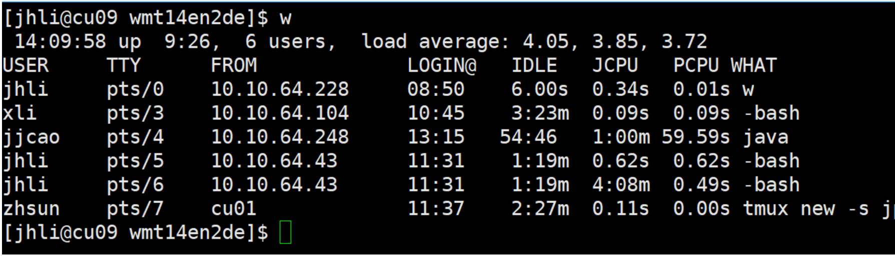
Linux系统管理

教师: 李军辉

监控系统状态:

1. w: 当前系统负载 ;
2. vmstat: 监控系统状态;
3. top: 显示进程所占的系统资源;
4. sar: 监控系统状态;
5. nload: 网络流量;
6. free: 内存使用情况;
7. ps: 进程;
8. netstat: 网络状态.

w: 当前系统负载



```
[jhli@cu09 wmt14en2de]$ w
 14:09:58 up  9:26,  6 users,  load average: 4.05, 3.85, 3.72
USER     TTY      FROM              LOGIN@   IDLE   JCPU   PCPU WHAT
jhli     pts/0    10.10.64.228      08:50    6.00s  0.34s  0.01s w
xli      pts/3    10.10.64.104      10:45    3:23m  0.09s  0.09s -bash
jjcao    pts/4    10.10.64.248      13:15   54:46   1:00m 59.59s java
jhli     pts/5    10.10.64.43       11:31    1:19m  0.62s  0.62s -bash
jhli     pts/6    10.10.64.43       11:31    1:19m  4:08m  0.49s -bash
zhsun    pts/7    cu01              11:37    2:27m  0.11s  0.00s tmux new -s j
[jhli@cu09 wmt14en2de]$ 
```

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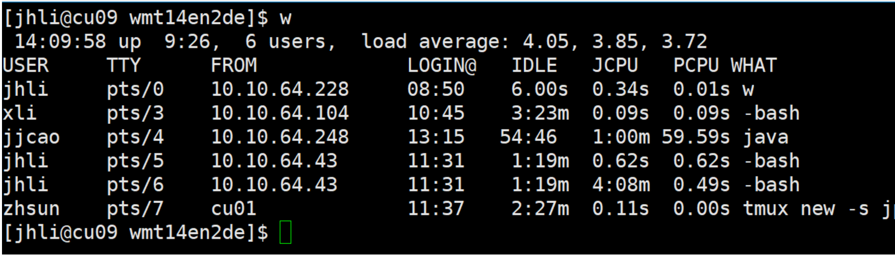

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[jhli@cu09 wmt14en2de]$
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时间、系统运行时间, 登录用户数, 平均负载 (平均1/5/15分钟内的平均负载值)

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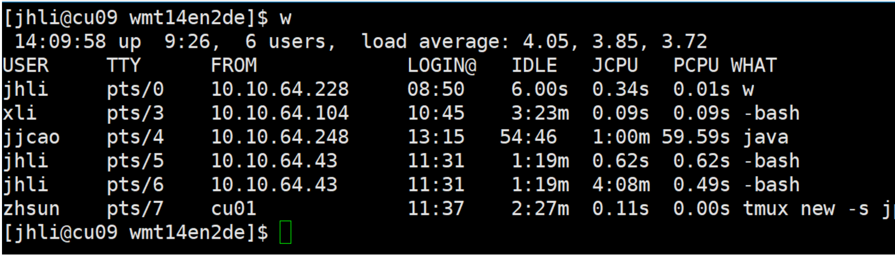

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时间、系统运行时间, 登录用户数, 平均负载 (平均1/5/15分钟内的平均负载值)

