A Commands

additional-paths

To configure the capability of sending and receiving additional paths to and from the BGP peers, use the **additional-paths** command. To disable this feature, use the **no** form of this command.

additional-paths {**receive** | **selection** **route-map** *map-name* | **send** | **install** **backup**}

Syntax Description		
receive	Enables the receive capability of additional paths for all of the neighbors under this address family for which the capability has not been disabled.
selection	Specifies the capability of selecting additional paths for a prefix.
route-map	Specifies the route map for the additional paths selection.
map-name	Route map name. The maximum size is 63 alphanumeric character.
send	Enables the send capability of additional paths for all of the neighbors under this address family for which the capability has not been disabled.
install **backup**	Enables BGP to install the backup path to the routing table.

Command Default   None

Command Modes

address-family configuration mode

Command History

Release	Modification
6.2(8)	Added the install backup keywords.
6.1(1)	This command was introduced.

Usage Guidelines   The **additional-paths install backup** command enables BGP to install the backup path to the routing table. This command is required to support the BGP PIC edge active-backup path scenario.

> **Note**   The **additional-paths install backup** command is supported only with IPv4 unicast address-families.

This command does not require a license.

Examples   This example shows how to enable the additional paths send and receive capability for all neighbors under the specified address family for which this capability has not been disabled:

```
switch# configure terminal
switch(config)# feature bgp
switch(config)# router bgp 64496
switch(config-router)# address-family ipv4 unicast
switch(config-router-af)# additional-paths send
switch(config-router-af)#
```

```
switch(config-router-af)# additional-paths receive
switch(config-router-af)#
```

This example shows how to configure the additional paths selection under the specified address family:

```
switch# configure terminal
switch(config-router)# address-family ipv4 unicast
switch(config-router-af)# additional-paths selection route-map PATH_SELECTION_RMAP
switch(config-router-af)# #
```

This example shows how to configure the backup path to the routing table:

```
switch# configure terminal
switch(config)# router bgp 100
switch(config-router)# address-family ipv4 unicast
switch(config-router-af)# additional-paths install backup
```

Related Commands

Command	Description
address family (BGP)	Enters the address family configuration mode for BGP.
show vrrp	Displays VRRP configuration information.

address (VRRP)

To add a single, primary IP address to a virtual router, use the **address** command. To remove an IP address from a virtual router, use the **no** form of this command.

address *ip-address* [**secondary**]
no address

Syntax Description

ip-address	Virtual router address (IPv4). This address should be in the same subnet as the interface IP address.
secondary	(Optional) Specifies a secondary virtual router address.

Command Default

None

Command Modes

VRRP configuration mode

Command History

Release	Modified
4.0(1)	This command was introduced.

Usage Guidelines

You can configure one virtual router IP address for a virtual router. If the configured IP address is the same as the interface IP address, this switch automatically owns the IP address. You can configure an IPv4 address only.

The master VRRP router drops the packets addressed to the virtual router's IP address because the virtual router is only intended as a next-hop router to forward packets. In NX-OS devices, some applications require that packets addressed to the virtual router's IP address be accepted and delivered. By using the **secondary** option to the virtual router IPv4 address, the VRRP router will accept these packets when it is the master.

This command does not require a license.

Examples

This example shows how to configure a virtual router IP address:

```
switch# configure terminal
switch(config)# interface ethernet 2/1
switch(config-if)# vrrp 250
switch(config-if-vrrp)# address 10.0.0.10
```

This example shows how to remove all the IP addresses (primary and secondary) using a single command:

```
switch# configure terminal
switch(config-if-vrrp)# show run interface ethernet 9/10
version 4.0(1)

interface Ethernet9/10
  vrrp 1
    address 10.10.10.10
    address 10.10.10.11 secondary
  ip address 10.10.10.1/24
  no shutdown
```

```
switch(config-if-vrrp)# no address
switch(config-if-vrrp)# show run int e9/10
version 4.0(1)

interface Ethernet9/10
  vrrp 1
  ip address 10.10.10.1/24
  no shutdown

switch(config-if-vrrp)#
```

Related Commands

Command	Description
show vrrp	Displays VRRP configuration information.
clear vrrp	Clears all the software counters for the specified virtual router.

address-family (BGP)

To enter the address family mode or a virtual routing and forwarding (VRF) address-family mode and configure submode commands for the Border Gateway Protocol (BGP), use the **address-family** command. To disable the address family submode for configuring routing protocols, use the **no** form of this command.

address-family {**ipv4** | **ipv6**} {**multicast** | **unicast**}
no **address-family** {**ipv4** | **ipv6**} {**multicast** | **unicast**}

Syntax Description

ipv4	Specifies the IPv4 address family.
ipv6	Specifies the IPv6 address family.
multicast	Specifies multicast address support.
unicast	Specifies unicast address support.

Command Default This command has no default settings.

Command Modes

Router configuration
Neighbor configuration
VRF configuration

Command History

Release	Modification
6.2(8)	Added support for IPv6 sessions.
4.0(1)	This command was introduced.

Usage Guidelines Use the **address-family** command to enter various address family configuration modes while configuring BGP routing. When you enter the **address-family** command from router configuration mode, you enable the address family and enter global address family configuration mode. The prompt changes to switch(config-router-af)#.

You must configure the address families if you are using route redistribution, address aggregation, load balancing, and other advanced features. IPv4 neighbor sessions support IPv4 unicast and multicast address families. IPv6 neighbor sessions support IPv6 unicast and multicast address families.

Note Beginning with Cisco NX-OS Release 6.2(8) you can configure the **address-family ipv4 unicast** command in an IPv6 session.

From the address family configuration mode, the following parameters are available:

Note This applies to IPv4 multicast or unicast and IPv6 multicast or unicast.

- **aggregate-address**—Configures BGP aggregate prefixes. See the **aggregate-address** command for additional information.
- **client-to-client reflection**—Enables client-to-client route reflection. Route reflection allows a BGP speaker (route reflector) to advertise IBGP learned routes to certain IBGP peers. Use the **no** form of this command to disable client-to-client route reflection. Default: Enabled.
- **dampening** [*half-life* | **route-map***name*] —Configures the route flap dampening. Optionally, you can set the time (in minutes) after which a penalty is decreased. Once the route has been assigned a penalty, the penalty is decreased by half after the half-life period (which is 15 minutes by default). The process of reducing the penalty happens every 5 seconds. The default half-life is 15 minutes. Range: 1 to 45. Default: Disabled.
- **default-metric** *metric*—Sets the default flap metric of redistributed routes. The **default-metric** command is used to set the metric value for routes redistributed into BGP with the **redistribute** command. A default metric can be configured to solve the problem of redistributing routes with incompatible metrics. Assigning the default metric will allow redistribution to occur. This value is the Multi Exit Discriminator (MED) that is evaluated by BGP during the best path selection process. The MED is a non-transitive value that is processed only within the local autonomous system and adjacent autonomous systems. The default metric is not set if the received route has a MED value. Range: 0 to 4294967295.

Note When enabled, the **default-metric** command applies a metric value of 0 to redistributed connected routes. The **default-metric** command does not override metric values that are applied with the **redistribute** command.

- **default-originate**—Originates a default toward this peer.
- **distance** *ebgp-route ibgp-route local-route*—Configures a rating of the trustworthiness of a routing information source, such as an individual router or a group of routers. BGP does not use discard routes for next-hop resolution. In general, the higher the value, the lower the trust rating. An administrative distance of 255 means the routing information source cannot be trusted at all and should be ignored. Use this command if another protocol is known to be able to provide a better route to a node than was actually learned via external BGP (eBGP), or if some internal routes should be preferred by BGP. Range: 1 to 255. Default: EBGP—20, IBGP—200.

Caution Changing the administrative distance of internal BGP routes is considered dangerous and is not recommended. Improper configuration can introduce routing table inconsistencies and break routing.

- **exit**—Exits from the current command mode.
- **maximum-paths** [**ibgp**] *parallel-paths*—Configures the number of parallel paths to forward packets. The **maximum-paths ibgp** command is used to configure equal-cost or unequal-cost multipath load sharing for iBGP peering sessions. In order for a route to be installed as a multipath in the BGP routing table, the route cannot have a next hop that is the same as another route that is already installed. The BGP routing process will still advertise a best path to iBGP peers when iBGP multipath load sharing is configured. For equal-cost routes, the path from the neighbor with the lowest router ID is advertised as the best path. To configure equal-cost multipath load sharing, all path attributes must be the same. The path attributes include weight, local preference, autonomous system path (entire attribute and not just the length), origin code, Multi Exit Discriminator (MED), and Interior Gateway Protocol (IGP) distance. The optional **ibgp** keyword allows you to configure multipath for the IBGP paths. To return to the default, use the **no** form of this command. The range is from 1 to 16.
- **network**—Configures an IP prefix to advertise. See the network command for more information.

- nexthop—Enables nexthop tracking. See the nexthop route-map and nexthop trigger-delay command for more information.
- **no**—Negates a command or sets its defaults.
- **redistribute**—Enables the redistribution of routes learned by other protocols into BGP. Redistribution is supported for both IPv4 and IPv6 routes. To disable the redistribution of routes learned by other protocols into BGP, use the **no** form of this command.

  - **direct route-map** *name*—Specifies directly connected routes.
  - **eigrp** *AS-num* **route-map** *name*—Specifies Enhanced Interior Gateway Protocol routes. Range: 1 to 65535.
  - **isis** *src-protocol* **route-map** *name*—Specifies ISO IS-IS routes.
  - **ospf** *src-protocol* **route-map** *name*—Specifies Open Shortest Path First (OSPF) routes.
  - **rip** *src-protocol* **route-map** *name*—Specifies Routing Information Protocol (RIP) routes.
  - **static route-map** *name*—Specifies static routes.

- **suppress-inactive**—Advertises only active routes to peer. See the **suppress-inactive** command for additional information.

