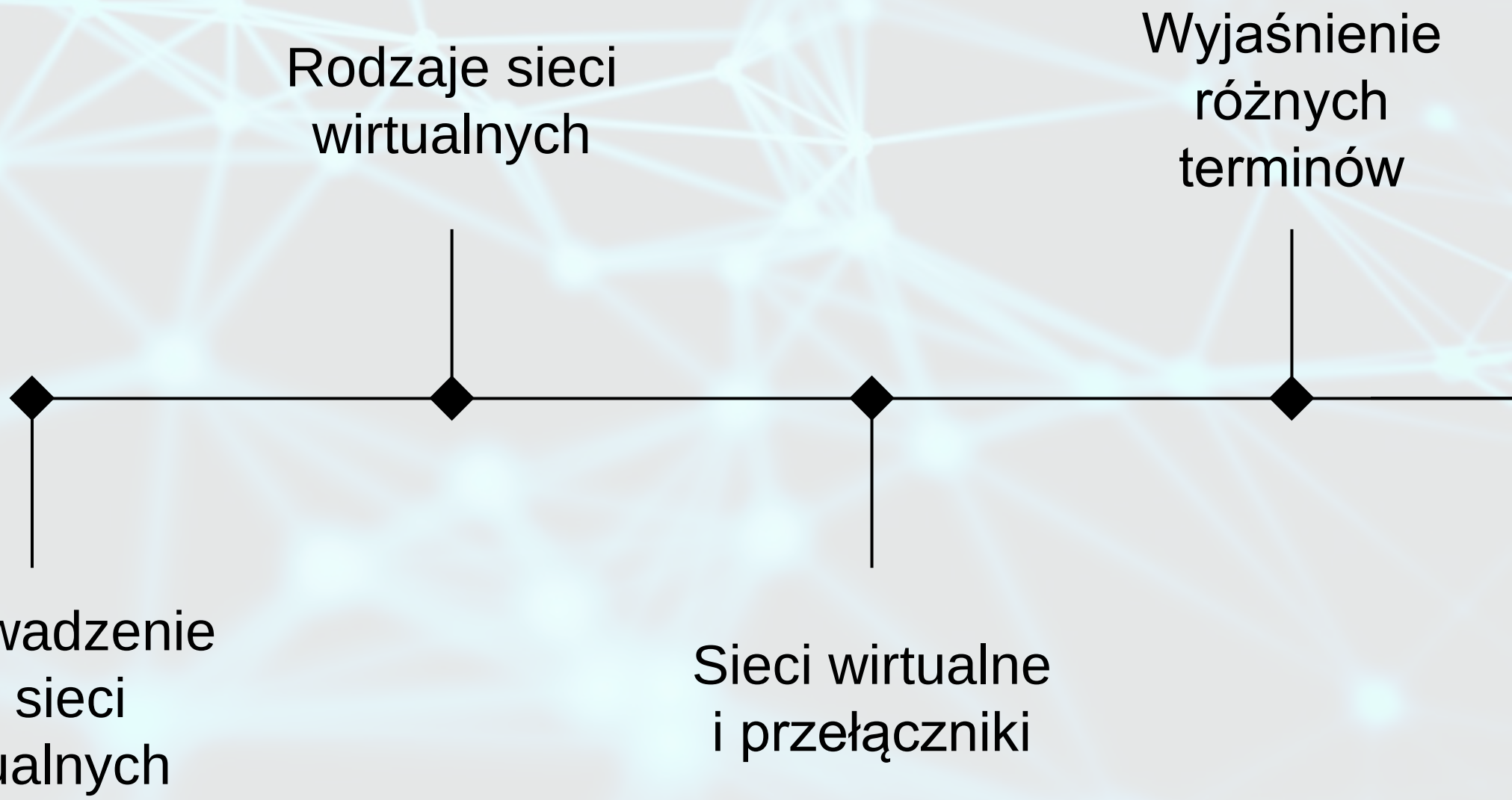
SIECI WIRTUALNE

Paweł Pasternak 2Ib

Zagadnienia prezentacji

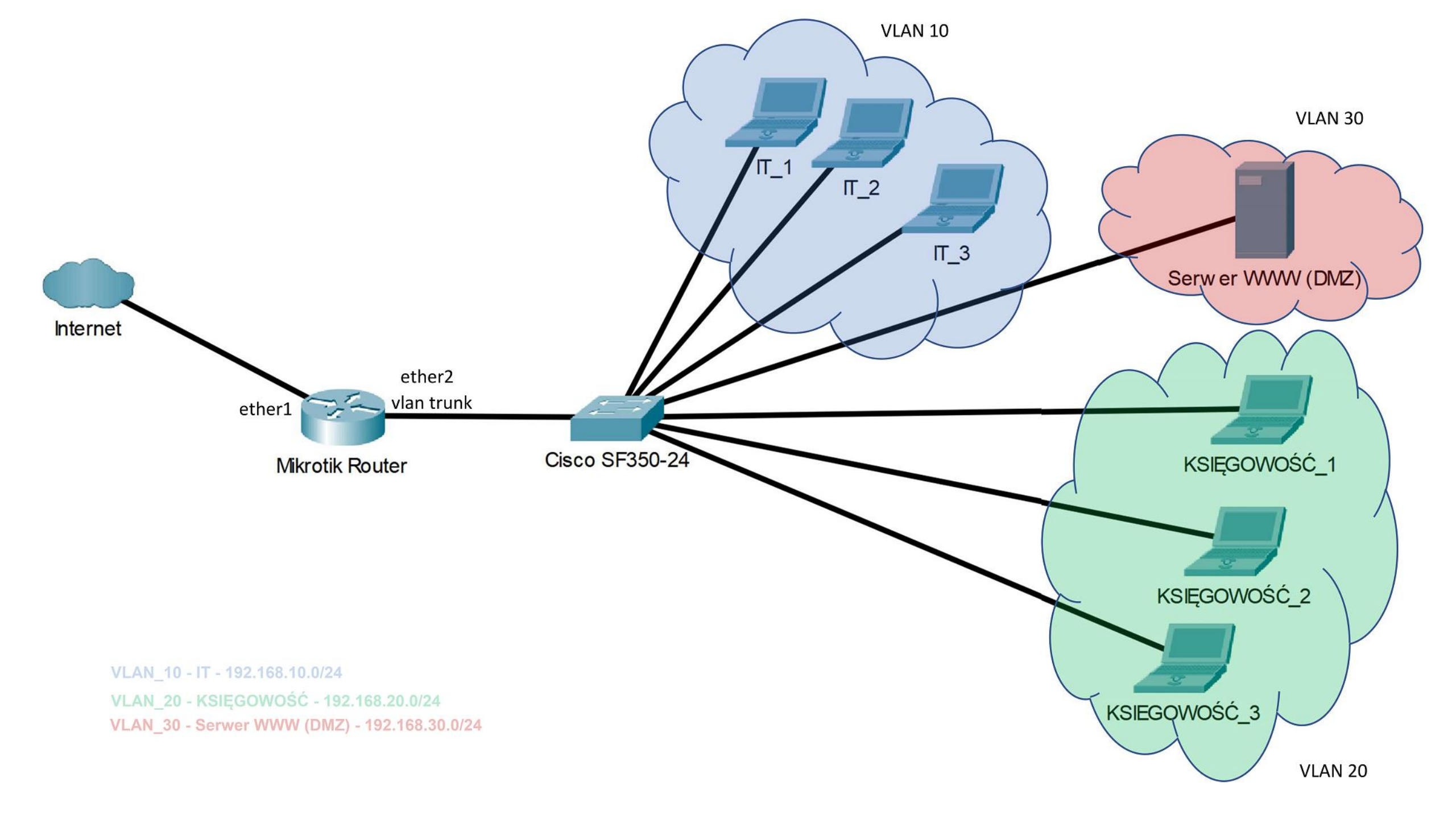


Wprowadzenie do sieci wirtualnych

Czyli co to jest VLAN
i jak to wszystko działa?