负载值

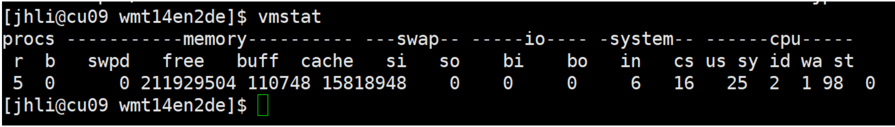
1. 单位时间段内使用CPU活动进程数;
2. 值越大说明服务器压力越大;
3. 一般不超过CPU数量即可.

cat /proc/cpuinfo: 查看CPU信息

```
cat /proc/cpuinfo | grep ‘processor’
```

```
cat /proc/cpuinfo | grep ‘physical id’
```

vmstat: 监控系统状态



```
[jhli@cu09 wmt14en2de]$ vmstat
procs -----------memory---------- ---swap-- -----io---- -system-- ------cpu-----
 r  b   swpd   free   buff  cache   si   so    bi    bo   in   cs us sy id wa st
 5  0      0 211929504 110748 15818948    0    0     0     6   16   25  2  1 98  0
[jhli@cu09 wmt14en2de]$ 
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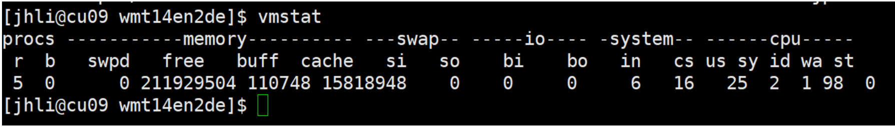

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[jhli@cu09 wmt14en2de]$ 
```
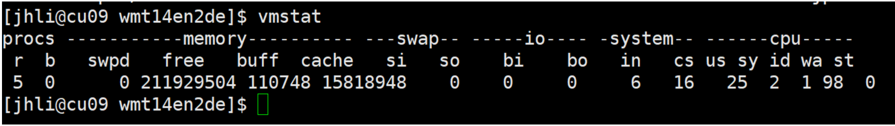

- proc
- memory
- swap
- io
- system
- cpu

vmstat: 监控系统状态



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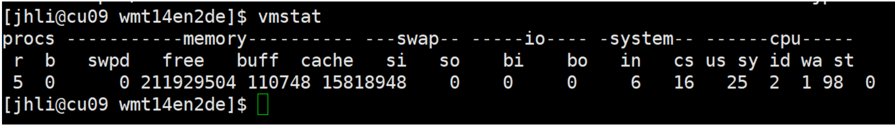
- r (run): 运行或等待CPU时间片的进程数;
- b (block): 等待资源的进程数;

vmstat: 监控系统状态



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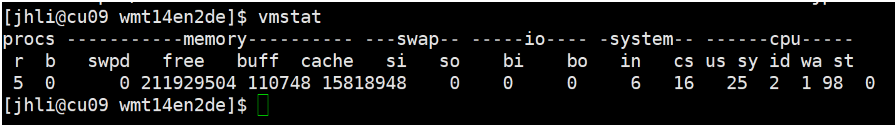
[jhli@cu09 wmt14en2de]$ 
```

- r (run): 运行或等待CPU时间片的进程数;
- b (block): 等待资源的进程数;
- swpd: 切换到交换区中的内存数量 (KB);
- free: 空闲的内存数量 (KB);
- buff: (即将写入磁盘的)缓冲大小 (KB);
- cache: (从磁盘中读取的)缓存大小 (KB).

vmstat: 监控系统状态



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[jhli@cu09 wmt14en2de]$ 
```
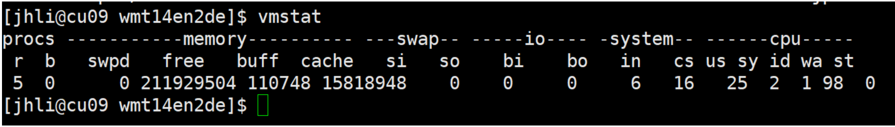

