The default value is 64.
level-1	Sets the priority of a router for Level 1 independently.
level-2	Sets the priority of a router for Level 2 independently.

[**no**] **isis retransmit-interval** *seconds*

To configure the time between retransmission of IS-IS link-state PDU (LSP) retransmission for point-to-point links, use the **isis retransmit-interval** interface configuration command. To restore the default value, use the **no** form of this command.

seconds	Time in seconds between retransmission of IS-IS LSP retransmissions. It is an integer that should be greater than the expected round-trip delay between any two routers on the attached network. The default is 5 seconds.

[**no**] **is-type** {**level-1** | **level-1-2** | **level-2-only**}

To configure the IS-IS level at which the router operates, use the **is-type** router configuration command. To reset the default value, use the **no** form of this command.

level-1	Router acts as a station router.
level-1-2	Router acts as both a station router and an area router. This is the default.
level-2-only	Router acts as an area router only.

[**no**] **match as-path** *path-list-number*

To match a BGP autonomous system path access list, use the **match as-path** route-map configuration command. To remove a path list entry, use the **no** form of this command.

path-list-number	Autonomous system path access list. An integer from 1 through 199.

[**no**] **match community-list** *community-list-number* [**exact**]

To match a BGP community, use the **match community-list** route-map configuration command. To remove the community list entry, use the **no** form of this command.

community-list-number	Community list number in the range from 1 through 99.
exact	(Optional) Indicates an exact match is required. All of the communities and only those communities in the community list must be present.

[**no**] **match interface** *type number...type number*

To distribute any routes that have their next hop out one of the interfaces specified, use the **match interface** route-map configuration command. To remove the **match interface** entry, use the **no** form of this command.

type	Interface type.
number	Interface number.

[**no**] **match ip address** *access-list-number...access-list-number*

To distribute any routes that have a destination network number address that is permitted by a standard access list, or to perform policy routing on packets, use the **match ip address** route-map configuration command. To remove the **match ip address** entry, use the **no** form of this command.

access-list-number	Number of an access list. It can be an integer from 1 through 99. It can be an extended access listi for policy routing.

[**no**] **match ip next-hop** *access-list-number...access-list-number*

To redistribute any routes that have a next-hop router address passed by one of the access lists specified, use the **match ip next-hop** route-map configuration command. To remove the next-hop entry, use the **no** form of this command.

access-list-number	Number of an access list. It can be an integer from 1 through 99.

[**no**] **match ip route-source** *access-list-number...access-list-number*

To redistribute routes that have been advertised by routers at the address specified by the access lists, use the **match ip route-source** route-map configuration command. To remove the route-source entry, use the **no** form of this command.

access-list-number	Number of an access list. It can be an integer from 1 through 99.

[**no**] **match length** *min max*

To base policy routing on the Level 3 length of a packet, use the **match length** route-map configuration command. To remove the entry, use the **no** form of this command.

min	Minimum Level 3 length of the packet, inclusive, allowed for a match. Range is 0 through 0x7FFFFFF.
max	Maximum Level 3 length of the packet, inclusive, allowed for a match. Range is 0 through 0x7FFFFFF.

[**no**] **match metric** *metric-value*

To redistribute routes with the metric specified, use the **match metric** route-map configuration command. To remove the entry, use the **no** form of this command.

metric-value	Route metric. This may be an IGRP five-part metric. A metric value from 0 through 4294967295.

[**no**] **match route-type** {**local** | **internal** | **external** [**type-1** | **type-2**] | **level-1** | **level-2**}

To redistribute routes of the specified type, use the **match route-type** route-map configuration command. To remove the route-type entry, use the **no** form of this command.

local	Locally generated BGP routes.
internal	OSPF intra-area and interarea routes or Enhanced IGRP internal routes.
external [**type-1** | **type-2**]	OSPF external routes, or enhanced IGRP external routes. For OSPF, **external type-1** matches only type 1 external routes and **external type-2** matches only type 2 external routes.
level-1	IS-IS Level 1 routes.
level-2	IS-IS Level 2 routes.

[**no**] **match tag** *tag-value...tag-value*

To redistribute routes in the routing table that match the specified tags, use the **match tag** command. To remove the tag entry, use the **no** form of this command.

tag-value	List of one or more route tags. An integer from 0 through 4294967295.

mbranch {*group-address* | *group-name*} *branch-address* [*ttl*]

To trace a branch of a multicast tree for a specific group, use the **mbranch** privileged EXEC command.

group-address	Address of the multicast group. This is a multicast IP address in four-part dotted notation.
group-name	Name of the multicast group, as defined in the DNS hosts table or with the **ip host** command.
branch-address	Address of a router that is a member of the group. This is a unicast IP address in four-part dotted notation.
ttl	(Optional) Time-to-live value, in seconds, that is used in trace request packets sent to the branch router. The default value is 30 seconds.

[**no**] **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.

[**no**] **metric maximum-hops** *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.

