

Reactive and Proactive Type Protocols for WiMAX Networks with Item Size Variation

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Abstract:- The paper illustrates analysis on measuring the performance of two distinguished protocols used in MANET (Mobile Adhoc Networks). The two categories of Reactive and Proactive protocols described include three different Routing strategies. These are Dynamic supply Routing (DSR), Ad-hoc On Demand Distance Vector Routing (AODV) protocols and FSR routing protocol. The Performance differentials square are measured and based on that victimization variable Item size is determined using QUALNET software. Based on different simulations on variation in item size, Throughput, End to End delay and Packet Delivery Ratio are determined and compared for three different Protocols.

Keywords: MANET, DSR, AODV, FSR, QUALNET

I. INTRODUCTION

Nowadays, there is an uprising increased demand for establishing new connections for data transmission between the different wireless nodes. Hence, the demand of working wireless solutions for connecting to the Internet is also increasing. In MANET, the nodes are mobile and are connected through wireless links whereby each node is free to move independently and randomly. Mobile Ad-Hoc networks come into role where permanent infrastructure of network is absent. Wi-Max is designed to be a low cost way to deliver wireless broadband services over a large area.

Routing protocol is the part of network layer. Its main function is to appropriately carry out transmission of addressed data packets effectively from their source node towards their destination node. There are several intermediate nodes used to achieve the process. Every routing protocol has its own algorithm on the basis of which it discovers and maintains the route. A known Routing metric is chosen that determines which route can perform better. Routing metrics covers information related to bandwidth consumption, delay, and number of hop counts, path cost, load, reliability, and cost of communication. The best possible route is stored in routing table for data packet to travel through that route.

Mobile Ad-hoc Network (MANET) may be an assortment of mobile nodes that square measure indiscriminately placed so the interconnections between nodes square measure dynamically. In Manet mobile nodes forms a brief network while not the employment of any existing network

infrastructure or centralized administration. A routing protocol is employed to seek out routes between mobile nodes to facilitate communication inside the network. The most goal of such an ad-hoc network routing protocol is to determine correct and economical route between a try of mobile nodes so messages delivered inside the active route timeout interval. With varied the item size of routing protocol.

This paper presents performance analysis of three completely different routing protocols and notice that with reduces the item size of routing protocols i.e. Dynamic supply routing Protocol DSR, Adhoc on-demand distance vector AODV, and wide-angle state Routing FSR. Performance of DSR, FSR and AODV is evaluated supported average end-to-end delay, Packet delivery Throughput.

Through this paper, a comparison is made between two on-demand routing protocol for VBR (Variable bit rate) traffic source. To carry out simulation for different size of data packets is QualNet 5.0.2 network simulator is used.

II. WI-MAX-802.16

The Wi-Max (World Wide Interoperability for Microwave Access) architecture was designed to offer strong QoS, lower latency, and better security. It serves as an excellent platform to run VoIP, to handle high-quality data, voice, video and multimedia services. It is a wireless digital communications system that is based on wireless "metropolitan area networks" technology. The technology is amongst one of the hottest emerging broadband wireless access (BWA) technology. It can deliver information theoretically up to 30 miles (50 km) for fixed stations, and 3-10 miles (5-15 km) for mobile stations. The name "Wi-Max" was created by the Wi-Max Forum.

III ROUTING Protocols

Routing is amongst the important concepts, because it is necessary medium to achieve end to end communication. It successfully transmits packets or information content from one node to another. The routing protocols also facilitate the communication within the network as they discover routes between different nodes. The routing protocols execute namely two functions. Firstly, they determine

routes to be followed and secondly the delivery of information content to the correct destination. The performance of the routing protocol depends on the efficiency of that particular routing protocol. It counter estimates the delay and overall path of transmission used in accessing efficiency of node. Routing protocols can be classified as either proactive, reactive, or a hybrid. The descriptions of all three are given below:

1. PROACTIVE ROUTING

These form a part of table-driven protocols. Proactive protocols attempt to maintain routing information of the entire network in correct order at all times. For carrying out this, routing tables are constantly maintained. Following that the route for data packet is known without any additional setup delay. These routing protocols have an advantage of being well suited for time-critical traffic. The disadvantage of the routing scheme is however that a large portion of bandwidth is used to keep the routing information up-to-date. When it happens to determine same for the case of fast node more concerns on mobility and route updates may be frequent than route requests. As a result bandwidth is wasted since much of the routing information is never used.

