目前官方的窗口调度 Scheduler 常常工作失灵，有的 worker 工作繁忙，有的 worker 则非常轻闲。个人认为 filecoin 运维人员最为熟悉自己的设备，所以重新编写了一套调度程序，废弃官方窗口调度和纯基于设备资源排序的规则，重新自定义排序规则，**总体调度目标是让相关的任务平均分配到各个可以执行的 worker 上面**。

(一) myScheduler 调度参数说明

1. lotus-worker run 参数设置【主要】

--precommit1max value set maximum precommit1 quantity (default: 7)

①用于控制调度 Worker 允许工作的最大 P1 数量，默认值 7。

--precommit1holdmax value set maximum precommit1 hold quantity (default: 25)

②用于控制 Worker 本地允许容纳的最大 P1 数量（包括正在工作的 P1 和已经完成尚未 GET 走的，但当前并未判断 fetching 临时子目录所占据的空间），默认值 25，防止 P1 过快导致磁盘爆满。**如果该值设置为 0，则自动忽略此参数的作用**。

--precommit2max value set maximum precommit2 quantity (default: 1)

③用于控制 Worker 允许工作的最大 P2 数量，默认值 1，调度支持并行多个 P2。

--commit2max value set maximum commit2 quantity (default: 1)

④用于控制 Worker 允许工作的最大 C2 数量，默认值 1，调度支持并行多个 C2，当只有单个 GPU 时，多个 C2 会交叉使用 GPU 资源。

--forcep2fromlocalp1 enable force precommit2 for local precommit1 (default: false)

⑤用于控制 Worker 工作 P2 仅仅接收本地的 P1（即绑定 P1/P2），用于避免 P1 近 500GB 的跨存储复制，默认值 false。请注意如果所有的 worker 都将此参数设置为 true，则都仅仅工作自己本地的 P1。如果某个 worker 的参数 --forcep2fromlocalp1 值为 false，则他可以获取来自各方的 P1，包括那些此参数设置为 true 机器上的 P1 来进行下一阶段的 P2 工作。

2. lotus-miner 参数 config.toml 设置【次要】

[Storage]

AllowMyScheduler= true

① 默认启用放弃官方标准窗口调度，启用自定义 myScheduler 调度程序。如果设置为 false，则**支持无缝切换回到官方标准窗口调度**。

PreCommit1Max= 7

② Worker 允许工作的最大 P1 数量，默认值 7。myScheduler 可以兼容调度 lotus-worker 仍然跑的是官方标准程序时，， 并且默认是该 worker 的最大 P1 数量。

PreCommit1HoldMax= 25

③ Worker 本地允许容纳的最大 P1 数量（包括正在工作的 P1 和已经完成但尚未 GET 走的，但当前并未判断 fetching 临时子目录所占据的空间），默认值 25，防止 P1 过快导致磁盘爆满。

3. 确认当前调度参数值

```
xl@epyc7302-161:~/lotus.xy.0.8.3$ lotus-worker run -h
NAME:
   lotus-worker run - Start lotus worker

USAGE:
   lotus-worker run [command options] [arguments...]

OPTIONS:
   --listen value                host address and port the worker api will listen on (default: "0.0.0.0:3456")
   --no-local-storage            don't use storageminer repo for sector storage (default: false)
   --addpiece                    enable addpiece (default: true)
   --precommit1                  enable precommit1 (32G sectors: 1 core, 128GiB Memory) (default: true)
   --unseal                      enable unsealing (32G sectors: 1 core, 128GiB Memory) (default: true)
   --precommit2                  enable precommit2 (32G sectors: all cores, 96GiB Memory) (default: true)
   --commit                      enable commit (32G sectors: all cores or GPUs, 128GiB Memory + 64GiB swap) (default: true)
   --parallel-fetch-limit value  maximum fetch operations to run in parallel (default: 5)
   --timeout value               used when 'listen' is unspecified. must be a valid duration recognized by golang's time.Par
   --precommit1max value         set maximum precommit1 quantity (default: 13)
   --precommit1holdmax value     set maximum precommit1 hold quantity (default: 25)
   --precommit2max value         set maximum precommit2 quantity (default: 1)
   --commit2max value            set maximum commit2 quantity (default: 1)
   --forcep2fromlocalp1          enable force precommit2 for local precommit1 (default: true)
   --help, -h                    show help (default: false)
```

```
psdz@lotus-2080ti:~$ lotus-miner sealing workers
Worker 0, host lotus-2080ti
        CPU:  [                                                       ] 0 core(s) in use
        RAM:  [|                                                      ] 2% 5.741 GiB/251.8 GiB
        VMEM: [                                                       ] 0% 5.741 GiB/717.5 GiB
        Types: [ precommit/1,precommit/2,commit/2,unseal,commit/1,finalize,fetch,unsealread,addpiece, ]
        PreCommit1Max: 7 PreCommit1HoldMax: 25 PreCommit2Max: 0 Commit2Max: 0 ForceP2FromLocalP1: false
```

4. 调度明细日志排查

由于调度的频繁度，导致在运行过程中，容易产生非常大的日志量，可以通过下面的方式轻松查询相关成功分配和未分配的调度情况列表：

① more miner.log |grep trySchedMine > trySchedMine.txt

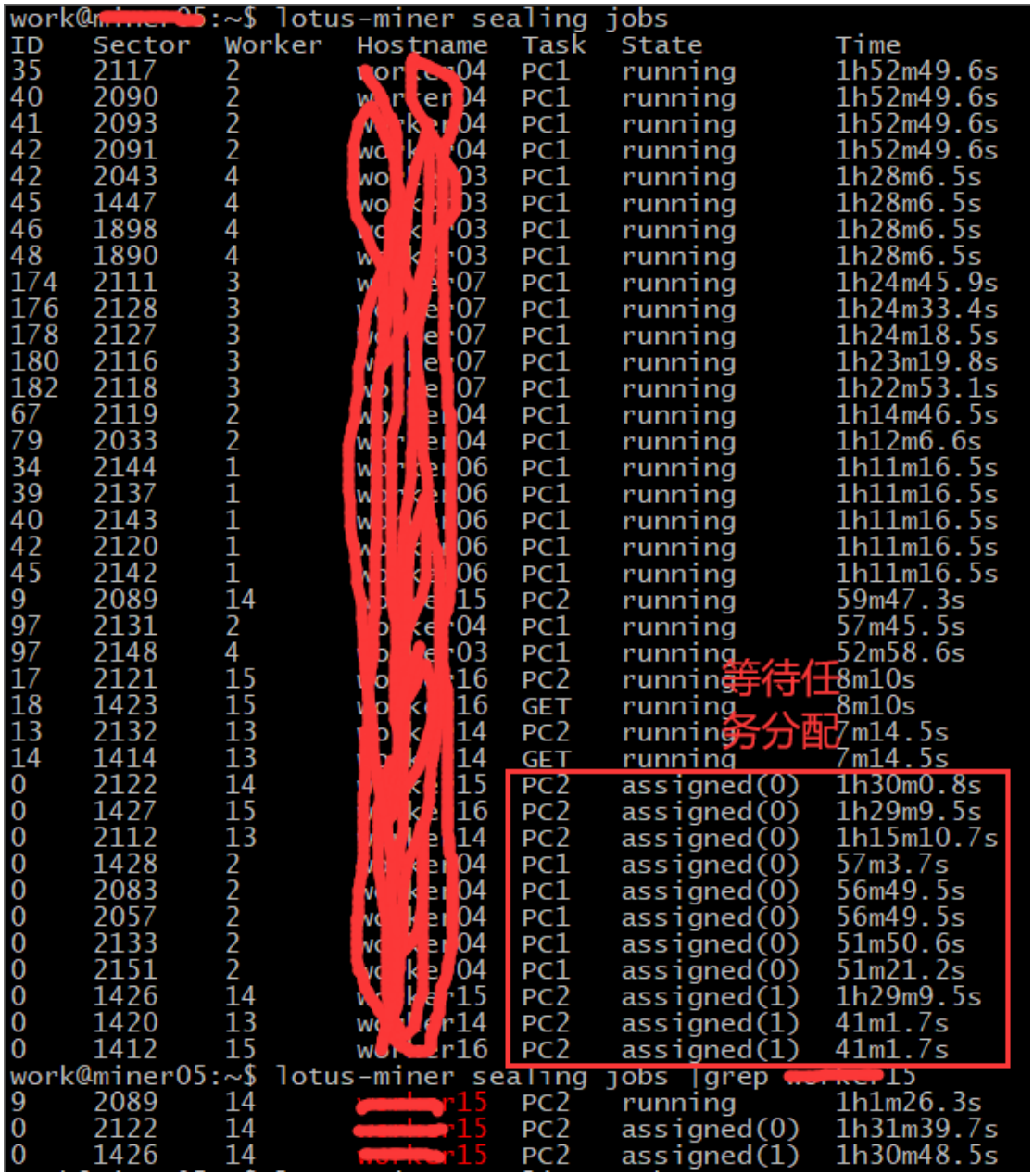
这个里面记录了，所有成功调度的 has sucessfully scheduled 相关信息。

② more miner.log |grep "not scheduling" > not_scheduling.txt 则是拒绝接收任务分配的 worker 的日志。

