Comparitive Performance Report for cbt-17thDec-main-4k vs cbt-20thDec-alexls12-4k vs cbt-9thJan-alexls14-4k

Table of contents

- $\bullet \ \ Comparison \ summary \ for \ cbt-17th Dec-main-4k \ vs \ cbt-20th Dec-alexls 12-4k \ vs \ cbt-9th Jan-alexls 14-4k$
- Response Curves
 - Sequential Read
 - Sequential Write
 - Random Read
 - Random Write
 - Random Read/Write
- Configuration yaml files
 - results
 - results
 - results

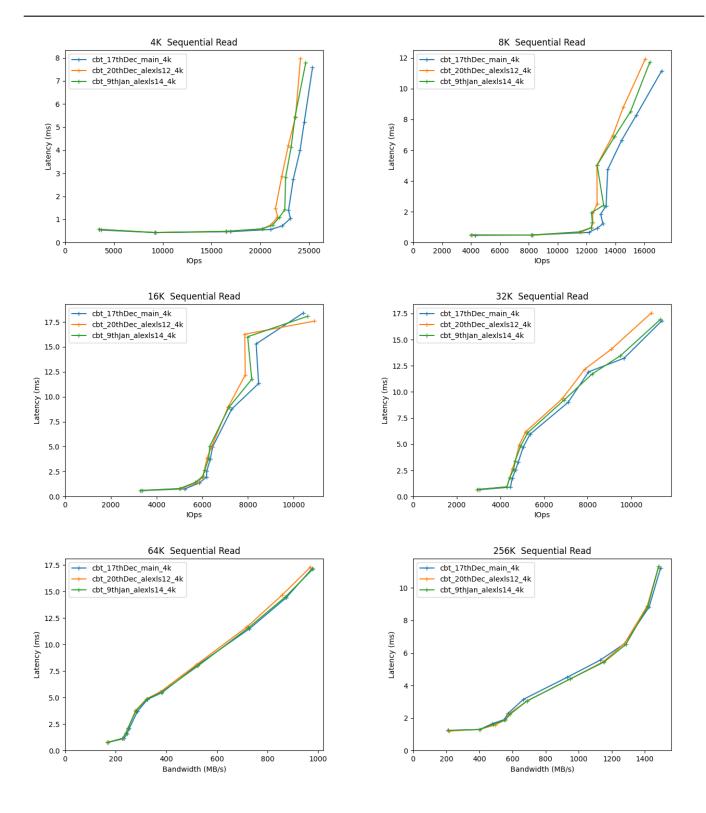
Comparison summary for cbt-17thDec-main-4k vs cbt-20thDec-alexls12-4k vs cbt-9thJan-alexls14-4k

Sequential Read	cbt_17thDec_main_4k	cbt_20thDec_alexls12_4k	cbt_9thJan_alexls14_4k
4K	25339 IOps@7.6ms	24109 IOps@8.0ms	24645 IOps@7.8ms
8K	17196 IOps@11.2ms	16069 IOps@11.9ms	16376 IOps@11.7ms
16K	10428 IOps@18.4ms	10917 IOps@17.6ms	$10620 \; \mathrm{IOps@18.1ms}$
32K	11409 IOps@16.8ms	10925 IOps@17.6ms	$11335~\mathrm{IOps@16.9ms}$
64K	977 MB/s@17.2 ms	970 MB/s@17.3 ms	980 MB/s@17.1 ms
256K	1495 MB/s@11.2 ms	1482 MB/s@11.3 ms	1483 MB/s@11.3 ms
512K	1501 MB/s@11.2ms	1502 MB/s@11.2ms	1499 MB/s@11.2 ms
1024K	1533 MB/s@13.7ms	1527 MB/s@13.7ms	1522 MB/s@13.8ms
C 1 XX	14 1741 D : 41	14 2041 D 1 1 1 2 41	1, 0,1 1 1 1 1 4 4
Sequential Write	cbt_17thDec_main_4k	cbt_20thDec_alexls12_4k	cbt_9thJan_alexls14_4k
4K	$2024 \; \mathrm{IOps@126.4ms}$	3764 IOps@68.0 ms	3949 IOps@64.8ms
8K	$2019 \; \mathrm{IOps@126.6ms}$	3599 IOps@71.1ms	3698 IOps@69.2 ms
16K	5117 IOps@37.5ms	4895 IOps@39.2ms	4987 IOps@38.5ms
32K	3621 IOps@35.3ms	5601 IOps@22.8ms	5759 IOps@22.2ms
64K	196 MB/s@42.8 ms	200 MB/s@42.0 ms	189 MB/s@44.5 ms
256K	400 MB/s@31.3ms	517 MB/s@8.0ms	503 MB/s@6.2ms
512K	439 MB/s@28.5 ms	432 MB/s@29.0 ms	419 MB/s@7.4ms
1024K	472 MB/s@26.3 ms	505 MB/s@28.7ms	498 MB/s@41.8 ms
Random Read	$cbt_17thDec_main_4k$	$cbt_20thDec_alexls12_4k$	$cbt_9thJan_alexls14_4k$
4K	95501 IOps@4.0ms	94377 IOps@4.1ms	95363 IOps@4.0ms
8K	60546 IOps@6.3ms	59367 IOps@6.5ms	60957 IOps@6.3ms
16K	34618 IOps@11.1ms	33414 IOps@7.7ms	34589 IOps@11.1ms
32K	31326 IOps@4.1ms	30473 IOps@4.2ms	29325 IOps@8.7ms
64K	1642 MB/s@10.2ms	1623 MB/s@10.3 ms	1605 MB/s@5.2ms
256K	1680 MB/s@20.0ms	1694 MB/s@19.8 ms	1699 MB/s@19.8 ms
512K	1698 MB/s@19.8ms	1699 MB/s@19.8 ms	1701 MB/s@19.7ms
1024K	1709 MB/s@19.6ms	1707 MB/s@19.7ms	1707 MB/s@19.7ms
Random Write	cbt_17thDec_main_4k	$cbt_20thDec_alexls12_4k$	cbt_9thJan_alexls14_4k
4K	2897 IOps@44.2ms	5072 IOps@25.2ms	5024 IOps@25.5ms
8K	2791 IOps@45.9ms	4734 IOps@27.0ms	4831 IOps@26.5ms
16K	5726 IOps@22.3 ms	4757 IOps@26.9ms	4829 IOps@26.5 ms
32K	3245 IOps@39.4ms	3674 IOps@34.8ms	3592 IOps@35.6ms
64K	193 MB/s@21.7 ms	178 MB/s@23.6 ms	186 MB/s@22.6 ms
256K	335 MB/s = 100.2 ms	387 MB/s = 21.6 ms	353 MB/s@95.0 ms
	,	,	•