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

metric weights *tos k1 k2 k3 k4 k5*
no metric weights

To allow the tuning of the IGRP or Enhanced IGRP metric calculations, use the **metric weights** router configuration command. To reset the values to their defaults, use the **no** form of this command.

tos	Type of service. Currently, it must always be zero.
k1–k5	Constants that convert an IGRP or Enhanced IGRP metric vector into a scalar quantity. The default values are as follows: *k1* = 0; k2 = 0; *k3* = 1; *k4* = 0; *k5* = 0.

mrbranch {*group-address* | *group-name*} *branch-address* [*ttl*]

To trace a branch of a multicast tree for a group in the reverse direction, use the **mrbranch** EXEC command.

group-address	Address of the multicast group. This is a multicast IP address in four-part dotted notation.
group-name	Name of the multicast group, as defined in the DNS hosts table or with the **ip host** command.
branch-address	Address of a router that is a member of the group. This is a unicast IP address in four-part dotted notation.
ttl	(Optional) Time-to-live value, in hops, that is used in trace request packets sent to the branch router. The default value is 30.

[**no**] **neighbor** *ip-address*

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.

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

[**no**] **neighbor** *ip-address* [**priority** *number*] [**poll-interval** *seconds*]

To configure OSPF routers interconnecting to nonbroadcast networks, use this form of the **neighbor** router configuration command. To remove a configuration, use the **no** form of this command.

ip-address	Interface IP address of the neighbor.
priority *number*	(Optional) 8-bit number indicating the router priority value of the nonbroadcast neighbor associated with the IP address specified. The default is 0.
poll-interval *seconds*	(Optional) Unsigned integer value reflecting the poll interval. RFC 1247 recommends that this value should be much larger than the hello interval. The default is 120 seconds.

[**no**] **neighbor** {*ip-address* | *peer-group-name*} **advertisement-interval** *seconds*

To set the minimum interval between the sending of BGP routing updates, use the **neighbor advertisement-interval** router configuration command. To remove an entry, use the **no** form of this command.

ip-address	Neighbor's IP address.
peer-group-name	Name of a BGP peer group.
seconds	Time in seconds. Integer from 0 through 600. The default is 30 for external peers and 5 for internal peers.

[**no**] **neighbor any** [*access-list-number*]

To control how neighbor entries are added to the routing table for both EGP and BGP, use the **neighbor any** router configuration command. To remove a configuration, use the **no** form of this command.

access-list-number	(Optional) Access list number the neighbor *must* be accepted by to be allowed to peer with the EGP or BGP process. If no list is specified, any neighbor will be allowed to peer with the router.

[**no**] **neighbor any third-party** *ip-address* [**internal** | **external**]

To configure an EGP process that determines which neighbors are treated as the next hop in EGP advertisements, use the **neighbor any third-party** router configuration command. To remove a configuration, use the **no** form of this command.

ip-address	IP address of the third-party router that is to be the next hop in EGP advertisements.
internal	(Optional) Indicates that the third-party router should be listed in the internal section of the EGP update.
external	(Optional) Indicates that the third-party router should be listed in the external section of the EGP update.

[**no**] **neighbor** *template-name* **configure-neighbors**

To have the router treat temporary neighbors that have been accepted by a template as if they had been configured manually, use the **neighbor configure-neighbors** router configuration command. To restore the default, use the **no** form of this command.

template-name	User-selectable designation that identifies a particular template. This can be an arbitrary word.

[**no**] **neighbor** {*ip-address* | *peer-group-name*} **default-originate** [**route-map** *map-name*]

To allow a BGP speaker (the local router) to send the default route 0.0.0.0 to a neighbor for use as a default route, use the **neighbor default-originate** router configuration command. To remove the default route, use the **no** form of this command.

ip-address	Neighbor's IP address.
peer-group-name	Name of a BGP peer group.
map-name	(Optional) Name of the route map. The route map allows route 0.0.0.0 to be injected conditionally.

[**no**] **neighbor** {*ip-address* | *peer-group-name*} **distribute-list** *access-list-number* {**in** | **out**}

To distribute BGP neighbor information as specified in an access list, use the **neighbor distribute-list** router configuration command. To remove an entry, use the **no** form of this command.

ip-address	Neighbor's IP address.
peer-group-name	Name of a BGP peer group.
access-list-number	Predefined access list number. Only standard access lists can be used with this command.
in	Access list is applied to incoming advertisements to that neighbor.
out	Access list is applied to outgoing advertisements from that neighbor.

neighbor {*ip-address* | *peer-group-name*} **ebgp-multihop**
no neighbor {*ip-address* | *peer-group-name*}

To accept and attempt BGP connections to external peers residing on networks that are not directly connected, use the **neighbor ebgp-multihop** router configuration command. To return to the default, use the **no** form of this command.

ip-address	IP address of the BGP-speaking neighbor.
peer-group-name	Name of a BGP peer group.

