东北大学秦皇岛分校

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Linux 操作系统及内核分析实验报告

Linux 基本命令

实验环境

Linux 版本

```
Linux northboat-nhx0dbde 6.1.12-1-MANJARO #1 SMP PREEMPT_DYNAMIC Tue Feb 14
21:59:10 UTC 2023 x86_64 GNU/Linux
```

ssh 版本

```
OpenSSH_9.2p1, OpenSSL 3.0.8 7 Feb 2023
```

目标机版本

```
Linux VM-0-17-debian 5.10.0-19-amd64 #1 SMP Debian 5.10.149-2 (2022-10-21) x86_64
GNU/Linux
```

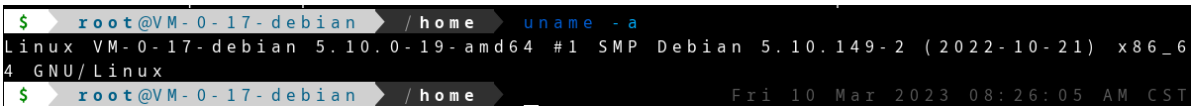
实验内容

ssh 连接 Linux

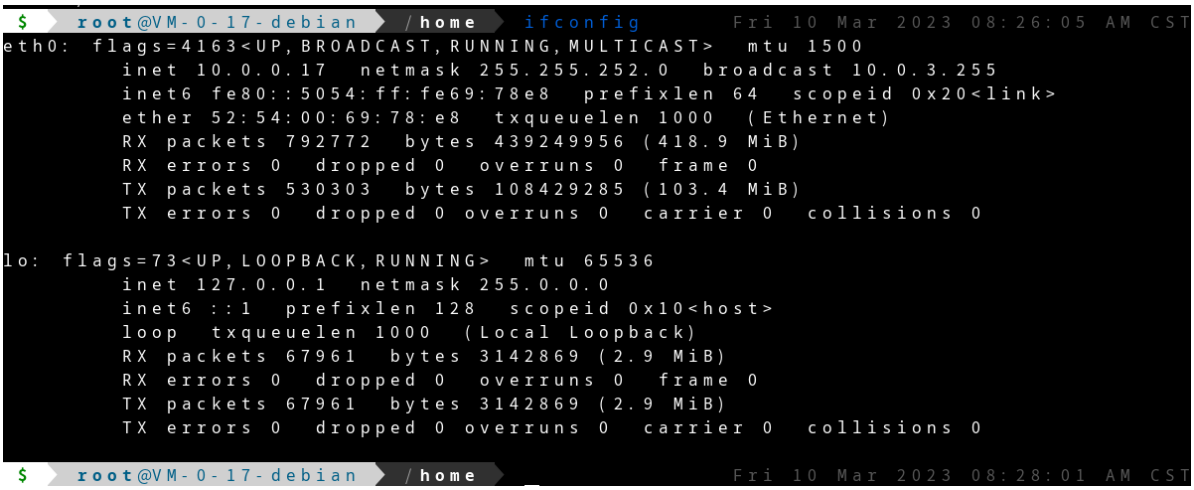
在`manjaro`上连接`debian`服务器

```
ssh root@43.163.218.127
```

查看主机基本信息



查看网卡信息



文件管理命令

搜索文件

```
$ root@VM-0-17-debian /home cd ~                    Fri 10 Mar 2023 08:28:01 AM CST
$ root@VM-0-17-debian ~ find / -name "?asswd" | more
find: /etc/passwd
/etc/pam.d/passwd
'/proc/791538/task/791538/net': Invalid argument
find: '/proc/791538/net': Invalid argument
/usr/share/lintian/overrides/passwd
/usr/share/bash-completion/completions/passwd
/usr/share/doc/passwd
/usr/bin/passwd
$ root@VM-0-17-debian ~                    5.1s < Fri 10 Mar 2023 08:29:28 AM CST
```

