Distance Vector Routing

a) The least-cost route between any two nodes is the route with minimum distance.

b) Each node maintains a vector(table) of minimum distances to every node.

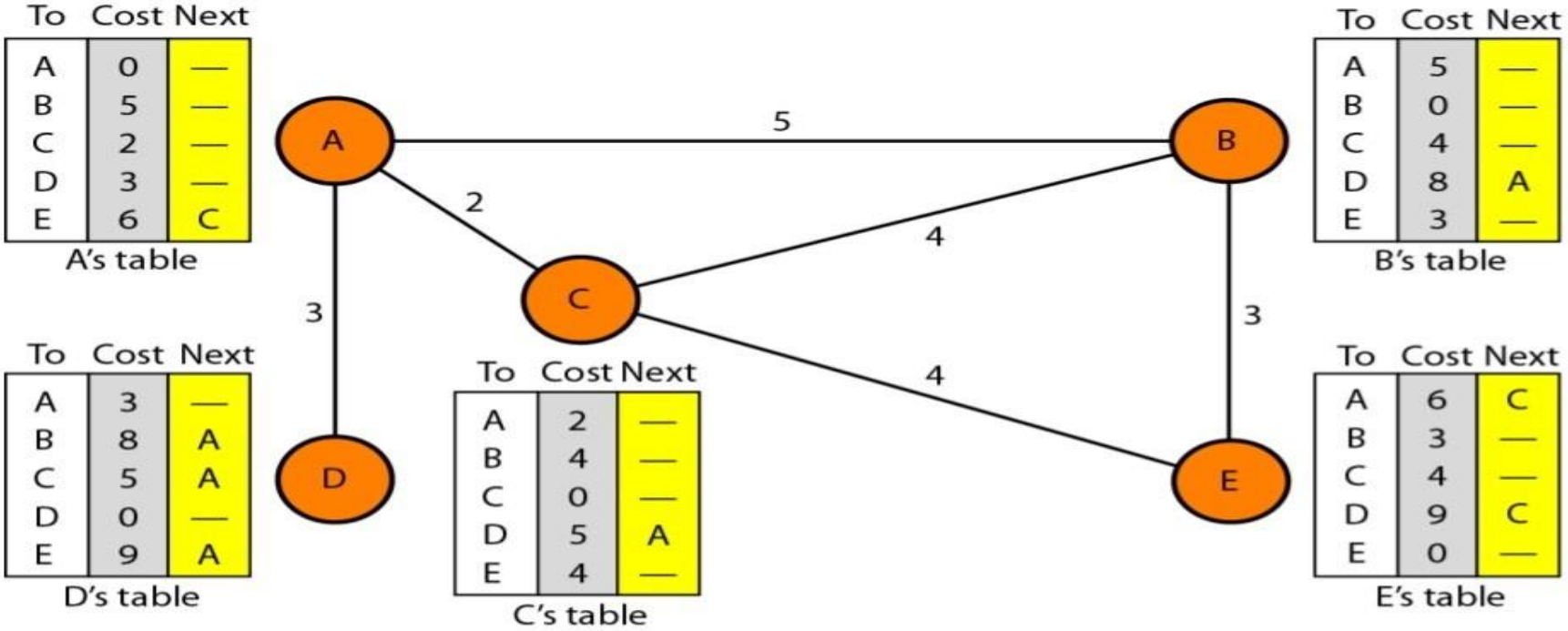
c) The table at each node also guides the packets to the desired node by showing the showing the next hop routing.

Example:

Assume each node as the cities.

Lines as the roads connecting them.

Final Distance vector routing tables



Initialization

a) The table in figure are stable.