[**no**] **neighbor** {*ip-address* | *peer-group-name*} **filter-list** *access-list-number* {**in** | **out** | **weight** *weight*}

To set up a BGP filter, use the **neighbor filter-list** router configuration command. To disable this function, use the **no** form of this command.

ip-address	IP address of the neighbor.
peer-group-name	Name of a BGP peer group.
access-list-number	Number of an access for the autonomous system path. You define this access list with the **ip as-path access-list** command.
in	Access list to incoming routes.
out	Access list to outgoing routes.
weight *weight*	Assigns a relative importance to incoming routes matching autonomous system paths. Acceptable values are 0 to 65535.

neighbor *template-name* **neighbor-list** *access-list-number*
no neighbor *template-name* **neighbor-list**

To configure BGP to support anonymous neighbor peers by configuring a neighbor template, use the **neighbor neighbor-list** router configuration command. To delete a template, use the **no** form of this command.

template-name	User-selectable designation that identifies a particular template (an arbitrary word).
access-list-number	Number of an access list. It can be a number in the range 1 through 99.

[**no**] **neighbor** {*ip-address* | *peer-group-name*} **next-hop-self**

To disable next-hop processing of BGP updates on the router, use the **neighbor next-hop-self** router configuration command. To disable this feature, use the **no** form of this command.

ip-address	IP address of the BGP-speaking neighbor.
peer-group-name	Name of a BGP peer group.

neighbor {*ip-address* | *peer-group-name*} **password** *string*
no neighbor {*ip-address* | *peer-group-name*} **password**

To enable MD5 authentication on a TCP connection between two BGP peers, use the **neighbor password** router configuration command. To disable this feature, use the **no** form of this command.

ip-address	IP address of the BGP-speaking neighbor.
peer-group-name	Name of a BGP peer group.
string	Case-sensitive password of up to 80 characters. The first character cannot be a number. The string can contain any alphanumeric characters, including spaces. You cannot specify a password in the format *number-space-anything*. The space after the number causes problems.

[**no**] **neighbor** *peer-group-name* **peer-group**

To create a BGP peer group, use the **neighbor peer-group** router configuration command. To remove the peer group and all of its members, use the **no** form of this command.

peer-group-name	Name of the BGP peer group.

[**no**] **neighbor** *ip-address* **peer-group** *peer-group-name*

To configure a BGP neighbor to be a member of a peer group, use the neighbo**r peer-group** router configuration command. To remove the neighbor from the peer group, use the **no** form of this command.

ip-address	IP address of the BGP neighbor who belongs to the peer group specified by the *tag*.
peer-group-name	Name of the BGP peer group to which this neighbor belongs.

[**no**] **neighbor** {*ip-address* | *peer-group-name*} **remote-as** *number*

To add an entry to the BGP neighbor table, use the **neighbor remote-as** router configuration command. To remove an entry from the table, use the **no** form of this command.

ip-address	Neighbor's IP address.
peer-group-name	Name of a BGP peer group.
number	AS to which the neighbor belongs.

[**no**] **neighbor** {*ip-address* | *peer-group-name*} **route-map** *route-map-name* {**in** | **out**}

To apply a route map to incoming or outgoing routes, use the **neighbor route-map** router configuration command. To remove a route map, use the **no** form of this command.

ip-address	Neighbor's IP address.
peer-group-name	Name of a BGP peer group.
route-map-name	Name of route map.
in	Apply to incoming routes.
out	Apply to outgoing routes.

[**no**] **neighbor** {*ip-address* | *peer-group-name*} **send-community**

To specify that a COMMUNITIES attribute should be sent to a BGP neighbor, use the **neighbor send-community** router configuration command. To remove the entry, use the **no** form of this command.

ip-address	Neighbor's IP address.
peer-group-name	Name of a BGP peer group.

[**no**] **neighbor** *ip-address* **third-party** *third-party-ip-address* [**internal** | **external**]

To send updates regarding EGP third-party routers, use the **neighbor third-party** router configuration command. To disable these updates, use the **no** form of this command.

ip-address	IP address of the EGP peer.
third-party-ip-address	Address of the third-party router on the network shared by the Cisco router and the EGP peer specified by *ip-address*.
internal	(Optional) Indicates that the third-party router should be listed in the internal section of the EGP update. This is the default.

external	(Optional) Indicates that the third-party router should be listed in the external section of the EGP update.

[**no**] **neighbor** {*ip-address* | *peer-group-name*} **update-source** *interface*

To have the router allow internal BGP sessions to use any operational interface for TCP connections, use the **neighbor update-source** router configuration command. To restore the interface assignment to the closest interface, which is called the best local address, use the **no** form of this command.

ip-address	IP address of the BGP-speaking neighbor.
peer-group-name	Name of a BGP peer group.
interface	Loopback interface.

[**no**] **neighbor** {*ip-address* | *peer-group-name*} **version** *value*

To configure the router to accept only a particular BGP version, use the **neighbor version** router configuration command. To use the default version level of a neighbor, use the **no** form of this command.

ip-address	IP address of the BGP-speaking neighbor.
peer-group-name	Name of a BGP peer group.
value	BGP version number. The version can be set to 2 to force the router to only use Version 2 with the specified neighbor. The default is to use Version 4 and dynamically negotiate down to Version 2 if requested.