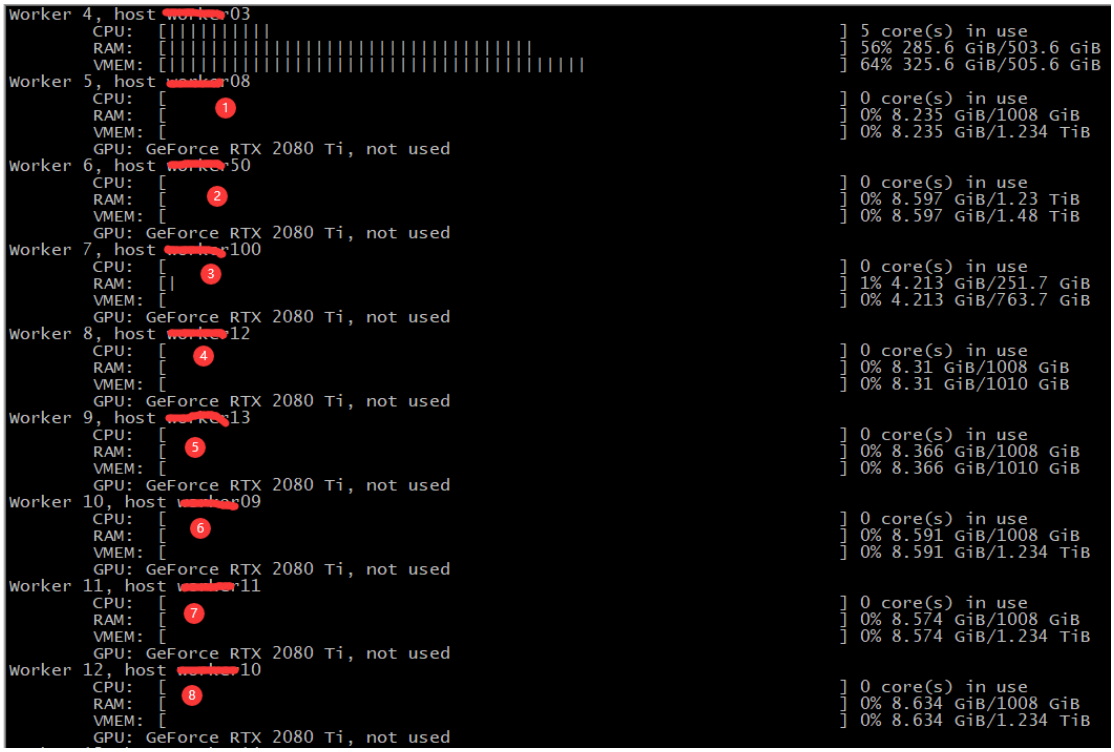
(二) 32GB 实测环境之一

1. 使用官方标准调度的工作情况

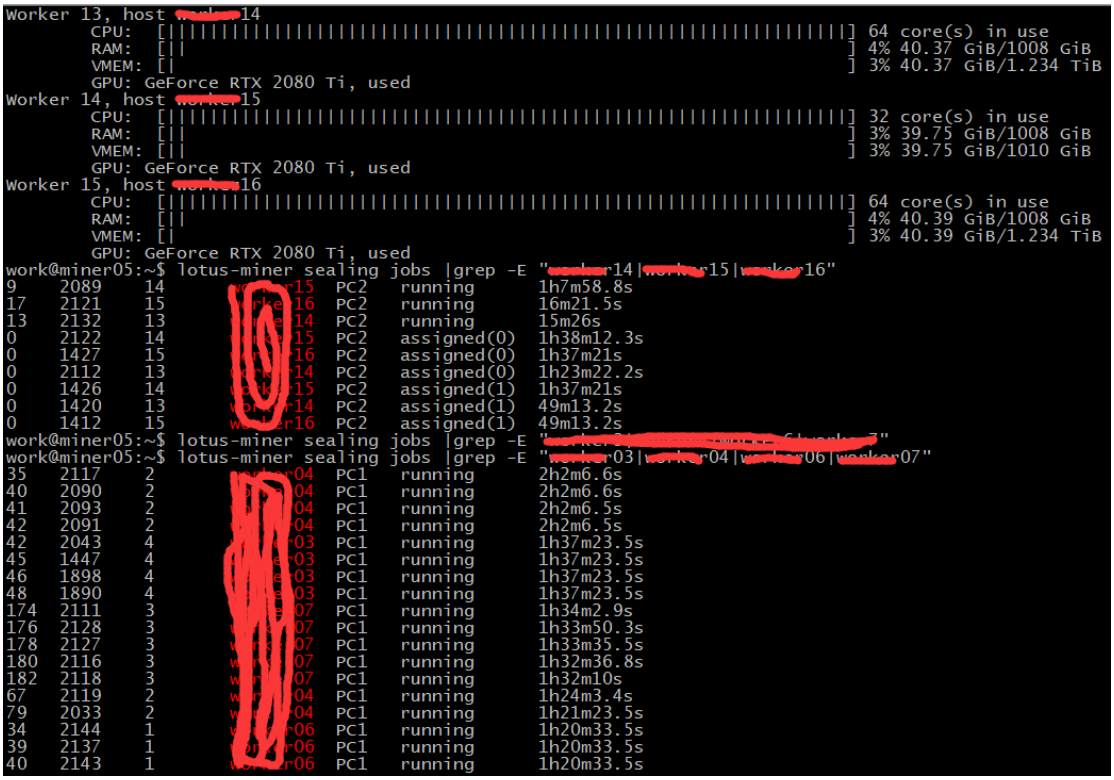
从 lotus-miner sealing jobs 可以看到，共有 11 号工作 assigned 等待分配中，例如第 15 号 worker 节点，当前有一个 P2 任务正在执行中，尚有两个 P2 任务在它后面 assigned 等待中……，是不是我们的 worker 设备不充足呢？



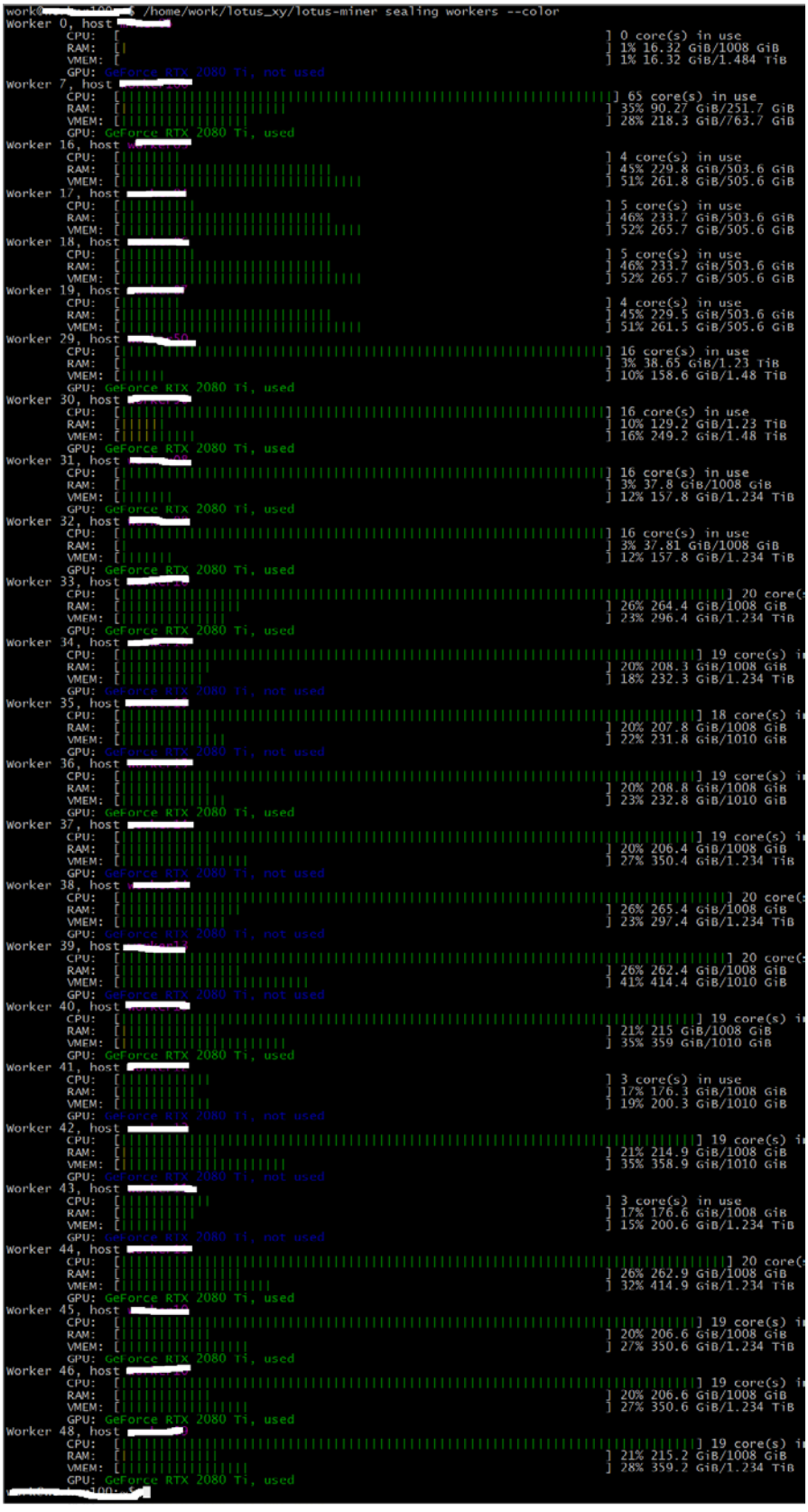
可是通过 lotus-miner sealing workers，我们发现 08， 50， 100， 12， 13， 09， 11， 10 这 8 台 worker 设备是完全空置的！



