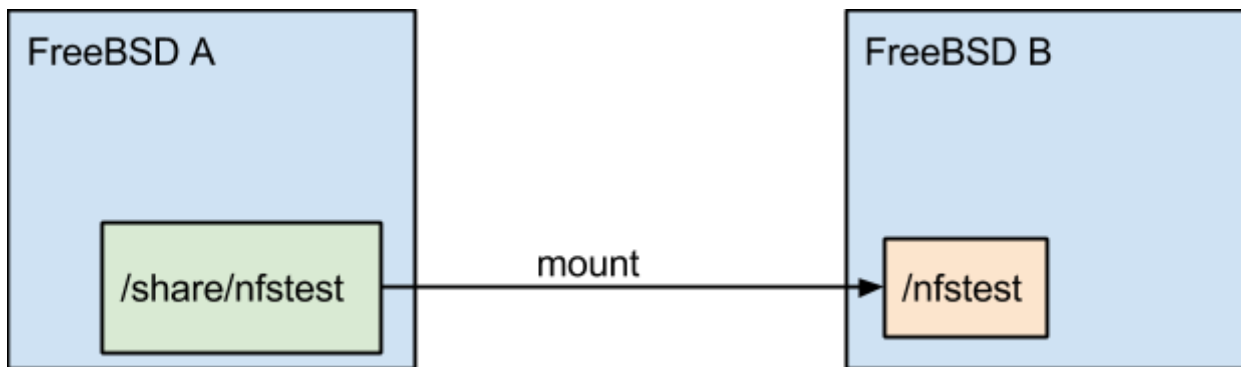


1. Environment



1. FreeBSD_A is a NFS server, FreeBSD_B is a NFS client.

2. FreeBSD_A and FreeBSD_B are connected directly through a CAT-6 cable with 10G interface.

3. **/share/nfstest** is a 20GB ramdisk with UFS2 FS. And is exported as a NFS mount point.

```
/sbin/mdmfs -M -S -o async -v 2 -s 20g md10 /share/nfstest
```

4. **/nfstest** mount the remote share folder **/share/nfstest** from FreeBSD_A

```
mount -t nfs -o rsize=262144 -o async -o noatime 10.10.10.10:/share/nfstest /nfstest
```

2. FIO Setting

ioengine=vsync

direct=0

directory=/nfstest

size=5000m or 16000m

thread

numjobs=1

refill_buffers

iodepth=16

3. FIO Benchmark result with FIO

Read

```
read 4k

read_file: (groupid=0, jobs=1): err= 0: pid=100599: Tue Mar 25 12:11:44 2014
 read : io=16000MB, bw=212304KB/s, iops=53076, runt= 77172msec
  clat (usec): min=2, max=77917, avg=17.39, stdev=90.72
   lat (usec): min=2, max=77917, avg=17.66, stdev=90.72
  clat percentiles (usec):
 | 1.00th=[  2],  5.00th=[  3], 10.00th=[  3], 20.00th=[  3],
 | 30.00th=[  3], 40.00th=[  3], 50.00th=[  3], 60.00th=[  3],
 | 70.00th=[  3], 80.00th=[  3], 90.00th=[  4], 95.00th=[ 21],
 | 99.00th=[ 410], 99.50th=[ 588], 99.90th=[ 620], 99.95th=[ 628],
 | 99.99th=[ 660]
 bw (KB /s): min=20752, max=237872, per=100.00%, avg=212432.26, stdev=17126.74
 lat (usec) : 4=82.40%, 10=11.36%, 20=0.17%, 50=2.33%, 100=0.04%
 lat (usec) : 250=0.78%, 500=2.14%, 750=0.78%, 1000=0.01%
 lat (msec) : 2=0.01%, 4=0.01%, 10=0.01%, 20=0.01%, 50=0.01%
 lat (msec) : 100=0.01%
 cpu       : usr=7.06%, sys=23.97%, ctx=159048, majf=0, minf=16
 IO depths : 1=0.1%, 2=0.1%, 4=0.1%, 8=0.1%, 16=100.0%, 32=0.0%, >=64=0.0%
 submit    : 0=0.0%, 4=100.0%, 8=0.0%, 16=0.0%, 32=0.0%, 64=0.0%, >=64=0.0%
 complete  : 0=0.1%, 4=100.0%, 8=0.0%, 16=0.0%, 32=0.0%, 64=0.0%, >=64=0.0%
 issued    : total=r=4096000/w=0/d=0, short=r=0/w=0/d=0

Run status group 0 (all jobs):
  READ: io=16000MB, aggrb=212304KB/s, minb=212304KB/s, maxb=212304KB/s, mint=77172msec, maxt=77172msec

Client Info:
Rpc Counts:
  Getattr  Setattr  Lookup  Readlink  Read  Write  Create  Remove
    1         0         1         0 256000         0         0         0
  Rename   Link  Symlink  Mkdir  Rmdir  Readdir  RdirPlus  Access
    0         0         0         0         0         0         0         1
  Mknod   Fsstat  Fsinfo  PathConf  Commit
    0         0         0         0         0

Rpc Info:
  TimedOut  Invalid X Replies  Retries  Requests
    256003         0         0         0         0

Cache Info:
Attr Hits  Misses Lkup Hits  Misses BioR Hits  Misses BioW Hits  Misses
 4096006         1         2         1 3840000 256000         0         0
BioRLHits  Misses BioD Hits  Misses DirE Hits  Misses Accs Hits  Misses
    0         0         0         0         0         0         3         1
```

read 128k

read_file: (groupid=0, jobs=1): err= 0: pid=100553: Tue Mar 25 11:57:58 2014

read : io=15998MB, bw=276067KB/s, iops=2157, runt= 59341msec

clat (usec): min=249, max=406501, avg=459.53, stdev=1225.72

lat (usec): min=249, max=406501, avg=459.91, stdev=1225.72

clat percentiles (usec):

| 1.00th=[322], 5.00th=[342], 10.00th=[354], 20.00th=[370],
| 30.00th=[382], 40.00th=[390], 50.00th=[398], 60.00th=[414],
| 70.00th=[446], 80.00th=[498], 90.00th=[668], 95.00th=[700],
| 99.00th=[748], 99.50th=[780], 99.90th=[2192], 99.95th=[5792],
| 99.99th=[13888]

bw (KB /s): min=137620, max=308480, per=100.00%, avg=276874.63, stdev=21948.25

lat (usec) : 250=0.01%, 500=80.10%, 750=18.97%, 1000=0.67%

lat (msec) : 2=0.14%, 4=0.04%, 10=0.04%, 20=0.03%, 50=0.01%

lat (msec) : 100=0.01%, 500=0.01%

cpu : usr=1.24%, sys=13.45%, ctx=243749, majf=0, minf=512

IO depths : 1=0.1%, 2=0.1%, 4=0.1%, 8=0.1%, 16=100.0%, 32=0.0%, >=64=0.0%

submit : 0=0.0%, 4=100.0%, 8=0.0%, 16=0.0%, 32=0.0%, 64=0.0%, >=64=0.0%

complete : 0=0.1%, 4=100.0%, 8=0.0%, 16=0.0%, 32=0.0%, 64=0.0%, >=64=0.0%

issued : total=r=128000/w=0/d=0, short=r=0/w=0/d=0

Run status group 0 (all jobs):

READ: io=15998MB, aggrbw=276066KB/s, minb=276066KB/s, maxb=276066KB/s, mint=59341msec, maxt=59341msec

Client Info:

Rpc Counts:

Getattr	Setattr	Lookup	Readlink	Read	Write	Create	Remove
1	1	4	0	256000	243793	1	0
Rename	Link	Symlink	Mkdir	Rmdir	Readdir	RdirPlus	Access
0	0	0	0	0	0	0	1
Mknod	Fsstat	Fsinfo	PathConf	Commit			
0	0	0	0	0			

Rpc Info:

TimedOut	Invalid X	Replies	Retries	Requests
509117	0	0	0	0

Cache Info:

Attr Hits	Misses	Lkup Hits	Misses	BioR Hits	Misses	BioW Hits	Misses
128006	1	1	4	0	256000	663	255337
BioRLHits	Misses	BioD Hits	Misses	DirE Hits	Misses	Accs Hits	Misses
0	0	0	0	0	0	5	1

random read 4k

read_file: (groupid=0, jobs=1): err= 0: pid=100833: Tue Mar 25 13:49:24 2014

read : io=4999.1MB, bw=77752KB/s, iops=19438, runt= 65850msec

clat (usec): min=3, max=9658, avg=49.29, stdev=137.03

lat (usec): min=3, max=9658, avg=49.61, stdev=137.04

clat percentiles (usec):

| 1.00th=[3], 5.00th=[4], 10.00th=[4], 20.00th=[5],
| 30.00th=[6], 40.00th=[19], 50.00th=[20], 60.00th=[20],
| 70.00th=[21], 80.00th=[21], 90.00th=[23], 95.00th=[516],
| 99.00th=[620], 99.50th=[628], 99.90th=[676], 99.95th=[1064],
| 99.99th=[1640]

bw (KB /s): min= 4416, max=433200, per=96.92%, avg=75356.92, stdev=95855.97

lat (usec) : 4=1.36%, 10=30.87%, 20=15.43%, 50=46.08%, 100=0.01%

lat (usec) : 250=0.01%, 500=0.98%, 750=5.20%, 1000=0.02%

lat (msec) : 2=0.05%, 4=0.01%, 10=0.01%

cpu : usr=4.31%, sys=34.59%, ctx=80219, majf=0, minf=16

IO depths : 1=0.1%, 2=0.1%, 4=0.1%, 8=0.1%, 16=100.0%, 32=0.0%, >=64=0.0%

submit : 0=0.0%, 4=100.0%, 8=0.0%, 16=0.0%, 32=0.0%, 64=0.0%, >=64=0.0%

complete : 0=0.1%, 4=100.0%, 8=0.0%, 16=0.0%, 32=0.0%, 64=0.0%, >=64=0.0%

issued : total=r=1280000/w=0/d=0, short=r=0/w=0/d=0

Run status group 0 (all jobs):

READ: io=4999.1MB, aggrb=77751KB/s, minb=77751KB/s, maxb=77751KB/s, mint=65850msec, maxt=65850msec

Client Info:

Rpc Counts:

Getattr	Setattr	Lookup	Readlink	Read	Write	Create	Remove
1	1	4	0	160000	80000	1	0
Rename	Link	Symlink	Mkdir	Rmdir	Readdir	RdirPlus	Access
0	0	0	0	0	0	0	1
Mknod	Fsstat	Fsinfo	PathConf	Commit			
0	0	0	0	0			

Rpc Info:

TimedOut	Invalid X Replies	Retries	Requests
240008	0	0	0

Cache Info:

Attr Hits	Misses	Lkup Hits	Misses	BioR Hits	Misses	BioW Hits	Misses
1280006	1	1	4	1120000	160000	1200000	80000
BioRLHits	Misses	BioD Hits	Misses	DirE Hits	Misses	Accs Hits	Misses
0	0	0	0	0	0	5	1

random read 128k

read_file: (groupid=0, jobs=1): err= 0: pid=100835: Tue Mar 25 13:51:26 2014
read : io=4998.2MB, bw=107683KB/s, iops=841, runt= 47529msec
clat (usec): min=793, max=250508, avg=1181.94, stdev=1670.55
lat (usec): min=793, max=250508, avg=1182.32, stdev=1670.55
clat percentiles (usec):
| 1.00th=[1020], 5.00th=[1048], 10.00th=[1048], 20.00th=[1080],
| 30.00th=[1112], 40.00th=[1128], 50.00th=[1144], 60.00th=[1176],
| 70.00th=[1208], 80.00th=[1224], 90.00th=[1256], 95.00th=[1288],
| 99.00th=[1880], 99.50th=[2320], 99.90th=[4448], 99.95th=[5856],
| 99.99th=[6560]
bw (KB /s): min=54930, max=112128, per=100.00%, avg=107806.84, stdev=7836.86
lat (usec) : 1000=0.26%
lat (msec) : 2=98.97%, 4=0.63%, 10=0.10%, 250=0.01%, 500=0.01%
cpu : usr=0.49%, sys=10.87%, ctx=80026, majf=0, minf=512
IO depths : 1=0.1%, 2=0.1%, 4=0.1%, 8=0.1%, 16=100.0%, 32=0.0%, >=64=0.0%
submit : 0=0.0%, 4=100.0%, 8=0.0%, 16=0.0%, 32=0.0%, 64=0.0%, >=64=0.0%
complete : 0=0.1%, 4=100.0%, 8=0.0%, 16=0.0%, 32=0.0%, 64=0.0%, >=64=0.0%
issued : total=r=40000/w=0/d=0, short=r=0/w=0/d=0

Run status group 0 (all jobs):

READ: io=4998.2MB, aggrb=107683KB/s, minb=107683KB/s, maxb=107683KB/s, mint=47529msec, maxt=47529msec

Client Info:

Rpc Counts:

Getattr	Setattr	Lookup	Readlink	Read	Write	Create	Remove
1	1	4	0	80000	77285	1	0
Rename	Link	Symlink	Mkdir	Rmdir	Readdir	RdirPlus	Access
0	0	0	0	0	0	0	1
Mknod	Fsstat	Fsinfo	PathConf	Commit			
0	0	0	0	0			

Rpc Info:

TimedOut	Invalid X Replies	Retries	Requests
159418	0	0	0

Cache Info:

Attr Hits	Misses	Lkup Hits	Misses	BioR Hits	Misses	BioW Hits	Misses
40006	1	1	4	0	80000	126	79874
BioRLHits	Misses	BioD Hits	Misses	DirE Hits	Misses	Accs Hits	Misses
0	0	0	0	0	0	5	1

Write

write 4K

```
write_file: (groupid=0, jobs=1): err= 0: pid=100723: Tue Mar 25 12:54:02 2014
write: io=16000MB, bw=85475KB/s, iops=21368, runt=191682msec
  clat (usec): min=2, max=118937, avg=44.11, stdev=179.62
    lat (usec): min=3, max=118937, avg=44.38, stdev=179.62
  clat percentiles (usec):
    | 1.00th=[   3],  5.00th=[   3], 10.00th=[   3], 20.00th=[   3],
    | 30.00th=[   3], 40.00th=[   3], 50.00th=[   3], 60.00th=[   3],
    | 70.00th=[   3], 80.00th=[   4], 90.00th=[   5], 95.00th=[  486],
    | 99.00th=[ 868], 99.50th=[ 908], 99.90th=[ 964], 99.95th=[ 996],
    | 99.99th=[1192]
  bw (KB /s): min=   7, max=99136, per=100.00%, avg=85538.42, stdev=6570.54
  lat (usec) : 4=72.44%, 10=21.28%, 20=0.02%, 50=0.01%, 100=0.01%
  lat (usec) : 250=0.01%, 500=1.48%, 750=2.75%, 1000=1.97%
  lat (msec) : 2=0.04%, 4=0.01%, 10=0.01%, 20=0.01%, 100=0.01%
  lat (msec) : 250=0.01%
  cpu       : usr=5.60%, sys=16.97%, ctx=257339, majf=0, minf=0
  IO depths : 1=0.1%, 2=0.1%, 4=0.1%, 8=0.1%, 16=100.0%, 32=0.0%, >=64=0.0%
    submit   : 0=0.0%, 4=100.0%, 8=0.0%, 16=0.0%, 32=0.0%, 64=0.0%, >=64=0.0%
  complete  : 0=0.1%, 4=100.0%, 8=0.0%, 16=0.0%, 32=0.0%, 64=0.0%, >=64=0.0%
  issued    : total=r=0/w=4096000/d=0, short=r=0/w=0/d=0
```

Run status group 0 (all jobs):

