

CSEN-241 CLOUD COMPUTING

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HOMEWORK - I

Hardware Setup:

To carry out a range of tests on OS virtualization, the setups can be outlined as follows:

1	System	Personal PC
2	Processor	AMD Ryzen 5 5600X 6-Core Processor 3.70 GHz
3	Memory	16.0 GiB RAM
4	Disk Capacity	1TB
5	Operating System	Ubuntu 22.04.01 LTS

Installing QEMU:

QEMU stands as an open-source hypervisor of the second type, offering free access to its capabilities. It specializes in mimicking the operations of a machine, furnishing a diverse array of hardware and device configurations. This versatility enables it to support the execution of numerous guest operating systems.

Currently, our experiments are being conducted on a 64-bit Linux operating system, for which we have chosen to utilize the x86_64 architecture image designed for AMD.

We run these commands as root user to install QEMU

```
$ sudo apt-get update  
$ sudo apt-get upgrade  
$ sudo apt-get install qemu qemu-utils qemu-system-x86
```

Now we need to pull the image from Docker repository of Ubuntu 20.04 and spin-up the container.

Creating a QCOW2/RAW image file

Following the installation of QEMU, our next step is to generate an image for setting up a guest virtual machine, allocating it a storage space of 10GB. This will be done utilizing the QCOW2 format (QEMU Copy-on-Write) with the command:

```
$ sudo qemu-img create -f qcow2 ubuntu.img 10G
```

Installing QEMU on VM

To set up the Ubuntu guest operating system on the QEMU image we've prepared, the command to execute is as follows:

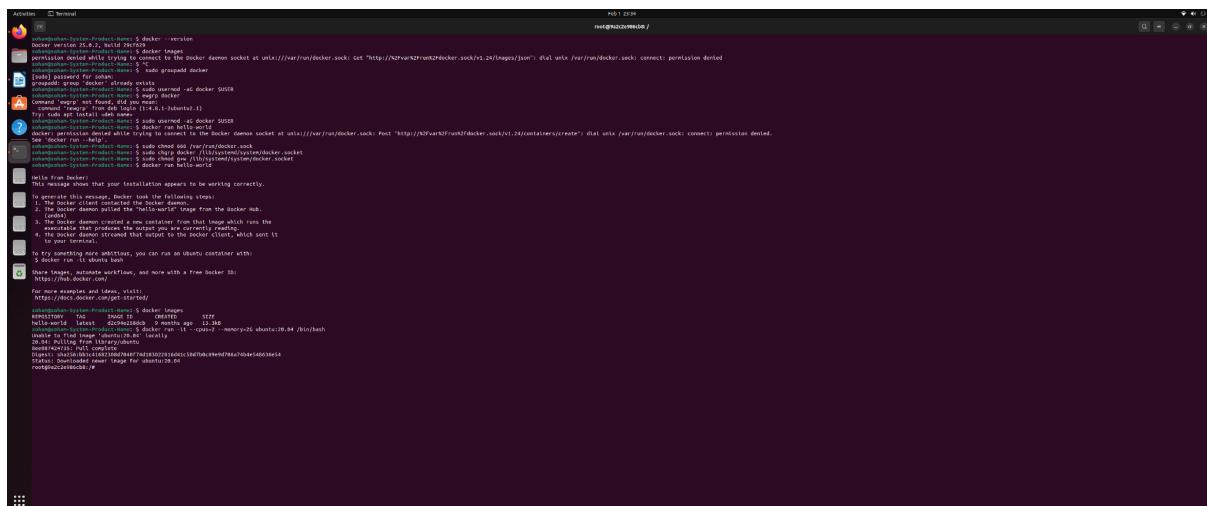
```
sudo qemu-system-x86_64 -accel kvm -cpu host -m 2G -smp 2 -boot d -cdrom ./Downloads/ubuntu-20.04.5-live-server-amd64.iso -hda ubuntu.img -netdev user,id=net0,hostfwd=tcp::5555-:22 -device e1000,netdev=net0 -device ahci,id=ahci -device usb-ehci -device usb-kbd -device usb-mouse -usb
```

For subsequent launches of this virtual machine, altering the boot sequence from the optical drive to the hard drive is necessary. This is achieved by modifying the boot flag from 'd' to 'c'. The revised command for starting the VM again is:

```
sudo qemu-system-x86_64 -accel kvm -cpu host -m 2G -smp 2 -boot c -cdrom ./Downloads/ubuntu-20.04.5-live-server-amd64.iso -hda ubuntu.img -netdev user,id=net0,hostfwd=tcp::5555-:22 -device e1000,netdev=net0 -device ahci,id=ahci -device usb-ehci -device usb-kbd -device usb-mouse -usb
```

The commands/arguments used with QEMU are:

1. accel: hardware acceleration
2. m: memory
3. smp: total cores allocated
4. hda: virtual hard drive
5. netdev: network device
6. device: I/O devices
7. nographic: run without GUI loader



Setting Up Docker

Docker represents a suite of Platform as a Service (PaaS) tools that leverage OS-level virtualization to distribute software in units known as containers. It serves as a comprehensive platform for creating, executing, and overseeing containers on both servers and cloud environments.

To get started with Docker, download the Docker Desktop application using the following guidance:

Docker Setup Instructions for Ubuntu

After installation, initiate the Docker desktop service through the terminal with:

```
systemctl --user start docker-desktop
```

An additional, optional step allows users to operate Docker without requiring root privileges. Guidance for this setup is available at the following resource:

Operating Docker Without Root Privileges

Following the setup, verify the installation by checking the versions of Docker Engine, Docker Compose, and Docker Desktop with the commands:

```
docker compose version  
docker --version  
docker version
```

After confirming Docker is operational, we proceed to verify the functionality of Docker containers. Following the execution of the command below, because the "hello-world" image was absent locally, it automatically fetched the most recent version of the image from the Docker Repository to execute it.

```
docker images  
docker run hello-world  
docker images
```

Initiating a Container

Next, we are to retrieve the Ubuntu 20.04 image from the Docker repository and launch a container with it. The command to accomplish this is:

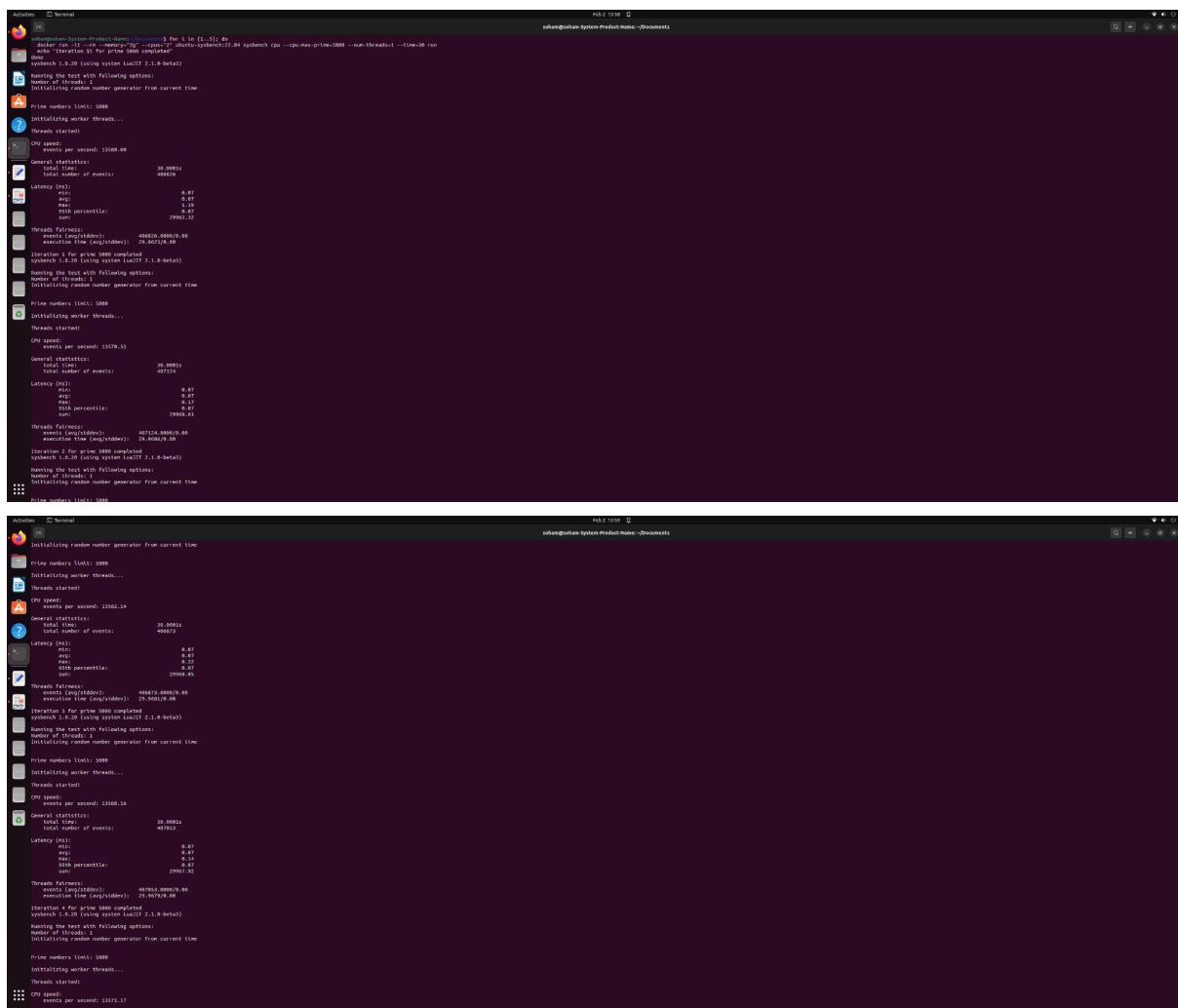
```
docker run -it --cpus=2 --memory=2G ubuntu:20.04 /bin/bash
```

TEST CONDITIONS

Condition 1: 2GB RAM and 2 Cores on Docker

Test Case 1: 5000

```
for i in {1..5}; do
    docker run -it --rm --memory="2g" --cpus="2" ubuntu-sysbench:22.04
    sysbench cpu --cpu-max-prime=5000 --num-threads=1 --time=30 run
    echo "Iteration $i for prime 5000 completed"
done
```



The terminal window displays the following output:

```
sysbench@sysbench:~$ for i in {1..5}; do
  docker run -it --rm --memory="2g" --cpus="2" ubuntu-sysbench:22.04 sysbench cpu --cpu-max-prime=5000 --num-threads=1 --time=30 run
  echo "Iteration $i for prime 5000 completed"
done
```

Iteration 1 for prime 5000 completed

Iteration 2 for prime 5000 completed

Iteration 3 for prime 5000 completed

Iteration 4 for prime 5000 completed

Iteration 5 for prime 5000 completed

```

sysbench 1.0.2 (using system Lmbench 2.1.0-beta)
Running the test with following options:
    threads: 1
    iterations: 5
    init_time: 0
    time: 30
    prime numbers: 5000
    threads started...
CPU speed:
events per second: 13568.18
General statistics:
    total time: 28.00000
    total number of events: 407144
Latency (ms):
    50th percentile: 0.87
    avg: 0.87
    max: 0.91
    95th percentile: 0.87
    99th percentile: 29987.00
Threads fairness:
events (avg/stddev): 407144.0000/0.00
execution time (avg/stddev): 28.0000/0.00
Iteration 1 for prime 5000 completed
sysbench 1.0.2 (using system Lmbench 2.1.0-beta)
Running the test with following options:
    threads: 1
    iterations: 5
    init_time: 0
    time: 30
    prime numbers: 5000
    threads started...
CPU speed:
events per second: 13568.17
General statistics:
    total time: 28.00000
    total number of events: 407144
Latency (ms):
    50th percentile: 0.87
    avg: 0.87
    max: 0.91
    95th percentile: 0.87
    99th percentile: 29987.30
Threads fairness:
events (avg/stddev): 407144.0000/0.00
execution time (avg/stddev): 28.0000/0.00
Iteration 2 for prime 5000 completed
sysbench 1.0.2 (using system Lmbench 2.1.0-beta)
Running the test with following options:
    threads: 1
    iterations: 5
    init_time: 0
    time: 30
    prime numbers: 5000
    threads started...
CPU speed:
events per second: 13562.14
General statistics:
    total time: 28.00000
    total number of events: 407144
Latency (ms):
    50th percentile: 0.87
    avg: 0.87
    max: 0.91
    95th percentile: 0.87
    99th percentile: 29987.30
Threads fairness:
events (avg/stddev): 407144.0000/0.00
execution time (avg/stddev): 28.0000/0.00
Iteration 3 for prime 5000 completed
sysbench 1.0.2 (using system Lmbench 2.1.0-beta)
Running the test with following options:
    threads: 1
    iterations: 5
    init_time: 0
    time: 30
    prime numbers: 5000
    threads started...
CPU speed:
events per second: 13568.16
General statistics:
    total time: 28.00000
    total number of events: 407144
Latency (ms):
    50th percentile: 0.87
    avg: 0.87
    max: 0.91
    95th percentile: 0.87
    99th percentile: 29987.30
Threads fairness:
events (avg/stddev): 407144.0000/0.00
execution time (avg/stddev): 28.0000/0.00
Iteration 4 for prime 5000 completed
sysbench 1.0.2 (using system Lmbench 2.1.0-beta)
Running the test with following options:
    threads: 1
    iterations: 5
    init_time: 0
    time: 30
    prime numbers: 5000
    threads started...
CPU speed:
events per second: 13571.17
General statistics:
    total time: 28.00000
    total number of events: 407144
Latency (ms):
    50th percentile: 0.87
    avg: 0.87
    max: 0.91
    95th percentile: 0.87
    99th percentile: 29987.30
Threads fairness:
events (avg/stddev): 407144.0000/0.00
execution time (avg/stddev): 28.0000/0.00
Iteration 5 for prime 5000 completed

```

Iteration Number	Number of Events per Second
1	13560
2	13570.51
3	13562.14
4	13568.16
5	13571.17

Minimum:	13560
Maxmimum:	13571.17
Average:	13566.396
S. Deviation	5.046041022

Test Case 2: 50000

```

for i in {1..5}; do
    docker run -it --rm --memory="2g" --cpus="2" ubuntu-sysbench:22.04
    sysbench cpu --cpu-max-prime=50000 --num-threads=1 --time=30 run
    echo "Iteration $i for prime 50000 completed"
done

```

Iteration Number	Number of Events per Second
1	600.69

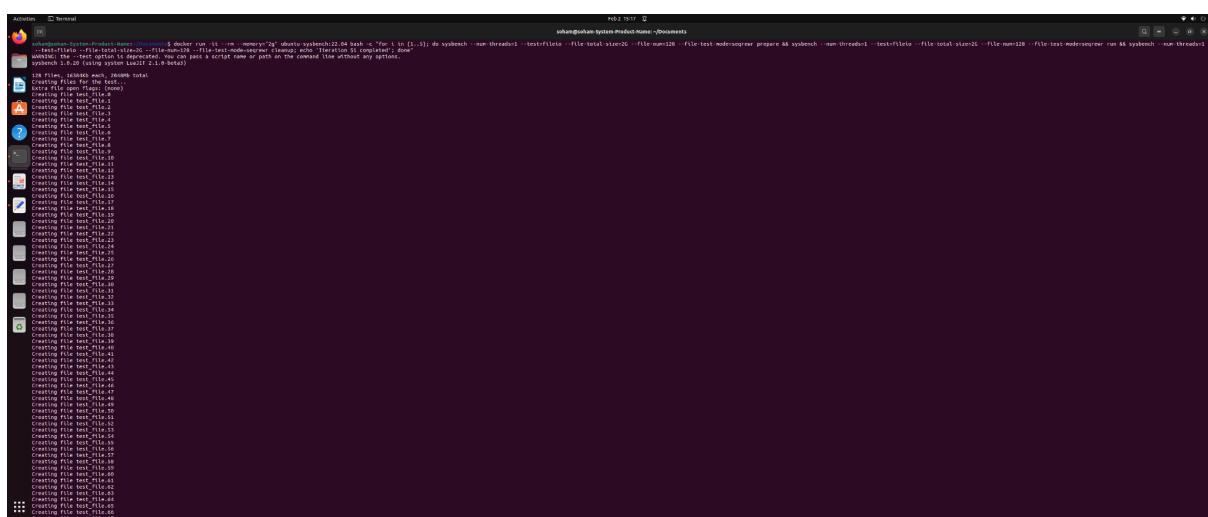
2	600.81
3	600.83
4	600.84
5	600.48

Minimum:	600.48
Maxmimum:	600.84
Average:	600.73
S. Deviation	0.1521512405

I/O Testing

128 files upto 2GB (Sequential Read/Write)

```
docker run -it --rm --memory="2g" ubuntu-sysbench:22.04 bash -c "for i in {1..5}; do sysbench --num-threads=1 --test=fileio --file-total-size=2G --file-num=128 --file-test-mode=seqrewr prepare && sysbench --num-threads=1 --test=fileio --file-total-size=2G --file-num=128 --file-test-mode=seqrewr run && sysbench --num-threads=1 --test=fileio --file-total-size=2G --file-num=128 --file-test-mode=seqrewr cleanup; echo 'Iteration $i completed'; done"
```



Serial Run Iterations	Results	
1	reads/s	0
	writes/sec	9241.10
	fsyncs/s	11837.70
2	reads/s	0
	writes/sec	9351.13
	fsyncs/s	11976.24
3	reads/s	0
	writes/sec	9340.66
	fsyncs/s	11964.74
4	reads/s	0
	writes/sec	9350.65
	fsyncs/s	11974.02
5	reads/s	0
	writes/sec	9350.65
	fsyncs/s	11966.95

Minimum read/s	0
Minimum write/s	9241.1
Minimum fsync/s	11837.7
Maximum read/s	0
Maximum write/s	9351.13
Maximum fsync/s	11976.24
Average read/s	0
Average write/s	9326.838
Average fsync/s	11943.93
S.Deviation read/s	0
S.Deviation write/s	48.13049002
S.Deviation fsync/s	59.57586256

Case 2: Combined Random

```
docker run -it --rm --memory="2g" ubuntu-sysbench:22.04 bash -c "for i in {1..5}; do sysbench --num-threads=1 --test=fileio --file-total-size=2G --file-num=128 --file-test-mode=rndrw prepare && sysbench --num-threads=1 --test=fileio --file-total-size=2G --file-num=128 --file-test-mode=rndrw run && sysbench --num-threads=1 --test=fileio --file-total-size=2G --file-num=128 --file-test-mode=rndrw cleanup; echo 'Iteration $i completed'; done"
```

```
zhang@zhang-System-Product-Name:~/Documents
```

```
zhang@zhang-System-Product-Name:~/Documents$ docker run -it -r --memory="2g" ubuntu:sybench:22.04 bash < ./run-test.sh
```

```
WARNING: The --test option is deprecated. You can pass a script name or path on the command line instead of my option.
```

```
./run-test.sh: line 1: syntax error near unexpected token `done'
```

```
128 files, 128k each, total:
```

```
Creating file test_file_0
```

```
Creating file test_file_1
```

```
Creating file test_file_2
```

```
Creating file test_file_3
```

```
Creating file test_file_4
```

```
Creating file test_file_5
```

```
Creating file test_file_6
```

```
Creating file test_file_7
```

```
Creating file test_file_8
```

```
Creating file test_file_9
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```
Creating file test_file_10
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Creating file test_file_11
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Creating file test_file_12
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Creating file test_file_13
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Creating file test_file_14
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Creating file test_file_15
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Creating file test_file_16
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Creating file test_file_17
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Creating file test_file_18
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Creating file test_file_97
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Creating file test_file_98
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```
Creating file test_file_99
```

Serial Run Iterations	Results	
1	reads/s	1798.81

	writes/sec	1199.21
	fsyncs/s	3850.25
2	reads/s	1788.55
	writes/sec	1192.36
	fsyncs/s	3815.97
3	reads/s	1780.68
	writes/sec	1187.12
	fsyncs/s	3811.18
4	reads/s	1796.00
	writes/sec	1197.33
	fsyncs/s	3835.45
5	reads/s	1796.80
	writes/sec	1197.33
	fsyncs/s	3840.06

Minimum read/s	1780.68
Minimum write/s	1187.12
Minimum fsync/s	3811.18
Maximum read/s	1798.81
Maximum write/s	1199.21
Maximum fsync/s	3850.25
Average read/s	1792.168
Average write/s	1194.67
Average fsync/s	3830.582
S.Deviation read/s	7.50532944
S.Deviation write/s	4.927002131

S.Deviation fsync/s	16.50990824
------------------------	-------------

Memory Test

Upto 1GB

```
docker run -it --rm --memory="2g" --cpus="2" ubuntu-sysbench:22.04 bash  
-c "for i in {1..5}; do sysbench memory --memory-block-size=1G run;  
done"
```

```

Running the test with following options:
Number of threads: 100
initializing random number generator from current time

Running memory speed test with the following options:
block size: 655360B
operation: read/write
latency: global
size: global
number of threads...

Threads started!
Total operations: 100 ( 13.44 per second)
40960.00 MB transferred (13848.76 MB/sec)

General statistics:
total time: 7.97156
total number of events: 100
Latency (ns):
min: 79.22
avg: 79.43
90th percentile: 99.45
95th percentile: 9979.60
99th percentile: 9979.60

Threads fairness:
events (avg/stddev): 100.0000/0.00
latency (avg/stddev): 79.43/0.00
latency (global): 79.43
latency (min): 79.22
latency (max): 99.45
latency (95th percentile): 9979.60

Initialization worker threads...
Threads started!
Total operations: 100 ( 13.46 per second)
40960.00 MB transferred (13798.91 MB/sec)

General statistics:
total number of events: 100
Latency (ns):
min: 79.49
avg: 80.46
90th percentile: 80.45
95th percentile: 80.45
99th percentile: 8003.79

Threads fairness:
events (avg/stddev): 100.0000/0.00
latency (avg/stddev): 80.4653/0.00
latency (global): 80.4653
latency (min): 79.49
latency (max): 80.45
latency (95th percentile): 80.45
latency (99th percentile): 8003.79

Initialization worker threads...
Threads started!
Total operations: 100 ( 13.46 per second)
40960.00 MB transferred (13798.91 MB/sec)

General statistics:
total number of events: 100
Latency (ns):
min: 79.49
avg: 80.46
90th percentile: 80.45
95th percentile: 80.45
99th percentile: 8003.79

Threads fairness:
events (avg/stddev): 100.0000/0.00
latency (avg/stddev): 80.4653/0.00
latency (global): 80.4653
latency (min): 79.49
latency (max): 80.45
latency (95th percentile): 80.45
latency (99th percentile): 8003.79

```

Iteration Number	Number of Events	Total Time
1	100	8.4650
2	100	7.9983
3	100	8.0156
4	100	10
5	100	10.0141

Minimum	9.985919853
Maximum	12.50265681
Average	11.35551964
S. Deviation	1.274118407

Upto 1 MB:

```

docker run -it --rm --memory="2g" --cpus="2" ubuntu-sysbench:22.04 bash
-c "for i in {1..5}; do sysbench memory --memory-block-size=1M run;
done"

```

```
Administrator:~System-Product-Homes/documents$ docker run li -r -m memory=2g --cpus=2 sborisov/sybench:2.0.4 bash -c "for i in {1..5}; do sysbench memory --memory-block-size=1M run; done"
```

```
sysbench 1.0.20 (using system LRU) 2.1.0.0-beta
```

```
Running the test with following options:
```

```
Handling the random number generator from current time
```

```
Initializing worker threads...
```

```
Threads started:
```

Total operations:	100000	(37500.00 per second)
Total size:	10240000 B	Mb transferred (37600.00 MB/sec)

```
General statistics:
```

Total time:	2.79000
total number of events:	100000

```
Latency (ms):
```

min:	0.00
avg:	0.42
max:	0.80
95th percentile:	0.40
sum:	27900.00

```
Threads fairness:
```

events (avg/stddev):	100000.0000/0.00
execution time (avg/stddev):	2.76972/0.00

```
sysbench 1.0.20 (using system LRU) 2.1.0.0-beta
```

```
Running the test with following options:
```

```
Handling the random number generator from current time
```

```
Initializing worker threads...
```

```
Threads started:
```

Total operations:	100000	(37500.00 per second)
Total size:	10240000 B	Mb transferred (37600.00 MB/sec)

```
General statistics:
```

Total time:	2.77000
total number of events:	100000

```
Latency (ms):
```

min:	0.00
avg:	0.40
max:	0.80
95th percentile:	0.40
sum:	27700.00

```
Threads fairness:
```

events (avg/stddev):	100000.0000/0.00
execution time (avg/stddev):	2.76969/0.00

Iteration Number	Number of Events	Total Time
1	62363	10
2	67161	10.001
3	68340	10.0010

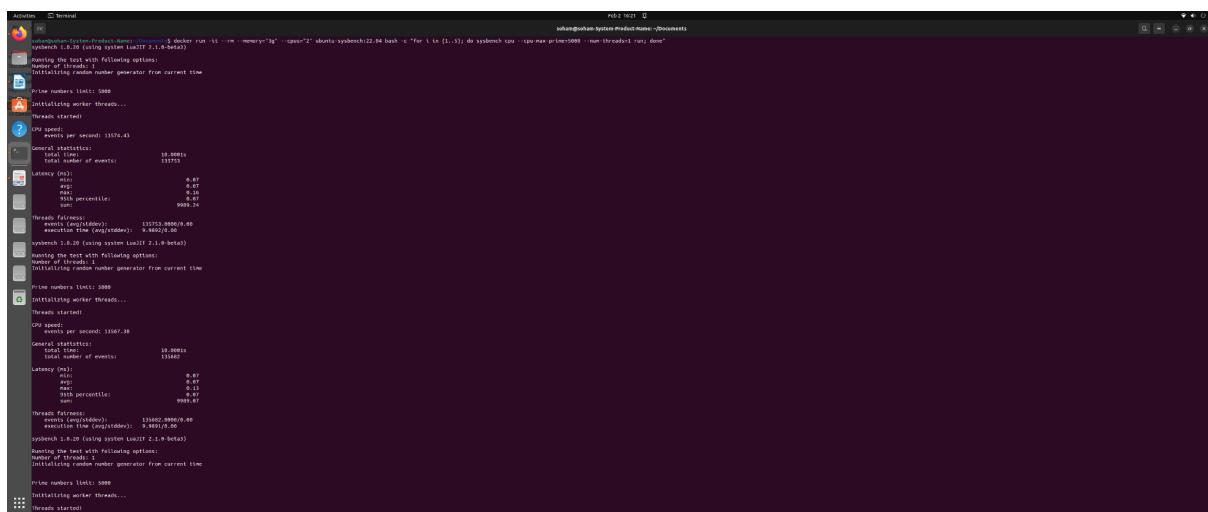
4	68336	10.0010
5	66863	10.0010

Minimum	6236.3
Maximum	6833.316668
Average	6660.718654
S. Deviation	246.5700953

Condition 2: 3GB RAM and 2 Cores on Docker

Test Case 1: max-prime = 5000

```
docker run -it --rm --memory="3g" --cpus="2" ubuntu-sysbench:22.04 bash
-c "for i in {1..5}; do sysbench cpu --cpu-max-prime=5000
--num-threads=1 run; done"
```



```

Administrator Terminal P@P: ~ 10:22
sohan@sohan-System Product Name: ~/Documents

Benchmark worker threads...
Threads started!
CPU speed: events per second: 13570.51
General statistics:
  total time: 10.0000s
  total number of events: 135705
Latency (ms):
  min: 0.47
  avg: 0.47
  max: 0.50
  50th percentile: 0.47
  99th percentile: 0.49
  sum: 9999.35
Bench Fairness:
  events (avg/stddev): 135713.0000/0.00
  execution time (avg/stddev): 9.9802/0.00
  sysbench 1.0.8 (using system iomegaT 2.1.0-beta)
  running the test with following options:
    number of threads: 1
    initializing random number generator from current time
  prime numbers limit: 5000
  initializing worker threads...
  Threads started!
CPU speed: events per second: 13565.06
General statistics:
  total time: 10.0000s
  total number of events: 135650
Latency (ms):
  min: 0.47
  avg: 0.47
  max: 0.50
  50th percentile: 0.47
  99th percentile: 0.49
  sum: 9999.36
Bench Fairness:
  events (avg/stddev): 135650.0000/0.00
  execution time (avg/stddev): 9.9802/0.00
  sysbench 1.0.8 (using system iomegaT 2.1.0-beta)
  running the test with following options:
    number of threads: 1
    initializing random number generator from current time
  prime numbers limit: 5000
  initializing worker threads...
  Threads started!
CPU speed: events per second: 13560.27
General statistics:
  total time: 10.0000s
  total number of events: 135602
Latency (ms):
  min: 0.47
  avg: 0.47
  max: 0.50
  50th percentile: 0.47
  99th percentile: 0.49
  sum: 9999.37
Bench Fairness:
  events (avg/stddev): 135611.0000/0.00
  execution time (avg/stddev): 9.9802/0.00
  sysbench 1.0.8 (using system iomegaT 2.1.0-beta)
  running the test with following options:
    number of threads: 1
    initializing random number generator from current time
  prime numbers limit: 5000
  initializing worker threads...
  Threads started!
CPU speed: events per second: 13560.06
General statistics:
  total time: 10.0000s
  total number of events: 135600
Latency (ms):
  min: 0.47
  avg: 0.47
  max: 0.50
  50th percentile: 0.47
  99th percentile: 0.49
  sum: 9999.40
Bench Fairness:
  events (avg/stddev): 135600.0000/0.00
  execution time (avg/stddev): 9.9802/0.00
  sysbench 1.0.8 (using system iomegaT 2.1.0-beta)
  running the test with following options:
    number of threads: 1
    initializing random number generator from current time
  prime numbers limit: 5000
  initializing worker threads...
  Threads started!
CPU speed: events per second: 13560.27
General statistics:
  total time: 10.0000s
  total number of events: 135602
Latency (ms):
  min: 0.47
  avg: 0.47
  max: 0.50
  50th percentile: 0.47
  99th percentile: 0.49
  sum: 9999.41
Bench Fairness:
  events (avg/stddev): 135611.0000/0.00
  execution time (avg/stddev): 9.9802/0.00
  sysbench 1.0.8 (using system iomegaT 2.1.0-beta)
  running the test with following options:
    number of threads: 1
    initializing random number generator from current time
  prime numbers limit: 5000
  initializing worker threads...
  Threads started!
Administrator Terminal P@P: ~ 10:22
sohan@sohan-System Product Name: ~/Documents
```

Iteration Number	Number of Events per Second
1	13574.43
2	13567.38
3	13570.51
4	13565.06
5	13566.27

Minimum:	13565.06
Maxmimum:	13574.43
Average:	13568.73
S. Deviation	3.774963576

Case 2: max-prime = 50,000

```
docker run -it --rm --memory="3g" --cpus="2" ubuntu-sysbench:22.04 bash
-c "for i in {1..5}; do sysbench cpu --cpu-max-prime=50000
--num-threads=1 run; done"
```

```

Activities Terminal P0 16:27
sohan@sohan:~$ docker run -it --rm --memory="3g" --cpus="2" ubuntu-sysbench:22.04 bash
-c "for i in {1..5}; do sysbench cpu --cpu-max-prime=50000
--num-threads=1 run; done"
sysbench 1.0.20 (using system Linux 2.1.0-beta)
Running the test with following options:
    threads: 1
    time: 10s
    init_time: 0s
    prime numbers limit: 50000
    initializing worker threads...
    threads started!
    CPU speed: 600.48 events per second
    General statistics:
        total number of events: 600000
    Latency (ms):
        min: 1.44
        avg: 1.46
        max: 1.49
        99th percentile: 1.47
        sum: 999.46
    Thread fairness:
        thread 0 (sysbench): 6000.0000/0.00
        execution time (AnyThread): 9.9999/0.00
sysbench 1.0.20 (using system Linux 2.1.0-beta)
Running the test with following options:
    threads: 1
    time: 10s
    init_time: 0s
    prime numbers limit: 50000
    initializing worker threads...
    threads started!
    CPU speed: 600.49 events per second
    General statistics:
        total number of events: 600000
    Latency (ms):
        min: 1.44
        avg: 1.46
        max: 1.49
        99th percentile: 1.47
        sum: 999.46
    Thread fairness:
        thread 0 (sysbench): 6000.0000/0.00
        execution time (AnyThread): 9.9997/0.00
sysbench 1.0.20 (using system Linux 2.1.0-beta)
Running the test with following options:
    threads: 1
    time: 10s
    init_time: 0s
    prime numbers limit: 50000
    initializing worker threads...
    threads started!
    CPU speed: 600.49 events per second
    General statistics:
        total number of events: 600000
    Latency (ms):
        min: 1.44
        avg: 1.46
        max: 1.49
        99th percentile: 1.47
        sum: 999.46
    Thread fairness:
        thread 0 (sysbench): 6000.0000/0.00
        execution time (AnyThread): 9.9977/0.00
sysbench 1.0.20 (using system Linux 2.1.0-beta)
Running the test with following options:
    threads: 1
    time: 10s
    init_time: 0s
    prime numbers limit: 50000
    initializing worker threads...
    threads started!
    CPU speed: 599.36 events per second
    General statistics:
        total number of events: 600000
    Latency (ms):

```

```

Iteration 1:
latency (ms):
    min: 1.44
    avg: 1.46
    std: 1.47
    95th percentile: 1.47
    max: 999.19
Threads fairness:
    min (events/sec): 599.36
    execution time (avg/stddev): 9.99579/0.00
sysbench 1.0.20 (using system libcurl 7.15.8-beta)
Running the test with following options:
--test=fileio --file-total-size=2G --file-num=128 --file-test-mode=seqrewr
initializing random number generator from current time
Prime numbers limit: 50000
initializing worker threads...
Threads started!
CPU speed: 600.68 events per second: 599.36
General statistics:
    total number of events: 5994
Latency (ms):
    min: 1.44
    avg: 1.46
    std: 1.47
    95th percentile: 1.47
    max: 999.19
Threads fairness:
    min (events/sec): 599.36
    execution time (avg/stddev): 9.99579/0.00
sysbench 1.0.20 (using system libcurl 7.15.8-beta)
Running the test with following options:
--test=fileio --file-total-size=2G --file-num=128 --file-test-mode=seqrewr
initializing random number generator from current time
Prime numbers limit: 50000
initializing worker threads...
Threads started!
CPU speed: 600.50 events per second: 599.36
General statistics:
    total number of events: 5994
Latency (ms):
    min: 1.44
    avg: 1.46
    std: 1.47
    95th percentile: 1.47
    max: 999.19
Threads fairness:
    min (events/sec): 599.36
    execution time (avg/stddev): 9.99579/0.00
sysbench 1.0.20 (using system libcurl 7.15.8-beta)
Running the test with following options:
--test=fileio --file-total-size=2G --file-num=128 --file-test-mode=seqrewr
initializing random number generator from current time
Prime numbers limit: 50000
initializing worker threads...
Threads started!
CPU speed: 600.39 events per second: 599.36
General statistics:
    total number of events: 5994
Latency (ms):
    min: 1.44
    avg: 1.46
    std: 1.47
    95th percentile: 1.47
    max: 999.19
Threads fairness:
    min (events/sec): 599.36
    execution time (avg/stddev): 9.99579/0.00
sysbench 1.0.20 (using system libcurl 7.15.8-beta)
Running the test with following options:
--test=fileio --file-total-size=2G --file-num=128 --file-test-mode=seqrewr
initializing random number generator from current time
Prime numbers limit: 50000
initializing worker threads...
Threads started!
CPU speed: 600.55 events per second: 599.36
General statistics:
    total number of events: 5994
Latency (ms):
    min: 1.44
    avg: 1.46
    std: 1.47
    95th percentile: 1.47
    max: 999.19
Threads fairness:
    min (events/sec): 599.36
    execution time (avg/stddev): 9.99579/0.00
sysbench 1.0.20 (using system libcurl 7.15.8-beta)
Running the test with following options:
--test=fileio --file-total-size=2G --file-num=128 --file-test-mode=seqrewr
initializing random number generator from current time

```

Iteration Number	Number of Events per Second
1	600.68
2	600.50
3	600.39
4	599.36
5	600.55

Minimum:	599.36
Maxmimum:	600.68
Average:	600.296
S. Deviation	0.5335072633

I/O Testing:
Sequential Read/Write

```

docker run -it --rm --memory="3g" --cpus="2" ubuntu-sysbench:22.04 bash
-c "for i in {1..5}; do sysbench --num-threads=1 --test=fileio
--file-total-size=2G --file-num=128 --file-test-mode=seqrewr prepare &&
sysbench --num-threads=1 --test=fileio --file-total-size=2G
--file-num=128 --file-test-mode=seqrewr run && sysbench --num-threads=1
--test=fileio --file-total-size=2G --file-num=128
--file-test-mode=seqrewr cleanup; echo 'Iteration $i completed'; done"

```

```
shane@shane-OptiPlex-5090:~/Documents$ docker run -it -r --memory="8g" --cpus="2" ubuntu:syntevo:22.04 bash -c "for i in {1..5}; do sysbench --test=file-test --file-size=100M --file-num=128 --file-test-mode=storage prepare && sysbench --run-threads=1 --test=file-test --file-total-size=0 --file-num=128 --file-test-mode=storage run && sysbench --test=file-test --file-size=100M --file-num=128 --file-test-mode=storage run && sysbench 1.0.20 (using system limit 2.1.0-beta)"
```

The terminal output shows the following sequence of operations:

- Creating file test_file_0
- Creating file test_file_1
- Creating file test_file_2
- Creating file test_file_3
- Creating file test_file_4
- Creating file test_file_5
- Creating file test_file_6
- Creating file test_file_7
- Creating file test_file_8
- Creating file test_file_9
- Creating file test_file_10
- Creating file test_file_11
- Creating file test_file_12
- Creating file test_file_13
- Creating file test_file_14
- Creating file test_file_15
- Creating file test_file_16
- Creating file test_file_17
- Creating file test_file_18
- Creating file test_file_19
- Creating file test_file_20
- Creating file test_file_21
- Creating file test_file_22
- Creating file test_file_23
- Creating file test_file_24
- Creating file test_file_25
- Creating file test_file_26
- Creating file test_file_27
- Creating file test_file_28
- Creating file test_file_29
- Creating file test_file_30
- Creating file test_file_31
- Creating file test_file_32
- Creating file test_file_33
- Creating file test_file_34
- Creating file test_file_35
- Creating file test_file_36
- Creating file test_file_37
- Creating file test_file_38
- Creating file test_file_39
- Creating file test_file_40
- Creating file test_file_41
- Creating file test_file_42
- Creating file test_file_43
- Creating file test_file_44
- Creating file test_file_45
- Creating file test_file_46
- Creating file test_file_47
- Creating file test_file_48
- Creating file test_file_49
- Creating file test_file_50
- Creating file test_file_51
- Creating file test_file_52
- Creating file test_file_53
- Creating file test_file_54
- Creating file test_file_55
- Creating file test_file_56
- Creating file test_file_57
- Creating file test_file_58
- Creating file test_file_59
- Creating file test_file_60
- Creating file test_file_61
- Creating file test_file_62
- Creating file test_file_63
- Creating file test_file_64
- Creating file test_file_65
- Creating file test_file_66
- Creating file test_file_67
- Creating file test_file_68
- Creating file test_file_69
- Creating file test_file_70
- Creating file test_file_71
- Creating file test_file_72
- Creating file test_file_73
- Creating file test_file_74
- Creating file test_file_75
- Creating file test_file_76
- Creating file test_file_77
- Creating file test_file_78
- Creating file test_file_79
- Creating file test_file_80
- Creating file test_file_81
- Creating file test_file_82
- Creating file test_file_83
- Creating file test_file_84
- Creating file test_file_85
- Creating file test_file_86
- Creating file test_file_87
- Creating file test_file_88
- Creating file test_file_89
- Creating file test_file_90
- Creating file test_file_91
- Creating file test_file_92
- Creating file test_file_93
- Creating file test_file_94
- Creating file test_file_95
- Creating file test_file_96
- Creating file test_file_97
- Creating file test_file_98
- Creating file test_file_99

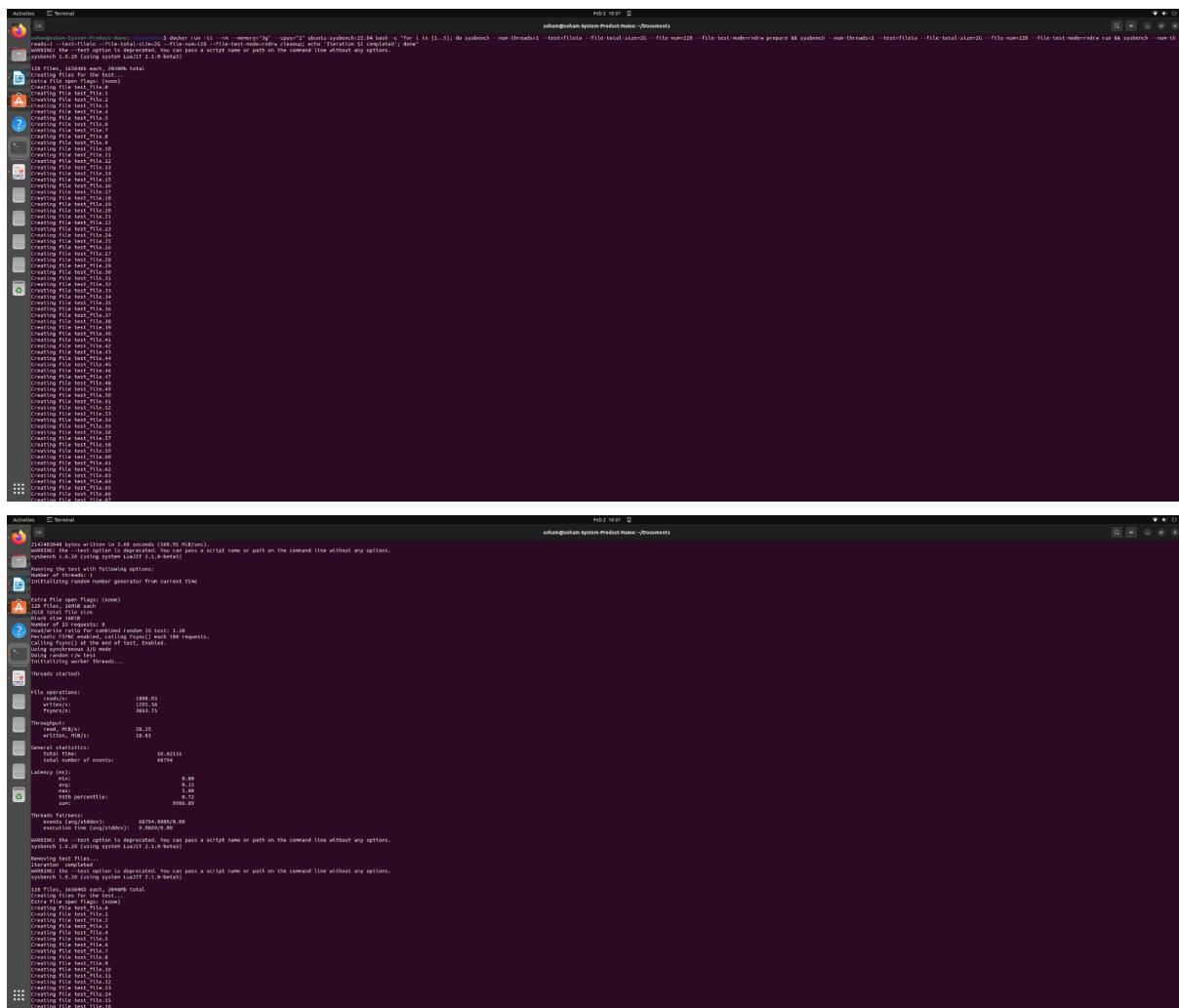
Serial Run Iterations	Results	
1	reads/s	0
	writes/sec	9949.62
	fsyncs/s	12739.91
2	reads/s	0
	writes/sec	9923.62
	fsyncs/s	12825.92
3	reads/s	0
	writes/sec	10018.65
	fsyncs/s	12825.92
4	reads/s	0
	writes/sec	9980.02
	fsyncs/s	12777.12
5	reads/s	0
	writes/sec	9960.07
	fsyncs/s	12755.38

Minimum read/s	0
Minimum write/s	9923.62
Minimum fsync/s	12739.91
Maximum read/s	0
Maximum write/s	10018.65
Maximum fsync/s	12825.92
Average read/s	0
Average write/s	9966.396
Average fsync/s	12784.85

S.Deviation read/s	0
S.Deviation write/s	35.59259937
S.Deviation fsync/s	39.75338728

Combined Random

```
docker run -it --rm --memory="3g" --cpus="2" ubuntu-sysbench:22.04 bash  
-c "for i in {1..5}; do sysbench --num-threads=1 --test=fileio  
--file-total-size=2G --file-num=128 --file-test-mode=rndrw prepare &&  
sysbench --num-threads=1 --test=fileio --file-total-size=2G  
--file-num=128 --file-test-mode=rndrw run && sysbench --num-threads=1  
--test=fileio --file-total-size=2G --file-num=128 --file-test-mode=rndrw  
cleanup; echo 'Iteration $i completed'; done"
```



Serial Run Iterations	Results	
1	reads/s	1808.05
	writes/sec	1205.36
	fsyncs/s	3863.75
2	reads/s	1786.44
	writes/sec	1191.00
	fsyncs/s	3822.18
3	reads/s	1792.66
	writes/sec	1195.10
	fsyncs/s	3837.02
4	reads/s	1779.82
	writes/sec	1186.55
	fsyncs/s	3805.74
5	reads/s	1802.60
	writes/sec	1201.73
	fsyncs/s	3851.13

Minimum read/s	1779.82
Minimum write/s	1186.55
Minimum fsync/s	3805.74
Maximum read/s	1808.05
Maximum write/s	1205.36
Maximum fsync/s	3863.75
Average read/s	1793.914
Average write/s	1195.948
Average fsync/s	3835.964
S.Deviation read/s	11.52548394
S.Deviation write/s	7.673680343
S.Deviation fsync/s	22.94925554

Memory Testing: Upto 1MB

```
docker run -it --rm ubuntu-sysbench:22.04 bash -c "for i in {1..5}; do sysbench memory --memory-block-size=1M run; done"
```

```

$ docker run -it --rm ubuntu-sysbench:22.04 bash -c "for i in {1..5}; do sysbench memory --memory-block-size=1M run; done"
sysbench 1.0.20 (using system LRU/TF 2.1.0-beta2)
Running the test with following options:
Number of threads: generator from current time
Number of thread groups: generator from current time
Running memory speed test with the following options:
    block size: 1MB
    number of threads: 1
    operation: read
    scope: global
    size: 1000000000
    threads: 1
    threads per group: 1
    time: 1000000000
    type: read
    value_size: 1
    warmup_time: 1000000000
    warmup_threads: 1
    threads started!
    total operations: 382400 (37461.85 per second)
    10240.00 MB transferred (27461.85 MB/sec)
General statistics:
    total time: 2.7149s
    total number of events: 382400
Latency (ms):
    min: 0.02
    avg: 0.02
    max: 0.02
    99th percentile: 0.02
    sum: 2721.02
    threads started!
    total operations: 382400 (37461.85 per second)
    10240.00 MB transferred (27461.85 MB/sec)
Threads fairness:
    threads per group (avg/stddev): 1.00/0.00
    execution time (avg/stddev): 2.7119/0.20
sysbench 1.0.20 (using system LRU/TF 2.1.0-beta2)
Running the test with following options:
Number of threads: generator from current time
Number of thread groups: generator from current time
Running memory speed test with the following options:
    block size: 1MB
    number of threads: 1
    operation: read
    scope: global
    size: 1000000000
    threads: 1
    threads per group: 1
    time: 1000000000
    type: read
    value_size: 1
    warmup_time: 1000000000
    warmup_threads: 1
    threads started!
    total operations: 382400 (37461.85 per second)
    10240.00 MB transferred (27461.85 MB/sec)
General statistics:
    total time: 2.7141s
    total number of events: 382400
Latency (ms):
    min: 0.02
    avg: 0.02
    max: 0.02
    99th percentile: 0.02
    sum: 2783.39
    threads started!
    total operations: 382400 (37461.85 per second)
    10240.00 MB transferred (27461.85 MB/sec)
Threads fairness:
    threads per group (avg/stddev): 1.00/0.00
    execution time (avg/stddev): 2.7052/0.16
    total operations: 382400 (37461.85 per second)
    10240.00 MB transferred (27461.85 MB/sec)

```

The image shows two side-by-side terminal windows. Both windows have a dark theme and are titled 'Actions Terminal'. The left window is for 'Linux 5.10.20 (using system luxoff 2.1.0-beta)' and the right window is for 'Linux 5.11.8-rc1 (using system luxoff 2.1.0-beta)'. Each window displays the same sequence of commands and output related to a memory speed test. The commands include 'sudo apt update', 'sudo apt upgrade -y', 'cd /tmp', 'sysbench 1.0.20 using system luxoff 2.1.0-beta', 'Running the test with following options:', 'installing random number generator from current time', 'Running memory speed test with the following options:', 'block size: 64KB', 'operation: read', 'iteration: 1', 'scope: global', and 'Threads fairness...'. The output shows 'Threads started' and 'Threads fairness' details like 'events (avg/stddev): 1024000 (37811.99 +/- 0.00)', 'execution time (avg/stddev): 2.710672 +/- 0.00', and 'latency (ms) statistics (avg/stddev): 0.40 +/- 0.00'. The right window's output also includes 'Threads fairness' statistics for '90th percentile' and 'sum'.