真实在工作 P2 的只 14， 15， 16 三台，工作 P1 的只有 03， 04， 06， 07 四台，15 台 worker 有 8 台完全闲置没有工作。

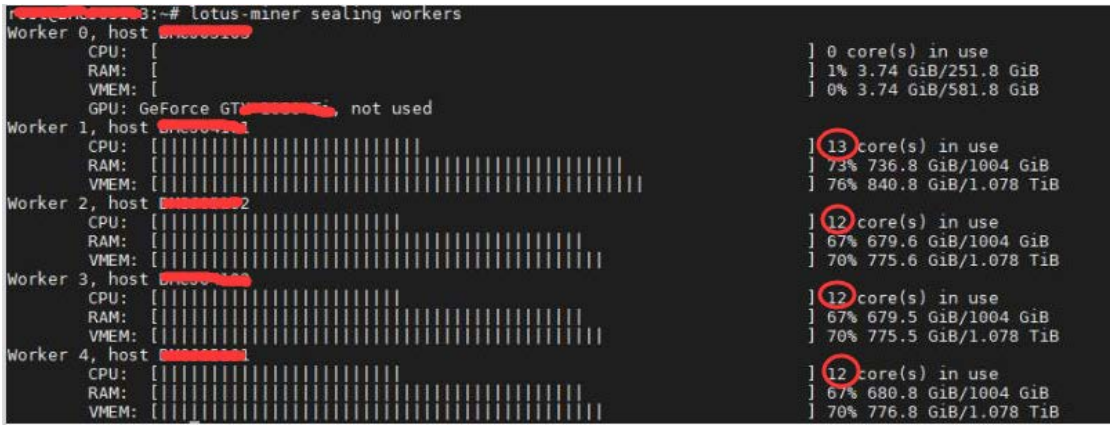


2. 使用 myScheduler 调度的工作情况

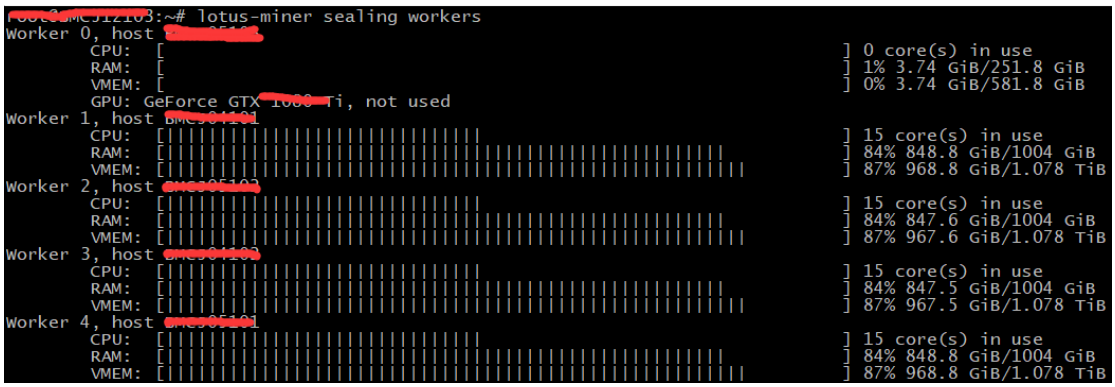


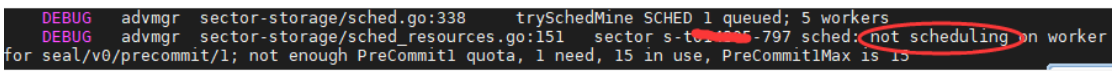
(三) 32GB 实测环境之二

1. 60 个工作任务下的 P1 压力逐渐派发情况



直到最终所有的 worker 达到 15 个参数设置的满配额度以后，任务无法再次下压：

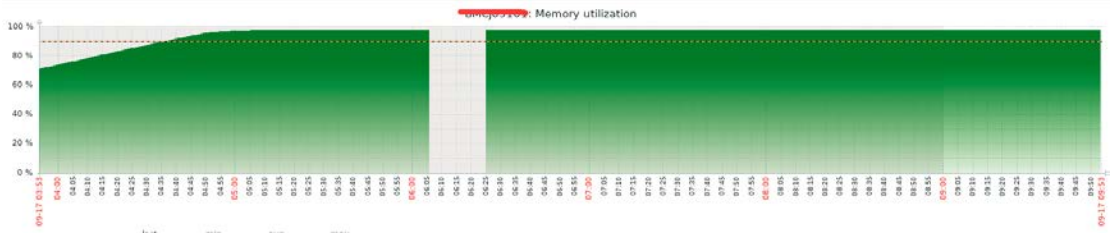


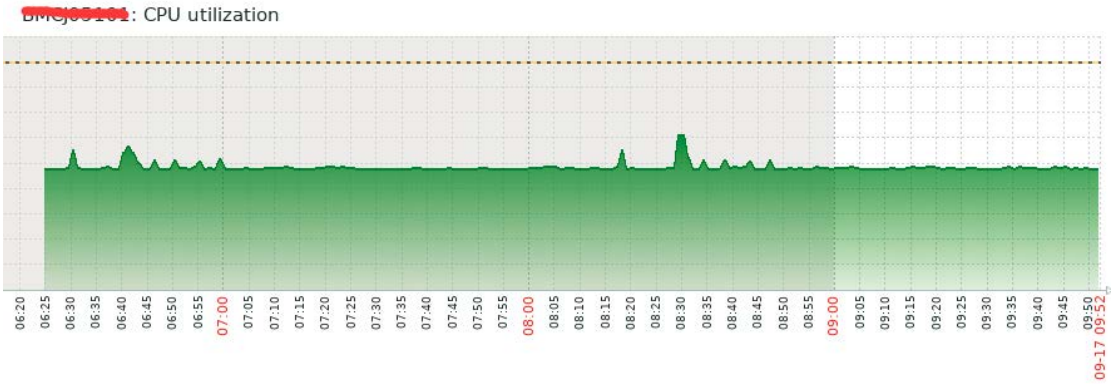


查看 lotus-miner sealing jobs，可以看到所有的 P1 工作任务完全匀称分摊到四个可以工作 P1 的 worker 上面：

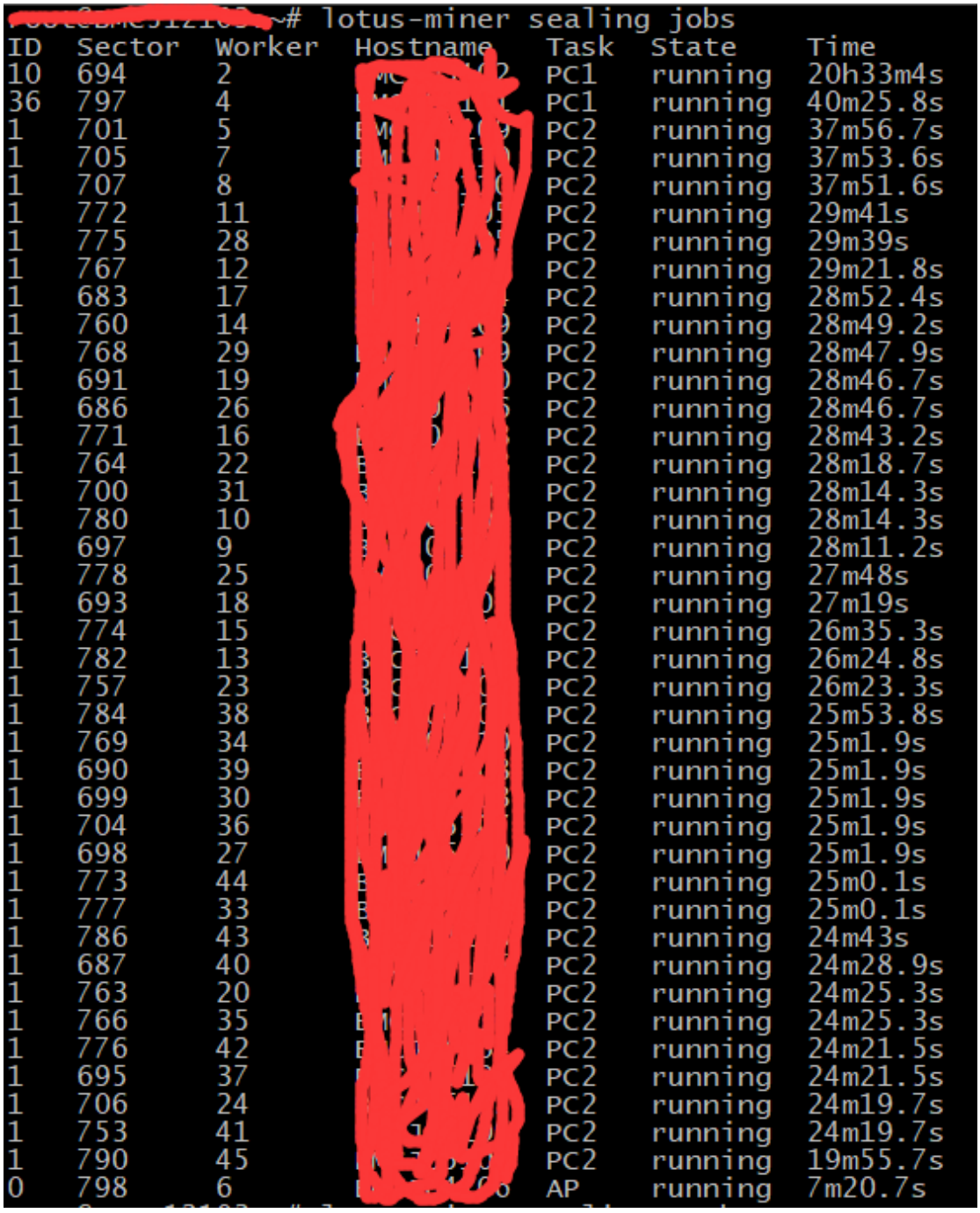
```
root@[redacted]:~# lotus-miner sealing jobs
ID  Sector  Worker  Hostname  Task  State    Time
10  689     1       [redacted]  PC1   running  7h25m22.3s
8   683     2       [redacted]  PC1   running  7h25m22.3s
8   686     4       [redacted]  PC1   running  7h25m22.3s
8   687     3       [redacted]  PC1   running  7h25m22.3s
11  690     1       [redacted]  PC1   running  7h25m22.3s
9   691     2       [redacted]  PC1   running  7h25m22.3s
9   692     3       [redacted]  PC1   running  7h25m22.3s
9   693     4       [redacted]  PC1   running  7h25m22.3s
10  694     2       [redacted]  PC1   running  7h25m22.3s
10  695     3       [redacted]  PC1   running  7h25m22.3s
10  697     4       [redacted]  PC1   running  7h25m22.3s
12  698     1       [redacted]  PC1   running  7h25m22.3s
13  699     1       [redacted]  PC1   running  7h25m22.3s
11  700     2       [redacted]  PC1   running  7h25m22.3s
11  701     3       [redacted]  PC1   running  7h25m22.3s
11  702     4       [redacted]  PC1   running  7h25m22.3s
14  704     1       [redacted]  PC1   running  7h25m22.3s
12  705     2       [redacted]  PC1   running  7h25m22.3s
12  706     3       [redacted]  PC1   running  7h25m22.3s
12  707     4       [redacted]  PC1   running  7h25m22.2s
13  708     3       [redacted]  PC1   running  7h25m22.2s
15  753     1       [redacted]  PC1   running  7h25m22.2s
13  757     2       [redacted]  PC1   running  7h25m22.2s
13  760     4       [redacted]  PC1   running  7h25m22.2s
16  761     1       [redacted]  PC1   running  7h25m22.2s
14  762     2       [redacted]  PC1   running  7h25m22.2s
14  763     3       [redacted]  PC1   running  7h25m22.2s
14  764     4       [redacted]  PC1   running  7h25m22.2s
17  765     1       [redacted]  PC1   running  7h25m22.2s
15  766     3       [redacted]  PC1   running  7h25m22.2s
15  767     4       [redacted]  PC1   running  7h25m22.2s
15  768     2       [redacted]  PC1   running  7h25m22.2s
18  769     1       [redacted]  PC1   running  7h25m22.2s
18  771     2       [redacted]  PC1   running  7h21m32.2s
17  770     3       [redacted]  PC1   running  7h21m32.2s
20  772     4       [redacted]  PC1   running  7h21m32.2s
```

