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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

```
$ root@VM-0-17-debian /home$ uname -a
Linux VM-0-17-debian 5.10.0-19-amd64 #1 SMP Debian 5.10.149-2 (2022-10-21) x86_64 GNU/Linux
$ root@VM-0-17-debian /home$ Fri 10 Mar 2023 08:26:05 AM CST
```

查看网卡信息

```

$ root@VM-0-17-debian /home ifconfig Fri 10 Mar 2023 08:26:05 AM CST
eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 10.0.0.17 netmask 255.255.252.0 broadcast 10.0.3.255
    inet6 fe80::5054:ff:fe69:78e8 prefixlen 64 scopeid 0x20<link>
    ether 52:54:00:69:78:e8 txqueuelen 1000 (Ethernet)
    RX packets 792772 bytes 439249956 (418.9 MiB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 530303 bytes 108429285 (103.4 MiB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
    inet 127.0.0.1 netmask 255.0.0.0
    inet6 ::1 prefixlen 128 scopeid 0x10<host>
    loop txqueuelen 1000 (Local Loopback)
    RX packets 67961 bytes 3142869 (2.9 MiB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 67961 bytes 3142869 (2.9 MiB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

$ root@VM-0-17-debian /home Fri 10 Mar 2023 08:28:01 AM CST

```

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 "?passwd" | 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
$ root@VM-0-17-debian / test1
```

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 /
```

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 2023
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
lighthouse/ test/ test.tar test.tar.gz
```

解压文件

```
$ root@VM-0-17-debian /home tar -xvf test.tar.gz
test/
$ root@VM-0-17-debian /home ls
lighthouse/ test/ test.tar test.tar.gz
$ root@VM-0-17-debian /home
```

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 default 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 group 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 noprefixroute wlp12s0
        valid_lft 2595sec preferred_lft 2595sec
    inet6 2408:841d:2530:4acd:4ce3:5f9c:8087:8635/64 scope global dynamic noprefixroute
        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 netctl1]$ 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/
root            42   0.0   0.0      0      0 ?        S    11:46   0:00 [migration/4]
```

进程信息排序

- 按内存占用

```
[northboat@northboat-nhx0dbde netctl1]$ 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 netctl1]$ 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   %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