Otto-Friedrich-University of Bamberg

Professorship for Computer Science,
Communication Services, Telecommunication
Systems and Computer Networks

Foundation of Internet Communication

Assignment 2
Static Routing and DHCP

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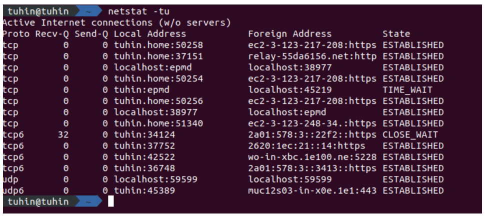
1 The Netstat Command

1.1 Display the information on the TCP and UDP ports that are currently in use

Information regarding currently used TCP and UDP ports is shown using command: *netstat -tu*

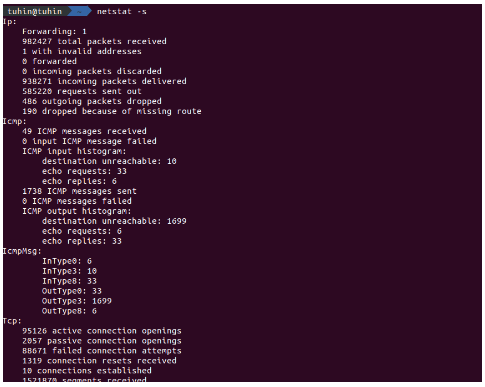


```
tuhin@tuhin ~ netstat -tu
Active Internet connections (w/o servers)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
tcp        0      0 tuhin.home:50258        ec2-3-123-217-208:https ESTABLISHED
tcp        0      0 tuhin.home:37151        relay-55da6156.net:http ESTABLISHED
tcp        0      0 localhost:epmd          localhost:38977         ESTABLISHED
tcp        0      0 tuhin.home:50254        ec2-3-123-217-208:https ESTABLISHED
tcp        0      0 tuhin:epmd              localhost:45219         TIME_WAIT
tcp        0      0 tuhin.home:50256        ec2-3-123-217-208:https ESTABLISHED
tcp        0      0 localhost:38977         localhost:epmd          ESTABLISHED
tcp        0      0 tuhin.home:51340        ec2-3-123-248-34.:https ESTABLISHED
tcp6      32      0 tuhin:34124             2a01:578:3::22f2::https CLOSE_WAIT
tcp6       0      0 tuhin:37752             2620:1ec:21::14:https   ESTABLISHED
tcp6       0      0 tuhin:42522             wo-in-xbc.1e100.ne:5228 ESTABLISHED
tcp6       0      0 tuhin:36748             2a01:578:3::3413::https ESTABLISHED
udp        0      0 localhost:59599         localhost:59599         ESTABLISHED
udp6       0      0 tuhin:45389             muc12s03-in-x0e.1e1:443 ESTABLISHED
tuhin@tuhin ~
```

Figure 1: Active TCP and UDP ports

1.2 Display the statistics of the various networking protocols

Display the statistics of the various networking protocols using command: *netstat -s*

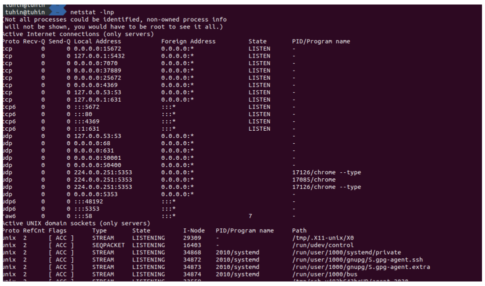


```
tuhin@tuhin ~ netstat -s
Ip:
    Forwarding: 1
    982427 total packets received
    1 with invalid addresses
    0 forwarded
    0 incoming packets discarded
    938271 incoming packets delivered
    585220 requests sent out
    486 outgoing packets dropped
    190 dropped because of missing route
Icmp:
    49 ICMP messages received
    0 input ICMP message failed
    ICMP input histogram:
        destination unreachable: 10
        echo requests: 33
        echo replies: 6
    1738 ICMP messages sent
    0 ICMP messages failed
    ICMP output histogram:
        destination unreachable: 1699
        echo requests: 6
        echo replies: 33
IcmpMsg:
        InType0: 6
        InType3: 10
        InType8: 33
        OutType0: 33
        OutType3: 1699
        OutType8: 6
Tcp:
    95126 active connection openings
    2057 passive connection openings
    88671 failed connection attempts
    1319 connection resets received
    10 connections established
    1521870 segments received
```

