OSPF (Open Shortest Path First)

OSPF is a standardized Link-State routing protocol, designed to scale efficiently to support larger networks.

OSPF Characteristics

- OSPF employs a hierarchical network design using Areas.
- OSPF will form neighbor relationships with adjacent routers in the same Area.
- Instead of advertising the distance to connected networks, OSPF advertises the status of directly connected links using Link-State Advertisements (LSAs).
- OSPF sends triggered updates only and send only changes
- LSAs are additionally refreshed every 30 minutes.
- OSPF traffic is multicast either to address 224.0.0.5 (all OSPF routers) or 224.0.0.6 (all Designated Routers).
- Point to Point only use multicast address 224.0.0.5
- OSPF uses the Dijkstra Shortest Path First algorithm to determine the shortest path.
- OSPF is a classless protocol, and thus supports VLSMs.
- OSPF supports only IP routing.
- OSPF routes have an administrative distance is 110.
- OSPF uses cost as its metric, which is computed based on the bandwidth of the link.
- ***OSPF COST = Reference bandwidth/Link Bandwidth***
- OSPF has no hop-count limit. But cisco s
- OSPF forms neighbor relationships, called adjacencies, with other routers in the same Area by
- All routers must be connected to area 0 (Backbone Area)
- All Routers in an AREA have same topology table
- OSPF summarice networks in ABR (Area Border Router)
- One Area contain localized updates.
- ASBR (Autonomous system Border Router) Connects OSPF with other dynamic protocols like EIGRP OR RIP
- only ABR and ASBR can summarize in OSPF
- OSPF only become neigbour with routers in same area
- In every single network in OSPF having a shared segment,there will be a DR and BDR
- In a shared ethernet segment ,Only DR and BDR will be in FULL state and others might be in 2 Way state

The OSPF process builds and maintains three separate tables:

- A neighbor table – contains a list of all neighboring routers.

- A topology table – contains a list of all possible routes to all known networks within an area.
- A routing table – contains the best route for each known network.

Different types of routers in OSPF

- Routers in the backbone area (area 0) are called **backbone routers**.
- Routers between 2 areas (like the one between area 0 and area 1) are called **area border routers (ABR)**
- Routers that run OSPF and are connected to another network that runs another routing protocol (for example RIP) are called **autonomous system border routers (ASBR)**

Each OSPF router is identified by a unique Router ID. The Router ID can be determined in one of three ways:

- The Router ID can be manually specified.
- If not manually specified, the highest IP address configured on any Loopback interface on the router will become the Router ID.
- If no loopback interface exists, the highest IP address configured on any Physical interface will become the Router ID

Hello / Dead Interval

- OSPF hello/Dead Interval time for non-broadcast and point-to-multipoint interfaces. : 30/120 seconds
- OSPF hello/Dead Interval time for broadcast and point-to-point interfaces. : 10/40 seconds
- Notice that, by default, the dead interval timer is four times the Hello interval.

DR and BDR election

- First they look at Router Priority. BY Default Router priority is One.We can change it if we need
- If Router priority is same,OSPF will look at Highest Router -ID for DR BDR election
- If we set Router priority is O,that router will not participate in DR/BDR election
- In FrameRelay (NBMA -non broadcast multi access) network ,HUB Must be elected as DR .We can do this by changing router priority