一、使用默认测试

随机写IOPS：

[root@iZ1c0g2i3vZ data]# fio -direct=1 -iodepth=128 -rw=randwrite -ioengine=libaio -bs=4k -size=10G -numjobs=1 -runtime=1000 -group\_reporting -name=/data/testfile\_random

/data/testfile\_random: (g=0): rw=randwrite, bs=4K-4K/4K-4K/4K-4K, ioengine=libaio, iodepth=128

fio-2.1.11

Starting 1 process

/data/testfile\_random: Laying out IO file(s) (1 file(s) / 10240MB)

Jobs: 1 (f=1): [w(1)] [100.0% done] [0KB/42540KB/0KB /s] [0/10.7K/0 iops] [eta 00m:00s]

/data/testfile\_random: (groupid=0, jobs=1): err= 0: pid=1773: Fri Mar 17 10:43:37 2017

write: io=10240MB, bw=30945KB/s, **iops=7736**, runt=338853msec

slat (usec): min=4, max=146045, avg=16.82, stdev=362.06

clat (msec): min=1, max=617, avg=16.53, stdev=10.79

lat (msec): min=1, max=617, avg=16.54, stdev=10.80

clat percentiles (msec):

| 1.00th=[ 5], 5.00th=[ 6], 10.00th=[ 7], 20.00th=[ 9],

| 30.00th=[ 11], 40.00th=[ 14], 50.00th=[ 16], 60.00th=[ 18],

| 70.00th=[ 20], 80.00th=[ 23], 90.00th=[ 26], 95.00th=[ 30],

| 99.00th=[ 63], 99.50th=[ 81], 99.90th=[ 113], 99.95th=[ 127],

| 99.99th=[ 167]

bw (KB /s): min= 4741, max=52344, per=100.00%, avg=30956.38, stdev=4788.89

lat (msec) : 2=0.01%, 4=0.49%, 10=25.38%, 20=45.54%, 50=27.09%

lat (msec) : 100=1.30%, 250=0.19%, 500=0.01%, 750=0.01%

cpu : usr=2.04%, sys=11.79%, ctx=1458421, majf=0, minf=22

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

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

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

issued : total=r=0/w=2621440/d=0, short=r=0/w=0/d=0

latency : target=0, window=0, percentile=100.00%, depth=128

Run status group 0 (all jobs):

WRITE: io=10240MB, aggrb=30944KB/s, minb=30944KB/s, maxb=30944KB/s, mint=338853msec, maxt=338853msec

Disk stats (read/write):

xvdb: ios=0/2647609, merge=0/321229, ticks=0/43218440, in\_queue=43218049, util=100.00%

说明：随机写IOPS：**7736**

随机读IOPS：

[root@iZ1c0g2i3vZ data]# fio -direct=1 -iodepth=128 -rw=randread -ioengine=libaio -bs=4k -size=10G -numjobs=1 -runtime=1000 -group\_reporting -name=/data/testfile\_random

/data/testfile\_random: (g=0): rw=randread, bs=4K-4K/4K-4K/4K-4K, ioengine=libaio, iodepth=128

fio-2.1.11

Starting 1 process

/data/testfile\_random: Laying out IO file(s) (1 file(s) / 10240MB)

Jobs: 1 (f=1): [r(1)] [100.0% done] [57564KB/0KB/0KB /s] [14.4K/0/0 iops] [eta 00m:00s]