Figure 2: The statistics of the various networking protocols

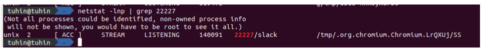
1.3 Suppose you want to write a small application that needs the process id (PID) of a given application. In order to achieve this, use a command of your choice, e.g. grep, sed or awk, to filter the output of netstat. Your application should only deliver the port number of a particular application (e.g. inetd or sshd), identified by the PID, as parameter

Process id (PID) filter with grep command along with netstat



```
tuhin@tuhin  ~  netstat -lnp
(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 0.0.0.0:15672           0.0.0.0:*               LISTEN      -
tcp        0      0 127.0.0.1:5432          0.0.0.0:*               LISTEN      -
tcp        0      0 0.0.0.0:7070            0.0.0.0:*               LISTEN      -
tcp        0      0 0.0.0.0:37889           0.0.0.0:*               LISTEN      -
tcp        0      0 0.0.0.0:25672           0.0.0.0:*               LISTEN      -
tcp        0      0 0.0.0.0:4369            0.0.0.0:*               LISTEN      -
tcp        0      0 127.0.0.53:53           0.0.0.0:*               LISTEN      -
tcp        0      0 127.0.0.1:631           0.0.0.0:*               LISTEN      -
tcp6       0      0 :::5672                 :::*                    LISTEN      -
tcp6       0      0 :::80                   :::*                    LISTEN      -
tcp6       0      0 :::4369                 :::*                    LISTEN      -
tcp6       0      0 ::1:631                 :::*                    LISTEN      -
udp        0      0 127.0.0.53:53           0.0.0.0:*                           -
udp        0      0 0.0.0.0:68              0.0.0.0:*                           -
udp        0      0 0.0.0.0:631             0.0.0.0:*                           -
udp        0      0 0.0.0.0:50001           0.0.0.0:*                           -
udp        0      0 0.0.0.0:50400           0.0.0.0:*                           -
udp        0      0 224.0.0.251:5353        0.0.0.0:*                           17126/chrome --type
udp        0      0 224.0.0.251:5353        0.0.0.0:*                           17085/chrome
udp        0      0 224.0.0.251:5353        0.0.0.0:*                           17126/chrome --type
udp        0      0 0.0.0.0:5353            0.0.0.0:*                           -
udp6       0      0 :::48192                :::*                                -
udp6       0      0 :::5353                 :::*                                -
raw6       0      0 :::58                   :::*                    7           -
Active UNIX domain sockets (only servers)
Proto RefCnt Flags       Type       State         I-Node   PID/Program name     Path
unix  2      [ ACC ]     STREAM     LISTENING     29309    -                    /tmp/.X11-unix/X0
unix  2      [ ACC ]     SEQPACKET  LISTENING     16403    -                    /run/udev/control
unix  2      [ ACC ]     STREAM     LISTENING     34868    2010/systemd         /run/user/1000/systemd/private
unix  2      [ ACC ]     STREAM     LISTENING     34872    2010/systemd         /run/user/1000/gnupg/S.gpg-agent.ssh
unix  2      [ ACC ]     STREAM     LISTENING     34873    2010/systemd         /run/user/1000/gnupg/S.gpg-agent.extra
unix  2      [ ACC ]     STREAM     LISTENING     34874    2010/systemd         /run/user/1000/bus
```

Figure 3: Check PID with netstat command

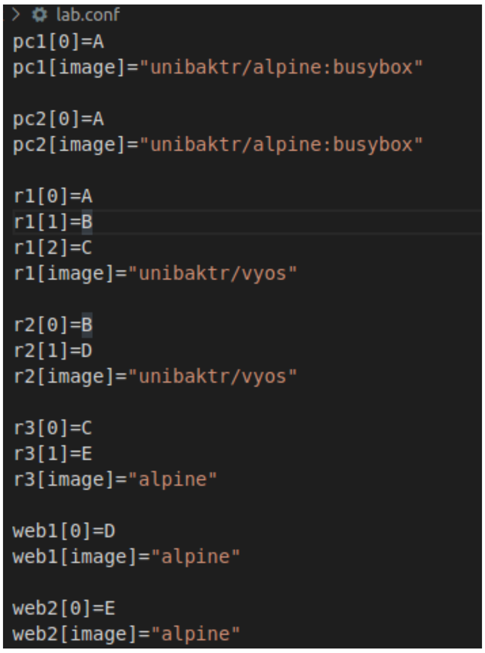


```
 tuhin@tuhin  ~  netstat -lnp | grep 22227
(Not all processes could be identified, non-owned process info
 will not be shown, you would have to be root to see it all.)
unix  2      [ ACC ]     STREAM     LISTENING     140091   22227/slack          /tmp/.org.chromium.Chromium.LrQXUj/SS
 tuhin@tuhin  ~ 
```