设备的内存使用已完全满了，调度程序优化好了，机器设备的“恶梦”就来了：

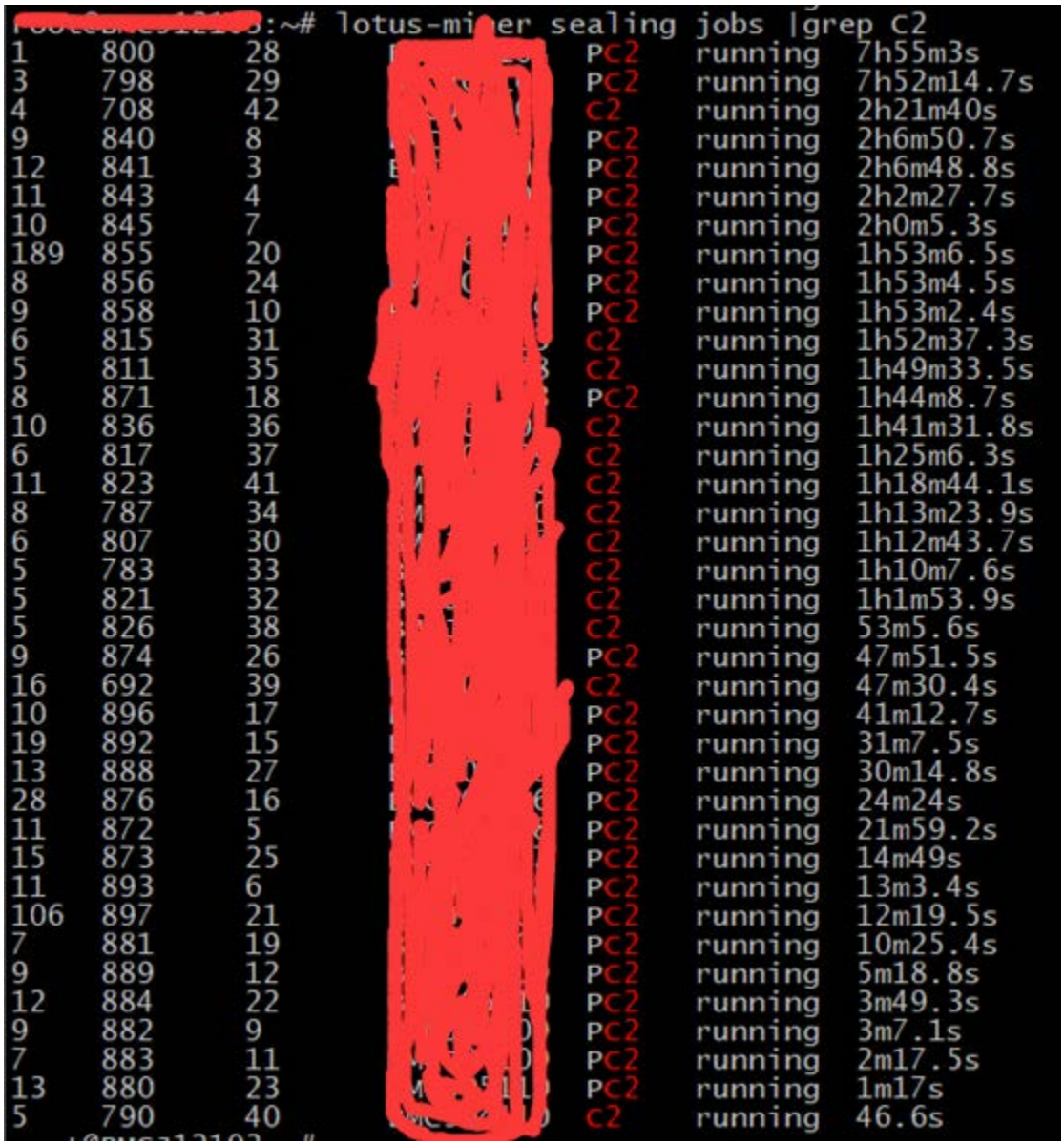




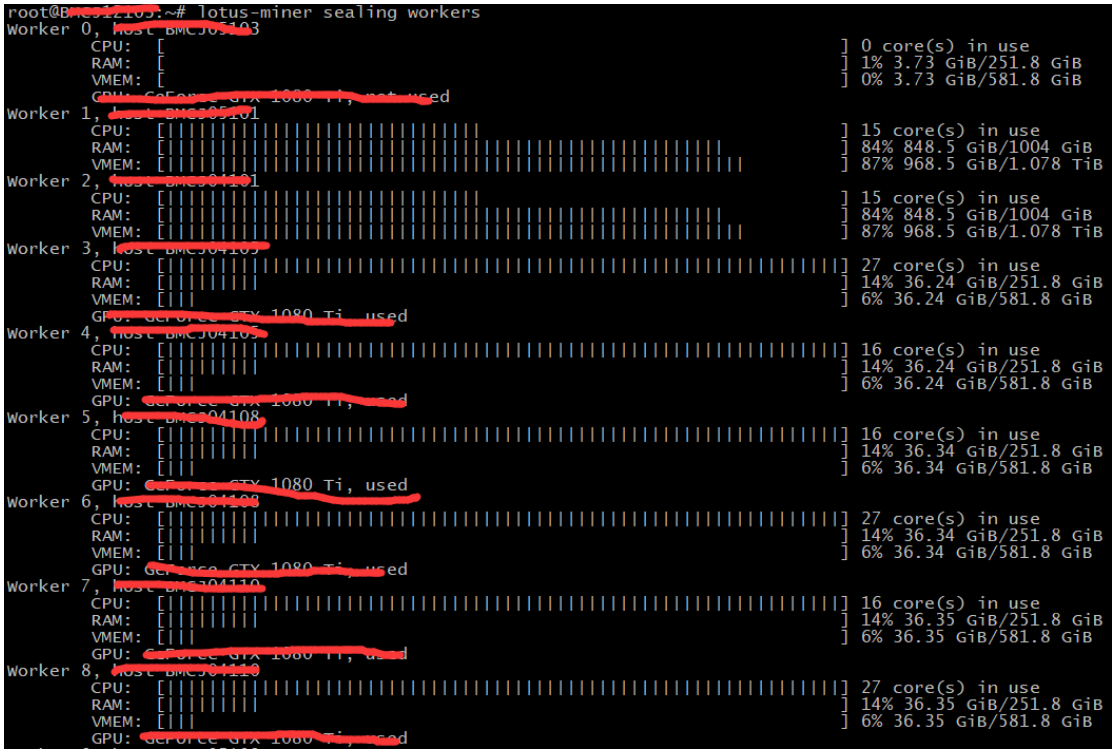
2. P2 /C2 工作派发情况

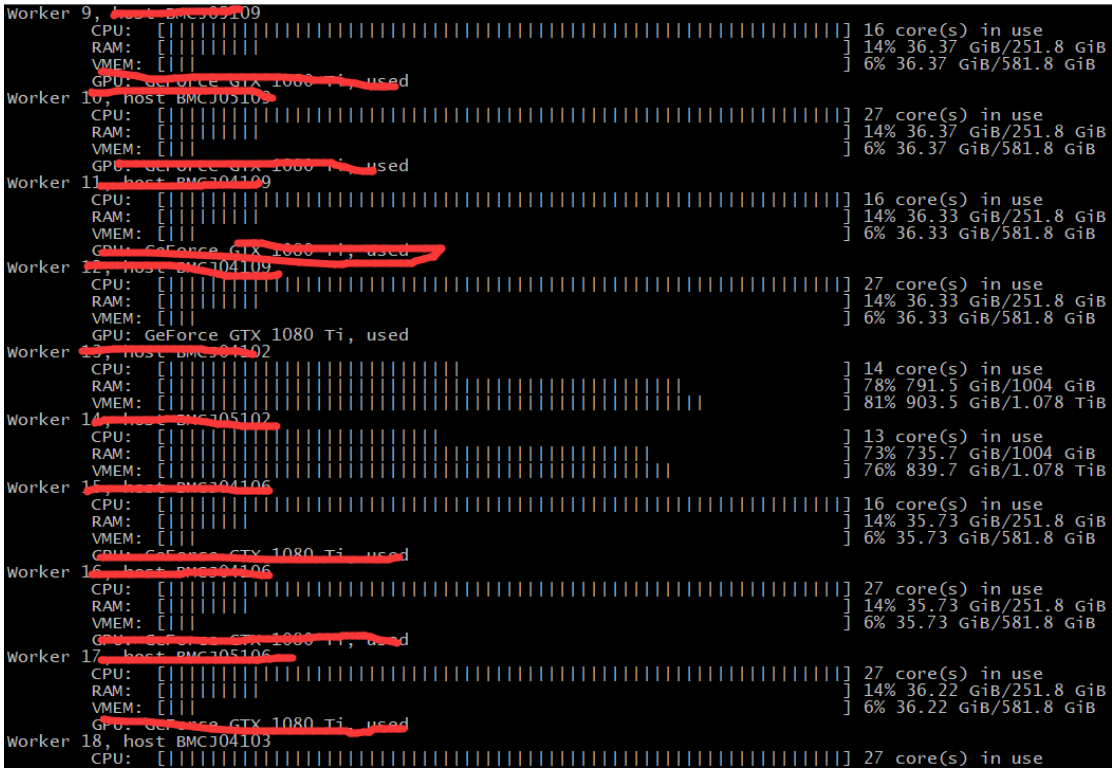


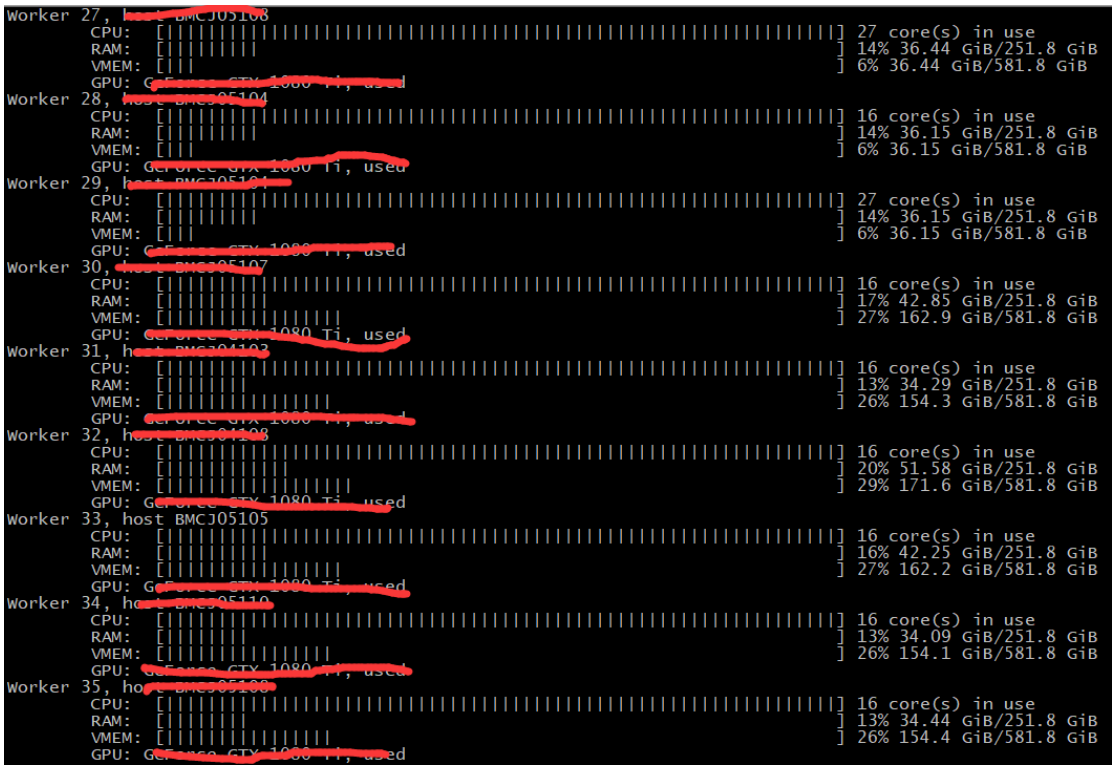
```
[redacted]# lotus-miner sealing jobs
ID  Sector  Worker  Hostname  Task  State    Time
10  694     2       [redacted]  PC1   running  20h33m4s
36  797     4       [redacted]  PC1   running  40m25.8s
1   701     5       [redacted]  PC2   running  37m56.7s
1   705     7       [redacted]  PC2   running  37m53.6s
1   707     8       [redacted]  PC2   running  37m51.6s
1   772     11      [redacted]  PC2   running  29m41s
1   775     28      [redacted]  PC2   running  29m39s
1   767     12      [redacted]  PC2   running  29m21.8s
1   683     17      [redacted]  PC2   running  28m52.4s
1   760     14      [redacted]  PC2   running  28m49.2s
1   768     29      [redacted]  PC2   running  28m47.9s
1   691     19      [redacted]  PC2   running  28m46.7s
1   686     26      [redacted]  PC2   running  28m46.7s
1   771     16      [redacted]  PC2   running  28m43.2s
1   764     22      [redacted]  PC2   running  28m18.7s
1   700     31      [redacted]  PC2   running  28m14.3s
1   780     10      [redacted]  PC2   running  28m14.3s
1   697     9       [redacted]  PC2   running  28m11.2s
1   778     25      [redacted]  PC2   running  27m48s
1   693     18      [redacted]  PC2   running  27m19s
1   774     15      [redacted]  PC2   running  26m35.3s
1   782     13      [redacted]  PC2   running  26m24.8s
1   757     23      [redacted]  PC2   running  26m23.3s
1   784     38      [redacted]  PC2   running  25m53.8s
1   769     34      [redacted]  PC2   running  25m1.9s
1   690     39      [redacted]  PC2   running  25m1.9s
1   699     30      [redacted]  PC2   running  25m1.9s
1   704     36      [redacted]  PC2   running  25m1.9s
1   698     27      [redacted]  PC2   running  25m1.9s
1   773     44      [redacted]  PC2   running  25m0.1s
1   777     33      [redacted]  PC2   running  25m0.1s
1   786     43      [redacted]  PC2   running  24m43s
1   687     40      [redacted]  PC2   running  24m28.9s
1   763     20      [redacted]  PC2   running  24m25.3s
1   766     35      [redacted]  PC2   running  24m25.3s
1   776     42      [redacted]  PC2   running  24m21.5s
1   695     37      [redacted]  PC2   running  24m21.5s
1   706     24      [redacted]  PC2   running  24m19.7s
1   753     41      [redacted]  PC2   running  24m19.7s
1   790     45      [redacted]  PC2   running  19m55.7s
0   798     6       [redacted]  AP    running  7m20.7s
```

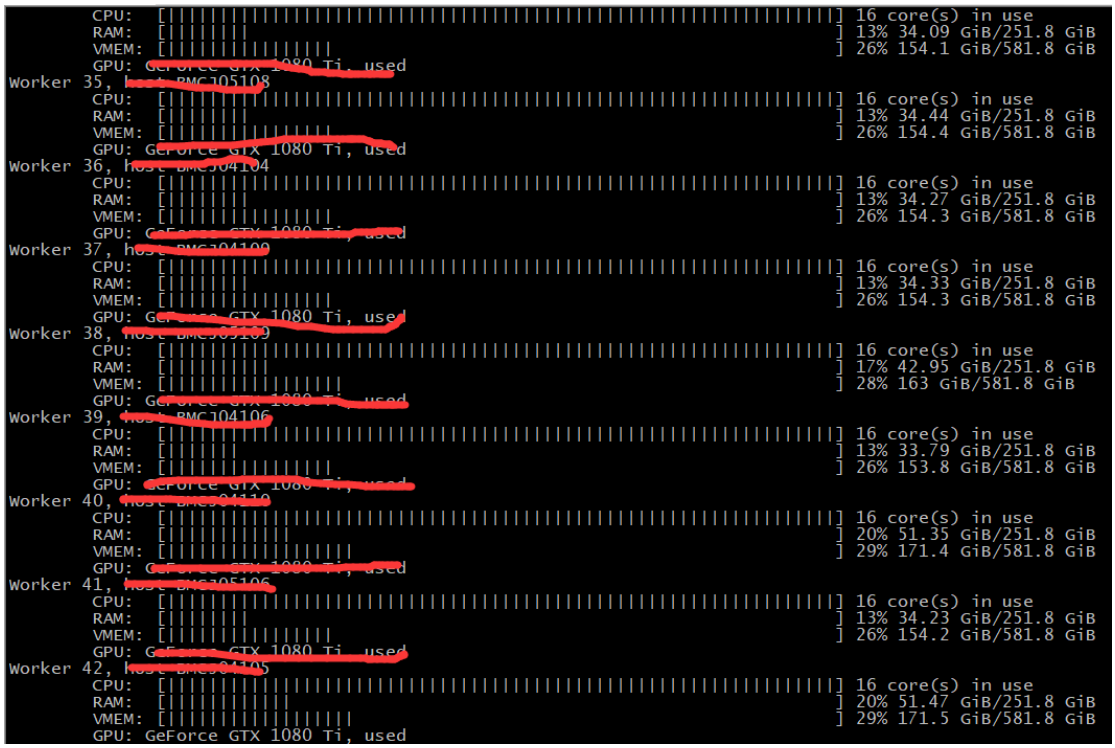


lotus-miner sealing workers 可以查到设备利用率近 100%


root@[redacted]:~# lotus-miner sealing workers
