Simulation study of Evaluation of TCP Variant over Wimax

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Abstract WiMax deals with many packet losses. This type of losses found in network due to Congestion. It can be managed by TCP congestion control mechanism .In 4G wimax there are some recent development in the network introduce new services to improve TCP's efficiency and resource utilization. In this paper, we implement various TCP protocol's favors on Wimax networks. TCP is reliable protocol but with a problem of slow start. This paper simulates the efficiency of different TCP variants i.e. TCP RENO, TCP TAHOE, TCP SACK and TCP NEWRENO. Performance comparison is done between all of these TCP variants on Wimax network. Simulation results shows that which TCP version perform better in Wimax network. These protocols are inspected based on TCP connection (Congestion Window)'.and segment delay retransmission.

Keywords: WiMax, Qos, Video Conferencing, IPsec, Security.

I . Introduction

To combat the increasing demand of 4G technologies like OFDM is adopted by the networking industry. Wimax was promoted by IEEE 802.11 standard Broadband internet connectivity, Wi-Fi mesh networks and Backhaul IP networks. Standard-based supported by Wimax. Wimax targets area like Metropolitan Area network to provide higher bandwidth, support for the Quality of Service with the help of TCP Protocol which is reliable protocol for data transfer. It also supports various multimedia applications like VoIP, video conferencing and online gaming. In heterogeneous wireless and wired networks approximately 90% of Internet traffic. Carries by Transmission control protocol which widely used connection oriented transport layer protocol that provides reliable packet delivery over unreliable links. In heterogeneous networks TCP may not perform well due to congestion. Various Congestion control algorithm have been originally proposed based on the assumption so that congestion has been reduce. As, wireless networks have faces very higher bit error rates due to weather conditions, obstacles, multipath interferences, mobility of wireless end-devices, and signal attenuation and fading, which may lead to packet loss. Various TCP algorithms and techniques have been proposed to improve congestion such as TCP Tahoe, TCP Reno, TCP Reno with Selective Acknowledgement (SACK), TCP New Reno, TCP Vegas.

II Comparison of TCP Algorithms

To analyze the effect of various algorithms in various network scenarios employed to recover and maintain congestion window. It is unpredictable behavior in case of heterogeneous networks and, hence, no algorithm performs well in all cases. In deployed networks many algorithms do not perform well as effect of various network parameters and network variables cannot be accurately predicted. when multiple packet losses occur within a window of data TCP NewReno, a modified version of TCP Reno, avoids several TCP Reno performance issues. However, in the absence of SACK, without selective acknowledgments the performance of TCP is still limits. There is some constrained in TCP implementations to either retransmit at most one dropped packet per round-trip time or to retransmit packets that might have already been successfully delivered. Hence, in case of multiple packet losses SACK performs better. Performance of TCP Tahoe, TCP Reno, Reno with SACK, and NewReno was compared using the opnet .Analysis of various TCP algorithms over wireless links with correlated packet losses indicated that TCP NewReno often performs worse than TCP Tahoe because of the inefficient fast recovery algorithm Under certain conditions, the performance depends not only on the bandwidth-delay product but also on the nature of timeout. In summary, reported studies indicate variable performance of TCP algorithms. These variations may be due to a variety of assumptions, network parameters, and network topologies. The purpose of developing these algorithms is to maintain and

recover the congestion window in order to increase the utilization of network resources in case of congestion.

IV Simulation

In this research created a network with Wimax network which is based on physical layer (PHY) Orthogonal Frequency Division Multiplexing (OFDM) and IEEE 802.16 standard in OPNET & checked that value of Congestion window size and segment delay. For this a simple Wimaxetwork is created which is shown in Fig 4.1 and various parameters that are used by this is shown in table 4.1 By using these parameters this network will help to find out, how much congestion and delay occur in wimax network so that it will help to improve the performance of

Table 1.1: Wimax Network with TCP parameter

ATTRIBUTE	VALUE
Version/Flavor	Unspecified
Maximum Segment Size (bytes)	Auto-Assigned
Refresh Buffer	65535
Refresh Buffer Adjustment	Window Based
Refresh Buffer usage threshold	0.0
Delayed ACK Mechanism	Segment/clock based
Maximum ACK Delay	0.200
Maximum ACK Segments	2
Slow –Start initial Count	2
Fast Retransmit	Disabled
Duplicate ACK Threshold	3
Fast Recovery	Disabled

the network. In this Wimax network with 8 nodes,wlan router,2 wimax router, IPcloud and a mobile server is created in which all the nodes are connected to them. In this, two other nodes such as Application Configuration & Profile Configuration have been used. These are used to define the application definition & profile definition. All these are connected with topology 802.11.Following table shows the various parameters of Wimax network with TCP Parameters out, how delay, throughput varied in the network at different video quality.

