

EPAM University Programs

DevOps L1 course

TASK: Networks using

Linux

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Практична частина модуля Linux Networking передбачає створення засобами Virtual Box мережі, що показаний на рисунку 1

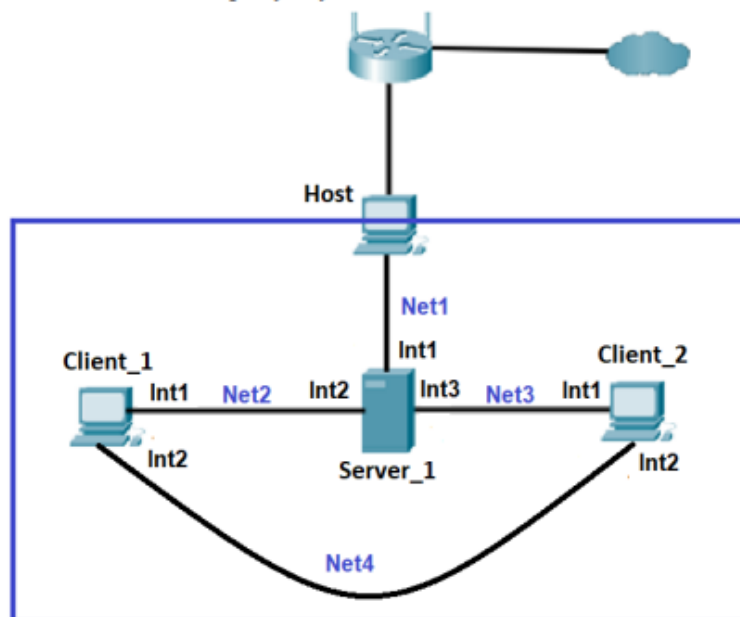


Рисунок 1

Host – це комп'ютер, на якому запущений Virtual Box;

Server_1 – Віртуальна машина, на якій розгорнуто ОС Linux. Int1 цієї машини в режимі «Мережевий міст» підключений до мережі Net1, тобто знаходиться в адресному просторі домашньої мережі. IP-адреса Int1 встановлюється статично відповідно до адресного простору, наприклад 192.168.1.200/24. Інтерфейси Int2 та Int3 відповідно підключено в режимі «Внутрішня мережа» до мереж Net2 та Net3.

