

Cloud Computing

Homework-1 Report

W1650226-Snehal Vijay Nikam

Configuration used for experiment :

1	Chip	Apple M2 Pro (Apple Silicon)
2	CPU	10-core CPU with 9 performance cores and 2 efficiency cores
3	Memory	32 GB
4	Free desk space	105.04 GB available of 494.38 GB
5	Operating System	macOS Sonoma

Git Repository Information:

Account Name	Snehal-Nikam
Repository Link	https://github.com/Snehal-Nikam/csen241-cloud-computing/tree/main/home-work-1

QEMU Installation and creation of QEMU image :

1. DOWNLOAD THE UBUNTU SERVER ISO IMAGE :

First check the laptop configuration and then download the compatible Ubuntu Server ISO image.

(Image is downloaded from the provided links in the homework documents)

The screenshot shows a terminal window with the following content:

```
snehalnikam@snehalns-MacBook-Pro:~/Desktop/Winter-24/csen241-cloud-computing/Ho...
Last login: Fri Jan 19 18:46:11 on console
> arch
arm64
> ls
ubuntu-20.04.5-live-server-arm64.iso
> ~/Desktop/Winter-24/csen241-cloud-computing/Home-Work-1 > main ?3
```

The terminal shows the user has logged in as 'snehalnikam' on a MacBook Pro. They have run 'arch' to check the architecture as 'arm64'. They then listed the contents of the current directory, which includes an ISO file named 'ubuntu-20.04.5-live-server-arm64.iso'. Finally, they navigated to a directory named 'Home-Work-1' and ran the command 'main ?3'.

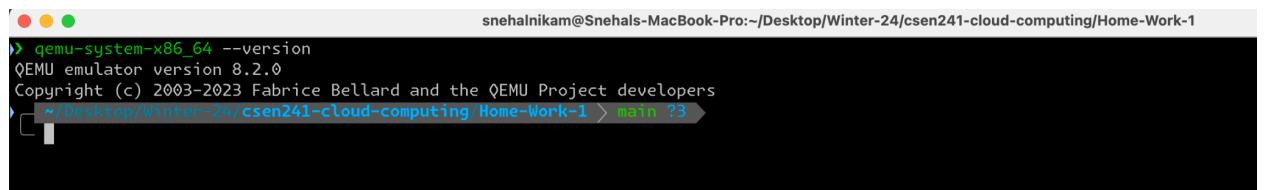
2. INSTALL QEMU:

Installation command :

```
brew install qemu
```

3.

Once the execution is successful you can check the version of qemu.

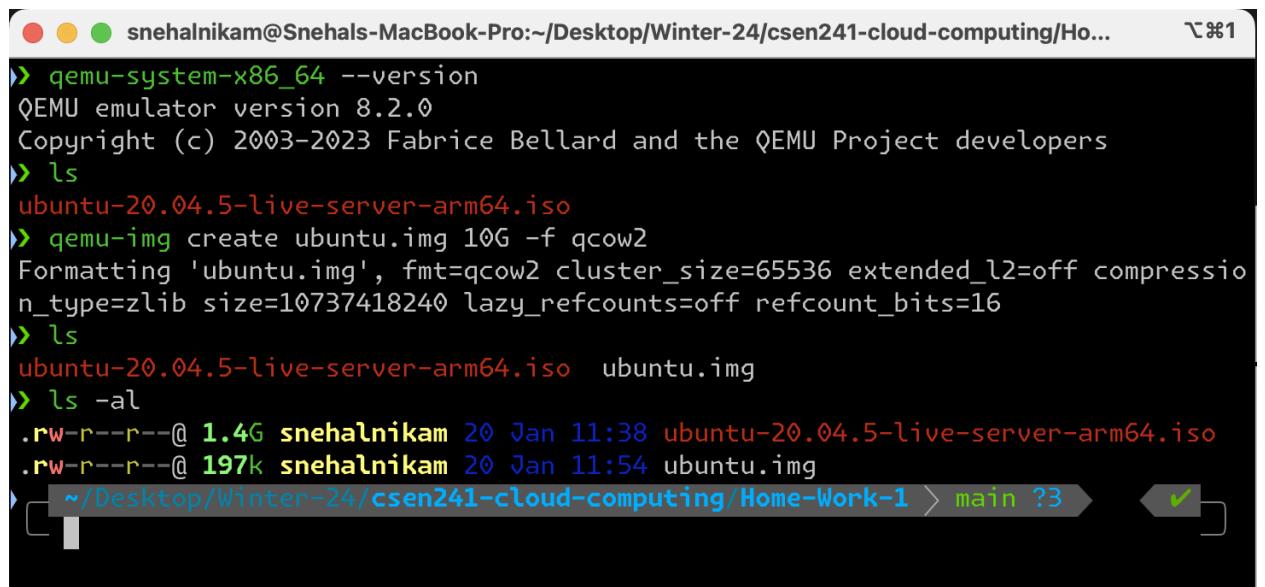


```
snehalnikam@snehals-MacBook-Pro:~/Desktop/Winter-24/csen241-cloud-computing/Home-Work-1
❯ qemu-system-x86_64 --version
QEMU emulator version 8.2.0
Copyright (c) 2003-2023 Fabrice Bellard and the QEMU Project developers
❯ ~/Desktop/Winter-24/csen241-cloud-computing/Home-Work-1 > main ?3
```

4. CREATE QEMU IMAGE:

Now, once the installation is successful we will be creating a QEMU image.

Will be creating this image in the same folder where we have ISO image save which we downloaded in the first step.



```
snehalnikam@snehals-MacBook-Pro:~/Desktop/Winter-24/csen241-cloud-computing/Ho...
❯ qemu-system-x86_64 --version
QEMU emulator version 8.2.0
Copyright (c) 2003-2023 Fabrice Bellard and the QEMU Project developers
❯ ls
ubuntu-20.04.5-live-server-arm64.iso
❯ qemu-img create ubuntu.img 10G -f qcow2
Formatting 'ubuntu.img', fmt=qcow2 cluster_size=65536 extended_l2=off compression=zlib size=10737418240 lazy_refcounts=off refcount_bits=16
❯ ls
ubuntu-20.04.5-live-server-arm64.iso  ubuntu.img
❯ ls -al
.rw-r--r--@ 1.4G snehalnikam 20 Jan 11:38 ubuntu-20.04.5-live-server-arm64.iso
.rw-r--r--@ 197k snehalnikam 20 Jan 11:54 ubuntu.img
❯ ~/Desktop/Winter-24/csen241-cloud-computing/Home-Work-1 > main ?3
```

Things need to be looked at : while creating an image we need to provide the image format. In the above example it's qcow2.

For creation of raw format the command is :



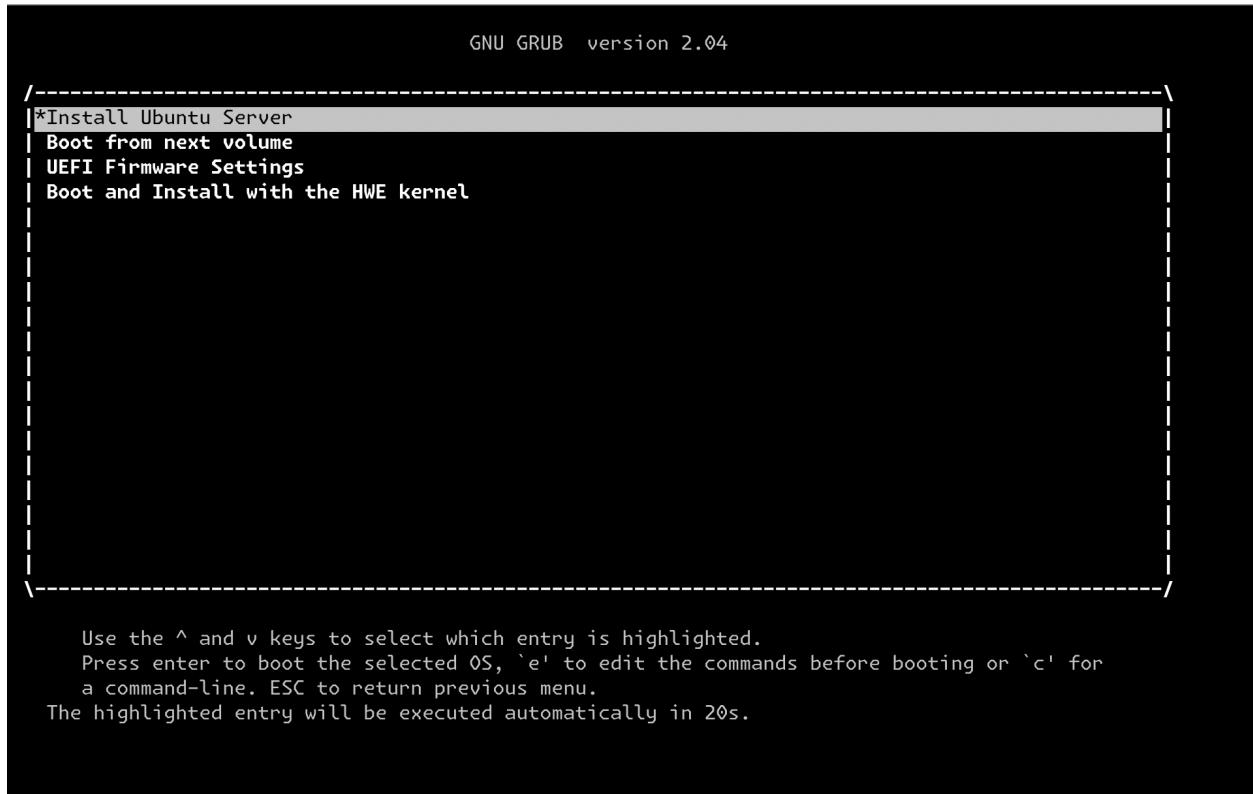
```
snehalnikam@snehals-MacBook-Pro:~/Desktop-2/Winter-24/csen241-cloud-computing/csen241-cloud-computing/home-wor...
❯ qemu-system-aarch64 (qemu-system-aarch64) ● *1 ..g/home-work-1 (-zsh) *2 +
Last login: Mon Jan 29 17:21:19 on ttys000
❯ cd Desktop-2/Winter-24/csen241-cloud-computing/csen241-cloud-computing/home-work-1/
❯ qemu-img create ubuntu_raw.img 10G -f raw
Formatting 'ubuntu_raw.img', fmt=raw size=10737418240
```

5. Install Ubuntu VM:

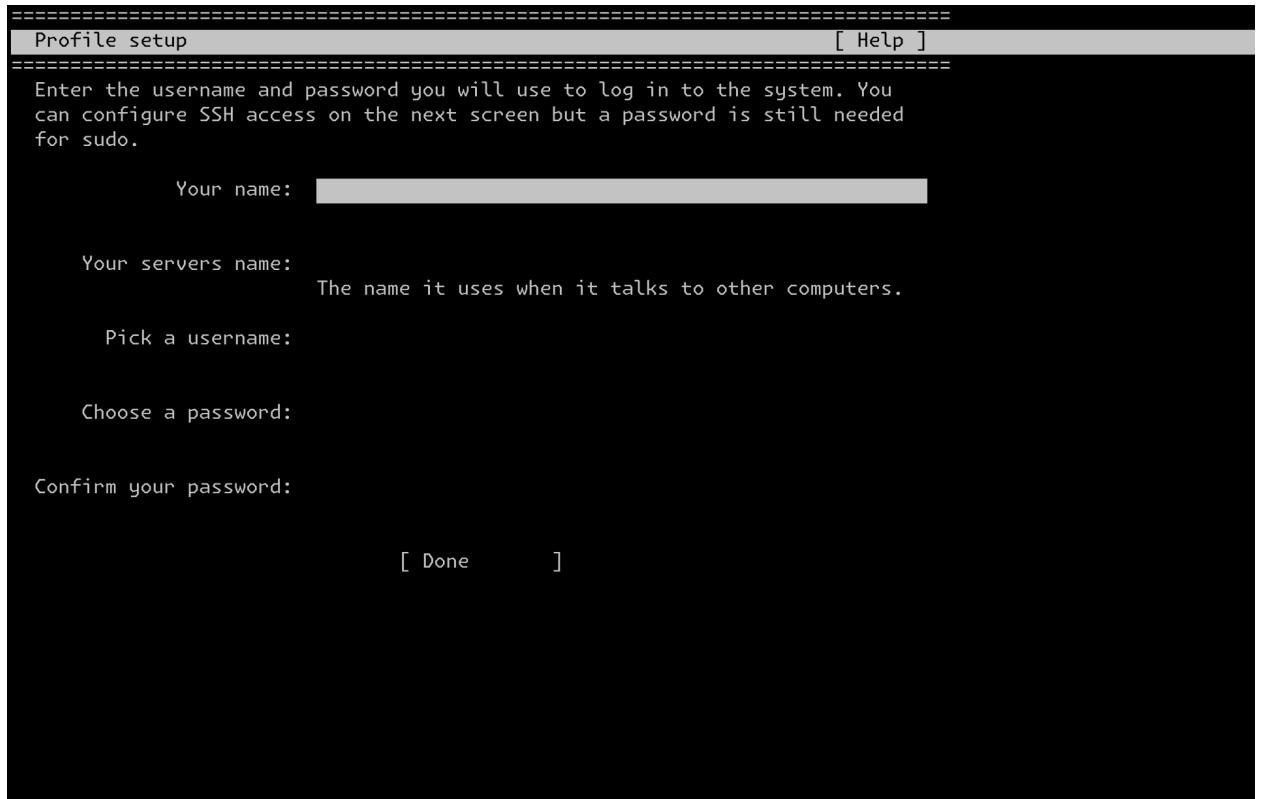
Run the following command to install Ubuntu VM:

```
qemu-system-aarch64 \
-accel hvf -cpu cortex-a57 -M virt,highmem=off -m 2G \
-smp 2 \
-drive
file=/opt/homebrew/Cellar/qemu/8.2.0/share/qemu/edk2-aarch64-code.fd,if=pflash
format=raw,readonly=on \
-drive if=none,file=ubuntu.img,format=qcow2,id=hd0 \
-device virtio-blk-device,drive=hd0,serial="serial_1" \
-device virtio-net-device,netdev=net0 \
-netdev user,id=net0 \
-vga none -device ramfb \
-cdrom ubuntu-20.04.5-live-server-arm64.iso \
-device usb-ehci -device usb-kbd -device usb-mouse -usb -nographic
```

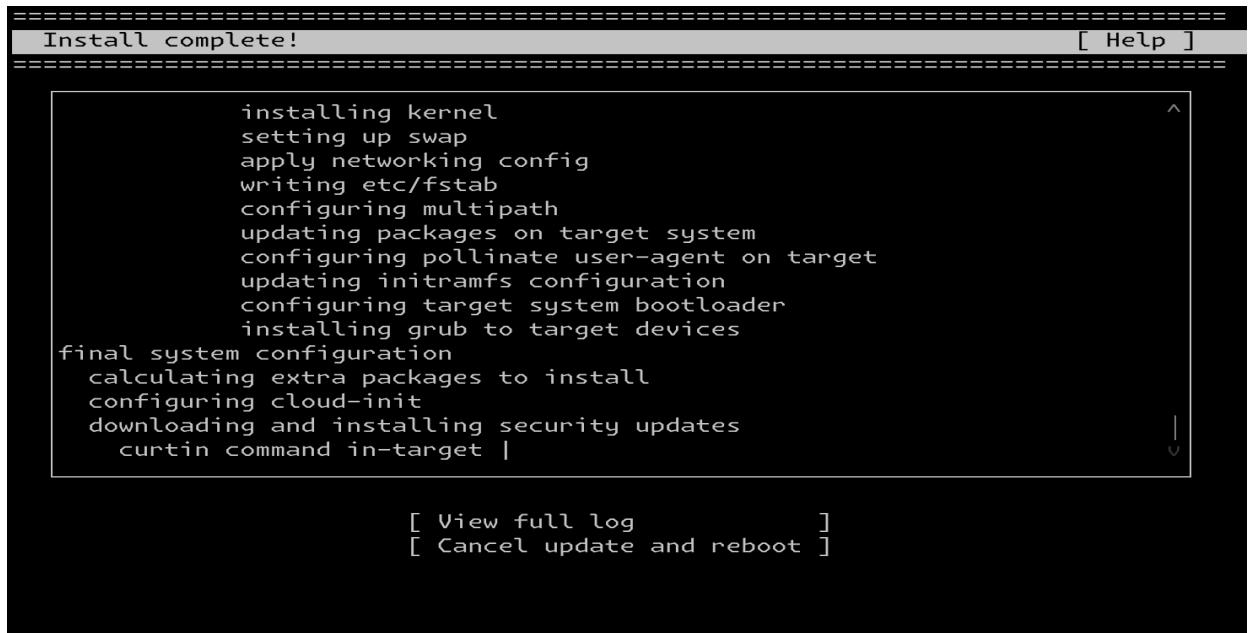
After running the multiple instruction and configuration options will appear on screen. Followed by default options.



Provide the necessary values for your VM profile



Once the installation is complete you will see screen something like below :



Once you are done with the update you can choose reboot and it will prompt you to provide the login details as username and password

```

qemu-system-aarch64 -accel hvf -cpu cortex-a57 -M virt,highmem=off -m 2G -smp
[ OK ] Finished Service for snap application lxd.activate.
[ OK ] Started snap.lxd.hook.conf...436b-8576-2dd4ab5ef75e.scope.
      Starting Time & Date Service...
[ OK ] Started Time & Date Service.
[ OK ] Finished Wait until snapd is fully seeded.
      Starting Apply the settings specified in cloud-config...
[ 10.575687] cloud-init[1291]: Generating locales (this might take a while)...
[ 11.256193] cloud-init[1291]: en_US.UTF-8... done
[ 11.256794] cloud-init[1291]: Generation complete.
[ 11.345427] cloud-init[1291]: Cloud-init v. 23.1.2-0ubuntu0~20.04.2 running 'modules:config' at Sun, 28 Jan 2024 01:20:26 +0000. Up 10.53 seconds.
[ OK ] Finished Apply the settings specified in cloud-config.
[ OK ] Reached target Multi-User System.
[ OK ] Reached target Graphical Interface.
      Starting Execute cloud user/final scripts...
      Starting Update UTMP about System Runlevel Changes...
[ OK ] Finished Update UTMP about System Runlevel Changes.
ci-info: no authorized SSH keys fingerprints found for user snikam2.
<14>Jan 28 01:20:27 cloud-init: #####-SSH HOST KEY FINGERPRINTS-----
<14>Jan 28 01:20:27 cloud-init: 1024 SHA256:jtc/q0UyYC0Cgak82mPkahbe+MuEjjuobtchdGr54W root@snikam2 (DSA)
<14>Jan 28 01:20:27 cloud-init: 256 SHA256:4jpkmIEpDPx+1z5SaYpP4HhcEQuoJhnwYFWPL+Kk8 root@snikam2 (EDSA)
<14>Jan 28 01:20:27 cloud-init: 256 SHA256:Mnq0B7RMSW/qCM7zjyT6ph//mm3Bq/wxh3gnhp79W root@snikam2 (ED25519)
<14>Jan 28 01:20:27 cloud-init: 3072 SHA256:ul5ndmCQR0BzX6CSWlwBVvvuYrCy0o784uuuwf7C60 root@snikam2 (RSA)
<14>Jan 28 01:20:27 cloud-init: #####-END SSH HOST KEY FINGERPRINTS-----
<14>Jan 28 01:20:27 cloud-init: #####-HOST KEYS-----
-----BEGIN SSH HOST KEY KEYS-----
ecdsa-sha2-nistp256 AAAAE2VjZHNhLXN0YTItbmlzdHAyNTYAAAIBmlzdHAyNTYAAABBBInFIWz+7HTcoZWAGMYVE5MLcZPMZuvUjyYSGz+Yv3ER3Ygz8AP3rTxEm0EL0hRU8KFnUUJJuP7ZoMF80M+o= root@snikam2
ssh-ed25519 AAAAC3NzaC1lZDI1TE5AAAAI0d54hsAqmUpqEjw0X45G43Sc/1osL29TEw1koxoWoR root@snikam2
ssh-rsa AAAAB3NzaC1yc2EAAAQABAAgQDfTk2XmT0B7vnZhkgRpUs3qbMLJY4nFY6zb6ljhau552Mzt0pgkzSzVzHtQgFpYpPLpXPGt0nhn9tUYaBe+8B8UZWMAFaQwjhOXOQPYxgWYp2bnJvyoQqlFu9dTRQzo4008gTzLKE/YfEf2/Up50L6K1N044snNxL7lt1+wf1PE+Zm2X/vNnL9jXU/2nHE2BC/+mkTqKHVLuzQfwcmgwbeWjAVGgXv0110E+hq1lvp81cqM#6VBr8buwg31OhGUbeUXHzbfmjzslpZhip9mouTUvTpZNdt37d0Fv/ /jGmwbtt440ZLQubF01qXK19SzJYbtMdBTagdb/vPRoQzbU0cQhbmMyPEF2oS9os8pi0NWDloZmI+HBw@vrwuM0jMVXUH2j0OXe3rvr9hpK0gHm3X0viEg/ScpwPNJSTqxp1ZFFb4c6D0/WTSa4oSj1rJSMFr+TEZmwuq+gtffeiRdjhxgJUHR= root@snikam2
-----END SSH HOST KEY KEYS-----
[ 11.587619] cloud-init[1328]: Cloud-init v. 23.1.2-0ubuntu0~20.04.2 running 'modules:final' at Sun, 28 Jan 2024 01:20:27 +0000. Up 11.51 seconds.
[ 11.588445] cloud-init[1328]: Cloud-init v. 23.1.2-0ubuntu0~20.04.2 finished at Sun, 28 Jan 2024 01:20:27 +0000. Datasource DataSourceNone. Up 11.58 seconds
[ 11.589027] cloud-init[1328]: 2024-01-28 01:20:27,716 - cc_final_message.py[WARNING]: Used fallback datasource
[ OK ] Reached target Cloud-init target.
[ OK ] Reached target Cloud-init target.

Ubuntu 20.04.5 LTS snikam2 ttyAMA0
snikam2 login: ■

```

After this step you will login to the Ubuntu VM

```

qemu-system-aarch64 -accel hvf -cpu cortex-a57 -M virt,highmem=off -m 2G -smp
[ OK ] Reached target Cloud-init target.

Ubuntu 20.04.5 LTS snikam2 ttyAMA0
  am2 login: sikkam2
Ubuntu 20.04.5 LTS snikam2 ttyAMA0
snikam2 login: snikam
Password:
Welcome to Ubuntu 20.04.5 LTS (GNU/Linux 5.4.0-170-generic aarch64)

 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:       https://ubuntu.com/advantage

System information as of Sun 28 Jan 2024 01:21:24 AM UTC

System load:          0.0
Usage of /:           49.0% of 7.50GB
Memory usage:         11%
Swap usage:           0%
Processes:            104
Users logged in:     0
IPv4 address for eth0: 10.0.2.15
IPv6 address for eth0: fec0::5054:ff:fe12:3456

66 updates can be applied immediately.
To see these additional updates run: apt list --upgradable

The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

snikam2@snikam2:~$ ■

```

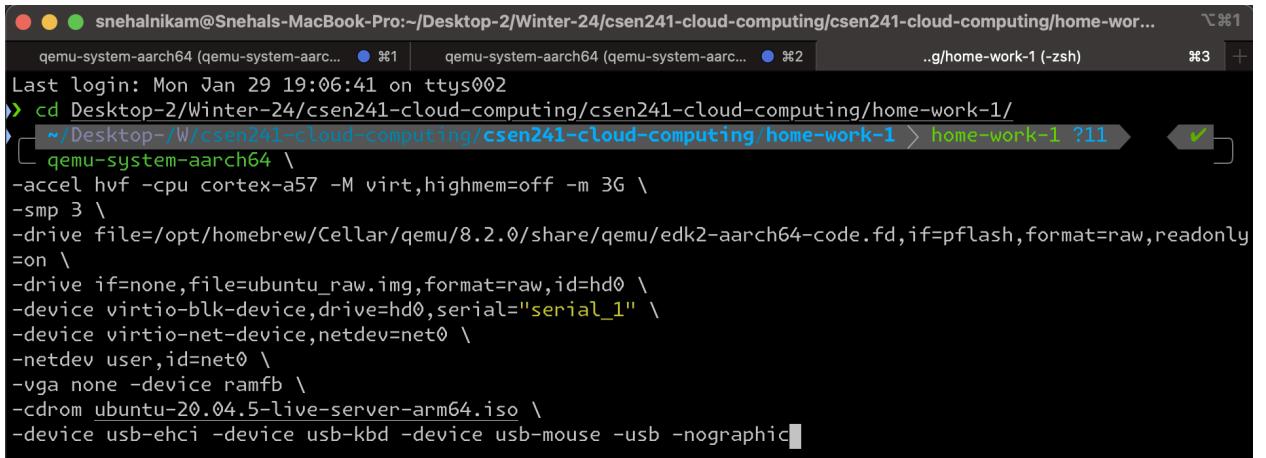
Inorder to login again we need to use below command :

```
qemu-system-aarch64 \
-accel hvf -cpu cortex-a57 -M virt,highmem=off -m 2G \
-smp 2 \
-drive
file=/opt/homebrew/Cellar/qemu/8.2.0/share/qemu/edk2-aarch64-code.fd,if=pflash
format=raw,readonly=on \
-drive if=none,file=ubuntu.img,format=qcow2,id=hd0 \
-device virtio-blk-device,drive=hd0,serial="serial_1" \
-device virtio-net-device,netdev=net0 \
-netdev user,id=net0 \
-vga none -device ramfb \
-device usb-ehci -device usb-kbd -device usb-mouse -usb -nographic
```

Basically just removing the parameter of cdrom.

Also in order to install Ubuntu with raw image type we need to make sure to provide the format=raw.

Sample screenshot of this command :



The screenshot shows a terminal window with three tabs. The current tab is titled 'qemu-system-aarch64' and contains the command being run. The command is:

```
qemu-system-aarch64 \
-accel hvf -cpu cortex-a57 -M virt,highmem=off -m 3G \
-smp 3 \
-drive file=/opt/homebrew/Cellar/qemu/8.2.0/share/qemu/edk2-aarch64-code.fd,if=pflash,format=raw,readonly=on \
-drive if=none,file=ubuntu_raw.img,format=raw,id=hd0 \
-device virtio-blk-device,drive=hd0,serial="serial_1" \
-device virtio-net-device,netdev=net0 \
-netdev user,id=net0 \
-vga none -device ramfb \
-cdrom ubuntu-20.04.5-live-server-arm64.iso \
-device usb-ehci -device usb-kbd -device usb-mouse -usb -nographic
```

The attributes we have used in this command are as follows :

-accel	Used to enable an accelerator. Depending on the target architecture, kvm, xen, hax, hvf, nvmm, whpx or tcg can be available
-m	Stands for memory. We have currently supplied 2G as the argument value which means we are allocating 2GB RAM memory for our VM
-smp	Stands for number of cores. We have currently given the argument value as 2, which means that we have allocated 2 cores for our VM

Note: We would be updating -m and -smp values when running for different configurations.

6. INSTALL SYSBENCH ON VM:

To install sysbench run the below command on Ubuntu :

- sudo apt update
- sudo apt install sysbench

```
qemu-system-aarch64 -accel hvf -cpu cortex-a57 -M virt,highmem=off -m 2G -smp
snikam2@snikam2:~$ sudo apt update
[sudo] password for snikam2:
Hit:1 http://ports.ubuntu.com/ubuntu-ports focal InRelease
Hit:2 http://ports.ubuntu.com/ubuntu-ports focal-updates InRelease
Hit:3 http://ports.ubuntu.com/ubuntu-ports focal-backports InRelease
Hit:4 http://ports.ubuntu.com/ubuntu-ports focal-security InRelease
Reading package lists... Done
Building dependency tree
Reading state information... Done
66 packages can be upgraded. Run 'apt list --upgradable' to see them.
snikam2@snikam2:~$ █

qemu-system-aarch64 -accel hvf -cpu cortex-a57 -M virt,highmem=off -m 2G -smp
snikam2@snikam2:~$ sudo apt install sysbench
Reading package lists... Done
Building dependency tree
Reading state information... Done
sysbench is already the newest version (1.0.18+ds-1).
0 upgraded, 0 newly installed, 0 to remove and 66 not upgraded.
snikam2@snikam2:~$ █
```

DOCKER INSTALLATION, IMAGE CREATION :

In order to install a docker I have made use following command :

```
brew install --cask docker
```

--cask option will install the application.

To check if docker is installed correctly, run the following commands in terminal:

```
docker --version
docker images
docker pull ubuntu:20.04
docker run ubuntu:20.04
```

```
snehalnikam@snehals-MacBook-Pro:~
```

```
» brew install --cask docker
==> Downloading https://formulae.brew.sh/api/cask.jws.json
##0#- #
==> Downloading https://raw.githubusercontent.com/Homebrew/homebrew-cask/f0eba5a
Already downloaded: /Users/snehalnikam/Library/Caches/Homebrew/downloads/2f4553e95908e8f98aa99e8f6298fc78
d1c2d261b7a516cdd899628810433cf--docker.rb
==> Downloading https://desktop.docker.com/mac/main/arm64/131620/Docker.dmg
Already downloaded: /Users/snehalnikam/Library/Caches/Homebrew/downloads/bcb0761d17dee11322c2ce5259fa6d282
6aa6df19b66c66246aa8cdd208a24b4--Docker.dmg
==> Installing Cask docker
==> Moving App 'Docker.app' to '/Applications/Docker.app'
==> Linking Binary 'docker' to '/usr/local/bin/docker'
Password:
==> Linking Binary 'docker-compose' to '/usr/local/bin/docker-compose'
==> Linking Binary 'docker-credential-desktop' to '/usr/local/bin/docker-credent
==> Linking Binary 'docker-credential-ecr-login' to '/usr/local/bin/docker-crede
==> Linking Binary 'docker-credential-osxkeychain' to '/usr/local/bin/docker-cre
==> Linking Binary 'docker-index' to '/usr/local/bin/docker-index'
==> Linking Binary 'kubectl' to '/usr/local/bin/kubectl.docker'
==> Linking Binary 'docker.bash-completion' to '/opt/homebrew/etc/bash_completio
==> Linking Binary 'docker.zsh-completion' to '/opt/homebrew/share/zsh/site-func
==> Linking Binary 'docker.fish-completion' to '/opt/homebrew/share/fish/vendor_
==> Linking Binary 'hub-tool' to '/usr/local/bin/hub-tool'
==> Linking Binary 'com.docker.cli' to '/usr/local/bin/com.docker.cli'

[D] docker was successfully installed!
» sudo docker --version
Docker version 24.0.7, build afdd53b
» docker images
REPOSITORY      TAG      IMAGE ID      CREATED      SIZE
ubuntu          latest    e2e172ecd069   2 weeks ago   69.3MB
» docker rmi e2e172ecd069
Error response from daemon: conflict: unable to delete e2e172ecd069 (must be forced) - image is being used
by stopped container 1a9dabf94916
```

Pull the required image :

```
snehalnikam@snehals-MacBook-Pro:~
```

```
» docker pull ubuntu:20.04
20.04: Pulling from library/ubuntu
d519a3a2a796: Pull complete
Digest: sha256:f2034e7195f61334e6caff6ecf2e965f92d11e888309065da85ff50c617732b8
Status: Downloaded newer image for ubuntu:20.04
docker.io/library/ubuntu:20.04

What's Next?
1. Sign in to your Docker account → docker login
2. View a summary of image vulnerabilities and recommendations → docker scout quickview ubuntu:20.04
» docker images
REPOSITORY      TAG      IMAGE ID      CREATED      SIZE
ubuntu          20.04    fde9c12d7d3f   6 weeks ago   65.7MB
```

Created DOCKERFILE :

```
snehalnikam@snehals-MacBook-Pro:~/Desktop-2/Winter-24/csen241-cloud-computing/cs...`⌘1
> cat Dockerfile
# Use the official Ubuntu image as a parent image
FROM ubuntu:20.04

# Run the command inside your image filesystem
RUN apt update && apt install -y sysbench zip curl nano

COPY script.sh /
RUN ls | tee -a /tmp/output.log
RUN chmod +x script.sh
# RUN zip result_22.zip *.txt | tee -a /tmp/output.log
# RUN curl --upload-file ./result_22.zip https://free.keep.sh
# RUN cat /tmp/output.log
CMD ["bash"]

~ /Desktop-/W/csen24/csen241-cloud-computing/h/docker > home-work-1 ?10
```

Build the Docker Image :

```
snehalnikam@Snehal-MacBook-Pro:~/Desktop-2/Winter-24/csen241-cloud-computing/csen241-cloud-computing/home-work-1/docker
```

```
› docker images
REPOSITORY      TAG      IMAGE ID      CREATED      SIZE
<none>        <none>    8e83c2ba1ad5  16 minutes ago  128MB
ubuntu-test1   latest   4ccc785a3969  16 minutes ago  128MB
ubuntu-test2   latest   4e1ed65a8aa7  16 minutes ago  128MB
<none>        <none>    73120ec104a3  16 minutes ago  128MB
ubuntu         20.04    c479edd881c9  19 minutes ago  127MB
<none>        <none>    59d8ba7d4e68  About an hour ago  124MB

› docker build -t cpu2ram2 .
[+] Building 0.0s (10/10) FINISHED
=> [internal] load build definition from Dockerfile
=> => transferring dockerfile: 472B
=> [internal] load .dockerignore
=> => transferring context: 2B
=> [internal] load metadata for docker.io/library/ubuntu:20.04
=> [1/5] FROM docker.io/library/ubuntu:20.04
=> [internal] load build context
=> => transferring context: 31B
=> CACHED [2/5] RUN apt update && apt install -y sysbench zip curl
=> CACHED [3/5] COPY script.sh /
=> CACHED [4/5] RUN ls | tee -a /tmp/output.log
=> CACHED [5/5] RUN chmod +x script.sh
=> exporting to image
=> => exporting layers
=> => writing image sha256:acc785a3969ea57077a49d1441fec8e11352a22a2308c8b2bb453e48a3bd706
=> => naming to docker.io/library/cpu2ram2

What's Next?
1. Sign in to your Docker account → docker login
2. View a summary of image vulnerabilities and recommendations → docker scout quickview

› docker ps
CONTAINER ID      IMAGE      COMMAND      CREATED      STATUS      PORTS      NAMES
eb88b36ef6dd    73120ec104a3  "bash"      13 minutes ago  Up 13 minutes      crazy_murdock
8f628fb8b7157   4e1ed65a8aa7  "bash"      15 minutes ago  Up 15 minutes      compassionate_nightingale

› docker images
REPOSITORY      TAG      IMAGE ID      CREATED      SIZE
ubuntu-test1   latest   4ccc785a3969  20 minutes ago  128MB
<none>        <none>    73120ec104a3  20 minutes ago  128MB
<none>        <none>    8e83c2ba1ad5  20 minutes ago  128MB
ubuntu-test2   latest   4ccc785a3969  20 minutes ago  128MB
cpu2ram2       latest   c479edd881c9  20 minutes ago  127MB
ubuntu         20.04    c479edd881c9  22 minutes ago  127MB
<none>        <none>    59d8ba7d4e68  About an hour ago  124MB
```

Run the docker image:

```
root@8ce8de62a327:/# 
1. Sign in to your Docker account → docker login
2. View a summary of image vulnerabilities and recommendations → docker scout quickview
> docker run -it --memory=2G --cpus=2 cpu2ram2
root@8ce8de62a327:/# ls
bin boot dev etc home lib media mnt opt proc root run sbin script.sh srv sys tmp usr var
root@8ce8de62a327:/# cat script.sh
#!/bin/bash

TestCases=(
    "cpu --cpu-max-prime=1000"
    "cpu --cpu-max-prime=20000"
    "memory --memory-block-size=2K"
    "memory --memory-block-size=4K"
    "fileio --file-test-mode=rndrw --file-total-size=3G"
    "fileio --file-test-mode=seqwr --file-total-size=3G"
)

# Iterate over test cases
for testCase in "${TestCases[@]}"; do
    read -r mode parameter value <<< "$testCase"
    echo "Running sysbench with Mode: $mode, Parameter: $parameter, Value: $value"

    filename="${{mode}}_${{parameter}}_${{value// /}}.txt"
    if [[ $mode == "fileio" ]]; then
        sysbench fileio --file-total-size=3G --time=30 $parameter prepare
    fi

    for ((i=1; i<=5; i++)); do
        echo "Run $i:" | tee -a "$filename"
        echo "Command: sysbench $mode $parameter $value run" >> "$filename"
        results=$(sysbench $mode $parameter $value --time=30 run)
        echo "Results:" | tee -a "$filename"
        echo "$results" | tee -a "$filename"
        echo "-----" | tee -a "$filename"
    done

    if [[ $mode == "fileio" ]]; then
        sysbench fileio --file-total-size=3G --time=30 $parameter cleanup
    fi
done
root@8ce8de62a327:/#
```

Following are the command description :

docker pull image-name:tag	To pull a docker image
docker images	To list out all docker images
docker run image-name	To run a docker image
docker run [container] image [command]	To run a container
docker ps	To list out all running containers
docker commit <container_id> <image_name>	To commit a container's file changes or settings into a new image
docker history <image_name>	To show history of an image
docker build -t [repository_name]	builds Docker images from a Dockerfile
docker run [options] [image]	Run the provided docker image,

Options used while using docker run to set the configuration and test the combination of cpu used and the memory use :

--cpus = Number of CPUs

-m or --memory = Memory limit

Scenarios to Test :

We will be measuring the performance of our VM using sysbench command for different combinations of cpu and ram for different qemu images (in this case qcow2 and raw) and docker. The details of test cases have been gathered here.

Reference used for different test mode via sysbench : <https://github.com/akopytov/sysbench> and <https://imysql.com/wp-content/uploads/2014/10/sysbench-manual.pdf>

1. CPU Testing :

For CPU testing, we will use the two different -cpu-max-prime values test cases to check for performance. The command format is :

```
sysbench cpu --cpu-max-prime=[value] --num-thread=[value] --time=[value] run
```

Options used :

--cpu-max-prime=calculation of prime numbers up to a value specified

--num-thread=number of threads to be used while running the test - default =1

--time= Limit for total execution time in seconds. 0 means no limit - default=10sec.