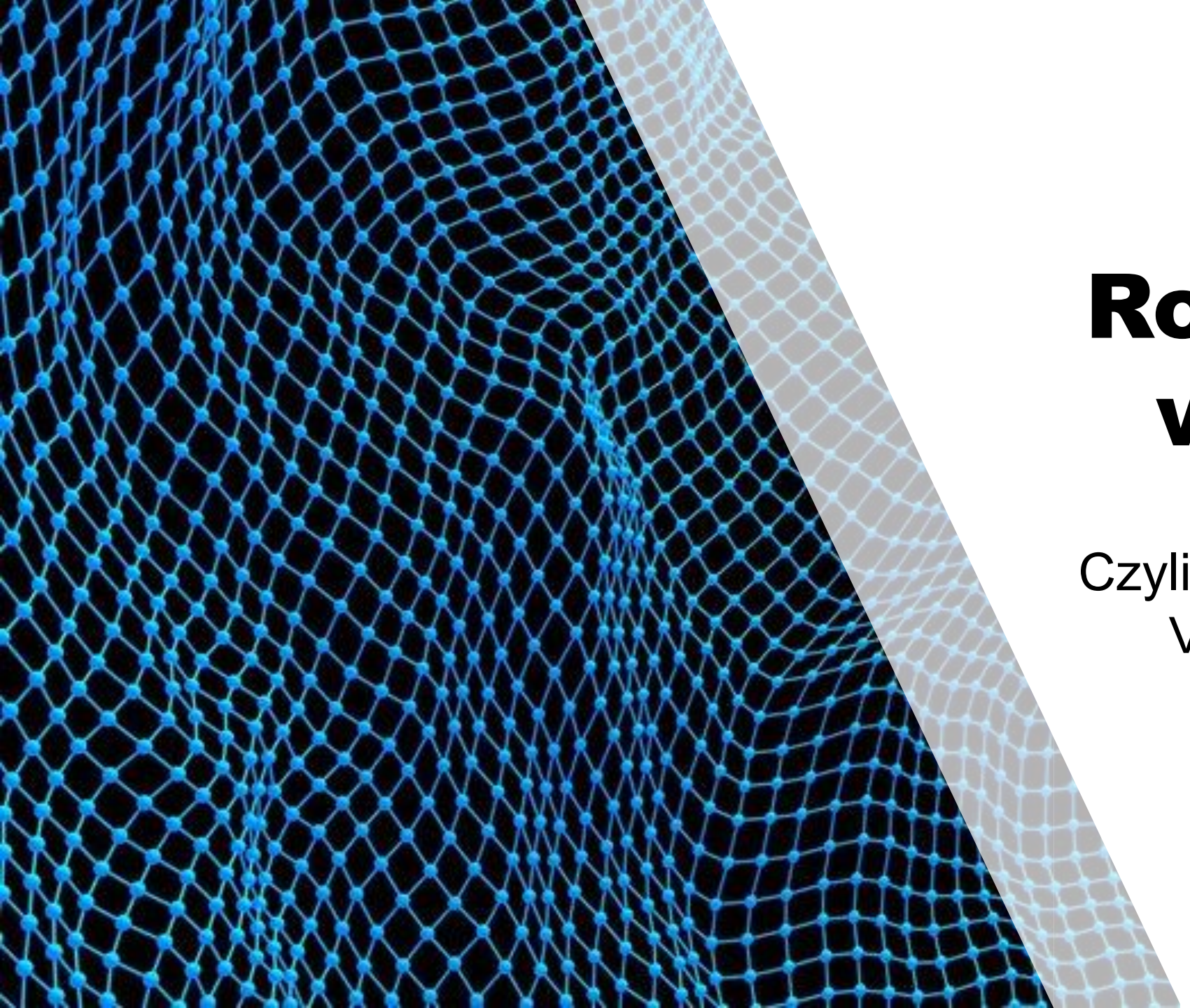
Czym jest wirtualizacja?

Wirtualizacja polega na utworzeniu symulowanego (wirtualnego) środowiska komputerowego, które stanowi przeciwieństwo środowiska fizycznego.


VLAN 10
IT_1
IT_2
IT_3
VLAN 30
Serwer WWW (DMZ)
Internet
ether1
ether2
vlan trunk
Mikrotik Router
Cisco SF350-24
KSIĘGOWOŚĆ_1
KSIĘGOWOŚĆ_2
KSIEGOWOŚĆ_3
VLAN 20
VLAN_10 - IT - 192.168.10.0/24
VLAN_20 - KSIĘGOWOŚĆ - 192.168.20.0/24
VLAN_30 - Serwer WWW (DMZ) - 192.168.30.0/24

Korzyści płynące z wdrożenia VLAN

- Łatwiejsze nadawanie uprawnień i ustawianie priorytetów
- Ograniczony ruch rozgłoszeniowy
- Logiczny podział sieci
- Bezpieczeństwo

