22 Interface configuration

Configuratie nic `/etc/network/interfaces`

config bestand wordt gebruikt door ifup en ifdown (zie later)

ifup -a wordt aangeroepen bij opstarten van OS om nic's beschikbaar te maken

meer info:

`man 5 interfaces`

sectie 5 van de man-pages (configuratie bestanden)

zie cursus

22.2.1 /etc/network/interfaces

```
root@ubu1104srv:~# cat /etc/network/interfaces
# This file describes the network interfaces available on your system
# and how to activate them. For more information, see interfaces(5).

# The loopback network interface
auto lo
iface lo inet loopback

# The primary network interface
auto eth0
iface eth0 inet dhcp
```

2 interfaces gedefinieerd: lo en eth0

auto: auto-start (ifup -a)

inet: tcp/ip (inet6 = ipv6, ddp = apple, ipx = novell, ...)

22.2.1 /etc/network/interface

- lo = loopback device

  virtueel device (geen hardware)

  loopback: trafic naar dit device wordt doorgestuurd naar een service op OS

  e.g. webserver localhost ip=127.0.0.1

```
root@ubu1104srv:~# cat /etc/network/interfaces
# This file describes the network interfaces available on your system
# and how to activate them. For more information, see interfaces(5).

# The loopback network interface
auto lo
iface lo inet loopback

# The primary network interface
auto eth0
iface eth0 inet dhcp
```

22.2.1 /etc/network/interface

- eth0 = eerste netwerk (ethernet) kaart

  optie 1: ip address via dhcp-server

```
root@ubu1104srv:~# cat /etc/network/interfaces
# This file describes the network interfaces available on your system
# and how to activate them. For more information, see interfaces(5).

# The loopback network interface
auto lo
iface lo inet loopback

# The primary network interface
auto eth0
iface eth0 inet dhcp
```

22.2.1 /etc/network/interface

- eth0 = eerste netwerk (ethernet) kaart

  optie 2: fixed ip (static)

```
root@ubu1104srv:~# cat /etc/network/interfaces
# This file describes the network interfaces available on your system
# and how to activate them. For more information, see interfaces(5).

# The loopback network interface
auto lo
iface lo inet loopback

# The primary network interface
auto eth0
iface eth0 inet static
address 192.168.33.100
network 192.168.33.0
netmask 255.255.255.0
gateway 192.168.33.1
```

gateway: alle traffic buiten het network wordt naar de gateway (router) gestuurd

22.2.1 /etc/network/interface

Wijziging in `/etc/network/interfaces` blijft behouden na reboot

verder: met ifconfig tijdelijke wijziging

22.2.2 ifdown

- take a network interface down

```
sudo ifdown eth0
sudo ifdown -a
```

```
man ifdown
```

-a, --all
If given to **ifup**, affect all interfaces marked **auto**. Interfaces are brought up in the order in which they are defined in /etc/network/interfaces. Combined with **--allow**, acts on all interfaces of a specified class instead. If given to **ifdown**, affect all defined interfaces. Interfaces are brought down in the order in which they are currently listed in the state file. Only interfaces defined in /etc/network/interfaces will be brought down.

22.2.3 ifup

- bring a network interface up

```
sudo ifup eth0
sudo ifup -a
```

```
man ifup
```

-a, --all

If given to **ifup**, affect all interfaces marked **auto**. Interfaces are brought up in the order in which they are defined in /etc/network/interfaces. Combined with **--allow**, acts on all interfaces of a specified class instead. If given to **ifdown**, affect all defined interfaces. Interfaces are brought down in the order in which they are currently listed in the state file. Only interfaces defined in /etc/network/interfaces will be brought down.

