# A Survey Paper on Routing Protocol in MANET

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Abstract: - MANET (mobile ad hot network) is self-configured, infrastructure less network, mobile device connected without wire. MANET is without centre control. Each node in MANET is both router and host. Topology in MANET is dynamic because each device in MANET is free to move anywhere so link to other device is frequently changes. The challenge in MANET is each device to continuously maintain the information required to properly route traffic. Hence there need for efficient routing protocol. MANET typically communicate at radio frequency 30MHz – 5MHz. This paper give a information about the routing protocol and efficiency of different protocols.

1. INTRODUCTION

Routing in MANET is developing area of research. All the node in MANET are mobile and use wireless connection to communicate. So research is done to discover the efficient and powerful routing algorithm. MANET is without centre control MANET is simple and efficient way to communicate and exchange information between devices. In MANET not only shortest path is considered to optimal algorithm. We have also consider topology, propagation delay, fading, multi user. Routing is done after considering effects of all this issues.
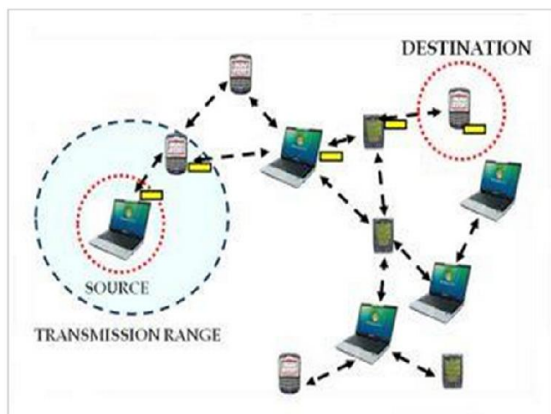
2. OVERVIEW: AD HOC CHARATERISTICS AND CHALLENGES

2.1 CHARATERISTICS OF MANET ARE:

- Dynamic topology

- Bandwidth constrained, variable capacity links.

- Energy constrained operation.

- Possibly unidirectional links.
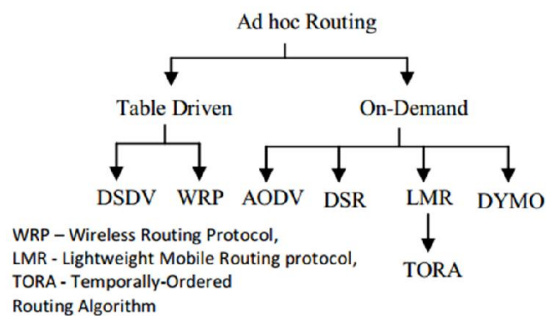
- Limited physical security.

2.2 CHALLENGES OF MANET ARE:

- Need dynamic routing: continually topology changes possibility.

- Security issues: Ease of DOS attack. Misbehaving node difficult to identify.

- Auto configuration issues.

- Routing overhead must be kept minimal.

3. OVERVIEW: AD HOC ROUTING PROTOCOL

Routing protocols is categorised into three part

1) table driven proactive,

2) on-demand-driven and

3) Hybrid protocols.

Ad hoc Routing
Table Driven   On-Demand
DSDV WRP AODV DSR LMR DYMO
TORA
WRP – Wireless Routing Protocol,
LMR - Lightweight Mobile Routing protocol,
TORA - Temporally-Ordered
Routing Algorithm

3.1 TABLE DRIVEN PROACTIVE

Proactive routing is based on periodic update. It is traditional distributed shortest path protocol. In this protocol node is continuously searching for routing information in a network so if any route is need then route is known.

1) Destination-Sequenced Distance Vector Routing (DSDV):

The first algorithm that is implemented is Destination-Sequenced Distance Vector Routing (DSDV). It is based on Bellman ford algorithm. Destination-Sequenced Distance Vector Routing (DSDV) is Distance vector (DV) based routing algorithm. In this routing technique each node operate as a special router and each router periodically send information about network to other node in network.

This routing technique each node have list of all destination and number hop to each destination also each entry has a sequence number. If router receive new information it use latest sequence number, if sequence number exists route with better matric is used. This algorithm is for portable computing device like laptops. This algorithm is solvation of routing loop problem. Disadvantage of Destination-Sequenced Distance Vector Routing (DSDV) is it

required regular update that uses batter power and uses bandwidth in ideal mode.

