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CS 360

Lab 3 - Report

Methodology:
I ran my experiment on my 50 megabit comcast connection over wifi (802.11n) on a Saturday afternoon. I mirrored the 1MB, 10MB and 100MB files from the Census Bureau (*tl_2013_10_tract.zip*, *tl_2013_35005_edges.zip*, *tlgdb_2013_a_39_oh.gdb.zip*) to an Amazon Web Services S3 Bucket. Tests were then run 10 times for each file with the following thread count: 1, 2, 3, 5, 10. The results are outlined below.
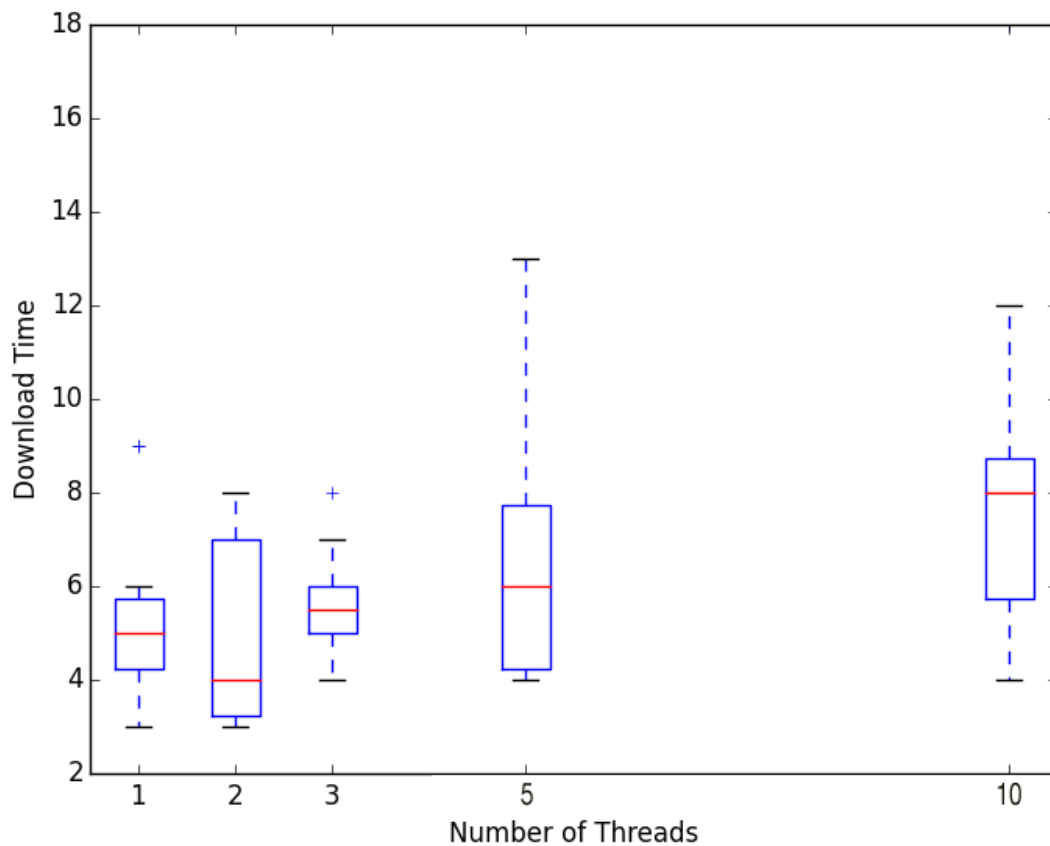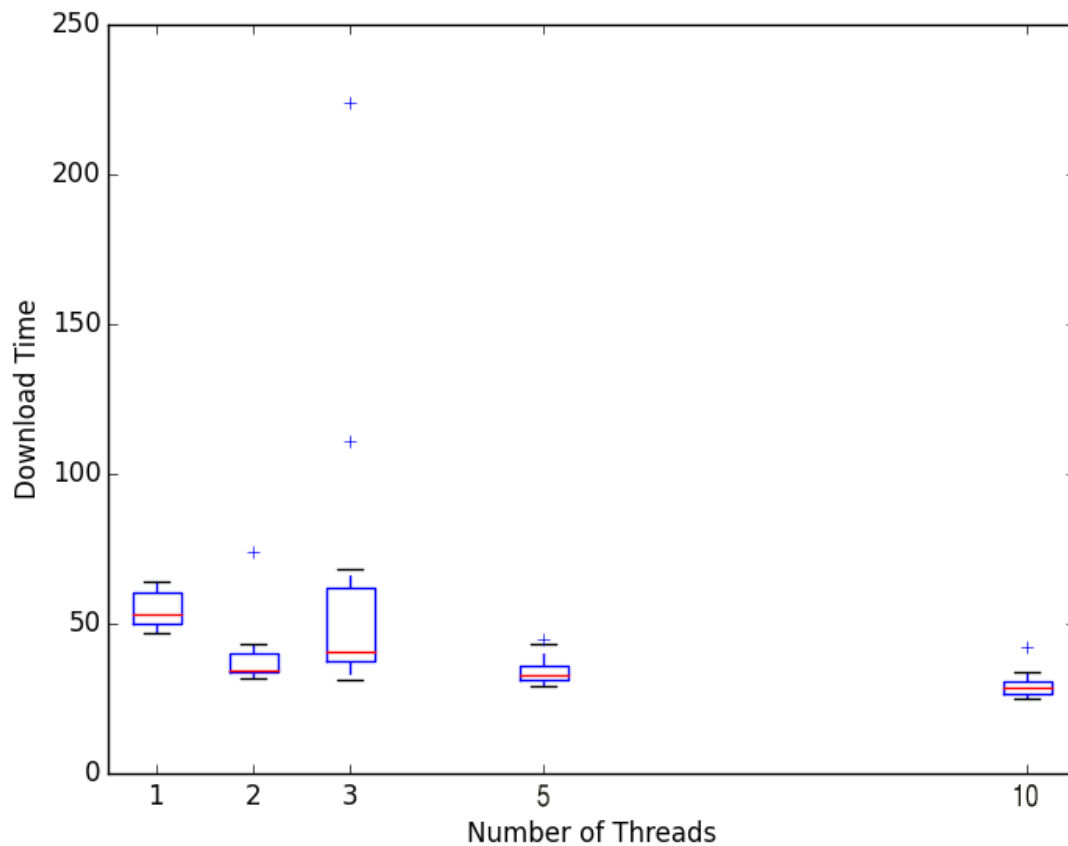
Results:
Small Test: 1MB
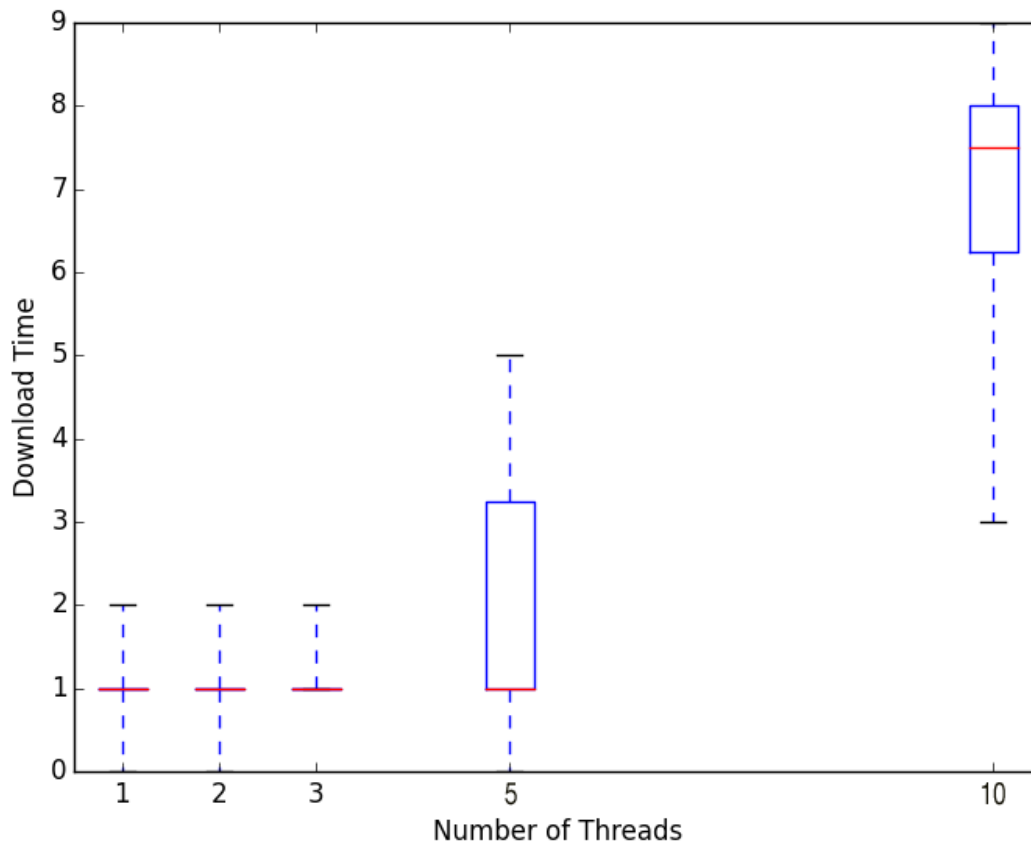
The graph above shows that the small 1MB file can be downloaded fairly quickly, averaging 500KB/s with a single thread. When the thread count exceeded 3, the speed began to weaken for certain tests, but still achieved a 2 second average. At 10 concurrent threads, the performance was drastically reduced, averaging 7.5 seconds to download the 1MB test file. On this connection, I recommend using at most 3 threads for 1MB files.

Medium Test: 10MB

The medium size tests results start to show the benefit of having a multithreaded downloader. The single thread test averages 5 seconds, while the 2 thread test reduces the average time by a full second! As the thread count increases on the quicker internet connection, the performance begins to decrease. Thread counts 3, 5, and 10 average slower test results. Based on these numbers, I recommend using 2 threads to concurrently download a 10MB file on this connection.

<u>Large Test: 100MB</u>

I think the results of the Large Test are fairly predictable. The single thread test averaged 2MB/s which is a very fast download speed from the S3 bucket. Finally, though, the 5 thread and 10 thread tests outperform the lower thread counts. The 5 thread test downloaded the 100MB file in under 35 seconds on average, achieving 3MB/s. Lastly, the 10 thread test was the fastest test on average, beating the 5 thread test by (about) 5 seconds. This means 10 threads is ideal for a 100MB file on this connection, achieving 3.33MB/s on average. Very impressive!

Conclusion:
If the test connection has more bandwidth, then it makes sense to use more threads for larger files. As shown in the Medium Test, attempting to use too many threads for smaller files can drastically weaken performance.