Iteration Number	Number of Events	Total Time
1	102400	2.7222
2	102400	2.7231
3	102400	2.7110
4	102400	2.5818
5	102400	2.7171

Minimum	37604.20109
Maximum	39662.25114
Average	38068.47315
S. Deviation	893.4549756

Memory Testing: Upto 1 GB

```
docker run -it --rm --memory="3g" --cpus="2" ubuntu-sysbench:22.04 bash
-c "for i in {1..5}; do sysbench memory --memory-block-size=1G run;
done"
```

The image shows two terminal windows side-by-side, both titled 'Terminal' and running on a system with the IP address 192.168.0.100. Both windows display the same command-line session:

```
suhang@ubahn-System-Product-Name:~/Documents
$ docker run -it --rm --memory="3g" --cpus="2" ubuntu-sysbench:22.04 bash -c "for i in {1..5}; do sysbench memory --memory-block-size=1G run; done"
sysbench 1.0.20 (using system libcurl 2.1.0-beta)
Running the test with following options:
  initializing random number generator from current time
  testing memory speed test with the following options:
    block size: 1024MB
    operation mode: readwrite
    operation type: global
    threads: 2
    initializing worker threads...
  threads started!
  total operations: 100 ( 12.48 per second)
  10240.00 MB transferred (12784.57 MB/sec)

General statistics:
  total time: 8.4099s
  total number of events: 100
Latency (ms):
  min: 79.34
  avg: 88.79
  max: 93.93
  95th percentile: 98.03
  sum: 8899.24
Threads fairness:
  events (avg/stddev): 100.0000/0.09
  execution time (avg/stddev): 8.4000/0.00
sysbench 1.0.20 (using system libcurl 2.1.0-beta)
Running the test with following options:
  initializing random number generator from current time
  testing memory speed test with the following options:
    block size: 1024MB
    operation mode: readwrite
    operation type: global
    threads: 2
    initializing worker threads...
  threads started!
  total operations: 100 ( 12.48 per second)
  10240.00 MB transferred (12784.56 MB/sec)

General statistics:
  total time: 8.4099s
  total number of events: 100
Latency (ms):
  min: 79.42
  avg: 88.80
  max: 94.41
  95th percentile: 98.13
  sum: 8899.17
Threads fairness:
  events (avg/stddev): 100.0000/0.09
  execution time (avg/stddev): 8.4000/0.00
sysbench 1.0.20 (using system libcurl 2.1.0-beta)
Running the test with following options:
  initializing random number generator from current time
  testing memory speed test with the following options:
    block size: 1024MB
    operation mode: readwrite
    operation type: global
    threads: 2
    initializing worker threads...
  threads started!
  total operations: 100 ( 12.47 per second)
  10240.00 MB transferred (12784.95 MB/sec)

General statistics:
  total time: 8.4081s
  total number of events: 100
Latency (ms):
  min: 79.46
  avg: 88.79
  max: 93.93
  95th percentile: 98.43
  sum: 8899.32
Threads fairness:
  events (avg/stddev): 100.0000/0.09
  execution time (avg/stddev): 8.4000/0.00
sysbench 1.0.20 (using system libcurl 2.1.0-beta)
Running the test with following options:
  initializing random number generator from current time
  testing memory speed test with the following options:
    block size: 1024MB
    operation mode: readwrite
    operation type: global
    threads: 2
    initializing worker threads...
```

```

Applications Terminal P0:2 16:16
pybench 1.0.20 (using system luajit 2.1.8-beta)
Running memory speed test with the following options:
  block size: 1MB
  number of events: 100
  initializing random number generator from current time
Running memory speed test with the following options:
  block size: 1MB
  number of events: 100
  operation: write
  size: 1GB
  threads: 1
  initializing worker threads...
  threads started!
  total operations: 100 ( 12.47 per second)
  40380.00 MB transferred (32768.95 MB/sec)

General statistics:
  total time: 8.0201s
  total number of events: 100
Latency (ms):
  p50: 0.00
  p90: 29.46
  p95: 99.19
  p99: 99.21
  p99.5th percentile: 99.43
  p99.9th percentile: 9937.32

Threads fairness:
  events (avg/stddev): 100.00/0.00
  execution time (avg/stddev): 8.0201/0.00
pybench 1.0.20 (using system luajit 2.1.8-beta)
Running the test with the following options:
  block size: 1MB
  number of events: 100
  initializing random number generator from current time
Running memory speed test with the following options:
  block size: 1MB
  number of events: 100
  operation: write
  size: 1GB
  threads: 1
  initializing worker threads...
  threads started!
  total operations: 100 ( 12.18 per second)
  36269.00 MB transferred (30479.28 MB/sec)

General statistics:
  total time: 8.2070s
  total number of events: 100
Latency (ms):
  p50: 0.00
  p90: 68.40
  p95: 82.47
  p99: 93.50
  p99.5th percentile: 93.56
  p99.9th percentile: 8000.00

Threads fairness:
  events (avg/stddev): 100.00/0.00
  execution time (avg/stddev): 8.2069/0.00
suhani@pavank-System Product Name: ~Documents $
```

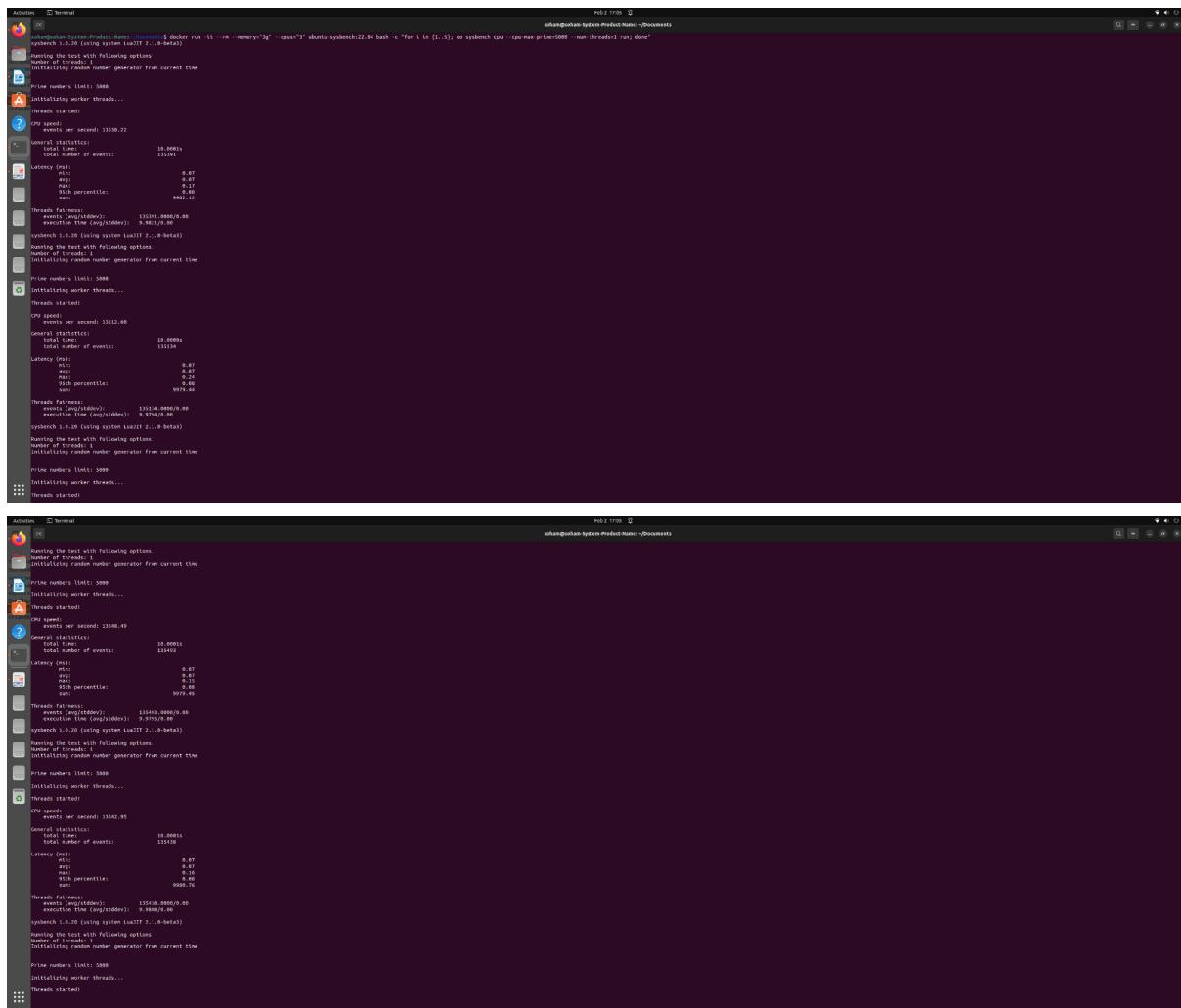
Iteration Number	Number of Events	Total Time
1	100	8.0090
2	100	8.0099
3	100	8.0259
4	100	8.0201
5	100	8.2070

Minimum	12.18472036
Maximum	12.4859533
Average	12.41671167
S. Deviation	0.1301548132

CONDITION 3: 3 GB RAM and 3 Cores on Docker

Memory Testing: Case 1: max-prime = 5000

```
docker run -it --rm --memory="3g" --cpus="3" ubuntu-sysbench:22.04 bash  
-c "for i in {1..5}; do sysbench cpu --cpu-max-prime=5000  
--num-threads=1 run; done"
```



Iteration Number	Number of Events per Second
1	13533.22
2	13512.60
3	13548.49
4	13542.95
5	13562.06

Minimum:	13512.6
Maxmimum:	13562.06
Average:	13539.864
S. Deviation	18.46660581

Case 2: max-prime = 50000

```
docker run -it --rm --memory="3g" --cpus="3" ubuntu-sysbench:22.04 bash  
-c "for i in {1..5}; do sysbench cpu --cpu-max-prime=50000  
--num-threads=1 run; done"
```

```
soham@soham-System-Product-Name:~/Documents$ docker run -it --rm --memory="3g" --cpus="3" ubuntu-sysbench:22.04 bash -c "for i in {1..5}; do sysbench cpu --cpu-max-prime=50000 --num-threads=1 run; done"  
sysbench 1.0.20 (using system LAPI) 2.1.0-beta  
Running the test with following options:  
Number of threads: 1  
Initializing random number generator from current time  
Prime numbers limit: 50000  
Initializing worker threads...  
Threads started!  
CPU speed: events per second: 600.32  
General statistics: total time: 10.00023s total number of events: 6000  
Latency (ms): min: 1.44 avg: 1.50 max: 1.80 50th percentile: 1.51 sum: 9999.79  
Threads fairness: events (avg/stddev): 6000.0000/0.00 execution time (avg/stddev): 10.0000/0.00  
sysbench 1.0.20 (using system LAPI) 2.1.0-beta  
Running the test with following options:  
Number of threads: 1  
Initializing random number generator from current time  
Prime numbers limit: 50000  
Initializing worker threads...  
Threads started!  
CPU speed: events per second: 600.39  
General statistics: total time: 10.0014s total number of events: 6000  
Latency (ms): min: 1.44 avg: 1.50 max: 1.82 50th percentile: 1.51 sum: 9999.99  
Threads fairness: events (avg/stddev): 6000.0000/0.00 execution time (avg/stddev): 10.0000/0.00  
sysbench 1.0.20 (using system LAPI) 2.1.0-beta  
Running the test with following options:  
Number of threads: 1  
Initializing random number generator from current time  
Prime numbers limit: 50000  
Initializing worker threads...  
Threads started!  
CPU speed: events per second: 600.39  
General statistics: total time: 10.0014s total number of events: 6000  
Latency (ms): min: 1.44 avg: 1.50 max: 1.82 50th percentile: 1.51 sum: 9999.99  
Threads fairness: events (avg/stddev): 6000.0000/0.00 execution time (avg/stddev): 10.0000/0.00  
sysbench 1.0.20 (using system LAPI) 2.1.0-beta  
Running the test with following options:  
Number of threads: 1  
Initializing random number generator from current time  
Prime numbers limit: 50000  
Initializing worker threads...  
Threads started!  
CPU speed: events per second: 600.72  
General statistics: total time: 10.0008s total number of events: 6000  
Latency (ms): min: 1.44 avg: 1.50 max: 2.19 50th percentile: 1.51 sum: 9999.42  
Threads fairness: events (avg/stddev): 6000.0000/0.00 execution time (avg/stddev): 9.9999/0.00  
sysbench 1.0.20 (using system LAPI) 2.1.0-beta  
Running the test with following options:  
Number of threads: 1  
Initializing random number generator from current time  
Prime numbers limit: 50000  
Initializing worker threads...  
Threads started!  
CPU speed: events per second: 600.78  
General statistics: total time: 10.0004s total number of events: 6000  
Latency (ms): min: 1.45 avg: 1.50 max: 2.29 50th percentile: 1.51 sum: 9999.48  
Threads fairness: events (avg/stddev): 6000.0000/0.00 execution time (avg/stddev): 9.9997/0.00  
sysbench 1.0.20 (using system LAPI) 2.1.0-beta  
Running the test with following options:  
Number of threads: 1  
Initializing random number generator from current time  
Prime numbers limit: 50000  
Initializing worker threads...  
Threads started!  
CPU speed: events per second: 600.78  
General statistics: total time: 10.0004s total number of events: 6000  
Latency (ms): min: 1.45 avg: 1.50 max: 2.29 50th percentile: 1.51 sum: 9999.48  
Threads fairness: events (avg/stddev): 6000.0000/0.00 execution time (avg/stddev): 9.9997/0.00  
sysbench 1.0.20 (using system LAPI) 2.1.0-beta  
Running the test with following options:  
Number of threads: 1  
Initializing random number generator from current time  
Prime numbers limit: 50000  
Initializing worker threads...  
Threads started!  
CPU speed: events per second: 600.49  
General statistics: total time: 10.0013s total number of events: 6000  
Latency (ms): min: 1.45 avg: 1.50 max: 2.37 50th percentile: 1.50 sum: 9999.16  
Threads fairness: events (avg/stddev): 6000.0000/0.00 execution time (avg/stddev): 9.9998/0.00  
sysbench 1.0.20 (using system LAPI) 2.1.0-beta  
Running the test with following options:  
Number of threads: 1  
Initializing random number generator from current time  
Prime numbers limit: 50000  
Initializing worker threads...  
Threads started!
```

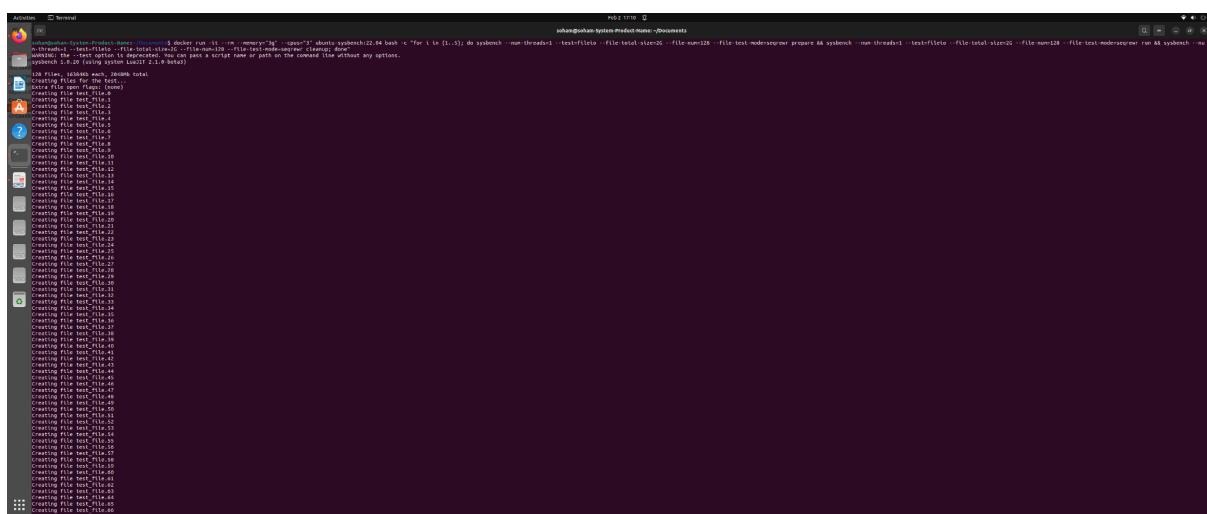
Iteration Number	Number of Events per Second
1	600.32
2	600.59
3	600.72
4	600.78
5	600.69

Minimum:	600.32
Maxmimum:	600.78
Average:	600.62
S. Deviation	0.1812456896

I/O Testing

Case 1: Sequential Read/Write

```
docker run -it --rm --memory="3g" --cpus="3" ubuntu-sysbench:22.04 bash  
-c "for i in {1..5}; do sysbench --num-threads=1 --test=fileio  
--file-total-size=2G --file-num=128 --file-test-mode=seqrewr prepare &&  
sysbench --num-threads=1 --test=fileio --file-total-size=2G  
--file-num=128 --file-test-mode=seqrewr run && sysbench --num-threads=1  
--test=fileio --file-total-size=2G --file-num=128  
--file-test-mode=seqrewr cleanup; done"
```



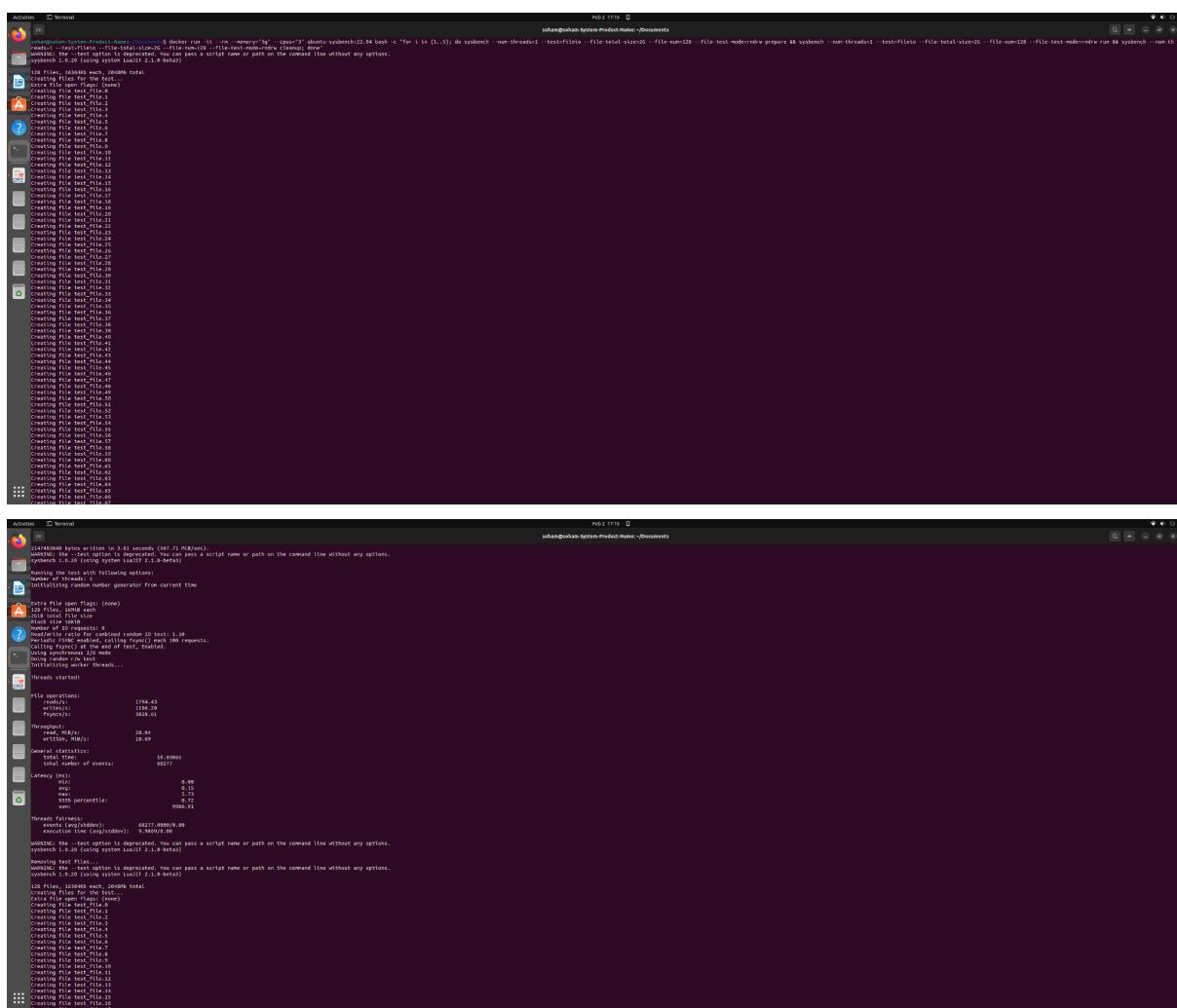
Serial Run Iterations	Results	
1	reads/s	0
	writes/sec	9050.46
	fsyncs/s	12359.58
2	reads/s	0
	writes/sec	9659.27
	fsyncs/s	12371.56

3	reads/s	0
	writes/sec	9610.53
	fsyncs/s	12305.27
4	reads/s	0
	writes/sec	9660.37
	fsyncs/s	12369.17
5	reads/s	0
	writes/sec	9610.98
	fsyncs/s	12306.01

Minimum read/s	0
Minimum write/s	9050.46
Minimum fsync/s	12305.27
Maximum read/s	0
Maximum write/s	9660.37
Maximum fsync/s	12371.56
Average read/s	0
Average write/s	9518.322
Average fsync/s	12342.318
S.Deviation read/s	0
S.Deviation write/s	262.6911896
S.Deviation fsync/s	33.78211909

Case 2: Combined Random

```
docker run -it --rm --memory="3g" --cpus="3" ubuntu-sysbench:22.04 bash  
-c "for i in {1..5}; do sysbench --num-threads=1 --test=fileio  
--file-total-size=2G --file-num=128 --file-test-mode=rndrw prepare &&  
sysbench --num-threads=1 --test=fileio --file-total-size=2G  
--file-num=128 --file-test-mode=rndrw run && sysbench --num-threads=1  
--test=fileio --file-total-size=2G --file-num=128 --file-test-mode=rndrw  
cleanup; done"
```

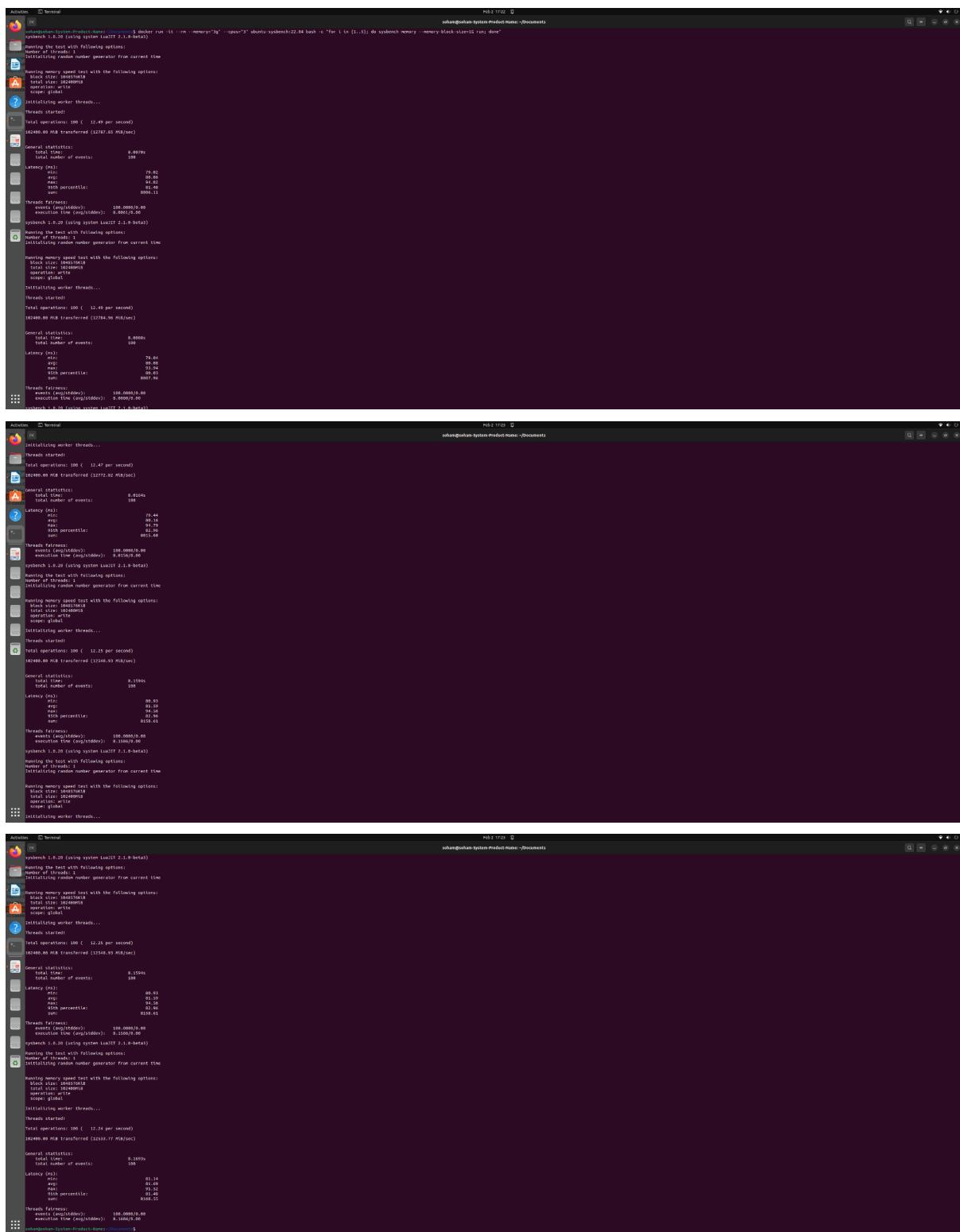


Serial Run Iterations	Results	
1	reads/s	1784.42
	writes/sec	1189.61
	fsyncs/s	3817.14
2	reads/s	1779.28
	writes/sec	1186.19
	fsyncs/s	3778.19
3	reads/s	1794.43
	writes/sec	1196.29
	fsyncs/s	3828.61
4	reads/s	1786.41
	writes/sec	1196.94
	fsyncs/s	3823.56
5	reads/s	1768.47
	writes/sec	1178.98
	fsyncs/s	3785.32

Minimum read/s	1768.47
Minimum write/s	1178.98
Minimum fsync/s	3778.19
Maximum read/s	1794.43
Maximum write/s	1196.94
Maximum fsync/s	3828.61
Average read/s	1782.602
Average write/s	1189.602
Average fsync/s	3806.564
S.Deviation read/s	9.597612724
S.Deviation write/s	7.467333527
S.Deviation fsync/s	23.14699397

Memory Testing: Case 1: 128 Files Upto 1GB

```
docker run -it --rm --memory="3g" --cpus="3" ubuntu-sysbench:22.04 bash  
-c "for i in {1..5}; do sysbench memory --memory-block-size=1G run;  
done"
```

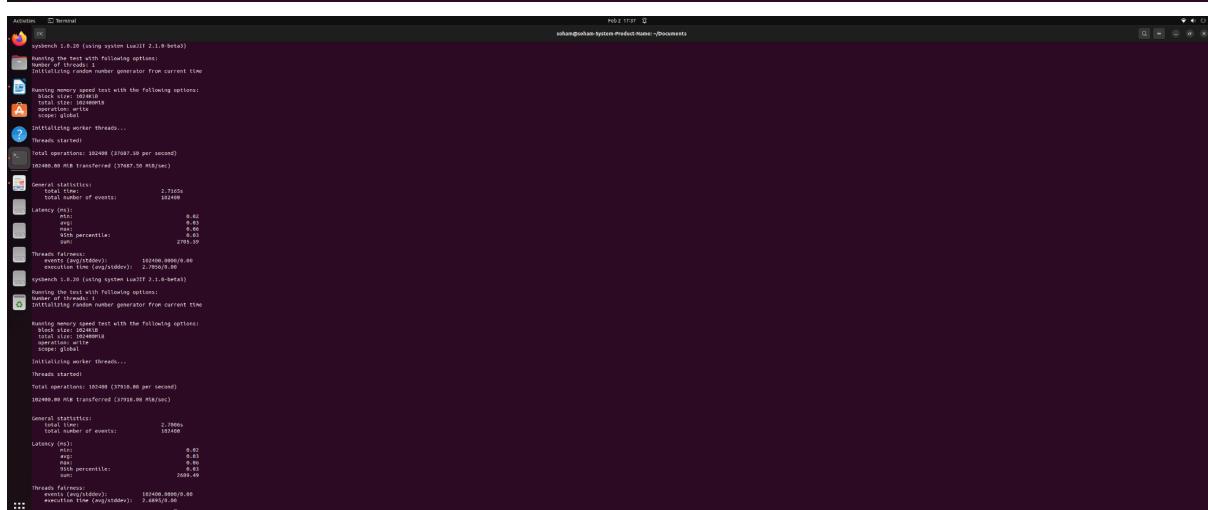
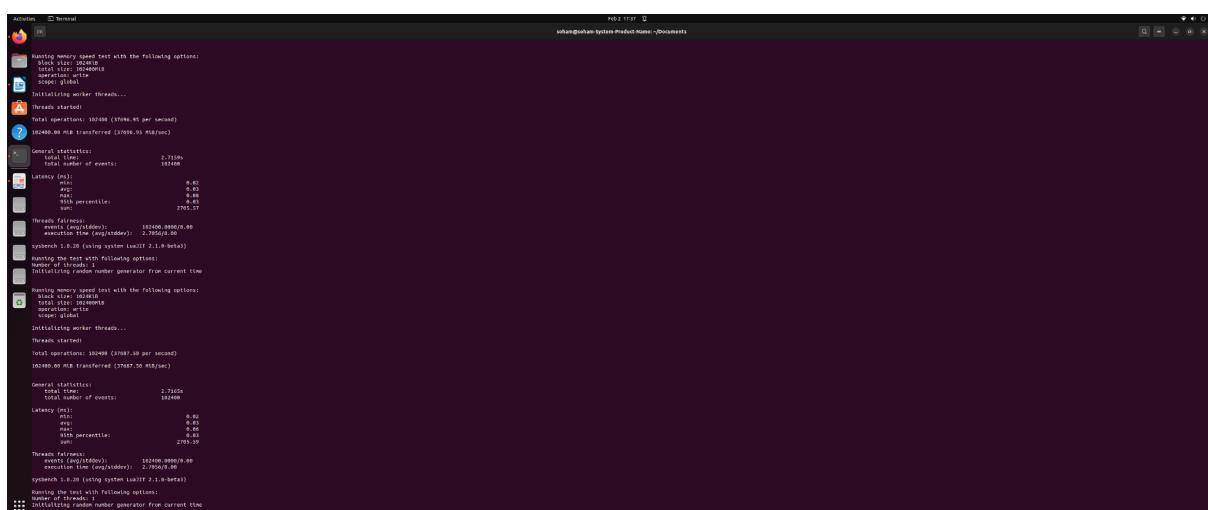
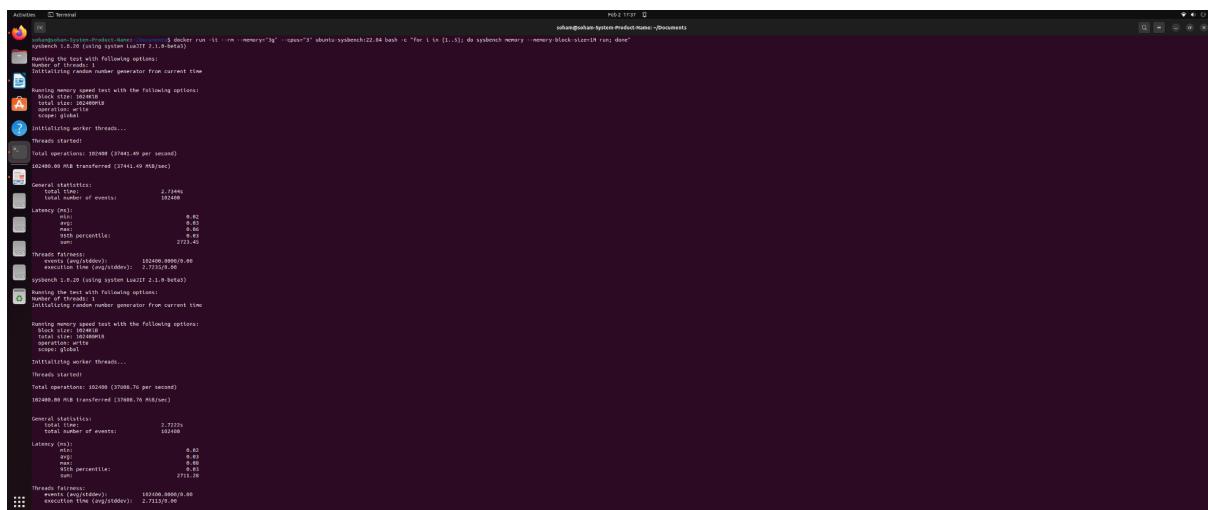


Iteration Number	Number of Events	Total Time
1	100	8.0070
2	100	8.0088
3	100	8.0164
4	100	8.1594
5	100	8.1693

Minimum	12.24095088
Maximum	12.48907206
Average	12.38930372
S. Deviation	0.1288722752

Memory Testing: Case 2: 128 Files Upto 1MB

```
docker run -it --rm --memory="3g" --cpus="3" ubuntu-sysbench:22.04 bash  
-c "for i in {1..5}; do sysbench memory --memory-block-size=1M run;  
done"
```



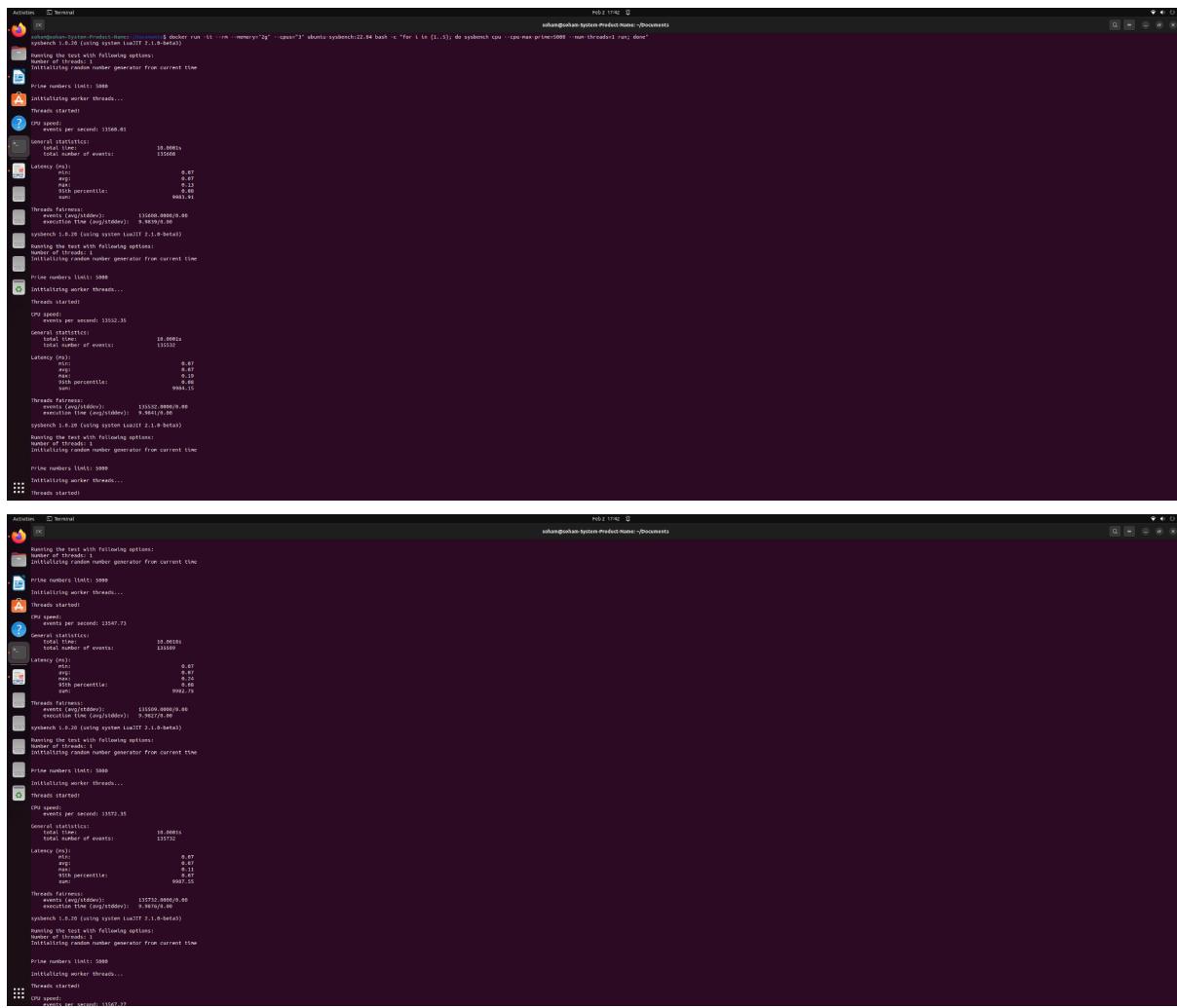
Iteration Number	Number of Events	Total Time
1	102400	2.7165
2	102400	2.7006
3	102400	2.7154
4	102400	2.7222
5	102400	2.7344

Minimum	37448.80047
Maximum	37917.49981
Average	37677.86651
S. Deviation	169.5913733

Condition 4: 2GB RAM and 3 Cores on Docker

CPU Testing: Case 1: max-prime = 5000

```
docker run -it --rm --memory="2g" --cpus="3" ubuntu-sysbench:22.04 bash  
-c "for i in {1..5}; do sysbench cpu --cpu-max-prime=5000  
--num-threads=1 run; done"
```



```
Latency (ns)
  min:          0.47
  avg:          0.47
  max:          0.50
  50% percentile: 0.48
  sum:         9982.75

Threads fairness:
  events (avg/stddev): 13359.0000/0.00
  execution time (avg/stddev): 0.982/0.00
  sysbench 1.0.20 (using system (multiT 2.0-beta))

Running the test with following options:
  number of threads: 1
  init-time: 0
  generating random numbers from current time

Prime numbers limit: 5000
Initializing worker threads...
Threads started
  CPU speed:
    events per second: 13372.35
  Generating statistics:
    total time: 10.0000s
    total number of events: 13372
  Latency (ns)
    min:          0.47
    avg:          0.47
    max:          0.50
    50% percentile: 0.48
    sum:         9487.15

Threads fairness:
  events (avg/stddev): 13352.0000/0.00
  execution time (avg/stddev): 0.978/0.00
  sysbench 1.0.20 (using system (multiT 2.0-beta))

Running the test with following options:
  number of threads: 1
  init-time: 0
  generating random numbers from current time

Prime numbers limit: 5000
Initializing worker threads...
Threads started
  CPU speed:
    events per second: 13387.27
  Generating statistics:
    total time: 10.0000s
    total number of events: 13386
  Latency (ns)
    min:          0.47
    avg:          0.47
    max:          0.50
    50% percentile: 0.47
    sum:         9985.40

Threads fairness:
  events (avg/stddev): 13361.0000/0.00
  execution time (avg/stddev): 0.976/0.00
  sysbench 1.0.20 (using system (multiT 2.0-beta))

Running the test with following options:
  number of threads: 1
  init-time: 0
  generating random numbers from current time
```

Iteration Number	Number of Events per Second
1	13560.01
2	13552.35
3	13547.73
4	13572.35
5	13567.27

Minimum:	13547.73
Maxmimum:	13572.35
Average:	13559.942
S. Deviation	10.17882704

CPU Testing: Case 2: max-prime = 50000

```
docker run -it --rm --memory="2g" --cpus="3" ubuntu-sysbench:22.04 bash  
-c "for i in {1..5}; do sysbench cpu --cpu-max-prime=50000  
--num-threads=1 run; done"
```

The terminal window displays the following output for each of the five runs:

```
sysbench 1.0.20 (using system LFS(1) 2.1.0-Debian)   
Running the test with following options:  
Number of threads: 1  
Initializing random number generator from current time  
Prime numbers limit: 50000  
Initializing worker threads...  
Threads started!  
CPU speed: events per second: 600.79  
General statistics:  
total time: 10.0013s  
total number of events: 6009  
Latency (ms):  
min: 1.44  
avg: 1.65  
max: 1.79  
95th percentile: 1.87  
sum: 10000.34  
Threads fairness:  
events (avg/stddev): 600.0000/0.00  
execution time (avg/stddev): 9.9979/0.00  
sysbench 1.0.20 (using system LFS(1) 2.1.0-Debian)  
Running the test with following options:  
Number of threads: 1  
Initializing random number generator from current time  
Prime numbers limit: 50000  
Initializing worker threads...  
Threads started!  
CPU speed: events per second: 600.83  
General statistics:  
total time: 10.0005s  
total number of events: 6009  
Latency (ms):  
min: 1.44  
avg: 1.65  
max: 1.73  
95th percentile: 1.87  
sum: 9999.77  
Threads fairness:  
events (avg/stddev): 600.0000/0.00  
execution time (avg/stddev): 9.9979/0.00  
sysbench 1.0.20 (using system LFS(1) 2.1.0-Debian)  
Running the test with following options:  
Number of threads: 1  
Initializing random number generator from current time  
Prime numbers limit: 50000  
Initializing worker threads...  
Threads started!  
CPU speed: events per second: 600.22  
General statistics:  
total time: 10.0087s  
total number of events: 6083  
Latency (ms):  
min: 1.44  
avg: 1.53  
max: 2.27  
95th percentile: 1.87  
sum: 9997.80  
Threads fairness:  
events (avg/stddev): 600.0000/0.00  
execution time (avg/stddev): 9.9979/0.00  
sysbench 1.0.20 (using system LFS(1) 2.1.0-Debian)  
Running the test with following options:  
Number of threads: 1  
Initializing random number generator from current time  
Prime numbers limit: 50000  
Initializing worker threads...  
Threads started!  
CPU speed: events per second: 600.40  
General statistics:  
total time: 10.0011s  
total number of events: 6005  
Latency (ms):  
min: 1.44  
avg: 1.65  
max: 1.72  
95th percentile: 1.87  
sum: 9997.81  
Threads fairness:  
events (avg/stddev): 600.0000/0.00  
execution time (avg/stddev): 9.9979/0.00  
sysbench 1.0.20 (using system LFS(1) 2.1.0-Debian)  
Running the test with following options:  
Number of threads: 1  
Initializing random number generator from current time  
Prime numbers limit: 50000  
Initializing worker threads...  
Threads started!  
CPU speed: events per second: 600.40  
General statistics:  
total time: 10.0007s  
total number of events: 6005  
Latency (ms):  
min: 1.44  
avg: 1.65  
max: 1.72  
95th percentile: 1.87  
sum: 9997.81  
Threads fairness:  
events (avg/stddev): 600.0000/0.00  
execution time (avg/stddev): 9.9979/0.00  
sysbench 1.0.20 (using system LFS(1) 2.1.0-Debian)  
Running the test with following options:  
Number of threads: 1  
Initializing random number generator from current time  
Prime numbers limit: 50000  
Initializing worker threads...  
Threads started!
```

