

# **CHARACTERIZATION OF INTERNET TRAFFIC IN UUM WIRELESS NETWORKS**

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# CHARACTERIZATION OF INTERNET TRAFFIC IN UUM WIRELESS NETWORKS

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## **ABSTRACT**

The development in communication technology and the propagation of mobile devices, lightweight, with built-in, high-speed radio access in wireless are making wireless access to the Internet the popular situation rather than a wire line. Whereas, the growth of the wireless network with additional mobile devices in the UUM and increasing number of users led to slow wireless connection. Therefore, understanding the behavior of traffic analysis helps us to develop, manage WLAN technology, and deploy. It help us to apply our workload analysis results to issues in wireless network deployment, such as capacity planning, and potential network optimizations, such as algorithms for load balancing across multiple Access Points (APs) in a wireless network. The trace composes of two parts: firstly, one that connects to the core switch in computer center which is connected with the distribution switches that link the Access Point (APs) with the wireless network at campus, and secondly, another one for the measurement of bulk data transfers and interactive data exchange between two nodes in UUM library, which had been initiated at that time. This thesis investigates the performance network and users' behavior in UUM wireless network.

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## LIST OF ABBREVIATION

AAA	Authentication, Authorization and Accounting Administrations.
AM	Amplitude Modulation.
ASK	Amplitude Shift Keying.
ASN	Access Service Network.
ASP	Application Service Provider.
AWGN	Additive White Gaussian Noise.
BER	Bit Error Rate.
BPSK	Binary Phase Shift Keying.
BS	Base Station.
DA	Destination Address
CC	Convolution Code.
CEPT	European Conference of Postal and Telecommunications.
CMIP	Common Management Information Protocol
CSN	Connectivity Service Network.
DAA	Detect and Avoid.
DKG	Dewan Kuliah Gugusan.
DL	Downlink.
DNS	Domain Name System.
DoS	Denial of Service.
DPSK	Differential Phase Shift Keying.
DPP	Dewan Penginapan Pelajar.
DPP YAB	Dewan Penginapan Pelajar Yagasan Al-Buqhari.
DSL	Digital Subscriber Line.
DSSS	Direct sequence Spread Spectrum.
DUR	Downlink to Uplink Ratio.
ECC	Electronic Communications Committee.
FCC	Federal Communications Commission.
FDM	Frequency Division Multiplexing.
FDMA	Frequency Division Multiple Access.
EDC	Executive Development Center.
FEC	Forward Error Correction.

FFT	Fast Fourier Transform.
FHSS	Frequency-hopping spread spectrum.
FTAM	File Transfer and Access Management Protocol
FTM	File Transfer Protocol
FTM	Fakulti Teknologi Maklumat
FM	Frequency Modulation.
FPAU	Fakulti Pengajian Antarabangsa dan Undang-Undang.
FSK	Frequency Shift Keying.
GW	Gateway.
HAP	High Altitude Platform.
HTTP	Hypertext Transfer Protocol
IEEE	Institute of Electrical and Electronic Engineers.
IFFT	Inverse Fast Fourier Transform.
IMS	IP Multimedia Subsystem.
IP	Internet Protocol.
ISI	Inter Symbol Interference.
ISP	Internet service provider.
ITU	International Telecommunication Union.
LAN	Local Area Network.
LOS	Line of Sight.
LTE	Long Term Evaluation.
MAC	Media Access Control.
MB-OFDM	Multiband OFDM.
Mbps	Mega bit per second.
MBWA	Mobile Broadband Wireless Access.
MFSK	Multiple Frequency Shift Keying.
MGF	Moment Generating Function.
MPSK	Multilevel Phase Shift Keying.
MS	Mobile Station.
MTRNG	Mersenne Twister Random Number Generator.
NLOS	None-Line of Sight.
NS	Network Simulator.
NSP	Network Service Provider.
NWG	Network Group.

OECD	Organization for Economic Co-operation and Development.
OFDM	Orthogonal Frequency Division Multiplexing.
OFDMA	Orthogonal Frequency Division Multiple Access.
PAPR	Peak-to-Average Power Ratio.
PE	Probability of Error.
PHY	Physical layer.
PK	Pusat Komputer.
PSD	Power Spectral Density.
PSK	Phase Shift Keying.
PSTN	Public Switched Telephone Network.
PUSC	Partially Used Sub-Carrier.
QAM	Quadrature Amplitude Modulation.
QoS	Quality of Service.
QPSK	Quadrature Phase Shift Keying
RA	Receiver Address
RNG	Random Number Generator.
RS	Reed-Solomon.
RSNA	Robust Security Network Association
SMTP	Simple Mail Transfer Protocol
SNR	Signal to Noise Ratio.
SS	Subscriber station.
STA	Station
TDMA	Time Division Multiple Access.
TA	Transmitter Address.
TCP	Transmission Control Protocol
UDP	User Datagram Protocol
UP	Uplink.
Wi-Fi	Wireless Fidelity.
WiMAX	Worldwide Interoperability for Microwave Access.
WLAN	Wireless Local Area Network.
WMAN	Wireless Metropolitan Area Network.

# **CHAPTER ONE**

## **INTRODUCTION**

In this chapter, wireless characterization is discussed in order to improve communication performance. This chapter highlights the concepts of Wi-Fi in term of standards and protocols. The attempt is to improve wireless services by study the characterization of UUM wireless network. The research problem, objectives and research questions together with significance of the study are included in this chapter.

### **1.1 BACKGROUND**

The development in communication technology and the widespread use of Mobile devices that are lightweight, compact, high speed radio access in wireless technology are increasingly popularizing wireless access to the Internet. WLAN runs on IEEE 802.11 technology and are catering to connectivity in various places such as, universities, companies, corporation, and even in public places such as shopping malls, airports, lounges, and libraries, etc.; in other words, where personnel spend a considerable amount of time outside of work and home. In Malaysia, most of connections to the networks depend on wireless network and most of these rely on free frequency 2.4 and 5GHZ. The environment in this is study on the University Utara Malaysia (UUM). A few areas of information technology are developing so rapidly as that of the current Wireless - LAN (WLAN). Always, new Wireless – Standards are adopted by the demands for ever increasing data throughout and greater range [1, 2]. In 2005, there are ten completely new wireless technologies [3]. The needs for security requirements, so far doesn't indicate the signs of existence, and it is well known that wireless networking's update occurs most of the time and this includes the telecommunications field which in turn has many classifications or



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