

## **Classification of Routing Protocols**

Classification of routing protocols in ad hoc wireless sensor networks is dependent on several reasons. It is not mutually exclusive and there exist some protocols which comes in more than one criteria. The four criteria's on which routing protocols are divided are as follows,

### **1. Routing Information Based on Update Mechanism**

Routing protocols which are classified based on routing information update mechanism are as follows,

#### **(i) Table Driven (Proactive) Routing Protocols**

In table driven routing protocols, route information is exchanged periodically between different nodes. Hence, a routing table is always available with each node in the network. Generally, the entire topology is flooded with the routing information. Whenever a node requires a path to reach destination then it runs related pathfinding algorithm on the topology information maintained by that node.

##### **Examples**

- ❖ Destination Sequenced Distance Vector Routing (DSDV) Protocol
- ❖ Wireless Routing (WRP) Protocol
- ❖ Cluster-head Gateway Switch Routing (CGSR) Protocol
- ❖ Source Tree Adaptive Routing (STAR) Protocol.

#### **(ii) On-demand (Reactive) Protocols**

In on demand routing protocols, route information is not exchanged periodically between different nodes. That is, the information related to network topology is not maintained by the nodes. Hence, whenever a node requires a path to reach destination then it obtains through a connection establishment process.

### Examples

- ❖ Dynamic Source Routing (DSR) Protocol
- ❖ Ad hoc On-demand Distance Vector Routing (AODV) Protocol
- ❖ Temporally Ordered Routing (TORA) Protocol
- ❖ Associativity Based Routing (ABR). Protocol.

### (iii) Hybrid Routing Protocols

Hybrid routing protocols combines the features of both table driven protocols and on-demand protocols. A table driven approach is used for the nodes that are within the routing zone (specific-geographical region) whereas on-demand approach is used for the nodes that are outside the routing zone.

## 2. Use of Temporal Information for Routing

Routing protocols which are classified based on the use of temporal information for routing depends on two categories,

### (i) Routing Protocols Using Past Temporal Information

Protocols belonging to this category contains information regarding the past status of the links. It also provides information of the links at the time of routing to make routing decisions. For example, during the process of path-finding algorithm, an efficient and stable path is provided by the routing algorithm along with its shortest path-finding algorithm. Any topological changes may effect the path and may also lead to its breakage. Thus, making the path to go through a resource-wise expensive path reconfiguration process.

### (ii) Routing Protocols Using Future Temporal Information

Protocol in this category uses information regarding future status of the links to provide good routing decisions. The information of future status contains not only the lifetime of wireless links but also the lifetime of its node.

## 3. Classification Based on the Routing Topology

In adhoc wireless networks, classification of routing protocols based on the routing topology depends on the number of nodes. It contains smaller number of nodes that is why it utilizes either flat topology or hierarchical topology.

### (i) Hierarchical Topology Protocols

It utilizes an addressing scheme and logical hierarchy to decrease the maintenance cost in the internet. In order to maintain hierarchy in the network it needs either a geographical information or hop distance.

### (ii) Flat Topology Protocols

It utilizes a flat addressing scheme which is same as addressing scheme of IEEE 802.3. It makes an assumption that all the nodes in the protocol have a unique address.

DSR and AODV are the examples of Flat topology protocols. Where as, cluster-head Gateway Switch Routing Protocol (CGSR) is an example of Hierarchical topology protocols.

## 4. Utilization of Specific Resources

### (i) Power Aware Routing

Power aware routing determines MANETs routing by using power-aware matrixs. These matrixs reduces the cost of packet routing by five to thirty percentage compared to shortest-hop routing. They also reduce energy consumption by forty to seventy percentage compared to MAC layer protocol. Besides reducing cost and energy consumption, they make sure that packet delays do not increase the mean time node failure.

### (ii) Geographical Information Assisted Routing

It effectively utilizes geographical information to enhance the performance of routing and decreases the overhead.



# Classifications of Routing Protocols:

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