CCNP BSCI Notes - OSPF Network Topologies

OSPF Network Topology Options

OSPF assumes a subnet is broadcast-capable by default.

OSPF Network Types

Broadcast multiaccess

Point-to-point

Point-to-multipoint broadcast

Point-to-multipoint nonbroadcast

Nonbroadcast multiaccess (NBMA)

NBMA and point-to-multipoint are standards-compliant (RFC 2328), whereas point-to-multipoint nonbroadcast, broadcast, and point-to-point implementations are Cisco proprietary.

NBMA networks utilize DRs like broadcast networks, however neighbors must be manually defined instead of being automatically discovered.

	NBMA	Point-to-multipoint broadcast	Point-to-multipoint nonbroadcast	Broadcast	Point-to-point
DR/BDR	Yes	No	No	Yes	No
Identify neighbor?	Yes	No	Yes	No	No
Hello/dead timers	30/120	30/120	30/120	10/40	10/40
Standard	RFC	RFC	Cisco	Cisco	Cisco
Network supported	Full mesh	Any	Any	Full mesh	Point-to-point

Configuring OSPF in a Nonbroadcast Environment

Nonbroadcast Network

Because NBMA is the default network type for a nonbroadcast interface, the only necessary

configuration is to define neighbors.

DR priorities should be specified to ensure only candidates positioned well in the topology are elected DR and BDR.

```
Router(config-if)# neighbor <IP address> [priority <priority>] [poll-interval <seconds>]
 [cost <cost>]
```

priority - This can be used to specify a higher priority than what has been configured on the neighbor (but not lower)

poll interval - The rate at which hellos are sent to inactive neighbors (default 120 seconds) cost - Cost to reach the neighbor

NBMA configuration:

```
Router(config-if)# ip address 10.0.0.60 255.255.255.0
Router(config-if)# encapsulation frame-relay
Router(config)# router ospf 1
Router(config-router)# network 10.0.0.0 0.0.0.255 area 0
Router(config-router)# neighbor 10.0.0.40
Router(config-router)# neighbor 10.0.0.50
```

Point-to-multipoint Network

Point-to-multipoint automatically establishes adjacencies along PVCs.

Point-to-multipoint assumes broadcast capability by default; nonbroadcast can be specified, and neighbors must then be defined manually.

```
Router(config-if)# ip address 10.1.1.1 255.255.255.0
Router(config-if)# encapsulation frame-relay
Router(config-if)# ip ospf network point-to-multipoint [nonbroadcast]
Router(config)# router ip ospf 1
Router(config-router)# network 10.1.1.1 0.0.0.255 area 0
```

Broadcast Network

```
Router(config-if)# ip address 10.1.1.1 255.255.255.0
Router(config-if)# ip ospf network broadcast
Router(config)# router ip ospf 1
Router(config-router)# network 10.1.1.1 0.0.0.255 area 0
```

Point-to-point on Subinterfaces

Router(config)# interface serial0

Router(config-if)# no ip address

Router(config-if)# encapsulation frame-relay

Router(config)# interface serial0.1 point-to-point

Router(config-if)# ip address 10.1.1.1 255.255.255.0

Router(config-if)# frame-relay interface-dlci 51

Router(config)# interface serial0.2 point-to-point

Router(config-if)# ip address 10.1.2.1 255.255.255.0

Router(config-if)# frame-relay interface-dlci 52

Router(config)# router ip ospf 1

Router(config-router)# network 10.1.1.1 0.0.0.255 area 0