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- The major issue in the ad-hoc network in shared medium is Security. The crisis previously has the right to use to the network transfer data which helps to forward copied data that which will origin the whole network to be completely shutdown very quickly.

3. Taxonomy of Wireless Routing Protocols:

Wireless routing protocols are getting used conjointly unpredictable to prompt recurrent modifications in topology which is to be helpful in correctly developing the resources. Wireless Routing Protocols are classified as table-driven, on-demand, hierarchical, hybrid, and geographical. The following figure demonstrates the categorization of MANET protocols.

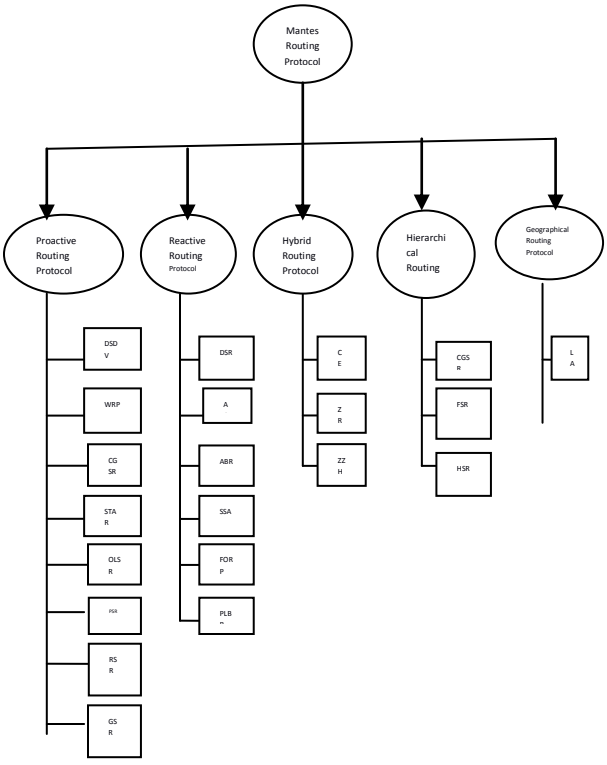

Fig 3.1: Routing protocols of MANET

3.1. Proactive Routing Protocols:

It can be utilized to locate the optimal path mechanism depends on the routing table and maintain periodical updates with neighbor nodes. Most drawbacks in this approach wasting the bandwidth with unnecessary control messages.

3.2. Reactive Routing Protocols:

It's an active approach to locate the path from the resource to target depends on time .If time changes the path also changes. It's reducing the network routing overhead and increasing bandwidth for data communication. The major problem to find neighbor nodes with a short period of time, but it overcomes using flooding process.

3.3. Hybrid Routing Protocols:

These protocols are used for standard data communication purpose. but, it can include the behavior of together table-driven and on-demand protocols and reduce the problems of presented protocols and fully depends on hybrid methods to look the issues in network connectivity as with the scenario it works similar to a proactive routing protocol and in a tiny network, which treats like a table-driven protocols thus may not be assured in development with minimum node density networks.

3.4. Hierarchical Routing Protocols:

Depends on the request we can select proactive or reactive, and both based on hierarchical level usage.

3.5. Geographical Routing Protocols:

It based on targeted network geo positions [4][5][6][7] based routing mechanisms. This

turns decreasing the routing overhead and control overhead for finding destinations.

4. Analysis of Wireless Routing Protocols

In this work we discussed about analysis of the Wireless routing protocols based on their uniqueness, the process, pros and cons.

4.1. Comparison of MANET Routing Protocols

In this we mention the assessment among the wireless routing protocols evaluated in the following Table.

Table 1: The assessment of the MANET routing protocols.