查看文件内容

```
$ root@VM-0-17-debian ~ cat /etc/passwd
root:x:0:0:root:/root:/usr/bin/fish
daemon:x:1:1:daemon:/usr/sbin:/usr/sbin/nologin
bin:x:2:2:bin:/bin:/usr/sbin/nologin
sys:x:3:3:sys:/dev:/usr/sbin/nologin
sync:x:4:65534:sync:/bin:/bin/sync
games:x:5:60:games:/usr/games:/usr/sbin/nologin
man:x:6:12:man:/var/cache/man:/usr/sbin/nologin
lp:x:7:7:lp:/var/spool/lpd:/usr/sbin/nologin
mail:x:8:8:mail:/var/mail:/usr/sbin/nologin
news:x:9:9:news:/var/spool/news:/usr/sbin/nologin
uucp:x:10:10:uucp:/var/spool/uucp:/usr/sbin/nologin
proxy:x:13:13:proxy:/bin:/usr/sbin/nologin
www-data:x:33:33:www-data:/var/www:/usr/sbin/nologin
backup:x:34:34:backup:/var/backups:/usr/sbin/nologin
list:x:38:38:Mailing List Manager:/var/list:/usr/sbin/nologin
irc:x:39:39:ircd:/run/ircd:/usr/sbin/nologin
gnats:x:41:41:Gnats Bug-Reporting System (admin):/var/lib/gnats:/usr/sbin/nologin
nobody:x:65534:65534:nobody:/nonexistent:/usr/sbin/nologin
_apt:x:100:65534::/nonexistent:/usr/sbin/nologin
systemd-timesync:x:101:101:systemd Time Synchronization,,,:/run/systemd:/usr/sbin/nologin
systemd-network:x:102:103:systemd Network Management,,,:/run/systemd:/usr/sbin/nologin
systemd-resolve:x:103:104:systemd Resolver,,,:/run/systemd:/usr/sbin/nologin
messagebus:x:104:110::/nonexistent:/usr/sbin/nologin
sshd:x:105:65534::/run/sshd:/usr/sbin/nologin
systemd-coredump:x:999:999:systemd Core Dumper:/:/usr/sbin/nologin
_chrony:x:106:112:Chrony daemon,,,:/var/lib/chrony:/usr/sbin/nologin
lighthouse:x:1000:1000::/home/lighthouse:/bin/bash
mysql:x:1001:1002::/home/mysql:/sbin/nologin
www:x:1002:1003::/home/www:/sbin/nologin
redis:x:1003:1004::/home/redis:/sbin/nologin
epmd:x:107:113::/run/epmd:/usr/sbin/nologin
rabbitmq:x:108:114:RabbitMQ messaging server,,,:/var/lib/rabbitmq:/usr/sbin/nologin
$ root@VM-0-17-debian ~ _
```

通过管道过滤查找关键字

```
$ root@VM-0-17-debian ~ cat /etc/passwd | grep "root"
root:x:0:0:root:/root:/usr/bin/fish
$ root@VM-0-17-debian ~ _                    Fri 10 Mar 2023 08:
```

创建目录

```
$ root@VM-0-17-debian / mkdir test1          Fri 10 Mar 2023 08:33:53 AM CST
$ root@VM-0-17-debian / mkdir test2          Fri 10 Mar 2023 08:33:57 AM CST
$ root@VM-0-17-debian / _                    Fri 10 Mar 2023 08:34:00 AM CST
```

创建文本文件

```
$ root@VM-0-17-debian / cd test1
$ root@VM-0-17-debian /test1 touch mytext
$ root@VM-0-17-debian /test1 ls
mytext
$ root@VM-0-17-debian /test1 _
```

编辑文件

```
$ root@VM-0-17-debian /test1 mv mytext hello
$ root@VM-0-17-debian /test1 vim hello     Fri 10
$ root@VM-0-17-debian /test1 cat hello
echo "hello debain"
$ root@VM-0-17-debian /test1 mv hello hello.sh
$ root@VM-0-17-debian /test1 sh hello.sh
hello debain
```

复制文件

```
$ root@VM-0-17-debian /test1 cp hello.sh ../test2/
$ root@VM-0-17-debian /test1 cd ..                    Fri 10 Mar 2023 08:41:48 AM CST
$ root@VM-0-17-debian /  ls                           Fri 10 Mar 2023 08:42:00 AM CST
bin@   home/            lib64@       opt/    srv/       tmp/
boot/  initrd.img@      libx32@      proc/   swapfile   usr/
data/  initrd.img.old@  lost+found/  root/   sys/       var/
dev/   lib@             media/       run/    test1/     vmlinuz@
etc/   lib32@           mnt/         sbin@   test2/     vmlinuz.old@
$ root@VM-0-17-debian /  cd test2                     Fri 10 Mar 2023 08:42:01 AM CST
$ root@VM-0-17-debian /test2 ls                       Fri 10 Mar 2023 08:42:03 AM CST
hello.sh
```

删除文件

```
$ root@VM-0-17-debian /test1 rm hello.sh
$ root@VM-0-17-debian /test1 ls                  Fri
$ root@VM-0-17-debian /test1                     Fri
```