ifdown && ifup

Wijziging in `/etc/network/interfaces`

nic opnieuw opstarten

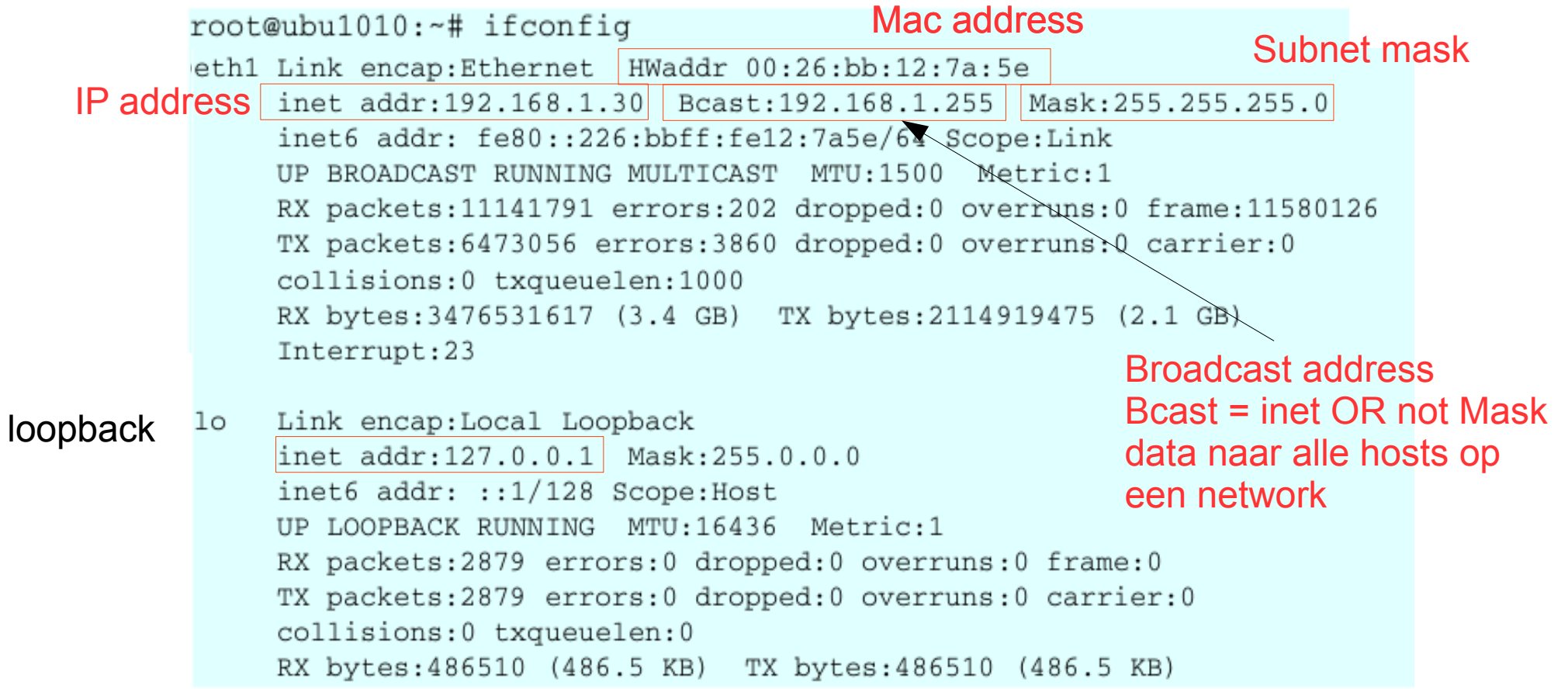
```
ifdown eth0 && ifup eth0
```

rol van `&&` :

- test of 1e commando lukt?
- indien ja voer 2e commando uit

22.2.4 ifconfig

- informatie opvragen en wijzigingen aanbrengen
- informatie opvragen zonder argument: alle nic's



22.4 ifconfig

- informatie opvragen en wijzigingen aanbrengen
- informatie opvragen met argument: 1 specifieke nic

```
[root@rhel6 ~]# ifconfig eth0
eth0 Link encap:Ethernet  HWaddr 08:00:27:DD:0D:5C
     inet addr:192.168.1.99  Bcast:192.168.1.255  Mask:255.255.255.0
     inet6 addr: fe80::a00:27ff:fedd:d5c/64 Scope:Link
     UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
     RX packets:2969 errors:0 dropped:0 overruns:0 frame:0
     TX packets:1918 errors:0 dropped:0 overruns:0 carrier:0
     collisions:0 txqueuelen:1000
     RX bytes:335942 (328.0 KiB)  TX bytes:190157 (185.7 KiB)
```

22.4.1 up and down

opnieuw opstarten nic

```
ifconfig eth0 down && ifconfig eth0 up
```

huidige configuratie eth0 wordt uitgelezen en opnieuw gebruikt
(eventueel aangebrachte wijziging via ifconfig blijft behouden)

alternatief voor

```
ifdown eth0 && ifup eth0
```

configuratie wordt gelezen uit /etc/network/interfaces

22.4.2 setting up ip address
22.4.3 setting up mac address

Tijdelijke wijziging

```
[root@rhel6 ~]# ifconfig eth0 192.168.33.42 netmask 255.255.0.0
```

```
[root@rhel6 ~]# ifconfig eth0 hw ether 00:42:42:42:42:42
```

Opmerking:

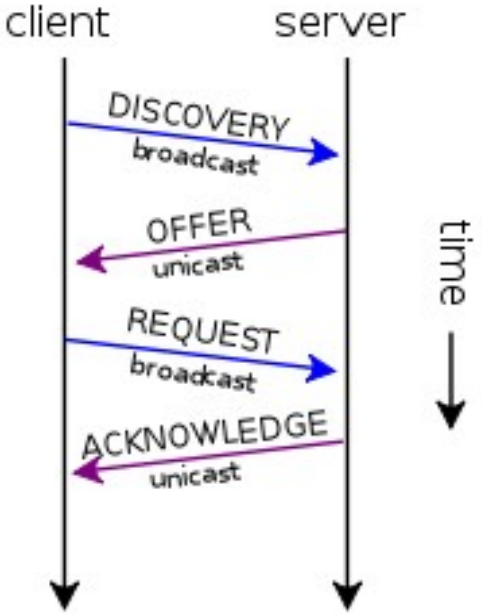
```
ifdown eth0 && ifup eth0
```

/etc/network/interfaces opnieuw uitgelezen en tijdelijke wijzigingen overschreven

