**COEN 241 HW1**

**SYSTEM Virtualization vs OS Virtualization**

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1. **Configurations:**

**HOST OS- Intel Mac**

**CPU-2 cores 1.6GHZ**

**Memory-8gb**

**Docker-**

**Memory -3.84 GB**

**QEMU-**

**Memory – 2GB**

**QEMU:**

**Memory Size :** ~2GB

**Main Steps to enable a QEMU VM**:

1)Brew install QEMU

2) sudo qemu-img create ubuntu.img 10G -f qcow2

3) sudo qemu-system-x86\_64 -hda ubuntu.img -boot d -cdrom ./Downloads/ ubuntu-20.04.5-live-server-amd64.iso -m 2046 -boot strict=on

4) Set up the Ububtu server following the instructions and Reboot

5) Reboot using sudo qemu-system-x86\_64 -hda ubuntu.img -boot d -m 2046 -boot strict=on

6)sudo apt install sysbench

**DOCKER:**

Commands used to create my image:

On the Docker container

1. docker run --rm - -it - - entrypoint /bin/sh ubuntu:20.04
2. apt update
3. apt install sysbench

On my IntelMac Terminal:

1. docker commit dc465c4c0009 my\_image\_with\_sysbench

The final image ID for the above image was 7d48b764acb4 Text

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Proof of Experiment

Screenshots of QEMU and Docker working enviornments

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Experiment

1)CPU

a)

CPU Performance max prime=20,000 DockerText

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The test ran for 10 seconds for the first iteration on both Docker and QEMU.

QEMU Events/sec =>81.10

Docker Events/sec =>278.6

b) CPU Performance max prime=60,000 DockerText

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QEMU CPU MAX Prime =60,000Text

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The test ran for 10 seconds for the first iteration on both Docker and QEMU.

QEMU Events/sec =>17.4

Docker Events/sec =>59.05

c) CPU Performance max prime=60,000 QEMU and Max Time =20sText

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CPU Performance max prime=60,000 DOCKER and Max Time =20s Text

Description automatically generated The test ran for 20 seconds for the first iteration on both Docker and QEMU.

QEMU Events/sec =>20.18

Docker Events/sec =>59.11

**ANALYSIS**

1. **The VM has lesser events per second processed as compared to the Docker Container for the same set of prime numbers being calculated**
2. **As we run it for more primes the events/sec rate goes down however docker container still being significantly faster**
3. **We change the max time for which the tests were running to 20s however the docker container is still 3x faster than the QEMU VM**
4. FILEIO

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**Graphical user interface, text

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**ANALYSIS**

1. **Reducing the number of threads to half has a significant amount of change in the latency but the change in throughput is impacted less comparatively**
2. **Increasing the write data size has significant amount of change in the throughput however has comparatively lesser change in the latency**

**BASH script to automate the sysbench test being run for the experiment Graphical user interface, text

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