删除目录

```
$ root@VM-0-17-debian /  ls                           Fri 10 Mar 2023 08:44:16 AM
bin@   home/            lib64@       opt/    srv/       tmp/
boot/  initrd.img@      libx32@      proc/   swapfile   usr/
data/  initrd.img.old@  lost+found/  root/   sys/       var/
dev/   lib@             media/       run/    test1/     vmlinuz@
etc/   lib32@           mnt/         sbin@   test2/     vmlinuz.old@
$ root@VM-0-17-debian /  rm -rf test1 test2
$ root@VM-0-17-debian /  ls                           Fri 10 Mar 2023 08:44:24 AM
bin@   etc/             lib@      lost+found/  proc/   srv/       usr/
boot/  home/            lib32@    media/       root/   swapfile   var/
data/  initrd.img@      lib64@    mnt/         run/    sys/       vmlinuz@
dev/   initrd.img.old@  libx32@   opt/         sbin@   tmp/       vmlinuz.old@
$ root@VM-0-17-debian /                               Fri 10 Mar 2023 08:44:25 AM
```

用户管理

新建用户

```
$ root@VM-0-17-debian /  useradd northboat
$ root@VM-0-17-debian /  passwd northboat   Fri 10 Mar 2023 08:45:46 AM CST
New password:
Retype new password:
passwd: password updated successfully
$ root@VM-0-17-debian /                  4498ms < Fri 10 Mar 2023 08:46:00 AM CST
```

切换并测试用户

```
$ root@VM-0-17-debian /  su northboat        Fri 10 Mar 20
$ pwd
/
$ mkdir /test
mkdir: cannot create directory ‘/test’: Permission denied
$ _
```

```
[northboat-nhx0dbde /]# su northboat
[northboat@northboat-nhx0dbde /]$ sudo mkdir /test
[northboat@northboat-nhx0dbde /]$ cd / & ls
[1] 6176
bin                   home          opt                  sbin        tmp
boot                  lib           proc                 srv         usr
desktopfs-pkgs.txt    lib64         root                 sys         var
dev                   lost+found    rootfs-pkgs.txt      test
etc                   mnt           run                  timeshift
[1]+  已完成                  cd /
[northboat@northboat-nhx0dbde /]$ _
```

修改用户权限

```
$ root@VM-0-17-debian /  addgroup wheel      Fri 10 Mar 202
Adding group `wheel' (GID 1006) ...
Done.
$ root@VM-0-17-debian /  usermod -a -G wheel northboat
```

查看用户组

```
$ root@VM-0-17-debian / cat /etc/group
root:x:0:
daemon:x:1:
bin:x:2:
sys:x:3:
adm:x:4:
tty:x:5:
disk:x:6:
lp:x:7:
mail:x:8:
news:x:9:
uucp:x:10:
man:x:12:
proxy:x:13:
kmem:x:15:
dialout:x:20:
fax:x:21:
voice:x:22:
cdrom:x:24:
floppy:x:25:
tape:x:26:
sudo:x:27:
audio:x:29:
dip:x:30:
www-data:x:33:
backup:x:34:
```

删除用户

```
$ root@VM-0-17-debian / userdel -r northboat
userdel: northboat mail spool (/var/mail/northboat) not found
userdel: northboat home directory (/home/northboat) not found
```

文件解压缩

压缩文件`.tar`

```
$ root@VM-0-17-debian /home ls                    Fri 10 Mar 2023 09:00:00 AM CST
lighthouse/
$ root@VM-0-17-debian /home mkdir test            Fri 10 Mar 2023 09:00:02 AM CST
$ root@VM-0-17-debian /home tar -cvf test.tar test/
test/
$ root@VM-0-17-debian /home ls                    Fri 10 Mar 2023 09:00:29 AM CST
lighthouse/  test/  test.tar
$ root@VM-0-17-debian /home _                     Fri 10 Mar 2023 09:00:33 AM CST
```

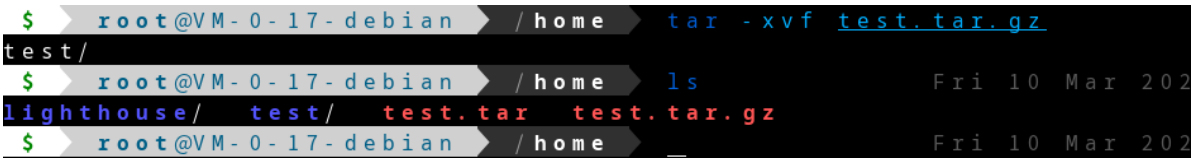
解压文件

```
$ root@VM-0-17-debian /home rm -rf test           Fri 10 Mar 2023 09:00:33 AM CST
$ root@VM-0-17-debian /home tar -xvf test.tar
test/
$ root@VM-0-17-debian /home ls                    Fri 10 Mar 2023 09:01:26 AM CST
lighthouse/  test/  test.tar
$ root@VM-0-17-debian /home _                     Fri 10 Mar 2023 09:01:27 AM CST
```