Figure 4: Filter process ID with grep

2 Static Routing

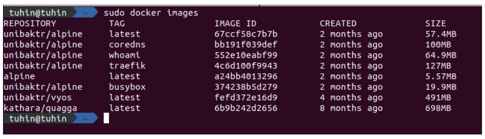
1. Following is the screenshot of kathara *lab.conf* file:



```
lab.conf
pc1[0]=A
pc1[image]="unibaktr/alpine:busybox"

pc2[0]=A
pc2[image]="unibaktr/alpine:busybox"

r1[0]=A
r1[1]=B
r1[2]=C
r1[image]="unibaktr/vyos"

r2[0]=B
r2[1]=D
r2[image]="unibaktr/vyos"

r3[0]=C
r3[1]=E
r3[image]="alpine"

web1[0]=D
web1[image]="alpine"

web2[0]=E
web2[image]="alpine"
```

Figure 5: katharaLabConfig

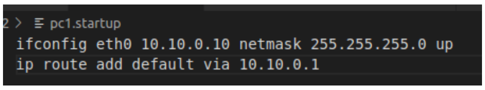
2. Following is the screenshot of docker images:



```
tuhin@tuhin  ~  sudo docker images
REPOSITORY          TAG                 IMAGE ID            CREATED             SIZE
unibaktr/alpine     latest              67ccf58c7b7b        2 months ago        57.4MB
unibaktr/alpine     coredns             bb191f039def        2 months ago        100MB
unibaktr/alpine     whoami              552e10eabf99        2 months ago        64.9MB
unibaktr/alpine     traefik             4c6d100f9943        2 months ago        127MB
alpine              latest              a24bb4013296        2 months ago        5.57MB
unibaktr/alpine     busybox             374238b5d279        2 months ago        19.9MB
unibaktr/vyos       latest              fefd372e16d9        4 months ago        491MB
kathara/quagga      latest              6b9b242d2656        8 months ago        698MB
tuhin@tuhin  ~
```

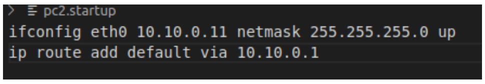
Figure 6: dockerImages

3. Following is the screenshot of diffierent startup files:



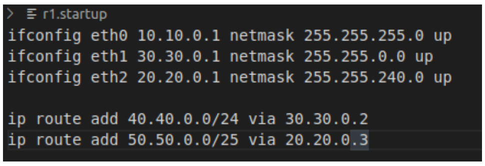
```
pc1.startup
ifconfig eth0 10.10.0.10 netmask 255.255.255.0 up
ip route add default via 10.10.0.1
```

Figure 7: pc1Startup



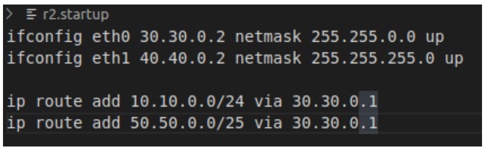
```
ifconfig eth0 10.10.0.11 netmask 255.255.255.0 up
ip route add default via 10.10.0.1
```

Figure 8: pc2Startup



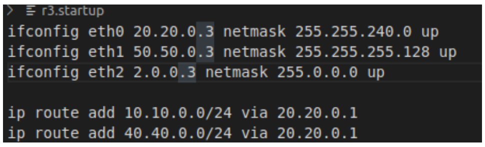
```
ifconfig eth0 10.10.0.1 netmask 255.255.255.0 up
ifconfig eth1 30.30.0.1 netmask 255.255.0.0 up
ifconfig eth2 20.20.0.1 netmask 255.255.240.0 up

ip route add 40.40.0.0/24 via 30.30.0.2
ip route add 50.50.0.0/25 via 20.20.0.3
```

