

# Filecoin operation and maintenance (1)-several commonly used system configurations

FileCoin (<https://learnblockchain.cn/tags/FileCoin>)

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Note: All operations in this article are performed under the Ubuntu18.04-LTS system. Centos may need some adjustments. Please find out by yourself.  
In addition, the tools and tuning configuration involved in this article are available for pro-testing.

## 1. Permanently modify ulimit

Two-stage test `lotus daemon` at the time of synchronization, often appear too many open files error, then stop sync. And as your computing power increases, the number of sectors that need to participate in the space-time proof will increase each time, too many open files and errors will also occur later. The solution to this problem is to modify `ulimit` the configuration.

Generally, the system default is 1024, we can set it to 1048576 for safety. To temporarily modify `ulimit`, we can use the following operations:

```
1  ulimit -n 1048576
```

If you want to set it permanently, the operation is more complicated. First, you need to set the `ulimit` at the system level.

```
1  echo 'fs.file-max = 1048576' | sudo tee -a /etc/sysctl.conf
2  sudo sysctl -p # 立即生效
```

Then modify the configuration of the user layer:

```
1  sudo tee -a /etc/security/limits.conf << EOF
2  *                hard    nofile      1048576
3  *                soft    nofile      1048576
4  root            hard    nofile      1048576
5  root            soft    nofile      1048576
6  EOF
```

Then modify the Systemd layer:

```
1  sudo sed -i '/DefaultLimitNOFILE/c DefaultLimitNOFILE=1048576' /etc/systemd/*.conf
2  sudo systemctl daemon-reexec
```

If you are using a network service to run, usually you also need to set the maximum number of socket connections:

```
1  echo 'net.core.somaxconn=65535' | sudo tee -a /etc/sysctl.conf
2  sudo sysctl -p # 立即生效
```

**Remember to restart to take effect after the change! ! !**

## 2. RAID restart failure problem

By the way, let me first mention the question of whether a hard RAID or a soft RAID is. Hard RAID reconstruction has a low resource occupancy rate; in the case of soft RAID, the CPU will be consumed during reconstruction. The algorithm of hard RAID is actually more stable. But the software RAID performance will be better.

Because the CACHE on the RAID card is generally 512MB or 1GB, but the software RAID can use the system memory as a RAID STRIE CACHE at will. So, in simple terms, **if your CPU and memory resources are surplus, then you can use RAID, otherwise it is recommended to use hard RAID .**

When building RAID, I don't know if you have encountered such a situation. After shutting down and restarting, the RAID devices of the previous group are gone, and the stored data is also lost. I have encountered it several times. The reason is that the boot load initialization of the software RAID is not configured.

The solution is as follows:

```
1  mdadm -Ds >> /etc/mdadm/mdadm.conf
```

In this way /etc/mdadm/mdadm.conf there will be a line similar to the configuration file

```
1 ARRAY /dev/md0 metadata=1.2 name=lotus-miner:0 UUID=63dd2141:834e1dd0:b4173301:d483e824
```

Where {name} is the `hostname` UUID of your host and the UUID of the RAID device.

Here is the script to build RAID by the way:

```
1 mdadm -Cv /dev/md0 -a yes -n 2 -l 0 /dev/sda /dev/sdb
```

Where the parameter `-n` is the number of disks, if followed partition, it is the number of partitions. `-l` The parameter represents the RAID level you use, 0 represents RAID0, 1 represents RAID1, and so on.

### 3. Turn off Numa function

First of all, we have to figure out one thing, why turn off NUMA?

The Linux system turns on NUMA by default. The default memory allocation strategy of NUMA is to prioritize the allocation in the local memory of the CPU node where the process is located, which will lead to unbalanced memory allocation among CPU nodes. For example, when the memory of a CPU node is insufficient, it will cause Swap to be generated instead of allocating memory from the remote node, even if there is enough physical memory on another CPU node.