/data/testfile\_random: (groupid=0, jobs=1): err= 0: pid=1759: Fri Mar 17 10:29:52 2017

read : io=10240MB, bw=44343KB/s, **iops=11085**, runt=236470msec

slat (usec): min=2, max=863, avg= 5.21, stdev= 2.78

clat (usec): min=866, max=186419, avg=11538.72, stdev=6412.35

lat (usec): min=925, max=186424, avg=11544.34, stdev=6412.37

clat percentiles (usec):

| 1.00th=[ 2960], 5.00th=[ 3792], 10.00th=[ 4640], 20.00th=[ 6240],

| 30.00th=[ 7776], 40.00th=[ 9408], 50.00th=[10944], 60.00th=[12480],

| 70.00th=[14144], 80.00th=[15808], 90.00th=[18048], 95.00th=[20864],

| 99.00th=[31104], 99.50th=[42240], 99.90th=[66048], 99.95th=[76288],

| 99.99th=[96768]

bw (KB /s): min=22309, max=58344, per=100.00%, avg=44340.07, stdev=5324.13

lat (usec) : 1000=0.01%

lat (msec) : 2=0.02%, 4=6.16%, 10=37.90%, 20=49.90%, 50=5.72%

lat (msec) : 100=0.30%, 250=0.01%

cpu : usr=4.95%, sys=9.40%, ctx=1590812, majf=0, minf=151

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

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

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

issued : total=r=2621440/w=0/d=0, short=r=0/w=0/d=0

latency : target=0, window=0, percentile=100.00%, depth=128

Run status group 0 (all jobs):

READ: io=10240MB, aggrb=44342KB/s, minb=44342KB/s, maxb=44342KB/s, mint=236470msec, maxt=236470msec

Disk stats (read/write):

xvdb: ios=2605094/6, merge=14634/1, ticks=30110927/42, in\_queue=30111943, util=100.00%

随机读IOPS：**11085。**

测试写吞吐量：

[root@iZ1c0g2i3vZ data]# fio -direct=1 -iodepth=64 -rw=randwrite -ioengine=libaio -bs=64k -size=10G -numjobs=1 -runtime=1000 -group\_reporting -name=/data/testfile\_random

/data/testfile\_random: (g=0): rw=randwrite, bs=64K-64K/64K-64K/64K-64K, ioengine=libaio, iodepth=64

fio-2.1.11

Starting 1 process

/data/testfile\_random: Laying out IO file(s) (1 file(s) / 10240MB)

Jobs: 1 (f=1): [w(1)] [100.0% done] [0KB/294.8MB/0KB /s] [0/4715/0 iops] [eta 00m:00s]

/data/testfile\_random: (groupid=0, jobs=1): err= 0: pid=1787: Fri Mar 17 10:48:15 2017

write: io=10240MB, **bw=299371KB/s**, iops=4677, runt= 35026msec

slat (usec): min=9, max=20846, avg=23.69, stdev=77.29

clat (msec): min=1, max=146, avg=13.65, stdev= 7.68

lat (msec): min=1, max=146, avg=13.68, stdev= 7.68

clat percentiles (msec):

| 1.00th=[ 4], 5.00th=[ 5], 10.00th=[ 6], 20.00th=[ 8],

| 30.00th=[ 10], 40.00th=[ 11], 50.00th=[ 13], 60.00th=[ 15],

| 70.00th=[ 17], 80.00th=[ 19], 90.00th=[ 22], 95.00th=[ 24],

| 99.00th=[ 42], 99.50th=[ 53], 99.90th=[ 75], 99.95th=[ 85],

| 99.99th=[ 112]

bw (KB /s): min=257024, max=362496, per=100.00%, avg=299385.04, stdev=18307.62

lat (msec) : 2=0.01%, 4=2.35%, 10=32.36%, 20=50.77%, 50=13.91%

lat (msec) : 100=0.58%, 250=0.02%

cpu : usr=1.99%, sys=13.00%, ctx=161093, majf=0, minf=22

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

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

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

issued : total=r=0/w=163840/d=0, short=r=0/w=0/d=0

latency : target=0, window=0, percentile=100.00%, depth=64

Run status group 0 (all jobs):

WRITE: io=10240MB, aggrb=299370KB/s, minb=299370KB/s, maxb=299370KB/s, mint=35026msec, maxt=35026msec