Figure 9: r1Startup



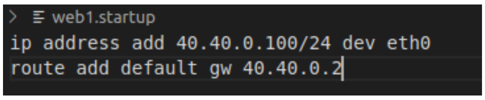
```
ifconfig eth0 30.30.0.2 netmask 255.255.0.0 up
ifconfig eth1 40.40.0.2 netmask 255.255.255.0 up

ip route add 10.10.0.0/24 via 30.30.0.1
ip route add 50.50.0.0/25 via 30.30.0.1
```

Figure 10: r2Startup



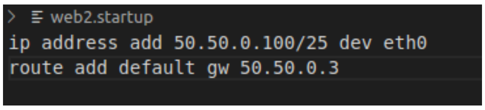
```
ifconfig eth0 20.20.0.3 netmask 255.255.240.0 up
ifconfig eth1 50.50.0.3 netmask 255.255.255.128 up
ifconfig eth2 2.0.0.3 netmask 255.0.0.0 up

ip route add 10.10.0.0/24 via 20.20.0.1
ip route add 40.40.0.0/24 via 20.20.0.1
```

Figure 11: r3Startup



```
ip address add 40.40.0.100/24 dev eth0
route add default gw 40.40.0.2
```

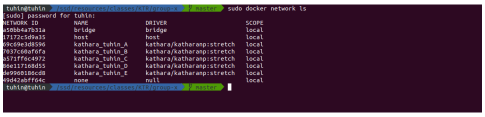
Figure 12: web1Startup



```
web2.startup
ip address add 50.50.0.100/25 dev eth0
route add default gw 50.50.0.3
```

Figure 13: web2startup

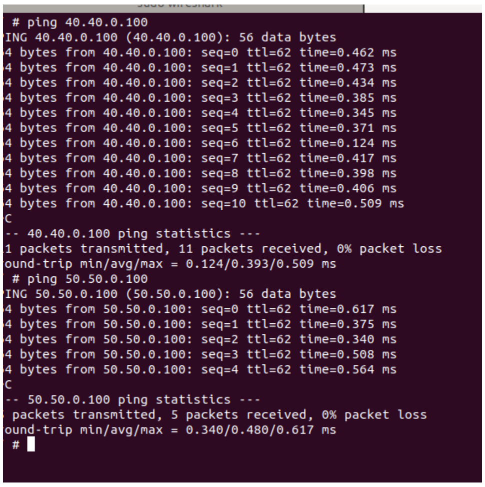
4. Collision domain ID from docker ls command



```
tuhin@tuhin  /ssd/resources/classes/KTR/group-x  master  sudo docker network ls
[sudo] password for tuhin:
NETWORK ID          NAME                DRIVER                      SCOPE
a50bb4a7b31a        bridge              bridge                      local
17172c5d9a35        host                host                        local
69c69e3d8596        kathara_tuhin_A     kathara/katharanp:stretch   local
7037c60af6fa        kathara_tuhin_B     kathara/katharanp:stretch   local
a571ff6c4972        kathara_tuhin_C     kathara/katharanp:stretch   local
86e117168d55        kathara_tuhin_D     kathara/katharanp:stretch   local
de9960186cd8        kathara_tuhin_E     kathara/katharanp:stretch   local
49d42abff64c        none                null                        local
tuhin@tuhin  /ssd/resources/classes/KTR/group-x  master 
```