压缩文件`.tar.gz`

```
$ root@VM-0-17-debian /home tar -cvf test.tar.gz test/
test/
$ root@VM-0-17-debian /home ls                    Fri 10 Mar 202
lighthouse/  test/  test.tar  test.tar.gz
```

解压文件



实验总结

debain 默认没有 wheel 组，在加入用户进 wheel 组时会报错：group wheel does not exist

需要新增组

```
groupadd wheel
```

再将用户加入组

```
usermod -a -G wheel northboat
```

删除组

```
groupdel wheel
```

通过查看组`cat /etc/group`发现存在`root`组，将用户加入`root`组

```
usermod -a -G root northboat
```

Linux 系统管理

实现环境

Linux 版本

```
Linux northboat-nhx0dbde 6.1.12-1-MANJARO #1 SMP PREEMPT_DYNAMIC Tue Feb 14
21:59:10 UTC 2023 x86_64 GNU/Linux
```

本地 Shell

实验内容

Linux 网络管理

> 设置静态 IP，manjaro 下，使用 netctl 实现

下载 netctl

```
yay -S netctl
```

查看网卡信息

```
[northboat@northboat-nhx0dbde Desktop]$ ip addr
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group defaul
t qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
       valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
       valid_lft forever preferred_lft forever
2: enp13s0f1: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc fq_codel state
DOWN group default qlen 1000
    link/ether 00:e0:4c:88:00:cb brd ff:ff:ff:ff:ff:ff
3: wlp12s0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue state UP gr
oup default qlen 1000
    link/ether d8:c0:a6:1f:47:15 brd ff:ff:ff:ff:ff:ff
    inet 192.168.106.185/24 brd 192.168.106.255 scope global dynamic noprefixrou
te wlp12s0
       valid_lft 2595sec preferred_lft 2595sec
    inet6 2408:841d:2530:4acd:4ce3:5f9c:8087:8635/64 scope global dynamic nopref
ixroute
       valid_lft 2597sec preferred_lft 2597sec
    inet6 fe80::75aa:7519:2df4:7588/64 scope link noprefixroute
       valid_lft forever preferred_lft forever
```

得知网卡名称`enp13s0f1`

终止网络服务

```
sudo systemctl stop NetworkManager
sudo systemctl disable NetworkManager
```

复制`netctl`默认配置文件

```
sudo cp /etc/netctl/examples/ethernet-static /etc/netctl/enp13s0f1
```

编辑文件`enp13s0f1`

```
Northboat's Terminal
文件(F)  编辑(E)  视图(V)  终端(T)  标签(A)  帮助(H)
Description='A basic static ethernet connection'
Interface=eth0
Connection=ethernet
IP=static
Address=('192.168.1.23/24' '192.168.1.87/24')
#Routes=('192.168.0.0/24 via 192.168.1.2')
Gateway='192.168.1.1'
DNS=('192.168.1.1')

## For IPv6 autoconfiguration
#IP6=stateless

## For IPv6 static address configuration
#IP6=static
#Address6=('1234:5678:9abc:def::1/64' '1234:3456::123/96')
#Routes6=('abcd::1234')
#Gateway6='1234:0:123::abcd'
~
~
```

配置 DNS 解析

```
[northboat@northboat-nhx0dbde netctl]$ cat /etc/resolv.conf
# Generated by NetworkManager
nameserver 192.168.106.90
nameserver 2408:841d:2530:4acd::fd
```

重启网络服务

```
sudo systemctl start NetworkManager
sudo systemctl enable NetworkManager
```

