Comparative Analysis and Performance of Proactive Reactive and Hybrid Routing with Different Parameter

Prachi Gupta
Department of Computer Science Engineering
Galgotia's college GreaterNoida

Manish Singh
Department of Computer Science Engineering
Galgotia's college GreaterNoida

Abstract- Mobile Ad-hoc Network (MANET) has opened a new dimension in wireless networks which means that user want to communicate with each other in absence of centralized administration and it can change position frequently. These types of routing protocols are Proactive, Reactive and Hybrid. In this we describes the performance evaluation of various routing protocols of MANET that are DSDV (Destination Sequenced Distance Vector Protocol Routing), DSR (Dynamic Source Routing) TORA (Temporally ordered Routing Algorithm ordered Routing with different parameters. To simulate this routing protocol we use different types of tools like ns-2, Opnet. In this survey paper we have to analyse the performance evaluation of routing protocol in ad-hoc network. Extensive Research has been done in comparing the different mobile ad-hoc routing protocol under various parameters includes PDR (Packet Delivery Ratio), Throughput, End to End Delay, Routing overhead.

Keywords – MANETS, TORA, DSDV, PDR, MATLAB , ENDtoEnd Delay, Throughput, Routing Overhead, Mobility.

I. INTRODUCTION

Mobile Ad-Hoc network is a wireless network and self configuring network of moving routers associated with wireless network. The routers are free to move randomly from one point to another point and organize themselves arbitrarily, thus, the network's wireless topology may change rapidly as well as unpredictably. Mobile Ad-Hoc network is an infractureless network due to mobile routers. MANET means Mobile Adhoc- Network so they utilize wireless connection to attach with system model network MANET can be a model as Wi-Fi connection, or another standard, like a cellular or satellite transmission ,classrooms for education system and in sensor network , mobile offices, small aircrafts The main aim of Manets are self organizing and restoring and transmission through multiple hopes, limited power ability, No central controlling authority continuously maintain the information required to properly route traffic. Mostly Mobile Ad-Hoc networks are used in various fields like, tanks .Ad hoc networking allows the devices to maintain connections to the network as well as easily removing and adding devices to and from the network time. The network is not centralized, where message delivery and network orginization must be executed by the nodes themselves. Message routing is a problem in a decentralize environment where the topology increases or decreases. While the shortest path from a source to a destination based on a cost function in a static network is usually the optimal route, this concept is difficult to extend in MANET. Various Applications of MANETs are ranging from large-scale, mobile, highly dynamic networks, Military Scenarios, Data Networks, sensor Network.

II. RELATED WORK

There are many routing protocols have been proposed, but with few comparisons between different mobile ad-hoc routing protocols have been made.The performance comparison of MANET routing protocols, namely AODV, DSR, TORA and OLSR [1] is done by Ashish Shrestha and FiratTekiner which shows the performance of AODV and OLSR. However, AODV showed the better efficiency to deal with high congestion and provides better in delivering and TORA

In [2], a comparison of DSDV, AODV, DSR protocols has been performed using NS2. DSR is good for the condition when there is mobility and balanced traffic and when movement of nodes and no. of packet is less then DSDV will be preferable.AODV perform good when area is large, nodes are dense and movement of nodes are higher

On the same basis research did previously, they proposed the performance analysis of AODV and DSR routing protocol in Mobile Ad hoc networks [3] and done the analysis of route discovery and packettransmission in AODV and DSR and concluded that for a small amount of time it's good to prefer AODV instead of DSR due to low initial packet loss and good packet delivery ratio in AODV.

Performance comparison of OLSR, GRP and TORA using OPNET are compared on the basis of packets delay, media access and throughput by Harmanpreet Kaur and Jaswinder Singh [4]

III. PROPOSED METHODOLOGY

This research work is considering three routing protocols from three categories such as proactive, reactive and hybrid routing protocols. The routing are used know their performance by considering the parameters such as Routing packets,Packet delivery friction, Normalized routing load, Route discovery delay, Dropped packets, Dropped bytes and Packet delivery ratio for the various numbers of nodes.

