Routing(RIP, OSPF, metrics)

The RIP protocol and OSPF protocol are two Interior Gateway Protocols (IGP) that intensively used in computer networks to specify the best routes for data transmission. RIP (Routing Information Protocol) is one of the oldest routing protocols in service, whereas OSPF (Open Shortest Path First) serves as the most widely adopted IGP for large enterprise networks. Network managers may find themselves in a dilemma when choosing between RIP vs OSPF. So, this blog will present a detailed description of these two routing protocols and key RIP vs OSPF differences.

RIP vs OSPF: What Is RIP Protocol in Networking?

RIP (Routing Information Protocol), is an example of distance vector routing for local networks. RIP works to deliver the whole routing table to all active interfaces every 30 seconds. In RIP protocol, hop count is the only metrics to decide the best path to a remote network. Let's take an example to see how RIP protocol works: Assuming, we have two paths available from the Source to the Destination. It is clear that Path 2 will be selected by RIP protocol since it has fewer hop counts.

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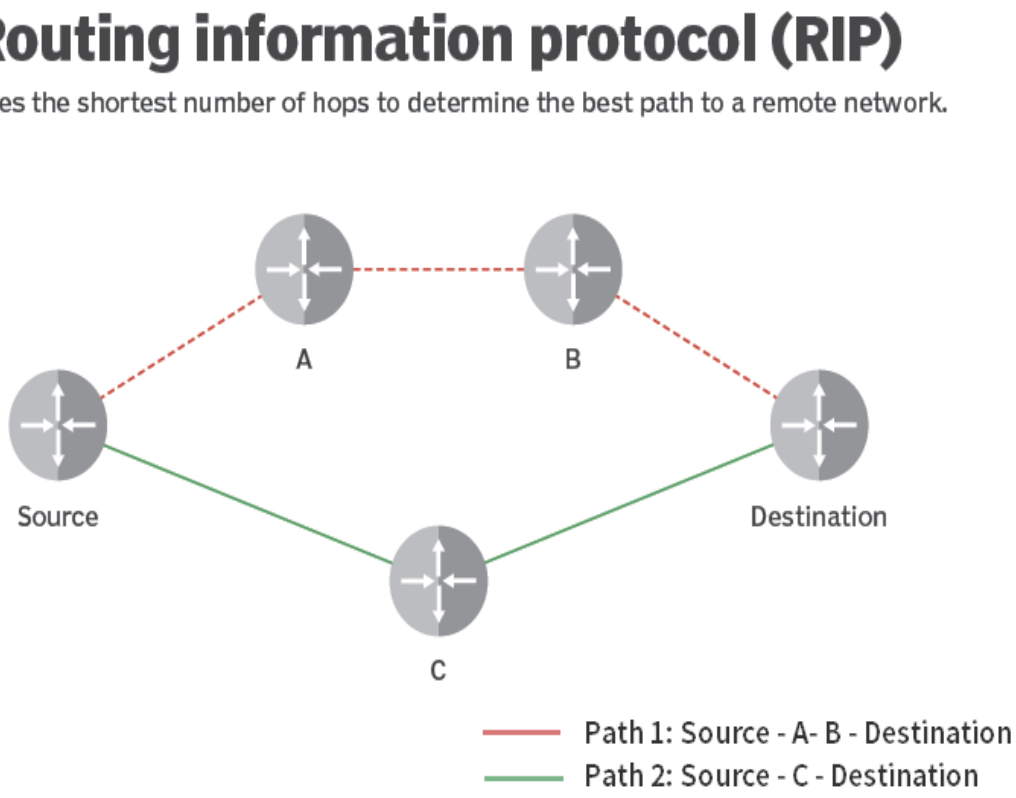

Pros and Cons of RIP Protocol

Pros:

- RIP protocol is a great fit for small networks - It's easy to understand and configure.
- RIP routing is guaranteed to support almost all routers.
- RIP does not require an update every time the network topology changes.

Cons:

- RIP can create a traffic bottleneck as it broadcasts its updates every 30 seconds. Since any routing update in RIP will take up great bandwidth, the resources for critical IT processes are hence limited.
- The hop counts of RIP are limited to 15 hops, so any router beyond that distance is considered infinity, and hence unreachable.
- The convergence rate is slow. When any link goes down it takes a lot of time to choose alternate routes.
- RIP doesn't support multiple paths on the same route, which may generate more routing loops. While using fixed hop count metrics to select the best routes, RIP fails to work when routes are compared based on real-time data. This causes packet loss and overloads network operations due to repeated processes.

RIP vs OSPF: What Is OSPF in Networking?

OSPF (Open Shortest Path First), a link-state routing protocol, is massively adopted in large enterprise networks. OSPF routing protocol collects link state information from routers in the network and determines the routing table information to forward packets. This occurs by creating a topology map for the network. Unlike RIP, OSPF only exchanges routing information when there's a change in network topology. OSPF protocol best fits for complex networks that comprise multiple subnets working to ease network administration and optimize traffic. It effectively calculates the shortest path with minimum network traffic when the change occurs.

RIP vs OSPF: What Is the Difference?

RIP and OSPF are Interior Gateway Protocols that routing information within an autonomous system and RIP vs OSPF differs in many aspects.

Features	RIP Protocol	OSPF Protocol
Routing Protocol Type	Distance vector routing protocol (uses the distance or hop counts to determine the transmission path)	Link State Routing Protocol (analyzes different sources like the speed, cost, and path congestion while identifying the shortest path)

Network Table Construction	The router consolidates the routing table from the neighboring devices to construct its own routing table and sends it to neighboring devices at a regular interval.	The router consolidates the routing table by getting only required information from the neighboring devices, never gets the entire routing table.
Default Metric	Based on hop count	Based on bandwidth
Hop Count Restriction	RIP protocol allows only up to 15 hops	OSPF protocol has no such restriction
Administrative Distance	120	110
Algorithm Used	Bellman-Ford algorithm	Dijkstra algorithm
Network Classification	In RIP, the networks are classified as areas and tables.	In OSPF, the networks are classified as areas, sub-areas, autonomous systems, and backbone areas.
Complexity Level	relatively simpler	much more complex
Network Application	RIP suits better for smaller networks as it has hop count restrictions	OSPF serves great for larger networks
Design	Flat network	Hierarchical network possible
Convergence Time	Slow	Fast
Device Resource Requirements	Much less memory and CPU intensive than OSPF	Memory and CPU intensive
Network Resource Requirements	Bandwidth consuming; whole routing table is sent	Less than RIP; only small updates are sent

Table: Key Differences Between RIP and OSPF