

Warsztaty - L3 - SK

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1 Wstępna konfiguracja sieci

1.1 Ustawienia virtualbox'a

W VirtualBox'ie stworzyłem 5 maszyn wirtualnych z ustawieniami sieci:

Virbian1:

Adapter 1 - Internal Network - local0

Virbian2:

Adapter 1 - Internal Network - local0

Adapter 2 - Internal Network - local1

Adapter 3 - Internal Network - local2

Virbian3:

Adapter 1 - Internal Network - local1

Adapter 2 - Internal Network - local3

Virbian4:

Adapter 1 - Internal Network - local2

Adapter 2 - Internal Network - local3

Adapter 3 - Internal Network - local4

Virbian5:

Adapter 1 - Internal Network - local4

1.2 Ustawienia sieci

Komendy użyte do konfiguracji sieci dla poszczególnej maszyny wirtualnej (po wcześniejszym sprawdzeniu adresów MAC w ustawieniach i interfejsów za pomocą 'ip link'):

Virbian1:

```
sudo ip link set enp0s3 name enp-loc0
sudo ip link set up dev enp-loc0
sudo ip addr add dev enp-loc0 192.168.0.1/24
```

Virbian2:

```
sudo ip link set enp0s3 name enp-loc0
sudo ip link set enp0s8 name enp-loc1
sudo ip link set enp0s9 name enp-loc2
sudo ip link set up dev enp-loc0
sudo ip link set up dev enp-loc1
sudo ip link set up dev enp-loc2
sudo ip addr add dev enp-loc0 192.168.0.2/24
sudo ip addr add dev enp-loc1 192.168.1.2/24
sudo ip addr add dev enp-loc2 192.168.2.2/24
```

Virbian3:

```
sudo ip link set enp0s3 name enp-loc1
sudo ip link set enp0s8 name enp-loc3
sudo ip link set up dev enp-loc1
sudo ip link set up dev enp-loc3
sudo ip addr add dev enp-loc1 192.168.1.3/24
sudo ip addr add dev enp-loc3 192.168.3.3/24
```

Virbian4:

```
sudo ip link set enp0s3 name enp-loc2
sudo ip link set enp0s8 name enp-loc3
sudo ip link set enp0s9 name enp-loc4
sudo ip link set up dev enp-loc2
sudo ip link set up dev enp-loc3
sudo ip link set up dev enp-loc4
sudo ip addr add dev enp-loc2 192.168.2.4/24
sudo ip addr add dev enp-loc3 192.168.3.4/24
sudo ip addr add dev enp-loc4 192.168.4.4/24
```

Virbian5:

```
sudo ip link set enp0s3 name enp-loc4
sudo ip link set up dev enp-loc4
sudo ip addr add dev enp-loc4 192.168.4.5/24
```

1.3 Ustawianie domyślnej trasy

Komendy użyte do ustawienia domyślnej trasy dla:

Virbian1 przebiegająca przez Virbian2:

```
sudo ip route add default via 192.168.0.2/24
```

Virbian5 przebiegająca przez Virbian4:

```
sudo ip route add default via 192.168.4.4/24
```

 Po wszystkich instrukcjach

warto sprawdzić czy nie popełniono błędu komendą 'ip addr'.

1.4 Protokół RIP

Włączenie protokołu RIP dla Virbian2:

```
sudo touch /etc/quagga/ripd.conf
```

```
sudo touch /etc/quagga/zebra.conf
```

```
sudo touch /etc/quagga/vtysh.conf
```

```
sudo systemctl start ripd
```

```
sudo vtysh
```

```
configure terminal
```

```
router rip
```

```
version 2
```

```
network 192.168.0.0/24
```

```
network 192.168.1.0/24
```

```
network 192.168.2.0/24
```

```
end
```

```
exit
```

```
ip route
```

Instrukcje dla innych różnią się pomiędzy instrukcją 'version 2', a 'end' dla:

Virbian3:

```
network 192.168.1.0/24
```

```
network 192.168.3.0/24
```

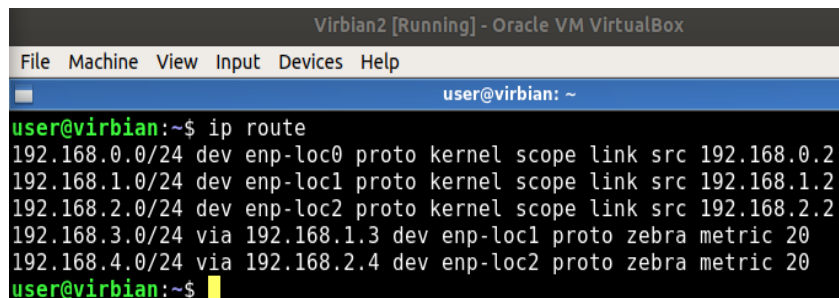
Virbian4:

```
network 192.168.2.0/24
```

```
network 192.168.3.0/24
```

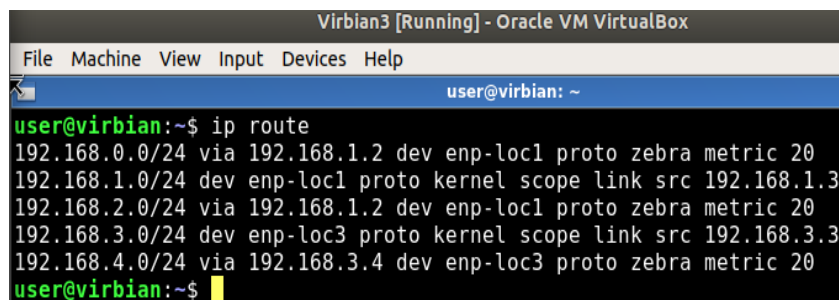
```
network 192.168.4.0/24
```

Otrzymane tablice:



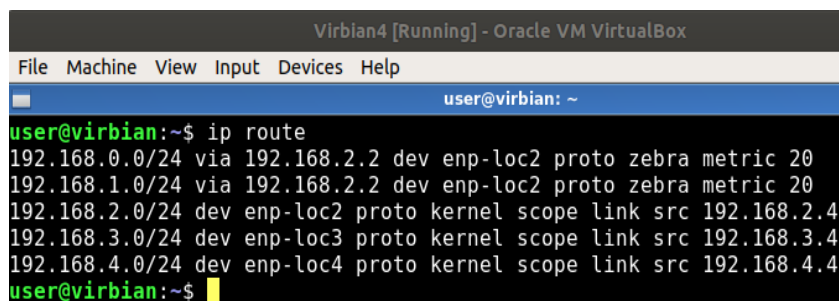
```
Virbian2 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
user@virbian: ~
user@virbian:~$ ip route
192.168.0.0/24 dev enp-loc0 proto kernel scope link src 192.168.0.2
192.168.1.0/24 dev enp-loc1 proto kernel scope link src 192.168.1.2
192.168.2.0/24 dev enp-loc2 proto kernel scope link src 192.168.2.2
192.168.3.0/24 via 192.168.1.3 dev enp-loc1 proto zebra metric 20
192.168.4.0/24 via 192.168.2.4 dev enp-loc2 proto zebra metric 20
user@virbian:~$
```

Rysunek 1: Tablica routingu dla V2



```
Virbian3 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
user@virbian: ~
user@virbian:~$ ip route
192.168.0.0/24 via 192.168.1.2 dev enp-loc1 proto zebra metric 20
192.168.1.0/24 dev enp-loc1 proto kernel scope link src 192.168.1.3
192.168.2.0/24 via 192.168.1.2 dev enp-loc1 proto zebra metric 20
192.168.3.0/24 dev enp-loc3 proto kernel scope link src 192.168.3.3
192.168.4.0/24 via 192.168.3.4 dev enp-loc3 proto zebra metric 20
user@virbian:~$
```

Rysunek 2: Tablica routingu dla V2



```
Virbian4 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
user@virbian: ~
user@virbian:~$ ip route
192.168.0.0/24 via 192.168.2.2 dev enp-loc2 proto zebra metric 20
192.168.1.0/24 via 192.168.2.2 dev enp-loc2 proto zebra metric 20
192.168.2.0/24 dev enp-loc2 proto kernel scope link src 192.168.2.4
192.168.3.0/24 dev enp-loc3 proto kernel scope link src 192.168.3.4
192.168.4.0/24 dev enp-loc4 proto kernel scope link src 192.168.4.4
user@virbian:~$
```