WRITE: io=16000MB, aggrbw=85474KB/s, minb=85474KB/s, maxb=85474KB/s, mint=191682msec, maxt=191682msec

Client Info:

Rpc Counts:

Getattr	Setattr	Lookup	Readlink	Read	Write	Create	Remove
178	356	4	0	256174	512160	1	0
Rename	Link	Symlink	Mkdir	Rmdir	Readdir	RdirPlus	Access
0	0	0	0	0	0	0	1
Mknod	Fsstat	Fsinfo	PathConf	Commit			
0	0	0	0	0			

Rpc Info:

TimedOut	Invalid X Replies	Retries	Requests
768880	0	0	0

Cache Info:

Attr Hits	Misses	Lkup Hits	Misses	BioR Hits	Misses	BioW Hits	Misses
7	178	1	4	-256174	256174	36351826	512174
BioRLHits	Misses	BioD Hits	Misses	DirE Hits	Misses	Accs Hits	Misses
0	0	0	0	0	0	5	1

write 128k

```
write_file: (groupid=0, jobs=1): err= 0: pid=100658: Tue Mar 25 12:16:56 2014
write: io=15998MB, bw=663511KB/s, iops=5184, runt= 24690msec
clat (usec): min=41, max=317475, avg=154.53, stdev=1960.82
lat (usec): min=42, max=317476, avg=155.03, stdev=1960.82
clat percentiles (usec):
| 1.00th=[ 47], 5.00th=[ 66], 10.00th=[ 67], 20.00th=[ 69],
| 30.00th=[ 70], 40.00th=[ 71], 50.00th=[ 73], 60.00th=[ 76],
| 70.00th=[ 82], 80.00th=[ 89], 90.00th=[ 94], 95.00th=[ 99],
| 99.00th=[ 1304], 99.50th=[ 1656], 99.90th=[33536], 99.95th=[35584],
| 99.99th=[55040]
bw (KB /s): min=395264, max=1130752, per=100.00%, avg=667552.57, stdev=124431.73
lat (usec) : 50=1.49%, 100=93.56%, 250=3.25%, 500=0.11%, 750=0.01%
lat (usec) : 1000=0.10%
lat (msec) : 2=1.20%, 4=0.10%, 10=0.03%, 20=0.01%, 50=0.12%
lat (msec) : 100=0.01%, 250=0.01%, 500=0.01%
cpu      : usr=20.67%, sys=39.29%, ctx=3914, majf=0, minf=0
IO depths : 1=0.1%, 2=0.1%, 4=0.1%, 8=0.1%, 16=100.0%, 32=0.0%, >=64=0.0%
submit   : 0=0.0%, 4=100.0%, 8=0.0%, 16=0.0%, 32=0.0%, 64=0.0%, >=64=0.0%
complete : 0=0.1%, 4=100.0%, 8=0.0%, 16=0.0%, 32=0.0%, 64=0.0%, >=64=0.0%
issued  : total=r=0/w=128000/d=0, short=r=0/w=0/d=0
```

Run status group 0 (all jobs):

WRITE: io=15998MB, aggrb=663510KB/s, minb=663510KB/s, maxb=663510KB/s, mint=24690msec, maxt=24690msec

Rpc Counts:

Getattr	Setattr	Lookup	Readlink	Read	Write	Create	Remove
180	360	4	0	177	500530	1	0
Rename	Link	Symlink	Mkdir	Rmdir	Readdir	RdirPlus	Access
0	0	0	0	0	0	0	2
Mknod	Fsstat	Fsinfo	PathConf	Commit			
0	0	0	0	0			

Rpc Info:

TimedOut	Invalid X	Replies	Retries	Requests
510020	0	0	0	0

Cache Info:

Attr Hits	Misses	Lkup Hits	Misses	BioR Hits	Misses	BioW Hits	Misses
7	180	1	4	-177	177	32512550	511450
BioRLHits	Misses	BioD Hits	Misses	DirE Hits	Misses	Accs Hits	Misses
0	0	0	0	0	0	4	2

random write 4k

```
write_file: (groupid=0, jobs=1): err= 0: pid=100853: Tue Mar 25 14:25:10 2014
write: io=4999.1MB, bw=8993.6KB/s, iops=2248, runt=569288msec
  clat (usec): min=4, max=745067, avg=439.50, stdev=3573.82
    lat (usec): min=5, max=745068, avg=439.90, stdev=3573.82
  clat percentiles (usec):
    | 1.00th=[ 30], 5.00th=[ 126], 10.00th=[ 211], 20.00th=[ 262],
    | 30.00th=[ 278], 40.00th=[ 286], 50.00th=[ 290], 60.00th=[ 294],
    | 70.00th=[ 302], 80.00th=[ 446], 90.00th=[ 668], 95.00th=[ 748],
    | 99.00th=[ 1064], 99.50th=[ 6752], 99.90th=[13120], 99.95th=[14272],
    | 99.99th=[43264]
  bw (KB /s): min= 2034, max=45480, per=100.00%, avg=9191.08, stdev=3931.44
  lat (usec) : 10=0.14%, 20=0.23%, 50=1.37%, 100=2.03%, 250=13.97%
  lat (usec) : 500=65.45%, 750=11.73%, 1000=3.95%
  lat (msec) : 2=0.23%, 4=0.10%, 10=0.58%, 20=0.19%, 50=0.01%
  lat (msec) : 100=0.01%, 250=0.01%, 500=0.01%, 750=0.01%
  cpu      : usr=1.55%, sys=68.82%, ctx=509220, majf=0, minf=0
  IO depths : 1=0.1%, 2=0.1%, 4=0.1%, 8=0.1%, 16=100.0%, 32=0.0%, >=64=0.0%
    submit  : 0=0.0%, 4=100.0%, 8=0.0%, 16=0.0%, 32=0.0%, 64=0.0%, >=64=0.0%
    complete : 0=0.1%, 4=100.0%, 8=0.0%, 16=0.0%, 32=0.0%, 64=0.0%, >=64=0.0%
    issued   : total=r=0/w=1280000/d=0, short=r=0/w=0/d=0
```

Run status group 0 (all jobs):

WRITE: io=4999.1MB, aggrb=8993KB/s, minb=8993KB/s, maxb=8993KB/s, mint=569288msec, maxt=569288msec

Rpc Counts:

Getattr	Setattr	Lookup	Readlink	Read	Write	Create	Remove
59	118	4	0	80058	1209267	1	0
Rename	Link	Symlink	Mkdir	Rmdir	Readdir	RdirPlus	Access
0	0	0	0	0	0	0	1
Mknod	Fsstat	Fsinfo	PathConf	Commit			
0	0	0	0	0			

Rpc Info:

TimedOut	Invalid X Replies	Retries	Requests
1294444	0	0	0

Cache Info:

Attr Hits	Misses	Lkup Hits	Misses	BioR Hits	Misses	BioW Hits	Misses
7	59	1	4	-80058	80058	10303816	1216184
BioRLHits	Misses	BioD Hits	Misses	DirE Hits	Misses	Accs Hits	Misses
0	0	0	0	0	0	5	1

random write 128k

```
write_file: (groupid=0, jobs=1): err= 0: pid=100857: Tue Mar 25 14:40:31 2014
write: io=14998MB, bw=631760KB/s, iops=4936, runt= 24310msec
  clat (usec): min=43, max=450063, avg=163.95, stdev=2094.65
  lat (usec): min=43, max=450063, avg=164.43, stdev=2094.65
  clat percentiles (usec):
    | 1.00th=[ 49], 5.00th=[ 66], 10.00th=[ 68], 20.00th=[ 71],
    | 30.00th=[ 72], 40.00th=[ 74], 50.00th=[ 76], 60.00th=[ 79],
    | 70.00th=[ 83], 80.00th=[ 89], 90.00th=[ 96], 95.00th=[ 104],
    | 99.00th=[ 1336], 99.50th=[ 1400], 99.90th=[33536], 99.95th=[34560],
    | 99.99th=[51968]
  bw (KB /s): min=37888, max=1134336, per=100.00%, avg=633251.50, stdev=151134.41
  lat (usec) : 50=1.03%, 100=91.96%, 250=4.80%, 500=0.07%, 750=0.01%
  lat (usec) : 1000=0.08%
  lat (msec) : 2=1.72%, 4=0.17%, 10=0.01%, 50=0.13%, 100=0.01%
  lat (msec) : 250=0.01%, 500=0.01%
  cpu      : usr=18.76%, sys=39.20%, ctx=4394, majf=0, minf=0
IO depths  : 1=0.1%, 2=0.1%, 4=0.1%, 8=0.1%, 16=100.0%, 32=0.0%, >=64=0.0%
  submit   : 0=0.0%, 4=100.0%, 8=0.0%, 16=0.0%, 32=0.0%, 64=0.0%, >=64=0.0%
  complete : 0=0.1%, 4=100.0%, 8=0.0%, 16=0.0%, 32=0.0%, 64=0.0%, >=64=0.0%
  issued   : total=r=0/w=120000/d=0, short=r=0/w=0/d=0
```

Run status group 0 (all jobs):

WRITE: io=14998MB, aggrb=631759KB/s, minb=631759KB/s, maxb=631759KB/s, mint=24310msec, maxt=24310msec

Rpc Counts:

Getattr	Setattr	Lookup	Readlink	Read	Write	Create	Remove
170	340	4	0	164	469297	1	0
Rename	Link	Symlink	Mkdir	Rmdir	Readdir	RdirPlus	Access
0	0	0	0	0	0	0	1
Mknod	Fsstat	Fsinfo	PathConf	Commit			
0	0	0	0	0			

Rpc Info:

TimedOut	Invalid X	Replies	Retries	Requests
478146	0	0	0	0

Cache Info:

Attr Hits	Misses	Lkup Hits	Misses	BioR Hits	Misses	BioW Hits	Misses
7	170	1	4	-164	164	30480310	479690
BioRLHits	Misses	BioD Hits	Misses	DirE Hits	Misses	Accs Hits	Misses
0	0	0	0	0	0	5	1

4. FIO Benchmark result with the patch

Read

read 4k

read_file: (g=0): rw=read, bs=4K-4K/4K-4K/4K-4K, ioengine=vsync, iodepth=16
fio-2.1.3

Starting 1 thread

read_file: Laying out IO file(s) (1 file(s) / 16000MB)

read_file: (groupid=0, jobs=1): err= 0: pid=100438: Tue Mar 25 16:21:33 2014

read : io=16000MB, bw=245320KB/s, iops=61330, runt= 66786msec

clat (usec): min=2, max=120677, avg=14.99, stdev=98.27

lat (usec): min=2, max=120678, avg=15.27, stdev=98.27

clat percentiles (usec):

```
| 1.00th=[ 2], 5.00th=[ 2], 10.00th=[ 3], 20.00th=[ 3],
| 30.00th=[ 3], 40.00th=[ 3], 50.00th=[ 3], 60.00th=[ 3],
| 70.00th=[ 3], 80.00th=[ 3], 90.00th=[ 4], 95.00th=[ 22],
| 99.00th=[ 338], 99.50th=[ 362], 99.90th=[ 540], 99.95th=[ 580],
| 99.99th=[ 676]
```

bw (KB /s): min=187536, max=305136, per=100.00%, avg=245363.62, stdev=13298.07

lat (usec) : 4=83.27%, 10=10.42%, 20=0.25%, 50=2.01%, 100=0.03%

lat (usec) : 250=1.89%, 500=2.02%, 750=0.10%, 1000=0.01%

lat (msec) : 2=0.01%, 4=0.01%, 10=0.01%, 20=0.01%, 50=0.01%

lat (msec) : 100=0.01%, 250=0.01%

cpu : usr=7.83%, sys=27.30%, ctx=170227, majf=0, minf=16

IO depths : 1=0.1%, 2=0.1%, 4=0.1%, 8=0.1%, 16=100.0%, 32=0.0%, >=64=0.0%

submit : 0=0.0%, 4=100.0%, 8=0.0%, 16=0.0%, 32=0.0%, 64=0.0%, >=64=0.0%

complete : 0=0.1%, 4=100.0%, 8=0.0%, 16=0.0%, 32=0.0%, 64=0.0%, >=64=0.0%

issued : total=r=4096000/w=0/d=0, short=r=0/w=0/d=0

Run status group 0 (all jobs):

READ: io=16000MB, aggrb=245319KB/s, minb=245319KB/s, maxb=245319KB/s, mint=66786msec, maxt=66786msec

Client Info:

Rpc Counts:

Getattr	Setattr	Lookup	Readlink	Read	Write	Create	Remove
0	1	4	0	512000	256000	1	0
Rename	Link	Symlink	Mkdir	Rmdir	Readdir	RdirPlus	Access
0	0	0	0	0	0	0	2
Mknod	Fsstat	Fsinfo	PathConf	Commit			
0	0	0	0	0			

Rpc Info:

TimedOut	Invalid X	Replies	Retries	Requests
768008	0	0	0	0

Cache Info:

Attr Hits	Misses	Lkup Hits	Misses	BioR Hits	Misses	BioW Hits	Misses
4096006	0	1	4	3584000	512000	3840000	256000
BioRLHits	Misses	BioD Hits	Misses	DirE Hits	Misses	Accs Hits	Misses
0	0	0	0	0	0	4	2

read 128k

read_file: (groupid=0, jobs=1): err= 0: pid=100422: Tue Mar 25 16:15:49 2014

read : io=15998MB, bw=315568KB/s, iops=2465, runt= 51913msec

clat (usec): min=234, max=495062, avg=402.20, stdev=1460.86

lat (usec): min=235, max=495063, avg=402.58, stdev=1460.86

clat percentiles (usec):

| 1.00th=[322], 5.00th=[338], 10.00th=[350], 20.00th=[362],
| 30.00th=[370], 40.00th=[378], 50.00th=[382], 60.00th=[386],
| 70.00th=[394], 80.00th=[406], 90.00th=[426], 95.00th=[450],
| 99.00th=[676], 99.50th=[740], 99.90th=[2416], 99.95th=[5408],
| 99.99th=[12608]

bw (KB /s): min=87238, max=332032, per=100.00%, avg=316418.15, stdev=28181.84

lat (usec) : 250=0.01%, 500=96.67%, 750=2.85%, 1000=0.24%

lat (msec) : 2=0.11%, 4=0.05%, 10=0.04%, 20=0.02%, 100=0.01%

lat (msec) : 250=0.01%, 500=0.01%

cpu : usr=1.40%, sys=15.00%, ctx=244746, majf=1, minf=512

IO depths : 1=0.1%, 2=0.1%, 4=0.1%, 8=0.1%, 16=100.0%, 32=0.0%, >=64=0.0%

submit : 0=0.0%, 4=100.0%, 8=0.0%, 16=0.0%, 32=0.0%, 64=0.0%, >=64=0.0%

complete : 0=0.1%, 4=100.0%, 8=0.0%, 16=0.0%, 32=0.0%, 64=0.0%, >=64=0.0%

issued : total=r=128000/w=0/d=0, short=r=0/w=0/d=0

Run status group 0 (all jobs):

READ: io=15998MB, aggrb=315567KB/s, minb=315567KB/s, maxb=315567KB/s, mint=51913msec, maxt=51913msec

Client Info:

Rpc Counts:

Getattr	Setattr	Lookup	Readlink	Read	Write	Create	Remove
1	1	4	0	256000	245033	1	0
Rename	Link	Symlink	Mkdir	Rmdir	Readdir	RdirPlus	Access
0	0	0	0	0	0	0	2
Mknod	Fsstat	Fsinfo	PathConf	Commit			
0	0	0	0	0			

Rpc Info:

TimedOut	Invalid X	Replies	Retries	Requests
511556	0	0	0	0

Cache Info:

