

**CS553 Cloud Computing
Programming Assignment 1
Design**

submitted by:
Chiranjeevi Ankamredy
A20359837

The assignment is on benchmark different parts of a computer system.

1. CPU Benchmarking
2. Disk Benchmarking
3. Network Benchmarking

1.CPU Benchmarking:

The CPU benchmark code has been written in java. We have performed two operations i.e floating point operations and integer operations. And measured time for all operations in a loop, reduced the time taken to perform empty loop. Using Multi-threading and Concurrency, Performed the operations concurrently for 1 thread, 2 thread and 4 threads. Here, each thread calculates the FLOPS and IOPS one after the other. We perform all these operations on Amazon AWS cloud t2.micro instances.

We have Evaluated Extra Experiment. In this Experiment, run the benchmark on floating point and integer instructions and 4 threads for a 10-minute period for each one and too samples every second. Here, For every second, calculated all the flops and lops performed and recorded(Total-600 samples for each operation)

2.Disk BenchMarking

The Disk benchmark code has been written in java. We have performed two Programs.

- 1.Sequential Access
- 2.Random Access.

Sequential Access: In Sequential Access, we have performed both read and write operations and varying block sizes 1B, 1KB, 1MB. Using Multi-threading and Concurrency, Performed the operations concurrently for 1 thread, 2 threads' have written code in java and read sequential bytes of data from the Disk. I have measured both read and write time for Each Buffersize of data. Here, each thread calculates the Read time, Write time, Latency and throughput for Each block size. We perform all these operations on Amazon AWS cloud t2.micro instances.

Random Access: In random Access, we have performed both read and write operations and varying block sizes 1B, 1KB, 1MB. Using Multi-threading and Concurrency, Performed the operations concurrently for 1 thread, 2 threads. I have measured both read and write time for Each Buffer size of data. I have written code in java and read Random bytes of data from the Disk. . Here, each thread calculates the Read time, Write time, Latency and throughput for Each block size. We perform all these operations on Amazon AWS cloud t2.micro instances.

3. Network Benchmarking

The Network benchmark code has been written in java. We have performed on the both the protocols TCP and UDP.

1.TCP

2.UDP

TCP: This Benchmark is divided into two programs one for Peer Client and other for peer Server.

And its varying block sizes 1B, 1KB, 64KB. For each peer client and peer server, I have crated sockets, multithreading in java. Using Multi-threading and Concurrency, Performed the operations concurrently for 1 thread, 2 threads. Servers are expected to handle operations request from Different threads at a time. So, to ensure concurrency on the server side multi-threading is used. The server creates a new thread for each client connection. The communication is synchronized between the clients and servers. The client invokes a certain operation to request a file and waits for the server to respond to the message. Throughput and latency are calculated in this benchmark.

UDP: This Benchmark is divided into two programs one for UDP Client and other for UDP Server.

And its varying block sizes 1B, 1KB, 64KB. For each peer client and udp server, I have crated Datagramsockets, multithreading in java. Using Multi-threading and Concurrency, Performed the operations concurrently for 1 thread, 2 threads. Servers are expected to handle operations request from Different threads at a time. So, to ensure concurrency on the server side multi-threading is used. The server creates a new thread for each client connection. The communication is synchronized between the clients and servers. The client invokes a certain operation to request a file and waits for the server to respond to the message. Throughput and latency are calculated in this benchmark.