Routing type	Proactive type	Reactive type	Hybrid type	Hierarchical type	Geographical type
Structure of Routing	Flat with Hierarchical	Mostly flat, not in cluster-based	Hierarchical	Flat with hierarchical	Greedy unicast routing
accessibility of route	Always	On demand	Target based routing	Always	Always
Control Traffic	High	light proactive Protocols	Medium	high	control traffic is less
cyclic updates	Yes depends on condition	Not required.	Yes	Depends on the node required or periodic	Periodic
delay in the route finding	short	elevated	Lower for Intra-zone; Higher for Inter-zone	elevated	short
Requirement of Storage	elevated	Based on the number of routes required. Lesser than proactive protocols	Based on the zone or cluster	based on the number of routes	High storage because every nodes stores the locations
Bandwidth requirement	elevated	short	Medium	elevated	elevated
Power requirement	elevated	short	Medium	elevated	short
Scalability	Up to 100 nodes	Elevated Point-to-point	Large networks	Short Point-to-point	scalability less
mobility	periodic mobility	AODV uses local route discovery	both	both	all the time changing
QoS	shortest path	shortest path	shortest path and stable route	shortest path and stable routing	node location service
Weaknesses	not suitable for large network	latency, Flooding occurred	Size of the zone it inherits the Disadvantages if it proactive and reactive	high latency In the large zone	Short life
Strengths	constant Control traffic	up-to-date maintains not necessary network information	overhead of proactive and Reduce	build overlay networks	Suitable for sensor networks.

4.2.1. DSDV (Destination-Sequenced Distance-Vector protocol):

It is an improvement of Bellman Ford Routing Mechanism with table driven protocol which includes liberated being of loops in routing tables. It depends on cyclic updates and the capability to contract with active topology is reduced. Not changing topology protocol. Cyclic update messages boundary the protocol to lesser networks. Poor scalability.

Advantages:

- It intended for the limited number of nodes,

Disadvantages:

- No proper measurement, no considerable business performance.
- High battery consumption for periodic updates with routing table.

4.2.2. Optimized Link State Routing (OLSR) Protocol:

It is IP based routing Protocol and maintain the optimized communication in mobile adhoc networks. It uses topology control to find the nodes.

Benefits:

- No route discovery delay.
- Greater throughput.
- Increase in the number of routes does not increase routing overhead.

Drawbacks:

- Throughout the network updated topology information transfers from time to time
- Greater bandwidth required.
- More processing power required to compute optimal paths.

4.2.3. Wireless Routing Protocol (WRP):

Every node maintains four tables: the cost of link, routing, amplitude and retransmission of the message list (MRL). Whenever, an updated message is communicated to neighbor nodes then WRP updates routing tables. SN of the update message and retransmission counter is kept in the MRL. Node transmit the updated message after identifying a change in the link or after processing updates from their neighbors.

Advantages:

- Count to infinity is solved

Disadvantages:

- More memory is required to maintain the four table
- Extra bandwidth and power is consumed due to periodic HELLO message

4.2.4. FSR (Fisheye State Routing) :

FSR is an absolute hierarchical routing approach. It is a proactive link-state routing protocol. Like link-sate, it keeps a complete topology map at every node. In this protocol, there is a regular transfer of HELLO packets and topology tables within the local neighbor only (instead of flooding entire network). Since the distance to destination decreases, the topology table update frequency also decreases. Updates for close destination are propagated generally more than updates for a remote destination. Every node holds: Distance Table, Neighbor list, the Next Hop Table and Topology Table.

Advantages:

- Maintain accurate routing information for immediate neighbors.

Parameters	DSDV	OLSR	WRP
Packet Delivery Ratio (PDR):	- Increases initially then Low compared to OLSR	compared to DSDV, the higher packet delivery ratio	Increases initially then Low compared to OLSR
Routing Overhead	- Very high for a trivial number of nodes	Low (reduces the routing overhead)	high
Caching Overhead	Medium	High	elevated
Delay and latency in the End to end	Increasing the number of nodes it remains constant	moderate DSDV	The average delay is high evaluated to standard routing
Packet/dropped/loss	High	Packet loss rate is less because most of the Packets sent and received is among the MPR nodes	high
Throughput	Least very low When compared with DSR, OLSR and AODV	High when judge against with further link state protocols	low

- Since the distance between data packets and destination node decreases accuracy increases.

Disadvantages:

- Progressively limited details as distance increases.
- The routing table size grows linearly with network size.

4.2.5. GSR (Global State Routing): It is identical to other connection status routing protocols. This protocol tries to provide worth of connection status routing, but with the integrity of distance vector protocols. This does not the flood network with link-state updates. This protocol regularly exchange collected link-state information with its neighbors. Sometime this is identical to STAR when optimal paths are required. To ensure the link-state table is up to date it uses sequence numbers. Entries with earlier sequence numbers are replaced with updated sequence number.

Advantages:

- GSR can provide optimal and loop free paths.
- It can be used to support Quality of Service.

Disadvantage:

- Reliability of the Link layer is still required.

