WRP AND CGSR PROTOCOL

Cluster-Head Gateway Switch Routing Protocol

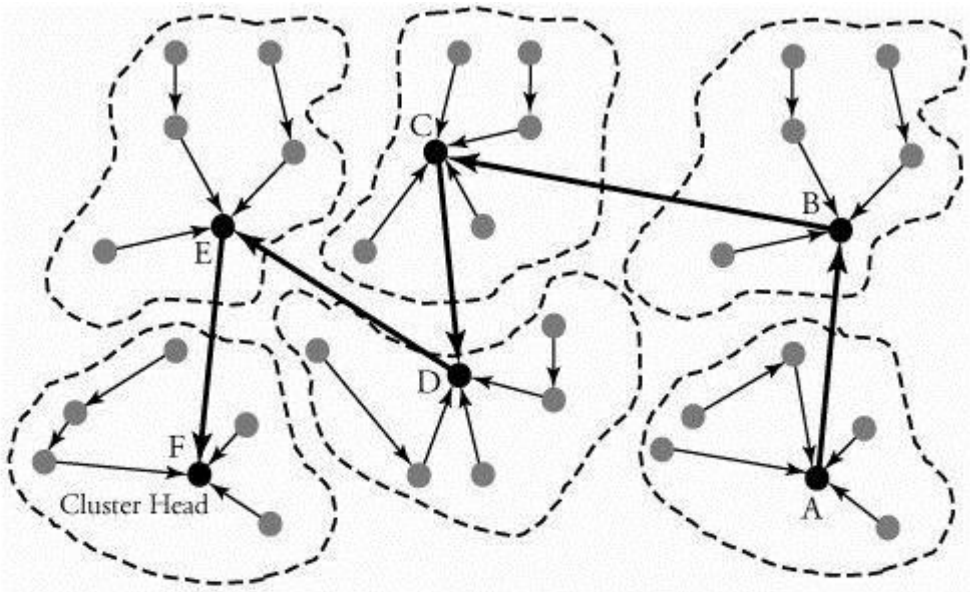
The Cluster-Head Gateway Switch Routing (CGSR) protocol is a table-driven routing protocol. In a clustering system. each predefined number of nodes are formed into a cluster controlled by a cluster head, which is assigned using a distributed clustering algorithm. However, with the clustering scheme, a cluster head can be replaced frequently by another node, for several reasons, such as lower-level energy left in the node or a node moves out of contact.

With this protocol, each node maintains two tables: a cluster-member table and a routing table. The cluster-member table records the cluster head for each destination node, and the routing table contains the next hop to reach the destination. As with the DSDV protocol, each node updates its cluster-member table on receiving a new update from its neighbors.

Clustering and Routing Algorithms

CGSR routing involves cluster routing, whereby a node is required to find the best route over cluster heads from the cluster-member table. Figure 19.3 shows an example of routing in an area in which six clusters have been formed. A node in cluster A is transmitting a packet to a node in cluster F. Nodes within each cluster route their packets to their own associated clusters. The transmitting node then sends its packet to the next hop, according to the routing table entry associated with that cluster head. The cluster head transmits the packet to another cluster head until the cluster head of the destination node is reached. The routing is made through a series of available cluster heads from A to F. Packets are then transmitted to the destination.

Figure 8.2. Communication with cluster-head gateway switch routing (CGSR) protocol



Wireless Routing Protocol (WRP)

The Wireless Routing Protocol (WRP) is a table-based protocol maintaining routing information among all nodes in the network. This protocol is based on the distributed Bellman-Ford algorithm. The main advantage of WRP is that it reduces the number of routing loops. With this protocol, each node in a network maintains four tables, as follows:

1. Distance table, which holds the destination, next hop, distance, and predecessors of each destination and each neighbor.
2. Routing table, which saves the destination address, next hop, distance, predecessor, and a marker for each destination, specifying whether that entry corresponds to a simple path.

3. Link-cost table, which provides the link cost to each neighbor and also the number of periodic update periods elapsed since the node received any error-free message from it.
4. Message transmission-list table, which records which updates in an update message are to be retransmitted and which neighbors need to acknowledge the retransmission. The table provides the sequence number of the update message, a retransmission counter, acknowledgments, and a list of updates sent in the update message.

   Nodes should either send a message including the update message or a HELLO message to their neighbors. If a node has no message to send, it should send a HELLO message to ensure connectivity. If the sending node is new, it is added to the node's routing table, and the current node sends the new node a copy of its routing table content.

   Once it detects a change in a route, a node sends the update message to its neighbors. The neighboring nodes then change their distance entries and look for new possible paths through other nodes. This protocol avoids the count-to-infinity issue present in most ad-hoc network protocols. This issue is resolved by making each node perform consistency checks of predecessor information reported by all its neighbors in order to remove looping and make a faster route convergence in the presence of any link or node failure.

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