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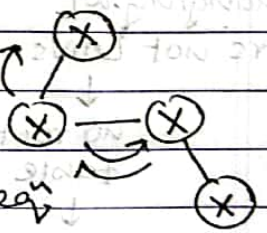
CSE421 – Computer Networks – SFQ

Lecture 17 – Routing Algorithms

* Autonomous System – group of networks and routers under the authority of a single administration.
* Routing inside an AS – intra-domain routing → Distance Vector (RI
  " between AS – inter-domain routing → Link State (OSPF)
  → Path Vector (X)

* Routing Alg^{m} classification –
  (I) Global – link state
    * all routers have complete topology + link cost info.
      ↳ gathers information about the network before making the routing table
  (II) Decentralized – Distance vector
    * routers know physically connected neighbors & their link cost → gathers information about the neighbors only

* Distance-Vector Algorithm –
  → contacts its neighbors + exchanges its routing table.
  (I) each node periodically sends its DV estimate to neighbors
  (II) when a node X receives new DV estimate from neighbor, it updates its own DV using BF eq^{n}
  (III) periodically – broadcast the entire routing table to each of its neighbors every 30 seconds (RIP) → inefficient
  (IV) Router is only aware of the N.A. of its own interfaces + N.A. of the neighbors running the same routing protocol. → unaware of remote networks.



* Network Discovery – enables routers to learn about remote networks for the first time.
* Cold Start – powering up the router (setup) + empty routing table (no information)
  ↳ knows only the info saved in NVRAM
  ↳ sends updates about its known networks.

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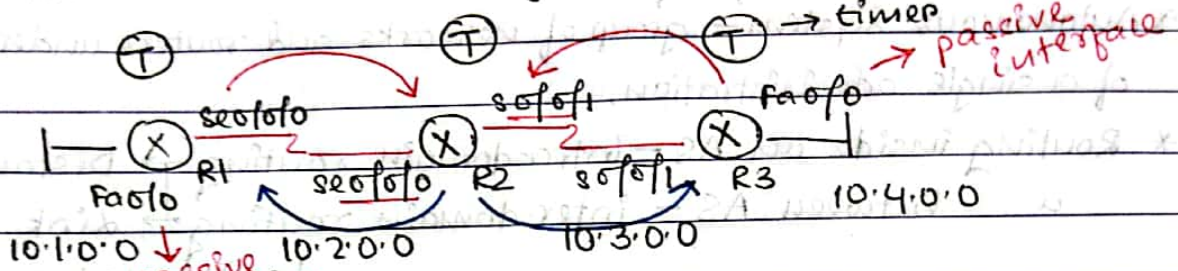
* Router notes down the information of the directly connected networks in its own routing table — RIP command



Initial

Network	Interface	Hop
10.1.0.0	Fa0/0	0
10.2.0.0	Se0/0/0	0
10.3.0.0	Se0/0/0	1 } T_1
10.4.0.0	Se0/0/0	2 } T_2

Network	Interface	Hop
10.2.0.0	Se0/0/0	0 } Initial
10.3.0.0	Se0/0/1	0 } Initial
10.1.0.0	Se0/0/0	1 } T_1
10.4.0.0	Se0/0/1	1 } T_1

↳ no Δ in T_2

After initializing, router starts exchanging wf routers not LANs.

Network	Interface	Hop
10.3.0.0	Se0/0/1	0 } Initial
10.4.0.0	Fa0/0	0 } Initial
10.2.0.0	Se0/0/1	1 } T_1
10.1.0.0	Se0/0/1	2 } T_2

↓ no routing table

↓ configured as passive interface → R does not send routing table updates

* all networks have converged — all routers have complete routing tables
* amount of time to converge α size of the network
* Routing protocols are compared based on their speed of convergence.
* Network is not completely operable until it has converged.
→ you do not have complete information so cannot route packets.

Disadvantages —
* Sending update every 30s even though there is no update, still getting router tables from neighbors; congestion in network ↑ Bandwidth waste ↑

* speed of convergence

↳ has no stopping criteria