Routing basics

Tags	
Klaar	JA
Week	Week 2

Distance Vector Routing Protocols

Distance vector means that routes are advertised by providing two characteristics:

- Distance - Identifies how far it is to the destination network based on a metric such as hop count, cost, bandwidth, delay.
- Vector - Specifies the direction of the next-hop router or exit interface to reach the destination.

Examples: RIP, RIPv2, EIGRP

RIP uses the Bellman-Ford algorithm as its routing algorithm

IGRP and EIGRP uses the Diffusing Update Algorithm (DUAL) routing algorithm

Link State Routing Protocols

A link-State router uses the link-state information received from other routers:

- to create a topology map.
- to select the best path to all destination networks in the topology.

Link-state routing protocols do not use periodic updates. updates are only sent when there is a change in the topology.

Examples: OSPF and IS-IS

All link-state routing protocols apply Dijkstra's algorithm (also known as shortest path first (SPF)) to calculate the best path route:

- Uses accumulated costs along each path, from source to destination.
- Each router determines its own cost to each destination in the topology.

Link-State Routing Process

1. Each router learns about each of its own directly connected networks.
2. Each router is responsible for "saying hello" to its neighbors on directly connected networks.
3. Each router builds a Link-State Packet (LSP) containing the state of each directly connected link.

4. Each router floods the LSP to all neighbors who then store all LSP's received in a database.
5. Each router uses the database to construct a complete map of the topology and computes the best path to each destination network.

Routing concepts

Split Horizon prevents information from being sent out the same interface from which it was received to avoid loops.

Network Convergence is when all routers have complete and accurate information about the entire network.

Routing Protocol Characteristics

	RIPv1 (DV)	RIPv2 (DV)	IGRP (DV)	EIGRP (DV)	OSPF (LS)	IS-IS (LS)
Speed of Convergence	Slow	Slow	Slow	Fast	Fast	Fast
Schalability - Size of Network	Small	Small	Small	Large	Large	Large
Use of VLSM	No	Yes	No	Yes	Yes	Yes
Resource Usage	Low	Low	Low	Medium	High	High
Implementation and Maintenance	Simple	Simple	Simple	Complex	Complex	Complex