3.1 Types of Routing Protocols

There are mainly three routing protocol that are proactive, reactive and hybrid routing protocol and we can brief study as:

3.1.1 Proactive routing algorithm

This protocols are also called table driven routing protocols in which, needed information are stored in the form of routing table the, Packets are transferred from source to destination route specified in the routing table which are continuously update through control packet that are send by each node. In this, the packet forwarding is faster because all the routes have to be defined before transferring the packets. Examples of Proactive routing protocols are DSDV, WRP

3.1.2 REACTIVE ROUTING ALGORITHM

This protocols are also called On-demand routing protocols in which, all the nodes does not required to maintain in each node only needed node, and does not require node to maintain routers to the destination that are not commonly used for communication. On-Demand techniques have smaller routing overheads but higher latency.Examples of Proactive routing protocols is AODV, DSR.

3.1.3 Hybrid Routing algorithm

Hybrid protocols are the combinations of Table-Driven routing protocol and On-Demand Routing Protocol one more category develop which is known as Hybrid Unicast Routing protocol and takes advantages of these two protocols and result is that routes are found quickly in the routing zone.Example of Hybrid Routing Protocol ZRP (Zone Routing Protocol),TORA.

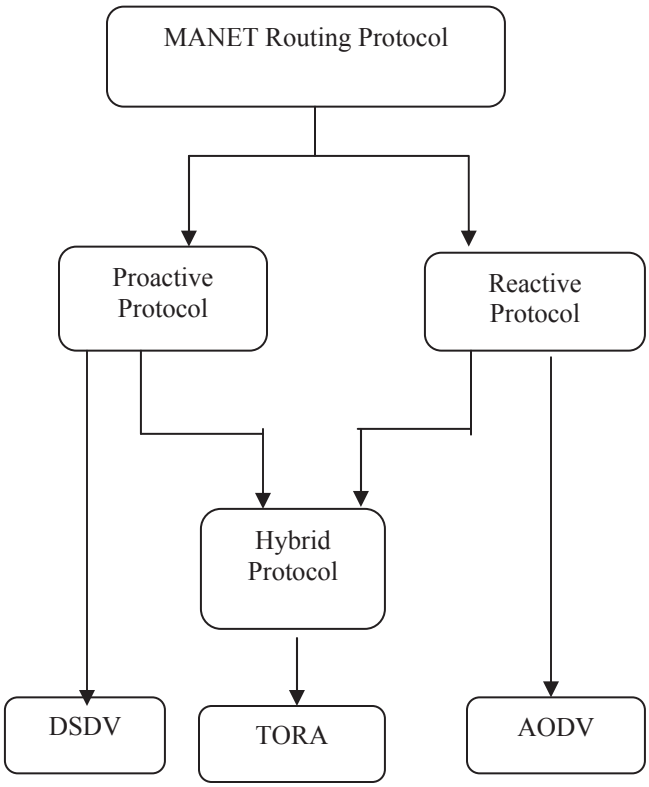

Figure 1 Ad-hoc routing protocol

3.2 Study of DSDV, AODV, TORA routing protocol

3.2.1 DSDV

The Table Driven DSDV protocol is a modified version of the Distributed Bellman-Ford (DBF) Algorithm that was used successfully in many dynamic packet switched networks [5]. The Bellman-Ford method defines that to calculate the shortest paths from source to destination nodes, if the distance-vectors to each link are known.DSDV is a proactive routing protocol in which, Each node maintains a routing table with all available destinations with information like the number of hops to reach to the destination, sequence number of the destination originated by the destination node, next hop etc. The sequence number is used to distinguish same routes from new ones and to avoid the loops. So, the update is both time-driven and event-driven. The routing table can be update in two forms : an incremental update or a "full dump". “Full dump packets having all available routing information and it may be require Multiple Network Protocol Data Units (NPDU); whereas in an incremental uptodate only those entries from the routing table are sent that has a change in routing since the end update and it must fit in a packet. If there is space in the incremental update packet then those entries may be included whose sequence number has changed. DSDV is continuously updated of its routing tables and whenever the topology of the network changes, a new sequence number is discovered before the network re-converges.

