Congestion Control in Wireless Mesh Network Using Shared Bottleneck Detection Algorithm

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ABSTRACT.

IEEE 802.11 Ethernet with Wireless Mesh Network (WMN) [4] to transfer all data in wirelesschannel in various links with the minimized loss of packets.It is to provide the optimization in the wireless network using Multipath TCP.Multipath TCP [1] is self-configure network by itself optimize the routing protocol which in turn leads to minimization of congestion. It provides services on the Wireless Mesh Network that uses IEEE 802.11 which improve the communication protocol. It is to provide the stability and optimization in the wireless mesh networks. But the drawback is packets tends to loss and it cannot be identified, the packet transfer rate is minimized and bandwidth is increased.Hence, we make use of an algorithm to detect the packet loss in the network and minimize it by using SBD (Shared Bottleneck Detection) algorithm.This researchfocuses on optimization of congestion controlin TCP with Multi-Path over wireless mesh network using SBD algorithm

Keywords— *TCP, Congestion control, 802.11s Wireless meshnetwork, Multi-path, Optimization, SBD algorithm*

I.INTRODUCTION

IEEE 802.11 Ethernet in Wireless Mesh network [6] is used with Multipath TCP for transmission of data with less congestion in the network.There were numerous mechanisms and protocols like TCP Reno, TCP New Reno, TCP Vegas and TCP Westwood. The congestion window is calculated in all the mechanism with respect to the packet loss. In the existing mechanism, the congestion window size is calculated by RTT (Time taken between sending and receiving packet) and BDP.

It would provide efficiency and optimization in the wireless mesh network.Due to the usage of Multipath TCP there will be the increased bandwidth distribution in the WMN network.The packet loss would not be detected in the existing system.So, we make use Shortest Bottleneck Detection(SBD) algorithm to find the where packet loss occurred in the network. SBD algorithm detects the packets which exceeds the buffer size, so that those packets can be retransmitted in order to minimize the packet loss. It will increase the potential and optimization of the wireless mesh networks.

II. LITERATURE REVIEW

The popularity of multimedia application will leads to increased media access protocol it has a lack of end to end congestion control mechanisms and flow control protocol.It is not concerned with reliable data delivery in the network. This has a problem that causes inequitable bandwidthdistribution [2]. Multicast is a method used for implementing group of communication. In wireless mesh network the problem is getting high through put due to malicious behaviour of nodes and interference among the nodes during the transmission of data.In reached the proposed a cross layer design for secure on demand multicast routing protocol it would help to achieve the high through put and performance [3].In this evaluation it could be done in two metrics

1 .Packet delivery ratio

PDR=Number of packets received/total number of packets send

2 .End to end delay

(1) It is the ratio between the buffer size and speed

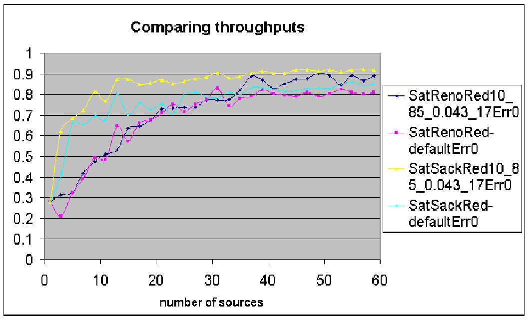

Figure 1-[3] End to end delay

TCP has poor performance due to slow problem recovery from the loss. It uses UDT a data transfer protocol that has an own mechanism to achieve the efficiency in the network. It is application level enable to be deployed with low cost.

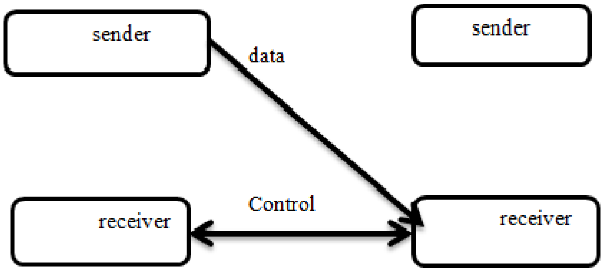

Figure 2-[9] Poor performance of TCP

Although UDT performance is impressive under normal conditions, but it only targets network congestion. Congestion window size is calculated for the efficient transfer of packets during the data transmission.

