Distributed Approach to Enhance Performance of Wi-Max Network

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Abstract- *WiMax, the Worldwide Interoperability for Microwave Access is a new technology dealing with provision of data over long distance using wireless communication method in many different ways. This paper explores the trade-off relationship between a spatial diversity gain and a control overhead with regard to the number of hop count of the routing tree in WiMax mesh. We proposed a distributed approach to reduce overhead in this network and increase network performance networks.*

Keywords- LOS, ATM, VLANs, QoS.

I. INTRODUCTION

Wi-Max (Worldwide Interoperability for Microwave Access) is an crystallize limited broadband wireless technology which will send end mile broadband connectivity in a bigger geographic region than Wi-Fi. It's requisite to endow coverage anywhere from one to six miles wide. As Wi-Max coverage range is requisite to endow nomadic and fixed wirelessly broadband connectivity without inevitably having a LOS (line-of-site) with a sink station. Wi-Max will also enable bigger mobility, big speed data usages, range and throughput than it is counterpart, Wi- Fi. There are many gains that can be earned from the diffuse of Wi-Max. Initially, it endorsement bigger data speed rates, and wider operating range and bigger throughput rates. These create the technology very utilitarian for diffuse in evil terrain regions or in atmospheres with limited wired substructure. Moreover, Wi-Max supports and interfaces easily to other wired and wireless technologies such as Ethernet, ATM, VLANs, and Wi-Fi [1].

Benefits of Wi-MAX

The range and bandwidth of Wi-MAX create it proper for the subsequent potential usage:

- Endow a wirelessly other to DSL and cable for "end mile" broadband entree.
- Endow data and telecommunications services.
- Endow a sender of Internet connectivity like kind of a business continuity plan. That is, if a industry has a limited and a wirelessly Internet link, specially kind Un-related endow, they are improbable to be affected thru the similar service outage.
- Endow portable connectivity [2].

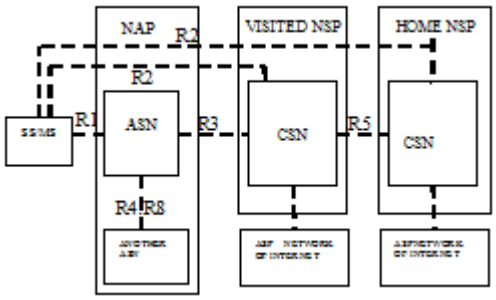

Fig. 1. WI-MAX SYSTEM

II. WI-MAX SYSTEM

Wi-MAX is a telecommunications protocol which endows fully and fixed mobility internet access. The present Wi-MAX alteration supplies up to 40 Mbit for consistently with the IEEE 802.16 ml anticipated that and overhaul would bargain up to 1 Gbit/s restricted correspondence speeds."Wi-MAX" term was first made thru the Wi-MAX Forum that was made in June 2001 and to promote interoperability and conventionality of the IEEE standard. The IEEE 802.16 standard kinds of basis 'Wi-MAX' and its separated sometimes into Mobility Wi-MAX and Fixed Wi-MAX of IEEE 802.16d and IEEE 802.16e standard respectively. Wi-MAX has many dissimilar physical radio transmission choices that allow it to be diffuse in regions with dissimilar frequency regulatory availability necessities. Moreover, the system was planned with the capability to be utilized in unlicensed or licensed frequency bands exploiting narrow or wide frequency channels. Wi-MAX systems have the potential to provide very high data transmission rates. Data throughput is the quantity of data information which can be transferred through a communiqué channel or transfer through a point on a communication system. iMAX device can be configured to offer services that have dissimilar kind of QoS levels. QoS is one/more estimation of craved execution and needs of an

