SURVEY ON REACTIVE PROTOCOLS IN MOBILE ADHOC NETWORK

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Abstract—**Mobile adhoc networks are temporary networks establish by mobile nodes without intervention of any existing network infrastructure. Due to the limited transmission range of wireless network, multiple network hops may be needed for exchange data from one node to another node. In recent years, there are many protocols that have been developed. Existing protocols for ad-hoc network can generally be categorized into pro-active and re-active protocols types. In Proactive protocols(table driven routing protocols) every node maintains the network topology information in the form of routing tables by periodically exchanging routing information. Reactive (on-demand routing protocols) do not maintain the network topology information. This paper is an effort to provide comprehensive overview of most of the reactive protocols. We have also included an analysis and discussion section to highlight their advantages and weakness.**
This study helps to gain overview of various protocols and in further development of new routing technique.

Keywords: AODV, DSR, TORA, Vulnerabilities, Protocol Stack, Performance metrics

SURVEY ON REACTIVE PROTOCOLS

Prashant Kumar Maurya, Gaurav Sharma[1] stated the AODV is a reactive protocol routes are created whenever required for transmission of the data .If the wireless nodes are within the range of other then intermediate nodes donot require ,otherwise we require intermediate nodes for source to destination transfer of data. Different routing algorithms define a scheme to transfer the data ways. Adhoc network differ from the traditional ways as they need to discover path every time as path varies with changes in the topology. Samir R. Das, Charles E. Perkins, Elizabeth M. Royer[2] compared the two prominent protocols- Dynamic Source Routing (DSR) and Ad Hoc On-Demand Distance Vector Routing (AODV). Three key performance metrics are evaluated: Packet delivery fraction, Average end to-end delay of data packets, Normalized routing load. The general observation from the simulation is that for application oriented metrics such as delay and throughput, DSR outperforms AODV in less .stressful. situations, i.e., smaller number of nodes and lower load and/ormobility. AODV, however, outperforms DSR in more stressful situations, with widening performance gaps with increasing stress.

Sakil Ahmad Ansari, Prof. Saoud Sarwar [3] stated the Due to mobile mobility and open media nature, the mobile ad hoc networks are much more prone to all kind of security risks, such as information disclosure, intrusion, or even denial of service. As a result, the security needs in the mobile ad hoc networks are much higher than those in the traditional wired networks. However, with the convenience that the mobile ad hoc networks have brought to us, there are also increasing security threats for the mobile ad hoc network, which need to gain enough attention.

Anurag Porwal, B.L.Pal, Rohit Maheshwari, Gaurav Kakhani[4] introduced the Advance-Ad hoc on demand distance vector (AAODV) routing protocol. It consists of the use of Ad-hoc On demand Distance Vector with Backup routing (AODV-BR) and concept of local recovery with limited TTL value in case of failure of local recovery in first attempt. AAODV enhances the performance of AODV. AAODV minimized the routing overhead because source node performs route discovery less often. Also by performing local recovery only in case of getting better metric in previous local discovery, we always get a fresh and optimal route that reflects the current network topology.

Sheng Liu, Yang Yang, Weixing Wang[5] stated the shortcomings of AODV As the node strenuous exercise during finding routings, the route was easy to break, which would lead to the loss of RREP packet. In the routing maintaining process, the broken node would discard error packet and notice the source node to resend request message when broadcasting RERR packets, which would lead time delay of subsequent packet, local repair may cause that the RREP sent by downstream node could be discarded, which reduced the probability of routing recovery.

Josh Broch David A. Maltz David B. Johnson Yih-Chun Hu Jorjeta Jetcheva[6] presented the results of a detailed packet-level simulation comparing four multi-hop wireless ad hoc network routing protocols that cover a range of design choices: DSDV, TORA, DSR, and AODV. The performance of DSR was very good at all mobility rates and movement speeds, although its use of source routing increases the number of routing overhead bytes required by the protocol. Finally, AODV performs almost as well as DSR at all mobility rates and movement speeds and accomplishes its goal of eliminating source routing overhead, but it still requires the transmission of many routing overhead packets and at high rates of node mobility is actually more expensive than DSR.

C.K.Toh, Elizabeth M. Roye[7] authors provided an overview of eight different protocols by presenting their characteristics and functionality, and then provided a comparison and discussion of their respective merits and drawbacks.In this paper they have provided descriptions of several routing schemes proposed for ad-hoc mobile networks. They have also provided a classification of these schemes according to the routing strategy, i.e., Proactive (table-driven) and Reactive (on-demand). They have presented a comparison of these two categories of routing protocols, highlighting their features, differences and characteristics.

Per Johansson, Tony Larsson, Nicklas Hedman, Bartosz Mielczarek, and Mikael Degermark[8] have also conducted some serious research about ad hoc routing performance. They studied three different routing protocols: DSDV, DSR and AODV. The results were published under a title: "Scenario-based Performance Analysis of Routing Protocols for Mobile Ad-hoc Networks".