2) Cluster head Gateway Switch Routing Protocol (CGSR)

In this routing technique node are grouped into cluster and cluster has cluster head. Cluster head control and provide framework, bandwidth allocation, channel access. Each node maintain cluster member table and routing table.

3) Wireless Routing Protocol (WRP):

Wireless routing protocol is modified version of distance vector routing protocol. It differ from Destination-Sequenced Distance Vector Routing (DSDV) in maintain table and in the update procedure, while Destination-Sequenced Distance Vector Routing (DSDV) maintain only topology table.

Wireless routing protocol use table to maintain accuracy information that table are following Distance table (DT), Routing table (RT), Link cost table (LCT), Message retransmission (MRT). Wireless routing protocol is path finding algorithm without count to infinity problem because each node perform consistency check of previous information and hello message is periodically exchange.

3.2 ON DEMAND DRIVEN REACTIVE PROTOCOL

On demand is dynamic. It find route only when needed. It can adapt any change in network topology or other changes like traffic changes etc.

Advantage of on demand routing:

- Adaptive to network dynamic.

- Eliminate periodic update.

Disadvantage of on demand routing:

- High route acquisition latency.

- High flood search overhead with mobility / distributed traffic.

1) Temporary-ordered routing algorithm (TORA):

Temporary-ordered routing algorithm (TORA) is used in highly dynamic mobile network means where movement of node is high. Temporary-ordered routing algorithm (TORA) is highly distributed and loop free algorithm. This algorithm need to be synchronized.

2) Signal Stability Routing (SSR):

Signal Stability Routing (SSR) is similar to Associativity Based Routing Protocol (ABR) but it select route based on signal strength between nodes and on a node location. It is divided into Dynamic Routing protocol (DRP) or Static Routing Protocol (SRP). Dynamic Routing protocol is for maintain signal strength and routing table.

3) Dynamic Source Routing (DSR):

Dynamic Source Routing (DSR) is based on concept of source routing. Cooperative node which record routes, it has learned and overheard overtime. Dynamic Source Routing (DSR) has to maintain route caches. Dynamic Source Routing (DSR) is relatively small network diameter. In this routing technique entries in route is periodically update when new route is learned. Dynamic Source Routing (DSR) support unidirectional as well as bidirectional link.

Dynamic Source Routing (DSR) has two phase Route discovery and Route maintenances. Route maintenance only while route is in use. Route maintenance use route error and acknowledge and route discovery use route relay and route request. For error detection, router continuously monitor validation of existing route by listing to data packets transmitted at neighbouring node. Dynamic Source Routing (DSR) is loop free protocol. In Dynamic Source Routing (DSR) space overhead in packet and route cache promiscuous mode operation consume more power.

4) Ad-hoc-on Demand Distance vector (AODV):

Ad-hoc-on Demand Distance vector (AODV) is improved version of Destination-Sequenced Distance Vector Routing (DSDV) on an on-demand basis. Ad-hoc-on Demand Distance vector (AODV) use bandwidth. Also Ad-hoc-on Demand Distance vector (AODV) is responsive to change in topology. In this routing technique source flood route request in network. In Ad-hoc-on Demand Distance vector (AODV) reverse path are formed when node hears a route request. Each node forward the request only once unused path expire based on a timer. In Ad-hoc-on Demand Distance vector (AODV) reverse path are formed when node hears a route request. Each node forward the request only once unused path expire based on a timer.

Use sequence number because sequence number prevent from loop, each node maintain a sequence number.

3.3 HYBRID PROTOCOL

1) Zone Routing Protocol:

Zone Routing Protocol is used in hybrid category. Zone Routing Protocol is similar to cluster but in this every node act as cluster head. Zone Routing Protocol required more memory. Zone Routing Protocol give better performance because hierarchical routing used.

4. COMPARISION BETWEEN PROTOCOLS AND EFFICIENCY OF PROTOCOLS

There is lot of research is going on to find the efficient and best algorithm. In all the protocols power consumption and efficient use of bandwidth is main issue. Research is made on different protocol to make more efficient. Protocols performance is evaluated based on overhead data, throughput, and propagation delay.

In demand protocols has less overhead then DBF but in static network Dynamic Source Routing (DSR) give lesser overhead then ABR. But in case if mobility is more than Associativity Based Routing Protocol (ABR) is more efficient than Dynamic Source Routing (DSR).

