DISTANCE VECTOR ROUTING PROTOCOL

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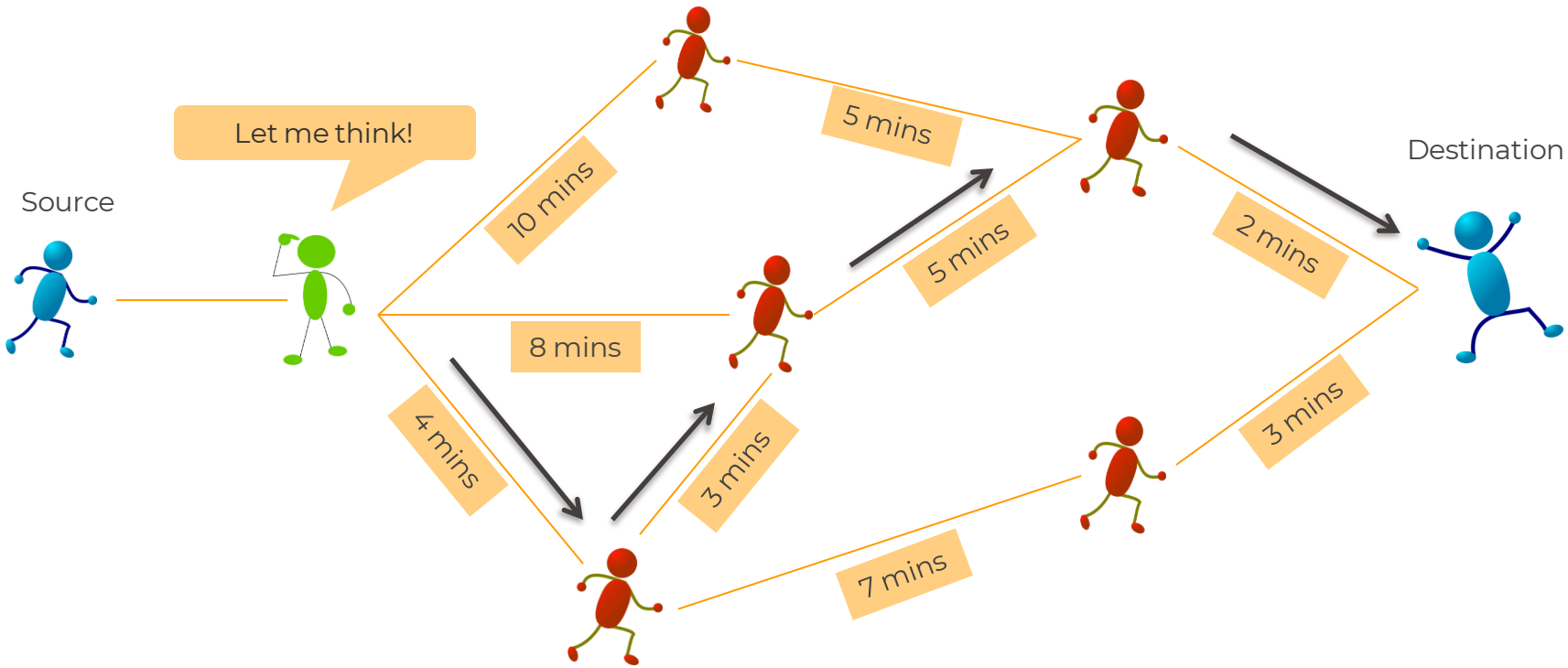
WHAT IS **DISTANCE VECTOR ROUTING PROTOCOL**?

In Distance Vector Routing Protocol, each node shares its routes in the network only to the neighbors and does not broadcast it. (not to all)



Total minimal distance is 4+3+5+2 = 14 mins

Distance is a measure of number of Hops the Packet requires to reach the Destination.

