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Project #3 (Download Accelerator) Report

Methodology

In order to test my download accelerator I ran several different test that took into account file size, thread count, and network speed. To begin, I tested a *slow* connection with 1, 2, 3, 5, and 10 threads on files of 1MB, 10MB, and 100MB in size and then repeated the exact same experiment on a significantly *faster* network. For each number of threads and file size combination I repeated the test 10 times to get increased accuracy (i.e 1 thread and 1MB file x10 times, 2 threads and 1MB file x10 times, etc). I did this for all possible thread and file size combinations on both networks. (With the exception of a large file on a slow network since this was taking way too long)

Results (x-axis: number of threads, y-axis: time in seconds)

Small File (slow network)

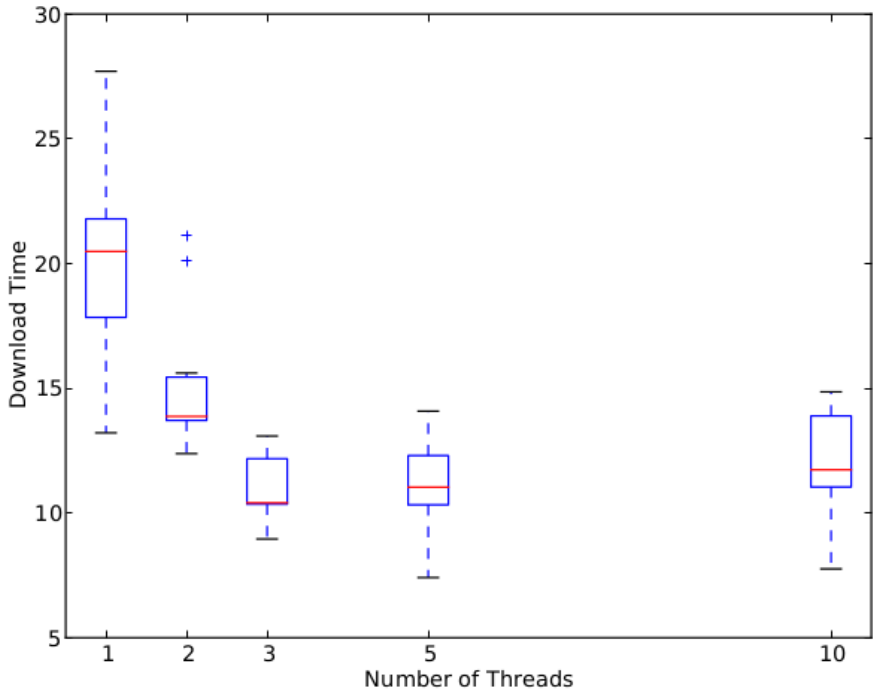

Figure 1.

Medium File (slow network)

