Operations Research Seminar

Mathematical Analysis of Transport Protocols

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Tuesday, June 2, 2009
15:00-16:00 in GL-115

We will give a review, and an attempt to a preview, of mathematical analysis of Internet Transport Protocols such as TCP. TCP has been a major factor in keeping the Internet alive during periods of high growth and high congestion. Starting in the mid nineties, increasingly sophisticated mathematical models have been built to understand the behavior of TCP, in particular for the situation of moving large files over a link with constant (and fairly low) drop probability. A review of such models will be given. The assumption of "Large Files" has always been suspect, though has some justification through the finding of "heavy tailed behavior." Wireless communication (including TCP to the iPod or Blackberry), and also Cloud Computing will make TCP work in a quite different environment: use of channels with quickly changing capacity or quickly changing level of congestion, and presence of "TCP" connections of long durations, though only occasional bursts of use. This talk will review some of the analytic work done to adapt TCP (and TCP-like protocols) to the newly developing situation, and will attempt to make some predictions.

Teun Ott got his "Drs" in Mathematics and Operations Research at the University of Amsterdam and his PhD in Operations Research at the University of Rochester. After teaching OR for a few years he went to Bell Laboratories - Bellcore - Telcordia where he first moved into Computer Performance Analysis and then into Computer Networking. From 2001 until 2006 Teun was professor in Computer Networking at the New Jersey Institute of Technology. Among Teun's papers are several related to TCP, including the original paper on the "Square Root Law" for TCP. Teun holds 7 patents.