Use the neighbor command to enter neighbor address family configuration mode while configuring BGP routing. From the BGP neighbor configuration mode, you can perform the following actions:

- **advertise-map**—Specifies route-map for conditional advertisement. See the advertise-map command.
- **allowas-in**—Accepts as-path with my AS present in it.
- **as-override**—Overrides matching AS-number while sending update.
- **default-originate** {**route-map**}— Originates a default toward this peer.
- **disable-peer-as-check**—Disables checking of peer AS-number while advertising.
- **filter-list**—Applies AS-PATH filter list.
- **inherit**— Inherits a template.
- **maximum-prefix**—Specifies maximum number of prefixes from this neighbor.
- **next-hop-self**—Sets our peering address as nexthop.
- **next-hop-third-party**—Computes a third-party nexthop if possible.
- **no**—Negates a command or set its defaults.
- **prefix-list**—Applies a prefix list.
- **route-map**—Applies a route map to neighbor. See the route map command for more information.
- **route-reflector-client**—Configures a neighbor as a Route reflector client.
- **send-community**—Sends community attribute to this neighbor.
- **soft-reconfiguration**—Soft reconfiguration.
- **soo**—Specify site-of-origin extcommunity.

This command requires the Enterprise Services license.

Examples

This example shows how to place the router in global address family configuration mode for the IPv4 unicast address family:

```
switch# configure terminal
switch(config)# feature bgp
switch(config)# router bgp 64496
switch(config-router)# address-family ipv4 unicast
switch(config-router-af)#
```

This example shows how to activate IPv4 multicast for neighbor 192.0.2.1 and place the device in neighbor address family configuration mode for the IPv4 multicast address family:

```
switch# configure terminal
switch(config)# feature bgp
switch(config)# router bgp 64496
switch(config-router)# address-family ipv4 multicast
switch(config-router-af)# exit
switch(config-router)# neighbor 192.0.2.1
switch(config-router-neighbor)# remote-as 64496
switch(config-router-neighbor)# address-family ipv4 multicast
switch(config-router-neighbor-af)
```

Related Commands

Command	Description
aggregate-address	Configures BGP summary addresses.
client-to-client	Configures route reflection.
dampening	Configures route flap dampening.
default-metric (BGP)	Configures the default metric for routes redistributed into BGP.
distance(BGP)	Configures the administrative distance.
feature bgp	Enables BGP configuration.
maximum-paths(BGP)	Configures the maximum number of equal-cost paths.
redistribute(BGP)	Configures route redistribution for BGP.
timers(BGP)	Configures the BGP timers.

address-family (EIGRP)

To configure an address family for the Enhanced Interior Gateway Routing Protocol (EIGRP), use the **address-family** command in router configuration mode.

address-family {**ipv4** | **ipv6**} **unicast**

Syntax Description

ipv4	Specifies the IPv4 address family.
ipv6	Specifies the IPv6 address family.
unicast	Specifies unicast address support.

Command Default None

Command Modes

Router configuration
Address family configuration

Command History

Release	Modification
4.0(1)	This command was introduced.
4.1(2)	The **ipv6**keyword was added.

Usage Guidelines This command requires the Enterprise license.

Examples This example shows how to set the IPv4 unicast address family for an EIGRP instance:

```
switch# configure terminal
switch(config)# router eigrp 201
switch(config-router)# address-family ipv4 unicast
```

Related Commands

Command	Description
default-information	Controls the distribution of a default route.
default-metric	Configures the default metric for routes redistributed into EIGRP.
distance	Configures the administrative distance.
maximum-paths	Configures the maximum number of equal-cost paths.
redistribute	Configures route redistribution for EIGRP.
router-id	Configures the router ID.
timers	Configures the EIGRP timers.

address-family (IS-IS)

To enter the address family mode or a virtual routing and forwarding (VRF) address-family mode and configure submode commands for the Intermediate System-to-Intermediate System Intradomain Routing Protocol (IS-IS), use the **address-family** command. To disable the address family submode for configuring routing protocols, use the **no** form of this command.

address-family {**ipv4** | **ipv6**} **unicast**
noaddress-family {**ipv4** | **ipv6**} **unicast**

Syntax Description

ipv4	Specifies the IPv4 address family.
ipv6	Specifies the IPv6 address family.
unicast	Specifies unicast address support.

Command Default

None

Command Modes

Router configuration
VRF configuration

Command History

Release	Modification
4.0(1)	This command was introduced.

Usage Guidelines

Use the **address-family** command to enter various address family configuration modes while configuring IS-IS routing. When you enter the **address-family** command from configuration mode, you enable the address family and enter global address family configuration mode. The prompt changes to switch(config-router-af)#.

You must configure the address families if you are using route redistribution, address aggregation, load balancing, and other advanced features. IPv4 neighbor sessions support IPv4 unicast address families.

IPv6 neighbor sessions support IPv6 unicast address familiesFrom the address family configuration mode, the following configuration modes are available:

- **adjacency-check**—Allows Intermediate System-to-Intermediate System (IS-IS)IPv6 or IPv4 protocol-support consistency checks to be performed on hello packets. To disable consistency checks on hello packets, use the **no** form of this command. Default: Enabled. IS-IS performs consistency checks on hello packets and will form an adjacency only with a neighboring router that supports the same set of protocols. A router running IS-IS for both IPv4 and IPv6 will not form an adjacency with a router running IS-IS for IPv4 only.

Use the **no adjacency-check** command in address-family configuration mode to suppress the consistency checks for IPv6 IS-IS and allow an IPv4 IS-IS router to form an adjacency with a router running IPv4 IS-IS and IPv6. IS-IS will never form an adjacency between a router running IPv4 IS-IS only and a router running IPv6 only.

Use the **no adjacency-check** configuration mode command to suppress the IPv4 subnet consistency check and allow IS-IS to form an adjacency with other routers regardless of whether or not they have an IPv4 subnet in common. By default, IS-IS makes checks in hello packets for IPv4 address subnet matching with a neighbor.

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Tip   Use the **debug isis adjacency packets** command in privileged EXEC mode to check for adjacency errors. Error messages in the output may indicate where routers are failing to establish adjacencies.

- **default-information originate** [**always**] [**route-map** *name*]—Controls the origination of a default route.

    - **always**—(Optional) Always advertises the default route.
    - **route-map** *name*—(Optional) Specifies the name of the route-map to announce the default routes.

- **distance** *value*—Specifies the administrative distance. To return to the default distance, use the **no** form of this command. An administrative distance of 255 means the routing information source cannot be trusted at all and should be ignored. Range: 1 to 255. Default: 115.
- **distribute** {**level-1** | **level-2**} **into** {**level-1** | **level-2**} {**all** | **route-map** *name*}—Configures domain-wide prefix distribution between levels.

    - **level-1**—Distributes the interarea routes into level-1 of this IS-IS instance.
    - **level-2**—Distributes the interarea routes into level-2 of this IS-IS instance.
    - **into**—Specifies from one level to another level.
    - **all**—Distributes all route levels.
    - **route-map** *name*—Prevents distribution of a specific route-map.

- **exit**—Exits from the current command mode.
- **no**—Negates a command or set its defaults.
- **redistribute** *protocol as-num.as-num*] [**route-map** *map-tag*]—Redistributes information from another routing protocol into IS-IS. To remove the **redistribute** command from the configuration file and return to the default setting, use the **no** form of this command. Default: Software does not redistribute routes. See the **redistribute (IS-IS)** command for information.
- **summary-address** {*ip-addr* | *ip-prefix*/*length* | *ipv6-addr* | *ipv6-prefix*/*length*} *level*—Creates the IS-IS aggregate addresses. To remove the aggregate address, use the **no** form of this command. See the **summary-address** command for information.

This command requires the Enterprise Services license.

Examples

This example shows how to place the router in address family configuration mode and specify unicast address prefixes for the IPv4 address family:

```
switch# configure terminal
switch(config)# router isis 100
switch(config-router)# address-family ipv4 unicast
switch(config-router-af)#
```

This example shows how to redistribute directly connected routes into IS-IS. This example advertises only 10.1.0.0 into the IS-IS level-1 link-state PDU.

```
switch# configure terminal
switch(config)# router isis 100
switch(config-router)# address-family ipv4 unicast
switch(config-router-af)# redistribute direct route-map core1
switch(config-router-af)# summary-address 10.1.0.0 255.255.0.0
```

This example shows how to introduce IPv6 into an existing IPv4 IS-IS network. To ensure that the checking of hello packet checks from adjacent neighbors is disabled until all the neighbor routers are configured to use IPv6, enter the **no adjacency-check** command.

```
switch# configure terminal
switch(config)# router isis test2
switch(config-router)# address-family ipv6 unicast
switch(config-router-af)# no adjacency-check
```

Related Commands

Command	Description
feature isis	Enables IS-IS on the router.
router isis	Enables IS-IS.

address-family (OSPFv3)

To enter address family mode for the Open Shortest Path First version 3(OSPFv3) protocol, use the **address-family**command.

address-family ipv6 unicast

Syntax Description

ipv6	Specifies the IPv6 address family.
unicast	Specifies unicast address support.

Command Default

This command has no default settings.

Command Modes

Router configuration

Command History

Release	Modification
4.0(1)	This command was introduced.

Usage Guidelines

This command requires the Enterprise Services license.

Examples

This example shows how to enter the IPv6 unicast address family for an OSPFv3v3 instance:

```
switch# configure terminal
switch(config)# router ospfv3v3 Enterprise
switch(config-router)# address-family ipv6 unicast
switch(config-router-af)#
```

Related Commands

Command	Description
default-information (OSPFv3)	Controls the distribution of a default route.
default-metric (OSPFv3)	Configures the default metric for routes redistributed into OSPFv3.
distance (OSPFv3)	Configures the administrative distance.
maximum-paths (OSPFv3)	Configures the maximum number of equal-cost paths.
redistribute (OSPFv3)	Configures route redistribution for OSPFv3.
timers (OSPFv3)	Configures the OSPFv3 timers.

address-family (RIP)

To configure an address family for the Routing Information Protocol (RIP), use the **address-family** command in router configuration mode.

address-family {{**ipv4** | **ipv6**} | **ipv6**} **unicast**

Syntax Description

ipv4	Specifies the IPv4 address family.
ipv6	Specifies the IPv6 address family.
unicast	Specifies unicast address support.

Command Default

This command has no default settings.

Command Modes

Router configuration

Command History

Release	Modification
6.1(1)	Added IPv6 keyword to the syntax description.
4.0(1)	This command was introduced.

Usage Guidelines

This command does not require a license.