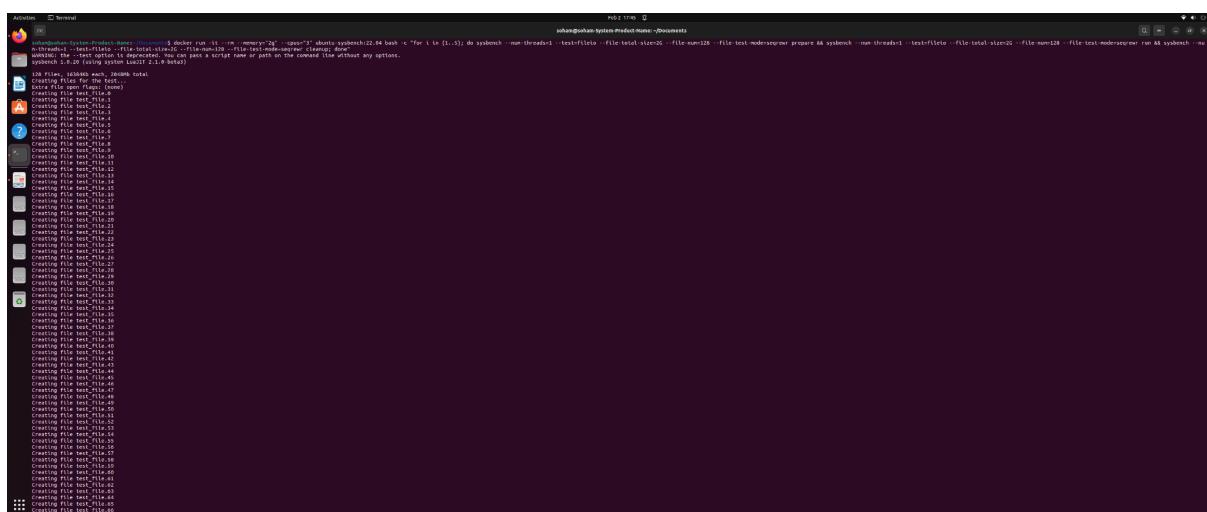
Iteration Number	Number of Events per Second
1	600.79
2	600.83
3	600.22
4	600.40
5	600.42

Minimum:	600.22
Maxmimum:	600.83
Average:	600.532
S. Deviation	0.2658382967

I/O Testing

Case 1: Sequential Read/Write

```
docker run -it --rm --memory="2g" --cpus="3" ubuntu-sysbench:22.04 bash -c "for i in {1..5}; do sysbench --num-threads=1 --test=fileio --file-total-size=2G --file-num=128 --file-test-mode=seqrewr prepare && sysbench --num-threads=1 --test=fileio --file-total-size=2G --file-num=128 --file-test-mode=seqrewr run && sysbench --num-threads=1 --test=fileio --file-total-size=2G --file-num=128 --file-test-mode=seqrewr cleanup; done"
```



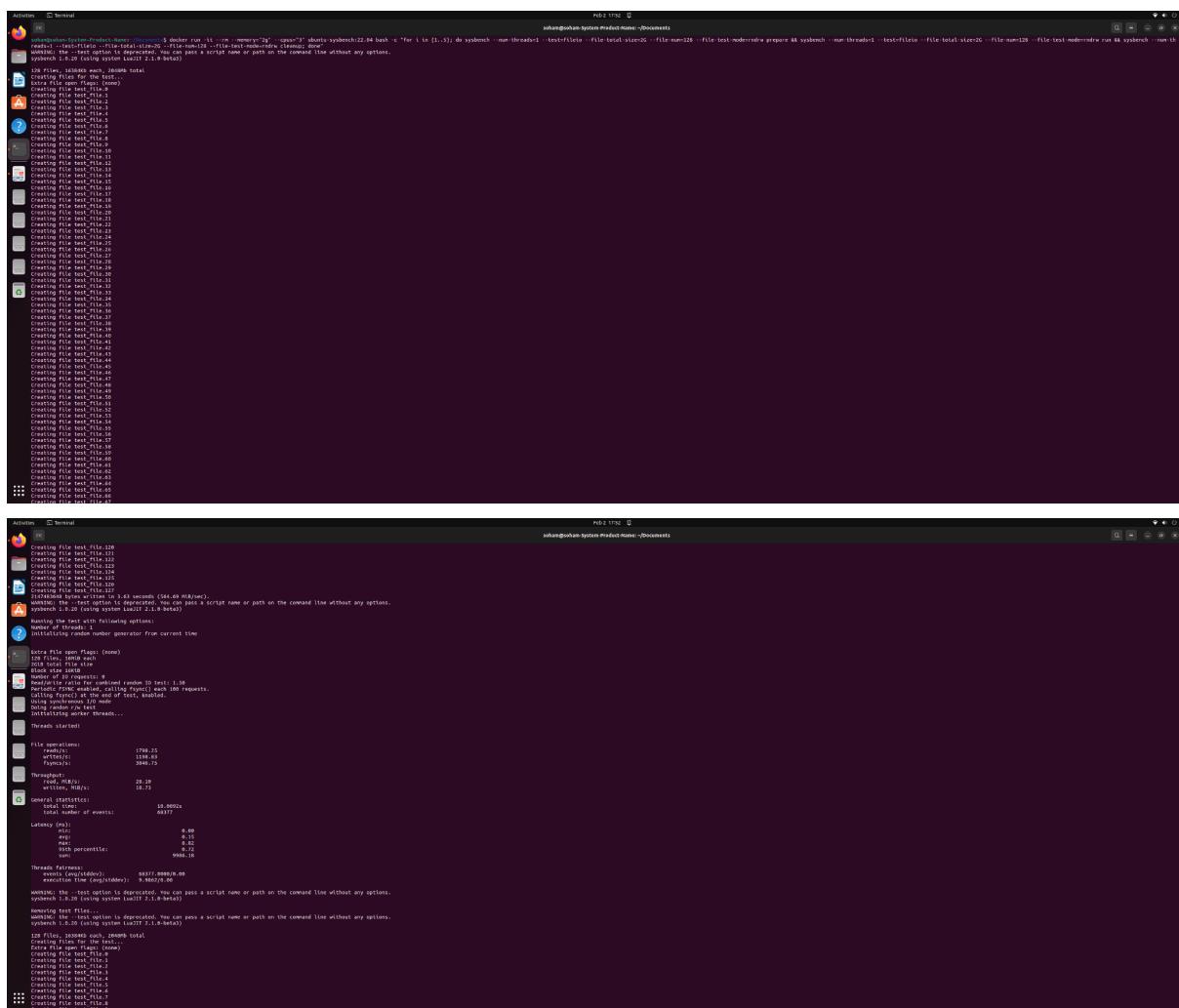
Serial Run Iterations	Results	
1	reads/s	0
	writes/sec	8872.46
	fsyncs/s	11365.45
2	reads/s	0
	writes/sec	8911.62
	fsyncs/s	11415.66

3	reads/s	0
	writes/sec	8946.25
	fsyncs/s	11457.84
4	reads/s	0
	writes/sec	9053.64
	fsyncs/s	11597.56
5	reads/s	0
	writes/sec	8980.98
	fsyncs/s	11500.05

Minimum read/s	0
Minimum write/s	8872.46
Minimum fsync/s	11365.45
Maximum read/s	0
Maximum write/s	9053.64
Maximum fsync/s	11597.56
Average read/s	0
Average write/s	8952.99
Average fsync/s	11467.312
S.Deviation read/s	0
S.Deviation write/s	69.20232655
S.Deviation fsync/s	88.2749017

Case 2: Combined Random

```
docker run -it --rm --memory="2g" --cpus="3" ubuntu-sysbench:22.04 bash  
-c "for i in {1..5}; do sysbench --num-threads=1 --test=fileio  
--file-total-size=2G --file-num=128 --file-test-mode=rndrw prepare &&  
sysbench --num-threads=1 --test=fileio --file-total-size=2G  
--file-num=128 --file-test-mode=rndrw run && sysbench --num-threads=1  
--test=fileio --file-total-size=2G --file-num=128 --file-test-mode=rndrw  
cleanup; done"
```



Serial Run Iterations	Results	
1	reads/s	1798.25
	writes/sec	1198.83
	fsyncs/s	3846.75
2	reads/s	1795.65
	writes/sec	1197.10
	fsyncs/s	3834.42
3	reads/s	1806.81
	writes/sec	1204.54
	fsyncs/s	3856.53
4	reads/s	1795.93
	writes/sec	1197.29
	fsyncs/s	3836.81
5	reads/s	1784.10
	writes/sec	1189.40

	fsyncs/s	3811.08
--	----------	---------

Minimum read/s	1784.1
Minimum write/s	1189.4
Minimum fsync/s	3811.08
Maximum read/s	1806.81
Maximum write/s	1204.54
Maximum fsync/s	3856.53
Average read/s	1796.148
Average write/s	1197.432
Average fsync/s	3837.118
S.Deviation read/s	8.117057349
S.Deviation write/s	5.411133892
S.Deviation fsync/s	16.99229737

Memory Testing: Case 1: 128 files upto 1GB

```
docker run -it --rm --memory="2g" --cpus="3" ubuntu-sysbench:22.04 bash
-c "for i in {1..5}; do sysbench memory --memory-block-size=1G run;
done"
```

```
sohan@sohan-System-Product-Name:~/Documents
```

```
sysbench memory speed test with the following options:
    total time: 1000000000000000000
    total size: 1024000000000000000
    scope: global
    threads: 128
    initializing worker threads...
    threads started!
    total operations: 85 (~ 0.49 per second)
    10.3200 MB transferred (1000.00 MB/sec)

General statistics:
    total time: 10.3200s
    total number of events: 85
    latency (ms):
        min: 0.00
        avg: 0.00
        max: 0.00
        99th percentile: 0.00
        sum: 0.00
    Threads fairness:
        events (avg/stddev): 7.5000/0.00
        execution time (avg/stddev): 0.0000/0.00
sysbench 2.0.0 (using system Linux/2.1.0-0-beta)
Running the test with following options:
    total time: 1000000000000000000
    initializing random number generator from current time
    threads: 128
    initializing worker threads...
    threads started!
    total operations: 75 (~ 7.04 per second)
    10000.00 MB transferred (704.00 MB/sec)

General statistics:
    total time: 10.0400s
    total number of events: 75
    latency (ms):
        min: 0.00
        avg: 0.00
        max: 0.00
        99th percentile: 0.00
        sum: 0.00
    Threads fairness:
        events (avg/stddev): 7.5000/0.00
        execution time (avg/stddev): 0.0000/0.00
sysbench 2.0.0 (using system Linux/2.1.0-0-beta)
Running the test with following options:
    total time: 1000000000000000000
    initializing random number generator from current time
    threads: 128
    initializing worker threads...
    threads started!
    total operations: 87 (~ 0.65 per second)
    10000.00 MB transferred (655.77 MB/sec)

General statistics:
    total time: 10.0000s
    total number of events: 87
    latency (ms):
        min: 0.00
        avg: 0.00
        max: 0.00
        99th percentile: 0.00
        sum: 0.00
    Threads fairness:
        events (avg/stddev): 8.5000/0.00
        execution time (avg/stddev): 0.0000/0.00
sysbench 2.0.0 (using system Linux/2.1.0-0-beta)
Running the test with following options:
    total time: 1000000000000000000
    initializing random number generator from current time
    threads: 128
    initializing worker threads...
    threads started!
    total operations: 100 (~ 10.37 per second)
    10000.00 MB transferred (9800.45 MB/sec)

General statistics:
    total time: 9.4400s
    total number of events: 100
    latency (ms):
        min: 0.00
        avg: 0.00
        max: 0.00
        99th percentile: 0.00
        sum: 0.00
    Threads fairness:
        events (avg/stddev): 100.0000/0.00
        execution time (avg/stddev): 0.0000/0.00
sysbench 2.0.0 (using system Linux/2.1.0-0-beta)
Running the test with following options:
    total time: 1000000000000000000
    initializing random number generator from current time
    threads: 128
    initializing worker threads...
    threads started!
    total operations: 100 (~ 10.37 per second)
    10000.00 MB transferred (9800.45 MB/sec)

General statistics:
    total time: 9.4400s
    total number of events: 100
    latency (ms):
        min: 0.00
        avg: 0.00
        max: 0.00
        99th percentile: 0.00
        sum: 0.00
    Threads fairness:
        events (avg/stddev): 100.0000/0.00
        execution time (avg/stddev): 0.0000/0.00
sysbench 2.0.0 (using system Linux/2.1.0-0-beta)
Running the test with following options:
    total time: 1000000000000000000
    initializing random number generator from current time
    threads: 128
    initializing worker threads...
    threads started!
    total operations: 100 (~ 10.37 per second)
    10000.00 MB transferred (9800.45 MB/sec)

General statistics:
    total time: 9.4400s
    total number of events: 100
    latency (ms):
        min: 0.00
        avg: 0.00
        max: 0.00
        99th percentile: 0.00
        sum: 0.00
    Threads fairness:
        events (avg/stddev): 100.0000/0.00
        execution time (avg/stddev): 0.0000/0.00
sysbench 2.0.0 (using system Linux/2.1.0-0-beta)
Running the test with following options:
    total time: 1000000000000000000
    initializing random number generator from current time
    threads: 128
    initializing worker threads...
    threads started!
    total operations: 100 (~ 10.37 per second)
    10000.00 MB transferred (9800.45 MB/sec)

General statistics:
    total time: 9.4400s
    total number of events: 100
    latency (ms):
        min: 0.00
        avg: 0.00
        max: 0.00
        99th percentile: 0.00
        sum: 0.00
    Threads fairness:
        events (avg/stddev): 100.0000/0.00
        execution time (avg/stddev): 0.0000/0.00
sysbench 2.0.0 (using system Linux/2.1.0-0-beta)
Running the test with following options:
    total time: 1000000000000000000
    initializing random number generator from current time
    threads: 128
    initializing worker threads...
    threads started!
```

Iteration Number	Number of Events	Total Time
1	85	10.1207
2	75	10.0475
3	87	10.0592
4	100	9.6448
5	100	8.1480

Minimum	7.464543419
Maximum	12.27295042
Average	9.43064057
S. Deviation	1.903927414

Case 2: 128 files upto 1MB

```
docker run -it --rm --memory="2g" --cpus="3" ubuntu-sysbench:22.04 bash
-c "for i in {1..5}; do sysbench memory --memory-block-size=1M run;
done"
```

The terminal window shows the following sequence of events:

- The user runs a Docker container with specific memory and CPU constraints.
- The container executes a script that runs the sysbench memory test five times.
- Each run involves initializing the test, starting it, and then stopping it after 100 iterations.
- The output for each run includes:
 - General statistics: Total number of events, Latency (ns), and CPU utilization.
 - Latency distribution: Histograms for 100, 200, 300, 400, and 500 ns.
 - Memory statistics: Total memory transferred (bytes).
 - Test summary: Operations per second (ops/sec) and error rate.
- The results show a steady increase in operations per second from iteration 1 to 5, starting around 7.46 ops/sec and reaching approximately 27212.00 ops/sec in iteration 5.

Iteration Number	Number of Events	Total Time
1	102400	2.7225
2	102400	2.7158
3	102400	2.6914
4	102400	2.7438
5	102400	2.7518

Minimum	37212.00669
Maximum	38047.11303
Average	37579.47857
S. Deviation	330.7948367

CONDITION 1 : 2GB RAM AND 2 CORES On QEMU (qcow2)

Case 1: max-prime = 5000

```
sysbench --test=cpu --cpu-max-prime=5000 --time=30 run
```

The screenshot shows a terminal window titled "QEMU". The output of the sysbench command is displayed:

```
Machine View
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Prime numbers limit: 5000
Initializing worker threads...
Threads started!

CPU speed:
events per second: 1858.37

General statistics:
total time: 30.0012s
total number of events: 55766

Latency (ms):
min: 0.51
avg: 0.54
max: 1.23
95th percentile: 0.56
sum: 29886.52

Threads fairness:
events (avg/stddev): 55766.0000/0.00
execution time (avg/stddev): 29.8865/0.00

soham@soham-123:~$ sysbench --test=cpu --cpu-max-prime=5000 --time=30 run
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Prime numbers limit: 5000
Initializing worker threads...
Threads started!
```

QEMU

Machine View

```
total time: 30.0111s
total number of events: 53412

Latency (ms):
min: 0.51
avg: 0.56
max: 17.76
95th percentile: 0.77
sum: 29840.86

Threads fairness:
events (avg/stddev): 53412.0000/0.00
execution time (avg/stddev): 29.8409/0.00

soham@soham-123:~$ sysbench --test=cpu --cpu-max-prime=5000 --time=30 run
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Prime numbers limit: 5000

Initializing worker threads...

Threads started!

CPU speed:
events per second: 1834.78

General statistics:
total time: 30.0012s
total number of events: 55051

Latency (ms):
min: 0.51
avg: 0.54
max: 14.80
95th percentile: 0.63
sum: 29836.01

Threads fairness:
events (avg/stddev): 55051.0000/0.00
execution time (avg/stddev): 29.8360/0.00

soham@soham-123:~$
```

QEMU

Machine View

```
total time: 30.0012s
total number of events: 55051

Latency (ms):
min: 0.51
avg: 0.54
max: 14.80
95th percentile: 0.63
sum: 29836.01

Threads fairness:
events (avg/stddev): 55051.0000/0.00
execution time (avg/stddev): 29.8360/0.00

soham@soham-123:~$ sysbench --test=cpu --cpu-max-prime=5000 --time=30 run
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Prime numbers limit: 5000

Initializing worker threads...

Threads started!

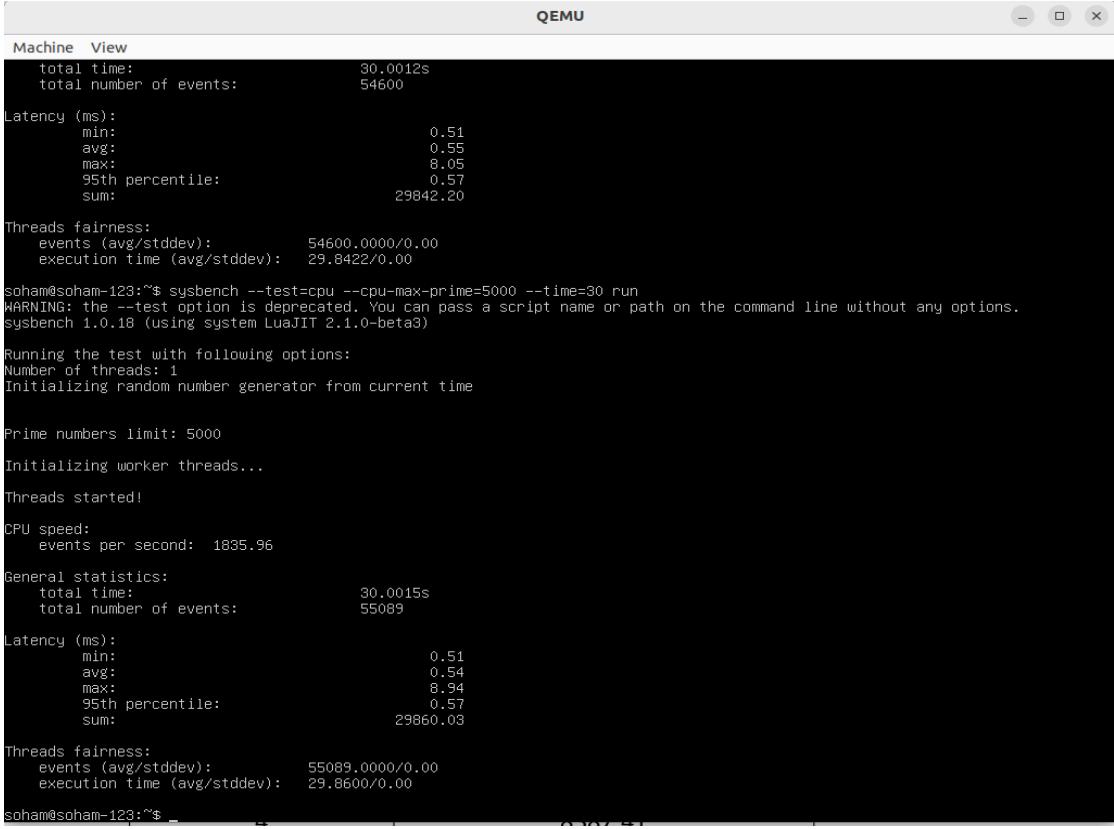
CPU speed:
events per second: 1819.70

General statistics:
total time: 30.0012s
total number of events: 54600

Latency (ms):
min: 0.51
avg: 0.55
max: 8.05
95th percentile: 0.97
sum: 29842.20

Threads fairness:
events (avg/stddev): 54600.0000/0.00
execution time (avg/stddev): 29.8422/0.00

soham@soham-123:~$
```



```

QEMU

Machine View
total time:          30.0012s
total number of events: 54600

Latency (ms):
min:                  0.51
avg:                  0.55
max:                  8.05
95th percentile:     0.57
sum:                 29842.20

Threads fairness:
events (avg/stddev): 54600.0000/0.00
execution time (avg/stddev): 29.8422/0.00

soham@soham-123:~$ sysbench --test=cpu --cpu-max-prime=5000 --time=30 run
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.18 (using system LuAJIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Prime numbers limit: 5000
Initializing worker threads...
Threads started!
CPU speed:
events per second: 1835.96

General statistics:
total time:          30.0015s
total number of events: 55089

Latency (ms):
min:                  0.51
avg:                  0.54
max:                  8.94
95th percentile:     0.57
sum:                 29860.03

Threads fairness:
events (avg/stddev): 55089.0000/0.00
execution time (avg/stddev): 29.8600/0.00

soham@soham-123:~$ _

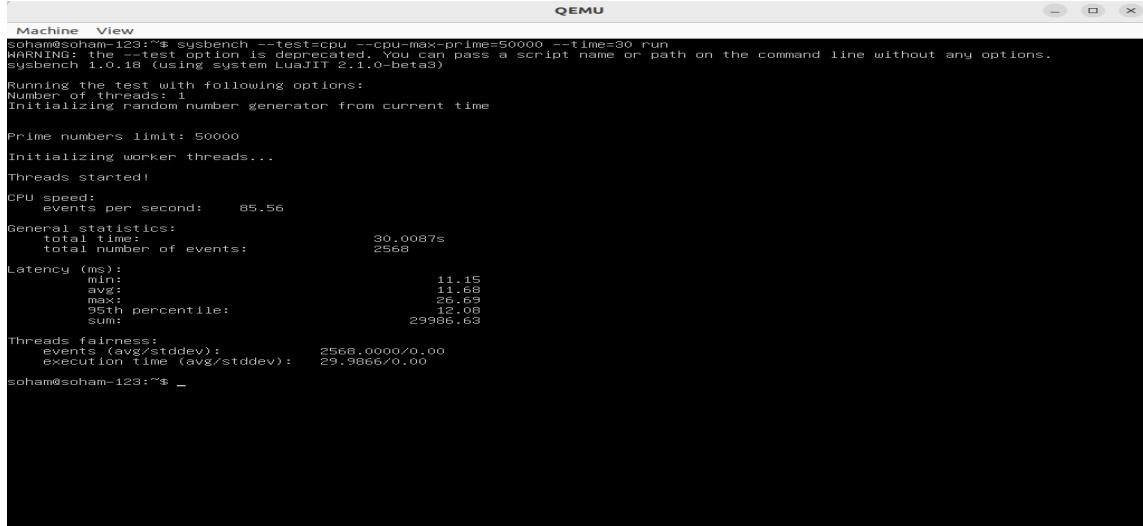
```

Iteration Number	Number of Events per Second
1	1858.37
2	1834.78
3	1819
4	1853.96
5	1835.96

Minimum:	1819
Maxmimum:	1858.37
Average:	1840.414
S. Deviation	15.93778153

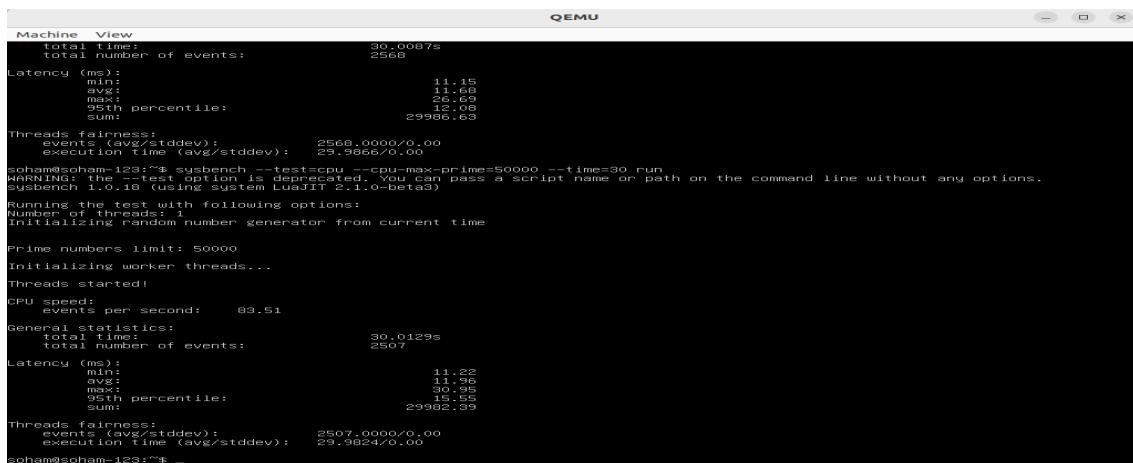
Case 2: max-prime = 50000

```
sysbench --test=cpu --cpu-max-prime=50000 --time=30 run
```



```
Machine View QEMU
soham@soham-123:~$ sysbench --test=cpu --cpu-max-prime=50000 --time=30 run
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)
Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Prime numbers limit: 50000
Initializing worker threads...
Threads started!
CPU speed:
  events per second:  85.56
General statistics:
  total time:           30.00087s
  total number of events: 2568
Latency (ms):
  min:                  11.15
  avg:                  11.68
  max:                  26.69
  50th percentile:      12.08
  sum:                  29986.63
Threads fairness:
  events (avg/stddev): 2568.0000/0.00
  execution time (avg/stddev): 29.9866/0.00
soham@soham-123:~$ _
```



```
Machine View QEMU
soham@soham-123:~$ sysbench --test=cpu --cpu-max-prime=50000 --time=30 run
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)
Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Prime numbers limit: 50000
Initializing worker threads...
Threads started!
CPU speed:
  events per second:  83.51
General statistics:
  total time:           30.0129s
  total number of events: 2507
Latency (ms):
  min:                  11.22
  avg:                  11.96
  max:                  20.00
  50th percentile:      15.55
  sum:                  29982.39
Threads fairness:
  events (avg/stddev): 2507.0000/0.00
  execution time (avg/stddev): 29.9824/0.00
soham@soham-123:~$ _
```

```

QEMU
Machine View
total time: 30.0129s
total number of events: 2507
Latency (ms):
min: 11.22
avg: 11.96
max: 30.95
95th percentile: 15.95
sum: 29962.39
Threads fairness:
events (avg/stddev): 2507.0000/0.00
execution time (avg/stddev): 29.9824/0.00
soham@soham-123:~$ sysbench --test=cpu --cpu-max-prime=50000 --time=30 run
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)
Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Prime numbers limit: 50000
Initializing worker threads...
Threads started!
CPU speed:
events per second: 81.04
General statistics:
total time: 30.0048s
total number of events: 2492
Latency (ms):
min: 11.26
avg: 12.32
max: 26.93
95th percentile: 16.71
sum: 29963.29
Threads fairness:
events (avg/stddev): 2492.0000/0.00
execution time (avg/stddev): 29.9633/0.00
soham@soham-123:~$ 

```

```

QEMU
Machine View
total time: 30.0048s
total number of events: 2432
Latency (ms):
min: 11.26
avg: 12.32
max: 26.93
95th percentile: 16.71
sum: 29963.29
Threads fairness:
events (avg/stddev): 2432.0000/0.00
execution time (avg/stddev): 29.9633/0.00
soham@soham-123:~$ sysbench --test=cpu --cpu-max-prime=50000 --time=30 run
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)
Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Prime numbers limit: 50000
Initializing worker threads...
Threads started!
CPU speed:
events per second: 86.86
General statistics:
total time: 30.0088s
total number of events: 2607
Latency (ms):
min: 11.22
avg: 11.50
max: 25.92
95th percentile: 11.65
sum: 29978.32
Threads fairness:
events (avg/stddev): 2607.0000/0.00
execution time (avg/stddev): 29.9783/0.00
soham@soham-123:~$ 

```

```

QEMU
Machine View
total time: 30.0088s
total number of events: 2607
Latency (ms):
min: 11.22
avg: 11.50
max: 25.92
95th percentile: 11.65
sum: 29978.32
Threads fairness:
events (avg/stddev): 2607.0000/0.00
execution time (avg/stddev): 29.9783/0.00
soham@soham-123:~$ sysbench --test=cpu --cpu-max-prime=50000 --time=30 run
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)
Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Prime numbers limit: 50000
Initializing worker threads...
Threads started!
CPU speed:
events per second: 85.01
General statistics:
total time: 30.0026s
total number of events: 2551
Latency (ms):
min: 11.18
avg: 11.75
max: 30.95
95th percentile: 11.87
sum: 29972.44
Threads fairness:
events (avg/stddev): 2551.0000/0.00
execution time (avg/stddev): 29.9724/0.00
soham@soham-123:~$ 

```

Iteration Number	Number of Events per Second
1	85.56
2	83.51
3	81.04

4	86.86
5	85.01

Minimum:	81.04
Maxmimum:	86.86
Average:	84.396
S. Deviation	2.227718564

I/O Testing

Sequential Read/Write

```
sysbench --num-threads=16 --test=fileio --file-total-size=2G --time=30  
--file-test-mode=seqrewr prepare  
sysbench --num-threads=16 --test=fileio --file-total-size=2G --time=30  
--file-test-mode=seqrewr run  
sysbench --num-threads=16 --test=fileio --file-total-size=2G --time=30  
--file-test-mode=seqrewr cleanup
```

QEMU

Machine View

```
soham@soham-123:~$ sysbench --test=fileio --file-total-size=2G --time=30 --file-test-mode=seqrewr prepare
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.18 (using system LuajIT 2.1.0-beta3)

128 files, 16384Kb each, 2048Mb total
Creating files for the test...
Extra file open flags: (none)
Creating file test_file.0
Creating file test_file.1
Creating file test_file.2
Creating file test_file.3
Creating file test_file.4
Creating file test_file.5
Creating file test_file.6
Creating file test_file.7
Creating file test_file.8
Creating file test_file.9
Creating file test_file.10
Creating file test_file.11
Creating file test_file.12
Creating file test_file.13
Creating file test_file.14
Creating file test_file.15
Creating file test_file.16
Creating file test_file.17
Creating file test_file.18
Creating file test_file.19
Creating file test_file.20
Creating file test_file.21
Creating file test_file.22
Creating file test_file.23
Creating file test_file.24
Creating file test_file.25
Creating file test_file.26
Creating file test_file.27
Creating file test_file.28
Creating file test_file.29
Creating file test_file.30
Creating file test_file.31
Creating file test_file.32
Creating file test_file.33
Creating file test_file.34
Creating file test_file.35
Creating file test_file.36
Creating file test_file.37
Creating file test_file.38
-
```

QEMU

Machine View

```
2147483648 bytes written in 17.16 seconds (119.34 MiB/sec).
soham@soham-123:~$ sysbench --test=fileio --file-total-size=2G --time=30 --file-test-mode=seqrewr run
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Extra file open flags: (none)
128 files, 16MiB each
2GiB total file size
Block size 16KiB
Periodic FSYNC enabled, calling fsync() each 100 requests.
Calling fsync() at the end of test, Enabled.
Using synchronous I/O mode
Doing sequential rewrite test
Initializing worker threads...

Threads started!

File operations:
  reads/s:          0.00
  writes/s:        2939.60
  fsyncs/s:        3763.48

Throughput:
  read, MiB/s:      0.00
  written, MiB/s:   45.93

General statistics:
  total time:       30.0356s
  total number of events: 201220

Latency (ms):
  min:              0.04
  avg:             0.14
  max:             41.73
  95th percentile: 0.18
  sum:            29056.43

Threads fairness:
  events (avg/stddev): 201220.0000/0.00
  execution time (avg/stddev): 29.0564/0.00

soham@soham-123:~$ _
```

QEMU

Machine View

```
soham@soham-123:~$ sysbench --test=fileio --file-total-size=2G --time=30 --file-test-mode=seqrewr run
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Extra file open flags: (none)
128 files, 16MiB each
2GiB total file size
Block size 16KiB
Periodic FSYNC enabled, calling fsync() each 100 requests.
Calling fsync() at the end of test, Enabled.
Using synchronous I/O mode
Doing sequential rewrite test
Initializing worker threads...

Threads started!

File operations:
  reads/s:          0.00
  writes/s:        4040.28
  fsyncs/s:        5175.45

Throughput:
  read, MiB/s:      0.00
  written, MiB/s:   68.18

General statistics:
  total time:       30.0192s
  total number of events: 276555

Latency (ms):
  min:              0.02
  avg:             0.10
  max:             11.96
  95th percentile: 0.15
  sum:            28938.90

Threads fairness:
  events (avg/stddev): 276555.0000/0.00
  execution time (avg/stddev): 28.9389/0.00

soham@soham-123:~$ _
```

```
QEMU
Machine View
saham@saham-123:~$ sysbench --test=fileio --file-total-size=2G --time=30 --file-test-mode=seqrewr run
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Extra file open flags: (none)
128 files, 16MB each
2GiB total file size
Block size 16KiB
Periodic FSYNC enabled, calling fsync() each 100 requests.
Calling fsync() at the end of test, Enabled.
Using synchronous I/O mode
Doing sequential rewrite test
Initializing worker threads...

Threads started!

File operations:
  reads/s:          0.00
  writes/s:        3647.43
  fsyncs/s:        4672.27

Throughput:
  read, MiB/s:      0.00
  written, MiB/s:   56.99

General statistics:
  total time:       30.0169s
  total number of events: 249639

Latency (ms):
  min:              0.04
  avg:              0.12
  max:              14.36
  95th percentile:  0.15
  sum:              29043.78

Threads fairness:
  events (avg/stddev):    249639.0000/0.00
  execution time (avg/stddev): 29.0438/0.00
saham@saham-123:~$
```

```
QEMU
Machine View
saham@saham-123:~$ sysbench --test=fileio --file-total-size=2G --time=30 --file-test-mode=seqrewr run
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Extra file open flags: (none)
128 files, 16MB each
2GiB total file size
Block size 16KiB
Periodic FSYNC enabled, calling fsync() each 100 requests.
Calling fsync() at the end of test, Enabled.
Using synchronous I/O mode
Doing sequential rewrite test
Initializing worker threads...

Threads started!

File operations:
  reads/s:          0.00
  writes/s:        3680.45
  fsyncs/s:        4714.38

Throughput:
  read, MiB/s:      0.00
  written, MiB/s:   57.51

General statistics:
  total time:       30.0195s
  total number of events: 251914

Latency (ms):
  min:              0.04
  avg:              0.12
  max:              15.82
  95th percentile:  0.15
  sum:              29056.58

Threads fairness:
  events (avg/stddev):    251914.0000/0.00
  execution time (avg/stddev): 29.0566/0.00
saham@saham-123:~$
```

```
QEMU
Machine View
saham@saham-123:~$ sysbench --test=fileio --file-total-size=2G --time=30 --file-test-mode=seqrewr run
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Extra file open flags: (none)
128 files, 16MB each
2GiB total file size
Block size 16KiB
Periodic FSYNC enabled, calling fsync() each 100 requests.
Calling fsync() at the end of test, Enabled.
Using synchronous I/O mode
Doing sequential rewrite test
Initializing worker threads...

Threads started!

File operations:
  reads/s:          0.00
  writes/s:        3680.45
  fsyncs/s:        4714.38

Throughput:
  read, MiB/s:      0.00
  written, MiB/s:   57.51

General statistics:
  total time:       30.0195s
  total number of events: 251914

Latency (ms):
  min:              0.04
  avg:              0.12
  max:              15.82
  95th percentile:  0.15
  sum:              29056.58

Threads fairness:
  events (avg/stddev):    251914.0000/0.00
  execution time (avg/stddev): 29.0566/0.00
saham@saham-123:~$
```

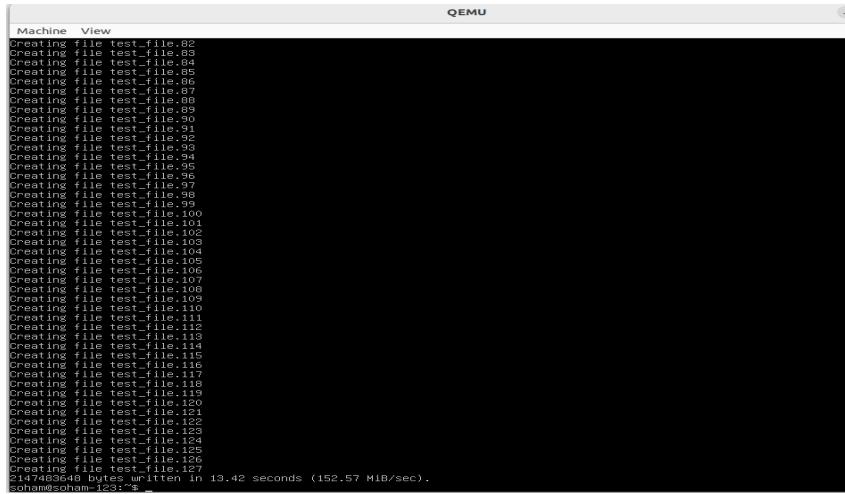
Serial Run Iterations	Results	
1	reads/s	0
	writes/sec	2939.60
	fsyncs/s	3763.48
2	reads/s	0
	writes/sec	4040.23
	fsyncs/s	5175.45
3	reads/s	0
	writes/sec	3647.43
	fsyncs/s	4672.27
4	reads/s	0
	writes/sec	3680.45
	fsyncs/s	4672.27
5	reads/s	0
	writes/sec	3638.22
	fsyncs/s	4659.10

Minimum read/s	0
Minimum write/s	2939.6
Minimum fsync/s	3763.48
Maximum read/s	0
Maximum write/s	4040.23
Maximum fsync/s	5175.45
Average read/s	0
Average write/s	3589.186
Average fsync/s	4588.514

S.Deviation	
read/s	0
S.Deviation	
write/s	399.8526215
S.Deviation	
fsync/s	510.9274625

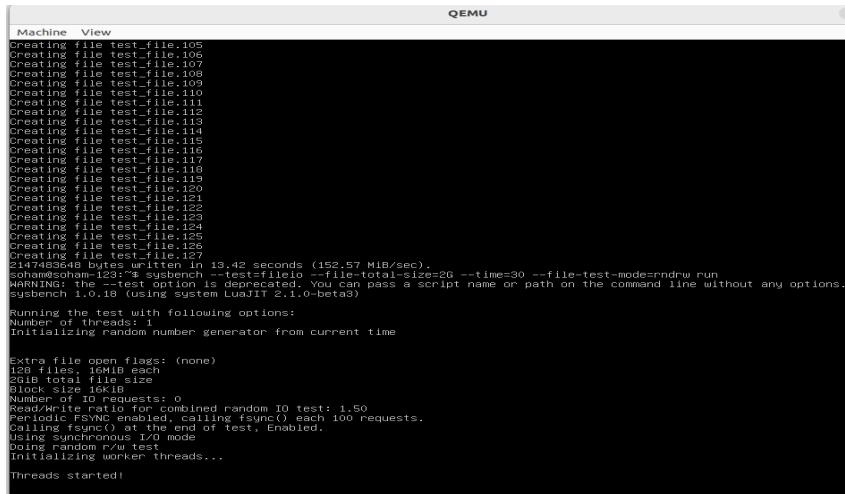
Combined Random 128 files upto 2GB

```
sysbench --test=fileio --file-total-size=2G --time=30
--file-test-mode=rndrw prepare
sysbench --test=fileio --file-total-size=2G --time=30
--file-test-mode=rndrw run
sysbench --test=fileio --file-total-size=2G --time=30
--file-test-mode=rndrw cleanup
```



Machine View

```
Creating file test_file.82
Creating file test_file.83
Creating file test_file.84
Creating file test_file.85
Creating file test_file.86
Creating file test_file.87
Creating file test_file.88
Creating file test_file.89
Creating file test_file.90
Creating file test_file.91
Creating file test_file.92
Creating file test_file.93
Creating file test_file.94
Creating file test_file.95
Creating file test_file.96
Creating file test_file.97
Creating file test_file.98
Creating file test_file.99
Creating file test_file.100
Creating file test_file.101
Creating file test_file.102
Creating file test_file.103
Creating file test_file.104
Creating file test_file.105
Creating file test_file.106
Creating file test_file.107
Creating file test_file.108
Creating file test_file.109
Creating file test_file.110
Creating file test_file.111
Creating file test_file.112
Creating file test_file.113
Creating file test_file.114
Creating file test_file.115
Creating file test_file.116
Creating file test_file.117
Creating file test_file.118
Creating file test_file.119
Creating file test_file.120
Creating file test_file.121
Creating file test_file.122
Creating file test_file.123
Creating file test_file.124
Creating file test_file.125
Creating file test_file.126
Creating file test_file.127
2147483640 bytes written in 13.42 seconds (152.57 MiB/sec).
sophomes@home-i23:~$ =
```



Machine View

```
Creating file test_file.105
Creating file test_file.106
Creating file test_file.107
Creating file test_file.108
Creating file test_file.109
Creating file test_file.110
Creating file test_file.111
Creating file test_file.112
Creating file test_file.113
Creating file test_file.114
Creating file test_file.115
Creating file test_file.116
Creating file test_file.117
Creating file test_file.118
Creating file test_file.119
Creating file test_file.120
Creating file test_file.121
Creating file test_file.122
Creating file test_file.123
Creating file test_file.124
Creating file test_file.125
Creating file test_file.126
Creating file test_file.127
2147483640 bytes written in 13.42 seconds (152.57 MiB/sec).
sophomes@home-i23:~$ sysbench --test=fileio --file-total-size=2G --time=30 --file-test-mode=rndrw run
WARNING: The --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.10 (using system LuAJIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Extra file open flags: (none)
128 files, 16MiB each
2GiB total file size
Block size: 1MiB
Number of IO requests: 0
Read/Write ratio for combined random IO test: 1.50
Per thread FSync enabled. Calling fsync() each 100 requests.
Calling sync() at the end of test. Enabled.
Using synchronous I/O mode
Only one thread per core
Initializing worker threads...
Threads started!
```

```

QEMU
Machine View
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.16 (using system LuajIT 2.1.0-beta3)
Running the test with following options:
Number of threads: 3
Initializing random number generator from current time

Extra file open flags: (none)
128 files, 16MB each
2048 total file size
Block size: 16KB
Number of IO requests: 0
Read/Write ratio for combined random IO test: 1:50
Periodic FSYNC enabled, calling fsync() each 100 requests.
Calling fsync() at the end of test, Enabled.
Using synchronous I/O mode
Doing random r/w test
Initializing worker threads...
Threads started!

File operations:
    reads/s:          770.21
    writes/s:         513.47
    fsyncs/s:        1643.72

Throughput:
    read, MiB/s:      12.03
    written, MiB/s:   8.02

General statistics:
    total time:       30.0635s
    total number of events: 87698

Latency (ms):
    min:               0.01
    avg:                0.33
    max:               9.52
    95th percentile:  1.32
    sum:            29360.19

Threads fairness:
    events (avg/stddev): 87298.0000/0.00
    execution time (avg/stddev): 29.3602/0.00
sopham@sopham-123:~$ sysbench --test=fileio --file-total-size=20 --time=30 --file-test-mode=rndrw run

```

```

QEMU
Machine View
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.16 (using system LuajIT 2.1.0-beta3)
Running the test with following options:
Number of threads: 3
Initializing random number generator from current time

Extra file open flags: (none)
128 files, 16MB each
2048 total file size
Block size: 16KB
Number of IO requests: 0
Read/Write ratio for combined random IO test: 1:50
Periodic FSYNC enabled, calling fsync() each 100 requests.
Calling fsync() at the end of test, Enabled.
Using synchronous I/O mode
Doing random r/w test
Initializing worker threads...
Threads started!

File operations:
    reads/s:          765.10
    writes/s:         510.07
    fsyncs/s:        1635.75

Throughput:
    read, MiB/s:      11.95
    written, MiB/s:   7.57

General statistics:
    total time:       30.0910s
    total number of events: 87502

Latency (ms):
    min:               0.01
    avg:                0.34
    max:               11.33
    95th percentile:  1.32
    sum:            29329.18

Threads fairness:
    events (avg/stddev): 87302.0000/0.00
    execution time (avg/stddev): 29.3292/0.00
sopham@sopham-123:~$ 

```

```

QEMU
Machine View
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.16 (using system LuajIT 2.1.0-beta3)
Running the test with following options:
Number of threads: 3
Initializing random number generator from current time

Extra file open flags: (none)
128 files, 16MB each
2048 total file size
Block size: 16KB
Number of IO requests: 0
Read/Write ratio for combined random IO test: 1:50
Periodic FSYNC enabled, calling fsync() each 100 requests.
Calling fsync() at the end of test, Enabled.
Using synchronous I/O mode
Doing random r/w test
Initializing worker threads...
Threads started!

File operations:
    reads/s:          761.85
    writes/s:         507.90
    fsyncs/s:        1626.79

Throughput:
    read, MiB/s:      11.90
    written, MiB/s:   7.94

General statistics:
    total time:       30.0514s
    total number of events: 86534

Latency (ms):
    min:               0.01
    avg:                0.34
    max:               10.23
    95th percentile:  1.32
    sum:            29302.58

Threads fairness:
    events (avg/stddev): 86394.0000/0.00
    execution time (avg/stddev): 29.3026/0.00
sopham@sopham-123:~$ 

```

```

QEMU
Machine View
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.16 (using system LuajIT 2.1.0-beta3)
Running the test with following options:
Number of threads: 3
Initializing random number generator from current time

Extra file open flags: (none)
128 files, 16MB each
2048 total file size
Block size: 16KB
Number of IO requests: 0
Read/Write ratio for combined random IO test: 1:50
Periodic FSYNC enabled, calling fsync() each 100 requests.
Calling fsync() at the end of test, Enabled.
Using synchronous I/O mode
Doing random r/w test
Initializing worker threads...
Threads started!

File operations:
    reads/s:          717.16
    writes/s:         478.11
    fsyncs/s:        1593.68

Throughput:
    read, MiB/s:      11.21
    written, MiB/s:   7.47

General statistics:
    total time:       20.0292s
    total number of events: 61836

Latency (ms):
    min:               0.01
    avg:                0.36
    max:               10.96
    95th percentile:  1.32
    sum:            29453.30

Threads fairness:
    events (avg/stddev): 81686.0000/0.00
    execution time (avg/stddev): 29.4533/0.00
sopham@sopham-123:~$ 

