CCNP and CCIE Enterprise Core & CCNP Enterprise Advanced Routing

Portable Command Guide

All ENCOR (350-401) and ENARSI (300-410) Commands in One Compact, Portable Resource

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`Router(config-if)# ospfv3 1 ipv6 dead-interval 12`	Changes the dead interval to 12 seconds for the OSPFv3 IPv6 address family. It is possible to modify the dead interval for the global OSPFv3 process or for individual address families **NOTE:** Hello and dead interval timers must match for routers to become neighbors

NOTE: The default hello timer is 10 seconds on multiaccess and point-to-point segments. The default hello timer is 30 seconds on nonbroadcast multiaccess (NBMA) segments such as Frame Relay, X.25, or ATM.

NOTE: The default dead interval timer is 40 seconds on multiaccess and point-to-point segments. The default hello timer is 120 seconds on NBMA segments such as Frame Relay, X.25, or ATM.

NOTE: If you change the hello interval timer, the dead interval timer will automatically be adjusted to four times the new hello interval timer.

IP MTU

The IP maximum transmission unit (MTU) parameter determines the maximum size of a packet that can be forwarded without fragmentation.

`Router(config)# interface gigabitethernet 0/0`	Moves to interface configuration mode
`Router(config-if)# ip mtu 1400`	Changes the MTU size to 1400 bytes. The range of this command is 68 to 1500 bytes

CAUTION: The MTU size must match between all OSPF neighbors on a link. If OSPF routers have mismatched MTU sizes, they will not form a neighbor adjacency.

Propagating a Default Route

`Router(config)# ip route 0.0.0.0 0.0.0.0 serial 0/0/0`	Creates a default route
`Router(config)# router ospf 1`	Starts OSPF process 1
`Router(config-router)# default-information originate`	Sets the default route to be propagated to all OSPF routers
`Router(config-router)# default-information originate always`	The **always** option will propagate a default "quad-0" route even if this router does not have a default route itself **NOTE:** The **default-information originate** command or the **default-information originate always** command is usually configured on the "entrance" or "gateway" router, the router that connects your network to the outside world—the Autonomous System Boundary Router (ASBR)

`Router(config-router-af)#` **`default-information originate`**	Sets the default route to be propagated to all OSPFv3 routers for a specific address family **NOTE:** This works for either IPv4 or IPv6 address-family configuration mode
`Router(config-router-af)#` **`default-information originate always`**	Sets the default route to be propagated to all OSPFv3 routers for a specific address family even if this router does not have a default route itself **NOTE:** This works for either IPv4 or IPv6 address-family configuration mode

Route Summarization

In OSPF, there are two different types of summarization:

- Interarea route summarization
- External route summarization

Interarea Route Summarization

NOTE: Interarea route summarization is to be configured on an ABR only.

NOTE: By default, ABRs do *not* summarize routes between areas.

`Router(config)#` **`router ospf 1`**	Starts OSPF process 1
`Router(config-router)#` **`area 1 range 192.168.64.0 255.255.224.0`**	Summarizes area 1 routes to the specified summary address, before injecting them into a different area
`Router(config-router-af)#` **`area 1 range 192.168.64.0 255.255.224.0`**	Summarizes area 1 routes to the specified summary address, before injecting them into a different area using the OSPFv3 IPv4 address family
`Router(config-router-af)#` **`area 1 range 2001:db8:0:10::/60`**	Summarizes area 1 routes to the specified summary address, before injecting them into a different area using the OSPFv3 IPv6 address family

External Route Summarization

NOTE: External route summarization is to be configured on an ASBR only.

NOTE: By default, ASBRs do *not* summarize routes.