Worker 0, host BMCJ05103
CPU: [ ] 0 core(s) in use
RAM: [ ] 1% 3.73 GiB/251.8 GiB
VMEM: [ ] 0% 3.73 GiB/581.8 GiB
GPU: GeForce GTX 1080 Ti, not used
Worker 1, host [redacted]
CPU: [||||] 15 core(s) in use
RAM: [||||] 84% 848.5 GiB/1004 GiB
VMEM: [||||] 87% 968.5 GiB/1.078 TiB
Worker 2, host [redacted]
CPU: [||||] 15 core(s) in use
RAM: [||||] 84% 848.5 GiB/1004 GiB
VMEM: [||||] 87% 968.5 GiB/1.078 TiB
Worker 3, host [redacted]
CPU: [||||] 27 core(s) in use
RAM: [||] 14% 36.24 GiB/251.8 GiB
VMEM: [|] 6% 36.24 GiB/581.8 GiB
GPU: GeForce GTX 1080 Ti, used
Worker 4, host [redacted]
CPU: [||||] 16 core(s) in use
RAM: [||] 14% 36.24 GiB/251.8 GiB
VMEM: [|] 6% 36.24 GiB/581.8 GiB
GPU: GeForce GTX 1080 Ti, used
Worker 5, host [redacted]
CPU: [||||] 16 core(s) in use
RAM: [||] 14% 36.34 GiB/251.8 GiB
VMEM: [|] 6% 36.34 GiB/581.8 GiB
GPU: GeForce GTX 1080 Ti, used
Worker 6, host [redacted]
CPU: [||||] 27 core(s) in use
RAM: [||] 14% 36.34 GiB/251.8 GiB
VMEM: [|] 6% 36.34 GiB/581.8 GiB
GPU: GeForce GTX 1080 Ti, used
Worker 7, host [redacted]
CPU: [||||] 16 core(s) in use
RAM: [||] 14% 36.35 GiB/251.8 GiB
VMEM: [|] 6% 36.35 GiB/581.8 GiB
GPU: GeForce GTX 1080 Ti, used
Worker 8, host [redacted]
CPU: [||||] 27 core(s) in use
RAM: [||] 14% 36.35 GiB/251.8 GiB
VMEM: [|] 6% 36.35 GiB/581.8 GiB
GPU: GeForce GTX 1080 Ti, used


Worker 9, host [redacted]
CPU: [||||] 16 core(s) in use
RAM: [||] 14% 36.37 GiB/251.8 GiB
VMEM: [|] 6% 36.37 GiB/581.8 GiB
GPU: GeForce GTX 1080 Ti, used
Worker 10, host BMCJ05103
CPU: [||||] 27 core(s) in use
RAM: [||] 14% 36.37 GiB/251.8 GiB
VMEM: [|] 6% 36.37 GiB/581.8 GiB
GPU: GeForce GTX 1080 Ti, used
Worker 11, host [redacted]
CPU: [||||] 16 core(s) in use
RAM: [||] 14% 36.33 GiB/251.8 GiB
VMEM: [|] 6% 36.33 GiB/581.8 GiB
GPU: GeForce GTX 1080 Ti, used
Worker 12, host [redacted]
CPU: [||||] 27 core(s) in use
RAM: [||] 14% 36.33 GiB/251.8 GiB
VMEM: [|] 6% 36.33 GiB/581.8 GiB
GPU: GeForce GTX 1080 Ti, used
Worker 13, host [redacted]
CPU: [||||] 14 core(s) in use
RAM: [||||] 78% 791.5 GiB/1004 GiB
VMEM: [||||] 81% 903.5 GiB/1.078 TiB
Worker 14, host [redacted]
CPU: [||||] 13 core(s) in use
RAM: [||||] 73% 735.7 GiB/1004 GiB
VMEM: [||||] 76% 839.7 GiB/1.078 TiB
Worker 15, host [redacted]
CPU: [||||] 16 core(s) in use
RAM: [||] 14% 35.73 GiB/251.8 GiB
VMEM: [|] 6% 35.73 GiB/581.8 GiB
GPU: GeForce GTX 1080 Ti, used
Worker 16, host [redacted]
CPU: [||||] 27 core(s) in use
RAM: [||] 14% 35.73 GiB/251.8 GiB
VMEM: [|] 6% 35.73 GiB/581.8 GiB
GPU: GeForce GTX 1080 Ti, used
Worker 17, host [redacted]
CPU: [||||] 27 core(s) in use
RAM: [||] 14% 36.22 GiB/251.8 GiB
VMEM: [|] 6% 36.22 GiB/581.8 GiB
GPU: GeForce GTX 1080 Ti, used
Worker 18, host BMCJ04103
CPU: [||||] 27 core(s) in use



