UNIVERSITI TEKNOLOGI MARA

PERFORMANCE ANALYSIS OF VOIP OVER 3G AND 4G NETWORK

MOHAMAD AZRAI BIN A.AZIZ

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ABSTRACT

The third and fourth generation of mobile telecommunication technology known as 3G and 4G respectively is the evolution of previous wireless technology known as 2G network [3, 14, 17, 1]. The upgraded features include high-speed transmission of data, global roaming and advanced multimedia access. In mobile telecommunication, both 2G and 3G network are intentionally design for voice communication rather than data networking. On the other hand, 4G networking are established specifically to cater data transmission rather than voice communication. Therefore, 4G should be able to access the data faster than both 3G and 2G [19]. Furthermore, streaming higher resolution video, online gaming and video conference should be able to work astonishingly with 4G network. VoIP (Voice over Internet Protocol) is a voice communication technology that transmit voice packet from one destination to another via internet connectivity. By using IP based technology, VoIP have to convert the analog voice signal produced from the sender into digital packets before it being sent to receiver end [6]. In this research, the studies is focusing on the comparison of VoIP performance between 3G and 4G network provide by Celcom mobile operator. All the data collected, are being compared with Standard Quality Management Scale recommended by ITU-T [2]. Jperf Software measurement is being used to collect the performance of VoIP and online Unifi Speed Test [4] website is being used to measure the throughput and bandwidth. Two important elements of QoS are being measure and analyzed, which is jitter and latency. These two elements are commonly contributed to the glitch and breaking communication between both parties.

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CHAPTER I

INTRODUCTION

1.1 Overview

In mobile communications, the first generation of analog cellular system started in early 1980s and known as 1G. It was designed specifically to serve voice calls and no internet data are available at that time [20]. By early 1990's, user can experience an improved sound quality, higher capacity and better security with the first digital cellular system known as 2G. It support circuit switched data where network switching system uses binary rather than screech of an analog modem. 3G network is advancement in mobile network after 2G because 3G can have data rate up to 384kbps. 2Mbps for stationary speeds and 384kbps for mobile speeds are needed to get the genuine 3G speed set by UN ITU IMT – 2000. 4G is the latest mobile network technology that expected to deliver downlink speed up to 1Gbps when stationary and 100Mbps when in mobile [19]. Currently, WiMAX and LTE are the only technology that stood up to take the challenge but unfortunately in real world network test, the speed and ranging from 4Mbps and 30Mbps only respectively.

Voice over IP (VoIP) technology allows the voice communication to be transmitted over IP data networks via packet switched network instead of traditional voice that use circuit switched that underpinning of the PSTN [12]. However, there are few drawbacks when implementing VoIP because VoIP is latency driven, thus, infrastructure readiness is crucial to overcome the delay that will cause glitch and breakable conversation. Furthermore, all the measurement of VoIP performance is to compare with Standard Quality Management Scale recommended by ITU-T P.862 to