22.4.4 dhclient

dhclient = daemon op huidige OS

server = DHCP server



DISCOVERY

client weet niet waar DHCP-server

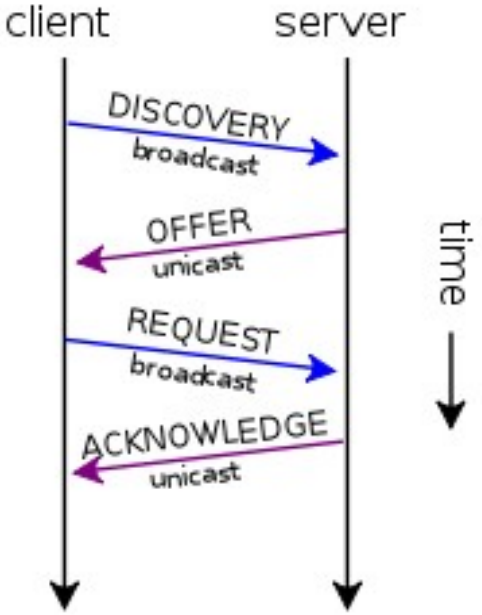
broadcast naar alle hosts in network

'mijn MAC address = ..., gelieve mij een ip address te bezorgen'

22.4.4 dhclient

dhclient = daemon op huidige OS

server = DHCP server



OFFER

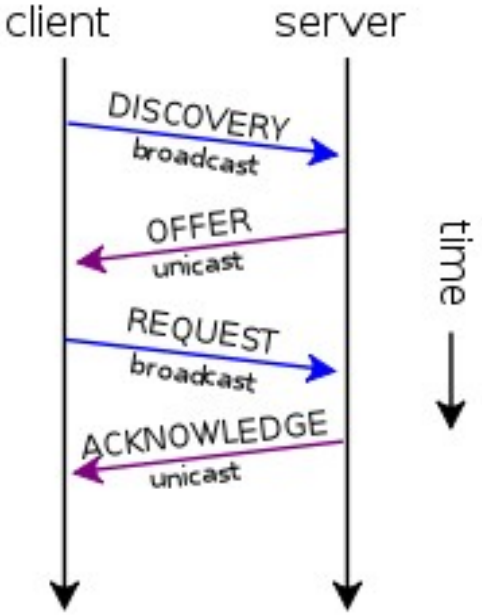
1 of meerdere DHCP servers sturen naar de client

aanbod (lease):
IP address voor client, subnet mask, lease duration en IP address van DHCP server

22.4.4 dhclient

dhclient = daemon op huidige OS

server = DHCP server



REQUEST

client kiest voor 1 van de OFFERS

doet een broadcast

'ik kies voor het OFFER van ...'

Gekozen DHCP server geeft ACKNOWLEDGE
alle andere DHCP servers weten dat hun OFFER niet meer nodig is

22.4.4 dhclient

- Zie man dhclient

  Release

  ```
  sudo dhclient -r eth0
  ```

  Opnieuw lease aanvragen

  ```
  sudo dhclient eth0
  ```

22.5 hostname

Terminal

```
jan@jan-laptop ~ $ cat /etc/hostname
jan-laptop
jan@jan-laptop ~ $ hostname
jan-laptop
jan@jan-laptop ~ $ sudo hostname test
[sudo] password for jan:
jan@jan-laptop ~ $ hostname
test
jan@jan-laptop ~ $ bash
jan@test ~ $ sysctl kernel.hostname
kernel.hostname = test
jan@test ~ $
```

Tijdelijke wijziging

Terminal

```
SYSCTL(8)                          System Administration

NAME
       sysctl - configure kernel parameters at runtime
```

22.6 arp

Terminal

```
ARP(8)                    Linux Programmer's Manual                    ARP(8)

NAME
       arp - manipulate the system ARP cache

DESCRIPTION
       Arp  manipulates or displays the kernel's IPv4 network neighbour cache.
       It can add entries to the table, delete one or display the current con-
       tent.

       ARP  stands  for Address Resolution Protocol, which is used to find the
       media access control address of a network neighbour for  a  given  IPv4
       Address.
```

