Percentiles Calculation of the IP Packet Delay Distribution Function

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Abstract

In the ITU-T Recommendation Y.1541, the method for estimation of percentile of the IP packet delay distribution function in multiphase network is proposed. For the calculation of the IP packet delay variation (IPDV), the value of the 99.9 percentile is used. However, recommendation Y.1543 states the necessity of measurement of 90 and 99 percentile. For this reason the errors of applying the percentile estimation method from Y.1541 for evaluation of the 90 and 99 percentile should be studied.

For the solution of this problem the multiphase queuing system based on a number of M/M/1 (by Kendall's classification) models is used. This model is frequently applied for analysis of telecommunication systems. The important feature of the proposed model is that it allows obtaining accurate expressions for delay distribution functions. Precise percentile values can be derived from this expression numerically. In this study, three percentile values are estimated and compared to the results, which method from Y.1541 recommendation yields. The errors are also estimated for different load values.

INDEX TERMS: PERCENTILE, IP PACKET, DELAY.