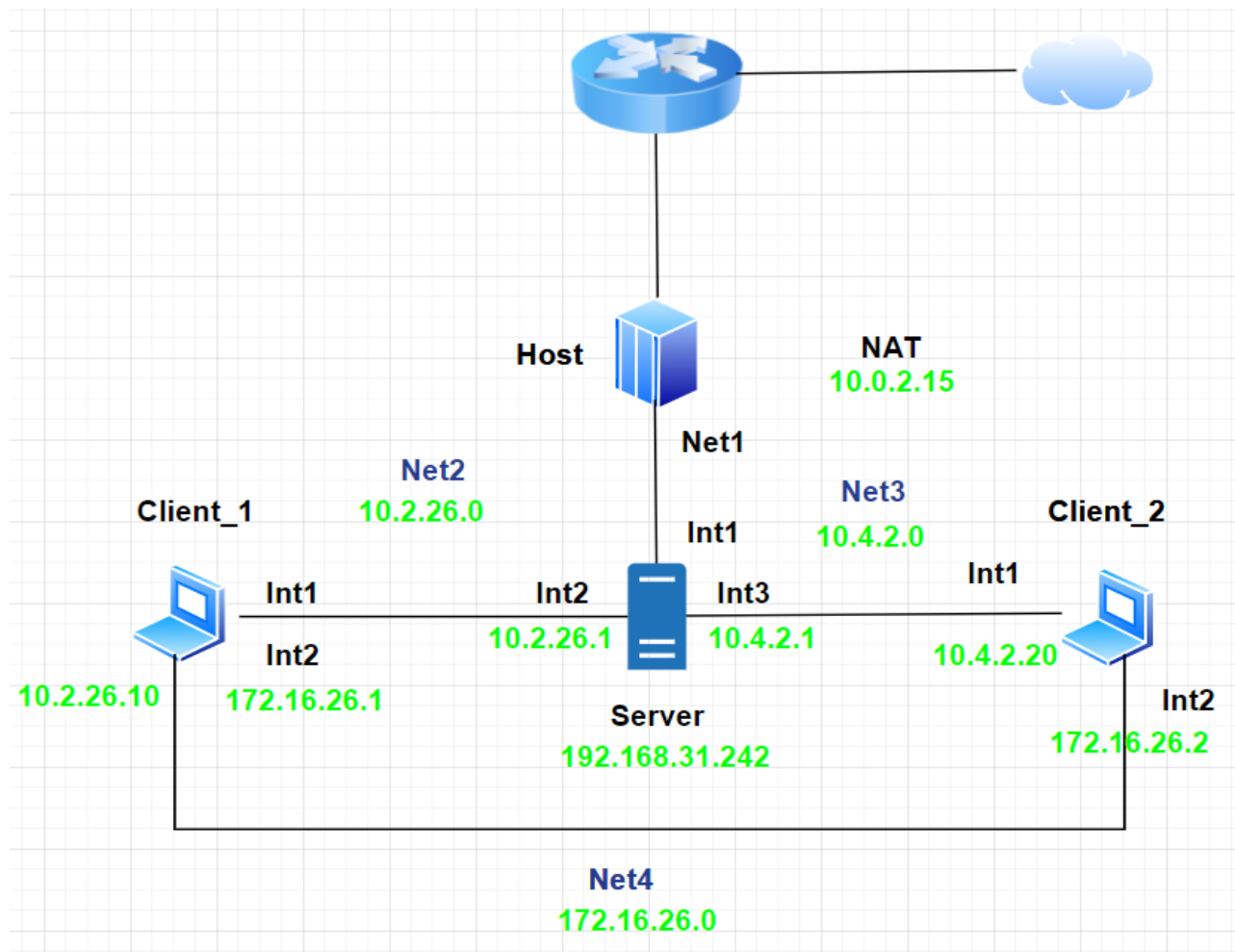
Client_1 та Client_2 – Віртуальні машини, на яких розгорнуто ОС Linux (бажано різні дистрибутиви, наприклад Ubuntu та CentOS). Інтерфейси підключені в режимі «Внутрішня мережа» до мереж Net2, Net3 та Net4 як показано на рисунку 1.

Адреса мережі Net2 – 10.Y.D.0/24, де Y – дві останні цифри з вашого року народження, D – дата народження.

Адреса мережі Net3 – 10.M.Y.0/24, де M – номер місяця народження.

Адреса мережі Net4 – 172.16.D.0/24.

Увага! Якщо, адресний простір Net2, Net3 або Net4 перетинається з адресним простором Net1 – відповідну адресу можна змінити на власний розсуд.



1) На Server_1 налаштувати статичні адреси на всіх інтерфейсах.

```

bekberov@bekberov-Server:/etc/netplan$ cat 01-network-manager-all.yaml
network:
  ethernets:
    enp0s8:
      addresses:
        - 10.2.26.1/24
      nameservers:
        addresses:
          - 10.2.26.1
        search:
          - vm.dom
    enp0s9:
      addresses:
        - 10.4.2.1/24
      nameservers:
        addresses:
          - 10.4.2.1
        search:
          - vm.dom
  version: 2
  renderer: NetworkManager
bekberov@bekberov-Server:/etc/netplan$

```

```

bekberov@bekberov-Server:/etc/netplan$ ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group defau
lt qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
        valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
        valid_lft forever preferred_lft forever
2: enp0s3: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP g
roup default qlen 1000
    link/ether 08:00:27:b7:ee:cc brd ff:ff:ff:ff:ff:ff
    inet 10.0.2.15/24 brd 10.0.2.255 scope global dynamic noprefixroute enp0s3
        valid_lft 78582sec preferred_lft 78582sec
3: enp0s8: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP g
roup default qlen 1000
    link/ether 08:00:27:f6:7b:cf brd ff:ff:ff:ff:ff:ff
    inet 10.2.26.1/24 brd 10.2.26.255 scope global noprefixroute enp0s8
        valid_lft forever preferred_lft forever
    inet6 fe80::a00:27ff:fef6:7bcf/64 scope link
        valid_lft forever preferred_lft forever
4: enp0s9: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP g
roup default qlen 1000
    link/ether 08:00:27:de:54:c7 brd ff:ff:ff:ff:ff:ff
    inet 10.4.2.1/24 brd 10.4.2.255 scope global noprefixroute enp0s9
        valid_lft forever preferred_lft forever
    inet6 fe80::a00:27ff:fede:54c7/64 scope link
        valid_lft forever preferred_lft forever
bekberov@bekberov-Server:/etc/netplan$