Examples

This example shows how to set the IPv4 unicast address family for a RIP instance:

```
switch# configure terminal
switch(config)# router rip Enterprise
switch(config-router-af)# address-family ipv4 unicast
```

This example shows how to set the IPv6 unicast address family for a RIP instance:

```
switch# configure terminal
switch(config)# router rip Enterprise
switch(config-router)# address-family ipv6 unicast
switch(config-router-af)#
```

Related Commands

Command	Description
default-information	Controls the distribution of a default route.
default-metric	Configures the default metric for routes redistributed into RIP.
distance	Configures the administrative distance.
maximum-paths	Configures the maximum number of equal-cost paths.
redistribute	Configures route redistribution for RIP.

Command	Description
timers	Configures the RIP timers.

address-family ipv6 (IS-IS)

To enter address family configuration mode for configuring Intermediate System-to-Intermediate System (IS-IS) routing sessions that use standard IPv6 address prefixes, use the **address-family ipv6** command. To disable the address family submode for configuring routing protocols, use the **no** form of this command.

address-family ipv6 unicast
no address-family ipv6 unicast

Syntax Description

unicast	Specifies IPv6 unicast address prefixes.

Command Default

None.

Command Modes

Router configuration

Command History

Release	Modification
6.2(2)	This command was introduced.

Usage Guidelines

Use the **address-family ipv6** command to enter various address family configuration modes while configuring IS-IS routing. You must enter the **address-family ipv6** command from router isis configuration mode. The prompt changes to switch(config-router-af)#:

```
switch# configure terminal
switch(config)# router isis 100
switch(config-router)# address-family ipv6
switch(config-router-af)#
```

You must configure the address families if you are using route redistribution, address aggregation, load balancing, and other advanced features.

From the address family configuration mode, the following configuration modes are available:

- **adjacency-check**—Allows protocol-support consistency checks to be performed on hello packets. Default: Enabled. IS-IS performs consistency checks on hello packets and will form an adjacency only with a neighboring router that supports the same set of protocols.

Use the **no adjacency-check** command in in address-family configuration mode to suppress the consistency checks for IPv6 IS-IS and allow an IPv4 IS-IS router to form an adjacency with a router running IPv4 IS-IS and IPv6. IS-IS will never form an adjacency between a router running IPv4 IS-IS only and a router running IPv6 only.

Tip Use the **debug isis adjacency packets** command in privileged EXEC mode to check for adjacency errors. Error messages in the output may indicate where routers are failing to establish adjacencies.

- **default-information originate** [**always**] [**route-map** *name*]—Controls the origination of a default route.

  - **always**—(Optional) Always advertises the default route.
  - **route-map** *name*—(Optional) Specifies the name of the route-map to announce the default routes.

- **distance** *value*—Specifies the administrative distance. To return to the default distance, use the **no** form of this command. An administrative distance of 255 means the routing information source cannot be trusted at all and should be ignored. Range: 1 to 255. Default: 115.
- **distribute** {**level-1** | **level-2**} **into** {**level-1** | **level-2**} {**all** | **route-map** *name*}—Configures domain-wide prefix distribution between levels.

  - **level-1**—Distributes the interarea routes into level-1 of this IS-IS instance.
  - **level-2**—Distributes the interarea routes into level-2 of this IS-IS instance.
  - **into**—Specifies from one level to another level.
  - **all**—Distributes all route levels.
  - **route-map** *name*—Prevents distribution of a specific route-map.

- **exit**—Exits from the current command mode.
- **maximum-paths**—Controls the maximum number of parallel routes that an IP routing protocol can support.
- **multi-topology** [**transition**]—Enables multitopology for IPv6.

  - **transition**—(Optional) Enables multitopology transition mode.

- **no**—Negates a command or set its defaults.
- **redistribute** *protocol as-num.as-num*] [**route-map** *map-tag*]—Redistributes information from another routing protocol into IS-IS. To remove the **redistribute** command from the configuration file and return to the default setting, use the **no** form of this command. Default: Software does not redistribute routes. See the **redistribute (IS-IS)** command for information.
- **set-attached-bit**—Sets the attached (ATT) bit for this IS-IS instance.
- **summary-address** {*ip-addr* | *ip-prefix/length* | *ipv6-addr* | *ipv6-prefix/length*} *level*—Creates the IS-IS aggregate addresses. To remove the aggregate address, use the **no** form of this command. See the **summary-address** command for information.

This command requires the Enterprise Services license.

Examples

This example shows how to place the router in address family configuration mode and specify unicast address prefixes for the IPv6 address family:

```
switch# configure terminal
switch(config)# router isis 100
switch(config-router)# address-family ipv6 unicast
switch(config-router-af)#
```

This example shows how to ensure that the checking of hello packet checks from adjacent neighbors is disabled until all the neighbor routers are configured to use IPv6:

```
switch# configure terminal
switch(config)# router isis test2
switch(config-router)# address-family ipv6 unicast
switch(config-router-af)# no adjacency-check
```

Related Commands

Command	Description
address-family (IS-IS)	Enters the address family configuration mode for IS-IS.
feature isis	Enables IS-IS on the router.
router isis	Enables IS-IS.

adjacency-check

To enable strict adjacency mode for the IPv4 and IPv6 address, use the **adjacency-check** command. To disable this feature, use the **no** form of this command.

adjacency-check
no   adjacency-check

Syntax Description   This command has no arguments or keywords.

Command Default   None.

Command Modes

address-family configuration mode

Command History

Release	Modification
6.1(1)	This command was introduced.

Usage Guidelines   This command does not require a license.

Examples   This example shows how to configure the adjacency's protocol support consistency check:

```
switch# configure terminal
switch(config)# router isis Enterprise
switch(config-router)# address-family ipv4 unicast
switch(config-router-af)# adjacency-check
```

Related Commands

Command	Description
feature isis	Enables IS-IS.

advertise-map

To configure Border Gateway Protocol (BGP) conditional advertisement, use the **advertise-map** command. To remove BGP conditional advertisement, use the **no** form of this command.

advertise-map *adv-map* {**exist-map** *exist-rmap* | **non-exist-map** *nonexist-rmap*}

Syntax Description

adv-map	Route map with match statements that the route must pass before BGP passes the route to the next route map. The *adv-map* is a case-sensitive, alphanumeric string up to 63 characters.
exist-map *exist-rmap*	Specifies a route map with match statements for a prefix list. A prefix in the BGP table must match a prefix in the prefix list before BGP will advertise the route. The *exist-rmap* is a case-sensitive, alphanumeric string up to 63 characters.
non-exist-map *nonexist-rmap*	Specifies a route map with match statements for a prefix list. A prefix in the BGP table must not match a prefix in the prefix list before BGP will advertise the route. The *nonexist-rmap* is a case-sensitive, alphanumeric string up to 63 characters.

Command Default   None

Command Modes

BGP neighbor address-family command mode

Command History

Release	Modification
4.2(1)	This command was introduced.

Usage Guidelines   Use the **advertise-map** command to conditionally advertise selected routes. The routes or prefixes that BGP conditionally advertises are defined in two route maps, the *adv-map* and an *exist-map* or *nonexist-map*. The *exist-map* or *nonexist-map* specifies the prefix that the BGP tracks. The *adv-map* specifies the prefix that BGP advertises to the specified neighbor when the condition is met.

This command requires the Enterprise Services license.

Examples   This example shows how to configure BGP conditional advertisement:

```
switch# configure terminal
switch(config)# router bgp 65536
switch(config-router)# neighbor 192.0.2.2 remote-as 65537
switch(config-router-neighbor)# address-family ipv4 unicast
switch(config-router-neighbor-af)# advertise-map advertise exist-map exist
switch(config-router-neighbor-af)# exit
switch(config-router-neighbor)# exit
switch(config-router)# exit
switch(config)# route-map advertise
switch(config-route-map)# match as-path pathList
switch(config-route-map)# exit
switch(config)# route-map exit
switch(config-route-map)# match ip address prefix-list plist
switch(config-route-map)# exit
switch(config)# ip prefix-list plist permit 209.165.201.0/27
```

advertise-map

Related Commands

Command	Description
feature bgp	Enables BGP.

advertisement-interval (VRRP)

To specify the time interval between the advertisement packets that are being sent to other Virtual Router Redundancy Protocol (VRRP) routers in the same group, use the **advertisement-interval** command. To return to the default interval value of 1 second, use the **no** form of this command.

advertisement-interval *seconds*
no advertisement-interval

Syntax Description

seconds	Number of seconds between advertisement frames being sent. For IPv4, the range is from 1 to 255 seconds.

Command Default

1 second

Command Modes

VRRP configuration

Command History

Release	Modified
4.0(1)	This command was introduced.

Usage Guidelines

VRRP advertisements communicate the priority and state of the virtual router master. The advertisements are encapsulated in IP packets and are sent to the IPv4 multicast address that is assigned to the VRRP group.

VRRP uses a dedicated Internet Assigned Numbers Authority (IANA) standard multicast address (224.0.0.18) for VRRP advertisements. This addressing scheme minimizes the number of routers that must service the multicasts and allows test equipment to accurately identify VRRP packets on a segment. The IANA-assigned VRRP IP protocol number is 112.

This command does not require a license.

Examples

This example shows how to specify an advertisement interval of 200 seconds for VRRP group 250:

```
switch# configure terminal
switch(config)# interface ethernet 2/1
switch(config-if)# vrrp 250
switch(config-if-vrrp)# advertisement-interval 200
```

Related Commands

Command	Description
show vrrp	Displays VRRP configuration information.
clear vrrp	Clears all the software counters for the specified virtual router.

aggregate-address

To create a summary address in a Border Gateway Protocol (BGP) routing table, use the **aggregate-address**command. To remove the summary address, use the **no** form of this command.

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

Syntax Description

address / *length*	Aggregate IP address and mask length. Valid values for *length* are as follows: • IPv4 addresses—1 to 32 • IPv6 addresses—1 to 128
advertise-map *map-name*	(Optional) Specifies the name of the route map used to select attribute information from specific routes.
as-set	(Optional) Generates the autonomous system set path information and community information from the contributing paths.
attribute-map *map-name*	(Optional) Specifies the name of the route map used to set the attribute information for specific routes. The map-name is an alphanumeric string up to 63 characters.
summary-only	(Optional) Filters all more-specific routes from updates.
suppress-map *map-name*	(Optional) Specifies the name of the route map used to conditionally filter more specific routes. The map-name is an alphanumeric string up to 63 characters.

Command Default

The atomic aggregate attribute is set automatically when an aggregate route is created with this command unless the **as-set** keyword is specified.

Command Modes

Address-family configuration
Neighbor address-family configuration
Router BGP configuration

Command History

Release	Modification
4.0(1)	This command was introduced.