```

Serial Run Iterations	Results	
1	reads/s	766.59
	writes/sec	511.06
	fsyncs/s	1635.79
2	reads/s	770.21
	writes/sec	513.47
	fsyncs/s	1643.72
3	reads/s	765.10
	writes/sec	510.07
	fsyncs/s	1635.75
4	reads/s	761.89
	writes/sec	507.90
	fsyncs/s	1626.79
5	reads/s	717.16
	writes/sec	478.11
	fsyncs/s	1533.68

Minimum read/s	717.16
Minimum write/s	478.11
Minimum fsync/s	1533.68
Maximum read/s	770.21
Maximum write/s	513.47
Maximum fsync/s	1643.72
Average read/s	756.19
Average write/s	504.122

Average fsync/s	1615.146
S.Deviation read/s	22.02237158
S.Deviation write/s	14.67819028
S.Deviation fsync/s	45.9332802

Memory Test (upto 1 GB)

```
sysbench memory --memory-block-size=1G run
```

```

Machine View
soham@soham-123:~$ sysbench memory --memory-block-size=1G run
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)
Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Running memory speed test with the following options:
block size: 1048576kB
total size: 102400MiB
operation: write
scope: global

Initializing worker threads...
Threads started!

Total operations: 45 (~ 4.42 per second)
46080.00 MiB transferred (4525.57 MiB/sec)

General statistics:
total time: 10.1762s
total number of events: 45

Latency (ms):
min: 168.63
avg: 226.01
max: 339.12
with percentile:
sum: 10170.60

Threads fairness:
events (avg/stddev): 45.0000/0.00
execution time (avg/stddev): 10.1706/0.00
soham@soham-123:~$
```

```

Machine View
soham@soham-123:~$ sysbench memory --memory-block-size=1G run
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)
Running the test with following options:
Number of threads: 48
Initializing random number generator from current time

Running memory speed test with the following options:
block size: 1048576kB
total size: 102400MiB
operation: write
scope: global

Initializing worker threads...
Threads started!

Total operations: 48 (~ 4.71 per second)
49152.00 MiB transferred (4827.24 MiB/sec)

General statistics:
total time: 10.1774s
total number of events: 48

Latency (ms):
min: 199.49
avg: 211.85
max: 334.38
with percentile:
sum: 10168.85

Threads fairness:
events (avg/stddev): 48.0000/0.00
execution time (avg/stddev): 10.1689/0.00
soham@soham-123:~$
```

```
QEMU
Machine View
avg: 211.85
max: 360.96
95th percentile: 244.38
sum: 10168.85

Threads fairness:
events (avg/stddev): 48.0000/0.00
execution time (avg/stddev): 10.1689/0.00
soham@soham-123:~$ sysbench memory --memory-block-size=1G run
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Running memory speed test with the following options:
block size: 1048576KB
total size: 102400MB
operation: write
scope: global

Initializing worker threads...
Threads started!

Total operations: 45 ( 4.45 per second)
46080.00 MIB transferred (4554.03 MIB/sec)

General statistics:
total time: 10.1142s
total number of events: 45

Latency (ms):
min: 202.89
avg: 224.59
max: 356.36
95th percentile: 282.25
sum: 10106.58

Threads fairness:
events (avg/stddev): 45.0000/0.00
execution time (avg/stddev): 10.1066/0.00
soham@soham-123:~$ _
```

```
QEMU
Machine View
avg: 224.59
max: 356.36
95th percentile: 282.25
sum: 10106.58

Threads fairness:
events (avg/stddev): 45.0000/0.00
execution time (avg/stddev): 10.1066/0.00
soham@soham-123:~$ sysbench memory --memory-block-size=1G run
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Running memory speed test with the following options:
block size: 1048576KB
total size: 102400MB
operation: write
scope: global

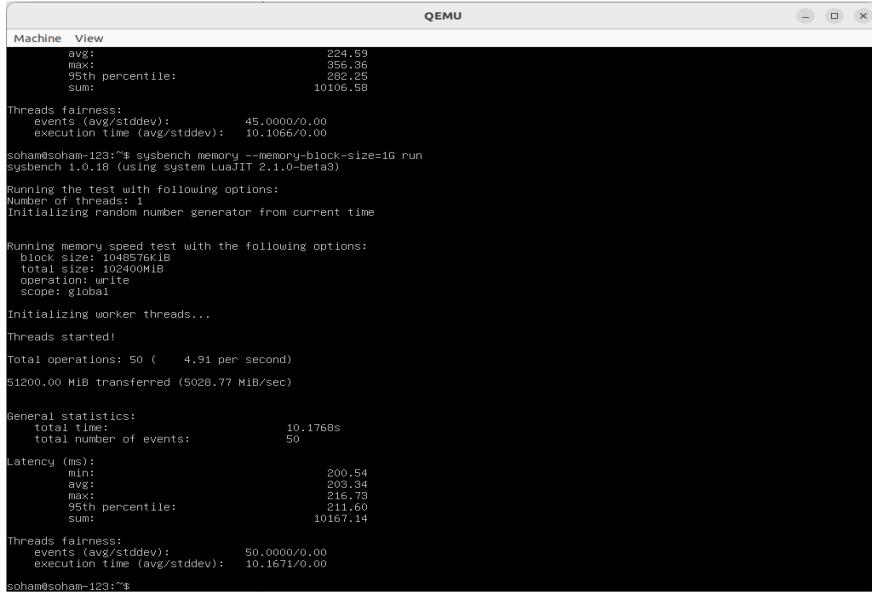
Initializing worker threads...
Threads started!

Total operations: 50 ( 4.91 per second)
51200.00 MIB transferred (5028.77 MIB/sec)

General statistics:
total time: 10.1768s
total number of events: 50

Latency (ms):
min: 200.54
avg: 203.94
max: 216.73
95th percentile: 211.60
sum: 10167.14

Threads fairness:
events (avg/stddev): 50.0000/0.00
execution time (avg/stddev): 10.1571/0.00
soham@soham-123:~$ _
```



```

Machine View
avg: 224.59
max: 356.36
95th percentile: 282.25
sum: 10106.58

Threads fairness:
events (avg/stddev): 45.0000/0.00
execution time (avg/stddev): 10.1066/0.00
soham@soham-123:~$ sysbench memory --memory-block-size=1G run
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Running memory speed test with the following options:
block size: 1048576kB
total size: 102400MiB
operation: write
scope: global

Initializing worker threads...
Threads started!

Total operations: 50 ( 4.91 per second)
51200.00 MiB transferred (5028.77 MiB/sec)

General statistics:
total time: 10.1768s
total number of events: 50

Latency (ms):
min: 200.54
avg: 203.34
max: 216.73
95th percentile: 211.60
sum: 10167.14

Threads fairness:
events (avg/stddev): 50.0000/0.00
execution time (avg/stddev): 10.1671/0.00
soham@soham-123:~$
```

Iteration Number	Number of Events	Total Time
1	45	101.762
2	48	10.1774
3	45	10.114
4	50	10.1768
5	41	10.0141

Minimum	0.4422082899
Maximum	4.91313576
Average	3.723036337
S. Deviation	1.859570919

Case 2: Upto 1 MB

```
sysbench memory --memory-block-run=1M run
```

```
Machine View
soham@soham-123:~$ sysbench memory --memory-block-size=1M run
sysbench 1.0.10 (using system LuajIT 2.1.0-beta3)
Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Running memory speed test with the following options:
  block size: 1024KiB
  total size: 102400MiB
  operation: write
  scope: global
  Initializing worker threads...
Threads started!
Total operations: 62365 ( 6233.35 per second)
62365.00 MiB transferred (6233.35 MiB/sec)

General statistics:
  total time:          10.00011s
  total number of events: 62365

Latency (ms):
  min:                 0.14
  avg:                 0.16
  max:                 0.25
  95th percentile:    0.25
  sum:                 9805.57

Threads fairness:
  events (avg/stddev):   62365.0000/0.00
  execution time (avg/stddev):  9.8055/0.00
soham@soham-123:~$
```

```
Machine View
soham@soham-123:~$ sysbench memory --memory-block-size=1M run
sysbench 1.0.10 (using system LuajIT 2.1.0-beta3)
Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Running memory speed test with the following options:
  block size: 1024KiB
  total size: 102400MiB
  operation: write
  scope: global
  Initializing worker threads...
Threads started!
Total operations: 67161 ( 6712.73 per second)
67161.00 MiB transferred (6712.73 MiB/sec)

General statistics:
  total time:          10.00105s
  total number of events: 67161

Latency (ms):
  min:                 0.14
  avg:                 0.16
  max:                 0.25
  95th percentile:    0.25
  sum:                 9796.70

Threads fairness:
  events (avg/stddev):   67161.0000/0.00
  execution time (avg/stddev):  9.7967/0.00
soham@soham-123:~$
```

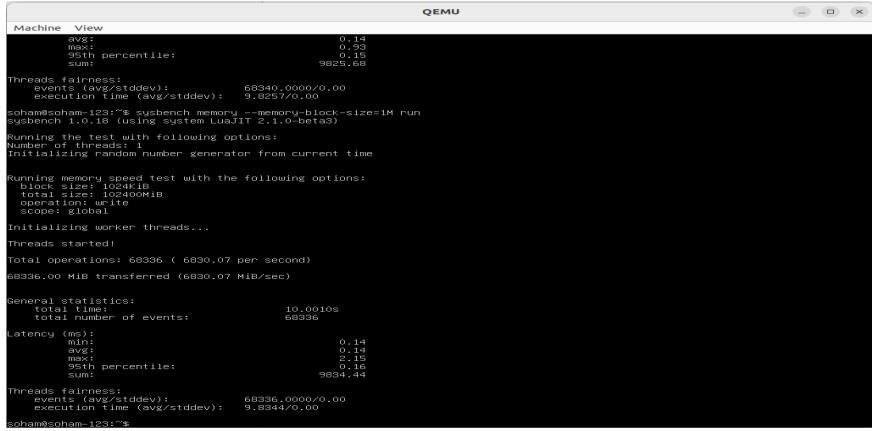
```
Machine View
soham@soham-123:~$ sysbench memory --memory-block-size=1M run
sysbench 1.0.10 (using system LuajIT 2.1.0-beta3)
Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Running memory speed test with the following options:
  block size: 1024KiB
  total size: 102400MiB
  operation: write
  scope: global
  Initializing worker threads...
Threads started!
Total operations: 68340 ( 6830.56 per second)
68340.00 MiB transferred (6830.56 MiB/sec)

General statistics:
  total time:          10.00310s
  total number of events: 68340

Latency (ms):
  min:                 0.14
  avg:                 0.14
  max:                 0.15
  95th percentile:    0.15
  sum:                 9825.68

Threads fairness:
  events (avg/stddev):   68340.0000/0.00
  execution time (avg/stddev):  9.8257/0.00
soham@soham-123:~$
```



```

Machine View
avg: 0.14
max: 0.95
min: 0.14
sum: 9825.68
Threads fairness:
events (avg/stddev): 68340.0000/0.00
execution time (avg/stddev): 9.8257/0.00
scham@scham-123:~$ susbench memory --memory-block-size=1M run
susbench 1.0.18 (using system LuajIT 2.1.0-beta3)
Running the test with following options:
Number of threads: 1
Initializing random number generator from current time
Running memory speed test with the following options:
Block size: 1MB
total size: 102400MB
operation: write
scope: global
Initializing worker threads...
Threads started!
Total operations: 68336 (~ 6830.07 per second)
68336.00 MIB transferred (6830.07 MIB/sec)

General statistics:
total time: 10.0010s
total number of events: 68336
Latency (ms):
min: 0.14
avg: 0.14
max: 2.15
99th percentile: 0.14
sum: 9834.44
Threads fairness:
events (avg/stddev): 68336.0000/0.00
execution time (avg/stddev): 9.8244/0.00
scham@scham-123:~$
```

Iteration Number	Number of Events	Total Time
1	10	62363
2	10.001	67161
3	10.0010	68340
4	10.0010	68336
5	10.0010	66863

Minimum	6236.3
Maximum	6833.316668
Average	6660.718654
S. Deviation	246.5700953

CONDITION 2: 2 GB RAM & 3 CORES on QEMU (qcow2)

```
soham@soham-System-Product-Name: ~
```

```
soham@soham-System-Product-Name: $ qemu-system-x86_64 -m 2048 -smp 2 -hda /path/to/ubuntu.img -boot d
qemu-system-x86_64: -hda /path/to/ubuntu.img: Could not open '/path/to/ubuntu.img': No such file or directory
soham@soham-System-Product-Name: $ qemu-system-x86_64 -m 2048 -smp 2 -hda /ubuntu.img -boot d
qemu-system-x86_64: -hda /ubuntu.img: Could not open '/ubuntu.img': No such file or directory
soham@soham-System-Product-Name: $ qemu-system-x86_64 -m 2048 -smp 2 -hda /home/soham/Documents/ubuntu.img -boot d
soham@soham-System-Product-Name: $ qemu-system-x86_64 -m 2048 -smp 3 -hda /home/soham/Documents/ubuntu.img -boot d
```

CPU Tests:

Case 1: Prime Number = 5000

```
sysbench --test=cpu --cpu-max-prime=5000 --time=30 run
```

```
Machine View
```

```
soham@soham-123:~$ sysbench --test=cpu --cpu-max-prime=5000 --time=30 run
WARNING! The --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.10 (using system LuaJIT 2.1.0-beta3)
Running the test with following options:
Number of threads: 5000
Initializing random number generator from current time

Prime numbers limit: 5000
Initializing worker threads...
Threads started!
CPU speed:
events per second: 1675.35
General statistics:
total time: 30.0025s
total number of events: 50272
Latency (ms):
min: 0.51
avg: 0.59
max: 10.59
95th percentile: 0.80
sum: 29814.04
Threads fairness:
events (avg/stddev): 50272.0000/0.00
execution time (avg/stddev): 29.8140/0.00
soham@soham-123:~$
```

```
Machine View
```

```
soham@soham-123:~$ sysbench --test=cpu --cpu-max-prime=5000 --time=30 run
WARNING! The --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.10 (using system LuaJIT 2.1.0-beta3)
Running the test with following options:
Number of threads: 5000
Initializing random number generator from current time

Prime numbers limit: 5000
Initializing worker threads...
Threads started!
CPU speed:
events per second: 1821.42
General statistics:
total time: 30.0020s
total number of events: 54656
Latency (ms):
min: 0.51
avg: 0.55
max: 5.31
95th percentile: 0.85
sum: 29854.84
Threads fairness:
events (avg/stddev): 54656.0000/0.00
execution time (avg/stddev): 29.8541/0.00
soham@soham-123:~$
```

```
QEMU
Machine View
total time: 30.00020s
total number of events: 54656

Latency (ms):
min: 0.51
avg: 0.55
max: 5.91
95th percentile: 0.65
sum: 29854.14

Threads fairness:
events (avg/stddev): 54656.0000/0.00
execution time (avg/stddev): 29.851/0.00

sahamsolaham-123:~$ sysbench --test=cpu --cpu-max-prime=5000 --time=30 run
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Prime numbers limit: 5000
Initializing worker threads...
Threads started!
CPU speed:
events per second: 1679.71

General statistics:
total time: 30.0050s
total number of events: 50407

Latency (ms):
min: 0.51
avg: 0.59
max: 10.39
95th percentile: 0.81
sum: 29802.77

Threads fairness:
events (avg/stddev): 50407.0000/0.00
execution time (avg/stddev): 29.8028/0.00

sahamsolaham-123:~$
```

```
QEMU
Machine View
total time: 30.00050s
total number of events: 50407

Latency (ms):
min: 0.51
avg: 0.59
max: 10.39
95th percentile: 0.81
sum: 29802.77

Threads fairness:
events (avg/stddev): 50407.0000/0.00
execution time (avg/stddev): 29.8028/0.00

sahamsolaham-123:~$ sysbench --test=cpu --cpu-max-prime=5000 --time=30 run
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Prime numbers limit: 5000
Initializing worker threads...
Threads started!
CPU speed:
events per second: 1856.88

General statistics:
total time: 30.0011s
total number of events: 55716

Latency (ms):
min: 0.50
avg: 0.54
max: 2.66
95th percentile: 0.56
sum: 29884.45

Threads fairness:
events (avg/stddev): 55716.0000/0.00
execution time (avg/stddev): 29.8844/0.00

sahamsolaham-123:~$
```

```
QEMU
Machine View
total time: 30.0011s
total number of events: 55716

Latency (ms):
min: 0.50
avg: 0.54
max: 2.66
95th percentile: 0.56
sum: 29884.45

Threads fairness:
events (avg/stddev): 55716.0000/0.00
execution time (avg/stddev): 29.8844/0.00

sahamsolaham-123:~$ sysbench --test=cpu --cpu-max-prime=5000 --time=30 run
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Prime numbers limit: 5000
Initializing worker threads...
Threads started!
CPU speed:
events per second: 1710.07

General statistics:
total time: 30.0015s
total number of events: 51312

Latency (ms):
min: 0.51
avg: 0.58
max: 10.87
95th percentile: 0.78
sum: 29772.12

Threads fairness:
events (avg/stddev): 51312.0000/0.00
execution time (avg/stddev): 29.7721/0.00

sahamsolaham-123:~$
```

Iteration Number	Number of Events per Second
1	1675.35
2	1821.42
3	1679.71
4	1856.88
5	1710.07

Minimum:	1675.35
Maxmimum:	1856.88
Average:	1748.686
S. Deviation	84.59200512

Case 2: Max Prime = 50,000

```
sysbench --test=cpu --cpu-max-prime=50000 --time=30 run
```

```
Machine View QEMU
soham@sham-123:~$ sysbench --test=cpu --cpu-max-prime=50000 --time=30 run
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.18 (using system LuAJIT 2.1.0-beta3)
Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Prime numbers limit: 50000
Initializing worker threads...
Threads started!
CPU speed:
  events per second: 87.50
General statistics:
  total time:          30.0069s
  total number of events: 2626
Latency (ms):
  min:                 11.11
  avg:                 11.42
  max:                 18.11
  95th percentile:    11.65
  sum:                 29950.64
Threads fairness:
  events (avg/stddev): 2626.0000/0.00
  execution time (avg/stddev): 29.9906/0.00
soham@sham-123:~$
```

```
Machine View QEMU
soham@sham-123:~$ sysbench --test=cpu --cpu-max-prime=50000 --time=30 run
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.18 (using system LuAJIT 2.1.0-beta3)
Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Prime numbers limit: 50000
Initializing worker threads...
Threads started!
CPU speed:
  events per second: 87.24
General statistics:
  total time:          30.0052s
  total number of events: 2018
Latency (ms):
  min:                 11.09
  avg:                 11.45
  max:                 16.74
  95th percentile:    11.65
  sum:                 29972.85
Threads fairness:
  events (avg/stddev): 2618.0000/0.00
  execution time (avg/stddev): 29.9728/0.00
soham@sham-123:~$
```

```
QEMU
Machine View
total time:          30.0052s
total number of events: 2618

Latency (ms):
min:                11.09
avg:                11.45
max:                16.74
95th percentile:   11.65
sum:                29972.85

Threads fairness:
events (avg/stddev): 2618.0000/0.00
execution time (avg/stddev): 29.9728/0.00

soham@soham-123:~$ sysbench --test=cpu --cpu-max-prime=50000 --time=30 run
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.18 (using system LuAJIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Prime numbers limit: 50000
Initializing worker threads...
Threads started!

CPU speed:
events per second: 83.51

General statistics:
total time:          30.0031s
total number of events: 2506

Latency (ms):
min:                11.11
avg:                11.96
max:                27.00
95th percentile:   15.27
sum:                29974.96

Threads fairness:
events (avg/stddev): 2506.0000/0.00
execution time (avg/stddev): 29.9750/0.00

soham@soham-123:~$
```

```
QEMU
Machine View
total time:          30.0031s
total number of events: 2506

Latency (ms):
min:                11.11
avg:                11.96
max:                27.00
95th percentile:   15.27
sum:                29974.96

Threads fairness:
events (avg/stddev): 2506.0000/0.00
execution time (avg/stddev): 29.9750/0.00

soham@soham-123:~$ sysbench --test=cpu --cpu-max-prime=50000 --time=30 run
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.18 (using system LuAJIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Prime numbers limit: 50000
Initializing worker threads...
Threads started!

CPU speed:
events per second: 86.75

General statistics:
total time:          30.0016s
total number of events: 2603

Latency (ms):
min:                11.15
avg:                11.52
max:                16.61
95th percentile:   11.65
sum:                29981.54

Threads fairness:
events (avg/stddev): 2603.0000/0.00
execution time (avg/stddev): 29.9815/0.00

soham@soham-123:~$
```

```
QEMU
Machine View
total time:          30.0016s
total number of events: 2603

Latency (ms):
min:                11.15
avg:                11.52
max:                16.61
95th percentile:   11.65
sum:                29981.54

Threads fairness:
events (avg/stddev): 2603.0000/0.00
execution time (avg/stddev): 29.9815/0.00

soham@soham-123:~$ sysbench --test=cpu --cpu-max-prime=50000 --time=30 run
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.18 (using system LuAJIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Prime numbers limit: 50000
Initializing worker threads...
Threads started!

CPU speed:
events per second: 83.62

General statistics:
total time:          30.0019s
total number of events: 2509

Latency (ms):
min:                11.09
avg:                11.94
max:                28.67
95th percentile:   16.12
sum:                29966.90

Threads fairness:
events (avg/stddev): 2509.0000/0.00
execution time (avg/stddev): 29.9669/0.00

soham@soham-123:~$
```

Iteration Number	Number of Events per Second
1	87.50
2	87.24
3	83.51
4	86.75
5	83.62

Minimum:	83.51
Maxmimum:	87.5
Average:	85.724
S. Deviation	1.989580358

I/O Operations

Case 1: Sequential Read/Write

```
sysbench --num-threads=1 --test=fileio --file-total-size=2G
--file-num=128 --file-test-mode=seqrewr prepare
sysbench --num-threads=1 --test=fileio --file-total-size=2G
--file-num=128 --file-test-mode=seqrewr run
sysbench --num-threads=1 --test=fileio --file-total-size=2G
--file-num=128 --file-test-mode=seqrewr cleanup
```

```
QEMU
Machine View
2147483648 bytes written in 15.44 seconds (132.68 MiB/sec).
soham@soham-123:~$ sysbench --num-threads=1 --test=fileio --file-total-size=2G --file-num=128 --file-test-mode=seqrewr prepare
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Extra file open flags: (none)
128 files, 16MiB each
2048B read size
Block size 16KiB
Periodic FSYNC enabled, calling fsync() each 100 requests.
Calling fsync() at the end of test, Enabled.
Using synchronous I/O mode
Doing sequential rewrite test
Initialazing worker threads...
Threads started!

File operations:
 reads/s: 0.00
 writes/s: 3248.23
 fsyncs/s: 4160.92

Throughput:
 read, MiB/s: 0.00
 written, MiB/s: 50.75

General statistics:
 total time: 10.0334s
 total number of events: 74232

Latency (ms):
 min: 0.04
 avg: 0.13
 max: 1.71
 95th percentile: 0.18
 sum: 9638.51

Threads fairness:
 events (avg/stddev): 74232.0000/0.00
 execution time (avg/stddev): 9.6985/0.00
soham@soham-123:~$
```

QEMU

Machine View

```
soham@soham-123:~$ sysbench --num-threads=1 --test=fileio --file-total-size=2G --file-num=128 --file-test-mode=sequential
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Extra file open flags: (none)
128 files, 16MB each
2GiB total file size
Block size 16KiB
Periodic FSYNC enabled, calling fsync() each 100 requests.
Calling fsync() at the end of test, Enabled.
Using synchronous I/O mode
Doing sequential rewrite test
Initializing worker threads...

Threads started!

File operations:
  reads/s:          0.00
  writes/s:        3031.23
  fsyncs/s:        3888.75

Throughput:
  read, MiB/s:      0.00
  written, MiB/s:   47.36

General statistics:
  total time:       10.0262s
  total number of events: 69272

Latency (ms):
  min:                  0.02
  avg:                 0.14
  max:                 27.95
  95th percentile:    0.19
  sum:                9678.64

Threads fairness:
  events (avg/stddev): 69272.0000/0.00
  execution time (avg/stddev): 9.6786/0.00

soham@soham-123:~$
```

QEMU

Machine View

```
soham@soham-123:~$ sysbench --num-threads=1 --test=fileio --file-total-size=2G --file-num=128 --file-test-mode=sequential
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Extra file open flags: (none)
128 files, 16MB each
2GiB total file size
Block size 16KiB
Periodic FSYNC enabled, calling fsync() each 100 requests.
Calling fsync() at the end of test, Enabled.
Using synchronous I/O mode
Doing sequential rewrite test
Initializing worker threads...

Threads started!

File operations:
  reads/s:          0.00
  writes/s:        3238.37
  fsyncs/s:        4155.58

Throughput:
  read, MiB/s:      0.00
  written, MiB/s:   50.60

General statistics:
  total time:       10.0333s
  total number of events: 74077

Latency (ms):
  min:                  0.02
  avg:                 0.13
  max:                 23.67
  95th percentile:    0.18
  sum:                9694.23

Threads fairness:
  events (avg/stddev): 74077.0000/0.00
  execution time (avg/stddev): 9.6942/0.00

soham@soham-123:~$
```

```
QEMU
Machine View
soham@soham-123:~$ sysbench --num-threads=1 --test=fileio --file-total-size=2G --file-num=128 --file-test-mode=segrew
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)
Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Extra file open flags: (none)
128 files, 16MiB each
2GiB total file size
Block Size 16KiB
Periodic FSYNC enabled, calling fsync() each 100 requests.
Call fsync() at the end of test, Enabled.
Using synchronous I/O mode
Doing sequential rewrite test
Initializing worker threads...
Threads started!

File operations:
  reads/s:          0.00
  writes/s:         3244.20
  fsyncs/s:        4164.15

Throughput:
  read, MiB/s:      0.00
  written, MiB/s:   50.69

General statistics:
  total time:       10.0141s
  total number of events: 74088

Latency (ms):
  min:              0.02
  avg:              0.19
  max:              27.27
  95th percentile:  0.18
  sum:              9694.12

Threads fairness:
  events (avg/stddev):    74088.0000/0.00
  execution time (avg/stddev): 9.6941/0.00
soham@soham-123:~$
```

```
QEMU
Machine View
soham@soham-123:~$ sysbench --num-threads=1 --test=fileio --file-total-size=2G --file-num=128 --file-test-mode=segrew
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)
Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Extra file open flags: (none)
128 files, 16MiB each
2GiB total file size
Block Size 16KiB
Periodic FSYNC enabled, calling fsync() each 100 requests.
Calling fsync() at the end of test, Enabled.
Using synchronous I/O mode
Doing sequential rewrite test
Initializing worker threads...
Threads started!

File operations:
  reads/s:          0.00
  writes/s:         4051.28
  fsyncs/s:        5189.62

Throughput:
  read, MiB/s:      0.00
  written, MiB/s:   63.30

General statistics:
  total time:       10.0174s
  total number of events: 92480

Latency (ms):
  min:              0.02
  avg:              0.10
  max:              14.65
  95th percentile:  0.15
  sum:              9669.59

Threads fairness:
  events (avg/stddev):    92480.0000/0.00
  execution time (avg/stddev): 9.6696/0.00
soham@soham-123:~$
```

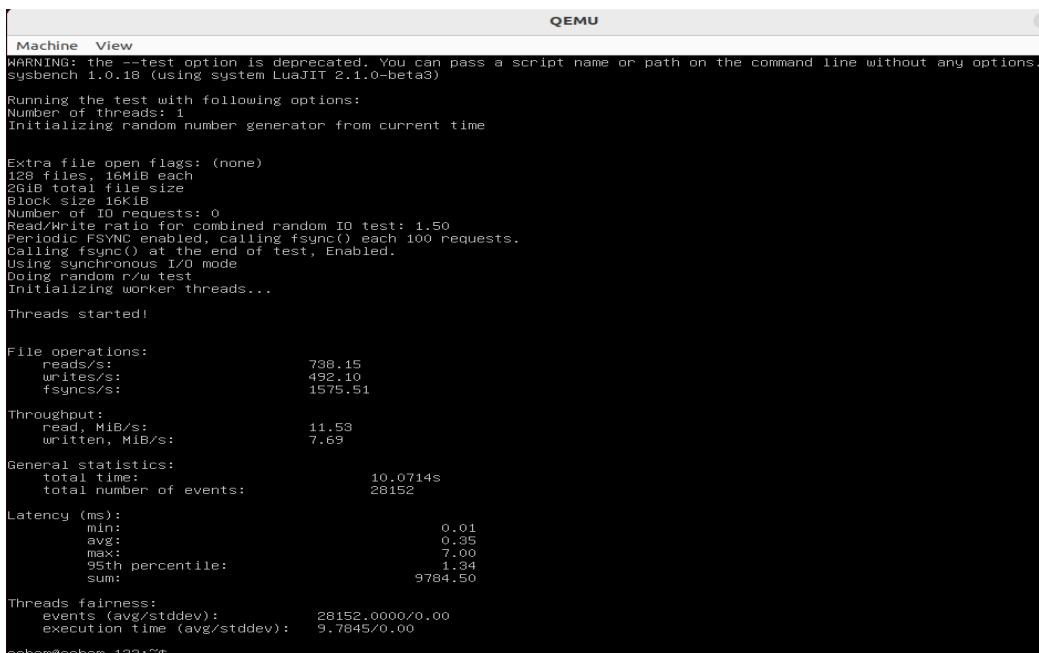
Serial Run Iterations	Results	
1	reads/s	0
	writes/sec	3248.23
	fsyncs/s	4160.92
2	reads/s	0
	writes/sec	3031.23
	fsyncs/s	3888.75
3	reads/s	0
	writes/sec	3238.37
	fsyncs/s	4155.58
4	reads/s	0
	writes/sec	3244.20
	fsyncs/s	4164.15
5	reads/s	0
	writes/sec	4051.28
	fsyncs/s	5189.62

Minimum read/s	0
Minimum write/s	3031.23
Minimum fsync/s	3888.75
Maximum read/s	0
Maximum write/s	4051.28
Maximum fsync/s	5189.62
Average read/s	0
Average write/s	3362.662
Average fsync/s	4311.804

S.Deviation read/s	0
S.Deviation write/s	395.7961438
S.Deviation fsync/s	504.6060939

Case 2: Combined Random

```
sysbench --num-threads=1 --test=fileio --file-total-size=2G
--file-num=128 --file-test-mode=rndrw prepare
sysbench --num-threads=1 --test=fileio --file-total-size=2G
--file-num=128 --file-test-mode=rndrw run
sysbench --num-threads=1 --test=fileio --file-total-size=2G
--file-num=128 --file-test-mode=rndrw cleanup
```



The screenshot shows a terminal window titled "QEMU" with the "Machine" tab selected. The output of the sysbench command is displayed:

```

Machine View
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Extra file open flags: (none)
128 files, 5MiB each
CPU thread file size
Block size 16KiB
Number of IO requests: 0
Read/Write ratio for combined random IO test: 1.50
Periodic FSYNC enabled, calling fsync() each 100 requests.
Calling fsync() at the end of test, Enabled.
Using synchronous I/O mode
Doing random r/w test
Initializing worker threads...
Threads started!

File operations:
  reads/s:          738.15
  writes/s:         492.10
  fsyncs/s:        1575.51

Throughput:
  read, MiB/s:      11.53
  written, MiB/s:   7.69

General statistics:
  total time:           10.0714s
  total number of events: 28152

Latency (ms):
  min:                  0.01
  avg:                  0.35
  max:                  7.04
  95th percentile:     1.84
  sum:                 9784.50

Threads fairness:
  events (avg/stddev): 28152.0000/0.00
  execution time (avg/stddev): 9.7845/0.00

```

```
QEMU
Machine View
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.16 (using system LUAJIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Extra file open flags: (none)
128 files, 16MiB each
2GiB total file size
Block size 16KiB
Number of IO requests: 0
Read/Write ratio for combined random IO test: 1.50
Periodic FSYNC enabled, calling fsync() each 100 requests.
Calling fsync() at the end of test, Enabled.
Using synchronous I/O mode
Doing random r/w test
Initializing worker threads...

Threads started!

File operations:
  reads/s:          770.77
  writes/s:         513.84
  fsyncs/s:        1656.41

Throughput:
  read, MiB/s:      12.04
  written, MiB/s:   8.03

General statistics:
  total time:       10.0394s
  total number of events: 29417

Latency (ms):
  min:              0.01
  avg:              0.33
  max:              13.85
  95th percentile:  1.50
  sum:             9812.44

Threads fairness:
  events (avg/stddev): 29417.0000/0.00
  execution time (avg/stddev): 9.8124/0.00
sobham@sobham-123:~$ sysbench --num-threads=1 --test=fileio --file-total-size=2G --file-num=128 --file-test-mode=randrw
```

```
QEMU
Machine View
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.16 (using system LUAJIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Extra file open flags: (none)
128 files, 16MiB each
2GiB total file size
Block size 16KiB
Number of IO requests: 0
Read/Write ratio for combined random IO test: 1.50
Periodic FSYNC enabled, calling fsync() each 100 requests.
Calling fsync() at the end of test, Enabled.
Using synchronous I/O mode
Doing random r/w test
Initializing worker threads...

Threads started!

File operations:
  reads/s:          788.67
  writes/s:         525.78
  fsyncs/s:        1692.55

Throughput:
  read, MiB/s:      12.32
  written, MiB/s:   8.22

General statistics:
  total time:       10.0366s
  total number of events: 30069

Latency (ms):
  min:              0.01
  avg:              0.33
  max:              13.09
  95th percentile:  1.30
  sum:             9781.80

Threads fairness:
  events (avg/stddev): 30069.0000/0.00
  execution time (avg/stddev): 9.7818/0.00
sobham@sobham-123:~$
```

```

QEMU
Machine View
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)
Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Extra file open flags: (none)
128 files, 16MB each
2GiB total file size
Block size 16KiB
Number of IO requests: 0
Read/Write ratio for combined random IO test: 1.50
Periodic FSYNC enabled, calling fsync() each 100 requests.
Calling fsync() at the end of test, Enabled.
Using synchronous I/O mode
Doing random r/w test
Initializing worker threads...
Threads started!

File operations:
  reads/s:          754.36
  writes/s:         502.91
  fsyncs/s:        1617.59

Throughput:
  read, MiB/s:      11.79
  written, MiB/s:   7.66

General statistics:
  total time:       10.0450s
  total number of events: 28768

Latency (ms):
  min:               0.01
  avg:              0.34
  max:              7.01
  95th percentile:  1.34
  sum:             9768.42

Threads fairness:
  events (avg/stddev): 28763.0000/0.00
  execution time (avg/stddev): 9.7684/0.00
soham@soham-123:~$ sysbench --num-threads=1 --test=fileio --file-total-size=2G --file-num=128 --file-test-mode=rndrw run

```

```

QEMU
Machine View
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)
Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Extra file open flags: (none)
128 files, 16MB each
2GiB total file size
Block size 16KiB
Number of IO requests: 0
Read/Write ratio for combined random IO test: 1.50
Periodic FSYNC enabled, calling fsync() each 100 requests.
Calling fsync() at the end of test, Enabled.
Using synchronous I/O mode
Doing random r/w test
Initializing worker threads...
Threads started!

File operations:
  reads/s:          734.92
  writes/s:         489.95
  fsyncs/s:        1574.21

Throughput:
  read, MiB/s:      11.48
  written, MiB/s:   7.66

General statistics:
  total time:       10.0378s
  total number of events: 27980

Latency (ms):
  min:               0.01
  avg:              0.35
  max:              23.62
  95th percentile:  1.27
  sum:             9815.75

Threads fairness:
  events (avg/stddev): 27980.0000/0.00
  execution time (avg/stddev): 9.8157/0.00
soham@soham-123:~$
```

Serial Run Iterations	Results	
1	reads/s	738.15
	writes/sec	492.10
	fsyncs/s	1575.51
2	reads/s	770.77
	writes/sec	513.84
	fsyncs/s	1656.41
3	reads/s	788.67

	writes/sec	525.70
	fsyncs/s	1692.55
4	reads/s	754.36
	writes/sec	502.91
	fsyncs/s	1617.59
	reads/s	734.92
5	writes/sec	489.95
	fsyncs/s	1574.21

Minimum read/s	734.92
Minimum write/s	489.95
Minimum fsync/s	1574.21
Maximum read/s	788.67
Maximum write/s	525.7
Maximum fsync/s	1692.55
Average read/s	757.374
Average write/s	504.9
Average fsync/s	1623.254
S.Deviation read/s	22.59270303
S.Deviation write/s	15.03218381
S.Deviation fsync/s	51.52218047

Memory Testing

Case 1: Upto 1GB

```
sysbench memory --memory-block-size=1G run
```

```
Machine View QEMU
soham@soham-123:~$ sysbench memory --memory-block-size=1G run
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Running memory speed test with the following options:
  block size: 1048576KB
  total size: 102400MIB
  operation: write
  scope: global

Initializing worker threads...
Threads started!

Total operations: 51 (  5.01 per second)
52224.00 MIB transferred (5126.86 MIB/sec)

General statistics:
  total time:          10.1807s
  total number of events: 51

Latency (ms):
  min:                197.50
  avg:                199.52
  max:                210.18
  95th percentile:    204.11
  sum:               10175.35

Threads fairness:
  events (avg/stddev):   51.0000/0.00
  execution time (avg/stddev):  10.1753/0.00
soham@soham-123:~$ _
```

```
Machine View QEMU
soham@soham-123:~$ sysbench memory --memory-block-size=1G run
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Running memory speed test with the following options:
  block size: 1048576KB
  total size: 102400MIB
  operation: write
  scope: global

Initializing worker threads...
Threads started!

Total operations: 50 (  4.95 per second)
51200.00 MIB transferred (5071.99 MIB/sec)

General statistics:
  total time:          10.0901s
  total number of events: 50

Latency (ms):
  min:                199.92
  avg:                201.64
  max:                222.59
  95th percentile:    204.11
  sum:               10081.95

Threads fairness:
  events (avg/stddev):   50.0000/0.00
  execution time (avg/stddev):  10.0819/0.00
soham@soham-123:~$ _
```

```
QEMU
Machine View
soham@soham-123:~$ sysbench memory --memory-block-size=1G run
sysbench 1.0.18 (using system Luajit 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Running memory speed test with the following options:
block size: 1048576KiB
total size: 102400MiB
operation: write
scope: global

Initializing worker threads...
Threads started!

Total operations: 46 ( 4.52 per second)
47104.00 MiB transferred (4626.22 MiB/sec)

General statistics:
total time: 10.1769s
total number of events: 46

Latency (ms):
min: 198.91
avg: 220.94
max: 320.17
95th percentile: 320.17
sum: 10163.15

Threads fairness:
events (avg/stddev): 46.0000/0.00
execution time (avg/stddev): 10.1631/0.00
soham@soham-123:~$ _
```

```
QEMU
Machine View
soham@soham-123:~$ sysbench memory --memory-block-size=1G run
sysbench 1.0.18 (using system Luajit 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Running memory speed test with the following options:
block size: 1048576KiB
total size: 102400MiB
operation: write
scope: global

Initializing worker threads...
Threads started!

Total operations: 49 ( 4.85 per second)
50176.00 MiB transferred (4964.69 MiB/sec)

General statistics:
total time: 10.1023s
total number of events: 49

Latency (ms):
min: 165.11
avg: 205.59
max: 306.97
95th percentile: 244.38
sum: 10073.96

Threads fairness:
events (avg/stddev): 49.0000/0.00
execution time (avg/stddev): 10.0740/0.00
soham@soham-123:~$ _
```

```
QEMU
Machine View
soham@soham-123:~$ sysbench memory --memory-block-size=1G run
sysbench 1.0.18 (using system Luajit 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Running memory speed test with the following options:
block size: 1048576KiB
total size: 102400MiB
operation: write
scope: global

Initializing worker threads...
Threads started!

Total operations: 47 ( 4.65 per second)
48128.00 MiB transferred (4766.57 MiB/sec)

General statistics:
total time: 10.0935s
total number of events: 47

Latency (ms):
min: 199.92
avg: 214.60
max: 298.44
95th percentile: 277.21
sum: 10086.25

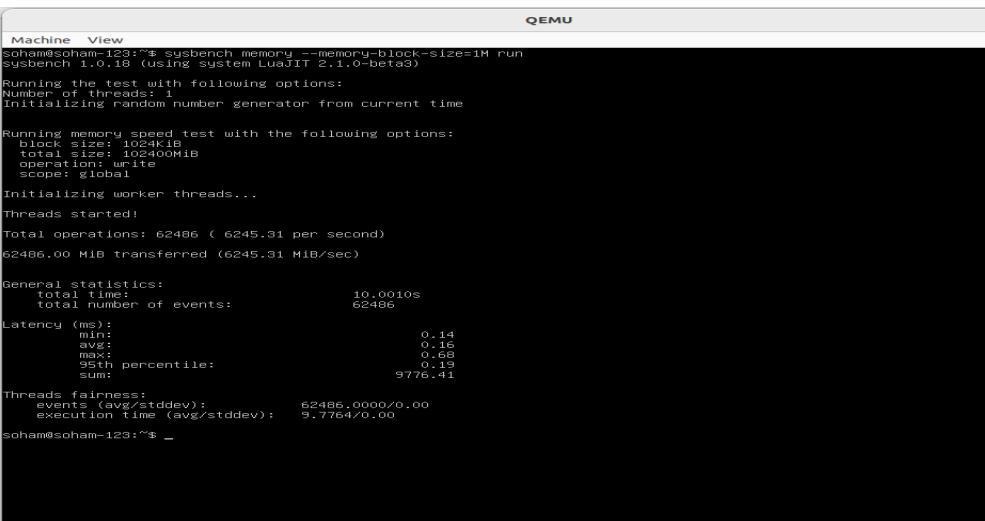
Threads fairness:
events (avg/stddev): 47.0000/0.00
execution time (avg/stddev): 10.0862/0.00
soham@soham-123:~$ clear_
```

Iteration Number	Number of Events	Total Time
1	51	10.1807
2	50	10.0901
3	46	10.1769
4	49	10.1023
5	47	10.0935

Minimum	4.520040484
Maximum	5.00947872
Average	4.798342833
S. Deviation	0.2058643992

Case 2: Upto 1MB

```
sysbench memory --memory-block-size=1M run
```



QEMU

```
Machine View
soham@soham-123:~$ sysbench memory --memory-block-size=1M run
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)
Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

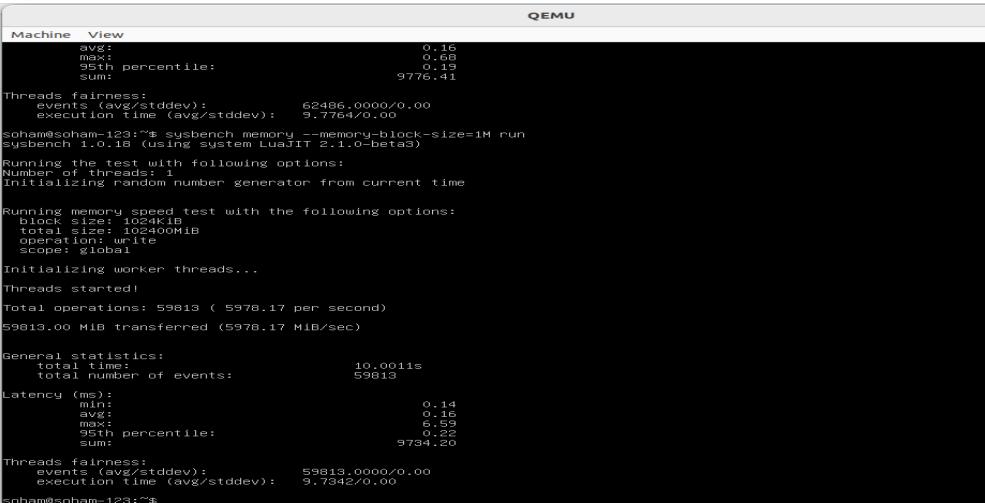
Running memory speed test with the following options:
  block size: 1024KiB
  total size: 102400MiB
  operation: write
  scope: global

Initializing worker threads...
Threads started!
Total operations: 62486 ( 6245.31 per second)
62486.00 MiB transferred (6245.31 MiB/sec)

General statistics:
  total time:          10.0010s
  total number of events: 62486

Latency (ms):
  min:                 0.14
  avg:                 0.16
  max:                 0.68
  95th percentile:    0.19
  sum:                9776.41

Threads fairness:
  events (avg/stddev):   62486.0000/0.00
  execution time (avg/stddev):  5.7764/0.00
soham@soham-123:~$ -
```

QEMU

```
Machine View
soham@soham-123:~$ sysbench memory --memory-block-size=1M run
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)
Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Running memory speed test with the following options:
  block size: 1024KiB
  total size: 102400MiB
  operation: write
  scope: global

Initializing worker threads...
Threads started!
Total operations: 59813 ( 5978.17 per second)
59813.00 MiB transferred (5978.17 MiB/sec)

General statistics:
  total time:          10.0011s
  total number of events: 59813

Latency (ms):
  min:                 0.14
  avg:                 0.16
  max:                 6.59
  95th percentile:    0.22
  sum:                9734.20

Threads fairness:
  events (avg/stddev):   59813.0000/0.00
  execution time (avg/stddev):  5.7342/0.00
soham@soham-123:~$ -
```

```

QEMU
Machine View
avg: 0.19
max: 15.48
95th percentile: 0.26
sum: 9736.66

Threads fairness:
events (avg/stddev): 52188.0000/0.00
execution time (avg/stddev): 5.7967/0.00

soham@soham-123:~$ sysbench memory --memory-block-size=1M run
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Running memory speed test with the following options:
block size: 1024KiB
total size: 102400MiB
operation: write
scope: global

Initializing worker threads...
Threads started!

Total operations: 63877 ( 6384.41 per second)
63877.00 MiB transferred (6384.41 MiB/sec)

General statistics:
total time: 10.0001s
total number of events: 63877

Latency (ms):
min: 0.14
avg: 0.15
max: 5.74
95th percentile: 0.20
sum: 9814.32

Threads fairness:
events (avg/stddev): 63877.0000/0.00
execution time (avg/stddev): 9.8143/0.00

soham@soham-123:~$
```

```

QEMU
Machine View
avg: 0.15
max: 5.74
95th percentile: 0.20
sum: 9814.32

Threads fairness:
events (avg/stddev): 63877.0000/0.00
execution time (avg/stddev): 9.8143/0.00

soham@soham-123:~$ sysbench memory --memory-block-size=1M run
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Running memory speed test with the following options:
block size: 1024KiB
total size: 102400MiB
operation: write
scope: global

Initializing worker threads...
Threads started!

Total operations: 67097 ( 6707.06 per second)
67097.00 MiB transferred (6707.06 MiB/sec)

General statistics:
total time: 10.0010s
total number of events: 67097

Latency (ms):
min: 0.14
avg: 0.15
max: 3.87
95th percentile: 0.17
sum: 9821.83

Threads fairness:
events (avg/stddev): 67097.0000/0.00
execution time (avg/stddev): 9.8218/0.00

soham@soham-123:~$
```