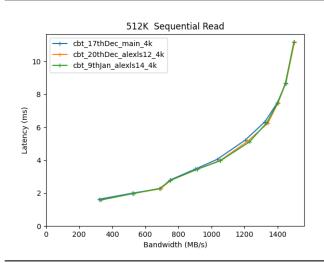
Random Write	$cbt_17thDec_main_4k$	$cbt_20thDec_alexls12_4k$	$cbt_9thJan_alexls14_4k$
512K	464 MB/s@72.2 ms	472 MB/s@70.9 ms $517 MB/s@32.1 ms$	478 MB/s@70.1ms
1024K	472 MB/s@35.2 ms		506 MB/s@32.9ms
Dandow Dood/Write	sht 17thDag main 41	sht 20thDas aloula12 4l-	oht Oth Ion aloulo14 4le
$\frac{\text{Random Read/Write}}{16\text{K}_70/30}$	cbt_17thDec_main_4k	cbt_20thDec_alexls12_4k	cbt_9thJan_alexls14_4k
	6191 IOps@20.7ms	6580 IOps@9.7ms	7351 IOps@17.4ms
64K_30/70	166 MB/s@12.6ms	191 MB/s@43.8ms	209 MB/s@20.0ms
64K_70/30	288 MB/s@29.2ms	275 MB/s@30.5ms	278 MB/s@30.2ms