Table 2: **Comparison between the Proactive Routing Protocols**

4.3.1. DSR (Dynamic Source Routing) Protocol:

This protocol is an on insist routing protocol depends on the perception of resource routing. Portable nodes preserve route accumulations that restrain the resource routes that the portable is attentive of accesses in route accumulations are frequently modernized as new routes are studied. It's intention for networks where the portables progress at reasonable speed with respect to packet transmission latency. Mock-up outcomes illustrate a excellent performance in highly portable networks as well as in fixed networks. Overheads are more in the large networks. This protocol is not scalable for huge networks.

Advantages:

- Guaranteed loop-free routing.

- Utilize "soft state" in routing.

Disadvantages:

- Not scalable to large networks.
- Processing resources required are more in comparison to other protocols.

4.3.2. AODV (Ad hoc On-Demand Distance Vector) Routing Protocol: It is an extension version of DSDV, in on demand basis reduce the number of broadcasts by generating routes. In the portable networks AODV has a good performance. Because of Transmission errors link breakage detection is performed in the MAC layer. AODV protocol can be utilized in mini, intermediate and large scale networks. The disadvantage of this protocol is its supports only for symmetric links.

Pros:

- For finding the most recent route to reach target node with help of on demand routes are established by utilizing destination sequence numbers
- Lesser interruption for link setup.

Cons:

- Its supports only for symmetric links.
- Numerous Route response packets in reply to a single Route Request packet can go ahead to profound control overhead.

4.3.3. TORA (Temporally Ordered Routing Algorithm): It is an efficient, more adaptive and extensible distributed routing protocol, which is based on the approach of link reversal. This protocol is recommended for multi-hop and highly changeable wireless networks. This approach is source-initiated and on requirement routing approach and it finds various paths from sender node to terminal node. This approach consists of mainly three phases: Route creation, Route maintenance and Route deletion. QUERY and UPDATE packet is used to route creation. To erase invalid routes a clear packet (CLR) is broadcasted through the network.

Advantages:

- Good in dense networks.
- Multiple paths created.

Disadvantages:

- With the increase in mobility, performance degrades.

4.3.4. ABR (Associatively Based Routing):

This describes a novel kind of routing metric “degree of association stability” for MANETs. There are three major stages of this approach: Route detection, Route modernization and Route removal. Every mobile node has their own degree of stability; on the basis of this degree of stability, a path is selected. Association permanence of single node with respect to further node can be defined Adhoc on requirement Distance Vector Routing. AODV is fundamentally an enhancement of DSDV. It reduces the number of transmission, by creating paths based requirement, which is different from DSDV. RREQ (route request) is transmitted when a node want to broadcast a data packet to destination node. To ensure the loop free path RREQ uses the SN and reply consist of updated information only.

Advantages:

- Less delay in connection setup.
- Routes are establishing on requirement and the newest route to

target is searched by destination progression number.

Disadvantages:

- If the source SN is old then intermediary node can lead to conflicting routes.
- Avoidable bandwidth utilization due to cyclic beaconing.

4.3.5. Single Stability Routing (SSR): This protocol selects a path on the basis of strength of the signal between the nodes and position establishment of nodes. SSR is composed of two cooperative approaches: SRP (Static Routing Protocol) and DRP (Dynamic Routing Protocol). The DRP keeps the Routing Table (RT) and Stability Table (SST). Strength of signal of neighbor nodes at SST is attaining by the periodic beacon. Strength of the signal is listed either as strong or weak. All communications are accepting by DRP and then progression.

Table 3: **Comparison between the Reactive Routing Protocols**

Parameters	**AODV**	**DSR**	**TORA**	**ABR**
Packet Delivery Ratio (PDR):	- High	Very high	- High	high
Routing Overhead	AODV has less traffic overhead , but compared to DSDV is high	Increases with an increase in the number of nodes	Low compared to DSR	high
Caching Overhead	Low	High	Medium	Low
End to end delay and jitter	Initially in AODV high but after some time very low - as the number of nodes are increasing the delay of AODV is increasing	The number of nodes increase in the networks then DSR degrades.	High compared to DSR	Least
Packet/ dropped /loss	Minimum	Moderate	Moderate	Moderate
Throughput	Poor for more than 20 mobiles	At speed 30 m/s throughput increases better than DSDV	Better throughput	Low

4.4.1. ZRP (Zone Routing Protocol):
It is hybrid routing protocol, it can be used for the largest traffic path nodes. It reduced the path finding based on maintain the zone.

