Throughput, Smoothness Analysis of SCTP over AODV and DSR MANET Routing Protocols

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Abstract

Mobile Ad hoc Network (MANET) is a wireless network of mobile-mobile node that has no fixed routers. In MANET, mobile nodes can communicate via the wireless interface while nodes are moving freely without using the network infrastructure. Each node in addition to functioning as a host, also serves as a router that can receive and forward packets to next the node. Nowadays existence of a new Internet protocol technology, that is, SCTP, the performance in a MANET Routing Protocol is still unknown. The general objective of this research is to analyze and make the comparative performance of Stream Control Transportation Protocol (SCTP) with Ad-hoc On-demand Distance Vector (AODV) and Dynamic Source Routing protocol (DSR) using Network Simulator (NS-2). Specifically, this research (1) to measure the behavior of SCTP in terms of throughput and smoothness and (2) to determine routing protocol in Mobile Ad-hoc Network (MANET) will have significant effect in SCTP. Internet Engineering Task Force (IETF) issued a new protocol called SCTP; the interaction of SCTP will be investigated through the examination of traffic flows through a number of network topologies. This research use Network Simulator 2 (NS-2), type of the traffic is CBR and packet size is 1000. This performance analysis is over MANET Routing Protocol that enables to analyst the several performance metrics such as Throughput and Smoothness. This topology consists of 16 nodes placed in a 1500m x 1500m rectangle because the researcher uses static topology, consisting of a 4x4 metric with SCTP transport layer and using routing protocol AODV and DSR. The data sent consists of five speeds at 5 m/s, 10 m/s, 15 m/s, 20 m/s, 25 m/s, and then these speeds are used in AODV and DSR simulation. Throughput of SCTP over AODV is highest than DSR and the smoothness of SCTP over DSR is highest than AODV depends on five types of speed. This research it was found that MANET did not have a great impact on the throughput of SCTP. In other words, MANET only amounted to 0-2% impact on the throughput of SCTP. Furthermore, the speed of node movement does not significantly affect the smoothness.

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LIST OF ABREVATION

SCTP	Stream Control Transmission Protocol
IETF	Internet Engineering Task Force
DSR	Ad-hoc On-demand Distance Vector
AODV	Dynamic Source Routing protocol
OSI	Open Systems Interconnection
TCP	Transmission Control Protocol
FTP	File Transfer Protocol
UDP	User Datagram Protocol
NS-2	Network Simulator 2
VOIP	Voice Over IP
CBR	Constant Bit Rate
MTU	Maximum Transmission Unit
DSDV	Destination Sequence Distance Vector
ZRP	Zone Routing Protocol
QoS	Quality of Service

WWW	World Wide Web
ACK	Acknowledgement
LAN	Local Area Network
TFTP	Trivial File Transfer Protocol
RIP	Routing Information Protocol
NFS	Network File System
SNMP	Simple Network Management Protocol
DHCP	Protocol and Dynamic Host Configuration
IP	Internet Protocols
RREQ	Route REQuest
RREP	Route REPly
RERR	RouteError
BPS	Bits Per Second
Pps	packets per second
Few	Fractional Windows Increment
SACK	(Selective ACK)
OTCL	Object-oriented Tool Command Language

CHAPTER ONE

INTRODUCTION

1.1 Introduction

Data and information is a matter of great importance to modern society, because whoever controls the information it could rule the world. To address this, it requires that information technology makes data and information move quickly [1]. In the science of information technology, speed and accuracy of data transfer is strongly influenced by the type of transport layer protocol. The Open Systems Interconnection (OSI), model which provides a framework of structured logic on how processes interact via a data communication network. In the OSI there are seven (7) layers, one of the seven (7) layers is the transport layer. The transport layer is responsible for dividing data into segments, providing logical connections "end-to-end" between the terminals, and providing error handling (error handling). Within the transport layer protocol is the User Datagram Protocol (UDP), the Transport Control Protocol (TCP) and the Stream Control Transmission Protocol (SCTP).

UDP is a message-oriented protocol [1], [2], where the process sending the message is encapsulated in a user datagram and sent over the network. UDP is used in applications such as IP phones and real-time data transmission. However, UDP has a weakness because the sender cannot know the state of the sent message. In the process of delivery, a message can be lost, duplicated, or received in a damaged condition. UDP also does not have some other features, such as

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