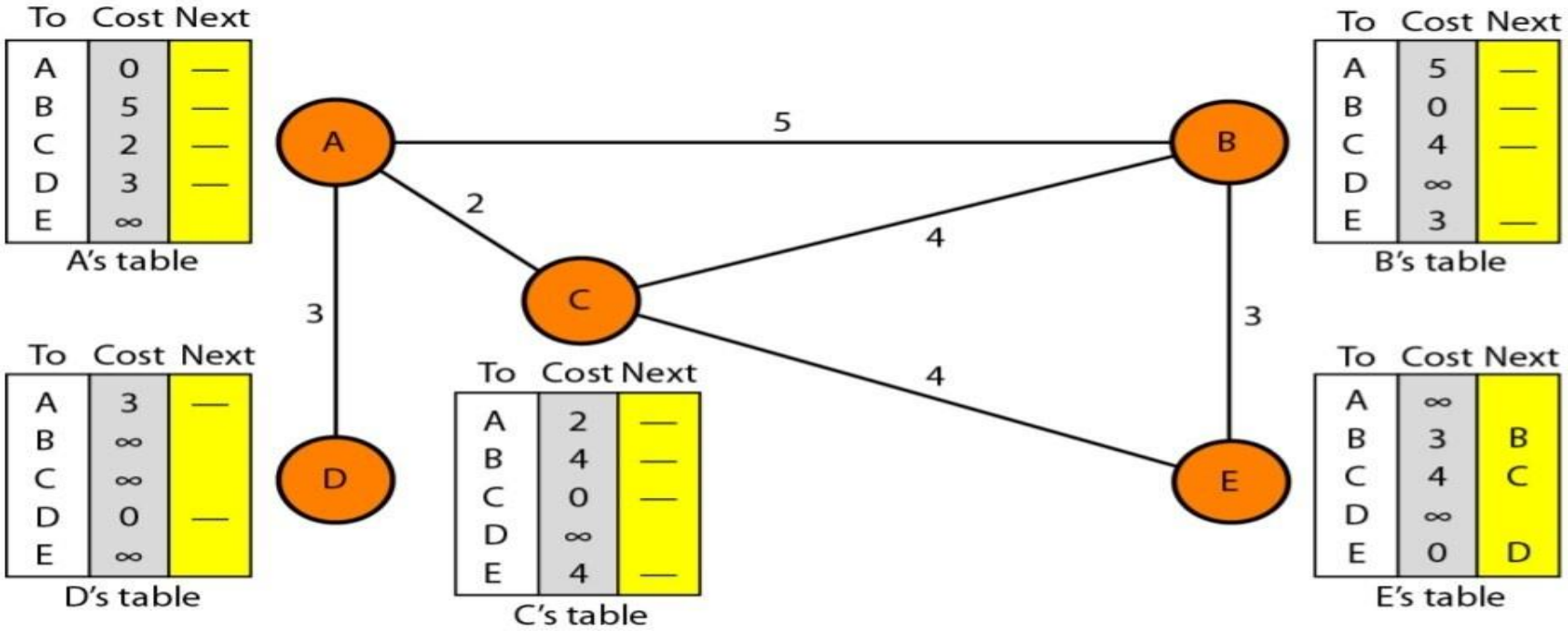
b) Each node knows how to reach any other node and their cost.

c) At the beginning, each node know the cost of itself and its immediate neighbor.[those node directly connected to it.]

d) Assume that each node send a message to the immediate neighbors and find the distance between itself and these neighbors.

e) The distance of any entry that is not a neighbor is marked as infinite(unreachable).

Initialization of tables in distance vector routing (DVR)



Sharing

a) Idea is to share the information between neighbors.

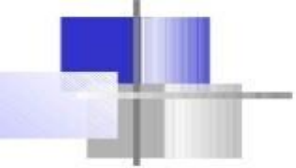
b) The node A does not know the distance about E, but node C does.

c) If node C share it routing table with A, node A can also know how to reach node E.

d) On the other hand, node C does not know how to reach node D, but node A does.

e) If node A share its routing table with C, then node C can also know how to reach node D.

f) Node A and C are immediate neighbors, can improve their routing tables if they help each other.



Sharing Contd.,

a) How much of the table must be shared with each neighbor?

b) The third column of the table(next hop) is not useful for the neighbor.

c) When the neighbor receives a table, this column needs to be replaced with the sender's name.

d) If any of the rows can be used, the next node column filled with sender of the table.

e) Therefore, a node can send only the first two column of its table to any neighbor.

When to share

a) Periodic Update: A node sends its table, normally every 30s, in a periodic update, it depends on the protocol that is using DVR.

b) Triggered Update: A node sends its two-column routing table to its neighbors anytime there is a change in its routing table.

c) This is called triggered update the change can result from the following:

- ✓ A node receives a table from a neighbor, resulting in changes in its own table after updating.
- ✓ A node detects some failure in the neighboring links which results in a distance change to infinity.

Distance Vector Routing (DVR)

a) 3 keys to understand how this algorithm works:
   - **Sharing knowledge about the entire AS**. Each router shares its knowledge about the entire AS with neighbours. It sends whatever it has.
   - **Sharing only with immediate neighbours**. Each router sends whatever knowledge it has thru **all** its interface.
   - **Sharing at regular intervals**. sends at fixed intervals, e.g. every 30 sec.

a) Problems: Tedious comparing/updating process, slow response to infinite loop problem, huge list to be maintained!!