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DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

19EC402- WIRELESS ADHOC AND SENSOR NETWORKS

IV ECE / VII SEMESTER

UNIT 3 – ROUTING PROTOCOLS

TOPIC 1 –ISSUES IN DESIGNING ROUTING PROTOCOLS

ROUTING

Routing is the process of finding the best path for traffic in a network, or across multiple networks. The role of routing is similar to the road map for a hotel. In both cases, we need to deliver messages at proper location and in an appropriate way.

Routing in a mobile ad-hoc network depends on many factors such as:

- Modeling of the topology,
- Selection of routers,
- Initiation of a route request,
- And specific underlying characteristics that could serve as heuristics in finding the path effectively.

ROUTING

In a MANET, each node or device is expected to serve as a router, and each router is indistinguishable from another in the sense that all routers execute the same routing algorithm to compute paths through the entire network.

NEED FOR ROUTING

- Since centralized routing in a dynamic and even for small networks is impossible therefore routing computation must be distributed.
- Route computation should not add many more nodes.
- If any host demands for the route, they must have quick access.
- Maintenance of a global state should not involve in the route computation.
- Each node should care about their destination node to its route and should not be involved in frequent topology updates for those portions of the network that have no traffic.
- Since broadcast can be time consuming for MANETs, it must be avoided as much as possible.
- In routing there must have a backup route when the primary route has become stale.

ROUTING CLASSIFICATION

Routing protocol can be classified as:

- Proactive Protocol
- Reactive Protocol
- Hybrid Protocol

PROACTIVE PROTOCOL

- Proactive protocols attempt to evaluate continuously the routes within the network. It means proactive protocol continuously maintain the routing information, so that when a packet needs to be forwarded, the path is known already and can be immediately used. The family of distance vector protocols is an example of proactive scheme.
- The advantage of the proactive schemes is that whenever a route is needed, there is negligible delay in determining the route.
- Unfortunately, it is a big overhead to maintain routing tables in the MANET environment. Therefore, this type of protocol has following common disadvantages:
- Requires more amounts of data for maintaining routing information.
- Low reaction on re-structuring network and failures of individual nodes.

REACTIVE PROTOCOL

Reactive protocols do not maintain routes but invoke a route determination procedure only on demand or we can say reactive protocols build the routes only on demand. Thus, when a route is required, some sort of global search procedure is initiated.

The family of classical flooding algorithms belongs to the reactive protocol group. Examples of reactive ad-hoc network routing protocols include ad hoc on demand distance vector (AODV) and temporally ordered routing algorithm (TORA).

REACTIVE PROTOCOL

These protocols have the following advantages:

- No large overhead for global routing table maintenance as in proactive protocols.
- Reaction is quick for network restructure and node failure. Even though reactive protocols have become the main stream for MANET routing, they still have the following disadvantages:
- Latency time is high in route finding
- Excessive flooding can lead to network clogging.

Hybrid Protocols

Hybrid protocols attempt to take advantage of best of reactive and proactive schemes. The basic idea behind such protocols is to initiate route discovery on demand but at a limited search cost. One of the popular hybrid protocols is zone routing protocol (ZRP).

Routing protocols may also be categorized as follows:

- Table-driven protocols
- Source initiated on -demand protocols

THANK YOU