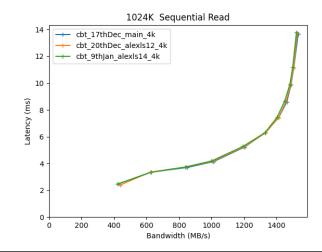
Response Curves

Sequential Read

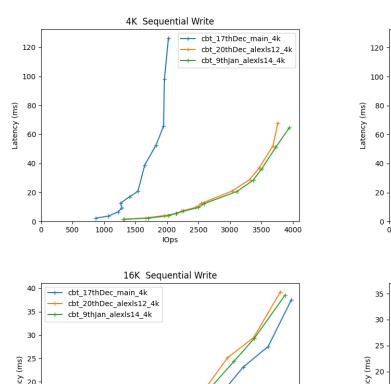


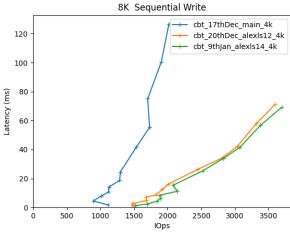
Response Curves Sequential Write

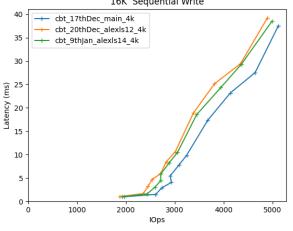


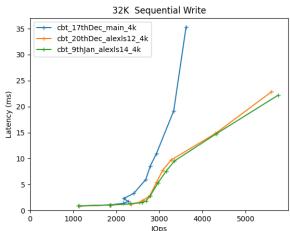


Sequential Write

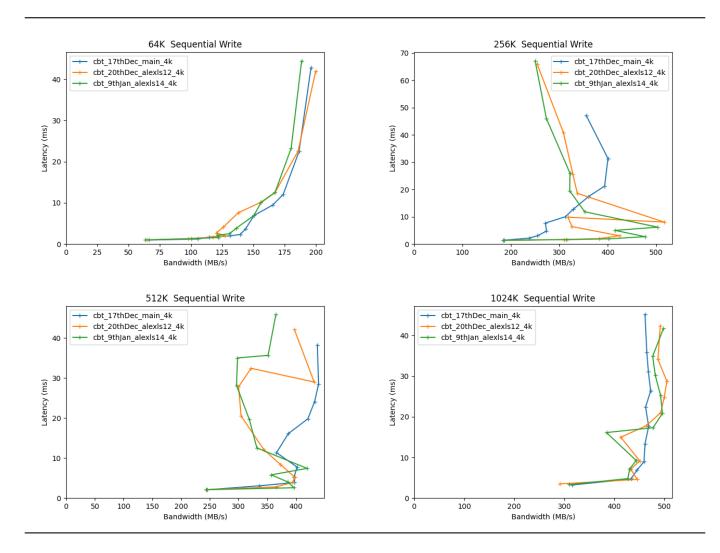




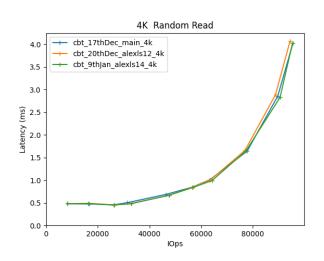


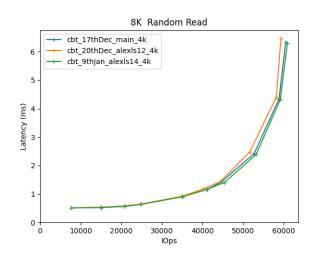


Response Curves Random Read

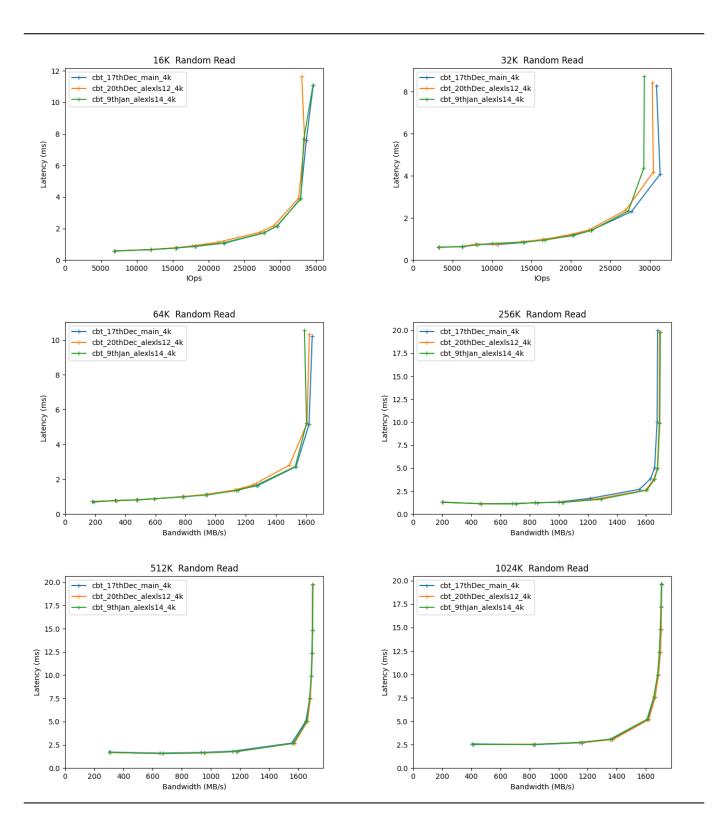


Random Read



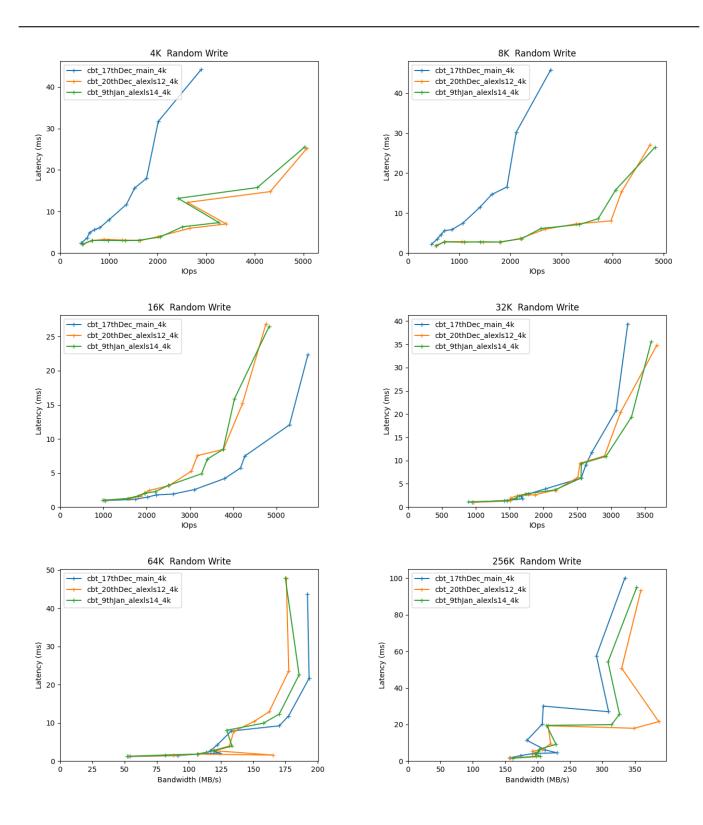


Response Curves Random Write

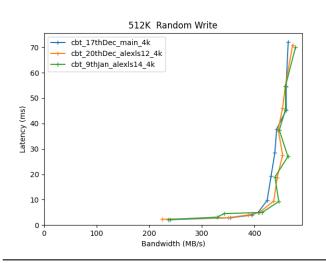


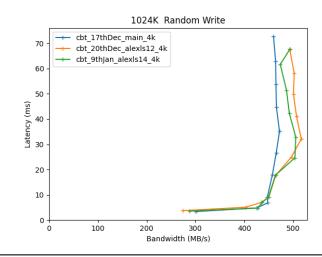
Random Write

Response Curves Random Write

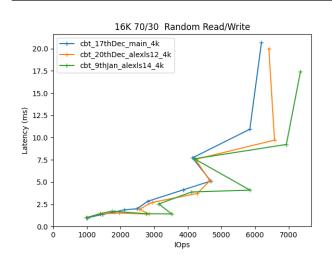


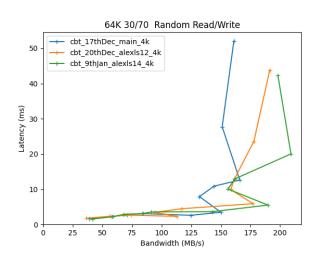
Response Curves Random Read/Write

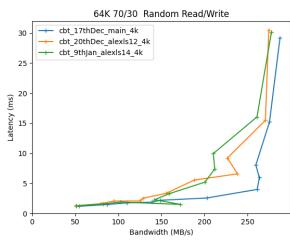




Random Read/Write







Configuration yaml files

results

```
librbdfio:
  cmd_path: /usr/local/bin/fio
  fio_out_format: json
  log_avg_msec: 100
  log_bw: true
  log_iops: true
  log_lat: true
 norandommap: true
  osd_ra:
  - 4096
  poolname: rbd_replicated
 precond_time: 600
 prefill:
    blocksize: 64k
    numjobs: 1
  procs_per_volume:
  - 1
  ramp: 30
  time: 60
  time_based: true
  use_existing_volumes: true
  vol_size: 420000
  volumes_per_client:
  - 1
  workloads:
    16k7030:
      iodepth:
      - 1
      - 2
      - 3
      - 4
      - 5
      - 8
      - 16
      - 24
      - 32
      - 64
      - 128
      jobname: randmix
      mode: randrw
      numjobs:
      - 1
      - 1
      - 1
      - 1
      - 1
      - 1
```

```
- 1
  - 1
  - 1
 op_size: 16384
 rwmixread: 70
16krandomread:
  iodepth:
  - 4
  - 8
  - 12
  - 16
  - 24
 - 48
 - 64
 - 128
  - 256
  - 384
  jobname: randread
 mode: randread
 numjobs:
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  op_size: 16384
16krandomwrite:
  iodepth:
  - 1
  - 2
  - 3
  - 4
  - 5
  - 8
  - 16
  - 24
  - 32
  - 64
  - 128
  jobname: randwrite
 mode: randwrite
 numjobs:
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
 op_size: 16384
1Mrandomread:
  iodepth:
```

