



**Kolegium Nauk Przyrodniczych Uniwersytet
Rzeszowski**

**Przedmiot:
Sieci komputerowe**

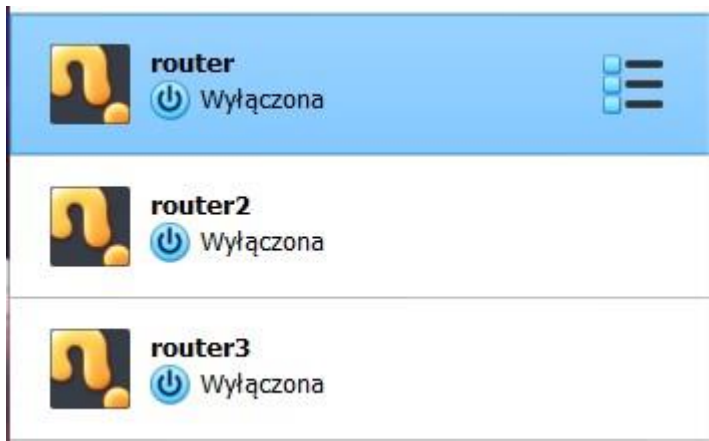
Routing Statyczny

**Wykonał:
Oskar Paśko (117 987)**

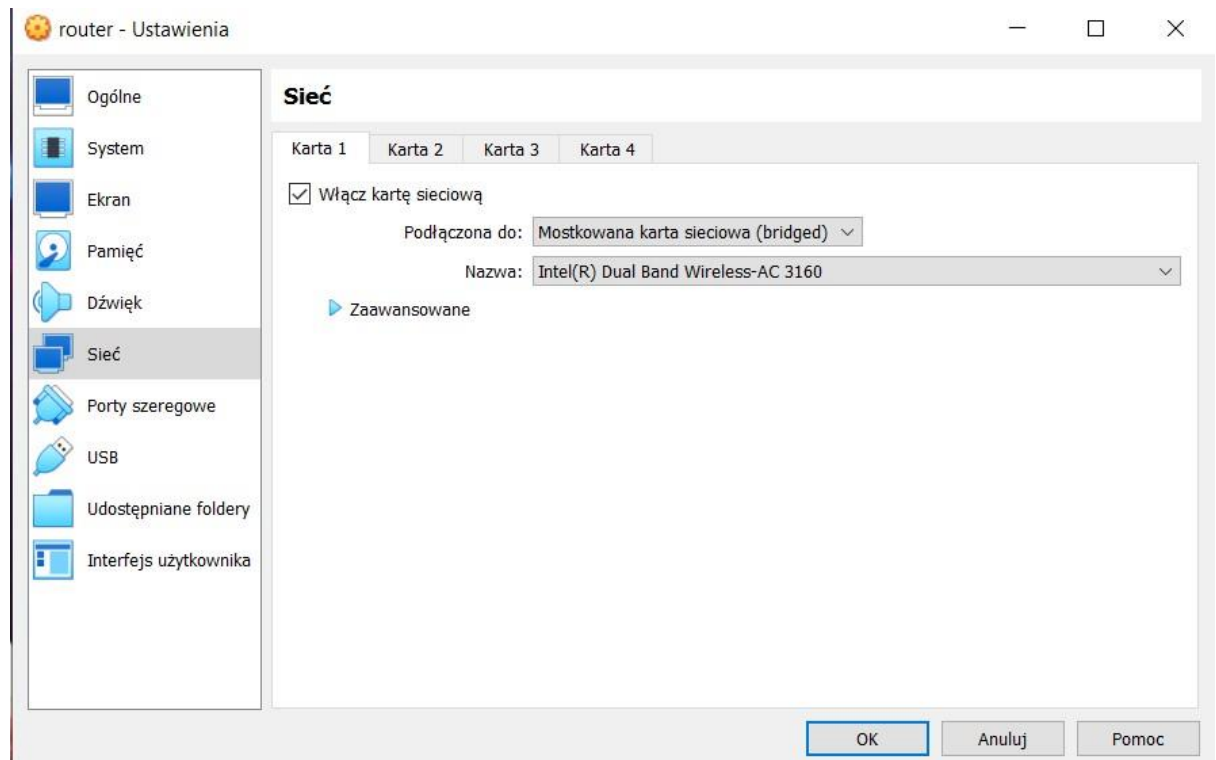
Prowadzący: Mgr inż. Jarosław Szkoła Rzeszów

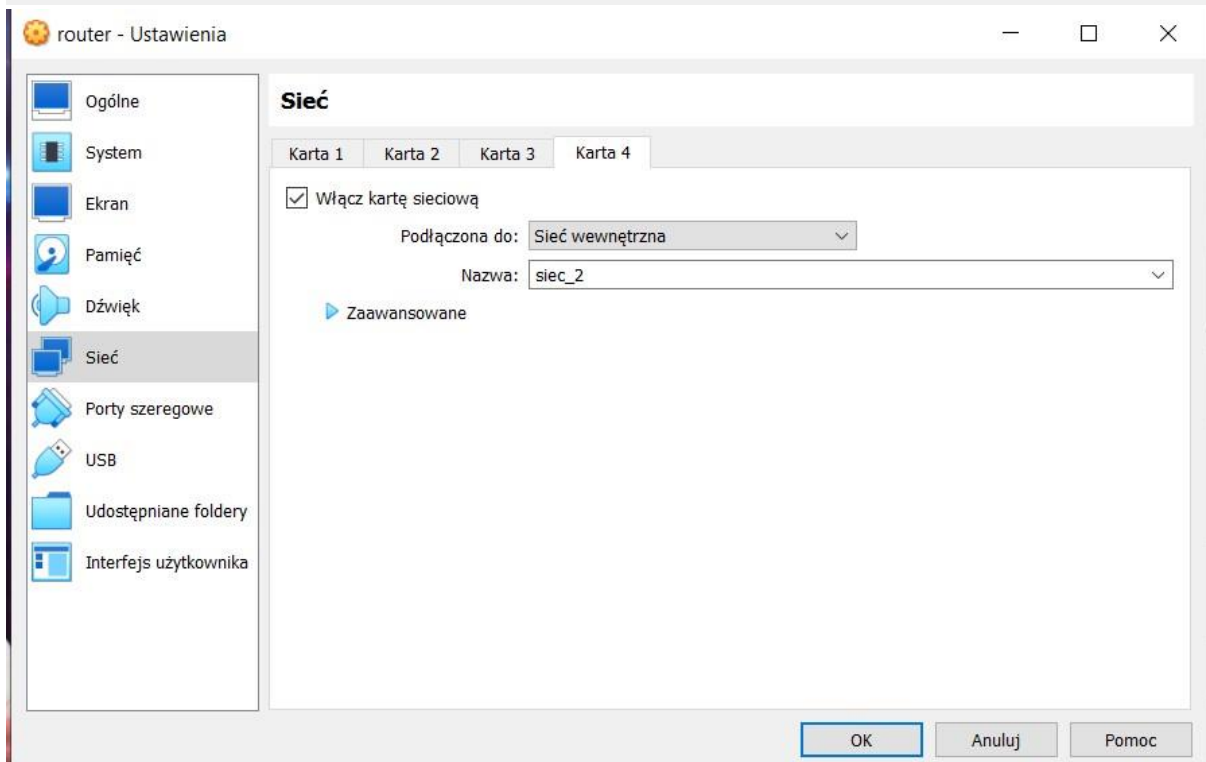
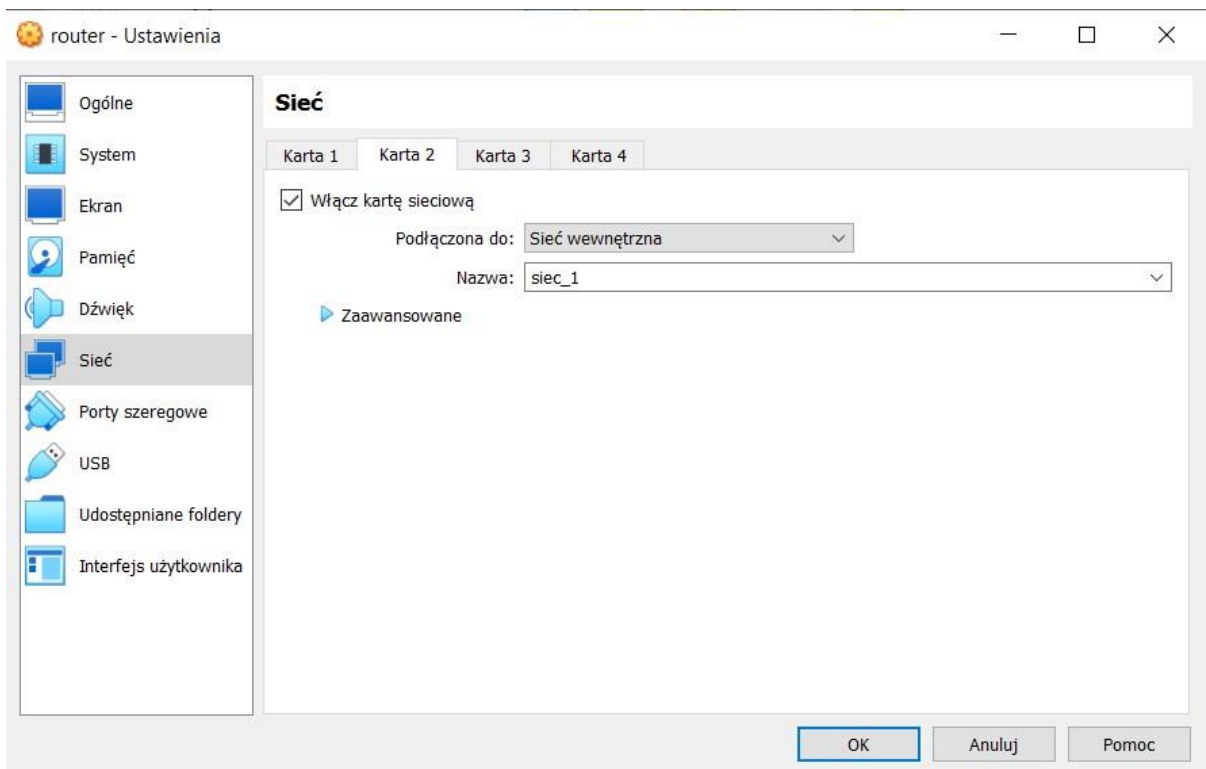
2023