22.6 arp

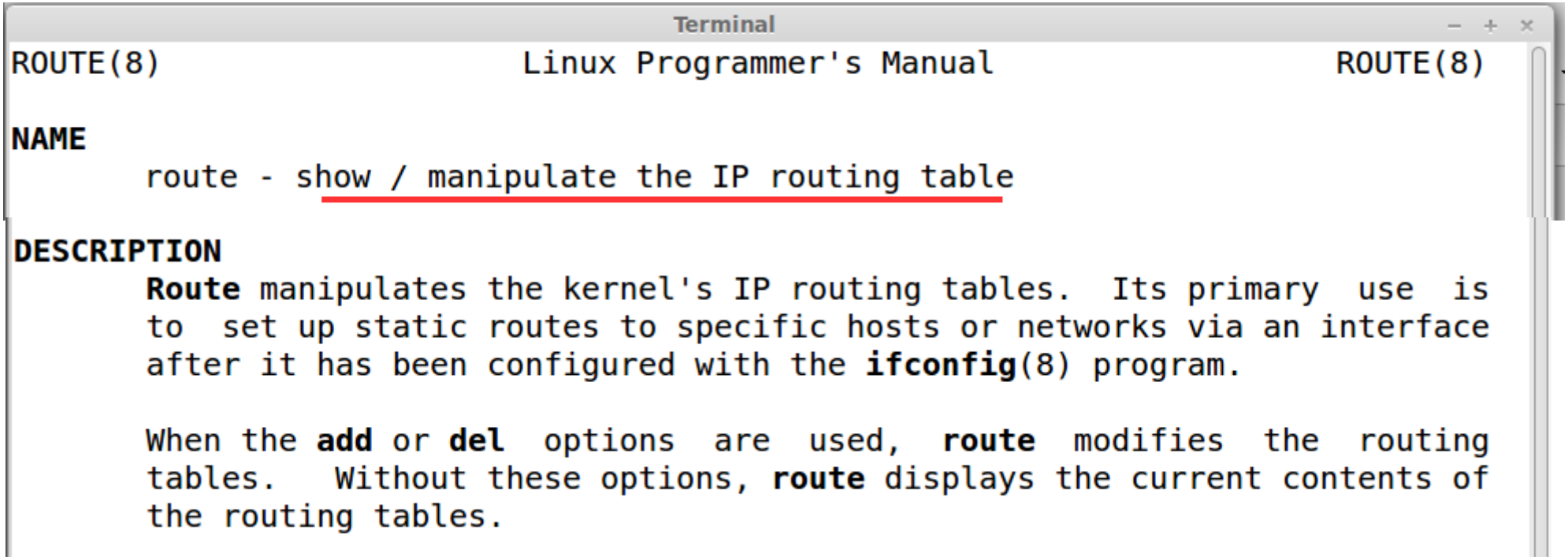
Toon alle entries

```
root@barry:~# arp -a
? (192.168.1.191) at 00:0C:29:3B:15:80 [ether] on eth1
agapi (192.168.1.73) at 00:03:BA:09:7F:D2 [ether] on eth1
anya (192.168.1.1) at 00:12:01:E2:87:FB [ether] on eth1
faith (192.168.1.41) at 00:0E:7F:41:0D:EB [ether] on eth1
kiss (192.168.1.49) at 00:D0:E0:91:79:95 [ether] on eth1
laika (192.168.1.40) at 00:90:F5:4E:AE:17 [ether] on eth1
pasha (192.168.1.71) at 00:03:BA:02:C3:82 [ether] on eth1
shaka (192.168.1.72) at 00:03:BA:09:7C:F9 [ether] on eth1
```

Delete entry

```
arp -d anya
```

22.7 route


Terminal
ROUTE(8) Linux Programmer's Manual ROUTE(8)
NAME
route - show / manipulate the IP routing table
DESCRIPTION
Route manipulates the kernel's IP routing tables. Its primary use is to set up static routes to specific hosts or networks via an interface after it has been configured with the ifconfig(8) program.
When the add or del options are used, route modifies the routing tables. Without these options, route displays the current contents of the routing tables.

22.7 route

```
[root@RHEL4b ~]# route
Kernel IP routing table
Destination     Gateway   Genmask         Flags Metric Ref    Use Iface
192.168.1.0     *         255.255.255.0   U     0      0        0 eth0
[root@RHEL4b ~]#
```

It appears this computer does not have a **gateway** configured, so we use **route add default gw** to add a **default gateway** on the fly.

```
[root@RHEL4b ~]# route add default gw 192.168.1.1
[root@RHEL4b ~]# route
Kernel IP routing table
Destination     Gateway      Genmask         Flags Metric Ref  Use Iface
192.168.1.0     *            255.255.255.0   U     0      0      0 eth0
default         192.168.1.1  0.0.0.0         UG    0      0      0 eth0
[root@RHEL4b ~]#
```

Alles in network range (192.168.1.0-192.168.1.255) wordt behandeld via ARP
Data buiten het netwerk wordt naar de defaultgateway gestuurd (192.168.1.1 = ip router)

