A Review Paper on Performance Evaluation of TCP Variant over Wimax

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Abstract: ***One of the most global telecommunication systems technologies is WiMax (World Wide Interoperability for Microwave access). IEEE 802.16 standard is used in Wimax which provides high-speed access to the Internet .Core transport protocol. Which is Transmission Control Protocol (TCP) .In WiMax network Congestion control can lead to key problem of degradation in the quality of service (QoS). To Control congestion some congestion control algorithm (TCP Variant) have been proposed such as TCP-Tahoe, TCP-Sack, TCP-New-Reno and TCP-Reno.*** **In this paper, performance comparison evaluation of different TCP variant over WiMax is analyzed using OPNET.**

Keywords: WiMax, TCP, TCP-Sack, TCP-Tahoe, TCP-Reno, TCP-New Reno,OPNET

I Introduction

Recently, Emerging technology of Wireless broadband access is WiMAX, WiMax is based on physical layer (PHY) Orthogonal Frequency Division Multiplexing (OFDM) and IEEE 802.16 standard, res. It uses Transmission Control Protocol (TCP) to carry approximately 90% of Internet traffic in heterogeneous wireless and wired networks due to this WiMax faces key problems of Congestion Control. when there is a lot of traffic in the networks Congestion can occurs in networks.In this paper different ways to improve the efficiency of TCP in wireless networks. By evaluate some TCP variant such as *TCP-Tahoe, TCP-Sack, TCP-New-Reno and TCP-Reno* which helps reduction of its congestion window after a packet lossby dynamically changes the window size .In the wired network packet loss is occur by link Congestion. In the wireless network packet loss include fading, temporary detachments, and handovers.

Next-generation wireless communication technology is Broadband wireless access (BWA) , The mechanism used for congestion control is totally based on packet loss after the congestion window These type of congestion occur in in wired network at link congestion where packet losses occur but its less effective in Wimax. In the WiMax reason for packet loss include fading, temporary detachments, and handovers.Sometime in network asymmetric is assumed which cause interrupt in smooth flow of acknowledgement. Due to interrupt or delay packet losses response become less by the protocol. In Wimax network sometime dissymmetry is occur in network when TDD is used. During TDD in uplink starvation of bandwidth may cause which also interrupt the smooth flow of acknowledgement. In WiMAX networks In this work, different TCP variant is used to improve the smooth flow.

II TCP -CONGESTION CONTROL

In Network when sender send packet at more quantity than the receiver buffer size congestion occur.TCP control this type of congestion by editing the window size.To resolve the congestion the first step to detect the congestion problem but its not a easy task. .The reason for packet lost may be due to packet discard or noise on a transmitterline.Today mainly packet timeout occur in network due to congestion so its necessary to choose the suitable window size at receiver side. The primary purpose of TCP is to provide a connection oriented reliable data transfer service between different applications. TCP in its present form is not well suited for ad hoc networks where packet loss due to broken routes can result of TCP_s congestion control**.**

III PERFORMANCE COMPARISON OF TCP VARIANTS

a) TCP Tahoe It maintains congestion window and a slow-start threshold as two variables that is a shown in figure 1 which determines the number of segments in the congestion window that is transmitted within an RTT.When TCP session start the value of congestion window is 1. The Transmitter waits for the acknowledgement of one segment which is send by them. When transmitter received the acknowledgement the value of congestion window set to double and again transmitter send two

segments at the same time, transmitter repeat this procedure until it reaches the maximum Congestion window size. Now at this point network get congested. TCP Tahoe begins this recovery process by dropping the value of congestion window to 1 and waits for a time when pipeline is emptied.

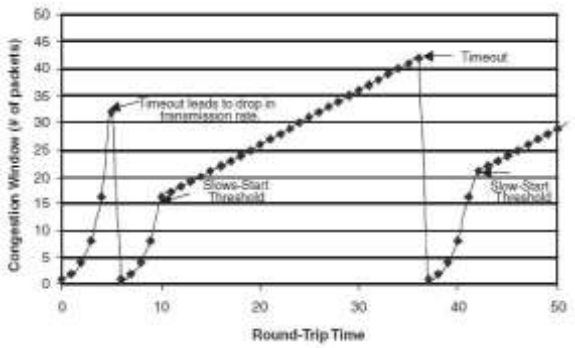

Figure no1

b) TCP Reno It uses the same principle of Tahoe, but it uses the concept of duplicate acknowledgements (dupacks) for trigger Fast Retransmit. When TCP Reno got 3 dupacks, it consider this sign of segment lost and again retransmit the packet immediately for Fast Recovery. In this process the value of ssthresh and cwnd is set to half of current cwnd.By sending 2 dupack cwnd value increase by 1.There is one drawback of TCP Reno cannot detect multiple packet loss within the same window .

c) TCP New Reno : In this the problem of TCP Reno is solved by slight modification over TCP-RENO. TCP new reno detect multiple packet losses . TCP new reno is efficient than TCP reno in case of multiple packet losses. In this receiver also receive the multiple duplicate packets acknowledgement and enter into fast retransmit

d) TCP Vegas is a modification of RENO. It get to overcome the problem of congestion by suggesting slow start algorithm to detect the packet Loss.

e) TCP Sack is improved version of TCP RENO and TCP new Reno which improved congestion control by multiple lost packet detection or by transmit lost packet more than one as per RTT. It also support fast retransmit and slow start . It is also not like Tahoe which only use modified algorithm to control congestion but also allow receiver to select acknowledgement according to segments and . If there are no such segments outstanding then it sends a new packet.

IV CONCLUSIONS

As the conclusion , it is shown that how wimax uses tcp protocol to send reliable data traffic and faces congestion problem .In this paper congestion control mechanism or different types of TCP variant is evaluated how they control congestion by slow start algorithm and fast retransmit recovery process. Congestion control is also solved by controlling the size of window size

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