

# Performance Analysis of WLAN in Presence of UMTS

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## ABSTRACT

In this paper the effect of interference of UMTS is analyzed on WLAN. The effect is analyzed by varying the speed of UMTS nodes. The interference is analyzed in terms of Video conferencing end to end delay, Throughput, Delay. Result shows that when there are no UMTS nodes, the performance is good, if UMTS nodes came in the network than due to interference performance decreases.

## Keywords

WLAN, Mobility, interference, UMTS.

## 1. INTRODUCTION

Wireless processing is a quickly developing innovation providing clients with network availability with no kind of wire association in between the network. A LAN to which mobile users (customers) can associate and speak with the assistance of high recurrence radio waves to a specific degree than wires [1, 2, 4]. IEEE 802.11 is the standard for Wireless Local Area Networks produced by the Institute of Electrical and Electronics Engineers (IEEE). A wireless local area network (WLAN) is a remote PC arrange which give association in the middle of the at least two than two devices utilizing a wireless circulation strategy (frequently spread-range) inside a some level of region, for example, a home, school, PC lab, or office building [3,5,6]. This gives clients the office to move around encompassed by a neighbourhood scope region and still be associated with the system, and can give a connection to the colossal web. The greater part late WLANs depend on IEEE 802.11 benchmarks, advertised under the Wi-Fi mark name [7, 12, 14].

### 1.1 WLAN STANDARDS

IEEE 802.11 is the standard for Wireless Local Area Networks (WLANs) created by the Institute of Electrical and Electronics Engineers (IEEE) i.e. IEEE 802.11a is an in light of OFDM waveform at 5.8 GHz. what's more, gives conventions that permit sending and getting of data at rates of 1.5 to 54Mbit/s, IEEE 802.11b is the moderate moving and smallest expensive open standard. At first, 802.11b was the best standard as a result of its cost, yet as quicker gauges get a little sum costly, 802.11b is losing prevalence. The 802.11b standard utilized DSSS (Direct Sequence Spread Spectrum) tweak procedure. IEEE 802.11b [10,11,13] has most extreme data rate 11 Mbps and IEEE 802.11g works in the 2.4 GHz band (like 802.11b), however utilizes the same OFDM depending transmission plot as 802.11a. It works at a most extreme physical layer bit rate of 54 Mbit/s select of forward blunder revision codes, or around 22 Mbit/s normal throughputs [8, 9, 15].

### 1.2 UMTS

The Universal Mobile Telecommunications System (UMTS) is a third era versatile mobile cellular technology in view of

the GSM standard. Created and kept up by the 3GPP (third Generation Partnership Project), UMTS is a part of the International Telecommunications Union IMT-2000 standard set and connect with the CDMA2000 standard set for systems relying upon the contending CDMA one innovation. UMTS utilizes wideband code division numerous get to (W-CDMA) radio get to offer greater spectral efficiency and bandwidth to mobile network operators. UMTS characterizes a total system framework, which contain the radio get to organize (UMTS Terrestrial Radio Access Network, or UTRAN), the centre system (Mobile Application Part) and the validation of clients by means of SIM (subscriber identity module) cards [10,11].

## 2. LITERATURE SURVEY

B.O. Sadiq et al [14] Designed a video conferencing application over an existing wireless network. To view if the existing wireless network was capable of running a video conferencing application they used The Riverbed Modeler 17.5 software. The Result analysis showed that, the modeled network has highest delay of 0.1225 bytes and lowest delay of 0.01, which resulted to severe throughput degradation. The throughput result was just 80 (Mbps), which is below the desired throughput of 100 (Mbps) for an efficient Video Conferencing application over wireless network.