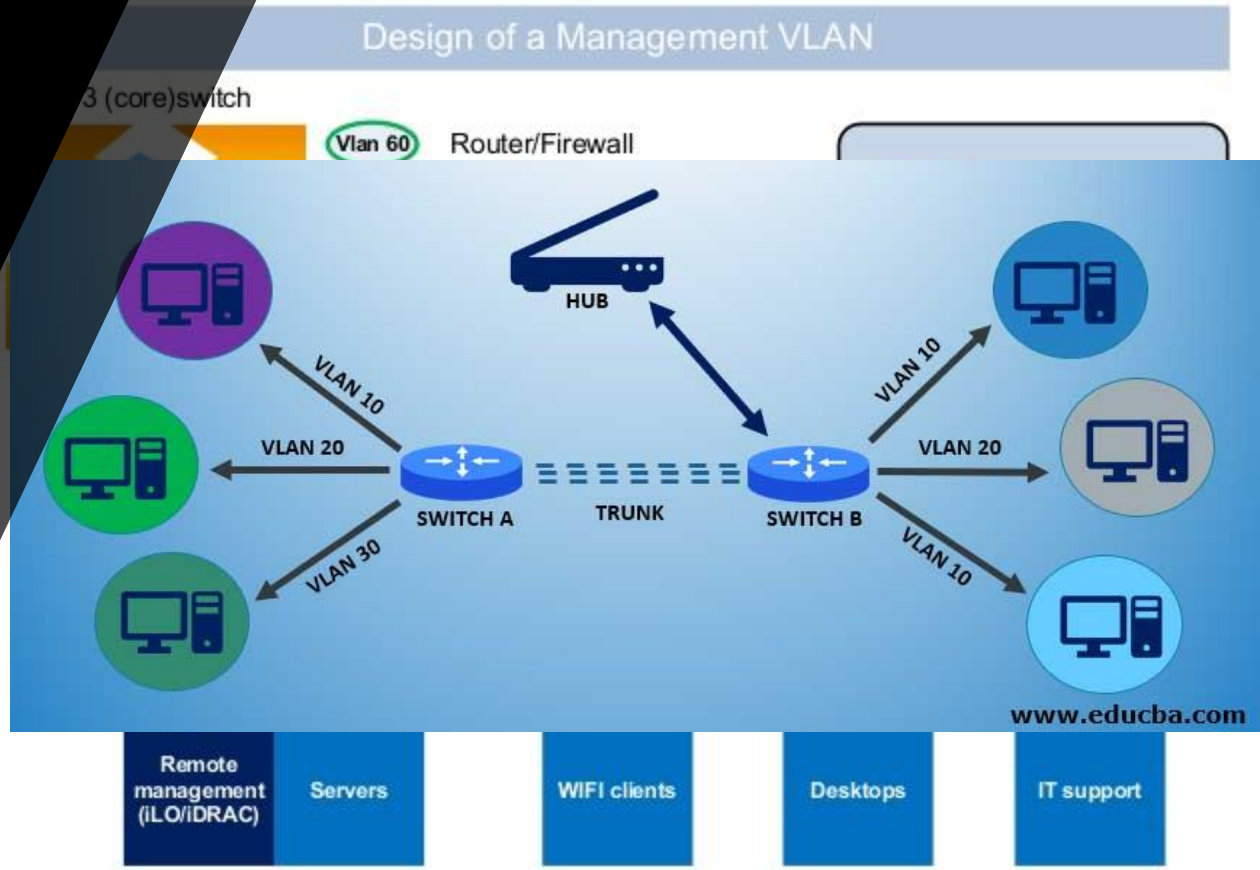


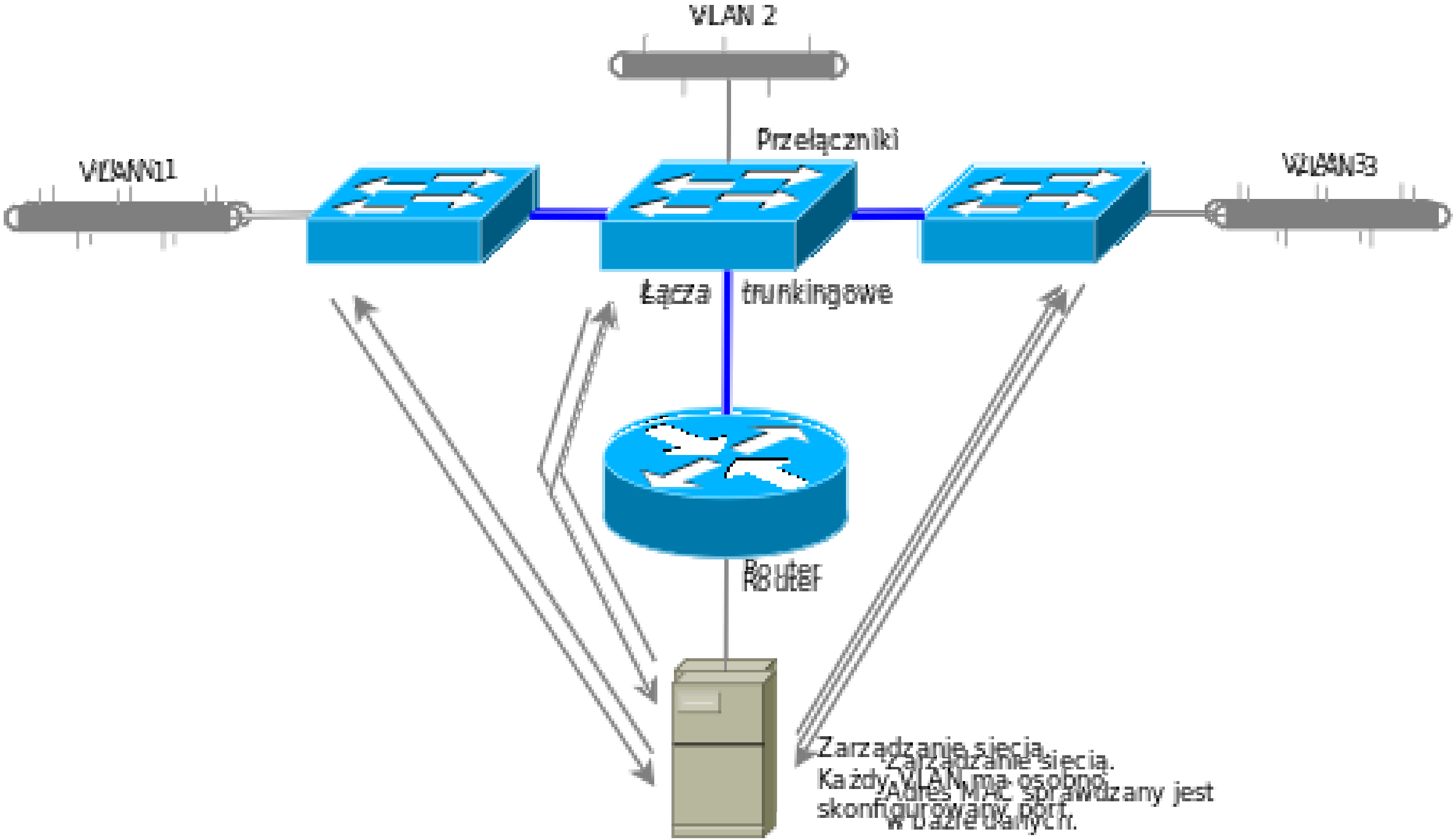
Rodzaje sieci wirtualnych

Czyli parę słów o rodzajach VLAN-ów i członkostwa w tych sieciach.

Rodzaje sieci wirtualnych

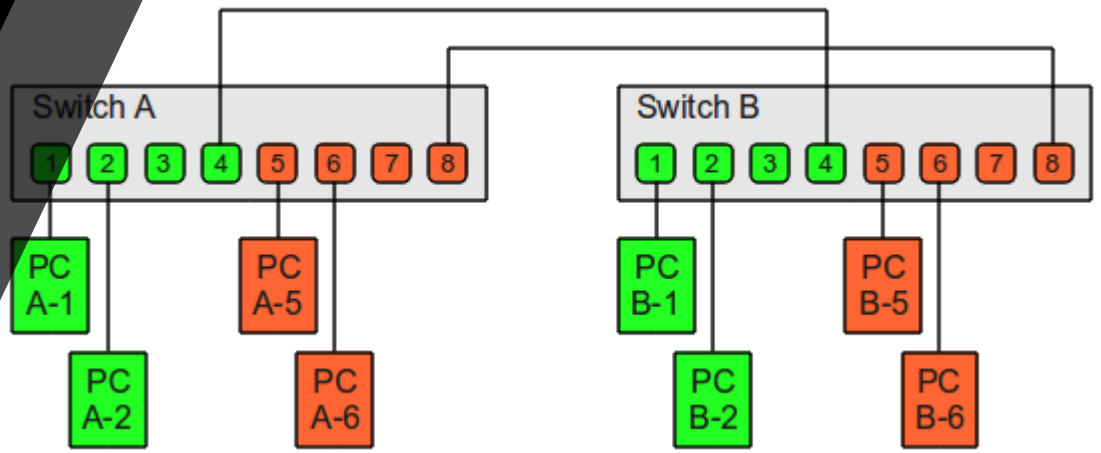
- Default VLAN
- Data VLAN
- Voice VLAN
- Management VLAN
- Native VLAN

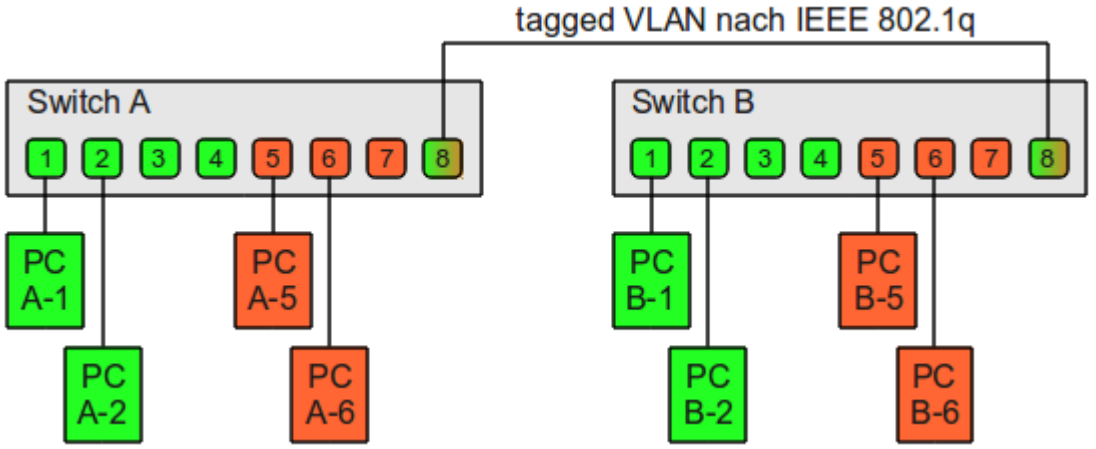



VLAN 2
Przełączniki
VLANN11
VLANN33
Łącza trunkingowe
Router
Router
Zarządzanie siecią.
Zarządzanie siecią.
Każdy VLAN ma osobno
skonfigurowany port.
Adres MAC sprawdzany jest
w bazie danych.

Rodzaje sieci wirtualnych

- Wykorzystujące separacje portów (bez znakowania)
- Wykorzystujące znakowanie ramek (tagged VLANs)



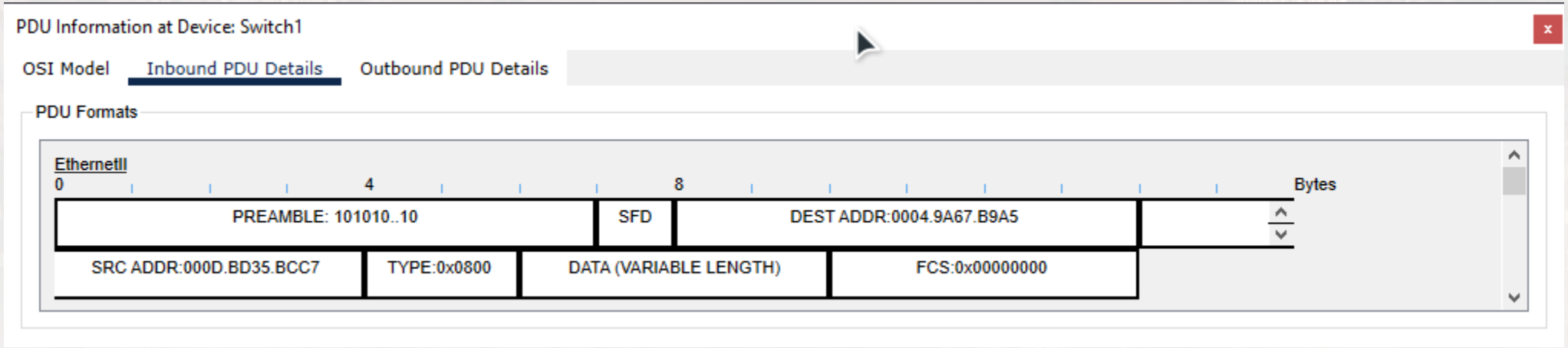


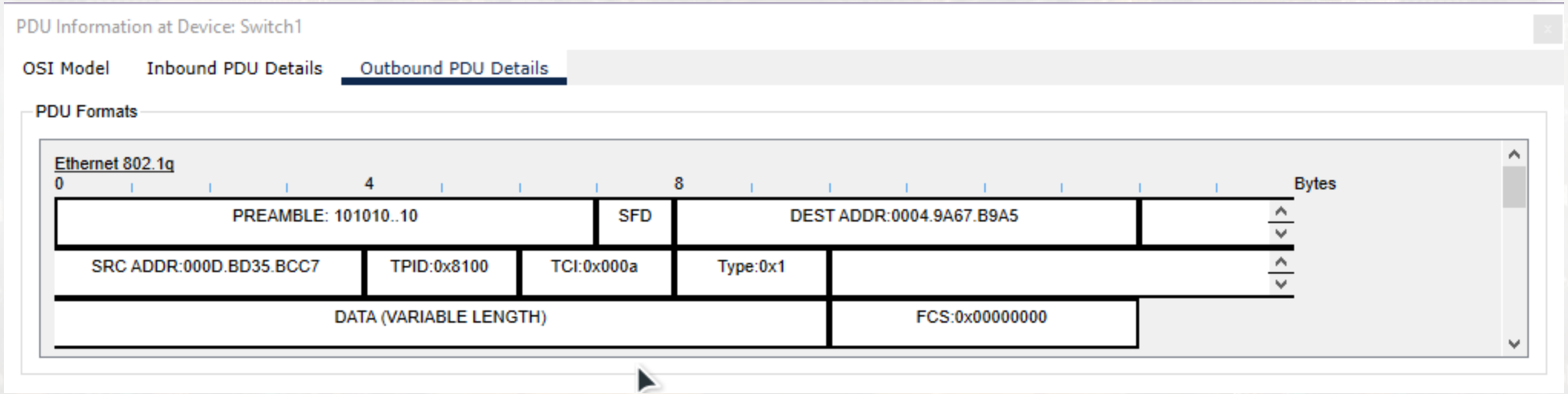
Wyjaśnienia terminów

A tu obok jedna z ładniejszych bibliotek na całym świecie.

