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Simulation of WLAN to Evaluate Various Response Times and Handoff Effect

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Abstract- This paper presents implementation of Wireless Local Area Network (WLAN) in an area where various hotspot sites are located through OPNET. This scenario focuses on the use of enterprise applications in a mobile environment. A mobile enterprise application platform (MEAP) is used in this work which is a pre-built environment that provides tools for developing, testing, deploying the various application. The main focus is to check the task response times and application response time for CRM and on-line banking applications. Both applications use ACE files to generate the traffic.

Keywords: WLAN, ACE, MEAP, CRM, Online banking.

I. INTRODUCTION

In Recent years, Wireless network are in a period of great expansion and becoming more and more momentum ranging from digital cellular telephony up to satellite broadcasting. Wireless access points are now common place on airports, domestic areas, and especially university campuses. Compared to Wired LAN technologies, WLAN technology has the advantage of mobility for Internet access and easy installation. Many wireless network standards belong to the IEEE 802.11 family have been appeared but the most known standards are 802.11b, the 802.11a and the 802.11g [1]. The proposed research in this paper aims to predict various response time in WLAN environment using OPNET.

OPNET had inbuilt functionality to import traffic with help of Application Characterization Environment (ACE). ACE provide powerful visualization and diagnosis capabilities that helps in network application analysis.It helps in analysis of existing, and the development of new applications[2]. ACE helps to provide specific information about the main cause of application problems. In addition the OPNET provides Mobile enterprise application platform (MEAP) platform technology that offers mobile enterprise applications with the purpose of design, building, deployment, management, and ongoing support of their mobile applications [3].MEAPs can support more than one type of mobile device. MEAP platforms are pre-built environment for designing, deploying and provide lower initial costs for mobile applications.

II. LITERATURE SURVEY

FTP and Database statistics in wireless network environment for web client is presented by Gurtej Singh [1]; The authors focused on the FTP and Database statistics in the wireless network environment, and the impacts of factors such as upload/download response time, media access delay, FTP and Database task processing time and has been observed that the Database traffic received (bytes/sec) with load balancing is more in comparison with unbalanced network. 3D Visualization of UMTS/WLAN Integration Using OPNET Modeler is presented by Sankaranarayanan Radha Ramyah[2]. 3D Network Visualizer (3DNV) functionality lets you create three-dimensional animations based on topology information, node relationships, performance statistics, and terrain data.The author evaluate different integration solutions and mobility schemes that provide best service and performance by using OPNET as simulation tool. Benefits offered by web applications on Mobile devices is presented by Sanjeev Narayan Bal [3]. Mobile enterprise platform offer applications for building, deploying, and supporting mobile enterprise applications. Mobile application is strategic for organizations in terms of enhanced productivity, improved organizational efficiency, increased revenue, and better customer care. A conceptual design model for high performance hotspot network infrastructure (GRID WLAN) presented by Udeze Chidiebele. C [4]. The authors shows that with the design model, a careful selection of buffer sizes, fragmentation threshold, network management framework with network load intensity will guarantee an efficient hotspot solution. Improvement in a novel L3 handoff delay in IEEE 802.11 wireless networks is done by Andrea G. Forte [5]; The authors introduce a novel algorithm for reducing the L3 handoff time and show how it is possible to reduce the L3 handoff latency to values that in some cases allow us to have seamless VoIP sessions. Performance of UMTS/WLAN Integration loose and open coupling at Hot-Spot Locations Using OPNET is presented by Marwan Abu-Amara[6].This paper show that FTP and HTTP throughput is better with loose coupling scheme and the handoff delay between the 3G and WLAN networks, the results indicate that a loose-couple integration solution together with Mobile IP provides the best performance.

Study of the Vertical Handoff in Heterogeneous Networks and Implement Based on Opnet is done by W. Benaatou, A. Latif [7]. The main objective of Vertical Handover is to access in different networks so the user use several networks like

WLAN UMTS and WiMAX in parallel, and the system commutate automatically without disconnecting itself. Performance Evaluation of Mobile Hotspots in Densely Deployed WLAN Environments is presented by Shweta Sagari[8].The author described scenario for fixed and mobile WLAN. This paper shows that the throughput at mobile APs may decrease than fixed AP due to interference from fixed APs and but performance can be improved using adaptive channel assignment techniques.