Iteration Number	Number of Events	Total Time
1	62486	10.0010
2	59813	10.0011
3	52188	10.0010
4	63877	10.0011
5	67097	10.0010

Minimum	5218.278172
Maximum	6709.029097
Average	6108.584406
S. Deviation	562.6926002

Condition 3: 3GB and 2 Cores on QEMU (qcow2)

```
soham@soham-System-Product-Name:~$ sudo qemu-img create ubuntu2.img 10G -f raw
[sudo] password for soham:
Formatting 'ubuntu2.img', fmt=raw size=10737418240
soham@soham-System-Product-Name:~$ ls
Desktop Documents Downloads Music Pictures Public snap Templates ubuntu2.img Videos
soham@soham-System-Product-Name:~$ qemu-system-x86_64 -m 2048 -smp 2 -hda /home/soham/ubuntu2.img -boot d
WARNING: Image format was not specified for '/home/soham/ubuntu2.img' and probing guessed raw.
        Automatically detecting the format is dangerous for raw images, write operations on block 0 will be restricted.
        Specify the 'raw' format explicitly to remove the restrictions.
qemu-system-x86_64: Could not open '/home/soham/ubuntu2.img': Permission denied
soham@soham-System-Product-Name:~$ qemu-system-x86_64 -m 2048 -smp 2 -drive file=/home/soham/ubuntu2.img,format=raw -boot d
qemu-system-x86_64: Could not open '/home/soham/ubuntu2.img': Permission denied
soham@soham-System-Product-Name:~$ ls -l /home/soham/ubuntu2.img
-rw-r--r-- 1 root root 10737418240 Feb 3 02:46 /home/soham/ubuntu2.img
soham@soham-System-Product-Name:~$ chmod +r /home/soham/ubuntu2.img
chmod: changing permissions of '/home/soham/ubuntu2.img': Operation not permitted
soham@soham-System-Product-Name:~$ sudo chown soham:soham /home/soham/ubuntu2.img
soham@soham-System-Product-Name:~$ chmod +r /home/soham/ubuntu2.img
soham@soham-System-Product-Name:~$ ls -l /home/soham/ubuntu2.img
-rw-r--r-- 1 soham soham 10737418240 Feb 3 02:46 /home/soham/ubuntu2.img
soham@soham-System-Product-Name:~$ qemu-system-x86_64 -m 2048 -smp 2 -drive file=/home/soham/ubuntu2.img,format=raw -boot d
soham@soham-System-Product-Name:~$ qemu-system-x86_64 -m 3072 -smp 2 -hda /home/soham/Documents/ubuntu.img -boot d
```

CPU Tests:

Case 1: max-prime = 5000

```
sysbench --test(cpu) --cpu-max-prime=5000 --time=30 run
```

```
Machine View
soham@soham-123:~$ sysbench --test(cpu) --cpu-max-prime=5000 --time=30 run
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.18 (using system LuajIT 2.1.0-beta3)
Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Prime numbers limit: 5000
Initializing worker threads...
Threads started!
CPU speed:
events per second: 1838.26
General statistics:
total time: 30.0010s
total number of events: 55163
Latency (ns):
min: 0.52
avg: 0.54
max: 1.43
95th percentile: 0.57
sum: 29885.54
Threads fairness:
events (avg/stddev): 55163.0000/0.00
execution time (avg/stddev): 29.8855/0.00
soham@soham-123:~$
```

```
QEMU
Machine View
total time: 30.00010s
total number of events: 55163

Latency (ms):
min: 0.52
avg: 0.54
max: 1.43
95th percentile: 0.57
sum: 29885.54

Threads fairness:
events (avg/stddev): 55163.0000/0.00
execution time (avg/stddev): 29.8855/0.00

soham@soham-123:~$ sysbench --test=cpu --cpu-max-prime=5000 --time=30 run
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.16 (using system LuaJIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Prime numbers limit: 5000
Initializing worker threads...
Threads started!
CPU speed:
events per second: 1749.40

General statistics:
total time: 30.00011s
total number of events: 52491

Latency (ms):
min: 0.52
avg: 0.57
max: 0.99
95th percentile: 0.74
sum: 29843.46

Threads fairness:
events (avg/stddev): 52491.0000/0.00
execution time (avg/stddev): 29.8435/0.00

soham@soham-123:~$
```

```
QEMU
Machine View
total time: 30.00011s
total number of events: 52491

Latency (ms):
min: 0.52
avg: 0.57
max: 0.99
95th percentile: 0.74
sum: 29843.46

Threads fairness:
events (avg/stddev): 52491.0000/0.00
execution time (avg/stddev): 29.8435/0.00

soham@soham-123:~$ sysbench --test=cpu --cpu-max-primes=5000 --time=30 run
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.16 (using system LuaJIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Prime numbers limit: 5000
Initializing worker threads...
Threads started!
CPU speed:
events per second: 1830.86

General statistics:
total time: 30.00014s
total number of events: 54935

Latency (ms):
min: 0.50
avg: 0.54
max: 6.30
95th percentile: 0.57
sum: 29874.22

Threads fairness:
events (avg/stddev): 54935.0000/0.00
execution time (avg/stddev): 29.8742/0.00

soham@soham-123:~$
```

```
QEMU
Machine View
total time: 30.00014s
total number of events: 54935

Latency (ms):
min: 0.50
avg: 0.54
max: 6.30
95th percentile: 0.57
sum: 29874.22

Threads fairness:
events (avg/stddev): 54935.0000/0.00
execution time (avg/stddev): 29.8742/0.00

soham@soham-123:~$ sysbench --test=cpu --cpu-max-prime=5000 --time=30 run
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.16 (using system LuaJIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Prime numbers limit: 5000
Initializing worker threads...
Threads started!
CPU speed:
events per second: 1830.98

General statistics:
total time: 30.00013s
total number of events: 48938

Latency (ms):
min: 0.51
avg: 0.61
max: 15.10
95th percentile: 0.88
sum: 29801.68

Threads fairness:
events (avg/stddev): 48938.0000/0.00
execution time (avg/stddev): 29.8017/0.00

soham@soham-123:~$
```

```

QEMU

Machine View
total time:          30.0013s
total number of events:    48938

Latency (ms):
min:                  0.51
avg:                  0.61
max:                 15.10
95th percentile:     0.83
sum:                29801.68

Threads fairness:
events (avg/stddev):   48938.0000/0.00
execution time (avg/stddev): 29.8017/0.00
soham@soham-123:~$ sysbench --test=cpu --cpu-max-prime=5000 --time=30 run
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Prime numbers limit: 5000
Initializing worker threads...
Threads started!
CPU speed:
events per second: 1748.59

General statistics:
total time:          30.0014s
total number of events:    52467

Latency (ms):
min:                  0.51
avg:                  0.57
max:                 10.05
95th percentile:     0.74
sum:                29840.61

Threads fairness:
events (avg/stddev):   52467.0000/0.00
execution time (avg/stddev): 29.8406/0.00
soham@soham-123:~$
```

Iteration Number	Number of Events per Second
1	1838.26
2	1749.40
3	1830.86
4	1630.98
5	1748.59

Minimum:	1630.98
Maxmimum:	1838.26
Average:	1759.618
S. Deviation	83.71640532

Case 2: Max-Prime = 50,000

```
sysbench --test=cpu --cpu-max-prime=5000 --time=30 run
```

The screenshot shows a terminal window titled "QEMU" with the command `sysbench --test=cpu --cpu-max-prime=5000 --time=30 run` being executed. The output indicates that the `--test` option is deprecated and suggests using a script name or path instead. It shows the test is running with 1 thread, initializing random number generator from current time, and prime numbers limit set to 50000. The CPU speed is listed as 86.19 events per second. General statistics show a total time of 30.0009s and 2586 events. Latency statistics show a minimum of 11.28ms, average of 11.59ms, maximum of 18.13ms, 95th percentile of 11.87ms, and a sum of 29983.96ms. Thread fairness shows events and execution time both at 2586.0000/0.00. The session ends with a blank line.

```
Machine View
soham@soham-123:~$ sysbench --test=cpu --cpu-max-prime=50000 --time=30 run
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Prime numbers limit: 50000
Initializing worker threads...
Threads started!

CPU speed:
events per second: 86.19

General statistics:
total time: 30.0009s
total number of events: 2586

Latency (ms):
min: 11.28
avg: 11.59
max: 18.13
95th percentile: 11.87
sum: 29983.96

Threads fairness:
events (avg/stddev): 2586.0000/0.00
execution time (avg/stddev): 29.9840/0.00

soham@soham-123:~$ _
```

This screenshot shows a second terminal session with identical output to the first, indicating the same test configuration and results for max-prime 50,000. The output includes the deprecation warning for the `--test` option, the use of LuaJIT 2.1.0-beta3, and the detailed performance metrics for CPU speed, general statistics, latency, and thread fairness.

```
Machine View
soham@soham-123:~$ sysbench --test=cpu --cpu-max-prime=50000 --time=30 run
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Prime numbers limit: 50000
Initializing worker threads...
Threads started!

CPU speed:
events per second: 86.81

General statistics:
total time: 30.0029s
total number of events: 2515

Latency (ms):
min: 11.17
avg: 11.92
max: 20.01
95th percentile: 15.55
sum: 29975.19

Threads fairness:
events (avg/stddev): 2515.0000/0.00
execution time (avg/stddev): 29.9752/0.00

soham@soham-123:~$ _
```

```
QEMU
Machine View
total time: 30.0029s
total number of events: 2515
Latency (ms):
min: 11.17
avg: 11.92
max: 28.19
95th percentile: 15.55
sum: 29975.19
Threads fairness:
events (avg/stddev): 2515.0000/0.00
execution time (avg/stddev): 29.9752/0.00
sobam@sobam-123:~$ sysbench --test=cpu --cpu-max-prime=50000 --time=30 run
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)
Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Prime numbers limit: 50000
Initializing worker threads...
Threads started!
CPU speed:
events per second: 82.65
General statistics:
total time: 30.0036s
total number of events: 2480
Latency (ms):
min: 11.21
avg: 12.08
max: 26.78
95th percentile: 19.89
sum: 29966.36
Threads fairness:
events (avg/stddev): 2480.0000/0.00
execution time (avg/stddev): 29.9664/0.00
sobam@sobam-123:~$
```

```
QEMU
Machine View
total time: 30.0036s
total number of events: 2480
Latency (ms):
min: 11.21
avg: 12.08
max: 26.78
95th percentile: 15.83
sum: 29966.36
Threads fairness:
events (avg/stddev): 2480.0000/0.00
execution time (avg/stddev): 29.9664/0.00
sobam@sobam-123:~$ sysbench --test=cpu --cpu-max-prime=50000 --time=30 run
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)
Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Prime numbers limit: 50000
Initializing worker threads...
Threads started!
CPU speed:
events per second: 83.02
General statistics:
total time: 30.0123s
total number of events: 2492
Latency (ms):
min: 11.28
avg: 12.03
max: 30.38
95th percentile: 15.00
sum: 29978.28
Threads fairness:
events (avg/stddev): 2492.0000/0.00
execution time (avg/stddev): 29.9783/0.00
sobam@sobam-123:~$
```

```

QEMU
Machine View
total time: 30.0123s
total number of events: 2492

Latency (ms):
min: 11.28
avg: 12.03
max: 30.38
95th percentile: 15.00
sum: 29978.28

Threads fairness:
events (avg/stddev): 2492.0000/0.00
execution time (avg/stddev): 29.9783/0.00

soham@soham-123:~$ sysbench --test=cpu --cpu-max-prime=50000 --time=30 run
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
subbench 1.0.18 (using system LuaJIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Prime numbers limit: 50000
Initializing worker threads...
Threads started!
CPU speed:
events per second: 88.36

General statistics:
total time: 30.0112s
total number of events: 2502

Latency (ms):
min: 11.17
avg: 11.98
max: 26.88
95th percentile: 15.55
sum: 29984.02

Threads fairness:
events (avg/stddev): 2502.0000/0.00
execution time (avg/stddev): 29.9840/0.00

soham@soham-123:~$
```

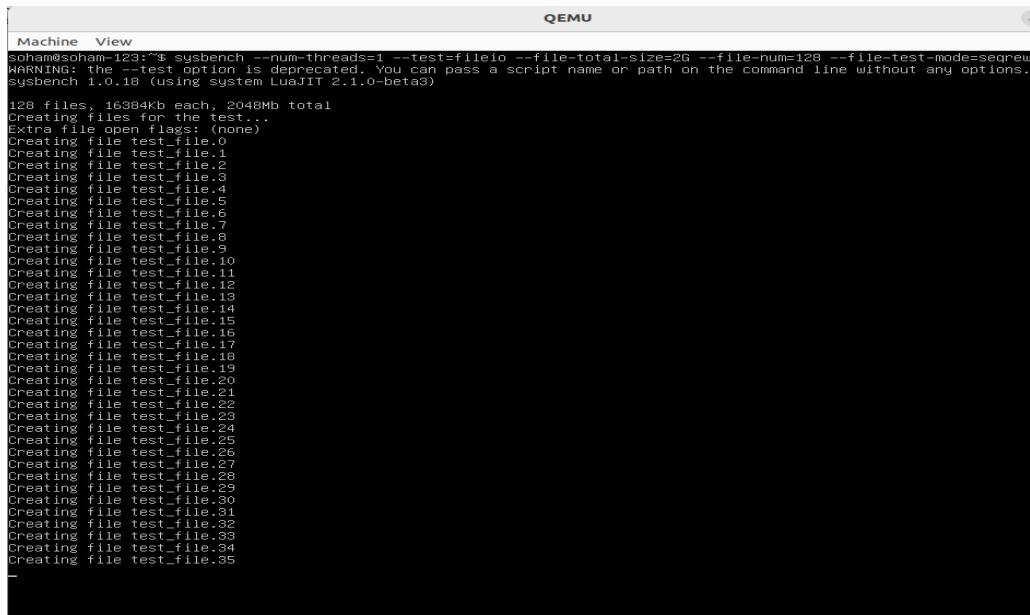
Iteration Number	Number of Events per Second
1	86.19
2	83.81
3	82.65
4	83.02
5	83.36

Minimum:	82.65
Maxmimum:	86.19
Average:	83.806
S. Deviation	1.399689251

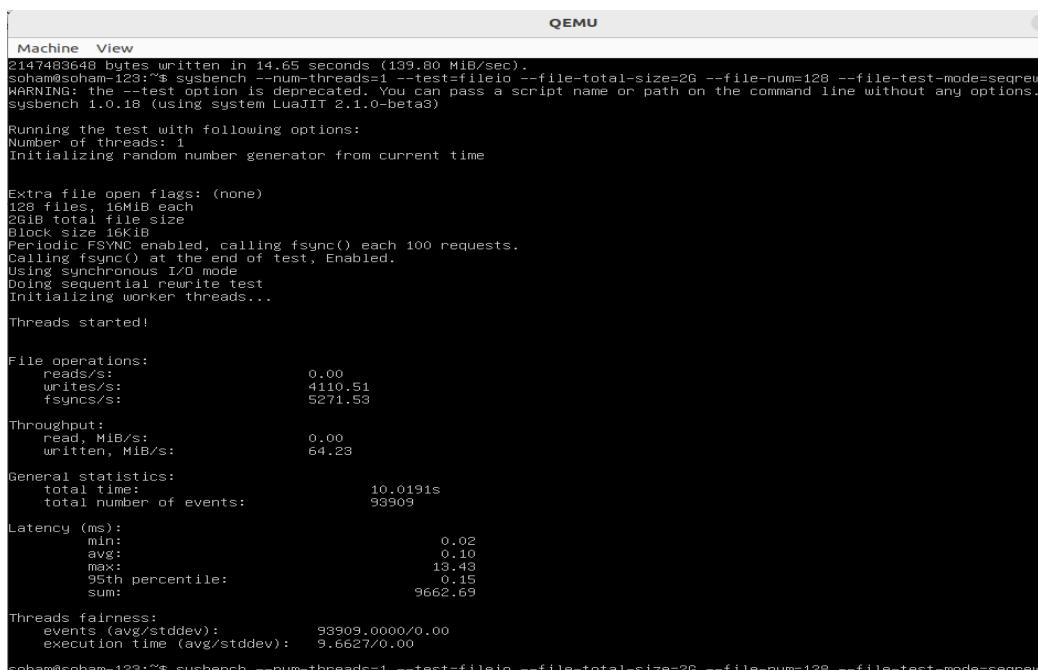
I/O Operation Test:

Case 1: Sequential Read/Write

```
sysbench --num-threads=1 --test=fileio --file-total-size=2G  
--file-num=128 --file-test-mode=seqrewr prepare  
sysbench --num-threads=1 --test=fileio --file-total-size=2G  
--file-num=128 --file-test-mode=seqrewr run  
sysbench --num-threads=1 --test=fileio --file-total-size=2G  
--file-num=128 --file-test-mode=seqrewr cleanup
```



```
Machine View QEMU  
soham@soham-123:~$ sysbench --num-threads=1 --test=fileio --file-total-size=2G --file-num=128 --file-test-mode=seqrewr prepare  
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.  
sysbench 1.0.18 (using system LuajIT 2.1.0-beta3)  
128 files, 16384kb each, 2048Mb total  
Creating files for the test...  
Extra file open flags: (none)  
Creating file test_file.0  
Creating file test_file.1  
Creating file test_file.2  
Creating file test_file.3  
Creating file test_file.4  
Creating file test_file.5  
Creating file test_file.6  
Creating file test_file.7  
Creating file test_file.8  
Creating file test_file.9  
Creating file test_file.10  
Creating file test_file.11  
Creating file test_file.12  
Creating file test_file.13  
Creating file test_file.14  
Creating file test_file.15  
Creating file test_file.16  
Creating file test_file.17  
Creating file test_file.18  
Creating file test_file.19  
Creating file test_file.20  
Creating file test_file.21  
Creating file test_file.22  
Creating file test_file.23  
Creating file test_file.24  
Creating file test_file.25  
Creating file test_file.26  
Creating file test_file.27  
Creating file test_file.28  
Creating file test_file.29  
Creating file test_file.30  
Creating file test_file.31  
Creating file test_file.32  
Creating file test_file.33  
Creating file test_file.34  
Creating file test_file.35
```



```
Machine View QEMU  
soham@soham-123:~$ sysbench --num-threads=1 --test=fileio --file-total-size=2G --file-num=128 --file-test-mode=seqrewr run  
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.  
sysbench 1.0.18 (using system LuajIT 2.1.0-beta3)  
  
Running the test with following options:  
Number of threads: 1  
Initializing random number generator from current time  
  
Extra file open flags: (none)  
128 files, 16MiB each  
2GiB total file size  
Block size: 16KiB  
Periodic FSYNC enabled, calling fsync() each 100 requests.  
Calling sync() at the end of test, Enabled.  
Using synchronous I/O mode  
Doing sequential rewrite test  
Initializing worker threads...  
Threads started!  
  
File operations:  
  reads/s:          0.00  
  writes/s:        4110.51  
  fsyncs/s:       5271.53  
  
Throughput:  
  read, MiB/s:      0.00  
  written, MiB/s:   64.23  
  
General statistics:  
  total time:           10.0191s  
  total number of events: 93909  
  
Latency (ms):  
  min:                 0.02  
  avg:                 0.10  
  max:                13.43  
  95th percentile:     0.15  
  sum:                9662.69  
  
Threads fairness:  
  events (avg/stddev): 93909.0000/0.00  
  execution time (avg/stddev): 9.6627/0.00  
soham@soham-123:~$ sysbench --num-threads=1 --test=fileio --file-total-size=2G --file-num=128 --file-test-mode=seqrewr cleanup
```

```
QEMU
Machine View
soham@soham-123:~$ sysbench --num-threads=1 --test=fileio --file-total-size=2G --file-num=128 --file-test-mode=seqrew
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)
Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Extra file open flags: (none)
2GB files, 16MB each
2GiB total file size
Block Size 16KiB
Periodic FSYNC enabled, calling fsync() each 100 requests.
Calling fsync() at the end of test, Enabled.
Using synchronous I/O mode
Doing sequential rewrite test
Initializing worker threads...

Threads started!

File operations:
  reads/s:          0.00
  writes/s:        4172.24
  fsyncs/s:       5348.65

Throughput:
  read, MiB/s:      0.00
  written, MiB/s:   65.19

General statistics:
  total time:      10.0145s
  total number of events: 95258

Latency (ms):
  min:              0.02
  avg:              0.05
  max:             14.52
  95th percentile: 0.15
  sum:            9649.10

Threads fairness:
  events (avg/stddev): 95258.0000/0.00
  execution time (avg/stddev): 9.6491/0.00
soham@soham-123:~$
```

```
QEMU
Machine View
soham@soham-123:~$ sysbench --num-threads=1 --test=fileio --file-total-size=2G --file-num=128 --file-test-mode=seqrew
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)
Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Extra file open flags: (none)
128 files, 16MiB each
2GiB total file size
Block size 16KiB
Periodic FSYNC enabled, calling fsync() each 100 requests.
Calling fsync() at the end of test, Enabled.
Using synchronous I/O mode
Doing sequential rewrite test
Initializing worker threads...

Threads started!

File operations:
  reads/s:          0.00
  writes/s:        3670.93
  fsyncs/s:       4711.57

Throughput:
  read, MiB/s:      0.00
  written, MiB/s:   57.41

General statistics:
  total time:      10.0184s
  total number of events: 83934

Latency (ms):
  min:              0.02
  avg:              0.12
  max:             24.91
  95th percentile: 0.16
  sum:            9659.95

Threads fairness:
  events (avg/stddev): 83934.0000/0.00
  execution time (avg/stddev): 9.6600/0.00
soham@soham-123:~$
```

QEMU

Machine View

```

soham@soham-123:~$ sysbench --num-threads=1 --test=fileio --file-total-size=2G --file-num=128 --file-test-mode=seqrewr run
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Extra file open flags: (none)
128 files, 64MB each
2GB total filesize
Block size 16KB
Periodic FSYNC enabled, calling fsync() each 100 requests.
Calling fsync() at the end of test, Enabled.
Using synchronous I/O mode
Doing sequential rewrite test
Initializing worker threads...

Threads started!

File operations:
  reads/s:          0.00
  writes/s:        3553.59
  fsyncs/s:       4557.78

Throughput:
  read, MiB/s:      0.00
  written, MiB/s:   55.52

General statistics:
  total time:      10.0154s
  total number of events: 81132

Latency (ms):
  min:              0.02
  avg:             0.12
  max:            28.08
  95th percentile: 0.17
  sum:            9679.08

Threads fairness:
  events (avg/stddev): 81132.0000/0.00
  execution time (avg/stddev): 9.6791/0.00

soham@soham-123:~$ 
```

Serial Run Iterations	Results	
1	reads/s	0
	writes/sec	4110.51
	fsyncs/s	5271.53
2	reads/s	0
	writes/sec	3322.29
	fsyncs/s	4258.32
3	reads/s	0
	writes/sec	4172.24

	fsyncs/s	5348.65
4	reads/s	0
	writes/sec	3673.93
	fsyncs/s	4711.57
5	reads/s	0
	writes/sec	3553.59
	fsyncs/s	4557.78

Minimum read/s	0
Minimum write/s	3322.29
Minimum fsync/s	4258.32
Maximum read/s	0
Maximum write/s	4172.24
Maximum fsync/s	5348.65
Average read/s	0
Average write/s	3766.512
Average fsync/s	4829.57
S.Deviation read/s	0
S.Deviation write/s	365.4415904
S.Deviation fsync/s	468.7464812

Case 2: Combined Random

```
sysbench --num-threads=1 --test=fileio --file-total-size=2G  
--file-num=128 --file-test-mode=rndrw prepare  
sysbench --num-threads=1 --test=fileio --file-total-size=2G  
--file-num=128 --file-test-mode=rndrw run  
sysbench --num-threads=1 --test=fileio --file-total-size=2G  
--file-num=128 --file-test-mode=rndrw cleanup
```

```
QEMU  
Machine View  
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.  
sysbench 1.0.18 (using system LuajIT 2.1.0-beta3)  
Running the test with following options:  
Number of threads: 1  
Initializing random number generator from current time  
  
Extra file open flags: (none)  
128 files, 16MiB each  
2GiB total file size  
Block size 16KiB  
Number of I/O requests: 0  
Read/WRITE ratio for combined random IO test: 1.50  
Periodic FSYNC enabled, calling fsync() each 100 requests.  
Calling fsync() at the end of test, Enabled.  
Using synchronous I/O mode  
Doing random r/w test  
Initializing worker threads...  
  
Threads started!  
  
File operations:  
    reads/s:          795.34  
    writes/s:         530.16  
    fsyncs/s:        1707.98  
  
Throughput:  
    read, MiB/s:     12.43  
    written, MiB/s:  8.28  
  
General statistics:  
    total time:      10.0864s  
    total number of events: 30335  
  
Latency (ms):  
    min:              0.01  
    avg:              0.32  
    max:              9.58  
    95th percentile: 11.35  
    sum:             9750.00  
  
Threads fairness:  
    events (avg/stddev): 30335.0000/0.00  
    execution time (avg/stddev): 9.7506/0.00  
soham@soham-123:~$
```

```
QEMU  
Machine View  
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.  
sysbench 1.0.18 (using system LuajIT 2.1.0-beta3)  
Running the test with following options:  
Number of threads: 1  
Initializing random number generator from current time  
  
Extra file open flags: (none)  
128 files, 16MiB each  
2GiB total file size  
Block size 16KiB  
Number of I/O requests: 0  
Read/WRITE ratio for combined random IO test: 1.50  
Periodic FSYNC enabled, calling fsync() each 100 requests.  
Calling fsync() at the end of test, Enabled.  
Using synchronous I/O mode  
Doing random r/w test  
Initializing worker threads...  
  
Threads started!  
  
File operations:  
    reads/s:          847.30  
    writes/s:         564.87  
    fsyncs/s:        1808.67  
  
Throughput:  
    read, MiB/s:     13.24  
    written, MiB/s:  8.83  
  
General statistics:  
    total time:      10.0526s  
    total number of events: 32259  
  
Latency (ms):  
    min:              0.01  
    avg:              0.30  
    max:              17.00  
    95th percentile: 1.27  
    sum:             9785.05  
  
Threads fairness:  
    events (avg/stddev): 32259.0000/0.00  
    execution time (avg/stddev): 9.7851/0.00  
soham@soham-123:~$
```

```
QEMU
Machine View
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
subbench 1.0.18 (using system Luajit 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Extra file open flags: (none)
128 files, 16MiB each
2GiB total file size
Block size 16KiB
Number of IO requests: 0
Read/Write ratio for combined random IO test: 1.50
Periodic FSYNC enabled, calling fsync() each 100 requests.
Calling fsync() at the end of test, Enabled.
Using synchronous I/O mode
Doing random r/w/test
Initializing worker threads...
Threads started!

File operations:
  reads/s:          785.93
  writes/s:         523.95
  fsyncs/s:        1676.74

Throughput:
  read, MiB/s:      12.28
  written, MiB/s:   8.19

General statistics:
  total time:       10.0711s
  total number of events: 29969

Latency (ms):
  min:               0.01
  avg:              0.35
  max:              9.23
  95th percentile:  1.34
  sum:             9758.56

Threads fairness:
  events (avg/stddev): 29969.0000/0.00
  execution time (avg/stddev): 9.7586/0.00
soham@soham-123:~$
```

```
QEMU
Machine View
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
subbench 1.0.18 (using system Luajit 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Extra file open flags: (none)
128 files, 16MiB each
2GiB total file size
Block size 16KiB
Number of IO requests: 0
Read/Write ratio for combined random IO test: 1.50
Periodic FSYNC enabled, calling fsync() each 100 requests.
Calling fsync() at the end of test, Enabled.
Using synchronous I/O mode
Doing random r/w/test
Initializing worker threads...
Threads started!

File operations:
  reads/s:          757.97
  writes/s:         505.32
  fsyncs/s:        1622.78

Throughput:
  read, MiB/s:      11.84
  written, MiB/s:   7.90

General statistics:
  total time:       10.0502s
  total number of events: 28886

Latency (ms):
  min:               0.01
  avg:              0.34
  max:              16.78
  95th percentile:  1.32
  sum:             9810.48

Threads fairness:
  events (avg/stddev): 28886.0000/0.00
  execution time (avg/stddev): 9.8105/0.00
soham@soham-123:~$
```

```
QEMU
Machine View
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
subbench 1.0.18 (using system Luajit 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Extra file open flags: (none)
128 files, 16MiB each
2GiB total file size
Block size 16KiB
Number of IO requests: 0
Read/Write ratio for combined random IO test: 1.50
Periodic FSYNC enabled, calling fsync() each 100 requests.
Calling fsync() at the end of test, Enabled.
Using synchronous I/O mode
Doing random r/w/test
Initializing worker threads...
Threads started!

File operations:
  reads/s:          857.53
  writes/s:         571.76
  fsyncs/s:        1830.89

Throughput:
  read, MiB/s:      13.40
  written, MiB/s:   8.93

General statistics:
  total time:       10.0629s
  total number of events: 32693

Latency (ms):
  min:               0.01
  avg:              0.30
  max:              15.86
  95th percentile:  1.27
  sum:             9788.23

Threads fairness:
  events (avg/stddev): 32693.0000/0.00
  execution time (avg/stddev): 9.7882/0.00
soham@soham-123:~$
```

Serial Run Iterations	Results	
1	reads/s	795.34
	writes/sec	530.16
	fsyncs/s	1707.98
2	reads/s	847.30
	writes/sec	564.87
	fsyncs/s	1808.67
3	reads/s	785.93
	writes/sec	523.95
	fsyncs/s	1676.74
4	reads/s	757.97
	writes/sec	505.32
	fsyncs/s	1622.78
5	reads/s	857.53
	writes/sec	571.76
	fsyncs/s	1830.89

Minimum read/s	757.97
Minimum write/s	505.32
Minimum fsync/s	1622.78
Maximum read/s	857.53
Maximum write/s	571.76
Maximum fsync/s	1830.89
Average read/s	808.814
Average write/s	539.212

Average fsync/s	1729.412
S.Deviation read/s	42.26333908
S.Deviation write/s	28.20124235
S.Deviation fsync/s	88.29449116

Memory Tests

Case 1: Upto 1 GB

```
sysbench memory --memory-block-size=1G run
```

```

Machine View QEMU
soham@soham-123:~$ sysbench memory --memory-block-size=1G run
sysbench 1.0.18 (using system LuajIT 2.1.0-beta3)
Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Running memory speed test with the following options:
  block size: 1048576KiB
  total size: 102400MiB
  operation: write
  scope: global

Initializing worker threads...
Threads started!

Total operations: 48 ( 4.70 per second)
49152.00 MiB transferred (4817.67 MiB/sec)

General statistics:
  total time: 10.1980s
  total number of events: 48

Latency (ms):
  min: 200.03
  avg: 212.31
  max: 359.02
  95th percentile: 244.38
  sum: 10191.07

Threads fairness:
  events (avg/stddev): 48.0000/0.00
  execution time (avg/stddev): 10.1911/0.00
soham@soham-123:~$ _

```

```
QEMU
Machine View
avg: 212.31
max: 359.02
95th percentile: 244.38
sum: 10191.07

Threads fairness:
events (avg/stddev): 48.0000/0.00
execution time (avg/stddev): 10.1911/0.00
soham@soham-123:~$ sysbench memory --memory-block-size=1G run
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Running memory speed test with the following options:
block size: 1048576KiB
total size: 102400MiB
operation: write
scope: global

Initializing worker threads...
Threads started!

Total operations: 51 ( 5.03 per second)
52224.00 MiB transferred (5155.71 MiB/sec)

General statistics:
total time: 10.1236s
total number of events: 51

Latency (ms):
min: 164.61
avg: 198.10
max: 220.46
95th percentile: 207.82
sum: 10103.34

Threads fairness:
events (avg/stddev): 51.0000/0.00
execution time (avg/stddev): 10.1033/0.00
soham@soham-123:~$
```

```
QEMU
Machine View
avg: 198.10
max: 220.46
95th percentile: 207.82
sum: 10103.34

Threads fairness:
events (avg/stddev): 51.0000/0.00
execution time (avg/stddev): 10.1033/0.00
soham@soham-123:~$ sysbench memory --memory-block-size=1G run
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Running memory speed test with the following options:
block size: 1048576KiB
total size: 102400MiB
operation: write
scope: global

Initializing worker threads...
Threads started!

Total operations: 47 ( 4.69 per second)
48128.00 MiB transferred (4801.12 MiB/sec)

General statistics:
total time: 10.0197s
total number of events: 47

Latency (ms):
min: 196.71
avg: 213.02
max: 293.37
95th percentile: 272.27
sum: 10011.97

Threads fairness:
events (avg/stddev): 47.0000/0.00
execution time (avg/stddev): 10.0120/0.00
soham@soham-123:~$
```

```
QEMU
Machine View
avg: 213.02
max: 293.37
95th percentile: 272.27
sum: 10011.97

Threads fairness:
events (avg/stddev): 47.0000/0.00
execution time (avg/stddev): 10.0120/0.00
soham@soham-123:~$ sysbench memory --memory-block-size=1G run
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Running memory speed test with the following options:
block size: 1048576KiB
total size: 102400MiB
operation: write
scope: global

Initializing worker threads...
Threads started!

Total operations: 50 ( 4.97 per second)
51200.00 MiB transferred (5090.13 MiB/sec)

General statistics:
total time: 10.0529s
total number of events: 50

Latency (ms):
min: 199.16
avg: 204.04
max: 220.06
95th percentile: 207.82
sum: 10041.80

Threads fairness:
events (avg/stddev): 50.0000/0.00
execution time (avg/stddev): 10.0418/0.00
soham@soham-123:~$
```

```

QEMU
Machine View
avg: 200.84
max: 220.06
95th percentile: 207.82
sum: 10041.80

Threads fairness:
events (avg/stddev): 50.0000/0.00
execution time (avg/stddev): 10.0418/0.00
soham@soham-123:~$ sysbench memory --memory-block-size=1G run
sysbench 1.0.18 (using system LuajIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Running memory speed test with the following options:
block size: 1048576KiB
total size: 102400MiB
operation: write
scope: global

Initializing worker threads...
Threads started!

Total operations: 46 ( 4.55 per second)
47104.00 MiB transferred (4662.12 MiB/sec)

General statistics:
total time: 10.0986s
total number of events: 46

Latency (ms):
min: 165.14
avg: 219.30
max: 337.78
95th percentile: 292.60
sum: 10067.72

Threads fairness:
events (avg/stddev): 46.0000/0.00
execution time (avg/stddev): 10.0877/0.00
soham@soham-123:~$ 

```

Iteration Number	Number of Events	Total Time
1	48	10.1980
2	51	10.1236
3	47	10.0197
4	50	10.0529
5	46	10.0986

Minimum	4.555086844
Maximum	5.037733613
Average	4.79281482
S. Deviation	0.204345501

Case 3: Upto 1 MB

```
sysbench memory --memory-block-size=1G run
```

```
QEMU
Machine View
block size: 1024KiB
total size: 102400MiB
operation: write
scope: global

Initializing worker threads...
Threads started!

Total operations: 68220 ( 6818.60 per second)
68220.00 MiB transferred (6818.60 MiB/sec)

General statistics:
    total time:           10.0010s
    total number of events: 68220

Latency (ms):
    min:                  0.14
    avg:                  0.14
    max:                  2.68
    95th percentile:      0.15
    sum:                 9831.83

Threads fairness:
    events (avg/stddev): 68220.0000/0.00
    execution time (avg/stddev): 9.8318/0.00
soham@soham-123:~$ sysbench memory --memory-block-size=1M run
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Running memory speed test with the following options:
    block size: 1024KiB
    total size: 102400MiB
    operation: write
    scope: global

Initializing worker threads...
Threads started!
```

```
QEMU
Machine View
    avg:                  0.16
    max:                  0.68
    95th percentile:      0.19
    sum:                 9776.41

Threads fairness:
    events (avg/stddev): 62486.0000/0.00
    execution time (avg/stddev): 9.7764/0.00
soham@soham-123:~$ sysbench memory --memory-block-size=1M run
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Running memory speed test with the following options:
    block size: 1024KiB
    total size: 102400MiB
    operation: write
    scope: global

Initializing worker threads...
Threads started!

Total operations: 59813 ( 5978.17 per second)
59813.00 MiB transferred (5978.17 MiB/sec)

General statistics:
    total time:           10.0011s
    total number of events: 59813

Latency (ms):
    min:                  0.14
    avg:                  0.16
    max:                  5.92
    95th percentile:      0.22
    sum:                 9734.20

Threads fairness:
    events (avg/stddev): 59813.0000/0.00
    execution time (avg/stddev): 9.7942/0.00
soham@soham-123:~$ _
```

```
Machine View
avg:          0.16
max:          9.25
95th percentile: 0.21
sum:         9805.57

Threads fairness:
events (avg/stddev):    62365.0000/0.00
execution time (avg/stddev): 9.8056/0.00
soham@soham-123:$ sysbench memory --memory-block-size=1M run
sysbench 1.0.18 (using system LuajIT 2.1.0-beta3)
Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Running memory speed test with the following options:
block size: 1024KiB
total size: 102400MiB
operation: write
scope: global
Initializing worker threads...
Threads started!
Total operations: 67161 ( 6712.73 per second)
67161.00 MiB transferred (6712.73 MiB/sec)

General statistics:
total time:           10.0010s
total number of events: 67161

Latency (ms):
min:                 0.14
avg:                 0.15
max:                 3.21
95th percentile:    0.16
sum:                9796.70

Threads fairness:
events (avg/stddev):    67161.0000/0.00
execution time (avg/stddev): 9.7967/0.00
soham@soham-123:$
```

```
Machine View
avg:          0.15
max:          7.70
95th percentile: 0.17
sum:         9819.71

Threads fairness:
events (avg/stddev):    66397.0000/0.00
execution time (avg/stddev): 9.8197/0.00
soham@soham-123:$ sysbench memory --memory-block-size=1M run
sysbench 1.0.18 (using system LuajIT 2.1.0-beta3)
Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Running memory speed test with the following options:
block size: 1024KiB
total size: 102400MiB
operation: write
scope: global
Initializing worker threads...
Threads started!
Total operations: 52378 ( 5232.99 per second)
52378.00 MiB transferred (5232.99 MiB/sec)

General statistics:
total time:           10.0026s
total number of events: 52378

Latency (ms):
min:                 0.14
avg:                 0.19
max:                 10.54
95th percentile:    0.26
sum:                9752.54

Threads fairness:
events (avg/stddev):    52378.0000/0.00
execution time (avg/stddev): 9.7929/0.00
soham@soham-123:$
```

```
Machine View
avg:          0.19
max:          10.54
95th percentile: 0.26
sum:         9752.54

Threads fairness:
events (avg/stddev):    52378.0000/0.00
execution time (avg/stddev): 9.7525/0.00
soham@soham-123:$ sysbench memory --memory-block-size=1M run
sysbench 1.0.18 (using system LuajIT 2.1.0-beta3)
Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Running memory speed test with the following options:
block size: 1024KiB
total size: 102400MiB
operation: write
scope: global
Initializing worker threads...
Threads started!
Total operations: 62733 ( 6267.66 per second)
62733.00 MiB transferred (6267.66 MiB/sec)

General statistics:
total time:           10.0026s
total number of events: 62733

Latency (ms):
min:                 0.14
avg:                 0.16
max:                 10.82
95th percentile:    0.21
sum:                9806.70

Threads fairness:
events (avg/stddev):    62733.0000/0.00
execution time (avg/stddev): 9.8067/0.00
soham@soham-123:$
```

Iteration Number	Number of Events	Total Time
1	64015	10.0011
2	68220	10.0010
3	66397	10.0011
4	52378	10.0026
5	62733	10.0026

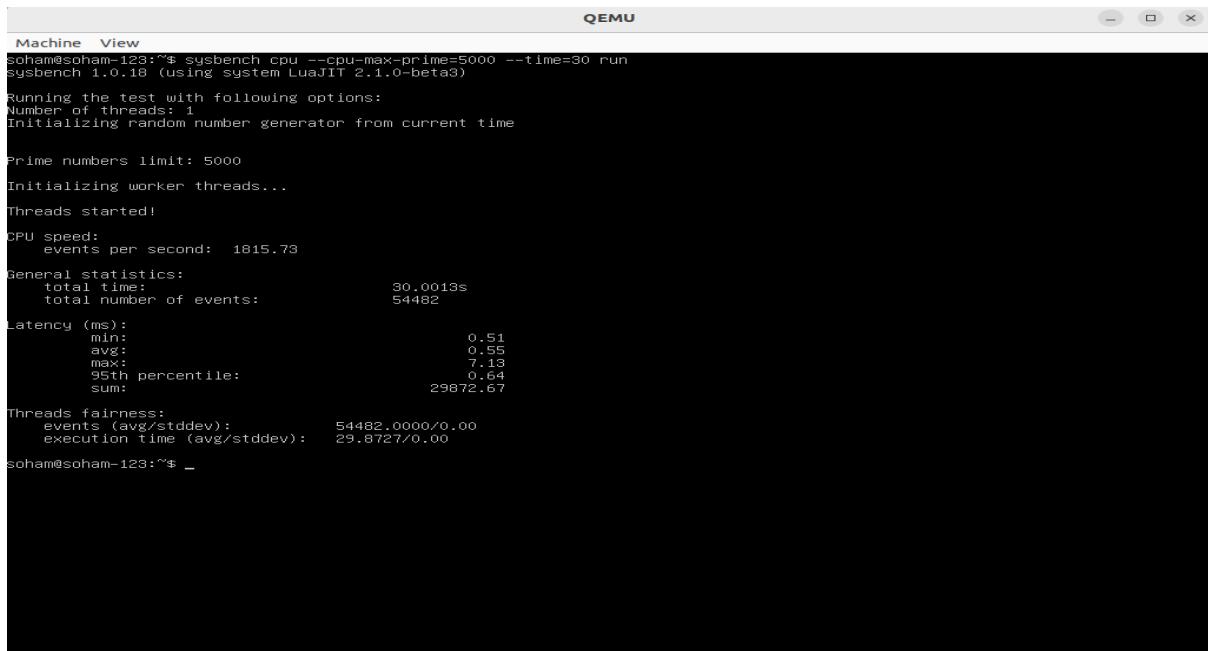
Minimum	5236.438526
Maximum	6821.317868
Average	6273.838277
S. Deviation	617.5305777

Condition 4: 3GB RAM and 3 Cores on QEMU (qcow2)

CPU Testing

Case 1: max-prime = 5000

```
sysbench --test=cpu --cpu-max-prime=5000 --time=30 run
```



The screenshot shows a terminal window titled "QEMU" running on a host system with 1.0.18. The command executed was "sysbench --test=cpu --cpu-max-prime=5000 --time=30 run". The output details the test configuration (1 thread), prime number limit (5000), and performance metrics. The CPU speed is 1815.73 events per second. General statistics show a total time of 30.0013s and 54482 events. Latency statistics show a minimum of 0.51ms, average of 0.55ms, maximum of 7.13ms, 95th percentile of 0.64ms, and a sum of 29872.67ms. Thread fairness shows events (avg/stddev) at 54482.0000/0.00 and execution time (avg/stddev) at 29.8727/0.00.

```
Machine View
soham@soham-123:~$ sysbench cpu --cpu-max-prime=5000 --time=30 run
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

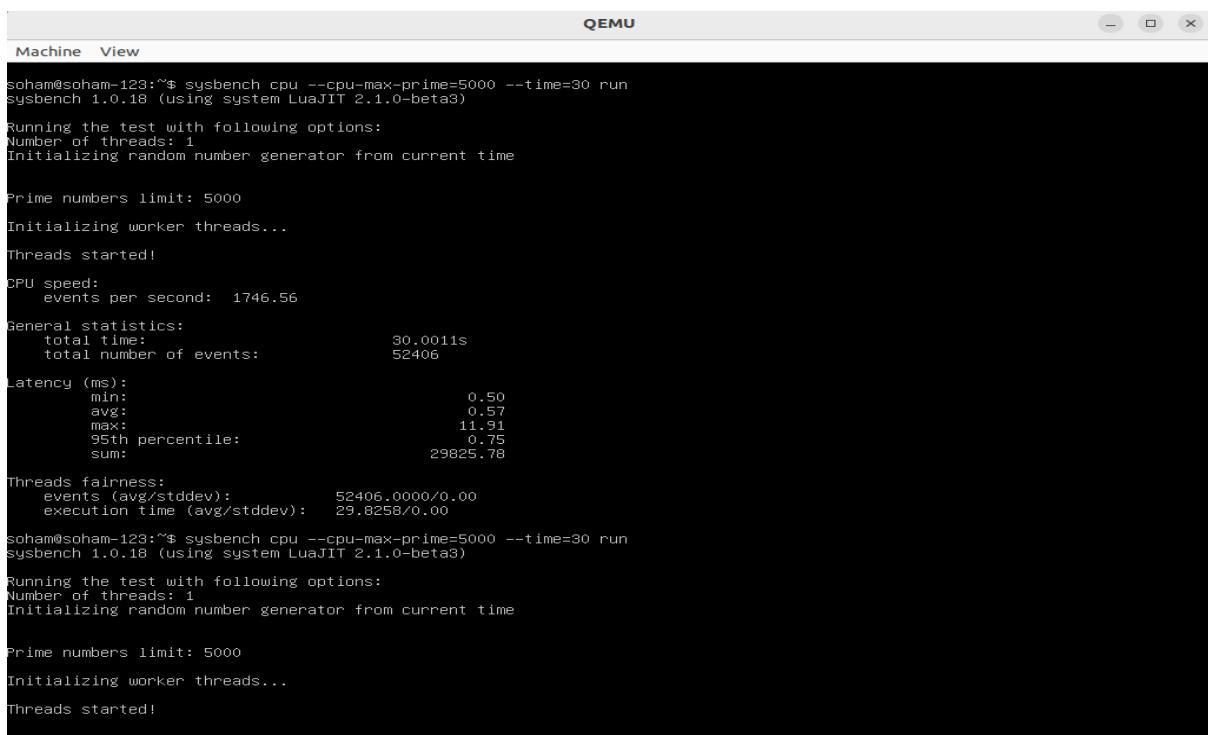
Prime numbers limit: 5000
Initializing worker threads...
Threads started!

CPU speed:
events per second: 1815.73

General statistics:
total time: 30.0013s
total number of events: 54482

Latency (ms):
min: 0.51
avg: 0.55
max: 7.13
95th percentile: 0.64
sum: 29872.67

Threads fairness:
events (avg/stddev): 54482.0000/0.00
execution time (avg/stddev): 29.8727/0.00
soham@soham-123:~$ _
```