查看网络连接状态

```
[northboat@northboat-nhx0dbde Desktop]$ netstat
Active Internet connections (w/o servers)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
tcp        0      0 northboat-nhx0dbd:51736 20.198.162.78:https     ESTABLISHED
tcp        0      0 northboat-nhx0dbd:36594 47.93.247.194:https     ESTABLISHED
tcp        0      0 northboat-nhx0dbd:41698 server-13-227-62-:https ESTABLISHED
tcp        0      0 northboat-nhx0dbd:55554 server-99-84-140-:https TIME_WAIT
tcp        0      0 northboat-nhx0dbd:35086 121.29.38.32:https      ESTABLISHED
tcp        0      0 northboat-nhx0dbd:44170 51.104.15.252:https     ESTABLISHED
tcp        0      0 northboat-nhx0dbd:44158 51.104.15.252:https     ESTABLISHED
tcp        0      0 northboat-nhx0dbd:55554 server-99-84-140-:https TIME_WAIT
tcp        0      0 northboat-nhx0dbd:35086 121.29.38.32:https      ESTABLISHED
tcp6       0      0 ipv6.localhost.cn:39046 ipv6.localhost.cn:https ESTABLISHED
tcp6       0      0 ipv6.localhost.cn:32880 ipv6.localhost.cn:https ESTABLISHED
tcp6       0      0 ipv6.localhost.cn:51934 ipv6.localhost:www-http ESTABLISHED
tcp6       0      0 ipv6.localhost.cn:51940 ipv6.localhost.cn:https ESTABLISHED
tcp6       0      0 ipv6.localhost.cn:39674 ipv6.localhost.cn:https ESTABLISHED
tcp6       0      0 ipv6.localhost.cn:47970 ipv6.localhost.cn:https ESTABLISHED
udp        0      0 northboat-nhx0db:bootpc _gateway:bootps         ESTABLISHED
udp6       0      0 ipv6.localhost.cn:55380 ipv6.localhost.cn:https ESTABLISHED
Active UNIX domain sockets (w/o servers)
Proto RefCnt Flags       Type       State         I-Node   Path
unix  3      [ ]         STREAM     CONNECTED     29163
unix  3      [ ]         STREAM     CONNECTED     31785
unix  3      [ ]         STREAM     CONNECTED     17228
unix  3      [ ]         STREAM     CONNECTED     987
unix  3      [ ]         STREAM     CONNECTED     27976    /run/user/1000/bus
unix  2      [ ]         DGRAM      CONNECTED     26628
unix  3      [ ]         STREAM     CONNECTED     34928    @/tmp/.X11-unix/X0
unix  3      [ ]         STREAM     CONNECTED     25066    /run/user/1000/at-spi/bus_0
unix  3      [ ]         STREAM     CONNECTED     25926    /run/user/1000/bus
unix  3      [ ]         STREAM     CONNECTED     27800
```

进程管理

`ps`命令查看进程

```
[northboat@northboat-nhx0dbde ~]$ ps
    PID TTY          TIME CMD
   5066 pts/1    00:00:00 bash
   5072 pts/1    00:00:00 ps
```

查看所有用户所有进程信息

```
[northboat@northboat-nhx0dbde netctl]$ ps -aux
USER         PID %CPU %MEM    VSZ   RSS TTY      STAT START   TIME COMMAND
root           1  0.0  0.0 170320 14876 ?        Ss   11:46   0:01 /sbin/init
root           2  0.0  0.0      0     0 ?        S    11:46   0:00 [kthreadd]
root           3  0.0  0.0      0     0 ?        I<   11:46   0:00 [rcu_gp]
root           4  0.0  0.0      0     0 ?        I<   11:46   0:00 [rcu_par_gp]
root           5  0.0  0.0      0     0 ?        I<   11:46   0:00 [slub_flushwq
root           6  0.0  0.0      0     0 ?        I<   11:46   0:00 [netns]
root           8  0.0  0.0      0     0 ?        I<   11:46   0:00 [kworker/0:0H
root          10  0.0  0.0      0     0 ?        I<   11:46   0:00 [mm_percpu_wq
root          12  0.0  0.0      0     0 ?        I    11:46   0:00 [rcu_tasks_kt
root          13  0.0  0.0      0     0 ?        I    11:46   0:00 [rcu_tasks_ru
root          14  0.0  0.0      0     0 ?        I    11:46   0:00 [rcu_tasks_tr
root          15  0.0  0.0      0     0 ?        S    11:46   0:00 [ksoftirqd/0]
root          16  0.0  0.0      0     0 ?        I    11:46   0:00 [rcu_preempt]
root          17  0.0  0.0      0     0 ?        S    11:46   0:00 [rcub/0]
root          18  0.0  0.0      0     0 ?        S    11:46   0:00 [migration/0]
root          19  0.0  0.0      0     0 ?        S    11:46   0:00 [idle_inject/
root          21  0.0  0.0      0     0 ?        S    11:46   0:00 [cpuhp/0]
root          22  0.0  0.0      0     0 ?        S    11:46   0:00 [cpuhp/1]
root          23  0.0  0.0      0     0 ?        S    11:46   0:00 [idle_inject/
root          24  0.0  0.0      0     0 ?        S    11:46   0:00 [migration/1]
root          25  0.0  0.0      0     0 ?        S    11:46   0:00 [ksoftirqd/1]
root          27  0.0  0.0      0     0 ?        I<   11:46   0:00 [kworker/1:0H
root          28  0.0  0.0      0     0 ?        S    11:46   0:00 [cpuhp/2]
root          29  0.0  0.0      0     0 ?        S    11:46   0:00 [idle_inject/
root          30  0.0  0.0      0     0 ?        S    11:46   0:00 [migration/2]
root          31  0.0  0.0      0     0 ?        S    11:46   0:00 [ksoftirqd/2]
root          33  0.0  0.0      0     0 ?        I<   11:46   0:00 [kworker/2:0H
root          34  0.0  0.0      0     0 ?        S    11:46   0:00 [cpuhp/3]
root          35  0.0  0.0      0     0 ?        S    11:46   0:00 [idle_inject/
root          36  0.0  0.0      0     0 ?        S    11:46   0:00 [migration/3]
root          37  0.0  0.0      0     0 ?        S    11:46   0:00 [ksoftirqd/3]
root          39  0.0  0.0      0     0 ?        I<   11:46   0:00 [kworker/3:0H
root          40  0.0  0.0      0     0 ?        S    11:46   0:00 [cpuhp/4]
root          41  0.0  0.0      0     0 ?        S    11:46   0:00 [idle_inject/
```

