ANALYSIS OF SCHEDULING ALGORITHM IN WiMAX NETWORK:

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ABSTRACT

WiMAX is abbreviated as worldwide interoperability for microwave access. It is new pattern of the remote innovation. It incorporates a few (QoS) nature of administration systems at (MAC) media access control level for provisioning a superior support of sound, video, information, data and so on. To give nature of administrations to meet the requesting pattern, there has been part of examination in the field of QoS planning strategies. In this area, a brief introduction of current work in this field is represented.

1. INTRODUCTION

WiMAX network is abbreviated as worldwide interoperability for microwave access. It has turned out to be very useful in the realm of correspondences and computer systems. This innovation has the capacity to give broadband access to long distances, superior and less expensive answer for correspondence administrations when compared with the current technologies.

This means to give remote broadband administrations in the size of the metropolitan area network (MAN). It depends on IEEE 802.16 standard. This innovation has range of up to 31 miles and an objective information exchange rate beyond 100 Mbps. WiMAX supports different media applications like VoIP, voice gathering and web gaming. The IEEE 802.16 innovation (WiMAX) is a superior distinct option for 3G or remote LAN systems for giving network by radio stations due to its high information rates, minimal effort of arrangement and expansive scope region and simple to utilise.

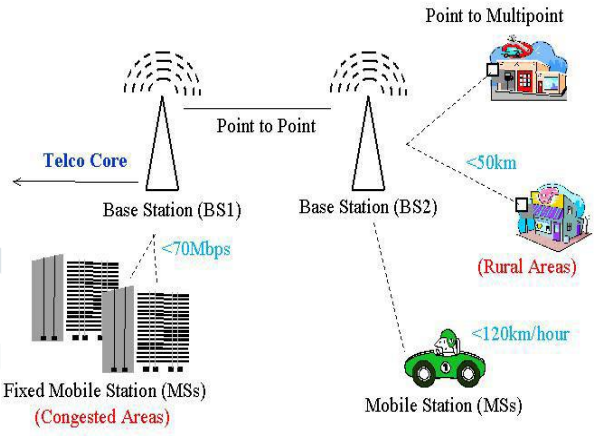

FIG 1. WiMAX SCENARIOS

A) WiMAX NETWORK DESIGN

The WiMAX system is a combination of base station (BS) and subscriber station (SS) and base station sends data to subscriber station. The information is exchanged through channels which are allotted by the base station. It ensures there is less delay in sending information.

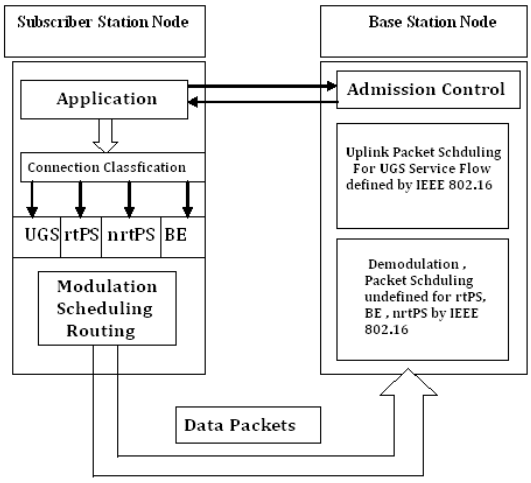

FIG 2. WiMAX NETWORK DESIGN

B) CHARACTERISTICS OF WiMAX NETWORK

WiMAX network has eight key characteristic that differentiates it from other wireless network technologies. They are [3]

1. OFDMA: It uses a multi-user version of the popular orthogonal frequency-division multiplexing digital modulation scheme Orthogonal Frequency Division Multiple Access (OFDMA).
2. Use of varied spectrum width (ranging from 1.25 MHz to 28 MHz),
3. It uses Time and Frequency Division Duplexing (TDD and FDD),
4. Beam forming, which is an advanced antenna technique is used.
5. Multiple Input Multiple Output (MIMO), adaptive to each subscriber modulation,
6. Advanced coding techniques such as space-time coding and turbo coding,
7. Strong secure security and offers very highspeed broadband access to mobile internet,
8. Multiple QoS classes: WiMAX technology is providing confrontation to multipath.