3.2.2 AODV

AODV is a reactive protocol; even though it still uses characteristics of a proactive protocol [6] The Ad hoc on-demand Distance Vector routing protocol does not maintain routing information for the whole network. Nodes that are not used to send data from source to destination that do not need to maintain information about that route and only maintain those nodes which are required to communicate from source to destination .Route discovery in AODV is done by broadcasting RREQ(Route Request) and RREP (Route Reply) packet.

In AODV, when a node wants to send packets from source to the destination but route is not available,it initiates a route discovery operation .In the route discovery operation, the source node broadcasts route request (RREQ) packets in which Destination Sequence Number. When a node that has a route wants to send data to the unknown destination in the network receives the RREQ to all its neighbours, it checks the destination sequence

numbers it currently knows and the one specified in the RREQ. It guarantee the use of the routing information, a route reply (RREP) packet is used to created and forwarded back to the source only if the destination sequence number same as or greater than the one specified in RREQ.AODV uses symmetric links and a RREP follows the unicast path of the respective RREQ.The RREP Packets or RREP Packets with lower destination sequence number will be dropped. The advantage of this protocol is low delay for connection setup, and the disadvantage is more number of control overheads due tomany route reply messages for single route request.

3.2.3 TORA

The Temporally Ordered Routing Algorithm (TORA) is a highly adaptive, efficient and scalable distributed routingalgorithm based on the concept of link reversal [7]. TORA builds and maintains a Directed Acyclic Graph (DAG) rooted at a destination. No two nodes may have the same height.TORA is used to operate in a highly dynamic mobile networking environment.The main principle of TORA is that messages that are control are localized in a very small set of nodes near the occurrence of a topological change. To find this, the nodes maintain routing information about one-hop (adjacent) nodes.TORA has performed on three functions tha are: Route creation, Route maintenance, Route erasure. During the route creation phase in TORA, is made using QRY (Query), UDP (Update) packets. Route creation algorithm starts by setting the requires link to a destination because it has no downstream neighbours height and for all other nodes to NULL. The source broadcasts a QRY packet with the destination node's id in it. A node with a non-NULL height responds with a UDP packet that has its height in it. A node receiving a UDP packet it sets when node with height is considered upstream and a node with lower height is considered downstream. In this way a directed acrylic graph (DAG) is constructed from source to the destination.

IV. PERFORMANCE ANALYSIS

We have to evaluated that the performance of DSDV, AODV and TORA on NS-2 and MATLAB and then analyze and compare their performance. We are analysing using 10 nodes that are arranged in grid faction. Simulations were performed on the Network Simulator-2 simulator. Some important performance metrics are measured and their output graphs are shown in following Figures:

4.1 Packet Send- Packet sends shows that packets send to three routing protocol that is AODV, DSDV, TORA.

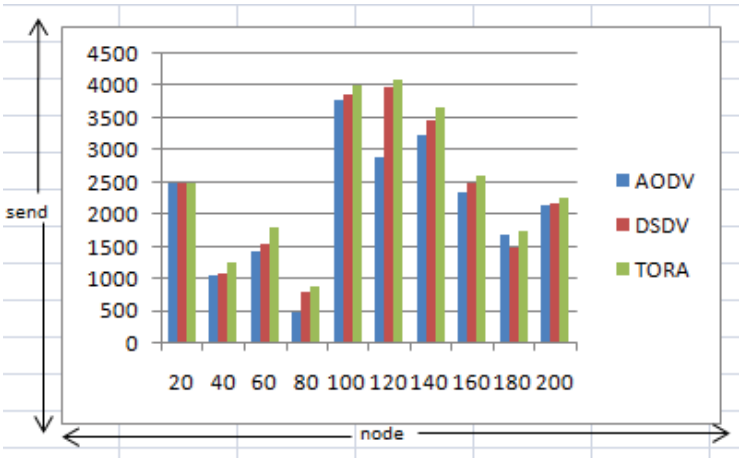

Figure 2: Packet Send Graph for AODV, DSDV and TORA

4.2 Packet Received- Packet Received Shows that TORA receives more packet among DSDV and AODV protocols.

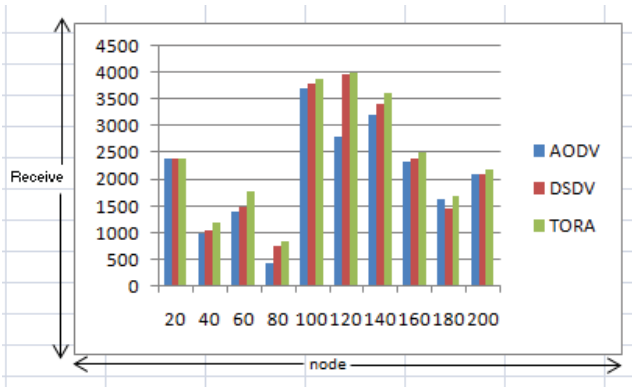

Figure 3: Packet Receives Graph for AODV, DSDV and TORA

4.3 Packet Delivery Ratio- Packet Delivery Shows that TORA receives more ratios among three protocols.

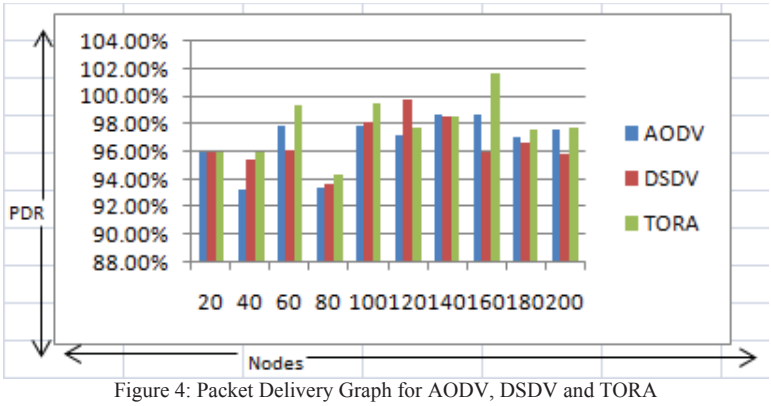

Figure 4: Packet Delivery Graph for AODV, DSDV and TORA

4.4 EndtoEnd Delay- Delay Shows that DSDV is best among three protocols.

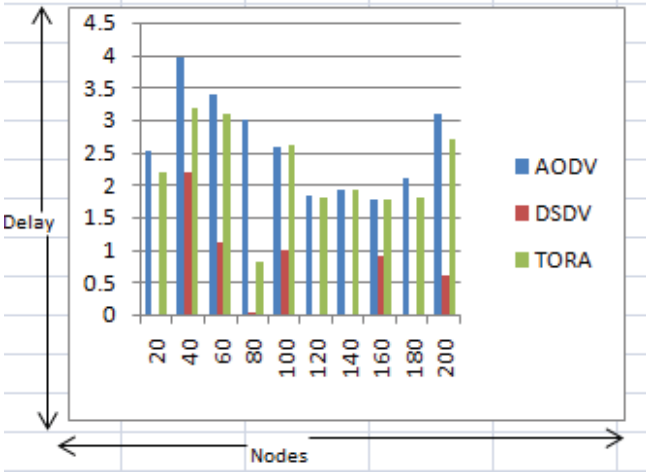

Figure 5: End to End Delay Graph for AODV, DSDV and TORA

4.5 Throughput- Throughput Shows that DSDV is best among three protocols.

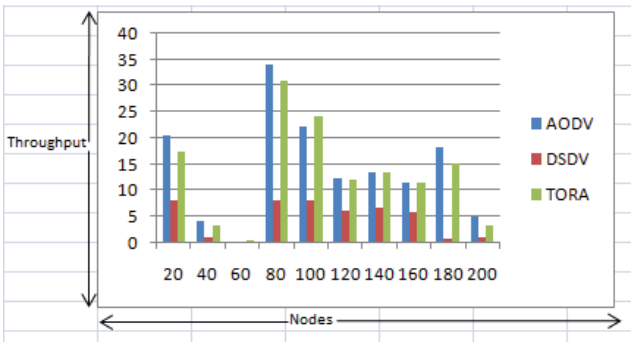

Figure 6: Throughput Graph for AODV, DSDV and TORA

4.6 Routing Load – Routing Load Shows that AODV receives minimum load among three protocols

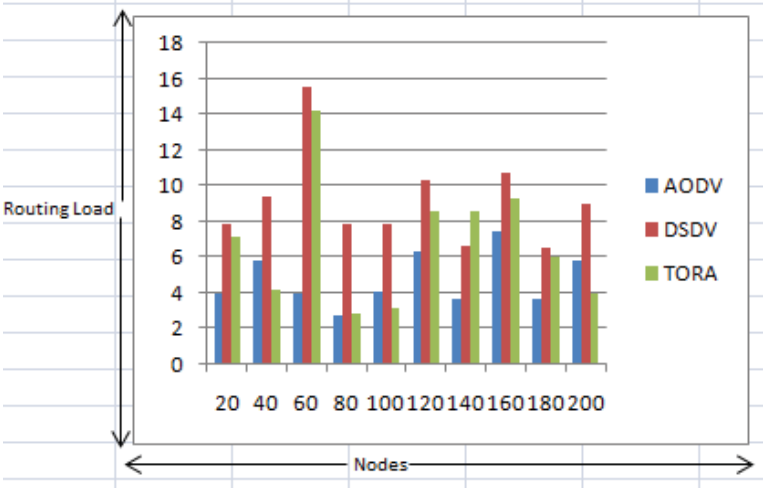

Figure7: Load Routing Graph for AODV, DSDV and TORA

4.7 Dropped packets - Dropped packets Shows that DSDV is best among three protocol

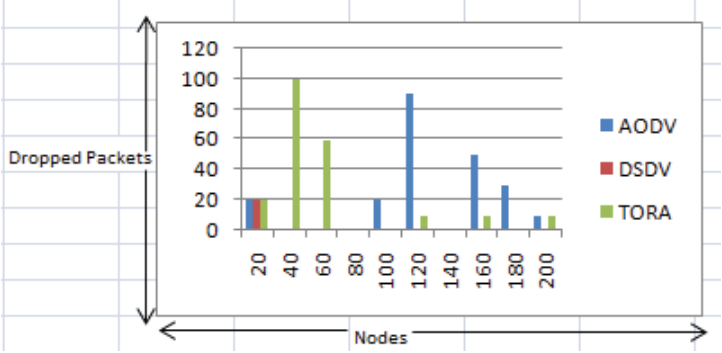