[**no**] **neighbor** {ip-*address* | *peer-group-name*} **weight** *weight*

To assign a weight to a neighbor connection, use the **neighbor weight** router configuration command. To remove a weight assignment, use the **no** form of this command.

ip-address	Neighbor's IP address.
ipeer-group-name	Name of a BGP peer group.
weight *weight*	Weight to assign. Acceptable values are 0 to 65535. Routes learned through another BGP peer have a default weight of 0 and routes sourced by the local router have a default weight of 32768.

[**no**] **net** *network-entity-title*

To configure a Network Entity Title (NET) for the routing process, use the **net** router configuration command. To remove a NET, use the **no** form of this command.

network-entity-title	NET that specifies the area address and the system ID for an IS-IS routing process. This argument can be either an address or a name.

[**no**] **network** *network-number* [**mask** *network-mask*]

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

network-number	IP address of a peer router with which routing information will be exchanged.
network-mask	(Optional) Network mask address.

[**no**] **network** *network-number*

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

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

[**no**] **network** *network-number*

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-number	IP address of the directly connected network.

network *network-number*

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

network-number	IP address of the network of directly connected networks.

[**no**] **network** *address wildcard-mask* **area** *area-id*

To define the interfaces on which OSPF runs and to define the area ID for those interfaces, use the **network area** router configuration command. To disable OSPF routing for interfaces defined with the *address wildcard-mask* pair, use the **no** form of this command.

address	IP address.
wildcard-mask	IP-address-type mask that includes “don’t care” bits.
area-id	Area that is to be associated with the OSPF address range. It can be specified as either a decimal value or as an IP address. If you intend to associate areas with IP subnets, you can specify a subnet address as the *area-id*.

[**no**] **network** *address* **backdoor**

To specify a backdoor route to a BGP border router that will provide better information about the network, use the **network backdoor** router configuration command. To remove an address from the list, use the **no** form of this command.

address	IP address of the network to which you want a backdoor route.

[**no**] **network** *address* **weight** *weight*

To assign an absolute weight to a BGP network, use the **network weight** command. To delete an entry, use the **no** form of the command.

address	IP address of the network.
weight *weight*	Absolute weight. Integer from 0 to 65535. By default, *weight* is unmodified and is zero unless it has been modified by other router configuration commands.

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

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

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.
access-list-number	(Optional) Access list to be applied. If unspecified, the argument supplied to *offset* is applied to all metrics. If *offset* is 0, no action is taken. For IGRP, the offset is added to the delay component only. Must be a standard access list.
type	(Optional) Interface type to which the offset-list is applied.
number	(Optional) Interface number to which the offset-list is applied.

[**no**] **ospf auto-cost-determination**

To control how OSPF calculates default metrics for the interface, use the **ospf auto-cost-determination** router configuration command. To disable this feature, use the **no** form of this command.

[**no**] **passive-interface** *type number*

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

type	Interface type.
number	Interface number.

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

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

protocol	Source protocol from which routes are being redistributed. It can be one of the following keywords: **bgp**, **egp**, **igrp**, **isis**, **ospf**, **static** [**ip**], **connected** and **rip**. The keyword **static** [**ip**] is used to redistribute IP static routes. The optional **ip** keyword is used when redistributing into IS-IS. The keyword **connected** refers to routes which are established automatically by virtue of having enabled IP on an interface. For routing protocols such as OSPF and IS-IS, these routes will be redistributed as external to the autonomous system.
process-id	(Optional) For **bgp**, **egp**, or **igrp**, this is an autonomous system number, which is a 16-bit decimal number. For **isis**, this is an optional *tag* 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 **ospf**, 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 **rip**, no *process-id* value is needed.

level-1	For IS-IS, Level 1 routes are redistributed into other IP routing protocols independently.
level-1-2	For IS-IS, both Level 1 and Level 2 routes are redistributed into other IP routing protocols.
level-2	For IS-IS, Level 2 routes are redistributed into other IP routing protocols independently.
metric *metric-value*	(Optional) Metric used for the redistributed route. If a value is not specified for this option, and no value is specified using the **default-metric** router configuration command, the default metric value is 0. Use a value consistent with the destination protocol.
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 router adopts a Type 2 external route. For IS-IS, it can be one of two values: **internal**—IS-IS metric which is < 63. **external**—IS-IS metric which is > 64 < 128. The default is **internal**.

match {**internal** | **external 1** | **external 2**}	(Optional) For OSPF, the criteria by which OSPF routes are redistributed into other routing domains. It an 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 the OSPF protocol itself. It may be used to communicate information between Autonomous System Boundary Routers. If none is specified, then the remote autonomous system number is used for routes from BGP and EGP; for other protocols, zero (0) is used.
route-map	(Optional) Route map 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.
weight *weight*	Network weight when redistributing into BGP. An integer between 0 and 65535.
subnets	(Optional) For redistributing routes into OSPF, the scope of redistribution for the specified protocol.

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

To define the conditions for redistributing routes from one routing protocol into another, use the **route-map** global configuration command and the route-map configuration commands **match** and **set**. To delete an entry, use the **no route-map** command.

