lotus bench 测试报告（戴泽军 2020-03-18）

测试结论(程序版本 v0.2.8)：

1. SSD 磁盘的写入效率比 HDD 有大约 50%的提升， 使用 SSD 作为 cache，打包效率提升比较明显（使用共享存储耗时 5h21m，使用 SSD 耗时 4h20m，节省近 1 小时）

2. 不使用 GPU，打包效率没有损失，反而还有小幅提高（使用 GPU 耗时 4h20m，不使用 GPU 耗时 4h14m，减少 6 分钟）（这个结论有点让人大跌眼镜）

3. 重庆 node5 没有安装显卡驱动，IO 测试效率没有明显不足，需要进一步调查封包效率严重不足的原因（耗时 6h40m，比西安机房慢近 2 小时）

下一步测试计划：**低配情况下的封包效率测试**

建议测试配置：

CPU 配置不变， 64 Core

内存：128G

磁盘：1T SSD + 8T HDD + 局域网共享存储

显卡： 2080（8G）或不配

硬件信息 西安-node1

显卡配置：GeForce2080(8G Cache）GPU

df -h #分区信息
free -m #内存信息
lspci | grep VGA #gpu 信息
nvidia -smi #gpu 信息
cat /proc/cpuinfo | grep name | cut -f2 -d: | uniq -c #CPU 信息

```
[root@xa_node01 ~]# df -h
Filesystem             Size  Used Avail Use% Mounted on
devtmpfs               189G     0  189G   0% /dev
tmpfs                  189G     0  189G   0% /dev/shm
tmpfs                  189G  330M  188G   1% /run
tmpfs                  189G     0  189G   0% /sys/fs/cgroup
/dev/sda5              530G  219G  312G  42% /
/dev/nvme0n1p1         894G   33M  894G   1% /ssd
/dev/sda3               24G   33M   24G   1% /home
/dev/sda2             1014M  340M  675M  34% /boot
/dev/sda1              200M   12M  189M   6% /boot/efi
tmpfs                   38G     0   38G   0% /run/user/0
/dev/mapper/disk10-5T  4.6T   67G  4.5T   2% /disk10-5T
[root@xa_node01 ~]# free -m
              total        used        free      shared  buff/cache   available
Mem:         385192        8380      178980         334      197831      378470
Swap:          4095           0        4095
[root@xa_node01 ~]# lspci |grep gpu
[root@xa_node01 ~]# lspci |grep -i vga
03:00.0 VGA compatible controller: Matrox Electronics Systems Ltd. Integrated Matrox G200eW3 Graphics Controller (rev 04)
af:00.0 VGA compatible controller: NVIDIA Corporation TU104 [GeForce RTX 2080 Rev. A] (rev a1)
[root@xa_node01 ~]# nvidia-smi
Mon Mar 16 11:21:13 2020
+-----------------------------------------------------------------------------+
| NVIDIA-SMI 440.44       Driver Version: 440.44       CUDA Version: 10.2     |
|-------------------------------+----------------------+----------------------+
| GPU  Name        Persistence-M| Bus-Id        Disp.A | Volatile Uncorr. ECC |
| Fan  Temp  Perf  Pwr:Usage/Cap|         Memory-Usage | GPU-Util  Compute M. |
|===============================+======================+======================|
|   0  GeForce RTX 2080    Off  | 00000000:AF:00.0 Off |                  N/A |
| 38%  33C    P0    19W / 225W |      0MiB /  7982MiB |      0%      Default |
+-------------------------------+----------------------+----------------------+

+-----------------------------------------------------------------------------+
| Processes:                                                       GPU Memory |
|  GPU       PID   Type   Process name                             Usage      |
|=============================================================================|
|  No running processes found                                                 |
+-----------------------------------------------------------------------------+
[root@xa_node01 ~]# cat /proc/cpuinfo | grep name | cut -f2 -d: | uniq -c
     64  Intel(R) Xeon(R) Silver 4216 CPU @ 2.10GHz
[root@xa_node01 ~]# 
```