2. Memory Testing :

For Memory testing, we will use the two different memory-block-size values in our test cases to check for performance. The command format is :

```
sysbench memory --memory-block-size=[value] --time=[value] run
```

Options used :

--memory-block-size= size of memory block to use. Default is 1K

3.Fileio Testing :

For File I/O testing, we will use two modes which sysbench supports, which are:

1. Sequential Rewrite (seqrewr)

2. Combined random read/write (rndrw)

We will keep the file size constant at 3GB and run each test case for 30 seconds.

For our testing purposes, we will use the following sysbench commands as follow :

```
sysbench fileio --file-total-size=3G --time=30 --file-test-mode= rndrw prepare  
sysbench fileio --file-total-size=3G --time=30 --file-test-mode= rndrw run  
Sysbench fileio --file-total-size=3G --time=30 --file-test-mode= rndrw cleanup
```

Explanation :

The first command is used to prepare the test date for fileio test mode.

Second command will perform the test and provide various performance metrics along with latency and throughput of read write operation.

The last command will clean up the created test data.

Options Used :

--file-total-size = Total size of files

--file-test-mode=type of workload to produce. Possible values: seqwr, seqrewr, seqrd, rndrd, rndwr, rndwr

Automation using script :

For the experiment we are supposed to run each test case 5 times and calculate the average, min, max and standard deviation to compare with each configuration to draw out the conclusion.

For the faster execution of all the tests created bash scripts to run multiple tests with different parameters and save the results in the files. Screenshots for script and related command.

```

qemu-system-aarch64 -accel hvf -cpu cortex-a57 -M virt,highmem=off -m 3G -smp
#!/bin/bash

TestCases=(
    "cpu --cpu-max-prime=1000"
    "cpu --cpu-max-prime=20000"
    "memory --memory-block-size=2K"
    "memory --memory-block-size=4K"
    "fileio --file-test-mode=rndrw --file-total-size=3G"
    "fileio --file-test-mode=seqwr --file-total-size=3G"
)

# Iterate over test cases
for testCase in "${TestCases[@]}"; do
    read -r mode parameter value <<< "$testCase"
    echo "Running sysbench with Mode: $mode, Parameter: $parameter, Value: $value"

    filename="${mode}_${parameter}_${value} // /}.txt"

    if [[ $mode == "fileio" ]]; then
        sysbench fileio --file-total-size=3G --time=30 $parameter prepare
    fi

    for ((i=1; i<=5; i++)); do
        echo "Run $i:" | tee -a "$filename"
        echo "Command: sysbench $mode $parameter $value run" >> "$filename"
        results=$(sysbench $mode $parameter $value --time=30 run 2>1)
        echo "Results:" | tee -a "$filename"
        echo "$results" | tee -a "$filename"
        echo "-----" | tee -a "$filename"
    done

    if [[ $mode == "fileio" ]]; then
        sysbench fileio --file-total-size=3G --time=30 $parameter cleanup
    fi
done

```

As this is a bash script first we need to make it executable for our user by using the chmod command.

```

qemu-system-aarch64 -accel hvf -cpu cortex-a57 -M virt,highmem=off -m 2G -smp
snikam2@snikam2:~$ ls
sysbenchBenchmarkScript.sh
snikam2@snikam2:~$ chmod +x sysbenchBenchmarkScript.sh
snikam2@snikam2:~$ 

```

Sample terminal screenshot for above script :

```

qemu-system-aarch64
snikam2@snikam2:~$ ./sysbenchBenchmarkScript.sh
Running sysbench with Mode: memory, Parameter: --memory-block-size=2K,
Run 1:

```

```
qemu-system
Threads started!

Total operations: 52428800 (7884344.80 per second)
102400.00 MiB transferred (15399.11 MiB/sec)

General statistics:
  total time:          6.6492s
  total number of events: 52428800

Latency (ms):
  min:                0.00
  avg:                0.00
  max:                0.05
  95th percentile:    0.00
  sum:               3439.22

Threads fairness:
  events (avg/stddev):      52428800.0000/0.00
  execution time (avg/stddev): 3.4392/0.00
-----
Run 2:
```

```
qemu-system-aarch64 -accel hvf -cpu cortex-
Total operations: 52428800 (7913420.74 per second)
102400.00 MiB transferred (15455.90 MiB/sec)

General statistics:
  total time:          6.6245s
  total number of events: 52428800

Latency (ms):
  min:                0.00
  avg:                0.00
  max:                0.18
  95th percentile:    0.00
  sum:               3431.01

Threads fairness:
  events (avg/stddev):      52428800.0000/0.00
  execution time (avg/stddev): 3.4310/0.00
-----
Running sysbench with Mode: memory, Parameter: --memory-block-size=4K, Value:
Run 1:
|
```

```

Threads started!

Total operations: 26214400 (5690267.81 per second)
102400.00 MiB transferred (22227.61 MiB/sec)

General statistics:
  total time: 4.6062s
  total number of events: 26214400

Latency (ms):
  min: 0.00
  avg: 0.00
  max: 0.05
  95th percentile: 0.00
  sum: 2978.78

Threads fairness:
  events (avg/stddev): 26214400.0000/0.00
  execution time (avg/stddev): 2.9788/0.00
-----
Run 3:

```

This script will store results into the files. File name will be composed of test name mode_parameter_value.txt. These files are available in github for review. Links given at the top.

I have used the same script for both the qemu image format i.e for raw as well as qcow2 and used the same one on the docker as well.

For the test first test case, output in the below proofs of experiment are taken from the terminal and manual execution.

To export the files from the vm to the local desktop I followed the simple method of using keep.sh.

Documents for the same are : <https://free.keep.sh/>

Steps I performed :

```

qemu-system-aarch64 -accel hvf -cpu cortex-a57 -M virt,highmem=off -m 2G
snikam@snikam2:~$ ls
'cpu_--cpu-max-prime=1000_.txt'
'cpu_--cpu-max-prime=20000_.txt'
'fileio_--file-test-mode=rndrw_--file-total-size=3G.txt'
'fileio_--file-test-mode=seqwr_--file-total-size=3G.txt'
'memory_--memory-block-size=2K_.txt'
'memory_--memory-block-size=4K_.txt'
'script.sh'
snikam@snikam2:~$ zip row_result22.zip *.txt
  adding: cpu_--cpu-max-prime=1000_.txt (deflated 87%)
  adding: cpu_--cpu-max-prime=20000_.txt (deflated 87%)
  adding: fileio_--file-test-mode=rndrw_--file-total-size=3G.txt (deflated 87%)
  adding: fileio_--file-test-mode=seqwr_--file-total-size=3G.txt (deflated 87%)
  adding: memory_--memory-block-size=2K_.txt (deflated 88%)
  adding: memory_--memory-block-size=4K_.txt (deflated 88%)
snikam@snikam2:~$ curl --upload-file ./row_result22.zip https://free.keep.sh
https://free.keep.sh/z8vFLSb16TzpRaW8/row_result22.zip
snikam@snikam2:~$ 

```

Once the unique link is generated at the last step. Just click on it and download the files.

TEST CASES :

QCOW2

Case 1 : IMG TYPE : qcown2 | CPU : 2 | RAM :2 | MODE : CPU | --cpu-max-prime=1000

1

```
snikam2@snikam2:~$ sysbench cpu --cpu-max-prime=1000 --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: 1000

Initializing worker threads...

Threads started!

CPU speed:
events per second: 371704.34

General statistics:
total time: 30.0001s
total number of events: 11151480

Latency (ms):
min: 0.00
avg: 0.00
max: 0.12
95th percentile: 0.00
sum: 29215.58

Threads fairness:
events (avg/stddev): 11151480.0000/0.00
execution time (avg/stddev): 29.2156/0.00
```

2.

```
qemu-system-aarch64 -accel hvf -cpu cortex-a57 -M virt,highmem=off -m 2G -smp
snikam2@snikam2:~$ sysbench cpu --cpu-max-prime=1000 --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: 1000

Initializing worker threads...

Threads started!

CPU speed:
events per second: 364297.63

General statistics:
total time: 30.0001s
total number of events: 10929173

Latency (ms):
min: 0.00
avg: 0.00
max: 1.29
95th percentile: 0.00
sum: 29136.06

Threads fairness:
events (avg/stddev): 10929173.0000/0.00
execution time (avg/stddev): 29.1361/0.00
```

3.

```
qemu-system-aarch64 -accel hvf -cpu cortex-a57 -M virt,highmem=off -m 2G -smp
snikam2@snikam2:~$ sysbench cpu --cpu-max-prime=1000 --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: 1000

Initializing worker threads...

Threads started!

CPU speed:
events per second: 368884.89

General statistics:
total time: 30.0001s
total number of events: 11066875

Latency (ms):
min: 0.00
avg: 0.00
max: 0.49
95th percentile: 0.00
sum: 29179.69

Threads fairness:
events (avg/stddev): 11066875.0000/0.00
execution time (avg/stddev): 29.1797/0.00
```

4.

```
qemu-system-aarch64 -accel hvf -cpu cortex-a57 -M virt,highmem=off -m 2G -smp
snikam2@snikam2:~$ sysbench cpu --cpu-max-prime=1000 --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: 1000

Initializing worker threads...

Threads started!

CPU speed:
events per second: 366124.74

General statistics:
total time: 30.0001s
total number of events: 10984080

Latency (ms):
min: 0.00
avg: 0.00
max: 0.94
95th percentile: 0.00
sum: 29130.61

Threads fairness:
events (avg/stddev): 10984080.0000/0.00
execution time (avg/stddev): 29.1306/0.00
```

5.

```
qemu-system-aarch64 -accel hvf -cpu cortex-a57 -M virt,highmem=off -m 2G -smp
snikam2@snikam2:~$ sysbench cpu --cpu-max-prime=1000 --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: 1000

Initializing worker threads...

Threads started!

CPU speed:
events per second: 372260.40

General statistics:
total time: 30.0001s
total number of events: 11168139

Latency (ms):
min: 0.00
avg: 0.00
max: 0.07
95th percentile: 0.00
sum: 29225.66

Threads fairness:
events (avg/stddev): 11168139.0000/0.00
execution time (avg/stddev): 29.2257/0.00
```

Observation :

Events per second :

1.	371704.34
2	364297.63
3.	368884.89
4.	366124.74
5.	372260.40

Stats :

Average events per second	368654.4
Minimum Number of events per second recorded	364297.63
Maximum Number of events per second recorded	372260.40
Standard Deviation of events per second recorded	3454.6751

Case 2 : IMG TYPE : qcow2 | CPU : 2 | RAM :2 | MODE : CPU | --cpu-max-prime=20000

```
1  qemu-system-aarch64 -accel hvf -cpu cortex-a57 -M virt,highmem=off -m 2G -smp          `⌘1
   Initializing worker threads...
   Threads started!
   CPU speed:
     events per second: 4527.67
   General statistics:
     total time:           10.0002s
     total number of events: 45280
   Latency (ms):
     min:                  0.21
     avg:                  0.22
     max:                  3.52
     95th percentile:      0.24
     sum:                 9982.06
   Threads fairness:
     events (avg/stddev): 45280.0000/0.00
     execution time (avg/stddev): 9.9821/0.00
```

2.

```
qemu-system-aarch64 -accel hvf -cpu cortex-a57 -M virt,highmem=off -m 2G -smp
Prime numbers limit: 20000

Initializing worker threads...

Threads started!

CPU speed:
events per second: 4571.24

General statistics:
total time: 10.0002s
total number of events: 45717

Latency (ms):
min: 0.21
avg: 0.22
max: 0.67
95th percentile: 0.23
sum: 9986.66

Threads fairness:
events (avg/stddev): 45717.0000/0.00
execution time (avg/stddev): 9.9867/0.00
```

3.

```
qemu-system-aarch64 -accel hvf -cpu cortex-a57 -M virt,highmem=off -m 2G -smp
snikam2@snikam2:~$ sysbench cpu --cpu-max-prime=20000 --num-threads=1 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: 20000

Initializing worker threads...

Threads started!

CPU speed:
events per second: 4588.96

General statistics:
total time: 10.0002s
total number of events: 45893

Latency (ms):
min: 0.21
avg: 0.22
max: 0.53
95th percentile: 0.23
sum: 9989.46

Threads fairness:
events (avg/stddev): 45893.0000/0.00
execution time (avg/stddev): 9.9895/0.00
```

4.

```

● ● ● qemu-system-aarch64 -accel hvf -cpu cortex-a57 -M virt,highmem=off -m 2G -smp
snikam2@snikam2:~$ sysbench cpu --cpu-max-prime=20000 --num-threads=1 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: 20000

Initializing worker threads...

Threads started!

CPU speed:
events per second: 4551.86

General statistics:
total time: 10.00003s
total number of events: 45523

Latency (ms):
min: 0.21
avg: 0.22
max: 0.60
95th percentile: 0.24
sum: 9985.70

Threads fairness:
events (avg/stddev): 45523.0000/0.00
execution time (avg/stddev): 9.9857/0.00

```

5.

```

● ● ● qemu-system-aarch64 -accel hvf -cpu cortex-a57 -M virt,highmem=off -m 2G -smp
snikam2@snikam2:~$ sysbench cpu --cpu-max-prime=20000 --num-threads=1 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: 20000

Initializing worker threads...

Threads started!

CPU speed:
events per second: 4525.96

General statistics:
total time: 10.00002s
total number of events: 45263

Latency (ms):
min: 0.21
avg: 0.22
max: 0.75
95th percentile: 0.24
sum: 9978.40

Threads fairness:
events (avg/stddev): 45263.0000/0.00
execution time (avg/stddev): 9.9784/0.00

```

Observation :

Events per second :

1.	4527.67
2	4571.24
3.	4588.96
4.	4551.86
5.	4525.7

Stats :

Average events per second	4553.086
Minimum Number of events per second recorded	4525.7
Maximum Number of events per second recorded	4588.96

Case 3 : IMG TYPE : qcow2 | CPU : 2 | RAM :2 | MODE : memory | --memory-block-size= 2K

```
1 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: 2KiB
total size: 102400MiB
operation: write
scope: global

Initializing worker threads...

Threads started!

Total operations: 52428800 (7884344.80 per second)
102400.00 MiB transferred (15399.11 MiB/sec)

General statistics:
    total time:                      6.6492s
    total number of events:           52428800

Latency (ms):
```

	<pre> min: 0.00 avg: 0.00 max: 0.05 95th percentile: 0.00 sum: 3439.22 Threads fairness: events (avg/stddev): 52428800.0000/0.00 execution time (avg/stddev): 3.4392/0.00 </pre>
2.	<pre> 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: 2KiB total size: 102400MiB operation: write scope: global Initializing worker threads... Threads started! Total operations: 52428800 (7747410.97 per second) 102400.00 MiB transferred (15131.66 MiB/sec) General statistics: total time: 6.7666s total number of events: 52428800 Latency (ms): min: 0.00 avg: 0.00 max: 0.07 95th percentile: 0.00 sum: 3511.28 Threads fairness: events (avg/stddev): 52428800.0000/0.00 execution time (avg/stddev): 3.5113/0.00 </pre>
3.	<pre> 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 </pre>

```
Running memory speed test with the following options:  
block size: 2KiB  
total size: 102400MiB  
operation: write  
scope: global  
  
Initializing worker threads...  
  
Threads started!  
  
Total operations: 52428800 (7860831.86 per second)  
102400.00 MiB transferred (15353.19 MiB/sec)  
  
General statistics:  
    total time: 6.6689s  
    total number of events: 52428800  
  
Latency (ms):  
    min: 0.00  
    avg: 0.00  
    max: 0.12  
    95th percentile: 0.00  
    sum: 3445.29  
  
Threads fairness:  
    events (avg/stddev): 52428800.0000/0.00  
    execution time (avg/stddev): 3.4453/0.00
```

4.

```
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: 2KiB  
total size: 102400MiB  
operation: write  
scope: global  
  
Initializing worker threads...  
  
Threads started!  
  
Total operations: 52428800 (7922023.01 per second)  
102400.00 MiB transferred (15472.70 MiB/sec)  
  
General statistics:  
    total time: 6.6174s  
    total number of events: 52428800
```

```
Latency (ms) :
    min:                      0.00
    avg:                      0.00
    max:                      0.05
    95th percentile:          0.00
    sum:                     3421.79

Threads fairness:
    events (avg/stddev):    52428800.0000/0.00
    execution time (avg/stddev): 3.4218/0.00
```

5. 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: 2KiB

total size: 102400MiB

operation: write

scope: global

Initializing worker threads...

Threads started!

Total operations: 52428800 (7913420.74 per second)

102400.00 MiB transferred (15455.90 MiB/sec)

General statistics:

total time:	6.6245s
total number of events:	52428800

Latency (ms) :

min:	0.00
avg:	0.00
max:	0.18
95th percentile:	0.00
sum:	3431.01

Threads fairness:

events (avg/stddev):	52428800.0000/0.00
execution time (avg/stddev):	3.4310/0.00

Observation :

Total Operation per second :

1.	7884344.80
2	7747410.97
3.	7860831.86
4.	7922023.01
5.	7913420.74

MB transferred per sec :

1.	15399.11
2	15131.66
3.	15353.19
4.	15472.70
5.	15455.90

Stats :

Average Operation per second	7865606.276
Minimum Operation per second	7747410.97
Maximum Operation per second	7922023.01
Standard Deviation Operation per second	70379.55764

Average MB transferred per second	15362.512
Minimum MB transferred per second	15131.66
Maximum MB transferred per second	15472.7
Standard Deviation MB transferred per second	137.461

Case 4 : IMG TYPE : qcow2 | CPU : 2 | RAM :2 | MODE : memory | --memory-block-size= 4K

1	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: 4KiB total size: 102400MiB operation: write scope: global
---	--

```
Initializing worker threads...

Threads started!

Total operations: 26214400 (5710752.89 per second)

102400.00 MiB transferred (22307.63 MiB/sec)

General statistics:
    total time: 4.5897s
    total number of events: 26214400

Latency (ms):
    min: 0.00
    avg: 0.00
    max: 0.07
    95th percentile: 0.00
    sum: 2970.41

Threads fairness:
    events (avg/stddev): 26214400.0000/0.00
    execution time (avg/stddev): 2.9704/0.00
```

2. 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: 4KiB
    total size: 102400MiB
    operation: write
    scope: global

Initializing worker threads...

Threads started!

Total operations: 26214400 (5690267.81 per second)

102400.00 MiB transferred (22227.61 MiB/sec)

General statistics:
    total time: 4.6062s
    total number of events: 26214400

Latency (ms):
    min: 0.00
    avg: 0.00
    max: 0.05
```

	<pre> 95th percentile: 0.00 sum: 2978.78 Threads fairness: events (avg/stddev): 26214400.0000/0.00 execution time (avg/stddev): 2.9788/0.00 </pre>
3.	<pre> 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: 4KiB total size: 102400MiB operation: write scope: global Initializing worker threads... Threads started! Total operations: 26214400 (5705721.15 per second) 102400.00 MiB transferred (22287.97 MiB/sec) General statistics: total time: 4.5938s total number of events: 26214400 Latency (ms): min: 0.00 avg: 0.00 max: 0.05 95th percentile: 0.00 sum: 2973.13 Threads fairness: events (avg/stddev): 26214400.0000/0.00 execution time (avg/stddev): 2.9731/0.00 </pre>
4.	<pre> 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: 4KiB </pre>

```
total size: 102400MiB
operation: write
scope: global

Initializing worker threads...

Threads started!

Total operations: 26214400 (5621519.47 per second)
102400.00 MiB transferred (21959.06 MiB/sec)

General statistics:
    total time:                      4.6627s
    total number of events:           26214400

Latency (ms):
    min:                            0.00
    avg:                            0.00
    max:                            0.06
    95th percentile:                0.00
    sum:                           3015.11

Threads fairness:
    events (avg/stddev):          26214400.0000/0.00
    execution time (avg/stddev):  3.0151/0.00
```

5. 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: 4KiB
    total size: 102400MiB
    operation: write
    scope: global

Initializing worker threads...

Threads started!

Total operations: 26214400 (5666993.17 per second)
102400.00 MiB transferred (22136.69 MiB/sec)

General statistics:
    total time:                      4.6251s
    total number of events:           26214400
```

	Latency (ms) : min: 0.00 avg: 0.00 max: 0.22 95th percentile: 0.00 sum: 2988.88
	Threads fairness: events (avg/stddev) : 26214400.0000/0.00 execution time (avg/stddev) : 2.9889/0.00

Observation :

Total Operation per second :

1.	5710752.89
2	5690267.81
3.	5705721.15
4.	5621519.47
5.	5710752.89

MB transferred per sec :

1.	22307.63
2	22227.61
3.	22287.97
4.	21959.06
5.	22136.69

Stats :

Average Operation per second	5679050.898
Minimum Operation per second	5621519.47
Maximum Operation per second	5710752.89
Standard Deviation Operation per second	36391.59163

Average MB transferred per second	22183.792
Minimum MB transferred per second	21959.06
Maximum MB transferred per second	22307.63
Standard Deviation MB transferred per second	142.1548392

Case 5 : IMG TYPE : qcow2 | CPU : 2 | RAM :2 | MODE : fileio | --file-test-mode= seqwr | --file-total-size=3G

```
1   Command: sysbench fileio --file-test-mode=seqwr --file-total-size=3G run
Results:
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, 24MiB each
3GiB 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 write (creation) test
Initializing worker threads...
|_
Threads started!

File operations:
  reads/s:          0.00
  writes/s:         13878.16
  fsyncs/s:         17769.44

Throughput:
  read, MiB/s:      0.00
  written, MiB/s:   216.85

General statistics:
  total time:        10.0081s
  total number of events: 316618

Latency (ms):
  min:                0.00
  avg:                0.03
  max:               22.11
  95th percentile:    0.05
```

	<pre> sum: 9937.26 Threads fairness: events (avg/stddev): 316618.0000/0.00 execution time (avg/stddev): 9.9373/0.00 </pre>
2.	<pre> Command: sysbench fileio --file-test-mode=seqwr --file-total-size=3G run Results: 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, 24MiB each 3GiB 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 write (creation) test Initializing worker threads... Threads started! File operations: reads/s: 0.00 writes/s: 13848.65 fsyncs/s: 17731.07 Throughput: read, MiB/s: 0.00 written, MiB/s: 216.39 General statistics: total time: 10.0077s total number of events: 315928 Latency (ms): min: 0.00 avg: 0.03 max: 5.37 95th percentile: 0.05 sum: 9940.38 Threads fairness: events (avg/stddev): 315928.0000/0.00 execution time (avg/stddev): 9.9404/0.00 </pre>
3.	<pre> Command: sysbench fileio --file-test-mode=seqwr --file-total-size=3G run Results: sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3) </pre>

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

Extra file open flags: (none)
128 files, 24MiB each
3GiB 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 write (creation) test
Initializing worker threads...

Threads started!

File operations:
  reads/s:          0.00
  writes/s:         13989.67
  fsyncs/s:         17915.67

Throughput:
  read, MiB/s:      0.00
  written, MiB/s:   218.59

General statistics:
  total time:       10.0069s
  total number of events: 319161

Latency (ms):
  min:              0.00
  avg:              0.03
  max:              10.84
  95th percentile:  0.05
  sum:              9940.36

Threads fairness:
  events (avg/stddev): 319161.0000/0.00
  execution time (avg/stddev): 9.9404/0.00
```

4. Command: sysbench fileio --file-test-mode=seqwr --file-total-size=3G run
Results:
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, 24MiB each
3GiB 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 write (creation) test
Initializing worker threads...

Threads started!

File operations:
  reads/s:                      0.00
  writes/s:                     14159.70
  fsyncs/s:                      18133.50

Throughput:
  read, MiB/s:                  0.00
  written, MiB/s:                221.25

General statistics:
  total time:                   10.0068s
  total number of events:        323039

Latency (ms):
  min:                           0.00
  avg:                           0.03
  max:                           3.75
  95th percentile:               0.05
  sum:                           9936.53

Threads fairness:
  events (avg/stddev):          323039.0000/0.00
  execution time (avg/stddev):   9.9365/0.00
```

5. Command: sysbench fileio --file-test-mode=seqwr --file-total-size=3G run
Results:
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, 24MiB each
3GiB 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 write (creation) test
Initializing worker threads...

Threads started!

File operations:
 reads/s: 0.00

writes/s:	13101.61
fsyncs/s:	16779.25
Throughput:	
read, MiB/s:	0.00
written, MiB/s:	204.71
General statistics:	
total time:	10.0059s
total number of events:	298872
Latency (ms):	
min:	0.00
avg:	0.03
max:	9.69
95th percentile:	0.05
sum:	9945.22
Threads fairness:	
events (avg/stddev):	298872.0000/0.00
execution time (avg/stddev):	9.9452/0.00

Observations :

	Throughput (MB/Sec)		File Operations (operation/sec)		
	read	write	reads/sec	writes/sec	fsync/sec
1.	0	216.85	0	13878.16	17769.44
2.	0	216.39	0	13848.65	17731.07
3	0	218.59	0	13989.67	17915.67
4.	0	221.25	0	14159.7	18133.5
5.	0	204.71	0	13101.61	16779.25
Avg	0	215.558	0	13795.558	17665.786
Min	0	216.39	0	13101.61	16779.25
Max	0	221.25	0	14159.7	18133.5
stddev	0	2.201030062	0	406.6584999	520.1323464

Case 6 : IMG TYPE : qcow2 CPU : 2 RAM :2 MODE : fileio --file-test-mode= rndwr --file-total-size=3G

1

```
Command: sysbench fileio --file-test-mode=rndrw --file-total-size=3G run
Results:
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, 24MiB each
3GiB 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:          4693.48
  writes/s:         3128.95
  fsyncs/s:        10014.24

Throughput:
  read, MiB/s:      73.34
  written, MiB/s:   48.89

General statistics:
  total time:       10.0077s
  total number of events: 178384

Latency (ms):
  min:              0.00
  avg:              0.06
  max:              6.81
  95th percentile: 0.18
  sum:             9962.24

Threads fairness:
  events (avg/stddev): 178384.0000/0.00
  execution time (avg/stddev): 9.9622/0.00
```

2.

```
Command: sysbench fileio --file-test-mode=rndrw --file-total-size=3G run
Results:
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, 24MiB each
3GiB 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:          4496.50
  writes/s:         2997.67
  fsyncs/s:         9594.43

Throughput:
  read, MiB/s:      70.26
  written, MiB/s:   46.84

General statistics:
  total time:        10.0073s
  total number of events: 170891

Latency (ms):
  min:                0.00
  avg:                0.06
  max:                3.06
  95th percentile:    0.19
  sum:               9958.23

Threads fairness:
  events (avg/stddev): 170891.0000/0.00
  execution time (avg/stddev): 9.9582/0.00

```

3. Command: sysbench fileio --file-test-mode=rndrw --file-total-size=3G run
 Results:
 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, 24MiB each
3GiB 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: 4393.40
 writes/s: 2928.93
 fsyncs/s: 9373.86

Throughput:
 read, MiB/s: 68.65
 written, MiB/s: 45.76

General statistics:
 total time: 10.0086s
 total number of events: 166986

Latency (ms):
 min: 0.00
 avg: 0.06
 max: 6.79
 95th percentile: 0.19
 sum: 9962.49

Threads fairness:
 events (avg/stddev): 166986.0000/0.00
 execution time (avg/stddev): 9.9625/0.00
```

4. Command: sysbench fileio --file-test-mode=rndrw --file-total-size=3G run  
Results:  
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, 24MiB each  
3GiB 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: 4447.05
 writes/s: 2964.64
 fsyncs/s: 9488.75

Throughput:
 read, MiB/s: 69.49
 written, MiB/s: 46.32

General statistics:
 total time: 10.0088s
 total number of events: 169034

Latency (ms):
 min: 0.00
 avg: 0.06
 max: 9.69
 95th percentile: 0.19
 sum: 9960.06

Threads fairness:
 events (avg/stddev): 169034.0000/0.00
 execution time (avg/stddev): 9.9601/0.00

```

5. Command: sysbench fileio --file-test-mode=rndrw --file-total-size=3G run

Results:

```

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, 24MiB each
3GiB 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: 4689.34
 writes/s: 3126.22
 fsyncs/s: 10008.02

Throughput:
 read, MiB/s: 73.27
 written, MiB/s: 48.85

```

|  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|--|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <pre> General statistics:     total time:                      10.0051s     total number of events:           178209  Latency (ms):     min:                            0.00     avg:                            0.06     max:                            8.28     95th percentile:                0.19     sum:                           9960.05  Threads fairness:     events (avg/stddev):          178209.0000/0.00     execution time (avg/stddev):   9.9600/0.00 </pre> |
|--|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Observations :

|        | Throughput (MB/Sec) |             | File Operations (operation/sec) |            |             |
|--------|---------------------|-------------|---------------------------------|------------|-------------|
|        | read                | write       | reads/sec                       | writes/sec | fsync/sec   |
| 1.     | 73.34               | 48.89       | 4693.48                         | 3128.95    | 10014.24    |
| 2.     | 70.26               | 46.84       | 4496.5                          | 2997.67    | 9594.43     |
| 3      | 68.65               | 45.76       | 4393.4                          | 2928.93    | 9373.86     |
| 4.     | 69.49               | 46.32       | 4447.05                         | 2964.64    | 9488.75     |
| 5.     | 73.27               | 48.85       | 4689.34                         | 3126.22    | 10008.02    |
| Avg    | 71.002              | 47.332      | 4543.954                        | 3029.282   | 9695.86     |
| Min    | 68.65               | 45.76       | 4393.4                          | 2928.93    | 9373.86     |
| Max    | 73.34               | 48.89       | 4693.48                         | 3128.95    | 10014.24    |
| stddev | 2.178226343         | 1.364877894 | 139.4667415                     | 92.9773046 | 298.1930109 |

|                                                                                 |                                                                                                                                                                  |
|---------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Case 7 : IMG TYPE : qcow2   CPU : 2   RAM :3   MODE :CPU   --cpu-max-prime=1000 |                                                                                                                                                                  |
| 1                                                                               | <pre> Command: sysbench cpu --cpu-max-prime=1000 run Results: sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)  Running the test with following options: </pre> |

```
Number of threads: 1
Initializing random number generator from current time

Prime numbers limit: 1000

Initializing worker threads...

Threads started!

CPU speed:
 events per second: 371949.12

General statistics:
 total time: 30.0001s
 total number of events: 11158784

Latency (ms):
 min: 0.00
 avg: 0.00
 max: 0.06
 95th percentile: 0.00
 sum: 29220.64

Threads fairness:
 events (avg/stddev): 11158784.0000/0.00
 execution time (avg/stddev): 29.2206/0.00
```

2.

```
Command: sysbench cpu --cpu-max-prime=1000 run
Results:
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: 1000

Initializing worker threads...

Threads started!

CPU speed:
 events per second: 373754.07

General statistics:
 total time: 30.0001s
 total number of events: 11212957

Latency (ms):
 min: 0.00
 avg: 0.00
 max: 1.88
 95th percentile: 0.00
 sum: 29221.03
```

|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    | <pre> Threads fairness:   events (avg/stddev):           11212957.0000/0.00   execution time (avg/stddev):   29.2210/0.00 </pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 3. | <pre> Command: sysbench cpu --cpu-max-prime=1000 run Results: 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: 1000  Initializing worker threads...  Threads started!  CPU speed:   events per second: 373456.47  General statistics:   total time:                      30.0001s   total number of events:          11204026  Latency (ms):   min:                            0.00   avg:                            0.00   max:                            0.23   95th percentile:                0.00   sum:                           29214.11  Threads fairness:   events (avg/stddev):           11204026.0000/0.00   execution time (avg/stddev):   29.2141/0.00 </pre> |
| 4. | <pre> Command: sysbench cpu --cpu-max-prime=1000 run Results: 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: 1000  Initializing worker threads...  Threads started!  CPU speed: </pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

```

events per second: 373502.96

General statistics:
 total time: 30.0001s
 total number of events: 11205401

Latency (ms):
 min: 0.00
 avg: 0.00
 max: 0.06
 95th percentile: 0.00
 sum: 29222.21

Threads fairness:
 events (avg/stddev): 11205401.0000/0.00
 execution time (avg/stddev): 29.2222/0.00

```

5. Command: sysbench cpu --cpu-max-prime=1000 run  
Results:  
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: 1000

Initializing worker threads...

Threads started!

CPU speed:  
events per second: 371689.84

General statistics:
total time: 30.0001s
total number of events: 11151048

Latency (ms):
min: 0.00
avg: 0.00
max: 1.79
95th percentile: 0.00
sum: 29218.86

Threads fairness:
events (avg/stddev): 11151048.0000/0.00
execution time (avg/stddev): 29.2189/0.00

#### Observation :

#### Events per second :

|    |           |
|----|-----------|
| 1. | 371949.12 |
|----|-----------|

|    |           |
|----|-----------|
| 2  | 373754.07 |
| 3. | 373456.47 |
| 4. | 373502.96 |
| 5. | 371689.84 |

Stats :

|                                                  |             |
|--------------------------------------------------|-------------|
| Average events per second                        | 372870.492  |
| Minimum Number of events per second recorded     | 371689.84   |
| Maximum Number of events per second recorded     | 373754.07   |
| Standard Deviation of events per second recorded | 970.4330962 |

#### Case 8 : IMG TYPE : qcow2 | CPU : 2 | RAM :3 | MODE : CPU | --cpu-max-prime=20000

|   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|---|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | <pre>Command: sysbench cpu --cpu-max-prime=20000 run Results: 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: 20000  Initializing worker threads...  Threads started!  CPU speed: events per second: 4628.52  General statistics: total time: 30.0002s total number of events: 138860  Latency (ms): min: 0.21 avg: 0.22 max: 0.36 95th percentile: 0.23 sum: 29980.79</pre> |
|---|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    | <pre> Threads fairness:   events (avg/stddev):          138860.0000/0.00   execution time (avg/stddev):  29.9808/0.00 </pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 2. | <pre> Command: sysbench cpu --cpu-max-prime=20000  run Results: 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: 20000  Initializing worker threads...  Threads started!  CPU speed:   events per second:  4614.03  General statistics:   total time:           30.00003s   total number of events: 138425  Latency (ms):   min:                  0.21   avg:                  0.22   max:                  0.74   95th percentile:     0.23   sum:                 29980.25  Threads fairness:   events (avg/stddev):  138425.0000/0.00   execution time (avg/stddev):  29.9803/0.00 </pre> |
| 3. | <pre> Command: sysbench cpu --cpu-max-prime=20000  run Results: 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: 20000  Initializing worker threads...  Threads started!  CPU speed:   events per second:  4630.62  General statistics: </pre>                                                                                                                                                                                                                                                                                                                                               |

```

total time: 30.0002s
total number of events: 138923

Latency (ms):
 min: 0.21
 avg: 0.22
 max: 0.34
 95th percentile: 0.23
 sum: 29984.67

Threads fairness:
 events (avg/stddev): 138923.0000/0.00
 execution time (avg/stddev): 29.9847/0.00

```

4.

```

Command: sysbench cpu --cpu-max-prime=20000 run
Results:
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: 20000

Initializing worker threads...

Threads started!

CPU speed:
 events per second: 4624.19

General statistics:
 total time: 30.0002s
 total number of events: 138730

Latency (ms):
 min: 0.21
 avg: 0.22
 max: 0.75
 95th percentile: 0.23
 sum: 29984.04

Threads fairness:
 events (avg/stddev): 138730.0000/0.00
 execution time (avg/stddev): 29.9840/0.00

```

5.

```

Command: sysbench cpu --cpu-max-prime=20000 run
Results:
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: 20000

Initializing worker threads...

Threads started!

CPU speed:
 events per second: 4628.86

General statistics:
 total time: 30.0002s
 total number of events: 138870

Latency (ms):
 min: 0.21
 avg: 0.22
 max: 0.42
 95th percentile: 0.23
 sum: 29982.91

Threads fairness:
 events (avg/stddev): 138870.0000/0.00
 execution time (avg/stddev): 29.9829/0.00

```

#### Observation :

##### Events per second :

|    |         |
|----|---------|
| 1. | 4628.52 |
| 2  | 4614.03 |
| 3. | 4630.62 |
| 4. | 4624.19 |
| 5. | 4628.86 |

##### Stats :

|                                                  |             |
|--------------------------------------------------|-------------|
| Average events per second                        | 4625.244    |
| Minimum Number of events per second recorded     | 4614.03     |
| Maximum Number of events per second recorded     | 4630.62     |
| Standard Deviation of events per second recorded | 6.700255965 |

**Case 9 : IMG TYPE : qcow2 | CPU : 2 | RAM :3 | MODE : memory |--memory-block-size= 2K**

1 Command: sysbench memory --memory-block-size=2K run  
Results:  
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: 2KiB  
total size: 102400MiB  
operation: write  
scope: global  
  
Initializing worker threads...  
  
Threads started!  
  
Total operations: 52428800 (7912172.40 per second)  
102400.00 MiB transferred (15453.46 MiB/sec)  
  
General statistics:  
total time: 6.6256s  
total number of events: 52428800  
  
Latency (ms):  
min: 0.00  
avg: 0.00  
max: 0.05  
95th percentile: 0.00  
sum: 3433.40  
  
Threads fairness:  
events (avg/stddev): 52428800.0000/0.00  
execution time (avg/stddev): 3.4334/0.00

2. Command: sysbench memory --memory-block-size=2K run  
Results:  
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: 2KiB  
total size: 102400MiB  
operation: write  
scope: global

```
Initializing worker threads...

Threads started!

Total operations: 52428800 (7910910.73 per second)

102400.00 MiB transferred (15451.00 MiB/sec)

General statistics:
 total time: 6.6266s
 total number of events: 52428800

Latency (ms):
 min: 0.00
 avg: 0.00
 max: 0.05
 95th percentile: 0.00
 sum: 3455.94

Threads fairness:
 events (avg/stddev): 52428800.0000/0.00
 execution time (avg/stddev): 3.4559/0.00
```

3. Command: sysbench memory --memory-block-size=2K run  
Results:  
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: 2KiB  
total size: 102400MiB  
operation: write  
scope: global

Initializing worker threads...