Usage Guidelines

You can implement aggregate routing in BGP and mBGP either by redistributing an aggregate route into BGP or mBGP, or by using the conditional aggregate routing feature.

Using the **aggregate-address** command with no keywords will create an aggregate entry in the BGP or mBGP routing table if any more-specific BGP or mBGP routes are available that fall within the specified range. (A longer prefix which matches the aggregate must exist in the RIB.) The aggregate route will be advertised as coming from your autonomous system and will have the atomic aggregate attribute set to show that information might be missing. (By default, the atomic aggregate attribute is set unless you specify the **as-set** keyword.)

Using the **as-set** keyword creates an aggregate entry using the same rules that the command follows without this keyword, but the path advertised for this route will be an AS_SET consisting of all elements contained in all paths that are being summarized. Do not use this form of the **aggregate-address** command when aggregating many paths, because this route must be continually withdrawn and updated as autonomous system path reachability information for the summarized routes changes.

Using the **summary-only** keyword not only creates the aggregate route (for example, 192.*.*.*) but also suppresses advertisements of more-specific routes to all neighbors. If you want to suppress only advertisements to certain neighbors, you may use the **neighbor distribute-list** command, with caution. If a more-specific route leaks out, all BGP or mBGP routers will prefer that route over the less-specific aggregate you are generating (using longest-match routing).

Using the **suppress-map** keyword creates the aggregate route but suppresses advertisement of specified routes. You can use the match clauses of route maps to selectively suppress some more-specific routes of the aggregate and leave others unsuppressed. IP access lists and autonomous system path access lists match clauses are supported.

Using the **advertise-map** keyword selects specific routes that will be used to build different components of the aggregate route, such as AS_SET or community. This form of the **aggregate-address** command is useful when the components of an aggregate are in separate autonomous systems and you want to create an aggregate with AS_SET, and advertise it back to some of the same autonomous systems. You must remember to omit the specific autonomous system numbers from the AS_SET to prevent the aggregate from being dropped by the BGP loop detection mechanism at the receiving router. IP access lists and autonomous system path access lists match clauses are supported.

Using the **attribute-map** keyword allows attributes of the aggregate route to be changed. This form of the **aggregate-address** command is useful when one of the routes forming the AS_SET is configured with an attribute such as the community no-export attribute, which would prevent the aggregate route from being exported. An attribute map route map can be created to change the aggregate attributes.

This command requires the Enterprise Services license.

AS-Set Example

In This example, an aggregate BGP address is created in router configuration mode. The path advertised for this route will be an AS_SET consisting of all elements contained in all paths that are being summarized.

```
switch# configure terminal
switch(config)# router bgp 64496
switch(config-router)# aggregate-address 10.0.0.0 255.0.0.0 as-set
```

Summary-Only Example

In This example, an aggregate BGP address is created in address family configuration mode and applied to the multicast database (SAFI) under the IP Version 4 address family. Because the **summary-only** keyword is configured, more-specific routes are filtered from updates.

```
switch# configure terminal
switch(config)# router bgp 64496
switch(config-router)# address-family ipv4 multicast
switch(config-router-af)# aggregate-address 10.0.0.0 255.0.0.0 summary-only
```

Conditional Aggregation Example

In This example, a route map called MAP-ONE is created to match on an as-path access list. The path advertised for this route will be an AS_SET consisting of elements contained in paths that are matched in the route map.

```
switch# configure terminal
switch(config)# ip as-path access-list 1 deny ^1234_
switch(config)# ip as-path access-list 1 permit .*
switch(config)# !

switch(config)# route-map MAP-ONE
switch(config-route-map)# match ip as-path 1
switch(config-route-map)# exit

switch(config)# router bgp 64496
switch(config-router)# address-family ipv4
switch(config-router-af)# aggregate-address 10.0.0.0 255.0.0.0 as-set advertise-map MAP-ONE

switch(config-router-af)# end
```

Related Commands

Command	Description
route-map	Creates a route map.

area authentication (OSPF)

To enable authentication for an Open Shortest Path First (OSPF) area, use the **area authentication** command. To remove authentication for an area, use the **no** form of this command.

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

Syntax Description		
	area-id	Identifier for the OSPF area where you want to enable authentication. Specify as either a positive integer value or an IP address.
	message-digest	(Optional) Enables Message Digest 5 (MD5) authentication on the area specified by the *area-id* argument.

Command Default   No authentication

Command Modes

Router configuration

Command History

Release	Modification
4.0(1)	This command was introduced.

Usage Guidelines   Use the **area authentication** command to configure the authentication mode for the entire OSPF area.

The authentication type and authentication password must be the same for all OSPF devices in an area. Use the **ip ospf authentication-key** command in interface configuration mode to specify this password.

If you enable MD5 authentication with the **message-digest** keyword, you must configure a password with the **ip ospf message-digest-key** command in interface configuration mode.

This command requires the Enterprise Services license.

Examples   This example shows how to configure authentication for area 0 of OSPF routing process 201:

```
switch# configure terminal
switch(config)# router ospf 201
switch(config-router)# area 0 authentication message-digest
switch(config-router)# interface ethernet 1/1
switch(config-if)# ip ospf area 0
switch(config)-if# ip ospf message-digest-key 10 md5 0 adcdefgh
```

Related Commands

Command	Description
ip ospf authentication-key	Assigns a password for simple password authentication for OSPF.
ip ospf message-digest-key	Assigns a password for OSPF MD5 authentication.

area authentication ipsec

To enable authentication of OSPFv3 packets on a per-interface basis at the Area level, use the **area authentication ipsec** command. To disable the authentication of OSPFv3 packets at the area level, use the **no** form of this command.

area *area-num* **authentication ipsec spi** *spi auth* [{**0** | **3** | **7**}] *key*
no authentication ipsec spi *spi*

Syntax Description

area-num	Area of the interfaces which need authentication.
spi	Specifies the Security Policy Index.
spi	Value of **spi**. It ranges from 256 to 4294967295.
auth	Authentication algorithm. Its value can be md1 / sha1 / null.
key	Authentication password.
0	Specifies that the authentication password is unencrypted.
3	Specifies that the authentication password is 3DES encrypted.
7	Specifies that the authentication password is Cisco type 7 encrypted.

Command Default   The OSPFv3 packets are not authenticated by default.

Command Modes

Router configuration (config-router).

Command History

Release	Modification
7.3(0)D1(1)	This command was introduced.

Usage Guidelines   Before running this command, ensure that you have enabled the authentication package with the **feature imp** command.

Examples   The following example shows how to authenticate OSPFv3 packets for all interfaces under area 0:

```
switch# configure terminal
switch(config)# feature imp
switch(config)# router ospfv3 1
switch(config-router)# area 0 authentication ipsec spi 301 md5 1234
```

Related Commands

Command	Description
authentication ipsec	Enables authentication of the OSPFv3 packets for all interfaces under the router.
ospfv3 authentication ipsec	Enables authentication of the OSPFv3 packets per interface.

area default-cost (OSPF)

To specify a cost for the default summary route sent into an Open Shortest Path First (OSPF) stub or not-so-stubby area (NSSA), use the **area default-cost**command. To remove the assigned default route cost, use the **no** form of this command.

area *area-id* **default-cost** *cost*
no **area** *area-id* **default-cost** *cost*

Syntax Description	*area-id*	Identifier for the OSPF area where you want to configure the default cost. Specify as either a positive integer value or an IP address.
	cost	Cost for the default summary route used for a stub or NSSA. The range is from 0 to 16777215.

Command Default

The summary route cost is based on the area border router that generated the summary route.

Command Modes

Router configuration

Command History

Release	Modification
4.0(1)	This command was introduced.

Usage Guidelines

Use the **area default-cost** command on an Area Border Router (ABR) attached to a stub or NSSA to configure the metric for the summary default route generated by the ABR into the stub area.

This command requires the Enterprise Services license.

Examples

This example shows how to set a default cost of 20 to stub network 192.0.2.0:

```
switch# configure terminal
switch(config)# router ospf 201
switch(config-router)# area 192.0.2.0 stub
switch(config-router)# area 192.0.2.0 default-cost 20
```

Related Commands

Command	Description
area stub	Defines an area as a stub area.

area default-cost (OSPFv3)

To specify a cost for the default summary route sent into an Open Shortest Path First version 3(OSPFv3) stub or not-so-stubby area (NSSA), use the **area default-cost**command. To remove the assigned default route cost, use the **no** form of this command.

area *area-id* **default-cost** *cost*
no area *area-id* **default-cost** *cost*

Syntax Description

area-id	Identifier for the OSPFv3 area where you want to configure the default cost. Specify as either an IP address or a number from 0 to 4294967295.
cost	Cost for the default summary route used for a stub or NSSA. The range is from 0 to 16777215.

Command Default

The summary route cost is based on the area border router that generated the summary route.

Command Modes

Address-family configuration

Command History

Release	Modification
4.0(1)	This command was introduced.

Usage Guidelines

Use the **area default-cost** command on an Area Border Router (ABR) attached to a stub or NSSA to configure the metric for the summary default route generated by the ABR into the stub area.

This command requires the Enterprise Services license.

Examples

This example shows how to set a default cost of 20 to stub network 33:

```
switch# configure terminal
switch(config)# router ospfv3 201
switch(config-router)# area 33 stub
switch(config-router)# address-family ipv6 unicast
switch(config-router-af)# area 33 default-cost 20
```

Related Commands

Command	Description
area stub	Defines an area as a stub area.

area filter-list (OSPF)

To filter prefixes advertised in type 3 link-state advertisements (LSAs) between Open Shortest Path First (OSPF) areas of an Area Border Router (ABR), use the **area filter-list** command. To change or cancel the filter, use the **no** form of this command.

area *area-id* **filter-list route-map** *map-name* {**in** | **out**}
no area *area-id* **filter-list route-map** *map-name* {**in** | **out**}

Syntax Description

area-id	Identifier for the OSPF area where you want to configure filtering. Specify as either a positive integer value or an IP address.
route-map *map-name*	Specifies the name of a route map used as the filter policy. The *map-name* argument can be any alphanumeric string of up to 63 characters.
in	Filters networks sent to this area.
out	Filters networks sent from this area.

Command Default

None

Command Modes

Router configuration

Command History

Release	Modification
4.0(1)	This command was introduced.

