Computer Network Protocols
Network Layer (Part 1)
Lesson 3

جامعة المستقبل
كلية الهندسة والتقنيات الهندسية
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

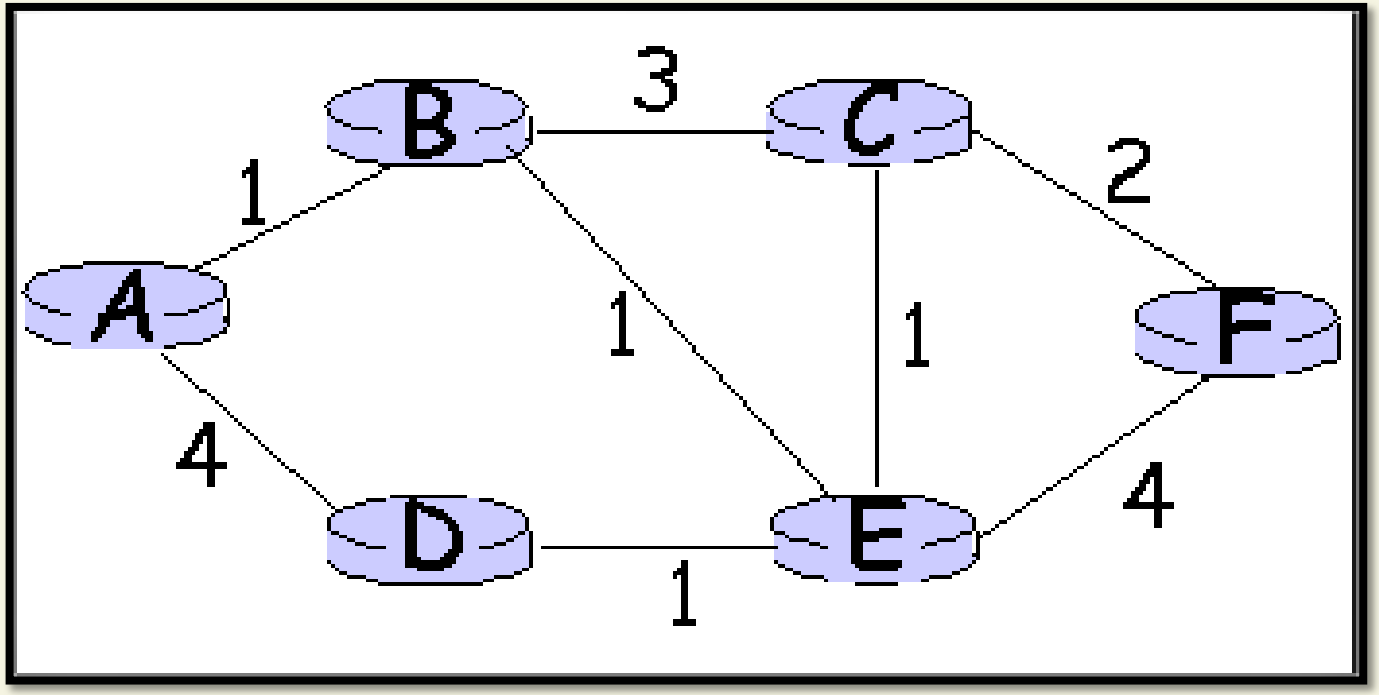
The idea behind link state routing is simple and can be stated as five parts. Each router must:

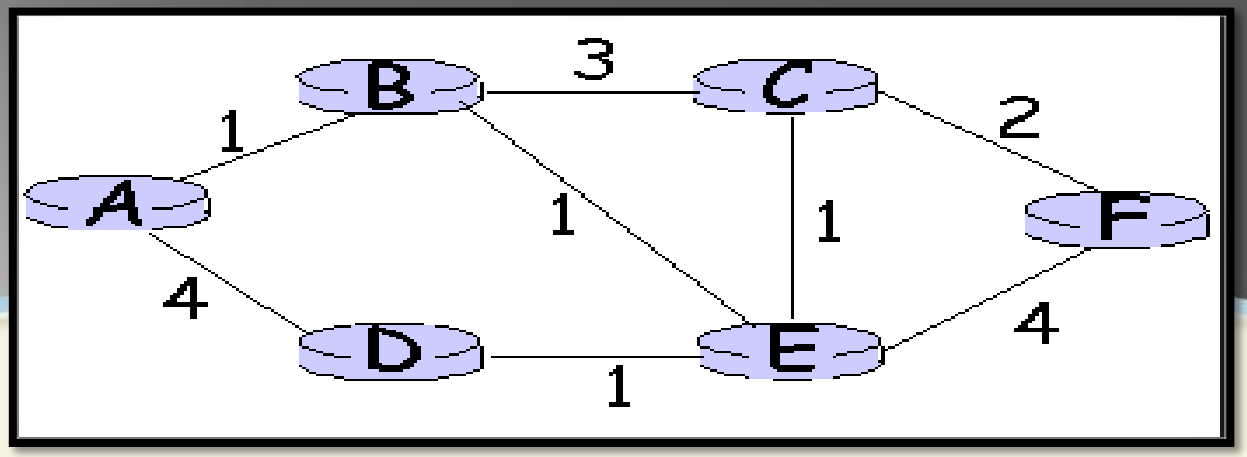
1. ***Discove**r its neighbors and learn their network addresses.*
2. ***Measure** the delay or cost to each of its neighbors.*
3. ***Construct** a packet telling to all it has just learned.*
4. ***Send** the packet to all other routers.*
5. ***Compute** the shortest path to every other router.*

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
• Entire routing table is sent as an update	• Updates are incremental & entire routing table is not sent as update.
• Distance vector protocol send periodic update at every 30 or 90 second	• Updates are triggered not periodic.
• Updates are sent to directly connected neighbor only	• Update are sent to entire network & to just directly connected neighbor.
• Routers don't have end to end visibility of entire network.	• Routers have visibility of entire network of that area only.
• Suffer from count to infinity problem	• No routing loops
. **Slow convergence** after network topology changed due to the count to infinty problem	• Convergence is fast because of triggered updates.
• Examples: RIP, BGP	• Examples: OSPF, IS-IS
. **Easy to configure**	. **More difficult to configure**

End Of Lesson 3

Thanks For Listening