Attr Hits	Misses	Lkup Hits	Misses	BioR Hits	Misses	BioW Hits	Misses
128006	1	1	4	0	256000	415	255585
BioRLHits	Misses	BioD Hits	Misses	DirE Hits	Misses	Accs Hits	Misses
0	0	0	0	0	0	4	2

random read 4k

read_file: (groupid=0, jobs=1): err= 0: pid=100424: Tue Mar 25 16:17:38 2014

read : io=4999.1MB, bw=93592KB/s, iops=23398, runt= 54705msec

clat (usec): min=3, max=11231, avg=40.53, stdev=103.69

lat (usec): min=3, max=11231, avg=40.85, stdev=103.70

clat percentiles (usec):

| 1.00th=[3], 5.00th=[4], 10.00th=[4], 20.00th=[5],
| 30.00th=[6], 40.00th=[20], 50.00th=[20], 60.00th=[21],
| 70.00th=[21], 80.00th=[22], 90.00th=[24], 95.00th=[334],
| 99.00th=[516], 99.50th=[588], 99.90th=[700], 99.95th=[724],
| 99.99th=[1320]

bw (KB /s): min= 5264, max=469728, per=98.20%, avg=91903.56, stdev=100151.03

lat (usec) : 4=1.72%, 10=30.47%, 20=7.70%, 50=53.82%, 100=0.02%

lat (usec) : 250=0.03%, 500=5.15%, 750=1.04%, 1000=0.02%

lat (msec) : 2=0.03%, 4=0.01%, 10=0.01%, 20=0.01%

cpu : usr=5.74%, sys=42.35%, ctx=80347, majf=0, minf=16

IO depths : 1=0.1%, 2=0.1%, 4=0.1%, 8=0.1%, 16=100.0%, 32=0.0%, >=64=0.0%

submit : 0=0.0%, 4=100.0%, 8=0.0%, 16=0.0%, 32=0.0%, 64=0.0%, >=64=0.0%

complete : 0=0.1%, 4=100.0%, 8=0.0%, 16=0.0%, 32=0.0%, 64=0.0%, >=64=0.0%

issued : total=r=1280000/w=0/d=0, short=r=0/w=0/d=0

Run status group 0 (all jobs):

READ: io=4999.1MB, aggrb=93591KB/s, minb=93591KB/s, maxb=93591KB/s, mint=54705msec, maxt=54705msec

Client Info:

Rpc Counts:

Getattr	Setattr	Lookup	Readlink	Read	Write	Create	Remove
1	1	4	0	160000	80000	1	0
Rename	Link	Symlink	Mkdir	Rmdir	Readdir	RdirPlus	Access
0	0	0	0	0	0	0	2
Mknod	Fsstat	Fsinfo	PathConf	Commit			
0	0	0	0	0			

Rpc Info:

TimedOut	Invalid X Replies	Retries	Requests
240009	0	0	0

Cache Info:

Attr Hits	Misses	Lkup Hits	Misses	BioR Hits	Misses	BioW Hits	Misses
1280006	1	1	4	1120000	160000	1200000	80000
BioRLHits	Misses	BioD Hits	Misses	DirE Hits	Misses	Accs Hits	Misses
0	0	0	0	0	0	4	2

random read 128k

read_file: (groupid=0, jobs=1): err= 0: pid=100420: Tue Mar 25 16:14:29 2014

read : io=4998.2MB, bw=164267KB/s, iops=1283, runt= 31157msec

clat (usec): min=595, max=343318, avg=772.52, stdev=1713.36

lat (usec): min=595, max=343318, avg=772.90, stdev=1713.36

clat percentiles (usec):

| 1.00th=[716], 5.00th=[732], 10.00th=[740], 20.00th=[756],
| 30.00th=[756], 40.00th=[764], 50.00th=[764], 60.00th=[764],
| 70.00th=[764], 80.00th=[772], 90.00th=[788], 95.00th=[796],
| 99.00th=[820], 99.50th=[876], 99.90th=[1144], 99.95th=[1160],
| 99.99th=[1896]

bw (KB /s): min=52736, max=167168, per=100.00%, avg=164376.77, stdev=15448.49

lat (usec) : 750=14.30%, 1000=85.47%

lat (msec) : 2=0.18%, 4=0.01%, 500=0.01%

cpu : usr=0.56%, sys=17.15%, ctx=80037, majf=0, minf=512

IO depths : 1=0.1%, 2=0.1%, 4=0.1%, 8=0.1%, 16=100.0%, 32=0.0%, >=64=0.0%

submit : 0=0.0%, 4=100.0%, 8=0.0%, 16=0.0%, 32=0.0%, 64=0.0%, >=64=0.0%

complete : 0=0.1%, 4=100.0%, 8=0.0%, 16=0.0%, 32=0.0%, 64=0.0%, >=64=0.0%

issued : total=r=40000/w=0/d=0, short=r=0/w=0/d=0

Run status group 0 (all jobs):

READ: io=4998.2MB, aggrb=164267KB/s, minb=164267KB/s, maxb=164267KB/s, mint=31157msec, maxt=31157msec

Client Info:

Rpc Counts:

Getattr	Setattr	Lookup	Readlink	Read	Write	Create	Remove
1	1	4	0	80000	77769	1	0
Rename	Link	Symlink	Mkdir	Rmdir	Readdir	RdirPlus	Access
0	0	0	0	0	0	0	1
Mknod	Fsstat	Fsinfo	PathConf	Commit			
0	0	0	0	0			

Rpc Info:

TimedOut	Invalid X	Replies	Retries	Requests
159921	0	0	0	0

Cache Info:

Attr Hits	Misses	Lkup	Hits	Misses	BioR	Hits	Misses	BioW	Hits	Misses
40006	1	1	1	4	0	0	80000	97	79903	
BioRLHits	Misses	BioD	Hits	Misses	DirE	Hits	Misses	Accs	Hits	Misses
0	0	0	0	0	0	0	0	5	1	

Write

write 4k

write_file: (groupid=0, jobs=1): err= 0: pid=100496: Tue Mar 25 16:37:31 2014

write: io=16000MB, bw=88713KB/s, iops=22178, runt=184685msec

clat (usec): min=2, max=265284, avg=42.37, stdev=233.67

lat (usec): min=3, max=265284, avg=42.64, stdev=233.67

clat percentiles (usec):

| 1.00th=[3], 5.00th=[3], 10.00th=[3], 20.00th=[3],

| 30.00th=[3], 40.00th=[3], 50.00th=[3], 60.00th=[3],

| 70.00th=[3], 80.00th=[4], 90.00th=[5], 95.00th=[390],

| 99.00th=[844], 99.50th=[876], 99.90th=[940], 99.95th=[972],

| 99.99th=[1112]

bw (KB /s): min= 5, max=104576, per=100.00%, avg=88914.43, stdev=7246.62

lat (usec) : 4=72.10%, 10=21.62%, 20=0.02%, 50=0.01%, 100=0.01%

lat (usec) : 250=0.01%, 500=1.76%, 750=2.57%, 1000=1.88%

lat (msec) : 2=0.03%, 4=0.01%, 10=0.01%, 20=0.01%, 50=0.01%

lat (msec) : 250=0.01%, 500=0.01%

cpu : usr=5.62%, sys=17.83%, ctx=257355, majf=0, minf=0

IO depths : 1=0.1%, 2=0.1%, 4=0.1%, 8=0.1%, 16=100.0%, 32=0.0%, >=64=0.0%

submit : 0=0.0%, 4=100.0%, 8=0.0%, 16=0.0%, 32=0.0%, 64=0.0%, >=64=0.0%

complete : 0=0.1%, 4=100.0%, 8=0.0%, 16=0.0%, 32=0.0%, 64=0.0%, >=64=0.0%

issued : total=r=0/w=4096000/d=0, short=r=0/w=0/d=0

Run status group 0 (all jobs):

WRITE: io=16000MB, aggrbw=88712KB/s, minbw=88712KB/s, maxbw=88712KB/s, mint=184685msec, maxt=184685msec

Client Info:

Rpc Counts:

Getattr	Setattr	Lookup	Readlink	Read	Write	Create	Remove
177	354	4	0	256169	512152	1	0
Rename	Link	Symlink	Mkdir	Rmdir	Readdir	RdirPlus	Access
0	0	0	0	0	0	0	1
Mknod	Fsstat	Fsinfo	PathConf	Commit			
0	0	0	0	0			

Rpc Info:

TimedOut	Invalid X	Replies	Retries	Requests
768875	0	0	0	0

Cache Info:

Attr Hits	Misses	Lkup Hits	Misses	BioR Hits	Misses	BioW Hits	Misses
7	177	1	4	-256169	256169	36351832	512168
BioRLHits	Misses	BioD Hits	Misses	DirE Hits	Misses	Accs Hits	Misses
0	0	0	0	0	0	5	1

write 8k

write_file: (groupid=0, jobs=1): err= 0: pid=100459: Tue Mar 25 16:23:49 2014

write: io=15998MB, bw=653636KB/s, iops=5107, runt= 25063msec

clat (usec): min=42, max=570520, avg=155.77, stdev=2341.70

lat (usec): min=43, max=570520, avg=156.32, stdev=2341.69

clat percentiles (usec):

| 1.00th=[47], 5.00th=[67], 10.00th=[69], 20.00th=[70],
| 30.00th=[72], 40.00th=[74], 50.00th=[77], 60.00th=[83],
| 70.00th=[88], 80.00th=[91], 90.00th=[96], 95.00th=[108],
| 99.00th=[1224], 99.50th=[1672], 99.90th=[33024], 99.95th=[36096],
| 99.99th=[60160]

bw (KB /s): min= 3567, max=1123072, per=100.00%, avg=659169.77, stdev=173637.66

lat (usec) : 50=1.84%, 100=91.15%, 250=5.04%, 500=0.67%, 750=0.15%

lat (usec) : 1000=0.07%

lat (msec) : 2=0.82%, 4=0.09%, 10=0.04%, 20=0.01%, 50=0.11%

lat (msec) : 100=0.01%, 250=0.01%, 500=0.01%, 750=0.01%

cpu : usr=20.93%, sys=39.72%, ctx=10848, majf=0, minf=0

IO depths : 1=0.1%, 2=0.1%, 4=0.1%, 8=0.1%, 16=100.0%, 32=0.0%, >=64=0.0%

submit : 0=0.0%, 4=100.0%, 8=0.0%, 16=0.0%, 32=0.0%, 64=0.0%, >=64=0.0%

complete : 0=0.1%, 4=100.0%, 8=0.0%, 16=0.0%, 32=0.0%, 64=0.0%, >=64=0.0%

issued : total=r=0/w=128000/d=0, short=r=0/w=0/d=0

Run status group 0 (all jobs):

WRITE: io=15998MB, aggrb=653636KB/s, minb=653636KB/s, maxb=653636KB/s, mint=25063msec, maxt=25063msec

Client Info:

Rpc Counts:

Getattr	Setattr	Lookup	Readlink	Read	Write	Create	Remove
175	350	4	0	172	501112	1	0
Rename	Link	Symlink	Mkdir	Rmdir	Readdir	RdirPlus	Access
0	0	0	0	0	0	0	1
Mknod	Fsstat	Fsinfo	PathConf	Commit			
0	0	0	0	0			

Rpc Info:

TimedOut	Invalid X	Replies	Retries	Requests
512394	0	0	0	0

Cache Info:

Attr Hits	Misses	Lkup Hits	Misses	BioR Hits	Misses	BioW Hits	Misses
7	175	1	4	-172	172	32512275	511725
BioRLHits	Misses	BioD Hits	Misses	DirE Hits	Misses	Accs Hits	Misses
0	0	0	0	0	0	5	1

random write 4k

```
write_file: (groupid=0, jobs=1): err= 0: pid=100461: Tue Mar 25 16:33:41 2014
write: io=4999.1MB, bw=8876.7KB/s, iops=2219, runt=576789msec
  clat (usec): min=4, max=867751, avg=445.48, stdev=3480.16
  lat (usec): min=4, max=867752, avg=445.87, stdev=3480.16
  clat percentiles (usec):
    | 1.00th=[ 25], 5.00th=[ 94], 10.00th=[ 175], 20.00th=[ 255],
    | 30.00th=[ 278], 40.00th=[ 286], 50.00th=[ 290], 60.00th=[ 298],
    | 70.00th=[ 302], 80.00th=[ 422], 90.00th=[ 660], 95.00th=[ 748],
    | 99.00th=[ 3440], 99.50th=[ 9152], 99.90th=[14016], 99.95th=[15168],
    | 99.99th=[70144]
  bw (KB /s): min= 1774, max=44536, per=100.00%, avg=9034.15, stdev=4039.17
  lat (usec) : 10=0.28%, 20=0.45%, 50=1.68%, 100=2.99%, 250=13.64%
  lat (usec) : 500=65.54%, 750=10.34%, 1000=3.86%
  lat (msec) : 2=0.19%, 4=0.12%, 10=0.61%, 20=0.28%, 50=0.01%
  lat (msec) : 100=0.01%, 250=0.01%, 500=0.01%, 750=0.01%, 1000=0.01%
cpu      : usr=1.56%, sys=68.36%, ctx=562411, majf=0, minf=0
IO depths : 1=0.1%, 2=0.1%, 4=0.1%, 8=0.1%, 16=100.0%, 32=0.0%, >=64=0.0%
  submit   : 0=0.0%, 4=100.0%, 8=0.0%, 16=0.0%, 32=0.0%, 64=0.0%, >=64=0.0%
  complete : 0=0.1%, 4=100.0%, 8=0.0%, 16=0.0%, 32=0.0%, 64=0.0%, >=64=0.0%
  issued   : total=r=0/w=1280000/d=0, short=r=0/w=0/d=0
```

Run status group 0 (all jobs):

WRITE: io=4999.1MB, aggrb=8876KB/s, minb=8876KB/s, maxb=8876KB/s, mint=576789msec, maxt=576789msec

Client Info:

Rpc Counts:

Getattr	Setattr	Lookup	Readlink	Read	Write	Create	Remove
54	108	4	0	80052	1209235	1	0
Rename	Link	Symlink	Mkdir	Rmdir	Readdir	RdirPlus	Access
0	0	0	0	0	0	0	1
Mknod	Fsstat	Fsinfo	PathConf	Commit			
0	0	0	0	0			

Rpc Info:

TimedOut	Invalid X	Replies	Retries	Requests
1297806	0	0	0	0

Cache Info:

Attr Hits	Misses	Lkup Hits	Misses	BioR Hits	Misses	BioW Hits	Misses
7	54	1	4	-80052	80052	10300566	1219434
BioRLHits	Misses	BioD Hits	Misses	DirE Hits	Misses	Accs Hits	Misses
0	0	0	0	0	0	5	1

random write 128k

write_file: (groupid=0, jobs=1): err= 0: pid=100457: Tue Mar 25 16:22:39 2014
write: io=14998MB, bw=629017KB/s, iops=4914, runt= 24416msec
clat (usec): min=45, max=266086, avg=163.43, stdev=1717.21
lat (usec): min=45, max=266087, avg=163.93, stdev=1717.21
clat percentiles (usec):
| 1.00th=[51], 5.00th=[71], 10.00th=[74], 20.00th=[77],
| 30.00th=[79], 40.00th=[80], 50.00th=[82], 60.00th=[85],
| 70.00th=[91], 80.00th=[97], 90.00th=[103], 95.00th=[114],
| 99.00th=[1304], 99.50th=[1688], 99.90th=[33024], 99.95th=[34560],
| 99.99th=[57088]
bw (KB /s): min=366848, max=1145600, per=100.00%, avg=630570.98, stdev=123750.83
lat (usec) : 50=0.58%, 100=84.09%, 250=13.33%, 500=0.37%, 750=0.07%
lat (usec) : 1000=0.03%
lat (msec) : 2=1.16%, 4=0.20%, 10=0.01%, 50=0.13%, 100=0.01%
lat (msec) : 250=0.01%, 500=0.01%
cpu : usr=18.34%, sys=42.84%, ctx=6944, majf=1, minf=0
IO depths : 1=0.1%, 2=0.1%, 4=0.1%, 8=0.1%, 16=100.0%, 32=0.0%, >=64=0.0%
submit : 0=0.0%, 4=100.0%, 8=0.0%, 16=0.0%, 32=0.0%, 64=0.0%, >=64=0.0%
complete : 0=0.1%, 4=100.0%, 8=0.0%, 16=0.0%, 32=0.0%, 64=0.0%, >=64=0.0%
issued : total=r=0/w=120000/d=0, short=r=0/w=0/d=0