- si: 由交换区写入内存的数据量 (KB);
- so: 由内存写入交换区的数据量 (KB);

vmstat: 监控系统状态



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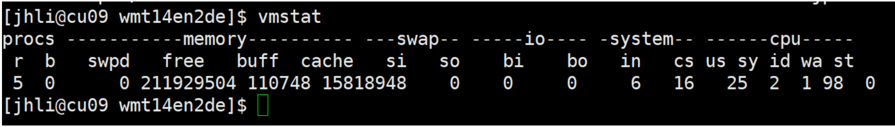
```

- si: 由交换区写入内存的数据量 (KB);
- so: 由内存写入交换区的数据量 (KB);
- bi: 从块设备读取的数据量 (KB);
- bo: 写入块设备的数据量 (KB);

vmstat: 监控系统状态



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```
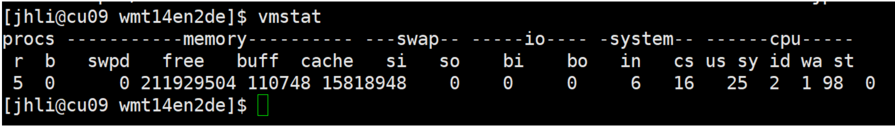

- si: 由交换区写入内存的数据量 (KB);
- so: 由内存写入交换区的数据量 (KB);
- bi: 从块设备读取的数据量 (KB);
- bo: 写入块设备的数据量 (KB);
- in: 某一时间间隔内观测到的每秒设备的中断次数;
- cs: 每秒产生的上下文切换次数;

vmstat: 监控系统状态



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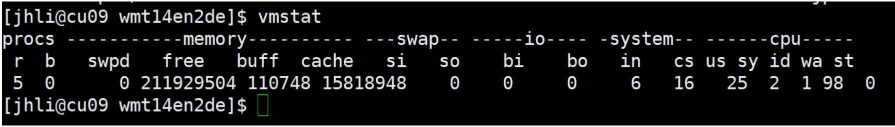
[jhli@cu09 wmt14en2de]$ 
```

- us: 用户下花费CPU的时间百分比;
- sy: 系统下花费CPU的时间百分比;
- id: CPU处于空闲状态的时间百分比;
- wa: I/O等待所占用CPU的时间百分比;
- st: 被偷走的CPU所占百分比 (一般为0, 不用关注).

vmstat: 监控系统状态



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```
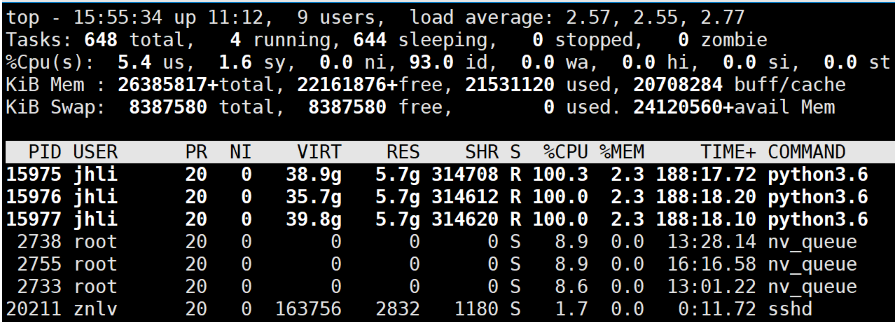

```
vmstat 1 5
```

```
vmstat 1
```