```

2) На Server_1 налаштувати DHCP сервіс, який буде конфігурувати адреси Int1 Client_1 та Client_2

- `sudo apt install isc-dhcp-server`
- `vim /etc/dhcp/dhcpd.conf`

```

subnet 10.2.26.0 netmask 255.255.255.0 {
    range 10.2.26.10 10.2.26.20;
    option domain-name-servers 8.8.8.8, 8.8.4.4;
    option domain-name "vm.dom";
    option subnet-mask 255.255.255.0;
    option routers 10.2.26.1;
}

subnet 10.4.2.0 netmask 255.255.255.0 {
    range 10.4.2.20 10.4.2.30;
    option domain-name-servers 8.8.8.8, 8.8.4.4;
    option domain-name "vm.dom";
    option subnet-mask 255.255.255.0;
    option routers 10.4.2.1;
}

```

- `sudo systemctl restart isc-dhcp-server.service`
- `sudo sysctl -w net.ipv4.ip_forward=1`

3) За допомогою команд ping та traceroute перевірити зв'язок між віртуальними машинами.

From Server:

```
bekberov@bekberov-Server:~$ ping -c 5 10.2.26.10
PING 10.2.26.10 (10.2.26.10) 56(84) bytes of data.
64 bytes from 10.2.26.10: icmp_seq=1 ttl=64 time=0.486 ms
64 bytes from 10.2.26.10: icmp_seq=2 ttl=64 time=0.363 ms
64 bytes from 10.2.26.10: icmp_seq=3 ttl=64 time=0.612 ms
64 bytes from 10.2.26.10: icmp_seq=4 ttl=64 time=0.546 ms
64 bytes from 10.2.26.10: icmp_seq=5 ttl=64 time=0.473 ms

--- 10.2.26.10 ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 4251ms
rtt min/avg/max/mdev = 0.363/0.496/0.612/0.082 ms
bekberov@bekberov-Server:~$ ping -c 5 10.4.2.20
PING 10.4.2.20 (10.4.2.20) 56(84) bytes of data.
64 bytes from 10.4.2.20: icmp_seq=1 ttl=64 time=0.462 ms
64 bytes from 10.4.2.20: icmp_seq=2 ttl=64 time=0.322 ms
64 bytes from 10.4.2.20: icmp_seq=3 ttl=64 time=0.557 ms
64 bytes from 10.4.2.20: icmp_seq=4 ttl=64 time=0.532 ms
64 bytes from 10.4.2.20: icmp_seq=5 ttl=64 time=0.480 ms

--- 10.4.2.20 ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 4088ms
rtt min/avg/max/mdev = 0.322/0.470/0.557/0.081 ms
bekberov@bekberov-Server:~$
```