Frame Tagging / Oznaczanie Ramek

Oznaczanie ramek sieciowych polega na dodawaniu do ramki 12-bitowej liczby identyfikującej sieć VLAN nadawcy.


PDU Information at Device: Switch1
OSI Model
Inbound PDU Details
Outbound PDU Details
PDU Formats
EthernetII
0
4
8
Bytes
PREAMBLE: 101010..10
SFD
DEST ADDR:0004.9A67.B9A5
SRC ADDR:000D.BD35.BCC7
TYPE:0x0800
DATA (VARIABLE LENGTH)
FCS:0x00000000


PDU Information at Device: Switch1
OSI Model
Inbound PDU Details
Outbound PDU Details
PDU Formats
Ethernet 802.1q
0
4
8
Bytes
PREAMBLE: 101010..10
SFD
DEST ADDR:0004.9A67.B9A5
SRC ADDR:000D.BD35.BCC7
TPID:0x8100
TCI:0x000a
Type:0x1
DATA (VARIABLE LENGTH)
FCS:0x00000000

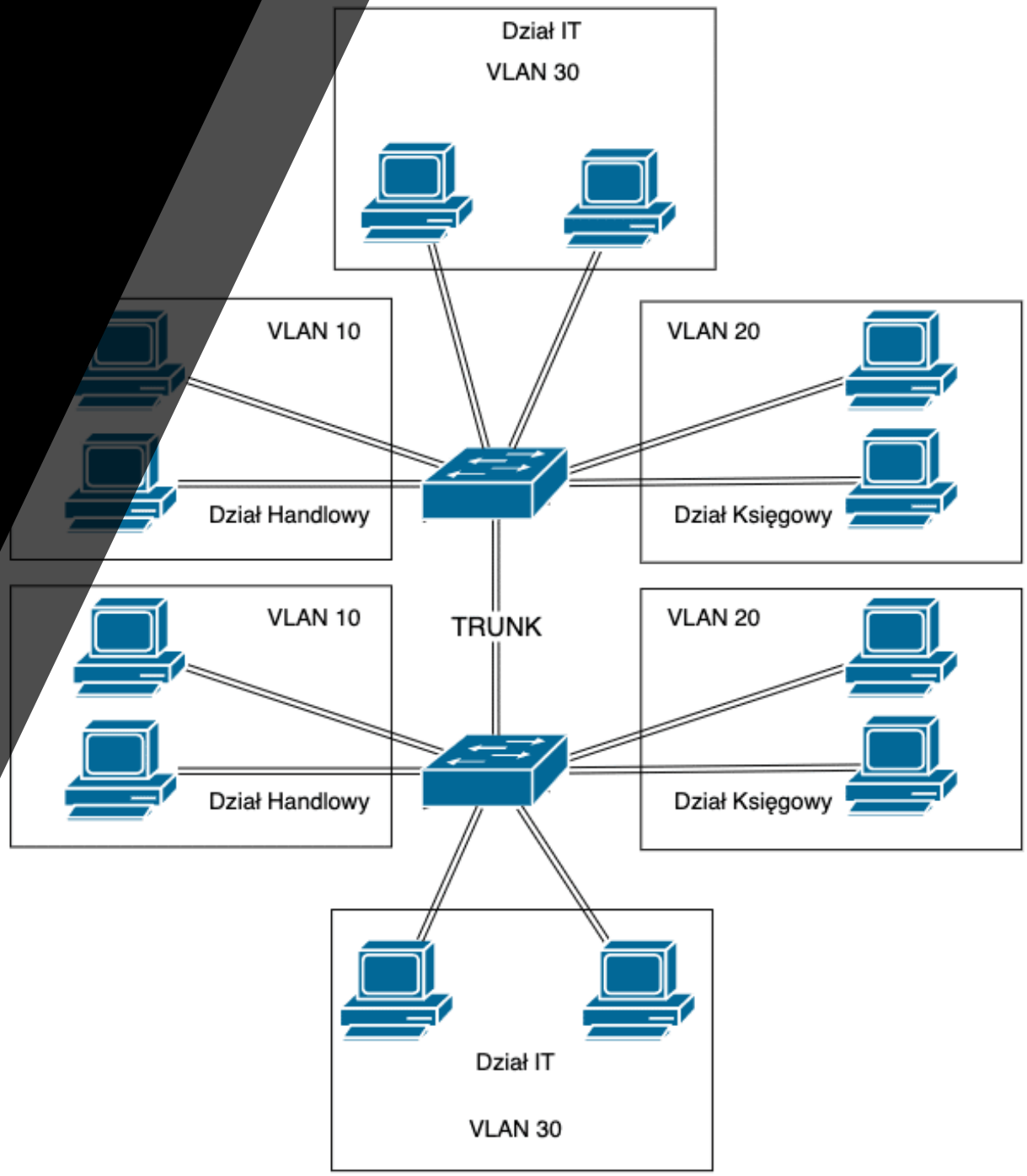
Tryb Access

Domyślny tryb dla wszystkich portów w switch-u.

Inaczej nazywany trybem dostępowym. Pozwala on na przypisanie do jednego portu jednej sieci VLAN (ramka jest nieoznaczona).

Tryb Trunk

Trunk to interfejs, który może przesyłać dane pochodzące z większej ilości VLAN-ów z oznaczonymi ramkami i VLAN-u natywnego.



Tryb General

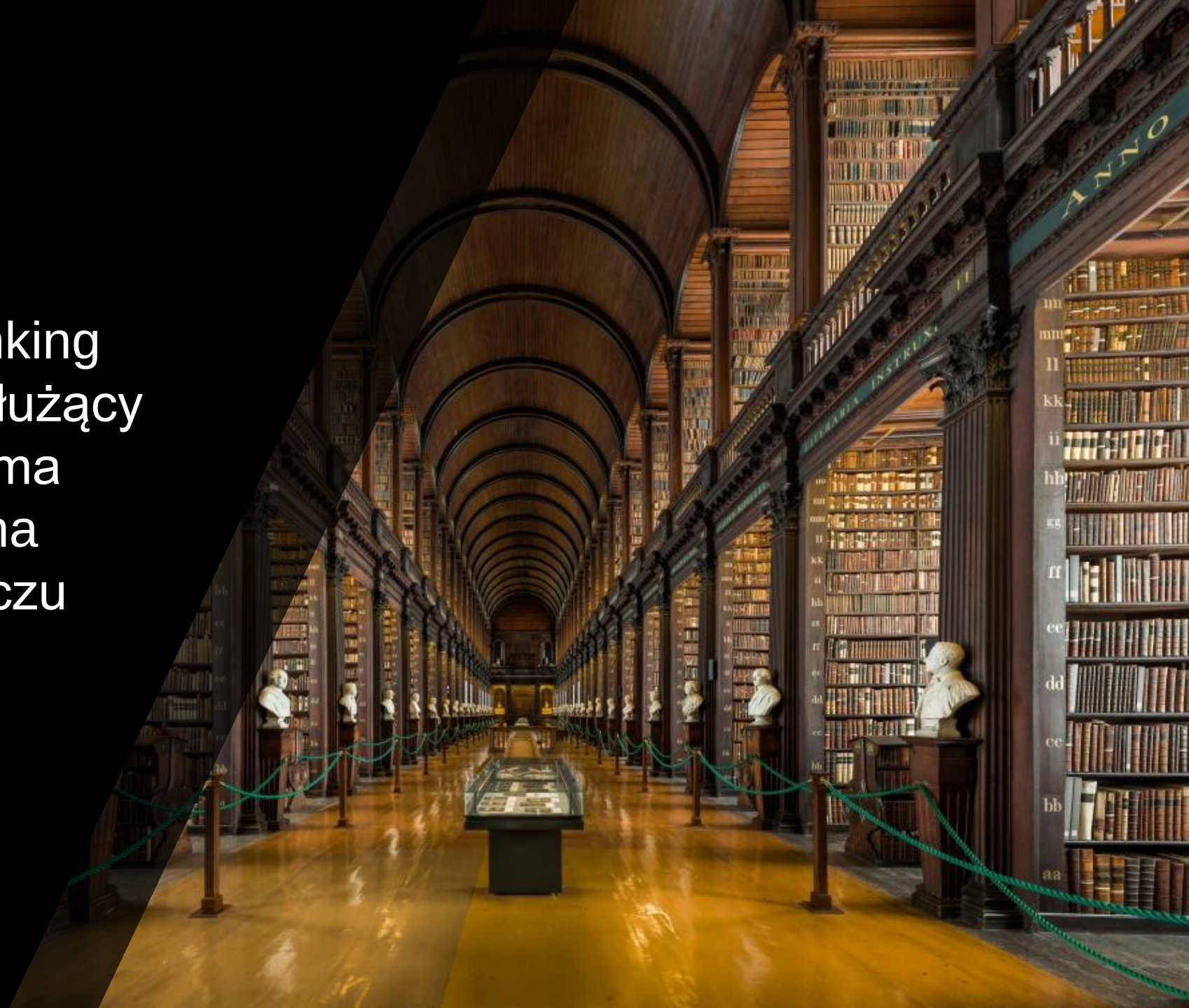
Tryb General pozwala na przypisanie jednego portu do większej ilości oznaczonych i nieoznaczonych VLAN-ów.

