

ESTUDO DIRIGIDO: Introdução a Redes com GNU/Linux

Arthur da Silva Machado Corguinha

ESPECIFICAÇÃO:

1. Configure a máquina virtual para ser executada com a placa de rede em modo bridge, conforme mostrado em aula.

Configuração realizada com sucesso! Máquina virtual já configurada para ser executada com a placa de rede em modo bridge.

2. Force a execução do DHCP usando o comando *ifconfig* . Após, com esse comando, descubra:
 - a) O IP da máquina - **192.168.30.44**
 - b) O endereço MAC - **08:00:27:e0:4a:aa**
 - c) A máscara de rede - **255.255.254.0**
 - d) O gateway padrão - **impossível identificar**

```
usuario@usuario-VirtualBox:~$ sudo ifconfig
enp0s3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 192.168.30.44 netmask 255.255.254.0 broadcast 192.168.31.255
    inet6 fe80::8504:9efa:6ac3:3955 prefixlen 64 scopeid 0x20<link>
    inet6 fe80::3bf9:4309:978d:a161 prefixlen 64 scopeid 0x20<link>
    inet6 fe80::62cf:e173:7205:7e55 prefixlen 64 scopeid 0x20<link>
    ether 08:00:27:e0:4a:aa txqueuelen 1000 (Ethernet)
    RX packets 762 bytes 305835 (305.8 KB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 167 bytes 17922 (17.9 KB)
    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 (Loopback Local)
    RX packets 126 bytes 11410 (11.4 KB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 126 bytes 11410 (11.4 KB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

usuario@usuario-VirtualBox:~$ sudo ifconfig enp0s3 down
usuario@usuario-VirtualBox:~$ sudo ifconfig enp0s3 up
usuario@usuario-VirtualBox:~$
```

3. Descubra o DNS do site www.cefet-rj.br. Em seguida:

- a) Avalie o desempenho de acesso ao site externamente.

O desempenho de acesso ao site externamente é de 158Mbps/sec.

```

usuario@usuario-VirtualBox:~$ sudo dig www.cefet-rj.br
; <<> DiG 9.11.3-lubuntu1.8-Ubuntu <<> www.cefet-rj.br
;; global options: +cmd
;; Got answer:
;; ->HEADER<- opcode: QUERY, status: NOERROR, id: 48431
;; flags: qr rd ra; QUERY: 1, ANSWER: 2, AUTHORITY: 0, ADDITIONAL: 1

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 65494
;; QUESTION SECTION:
;www.cefet-rj.br.                IN      A

;; ANSWER SECTION:
www.cefet-rj.br.                12567   IN      CNAME   nginx.cefet-rj.br.
nginx.cefet-rj.br.              7199    IN      A        200.9.149.88

;; Query time: 13 msec
;; SERVER: 127.0.0.53#53(127.0.0.53)
;; WHEN: Fri Sep 20 17:11:17 CEST 2019
;; MSG SIZE rcvd: 80

```

```

Arquivo  Editar  Abas  Ajuda
atualizados.
É preciso baixar 60,5 kB de arquivos.
Depois desta operação, 176 kB adicionais de espaço em disco serão usados.
Obter:1 http://cz.archive.ubuntu.com/ubuntu bionic-updates/universe amd64 iperf
amd64 2.0.10+dfsg1-lubuntu0.18.04.2 [60,5 kB]
Baixados 60,5 kB em 0s (237 kB/s)
A seleccionar pacote anteriormente não seleccionado iperf.
(Lendo banco de dados ... 117921 ficheiros e directórios actualmente instalados.
)
A preparar para desempacotar .../iperf_2.0.10+dfsg1-lubuntu0.18.04.2_amd64.deb
..
A descompactar iperf (2.0.10+dfsg1-lubuntu0.18.04.2) ...
Configurando iperf (2.0.10+dfsg1-lubuntu0.18.04.2) ...
A processar 'triggers' para man-db (2.8.3-2ubuntu0.1) ...
usuario@usuario-VirtualBox:~$ sudo iperf -c 200.9.149.88 -p 80

Client connecting to 200.9.149.88, TCP port 80
TCP window size: 85.0 KByte (default)
-----
[ 3] local 192.168.30.44 port 44780 connected with 200.9.149.88 port 80
write failed: Connection reset by peer
[ ID] Interval      Transfer      Bandwidth
[ 3] 0.0- 0.0 sec    498 KBytes    158 Mbits/sec
usuario@usuario-VirtualBox:~$

```

- b) Avalie o desempenho de acesso ao site internamente (ou seja, descubra o IP do servidor de www.cefet-rj.br).

