

## **MOBILITY MANAGEMENT AND ITS CHALLENGES IN WIRELESS MESH NETWORKS**

**Ahmed Mateen \***

**Umair Abdul Aziz \*\***

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### **Abstract**

In this research the main focus is on wireless mesh networks (WMNs) that become known as a mean knowledge for next-generation wireless network. So their advantages across the further wireless networks, wireless mesh networks (WMNs) are facing different challenges. Wireless mesh networks (WMNs) can possibly convey Internet broadband access, wireless network for stationary or portable hosts at low costs both for system administrators and clients. The main goal of is research to analyze next generation wireless services with strongest quality of services (QoS) guarantee high mobility support for user hand off, time delay in packet delivering, authentication and suggest the best possible services for enhancing quality of services (QoS) of WLAN. In this research Opnet/NS2 simulator will be used for simulation. The main drawback of the technology is its complexity in terms of routing issues, mobility, link Adaptation, multiple Transceivers and security. Optimize and suggest better mobility management in wireless mesh network.

**Keywords: Mobility Management Mesh Network Issues in Mesh Networks Wireless Networks**

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**\*Department of Computer Science, University of Agriculture Faisalabad**

## 1. Introduction

Wireless network are the computer networks that are not linked with any other kind of guided media. Wireless media mainly radio waves that present a physical level at network configuration. WLAN, WWAN, WMAN, WPAN are the major types of wireless networks. Wireless mesh network in which communication is completed up among the mesh topology by radio links. Different types of user with different types of switches make wireless mesh networks. The radio links region in which these nodes are work knows as mesh cloud. WMN`s executed with a variety of wireless technology like 802.11, 802.16, 802.15 or others cellular technologies and grouping of more than one kind. In currently wireless mesh network (WMN) has turn into one of the proficient technologies for giving network connectivity for expanding number of mobile user. Furthermore, due to development of cost value, effectiveness, and fast install ability; it has become an attractive technology for future network. WMN consists of two types of nodes: interconnect client, interconnect router [1].

## 2: Previous Work

These are the WLAN, WWAN, WMAN, WPAN major types of wireless networks. The GW receive the down link Internet packets and sends individuals to the goal MCs throughout the WMN. In case of up-link Internet passage, packets are sending from MC to GW (Lin et al., 2014). Wi-Fi network systems (WMNs) are powerfully self-composed not surviving self-designed, utilizing the hubs as a part of the system routinely making an incredible unplanned system and the modifications; network although conventional remote switches are frequently created by similar PC equipment stage [2].

The protocols M-IPv4, HM-IPv6, FM-IPv6, M-IPv6, surround be projected for the enthusiastic Internet. In wireless interconnect network (WMN) give a number of issues that confines from beginning to end applicability of these mobility managing protocol for wired network [3].

Which contain special access networks, like a WLAN, (2G), and (3G) networks? On the other hand, every node in networks only represents one domain, which mostly in the case of most existing networks today. Macro mobility protocol is HMIPv6, FMIPv6, and M-IPv6 along with MIPv4 [4].

Internet focused on guests from the complete WMN experiences the GW. The Next generation (NXG) communication systems also referred to as Active Range Admittance Sites [5].

### **3: Proposed Mobility Management Scheme**

Proposed mobility management system handles the shifting of the hand-offs in for the mobile devices in wireless mesh networks inside a (MR-WMN). This scheme currently not disturbed with the schemes to preserve the quality of services and perform a successful routing throughout the handoff process. A number of attribute inside a (MR-WMN) structural design inside which they suggest the mobility administration system for without wired interconnect nodes be free of every means of communication technology, method inside planned design be spread, by heterogeneous in this way they could be of special wireless technologies, authority well-organized algorithms be use inside interconnect nodes and with-out wired interconnect nodes be measured fixed and heterogeneous, such as 802.11 and WiMax.

The WMN is estimated to serve fixed with cell phone subscribers in self-motivated set of connections environment as well as propose some kind of examine. The MR-WMN motivation be connected in the direction of backbone Internet through income more than single origin node, that are inside interconnect network terms be identified seeing that the interconnect gateway nodes. In some times it determination be alive further bandwidth able in the direction of create make use of next (MAP) slightly transfer the information packet throughout in the direction of outermost absent interconnect portal MAP. The RFC 4140 allow the partly cover MAP domain consequently this resources a node in MR-WMN might exist register through two adjacent MAPs [6]. The prose review through does not point to some comparable move toward for a dispersed MAP-environment in MR-WMN. Conditions we use accidental initialization procedure because explain inside direct task the MAPs might continue living attached through the node bottom an appropriate selection method.

