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Project Title: IMPLEMENTATION AND ANALYSIS OF WIMAX COMMUNICATION IN NS2

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ABSTRACT

The network simulator 2 (ns-2) is a popular and powerful simulation tool for the simulation of packet-switched networks, which provides substantial support for simulation of TCP, routing, and MAC protocols over wired and wireless networks, such as wireless LANs, mobile ad hoc networks (MANETs), and satellite communications etc, and is widely used in both academia and industry. Although many protocol modules have been implemented in the ns-2, the IEEE 802.16 broadband wireless access networks (BWANs) or WiMAX module has not been contributed yet. Thus, in this paper, we present our detailed design and implementation of the WiMAX based on the IEEE 802.16 standard with the point-to-multipoint (PMP) mode for the ns-2.

We measure how many packets are received by destination, how many data packets are dropped during sending, how much time it take to reach the destination. All above conditions can be measured with the help of routing metrics such as

- Packets sent, received
- Throughput
- Packet delivery ratio
- Average End-to-End Delay

LITERATURE SURVEY

PROPOSED SYSTEM

Wireless means transmitting signals using radiowaves as the medium instead of wires. Wimax is one of the hottest broadband wireless technologies today. Wireless systems are expected to deliver broadband access services to residential and enterprise customer in an economical way. Wimax is the standardized wireless version of Ethernet intended primarily as an alternative to wired technologies is to provide broadband access to customer premises. Wimax is an IP based wireless broadband access technology, i.e. also known as World Wide Interoperability for Microwave Access (Wimax). This provides similar performance to that of 802.11/Wi-Fi networks with the coverage and quality of service (QOS) of cellular networks. This wireless broadband access standard could supply the absent connection for the “last mile” relation in wireless metropolitian area networks (MAN).

Wi-Fi signal can cover a radius of several hundred feet, a fixed WiMAX station can cover a range of up to 30 miles. Mobile WiMAX stations can broadcast up to 10 miles. IEEE 802.16 is a specification for fixed broadband wireless metropolitan access networks (MANs) that use a point-to-multipoint architecture. It is similar to the Wi-Fi standard, but supports a far greater range of coverage. It’s commonly termed as 4G networks.

Wimax has stepped forward to help solve barriers to adoption such as interoperability and cist of deployment. Wimax will help ignite the wireless MAN industry by defining and conducting interoperability testing and labeling vendor systems.

TOOLS

SOFTWARE REQUIRED

In this project, main softwares used are:

- NS2(Network Simulator-2.35)
- Linux-Ubuntu 16.04 LTS

NS is a discrete event simulator .It provides support for Simulation of TCP, Routing, and Multicast Protocols over Wired and Wireless networks. NS is not a polished and finished product, but the result of an on-going effort of research and development. In particular, bugs in the software are still being discovered and corrected. Users of ns are responsible for verifying for themselves that their simulations are not invalidated by bugs.

It consists of two languages:

- C++ (Internally)
- OTCL (User Interface)
- TclCL (Interface between C++ and OTCL)

METHODOLOGY

Step1: Start

Step2: Make an instance of Simulator and ON wpan & wibrose for 802.16

Step3: Set up tracefile by opening file "trace.tr" in write mode and call trace by "trace all".

Step4: Design a topology object

Step5: Topology grid

Step6: Make a GOD

Step7: Configure node using node configuration

Step8: Create node and disable random movement

Step9: Design a network scenario by assigning node position

Step10: Set up node movement such as location of the node

Step11: Assign WIMAX base station, WLAN stations and Users

Step12: Set up traffic flow between nodes

Step13: Set up stop time of simulation and flush out trace file

Step14: Create AWK files to measure metrics such as Throughput, PDF, Delay, Packet sent, Packet received