O desempenho de acesso ao site internamente é 1.05Mbits/sec.

```

usuario@usuario-VirtualBox:~$ sudo iperf -c 200.9.149.88 -p 53 -u

Client connecting to 200.9.149.88, UDP port 53
Sending 1470 byte datagrams, IPG target: 11215.21 us (kalman adjust)
UDP buffer size: 208 KByte (default)
-----
[ 3] local 192.168.30.44 port 51797 connected with 200.9.149.88 port 53
[ ID] Interval      Transfer      Bandwidth
[ 3] 0.0-10.0 sec    1.25 MBytes    1.05 Mbits/sec
[ 3] Sent 893 datagrams
[ 3] WARNING: did not receive ack of last datagram after 10 tries.
usuario@usuario-VirtualBox:~$ sudo nslookup www.google.com
Server:                127.0.0.53
Address:                127.0.0.53#53

Non-authoritative answer:
Name:   www.google.com
Address: 172.217.30.4
Name:   www.google.com
Address: 2800:3f0:4004:801::2004

```

- c) Avalie o desempenho do DNS usado pelo site (descubra o DNS antes ...).

O desempenho usado pelo cefet é de 1.05Mbits/sec.

- d) Avalie o desempenho do DNS do google. Entre a letra c e d, qual dos 2 é mais rápido?

```
usuario@usuario-VirtualBox:~$ sudo iperf -c 200.9.149.88 -p 53 -u
-----
Client connecting to 200.9.149.88, UDP port 53
Sending 1470 byte datagrams, IPG target: 11215.21 us (kalman adjust)
UDP buffer size: 208 KByte (default)
-----
[ 3] local 192.168.30.44 port 51797 connected with 200.9.149.88 port 53
[ ID] Interval      Transfer    Bandwidth
[ 3] 0.0-10.0 sec  1.25 MBytes  1.05 Mbits/sec
[ 3] Sent 893 datagrams
[ 3] WARNING: did not receive ack of last datagram after 10 tries.
usuario@usuario-VirtualBox:~$ sudo nslookup www.google.com
Server:      127.0.0.53
Address:     127.0.0.53#53

Non-authoritative answer:
Name:   www.google.com
Address: 172.217.30.4
Name:   www.google.com
Address: 2800:3f0:4004:801::2004
```

```
usuario@usuario-VirtualBox:~$ sudo iperf-c 172.217.30.4 -p 53 -u
sudo: iperf-c: comando não encontrado
usuario@usuario-VirtualBox:~$ sudo iperf -c 172.217.30.4 -p 53 -u
-----
Client connecting to 172.217.30.4, UDP port 53
Sending 1470 byte datagrams, IPG target: 11215.21 us (kalman adjust)
UDP buffer size: 208 KByte (default)
-----
[ 3] local 192.168.30.44 port 49932 connected with 172.217.30.4 port 53
[ ID] Interval      Transfer    Bandwidth
[ 3] 0.0-10.2 sec  1.25 MBytes  1.03 Mbits/sec
[ 3] Sent 891 datagrams
[ 3] WARNING: did not receive ack of last datagram after 10 tries.
usuario@usuario-VirtualBox:~$
```

O desempenho do google é 1.03Mbits/sec. Então, o cefet é mais rápido, com velocidade de 1.05Mbits/sec.

Baseado nos resultados, responda: qual é o gargalo da velocidade de acesso do site www.cefet-rj.br?

O gargalo é a pior velocidade, então, 1.03Mbits/sec.

4. Execute um ping com broadcast para toda a rede. Quantas máquinas responderam?

3 máquinas responderam:

```
rtt min/avg/max/mdev = 0.601/1.561/3.777/0.705 ms
usuario@usuario-VirtualBox:~$ ping -b 192.168.31.255
WARNING: pinging broadcast address
PING 192.168.31.255 (192.168.31.255) 56(84) bytes of data.
64 bytes from 192.168.31.254: icmp_seq=1 ttl=64 time=1.11 ms
64 bytes from 192.168.30.9: icmp_seq=1 ttl=255 time=1.58 ms (DUP!)
64 bytes from 192.168.30.8: icmp_seq=1 ttl=255 time=1.61 ms (DUP!)
64 bytes from 192.168.31.254: icmp_seq=2 ttl=64 time=0.698 ms
64 bytes from 192.168.30.9: icmp_seq=2 ttl=255 time=1.66 ms (DUP!)
64 bytes from 192.168.30.8: icmp_seq=2 ttl=255 time=2.11 ms (DUP!)
^C
--- 192.168.31.255 ping statistics ---
2 packets transmitted, 2 received, +4 duplicates, 0% packet loss, time 1001ms
rtt min/avg/max/mdev = 0.698/1.465/2.115/0.449 ms
usuario@usuario-VirtualBox:~$
```

