E - INEA Based Fast and Secure Reauthentication in a Multihop Environment

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Abstract

This paper describes roaming users utilizing heterogeneous network such as WiMAX and WLAN defining handovers between the wireless networks. And also defining the ranges and roaming users moving towards different networks .the aim of the project To ensure high quality of services about the handovers between heterogeneous networks with 3GPP subscribers .This can be done by adopting best possible networking algorithm and adopting best out coming queuing mechanism to reduce delay jitter ,throughput and traffic . To provide authenticated handover in a heterogeneous networks with high possible QoS (quality of service). Keywords: WLAN, WiMAX, Handovers, 3GPP, Re-authentication protocols.

1. Introduction

WiMAX (wireless interoperability for microwave access) is one of the wireless technologies. the heterogeneous wireless networks includes wireless personal, local &broadband networks are working fast to offer high speed data connection to portal devices, splits two technology such as WiMAX &WLAN(wireless local area network) "wireless fidelity" while the other supports mobile technology 3Gand High Speed Downlink Packet Access (HSDPA).The paper proposes a seamless vertical handoff between WiFi and WiMAX handoff mechanism for heterogeneous wireless network which can extend the transmission scope and guarantee to maintain the quality of service (QoS).seamless vertical handoff is the key to maintain the quality of service in the heterogeneous environment.

2. Existing system

The problem statement is handover between both WLAN and WiMAX is a single hop environment as a point to point communication or direct communication involving line of sight communication. Lacks in security and less requirements of Quality of Services (QoS).

3. Comparison between two networks

The basic difference between WiFi and WiMAX is that they are designed for totally various applications WiFi is a local network technology designed to add mobility from private LANs (Local Area Network).WiMAX is designed to deliver a meter area broadband wireless access (BWA) services. WiFi is used for LAN applications where as WiMAX is applicable for MAN services. Transmission mode accepts only half duplex systems and for 802.16 might be full duplex mode no forward error correction in WLAN .convolution codes, turbo codes are used in WiMAX. Modulation techniques used in WiFi are QPSK (Quadrature Phase Shift Keying) and in WIMAX 256-QAM (Quadrature Amplitude Modulation), BPSK (Binary Phase Shift Keying), 16-QPSK, 64-QPSK are used. Spectrum efficiency will be LOW(less than are equal to 0.44bps/HZ) in WiFi other network has HIGH with efficiency(less than or equal to 5 bps/HZ).few more

differences are added. Table 1 illustrates comparison is given below,

Table.1 Comparison between WiFi and WiMAX

Parameters	WIFI	WIMAX
Distance	100M	50Km (Exactly 408Km)
Mesh	Vendor Proprietary	Yes
Channel Bandwidth(BW)	20MHz	1.25MHz to 20MHz
Efficiency	Up to 2.7bps/Hz	Up to 5bps/Hz
Radio Technology	OFDM	OFDM
Mobility	Fixed	Mobile (802.16 e)
Primary Application	Wireless LAN	BWA

Table 1. Comparison between WIFI and WIMAX

The parameter explains the differences between WiFi and WiMAX.

4. Fixed and mobile networks

	Fixed WIMAX	Mobile WIMAX
1)	802.16 d	802.16 e
2)	Developed in the year 2004	Developed in the year 2005
3)	Based on Full Duplex mode only	Based on Frequency division duplexing(FDD) (optional)
4)	Time Division duplexing, Frequency division duplexing	Operates only on Time Division Duplexing (TDD)
5)	No Handover provided	Handover provided
6)	Connected with Digital Subscriber line (DSL), coaxial cable, fiber optical cable	Digital Subscriber line (DSL), cable, wireless, wired medium, mobile equipment
7)	Increases Performance	Decreases Performance

Table 2. Comparison between Fixed WIMAX and Mobile WIMAX

It offers both line of sight and non line of sight. Microwave frequency ranges about 10-66 GHZ to provide data, audio and video applications. It was developed to provide a common frame work for wireless connectivity in fixed, portable and mobile environments. nowadays to utilize both homogeneous and heterogeneous networks bandwidth allocation of frequency provide with 2.4 GHz and perfect in QOS requirement .frequency reuse factor is introduced here for bandwidth allocation. So the number of users can utilize the allocation provided by the network. In LOS contains higher bandwidth due to the coverage of 30-50 ICM with possibility of direct communication (i.e.) stable connection therefore the connection made strong.

