Title: Capacity measurement in small-scale, heterogeneous, best-effort IP networks
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Abstract:
Current home networks are not well designed to support quality of service (QoS). Successfully employing current QoS solutions in heterogeneous environments, such as home networks, requires compatibility between the many possible solutions for the different network technologies. Often the solutions need support from all devices throughout the network. Additionally, it is often difficult to configure QoS settings properly.

An alternative approach that adds some QoS support to home networks is admission control based on path quality assessment. The service delivering device decides if a new service can be admitted based on a quick path quality measurement. Currently there are no tools available for performing a fast and accurate path quality measurement in heterogeneous network paths.

This report describes the design and evaluation of a path capacity measurement tool for small scale, heterogeneous, best-effort IP networks. A new probing method is developed that obtains the bottleneck capacity in paths consisting of different link layer technologies. Besides standard IP support, we do not put any requirements on the service receiving devices. The performance of the newly developed probing method is evaluated through simulations of Ethernet/802.11b networks in OPNET Modeler©. Simulation results show that the path capacity estimation tool provides accurate (typically ±0.5 Mbps) estimates for the path capacity (typically within 5 seconds) if employed in paths with low to moderate cross traffic intensities. For higher cross traffic intensities, the performance of the tool decreases.