PERFORMANCE ANALYSIS OF WIMAX POINT-TO-MULTIPOINT NETWORK

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ABSTRACT

Amidst the rapidly growing demand for high-speed Internet access in the residential and small office sectors and an equally fast paced growth in last-mile access technologies, Broadband Wireless Access (BWA) has emerged as a promising solution. Despite being capable of high-speed multimedia services and rapid flexible deployment, Broadband Wireless Access (BWA) has fallen short of becoming a cost effective option in the market.

This thesis develops the Performance Analysis of WiMAX Point-to-Multipoint Network. A worldwide demand for high speed broadband wireless systems across commercial and residential regions is emerging rapidly due to the increasing reliance on web for information, business, entertainment and new upcoming high bandwidth intensive or real-time applications. The IEEE 802.16 WirelessMAN standard which has emerged as Broadband Wireless Access (BWA) solution is promising to meet all such requirements and becoming the most popular way for wireless communication. The IEEE 802.16 advantages includes variable and high data rate, last mile wireless access, point-to-multipoint communication, large frequency range and QoS for various types of applications.

The proposed MAC supports a range of physical layer technologies and provides manufacturers with the option of switching modulation and coding schemes based on the channel conditions. We model IEEE 802.16 and evaluate the performance of its MAC layer over various physical layer options using OPNET Modeler v 10.5. Our results show the performance of IEEE 802.16 when using Quadrature Shift Keying (QPSK) and Quadrature Amplitude Modulation (QAM) modulation schemes in an additive white Gaussian noise (AWGN) channel. Based on these results we demonstrate the need for an algorithm to dynamically switch between different PHY burst profiles in order to improve the protocols performance under various channel conditions. All the results obtained were performed in the graph which has been generating by the software itself.

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LIST OF ABBREVIATION

ARQ	-	Automatic Repeat Request
BE	-	Best Effort
BPSK	-	Binary Pulse Shift Keying
BR	-	Bandwidth Request
BS	-	Base Station
BWA	-	Broadband Wireless Access
CID	-	Connection Identifier
CM	-	Cable Modem
CMTS	-	Cable Modem Termination system
CPS	-	Common Part Sublayer
CRC	-	Cyclic Redundancy Check
DIUC	-	Downlink Interval Usage Code
DL_MAP	-	Downlink MAP
DOCSIS	-	Data over Cable System Interface Specifications
DSL	-	digital Subscriber Line
FDD	-	Frequency Division Duplexing
FEC	-	Forward Error Connection
FTP	-	File Transfer protocol
FCRC	-	Fragment Cyclic Redundancy Check
GM	-	Generic MAC
GPSS	-	Grant per Subscriber Station
HARQ	-	Hybrid Automated Repeat Request
LAN	-	Local Area Network
LOS	-	Line-of-Sight
MAC	-	Medium Access Control
MBWA	-	Mobile Broadband Wireless access
MIMO	-	Multiple in multiple Out
MPDU	-	MAC Protocol Data Unit