III. PROPOSED WORK

The research paper emphasis on the use of enterprise applications in a mobile environment. The designed scenario has many subnets representing hotspot locations. In each subnet there are some business and leisure user. The ISP (Internet service provider) is connecting each subnet to internet. Network also contains a mobile user which aims to analyze the handoff effect during mobile user movement. The mobile user starts at a point and stays for 30+ minutes then travel to next location and stay there for another 30 minutes before returning to end point.

The two graphs show response times for CRM and on-line banking applications for business and mobile user. The application response time and task response time for various users is also compared. Both applications use ACE files to generate the traffic.

IV. RESULTS ANALYSIS

The major focus of the paper is to use of enterprise application in a mobile environment that represent the task response time and application response time for both mobile and business user. The graph shows the task response for both mobile and business user. The red line is showing response time for mobile user and blue for business user. From Fig 1, it can be observed that the mobile user is moving across various subnets, whereas business user is static in its subnet. Initially the response time for both users is almost same, but with time the response time for mobile user is increasing due to hand off from one subnet to other.

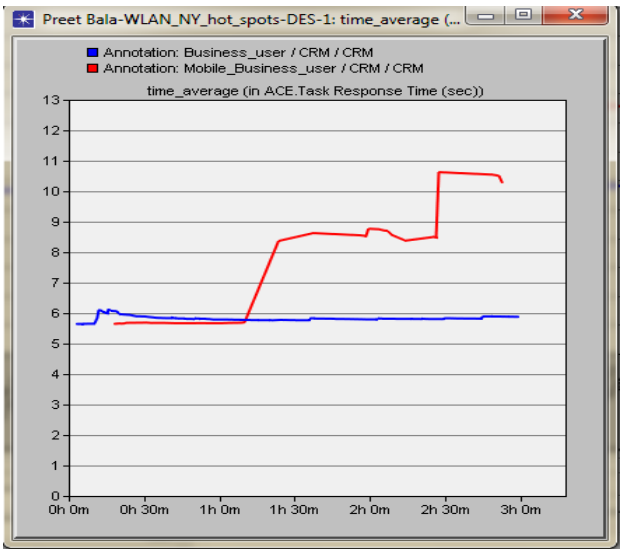

Fig 1: CRM Task Response Time for business and mobile user

The graph 2 shows online banking response time that is desirable to be low, as it involves financial transactions which need high bandwidth. The response time of business user and mobile business user is shown.

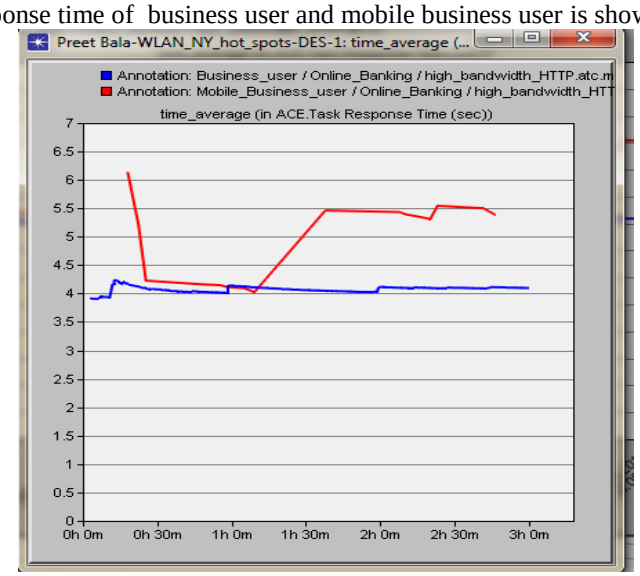

Fig 2: Online banking Response Time for business and mobile user

The traffic received for business and mobile business user for customer relationship management is shown by Fig 3. The business users receive much higher traffic than mobile user. The traffic receive signify throughput which is expected to high for business user.