- 2 - 3 - 4 - 8 - 12 - 16 - 20 - 24 - 28 - 32 jobname: randread mode: randread numjobs: - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 op_size: 1048576 1Mrandomwrite: iodepth: - 1 - 2 - 3 - 4 - 8 - 12 - 16 - 20 - 24 - 28 - 32 jobname: randwrite mode: randwrite numjobs: - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 op_size: 1048576 1Mseqread: iodepth: - 1 - 2 - 3 - 4 - 6 - 8 - 10 - 12

```
- 14
  - 16
  - 20
 jobname: seqread
 mode: read
 numjobs:
  - 1
  - 1
 - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
 - 1
 op_size: 1048576
1Mseqwrite:
  iodepth:
  - 1
  - 2
  - 3
  - 4
  - 6
  - 8
  - 10
  - 12
  - 14
  - 16
  - 20
  jobname: seqwrite
 mode: write
 numjobs:
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  op_size: 1048576
256krandomread:
  iodepth:
  - 1
  - 2
  - 3
  - 4
  - 5
  - 8
  - 16
  - 24
  - 32
  - 64
  - 128
 jobname: randread
 mode: randread
 numjobs:
  - 1
```

- 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 op_size: 262144 256krandomwrite: iodepth: - 1 - 2 - 3 - 4 - 5 - 8 - 16 - 24 - 32 - 64 - 128 jobname: randwrite mode: randwrite numjobs: - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 op_size: 262144 32krandomread: iodepth: - 2 - 4 - 6 - 8 - 12 - 16 - 24 - 32 - 64 - 128 - 256 jobname: randread mode: randread numjobs: - 1 - 1 - 1 - 1 - 1 - 1 - 1

- 1 - 1 - 1 op_size: 32768 32krandomwrite: iodepth: - 1 - 2 - 3 - 4 - 5 - 8 - 16 - 24 - 32 - 64 - 128 jobname: randwrite mode: randwrite numjobs: - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 op_size: 32768 4krandomread: iodepth: - 4 - 8 - 12 - 16 - 32 - 48 - 64 - 128 - 256 - 384 jobname: randread mode: randread numjobs: - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 op_size: 4096 ${\tt 4krandomwrite:}$ iodepth: - 1

- 3 - 4 - 5 - 8 - 16 - 24 - 32 - 64 - 128 jobname: randwrite mode: randwrite numjobs: - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 op_size: 4096 512krandomread: iodepth: - 1 - 2 - 3 - 4 - 8 - 16 - 24 - 32 - 40 - 48 - 64 jobname: randread mode: randread numjobs: - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 op_size: 524288 ${\tt 512krandomwrite:}\\$ iodepth: - 1 - 2 - 3 - 4 - 8 - 16 - 24 - 32

```
- 48
  - 64
  jobname: randwrite
 mode: randwrite
 numjobs:
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
 op_size: 524288
512kseqread:
  iodepth:
  - 1
  - 2
  - 3
  - 4
  - 6
  - 8
  - 12
  - 16
  - 20
  - 24
  - 32
  jobname: seqread
 mode: read
 numjobs:
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  op_size: 524288
512kseqwrite:
  iodepth:
  - 1
  - 2
  - 3
  - 4
  - 6
  - 8
 - 12
  - 16
  - 20
  - 24
 - 32
 jobname: seqwrite
 mode: write
 numjobs:
  - 1
  - 1
```

- 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 op_size: 524288 64k3070: iodepth: - 1 - 2 - 3 - 4 - 5 - 8 - 16 - 24 - 32 - 64 - 128 jobname: randmix mode: randrw numjobs: - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 op_size: 65536 rwmixread: 30 64k7030: iodepth: - 1 - 2 - 3 - 4 - 5 - 8 - 16 - 24 - 32 - 64 - 128 jobname: randmix mode: randrw numjobs: - 1 - 1 - 1 - 1 - 1 - 1

- 1 - 1 - 1 op_size: 65536 rwmixread: 70 64krandomread: iodepth: - 2 - 4 - 6 - 8 - 12 - 16 - 24 - 32 - 64 - 128 - 256 jobname: randread mode: randread numjobs: - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 op_size: 65536 64krandomwrite: iodepth: - 1 - 2 - 3 - 4 - 5 - 8 - 16 - 24 - 32 - 64 - 128 jobname: randwrite mode: randwrite numjobs: - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 op_size: 65536 64kseqread:

iodepth:

- 2 - 4 - 6 - 8 - 16 - 24 - 32 - 64 - 128 - 192 - 256 jobname: read mode: read numjobs: - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 op_size: 65536 64kseqwrite: iodepth: - 1 - 2 - 3 - 4 - 5 - 8 - 16 - 24 - 32 - 64 - 128 jobname: write mode: write numjobs: - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 op_size: 65536 8krandomread: iodepth: - 4 - 8 - 12 - 16 - 32 - 48 - 64

```
- 128
  - 256
  - 384
 jobname: randread
 mode: randread
 numjobs:
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
 op_size: 8192
8krandomwrite:
  iodepth:
  - 1
  - 2
  - 3
  - 4
  - 5
  - 8
  - 16
  - 24
  - 32
  - 64
  - 128
  jobname: randwrite
 mode: randwrite
 numjobs:
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  op_size: 8192
precondition:
  iodepth:
  jobname: precond1rw
 mode: randwrite
 monitor: false
 numjobs:
  - 1
 op_size: 65536
 precond: true
seq16kread:
  iodepth:
  - 2
  - 4
  - 8
  - 12
  - 16
```

```
- 24
  - 32
  - 64
 - 96
 - 128
 - 192
 jobname: seqread
 mode: read
 numjobs:
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
 op_size: 16384
seq16kwrite:
  iodepth:
  - 2
  - 4
  - 8
  - 12
  - 16
  - 24
  - 32
 - 64
 - 96
  - 128
 - 192
 jobname: seqwrite
 mode: write
 numjobs:
  - 1
  - 1
 - 1
  - 1
  - 1
  - 1
  - 1
  - 1
 - 1
  - 1
 op_size: 16384
seq256kread:
  iodepth:
  - 1
  - 2
  - 3
  - 4
  - 5
  - 8
  - 16
  - 24
  - 32
  - 48
  - 64
  jobname: seqread
```

```
mode: read
 numjobs:
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
 - 1
  - 1
  - 1
  - 1
 - 1
 op_size: 262144
seq256kwrite:
  iodepth:
  - 1
  - 2
  - 3
  - 5
  - 8
  - 12
 - 16
  - 24
  - 32
  - 48
  - 64
  jobname: seqwrite
 mode: write
 numjobs:
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
 op_size: 262144
seq32kread:
 iodepth:
 - 2
  - 4
 - 8
  - 12
  - 16
  - 24
 - 32
 - 64
 - 96
 - 128
 - 192
 jobname: seqread
 mode: read
 numjobs:
  - 1
  - 1
  - 1
 - 1
  - 1
```