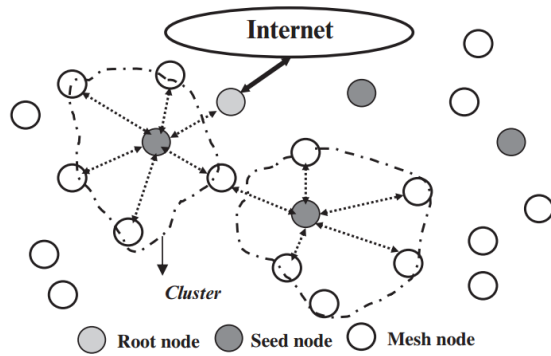


Figure 1. Random Processes [7]

### 3.1. Location Management

Location management system tracks the mobile node in the communication among two devices. It include two main responsibilities, namely (a) Call delivery, (b) Location update, In location update (known as location registration), the mobile mechanism sometimes inform the structure in the direction of bring up to date appropriate position database through up and doing position in order [8]. The systems determine the existing position of the mobile terminal base on top of the existing in order by the side of the structure database at what time a message intended for the mobile node be started. Two main hierarchies are concerned inside call-delivery formative the helping databases are call mobile joint as well as locate visit unit of the call cell phone joint. This known as paging, when poll communication are sent to all the cells that exist in registration area are called mobile terminal. Inter-system wandering, the suggesting of position administration technique faces the follow challenges [8]. Decrease of the signaling delays as well as latency of the service release. The check area of diverse during the network and mobile node has to perform location registrations. How user will choose the network and that selection will be based on which characteristics? How the correct location of a mobile node should be resolute in an exact time control. The ad-hoc position scheme (APS) design a dispersed algorithm, call DV-Hop, base on top of the theory of space vector worn in several direction-finding algorithms. A little portion of hops which are implicit in the direction of alert their location is calling landmark. They determination sometimes overflow exposed their coordinate.

### 3.2.Methodology

Location update is use to update the network concerning the ambiguity of a mobile terminal. Every mobile machine has to update its location from time to time. Location updates processes begin with an update message send the mobile device. In that case the location database is simplified after several signaling messages. The accurate procedures still differ with different location update scheme. A key problem in location update is, a mobile terminal must drive a keep informed message. If the update procedure is less regular than compulsory, the network may block in a paging stage and send paging message to enormous number of cell. The outcome will be great paging delay. Every class has a variety of amount of sub-schemes.

Location management keep follow the location in sequence of mesh clients, throughout location registration and location update operation. Location management is a fundamental task to distribute incoming calls properly to the call mobile roaming since point to point. Location management routing protocol utilize location of node for attractive the piece of routing protocol. The capability to modify locations while attached to the network creates a dynamic location. It means that data, that is static for fixed computing, become dynamic for mobile compute.

Premises based wireless network having a multi-segment wired network and a plurality of wireless access points connected to the wired network. The wired network operates according to a wired network protocol which may be the Internet Protocol. Wireless terminals communicate with the wireless access points according to a wireless network protocol, inconsistent with the wired network protocol. Each wireless terminal also has an address according to the wired network protocol [9]. As the wireless terminals roam throughout the premises, protocol tunnels route communications between wireless terminals, thereby preserving communications while roaming by allowing the wireless terminals to retain their wired network addresses during the ongoing communications. The wireless terminals are connected to wireless access points. These wireless access points are in turn linked by data link tunnels to a root access point for a subnet [10]. The data link tunnels enable the root access point for a subnet to forward data to the wireless access points. The forwarded data is not bridged onto the particular subnet that connects the wireless access point and access point that subnet.