22.8. ping

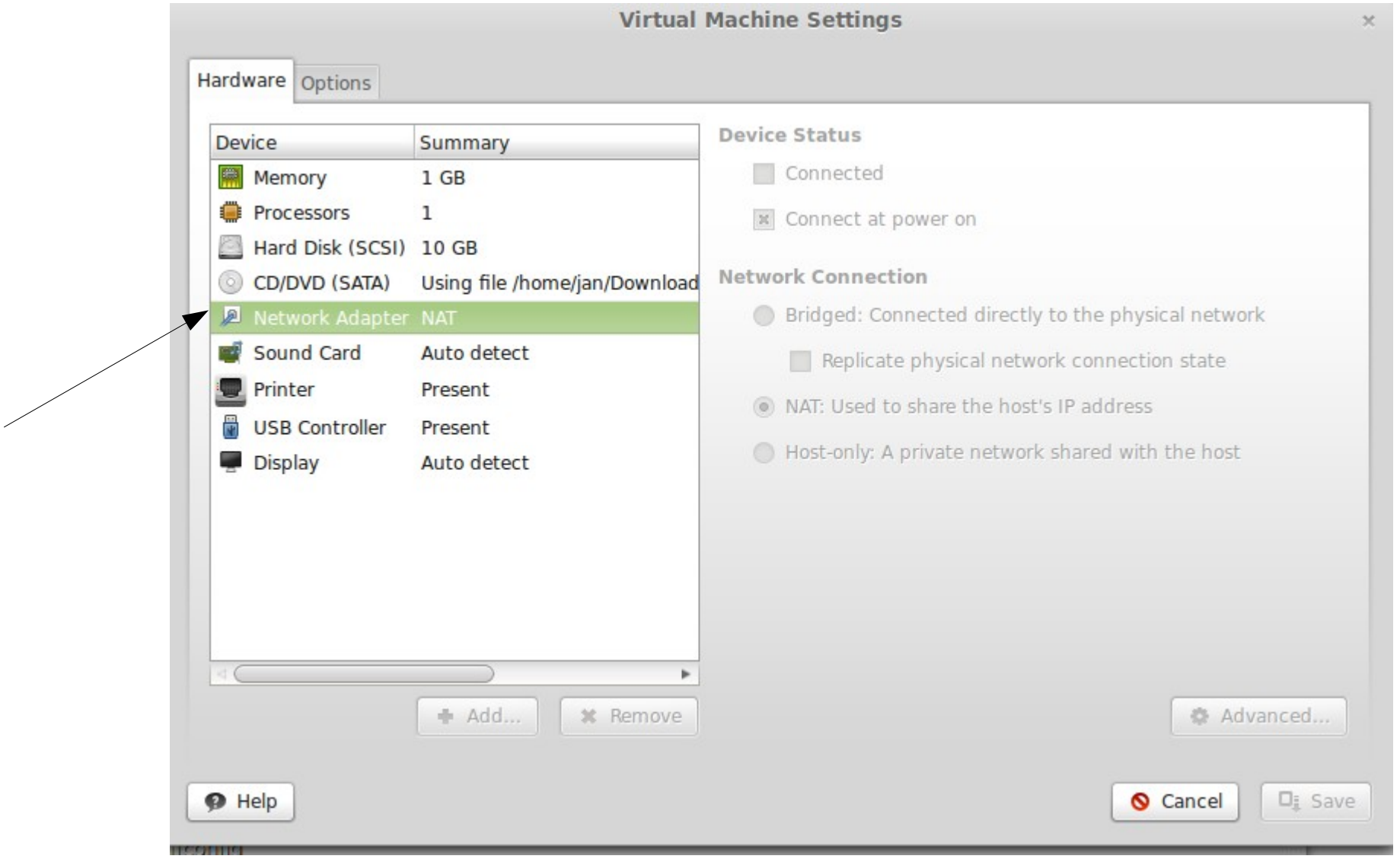
If you can **ping** to another host, then **tcp/ip** is configured.

```
[root@RHEL4b ~]# ping 192.168.1.5
PING 192.168.1.5 (192.168.1.5) 56(84) bytes of data.
64 bytes from 192.168.1.5: icmp_seq=0 ttl=64 time=1004 ms
64 bytes from 192.168.1.5: icmp_seq=1 ttl=64 time=1.19 ms
64 bytes from 192.168.1.5: icmp_seq=2 ttl=64 time=0.494 ms
64 bytes from 192.168.1.5: icmp_seq=3 ttl=64 time=0.419 ms

--- 192.168.1.5 ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3009ms
rtt min/avg/max/mdev = 0.419/251.574/1004.186/434.520 ms, pipe 2
[root@RHEL4b ~]#
```

ook traceroute, dig

VMware: NAT


Virtual Machine Settings
Hardware
Options
Device
Summary
Memory
1 GB
Processors
1
Hard Disk (SCSI)
10 GB
CD/DVD (SATA)
Using file /home/jan/Download
Network Adapter
NAT
Sound Card
Auto detect
Printer
Present
USB Controller
Present
Display
Auto detect
Device Status
Connected
Connect at power on
Network Connection
Bridged: Connected directly to the physical network
Replicate physical network connection state
NAT: Used to share the host's IP address
Host-only: A private network shared with the host
Add...
Remove
Advanced...
Help
Cancel
Save