- 1 - 1 - 1 - 1 - 1 - 1 op_size: 32768 seq32kwrite: iodepth: - 1 - 2 - 3 - 4 - 5 - 8 - 16 - 24 - 32 - 64 - 128 jobname: seqwrite mode: write numjobs: - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 op_size: 32768 seq4kread: iodepth: - 2 - 4 - 8 - 12 - 16 - 24 - 32 - 64 - 96 - 128 - 192 jobname: seqread mode: read numjobs: - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1

op_size: 4096

```
seq4kwrite:
  iodepth:
  - 2
  - 4
  - 8
  - 12
  - 16
 - 24
 - 32
  - 64
 - 96
 - 128
 - 192
  - 256
  jobname: seqwrite
 mode: write
 numjobs:
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
 op_size: 4096
seq8kread:
  iodepth:
  - 2
  - 4
  - 8
  - 12
  - 16
  - 24
 - 32
  - 64
  - 96
 - 128
  - 192
 jobname: seqread
 mode: read
 numjobs:
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
 op_size: 8192
seq8kwrite:
 iodepth:
 - 2
  - 4
```

```
- 12
        - 16
        - 24
        - 32
        - 64
        - 96
        - 128
        - 192
        - 256
        jobname: seqwrite
        mode: write
        numjobs:
        - 1
        - 1
        - 1
        - 1
        - 1
        - 1
        - 1
        - 1
        - 1
        - 1
        - 1
        - 1
        op_size: 8192
cluster:
  archive_dir: /tmp/cbt
  ceph-mgr_cmd: /usr/bin/ceph-mgr
  ceph-mon_cmd: /usr/bin/ceph-mon
  ceph-osd_cmd: /usr/bin/ceph-osd
  ceph-run_cmd: /usr/bin/ceph-run
  ceph_cmd: /usr/bin/ceph
  clients:
  - --- server1 ---
  clusterid: ceph
  conf_file: /cbt/ceph.conf.4x1x1.fs
  head: --- server1 ---
  iterations: 1
  mgrs:
   --- server1 ---:
     a: null
  mkfs_opts: -f -i size=2048
  mons:
    --- server1 ---:
      a: --- IP Address --:6789
  mount_opts: -o inode64,noatime,logbsize=256k
  osds:
  - --- server1 ---
  osds_per_node: 6
  pdsh_ssh_args: -a -x -l%u %h
  rados_cmd: /usr/bin/rados
  rbd_cmd: /usr/bin/rbd
  tmp_dir: /tmp/cbt
  use_existing: true
  user: root
monitoring_profiles:
  collectl:
    args: -c 18 -sCD -i 10 -P -oz -F0 --rawtoo --sep ";" -f {collectl_dir}
```

results

```
librbdfio:
  cmd_path: /usr/local/bin/fio
  fio_out_format: json
  log_avg_msec: 100
  log_bw: true
  log_iops: true
  log_lat: true
  norandommap: true
  osd_ra:
  - 4096
 poolname: rbd_replicated
 precond_time: 600
 prefill:
    blocksize: 64k
    numjobs: 1
  procs_per_volume:
  - 1
  ramp: 30
  time: 60
  time_based: true
  use_existing_volumes: true
  vol_size: 420000
  volumes_per_client:
  - 1
  workloads:
    16k7030:
      iodepth:
      - 1
      - 2
      - 3
      - 4
      - 5
      - 8
      - 16
      - 24
      - 32
      - 64
      - 128
      jobname: randmix
      mode: randrw
      numjobs:
      - 1
      - 1
      - 1
      - 1
      - 1
      - 1
      - 1
      - 1
      - 1
      - 1
      - 1
      op size: 16384
      rwmixread: 70
    16krandomread:
      iodepth:
      - 4
      - 8
      - 12
      - 16
      - 24
```

- 48 - 64 - 128 - 256 - 384 jobname: randread mode: randread numjobs: - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 op_size: 16384 16krandomwrite: iodepth: - 1 - 2 - 3 - 4 - 5 - 8 - 16 - 24 - 32 - 64 - 128 jobname: randwrite mode: randwrite numjobs: - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 op_size: 16384 1Mrandomread: iodepth: - 1 - 2 - 3 - 4 - 8 - 12 - 16 - 20 - 24 - 28 - 32 jobname: randread mode: randread

```
numjobs:
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
 - 1
  - 1
  - 1
  - 1
  op_size: 1048576
1Mrandomwrite:
  iodepth:
 - 1
  - 2
  - 3
  - 4
  - 8
  - 12
  - 16
 - 20
  - 24
  - 28
  - 32
 jobname: randwrite
 mode: randwrite
 numjobs:
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
 op_size: 1048576
1Mseqread:
 iodepth:
  - 1
  - 2
  - 3
  - 4
  - 6
  - 8
  - 10
  - 12
 - 14
 - 16
 - 20
 jobname: seqread
 mode: read
 numjobs:
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
```

- 1 - 1 - 1 - 1 - 1 op_size: 1048576 1Mseqwrite: iodepth: - 1 - 2 - 3 - 4 - 6 - 8 - 10 - 12 - 14 - 16 - 20 jobname: seqwrite mode: write numjobs: - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 op_size: 1048576 256krandomread: iodepth: - 1 - 2 - 3 - 4 - 5 - 8 - 16 - 24 - 32 - 64 - 128 jobname: randread mode: randread numjobs: - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 op_size: 262144