`Router(config)#` **`router ospf 1`**	Starts OSPF process 1
`Router(config-router)#` **`summary-address 192.168.64.0 255.255.224.0`**	Advertises a single route for all the redistributed routes that are covered by a specified network address and netmask

`Router(config-router-af)#` **`summary-prefix 192.168.64.0 255.255.224.0`**	Advertises a single route for all the redistributed routes that are covered by a specified network address and netmask in OSPFv3 IPv4 address family configuration mode
`Router(config-router-af)#` **`summary-prefix 2001:db8:0:10::/60`**	Advertises a single route for all the redistributed routes that are covered by a specified network address and netmask in OSPFv3 IPv6 address family configuration mode

OSPF Route Filtering

This section covers four methods of applying route filtering to OSPF:

- Using the **filter-list** command
- Using the **area range not-advertise** command
- Using the **distribute-list in** command
- Using the **summary-address not-advertise** command

Using the filter-list Command

`ABR(config)#` **`ip prefix-list MyPFList permit 172.16.0.0/16 le 32`**	Defines a prefix list called *MyPFList* that permits all 172.16.0.0 prefixes with a mask between /16 and /32
`ABR(config)#` **`router ospf 202`**	Enters OSPF process 202
`ABR(config-router)#` **`area 1 filter-list prefix MyPFList out`**	Uses a prefix list called *MyPFList* to filter Type-3 LSAs coming out of area 1
`ABR(config-router)#` **`area 1 filter-list prefix MyPFList in`**	Uses a prefix list called *MyPFList* to filter Type-3 LSAs going into area 1

Using the area range not-advertise Command

`ABR(config)#` **`router ospf 202`**	Enters OSPF process 202
`ABR(config-router)#` **`area 1 range 10.1.1.0 255.255.255.0 not-advertise`**	Filters the 10.1.1.0/24 prefix from being advertised out of area 1 as a Type-3 Summary LSA

Using the distribute-list in Command

`ABR(config)#` **`access-list 1 permit 192.168.1.0 0.0.0.255`**	Defines an ACL that permits the 192.168.1.0/24 prefix
`ABR(config)#` **`router ospf 202`**	Enters OSPF process 202
`ABR(config-router)#` **`distribute-list 1 in`**	Allows the router to only learn the 192.168.1.0/24 prefix **NOTE:** The inbound logic does not filter inbound LSAs; it instead filters the routes that SPF chooses to add to its own local routing table

NOTE: It is also possible to use a prefix list or a route map with the **distribute-list** command instead of an ACL.

Using the summary-address not-advertise Command

`ASBR(config)# router ospf 202`	Enters OSPF process 202
`ASBR(config-router)# summary-address 172.17.10 255.255.255.0 not-advertise`	Filters the 172.17.10/24 prefix from being advertised into the OSPF network as a Type-5 External LSA **NOTE:** This command is only applied to an ASBR

NOTE: Recall that the **summary-address** command is replaced by the **summary-prefix** command under OSPFv3.

OSPF Special Area Types

This section covers four different special areas with respect to OSPF:

- Stub areas
- Totally stubby areas
- Not-so-stubby areas (NSSAs)
- Totally NSSA

Stub Areas

`ABR(config)# router ospf 1`	Starts OSPF process 1
`ABR(config-router)# network 172.16.10.0 0.0.0.255 area 0`	Read this line to say, "Any interface with an address of 172.16.10.*x* is to run OSPF and be put into area 0"
`ABR(config-router)# network 172.16.20.0 0.0.0.255 area 51`	Read this line to say, "Any interface with an address of 172.16.20.*x* is to run OSPF and be put into area 51"
`ABR(config-router)# area 51 stub`	Defines area 51 as a stub area
`ABR(config-router)# area 51 default-cost 10`	Defines the cost of a default route sent into the stub area. Default is 1 **NOTE:** This is an optional command
`ABR(config-router-af)# area 51 stub`	Defines area 51 as a stub area in OSPFv3 address-family configuration mode **NOTE:** The command works for both IPv4 and IPv6 address families
`Internal(config)# router ospf 1`	Starts OSPF process 1
`Internal(config-router)# network 172.16.20.0 0.0.0.255 area 51`	Read this line to say, "Any interface with an address of 172.16.20.*x* is to run OSPF and be put into area 51"

`Internal(config-router)#` **`area 51 stub`**	Defines area 51 as a stub area **NOTE:** All routers in the stub area must be configured with the **area** *x* **stub** command, including the Area Border Router (ABR)
`Internal(config-router-af)#` **`area 51 stub`**	Defines area 51 as a stub area in OSPFv3 address-family configuration mode **NOTE:** The command works for both IPv4 and IPv6 address families