Gagro, Ivan et al [15] they used IEEE 802.11 a and b for Video streaming. They have designed private network to show some issues which unbalanced the throughput. They describe other factor that effects the performance of video streaming. They concluded that peer to peer connection is better than access point connection

## 3. SIMULATION SETUP

In this paper the effect of interference of UMTS nodes is analysed over WLAN. To analyse this effect WLAN network is made. In this network there scenarios are made (ground floor, first floor and second floor). There is also a server room in which two servers is placed in which one have VOIP application and other have VOD application as shown in fig 1. In ground floor 2 access point is used and 16 WLAN nodes is used as shown in fig 2. In this scenario some nodes are giving VOD and some node having VoIP application. In first floor there are 4 access point is used and 12 WLAN nodes is used as shown in fig 3. In this scenario some nodes are giving VOD and some node having VoIP application. In 2<sup>nd</sup> floor 1 access point is used and 5WLAN nodes are used as shown in fig 4. In this scenario some nodes are giving VOD and some node having VoIP application. To analyse the effect in first scenario in each floor there is UMTS mobile nodes is place which are moving at speed of 5m/s. In second scenario UMTS mobile nodes are moving at speed of 7m/s and in third scenario some UMTS mobile nodes are moving at speed of 5m/s and some at 7m/s.