Nieoznaczonych czyli takich, które są czytelne dla wszystkich komputerów.

VTP

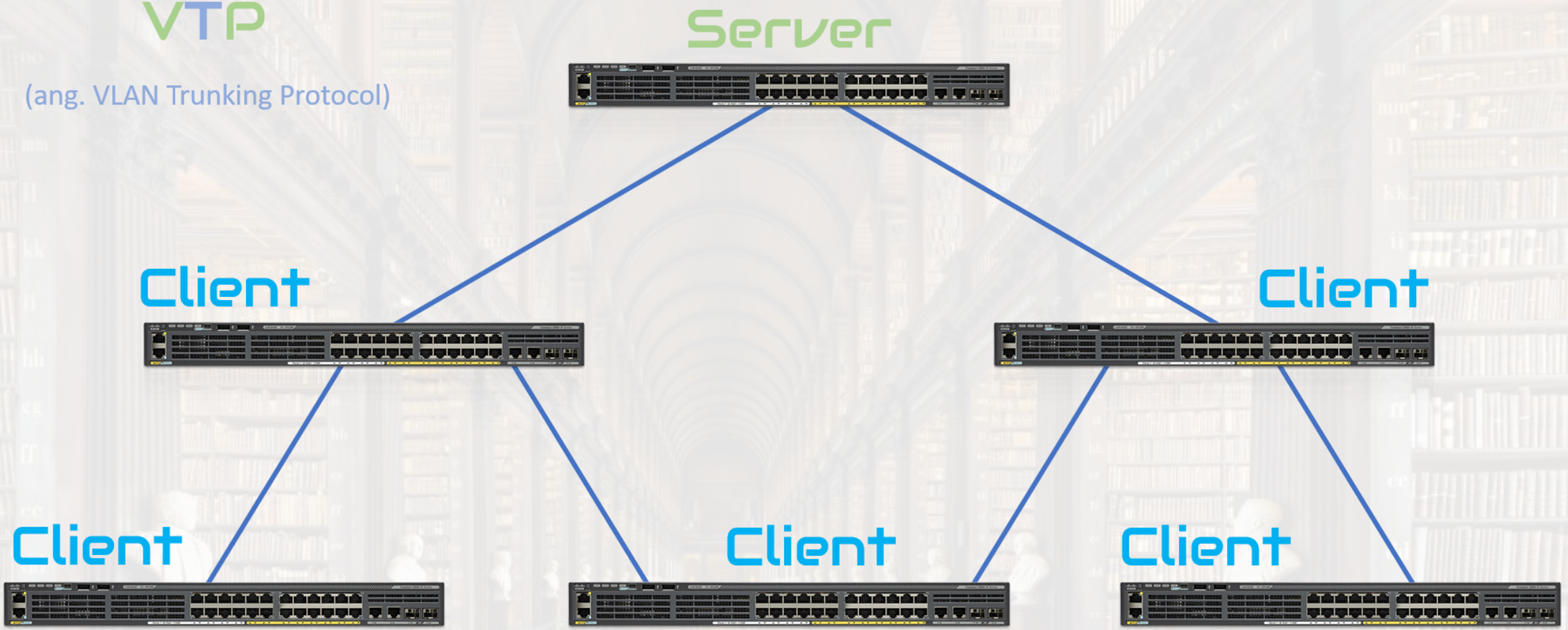
VTP (ang. VLAN Trunking Protocol) – protokół służący do zarządzania wieloma sieciami wirtualnymi na jednym, wspólnym łączu fizycznym.

Jest to własnościowy protokół firmy Cisco.



VTP

(ang. VLAN Trunking Protocol)



Sieci wirtualne a przełączniki

Czyli co wspólnego ma oprogramowanie ze sprzętem?

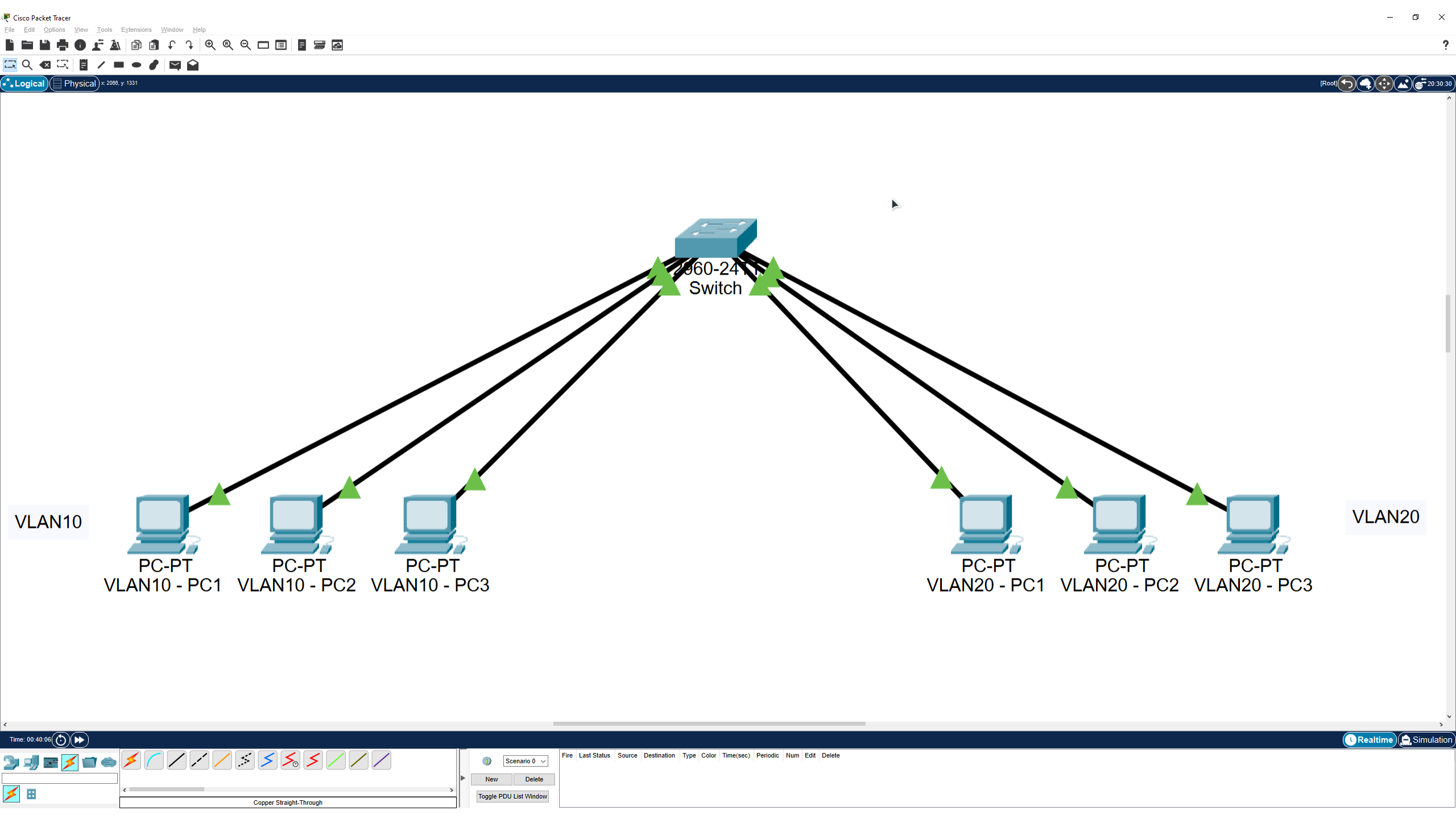

BUSINESS
SOLUTION
Milka
MMMAX
Toffee Wholenut


OF E 819


Milka
MMMAX
Toffee Wholenut

Konfiguracja VLAN

Krótki poradnik do tworzenia sieci wirtualnych na przełącznikach Cisco


Cisco Packet Tracer
File Edit Options View Tools Extensions Window Help
Logical
Physical
x: 2066, y: 1331
[Root]
20:30:30
2960-24TT
Switch
VLAN10
PC-PT
VLAN10 - PC1
PC-PT
VLAN10 - PC2
PC-PT
VLAN10 - PC3
VLAN20
PC-PT
VLAN20 - PC1
PC-PT
VLAN20 - PC2
PC-PT
VLAN20 - PC3
Time: 00:40:06
Realtime
Simulation
Scenario 0
New
Delete
Toggle PDU List Window
Fire
Last Status
Source
Destination
Type
Color
Time(sec)
Periodic
Num
Edit
Delete
Copper Straight-Through