2. REACTIVE ROUTING

As compared to Table driven protocols, Reactive routing protocols are the on-demand protocols. The on-demand routing protocols are the ones that do not maintain the correct information of route on all nodes at all times. Information of data sent over the channel at a particular route is collected only when it is required. The determination of route is dependent on sending route queries throughout the network. The basic merit of using on demand Reactive protocol over others is that the wireless transmission channel is not subjected to the data of routing. The overhead for routes may never be used in such cases. Examples are AODV, DYMO, DSR etc.

3. HYBRID ROUTING

Hybrid routing protocols are the combination of both proactive routing and reactive routing. Hybrid protocols attempt to combine advantages of both protocols. The strengths like maintaining routing information throughout and capability of wireless transmission is supported by removing overhead routes which are not used thereby minimizing the weaknesses of both the routing.

IV. MANET ROUTING PROTOCOLS

AD-HOC ON-DEMAND DISTANCE VECTOR ROUTING:

Demand distance vector routing protocol is used for mobile ad-hoc network. It was developed in nokia centre of university of California and Santa Barbara Abs University of metropolis. It is an On-demand vector routing protocol [12]. AODV has capability of each unicast as well as multicast routing [14].

The main advantage of AODV is routes square measure protocol designed on demand and destination sequence numbers square measure used for the latest route to the

destination. The hello messages supporting the routes maintenance square measure range-limited. One of the limitations of this protocol is that the intermediate nodes cause inconsistent routes.

DYNAMIC SOURCE ROUTING

Dynamic supply Routing DSR is a routing protocol for wireless mesh networks like AODV [8]. It is also an on-demand, supply routing protocol [10]. DSR square measure permits the network to be utterly self organizing and self configuring, while don't require any exist network. Two methods "Route Discovery" and "Route Maintenance" are used by the protocol square measure and permit nodes to get and maintain the routes to absolute destinations within the impromptu network [11]. An optimum path for a communication between a source and destination is set by route discovery method. Route maintenance ensures the communication path remains optimum and loop-free. Inaccurate hops are detached from the node's route cache. All routes containing the hop square measure reduced at that time [12].

Disadvantage of AODV is the periodic changing into results in surplus information measure consumption.

FSR ROUTING PROTOCOL

Fisheye State Routing FSR [4] protocol is a proactive table driven impromptu routing protocol and its mechanism relies on the link state routing protocol utilized in wired networks. FSR is an implicit gradable routing protocol. It reduces the routing update overhead in giant internet works by employing a camera lens technique.

Camera lens has the power to envision objects the higher after they square measure close tore to its centres of attention meaning every node maintains correct information concerning near nodes and not thus correct concerning far-away

FSR reduced the consumed information measure because the link state update packets that square measure changed solely among close nodes and it manages to cut back the message size of the topology information because of removal of topology.

FSR possesses advantages like Simplicity, Shortest routes, Robustness and Partial routing updates.

3. SIMULATION RESULTS

The test observations are carried on Qualnet software. Simulation parameters used in QUALNET to design a node network are as follows:

Examined Protocols	AODV, DSR, FSR
Simulation Time	10 sec
Simulation house (m x m)	1500 x1500
Nodes altogether	20 and 21, 28, 18
Traffic type	VBR
Performance Parameters	Throughput , Packet delivery ratio, end to end delay
Type of Nodes	Mobile

Table 1: Simulation Parameters

By considering an environment utilizing about 30 mobile nodes with variable bit rate prior to four different sets, QUALNET screen shot for design of node network appears as in Fig 1.