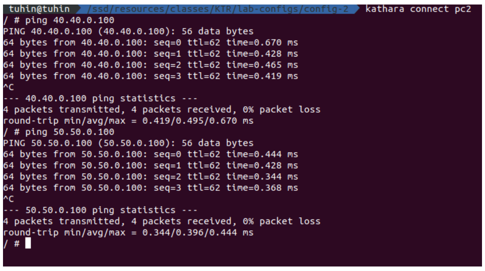
Figure 14: Collison domain id

5. Connection tests between hosts



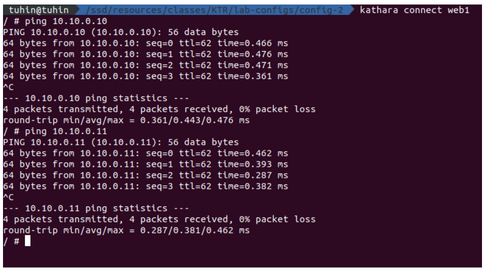
```
 # ping 40.40.0.100
ING 40.40.0.100 (40.40.0.100): 56 data bytes
4 bytes from 40.40.0.100: seq=0 ttl=62 time=0.462 ms
4 bytes from 40.40.0.100: seq=1 ttl=62 time=0.473 ms
4 bytes from 40.40.0.100: seq=2 ttl=62 time=0.434 ms
4 bytes from 40.40.0.100: seq=3 ttl=62 time=0.385 ms
4 bytes from 40.40.0.100: seq=4 ttl=62 time=0.345 ms
4 bytes from 40.40.0.100: seq=5 ttl=62 time=0.371 ms
4 bytes from 40.40.0.100: seq=6 ttl=62 time=0.124 ms
4 bytes from 40.40.0.100: seq=7 ttl=62 time=0.417 ms
4 bytes from 40.40.0.100: seq=8 ttl=62 time=0.398 ms
4 bytes from 40.40.0.100: seq=9 ttl=62 time=0.406 ms
4 bytes from 40.40.0.100: seq=10 ttl=62 time=0.509 ms
C
-- 40.40.0.100 ping statistics ---
1 packets transmitted, 11 packets received, 0% packet loss
ound-trip min/avg/max = 0.124/0.393/0.509 ms
 # ping 50.50.0.100
ING 50.50.0.100 (50.50.0.100): 56 data bytes
4 bytes from 50.50.0.100: seq=0 ttl=62 time=0.617 ms
4 bytes from 50.50.0.100: seq=1 ttl=62 time=0.375 ms
4 bytes from 50.50.0.100: seq=2 ttl=62 time=0.340 ms
4 bytes from 50.50.0.100: seq=3 ttl=62 time=0.508 ms
4 bytes from 50.50.0.100: seq=4 ttl=62 time=0.564 ms
C
-- 50.50.0.100 ping statistics ---
 packets transmitted, 5 packets received, 0% packet loss
ound-trip min/avg/max = 0.340/0.480/0.617 ms
 # 
```

Figure 15: From pc1



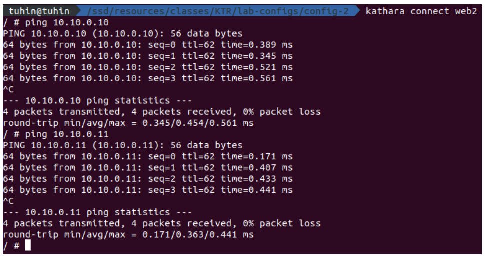
```
tuhin@tuhin  /ssd/resources/classes/KTR/lab-configs/config-2  kathara connect pc2
/ # ping 40.40.0.100
PING 40.40.0.100 (40.40.0.100): 56 data bytes
64 bytes from 40.40.0.100: seq=0 ttl=62 time=0.670 ms
64 bytes from 40.40.0.100: seq=1 ttl=62 time=0.428 ms
64 bytes from 40.40.0.100: seq=2 ttl=62 time=0.465 ms
64 bytes from 40.40.0.100: seq=3 ttl=62 time=0.419 ms
^C
--- 40.40.0.100 ping statistics ---
4 packets transmitted, 4 packets received, 0% packet loss
round-trip min/avg/max = 0.419/0.495/0.670 ms
/ # ping 50.50.0.100
PING 50.50.0.100 (50.50.0.100): 56 data bytes
64 bytes from 50.50.0.100: seq=0 ttl=62 time=0.444 ms
64 bytes from 50.50.0.100: seq=1 ttl=62 time=0.428 ms
64 bytes from 50.50.0.100: seq=2 ttl=62 time=0.344 ms
64 bytes from 50.50.0.100: seq=3 ttl=62 time=0.368 ms
^C
--- 50.50.0.100 ping statistics ---
4 packets transmitted, 4 packets received, 0% packet loss
round-trip min/avg/max = 0.344/0.396/0.444 ms
/ #
```