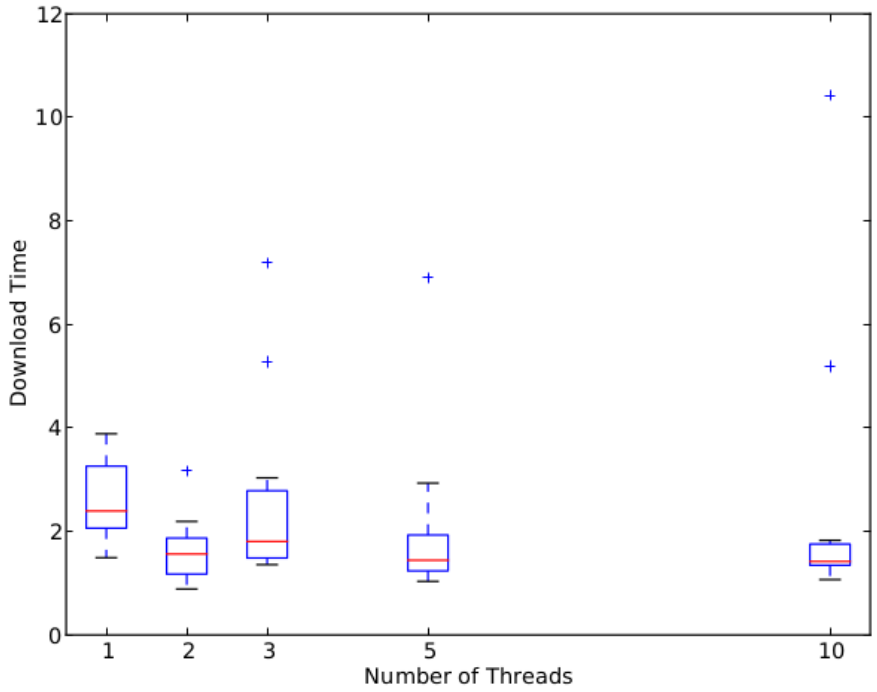

Figure 2.

Small File (fast network)

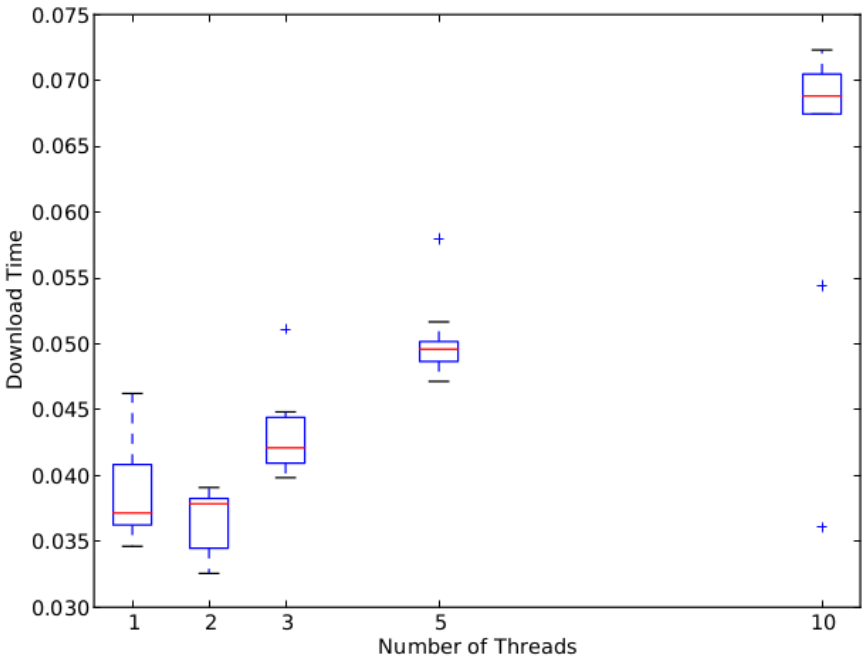

Figure 3.

Medium File (fast network)