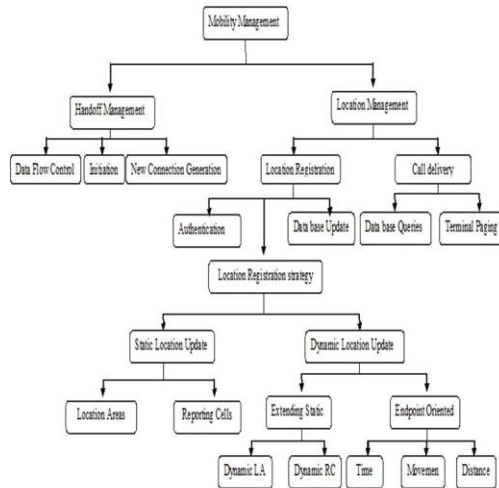


Figure 2. Mobility Management Area Plan.[11]

This section describes the methodology adapted for the TCP performance measurements. The environment and arrangements used in the performance measurements, the exact test parameters, workload models and the TCP features used are described. Finally, the validity and possible inaccuracies in the selected model were discussed. For the purpose of making network simulation for different environment a powerful network simulator is used named OPNET MODELER. This simulator has many properties for making different options in the environment. There are many advantages of using OPNET. By the use of OPNET, links of wireless and proposed network simulations architecture can be handled easily. Many other simulators can be used for this purpose but they are made for some specific special purpose. Because of their specific behavior they cannot use for general purpose. The most widely known simulator of this kind is OPNET. For emulation of the targeted environment, OPNET tool is selected for this research work.

### 3.3 The Targeted Environment

The situation for which all the study is done is for local area network and user datagram protocol data flow. In this simulation three different servers are used for serving ten users (clients). In this study the main concern is with the flow of the transmission control protocol and the user datagram protocol traffic. Local area network consists of bandwidth of size hundred mbps and a link that is of the speed 64000 bits per second. This network will be much faster in speed than in

the wireless networks. Figure number 3 shows the essentials that are required the proposed network simulations.

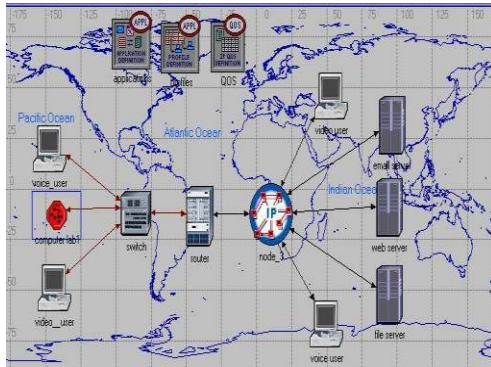


Figure 3. Emulation environment [12]

The network simulator which is used for making different environments for the proposed wireless network was opnet modeler. In this simulation ten different clients were simulated and they generate transport controls protocols. Each of the ten hosts generates TCP traffic. The flow of the traffic is not affected by the network topology.

The most commonly used applications in the target network environment are those that require Internet access, which we call the Internet applications and Internet application traffic must traverse via the last router, the IP32 cloud, and finally via the Internet Servers gateway to reach the Internet Servers. The Internet applications are web browsing, instant messaging, video conference, FTP, e-mail, and online games.

OPNET Modeler provides standard built-in models for software applications such as web (HTTP), e-mail and FTP which can be easily configured to simulate applications used in the subnets. Thus, these applications are implemented and configured via OPNET's Custom Application feature. Table 3.0 summarizes the application definitions.

## 4.Results

In this research work we summarize different challenges and issues in WMNs. WMNs individuality create them a good-looking explanation for self-organization, suppleness. They reduce difficulty of set of connections operation as well as preservation, negligible speculation. It enhances the reliability of the cell phone ad-hoc set of connections of interconnect clients. Allow the addition of numerous without wired set of connections. For the better performance different corporation by now have crop as well as deployments live for a variety of request scenario.

### 4.1. Analysis of the TCP Performance

The performance of the TCP was analyzed with various data rates and different router buffer sizes scenarios as figured out in section 3.6. The goal of the study was to evaluate the performance of TCP and to understand how the behavior should be changed in order to improve the TCP performance. Another motivation for the detailed analysis is to validate the experimental results.

This section analyzed the results of tests with multiple reliable connections workload. In this model, each host established TCP connection for traffic flow of different modeled Internet application traffic described in section. Figures 4 and 5 showed the results of baseline configurations.

Above figures shows the results of the different network environments in transmission control protocol when no user datagram protocols were involved. It is observed from figures that the first 6 minutes of simulation, TCP experience slight packets drop, but packets drop increases gradually and reached up to 8.6%. The reasons for gradual packets drop could be link noise, packet processing rate, link capacity, and router buffer overflow when the congestion window size exceeds the pipe capacity.

After 28 minutes of simulation, gradually increase curves of packets dropped maintained its state because of the SACK acknowledgements algorithm. The re-transmission count as shown in figure 4.2 is caused by the packet dropped and delay.