interchanges framework. QoS measures may contain BER (greatest piece mistake rate), most minimal CBR (submitted bit rate) and administration accessibility and other estimations which are abused to ensure quality correspondences administration. The QoS abilities of Wi-MAX device permit device operators to endow priority services to high-value customers and best effort services to less demanding consumers. The 802.16a standard for 2-11 GHz is a remotely MAN (metropolitan zone system) innovation which will enrich broadband remotely network to Portable and Nomadic and Fixed devices. Wi-MAX is estimated to dealfirstly up to concerning 40 Mbps capacity per wirelessly channel for both portable and fixed usages, depend on the special technical configuration. Wi-MAX is likewise planned to invest broadband network to cell phones. It would not be as rapid as in these fixed usage but expectations are for concerning 15 Mbps capacity in a 3 km cell coverage region. Wi-MAX could conceivably be diffuse in a type of range groups.

2.5GHz, 3.5GHz, and 5.8GHz and 2.3GHz. Wi-MAX, that is an IP-depend wirelessly broadband technology, can be combined into both wire line networks, wide-area third-generation (3G) mobility and wirelessly [3].

III. ADAPTIVE ROUTING BASED ON TREE CONSTRUCTION

All modern high-speed networks implement some sort of flow control in hardware, for instance the one described in when there is contention in the fabric, the transmitter NIC will lastly break injecting packets. On Myrinet, the NIC firmware knows when the back-pressure flow control is stopping outgoing traffic. This info can be utilized to sense contention in the network and only use dispersive routing when contention occurs.

This adaptive routing behaves like static routing when never contention is sensed, sending packets in order along a sole path. However, it does change routes randomly when a packet is stopped due to flow control. In the worst case, when every packet is blocked, this technique retro grades into the randomized oblivious routing.

Thru keeping a sole route when there is never contention, adaptive routing does progress the actual bisection thru not exploiting resources on other links, and so decreases the probability of head-of-line blocking. This algorithm can arrive full bisection bandwidth if all pairs eventually settle on a non-blocking route [4].

A. System model

We suppose OFDM (Orthogonal Frequency Division Multiplexing) in the physical layer and utilize the original messages defined for mesh mode in IEEE 802.16 standard such as MS H-NCFG message, MSH-NENT message, MSH-CSCH message and MSH- CSCF message.[1] We assume the nomadic mobility of SSs which means SSs does not frequently move and has relatively long residual time once they moved. So, we assume that the network situation changes in the long term period such as day time/evening time for a day.

For a convenience, we ponder a sole BS in the network and downlink traffic which is received from the Internet. There is the amount of *N* SSs which are uniformly distributed in the network [5].

IV. LITERATURE SURVEY

S.Swathi[2016]et al. study on E-Shaped patch on the topmost of the substrate and an inverted L-Shape slit in the infinite ground plane, circular polarization is realized to minimize the losses. It can operate at the frequency of 2.4 GHz, 3.3 GHz and 5.2 GHz for WLAN a/g and WIMAX applications. The dimension of the define antenna is relatively small (40 x 45 and it can operate over the frequency range of 2.10–2.85 GHz, 3.1-3.65 GHz and 4.95–5.80 GHz. The simulated outcomesachieved from HFSS 13.0 software and measured results from Agilent network analyzer tool shows that the planed antenna performs the triple band operation [6]**.**

Goran T. Djordjevic [2016]et al. study on a mixed FSO/WiMAX link with primary aim to determine the overall error rate performance. Firstly, we provide a brief recapitulation of main results in this field. Secondly, we determine error rate dependence on different system and channel parameters. We observe the simultaneous effects of FSO and RF channel circumstances on error rate performance. Further, we suggest some quasi cyclic LDPC (low-density parity-check) codes suitable for implementation in these systems and determine their error rate performance for dissimilar code words lengths [7].