5. Mude o IP de sua máquina, ainda na mesma rede do exercício 2, para: 192.168.40.x .

```
usuario@usuario-VirtualBox:~$ sudo ifconfig enp0s3 192.168.30.203
usuario@usuario-VirtualBox:~$ ifconfig
enp0s3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 192.168.30.203 netmask 255.255.255.0 broadcast 192.168.30.255
    inet6 fe80::8504:9efa:6ac3:3955 prefixlen 64 scopeid 0x20<link>
    inet6 fe80::3bf9:4309:978d:a161 prefixlen 64 scopeid 0x20<link>
    inet6 fe80::62cf:e173:7205:7e55 prefixlen 64 scopeid 0x20<link>
    ether 08:00:27:e0:4a:aa txqueuelen 1000 (Ethernet)
    RX packets 8803 bytes 1202374 (1.2 MB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 2452 bytes 3086695 (3.0 MB)
    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 (Loopback Local)
    RX packets 246 bytes 22248 (22.2 KB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 246 bytes 22248 (22.2 KB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

usuario@usuario-VirtualBox:~$
```

IP da máquina mudado para 192.168.40.203, pois sou o número 3 da chamada. Antes, ao invés do .40 era .30, por isso o print está errado, mas o IP foi atualizado e está

correto, eu só esqueci de tirar outro print atualizando.

x é descoberto somando 200 ao número do aluno na chamada.

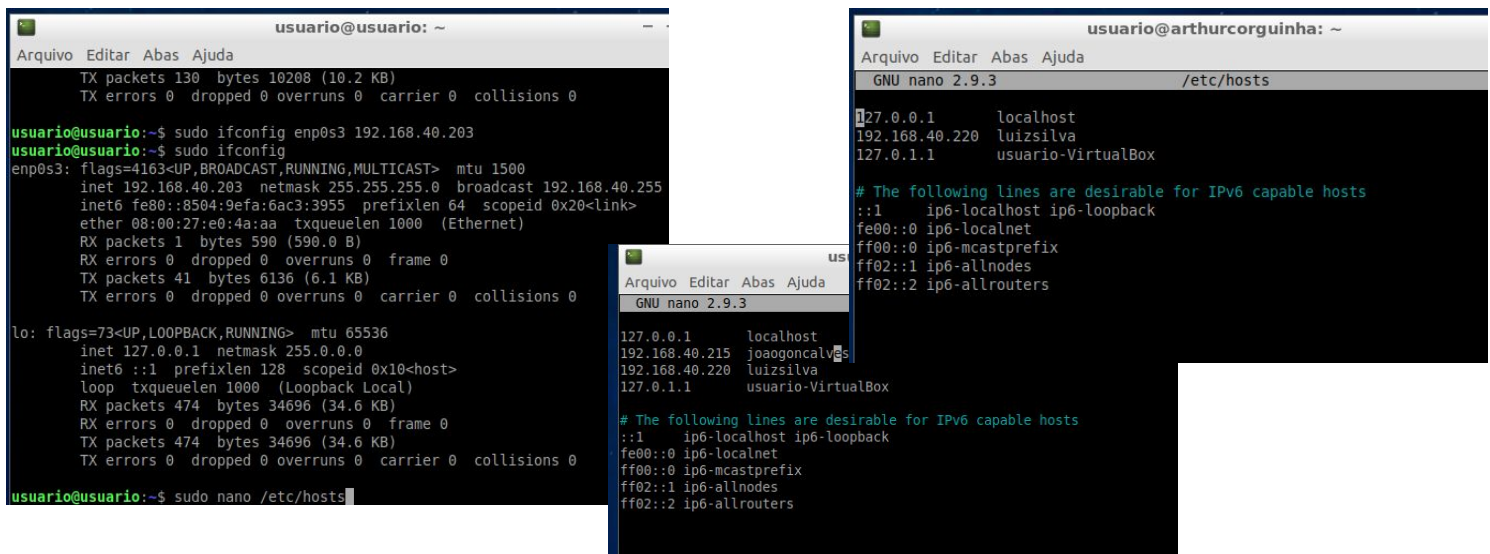
6. Modifique o arquivo `/etc/hostname` para que a máquina tenha seu nome seguido do último nome.

```
Arquivo Editar Abas Ajuda
usuario@usuario-VirtualBox:~$ sudo nano /etc/hostname
[sudo] senha para usuario:
usuario@usuario-VirtualBox:~$
```