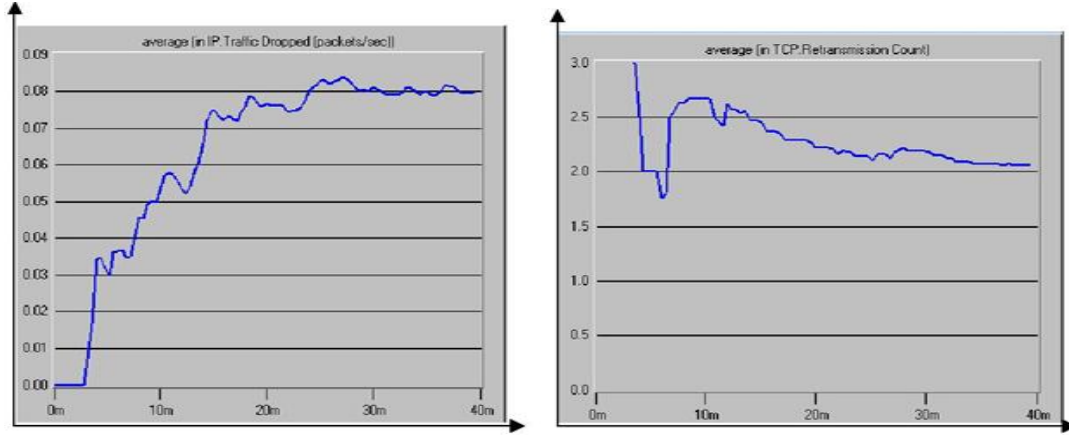


Figure 4. MRCE Dropped Packets Figure 5. MRCE Retransmission Count

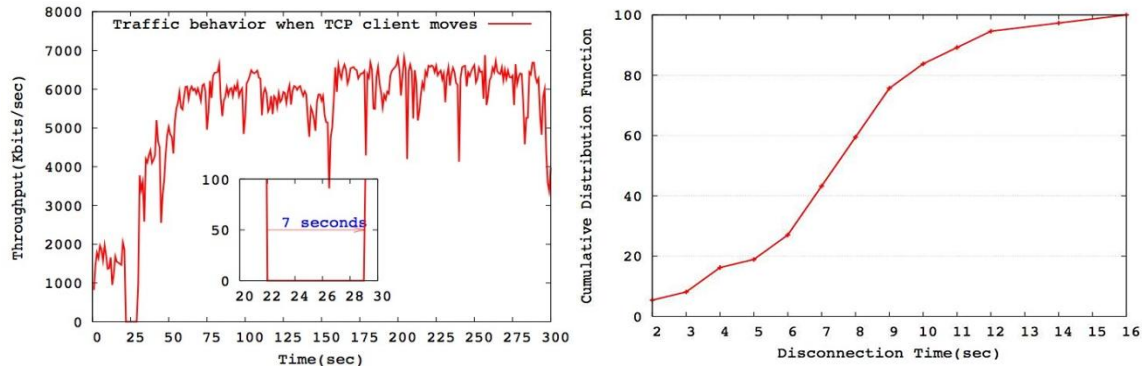


Figure 6. Server moves Figure 7. CDF of client disconnection time

Different effects of examinations in order to several undependable networks situation workload by user datagram traffic flow flows are analyzed as follows. In addition to the model discussed and analyzed in the above section 7, 2 users recognized user datagram protocol. For video conferences on client is used and for the voice over IP the other user is utilized as described in section 8. Figure 4.3 and 4.4 showed the results of baseline configuration.

**5: Conclusion**

After studying this we came to the result that our suggested method is much efficient and stronger than the old version of vigenere algo to analyze the performance and efficiency we examine two cases and perform both methods on it one by one. From both two cases we came to

see that in vinegere algo method when the same combination happen the resultant cipher text is same, while by performing e-vig algo method if the arrangements repeated then a unique cipher-text generated every time. There is no repetition. Because of this method it becomes difficult for brute-force attack, cryptanalysis & pattern prediction. We also perform performance analysis to check the efficiency of our suggested method and it shows that it is nearly like the old vigenere-cipher. So, we can say that our suggested method removes the flaws of old vigenere method and is much stronger for data privacy then veneer method.

## 6: Future Work

Not a lot of studies done in LM wi-fi capable system. Still, powerful LM style have not up until fixed, since many plan are only just concept based, being intelligent growth, but not realistic in real-world atmosphere. As a outcome, place control must keep on being investigated and improved.

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