Switch

Physical | Config | CLI | Attributes

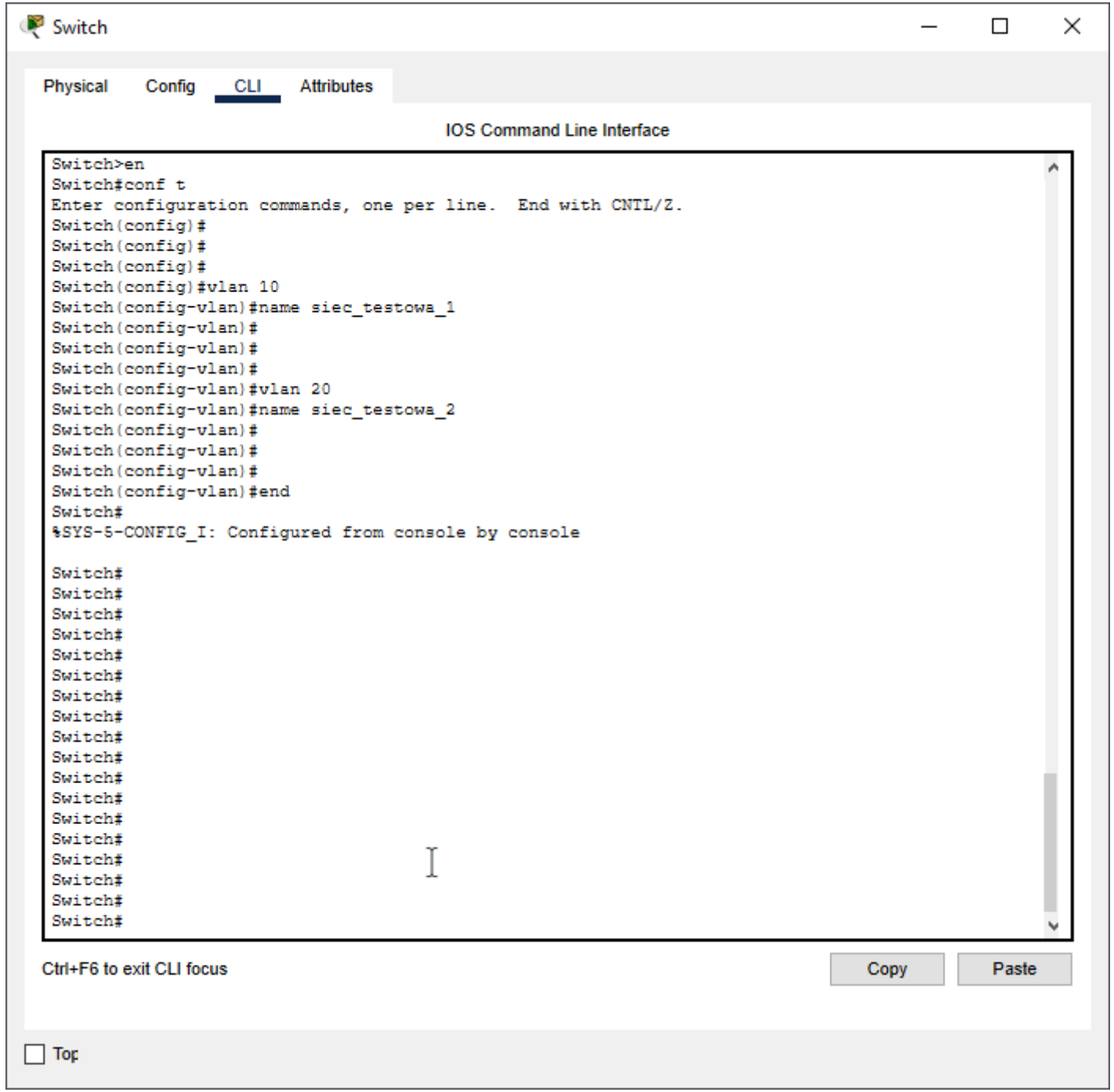
IOS Command Line Interface

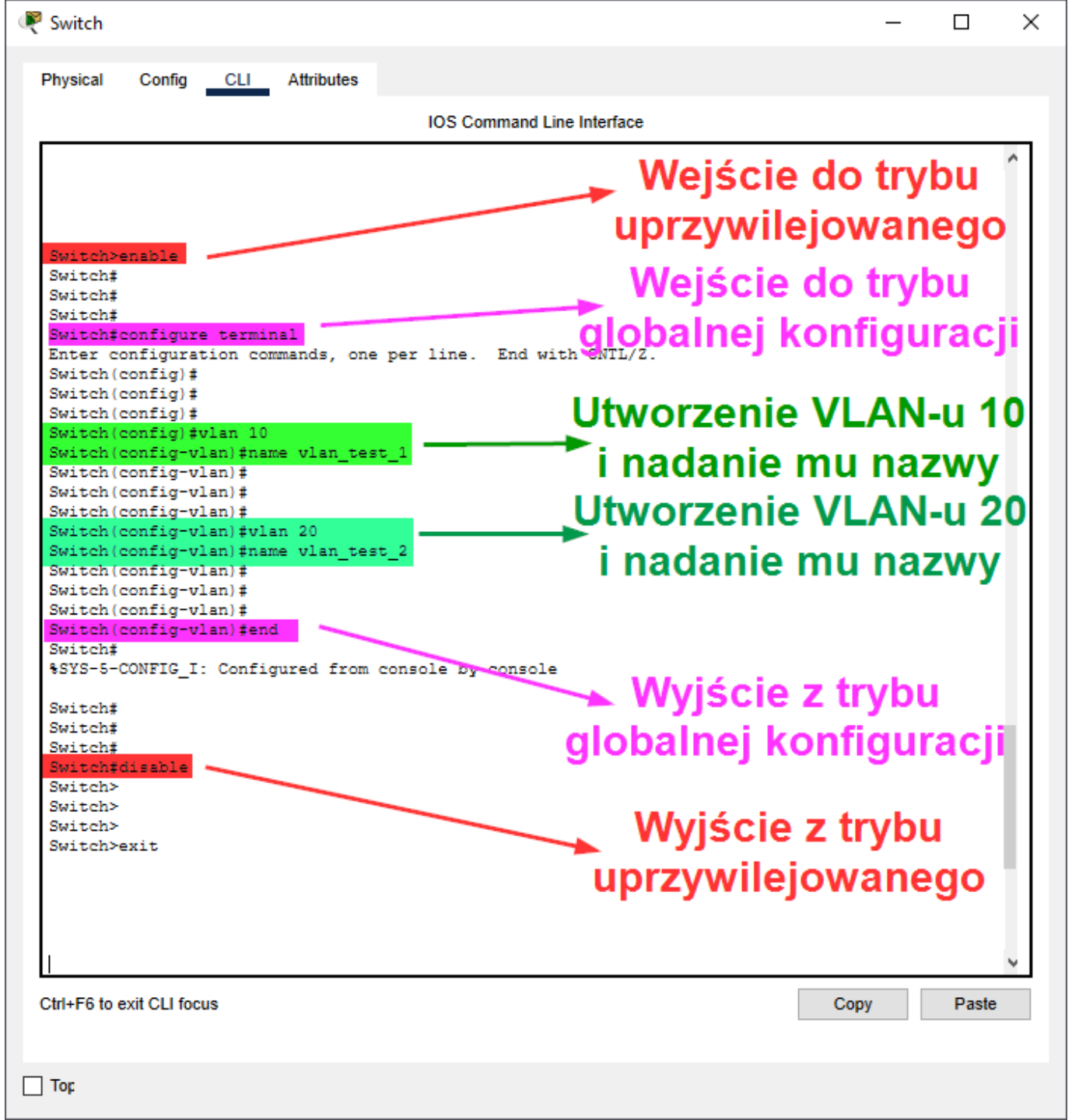
```
Switch>show vlan

VLAN Name                             Status    Ports
---- -------------------------------- --------- -------------------------------
1    default                          active    Fa0/1, Fa0/2, Fa0/3, Fa0/4
                                                Fa0/5, Fa0/6, Fa0/7, Fa0/8
                                                Fa0/9, Fa0/10, Fa0/11, Fa0/12
                                                Fa0/13, Fa0/14, Fa0/15, Fa0/16
                                                Fa0/17, Fa0/18, Fa0/19, Fa0/20
                                                Fa0/21, Fa0/22, Fa0/23, Fa0/24
                                                Gig0/1, Gig0/2
1002 fddi-default                     active
1003 token-ring-default               active
1004 fddinet-default                  active
1005 trnet-default                    active

VLAN Type  SAID       MTU   Parent RingNo BridgeNo Stp  BrdgMode Trans1 Trans2
---- ----- ---------- ----- ------ ------ -------- ---- -------- ------ ------
1    enet  100001     1500  -      -      -        -    -        0      0
1002 fddi  101002     1500  -      -      -        -    -        0      0
1003 tr    101003     1500  -      -      -        -    -        0      0
1004 fdnet 101004     1500  -      -      -        ieee -        0      0
1005 trnet 101005     1500  -      -      -        ibm  -        0      0

VLAN Type  SAID       MTU   Parent RingNo BridgeNo Stp  BrdgMode Trans1 Trans2
---- ----- ---------- ----- ------ ------ -------- ---- -------- ------ ------

Remote SPAN VLANs
------------------------------------------------------------------------------

Primary Secondary Type              Ports
------- --------- ----------------- ------------------------------------------
Switch>
Switch>
Switch>
Switch>
Switch>
Switch>
```