The original intention of this memory allocation strategy is good, in order to get the memory closer to the process that needs it, but it is not suitable for large-scale memory usage application scenarios, and it is not conducive to making full use of the physical memory of the system.

However, as we all know, Filecoin's demand for memory is almost greedy. And you will find that there are dozens of GB of physical memory, but it happens to load dozens of GB of Swap. **Once Swap is used, the performance immediately drops by one ten thousandth of the memory or even lower .**

First you need to check whether your machine has opened Numa mode, you can use `numastat` this command to see if the machine does not have this command, you need to install `numactl` .

```
1 sudo apt-get install numactl
```

Then you can use `numastat` to see if the current system has enabled Numa.

```

1  numastat
2                                node0
3  numa_hit                    484417331
4  numa_miss                    0
5  numa_foreign                 0
6  interleave_hit               40687
7  local_node                   484417331
8  other_node                   0

```

If your machine is only one like me node , then you do not need to explain the close Numa, Numa at this time because there is no work. Generally speaking, the number of CPU cores in home machines is not too high, so Numa does not need to be optimized.

I'm E5-2684 V4 running a bit on the machine, the following results:

```

1  root@miner1:~# numastat
2                                node0          node1
3  numa_hit                    2093513830      2859729719
4  numa_miss                    949731552      128562031
5  numa_foreign                 128562031      949731552
6  interleave_hit               51160        50655
7  local_node                   2093549941      2859639315
8  other_node                   949695441      128652435

```

From the above results, Numa is obviously enabled, and both CPU and memory are allocated to 2 nodes. **Cross-node physical memory access will reduce performance by ten times .**

There are two ways to disable Numa. One is to set up via Bios. Different motherboards have different setting methods. I won't talk about this. You can find the answer online according to your own motherboard type.

Here we mainly talk about disabling Numa by modifying the system configuration:

(1) Modify and edit the grub configuration file of CentOS, /etc/grub.conf and find the kernel line, which is similar to the following (different versions have slightly different contents, but there is "kernel /vmlinuz-" at the beginning):

```

1  kernel /vmlinuz-2.6.32-358.el6.x86_64 ro root=/dev/mapper/vg_centos64001-lv_root rd_NO_LUKS rd_LV
2  crashkernel=128M LANG=zh_CN.UTF-8 KEYBOARDTYPE=pc KEYTABLE=us rd_NO_DM rhgb quiet

```

Add a space at the end of the kernel line numa=off . If there are multiple kernel lines, add each kernel line.

(2) Modify and edit the grub file of Ubuntu 18.04, /boot/grub/grub.cfg and find the Linux boot line, which is similar to the following (the contents of different versions are slightly different, but there are some at the beginning linux /boot/vmlinuz- ):

```
1 linux /boot/vmlinuz-4.15.0-106-generic root=UUID=2c5f7d8a-ff33-4c78-b5a4-cd8dc75823f3 ro maybe
```

At the end of the Linux boot line, add a space `numa=off` . If there are multiple Linux boot lines, add each Linux boot line.

(3) Save after modification, restart the system, and verify whether NUMA is successfully closed.

```
1 numastat
```

If there is only node0 in the output, it means that NUMA is successfully disabled, and if node1 appears, it will fail.

## 4. Turn on the CPU to high performance mode

The default CPU in the Ubuntu system is working in `powersave` (power saving) mode, so the performance is not maximized, so it needs to be adjusted to `performance` (high performance) mode. You can adjust it temporarily by setting Bios or by software.

1. Install `cpufrequtils`:

```
1 sudo apt-get install cpufrequtils
```

2. View the current state of the cpu:

```
1 cpufreq-info
```

3. Adjust the cpu to performance mode:

```
1 sudo cpufreq-set -g performance
```

## 5. Two resource viewing widgets

(1) Although the system comes with linux `top` tool has been relatively strong, but the feeling on the visual experience is not good enough, and can not see the usage for each core. `htop` Just to make up for the shortcomings of the `top` tool.