Usage Guidelines

Use the **area filter-list** command to filter Type 3 LSAs. If you apply the route map with the **in** keyword, the route map filters all Type 3 LSAs originated by the ABR to this area, including Type 3 LSAs that originated as a result of the area range command in another area.

If you apply the route map with the **out** keyword, the route map filters all Type 3 LSAs that are advertised by the ABR to all other areas including Type 3 LSAs that originate locally as a result of the **area range** command configured in this area.

Cisco NX-OS implicitly denies any prefix that does not match an entry in the route map.

This command requires the Enterprise Services license.

Examples

This example shows how to filter prefixes that are sent from all other areas to area 1:

```
switch# configure terminal
switch(config)# router ospf 202
switch(config-router)# area 1 filter-list route-map FilterExternal in
```

Related Commands

Command	Description
area range	Consolidates and summarizes routes at an area boundary.

Command	Description
route-map	Defines the conditions for redistributing routes from one routing protocol into another or to enable policy routing.

area filter-list (OSPFv3)

To filter prefixes advertised in type 3 link-state advertisements (LSAs) between Open Shortest Path First version 3 (OSPFv3) areas of an Area Border Router (ABR), use the **area filter-list** command. To change or cancel the filter, use the **no** form of this command.

area *area-id* **filter-list** **route-map** *map-name* {**in** | **out**}
no **area** *area-id* **filter-list** **route-map** *map-name* {**in** | **out**}

Syntax Description

area-id	Identifier for the OSPFv3 area where you want to configure filtering. Specify as either an IP address or a number from 0 to 4294967295.
route-map *map-name*	Specifies the name of a route map used as the filter policy. The *map-name* argument can be any alphanumeric string up to 63 characters.
in	Filters networks sent to this area.
out	Filters networks sent from this area.

Command Default   None

Command Modes

Address-family configuration

Command History

Release	Modification
4.0(1)	This command was introduced.

Usage Guidelines   Use the **area filter-list** command to filter Type 3 LSAs. If you apply the route map with the **in** keyword, the route map filters all Type 3 LSAs originated by the ABR to this area, including Type 3 LSAs that originated as a result of the area range command in another area.

If you apply the route map with the **out** keyword, the route map filters all Type 3 LSAs that are advertised by the ABR to all other areas including Type 3 LSAs that originate locally as a result of the area range command configured in this area.

Cisco NX-OS implicitly denies any prefix that does not match an entry in the route map.

This command requires the Enterprise Services license.

Examples   This example shows how to filter prefixes that are sent from all other areas to area 1:

```
switch# configure terminal
switch(config)# router ospfv3 201
switch(config-router)# address-family ipv6 unicast
switch(config-router-af)# area 1 filter-list route-map FilterExternal in
```

Related Commands

Command	Description
area range (OSPFv3)	Consolidates and summarizes routes at an area boundary.

Command	Description
route-map	Defines the conditions for redistributing routes from one routing protocol into another or to enable policy routing.

area nssa (OSPF)

To configure an area as an Open Shortest Path First (OSPF) not-so-stubby area (NSSA), use the **area nssa**command. To remove the NSSA area, use the **no** form of this command.

area *area-id* **nssa** [**default-information-originate** [**route-map** *map-name*]] [**no-redistribution**] [**no-summary**] [**translate type7** [{**always** | **never**}] [**suppress-fa**]]
no area *area-id* **nssa** [**default-information-originate** [**route-map** *map-name*]] [**no-redistribution**] [**no-summary**] [**translate type7** [{**always** | **never**}] [**suppress-fa**]]

Syntax Description

area-id	Identifier for the OSPF NSSA area. Specify as either a positive integer value or an IP address.
default-information-originate	(Optional) Generates a Type 7 default into the NSSA area. This keyword takes effect only on NSSA ABR or NSSA ASBR.
route-map *map-name*	(Optional) Filters the Type 7 default generation based on the route map. The *map-name* argument can be any alphanumeric string up to 63 characters.
no-redistribution	(Optional) Blocks redistributed LSAs from entering this NSSA area. Use this keyword when the router is both an NSSA autonomous system border router (ASBR) and an NSSA area border router (ABR) and you want the **redistribute** command to import routes into the normal areas but not into the NSSA area.
no-summary	(Optional) Allows an area to be an NSSA area but not have summary routes injected into it.
translate type7	(Optional) Translates Type 7 LSAs to type 5 LSAs.
always	(Optional) Always translates LSAs.
never	(Optional) Never translates LSAs.
suppress-fa	(Optional) Suppresses the forwarding address in translated LSAs. The ABR uses 0.0.0.0 as the forwarding IPv4 address.

Command Default

None

Command Modes

Router configuration

Command History

Release	Modification
4.0(1)	This command was introduced.

Usage Guidelines

Use the **area nssa** command to create an NSSA area in an OSPF autonomous system. We recommend that you understand the network topology before configuring forwarding address suppression for translated LSAs. Suboptimal routing might result because there might be better paths to reach the destination's forwarding address.

This command requires the Enterprise Services license.

Examples

This example shows how to configure area 1 as an NSSA area:

```
switch# configure terminal
switch(config)# router ospf 10
switch(config-router)# area 1 nssa
```

This example shows how to configure area 1 as an NSSA area and translate Type 7 LSAs from area 1 to Type 5 LSAs, but not place the Type 7 forwarding address into the Type 5 LSAs. (OSPF places 0.0.0.0 as the forwarding address in the Type 5 LSAs.)

```
switch# configure terminal
switch(config)# router ospf 2
switch(config-router)# area 1 nssa translate type7 suppress-fa
```

Related Commands

Command	Description
redistribute	Redistributes routes learned from one routing protocol to another routing protocol domain.

area nssa (OSPFv3)

To configure an area as an Open Shortest Path First version 3 (osPFv3) not-so-stubby area (NSSA), use the **area nssa** command. To remove the NSSA area, use the **no** form of this command.

area *area-id* **nssa** [**default-information-originate** [**route-map** *map-name*]] [**no-redistribution**]
[**no-summary**] [**translate type7** [{**always** | **never**}] [**suppress-fa**]]
no area *area-id* **nssa** [**default-information-originate** [**route-map** *map-name*]] [**no-redistribution**]
[**no-summary**] [**translate type7** [{**always** | **never**}] [**suppress-fa**]]

Syntax Description

area-id	Identifier for the OSPFv3 NSSA area. Specify as either an IP address or a number from 0 to 4294967295.
default-information-originate	(Optional) Generates a Type 7 default into the NSSA area. This keyword takes effect only on NSSA ABR or NSSA ASBR.
route-map *map-name*	(Optional) Filters the Type 7 default generation based on the route map. The *map-name* argument can be any alphanumeric string up to 63 characters.
no-redistribution	(Optional) Blocks redistributed LSAs from entering this NSSA area. Use this keyword when the router is both an NSSA autonomous system border router (ASBR) and an NSSA area border router (ABR) and you want the **redistribute** command to import routes into the normal areas but not into the NSSA area.
no-summary	(Optional) Allows an area to be an NSSA area but not have summary routes injected into it.
translate type7	(Optional) Translates Type 7 LSAs to type 5 LSAs.
always	(Optional) Always translates LSAs.
never	(Optional) Never translates LSAs.
suppress-fa	(Optional) Suppresses the forwarding address in translated LSAs. The ABR uses 0.0.0.0 as the forwarding IPv4 address.

Command Default

None

Command Modes

Router configuration

Command History

Release	Modification
4.0(1)	This command was introduced.

Usage Guidelines

Use the **area nssa** command to create an NSSA area in an OSPFv3 autonomous system. We recommend that you understand the network topology before configuring forwarding address suppression for translated LSAs. Suboptimal routing might result because there might be better paths to reach the destination's forwarding address.

This command requires the Enterprise Services license.

Examples

This example shows how to configure area 1 as an NSSA area:

```
switch# configure terminal
switch(config)# router ospfv3 10
switch(config-router)# area 1 nssa
```

This example shows how to configure area 1 as an NSSA area and translate Type 7 LSAs from area 1 to Type 5 LSAs, but not place the Type 7 forwarding address into the Type 5 LSAs. (OSPFv3 places 0.0.0.0 as the forwarding address in the Type 5 LSAs.)

```
switch# configure terminal
switch(config)# router ospfv3 2
switch(config-router)# area 1 nssa translate type7 suppress-fa
```

Related Commands

Command	Description
redistribute (OSPFv3)	Redistributes routes learned from one routing protocol to another routing protocol domain.

area range (OSPF)

To consolidate and summarize routes at an Open Shortest Path First (OSPF) area boundary, use the **area range** command. To disable this function, use the **no** form of this command.

area *area-id* **range** *ip-prefix* [**not-advertise**] [**cost** *cost-value*]
no area *area-id* **range** *ip-prefix* [**not-advertise**] [**cost** *cost-value*]

Syntax Description

area-id	Identifier for the OSPF area where you want to summarize routes. Specify as either a positive integer value or an IP address.
ip-prefix	IP prefix specified as IP address/subnet mask length (A.B.C.D/LEN).
not-advertise	(Optional) Sets the address range status to DoNotAdvertise. The Type 3 summary LSA is suppressed, and the component networks remain hidden from other networks.
cost	(Optional) Specifies the cost to use during shortest path first (SPF) calculation for the summarized route.
cost-value	Cost value. The range is from 0 to 16777215.

Command Default   Disabled

Command Modes

Router configuration

Command History

Release	Modification
5.2(1)	Added the cost key word.
4.0(1)	This command was introduced.

Usage Guidelines   Use the **area range** command only with Area Border Routers (ABRs) to consolidate or summarize routes for an area. The ABR advertises that a single summary route is advertised to other areas and condenses routing information at area boundaries.

You can configure OSPF to summarize addresses for many different sets of address ranges by configuring multiple **area range** commands.

This command requires the Enterprise Services license.