1. Przedstaw kroki konfiguracji trasowania statycznego, dla trzech sieci komputerowych lokalnych. Wszystkie maszyny z każdej sieci powinny mieć możliwość komunikacji między sobą. Przygotowane obrazy skonfigurowanych routerów wyślij na serwer z repozytorium prac, pliki powinny być w formacie *.ova. Każda z maszyn powinna mieć również dostęp do Internetu.



Ustawienia routera 1:





Ustawienia routera 2:

router2 - Ustawienia

Sieć

Karta 1 Karta 2 Karta 3 Karta 4

☒ Włącz kartę sieciową

Podłączona do: Mostkowana karta sieciowa (bridged) ▾

Nazwa: Intel(R) Dual Band Wireless-AC 3160 ▾

▶ Zaawansowane

OK Anuluj Pomoc

router2 - Ustawienia

Sieć

Karta 1 Karta 2 Karta 3 Karta 4

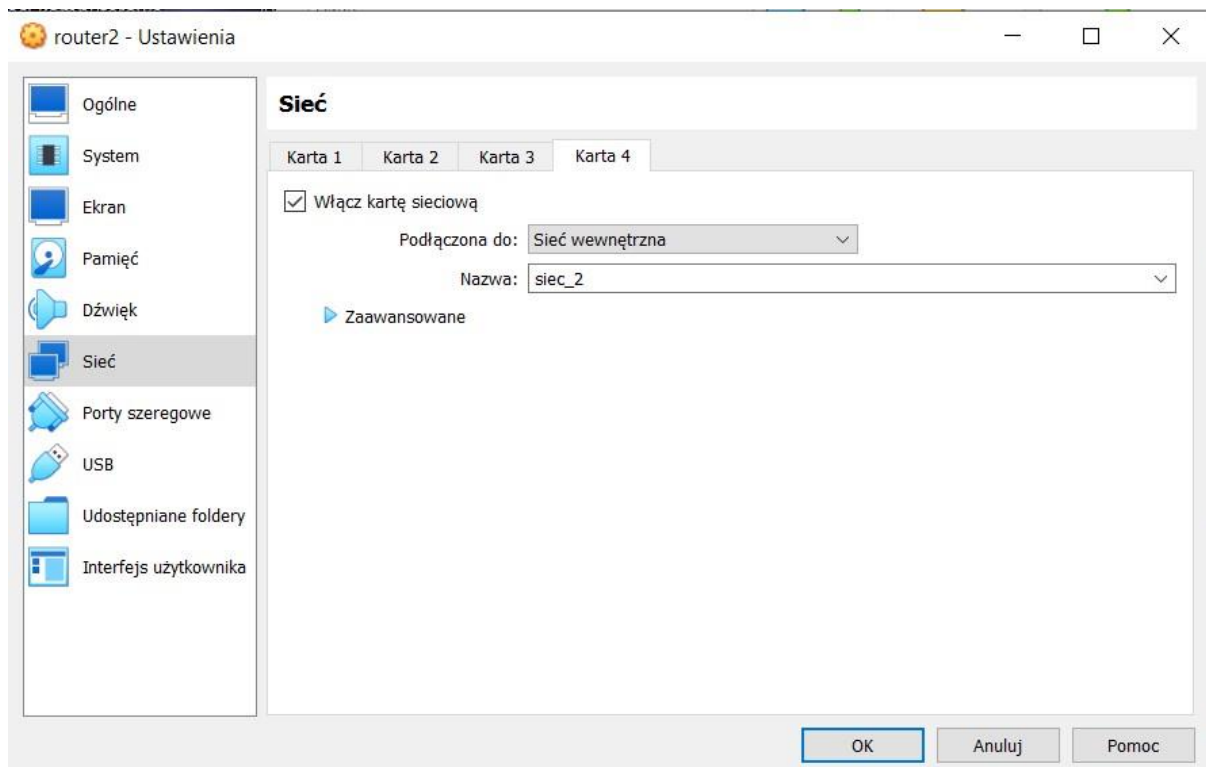
☒ Włącz kartę sieciową

Podłączona do: Sieć wewnętrzna ▾

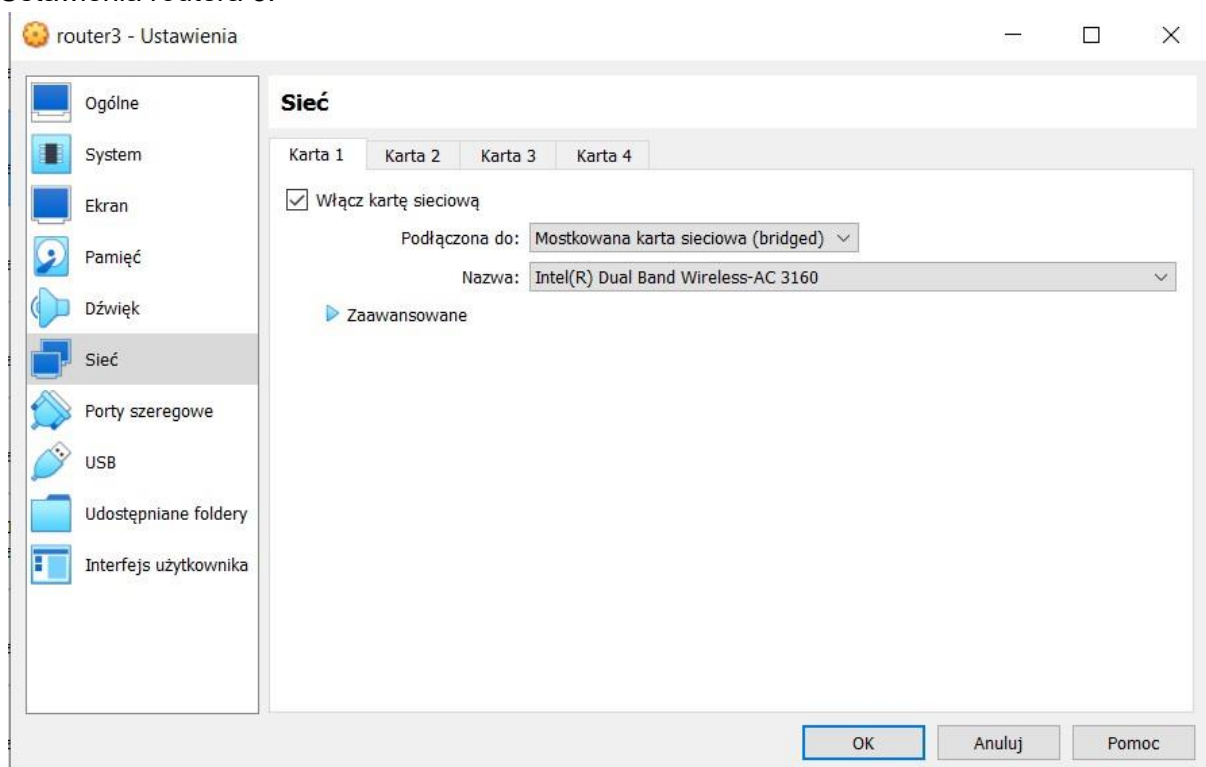
Nazwa: siec_3 ▾

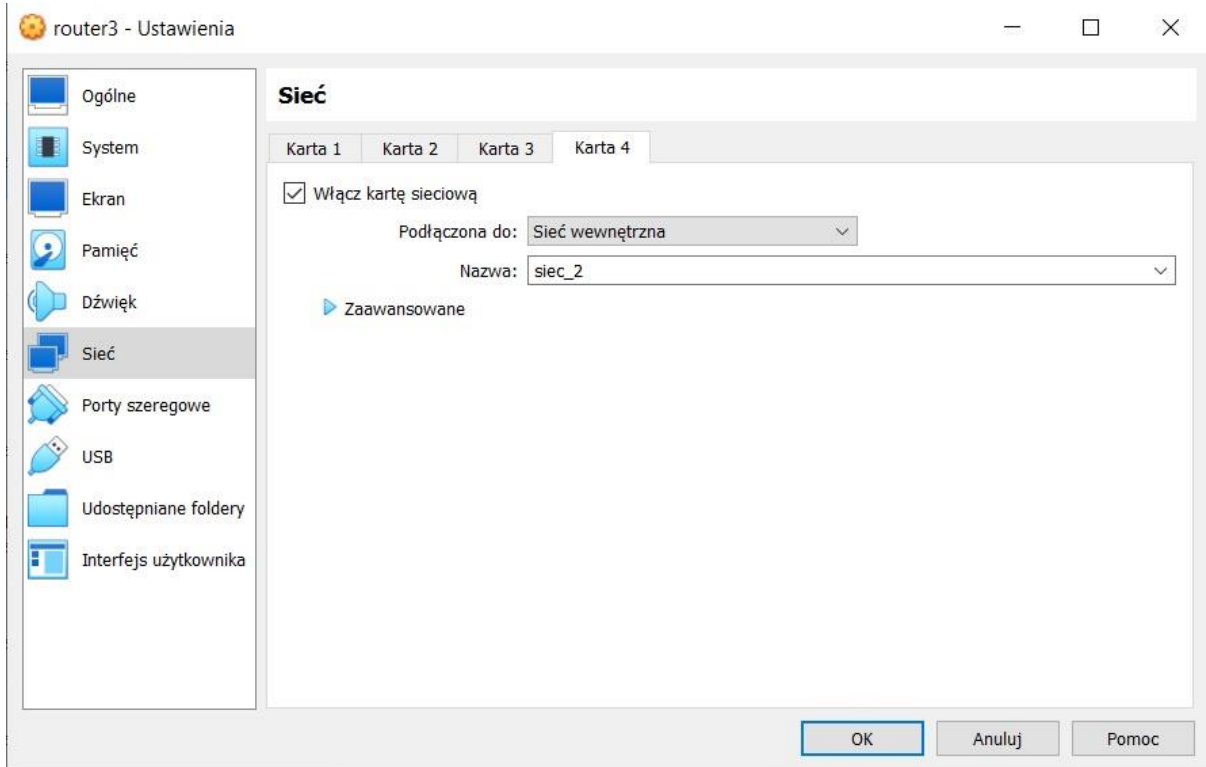
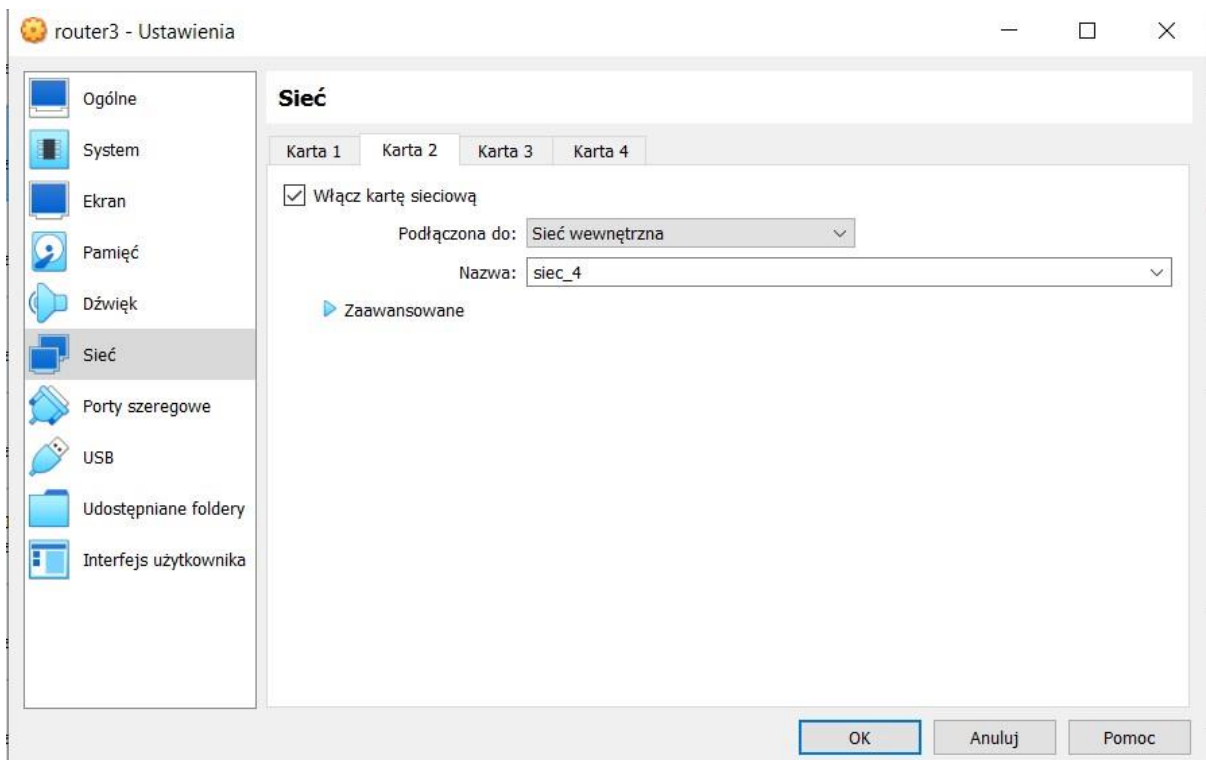
▶ Zaawansowane

OK Anuluj Pomoc



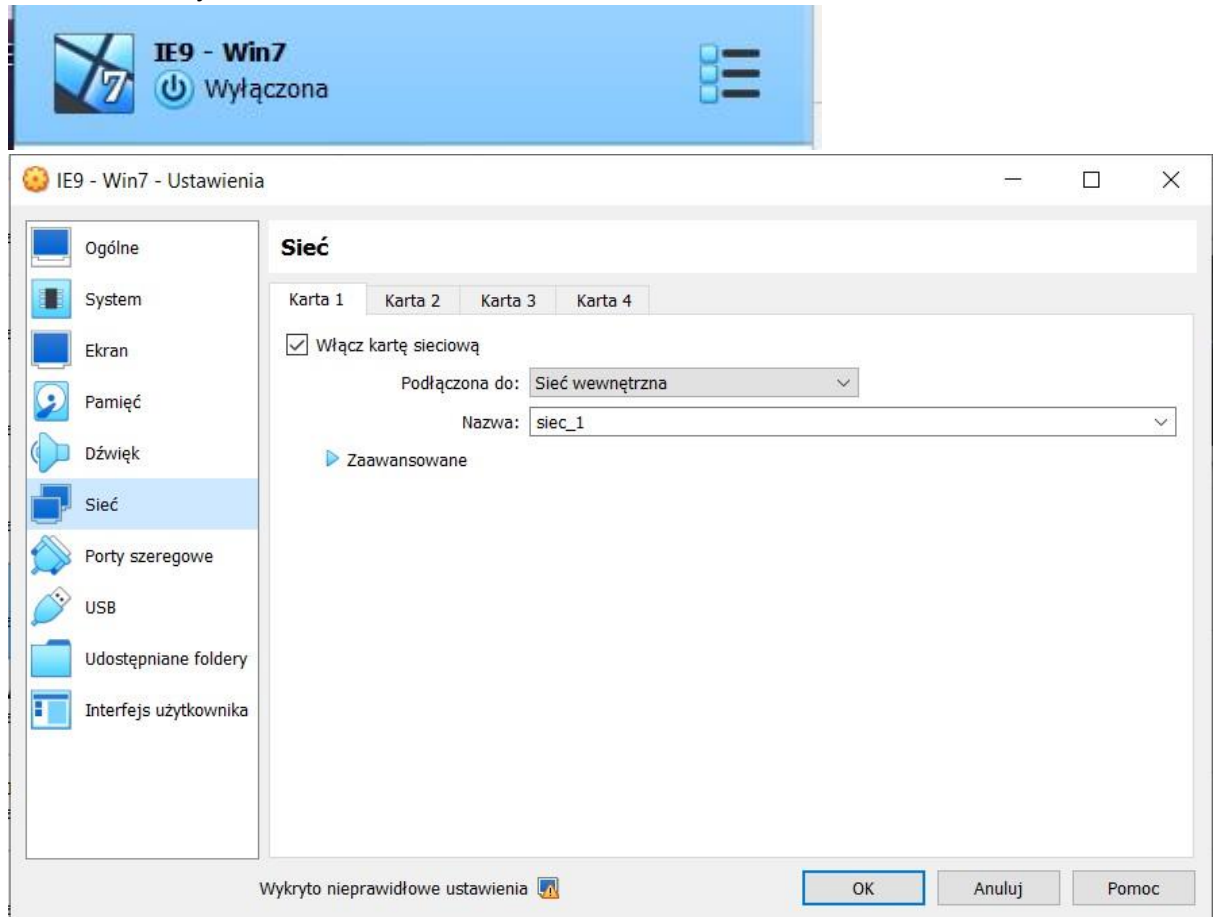
Ustawienia routera 3:



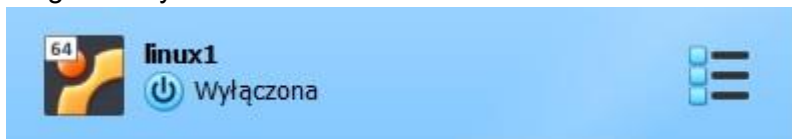


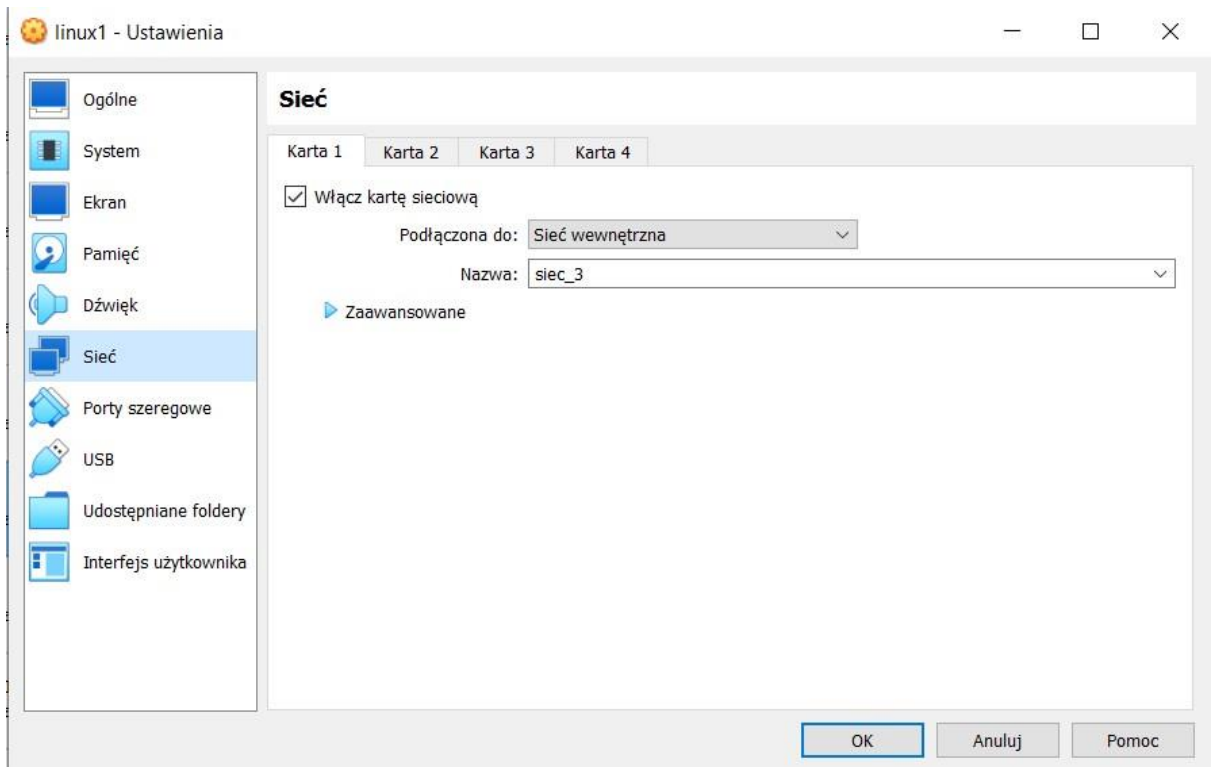
Do każdego interfejsu sieciowego wewnętrznego każdego router należy podłączyć jedną lub więcej maszyn testowych:

Pierwsza maszyna testowa:

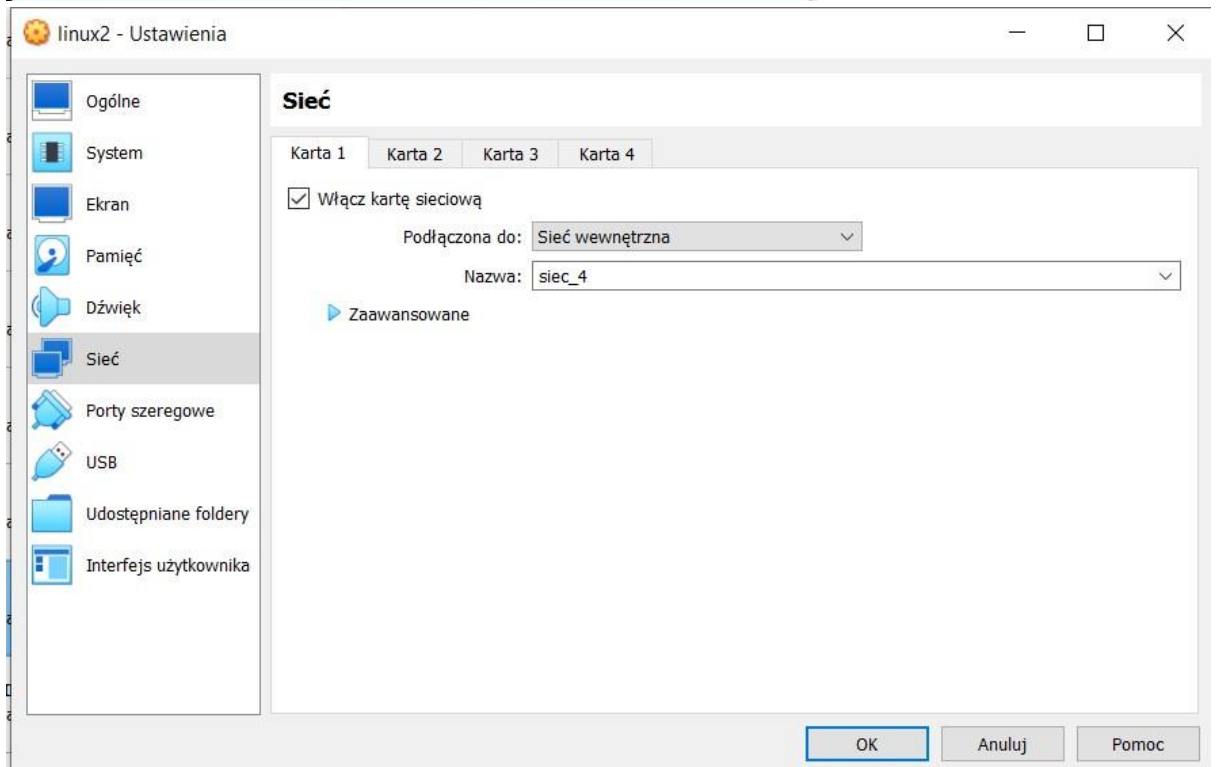
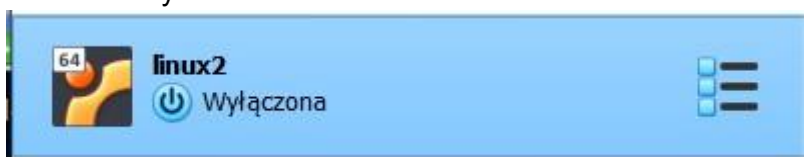


Druga maszyna testowa:











trzecia maszyna testowa:



Ruter 1:

Address List			
<div><div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div></div><div>Find</div></div>			
	Address	Network	Interface
	 10.10.10.1/24	10.10.10.0	lan2
	 172.22.10.1/24	172.22.10.0	lan1
D	 192.168.0.225/24	192.168.0.0	Wan
3 items			

Ruter 2:

Address List			
<div><div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div></div><div>Find</div></div>			
	Address	Network	Interface
	 10.10.10.2/24	10.10.10.0	lan2
	 172.22.20.1/24	172.22.20.0	lan1
D	 192.168.0.45/24	192.168.0.0	Wan
3 items (1 selected)			

Router 3:

Address List			
<div> + - ✓ ✗ 📄 🔍 <input type="text" value="Find"/> </div>			
	Address /	Network	Interface
	10.10.10.3/24	10.10.10.0	lan2
	172.22.30.1/24	172.22.30.0	lan1
D	192.168.0.230/24	192.168.0.0	Wan
3 items			

Router 1 (wchodzimy w IP -> Routes):

Klikamy w „+”

Route List

Routes

Nexthops

Rules

VRF

+

-

✓

✗

📄

🔍

	Dst Address /	Gateway
DAS	0.0.0.0/0	192.168.0.1 reachable Wan
DAC	10.10.10.0/24	lan2 reachable
DAC	172.22.10.0/24	lan1 reachable
AS	172.22.20.0/24	10.10.10.2 reachable lan2
DAC	192.168.0.0/24	Wan reachable

5 items

Route <172.22.20.0/24>

General

Attributes

Dst Address: 172.22.20.0/24

Gateway: 10.10.10.2 reachable lan2

Check Gateway:

Type: unicast

Distance: 1

Scope: 30

Target Scope: 10

Routing Mark:

Pref. Source:

OK

Cancel

Apply

Disable

Comment

Copy

Remove

enabled active

Route List

Routes

Nexthops

Rules

VRF

+

-

✓

✗

📄

🔍

	Dst Address /	Gateway
DAS	0.0.0.0/0	192.168.0.1 reachable Wan
DAC	10.10.10.0/24	lan2 reachable
DAC	172.22.10.0/24	lan1 reachable
AS	172.22.20.0/24	10.10.10.2 reachable lan2
AS	172.22.30.0/24	10.10.10.3 reachable lan2
DAC	192.168.0.0/24	Wan reachable

6 items

Route <172.22.30.0/24>

General

Attributes

Dst Address: 172.22.30.0/24

Gateway: 10.10.10.3 reachable lan2

Check Gateway:

Type: unicast

Distance: 1

Scope: 30

Target Scope: 10

Routing Mark:

Pref. Source:

OK

Cancel

Apply

Disable

Comment

Copy

Remove

enabled active

Router 2 (wchodzimy w IP -> Routes):
Klikamy w „+”

The first screenshot shows the 'Route List' window for Router 2. It contains a table with 4 items:

	Dst. Address	Gateway
DAC	10.10.10.0/24	lan2 reachable
AS	172.22.10.0/24	10.10.10.1 reachable lan2
DAC	172.22.20.0/24	lan1 reachable
DAC	192.168.0.0/24	Wan reachable

The second screenshot shows the 'Route <172.22.10.0/24>' configuration window. The 'General' tab is active, showing the following details:

- Dst. Address: 172.22.10.0/24
- Gateway: 10.10.10.1 (reachable lan2)
- Check Gateway: (empty)
- Type: unicast
- Distance: 1
- Scope: 30
- Target Scope: 10
- Routing Mark: (empty)
- Pref. Source: (empty)

Buttons on the right include OK, Cancel, Apply, Disable, Comment, Copy, and Remove. The status bar at the bottom indicates 'enabled' and 'active'.