From Client 1:

```
client_1@client1:/$ ping -c 3 192.168.31.242
PING 192.168.31.242 (192.168.31.242) 56(84) bytes of data.
64 bytes from 192.168.31.242: icmp_seq=1 ttl=126 time=1.13 ms
64 bytes from 192.168.31.242: icmp_seq=2 ttl=126 time=1.27 ms
64 bytes from 192.168.31.242: icmp_seq=3 ttl=126 time=1.22 ms

--- 192.168.31.242 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2003ms
rtt min/avg/max/mdev = 1.126/1.203/1.265/0.057 ms
client_1@client1:/$ ping -c 3 10.2.26.1
PING 10.2.26.1 (10.2.26.1) 56(84) bytes of data.
64 bytes from 10.2.26.1: icmp_seq=1 ttl=64 time=0.593 ms
64 bytes from 10.2.26.1: icmp_seq=2 ttl=64 time=0.617 ms
64 bytes from 10.2.26.1: icmp_seq=3 ttl=64 time=0.641 ms

--- 10.2.26.1 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2049ms
rtt min/avg/max/mdev = 0.593/0.617/0.641/0.019 ms
client_1@client1:/$
```

```
client_1@client1:/$ ping -c 3 10.4.2.20
PING 10.4.2.20 (10.4.2.20) 56(84) bytes of data.
64 bytes from 10.4.2.20: icmp_seq=1 ttl=63 time=1.11 ms
64 bytes from 10.4.2.20: icmp_seq=2 ttl=63 time=1.13 ms
64 bytes from 10.4.2.20: icmp_seq=3 ttl=63 time=0.912 ms

--- 10.4.2.20 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2002ms
rtt min/avg/max/mdev = 0.912/1.050/1.125/0.097 ms
client_1@client1:/$ ping -c 3 172.16.26.2
PING 172.16.26.2 (172.16.26.2) 56(84) bytes of data.
64 bytes from 172.16.26.2: icmp_seq=1 ttl=64 time=0.717 ms
64 bytes from 172.16.26.2: icmp_seq=2 ttl=64 time=0.507 ms
64 bytes from 172.16.26.2: icmp_seq=3 ttl=64 time=0.471 ms

--- 172.16.26.2 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2026ms
rtt min/avg/max/mdev = 0.471/0.565/0.717/0.108 ms
client_1@client1:/$
```

From Client 2:

```
client2@client2:~$ ping -c 3 10.4.2.1
PING 10.4.2.1 (10.4.2.1) 56(84) bytes of data.
64 bytes from 10.4.2.1: icmp_seq=1 ttl=64 time=0.520 ms
64 bytes from 10.4.2.1: icmp_seq=2 ttl=64 time=1.43 ms
64 bytes from 10.4.2.1: icmp_seq=3 ttl=64 time=0.484 ms

--- 10.4.2.1 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2033ms
rtt min/avg/max/mdev = 0.484/0.810/1.427/0.436 ms
client2@client2:~$ ping -c 3 192.168.31.242
PING 192.168.31.242 (192.168.31.242) 56(84) bytes of data.
64 bytes from 192.168.31.242: icmp_seq=1 ttl=126 time=1.18 ms
64 bytes from 192.168.31.242: icmp_seq=2 ttl=126 time=0.999 ms
64 bytes from 192.168.31.242: icmp_seq=3 ttl=126 time=1.35 ms

--- 192.168.31.242 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2003ms
rtt min/avg/max/mdev = 0.999/1.177/1.353/0.144 ms
client2@client2:~$
```



```

client2@client2:~$ ping -c 3 10.2.26.10
PING 10.2.26.10 (10.2.26.10) 56(84) bytes of data.
64 bytes from 10.2.26.10: icmp_seq=1 ttl=63 time=1.05 ms
64 bytes from 10.2.26.10: icmp_seq=2 ttl=63 time=1.00 ms
64 bytes from 10.2.26.10: icmp_seq=3 ttl=63 time=1.04 ms

--- 10.2.26.10 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2003ms
rtt min/avg/max/mdev = 1.003/1.029/1.048/0.019 ms
client2@client2:~$ ping -c 3 172.16.26.1
PING 172.16.26.1 (172.16.26.1) 56(84) bytes of data.
64 bytes from 172.16.26.1: icmp_seq=1 ttl=64 time=0.996 ms
64 bytes from 172.16.26.1: icmp_seq=2 ttl=64 time=0.431 ms
64 bytes from 172.16.26.1: icmp_seq=3 ttl=64 time=0.480 ms

--- 172.16.26.1 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2016ms
rtt min/avg/max/mdev = 0.431/0.635/0.996/0.255 ms
client2@client2:~$

