Project Summary-Ideas

Award No:
0125410

Project Title:
Quantifying the Temporal Characteristics of Congestion Events in the Internet

Investigators:
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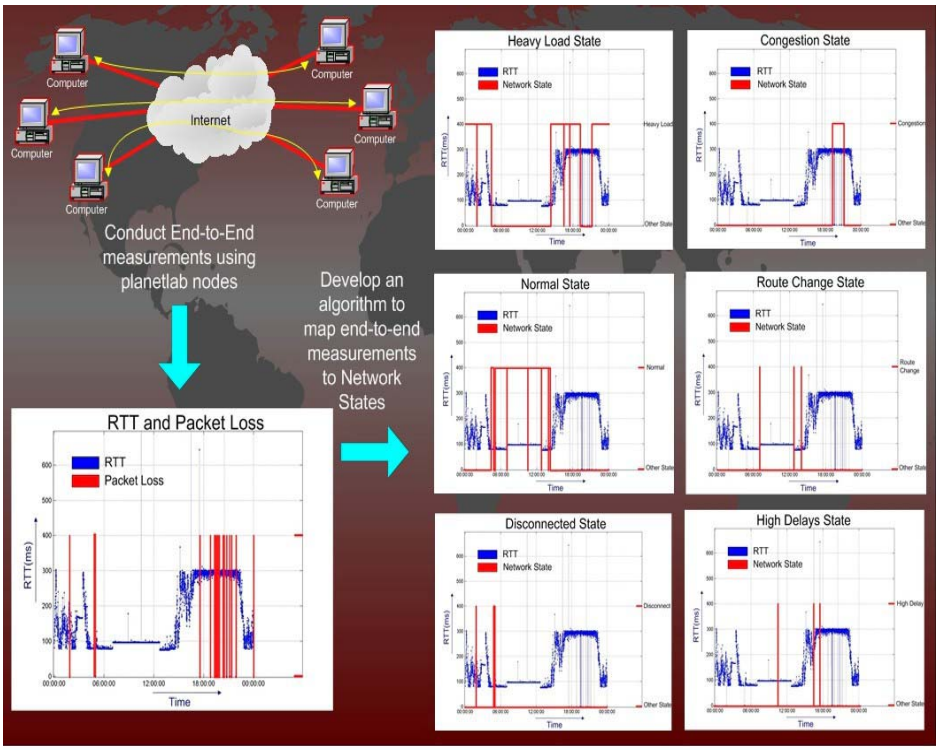

Website:
http://www.ittc.ku.edu/~frost/Characterizing-Internet-Congestion.htm

Description of Graphic Image:
End-to-end network measurements are conducted using globally distributed PlanetLab nodes. This end-to-end measurement data is used as input to an algorithm that determines network state. It generates network state as a function of time as a final output.

Project Description and Outcome *(Provide content for one or more of the following outcome goals)*

Ideas:

While Quality of Service (QoS) mechanisms exist they have not been widely employed because of their complexity and lack of relevance to user perceived performance, thus customers are reluctant to pay extra for QoS. There is a need to increase our understanding of the temporal characteristics of the events that impact user perceived QoS. These events may be caused by congestion or other factors; e.g., routing changes. The goal of this work is to increase our understanding of temporal characteristic of events that influence end user applications. To achieve this goal we are developing network-probing methodologies to collect data on the condition of end-to-end paths. Techniques are being developed to map the collected data into network states, e.g., normal, congested, overloaded, high delay, route change and disconnected. Analysis of the observed dynamics will involve Fractional Brownian motions with the Hurst parameter in the interval (1/2, 1). Construction of martingales from a fractional Brownian motion is needed for this investigation. This construction requires a stochastic calculus for fractional Brownian motion that the co-PI has been instrumental in developing. Recently the co-PI has constructed a large family of martingales from a fractional Brownian motion. The dynamics of the states will be used to characterize the temporal characteristics of performance incidents.