Advanced Science and Technology Letters
Vol.31 (MulGraB 2013), pp.126-129
http://dx.doi.org/10.14257/astl.2013.31.28

Delay-based Congestion Control for Multipath TCP

Wenlan Guo[1], Zhijia Wang[1], Yun Zhang[2]

[1] School of Computer Science and Technology,Harbin Univ.Sci.Tech.,Harbin,China
guowenlan@sohu.com
[2] Department of Electrical and Computer Engineering,University of Texas at Austin
zhangyun@utexas.edu

Abstract. A single flow stream could be divided into several sub-flows to be sent across multiple paths. This method obtains obvious advantages against traditional TCP as it maintains higher reliability and makes better use of the network resources. Congestion control algorithm is an essential part to be considered. This paper first reviews the existing multipath TCP congestion control algorithms and then analyzes and formulates the goals and problems need to be achieved and solved. A delay-based congestion control algorithm named Weighted Vegas (wVegas) is provided. Finally, two possible modifications are demonstrated including adjusting the congestion control window according to how far the path is from congestion and redefining the behavior when loss occurs.

Keywords: Congestion control; Multipath TCP; Weighted Vegas

1 Introduction

There are three goals during the design of multipath TCP congestion control algorithm including efficiency, fairness and the congestion depended utilization of each available path. A number of multipath TCP algorithms have already been proposed. The uncoupled algorithms apply congestion control on each path independently. This kind of algorithms is difficult to ensure the fairness, like Ptcp[1], , CMT-SCTP [2] and M/TCP [3]. Some uncoupled methods like EWTCP [4] applies weight on each sub-flow could ensure fairness, but it could hardly make full use of network resource. The fully coupled algorithms will couple the congestion control on each involved path. However it leads to the result that the traffic would totally shift to the less congested flow which would sometimes causes link to shut down. The robust algorithm always applies semi-coupled method in which the traffic will prefer the less congested paths while keep a reasonable traffic on the congested ones, such as MPTCP [4].

Most of current multipath TCP congestion control algorithms use the loss of packets as the indication of the congestion. It provides congestion detection, but not the avoidance. Network resources have been wasted if the congestion control starts to shift the traffic when the loss occurs. One more problem is the buffer overflow loss in the loss-based congestion control as the sending window would increase infinitely if

ISSN: 2287-1233 ASTL