Examples   This example shows how to configure one summary route to be advertised by the ABR to other areas for all hosts on network 192.0.2.0:

```
switch# configure terminal
switch(config-if)# interface ethernet 1/2
switch(config-if)# ip address 192.0.2.201 255.255.255.0
switch(config-if)# ip ospf area 201
switch(config-router)# area 0 range 192.0.2.0 255.255.0.0
```

area range (OSPFv3)

To consolidate and summarize routes at an Open Shortest Path First version 3 (OSPFv3) area boundary, use the **area range** command. To disable this function, use the **no** form of this command.

area *area-id* **range** *ivp6-prefix/length* [**not-advertise**] [**cost** *cost-value*]
no **area** *area-id* **range** *ivp6-prefix* [**not-advertise**] [**cost** *cost-value*]

Syntax Description

area-id	Identifier for the OSPF area where you want to summarize routes. Specify as either an IP address or a number from 0 to 4294967295.
ipv6-prefix/length	IP prefix specified as IPv6 address/length (A:B::C:D/LEN). The *length* argument can be from 1 to 127.
not-advertise	(Optional) Sets the address range status to DoNotAdvertise. The Type 3 summary LSA is suppressed, and the component networks remain hidden from other networks.
cost	(Optional) Specifies the cost to use during shortest path first (SPF) calculation for the summarized route.
cost-value	Cost value. The range is from 0 to 16777215.

Command Default Disabled

Command Modes

Router configuration

Command History

Release	Modification
5.2(1)	Added the cost key word.
4.0(1)	This command was introduced.

Usage Guidelines Use the **area range** command only with Area Border Routers (ABRs) to consolidate or summarize routes for an area. The ABR advertises that a single summary route is advertised to other areas and condenses routing information at area boundaries.

You can configure OSPFv3 to summarize addresses for many different sets of address ranges by configuring multiple **area range** commands.

This command requires the Enterprise Services license.

Examples This example shows how to configure one summary route to be advertised by the ABR to other areas for all hosts on network 2001:0DB8::/32:

```
switch# configure terminal
switch(config)# router ospfv3 201
switch(config-router)# address-family ipv6 unicast
switch(config-router-af)# area 0 range 2001:0DB8::/32
```

area stub (OSPF)

To define an area as an Open Shortest Path First (OSPF) stub area, use the **area stub** command. To remove the area, use the **no** form of this command.

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

Syntax Description

area-id	Identifier for the OSPF stub area. Specify as either a positive integer value or an IP address.
no-summary	(Optional) Prevents an Area Border Router (ABR) from sending summary link advertisements into the stub area.

Command Default

None

Command Modes

Router configuration

Command History

Release	Modification
4.0(1)	This command was introduced.

Usage Guidelines

Use the **area stub** command to configure all devices attached to the stub area. Use the **area default-cost** command on an area border router (ABR) attached to the stub area. The **area default-cost** command provides the metric for the summary default route generated by the ABR into the stub area.

To further reduce the number of link-state advertisements (LSAs) sent into a stub area, you can configure the **no-summary** keyword on the ABR to prevent it from sending Summary LSAs (Type 3 LSAs3) into the stub area.

This command requires the Enterprise Services license.

Examples

This example shows how to create stub area 33 in OSPF 209:

```
switch# configure terminal
switch(config)# router ospf 201
switch(config-router)# area 33 stub
```

Related Commands

Command	Description
area default-cost	Specifies a cost for the default summary route sent into a stub area.

area stub (OSPFv3)

To define an area as an Open Shortest Path First version 3 (OSPFv3) stub area, use the **area stub** command. To remove the area, use the **no** form of this command.

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

Syntax Description

area-id	Identifier for the OSPFv3 stub area. Specify as either an IP address or a number from 0 to 4294967295.
no-summary	(Optional) Prevents an Area Border Router (ABR) from sending summary link advertisements into the stub area.

Command Default

None

Command Modes

Router configuration

Command History

Release	Modification
4.0(1)	This command was introduced.

Usage Guidelines

Use the **area stub** command to configure all devices attached to the stub area. Use the **area default-cost** command on an area border router (ABR) attached to the stub area. The **area default-cost** command provides the metric for the summary default route generated by the ABR into the stub area.

To further reduce the number of link-state advertisements (LSAs) sent into a stub area, you can configure the **no-summary** keyword on the ABR to prevent it from sending Summary LSAs (Type 3 LSAs3) into the stub area.

This command requires the Enterprise Services license.

Examples

This example shows how to create stub area 33 in OSPFv3 209:

```
switch# configure terminal
switch(config)# router ospfv3 201
switch(config-router)# area 33 stub
```

Related Commands

Command	Description
area default-cost (OSPFv3)	Specifies a cost for the default summary route sent into a stub area.

area virtual-link (OSPF)

To define an Open Shortest Path First (OSPF) virtual link, use the **area virtual-link** command. To remove a virtual link, use the **no** form of this command.

area *area-id* **virtual-link** *router-id*
no area *area-id* **virtual-link** *router-id*

Syntax Description	*area-id*	Identifier for the OSPF area assigned to the transit area for the virtual link. Specify as either a positive integer value or an IP address.
	router-id	Router ID associated with the virtual link neighbor. Specify as an IP address. The router ID appears in the **show ip ospf neighbors** display.

Command Default   None

Command Modes

Router configuration

Command History	**Release**	**Modification**
	4.0(1)	This command was introduced.

Usage Guidelines   Use the **area virtual-link** command to establish a virtual link from a remote area to the backbone area. In OSPF, all areas must be connected to a backbone area. If the connection to the backbone is lost, it can be repaired by establishing a virtual link.

Use the **area virtual-link** command to enter the virtual link configuration mode where you can use the following commands:

- **authentication [key-chain | message-digest | null]**
- **authentication-key [0 | 3]** *key*
- **dead-interval** *seconds*
- **hello-interval** *seconds*
- **message-digest-key** *key-id* **md5** *key*
- **retransmit-interval** *seconds*
- **transmit-delay** *seconds*

See each command for syntax and usage details.

You must configure both sides of a virtual link with the same area ID and the corresponding virtual link neighbor router ID. To see the router ID, use the **show ip ospf neighbors** command in any mode.

This command requires the Enterprise Services license.

Examples   This example shows how to establish a virtual link between two devices, A, and B, with default values for all optional parameters:

```
Device A:
switch# configure terminal
switch(config)# router ospf 1
```

```
switch(config-router)# router-id 192.0.2.2
switch(config-router)# area 1 virtual-link 192.0.2.1
Device B:
switch(config# router ospf 209
switch(config-router)# router-id 192.0.2.1
switch(config-router)# area 1 virtual-link 192.0.2.2
```

Related Commands

Command	Description
authentication (OSPF virtual link)	Enables authentication for an OSPF virtual link.
authentication-key (OSPF virtual link)	Assigns a password to be used by neighboring routers that are using the simple password authentication of OSPF.
dead-interval (OSPF virtual link)	Configures the dead interval for an OSPF virtual link.
hello-interval (OSPF virtual link)	Configures the hello interval for an OSPF virtual link.
message-digest-key (virtual link)	Enables OSPF MD5 authentication in an OSPF virtual link.
retransmit-interval (OSPF virtual link)	Configures the retransmit interval for an OSPF virtual link.
transmit-delay (OSPF virtual link)	Configures the transmit delay for an OSPF virtual link.

area virtual-link (OSPFv3)

To define an Open Shortest Path First version 3 (osPFv3) virtual link, use the **area virtual-link** command. To remove a virtual link, use the **no** form of this command.

area *area-id* **virtual-link** *router-id*
no area *area-id* **virtual-link** *router-id*

Syntax Description	*area-id*	Identifier for the OSPFv3 area assigned to the transit area for the virtual link. Specify as either an IP address or a number from 0 to 4294967295.
	router-id	Router ID associated with the virtual link neighbor. Specify as an IP address. The router ID appears in the **show ospfv3 neighbors** display.

Command Default   None

Command Modes

Router configuration

Command History

Release	Modification
4.0(1)	This command was introduced.

Usage Guidelines   Use the **area virtual-link** command to establish a virtual link from a remote area to the backbone area. In OSPFv3, all areas must be connected to a backbone area. If the connection to the backbone is lost, it can be repaired by establishing a virtual link.

Use the **area virtual-link** command to enter the virtual link configuration mode where you can use the following commands:

- **dead-interval** *seconds*
- **hello-interval** *seconds*
- **retransmit-interval** *seconds*
- **transmit-delay** *seconds*

See each command for syntax and usage details.

You must configure both sides of a virtual link with the same area ID and the corresponding virtual link neighbor router ID. To see the router ID, use the **show ospfv3 neighbors** command in any mode.

This command requires the Enterprise Services license.

Examples   This example shows how to establish a virtual link between two devices, A, and B, with default values for all optional parameters:

```
Device A:
switch(config)# router ospfv3 1
switch(config-router)# router-id 192.0.2.2
switch(config-router)# area 1 virtual-link 192.0.2.1
Device B:
switch(config# router ospfv3 209
```

```
switch(config-router)# router-id 192.0.2.1
switch(config-router)# area 1 virtual-link 192.0.2.2
```

Related Commands

Command	Description
dead-interval (OSPFv3 virtual link)	Configures the dead interval for an OSPFv3 virtual link.
hello-interval (OSPFv3 virtual link)	Configures the hello interval for an OSPFv3 virtual link.
retransmit-interval (OSPFv3 virtual link)	Configures the retransmit interval for an OSPFv3 virtual link.
transmit-delay (OSPFv3 virtual link)	Configures the transmit delay for an OSPFv3 virtual link.

as-format asdot

To configure the autonomous system number (ASN) notation to asdot, use the **as-format asdot** command. To delete the ASN notation configuration, use the **no** form of this command.

as-format   asdot
no   as-format   asdot

Syntax Description   This command has no arguments or keywords.

Command Default   asplain

Command Modes

Global configuration mode

Command History

Release	Modification
6.2(2)	This command was introduced.

Usage Guidelines   This command requires the Enterprise Services license.

Examples

This example shows how to configure the ASN notation to asdot:

```
switch# configure terminal
switch(config)# as-format asdot
switch(config)#
```

This example shows how to delete the ASN notation configuration:

```
switch# configure terminal
switch(config)# no as-format asdot
```

Related Commands

Command	Description
copy running-config startup-config	Saves the configuration change.

authentication (GLBP)

To configure an authentication for the Gateway Load Balancing Protocol (GLBP), use the **authentication** command. To disable authentication, use the **no** form of this command.

authentication {**text** *string* | **md5** {**key-string** [**encrypted**] *key* | **key-chain** *name-of-chain*}}
no authentication {**text** *string* | **md5** {**key-string** [{**0** | **7**}] *key* | **key-chain** *name-of-chain*}}

Syntax Description

text *string*	Specifies an authentication string. The range is from 1 to 255 characters.
md5	Specifies the Message Digest 5 (MD5) authentication.
key-string *key*	Specifies the secret key for MD5 authentication. The range is from 1 to 255 characters. We recommend that you use at least 16 characters.
encrypted	(Optional) Specifies the encrypted key.
key-chain *name-of-chain*	Identifies a group of authentication keys.

