

Algorithm for TCP Congestion Control

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EE 384y – Spring 2003 - Prof. Nick McKeown, Prof. Balaji Prabhakar

Objective:

To design a TCP Congestion Control algorithm that can be implemented by routers that is stable for all short network data flows.

Background and Motivation:

TCP Congestion Control is important in modern networks to relieve the serious and very real problem of link congestion that occurs from time to time. To date, TCP Congestion Control has been implemented using many different techniques, most of which are based on feedback over the network. This introduces the problem of slow start where a node slowly ramps up its rate of transmission of packets over the network until a comfortable rate can be established. This is a problem because the average file (approx 1 KB) would have been already completed transmission before this ramping up to a comfortable rate takes place. This causes network inefficiencies, since the file could have been transmitted much quicker had this feedback-based TCP Congestion Control not been employed.

Therefore this project seeks to design an algorithm that can be implemented in a TCP router that can determine the optimal transmission rate rapidly, eliminating the slow start problem.

Tasks:

- “Poster Boy” example of the inefficiencies introduced by current TCP Congestion Control algorithms, and the need for a new design.
- Traffic modeling – finding reasonable traffic models that can be used to study TCP Congestion Control.
- TCP Congestion Control algorithm design
- Simulation of new TCP Congestion Control algorithm
- Analysis of simulations

Schedule:

Week of:	Activity:
April 21	“Poster Boy” Example
April 28	Traffic Modeling
May 5	TCP Congestion Control algorithm design
May 12	Prepare intermediate report (due May 14)
May 19	Simulation of new TCP Congestion Control algorithm
May 26	Analysis of simulations
June 2	Prepare Final Report (due June 5)

References:

- [1] ABR Traffic Congestion Control Mechanisms with VD/VS in Wireless ATM Networks
/ Moonsik Kang; Sangmin Lee
- [2] TCP with Bandwidth Estimation over Wireless Networks
/ Fabio Martignon; Antonio Capone
- [3] Congestion Controlled Adaptive Lightweight Multicast in Wireless Mobile Ad Hoc Networks
/ Ken Tang; Katia Obraczka; Sung-Ju Lee; Mario Gerla