Router 3 (wchodzimy w IP -> Routes):
Klikamy w „+”

The first screenshot shows the 'Route List' window for Router 3. It contains a table with 5 items:

	Dst. Address	Gateway
DAS	0.0.0.0/0	192.168.0.1 reachable Wan
DAC	10.10.10.0/24	lan2 reachable
AS	172.22.10.0/24	10.10.10.1 reachable lan2
DAC	172.22.30.0/24	lan1 reachable
DAC	192.168.0.0/24	Wan reachable

The second screenshot shows the 'Route <172.22.10.0/24>' configuration window. The 'General' tab is active, showing the following details:

- Dst. Address: 172.22.10.0/24
- Gateway: 10.10.10.1 (reachable lan2)
- Check Gateway: (empty)
- Type: unicast
- Distance: 1
- Scope: 30
- Target Scope: 10
- Routing Mark: (empty)
- Pref. Source: (empty)

Buttons on the right include OK, Cancel, Apply, Disable, Comment, Copy, and Remove. The status bar at the bottom indicates 'enabled' and 'active'.

Route List

Routes	Nexthops	Rules	VRF
DAS	0.0.0.0/0	192.168.0.1 reachable Wan	
DAC	10.10.10.0/24	lan2 reachable	
AS	172.22.10.0/24	10.10.10.1 reachable lan2	
AS	172.22.20.0/24	10.10.10.2 reachable lan2	
DAC	172.22.30.0/24	lan1 reachable	
DAC	192.168.0.0/24	Wan reachable	

6 items (1 selected)

Route <172.22.20.0/24>

General Attributes

Dst. Address: 172.22.20.0/24

Gateway: 10.10.10.2 reachable lan2

Check Gateway:

Type: unicast

Distance: 1

Scope: 30

Target Scope: 10

Routing Mark:

Pref. Source:

OK Cancel Apply Disable Comment Copy Remove

enabled active static

Ustawiamy dhcp server dla wszystkich 3 ruterów:

Wchodzimy w IP -> DHCP Server klikamy w DHCP Setup wybieramy lan1 i przeklikujemy next.

DHCP Server

DHCP Networks Leases Options Option Sets Vendor Classes Alerts

+ - DHCP Config DHCP Setup Find

Name	Interface	Relay	Lease Time	Address Pool	Add AR...
------	-----------	-------	------------	--------------	-----------

0 items

DHCP Setup

Select interface to run DHCP server on

DHCP Server Interface: lan1

Back Next Cancel

DHCP Server

DHCP Networks Leases Options Option Sets Vendor Classes Alerts

+ - DHCP Config DHCP Setup Find

Name	Interface	Relay	Lease Time	Address Pool	Add AR...
dhcp1	lan1		00:10:00	dhcp_pool3	no

1 item

Uruchamiamy maszyny testowe:

Maszyna kliencka 1:

```
Command Prompt
Connection-specific DNS Suffix  . :
C:\Users\IEUser>ping 172.22.20.254

Pinging 172.22.20.254 with 32 bytes of data:
Reply from 172.22.20.254: bytes=32 time=2ms TTL=62
Reply from 172.22.20.254: bytes=32 time=1ms TTL=62
Reply from 172.22.20.254: bytes=32 time=1ms TTL=62
Reply from 172.22.20.254: bytes=32 time=1ms TTL=62

Ping statistics for 172.22.20.254:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 2ms, Average = 1ms

C:\Users\IEUser>ping 172.22.30.254

Pinging 172.22.30.254 with 32 bytes of data:
Reply from 172.22.30.254: bytes=32 time=2ms TTL=62
Reply from 172.22.30.254: bytes=32 time=1ms TTL=62
Reply from 172.22.30.254: bytes=32 time=3ms TTL=62

Ping statistics for 172.22.30.254:
    Packets: Sent = 3, Received = 3, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
```

Maszyna kliencka 2:

Użyto komendy ping

```
PING 172.22.10.254 (172.22.10.254) 56(84) bytes of data.
64 bytes from 172.22.10.254: icmp_seq=1 ttl=126 time=1.54 ms
64 bytes from 172.22.10.254: icmp_seq=2 ttl=126 time=1.64 ms
64 bytes from 172.22.10.254: icmp_seq=3 ttl=126 time=1.37 ms
64 bytes from 172.22.10.254: icmp_seq=4 ttl=126 time=3.94 ms
64 bytes from 172.22.10.254: icmp_seq=5 ttl=126 time=1.70 ms
^C
--- 172.22.10.254 ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 4007ms
rtt min/avg/max/mdev = 1.376/2.042/3.945/0.958 ms
```

Użyto dalej tej samej komendy

```
PING 172.22.30.254 (172.22.30.254) 56(84) bytes of data.
64 bytes from 172.22.30.254: icmp_seq=1 ttl=62 time=2.22 ms
64 bytes from 172.22.30.254: icmp_seq=2 ttl=62 time=1.30 ms
64 bytes from 172.22.30.254: icmp_seq=3 ttl=62 time=1.60 ms
^C
```

Maszyna kliencka 3:

```
PING 172.22.10.254 (172.22.10.254) 56(84) bytes of data.
64 bytes from 172.22.10.254: icmp_seq=1 ttl=126 time=3.32 ms
64 bytes from 172.22.10.254: icmp_seq=2 ttl=126 time=1.70 ms
64 bytes from 172.22.10.254: icmp_seq=3 ttl=126 time=1.68 ms
^C
--- 172.22.10.254 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2004ms
rtt min/avg/max/mdev = 1.680/2.234/3.322/0.770 ms
```

```
PING 172.22.10.254 (172.22.10.254) 56(84) bytes of data.  
64 bytes from 172.22.10.254: icmp_seq=1 ttl=126 time=3.32 ms  
64 bytes from 172.22.10.254: icmp_seq=2 ttl=126 time=1.70 ms  
64 bytes from 172.22.10.254: icmp_seq=3 ttl=126 time=1.68 ms  
^C  
--- 172.22.10.254 ping statistics ---  
3 packets transmitted, 3 received, 0% packet loss, time 2004ms  
rtt min/avg/max/mdev = 1.680/2.234/3.322/0.770 ms
```

2. Przedstawi kolejne kroki konfiguracji routingu statycznego dla trzech sieci lokalnych, która spełnia następujące wymagania:

- pierwsza sieć lokalna zawiera serwer WWW dostarczający dowolny контент w postaci strony WWW bez szyfrowania,
- druga sieć zawiera dwie maszyny:
 - pierwsza maszyna posiada zainstalowany system linux z możliwością autoryzacji za pomocą połączenia SSH,
 - druga maszyna jest klientem z system Windows
- trzecia sieć zawiera serwer lokalny serwer DNS, serwer SSH i serwer WWW z dowolną treścią.

Oczekiwane zachowanie sieci:

- maszyny w sieci drugiej mają dostęp do serwera WWW w sieci pierwszej, oraz nie mają dostępu do serwera WWW w sieci trzeciej,
- maszyny w sieci pierwszej i trzeciej mogą wzajemnie przeglądać strony które są dostępne na serwerach w ich sieci,
- wszystkie maszyny w każdej sieci wykorzystują lokalny serwer DNS działający w sieci trzeciej,
- dostęp do komputerów z serwisem SSH w sieci drugiej jest możliwy tylko z sieci trzeciej,
- dostęp do serwera SSH w sieci trzeciej jest możliwy tylko z sieci trzeciej.

W sprawozdaniu przedstaw szczegółowo kolejne kroki konfiguracji, oraz wynik weryfikacji oczekiwanego zachowania sieci.

