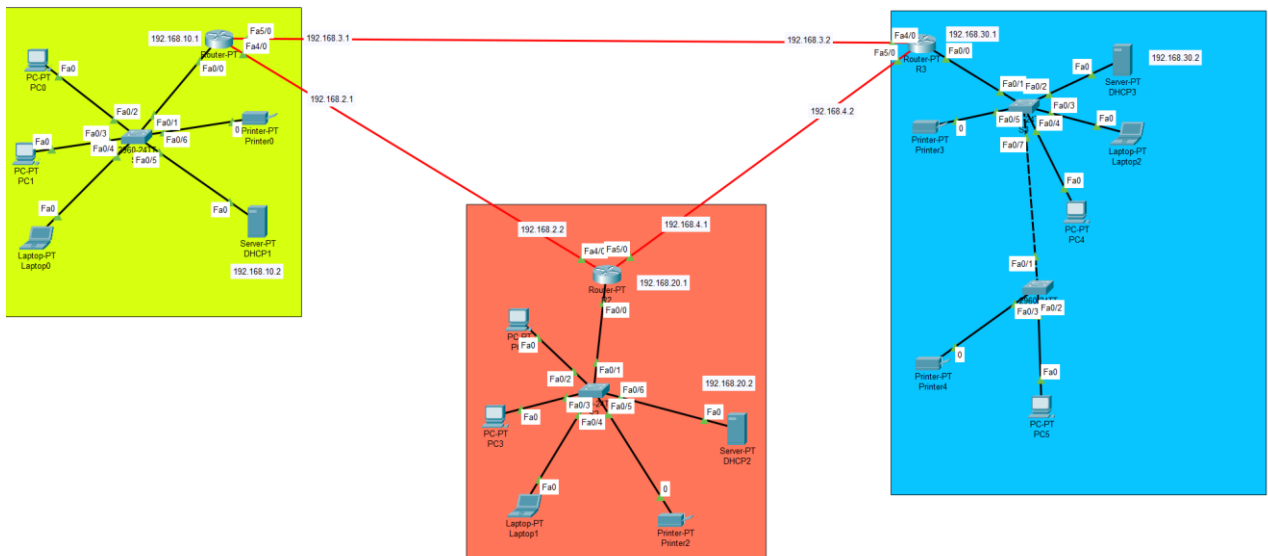


# Wprowadzenie do cyberbezpieczeństwa

Projekt

Michał Rusak

Celem projektu jest zaprojektowanie topologii sieci wraz z podstawową konfiguracją urządzeń. Projekt realizowany jest w programie Cisco Packet Tracer. Poniżej znajduje się zrzut ekranu z tego programu:



Hasła dostępne w projekcie to:

- admin, cisco
- admin2, cisco2
- dla enable: class

Sieć została podzielona na 3 podsieci, zaznaczone są one różnymi kolorami tła. Każda sieć posiada router, co najmniej 1 switch oraz urządzenia końcowe takie jak komputery czy drukarki. Każda podsieć ma do dyspozycji po 254 adresy dla urządzeń. W każdej sieci został umieszczony serwer DHCP, co pozwala na dynamiczne przypisywanie adresów IP urządzeniom.

	1 podsieć	2 podsieć	3 podsieć
Adres sieci	192.168.10.0	192.168.20.0	192.168.30.0
Zakres adresów IP dla hostów	192.168.10.1 - 192.168.10.254	192.168.20.1 - 192.168.20.254	192.168.30.1 - 192.168.30.254
Adres rozgłoszeniowy	192.168.10.255	192.168.20.255	192.168.30.255

Poniżej znajdują się zrzuty z adresacji switchy.