内网 IO 效率：

dd if=/dev/zero of=/bench.dat bs=100M count=1024

dd if=/bench.dat of=/dev/null bs=100M count=1024

rm -f /bench.dat

dd if=/dev/zero of=/disk10-5T/bench.dat bs=100M count=1024

dd if=/disk10-5T/bench.dat of=/dev/null bs=100M count=1024

rm -f /disk10-5T/bench.dat

dd if=/dev/zero of=/ssd/bench.dat bs=100M count=1024

dd if=/ssd/bench.dat of=/dev/null bs=100M count=1024

rm -f /ssd/bench.dat

dd if=/dev/zero of=/dev/shm/bench.dat bs=100M count=1024

dd if=/dev/shm/bench.dat of=/dev/null bs=100M count=1024

rm -f /dev/shm/bench.dat

```
84   Intel(R) Xeon(R) Silver 4218 CPU @ 2.10GHz
[root@xa_node01 ~]# dd if=/dev/zero of=/bench.dat bs=100M count=1024
dat
dd if=/dev/zero of=/ssd/bench.dat bs=100M count=1024
dd if=/ssd/bench.dat of=/dev/null bs=100M count=1024
rm -f /ssd/bench.dat
dd if=/dev/zero of=/dev/shm/bench.dat bs=100M count=1024
dd if=/dev/shm/bench.dat of=/dev/null bs=100M count=1024
rm -f /dev/shm/bench.dat
1024+0 records in
1024+0 records out
107374182400 bytes (107 GB) copied, 304.359 s, 353 MB/s
[root@xa_node01 ~]# dd if=/bench.dat of=/dev/null bs=100M count=1024
1024+0 records in
1024+0 records out
107374182400 bytes (107 GB) copied, 29.7966 s, 3.6 GB/s
[root@xa_node01 ~]# rm -f /bench.dat
[root@xa_node01 ~]# dd if=/dev/zero of=/disk10-5T/bench.dat bs=100M count=1024
1024+0 records in
1024+0 records out
107374182400 bytes (107 GB) copied, 129.447 s, 829 MB/s
[root@xa_node01 ~]# dd if=/disk10-5T/bench.dat of=/dev/null bs=100M count=1024
1024+0 records in
1024+0 records out
107374182400 bytes (107 GB) copied, 27.8524 s, 3.9 GB/s
[root@xa_node01 ~]# rm -f /disk10-5T/bench.dat
[root@xa_node01 ~]# dd if=/dev/zero of=/ssd/bench.dat bs=100M count=1024
1024+0 records in
1024+0 records out
107374182400 bytes (107 GB) copied, 84.1312 s, 1.3 GB/s
[root@xa_node01 ~]# dd if=/ssd/bench.dat of=/dev/null bs=100M count=1024
1024+0 records in
1024+0 records out
107374182400 bytes (107 GB) copied, 27.9242 s, 3.8 GB/s
[root@xa_node01 ~]# rm -f /ssd/bench.dat
[root@xa_node01 ~]# dd if=/dev/zero of=/dev/shm/bench.dat bs=100M count=1024
1024+0 records in
1024+0 records out
107374182400 bytes (107 GB) copied, 55.0288 s, 2.0 GB/s
[root@xa_node01 ~]# dd if=/dev/shm/bench.dat of=/dev/null bs=100M count=1024
1024+0 records in
1024+0 records out
107374182400 bytes (107 GB) copied, 31.0684 s, 3.5 GB/s
[root@xa_node01 ~]# rm -f /dev/shm/bench.dat
[root@xa_node01 ~]#
```