Maszyny w sieci drugiej mają dostęp do serwera WWW w sieci pierwszej, oraz nie mają dostępu do serwera WWW w sieci trzeciej:

Na routerze 2:

Wchodzimy w IP->Firewall i klikamy w „+”:

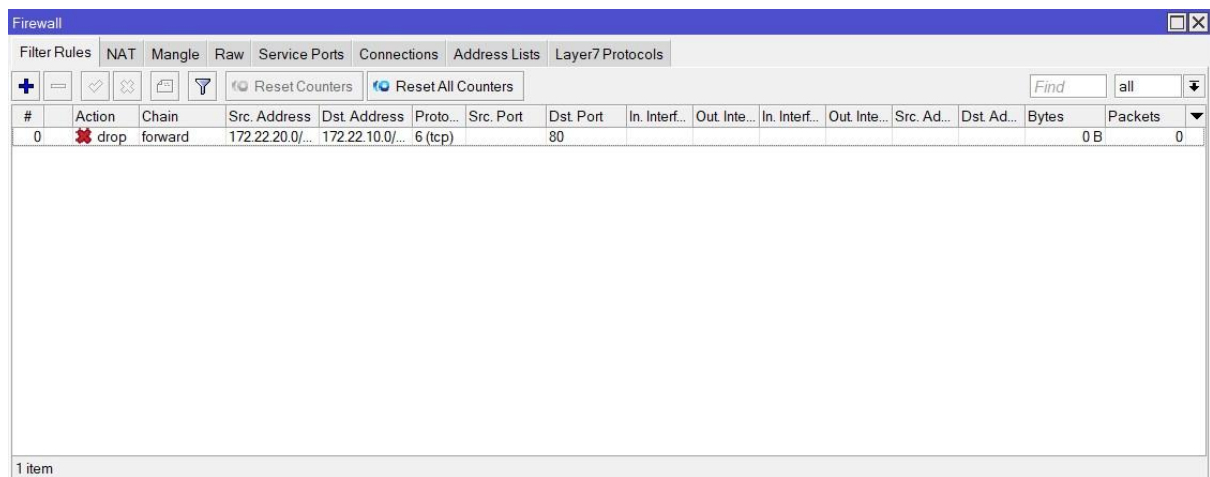
The image displays two screenshots of the Mikrotik WinBox 'New Firewall Rule' dialog box, showing the configuration steps for a firewall rule.

Top Screenshot (General Tab):

- Chain:** forward
- Src. Address:** 172.22.20.0/24
- Dst. Address:** 172.22.10.0/24
- Protocol:** 6 (tcp)
- Dst. Port:** 80
- Enabled:** checked

Bottom Screenshot (Action Tab):

- Action:** drop
- Log:** checked

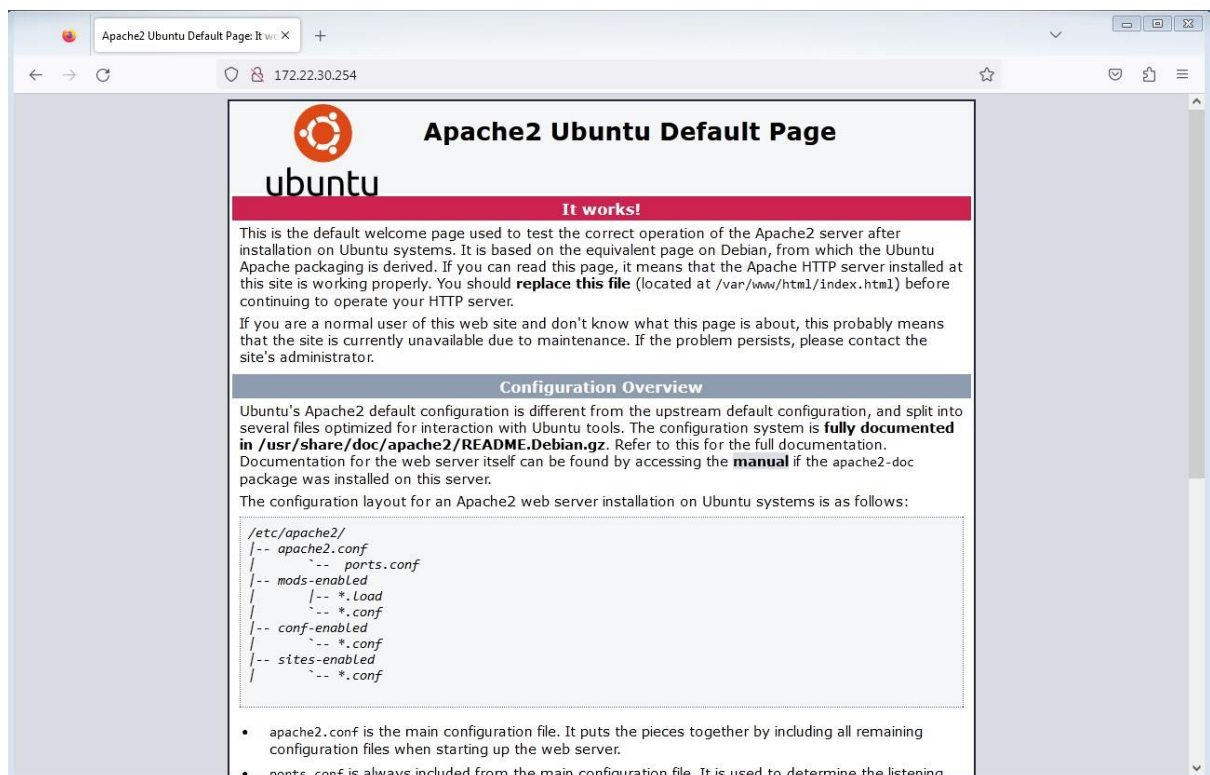


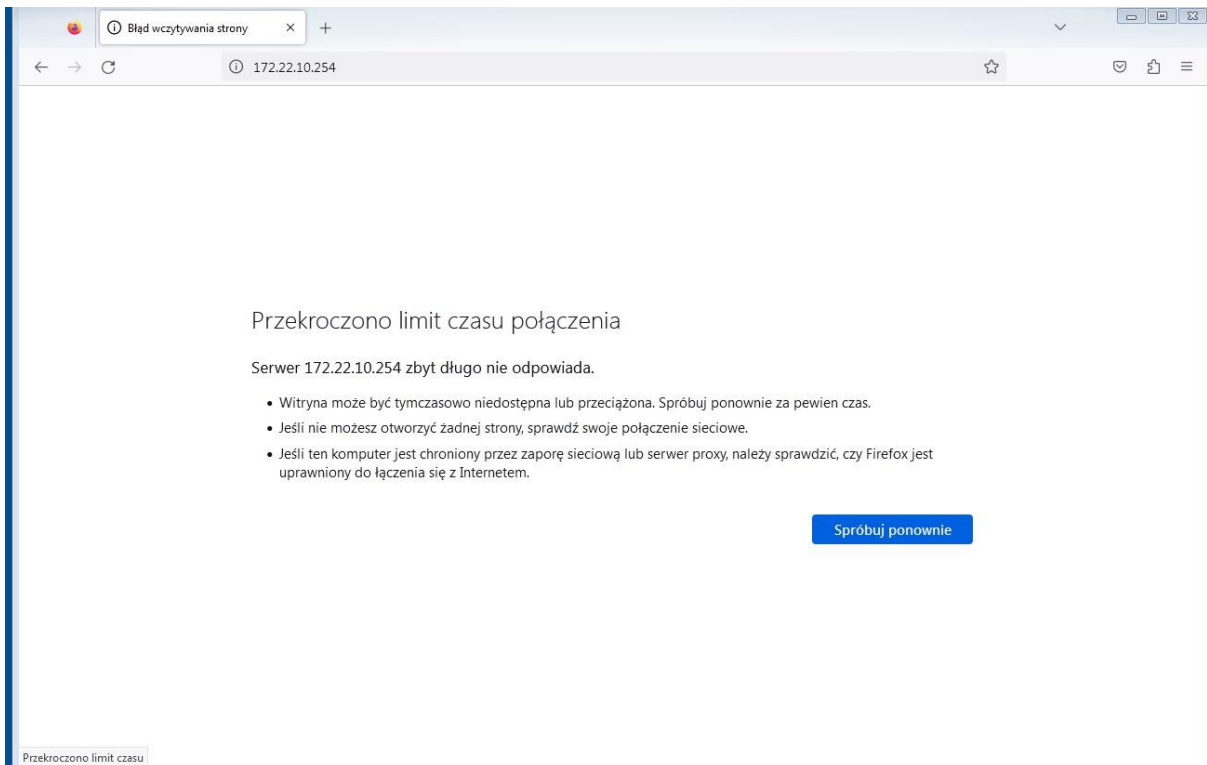
Na maszynach linux zainstalowałem serwer apache2:

```
root@server2:/home/admin# apt-get install apache2
```

Na windows 7 :

maszyny w sieci pierwszej i trzeciej mogą wzajemnie przeglądać strony które są dostępne na serwerach w ich sieci





wszystkie maszyny w każdej sieci wykorzystują lokalny serwer DNS działający w sieci trzeciej,

dostęp do komputerów z serwisem SSH w sieci drugiej jest możliwy tylko z sieci trzeciej,