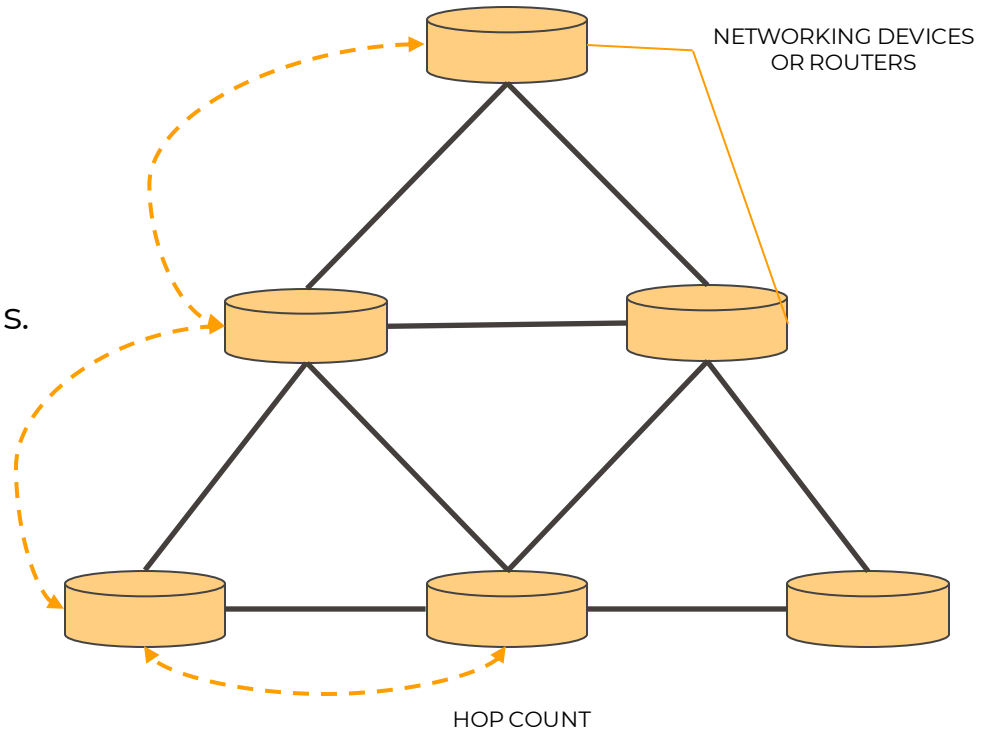
Here Vector is defined as (Distance, Direction) next Hop router to which the packet is to be forwarded.

Distance is defined in terms of hop count and direction.

For example:-

Infinity value is 16 hops.

Routers send vectors every 30 seconds.



- Firstly each node enters the cost of the neighboring node
- A link that is down (not a direct neighbor) is assigned a cost is assigned to Infinity
- Every node that sends a message directly connected to the adjacent node about the adjacent neighbors and their cost.
- After exchanging the nodes information it will find the least cost to reach the other nodes information.

DID YOU KNOW?

The Distance vector algorithm is a dynamic algorithm.

It is mainly used in ARPANET, and RIP.

A distance vector routing algorithm is an intra-domain(within a network) routing protocol which is:

i. Iterative
ii. Asynchronous
iii. Distributed

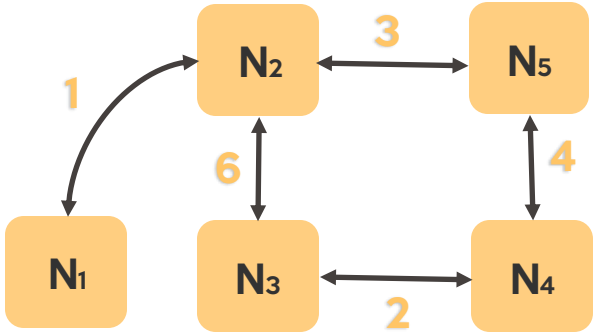
It is based on the Bellman-Ford Equation.

Information kept by router

- Associated with each link connected to a router(neighboring),
- There is a link cost (vector distance).
- Each router has an ID
- Destination, Distance, Next are stored in its routing table.