2. QUALITY OF SERVICES (QoS)

The term Quality of Service refers to the probability of the telecommunication network meeting a given traffic contract. In the field of packet-switched networks and computer networking it is used informally to refer to the probability of a packet succeeding in passing between two points in the network. Although the name suggests that it is a qualitative measure of how reliable and consistent a network is, there are a number of 4 parameters that can be used to measure it quantitatively. These include throughput, transmission delay or packet delay, delay jitter, percentage of packets lost etc. In the terms of system administration, it is referred as the likelihood of a bundle going between two focuses in the system. QoS is likewise termed as the capacity of system component (e.g. an application, host or switch) having some level of certification that its activity and administration prerequisites would be fulfilled [2]..

It is a measure of how dependable and predictable a system is. There are number of parameters that can be utilized to quantify the level of execution in a specific system such as WiMAX. The primary objective of QoS is to provide better throughput, less jitter and dormancy and enhanced misfortune attributes.

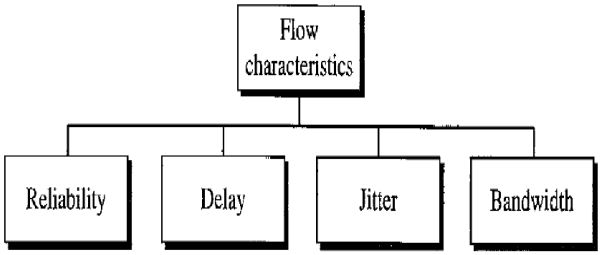

FIG 3. QoS FLOW CHARACTERISTICS

A) QOS CLASS IN WiMAX

QoS category	Applications	QoS specifications
UGS Unsolicited Grand Service	VoIP	Maximum Sustained Rate Maximum latency Tolerance Jitter tolerance
rtPS Real-Time Packet Service	Streaming Audio or Video	Minimum reserved rate Maximum sustained rate Maximum latency tolerance Traffic priority
ErtPS Extended Real-Time Packet Service	Voice with Acitity Detection (VoIP)	Minimum reserved rate Maximum sustained rate Maximum latency tolerance Jitter tolerance Traffic priority
nrtPS Non Real-Time Packet Service	File Transfer Protocol (FTP)	Minimum reserved rate Maximum sustained rate Traffic priority
BE Best-Effort Service	Data transfer, Web Browsing, etc...	Maximum sustained rate Traffic priority

FIG 4. QoS CATEGORY IS CLASSIFICATION

In FIG 4. The QoS category are the classes that the base station in a network should be able to support a wide variety of applications those categories include

- **Unsolicited Grant Service (UGS)**: It supports study Bit Rate (CBR) such as voice applications.
- **Real-Time Polling Service (rtPS):** This supports ongoing information streams that contain variable size information packets, which are issued for immediate service, for example, MPEG video.
- **Extended Real-Time Polling Service (ertPS):** It is material with constant applications that require information rate and defer certifications like VoIP with hush concealment.
- **Non-Real-Time Polling Service (nrtPS):** The applications which are less important are given less

bandwidth. These can tolerate delay of service but should be serviced later.

- **Best Effort (BE):** The delay tolerant information streams that need not bother with any QoS ensures like HTTP.

3. PROBLEM STATEMENT

In WiMAX, there are many issues that we should be thinking about such as, the level of Quality of Service (QoS), transfer speed designation and transmission rate restrictions. It is troublesome task to pick a suitable planning procedure that backings diverse QoS prerequisites for various subscriber stations. We have pointed this issue and proposed another planning system.