The screenshot shows a terminal window titled "QEMU" running on a host system with 1.0.18. The command executed was "sysbench --test=cpu --cpu-max-prime=5000 --time=30 run". The output details the test configuration (1 thread), prime number limit (5000), and performance metrics. The CPU speed is 1746.56 events per second. General statistics show a total time of 30.0011s and 52406 events. Latency statistics show a minimum of 0.50ms, average of 0.57ms, maximum of 11.91ms, 95th percentile of 0.75ms, and a sum of 29825.78ms. Thread fairness shows events (avg/stddev) at 52406.0000/0.00 and execution time (avg/stddev) at 29.8258/0.00.

```
Machine View
soham@soham-123:~$ sysbench cpu --cpu-max-prime=5000 --time=30 run
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Prime numbers limit: 5000
Initializing worker threads...
Threads started!

CPU speed:
events per second: 1746.56

General statistics:
total time: 30.0011s
total number of events: 52406

Latency (ms):
min: 0.50
avg: 0.57
max: 11.91
95th percentile: 0.75
sum: 29825.78

Threads fairness:
events (avg/stddev): 52406.0000/0.00
execution time (avg/stddev): 29.8258/0.00
soham@soham-123:~$ sysbench cpu --cpu-max-prime=5000 --time=30 run
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Prime numbers limit: 5000
Initializing worker threads...
Threads started!
```

```
QEMU
Machine View
soham@soham-123:~$ sysbench cpu --cpu-max-prime=5000 --time=30 run
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)
Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Prime numbers limit: 5000
Initializing worker threads...
Threads started!
CPU speed:
events per second: 1786.19
General statistics:
total time: 30.0014s
total number of events: 53595
Latency (ms):
min: 0.51
avg: 0.56
max: 10.89
95th percentile: 0.74
sum: 29851.34
Threads fairness:
events (avg/stddev): 53595.0000/0.00
execution time (avg/stddev): 29.8513/0.00
soham@soham-123:~$ sysbench cpu --cpu-max-prime=5000 --time=30 run
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)
Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Prime numbers limit: 5000
Initializing worker threads...
Threads started!
```

```
QEMU
Machine View
General statistics:
total time: 30.0014s
total number of events: 53595
Latency (ms):
min: 0.51
avg: 0.56
max: 10.89
95th percentile: 0.74
sum: 29851.34
Threads fairness:
events (avg/stddev): 53595.0000/0.00
execution time (avg/stddev): 29.8513/0.00
soham@soham-123:~$ sysbench cpu --cpu-max-prime=5000 --time=30 run
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)
Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Prime numbers limit: 5000
Initializing worker threads...
Threads started!
CPU speed:
events per second: 1698.58
General statistics:
total time: 30.0017s
total number of events: 50965
Latency (ms):
min: 0.51
avg: 0.58
max: 13.80
95th percentile: 0.81
sum: 29792.78
Threads fairness:
events (avg/stddev): 50965.0000/0.00
execution time (avg/stddev): 29.7928/0.00
soham@soham-123:~$
```

```

QEMU

Machine View
General statistics:
  total time:          30.00017s
  total number of events:      50965

Latency (ms):
  min:                 0.51
  avg:                 0.58
  max:                13.80
  95th percentile:     0.81
  sum:               29792.78

Threads fairness:
  events (avg/stddev):   50965.0000/0.00
  execution time (avg/stddev): 29.7928/0.00
soham@soham-123:~$ sysbench cpu --cpu-max-prime=5000 --time=30 run
SysBench 1.0.18 (using system LuaJIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Prime numbers limit: 5000
Initializing worker threads...
Threads started!
CPU speed:
  events per second: 1693.10

General statistics:
  total time:          30.00011s
  total number of events:      50807

Latency (ms):
  min:                 0.51
  avg:                 0.59
  max:                11.68
  95th percentile:     0.78
  sum:               29812.50

Threads fairness:
  events (avg/stddev):   50807.0000/0.00
  execution time (avg/stddev): 29.8125/0.00
soham@soham-123:~$ clear

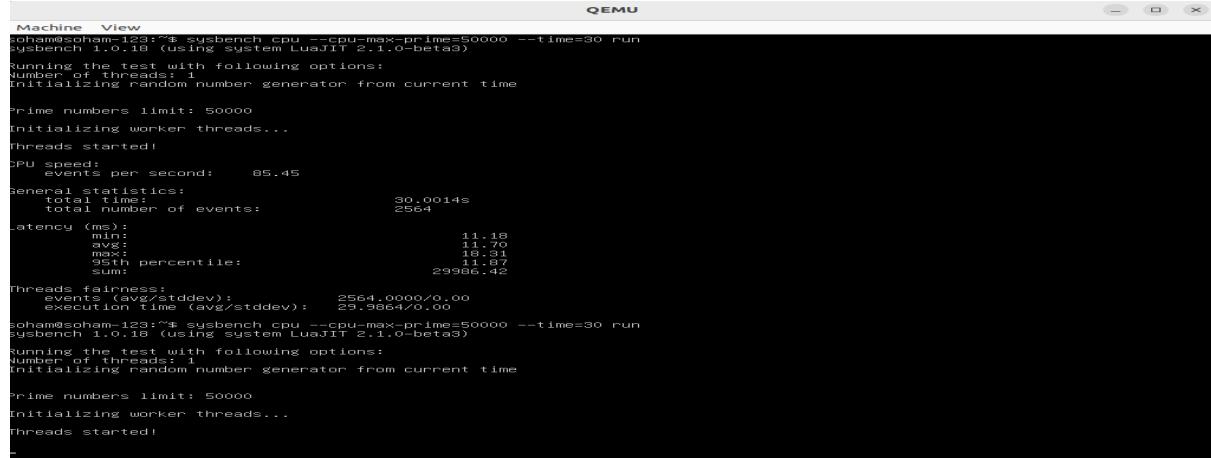
```

Iteration Number	Number of Events per Second
1	1815.73
2	1746.56
3	1786.19
4	1648.58
5	1693.10

Minimum:	1648.58
Maxmimum:	1815.73
Average:	1738.032
S. Deviation	67.91436498

Case 2: max-prime = 50,000

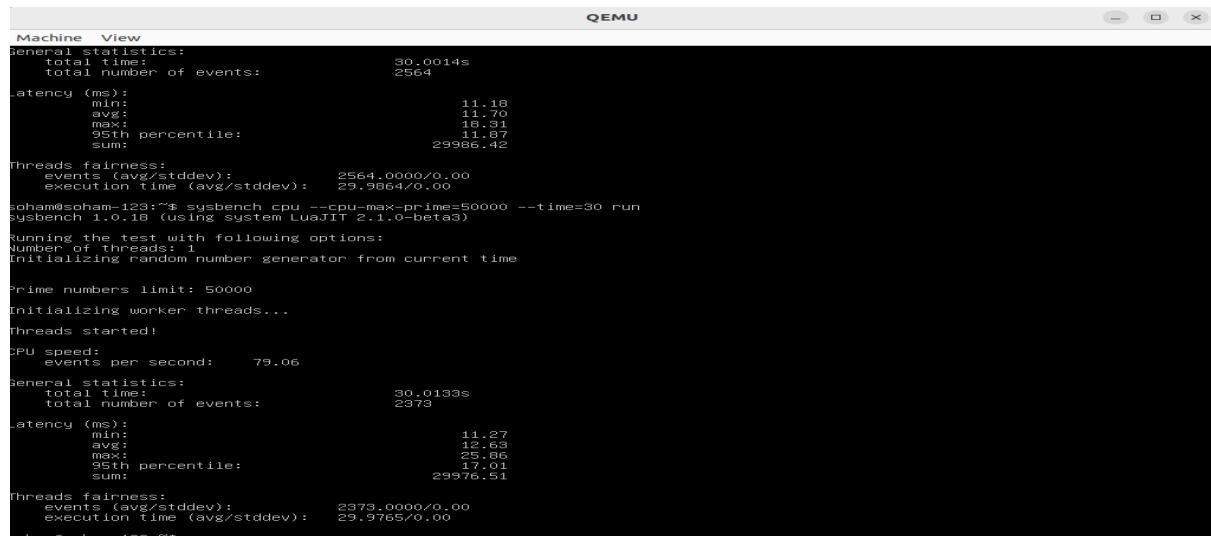
```
sysbench --test=cpu --cpu-max-prime=50000 --time=30 run
```



Machine View
soham@soham-123:~\$ sysbench cpu --cpu-max-prime=50000 --time=30 run
sysbench 1.0.18 (using system LuAJIT 2.1.0-beta3)
Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Prime numbers limit: 50000
Initializing worker threads...
Threads started!
CPU speed:
events per second: 85.45
General statistics:
total time: 30.0014s
total number of events: 2564
Latency (ms):
min: 11.18
avg: 11.70
max: 18.91
95th percentile: 11.87
sum: 29986.42
Threads fairness:
events (avg/stddev): 2564.0000/0.00
execution time (avg/stddev): 29.9864/0.00
soham@soham-123:~\$ sysbench cpu --cpu-max-prime=50000 --time=30 run
sysbench 1.0.18 (using system LuAJIT 2.1.0-beta3)
Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Prime numbers limit: 50000
Initializing worker threads...
Threads started!



Machine View
General statistics:
total time: 30.0014s
total number of events: 2564
Latency (ms):
min: 11.18
avg: 11.70
max: 18.91
95th percentile: 11.87
sum: 29986.42
Threads fairness:
events (avg/stddev): 2564.0000/0.00
execution time (avg/stddev): 29.9864/0.00
soham@soham-123:~\$ sysbench cpu --cpu-max-prime=50000 --time=30 run
sysbench 1.0.18 (using system LuAJIT 2.1.0-beta3)
Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Prime numbers limit: 50000
Initializing worker threads...
Threads started!
CPU speed:
events per second: 79.06
General statistics:
total time: 30.0133s
total number of events: 2373
Latency (ms):
min: 11.27
avg: 12.63
max: 25.86
95th percentile: 17.01
sum: 29976.51
Threads fairness:
events (avg/stddev): 2373.0000/0.00
execution time (avg/stddev): 29.9765/0.00
soham@soham-123:~\$

```
QEMU
Machine View
General statistics:
  total time:          30.0133s
  total number of events: 2373
Latency (ms):
  min:                  11.27
  avg:                 12.63
  max:                 25.95
  95th percentile:    17.01
  sum:                29976.51
Threads fairness:
  events (avg/stddev):   2373.0000/0.00
  execution time (avg/stddev): 29.9765/0.00
soham@soham-123:~$ sysbench cpu --cpu-max-prime=50000 --time=30 run
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Prime numbers limit: 50000
Initializing worker threads...
Threads started!
CPU speed:
  events per second: 82.28
General statistics:
  total time:          30.0020s
  total number of events: 2469
Latency (ms):
  min:                  11.22
  avg:                 12.14
  max:                 29.28
  95th percentile:    16.12
  sum:                29968.51
Threads fairness:
  events (avg/stddev):   2469.0000/0.00
  execution time (avg/stddev): 29.9685/0.00
soham@soham-123:~$ sysbench cpu --cpu-max-prime=50000 --time=30 run
```

```
QEMU
Machine View
General statistics:
  total time:          30.0020s
  total number of events: 2469
Latency (ms):
  min:                  11.22
  avg:                 12.14
  max:                 29.28
  95th percentile:    16.12
  sum:                29968.51
Threads fairness:
  events (avg/stddev):   2469.0000/0.00
  execution time (avg/stddev): 29.9685/0.00
soham@soham-123:~$ sysbench cpu --cpu-max-prime=50000 --time=30 run
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Prime numbers limit: 50000
Initializing worker threads...
Threads started!
CPU speed:
  events per second: 82.97
General statistics:
  total time:          30.0088s
  total number of events: 2490
Latency (ms):
  min:                  11.26
  avg:                 12.04
  max:                 31.06
  95th percentile:    15.27
  sum:                29980.43
Threads fairness:
  events (avg/stddev):   2490.0000/0.00
  execution time (avg/stddev): 29.9804/0.00
soham@soham-123:~$
```

```

QEMU
Machine View
General statistics:
  total time:          30.00088s
  total number of events:    2490

Latency (ms):
  min:                  11.26
  avg:                 12.04
  max:                 31.06
  95th percentile:     15.27
  sum:                29980.43

Threads fairness:
  events (avg/stddev):   2490.0000/0.00
  execution time (avg/stddev): 29.9804/0.00

soham@soham-123:~$ sysbench cpu --cpu-max-prime=50000 --time=30 run
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Prime numbers limit: 50000
Initializing worker threads...
Threads started!
CPU speed:
  events per second: 81.62

General statistics:
  total time:          30.0019s
  total number of events:    2449

Latency (ms):
  min:                  11.18
  avg:                 12.24
  max:                 27.95
  95th percentile:     15.83
  sum:                29964.19

Threads fairness:
  events (avg/stddev):   2449.0000/0.00
  execution time (avg/stddev): 29.9642/0.00

soham@soham-123:~$
```

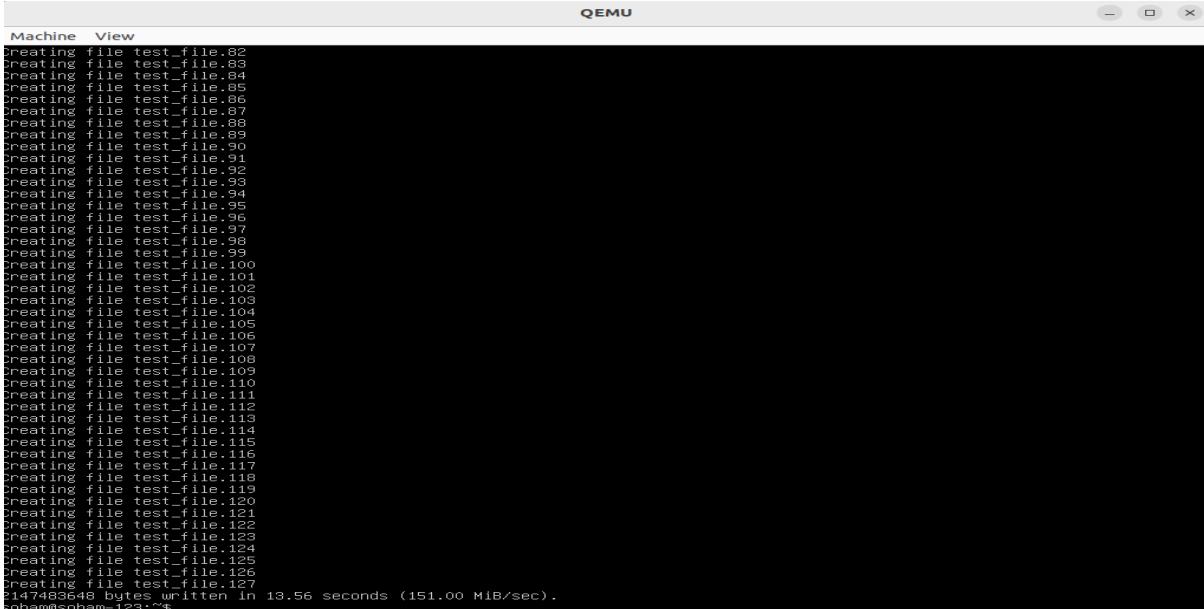
Iteration Number	Number of Events per Second
1	85.45
2	79.06
3	82.28
4	82.97
5	81.62

Minimum:	79.06
Maxmimum:	85.45
Average:	82.276
S. Deviation	2.309162186

I/O Operations Test

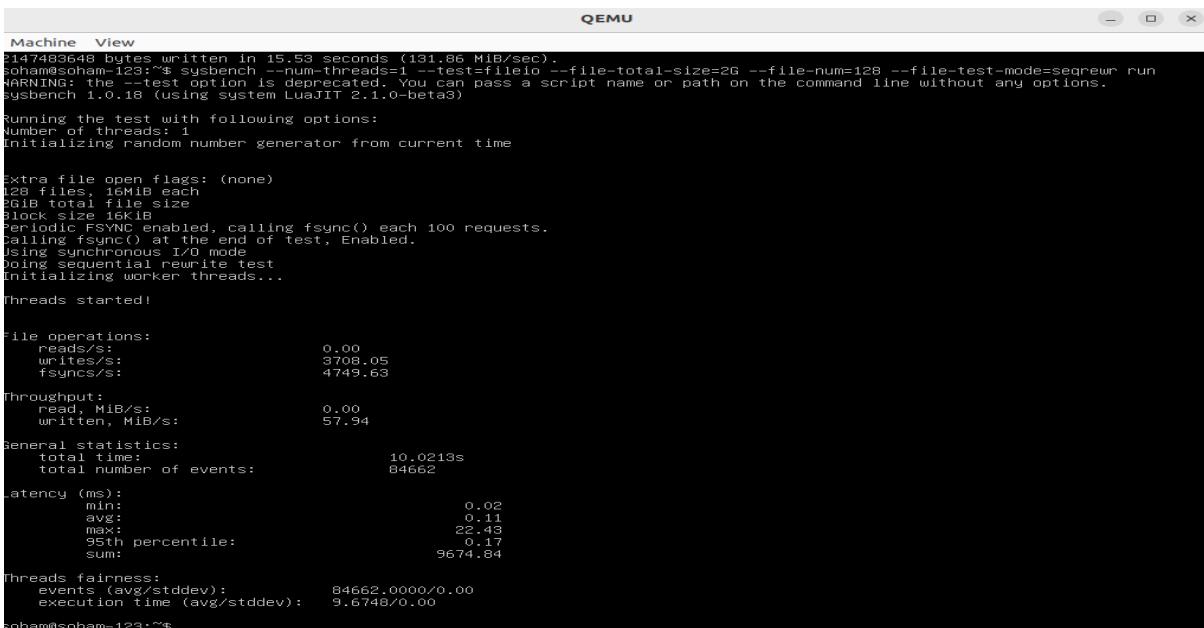
Case 1: Sequential Read/Write

```
sysbench --num-threads=1 --test=fileio --file-total-size=2G  
--file-num=128 --file-test-mode=seqrewr prepare  
sysbench --num-threads=1 --test=fileio --file-total-size=2G  
--file-num=128 --file-test-mode=seqrewr run  
sysbench --num-threads=1 --test=fileio --file-total-size=2G  
--file-num=128 --file-test-mode=seqrewr cleanup
```



Machine View

```
Creating file test_file.82  
Creating file test_file.83  
Creating file test_file.84  
Creating file test_file.85  
Creating file test_file.86  
Creating file test_file.87  
Creating file test_file.88  
Creating file test_file.89  
Creating file test_file.90  
Creating file test_file.91  
Creating file test_file.92  
Creating file test_file.93  
Creating file test_file.94  
Creating file test_file.95  
Creating file test_file.96  
Creating file test_file.97  
Creating file test_file.98  
Creating file test_file.99  
Creating file test_file.100  
Creating file test_file.101  
Creating file test_file.102  
Creating file test_file.103  
Creating file test_file.104  
Creating file test_file.105  
Creating file test_file.106  
Creating file test_file.107  
Creating file test_file.108  
Creating file test_file.109  
Creating file test_file.110  
Creating file test_file.111  
Creating file test_file.112  
Creating file test_file.113  
Creating file test_file.114  
Creating file test_file.115  
Creating file test_file.116  
Creating file test_file.117  
Creating file test_file.118  
Creating file test_file.119  
Creating file test_file.120  
Creating file test_file.121  
Creating file test_file.122  
Creating file test_file.123  
Creating file test_file.124  
Creating file test_file.125  
Creating file test_file.126  
Creating file test_file.127  
2147483648 bytes written in 18.56 seconds (151.00 MiB/sec).  
soham@soham-123:~$
```



Machine View

```
2147483648 bytes written in 15.53 seconds (131.86 MiB/sec).  
soham@soham-123:~$ sysbench --num-threads=1 --test=fileio --file-total-size=2G --file-num=128 --file-test-mode=seqrewr run  
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.  
sysbench 1.0.18 (using system LuajIT 2.1.0-beta3)  
  
Running the test with following options:  
Number of threads: 1  
Initializing random number generator from current time  
  
Extra file open flags: (none)  
128 files, 16MiB each  
2GiB total file size  
Block size: 6KiB  
File and Fsync enabled, calling sync() each 100 requests.  
Calling fsync() at the end of test, Enabled.  
Using synchronous I/O mode  
Doing sequential rewrite test  
Initializing worker threads...  
Threads started!  
  
File operations:  
  reads/s:          0.00  
  writes/s:        3708.05  
  fsyncs/s:       4749.63  
  
Throughput:  
  read, MiB/s:      0.00  
  written, MiB/s:   57.94  
  
General statistics:  
  total time:           10.0213s  
  total number of events: 84662  
  
Latency (ms):  
  min:                  0.02  
  avg:                  0.11  
  max:                 22.43  
  95th percentile:     0.17  
  sum:                 9674.84  
  
Threads fairness:  
  events (avg/stddev): 84662.0000/0.00  
  execution time (avg/stddev): 9.6748/0.00  
soham@soham-123:~$
```

```
QEMU
Machine View
soham@soham-123:~$ sysbench --num-threads=1 --test=fileio --file-total-size=2G --file-num=128 --file-test-mode=seqrewr run
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)
Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Extra file open flags: (none)
128 files, 16MiB each
2GiB total file size
Block size 16KiB
Periodic FSYNC enabled, calling fsync() each 100 requests.
Calling fsync() at the end of test, Enabled.
Using synchronous I/O mode
Doing sequential rewrite test
Initializing worker threads...
Threads started!

File operations:
  reads/s:          0.00
  writes/s:        3832.02
  fsyncs/s:        4910.87

Throughput:
  read, MiB/s:      0.00
  written, MiB/s:   59.88

General statistics:
  total time:       10.0167s
  total number of events: 87483

Latency (ms):
  min:              0.02
  avg:              0.1
  max:             14.46
  95th percentile:  0.16
  sum:             9673.68

Threads fairness:
  events (avg/stddev): 87483.0000/0.00
  execution time (avg/stddev): 9.6787/0.00
soham@soham-123:~$
```

```
QEMU - Press Ctrl+Alt+G to release grab
Machine View
soham@soham-123:~$ sysbench --num-threads=1 --test=fileio --file-total-size=2G --file-num=128 --file-test-mode=seqrewr run
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)
Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Extra file open flags: (none)
128 files, 16MiB each
2GiB total file size
Block size 16KiB
Periodic FSYNC enabled, calling fsync() each 100 requests.
Calling fsync() at the end of test, Enabled.
Using synchronous I/O mode
Doing sequential rewrite test
Initializing worker threads...
Threads started!

File operations:
  reads/s:          0.00
  writes/s:        3553.21
  fsyncs/s:        4554.10

Throughput:
  read, MiB/s:      0.00
  written, MiB/s:   55.52

General statistics:
  total time:       10.0163s
  total number of events: 81100

Latency (ms):
  min:              0.02
  avg:              0.1
  max:             20.68
  95th percentile:  0.17
  sum:             9675.73

Threads fairness:
  events (avg/stddev): 81100.0000/0.00
  execution time (avg/stddev): 9.6757/0.00
soham@soham-123:~$ sysbench --num-threads=1 --test=fileio --file-total-size=2G --file-num=128 --file-test-mode=seqrewr run
```

```
QEMU - Press Ctrl+Alt+G to release grab
Machine View
soham@soham-123:~$ sysbench --num-threads=1 --test=fileio --file-total-size=2G --file-num=128 --file-test-mode=seqrewr run
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)
Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Extra file open flags: (none)
128 files, 16MiB each
2GiB total file size
Block size 16KiB
Periodic FSYNC enabled, calling fsync() each 100 requests.
Calling fsync() at the end of test, Enabled.
Using synchronous I/O mode
Doing sequential rewrite test
Initializing worker threads...
Threads started!

File operations:
  reads/s:          0.00
  writes/s:        3266.46
  fsyncs/s:        4184.26

Throughput:
  read, MiB/s:      0.00
  written, MiB/s:   51.04

General statistics:
  total time:       10.0388s
  total number of events: 74688

Latency (ms):
  min:              0.02
  avg:              0.13
  max:             28.79
  95th percentile:  0.18
  sum:             9723.89

Threads fairness:
  events (avg/stddev): 74688.0000/0.00
  execution time (avg/stddev): 9.7239/0.00
soham@soham-123:~$
```

Serial Run Iterations	Results	
1	reads/s	0
	writes/sec	3708.05
	fsyncs/s	4749.63
2	reads/s	0
	writes/sec	3832.02
	fsyncs/s	4980.87
3	reads/s	0
	writes/sec	3232.44
	fsyncs/s	4148.80
4	reads/s	0
	writes/sec	3553.21
	fsyncs/s	4554.10
5	reads/s	0
	writes/sec	3266.46
	fsyncs/s	4487.26

Minimum read/s	0
Minimum write/s	3232.44
Minimum fsync/s	4148.8
Maximum read/s	0
Maximum write/s	3832.02
Maximum fsync/s	4980.87
Average read/s	0
Average write/s	3518.436
Average fsync/s	4584.132

S.Deviation	
read/s	0
S.Deviation	
write/s	264.9449196
S.Deviation	
fsync/s	310.0768793

Case 2: Combined Random

```
sysbench --num-threads=1 --test=fileio --file-total-size=2G
--file-num=128 --file-test-mode=rndrw prepare
sysbench --num-threads=1 --test=fileio --file-total-size=2G
--file-num=128 --file-test-mode=rndrw prepare
sysbench --num-threads=1 --test=fileio --file-total-size=2G
--file-num=128 --file-test-mode=rndrw prepare
```



The screenshot shows a terminal window titled "QEMU - Press Ctrl+Alt+G to release grab". The window contains a log of file creation commands. The log starts with "Creating file test_file.82" and continues sequentially up to "Creating file test_file.127". Below this, it says "2147483648 bytes written in 14.29 seconds (143.33 MiB/sec)." The command at the bottom is "soham@soham-123:~\$".

```
Creating file test_file.82
Creating file test_file.83
Creating file test_file.84
Creating file test_file.85
Creating file test_file.86
Creating file test_file.87
Creating file test_file.88
Creating file test_file.89
Creating file test_file.90
Creating file test_file.91
Creating file test_file.92
Creating file test_file.93
Creating file test_file.94
Creating file test_file.95
Creating file test_file.96
Creating file test_file.97
Creating file test_file.98
Creating file test_file.99
Creating file test_file.100
Creating file test_file.101
Creating file test_file.102
Creating file test_file.103
Creating file test_file.104
Creating file test_file.105
Creating file test_file.106
Creating file test_file.107
Creating file test_file.108
Creating file test_file.109
Creating file test_file.110
Creating file test_file.111
Creating file test_file.112
Creating file test_file.113
Creating file test_file.114
Creating file test_file.115
Creating file test_file.116
Creating file test_file.117
Creating file test_file.118
Creating file test_file.119
Creating file test_file.120
Creating file test_file.121
Creating file test_file.122
Creating file test_file.123
Creating file test_file.124
Creating file test_file.125
Creating file test_file.126
Creating file test_file.127
2147483648 bytes written in 14.29 seconds (143.33 MiB/sec).
soham@soham-123:~$
```

```
QEMU - Press Ctrl+Alt+G to release grab
Machine View
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Extra file open flags: (none)
128 files, 16MiB each
2GiB total file size
Block size 16KiB
Number of IO requests: 0
Read/Write ratio for combined random IO test: 1.50
Periodic FSYNC enabled, calling fsync() each 100 requests.
Calling fsync() at the end of test, Enabled.
Using synchronous I/O mode
Doing random r/w test
Initializing worker threads...

Threads started!

File operations:
    reads/s:          818.20
    writes/s:         545.46
    fsyncs/s:        1748.67

Throughput:
    read, MiB/s:      12.78
    written, MiB/s:   8.52

General statistics:
    total time:       10.0415s
    total number of events: 31140

Latency (ms):
    min:              0.01
    avg:              0.31
    max:              23.97
    95th percentile:  1.30
    sum:             9789.52

Threads fairness:
    events (avg/stddev): 31140.0000/0.00
    execution time (avg/stddev): 9.7895/0.00
soham@soham-123:~$
```

```
QEMU - Press Ctrl+Alt+G to release grab
Machine View
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Extra file open flags: (none)
128 files, 16MiB each
2GiB total file size
Block size 16KiB
Number of IO requests: 0
Read/Write ratio for combined random IO test: 1.50
Periodic FSYNC enabled, calling fsync() each 100 requests.
Calling fsync() at the end of test, Enabled.
Using synchronous I/O mode
Doing random r/w test
Initializing worker threads...

Threads started!

File operations:
    reads/s:          789.31
    writes/s:         522.21
    fsyncs/s:        1678.43

Throughput:
    read, MiB/s:      12.24
    written, MiB/s:   8.16

General statistics:
    total time:       10.0303s
    total number of events: 29814

Latency (ms):
    min:              0.01
    avg:              0.83
    max:              19.44
    95th percentile:  1.30
    sum:             9819.40

Threads fairness:
    events (avg/stddev): 29814.0000/0.00
    execution time (avg/stddev): 9.6194/0.00
soham@soham-123:~$
```

```

QEMU - Press Ctrl+Alt+G to release grab
Machine View
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)
Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Extra file open flags: (none)
128 files, 16MiB each
2GiB total file size
Block size 16KiB
Number of IO requests: 0
Read/Write ratio for combined random IO test: 1.50
Periodic FSYNC enabled, calling fsync() each 100 requests.
Calling fdatasync() at the end of test, Enabled.
Using synchronous I/O mode
Doing random r/w test
Initializing worker threads...
Threads started!

File operations:
  reads/s:           790.22
  writes/s:          526.82
  fsyncs/s:          1698.48

Throughput:
  read, MiB/s:      12.35
  written, MiB/s:   8.23

General statistics:
  total time:        10.0193s
  total number of events: 30095

Latency (ms):
  min:                 0.01
  avg:                 0.38
  max:                18.82
  95th percentile:    1.30
  sum:                9816.22

Threads fairness:
  events (avg/stddev): 30095.0000/0.00
  execution time (avg/stddev): 9.8162/0.00
soham@soham-123:~$
```

```

QEMU - Press Ctrl+Alt+G to release grab
Machine View
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)
Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Extra file open flags: (none)
128 files, 16MiB each
2GiB total file size
Block size 16KiB
Number of IO requests: 0
Read/Write ratio for combined random IO test: 1.50
Periodic FSYNC enabled, calling fsync() each 100 requests.
Calling fdatasync() at the end of test, Enabled.
Using synchronous I/O mode
Doing random r/w test
Initializing worker threads...
Threads started!

File operations:
  reads/s:           842.96
  writes/s:          561.97
  fsyncs/s:          1804.45

Throughput:
  read, MiB/s:      13.17
  written, MiB/s:   8.78

General statistics:
  total time:        10.1040s
  total number of events: 32310

Latency (ms):
  min:                 0.01
  avg:                 0.30
  max:                17.12
  95th percentile:    1.25
  sum:                9812.63

Threads fairness:
  events (avg/stddev): 32310.0000/0.00
  execution time (avg/stddev): 9.8126/0.00
soham@soham-123:~$
```

Serial Run Iterations	Results	
1	reads/s	818.20
	writes/sec	545.46
	fsyncs/s	1748.67
2	reads/s	783.31
	writes/sec	522.21
	fsyncs/s	1678.43
3	reads/s	790.22

	writes/sec	526.82
	fsyncs/s	1698.48
4	reads/s	842.96
	writes/sec	561.97
	fsyncs/s	1804.45
5	reads/s	801.60
	writes/sec	534.40
	fsyncs/s	1721.34

Minimum read/s	783.31
Minimum write/s	522.21
Minimum fsync/s	1678.43
Maximum read/s	842.96
Maximum write/s	561.97
Maximum fsync/s	1804.45
Average read/s	807.258
Average write/s	538.172
Average fsync/s	1730.274
S.Deviation read/s	23.92787747
S.Deviation write/s	15.94789234
S.Deviation fsync/s	49.03816605

Memory Tests

Case 1: Upto 1GB

```
sysbench memory --memory-block-size=1G run
```

```
QEMU - Press Ctrl+Alt+G to release grab
Machine View
soham@soham-123:~$ sysbench memory --memory-block-size=1G run
sysbench 1.0.18 (using system LuajIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Running memory speed test with the following options:
  block size: 1048576KiB
  total size: 102400MiB
  operation: write
  scope: global

Initializing worker threads...
Threads started!

Total operations: 51 ( 5.09 per second)
52224.00 MiB transferred (5212.45 MiB/sec)

General statistics:
  total time:          10.0144s
  total number of events: 51

Latency (ms):
  min:                 192.01
  avg:                 196.26
  max:                 216.02
  95th percentile:    196.89
  sum:                 10009.31

Threads fairness:
  events (avg/stddev): 51.0000/0.00
  execution time (avg/stddev): 10.0093/0.00
soham@soham-123:~$
```

```
QEMU - Press Ctrl+Alt+G to release grab
Machine View
soham@soham-123:~$ sysbench memory --memory-block-size=1G run
sysbench 1.0.18 (using system LuajIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Running memory speed test with the following options:
  block size: 1048576KiB
  total size: 102400MiB
  operation: write
  scope: global

Initializing worker threads...
Threads started!

Total operations: 43 ( 4.27 per second)
44032.00 MiB transferred (4372.73 MiB/sec)

General statistics:
  total time:          10.0619s
  total number of events: 43

Latency (ms):
  min:                 197.35
  avg:                 233.78
  max:                 343.72
  95th percentile:    320.17
  sum:                 10052.71

Threads fairness:
  events (avg/stddev): 43.0000/0.00
  execution time (avg/stddev): 10.0527/0.00
soham@soham-123:~$ sysbench memory --memory-block-size=1G run
```

QEMU - Press Ctrl+Alt+G to release grab

```

Machine View
avg: 233.78
max: 343.72
95th percentile: 320.17
sum: 10052.71

Threads fairness:
events (avg/stddev): 43.0000/0.00
execution time (avg/stddev): 10.0527/0.00

soham@soham-123:~$ sysbench memory --memory-block-size=1G run
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Running memory speed test with the following options:
block size: 1048576KiB
total size: 102400MiB
operation: write
scope: global

Initializing worker threads...

Threads started!

Total operations: 48 ( 4.75 per second)
9152.00 MiB transferred (4864.51 MiB/sec)

General statistics:
total time: 10.0998s
total number of events: 48

Latency (ms):
min: 153.18
avg: 210.07
max: 310.85
95th percentile: 277.21
sum: 10083.22

Threads fairness:
events (avg/stddev): 48.0000/0.00
execution time (avg/stddev): 10.0832/0.00

soham@soham-123:~$
```

Iteration Number	Number of Events	Total Time
1	51	10.0144
2	46	10.0414
3	43	10.0619
4	48	10.0998
5	44	10.0470

Minimum	4.273546746
Maximum	5.09266656
Average	4.615846784
S. Deviation	0.324164517

Case 2: Upto 1 MB

```
sysbench memory --memory-block-size=1M run
```

```
QEMU - Press Ctrl+Alt+G to release grab
Machine View
soham@soham-123:~$ sysbench memory --memory-block-size=1M run
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Running memory speed test with the following options:
  block size: 1024KiB
  total size: 102400MiB
  operation: write
  scope: global

Initializing worker threads...
Threads started!

Total operations: 57422 ( 5739.19 per second)
57422.00 MiB transferred (5739.19 MiB/sec)

General statistics:
  total time:           10.0010s
  total number of events: 57422

Latency (ms):
  min:                 0.14
  avg:                 0.17
  max:                 0.59
  95th percentile:    0.21
  sum:                9765.36

Threads fairness:
  events (avg/stddev): 57422.0000/0.00
  execution time (avg/stddev): 9.7654/0.00

soham@soham-123:~$
```

```
QEMU - Press Ctrl+Alt+G to release grab
Machine View
soham@soham-123:~$ sysbench memory --memory-block-size=1M run
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Running memory speed test with the following options:
  block size: 1024KiB
  total size: 102400MiB
  operation: write
  scope: global

Initializing worker threads...
Threads started!

Total operations: 54050 ( 5402.11 per second)
54050.00 MiB transferred (5402.11 MiB/sec)

General statistics:
  total time:           10.0012s
  total number of events: 54050

Latency (ms):
  min:                 0.14
  avg:                 0.18
  max:                 9.44
  95th percentile:    0.28
  sum:                9719.76

Threads fairness:
  events (avg/stddev): 54050.0000/0.00
  execution time (avg/stddev): 9.7138/0.00

soham@soham-123:~$ sysbench memory --memory-block-size=1M run
```

```
QEMU - Press Ctrl+Alt+G to release grab
Machine View
avg: 0.18
max: 9.44
95th percentile: 0.28
sum: 9719.78

Threads fairness:
events (avg/stddev): 54050.0000/0.00
execution time (avg/stddev): 9.7138/0.00
soham@soham-123:~$ sysbench memory --memory-block-size=1M run
sysbench 1.0.18 (using system LuajIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Running memory speed test with the following options:
block size: 1024KiB
total size: 102400MiB
operation: write
scope: global

Initializing worker threads...
Threads started!
Total operations: 58175 ( 5814.47 per second)
58175.00 MiB transferred (5814.47 MiB/sec)

General statistics:
total time: 10.0011s
total number of events: 58175

Latency (ms):
min: 0.14
avg: 0.17
max: 11.66
95th percentile: 0.23
sum: 9781.22

Threads fairness:
events (avg/stddev): 58175.0000/0.00
execution time (avg/stddev): 9.7812/0.00
soham@soham-123:~$ _
```

```
QEMU - Press Ctrl+Alt+G to release grab
Machine View
avg: 0.17
max: 11.66
95th percentile: 0.23
sum: 9781.22

Threads fairness:
events (avg/stddev): 58175.0000/0.00
execution time (avg/stddev): 9.7812/0.00
soham@soham-123:~$ sysbench memory --memory-block-size=1M run
sysbench 1.0.18 (using system LuajIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Running memory speed test with the following options:
block size: 1024KiB
total size: 102400MiB
operation: write
scope: global

Initializing worker threads...
Threads started!
Total operations: 62041 ( 6200.47 per second)
62041.00 MiB transferred (6200.47 MiB/sec)

General statistics:
total time: 10.0012s
total number of events: 62041

Latency (ms):
min: 0.14
avg: 0.16
max: 11.28
95th percentile: 0.23
sum: 9798.00

Threads fairness:
events (avg/stddev): 62041.0000/0.00
execution time (avg/stddev): 9.7980/0.00
soham@soham-123:~$ _
```

```

QEMU - Press Ctrl+Alt+G to release grab
Machine View
avg: 0.16
max: 11.28
95th percentile: 0.23
sum: 9798.00

Threads fairness:
events (avg/stddev): 62041.0000/0.00
execution time (avg/stddev): 9.7980/0.00

soham@soham-123:~$ sysbench memory --memory-block-size=1M run
sysbench 1.0.18 (using system LuajIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Running memory speed test with the following options:
block size: 1024KiB
total size: 102400MiB
operation: write
scope: global

Initializing worker threads...
Threads started!

Total operations: 59596 ( 5956.85 per second)
59596.00 MiB transferred (5956.85 MiB/sec)

General statistics:
total time: 10.0012s
total number of events: 59596

Latency (ms):
min: 0.14
avg: 0.16
max: 11.88
95th percentile: 0.22
sum: 9774.09

Threads fairness:
events (avg/stddev): 59596.0000/0.00
execution time (avg/stddev): 9.7741/0.00

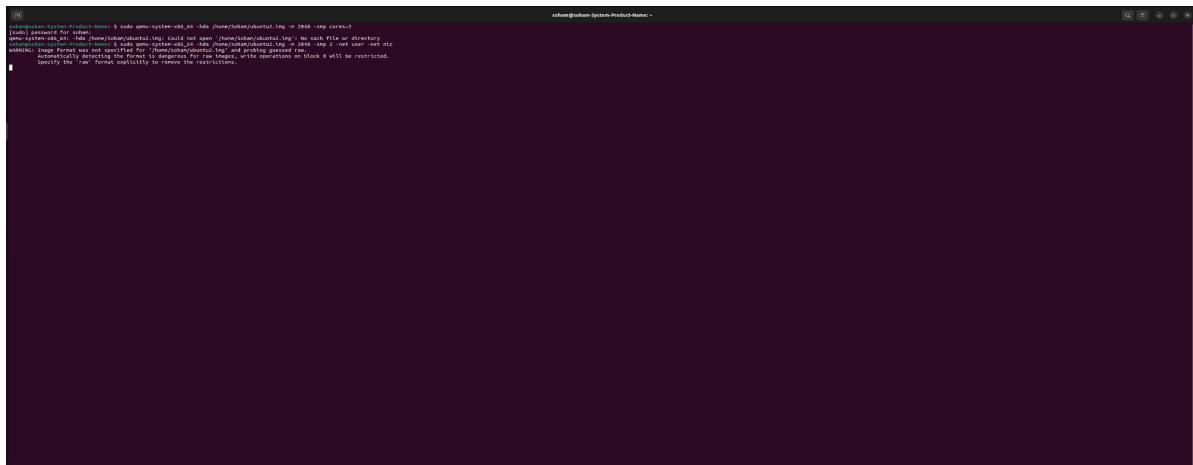
soham@soham-123:~$ _

```

Iteration Number	Number of Events	Total Time
1	57422	10.0010
2	54050	10.0012
3	58175	10.0011
4	62041	10.0012
5	59596	10.0012

Minimum	5404.351478
Maximum	6203.355597
Average	5825.015598
S. Deviation	293.7008766

Condition 1: 2GB RAM and 2 Cores on QEMU (raw)



CPU Testing:

Case 1: max-prime=5000

```
sysbench --test(cpu) --cpu-max-prime=5000 --time=30 run
```



```
Machine View QEMU
total time: 30.0011s
total number of events: 52906
Latency (ms):
min: 0.51
avg: 0.56
max: 26.29
95th percentile: 0.79
sum: 29859.09
Threads fairness:
events (avg/stddev): 52906.0000/0.00
execution time (avg/stddev): 29.8531/0.00
soham@soham123:~$ sysbench --test=cpu --cpu_max_prime=5000 --time=30 run
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)
Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Prime numbers limit: 5000
Initializing worker threads...
Threads started!
CPU speed:
events per second: 1834.58
General statistics:
total time: 30.0010s
total number of events: 55046
Latency (ms):
min: 0.50
avg: 0.54
max: 13.74
95th percentile: 0.65
sum: 29864.36
Threads fairness:
events (avg/stddev): 55046.0000/0.00
execution time (avg/stddev): 29.8644/0.00
soham@soham123:~$ ~
```

```
Machine View QEMU
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)
Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Prime numbers limit: 5000
Initializing worker threads...
Threads started!
CPU speed:
events per second: 1886.31
General statistics:
total time: 30.0010s
total number of events: 56599
Latency (ms):
min: 0.50
avg: 0.53
max: 9.41
95th percentile: 0.55
sum: 29879.44
Threads fairness:
events (avg/stddev): 56599.0000/0.00
execution time (avg/stddev): 29.8794/0.00
soham@soham123:~$ sysbench --test=cpu --cpu_max_prime=5000 --time=30 run
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)
Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Prime numbers limit: 5000
Initializing worker threads...
Threads started!
```

```
Machine View QEMU
total time: 30.0010s
total number of events: 56599
Latency (ms):
min: 0.50
avg: 0.53
max: 9.41
95th percentile: 0.55
sum: 29879.44
Threads fairness:
events (avg/stddev): 56599.0000/0.00
execution time (avg/stddev): 29.8794/0.00
soham@soham123:~$ sysbench --test=cpu --cpu_max_prime=5000 --time=30 run
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)
Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Prime numbers limit: 5000
Initializing worker threads...
Threads started!
CPU speed:
events per second: 1746.82
General statistics:
total time: 30.0012s
total number of events: 52412
Latency (ms):
min: 0.50
avg: 0.57
max: 23.47
95th percentile: 0.77
sum: 29816.67
Threads fairness:
events (avg/stddev): 52412.0000/0.00
execution time (avg/stddev): 29.8167/0.00
soham@soham123:~$
```

```

QEMU

Machine View
total time:          30.00012s
total number of events:      52412

Latency (ms):
min:                  0.50
avg:                  0.57
max:                 23.47
95th percentile:     0.77
sum:                29816.67

Threads fairness:
events (avg/stddev):   52412.0000/0.00
execution time (avg/stddev): 29.8167/0.00

sopham@sopham123:~$ sysbench --test=cpu --cpu_max_prime=5000 --time=30 run
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Prime numbers limit: 5000
Initializing worker threads...
Threads started!
CPU speed:
events per second: 1740.35

General statistics:
total time:          30.00010s
total number of events:      52219

Latency (ms):
min:                  0.50
avg:                  0.57
max:                 23.06
95th percentile:     0.75
sum:                29801.48

Threads fairness:
events (avg/stddev):   52219.0000/0.00
execution time (avg/stddev): 29.8015/0.00
sopham@sopham123:~$
```

Iteration Number	Number of Events per Second
1	1763.24
2	1834.58
3	1886.31
4	1746.82
5	1740.35