Op host OS: VMWare maakt

(1) interface vmnet8

```
jan@jan-laptop ~ $ ifconfig vmnet8
vmnet8    Link encap:Ethernet  HWaddr 00:50:56:c0:00:08
          inet addr:192.168.199.1  Bcast:192.168.199.255  Mask:255.255.255
          inet6 addr: fe80::250:56ff:fec0:8/64 Scope:Link
```

(2) NAT router en DNS Server

ip = 192.168.199.2

DNS Server forwards naar DNS server v. host os

NAT router vertaalt ip adressen

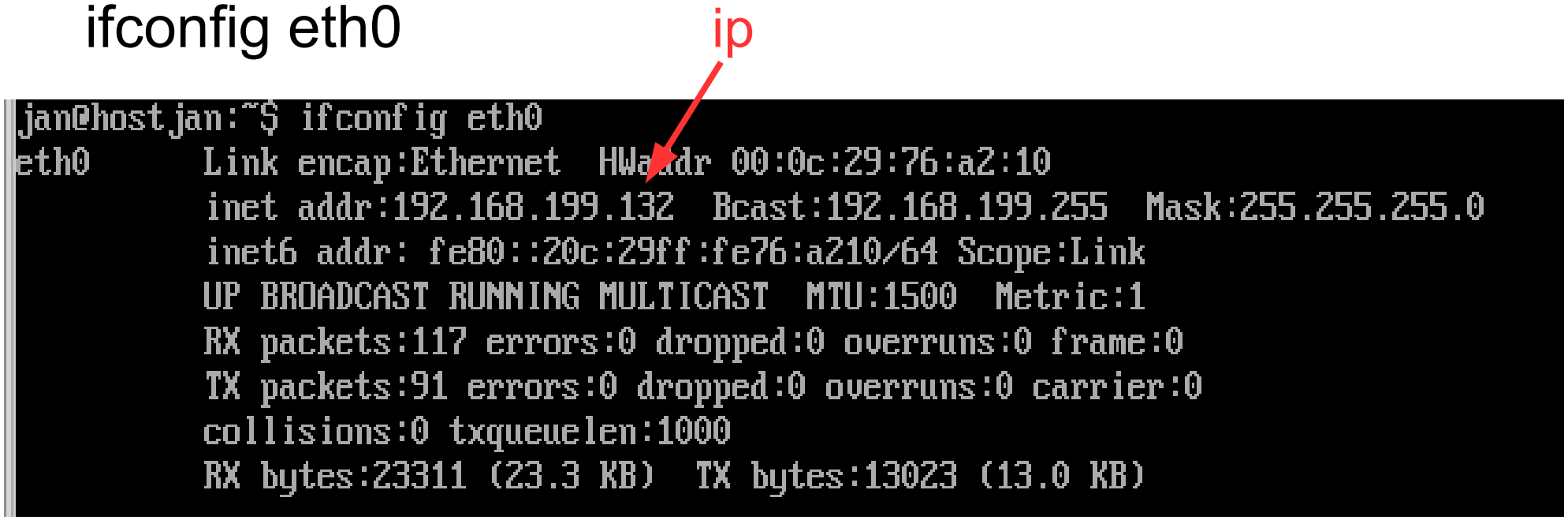
> The NAT device waits for packets coming from virtual machines on the VMnet8 virtual network. When a packet arrives, the NAT device translates the address of the virtual machine to that of the host before forwarding the packet to the external network.