256krandomwrite:

```
iodepth:
  - 1
  - 2
  - 3
  - 4
  - 5
  - 8
  - 16
 - 24
  - 32
  - 64
 - 128
 jobname: randwrite
 mode: randwrite
 numjobs:
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  op_size: 262144
32krandomread:
  iodepth:
  - 2
  - 4
  - 6
  - 8
  - 12
  - 16
  - 24
 - 32
 - 64
 - 128
  - 256
 jobname: randread
 mode: randread
 numjobs:
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
 - 1
 op_size: 32768
32krandomwrite:
  iodepth:
  - 1
  - 2
  - 3
  - 4
  - 5
```

- 16 - 24 - 32 - 64 - 128 jobname: randwrite mode: randwrite numjobs: - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 op_size: 32768 ${\tt 4krandomread:}$ iodepth: - 4 - 8 - 12 - 16 - 32 - 48 - 64 - 128 - 256 - 384 jobname: randread mode: randread numjobs: - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 op_size: 4096 4krandomwrite: iodepth: - 1 - 2 - 3 - 4 - 5 - 8 - 16 - 24 - 32 - 64 - 128 jobname: randwrite mode: randwrite numjobs:

- 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 op_size: 4096 512krandomread: iodepth: - 1 - 2 - 3 - 4 - 8 - 16 - 24 - 32 - 40 - 48 - 64 jobname: randread mode: randread numjobs: - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 op_size: 524288 ${\tt 512krandomwrite:}\\$ iodepth: - 1 - 2 - 3 - 4 - 8 - 16 - 24 - 32 - 40 - 48 - 64 jobname: randwrite mode: randwrite numjobs: - 1 - 1 - 1 - 1 - 1 - 1 - 1

- 1 - 1 - 1 - 1 op_size: 524288 512kseqread: iodepth: - 1 - 2 - 3 - 4 - 6 - 8 - 12 - 16 - 20 - 24 - 32 jobname: seqread mode: read numjobs: - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 op_size: 524288 512kseqwrite: iodepth: - 1 - 2 - 3 - 4 - 6 - 8 - 12 - 16 - 20 - 24 - 32 jobname: seqwrite mode: write numjobs: - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 op_size: 524288 64k3070:

iodepth:

- 1 - 2 - 3 - 4 - 5 - 8 - 16 - 24 - 32 - 64 - 128 jobname: randmix mode: randrw numjobs: - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 op_size: 65536 rwmixread: 30 64k7030: iodepth: - 1 - 2 - 3 - 4 - 5 - 8 - 16 - 24 - 32 - 64 - 128 jobname: randmix mode: randrw numjobs: - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 op_size: 65536 rwmixread: 70 64krandomread: iodepth: - 2 - 4 - 6 - 8

- 16 - 24 - 32 - 64 - 128 - 256 jobname: randread mode: randread numjobs: - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 op_size: 65536 64 krandom write:iodepth: - 1 - 2 - 3 - 4 - 5 - 8 - 16 - 24 - 32 - 64 - 128 jobname: randwrite mode: randwrite numjobs: - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 op_size: 65536 64kseqread: iodepth: - 2 - 4 - 6 - 8 - 16 - 24 - 32 - 64 - 128 - 192 - 256 jobname: read

```
mode: read
 numjobs:
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
 - 1
  - 1
  - 1
  - 1
 - 1
  op_size: 65536
64kseqwrite:
  iodepth:
  - 1
  - 2
  - 3
  - 4
  - 5
  - 8
  - 16
  - 24
  - 32
  - 64
  - 128
 jobname: write
 mode: write
 numjobs:
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
 op_size: 65536
8krandomread:
 iodepth:
 - 4
 - 8
  - 12
  - 16
  - 32
  - 48
 - 64
 - 128
 - 256
 - 384
  jobname: randread
 mode: randread
 numjobs:
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
```

- 1 - 1 - 1 - 1 - 1 op_size: 8192 ${\tt 8krandomwrite:}$ iodepth: - 1 - 2 - 3 - 4 - 5 - 8 - 16 - 24 - 32 - 64 - 128 jobname: randwrite mode: randwrite numjobs: - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 op_size: 8192 precondition: iodepth: - 4 jobname: precond1rw mode: randwrite monitor: false numjobs: - 1 op_size: 65536 precond: true seq16kread: iodepth: - 2 - 4 - 8 - 12 - 16 - 24 - 32 - 64 - 96 - 128 - 192 jobname: seqread mode: read numjobs: - 1 - 1 - 1

- 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 op_size: 16384 seq16kwrite: iodepth: - 2 - 4 - 8 - 12 - 16 - 24 - 32 - 64 - 96 - 128 - 192 jobname: seqwrite mode: write numjobs: - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 op_size: 16384 seq256kread: iodepth: - 1 - 2 - 3 - 4 - 5 - 8 - 16 - 24 - 32 - 48 - 64 jobname: seqread mode: read numjobs: - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1

```
- 1
  op_size: 262144
seq256kwrite:
  iodepth:
  - 1
  - 2
  - 3
  - 5
  - 8
  - 12
  - 16
  - 24
  - 32
  - 48
  - 64
  jobname: seqwrite
  mode: write
  numjobs:
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  op_size: 262144
{\tt seq32kread:}
  iodepth:
  - 2
  - 4
  - 8
  - 12
  - 16
  - 24
  - 32
  - 64
  - 96
  - 128
  - 192
  jobname: seqread
  mode: read
  numjobs:
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  op_size: 32768
seq32kwrite:
  iodepth:
  - 1
  - 2
```