Disk stats (read/write):

xvdb: ios=0/327134, merge=0/2821, ticks=0/4444949, in\_queue=4445897, util=99.80%

随机写吞吐率最高：**299371KB/s**

测试读吞吐量：

[root@iZ1c0g2i3vZ data]# fio -direct=1 -iodepth=64 -rw=randread -ioengine=libaio -bs=64k -size=10G -numjobs=1 -runtime=1000 -group\_reporting -name=/data/testfile\_random

/data/testfile\_random: (g=0): rw=randread, bs=64K-64K/64K-64K/64K-64K, ioengine=libaio, iodepth=64

fio-2.1.11

Starting 1 process

Jobs: 1 (f=1): [r(1)] [100.0% done] [303.7MB/0KB/0KB /s] [4858/0/0 iops] [eta 00m:00s]

/data/testfile\_random: (groupid=0, jobs=1): err= 0: pid=1796: Fri Mar 17 11:01:01 2017

read : io=10240MB, **bw=292514KB/s**, iops=4570, runt= 35847msec

slat (usec): min=5, max=832, avg=10.68, stdev= 4.23

clat (msec): min=1, max=147, avg=13.99, stdev= 7.91

lat (msec): min=2, max=147, avg=14.00, stdev= 7.91

clat percentiles (msec):

| 1.00th=[ 4], 5.00th=[ 5], 10.00th=[ 6], 20.00th=[ 8],

| 30.00th=[ 10], 40.00th=[ 12], 50.00th=[ 14], 60.00th=[ 16],

| 70.00th=[ 18], 80.00th=[ 20], 90.00th=[ 22], 95.00th=[ 25],

| 99.00th=[ 43], 99.50th=[ 55], 99.90th=[ 79], 99.95th=[ 88],

| 99.99th=[ 117]

bw (KB /s): min=188288, max=340352, per=100.00%, avg=292777.59, stdev=24727.42

lat (msec) : 2=0.01%, 4=1.90%, 10=31.28%, 20=50.84%, 50=15.32%

lat (msec) : 100=0.63%, 250=0.03%

cpu : usr=1.69%, sys=8.48%, ctx=157827, majf=0, minf=537

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

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

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

issued : total=r=163840/w=0/d=0, short=r=0/w=0/d=0

latency : target=0, window=0, percentile=100.00%, depth=64

Run status group 0 (all jobs):

READ: io=10240MB, aggrb=292514KB/s, minb=292514KB/s, maxb=292514KB/s, mint=35847msec, maxt=35847msec

Disk stats (read/write):

xvdb: ios=326285/2, merge=0/1, ticks=4544286/9, in\_queue=4547429, util=99.81%

读吞吐量：**292514KB/s**

二、将读写增加到10W

测试随机写：

[root@iZ1c0g2i3vZ data]# fio -direct=1 -iodepth=128 -rw=randwrite -ioengine=libaio -bs=4k -size=10G -numjobs=1 -runtime=1000 -group\_reporting -name=/data/testfile\_random

/data/testfile\_random: (g=0): rw=randwrite, bs=4K-4K/4K-4K/4K-4K, ioengine=libaio, iodepth=128

fio-2.1.11

Starting 1 process

/data/testfile\_random: Laying out IO file(s) (1 file(s) / 10240MB)

Jobs: 1 (f=1): [w(1)] [99.7% done] [0KB/51620KB/0KB /s] [0/12.1K/0 iops] [eta 00m:01s]