top: 显示进程所占的系统资源

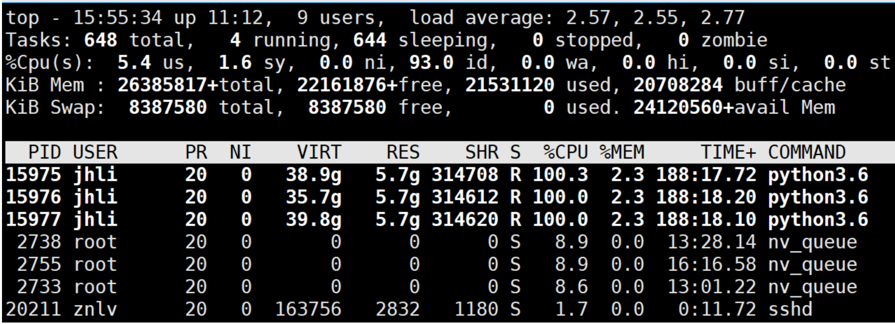


```
top - 15:55:34 up 11:12,  9 users,  load average: 2.57, 2.55, 2.77
Tasks: 648 total,   4 running, 644 sleeping,   0 stopped,   0 zombie
%Cpu(s):  5.4 us,  1.6 sy,  0.0 ni, 93.0 id,  0.0 wa,  0.0 hi,  0.0 si,  0.0 st
KiB Mem : 26385817+total, 22161876+free, 21531120 used, 20708284 buff/cache
KiB Swap:  8387580 total,  8387580 free,        0 used. 24120560+avail Mem

  PID USER      PR  NI    VIRT    RES    SHR S  %CPU %MEM     TIME+ COMMAND
15975 jhli      20   0   38.9g   5.7g 314708 R 100.3  2.3 188:17.72 python3.6
15976 jhli      20   0   35.7g   5.7g 314612 R 100.0  2.3 188:18.20 python3.6
15977 jhli      20   0   39.8g   5.7g 314620 R 100.0  2.3 188:18.10 python3.6
 2738 root      20   0       0      0      0 S   8.9  0.0  13:28.14 nv_queue
 2755 root      20   0       0      0      0 S   8.9  0.0  16:16.58 nv_queue
 2733 root      20   0       0      0      0 S   8.6  0.0  13:01.22 nv_queue
20211 znlv      20   0  163756   2832   1180 S   1.7  0.0   0:11.72 sshd
```

动态监测进程所占的系统资源, 每3秒更新一次;

- Shift+m: 按内存使用大小排充;
- 1: 列出所有核CPU的使用状态;
- q: 退出.