Figure 16: From pc2



```
tuhin@tuhin  /ssd/resources/classes/KTR/lab-configs/config-2  kathara connect web1
/ # ping 10.10.0.10
PING 10.10.0.10 (10.10.0.10): 56 data bytes
64 bytes from 10.10.0.10: seq=0 ttl=62 time=0.466 ms
64 bytes from 10.10.0.10: seq=1 ttl=62 time=0.476 ms
64 bytes from 10.10.0.10: seq=2 ttl=62 time=0.471 ms
64 bytes from 10.10.0.10: seq=3 ttl=62 time=0.361 ms
^C
--- 10.10.0.10 ping statistics ---
4 packets transmitted, 4 packets received, 0% packet loss
round-trip min/avg/max = 0.361/0.443/0.476 ms
/ # ping 10.10.0.11
PING 10.10.0.11 (10.10.0.11): 56 data bytes
64 bytes from 10.10.0.11: seq=0 ttl=62 time=0.462 ms
64 bytes from 10.10.0.11: seq=1 ttl=62 time=0.393 ms
64 bytes from 10.10.0.11: seq=2 ttl=62 time=0.287 ms
64 bytes from 10.10.0.11: seq=3 ttl=62 time=0.382 ms
^C
--- 10.10.0.11 ping statistics ---
4 packets transmitted, 4 packets received, 0% packet loss
round-trip min/avg/max = 0.287/0.381/0.462 ms
/ #
```

Figure 17: From web1

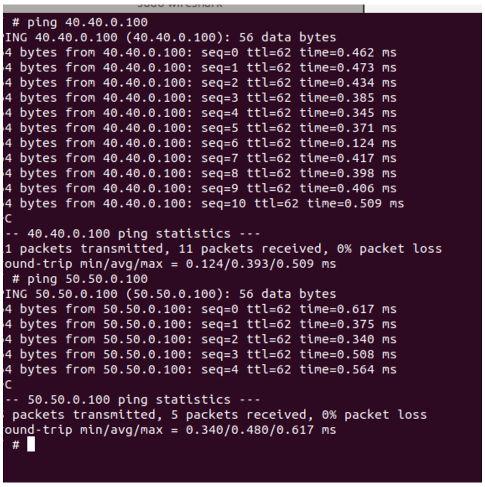


```
tuhin@tuhin  /ssd/resources/classes/KTR/lab-configs/config-2  kathara connect web2
/ # ping 10.10.0.10
PING 10.10.0.10 (10.10.0.10): 56 data bytes
64 bytes from 10.10.0.10: seq=0 ttl=62 time=0.389 ms
64 bytes from 10.10.0.10: seq=1 ttl=62 time=0.345 ms
64 bytes from 10.10.0.10: seq=2 ttl=62 time=0.521 ms
64 bytes from 10.10.0.10: seq=3 ttl=62 time=0.561 ms
^C
--- 10.10.0.10 ping statistics ---
4 packets transmitted, 4 packets received, 0% packet loss
round-trip min/avg/max = 0.345/0.454/0.561 ms
/ # ping 10.10.0.11
PING 10.10.0.11 (10.10.0.11): 56 data bytes
64 bytes from 10.10.0.11: seq=0 ttl=62 time=0.171 ms
64 bytes from 10.10.0.11: seq=1 ttl=62 time=0.407 ms
64 bytes from 10.10.0.11: seq=2 ttl=62 time=0.433 ms
64 bytes from 10.10.0.11: seq=3 ttl=62 time=0.441 ms
^C
--- 10.10.0.11 ping statistics ---
4 packets transmitted, 4 packets received, 0% packet loss
round-trip min/avg/max = 0.171/0.363/0.441 ms
/ #
```