IO 测试结论：

SSD 可以较大幅度提升 **IO** 写入效率，是作为 seal cache 具有较高性价比的理想存储系统

程序版本：

```
[root@xa_node01 allytest]# ./lotus version
0.2.8+git954085d3+api0.1.7
lotus version 0.2.8+git954085d3
[root@xa_node01 allytest]#
```

```
-rwxr-x--x  1 root root 55025452 Mar 18 11:44 lotus-storage-miner
[root@xa_node01 allytest]# ./bench -v
2020-03-18T08:14:06.597+0800    INFO    lotus-bench    lotus-bench/main.go:57  Starting lotus-bench
lotus-bench version 0.2.8
```

cp -r -f -u /root/filecoin-proof-parameters /disk10-5T

killall -9 bench

nohup ./bench --sector-size=32GiB --storage-dir="/ssd/.lotus-bench" >> bench.log 2>&1 &

tail bench.log & df -h & nvidia-smi

```
[4]+  Done                    df -h
[root@xa_node01 allytest]# tail bench.log & df -h & nvidia-smi
[3] 50024
[4] 50025
2020-03-16T12:13:20.431+0800    INFO    build    go-paramfetch@v0.0.1/paramfetch.go:127  Parameter file /disk10-5T/fil
2020-03-16T12:13:20.432+0800    INFO    build    go-paramfetch@v0.0.1/paramfetch.go:127  Parameter file /disk10-5T/fil
2020-03-16T12:13:20.432+0800    INFO    build    go-paramfetch@v0.0.1/paramfetch.go:127  Parameter file /disk10-5T/fil
2020-03-16T12:13:20.432+0800    INFO    build    go-paramfetch@v0.0.1/paramfetch.go:127  Parameter file /disk10-5T/fil
2020-03-16T12:13:20.433+0800    INFO    build    go-paramfetch@v0.0.1/paramfetch.go:127  Parameter file /disk10-5T/fil
2020-03-16T12:13:21.532+0800    INFO    build    go-paramfetch@v0.0.1/paramfetch.go:127  Parameter file /disk10-5T/fil
2020-03-16T12:14:17.951+0800    INFO    build    go-paramfetch@v0.0.1/paramfetch.go:127  Parameter file /disk10-5T/fil
2020-03-16T12:14:17.951+0800    INFO    lotus-bench      lotus-bench/main.go:173 Writing piece into sector...
2020-03-16T12:25:35.689+0800    INFO    lotus-bench      lotus-bench/main.go:189 Running replication...
2020-03-16T14:19:55.548+0800    INFO    lotus-bench      lotus-bench/main.go:208 Generating PoRep for sector
Filesystem              Size  Used Avail Use% Mounted on
devtmpfs                189G     0  189G   0% /dev
tmpfs                   189G     0  189G   0% /dev/shm
tmpfs                   189G  338M  188G   1% /run
tmpfs                   189G     0  189G   0% /sys/fs/cgroup
/dev/sda5               530G  219G  312G  42% /
/dev/nvme0n1p1          894G  385G  510G  43% /ssd
/dev/sda3                24G   33M   24G   1% /home
/dev/sda2              1014M  340M  675M  34% /boot
/dev/sda1               200M   12M  189M   6% /boot/efi
tmpfs                    38G     0   38G   0% /run/user/0
/dev/mapper/disk10-5T   4.6T  131G  4.5T   3% /disk10-5T
Mon Mar 16 15:22:40 2020
+-----------------------------------------------------------------------------+
| NVIDIA-SMI 440.44       Driver Version: 440.44       CUDA Version: 10.2     |
|-------------------------------+----------------------+----------------------+
| GPU  Name        Persistence-M| Bus-Id        Disp.A | Volatile Uncorr. ECC |
| Fan  Temp  Perf  Pwr:Usage/Cap|         Memory-Usage | GPU-Util  Compute M. |
|===============================+======================+======================|
|   0  GeForce RTX 2080    Off  | 00000000:AF:00.0 Off |                  N/A |
| 51%   55C    P2   104W / 225W |   5306MiB /  7982MiB |    100%      Default |
+-------------------------------+----------------------+----------------------+

+-----------------------------------------------------------------------------+
| Processes:                                                       GPU Memory |
|  GPU       PID   Type   Process name                             Usage      |
|=============================================================================|
|    0     14790      C   ./bench                                    5295MiB  |
+-----------------------------------------------------------------------------+
```