Minimum	1740.35
Maximum	1886.31
Average	1794.26
S. Deviation	63.67493031

Condition 2: max-prime = 50000

```
sysbench --test=cpu --cpu-max-prime=5000 --time=30 run
```

```
Machine View
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.18 (using system LuajIT 2.1.0-beta3)
Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Prime numbers limit: 50000
Initializing worker threads...
Threads started!
CPU speed:
events per second: 86.73
General statistics:
total time: 30.00805s
total number of events: 2603
Latency (ms):
min: 11.12
avg: 11.52
max: 17.47
95th percentile: 12.75
sum: 29988.09
Threads fairness:
events (avg/stddev): 2603.0000/0.00
execution time (avg/stddev): 29.9880/0.00
soham@soham123:~$ sysbench --test=cpu --cpu_max_prime=50000 --time=30 run
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.18 (using system LuajIT 2.1.0-beta3)
Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Prime numbers limit: 50000
Initializing worker threads...
Threads started!
```

```
Machine View
total time: 30.00805s
total number of events: 2603
Latency (ms):
min: 11.12
avg: 11.52
max: 17.47
95th percentile: 12.75
sum: 29988.09
Threads fairness:
events (avg/stddev): 2603.0000/0.00
execution time (avg/stddev): 29.9880/0.00
soham@soham123:~$ sysbench --test=cpu --cpu_max_prime=50000 --time=30 run
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.18 (using system LuajIT 2.1.0-beta3)
Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Prime numbers limit: 50000
Initializing worker threads...
Threads started!
CPU speed:
events per second: 76.09
General statistics:
total time: 30.01205s
total number of events: 2284
Latency (ms):
min: 11.16
avg: 13.13
max: 35.97
95th percentile: 18.95
sum: 29951.12
Threads fairness:
events (avg/stddev): 2284.0000/0.00
execution time (avg/stddev): 29.9511/0.00
soham@soham123:~$
```

```
Machine View
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.18 (using system LuajIT 2.1.0-beta3)
Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Prime numbers limit: 50000
Initializing worker threads...
Threads started!
CPU speed:
events per second: 63.36
General statistics:
total time: 30.00885s
total number of events: 2502
Latency (ms):
min: 11.06
avg: 11.98
max: 41.45
95th percentile: 15.27
sum: 29979.34
Threads fairness:
events (avg/stddev): 2502.0000/0.00
execution time (avg/stddev): 29.9753/0.00
soham@soham123:~$ sysbench --test=cpu --cpu_max_prime=50000 --time=30 run
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.18 (using system LuajIT 2.1.0-beta3)
Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Prime numbers limit: 50000
Initializing worker threads...
Threads started!
```

```

QEMU
Machine View
total time: 30.0088s
total number of events: 2502

Latency (ms):
min: 11.06
avg: 11.98
max: 41.45
95th percentile: 15.27
sum: 29975.34

Threads fairness:
events (avg/stddev): 2502.0000/0.00
execution time (avg/stddev): 29.9753/0.00

soham@soham123:~$ sysbench --test=cpu --cpu_max_prime=50000 --time=30 run
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Prime numbers limit: 50000
Initializing worker threads...
Threads started!
CPU speed:
events per second: 78.59

General statistics:
total time: 30.0113s
total number of events: 2359

Latency (ms):
min: 11.19
avg: 12.71
max: 35.07
95th percentile: 17.63
sum: 29974.44

Threads fairness:
events (avg/stddev): 2359.0000/0.00
execution time (avg/stddev): 29.9744/0.00
soham@soham123:~$
```



```

QEMU
Machine View
total time: 30.0113s
total number of events: 2359

Latency (ms):
min: 11.19
avg: 12.71
max: 35.07
95th percentile: 17.63
sum: 29974.44

Threads fairness:
events (avg/stddev): 2359.0000/0.00
execution time (avg/stddev): 29.9744/0.00

soham@soham123:~$ sysbench --test=cpu --cpu_max_prime=50000 --time=30 run
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Prime numbers limit: 50000
Initializing worker threads...
Threads started!
CPU speed:
events per second: 76.00

General statistics:
total time: 30.0107s
total number of events: 2281

Latency (ms):
min: 11.24
avg: 13.13
max: 32.86
95th percentile: 19.65
sum: 29949.09

Threads fairness:
events (avg/stddev): 2281.0000/0.00
execution time (avg/stddev): 29.9491/0.00
soham@soham123:~$
```

Iteration Number	Number of Events per Second
1	86.73
2	76.09
3	83.36
4	78.59
5	76.00

Minimum	76
Maximum	86.73
Average	80.154
S. Deviation	4.7365631

I/O Operations

Case 1: Sequential Read/Write

```
sysbench --num-threads=16 --test=fileio --file-total-size=2G --time=30
--file-test-mode=seqrewr prepare
sysbench --num-threads=16 --test=fileio --file-total-size=2G --time=30
--file-test-mode=seqrewr run
sysbench --num-threads=16 --test=fileio --file-total-size=2G --time=30
--file-test-mode=seqrewr cleanup
```

```
MACHINE View
schandesham123:~$ sysbench --num-threads=1 --test=fileio --file-total-size=2G --time=30 --file-test-mode=seqrewr prepare
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.18 (using system LuajIT 2.1.0-beta3)
128 files, 16MB each, 2048Mb total
Creating file test-file.0
Creating file test-file.1
Creating file test-file.2
Creating file test-file.3
Creating file test-file.4
Creating file test-file.5
Creating file test-file.6
Creating file test-file.7
Creating file test-file.8
Creating file test-file.9
Creating file test-file.10
Creating file test-file.11
Creating file test-file.12
Creating file test-file.13
Creating file test-file.14
Creating file test-file.15
Creating file test-file.16
Creating file test-file.17
Creating file test-file.18
Creating file test-file.19
Creating file test-file.20
Creating file test-file.21
Creating file test-file.22
Creating file test-file.23
Creating file test-file.24
Creating file test-file.25
Creating file test-file.26
Creating file test-file.27
Creating file test-file.28
Creating file test-file.29
Creating file test-file.30
Creating file test-file.31
Creating file test-file.32
Creating file test-file.33
Creating file test-file.34
Creating file test-file.35
Creating file test-file.36
Creating file test-file.37
Creating file test-file.38
```

```
MACHINE View
217483648 bytes written in 16.64 Seconds (130.95 MB/sec).
schandesham123:~$ sysbench --num-threads=1 --test=fileio --file-total-size=2G --time=30 --file-test-mode=seqrewr run
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.18 (using system LuajIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Extra file open flags: (none)
128 files, 16MB each
2G total file size
Block size 16KiB
Periodic FSYNC enabled, calling fsync() each 100 requests.
Using sequential mode of test, Enabled.
Using synchronous I/O mode
Doing sequential rewrite test
Initializing worker threads...
Threads started!

File operations:
 reads/s: 0.00
 writes/s: 3626.87
 fsyncs/s: 4645.81

Throughput:
 read, MiB/s: 0.00
 written, MiB/s: 56.66

General statistics:
 total time: 30.0263s
 total number of events: 248271

Latency (ms):
 min: 0.04
 avg: 0.12
 max: 15.63
 95th percentile: 0.16
 sum: 29069.51

Threads fairness:
 events (avg/stddev): 248271.0000/0.00
 execution time (avg/stddev): 29.0635/0.00
schandesham123:~$
```

```
Machine View QEMU
soham@soham123:~$ sysbench --num-threads=1 --test=fileio --file-total-size=2G --time=30 --file-test-mode=seqrewr run
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)
Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Extra file open flags: (none)
128 files, 16MB each
2GB total file size
Block size 16KiB
Periodic FSYNC enabled, calling fsync() each 100 requests.
Calling sync() at the end of test, Enabled.
Using synchronous I/O mode
Doing sequential rewrite test
Initializing worker threads...
Threads started!

File operations:
  reads/s:          0.00
  writes/s:        3973.28
  fsyncs/s:         4959.20

Throughput:
  read, MiB/s:      0.00
  written, MiB/s:   60.52

General statistics:
  total time:       30.0225s
  total number of events: 265078

Latency (ms):
  min:              0.02
  avg:             0.11
  max:            10.95
  95th percentile: 0.15
  sum:            29001.01

Threads fairness:
  events (avg/stddev): 265078.0000/0.00
  execution time (avg/stddev): 29.0010/0.00
soham@soham123:~$ sysbench --num-threads=1 --test=fileio --file-total-size=2G --time=30 --file-test-mode=seqrewr run
```

```
Machine View QEMU
soham@soham123:~$ sysbench --num-threads=1 --test=fileio --file-total-size=2G --time=30 --file-test-mode=seqrewr run
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)
system-x86_64
Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Extra file open flags: (none)
128 files, 16MB each
2GB total file size
Block size 16KiB
Periodic FSYNC enabled, calling fsync() each 100 requests.
Calling sync() at the end of test, Enabled.
Using synchronous I/O mode
Doing sequential rewrite test
Initializing worker threads...
Threads started!

File operations:
  reads/s:          0.00
  writes/s:        2952.82
  fsyncs/s:         3782.50

Throughput:
  read, MiB/s:      0.00
  written, MiB/s:   46.14

General statistics:
  total time:       30.0360s
  total number of events: 202195

Latency (ms):
  min:              0.01
  avg:             0.14
  max:            31.86
  95th percentile: 0.18
  sum:            29038.79

Threads fairness:
  events (avg/stddev): 202195.0000/0.00
  execution time (avg/stddev): 29.0388/0.00
soham@soham123:~$
```

```
Machine View QEMU
soham@soham123:~$ sysbench --num-threads=1 --test=fileio --file-total-size=2G --time=30 --file-test-mode=seqrewr run
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)
Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Extra file open flags: (none)
128 files, 16MB each
2GB total file size
Block size 16KiB
Periodic FSYNC enabled, calling fsync() each 100 requests.
Calling sync() at the end of test, Enabled.
Using synchronous I/O mode
Doing sequential rewrite test
Initializing worker threads...
Threads started!

File operations:
  reads/s:          0.00
  writes/s:        3181.46
  fsyncs/s:         4075.79

Throughput:
  read, MiB/s:      0.00
  written, MiB/s:   49.71

General statistics:
  total time:       30.0143s
  total number of events: 217716

Latency (ms):
  min:              0.02
  avg:             0.19
  max:            38.11
  95th percentile: 0.18
  sum:            29036.80

Threads fairness:
  events (avg/stddev): 217716.0000/0.00
  execution time (avg/stddev): 29.0368/0.00
soham@soham123:~$
```

```

Machine View QEMU
soham@sohami23:~$ sysbench --num-threads=1 --test=fileio --file-total-size=2G --time=30 --file-test-mode=seqrewr run
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.18 (using system LueJIT 2.1.0-beta1)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Extra file open flags: (none)
File I/O buffer size: 2GiB
Total file size: 2GiB
Block size: 16KiB
Prewriting is enabled, calling fsync() each 100 requests.
Calling fsync() at the end of test, Enabled.
Using synchronous I/O mode
Doing sequential rewrite test
Initializing worker threads...

Threads started!

File operations:
  reads/s:          0.00
  writes/s:        3933.13
  fsyncs/s:       5036.74

Throughput:
  read, MiB/s:      0.00
  written, MiB/s:   61.46

General statistics:
  total time:           30.0244s
  total number of events: 269210

Latency (ms):
  min:                 0.02
  avg:                 0.11
  max:                26.28
  95th percentile:     0.15
  sum:               29020.07

Threads fairness:
  contention (avg/stddev): 269210.0000/0.00
  execution time (avg/stddev): 29.0201/0.00
soham@sohami23:~$ 

```

Serial Run Iterations	Results	
1	reads/s	0
	writes/sec	3626.37
	fsyncs/s	4645.31
2	reads/s	0
	writes/sec	2952.82
	fsyncs/s	3782.50
3	reads/s	0
	writes/sec	3873.28
	fsyncs/s	4959.20
4	reads/s	0
	writes/sec	3181.46
	fsyncs/s	4075.73
5	reads/s	0
	writes/sec	3933.13
	fsyncs/s	5036.74

Minimum read/s	0
Minimum write/s	2952.82
Minimum fsync/s	3782.5
Maximum read/s	0
Maximum write/s	3933.13
Maximum fsync/s	5036.74
Average read/s	0
Average write/s	3513.412
Average fsync/s	4499.896
S.Deviation read/s	0
S.Deviation write/s	430.9533639
S.Deviation fsyn/s	551.108132

Case 2: Combined Random (128 files upto 2GB)

```
sysbench --test=fileio --file-total-size=2G --time=30
--file-test-mode=rndrw prepare
sysbench --test=fileio --file-total-size=2G --time=30
--file-test-mode=rndrw run
sysbench --test=fileio --file-total-size=2G --time=30
--file-test-mode=rndrw cleanup
```

```

Machine View
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)
Running the test with following options:
Number of threads: 128
Number of events: 0
Number of file: 128
Number of IO requests: 0
Number of files: 128
Number of events per combined random IO test: 1.50
Periodic FSYNC enabled, calling fsync() each 100 requests.
Setting syncronous at the beginning of test. Enabled.
Using synchronous I/O mode
Doing random r/w test
Initializing worker threads...
Threads started!

File operations:
  reads/s:           820.44
  writes/s:          595.38
  fsyncs/s:          1751.33

Throughput:
  read bandwidth:    12.82
  write bandwidth:   9.55

General statistics:
  total time:        30.0530s
  total number of events: 39612

Latency (ms):
  min:               0.01
  avg:               0.31
  max:              14.95
  95th percentile:  1.27
  sum:              29403.37

Threads fairness:
  events (avg/stddev): 33612.0000/0.00
  execution time (avg/stddev): 29.4034/0.00

```

```
QEMU
Machine View
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)
Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Extra file open flags: (none)
128 files, 16MB each
2GB total file size
Block size 16KB
Number of IO requests: 0
Read/Write ratio for combined random IO test: 1.50
Periodic FSYNC enabled, calling fsync() each 100 requests.
Using synchronous I/O mode
Doing random r/w test
Doing random r/w test
Initializing worker threads...
Threads started!

File operations:
  reads/s:          822.01
  writes/s:         548.00
  fsyncs/s:        1753.68

Throughput:
  read, MiB/s:      12.84
  written, MiB/s:   8.56

General statistics:
  total time:       30.06725
  total number of events: 93810

Latency (ms):
  min:               0.01
  avg:              0.31
  max:              10.09
  95th percentile:  1.77
  sum:             29389.63

Threads fairness:
  events (avg/stddev): 93810.0000/0.00
  execution time (avg/stddev): 29.3896/0.00
sopham@sopham123:~$ sysbench --num-threads=1 --test=fileio --file-total-size=2G --time=30 --file-test-mode=random run
```

```
QEMU
Machine View
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)
Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Extra file open flags: (none)
128 files, 16MB each
2GB total file size
Block size 16KB
Number of IO requests: 0
Read/Write ratio for combined random IO test: 1.50
Periodic FSYNC enabled, calling fsync() each 100 requests.
Using synchronous I/O mode
Doing random r/w test
Doing random r/w test
Initializing worker threads...
Threads started!

File operations:
  reads/s:          728.49
  writes/s:         485.66
  fsyncs/s:        1654.64

Throughput:
  read, MiB/s:      11.38
  written, MiB/s:   7.59

General statistics:
  total time:       30.05735
  total number of events: 83105

Latency (ms):
  min:               0.01
  avg:              0.35
  max:              24.11
  95th percentile:  1.30
  sum:             29472.62

Threads fairness:
  events (avg/stddev): 83105.0000/0.00
  execution time (avg/stddev): 29.14725/0.00
sopham@sopham123:~%
```

```
QEMU
Machine View
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)
Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Extra file open flags: (none)
128 files, 16MB each
2GB total file size
Block size 16KB
Number of IO requests: 0
Read/Write ratio for combined random IO test: 1.50
Periodic FSYNC enabled, calling fsync() each 100 requests.
Using synchronous I/O mode
Doing random r/w test
Doing random r/w test
Initializing worker threads...
Threads started!

File operations:
  reads/s:          795.28
  writes/s:         550.19
  fsyncs/s:        1700.00

Throughput:
  read, MiB/s:      12.43
  written, MiB/s:   8.26

General statistics:
  total time:       30.02325
  total number of events: 90718

Latency (ms):
  min:               0.01
  avg:              0.32
  max:              11.87
  95th percentile:  1.50
  sum:             29368.86

Threads fairness:
  events (avg/stddev): 90718.0000/0.00
  execution time (avg/stddev): 29.3689/0.00
sopham@sopham123:~%
```

```

Machine View
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.18 (using system LuajIT 2.1.0-beta3)
Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Extra file open flags: (none)
128 files, 16MB each
2MB initial file size
Block size 16KiB
Number of IO requests: 0
Request rate test: combined random IO test: 1.50
Periodic FSYNC enabled, calling fsync() each 100 requests.
Calling fsync() at the end of test, Enabled.
Using thread pool mode
Doing random r/w test
Initializing worker threads...
Threads started!

File operations:
    reads/s:           805.65
    writes/s:          537.12
    fsyncs/s:          1719.43

Throughput:
    read, 1MB/s:       12.59
    write, 1MB/s:      8.39

General statistics:
    total time:        30.0695s
    total number of events: 91968

Latency (ms):
    min:               0.01
    avg:              0.02
    max:              18.54
    95th percentile:  1.30
    sum:              29347.14

Threads fairness:
    events (avg/stddev): 91968.0000/0.00
    execution time (avg/stddev): 29.3471/0.00
soham@soham:~/Desktop$ 

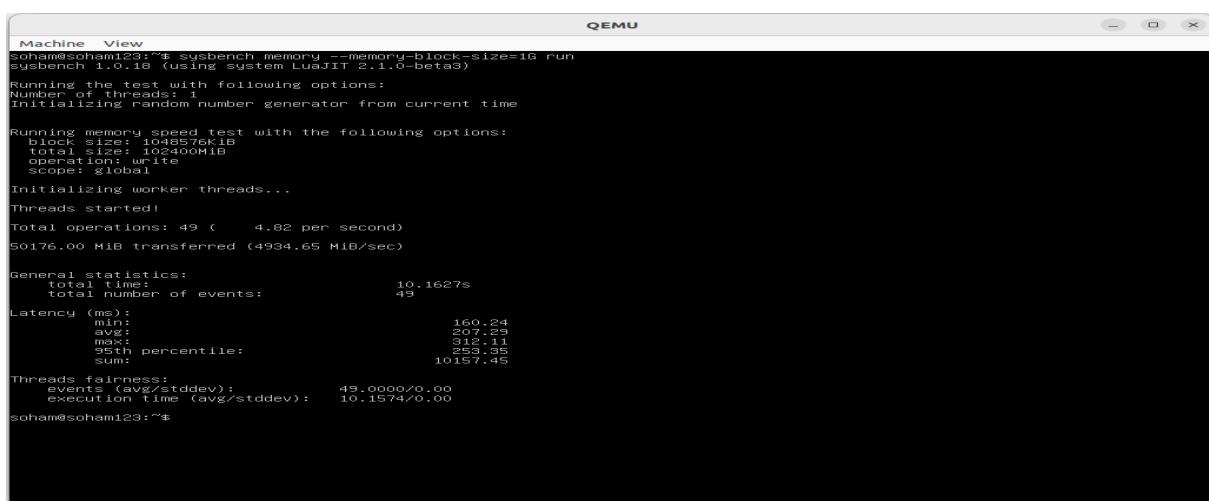
```

Serial Run Iterations	Results	
1	reads/s	820.44
	writes/sec	546.96
	fsyncs/s	1751.33
2	reads/s	822.01
	writes/sec	548.00
	fsyncs/s	1753.68
3	reads/s	728.49
	writes/sec	485.66
	fsyncs/s	1544.54
4	reads/s	795.28
	writes/sec	530.19
	fsyncs/s	1700
5	reads/s	805.65
	writes/sec	537.12
	fsyncs/s	1719.43

Minimum read/s	728.49
Minimum write/s	485.66
Minimum fsync/s	1544.54
Maximum read/s	822.01
Maximum write/s	548
Maximum fsync/s	1753.68
Average read/s	794.374
Average write/s	529.586
Average fsync/s	1693.796
S.Deviation read/s	38.44429516
S.Deviation write/s	25.62982013
S.Deviation fsyn/s	86.4135402

Memory Testing (Upto 1 GB)

```
sysbench memory --memory-block-size=1G run
```



The screenshot shows a terminal window titled "QEMU" running on a host system named "sohamesoham123". The command issued was "sysbench memory --memory-block-size=1G run". The output details a memory speed test with the following options: block size: 1048576KiB, total size: 102400MiB, operation type: write, scope: global. It initializes worker threads and starts 49 threads. The test results show a total of 50176.00 MiB transferred at 4934.65 MiB/sec. General statistics include a total time of 10.1627s and 49 events. Latency statistics show a minimum of 160.24 ms, an average of 312.41 ms, a maximum of 253.35 ms, and a 95th percentile of 10157.45 ms. Thread fairness metrics show events (avg/stddev) at 49.0000/0.00 and execution time (avg/stddev) at 10.1574/0.00.

```

Machine View
sohamesoham123:~$ sysbench memory --memory-block-size=1G run
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)
Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Running memory speed test with the following options:
block size: 1048576KiB
total size: 102400MiB
operation type: write
scope: global

Initializing worker threads...
Threads started!

Total operations: 49 (~ 4.82 per second)
50176.00 MiB transferred (4934.65 MiB/sec)

General statistics:
    total time: 10.1627s
    total number of events: 49

Latency (ms):
    min: 160.24
    avg: 312.41
    max: 253.35
    95th percentile: 10157.45

Threads fairness:
    events (avg/stddev): 49.0000/0.00
    execution time (avg/stddev): 10.1574/0.00
sohamesoham123:~$
```

```
Machine View QEMU
avg: 207.29
max: 312.11
95th percentile: 253.35
sum: 10157.45

Threads fairness:
events (avg/stddev): 49.0000/0.00
execution time (avg/stddev): 10.1574/0.00

soham@soham123:~$ sysbench memory --memory-block-size=1G run
sysbench 1.0.18 (using system LuajIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Running memory speed test with the following options:
Block size: 1048576kB
Total size: 102400MiB
operation: write
scope: global

Initializing worker threads...
Threads started!
Total operations: 44 (~ 4.39 per second)
45056.00 MiB transferred (4492.22 MiB/sec)

General statistics:
total time: 10.0247s
total number of events: 44

Latency (ms):
min: 161.18
avg: 227.60
max: 322.34
95th percentile: 308.84
sum: 10014.50

Threads fairness:
events (avg/stddev): 44.0000/0.00
execution time (avg/stddev): 10.0145/0.00

soham@soham123:~$ sysbench memory --memory-block-size=1G run
```

```
Machine View QEMU
avg: 227.60
max: 322.34
95th percentile: 308.84
sum: 10014.50

Threads fairness:
events (avg/stddev): 44.0000/0.00
execution time (avg/stddev): 10.0145/0.00

soham@soham123:~$ sysbench memory --memory-block-size=1G run
sysbench 1.0.18 (using system LuajIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Running memory speed test with the following options:
Block size: 1048576kB
Total size: 102400MiB
operation: write
scope: global

Initializing worker threads...
Threads started!
Total operations: 50 (~ 4.92 per second)
51200.00 MiB transferred (5043.12 MiB/sec)

General statistics:
total time: 10.1476s
total number of events: 50

Latency (ms):
min: 150.31
avg: 202.72
max: 302.28
95th percentile: 272.27
sum: 10135.97

Threads fairness:
events (avg/stddev): 50.0000/0.00
execution time (avg/stddev): 10.1360/0.00

soham@soham123:~$ sysbench memory --memory-block-size=1G run
```

```
Machine View QEMU
avg: 202.72
max: 302.28
95th percentile: 272.27
sum: 10135.97

Threads fairness:
events (avg/stddev): 50.0000/0.00
execution time (avg/stddev): 10.1360/0.00

soham@soham123:~$ sysbench memory --memory-block-size=1G run
sysbench 1.0.18 (using system LuajIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Running memory speed test with the following options:
Block size: 1048576kB
Total size: 102400MiB
operation: write
scope: global

Initializing worker threads...
Threads started!
Total operations: 42 (~ 4.19 per second)
43008.00 MiB transferred (4292.18 MiB/sec)

General statistics:
total time: 10.0156s
total number of events: 42

Latency (ms):
min: 203.76
avg: 237.76
max: 330.12
95th percentile: 229.60
sum: 9985.74

Threads fairness:
events (avg/stddev): 42.0000/0.00
execution time (avg/stddev): 9.9857/0.00

soham@soham123:~$
```

```

QEMU

Machine View
avg: 237.76
max: 330.12
95th percentile: 292.60
sum: 9985.74

Threads fairness:
events (avg/stddev): 42.0000/0.00
execution time (avg/stddev): 9.9857/0.00

soham@soham123:~$ sysbench memory --memory-block-size=1G run
sysbench 1.0.10 (using system LuaJIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Running memory speed test with the following options:
block size: 1048576KiB
total size: 102400MiB
operation: write
scope: global

Initializing worker threads...
Threads started!
Total operations: 39 (~ 3.79 per second)
39936.00 MiB transferred (3876.89 MiB/sec)

General statistics:
total time: 10.2975s
total number of events: 39

Latency (ms):
min: 205.55
avg: 263.47
max: 459.69
95th percentile: 419.49
sum: 10275.46

Threads fairness:
events (avg/stddev): 39.0000/0.00
execution time (avg/stddev): 10.2755/0.00

soham@soham123:~$ 

```

Iteration Number	Number of Events	Total Time
1	49	10.1627
2	44	10.0247
3	50	10.1476
4	42	10.0156
5	30	10.2975

Minimum	2.913328478
Maximum	4.927273444
Average	4.248954446
S. Deviation	0.8053912025

Case 2: Upto 1 MB

```
sysbench memory --memory-block-size=1M run
```

```
QEMU
Machine View
      95th percentile:          419.45
      sum:                  10275.46
Threads fairness:
  events (avg/stddev):    39.0000/0.00
  execution time (avg/stddev): 10.2755/0.00
soham@soham123:~$ sysbench memory --memory-block-size = 1M run
Unrecognized command line argument: 1M
soham@soham123:~$ sysbench memory --memory-block-size=1M run
sysbench 1.0.18 (using system LuajIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Running memory speed test with the following options:
  block size: 1024KiB
  total size: 102400MiB
  operation: write
  scope: global

Initializing worker threads...
Threads started!
Total operations: 58725 ( 5867.55 per second)
58725.00 MiB transferred (5867.55 MiB/sec)

General statistics:
  total time:           10.0017s
  total number of events: 58725

Latency (ms):
  min:                   0.14
  avg:                   0.17
  max:                   19.80
  95th percentile:       0.23
  sum:                  9804.37

Threads fairness:
  events (avg/stddev): 58725.0000/0.00
  execution time (avg/stddev): 9.8044/0.00
soham@soham123:~$ sysbench memory --memory-block-size=1M run
```

```
QEMU
Machine View
      avg:                 0.11
      max:                19.90
      95th percentile:     0.23
      sum:                9804.37
Threads fairness:
  events (avg/stddev): 58725.0000/0.00
  execution time (avg/stddev): 9.8044/0.00
soham@soham123:~$ sysbench memory --memory-block-size=1M run
sysbench 1.0.18 (using system LuajIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Running memory speed test with the following options:
  block size: 1024KiB
  total size: 102400MiB
  operation: write
  scope: global

Initializing worker threads...
Threads started!
Total operations: 58056 ( 5802.26 per second)
58056.00 MiB transferred (5802.26 MiB/sec)

General statistics:
  total time:           10.0009s
  total number of events: 58056

Latency (ms):
  min:                   0.14
  avg:                   0.17
  max:                   17.99
  95th percentile:       0.23
  sum:                  9768.46

Threads fairness:
  events (avg/stddev): 58056.0000/0.00
  execution time (avg/stddev): 9.7685/0.00
soham@soham123:~$ sysbench memory --memory-block-size=1M run
```

```
QEMU
Machine View
      avg:                 0.17
      max:                17.89
      95th percentile:     0.23
      sum:                9768.46
Threads fairness:
  events (avg/stddev): 58056.0000/0.00
  execution time (avg/stddev): 9.7685/0.00
soham@soham123:~$ sysbench memory --memory-block-size=1M run
sysbench 1.0.18 (using system LuajIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Running memory speed test with the following options:
  block size: 1024KiB
  total size: 102400MiB
  operation: write
  scope: global

Initializing worker threads...
Threads started!
Total operations: 59979 ( 5994.27 per second)
59979.00 MiB transferred (5994.27 MiB/sec)

General statistics:
  total time:           10.0018s
  total number of events: 59979

Latency (ms):
  min:                   0.14
  avg:                   0.15
  max:                   38.43
  95th percentile:       0.23
  sum:                  9792.40

Threads fairness:
  events (avg/stddev): 59979.0000/0.00
  execution time (avg/stddev): 9.7924/0.00
soham@soham123:~$ sysbench memory --memory-block-size=1M run
```

```

QEMU

Machine View
avg: 0.17
max: 14.30
95th percentile: 0.23
sum: 9768.74

Threads fairness:
events (avg/stddev): 58370.0000/0.00
execution time (avg/stddev): 9.7687/0.00

soham@soham123:~$ sysbench memory --memory-block-size=1M run
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Running memory speed test with the following options:
block size: 1024KiB
total size: 102400MiB
operation: write
scope: global

Initializing worker threads...
Threads started!

Total operations: 65510 ( 6547.79 per second)
65510.00 MiB transferred (6547.79 MiB/sec)

General statistics:
total time: 10.0009s
total number of events: 65510

Latency (ms):
min: 0.14
avg: 0.15
max: 4.05
95th percentile: 0.17
sum: 9831.48

Threads fairness:
events (avg/stddev): 65510.0000/0.00
execution time (avg/stddev): 9.8315/0.00

soham@soham123:~$
```

Iteration Number	Number of Events	Total Time
1	58725	10.0017
2	58056	10.0009
3	59979	10.0013
4	58370	10.0011
5	65510	10.0009

Minimum	5805.077543
Maximum	6550.410463
Average	6012.093645
S. Deviation	309.6425088

CONDITION 2: 2GB RAM and 3 CORES on QEMU (raw)

```
soham@soham-System-Product-Name:~$ sudo qemu-system-x86_64 -hda /home/Soham/ubuntu2.img -m 2048 -smp cores=2
[sudo] password for soham:
qemu-system-x86_64: -hda /home/Soham/ubuntu2.img: could not open '/home/Soham/ubuntu2.img': No such file or directory
soham@soham-System-Product-Name:~$ sudo qemu-system-x86_64 -hda /home/Soham/ubuntu2.img -m 2048 -smp 2 -net user -net nic
WARNING: Image format was not specified for '/home/Soham/ubuntu2.img' and probing guessed raw.
        Automatically detecting the format is dangerous for raw images, write operations on block 0 will be restricted.
        Specify the 'raw' format explicitly to remove the restrictions.
soham@soham-System-Product-Name:~$ sudo qemu-system-x86_64 -hda /home/soham/ubuntu2.img -m 2048 -smp 3 -net user -net nic
[sudo] password for soham:
WARNING: Image format was not specified for '/home/soham/ubuntu2.img' and probing guessed raw.
        Automatically detecting the format is dangerous for raw images, write operations on block 0 will be restricted.
        Specify the 'raw' format explicitly to remove the restrictions.
```

CPU Tests

Case 1: max-prime = 5000

```
sysbench cpu --cpu-max-prime=5000 --num-threads=1 --time=30 run
```

```
Machine View QEMU
soham@soham123:~/sysbench$ sysbench cpu --cpu-max-prime=5000 --num-threads=1 --time=30 run
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)
Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Prime numbers limit: 5000
Initializing worker threads...
Threads started!
CPU speed:
events per second: 1848.50
General statistics:
total time: 30.0012s
total number of events: 55465
Latency (ms):
min: 0.50
avg: 0.54
max: 9.52
95th percentile: 0.98
sum: 29867.27
Threads fairness:
events (avg/stddev): 55465.0000/0.00
execution time (avg/stddev): 29.8673/0.00
soham@soham123:~/
```

```
Machine View QEMU
General statistics:
total time: 30.0012s
total number of events: 55465
Latency (ms):
min: 0.50
avg: 0.54
max: 9.52
95th percentile: 0.98
sum: 29867.27
Threads fairness:
events (avg/stddev): 55465.0000/0.00
execution time (avg/stddev): 29.8673/0.00
soham@soham123:~/sysbench$ sysbench cpu --cpu-max-prime=5000 --num-threads=1 --time=30 run
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)
Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Prime numbers limit: 5000
Initializing worker threads...
Threads started!
CPU speed:
events per second: 1778.31
General statistics:
total time: 30.0014s
total number of events: 53359
Latency (ms):
min: 0.51
avg: 0.56
max: 26.67
95th percentile: 0.72
sum: 29868.09
Threads fairness:
events (avg/stddev): 53359.0000/0.00
execution time (avg/stddev): 29.8681/0.00
soham@soham123:~/
```

```
Machine View
QEMU
General statistics:
    total time:          30.00014s
    total number of events:      53359
Latency (ms):
    min:                  0.51
    avg:                  0.56
    max:                 26.67
    95th percentile:     0.72
    sum:                29880.69
Threads fairness:
    events (avg/stddev):   53359.0000/0.00
    execution time (avg/stddev): 29.8681/0.00
soham@soham123:~$ sysbench cpu --cpu-max-prime=5000 --num-threads=1 --time=30 run
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)
Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Prime numbers limit: 5000
Initializing worker threads...
Threads started!
CPU speed:
    events per second: 1854.26
General statistics:
    total time:          30.00018s
    total number of events:      55698
Latency (ms):
    min:                  0.51
    avg:                  0.54
    max:                 26.62
    95th percentile:     0.66
    sum:                29880.38
Threads fairness:
    events (avg/stddev):   55698.0000/0.00
    execution time (avg/stddev): 29.8804/0.00
soham@soham123:~$
```

```
Machine View
QEMU
soham@soham123:~$ sysbench cpu --cpu-max-prime=5000 --num-threads=1 --time=30 run
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)
Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Prime numbers limit: 5000
Initializing worker threads...
Threads started!
CPU speed:
    events per second: 1755.91
General statistics:
    total time:          30.00011s
    total number of events:      52686
Latency (ms):
    min:                  0.51
    avg:                  0.57
    max:                 28.72
    95th percentile:     0.74
    sum:                29828.50
Threads fairness:
    events (avg/stddev):   52686.0000/0.00
    execution time (avg/stddev): 29.8285/0.00
soham@soham123:~$ sysbench cpu --cpu-max-prime=5000 --num-threads=1 --time=30 run
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)
Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Prime numbers limit: 5000
Initializing worker threads...
Threads started!
```

```
Machine View
QEMU
General statistics:
    total time:          30.00011s
    total number of events:      52686
Latency (ms):
    min:                  0.51
    avg:                  0.57
    max:                 28.72
    95th percentile:     0.74
    sum:                29828.50
Threads fairness:
    events (avg/stddev):   52686.0000/0.00
    execution time (avg/stddev): 29.8285/0.00
soham@soham123:~$ sysbench cpu --cpu-max-prime=5000 --num-threads=1 --time=30 run
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)
Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Prime numbers limit: 5000
Initializing worker threads...
Threads started!
CPU speed:
    events per second: 1757.62
General statistics:
    total time:          30.00013s
    total number of events:      52738
Latency (ms):
    min:                  0.51
    avg:                  0.57
    max:                 26.56
    95th percentile:     0.73
    sum:                29840.88
Threads fairness:
    events (avg/stddev):   52738.0000/0.00
    execution time (avg/stddev): 29.8409/0.00
soham@soham123:~$
```

Iteration Number	Number of Events per Second
1	1848.50
2	1778.31
3	1854.31
4	1755.91
5	1757.62

Minimum	1755.91
Maximum	1854.31
Average	1798.93
S. Deviation	48.75076974

Case 2: max-prime: 50000

```
sysbench cpu --cpu-max-prime=5000 --num-threads=1 --time=30 run
```

```
Machine View
soham@soham123:~$ sysbench cpu --cpu-max-prime=50000 --num-threads=1 --time=30 run
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)
Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Prime numbers limit: 50000
Initializing worker threads...
Threads started!
CPU speed:
events per second: 78.44
General statistics:
total time: 30.0069s
total number of events: 2354
Latency (ms):
min: 11.14
avg: 12.73
max: 38.37
95th percentile: 17.95
sum: 29961.76
Threads fairness:
events (avg/stddev): 2354.0000/0.00
execution time (avg/stddev): 29.9618/0.00
soham@soham123:~$ _
```

```
Machine View
soham@soham123:~$ sysbench cpu --cpu-max-prime=50000 --num-threads=1 --time=30 run
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)
Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Prime numbers limit: 50000
Initializing worker threads...
Threads started!
CPU speed:
events per second: 82.30
General statistics:
total time: 30.0097s
total number of events: 2470
Latency (ms):
min: 11.19
avg: 12.14
max: 30.96
95th percentile: 16.12
sum: 29980.20
Threads fairness:
events (avg/stddev): 2470.0000/0.00
execution time (avg/stddev): 29.9802/0.00
soham@soham123:~$ sysbench cpu --cpu-max-prime=50000 --num-threads=1 --time=30 run
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)
Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Prime numbers limit: 50000
Initializing worker threads...
Threads started!
```

```
Machine View
General statistics:
total time: 30.0097s
total number of events: 2470
Latency (ms):
min: 11.19
avg: 12.14
max: 30.96
95th percentile: 16.12
sum: 29980.20
Threads fairness:
events (avg/stddev): 2470.0000/0.00
execution time (avg/stddev): 29.9802/0.00
soham@soham123:~$ sysbench cpu --cpu-max-prime=50000 --num-threads=1 --time=30 run
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)
Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Prime numbers limit: 50000
Initializing worker threads...
Threads started!
CPU speed:
events per second: 82.57
General statistics:
total time: 30.0051s
total number of events: 2478
Latency (ms):
min: 11.24
avg: 12.09
max: 38.26
95th percentile: 15.75
sum: 29957.70
Threads fairness:
events (avg/stddev): 2478.0000/0.00
execution time (avg/stddev): 29.9577/0.00
soham@soham123:~$ _
```

```

QEMU
Machine View
General statistics:
  total time:          30.0051s
  total number of events: 2478
Latency (ms):
  min:                 11.24
  avg:                 12.09
  max:                 38.28
  95th percentile:    15.75
  sum:                29957.70
Threads fairness:
  events (avg/stddev):   2478.0000/0.00
  execution time (avg/stddev): 29.9577/0.00
soham@soham123:~$ sysbench cpu --cpu-max-prime=50000 --num-threads=1 --time=30 run
sysbench 1.0.18 (using system LuAJIT 2.1.0-beta3)
Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Prime numbers limit: 50000
Initializing worker threads...
Threads started!
CPU speed:
  events per second: 79.62
General statistics:
  total time:          30.0018s
  total number of events: 2389
Latency (ms):
  min:                 11.09
  avg:                 12.53
  max:                 32.03
  95th percentile:    17.01
  sum:                29940.75
Threads fairness:
  events (avg/stddev):   2389.0000/0.00
  execution time (avg/stddev): 29.9407/0.00
soham@soham123:~$
```

```

QEMU
Machine View
General statistics:
  total time:          30.0018s
  total number of events: 2389
Latency (ms):
  min:                 11.09
  avg:                 12.53
  max:                 32.03
  95th percentile:    17.01
  sum:                29940.75
Threads fairness:
  events (avg/stddev):   2389.0000/0.00
  execution time (avg/stddev): 29.9407/0.00
soham@soham123:~$ sysbench cpu --cpu-max-prime=50000 --num-threads=1 --time=30 run
sysbench 1.0.18 (using system LuAJIT 2.1.0-beta3)
Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Prime numbers limit: 50000
Initializing worker threads...
Threads started!
CPU speed:
  events per second: 80.02
General statistics:
  total time:          30.0015s
  total number of events: 2401
Latency (ms):
  min:                 11.18
  avg:                 12.48
  max:                 32.03
  95th percentile:    17.01
  sum:                29955.28
Threads fairness:
  events (avg/stddev):   2401.0000/0.00
  execution time (avg/stddev): 29.9553/0.00
soham@soham123:~$
```

Iteration Number	Number of Events per Second
1	78.44
2	82.30
3	82.57
4	79.62
5	80.02

Minimum	78.44
Maximum	82.57
Average	80.59
S. Deviation	1.78415246

I/O Tests

Case 1: Sequential Read/Write

```
sysbench --num-threads=1 --test=fileio --file-total-size=2G
--file-num=128 --file-test-mode=seqrewr prepare
sysbench --num-threads=1 --test=fileio --file-total-size=2G
--file-num=128 --file-test-mode=seqrewr run
sysbench --num-threads=1 --test=fileio --file-total-size=2G
--file-num=128 --file-test-mode=seqrewr cleanup
```

Machine View

```
soham@soham123:~$ sysbench --num-threads=1 --test=fileio --file-total-size=2G --file-num=128 --file-test-mode=seqrewr run
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.18 (using system LuajIT 2.1.0-beta0)
Running the test with following options:
Number of threads: 1
Initializing random number generator from current time
Initializing random number generator from current time
Extra file open flags: (none)
128 files, 16MB each
2GB total file size
Block size 16KiB
Periodic FSYNC enabled, calling fsync() each 100 requests.
Calling fsync() at the end of test, Enabled.
Using synchronous I/O mode
Doing sequential rewrite test
Initializing worker threads...
Threads started!

File operations:
  reads/s:          0.00
  writes/s:        3460.20
  fsyncs/s:       4432.44

Throughput:
  read, MiB/s:      0.00
  written, MiB/s:   54.07

General statistics:
  total time:           10.02445
  total number of events: 79022

Latency (ms):
  min:                 0.04
  q1:                  0.05
  avg:                 11.62
  q3:                  0.16
  95th percentile:     9716.96
  sum:                 9716.96

Threads fairness:
  events (avg/stddev):    79022.0000/0.00
  execution time (avg/stddev): 9.7170/0.00
soham@soham123:~$
```

Machine View

```
soham@soham123:~$ sysbench --num-threads=1 --test=fileio --file-total-size=2G --file-num=128 --file-test-mode=seqrewr run
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.18 (using system LuajIT 2.1.0-beta0)
Running the test with following options:
Number of threads: 1
Initializing random number generator from current time
Initializing random number generator from current time
Extra file open flags: (none)
128 files, 16MB each
2GB total file size
Block size 16KiB
Periodic FSYNC enabled, calling fsync() each 100 requests.
Calling fsync() at the end of test, Enabled.
Using synchronous I/O mode
Doing sequential rewrite test
Initializing worker threads...
Threads started!

File operations:
  reads/s:          0.00
  writes/s:        3482.79
  fsyncs/s:       4077.16

Throughput:
  read, MiB/s:      0.00
  written, MiB/s:   49.73

General statistics:
  total time:           10.01905
  total number of events: 72636

Latency (ms):
  min:                 0.02
  q1:                  0.13
  avg:                 24.45
  q3:                  0.17
  95th percentile:     9715.02
  sum:                 9715.02

Threads fairness:
  events (avg/stddev):    72636.0000/0.00
  execution time (avg/stddev): 9.7130/0.00
soham@soham123:~$
```

```
Machine View
soham@soham123:~$ sysbench --num-threads=1 --test=fileio --file-total-size=2G --file-num=128 --file-test-mode=segrewr run
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.18 (using system LuajIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Extra file open flags: (none)
128 files, 16MiB each
2GiB total file size
Block size: 64KiB
Per-thread FSYNC enabled, calling fsync() each 100 requests.
Calling fsync() at the end of test, Enabled.
Using synchronous I/O mode
Doing sequential rewrite test
Initializing worker threads...

Threads started!

File operations:
  reads/s:          0.00
  writes/s:        3093.98
  fsyncs/s:       4396.38

Throughput:
  read, MiB/s:      0.00
  written, MiB/s:   52.87

General statistics:
  total time:       10.0148s
  total number of events: 77213

Latency (ms):
  min:                      0.02
  avg:                     0.13
  max:                     35.93
  95th percentile:          0.18
  sum:                    9683.48

Threads fairness:
  events (avg/stddev):    77213.0000/0.00
  execution time (avg/stddev): 9.6835/0.00
soham@soham123:~$
```

```
Machine View
soham@soham123:~$ sysbench --num-threads=1 --test=fileio --file-total-size=2G --file-num=128 --file-test-mode=segrewr run
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.18 (using system LuajIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Extra file open flags: (none)
128 files, 16MiB each
2GiB total file size
Block size: 64KiB
Per-thread FSYNC enabled, calling fsync() each 100 requests.
Calling fsync() at the end of test, Enabled.
Using synchronous I/O mode
Doing sequential rewrite test
Initializing worker threads...

Threads started!

File operations:
  reads/s:          0.00
  writes/s:        3093.69
  fsyncs/s:       3963.01

Throughput:
  read, MiB/s:      0.00
  written, MiB/s:   48.34

General statistics:
  total time:       10.0178s
  total number of events: 70583

Latency (ms):
  min:                      0.02
  avg:                     0.14
  max:                     26.67
  95th percentile:          0.19
  sum:                    9658.56

Threads fairness:
  events (avg/stddev):    70583.0000/0.00
  execution time (avg/stddev): 9.6586/0.00
soham@soham123:~$
```

```
Machine View
soham@soham123:~$ sysbench --num-threads=1 --test=fileio --file-total-size=2G --file-num=128 --file-test-mode=segrewr run
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.18 (using system LuajIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Extra file open flags: (none)
128 files, 16MiB each
2GiB total file size
Block size: 16KiB
Per-thread FSYNC enabled, calling fsync() each 100 requests.
Calling fsync() at the end of test, Enabled.
Using synchronous I/O mode
Doing sequential rewrite test
Initializing worker threads...

Threads started!

File operations:
  reads/s:          0.00
  writes/s:        3065.20
  fsyncs/s:       3931.41

Throughput:
  read, MiB/s:      0.00
  written, MiB/s:   47.89

General statistics:
  total time:       10.0444s
  total number of events: 70176

Latency (ms):
  min:                      0.02
  avg:                     0.14
  max:                     28.59
  95th percentile:          0.19
  sum:                    9689.28

Threads fairness:
  events (avg/stddev):    70176.0000/0.00
  execution time (avg/stddev): 9.6893/0.00
soham@soham123:~$
```

Serial Run Iterations	Results	
1	reads/s	0
	writes/sec	3460.20
	fsyncs/s	4432.44
2	reads/s	0
	writes/sec	3182.79
	fsyncs/s	4077.44
3	reads/s	0
	writes/sec	3383.79
	fsyncs/s	4336.38
4	reads/s	0
	writes/sec	3093.69
	fsyncs/s	3963.01
5	reads/s	0
	writes/sec	3065.20
	fsyncs/s	3931.41

Minimum read/s	0
Minimum write/s	3065.2
Minimum fsync/s	3931.41
Maximum read/s	0
Maximum write/s	3460.2
Maximum fsync/s	4432.44
Average read/s	0
Average write/s	3237.134

Average fsync/s	4148.136
S.Deviation read/s	0
S.Deviation write/s	176.3215631
S.Deviation fsyn/s	225.0023818

Case 2: Combined Random

```
sysbench --num-threads=1 --test=fileio --file-total-size=2G
--file-num=128 --file-test-mode=rndrw prepare
sysbench --num-threads=1 --test=fileio --file-total-size=2G
--file-num=128 --file-test-mode=rndrw run
sysbench --num-threads=1 --test=fileio --file-total-size=2G
--file-num=128 --file-test-mode=rndrw cleanup
```

Machine View

WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.

sysbench 1.0.18 (using system LuajIT 2.1.0-beta3)

Running the test with following options:

Number of threads: 1

Initializing random number generator from current time

Extra file open flags: (none)

128 files, 16MB each

2GB total filesize

Block size: 64KB

Number of IO requests: 0

Read/Write ratio for combined random IO test: 1.50

Periodic FSync enabled, calling fsync() each 100 requests.

Using synchronous I/O mode

Doing random r/w test

Initializing worker threads...

Threads started!