Figure 18: From web2

6. Manually adding entries for route
   The answer for this lies in the startup files of route configuration

7. Ping web1 from pc1 and observe what happens when packets transferred through r1

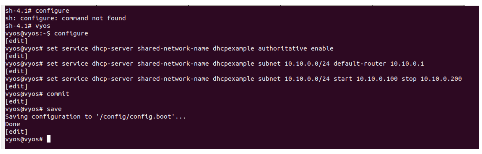


```
 # ping 40.40.0.100
ING 40.40.0.100 (40.40.0.100): 56 data bytes
4 bytes from 40.40.0.100: seq=0 ttl=62 time=0.462 ms
4 bytes from 40.40.0.100: seq=1 ttl=62 time=0.473 ms
4 bytes from 40.40.0.100: seq=2 ttl=62 time=0.434 ms
4 bytes from 40.40.0.100: seq=3 ttl=62 time=0.385 ms
4 bytes from 40.40.0.100: seq=4 ttl=62 time=0.345 ms
4 bytes from 40.40.0.100: seq=5 ttl=62 time=0.371 ms
4 bytes from 40.40.0.100: seq=6 ttl=62 time=0.124 ms
4 bytes from 40.40.0.100: seq=7 ttl=62 time=0.417 ms
4 bytes from 40.40.0.100: seq=8 ttl=62 time=0.398 ms
4 bytes from 40.40.0.100: seq=9 ttl=62 time=0.406 ms
4 bytes from 40.40.0.100: seq=10 ttl=62 time=0.509 ms
C
-- 40.40.0.100 ping statistics ---
1 packets transmitted, 11 packets received, 0% packet loss
ound-trip min/avg/max = 0.124/0.393/0.509 ms
 # ping 50.50.0.100
ING 50.50.0.100 (50.50.0.100): 56 data bytes
4 bytes from 50.50.0.100: seq=0 ttl=62 time=0.617 ms
4 bytes from 50.50.0.100: seq=1 ttl=62 time=0.375 ms
4 bytes from 50.50.0.100: seq=2 ttl=62 time=0.340 ms
4 bytes from 50.50.0.100: seq=3 ttl=62 time=0.508 ms
4 bytes from 50.50.0.100: seq=4 ttl=62 time=0.564 ms
C
-- 50.50.0.100 ping statistics ---
 packets transmitted, 5 packets received, 0% packet loss
ound-trip min/avg/max = 0.340/0.480/0.617 ms
 #
```

Figure 19: Ping web1 from pc1

3 DHCP - Dynamic Host Control Protocol

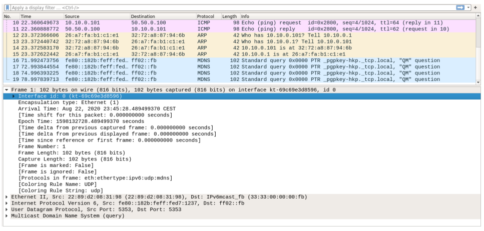
1. DHCP configuration on router1:



```
sh-4.1# configure
sh: configure: command not found
sh-4.1# vyos
vyos@vyos:~$ configure
[edit]
vyos@vyos# set service dhcp-server shared-network-name dhcpexample authoritative enable
[edit]
vyos@vyos# set service dhcp-server shared-network-name dhcpexample subnet 10.10.0.0/24 default-router 10.10.0.1
[edit]
vyos@vyos# set service dhcp-server shared-network-name dhcpexample subnet 10.10.0.0/24 start 10.10.0.100 stop 10.10.0.200
[edit]
vyos@vyos# commit
[edit]
vyos@vyos# save
Saving configuration to '/config/config.boot'...
Done
[edit]
vyos@vyos#
```

