

QoS routing for Differentiated Services: simulations and prototype experiments

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In this paper a QoS routing proposal for the Differentiated Services framework is evaluated on a variety of well know local area network and wide area network benchmarking topologies. The results presented are unique for two main reasons. The first reason pertains to the methodology used: the evaluation is done by simulation on the NS-2 simulator and on an experimental test scenario, using PCs running FreeBSD with a modified kernel to support class-based scheduling and routing mechanisms. These mechanisms were implemented on ALTQ and GateD. The second reason is the scope of the evaluation including the assessment of QoS routing open issues concerning both traffic performance and protocol behavior under various traffic patterns. Traffic performance is measured by throughput, delay and loss parameters. Inter-class traffic effects are also accessed. The evaluation of protocol behavior is conducted under different loads and traffic patterns. The issues addressed concern the analysis of QoS routing cost/benefit relation, regarding communication and processing overhead, stability and scalability issues in large topologies with the capability to differentiate traffic and improve its performance.

The tradeoffs that must be accomplished on the various parameters and timescales used in QoS routing are analyzed by simulation and experimental results. The results show that the QoS routing strategy evaluated has capabilities to support Traffic Class routing in Differentiated Services networks and can contribute to a significant improvement in traffic performance without posing an excessive burden regarding processing and network overhead.