Rysunek 3: Tablica routingu dla V4

2 Testowanie rozwiązania

```
Virbian1 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
user@virbian: ~
user@virbian:~$ ping 192.168.1.3
PING 192.168.1.3 (192.168.1.3) 56(84) bytes of data.
64 bytes from 192.168.1.3: icmp_seq=1 ttl=63 time=1.67 ms
64 bytes from 192.168.1.3: icmp_seq=2 ttl=63 time=1.47 ms
^C
--- 192.168.1.3 ping statistics ---
2 packets transmitted, 2 received, 0% packet loss, time 2ms
rtt min/avg/max/mdev = 1.468/1.568/1.668/0.100 ms
user@virbian:~$ ping 192.168.3.3
PING 192.168.3.3 (192.168.3.3) 56(84) bytes of data.
64 bytes from 192.168.3.3: icmp_seq=1 ttl=63 time=1.43 ms
64 bytes from 192.168.3.3: icmp_seq=2 ttl=63 time=1.55 ms
^C
--- 192.168.3.3 ping statistics ---
2 packets transmitted, 2 received, 0% packet loss, time 3ms
rtt min/avg/max/mdev = 1.429/1.489/1.550/0.071 ms
user@virbian:~$ traceroute 192.168.1.3
traceroute to 192.168.1.3 (192.168.1.3), 30 hops max, 60 byte packets
 1 192.168.0.2 (192.168.0.2) 0.653 ms 0.287 ms 0.353 ms
 2 192.168.1.3 (192.168.1.3) 1.005 ms 0.799 ms 0.979 ms
user@virbian:~$ traceroute 192.168.3.3
traceroute to 192.168.3.3 (192.168.3.3), 30 hops max, 60 byte packets
 1 192.168.0.2 (192.168.0.2) 0.573 ms 0.244 ms 0.467 ms
 2 192.168.3.3 (192.168.3.3) 0.826 ms 0.922 ms *
```

Rysunek 4: Ping i traceroute dla V1 do V3

```
Virbian1 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
user@virbian: ~
user@virbian:~$ ping 192.168.4.5
PING 192.168.4.5 (192.168.4.5) 56(84) bytes of data.
64 bytes from 192.168.4.5: icmp_seq=1 ttl=62 time=2.15 ms
64 bytes from 192.168.4.5: icmp_seq=2 ttl=62 time=2.10 ms
^C
--- 192.168.4.5 ping statistics ---
2 packets transmitted, 2 received, 0% packet loss, time 3ms
rtt min/avg/max/mdev = 2.103/2.124/2.146/0.050 ms
user@virbian:~$ traceroute 192.168.4.5
traceroute to 192.168.4.5 (192.168.4.5), 30 hops max, 60 byte packets
 1 192.168.0.2 (192.168.0.2) 0.633 ms 0.386 ms 0.222 ms
 2 192.168.2.4 (192.168.2.4) 0.922 ms 0.763 ms 1.164 ms
 3 192.168.4.5 (192.168.4.5) 1.622 ms 2.235 ms 2.258 ms
user@virbian:~$
```

Rysunek 5: Ping i traceroute dla V1 do V2

```
Virbian3 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
user@virbian: ~
user@virbian:~$ ping 192.168.4.5
PING 192.168.4.5 (192.168.4.5) 56(84) bytes of data.
64 bytes from 192.168.4.5: icmp_seq=1 ttl=63 time=1.36 ms
64 bytes from 192.168.4.5: icmp_seq=2 ttl=63 time=1.53 ms
^C
--- 192.168.4.5 ping statistics ---
2 packets transmitted, 2 received, 0% packet loss, time 3ms
rtt min/avg/max/mdev = 1.360/1.442/1.525/0.090 ms
user@virbian:~$ traceroute 192.168.4.5
traceroute to 192.168.4.5 (192.168.4.5), 30 hops max, 60 byte packets
 1 192.168.3.4 (192.168.3.4) 0.674 ms 0.471 ms 0.340 ms
 2 192.168.4.5 (192.168.4.5) 1.015 ms 0.944 ms 0.814 ms
user@virbian:~$ ping 192.168.0.1
PING 192.168.0.1 (192.168.0.1) 56(84) bytes of data.
64 bytes from 192.168.0.1: icmp_seq=1 ttl=63 time=1.40 ms
64 bytes from 192.168.0.1: icmp_seq=2 ttl=63 time=1.56 ms
^C
--- 192.168.0.1 ping statistics ---
2 packets transmitted, 2 received, 0% packet loss, time 3ms
rtt min/avg/max/mdev = 1.404/1.483/1.562/0.079 ms
user@virbian:~$ traceroute 192.168.0.1
traceroute to 192.168.0.1 (192.168.0.1), 30 hops max, 60 byte packets
 1 192.168.1.2 (192.168.1.2) 0.668 ms 0.441 ms 0.308 ms
 2 192.168.0.1 (192.168.0.1) 0.748 ms 0.621 ms 0.914 ms
user@virbian:~$
```