<div align="center">显存使用情况，最大使用 5.2G 显存</div>

seal: addPiece: 11m17.737616777s (48.3 MiB/s)

seal: preCommit: 1h54m19.859452954s (4.78 MiB/s)

seal: commit: 1h59m22.905490794s (4.57 MiB/s)

seal: verify: 88.932465ms

unseal: 26m48.365103969s   (20.4 MiB/s)

generate candidates: 91.235838ms (351 GiB/s)

compute epost proof (cold): 16.605423971s

compute epost proof (hot): 9.982621541s

verify epost proof (cold): 55.187539ms

verify epost proof (hot): 9.206301ms

```
2020-03-16T12:14:17.951+0800    INFO    build    go-paramfetch@v0.0.1/paramfetch.go:127  Parameter file /disk1
2020-03-16T12:14:17.951+0800    INFO    lotus-bench    lotus-bench/main.go:173 Writing piece into sector...
2020-03-16T12:25:35.689+0800    INFO    lotus-bench    lotus-bench/main.go:189 Running replication...
2020-03-16T14:19:55.548+0800    INFO    lotus-bench    lotus-bench/main.go:208 Generating PoRep for sector
2020-03-16T16:19:18.543+0800    INFO    lotus-bench    lotus-bench/main.go:227 Unsealing sector
Filesystem            Size  Used Avail Use% Mounted on
devtmpfs              189G     0  189G   0% /dev
tmpfs                 189G     0  189G   0% /dev/shm
tmpfs                 189G  338M  188G   1% /run
tmpfs                 189G     0  189G   0% /sys/fs/cgroup
/dev/sda5             530G  219G  312G  42% /
/dev/nvme0n1p1        894G  131G  764G  15% /ssd
/dev/sda3              24G   33M   24G   1% /home
/dev/sda2            1014M  340M  675M  34% /boot
/dev/sda1             200M   12M  189M   6% /boot/efi
tmpfs                  38G     0   38G   0% /run/user/0
/dev/mapper/disk10-5T 4.6T  132G  4.5T   3% /disk10-5T
Mon Mar 16 16:42:18 2020
+-----------------------------------------------------------------------------+
| NVIDIA-SMI 440.44       Driver Version: 440.44       CUDA Version: 10.2      |
|-------------------------------+----------------------+----------------------+
| GPU  Name        Persistence-M| Bus-Id        Disp.A | Volatile Uncorr. ECC |
| Fan  Temp  Perf  Pwr:Usage/Cap|         Memory-Usage | GPU-Util  Compute M. |
|===============================+======================+======================|
|   0  GeForce RTX 2080    Off  | 00000000:AF:00.0 Off |                  N/A |
| 33%   45C    P0    45W / 225W |     11MiB /  7982MiB |      0%      Default |
+-------------------------------+----------------------+----------------------+

+-----------------------------------------------------------------------------+
| Processes:                                                       GPU Memory |
|  GPU       PID   Type   Process name                             Usage      |
|=============================================================================|
|  No running processes found                                                 |
+-----------------------------------------------------------------------------+
[3]-  Done                    tail bench.log
[4]+  Done                    df -h
[root@xa_node01 allytest]# tail bench.log & df -h & nvidia-smi
[3] 9468
[4] 9469
seal: addPiece: 11m17.737616777s (48.3 MiB/s)
seal: preCommit: 1h54m19.859452954s (4.78 MiB/s)
seal: commit: 1h59m22.905490794s (4.57 MiB/s)
seal: verify: 88.932465ms
unseal: 26m48.365103969s  (20.4 MiB/s)
generate candidates: 91.235838ms (351 GiB/s)
compute epost proof (cold): 16.605423971s
compute epost proof (hot): 9.982621541s
verify epost proof (cold): 55.187539ms
verify epost proof (hot): 9.206301ms
```