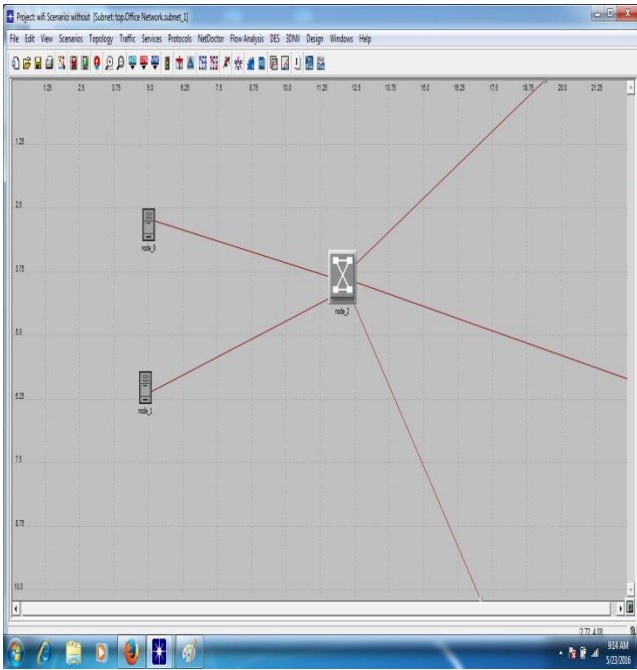


Figure 1: server room

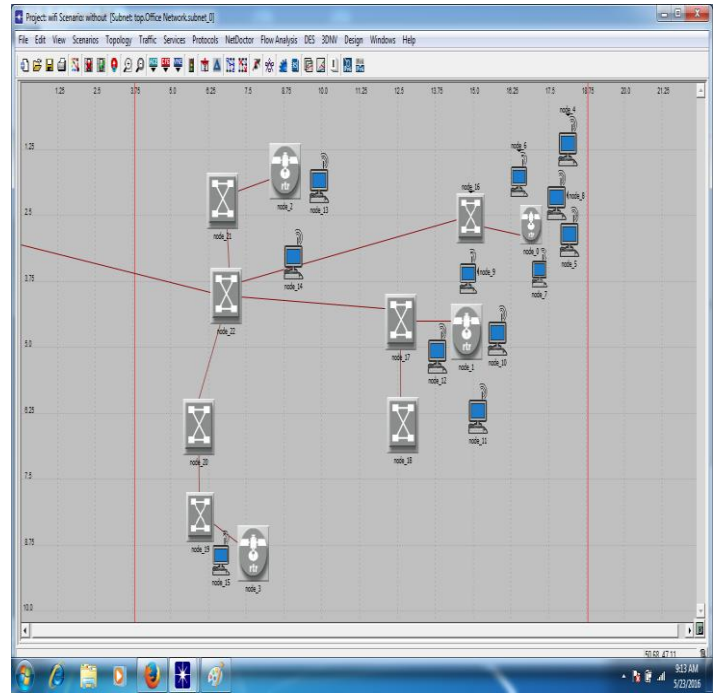


Figure 3: 1<sup>st</sup> floor

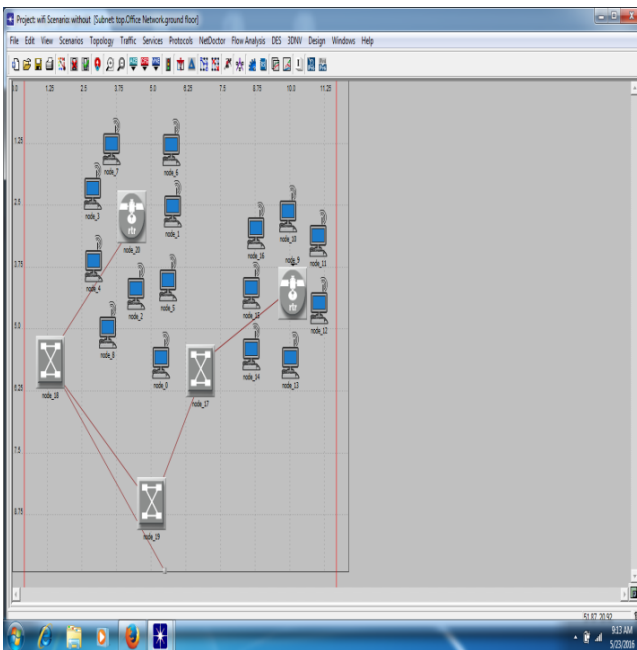


Figure 2: Ground floor

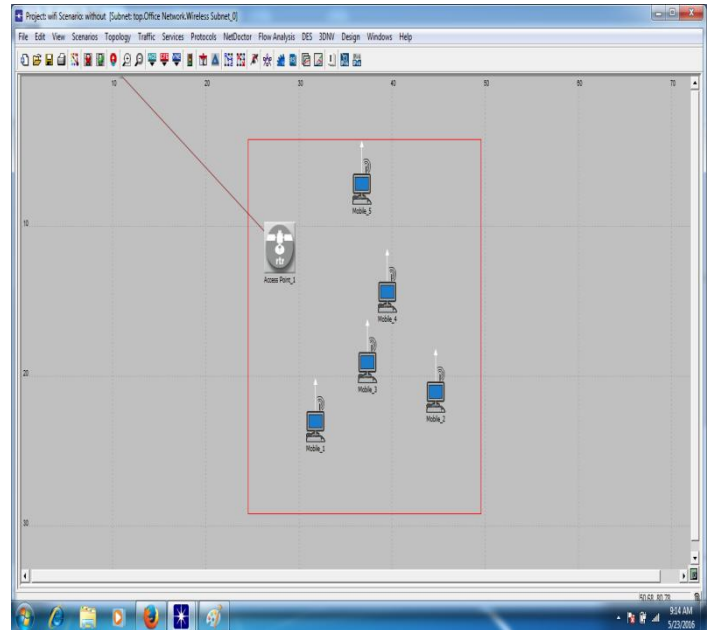


Figure 4: 2nd floor

#### 4. RESULTS

In this paper the effect of mobility of UMTS nodes on WLAN performance is analysed in terms of Video conferencing end to end delay, Throughput, Delay.

