

UNIVERSITI TEKNOLOGI MARA

**EVALUATION OF UDP-BASED RELIABLE TRANSPORT PROTOCOLS IN
WIRELESS NETWORK**

By

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ABSTRACT

This paper is mainly interested in near real-time wireless application with regards to Internet of Things (IoT). Wireless network speed had been improved significantly since its introduction. We had seen its wide implementations in various sectors. This however doesn't dismiss the fact that wireless network is unreliable. Its unreliability comes from various sources such as wireless signal collision and hardware issue. The idea of wireless networking is interesting mainly because it introduce portability. For IoT application that require near real-time wireless connection, the traditional TCP protocol is not suitable because of its packet header size and its conservative Additive Increase Multiplicative Decrease (AIMD) congestion control algorithm and slow start strategy. This paper mainly evaluates three kinds of UDP-based high speed transport protocols (RUBDP, UDT, and PA-UDP). The evaluation was done on a test bed that consist of two machine connected by wireless ad-hoc network. This paper focused on the effect of data size by monitoring throughput of the implemented protocol. This paper also discussed the CPU behavior on the sender and receiver side of each protocol. The paper findings are, PA-UDP protocol has the best transport performance but it requires high CPU utilization during the start and end of transmission at the receiver side. UDT protocol is most efficient in term of CPU usage but it has lesser throughput. RUBDP performed consistently in wireless network but the CPU usage is very high at the sender side. The conclusion drawn on this paper is UDT protocol is most suitable protocol for IoT because it has consistent performance and CPU friendly.

Keywords: UDP-based transport protocol; wireless ad-hoc network; performance evaluation

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CHAPTER 1

INTRODUCTION

This thesis entitled ‘Evaluation of Reliable UDP-based Transport Protocol’, focuses on evaluation of existing reliable UDP-based transport protocol with Internet of Things in mind. The overall goal of this thesis is to have a conclusion on which UDP-based transport protocols will be suitable for Internet of Things applications in wireless network.

1.1 Background

Long time ago, Internet was a foreign term for most of us. It was only in the recent years that the Internet becomes more viable due to lower infrastructure cost. The Internet that we know now is completely different from the Internet at its early days in terms of contents and the network size. The Internet connection speed also had increased tremendously and as a result now we are able to watch live high definition TV in countries with high speed backbone network. The demand for higher Internet connection speed had urged ISPs to improve their infrastructure further and this trend will keep going on in years to come.

The Internet uses Internet Protocol (IP) to provide the means of locating other devices with an address called IP address. The packet used by IP is commonly called IP packets. IP packets could be transported by two typical transportation protocols that are used by IP. The two transport protocols for IP are Transmission Control Protocol