Ubuntu 10.04 is installed by default `htop` tool of the. If not, use `apt-get install htop` the installation. The effect is as follows:

```

1  [|||||||100.0%]  7  [|||||||100.0%]  13 [|||||||100.0%]  19 [|||||||100.0%]
2  [|||||||100.0%]  8  [|||||||100.0%]  14 [|||||||100.0%]  20 [|||||||100.0%]
3  [|||||||100.0%]  9  [|||||||100.0%]  15 [|||||||100.0%]  21 [|||||||100.0%]
4  [|||||||100.0%] 10 [|||||||100.0%]  16 [|||||||100.0%]  22 [|||||||100.0%]
5  [|||||||100.0%] 11 [|||||||100.0%]  17 [|||||||100.0%]  23 [|||||||100.0%]
6  [|||||||100.0%] 12 [|||||||100.0%]  18 [|||||||100.0%]  24 [|||||||100.0%]
Mem[|||||||60.4G/126G] Tasks: 112, 390 thr; 24 running
Swp[|||||||1.37G/1.37G] Load average: 24.26 24.25 24.13
                          Uptime: 23 days, 17:47:31

  PID USER      PRI  NI  VIRT   RES   SHR  S  CPU% MEM%   TIME+  Command
2230 root        20   0   96G  59.5G  4880  S   2400  47.3   471h  /opt/GammaOS/lotus-seal-worker/lotus-seal-w
6803 root        20   0   96G  59.5G  4880  R  101.  47.3  19h32:42 /opt/GammaOS/lotus-seal-worker/lotus-seal-w
6793 root        20   0   96G  59.5G  4880  R  100.  47.3  19h32:54 /opt/GammaOS/lotus-seal-worker/lotus-seal-w
6792 root        20   0   96G  59.5G  4880  R  100.  47.3  19h32:24 /opt/GammaOS/lotus-seal-worker/lotus-seal-w
6811 root        20   0   96G  59.5G  4880  R  100.  47.3  19h32:41 /opt/GammaOS/lotus-seal-worker/lotus-seal-w
6807 root        20   0   96G  59.5G  4880  R  100.  47.3  19h32:30 /opt/GammaOS/lotus-seal-worker/lotus-seal-w
6802 root        20   0   96G  59.5G  4880  R  100.  47.3  19h32:28 /opt/GammaOS/lotus-seal-worker/lotus-seal-w
6804 root        20   0   96G  59.5G  4880  R  100.  47.3  19h32:30 /opt/GammaOS/lotus-seal-worker/lotus-seal-w
6798 root        20   0   96G  59.5G  4880  R  100.  47.3  19h34:08 /opt/GammaOS/lotus-seal-worker/lotus-seal-w
6799 root        20   0   96G  59.5G  4880  R  100.  47.3  19h33:12 /opt/GammaOS/lotus-seal-worker/lotus-seal-w
1Help  F2Setup  F3Search F4Filter F5Tree  F6SortBy F7Nice  -F8Nice +F9Kill  F10Quit

```

(2) nvidia-smi is a tool for viewing GPU resources, nvidia-smi with top the same simple; by contrast, nvidia-smi looking than nvidia-smi more.