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 **permit** 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 **permit** 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.
deny	(Optional) If the match criteria are met for the route map, and **deny** is specified, the route is not redistributed or 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, it reverts to the normal forwarding algorithm.
sequence-number	(Optional) Number that indicates the position a new route map is to have in the list of route maps already configured with the same name. If given with the **no** form of this command, it specifies the position of the route map that should be deleted.

[**no**] **router bgp** *autonomous-system*

To configure the Border Gateway Protocol (BGP) routing process, use the **router bgp** global configuration command. To remove a routing process, use the **no** form of this command.

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

[**no**] **router egp** *remote-as*

To configure the Exterior Gateway Protocol (EGP) routing process, use the **router egp** global configuration command. To turn off an EGP routing process, use the **no** form of this command.

remote-as	Autonomous system number the router expects its peers to be advertising in their EGP messages.

[**no**] **router egp 0**

To specify that a router should be considered a core gateway, use the **router egp 0** global configuration command. To disable this function, use the **no** form of this command.

[**no**] **router eigrp** *process-id*

To configure the IP Enhanced IGRP routing process, use the **router eigrp** global configuration command. To shut down a routing process, use the **no** form of this command.

process-id	Number of a process that identifies the routes to the other Enhanced IGRP routers. It is also used to tag the routing information. If you have an autonomous system number, you can use it for the process number.

[**no**] **router igrp** *process-id*

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.

process-id	Number of a process that identifies the routes to the other IGRP routers. It is also used to tag the routing information. If you have an autonomous system number, you can use it for the process number.

[**no**] **router isis** [*tag*]

To enable the IS-IS routing protocol and to specify an IS-IS process for IP, use the **router isis** global configuration command. To disable IS-IS routing, use the **no** form of this command.

tag	(Optional) 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 router processes for a given router.

[**no**] **router ospf** *process-id*

To configure an OSPF routing process, use the **router ospf** global configuration command. To terminate an OSPF routing process, use the **no** form of this command.

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.

[**no**] **router rip**

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

[**no**] **set as-path** {**tag** | **prepend** *as-path-string*}

To modify an autonomous system path for BGP routes, use the **set as-path** route map configuration command. To not modify the autonomous system path, use the **no** form of this command.

tag	Converts the tag of a route into an autonomous system path. Applies only when redistributing routes into BGP.
prepend *as-path-string*	Appends the string following the keyword **prepend** to the as-path of the route that is matched by the route map. Applies to inbound and outbound BGP route maps.

[**no**] **set automatic-tag**

To automatically compute the tag value, use the **set automatic-tag** route-map configuration command. To disable this function, use the **no** form of this command.

[**no**] **set community** *community-number* [**additive**]

To set the BGP COMMUNITIES attribute, use the **set community** route-map configuration command. To delete the entry, use the **no** form of this command.

community-number	Valid values are 1 through 4294967200, **internet**, **no-export**, or **no-advertise**.
additive	(Optional) Add the community to the already existing communities.

[**no**] **set default interface** *type number* [... *type number*]

To indicate where to output packets that pass a match clause of a route map for policy routing, use the **set default interface** route-map configuration command. To delete an entry, use the **no** form of this command.

type	Interface type, used with the interface number, to which packets are output.
number	Interface number, used with the interface type, to which packets are output.

set interface *type number* [... *type number*]

To indicate where to output packets that pass a match clause of route map for policy routing, use the **set interface** route-map configuration command. To delete an entry, use the **no** form of this command.

type	Interface type, used with the interface number, to which packets are output.
number	Interface number, used with the interface type, to which packets are output.

set ip default next-hop *ip-address* [... *ip-address*]

To indicate where to output packets that pass a match clause of a route map for policy routing, use the **set ip default next-hop** route-map configuration command. To delete an entry, use the **no** form of this command.

ip-address	IP address of the next hop to which packets are output. It need not be an adjacent router.

[**no**] **set ip next-hop** *ip-address* [*... ip-address*]

To indicate where to output packets that pass a match clause of a route map for policy routing, use the **set ip next-hop** route-map configuration command. To delete an entry, use the **no** form of this command.

ip-address	IP address of the next hop to which packets are output. It need not be an adjacent router.

[**no**] **set level** {**level-1** | **level-2** | **level-1-2** | **stub-area** | **backbone**}

To indicate where to import routes, use the **set level** route-map configuration command. To delete an entry, use the **no** form of this command.

level-1	Imports routes into a Level 1 area.
level-2	Imports routes into Level 2 subdomain. For IS-IS destinations, this is the default.
level-1-2	Imports routes into Level 1 and Level 2.
stub-area	Imports routes into OSPF NSSA area.
backbone	Imports routes into OSPF backbone area. For OSPF destinations, this is the default.

[**no**] **set local-preference** *value*

To specify a preference value for autonomous system path, use the **set local-preference** route-map configuration command. To delete an entry, use the **no** form of this command.

value	Preference value. An integer from 0 through 4294967295. The default is 100.

[**no**] **set metric** *metric-value*

To set the metric value for the destination routing protocol, use the **set metric** route-map configuration command. To return to the default metric value, use the **no** form of this command.

metric-value	Metric value or IGRP bandwidth in kilobits per second. An integer from 0 through 294967295.