Device Name: S1  
Custom Device Model: 2960 IOS15  
Hostname: S1

Port	Link	VLAN	IP Address	MAC Address
FastEthernet0/1	Up	--	--	00E0.B0E8.9B01
FastEthernet0/2	Up	20	--	00E0.B0E8.9B02
FastEthernet0/3	Up	20	--	00E0.B0E8.9B03
FastEthernet0/4	Up	20	--	00E0.B0E8.9B04
FastEthernet0/5	Up	20	--	00E0.B0E8.9B05
FastEthernet0/6	Up	20	--	00E0.B0E8.9B06
FastEthernet0/7	Down	20	--	00E0.B0E8.9B07
FastEthernet0/8	Down	20	--	00E0.B0E8.9B08
FastEthernet0/9	Down	1	--	00E0.B0E8.9B09
FastEthernet0/10	Down	1	--	00E0.B0E8.9B0A
FastEthernet0/11	Down	1	--	00E0.B0E8.9B0B
FastEthernet0/12	Down	1	--	00E0.B0E8.9B0C
FastEthernet0/13	Down	1	--	00E0.B0E8.9B0D
FastEthernet0/14	Down	1	--	00E0.B0E8.9B0E
FastEthernet0/15	Down	1	--	00E0.B0E8.9B0F
FastEthernet0/16	Down	1	--	00E0.B0E8.9B10
FastEthernet0/17	Down	1	--	00E0.B0E8.9B11
FastEthernet0/18	Down	1	--	00E0.B0E8.9B12
FastEthernet0/19	Down	1	--	00E0.B0E8.9B13
FastEthernet0/20	Down	1	--	00E0.B0E8.9B14
FastEthernet0/21	Down	1	--	00E0.B0E8.9B15
FastEthernet0/22	Down	1	--	00E0.B0E8.9B16
FastEthernet0/23	Down	1	--	00E0.B0E8.9B17
FastEthernet0/24	Down	1	--	00E0.B0E8.9B18
GigabitEthernet0/1	Down	1	--	00E0.B0E8.9B19
GigabitEthernet0/2	Down	1	--	00E0.B0E8.9B1A
Vlan1	Down	1	<not set>	0060.3E40.EC30
Vlan20	Up	20	192.168.10.20/24	0060.3E40.EC01

Physical Location: Intercity > Home City > Corporate Office > Main Wiring Closet > Rack > S1

Device Name: S2  
Custom Device Model: 2960 IOS15  
Hostname: S2

Port	Link	VLAN	IP Address	MAC Address
FastEthernet0/1	Up	--	--	0004.9A97.5A01
FastEthernet0/2	Up	30	--	0004.9A97.5A02
FastEthernet0/3	Up	30	--	0004.9A97.5A03
FastEthernet0/4	Up	30	--	0004.9A97.5A04
FastEthernet0/5	Up	30	--	0004.9A97.5A05
FastEthernet0/6	Up	30	--	0004.9A97.5A06
FastEthernet0/7	Down	30	--	0004.9A97.5A07
FastEthernet0/8	Down	30	--	0004.9A97.5A08
FastEthernet0/9	Down	1	--	0004.9A97.5A09
FastEthernet0/10	Down	1	--	0004.9A97.5A0A
FastEthernet0/11	Down	1	--	0004.9A97.5A0B
FastEthernet0/12	Down	1	--	0004.9A97.5A0C
FastEthernet0/13	Down	1	--	0004.9A97.5A0D
FastEthernet0/14	Down	1	--	0004.9A97.5A0E
FastEthernet0/15	Down	1	--	0004.9A97.5A0F
FastEthernet0/16	Down	1	--	0004.9A97.5A10
FastEthernet0/17	Down	1	--	0004.9A97.5A11
FastEthernet0/18	Down	1	--	0004.9A97.5A12
FastEthernet0/19	Down	1	--	0004.9A97.5A13
FastEthernet0/20	Down	1	--	0004.9A97.5A14
FastEthernet0/21	Down	1	--	0004.9A97.5A15
FastEthernet0/22	Down	1	--	0004.9A97.5A16
FastEthernet0/23	Down	1	--	0004.9A97.5A17
FastEthernet0/24	Down	1	--	0004.9A97.5A18
GigabitEthernet0/1	Down	1	--	0004.9A97.5A19
GigabitEthernet0/2	Down	1	--	0004.9A97.5A1A
Vlan1	Down	1	<not set>	0007.EC5D.2033
Vlan30	Up	30	192.168.20.30/24	0007.EC5D.2001

Physical Location: Intercity > Home City > Corporate Office > Main Wiring Closet > Rack > S2