Totally Stubby Areas

`ABR(config)#` **`router ospf 1`**	Starts OSPF process 1
`ABR(config-router)#` **`network 172.16.10.0 0.0.0.255 area 0`**	Read this line to say, "Any interface with an address of 172.16.10.*x* is to run OSPF and be put into area 0"
`ABR(config-router)#` **`network 172.16.20.0 0.0.0.255 area 51`**	Read this line to say, "Any interface with an address of 172.16.20.*x* is to run OSPF and be put into area 51"
`ABR(config-router)#` **`area 51 stub no-summary`**	Defines area 51 as a totally stubby area
`ABR(config-router-af)#` **`area 51 stub no-summary`**	Defines area 51 as a totally stubby area in OSPFv3 address-family configuration mode **NOTE:** The command works for both IPv4 and IPv6 address families
`Internal(config)#` **`router ospf 1`**	Starts OSPF process 1
`Internal(config-router)#` **`network 172.16.20.0 0.0.0.255 area 51`**	Read this line to say, "Any interface with an address of 172.16.20.*x* is to run OSPF and be put into area 51"
`Internal(config-router)#` **`area 51 stub`**	Defines area 51 as a stub area **NOTE:** Whereas all internal routers in the area are configured with the **area** *x* **stub** command, the ABR is configured with the **area** *x* **stub no-summary** command
`Internal(config-router-af)#` **`area 51 stub`**	Defines area 51 as a stub area in OSPFv3 address-family configuration mode **NOTE:** The command works for both IPv4 and IPv6 address families

Not-So-Stubby Areas (NSSA)

`ABR(config)#` **`router ospf 1`**	Starts OSPF process 1
`ABR(config-router)#` **`network 172.16.10.0 0.0.0.255 area 0`**	Read this line to say, "Any interface with an address of 172.16.10.*x* is to run OSPF and be put into area 0"

`ABR(config-router)# network 172.16.20.0 0.0.0.255 area 1`	Read this line to say, "Any interface with an address of 172.16.20.*x* is to run OSPF and be put into area 1"
`ABR(config-router)# area 1 nssa`	Defines area 1 as an NSSA
`ABR(config-router-af)# area 1 nssa`	Defines area 1 as an NSSA in OSPFv3 address-family configuration mode **NOTE:** The command works for both IPv4 and IPv6 address families
`Internal(config)# router ospf 1`	Starts OSPF process 1
`Internal(config-router)# network 172.16.20.0 0.0.0.255 area 1`	Read this line to say, "Any interface with an address of 172.16.20.*x* is to run OSPF and be put into area 1"
`Internal(config-router)# area 1 nssa`	Defines area 1 as an NSSA **NOTE:** All routers in the NSSA stub area must be configured with the **area** *x* **nssa** command
`Internal(config-router-af)# area 1 nssa`	Defines area 1 as an NSSA in OSPFv3 address-family configuration mode **NOTE:** The command works for both IPv4 and IPv6 address families

Totally NSSA

`ABR(config)# router ospf 1`	Starts OSPF process 1
`ABR(config-router)# network 172.16.10.0 0.0.0.255 area 0`	Read this line to say, "Any interface with an address of 172.16.10.*x* is to run OSPF and be put into area 0"
`ABR(config-router)# network 172.16.20.0 0.0.0.255 area 11`	Read this line to say, "Any interface with an address of 172.16.20.*x* is to run OSPF and be put into area 11"
`ABR(config-router)# area 11 nssa no-summary`	Defines area 11 as a totally NSSA
`ABR(config-router-af)# area 11 nssa no-summary`	Defines area 11 as a totally NSSA in OSPFv3 address-family configuration mode **NOTE:** The command works for both IPv4 and IPv6 address families
`Internal(config)# router ospf 1`	Starts OSPF process 1
`Internal(config-router)# network 172.16.20.0 0.0.0.255 area 11`	Read this line to say, "Any interface with an address of 172.16.20.*x* is to run OSPF and be put into area 11"