

CS 333 Lab 4 Synchronization

Rajat Chaturvedi 140050027

Suman Swaroop 140050032

1)

Setup:

Number of clients: 20

Fixed File being sent

Sleep duration 0

Client Duration 120s

Queue size : Infinite

BackLog 8

Command : btmon

Output : 11.73 MiB/s network Bandwidth

Disk Read was not the bottleneck. Being read from the cache at speed reasonably greater than this. Even the disk read rate is approx 60 Mib/s.

Since our setup bottleneck is network bandwidth

At $n = 1$ itself we got the maximum throughput of 5.74.

On increasing n the throughput was fluctuating with an error of ± 0.1

Even if there is one worker it is picking the first request serving with max speed and then second and so on. Network is being utilized at its peak all the time (except at times of locking which is negligible.)

2)

Setup :

Number of client threads 1000.

Fixed File being sent.

Sleep duration 0

Client Duration 120s

Queue Size : 1

BackLog in listen = 8

Increasing Backlog resulted in less file being denied service.

In this case a large number of files request were denied service by the server.

Maximum throughput was never achieved from $n = 1$ to 10

Detailed analysis is present in plots folder with plots.

Disk Read was not the bottleneck. Being read from the cache at speed reasonably greater than this. Even the disk read rate is approx 60 Mib/s.

Observation:

1) Seeing the network traffic over the entire duration, it was found that the transmission was occurring at 11.73 MiB/s with small fluctuations. At the end even when transmission rate went to 0. Client ran for few more seconds.

Calculation of throughput:

Case 1: (Wrong Method)

If throughput is calculated as $(\text{number of files served}) / (\text{duration as given input (say 120)})$

Throughput coming out is very large. Greater than maximum possible. This shows that the client is running for a time duration greater than 120 and transmission is occurring even at that time. Running of client much greater than 120 is due to many connections pending in queue to be accepted or waiting for file to be received and hence while loop condition is checked much later.

Case 2:

if throughput is calculated as $(\text{number of files served} / \text{total time client runs})$

Throughput is coming less than the maximum possible. But as observed over the entire duration network is almost at its bottleneck except the last few seconds. Due to this last extra few seconds, throughput never appeared to reach maximum.