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Best path selection using ospf

Abstract

The purpose of routing algorithms is to determine the most efficient path for forwarding data packets from a source to a destination within a network. Routing algorithms help reduce congestion, improve network performance, and adapt to changes in the network environment or traffic patterns. Static and dynamic routing protocols are two approaches used in networking to determine how data packets are forwarded between devices. Dynamic routing protocols can be categorized into several types based on their operation and purpose. Here are some common types, Distance Vector Protocols and link-state protocols build a detailed map of the network topology by exchanging information about link states with neighboring routers.

OSPF is including several steps, Neighbor Discovery, Topology Discovery building link state database, short path calculation and Routing Table Generation. Neighbor discovery routers establish neighbor relationships with adjacent routers on directly connected networks using OSPF Hello packets. Topology Discovery routers exchange Link State Advertisements (LSAs) to discover the network topology. LSAs contain information about the router's directly connected links and their states. Building Link State Database each router builds a Link State Database (LSDB) based on the LSAs received from neighboring routers. Shortest Path Calculation is using the information in the LSDB, OSPF routers run the Dijkstra algorithm to calculate the shortest path to each network destination within the OSPF area. Routing Table Generation is based on the shortest path calculation, each router constructs its routing table, which includes the best path to reach each network destination.