Instalujemy ssh na 1 linuxie

```
root@serwer2:/home/admin# apt install ssh
```

Na windows 7

```
C:\Users\IEUser>ssh admin@172.22.20.254
The authenticity of host '172.22.20.254 (172.22.20.254)' can't be established.
ECDSA key fingerprint is 7b:c9:26:51:03:dd:af:61:2e:3f:8a:b7:ee:14:9c:70.
Are you sure you want to continue connecting (yes/no)? yes
Please type 'yes' or 'on': yes
Warning: type Permanently added '172.22.20.254' (ECDSA) to the list of known hosts.
admin@172.22.20.254's password:
Welcome to Ubuntu 16.04.5 LTS (GNU/Linux 4.4.0-131-generic x86_64)

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

```

1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1
   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 pfifo_fast state UP group default qlen 1000
   link/ether 08:00:27:64:5f:a9 brd ff:ff:ff:ff:ff:ff
   inet 172.22.20.254/24 brd 172.22.20.255 scope global enp0s3
       valid_lft forever preferred_lft forever
   inet6 fe80::a00:27ff:fe64:5fa9/64 scope link
       valid_lft forever preferred_lft forever
3: enp0s8: <BROADCAST,MULTICAST> mtu 1500 qdisc noop state DOWN group default qlen 1000
   link/ether 08:00:27:23:71:da brd ff:ff:ff:ff:ff:ff

```

Router 2

New Firewall Rule

General

Advanced

Extra

Action

Statistics

Chain:

Src. Address: ☐

Dst. Address: ☐

Protocol: ☐

Src. Port:

Dst. Port: ☐

Any. Port:

In. Interface:

Out. Interface:

In. Interface List:

Out. Interface List:

enabled

Firewall Rule <172.22.30.0/24->172.22.20.0/24:22>

General

Advanced

Extra

Action

Statistics

Action:

☐ Log

Log Prefix:

enabled

Firewall																
Filter Rules NAT Mangle Raw Service Ports Connections Address Lists Layer7 Protocols																
<div> <div> <div>+</div> <div>-</div> <div>✓</div> <div>✗</div> <div>📄</div> <div>🔍</div> </div> <div> <div>Reset Counters</div> <div>Reset All Counters</div> </div> <div>Find all</div> </div>																
#	Action	Chain	Src. Address	Dst. Address	Proto...	Src. Port	Dst. Port	In. Interf...	Out. Inte...	In. Interf...	Out. Inte...	Src. Ad...	Dst. Ad...	Bytes	Packets	
0	✗ drop	forward	172.22.20.0/...	172.22.10.0/...	6 (tcp)		80							304 B	6	
1	✓ acc...	forward	172.22.30.0/...	172.22.20.0/...	6 (tcp)		22							0 B	0	

2 items (1 selected)

Firewall Rule <172.22.10.0/24->172.22.20.0/24:22>

General

Advanced

Extra

Action

Statistics

Chain: forward

Src. Address: 172.22.10.0/24

Dst. Address: 172.22.20.0/24

Protocol: 6 (tcp)

Src. Port:

Dst. Port: 22

Any. Port:

In. Interface:

Out. Interface:

In. Interface List:

Out. Interface List:

OK

Cancel

Apply

Disable

Comment

Copy

Remove

Reset Counters

Reset All Counters

enabled

Firewall Rule <172.22.10.0/24->172.22.20.0/24:22>

General Advanced Extra Action Statistics

Action: **drop**

☐ Log

Log Prefix:

OK

Cancel

Apply

Disable

Comment

Copy

Remove

Reset Counters

Reset All Counters

enabled

Firewall

Filter Rules NAT Mangle Raw Service Ports Connections Address Lists Layer7 Protocols

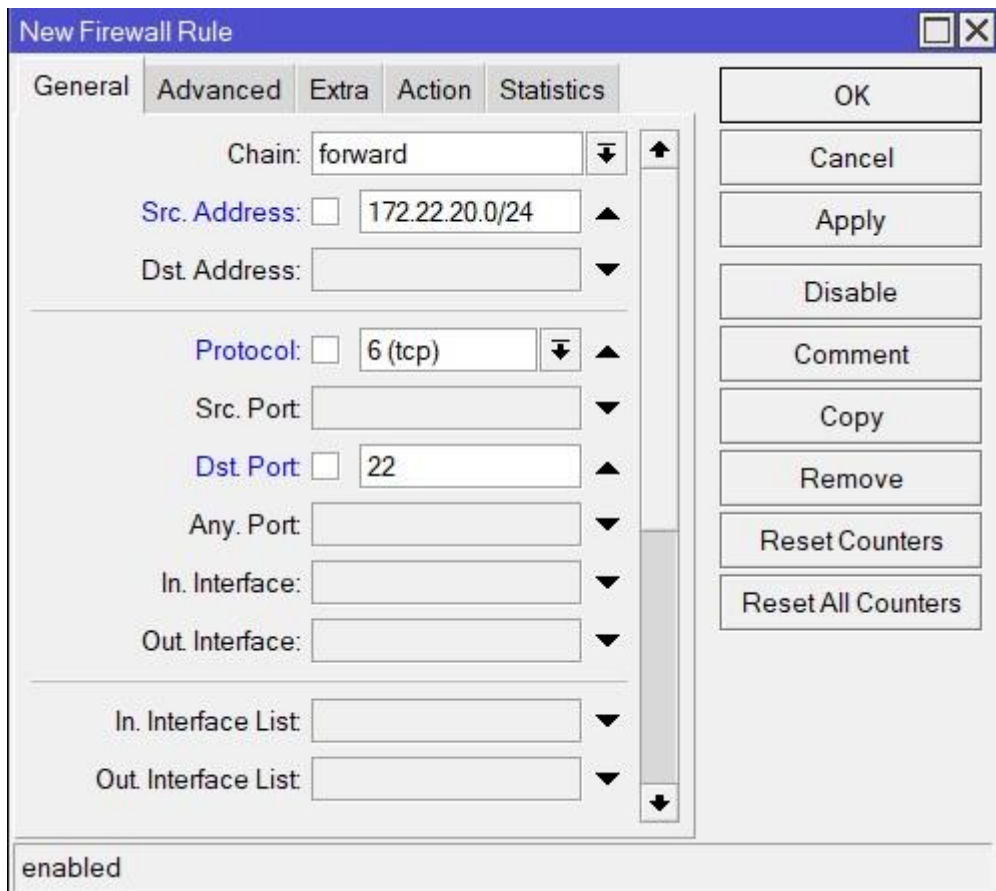
+ - ✓ ✗ 📄 🔍 Reset Counters Reset All Counters Find all

#	Action	Chain	Src. Address	Dst. Address	Proto...	Src. Port	Dst. Port	In. Interf...	Out. Inte...	In. Interf...	Out. Inte...	Src. Ad...	Dst. Ad...	Bytes	Packets
0	✗ drop	forward	172.22.20.0/...	172.22.10.0/...	6 (tcp)		80							304 B	6
1	✓ acc...	forward	172.22.30.0/...	172.22.20.0/...	6 (tcp)		22							0 B	0
2	✗ drop	forward	172.22.10.0/...	172.22.20.0/...	6 (tcp)		22							0 B	0

3 items (1 selected)

dostęp do serwera SSH w sieci trzeciej jest możliwy tylko z sieci trzeciej.

Na routerze 3:



The image shows a 'New Firewall Rule' configuration window with the following fields and options:

- Chain:** forward
- Src. Address:** 172.22.20.0/24
- Dst. Address:** (empty)
- Protocol:** 6 (tcp)
- Src. Port:** (empty)
- Dst. Port:** 22
- Any. Port:** (empty)
- In. Interface:** (empty)
- Out. Interface:** (empty)
- In. Interface List:** (empty)
- Out. Interface List:** (empty)

Buttons on the right side of the window:

- OK
- Cancel
- Apply
- Disable
- Comment
- Copy
- Remove
- Reset Counters
- Reset All Counters

At the bottom left, the status is set to **enabled**.

New Firewall Rule

General Advanced Extra Action Statistics

Action: drop

☐ Log

Log Prefix:

OK

Cancel

Apply

Disable

Comment

Copy

Remove

Reset Counters

Reset All Counters

enabled

Firewall

Filter Rules NAT Mangle Raw Service Ports Connections Address Lists Layer7 Protocols

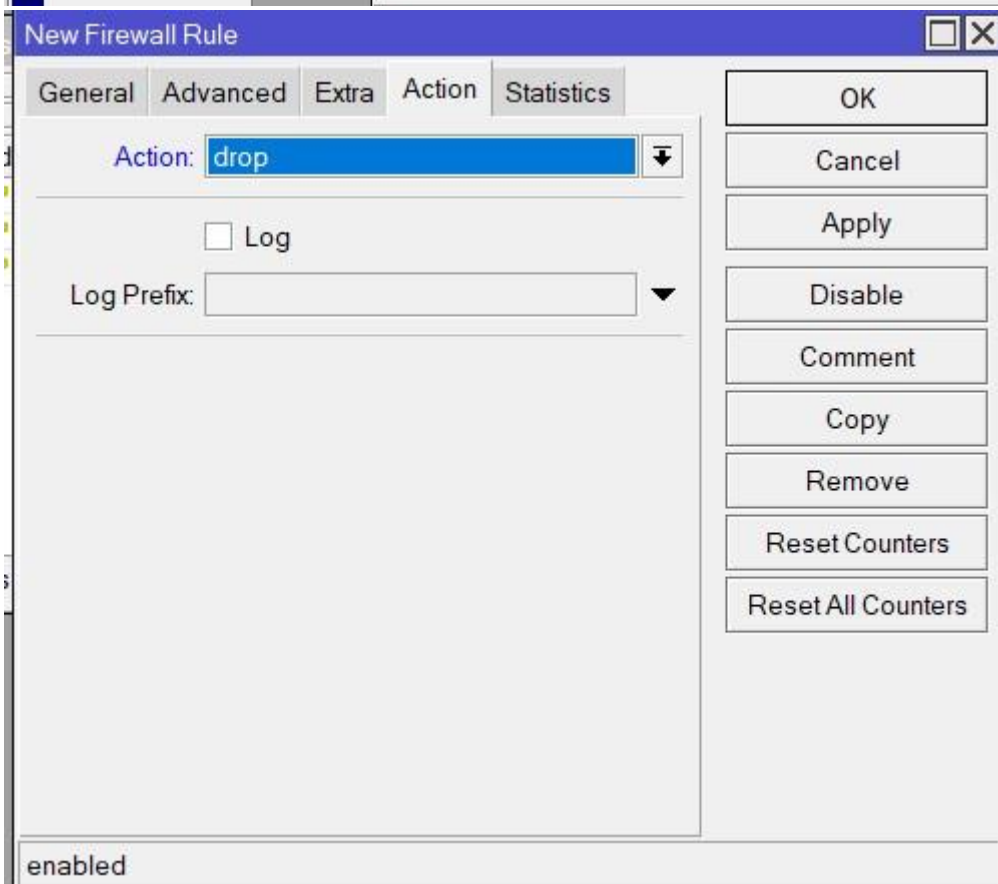
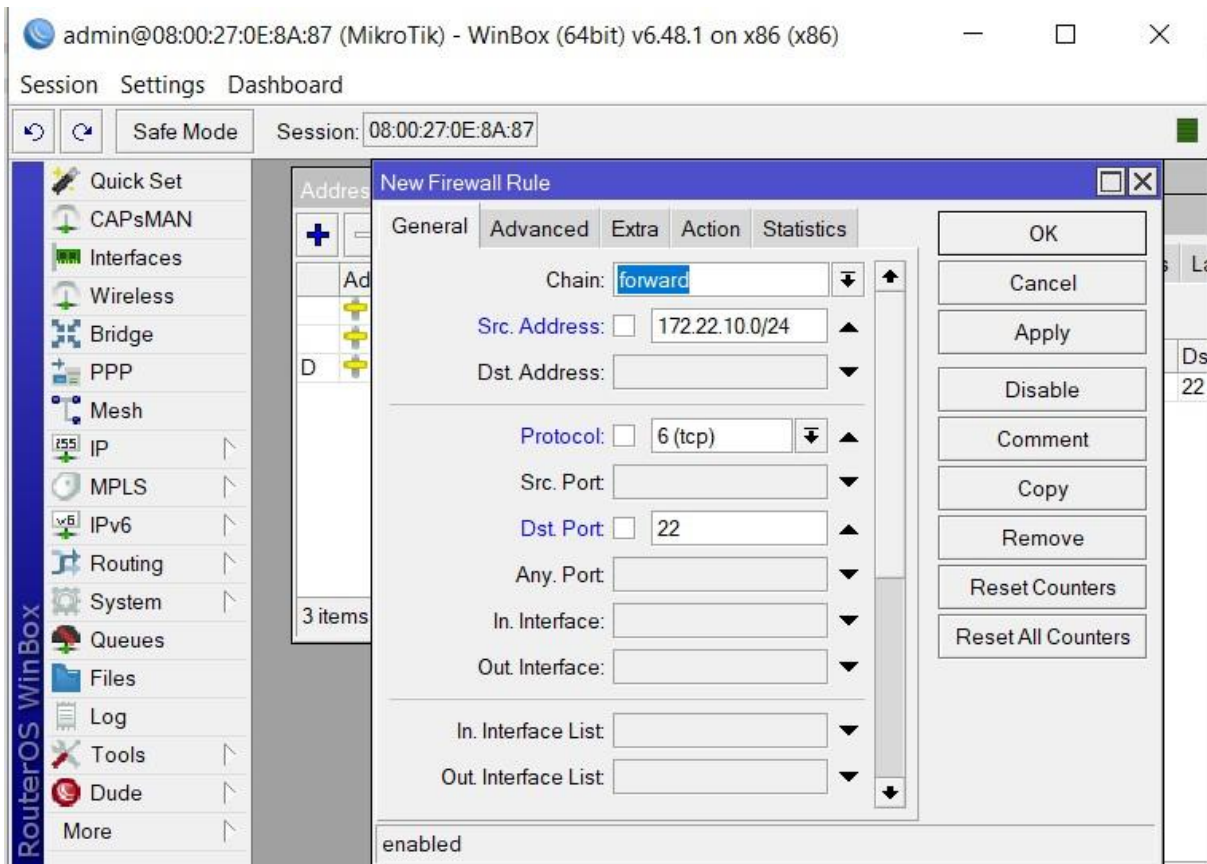
+ - ✓ ✕ 📄 🔍

Reset Counters Reset All Counters

Find all

#	Action	Chain	Src. Address	Dst Address	Proto...	Src. Port	Dst Port	In. Interf...	Out. Inte...	In. Interf...	Out. Inte...	Src. Ad...	Dst Ad...	Bytes	Packets
0	✕ drop	forward	172.22.20.0/...		6 (tcp)		22							0 B	0

1 item



Firewall																
Filter Rules																
NAT Mangle Raw Service Ports Connections Address Lists Layer7 Protocols																
<input type="button" value="+"/> <input type="button" value="-"/> <input type="button" value="✓"/> <input type="button" value="✗"/> <input type="button" value="📄"/> <input type="button" value="🔍"/> <input type="button" value="🔄"/> <input type="button" value="🔄"/> <input type="button" value="🔄"/> <input type="button" value="🔄"/> <input type="button" value="🔄"/> <input type="button" value="🔄"/> <input type="button" value="🔄"/> <input type="button" value="🔄"/> <input type="button" value="🔄"/> <input type="button" value="🔄"/> <input type="button" value="🔄"/>																
<input type="button" value="Reset Counters"/> <input type="button" value="Reset All Counters"/> <input type="text" value="Find"/> <input type="text" value="all"/> <input type="button" value="▼"/>																
#	Action	Chain	Src. Address	Dst. Address	Proto...	Src. Port	Dst. Port	In. Interf...	Out. Inte...	In. Interf...	Out. Inte...	Src. Ad...	Dst. Ad...	Bytes	Packets	
0	drop	forward	172.22.20.0/...		6 (tcp)		22							0 B	0	
1	drop	forward	172.22.10.0/...		6 (tcp)		22							0 B	0	

2 items

wszystkie maszyny w każdej sieci wykorzystują lokalny serwer DNS działający w sieci trzeciej:

Na 2 linuxie:

```

C:\> Select Command Prompt

Microsoft Windows [Version 6.1.7601]
Copyright (c) 2009 Microsoft Corporation. All rights reserved.

C:\Users\IEUser>ipconfig /all

Windows IP Configuration

    Host Name . . . . . : IE9WIN7
    Primary Dns Suffix . . . . . :
    Node Type . . . . . : Hybrid
    IP Routing Enabled. . . . . : No
    WINS Proxy Enabled. . . . . : No

Ethernet adapter Local Area Connection 2:

    Connection-specific DNS Suffix . :
    Description . . . . . : Intel(R) PRO/1000 MT Desktop Adapter
    Physical Address. . . . . : 08-00-27-69-24-0C
    DHCP Enabled. . . . . : Yes
    Autoconfiguration Enabled . . . . : Yes
    Link-local IPv6 Address . . . . . : fe80::fdcf:c25a:534:30b7%15(Preferred)
    IPv4 Address. . . . . : 172.22.10.254(Preferred)
    Subnet Mask . . . . . : 255.255.255.0
    Lease Obtained. . . . . : Saturday, June 17, 2023 2:47:45 PM
    Lease Expires . . . . . : Saturday, June 17, 2023 2:57:45 PM
    Default Gateway . . . . . : 172.22.10.1
    DHCP Server . . . . . : 172.22.10.1
    DHCPv6 IAID . . . . . : 302514215
    DHCPv6 Client DUID. . . . . : 00-01-00-01-1D-92-01-C6-00-15-5D-62-6C-6C

    DNS Servers . . . . . : 172.22.30.254
    NetBIOS over Tcpip. . . . . : Enabled

Tunnel adapter isatap.{53152A2F-39F7-458E-BD58-24D17099256A}:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix . :
    Description . . . . . : Microsoft ISATAP Adapter
    Physical Address. . . . . : 00-00-00-00-00-00-E0
    DHCP Enabled. . . . . : No
    Autoconfiguration Enabled . . . . : Yes

Tunnel adapter Reusable ISATAP Interface {EC2BA6F6-798E-4099-B9E0-04394C18DD31}:
  
```


Wnioski:

Ze względu na klonowanie routerów należało odświeżyć wszystkie adresy MAC dla LAN1, LAN2 i WAN dla wszystkich 3 routerów.

Z powodu problemów sprzętowych w zadaniu 2 użyłem tylko 3 maszyn.