Threads started!

Total operations: 52428800 (7817923.55 per second)

102400.00 MiB transferred (15269.38 MiB/sec)

General statistics:
 total time: 6.7055s
 total number of events: 52428800

Latency (ms):
 min: 0.00
 avg: 0.00

|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    | <pre> max:                                0.52 95th percentile:                   0.00 sum:                               3444.24  Threads fairness:   events (avg/stddev):      52428800.0000/0.00   execution time (avg/stddev): 3.4442/0.00 </pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 4. | <pre> Command: sysbench memory --memory-block-size=2K run Results: 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: 2KiB total size: 102400MiB operation: write scope: global  Initializing worker threads...  Threads started!  Total operations: 52428800 (7921505.35 per second) 102400.00 MiB transferred (15471.69 MiB/sec)  General statistics:   total time:                      6.6178s   total number of events:          52428800  Latency (ms):   min:                            0.00   avg:                           0.00   max:                           0.04   95th percentile:                0.00   sum:                          3432.19  Threads fairness:   events (avg/stddev):      52428800.0000/0.00   execution time (avg/stddev): 3.4322/0.00 </pre> |
| 5. | <pre> Command: sysbench memory --memory-block-size=2K run Results: 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 </pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

```

Running memory speed test with the following options:
 block size: 2KiB
 total size: 102400MiB
 operation: write
 scope: global

Initializing worker threads...

Threads started!

Total operations: 52428800 (7921010.28 per second)
102400.00 MiB transferred (15470.72 MiB/sec)

General statistics:
 total time: 6.6182s
 total number of events: 52428800

Latency (ms):
 min: 0.00
 avg: 0.00
 max: 0.05
 95th percentile: 0.00
 sum: 3430.11

Threads fairness:
 events (avg/stddev): 52428800.0000/0.00
 execution time (avg/stddev): 3.4301/0.00

```

#### Observation :

Total Operation per second :

MB transferred per sec :

|    |            |
|----|------------|
| 1. | 7912172.4  |
| 2  | 7910910.73 |
| 3. | 7817923.55 |
| 4. | 7921505.35 |
| 5. | 7921010.28 |

|    |          |
|----|----------|
| 1. | 15453.46 |
| 2  | 15451    |
| 3. | 15269.38 |
| 4. | 15471.69 |
| 5. | 15470.72 |

#### Stats :

|                              |             |
|------------------------------|-------------|
| Average Operation per second | 7896704.462 |
|------------------------------|-------------|

|                                         |             |
|-----------------------------------------|-------------|
| Minimum Operation per second            | 7817923.55  |
| Maximum Operation per second            | 7921505.35  |
| Standard Deviation Operation per second | 44309.60417 |

|                                              |             |
|----------------------------------------------|-------------|
| Average MB transferred per second            | 15423.25    |
| Minimum MB transferred per second            | 15269.38    |
| Maximum MB transferred per second            | 15471.69    |
| Standard Deviation MB transferred per second | 86.54264556 |

| Case 10 : IMG TYPE : qcow2   CPU : 2   RAM :3   MODE : memory   --memory-block-size= 4K |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-----------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1                                                                                       | <pre>Command: sysbench memory --memory-block-size=4K run Results: 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: 4KiB total size: 102400MiB operation: write scope: global  Initializing worker threads...  Threads started!  Total operations: 26214400 (5754228.42 per second) 102400.00 MiB transferred (22477.45 MiB/sec)  General statistics:   total time: 4.5550s   total number of events: 26214400  Latency (ms):   min: 0.00   avg: 0.00   max: 0.04   95th percentile: 0.00   sum: 2949.61</pre> |

|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    | <pre> Threads fairness:   events (avg/stddev):      26214400.0000/0.00   execution time (avg/stddev):  2.9496/0.00 </pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 2. | <pre> Command: sysbench memory --memory-block-size=4K run Results: 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: 4KiB   total size: 102400MiB   operation: write   scope: global  Initializing worker threads...  Threads started!  Total operations: 26214400 (5761313.31 per second) 102400.00 MiB transferred (22505.13 MiB/sec)  General statistics:   total time:                      4.5493s   total number of events:          26214400  Latency (ms):   min:                            0.00   avg:                            0.00   max:                            0.05   95th percentile:                0.00   sum:                           2948.24  Threads fairness:   events (avg/stddev):      26214400.0000/0.00   execution time (avg/stddev):  2.9482/0.00 </pre> |
| 3. | <pre> Command: sysbench memory --memory-block-size=4K run Results: 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: 4KiB   total size: 102400MiB </pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

```
operation: write
scope: global

Initializing worker threads...

Threads started!

Total operations: 26214400 (5748868.37 per second)
102400.00 MiB transferred (22456.52 MiB/sec)

General statistics:
 total time: 4.5591s
 total number of events: 26214400

Latency (ms):
 min: 0.00
 avg: 0.00
 max: 0.06
 95th percentile: 0.00
 sum: 2951.56

Threads fairness:
 events (avg/stddev): 26214400.0000/0.00
 execution time (avg/stddev): 2.9516/0.00
```

4.

```
Command: sysbench memory --memory-block-size=4K run
Results:
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: 4KiB
 total size: 102400MiB
 operation: write
 scope: global

Initializing worker threads...

Threads started!

Total operations: 26214400 (5762470.54 per second)
102400.00 MiB transferred (22509.65 MiB/sec)

General statistics:
 total time: 4.5484s
 total number of events: 26214400

Latency (ms):
```

|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    | <pre> min:                      0.00 avg:                      0.00 max:                      0.04 95th percentile:          0.00 sum:                     2943.91  Threads fairness: events (avg/stddev):   26214400.0000/0.00 execution time (avg/stddev): 2.9439/0.00 </pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 5. | <pre> Command: sysbench memory --memory-block-size=4K run Results: 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: 4KiB total size: 102400MiB operation: write scope: global  Initializing worker threads...  Threads started!  Total operations: 26214400 (5767030.72 per second) 102400.00 MiB transferred (22527.46 MiB/sec)  General statistics: total time:                  4.5448s total number of events:      26214400  Latency (ms): min:                          0.00 avg:                          0.00 max:                          0.05 95th percentile:              0.00 sum:                         2942.66  Threads fairness: events (avg/stddev):   26214400.0000/0.00 execution time (avg/stddev): 2.9427/0.00 </pre> |

**Observation :**

**Total Operation per second :**

**MB transferred per sec :**

|    |          |
|----|----------|
| 1. | 22477.45 |
|----|----------|

|    |            |
|----|------------|
| 1. | 5754228.42 |
| 2  | 5761313.31 |
| 3. | 5748868.37 |
| 4. | 5762470.54 |
| 5. | 5767030.72 |

|    |          |
|----|----------|
| 2  | 22505.13 |
| 3. | 22456.52 |
| 4. | 22509.65 |
| 5. | 22527.46 |

Stats :

|                                         |             |
|-----------------------------------------|-------------|
| Average Operation per second            | 5758782.272 |
| Minimum Operation per second            | 5748868.37  |
| Maximum Operation per second            | 5767030.72  |
| Standard Deviation Operation per second | 7194.95291  |

|                                              |             |
|----------------------------------------------|-------------|
| Average MB transferred per second            | 22495.242   |
| Minimum MB transferred per second            | 22456.52    |
| Maximum MB transferred per second            | 22527.46    |
| Standard Deviation MB transferred per second | 28.10387464 |

Case 11 : IMG TYPE : qcow2 | CPU : 2 | RAM : 3 | MODE : fileio | --file-test-mode= rndwr | --file-total-size=3G

|   |                                                                                                                                                                                                                                                                                                                                                                 |
|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | <pre>Command: sysbench fileio --file-test-mode=rndrw --file-total-size=3G run Results: 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, 24MiB each 3GiB total file size Block size 16KiB</pre> |
|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

```

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: 7220.60
 writes/s: 4813.74
 fsyncs/s: 15405.95

Throughput:
 read, MiB/s: 112.82
 written, MiB/s: 75.21

General statistics:
 total time: 30.0053s
 total number of events: 823240

Latency (ms):
 min: 0.00
 avg: 0.04
 max: 2.69
 95th percentile: 0.12
 sum: 29839.12

Threads fairness:
 events (avg/stddev): 823240.0000/0.00
 execution time (avg/stddev): 29.8391/0.00

```

2. Command: sysbench fileio --file-test-mode=rndrw --file-total-size=3G run  
 Results:  
 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, 24MiB each  
 3GiB 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: 6744.63
 writes/s: 4496.42
 fsyncs/s: 14392.42

Throughput:
 read, MiB/s: 105.38
 written, MiB/s: 70.26

General statistics:
 total time: 30.0056s
 total number of events: 769032

Latency (ms):
 min: 0.00
 avg: 0.04
 max: 2.98
 95th percentile: 0.12
 sum: 29837.03

Threads fairness:
 events (avg/stddev): 769032.0000/0.00
 execution time (avg/stddev): 29.8370/0.00
```

3. Command: sysbench fileio --file-test-mode=rndrw --file-total-size=3G run  
Results:  
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, 24MiB each  
3GiB 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: 6738.61
writes/s: 4492.41
fsyncs/s: 14379.60

Throughput:
 read, MiB/s: 105.29
 written, MiB/s: 70.19

General statistics:
 total time: 30.0057s
 total number of events: 768349

Latency (ms):
 min: 0.00
 avg: 0.04
 max: 4.47
 95th percentile: 0.12
 sum: 29832.26

Threads fairness:
 events (avg/stddev): 768349.0000/0.00
 execution time (avg/stddev): 29.8323/0.00

```

4. Command: sysbench fileio --file-test-mode=rndrw --file-total-size=3G run  
Results:  
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, 24MiB each  
3GiB 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: 6833.91
 writes/s: 4555.92
 fsyncs/s: 14580.44

Throughput:
 read, MiB/s: 106.78

|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    | <pre> written, MiB/s: 71.19  General statistics:     total time: 30.0057s     total number of events: 779142  Latency (ms):     min: 0.00     avg: 0.04     max: 2.70     95th percentile: 0.12     sum: 29837.99  Threads fairness:     events (avg/stddev): 779142.0000/0.00     execution time (avg/stddev): 29.8380/0.00 </pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 5. | <pre> Command: sysbench fileio --file-test-mode=rndrw --file-total-size=3G run Results: 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, 24MiB each 3GiB 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: 6717.38     writes/s: 4478.28     fsyncs/s: 14332.19  Throughput:     read, MiB/s: 104.96     written, MiB/s: 69.97  General statistics:     total time: 30.0074s     total number of events: 765911 </pre> |

|  |                                                                                                                                                                                                                                                                                                                        |
|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <pre> Latency (ms):     min:                      0.00     avg:                       0.04     max:                      5.26     95th percentile:          0.12     sum:                     29839.23  Threads fairness:   events (avg/stddev):   765911.0000/0.00   execution time (avg/stddev): 29.8392/0.00 </pre> |
|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Observation :

|        | Throughput (MB/Sec) |             | File Operations (operation/sec) |             |             |
|--------|---------------------|-------------|---------------------------------|-------------|-------------|
|        | read                | write       | reads/sec                       | writes/sec  | fsync/sec   |
| 1.     | 112.82              | 75.21       | 7220.6                          | 4813.74     | 15405.95    |
| 2.     | 105.38              | 70.26       | 6744.63                         | 4496.42     | 14392.42    |
| 3      | 105.29              | 70.19       | 6738.61                         | 4492.41     | 14379.6     |
| 4.     | 106.78              | 71.19       | 6833.91                         | 4555.92     | 14580.4     |
| 5.     | 104.96              | 69.97       | 6717.38                         | 4478.28     | 14332.19    |
| Avg    | 107.046             | 71.364      | 6851.026                        | 4567.354    | 14618.112   |
| Min    | 104.96              | 70.19       | 6717.38                         | 4478.28     | 14332.19    |
| Max    | 112.82              | 75.21       | 7220.6                          | 4813.74     | 15405.95    |
| stddev | 3.302284058         | 2.375799865 | 211.3626138                     | 140.9070707 | 450.4684096 |

|                                                                                                                 |                                                                                                                                                                                                                                                                        |
|-----------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Case 12 : IMG TYPE : qcow2   CPU : 2   RAM : 3   MODE : fileio   --file-test-mode= seqwr   --file-total-size=3G |                                                                                                                                                                                                                                                                        |
| 1                                                                                                               | <pre> Command: sysbench fileio --file-test-mode=seqwr --file-total-size=3G run Results: 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 </pre> |

```

Extra file open flags: (none)
128 files, 24MiB each
3GiB 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 write (creation) test
Initializing worker threads...

Threads started!

File operations:
 reads/s: 0.00
 writes/s: 15767.03
 fsyncs/s: 20183.96

Throughput:
 read, MiB/s: 0.00
 written, MiB/s: 246.36

General statistics:
 total time: 30.00051s
 total number of events: 1078605

Latency (ms):
 min: 0.00
 avg: 0.03
 max: 2.67
 95th percentile: 0.04
 sum: 29800.13

Threads fairness:
 events (avg/stddev): 1078605.0000/0.00
 execution time (avg/stddev): 29.8001/0.00

```

2. Command: sysbench fileio --file-test-mode=seqwr --file-total-size=3G run  
 Results:  
 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, 24MiB each
3GiB 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 write (creation) test
Initializing worker threads...

```

```

Threads started!

File operations:
 reads/s: 0.00
 writes/s: 16329.93
 fsyncs/s: 20903.77

Throughput:
 read, MiB/s: 0.00
 written, MiB/s: 255.16

General statistics:
 total time: 30.0057s
 total number of events: 1117116

Latency (ms):
 min: 0.00
 avg: 0.03
 max: 12.81
 95th percentile: 0.04
 sum: 29810.71

Threads fairness:
 events (avg/stddev): 1117116.0000/0.00
 execution time (avg/stddev): 29.8107/0.00

```

3. Command: sysbench fileio --file-test-mode=seqwr --file-total-size=3G run

Results:  
 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, 24MiB each  
 3GiB 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 write (creation) test  
 Initializing worker threads...

Threads started!

File operations:
 reads/s: 0.00
 writes/s: 16427.65
 fsyncs/s: 21027.44

Throughput:
 read, MiB/s: 0.00

|  |                                                                                                          |
|--|----------------------------------------------------------------------------------------------------------|
|  | written, MiB/s: 256.68                                                                                   |
|  | General statistics:<br>total time: 30.0037s<br>total number of events: 1123683                           |
|  | Latency (ms):<br>min: 0.00<br>avg: 0.03<br>max: 7.22<br>95th percentile: 0.05<br>sum: 29793.09           |
|  | Threads fairness:<br>events (avg/stddev): 1123683.0000/0.00<br>execution time (avg/stddev): 29.7931/0.00 |

|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4. | Command: sysbench fileio --file-test-mode=seqwr --file-total-size=3G run<br>Results:<br>sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)<br><br>Running the test with following options:<br>Number of threads: 1<br>Initializing random number generator from current time<br><br>Extra file open flags: (none)<br>128 files, 24MiB each<br>3GiB total file size<br>Block size 16KiB<br>Periodic FSYNC enabled, calling fsync() each 100 requests.<br>Calling fsync() at the end of test, Enabled.<br>Using synchronous I/O mode<br>Doing sequential write (creation) test<br>Initializing worker threads...<br><br>Threads started!<br><br>File operations:<br>reads/s: 0.00<br>writes/s: 15721.48<br>fsyncs/s: 20125.96<br><br>Throughput:<br>read, MiB/s: 0.00<br>written, MiB/s: 245.65<br><br>General statistics:<br>total time: 30.0031s<br>total number of events: 1075422<br><br>Latency (ms):<br>min: 0.00 |
|----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    | <pre> avg:                      0.03 max:                      5.49 95th percentile:          0.04 sum:                     29799.93  Threads fairness:   events (avg/stddev): 1075422.0000/0.00   execution time (avg/stddev): 29.7999/0.00 </pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 5. | <pre> Command: sysbench fileio --file-test-mode=seqwr --file-total-size=3G run Results: 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, 24MiB each 3GiB 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 write (creation) test Initializing worker threads...  Threads started!  File operations:   reads/s:                 0.00   writes/s:                15987.80   fsyncs/s:                20465.61  Throughput:   read, MiB/s:              0.00   written, MiB/s:            249.81  General statistics:   total time:                30.0036s   total number of events:    1093625  Latency (ms):   min:                      0.00   avg:                      0.03   max:                      4.89   95th percentile:           0.04   sum:                     29806.98  Threads fairness:   events (avg/stddev): 1093625.0000/0.00   execution time (avg/stddev): 29.8070/0.00 </pre> |

**Observation :**

|        | Throughput (MB/Sec) |             | File Operations (operation/sec) |            |             |
|--------|---------------------|-------------|---------------------------------|------------|-------------|
|        | read                | write       | reads/sec                       | writes/sec | fsync/sec   |
| 1.     | 0                   | 246.36      | 0                               | 15767.03   | 20183.96    |
| 2.     | 0                   | 255.16      | 0                               | 16329.93   | 20903.77    |
| 3      | 0                   | 256.68      | 0                               | 16427.65   | 21027.44    |
| 4.     | 0                   | 245.65      | 0                               | 15721.48   | 20125.9     |
| 5.     | 0                   | 249.81      | 0                               | 15987.8    | 20465.61    |
| Avg    | 0                   | 250.732     | 0                               | 16046.778  | 20541.336   |
| Min    | 0                   | 245.65      | 0                               | 15721.48   | 20125.9     |
| Max    | 0                   | 256.68      | 0                               | 16427.65   | 21027.44    |
| stddev | 0                   | 5.765254403 | 0                               | 321.245495 | 410.3945071 |

Case 13 : IMG TYPE : qcow2 | CPU : 3 | RAM : 2 | MODE : CPU | --cpu-max-prime=1000

```
1 Command: sysbench cpu --cpu-max-prime=1000 run
Results:
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: 1000

Initializing worker threads...

Threads started!

CPU speed:
 events per second: 364135.20

General statistics:
 total time: 30.0001s
 total number of events: 10924407
```

|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    | <pre> Latency (ms):     min:                      0.00     avg:                      0.00     max:                      2.30     95th percentile:          0.00     sum:                     29113.45  Threads fairness:   events (avg/stddev):   10924407.0000/0.00   execution time (avg/stddev): 29.1134/0.00 </pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 2. | <pre> Command: sysbench cpu --cpu-max-prime=1000 run Results: 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: 1000  Initializing worker threads...  Threads started!  CPU speed:   events per second: 360850.47  General statistics:   total time:           30.0001s   total number of events: 10825741  Latency (ms):     min:                      0.00     avg:                      0.00     max:                      1.35     95th percentile:          0.00     sum:                     29029.21  Threads fairness:   events (avg/stddev):   10825741.0000/0.00   execution time (avg/stddev): 29.0292/0.00 </pre> |
| 3. | <pre> Command: sysbench cpu --cpu-max-prime=1000 run Results: 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: 1000  Initializing worker threads... </pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

```
Threads started!

CPU speed:
 events per second: 359881.90

General statistics:
 total time: 30.0001s
 total number of events: 10796725

Latency (ms):
 min: 0.00
 avg: 0.00
 max: 2.05
 95th percentile: 0.00
 sum: 29039.44

Threads fairness:
 events (avg/stddev): 10796725.0000/0.00
 execution time (avg/stddev): 29.0394/0.00
```

4.

```
Command: sysbench cpu --cpu-max-prime=1000 run
Results:
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: 1000

Initializing worker threads...

Threads started!

CPU speed:
 events per second: 360798.06

General statistics:
 total time: 30.0002s
 total number of events: 10824184

Latency (ms):
 min: 0.00
 avg: 0.00
 max: 2.08
 95th percentile: 0.00
 sum: 29035.08

Threads fairness:
 events (avg/stddev): 10824184.0000/0.00
 execution time (avg/stddev): 29.0351/0.00
```

5.

```
Command: sysbench cpu --cpu-max-prime=1000 run
Results:
```

```

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: 1000

Initializing worker threads...

Threads started!

CPU speed:
 events per second: 361425.12

General statistics:
 total time: 30.0001s
 total number of events: 10843060

Latency (ms):
 min: 0.00
 avg: 0.00
 max: 2.05
 95th percentile: 0.00
 sum: 29048.91

Threads fairness:
 events (avg/stddev): 10843060.0000/0.00
 execution time (avg/stddev): 29.0489/0.00

```

#### Observation :

##### Events per second :

|    |           |
|----|-----------|
| 1. | 364135.2  |
| 2  | 360850.47 |
| 3. | 359881.9  |
| 4. | 360798.06 |
| 5. | 361425.12 |

##### Stats :

|                                              |             |
|----------------------------------------------|-------------|
| Average events per second                    | 360701.6933 |
| Minimum Number of events per second recorded | 359881.9    |
| Maximum Number of events per second recorded | 361425.12   |

|                                                  |             |
|--------------------------------------------------|-------------|
| Standard Deviation of events per second recorded | 776.1101036 |
|--------------------------------------------------|-------------|

Case 14 : IMG TYPE : qcow2 | CPU : 3 | RAM : 2 | MODE : CPU | --cpu-max-prime=20000

1

```
Command: sysbench cpu --cpu-max-prime=20000 run
Results:
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: 20000

Initializing worker threads...

Threads started!

CPU speed:
events per second: 4536.52

General statistics:
total time: 30.00002s
total number of events: 136099

Latency (ms):
min: 0.21
avg: 0.22
max: 1.54
95th percentile: 0.24
sum: 29937.16

Threads fairness:
events (avg/stddev): 136099.0000/0.00
execution time (avg/stddev): 29.9372/0.00
```

2.

```
Command: sysbench cpu --cpu-max-prime=20000 run
Results:
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: 20000

Initializing worker threads...

Threads started!

CPU speed:
events per second: 4502.21
```

```

General statistics:
 total time: 30.0003s
 total number of events: 135071

Latency (ms):
 min: 0.21
 avg: 0.22
 max: 3.51
 95th percentile: 0.24
 sum: 29918.97

Threads fairness:
 events (avg/stddev): 135071.0000/0.00
 execution time (avg/stddev): 29.9190/0.00

```

3.

```

Command: sysbench cpu --cpu-max-prime=20000 run
Results:
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: 20000

Initializing worker threads...

Threads started!

CPU speed:
 events per second: 4527.24

General statistics:
 total time: 30.0002s
 total number of events: 135821

Latency (ms):
 min: 0.21
 avg: 0.22
 max: 2.00
 95th percentile: 0.24
 sum: 29932.38

Threads fairness:
 events (avg/stddev): 135821.0000/0.00
 execution time (avg/stddev): 29.9324/0.00

```

4.

```

Command: sysbench cpu --cpu-max-prime=20000 run
Results:
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: 20000
Initializing worker threads...
Threads started!
CPU speed:
 events per second: 4515.45
General statistics:
 total time: 30.0001s
 total number of events: 135467
Latency (ms):
 min: 0.21
 avg: 0.22
 max: 3.66
 95th percentile: 0.24
 sum: 29929.57
Threads fairness:
 events (avg/stddev): 135467.0000/0.00
 execution time (avg/stddev): 29.9296/0.00
```

5. Command: sysbench cpu --cpu-max-prime=20000 run  
Results:  
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: 20000
Initializing worker threads...
Threads started!
CPU speed:
 events per second: 4508.80
General statistics:
 total time: 30.0002s
 total number of events: 135268
Latency (ms):
 min: 0.21
 avg: 0.22
 max: 3.20
 95th percentile: 0.24
 sum: 29923.31
Threads fairness:
```

|  |                                            |
|--|--------------------------------------------|
|  | events (avg/stddev) : 135268.0000/0.00     |
|  | execution time (avg/stddev) : 29.9233/0.00 |

### Observation :

#### Events per second :

|    |         |
|----|---------|
| 1. | 4536.52 |
| 2  | 4502.21 |
| 3. | 4527.24 |
| 4. | 4515.45 |
| 5. | 4508.8  |

#### Stats :

|                                                  |         |
|--------------------------------------------------|---------|
| Average events per second                        | 4517.16 |
| Minimum Number of events per second recorded     | 4508.8  |
| Maximum Number of events per second recorded     | 4527.24 |
| Standard Deviation of events per second recorded | 9.3386  |

Case 15 : IMG TYPE : qcow2 | CPU : 3 | RAM : 2 | MODE : memory |--memory-block-size= 2K

|   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|---|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | <pre>Command: sysbench memory --memory-block-size=2K run Results: 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: 2KiB total size: 102400MiB operation: write scope: global  Initializing worker threads...  Threads started!  Total operations: 52428800 (7816618.56 per second)</pre> |
|---|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

```
102400.00 MiB transferred (15266.83 MiB/sec)

General statistics:
 total time: 6.7068s
 total number of events: 52428800

Latency (ms):
 min: 0.00
 avg: 0.00
 max: 0.44
 95th percentile: 0.00
 sum: 3462.45

Threads fairness:
 events (avg/stddev): 52428800.0000/0.00
 execution time (avg/stddev): 3.4624/0.00
```

2. Command: sysbench memory --memory-block-size=2K run  
Results:  
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: 2KiB  
total size: 102400MiB  
operation: write  
scope: global

Initializing worker threads...

Threads started!

Total operations: 52428800 (7727978.16 per second)  
102400.00 MiB transferred (15093.71 MiB/sec)

General statistics:
 total time: 6.7835s
 total number of events: 52428800

Latency (ms):
 min: 0.00
 avg: 0.00
 max: 6.06
 95th percentile: 0.00
 sum: 3505.11

Threads fairness:
 events (avg/stddev): 52428800.0000/0.00
 execution time (avg/stddev): 3.5051/0.00

3.

```
Command: sysbench memory --memory-block-size=2K run
Results:
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: 2KiB
 total size: 102400MiB
 operation: write
 scope: global

Initializing worker threads...

Threads started!

Total operations: 52428800 (7756631.36 per second)
102400.00 MiB transferred (15149.67 MiB/sec)

General statistics:
 total time: 6.7585s
 total number of events: 52428800

Latency (ms):
 min: 0.00
 avg: 0.00
 max: 0.08
 95th percentile: 0.00
 sum: 3492.68

Threads fairness:
 events (avg/stddev): 52428800.0000/0.00
 execution time (avg/stddev): 3.4927/0.00
```

4.

```
Command: sysbench memory --memory-block-size=2K run
Results:
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: 2KiB
 total size: 102400MiB
 operation: write
 scope: global

Initializing worker threads...
```

```
Threads started!

Total operations: 52428800 (7687383.80 per second)

102400.00 MiB transferred (15014.42 MiB/sec)

General statistics:
 total time: 6.8194s
 total number of events: 52428800

Latency (ms):
 min: 0.00
 avg: 0.00
 max: 0.75
 95th percentile: 0.00
 sum: 3525.73

Threads fairness:
 events (avg/stddev): 52428800.0000/0.00
 execution time (avg/stddev): 3.5257/0.00
```

5. Command: sysbench memory --memory-block-size=2K run  
Results:  
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: 2KiB  
total size: 102400MiB  
operation: write  
scope: global

Initializing worker threads...

Threads started!

Total operations: 52428800 (7673972.15 per second)

102400.00 MiB transferred (14988.23 MiB/sec)

General statistics:
 total time: 6.8315s
 total number of events: 52428800

Latency (ms):
 min: 0.00
 avg: 0.00
 max: 0.31
 95th percentile: 0.00
 sum: 3522.65

|  |                                                                                                            |
|--|------------------------------------------------------------------------------------------------------------|
|  | Threads fairness:<br>events (avg/stddev) : 52428800.0000/0.00<br>execution time (avg/stddev) : 3.5227/0.00 |
|--|------------------------------------------------------------------------------------------------------------|

#### Observation :

Total Operation per second :

|    |            |
|----|------------|
| 1. | 7816618.56 |
| 2  | 7727978.16 |
| 3. | 7756631.36 |
| 4. | 7687383.8  |
| 5. | 7673972.15 |

MB transferred per sec :

|    |          |
|----|----------|
| 1. | 15266.83 |
| 2  | 15093.71 |
| 3. | 15149.67 |
| 4. | 15014.42 |
| 5. | 14988.23 |

#### Stats :

|                                         |             |
|-----------------------------------------|-------------|
| Average Operation per second            | 7705995.77  |
| Minimum Operation per second            | 7673972.15  |
| Maximum Operation per second            | 7756631.36  |
| Standard Deviation Operation per second | 44361.47337 |

|                                   |           |
|-----------------------------------|-----------|
| Average MB transferred per second | 15102.572 |
| Minimum MB transferred per second | 14988.23  |

|                                              |            |
|----------------------------------------------|------------|
| Maximum MB transferred per second            | 15266.83   |
| Standard Deviation MB transferred per second | 111.940068 |

Case 16 : IMG TYPE : qcow2 | CPU : 3 | RAM :2 | MODE : memory | --memory-block-size= 4K

|   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|---|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | <pre> Command: sysbench memory --memory-block-size=4K run Results: 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: 4KiB total size: 102400MiB operation: write scope: global  Initializing worker threads...  Threads started!  Total operations: 26214400 (5623311.92 per second) 102400.00 MiB transferred (21966.06 MiB/sec)  General statistics:     total time: 4.6612s     total number of events: 26214400  Latency (ms):     min: 0.00     avg: 0.00     max: 0.18     95th percentile: 0.00     sum: 3008.29  Threads fairness:     events (avg/stddev): 26214400.0000/0.00     execution time (avg/stddev): 3.0083/0.00 </pre> |
| 2 | <pre> Command: sysbench memory --memory-block-size=4K run Results: 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 </pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

```
Running memory speed test with the following options:
block size: 4KiB
total size: 102400MiB
operation: write
scope: global

Initializing worker threads...

Threads started!

Total operations: 26214400 (5576520.97 per second)
102400.00 MiB transferred (21783.29 MiB/sec)

General statistics:
 total time: 4.7001s
 total number of events: 26214400

Latency (ms):
 min: 0.00
 avg: 0.00
 max: 1.07
 95th percentile: 0.00
 sum: 3029.86

Threads fairness:
 events (avg/stddev): 26214400.0000/0.00
 execution time (avg/stddev): 3.0299/0.00
```

3. Command: sysbench memory --memory-block-size=4K run  
Results:  
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: 4KiB  
total size: 102400MiB  
operation: write  
scope: global  
  
Initializing worker threads...  
  
Threads started!  
  
Total operations: 26214400 (5641249.11 per second)  
102400.00 MiB transferred (22036.13 MiB/sec)

```

General statistics:
 total time: 4.6463s
 total number of events: 26214400

Latency (ms):
 min: 0.00
 avg: 0.00
 max: 0.66
 95th percentile: 0.00
 sum: 3002.51

Threads fairness:
 events (avg/stddev): 26214400.0000/0.00
 execution time (avg/stddev): 3.0025/0.00

```

4.

```

Command: sysbench memory --memory-block-size=4K run
Results:
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: 4KiB
total size: 102400MiB
operation: write
scope: global

Initializing worker threads...

Threads started!

Total operations: 26214400 (5586299.36 per second)
102400.00 MiB transferred (21821.48 MiB/sec)

General statistics:
 total time: 4.6915s
 total number of events: 26214400

Latency (ms):
 min: 0.00
 avg: 0.00
 max: 0.42
 95th percentile: 0.00
 sum: 3024.42

Threads fairness:
 events (avg/stddev): 26214400.0000/0.00
 execution time (avg/stddev): 3.0244/0.00

```

5.

```

Command: sysbench memory --memory-block-size=4K run
Results:

```

```

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: 4KiB
total size: 102400MiB
operation: write
scope: global

Initializing worker threads...

Threads started!

Total operations: 26214400 (5612698.98 per second)
102400.00 MiB transferred (21924.61 MiB/sec)

General statistics:
 total time: 4.6698s
 total number of events: 26214400

Latency (ms):
 min: 0.00
 avg: 0.00
 max: 0.53
 95th percentile: 0.00
 sum: 3013.84

Threads fairness:
 events (avg/stddev): 26214400.0000/0.00
 execution time (avg/stddev): 3.0138/0.00

```

#### Observation :

##### Total Operation per second :

|    |            |
|----|------------|
| 1. | 5623311.92 |
| 2  | 5576520.97 |
| 3. | 5641249.11 |
| 4. | 5586299.36 |
| 5. | 5612698.98 |

##### MB transferred per sec :

|    |          |
|----|----------|
| 1. | 21966.06 |
| 2  | 21783.29 |
| 3. | 22036.13 |
| 4. | 21821.48 |
| 5. | 21924.61 |

Stats :

|                                         |             |
|-----------------------------------------|-------------|
| Average Operation per second            | 5613415.817 |
| Minimum Operation per second            | 5586299.36  |
| Maximum Operation per second            | 5641249.11  |
| Standard Deviation Operation per second | 27481.88762 |

|                                              |           |
|----------------------------------------------|-----------|
| Average MB transferred per second            | 21906.314 |
| Minimum MB transferred per second            | 21783.29  |
| Maximum MB transferred per second            | 22036.13  |
| Standard Deviation MB transferred per second | 103.7885  |

Case 17 : IMG TYPE : qcow2 | CPU : 3 | RAM : 2 | MODE : fileio | --file-test-mode= rndwr | --file-total-size=3G

|   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|---|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | <pre>Command: sysbench fileio --file-test-mode=rndrw --file-total-size=3G run Results: 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, 24MiB each 3GiB 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</pre> |
|---|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

```
Doing random r/w test
Initializing worker threads...

Threads started!

File operations:
 reads/s: 4230.84
 writes/s: 2820.56
 fsyncs/s: 9026.47

Throughput:
 read, MiB/s: 66.11
 written, MiB/s: 44.07

General statistics:
 total time: 30.0077s
 total number of events: 482340

Latency (ms):
 min: 0.00
 avg: 0.06
 max: 3.50
 95th percentile: 0.19
 sum: 29855.98

Threads fairness:
 events (avg/stddev): 482340.0000/0.00
 execution time (avg/stddev): 29.8560/0.00
```

2. Command: sysbench fileio --file-test-mode=rndrw --file-total-size=3G run  
Results:  
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, 24MiB each  
3GiB 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: 4468.79

|                              |                  |
|------------------------------|------------------|
| writes/s:                    | 2979.19          |
| fsyncs/s:                    | 9535.15          |
| <br>Throughput:              |                  |
| read, MiB/s:                 | 69.82            |
| written, MiB/s:              | 46.55            |
| <br>General statistics:      |                  |
| total time:                  | 30.0076s         |
| total number of events:      | 509504           |
| <br>Latency (ms):            |                  |
| min:                         | 0.00             |
| avg:                         | 0.06             |
| max:                         | 4.18             |
| 95th percentile:             | 0.19             |
| sum:                         | 29858.62         |
| <br>Threads fairness:        |                  |
| events (avg/stddev):         | 509504.0000/0.00 |
| execution time (avg/stddev): | 29.8586/0.00     |

**3.**

```
Command: sysbench fileio --file-test-mode=rndrw --file-total-size=3G run
Results:
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, 24MiB each
3GiB 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: 4587.02
 writes/s: 3058.01
 fsyncs/s: 9788.63

Throughput:
 read, MiB/s: 71.67
 written, MiB/s: 47.78

General statistics:
```

```

total time: 30.0060s
total number of events: 522994

Latency (ms):
 min: 0.00
 avg: 0.06
 max: 8.29
 95th percentile: 0.18
 sum: 29851.53

Threads fairness:
 events (avg/stddev): 522994.0000/0.00
 execution time (avg/stddev): 29.8515/0.00

```

4. Command: sysbench fileio --file-test-mode=rndrw --file-total-size=3G run  
 Results:  
 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, 24MiB each  
 3GiB 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: 4478.79
 writes/s: 2985.86
 fsyncs/s: 9556.89

Throughput:
 read, MiB/s: 69.98
 written, MiB/s: 46.65

General statistics:
 total time: 30.0076s
 total number of events: 510656

Latency (ms):
 min: 0.00
 avg: 0.06
 max: 8.25
 95th percentile: 0.19

|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    | <pre> sum: 29837.19  Threads fairness:   events (avg/stddev): 510656.0000/0.00   execution time (avg/stddev): 29.8372/0.00 </pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 5. | <pre> Command: sysbench fileio --file-test-mode=rndrw --file-total-size=3G run Results: 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, 24MiB each 3GiB 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: 4513.12   writes/s: 3008.75   fsyncs/s: 9631.89  Throughput:   read, MiB/s: 70.52   written, MiB/s: 47.01  General statistics:   total time: 30.0053s   total number of events: 514585  Latency (ms):   min: 0.00   avg: 0.06   max: 9.31   95th percentile: 0.19   sum: 29848.91  Threads fairness:   events (avg/stddev): 514585.0000/0.00   execution time (avg/stddev): 29.8489/0.00 </pre> |

Case 18 : IMG TYPE : qcow2 | CPU : 3 | RAM : 2 | MODE : fileio | --file-test-mode=seqwr | --file-total-size=3G

1

```
Command: sysbench fileio --file-test-mode=seqwr --file-total-size=3G run
Results:
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, 24MiB each
3GiB 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 write (creation) test
Initializing worker threads...

Threads started!

File operations:
 reads/s: 0.00
 writes/s: 15007.20
 fsyncs/s: 19213.25

Throughput:
 read, MiB/s: 0.00
 written, MiB/s: 234.49

General statistics:
 total time: 30.0051s
 total number of events: 1026677

Latency (ms):
 min: 0.00
 avg: 0.03
 max: 12.13
 95th percentile: 0.05
 sum: 29771.28

Threads fairness:
 events (avg/stddev): 1026677.0000/0.00
 execution time (avg/stddev): 29.7713/0.00
```

2.

```
Command: sysbench fileio --file-test-mode=seqwr --file-total-size=3G run
Results:
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, 24MiB each
3GiB 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 write (creation) test
Initializing worker threads...

Threads started!

File operations:
 reads/s: 0.00
 writes/s: 14793.77
 fsyncs/s: 18937.76

Throughput:
 read, MiB/s: 0.00
 written, MiB/s: 231.15

General statistics:
 total time: 30.0053s
 total number of events: 1012016

Latency (ms):
 min: 0.00
 avg: 0.03
 max: 20.53
 95th percentile: 0.05
 sum: 29782.61

Threads fairness:
 events (avg/stddev): 1012016.0000/0.00
 execution time (avg/stddev): 29.7826/0.00

```

3. Command: sysbench fileio --file-test-mode=seqwr --file-total-size=3G run  
 Results:  
 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, 24MiB each  
 3GiB 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 write (creation) test
Initializing worker threads...

