

# ECE568 HW4 Scalability Report

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## 1 Introduction

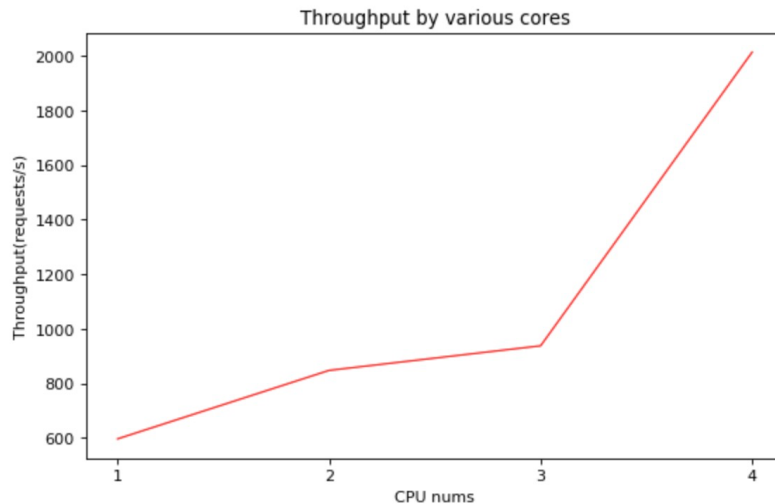
In homework 4, we designed a stock exchange system that servers for large number of buyers and sellers. We want to prove that the system has reasonable scalability.

## 2 Method

We have a client that sent 1000 requests for creating accounts with 10 processes concurrently in user side. In server side, 8 processes were busy processing incoming requests and responded with xml answers. We recorded time elapsed in this process from client side and calculated throughput by various numbers of CPU cores.

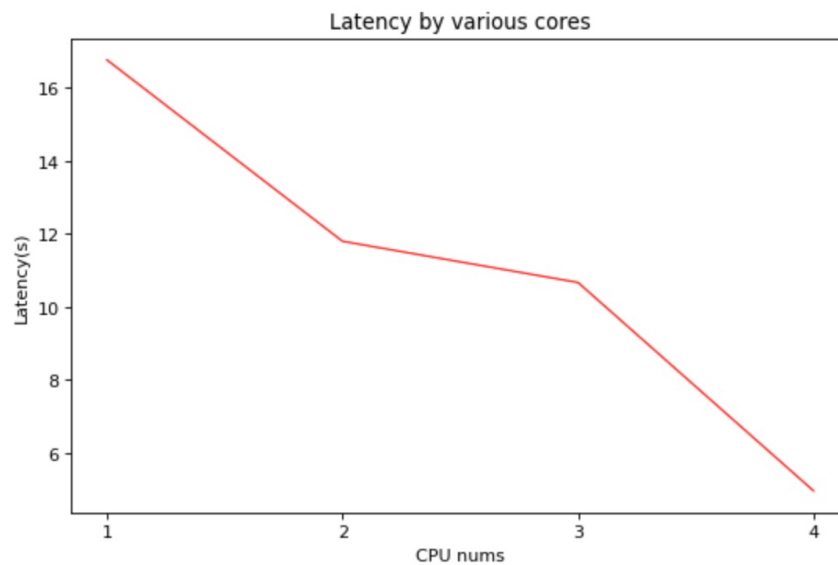
We Also recorded throughput verses number of requests to see where the bottleneck of stock server is. At this experiment, we increased number of competing requests and tried to figure out if throughput would reach a limit in the end.

## 3 Results

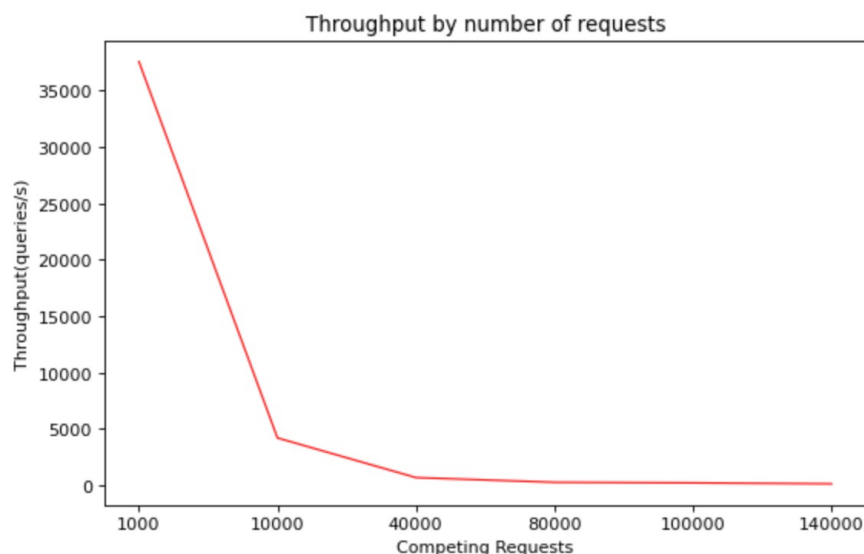


In the figure above, the x axis is labeled as “number of CPU cores” and y axis is labeled as “throughput.” When we increase CPU cores amount from 1 to 2, we find that throughput goes up from 600 to 800 requests/second. When CPU cores amount is increased from 2 to 3, there is a small grow in throughput. We think it is due to the location of CPU cores. Distance between CPU core #2 and #3 is relatively far so that additional overheads are needed to

communication between them. Finally, throughput reached the highest when the number of CPU cores is 4.



The Latency figure shows that as number of CPU cores goes up, latency falls. It follows the same trend as what throughput displays.



The figure shows how number of competing requests affect throughput in server side. We observe that throughput goes down as number of requests goes up. Throughput converges to 150 queries/second as number of requests goes to infinity. This is reasonable since the server will reach its bottleneck due to limitation of computational resources(Memory, CPU cores, TCP connections etc).

## **4 Summary**

In conclusion, throughput and latency change a lot given different computer resources; Throughput does reach a limit when number of requests goes up to infinity. From the figures we know that additional resources do increase throughput of stock exchange system, which means we can handle more user requests on server's side and drastically decrease responding time and server more users on user's side. To put it in another word, the system is scalable and able to deliver more computational power with increasing amount of resource.