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MANET & its Qos

By Mahak Singla

Abstract- MANET is used to provide communication among the nodes. There is no central authority which control communication session between nodes i.e. there is no any defined infrastructure. Nodes moves frequently in the network which generate some issues like routing, coverage, congestion and security issues. Quality of service (QoS) in MANET is universally a growing area. Here, different mobile devices collaborate to form a communication network without any pre-existing infrastructure. Due to vast expansion of multimedia technology, mobile technology and real time applications has need to strictly support quality of service such as throughput, delay, energy consumption, jitter etc. This paper presents the description about the message sending in MANET and its QoS.

Keywords: MANET, QoS, ad-hoc networks.

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I. INTRODUCTION

The Ad hoc On-Demand Distance Vector (AODV) algorithm provides dynamic multihop routing among various participating mobile nodes that wish to establish and maintain an ad hoc network. AODV allows mobile nodes to obtain routes quickly for new destinations, and does it not require nodes to maintain routes to destinations that are not active at time of communication.

Some issues in MANET are:

(i) unpredictable link properties that may lead to packet collision and signal propagation, (ii) the dynamic topology created by mobility of nodes, (iii) limited life of mobile device batteries, (iv) hidden and revealing terminal problems that occur when signals of two nodes are colliding with each other. (v) maintenance of route is very difficult because of changing behavior of the communication medium, and (vi) inadequate security measures in MANET leads to various attacks like passive attack, eavesdropping, leakage of secret information, data tampering, message replay, message contamination, and denial-of-service (DoS)[1].

II. MESSAGE PROCESSING IN AD-HOC NETWORKS

AODV use 3 messaging types namely, Route Requests (RREQs), Route Replies (RREPs), and Route Errors (RERRs). These message types are received using UDP, and then normal IP header processing is applied. The requesting node use its IP address as the Originator IP address for the messages. For broadcasting messages, the IP limited broadcast

address (255.255.255.255) is used i.e. messages are not forwarded blindly. However, operation of AODV do need some messages (e.g., RREQ) to be disseminated widely over the entire ad hoc network. The range of dissemination of such RREQs is indicated by the TTL in the IP header and no need of fragmentation is there[14].

The status of links present at next hops in the active routes is monitored by the nodes. Whenever a link break is detected in an active route, message is used to inform other nodes that the link loss has occurred at that node is RERR[14]. It indicates only those nodes that are reachable through the broken link, eg. If there is a link break at B, then RERR message will indicate that node D is no longer reachable destinations which are no longer through node B.

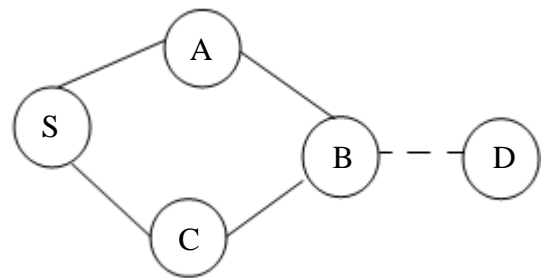


Fig 1: RERR Message Indication

To enable this mechanism, each node have a "precursor list" that contains the info regarding IP address for each of its neighbors that may use it as a next hop to reach destination. The information present in precursor list is easily obtained during the processing for generation of a RREP message, which has to be sent to node of precursor list. If the RREP has nonzero prefix length, then the originator of the RREQ which solicited the RREP information is included among the precursors for the subnet route (not specifically for the particular destination).

AODV routing protocol deals with route table management by keeping information ven for short-lived routes, that are created for temporarily store reverse paths towards nodes originating RREQs. AODV uses the following fields with each route table entry:

- IP Address of destination node
- Sequence Number of destination node
- Valid Destination Sequence Number flag
- Other state and routing flags (e.g., valid, invalid, repairable, being repaired)
- Network Interface

Author: Giani Zail Singh, MRSSTU, Bathinda.
e-mail: mshappy92@gmail.com

- Hop Count (i.e. total number of hops needed to reach destination)
- Next Hop
- List of Precursors
- Lifetime (expiry time or deletion time of the route) [14]

III. LAYERED ARCHITECTURE OF QoS

QoS have a layered view which contains 3 parts :

- User
 - Application
 - Network
- a) *Application layer QoS*: This layer explain how well user expectations like clear voice, jitter –free video, etc are satisfied. This layer also describes arrival pattern and sensitivity to delivery delays. End-to-end protocols (RTP/RTCP), application-specific representations and encoding (FEC, interleaving) are implemented at this layer[13].

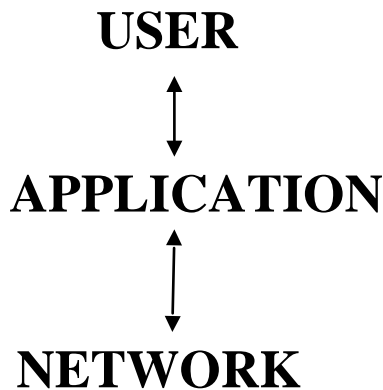


Fig 2: Layeres Structure of MANET [13]

- b) *Network layer QoS*: This layer has four quality factors:
- Bandwidth* - The rate at which an traffic of application must be carried by the network.
 - Latency* - The delay that one application can tolerate while delivering a single packet of data.
 - Jitter* - The variation in latency.
 - Loss* - The percentage of data lost [13].