Threads started!

File operations:
 reads/s: 0.00
 writes/s: 14630.31
 fsyncs/s: 18728.19

Throughput:
 read, MiB/s: 0.00
 written, MiB/s: 228.60

General statistics:
 total time: 30.0057s
 total number of events: 1000834

Latency (ms):
 min: 0.00
 avg: 0.03
 max: 6.44
 95th percentile: 0.05
 sum: 29795.11

Threads fairness:
 events (avg/stddev): 1000834.0000/0.00
 execution time (avg/stddev): 29.7951/0.00
```

4. Command: sysbench fileio --file-test-mode=seqwr --file-total-size=3G run  
Results:  
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, 24MiB each  
3GiB 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 write (creation) test  
Initializing worker threads...

Threads started!

File operations:
 reads/s: 0.00
 writes/s: 15092.47

```

fsyncs/s: 19320.71

Throughput:
 read, MiB/s: 0.00
 written, MiB/s: 235.82

General statistics:
 total time: 30.0042s
 total number of events: 1032429

Latency (ms):
 min: 0.00
 avg: 0.03
 max: 14.74
 95th percentile: 0.05
 sum: 29780.77

Threads fairness:
 events (avg/stddev): 1032429.0000/0.00
 execution time (avg/stddev): 29.7808/0.00

```

5. Command: sysbench fileio --file-test-mode=seqwr --file-total-size=3G run  
Results:  
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, 24MiB each  
3GiB 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 write (creation) test  
Initializing worker threads...

Threads started!

File operations:
 reads/s: 0.00
 writes/s: 14649.94
 fsyncs/s: 18754.39

Throughput:
 read, MiB/s: 0.00
 written, MiB/s: 228.91

General statistics:
 total time: 30.0064s
 total number of events: 1002234

```
Latency (ms):
 min: 0.00
 avg: 0.03
 max: 10.61
 95th percentile: 0.05
 sum: 29794.17

Threads fairness:
 events (avg/stddev): 1002234.0000/0.00
 execution time (avg/stddev): 29.7942/0.00
```

| Case 19 : IMG TYPE : qcow2   CPU : 3   RAM :3   MODE : CPU   --cpu-max-prime=1000 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1                                                                                 | <pre>Command: sysbench cpu --cpu-max-prime=1000 run Results: 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: 1000  Initializing worker threads...  Threads started!  CPU speed:     events per second: 368429.18  General statistics:     total time:                      30.0001s     total number of events:           11053197  Latency (ms):     min:                            0.00     avg:                            0.00     max:                            1.55     95th percentile:                0.00     sum:                           29157.90  Threads fairness:     events (avg/stddev):          11053197.0000/0.00     execution time (avg/stddev):   29.1579/0.00</pre> |
| 2.                                                                                | <pre>Command: sysbench cpu --cpu-max-prime=1000 run Results: sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)  Running the test with following options: Number of threads: 1</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

```
Initializing random number generator from current time

Prime numbers limit: 1000

Initializing worker threads...

Threads started!

CPU speed:
 events per second: 368157.90

General statistics:
 total time: 30.0001s
 total number of events: 11045042

Latency (ms):
 min: 0.00
 avg: 0.00
 max: 0.45
 95th percentile: 0.00
 sum: 29162.22

Threads fairness:
 events (avg/stddev): 11045042.0000/0.00
 execution time (avg/stddev): 29.1622/0.00
```

3.

```
Command: sysbench cpu --cpu-max-prime=1000 run
Results:
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: 1000

Initializing worker threads...

Threads started!

CPU speed:
 events per second: 370442.99

General statistics:
 total time: 30.0001s
 total number of events: 11113520

Latency (ms):
 min: 0.00
 avg: 0.00
 max: 0.51
 95th percentile: 0.00
 sum: 29197.55
```

|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    | <pre>Threads fairness:   events (avg/stddev):           11113520.0000/0.00   execution time (avg/stddev):   29.1975/0.00</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 4. | <pre>Command: sysbench cpu --cpu-max-prime=1000 run Results: 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: 1000  Initializing worker threads...  Threads started!  CPU speed:   events per second: 368597.64  General statistics:   total time:                      30.0001s   total number of events:          11058218  Latency (ms):   min:                            0.00   avg:                            0.00   max:                            0.48   95th percentile:                0.00   sum:                           29178.35  Threads fairness:   events (avg/stddev):           11058218.0000/0.00   execution time (avg/stddev):   29.1783/0.00</pre> |
| 5. | <pre>Command: sysbench cpu --cpu-max-prime=1000 run Results: 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: 1000  Initializing worker threads...  Threads started!  CPU speed:   events per second: 367293.28  General statistics:</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                   |

|                              |                    |
|------------------------------|--------------------|
| total time:                  | 30.0001s           |
| total number of events:      | 11019038           |
| Latency (ms):                |                    |
| min:                         | 0.00               |
| avg:                         | 0.00               |
| max:                         | 0.12               |
| 95th percentile:             | 0.00               |
| sum:                         | 29187.70           |
| Threads fairness:            |                    |
| events (avg/stddev):         | 11019038.0000/0.00 |
| execution time (avg/stddev): | 29.1877/0.00       |

Observation :

Events per second :

|    |           |
|----|-----------|
| 1. | 368429.18 |
| 2  | 368157.9  |
| 3. | 370442.99 |
| 4. | 368597.64 |
| 5. | 367293.28 |

Stats :

|                                                  |             |
|--------------------------------------------------|-------------|
| Average events per second                        | 368777.97   |
| Minimum Number of events per second recorded     | 367293.28   |
| Maximum Number of events per second recorded     | 370442.99   |
| Standard Deviation of events per second recorded | 1582.579367 |

Case 20 : IMG TYPE : qcow2 | CPU : 3 | RAM :3 | MODE : CPU | --cpu-max-prime=20000

|   |                                                                                                                                                                                                                                                                         |
|---|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | <pre>Command: sysbench cpu --cpu-max-prime=20000 run Results: 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: 20000</pre> |
|---|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

```
Initializing worker threads...

Threads started!

CPU speed:
 events per second: 4584.34

General statistics:
 total time: 30.0003s
 total number of events: 137535

Latency (ms):
 min: 0.21
 avg: 0.22
 max: 0.43
 95th percentile: 0.23
 sum: 29972.78

Threads fairness:
 events (avg/stddev): 137535.0000/0.00
 execution time (avg/stddev): 29.9728/0.00
```

2. Command: sysbench cpu --cpu-max-prime=20000 run  
Results:  
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: 20000

Initializing worker threads...

Threads started!

CPU speed:
 events per second: 4576.03

General statistics:
 total time: 30.0002s
 total number of events: 137285

Latency (ms):
 min: 0.21
 avg: 0.22
 max: 1.74
 95th percentile: 0.23
 sum: 29964.19

Threads fairness:
 events (avg/stddev): 137285.0000/0.00
 execution time (avg/stddev): 29.9642/0.00

3.

```
Command: sysbench cpu --cpu-max-prime=20000 run
Results:
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: 20000

Initializing worker threads...

Threads started!

CPU speed:
 events per second: 4588.18

General statistics:
 total time: 30.0003s
 total number of events: 137650

Latency (ms):
 min: 0.21
 avg: 0.22
 max: 0.78
 95th percentile: 0.23
 sum: 29972.09

Threads fairness:
 events (avg/stddev): 137650.0000/0.00
 execution time (avg/stddev): 29.9721/0.00
```

4.

```
Command: sysbench cpu --cpu-max-prime=20000 run
Results:
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: 20000

Initializing worker threads...

Threads started!

CPU speed:
 events per second: 4568.60

General statistics:
 total time: 30.0003s
 total number of events: 137062
```

```

Latency (ms):
 min: 0.21
 avg: 0.22
 max: 0.94
 95th percentile: 0.23
 sum: 29958.36

Threads fairness:
 events (avg/stddev): 137062.0000/0.00
 execution time (avg/stddev): 29.9584/0.00

```

5.

```

Command: sysbench cpu --cpu-max-prime=20000 run
Results:
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: 20000

Initializing worker threads...

Threads started!

CPU speed:
 events per second: 4576.21

General statistics:
 total time: 30.0002s
 total number of events: 137290

Latency (ms):
 min: 0.21
 avg: 0.22
 max: 1.06
 95th percentile: 0.23
 sum: 29963.76

Threads fairness:
 events (avg/stddev): 137290.0000/0.00
 execution time (avg/stddev): 29.9638/0.00

```

#### Observation :

##### Events per second :

|    |         |
|----|---------|
| 1. | 4584.34 |
| 2  | 4576.03 |
| 3. | 4588.18 |

|    |         |
|----|---------|
| 4. | 4568.6  |
| 5. | 4576.21 |

Stats :

|                                                  |          |
|--------------------------------------------------|----------|
| Average events per second                        | 4578.672 |
| Minimum Number of events per second recorded     | 4568.6   |
| Maximum Number of events per second recorded     | 4588.18  |
| Standard Deviation of events per second recorded | 7.698    |

Case 21 : IMG TYPE : qcow2 | CPU : 3 | RAM :3 | MODE : memory |--memory-block-size= 2K

|   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|---|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | <pre>Command: sysbench memory --memory-block-size=2K run Results: 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: 2KiB total size: 102400MiB operation: write scope: global  Initializing worker threads...  Threads started!  Total operations: 52428800 (7648204.02 per second) 102400.00 MiB transferred (14937.90 MiB/sec)  General statistics:   total time: 6.8545s   total number of events: 52428800  Latency (ms):   min: 0.00   avg: 0.00   max: 0.64   95th percentile: 0.00   sum: 3529.74</pre> |
|---|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    | <pre> Threads fairness:   events (avg/stddev):      52428800.0000/0.00   execution time (avg/stddev):  3.5297/0.00 </pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 2. | <pre> Command: sysbench memory --memory-block-size=2K  run Results: 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: 2KiB   total size: 102400MiB   operation: write   scope: global  Initializing worker threads...  Threads started!  Total operations: 52428800 (7675733.39 per second) 102400.00 MiB transferred (14991.67 MiB/sec)  General statistics:   total time:                      6.8300s   total number of events:          52428800  Latency (ms):   min:                            0.00   avg:                            0.00   max:                            0.32   95th percentile:                0.00   sum:                           3528.53  Threads fairness:   events (avg/stddev):      52428800.0000/0.00   execution time (avg/stddev):  3.5285/0.00 </pre> |
| 3. | <pre> Command: sysbench memory --memory-block-size=2K  run Results: 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: 2KiB   total size: 102400MiB   operation: write </pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

```
scope: global

Initializing worker threads...

Threads started!

Total operations: 52428800 (7631600.27 per second)

102400.00 MiB transferred (14905.47 MiB/sec)

General statistics:
 total time: 6.8694s
 total number of events: 52428800

Latency (ms):
 min: 0.00
 avg: 0.00
 max: 2.05
 95th percentile: 0.00
 sum: 3539.69

Threads fairness:
 events (avg/stddev): 52428800.0000/0.00
 execution time (avg/stddev): 3.5397/0.00
```

4. Command: sysbench memory --memory-block-size=2K run  
Results:  
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: 2KiB  
total size: 102400MiB  
operation: write  
scope: global

Initializing worker threads...

Threads started!

Total operations: 52428800 (7705753.68 per second)

102400.00 MiB transferred (15050.30 MiB/sec)

General statistics:
 total time: 6.8032s
 total number of events: 52428800

Latency (ms):
 min: 0.00

|                  |         |
|------------------|---------|
| avg:             | 0.00    |
| max:             | 1.47    |
| 95th percentile: | 0.00    |
| sum:             | 3511.74 |

Threads fairness:

|                              |                    |
|------------------------------|--------------------|
| events (avg/stddev):         | 52428800.0000/0.00 |
| execution time (avg/stddev): | 3.5117/0.00        |

5. Command: sysbench memory --memory-block-size=2K run  
 Results:  
 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: 2KiB  
 total size: 102400MiB  
 operation: write  
 scope: global

Initializing worker threads...

Threads started!

Total operations: 52428800 (7801785.17 per second)  
 102400.00 MiB transferred (15237.86 MiB/sec)

General statistics:

|                         |          |
|-------------------------|----------|
| total time:             | 6.7193s  |
| total number of events: | 52428800 |

Latency (ms):

|                  |         |
|------------------|---------|
| min:             | 0.00    |
| avg:             | 0.00    |
| max:             | 0.40    |
| 95th percentile: | 0.00    |
| sum:             | 3472.30 |

Threads fairness:

|                              |                    |
|------------------------------|--------------------|
| events (avg/stddev):         | 52428800.0000/0.00 |
| execution time (avg/stddev): | 3.4723/0.00        |

#### Observation :

|    | Total Operation per second | MB transferred per second |
|----|----------------------------|---------------------------|
| 1. | 7648204.02                 | 14937.9                   |

|    |            |          |
|----|------------|----------|
| 2  | 7675733.39 | 14991.67 |
| 3. | 7631600.27 | 14905.47 |
| 4. | 7705753.68 | 15050.3  |
| 5. | 7801785.17 | 15237.86 |

Stats :

|                                         |             |
|-----------------------------------------|-------------|
| Average Operation per second            | 7713046.373 |
| Minimum Operation per second            | 7631600.27  |
| Maximum Operation per second            | 7801785.17  |
| Standard Deviation Operation per second | 85326.50572 |

|                                              |             |
|----------------------------------------------|-------------|
| Average MB transferred per second            | 15024.64    |
| Minimum MB transferred per second            | 14905.47    |
| Maximum MB transferred per second            | 15237.86    |
| Standard Deviation MB transferred per second | 131.2759892 |

Case 22 : IMG TYPE : qcow2 | CPU : 3 | RAM :3 | MODE : memory | --memory-block-size= 4K

|   |                                                                                                                                                                                                                                                                                                                                                                                                              |
|---|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | <pre>Command: sysbench memory --memory-block-size=4K run Results: 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: 4KiB total size: 102400MiB operation: write scope: global  Initializing worker threads...</pre> |
|---|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

```
Threads started!

Total operations: 26214400 (5723302.64 per second)

102400.00 MiB transferred (22356.65 MiB/sec)

General statistics:
 total time: 4.5797s
 total number of events: 26214400

Latency (ms):
 min: 0.00
 avg: 0.00
 max: 0.09
 95th percentile: 0.00
 sum: 2964.55

Threads fairness:
 events (avg/stddev): 26214400.0000/0.00
 execution time (avg/stddev): 2.9645/0.00
```

2. Command: sysbench memory --memory-block-size=4K run  
Results:  
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: 4KiB  
total size: 102400MiB  
operation: write  
scope: global

Initializing worker threads...

Threads started!

Total operations: 26214400 (5734501.10 per second)

102400.00 MiB transferred (22400.39 MiB/sec)

General statistics:
 total time: 4.5705s
 total number of events: 26214400

Latency (ms):
 min: 0.00
 avg: 0.00
 max: 0.12
 95th percentile: 0.00
 sum: 2961.40

|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    | <pre> Threads fairness:   events (avg/stddev):      26214400.0000/0.00   execution time (avg/stddev):  2.9614/0.00 </pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 3. | <pre> Command: sysbench memory --memory-block-size=4K run Results: 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: 4KiB   total size: 102400MiB   operation: write   scope: global  Initializing worker threads...  Threads started!  Total operations: 26214400 (5656013.49 per second) 102400.00 MiB transferred (22093.80 MiB/sec)  General statistics:   total time:                      4.6342s   total number of events:          26214400  Latency (ms):   min:                            0.00   avg:                            0.00   max:                            0.06   95th percentile:                0.00   sum:                           2995.68  Threads fairness:   events (avg/stddev):      26214400.0000/0.00   execution time (avg/stddev):  2.9957/0.00 </pre> |
| 4. | <pre> Command: sysbench memory --memory-block-size=4K run Results: 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: 4KiB   total size: 102400MiB </pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

```
operation: write
scope: global

Initializing worker threads...

Threads started!

Total operations: 26214400 (5623193.86 per second)
102400.00 MiB transferred (21965.60 MiB/sec)

General statistics:
 total time: 4.6612s
 total number of events: 26214400

Latency (ms):
 min: 0.00
 avg: 0.00
 max: 0.91
 95th percentile: 0.00
 sum: 3009.95

Threads fairness:
 events (avg/stddev): 26214400.0000/0.00
 execution time (avg/stddev): 3.0100/0.00
```

5. Command: sysbench memory --memory-block-size=4K run  
Results:  
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: 4KiB  
total size: 102400MiB  
operation: write  
scope: global

Initializing worker threads...

Threads started!

Total operations: 26214400 (5625882.03 per second)
102400.00 MiB transferred (21976.10 MiB/sec)

General statistics:
 total time: 4.6588s
 total number of events: 26214400

Latency (ms):

|  |                                                                                                            |
|--|------------------------------------------------------------------------------------------------------------|
|  | min: 0.00<br>avg: 0.00<br>max: 0.37<br>95th percentile: 0.00<br>sum: 3013.62                               |
|  | Threads fairness:<br>events (avg/stddev) : 26214400.0000/0.00<br>execution time (avg/stddev) : 3.0136/0.00 |

Observation :

|    | Total Operation per second | MB transferred per second |
|----|----------------------------|---------------------------|
| 1. | 5723302.64                 | 22356.65                  |
| 2  | 5734501.1                  | 22400.39                  |
| 3. | 5656013.49                 | 22093.8                   |
| 4. | 5623193.86                 | 21965.6                   |
| 5. | 5625882.03                 | 21976.1                   |

Stats :

|                                         |             |
|-----------------------------------------|-------------|
| Average Operation per second            | 5672578.624 |
| Minimum Operation per second            | 5623193.86  |
| Maximum Operation per second            | 5734501.1   |
| Standard Deviation Operation per second | 53153.43    |

|                                              |           |
|----------------------------------------------|-----------|
| Average MB transferred per second            | 22158.508 |
| Minimum MB transferred per second            | 21965.6   |
| Maximum MB transferred per second            | 22400.39  |
| Standard Deviation MB transferred per second | 207.63    |

|                                                                                                                |
|----------------------------------------------------------------------------------------------------------------|
| Case 23 : IMG TYPE : qcow2   CPU : 3   RAM :3   MODE : fileio   --file-test-mode= rndwr   --file-total-size=3G |
|----------------------------------------------------------------------------------------------------------------|

1

```
Command: sysbench fileio --file-test-mode=rndrw --file-total-size=3G run
Results:
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, 24MiB each
3GiB 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: 5168.84
 writes/s: 3445.89
 fsyncs/s: 11029.82

Throughput:
 read, MiB/s: 80.76
 written, MiB/s: 53.84

General statistics:
 total time: 30.0062s
 total number of events: 589341

Latency (ms):
 min: 0.00
 avg: 0.05
 max: 8.30
 95th percentile: 0.18
 sum: 29866.10

Threads fairness:
 events (avg/stddev): 589341.0000/0.00
 execution time (avg/stddev): 29.8661/0.00
```

2.

```
Command: sysbench fileio --file-test-mode=rndrw --file-total-size=3G run
Results:
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, 24MiB each
3GiB 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: 5480.41
 writes/s: 3653.61
 fsyncs/s: 11693.37

Throughput:
 read, MiB/s: 85.63
 written, MiB/s: 57.09

General statistics:
 total time: 30.0082s
 total number of events: 624875

Latency (ms):
 min: 0.00
 avg: 0.05
 max: 7.91
 95th percentile: 0.17
 sum: 29854.29

Threads fairness:
 events (avg/stddev): 624875.0000/0.00
 execution time (avg/stddev): 29.8543/0.00

```

3. Command: sysbench fileio --file-test-mode=rndrw --file-total-size=3G run  
 Results:  
 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, 24MiB each
3GiB 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:                      5623.05
    writes/s:                     3748.69
    fsyncs/s:                      11998.91

Throughput:
    read, MiB/s:                  87.86
    written, MiB/s:                58.57

General statistics:
    total time:                   30.0076s
    total number of events:        641164

Latency (ms):
    min:                           0.00
    avg:                           0.05
    max:                           9.70
    95th percentile:                 0.14
    sum:                          29858.14

Threads fairness:
    events (avg/stddev):          641164.0000/0.00
    execution time (avg/stddev):   29.8581/0.00
```

4. Command: sysbench fileio --file-test-mode=rndrw --file-total-size=3G run
Results:
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, 24MiB each
3GiB 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:          5772.46
  writes/s:         3848.31
  fsyncs/s:        12316.51

Throughput:
  read, MiB/s:      90.19
  written, MiB/s:   60.13

General statistics:
  total time:       30.0075s
  total number of events: 658166

Latency (ms):
  min:              0.00
  avg:              0.05
  max:              8.24
  95th percentile: 0.14
  sum:             29840.52

Threads fairness:
  events (avg/stddev): 658166.0000/0.00
  execution time (avg/stddev): 29.8405/0.00

```

5. Command: sysbench fileio --file-test-mode=rndrw --file-total-size=3G run
Results:
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, 24MiB each
3GiB 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: 5476.59
 writes/s: 3651.06
 fsyncs/s: 11685.19

Throughput:
 read, MiB/s: 85.57
 written, MiB/s: 57.05

```

General statistics:
    total time:                      30.0071s
    total number of events:           624418

Latency (ms):
    min:                            0.00
    avg:                            0.05
    max:                            5.66
    95th percentile:                0.14
    sum:                           29830.01

Threads fairness:
    events (avg/stddev):          624418.0000/0.00
    execution time (avg/stddev):  29.8300/0.00

```

Case 24 : IMG TYPE : qcow2 | CPU : 3 | RAM :3 | MODE : fileio | --file-test-mode= seqwr | --file-total-size=3G

```

1   Command: sysbench fileio --file-test-mode=seqwr --file-total-size=3G run
Results:
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, 24MiB each
3GiB 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 write (creation) test
Initializing worker threads...

Threads started!

File operations:
    reads/s:                      0.00
    writes/s:                     14307.07
    fsyncs/s:                     18313.85

Throughput:
    read, MiB/s:                  0.00
    written, MiB/s:                223.55

General statistics:
    total time:                   30.0056s

```

```

total number of events: 978700

Latency (ms):
    min: 0.00
    avg: 0.03
    max: 10.06
    95th percentile: 0.05
    sum: 29759.94

Threads fairness:
    events (avg/stddev): 978700.0000/0.00
    execution time (avg/stddev): 29.7599/0.00

```

2. Command: sysbench fileio --file-test-mode=seqwr --file-total-size=3G run
Results:
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, 24MiB each
3GiB 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 write (creation) test
Initializing worker threads...

Threads started!

File operations:
 reads/s: 0.00
 writes/s: 15392.99
 fsyncs/s: 19703.03

Throughput:
 read, MiB/s: 0.00
 written, MiB/s: 240.52

General statistics:
 total time: 30.0066s
 total number of events: 1053004

Latency (ms):
 min: 0.00
 avg: 0.03
 max: 6.52
 95th percentile: 0.05
 sum: 29799.29

Threads fairness:

	<pre> events (avg/stddev): 1053004.0000/0.00 execution time (avg/stddev): 29.7993/0.00 </pre>
3.	<pre> Command: sysbench fileio --file-test-mode=seqwr --file-total-size=3G run Results: 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, 24MiB each 3GiB 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 write (creation) test Initializing worker threads... Threads started! File operations: reads/s: 0.00 writes/s: 14993.87 fsyncs/s: 19194.82 Throughput: read, MiB/s: 0.00 written, MiB/s: 234.28 General statistics: total time: 30.0051s total number of events: 1025724 Latency (ms): min: 0.00 avg: 0.03 max: 10.36 95th percentile: 0.05 sum: 29796.02 Threads fairness: events (avg/stddev): 1025724.0000/0.00 execution time (avg/stddev): 29.7960/0.00 </pre>
4.	<pre> Command: sysbench fileio --file-test-mode=seqwr --file-total-size=3G run Results: 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 </pre>

```

Extra file open flags: (none)
128 files, 24MiB each
3GiB 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 write (creation) test
Initializing worker threads...

Threads started!

File operations:
  reads/s:                      0.00
  writes/s:                     15404.51
  fsyncs/s:                      19719.27

Throughput:
  read, MiB/s:                  0.00
  written, MiB/s:                240.70

General statistics:
  total time:                   30.0037s
  total number of events:        1053733

Latency (ms):
  min:                           0.00
  avg:                           0.03
  max:                           13.15
  95th percentile:               0.05
  sum:                           29792.35

Threads fairness:
  events (avg/stddev):          1053733.0000/0.00
  execution time (avg/stddev):   29.7923/0.00

```

5. Command: sysbench fileio --file-test-mode=seqwr --file-total-size=3G run
 Results:
 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, 24MiB each
3GiB 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 write (creation) test

```

```

Initializing worker threads...

Threads started!

File operations:
 reads/s: 0.00
 writes/s: 15745.12
 fsyncs/s: 20157.68

Throughput:
 read, MiB/s: 0.00
 written, MiB/s: 246.02

General statistics:
 total time: 30.0088s
 total number of events: 1077290

Latency (ms):
 min: 0.00
 avg: 0.03
 max: 6.70
 95th percentile: 0.05
 sum: 29800.80

Threads fairness:
 events (avg/stddev): 1077290.0000/0.00
 execution time (avg/stddev): 29.8008/0.00

```

\*\*\*\*\*  
**RAW**

**Case 25 : IMG TYPE : raw | CPU : 2 | RAM : 2 | MODE : CPU | --cpu-max-prime=1000**

|   |                                                                                                                                                                                                                                                                                                                                       |
|---|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | <pre> Command: sysbench cpu --cpu-max-prime=1000 run Results: 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: 1000  Initializing worker threads...  Threads started!  CPU speed: </pre> |
|---|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

```

events per second: 363840.57

General statistics:
 total time: 30.0001s
 total number of events: 10915459

Latency (ms):
 min: 0.00
 avg: 0.00
 max: 1.93
 95th percentile: 0.00
 sum: 29102.80

Threads fairness:
 events (avg/stddev): 10915459.0000/0.00
 execution time (avg/stddev): 29.1028/0.00

```

2.

```

Command: sysbench cpu --cpu-max-prime=1000 run
Results:
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: 1000

Initializing worker threads...

Threads started!

CPU speed:
 events per second: 358745.15

General statistics:
 total time: 30.0001s
 total number of events: 10762626

Latency (ms):
 min: 0.00
 avg: 0.00
 max: 2.15
 95th percentile: 0.00
 sum: 29056.88

Threads fairness:
 events (avg/stddev): 10762626.0000/0.00
 execution time (avg/stddev): 29.0569/0.00

```

3.

```

Command: sysbench cpu --cpu-max-prime=1000 run
Results:
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: 1000

Initializing worker threads...

Threads started!

CPU speed:
 events per second: 359955.46

General statistics:
 total time: 30.0001s
 total number of events: 10798905

Latency (ms):
 min: 0.00
 avg: 0.00
 max: 1.43
 95th percentile: 0.00
 sum: 29060.33

Threads fairness:
 events (avg/stddev): 10798905.0000/0.00
 execution time (avg/stddev): 29.0603/0.00
```

4.

```
Command: sysbench cpu --cpu-max-prime=1000 run
Results:
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: 1000

Initializing worker threads...

Threads started!

CPU speed:
 events per second: 362737.50

General statistics:
 total time: 30.0001s
 total number of events: 10882372

Latency (ms):
 min: 0.00
 avg: 0.00
 max: 0.87
 95th percentile: 0.00
 sum: 29099.62
```

|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    | <pre>Threads fairness:   events (avg/stddev) : 10882372.0000/0.00   execution time (avg/stddev) : 29.0996/0.00</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 5. | <pre>Command: sysbench cpu --cpu-max-prime=1000 run Results: 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: 1000  Initializing worker threads...  Threads started!  CPU speed:   events per second: 361073.88  General statistics:   total time: 30.0001s   total number of events: 10832429  Latency (ms):   min: 0.00   avg: 0.00   max: 0.12   95th percentile: 0.00   sum: 29074.44  Threads fairness:   events (avg/stddev) : 10832429.0000/0.00   execution time (avg/stddev) : 29.0744/0.00</pre> |

Observation :

Events per second :

|    |           |
|----|-----------|
| 1. | 363840.57 |
| 2  | 358745.15 |
| 3. | 359955.46 |
| 4. | 362737.5  |
| 5. | 361073.88 |

Stats :

|                                                  |             |
|--------------------------------------------------|-------------|
| Average events per second                        | 361255.6133 |
| Minimum Number of events per second recorded     | 359955.46   |
| Maximum Number of events per second recorded     | 362737.5    |
| Standard Deviation of events per second recorded | 1399.895315 |

#### Case 26 : IMG TYPE : raw | CPU : 2 | RAM : 2 | MODE : CPU | --cpu-max-prime=20000

|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1  | <pre> Command: sysbench cpu --cpu-max-prime=20000 run Results: 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: 20000  Initializing worker threads...  Threads started!  CPU speed: events per second: 4497.63  General statistics: total time: 30.00003s total number of events: 134933  Latency (ms): min: 0.21 avg: 0.22 max: 1.13 95th percentile: 0.25 sum: 29927.01  Threads fairness: events (avg/stddev): 134933.0000/0.00 execution time (avg/stddev): 29.9270/0.00 </pre> |
| 2. | <pre> Command: sysbench cpu --cpu-max-prime=20000 run Results: 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 </pre>                                                                                                                                                                                                                                                                                                                                                                                    |

```
Prime numbers limit: 20000

Initializing worker threads...

Threads started!

CPU speed:
 events per second: 4516.59

General statistics:
 total time: 30.00001s
 total number of events: 135501

Latency (ms):
 min: 0.21
 avg: 0.22
 max: 2.08
 95th percentile: 0.24
 sum: 29931.71

Threads fairness:
 events (avg/stddev): 135501.0000/0.00
 execution time (avg/stddev): 29.9317/0.00
```

3. Command: sysbench cpu --cpu-max-prime=20000 run  
Results:  
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: 20000

Initializing worker threads...

Threads started!

CPU speed:
 events per second: 4509.67

General statistics:
 total time: 30.0003s
 total number of events: 135294

Latency (ms):
 min: 0.21
 avg: 0.22
 max: 2.85
 95th percentile: 0.24
 sum: 29925.53

Threads fairness:
 events (avg/stddev): 135294.0000/0.00
```

|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    | <pre>execution time (avg/stddev) : 29.9255/0.00</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 4. | <pre>Command: sysbench cpu --cpu-max-prime=20000 run Results: 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: 20000  Initializing worker threads...  Threads started!  CPU speed:   events per second: 4471.79  General statistics:   total time: 30.0003s   total number of events: 134158  Latency (ms):   min: 0.21   avg: 0.22   max: 5.36   95th percentile: 0.24   sum: 29927.00  Threads fairness:   events (avg/stddev) : 134158.0000/0.00   execution time (avg/stddev) : 29.9270/0.00</pre> |
| 5. | <pre>Command: sysbench cpu --cpu-max-prime=20000 run Results: 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: 20000  Initializing worker threads...  Threads started!  CPU speed:   events per second: 4502.82  General statistics:</pre>                                                                                                                                                                                                                                                             |

|                              |                  |
|------------------------------|------------------|
| total time:                  | 30.0003s         |
| total number of events:      | 135089           |
| Latency (ms):                |                  |
| min:                         | 0.21             |
| avg:                         | 0.22             |
| max:                         | 3.65             |
| 95th percentile:             | 0.24             |
| sum:                         | 29929.60         |
| Threads fairness:            |                  |
| events (avg/stddev):         | 135089.0000/0.00 |
| execution time (avg/stddev): | 29.9296/0.00     |

### Observation :

#### Events per second :

|    |         |
|----|---------|
| 1. | 4497.63 |
| 2  | 4516.59 |
| 3. | 4509.67 |
| 4. | 4471.79 |
| 5. | 4502.82 |

#### Stats :

|                                                  |             |
|--------------------------------------------------|-------------|
| Average events per second                        | 4499.7      |
| Minimum Number of events per second recorded     | 4471.79     |
| Maximum Number of events per second recorded     | 4516.59     |
| Standard Deviation of events per second recorded | 17.15852849 |

Case 27 : IMG TYPE : raw | CPU : 2 | RAM : 2 | MODE : memory |--memory-block-size= 2K

|   |                                                                                                                                                                                     |
|---|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)<br><br>Running the test with following options:<br>Number of threads: 1<br>Initializing random number generator from current time |
|---|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

```
Running memory speed test with the following options:
block size: 2KiB
total size: 102400MiB
operation: write
scope: global

Initializing worker threads...

Threads started!

Total operations: 52428800 (7734383.33 per second)
102400.00 MiB transferred (15106.22 MiB/sec)

General statistics:
 total time: 6.7781s
 total number of events: 52428800

Latency (ms):
 min: 0.00
 avg: 0.00
 max: 1.23
 95th percentile: 0.00
 sum: 3502.80

Threads fairness:
 events (avg/stddev): 52428800.0000/0.00
 execution time (avg/stddev): 3.5028/0.00
```

2. 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: 2KiB
total size: 102400MiB
operation: write
scope: global

Initializing worker threads...

Threads started!

Total operations: 52428800 (7672363.42 per second)
102400.00 MiB transferred (14985.08 MiB/sec)

General statistics:
 total time: 6.8327s
 total number of events: 52428800
```

|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    | <pre> Latency (ms):     min:                      0.00     avg:                      0.00     max:                      0.34     95th percentile:          0.00     sum:                     3511.81  Threads fairness:     events (avg/stddev):   52428800.0000/0.00     execution time (avg/stddev): 3.5118/0.00 </pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 3. | <pre> 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: 2KiB total size: 102400MiB operation: write scope: global  Initializing worker threads...  Threads started!  Total operations: 52428800 (7705763.44 per second) 102400.00 MiB transferred (15050.32 MiB/sec)  General statistics:     total time:                 6.8032s     total number of events:    52428800  Latency (ms):     min:                      0.00     avg:                      0.00     max:                      0.09     95th percentile:          0.00     sum:                     3509.62  Threads fairness:     events (avg/stddev):   52428800.0000/0.00     execution time (avg/stddev): 3.5096/0.00 </pre> |
| 4. | <pre> 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: </pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

```
block size: 2KiB
total size: 102400MiB
operation: write
scope: global

Initializing worker threads...

Threads started!

Total operations: 52428800 (7717272.01 per second)
102400.00 MiB transferred (15072.80 MiB/sec)

General statistics:
 total time: 6.7929s
 total number of events: 52428800

Latency (ms):
 min: 0.00
 avg: 0.00
 max: 0.06
 95th percentile: 0.00
 sum: 3508.56

Threads fairness:
 events (avg/stddev): 52428800.0000/0.00
 execution time (avg/stddev): 3.5086/0.00
```

5. 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: 2KiB
total size: 102400MiB
operation: write
scope: global

Initializing worker threads...

Threads started!

Total operations: 52428800 (7779469.02 per second)
102400.00 MiB transferred (15194.28 MiB/sec)

General statistics:
 total time: 6.7388s
 total number of events: 52428800

Latency (ms):
```

|  |                                                                                                            |
|--|------------------------------------------------------------------------------------------------------------|
|  | min: 0.00<br>avg: 0.00<br>max: 0.09<br>95th percentile: 0.00<br>sum: 3483.35                               |
|  | Threads fairness:<br>events (avg/stddev) : 52428800.0000/0.00<br>execution time (avg/stddev) : 3.4834/0.00 |

Observation :

|    | Total Operation per second | MB transferred per second |
|----|----------------------------|---------------------------|
| 1. | 7734383.33                 | 15106.22                  |
| 2  | 7672363.42                 | 14985.08                  |
| 3. | 7705763.44                 | 15050.32                  |
| 4. | 7717272.01                 | 15072.8                   |
| 5. | 7779469.02                 | 15194.28                  |

Stats :

|                                         |             |
|-----------------------------------------|-------------|
| Average Operation per second            | 7734168.157 |
| Minimum Operation per second            | 7705763.44  |
| Maximum Operation per second            | 7779469.02  |
| Standard Deviation Operation per second | 39651.45596 |

|                                              |             |
|----------------------------------------------|-------------|
| Average MB transferred per second            | 15081.74    |
| Minimum MB transferred per second            | 14985.08    |
| Maximum MB transferred per second            | 15194.28    |
| Standard Deviation MB transferred per second | 76.93311641 |

Case 28 : IMG TYPE : raw | CPU : 2 | RAM :2 | MODE : memory | --memory-block-size= 4K

1 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: 4KiB

total size: 102400MiB

operation: write

scope: global

Initializing worker threads...

Threads started!

Total operations: 26214400 (5612253.61 per second)

102400.00 MiB transferred (21922.87 MiB/sec)

General statistics:

|                         |          |
|-------------------------|----------|
| total time:             | 4.6703s  |
| total number of events: | 26214400 |

Latency (ms):

|                  |         |
|------------------|---------|
| min:             | 0.00    |
| avg:             | 0.00    |
| max:             | 0.07    |
| 95th percentile: | 0.00    |
| sum:             | 3016.24 |

Threads fairness:

|                              |                    |
|------------------------------|--------------------|
| events (avg/stddev):         | 26214400.0000/0.00 |
| execution time (avg/stddev): | 3.0162/0.00        |

2. 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: 4KiB

total size: 102400MiB

operation: write

scope: global

Initializing worker threads...

Threads started!