```

- 4) На віртуальному інтерфейсу lo Client_1 призначити дві IP адреси за таким правилом: 172.17.D+10.1/24 та 172.17.D+20.1/24. Налаштувати маршрутизацію таким чином, щоб трафік з Client_2 до 172.17.D+10.1 проходив через Server_1, а до 172.17.D+20.1 через Net4. Для перевірки використати traceroute

```

client_1@client1:/$ sudo ip addr add 172.17.36.1/24 dev lo label lo:10
[sudo] password for client_1:
client_1@client1:/$ sudo ip addr add 172.17.46.1/24 dev lo label lo:20

```

```

client2@client2:/$ sudo ip route add 172.17.46.0/24 via 172.16.26.1
[sudo] пароль для client2:
client2@client2:/$

```

Файлы

```

bekberov@bekberov-Server:~$ sudo ip route add 172.17.36.0/24 via 10.2.26.10

```

```

client2@client2:/$ traceroute 172.17.36.1
traceroute to 172.17.36.1 (172.17.36.1), 30 hops max, 60 byte packets
 1  _gateway (10.4.2.1)  0.416 ms  0.367 ms  0.351 ms
 2  172.17.36.1 (172.17.36.1)  2.470 ms  2.363 ms  2.340 ms
client2@client2:/$ traceroute 172.17.46.1
traceroute to 172.17.46.1 (172.17.46.1), 30 hops max, 60 byte packets
 1  172.17.46.1 (172.17.46.1)  0.437 ms  0.391 ms  0.374 ms
client2@client2:/$

```

- 5) На Розрахувати спільну адресу та маску (summarizing) адрес 172.17.D+10.1 та 172.17.D+20.1, при чому префікс має бути максимально можливим. Видалити маршрути, встановлені на попередньому кроці та замінити їх об'єднаним маршрутом, якій має проходити через Server_1

```
client2@client2:~$ sudo ip route add 172.17.0.0/20 via 10.4.2.1
```

- 6) Налаштувати SSH сервіс таким чином, щоб Client_1 та Client_2 могли підключатись до Server_1 та один до одного.

Генерація ключа

```
client_1@client1:~$ ssh-keygen
Generating public/private rsa key pair.
Enter file in which to save the key (/home/client_1/.ssh/id_rsa):
Created directory '/home/client_1/.ssh'.
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in /home/client_1/.ssh/id_rsa
Your public key has been saved in /home/client_1/.ssh/id_rsa.pub
The key fingerprint is:
SHA256:mdRA7EXffPs9cTztJ86/XCWZx2h9aJv0TffBdv9l9Bo client_1@client1
The key's randomart image is:
+---[RSA 3072]---+
|      oo..      |
|      .o.. o    |
|      .... . o .|
|      ..o      Xo|
|      S        O+@|
|      o.BX      |
|      E=&       |
|      =oB@      |
|      *+0       |
+---[SHA256]-----+
```

Копіювання ключа

```
client_1@client1:~$ ssh-copy-id -i ~/.ssh/id_rsa.pub bekberov@10.0.2.15
/usr/bin/ssh-copy-id: INFO: Source of key(s) to be installed: " ~/.ssh/id_rsa.pub"
/usr/bin/ssh-copy-id: INFO: attempting to log in with the new key(s), to filter
out any that are already installed
/usr/bin/ssh-copy-id: INFO: 1 key(s) remain to be installed -- if you are prompt
ed now it is to install the new keys
bekberov@10.0.2.15's password:

Number of key(s) added: 1

Now try logging into the machine, with:  "ssh 'bekberov@10.0.2.15'"
and check to make sure that only the key(s) you wanted were added.
```

Підключення Client_1 до Server

```
client_1@client1:~$ ssh bekberov@10.0.2.15
Welcome to Ubuntu 22.04.1 LTS (GNU/Linux 5.15.0-58-generic x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:       https://ubuntu.com/advantage

157 updates can be applied immediately.
To see these additional updates run: apt list --upgradable

Last login: Mon Jan 30 12:32:58 2023 from 10.2.26.10
bekberov@bekberov-Server:~$ hostname
bekberov-Server
```