(3) DHCP Server

ip = 192.168.199.254

Op guest OS

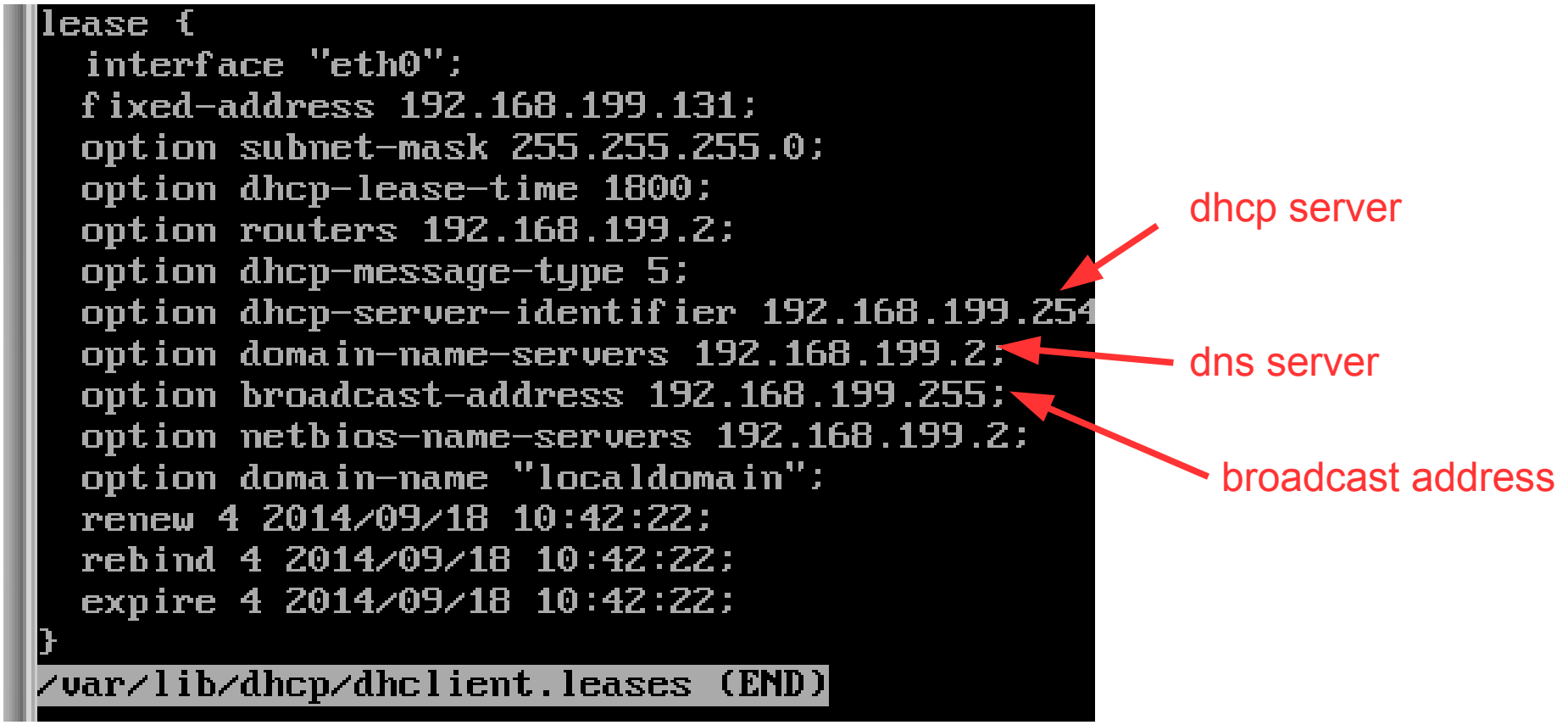
ifconfig eth0



ifconfig eth0 | grep inet

Op guest OS

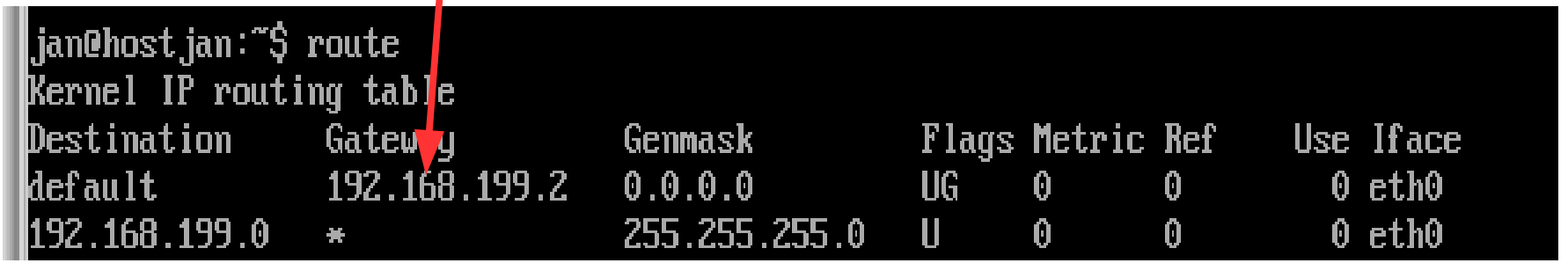
less /var/lib/dhcp/dhclient.leases



Op guest OS

route

default gateway



Probeer ook

```
ip route
```

/etc/resolv.conf (configuratie dns)

```
jan@hostjan:~$ cat /etc/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
nameserver 192.168.199.2
search localdomain
```

dig (dns uittesten)

```
jan@hostjan:~$ dig www.yahoo.com

; <<>> DiG 9.9.5-3-Ubuntu <<>> www.yahoo.com
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 52291
;; flags: qr rd ra; QUERY: 1, ANSWER: 3, AUTHORITY: 0, ADDITIONAL: 1

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; MBZ: 0005 , udp: 4000
;; QUESTION SECTION:
;www.yahoo.com.                 IN      A

;; ANSWER SECTION:
www.yahoo.com.          5       IN      CNAME   fd-fp3.wg1.b.yahoo.com.
fd-fp3.wg1.b.yahoo.com. 5       IN      A       46.228.47.115
fd-fp3.wg1.b.yahoo.com. 5       IN      A       46.228.47.114

;; Query time: 40 msec
;; SERVER: 192.168.199.2#53(192.168.199.2)
;; WHEN: Thu Sep 18 16:41:40 CEST 2014
;; MSG SIZE  rcvd: 101
```

