

S18 Networks – week 2 lab report

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B17-03

Gleb Petrakov

g.petrakov@innopolis.ru (mailto:g.petrakov@innopolis.ru)

Architecture

Host system: Mac Os X Mojave 10.14.3

Virtualization: VMware Fusion 11

Base image: Ubuntu Server 18.10 64-bit

Linked images: client1, client2, router

Goal

Create network topology (star topology), which allows `client1` and `client2` to communicate with each other via `router` .

Configuration

In Ubuntu Server 18.10 interface configuration was moved to `netplan` .

Configuration file: `/etc/netplan/50-cloud-init.yaml`

Configuration file format:

```
network:
  ethernets:
    <interface>:
      addresses: [<ip>/<mask>]
      gateway4: <gateway>
      dhcp4: false
  version: 2
```

client1

ens33

IP: 192.168.1.1/24

Gateway: 192.168.1.10/24

client2

ens33

IP: 192.168.2.1/24

Gateway: 192.168.2.10/24

router

Enabled ipv4 forwarding.

Enabled routing within interfaces with `ufw` (uncomplicated firewall).

ens33

IP: 192.168.1.10/24

Gateway: 0.0.0.0

ens38

IP: 192.168.2.10/24

Gateway: 0.0.0.0

Result

Network created, netplan configured, routing configured.

`client1` is able to send ping-requests to `client2` (and vice versa) without direct connection, but through `router` .

```

glebpetrakov@vm:~$ ifconfig
ens33: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 192.168.1.10 netmask 255.255.255.0 broadcast 192.168.1.255
    inet6 fe80::250:56ff:fe2d:e83d prefixlen 64 scopeid 0x20<link>
    ether 00:50:56:2d:e8:3d txqueuelen 1000 (Ethernet)
    RX packets 33 bytes 2550 (2.5 KB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 38 bytes 3066 (3.0 KB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

ens38: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 192.168.2.10 netmask 255.255.255.0 broadcast 192.168.2.255
    inet6 fe80::250:56ff:fe2d:663b prefixlen 64 scopeid 0x20<link>
    ether 00:50:56:2d:66:3b txqueuelen 1000 (Ethernet)
    RX packets 24 bytes 1858 (1.8 KB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 29 bytes 2374 (2.3 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 (Local Loopback)
    RX packets 1136 bytes 69312 (69.3 KB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 1136 bytes 69312 (69.3 KB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

glebpetrakov@vm:~$ route -n
Kernel IP routing table
Destination        Gateway           Genmask          Flags Metric Ref    Use Iface
0.0.0.0            0.0.0.0          0.0.0.0          U        0      0      0 ens38
0.0.0.0            0.0.0.0          0.0.0.0          U        0      0      0 ens33
192.168.1.0        0.0.0.0          255.255.255.0    U        0      0      0 ens33
192.168.2.0        0.0.0.0          255.255.255.0    U        0      0      0 ens38
glebpetrakov@vm:~$ router_

```

router

```

glebpetrakov@vm:~$ ifconfig
ens33: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 192.168.1.1 netmask 255.255.255.0 broadcast 192.168.1.255
    inet6 fe80::250:56ff:fe39:4c40 prefixlen 64 scopeid 0x20<link>
    ether 00:50:56:39:4c:40 txqueuelen 1000 (Ethernet)
    RX packets 18 bytes 1422 (1.4 KB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 35 bytes 2658 (2.6 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 (Local Loopback)
    RX packets 900 bytes 55360 (55.3 KB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 900 bytes 55360 (55.3 KB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

glebpetrakov@vm:~$ route -n
Kernel IP routing table
Destination Gateway Genmask Flags Metric Ref Use Iface
0.0.0.0 192.168.1.10 0.0.0.0 UG 0 0 0 ens33
192.168.1.0 0.0.0.0 255.255.255.0 U 0 0 0 ens33
glebpetrakov@vm:~$ ping -c 4 192.168.2.1
PING 192.168.2.1 (192.168.2.1) 56(84) bytes of data:
64 bytes from 192.168.2.1: icmp_seq=1 ttl=63 time=0.736 ms
64 bytes from 192.168.2.1: icmp_seq=2 ttl=63 time=1.23 ms
64 bytes from 192.168.2.1: icmp_seq=3 ttl=63 time=1.56 ms
64 bytes from 192.168.2.1: icmp_seq=4 ttl=63 time=1.30 ms

--- 192.168.2.1 ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 31ms
rtt min/avg/max/mdev = 0.736/1.205/1.562/0.301 ms
glebpetrakov@vm:~$ client1

```

client1

```

glebpetrakov@vm:~$ ifconfig
ens33: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 192.168.2.1 netmask 255.255.255.0 broadcast 192.168.2.255
    inet6 fe80::250:56ff:fe3d:c8f3 prefixlen 64 scopeid 0x20<link>
    ether 00:50:56:3d:c8:f3 txqueuelen 1000 (Ethernet)
    RX packets 23 bytes 1798 (1.7 KB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 29 bytes 2374 (2.3 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 (Local Loopback)
    RX packets 1024 bytes 62960 (62.9 KB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 1024 bytes 62960 (62.9 KB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

glebpetrakov@vm:~$ route -n
Kernel IP routing table
Destination Gateway Genmask Flags Metric Ref Use Iface
0.0.0.0 192.168.2.10 0.0.0.0 UG 0 0 0 ens33
192.168.2.0 0.0.0.0 255.255.255.0 U 0 0 0 ens33
glebpetrakov@vm:~$ ping -c 4 192.168.1.1
PING 192.168.1.1 (192.168.1.1) 56(84) bytes of data:
64 bytes from 192.168.1.1: icmp_seq=1 ttl=63 time=0.912 ms
64 bytes from 192.168.1.1: icmp_seq=2 ttl=63 time=1.20 ms
64 bytes from 192.168.1.1: icmp_seq=3 ttl=63 time=1.17 ms
64 bytes from 192.168.1.1: icmp_seq=4 ttl=63 time=1.01 ms

--- 192.168.1.1 ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 39ms
rtt min/avg/max/mdev = 0.912/1.071/1.195/0.119 ms
glebpetrakov@vm:~$ client2

```

client2