Run status group 0 (all jobs):

WRITE: io=14998MB, aggrb=629017KB/s, minb=629017KB/s, maxb=629017KB/s, mint=24416msec, maxt=24416msec

Client Info:

Rpc Counts:

Getattr	Setattr	Lookup	Readlink	Read	Write	Create	Remove
164	328	4	0	161	467559	1	0
Rename	Link	Symlink	Mkdir	Rmdir	Readdir	RdirPlus	Access
0	0	0	0	0	0	0	1
Mknod	Fsstat	Fsinfo	PathConf	Commit			
0	0	0	0	0			

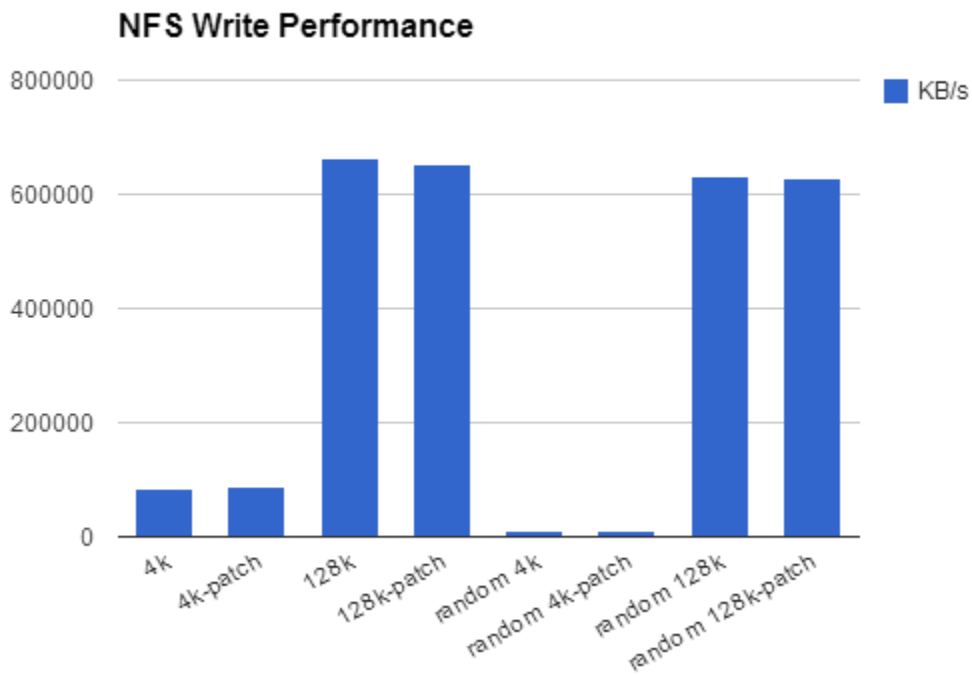
Rpc Info:

TimedOut	Invalid X	Replies	Retries	Requests
480291	0	0	0	0

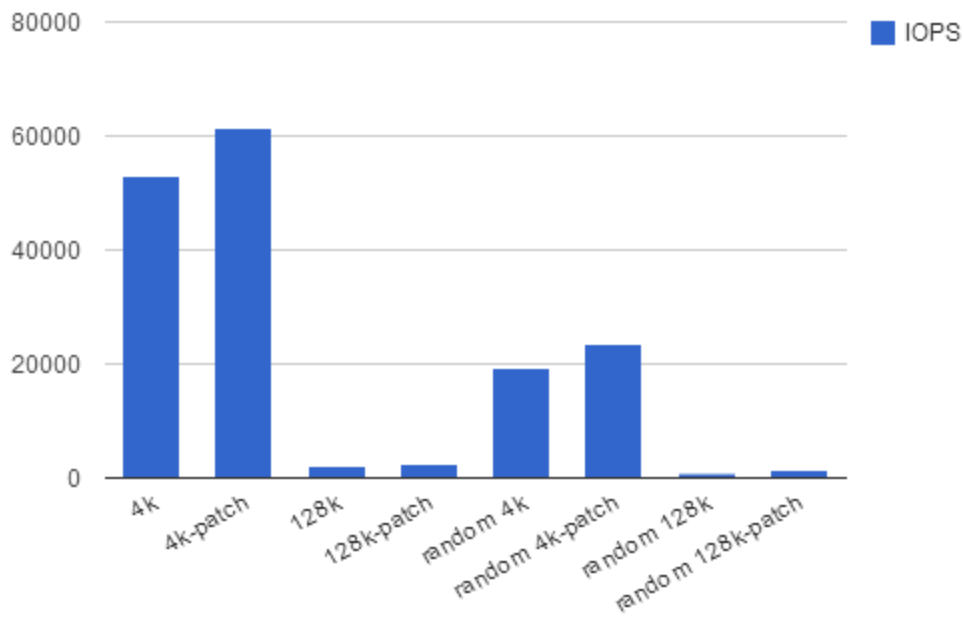
Cache Info:

Attr Hits	Misses	Lkup Hits	Misses	BioR Hits	Misses	BioW Hits	Misses
7	164	1	4	-161	161	30480296	479704
BioRLHits	Misses	BioD Hits	Misses	DirE Hits	Misses	Accs Hits	Misses
0	0	0	0	0	0	5	1

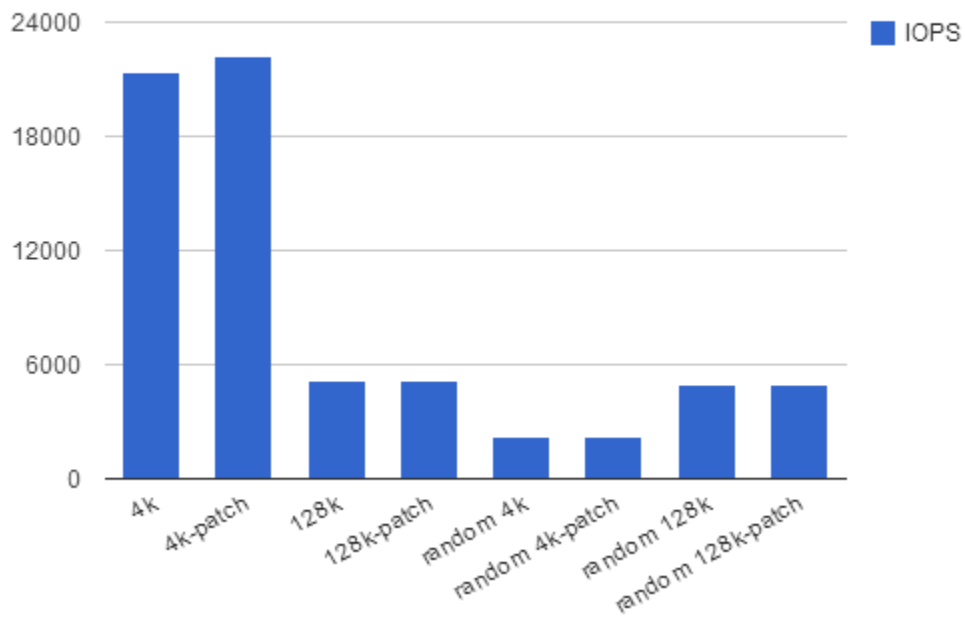
5. Performance of patched and un-patched NFS



NFS Read IOPS



NFS Write IOPS



6. CPU and Memory usage

On Server Side:

Create a file with size 10G Bytes

```
dd if=/dev/zero of=/share/nfstest/file bs=1024k count=10000
```

On Client Side:

Run dd for read for about 4 minutes.

```
while true; do dd if=/nfstest/file of=/dev/null bs=128k; done
```

CPU and Memory usage of nfsd on server(with command **top**.)

Without the patch

```
4695 admin      4  34    0 11892K  1628K CPU6    6   4:30 52.25% nfsd
```

With the patch

```
10548 admin     4  26    0 11892K  1596K rpcsvc 11   3:52 41.99% nfsd
```

7. FIO Benchmark result with FIO (64 thread and 8-readahead)

Change server config :

```
nfs_server_flags="-u -t -n 64"
```

Change client config.

```
mount -t nfs -o -o async -o noatime -o readahead=8 10.10.10.10:/share/nfstest /nfstest
```

Read

<pre>read 4k 17407/4643/22050 mbufs in use (current/cache/total) 9215/3581/12796/262144 mbuf clusters in use (current/cache/total/max) 9215/1409 mbuf+clusters out of packet secondary zone in use (current/cache) 0/104/104/262144 4k (page size) jumbo clusters in use (current/cache/total/max) 8191/2296/10487/64000 9k jumbo clusters in use (current/cache/total/max) 0/0/0/32000 16k jumbo clusters in use (current/cache/total/max) 96500K/29402K/125903K bytes allocated to network (current/cache/total) 0/0/0 requests for mbufs denied (mbufs/clusters/mbuf+clusters) 0/0/0 requests for jumbo clusters denied (4k/9k/16k) 0/0/0 sfbufs in use (current/peak/max) 0 requests for sfbufs denied 0 requests for sfbufs delayed 0 requests for I/O initiated by sendfile 0 calls to protocol drain routines</pre>
<pre>read_file: (groupid=0, jobs=1): err= 0: pid=100504: Wed Mar 26 17:12:28 2014 read : io=16000MB, bw=616679KB/s, iops=154170, runt= 26568msec clat (usec): min=2, max=87859, avg= 5.12, stdev=73.24 lat (usec): min=3, max=87860, avg= 5.39, stdev=73.24 clat percentiles (usec): 1.00th=[3], 5.00th=[3], 10.00th=[3], 20.00th=[3], 30.00th=[3], 40.00th=[3], 50.00th=[3], 60.00th=[4], 70.00th=[4], 80.00th=[4], 90.00th=[5], 95.00th=[19], 99.00th=[22], 99.50th=[27], 99.90th=[72], 99.95th=[163], 99.99th=[732] bw (KB /s): min=436896, max=670264, per=99.97%, avg=616511.04, stdev=42700.05 lat (usec) : 4=59.17%, 10=34.76%, 20=2.57%, 50=3.35%, 100=0.07% lat (usec) : 250=0.05%, 500=0.01%, 750=0.01%, 1000=0.01% lat (msec) : 2=0.01%, 4=0.01%, 10=0.01%, 20=0.01%, 50=0.01% lat (msec) : 100=0.01% cpu : usr=17.98%, sys=74.22%, ctx=8237, majf=0, minf=16 IO depths : 1=0.1%, 2=0.1%, 4=0.1%, 8=0.1%, 16=100.0%, 32=0.0%, >=64=0.0% submit : 0=0.0%, 4=100.0%, 8=0.0%, 16=0.0%, 32=0.0%, 64=0.0%, >=64=0.0% complete : 0=0.1%, 4=100.0%, 8=0.0%, 16=0.0%, 32=0.0%, 64=0.0%, >=64=0.0% issued : total=r=4096000/w=0/d=0, short=r=0/w=0/d=0</pre>
<pre>Run status group 0 (all jobs): READ: io=16000MB, aggrbw=616679KB/s, minbw=616679KB/s, maxbw=616679KB/s, mint=26568msec, maxt=26568msec</pre>
<pre>17410/4010/21420 mbufs in use (current/cache/total) 9215/2705/11920/262144 mbuf clusters in use (current/cache/total/max) 9215/897 mbuf+clusters out of packet secondary zone in use (current/cache) 0/104/104/262144 4k (page size) jumbo clusters in use (current/cache/total/max) 8191/2296/10487/64000 9k jumbo clusters in use (current/cache/total/max) 0/0/0/32000 16k jumbo clusters in use (current/cache/total/max) 96501K/27492K/123994K bytes allocated to network (current/cache/total) 0/0/0 requests for mbufs denied (mbufs/clusters/mbuf+clusters) 0/0/0 requests for jumbo clusters denied (4k/9k/16k) 0/0/0 sfbufs in use (current/peak/max) 0 requests for sfbufs denied 0 requests for sfbufs delayed 0 requests for I/O initiated by sendfile 0 calls to protocol drain routines</pre>
<pre>Client Info: Rpc Counts: Getattr Setattr Lookup Readlink Read Write Create Remove 0 1 4 0 512000 256000 1 0 Rename Link Symlink Mkdir Rmdir Readdir RdirPlus Access 0 0 0 0 0 0 0 2 Mknod Fsstat Fsinfo PathConf Commit 0 0 0 0 0 Rpc Info: TimedOut Invalid X Replies Retries Requests 768003 0 0 0 0</pre>

Cache Info:

Attr Hits	Misses	Lkup	Hits	Misses	BioR Hits	Misses	BioW Hits	Misses
4096006	0		1	4	3584000	512000	3840000	256000
BioRLHits	Misses	BioD	Hits	Misses	DirE Hits	Misses	Accs Hits	Misses
0	0		0	0	0	0	4	2

Read 128k

17407/13313/30720 mbufs in use (current/cache/total)
9215/12103/21318/262144 mbuf clusters in use (current/cache/total/max)
9215/9857 mbuf+clusters out of packet secondary zone in use (current/cache)
0/104/104/262144 4k (page size) jumbo clusters in use (current/cache/total/max)
8191/1416/9607/64000 9k jumbo clusters in use (current/cache/total/max)
0/0/0/32000 16k jumbo clusters in use (current/cache/total/max)
96500K/40694K/137195K bytes allocated to network (current/cache/total)
0/0/0 requests for mbufs denied (mbufs/clusters/mbuf+clusters)
0/0/0 requests for jumbo clusters denied (4k/9k/16k)
0/0/0 sbufs in use (current/peak/max)
0 requests for sbufs denied
0 requests for sbufs delayed
0 requests for I/O initiated by sendfile
0 calls to protocol drain routines

read_file: (groupid=0, jobs=1): err= 0: pid=100454: Wed Mar 26 17:07:10 2014
read : io=15998MB, bw=649928KB/s, iops=5078, runt= 25206msec
clat (usec): min=24, max=138010, avg=192.04, stdev=499.72
lat (usec): min=24, max=138010, avg=192.40, stdev=499.72
clat percentiles (usec):
| 1.00th=[51], 5.00th=[54], 10.00th=[55], 20.00th=[61],
| 30.00th=[94], 40.00th=[135], 50.00th=[169], 60.00th=[191],
| 70.00th=[217], 80.00th=[262], 90.00th=[342], 95.00th=[422],
| 99.00th=[692], 99.50th=[796], 99.90th=[2832], 99.95th=[5792],
| 99.99th=[12992]
bw (KB /s): min=286208, max=716800, per=100.00%, avg=650216.58, stdev=65941.27
lat (usec) : 50=0.94%, 100=30.69%, 250=46.57%, 500=18.82%, 750=2.30%
lat (usec) : 1000=0.45%
lat (msec) : 2=0.10%, 4=0.04%, 10=0.07%, 20=0.01%, 50=0.01%
lat (msec) : 100=0.01%, 250=0.01%
cpu : usr=2.55%, sys=31.42%, ctx=159799, majf=1, minf=512
IO depths : 1=0.1%, 2=0.1%, 4=0.1%, 8=0.1%, 16=100.0%, 32=0.0%, >=64=0.0%
submit : 0=0.0%, 4=100.0%, 8=0.0%, 16=0.0%, 32=0.0%, 64=0.0%, >=64=0.0%
complete : 0=0.1%, 4=100.0%, 8=0.0%, 16=0.0%, 32=0.0%, 64=0.0%, >=64=0.0%
issued : total=r=128000/w=0/d=0, short=r=0/w=0/d=0