top: 显示进程所占的系统资源



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非动态打印系统资源的使用情况

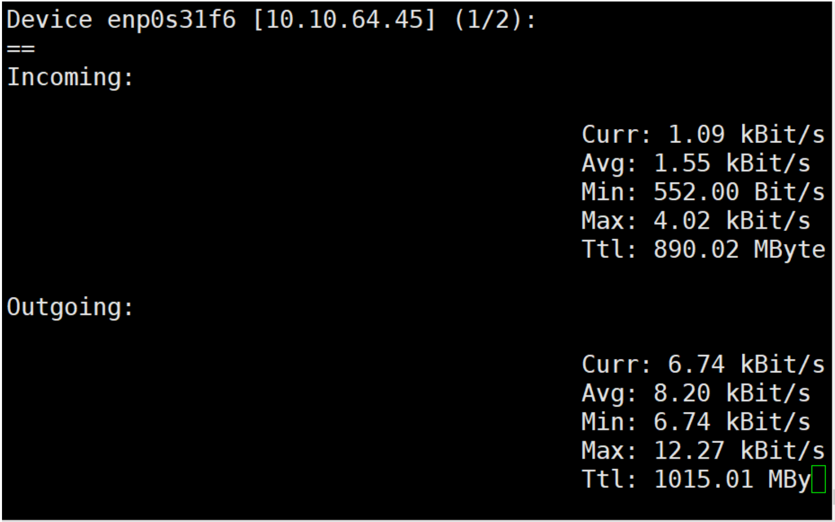
```
top -bn1
```

sar (System Activity Report): 监控系统状态

查看网卡流量

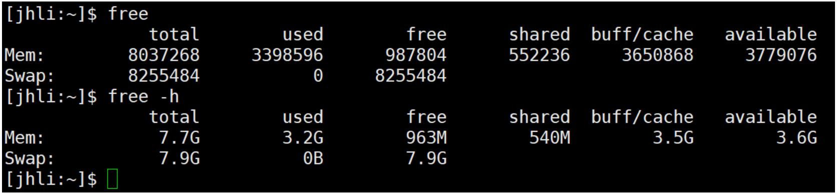
```
sar -n DEV
```

nload: 网卡流量



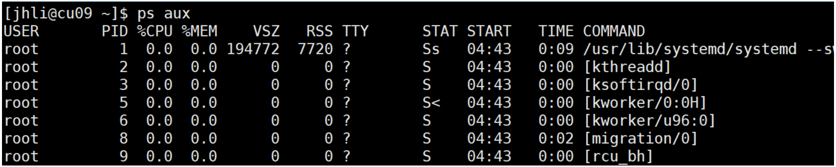
```
Device enp0s31f6 [10.10.64.45] (1/2):
==
Incoming:

                                        Curr: 1.09 kBit/s
                                        Avg: 1.55 kBit/s
                                        Min: 552.00 Bit/s
                                        Max: 4.02 kBit/s
                                        Ttl: 890.02 MByte

Outgoing:

                                        Curr: 6.74 kBit/s
                                        Avg: 8.20 kBit/s
                                        Min: 6.74 kBit/s
                                        Max: 12.27 kBit/s
                                        Ttl: 1015.01 MBy
```

free: 内存使用情况



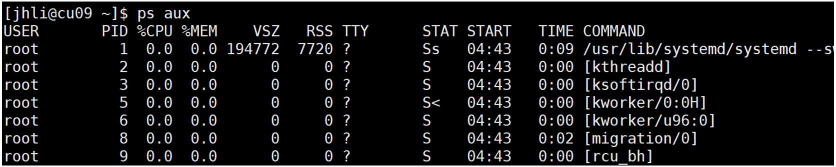
```
[jhli:~]$ free
              total        used        free      shared  buff/cache   available
Mem:        8037268     3398596      987804      552236     3650868     3779076
Swap:       8255484           0     8255484
[jhli:~]$ free -h
              total        used        free      shared  buff/cache   available
Mem:           7.7G        3.2G        963M        540M        3.5G        3.6G
Swap:          7.9G          0B        7.9G
[jhli:~]$ 
```

ps: 进程



```
[jhli@cu09 ~]$ ps aux
USER       PID %CPU %MEM    VSZ   RSS TTY      STAT START   TIME COMMAND
root         1  0.0  0.0 194772  7720 ?        Ss   04:43   0:09 /usr/lib/systemd/systemd --s
root         2  0.0  0.0      0     0 ?        S    04:43   0:00 [kthreadd]
root         3  0.0  0.0      0     0 ?        S    04:43   0:00 [ksoftirqd/0]
root         5  0.0  0.0      0     0 ?        S<   04:43   0:00 [kworker/0:0H]
root         6  0.0  0.0      0     0 ?        S    04:43   0:00 [kworker/u96:0]
root         8  0.0  0.0      0     0 ?        S    04:43   0:02 [migration/0]
root         9  0.0  0.0      0     0 ?        S    04:43   0:00 [rcu_bh]
```

ps: 进程



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[jhli@cu09 ~]$ ps aux
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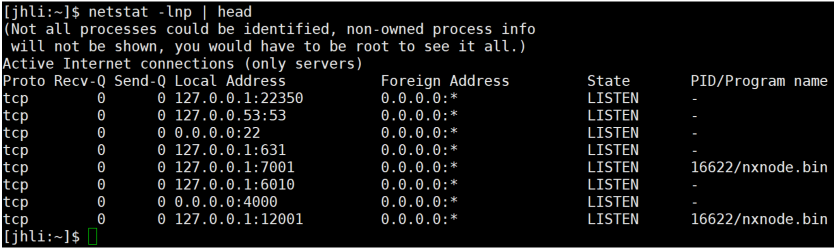
root         2  0.0  0.0      0     0 ?        S    04:43   0:00 [kthreadd]
root         3  0.0  0.0      0     0 ?        S    04:43   0:00 [ksoftirqd/0]
root         5  0.0  0.0      0     0 ?        S<   04:43   0:00 [kworker/0:0H]
root         6  0.0  0.0      0     0 ?        S    04:43   0:00 [kworker/u96:0]
root         8  0.0  0.0      0     0 ?        S    04:43   0:02 [migration/0]
root         9  0.0  0.0      0     0 ?        S    04:43   0:00 [rcu_bh]
```

跟grep配合使用