Command Default   No authentication of GLBP messages occurs.

Command Modes

GLBP configuration

Command History

Release	Modification
4.0(1)	This command was introduced.

Usage Guidelines   To ensure interoperation, you must configure the same authentication method on all the gateways that are members of the same GLBP group. A gateway ignores all GLBP messages that contain the wrong authentication information.

This command does not require a license.

Examples   This example shows how to configure stringxyz as the authentication string for GLBP group 10:

```
switch#configure terminal
switch(config)# interface ethernet 1/1
switch(config-if)# glbp 10
switch(config-glbp)# authentication text stringxyz
```

This example shows how to configure GLBP to use the key chain "AuthenticateGLBP" to obtain the current live key and key ID for MD5 authentication:

```
switch#configure terminal
switch(config)# interface ethernet1/1
switch(config-if)# glbp 2
switch(config-glbp)# authentication md5 key-chain AuthenticateGLBP
```

Related Commands

Command	Description
glbp	Creates a GLBP group and enters GLBP configuration mode.
ip (GLBP)	Enables GLBP on an interface.
key chain	Creates a key chain.

authentication (HSRP)

To configure authentication for the Hot Standby Router Protocol (HSRP), use the **authentication** command. To disable authentication, use the **no** form of this command.

authentication {**text** *string* | **md5** {**key-chain** *key-chain* | **key-string** {**0** | **7**} *text* [**timeout** *seconds*]}}
no authentication {**text** *string* | **md5** {**key-chain** *key-chain* | **key-string** {**0** | **7**} *text* [**timeout** *seconds*]}}

Syntax Description

text *string*	Specifies an authentication string. The range is from 1 to 255 characters. The default string is "cisco".
md5	Specifies the Message Digest 5 (MD5) authentication.
key-chain *key-chain*	Identifies a group of authentication keys.
key-string	Specifies the secret key for MD5 authentication.
0	Specifies a clear text string.
7	Specifies an encrypted string.
text	Secret key for MD5 authentication. The range is from 1 to 255 characters. We recommend that you use at least 16 characters.
timeout *seconds*	(Optional) Specifies the authentication timeout value. The range is from 0 to 32767.

Command Default   Disabled

Command Modes

HSRP configuration or HSRP template mode

Command History

Release	Modification
4.0(1)	This command was introduced.

Usage Guidelines   Use the **authentication text** command to prevent misconfigured routers from participating in HSRP groups that they are not intended to participate in. The authentication string is sent unencrypted in all HSRP messages. The same authentication string must be configured on all routers in the same group to ensure interoperation. HSRP protocol packets that do not authenticate are ignored.

⚠

Caution   If two routers are configured with identical HSRP IP addresses, but with different authentication strings, then neither router will be aware of the duplication.

This command does not require a license.

Examples   This example shows how to configure an authentication string for HSRP group 2:

```
switch# configure terminal
switch(config)# interface ethernet 0/1
switch(config-if)# ip address 10.0.0.1 255.255.255.0
switch(config-if)# hsrp 2
switch(config-if-hsrp)# priority 110
switch(config-if-hsrp)# preempt
switch(config-if-hsrp)# authentication text sanjose
switch(config-if-hsrp)# ip 10.0.0.3
switch(config-if-hsrp)# end
```

Related Commands

Command	Description
feature hsrp	Enable HSRP and enters HSRP configuration mode.
hsrp group	Creates an HSRP group.

authentication (OSPF virtual link)

To specify the authentication type for an Open Shortest Path First (OSPF) virtual link, use the **authentication** command. To remove the authentication type for a virtual link, use the **no** form of this command.

authentication [{**key-chain** *key-name* | **message-digest** | **null**}]
no ip ospf authentication

Syntax Description		
key-chain *key-name*	(Optional) Specifies the key-chain to use. The *key-name* argument can be any alphanumeric string up to 63 characters.
message-digest	(Optional) Specifies to use message-digest authentication.
null	(Optional) Specifies no authentication is used. Disables authentication if configured for an area.

Command Default

Defaults to password authentication if you configure authentication with none of the optional keywords.

Command Modes

OSPF virtual link configuration

Command History

Release	Modification
4.0(1)	This command was introduced.

Usage Guidelines

Use the **authentication** command in virtual link configuration mode to configure the authentication method used on the virtual link. Use the **message-digest** keyword to configure MD5 message digest authentication and use the **message-digest-key** command to complete this authentication configuration. Use the **key-chain** keyword to configure password authentication using key chains and use the key chain command to complete this authentication configuration. Use the **authentication** command with no keywords to configure a password for the virtual link, and use the **authentication-key** command to complete this authentication configuration.

This command requires the Enterprise Services license.

Examples

This example shows how to enable message-digest authentication:

```
switch#configure terminal
switch(config)# router ospf 22
switch(config-router)# area 99 virtual-link 192.0.2.12
switch(config-router-vlink)# authentication message-digest
switch(config-router-vlink)# message-digest key 4 md5 0 abcd
```

Related Commands

Command	Description
area authentication	Enables authentication for an OSPF area.
authentication-key (OSPF virtual link)	Assigns a password to be used by neighboring routers that are using the password authentication of OSPF.
key chain	Creates a key chain for managing authentication keys.

Command	Description
message-digest-key (OSPF virtual link)	Enables OSPF MD5 authentication.

authentication (VRRP)

To configure an authentication for the Virtual Router Redundancy Protocol (VRRP), use the **authentication** command. To disable authentication, use the **no** form of this command.

authentication text *password*
no authentication

Syntax Description	**text** *password*	Selects to use simple text password of up to 8 alphanumeric characters.

Command Default No authentication

Command Modes

VRRP configuration mode

Command History

Release	Modification
4.0(1)	This command was introduced.

Usage Guidelines This command does not require a license.

Examples This example shows how to configure md5 authentication for VRRP:

```
switch# configure terminal
switch(config)# interface ethernet 2/1
switch(config-if)# vrrp 250
switch(config-if-vrrp)# authentication text mypassword
```

Related Commands

Command	Description
show vrrp	Displays VRRP configuration information.
clear vrrp	Clears all the software counters for the specified virtual router.

authentication key-chain (EIGRP)

To enable authentication for the Enhanced Interior Gateway Routing Protocol (EIGRP) packets and to specify the set of keys that can be used on an interface, use the **authentication key-chain** command. To prevent authentication, use the **no** form of this command.

authentication key-chain *name-of-chain*
no authentication key-chain *name-of-chain*

Syntax Description

name-of-chain	Group of keys that are valid.

Command Default

No authentication is provided for EIGRP packets.

Command Modes

Router configuration
Address family configuration
Router VRF configuration

Command History

Release	Modification
4.0(3)	This command was introduced.

Usage Guidelines

Set the authentication mode using the **authentication mode** command in VRF configuration mode. You must separately configure a key chain using the **key-chain** command to complete the authentication configuration for an interface.

This command requires the Enterprise Services license.

Examples

This example shows how to configure the interface to accept and send any key that belongs to the key-chain trees:

```
switch#configure terminal
switch(config)# router eigrp 209
switch(config-router)# vrf red
switch(config-router-vrf)# authentication key-chain trees
```

Related Commands

Command	Description
authentication mode (EIGRP)	Sets the authentication mode for EIGRP in a VRF.
ip authentication key-chain eigrp	Enables authentication for EIGRP and specifies the set of keys that can be used on an interface.
key-chain	Creates a set of keys that can be used by an authentication method.

authentication key-chain (IS-IS)

To enable authentication for Intermediate System-to-Intermediate System (IS-IS), use the **authentication key-chain** configuration mode command. To disable such authentication, use the **no** form of this command.

authentication key-chain *auth-key* {**level-1** | **level-2**}
no authentication key-chain *auth-key* {**level-1** | **level-2**}

Syntax Description

auth-key	Authentication key chain.
level-1	Specifies the authentication key for level-1 link state packets (LSP), complete sequence number packets (CSNP), and partial sequence number packets (PSNP) only.
level-2	Specifies the authentication key for level-2 LSP, CSNP and PSNP packets only.

Command Default

No key chain authentication is provided for IS-IS packets at the router level.

Command Modes

Router configuration
VRF configuration

Command History

Release	Modification
4.0(1)	This command was introduced.

Usage Guidelines

If no key chain is configured with the **authentication key-chain** command, no key chain authentication is performed.

Key chain authentication could apply to clear text authentication or MD5 authentication. The mode is determined by the authentication mode command.

Only one authentication key chain is applied to IS-IS at one time. For example, if you configure a second **authentication key-chain** command, the first authentication key chain is overridden.

You can specify authentication for an individual IS-IS interface by using the **isis authentication key-chain** command.

This command requires the Enterprise Services license.

Examples

This example shows how to configure IS-IS to accept and send any key belonging to the key chain named site1:

```
switch#configure terminal
switch(config)# router isis real_secure_network
switch(config-router)# authentication key-chain site1 level-1
```

Related Commands

Command	Description
feature isis	Enables IS-IS on the router.
isis authentication key-chain	Enables authentication for an individual IS-IS interface.

Command	Description
router isis	Enables IS-IS.

authentication mode (EIGRP)

To specify the type of authentication used in the Enhanced Interior Gateway Routing Protocol (EIGRP) packets, use the **authentication mode** command. To remove authentication, use the **no** form of this command.

authentication mode md5
no authentication mode md5

Syntax Description

md5	Specifies Message Digest 5 (MD5) authentication.

Command Default   None

Command Modes

Router configuration
Address family configuration
VRF configuration

Command History

Release	Modification
4.0(1)	This command was introduced.

Usage Guidelines   This command requires the Enterprise Services license.

Examples   This example shows how to configure the interface to use MD5 authentication:

```
switch#configure terminal
switch(config)# router eigrp 209
switch(config-router)# vrf red
switch(config-router-vrf)# authentication mode md5
```

Related Commands

Command	Description
authentication key-chain eigrp	Enables authentication for EIGRP and specifies the set of keys that can be used on an interface.
ip authentication mode eigrp	Configures the authentication mode for EIGRP on an interface.
key chain	Creates a set of keys that can be used by an authentication method.

authentication-check

To specify for the Intermediate System-to-Intermediate System (IS-IS) instance that authentication is performed only on IS-IS packets being sent (not received), use the **authentication-check** configuration mode command. To configure for the IS-IS instance that if authentication is configured at the router level, such authentication be performed on packets being sent and received, use the **no** form of this command.

authentication-check {**level-1** | **level-2**}
no authentication-check

Syntax Description	**level-1**	Specifies that authentication is performed only on level-1 packets that are being sent (not received)
	level-2	Specifies that authentication is performed only on level-2 packets that are being sent (not received).