Run status group 0 (all jobs):
READ: io=15998MB, aggrb=649927KB/s, minb=649927KB/s, maxb=649927KB/s, mint=25206msec, maxt=25206msec

17408/4642/22050 mbufs in use (current/cache/total)
9215/3581/12796/262144 mbuf clusters in use (current/cache/total/max)
9215/897 mbuf+clusters out of packet secondary zone in use (current/cache)
0/104/104/262144 4k (page size) jumbo clusters in use (current/cache/total/max)
8191/2040/10231/64000 9k jumbo clusters in use (current/cache/total/max)
0/0/0/32000 16k jumbo clusters in use (current/cache/total/max)
96501K/27098K/123599K bytes allocated to network (current/cache/total)
0/0/0 requests for mbufs denied (mbufs/clusters/mbuf+clusters)
0/0/0 requests for jumbo clusters denied (4k/9k/16k)
0/0/0 sbufs in use (current/peak/max)
0 requests for sbufs denied
0 requests for sbufs delayed
0 requests for I/O initiated by sendfile
0 calls to protocol drain routines

Client Inpc Counts:	Getattr	Setattr	Lookup	Readlink	Read	Write	Create	Remove
1	1	4	0	256000	253928	1	0	
Rename	Link	Symlink	Mkdir	Rmdir	Readdir	RdirPlus	Access	
0	0	0	0	0	0	0	2	
Mknod	Fsstat	Fsinfo	PathConf	Commit				
0	0	0	0	0				
Rpc Info:								
TimedOut	Invalid X Replies	Retries	Requests					
511640	0	0	0					
Cache Info:								
Attr Hits	Misses	Lkup Hits	Misses	BioR Hits	Misses	BioW Hits	Misses	
128006	1	1	4	0	256000	71	255929	
BioRLHits	Misses	BioD Hits	Misses	DirE Hits	Misses	Accs Hits	Misses	
0	0	0	0	0	0	4	2	

Random Read 4k

17407/4643/22050 mbufs in use (current/cache/total)
9215/3581/12796/262144 mbuf clusters in use (current/cache/total/max)
9215/897 mbuf+clusters out of packet secondary zone in use (current/cache)
0/104/104/262144 4k (page size) jumbo clusters in use (current/cache/total/max)
8191/2040/10231/64000 9k jumbo clusters in use (current/cache/total/max)
0/0/0/32000 16k jumbo clusters in use (current/cache/total/max)
96500K/27098K/123599K bytes allocated to network (current/cache/total)
0/0/0 requests for mbufs denied (mbufs/clusters/mbuf+clusters)
0/0/0 requests for jumbo clusters denied (4k/9k/16k)
0/0/0 sbufs in use (current/peak/max)
0 requests for sbufs denied
0 requests for sbufs delayed
0 requests for I/O initiated by sendfile
0 calls to protocol drain routines

read_file: (groupid=0, jobs=1): err= 0: pid=100491: Wed Mar 26 17:09:04 2014
read : io=4999.1MB, bw=89969KB/s, iops=22492, runt= 56908msec
clat (usec): min=3, max=75835, avg=42.31, stdev=128.97
lat (usec): min=3, max=75835, avg=42.62, stdev=128.98
clat percentiles (usec):
| 1.00th=[3], 5.00th=[4], 10.00th=[4], 20.00th=[5],
| 30.00th=[6], 40.00th=[19], 50.00th=[20], 60.00th=[21],
| 70.00th=[21], 80.00th=[22], 90.00th=[24], 95.00th=[350],
| 99.00th=[580], 99.50th=[652], 99.90th=[724], 99.95th=[748],
| 99.99th=[1304]
bw (KB /s): min= 5632, max=420216, per=96.56%, avg=86871.79, stdev=96496.55
lat (usec) : 4=1.54%, 10=30.65%, 20=8.18%, 50=53.34%, 100=0.03%
lat (usec) : 250=0.02%, 500=4.56%, 750=1.64%, 1000=0.03%
lat (msec) : 2=0.02%, 4=0.01%, 10=0.01%, 20=0.01%, 100=0.01%
cpu : usr=4.87%, sys=41.22%, ctx=80540, majf=0, minf=16
IO depths : 1=0.1%, 2=0.1%, 4=0.1%, 8=0.1%, 16=100.0%, 32=0.0%, >=64=0.0%
submit : 0=0.0%, 4=100.0%, 8=0.0%, 16=0.0%, 32=0.0%, 64=0.0%, >=64=0.0%
complete : 0=0.1%, 4=100.0%, 8=0.0%, 16=0.0%, 32=0.0%, 64=0.0%, >=64=0.0%
issued : total=r=1280000/w=0/d=0, short=r=0/w=0/d=0

Run status group 0 (all jobs):

READ: io=4999.1MB, aggrb=89968KB/s, minb=89968KB/s, maxb=89968KB/s, mint=56908msec, maxt=56908msec

17407/4643/22050 mbufs in use (current/cache/total)
9215/3581/12796/262144 mbuf clusters in use (current/cache/total/max)
9215/1409 mbuf+clusters out of packet secondary zone in use (current/cache)
0/104/104/262144 4k (page size) jumbo clusters in use (current/cache/total/max)
8191/2296/10487/64000 9k jumbo clusters in use (current/cache/total/max)
0/0/0/32000 16k jumbo clusters in use (current/cache/total/max)
96500K/29402K/125903K bytes allocated to network (current/cache/total)
0/0/0 requests for mbufs denied (mbufs/clusters/mbuf+clusters)
0/0/0 requests for jumbo clusters denied (4k/9k/16k)
0/0/0 sbufs in use (current/peak/max)
0 requests for sbufs denied
0 requests for sbufs delayed
0 requests for I/O initiated by sendfile
0 calls to protocol drain routines

Client Info:

Rpc Counts:

Getattr	Setattr	Lookup	Readlink	Read	Write	Create	Remove
1	1	4	0	160000	80000	1	0
Rename	Link	Symlink	Mkdir	Rmdir	Readdir	RdirPlus	Access
0	0	0	0	0	0	0	2
Mknod	Fsstat	Fsinfo	PathConf	Commit			
0	0	0	0	0			

Rpc Info:

TimedOut	Invalid X Replies	Retries	Requests
240009	0	0	0

Cache Info:

Attr Hits	Misses	Lkup Hits	Misses	BioR Hits	Misses	BioW Hits	Misses
1280006	1	1	4	1120000	160000	1200000	80000
BioRLHits	Misses	BioD Hits	Misses	DirE Hits	Misses	Accs Hits	Misses
0	0	0	0	0	0	4	2

Write

Write 4k

```
17410/5255/22665 mbufs in use (current/cache/total)
9215/4407/13622/262144 mbuf clusters in use (current/cache/total/max)
9215/2561 mbuf+clusters out of packet secondary zone in use (current/cache)
0/104/104/262144 4k (page size) jumbo clusters in use (current/cache/total/max)
8191/2424/10615/64000 9k jumbo clusters in use (current/cache/total/max)
0/0/0/32000 16k jumbo clusters in use (current/cache/total/max)
96501K/32359K/128861K bytes allocated to network (current/cache/total)
0/0/0 requests for mbufs denied (mbufs/clusters/mbuf+clusters)
0/0/0 requests for jumbo clusters denied (4k/9k/16k)
0/0/0 sbufs in use (current/peak/max)
0 requests for sbufs denied
0 requests for sbufs delayed
0 requests for I/O initiated by sendfile
0 calls to protocol drain routines
```

```
write_file: (groupid=0, jobs=1): err= 0: pid=100544: Wed Mar 26 17:25:33 2014
write: io=4999.1MB, bw=88834KB/s, iops=22208, runt= 57635msec
  clat (usec): min=2, max=82301, avg=42.34, stdev=176.10
  lat (usec): min=3, max=82301, avg=42.61, stdev=176.10
  clat percentiles (usec):
    | 1.00th=[ 3], 5.00th=[ 3], 10.00th=[ 3], 20.00th=[ 3],
    | 30.00th=[ 3], 40.00th=[ 3], 50.00th=[ 3], 60.00th=[ 3],
    | 70.00th=[ 3], 80.00th=[ 4], 90.00th=[ 5], 95.00th=[ 390],
    | 99.00th=[ 852], 99.50th=[ 884], 99.90th=[ 948], 99.95th=[ 988],
    | 99.99th=[ 1080]
  bw (KB /s): min=58696, max=96384, per=100.00%, avg=88890.02, stdev=5206.40
  lat (usec) : 4=71.86%, 10=21.88%, 20=0.01%, 50=0.01%, 100=0.01%
  lat (usec) : 500=1.79%, 750=2.67%, 1000=1.75%
  lat (msec) : 2=0.04%, 4=0.01%, 10=0.01%, 50=0.01%, 100=0.01%
  cpu       : usr=6.34%, sys=16.70%, ctx=80292, majf=0, minf=0
  IO depths : 1=0.1%, 2=0.1%, 4=0.1%, 8=0.1%, 16=100.0%, 32=0.0%, >=64=0.0%
             submit   : 0=0.0%, 4=100.0%, 8=0.0%, 16=0.0%, 32=0.0%, 64=0.0%, >=64=0.0%
             complete  : 0=0.1%, 4=100.0%, 8=0.0%, 16=0.0%, 32=0.0%, 64=0.0%, >=64=0.0%
             issued    : total=r=0/w=1280000/d=0, short=r=0/w=0/d=0
```

Run status group 0 (all jobs):

WRITE: io=4999.1MB, aggrb=88833KB/s, minb=88833KB/s, maxb=88833KB/s, mint=57635msec, maxt=57635msec

```
17410/5255/22665 mbufs in use (current/cache/total)
9215/4407/13622/262144 mbuf clusters in use (current/cache/total/max)
9215/2561 mbuf+clusters out of packet secondary zone in use (current/cache)
0/104/104/262144 4k (page size) jumbo clusters in use (current/cache/total/max)
8191/2424/10615/64000 9k jumbo clusters in use (current/cache/total/max)
0/0/0/32000 16k jumbo clusters in use (current/cache/total/max)
96501K/32359K/128861K bytes allocated to network (current/cache/total)
0/0/0 requests for mbufs denied (mbufs/clusters/mbuf+clusters)
0/0/0 requests for jumbo clusters denied (4k/9k/16k)
0/0/0 sbufs in use (current/peak/max)
0 requests for sbufs denied
0 requests for sbufs delayed
0 requests for I/O initiated by sendfile
0 calls to protocol drain routines
```

Client Info:

Rpc Counts:

Getattr	Setattr	Lookup	Readlink	Read	Write	Create	Remove
55	110	4	0	80054	160054	1	0
Rename	Link	Symlink	Mkdir	Rmdir	Readdir	RdirPlus	Access
0	0	0	0	0	0	0	1
Mknod	Fsstat	Fsinfo	PathConf	Commit			
0	0	0	0	0			

Rpc Info:

TimedOut	Invalid X Replies	Retries	Requests
240279	0	0	0

Cache Info:

Attr Hits	Misses	Lkup Hits	Misses	BioR Hits	Misses	BioW Hits	Misses
7	55	1	4	-80054	80054	11359946	160054
BioRLHits	Misses	BioD Hits	Misses	DirE Hits	Misses	Accs Hits	Misses
0	0	0	0	0	0	5	1

Write 128k

17412/5103/22515 mbufs in use (current/cache/total)
9215/3945/13160/262144 mbuf clusters in use (current/cache/total/max)
9215/1665 mbuf+clusters out of packet secondary zone in use (current/cache)
0/104/104/262144 4k (page size) jumbo clusters in use (current/cache/total/max)
8191/2040/10231/64000 9k jumbo clusters in use (current/cache/total/max)
0/0/0/32000 16k jumbo clusters in use (current/cache/total/max)
96502K/27941K/124443K bytes allocated to network (current/cache/total)
0/0/0 requests for mbufs denied (mbufs/clusters/mbuf+clusters)
0/0/0 requests for jumbo clusters denied (4k/9k/16k)
0/0/0 sbufs in use (current/peak/max)
0 requests for sbufs denied
0 requests for sbufs delayed
0 requests for I/O initiated by sendfile
0 calls to protocol drain routines

write_file: (groupid=0, jobs=1): err= 0: pid=100510: Wed Mar 26 17:14:08 2014
write: io=9998.2MB, bw=492310KB/s, iops=3846, runt= 20796msec
clat (usec): min=39, max=330910, avg=222.06, stdev=2124.27
lat (usec): min=39, max=330910, avg=222.49, stdev=2124.27
clat percentiles (usec):
| 1.00th=[44], 5.00th=[48], 10.00th=[66], 20.00th=[67],
| 30.00th=[68], 40.00th=[69], 50.00th=[70], 60.00th=[71],
| 70.00th=[73], 80.00th=[76], 90.00th=[84], 95.00th=[119],
| 99.00th=[1944], 99.50th=[2224], 99.90th=[34048], 99.95th=[39168],
| 99.99th=[73216]
bw (KB /s): min=272384, max=803328, per=100.00%, avg=493698.22, stdev=90141.17
lat (usec) : 50=6.04%, 100=88.15%, 250=1.11%, 500=0.13%, 750=0.01%
lat (usec) : 1000=0.01%
lat (msec) : 2=3.56%, 4=0.79%, 10=0.02%, 20=0.01%, 50=0.15%
lat (msec) : 100=0.03%, 500=0.01%
cpu : usr=15.42%, sys=26.37%, ctx=5310, majf=0, minf=0
IO depths : 1=0.1%, 2=0.1%, 4=0.1%, 8=0.1%, 16=100.0%, 32=0.0%, >=64=0.0%
submit : 0=0.0%, 4=100.0%, 8=0.0%, 16=0.0%, 32=0.0%, 64=0.0%, >=64=0.0%
complete : 0=0.1%, 4=100.0%, 8=0.0%, 16=0.0%, 32=0.0%, 64=0.0%, >=64=0.0%
issued : total=r=0/w=80000/d=0, short=r=0/w=0/d=0

Run status group 0 (all jobs):

WRITE: io=9998.2MB, aggrb=492310KB/s, minb=492310KB/s, maxb=492310KB/s, mint=20796msec, maxt=20796msec

17407/5258/22665 mbufs in use (current/cache/total)
9215/4407/13622/262144 mbuf clusters in use (current/cache/total/max)
9215/2561 mbuf+clusters out of packet secondary zone in use (current/cache)
0/104/104/262144 4k (page size) jumbo clusters in use (current/cache/total/max)
8191/2168/10359/64000 9k jumbo clusters in use (current/cache/total/max)
0/0/0/32000 16k jumbo clusters in use (current/cache/total/max)
96500K/30056K/126557K bytes allocated to network (current/cache/total)
0/0/0 requests for mbufs denied (mbufs/clusters/mbuf+clusters)
0/0/0 requests for jumbo clusters denied (4k/9k/16k)
0/0/0 sbufs in use (current/peak/max)
0 requests for sbufs denied
0 requests for sbufs delayed
0 requests for I/O initiated by sendfile
0 calls to protocol drain routines

Client Info:

Rpc Counts:

Getattr	Setattr	Lookup	Readlink	Read	Write	Create	Remove
111	222	4	0	105	319249	1	0
Rename	Link	Symlink	Mkdir	Rmdir	Readdir	RdirPlus	Access
0	0	0	0	0	0	0	1
Mknod	Fsstat	Fsinfo	PathConf	Commit			
0	0	0	0	0			

