You are invited to attend a lecture by

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The Gaussian Nature of TCP

Most of the traffic in Internet networks belongs to TCP flows. The Internet network seems to be too complex to be fully analyzed. Feedback mechanisms of TCP, numerous protocols and complex flow interactions, together with a variety of different topologies, imply a complex statistical problem. In fact, currently there is no complete statistical network model.

In this talk we present a novel approach to the analysis of a network in which most of the traffic consists of TCP flows. We find the traffic distribution of all network components, which centralized around a bottleneck. By exploring deeply the nature of the packet losses, we find that they are bursty and correlated. This insight provides us with a novel model for the TCP congestion window, leading to statistical models of single links, and finally escalating to the level of distributions of the largest components. We utilize the achieved models to construct the pattern of the arrival rate to queues, and derive the distribution of the bottleneck queue size and a resulting loss rate for the network.

We end up with the first complete statistical description of the entire network. Further we prove that the number of packets on most network link sections follows a Gaussian distribution, and analyze as well the parameters of this distribution, thus providing a key insight into the general statistical behavior of Internet traffic.

The lecture will take place on Tuesday, 12/6/2007 at 16:30 in room 861

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