Analysis of Protocol Performance

Based on the data I have observed from the outcome for the three protocols (Go-Back-N, Selective Repeat, and Stop-and-Wait), here are some key insights:

Selective Repeat Protocol Performance:

• This protocol consistently shows the lowest download times across different latency and packet loss conditions. This suggests that the Selective Repeat protocol is the most efficient in handling errors and maintaining a higher throughput in the network conditions tested.

Impact of Latency:

• As the mean latency increases from 50ms to 500ms, the download time for each protocol also increases. This is expected as higher latency implies a longer time for packets to travel back and forth, affecting the overall transmission time.

Impact of Packet Loss:

• Increasing the packet loss percentage leads to higher download times in all protocols. This impact is due to the need for retransmissions when packets are lost. Notably, the Selective Repeat protocol appears to handle higher packet losses more effectively compared to the other protocols.

Comparison of Protocols:

• The Stop-and-Wait protocol tends to have the highest download times across most conditions. This indicates its inefficiency in environments where high throughput and low latency are required, likely due to the simple nature of waiting for an acknowledgment before sending the next packet.

• Go-Back-N performs better than Stop-and-Wait but is still consistently outperformed by Selective Repeat. This might be due to the efficiency of Selective Repeat in managing multiple outstanding packets and better handling packet loss.

Efficiency at Extreme Conditions:

• At a latency of 500ms and higher packet loss rates, the differences in performance between the protocols become more pronounced, highlighting the robustness of Selective Repeat under stressful network conditions.