Modificando o arquivo `/etc/hostname` através do nano mudamos o nome da máquina:

```
usuario@arthurcorguinha: ~
Arquivo Editar Abas Ajuda
GNU nano 2.9.3 /etc/hostname
arthurcorguinha
```


7. Adicione no arquivo `/etc/hosts` todas as máquinas dos seus colegas.



The image shows three terminal windows. The left window shows the configuration of the `enp0s3` interface with `ifconfig` and the configuration of the `lo` loopback interface. The middle window shows the `/etc/hosts` file being edited with `nano`, adding entries for `localhost`, `joaogoncalves`, `luizsilva`, and `usuario-VirtualBox`. The right window shows the `/etc/hosts` file being edited with `nano`, adding entries for `localhost`, `luizsilva`, and `usuario-VirtualBox`.

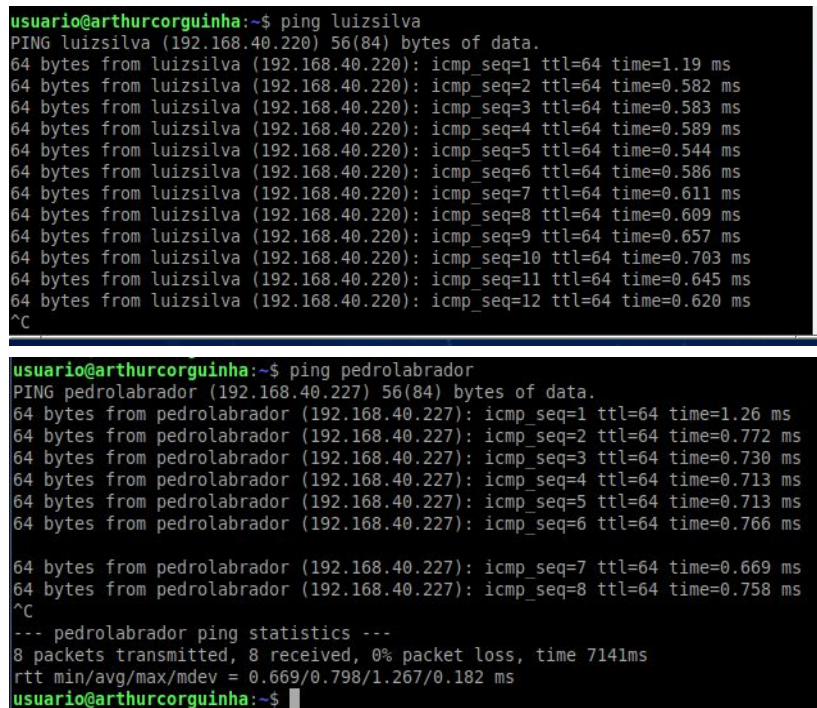
```
usuario@usuario: ~  
Arquivo Editar Abas Ajuda  
TX packets 130 bytes 10208 (10.2 KB)  
TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0  
  
usuario@usuario:~$ sudo ifconfig enp0s3 192.168.40.203  
usuario@usuario:~$ sudo ifconfig  
enp0s3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500  
inet 192.168.40.203 netmask 255.255.255.0 broadcast 192.168.40.255  
inet6 fe80::8504:9efa:6ac3:3955 prefixlen 64 scopeid 0x20<link>  
ether 08:00:27:e0:4a:aa txqueuelen 1000 (Ethernet)  
RX packets 1 bytes 590 (590.0 B)  
RX errors 0 dropped 0 overruns 0 frame 0  
TX packets 41 bytes 6136 (6.1 KB)  
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 (Loopback Local)  
RX packets 474 bytes 34696 (34.6 KB)  
RX errors 0 dropped 0 overruns 0 frame 0  
TX packets 474 bytes 34696 (34.6 KB)  
TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0  
usuario@usuario:~$ sudo nano /etc/hosts
```

```
usuario@arthurcorguinha: ~  
Arquivo Editar Abas Ajuda  
GNU nano 2.9.3 /etc/hosts  
127.0.0.1 localhost  
192.168.40.220 luizsilva  
127.0.1.1 usuario-VirtualBox  
  
# The following lines are desirable for IPv6 capable hosts  
::1 ip6-localhost ip6-loopback  
fe00::0 ip6-localnet  
ff00::0 ip6-mcastprefix  
ff02::1 ip6-allnodes  
ff02::2 ip6-allrouters
```

```
us  
Arquivo Editar Abas Ajuda  
GNU nano 2.9.3  
127.0.0.1 localhost  
192.168.40.215 joaogoncalves  
192.168.40.220 luizsilva  
127.0.1.1 usuario-VirtualBox  
  
# The following lines are desirable for IPv6 capable hosts  
::1 ip6-localhost ip6-loopback  
fe00::0 ip6-localnet  
ff00::0 ip6-mcastprefix  
ff02::1 ip6-allnodes  
ff02::2 ip6-allrouters
```

8. Execute um ping para as máquinas dos colegas que estão à sua esquerda e direita por nome da máquina. Você conseguiu? Se não, corrija-os até conseguir ...