```
Total operations: 26214400 (5617138.50 per second)
102400.00 MiB transferred (21941.95 MiB/sec)

General statistics:
 total time: 4.6662s
 total number of events: 26214400

Latency (ms):
 min: 0.00
 avg: 0.00
 max: 0.08
 95th percentile: 0.00
 sum: 3014.23

Threads fairness:
 events (avg/stddev): 26214400.0000/0.00
 execution time (avg/stddev): 3.0142/0.00
```

3. 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: 4KiB
total size: 102400MiB
operation: write
scope: global

Initializing worker threads...

Threads started!

Total operations: 26214400 (5604702.37 per second)
102400.00 MiB transferred (21893.37 MiB/sec)

General statistics:
 total time: 4.6767s
 total number of events: 26214400

Latency (ms):
 min: 0.00
 avg: 0.00
 max: 0.12
 95th percentile: 0.00
 sum: 3021.00

Threads fairness:
 events (avg/stddev): 26214400.0000/0.00
```

|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    | <pre>execution time (avg/stddev) : 3.0210/0.00</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 4. | <pre>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: 4KiB total size: 102400MiB operation: write scope: global  Initializing worker threads...  Threads started!  Total operations: 26214400 (5569198.07 per second) 102400.00 MiB transferred (21754.68 MiB/sec)  General statistics:     total time: 4.7065s     total number of events: 26214400  Latency (ms):     min: 0.00     avg: 0.00     max: 0.07     95th percentile: 0.00     sum: 3035.21  Threads fairness:     events (avg/stddev) : 26214400.0000/0.00     execution time (avg/stddev) : 3.0352/0.00</pre> |
| 5. | <pre>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: 4KiB total size: 102400MiB operation: write scope: global  Initializing worker threads...  Threads started!</pre>                                                                                                                                                                                                                                                                                                                                                                                                      |

```

Total operations: 26214400 (5611871.85 per second)
102400.00 MiB transferred (21921.37 MiB/sec)

General statistics:
total time: 4.6708s
total number of events: 26214400

Latency (ms):
min: 0.00
avg: 0.00
max: 0.08
95th percentile: 0.00
sum: 3017.23

Threads fairness:
events (avg/stddev): 26214400.0000/0.00
execution time (avg/stddev): 3.0172/0.00

```

#### Observation :

|    | Total Operation per second | MB transferred per second |  |
|----|----------------------------|---------------------------|--|
| 1. | 5612253.61                 | 21922.87                  |  |
| 2  | 5617138.5                  | 21941.95                  |  |
| 3. | 5604702.37                 | 21893.37                  |  |
| 4. | 5569198.07                 | 21754.68                  |  |
| 5. | 5611871.85                 | 21921.37                  |  |

Stats :

|                                         |             |
|-----------------------------------------|-------------|
| Average Operation per second            | 5603032.88  |
| Minimum Operation per second            | 5569198.07  |
| Maximum Operation per second            | 5617138.5   |
| Standard Deviation Operation per second | 19427.42477 |

|                                              |             |
|----------------------------------------------|-------------|
| Average MB transferred per second            | 21886.848   |
| Minimum MB transferred per second            | 21754.68    |
| Maximum MB transferred per second            | 21941.95    |
| Standard Deviation MB transferred per second | 75.88889919 |

Case 29 : IMG TYPE :raw | CPU : 2 | RAM : 2 | MODE : fileio | --file-test-mode= rndwr | --file-total-size=3G

1

```
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, 24MiB each
3GiB 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: 4704.72
 writes/s: 3136.48
 fsyncs/s: 10037.97

Throughput:
 read, MiB/s: 73.51
 written, MiB/s: 49.01

General statistics:
 total time: 30.0076s
 total number of events: 536393

Latency (ms):
 min: 0.00
 avg: 0.06
 max: 4.07
 95th percentile: 0.18
 sum: 29876.87

Threads fairness:
 events (avg/stddev): 536393.0000/0.00
 execution time (avg/stddev): 29.8769/0.00
```

2.

```
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, 24MiB each
3GiB 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: 4783.21
 writes/s: 3188.81
 fsyncs/s: 10207.04

Throughput:
 read, MiB/s: 74.74
 written, MiB/s: 49.83

General statistics:
 total time: 30.0045s
 total number of events: 545334

Latency (ms):
 min: 0.00
 avg: 0.05
 max: 7.31
 95th percentile: 0.18
 sum: 29867.93

Threads fairness:
 events (avg/stddev): 545334.0000/0.00
 execution time (avg/stddev): 29.8679/0.00
```

3. 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, 24MiB each
3GiB 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: 4900.88
 writes/s: 3267.25
 fsyncs/s: 10457.90

Throughput:
 read, MiB/s: 76.58
 written, MiB/s: 51.05

General statistics:
 total time: 30.0064s
 total number of events: 558781

Latency (ms):
 min: 0.00
 avg: 0.05
 max: 6.78
 95th percentile: 0.18
 sum: 29863.58

Threads fairness:
 events (avg/stddev): 558781.0000/0.00
 execution time (avg/stddev): 29.8636/0.00
```

4.

```
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, 24MiB each
3GiB 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: 5057.50
writes/s: 3371.67
fsyncs/s: 10792.32

Throughput:
 read, MiB/s: 79.02
 written, MiB/s: 52.68

General statistics:
 total time: 30.0060s
 total number of events: 576642

Latency (ms):
 min: 0.00
 avg: 0.05
 max: 9.55
 95th percentile: 0.17
 sum: 29861.56

Threads fairness:
 events (avg/stddev): 576642.0000/0.00
 execution time (avg/stddev): 29.8616/0.00
```

5. 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, 24MiB each

3GiB 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:  | 5248.48  |
| writes/s: | 3498.98  |
| fsyncs/s: | 11197.62 |

Throughput:

|                 |       |
|-----------------|-------|
| read, MiB/s:    | 82.01 |
| written, MiB/s: | 54.67 |

General statistics:

|             |          |
|-------------|----------|
| total time: | 30.0082s |
|-------------|----------|

|  |                                           |
|--|-------------------------------------------|
|  | total number of events: 598398            |
|  | Latency (ms) :                            |
|  | min: 0.00                                 |
|  | avg: 0.05                                 |
|  | max: 7.26                                 |
|  | 95th percentile: 0.17                     |
|  | sum: 29854.43                             |
|  | Threads fairness:                         |
|  | events (avg/stddev): 598398.0000/0.00     |
|  | execution time (avg/stddev): 29.8544/0.00 |

Observation :

|        | Throughput (MB/Sec) |             | File Operations (operation/sec) |             |             |
|--------|---------------------|-------------|---------------------------------|-------------|-------------|
|        | read                | write       | reads/sec                       | writes/sec  | fsync/sec   |
| 1.     | 73.51               | 49.01       | 4704.72                         | 3126.48     | 10037.97    |
| 2.     | 74.74               | 49.83       | 4783.21                         | 3188.81     | 10207.04    |
| 3      | 76.58               | 51.05       | 4900.88                         | 3267.25     | 10457.9     |
| 4.     | 79.02               | 52.68       | 5057.5                          | 3371.67     | 10792.32    |
| 5.     | 82.01               | 54.67       | 5248.48                         | 3498.98     | 11197.62    |
| Avg    | 77.172              | 51.448      | 4938.958                        | 3290.638    | 10538.57    |
| Min    | 73.51               | 49.01       | 4704.72                         | 3126.48     | 10037.97    |
| Max    | 82.01               | 54.67       | 5248.48                         | 3498.98     | 11197.62    |
| stddev | 3.409423705         | 2.270422868 | 218.1919387                     | 148.1860006 | 465.2300815 |

|                                                                                                             |                                                                                                                                                                                     |
|-------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Case 30 : IMG TYPE :raw  CPU : 2   RAM : 2   MODE : fileio   --file-test-mode= rndwr   --file-total-size=3G |                                                                                                                                                                                     |
| 1                                                                                                           | sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)<br><br>Running the test with following options:<br>Number of threads: 1<br>Initializing random number generator from current time |

```
Extra file open flags: (none)
128 files, 24MiB each
3GiB 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 write (creation) test
Initializing worker threads...

Threads started!

File operations:
 reads/s: 0.00
 writes/s: 15590.15
 fsyncs/s: 19958.89

Throughput:
 read, MiB/s: 0.00
 written, MiB/s: 243.60

General statistics:
 total time: 30.0056s
 total number of events: 1066561

Latency (ms):
 min: 0.00
 avg: 0.03
 max: 4.99
 95th percentile: 0.05
 sum: 29798.32

Threads fairness:
 events (avg/stddev): 1066561.0000/0.00
 execution time (avg/stddev): 29.7983/0.00
```

2.

```
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, 24MiB each
3GiB 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 write (creation) test
Initializing worker threads...
```

```
Threads started!

File operations:
 reads/s: 0.00
 writes/s: 16053.44
 fsyncs/s: 20548.47

Throughput:
 read, MiB/s: 0.00
 written, MiB/s: 250.83

General statistics:
 total time: 30.0055s
 total number of events: 1098150

Latency (ms):
 min: 0.00
 avg: 0.03
 max: 5.29
 95th percentile: 0.05
 sum: 29801.10

Threads fairness:
 events (avg/stddev): 1098150.0000/0.00
 execution time (avg/stddev): 29.8011/0.00
```

3. 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, 24MiB each  
3GiB 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 write (creation) test  
Initializing worker threads...

Threads started!

File operations:
 reads/s: 0.00
 writes/s: 16690.12
 fsyncs/s: 21364.48

Throughput:
 read, MiB/s: 0.00
 written, MiB/s: 260.78

```
General statistics:
 total time: 30.0053s
 total number of events: 1141730

Latency (ms):
 min: 0.00
 avg: 0.03
 max: 9.30
 95th percentile: 0.05
 sum: 29785.84

Threads fairness:
 events (avg/stddev): 1141730.0000/0.00
 execution time (avg/stddev): 29.7858/0.00
```

#### 4. 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, 24MiB each
3GiB 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 write (creation) test
Initializing worker threads...

Threads started!
```

```
File operations:
 reads/s: 0.00
 writes/s: 16756.69
 fsyncs/s: 21448.72

Throughput:
 read, MiB/s: 0.00
 written, MiB/s: 261.82

General statistics:
 total time: 30.0054s
 total number of events: 1146261
```

```
Latency (ms):
 min: 0.00
 avg: 0.03
 max: 5.93
 95th percentile: 0.04
 sum: 29791.27
```

```
Threads fairness:
```

|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    | <pre> events (avg/stddev):      1146261.0000/0.00 execution time (avg/stddev): 29.7913/0.00 </pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 5. | <pre> 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, 24MiB each 3GiB 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 write (creation) test Initializing worker threads...  Threads started!  File operations:   reads/s:                      0.00   writes/s:                     16563.23   fsyncs/s:                      21203.60  Throughput:   read, MiB/s:                  0.00   written, MiB/s:                258.80  General statistics:   total time:                   30.0058s   total number of events:        1133112  Latency (ms):   min:                           0.00   avg:                           0.03   max:                           6.62   95th percentile:               0.04   sum:                           29799.29  Threads fairness:   events (avg/stddev):          1133112.0000/0.00   execution time (avg/stddev):   29.7993/0.00 </pre> |

#### Observations :

|    | Throughput (MB/Sec) |       | File Operations (operation/sec) |            |           |
|----|---------------------|-------|---------------------------------|------------|-----------|
|    | read                | write | reads/sec                       | writes/sec | fsync/sec |
| 1. | 0                   | 243.6 | 0                               | 15590.15   | 19958.89  |

|        |   |             |   |             |            |
|--------|---|-------------|---|-------------|------------|
| 2.     | 0 | 250.83      | 0 | 16053.44    | 20548.47   |
| 3      | 0 | 260.78      | 0 | 16690.12    | 21364.48   |
| 4.     | 0 | 261.82      | 0 | 16756.69    | 21448.72   |
| 5.     | 0 | 258.8       | 0 | 16563.23    | 21203.6    |
| Avg    | 0 | 254.2575    | 0 | 16330.726   | 20904.832  |
| Min    | 0 | 243.6       | 0 | 15590.15    | 19958.89   |
| Max    | 0 | 261.82      | 0 | 16756.69    | 21448.72   |
| stddev | 0 | 8.661494771 | 0 | 497.4956844 | 636.033195 |

| Case 31 : IMG TYPE : raw   CPU : 2   RAM :3   MODE :CPU   --cpu-max-prime=1000 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|--------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1                                                                              | <pre>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: 1000  Initializing worker threads...  Threads started!  CPU speed:     events per second: 367493.95  General statistics:     total time:                      30.00001s     total number of events:           11025087  Latency (ms):     min:                            0.00     avg:                            0.00     max:                            1.53     95th percentile:                0.00     sum:                           29165.06  Threads fairness:     events (avg/stddev):          11025087.0000/0.00     execution time (avg/stddev):   29.1651/0.00</pre> |
| 2.                                                                             | <pre>sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)  Running the test with following options:</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

```
Number of threads: 1
Initializing random number generator from current time

Prime numbers limit: 1000

Initializing worker threads...

Threads started!

CPU speed:
 events per second: 359752.57

General statistics:
 total time: 30.0001s
 total number of events: 10792907

Latency (ms):
 min: 0.00
 avg: 0.00
 max: 1.45
 95th percentile: 0.00
 sum: 29074.89

Threads fairness:
 events (avg/stddev): 10792907.0000/0.00
 execution time (avg/stddev): 29.0749/0.00
```

3. 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: 1000

Initializing worker threads...

Threads started!

CPU speed:
 events per second: 366510.78

General statistics:
 total time: 30.0001s
 total number of events: 10995681

Latency (ms):
 min: 0.00
 avg: 0.00
 max: 0.50
 95th percentile: 0.00
 sum: 29127.82

Threads fairness:
```

|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    | <pre> events (avg/stddev):      10995681.0000/0.00 execution time (avg/stddev): 29.1278/0.00 </pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 4. | <pre> 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: 1000  Initializing worker threads...  Threads started!  CPU speed:   events per second: 363094.11  General statistics:   total time:          30.0001s   total number of events: 10893157  Latency (ms):   min:                0.00   avg:                0.00   max:                1.20   95th percentile:    0.00   sum:               29104.68  Threads fairness:   events (avg/stddev): 10893157.0000/0.00   execution time (avg/stddev): 29.1047/0.00 </pre> |
| 5. | <pre> 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: 1000  Initializing worker threads...  Threads started!  CPU speed:   events per second: 369058.44  General statistics:   total time:          30.0001s   total number of events: 11072069  Latency (ms):   min:                0.00 </pre>                                                                                                                                                                                                                         |

|                              |                    |
|------------------------------|--------------------|
| avg:                         | 0.00               |
| max:                         | 0.55               |
| 95th percentile:             | 0.00               |
| sum:                         | 29160.01           |
| Threads fairness:            |                    |
| events (avg/stddev):         | 11072069.0000/0.00 |
| execution time (avg/stddev): | 29.1600/0.00       |

Observation :

Events per second :

|    |           |
|----|-----------|
| 1. | 367493.95 |
| 2  | 359752.57 |
| 3. | 366510.78 |
| 4. | 363094.11 |
| 5. | 369058.44 |

Stats :

|                                                  |             |
|--------------------------------------------------|-------------|
| Average events per second                        | 366221.11   |
| Minimum Number of events per second recorded     | 363094.11   |
| Maximum Number of events per second recorded     | 369058.44   |
| Standard Deviation of events per second recorded | 2992.697716 |

Case 32 : IMG TYPE : raw | CPU :2 | RAM :3 | MODE : CPU | --cpu-max-prime=20000

|   |                                                                                                                                                                                                                                                                  |
|---|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | <pre>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: 20000  Initializing worker threads...  Threads started!</pre> |
|---|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

```
CPU speed:
 events per second: 4563.57

General statistics:
 total time: 30.0001s
 total number of events: 136911

Latency (ms):
 min: 0.21
 avg: 0.22
 max: 0.46
 95th percentile: 0.24
 sum: 29957.79

Threads fairness:
 events (avg/stddev): 136911.0000/0.00
 execution time (avg/stddev): 29.9578/0.00
```

2. 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: 20000

Initializing worker threads...

Threads started!

CPU speed:  
 events per second: 4572.21

General statistics:  
 total time: 30.0002s  
 total number of events: 137171

Latency (ms):  
 min: 0.21  
 avg: 0.22  
 max: 0.58  
 95th percentile: 0.23  
 sum: 29950.57

Threads fairness:  
 events (avg/stddev): 137171.0000/0.00  
 execution time (avg/stddev): 29.9506/0.00

3. 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: 20000
Initializing worker threads...
Threads started!
CPU speed:
 events per second: 4555.74
General statistics:
 total time: 30.00003s
 total number of events: 136676
Latency (ms):
 min: 0.21
 avg: 0.22
 max: 3.04
 95th percentile: 0.24
 sum: 29947.23
Threads fairness:
 events (avg/stddev): 136676.0000/0.00
 execution time (avg/stddev): 29.9472/0.00
```

4.

```
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: 20000
Initializing worker threads...
Threads started!
CPU speed:
 events per second: 4502.78
General statistics:
 total time: 30.0002s
 total number of events: 135087
Latency (ms):
 min: 0.21
 avg: 0.22
 max: 4.30
 95th percentile: 0.24
 sum: 29933.09
Threads fairness:
```

|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    | <pre> events (avg/stddev) : 135087.0000/0.00 execution time (avg/stddev) : 29.9331/0.00 </pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 5. | <pre> 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: 20000  Initializing worker threads...  Threads started!  CPU speed:     events per second: 4512.67  General statistics:     total time: 30.0001s     total number of events: 135383  Latency (ms):     min: 0.21     avg: 0.22     max: 1.09     95th percentile: 0.24     sum: 29933.14  Threads fairness:     events (avg/stddev) : 135383.0000/0.00     execution time (avg/stddev) : 29.9331/0.00 </pre> |

### Observation :

#### Events per second :

|    |         |
|----|---------|
| 1. | 4563.57 |
| 2  | 4572.21 |
| 3. | 4555.74 |
| 4. | 4502.78 |
| 5. | 4512.67 |

#### Stats :

|                           |         |
|---------------------------|---------|
| Average events per second | 4523.73 |
|---------------------------|---------|

|                                                  |         |
|--------------------------------------------------|---------|
| Minimum Number of events per second recorded     | 4502.78 |
| Maximum Number of events per second recorded     | 4555.74 |
| Standard Deviation of events per second recorded | 28.16   |

Case 33 : IMG TYPE : raw | CPU : 2 | RAM :3 | MODE : memory |--memory-block-size= 2K

|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1  | <pre> 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: 2KiB total size: 102400MiB operation: write scope: global  Initializing worker threads...  Threads started!  Total operations: 52428800 (7820267.73 per second) 102400.00 MiB transferred (15273.96 MiB/sec)  General statistics:     total time: 6.7035s     total number of events: 52428800  Latency (ms):     min: 0.00     avg: 0.00     max: 0.06     95th percentile: 0.00     sum: 3448.86  Threads fairness:     events (avg/stddev): 52428800.0000/0.00     execution time (avg/stddev): 3.4489/0.00 </pre> |
| 2. | <pre> 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: </pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

```
block size: 2KiB
total size: 102400MiB
operation: write
scope: global

Initializing worker threads...

Threads started!

Total operations: 52428800 (7775620.68 per second)
102400.00 MiB transferred (15186.76 MiB/sec)

General statistics:
 total time: 6.7421s
 total number of events: 52428800

Latency (ms):
 min: 0.00
 avg: 0.00
 max: 3.07
 95th percentile: 0.00
 sum: 3467.60

Threads fairness:
 events (avg/stddev): 52428800.0000/0.00
 execution time (avg/stddev): 3.4676/0.00
```

3. 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: 2KiB
 total size: 102400MiB
 operation: write
 scope: global

Initializing worker threads...

Threads started!

Total operations: 52428800 (7743479.29 per second)
102400.00 MiB transferred (15123.98 MiB/sec)

General statistics:
 total time: 6.7701s
 total number of events: 52428800
```

```
Latency (ms) :
 min: 0.00
 avg: 0.00
 max: 1.34
 95th percentile: 0.00
 sum: 3487.58

Threads fairness:
 events (avg/stddev): 52428800.0000/0.00
 execution time (avg/stddev): 3.4876/0.00
```

4.

```
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: 2KiB
total size: 102400MiB
operation: write
scope: global

Initializing worker threads...

Threads started!

Total operations: 52428800 (7685443.08 per second)
102400.00 MiB transferred (15010.63 MiB/sec)

General statistics:
 total time: 6.8210s
 total number of events: 52428800

Latency (ms) :
 min: 0.00
 avg: 0.00
 max: 3.34
 95th percentile: 0.00
 sum: 3501.55

Threads fairness:
 events (avg/stddev): 52428800.0000/0.00
 execution time (avg/stddev): 3.5016/0.00
```

5.

```
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: 2KiB
 total size: 102400MiB
 operation: write
 scope: global

Initializing worker threads...

Threads started!

Total operations: 52428800 (7856828.02 per second)
102400.00 MiB transferred (15345.37 MiB/sec)

General statistics:
 total time: 6.6722s
 total number of events: 52428800

Latency (ms):
 min: 0.00
 avg: 0.00
 max: 0.05
 95th percentile: 0.00
 sum: 3424.94

Threads fairness:
 events (avg/stddev): 52428800.0000/0.00
 execution time (avg/stddev): 3.4249/0.00

```

#### Observation :

|    | Total Operation per second | MB transferred per second |
|----|----------------------------|---------------------------|
| 1. | 7820267.73                 | 15273.96                  |
| 2  | 7775620.68                 | 15186.76                  |
| 3. | 7743479.29                 | 15123.98                  |
| 4. | 7685443.08                 | 15010.63                  |
| 5. | 7856828.02                 | 15345.37                  |

#### Stats :

|                              |             |
|------------------------------|-------------|
| Average Operation per second | 7761916.797 |
| Minimum Operation per second | 7685443.08  |

|                                         |             |
|-----------------------------------------|-------------|
| Maximum Operation per second            | 7856828.02  |
| Standard Deviation Operation per second | 87167.40018 |

|                                              |          |
|----------------------------------------------|----------|
| Average MB transferred per second            | 15188.14 |
| Minimum MB transferred per second            | 15010.63 |
| Maximum MB transferred per second            | 15345.37 |
| Standard Deviation MB transferred per second | 130.11   |

Case 34 : IMG TYPE : raw | CPU : 2 | RAM :3 | MODE : memory | --memory-block-size= 4K

```
1 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: 4KiB
total size: 102400MiB
operation: write
scope: global

Initializing worker threads...

Threads started!

Total operations: 26214400 (5716219.32 per second)
102400.00 MiB transferred (22328.98 MiB/sec)

General statistics:
 total time: 4.5852s
 total number of events: 26214400

Latency (ms):
 min: 0.00
 avg: 0.00
 max: 0.09
 95th percentile: 0.00
 sum: 2966.83

Threads fairness:
 events (avg/stddev): 26214400.0000/0.00
```

|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    | <pre> execution time (avg/stddev): 2.9668/0.00 ----- Run 2: Command: sysbench memory --memory-block-size=4K run Results: </pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 2. | <pre> 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: 4KiB total size: 102400MiB operation: write scope: global  Initializing worker threads...  Threads started!  Total operations: 26214400 (5661516.60 per second) 102400.00 MiB transferred (22115.30 MiB/sec)  General statistics:     total time: 4.6295s     total number of events: 26214400  Latency (ms):     min: 0.00     avg: 0.00     max: 0.17     95th percentile: 0.00     sum: 2976.10  Threads fairness:     events (avg/stddev): 26214400.0000/0.00     execution time (avg/stddev): 2.9761/0.00 </pre> |
| 3. | <pre> 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: 4KiB total size: 102400MiB operation: write </pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

```
scope: global

Initializing worker threads...

Threads started!

Total operations: 26214400 (5729715.75 per second)

102400.00 MiB transferred (22381.70 MiB/sec)

General statistics:
 total time: 4.5744s
 total number of events: 26214400

Latency (ms):
 min: 0.00
 avg: 0.00
 max: 0.06
 95th percentile: 0.00
 sum: 2962.65

Threads fairness:
 events (avg/stddev): 26214400.0000/0.00
 execution time (avg/stddev): 2.9626/0.00
```

4. 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: 4KiB
 total size: 102400MiB
 operation: write
 scope: global

Initializing worker threads...

Threads started!

Total operations: 26214400 (5746977.92 per second)

102400.00 MiB transferred (22449.13 MiB/sec)

General statistics:
 total time: 4.5607s
 total number of events: 26214400

Latency (ms):
 min: 0.00
 avg: 0.00
 max: 0.04
```

|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    | <pre> 95th percentile:          0.00 sum:                   2953.58  Threads fairness: events (avg/stddev):   26214400.0000/0.00 execution time (avg/stddev): 2.9536/0.00 </pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 5. | <pre> 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: 4KiB total size: 102400MiB operation: write scope: global  Initializing worker threads...  Threads started!  Total operations: 26214400 (5620075.48 per second) 102400.00 MiB transferred (21953.42 MiB/sec)  General statistics: total time:           4.6637s total number of events: 26214400  Latency (ms): min:                  0.00 avg:                  0.00 max:                  0.07 95th percentile:      0.00 sum:                 3015.07  Threads fairness: events (avg/stddev):   26214400.0000/0.00 execution time (avg/stddev): 3.0151/0.00 </pre> |

Observation :

|    | Total Operation per second | MB transferred per second |
|----|----------------------------|---------------------------|
| 1. | 5620075.48                 | 21953.42                  |
| 2  | 5746977.92                 | 22449.13                  |
| 3. | 5729715.75                 | 22381.7                   |

|    |            |          |
|----|------------|----------|
| 4. | 5661516.6  | 22115.3  |
| 5. | 5716219.32 | 22328.98 |

Stats :

|                                         |             |
|-----------------------------------------|-------------|
| Average Operation per second            | 5694901.014 |
| Minimum Operation per second            | 5620075.48  |
| Maximum Operation per second            | 5746977.92  |
| Standard Deviation Operation per second | 52659.09178 |

|                                              |             |
|----------------------------------------------|-------------|
| Average MB transferred per second            | 22245.706   |
| Minimum MB transferred per second            | 21953.42    |
| Maximum MB transferred per second            | 22449.13    |
| Standard Deviation MB transferred per second | 205.6982508 |

Case 35 : IMG TYPE :raw | CPU :2 | RAM :3 | MODE : fileio | --file-test-mode= rndwr | --file-total-size=3G

|   |                                                                                                                                                                                                                                    |
|---|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | <pre>File operations:   reads/s:          5618.40   writes/s:         3745.60   fsyncs/s:        11986.43  Throughput:   read, MiB/s:      87.79   written, MiB/s:   58.53  General statistics:   total time:       30.0081s</pre> |
|---|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    | <pre> total number of events: 640567  Latency (ms):     min: 0.00     avg: 0.05     max: 4.14     95th percentile: 0.17     sum: 29846.68  Threads fairness:     events (avg/stddev): 640567.0000/0.00     execution time (avg/stddev): 29.8467/0.00 </pre>                                                                                                                                                                                                    |
| 2. | <pre> File operations:     reads/s: 5958.48     writes/s: 3972.32     fsyncs/s: 12714.79  Throughput:     read, MiB/s: 93.10     written, MiB/s: 62.07  General statistics:     total time: 30.0072s     total number of events: 679413 </pre>                                                                                                                                                                                                                 |
| 3. | <pre> File operations:     reads/s: 5920.73     writes/s: 3947.15     fsyncs/s: 12634.88  Throughput:     read, MiB/s: 92.51     written, MiB/s: 61.67  General statistics:     total time: 30.0060s     total number of events: 675100  Latency (ms):     min: 0.00     avg: 0.04     max: 9.51     95th percentile: 0.13     sum: 29837.25  Threads fairness:     events (avg/stddev): 675100.0000/0.00     execution time (avg/stddev): 29.8372/0.00 </pre> |
| 4. | <pre> File operations:     reads/s: 6070.61     writes/s: 4047.07     fsyncs/s: 12953.40 </pre>                                                                                                                                                                                                                                                                                                                                                                |

|                              |                  |
|------------------------------|------------------|
| Throughput:                  |                  |
| read, MiB/s:                 | 94.85            |
| written, MiB/s:              | 63.24            |
| General statistics:          |                  |
| total time:                  | 30.0063s         |
| total number of events:      | 692163           |
| Latency (ms):                |                  |
| min:                         | 0.00             |
| avg:                         | 0.04             |
| max:                         | 7.40             |
| 95th percentile:             | 0.12             |
| sum:                         | 29839.83         |
| Threads fairness:            |                  |
| events (avg/stddev):         | 692163.0000/0.00 |
| execution time (avg/stddev): | 29.8398/0.00     |

5.

|                              |                  |
|------------------------------|------------------|
| File operations:             |                  |
| reads/s:                     | 6323.39          |
| writes/s:                    | 4215.61          |
| fsyncs/s:                    | 13492.18         |
| Throughput:                  |                  |
| read, MiB/s:                 | 98.80            |
| written, MiB/s:              | 65.87            |
| General statistics:          |                  |
| total time:                  | 30.0068s         |
| total number of events:      | 720983           |
| Latency (ms):                |                  |
| min:                         | 0.00             |
| avg:                         | 0.04             |
| max:                         | 9.75             |
| 95th percentile:             | 0.12             |
| sum:                         | 29839.06         |
| Threads fairness:            |                  |
| events (avg/stddev):         | 720983.0000/0.00 |
| execution time (avg/stddev): | 29.8391/0.00     |

Observations :

|    | Throughput (MB/Sec) |       | File Operations (operation/sec) |            |           |
|----|---------------------|-------|---------------------------------|------------|-----------|
|    | read                | write | reads/sec                       | writes/sec | fsync/sec |
| 1. | 87.79               | 58.53 | 5618.4                          | 3745.6     | 11986.43  |
| 2. | 93.1                | 62.07 | 5958.48                         | 3972.32    | 12714.79  |
| 3  | 92.51               | 61.67 | 5920.73                         | 3947.15    | 12634.88  |

|        |             |             |             |             |             |
|--------|-------------|-------------|-------------|-------------|-------------|
| 4.     | 94.85       | 63.24       | 6070.61     | 4047.07     | 12953.4     |
| 5.     | 98.8        | 65.87       | 6323.39     | 4215.61     | 13492.18    |
| Avg    | 93.41       | 62.276      | 5978.322    | 3985.55     | 12756.336   |
| Min    | 87.79       | 58.53       | 5618.4      | 3745.6      | 11986.43    |
| Max    | 98.8        | 63.24       | 6323.39     | 4215.61     | 13492.18    |
| stddev | 3.987988215 | 2.011821314 | 255.3641464 | 170.2482815 | 545.3286833 |

| Case 36 : IMG TYPE :raw  CPU :2   RAM :3   MODE : fileio   --file-test-mode= rndwr   --file-total-size=3G |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  |  |  |  |
|-----------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|--|
| 1                                                                                                         | <pre> File operations:   reads/s:                      0.00   writes/s:                     16080.05   fsyncs/s:                      20583.70  Throughput:   read, MiB/s:                  0.00   written, MiB/s:                251.25  General statistics:   total time:                   30.0056s   total number of events:        1100009  Latency (ms):   min:                           0.00   avg:                           0.03   max:                           4.77   95th percentile:               0.05   sum:                           29795.99  Threads fairness:   events (avg/stddev):          1100009.0000/0.00   execution time (avg/stddev):   29.7960/0.00 </pre> |  |  |  |  |
| 2.                                                                                                        | <pre> File operations:   reads/s:                      0.00   writes/s:                     16463.68   fsyncs/s:                      21077.30  Throughput:   read, MiB/s:                  0.00   written, MiB/s:                257.24  General statistics: </pre>                                                                                                                                                                                                                                                                                                                                                                                                                       |  |  |  |  |

|                              |                   |
|------------------------------|-------------------|
| total time:                  | 30.0049s          |
| total number of events:      | 1126306           |
| Latency (ms):                |                   |
| min:                         | 0.00              |
| avg:                         | 0.03              |
| max:                         | 10.49             |
| 95th percentile:             | 0.05              |
| sum:                         | 29792.21          |
| Threads fairness:            |                   |
| events (avg/stddev):         | 1126306.0000/0.00 |
| execution time (avg/stddev): | 29.7922/0.00      |

3.

|                              |                   |
|------------------------------|-------------------|
| File operations:             |                   |
| reads/s:                     | 0.00              |
| writes/s:                    | 15693.47          |
| fsyncs/s:                    | 20088.08          |
| Throughput:                  |                   |
| read, MiB/s:                 | 0.00              |
| written, MiB/s:              | 245.21            |
| General statistics:          |                   |
| total time:                  | 30.0056s          |
| total number of events:      | 1073537           |
| Latency (ms):                |                   |
| min:                         | 0.00              |
| avg:                         | 0.03              |
| max:                         | 17.82             |
| 95th percentile:             | 0.05              |
| sum:                         | 29799.01          |
| Threads fairness:            |                   |
| events (avg/stddev):         | 1073537.0000/0.00 |
| execution time (avg/stddev): | 29.7990/0.00      |

4.

|                         |          |
|-------------------------|----------|
| File operations:        |          |
| reads/s:                | 0.00     |
| writes/s:               | 16177.12 |
| fsyncs/s:               | 20708.74 |
| Throughput:             |          |
| read, MiB/s:            | 0.00     |
| written, MiB/s:         | 252.77   |
| General statistics:     |          |
| total time:             | 30.0048s |
| total number of events: | 1106645  |
| Latency (ms):           |          |
| min:                    | 0.00     |
| avg:                    | 0.03     |

|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    | <pre> max:                                5.31 95th percentile:                    0.05 sum:                                 29781.25  Threads fairness:   events (avg/stddev):           1106645.0000/0.00   execution time (avg/stddev):    29.7812/0.00 </pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 5. | <pre> File operations:   reads/s:                          0.00   writes/s:                         15710.17   fsyncs/s:                          20113.18  Throughput:   read, MiB/s:                      0.00   written, MiB/s:                   245.47  General statistics:   total time:                        30.0055s   total number of events:            1074789  Latency (ms):   min:                               0.00   avg:                               0.03   max:                               11.71   95th percentile:                  0.05   sum:                               29788.92  Threads fairness:   events (avg/stddev):           1074789.0000/0.00   execution time (avg/stddev):    29.7889/0.00 </pre> |

#### Observations :

|     | Throughput (MB/Sec) |         | File Operations (operation/sec) |            |           |
|-----|---------------------|---------|---------------------------------|------------|-----------|
|     | read                | write   | reads/sec                       | writes/sec | fsync/sec |
| 1.  | 0                   | 251.25  | 0                               | 16080.05   | 20583.7   |
| 2.  | 0                   | 257.24  | 0                               | 16463.68   | 21077.3   |
| 3   | 0                   | 245.21  | 0                               | 15693.47   | 20088.08  |
| 4.  | 0                   | 252.77  | 0                               | 16177.12   | 20708.74  |
| 5.  | 0                   | 245.47  | 0                               | 15710.17   | 20113.18  |
| Avg | 0                   | 250.388 | 0                               | 16024.898  | 20514.2   |

|        |   |             |   |             |             |
|--------|---|-------------|---|-------------|-------------|
| Min    | 0 | 245.21      | 0 | 15693.47    | 20088.08    |
| Max    | 0 | 257.24      | 0 | 16463.68    | 21077.3     |
| stddev | 0 | 4.970978274 | 0 | 326.9713891 | 418.9728411 |

| Case 37 : IMG TYPE : raw   CPU : 3   RAM : 2   MODE : CPU   --cpu-max-prime=1000 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|----------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1                                                                                | <pre>Prime numbers limit: 1000  Initializing worker threads...  Threads started!  CPU speed:   events per second: 338456.34  General statistics:   total time:           30.0001s   total number of events: 10153894  Latency (ms):   min:                 0.00   avg:                 0.00   max:                 0.55   95th percentile:    0.00   sum:                29120.35  Threads fairness:   events (avg/stddev): 10153894.0000/0.00   execution time (avg/stddev): 29.1204/0.00</pre> |
| 2.                                                                               | <pre>Prime numbers limit: 1000  Initializing worker threads...  Threads started!  CPU speed:   events per second: 338308.28  General statistics:   total time:           30.0001s   total number of events: 10149442  Latency (ms):   min:                 0.00   avg:                 0.00   max:                 2.50   95th percentile:    0.00   sum:                29119.27</pre>                                                                                                          |

|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    | <pre> Threads fairness:   events (avg/stddev):      10149442.0000/0.00   execution time (avg/stddev): 29.1193/0.00 </pre>                                                                                                                                                                                                                                                                                                                                                                          |
| 3. | <pre> Prime numbers limit: 1000  Initializing worker threads...  Threads started!  CPU speed:   events per second: 339022.22  General statistics:   total time:          30.0001s   total number of events: 10170903  Latency (ms):   min:                0.00   avg:                0.00   max:                0.11   95th percentile:    0.00   sum:               29115.92  Threads fairness:   events (avg/stddev):      10170903.0000/0.00   execution time (avg/stddev): 29.1159/0.00 </pre> |
| 4. | <pre> Prime numbers limit: 1000  Initializing worker threads...  Threads started!  CPU speed:   events per second: 336995.52  General statistics:   total time:          30.0001s   total number of events: 10110079  Latency (ms):   min:                0.00   avg:                0.00   max:                2.21   95th percentile:    0.00   sum:               29103.98  Threads fairness:   events (avg/stddev):      10110079.0000/0.00   execution time (avg/stddev): 29.1040/0.00 </pre> |

5. Prime numbers limit: 1000

Initializing worker threads...

Threads started!