killall -9 bench

nohup ./bench --sector-size=32GiB --storage-dir="/disk10-5T/.lotus-bench" >> bench.log 2>&1 &

tail bench.log & df -h & nvidia-smi

seal: addPiece: 10m55.235134461s (50 MiB/s)

seal: preCommit: 2h52m46.839114235s (3.16 MiB/s)

seal: commit: 2h2m42.89170731s (4.45 MiB/s)

seal: verify: 88.801691ms

unseal: 26m50.807561135s   (20.3 MiB/s)

generate candidates: 71.28306ms (449 GiB/s)

compute epost proof (cold): 18.960658292s

compute epost proof (hot): 9.939425199s

verify epost proof (cold): 66.65752ms

verify epost proof (hot): 9.411195ms

```
2020-03-16T17:09:24.808+0800    INFO    lotus-bench    lotus-bench/main.go:173 Writing piece into sector...
2020-03-16T17:20:20.043+0800    INFO    lotus-bench    lotus-bench/main.go:189 Running replication...
2020-03-16T20:13:06.882+0800    INFO    lotus-bench    lotus-bench/main.go:208 Generating PoRep for sector
2020-03-16T22:15:49.862+0800    INFO    lotus-bench    lotus-bench/main.go:227 Unsealing sector
2020-03-16T22:42:40.670+0800    INFO    lotus-bench    lotus-bench/main.go:281 generating election post candidates
2020-03-16T22:42:40.741+0800    INFO    lotus-bench    lotus-bench/main.go:290 computing election post snark (cold)
2020-03-16T22:42:59.702+0800    INFO    lotus-bench    lotus-bench/main.go:298 computing election post snark (hot)
results (34359738368)
seal: addPiece: 10m55.235134461s (50 MiB/s)
seal: preCommit: 2h52m46.839114235s (3.16 MiB/s)
seal: commit: 2h2m42.89170731s (4.45 MiB/s)
seal: verify: 88.801691ms
unseal: 26m50.807561135s  (20.3 MiB/s)
generate candidates: 71.28306ms (449 GiB/s)
compute epost proof (cold): 18.960658292s
compute epost proof (hot): 9.939425199s
verify epost proof (cold): 66.65752ms
verify epost proof (hot): 9.411195ms
```

killall -9 bench

nohup ./bench --sector-size=32GiB --no-gpu --storage-dir="/ssd/.lotus-bench" >> bench.log 2>&1 &

tail bench.log & df -h & nvidia-smi

seal: addPiece: 10m45.286670295s (50.8 MiB/s)

seal: preCommit: 1h54m3.893720506s (4.79 MiB/s)

seal: commit: 1h53m55.904790699s (4.79 MiB/s)

seal: verify: 89.700704ms

unseal: 26m20.869032472s   (20.7 MiB/s)

generate candidates: 62.761695ms (510 GiB/s)

compute epost proof (cold): 17.494694283s

compute epost proof (hot): 11.316508328s

verify epost proof (cold): 37.173554ms

verify epost proof (hot): 9.327302ms


```
2020-03-16T22:55:13.685+0800    INFO    lotus-bench    lotus-bench/main.go:173 Writing piece into sector...
2020-03-16T23:05:58.972+0800    INFO    lotus-bench    lotus-bench/main.go:189 Running replication...
2020-03-17T01:00:02.866+0800    INFO    lotus-bench    lotus-bench/main.go:208 Generating PoRep for sector
2020-03-17T02:53:58.860+0800    INFO    lotus-bench    lotus-bench/main.go:227 Unsealing sector
2020-03-17T03:20:19.729+0800    INFO    lotus-bench    lotus-bench/main.go:281 generating election post candidates
2020-03-17T03:20:19.792+0800    INFO    lotus-bench    lotus-bench/main.go:290 computing election post snark (cold)
2020-03-17T03:20:37.286+0800    INFO    lotus-bench    lotus-bench/main.go:298 computing election post snark (hot)
results (34359738368)
seal: addPiece: 10m45.286670295s (50.8 MiB/s)
seal: preCommit: 1h54m3.893720506s (4.79 MiB/s)
seal: commit: 1h53m55.904790699s (4.79 MiB/s)
seal: verify: 89.700704ms
unseal: 26m20.869032472s  (20.7 MiB/s)
generate candidates: 62.761695ms (510 GiB/s)
compute epost proof (cold): 17.494694283s
compute epost proof (hot): 11.316508328s
verify epost proof (cold): 37.173554ms
verify epost proof (hot): 9.327302ms
```

