

Computer Network Protocols

Network Layer (Part 1)

Lesson 3

كلية المستقبل الجامعة
قسم هندسة تقنيات الحاسوب
المرحلة الرابعة

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Dynamic Routing Algorithm

We will study two type of dynamic routing algorithm, these are:

1. Distance Vector Routing.

1. Link state routing.

Link State Routing

The idea behind link state routing is simple and can be stated as five parts. Each router must:

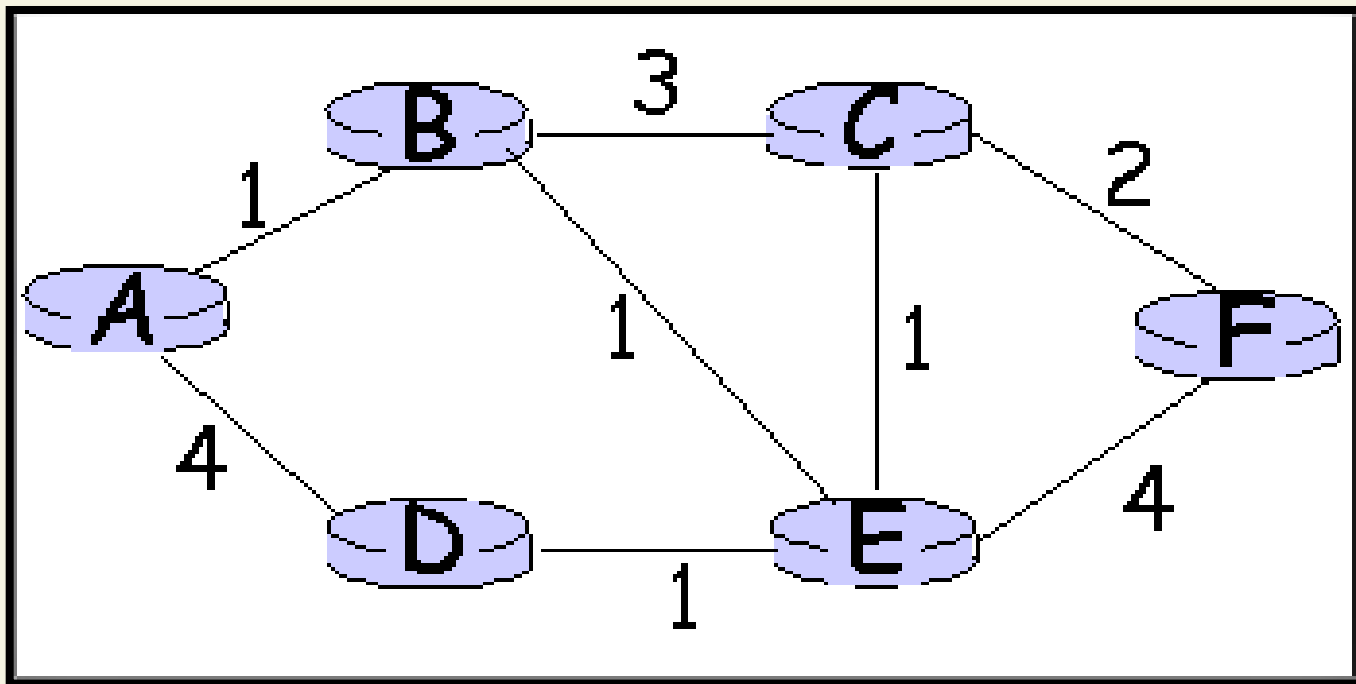
- 1. **Discover** its neighbors and learn their network addresses.*
- 2. **Measure** the delay or cost to each of its neighbors.*
- 3. **Construct** a packet telling to all it has just learned.*
- 4. **Send** the packet to all other routers.*
- 5. **Compute** the shortest path to every other router.*

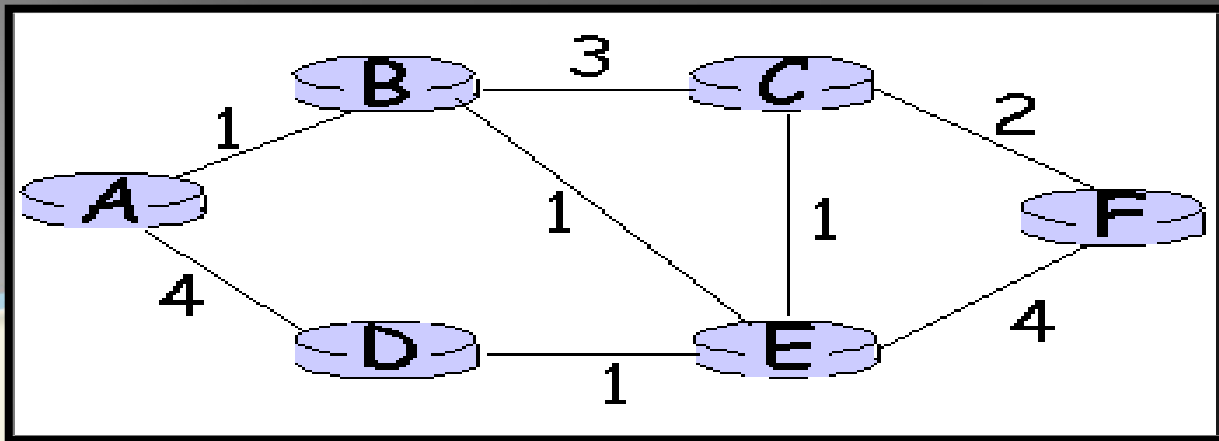
Note that the Link-State router tells ALL other routers about ONLY its neighbors and links.

*Compared to distance vector routing, link state routing **requires more memory** and **computation**. Also, the computation time grows faster. Nevertheless, in many practical situations, link state routing works well because it does not suffer from slow convergence problems.*

Link State Routing Example

Find the shortest path for the network given below from node A to node F using Dijkstra algorithm.





	A	B	C	D	E	F
A	0	1 _A	∞	4 _A	∞	∞
B		1 _A	4 _B	4 _A	2 _B	∞
E			3 _E	3 _E	2 _B	6 _E
C			3 _E	3 _E		5 _C
D				3 _E		5 _C
F						5 _C

The path is {A, B, E, C, F}

Distance Vector Vs. Link State

Distance Vector	Link State
<ul style="list-style-type: none">• Entire routing table is sent as an update• Distance vector protocol send periodic update at every 30 or 90 second• Updates are sent to directly connected neighbor only• Routers don't have end to end visibility of entire network.• Suffer from count to infinity problem• Slow convergence after network topology changed due to the count to infinity problem• Examples: RIP, BGP• Easy to configure	<ul style="list-style-type: none">• Updates are incremental & entire routing table is not sent as update.• Updates are triggered not periodic.• Update are sent to entire network & to just directly connected neighbor.• Routers have visibility of entire network of that area only.• No routing loops• Convergence is fast because of triggered updates.• Examples: OSPF, IS-IS• More difficult to configure

End Of Lesson 3

Thanks For Listening