Device Name: S3				
Custom Device Model: 2960 IOS15				
Hostname: S3				
Port	Link	VLAN	IP Address	MAC Address
FastEthernet0/1	Up	--	--	000C.CF69.CD01
FastEthernet0/2	Up	40	--	000C.CF69.CD02
FastEthernet0/3	Up	40	--	000C.CF69.CD03
FastEthernet0/4	Up	40	--	000C.CF69.CD04
FastEthernet0/5	Up	40	--	000C.CF69.CD05
FastEthernet0/6	Down	--	--	000C.CF69.CD06
FastEthernet0/7	Up	--	--	000C.CF69.CD07
FastEthernet0/8	Down	40	--	000C.CF69.CD08
FastEthernet0/9	Down	1	--	000C.CF69.CD09
FastEthernet0/10	Down	1	--	000C.CF69.CD0A
FastEthernet0/11	Down	1	--	000C.CF69.CD0B
FastEthernet0/12	Down	1	--	000C.CF69.CD0C
FastEthernet0/13	Down	1	--	000C.CF69.CD0D
FastEthernet0/14	Down	1	--	000C.CF69.CD0E
FastEthernet0/15	Down	1	--	000C.CF69.CD0F
FastEthernet0/16	Down	1	--	000C.CF69.CD10
FastEthernet0/17	Down	1	--	000C.CF69.CD11
FastEthernet0/18	Down	1	--	000C.CF69.CD12
FastEthernet0/19	Down	1	--	000C.CF69.CD13
FastEthernet0/20	Down	1	--	000C.CF69.CD14
FastEthernet0/21	Down	1	--	000C.CF69.CD15
FastEthernet0/22	Down	1	--	000C.CF69.CD16
FastEthernet0/23	Down	1	--	000C.CF69.CD17
FastEthernet0/24	Down	1	--	000C.CF69.CD18
GigabitEthernet0/1	Down	1	--	000C.CF69.CD19
GigabitEthernet0/2	Down	1	--	000C.CF69.CD1A
Vlan1	Down	1	<not set>	00E0.B0D6.003E
Vlan40	Up	40	192.168.30.40/24	00E0.B0D6.0001
Physical Location: Intercity > Home City > Corporate Office > Main Wiring Closet > Rack > S3				

Device Name: S4				
Custom Device Model: 2960 IOS15				
Hostname: S4				
Port	Link	VLAN	IP Address	MAC Address
FastEthernet0/1	Up	--	--	0001.9733.8D01
FastEthernet0/2	Up	40	--	0001.9733.8D02
FastEthernet0/3	Up	40	--	0001.9733.8D03
FastEthernet0/4	Down	40	--	0001.9733.8D04
FastEthernet0/5	Down	1	--	0001.9733.8D05
FastEthernet0/6	Down	2	--	0001.9733.8D06
FastEthernet0/7	Down	1	--	0001.9733.8D07
FastEthernet0/8	Down	1	--	0001.9733.8D08
FastEthernet0/9	Down	1	--	0001.9733.8D09
FastEthernet0/10	Down	1	--	0001.9733.8D0A
FastEthernet0/11	Down	1	--	0001.9733.8D0B
FastEthernet0/12	Down	1	--	0001.9733.8D0C
FastEthernet0/13	Down	1	--	0001.9733.8D0D
FastEthernet0/14	Down	1	--	0001.9733.8D0E
FastEthernet0/15	Down	1	--	0001.9733.8D0F
FastEthernet0/16	Down	1	--	0001.9733.8D10
FastEthernet0/17	Down	1	--	0001.9733.8D11
FastEthernet0/18	Down	1	--	0001.9733.8D12
FastEthernet0/19	Down	1	--	0001.9733.8D13
FastEthernet0/20	Down	1	--	0001.9733.8D14
FastEthernet0/21	Down	1	--	0001.9733.8D15
FastEthernet0/22	Down	1	--	0001.9733.8D16
FastEthernet0/23	Down	1	--	0001.9733.8D17
FastEthernet0/24	Down	1	--	0001.9733.8D18
GigabitEthernet0/1	Down	1	--	0001.9733.8D19
GigabitEthernet0/2	Down	1	--	0001.9733.8D1A
Vlan1	Down	1	<not set>	0001.C761.4EE3
Vlan40	Up	40	192.168.30.41/24	0001.C761.4E01
Physical Location: Intercity > Home City > Corporate Office > Main Wiring Closet > Rack > S4				

