

OSPF Instructional Documentation



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Problem Description

As the Information Technology space continues to expand, there is a need for proper instructional documentation to be developed to aid in the development of new IT professionals. Throughout the United States and the rest of the world, large parts of daily operations for companies and individuals are becoming digitized. The large transition from traditional work to work localized to the internet necessitates the expansion of networks and requires the adoption of faster and more efficient routing protocols. Open Shortest Path First (OSPF) is one such protocol that allows for extremely fast communication within large networks. To operate networks based on OSPF, instructional documentation needs to be developed for students and IT professionals alike.



Background Information

Open Shortest Path First is a routing protocol that uses the Shortest Path First algorithm to calculate the cost of each possible route from source to destination, the protocol then uses the route with the lowest cost to send packets. The cost calculation takes into account the bandwidth of each interface in the route. The cost per bandwidth can be changed in the protocol itself to fit the needs of a specific network.

Cost for OSPF is calculated through the formula:

Cost = Reference Bandwidth / Interface Bandwidth in bps

This formula gives the router the default values for these interface types:

Ethernet Link	10Mbps	$100000000/10000000 = 10$	Cost of 10
FastEthernet Link	100Mbps	$100000000/100000000 = 1$	Cost of 1
Serial Link	1544Kbps(default)	$100000000/1544000 = 64.76$	Cost of 64



Instructional Documentation

The goal of creating the OSPF instructional documentation has been to create a simple and effective way to give students hands-on experience working with OSPF in a non-critical environment. The Instructional Documentation or “Labs” take the student through configuring different aspects of OSPF in a step-by-step manner. Each lab is a self-contained document with ~35 pages of instructions, explanations, and figures that explain how to configure OSPF.

The student is able to utilize NetLab+ to work through configuring OSPF in a virtualized environment. Each lab topology is pre-configured in NetLab+ and contains the instructional documentation as well.



OSPF Lab 2 Demonstration

This lab is tentatively the second lab in the OSPF lab series, this is subject to change.



Sources

- <https://www.computernetworkingnotes.com/ccna-study-guide/ospf-metric-cost-calculation-formula-explained.html>