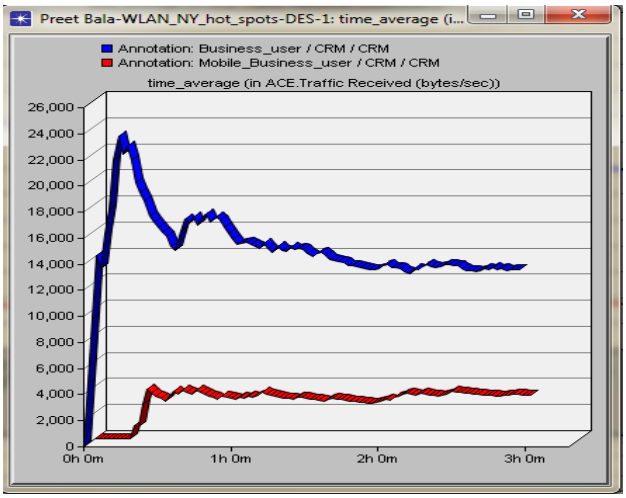

Fig 3: Traffic received for business and mobile business user for CRM

The traffic received for business and mobile business user for online banking is represented in Fig 4.The business users receive much higher traffic than mobile user The traffic receive signify throughput which is expected to high for business user.

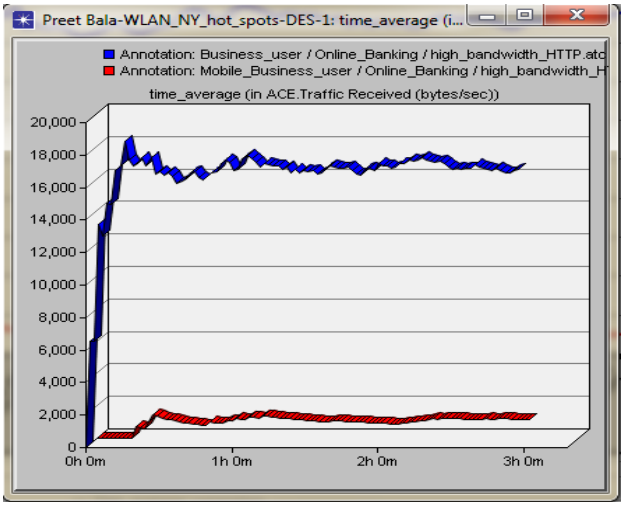

Fig 4: Traffic received for business and mobile business user for Online Banking.

Online banking task and application response time difference is shown in Fig 5. The application response time is when user interact with application to accomplish a task. Once user request transaction the task response time starts. The aim is to decrease the task response time, so high bandwidth provided to business user, which contributing in decreasing overall task response time.

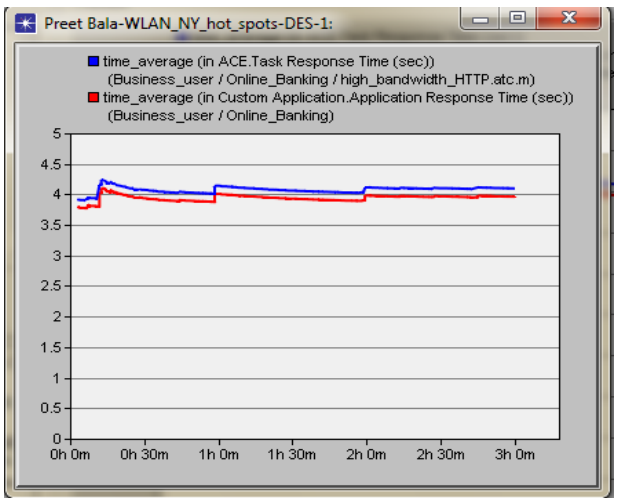

Fig 5: Online banking task and application response time difference

V. CONCLUSION

Managing the online and CRM applications over WLAN is major task. The applications like ERP, CRM and online banking requires least response times for efficient working. In this paper the various response time are predicted using simulator OPNET. The users with high bandwidth shows lesser time than normal user, also shows better response time. The handoff effect is seen on mobile user when it switches from one subnet to another. Mobile user receives much lesser data traffic in contrast with other user for one to another subnet. In future researchers can work on CRM systems that track and measure marketing campaigns over multiple networks.

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