[**no**] **set metric-type** {**internal** | **external** | **type-1** | **type-2**}

To set the metric type for the destination routing protocol, use the **set metric-type** route-map command. To return to the default, use the **no** form of this command.

internal	IS-IS internal metric.
external	IS-IS external metric.
type-1	OSPF external type 1 metric.
type-2	OSPF external type 2 metric.

[**no**] **set next-hop** *next-hop*

To specify the address of the next hop, use the **set next-hop** route-map configuration command. To delete an entry, use the **no** form of this command.

next-hop	IP address of the next hop router.

set origin {**igp** | **egp** *autonomous-system* | **incomplete**}

To set the BGP origin code, use the **set origin** route-map configuration command. To delete an entry, use the **no** form of this command.

igp	Remote EGP.
egp	Local IGP.
autonomous-system	Remote autonomous system. This is an integer from 0 through 65535.

incomplete	Unknown heritage.

[**no**] **set tag** *tag-value*

To set a tag value of the destination routing protocol, use the **set tag** route-map configuration command. To delete the entry, use the **no** form of this command.

tag-value	Name for the tag. Integer from 0 through 4294967295.

[**no**] **set weight** *weight*

To specify the BGP weight for the routing table, use the **set weight** route-map configuration command. To delete an entry, use the **no** form of this command.

weight	Weight value. From 0 through 65535.

show ip bgp [*network*] [*network-mask*] [**subnets**]

To display entries in the BGP routing table, use the **show ip bgp** EXEC command.

network	(Optional) Network number, entered to display a particular network in the BGP routing table.
network-mask	(Optional) Displays all BGP routes matching the address/mask pair.
subnets	(Optional) Displays route and more specific routes.

show ip bgp cidr-only

To display routes with non natural network masks, use the **show ip bgp cidr-only** privileged EXEC command.

show ip bgp community *community-number* [**exact**]

To display routes that belong to specified BGP communities, use the **show ip bgp community** EXEC command.

community-number	Valid value is community number in the range from 1 through 4294967200, **internet**, **no-export**, or **no-advertise**.
exact	(Optional) Displays only routes that have exactly the same specified communities.

show ip bgp community-list *community-list-number* [**exact**]

To display routes that are permitted by the BGP community list, use the **show ip bgp community-list** EXEC command.

community-list-number	Community list number in the range from 1 through 99.
exact	(Optional) Displays only routes that have an exact match.

show ip bgp filter-list *access-list-number*

To display routes that conform to a specified filter list, use the **show ip bgp filter-list** privileged EXEC command.

access-list-number	Number of an access list. It can be a number from 1 through 199.

show ip bgp inconsistent-as

To display routes with inconsistent originating autonomous systems, use the **show ip bgp inconsistent-as** privileged EXEC command.

show ip bgp neighbors [*address* [**routes** | **paths**]]

To display information about the TCP and BGP connections to individual neighbors, use the **show ip bgp neighbors** EXEC command.

address	(Optional) Address of the neighbor whose routes you have learned from.
routes	(Optional) If you specify an address, displays routes from the specified neighbor.
paths	(Optional) If you specify an address, displays autonomous system paths of the routes received from the specified neighbor.

show ip bgp paths

To display all the BGP paths in the database, use the **show ip bgp paths** EXEC command.

show ip bgp peer-group [*tag*] [**summary**]

To display information about BGP peer groups, use the **show ip bgp peer-group** EXEC command.

tag	(Optional) Displays information about that specific peer group.
summary	(Optional) Displays a summary of the status of all the members of a peer group.

show ip bgp regexp *regular-expression*

To display routes matching the regular expression, use the **show ip bgp regexp** privileged EXEC command.

regular-expression	Regular-expression to match the BGP autonomous system paths.

show ip bgp summary

To display the status of all BGP connections, use the **show ip bgp summary** EXEC command.

show ip dvmrp route [*ip-address*]

To display the contents of the DVMRP routing table, use the **show ip dvmrp route** EXEC command.

ip-address	(Optional) IP address of an entry in the DVMRP routing table.

show ip egp

To display statistics about EGP connections and neighbors, use the **show ip egp** EXEC command.

show ip eigrp neighbors [*type number*]

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

type	(Optional) Interface type.
number	(Optional) Interface number.

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

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

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

ip-address	(Optional) IP address. When specified with a mask, a detailed description of the entry is provided.
mask	(Optional) Subnet mask.