More dates can be transmitted simultaneously. Error problem are not often occurs. No interference occurs. Mobility and roaming is also provided to WiMAX subscriber through this latest technology. In a NLOS link, a signal reaches the receiver through reflections, scattering and diffractions. The signal arriving at the receiver consists of components from the direct path, multiple reflected paths, scattered energy, and diffracted propagation path. (NLOS) non line of sight in 2-11 GHZ with mesh connections for both fixed and nomadic users. For delivering high accessing for large coverage area with LOS and NLOS. It allows portable access facility. Limited level of mobility, Susceptible to interference, Security is a concern; Designed technically for short range operations and basically all indoor technology is the limitation of WiFi. Mostly fixed network is often used by customers nowadays.

4.1. Vertical handoff

It is the process of handoff that occurred by the movement of a mobile station among the heterogeneous base station. To achieve the advanced seamless vertical handoff ,the following three requirements are needed they are the given below, one is the effective packet translation methods used in the heterogeneous networks second one is the smooth connection control mechanism between WiFi and WiMAX last one is an advanced seamless vertical handoff protocol.
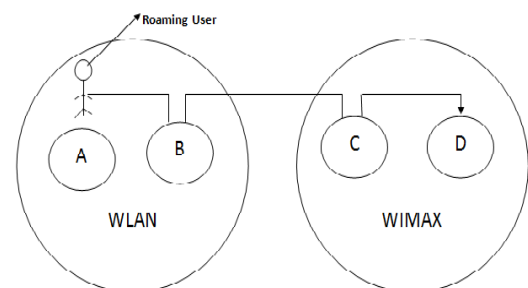

Fig : Vertical Handoff

The above diagram describes when the user utilizes different networks. Roaming user starts from shares the data through B then C and receives D by using handovers .This is vertical handoff process. This is totally different from other handovers. It utilizes the multihop environment only.

4.2. Horizontal handoff

It is the process of handoff that occurred by the movement of a mobile station .based on the homogeneous network protocols.
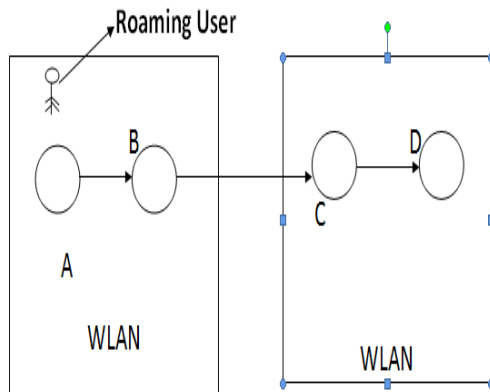

Fig: 2

The above diagram represents the network consist with same domain or network for communication purposes.whatever it enhances it may have the single hop environment with line of sight communication.

5. WiMAX reauthentication protocols

Seamless handovers for heterogeneous networks environment QOS and security is needed . therefore havovers must be protected by using several standards algorithms and mechanisms . normally the network needs protocol such as EAP- AKA (extensible authentication protocol- with authentication and key agreement protocol) M –INEA (modified-initial network entry authentication), WiMAX fast re-authentication protocol, WiMAX local re-authentication protocol, inter organization protocol. Though wireless vendors have already marketed their WiMAX product, this technology is still under development and need more academic research and time to achieve a maturity level.

6. Results

Defining handovers between the roaming users in a heterogeneous network: For a heterogeneous network more number of nodes can be implemented in simulation software Network Simulator. Here the network is showing defined different network environments with the ranges of

particular area and the roaming is starting the process to other network is described typically.

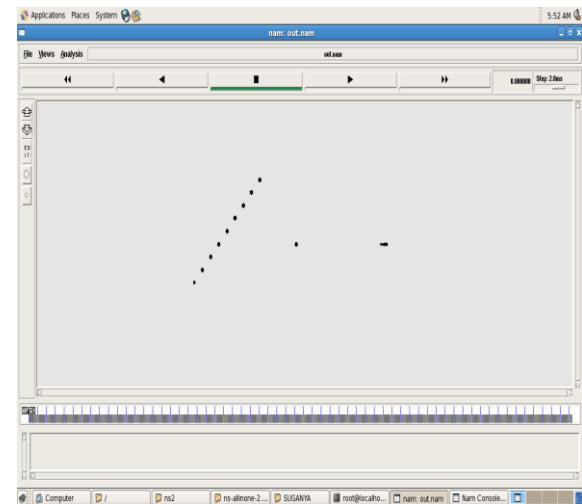## 6.1. Defining the Roaming users WLAN WiMAX

Fig: 3

The above snap shot describes to Creating a heterogeneous network with WLAN &WIMAX domain which consist of roaming user &providing them to transfer data with multiple handovers in a multihop manner.