Генерація ключа

```
client2@client2:~$ ssh-keygen
Generating public/private rsa key pair.
Enter file in which to save the key (/home/client2/.ssh/id_rsa):
Created directory '/home/client2/.ssh'.
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in /home/client2/.ssh/id_rsa
Your public key has been saved in /home/client2/.ssh/id_rsa.pub
The key fingerprint is:
SHA256:gSSFK3i1lrshd5FWVQ03JurAhZjZQJs3lxKiXkDsouw client2@client2
The key's randomart image is:
+---[RSA 3072]-----+
|      ++*B . .oo+   |
|      . *= & = . . o |
|      o..% @ + . o   |
|      ...o = B . o   |
|.. .o + S .         |
|..  o + o           |
|      . . .         |
|      E             |
|                    |
+-----[SHA256]-----+
```

Копіювання ключа

```
client2@client2:~$ ssh-copy-id -i ./ssh/id_rsa.pub bekberov@10.0.2.15
/usr/bin/ssh-copy-id: INFO: Source of key(s) to be installed: './ssh/id_rsa.pub'
The authenticity of host '10.0.2.15 (10.0.2.15)' can't be established.
ED25519 key fingerprint is SHA256:RSAjXXunNZanYrKUG+r/JFF/CrWYyvqtm/dnKRLYyZ4.
This key is not known by any other names
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
/usr/bin/ssh-copy-id: INFO: attempting to log in with the new key(s), to filter
out any that are already installed
/usr/bin/ssh-copy-id: INFO: 1 key(s) remain to be installed -- if you are prompted now it is to install the new keys
bekberov@10.0.2.15's password:

Number of key(s) added: 1

Now try logging into the machine, with:  "ssh 'bekberov@10.0.2.15'"
and check to make sure that only the key(s) you wanted were added.
```


Підключення Client_2 до Server

```
client2@client2:~$ ssh bekberov@10.0.2.15
Welcome to Ubuntu 22.04.1 LTS (GNU/Linux 5.15.0-58-generic x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:       https://ubuntu.com/advantage

157 updates can be applied immediately.
To see these additional updates run: apt list --upgradable

Last login: Mon Jan 30 12:43:06 2023 from 10.2.26.10
bekberov@bekberov-Server:~$ hostname
bekberov-Server
```

Контет файлу на Server

```
bekberov@bekberov-Server:~$ cat ~/.ssh/authorized_keys
ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAQGCtdaJL/G4pPem9kS4NrHEmT7y7b9gbZ7CGA4zE3lC
b11uSWOU+c/oRLudkJHSrDyPFZ/t10XaFS8mH8eijl/tQSBXBi+AJeedIqpD70h3chuctxtQPVRbTQU
EtvjY2L2i7SGa2Uc88cvlPqe4KjGahSy082gqCkmEZSGrhi21QL9XKvydsaxqPSmHXWP/00Zd8QvmJE
zbIx3yNq3bIg0G73245cG6phiBiZSwsVnAT3h4Efx5zKYmBP6LBV5n/8uhSXNMBLisjDy3j09GXDluV
Vd6SSzi7Bw7FxzkiMLZaXGYGtsLGDl10ADmWyJI1HgIj92QEB9pJub0mGdU4f0dql1DfnlgnSIC1YrL
1lUULoiAcm+GC2miWz9o0YgA12TtK1v05ZFz1LLYS0r7M89Wf3YXvihYEUT6GvB6Frhu5ttqIHYPi6
4KutpEtM5XK3mPtf/4XfnWfdatx0tabkZQNCuR6U/N/RDkJYhTGpl2usPQo8xHnmpUGh6iS53G8kc=
client_1@client1
ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAQGCfQP2+Hho/txgo4MTL9K2f31aZY34hNgxONyamQ7I
dtQy2CGbG5hKQ3VON/tUuRwZwn9qq7aWYNophgbBbXKGGd8l0I93dr/wgg4teuHFUCIKSRdZGBALrxI
TKQvLK0CiGirkiqtF+liR84202wSsjk3L0nUGfdw9DoCbq0y+YZhlPLzFENI5Y+5/JyjoJcKWkxjtt/
v5tjRsLN1oMzB47EXTKQxHaYoGTDWAULeU0o7VuDefZuSjedIrcw0kIXCUMUG3yshepGoI04p3rq6b
CuPS066qm27VXqf7zJs1X/wyMZwnNEIrHox8RjFjX8DWiv+b/JK0XxW123oQRLYxkZyZUCLbyz7G8ZwQ
L9d4qR2K/IG/i+9BYpVf/3dS7ZdCC5LpMaCy5HFH8Yu14XAjVNB1uaE/AeAZKbNgiEAcZJh4Vl6k3Sz
OhLLB3hobWJVgyhr4eYOEI9/HqlmROIavA24Km5FXb8riXN1PM5wiH26TLWhcH01DC/1NraZqHvr8=
client2@client2
bekberov@bekberov-Server:~$
```

