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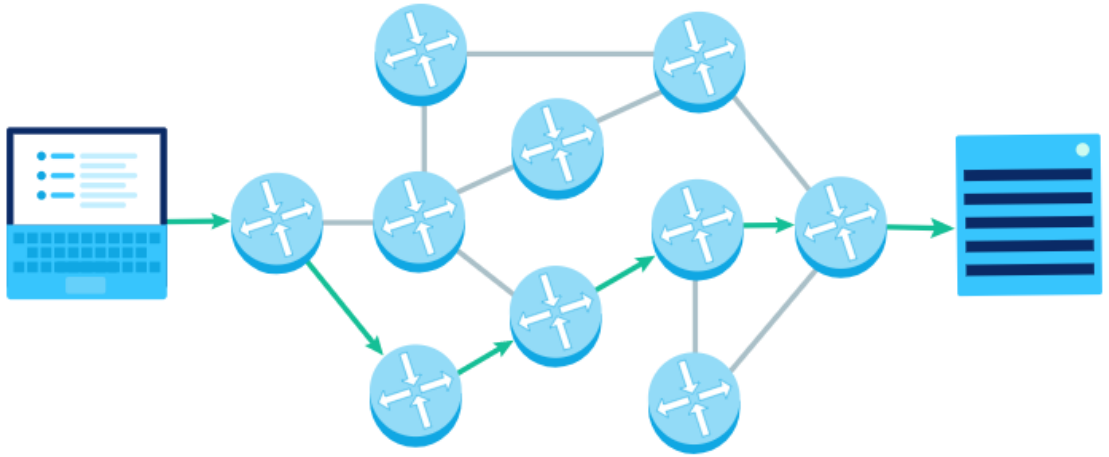
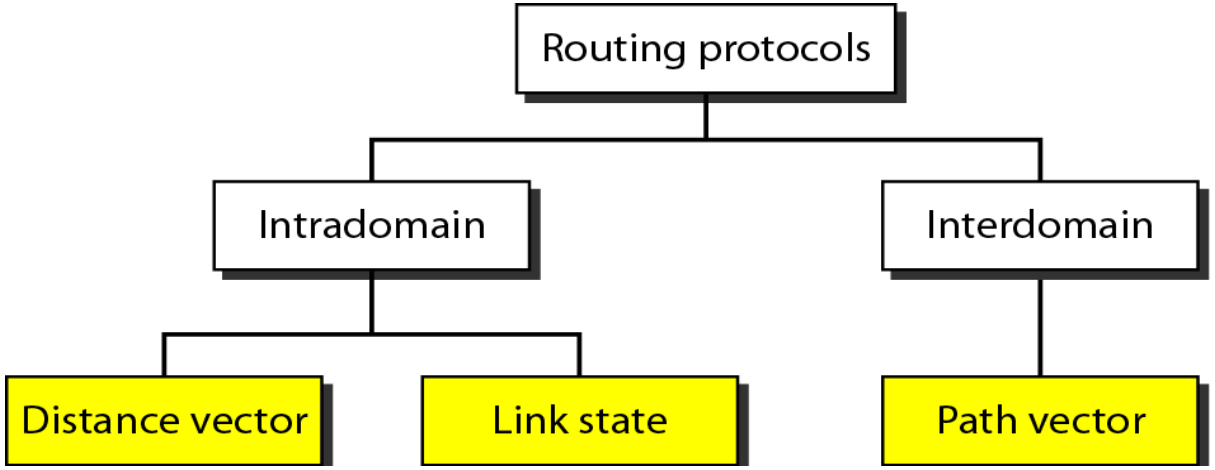
Computer Networks

(RCS-601)