6.2. Defining the Range of WiMAX &WLAN

The given snap describes that given 10 nodes are representing the roaming users and middle one be the WLAN and last node be the WiMAX.

The range of each network can be analyzed according to that the applications such that the images audio video data can be shared according to the mechanisms and protocols used this diagram represents the roaming user is ready with the coverage area fixed in their environment. Multiple handovers are mentioned by multihop environment .The snapshots are taken and simulated by network simulation .Normally the ranges considered as a coverage area the roaming user allowed to search for the signal and according to the distance and applications it must verify which network must be focused to and the path followed on it.so the roaming user take accordingly to the distance and allotted applications.
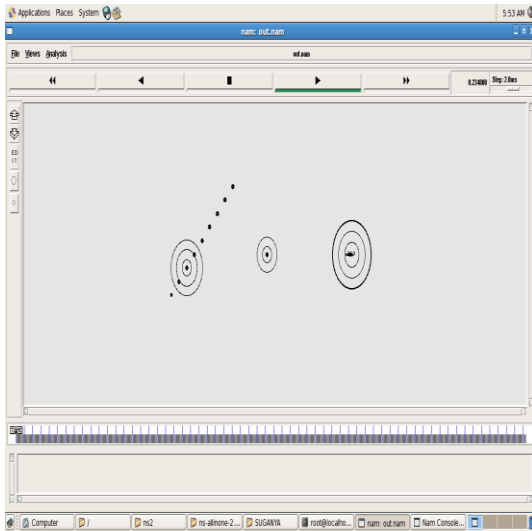
Fig: 4

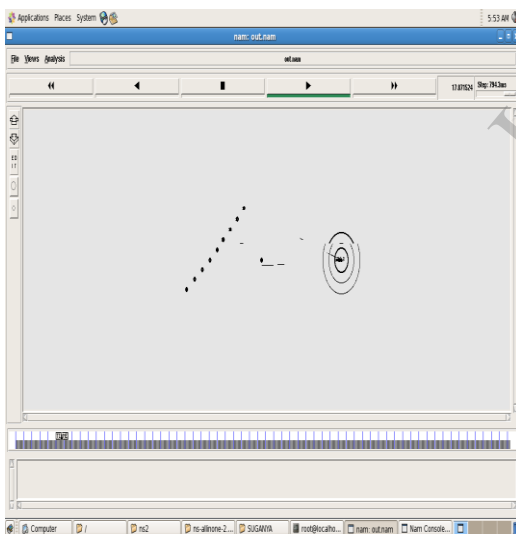### 6.3. Roaming users moving towards different networks

Fig: 5

The range are described as rounded symbols and also represents, ready to receive the handovers for transmission from initiator to the responder by heterogeneous network.The roaming user will be moving from one network to other network to transmit data audio or video applications by handovers to the responder or the other given mentioned network to

enhance the security of the handovers the mechanisms and protocols are been needed. By simulation shown the defined different environments, ranges and all other process.

7. Conclusion

The E-INEA protocols involving RED algorithm shows that effectively reduces the reauthentication delay and reauthentication signaling traffic by using priority queuing method depending on the type of service the variation of the throughput and jitter CAN BE analyzed during reauthentication Handover.

8. Future work

The congestion avoidance methods can be implemented to enhance the high throughput and the less jitter. By using M-INEA Re-authentication errors and failed validations are handled, this can be implemented. LTE (long term evolution) is a next generation of 4G Technologies could provide medium and facilitate the requirements for sophisticated application such as multimedia, internet protocol television (IPTV) Remote surgery and so on. Wireless technologies are facing challenging issues with respect to new applications and increasingly sophisticated user demands. LTE will support heterogeneous deployments where low-power nodes comprising picocells, femtocells, relays, remote radio heads, and so on are placed in a macro cells layout.

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