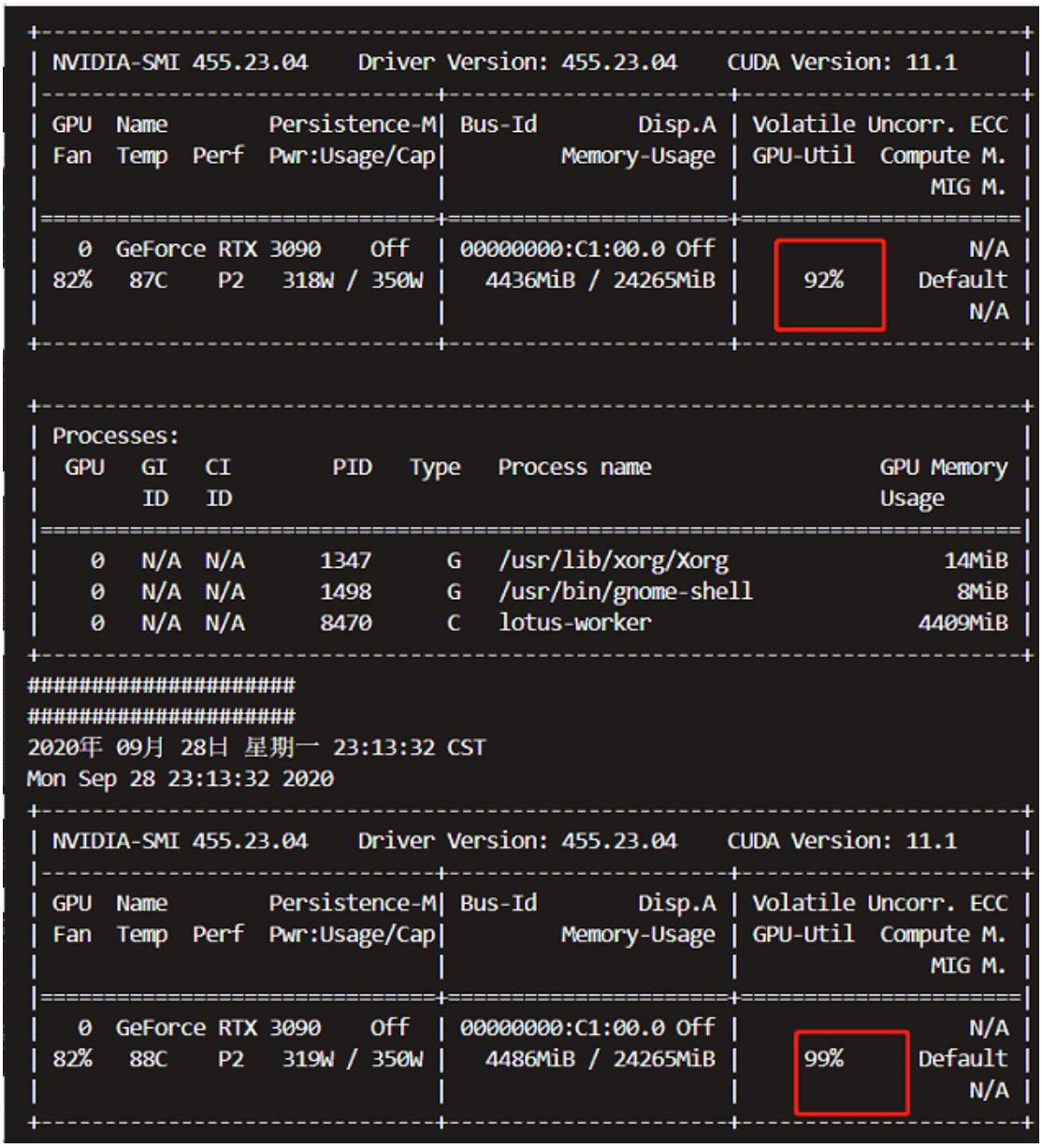


3. 单 Worker 多 P2 工作派发情况

```
Worker 27, host [redacted]
        CPU:  [||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||] 64 core(s) in use
        RAM:  [||||||||                                                  ] 15% 75.76 GiB/503.6 GiB
        VMEM: [||||||||||||||||||||||||||||||||                          ] 49% 315.8 GiB/631.6 GiB
        GPU: GeForce RTX 2080 Ti, used
        GPU: GeForce RTX 2080 Ti, used
        Types: [ finalize,unseal,addpiece,commit/1,commit/2,fetch, ]
        PreCommit1Max: 13 PreCommit1HoldMax: 25 PreCommit2Max: 1 Commit2Max: 2 ForceP2FromLocalP1: true
Worker 28, host [redacted]
        CPU:  [||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||] 160 core(s) in use
        RAM:  [||||||||||                                                ] 18% 166.3 GiB/881.5 GiB
        VMEM: [||||||||||                                                ] 16% 166.3 GiB/1009 GiB
        GPU: GeForce RTX 3090, not used
        Types: [ unseal,addpiece,commit/1,fetch,finalize,precommit/2, ]
        PreCommit1Max: 5 PreCommit1HoldMax: 8 PreCommit2Max: 5 Commit2Max: 1 ForceP2FromLocalP1: false
psdz@1080:~$ lotus-miner sealing jobs |grep epyc7f52-167
555  1601    28      epyc7f52-167  PC2   running  1h18m45.1s
559  1564    28      epyc7f52-167  PC2   running  1h16m23.4s
560  1544    28      epyc7f52-167  PC2   running  1h16m23.4s
567  1567    28      epyc7f52-167  PC2   running  1h12m42.4s
570  1572    28      epyc7f52-167  PC2   running  1h3m54.4s
```

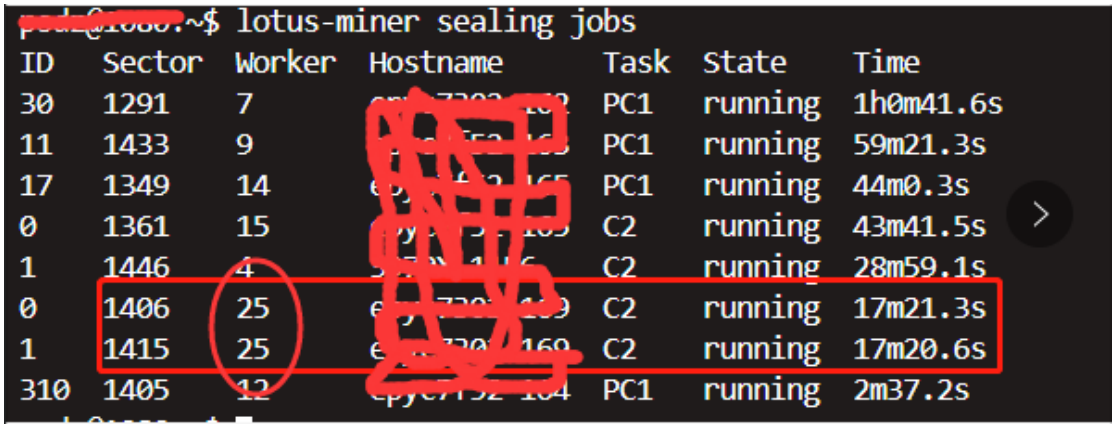
```
2020-09-28T22:38:44.048 INFO storage_proofs_porep::stacked::vanilla::proof > persisting base tree_c 1/8 of length 153391689
2020-09-28T22:38:48.836 INFO storage_proofs_porep::stacked::vanilla::proof > persisting base tree_c 1/8 of length 153391689
2020-09-28T22:38:49.717 INFO storage_proofs_porep::stacked::vanilla::proof > persisting base tree_c 1/8 of length 153391689
2020-09-28T22:38:49.830 INFO storage_proofs_porep::stacked::vanilla::proof > persisting base tree_c 1/8 of length 153391689
2020-09-28T22:38:50.015 INFO storage_proofs_porep::stacked::vanilla::proof > persisting base tree_c 1/8 of length 153391689
2020-09-28T22:41:57.919+0800    ^[[35mDEBUG^[[0m        stores  stores/util_unix.go:28  move sector data        {"from": "/notnvme/lotusworker1
1508", "to": "/notnvme/lotusworker1/cache/s-t03364-1508"}
2020-09-28T22:41:57.929+0800    ^[[34mINFO^[[0m stores  stores/remote.go:322    Delete http://192.168.11.171:2346/remote/cache/s-t03364-1508
2020-09-28T22:42:15.822+0800    ^[[35mDEBUG^[[0m        advmgr  sector-storage/localworker.go:102       acquired sector {3364 1508} (e:6; a:0):
rker1/sealed/s-t03364-1508 /notnvme/lotusworker1/cache/s-t03364-1508}
2020-09-28T22:48:03.449 INFO storage_proofs_porep::stacked::vanilla::proof > persisting base tree_c 2/8 of length 153391689
2020-09-28T22:48:21.524 INFO storage_proofs_porep::stacked::vanilla::proof > persisting base tree_c 2/8 of length 153391689
2020-09-28T22:48:23.579 INFO storage_proofs_porep::stacked::vanilla::proof > persisting base tree_c 2/8 of length 153391689
2020-09-28T22:48:24.064 INFO storage_proofs_porep::stacked::vanilla::proof > persisting base tree_c 2/8 of length 153391689
2020-09-28T22:48:24.213 INFO storage_proofs_porep::stacked::vanilla::proof > persisting base tree_c 2/8 of length 153391689
2020-09-28T22:50:27.150+0800    ^[[35mDEBUG^[[0m        stores  stores/util_unix.go:28  move sector data        {"from": "/notnvme/lotusworker1
1505", "to": "/notnvme/lotusworker1/cache/s-t03364-1505"}
2020-09-28T22:50:27.156+0800    ^[[34mINFO^[[0m stores  stores/remote.go:322    Delete http://192.168.11.171:2347/remote/cache/s-t03364-1505
2020-09-28T22:50:49.880+0800    ^[[35mDEBUG^[[0m        advmgr  sector-storage/localworker.go:102       acquired sector {3364 1505} (e:6; a:0):
rker1/sealed/s-t03364-1505 /notnvme/lotusworker1/cache/s-t03364-1505}
2020-09-28T22:56:31.957 INFO storage_proofs_porep::stacked::vanilla::proof > persisting base tree_c 3/8 of length 153391689
2020-09-28T22:57:14.915 INFO storage_proofs_porep::stacked::vanilla::proof > persisting base tree_c 3/8 of length 153391689
2020-09-28T22:57:16.182 INFO storage_proofs_porep::stacked::vanilla::proof > persisting base tree_c 3/8 of length 153391689
2020-09-28T22:57:16.680 INFO storage_proofs_porep::stacked::vanilla::proof > persisting base tree_c 3/8 of length 153391689
2020-09-28T22:57:16.974 INFO storage_proofs_porep::stacked::vanilla::proof > persisting base tree_c 3/8 of length 153391689
2020-09-28T23:04:32.639 INFO storage_proofs_porep::stacked::vanilla::proof > persisting base tree_c 4/8 of length 153391689
```

```
2020-09-28T22:26:32.192 INFO storage_proofs_porep::stacked::vanilla::proof > replicate_phase2
2020-09-28T22:26:32.192 INFO storage_proofs_porep::stacked::vanilla::proof > generating tree c using the GPU
2020-09-28T22:26:32.192 INFO storage_proofs_porep::stacked::vanilla::proof > Building column hashes
2020-09-28T22:26:32.194 INFO storage_proofs_porep::stacked::vanilla::proof > replicate_phase2
2020-09-28T22:26:32.195 INFO storage_proofs_porep::stacked::vanilla::proof > generating tree c using the GPU
2020-09-28T22:26:32.195 INFO storage_proofs_porep::stacked::vanilla::proof > Building column hashes
2020-09-28T22:38:44.048 INFO storage_proofs_porep::stacked::vanilla::proof > persisting base tree_c 1/8 of length 153391689
2020-09-28T22:38:48.836 INFO storage_proofs_porep::stacked::vanilla::proof > persisting base tree_c 1/8 of length 153391689
2020-09-28T22:38:49.717 INFO storage_proofs_porep::stacked::vanilla::proof > persisting base tree_c 1/8 of length 153391689
2020-09-28T22:38:49.830 INFO storage_proofs_porep::stacked::vanilla::proof > persisting base tree_c 1/8 of length 153391689
2020-09-28T22:38:50.015 INFO storage_proofs_porep::stacked::vanilla::proof > persisting base tree_c 1/8 of length 153391689
2020-09-28T22:48:03.449 INFO storage_proofs_porep::stacked::vanilla::proof > persisting base tree_c 2/8 of length 153391689
2020-09-28T22:48:21.524 INFO storage_proofs_porep::stacked::vanilla::proof > persisting base tree_c 2/8 of length 153391689
2020-09-28T22:48:23.579 INFO storage_proofs_porep::stacked::vanilla::proof > persisting base tree_c 2/8 of length 153391689
2020-09-28T22:48:24.064 INFO storage_proofs_porep::stacked::vanilla::proof > persisting base tree_c 2/8 of length 153391689
2020-09-28T22:48:24.213 INFO storage_proofs_porep::stacked::vanilla::proof > persisting base tree_c 2/8 of length 153391689
2020-09-28T22:56:31.957 INFO storage_proofs_porep::stacked::vanilla::proof > persisting base tree_c 3/8 of length 153391689
2020-09-28T22:57:14.915 INFO storage_proofs_porep::stacked::vanilla::proof > persisting base tree_c 3/8 of length 153391689
2020-09-28T22:57:16.182 INFO storage_proofs_porep::stacked::vanilla::proof > persisting base tree_c 3/8 of length 153391689
2020-09-28T22:57:16.680 INFO storage_proofs_porep::stacked::vanilla::proof > persisting base tree_c 3/8 of length 153391689
2020-09-28T22:57:16.974 INFO storage_proofs_porep::stacked::vanilla::proof > persisting base tree_c 3/8 of length 153391689
2020-09-28T23:04:32.639 INFO storage_proofs_porep::stacked::vanilla::proof > persisting base tree_c 4/8 of length 153391689
2020-09-28T23:05:35.649 INFO storage_proofs_porep::stacked::vanilla::proof > persisting base tree_c 4/8 of length 153391689
2020-09-28T23:05:37.166 INFO storage_proofs_porep::stacked::vanilla::proof > persisting base tree_c 4/8 of length 153391689
2020-09-28T23:05:38.151 INFO storage_proofs_porep::stacked::vanilla::proof > persisting base tree_c 4/8 of length 153391689
2020-09-28T23:05:38.368 INFO storage_proofs_porep::stacked::vanilla::proof > persisting base tree_c 4/8 of length 153391689
2020-09-28T23:12:20.223 INFO storage_proofs_porep::stacked::vanilla::proof > persisting base tree_c 5/8 of length 153391689
2020-09-28T23:13:49.808 INFO storage_proofs_porep::stacked::vanilla::proof > persisting base tree_c 5/8 of length 153391689
2020-09-28T23:13:52.249 INFO storage_proofs_porep::stacked::vanilla::proof > persisting base tree_c 5/8 of length 153391689
2020-09-28T23:13:52.474 INFO storage_proofs_porep::stacked::vanilla::proof > persisting base tree_c 5/8 of length 153391689
2020-09-28T23:13:52.671 INFO storage_proofs_porep::stacked::vanilla::proof > persisting base tree_c 5/8 of length 153391689
2020-09-28T23:20:07.444 INFO storage_proofs_porep::stacked::vanilla::proof > persisting base tree_c 6/8 of length 153391689
2020-09-28T23:22:06.264 INFO storage_proofs_porep::stacked::vanilla::proof > persisting base tree_c 6/8 of length 153391689
2020-09-28T23:22:08.948 INFO storage_proofs_porep::stacked::vanilla::proof > persisting base tree_c 6/8 of length 153391689
2020-09-28T23:22:09.272 INFO storage_proofs_porep::stacked::vanilla::proof > persisting base tree_c 6/8 of length 153391689
2020-09-28T23:22:09.416 INFO storage_proofs_porep::stacked::vanilla::proof > persisting base tree_c 6/8 of length 153391689
[redacted]:~$
```