File operations:

reads/s:	813.83
writes/s:	542.02
fsyncs/s:	1740.68

Throughput:

read, MiB/s:	12.71
written, MiB/s:	8.47

General statistics:

total time:	10.0291s
total number of events:	30936

Latency (ms):

min:	0.01
avg:	0.33
max:	17.58
95th percentile:	1.25
sum:	9800.82

Threads fairness:

events (avg/stddev):	30936.0000/0.00
execution time (avg/stddev):	9.8008/0.00

soham@soham123:~\$

Machine View

WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.

sysbench 1.0.18 (using system LuajIT 2.1.0-beta3)

Running the test with following options:

Number of threads: 1

Initializing random number generator from current time

Extra file open flags: (none)

128 files, 16MB each

2GB total filesize

Block size: 64KB

Number of IO requests: 0

Read/Write ratio for combined random IO test: 1.50

Periodic FSync enabled, calling fsync() each 100 requests.

Using synchronous I/O mode

Doing random r/w test

Initializing worker threads...

Threads started!

File operations:

reads/s:	687.54
writes/s:	458.86
fsyncs/s:	1479.00

Throughput:

read, MiB/s:	10.74
written, MiB/s:	7.16

General statistics:

total time:	10.0304s
total number of events:	26215

Latency (ms):

min:	0.01
avg:	0.37
max:	17.58
95th percentile:	1.34
sum:	9803.69

Threads fairness:

events (avg/stddev):	26215.0000/0.00
execution time (avg/stddev):	9.8037/0.00

soham@soham123:~\$

```
QEMU
Machine View
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
subbench 1.0.18 (using system LuajIT 2.1.0-beta3)
Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Extra file open flags: (none)
128 files, 16MB each
2GB total file size
Block size 16KiB
Number of IO requests: 0
Read/write ratio for combined random IO test: 1.50
Periodic FSYNC enabled, calling fsync() each 100 requests.
Calling sync() at the end of test, Enabled.
Using synchronous I/O mode
Doing random r/w test
Initializing worker threads...
Threads started!

File operations:
  reads/s:          717.06
  writes/s:         478.04
  fsyncs/s:        1540.88

Throughput:
  read, MiB/s:      11.20
  written, MiB/s:   7.47

General statistics:
  total time:       10.0365s
  total number of events: 27944

Latency (ms):
  min:               0.01
  avg:               0.36
  max:              21.99
  95th percentile:  1.30
  sum:              9788.82

Threads fairness:
  events (avg/stddev): 27944.0000/0.00
  execution time (avg/stddev): 9.7888/0.00
solaris@solaris123:~%
```

```
QEMU
Machine View
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
subbench 1.0.18 (using system LuajIT 2.1.0-beta3)
Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Extra file open flags: (none)
128 files, 16MB each
2GB total file size
Block size 16KiB
Number of IO requests: 0
Read/write ratio for combined random IO test: 1.50
Periodic FSYNC enabled, calling fsync() each 100 requests.
Calling sync() at the end of test, Enabled.
Using synchronous I/O mode
Doing random r/w test
Initializing worker threads...
Threads started!

File operations:
  reads/s:          741.45
  writes/s:         494.90
  fsyncs/s:        1593.62

Throughput:
  read, MiB/s:      11.59
  written, MiB/s:   7.72

General statistics:
  total time:       10.0318s
  total number of events: 28263

Latency (ms):
  min:               0.01
  avg:               0.35
  max:              14.10
  95th percentile:  1.00
  sum:              9802.85

Threads fairness:
  events (avg/stddev): 28263.0000/0.00
  execution time (avg/stddev): 9.8028/0.00
solaris@solaris123:~%
```

```
QEMU
Machine View
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
subbench 1.0.18 (using system LuajIT 2.1.0-beta3)
Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Extra file open flags: (none)
128 files, 16MB each
2GB total file size
Block size 16KiB
Number of IO requests: 0
Read/write ratio for combined random IO test: 1.50
Periodic FSYNC enabled, calling fsync() each 100 requests.
Calling sync() at the end of test, Enabled.
Using synchronous I/O mode
Viewer random r/w test
Initializing worker threads...
Threads started!

File operations:
  reads/s:          675.75
  writes/s:         450.50
  fsyncs/s:        1451.27

Throughput:
  read, MiB/s:      10.56
  written, MiB/s:   7.04

General statistics:
  total time:       10.0299s
  total number of events: 25793

Latency (ms):
  min:               0.01
  avg:               0.38
  max:              24.07
  95th percentile:  1.07
  sum:              9795.28

Threads fairness:
  events (avg/stddev): 25793.0000/0.00
  execution time (avg/stddev): 9.7953/0.00
solaris@solaris123:~%
```

Serial Run Iterations	Results	
1	reads/s	813.33
	writes/sec	542.22
	fsyncs/s	1740.68
2	reads/s	687.54
	writes/sec	458.36
	fsyncs/s	1479.00
3	reads/s	717.06
	writes/sec	478.04
	fsyncs/s	1540.68
4	reads/s	741.45
	writes/sec	494.30
	fsyncs/s	1593.62
5	reads/s	675.75
	writes/sec	450.50
	fsyncs/s	1451.27

Minimum read/s	675.75
Minimum write/s	450.5
Minimum fsync/s	1451.27
Maximum read/s	813.33
Maximum write/s	542.22
Maximum fsync/s	1740.68
Average read/s	727.026
Average write/s	484.684
Average fsync/s	1561.05

S.Deviation	
read/s	54.64459196
S.Deviation	
write/s	36.42972797
S.Deviation	
fsyn/s	114.5933349

Memory Test

Case 1: Upto 1GB

```
sysbench memory --memory-block-size=1G run
```

```

Machine View QEMU
soham@soham123:~$ sysbench memory --memory-block-size=1G run
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)
Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Running memory speed test with the following options:
block size: 1048576KiB
total size: 102400MiB
operation: write
scope: global

Initializing worker threads...
Threads started!
Total operations: 50 ( 4.92 per second)
51200.00 MiB transferred (5039.07 MiB/sec)

General statistics:
    total time: 10.1569s
    total number of events: 50
Latency (ms):
    min: 160.74
    avg: 203.03
    max: 221.29
    95th percentile: 215.44
    sum: 10151.71

Threads fairness:
    events (avg/stddev): 50.0000/0.00
    execution time (avg/stddev): 10.1517/0.00
soham@soham123:~$
```

```

Machine View QEMU
soham@soham123:~$ sysbench memory --memory-block-size=1G run
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)
Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Running memory speed test with the following options:
block size: 1048576KiB
total size: 102400MiB
operation: write
scope: global

Initializing worker threads...
Threads started!
Total operations: 43 ( 4.25 per second)
44032.00 MiB transferred (4346.88 MiB/sec)

General statistics:
    total time: 10.1255s
    total number of events: 43
Latency (ms):
    min: 204.15
    avg: 294.80
    max: 313.11
    95th percentile: 308.84
    sum: 10096.20

Threads fairness:
    events (avg/stddev): 43.0000/0.00
    execution time (avg/stddev): 10.0962/0.00
soham@soham123:~$
```

```
QEMU
Machine View
avg: 234.60
max: 313.11
95th percentile: 308.84
sum: 10096.20

Threads fairness:
events (avg/stddev): 48.0000/0.00
execution time (avg/stddev): 10.0962/0.00
sopham@sopham123:~$ sysbench memory --memory-block-size=1G run
sysbench 1.0.16 (using system LuaJIT 2.1.0-beta3)
Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Running memory speed test with the following options:
block size: 1048576KiB
total size: 102400MiB
operation: write
scope: global
Initializing worker threads...
Threads started!
Total operations: 42 (~ 4.18 per second)
43008.00 MiB transferred (4279.50 MiB/sec)

General statistics:
total time: 10.0450s
total number of events: 42

Latency (ms):
min: 201.52
avg: 238.80
max: 406.90
95th percentile: 325.98
sum: 10029.80

Threads fairness:
events (avg/stddev): 42.0000/0.00
execution time (avg/stddev): 10.0298/0.00
sopham@sopham123:~$
```

```
QEMU
Machine View
avg: 238.80
max: 403.90
95th percentile: 325.98
sum: 10029.80

Threads fairness:
events (avg/stddev): 42.0000/0.00
execution time (avg/stddev): 10.0298/0.00
sopham@sopham123:~$ sysbench memory --memory-block-size=1G run
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)
Running the test with following options:
item-x86_64 threads: 1
Initializing random number generator from current time

Running memory speed test with the following options:
block size: 1048576KiB
total size: 102400MiB
operation: write
scope: global
Initializing worker threads...
Threads started!
Total operations: 43 (~ 4.25 per second)
44032.00 MiB transferred (4351.66 MiB/sec)

General statistics:
total time: 10.1122s
total number of events: 43

Latency (ms):
min: 202.78
avg: 234.98
max: 395.90
95th percentile: 344.08
sum: 10104.22

Threads fairness:
events (avg/stddev): 43.0000/0.00
execution time (avg/stddev): 10.1042/0.00
sopham@sopham123:~$
```

```
QEMU
Machine View
avg: 234.98
max: 395.90
95th percentile: 364.09
sum: 10104.22

Threads fairness:
events (avg/stddev): 43.0000/0.00
execution time (avg/stddev): 10.1042/0.00
sopham@sopham123:~$ sysbench memory --memory-block-size=1G run
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)
Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Running memory speed test with the following options:
block size: 1048576KiB
total size: 102400MiB
operation: write
scope: global
Initializing worker threads...
Threads started!
Total operations: 49 (~ 4.80 per second)
50176.00 MiB transferred (4915.32 MiB/sec)

General statistics:
total time: 10.2035s
total number of events: 49

Latency (ms):
min: 204.92
avg: 236.00
max: 291.92
95th percentile: 219.36
sum: 10182.23

Threads fairness:
events (avg/stddev): 49.0000/0.00
execution time (avg/stddev): 10.1822/0.00
sopham@sopham123:~$
```

Iteration Number	Number of Events	Total Time
1	50	10.0010
2	43	10.0013
3	42	10.0010
4	43	10.0010
5	49	10.0020

Minimum	4.199580042
Maximum	4.99950005
Average	4.539422281
S. Deviation	0.3780195226

Case 2: Upto 1MB

```
sysbench memory --memory-block-size=1M run
```

```

Machine View
block size: 1024KiB
total size: 102400MiB
operations: write
scope: global

Initializing worker threads...
Threads started!
Total operations: 61086 ( 6104.59 per second)
61086.00 MiB transferred (6104.59 MiB/sec)

General statistics:
  total time: 10.0010s
  total number of events: 61086

Latency (ms):
  min: 0.14
  avg: 0.16
  max: 3.04
  95th percentile: 0.20
  sum: 9761.28

Threads fairness:
  events/(avg/stddev): 61086.0000/0.00
  execution time (avg/stddev): 9.7613/0.00

soham@sohami23:~$ sysbench memory --memory-block-size=1M run
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Running memory speed test with the following options:
block size: 1024KiB
total size: 102400MiB
operations: write
scope: global

Initializing worker threads...
Threads started!

```

```
Machine View QEMU
avg: 0.16
max: 0.04
95th percentile: 0.20
sum: 9761.28

Threads fairness:
events (avg/stddev): 61086.0000/0.00
execution time (avg/stddev): 9.7613/0.00
soham@soham123:~$ sysbench memory --memory-block-size=1M run
sysbench 1.0.18 (using system LuajIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Running memory speed test with the following options:
block size: 1024KiB
total size: 102400MiB
operation: write
scope: global

Initializing worker threads...
Threads started!
Total operations: 60291 (~ 6024.30 per second)
60291.00 MiB transferred (6024.30 MiB/sec)

General statistics:
total time: 10.0013S
total number of events: 60291

Latency (ms):
min: 0.14
avg: 0.16
max: 11.29
95th percentile: 0.21
sum: 9785.95

Threads fairness:
events (avg/stddev): 60291.0000/0.00
execution time (avg/stddev): 9.7859/0.00
soham@soham123:~$
```

```
Machine View QEMU
avg: 0.16
max: 1.29
95th percentile: 0.21
sum: 9785.95

Threads fairness:
events (avg/stddev): 60291.0000/0.00
execution time (avg/stddev): 9.7859/0.00
soham@soham123:~$ sysbench memory --memory-block-size=1M run
sysbench 1.0.18 (using system LuajIT 2.1.0-beta3)

test with following options:
x86_64 threads: 1
Initializing random number generator from current time

Running memory speed test with the following options:
block size: 1024KiB
total size: 102400MiB
operation: write
scope: global

Initializing worker threads...
Threads started!
Total operations: 53811 (~ 5378.95 per second)
53811.00 MiB transferred (5378.95 MiB/sec)

General statistics:
total time: 10.0010S
total number of events: 53811

Latency (ms):
min: 0.14
avg: 0.18
max: 8.33
95th percentile: 0.28
sum: 9722.57

Threads fairness:
events (avg/stddev): 53811.0000/0.00
execution time (avg/stddev): 9.7226/0.00
soham@soham123:~$
```

```
Machine View QEMU
soham@soham123:~$ sysbench memory --memory-block-size=1M run
sysbench 1.0.18 (using system LuajIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Running memory speed test with the following options:
block size: 1024KiB
total size: 102400MiB
operation: write
scope: global

Initializing worker threads...
Threads started!
Total operations: 59764 (~ 5973.48 per second)
59764.00 MiB transferred (5973.48 MiB/sec)

General statistics:
total time: 10.0010S
total number of events: 59764

Latency (ms):
min: 0.15
avg: 0.16
max: 11.79
95th percentile: 0.21
sum: 9774.11

Threads fairness:
events (avg/stddev): 59764.0000/0.00
execution time (avg/stddev): 9.7741/0.00
soham@soham123:~$
```

```

QEMU

Machine View
avg:          0.16
max:          11.79
95th percentile: 0.21
sum:         9774.11

Threads fairness:
events (avg/stddev): 59754.0000/0.00
execution time (avg/stddev): 9.7741/0.00

soham@soham123:~$ sysbench memory --memory-block-size=1M run
sysbench 1.0.18 (using system LuajIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Running memory speed test with the following options:
block size: 1024KiB
total size: 102400MiB
operation: write
scope: global

Initializing worker threads...
Threads started!

Total operations: 57096 ( 5705.33 per second)
57096.00 MiB transferred (5705.33 MiB/sec)

General statistics:
total time:           10.0020s
total number of events: 57096

Latency (ms):
min:                  0.14
avg:                  0.17
max:                 19.82
95th percentile:    0.23
sum:                 9766.48

Threads fairness:
events (avg/stddev): 57096.0000/0.00
execution time (avg/stddev): 9.7665/0.00

soham@soham123:~$
```

Iteration Number	Number of Events	Total Time
1	61086	10.15636
2	60291	10.12500
3	53811	10.04500
4	59764	10.11220
5	57096	10.20350

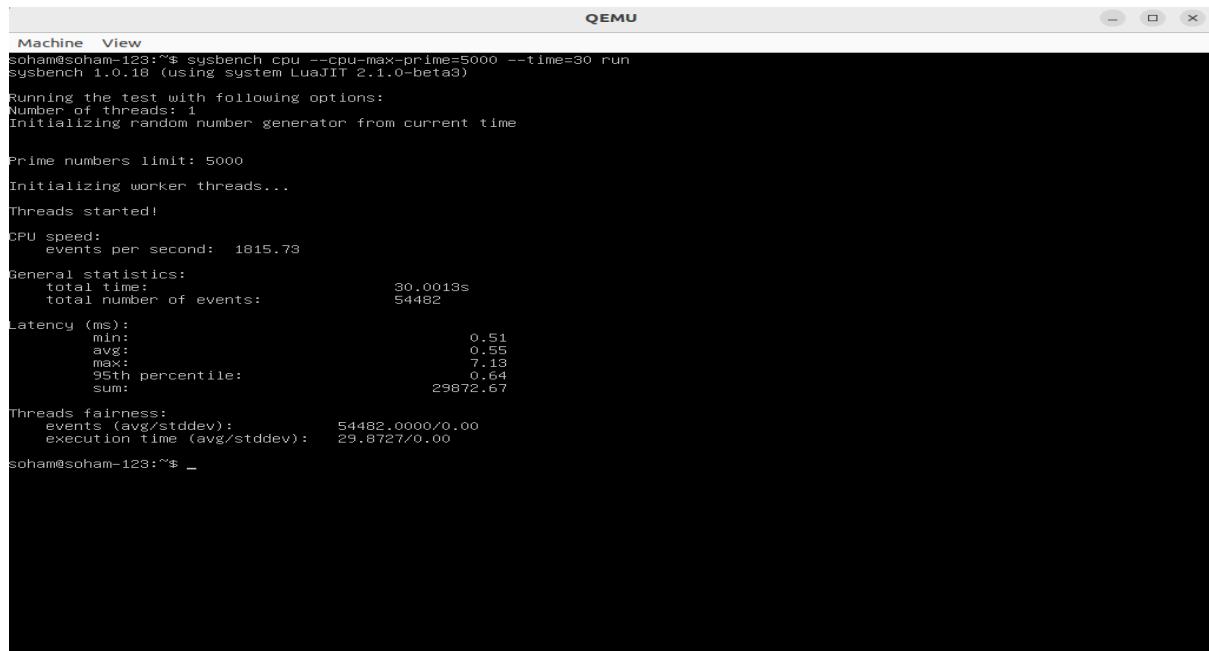
Minimum	5356.993529
Maximum	6014.556396
Average	5766.40647
S. Deviation	280.3637606

CONDITION 3: 3GB RAM and 3 CORES on QEMU (raw)

```
soham@soham-System-Product-Name:~$ sudo qemu-system-x86_64 -hda /home/Soham/ubuntu2.img -m 2048 -smp cores=2
[sudo] password for soham:
qemu-system-x86_64: -hda '/home/Soham/ubuntu2.img': Could not open '/home/Soham/ubuntu2.img': No such file or directory
soham@soham-System-Product-Name:~$ sudo qemu-system-x86_64 -hda /home/soham/ubuntu2.img -m 2048 -smp 2 -net user -net nic
WARNING: Image format was not specified for '/home/soham/ubuntu2.img' and probing guessed raw.
        Automatically detecting the format is dangerous for raw images, write operations on block 0 will be restricted.
        Specify the 'raw' format explicitly to remove the restrictions.
soham@soham-System-Product-Name:~$ sudo qemu-system-x86_64 -hda /home/soham/ubuntu2.img -m 2048 -smp 3 -net user -net nic
[sudo] password for soham:
WARNING: Image format was not specified for '/home/soham/ubuntu2.img' and probing guessed raw.
        Automatically detecting the format is dangerous for raw images, write operations on block 0 will be restricted.
        Specify the 'raw' format explicitly to remove the restrictions.
soham@soham-System-Product-Name:~$ sudo qemu-system-x86_64 -hda /home/soham/ubuntu2.img -m 2048 -smp 3 -net user -net nic
[sudo] password for soham:
WARNING: Image format was not specified for '/home/soham/ubuntu2.img' and probing guessed raw.
        Automatically detecting the format is dangerous for raw images, write operations on block 0 will be restricted.
        Specify the 'raw' format explicitly to remove the restrictions.
soham@soham-System-Product-Name:~$ sudo qemu-system-x86_64 -hda /home/soham/ubuntu2.img -m 3076 -smp 3 -net user -net nic
[sudo] password for soham:
WARNING: Image format was not specified for '/home/soham/ubuntu2.img' and probing guessed raw.
        Automatically detecting the format is dangerous for raw images, write operations on block 0 will be restricted.
        Specify the 'raw' format explicitly to remove the restrictions.
```

Memory Test:

Case 1: max-prime = 5000



The screenshot shows a terminal window titled "QEMU" with the title bar "Machine View". The terminal output is as follows:

```
soham@soham-123:~$ sysbench cpu --cpu-max-prime=5000 --time=30 run
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Prime numbers limit: 5000
Initializing worker threads...
Threads started!
CPU speed:
    events per second: 1815.78

General statistics:
    total time:          30.00013s
    total number of events: 54482

Latency (ms):
    min:                 0.51
    avg:                 0.55
    max:                 7.13
    95th percentile:     0.64
    sum:                29872.67

Threads fairness:
    events (avg/stddev): 54482.0000/0.00
    execution time (avg/stddev): 29.8727/0.00
soham@soham-123:~$ _
```

```

QEMU
Machine View
General statistics:
  total time:          30.0017s
  total number of events:      50965

Latency (ms):
  min:                 0.51
  avg:                 0.58
  max:                13.80
  95th percentile:    0.81
  sum:               29792.78

Threads fairness:
  events (avg/stddev):   50965.0000/0.00
  execution time (avg/stddev): 29.7928/0.00
soham@soham-123:~$ sysbench cpu --cpu-max-prime=5000 --time=30 run
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Prime numbers limit: 5000
Initializing worker threads...
Threads started!

CPU speed:
  events per second: 1693.10

General statistics:
  total time:          30.0011s
  total number of events:      50807

Latency (ms):
  min:                 0.51
  avg:                 0.59
  max:                11.68
  95th percentile:    0.78
  sum:               29812.50

Threads fairness:
  events (avg/stddev):   50807.0000/0.00
  execution time (avg/stddev): 29.8125/0.00
soham@soham-123:~$ clear

```

```

QEMU
Machine View
soham@soham-123:~$ sysbench cpu --cpu-max-prime=5000 --time=30 run
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Prime numbers limit: 5000
Initializing worker threads...
Threads started!

CPU speed:
  events per second: 1786.19

General statistics:
  total time:          30.0014s
  total number of events:      53595

Latency (ms):
  min:                 0.51
  avg:                 0.65
  max:                10.89
  95th percentile:    0.74
  sum:               29851.34

Threads fairness:
  events (avg/stddev):   53595.0000/0.00
  execution time (avg/stddev): 29.8513/0.00
soham@soham-123:~$ sysbench cpu --cpu-max-prime=5000 --time=30 run
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Prime numbers limit: 5000
Initializing worker threads...
Threads started!

```

Iteration Number	Number of Events per Second
1	1885.81
2	1800.83
3	1892.04
4	1793.98
5	1804.90

Minimum:	1793.98
Maxmimum:	1892.04
Average:	1835.512
S. Deviation	48.96464612

Case 2: max-prime: 50000

```
sysbench cpu --cpu-max-prime=50000 --num-threads=1 --time=30 run
```

```

Machine View
scham@scham-123:~$ sysbench cpu --cpu-max-prime=50000 --time=30 run
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)
Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Prime numbers limit: 50000
Initializing worker threads...
Threads started!
CPU speed:
events per second: 85.56
General statistics:
total time: 30.00087s
total number of events: 2568
Latency (ms):
min: 11.15
avg: 11.68
max: 26.69
95th percentile: 12.08
sum: 29986.63
Threads fairness:
events (avg/stddev): 2568.0000/0.00
execution time (avg/stddev): 29.9866/0.00
scham@scham-123:~$ -

```

```

Machine View
scham@scham-123:~$ sysbench cpu --cpu-max-prime=50000 --time=30 run
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)
Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Prime numbers limit: 50000
Initializing worker threads...
Threads started!
CPU speed:
events per second: 83.51
General statistics:
total time: 30.0129s
total number of events: 2507
Latency (ms):
min: 11.22
avg: 11.95
max: 30.95
95th percentile: 15.55
sum: 29982.39
Threads fairness:
events (avg/stddev): 2507.0000/0.00
execution time (avg/stddev): 29.9824/0.00
scham@scham-123:~$ -

```

```

Machine View
scham@scham-123:~$ sysbench cpu --cpu-max-prime=50000 --time=30 run
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)
Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Prime numbers limit: 50000
Initializing worker threads...
Threads started!
CPU speed:
events per second: 86.75
General statistics:
total time: 30.0016s
total number of events: 2603
Latency (ms):
min: 11.15
avg: 11.52
max: 16.65
95th percentile: 15.27
sum: 29981.54
Threads fairness:
events (avg/stddev): 2603.0000/0.00
execution time (avg/stddev): 29.9815/0.00
scham@scham-123:~$ -

```

Iteration Number	Number of Events per Second
1	81.03
2	80.90
3	82.45
4	78.28
5	80.03

Minimum:	78.28
Maxmimum:	82.45
Average:	80.538
S. Deviation	1.531786539

I/O Tests:

Case 1: Sequential Read/Write

```
sysbench --num-threads=1 --test=fileio --file-total-size=2G
--file-num=128 --file-test-mode=seqrewr prepare
sysbench --num-threads=1 --test=fileio --file-total-size=2G
--file-num=128 --file-test-mode=seqrewr run
sysbench --num-threads=1 --test=fileio --file-total-size=2G
--file-num=128 --file-test-mode=seqrewr cleanup
```

```
Machine View
QEMU
scham@soham-129:~$ sysbench --test=fileio --file-total-size=2G --time=30 --file-test-mode=seqrewr prepare
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.18 (using system LuajIT 2.1.0-beta3)

128 files, 16MB each, 2048Mb total
Creating files for the test...
Creating file test_file.0
Creating file test_file.1
Creating file test_file.2
Creating file test_file.3
Creating file test_file.4
Creating file test_file.5
Creating file test_file.6
Creating file test_file.7
Creating file test_file.8
Creating file test_file.9
Creating file test_file.10
Creating file test_file.11
Creating file test_file.12
Creating file test_file.13
Creating file test_file.14
Creating file test_file.15
Creating file test_file.16
Creating file test_file.17
Creating file test_file.18
Creating file test_file.19
Creating file test_file.20
Creating file test_file.21
Creating file test_file.22
Creating file test_file.23
Creating file test_file.24
Creating file test_file.25
Creating file test_file.26
Creating file test_file.27
Creating file test_file.28
Creating file test_file.29
Creating file test_file.30
Creating file test_file.31
Creating file test_file.32
Creating file test_file.33
Creating file test_file.34
Creating file test_file.35
Creating file test_file.36
Creating file test_file.37
Creating file test_file.38
```

Machine View

```
soham@soham-123:~$ sysbench --num-threads=1 --test=fileio --file-total-size=2G --file-num=128 --file-test-mode=seqrewr run
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.18 (using system LuajIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Extra file open flags: (none)
128 files, 16MiB each
2GiB total file size
Block size: 16KiB
Periodic FSYNC enabled, calling fsync() each 100 requests.
Calling fsync() at the end of test, Enabled.
Using synchronous I/O mode
Doing sequential rewrite test
Initializing worker threads...

Threads started!

File operations:
  reads/s:          0.00
  writes/s:        9832.02
  fsyncs/s:       4910.87

Throughput:
  read, MiB/s:      0.00
  written, MiB/s:   59.88

General statistics:
  total time:      10.0167s
  total number of events: 87483

Latency (ms):
  min:                  0.02
  avg:                 0.11
  max:                14.46
  95th percentile:    0.16
  sum:                 9673.68

Threads fairness:
  events (avg/stddev): 87483.0000/0.00
  execution time (avg/stddev): 9.6737/0.00
soham@soham-123:~$
```

QEMU - Press Ctrl+Alt+G to release grab

```
Machine View
soham@soham-123:~$ sysbench --num-threads=1 --test=fileio --file-total-size=2G --file-num=128 --file-test-mode=seqrewr run
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.18 (using system LuajIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Extra file open flags: (none)
128 files, 16MiB each
2GiB total file size
Block size: 16KiB
Number of requests: 0
Read/Write ratio for combined random IO test: 1.50
Periodic FSYNC enabled, calling fsync() each 100 requests.
Calling fsync() at the end of test, Enabled.
Using synchronous I/O mode
Doing random r/w test
Initializing worker threads...

Threads started!

File operations:
  reads/s:          790.22
  writes/s:        526.82
  fsyncs/s:       1698.48

Throughput:
  read, MiB/s:      12.35
  written, MiB/s:   8.23

General statistics:
  total time:      10.0193s
  total number of events: 30095

Latency (ms):
  min:                  0.01
  avg:                 0.33
  max:                16.82
  95th percentile:    1.00
  sum:                 9816.22

Threads fairness:
  events (avg/stddev): 30095.0000/0.00
  execution time (avg/stddev): 9.8162/0.00
soham@soham-123:~$
```

Machine View

```
soham@soham-123:~$ sysbench --num-threads=1 --test=fileio --file-total-size=2G --file-num=128 --file-test-mode=seqrewr run
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
sysbench 1.0.18 (using system LuajIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Extra file open flags: (none)
128 files, 16MiB each
2GiB total file size
Block size: 16KiB
Periodic FSYNC enabled, calling fsync() each 100 requests.
Calling fsync() at the end of test, Enabled.
Using synchronous I/O mode
Doing sequential rewrite test
Initializing worker threads...

Threads started!

File operations:
  reads/s:          0.00
  writes/s:        9832.02
  fsyncs/s:       4910.87

Throughput:
  read, MiB/s:      0.00
  written, MiB/s:   59.88

General statistics:
  total time:      10.0167s
  total number of events: 87483

Latency (ms):
  min:                  0.02
  avg:                 0.11
  max:                14.46
  95th percentile:    0.16
  sum:                 9673.68

Threads fairness:
  events (avg/stddev): 87483.0000/0.00
  execution time (avg/stddev): 9.6737/0.00
soham@soham-123:~$
```

Serial Run Iterations	Results	
1	reads/s	0
	writes/sec	3606.65
	fsyncs/s	4619.21
2	reads/s	0
	writes/sec	3752.00
	fsyncs/s	4815.03
3	reads/s	0
	writes/sec	3870.23
	fsyncs/s	5091.21
4	reads/s	0
	writes/sec	3241.71
	fsyncs/s	4151.49
5	reads/s	0
	writes/sec	3185.45
	fsyncs/s	4086.04

Minimum read/s	0
Minimum write/s	3185.45
Minimum fsync/s	4086.04
Maximum read/s	0
Maximum write/s	3870.23
Maximum fsync/s	5091.21
Average read/s	0
Average write/s	3531.208
Average fsync/s	4552.596

S.Deviation read/s	0
S.Deviation write/s	305.2598097
S.Deviation fsync/s	430.689736

Case 2: Combined Random

```
sysbench --num-threads=1 --test=fileio --file-total-size=2G  
--file-num=128 --file-test-mode=rndrw prepare  
sysbench --num-threads=1 --test=fileio --file-total-size=2G  
--file-num=128 --file-test-mode=rndrw run  
sysbench --num-threads=1 --test=fileio --file-total-size=2G  
--file-num=128 --file-test-mode=rndrw cleanup
```

```

Machine View QEMU
scham@scham13:~/sysbench$ ./sysbench fileio --num-threads=1 --file-total-size=2G --file-num=128 --file-test-mode=rndrw run
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)
Running the test with following options:
  num threads: 1
  init time: 0
  initializing random number generator from current time

Extra file open flags: {none}
128 files, 16MiB each
16MiB total, 16KiB size
Block size: 16KiB
Number of IO requests: 0
File operations: combined random IO test: 1.50
Periodic FSYNC enabled, calling fsync() each 100 requests.
Using synchronous I/O mode
Using direct memory access
Initializing worker threads...
Threads started!

File operations:
  reads/s:           874.07
  writes/s:          582.71
  fsync/s:           1665.57

Throughput:
  read: MiB/s:      13.66
  written: MiB/s:   9.10

General statistics:
  total time:           10.0881s
  total number of events: 33397

Latency (ms):
  min:                0.01
  avg:                0.29
  max:                10.00
  95th percentile:    1.51
  sum:                9822.77

Threads scaling:
  events (avg/stddev): 33397.0000/0.00
  execution time (avg/stddev): 9.8228/0.00

```

```
Machine View QEMU
soham@soham123:~$ sysbench fileio --num-threads=1 --file-total-size=2G --file-num=128 --file-test-mode=rndrw run
sysbench 1.0.18 (using system Luajit 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Extra file open flags: (none)
128 files, 16MiB each
2GiB total memory size
block size: 16KiB
Number of IO requests: 0
Periodic IO requests: 0
Periodic random IO requests: 0
Combined random IO test: 1.50
Periodic FSYNC enabled, calling fsync() each 100 requests.
Calling fsync() at the end of test, Enabled.
Using direct I/O mode
Doing random r/w test
Initializing worker threads...
Threads started!

File operations:
  requests/s:          812.50
  writes/s:           541.67
  fsyncs/s:          1745.39

Throughput:
  read, MiB/s:        12.70
  written, MiB/s:     8.46

General statistics:
  total events:        10.0975s
  total number of events: 31001

Latency (ms):
  min:                  0.01
  avg:                  0.35
  max:                 28.99
  95th percentile:      1.32
  sum:                9806.12

Threads fairness:
  events per second/stddev: 31001/0.0000/0.00
  execution time (avg/stddev): 3.8061/0.00
```

```

Machine View
soham@soham123:~$ sysbench fileio --num-threads=1 --file-total-size=2G --file-num=128 --file-test-mode=rndrw run
sysbench 1.0.18 (using system LuajIT 2.1.0-beta3)
Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Extra file open flags: (none)
128 files, 16MiB each
2GiB total file size
Block size 16KiB
Number of IO requests: 0
Read/write ratio for combined random IO test: 1.50
Periodic FSync enabled, calling sync() each 100 requests.
Calling fsync() at the end of test, Enabled.
Using synchronous I/O mode
Doing random r/w test
Initializing worker threads...
Threads started!

File operations:
  reads/s:          755.78
  writes/s:         503.86
  fsyncs/s:          100.93
Throughput:
  read, MiB/s:      11.81
  written, MiB/s:   7.87
General statistics:
  total time:       10.0763s
  total number of events: 28844
Latency (ms):
  min:               0.01
  avg:              0.34
  max:             21.97
  95th percentile:  1.37
  sum:             9812.31
Threads fairness:
  events (avg/stddev): 28844.0000/0.00
  execution time (avg/stddev): 9.8121/0.00
soham@soham123:~$
```

```

Machine View
soham@soham123:~$ sysbench fileio --num-threads=1 --file-total-size=2G --file-num=128 --file-test-mode=rndrw run
sysbench 1.0.18 (using system LuajIT 2.1.0-beta3)
Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Extra file open flags: (none)
128 files, 16MiB each
2GiB total file size
Block size 16KiB
Number of IO requests: 0
Read/write ratio for combined random IO test: 1.50
Periodic FSync enabled, calling sync() each 100 requests.
Calling fsync() at the end of test, Enabled.
Using synchronous I/O mode
Doing random r/w test
Initializing worker threads...
Threads started!

File operations:
  reads/s:          801.00
  writes/s:         500.00
  fsyncs/s:          1721.34
Throughput:
  read, MiB/s:      12.52
  written, MiB/s:   8.34
General statistics:
  total time:       10.0348s
  total number of events: 30550
Latency (ms):
  min:               0.01
  avg:              0.35
  max:             38.89
  95th percentile:  1.25
  sum:             9808.37
Threads fairness:
  events (avg/stddev): 30550.0000/0.00
  execution time (avg/stddev): 9.8090/0.00
soham@soham123:~$
```

```

Machine View
soham@soham123:~$ sysbench fileio --num-threads=1 --file-total-size=2G --file-num=128 --file-test-mode=rndrw run
sysbench 1.0.18 (using system LuajIT 2.1.0-beta3)
Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Extra file open flags: (none)
128 files, 16MiB each
2GiB total file size
Block size 16KiB
Number of IO requests: 0
Read/write ratio for combined random IO test: 1.50
Periodic FSync enabled, calling sync() each 100 requests.
Calling fsync() at the end of test, Enabled.
Using synchronous I/O mode
Doing random r/w test
Initializing worker threads...
Threads started!

File operations:
  reads/s:          770.63
  writes/s:         513.76
  fsyncs/s:          1650.59
Throughput:
  read, MiB/s:      12.04
  written, MiB/s:   8.03
General statistics:
  total time:       10.0381s
  total number of events: 29350
Latency (ms):
  min:               0.01
  avg:              0.33
  max:             17.20
  95th percentile:  1.30
  sum:             9806.39
Threads fairness:
  events (avg/stddev): 29350.0000/0.00
  execution time (avg/stddev): 9.8043/0.00
soham@soham123:~$
```

Serial Run Iterations	Results	
1	reads/s	874.07
	writes/sec	582.71
	fsyncs/s	1865.57

2	reads/s	812.5
	writes/sec	541.67
	fsyncs/s	1745.39
3	reads/s	755.78
	writes/sec	503.86
	fsyncs/s	1613.93
4	reads/s	801
	writes/sec	534
	fsyncs/s	1721.34
5	reads/s	770.63
	writes/sec	513.76
	fsyncs/s	1650.59

Minimum read/s	755.78
Minimum write/s	503.86
Minimum fsync/s	1613.93
Maximum read/s	874.07
Maximum write/s	582.71
Maximum fsync/s	1865.57
Average read/s	802.796
Average write/s	535.2
Average fsync/s	1719.364
S.Deviation read/s	45.88717718
S.Deviation write/s	30.5874574
S.Deviation fsync/s	97.34428992

Memory Test: 128 files upto 1GB

```
sysbench memory --memory-block-size=1G run; done
```

```
Machine View QEMU
soham@soham123:~$ sysbench memory --memory-block-size=1G run
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)
FATAL: Cannot find benchmark 'run': no such built-in test, file or module
soham@soham123:~$ sysbench --memory-block-size=1G run; done
:bash: syntax error near unexpected token `done'
soham@soham123:~$ sysbench memory --memory-block-size=1G run
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Running memory speed test with the following options:
  block size: 1048576KiB
  total size: 102400MiB
  operation: write
  scope: global

Initializing worker threads...
Threads started!
Total operations: 47 (~ 4.65 per second)
48128.00 MiB transferred (4757.80 MiB/sec)

General statistics:
  total time: 10.1109s
  total number of events: 47

Latency (ms):
  min: 197.69
  avg: 215.00
  max: 280.75
  95th percentile: 253.35
  sum: 10104.90

Threads fairness:
  events (avg/stddev): 47.0000/0.00
  execution time (avg/stddev): 10.1049/0.00
soham@soham123:~$
```

```
Machine View QEMU
soham@soham123:~$ sysbench memory --memory-block-size=1G run
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Running memory speed test with the following options:
  block size: 1048576KiB
  total size: 102400MiB
  operation: write
  scope: global

Initializing worker threads...
Threads started!
Total operations: 44 (~ 4.36 per second)
45056.00 MiB transferred (4460.36 MiB/sec)

General statistics:
  total time: 10.0965s
  total number of events: 44

Latency (ms):
  min: 198.36
  avg: 225.07
  max: 329.88
  95th percentile: 320.17
  sum: 10079.07

Threads fairness:
  events (avg/stddev): 44.0000/0.00
  execution time (avg/stddev): 10.0791/0.00
soham@soham123:~$
```

```
Machine View QEMU
soham@soham123:~$ sysbench memory --memory-block-size=1G run
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Running memory speed test with the following options:
  block size: 1048576KiB
  total size: 102400MiB
  operation: write
  scope: global

Initializing worker threads...
Threads started!
Total operations: 46 (~ 4.53 per second)
47104.00 MiB transferred (4639.32 MiB/sec)

General statistics:
  total time: 10.1484s
  total number of events: 46

Latency (ms):
  min: 197.55
  avg: 220.42
  max: 336.82
  95th percentile: 320.02
  sum: 10139.30

Threads fairness:
  events (avg/stddev): 46.0000/0.00
  execution time (avg/stddev): 10.1393/0.00
soham@soham123:~$
```

```

QEMU
Machine View
avg: 220.42
max: 336.82
95th percentile: 297.92
sum: 10189.30

Threads fairness:
events (avg/stddev): 46.0000/0.00
execution time (avg/stddev): 10.1993/0.00
soham@soham123:~$ sysbench memory --memory-block-size=1G run
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Running memory speed test with the following options:
block size: 1048576KiB
total size: 102400MiB
operation: write
scope: global

Initializing worker threads...
Threads started!
Total operations: 44 (~ 4.39 per second)
45056.00 MiB transferred (4491.34 MiB/sec)

General statistics:
total time: 10.0271s
total number of events: 44

Latency (ms):
min: 198.16
avg: 227.44
max: 316.95
95th percentile: 277.21
sum: 10007.58

Threads fairness:
events (avg/stddev): 44.0000/0.00
execution time (avg/stddev): 10.0076/0.00
soham@soham123:~$ sysbench memory --memory-block-size=1G run_

```

```

QEMU
Machine View
avg: 227.44
max: 316.95
95th percentile: 277.21
sum: 10007.58

Threads fairness:
events (avg/stddev): 44.0000/0.00
execution time (avg/stddev): 10.0076/0.00
soham@soham123:~$ sysbench memory --memory-block-size=1G run
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Running memory speed test with the following options:
block size: 1048576KiB
total size: 102400MiB
operation: write
scope: global

Initializing worker threads...
Threads started!
Total operations: 41 (~ 4.05 per second)
41984.00 MiB transferred (4142.70 MiB/sec)

General statistics:
total time: 10.1297s
total number of events: 41

Latency (ms):
min: 200.29
avg: 246.73
max: 382.24
95th percentile: 356.17
sum: 10115.97

Threads fairness:
events (avg/stddev): 41.0000/0.00
execution time (avg/stddev): 10.1160/0.00
soham@soham123:~$ _

```

Iteration Number	Number of Events	Total Time
1	47	10.1109
2	44	10.0965
3	46	10.148
4	44	10.0271
5	41	10.1292

Minimum	4.047703669
Maximum	4.648448704
Average	4.395023862
S. Deviation	0.2265455021

Case 2: 128 Files upto 1MB

```
sysbench memory --memory-block-size=1M run
```

```
Machine View
QEMU
soham@soham123:~$ sysbench memory --memory-block-size=1M run
sysbench 1.0.18 (using system LuajIT 2.1.0-beta3)
Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Running memory speed test with the following options:
  block size: 1024KiB
  total size: 102400MiB
  operation: write
  scope: global
Initializing worker threads...
Threads started!
Total operations: 57506 ( 5747.37 per second)
57506.00 MiB transferred (5747.37 MiB/sec)

General statistics:
  total time: 10.0015s
  total number of events: 57506

Latency (ms):
  min: 0.14
  avg: 0.17
  max: 14.60
  95th percentile: 0.23
  sum: 9774.52

Threads fairness:
  events (avg/stddev): 57506.0000/0.00
  execution time (avg/stddev): 9.7745/0.00
soham@soham123:~$ _
```

```
Machine View
QEMU
block size: 1024KiB
total size: 102400MiB
operation: write
scope: global
Initializing worker threads...
Threads started!
Total operations: 56210 ( 5615.63 per second)
56210.00 MiB transferred (5615.63 MiB/sec)

General statistics:
  total time: 10.0017s
  total number of events: 56210

Latency (ms):
  min: 0.14
  avg: 0.17
  max: 13.59
  95th percentile: 0.23
  sum: 9748.31

Threads fairness:
  events (avg/stddev): 56210.0000/0.00
  execution time (avg/stddev): 9.7483/0.00
soham@soham123:~$ sysbench memory --memory-block-size=1M run
sysbench 1.0.18 (using system LuajIT 2.1.0-beta3)
Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Running memory speed test with the following options:
  block size: 1024KiB
  total size: 102400MiB
  operation: write
  scope: global
Initializing worker threads...
Threads started!
```

```
QEMU
Machine View
avg: 0.17
max: 13.59
95th percentile: 0.23
sum: 9748.81

Threads fairness:
events (avg/stddev): 56210.0000/0.00
execution time (avg/stddev): 9.7403/0.00
soham@soham123:~$ sysbench memory --memory-block-size=1M run
sysbench 1.0.18 (using system LuajIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Running memory speed test with the following options:
block size: 1024KiB
total size: 102400MiB
operation: write
scope: global

Initializing worker threads...
Threads started!

Total operations: 51502 ( 5147.19 per second)
51502.00 MiB transferred (5147.19 MiB/sec)

General statistics:
total time: 10.00010s
total number of events: 51502

Latency (ms):
min: 0.14
avg: 0.19
max: 14.29
95th percentile: 0.27
sum: 9710.66

Threads fairness:
events (avg/stddev): 51502.0000/0.00
execution time (avg/stddev): 9.7107/0.00
soham@soham123:~$ _
```

```
QEMU
Machine View
avg: 0.19
max: 14.29
95th percentile: 0.27
sum: 9710.66

Threads fairness:
events (avg/stddev): 51502.0000/0.00
execution time (avg/stddev): 9.7107/0.00
soham@soham123:~$ sysbench memory --memory-block-size=1M run
sysbench 1.0.18 (using system LuajIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Running memory speed test with the following options:
block size: 1024KiB
total size: 102400MiB
operation: write
scope: global

Initializing worker threads...
Threads started!

Total operations: 60111 ( 6007.98 per second)
60111.00 MiB transferred (6007.98 MiB/sec)

General statistics:
total time: 10.00010s
total number of events: 60111

Latency (ms):
min: 0.15
avg: 0.16
max: 17.80
95th percentile: 0.20
sum: 9744.18

Threads fairness:
events (avg/stddev): 60111.0000/0.00
execution time (avg/stddev): 9.7442/0.00
soham@soham123:~$ _
```

```
QEMU
Machine View
avg: 0.16
max: 17.80
95th percentile: 0.20
sum: 9744.18

Threads fairness:
events (avg/stddev): 60111.0000/0.00
execution time (avg/stddev): 9.7442/0.00
soham@soham123:~$ sysbench memory --memory-block-size=1M run
sysbench 1.0.18 (using system LuajIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Running memory speed test with the following options:
block size: 1024KiB
total size: 102400MiB
operation: write
scope: global

Initializing worker threads...
Threads started!

Total operations: 56446 ( 5641.07 per second)
56446.00 MiB transferred (5641.07 MiB/sec)

General statistics:
total time: 10.0001s
total number of events: 56446

Latency (ms):
min: 0.14
avg: 0.17
max: 11.29
95th percentile: 0.23
sum: 9756.14

Threads fairness:
events (avg/stddev): 56446.0000/0.00
execution time (avg/stddev): 9.7561/0.00
soham@soham123:~$ _
```

Iteration Number	Number of Events	Total Time
1	57506	10.0015
2	56210	10.0010
3	51502	10.0010
4	60111	10.0010
5	56446	10.0011

Minimum	5149.685031
Maximum	6010.49895
Average	5634.867728
S. Deviation	312.2448455

CONCLUSION

The number of events processed per second decreases when the upper bound for max-prime number is raised from 5,000 to 50,000, specifically by altering the cpu-max-prime argument. This finding holds true for the testing frameworks for QEMU and Docker. When QEMU and Docker are compared, the results are strikingly similar, although QEMU shows a small speed advantage. However, increasing the available computational power does not significantly change their performance indicators.

Furthermore, our results show that in terms of events, writes, and file synchronizations per second, sequential rewrite operations typically perform at a faster pace than combinations of random reads and writes. There have been times when Docker has demonstrated the ability to run some tests faster than QEMU, recording more events. It has also has more consistent results with less fluctuations/standard deviation over QEMU. Also, among raw and qcow2, I generally found raw faster at times than qcow2, even though if just marginally. Overall, on my device there was not a significant change over QEMU vs Docker and qcow2 vs raw.

GITHUB

<https://github.com/sohammehta777/cloud-computing/tree/main>