A performance evaluation of Hierarchical Link-Sharing with HTB and CBQ on Linux

何振毅、王欣平博士

E-mail: 9314761@mail.dyu.edu.tw

ABSTRACT

Network multimedia applications render packet transmission in more stringent requirements than before. Traditional guarantee of packet transmission along no longer suffices these real time multimedia application requirements. In these applications, packet has to be transmitted in a timely and even deterministic manner that often contradicts the nature of traditional packet based network. Quality of Service (QoS) is regarded as a solution to the above problem and IETF currently has proposed Interserve [1] and DiffServe [2] for the problem. While advanced commercial QoS solutions in general are still pending, Linux from Open Software Society has realized some of advanced QoS facilities in its design as edge node solution in particular. This thesis concerns the QoS design of the Link-sharing Queue in Linux. There are two Link-sharing Queue designs currently implemented in Linux, and they are Class Based Queuing (CBQ) by S. Floyd and V. Jacobson, and Hierarchical Token Bucket (HTB) by Martin Devera. CBQ has come to its existence for a while. It was fairly tested and a lot of related literatures regarding to its performance are available for referencing. CBQ has being criticized for its complexity that make it difficult to configure and less efficient [8, 12, 14]. In contrast, HTB on the other hand are quite new. It simplifies the complexity of CBQ and claimed by the origin designer to be more efficient than CBQ. Because HTB was developed just recently, related literatures about its performance are rarely seen. Still, the Open Source society regards HTB a replacement of CBQ. All considering, this thesis is setup to conducts a systematic comparison between performance of CBQ and HTB in an actual network environment. A Linux gateway equips with both CBQ and HTB is installed. A test platform was built that based on the above gateway with proper hardware arrangement and software configuration where CBQ and HTB are tested independently that under the same network environment. Consequently, test results are collected and are compared. The comparison is made with emphasizing on bandwidth guarantee, transmission latency, and delay jitter. In addition, the same comparison is extended with inclusion of scability that taken combination of different class numbers and levels into account. Generally speaking, the test shows HTB has better performance in bandwidth guarantee but minor deficiency in latency and delay jitter in comparing to CBQ. Full detail is covered in chapter 4 of this thesis.

Keywords : Link-Sharing ; Linux ; CBQ ; HTB

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