Ubuntu-20.04 installation:

```
1 sudo apt install nvidia-smi
```

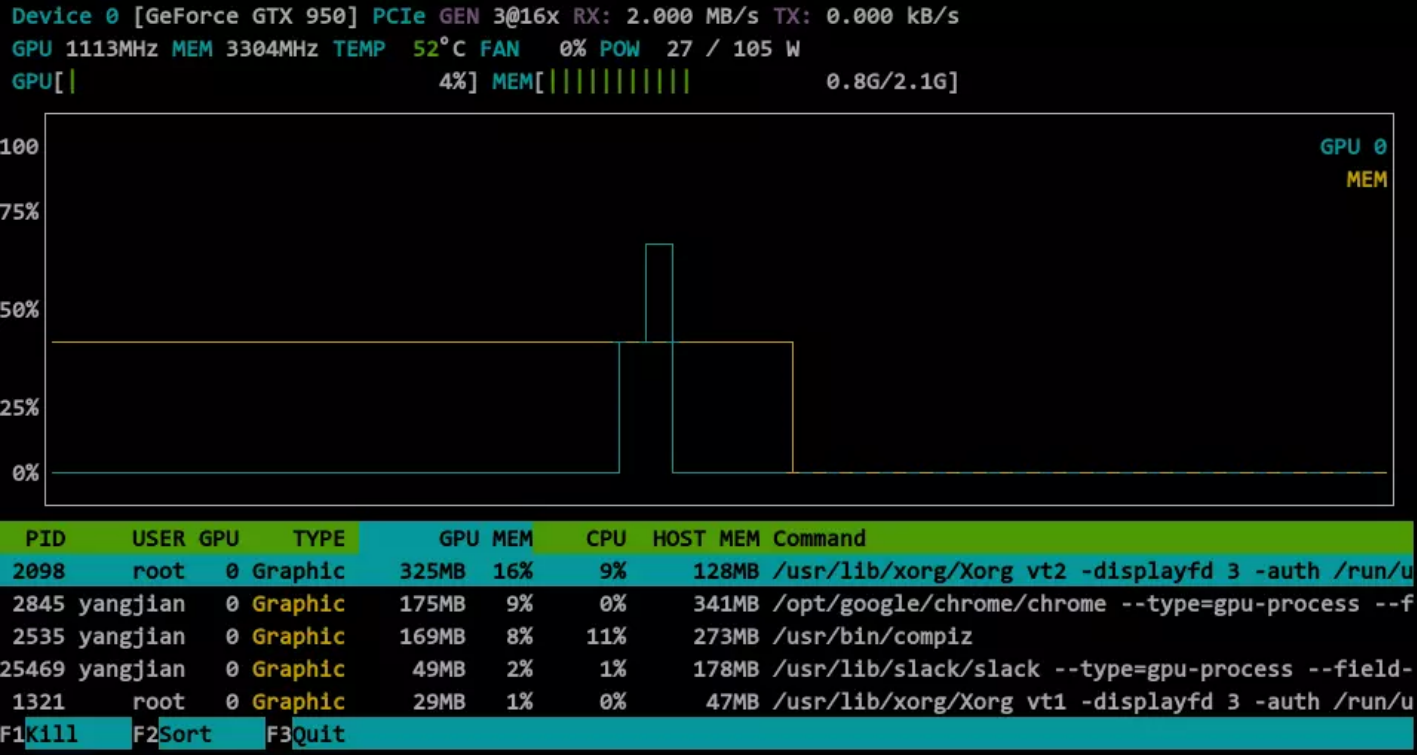
18.04 No direct software source can be used, manual compilation is required:

```

1 sudo apt install cmake libncurses5-dev libncursesw5-dev git
2 git clone https://github.com/Syllo/nvidia-smi.git
3 mkdir -p nvidia-smi/build && cd nvidia-smi/build
4 cmake ..
5 # 如果上面命令报错 "Could NOT find NVML (missing: NVML_INCLUDE_DIRS)" 就执行下面这个
6 cmake .. -DNVML_RETRIEVE_HEADER_ONLINE=True
7 make && sudo make install

```

nvidia-smi The effect is as follows:



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This article was first published at: Original link: <http://www.r9it.com/20200615/sys-config-for-filecoin.html> (<http://www.r9it.com/20200615/sys-config-for-filecoin.html>) 小一辈无产阶级码农 (<http://www.r9it.com/>) (<http://www.r9it.com/20200615/sys-config-for-filecoin.html>)

## Reference link

- Numa architecture (<https://blog.51cto.com/xjsunjie/1616347>)
- Disable Numa ([http://doc.sequoiadb.com/cn/sequoiadb-cat\\_id-1461057844-edition\\_id-206](http://doc.sequoiadb.com/cn/sequoiadb-cat_id-1461057844-edition_id-206))

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