T=data per cycle/time per cycle

(2)It is calculated by round trip time (RTT) and$T_0$is a retransmission timeout,WiMAX is the maximum congestion windows when it is limited bythe buffer size at the receiver. Many types of TCP versions are available for optimized congestion control and setup a congestion window size. They set up a compare the TCP new Reno with other networks. The performance is compared with other networks to avoid the congestion calculated by RTT. [9]The mechanism used before were

A. TCP Reno
B. TCP New Reno
C. TCP Tahoe
D. TCP Vegas
E. TCP Westwood

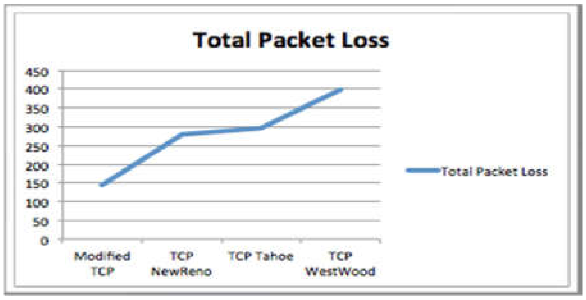

Figure 3-[3] Total Packet Loss

These are the various protocols and mechanism used for congestion control and avoidances in the network. They are mainly determined for the faster recovery in the network when there is packet loss in the network. In that existing method they calculated the congestion window size by using MTU (Memory Transfer Unit), acknowledgement, RTO (Retransmission Time Out) and threshold size. In the existing mechanism packet loss is gradually increased from TCP Westwood to TCP Reno. So, it is focusing on calculating the best congestion window size by using RTT [8,9,10]. The modified TCP used MeshL2HWMPProtocol. The window size is calculated by BDP (Bandwidth Delay Product) and RTT (i.e. Time taken between sending and receiving the data). It would reduce the packet loss when comparing to other mechanism.

III. PROPOSED METHOD

In this method we use IEEE 802.11 in wireless mesh network using multipath TCP.The congestion window size is calculated by RTT and BDP.The following formula has been derived from the existing system

$$cWnd = BDP_{byte/sec} x RTT_{sec}$$

(3)The best Congestion Window Size (3) is calculated in order to minimize the packet loss.In the existing system, the packet loss is minimized in Wireless Mesh Network (WMW) through Multipath TCP but there is no detection of packet loss. The hopcount is increased since it has various paths.

Due to multipath TCP, there are many paths which will increase in the bandwidth distribution. There were various paths used that would lead to increased bandwidth. The hop count is the bottle neck for the bandwidth. The packet loss would not be detected in this system. Hence, we make use of an algorithm SBD (Shared Bottleneck Detection)

SBD algorithm detects and finds the packets which exceeds the buffer size, so that those packets can be retransmitted in order to minimize the packet loss.For the non-shared bottleneck scenarios, we observe throughput gains of up to 40% with two sub flows and the gains increase significantly as the number of sub flows increases, reaching gain values of more than 100% with five sub flows. While achieving such performance gains in non-shared bottleneck, we show that MPTCP-SBD remains fair to TCP in shared bottlenecks.

IV.RESULT AND CONCLUSION

The optimization in the WMN network has been done with Multipath TCP using IEEE 802.11. In this method, we make use of modified TCP.In the proposed method we make use of an algorithm SBD.Shared Bottleneck Detection (SBD) algorithm detects and finds the packets which exceeds the buffer size, so that those packets can be retransmitted in order to minimize the packet loss. The network would bind to low cost and high performance withstanding the great potential of bandwidth. With this we improve the efficiency and optimization in the network.

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