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

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

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

show ip igmp groups [*group-name* | *group-address* | *type number*]

To display the multicast groups that are directly connected to the router and that were learned via IGMP, use the **show ip igmp groups** EXEC command.

group-name	(Optional) Name of the multicast group, as defined in the DNS hosts table.
group-address	(Optional) Address of the multicast group. This is a multicast IP address in four-part dotted notation.
type	(Optional) Interface type.
number	(Optional) Interface number.

show ip igmp interface [*type number*]

To display multicast-related information about an interface, use the **show ip igmp interface** EXEC command.

type	(Optional) Interface type.
number	(Optional) Interface number.

show ip irdp

To display IRDP values, use the **show ip irdp** EXEC command.

show ip mcache [*group* [*source*]]

To display the contents of the IP fast switching cache, use the **show ip mcache** EXEC command.

group	(Optional) Displays the fast switching cache for the single group. The *group* argument can be either a Class D IP address or a DNS name.
source	(Optional) If *source* is also specified, displays a single multicast cache entry. The *source* argument can be either a unicast IP address or a DNS name.

show ip mroute [*group*] [*source*] [**summary**] [**count**]

To display the contents of the IP multicast routing table, use the **show ip mroute** EXEC command.

group	(Optional) IP address or name of the multicast group as defined in the DNS hosts table.
source	(Optional) IP address or name of a multicast source.
summary	(Optional) Displays a one-line, abbreviated summary of each entry in the IP multicast routing table.
count	(Optional) Displays statistics about the group and source, including number of packets, packets per second, average packet size, and bits per second.

show ip ospf [*process-id*]

To display general information about OSPF routing processes, use the **show ip ospf** EXEC command.

process-id (Optional) Process ID. If this argument is included, only information for the specified routing process is displayed.

show ip ospf border-routers

To display the internal OSPF routing table entries to an Area Border Router (ABR) and Autonomous System Boundary Router (ASBR), use the **show ip ospf border-routers** privileged EXEC command.

show ip ospf [*process-id area-id*] **database**
show ip ospf [*process-id area-id*] **database** [**router**] [*link-state-id*]
show ip ospf [*process-id area-id*] **database** [**network**] [*link-state-id*]
show ip ospf [*process-id area-id*] **database** [**summary**] [*link-state-id*]
show ip ospf [*process-id area-id*] **database** [**asbr-summary**] [*link-state-id*]
show ip ospf [*process-id*] **database** [**external**] [*link-state-id*]
show ip ospf [*process-id area-id*] **database** [**database-summary**]

Use the **show ip ospf database** EXEC command to display lists of information related to the OSPF database for a specific router. The various forms of this command deliver information about different OSPF link state advertisements.

process-id (Optional) Internally used identifier. It is locally assigned and can be any positive integer number. The number used here is the number assigned administratively when enabling the OSPF routing process.

area-id (Optional) Area number associated with the OSPF address range defined in the **network** router configuration command used to define the particular area.

link-state-id	(Optional) Portion of the IP environment that is being described by the advertisement. The value entered depends on the advertisement's LS type. It must be entered in the form of an IP address. When the link state advertisement is describing a network, the *link-state-id* can take one of two forms: —Network's IP address (as in type 3 summary link advertisements and autonomous system external link advertisements). —Derived address obtained from the link state ID. (Note that masking a network links advertisement's link state ID with the network's subnet mask yields the network's IP address.) When the link state advertisement is describing a router, the link state ID is always the described router's OSPF router ID. When an autonomous system external advertisement (LS Type of 5) is describing a default route, its link state ID is set to Default Destination (0.0.0.0).
router	(Optional) Displays information about router link states.
network	(Optional) Displays information about network link states.
summary	(Optional) Displays summary information about network link states.
asbr-summary	(Optional) Displays summary information about Autonomous System Boundary Router link states.
external	(Optional) Displays information about autonomous system external link states.
database-summary	(Optional) Displays database summary information and totals.

show ip ospf interface [*type number*]

To display OSPF-related interface information, use the **show ip ospf interface** EXEC command.

type	(Optional) Interface type.
number	(Optional) Interface number.

show ip ospf neighbor [*type number*] [*neighbor-id*] **detail**

To display OSPF-neighbor information on a per-interface basis, use the **show ip ospf neighbor** EXEC command.

type	(Optional) Interface type.
number	(Optional) Interface number.
neighbor-id	(Optional) Neighbor ID.
detail	Display all neighbors given in detail (list all neighbors).

show ip ospf virtual-links

To display parameters about and the current state of OSPF virtual links, use the **show ip ospf virtual-links** EXEC command.

show ip pim interface [*type number*]

To display information about interfaces configured for PIM, use the **show ip pim interface** EXEC command.

type	(Optional) Interface type.
number	(Optional) Interface number.

show ip pim neighbor [*type number*]

To list the PIM neighbors discovered by the router, use the **show ip pim neighbor** EXEC command.

type	(Optional) Interface type.
number	(Optional) Interface number.

show ip pim rp [*group-name* | *group-address*]

To display the rendezvous point (RP) routers associated with a sparse-mode multicast group, use the **show ip pim rp** EXEC command.

group-name	(Optional) Name of the multicast group, as defined in the DNS hosts table.
group-address	(Optional) Address of the multicast group. This is a multicast IP address in four-part dotted notation.

show ip protocols

To display the parameters and current state of the active routing protocol process, use the **show ip protocols** EXEC command.

show ip route [*address* [*mask*] [**longer-prefixes**]] | [*protocol* [*process-id*]]

Use the **show ip route** EXEC command to display the current state of the routing table.

address	(Optional) Address about which routing information should be displayed.
mask	(Optional) Argument for a subnet mask.
longer-prefixes	(Optional) The *address* and *mask* pair becomes a prefix and any routes that match that prefix are displayed.