Підключення Client_1 до Client2

```
client_1@client1:~$ ssh client2@10.4.2.20
client2@10.4.2.20's password:
Welcome to Ubuntu 22.04.1 LTS (GNU/Linux 5.15.0-58-generic x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:       https://ubuntu.com/advantage

136 обновлений может быть применено немедленно.
7 из этих обновлений, являются стандартными обновлениями безопасности.
Чтобы просмотреть дополнительные обновления выполните: apt list --upgradable

The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

client2@client2:~$
```

Підключення Client2 до Client_1

```
client2@client2:~$ ssh client_1@10.2.26.10
client_1@10.2.26.10's password:
Welcome to Ubuntu 22.04.1 LTS (GNU/Linux 5.15.0-58-generic x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:       https://ubuntu.com/advantage

172 updates can be applied immediately.
44 of these updates are standard security updates.
To see these additional updates run: apt list --upgradable

The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

client_1@client1:~$
```

7) Налаштуйте на Server_1 firewall таким чином:

- Дозволено підключатись через SSH з Client_1 та заборонено з Client_2
- З Client_2 на 172.17.D+10.1 ping проходив, а на 172.17.D+20.1 не проходив

```
bekberov@bekberov-Server:~$ sudo iptables -A INPUT -i enp0s9 -p tcp --dport 22 -j DROP
[sudo] password for bekbervov:
bekberov@bekberov-Server:~$ sudo iptables -L -v
Chain INPUT (policy ACCEPT 0 packets, 0 bytes)
 pkts bytes target     prot opt in     out     source            destination
    0      0 DROP      tcp  --  enp0s9  any     anywhere          anywhere
      tcp dpt:ssh

Chain FORWARD (policy ACCEPT 0 packets, 0 bytes)
 pkts bytes target     prot opt in     out     source            destination

Chain OUTPUT (policy ACCEPT 0 packets, 0 bytes)
 pkts bytes target     prot opt in     out     source            destination

bekberov@bekberov-Server:~$
```

Підключення через SSH з Client_1 **дозволено**

```
client_1@client1:~$ ssh bekberov@10.0.2.15
Welcome to Ubuntu 22.04.1 LTS (GNU/Linux 5.15.0-58-generic x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:       https://ubuntu.com/advantage

157 updates can be applied immediately.
To see these additional updates run: apt list --upgradable

Last login: Mon Jan 30 12:55:37 2023 from 10.4.2.20
bekberov@bekberov-Server:~$
```

Підключення через SSH з Client_2 **заборонено**

```
client2@client2:~$ ssh -v bekberov@10.0.2.15
OpenSSH_8.9p1 Ubuntu-3ubuntu0.1, OpenSSL 3.0.2 15 Mar 2022
debug1: Reading configuration data /etc/ssh/ssh_config
debug1: /etc/ssh/ssh_config line 19: include /etc/ssh/ssh_config.d/*.conf matche
d no files
debug1: /etc/ssh/ssh_config line 21: Applying options for *
debug1: Connecting to 10.0.2.15 [10.0.2.15] port 22.
```

```
bekberov@bekberov-Server:~$ sudo iptables -P FORWARD DROP
[sudo] password for bekberov:
bekberov@bekberov-Server:~$ sudo iptables -A FORWARD -p icmp -d 172.17.36.0/24
-j ACCEPT
bekberov@bekberov-Server:~$ sudo iptables -L
Chain INPUT (policy ACCEPT)
target     prot opt source                destination

Chain FORWARD (policy DROP)
target     prot opt source                destination
ACCEPT     icmp -- anywhere             172.17.36.0/24

Chain OUTPUT (policy ACCEPT)
target     prot opt source                destination
```