CPU speed:

events per second: 337029.70

General statistics:

|                         |          |
|-------------------------|----------|
| total time:             | 30.0001s |
| total number of events: | 10111099 |

Latency (ms):

|                  |          |
|------------------|----------|
| min:             | 0.00     |
| avg:             | 0.00     |
| max:             | 1.46     |
| 95th percentile: | 0.00     |
| sum:             | 29077.55 |

Threads fairness:

|                              |                    |
|------------------------------|--------------------|
| events (avg/stddev):         | 10111099.0000/0.00 |
| execution time (avg/stddev): | 29.0776/0.00       |

**Observation :**

**Events per second :**

|    |           |
|----|-----------|
| 1. | 337029.7  |
| 2  | 336995.52 |
| 3. | 339022.22 |
| 4. | 338308.28 |
| 5. | 338456.34 |

**Stats :**

|                                                  |             |
|--------------------------------------------------|-------------|
| Average events per second                        | 338595.6133 |
| Minimum Number of events per second recorded     | 338308.28   |
| Maximum Number of events per second recorded     | 339022.22   |
| Standard Deviation of events per second recorded | 376.7962008 |

Case 38 : IMG TYPE : raw | CPU : 3 | RAM : 2 | MODE : CPU | --cpu-max-prime=20000

|    |                                                                                                                                                                                                                                                                                                                                                                                                                  |
|----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1  | <pre>Prime numbers limit: 20000  Initializing worker threads...  Threads started!  CPU speed:   events per second: 4410.80  General statistics:   total time: 30.00002s   total number of events: 132327  Latency (ms):   min: 0.21   avg: 0.23   max: 0.34   95th percentile: 0.24   sum: 29917.66  Threads fairness:   events (avg/stddev): 132327.0000/0.00   execution time (avg/stddev): 29.9177/0.00</pre> |
| 2. | <pre>Prime numbers limit: 20000  Initializing worker threads...  Threads started!  CPU speed:   events per second: 4402.44  General statistics:   total time: 30.00001s   total number of events: 132076  Latency (ms):   min: 0.21   avg: 0.23   max: 0.82   95th percentile: 0.24   sum: 29918.25  Threads fairness:   events (avg/stddev): 132076.0000/0.00   execution time (avg/stddev): 29.9183/0.00</pre> |
| 3. | <pre>Prime numbers limit: 20000  Initializing worker threads...  Threads started!</pre>                                                                                                                                                                                                                                                                                                                          |

```
CPU speed:
 events per second: 4197.65

General statistics:
 total time: 30.0005s
 total number of events: 125935

Latency (ms):
 min: 0.21
 avg: 0.24
 max: 0.57
 95th percentile: 0.26
 sum: 29960.43

Threads fairness:
 events (avg/stddev): 125935.0000/0.00
 execution time (avg/stddev): 29.9604/0.00
```

4.

```
Prime numbers limit: 20000

Initializing worker threads...

Threads started!

CPU speed:
 events per second: 4177.29

General statistics:
 total time: 30.0002s
 total number of events: 125322

Latency (ms):
 min: 0.21
 avg: 0.24
 max: 2.23
 95th percentile: 0.26
 sum: 29964.10

Threads fairness:
 events (avg/stddev): 125322.0000/0.00
 execution time (avg/stddev): 29.9641/0.00
```

5.

```
Prime numbers limit: 20000

Initializing worker threads...

Threads started!

CPU speed:
 events per second: 4228.10

General statistics:
 total time: 30.0003s
 total number of events: 126847
```

|                               |                  |
|-------------------------------|------------------|
| Latency (ms) :                |                  |
| min:                          | 0.22             |
| avg:                          | 0.24             |
| max:                          | 1.45             |
| 95th percentile:              | 0.26             |
| sum:                          | 29963.32         |
| Threads fairness:             |                  |
| events (avg/stddev) :         | 126847.0000/0.00 |
| execution time (avg/stddev) : | 29.9633/0.00     |

**Observation :**

**Events per second :**

|    |         |
|----|---------|
| 1. | 4410.8  |
| 2  | 4402.44 |
| 3. | 4197.65 |
| 4. | 4177.29 |
| 5. | 4228.1  |

**Stats :**

|                                                  |             |
|--------------------------------------------------|-------------|
| Average events per second                        | 4201.013333 |
| Minimum Number of events per second recorded     | 4177.29     |
| Maximum Number of events per second recorded     | 4228.1      |
| Standard Deviation of events per second recorded | 25.57143002 |

**Case 39 : IMG TYPE : raw | CPU : 3 | RAM : 2 | MODE : memory |--memory-block-size= 2K**

|   |                                                    |
|---|----------------------------------------------------|
| 1 | Total operations: 52428800 (7218752.79 per second) |
|   | 102400.00 MiB transferred (14099.13 MiB/sec)       |
|   | General statistics:                                |
|   | total time: 7.2622s                                |
|   | total number of events: 52428800                   |
|   | Latency (ms) :                                     |
|   | min: 0.00                                          |
|   | avg: 0.00                                          |
|   | max: 5.19                                          |

|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    | <pre> 95th percentile:          0.00 sum:                   3750.38  Threads fairness: events (avg/stddev):   52428800.0000/0.00 execution time (avg/stddev): 3.7504/0.00 </pre>                                                                                                                                                                                                                                                                              |
| 2. | <pre> Total operations: 52428800 (7213035.17 per second)  102400.00 MiB transferred (14087.96 MiB/sec)  General statistics: total time:           7.2680s total number of events: 52428800  Latency (ms): min:                  0.00 avg:                  0.00 max:                  0.55 95th percentile:      0.00 sum:                 3748.93  Threads fairness: events (avg/stddev): 52428800.0000/0.00 execution time (avg/stddev): 3.7489/0.00 </pre> |
| 3. | <pre> Total operations: 52428800 (7221168.86 per second)  102400.00 MiB transferred (14103.85 MiB/sec)  General statistics: total time:           7.2599s total number of events: 52428800  Latency (ms): min:                  0.00 avg:                  0.00 max:                  0.07 95th percentile:      0.00 sum:                 3750.69  Threads fairness: events (avg/stddev): 52428800.0000/0.00 execution time (avg/stddev): 3.7507/0.00 </pre> |
| 4. | <pre> Total operations: 52428800 (7148073.21 per second)  102400.00 MiB transferred (13961.08 MiB/sec) </pre>                                                                                                                                                                                                                                                                                                                                                 |

|                              |                    |
|------------------------------|--------------------|
| General statistics:          |                    |
| total time:                  | 7.3341s            |
| total number of events:      | 52428800           |
| Latency (ms):                |                    |
| min:                         | 0.00               |
| avg:                         | 0.00               |
| max:                         | 0.07               |
| 95th percentile:             | 0.00               |
| sum:                         | 3799.30            |
| Threads fairness:            |                    |
| events (avg/stddev):         | 52428800.0000/0.00 |
| execution time (avg/stddev): | 3.7993/0.00        |

5. Total operations: 52428800 (7256864.50 per second)  
 102400.00 MiB transferred (14173.56 MiB/sec)

|                              |                    |
|------------------------------|--------------------|
| General statistics:          |                    |
| total time:                  | 7.2242s            |
| total number of events:      | 52428800           |
| Latency (ms):                |                    |
| min:                         | 0.00               |
| avg:                         | 0.00               |
| max:                         | 0.05               |
| 95th percentile:             | 0.00               |
| sum:                         | 3731.44            |
| Threads fairness:            |                    |
| events (avg/stddev):         | 52428800.0000/0.00 |
| execution time (avg/stddev): | 3.7314/0.00        |

#### Observation :

|    | Total Operation per second | MB transferred per second |
|----|----------------------------|---------------------------|
| 1. | 7218752.79                 | 14099.13                  |
| 2  | 7213035.17                 | 14087.96                  |
| 3. | 7221168.86                 | 14103.85                  |
| 4. | 7148073.21                 | 13961.08                  |
| 5. | 7256864.5                  | 14173.56                  |

#### Stats :

|                                         |             |
|-----------------------------------------|-------------|
| Average Operation per second            | 7208702.19  |
| Minimum Operation per second            | 7148073.21  |
| Maximum Operation per second            | 7256864.5   |
| Standard Deviation Operation per second | 55456.73621 |

|                                              |             |
|----------------------------------------------|-------------|
| Average MB transferred per second            | 14085.116   |
| Minimum MB transferred per second            | 13961.08    |
| Maximum MB transferred per second            | 14173.56    |
| Standard Deviation MB transferred per second | 77.07579665 |

| Case 40 : IMG TYPE : raw   CPU : 3   RAM :2   MODE : memory   --memory-block-size= 4K |                                                                                                                                                                                                                                                                                                                                                                          |
|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1                                                                                     | <pre>Total operations: 26214400 (5272072.30 per second) 102400.00 MiB transferred (20594.03 MiB/sec)  General statistics: total time: 4.9717s total number of events: 26214400  Latency (ms): min: 0.00 avg: 0.00 max: 0.06 95th percentile: 0.00 sum: 3209.58  Threads fairness: events (avg/stddev): 26214400.0000/0.00 execution time (avg/stddev): 3.2096/0.00</pre> |
| 2.                                                                                    | <pre>Total operations: 26214400 (5284563.17 per second) 102400.00 MiB transferred (20642.82 MiB/sec)  General statistics: total time: 4.9600s total number of events: 26214400</pre>                                                                                                                                                                                     |

|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    | <pre> Latency (ms):     min:                      0.00     avg:                      0.00     max:                      0.08     95th percentile:          0.00     sum:                     3202.58  Threads fairness:   events (avg/stddev):    26214400.0000/0.00   execution time (avg/stddev): 3.2026/0.00 </pre>                                                                                                                                                                                                   |
| 3. | <pre> Total operations: 26214400 (5268391.04 per second)  102400.00 MiB transferred (20579.65 MiB/sec)  General statistics:   total time:                4.9752s   total number of events:    26214400  Latency (ms):     min:                      0.00     avg:                      0.00     max:                      0.04     95th percentile:          0.00     sum:                     3213.47  Threads fairness:   events (avg/stddev):    26214400.0000/0.00   execution time (avg/stddev): 3.2135/0.00 </pre> |
| 4. | <pre> Total operations: 26214400 (5251803.08 per second)  102400.00 MiB transferred (20514.86 MiB/sec)  General statistics:   total time:                4.9909s   total number of events:    26214400  Latency (ms):     min:                      0.00     avg:                      0.00     max:                      0.06     95th percentile:          0.00     sum:                     3222.77  Threads fairness:   events (avg/stddev):    26214400.0000/0.00   execution time (avg/stddev): 3.2228/0.00 </pre> |
| 5. | <pre> Total operations: 26214400 (5265559.52 per second)  102400.00 MiB transferred (20568.59 MiB/sec) </pre>                                                                                                                                                                                                                                                                                                                                                                                                            |

|                              |                    |
|------------------------------|--------------------|
| General statistics:          |                    |
| total time:                  | 4.9779s            |
| total number of events:      | 26214400           |
| Latency (ms):                |                    |
| min:                         | 0.00               |
| avg:                         | 0.00               |
| max:                         | 1.08               |
| 95th percentile:             | 0.00               |
| sum:                         | 3214.32            |
| Threads fairness:            |                    |
| events (avg/stddev):         | 26214400.0000/0.00 |
| execution time (avg/stddev): | 3.2143/0.00        |

Observation :

|    | Total Operation per second | MB transferred per second |
|----|----------------------------|---------------------------|
| 1. | 5272072.3                  | 20594.03                  |
| 2  | 5284563.17                 | 20642.82                  |
| 3. | 5268391.04                 | 20579.65                  |
| 4. | 5251803.08                 | 20514.86                  |
| 5. | 5265559.52                 | 20568.59                  |

Stats :

|                                         |             |
|-----------------------------------------|-------------|
| Average Operation per second            | 5261917.88  |
| Minimum Operation per second            | 5251803.08  |
| Maximum Operation per second            | 5268391.04  |
| Standard Deviation Operation per second | 8873.345517 |

|                                              |             |
|----------------------------------------------|-------------|
| Average MB transferred per second            | 20579.99    |
| Minimum MB transferred per second            | 20514.86    |
| Maximum MB transferred per second            | 20642.82    |
| Standard Deviation MB transferred per second | 46.14304661 |

Case 41 : IMG TYPE :raw | CPU : 3 | RAM : 2 | MODE : fileio | --file-test-mode= rndwr | --file-total-size=3G

|                 |                                                                                                                                                                                                                                                                                                                                                |          |         |           |         |           |         |              |       |                 |       |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|---------|-----------|---------|-----------|---------|--------------|-------|-----------------|-------|
| 1               | <p>File operations:</p> <table> <tbody> <tr><td>reads/s:</td><td>2720.98</td></tr> <tr><td>writes/s:</td><td>1813.98</td></tr> <tr><td>fsyncs/s:</td><td>5804.78</td></tr> </tbody> </table> <p>Throughput:</p> <table> <tbody> <tr><td>read, MiB/s:</td><td>42.52</td></tr> <tr><td>written, MiB/s:</td><td>28.34</td></tr> </tbody> </table> | reads/s: | 2720.98 | writes/s: | 1813.98 | fsyncs/s: | 5804.78 | read, MiB/s: | 42.52 | written, MiB/s: | 28.34 |
| reads/s:        | 2720.98                                                                                                                                                                                                                                                                                                                                        |          |         |           |         |           |         |              |       |                 |       |
| writes/s:       | 1813.98                                                                                                                                                                                                                                                                                                                                        |          |         |           |         |           |         |              |       |                 |       |
| fsyncs/s:       | 5804.78                                                                                                                                                                                                                                                                                                                                        |          |         |           |         |           |         |              |       |                 |       |
| read, MiB/s:    | 42.52                                                                                                                                                                                                                                                                                                                                          |          |         |           |         |           |         |              |       |                 |       |
| written, MiB/s: | 28.34                                                                                                                                                                                                                                                                                                                                          |          |         |           |         |           |         |              |       |                 |       |
| 2.              | <p>File operations:</p> <table> <tbody> <tr><td>reads/s:</td><td>2817.20</td></tr> <tr><td>writes/s:</td><td>1878.13</td></tr> <tr><td>fsyncs/s:</td><td>6012.29</td></tr> </tbody> </table> <p>Throughput:</p> <table> <tbody> <tr><td>read, MiB/s:</td><td>44.02</td></tr> <tr><td>written, MiB/s:</td><td>29.35</td></tr> </tbody> </table> | reads/s: | 2817.20 | writes/s: | 1878.13 | fsyncs/s: | 6012.29 | read, MiB/s: | 44.02 | written, MiB/s: | 29.35 |
| reads/s:        | 2817.20                                                                                                                                                                                                                                                                                                                                        |          |         |           |         |           |         |              |       |                 |       |
| writes/s:       | 1878.13                                                                                                                                                                                                                                                                                                                                        |          |         |           |         |           |         |              |       |                 |       |
| fsyncs/s:       | 6012.29                                                                                                                                                                                                                                                                                                                                        |          |         |           |         |           |         |              |       |                 |       |
| read, MiB/s:    | 44.02                                                                                                                                                                                                                                                                                                                                          |          |         |           |         |           |         |              |       |                 |       |
| written, MiB/s: | 29.35                                                                                                                                                                                                                                                                                                                                          |          |         |           |         |           |         |              |       |                 |       |
| 3.              | <p>File operations:</p> <table> <tbody> <tr><td>reads/s:</td><td>2388.37</td></tr> <tr><td>writes/s:</td><td>1592.22</td></tr> <tr><td>fsyncs/s:</td><td>5096.61</td></tr> </tbody> </table> <p>Throughput:</p> <table> <tbody> <tr><td>read, MiB/s:</td><td>37.32</td></tr> <tr><td>written, MiB/s:</td><td>24.88</td></tr> </tbody> </table> | reads/s: | 2388.37 | writes/s: | 1592.22 | fsyncs/s: | 5096.61 | read, MiB/s: | 37.32 | written, MiB/s: | 24.88 |
| reads/s:        | 2388.37                                                                                                                                                                                                                                                                                                                                        |          |         |           |         |           |         |              |       |                 |       |
| writes/s:       | 1592.22                                                                                                                                                                                                                                                                                                                                        |          |         |           |         |           |         |              |       |                 |       |
| fsyncs/s:       | 5096.61                                                                                                                                                                                                                                                                                                                                        |          |         |           |         |           |         |              |       |                 |       |
| read, MiB/s:    | 37.32                                                                                                                                                                                                                                                                                                                                          |          |         |           |         |           |         |              |       |                 |       |
| written, MiB/s: | 24.88                                                                                                                                                                                                                                                                                                                                          |          |         |           |         |           |         |              |       |                 |       |
| 4.              | <p>File operations:</p> <table> <tbody> <tr><td>reads/s:</td><td>2551.96</td></tr> <tr><td>writes/s:</td><td>1701.30</td></tr> <tr><td>fsyncs/s:</td><td>5446.18</td></tr> </tbody> </table> <p>Throughput:</p> <table> <tbody> <tr><td>read, MiB/s:</td><td>39.87</td></tr> <tr><td>written, MiB/s:</td><td>26.58</td></tr> </tbody> </table> | reads/s: | 2551.96 | writes/s: | 1701.30 | fsyncs/s: | 5446.18 | read, MiB/s: | 39.87 | written, MiB/s: | 26.58 |
| reads/s:        | 2551.96                                                                                                                                                                                                                                                                                                                                        |          |         |           |         |           |         |              |       |                 |       |
| writes/s:       | 1701.30                                                                                                                                                                                                                                                                                                                                        |          |         |           |         |           |         |              |       |                 |       |
| fsyncs/s:       | 5446.18                                                                                                                                                                                                                                                                                                                                        |          |         |           |         |           |         |              |       |                 |       |
| read, MiB/s:    | 39.87                                                                                                                                                                                                                                                                                                                                          |          |         |           |         |           |         |              |       |                 |       |
| written, MiB/s: | 26.58                                                                                                                                                                                                                                                                                                                                          |          |         |           |         |           |         |              |       |                 |       |
| 5.              | <p>File operations:</p> <table> <tbody> <tr><td>reads/s:</td><td>2600.93</td></tr> <tr><td>writes/s:</td><td>1733.94</td></tr> <tr><td>fsyncs/s:</td><td>5548.93</td></tr> </tbody> </table> <p>Throughput:</p> <table> <tbody> <tr><td>read, MiB/s:</td><td>40.64</td></tr> <tr><td>written, MiB/s:</td><td>27.09</td></tr> </tbody> </table> | reads/s: | 2600.93 | writes/s: | 1733.94 | fsyncs/s: | 5548.93 | read, MiB/s: | 40.64 | written, MiB/s: | 27.09 |
| reads/s:        | 2600.93                                                                                                                                                                                                                                                                                                                                        |          |         |           |         |           |         |              |       |                 |       |
| writes/s:       | 1733.94                                                                                                                                                                                                                                                                                                                                        |          |         |           |         |           |         |              |       |                 |       |
| fsyncs/s:       | 5548.93                                                                                                                                                                                                                                                                                                                                        |          |         |           |         |           |         |              |       |                 |       |
| read, MiB/s:    | 40.64                                                                                                                                                                                                                                                                                                                                          |          |         |           |         |           |         |              |       |                 |       |
| written, MiB/s: | 27.09                                                                                                                                                                                                                                                                                                                                          |          |         |           |         |           |         |              |       |                 |       |

Observations :

|  | Throughput (MB/Sec) | File Operations (operation/sec) |
|--|---------------------|---------------------------------|
|  |                     |                                 |

|        | read        | write      | reads/sec   | writes/sec  | fsync/sec   |
|--------|-------------|------------|-------------|-------------|-------------|
| 1.     | 42.52       | 28.34      | 2720.98     | 1813.98     | 5804.78     |
| 2.     | 44.02       | 29.35      | 2817.2      | 1878.13     | 6012.29     |
| 3      | 37.32       | 24.88      | 2388.37     | 1592.22     | 5096.61     |
| 4.     | 39.87       | 26.58      | 2551.96     | 1701.3      | 5446.18     |
| 5.     | 40.64       | 27.09      | 2600.93     | 1733.94     | 5548.93     |
| Avg    | 40.4625     | 26.975     | 2589.615    | 1726.3975   | 5526.0025   |
| Min    | 37.32       | 24.88      | 2388.37     | 1592.22     | 5096.61     |
| Max    | 44.02       | 29.35      | 2817.2      | 1878.13     | 6012.29     |
| stddev | 2.763673582 | 2.25624319 | 176.8619146 | 117.9168165 | 377.6024159 |

| Case 42 : IMG TYPE :raw  CPU : 3   RAM : 2   MODE : fileio   --file-test-mode= rndwr   --file-total-size=3G |                                                                                                                                                                                                                                                                                                                                                       |
|-------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1                                                                                                           | <pre> File operations:   reads/s:                      0.00   writes/s:                     13804.09   fsyncs/s:                      17673.45  Throughput:   read, MiB/s:                  0.00   written, MiB/s:                215.69  General statistics:   total time:                   30.0051s   total number of events:        944377 </pre> |
| 2.                                                                                                          | <pre> File operations:   reads/s:                      0.00   writes/s:                     14034.60   fsyncs/s:                      17964.92  Throughput:   read, MiB/s:                  0.00   written, MiB/s:                219.29 </pre>                                                                                                       |
| 3.                                                                                                          | <pre> File operations:   reads/s:                      0.00   writes/s:                     13983.66   fsyncs/s:                      17903.08 </pre>                                                                                                                                                                                                 |

|    |                                                                                                                                                 |
|----|-------------------------------------------------------------------------------------------------------------------------------------------------|
|    | Throughput:<br>read, MiB/s: 0.00<br>written, MiB/s: 218.49                                                                                      |
| 4. | File operations:<br>reads/s: 0.00<br>writes/s: 14451.29<br>fsyncs/s: 18498.55<br><br>Throughput:<br>read, MiB/s: 0.00<br>written, MiB/s: 225.80 |
| 5. | File operations:<br>reads/s: 0.00<br>writes/s: 14710.55<br>fsyncs/s: 18832.37<br><br>Throughput:<br>read, MiB/s: 0.00<br>written, MiB/s: 229.85 |

Observations :

|        | Throughput (MB/Sec) |             | File Operations (operation/sec) |             |             |
|--------|---------------------|-------------|---------------------------------|-------------|-------------|
|        | read                | write       | reads/sec                       | writes/sec  | fsync/sec   |
| 1.     | 0                   | 215.69      | 0                               | 13804.09    | 17673.45    |
| 2.     | 0                   | 219.29      | 0                               | 14034.6     | 17964.92    |
| 3      | 0                   | 218.49      | 0                               | 13983.66    | 17903.08    |
| 4.     | 0                   | 225.8       | 0                               | 14451.29    | 18498.55    |
| 5.     | 0                   | 229.85      | 0                               | 14710.55    | 18832.37    |
| Avg    | 0                   | 223.3575    | 0                               | 14196.838   | 18174.474   |
| Min    | 0                   | 215.69      | 0                               | 13804.09    | 17673.45    |
| Max    | 0                   | 225.8       | 0                               | 14710.55    | 18832.37    |
| stddev | 0                   | 4.276566964 | 0                               | 372.3784564 | 476.0370341 |

Case 43 : IMG TYPE : raw | CPU : 3 | RAM :3 | MODE : CPU | --cpu-max-prime=1000

|    |                                                                                                                                           |
|----|-------------------------------------------------------------------------------------------------------------------------------------------|
| 1  | Prime numbers limit: 1000<br><br>Initializing worker threads...<br><br>Threads started!<br><br>CPU speed:<br>events per second: 366232.24 |
| 2. | Prime numbers limit: 1000<br><br>Initializing worker threads...<br><br>Threads started!<br><br>CPU speed:<br>events per second: 362964.24 |
| 3. | Prime numbers limit: 1000<br><br>Initializing worker threads...<br><br>Threads started!<br><br>CPU speed:<br>events per second: 362872.77 |
| 4. | Prime numbers limit: 1000<br><br>Initializing worker threads...<br><br>Threads started!<br><br>CPU speed:<br>events per second: 364038.70 |
| 5. | Prime numbers limit: 1000<br><br>Initializing worker threads...<br><br>Threads started!<br><br>CPU speed:<br>events per second: 363372.30 |

Observation :

Stats :

|                                              |             |
|----------------------------------------------|-------------|
| Average events per second                    | 363427.9233 |
| Minimum Number of events per second recorded | 362872.77   |
| Maximum Number of events per second recorded | 364038.7    |

|                                                  |             |
|--------------------------------------------------|-------------|
| Standard Deviation of events per second recorded | 584.9518421 |
|--------------------------------------------------|-------------|

| Case 44 : IMG TYPE : raw   CPU :3   RAM :3   MODE :CPU   --cpu-max-prime=20000 |                                                                                                                                          |
|--------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| 1                                                                              | Prime numbers limit: 20000<br><br>Initializing worker threads...<br><br>Threads started!<br><br>CPU speed:<br>events per second: 4554.35 |
| 2.                                                                             | Prime numbers limit: 20000<br><br>Initializing worker threads...<br><br>Threads started!<br><br>CPU speed:<br>events per second: 4558.91 |
| 3.                                                                             | Prime numbers limit: 20000<br><br>Initializing worker threads...<br><br>Threads started!<br><br>CPU speed:<br>events per second: 4567.75 |
| 4.                                                                             | Prime numbers limit: 20000<br><br>Initializing worker threads...<br><br>Threads started!<br><br>CPU speed:<br>events per second: 4525.54 |
| 5.                                                                             | Prime numbers limit: 20000<br><br>Initializing worker threads...<br><br>Threads started!<br><br>CPU speed:<br>events per second: 4533.60 |

Observation :

Stats :

|                                                  |             |
|--------------------------------------------------|-------------|
| Average events per second                        | 4542.296667 |
| Minimum Number of events per second recorded     | 4525.54     |
| Maximum Number of events per second recorded     | 4567.75     |
| Standard Deviation of events per second recorded | 22.40859285 |

| Case 45 : IMG TYPE : raw   CPU : 3   RAM :3   MODE : memory  --memory-block-size= 2K |                                                                                                    |
|--------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|
| 1                                                                                    | Total operations: 52428800 (7817782.28 per second)<br>102400.00 MiB transferred (15269.11 MiB/sec) |
| 2.                                                                                   | Total operations: 52428800 (7766398.33 per second)<br>102400.00 MiB transferred (15168.75 MiB/sec) |
| 3.                                                                                   | Total operations: 52428800 (7731321.88 per second)<br>102400.00 MiB transferred (15100.24 MiB/sec) |
| 4.                                                                                   | Total operations: 52428800 (7700396.61 per second)<br>102400.00 MiB transferred (15039.84 MiB/sec) |
| 5.                                                                                   | Total operations: 52428800 (7795601.99 per second)<br>102400.00 MiB transferred (15225.79 MiB/sec) |

Observation :

Stats :

|                                         |             |
|-----------------------------------------|-------------|
| Average Operation per second            | 7742440.16  |
| Minimum Operation per second            | 7700396.61  |
| Maximum Operation per second            | 7795601.99  |
| Standard Deviation Operation per second | 48566.73973 |

|                                   |           |
|-----------------------------------|-----------|
| Average MB transferred per second | 15160.746 |
| Minimum MB transferred per second | 15039.84  |
| Maximum MB transferred per second | 15269.11  |

|                                              |             |
|----------------------------------------------|-------------|
| Standard Deviation MB transferred per second | 92.62394307 |
|----------------------------------------------|-------------|

| Case 46 : IMG TYPE : raw   CPU : 3   RAM :3   MODE : memory   --memory-block-size= 4K |                                                                                                    |
|---------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|
| 1                                                                                     | Total operations: 26214400 (5634397.89 per second)<br>102400.00 MiB transferred (22009.37 MiB/sec) |
| 2.                                                                                    | Total operations: 26214400 (5583254.53 per second)<br>102400.00 MiB transferred (21809.59 MiB/sec) |
| 3.                                                                                    | Total operations: 26214400 (5649485.12 per second)<br>102400.00 MiB transferred (22068.30 MiB/sec) |
| 4.                                                                                    | Total operations: 26214400 (5631233.04 per second)<br>102400.00 MiB transferred (21997.00 MiB/sec) |
| 5.                                                                                    | Total operations: 26214400 (5563608.03 per second)<br>102400.00 MiB transferred (21732.84 MiB/sec) |

Observation :

Stats :

|                                         |             |
|-----------------------------------------|-------------|
| Average Operation per second            | 5612395.722 |
| Minimum Operation per second            | 5563608.03  |
| Maximum Operation per second            | 5649485.12  |
| Standard Deviation Operation per second | 36891.77196 |

|                                              |           |
|----------------------------------------------|-----------|
| Average MB transferred per second            | 21923.42  |
| Minimum MB transferred per second            | 21732.84  |
| Maximum MB transferred per second            | 22068.3   |
| Standard Deviation MB transferred per second | 144.10902 |

|                                                                                                          |
|----------------------------------------------------------------------------------------------------------|
| Case 47 : IMG TYPE :raw  CPU:3   RAM :3   MODE : fileio   --file-test-mode= rndwr   --file-total-size=3G |
|----------------------------------------------------------------------------------------------------------|

|                 |                                                                                                                                                                                                                                                                                                               |          |         |           |         |           |          |              |       |                 |       |
|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|---------|-----------|---------|-----------|----------|--------------|-------|-----------------|-------|
| 1               | <p>File operations:</p> <table> <tr><td>reads/s:</td><td>5465.27</td></tr> <tr><td>writes/s:</td><td>3643.51</td></tr> <tr><td>fsyncs/s:</td><td>11662.90</td></tr> </table> <p>Throughput:</p> <table> <tr><td>read, MiB/s:</td><td>85.39</td></tr> <tr><td>written, MiB/s:</td><td>56.93</td></tr> </table> | reads/s: | 5465.27 | writes/s: | 3643.51 | fsyncs/s: | 11662.90 | read, MiB/s: | 85.39 | written, MiB/s: | 56.93 |
| reads/s:        | 5465.27                                                                                                                                                                                                                                                                                                       |          |         |           |         |           |          |              |       |                 |       |
| writes/s:       | 3643.51                                                                                                                                                                                                                                                                                                       |          |         |           |         |           |          |              |       |                 |       |
| fsyncs/s:       | 11662.90                                                                                                                                                                                                                                                                                                      |          |         |           |         |           |          |              |       |                 |       |
| read, MiB/s:    | 85.39                                                                                                                                                                                                                                                                                                         |          |         |           |         |           |          |              |       |                 |       |
| written, MiB/s: | 56.93                                                                                                                                                                                                                                                                                                         |          |         |           |         |           |          |              |       |                 |       |
| 2.              | <p>File operations:</p> <table> <tr><td>reads/s:</td><td>5635.10</td></tr> <tr><td>writes/s:</td><td>3756.74</td></tr> <tr><td>fsyncs/s:</td><td>12024.49</td></tr> </table> <p>Throughput:</p> <table> <tr><td>read, MiB/s:</td><td>88.05</td></tr> <tr><td>written, MiB/s:</td><td>58.70</td></tr> </table> | reads/s: | 5635.10 | writes/s: | 3756.74 | fsyncs/s: | 12024.49 | read, MiB/s: | 88.05 | written, MiB/s: | 58.70 |
| reads/s:        | 5635.10                                                                                                                                                                                                                                                                                                       |          |         |           |         |           |          |              |       |                 |       |
| writes/s:       | 3756.74                                                                                                                                                                                                                                                                                                       |          |         |           |         |           |          |              |       |                 |       |
| fsyncs/s:       | 12024.49                                                                                                                                                                                                                                                                                                      |          |         |           |         |           |          |              |       |                 |       |
| read, MiB/s:    | 88.05                                                                                                                                                                                                                                                                                                         |          |         |           |         |           |          |              |       |                 |       |
| written, MiB/s: | 58.70                                                                                                                                                                                                                                                                                                         |          |         |           |         |           |          |              |       |                 |       |
| 3.              | <p>File operations:</p> <table> <tr><td>reads/s:</td><td>5545.56</td></tr> <tr><td>writes/s:</td><td>3697.04</td></tr> <tr><td>fsyncs/s:</td><td>11833.73</td></tr> </table> <p>Throughput:</p> <table> <tr><td>read, MiB/s:</td><td>86.65</td></tr> <tr><td>written, MiB/s:</td><td>57.77</td></tr> </table> | reads/s: | 5545.56 | writes/s: | 3697.04 | fsyncs/s: | 11833.73 | read, MiB/s: | 86.65 | written, MiB/s: | 57.77 |
| reads/s:        | 5545.56                                                                                                                                                                                                                                                                                                       |          |         |           |         |           |          |              |       |                 |       |
| writes/s:       | 3697.04                                                                                                                                                                                                                                                                                                       |          |         |           |         |           |          |              |       |                 |       |
| fsyncs/s:       | 11833.73                                                                                                                                                                                                                                                                                                      |          |         |           |         |           |          |              |       |                 |       |
| read, MiB/s:    | 86.65                                                                                                                                                                                                                                                                                                         |          |         |           |         |           |          |              |       |                 |       |
| written, MiB/s: | 57.77                                                                                                                                                                                                                                                                                                         |          |         |           |         |           |          |              |       |                 |       |
| 4.              | <p>File operations:</p> <table> <tr><td>reads/s:</td><td>5850.67</td></tr> <tr><td>writes/s:</td><td>3900.45</td></tr> <tr><td>fsyncs/s:</td><td>12483.60</td></tr> </table> <p>Throughput:</p> <table> <tr><td>read, MiB/s:</td><td>91.42</td></tr> <tr><td>written, MiB/s:</td><td>60.94</td></tr> </table> | reads/s: | 5850.67 | writes/s: | 3900.45 | fsyncs/s: | 12483.60 | read, MiB/s: | 91.42 | written, MiB/s: | 60.94 |
| reads/s:        | 5850.67                                                                                                                                                                                                                                                                                                       |          |         |           |         |           |          |              |       |                 |       |
| writes/s:       | 3900.45                                                                                                                                                                                                                                                                                                       |          |         |           |         |           |          |              |       |                 |       |
| fsyncs/s:       | 12483.60                                                                                                                                                                                                                                                                                                      |          |         |           |         |           |          |              |       |                 |       |
| read, MiB/s:    | 91.42                                                                                                                                                                                                                                                                                                         |          |         |           |         |           |          |              |       |                 |       |
| written, MiB/s: | 60.94                                                                                                                                                                                                                                                                                                         |          |         |           |         |           |          |              |       |                 |       |
| 5.              | <p>File operations:</p> <table> <tr><td>reads/s:</td><td>6032.68</td></tr> <tr><td>writes/s:</td><td>4021.79</td></tr> <tr><td>fsyncs/s:</td><td>12873.85</td></tr> </table> <p>Throughput:</p> <table> <tr><td>read, MiB/s:</td><td>94.26</td></tr> <tr><td>written, MiB/s:</td><td>62.84</td></tr> </table> | reads/s: | 6032.68 | writes/s: | 4021.79 | fsyncs/s: | 12873.85 | read, MiB/s: | 94.26 | written, MiB/s: | 62.84 |
| reads/s:        | 6032.68                                                                                                                                                                                                                                                                                                       |          |         |           |         |           |          |              |       |                 |       |
| writes/s:       | 4021.79                                                                                                                                                                                                                                                                                                       |          |         |           |         |           |          |              |       |                 |       |
| fsyncs/s:       | 12873.85                                                                                                                                                                                                                                                                                                      |          |         |           |         |           |          |              |       |                 |       |
| read, MiB/s:    | 94.26                                                                                                                                                                                                                                                                                                         |          |         |           |         |           |          |              |       |                 |       |
| written, MiB/s: | 62.84                                                                                                                                                                                                                                                                                                         |          |         |           |         |           |          |              |       |                 |       |

Observations :

|    | Throughput (MB/Sec) |       | File Operations (operation/sec) |            |           |
|----|---------------------|-------|---------------------------------|------------|-----------|
|    | read                | write | reads/sec                       | writes/sec | fsync/sec |
| 1. | 85.39               | 56.93 | 5465.27                         | 3643.51    | 11662.9   |
| 2. | 88.05               | 58.7  | 5635.1                          | 3756.74    | 12024.49  |

|        |             |             |            |             |             |
|--------|-------------|-------------|------------|-------------|-------------|
| 3      | 86.65       | 57.77       | 5545.56    | 3697.04     | 11833.73    |
| 4.     | 91.42       | 60.94       | 5850.67    | 3900.45     | 12483.6     |
| 5.     | 94.26       | 62.84       | 6032.68    | 4021.79     | 12873.85    |
| Avg    | 89.154      | 60.0625     | 5705.856   | 3803.906    | 12175.714   |
| Min    | 85.39       | 56.93       | 5465.27    | 3643.51     | 11662.9     |
| Max    | 94.26       | 60.94       | 6032.68    | 4021.79     | 12873.85    |
| stddev | 3.635330797 | 1.728438602 | 232.576796 | 155.0532422 | 496.2327117 |

| Case 48 : IMG TYPE :raw  CPU:3   RAM :3   MODE : fileio   --file-test-mode= seqwr   --file-total-size=3G |                                                                                                                                                 |  |  |  |  |
|----------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|--|
| 1                                                                                                        | File operations:<br>reads/s: 0.00<br>writes/s: 14386.83<br>fsyncs/s: 18416.01<br><br>Throughput:<br>read, MiB/s: 0.00<br>written, MiB/s: 224.79 |  |  |  |  |
| 2.                                                                                                       | File operations:<br>reads/s: 0.00<br>writes/s: 14054.00<br>fsyncs/s: 17989.76<br><br>Throughput:<br>read, MiB/s: 0.00<br>written, MiB/s: 219.59 |  |  |  |  |
| 3.                                                                                                       | File operations:<br>reads/s: 0.00<br>writes/s: 14836.45<br>fsyncs/s: 18991.79<br><br>Throughput:<br>read, MiB/s: 0.00<br>written, MiB/s: 231.82 |  |  |  |  |
| 4.                                                                                                       | File operations:<br>reads/s: 0.00<br>writes/s: 15030.45<br>fsyncs/s: 19243.11<br><br>Throughput:                                                |  |  |  |  |

|    |                                                                                                                                                 |
|----|-------------------------------------------------------------------------------------------------------------------------------------------------|
|    | read, MiB/s: 0.00<br>written, MiB/s: 234.85                                                                                                     |
| 5. | File operations:<br>reads/s: 0.00<br>writes/s: 13813.24<br>fsyncs/s: 17684.51<br><br>Throughput:<br>read, MiB/s: 0.00<br>written, MiB/s: 215.83 |