DHCP1

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VM Management

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DHCP

InterfaceFastEthernet0ServiceOnOff

Pool NameserverPool

Default Gateway192.168.10.1

DNS Server0.0.0.0

Start IP Address : 192168102

Subnet Mask: 2552552550

Maximum Number of Users :254

TFTP Server:0.0.0.0

WLC Address:0.0.0.0

AddSaveRemove

Pool Name	Default Gateway	DNS Server	Start IP Address	Subnet Mask	Max User	TFTP Server	WLC Address
serverPool	192.168.10.1	0.0.0.0	192.168.10.2	255.255.255.0	254	0.0.0.0	0.0.0.0

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Algorithm Settings

INTERFACE

FastEthernet0

Bluetooth

Global Settings

Display NamePC0

InterfacesFastEthernet0

Gateway/DNS IPv4

DHCP

Static

Default Gateway192.168.10.1

DNS Server0.0.0.0

Gateway/DNS IPv6

Automatic

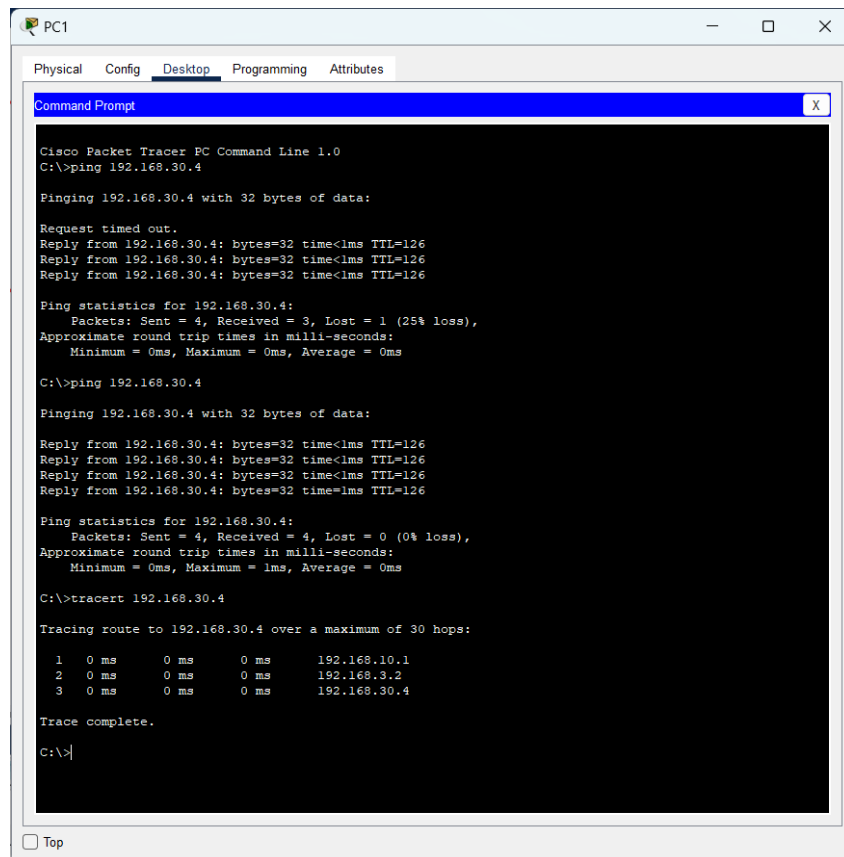
Static

Default Gateway

DNS Server

Top

Routery każdej podsieci są ze sobą połączone i w chwili obecnej można komunikować się z urządzenia z jednej podsieci do innej. Poniżej znajduje się przykład sprawdzenia komunikacji między sieciami:



```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.168.30.4

