CS4513 Distributed System

Project2 Experiment Report

Submitted by:

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Design:

For the first part of this experiment, we are asked to measure the setup, authentication, and tear down time of the program we wrote for project 2. In order to do this, I measured the time elapsed using the gettimeofday() call in my client's code, and store the data into files. The program will create (if not exist) a file called setup.txt to store measured setup time, a file call authen.txt to store measured authentication time, and a file called teardown.txt to store measured tear down time. For separate experiment, these files should be removed before running the program, since they might contain the data from the previous experiment.

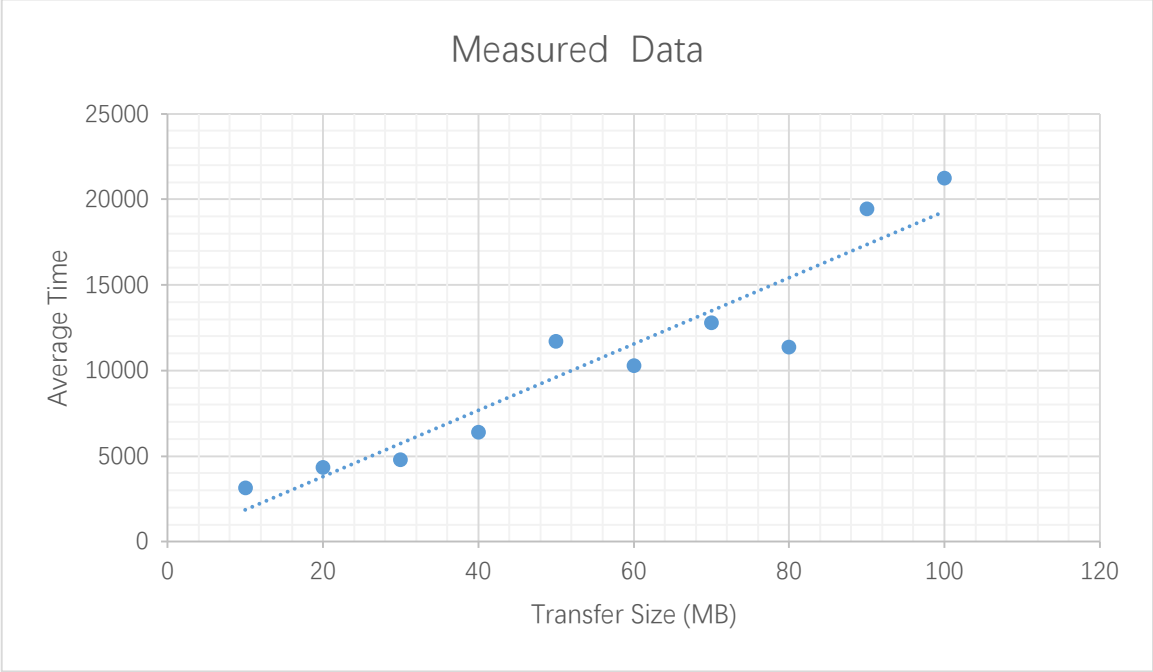
I also wrote a bash script that will ask AWS server to send files with sizes 10M, 20M, 30M, 40M, 50M, 60M, 70M, 80M, 90M and 100M separately to the client which runs on my own machine (MAC OS). Each file was sent 5 time in order to reduce errors caused by the fluctuation of the network conditions.

Results:

The measured results from the network performance part are shown in the table below:

File size	10M	20M	30M	40M	50M	60M	70M	80M	90M	100M
Time in mSecs	5439.954	3483.571	4323.636	4312.009	4872.253	16530.12	13358.477	6364.783	19873.753	47591.718
	3295.069	3148.872	2875.638	4177.758	20349.668	12109.195	6992.089	7296.456	29575.955	8416.091
	2419.065	6856.227	6101.609	3549.391	6955.619	11670.302	6790.752	20637.017	19264.57	20977.186
	2926.887	3333.212	3969.75	4954.591	4963.181	5062.823	23886.566	7356.715	7536.031	16827.969
	1695.206	4990.815	6641.44	14976.891	21376.44	6028.96	13043.552	15295.48	21081.55	12408.403
Mean	3155.236	4362.539	4782.415	6394.128	11703.432	10280.28	12814.287	11390.090	19466.372	21244.273
SD	1411.140	1574.666	1557.478	4823.799	8410.740	4733.740	6948.472	6305.501	7863.717	15462.841
Throughput (Mb/sec)	3.170	4.585	6.274	6.256	4.272	5.837	5.463	7.034	4.623	4.707

Then plot the transfer file size vs. average time, shown in the figure below:



The above figure shows a linear behavior of the network performance. With the increase of the transfer size, the average time spent also increases.

For the CPU and I/O performance part, the measured results using sysbench is shown in the table below

	AWS Server	**Local Machine**
CPU Total Time (sec)	29.8922	22.9425
I/O Performance (Mb/sec)	32.925	52.283

Analysis

According to the equation:

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Local_CPU + Local_File_I/O = n * Network + Remote_CPU + Remote_File_I/O
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And plug in the measured data, for example, when the server transfers a 10M file to the the client, the left side of the equation is 22.9425 + 52.283 = 75.2255, and the right side of the equation is 10 * 1.411 + 29.8922 + 32.925 = 76.9272. The right side and the left side are roughly equal. We verified on the other set of data. It shows that the measured data matches with the equation above. It also shows from the equation that when the remote CPU and I/O performance remains unchanged, the maximum network performance is limited by the local CPU and local file I/O capabilities.