Figure 20: DHCP configuration on r1

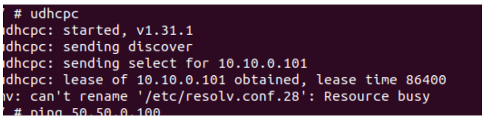
2. Wireshark capture on collision domain A



```
No.  Time          Source                Destination        Protocol  Length  Info
  10 22.360649673  10.10.0.101           50.50.0.100        ICMP          98 Echo (ping) request  id=0x2800, seq=4/1024, ttl=64 (reply in 11)
  11 22.360888772  50.50.0.100           10.10.0.101        ICMP          98 Echo (ping) reply    id=0x2800, seq=4/1024, ttl=62 (request in 10)
  12 23.372366606  26:a7:fa:b1:c1:e1     32:72:a8:87:94:6b  ARP           42 Who has 10.10.0.101? Tell 10.10.0.1
  13 23.372440742  32:72:a8:87:94:6b     26:a7:fa:b1:c1:e1  ARP           42 Who has 10.10.0.1? Tell 10.10.0.101
  14 23.372583170  32:72:a8:87:94:6b     26:a7:fa:b1:c1:e1  ARP           42 10.10.0.101 is at 32:72:a8:87:94:6b
  15 23.372622442  26:a7:fa:b1:c1:e1     32:72:a8:87:94:6b  ARP           42 10.10.0.1 is at 26:a7:fa:b1:c1:e1
  16 71.992473756  fe80::182b:feff:fed…  ff02::fb           MDNS         102 Standard query 0x0000 PTR _pgpkey-hkp._tcp.local, "QM" question
  17 72.993844554  fe80::182b:feff:fed…  ff02::fb           MDNS         102 Standard query 0x0000 PTR _pgpkey-hkp._tcp.local, "QM" question
  18 74.996393225  fe80::182b:feff:fed…  ff02::fb           MDNS         102 Standard query 0x0000 PTR _pgpkey-hkp._tcp.local, "QM" question
  19 78.997839713  fe80::182b:feff:fed…  ff02::fb           MDNS         102 Standard query 0x0000 PTR _pgpkey-hkp._tcp.local, "QM" question

▾ Frame 1: 102 bytes on wire (816 bits), 102 bytes captured (816 bits) on interface kt-69c69e3d8596, id 0
  ▸ Interface id: 0 (kt-69c69e3d8596)
    Encapsulation type: Ethernet (1)
    Arrival Time: Aug 22, 2020 23:45:28.489499370 CEST
    [Time shift for this packet: 0.000000000 seconds]
    Epoch Time: 1598132728.489499370 seconds
    [Time delta from previous captured frame: 0.000000000 seconds]
    [Time delta from previous displayed frame: 0.000000000 seconds]
    [Time since reference or first frame: 0.000000000 seconds]
    Frame Number: 1
    Frame Length: 102 bytes (816 bits)
    Capture Length: 102 bytes (816 bits)
    [Frame is marked: False]
    [Frame is ignored: False]
    [Protocols in frame: eth:ethertype:ipv6:udp:mdns]
    [Coloring Rule Name: UDP]
    [Coloring Rule String: udp]
▸ Ethernet II, Src: 22:89:d2:08:31:98 (22:89:d2:08:31:98), Dst: IPv6mcast_fb (33:33:00:00:00:fb)
▸ Internet Protocol Version 6, Src: fe80::182b:feff:fed7:1237, Dst: ff02::fb
▸ User Datagram Protocol, Src Port: 5353, Dst Port: 5353
▸ Multicast Domain Name System (query)
```

Figure 21: Wireshark capture on CD A

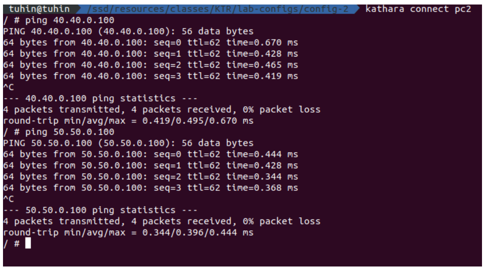
3. udhcp client on emulated pc



```
/ # udhcpc
udhcpc: started, v1.31.1
udhcpc: sending discover
udhcpc: sending select for 10.10.0.101
udhcpc: lease of 10.10.0.101 obtained, lease time 86400
mv: can't rename '/etc/resolv.conf.28': Resource busy
/ # ping 50.50.0.100
```

Figure 22: udhcp client to gather IP address

4. Connectivity check from pc2



```
tuhin@tuhin  /ssd/resources/classes/KTR/lab-configs/config-2  kathara connect pc2
/ # ping 40.40.0.100
PING 40.40.0.100 (40.40.0.100): 56 data bytes
64 bytes from 40.40.0.100: seq=0 ttl=62 time=0.670 ms
64 bytes from 40.40.0.100: seq=1 ttl=62 time=0.428 ms
64 bytes from 40.40.0.100: seq=2 ttl=62 time=0.465 ms
64 bytes from 40.40.0.100: seq=3 ttl=62 time=0.419 ms
^C
--- 40.40.0.100 ping statistics ---
4 packets transmitted, 4 packets received, 0% packet loss
round-trip min/avg/max = 0.419/0.495/0.670 ms
/ # ping 50.50.0.100
PING 50.50.0.100 (50.50.0.100): 56 data bytes
64 bytes from 50.50.0.100: seq=0 ttl=62 time=0.444 ms
64 bytes from 50.50.0.100: seq=1 ttl=62 time=0.428 ms
64 bytes from 50.50.0.100: seq=2 ttl=62 time=0.344 ms
64 bytes from 50.50.0.100: seq=3 ttl=62 time=0.368 ms
^C
--- 50.50.0.100 ping statistics ---
4 packets transmitted, 4 packets received, 0% packet loss
round-trip min/avg/max = 0.344/0.396/0.444 ms
/ # 
```

Figure 23: Connectivity check from pc2 to web2

5. How DHCP works