

UDP-Based Multi-Stream Communication Protocol Using NS2

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Abstract-- In these we have to discuss about two basic protocols one is connectionless and other is connection-oriented. In connectionless protocol handshaking are not required but in connection-oriented protocol handshaking process are most important. UDP (user datagram protocol) is an example of connectionless protocol, TCP (transmission control protocol) is connection-oriented protocol. A connection-oriented communication is a data communication made that requires an overhead in setting up a request for connection before sending any type of data communication message. In Connectionless Protocol cannot require any type of handshaking process for sending a data. The communication method, in which communication occurs between hosts. The device at one end of the communication transmits data to the other, without first ensuring that the delivery report is available and ready to accepting the data. The server sending a message to sends it addressed to the intended recipient. The Internet Protocol (IP) and User Datagram Protocol (UDP) are connectionless protocols, but TCP/IP (the most common use of IP) is connection-oriented. Here we have to study how to use UDP connectionless protocol as a connection oriented protocol. But these two protocols are not sufficient for today's internet. Today we want more flexible, more efficient protocol. For fulfill is requirement we developed the new generation protocol SCTP. The full name is Stream Control Transmission Protocol. SCTP is fulfilling the each and every requirement of today's internet very effectively. It is basically more similar with TCP because it is also a connection-oriented protocol. In SCTP there are four step connection setup processes. All basic features of TCP and UDP are included in SCTP protocol.

Keywords: SCTP protocol, multi-streaming, multi-homing, wireless network

1. INTRODUCTION

This work is totally base on the study of the reliable communication from single user to multi- stream, on available multiple devices. The major purpose behind this paper is to provide reliable communication functionality from one single user to multiple users. It should be noted that similar transport layer contain two Transport protocol TCP and SCTP don't provide the kind of functionality that this protocol provides. The Stream Control Transmission Protocol (SCTP) is a reliable message-oriented protocol with transparent support for multihoming. It allows multiple not dependent complex exchanges which all share a single connection and congestion context. SCTP is a multi homing and multi streaming supported which only deals with communication between two single user endpoints, on work interfaces, which is assigned multiple IP addresses ; it does not able to deal with communication that contain multiple user endpoint. Our main purpose is to provide an application running on a machine to connect to a collection of machines a single one. The Load Balancing is one of the feature can implemented, which is absent in SCTP. Load balancing is the management of traffic across network without use of complex routing protocol. Load balancing distributes workload across one or more CPUs, CD and DVD drives and other resources in an effort to use network resources more efficiently and avoid network overload. Load balancing may be accomplished through software or hardware. Add load balancing to current more than one user

server communication in order to achieve high availability. Load balancing can be implemented quickly and easily as an add-on to your current server solution to share the load between your web servers, using a simple script to replicate the data on the servers. By using approach of virtualition, it is a set machine under the same endpoint, each machine accessible under many-stream. In computer networking, the Stream Control Transmission Protocol (SCTP) is a transport layer protocol, performed in a similar role to the popular protocols Transmission Control Protocol (TCP) and User Datagram Protocol (UDP). It provides some of the same service features of both: it is message-oriented like UDP and ensures reliable, in-sequence transport of messages with congestion control and data flow like TCP. TCP provides reliable and strict order-of-transmission data transferred.

2. RELATED WORK

2.1 Stream control Transmission Protocol (SCTP)

We know only to basic protocol one is TCP and another one is UDP. These are used to connect distributed applications and allow messages to flow between them. These protocols have been used successfully to design and developed Internet applications as we know them: e-mail, HTTP, name services and so forth. In modern generation we required most powerful protocol which provides stream data transmission and reliable data transmission and most important is more secure. The combination of these features

protocol is stream control protocol. The Stream control transmission protocol [1] stack and provides transport layer functions to many Internet applications. SCTP has been approved by the IETF as a proposed standard in 2000 and updated over the years. SCTP is a reliable transport protocol operating on top of a connectionless packet network such as IP[2]. SCTP protocol is a combination of TCP and UDP because each has some advantages and some drawback. UDP transmit the data in the form of stream and TCP transmit the data in the form of bytes. Transition of the data in the of stream is faster than transmission of bytes.

SCTP (Stream Control Transmission Protocol) is a protocol for transmitting multiple streams of data at the same time between two end points that have established a connection in a network. Sometimes referred to as "next generation TCP" (Transmission Control Protocol) - or TCPng. SCTP is designed to make it easier to support a telephone connection over the Internet (and specifically to support the telephone system's Signaling System 7 - SS7 - on an Internet connection). A telephone connection requires that signaling information (which controls the connection) be sent along with voice and other data at the same time. SCTP also is intended to make it easier to manage connections over a wireless network and to manage the transmission of multimedia data. SCTP is a standard protocol (RFC 2960) developed by the Internet Engineering Task Force (IETF)

2.1.1 Multi-homing

SCTP was designed to handle the signaling of telecommunications over IP[4]. Since telecommunications are very susceptible to time delays, every millisecond counts. Multi-homing enables systems that have multiple interfaces, for redundancy, to use one over the other without having to wait. Within SCTP one interface is established as the primary and the rest become secondary. If the primary should fail for whatever reason, a secondary is selected and utilized. When the primary becomes available again, the communications can be transferred back without the application being aware there was an issue. While establishing the connections, the primary and secondary interfaces are checked and monitored using a heartbeat/heartbeat acknowledgement process that validates addresses, and maintains a Round Trip Time (RTT) calculation for each address. The RTT can indicate that the primary is slower than a secondary and allow for the communications to migrate to the secondary interface.