Distance Vector Table

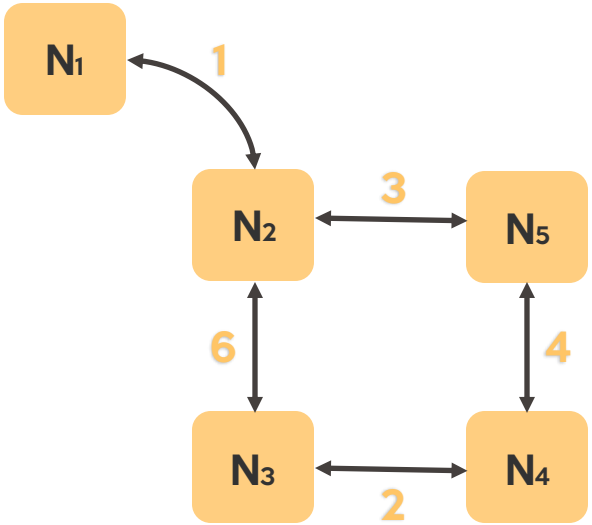
- Distance to itself = 0
- Distance to neighboring router varies
- Distance to other routers = ∞



GRAPHICAL REPRESENTATION

DESTINATION	DISTANCE	NEXT
N_1	0	N_1
N_2	1	N_2
N_3	∞	-
N_4	∞	-
N_5	∞	-

Table For N_1



DESTINATION	DISTANCE	NEXT
N_1	∞	-
N_2	3	N_2
N_3	∞	-
N_4	4	N_3
N_5	0	N_4

Table For N_5

DESTINATION	DISTANCE	NEXT
N_1	1	N_1
N_2	0	N_2
N_3	4	N_3
N_4	∞	-
N_5	3	N_3

Table For N_2

DESTINATION	DISTANCE	NEXT
N_1	∞	-
N_2	6	N_2
N_3	0	N_3
N_4	2	N_4
N_5	∞	-

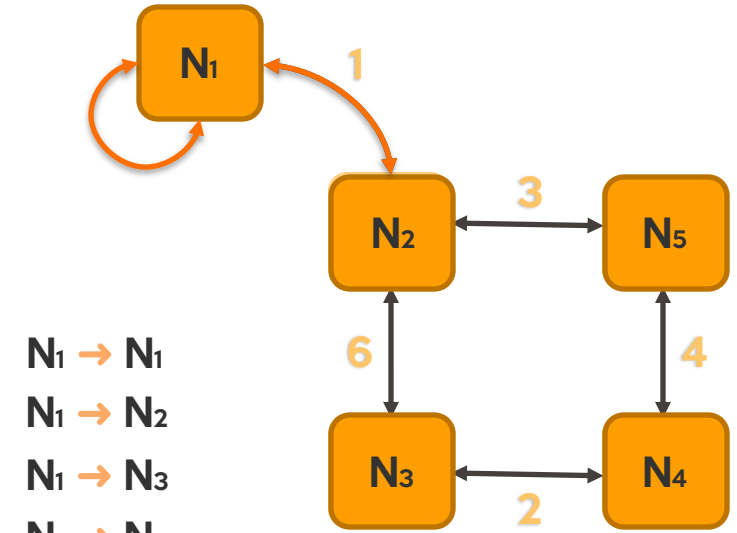
Table For N_3

DESTINATION	DISTANCE	NEXT
N_1	∞	-
N_2	∞	-
N_3	2	N_3
N_4	0	N_4
N_5	4	N_5

Table For N_4

DESTINATION	DISTANCE	NEXT
N_1	0	N_1
N_2	1	N_2
N_3	∞	-
N_4	∞	-
N_5	∞	-

Table For N_1



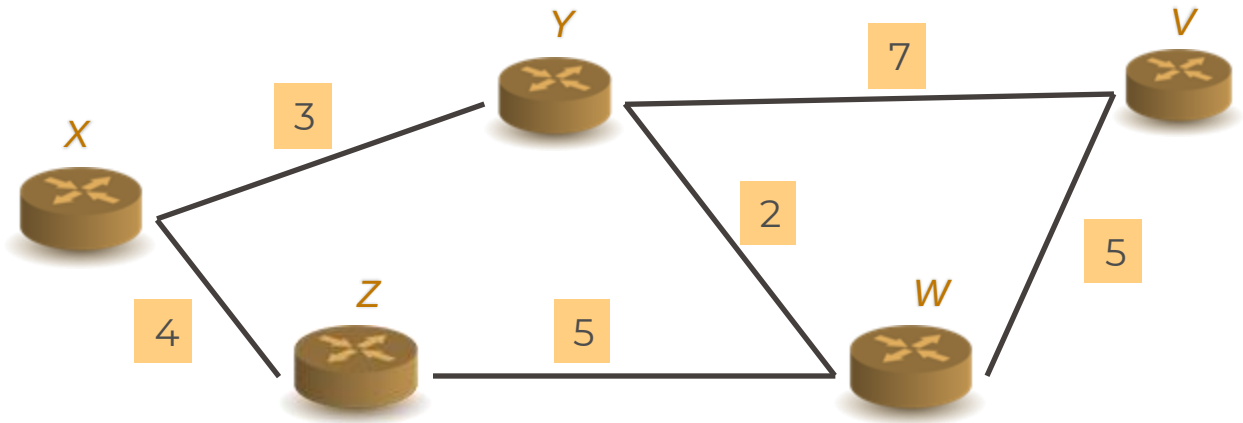
The Bellman-Ford Equation is based on:-

