GALGOTIAS UNIVERSITY

School of Computing Science and Engineering

Program: B.Tech.

Course Code: CSCN 4024

Course Name: Wireless and Mobile Security

Routing Protocols

- Routing- It is a process of choosing paths in a network along which network traffic to be send

- Routing algorithms determine the specific choice of route

Performance Criteria	**Network Information Source**
Number of hops	None
Cost	Local
Delay	Adjacent node
Throughput	Nodes along route
	All nodes
Decision Time	
Packet (datagram)	**Network Information Update Timing**
Session (virtual circuit)	Continuous
	Periodic
Decision Place	Major load change
Each node (distributed)	Topology change
Central node (centralized)	
Originating node (source)	

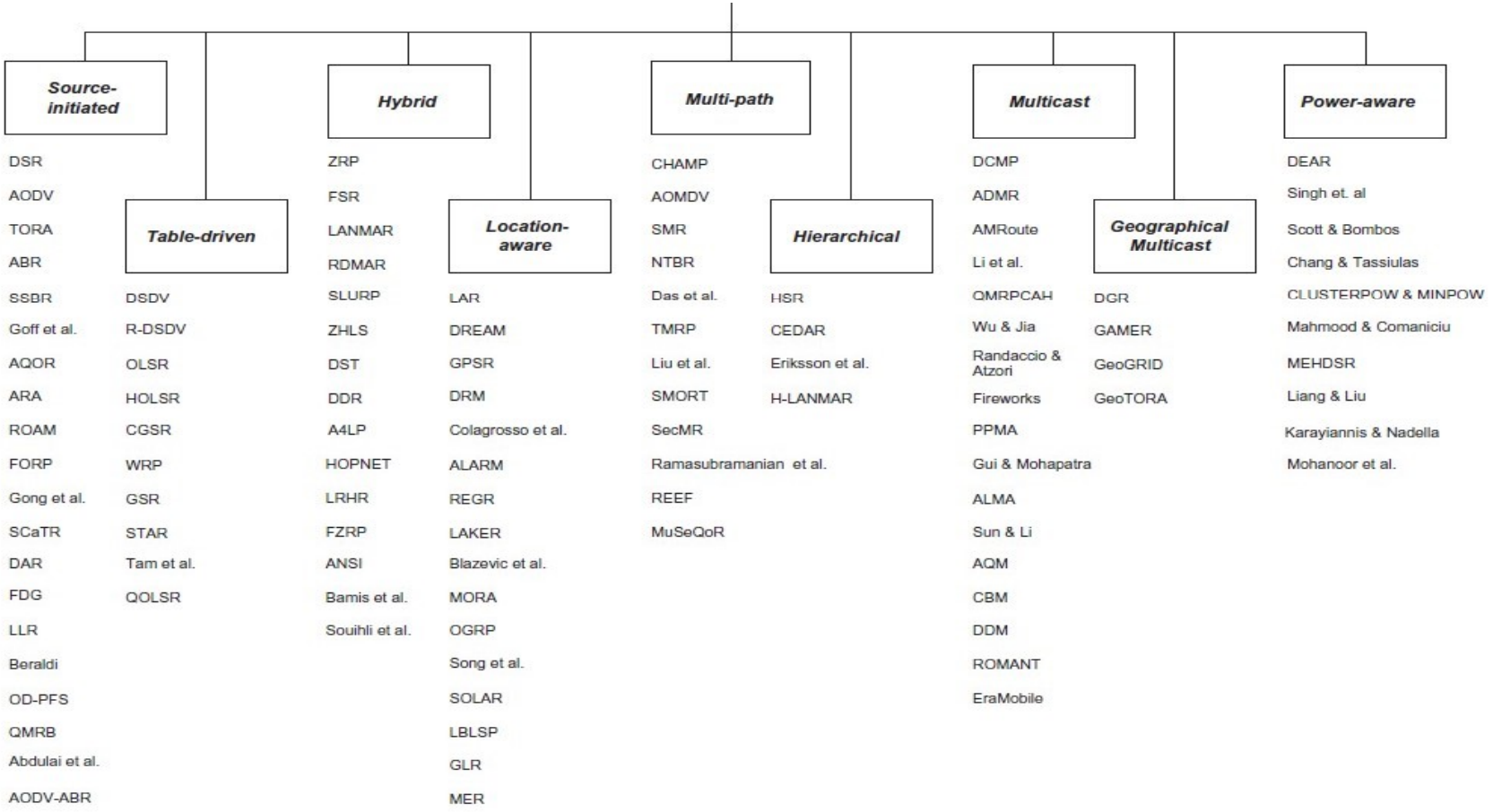
Routing in MANET

- No dedicated router nodes
- Local node mobility
- Global node mobility
- Limited resources
- Dynamic network environment
- Limited power
- Uncertainty of path quality

Routing in MANET

- Basic goals of routing protocols
  - Maximize
    - throughput
    - network capacity
    - network lifetime
  - Minimize
    - packet loss and drop
    - control overhead
    - energy consumption
    - delay

Routing in MANET



Reactive routing protocols

- Route is created only when the source requests a route to a destination
  - Route discovery process
  - Route maintenance

Reactive routing protocols

- Dynamic source routing
  - Route discovery process
    - Route request
      - Broadcasts a route request packet to its neighbors
      - Every node within a broadcast range adds their node id to the route request packet and rebroadcasts
      - Every node maintains route cache - If a route is found in the route cache, the node will return a route reply message to the source node rather than forwarding the route request message further
      - DSR assumes that the path obtained is the shortest since it takes into
        - consideration the first packet to arrive at the destination node