2.1.2 Multi-streaming

Using TCP, only one single data stream is allowed per connection[4]. All of the information must be passed through that one stream. SCTP allows multiple simultaneous data streams within a connection or association. Each message sent to a data stream can have a different final destination, but each must maintain message boundaries. For example, systems cannot send parts of the same message through different streams; one message must go through one stream. When running an ordered data delivery system, if

one of the packets is out of order or missing, the stream is blocked pending resolution to the order. This is called "Head-of-Line Blocking." With the use of multi-streams, only the stream that is affected would be blocked; the other streams would continue to flow.

3. ANALYSIS OF PROBLEM

In this project, I have to analysis the working of TCP and UDP. Using TCP and UDP, only one single data stream is allowed per connection. All of the information must be passed through that one stream. SCTP's features of control chunk multiplexing and multihoming present a number of potential security risks for NAT design. Although encryption was not part of the original SCTP design, SCTP was designed with features for improved security, such as 4-way handshake (compared to TCP 3-way handshake) to protect against SYN flooding attacks[4], and large "cookies" for association verification and authenticity. Reliability was also a key part of the security design of SCTP. Multihoming enables an association to stay open even when some routes and interfaces are down.

Following are some problem which occurred in UDP or TCP protocol[5]

- 1.TCP provides both reliable data transfer and strict order-of-transmission delivery of data. Some applications need reliable transfer without sequence maintenance, while others would be satisfied with partial ordering of the data. In both of these cases, the head-of-line blocking offered by TCP causes unnecessary delay.
- 2.The stream-oriented nature of TCP is often an inconvenience. Applications must add their own record marking to delineate their messages, and must make explicit use of the push facility to ensure that a complete message is transferred in a reasonable time.
- 3.The limited scope of TCP sockets complicates the task of providing highly-available data transfer capability using multi-homed hosts.
- 4.TCP is relatively vulnerable to denial-of-service attacks, such as SYN attacks.

Multiple and changing IP addresses during an SCTP association, mean that SCTP NATs cannot operate in the way conventional UDP/TCP NATs operate. Tracking these multiple global IP addresses can help in avoiding lookup table conflicts, however, it can also result in circumstances that can lead to NAT state inconsistencies. Our analysis shows that tracking global IP addresses is not necessary in most expected practical installations.

Key issue relates to the concept of tracking global IP addresses per association within the NAT. We explore the impact of tracking global addresses by[6]:

- 1.looking at situations where it is difficult for NATs to gain the necessary association state information.

2. modeling NAT lookup table conflicts to determine if the reduction in conflict probabilities is operationally significant.

4. PROPOSE WORK AND OBJECTIVES

It is two step process to implement UDP based connection oriented protocol

1. Designing a connection oriented UDP protocol
2. Designing UDP for multi-stream communications

Propose work is to implement the UDP based connection oriented protocol. Another name of UDP based multi stream protocol is SCTP means Stream Control Transmission Protocol. It means that this protocol is combination of TCP and UDP. SCTP allows multiple simultaneous data streams within a connection or association. Each message sent to a data stream can have a different final destination, but each must maintain message boundaries.

This work is implementing in NS2[7]. NS2 stand for Network Simulator version2[8]. This Wired network is a computer network that is bused to share data, audio, video and image files among the computers. It is also used to share network resources like printer. The reason of using wired network because it is easy to understand for all new users. We will use NS2 simulator for designing and studying the wired scenario[9]. NS2 is an open source and freely distributed simulator for the new researcher. It is used to designed and studying the variou purposes

Protocol design, traffic analysis, implementation etc.

1. Use to compare different protocol.
2. Wired and wireless network scenario can generate.
3. Open source and freely distributed.
4. Create different network topology.
5. Analyze events to understand the network behavior.
6. It is a standard experiment environment in research community.
7. It works at packet level.

We would be developing a C++ file for SCTP protocol based on the NS2 standards and than running the SCTP on NS2.

Objectives

There are six objectives

1. Development of UDP server.
2. Development of UDP client.
3. Development of multi-stream UDP server.
4. Integration of steps 1,2 and 3 in the order to create a UDP based multi-stream system.

5. To design SCTP Protocol
6. To make SCTP multi-stream.
7. Compare performance with normal UDP

5. APPLICATION

Following are the application of SCTP protocol

1. SCTP protocol used in mobile technology.
2. It is used in commercial wireless networking.
3. It is used in long distance communications like Skype or Team Viewer

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