```
ps aux | grep ‘sshd’
```

netstat: 网络状态



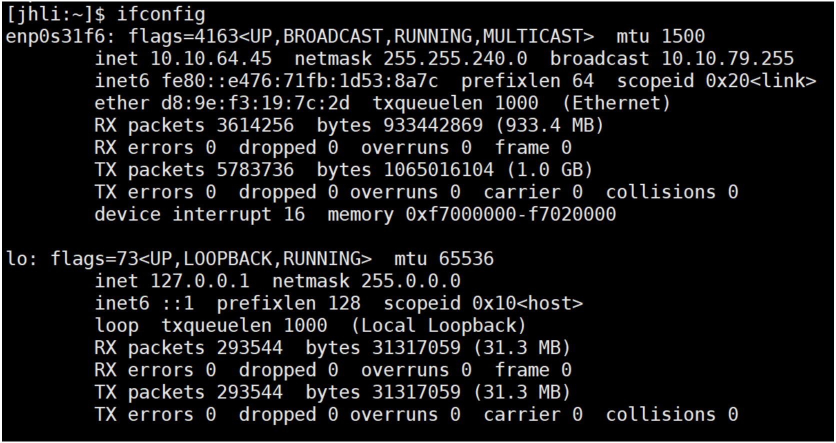
```
[jhli:~]$ netstat -lnp | head
(Not all processes could be identified, non-owned process info
 will not be shown, you would have to be root to see it all.)
Active Internet connections (only servers)
Proto Recv-Q Send-Q Local Address           Foreign Address         State       PID/Program name
tcp        0      0 127.0.0.1:22350         0.0.0.0:*               LISTEN      -
tcp        0      0 127.0.0.53:53           0.0.0.0:*               LISTEN      -
tcp        0      0 0.0.0.0:22              0.0.0.0:*               LISTEN      -
tcp        0      0 127.0.0.1:631           0.0.0.0:*               LISTEN      -
tcp        0      0 127.0.0.1:7001          0.0.0.0:*               LISTEN      16622/nxnode.bin
tcp        0      0 127.0.0.1:6010          0.0.0.0:*               LISTEN      -
tcp        0      0 0.0.0.0:4000            0.0.0.0:*               LISTEN      -
tcp        0      0 127.0.0.1:12001         0.0.0.0:*               LISTEN      16622/nxnode.bin
[jhli:~]$
```

网络相关:

1. ifconfig: 查看网卡IP ;
2. 给一个网卡设定多个IP;
3. 查看网卡连接状态;
4. 更改主机名;
5. 设置DNS.

ifconfig: 查看网卡IP

ifconfig: Interface configuration



```
[jhli:~]$ ifconfig
enp0s31f6: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 10.10.64.45  netmask 255.255.240.0  broadcast 10.10.79.255
        inet6 fe80::e476:71fb:1d53:8a7c  prefixlen 64  scopeid 0x20<link>
        ether d8:9e:f3:19:7c:2d  txqueuelen 1000  (Ethernet)
        RX packets 3614256  bytes 933442869 (933.4 MB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 5783736  bytes 1065016104 (1.0 GB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
        device interrupt 16  memory 0xf7000000-f7020000

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 293544  bytes 31317059 (31.3 MB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 293544  bytes 31317059 (31.3 MB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
```

给一个网卡设定多个IP

临时添加IP地址 (其中假设网卡名称为enp0s3)

```
sudo ip addr add 192.168.1.104 dev enp0s3
```

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检查是否启用了新的 IP

```
sudo ip address show enp0s3
```

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```

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```
sudo ip address show enp0s3
```

删除IP

```
sudo ip addr del 192.168.1.104 dev enp0s3
```

给一个网卡设定多个IP

临时添加IP地址 (其中假设网卡名称为enp0s3)

```
sudo ifconfig enp0s3:0 192.168.29.155 netmask 255.255.255.0 broadcast 192.168.29.255 up
```

```
sudo ifconfig enp0s3:1 192.168.29.165 netmask 255.255.255.0 broadcast 192.168.29.255 up
```

给一个网卡设定多个IP

永久添加IP地址 (其中假设网卡名称为enp0s3)

修改/etc/network/interfaces

```
auto enp0s3:0
iface enp0s3:0 inet static
address 192.168.29.155
netmask 255.255.255.0
gateway 192.168.43.1
auto enp0s3:1
iface enp0s3:1 inet static
address 192.168.29.165
netmask 255.255.255.0
gateway 192.168.43.1
```

查看网卡连接状态

假设网卡名称为enp0s3

```
mii-tool enp0s3
enp0s3: negotiated 1000baseT-FD flow-control, link ok
```

更改主机名

查看主机名

```
hostname
```

更改主机名

查看主机名

```
hostname
```

(临时)更改主机名

```
hostname HAHA
```

更改主机名

查看主机名

```
hostname
```

(临时)更改主机名

```
hostname HAHA
```

(永久)更改主机名

```
hostnamectl set-hostname HAHA
```

即修改/etc/hostname文件.