/data/testfile\_random: (groupid=0, jobs=1): err= 0: pid=1764: Fri Mar 17 11:53:25 2017

write: io=10240MB, bw=35913KB/s, **iops=8978**, runt=291979msec

slat (usec): min=4, max=177664, avg=16.21, stdev=360.02

clat (msec): min=1, max=263, avg=14.24, stdev= 8.91

lat (msec): min=1, max=263, avg=14.26, stdev= 8.92

clat percentiles (msec):

| 1.00th=[ 4], 5.00th=[ 5], 10.00th=[ 6], 20.00th=[ 8],

| 30.00th=[ 10], 40.00th=[ 12], 50.00th=[ 14], 60.00th=[ 16],

| 70.00th=[ 18], 80.00th=[ 20], 90.00th=[ 23], 95.00th=[ 26],

| 99.00th=[ 44], 99.50th=[ 65], 99.90th=[ 97], 99.95th=[ 111],

| 99.99th=[ 182]

bw (KB /s): min=17696, max=56168, per=100.00%, avg=35919.07, stdev=5188.93

lat (msec) : 2=0.01%, 4=2.06%, 10=30.68%, 20=50.52%, 50=15.94%

lat (msec) : 100=0.71%, 250=0.08%, 500=0.01%

cpu : usr=2.35%, sys=13.59%, ctx=1494096, majf=0, minf=22

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

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

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

issued : total=r=0/w=2621440/d=0, short=r=0/w=0/d=0

latency : target=0, window=0, percentile=100.00%, depth=128

Run status group 0 (all jobs):

WRITE: io=10240MB, aggrb=35912KB/s, minb=35912KB/s, maxb=35912KB/s, mint=291979msec, maxt=291979msec

Disk stats (read/write):

xvdb: ios=0/2643047, merge=0/295141, ticks=0/37169142, in\_queue=37168800, util=99.99%

测试随机读：

[root@iZ1c0g2i3vZ data]# fio -direct=1 -iodepth=128 -rw=randread -ioengine=libaio -bs=4k -size=10G -numjobs=1 -runtime=1000 -group\_reporting -name=/data/testfile\_random

/data/testfile\_random: (g=0): rw=randread, bs=4K-4K/4K-4K/4K-4K, ioengine=libaio, iodepth=128

fio-2.1.11

Starting 1 process

Jobs: 1 (f=1): [r(1)] [100.0% done] [66068KB/0KB/0KB /s] [16.6K/0/0 iops] [eta 00m:00s]

/data/testfile\_random: (groupid=0, jobs=1): err= 0: pid=1802: Fri Mar 17 12:29:36 2017

read : io=10240MB, bw=45161KB/s, **iops=11290**, runt=232184msec

slat (usec): min=1, max=998, avg= 5.36, stdev= 2.94

clat (usec): min=835, max=154128, avg=11329.21, stdev=6194.04

lat (usec): min=880, max=154133, avg=11334.99, stdev=6194.04

clat percentiles (usec):

| 1.00th=[ 2960], 5.00th=[ 3760], 10.00th=[ 4576], 20.00th=[ 6112],

| 30.00th=[ 7648], 40.00th=[ 9280], 50.00th=[10816], 60.00th=[12352],

| 70.00th=[13888], 80.00th=[15552], 90.00th=[17792], 95.00th=[20096],

| 99.00th=[29824], 99.50th=[40704], 99.90th=[64768], 99.95th=[73216],

| 99.99th=[94720]

bw (KB /s): min=32200, max=67152, per=100.00%, avg=45168.76, stdev=5104.04

lat (usec) : 1000=0.01%

lat (msec) : 2=0.01%, 4=6.43%, 10=38.60%, 20=49.91%, 50=4.77%

lat (msec) : 100=0.27%, 250=0.01%

cpu : usr=4.91%, sys=9.61%, ctx=1483251, majf=0, minf=152

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

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

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

issued : total=r=2621440/w=0/d=0, short=r=0/w=0/d=0

latency : target=0, window=0, percentile=100.00%, depth=128

Run status group 0 (all jobs):

READ: io=10240MB, aggrb=45161KB/s, minb=45161KB/s, maxb=45161KB/s, mint=232184msec, maxt=232184msec

Disk stats (read/write):

xvdb: ios=2604896/0, merge=14687/0, ticks=29564349/0, in\_queue=29565773, util=100.00%

测试写吞吐量：

测试读吞吐量：