{tag}

{/tag}

International Journal of Computer Applications

Volume 100 - Number 11

Year of Publication: 2014

Authors:

Sara Raad Qasim

Zainab T. Alisa

10.5120/17573-8270

{bibtex}pxc3898270.bib{/bibtex}

Abstract

The Transmission Control Protocol (TCP) is used for reliable delivery of data over unreliable networks. Practically, most TCP mechanisms have been carefully designed for wired networks. Neglecting the characteristics of wireless environments can lead to TCP implementations with poor performance. In order to use TCP in mobile networks, improvements have been proposed in this paper to enhance TCP algorithm to distinguish between the different types of loss events. In mobile or static wireless environments, losses are not always due to network congestion, as in the case of wired networks. In this paper, a modified algorithm is presented using fuzzy controller to differentiate the loss events (error loss from congestion loss) that intend at adapting TCP to mobile and static wireless environments with better performance. Simulation results were performed using OMNET simulator and have showed that the new proposal has better throughput than other TCP schemes.

References

- Postel, J. 1981. Transmission control protocol, RFC793.
- Xu, S. and Saadawi, T. 2002. Performance evaluation of TCP algorithms in multi-hop

wireless packet networks, Journal of Wireless Communications and Mobile Computing, Vol. 2, no. 1, pp. 85–100,.

- Wikipedia organization, [Online] Available from: http://en. wikipedia. org/wiki/Sliding_window_protocol, [Accessed: April 2014].
- TCP Congestion avoidance algorithm [Online] Available from: http://en. wikipedia. org/wiki/TCP_congestion-avoidance-algorithm, [Accessed: April 2014].
- Jacobson, V. 1988. Congestion avoidance and control, in Proc. of ACM SIGCOMM, Vancouver, Canada.
- Fall, K. and Floyd, S. 1996. Simulation based comparisons of Tahoe, Reno, and Sack TCP, in Computer Communications review.
- Floyd, S. , Henderson, T and Gurtov, A. 2012. The New Reno Modification to TCP's Fast Recovery Algorithm, RFC 3782.
- Brakmo, L. S. & Peterson, L. L. , 1995. TCP Vegas: End to End Congestion Avoidance on a Global Internet, IEEE Journal on Selected Areas in Communication, Vol. 13, no. 8.
- Casetti, C. , Gerla, M. and Mascolo, S. 2002. TCP Westwood: End-to-End Congestion Control for Wired/Wireless Networks, Kluwer Academic Publishers, Wireless Networks, pp. 467–479.
- Chang, C. and Cheng, R. 1994. Traffic control in an ATM network using fuzzy set theory, in Proc. IEEE INFOCOM, vol. 3. pp. 1200–1207.
- Harju, J. and Pulakka, K. 1999. Optimization of the performance of a rate based congestion control system by using fuzzy controllers, in Proc. IEEE IPCCC, pp. 192–198.
- Chang, R. and Cheng, C. 1996. Design of fuzzy traffic controller for ATM networks, IEEE/ACM Trans. Netw. , vol. 4, no. 3, pp. 460–469.
- Aoul, H,. Nafaa, A. , Negru, D. and Mehaoua, A. 2004. FAFC: fast adaptive fuzzy AQM controller for TCP/IP networks, in Proc. IEEE GLOBECOM, vol. 3, pp. 1319–1323.
- Chrysostomou, C. , Pitsillides, A. and Hadjipollas, G. 2003. Fuzzy explicit marking for congestion control in differentiated services networks, in Proc. IEEE Int. Symp. Computers Commun. , vol. 1, pp. 312–319.
- Passino, K. M. and Yurkovich, S. 1998. Fuzzy Control, Addison Wesley Longman Inc.
- Qasim, S. R. , and Alisa, Z. T. , 2014. A Fuzzy based TCP Congestion Control for Wired Networks, International Journal of Computer Applications (0975 – 8887) Vol. 89, no. 4.
- Varga, A. , and OpenSim Ltd. , 2011. OMNeT++, User Manual, Version 4. 3.
- Varga, A. , and OpenSim Ltd. , 2011. OMNeT++, User Guide, Version 4. 3.
- www. omnetpp. org.

Index Terms

Computer Science Fuzzy Systems

Keywords

ssthresh cwnd westwood FLC RTT fwestwood