

AN INTELLIGENT TCP VEGAS TO SUPPORT LONG-DISTANCE HIGH SPEED NETWORKS

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ABSTRACT. *In this paper, an Intelligent TCP Vegas (iTCP-Vegas) is proposed to improve the throughput of long-distance high-speed TCP connections. Large Round Trip Time (RTT) of packets in long-distance networks is a problem to cause the performance degradation of original TCP connections. Although the RTT-based TCP has been recognized to benefit the response performance of TCP connections, the previous conservative schemes do not offers a feasible and reliably approach. For efficient response, the alternative approach to adapt the congestion window is proposed based on a four-stage adjustment, rather than the conventional three-stage approach. Additionally, the original TCP Vegas with constant-interval is improved by the usage of dynamic intervals. In the proposed iTCP-Vegas, the main advantages includes (1) dynamic adjustment of the parameters, α and β , to control the congestion window size values to upgrade the throughput of TCP connections on long-distance networks; (2) Simulation results show that in typical conditions of bandwidth and distance, the proposed mechanism effectively improves the throughput of standard TCP Vegas. Besides, the analysis of fairness among homogenous and heterogeneous TCP connections is also presented.*

Keywords: Congestion control, High-speed transmission, Long-distance networks, TCP Vegas, Quality of services

1. Introduction. The exponential growth of Internet population and facility greatly contribute globalization of information. There are so many kinds of Internet services including is the convergence of Internet services in past decades. On the Internet of globalization, more and more service contents are delivery across continents with large delivery delay, typically more than 5000 KM with a delay of 150 ms. Thus, Long transmission Distance and High-speed transmission Network (LDHN) is a trend of Internet in near future. For the decades of rapid and rich development, Internet services demonstrate the diversity of content. In the early stage of Internet, text-style services are popular for archive, file access, hypertext and email. As the development of networking technology, people can enjoy more and more access technology, such as wireless access, optical network and mobile access. In addition, more and more available bandwidth and users terminals are conducted to deliver and present more interesting contents. For an example, Youtube is one of the emerging content providers on Internet. The revenue of Youtube in 2009 is close to USD 1 billion. Users upload their media clips to Youtube through wireless access to share with their friends in worldwide. YouTube has to provide a reliable streaming service for its users in countries. How to make worldwide users access the content smoothly, sufficient bandwidth and long-distance flow control are necessary to promise a trustable service quality.