Automatize benchmarks execution: DP3 benchmark

Description:

Download 81 files of 43.9 MB of Lofar and average them, the output es the averaged file of 43.9 MB. The average is repeated 5 times. The metrics include:

- Average execution time
- Maximum execution time
- Standard deviation of execution time

Deploy:

- 12 vCPU
- 12 GB of ram
- 400 GB internal storage
- Internet access
- Storage for test:
  - 600 GB in Block Storage (Cinder) (/mnt/scratch)
  - 600 GB in CephFS (manila) (/mnt/scratch1)
- S.O.: Ubuntu 20.04 LTS

Execution:

1. We cloned the branch *storage-benchmark-dp3* :

   git clone https://gitlab.com/ska-telescope/src/src-workloads.git

   ⚠️ This branch doesn't exist any more

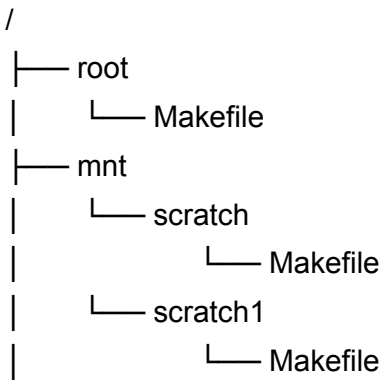
2. We installed Singularity using the provided script:

   cd src-workloads/tasks/storage-benchmark-dp3/scripts/

   chmod u+x singularity-install.sh

   ./singularity-install.sh

3. We saved, configured the Makefile for each storage:



Makefile

```
# Define variables
SINGULARITY_IMAGE=library://boyewo/collection/dp3-new-benchmark-singularity.sif
IMAGE_NAME=dp3-new-benchmark-singularity.sif
DATA_DIR=/mnt/datavolume # replace /mnt/datavolume with the file system to be accessed

# Default target
all: run

# Pull the Singularity image from the registry
pull:
      singularity pull $(IMAGE_NAME) $(SINGULARITY_IMAGE)

# Run the Singularity command
run: pull
        singularity exec --bind "/mnt:/mnt" "$(IMAGE_NAME)" images.py /mnt/datavolume
```

CINDER Makefile

```
# Define variables
SINGULARITY_IMAGE=library://boyewo/collection/dp3-new-benchmark-singularity.sif
IMAGE_NAME=dp3-new-benchmark-singularity.sif
DATA_DIR=/mnt/scratch/datavolume # replace /mnt/datavolume with the file system to be accessed

# Default target
all: run

# Pull the Singularity image from the registry
pull:
	/usr/local/bin/ singularity pull $(IMAGE_NAME) $(SINGULARITY_IMAGE)

# Run the Singularity command
run: pull
	/usr/local/bin/ singularity exec --bind "/mnt/scratch:/mnt/scratch" "$(IMAGE_NAME)" images.py
/mnt/scratch/datavolume
```

MANILA Makefile

```
# Define variables
SINGULARITY_IMAGE=library://boyewo/collection/dp3-new-benchmark-singularity.sif
IMAGE_NAME=dp3-new-benchmark-singularity.sif
DATA_DIR=/mnt/scratch1/datavolume # replace /mnt/datavolume with the file system to be accessed

# Default target
all: run

# Pull the Singularity image from the registry
pull:
	/usr/local/bin/singularity pull $(IMAGE_NAME) $(SINGULARITY_IMAGE)

# Run the Singularity command
run: pull
	/usr/local/bin/singularity exec --bind "/mnt/scratch1:/mnt/scratch1" "$(IMAGE_NAME)" images.py
/mnt/scratch1/datavolume
```

LOCAL Makefile

```
# Define variables
SINGULARITY_IMAGE=library://boyewo/collection/dp3-new-benchmark-singularity.sif
IMAGE_NAME=dp3-new-benchmark-singularity.sif
DATA_DIR=/root/datavolume # replace /mnt/datavolume with the file system to be accessed

# Default target
all: run

# Pull the Singularity image from the registry
pull:
	/usr/local/bin/ singularity pull $(IMAGE_NAME) $(SINGULARITY_IMAGE)

# Run the Singularity command
run: pull
	/usr/local/bin/ singularity exec --bind "/root:/root" "$(IMAGE_NAME)" images.py /root/datavolume
```

Automation: automize_storagebenchmark_dp3.sh

```
#!/bin/bash
#automize DP3 storage benchmark
for local disk, BS-Cinder and
CephFS-Manila

#BS - cinder (/mnt/scratch)
cd /mnt/scratch
mkdir -p datavolume
DAY=`date +"%d/%m/%Y"`
TIME=`date +"%H:%M"`
echo "CINDER: TODAY is $DAY AND
THE CURRENT TIME $TIME UTC
!!!!!!!!!"
make
rm -f
dp3-new-benchmark-singularity.sif
sleep 600
```

```
#CephFS - Manila (/mnt/scratch1)
cd /mnt/scratch1
mkdir -p datavolume
DAY=`date +"%d/%m/%Y"`
TIME=`date +"%H:%M"`
echo "MANILA: TODAY is $DAY AND
THE CURRENT TIME $TIME UTC
!!!!!!!!!"
make
rm -f
dp3-new-benchmark-singularity.sif
sleep 600
```

```
#local disk (/root)
cd /root
mkdir  -p datavolume
DAY=`date +"%d/%m/%Y"`
TIME=`date +"%H:%M"`
echo "LOCAL-DISK: TODAY is $DAY
AND THE CURRENT TIME $TIME UTC
!!!!!!!!!"
make
rm -f
dp3-new-benchmark-singularity.sif
sleep 600
```

Automation:

- Create the crontab entry

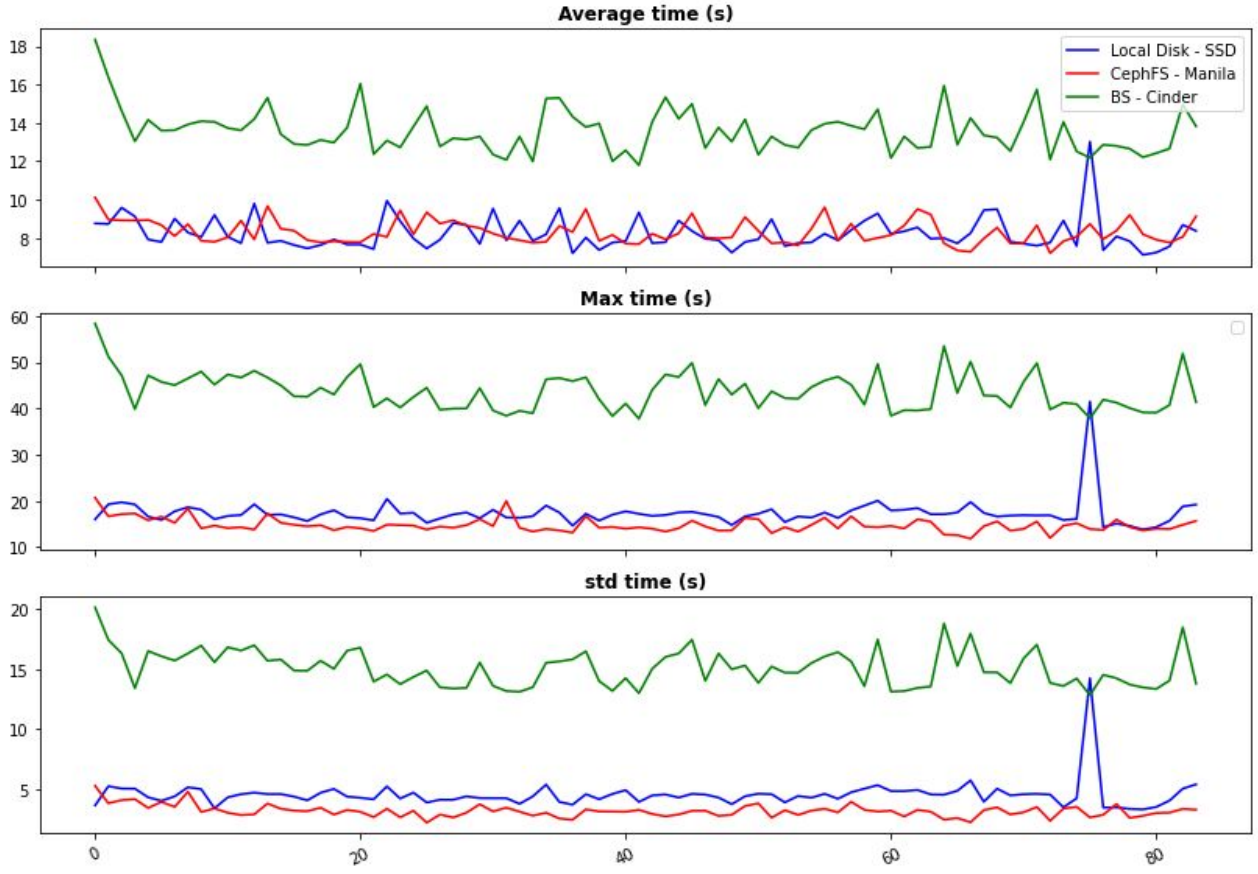
  sudo crontab -e

- We run the benchamart every 4 hours

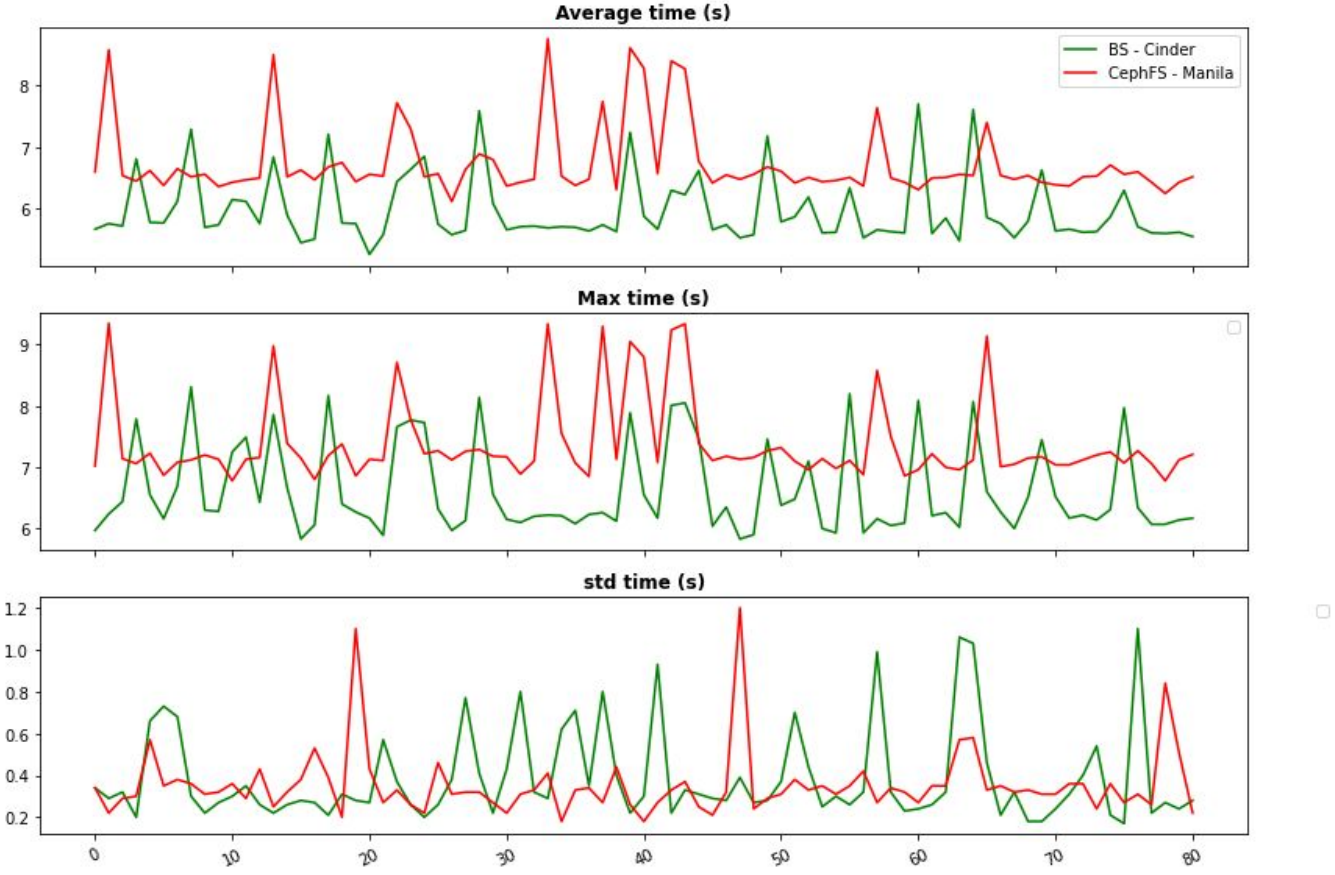
0 11,15,19,23,3,7 * * * ~/automize_storagebenchmark_dp3.sh >> logs_automatize_dpe3.log 2>&1

