

Cloud Computing

Programming Assignment – 1

- In this experiment I have evaluated three Benchmarks of t2.micro amazon instance.
- I have performed benchmarking of Disk, Memory and Network.
- **Configuration:** T2.micro has 1Gig of primary memory and has 8 gig of storage.

Disk Benchmarking:

- Disk benchmarking is performed to evaluate disk reading speed and writing speed.
- This evaluation is performed using C program.
- fread() and fwrite() functions of C library are used to read and write data to a file.
- 100 MB's of data is been **Read and Write sequentially and randomly** to a file.
- Same operations are **performed using multiple threads** (2 Threads Concurrently).
- Same operations are performed by varying the read/write block size from 1 byte, 1Kilo byte to 1 Mega Byte.
 - 1 Byte of data is read/write 100000000 times.
 - 1 Kilo Byte of data is read/write 100000 times.
 - 1 Mega Byte of data is read/write 100 times.
- **Latency** is measured as time required to perform one operation. Latency of Disk with respect to read and write operation is **measured in milliseconds**.
- **Throughput** is measured as amount of data read or write on read in a second. Throughput of a read write operation on disk is **measured in MB's/second**.

Possible Extensions and Improvement in Disk Benchmarking.

- In this experiment only 100Mb of data has been read and write. We can increase the block size to get more accurate result.
- Many times there exist bad sector in disk, so it might increase the latency. It should be considered while evaluating.

Memory Benchmarking:

- Memory benchmarking is performed to evaluate memory's reading and writing speed.
- This evaluation is performed using C program.
- memcpy() function is used to read write bytes in memory.

- 100 MB's of data is been **Read** and **Write sequentially** and **randomly** into a memory.
- Same operations are **performed using multiple threads** (2 Threads Concurrently).
- Same operations are performed by varying the read/write memory block size from 1 byte, 1Kilo byte to 1 Mega Byte.
 - 1 Byte of data is read/write 100000000 times into a memory.
 - 1 Kilo Byte of data is read/write 100000 times into a memory.
 - 1 Mega Byte of data is read/write 100 times into a memory.
- **Latency** is measured as time required to perform one operation on memory. Latency of Disk with respect to read and write operation is **measured in milliseconds**.
- **Throughput** is measured as amount of data read or write on Memory in a second. Throughput of a read write operation on memory is **measured in MB's/second**.

Possible Extensions and Improvement in Memory Benchmarking.

- Effect of caching can be avoided to get more accurate result.

Network Benchmarking:

- In this experiment 1000 Data Packets are send and receive between two machines.
- TCP and UDP packets are send over the network.
- I have used Java to perform this benchmarking.
- Packet size are varied as 1 Byte, 1 Kilo Byte, 1 Mega Byte.
- Same experiment is repeated with two concurrent clients.
- Flow:
 - Start Server First and then start client.
 - Client will send TCP/ UDP different size packets (1Byte / 1KB/ 64KB) to server, where server will receive all these packets.
 - After receiving all packets Server will send response to client.
 - After receiving response from server, I have calculated total time taken for sending packets and getting response. Using this value I have calculated latency and throughput of the network.
- **Latency** is measured as time required to perform one operation over network. Latency of Network with respect to send or receive operation is **measured in milliseconds**.
- **Throughput** is measured as amount of data send over network in a second. Throughput of a Network is **measured in MB's/second**.

Possible Extensions and Improvement in Memory Benchmarking.

- We can test this networks speed over Wi-Fi network.
- Packet size and number of packets can be vary more to get more specific results.