设置DNS

DNS用于解析域名

```
vim /ect/resolv.conf
```

```
# Dynamic resolv.conf(5) file for glibc resolver(3) generated by resolvconf(8)
# DO NOT EDIT THIS FILE BY HAND – YOUR CHANGES WILL BE OVERWRITTEN
# 127.0.0.53 is the systemd-resolved stub resolver.
# run "systemd-resolve –status" to see details about the actual nameservers.
nameserver 127.0.0.53
```

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```
# Dynamic resolv.conf(5) file for glibc resolver(3) generated by resolvconf(8)
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# 127.0.0.53 is the systemd-resolved stub resolver.
# run "systemd-resolve –status" to see details about the actual nameservers.
nameserver 127.0.0.53
```

内容是一段警告：说这个文件是resolvconf程序动态创建的，不要直接手动编辑，修改将被覆盖。

设置DNS

```
vim /etc/network/interfaces
```

设置DNS

```
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```

```
dns-nameservers 8.8.8.8
```

设置DNS

```
vim /etc/network/interfaces
```

```
dns-nameservers 8.8.8.8
```

- 8.8.8.8是Google提供的DNS服务
- 重启后/ect/resolv.conf会添加nameserver 8.8.8.8

设置DNS

```
vim /etc/resolvconf/resolv.conf.d/base
```

设置DNS

```
vim /etc/resolvconf/resolv.conf.d/base
```

```
nameserver 8.8.8.8
nameserver 8.8.4.4
```

设置DNS

```
vim /etc/resolvconf/resolv.conf.d/base
```

```
nameserver 8.8.8.8
nameserver 8.8.4.4
```

立即生效

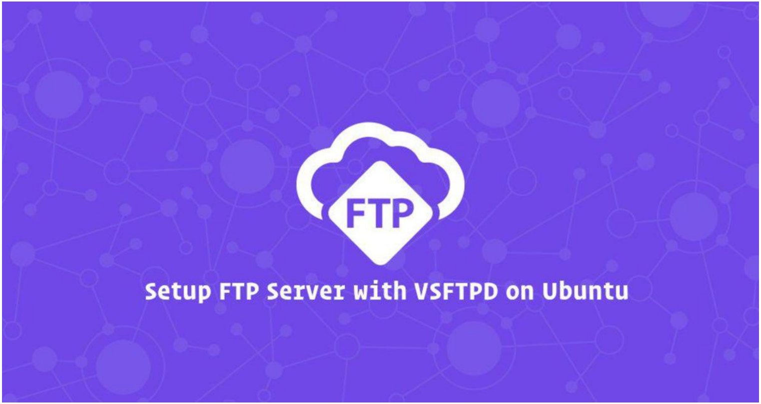
```
resolvconf -u
```

配置FTP

FTP: File Transfer Protocol (文件传输协议)

1. 使用vsftpd搭建FTP服务
2. 安装配置pure-ftpd

配置FTP



使用vsftpd搭建FTP服务

1. 安装vsftpd

```
sudo apt install vsftpd
```

使用vsftpd搭建FTP服务

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```
sudo apt install vsftpd
```

2. 创建虚拟账号(此账号不能登录)

```
useradd virftp -s /sbin/nologin
```

使用vsftpd搭建FTP服务

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```
sudo apt install vsftpd
```

2. 创建虚拟账号(此账号不能登录)

```
useradd virftp -s /sbin/nologin
```

3. 建议与虚拟账号相关的文件

vim /etc/vsftpd/vsftpd$_{l}ogin$