Step15: Enable all connections by COMenable connection.o

Step16: Set source files to trace

Step17: Run the Simulator

Step18: Calculate (or) Measure metrics using trace file

Step19: Generate the graph using Xgraph

Step20: Stop

RESULTS

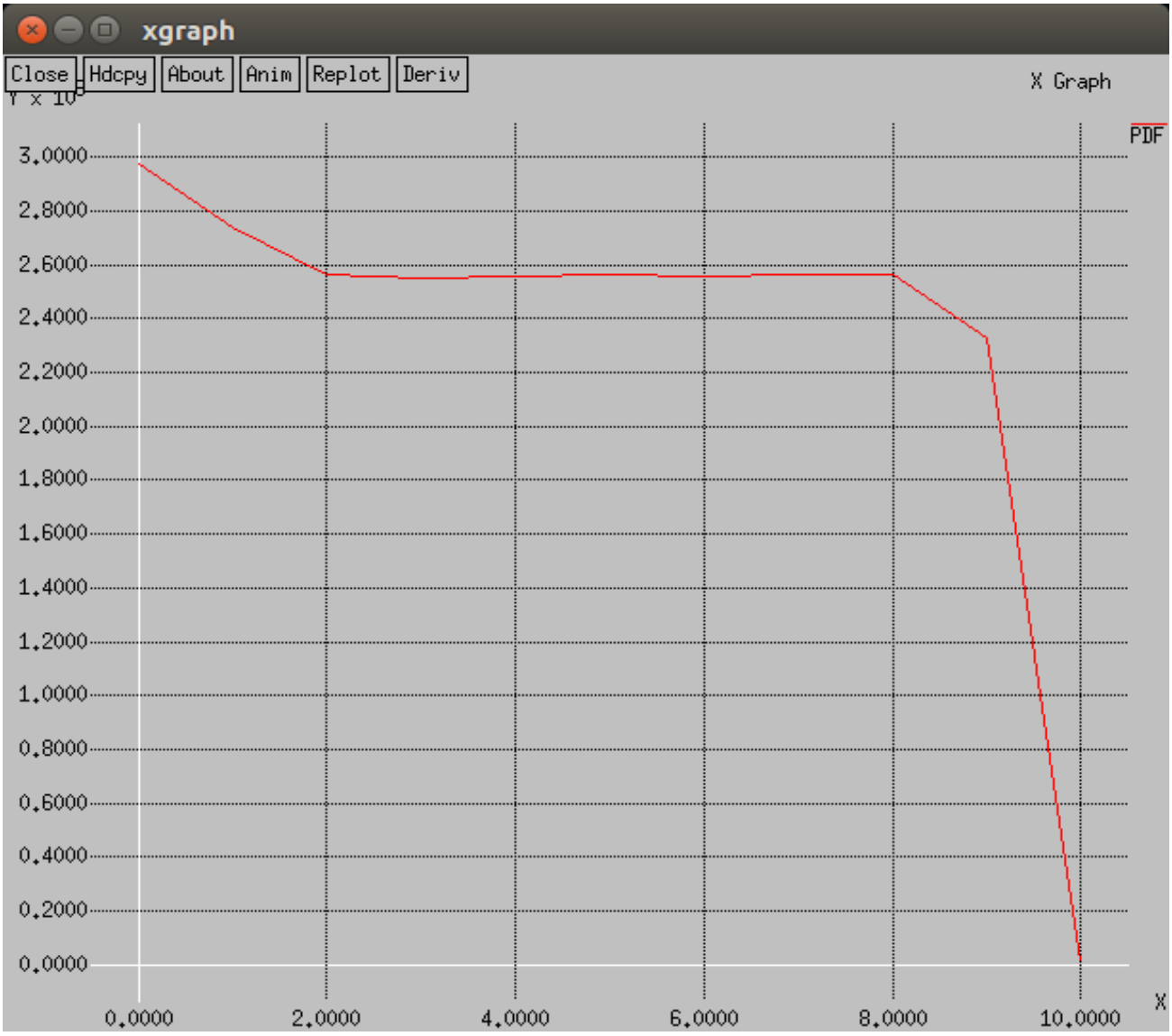

Figure 1.1: Packet Drop of overall simulation

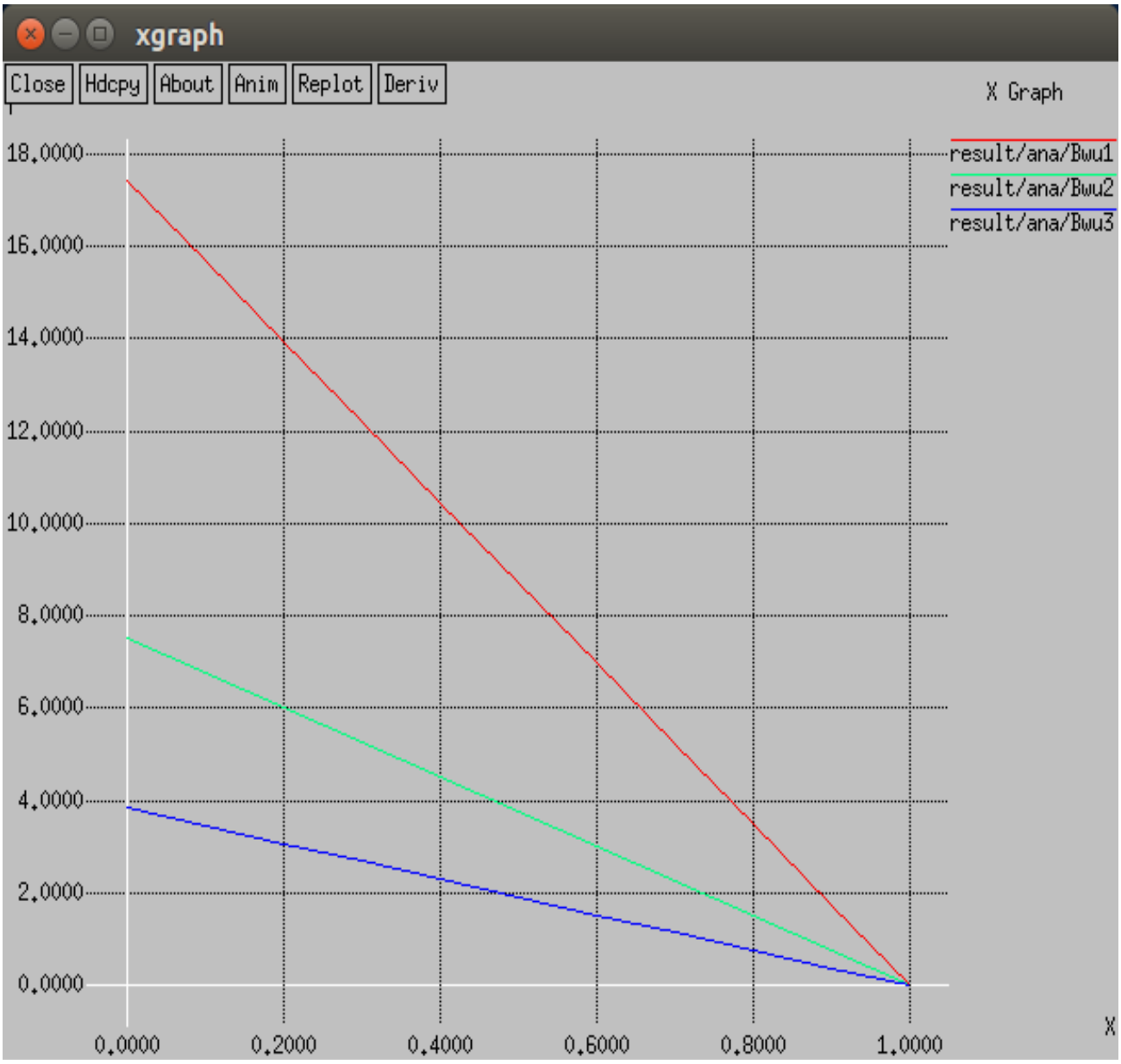

Figure 1.2: Upper Bandwidth ranges of wimax

