ANALYSIS OF PERFORMANCE SCTP IN MOBILE-IP NETWORK ENVIRONMENT

MUHAMAD SAFAR BIN MANSOR

UNIVERSITI UTARA MALAYSIA
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KOLEJ SASTERA DAN SAINS
(College of Arts and Sciences)
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Nama Penyelia
(Name of Supervisor) :**MR. FAZLI AZZALI**

Tandatangan
(Signature) : _____ Tarikh (Date) : 21/10/10

Nama Penilai
(Name of Evaluator) : **MR. SHAHRUDIN AWANG NOR**

Tandatangan
(Signature) : _____ Tarikh (Date) : 21/10/'10

ANALYSIS OF PERFORMANCE SCTP IN MOBILE-IP NETWORK ENVIRONMENT

A project submitted to Dean of Postgraduate Studies and Research in partial
Fulfillment of the requirement for the degree
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By

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Abstrak

Kajian ini menerangkan serta membuat analisis terhadap prestasi Stream Control Transmission Protocol (SCTP) yang dibandingkan dengan User Datagram Protokol (UDP) dengan menggunakan Simulator Rangkaian NS2. Protokol lapisan pengangkutan yang baru ini telah diterima oleh Internet Engineering Task Force (IETF) sebagai satu piawaian untuk mengatasi kelemahan dan kekurangan yang terdapat pada Transport Control Protocol (TCP). Di dalam kajian ini juga, interaksi antara kedua-dua protokol pengangkutan ini (SCTP & UDP) telah dikaji menerusi pemeriksaan terhadap aliran trafik melalui topologi rangkaian. SCTP mempunyai banyak ciri yang sememangnya tidak dapat ditemui pada protokol pengangkutan yang lain iaitu multi-streaming dan multi-homing. Analisis prestasi ini dibuat menerusi persekitaran rangkaian mobile-IP yang membenarkan pengukuran beberapa metrik prestasi seperti packed delay, packet loss dan juga jitter. Di akhir kajian ini, keputusan yang diperolehi dan juga analisis menunjukkan bahawa objektif kajian ini telah berjaya dicapai disamping membuat perbandingan antara protocol-protokol pengangkutan iaitu SCTP, UDP dan TCP.

Abstract

This research describes and makes an analysis of performance of Stream Control Transmission Protocol (SCTP) compared with User Datagram Protocol (UDP) using Network Simulator (NS-2). This new transport layer protocol has recently been accepted by Internet Engineering Task Force (IETF) as a proposed standard to address a number of Transport Control Protocol (TCP) limitations. Here, the interaction of these two transport protocols (SCTP & UDP) has been investigated through the examination of traffic flows through a number of network topologies. SCTP has many new features that could not be found in other transport protocol such as multi-streaming and multi-homing. This performance analysis was done over mobile-IP network environment that enables to measure the several performance metrics such as packet delay, packet loss and jitter. At the end of the study, results and analysis shows that the research objective was achieved as well as comparative studies between the three transport protocols that is SCTP, UDP and TCP.

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List of Abbreviations

CBR	-	Constant Bit Rate
DCCP	-	Datagram Congestion Control Protocol
DHCP	-	Dynamic Host Configuration Protocol
DNS	-	Domain Name Server
DoS	-	Denial of Service
FA	-	Foreign Agent
FN	-	Foreign Network
HA	-	Home Agent
HN	-	Home Network
IANA	-	Internet Assigned Numbers Authority
IETF	-	Internet Engineering Task Force
IP	-	Internet Protocol
IPv4	-	Internet Protocol version 4
IPv6	-	Internet Protocol version 6
ISP	-	Internet Service Provider
LAN	-	Local Area Network
MA	-	Mobile Agent
MH	-	Mobile Host
MN	-	Mobile Node
NIC	-	Network Interface Card
OSI	-	Open Systems Interconnection
P2P	-	Peer-to-Peer
PR-SCTP	-	Partial Reliable – Stream Control Transmission Protocol
RFC	-	Request for Comment
RIP	-	Routing Information Protocol
SCTP	-	Stream Control Transmission Protocol
SIGTRAN	-	Signalling Transport
SNMP	-	Simple Network Management Protocol
TCP	-	Transport Control Protocol
TLS	-	Transport Layer Security
UDP	-	User Datagram Protocol

USB	-	Universal Serial Bus
VoIP	-	Voice over Protocol
Vtag	-	Verification tag

Chapter 1

INTRODUCTION

1.1 Introduction

Transport Control Protocol provides reliable datagram delivery service while User Datagram Protocol provides an unreliable datagram delivery service. Until April 2001, this both transport protocol existed as the only IETF standardise transport protocol [1]. Today, the third transport protocol is being standardise and known as Stream Control Transmission Protocol [1][2]. This new transport protocol shares many characteristic with TCP but it also has many differences. Mobile-IP [3] was designed specifically with TCP [1]. So, in this research, the measurement of performance for SCTP instead of UDP over Mobile-IP network has been done. To perform this performance analysis, some configurations has been introduced which suggest that SCTP suitable for further research especially in a mobile domain. At the end of this research, an analysis of this both protocol has been included and suggestion of potential especially the SCTP to perform better in Mobile-IP network.

Until now, there are many transport protocol was designed by a particular body, but for this study, SCTP and UDP were chosen because there are a number of factors and specific characteristics. Both transport protocol which was created by the IETF has a lot of difference. UDP has been known generally and widely used before, while SCTP is a third transport protocol, still new and less well known, especially in this country compared with the UDP and TCP. TCP is the second transport protocol introduced by IETF after UDP. In that case, many features of SCTP and its performance have yet to be identified and fully tested. In fact, SCTP

The contents of the thesis is for internal user only

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