3 Client_2 на 172.17.D+10.1 ping **проходив**

3 Client_2 на 172.17.D+20.1 **не проходив**

```
client2@client2:~$ ping -c 3 172.17.36.1
PING 172.17.36.1 (172.17.36.1) 56(84) bytes of data.
64 bytes from 172.17.36.1: icmp_seq=1 ttl=63 time=1.43 ms
64 bytes from 172.17.36.1: icmp_seq=2 ttl=63 time=2.51 ms
64 bytes from 172.17.36.1: icmp_seq=3 ttl=63 time=1.27 ms

client2@client2:~$ ping -c 3 172.17.46.1
PING 172.17.46.1 (172.17.46.1) 56(84) bytes of data.
^C
--- 172.17.46.1 ping statistics ---
3 packets transmitted, 0 received, 100% packet loss, time 2032ms
rtt min/avg/max/mdev = 0.538/0.823/1.234/0.297 ms
```

- 8) Якщо в п.3 була налаштована маршрутизація для доступу Client_1 та Client_2 до мережі Інтернет – видалити відповідні записи. На Server_1 налаштувати NAT сервіс таким чином, щоб з Client_1 та Client_2 проходив ping в мережу Інтернет.

```
bekberov@bekberov-Server:/$ sudo iptables -t nat -A POSTROUTING -j MASQUERADE
bekberov@bekberov-Server:/$ sudo iptables -t nat -L -v
Chain PREROUTING (policy ACCEPT 0 packets, 0 bytes)
 pkts bytes target      prot opt in       out      source            destination

Chain INPUT (policy ACCEPT 0 packets, 0 bytes)
 pkts bytes target      prot opt in       out      source            destination

Chain OUTPUT (policy ACCEPT 0 packets, 0 bytes)
 pkts bytes target      prot opt in       out      source            destination

Chain POSTROUTING (policy ACCEPT 0 packets, 0 bytes)
 pkts bytes target      prot opt in       out      source            destination
    30   2027 MASQUERADE  all  --  any      any      anywhere          anywhere
bekberov@bekberov-Server:/$
```

Client_1

```
client_1@client1:/$ ping -c 5 google.com
PING google.com (142.250.201.206) 56(84) bytes of data.
64 bytes from bud02s35-in-f14.1e100.net (142.250.201.206): icmp_seq=1 ttl=116
time=18.7 ms
64 bytes from bud02s35-in-f14.1e100.net (142.250.201.206): icmp_seq=2 ttl=116
time=20.1 ms
64 bytes from bud02s35-in-f14.1e100.net (142.250.201.206): icmp_seq=3 ttl=116
time=20.8 ms
64 bytes from bud02s35-in-f14.1e100.net (142.250.201.206): icmp_seq=4 ttl=116
time=19.3 ms
64 bytes from bud02s35-in-f14.1e100.net (142.250.201.206): icmp_seq=5 ttl=116
time=19.2 ms

--- google.com ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 4006ms
rtt min/avg/max/mdev = 18.655/19.615/20.833/0.760 ms
client_1@client1:/$
```

Client_2

```
client2@client2:/$ ping -c 5 google.com
PING google.com (142.251.208.142) 56(84) bytes of data.
64 bytes from bud02s42-in-f14.1e100.net (142.251.208.142): icmp_seq=1 ttl=116 time=29.1 ms
64 bytes from bud02s42-in-f14.1e100.net (142.251.208.142): icmp_seq=2 ttl=116 time=18.5 ms
64 bytes from bud02s42-in-f14.1e100.net (142.251.208.142): icmp_seq=3 ttl=116 time=19.2 ms
64 bytes from bud02s42-in-f14.1e100.net (142.251.208.142): icmp_seq=4 ttl=116 time=18.6 ms
64 bytes from bud02s42-in-f14.1e100.net (142.251.208.142): icmp_seq=5 ttl=116 time=19.1 ms

--- google.com ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 4007ms
rtt min/avg/max/mdev = 18.491/20.898/29.092/4.106 ms
client2@client2:/$
```