# QoS Provisioning and Routing with EDF Scheduling, Stochastic Burstiness and Stochastic Guarantees

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**Abstract**

A scalable approach to end-to-end QoS provisioning requires to handle traffic aggregates. This translates into a looser characterization of traffic profiles. Scalability of QoS provisioning is further enhanced by the elasticity of typical (QoS demanding) applications, which translates into looser QoS requirements. Accordingly, this study considers QoS provision schemes for connections with *stochastic* traffic profiles and *stochastic* QoS requirements. We concentrate on the class of Rate-Controlled Earliest Deadline First (RC-EDF) scheduling disciplines, which have several well known advantages, in particular simplicity of implementation and flexibility. Assuming the Exponentially Bounded Burstiness (EBB) traffic model, we establish results that extend the deterministic study of RC-EDF, both for a single server in isolation and for networks of servers. For a single traffic shaper followed by an EDF scheduler, we establish stochastic bounds on the distribution of the delay for each session. In the general (multi-hop) setting, we first

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