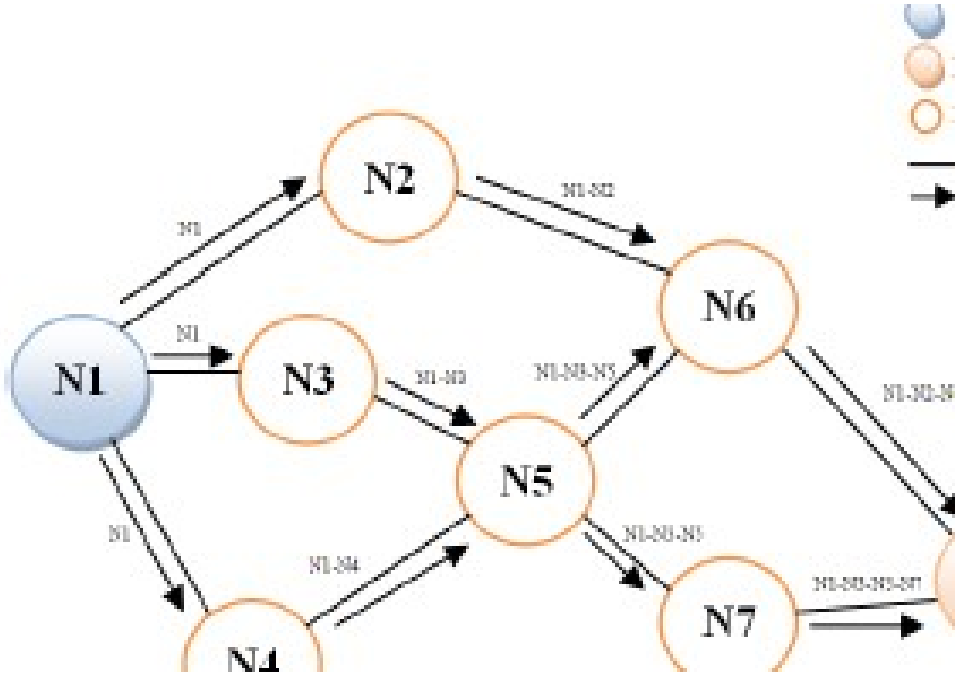
Reactive routing protocols

- Dynamic source routing
  - Route discovery process
    - Route reply messages
      - Sent to the source which contains the complete route from the source to the destination
      - The source caches this route

Reactive routing protocols

- Dynamic source routing
  - Route maintenance
    - Route error and acknowledgements packets
      - DSR ensures the validity of the existing routes based on the acknowledgements received from the neighboring nodes
      - Acknowledgement packets also include passive acknowledgements as the node overhears the next hop neighbor is forwarding the packet along the route to the destination
      - A route error packet is generated when a node encounters a transmission problem which means that a node has failed to receive an acknowledgement

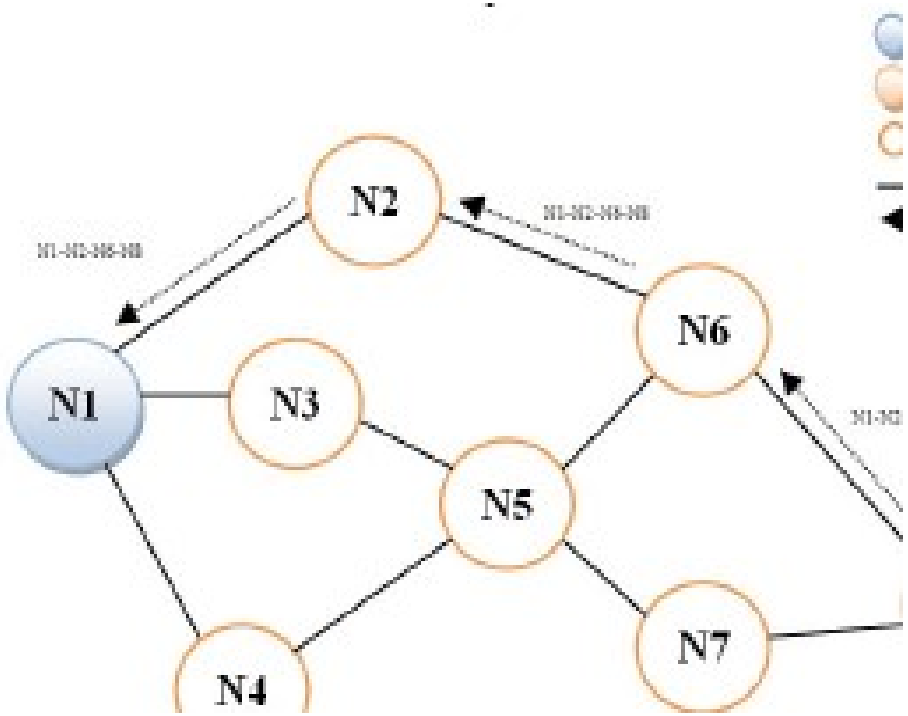
Route Discovery in DSR



Route Discovery in DSR

- In route discovery operation, Route Request Packet is initiated for seeking a route to specified destination.
- This packet contains information about the source and destination.
- According to that, any node that receives a *Route Request Packet first checks its route cache for any available* information about its listed destinations as shown in figure.

Route Reply Propagation in DSR



Route Reply Propagation in DSR

- The Route Reply Packet contains the entire route to the destination which is recorded in the route cache of the source node.

- On the case of link failure, the node that had detected the route break sends ERROR Packet back to the source.


Thank You