Observations :

|        | Throughput (MB/Sec) |             | File Operations (operation/sec) |             |             |
|--------|---------------------|-------------|---------------------------------|-------------|-------------|
|        | read                | write       | reads/sec                       | writes/sec  | fsync/sec   |
| 1.     | 0                   | 224.79      | 0                               | 14386.83    | 18416.01    |
| 2.     | 0                   | 219.59      | 0                               | 14054       | 17989.76    |
| 3      | 0                   | 231.82      | 0                               | 14836.45    | 18991.79    |
| 4.     | 0                   | 234.85      | 0                               | 15030.45    | 19243.11    |
| 5.     | 0                   | 215.83      | 0                               | 13813.24    | 17684.51    |
| Avg    | 0                   | 225.376     | 0                               | 14424.194   | 18465.036   |
| Min    | 0                   | 219.59      | 0                               | 13813.24    | 17684.51    |
| Max    | 0                   | 234.85      | 0                               | 15030.45    | 19243.11    |
| stddev | 0                   | 6.887705835 | 0                               | 512.1537375 | 655.8163972 |

\*\*\*\*\*

## DOCKER

Some screenshot of proof of docker execution :

```
▶ docker run -it --cpus=3 -m=3G cpu3ram3
root@5a8ff6666d9d:/# ./script.sh
Running sysbench with Mode: cpu, Parameter: --cpu-max-prime=1000, Value:
Run 1:
Results:
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: 1000

Initializing worker threads...

Threads started!

CPU speed:
events per second: 362018.84

General statistics:
total time: 30.0001s
total number of events: 10860936

Latency (ms):
min: 0.00
avg: 0.00
max: 1.77
95th percentile: 0.00
sum: 29079.56
```

```
▶ docker run -it --memory=3G --cpus=2 cpu2ram3
root@2d0ef4f6c097:/# ls
bin boot dev etc home lib media mnt opt proc root run sbin script.sh srv sys tmp usr var
root@2d0ef4f6c097:/# ./script.sh
Running sysbench with Mode: cpu, Parameter: --cpu-max-prime=1000, Value:
Run 1:
Results:
sysbench 1.0.18 (using system LuaJIT 2.1.0-beta3)

Running the test with following options:
```

```
1. Sign in to your Docker account → docker login
2. View a summary of image vulnerabilities and recommendations → docker scout quickview
> docker run -it --memory=2G --cpus=2 cpub2ram2
root@8ce8de62a327:/# ls
bin boot dev etc home lib media mnt opt proc root run sbin script.sh srv sys tmp usr var
root@8ce8de62a327:/# cat script.sh
#!/bin/bash

TestCases=(
 "cpu --cpu-max-prime=1000"
 "cpu --cpu-max-prime=2000"
 "memory --memory-block-size=2K"
 "memory --memory-block-size=4K"
 "fileio --file-test-mode=rndrw --file-total-size=3G"
 "fileio --file-test-mode=seqwr --file-total-size=3G"
)

Iterate over test cases
for testCase in "${!testCases[@]}"; do
 read -r mode parameter value <<< "$testCase"
 echo "Running sysbench with Mode: $mode, Parameter: $parameter, Value: $value"

 filename="${mode}_${parameter}_${value// /}.txt"

 if [[$mode == "fileio"]]; then
 sysbench fileio --file-total-size=3G --time=30 $parameter prepare
 fi

 for ((i=1; i<=5; i++)); do
 echo "Run $i" | tee -a "$filename"
 echo "Command: sysbench $mode $parameter $value run" >> "$filename"
 results=$(sysbench $mode $parameter $value --time=30 run)
 echo "Results:" | tee -a "$filename"
 echo "$results" | tee -a "$filename"
 echo "-----" | tee -a "$filename"
 done

 if [[$mode == "fileio"]]; then
 sysbench fileio --file-total-size=3G --time=30 $parameter cleanup
 fi

done
root@8ce8de62a327:/#
```

Case 49 : IMG TYPE : raw | CPU : 2 | RAM : 2 | MODE : CPU | --cpu-max-prime=1000

```
1 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: 1000

Initializing worker threads...

Threads started!

CPU speed:
events per second: 367125.58

General statistics:
total time: 30.00001s
total number of events: 11014136

Latency (ms):
min: 0.00
avg: 0.00
max: 0.29
95th percentile: 0.00
sum: 29153.33
```

|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    | <pre> Threads fairness:   events (avg/stddev):      11014136.0000/0.00   execution time (avg/stddev):   29.1533/0.00 </pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 2. | <pre> 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: 1000  Initializing worker threads...  Threads started!  CPU speed:   events per second: 366046.96  General statistics:   total time:          30.0001s   total number of events: 10981806  Latency (ms):   min:                0.00   avg:                0.00   max:                0.09   95th percentile:    0.00   sum:               29130.03  Threads fairness:   events (avg/stddev):      10981806.0000/0.00   execution time (avg/stddev):   29.1300/0.00 </pre> |
| 3. | <pre> 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: 1000  Initializing worker threads...  Threads started!  CPU speed:   events per second: 364102.39  General statistics:   total time:          30.0001s   total number of events: 10923448 </pre>                                                                                                                                                                                                                                                                          |

|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    | <pre> Latency (ms):     min:                      0.00     avg:                      0.00     max:                      0.57     95th percentile:          0.00     sum:                     29100.98  Threads fairness:     events (avg/stddev):   10923448.0000/0.00     execution time (avg/stddev): 29.1010/0.00 </pre>                                                                                                                                                                                                                                                                                                                                                                                                  |
| 4. | <pre> 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: 1000  Initializing worker threads...  Threads started!  CPU speed:     events per second: 365115.17  General statistics:     total time:            30.0001s     total number of events: 10953824  Latency (ms):     min:                      0.00     avg:                      0.00     max:                      3.03     95th percentile:          0.00     sum:                     29134.93  Threads fairness:     events (avg/stddev):   10953824.0000/0.00     execution time (avg/stddev): 29.1349/0.00 </pre> |
| 5. | <pre> 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: 1000  Initializing worker threads...  Threads started!  CPU speed: </pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                |

```

events per second: 365184.93

General statistics:
 total time: 30.0001s
 total number of events: 10955908

Latency (ms):
 min: 0.00
 avg: 0.00
 max: 1.10
 95th percentile: 0.00
 sum: 29140.09

Threads fairness:
 events (avg/stddev): 10955908.0000/0.00
 execution time (avg/stddev): 29.1401/0.00

```

Stats :

|                                                  |             |
|--------------------------------------------------|-------------|
| Average events per second                        | 365515.006  |
| Minimum Number of events per second recorded     | 364102.39   |
| Maximum Number of events per second recorded     | 367125.58   |
| Standard Deviation of events per second recorded | 1133.713657 |

Case 50 : IMG TYPE : raw | CPU : 2 | RAM : 2 | MODE : CPU | --cpu-max-prime=20000

|    |                                                                                                                                          |
|----|------------------------------------------------------------------------------------------------------------------------------------------|
| 1  | Prime numbers limit: 20000<br><br>Initializing worker threads...<br><br>Threads started!<br><br>CPU speed:<br>events per second: 4539.21 |
| 2. | Prime numbers limit: 20000<br><br>Initializing worker threads...<br><br>Threads started!<br><br>CPU speed:<br>events per second: 4522.77 |
| 3. | Prime numbers limit: 20000                                                                                                               |

|    |                                                                                                                             |
|----|-----------------------------------------------------------------------------------------------------------------------------|
|    | <pre>Initializing worker threads... Threads started! CPU speed: events per second: 4500.42</pre>                            |
| 4. | <pre>Prime numbers limit: 20000 Initializing worker threads... Threads started! CPU speed: events per second: 4494.86</pre> |
| 5. | <pre>Prime numbers limit: 20000 Initializing worker threads... Threads started! CPU speed: events per second: 4525.42</pre> |

Observation :

Stats :

|                                                  |          |
|--------------------------------------------------|----------|
| Average events per second                        | 4516.536 |
| Minimum Number of events per second recorded     | 4494.86  |
| Maximum Number of events per second recorded     | 4539.21  |
| Standard Deviation of events per second recorded | 18.45    |

| Case 51 : IMG TYPE : raw   CPU : 2   RAM : 2   MODE : memory  --memory-block-size= 2K |                                                                                                            |
|---------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| 1                                                                                     | <pre>Total operations: 52428800 (7633977.42 per second) 102400.00 MiB transferred (14910.11 MiB/sec)</pre> |
| 2.                                                                                    | <pre>Total operations: 52428800 (7498292.85 per second) 102400.00 MiB transferred (14645.10 MiB/sec)</pre> |
| 3.                                                                                    | <pre>Total operations: 52428800 (7509779.15 per second) 102400.00 MiB transferred (14667.54 MiB/sec)</pre> |

|    |                                                                                                    |
|----|----------------------------------------------------------------------------------------------------|
| 4. | Total operations: 52428800 (7482375.23 per second)<br>102400.00 MiB transferred (14614.01 MiB/sec) |
| 5. | Total operations: 52428800 (7538991.41 per second)<br>102400.00 MiB transferred (14724.59 MiB/sec) |

Observation :

Stats :

|                                         |             |
|-----------------------------------------|-------------|
| Average Operation per second            | 7532683.212 |
| Minimum Operation per second            | 7482375.23  |
| Maximum Operation per second            | 7633977.42  |
| Standard Deviation Operation per second | 60287.84298 |

|                                              |             |
|----------------------------------------------|-------------|
| Average MB transferred per second            | 14712.27    |
| Minimum MB transferred per second            | 14614.01    |
| Maximum MB transferred per second            | 14910.11    |
| Standard Deviation MB transferred per second | 117.7497955 |

| Case 52 : IMG TYPE : raw   CPU : 2   RAM :2   MODE : memory   --memory-block-size= 4K |                                                                                                    |
|---------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|
| 1                                                                                     | Total operations: 26214400 (5479402.28 per second)<br>102400.00 MiB transferred (21403.92 MiB/sec) |
| 2.                                                                                    | Total operations: 26214400 (5534860.59 per second)<br>102400.00 MiB transferred (21620.55 MiB/sec) |
| 3.                                                                                    | Total operations: 26214400 (5549122.91 per second)<br>102400.00 MiB transferred (21676.26 MiB/sec) |
| 4.                                                                                    | Total operations: 26214400 (5547557.10 per second)<br>102400.00 MiB transferred (21670.14 MiB/sec) |
| 5.                                                                                    | Total operations: 26214400 (5546285.13 per second)<br>102400.00 MiB transferred (21665.18 MiB/sec) |

Observation :

Stats :

|                                         |            |
|-----------------------------------------|------------|
| Average Operation per second            | 5531445.60 |
| Minimum Operation per second            | 5479402.28 |
| Maximum Operation per second            | 5549122.91 |
| Standard Deviation Operation per second | 29632.96   |

|                                              |          |
|----------------------------------------------|----------|
| Average MB transferred per second            | 21607.21 |
| Minimum MB transferred per second            | 21403.92 |
| Maximum MB transferred per second            | 21676.26 |
| Standard Deviation MB transferred per second | 115.75   |

Case 53 : IMG TYPE :raw | CPU : 2 | RAM : 2 | MODE : fileio | --file-test-mode= rndwr | --file-total-size=3G

|    |                                                                                                                                                   |
|----|---------------------------------------------------------------------------------------------------------------------------------------------------|
| 1  | File operations:<br>reads/s: 6287.41<br>writes/s: 4191.61<br>fsyncs/s: 13416.56<br><br>Throughput:<br>read, MiB/s: 98.24<br>written, MiB/s: 65.49 |
| 2. | File operations:<br>reads/s: 6346.02<br>writes/s: 4230.68<br>fsyncs/s: 13539.66<br><br>Throughput:<br>read, MiB/s: 99.16<br>written, MiB/s: 66.10 |
| 3. | File operations:<br>reads/s: 6372.75<br>writes/s: 4248.50<br>fsyncs/s: 13596.53<br><br>Throughput:<br>read, MiB/s: 99.57<br>written, MiB/s: 66.38 |

|                 |                                                                                                                                                                                                                                                                                                                |          |         |           |         |           |          |              |        |                 |       |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|---------|-----------|---------|-----------|----------|--------------|--------|-----------------|-------|
| 4.              | <p>File operations:</p> <table> <tr><td>reads/s:</td><td>6513.60</td></tr> <tr><td>writes/s:</td><td>4342.39</td></tr> <tr><td>fsyncs/s:</td><td>13895.96</td></tr> </table> <p>Throughput:</p> <table> <tr><td>read, MiB/s:</td><td>101.77</td></tr> <tr><td>written, MiB/s:</td><td>67.85</td></tr> </table> | reads/s: | 6513.60 | writes/s: | 4342.39 | fsyncs/s: | 13895.96 | read, MiB/s: | 101.77 | written, MiB/s: | 67.85 |
| reads/s:        | 6513.60                                                                                                                                                                                                                                                                                                        |          |         |           |         |           |          |              |        |                 |       |
| writes/s:       | 4342.39                                                                                                                                                                                                                                                                                                        |          |         |           |         |           |          |              |        |                 |       |
| fsyncs/s:       | 13895.96                                                                                                                                                                                                                                                                                                       |          |         |           |         |           |          |              |        |                 |       |
| read, MiB/s:    | 101.77                                                                                                                                                                                                                                                                                                         |          |         |           |         |           |          |              |        |                 |       |
| written, MiB/s: | 67.85                                                                                                                                                                                                                                                                                                          |          |         |           |         |           |          |              |        |                 |       |
| 5.              | <p>File operations:</p> <table> <tr><td>reads/s:</td><td>6380.89</td></tr> <tr><td>writes/s:</td><td>4253.92</td></tr> <tr><td>fsyncs/s:</td><td>13615.42</td></tr> </table> <p>Throughput:</p> <table> <tr><td>read, MiB/s:</td><td>99.70</td></tr> <tr><td>written, MiB/s:</td><td>66.47</td></tr> </table>  | reads/s: | 6380.89 | writes/s: | 4253.92 | fsyncs/s: | 13615.42 | read, MiB/s: | 99.70  | written, MiB/s: | 66.47 |
| reads/s:        | 6380.89                                                                                                                                                                                                                                                                                                        |          |         |           |         |           |          |              |        |                 |       |
| writes/s:       | 4253.92                                                                                                                                                                                                                                                                                                        |          |         |           |         |           |          |              |        |                 |       |
| fsyncs/s:       | 13615.42                                                                                                                                                                                                                                                                                                       |          |         |           |         |           |          |              |        |                 |       |
| read, MiB/s:    | 99.70                                                                                                                                                                                                                                                                                                          |          |         |           |         |           |          |              |        |                 |       |
| written, MiB/s: | 66.47                                                                                                                                                                                                                                                                                                          |          |         |           |         |           |          |              |        |                 |       |

Observations :

|        | Throughput (MB/Sec) |              | File Operations (operation/sec) |            |            |
|--------|---------------------|--------------|---------------------------------|------------|------------|
|        | read                | write        | reads/sec                       | writes/sec | fsync/sec  |
| 1.     | 98.24               | 65.49        | 6287.41                         | 4191.61    | 13416.56   |
| 2.     | 99.16               | 66.1         | 6346.02                         | 4230.68    | 13539.66   |
| 3      | 99.57               | 66.38        | 6372.75                         | 4248.5     | 13596.53   |
| 4.     | 101.77              | 67.85        | 6513.6                          | 4342.39    | 13895.96   |
| 5.     | 99.7                | 66.47        | 6380.89                         | 4253.92    | 13615.42   |
| Avg    | 99.688              | 66.458       | 6380.134                        | 4253.42    | 13612.826  |
| Min    | 98.24               | 65.49        | 6287.41                         | 4191.61    | 13416.56   |
| Max    | 101.77              | 67.85        | 6513.6                          | 4342.39    | 13895.96   |
| stddev | 1.296560835         | 0.8673349987 | 83.11103013                     | 55.4023939 | 176.288653 |

|                                                                                                             |                                                                                                                                                                            |          |      |           |          |           |          |
|-------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|------|-----------|----------|-----------|----------|
| Case 54 : IMG TYPE :raw  CPU : 2   RAM : 2   MODE : fileio   --file-test-mode= rndwr   --file-total-size=3G |                                                                                                                                                                            |          |      |           |          |           |          |
| 1                                                                                                           | <p>File operations:</p> <table> <tr><td>reads/s:</td><td>0.00</td></tr> <tr><td>writes/s:</td><td>18420.78</td></tr> <tr><td>fsyncs/s:</td><td>23582.36</td></tr> </table> | reads/s: | 0.00 | writes/s: | 18420.78 | fsyncs/s: | 23582.36 |
| reads/s:                                                                                                    | 0.00                                                                                                                                                                       |          |      |           |          |           |          |
| writes/s:                                                                                                   | 18420.78                                                                                                                                                                   |          |      |           |          |           |          |
| fsyncs/s:                                                                                                   | 23582.36                                                                                                                                                                   |          |      |           |          |           |          |

|    |                                                                                                                                                 |
|----|-------------------------------------------------------------------------------------------------------------------------------------------------|
|    | Throughput:<br>read, MiB/s: 0.00<br>written, MiB/s: 287.82                                                                                      |
| 2. | File operations:<br>reads/s: 0.00<br>writes/s: 18616.31<br>fsyncs/s: 23832.47<br><br>Throughput:<br>read, MiB/s: 0.00<br>written, MiB/s: 290.88 |
| 3. | File operations:<br>reads/s: 0.00<br>writes/s: 19370.15<br>fsyncs/s: 24796.95<br><br>Throughput:<br>read, MiB/s: 0.00<br>written, MiB/s: 302.66 |
| 4. | File operations:<br>reads/s: 0.00<br>writes/s: 18164.14<br>fsyncs/s: 23253.90<br><br>Throughput:<br>read, MiB/s: 0.00<br>written, MiB/s: 283.81 |
| 5. | File operations:<br>reads/s: 0.00<br>writes/s: 18300.21<br>fsyncs/s: 23425.54<br><br>Throughput:<br>read, MiB/s: 0.00<br>written, MiB/s: 285.94 |

Observations :

|    | Throughput (MB/Sec) |        | File Operations (operation/sec) |            |           |
|----|---------------------|--------|---------------------------------|------------|-----------|
|    | read                | write  | reads/sec                       | writes/sec | fsync/sec |
| 1. | 0                   | 287.82 | 0                               | 18420.78   | 23582.36  |
| 2. | 0                   | 290.88 | 0                               | 18616.31   | 23832.47  |
| 3  | 0                   | 302.66 | 0                               | 19370.15   | 24796.95  |

|        |   |             |   |             |             |
|--------|---|-------------|---|-------------|-------------|
| 4.     | 0 | 283.81      | 0 | 18164.14    | 23253.9     |
| 5.     | 0 | 285.94      | 0 | 18300.21    | 23425.54    |
| Avg    | 0 | 291.2925    | 0 | 18574.318   | 23778.244   |
| Min    | 0 | 283.81      | 0 | 18164.14    | 23253.9     |
| Max    | 0 | 302.66      | 0 | 19370.15    | 24796.95    |
| stddev | 0 | 8.112465203 | 0 | 474.8860403 | 607.9493517 |

| Case 55 : IMG TYPE : raw   CPU : 2   RAM :3   MODE : CPU   --cpu-max-prime=1000 |                                                                                                                                           |
|---------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| 1                                                                               | Prime numbers limit: 1000<br><br>Initializing worker threads...<br><br>Threads started!<br><br>CPU speed:<br>events per second: 364973.02 |
| 2.                                                                              | Prime numbers limit: 1000<br><br>Initializing worker threads...<br><br>Threads started!<br><br>CPU speed:<br>events per second: 364224.69 |
| 3.                                                                              | Prime numbers limit: 1000<br><br>Initializing worker threads...<br><br>Threads started!<br><br>CPU speed:<br>events per second: 360465.29 |
| 4.                                                                              | Prime numbers limit: 1000<br><br>Initializing worker threads...<br><br>Threads started!<br><br>CPU speed:<br>events per second: 364876.65 |

|    |                                                                                                                               |
|----|-------------------------------------------------------------------------------------------------------------------------------|
| 5. | Prime numbers limit: 1000<br>Initializing worker threads...<br>Threads started!<br>CPU speed:<br>events per second: 362600.29 |
|----|-------------------------------------------------------------------------------------------------------------------------------|

**Observation :**

**Stats :**

|                                                  |            |
|--------------------------------------------------|------------|
| Average events per second                        | 363427.988 |
| Minimum Number of events per second recorded     | 360465.29  |
| Maximum Number of events per second recorded     | 364973.02  |
| Standard Deviation of events per second recorded | 1909.394   |

**Case 56 : IMG TYPE : raw | CPU :2 | RAM :3 | MODE : CPU | --cpu-max-prime=20000**

|    |                                                                                                                              |
|----|------------------------------------------------------------------------------------------------------------------------------|
| 1  | Prime numbers limit: 20000<br>Initializing worker threads...<br>Threads started!<br>CPU speed:<br>events per second: 4554.89 |
| 2. | Prime numbers limit: 20000<br>Initializing worker threads...<br>Threads started!<br>CPU speed:<br>events per second: 4559.87 |
| 3. | Prime numbers limit: 20000<br>Initializing worker threads...<br>Threads started!<br>CPU speed:<br>events per second: 4545.50 |
| 4. | Prime numbers limit: 20000                                                                                                   |

|    |                                                                                                                               |
|----|-------------------------------------------------------------------------------------------------------------------------------|
|    | <pre>Initializing worker threads... Threads started! CPU speed:   events per second: 4513.57</pre>                            |
| 5. | <pre>Prime numbers limit: 20000 Initializing worker threads... Threads started! CPU speed:   events per second: 4506.58</pre> |

Observation :

Stats :

|                                                  |          |
|--------------------------------------------------|----------|
| Average events per second                        | 4536.082 |
| Minimum Number of events per second recorded     | 4506.58  |
| Maximum Number of events per second recorded     | 4559.87  |
| Standard Deviation of events per second recorded | 24.420   |

| Case 57 : IMG TYPE : raw   CPU : 2   RAM :3   MODE : memory  --memory-block-size= 2K |                                                                                                            |
|--------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| 1                                                                                    | <pre>Total operations: 52428800 (7570870.73 per second) 102400.00 MiB transferred (14786.86 MiB/sec)</pre> |
| 2.                                                                                   | <pre>Total operations: 52428800 (7585797.90 per second) 102400.00 MiB transferred (14816.01 MiB/sec)</pre> |
| 3.                                                                                   | <pre>Total operations: 52428800 (7579799.66 per second) 102400.00 MiB transferred (14804.30 MiB/sec)</pre> |
| 4.                                                                                   | <pre>Total operations: 52428800 (7587214.30 per second) 102400.00 MiB transferred (14818.78 MiB/sec)</pre> |
| 5.                                                                                   | <pre>Total operations: 52428800 (7534876.77 per second) 102400.00 MiB transferred (14716.56 MiB/sec)</pre> |

Observation :

Stats :

|                                         |             |
|-----------------------------------------|-------------|
| Average Operation per second            | 7571711.872 |
| Minimum Operation per second            | 7534876.77  |
| Maximum Operation per second            | 7587214.3   |
| Standard Deviation Operation per second | 21573.623   |

|                                              |             |
|----------------------------------------------|-------------|
| Average MB transferred per second            | 14788.502   |
| Minimum MB transferred per second            | 14716.56    |
| Maximum MB transferred per second            | 14818.78    |
| Standard Deviation MB transferred per second | 42.13481838 |

| Case 58 : IMG TYPE : raw   CPU : 2   RAM :3   MODE : memory   --memory-block-size= 4K |                                                                                                    |
|---------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|
| 1                                                                                     | Total operations: 26214400 (5563771.39 per second)<br>102400.00 MiB transferred (21733.48 MiB/sec) |
| 2.                                                                                    | Total operations: 26214400 (5551054.27 per second)<br>102400.00 MiB transferred (21683.81 MiB/sec) |
| 3.                                                                                    | Total operations: 26214400 (5560629.08 per second)<br>102400.00 MiB transferred (21721.21 MiB/sec) |
| 4.                                                                                    | Total operations: 26214400 (5567921.13 per second)<br>102400.00 MiB transferred (21749.69 MiB/sec) |
| 5.                                                                                    | Total operations: 26214400 (5563863.11 per second)<br>102400.00 MiB transferred (21733.84 MiB/sec) |

Observation :

Stats :

|                              |             |
|------------------------------|-------------|
| Average Operation per second | 5561447.796 |
| Minimum Operation per second | 5551054.27  |

|                                         |            |
|-----------------------------------------|------------|
| Maximum Operation per second            | 5567921.13 |
| Standard Deviation Operation per second | 6360.67    |

|                                              |           |
|----------------------------------------------|-----------|
| Average MB transferred per second            | 21724.406 |
| Minimum MB transferred per second            | 21683.81  |
| Maximum MB transferred per second            | 21749.69  |
| Standard Deviation MB transferred per second | 24.844    |

| Case 59 : IMG TYPE :raw  CPU :2   RAM :3   MODE : fileio   --file-test-mode= rndwr   --file-total-size=3G |                                                                                                                                                                                                                                                                                                                               |          |         |           |         |           |          |              |        |                 |       |
|-----------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|---------|-----------|---------|-----------|----------|--------------|--------|-----------------|-------|
| 1.                                                                                                        | <p>File operations:</p> <table> <tr> <td>reads/s:</td> <td>8816.29</td> </tr> <tr> <td>writes/s:</td> <td>5877.53</td> </tr> <tr> <td>fsyncs/s:</td> <td>18808.83</td> </tr> </table> <p>Throughput:</p> <table> <tr> <td>read, MiB/s:</td> <td>137.75</td> </tr> <tr> <td>written, MiB/s:</td> <td>91.84</td> </tr> </table> | reads/s: | 8816.29 | writes/s: | 5877.53 | fsyncs/s: | 18808.83 | read, MiB/s: | 137.75 | written, MiB/s: | 91.84 |
| reads/s:                                                                                                  | 8816.29                                                                                                                                                                                                                                                                                                                       |          |         |           |         |           |          |              |        |                 |       |
| writes/s:                                                                                                 | 5877.53                                                                                                                                                                                                                                                                                                                       |          |         |           |         |           |          |              |        |                 |       |
| fsyncs/s:                                                                                                 | 18808.83                                                                                                                                                                                                                                                                                                                      |          |         |           |         |           |          |              |        |                 |       |
| read, MiB/s:                                                                                              | 137.75                                                                                                                                                                                                                                                                                                                        |          |         |           |         |           |          |              |        |                 |       |
| written, MiB/s:                                                                                           | 91.84                                                                                                                                                                                                                                                                                                                         |          |         |           |         |           |          |              |        |                 |       |
| 2.                                                                                                        | <p>File operations:</p> <table> <tr> <td>reads/s:</td> <td>8700.23</td> </tr> <tr> <td>writes/s:</td> <td>5800.15</td> </tr> <tr> <td>fsyncs/s:</td> <td>18561.85</td> </tr> </table> <p>Throughput:</p> <table> <tr> <td>read, MiB/s:</td> <td>135.94</td> </tr> <tr> <td>written, MiB/s:</td> <td>90.63</td> </tr> </table> | reads/s: | 8700.23 | writes/s: | 5800.15 | fsyncs/s: | 18561.85 | read, MiB/s: | 135.94 | written, MiB/s: | 90.63 |
| reads/s:                                                                                                  | 8700.23                                                                                                                                                                                                                                                                                                                       |          |         |           |         |           |          |              |        |                 |       |
| writes/s:                                                                                                 | 5800.15                                                                                                                                                                                                                                                                                                                       |          |         |           |         |           |          |              |        |                 |       |
| fsyncs/s:                                                                                                 | 18561.85                                                                                                                                                                                                                                                                                                                      |          |         |           |         |           |          |              |        |                 |       |
| read, MiB/s:                                                                                              | 135.94                                                                                                                                                                                                                                                                                                                        |          |         |           |         |           |          |              |        |                 |       |
| written, MiB/s:                                                                                           | 90.63                                                                                                                                                                                                                                                                                                                         |          |         |           |         |           |          |              |        |                 |       |
| 3.                                                                                                        | <p>File operations:</p> <table> <tr> <td>reads/s:</td> <td>9014.09</td> </tr> <tr> <td>writes/s:</td> <td>6009.39</td> </tr> <tr> <td>fsyncs/s:</td> <td>19231.89</td> </tr> </table> <p>Throughput:</p> <table> <tr> <td>read, MiB/s:</td> <td>140.85</td> </tr> <tr> <td>written, MiB/s:</td> <td>93.90</td> </tr> </table> | reads/s: | 9014.09 | writes/s: | 6009.39 | fsyncs/s: | 19231.89 | read, MiB/s: | 140.85 | written, MiB/s: | 93.90 |
| reads/s:                                                                                                  | 9014.09                                                                                                                                                                                                                                                                                                                       |          |         |           |         |           |          |              |        |                 |       |
| writes/s:                                                                                                 | 6009.39                                                                                                                                                                                                                                                                                                                       |          |         |           |         |           |          |              |        |                 |       |
| fsyncs/s:                                                                                                 | 19231.89                                                                                                                                                                                                                                                                                                                      |          |         |           |         |           |          |              |        |                 |       |
| read, MiB/s:                                                                                              | 140.85                                                                                                                                                                                                                                                                                                                        |          |         |           |         |           |          |              |        |                 |       |
| written, MiB/s:                                                                                           | 93.90                                                                                                                                                                                                                                                                                                                         |          |         |           |         |           |          |              |        |                 |       |
| 4.                                                                                                        | <p>File operations:</p> <table> <tr> <td>reads/s:</td> <td>9158.44</td> </tr> <tr> <td>writes/s:</td> <td>6105.63</td> </tr> <tr> <td>fsyncs/s:</td> <td>19541.63</td> </tr> </table> <p>Throughput:</p> <table> <tr> <td>read, MiB/s:</td> <td>143.10</td> </tr> </table>                                                    | reads/s: | 9158.44 | writes/s: | 6105.63 | fsyncs/s: | 19541.63 | read, MiB/s: | 143.10 |                 |       |
| reads/s:                                                                                                  | 9158.44                                                                                                                                                                                                                                                                                                                       |          |         |           |         |           |          |              |        |                 |       |
| writes/s:                                                                                                 | 6105.63                                                                                                                                                                                                                                                                                                                       |          |         |           |         |           |          |              |        |                 |       |
| fsyncs/s:                                                                                                 | 19541.63                                                                                                                                                                                                                                                                                                                      |          |         |           |         |           |          |              |        |                 |       |
| read, MiB/s:                                                                                              | 143.10                                                                                                                                                                                                                                                                                                                        |          |         |           |         |           |          |              |        |                 |       |

|    |                  |          |
|----|------------------|----------|
|    | written, MiB/s:  | 95.40    |
| 5. | File operations: |          |
|    | reads/s:         | 8800.23  |
|    | writes/s:        | 5866.82  |
|    | fsyncs/s:        | 18776.03 |
|    | Throughput:      |          |
|    | read, MiB/s:     | 137.50   |
|    | written, MiB/s:  | 91.67    |

Observations :

|        | Throughput (MB/Sec) |             | File Operations (operation/sec) |             |            |
|--------|---------------------|-------------|---------------------------------|-------------|------------|
|        | read                | write       | reads/sec                       | writes/sec  | fsync/sec  |
| 1.     | 137.75              | 91.84       | 8816.29                         | 5877.53     | 18808.83   |
| 2.     | 135.94              | 90.63       | 8700.23                         | 5800.15     | 18561.85   |
| 3      | 140.85              | 93.9        | 9014.09                         | 6009.39     | 19231.89   |
| 4.     | 143.1               | 95.4        | 9158.44                         | 6105.63     | 19541.63   |
| 5.     | 137.5               | 91.67       | 8800.23                         | 5866.82     | 18776.03   |
| Avg    | 139.028             | 92.688      | 8897.856                        | 5931.904    | 18984.046  |
| Min    | 135.94              | 90.63       | 8700.23                         | 5800.15     | 18561.85   |
| Max    | 143.1               | 95.4        | 9158.44                         | 6105.63     | 19541.63   |
| stddev | 2.889839096         | 1.924492141 | 184.8338767                     | 123.2237586 | 395.141535 |

|                                                                                                           |                                                                                                                                                 |
|-----------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| Case 60 : IMG TYPE :raw  CPU :2   RAM :3   MODE : fileio   --file-test-mode= seqwr   --file-total-size=3G |                                                                                                                                                 |
| 1                                                                                                         | File operations:<br>reads/s: 0.00<br>writes/s: 21686.93<br>fsyncs/s: 27760.87<br><br>Throughput:<br>read, MiB/s: 0.00<br>written, MiB/s: 338.86 |
| 2.                                                                                                        | File operations:<br>reads/s: 0.00                                                                                                               |

|    |                                                                                                                                                             |
|----|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    | <p>writes/s: 20472.96<br/>fsyncs/s: 26205.92</p> <p>Throughput:<br/>read, MiB/s: 0.00<br/>written, MiB/s: 319.89</p>                                        |
| 3. | <p>File operations:<br/>reads/s: 0.00<br/>writes/s: 19273.39<br/>fsyncs/s: 24670.95</p> <p>Throughput:<br/>read, MiB/s: 0.00<br/>written, MiB/s: 301.15</p> |
| 4. | <p>File operations:<br/>reads/s: 0.00<br/>writes/s: 20243.79<br/>fsyncs/s: 25912.45</p> <p>Throughput:<br/>read, MiB/s: 0.00<br/>written, MiB/s: 316.31</p> |
| 5. | <p>File operations:<br/>reads/s: 0.00<br/>writes/s: 19323.82<br/>fsyncs/s: 24738.56</p> <p>Throughput:<br/>read, MiB/s: 0.00<br/>written, MiB/s: 301.93</p> |

Observations :

|     | Throughput (MB/Sec) |         | File Operations (operation/sec) |            |           |
|-----|---------------------|---------|---------------------------------|------------|-----------|
|     | read                | write   | reads/sec                       | writes/sec | fsync/sec |
| 1.  | 0                   | 338.86  | 0                               | 21686.93   | 27760.87  |
| 2.  | 0                   | 319.89  | 0                               | 20472.96   | 26205.92  |
| 3   | 0                   | 301.15  | 0                               | 19273.39   | 24670.95  |
| 4.  | 0                   | 316.31  | 0                               | 20243.79   | 25912.45  |
| 5.  | 0                   | 301.93  | 0                               | 19323.82   | 24738.56  |
| Avg | 0                   | 315.628 | 0                               | 20200.178  | 25857.75  |
| Min | 0                   | 301.15  | 0                               | 19273.39   | 24670.95  |

|        |   |             |   |             |             |
|--------|---|-------------|---|-------------|-------------|
| Max    | 0 | 338.86      | 0 | 21686.93    | 27760.87    |
| stddev | 0 | 15.50332518 | 0 | 989.1515148 | 1265.618492 |

| Case 61 : IMG TYPE : raw   CPU : 3   RAM : 2   MODE : CPU   --cpu-max-prime=1000 |                                                                                                                                           |
|----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| 1                                                                                | Prime numbers limit: 1000<br><br>Initializing worker threads...<br><br>Threads started!<br><br>CPU speed:<br>events per second: 361558.28 |
| 2.                                                                               | Prime numbers limit: 1000<br><br>Initializing worker threads...<br><br>Threads started!<br><br>CPU speed:<br>events per second: 357809.35 |
| 3.                                                                               | Prime numbers limit: 1000<br><br>Initializing worker threads...<br><br>Threads started!<br><br>CPU speed:<br>events per second: 361745.81 |
| 4.                                                                               | Prime numbers limit: 1000<br><br>Initializing worker threads...<br><br>Threads started!<br><br>CPU speed:<br>events per second: 363123.49 |
| 5.                                                                               | Prime numbers limit: 1000<br><br>Initializing worker threads...<br><br>Threads started!<br><br>CPU speed:<br>events per second: 358486.53 |

Observation :

Stats :

|                                                  |             |
|--------------------------------------------------|-------------|
| Average events per second                        | 360544.692  |
| Minimum Number of events per second recorded     | 357809.35   |
| Maximum Number of events per second recorded     | 363123.49   |
| Standard Deviation of events per second recorded | 2282.453224 |

| Case 62 : IMG TYPE : raw   CPU : 3   RAM : 2   MODE : CPU   --cpu-max-prime=20000 |                                                                                                                              |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|
| 1                                                                                 | Prime numbers limit: 20000<br>Initializing worker threads...<br>Threads started!<br>CPU speed:<br>events per second: 4511.59 |
| 2.                                                                                | Prime numbers limit: 20000<br>Initializing worker threads...<br>Threads started!<br>CPU speed:<br>events per second: 4516.67 |
| 3.                                                                                | Prime numbers limit: 20000<br>Initializing worker threads...<br>Threads started!<br>CPU speed:<br>events per second: 4522.09 |
| 4.                                                                                | Prime numbers limit: 20000<br>Initializing worker threads...<br>Threads started!<br>CPU speed:<br>events per second: 4526.88 |
| 5.                                                                                | Prime numbers limit: 20000<br>Initializing worker threads...                                                                 |

|  |                                                                  |
|--|------------------------------------------------------------------|
|  | Threads started!<br><br>CPU speed:<br>events per second: 4518.85 |
|--|------------------------------------------------------------------|

Observation :

Stats :

|                                                  |          |
|--------------------------------------------------|----------|
| Average events per second                        | 4519.216 |
| Minimum Number of events per second recorded     | 4511.59  |
| Maximum Number of events per second recorded     | 4526.88  |
| Standard Deviation of events per second recorded | 5.739    |

| Case 63 : IMG TYPE : raw   CPU : 3   RAM : 2   MODE : memory   --memory-block-size= 2K |                                                                                                        |
|----------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|
| 1                                                                                      | Total operations: 52428800 (7347206.26 per second)<br><br>102400.00 MiB transferred (14350.01 MiB/sec) |
| 2.                                                                                     | Total operations: 52428800 (7563797.65 per second)<br><br>102400.00 MiB transferred (14773.04 MiB/sec) |
| 3.                                                                                     | Total operations: 52428800 (7526918.80 per second)<br><br>102400.00 MiB transferred (14701.01 MiB/sec) |
| 4.                                                                                     | Total operations: 52428800 (7568885.21 per second)<br><br>102400.00 MiB transferred (14782.98 MiB/sec) |
| 5.                                                                                     | Total operations: 52428800 (7497900.95 per second)<br><br>102400.00 MiB transferred (14644.34 MiB/sec) |