Pinging 192.168.30.4 with 32 bytes of data:

Request timed out.
Reply from 192.168.30.4: bytes=32 time<1ms TTL=126
Reply from 192.168.30.4: bytes=32 time<1ms TTL=126
Reply from 192.168.30.4: bytes=32 time<1ms TTL=126

Ping statistics for 192.168.30.4:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 192.168.30.4

Pinging 192.168.30.4 with 32 bytes of data:

Reply from 192.168.30.4: bytes=32 time<1ms TTL=126
Reply from 192.168.30.4: bytes=32 time<1ms TTL=126
Reply from 192.168.30.4: bytes=32 time<1ms TTL=126
Reply from 192.168.30.4: bytes=32 time=1ms TTL=126

Ping statistics for 192.168.30.4:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\>tracert 192.168.30.4

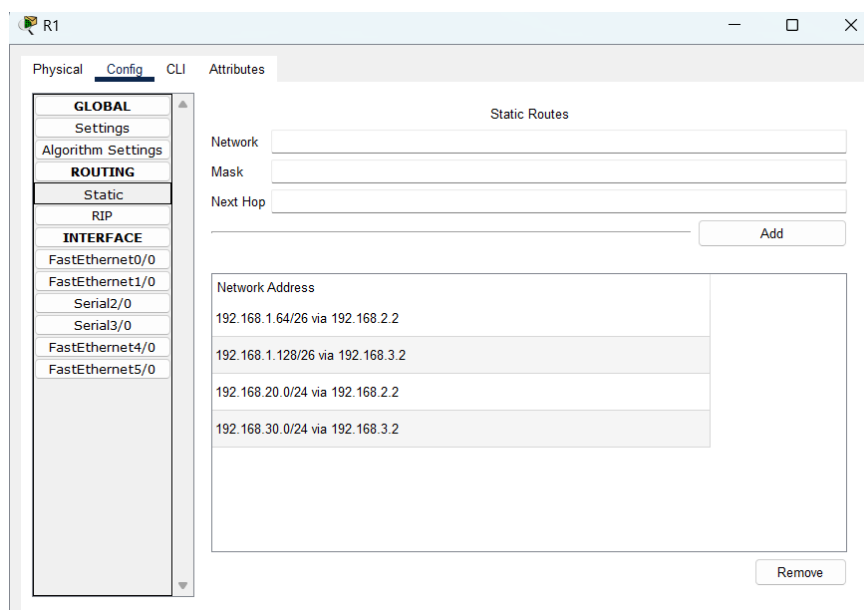
Tracing route to 192.168.30.4 over a maximum of 30 hops:

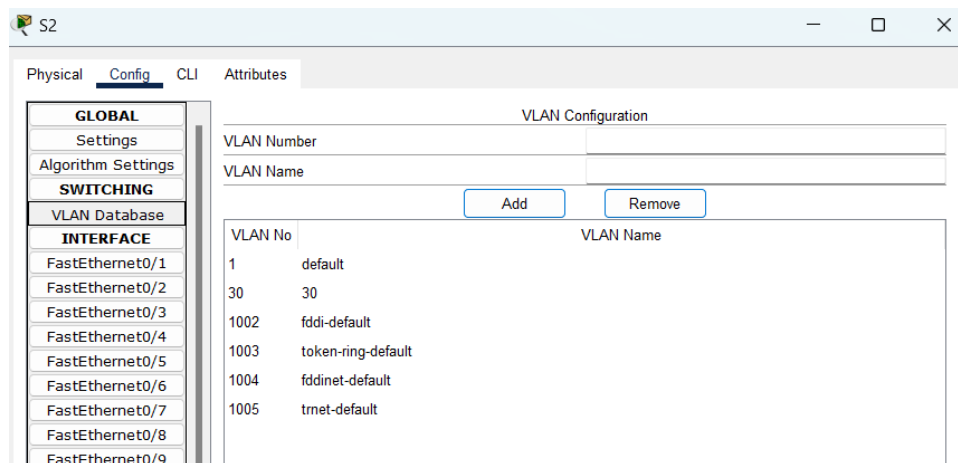
  0  0 ms    0 ms    0 ms    192.168.10.1
  1  0 ms    0 ms    0 ms    192.168.3.2
  2  0 ms    0 ms    0 ms    192.168.30.4

Trace complete.

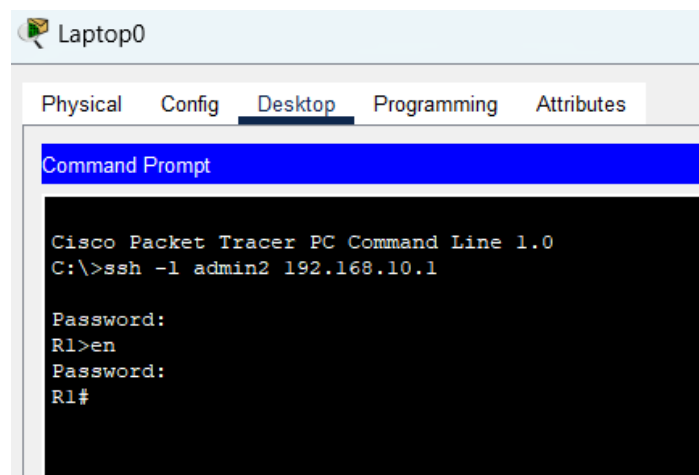
C:\>
```

Podsieci zostały ze sobą połączone, zostały zaimplementowane VLAN oraz enkapsulacja, co widać na poniższym zrzucie z routera R1.





