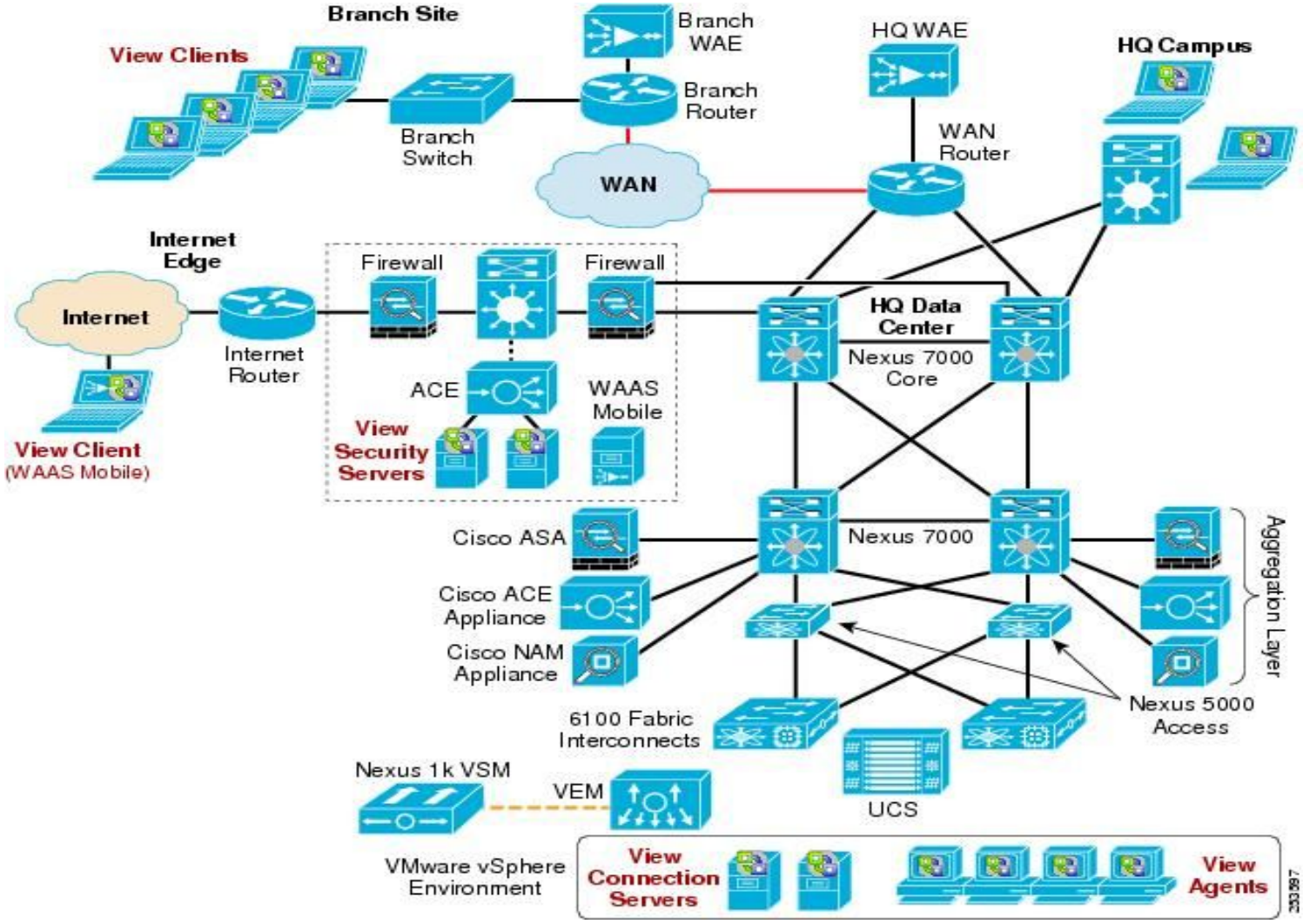
OSPF Routing Protocol



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Overview

OSPF is a standardized Link-State routing protocol, designed to scale efficiently to support larger networks. OSPF detects changes in the topology, such as link failures, very quickly and converges on a new loop-free routing structure within seconds. It computes the shortest path tree for each route using a method based on Dijkstra's algorithm, a shortest path first algorithm.

Goals

1. To study how the protocol uses the Dijkstra's Algorithm to find the shortest path.
2. To find out counter example where this greedy approach might fail.
3. To analyze the complexity involved in the algorithm.
4. To find if this can be done using Dynamic Programming , If not , provide reasons for it .
5. To study various optimizations done till now , and propose our optimization(if possible)

About the protocol

Open shortest path first created in the mid 1980 gives and provide the overcome many of the efficiency and the problem with RIP. It is based on the open standards. It is very popular in the corporate network today. OSPF is a link state routing protocol; it delivers the finest path in the network, which delivers the shortest path accessible from the source network to the destination network.

The OSPF routing protocol has largely replaced the older Routing Information Protocol (RIP) in corporate networks. Using OSPF, a router that learns of a change to a routing table (when it is reconfigured by network staff, for example) or detects a change in the network immediately multicasts the information to all other OSPF hosts in the network so they will all have the same routing table information. Unlike RIP, which requires routers to send the entire routing table to neighbors every 30 seconds, OSPF sends only the part that has changed and only when a change has taken place. When routes change -- sometimes due to equipment failure -- the time it takes OSPF routers to find a new path between

endpoints with no loops (which is called "open") and that minimizes the length of the path is called the convergence time.

Rather than simply counting the number of router hops between hosts on a network, as RIP does, OSPF bases its path choices on "link states" that take into account additional network information, including IT-assigned cost metrics that give some paths higher assigned costs. For example, a satellite link may be assigned higher cost than a wireless WAN link, which in turn may be assigned higher cost than a metro Ethernet link.

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

In this project we will learn how the routing table is generated by routers using Dijkstra’s algorithm.