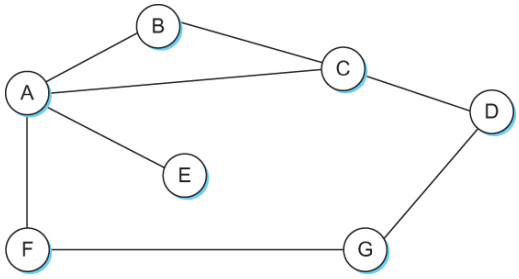
Distance Vector Notes

- Each node(host) constructs a one-dimensional array (vector) containing the cost to all nodes in the network
- Each node distributes its vectors to its immediate neighbors only
- Assume that each node initially knows the cost to each of its neighbors
- Nodes use the distance vectors received from their neighbors to update their vector
- Routing table is determined from these vectors
- Routing Information Protocol (RIP) uses Distance Vector Routing

Example: Consider the following network



Initial vectors for each node are (in table format)

Information Stored at Node	Distance to Reach Node						
	A	B	C	D	E	F	G
A	0	1	1	∞	1	1	∞
B	1	0	1	∞	∞	∞	∞
C	1	1	0	1	∞	∞	∞
D	∞	∞	1	0	∞	∞	1
E	1	∞	∞	∞	0	∞	∞
F	1	∞	∞	∞	∞	0	1
G	∞	∞	∞	1	∞	1	0

Initial Routing Tables

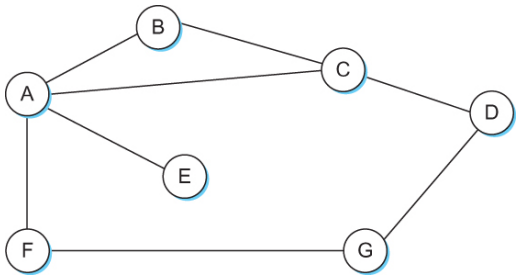
Node A

Destination	*Cost*	*NextHop*
B	1	B
C	1	C
D	∞	-
E	1	E
F	1	F
G	∞	-

Node E

Destination	*Cost*	*NextHop*
A	1	A
B	∞	-
C	∞	-
D	∞	-
F	∞	-
G	∞	-

Each node takes the received vectors from its immediate neighbors and updates its vector table from that information.



In this example for the first update, each node sends its initial vector to each of its neighbors. Each node then updates its vector table from the information contained in the received vectors.

Vectors at each node after receiving the initial vectors from its neighbors (1st update)

Information Stored at Node	Distance to Reach Node						
	A	B	C	D	E	F	G
A	0	1	1	2	1	1	2
B	1	0	1	2	2	2	∞
C	1	1	0	1	2	2	2
D	2	2	1	0	∞	2	1
E	1	2	2	∞	0	2	∞
F	1	2	2	2	2	0	1
G	2	∞	2	1	∞	1	0

Routing Tables after 1 update (Final table for node A)

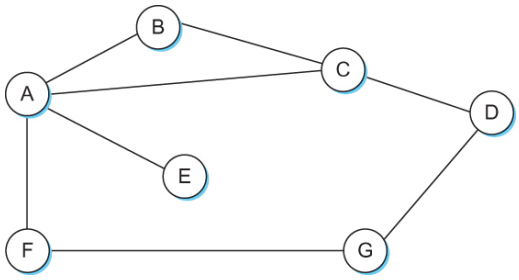
Node A (Final Table)

Destination	*Cost*	*NextHop*
B	1	B
C	1	C
D	2	F
E	1	E
F	1	F
G	2	F

Node E

Destination	*Cost*	*NextHop*
A	1	A
B	2	A
C	2	A
D	∞	-
F	2	A
G	∞	-

For the second update, each node transmits the vector it has after the first update. Each node then updates its vector tables from the information received. Updates are continuously sent at time intervals specified by the protocol.



Vectors at each node after receiving the 2nd update from its neighbors

Information Stored at Node	Distance to Reach Node						
	A	B	C	D	E	F	G
A	0	1	1	2	1	1	2
B	1	0	1	2	2	2	3
C	1	1	0	1	2	2	2
D	2	2	1	0	3	2	1
E	1	2	2	3	0	2	3
F	1	2	2	2	2	0	1
G	2	3	2	1	3	1	0

Routing Tables after 2nd update – Final table for all nodes

Node A (Final Table)

Destination	*Cost*	*NextHop*
B	1	B
C	1	C
D	2	F
E	1	E
F	1	F
G	2	F

Node E (Final Table)

Destination	*Cost*	*NextHop*
A	1	A
B	2	A
C	2	A
D	3	A
F	2	A
G	3	A

As further updates are received, entries in the table are updated as needed – costs can change, nodes can drop out and new nodes can enter.