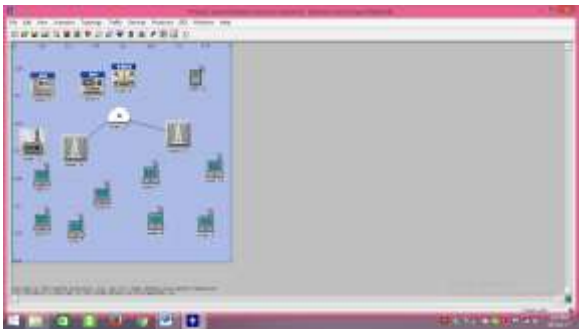

Figure 1.1: Wimax Network with TCP Protocol

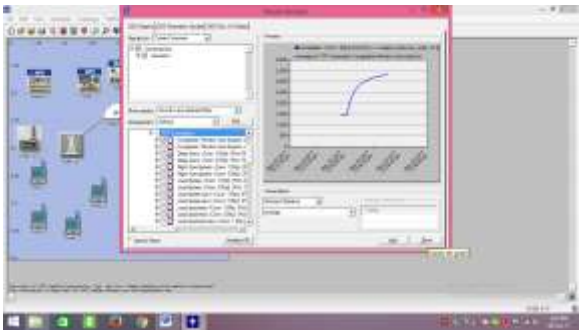

Figure 1.2: Congestion Window Size with Wimax Network

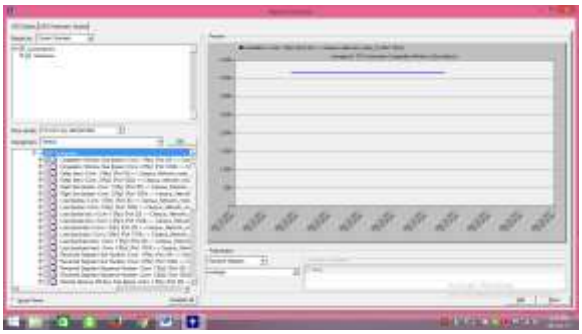

Figure 1.3 Congestion Window Size with TCP Tahoe

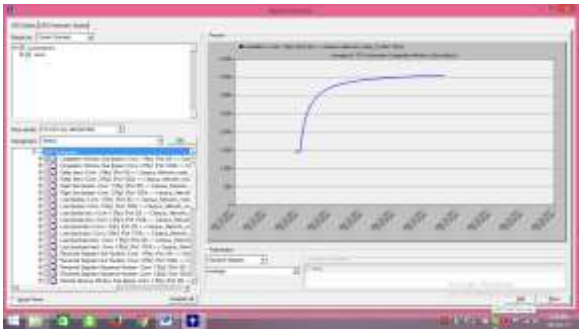

Figure 1.4: Congestion Window Size with TCP Reno

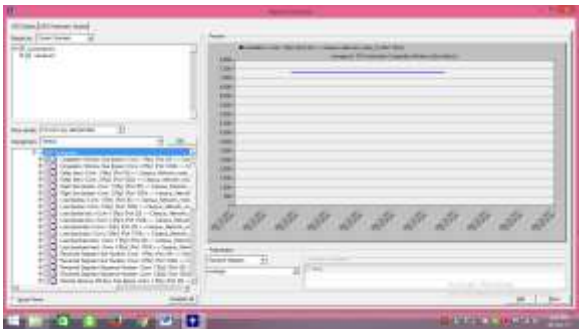

Figure 1.5 Congestion Window Size with TCP NewReno

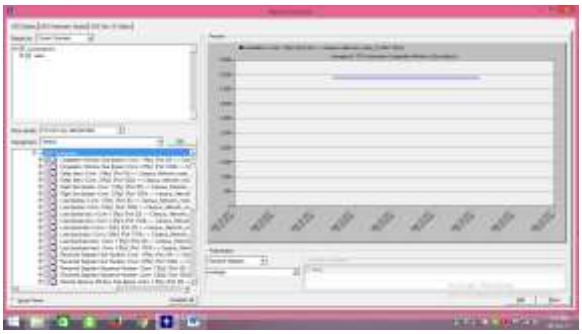

Figure 1.6Congestion Window Size with TCP Sack

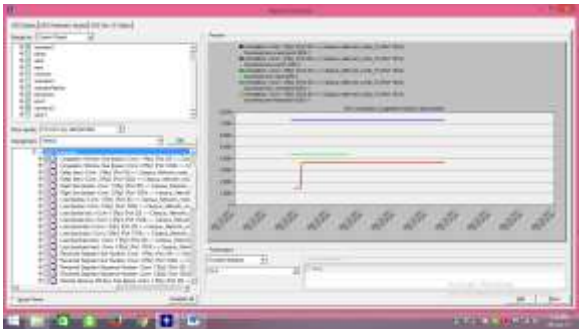

Figure 1.7 Comparisons between Congestion window size Wimax Networks with different variant such as TCP Reno,New Reno,Tahoe,Sack

From the results of all these, it has been find out that if there is a use of different TCP Variant to improve the network performance by controlling congestion as compared to normal Network., Here, in this as mentioned, Congestion window size, segment delay , measured for Tahoe, Reno, Newreno, Sack, TCP, over a model of Wimax network. New reno performs best in terms of congestion window size, segment delay as compare with all. It also concluded that Sack performed better as compared to Tahoe in case of Congestion window size, segment delay. Tahoe performed better as compared to Reno in case of Congestion window size, segment delay.

VI Conclusion

In this thesis, a network is created for all different TCP variant. The reason behind to design the network is to find that how network Congestion performance improved by TCP Variant. If there is a large amount of network degrades in the network then that network is not reliable. Even, the main objective in networking is to create a network which is secure as well as reliable so that the data that is sent by the sender should be correctly received by the receiver. And from the above discussion and results it is concluded that different TCP Variant TCP Tahoe, sack. Reno, changes the network performance Improvement.

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