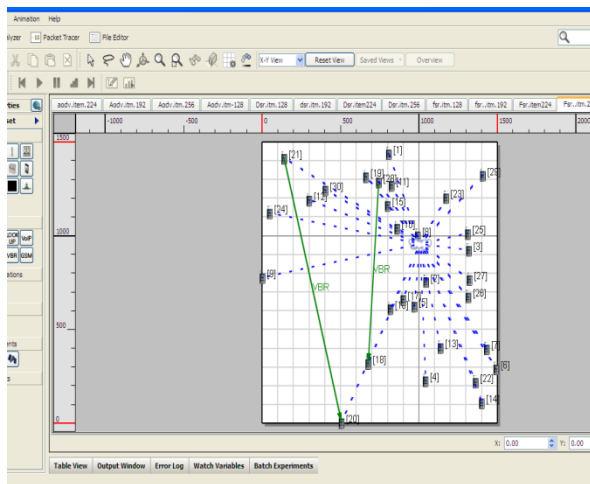


Fig 1 : QUALNET design window

The design is simulated for 10 seconds and corresponding to variable bit rate different speed of transmitting and receiving packets is obtained for Application, Transport and Networks layer. The observations obtained at different layers appear as shown in Fig 2 below:

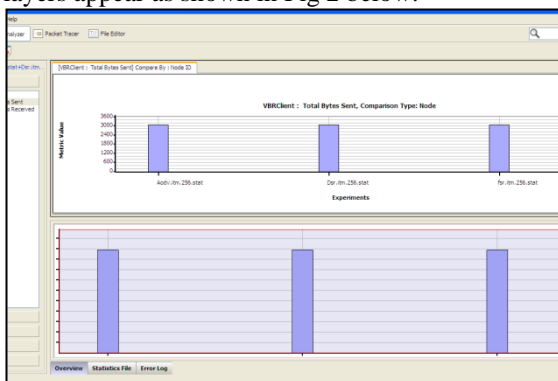


Fig 2: VBR data format

Based on different test observations now graphs are obtained and Three metric performance indices are used for study i.e. Throughput, packet delivery and end to end delay. Throughput describes the numbers of data transferred over the amount of it sent. Packet delivery states a quantitative relation between total Information packets sent by the VBR purchasers over the complete information packets received by the VBR servers. Packet Delivery Ratio. The term end-to-end delay is referred to the time taken by a packet to be transmitted across a network from provide node to destination node that has all potential delays caused throughout route discovery latency, retransmission delays at the raincoat, propagation and transfer times. All the three performance indices are simulated and compared for different layers. This is analysed below:

GRAPHS FOR THROUGHPUT:

AODV: In this caseover all performance of DSR is very good on Item size 224 at Application layer, than

the AODV and FSR due to variation of Item Size. This is shown in Fig 3.

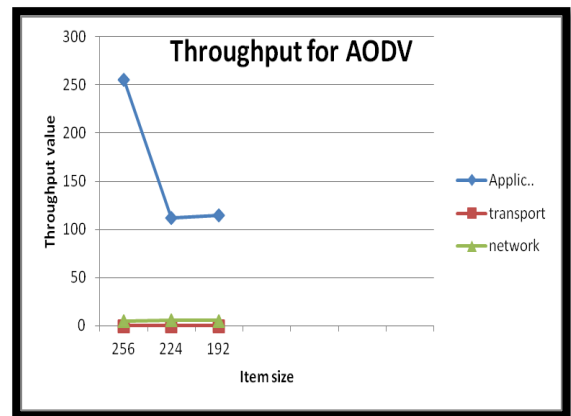


Fig 3 : AODV Throughput

DSR: We see for 256 item size at Application layer and transport layer AODV and DSR have approximate equal but in n/w layer AODV is better than DSR so that over all AODV is better. This is shown in Fig 4.

