

Mini-Project. Performance and Reliability Analysis of Communication Networks

Submit to srp@es.aau.dk with subject [NetPerf24][MP][Your Group Name]

Deadline: Nov 15, 2024

Task 1. Moby Dick is an extremely long novel, and the size of the plain-text file containing the unabridged version is approximately 1.2 MB.

(see <https://gutenberg.org/ebooks/2701>). However, language is relatively easy to compress, as it is very redundant.

- Encode the novel with Huffman and Shannon-Fano compression, using individual characters as symbols and estimating their probability by their relative frequency. You can use any programming language to implement both the codes and the probability estimation.
- Encode the novel using words as symbols (you can count punctuation and white spaces as separate words), then run the encoding again - how has the size of the file changed?
- Implement a version of LZW or LZ77 and encode the book.

Your report should provide both the code listing for the compression algorithms and a short discussion of the results you obtained.

Task 2. Complete the Mininet bufferbloat exercise available at the link

<https://github.com/mininet/mininet/wiki/Bufferbloat> and include the results in your report.

Task 3. Create a dumbbell topology as in Fig. 1 (considering all links with a 10 Mb/s capacity and a propagation delay of 5 ms) and test the behaviour of TCP New Reno, Vegas, and Cubic as a function of n : how does the congestion window change? How does the delay change?

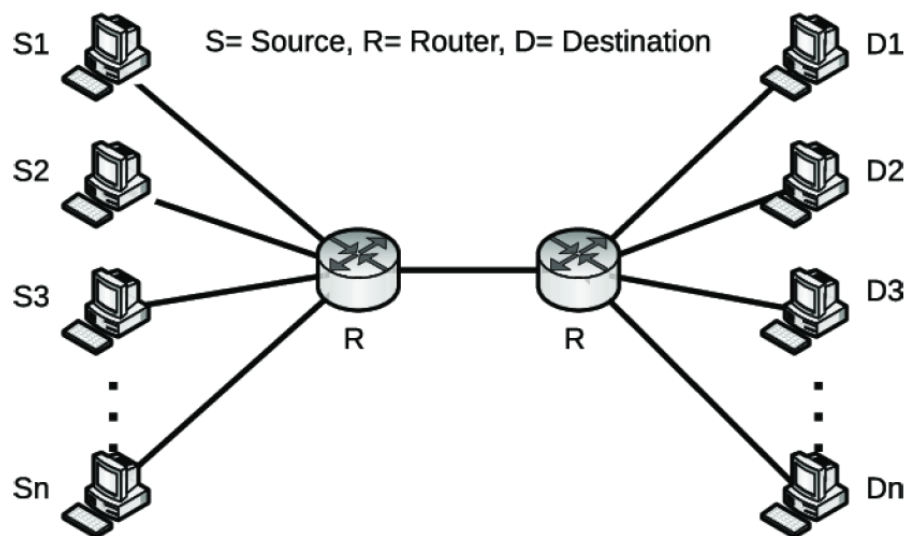


FIGURE 1. Caption

Task 4. Repeat the experiment, but introduce a packet loss rate of 1%. How do the results change?

Task 5. *Bonus:* test the BBR congestion control algorithm in the previous conditions and discuss the results.