Rpc Info:

TimedOut	Invalid X	Replies	Retries	Requests
320419	0	0	0	0

Cache Info:

Attr Hits	Misses	Lkup Hits	Misses	BioR Hits	Misses	BioW Hits	Misses
7	111	1	4	-105	105	20319914	320086
BioRLHits	Misses	BioD Hits	Misses	DirE Hits	Misses	Accs Hits	Misses
0	0	0	0	0	0	5	1

Random Write 128k

17407/4013/21420 mbufs in use (current/cache/total)
9215/2705/11920/262144 mbuf clusters in use (current/cache/total/max)
9215/897 mbuf+clusters out of packet secondary zone in use (current/cache)
0/104/104/262144 4k (page size) jumbo clusters in use (current/cache/total/max)
8191/2296/10487/64000 9k jumbo clusters in use (current/cache/total/max)
0/0/0/32000 16k jumbo clusters in use (current/cache/total/max)
96500K/27493K/123994K bytes allocated to network (current/cache/total)
0/0/0 requests for mbufs denied (mbufs/clusters/mbuf+clusters)
0/0/0 requests for jumbo clusters denied (4k/9k/16k)
0/0/0 sbufs in use (current/peak/max)
0 requests for sbufs denied
0 requests for sbufs delayed
0 requests for I/O initiated by sendfile
0 calls to protocol drain routines

write_file: (groupid=0, jobs=1): err= 0: pid=100508: Wed Mar 26 17:13:18 2014
write: io=9998.2MB, bw=474227KB/s, iops=3705, runt= 21589msec
clat (usec): min=45, max=165733, avg=231.55, stdev=2022.56
lat (usec): min=45, max=165733, avg=231.98, stdev=2022.56
clat percentiles (usec):
| 1.00th=[48], 5.00th=[53], 10.00th=[71], 20.00th=[73],
| 30.00th=[75], 40.00th=[76], 50.00th=[77], 60.00th=[79],
| 70.00th=[80], 80.00th=[83], 90.00th=[93], 95.00th=[149],
| 99.00th=[2128], 99.50th=[2256], 99.90th=[34048], 99.95th=[43264],
| 99.99th=[78336]
bw (KB /s): min=375788, max=857932, per=100.00%, avg=474934.33, stdev=84713.64
lat (usec) : 50=2.27%, 100=89.55%, 250=3.72%, 500=0.13%, 1000=0.01%
lat (msec) : 2=2.57%, 4=1.54%, 10=0.01%, 20=0.01%, 50=0.15%
lat (msec) : 100=0.03%, 250=0.01%
cpu : usr=14.22%, sys=28.95%, ctx=4842, majf=1, minf=0
IO depths : 1=0.1%, 2=0.1%, 4=0.1%, 8=0.1%, 16=100.0%, 32=0.0%, >=64=0.0%
submit : 0=0.0%, 4=100.0%, 8=0.0%, 16=0.0%, 32=0.0%, 64=0.0%, >=64=0.0%
complete : 0=0.1%, 4=100.0%, 8=0.0%, 16=0.0%, 32=0.0%, 64=0.0%, >=64=0.0%
issued : total=r=0/w=80000/d=0, short=r=0/w=0/d=0

Run status group 0 (all jobs):

WRITE: io=9998.2MB, agrbr=474226KB/s, minb=474226KB/s, maxb=474226KB/s, mint=21589msec, maxt=21589msec

17407/5108/22515 mbufs in use (current/cache/total)
9215/3945/13160/262144 mbuf clusters in use (current/cache/total/max)
9215/1665 mbuf+clusters out of packet secondary zone in use (current/cache)
0/104/104/262144 4k (page size) jumbo clusters in use (current/cache/total/max)
8191/2040/10231/64000 9k jumbo clusters in use (current/cache/total/max)
0/0/0/32000 16k jumbo clusters in use (current/cache/total/max)
96500K/27943K/124443K bytes allocated to network (current/cache/total)
0/0/0 requests for mbufs denied (mbufs/clusters/mbuf+clusters)
0/0/0 requests for jumbo clusters denied (4k/9k/16k)
0/0/0 sbufs in use (current/peak/max)
0 requests for sbufs denied
0 requests for sbufs delayed
0 requests for I/O initiated by sendfile
0 calls to protocol drain routines

Client Info:

Rpc Counts:

Getattr	Setattr	Lookup	Readlink	Read	Write	Create	Remove
108	216	4	0	101	319406	1	0
Rename	Link	Symlink	Mkdir	Rmdir	Readdir	RdirPlus	Access
0	0	0	0	0	0	0	1
Mknod	Fsstat	Fsinfo	PathConf	Commit			
0	0	0	0	0			

Rpc Info:

TimedOut	Invalid X Replies	Retries	Requests
320395	0	0	0

Cache Info:

Attr Hits	Misses	Lkup Hits	Misses	BioR Hits	Misses	BioW Hits	Misses
7	108	1	4	-101	101	20319916	320084
BioRLHits	Misses	BioD Hits	Misses	DirE Hits	Misses	Accs Hits	Misses
0	0	0	0	0	0	5	1

8. FIO Benchmark result with the patch(64 thread and 8-readahead)

Read

<pre>read 4k 279554/4921/284475 mbufs in use (current/cache/total) 9215/3599/12814/262144 mbuf clusters in use (current/cache/total/max) 9215/1409 mbuf+clusters out of packet secondary zone in use (current/cache) 262146/0/262146/262144 4k (page size) jumbo clusters in use (current/cache/total/max) 8191/2632/10823/64000 9k jumbo clusters in use (current/cache/total/max) 0/0/0/32000 16k jumbo clusters in use (current/cache/total/max) 1210621K/32116K/1242737K bytes allocated to network (current/cache/total) 0/0/0 requests for mbufs denied (mbufs/clusters/mbuf+clusters) 13049854/0/0 requests for jumbo clusters denied (4k/9k/16k) 0/0/0 sfbufs in use (current/peak/max) 0 requests for sfbufs denied 0 requests for sfbufs delayed 0 requests for I/O initiated by sendfile 0 calls to protocol drain routines</pre>
<pre>read_file: (groupid=0, jobs=1): err= 0: pid=100493: Wed Mar 26 17:57:57 2014 read : io=16000MB, bw=642230KB/s, iops=160558, runt= 25511msec clat (usec): min=2, max=109223, avg= 4.93, stdev=76.36 lat (usec): min=3, max=109223, avg= 5.20, stdev=76.36 clat percentiles (usec): 1.00th=[3], 5.00th=[3], 10.00th=[3], 20.00th=[3], 30.00th=[3], 40.00th=[3], 50.00th=[3], 60.00th=[3], 70.00th=[4], 80.00th=[4], 90.00th=[5], 95.00th=[19], 99.00th=[22], 99.50th=[25], 99.90th=[51], 99.95th=[129], 99.99th=[652] bw (KB /s): min=484192, max=703584, per=100.00%, avg=642602.84, stdev=38632.94 lat (usec) : 4=63.54%, 10=30.41%, 20=2.75%, 50=3.20%, 100=0.05% lat (usec) : 250=0.03%, 500=0.01%, 750=0.01%, 1000=0.01% lat (msec) : 2=0.01%, 4=0.01%, 10=0.01%, 20=0.01%, 50=0.01% lat (msec) : 100=0.01%, 250=0.01% cpu : usr=19.73%, sys=73.74%, ctx=4754, majf=0, minf=16 IO depths : 1=0.1%, 2=0.1%, 4=0.1%, 8=0.1%, 16=100.0%, 32=0.0%, >=64=0.0% submit : 0=0.0%, 4=100.0%, 8=0.0%, 16=0.0%, 32=0.0%, 64=0.0%, >=64=0.0% complete : 0=0.1%, 4=100.0%, 8=0.0%, 16=0.0%, 32=0.0%, 64=0.0%, >=64=0.0% issued : total=r=4096000/w=0/d=0, short=r=0/w=0/d=0 Run status group 0 (all jobs): READ: io=16000MB, agrb=642230KB/s, minb=642230KB/s, maxb=642230KB/s, mint=25511msec, maxt=25511msec</pre>
<pre>279554/4291/283845 mbufs in use (current/cache/total) 9215/2579/11794/262144 mbuf clusters in use (current/cache/total/max) 9215/769 mbuf+clusters out of packet secondary zone in use (current/cache) 262146/0/262146/262144 4k (page size) jumbo clusters in use (current/cache/total/max) 8191/2504/10695/64000 9k jumbo clusters in use (current/cache/total/max) 0/0/0/32000 16k jumbo clusters in use (current/cache/total/max) 1210621K/28766K/1239388K bytes allocated to network (current/cache/total) 0/0/0 requests for mbufs denied (mbufs/clusters/mbuf+clusters) 21241854/0/0 requests for jumbo clusters denied (4k/9k/16k) 0/0/0 sfbufs in use (current/peak/max) 0 requests for sfbufs denied 0 requests for sfbufs delayed 0 requests for I/O initiated by sendfile 0 calls to protocol drain routines</pre>
<pre>Client Info: Rpc Counts: Getattr Setattr Lookup Readlink Read Write Create Remove 0 1 4 0 512000 256000 1 0 Rename Link Symlink Mkdir Rmdir Readdir RdirPlus Access 0 0 0 0 0 0 0 2 Mknod Fsstat Fsinfo PathConf Commit 0 0 0 0 0 Rpc Info:</pre>

TimedOut	Invalid X Replies	Retries	Requests				
768008	0	0	0				
Cache Info:							
Attr Hits	Misses Lkup Hits	Misses BioR Hits	Misses BioW Hits	Misses			
4096006	0	1	4	3584000	512000	3840000	256000
BioRLHits	Misses BioD Hits	Misses DirE Hits	Misses Accs Hits	Misses			
0	0	0	0	0	4	2	

Read 128k

```

279554/12811/292365 mbufs in use (current/cache/total)
9215/12199/21414/262144 mbuf clusters in use (current/cache/total/max)
9215/9729 mbuf+clusters out of packet secondary zone in use (current/cache)
262146/0/262146/262144 4k (page size) jumbo clusters in use (current/cache/total/max)
8191/1560/9751/64000 9k jumbo clusters in use (current/cache/total/max)
0/0/0/32000 16k jumbo clusters in use (current/cache/total/max)
1210621K/41640K/1252262K bytes allocated to network (current/cache/total)
0/0/0 requests for mbufs denied (mbufs/clusters/mbuf+clusters)
2297854/0/0 requests for jumbo clusters denied (4k/9k/16k)
0/0/0 sbufs in use (current/peak/max)
0 requests for sbufs denied
0 requests for sbufs delayed
0 requests for I/O initiated by sendfile
0 calls to protocol drain routines

```

```

read_file: (groupid=0, jobs=1): err= 0: pid=100451: Wed Mar 26 17:53:03 2014
 read : io=15998MB, bw=686132KB/s, iops=5361, runt= 23876msec
  clat (usec): min=29, max=108371, avg=181.70, stdev=496.14
    lat (usec): min=29, max=108371, avg=182.06, stdev=496.14
  clat percentiles (usec):
    | 1.00th=[ 34], 5.00th=[ 53], 10.00th=[ 55], 20.00th=[ 57],
    | 30.00th=[ 75], 40.00th=[ 106], 50.00th=[ 141], 60.00th=[ 177],
    | 70.00th=[ 205], 80.00th=[ 249], 90.00th=[ 338], 95.00th=[ 418],
    | 99.00th=[ 708], 99.50th=[ 796], 99.90th=[ 3248], 99.95th=[ 6624],
    | 99.99th=[15296]
  bw (KB /s): min=349952, max=775168, per=100.00%, avg=686166.43, stdev=69603.10
  lat (usec) : 50=1.33%, 100=36.49%, 250=42.28%, 500=16.87%, 750=2.31%
  lat (usec) : 1000=0.47%
  lat (msec) : 2=0.11%, 4=0.05%, 10=0.06%, 20=0.01%, 50=0.01%
  lat (msec) : 100=0.01%, 250=0.01%
  cpu      : usr=2.04%, sys=33.30%, ctx=142511, majf=1, minf=512
  IO depths : 1=0.1%, 2=0.1%, 4=0.1%, 8=0.1%, 16=100.0%, 32=0.0%, >=64=0.0%
    submit   : 0=0.0%, 4=100.0%, 8=0.0%, 16=0.0%, 32=0.0%, 64=0.0%, >=64=0.0%
  complete  : 0=0.1%, 4=100.0%, 8=0.0%, 16=0.0%, 32=0.0%, 64=0.0%, >=64=0.0%
  issued    : total=r=128000/w=0/d=0, short=r=0/w=0/d=0

Run status group 0 (all jobs):
  READ: io=15998MB, agrb=686131KB/s, minb=686131KB/s, maxb=686131KB/s, mint=23876msec, maxt=23876msec

```

```

279554/4921/284475 mbufs in use (current/cache/total)
9215/3599/12814/262144 mbuf clusters in use (current/cache/total/max)
9215/897 mbuf+clusters out of packet secondary zone in use (current/cache)
262146/0/262146/262144 4k (page size) jumbo clusters in use (current/cache/total/max)
8191/2632/10823/64000 9k jumbo clusters in use (current/cache/total/max)
0/0/0/32000 16k jumbo clusters in use (current/cache/total/max)
1210621K/32116K/1242737K bytes allocated to network (current/cache/total)
0/0/0 requests for mbufs denied (mbufs/clusters/mbuf+clusters)
10489854/0/0 requests for jumbo clusters denied (4k/9k/16k)
0/0/0 sbufs in use (current/peak/max)
0 requests for sbufs denied
0 requests for sbufs delayed
0 requests for I/O initiated by sendfile
0 calls to protocol drain routines

```

```

Client Info:
Rpc Counts:

```

Getattr	Setattr	Lookup	Readlink	Read	Write	Create	Remove
1	1	4	0	256000	253248	1	0
Rename	Link	Symlink	Mkdir	Rmdir	Readdir	RdirPlus	Access
0	0	0	0	0	0	0	2
Mknod	Fsstat	Fsinfo	PathConf	Commit			
0	0	0	0	0			
Rpc Info:							
TimedOut	Invalid X	Replies	Retries	Requests			
511864	0	0	0	0			
Cache Info:							
Attr Hits	Misses	Lkup Hits	Misses	BioR Hits	Misses	BioW Hits	Misses
128006	1	1	4	0	256000	60	255940
BioRLHits	Misses	BioD Hits	Misses	DirE Hits	Misses	Accs Hits	Misses
0	0	0	0	0	0	4	2

```

Random Read 4k

279554/4921/284475 mbufs in use (current/cache/total)
9215/3599/12814/262144 mbuf clusters in use (current/cache/total/max)
9215/897 mbuf+clusters out of packet secondary zone in use (current/cache)
262146/0/262146/262144 4k (page size) jumbo clusters in use (current/cache/total/max)
8191/2632/10823/64000 9k jumbo clusters in use (current/cache/total/max)
0/0/0/32000 16k jumbo clusters in use (current/cache/total/max)
1210621K/32116K/1242737K bytes allocated to network (current/cache/total)
0/0/0 requests for mbufs denied (mbufs/clusters/mbuf+clusters)
10489854/0/0 requests for jumbo clusters denied (4k/9k/16k)
0/0/0 sbufs in use (current/peak/max)
0 requests for sbufs denied
0 requests for sbufs delayed
0 requests for I/O initiated by sendfile
0 calls to protocol drain routines

read_file: (groupid=0, jobs=1): err= 0: pid=100453: Wed Mar 26 17:54:47 2014
 read : io=4999.1MB, bw=94534KB/s, iops=23633, runt= 54160msec
  clat (usec): min=3, max=15889, avg=40.20, stdev=102.60
  lat (usec): min=3, max=15889, avg=40.51, stdev=102.61
  clat percentiles (usec):
    | 1.00th=[  3], 5.00th=[  4], 10.00th=[  4], 20.00th=[  5],
    | 30.00th=[  6], 40.00th=[ 19], 50.00th=[ 20], 60.00th=[ 20],
    | 70.00th=[ 21], 80.00th=[ 22], 90.00th=[ 24], 95.00th=[ 334],
    | 99.00th=[ 506], 99.50th=[ 580], 99.90th=[ 692], 99.95th=[ 708],
    | 99.99th=[ 1176]
  bw (KB /s): min= 6144, max=481632, per=98.61%, avg=93220.37, stdev=101513.32
  lat (usec) : 4=1.60%, 10=30.60%, 20=9.58%, 50=51.93%, 100=0.02%
  lat (usec) : 250=0.04%, 500=5.21%, 750=1.00%, 1000=0.01%
  lat (msec) : 2=0.01%, 4=0.01%, 10=0.01%, 20=0.01%
  cpu       : usr=5.82%, sys=42.44%, ctx=80191, majf=0, minf=16
  IO depths : 1=0.1%, 2=0.1%, 4=0.1%, 8=0.1%, 16=100.0%, 32=0.0%, >=64=0.0%
  submit    : 0=0.0%, 4=100.0%, 8=0.0%, 16=0.0%, 32=0.0%, 64=0.0%, >=64=0.0%
  complete  : 0=0.1%, 4=100.0%, 8=0.0%, 16=0.0%, 32=0.0%, 64=0.0%, >=64=0.0%
  issued    : total=r=1280000/w=0/d=0, short=r=0/w=0/d=0

Run status group 0 (all jobs):
  READ: io=4999.1MB, aggrb=94533KB/s, minb=94533KB/s, maxb=94533KB/s, mint=54160msec, maxt=54160msec

279554/4921/284475 mbufs in use (current/cache/total)
9215/3599/12814/262144 mbuf clusters in use (current/cache/total/max)
9215/1409 mbuf+clusters out of packet secondary zone in use (current/cache)
262146/0/262146/262144 4k (page size) jumbo clusters in use (current/cache/total/max)
8191/2632/10823/64000 9k jumbo clusters in use (current/cache/total/max)
0/0/0/32000 16k jumbo clusters in use (current/cache/total/max)
1210621K/32116K/1242737K bytes allocated to network (current/cache/total)
0/0/0 requests for mbufs denied (mbufs/clusters/mbuf+clusters)
13049854/0/0 requests for jumbo clusters denied (4k/9k/16k)
0/0/0 sbufs in use (current/peak/max)
0 requests for sbufs denied

```



```
0 requests for sbufs delayed
0 requests for I/O initiated by sendfile
0 calls to protocol drain routines
```

Client Info:

Rpc Counts:

Getattr	Setattr	Lookup	Readlink	Read	Write	Create	Remove
1	1	4	0	160000	80000	1	0
Rename	Link	Symlink	Mkdir	Rmdir	Readdir	RdirPlus	Access
0	0	0	0	0	0	0	2
Mknod	Fsstat	Fsinfo	PathConf	Commit			
0	0	0	0	0			

Rpc Info:

TimedOut	Invalid X Replies	Retries	Requests
240009	0	0	0

Cache Info:

Attr Hits	Misses	Lkup Hits	Misses	BioR Hits	Misses	BioW Hits	Misses
1280006	1	1	4	1120000	160000	1200000	80000
BioRLHits	Misses	BioD Hits	Misses	DirE Hits	Misses	Accs Hits	Misses
0	0	0	0	0	0	4	2

Random Read 128k

```
17411/11269/28680 mbufs in use (current/cache/total)
9215/10119/19334/262144 mbuf clusters in use (current/cache/total/max)
9215/9729 mbuf+clusters out of packet secondary zone in use (current/cache)
0/20/20/262144 4k (page size) jumbo clusters in use (current/cache/total/max)
8191/136/8327/64000 9k jumbo clusters in use (current/cache/total/max)
0/0/0/32000 16k jumbo clusters in use (current/cache/total/max)
96501K/24359K/120861K bytes allocated to network (current/cache/total)
0/0/0 requests for mbufs denied (mbufs/clusters/mbuf+clusters)
0/0/0 requests for jumbo clusters denied (4k/9k/16k)
0/0/0 sbufs in use (current/peak/max)
0 requests for sbufs denied
0 requests for sbufs delayed
0 requests for I/O initiated by sendfile
0 calls to protocol drain routines
```

read_file: (groupid=0, jobs=1): err= 0: pid=100419: Wed Mar 26 17:52:04 2014

```
read : io=4998.2MB, bw=165131KB/s, iops=1290, runt= 30994msec
clat (usec): min=636, max=206984, avg=769.07, stdev=1031.64
lat (usec): min=636, max=206984, avg=769.46, stdev=1031.64
clat percentiles (usec):
| 1.00th=[ 716], 5.00th=[ 732], 10.00th=[ 740], 20.00th=[ 756],
| 30.00th=[ 756], 40.00th=[ 764], 50.00th=[ 764], 60.00th=[ 764],
| 70.00th=[ 764], 80.00th=[ 772], 90.00th=[ 788], 95.00th=[ 796],
| 99.00th=[ 820], 99.50th=[ 876], 99.90th=[ 1144], 99.95th=[ 1144],
| 99.99th=[ 1176]
bw (KB /s): min=97792, max=167168, per=100.00%, avg=165229.11, stdev=9805.66
lat (usec) : 750=14.92%, 1000=84.83%
lat (msec) : 2=0.20%, 250=0.01%
cpu      : usr=0.77%, sys=17.00%, ctx=80014, majf=0, minf=512
IO depths : 1=0.1%, 2=0.1%, 4=0.1%, 8=0.1%, 16=100.0%, 32=0.0%, >=64=0.0%
submit   : 0=0.0%, 4=100.0%, 8=0.0%, 16=0.0%, 32=0.0%, 64=0.0%, >=64=0.0%
complete : 0=0.1%, 4=100.0%, 8=0.0%, 16=0.0%, 32=0.0%, 64=0.0%, >=64=0.0%
issued  : total=r=40000/w=0/d=0, short=r=0/w=0/d=0
```

Run status group 0 (all jobs):

```
READ: io=4998.2MB, aggrb=165131KB/s, minb=165131KB/s, maxb=165131KB/s, mint=30994msec, maxt=30994msec
```

```
279554/12811/292365 mbufs in use (current/cache/total)
9215/12199/21414/262144 mbuf clusters in use (current/cache/total/max)
9215/9729 mbuf+clusters out of packet secondary zone in use (current/cache)
262146/0/262146/262144 4k (page size) jumbo clusters in use (current/cache/total/max)
8191/1560/9751/64000 9k jumbo clusters in use (current/cache/total/max)
```


Write

Write 4k

```
279554/4981/284535 mbufs in use (current/cache/total)
9215/3979/13194/262144 mbuf clusters in use (current/cache/total/max)
9215/1409 mbuf+clusters out of packet secondary zone in use (current/cache)
262146/0/262146/262144 4k (page size) jumbo clusters in use (current/cache/total/max)
8191/2632/10823/64000 9k jumbo clusters in use (current/cache/total/max)
0/0/0/32000 16k jumbo clusters in use (current/cache/total/max)
1210621K/32891K/1243512K bytes allocated to network (current/cache/total)
0/0/0 requests for mbufs denied (mbufs/clusters/mbuf+clusters)
46841651/0/0 requests for jumbo clusters denied (4k/9k/16k)
0/0/0 sbufs in use (current/peak/max)
0 requests for sbufs denied
0 requests for sbufs delayed
0 requests for I/O initiated by sendfile
0 calls to protocol drain routines
```

write_file: (groupid=0, jobs=1): err= 0: pid=100588: Wed Mar 26 18:11:08 2014

write: io=4999.1MB, bw=90388KB/s, iops=22597, runt= 56644msec

clat (usec): min=2, max=39540, avg=41.59, stdev=161.49

lat (usec): min=3, max=39541, avg=41.86, stdev=161.49

clat percentiles (usec):

```
| 1.00th=[ 3], 5.00th=[ 3], 10.00th=[ 3], 20.00th=[ 3],
| 30.00th=[ 3], 40.00th=[ 3], 50.00th=[ 3], 60.00th=[ 3],
| 70.00th=[ 3], 80.00th=[ 4], 90.00th=[ 5], 95.00th=[ 326],
| 99.00th=[ 844], 99.50th=[ 868], 99.90th=[ 908], 99.95th=[ 956],
| 99.99th=[ 1080]
```

bw (KB /s): min=66320, max=100864, per=100.00%, avg=90470.09, stdev=8836.34

lat (usec) : 4=72.52%, 10=21.22%, 20=0.01%, 50=0.01%, 250=0.01%

lat (usec) : 500=2.02%, 750=2.14%, 1000=2.08%

lat (msec) : 2=0.02%, 4=0.01%, 10=0.01%, 50=0.01%

cpu : usr=5.60%, sys=17.85%, ctx=80061, majf=0, minf=0

IO depths : 1=0.1%, 2=0.1%, 4=0.1%, 8=0.1%, 16=100.0%, 32=0.0%, >=64=0.0%

submit : 0=0.0%, 4=100.0%, 8=0.0%, 16=0.0%, 32=0.0%, 64=0.0%, >=64=0.0%

complete : 0=0.1%, 4=100.0%, 8=0.0%, 16=0.0%, 32=0.0%, 64=0.0%, >=64=0.0%

issued : total=r=0/w=1280000/d=0, short=r=0/w=0/d=0

Run status group 0 (all jobs):

WRITE: io=4999.1MB, aggrb=90388KB/s, minb=90388KB/s, maxb=90388KB/s, mint=56644msec, maxt=56644msec

```
279557/4978/284535 mbufs in use (current/cache/total)
9215/3979/13194/262144 mbuf clusters in use (current/cache/total/max)
9215/1665 mbuf+clusters out of packet secondary zone in use (current/cache)
262146/0/262146/262144 4k (page size) jumbo clusters in use (current/cache/total/max)
8191/2632/10823/64000 9k jumbo clusters in use (current/cache/total/max)
0/0/0/32000 16k jumbo clusters in use (current/cache/total/max)
1210622K/32890K/1243512K bytes allocated to network (current/cache/total)
0/0/0 requests for mbufs denied (mbufs/clusters/mbuf+clusters)
51961607/0/0 requests for jumbo clusters denied (4k/9k/16k)
0/0/0 sbufs in use (current/peak/max)
0 requests for sbufs denied
0 requests for sbufs delayed
0 requests for I/O initiated by sendfile
0 calls to protocol drain routines
```

Client Info:

Rpc Counts:

Getattr	Setattr	Lookup	Readlink	Read	Write	Create	Remove
57	114	4	0	80056	160054	1	0
Rename	Link	Symlink	Mkdir	Rmdir	Readdir	RdirPlus	Access
0	0	0	0	0	0	0	1
Mknod	Fsstat	Fsinfo	PathConf	Commit			
0	0	0	0	0			

Rpc Info:

TimedOut	Invalid X Replies	Retries	Requests
----------	-------------------	---------	----------

240288	0	0	0	0	0	0	0	0
Cache Info:								
Attr Hits	Misses	Lkup Hits	Misses	BioR Hits	Misses	BioW Hits	Misses	
7	57	1	4	-80056	80056	11359944	160056	
BioRLHits	Misses	BioD Hits	Misses	DirE Hits	Misses	Accs Hits	Misses	
0	0	0	0	0	0	5	1	

Write 128k

```

279554/5131/284685 mbufs in use (current/cache/total)
9215/3863/13078/262144 mbuf clusters in use (current/cache/total/max)
9215/1793 mbuf+clusters out of packet secondary zone in use (current/cache)
262146/0/262146/262144 4k (page size) jumbo clusters in use (current/cache/total/max)
8191/2120/10311/64000 9k jumbo clusters in use (current/cache/total/max)
0/0/0/32000 16k jumbo clusters in use (current/cache/total/max)
1210621K/28088K/1238710K bytes allocated to network (current/cache/total)
0/0/0 requests for mbufs denied (mbufs/clusters/mbuf+clusters)
31481777/0/0 requests for jumbo clusters denied (4k/9k/16k)
0/0/0 sbufs in use (current/peak/max)
0 requests for sbufs denied
0 requests for sbufs delayed
0 requests for I/O initiated by sendfile
0 calls to protocol drain routines

```

```

write_file: (groupid=0, jobs=1): err= 0: pid=100520: Wed Mar 26 17:59:36 2014
write: io=9998.2MB, bw=507791KB/s, iops=3967, runt= 20162msec
  clat (usec): min=40, max=317665, avg=214.11, stdev=2092.88
  lat (usec): min=40, max=317666, avg=214.56, stdev=2092.89
  clat percentiles (usec):
    | 1.00th=[ 44], 5.00th=[ 49], 10.00th=[ 66], 20.00th=[ 68],
    | 30.00th=[ 69], 40.00th=[ 69], 50.00th=[ 70], 60.00th=[ 71],
    | 70.00th=[ 73], 80.00th=[ 76], 90.00th=[ 89], 95.00th=[ 110],
    | 99.00th=[ 1816], 99.50th=[ 2192], 99.90th=[34048], 99.95th=[40192],
    | 99.99th=[72192]
  bw (KB /s): min=305920, max=862208, per=100.00%, avg=509636.00, stdev=92691.94
  lat (usec) : 50=5.21%, 100=88.90%, 250=1.50%, 500=0.10%, 750=0.01%
  lat (usec) : 1000=0.01%
  lat (msec) : 2=3.47%, 4=0.59%, 10=0.01%, 20=0.01%, 50=0.14%
  lat (msec) : 100=0.03%, 500=0.01%
cpu      : usr=15.45%, sys=28.04%, ctx=4260, majf=0, minf=0
IO depths : 1=0.1%, 2=0.1%, 4=0.1%, 8=0.1%, 16=100.0%, 32=0.0%, >=64=0.0%
submit   : 0=0.0%, 4=100.0%, 8=0.0%, 16=0.0%, 32=0.0%, 64=0.0%, >=64=0.0%
complete : 0=0.1%, 4=100.0%, 8=0.0%, 16=0.0%, 32=0.0%, 64=0.0%, >=64=0.0%
issued  : total=r=0/w=80000/d=0, short=r=0/w=0/d=0

```

```

Run status group 0 (all jobs):
WRITE: io=9998.2MB, aggrb=507790KB/s, minb=507790KB/s, maxb=507790KB/s, mint=20162msec, maxt=20162msec

```

```

279554/4981/284535 mbufs in use (current/cache/total)
9215/3979/13194/262144 mbuf clusters in use (current/cache/total/max)
9215/897 mbuf+clusters out of packet secondary zone in use (current/cache)
262146/0/262146/262144 4k (page size) jumbo clusters in use (current/cache/total/max)
8191/2248/10439/64000 9k jumbo clusters in use (current/cache/total/max)
0/0/0/32000 16k jumbo clusters in use (current/cache/total/max)
1210621K/29435K/1240056K bytes allocated to network (current/cache/total)
0/0/0 requests for mbufs denied (mbufs/clusters/mbuf+clusters)
41721688/0/0 requests for jumbo clusters denied (4k/9k/16k)
0/0/0 sbufs in use (current/peak/max)
0 requests for sbufs denied
0 requests for sbufs delayed
0 requests for I/O initiated by sendfile
0 calls to protocol drain routines

```

Client Info:

Rpc Counts:

Getattr	Setattr	Lookup	Readlink	Read	Write	Create	Remove
---------	---------	--------	----------	------	-------	--------	--------