IV. CHALLENGES IN MANET

The following challenges make QoS hard in MANET:

- *Autonomous*- There is no centralized administration available to manage the operation of different mobile nodes.
- *Dynamic topology*- Nodes are mobile and they can be connected dynamically in any arbitrary manner.
- *Device discovery*- Identifying relevant new nodes that have joined the network and informing about their existence need dynamic updates to automatically select the optimal route.

- *Poor Transmission Quality*- This is a major problem of wireless communication that is caused by several erroneous sources that result in degradation of the received signal.
- *Network configuration*- The entire infrastructure of MANET is dynamic and thus it results in dynamic connection and disconnection of the variable links.
- *Topology maintenance*- Updation of dynamic link data among nodes in MANETs is a major challenge [2].

V. CONCLUSION

This paper deals with the message processing in Ad-hoc Networks and QoS in MANETs. Mobile ad-hoc networks must be able to provide the required quality of service for the delivery of real-time communications such as audio and video that poses a number of different technical challenges and new definitions. The development of mobile ad-hoc networks helps in various areas including academic, defence, disaster recovery, industrial environments, and healthcare. Nevertheless, there are many challenges that require to be addressed as well. These challenges needs to develop efficient routing procedures, mechanisms for reducing power consumption and extending the battery life, mechanisms for efficient use of limited bandwidth and communication capacity, new algorithms for information security, and making smaller but more powerful mobile devices. In short have to improve QoS in MANETs. This paper provides basic concepts related to QoS in networking, especially in MANET. In the upcoming paper tries to represent the improve QoS in MANET by applying genetic algorithm to routing protocol.

REFERENCES RÉFÉRENCES REFERENCIAS

1. P.PERIYASAMY and E.KARTHIKEYAN, " a Novel Approach To Enhance the Quality of Aomdv Routing Protocol for Mobile Ad Hoc Networks," vol. 69, no.2, pp. 394–404, 2014.
2. N. Tiwari and S. Shibu, "Load Balancing Congestion Control Techniques in Mobile Ad hoc Network : A Survey," vol. 3, no. 2, pp. 2652–2659, 2014.
3. Dr MadhumitaDash and Mrs Ricky Mohanty, "Quality- Of- Survey Routing Solutions forMobile Ad HocNetworks: A Review," *IOSR J. Electron. Commun. Eng.*, vol. 9, no. 2, pp. 29–36, 2014.
4. K. Fall and K. Varadhan, "The ns Manual (formerly ns Notes and Documentation)," *VINT Proj.*, no. 3, p. 434, 2011.
5. R. Kumar, M. Misra, and A. K. Sarje, "A Proactive Load-Aware Gateway Discovery in Ad Hoc Networks for Internet Connectivity," *Int. J. Comput. Networks Commun.*, vol. 2, no. 5, pp. 120–139, 2010.
6. K. S. Madhusudhananagakumar, Aghila, and G., "A Survey on Black Hole Attack Detection in MANET

- Using AODV Protocol," *Int. J. Comput. Appl.*, vol. 34, no. 7, pp. 23–30, 2011.
7. A. Modi and D. Rathod, "Improve Performance of AOMDV Protocol in," vol. 1, no. 11, 2015.
 8. F. De Rango, P. Fazio, S. Member, and F. Conte, "A New Distributed Application and Network Layer Protocol for VoIP in Hostile Environments."
 9. T. B. Reddy, I. Karthigeyan, B. S. Manoj, and C. S. R. Murthy, "Quality of service provisioning in ad hoc wireless networks: A survey of issues and solutions," *Ad Hoc Networks*, vol. 4, no. 1, pp. 83–124, 2006.
 10. N. Simulator, "This Installation of Network Simulator 2 on the Ubuntu 16 . 04 Live CD UDisk," 2011.
 11. K. N. Sridhar and M. C. Chan, "Channel-aware packet scheduling for MANETs," *2008 IEEE Int. Symp. A World Wireless, Mob. Multimed. Networks, WoWMoM2008*, 2008.
 12. P. P. White, "RSVP and integrated services in the internet: A tutorial," *IEEE Commun. Mag.*, vol. 35, no. 5, pp. 100–106, 1997.
 13. Seema, Y. Singh, and V. Siwach, "Quality of Service in MANET," *Int. J. Innov. Eng. Technol.*, vol. 1, no. 3, pp. 28–31, 2012.
 14. R. Braden, D. Clark, and S. . Shenker, "RFC1633: Integrated Services in the Internet Architecture: an Overview," *IETF RFC 1633, July*, pp. 1–28, 1994.

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