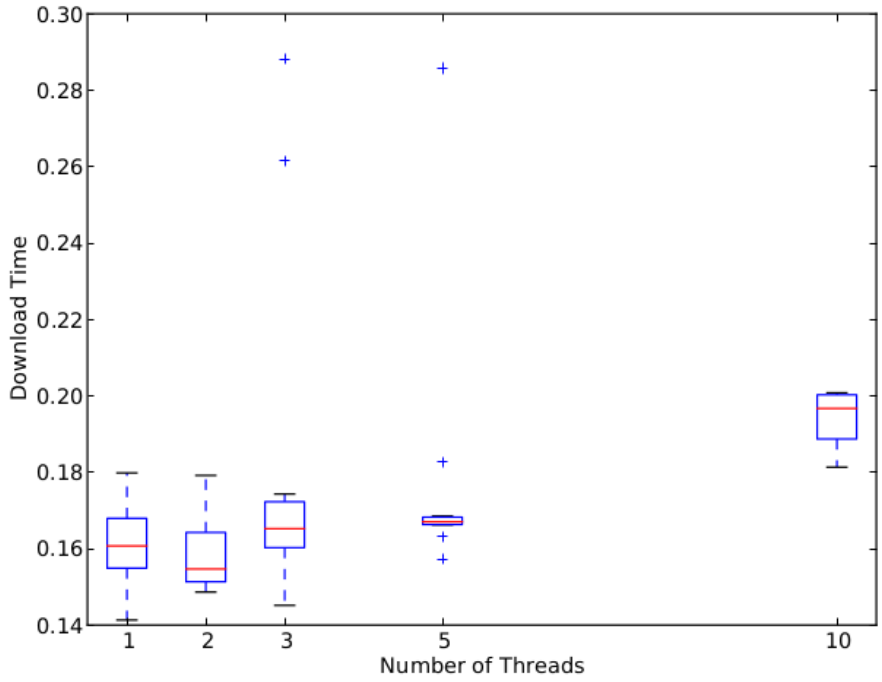

Figure 4.

Large File (fast network)

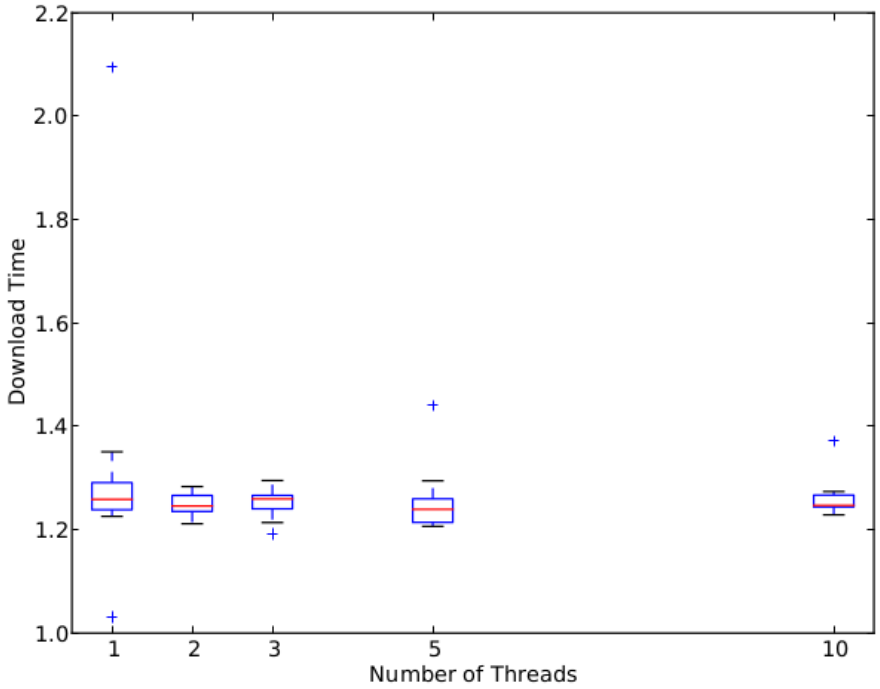

Figure 5.

Conclusion

In conclusion, there are many things that we can learn from this experiment's results. First, regardless of thread count or file size, download speeds are more significantly determined by your internet *connection*. As seen in **Figure 5**, downloading a large file (100MB) on a fast network with one thread was faster than a small file (1MB) with any amount of threads on a slow network (compare with **Figure 1**).

Furthermore, the number of threads can improve performance on download speeds, however, there is a tradeoff between the number of threads you use and the speed of the download. As seen in **Figure 1**, the optimal thread count was around 3 to 5 threads. Using 10 threads actually caused the download to decrease in speed. Also, in **Figure 3** the download took place so fast that creating additional threads actually caused the download to take longer. In this particular set of circumstances there is no added benefit (it actually worsens performance) using multiple threads.

Finally, as seen in **Figure 5** the number of threads does not significantly change the download speed. The network was fast enough that it made little difference if the download took place with 1 or 10 threads. As seen in the graph, all the downloads took around the same amount of time. As previously mentioned, there is no added benefit for use of multiple threads in this particular set of circumstances.

Thus, from this experiment I have learned that network speeds are very important for good download times, while threads can additionally be used to improve performance on slower networks or with larger files.