⚠️ hour in UTC

Results:

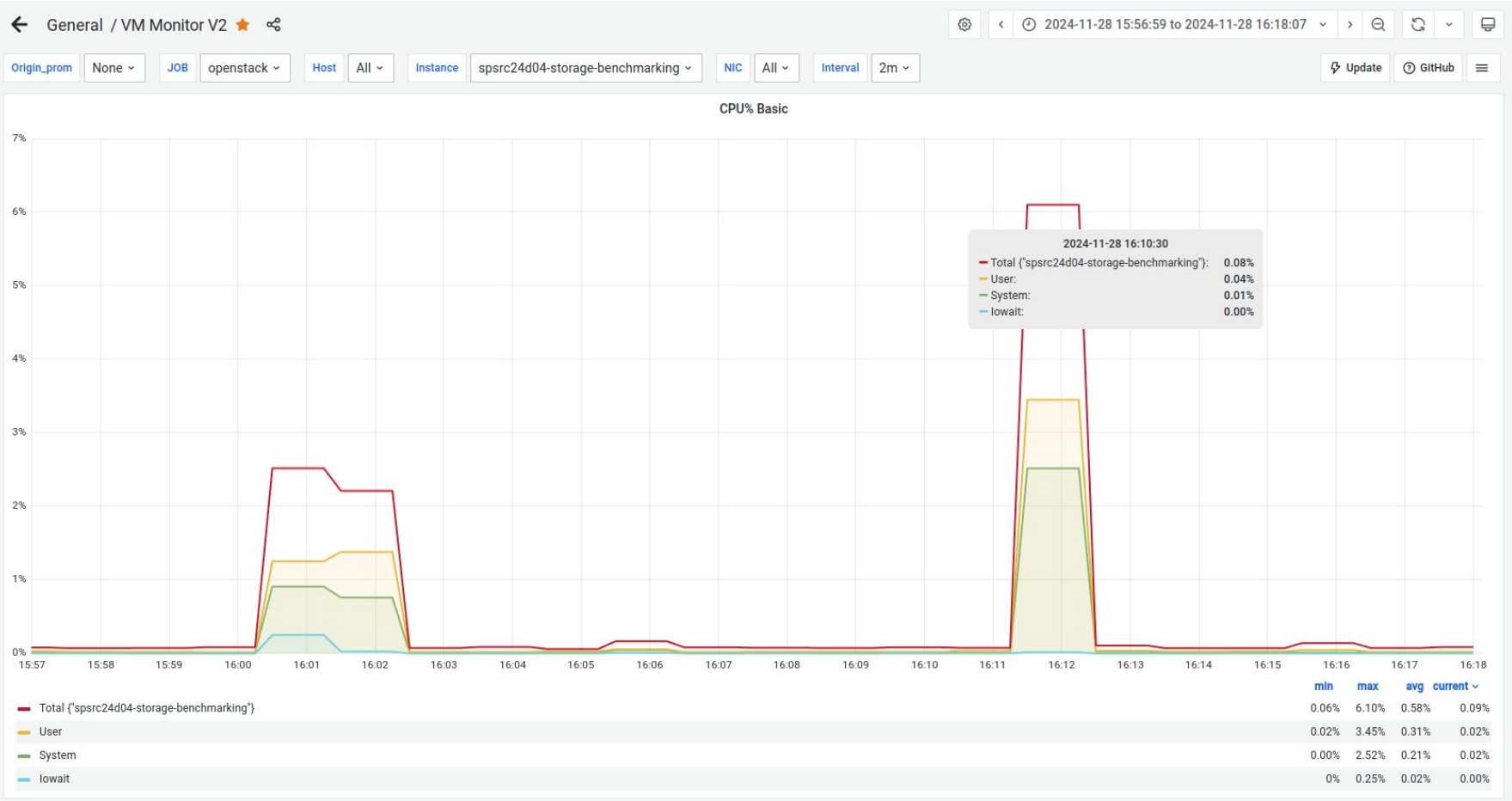

Average time (s)
Local Disk - SSD
CephFS - Manila
BS - Cinder
Max time (s)
std time (s)

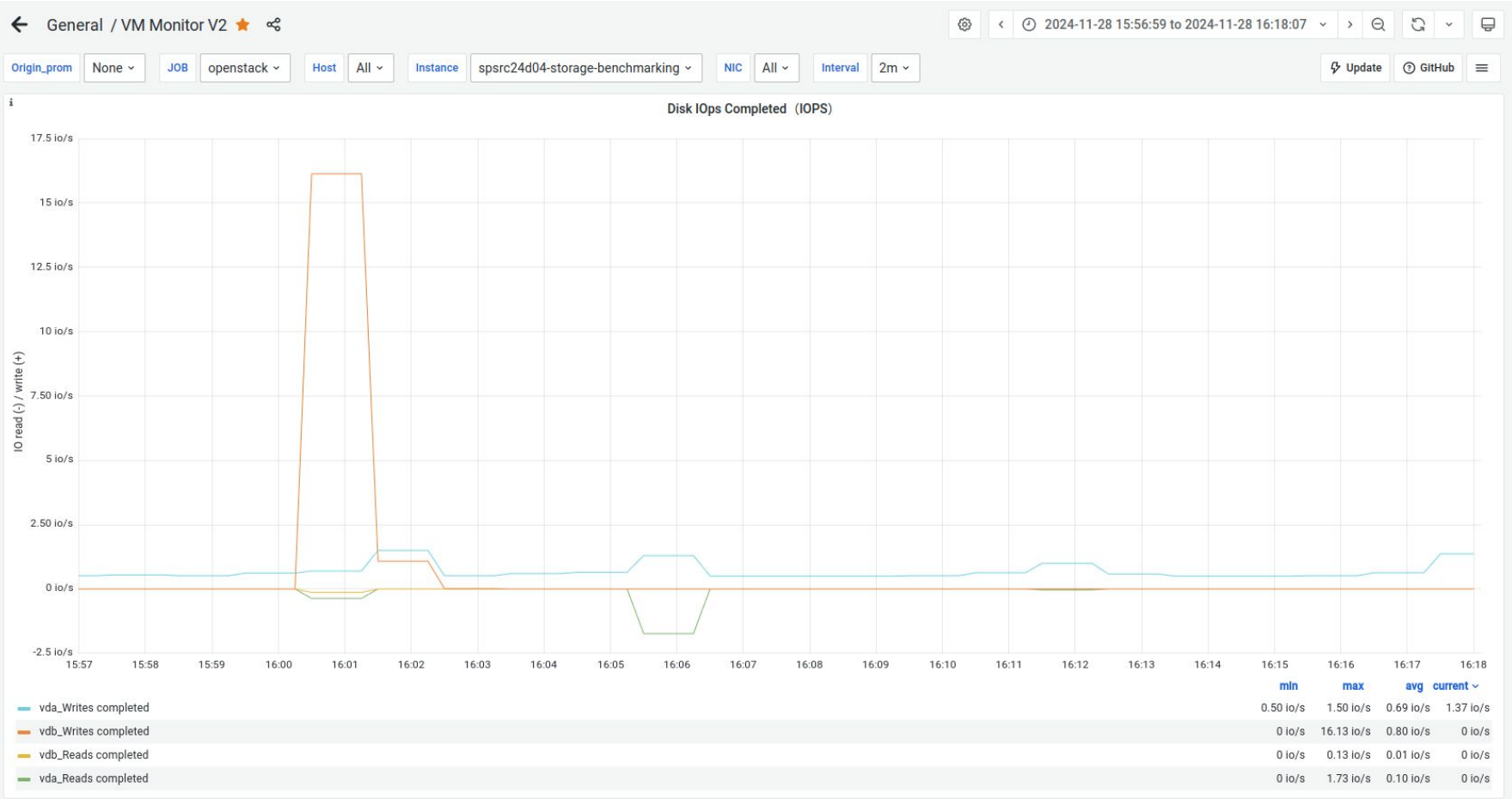
Results:

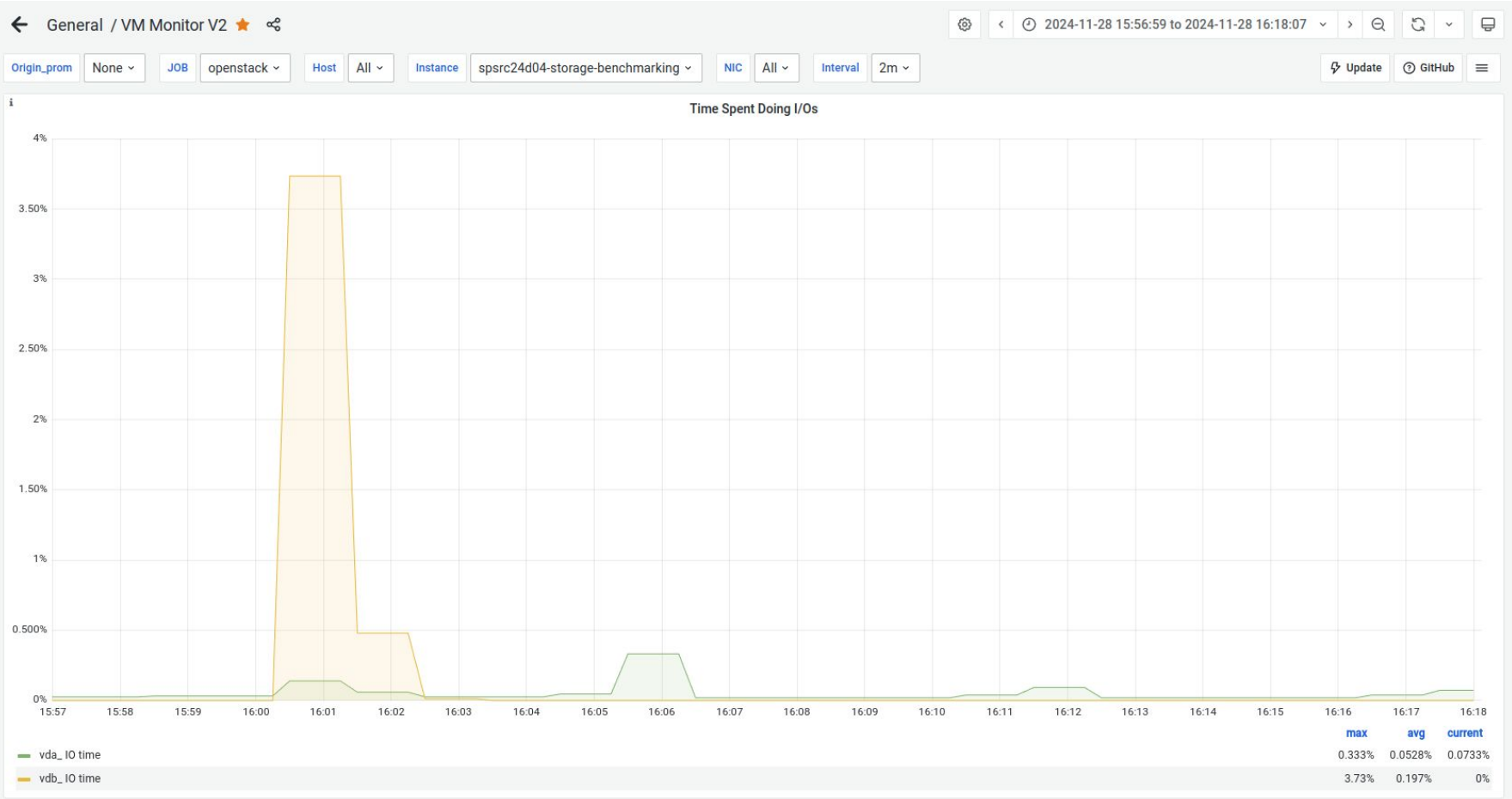

Average time (s)
BS - Cinder
CephFS - Manila
8
7
6
Max time (s)
9
8
7
6
std time (s)
1.2
1.0
0.8
0.6
0.4
0.2
0
10
20
30
40
50
60
70
80

