DESTINATION-SEQUENCED DISTANCE VECTOR (DSDV) PROTOCOL

The Destination-Sequenced Distance Vector (DSDV) protocol is a table-driven routing protocol based on the improved version of classical Bellman-Ford routing algorithm. DSDV is based on the Routing Information Protocol (RIP), explained in Chapter 7. With RIP, a node holds a routing table containing all the possible destinations within the network and the number of hops to each destination. DSDV is also based on distance vector routing and thus uses bidirectional links. A limitation of DSDV is that it provides only one route for a source/destination pair.

Routing Tables

The structure of the routing table for this protocol is simple. Each table entry has a sequence number that is incremented every time a node sends an updated message. Routing tables are periodically updated when the topology of the network changes and are propagated throughout the network to keep consistent information throughout the network.

Each DSDV node maintains two routing tables: one for forwarding packets and one for advertising incremental routing packets. The routing information sent periodically by a node contains a new sequence number, the destination address, the number of hops to the destination node, and the sequence number of the destination. When the topology of a network changes, a detecting node sends an update packet to its neighboring nodes. On receipt of an update packet from a neighboring node, a node extracts the information from the packet and updates its routing table as follows

DSDV Packet Process Algorithm

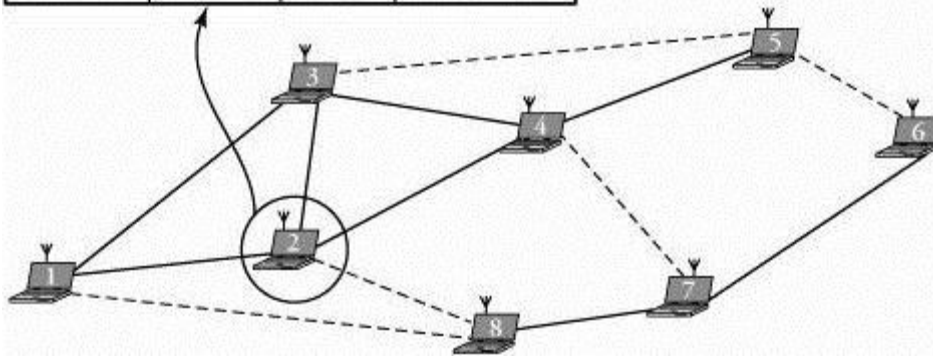
1. If the new address has a higher sequence number, the node chooses the route with the higher sequence number and discards the old sequence number.
2. If the incoming sequence number is identical to the one belonging to the existing route, a route with the least cost is chosen.
3. All the metrics chosen from the new routing information are incremented.
4. This process continues until all the nodes are updated. If there are duplicate updated packets, the node considers keeping the one with the least-cost metric and discards the rest.

   In case of a broken link, a cost of ∞metric with a new sequence number (incremented) is assigned to it to ensure that the sequence number of that metric is always greater than or equal to the sequence number of that node. Figure 8.2 shows a routing table for node 2, whose neighbors are nodes 1, 3, 4, and 8. The dashed lines indicate no communications between any corresponding pair of nodes. Therefore, node 2 has no information about node 8.

Figure 8.2. A DSDV routing table

Routing Table for Node 2

Destination	Next Hop	Metric	Dest. Seq. No.
1	1	1	123
2	0	0	516
3	3	1	212
4	4	1	168
5	4	2	372
8	1	INF	432



The packet overhead of the DSDV protocol increases the total number of nodes in the ad-hoc network. This fact makes DSDV suitable for small networks. In large adhoc networks, the mobility rateand therefore the overheadincrease, making the network unstable to the point that updated packets might not reach nodes on time.

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