Sim, consegui executar ping para as máquinas luizsilva e pedrolabrador normalmente.



The image shows two terminal windows. The first window shows a successful ping command to `luizsilva` (192.168.40.220) with 12 successful pings. The second window shows a successful ping command to `pedrolabrador` (192.168.40.227) with 8 successful pings and statistics.

```
usuario@arthurcorguinha:~$ ping luizsilva  
PING luizsilva (192.168.40.220) 56(84) bytes of data.  
64 bytes from luizsilva (192.168.40.220): icmp_seq=1 ttl=64 time=1.19 ms  
64 bytes from luizsilva (192.168.40.220): icmp_seq=2 ttl=64 time=0.582 ms  
64 bytes from luizsilva (192.168.40.220): icmp_seq=3 ttl=64 time=0.583 ms  
64 bytes from luizsilva (192.168.40.220): icmp_seq=4 ttl=64 time=0.589 ms  
64 bytes from luizsilva (192.168.40.220): icmp_seq=5 ttl=64 time=0.544 ms  
64 bytes from luizsilva (192.168.40.220): icmp_seq=6 ttl=64 time=0.586 ms  
64 bytes from luizsilva (192.168.40.220): icmp_seq=7 ttl=64 time=0.611 ms  
64 bytes from luizsilva (192.168.40.220): icmp_seq=8 ttl=64 time=0.609 ms  
64 bytes from luizsilva (192.168.40.220): icmp_seq=9 ttl=64 time=0.657 ms  
64 bytes from luizsilva (192.168.40.220): icmp_seq=10 ttl=64 time=0.703 ms  
64 bytes from luizsilva (192.168.40.220): icmp_seq=11 ttl=64 time=0.645 ms  
64 bytes from luizsilva (192.168.40.220): icmp_seq=12 ttl=64 time=0.620 ms  
^C
```

```
usuario@arthurcorguinha:~$ ping pedrolabrador  
PING pedrolabrador (192.168.40.227) 56(84) bytes of data.  
64 bytes from pedrolabrador (192.168.40.227): icmp_seq=1 ttl=64 time=1.26 ms  
64 bytes from pedrolabrador (192.168.40.227): icmp_seq=2 ttl=64 time=0.772 ms  
64 bytes from pedrolabrador (192.168.40.227): icmp_seq=3 ttl=64 time=0.730 ms  
64 bytes from pedrolabrador (192.168.40.227): icmp_seq=4 ttl=64 time=0.713 ms  
64 bytes from pedrolabrador (192.168.40.227): icmp_seq=5 ttl=64 time=0.713 ms  
64 bytes from pedrolabrador (192.168.40.227): icmp_seq=6 ttl=64 time=0.766 ms  
  
64 bytes from pedrolabrador (192.168.40.227): icmp_seq=7 ttl=64 time=0.669 ms  
64 bytes from pedrolabrador (192.168.40.227): icmp_seq=8 ttl=64 time=0.758 ms  
^C  
--- pedrolabrador ping statistics ---  
8 packets transmitted, 8 received, 0% packet loss, time 714lms  
rtt min/avg/max/mdev = 0.669/0.798/1.267/0.182 ms  
usuario@arthurcorguinha:~$
```

9. Execute um *ping* com broadcast para a rede.
Você obteve respostas de quantas máquinas de todos os colegas?

Não consegui obter resposta de nenhuma máquina.

```
usuario@arthurcorguinha:~$ sudo ifconfig
enp0s3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 192.168.40.203 netmask 255.255.255.0 broadcast 192.168.40.255
    ether 08:00:27:e0:4a:aa txqueuelen 1000 (Ethernet)
    RX packets 5954 bytes 779699 (779.6 KB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 170 bytes 27391 (27.3 KB)
    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 (Loopback Local)
    RX packets 3357 bytes 240132 (240.1 KB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 3357 bytes 240132 (240.1 KB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

usuario@arthurcorguinha:~$ ping -b 192.168.40.255
WARNING: pinging broadcast address
PING 192.168.40.255 (192.168.40.255) 56(84) bytes of data.
```