进程信息排序

- 按内存占用

```
[northboat@northboat-nhx0dbde netctl]$ ps -auxw --sort=rss
USER         PID %CPU %MEM    VSZ   RSS TTY      STAT START   TIME COMMAND
root           2  0.0  0.0      0     0 ?        S    11:46   0:00 [kthreadd]
root           3  0.0  0.0      0     0 ?        I<   11:46   0:00 [rcu_gp]
root           4  0.0  0.0      0     0 ?        I<   11:46   0:00 [rcu_par_gp]
root           5  0.0  0.0      0     0 ?        I<   11:46   0:00 [slub_flushwq]
root           6  0.0  0.0      0     0 ?        I<   11:46   0:00 [netns]
root           8  0.0  0.0      0     0 ?        I<   11:46   0:00 [kworker/0:0H-acpi_thermal_pm]
root          10  0.0  0.0      0     0 ?        I<   11:46   0:00 [mm_percpu_wq]
root          12  0.0  0.0      0     0 ?        I    11:46   0:00 [rcu_tasks_kthread]
root          13  0.0  0.0      0     0 ?        I    11:46   0:00 [rcu_tasks_rude_kthread]
root          14  0.0  0.0      0     0 ?        I    11:46   0:00 [rcu_tasks_trace_kthread]
root          15  0.0  0.0      0     0 ?        S    11:46   0:00 [ksoftirqd/0]
root          16  0.0  0.0      0     0 ?        I    11:46   0:00 [rcu_preempt]
root          17  0.0  0.0      0     0 ?        S    11:46   0:00 [rcub/0]
root          18  0.0  0.0      0     0 ?        S    11:46   0:00 [migration/0]
root          19  0.0  0.0      0     0 ?        S    11:46   0:00 [idle_inject/0]
root          21  0.0  0.0      0     0 ?        S    11:46   0:00 [cpuhp/0]
root          22  0.0  0.0      0     0 ?        S    11:46   0:00 [cpuhp/1]
root          23  0.0  0.0      0     0 ?        S    11:46   0:00 [idle_inject/1]
root          24  0.0  0.0      0     0 ?        S    11:46   0:00 [migration/1]
root          25  0.0  0.0      0     0 ?        S    11:46   0:00 [ksoftirqd/1]
root          27  0.0  0.0      0     0 ?        I<   11:46   0:00 [kworker/1:0H-events_highpri]
root          28  0.0  0.0      0     0 ?        S    11:46   0:00 [cpuhp/2]
root          29  0.0  0.0      0     0 ?        S    11:46   0:00 [idle_inject/2]
root          30  0.0  0.0      0     0 ?        S    11:46   0:00 [migration/2]
root          31  0.0  0.0      0     0 ?        S    11:46   0:00 [ksoftirqd/2]
root          33  0.0  0.0      0     0 ?        I<   11:46   0:00 [kworker/2:0H-events_highpri]
root          34  0.0  0.0      0     0 ?        S    11:46   0:00 [cpuhp/3]
root          35  0.0  0.0      0     0 ?        S    11:46   0:00 [idle_inject/3]
root          36  0.0  0.0      0     0 ?        S    11:46   0:00 [migration/3]
root          37  0.0  0.0      0     0 ?        S    11:46   0:00 [ksoftirqd/3]
root          39  0.0  0.0      0     0 ?        I<   11:46   0:00 [kworker/3:0H-events_highpri]
root          40  0.0  0.0      0     0 ?        S    11:46   0:00 [cpuhp/4]
root          41  0.0  0.0      0     0 ?        S    11:46   0:00 [idle_inject/4]
root          42  0.0  0.0      0     0 ?        S    11:46   0:00 [migration/4]
root          43  0.0  0.0      0     0 ?        S    11:46   0:00 [ksoftirqd/4]
root          44  0.0  0.0      0     0 ?        I    11:46   0:00 [kworker/4:0-cgroup_destroy]
root          45  0.0  0.0      0     0 ?        I<   11:46   0:00 [kworker/4:0H-events_highpri]
root          46  0.0  0.0      0     0 ?        S    11:46   0:00 [cpuhp/5]
```