protocol	(Optional) Name of a routing protocol; or the keyword **connected**, **static**, or **summary**. If you specify a routing protocol, use one of the following keywords: **bgp**, **egp**, **eigrp**, **hello**, **igrp**, **isis**, **ospf**, or **rip**.
process-id	(Optional) Number used to identify a process of the specified protocol.

show ip route summary

To display the current state of the routing table, use the **show ip route summary** EXEC command.

show ip route supernets-only

To display information about supernets, use the **show ip route supernets-only** privileged EXEC command.

show ip sd [*group* | **"***session-name***"** | **detail**]

To display the contents of the session directory cache, use the **show ip sd** EXEC command.

group	(Optional) Displays the session(s) defining the multicast group in detail format.
"*session-name***"**	(Optional) Displays the single session in detail format. Can be in uppercase or lowercase and still match. The session name is enclosed in quotation marks.
detail	(Optional) Displays all sessions in detail format.

show isis database [**level-1**] [**level-2**] [**l1**] [**l2**] [**detail**] [**lspid**]

To display the IS-IS link state database, use the **show isis database** EXEC command.

level-1	(Optional) Displays the IS-IS link state database for Level 1.
level-2	(Optional) Displays the IS-IS link state database for Level 2.
l1	(Optional) Abbreviation for the option **level-1**.
l2	(Optional) Abbreviation for the option **level-2**.
detail	(Optional) When specified, the contents of each LSP is displayed. Otherwise, a summary display is provided.
lspid	(Optional) Link-state protocol ID. When specified, the contents of a single LSP is displayed by its ID number.

show route-map [*map-name*]

To display configured route-maps, use the **show route-map** EXEC command.

map-name	(Optional) Name of a specific route-map.

[**no**] **summary-address** *address mask* {**level-1** | **level-1-2** | **level-2**}

Use the **summary-address** router configuration command to create aggregate addresses for IS-IS or OSPF. The **no summary-address** command restores the default.

address	Summary address designated for a range of addresses.
mask	IP subnet mask used for the summary route.
level-1	Only routes redistributed into Level 1 are summarized with the configured address/mask value. This keyword does not apply to OSPF.

level-1-2 The summary router is injected into both a Level 1 area and a Level 2 subdomain. This keyword does not apply to OSPF.

level-2 Routes learned by Level 1 routing will be summarized into the Level 2 backbone with the configured address/mask value. This keyword does not apply to OSPF.

[**no**] **synchronization**

To disable the synchronization between BGP and your IGP, use the **synchronization** router configuration command. To enable a router to advertise a network route without waiting for the IGP, use the **no** form of this command.

[**no**] **table-map** *route-map-name*

To modify metric and tag values when the IP routing table is updated with BGP learned routes, use the **table-map** router configuration command. To disable this function, use the **no** form of the command.

route-map-name Route map name, from **route-map** command.

timers basic *update invalid holddown flush* [*sleeptime*]
no timers basic

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

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 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) For IGRP only, 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.

timers bgp *keepalive holdtime*
no timers bgp

To adjust BGP network timers, use the **timers bgp** router configuration command. To reset the BGP timing defaults, use the **no** form of this command.

keepalive	Frequency, in seconds, with which the router sends *keepalive* messages to its peer. The default is 60 seconds.
holdtime	Interval, in seconds, after not receiving a *keepalive* message that the router declares a peer dead. The default is 180 seconds.

timers egp *hello polltime*
no timers egp

To adjust EGP Hello and polltime network timers, use the **timers egp** router configuration command. The **no timers egp** command resets the EGP timing defaults.

hello	Frequency, in seconds, with which the router sends hello messages to its peer. The default is 60 seconds.
polltime	Interval, in seconds, for how frequently to exchange updates. The default is 180 seconds.

[**no**] **timers spf** *spf-delay spf-holdtime*

To configure the delay time between when OSPF receives a topology change and when it starts a Shortest Path First (SPF) calculation, and the hold time between two consecutive SPF calculations, use the **timers spf** router configuration command. To return to the default timer values, use the **no** form of this command.

spf-delay	Delay time, in seconds, between when OSPF receives a topology change and when it starts a SPF. calculation. It can be an integer from 0 to 65535. The default time is 5 seconds. A value of 0 means that there is no delay; that is, the SPF calculation is started immediately.
spf-holdtime	Minimum time, in seconds, between two consecutive SPF calculations. It can be an integer from 0 to 65535. The default time is 10 seconds. A value of 0 means that there is no delay; that is, two consecutive SPF calculations can be done one immediately after the other.

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

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.

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

[**no**] **validate-update-source**

To have the router to validate the source IP address of incoming routing updates for RIP and IGRP routing protocols, use the **validate-update-source** router configuration command. To disable this function, use the **no** form of this command.

variance *multiplier*
no variance

To control load balancing in an IP Enhanced IGRP-based internetwork, use the **variance** router configuration command. To reset the variance to the default value, use the **no** form of this command.

multiplier	Metric value used for load balancing. It can be a value from 1 to 128. The default is 1, which means equal-cost load balancing.