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Comparison of Link-by-Link Admission Control and Capacity Overprovisioning

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Abstract. There are two basic approaches to achieve Quality of Service (QoS) for communication networks: admission control (AC) and capacity overprovisioning (CO). AC requires less capacity than CO because it can block excess traffic, preventing it from disturbing the QoS of admitted flows. CO on the other hand is simple and cheaper to implement than AC, which makes it an attractive option for Internet service providers that do not have an AC infrastructure yet, at the risk of the network being overwhelmed by excess traffic in rare cases. In this paper we contribute further insights to this discussion by quantifying the ratio of required capacity for CO:AC in certain networking scenarios including rare overload and hot spot scenarios.
Keywords: QoS, admission control, capacity overprovisioning

1 Introduction

Today's Internet offers (almost) global reachability at low cost. On the one hand, the "Best-Effort" delivery of packets does not guarantee any Quality of Service (QoS) level, but it is often sufficient even for high bit rate transfers. On the other hand, there is an ever increasing tendency to move value added services like telephony or video conferencing onto the Internet, which require bounded packet delay and predictable throughput. High precision applications like tele-surgery, tele-robotics or tele-music additionally require extremely low packet loss rates. Therefore, QoS in terms of short packet delay and low packet loss will be required in future versions of the Internet, so called "next generation networks" (NGNs), to support these services.

QoS can be achieved by introducing an admission control (AC) infrastructure into the network. Demanding applications reserve network resources before transmitting traffic over the network, at least in high-QoS classes. AC blocks out reservations when the capacity does not suffice to guarantee the required QoS level both for the new reservation

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