Abstract

The IEEE 802.16 standard defines the specifications of the Worldwide Interoperability for Microwave Access (WIMAX) technology as a Broadband Wireless Access network. This type of networks supports multiservice traffic (voice and video) and guarantees the Quality of Service (QoS). The standard specifies four scheduling service algorithms to support QoS This thesis provides an analytical study for voice interactive and video streaming performance in WIMAX networks, Parameters that indicate the Quality of Service such as delay, jitter, reliability and WIMAX throughput are analyzed over two scheduling services algorithms namely, UGS,RTPS compare with a novel scheduling service algorithm called ERTPS. The analysis includes check the compatibility for each scheduling service algorithm which include voice and video streaming and check out which scheduling services are better for voice and video interactive. OPNET network simulator is used to evaluate the performance of the three scheduling service algorithms.

Key words:

IEEE 802.16, WIMAX, scheduling, Quality of Service (QoS), and OPNET simulation.

المستخلص

قامت منظمة ال**IEEE** بوضع المعيار 802.16 الخاص بشبكات النطاق الواسع اللاسلكية (**WiMAX**)التي من طبيعتها دعم مختلف انواع البيانات(الصوت , الفيديو). كذلك تقدم شبكات وايماكس جودة الخدمة علي مستوي طبقة ربط البيانات. وقد حدد المعيار اربعة خوارزميات لجدولة الخدمة وهذه الاطروحة تقدم دراسة تحليلية لنقل الصوت والفيديو عبر شبكات الوايماكس ولضمان ذلك تم تحليل المعاملات التي تشير الي جودة الخدمة **(delay,jitter,reliability and throughput)**وتم ذلك عن طريق مقارنة كل من خوارزمية **UGS** و خوارزمية **rtPS** مع خوارزمية متطورة **ertPS** ويتضمن التحليل التحقق من التوافقية لكل خوارزمية جدولة والتحقق من ايهما افضل لنقل الصوت وايهما افضل لنقل الفيديو وقد تم ذلك بإستخدام برنامج محاكي الشبكات **OPNET** لتقييم الاداء .

Acknowledgements

In the name of Allah, the Most Gracious and the Most Merciful Alhamdulillah. All praises to Allah for the strengths and His blessing in completing this thesis. Special appreciation goes to my supervisor, Dr. Hassab Elgawi Osman for supervising this thesis. Special thank extended to Dr. Omer Abdelrazig for his kind support and valuable comments. I must express my deep gratitude to my parents, uncles and aunts and love to all my family who have supported me and guided me to reached this stage.

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Abbreviations

ASN	Access Service Network
ARQ	Automatic Repeat Request
ADSL	Asymmetric Digital Subscriber Line
BS	Base Station
BWA	Broadband Wireless Access
BE	Best Effort service
CBR	Constant Bit Rate
CDMA	Code Division Multiple Access
CID	Connection Identier
CIR	Committed Information Rate
CPS	Common Part Sublayer
CS	Convergence Sublayer
CSN	Connectivity Service Network
CRC	Cyclic Redundancy Check
CAC	Connection Admission Control
CDRR	Customized Deficit Round Robin
DRR	Deficit Round Robin
DWRR	Deficit Weighted Round Robin
DL	Downlink
DSA	Dynamic Service Addition
DSC	Dynamic Service Change
DSD	Dynamic Service Deletion
DRRF	Deficit Round Robin with Fragmentation
EDF	Earliest Deadline First algorithm
FDD	Frequency Division Duplexing
FIFO	First In First Out algorithm
FTP	File Transfer Protocol
GMH	Generic MAC Header
HTTP	Hypertext Transfer Protocol

IEEE	Institute of Electrical and Electronic Engineers
IETF	Internet Engineering task Force
ISP	Internet Service Provider
ITU	International Telecommunications Union
IPV4	Internet Protocol Version 4
IPV6	Internet Protocol Version 6
LOS	Line-of-Sight
MS	Mobile Station
MPLS	Multiprotocol Label Switching
MTU	Maximum Transmission Unit
MDRR	Modified Deficit Round Robin
MIB	Management Information Base
NFS	Network File system
NIC	Network Interface Card
NWG	Network Working Group
NLOS	Non-Line-of-Sight
NS-2	Network Simulator Version 2
nrtPS	Non real-time Polling Service
OFDM	Orthogonal Frequency-Division Multiplexing
OFDMA	Orthogonal Frequency-Division Multiple Access
OSI	Open System Interconnection
PDN	Packet Data Network
PDU	Protocol Data Unit
PHY	Physical layer
PMP	Point to multipoint
PTP	Point to Point
PKM	privacy and key management
QoS	Quality of Service
RACH	Random Access Channel
RFC	Request For Comment
rtPS	real-time Polling Service

RR	Round Robin Algorithm
RS	Relay stations
SDU	Service Data Unit
SFID	Service Flow Identifier
SMTP	Simple Mail Transfer Protocol
SNMP	Simple Network Management Protocol
SNR	Signal-to-noise ratio
SS	Subscriber Station
SP	Strict Priority algorithm.
TCP	Transfer Control Protocol
TDD	Time Division Duplexing
TLS	Two Level Scheduling
UDP	User Datagram Protocol
UL	Uplink
UGS	Unsolicited Grant Service
VOIP	Voice Over Internet protocol
VBR	Variable Bit Rate
WIMAX	Worldwide Interoperability for Microwave Access
WLAN	Wireless Local Area Network
WFQ	Weighted fair Queueing
WRR	Weighted Round Robin