- 按 CPU 占用

```
[northboat@northboat-nhx0dbde netctl]$ ps -auxw --sort=%cpu
USER         PID %CPU %MEM    VSZ   RSS TTY      STAT START   TIME COMMAND
root           1  0.0  0.0 170320 14876 ?        Ss   11:46   0:01 /sbin/init
root           2  0.0  0.0      0     0 ?        S    11:46   0:00 [kthreadd]
root           3  0.0  0.0      0     0 ?        I<   11:46   0:00 [rcu_gp]
root           4  0.0  0.0      0     0 ?        I<   11:46   0:00 [rcu_par_gp]
root           5  0.0  0.0      0     0 ?        I<   11:46   0:00 [slub_flushwq]
root           6  0.0  0.0      0     0 ?        I<   11:46   0:00 [netns]
root           8  0.0  0.0      0     0 ?        I<   11:46   0:00 [kworker/0:0H-acpi_thermal_pm]
root          10  0.0  0.0      0     0 ?        I<   11:46   0:00 [mm_percpu_wq]
root          12  0.0  0.0      0     0 ?        I    11:46   0:00 [rcu_tasks_kthread]
root          13  0.0  0.0      0     0 ?        I    11:46   0:00 [rcu_tasks_rude_kthread]
root          14  0.0  0.0      0     0 ?        I    11:46   0:00 [rcu_tasks_trace_kthread]
root          15  0.0  0.0      0     0 ?        S    11:46   0:00 [ksoftirqd/0]
root          16  0.0  0.0      0     0 ?        I    11:46   0:00 [rcu_preempt]
root          17  0.0  0.0      0     0 ?        S    11:46   0:00 [rcub/0]
root          18  0.0  0.0      0     0 ?        S    11:46   0:00 [migration/0]
root          19  0.0  0.0      0     0 ?        S    11:46   0:00 [idle_inject/0]
root          21  0.0  0.0      0     0 ?        S    11:46   0:00 [cpuhp/0]
root          22  0.0  0.0      0     0 ?        S    11:46   0:00 [cpuhp/1]
root          23  0.0  0.0      0     0 ?        S    11:46   0:00 [idle_inject/1]
root          24  0.0  0.0      0     0 ?        S    11:46   0:00 [migration/1]
root          25  0.0  0.0      0     0 ?        S    11:46   0:00 [ksoftirqd/1]
root          27  0.0  0.0      0     0 ?        I<   11:46   0:00 [kworker/1:0H-events_highpri]
root          28  0.0  0.0      0     0 ?        S    11:46   0:00 [cpuhp/2]
root          29  0.0  0.0      0     0 ?        S    11:46   0:00 [idle_inject/2]
root          30  0.0  0.0      0     0 ?        S    11:46   0:00 [migration/2]
root          31  0.0  0.0      0     0 ?        S    11:46   0:00 [ksoftirqd/2]
root          33  0.0  0.0      0     0 ?        I<   11:46   0:00 [kworker/2:0H-events_highpri]
root          34  0.0  0.0      0     0 ?        S    11:46   0:00 [cpuhp/3]
root          35  0.0  0.0      0     0 ?        S    11:46   0:00 [idle_inject/3]
root          36  0.0  0.0      0     0 ?        S    11:46   0:00 [migration/3]
root          37  0.0  0.0      0     0 ?        S    11:46   0:00 [ksoftirqd/3]
root          39  0.0  0.0      0     0 ?        I<   11:46   0:00 [kworker/3:0H-events_highpri]
root          40  0.0  0.0      0     0 ?        S    11:46   0:00 [cpuhp/4]
root          41  0.0  0.0      0     0 ?        S    11:46   0:00 [idle_inject/4]
root          42  0.0  0.0      0     0 ?        S    11:46   0:00 [migration/4]
root          43  0.0  0.0      0     0 ?        S    11:46   0:00 [ksoftirqd/4]
root          44  0.0  0.0      0     0 ?        I    11:46   0:00 [kworker/4:0-cgroup_destroy]
```