If we consider data throughput then DBF give poor performance due to excess usage of channel. But ABR give higher throughput compared to DSR.

If we talk about delay DBF give high delay than on demand because of high control overhead. ABR have less delay then DSR due to high mobility. Performance of ABR is best due to it routing matrices.

4. CONCLUSION:

We conclude that we need more efficient and reliable and dynamic routing protocol which can adapt any change.

Future work is done on improvement of Associativity Based Routing Protocol (ABR) protocol because Associativity Based Routing Protocol (ABR) is only protocol which consider spatial, stable and temporal.

5. REFERENCES:

[1] C.P.P. Bhagwat, "Highly Dynamic Destination-Sequenced Distance Vector Routing (DSDV) for Mobile Computers," in Proceedings of ACM SIGCOMM' 94, pp.234-244, September 1994.

[2] S. Murthy and J.J. Garcia-Luna-Aceves, "A Routing Protocol for Packet Radio Networks'," in Proceedings of ACM First International Conference on Mobile Computing & Networking (MOBICOM'95), November 1995.

[3] Jyoti Raju and J.J. Garcia-Luna-Aceves, " A comparison of On-Demand and Table-Driven Routing for Ad Hoc Wireless Networks'," in Proceedings of IEEE ICC, June 2000.

[4] C.C. Chiang, H.K.Wu, W.Liu and M.Gerla, "Routing in Clustered Multihop Mobile Wireless Networks with Fading Channel," in Proceedings of IEEE Singapore International Conference on Networks, 1997.

[5] C.Perkins and E.Royer, "Ad-Hoc On-Demand Distance Vector Routing," in Proceedings of 2ndIEEE Workshop on Mobile Computing Systems and Applicationsm February 1999.

[6] David B. Johnson and David A.Maltz, Mobile Computing. Kluwer Academic Publishers, 1996.

[7] V.Park and M.Scott Corson, "A Highly Adaptive Distributed Routing Algorithm for Mobile Wireless Networks," in Proceedings of IEEE INFOCOM '97, March 1996.

[8] R.Dube, et al, "Signal Stability based Adaptive Routing (SSA) for Ad Hoc Mobile Networks," in IEEE Personal Communication Magazine, February 1997.

[9] C.K.Toh, "Ad Hoc Mobile Wireless Networks: Protocols and Systems," Prentice Hall Publications, 2002.

[10] Z.Haas and M.Pearlman, "The Zone Routing Protocol (ZRP) for Ad Hoc Networks," in IETF MANET Draft, June 1999.

[11] Alejandro Quintero, Samuel Pierre, Benjamin Macabeo, " A routing protocol based on node density for ad hoc networks. Ad Hoc Networks,"

vol 2, pp 335-349, 2004.

[12] D. Perkins, H. Hughes, A survey of quality-of-service support for mobile ad hoc networks, Wireless Communications and Mobile Computing2 (2002) 503–513.

[13] S. Nelakuditi, S. Varadarajan, Z. Zhi-Li, On localized control in QoS routing, IEEE Transactions on Automatic Control 47 (6) (2002) 1026–1032.

[14] A. Orda, A. Sprintson, Precomputation schemes for QoS routing, IEEE/ACM Transactions on Networking 11 (4) (2003) 578–591.

[15] D. Ghosh, V. Sarangan, R. Acharya, Quality-of-service routing in IP networks, IEEE Transactions on Multimedia 3 (2) (2001) 200–208.

[16] E. Gelenbe, R. Lent, A. Montuori, X. Zhiguang, Cognitive packet networks: QoS and performance, in: Proceedings of the 10th IEEE International Symposium on Modeling, Analysis and Simulation of Computer and Telecommunications Systems, MASCOTS, 2002, pp. 3–9.

[17] E. Gelenbe, M. Gellman, P. Su, Self-awareness and adaptivity for quality of service, in: Eight IEEE International Symposium on Computers and Communications ISCC'03, 2003, pp. 3–9.

[18] D. Johnson, D. Maltz, Dynamic source routing in ad hoc wireless networks, in: Computer Communications Review, Proceedings of SIGCOMM '96, 1996, pp. 153–181

[19] C. Perkins, P. Bhagwat, Highly dynamic destinationsequenced distancevector routing for mobile computer, in: ACM Conference on Communications Architectures, 1994, pp. 234–244.