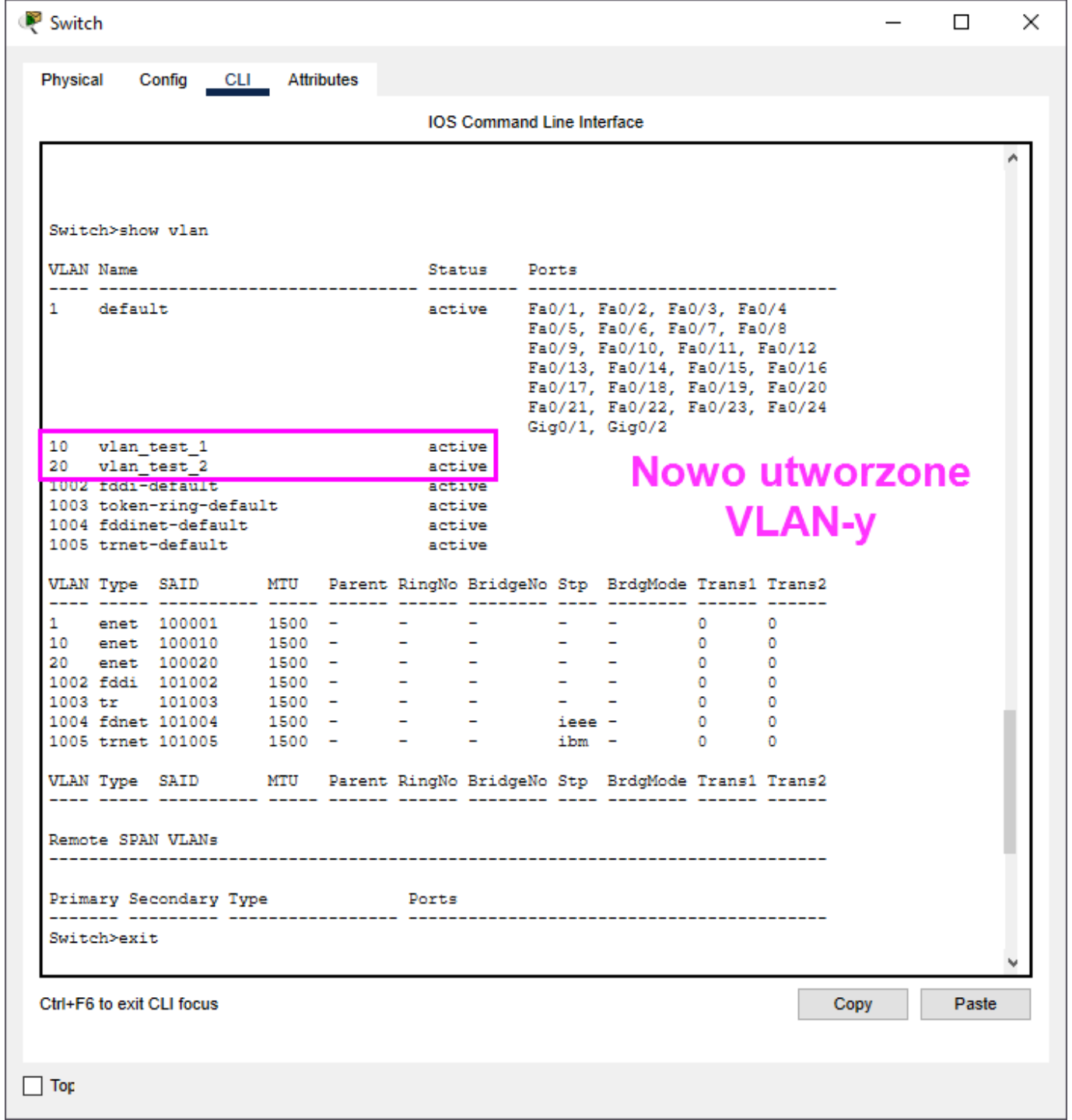
Ctrl+F6 to exit CLI focus

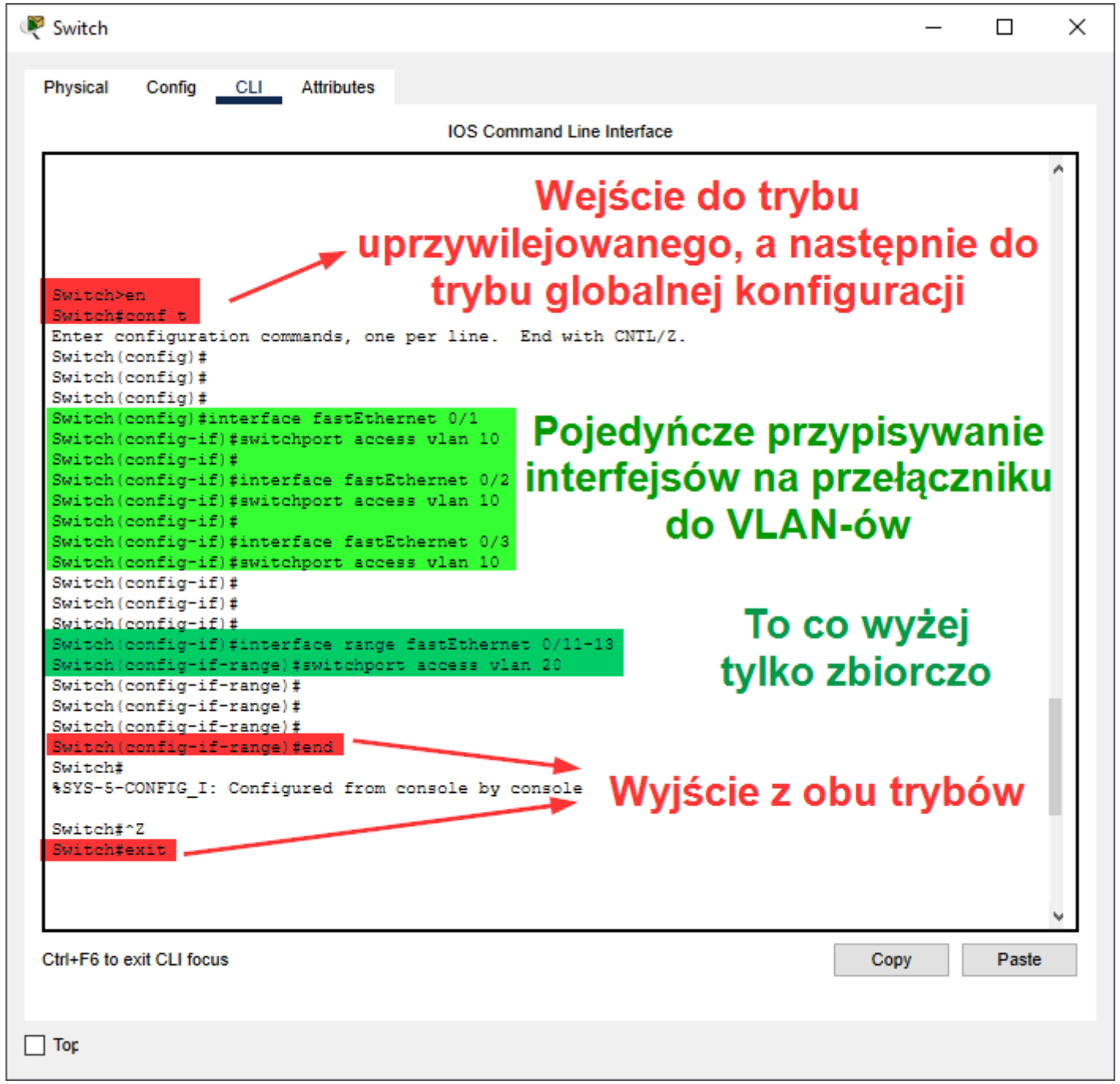
Copy | Paste

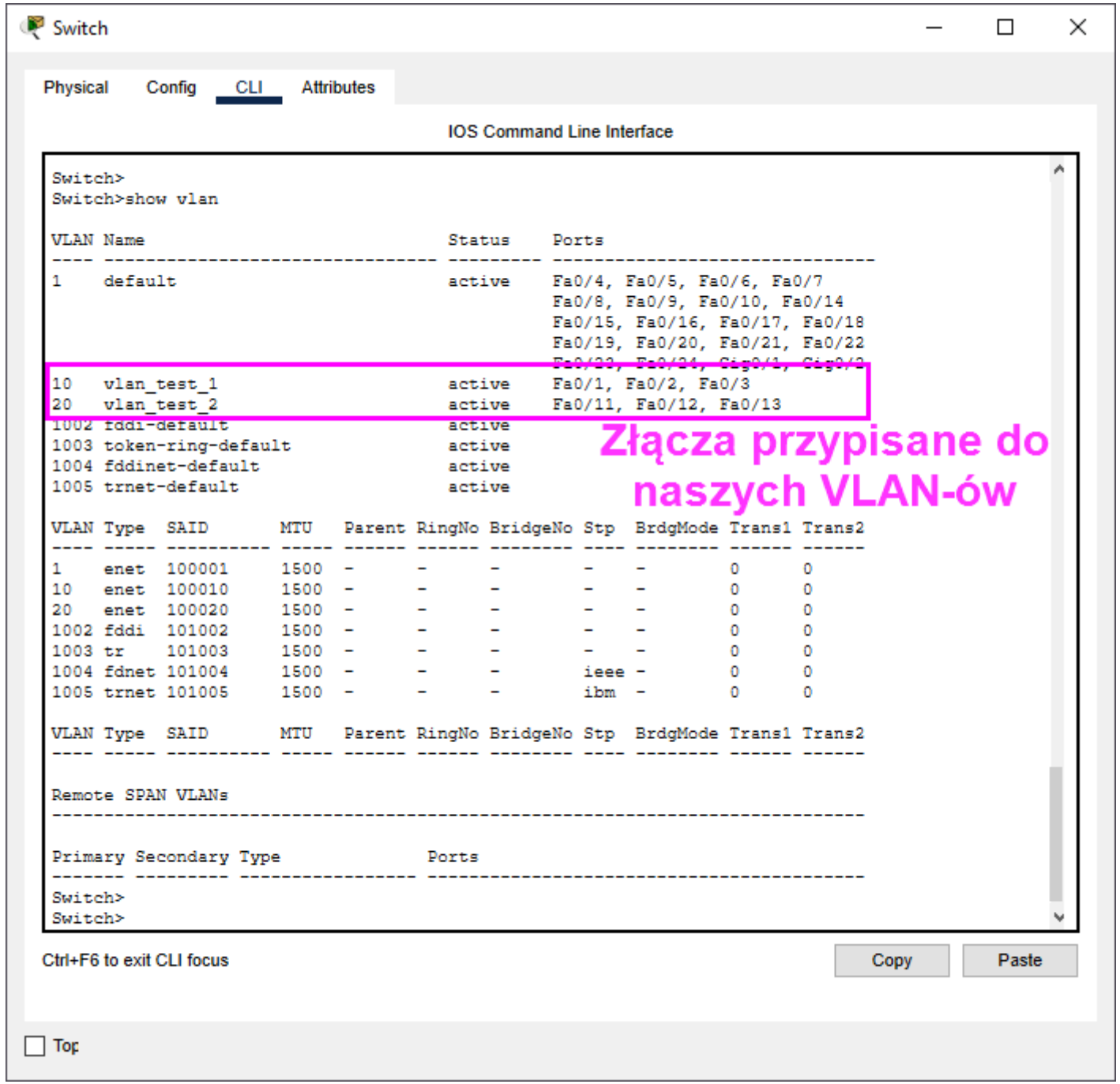
Top

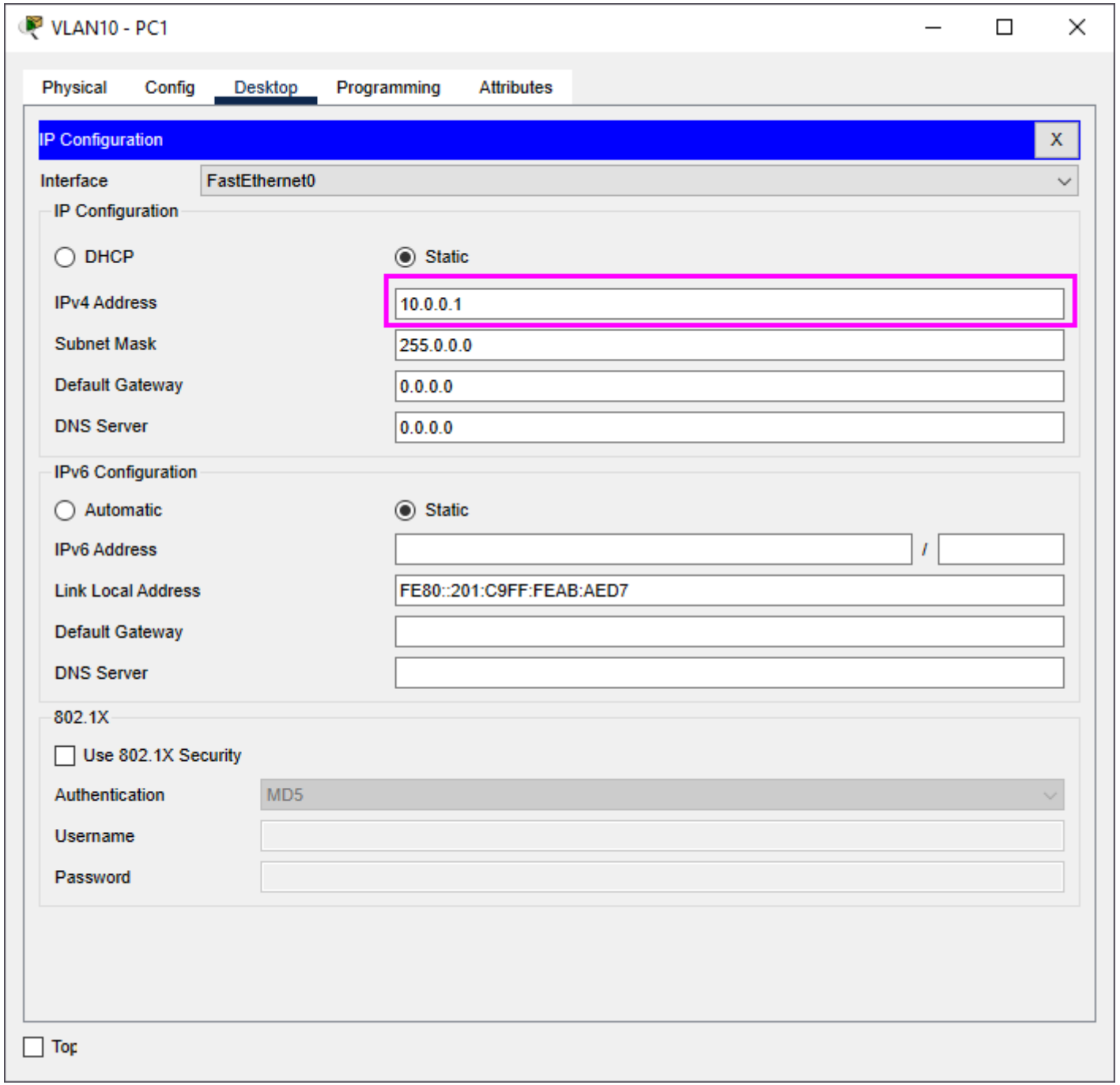

Switch
Physical
Config
CLI
Attributes
IOS Command Line Interface
Switch>en
Switch#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#
Switch(config)#
Switch(config)#
Switch(config)#vlan 10
Switch(config-vlan)#name siec_testowa_1
Switch(config-vlan)#
Switch(config-vlan)#
Switch(config-vlan)#
Switch(config-vlan)#vlan 20
Switch(config-vlan)#name siec_testowa_2
Switch(config-vlan)#
Switch(config-vlan)#
Switch(config-vlan)#
Switch(config-vlan)#end
Switch#
%SYS-5-CONFIG_I: Configured from console by console
Switch#
Switch#
Switch#
Switch#
Switch#
Switch#
Switch#
Switch#
Switch#
Switch#
Switch#
Switch#
Switch#
Switch#
Switch#
Switch#
Switch#
Switch#
Switch#
Ctrl+F6 to exit CLI focus
Copy
Paste
Top


Switch
Physical
Config
CLI
Attributes
IOS Command Line Interface
Switch>enable
Switch#
Switch#
Switch#
Switch#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#
Switch(config)#
Switch(config)#
Switch(config)#vlan 10