- 4 - 5 - 8 - 16 - 24 - 32 - 64 - 128 jobname: seqwrite mode: write numjobs: - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 op_size: 32768 seq4kread: iodepth: - 4 - 8 - 12 - 16 - 24 - 32 - 64 - 96 - 128 - 192 jobname: seqread mode: read numjobs: - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 op_size: 4096 seq4kwrite: $\verb"iodepth":$ - 2 - 4 - 8 - 12 - 16 - 24 - 32 - 64 - 96

```
- 192
  - 256
  jobname: seqwrite
  mode: write
  numjobs:
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  op_size: 4096
{\tt seq8kread:}
  iodepth:
  - 2
  - 4
  - 8
  - 12
  - 16
  - 24
  - 32
  - 64
  - 96
  - 128
  - 192
  jobname: seqread
  mode: read
  numjobs:
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  op_size: 8192
seq8kwrite:
  iodepth:
  - 2
  - 4
  - 8
  - 12
  - 16
  - 24
  - 32
  - 64
  - 96
  - 128
  - 192
  - 256
  jobname: seqwrite
  mode: write
  numjobs:
```

```
- 1
        - 1
        - 1
        - 1
        - 1
        - 1
        - 1
        - 1
        - 1
        - 1
        - 1
        - 1
        op_size: 8192
cluster:
  archive_dir: /tmp/cbt
  ceph-mgr_cmd: /usr/bin/ceph-mgr
  ceph-mon_cmd: /usr/bin/ceph-mon
  ceph-osd_cmd: /usr/bin/ceph-osd
  ceph-run_cmd: /usr/bin/ceph-run
  ceph_cmd: /usr/bin/ceph
  clients:
  - --- server1 ---
  clusterid: ceph
  conf_file: /cbt/ceph.conf.4x1x1.fs
  fs: xfs
  head: --- server1 ---
  iterations: 1
  mgrs:
   --- server1 ---:
     a: null
  mkfs_opts: -f -i size=2048
  mons:
    --- server1 ---:
      a: --- IP Address --:6789
  mount_opts: -o inode64,noatime,logbsize=256k
  osds:
  - --- server1 ---
  osds_per_node: 6
  pdsh_ssh_args: -a -x -1%u %h
  rados_cmd: /usr/bin/rados
  rbd_cmd: /usr/bin/rbd
  tmp_dir: /tmp/cbt
  use_existing: true
  user: root
monitoring_profiles:
  collectl:
    args: -c 18 -sCD -i 10 -P -oz -F0 --rawtoo --sep ";" -f {collectl_dir}
```

results

```
librbdfio:
  cmd_path: /usr/local/bin/fio
  fio_out_format: json
  log_avg_msec: 100
  log_bw: true
  log_iops: true
  log_lat: true
  norandommap: true
  osd_ra:
  - 4096
 poolname: rbd_replicated
 precond_time: 600
 prefill:
    blocksize: 64k
    numjobs: 1
  procs_per_volume:
  - 1
  ramp: 30
  time: 60
  time_based: true
  use_existing_volumes: true
  vol_size: 420000
  volumes_per_client:
  - 1
  workloads:
    16k7030:
      iodepth:
      - 1
      - 2
      - 3
      - 4
      - 5
      - 8
      - 16
      - 24
      - 32
      - 64
      - 128
      jobname: randmix
      mode: randrw
      numjobs:
      - 1
      - 1
      - 1
      - 1
      - 1
      - 1
      - 1
      - 1
      - 1
      - 1
      - 1
      op size: 16384
      rwmixread: 70
    16krandomread:
      iodepth:
      - 4
      - 8
      - 12
      - 16
      - 24
```

- 48 - 64 - 128 - 256 - 384 jobname: randread mode: randread numjobs: - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 op_size: 16384 16krandomwrite: iodepth: - 1 - 2 - 3 - 4 - 5 - 8 - 16 - 24 - 32 - 64 - 128 jobname: randwrite mode: randwrite numjobs: - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 op_size: 16384 1Mrandomread: iodepth: - 1 - 2 - 3 - 4 - 8 - 12 - 16 - 20 - 24 - 28 - 32 jobname: randread

mode: randread

```
numjobs:
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
 - 1
  - 1
  - 1
  - 1
  op_size: 1048576
1Mrandomwrite:
  iodepth:
 - 1
  - 2
  - 3
  - 4
  - 8
  - 12
  - 16
 - 20
  - 24
  - 28
  - 32
 jobname: randwrite
 mode: randwrite
 numjobs:
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
 - 1
 op_size: 1048576
1Mseqread:
 iodepth:
  - 1
  - 2
  - 3
  - 4
  - 6
  - 8
  - 10
  - 12
 - 14
 - 16
 - 20
 jobname: seqread
 mode: read
 numjobs:
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
```

- 1 - 1 - 1 - 1 - 1 op_size: 1048576 1Mseqwrite: iodepth: - 1 - 2 - 3 - 4 - 6 - 8 - 10 - 12 - 14 - 16 - 20 jobname: seqwrite mode: write numjobs: - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 op_size: 1048576 256krandomread: iodepth: - 1 - 2 - 3 - 4 - 5 - 8 - 16 - 24 - 32 - 64 - 128 jobname: randread mode: randread numjobs: - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 op_size: 262144

256krandomwrite:

```
iodepth:
  - 1
  - 2
  - 3
  - 4
  - 5
  - 8
  - 16
 - 24
  - 32
  - 64
 - 128
 jobname: randwrite
 mode: randwrite
 numjobs:
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  op_size: 262144
32krandomread:
  iodepth:
  - 2
  - 4
  - 6
  - 8
  - 12
  - 16
  - 24
 - 32
 - 64
 - 128
  - 256
 jobname: randread
 mode: randread
 numjobs:
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
 - 1
 op_size: 32768
32krandomwrite:
  iodepth:
  - 1
  - 2
  - 3
  - 4
  - 5
```

- 16 - 24 - 32 - 64 - 128 jobname: randwrite mode: randwrite numjobs: - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 op_size: 32768 ${\tt 4krandomread:}$ iodepth: - 4 - 8 - 12 - 16 - 32 - 48 - 64 - 128 - 256 - 384 jobname: randread mode: randread numjobs: - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 op_size: 4096 4krandomwrite: iodepth: - 1 - 2 - 3 - 4 - 5 - 8 - 16 - 24 - 32 - 64 - 128 jobname: randwrite mode: randwrite numjobs:

- 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 op_size: 4096 512krandomread: iodepth: - 1 - 2 - 3 - 4 - 8 - 16 - 24 - 32 - 40 - 48 - 64 jobname: randread mode: randread numjobs: - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 op_size: 524288 ${\tt 512krandomwrite:}\\$ iodepth: - 1 - 2 - 3 - 4 - 8 - 16 - 24 - 32 - 40 - 48 - 64 jobname: randwrite mode: randwrite numjobs: - 1 - 1 - 1 - 1 - 1 - 1