Bhupendra Singh[2016]et al. study on, A Micro-strip patch reception apparatus with multiband attributes is illustrated. At the first, Conventional patch antenna is made for 2.4GHz frequency. By introducing SRR (Split Ring Resonator) loaded patch, the define antenna works on resonant frequencies of 2.45 GHz, 3.5 GHz and 5.2 GHz. The antenna is proper for WiMAX, HIPERLAN/WLAN and Bluetooth applications. CST Microwave Studio suit 2014 is used for simulating the define design. The Antenna parameters like VSWR, Gain, Radiation Pattern and surface current and

Reflection Coefficient are simulated to analyze the recital of antenna [8].

Raminder JeetKaur [2016]et al. study on a minor size planar inverted-F antenna (PIFA) is define that covers WLAN (5.15-5.85 GHz) and Wi-MAX (3.3-3.8 GHz) range. The antenna define paper has numerous aids as extensive operation bandwidth and compact size. The antenna portion has dimensions like 13.5 mm * 10 mm and the overall dimensions are 36 mm * 10 mm * 0.8 mm which can be simply executed in USB dongle usages. The antenna is planned on RT Duroid5880 Substrate. Simulation and measured results are discussed and presented [9].

Jimmy Gautam[2016]et al. study on aims to design micro strip hairpin and combine band pass filters for frequency of 5.8 GHz which is designated for Wi-MAX systems. For micro-strip implementation, substrate Rogers TMM10 is used for both designs. The filters have been planned on the ADS software. The final conclusions have been drawn by analyzing various performance parameters for instance return loss, insertion loss, 3-dB bandwidth etc[10].

UpasanaMalhotra[2016]et al. study on, a stacked Shivling shaped micro strip patch antenna suitable for Bluetooth, GSM, IMT, WLAN and Wi-MAX applications has been proposed. The define antenna plan employs two substrates of Teflon material having dielectric constant 2.1 and 4.5 mm and 1.5 mm thickness. The substrate of thickness 1.5 mm has been stacked over 4.5 mm thick substrate. The antenna design has Shivling shaped radiating patch and a micro strip feed line on the upper surface of 4.5 mm thick substrate and a defected ground plane on the lower surface [11].

Indranil Acharya [2016] et al. study on, a fresh L-strip fed hexagonal patch antenna is examined. Several antenna parameters for instance the return gain and loss are studied. The antenna exhibits sharp resonance at 2.4 GHz with a return loss value of -17.83 db. In order to ensure additional modes for Wi-MAX applications, fractal structures are placed in close proximity to the L-strip feed line. Additional resonance modes are observed at 3.55 GHz having return loss value of -13.15 dB and at 4.05 GHz with return loss of -10.29 db. Defective ground structures are incorporated in the ground to attenuate the higher order modes. All the analysis of the define antenna is carried out in HFSS 2014 [12].

Monika Cheema [2015]et al. study on the receiver involves of a two stag interference canceller. The co channel interference cancellation is performed based on Zero Forcing (ZF) Detection method used to suppress the effect of ISI in the first stage. The latter stage involves of a simplified PIC scheme. Higher bit error rates of wirelessly communication device need employing FEC (forward error correction) approaches on the data transmitted in sequence to avert burst errors that occur in physical channel. To achieve high capacity with minimum error rate LDPC codes which have recently drawn much attention because of their error correction act is utilized in this system. The device recital is analyzed for two different values of normalized doppler shift for varying speeds. The BER is illustrating to improve in every iterations cause to the ICI cancellation [13].

Zi-Tsan [2015]et al. study on, the problematic of scalable video multicast scheduling in a mobility Wi-MAX net with the aim of make the most of the multicast energy-throughput. This problematic has never been gravely learn when the supposition which dissimilar multicast sets may partially overlap is made. This problematic is NP-complete. Our characterize result, named EEMS-AMC, comprises of three modules: base layer information scheduling, and improvement layer information scheduling and online confirmation control [14].