## 4.1 Video Conferencing end to end delay

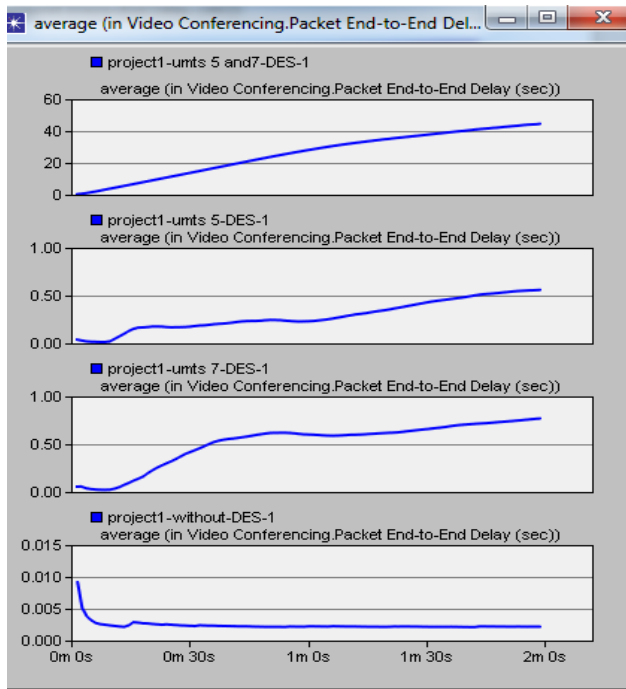


Figure 5: Result for Video Conferencing end to end delay

Fig5 shows that when only WLAN is used then performance is good which is 0.003sec. But when UMTS nodes come in network performance decrease which is 0.7sec when nodes move at speed of 7 m/s. Further when nodes move at 5m/s it is 0.6 sec. At mix speed it is 50 sec. Fig shows that the performance of WLAN without interference is better because more delay means more no. Of packets are transmitted.

## 4.2 Throughput

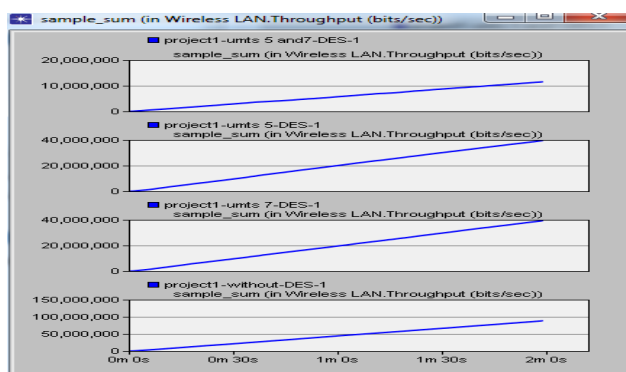


Figure 6: Result for Throughput

Figure 6 shows that when only WLAN is used then performance is good which is 90000000 bits/sec. But when UMTS nodes come performance decrease which is 40,000,000 bits/sec when nodes are moving at speed of 5m/s and 7m/s, it is 20,000,000 bits/sec when nodes are moving at mix speed of 5 m/s and 7m/s.

## 4.3 Delay

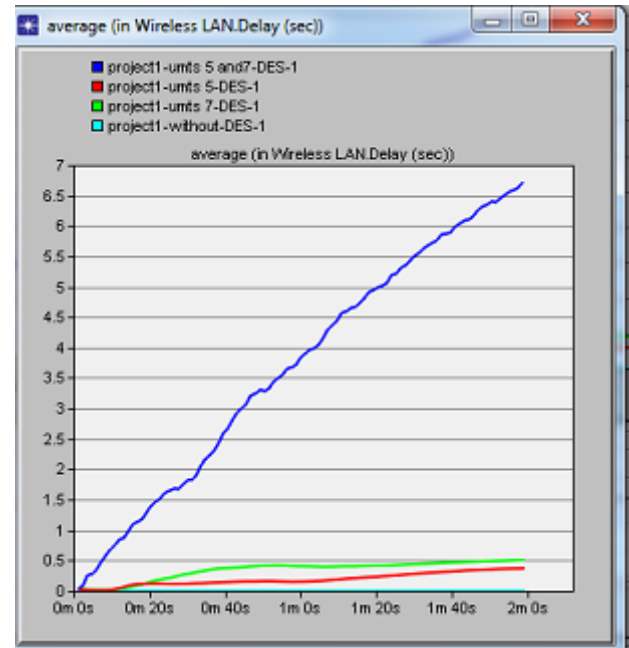


Figure 7: Result for Delay

Fig7 shows that when only WLAN is used then performance is good which is 0.2sec. But when UMTS nodes at the speed of 5m/s delay is 0.3sec. Further by change in mobility when nodes move at the speed of 7m/s it is 0.5 sec. when nodes move at mix speed of 5m/sec and 7m/sec it higher 6.7 sec.

## 5. CONCLUSION

In this paper the effect of interference and variation of speed of UMTS on WLAN is analysed. The performance is also analysed by moving nodes of UMTS at different speed. The performance of WLAN in presence of UMTS is analysed in terms of Video conferencing end to end delay, Throughput, Delay. Result shows that when there is no interference of UMTS then performance of WLAN is better but when UMTS nodes come then performance decrease. Result also shows that with increase in speed performance decreases.

## 6. REFERENCES

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