

Wavelet analysis of QoS based network traffic

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Abstract

Integration of different network services into a converged infrastructure is one of the most intensive challenges in the converged network application development area. Huge differences exist regarding several characteristics of data, voice and video content traffics. While data traffic requires error free services, real time applications like interactive video transfer and VoIP distress of the high delay and jitter values.

DiffServ becomes more and more popular Quality of Service (QoS) mechanism not only in WAN but LAN environment as well. Coloring the IP packets of different traffic streams based on QoS traffic classes generate increased diversification of the statistical characteristics detected at the measuring points of the production network. Self similarity, long range dependence and fractal characteristics of these packet flows are strongly influenced by the QoS parameters in congested network environment.

Several models are proposed for the qualitative and quantitative evaluation of physical phenomenon supervened on different OSI layers at the intermediate nodes. Most of these claims relatively long traces to evaluate the scale independence and fractal characteristics. The wavelets based Multi Resolution Analysis (MRA) proposes fast pyramidal algorithm requiring $\sim O(n)$ computation steps for determining the self similarity measure of the traces with n samples, consisting serious interest in the low delay aspect of the burst detection.

In this paper several UDP and TCP traffics are considered and statistically analyzed based on MRA method. Fast detection algorithm of real time traffic burstiness is presented for QoS based packet switched WAN environment with congestion.

Keywords: IP, TCP, UDP, VoIP, Wavelet, MRA, QoS, LRD, Self-similarity.

References

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