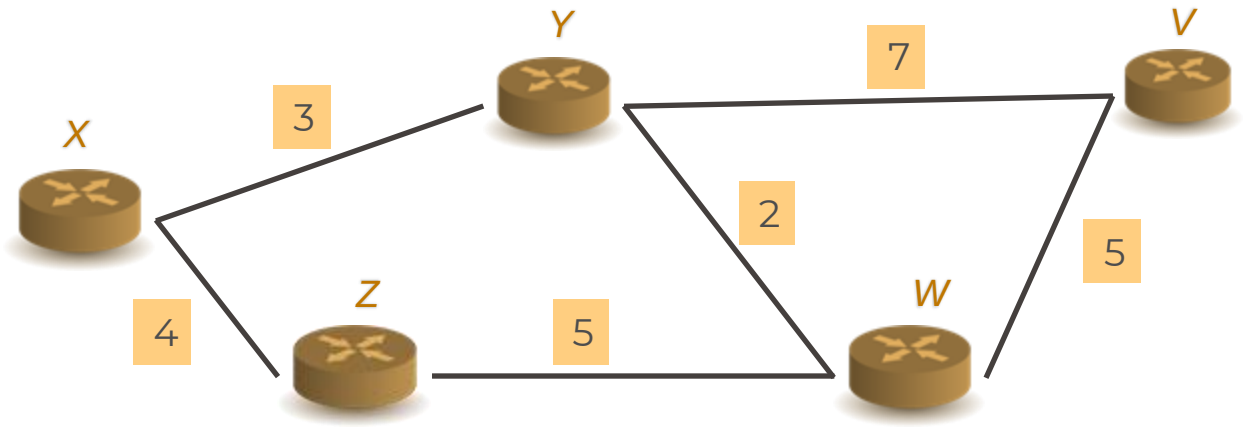
Defining distances at each node X :

dx(y) = cost of least-cost path from X to Y.

Updating distances based on neighbors

dx(y) = min {c(x,v) + dv(y)} over all neighbors V





dx(y) = min{c(x,y) + dy(y), c(x,z) + dz(y)}

= min{3+0, 4+5} = min{3, 9} = **3**

PROS

- Simple implementation and maintenance
- Low resource requirements (memory, CPU)

CONS

- Slow convergence (periodic updates)
- Limited scalability
- Routing loops (due to slow convergence)

D.V. routing protocols maintains routing tables through it's characteristics such that

- Periodic updates which include the entire routing table.
- Calculate the best path.

- Neighbors are defined as routers that share a link and are configured to use the same protocol.
- Detect and react to the topology changes.

THANK YOU

ANY QUESTIONS?