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## Quality of Service-Concept and Need for Wireless Telemedicine and E-Health Services

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### ABSTRACT

In this article we mainly look for the merits of IEEE 802.11 wireless standard in the field of Telemedicine and E-health by examining its Quality Of Service (QoS). The important and one of the foremost demand of medical application is the need to introduce and modernize the concept of QoS to improve medical networks. One of the necessity is the data delivery of patient in emergency cases via network services. Most important concept to implement this idea is to take proper steps to device a good telemedicine and e-health service by having a planned scheme of handoff's for QoS to support wireless networks. The technology which we use should have a motive to reduce patient's journey, hospital admissions and also to raise the standard of care and treatment which has to be delivered to the patient. We all know in medical networks time factor plays a vital role and thus there should be no delay in order to save the life of a serious patient. In remote areas where it is difficult have immediate medical service, telemedicine and e-health services come out with the best solutions to provide patient with the medical aid. Thus to make these services perform at their best QoS needs to be maintained. This paper mainly emphasis on the architecture needed to improve and maintain QoS to make the provision of telemedicine and e-health services perform at their very best level.

Keywords: *QoS, Telemedicine, E-Health, Priority, Mobihealth, Handoff's.*

### 1 INTRODUCTION

In today's modern world, medical field is one such field in which developments are being made by raising the standards of wireless networking to come up with the best solutions for a patient. Networking plays a vital role as we don't know when a person may need a medical facility. Wireless Networks help to deliver the sufficient and precious information needed to provide a treatment. In order to do this we always have to maintain QoS of telemedicine and e-Health services given to a person. Mainly these services are to be made available to remote areas, ambulances, ships, airplanes and also to home conditions.

QoS can be defined as the service to be given and its performance which further determines the degree of satisfaction of the user who uses it.

According to D.D.Vargos basic needs needed to implement the concept of telemedicine and e-health

services we need to keep in mind certain factors like availability, confidentiality and privacy, data delivery latency, reliability and most importantly the QoS and mobility support.

A wide variety of telemedicine and e-health services impose different kinds of QoS mechanisms. Mainly EPS QoS control Architecture focuses on providing the facility of the services required by its user.

### 2 NEED OF QOS FOR TELEMEDICINE/E-HEALTH SERVICE

Telemedicine/E-health services may be telephonic or based on mobile communications. Today mobile communications are fast becoming popular and are widely used for various purposes. Telemedicine/E-health services can also be made available easily through mobile communications. For these services to be at their very best it should

be important that there should be a face-to-face consultation experience. We can say that telemedicine/e-health services can be classified into various categories based on the QoS available. These can be tele-diagnosis, tele-management, tele-consultation etc.

However based on mobile communication European Commission launched Mobihealth Project which focuses on mobile tele-monitoring which also includes interacting with a patient on a remote site via audio and visual communication. QoS requirements can be applied to maintain certain e-health services, these services which require QoS mainly include multimedia conferencing, tele robotic systems, transmission of patient's necessary signs and many more.

### **2.1 Multimedia Conferencing**

Multimedia Conferencing is considered to be one of the essential part of E-Health services provided to the user. They lay their entire focus on the communication between patient-doctor or between doctor-doctor. The International Telecommunication Union also has defined a model to maintain a QoS required for multimedia conferencing. QoS in this function targets that there should be no delay and audio/video application should run on a good rate to maintain a good conversation between the patient and the doctor.

### **2.2 Medical Images**

This function targets that we should get high definition still images. These images include dermatological images, X-Rays, MRIs, ultrasounds. Here we need to see that there is no packet loss when these images are transmitted and Quality of image should also be maintained. Thus QoS in this facility we can say maintains a service so that quality of image are not disturbed and pixels of each image are accurate.

### **2.3 Finding Emergency E-Health Services**

This is one of the most important factor in which whenever there is a immediate need of E-health service, it is made easily available to the patient. Here it is ensured that when a patient needs a medical aid he/she gets it as soon as possible. Whenever there is a need of ambulance E-health service makes it available to the patient. Also there should be a facility to send still images of patient to the expert doctor so that exact position of patient can be made out. QoS needs to see that these facilities are made available to the patient without

any kind of delay and also a good network should be established for a doctor to examine the patient.

### **2.4 Electronic Health Records**

According to this function a electronic record of patient should be maintained by the hospital. This record should have all the related information about the patient. It should be taken care that the packet of information it contains shouldn't be lost and should be accessible whenever a need arises. Main focus should be on zero packet loss.

## **3 SUPPORT OF HANDOFF SCHEMES FOR EFFICIENT QOS**

Handoff refers to the process of transferring an ongoing data session from one channel connected to the central part of telecommunication network to another channel. Most of the times handoff schemes are only applied to voice channel networks. Handoff schemes encourages the use of cell and size of these cells is decreased in order to increase the capacity so that people can have conversation for a long duration of time. There are two basic parameters to make a decision in handoff schemes and these are based on signal strength and other based on interference ratio. The idea to use handoff schemes was implemented in order to have uninterrupted conversation and it also had direct effect on QoS needed for Telemedicine and E-Health services and they also support mobility services. The QoS of mobile networks depends mostly on handoff strategies.

We have two handoff strategies and these are Priority Strategies (helps to improve performance by decreasing traffic and blocking schemes) and Non-Priority Strategy (helps to provide the benefit of efficient utilization of frequency spectrum available to the user).

## **4 TELEMEDICINE/E-HEALTH SERVICES BASED ON PRIORITY CONCEPT**

In order to avail these services and use them in a effective and efficient way we need to decide a priority concept in order to handle the calls associated with telemedicine and e-health services. Most of the times we make priority in such a manner that the most important call in handled first followed by next call and so on. Thus, we can say that priority should be in order:

- First of all the ambulance calls should be handled so that all the necessary requirements can be made for providing patient with the best possible treatment.

- Next comes the calls of emergency, these calls should be made available to the patient in case of any sought of emergency and immediate medical aid should be supplied to him.
- Last priority should be the priority of calls which only seek to get information regarding a patient and which needs to keep a track about health of a patient.

On deciding these priorities it should be kept in mind that the call which is going on shouldn't be altered and there should be proper conversation without any interference and also without the loss of any packet of information.

## 5 EFFECTIVE ARRANGEMENTS TO BE MADE BY IEEE 802.11 TO GIVE EFFECTIVE QoS

Different methods and techniques are being designed in order to provide us with a efficient QoS needed to give accurate and best facility of telemedicine and e-health services. IEEE 802.11 has proposed some effective requirements needed to provide us with the exceptional phase of QoS and these are:

- To decide priority based data flow we mainly make use of Inter Frame Space (IFS) or Contention Based Windows or in some cases use of both to provide effective flow of data.
- Use of some specific measurements encourage to provide QoS which is necessary for admission based mechanisms.
- Encouraging the use of Resource Allocation helps to provide effective data needed to get telemedicine and e-health services.
- Thus we can say that use of these standards help us to make full use of telemedicine and e-health services and also encourage us to know how to make use of these minimum requirements necessary to maintain QoS.

## 6 CONCLUSION

As we all know life of a patient is the most important thing which is kept in mind whenever a treatment is given to him/her. Thus, it should be seen that the healthcare given to the patient should be the best one and should use nest network services. In order to get best medical services QoS should the foremost point taken care of in order to establish the beat communicating network. It should be seen that the network which is being used should have minimum delay factor and also the calls should be handled in properly defined priority manner.

QoS should be such that people make the best use of services available to them and should think Telemedicine and E-health services are the best whenever we want emergency medical facility.

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