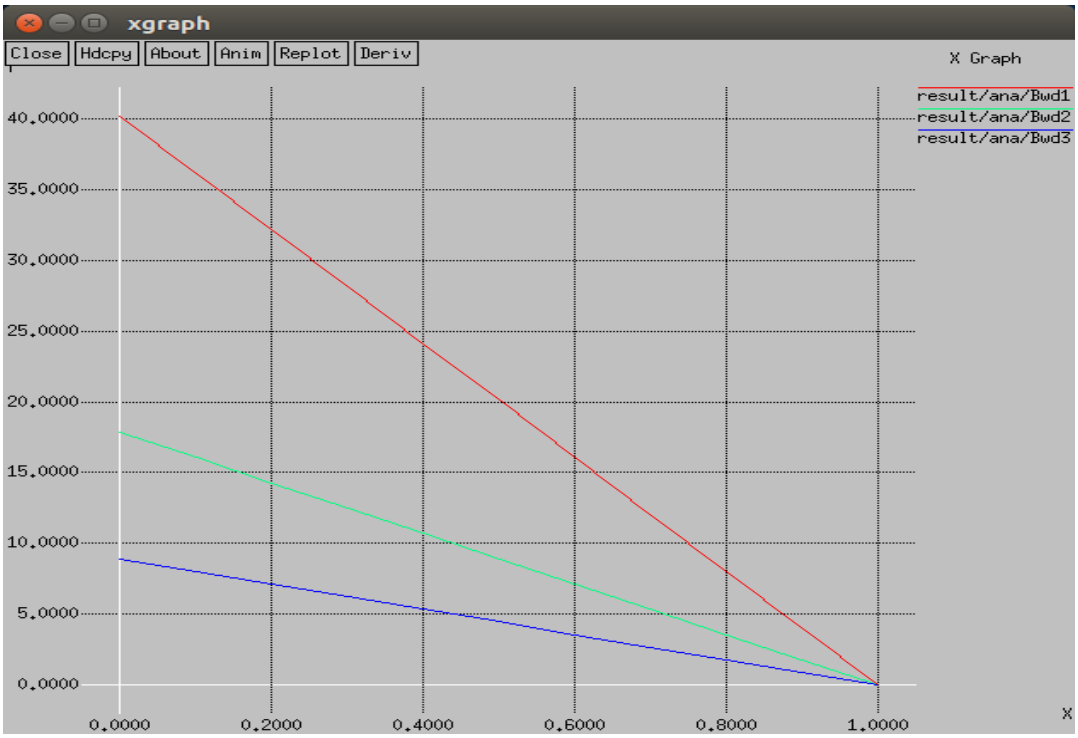

Figure 1.3: Lower Bandwidth ranges of wimax

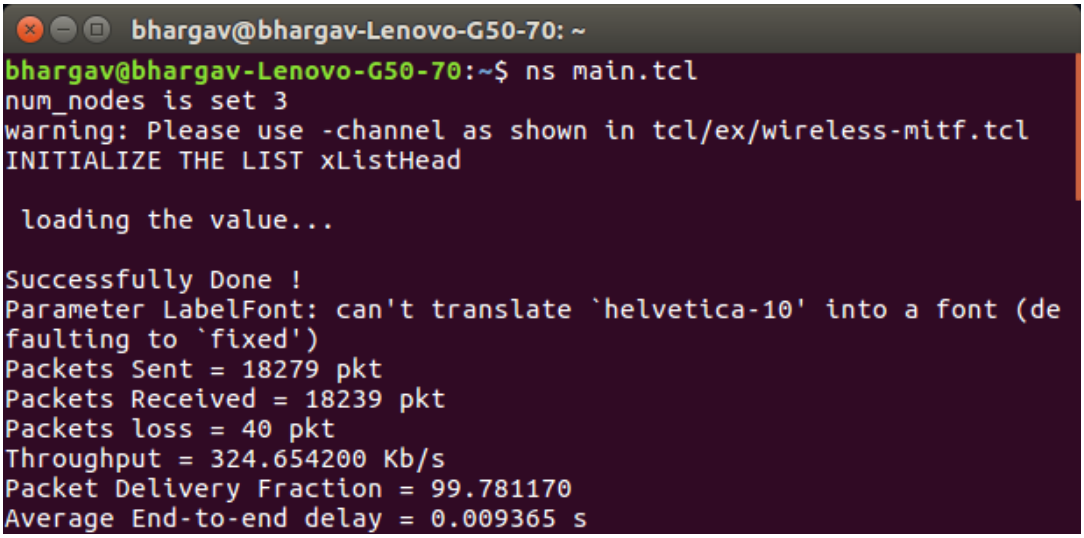

Figure 1.4: Performance metrics of Wimax

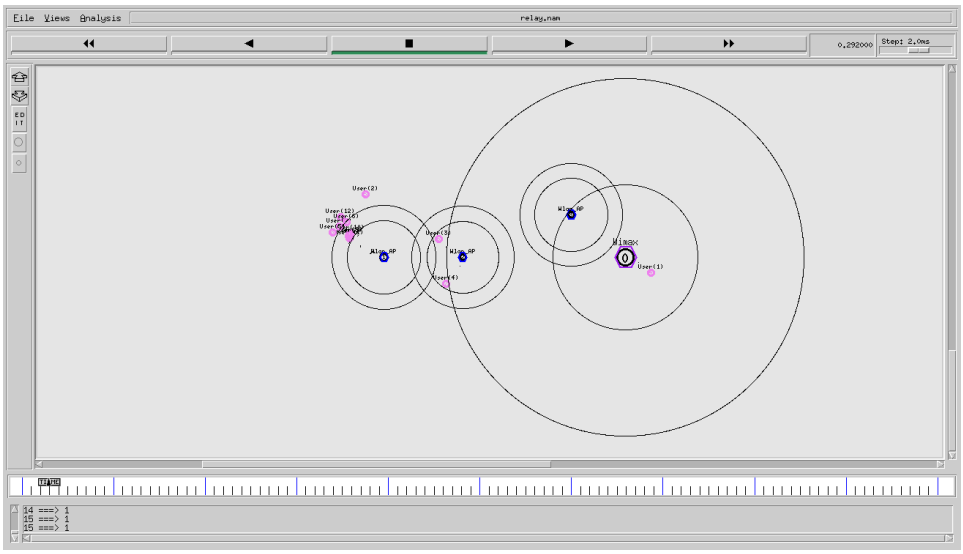

Figure 1.5.a: Simulation of Wimax

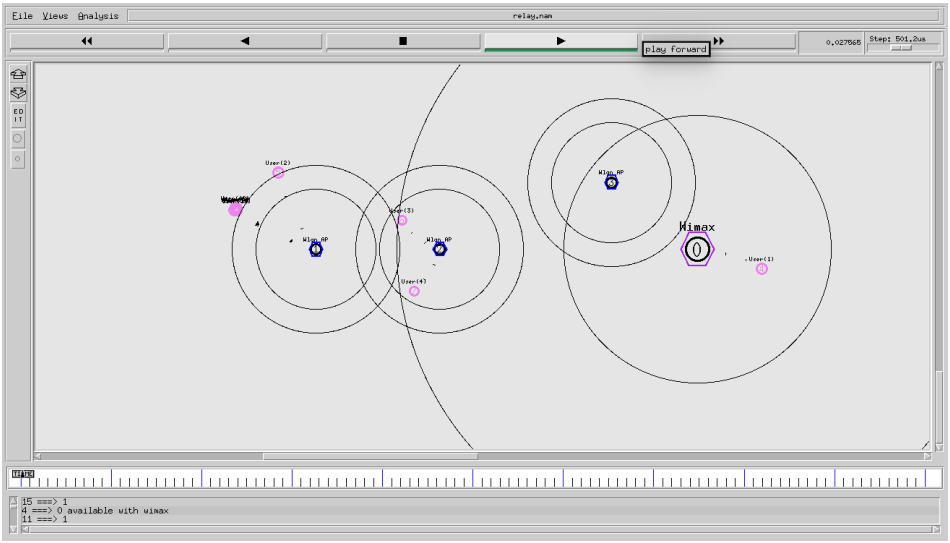

Figure 1.5.b: Simulation of Wimax emerging

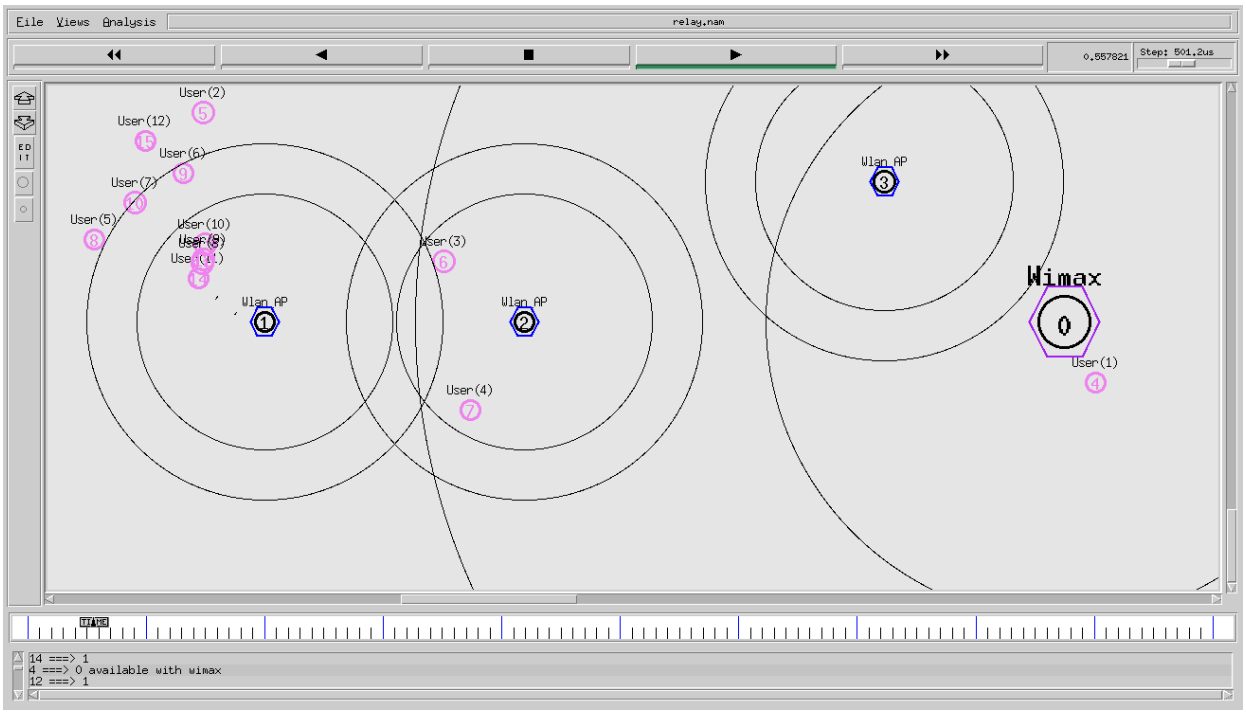

FIGURE 1.5.C: SIMULATION WHERE ALL USERS GET ACCESS TO WIMAX

CONCLUSION

We have implemented Wimax under Ns-2 Simulator and then analyzed its performance using various Metrics. From above results it is clear that when in a wimax scenario nodes move rapidly than the overall performance of network is good in terms of PDR and Throughput as Compare to the scenario having slow speed of node movement. With the introduction of mobile WiMAX technology, it can be expected that future work will focus on the mobility aspect and interoperability of mobile WiMAX with other wireless technologies. This paper indicates many results provided by various researchers and developers to market the need of high speed WAN communication.

BASE PAPER DETAILS

1. **Research Article:** Implementation and Analysis of Wimax Module under Ns2 with Varying Mobility Model.

OTHER REFERENCES

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[2] Usop, N., Abdullah, A., and Abidin, A., "Performance Evaluation of AODV, DSDV and DSR routing Protocol in Grid Environment", International Journal of Computer and Network Security.

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[4] Anwar F, Azad M, Rahman M, and Uddin,M., "Performance Analysis of Ad-hoc Routing Protocols in Mobile WiMAX Environment,"IAENG International Journal of Computer Science".