4. SCHEDULING ALGORITHMS FOR WiMAX

Planning calculations is in charge of conveying benefits among all clients in the system, and is enhanced with a higher QoS. Clients ask for various classes of administration that might have different necessity requirements, for example, data transfer capacity, throughput, jitter and so on so the principle point of any booking calculation is to amplify the system use and accomplish reasonableness among all users.

A) STRICT PRIORITY (SP)

In this algorithm the scheduler is relying upon the QoS class and after that they are issued out into various need lines, these lines are served from the most needy to the least in which this component might cause some need of the QoS classes.

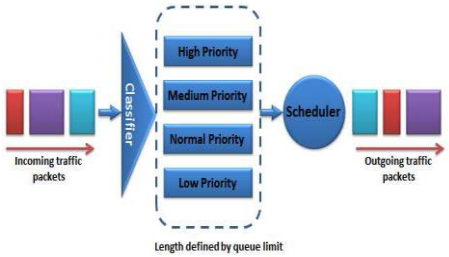

FIG 5. STRICT PRIORITY SCHEDULING

B) ROUND ROBIN TECHNIQUE (RR)

The system of round robin scheduler works in the strategy for rounds by serving the primary bundle in every need line in arrangement as per their priority till all lines are served and afterward it restarts over to the second parcel in each queue.

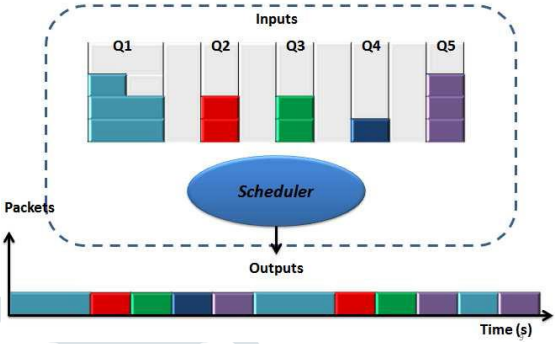

FIG 6. ROUND ROBIN SCHEDULING

C) WEIGHTED ROUND ROBIN (WRR)

In WRR technique, packets are classified into different service classes and then assigned to a queue that can be allotted with a different percentage of bandwidth and served based on Round Robin order. This algorithm addresses the problem of starvation by guaranting that all service classes have the ability to access at least some amount of network bandwidth.

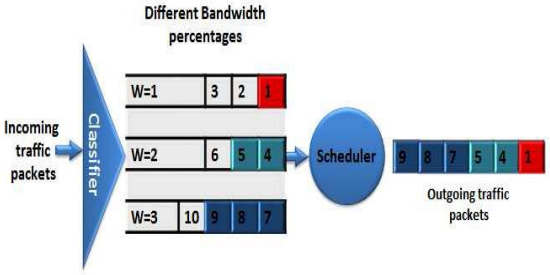

FIG 7. WRR TECHNIQUE

D)WEIGHTED FAIR QUEUING(WFQ)

In the method every stream is doled out with different weights to different data transmission rate in an approach to keep an impact of the transfer speed by various streams giving a reasonable booking to different streams which support different length parcels by hypothetical methodology of the total processor sharing (GPS) framework that finds out a completion time to every bundle.

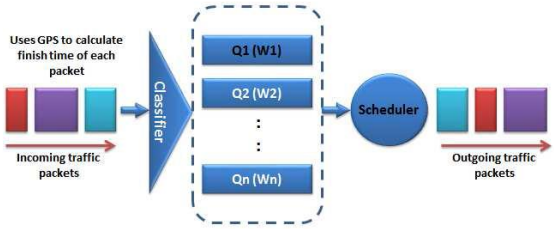

FIG 7. WFQ TECHNIQUE

5. LITERATURE SURVEY

There is a fast development in remote innovation. With that the interest for remote information administrations and media applications has extended. To make a better administration to take care of the developing demand, there is an expansion in the field of QoS with the raise in the standard of IEEE 802.16. QoS issues have been tend to by a various number of papers. In the segment, rundown of current work in the field is briefed.