为了防止测试数据不准确，再测试一次--no-gpu 的情况


```
2020-03-17T08:33:47.502+0800    INFO    build    go-paramfetch@v0.0.1/paramfetch.go:127  Parameter file /disk10-5T/filecoin-proof-p
2020-03-17T08:34:46.901+0800    INFO    build    go-paramfetch@v0.0.1/paramfetch.go:127  Parameter file /disk10-5T/filecoin-proof-p
2020-03-17T08:34:46.901+0800    INFO    lotus-bench    lotus-bench/main.go:173 Writing piece into sector...
2020-03-17T08:45:33.487+0800    INFO    lotus-bench    lotus-bench/main.go:189 Running replication...
2020-03-17T10:39:44.910+0800    INFO    lotus-bench    lotus-bench/main.go:208 Generating PoRep for sector
2020-03-17T12:33:33.661+0800    INFO    lotus-bench    lotus-bench/main.go:227 Unsealing sector
2020-03-17T13:00:12.447+0800    INFO    lotus-bench    lotus-bench/main.go:281 generating election post candidates
2020-03-17T13:00:12.500+0800    INFO    lotus-bench    lotus-bench/main.go:290 computing election post snark (cold)
2020-03-17T13:00:31.011+0800    INFO    lotus-bench    lotus-bench/main.go:298 computing election post snark (hot)
results (34359738368)
seal: addPiece: 10m46.586066401s (50.7 MiB/s)
seal: preCommit: 1h54m11.42296219s (4.78 MiB/s)
seal: commit: 1h53m48.661550157s (4.8 MiB/s)
seal: verify: 88.988652ms
unseal: 26m38.786061918s  (20.5 MiB/s)
generate candidates: 53.480164ms (598 GiB/s)
compute epost proof (cold): 18.511039639s
compute epost proof (hot): 11.56964034s
verify epost proof (cold): 46.17551ms
verify epost proof (hot): 10.14509ms
[root@xa_node01 allytest]#
```