4.4.2. ZHLS (Zone Based Hierarchical Link State):
It depends on GPS for identification of the physical address of the zone, so in ZHLS [10] maintain the non-overlapping zones on hierarchical routing protocol.

4.4.3. CEDAR (Core Extraction Distributed Ad hoc Routing):

Reactive routing scheme uses path formation process performed [10] by center nodes.

Table 4: **Comparison between the Hybrid Routing Protocols**

Factors	ZRP	ZHLS	DEDAR
The structure of routing	plane	Tree type structure	Tree type structure
numerous Routes	fail	True	True
Beacons	True	fail	True
Storing of route information	Local and external tables	Local and external tables	Local and external tables
Metrics	Optimized path	Optimized path	Optimized path
strengths	Less control overhead	Less control overhead	Less control overhead and Memory Overhead
weaknesses	Zones are Overlapping	Needed the fixed map zone	GPS

4.5.1. HSR protocol (Hierarchical State Routing): This protocol is a distributed multi-level hierarchical routing protocol in leadership each and every different level of clusters maintains membership management.

Levels of Clustering

- Physical wireless one-hop links between different nodes is called as physical clustering..
- Based on relations the clustering is called logical.

Advantages

- Reduces routing table size storage required is O (n x m).
  - For flat topology, it is O (nm) ,n→ number of nodes ,m→ number of levels.

Disadvantages

- The leader election in each cluster, the process of exchanging information concerned makes it critical for adhoc networks.

4.5.2. FSR (Fish-Eye State Routing Protocol):

Depending on the eye's focal point routing creates eye capturing information node accuracy. FSR is a generalized form of GSR.

- Focal point distance increases simultaneously accuracy decreases.
- Every node maintains its neighbor node data.
- Depends on neighbor nodes changes the topology information
- Every update maintains the new sequence number
- FSR defines routing scope

Advantages

- Reduce bandwidth consumption by link state update packets.
- Suitable for large and highly mobile adhoc wireless network.

Disadvantages

- Very poor performance in small adhoc networks.

Table 5: **Comparison between the Hierarchical Routing Protocols**

Parameters	**HSR**	**FSR**
Routing structure	Hierarchical	Link State
Routing metric	Shortest Path	Shortest Path
Mobility	low	low
Weaknesses	Scalability is poor	Routing table storage, overhead is the higher
Strengths	Memory Requirement is moderate and undertaking Loop free Paths at all instants.	Low Latency for access to non frequency used destinations

4.6.1. Greedy Perimeter Stateless Routing (GPSR):

It is Stateless wireless routing protocol depends on location diversions based on greedy.

4.6.2. LAR (Location Aided Routing):

LAR sides are analogous to equally the x and y-axis message together with the four corners of the demanded region and a transitional node decides within transmitted messages.

4.6.3. GSR (Geography Source Routing) :

based on dijkstra's algorithm calculating the source with destination paths depends on geography.

Table 6: **Comparison between the Geo Cast Routing Protocols**

Parameters	Greedy Perimeter Stateless Routing	Location Aided Routing	Geography source Routing
the Structure of routing	cyclic updates	GPS mechanism	Flat
Metric of routing	The nearest remoteness	Optimized Path	Optimized Path
Overhead control	elevated	Low	elevated
Drawbacks	At high mutability increasing in delay , creates a High density of control- packets,	Control complexity is higher in the tracking problem in GPSR.	Delay, mobility and Memory Overhead are elevated.
Advantages	Successful delivered packet small amount of data heading transparency and local maxima can be establish ed	Defining the range of the destination node in reduced size.	Localized , optimized path updates

5. Conclusion

In this work we did the survey on a comparison of difference metrics of wire-less protocols in MANET. Protocols of MANET are segregated as: table-driven, on-demand, hybrid, hierarchical and geographical. Every class of protocols, we have evaluated few metrics of protocols. Differentiate the protocols by utilizing the method of determining paths in the resource target pair. In this work we discussed about the drawbacks, the strengths and weaknesses of every protocol. In this work we observed

that time-consuming delays in Reactive routing suffer from and elevated transparency in proactive routing protocols. For sensor networks the geographical routing protocol is appropriate where by information gathering is useful in the reduction of communication in the direction of the root station through the exclusion of excess between sachets of numerous resources.

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