V. PROPOSE WORK

In our propose work we apply distributed approach for better performance first RSU put as a tree root node at outside of area and after that subscriber nodes connect to each other below we mention the manner of connection

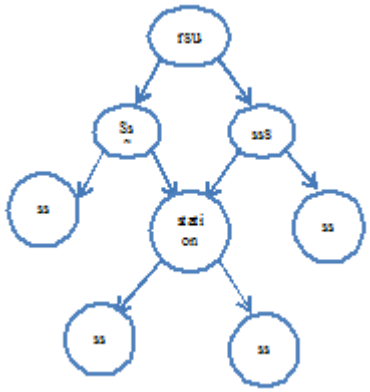

Fig. 2.Tree construction

For tree construction we choose like rsu behave like base station than subscribers station connect rsu than after three level we create another station for better or distributed connection.

Algorithm
Step1: p= create rsu // root node
Step2: pm = {1,2,….N} // unselected node

Step3:RN=p
Step4: while(pm){
Select node from pm }
Step5: each three level put station
Step6: repeat step1 to step4
Step7: exit

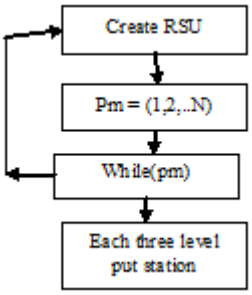

Fig. 3. Proposed work

Packet delivery ratio: packet delivery ratio is define as how many packets receive divided by how many packets send.

Packet delivery ratio = $\sum \frac{receivepackets}{sendpacket}$

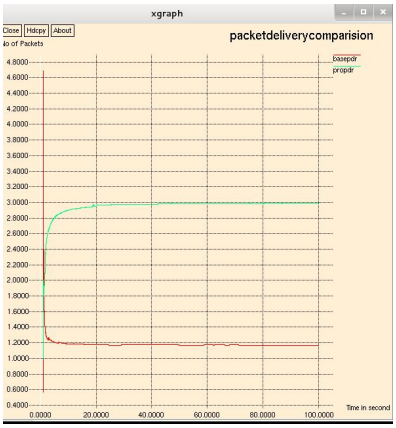

Fig. 4.Packet delivery ratio

By seeing above packet delivery ratio graph in which red line show existing technology and green line shows proposed technology, we can say that our proposed work perform better compare to existing one.

Throughput: number of bits forward per second over the band width.

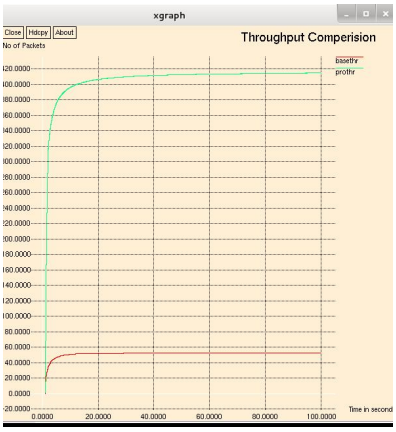

Fig. 5.Throughput

By seeing above throughout graph in which red line show existing technology and green line shows proposed technology, we can say that our proposed work perform better compare to existing one.

Routing overhead: Routing overhead defines as how many extra packets generate at the time of communication. By seeing above Routing overhead graph in which red line show existing technology and green line shows proposed technology, we can say that our proposed work perform better compare to existing one.

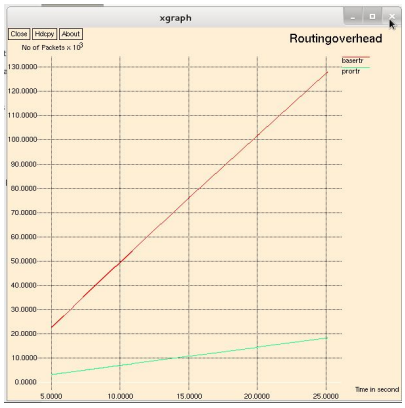

Fig. 6.Routing overhead

VI. CONCLUSION

In this paper we study about wimax network and there architecture whole study of this network shows that overhead is one of the main concerning issues of this network so that by proposing distributed approach we get better results. In future we apply any ANN based approach for gaining better results.

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