Data Communication and Computer Networks (CS536)

Lab 4

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Problem 1

I have tested with file size $\sim 10MB$**, and** $\sim 100bytes$
Experiment for **window size=1** and within **same lab** machines,

Block Size (Bytes)	File Size (Bytes)	Completion Time (ms)	Throughput (Bytes/ms)
512	10045054	564.838013	17783.955078
512	100	2.3	43.47
1024	10045054	322.564	31141.27242
1024	100	1.8	55.5555
1471	10045054	301.2333	33346.4261
1471	100	1.545	64.7249

Experiment for **window size=1** and within **different lab** machines,

Block Size (Bytes)	File Size (Bytes)	Completion Time (ms)	Throughput (Bytes/ms)
512	10045054	612.123	16410.1888
512	100	3.444	29.0360046
1024	10045054	408.5634	24586.2796
1024	100	2.233	44.7828034
1471	10045054	350.4287	28665.0437
1471	100	1.72	58.1395

Compared to myftpc/myftps, when window size=1, the completion time increased by 120-350 ms for each case. This is because, even though the client sent ACK for each window, there are some file operations, we are performing - like storing the previous position in the file so that if ACK does not arrive in proper time duration, the file reading should happen from correct position. These computations leads to extra time consumption. Therefore, the completion time for rrunner is higher for windowsize=1 than myftps/myftpc.

For block size=1024, observations after increasing window size (For same lab machines) -

Window Size (Bytes)	File Size (Bytes)	Completion Time (ms)	Throughput (Bytes/ms)
5	10045054	280.34	35831.6829
5	100	1.22	81.9672
10	10045054	187.34	53619.3765
10	100	0.67	149.2537
50	10045054	135.6732	74038.6015
50	100	0.544	183.8235

If we keep on increasing the window size, here the client sends ACK for every window (no packet loss). We store the previous position in a file for starting of every window, therefore, if we increase the window size, the number of storing file positions decreases, therefore, reducing the completion time. For example, The window size=5 will have more file operations than window size=10. Therefore, completion time is lesser for windowsize 10 than 5.

Problem 2:

Authentication process increases the completion time 3-5 ms, throughput decreases by ~ 5 bytes/ms. But it could increase more, if large number of IPs were kept in acl.dat file. As server parses whole file in worst case, which increases the completion time, decreasing throughput by large amount. For my experiment, I only had 3 entries, therefore, the parsing happened in constant time, so, decrease in throughput was very less.

Bonus Problem :

For my experiment, throughput decreased by $1200 bytes/ms$ for block size=1024, window size=5. I obtained similar result for different window sizes and block size=1024. For each byte of data, encoding and decoding happened, therefore number of operations increases highly, therefore, throughput decreased.