A graph on a white background

AI-generated content may be incorrect.

13. Use the Time-Sequence-Graph (Stevens) plotting tool to view the sequence number versus time plot of segments being sent from the client to the gaia.cs.umass.edu server. Can you identify where TCP’s slow start phase begins and ends, and where congestion avoidance takes over? Comment on ways in which the measured data differs from the idealized behavior of TCP that we’ve studied in the text.

[Answer]

TCP slow start begins at #4 packet (0.027s ~) and ends at #23 packet after 3-way handshaking. However, the slow start is not increased exponentially. The increase in the number of packets is rather irregular. This means that in the actual network environment, theoretical exponential increase could not be achieved due to the limitation of ACK delay or buffer size.

Switching congestion avoidance from slow start is realized from #30 (0.58s ~) - #35 packets. Theoretically, the number of packets should increase linearly in a Congestion Availability situation, but in this graph, the number of packets delivered simultaneously is fixed at 6. When sending six packets at the same time, the length of the last six packets is less than 1 MSS, so it can be estimated that the maximum capacity that can be transmitted is reached and further increase in the number of packets is impossible.

A screenshot of a computer

AI-generated content may be incorrect.

A screenshot of a computer

AI-generated content may be incorrect.

A screen shot of a graph

AI-generated content may be incorrect.

14. Answer each of two questions above for the trace that you have gathered when you transferred a file from your computer to gaia.cs.umass.edu

[Answer]

Looking at the traces I collected myself, it can be observed that the number of packets increases exponentially. A slow start was executed from 2.1 seconds to 2.6 seconds. After 2.6 seconds, the number of packets decreases compared to the previous one, which can be seen because of a decrease in “ssthresh” caused by a packet loss. Therefore, it can be understood that after 2.6 seconds, congestion avoidance is applied. After 2.6 seconds, the congestion avoidance is applied. Contrary to the theory, it only shows a tendency to increase exponentially but does not accurately increase exponentially. In addition, the length of each packet is different, so the spacing of points on the graph is not constant.

A screen shot of a graph

AI-generated content may be incorrect.