In [7], This work guides the usage of different types of booking calculations in WiMAX system, for example, Round Robin (RR), Self-Strict- Priority (SP), Weighted-Fair Queuing (WFQ) and Weighted-Round Robin (WRR). In this study Qual Net 5.0 test system assessment variant are used to take these calculations and to decide the best one among them.

This [6] gives fundamental systems for giving QoS in different parcel systems. Control ways of systems that are helpful to permit the clients are discussed and system to concede to administration definition and information ways of various parts which empower in providing separated administration. Various ideas are adjusted in giving the QoS support.

This [5] paper proposes a structure of cross-layer QoS support in the IEEE 802.16 system. Two novel components are given in the structure for QoS execution change.

In [8] creator presented portable WiMAX framework which has a better framework limit and a more convoluted component to give a better nature of administration (QoS) than before remote frameworks, for example, code-division different access (CDMA) or the all-inclusive portable information transfers framework (UMTS).

Here [9] The general structure of a cross-layer system driven arrangement is presented and portrayed the late advanced systems in demonstrations, QoS mapping, and QoS adjustment in terms of giving end-to-end QoS to video conveyance over remote web.

6. OBJECTIVE

- Surveying recent trends of existing scheduling algorithms in WiMAX.
- Providing opportunistic scheduling by taking channel conditions into account.
- Fulfilling the delay requirements of WiMAX802.16e network applications using the end-to-end delay of network by a scalable network to a graph tool that estimates the delay of paths between base station and destination addresses.

7. METHODOLOGY

In the proposed work re-enactment environment for 802.16e WiMAX systems will be made in light of which the QoS provisioning will be demonstrated. The throughput jitter bundle misfortune and debasement elements will be considered in displaying the 802.16e channels. Booking is performed at the Base Station (BS) and Subscriber station (SS).

The strategies that as of now exist clarifies booking systems at the supporter station or base station. Little endeavours have been embraced to fuse communication in the middle of BS and SS to accommodate better data transfer capacity allotment methods to the endorsers ensuring Quality of Service (QoS). In proposed work, we investigate Evolutionary Computing methods for planning at the BS and SS joining a synchronization circle called "Sync Loop" Here the UL (upper connection) map contains information regarding the UL outlines furthermore contains data about the transfer speed, recurrence distribution subtle elements.

A sync circle is presented between the BS and the SS to stick to the UL Maps transmitted and the QoS parameters. In view

of the sync data got by the SS the BS could change the UL Maps guaranteeing upgraded QoS. The adaptability and its consequences for the proposed scheduler will likewise be firmly considered.

"**Sync Loop**" Here the UL (upper link) map contains data with respect to the UL frames and also contains information about the bandwidth, frequency allocation details.

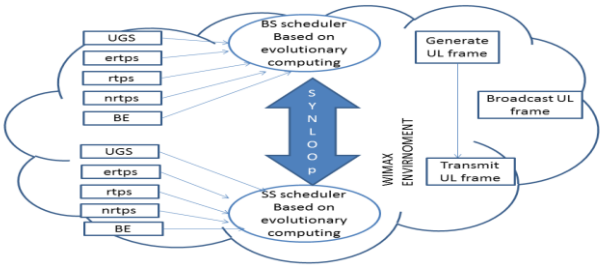

FIG 8. EVOLUTIONARY SCHEDULING BASED SCHEDULER FOR WiMAX NETWORK

8. POSSIBLE OUTCOMES

The conceivable result of the work embraced is to give QoS to all the administration classes characterized in the IEEE 802.16e standard for WiMAX systems. Better QoS can be demonstrated in light of the system parameters like opening achievement ratios, network throughput, lessened parcel disappointments, administration due dates for fluctuated client situations and differed ecological conditions. The deferral bound, channel state data and administration debasement are critical outline calculates that ought to the delay bound, channel state information and service degradation are significant design factors that should also be considered by the scheduler. The proposed work attempts to prove the scheduling efficiency against the existing scheduling models.

7. REFERENCES

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