动态查看进程信息

```
[northboat@northboat-nhx0dbde netctl]$ top

top - 12:23:45 up 37 min,  1 user,  load average: 0.87, 0.63, 0.52
任务: 323 total,   1 running, 322 sleeping,   0 stopped,   0 zombie
%Cpu(s):  1.7 us,  0.9 sy,  0.0 ni, 97.0 id,  0.0 wa,  0.3 hi,  0.2 si,  0.0 st
MiB Mem :  15821.4 total,  10135.8 free,   2682.1 used,   3003.5 buff/cache
MiB Swap:  17405.8 total,  17405.8 free,      0.0 used.  11881.3 avail Mem

  进程号 USER      PR  NI    VIRT    RES    SHR S  %CPU  %MEM     TIME+ COMMAND
    894 root      20   0   26.1g 166568  94908 S  16.3   1.0   2:25.21 Xorg
   1381 northbo+  20   0  738664  78820  53076 S   8.6   0.5   0:13.83 panel-1+
   1337 northbo+  20   0 1735468 107708  72328 S   5.0   0.7   0:27.11 xfwm4
    883 mysql     20   0 2307672 420644  35268 S   0.7   2.6   0:14.71 mysqld
   2414 northbo+  20   0   37.1g 176480 118860 S   0.7   1.1   1:04.34 Typora
   4011 northbo+  20   0 1130.1g 199904 139536 S   0.7   1.2   0:12.83 electron
   4313 northbo+  20   0 1125.3g 203460 121720 S   0.7   1.3   0:33.33 msedge
   5312 northbo+  20   0   14044   4520   3400 R   0.7   0.0   0:00.05 top
     93 root      20   0       0      0      0 I   0.3   0.0   0:00.67 kworker+
    231 root       0 -20       0      0      0 I   0.3   0.0   0:00.21 kworker+
   1645 northbo+  20   0 1694228  98364  57036 S   0.3   0.6   0:01.76 xdg-des+
   1923 northbo+  20   0   32.9g 157884  88584 S   0.3   1.0   0:17.93 msedge
   2487 northbo+  20   0   41.1g 738748 626296 S   0.3   4.6   3:06.62 Typora
```

终止进程

```
# 根据 pid 杀死进程
kill -9 pid

# 根据进程名查找 pid
pgrep -f name

# 根据进程名杀死进程
pkill -f name
```

磁盘管理

查看已挂载磁盘总容量、已使用、剩余容量

```
[northboat@northboat-nhx0dbde netctl]$ df -h
文件系统        大小  已用  可用 已用% 挂载点
dev             7.8G     0  7.8G    0% /dev
run             7.8G   1.7M  7.8G    1% /run
/dev/sda2       452G   139G  290G   33% /
tmpfs           7.8G   560M  7.2G    8% /dev/shm
tmpfs           7.8G   5.6M  7.8G    1% /tmp
/dev/sda1       300M   308K  300M    1% /boot/efi
tmpfs           1.6G    88K  1.6G    1% /run/user/1000
```

查看目录或文件所占空间

```
[northboat@northboat-nhx0dbde file]$ ls
ai   bash   c   compiler   fe   java   python   reco   school
[northboat@northboat-nhx0dbde file]$ du -s java/
212780  java/
[northboat@northboat-nhx0dbde file]$ _
```

```
[northboat@northboat-nhx0dbde reco]$ du -s pull.sh
4       pull.sh
[northboat@northboat-nhx0dbde reco]$ _
```

实验总结

修改静态 IP 可以方便局域网内对本机进行访问，感觉用处不大，之前使用系统提供的配置文件对静态 IP 进行过修改，但每次重启或重新联网后都会重置该 IP，后采用`netctl`对静态 IP 进行统一管理，解决了问题