Urządzenia zostały skonfigurowane również z dostępem SSH.



Projekt zawiera również NTP:

```

R2>show clock detail
13:26:24.702 UTC Fri Mar 29 2024
Time source is NTP
R2>
  
```

DHCP2

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Service

On

Off

Authentication

Enable

Disable

Key:

Password:

marzec, 2024

01:27:19PM

pon.	wt.	śr.	czw.	pt.	sob.	niedz.
26	27	28	29	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31
1	2	3	4	5	6	7

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On

Off

	Time	HostName	Message
1	03.29.2024 01:16:30.256 PM	192.168.10.1	%SYS-5-CONFIG_I: Configured from console by console

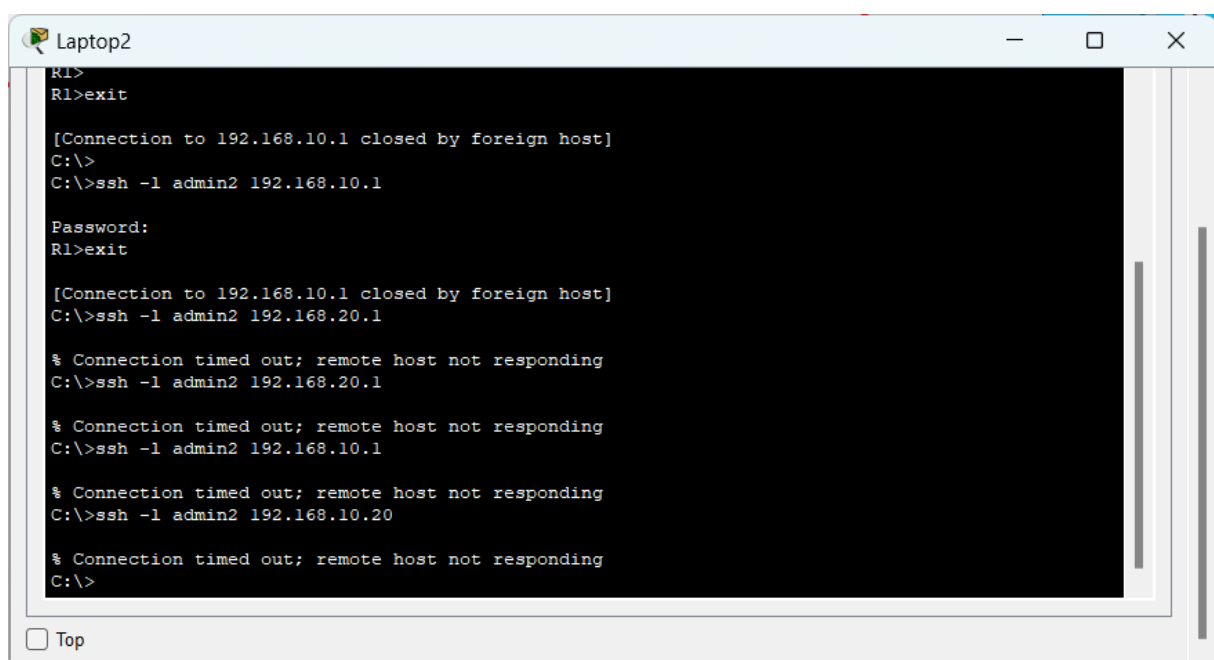
Clear Log

Top

W projekt zawiera listy kontroli dostępu ACL, zarówno standardowe jak i rozszerzone, które są ostatnim wymaganiem na ocenę 4 jest wykonanie zapory sieciowej typu Private and Public.

```
R3#show access-lists
Extended IP access list 100
 10 permit tcp 192.168.20.0 0.0.0.255 any eq 22 (92 match(es))
 20 deny ip any any (39 match(es))
Extended IP access list 101
 10 deny tcp any any eq 22 (36 match(es))
 20 permit ip any any (151 match(es))

R3#
```



```
Laptop2
R1>
R1>exit