Samir R. Das Charles E. Perkins, Elizabeth M. Belding- Royer[9] presented Ad-hoc On Demand Distance Vector Routing (AODV), a novel algorithm for the operation of such ad-hoc networks. Each Mobile Host operates as a specialized router, and routes are obtained as needed (i.e., on-demand) with little or no reliance on periodic advertisements. This new routing algorithm is quite suitable for a dynamic self-starting network, as required by users wishing to utilize ad-hoc networks. AODV provides loop-free routes even while repairing broken links. Because the protocol does not require global periodic routing advertisements, the demand on the overall bandwidth available to the mobile nodes is substantially less than in those protocols that do necessitate such advertisements. Nevertheless we can still maintain most of the advantages of basic distance-vector routing mechanisms. The authors shown that this algorithm scales to large populations of mobile nodes wishing to form ad-hoc networks. They also include an evaluation methodology and simulation results to verify the operation of the algorithm.

Reema Gupta,Dr. Sukhvir Singh [10] stated the classification of different attacks in Manet based on behavior and location. SECURITY VULNERABILITY ON VARIOUS LAYERS OF MANET STACK discussed which includes physical layer,datalink layer, network layer, transport layer, application layer. Security Vulnerabilities at Physical Layer includes Jamming and Active Interference, Eavesdropping. Security Vulnerabilities at Data Link Layer includes Selfish Misbehavior of Nodes, Malicious Behaviour of nodes, Traffic Analysis. Security Vulnerabilities at Network Layer includes ROUTING ATTACK, BLACKHOLE ATTACK, WORMHOLE ATTACK, Byzantine ATTACK, Sinkhole attack, Sybil Attack. Security Vulnerabilities at Transport Layer includes SYN flooding attack, Session hijacking. Security Vulnerabilities at Application Layer includes Malicious code attacks, Repudiation attack.

Kiranveer Kaur, Surinderjit Kaur, Vikramjit Singh[11] compared the results three MANET routing protocols such as Ad hoc On Demand Distance Vector (AODV), Dynamic Source Routing (DSR) and Optimized Link State Routing (OLSR) by using different web based applications such as HTTP, FTP, E-mail and Video conferencing and hence presented our observation regarding the performance of these protocols. OPNET Modeler 14.0 simulator is used for simulation purpose and performance of these routing protocols is measured using three performance metrics such as throughput, network load and network delay. From experimental results it has been observed that in case of delay AODV and OLSR perform in a similar manner with HTTP, FTP, E-mail traffics, but in Video conferencing AODV performs better than OLSR. In case of network load OLSR routing protocol is quite low as compared to reactive protocols AODV and DSR.

Reema Gupta,Dr. Sukhvir Singh[12] explained the working of AODV its request, reply procedure.
 For the route discovery the control packets are used: Route Request (RREQ), Route Reply (RREP), Route Error (RERR). Due to dynamic infrastructure of MANETs and having no centralized administration makes such network more vulnerable to many attacks. MANET is growing field and have various protocols used for transfer packet from one node to other. AODV is most efficient ,reactive protocol that uses RREQ,RREP,RERR,RREP-ACK messages used in AODV for route discovery

Humayun Bakht[13] introduces the Manet and tehn claasified routing protocols into various types:Proactive versus on demand routing protocols, Single Channel vs Multichannel protocols ,Hierarchical Topology /Clustered based routing, Uniform Vs Non-Uniform protocols, Position based protocols Hybrid protocols . Various routing techniques were introduced Destination-Sequenced Distance-Vector Routing Protocol , Zone-based Hierarchical Link State Routing Protocol,) Cluster head Gateway Switch Routing Protocol, Wireless Routing Protocol , Global State Routing Fisheye State Routing , Hierarchical State Routing, Cluster based Routing Protocols , Ad-hoc on-demand distance vector routing , Dynamic Source Routing , Temporarily ordered routing algorithm (TORA) , Associativity Based Routing.

Sandeep Kumar , Harmandep Singh [14] compared the performances of two reactive protocols (AODV,DSR) with the help of RSA algorithm and compared their network performance using performance evaluation parameters: Average end-to-end-delay, routing load and throughput. Encryption technique RSA was used to maintain the confidentiality and the integrity of the messages send by the nodes in the network. OPNET simulator was used for comparing the performance of the routing protocols. The protocols are compared under different scenarios like number of nodes, mobility, and type of traffic.

 Anit Kumar, Pardeep Mittal [15] analyzed the performance of DSR and AODV on the basis of Packet Delivery ratio. Both protocols showed variation in packet loss with increase in speed and the pause time.Ns-2 simulator is used for simulation purposes. Various cases have been taken and a bias less scenario generation has been done. Scenarios has been created using TCL scripts and a real life situation has been assumed.

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