Observation :

Stats :

|                              |             |
|------------------------------|-------------|
| Average Operation per second | 7500941.774 |
| Minimum Operation per second | 7347206.26  |
| Maximum Operation per second | 7568885.21  |

|                                         |            |
|-----------------------------------------|------------|
| Standard Deviation Operation per second | 90672.2565 |
|-----------------------------------------|------------|

|                                              |             |
|----------------------------------------------|-------------|
| Average MB transferred per second            | 14650.276   |
| Minimum MB transferred per second            | 14350.01    |
| Maximum MB transferred per second            | 14782.98    |
| Standard Deviation MB transferred per second | 177.0947465 |

| Case 64 : IMG TYPE : raw   CPU : 3   RAM :2   MODE : memory   --memory-block-size= 4K |                                                                                                    |
|---------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|
| 1.                                                                                    | Total operations: 26214400 (5509189.54 per second)<br>102400.00 MiB transferred (21520.27 MiB/sec) |
| 2.                                                                                    | Total operations: 26214400 (5528545.03 per second)<br>102400.00 MiB transferred (21595.88 MiB/sec) |
| 3.                                                                                    | Total operations: 26214400 (5564493.58 per second)<br>102400.00 MiB transferred (21736.30 MiB/sec) |
| 4.                                                                                    | Total operations: 26214400 (5540900.47 per second)<br>102400.00 MiB transferred (21644.14 MiB/sec) |
| 5.                                                                                    | Total operations: 26214400 (5487259.44 per second)<br>102400.00 MiB transferred (21434.61 MiB/sec) |

Observation :

Stats :

|                                         |             |
|-----------------------------------------|-------------|
| Average Operation per second            | 5526077.612 |
| Minimum Operation per second            | 5487259.44  |
| Maximum Operation per second            | 5564493.58  |
| Standard Deviation Operation per second | 29553.55022 |

|                                   |          |
|-----------------------------------|----------|
| Average MB transferred per second | 21586.24 |
| Minimum MB transferred per second | 21434.61 |

|                                              |            |
|----------------------------------------------|------------|
| Maximum MB transferred per second            | 21736.3    |
| Standard Deviation MB transferred per second | 115.441588 |

Case 65 : IMG TYPE :raw | CPU : 3 | RAM : 2 | MODE : fileio | --file-test-mode= rndwr | --file-total-size=3G

|                 |                                                                                                                                                                                                                                                                                                                |          |         |           |         |           |          |              |        |                 |       |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|---------|-----------|---------|-----------|----------|--------------|--------|-----------------|-------|
| 1               | <p>File operations:</p> <table> <tr><td>reads/s:</td><td>6375.84</td></tr> <tr><td>writes/s:</td><td>4250.54</td></tr> <tr><td>fsyncs/s:</td><td>13604.06</td></tr> </table> <p>Throughput:</p> <table> <tr><td>read, MiB/s:</td><td>99.62</td></tr> <tr><td>written, MiB/s:</td><td>66.41</td></tr> </table>  | reads/s: | 6375.84 | writes/s: | 4250.54 | fsyncs/s: | 13604.06 | read, MiB/s: | 99.62  | written, MiB/s: | 66.41 |
| reads/s:        | 6375.84                                                                                                                                                                                                                                                                                                        |          |         |           |         |           |          |              |        |                 |       |
| writes/s:       | 4250.54                                                                                                                                                                                                                                                                                                        |          |         |           |         |           |          |              |        |                 |       |
| fsyncs/s:       | 13604.06                                                                                                                                                                                                                                                                                                       |          |         |           |         |           |          |              |        |                 |       |
| read, MiB/s:    | 99.62                                                                                                                                                                                                                                                                                                          |          |         |           |         |           |          |              |        |                 |       |
| written, MiB/s: | 66.41                                                                                                                                                                                                                                                                                                          |          |         |           |         |           |          |              |        |                 |       |
| 2.              | <p>File operations:</p> <table> <tr><td>reads/s:</td><td>6284.68</td></tr> <tr><td>writes/s:</td><td>4189.79</td></tr> <tr><td>fsyncs/s:</td><td>13408.89</td></tr> </table> <p>Throughput:</p> <table> <tr><td>read, MiB/s:</td><td>98.20</td></tr> <tr><td>written, MiB/s:</td><td>65.47</td></tr> </table>  | reads/s: | 6284.68 | writes/s: | 4189.79 | fsyncs/s: | 13408.89 | read, MiB/s: | 98.20  | written, MiB/s: | 65.47 |
| reads/s:        | 6284.68                                                                                                                                                                                                                                                                                                        |          |         |           |         |           |          |              |        |                 |       |
| writes/s:       | 4189.79                                                                                                                                                                                                                                                                                                        |          |         |           |         |           |          |              |        |                 |       |
| fsyncs/s:       | 13408.89                                                                                                                                                                                                                                                                                                       |          |         |           |         |           |          |              |        |                 |       |
| read, MiB/s:    | 98.20                                                                                                                                                                                                                                                                                                          |          |         |           |         |           |          |              |        |                 |       |
| written, MiB/s: | 65.47                                                                                                                                                                                                                                                                                                          |          |         |           |         |           |          |              |        |                 |       |
| 3.              | <p>File operations:</p> <table> <tr><td>reads/s:</td><td>6362.26</td></tr> <tr><td>writes/s:</td><td>4241.48</td></tr> <tr><td>fsyncs/s:</td><td>13573.82</td></tr> </table> <p>Throughput:</p> <table> <tr><td>read, MiB/s:</td><td>99.41</td></tr> <tr><td>written, MiB/s:</td><td>66.27</td></tr> </table>  | reads/s: | 6362.26 | writes/s: | 4241.48 | fsyncs/s: | 13573.82 | read, MiB/s: | 99.41  | written, MiB/s: | 66.27 |
| reads/s:        | 6362.26                                                                                                                                                                                                                                                                                                        |          |         |           |         |           |          |              |        |                 |       |
| writes/s:       | 4241.48                                                                                                                                                                                                                                                                                                        |          |         |           |         |           |          |              |        |                 |       |
| fsyncs/s:       | 13573.82                                                                                                                                                                                                                                                                                                       |          |         |           |         |           |          |              |        |                 |       |
| read, MiB/s:    | 99.41                                                                                                                                                                                                                                                                                                          |          |         |           |         |           |          |              |        |                 |       |
| written, MiB/s: | 66.27                                                                                                                                                                                                                                                                                                          |          |         |           |         |           |          |              |        |                 |       |
| 4.              | <p>File operations:</p> <table> <tr><td>reads/s:</td><td>6592.01</td></tr> <tr><td>writes/s:</td><td>4394.67</td></tr> <tr><td>fsyncs/s:</td><td>14064.23</td></tr> </table> <p>Throughput:</p> <table> <tr><td>read, MiB/s:</td><td>103.00</td></tr> <tr><td>written, MiB/s:</td><td>68.67</td></tr> </table> | reads/s: | 6592.01 | writes/s: | 4394.67 | fsyncs/s: | 14064.23 | read, MiB/s: | 103.00 | written, MiB/s: | 68.67 |
| reads/s:        | 6592.01                                                                                                                                                                                                                                                                                                        |          |         |           |         |           |          |              |        |                 |       |
| writes/s:       | 4394.67                                                                                                                                                                                                                                                                                                        |          |         |           |         |           |          |              |        |                 |       |
| fsyncs/s:       | 14064.23                                                                                                                                                                                                                                                                                                       |          |         |           |         |           |          |              |        |                 |       |
| read, MiB/s:    | 103.00                                                                                                                                                                                                                                                                                                         |          |         |           |         |           |          |              |        |                 |       |
| written, MiB/s: | 68.67                                                                                                                                                                                                                                                                                                          |          |         |           |         |           |          |              |        |                 |       |
| 5.              | <p>File operations:</p> <table> <tr><td>reads/s:</td><td>6774.39</td></tr> <tr><td>writes/s:</td><td>4516.24</td></tr> <tr><td>fsyncs/s:</td><td>14452.40</td></tr> </table> <p>Throughput:</p> <table> <tr><td>read, MiB/s:</td><td>105.85</td></tr> </table>                                                 | reads/s: | 6774.39 | writes/s: | 4516.24 | fsyncs/s: | 14452.40 | read, MiB/s: | 105.85 |                 |       |
| reads/s:        | 6774.39                                                                                                                                                                                                                                                                                                        |          |         |           |         |           |          |              |        |                 |       |
| writes/s:       | 4516.24                                                                                                                                                                                                                                                                                                        |          |         |           |         |           |          |              |        |                 |       |
| fsyncs/s:       | 14452.40                                                                                                                                                                                                                                                                                                       |          |         |           |         |           |          |              |        |                 |       |
| read, MiB/s:    | 105.85                                                                                                                                                                                                                                                                                                         |          |         |           |         |           |          |              |        |                 |       |

|  |                 |       |
|--|-----------------|-------|
|  | written, MiB/s: | 70.57 |
|--|-----------------|-------|

Observations :

|        | Throughput (MB/Sec) |             | File Operations (operation/sec) |             |             |
|--------|---------------------|-------------|---------------------------------|-------------|-------------|
|        | read                | write       | reads/sec                       | writes/sec  | fsync/sec   |
| 1.     | 99.62               | 66.41       | 6375.84                         | 4250.54     | 13604.06    |
| 2.     | 98.2                | 65.47       | 6284.68                         | 4189.79     | 13408.89    |
| 3      | 99.41               | 66.27       | 6362.26                         | 4241.48     | 13573.82    |
| 4.     | 103                 | 68.67       | 6592.01                         | 4394.67     | 14064.23    |
| 5.     | 105.85              | 70.57       | 6774.39                         | 4516.24     | 14452.4     |
| Avg    | 101.216             | 67.478      | 6477.836                        | 4318.544    | 13820.68    |
| Min    | 98.2                | 65.47       | 6284.68                         | 4189.79     | 13408.89    |
| Max    | 105.85              | 68.67       | 6774.39                         | 4516.24     | 14452.4     |
| stddev | 3.144905404         | 1.373887429 | 201.2773046                     | 134.1825929 | 428.9002941 |

| Case 66 : IMG TYPE :raw  CPU : 3   RAM : 2   MODE : fileio   --file-test-mode= seqwr   --file-total-size=3G |                                                                                                                                                 |  |
|-------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|--|
| 1                                                                                                           | File operations:<br>reads/s: 0.00<br>writes/s: 20120.51<br>fsyncs/s: 25755.46<br><br>Throughput:<br>read, MiB/s: 0.00<br>written, MiB/s: 314.38 |  |
| 2.                                                                                                          | File operations:<br>reads/s: 0.00<br>writes/s: 18526.96<br>fsyncs/s: 23716.54<br><br>Throughput:<br>read, MiB/s: 0.00<br>written, MiB/s: 289.48 |  |
| 3.                                                                                                          | File operations:                                                                                                                                |  |

|    |                                                                                                                                                             |
|----|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    | <p>reads/s: 0.00<br/>writes/s: 18213.30<br/>fsyncs/s: 23314.75</p> <p>Throughput:<br/>read, MiB/s: 0.00<br/>written, MiB/s: 284.58</p>                      |
| 4. | <p>File operations:<br/>reads/s: 0.00<br/>writes/s: 18906.72<br/>fsyncs/s: 24202.80</p> <p>Throughput:<br/>read, MiB/s: 0.00<br/>written, MiB/s: 295.42</p> |
| 5. | <p>File operations:<br/>reads/s: 0.00<br/>writes/s: 17986.56<br/>fsyncs/s: 23024.33</p> <p>Throughput:<br/>read, MiB/s: 0.00<br/>written, MiB/s: 281.04</p> |

Observations :

|        | Throughput (MB/Sec) |             | File Operations (operation/sec) |             |             |
|--------|---------------------|-------------|---------------------------------|-------------|-------------|
|        | read                | write       | reads/sec                       | writes/sec  | fsync/sec   |
| 1.     | 0                   | 314.38      | 0                               | 20120.51    | 25755.46    |
| 2.     | 0                   | 289.48      | 0                               | 18526.96    | 23716.54    |
| 3      | 0                   | 284.58      | 0                               | 18213.3     | 23314.75    |
| 4.     | 0                   | 295.42      | 0                               | 18906.72    | 24202.8     |
| 5.     | 0                   | 281.04      | 0                               | 17986.56    | 23024.33    |
| Avg    | 0                   | 292.98      | 0                               | 18750.81    | 24002.776   |
| Min    | 0                   | 284.58      | 0                               | 17986.56    | 23024.33    |
| Max    | 0                   | 314.38      | 0                               | 20120.51    | 25755.46    |
| stddev | 0                   | 13.05223736 | 0                               | 840.1621723 | 1075.241624 |

Case 67 : IMG TYPE : raw | CPU : 3 | RAM :3 | MODE : CPU | --cpu-max-prime=1000

|    |                                                                                                                                           |
|----|-------------------------------------------------------------------------------------------------------------------------------------------|
| 1  | Prime numbers limit: 1000<br><br>Initializing worker threads...<br><br>Threads started!<br><br>CPU speed:<br>events per second: 360811.06 |
| 2. | Prime numbers limit: 1000<br><br>Initializing worker threads...<br><br>Threads started!<br><br>CPU speed:<br>events per second: 362186.32 |
| 3. | Prime numbers limit: 1000<br><br>Initializing worker threads...<br><br>Threads started!<br><br>CPU speed:<br>events per second: 362023.84 |
| 4. | Prime numbers limit: 1000<br><br>Initializing worker threads...<br><br>Threads started!<br><br>CPU speed:<br>events per second: 361902.01 |
| 5. | Prime numbers limit: 1000<br><br>Initializing worker threads...<br><br>Threads started!<br><br>CPU speed:<br>events per second: 360195.01 |

Observation :

Stats :

|                                              |            |
|----------------------------------------------|------------|
| Average events per second                    | 361423.648 |
| Minimum Number of events per second recorded | 360195.01  |

|                                                  |           |
|--------------------------------------------------|-----------|
| Maximum Number of events per second recorded     | 362186.32 |
| Standard Deviation of events per second recorded | 874.0058  |

| Case 68 : IMG TYPE : raw   CPU :3   RAM :3   MODE :CPU   --cpu-max-prime=20000 |                                                                                                                                          |
|--------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| 1                                                                              | Prime numbers limit: 20000<br><br>Initializing worker threads...<br><br>Threads started!<br><br>CPU speed:<br>events per second: 4515.38 |
| 2.                                                                             | Prime numbers limit: 20000<br><br>Initializing worker threads...<br><br>Threads started!<br><br>CPU speed:<br>events per second: 4509.69 |
| 3.                                                                             | Prime numbers limit: 20000<br><br>Initializing worker threads...<br><br>Threads started!<br><br>CPU speed:<br>events per second: 4538.72 |
| 4.                                                                             | Prime numbers limit: 20000<br><br>Initializing worker threads...<br><br>Threads started!<br><br>CPU speed:<br>events per second: 4527.79 |
| 5.                                                                             | Prime numbers limit: 20000<br><br>Initializing worker threads...<br><br>Threads started!<br><br>CPU speed:<br>events per second: 4538.45 |

Observation :

Stats :

|                                                  |          |
|--------------------------------------------------|----------|
| Average events per second                        | 4526.006 |
| Minimum Number of events per second recorded     | 4509.69  |
| Maximum Number of events per second recorded     | 4538.72  |
| Standard Deviation of events per second recorded | 13.217   |

Case 69 : IMG TYPE : raw | CPU : 3 | RAM :3 | MODE : memory |--memory-block-size= 2K

|    |                                                                                                    |
|----|----------------------------------------------------------------------------------------------------|
| 1. | Total operations: 52428800 (7583165.51 per second)<br>102400.00 MiB transferred (14810.87 MiB/sec) |
| 2. | Total operations: 52428800 (7568222.70 per second)<br>102400.00 MiB transferred (14781.68 MiB/sec) |
| 3. | Total operations: 52428800 (7596212.67 per second)<br>102400.00 MiB transferred (14836.35 MiB/sec) |
| 4. | Total operations: 52428800 (7548109.95 per second)<br>102400.00 MiB transferred (14742.40 MiB/sec) |
| 5. | Total operations: 52428800 (7595784.79 per second)<br>102400.00 MiB transferred (14835.52 MiB/sec) |

Observation :

Stats :

|                                         |             |
|-----------------------------------------|-------------|
| Average Operation per second            | 7578299.124 |
| Minimum Operation per second            | 7548109.95  |
| Maximum Operation per second            | 7596212.67  |
| Standard Deviation Operation per second | 20391.455   |

|                                   |           |
|-----------------------------------|-----------|
| Average MB transferred per second | 14801.364 |
| Minimum MB transferred per second | 14742.4   |

|                                              |          |
|----------------------------------------------|----------|
| Maximum MB transferred per second            | 14836.35 |
| Standard Deviation MB transferred per second | 39.83    |

| Case 70 : IMG TYPE : raw   CPU : 3   RAM :3   MODE : memory   --memory-block-size= 4K |                                                                                                    |
|---------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|
| 1.                                                                                    | Total operations: 26214400 (5485267.76 per second)<br>102400.00 MiB transferred (21426.83 MiB/sec) |
| 2.                                                                                    | Total operations: 26214400 (5492523.09 per second)<br>102400.00 MiB transferred (21455.17 MiB/sec) |
| 3.                                                                                    | Total operations: 26214400 (5558923.22 per second)<br>102400.00 MiB transferred (21714.54 MiB/sec) |
| 4.                                                                                    | Total operations: 26214400 (5516411.97 per second)<br>102400.00 MiB transferred (21548.48 MiB/sec) |
| 5.                                                                                    | Total operations: 26214400 (5495368.50 per second)<br>102400.00 MiB transferred (21466.28 MiB/sec) |

Observation :

Stats :

|                                         |             |
|-----------------------------------------|-------------|
| Average Operation per second            | 5509698.908 |
| Minimum Operation per second            | 5485267.76  |
| Maximum Operation per second            | 5558923.22  |
| Standard Deviation Operation per second | 29855.26923 |

|                                              |          |
|----------------------------------------------|----------|
| Average MB transferred per second            | 21522.26 |
| Minimum MB transferred per second            | 21426.83 |
| Maximum MB transferred per second            | 21714.54 |
| Standard Deviation MB transferred per second | 116.62   |

Case 71 : IMG TYPE :raw| CPU:3 | RAM :3 | MODE : fileio | --file-test-mode= rndwr | --file-total-size=3G

|                 |                                                                                                                                                                                                                                                                                                                                                  |          |         |           |         |           |          |              |        |                 |       |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|---------|-----------|---------|-----------|----------|--------------|--------|-----------------|-------|
| 1               | <p>File operations:</p> <table> <tbody> <tr><td>reads/s:</td><td>8660.69</td></tr> <tr><td>writes/s:</td><td>5773.80</td></tr> <tr><td>fsyncs/s:</td><td>18479.75</td></tr> </tbody> </table> <p>Throughput:</p> <table> <tbody> <tr><td>read, MiB/s:</td><td>135.32</td></tr> <tr><td>written, MiB/s:</td><td>90.22</td></tr> </tbody> </table> | reads/s: | 8660.69 | writes/s: | 5773.80 | fsyncs/s: | 18479.75 | read, MiB/s: | 135.32 | written, MiB/s: | 90.22 |
| reads/s:        | 8660.69                                                                                                                                                                                                                                                                                                                                          |          |         |           |         |           |          |              |        |                 |       |
| writes/s:       | 5773.80                                                                                                                                                                                                                                                                                                                                          |          |         |           |         |           |          |              |        |                 |       |
| fsyncs/s:       | 18479.75                                                                                                                                                                                                                                                                                                                                         |          |         |           |         |           |          |              |        |                 |       |
| read, MiB/s:    | 135.32                                                                                                                                                                                                                                                                                                                                           |          |         |           |         |           |          |              |        |                 |       |
| written, MiB/s: | 90.22                                                                                                                                                                                                                                                                                                                                            |          |         |           |         |           |          |              |        |                 |       |
| 2.              | <p>File operations:</p> <table> <tbody> <tr><td>reads/s:</td><td>8874.19</td></tr> <tr><td>writes/s:</td><td>5916.13</td></tr> <tr><td>fsyncs/s:</td><td>18932.05</td></tr> </tbody> </table> <p>Throughput:</p> <table> <tbody> <tr><td>read, MiB/s:</td><td>138.66</td></tr> <tr><td>written, MiB/s:</td><td>92.44</td></tr> </tbody> </table> | reads/s: | 8874.19 | writes/s: | 5916.13 | fsyncs/s: | 18932.05 | read, MiB/s: | 138.66 | written, MiB/s: | 92.44 |
| reads/s:        | 8874.19                                                                                                                                                                                                                                                                                                                                          |          |         |           |         |           |          |              |        |                 |       |
| writes/s:       | 5916.13                                                                                                                                                                                                                                                                                                                                          |          |         |           |         |           |          |              |        |                 |       |
| fsyncs/s:       | 18932.05                                                                                                                                                                                                                                                                                                                                         |          |         |           |         |           |          |              |        |                 |       |
| read, MiB/s:    | 138.66                                                                                                                                                                                                                                                                                                                                           |          |         |           |         |           |          |              |        |                 |       |
| written, MiB/s: | 92.44                                                                                                                                                                                                                                                                                                                                            |          |         |           |         |           |          |              |        |                 |       |
| 3.              | <p>File operations:</p> <table> <tbody> <tr><td>reads/s:</td><td>8681.74</td></tr> <tr><td>writes/s:</td><td>5787.82</td></tr> <tr><td>fsyncs/s:</td><td>18521.12</td></tr> </tbody> </table> <p>Throughput:</p> <table> <tbody> <tr><td>read, MiB/s:</td><td>135.65</td></tr> <tr><td>written, MiB/s:</td><td>90.43</td></tr> </tbody> </table> | reads/s: | 8681.74 | writes/s: | 5787.82 | fsyncs/s: | 18521.12 | read, MiB/s: | 135.65 | written, MiB/s: | 90.43 |
| reads/s:        | 8681.74                                                                                                                                                                                                                                                                                                                                          |          |         |           |         |           |          |              |        |                 |       |
| writes/s:       | 5787.82                                                                                                                                                                                                                                                                                                                                          |          |         |           |         |           |          |              |        |                 |       |
| fsyncs/s:       | 18521.12                                                                                                                                                                                                                                                                                                                                         |          |         |           |         |           |          |              |        |                 |       |
| read, MiB/s:    | 135.65                                                                                                                                                                                                                                                                                                                                           |          |         |           |         |           |          |              |        |                 |       |
| written, MiB/s: | 90.43                                                                                                                                                                                                                                                                                                                                            |          |         |           |         |           |          |              |        |                 |       |
| 4.              | <p>File operations:</p> <table> <tbody> <tr><td>reads/s:</td><td>8400.54</td></tr> <tr><td>writes/s:</td><td>5600.36</td></tr> <tr><td>fsyncs/s:</td><td>17924.56</td></tr> </tbody> </table> <p>Throughput:</p> <table> <tbody> <tr><td>read, MiB/s:</td><td>131.26</td></tr> <tr><td>written, MiB/s:</td><td>87.51</td></tr> </tbody> </table> | reads/s: | 8400.54 | writes/s: | 5600.36 | fsyncs/s: | 17924.56 | read, MiB/s: | 131.26 | written, MiB/s: | 87.51 |
| reads/s:        | 8400.54                                                                                                                                                                                                                                                                                                                                          |          |         |           |         |           |          |              |        |                 |       |
| writes/s:       | 5600.36                                                                                                                                                                                                                                                                                                                                          |          |         |           |         |           |          |              |        |                 |       |
| fsyncs/s:       | 17924.56                                                                                                                                                                                                                                                                                                                                         |          |         |           |         |           |          |              |        |                 |       |
| read, MiB/s:    | 131.26                                                                                                                                                                                                                                                                                                                                           |          |         |           |         |           |          |              |        |                 |       |
| written, MiB/s: | 87.51                                                                                                                                                                                                                                                                                                                                            |          |         |           |         |           |          |              |        |                 |       |
| 5.              | <p>File operations:</p> <table> <tbody> <tr><td>reads/s:</td><td>8556.40</td></tr> <tr><td>writes/s:</td><td>5704.27</td></tr> <tr><td>fsyncs/s:</td><td>18255.52</td></tr> </tbody> </table> <p>Throughput:</p> <table> <tbody> <tr><td>read, MiB/s:</td><td>133.69</td></tr> <tr><td>written, MiB/s:</td><td>89.13</td></tr> </tbody> </table> | reads/s: | 8556.40 | writes/s: | 5704.27 | fsyncs/s: | 18255.52 | read, MiB/s: | 133.69 | written, MiB/s: | 89.13 |
| reads/s:        | 8556.40                                                                                                                                                                                                                                                                                                                                          |          |         |           |         |           |          |              |        |                 |       |
| writes/s:       | 5704.27                                                                                                                                                                                                                                                                                                                                          |          |         |           |         |           |          |              |        |                 |       |
| fsyncs/s:       | 18255.52                                                                                                                                                                                                                                                                                                                                         |          |         |           |         |           |          |              |        |                 |       |
| read, MiB/s:    | 133.69                                                                                                                                                                                                                                                                                                                                           |          |         |           |         |           |          |              |        |                 |       |
| written, MiB/s: | 89.13                                                                                                                                                                                                                                                                                                                                            |          |         |           |         |           |          |              |        |                 |       |

Observations :

|  | Throughput (MB/Sec) |       | File Operations (operation/sec) |            |           |
|--|---------------------|-------|---------------------------------|------------|-----------|
|  | read                | write | reads/sec                       | writes/sec | fsync/sec |
|  |                     |       |                                 |            |           |

|        |             |             |            |             |             |
|--------|-------------|-------------|------------|-------------|-------------|
| 1.     | 135.32      | 90.22       | 8660.69    | 5773.8      | 18479.75    |
| 2.     | 138.66      | 92.44       | 8874.19    | 5916.13     | 18932.05    |
| 3      | 135.65      | 90.43       | 8681.74    | 5787.82     | 18521.12    |
| 4.     | 131.26      | 87.51       | 8400.54    | 5600.36     | 17924.56    |
| 5.     | 133.69      | 89.13       | 8556.4     | 5704.27     | 18255.52    |
| Avg    | 134.916     | 89.946      | 8634.712   | 5756.476    | 18422.6     |
| Min    | 131.26      | 87.51       | 8400.54    | 5600.36     | 17924.56    |
| Max    | 138.66      | 92.44       | 8874.19    | 5916.13     | 18932.05    |
| stddev | 2.719784918 | 2.024598726 | 174.072899 | 116.0491694 | 370.2942018 |

| Case 72 : IMG TYPE :raw  CPU:3   RAM :3   MODE : fileio   --file-test-mode= rndwr   --file-total-size=3G |                                                                                                                                                                                                                                                                                                             |          |      |           |          |           |          |              |      |                 |        |
|----------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|------|-----------|----------|-----------|----------|--------------|------|-----------------|--------|
| 1                                                                                                        | <p>File operations:</p> <table> <tr><td>reads/s:</td><td>0.00</td></tr> <tr><td>writes/s:</td><td>19453.30</td></tr> <tr><td>fsyncs/s:</td><td>24903.69</td></tr> </table> <p>Throughput:</p> <table> <tr><td>read, MiB/s:</td><td>0.00</td></tr> <tr><td>written, MiB/s:</td><td>303.96</td></tr> </table> | reads/s: | 0.00 | writes/s: | 19453.30 | fsyncs/s: | 24903.69 | read, MiB/s: | 0.00 | written, MiB/s: | 303.96 |
| reads/s:                                                                                                 | 0.00                                                                                                                                                                                                                                                                                                        |          |      |           |          |           |          |              |      |                 |        |
| writes/s:                                                                                                | 19453.30                                                                                                                                                                                                                                                                                                    |          |      |           |          |           |          |              |      |                 |        |
| fsyncs/s:                                                                                                | 24903.69                                                                                                                                                                                                                                                                                                    |          |      |           |          |           |          |              |      |                 |        |
| read, MiB/s:                                                                                             | 0.00                                                                                                                                                                                                                                                                                                        |          |      |           |          |           |          |              |      |                 |        |
| written, MiB/s:                                                                                          | 303.96                                                                                                                                                                                                                                                                                                      |          |      |           |          |           |          |              |      |                 |        |
| 2.                                                                                                       | <p>File operations:</p> <table> <tr><td>reads/s:</td><td>0.00</td></tr> <tr><td>writes/s:</td><td>18955.31</td></tr> <tr><td>fsyncs/s:</td><td>24264.30</td></tr> </table> <p>Throughput:</p> <table> <tr><td>read, MiB/s:</td><td>0.00</td></tr> <tr><td>written, MiB/s:</td><td>296.18</td></tr> </table> | reads/s: | 0.00 | writes/s: | 18955.31 | fsyncs/s: | 24264.30 | read, MiB/s: | 0.00 | written, MiB/s: | 296.18 |
| reads/s:                                                                                                 | 0.00                                                                                                                                                                                                                                                                                                        |          |      |           |          |           |          |              |      |                 |        |
| writes/s:                                                                                                | 18955.31                                                                                                                                                                                                                                                                                                    |          |      |           |          |           |          |              |      |                 |        |
| fsyncs/s:                                                                                                | 24264.30                                                                                                                                                                                                                                                                                                    |          |      |           |          |           |          |              |      |                 |        |
| read, MiB/s:                                                                                             | 0.00                                                                                                                                                                                                                                                                                                        |          |      |           |          |           |          |              |      |                 |        |
| written, MiB/s:                                                                                          | 296.18                                                                                                                                                                                                                                                                                                      |          |      |           |          |           |          |              |      |                 |        |
| 3.                                                                                                       | <p>File operations:</p> <table> <tr><td>reads/s:</td><td>0.00</td></tr> <tr><td>writes/s:</td><td>18144.14</td></tr> <tr><td>fsyncs/s:</td><td>23228.36</td></tr> </table> <p>Throughput:</p> <table> <tr><td>read, MiB/s:</td><td>0.00</td></tr> <tr><td>written, MiB/s:</td><td>283.50</td></tr> </table> | reads/s: | 0.00 | writes/s: | 18144.14 | fsyncs/s: | 23228.36 | read, MiB/s: | 0.00 | written, MiB/s: | 283.50 |
| reads/s:                                                                                                 | 0.00                                                                                                                                                                                                                                                                                                        |          |      |           |          |           |          |              |      |                 |        |
| writes/s:                                                                                                | 18144.14                                                                                                                                                                                                                                                                                                    |          |      |           |          |           |          |              |      |                 |        |
| fsyncs/s:                                                                                                | 23228.36                                                                                                                                                                                                                                                                                                    |          |      |           |          |           |          |              |      |                 |        |
| read, MiB/s:                                                                                             | 0.00                                                                                                                                                                                                                                                                                                        |          |      |           |          |           |          |              |      |                 |        |
| written, MiB/s:                                                                                          | 283.50                                                                                                                                                                                                                                                                                                      |          |      |           |          |           |          |              |      |                 |        |
| 4.                                                                                                       | File operations:                                                                                                                                                                                                                                                                                            |          |      |           |          |           |          |              |      |                 |        |

|    |                                                                                                                                                 |
|----|-------------------------------------------------------------------------------------------------------------------------------------------------|
|    | reads/s: 0.00<br>writes/s: 19166.70<br>fsyncs/s: 24533.51<br><br>Throughput:<br>read, MiB/s: 0.00<br>written, MiB/s: 299.48                     |
| 5. | File operations:<br>reads/s: 0.00<br>writes/s: 19203.67<br>fsyncs/s: 24584.69<br><br>Throughput:<br>read, MiB/s: 0.00<br>written, MiB/s: 300.06 |

Observations :

|        | Throughput (MB/Sec) |             | File Operations (operation/sec) |             |           |
|--------|---------------------|-------------|---------------------------------|-------------|-----------|
|        | read                | write       | reads/sec                       | writes/sec  | fsync/sec |
| 1.     | 0                   | 303.96      | 0                               | 19453.3     | 24903.69  |
| 2.     | 0                   | 296.18      | 0                               | 18955.31    | 24264.3   |
| 3      | 0                   | 283.5       | 0                               | 18144.14    | 23228.36  |
| 4.     | 0                   | 299.48      | 0                               | 19166.7     | 24533.51  |
| 5.     | 0                   | 300.06      | 0                               | 19203.67    | 24584.69  |
| Avg    | 0                   | 296.636     | 0                               | 18984.624   | 24302.91  |
| Min    | 0                   | 283.5       | 0                               | 18144.14    | 23228.36  |
| Max    | 0                   | 303.96      | 0                               | 19453.3     | 24903.69  |
| stddev | 0                   | 8.785609446 | 0                               | 502.0116228 | 642.19572 |

### Conclusion:

**From the above experiment below are the quick conclusions we can see :**

- As we see, when we increase the cpu-max-prime argument value the number of events per second decreases for our current experimental configuration.
- From the memory test mode for block 2K has a higher operation rate than the memory test mode for block 4K whereas 4K has better MB/sec transfer rate than the 2k block size. Therefore, the choice of block size depends on the specific use case. If the application requires more data

transfer, then the 4K block size would be a better choice. If the application requires more operations, then the 2K block size would be a better choice

- For all Images (qcow2, raw, docker) : When we increase the RAM keeping the number of cpus the same we can increase the performance for CPU, Memory and fileIO.
  - For all Images (qcow2, raw, docker) : When we increase CPU count keeping ram same the slight performance decrement has been observed.
  - From CPU performance it looks like QEMU is slightly faster for qcow2 image format than Docker desktop on my MacBook chip.
  - For memory performance it looks like QEMU for both images giving good performance than Docker desktop on my Macbook chip
  - For fileio performance it looks like Docker is giving faster performance than QEMU.
- 

## Extra Credit Vagrant File :

Followed the provided documentation.

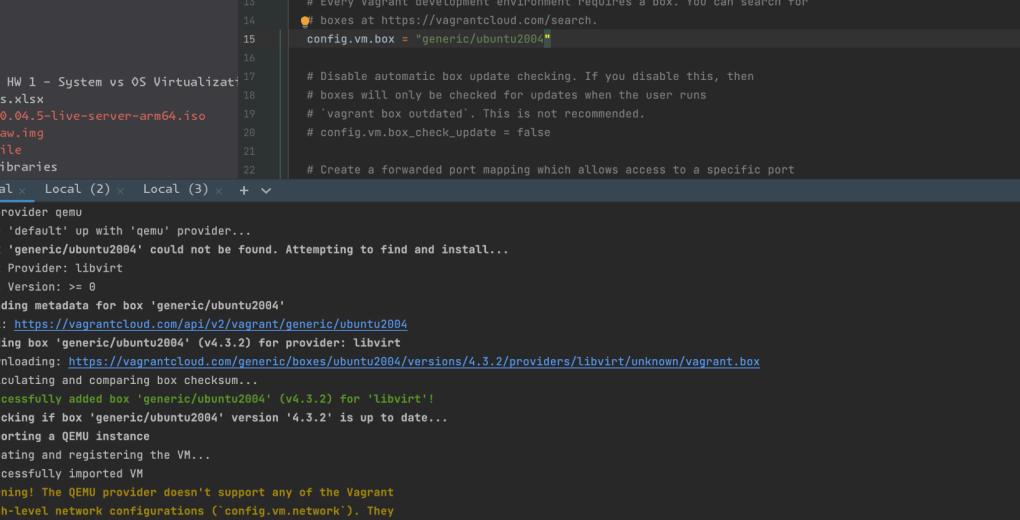
Commands used :

```
brew install vagrant
vagrant init # create a vagrant file with basic details
vagrant plugin install vagrant-qemu #install a plugin to have support for qemu
vagrant up #once the script is done this will execute and create vm, with provided configurations.
```

Screen shots :

The screenshot shows the IntelliJ IDEA interface with the 'Vagrantfile' open in the editor. The code in the Vagrantfile is as follows:

```
home-work-1 - Vagrantfile
home-work-1 ~/Desktop-2/Winter-24/csen241-
Project Vagrantfile
 home-work-1 ~/Desktop-2/Winter-24/csen241-
 .idea
 docker
 cpu2ram2
 cpu2ram3
 cpu3ram2
 cpu3ram3
 Screenshots
 Dockerfile
 script.sh
 qcow2
 raw
 CSEN 241 HW 1 - System vs OS Virtualizat.
 sysbenchPerformanceScript.sh
 TestCases.xlsx
 ubuntu-20.04.5-live-server-arm64.iso
 ubuntu_raw.img
 Vagrantfile
 External Libraries
 Scratches and Consoles
Terminal: Local + v
> vagrant init
A 'Vagrantfile' has been placed in this directory. You are now
ready to 'vagrant up' your first virtual environment! Please read
the comments in the Vagrantfile as well as documentation on
'vagrantup.com' for more information on using Vagrant.
```



The screenshot shows a terminal window with the following output:

```
vagrant up --provider qemu
Bringing machine 'default' up with 'qemu' provider...
==> default: Box 'generic/ubuntu2004' could not be found. Attempting to find and install...
 default: Box Provider: libvirt
 default: Box Version: >= 0
==> default: Loading metadata for box 'generic/ubuntu2004'
 default: URL: https://vagrantcloud.com/api/v2/vagrant/generic/ubuntu2004
==> default: Adding box 'generic/ubuntu2004' (v4.3.2) for provider: libvirt
 default: Downloading: https://vagrantcloud.com/generic/boxes/ubuntu2004/versions/4.3.2/providers/libvirt/unknown/vagrant.box
 default: Calculating and comparing box checksum...
==> default: Successfully added box 'generic/ubuntu2004' (v4.3.2) for 'libvirt'!
==> default: Checking if box 'generic/ubuntu2004' version '4.3.2' is up to date...
==> default: Importing a QEMU instance
 default: Creating and registering the VM...
 default: Successfully imported VM
==> default: Warning! The QEMU provider doesn't support any of the Vagrant
==> default: high-level network configurations ('config.vm.network'). They
==> default: will be silently ignored.
==> default: Starting the instance...
```