115	230	4	0	112	318675	1	0
Rename	Link	Symlink	Mkdir	Rmdir	Readdir	RdirPlus	Access
0	0	0	0	0	0	0	1
Mknod	Fsstat	Fsinfo	PathConf	Commit			
0	0	0	0	0			
Rpc Info:							
TimedOut	Invalid	X Replies	Retries	Requests			
320507	0	0	0	0			
Cache Info:							
Attr Hits	Misses	Lkup Hits	Misses	BioR Hits	Misses	BioW Hits	Misses
7	115	1	4	-112	112	20319922	320078
BioRLHits	Misses	BioD Hits	Misses	DirE Hits	Misses	Accs Hits	Misses
0	0	0	0	0	0	5	1

```

Random Write 4k

279554/4981/284535 mbufs in use (current/cache/total)
9215/3979/13194/262144 mbuf clusters in use (current/cache/total/max)
9215/1025 mbuf+clusters out of packet secondary zone in use (current/cache)
262146/0/262146/262144 4k (page size) jumbo clusters in use (current/cache/total/max)
8191/2248/10439/64000 9k jumbo clusters in use (current/cache/total/max)
0/0/0/32000 16k jumbo clusters in use (current/cache/total/max)
1210621K/29435K/1240056K bytes allocated to network (current/cache/total)
0/0/0 requests for mbufs denied (mbufs/clusters/mbuf+clusters)
41721688/0/0 requests for jumbo clusters denied (4k/9k/16k)
0/0/0 sbufs in use (current/peak/max)
0 requests for sbufs denied
0 requests for sbufs delayed
0 requests for I/O initiated by sendfile
0 calls to protocol drain routines

write_file: (groupid=0, jobs=1): err= 0: pid=100538: Wed Mar 26 18:09:57 2014
write: io=4999.1MB, bw=8460.2KB/s, iops=2115, runt=605181msec
clat (usec): min=4, max=869836, avg=467.66, stdev=3509.89
lat (usec): min=4, max=869836, avg=468.06, stdev=3509.89
clat percentiles (usec):
| 1.00th=[ 26], 5.00th=[ 107], 10.00th=[ 183], 20.00th=[ 266],
| 30.00th=[ 282], 40.00th=[ 290], 50.00th=[ 298], 60.00th=[ 302],
| 70.00th=[ 306], 80.00th=[ 466], 90.00th=[ 708], 95.00th=[ 756],
| 99.00th=[ 3856], 99.50th=[ 9536], 99.90th=[14144], 99.95th=[15808],
| 99.99th=[99840]
bw (KB /s): min= 960, max=44592, per=100.00%, avg=8610.89, stdev=3903.04
lat (usec) : 10=0.21%, 20=0.40%, 50=1.69%, 100=2.29%, 250=11.15%
lat (usec) : 500=65.55%, 750=13.57%, 1000=3.99%
lat (msec) : 2=0.09%, 4=0.11%, 10=0.67%, 20=0.27%, 50=0.01%
lat (msec) : 100=0.01%, 250=0.01%, 500=0.01%, 750=0.01%, 1000=0.01%
cpu      : usr=1.51%, sys=66.25%, ctx=576013, majf=0, minf=0
IO depths : 1=0.1%, 2=0.1%, 4=0.1%, 8=0.1%, 16=100.0%, 32=0.0%, >=64=0.0%
submit   : 0=0.0%, 4=100.0%, 8=0.0%, 16=0.0%, 32=0.0%, 64=0.0%, >=64=0.0%
complete : 0=0.1%, 4=100.0%, 8=0.0%, 16=0.0%, 32=0.0%, 64=0.0%, >=64=0.0%
issued  : total=r=0/w=1280000/d=0, short=r=0/w=0/d=0

Run status group 0 (all jobs):
WRITE: io=4999.1MB, aggrb=8460KB/s, minb=8460KB/s, maxb=8460KB/s, mint=605181msec, maxt=605181msec

279554/4981/284535 mbufs in use (current/cache/total)
9215/3979/13194/262144 mbuf clusters in use (current/cache/total/max)
9215/1409 mbuf+clusters out of packet secondary zone in use (current/cache)
262146/0/262146/262144 4k (page size) jumbo clusters in use (current/cache/total/max)
8191/2632/10823/64000 9k jumbo clusters in use (current/cache/total/max)
0/0/0/32000 16k jumbo clusters in use (current/cache/total/max)
1210621K/32891K/1243512K bytes allocated to network (current/cache/total)
0/0/0 requests for mbufs denied (mbufs/clusters/mbuf+clusters)
46841651/0/0 requests for jumbo clusters denied (4k/9k/16k)
0/0/0 sbufs in use (current/peak/max)
0 requests for sbufs denied

```

```
0 requests for sbufs delayed
0 requests for I/O initiated by sendfile
0 calls to protocol drain routines
```

Client Info:

Rpc Counts:

Getattr	Setattr	Lookup	Readlink	Read	Write	Create	Remove
57	114	4	0	80052	1208016	1	0
Rename	Link	Symlink	Mkdir	Rmdir	Readdir	RdirPlus	Access
0	0	0	0	0	0	0	2
Mknod	Fsstat	Fsinfo	PathConf	Commit			
0	0	0	0	0			

Rpc Info:

TimedOut	Invalid X	Replies	Retries	Requests
1296696	0	0	0	0

Cache Info:

Attr Hits	Misses	Lkup Hits	Misses	BioR Hits	Misses	BioW Hits	Misses
7	57	1	4	-80052	80052	10301949	1218051
BioRLHits	Misses	BioD Hits	Misses	DirE Hits	Misses	Accs Hits	Misses
0	0	0	0	0	0	4	2

Random Write 128k

```
279554/4291/283845 mbufs in use (current/cache/total)
9215/2579/11794/262144 mbuf clusters in use (current/cache/total/max)
9215/769 mbuf+clusters out of packet secondary zone in use (current/cache)
262146/0/262146/262144 4k (page size) jumbo clusters in use (current/cache/total/max)
8191/2504/10695/64000 9k jumbo clusters in use (current/cache/total/max)
0/0/0/32000 16k jumbo clusters in use (current/cache/total/max)
1210621K/28766K/1239388K bytes allocated to network (current/cache/total)
0/0/0 requests for mbufs denied (mbufs/clusters/mbuf+clusters)
21241854/0/0 requests for jumbo clusters denied (4k/9k/16k)
0/0/0 sbufs in use (current/peak/max)
0 requests for sbufs denied
0 requests for sbufs delayed
0 requests for I/O initiated by sendfile
0 calls to protocol drain routines
```

```
write_file: (groupid=0, jobs=1): err= 0: pid=100517: Wed Mar 26 17:58:47 2014
```

```
write: io=9998.2MB, bw=483727KB/s, iops=3779, runt= 21165msec
```

```
clat (usec): min=44, max=171145, avg=226.10, stdev=2036.67
```

```
lat (usec): min=44, max=171145, avg=226.54, stdev=2036.67
```

```
clat percentiles (usec):
```

```
| 1.00th=[ 49], 5.00th=[ 55], 10.00th=[ 72], 20.00th=[ 74],
| 30.00th=[ 75], 40.00th=[ 77], 50.00th=[ 78], 60.00th=[ 79],
| 70.00th=[ 81], 80.00th=[ 85], 90.00th=[ 96], 95.00th=[ 118],
| 99.00th=[ 2096], 99.50th=[ 2192], 99.90th=[34048], 99.95th=[43776],
| 99.99th=[78336]
```

```
bw (KB /s): min=345212, max=907008, per=100.00%, avg=484562.15, stdev=97700.47
```

```
lat (usec) : 50=1.63%, 100=90.08%, 250=4.10%, 500=0.12%, 750=0.03%
```

```
lat (usec) : 1000=0.02%
```

```
lat (msec) : 2=2.60%, 4=1.21%, 10=0.01%, 20=0.01%, 50=0.13%
```

```
lat (msec) : 100=0.04%, 250=0.01%
```

```
cpu : usr=14.93%, sys=29.38%, ctx=4443, majf=0, minf=1
```

```
IO depths : 1=0.1%, 2=0.1%, 4=0.1%, 8=0.1%, 16=100.0%, 32=0.0%, >=64=0.0%
```

```
submit : 0=0.0%, 4=100.0%, 8=0.0%, 16=0.0%, 32=0.0%, 64=0.0%, >=64=0.0%
```

```
complete : 0=0.1%, 4=100.0%, 8=0.0%, 16=0.0%, 32=0.0%, 64=0.0%, >=64=0.0%
```

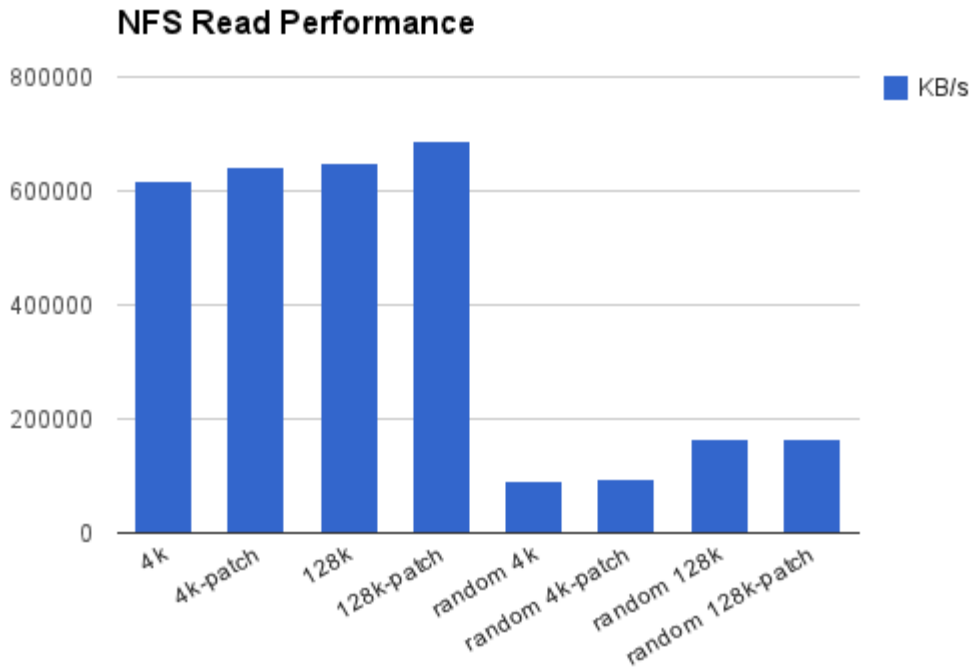
```
issued : total=r=0/w=80000/d=0, short=r=0/w=0/d=0
```

```
Run status group 0 (all jobs):
```

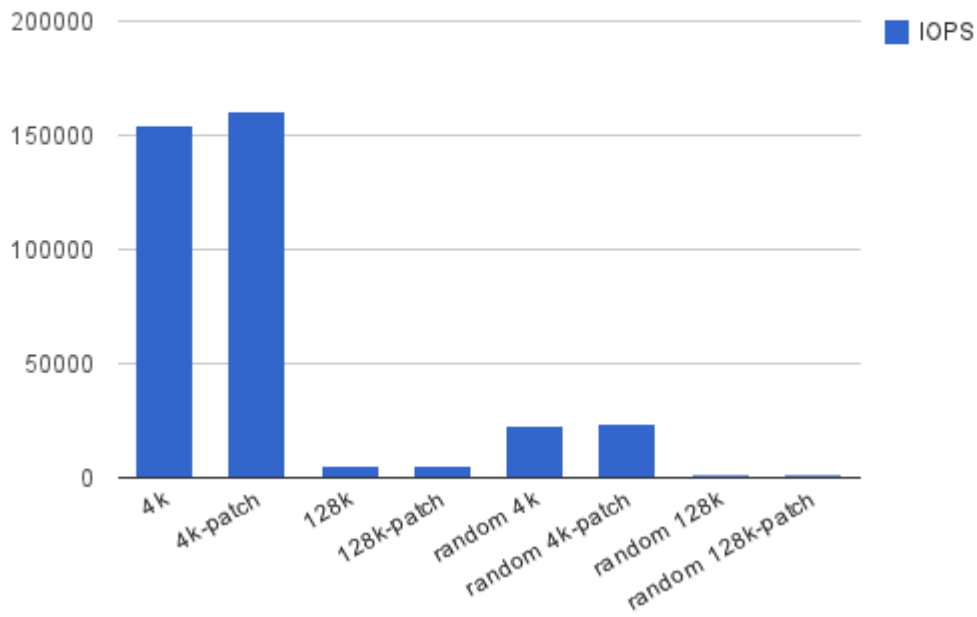
```
WRITE: io=9998.2MB, aggrb=483726KB/s, minb=483726KB/s, maxb=483726KB/s, mint=21165msec, maxt=21165msec
```

```
279557/5128/284685 mbufs in use (current/cache/total)
9215/3863/13078/262144 mbuf clusters in use (current/cache/total/max)
9215/1793 mbuf+clusters out of packet secondary zone in use (current/cache)
262146/0/262146/262144 4k (page size) jumbo clusters in use (current/cache/total/max)
```

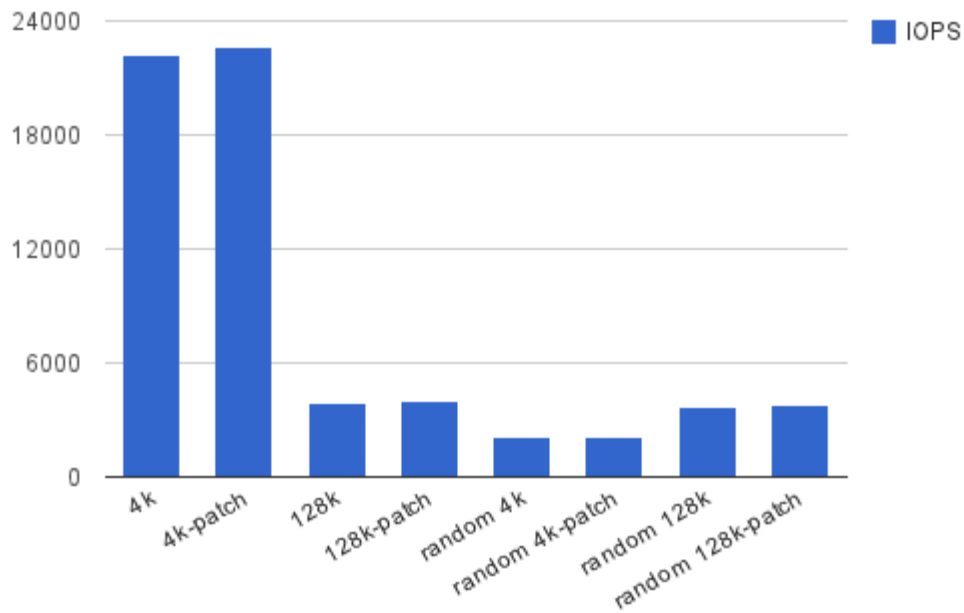

9. Performance of patched and un-patched NFS(64 thread and 8-readahead)



NFS Read IOPS



NFS Write IOPS



10. CPU and Memory usage(64 thread and 8-readahead)

On Server Side:

Create a file with size 10G Bytes

```
dd if=/dev/zero of=/share/nfstest/file bs=1024k count=10000
```

On Client Side:

Run dd for read for about 4 minutes.

```
while true; do dd if=/nfstest/file of=/dev/null bs=128k; done
```

CPU and Memory usage of nfsd on server(with command **top**.)

Without the patch

```
18941 admin      64  21    0 11892K  2584K rpcsvc   3  14:33 109.57% nfs
```

With the patch

```
3611 admin      64  21    0 11892K  2588K rpcsvc   6   8:58 80.57% nfsd
```