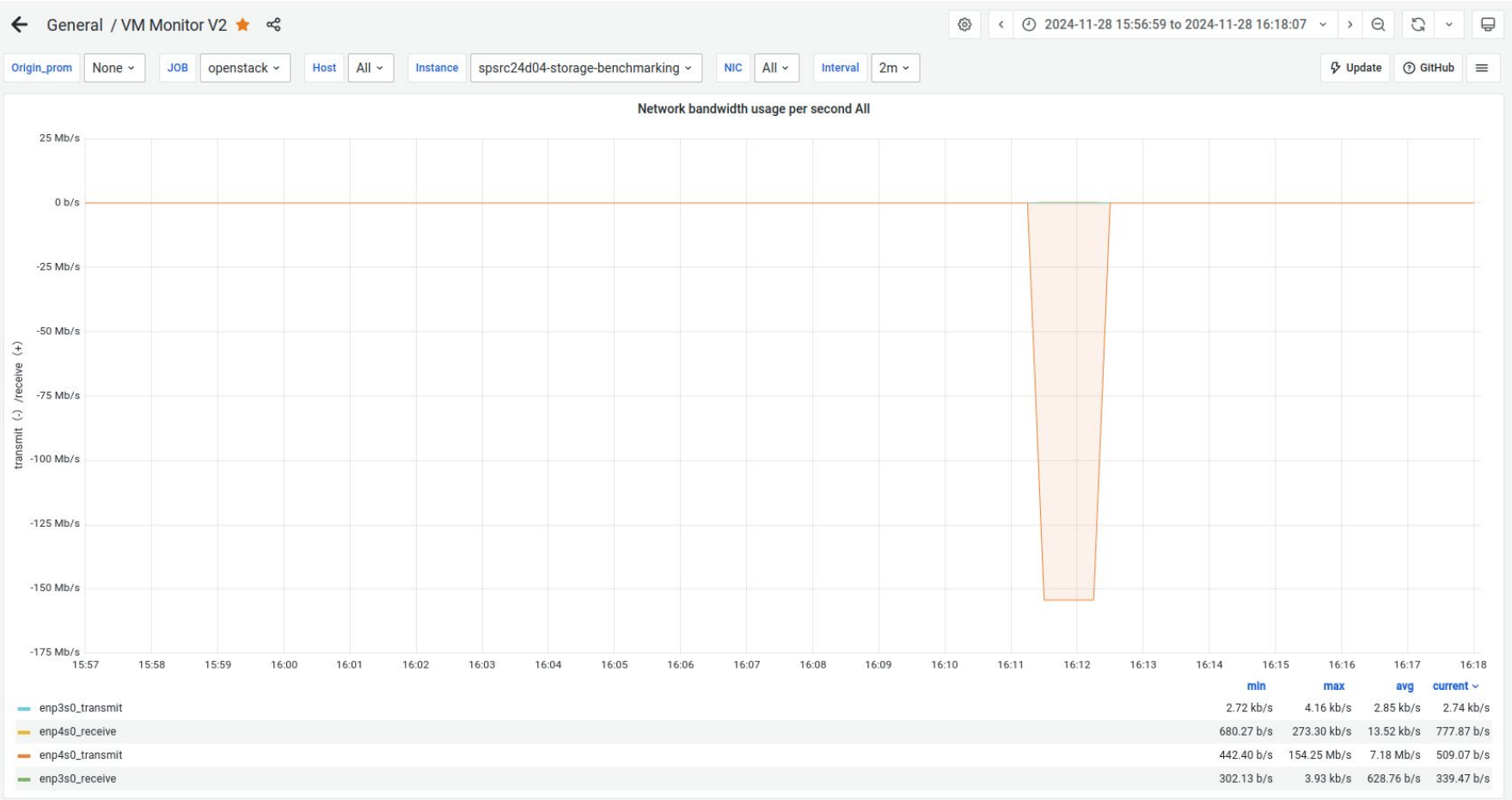
Tests in 28/11/2024:

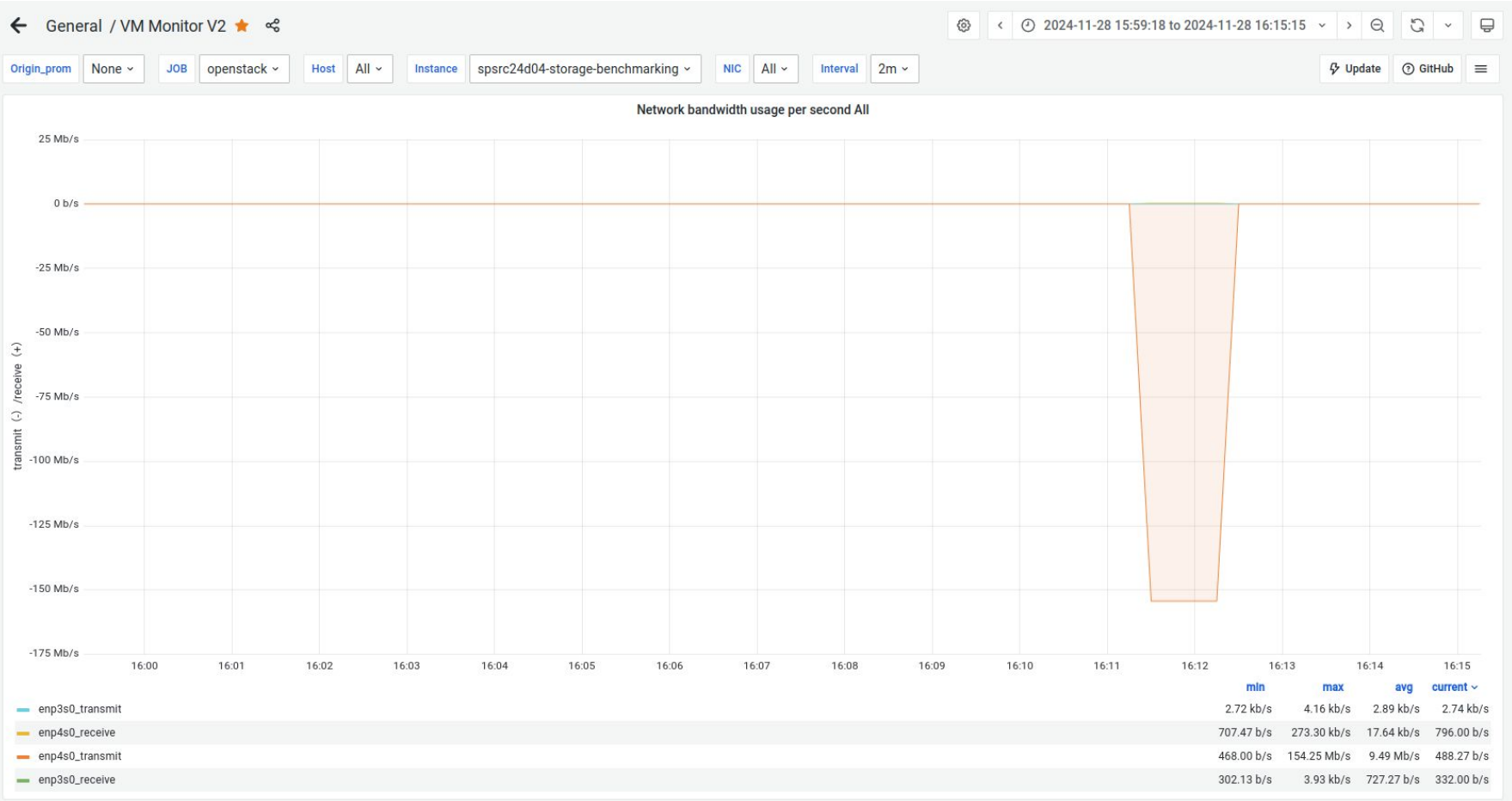
- 16:00 - Cinder
- 16:10 - Manila


General / VM Monitor V2
2024-11-28 15:56:59 to 2024-11-28 16:18:07
Origin_prom
None
JOB
openstack
Host
All
Instance
spsrc24d04-storage-benchmarking
NIC
All
Interval
2m
Update
GitHub
CPU% Basic
7%
6%
5%
4%
3%
2%
1%
0%
15:57
15:58
15:59
16:00
16:01
16:02
16:03
16:04
16:05
16:06
16:07
16:08
16:09
16:10
16:11
16:12
16:13
16:14
16:15
16:16
16:17
16:18
2024-11-28 16:10:30
Total {"spsrc24d04-storage-benchmarking"}: 0.08%
User: 0.04%
System: 0.01%
Iowait: 0.00%
min max avg current
Total {"spsrc24d04-storage-benchmarking"} 0.06% 6.10% 0.58% 0.09%
User 0.02% 3.45% 0.31% 0.02%
System 0.00% 2.52% 0.21% 0.02%
Iowait 0% 0.25% 0.02% 0.00%


General / VM Monitor V2
2024-11-28 15:56:59 to 2024-11-28 16:18:07
Origin_prom None
JOB openstack
Host All
Instance spsrc24d04-storage-benchmarking
NIC All
Interval 2m
Update
GitHub
Disk IOps Completed (IOPS)
IO read (-) / write (+)
17.5 io/s
15 io/s
12.5 io/s
10 io/s
7.50 io/s
5 io/s
2.50 io/s
0 io/s
-2.5 io/s
15:57 15:58 15:59 16:00 16:01 16:02 16:03 16:04 16:05 16:06 16:07 16:08 16:09 16:10 16:11 16:12 16:13 16:14 16:15 16:16 16:17 16:18
min max avg current
vda_Writes completed 0.50 io/s 1.50 io/s 0.69 io/s 1.37 io/s
vdb_Writes completed 0 io/s 16.13 io/s 0.80 io/s 0 io/s
vdb_Reads completed 0 io/s 0.13 io/s 0.01 io/s 0 io/s
vda_Reads completed 0 io/s 1.73 io/s 0.10 io/s 0 io/s


General / VM Monitor V2
2024-11-28 15:56:59 to 2024-11-28 16:18:07
Origin_prom
None
JOB
openstack
Host
All
Instance
spsrc24d04-storage-benchmarking
NIC
All
Interval
2m
Update
GitHub
Time Spent Doing I/Os
4%
3.50%
3%
2.50%
2%
1.50%
1%
0.500%
0%
15:57
15:58
15:59
16:00
16:01
16:02
16:03
16:04
16:05
16:06
16:07
16:08
16:09
16:10
16:11
16:12
16:13
16:14
16:15
16:16
16:17
16:18
max
avg
current
vda_ IO time
0.333%
0.0528%
0.0733%
vdb_ IO time
3.73%
0.197%
0%


General / VM Monitor V2
2024-11-28 15:56:59 to 2024-11-28 16:18:07
Origin_prom
None
JOB
openstack
Host
All
Instance
spsrc24d04-storage-benchmarking
NIC
All
Interval
2m
Update
GitHub
Network bandwidth usage per second All
25 Mb/s
0 b/s
-25 Mb/s
-50 Mb/s
-75 Mb/s
-100 Mb/s
-125 Mb/s
-150 Mb/s
-175 Mb/s
transmit (-) /receive (+)
15:57
15:58
15:59
16:00
16:01
16:02
16:03
16:04
16:05
16:06
16:07
16:08
16:09
16:10
16:11
16:12
16:13
16:14
16:15
16:16
16:17
16:18
min
max
avg
current
enp3s0_transmit 2.72 kb/s 4.16 kb/s 2.85 kb/s 2.74 kb/s
enp4s0_receive 680.27 b/s 273.30 kb/s 13.52 kb/s 777.87 b/s
enp4s0_transmit 442.40 b/s 154.25 Mb/s 7.18 Mb/s 509.07 b/s
enp3s0_receive 302.13 b/s 3.93 kb/s 628.76 b/s 339.47 b/s