Rysunek 6: Ping i traceroute dla V3 do V1 i V5

```
Virbian5 [Running] - Oracle VM VirtualBox
File Machine View Input Help
user@virbian: ~
user@virbian:~$ ping 192.168.1.3
PING 192.168.1.3 (192.168.1.3) 56(84) bytes of data.
64 bytes from 192.168.1.3: icmp_seq=1 ttl=63 time=1.69 ms
64 bytes from 192.168.1.3: icmp_seq=2 ttl=63 time=1.97 ms
^C
--- 192.168.1.3 ping statistics ---
2 packets transmitted, 2 received, 0% packet loss, time 3ms
rtt min/avg/max/mdev = 1.693/1.830/1.968/0.144 ms
user@virbian:~$ ping 192.168.3.3
PING 192.168.3.3 (192.168.3.3) 56(84) bytes of data.
64 bytes from 192.168.3.3: icmp_seq=1 ttl=63 time=1.39 ms
64 bytes from 192.168.3.3: icmp_seq=2 ttl=63 time=1.24 ms
^C
--- 192.168.3.3 ping statistics ---
2 packets transmitted, 2 received, 0% packet loss, time 3ms
rtt min/avg/max/mdev = 1.240/1.313/1.386/0.073 ms
user@virbian:~$ traceroute 192.168.1.3
traceroute to 192.168.1.3 (192.168.1.3), 30 hops max, 60 byte packets
 1 192.168.4.4 (192.168.4.4) 0.623 ms 0.397 ms 0.261 ms
 2 192.168.2.2 (192.168.2.2) 1.007 ms 0.768 ms 0.635 ms
 3 192.168.1.3 (192.168.1.3) 1.462 ms 1.292 ms 0.921 ms
user@virbian:~$ traceroute 192.168.3.3
traceroute to 192.168.3.3 (192.168.3.3), 30 hops max, 60 byte packets
 1 192.168.4.4 (192.168.4.4) 0.530 ms 0.463 ms 0.593 ms
 2 192.168.3.3 (192.168.3.3) 1.081 ms 0.823 ms 0.644 ms
user@virbian:~$
```

Rysunek 7: Ping i traceroute dla V5 do V3

```
Virbian5 [Running] - Oracle VM VirtualBox
File Machine View Input Help
user@virbian: ~
user@virbian:~$ ping 192.168.0.1
PING 192.168.0.1 (192.168.0.1) 56(84) bytes of data.
64 bytes from 192.168.0.1: icmp_seq=1 ttl=62 time=2.19 ms
64 bytes from 192.168.0.1: icmp_seq=2 ttl=62 time=2.22 ms
^C
--- 192.168.0.1 ping statistics ---
2 packets transmitted, 2 received, 0% packet loss, time 3ms
rtt min/avg/max/mdev = 2.186/2.203/2.220/0.017 ms
user@virbian:~$ traceroute 192.168.0.1
traceroute to 192.168.0.1 (192.168.0.1), 30 hops max, 60 byte packets
 1  192.168.4.4 (192.168.4.4)  0.969 ms  0.364 ms  0.223 ms
 2  192.168.2.2 (192.168.2.2)  0.884 ms  0.853 ms  0.693 ms
 3  192.168.0.1 (192.168.0.1)  1.108 ms  1.262 ms  1.132 ms
user@virbian:~$
```

Rysunek 8: Ping i traceroute dla V5 do V1