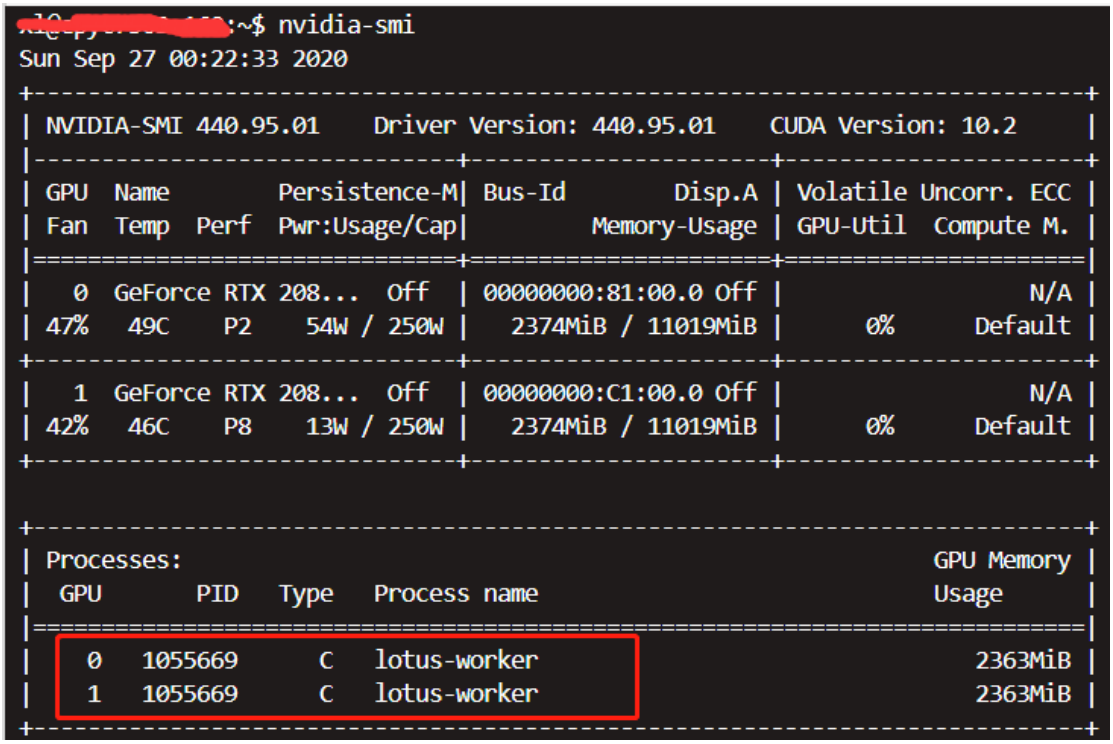


测试过程中发现实际使用到了 4GB 显存，最后前面 3 个 P2 是 1 小时 20 分钟左右完成了，后面 2 个 P2 则花了 1 小时 40 分钟以上。

4. 单 Worker 多 C2 工作派发情况



```
~$ lotus-miner sealing jobs
ID   Sector  Worker  Hostname      Task  State    Time
30   1291    7                     PC1   running  1h0m41.6s
11   1433    9                     PC1   running  59m21.3s
17   1349    14                    PC1   running  44m0.3s
0    1361    15                    C2    running  43m41.5s
1    1446    4                     C2    running  28m59.1s
0    1406    25                    C2    running  17m21.3s
1    1415    25                    C2    running  17m20.6s
310  1405    12                    PC1   running  2m37.2s
```



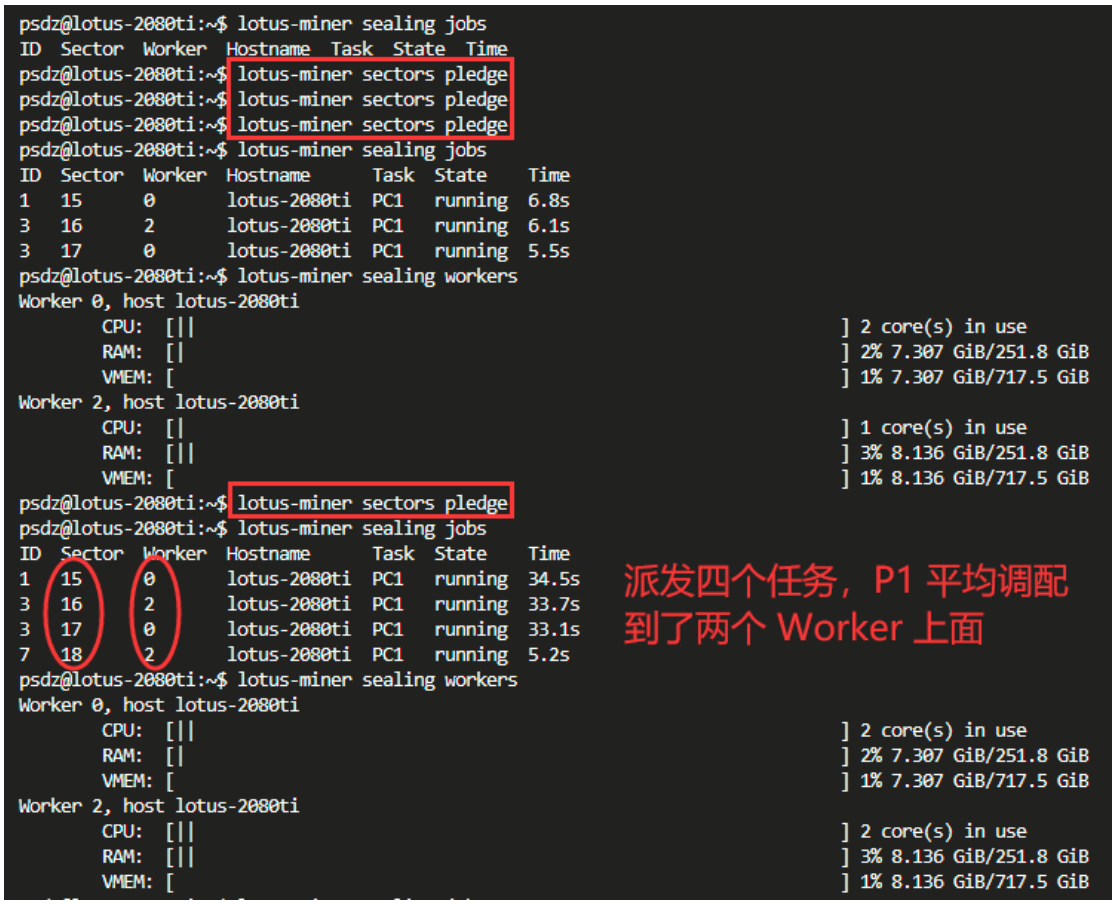
```
~$ nvidia-smi
Sun Sep 27 00:22:33 2020
+-----------------------------------------------------------------------------+
| NVIDIA-SMI 440.95.01    Driver Version: 440.95.01    CUDA Version: 10.2     |
|-------------------------------+----------------------+----------------------+
| GPU  Name        Persistence-M| Bus-Id        Disp.A | Volatile Uncorr. ECC |
| Fan  Temp  Perf  Pwr:Usage/Cap|         Memory-Usage | GPU-Util  Compute M. |
|===============================+======================+======================|
|   0  GeForce RTX 208...  Off  | 00000000:81:00.0 Off |                  N/A |
| 47%   49C    P2    54W / 250W |   2374MiB / 11019MiB |      0%      Default |
+-------------------------------+----------------------+----------------------+
|   1  GeForce RTX 208...  Off  | 00000000:C1:00.0 Off |                  N/A |
| 42%   46C    P8    13W / 250W |   2374MiB / 11019MiB |      0%      Default |
+-------------------------------+----------------------+----------------------+

+-----------------------------------------------------------------------------+
| Processes:                                                       GPU Memory |
|  GPU       PID   Type   Process name                             Usage      |
|=============================================================================|
|    0   1055669      C   lotus-worker                                2363MiB |
|    1   1055669      C   lotus-worker                                2363MiB |
+-----------------------------------------------------------------------------+
```

