Implementation of MANET using WiMAX for different Protocols

Anubhuti Jain, Shashank Mane

Mtech student Shri Balaji Institute of Technology and Management Betul (M.P),

Assistant Professor Electronics and Communication Shri Balaji Institute of Technology and Management Betul

Abstract— Now a day the crisis of mobile network is increasing day by day and the people have to continuously suffer the improper facility of the ranging, as they move away from the range of their network. Usually the people use wifi at their home but its range is limited to an area, so to overcome this I have discussed about Wimax which is more convenient than wifi and its range is more than wifi. Wimax is power station through which mobile network, commonly known as MANET is used by the people. MANET has its protocols this is AODV and DSDV. In this paper the comparison between these two protocols is done on the basis of superiority and the results are simulated with Ns2.

Index Terms— AD HOC network. AODV, DSDV, MANET, Routing protocols, WIMAX.

I. INTRODUCTION

A. MANET

MANET is a continuously self configuring, infrastructure less and wireless network of mobile devices. In MANET each device is free to move in any direction and they are connected to themselves or to longer network and are operated by themselves. They consist of nodes which carries message or information between the routes of two devices.

Being wireless in its nature it can be deployed as multiple hop packets network both rapidly with less expensive. It has unique feature to control and prevent the attack or malicious nodes from different network. MANET uses its own separate network or it can be connected to an external network that is internet.

A device often changes its links with other devices as it is free to move anywhere in a MANET. Data must be forwarded even if is not of user's use and for this be a router. The main difficulty in forming a MANET is having a device to keep on maintaining necessary information to route traffic orderly.

These networks may be self operating or may be linked through other large network such as internet. They can have one or more and various transceivers between nodes. Its consequence is a very fast topology.

Usually a MANET is one of the wireless ad hoc network which has a routable networking environment on the top of link layer ad hoc network .MANET include peer to peer, self building, and self healing network. MANETs circa 2000-2015 especially transmits signal at radio frequencies (30MHz to 5 GHz).

The developments of laptops and 802.11/WiFi wireless networking have converted MANET to a source of public interest and research since mid 1990s. Many academic papers evaluate protocols and their abilities, keeping in mind the different degrees of transmission within a limited space, usually including all nodes within some hops from each other.

Various protocols are then estimated based on dealings such as the packet drop rate, the overhead introduced by the routing protocol, end to end packet delays network throughput, ability to scale etc.

Fig 1 shows the structure of MANET. It is a MANET network in which one laptop is connected through the internet and this laptop transfers the network to all other devices (mobiles and laptops).

B. Wimax

Worldwide interoperability microwave access consists of wireless standards newly formed to provide 30 to 40 megabit /second data rates and after having 2011 update it provides up to 1Gbits/s for fixed stations. It was named WIMAX by WIMAX Forum which was formed in June 2001 led and forwarded the conformity and interoperability of the standard. IEEE 802.16 or wireless man advanced is a contender for the 4G, in contest with LTE advanced standard.

The original IEEE 802.11 standard also called fixed WIMAX was published in 2001. It took some of WiBro's technology, a service in Korea. WIMAX is also referred to as "wifi on steroids" and can be utilized in multiple applications such as broadband connection, cellular backhaul, hot spot etc .It is almost same as WiFi except it enable usage it much greater distances.

It is suitable for following various potential applications because of its bandwidth and range:

➢ It access easy handling mobile broadband connectivity over cities and countries through a variety of devices.
➢ Smart grids and metering.
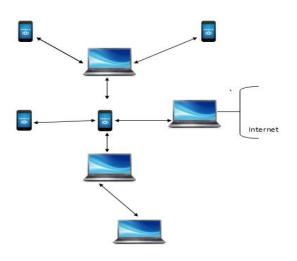➢ Providing a source of internet connectivity as a part of business continuity.

Fig.1 Shows structure of MANET in which one laptop is connected through the internet and this laptop transfers the network to all other devices (mobiles and laptops).

II. REVIEW

A. Literature Review

In this paper, we use wimax through which MANET network is connected. There are 8 nodes out of which 4 nodes are fixed, and rest 4 is movable. There is 1 base station and 3 relay station and 4 users, for this we use two routing protocol one is AODV and other is DSDV.

Three conditions are considered, in 1st condition users are fixed, in 2nd users are towards the base station, and in the last one users are away from the base station and in all three condition base station and all relay stations are fixed. This process will be done one by one with both protocols. Results will be simulated with ns2, and compared.

B. Protocols Review

AODV stands for ad hoc on demand vector. AODV is a reactive protocol which works by setting its own path when the user wants to start the communiqué session, and the path continues to work till the user wants to utilize it.

As soon as the user finishes his/her work the route of it get deactivated by AODV and if the user wants to connect again the AODV creates a new route to work.

AODV has a main advantage that it creates a path only when the user wants to use otherwise it has no connection to work and because of this the number of losses is less compare to others.

It works only on demand of the users, and when the source node wants to route information or packets to destination then first it checks the route to destination whether it is available or not.

If the route is free then it transmit the packets and works further and if not it sends a request to neighbor and then its works further until it reaches to an intermediate code and with

this intermediate codes it create a fresh route to reach its destination.

This protocol provides routes to destination on demand and support unicast as well as multicast routing. They start own self and are loop free except scaling to multiple mobile nodes. Network nodes seeking for connections broadcast a request for connection.