- 1 - 1 - 1 - 1 op_size: 524288 512kseqread: iodepth: - 1 - 2 - 3 - 4 - 6 - 8 - 12 - 16 - 20 - 24 - 32 jobname: seqread mode: read numjobs: - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 op_size: 524288 512kseqwrite: iodepth: - 1 - 2 - 3 - 4 - 6 - 8 - 12 - 16 - 20 - 24 - 32 jobname: seqwrite mode: write numjobs: - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 op_size: 524288 64k3070:

iodepth:

- 1 - 2 - 3 - 4 - 5 - 8 - 16 - 24 - 32 - 64 - 128 jobname: randmix mode: randrw numjobs: - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 op_size: 65536 rwmixread: 30 64k7030: iodepth: - 1 - 2 - 3 - 4 - 5 - 8 - 16 - 24 - 32 - 64 - 128 jobname: randmix mode: randrw numjobs: - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 op_size: 65536 rwmixread: 70 64krandomread: iodepth: - 2 - 4 - 6 - 8 - 12

- 16 - 24 - 32 - 64 - 128 - 256 jobname: randread mode: randread numjobs: - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 op_size: 65536 64 krandom write:iodepth: - 1 - 2 - 3 - 4 - 5 - 8 - 16 - 24 - 32 - 64 - 128 jobname: randwrite mode: randwrite numjobs: - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 op_size: 65536 64kseqread: iodepth: - 2 - 4 - 6 - 8 - 16 - 24 - 32 - 64 - 128 - 192 - 256 jobname: read

```
mode: read
 numjobs:
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
 - 1
  - 1
  - 1
  - 1
 - 1
  op_size: 65536
64kseqwrite:
  iodepth:
  - 1
  - 2
  - 3
  - 4
  - 5
  - 8
  - 16
  - 24
  - 32
  - 64
  - 128
 jobname: write
 mode: write
 numjobs:
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
 op_size: 65536
8krandomread:
 iodepth:
 - 4
 - 8
  - 12
  - 16
  - 32
  - 48
 - 64
 - 128
 - 256
 - 384
  jobname: randread
 mode: randread
 numjobs:
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
```

- 1 - 1 - 1 - 1 - 1 op_size: 8192 ${\tt 8krandomwrite:}$ iodepth: - 1 - 2 - 3 - 4 - 5 - 8 - 16 - 24 - 32 - 64 - 128 jobname: randwrite mode: randwrite numjobs: - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 op_size: 8192 precondition: iodepth: - 4 jobname: precond1rw mode: randwrite monitor: false numjobs: - 1 op_size: 65536 precond: true seq16kread: iodepth: - 2 - 4 - 8 - 12 - 16 - 24 - 32 - 64 - 96 - 128 - 192 jobname: seqread mode: read numjobs: - 1 - 1

- 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 op_size: 16384 seq16kwrite: iodepth: - 2 - 4 - 8 - 12 - 16 - 24 - 32 - 64 - 96 - 128 - 192 jobname: seqwrite mode: write numjobs: - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 op_size: 16384 seq256kread: iodepth: - 1 - 2 - 3 - 4 - 5 - 8 - 16 - 24 - 32 - 48 - 64 jobname: seqread mode: read numjobs: - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1

```
- 1
  op_size: 262144
seq256kwrite:
  iodepth:
  - 1
  - 2
  - 3
  - 5
  - 8
  - 12
  - 16
  - 24
  - 32
  - 48
  - 64
  jobname: seqwrite
  mode: write
  numjobs:
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  op_size: 262144
{\tt seq32kread:}
  iodepth:
  - 2
  - 4
  - 8
  - 12
  - 16
  - 24
  - 32
  - 64
  - 96
  - 128
  - 192
  jobname: seqread
  mode: read
  numjobs:
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  op_size: 32768
seq32kwrite:
  iodepth:
  - 1
  - 2
```

- 4 - 5 - 8 - 16 - 24 - 32 - 64 - 128 jobname: seqwrite mode: write numjobs: - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 op_size: 32768 seq4kread: iodepth: - 4 - 8 - 12 - 16 - 24 - 32 - 64 - 96 - 128 - 192 jobname: seqread mode: read numjobs: - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 op_size: 4096 seq4kwrite: $\verb"iodepth":$ - 2 - 4 - 8 - 12 - 16 - 24 - 32 - 64 - 96

```
- 192
  - 256
  jobname: seqwrite
  mode: write
  numjobs:
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  op_size: 4096
{\tt seq8kread:}
  iodepth:
  - 2
  - 4
  - 8
  - 12
  - 16
  - 24
  - 32
  - 64
  - 96
  - 128
  - 192
  jobname: seqread
  mode: read
  numjobs:
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1
  op_size: 8192
seq8kwrite:
  iodepth:
  - 2
  - 4
  - 8
  - 12
  - 16
  - 24
  - 32
  - 64
  - 96
  - 128
  - 192
  - 256
  jobname: seqwrite
  mode: write
  numjobs:
```

```
- 1
        - 1
        - 1
        - 1
        - 1
        - 1
        - 1
        - 1
        - 1
        - 1
        - 1
        - 1
        op_size: 8192
cluster:
  archive_dir: /tmp/cbt
  ceph-mgr_cmd: /usr/bin/ceph-mgr
  ceph-mon_cmd: /usr/bin/ceph-mon
  ceph-osd_cmd: /usr/bin/ceph-osd
  ceph-run_cmd: /usr/bin/ceph-run
  ceph_cmd: /usr/bin/ceph
  clients:
  - --- server1 ---
  clusterid: ceph
  conf_file: /cbt/ceph.conf.4x1x1.fs
  fs: xfs
  head: --- server1 ---
  iterations: 1
  mgrs:
   --- server1 ---:
     a: null
  mkfs_opts: -f -i size=2048
  mons:
    --- server1 ---:
      a: --- IP Address --:6789
  mount_opts: -o inode64,noatime,logbsize=256k
  osds:
  - --- server1 ---
  osds_per_node: 6
  pdsh_ssh_args: -a -x -1%u %h
  rados_cmd: /usr/bin/rados
  rbd_cmd: /usr/bin/rbd
  tmp_dir: /tmp/cbt
  use_existing: true
  user: root
monitoring_profiles:
  collectl:
    args: -c 18 -sCD -i 10 -P -oz -F0 --rawtoo --sep ";" -f {collectl_dir}
```