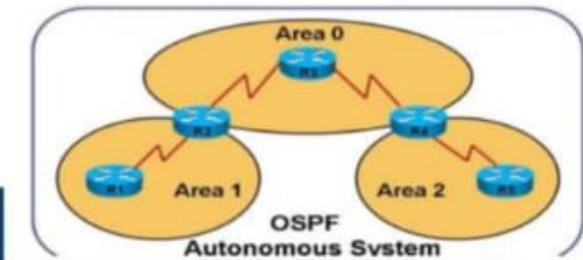


OSPF (Open Shortest Path First):

- It is the popular and most widely used open standard protocol.
- It is one of the internal gateway protocols that use a link-state routing algorithm or shortest path first algorithm that works within a single routing domain.
- This algorithm was designed by an expert named Dijkstra, which is why it is also known as Dijkstra Algorithm.
- It is developed to work with both IPv4 and IPv6 networks. It can divide a larger internetwork into smaller internetwork called areas.

OPEN SHORTEST PATH FIRST (OSPF)



Contd....

- OSPF is a link-state routing protocol that sends information about directly connected links to all the routers in the AS network. The protocol has a full picture of the network topology, which is shared with all the routers in an area of the AS to calculate the shortest path to each destination.
- Open Shortest Path First (OSPF) is a link-state routing protocol that is used to find the best path between the source and the destination router using its own Shortest Path First).
- One difference between OSPF and RIP is that, unlike RIP, OSPF does not simply count the number of router hops between hosts on a network. Instead, OSPF bases its path choices on "link states" that consider additional network information. The information might include IT-assigned cost metrics that give some paths higher assigned costs. For example, a satellite link might be assigned higher cost than a wireless WAN link, which in turn might be assigned a higher cost than a metro Ethernet link.

Routing Information Protocol (RIP)

- Routing Information Protocol (RIP) is one of the oldest and most straightforward interior gateway protocols (IGP) used in computer networking. Initially developed in the 1980s, RIP has undergone several revisions, with the most widely used version being RIP version 2 (RIPv2).
- RIP operates as a distance-vector routing protocol, which means that routers exchange routing information with their neighbors, and each router makes decisions based on the distance (metric) to reach a destination. The metric used by RIP is typically the hop count – the number of routers that must be traversed to reach a particular destination.
- RIP uses a simple hop count metric to determine the best path to a destination. Each router in the network maintains a routing table that contains information about the number of hops to reach each destination.



Contd...

RIP routers periodically broadcast routing updates to their neighboring routers. These updates contain information about the network's topology, including reachable destinations and their associated hop counts.

- To prevent routing loops, RIP uses a technique called split horizon. This means that a router does not advertise routes back through the interface from which it received the route information.
- When a route becomes unreachable, RIP uses route poisoning to inform other routers about the change. The unreachable route is advertised with an infinite metric, indicating that the route should not be used.

Difference Between Distance Vector Routing and Link State Routing

Distance Vector Routing –

- It is a dynamic routing algorithm in which each router computes a distance between itself and each possible destination i.e. its immediate neighbors.
 - The router shares its knowledge about the whole network to its neighbors and accordingly updates the table based on its neighbors.
 - The sharing of information with the neighbors takes place at regular intervals.
 - It makes use of [Bellman-Ford Algorithm](#) for making routing tables.
-
- **Problems** – Count to infinity problem which can be solved by splitting horizon.
 - Good news spread fast and bad news spread slowly.
 - Persistent looping problem i.e. loop will be there forever.



Link State Routing –

- It is a dynamic routing algorithm in which each router shares knowledge of its neighbors with every other router in the network.
 - A router sends its information about its neighbors only to all the routers through flooding.
 - Information sharing takes place only whenever there is a change.
 - It makes use of [Dijkstra's Algorithm](#) for making routing tables.
-
- **Problems** – Heavy traffic due to flooding of packets.
 - Flooding can result in infinite looping which can be solved by using the **Time to live (TTL)** field.



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- To prevent routing loops, RIP uses a technique called split horizon. This means that a router does not advertise routes back through the interface from which it received the route information.
- When a route becomes unreachable, RIP uses route poisoning to inform other routers about the change. The unreachable route is advertised with an infinite metric, indicating that the route should not be used.



- While RIP has been largely replaced by more advanced routing protocols like OSPF (Open Shortest Path First) in large and complex networks, RIP is still used in smaller networks or as a legacy protocol in certain environments. Its simplicity makes it easy to configure and deploy, especially in scenarios where more advanced routing protocols might be unnecessary.