dns ip
poort 53

Besluit

Configuratie nic /etc/network/interfaces
ifup en ifdown

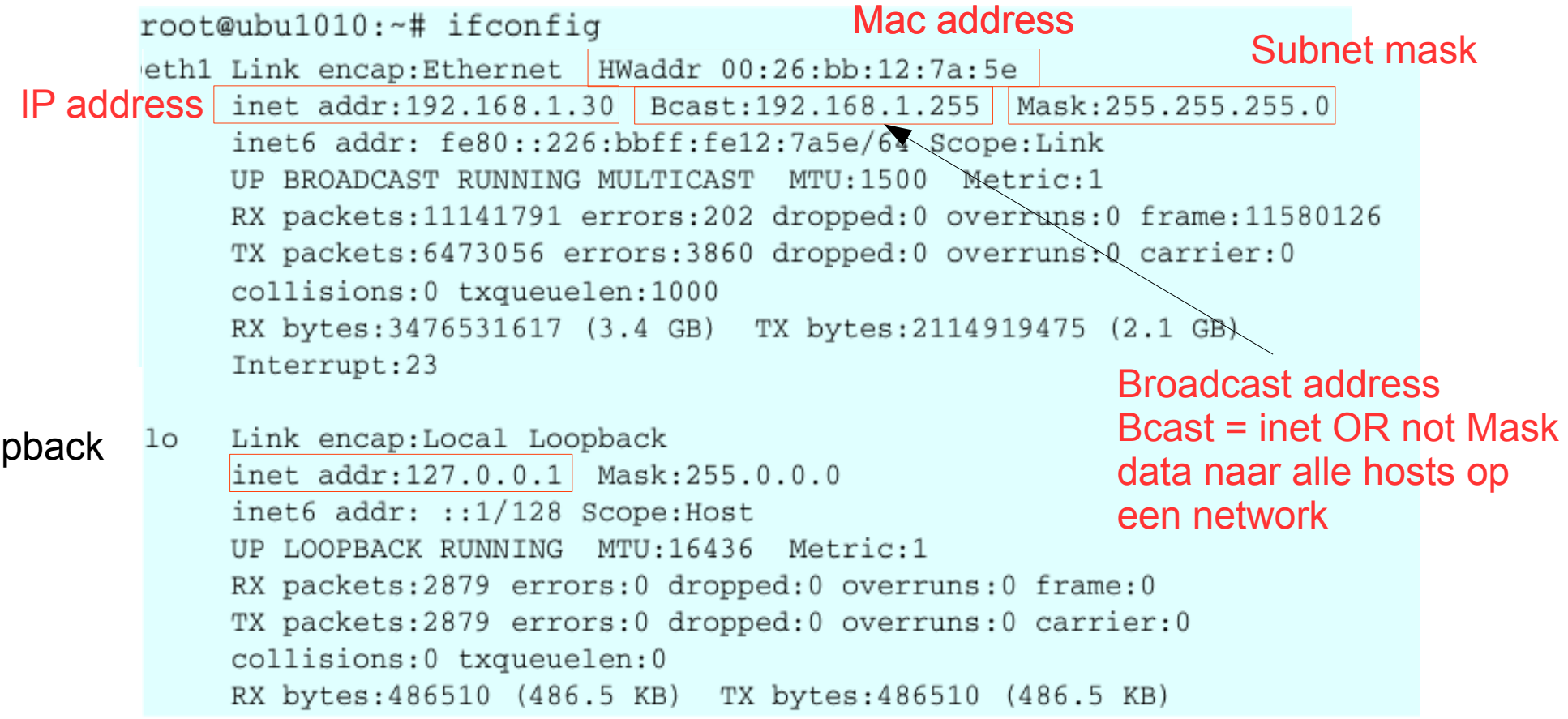
```
root@ubu1104srv:~# cat /etc/network/interfaces
# This file describes the network interfaces available on your system
# and how to activate them. For more information, see interfaces(5).

# The loopback network interface
auto lo
iface lo inet loopback

# The primary network interface
auto eth0
iface eth0 inet dhcp
```

Besluit

- ifconfig: informatie opvragen



Besluit

- ifconfig: tijdelijke wijzigingen aanbrengen

```
[root@rhel6 ~]# ifconfig eth0 192.168.33.42 netmask 255.255.0.0
```

```
[root@rhel6 ~]# ifconfig eth0 hw ether 00:42:42:42:42:42
```

Besluit

- dhclient: DHCP client

  dhclient eth0 (vraag een nieuwe lease aan)

  dhclient -r eth0 (release)

- arp: lees/wijzig de arp-table van de kernel
- route: lees/wijzig de routing table van de kernel