结论：

使用 SSD 作为 cache，打包效率比较理想（使用共享存储耗时 5h21m，使用 SSD 耗时 4h20m，节省 1h）

不使用 GPU，打包效率没有损失，反而还有小幅提高（使用 GPU 耗时 4h20m，不使用 GPU 耗时 4h14m，减少 6 分钟）

另一台机器上的测试数据 重庆_node5

显卡配置：GeForce1060(6G Cache）GPU（可能没有安装显卡驱动）

磁盘 IO 速度：

dd if=/dev/zero of=/bench.dat bs=100M count=1024

dd if=/bench.dat of=/dev/null bs=100M count=1024

rm -f /bench.dat

dd if=/dev/zero of=/cq_data/bench.dat bs=100M count=1024

dd if=/cq_data/bench.dat of=/dev/null bs=100M count=1024

rm -f /cq_data/bench.dat

dd if=/dev/zero of=/dev/shm/bench.dat bs=100M count=1024

dd if=/dev/shm/bench.dat of=/dev/null bs=100M count=1024

rm -f /dev/shm/bench.dat

```
bash: 脸室18速众(?)区??: command not found
[root@node05 ~]# dd if=/dev/zero of=/bench.dat bs=100M count=1024
1024+0 records in
1024+0 records out
107374182400 bytes (107 GB) copied, 214.847 s, 500 MB/s
[root@node05 ~]# dd if=/bench.dat of=/dev/null bs=100M count=1024
1024+0 records in
1024+0 records out
107374182400 bytes (107 GB) copied, 27.1952 s, 3.9 GB/s
[root@node05 ~]# rm -f /bench.dat
[root@node05 ~]#
[root@node05 ~]# dd if=/dev/zero of=/cq_data/bench.dat bs=100M count=1024
1024+0 records in
1024+0 records out
107374182400 bytes (107 GB) copied, 115.565 s, 929 MB/s
[root@node05 ~]# dd if=/cq_data/bench.dat of=/dev/null bs=100M count=1024
1024+0 records in
1024+0 records out
107374182400 bytes (107 GB) copied, 25.941 s, 4.1 GB/s
[root@node05 ~]# rm -f /cq_data/bench.dat
[root@node05 ~]#
[root@node05 ~]# dd if=/dev/zero of=/dev/shm/bench.dat bs=100M count=1024
1024+0 records in
1024+0 records out
107374182400 bytes (107 GB) copied, 55.5004 s, 1.9 GB/s
[root@node05 ~]# dd if=/dev/shm/bench.dat of=/dev/null bs=100M count=1024
1024+0 records in
1024+0 records out
107374182400 bytes (107 GB) copied, 34.2627 s, 3.1 GB/s
[root@node05 ~]# rm -f /dev/shm/bench.dat
[root@node05 ~]#
```

```
[root@node05 lotus]# ./bench --v
2020-03-17T22:22:14.963+0800    INFO    lotus-bench    lotus-bench/main.go:57  Starting lotus-bench
lotus-bench version 0.2.8
[root@node05 lotus]#
```

nohup ./bench --sector-size=32GiB --no-gpu --storage-dir="/cq_data/.lotus-bench" >> bench2.log 2>&1 &

tail bench2.log & df -h

```
top - 22:45:26 up 3 days, 4:53,  2 users,  load average: 57.69, 43.52, 41.72
Tasks: 721 total,   1 running, 346 sleeping,   0 stopped,   0 zombie
%Cpu(s): 99.7 us,  0.3 sy,  0.0 ni,  0.0 id,  0.0 wa,  0.0 hi,  0.0 si,  0.0 st
KiB Mem : 39446387+total, 12656868+free, 10532144+used, 16257376+buff/cache
KiB Swap:  4194300 total,  4154352 free,    39948 used. 23916915+avail Mem

  PID USER      PR  NI    VIRT    RES    SHR S  %CPU %MEM     TIME+ COMMAND
19898 root      20   0  124.4g  95.7g  16568 S  6371 25.4  20869:46 bench
12129 root      20   0   78.9g   6.6g   2.9g S   1.3  1.8 817:21.00 lotus
22036 root      20   0  162692   5160   3784 R   1.0  0.0   0:00.28 top
    1 root      20   0  191452   5476   3592 S   0.0  0.0   1:44.67 systemd
    2 root      20   0       0      0      0 S   0.0  0.0   0:01.32 kthreadd
    4 root       0 -20       0      0      0 I   0.0  0.0   0:00.00 kworker/0:0H
    5 root      20   0       0      0      0 I   0.0  0.0   0:01.94 kworker/u128:0
    7 root       0 -20       0      0      0 I   0.0  0.0   0:00.00 mm_percpu_wq
    8 root      20   0       0      0      0 S   0.0  0.0   2:00.17 ksoftirqd/0
```

seal: addPiece: 10m32.376551621s (51.8 MiB/s)

seal: preCommit: 4h3m17.79502858s (2.24 MiB/s)

seal: commit: 2h37m31.242213151s (3.47 MiB/s)

seal: verify: 89.573028ms

unseal: 44m24.861147046s   (12.3 MiB/s)

generate candidates: 48.867599ms (655 GiB/s)