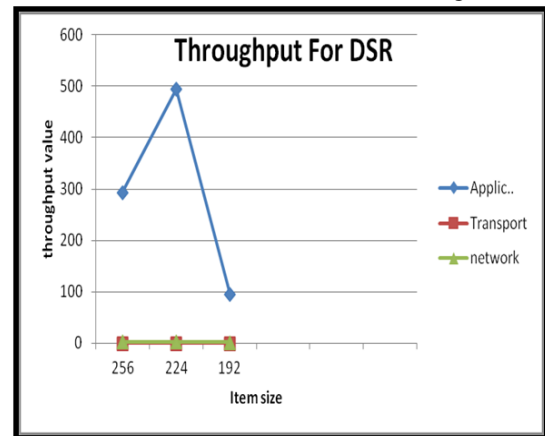


Fig 4 : DSR Throughput

FSR: For some item density FSR In Application and transport layer have not satisfactory response but in n/w layer provide good result in n/w from over all Analysis So we can say that Fsr is not good for 256 item size only its best work 224. This is shown in Fig 5.

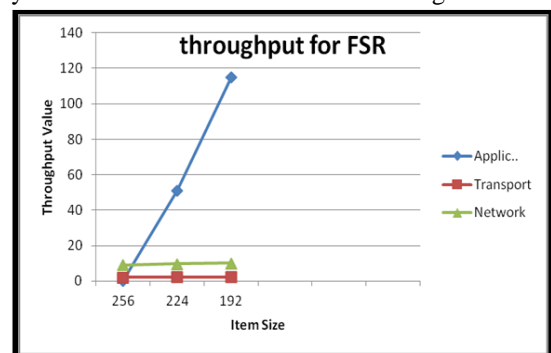


Fig 5 : FSR Throughput

GRAPHS FOR PACKET DENSITY RATIO

In this case Packet delivery ratio performance is very good of FSR on item size 256 at Network layer than the DSR & AODV Because FSR is very less packets loss on item size 256 at network layer but DSR and AODV high packet loss at transport layer due to Reduce the item size 224 & 192. So we can say that FSR is Good packet delivery ratio At Network layer due to Item size 256. This is shown in Fig 6.

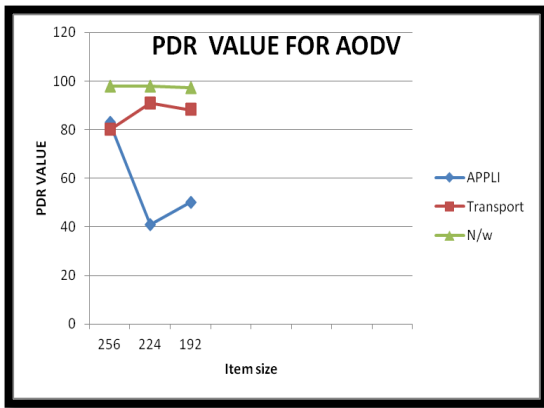


Fig 6 : AODV PDR

Next system is simulated for End to End delay.

GRAPHS FOR END TO END DELAY:

On simulating, we find that End to End delay takes an average of 0.00026 sec delay in AODV but approximate close delay in DSR and FSR 0.829 and 0.825 seen respectively. Thus, AODV provides best and fast delivery of packet from source to destination at Network layer.

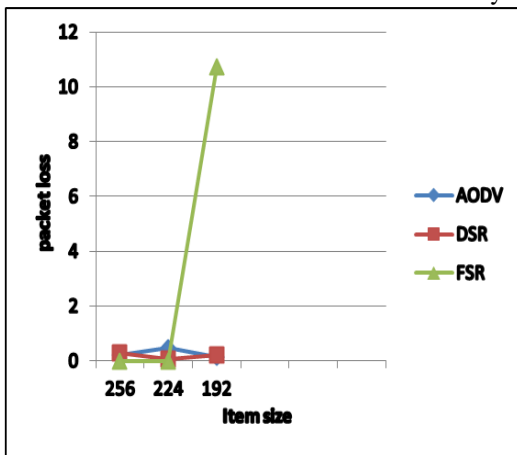


Fig 7: Graph of End to End delay

4. CONCLUSIONS:

In this paper we studied three routing protocols (both reactive and proactive). As like AODV, DSR, FSR by variation of item size. The performance is determined on the basis of Throughput, Packet delivery ratio, and End to End delay.

By comparing these protocols on the basis of various performance metrics we have reached to a conclusion that AODV and DSR give the better result than the FSR. Thus, AODV provides best and fast delivery of packets from source to destination at network layer.

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