(四) 本地开发环境

下面是一个只有 2 个 worker 的本地测试情况，派发了四个 pledge 任务（15、16、17、18 号扇区）：

1. 四个任务下的 P1 工作情况



2. 四个任务下的 P2 工作情况

```
psdz@lotus-2080ti:~$ lotus-miner sealing jobs
ID  Sector  Worker  Hostname      Task  State    Time
5   15      0       lotus-2080ti  PC2   running  1m33.8s
9   16      2       lotus-2080ti  PC2   running  1m33.1s
psdz@lotus-2080ti:~$ lotus-miner sealing jobs
ID  Sector  Worker  Hostname      Task  State    Time
7   18      0       lotus-2080ti  PC2   running  9.7s
11  17      2       lotus-2080ti  PC2   running  8.9s
psdz@lotus-2080ti:~$ lotus-miner sealing workers
Worker 0, host lotus-2080ti
        CPU:  [||||||||||||||||||||||||||||||||||||||||||||||||||||||||||        ] 44 core(s) in use
        RAM:  [|                                                                 ] 2% 7.307 GiB/251.8 GiB
        VMEM: [                                                                  ] 1% 7.307 GiB/717.5 GiB
Worker 2, host lotus-2080ti
        CPU:  [||||||||||||||||||||||||||||||||||||||||||||||||||||||||||        ] 44 core(s) in use
        RAM:  [||                                                                ] 3% 8.136 GiB/251.8 GiB
        VMEM: [                                                                  ] 1% 8.136 GiB/717.5 GiB
psdz@lotus-2080ti:~$ lotus-miner sealing jobs
ID  Sector  Worker  Hostname  Task  State  Time
psdz@lotus-2080ti:~$ lotus-miner sectors list
0: Proving                sSet: YES active: YES tktH: 0     seedH: 0     deals: [0]  toUpgrade:false
1: Proving                sSet: YES active: YES tktH: 0     seedH: 0     deals: [1]  toUpgrade:false
3: SealPreCommit1Failed sSet: NO  active: NO  tktH: 15309 seedH: 16448 deals: [0]  toUpgrade:false
4: SealPreCommit1Failed sSet: NO  active: NO  tktH: 15522 seedH: 16587 deals: [0]  toUpgrade:false
5: SealPreCommit1Failed sSet: NO  active: NO  tktH: 15522 seedH: 16605 deals: [0]  toUpgrade:false
7: Proving                sSet: YES active: YES tktH: 25623 seedH: 26772 deals: [0]  toUpgrade:false
8: Proving                sSet: YES active: YES tktH: 25711 seedH: 26861 deals: [0]  toUpgrade:false
9: Proving                sSet: YES active: YES tktH: 26096 seedH: 27246 deals: [0]  toUpgrade:false
10: Proving               sSet: YES active: YES tktH: 26097 seedH: 27295 deals: [0]  toUpgrade:false
11: Proving               sSet: YES active: YES tktH: 26147 seedH: 27296 deals: [0]  toUpgrade:false
12: Proving               sSet: YES active: YES tktH: 26508 seedH: 27687 deals: [0]  toUpgrade:false
13: Proving               sSet: YES active: YES tktH: 26508 seedH: 27648 deals: [0]  toUpgrade:false
15: WaitSeed              sSet: NO  active: NO  tktH: 27119 seedH: 0     deals: [0]  toUpgrade:false
16: WaitSeed              sSet: NO  active: NO  tktH: 27119 seedH: 0     deals: [0]  toUpgrade:false
17: WaitSeed              sSet: NO  active: NO  tktH: 27120 seedH: 0     deals: [0]  toUpgrade:false
18: WaitSeed              sSet: NO  active: NO  tktH: 27131 seedH: 0     deals: [0]  toUpgrade:false
```

四个 P2 先后串行分配到了两个 Worker 上面

3. 四个任务下的 C2 工作情况

```
15: Committing          sSet: NO  active: NO  tktH: 27119 seedH: 28269 deals: [0]  toUpgrade:false
16: Proving             sSet: YES active: YES tktH: 27119 seedH: 28269 deals: [0]  toUpgrade:false
17: Committing          sSet: NO  active: NO  tktH: 27120 seedH: 28319 deals: [0]  toUpgrade:false
18: Committing          sSet: NO  active: NO  tktH: 27131 seedH: 28319 deals: [0]  toUpgrade:false
psdz@lotus-2080ti:~$ lotus-miner sealing jobs
ID  Sector  Worker  Hostname      Task  State    Time
12  18      0       lotus-2080ti  C2    running  1m27s
17  15      2       lotus-2080ti  C2    running  41.4s
psdz@lotus-2080ti:~$ lotus-miner sealing workers
Worker 0, host lotus-2080ti
        CPU:  [|                                                  ] 1 core(s) in use
        RAM:  [|                                                  ] 2% 7.307 GiB/251.8 GiB
        VMEM: [                                                   ] 1% 7.307 GiB/717.5 GiB
Worker 2, host lotus-2080ti
        CPU:  [|                                                  ] 1 core(s) in use
        RAM:  [||                                                 ] 3% 8.136 GiB/251.8 GiB
        VMEM: [                                                   ] 1% 8.136 GiB/717.5 GiB
psdz@lotus-2080ti:~$ lotus-miner sealing workers
Worker 0, host lotus-2080ti
        CPU:  [                                                   ] 0 core(s) in use
        RAM:  [|                                                  ] 2% 7.307 GiB/251.8 GiB
        VMEM: [                                                   ] 1% 7.307 GiB/717.5 GiB
Worker 2, host lotus-2080ti
        CPU:  [|                                                  ] 1 core(s) in use
        RAM:  [||                                                 ] 3% 8.136 GiB/251.8 GiB
        VMEM: [                                                   ] 1% 8.136 GiB/717.5 GiB
psdz@lotus-2080ti:~$ lotus-miner sealing jobs
ID  Sector  Worker  Hostname      Task  State    Time
20  17      2       lotus-2080ti  C2    running  2m20.3s
```

C2 任务均分到两个 Worker

4. 四个任务工作完成

```
psdz@lotus-2080ti:~$ lotus-miner sealing jobs
ID  Sector  Worker  Hostname  Task  State  Time
psdz@lotus-2080ti:~$ lotus-miner sealing workers
Worker 0, host lotus-2080ti
        CPU:  [                                                   ] 0 core(s) in use
        RAM:  [|                                                  ] 2% 7.307 GiB/251.8 GiB
        VMEM: [                                                   ] 1% 7.307 GiB/717.5 GiB
Worker 2, host lotus-2080ti
        CPU:  [                                                   ] 0 core(s) in use
        RAM:  [||                                                 ] 3% 8.136 GiB/251.8 GiB
        VMEM: [                                                   ] 1% 8.136 GiB/717.5 GiB
psdz@lotus-2080ti:~$ lotus-miner sectors list
0: Proving             sSet: YES active: YES tktH: 0     seedH: 0     deals: [0]  toUpgrade:false
1: Proving             sSet: YES active: YES tktH: 0     seedH: 0     deals: [1]  toUpgrade:false
3: SealPreCommit1Failed sSet: NO  active: NO  tktH: 15309 seedH: 16448 deals: [0]  toUpgrade:false
4: SealPreCommit1Failed sSet: NO  active: NO  tktH: 15522 seedH: 16587 deals: [0]  toUpgrade:false
5: SealPreCommit1Failed sSet: NO  active: NO  tktH: 15522 seedH: 16605 deals: [0]  toUpgrade:false
7: Proving             sSet: YES active: YES tktH: 25623 seedH: 26772 deals: [0]  toUpgrade:false
8: Proving             sSet: YES active: YES tktH: 25711 seedH: 26861 deals: [0]  toUpgrade:false
9: Proving             sSet: YES active: YES tktH: 26096 seedH: 27246 deals: [0]  toUpgrade:false
10: Proving            sSet: YES active: YES tktH: 26097 seedH: 27295 deals: [0]  toUpgrade:false
11: Proving            sSet: YES active: YES tktH: 26147 seedH: 27296 deals: [0]  toUpgrade:false
12: Proving            sSet: YES active: YES tktH: 26508 seedH: 27687 deals: [0]  toUpgrade:false
13: Proving            sSet: YES active: YES tktH: 26508 seedH: 27648 deals: [0]  toUpgrade:false
15: Proving            sSet: YES active: YES tktH: 27119 seedH: 28269 deals: [0]  toUpgrade:false
16: Proving            sSet: YES active: YES tktH: 27119 seedH: 28269 deals: [0]  toUpgrade:false
17: Proving            sSet: YES active: YES tktH: 27120 seedH: 28319 deals: [0]  toUpgrade:false
18: Proving            sSet: YES active: YES tktH: 27131 seedH: 28319 deals: [0]  toUpgrade:false
```