Routing - IV



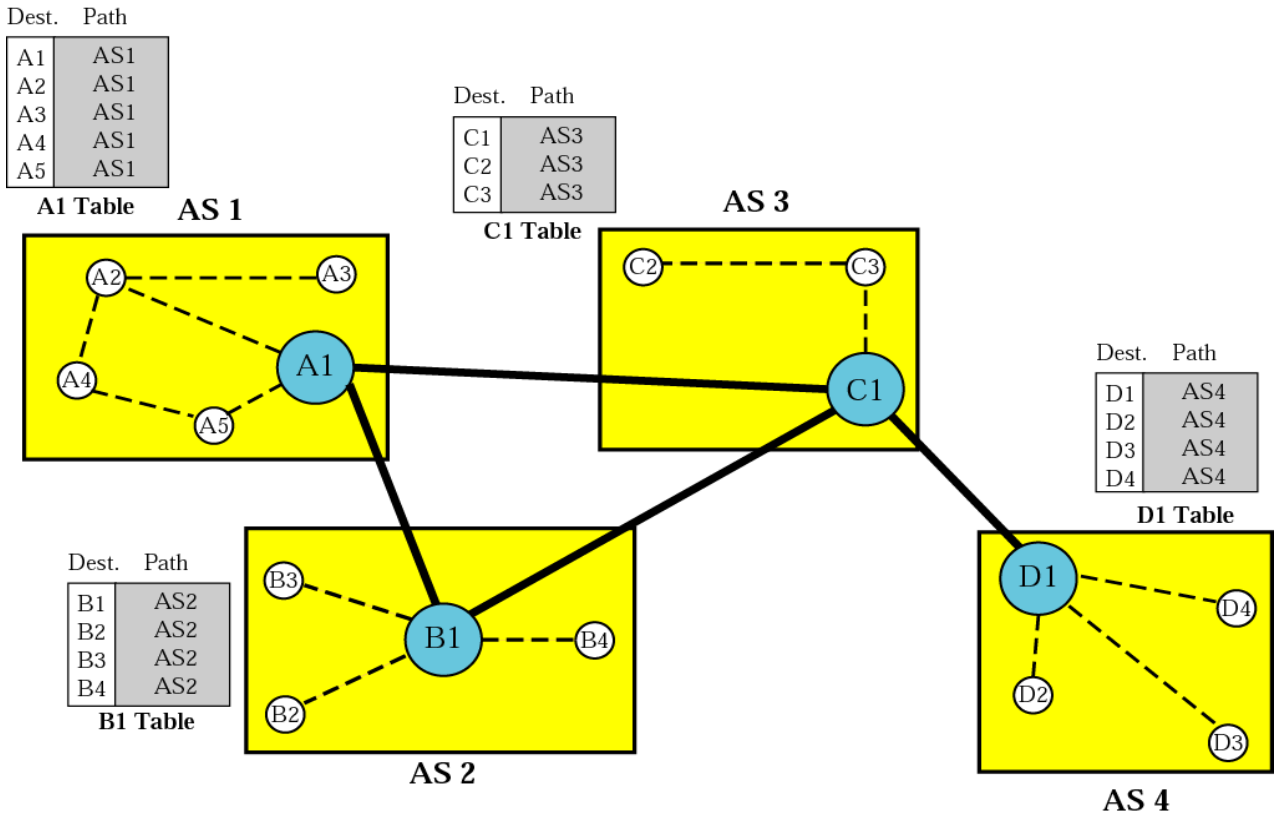


Path Vector Routing

- Path Vector Routing is similar to distance vector routing.
- Assuming that there is one node in each Autonomous System **(AS)** that acts as on behalf of the entire AS : **Speaker Node**
- Speaker node creates a routing table and advertises it speaker nodes in the neighboring ASs-
  - advertising the path, not the metric of the nodes

Path Vector Routing (contd.)

- Initialization
  - Each speaker node can only know the reachability of nodes inside its AS



Path Vector Routing (contd.)

- Sharing and Updating

Dest.	Path
A1	AS1
...	
A5	AS1
B1	AS1-AS2
...	...
B4	AS1-AS2
C1	AS1-AS3
...	...
C3	AS1-AS3
D1	AS1-AS2-AS4
...	...
D4	AS1-AS2-AS4

A1 Table

Dest.	Path
A1	AS2-AS1
...	
A5	AS2-AS1
B1	AS2
...	...
B4	AS2
C1	AS2-AS3
...	...
C3	AS2-AS3
D1	AS2-AS3-AS4
...	...
D4	AS2-AS3-AS4

B1 Table

Dest.	Path
A1	AS3-AS1
...	
A5	AS3-AS1
B1	AS3-AS2
...	...
B4	AS3-AS2
C1	AS3
...	...
C3	AS3
D1	AS3-AS4
...	...
D4	AS3-AS4

C1 Table

Dest.	Path
A1	AS4-AS3-AS1
...	
A5	AS4-AS3-AS1
B1	AS4-AS3-AS2
...	...
B4	AS4-AS3-AS2
C1	AS4-AS3
...	...
C3	AS4-AS3
D1	AS4
...	...
D4	AS4

D1 Table

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Popular Routing Protocols

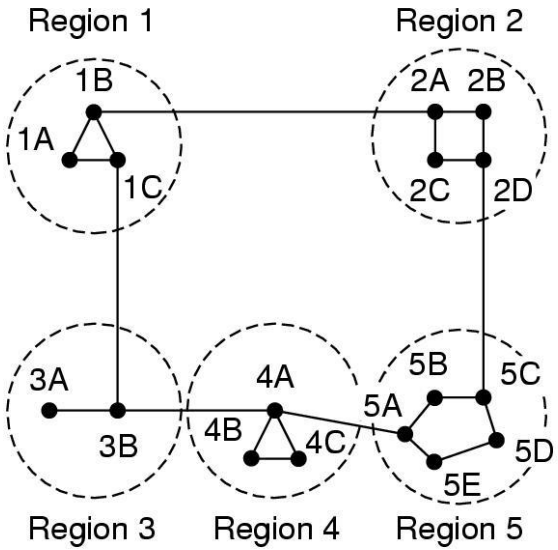
RIP, OSPF, BGP

- **Routing Information Protocol** (RIP) is an implementation of the distance vector algorithm.
- **Open Shortest Path First** (OSPF) is an implementation of the link state algorithm.
- **Border Gateway Protocol** (BGP) is an implementation of the path vector algorithm.

Comparison b/w RIP, OSPF & BGP

Attributes	RIP	OSPF	BGP
Convergence	Slow	Fast	Slow
Network size	For small to medium network	For large network	For large network
Need of device resources	Much less memory and CPU intensive than OSPF.	Memory and CPU intensive.	Depends on the size of the routing table but scales better that OSPF.
Design	Flat network.	Hierarchical network possible.	Fully meshed.

Hierarchical Routing



Full table for 1A

Dest.	Line	Hops
1A	–	–
1B	1B	1
1C	1C	1
2A	1B	2
2B	1B	3
2C	1B	3
2D	1B	4
3A	1C	3
3B	1C	2
4A	1C	3
4B	1C	4
4C	1C	4
5A	1C	4
5B	1C	5
5C	1B	5
5D	1C	6
5E	1C	5

Hierarchical table for 1A

Dest.	Line	Hops
1A	–	–
1B	1B	1
1C	1C	1
2	1B	2
3	1C	2
4	1C	3
5	1C	4

- Routers grouped in regions
- Each routers knows how to reach:
  - Other routers in its own group
  - Other regions

\+ Smaller tables

– Longer paths

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Thank you