compute epost proof (cold): 21.267067178s

compute epost proof (hot): 16.023777969s

verify epost proof (cold): 26.793438ms

verify epost proof (hot): 9.403124ms

```
2020-03-17T15:51:45.088+0800    INFO    lotus-bench    lotus-bench/main.go:173 Writing piece into sector...
2020-03-17T16:02:17.465+0800    INFO    lotus-bench    lotus-bench/main.go:189 Running replication...
2020-03-17T20:05:35.260+0800    INFO    lotus-bench    lotus-bench/main.go:208 Generating PoRep for sector
2020-03-17T22:43:06.591+0800    INFO    lotus-bench    lotus-bench/main.go:227 Unsealing sector
2020-03-17T23:27:31.453+0800    INFO    lotus-bench    lotus-bench/main.go:281 generating election post candidates
2020-03-17T23:27:31.501+0800    INFO    lotus-bench    lotus-bench/main.go:290 computing election post snark (cold)
2020-03-17T23:27:52.769+0800    INFO    lotus-bench    lotus-bench/main.go:298 computing election post snark (hot)
results (34359738368)
seal: addPiece: 10m32.376551621s (51.8 MiB/s)
seal: preCommit: 4h3m17.79502858s (2.24 MiB/s)
seal: commit: 2h37m31.242213151s (3.47 MiB/s)
seal: verify: 89.573028ms
unseal: 44m24.861147046s  (12.3 MiB/s)
generate candidates: 48.867599ms (655 GiB/s)
compute epost proof (cold): 21.267067178s
compute epost proof (hot): 16.023777969s
verify epost proof (cold): 26.793438ms
verify epost proof (hot): 9.403124ms
```

nohup ./bench --sector-size=32GiB --storage-dir="/cq_data/.lotus-bench" >> bench2.log 2>&1 &

tail bench2.log & df -h

seal: addPiece: 11m19.526381179s (48.2 MiB/s)

seal: preCommit: 4h3m18.346180555s (2.24 MiB/s)

seal: commit: 2h37m10.486566193s (3.47 MiB/s)

seal: verify: 88.626853ms

unseal: 44m22.822873532s   (12.3 MiB/s)

generate candidates: 21.969137ms (1.42 TiB/s)

compute epost proof (cold): 16.76087281s

compute epost proof (hot): 11.22086881s

verify epost proof (cold): 24.44339ms

verify epost proof (hot): 9.179343ms

```
2020-03-18T00:25:56.604+0800    INFO    lotus-bench    lotus-bench/main.go:173 Writing piece into sector...
2020-03-18T00:37:16.131+0800    INFO    lotus-bench    lotus-bench/main.go:189 Running replication...
2020-03-18T04:40:34.477+0800    INFO    lotus-bench    lotus-bench/main.go:208 Generating PoRep for sector
2020-03-18T07:17:45.052+0800    INFO    lotus-bench    lotus-bench/main.go:227 Unsealing sector
2020-03-18T08:02:07.875+0800    INFO    lotus-bench    lotus-bench/main.go:281 generating election post candidates
2020-03-18T08:02:07.897+0800    INFO    lotus-bench    lotus-bench/main.go:290 computing election post snark (cold)
2020-03-18T08:02:24.658+0800    INFO    lotus-bench    lotus-bench/main.go:298 computing election post snark (hot)
results (34359738368)
seal: addPiece: 11m19.526381179s (48.2 MiB/s)
seal: preCommit: 4h3m18.346180555s (2.24 MiB/s)
seal: commit: 2h37m10.486566193s (3.47 MiB/s)
seal: verify: 88.626853ms
unseal: 44m22.822873532s  (12.3 MiB/s)
generate candidates: 21.969137ms (1.42 TiB/s)
compute epost proof (cold): 16.76087281s
compute epost proof (hot): 11.22086881s
verify epost proof (cold): 24.44339ms
verify epost proof (hot): 9.179343ms
```