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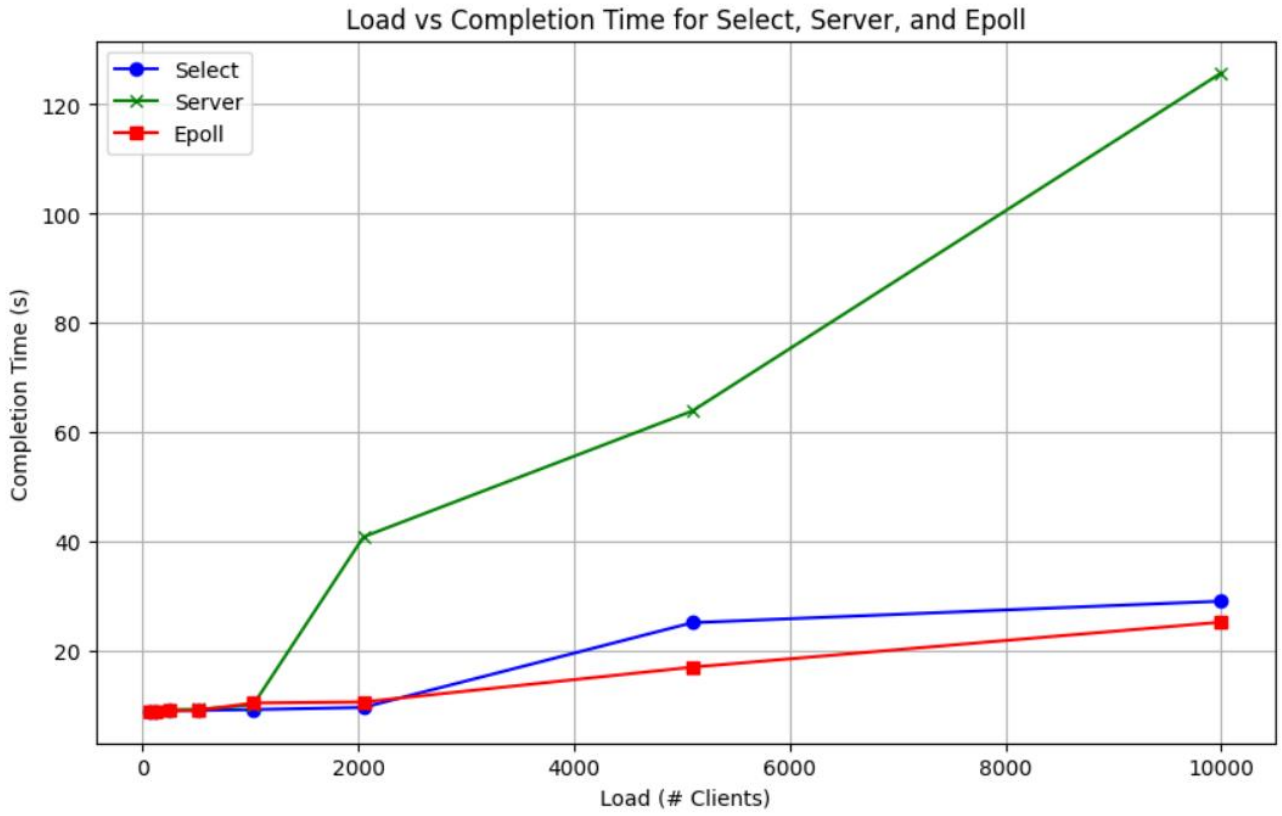
Report for question 4a:

Part 4: draw a plot of load (#clients) vs. completion time for the three different server implementations.



Conclusion on above plot:

(a) As we can see that for around 1000 clients almost all of three takes the same time. The difference we are getting as we increases the no of clients.

(b) After increasing clients number value , epoll is giving the minimum time out of all the three.

(c) As it is desired that epoll will give the min time out of three as it will work in edge triggered and will notify once when any fd is ready . But select is level triggered so it will give notification continuously until the entire action had not been taken . Also both will epoll and select will notify when the fd is ready , but for normal server it will block in read statement when fd is not ready and there is no data to read as it is bocking IO .

Ques 5:

I am running on WSL . I kept the Listen backlog queue as 5 so that if queue is full , requests have to wait. I had set the retry count to 1 by (sudo sysctl net.ipv4.tcp_syn_retries=1). In my system for kserver it is giving connection failed for 9 clients. For kselect it is giving connection failed error for 1000 clients . For kepoll , it is giving connection failed error for 900 clients. The value of this will depends on system to system.

Ques 6 :

I had tried running select and epoll for different clients and analysed the performance of epoll and select . After performing experiment it can be found that epoll works better than select .

Epoll

No of clients	Time
8	9.01
32	9.07
64	9.5
128	9.7
1024	10.1

2056	10.7
10000	21.1
25000	56.7
64000	169.78
100000	269.145

Select

8	9.02
32	9.07
64	9.78
128	10.1
1024	10.4
2056	12
10000	29.14
24000	58.815
64000	140.886
100000	300.1546

Throughput of select = 100000/300.1546 = 333.1648 clients /sec

Throughput of epoll = 100000/269.145 = 371.5469 clients /sec

In the select , internally all the fds in the working set for select will be copied into the kernel so it will copying the entire fd set . It will take significantly amount of time as it will be copying . Also select is level triggered so it will continuously give notification if we haven’t handled that notification while in the epoll it is edge triggered so it will give notification only once so in that case u have to handle when it will give notification so it will takes less time .