The remaining AODV nodes sends the message and the node seeking connection is recorded. Thus, a series of temporary routes back to requesting is created. The node receiving such message seizes a route to wished node and sends a backward message through temporary route to the requesting node.

The node which made request uses route including least number of hops through other nodes. The not in use entries are recycled after some time. If link is unsuccessful the routing problem is sent back to broadcasting node and process is repeated.

DSDV stands for direct sequenced distance vector. In this protocol the messages are transferred between the neighboring nodes as well as mobile node (mobile nodes that are in the range of each other).

In DSDV protocol the shortest path is recorded and each node works only on that route, so that looping of the routing network can be avoided. It works by making the sequence number, even or odd and these numbers are made on the basis of their destination.

If new information is received by router, then latest sequence number is used. If sequence number is same as one already in table, the route with better metric is used. The entries not been updated for a while known as stable entries are deleted along with their routes using those nodes.

The main advantage of using DSDV is with less change all the available wired network protocol can be useful. It also has a demerit that it is not suitable for highly-moving large scale networks.

The best known proper distance agent carrying protocol is AODV, which, by quality of being a reactive protocol can use simple sequencing heuristics. Babel is an attempt at forming a DSDV more robust, efficient, widely, applicable while staying limited in the framework of proactive protocols.

III. SIMULATION PARAMETERS

Parameter	Description
1. Channel	Wireless
2. Radio propagation	Two ray ground
2. Network interface	Wireless physical
4. Mac type	802.16
5. Interface queue	Drop tail/pre queue
6. Antenna type	Omni directional

7.Routing protocol	AODV & DSDV
8. Packet size	1000 byte
9. Nodes	8
10. Area	500/500

Table.1 shows simulation parameters and their description. It shows channel type, protocols, packet size and other parameters.
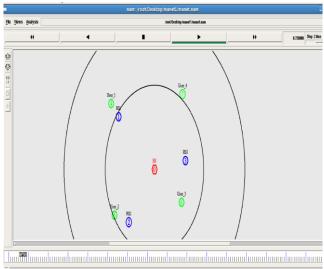
IV. SIMULATED RESULTS

Fig. 2 In this figure the red point shows base stations or server, the blue ones are relay stations and green ones are for users]

The comparison between AODV and DSDV is shown in table 2 on the basis of parameters like average throughput, no of packets sent and received, delivery ratio and loss ratio shows that AODV is better than DSDV.

Parameter	AODV	DSDV
Average Throughput	787.8325 Kbps	628.4648 Kbps
No. of Packet Sent	1902	1902
No. of Packet Received	1462	1163
Packet Delivery Ratio	76.86 %	61.14 %
Packet Loss Ratio	23.13 %	38.85 %

Table.2 shows comparison between AODV and DSDV on the basis of various parameters which proves that AODV is better than DSDV.
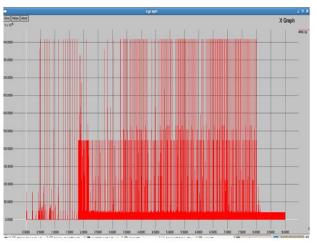

Fig.3 Shows delay time of AODV protocol X axis shows simulation time and Y axis shows the delay time

In fig 3 and fig 4 X axis shows simulation time and Y axis shows the delay time. Number of red lines shows the number of packet sent in particular interval. The height of red lines shows the Delay time thus, the maximum height shows maximum delay.
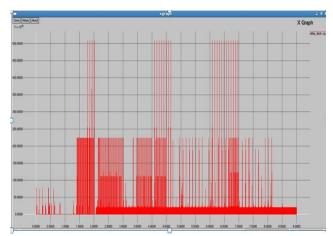

Fig.4 shows delay time of DSDV protocol. Number of red lines shows the number of packet sent in particular interval. The height of red lines shows the Delay time thus, the maximum height shows maximum delay.

IV. ADVANTAGES AND APPLICATIONS

Advantages and applications of MANET are shown below:

Fig.5 shows Advantages & Applications of MANET

V. CONCLUSION

In this paper we have shown the scenario of mobile nodes or user moving towards the base station which are having different mobility speed for all the user such as 20m/s, 30m/s, 40m/sec and we have concluded that as the user moving toward the base station then it gets more signal strength and best coverage area therefore the packet delivery ratio and throughput is good.

VI. FUTURE WORK

We have shown the scenario of user moving towards the base station. In future this work can be extended for the different scenario in which user moving away from the base station of the user are stable and then compare all the result on different routing protocols. This comparative analysis will be publishing in our next paper. Also we will increase the number of user and then compare the result with the existing result of our work.

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AUTHOR BIOGRAPHY

Anubhuti Jain is currently pursuing M.Tech degree in Digital communication at Rajiv Gandhi Proudyogiki Vishwavidyalaya, Bhopal (M.P). From 2013 to 2014, she was a Graduate Trainee with the Bharat Heavy Electricals Limited Bhopal. Her research interests include development of mobile network.

Shashank Mane wworking as an Assistant Professor in Shri Balaji Institute of Technology and Management Betul (M.P), in Electronics & Communication Department. having 8 years of experience in teaching. Got Gold medal in M.Tech (VLSI).6 publications in international journal and 3 national conferences.