Performance Comparison of Video Streaming Application between Mobile WiMAX and UMTS

This thesis is presented in partial fulfillment for the award of the Master of Science in Telecommunication and Information Engineering UNIVERSITI TEKNOLOGI MARA



NURULANIS BINTI MOHD YUSOFF Faculty of Electrical Engineering UNIVERSITI TEKNOLOGI MARA 40450 SHAH ALAM, SELANGOR JULY 2013

ACKNOWLEDGEMENT

First and foremost thank you Allah S.W.T for giving me the opportunity to live life and for giving me the spirit to complete this project. I would also like to thank my family for supporting me all these hard years. Special thanks to Dr. Darmawaty Bt Mohd Ali for her guidance and advices to ensure this research is a success. Her insights and comments greatly helped the progress of this research. Also, not forgetting my friends that helped me during the project, a very big thanks to them for giving me the motivation and mentality to complete this project in due time. May Allah bless all of you.

ABSTRACT

Abstract— Video streaming is the real time delivery process of video to the user's media player services. In multimedia streaming technique, the user can access data while it is being transferred. To meet the demand of providing high-quality of video streaming, it is important to design suitable QoS model. Hence, in this project, we designed around streaming services using an Internet topology on expected video performance. We evaluate the performance of the Mobile WiMAX and UMTS due to fading effect according to the performance metrics of throughput, packet loss, jitter and delay. It will stream the LOTR2 (Lord of the Ring 2) movie for 1 hour interval to all client subscribers in mobile WiMAX and UMTS. Simulation results show that mobile WiMAX has better performance to support video streaming compared to UMTS.

iv

TABLE OF CONTENTS

TITL	Æ			PAGE
DECLARATION				
ACKNOWLEDGEMENT				
ABSTRACT				
TABLE OF CONTENTS				
LIST OF FIGURE				
LIST OF TABLE				
LIST OF TABLE				
L121	UF ABI	SKEVIA	ATION	1X /
СНА	PTER 1	: INTR	ODUCTION	
	11	INTRO	DUCTION	1
	1.2	PROB	LEM STATEMENT	4
	1.3	OBJE	CTIVES	5
	1.4	SCOP	E OF WORK	5
	1.5	PROЛ	ECT SUMMARY	7
СНА	PTER 2	: LITE	RATURE REVIEW	
2.1 INTRODUCTION				
2.2 UMTS/3G				
2.3 MOBILE WIMAX				
	2.4 CC	OMPAR	ISON BETWEEN UMTS AND MOBILE WIMAX	12
CHA	PTER 3	: RESE	EARCH METHODOLOGY	
	3.1 M	OBILE	WIMAX	15
		3.1.1	WIMAX SPECTRUM IN MALAYSIA	16
		3.1.2	MOBILE WIMAX ARCHITECTURE	18
		3.1.3	WIMAX PHYSICAL LAYER	18
			3.1.3.1 OFDM AND OFDMA	18

3.1.3.2 SOFDMA193.1.3.3 TDD FRAME STRUCTURE213.1.4MAC LAYER223.1.5SYSTEM PERFORMANCE EVALUATION243.2 UMTS25

v

3.2.1	UMTS ARCHITECTURE	26		
3.2.2	SERVICES AND APPLICATION	28		
3.3 STREAMING VIDEO CONTENT				
CHAPTER 4: RESU	JLT AND DISCUSSIONS			
4.1 INTRODUCTION				
4.2 TRAFFIC CONFIGURATION				
4.3 FADING		33		
4.4 SIMULA	SIMULATION MODULE			
4.4.1	MOBILE WIMAX CONFIGURATION	35		
	4.4.1.1 VIDEO CONFIGURATION	36		
	4.4.1.2 EFFICIENCY MODE CONFIGURATION	37		
	4.4.1.3 MAC SERVICE CLASS	38		
	4.4.1.4 PHY LAYER CONFIGURATION	39		
	4.4.1.5 FADING EFFECT CONFIGURATION	39		
	4.4.1.6 AMC CONFIGURATION	41		
	4.4.1.7 TRAJECTORY CONFIGURATION	41		
4.4.2	UMTS SIMULATION MODULE	42		
	4.4.2.1 VIDEO CONFIGURATION	42		
	4.4.2.2 UMTS QOS CONFIGURATION	43		
	4.4.2.3 UMTS PATHLOSS	44		
	4.4.2.4 TRAJECTORY CONFIGURATION	44		
4.5 RESULTS AND DISCUSSION				
4.5.1 PACKET DROPPED 4.5.2 PACKET RECEIVED				
4.5.5 THROUGHPUT				
4.6 RESULTS CONCLUSION				
CHAPTER 5: CON	CLUSION and FUTURE WORK	54		

÷

.+

REFERENCES

Appendix