

EE 542 – Laboratory Assignment #5: Fast, Reliable File Transfer (Team - Competitive)

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Due date: Sept 13 (Report) at 11:55pm and Sept 15 (Demo)

This project will build on the last assignment. In it you will explore the real-world implications of how TCP performs under less than perfect conditions. Your goal is to develop a file transfer program that uses your custom protocol that performs better than any other program available. This is your first competitive laboratory that will go head to head against one other randomly selected team's result. We suggest doing the following experiments using the Ubuntu operating system.

While TCP is effective, reliable, and relatively robust on the Internet, it doesn't always give us the best throughput under every circumstance. In this section you'll design an IP based file-transfer utility. The design and implementation of the utility is up to your group, however it must full-fill only three requirements: it must use IP (so it can be routed), it must transfer the file reliably (with no errors) and it must be implemented with a command-line interface similar to scp.

The link speed between the sender and receiver must be 100Mbps and the test file size must be at least 1GBytes. You should emulate the delay and the loss rate of the link using the delay node. You should test your system under various different conditions. However two settings that you must expose your system for the assignment are:

- The Delay (RTT) of 10ms with the Loss rate of 1%
- The Delay (RTT) of 200ms with the Loss rate of 20%

For your demo and competition, you will need to create an experiment with two nodes connected by the second link (delay of 200ms and the loss rate of 20%) in both direction defined in your .ns file.

You will also need to create a 1GB file in your local /tmp directory of the sender computer.

Your program will need to reliably transfer the entire file from the sender to the receiver at the highest performance possible through this bad network link.

You must timestamp right when the first bit of the data leaves the sender and the final bit is received by the receiver. The total time for the file to make the one-way trip will be used to compare your program's performance against other team's program performance. You also will need to prove the reliability of your system by running MD5 on both the original file and the received file.

The execution of the system should be straight forward and any notion of cheating will result in automatic defeat in the competition and possibly zero on the lab score. The goal of this task is to encourage a healthy competitive development environment for everyone. You are encouraged to help each other to get the best result. However, at the end, the faster team will win.

- (1) The minimum transfer rate for your final FTP is 20 Mbps to compete against the other team.
- (2) Describe, in detail, the concept(s) behind your file transfer utility, results, and the analysis in the report slides that must be submitted on the due date specified on blackboard by 11:55pm.
- (3) The scoring will be based on the submitted report slides and video demo.