[Connection to 192.168.10.1 closed by foreign host]
C:\>
C:\>ssh -l admin2 192.168.10.1

Password:
R1>exit

[Connection to 192.168.10.1 closed by foreign host]
C:\>ssh -l admin2 192.168.20.1

% Connection timed out; remote host not responding
C:\>ssh -l admin2 192.168.20.1

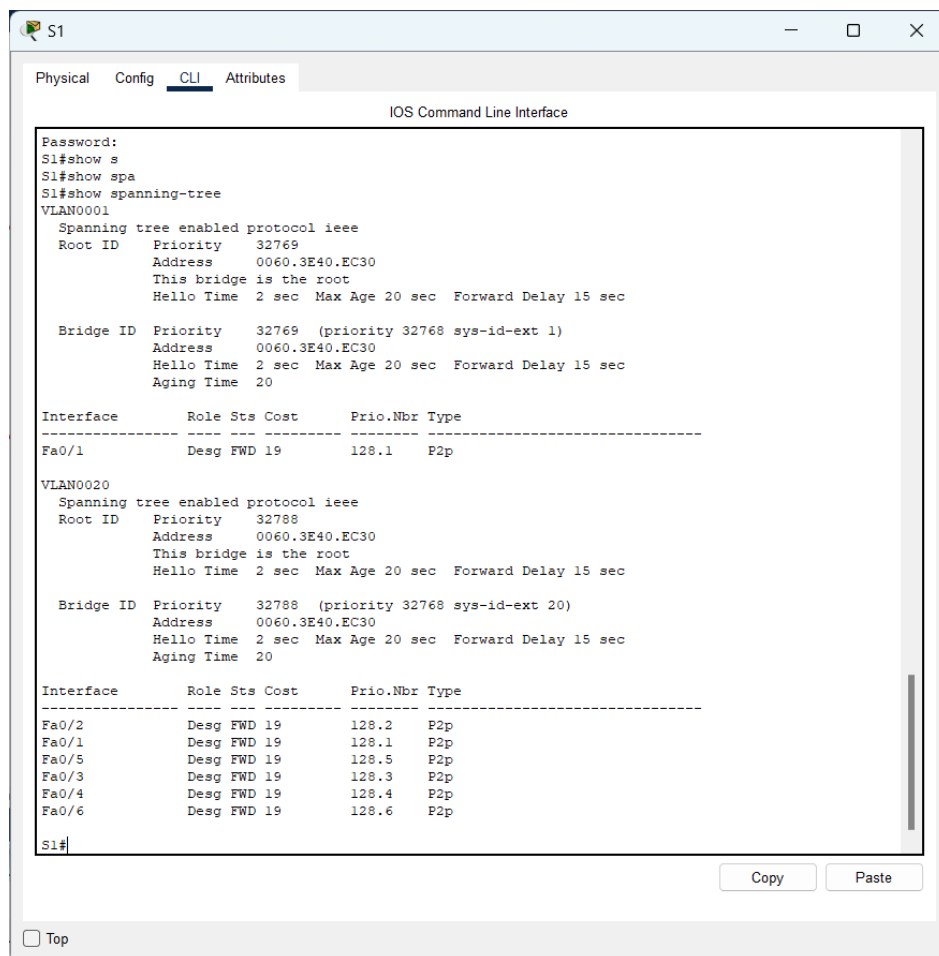
% Connection timed out; remote host not responding
C:\>ssh -l admin2 192.168.10.1

% Connection timed out; remote host not responding
C:\>ssh -l admin2 192.168.10.20

% Connection timed out; remote host not responding
C:\>
```

Projekt implementuje zabezpieczenia STP:





W kwestii zabezpieczeń projekt został skonfigurowany pod kątem AAA przy użyciu TACACS+.

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On

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Radius Port

1645

Network Configuration

Client NameClient IP

SecretServerType

Radius

	Client Name	Client IP	Server Type	Key	
1	R1	192.168.10.1	Tacacs	key	Add
2	S1	192.168.10.20	Tacacs	key	
					Save
					Remove

User Setup

UsernamePassword

	Username	Password	
1	admin2	cisco2	Add
2	admin3	cisco3	
			Save
			Remove

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