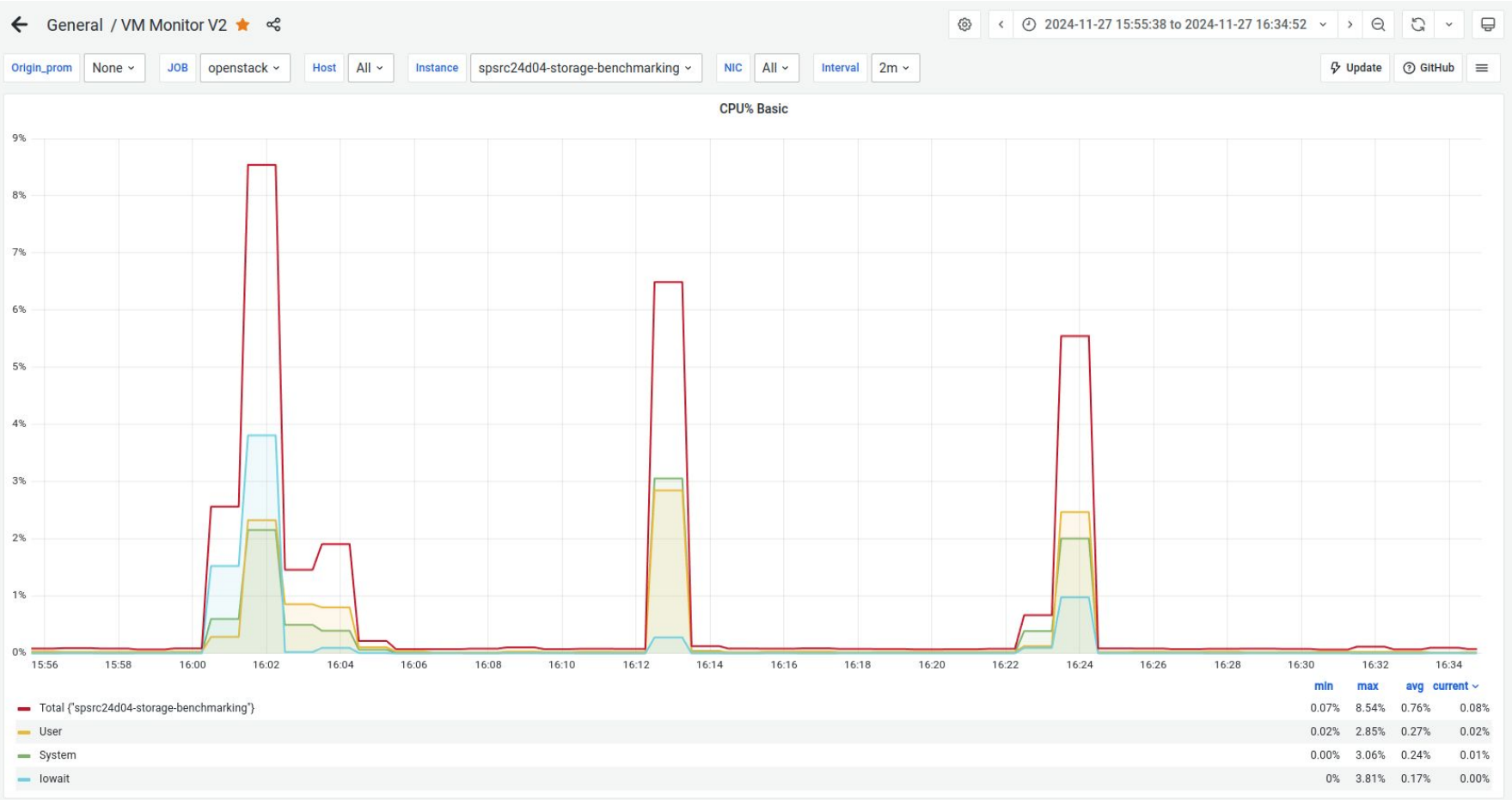

General / VM Monitor V2
2024-11-28 15:59:18 to 2024-11-28 16:15:15
Origin_prom
None
JOB
openstack
Host
All
Instance
spsrc24d04-storage-benchmarking
NIC
All
Interval
2m
Update
GitHub
Network bandwidth usage per second All
25 Mb/s
0 b/s
-25 Mb/s
-50 Mb/s
-75 Mb/s
-100 Mb/s
-125 Mb/s
-150 Mb/s
-175 Mb/s
transmit (-) /receive (+)
16:00
16:01
16:02
16:03
16:04
16:05
16:06
16:07
16:08
16:09
16:10
16:11
16:12
16:13
16:14
16:15
min
max
avg
current
enp3s0_transmit 2.72 kb/s 4.16 kb/s 2.89 kb/s 2.74 kb/s
enp4s0_receive 707.47 b/s 273.30 kb/s 17.64 kb/s 796.00 b/s
enp4s0_transmit 468.00 b/s 154.25 Mb/s 9.49 Mb/s 488.27 b/s
enp3s0_receive 302.13 b/s 3.93 kb/s 727.27 b/s 332.00 b/s

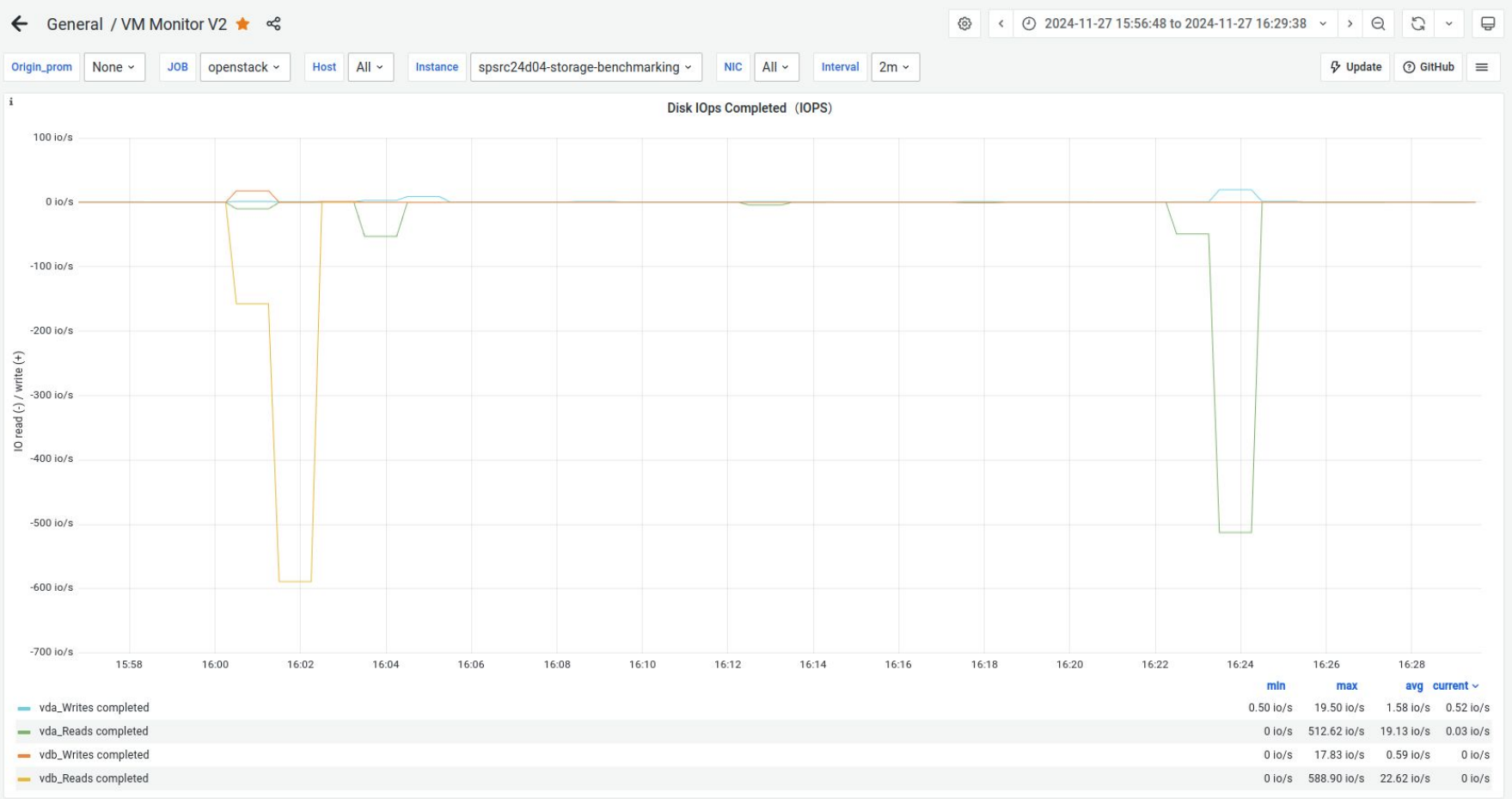
Tests in 27/11/2024:

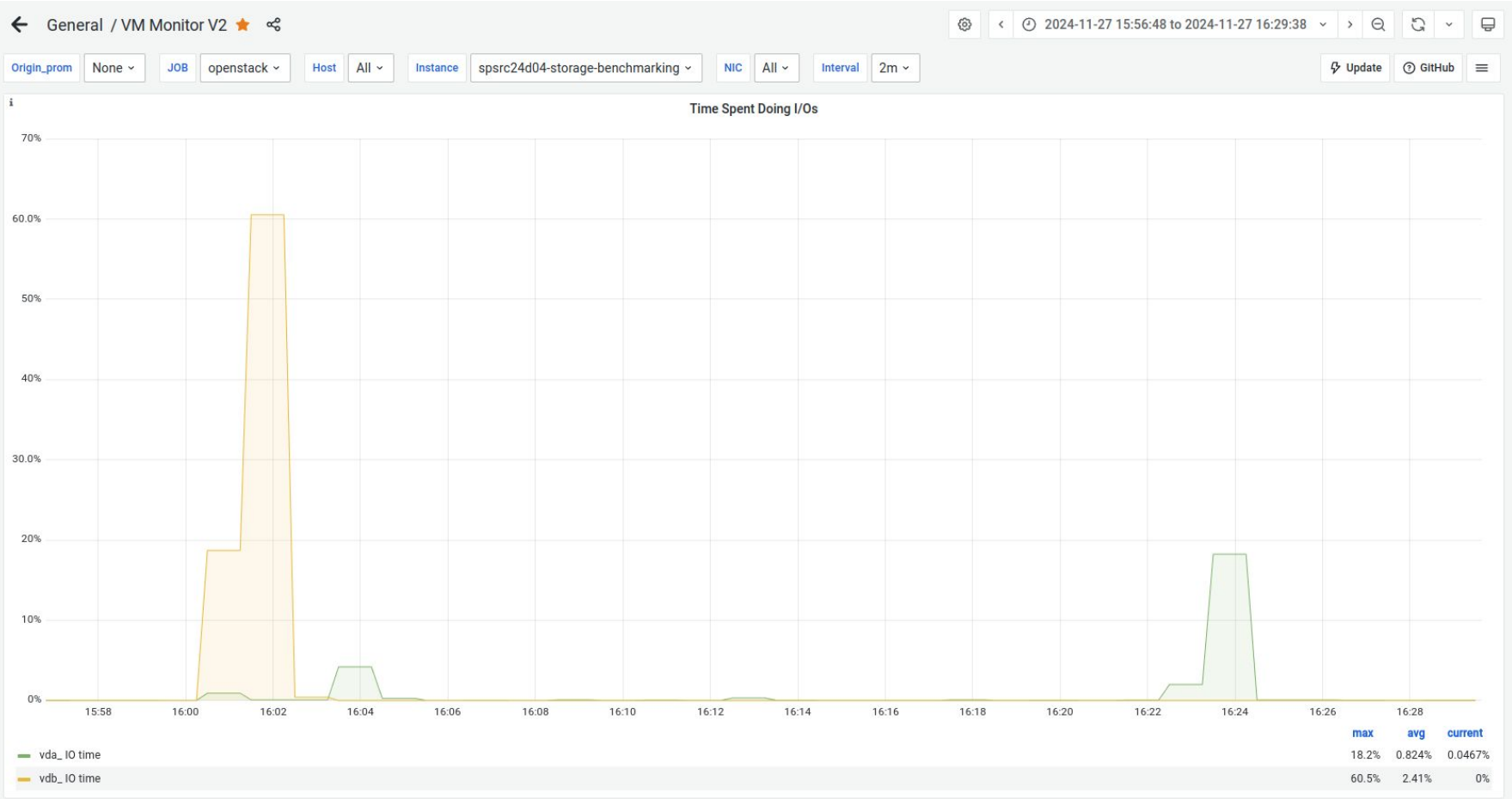
16:00 - Cinder

16:11 - Manila

16:21 - Local


General / VM Monitor V2
2024-11-27 15:55:38 to 2024-11-27 16:34:52
Origin_prom
None
JOB
openstack
Host
All
Instance
spsrc24d04-storage-benchmarking
NIC
All
Interval
2m
Update
GitHub
CPU% Basic
9%
8%
7%
6%
5%
4%
3%
2%
1%
0%
15:56
15:58
16:00
16:02
16:04
16:06
16:08
16:10
16:12
16:14
16:16
16:18
16:20
16:22
16:24
16:26
16:28
16:30
16:32
16:34
min
max
avg
current
Total {"spsrc24d04-storage-benchmarking"}
0.07%
8.54%
0.76%
0.08%
User
0.02%
2.85%
0.27%
0.02%
System
0.00%
3.06%
0.24%
0.01%
Iowait
0%
3.81%
0.17%
0.00%


General / VM Monitor V2
2024-11-27 15:56:48 to 2024-11-27 16:29:38
Origin_prom None
JOB openstack
Host All
Instance spsrc24d04-storage-benchmarking
NIC All
Interval 2m
Update
GitHub
Disk IOps Completed (IOPS)
IO read (-) / write (+)
100 io/s
0 io/s
-100 io/s
-200 io/s
-300 io/s
-400 io/s
-500 io/s
-600 io/s
-700 io/s
15:58
16:00
16:02
16:04
16:06
16:08
16:10
16:12
16:14
16:16
16:18
16:20
16:22
16:24
16:26
16:28
min max avg current
vda_Writes completed 0.50 io/s 19.50 io/s 1.58 io/s 0.52 io/s
vda_Reads completed 0 io/s 512.62 io/s 19.13 io/s 0.03 io/s
vdb_Writes completed 0 io/s 17.83 io/s 0.59 io/s 0 io/s
vdb_Reads completed 0 io/s 588.90 io/s 22.62 io/s 0 io/s


General / VM Monitor V2
2024-11-27 15:56:48 to 2024-11-27 16:29:38
Origin_prom
None
JOB
openstack
Host
All
Instance
spsrc24d04-storage-benchmarking
NIC
All
Interval
2m
Update
GitHub
Time Spent Doing I/Os
70%
60.0%
50%
40%
30.0%
20%
10%
0%
15:58
16:00
16:02
16:04
16:06
16:08
16:10
16:12
16:14
16:16
16:18
16:20
16:22
16:24
16:26
16:28
max
avg
current
vda_ IO time
18.2%
0.824%
0.0467%
vdb_ IO time
60.5%
2.41%
0%