Command Default

If authentication is configured at the router level, it applies to IS-IS packets being sent and received.

Command Modes

Router configurationVRF configuration

Usage Guidelines

Enter the **authentication-check** command before configuring the authentication mode and authentication key chain. Entering the **authentication-check** command allows the routers to have more time for the keys to be configured on each router if authentication is inserted only on the packets being sent, not checked on packets being received. After you enter the authentication-check command on all communicating routers, enable the authentication mode and key chain on each router. Then enter the **no authentication-check** command to disable the command.

This command could apply to clear text authentication or Message Digest 5 (MD5) authentication. The mode is determined by the authentication mode command.

You can specify authentication for an individual IS-IS interface by using the **isis authentication-check** {**level-1** | **level-2**} interface configuration mode command.

This command requires the Enterprise Services license.

Examples

This example shows how to configure IS-IS level-1 packets to use clear text authentication on packets being sent (not received):

```
switch#configure terminal
switch(config)# router isis test1
switch(config-router)# authentication-check level-1
switch(config-router)# authentication key-chain site1 level-1
switch(config-router)#
```

Related Commands	**Command**	**Description**
	feature isis	Enables IS-IS on the router.
	isis authentication-check	Enables authentication on IS-IS packets being sent (not received) from a specific interface.
	router isis	Enables IS-IS.

authentication ipsec

To enable authentication of OSPFv3 packets on a per-interface basis at the Router level, use the **authentication ipsec** command. To disable the authentication of OSPFv3 packets, use the **no** form of this command.

authentication ipsec spi *spi* *auth* [{**0** | **3** | **7**}] *key*
no authentication ipsec spi *spi*

Syntax Description

spi	Specifies the Security Policy Index.
spi	Value of **spi**. It ranges from 256 to 4294967295.
auth	Authentication algorithm. Its value can be md1 / sha1 / null.
key	Authentication password.
0	Specifies that the authentication password is unencrypted.
3	Specifies that the authentication password is 3DES encrypted.
7	Specifies that the authentication password is Cisco type 7 encrypted.

Command Default

The OSPFv3 packets are not authenticated by default.

Command Modes

Router configuration (config-router).

Command History

Release	Modification
7.3(0)D1(1)	This command was introduced.

Usage Guidelines

Before running this command, ensure that you have enabled the authentication package with the **feature imp** command.

Examples

The following example shows how to authenticate OSPFv3 packets using md5, at the Router level for default VRF:

```
switch# configure terminal
switch(config)# feature imp
switch(config)# router ospfv3 1
switch(config-router)# authentication ipsec spi 301 md5 1234
```

Related Commands

Command	Description
area authentication ipsec	Enables authentication of the OSPFv3 packets for all interfaces under the area.
ospfv3 authentication ipsec	Enables authentication of the OSPFv3 packets per interface.

authentication-key (OSPF virtual link)

To assign a password to be used by an Open Shortest Path First (OSPF) virtual link, use the **authentication-key** command. To remove a previously assigned OSPF password, use the **no** form of this command.

authentication-key $[\{\mathbf{0} \mid \mathbf{3}\}]$ *password*
no authentication-key

Syntax Description	**0**	(Optional) Specifies an unencrypted authentication key.
	3	(Optional) Specifies a 3DES encrypted authentication key.
	password	Any continuous string of characters that can be entered from the keyboard up to 8 bytes.

Command Default   Unencrypted password

Command Modes

OSPF virtual link configuration

Command History	Release	Modification
	4.0(1)	This command was introduced.

Usage Guidelines   Use the **authentication-key** command to configure the password for password authentication on an OSPF virtual link. All devices on the same virtual link must have the same password to be able to exchange OSPF information.

This command requires the Enterprise Services license.

Examples   This example shows how to enable the authentication key with the string yourpass:

```
switch#configure terminal
switch(config)# router ospf 22
switch(config-router)# area 99 virtual-link 192.0.2.12
switch(config-router-vlink)# authentication
switch(config-router-vlink)# authentication-key yourpass
```

Related Commands	Command	Description
	authentication (virtual link)	Enables authentication for an OSPF virtual link.

authentication-type

To specify the type of authentication used in Intermediate System-to-Intermediate System (IS-IS) packets for the IS-IS instance, use the **authentication-type** configuration mode command. To restore clear text authentication, use the **no** form of this command.

authentication-type {**cleartext** | **md5**} [{**level-1** | **level-2**}]
no authentication-type

Syntax Description

cleartext	Specifies clear text authentication.
md5	Specifies Message Digest 5 (MD5) authentication.
level-1	Enables the specified authentication for level-1 link state packet (LSP), complete sequence number packet (CSNP) and partial sequence number packet (PSNP) packets only.
level-2	Enables the specified authentication for level-2 LSP, CSNP and PSNP packets only.

Command Default

No authentication is provided for IS-IS packets at the router level by use of this command.

Command Modes

Router configuration
VRF configuration

Command History

Release	Modification
4.0(1)	This command was introduced.

Usage Guidelines

If you do not enter the **level-1** or **level-2** keywords, the mode applies to both levels.

You can specify the type of authentication and the level to which it applies for a single IS-IS interface, rather than per IS-IS instance, by using the **authentication-type** command.

You can specify authentication type for an individual IS-IS interface by using the **isis authentication-type** {**cleartext** | **md5**} [**level-1** | **level-2**] interface configuration mode command.

Examples

This example shows how to configure the IS-IS instance that Message Digest 5 (MD5) authentication is performed on level-1 packets:

```
switch#configure terminal
switch(config)# router isis TEST1
switch(config-router)# authentication-type md5 level-1
switch(config-router)#
```

Related Commands

Command	Description
feature isis	Enables IS-IS on the router.
isis authentication-type	Specifies the authentication type for an individual IS-IS interface.

Command	Description
router isis	Enables IS-IS.

auto-cost (OSPF)

To control how Open Shortest Path First (OSPF) calculates default metrics for an interface, use the **auto-cost** command. To assign the default reference bandwidth of 40Gb/s, use the **no** form of this command.

auto-cost reference-bandwidth *bandwidth* [{**Gbps** | **Mbps**}]
no auto-cost reference-bandwidth

Syntax Description		
	reference-bandwidth *bandwidth*	Sets the reference bandwidth used to calculate the default metrics for an interface. The range depends on whether you use the **Gbps** or **MBps** keywords.
	Gbps	(Optional) Specifies the rate in Gbps (bandwidth). The range is from 1 to 4000; the default is 40.
	Mbps	(Optional) Specifies the rate in Mbps (bandwidth). The range is from 1 to 4000000; the default is 40000.

Command Default

40 Gb/s. The bandwidth defaults to Gb/s if you do not specify the **Gpbs** or **Mbps** keyword .

Command Modes

Router configuration

Command History	Release	Modification
	4.0(1)	This command was introduced.

Usage Guidelines

Use the **auto-cost** command to set the reference bandwidth used by the OSPF cost-metric calculation.

The value set by the **ip ospf cost** command overrides the cost that results from the **auto-cost** command.

This command requires the Enterprise Services license.

Examples

This example shows how to set the reference bandwidth for all local interfaces in an OSPF instance:

```
switch#configure terminal
switch(config)# router ospf 201
switch(config-router)# auto-cost reference-bandwidth 10
```

Related Commands	Command	Description
	ip ospf cost	Explicitly specifies the cost of sending a packet on an interface.

auto-cost (OSPFv3)

To control how Open Shortest Path First version 3 (OSPFv3) calculates default metrics for an interface, use the **auto-cost** command. To assign the default reference bandwidth of 40Gb/s, use the **no** form of this command.

auto-cost reference-bandwidth *bandwidth* [{**Gbps** | **Mbps**}]
no auto-cost reference-bandwidth

Syntax Description	reference-bandwidth *bandwidth*	Sets the reference bandwidth used to calculate the default metrics for an interface. The range depends on whether you use the **Gbps** or **MBps** keywords.
	Gbps	(Optional) Specifies the rate in Gbps (bandwidth). The range is from 1 to 4000; the default is 40.
	Mbps	(Optional) Specifies the rate in Mbps (bandwidth). The range is from 1 to 4000000; the default is 40000.

Command Default 40 Gb/s. The bandwidth defaults to Gb/s if you do not specify the **Gpbs** or **Mbps** keyword .

Command Modes

Router configuration

Command History

Release	Modification
4.0(1)	This command was introduced.

Usage Guidelines Use the **auto-cost** command to set the reference bandwidth used by the OSPFv3 cost-metric calculation.

The value set by the **ipv6 ospfv3 cost** command overrides the cost that results from the **auto-cost** command.

This command requires the Enterprise Services license.

Examples This example shows how to set the reference bandwidth for all local interfaces in an OSPFv3 instance:

```
switch#configure terminal
switch(config)# router ospfv3 201
switch(config-router)# auto-cost reference-bandwidth 10
```

Related Commands

Command	Description
ipv6 ospfv3 cost	Explicitly specifies the cost of sending a packet on an interface.

autonomous-system

To configure the autonomous system number for an Enhanced Interior Gateway Routing Protocol (EIGRP) address family, use the **autonomous-system** command. To revert to default, use the **no** form of this command.

autonomous-system *as-number*
no **autonomous-system** *as-number*

Syntax Description

as-number	Autonomous system number. The range is from 1 to 65535.

Command Default

None

Command Modes

Address family configuration

Command History

Release	Modification
4.1(2)	This command was introduced.

Usage Guidelines

Use the **autonomous-system** command to set a common AS number for all EIGRP instances in an address family.

This command requires the Enterprise Services license.

Examples

This example shows how to set an AS number for EIGRP for IPv6 unicast:

```
switch#configure terminal
switch(config)# router eigrp 201
switch(config-router)# address-family ipv6 unicast
switch(config-router-af)# autonomous-system 64496
```

Related Commands

Command	Description
address-family (EIGRP)	Enters the address family configuration mode for EIGRP.