Figure 8: Dropped packet Graph for AODV, DSDV and TORA

4.8 Overhead- Overhead Shows that DSDV is best among three protocols.

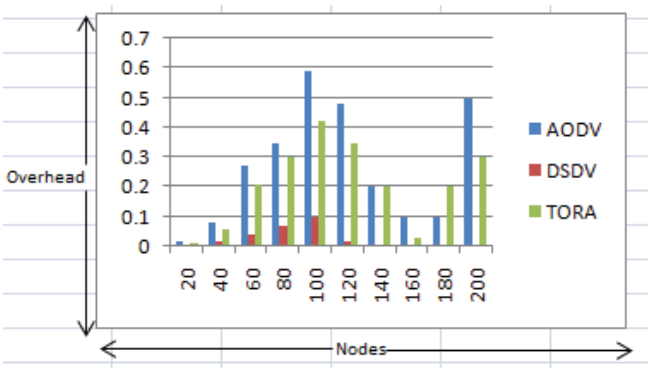

Figure 9: Throughput Graph for AODV, DSDV and TORA

V.CONCLUSION

In this paper we analyse that not a Ad-hoc routing protocol can adapt to all environments, whether it is Proactive Protocol, reactive Protocol, or a Hybrid protocols, are limited by the network characteristic, differences, their features, whereas it is not specify that any particular algorithm or collection of algorithm is the best for all cases, each protocol has definite advantages and disadvantages and is well suited for certain situations. Often, for PDR, hybrid protocol is well among the proactive and hybrid routing protocol, Packet Dropped is best in Proactive Routing Protocol rather than a Reactive protocol and hybrid protocols. Analysis and comparision of these routing protocols for MANET might come in the coming future, which might take security and QoS (Quality of Service) as the major concerns. There are still many issues and challenges which have not been considered. This will be subjected to further investigations.

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