Switch(config-vlan)#name vlan_test_1
Switch(config-vlan)#
Switch(config-vlan)#
Switch(config-vlan)#
Switch(config-vlan)#vlan 20
Switch(config-vlan)#name vlan_test_2
Switch(config-vlan)#
Switch(config-vlan)#
Switch(config-vlan)#
Switch(config-vlan)#end
Switch#
%SYS-5-CONFIG_I: Configured from console by console
Switch#
Switch#
Switch#
Switch#disable
Switch>
Switch>
Switch>
Switch>exit
Wejście do trybu uprzywilejowanego
Wejście do trybu globalnej konfiguracji
Utworzenie VLAN-u 10 i nadanie mu nazwy
Utworzenie VLAN-u 20 i nadanie mu nazwy
Wyjście z trybu globalnej konfiguracji
Wyjście z trybu uprzywilejowanego
Ctrl+F6 to exit CLI focus
Copy
Paste
Top


Switch
Physical
Config
CLI
Attributes
IOS Command Line Interface
Switch>show vlan
VLAN Name Status Ports
1 default active Fa0/1, Fa0/2, Fa0/3, Fa0/4
Fa0/5, Fa0/6, Fa0/7, Fa0/8
Fa0/9, Fa0/10, Fa0/11, Fa0/12
Fa0/13, Fa0/14, Fa0/15, Fa0/16
Fa0/17, Fa0/18, Fa0/19, Fa0/20
Fa0/21, Fa0/22, Fa0/23, Fa0/24
Gig0/1, Gig0/2
10 vlan_test_1 active
20 vlan_test_2 active
1002 fddi-default active
1003 token-ring-default active
1004 fddinet-default active
1005 trnet-default active
Nowo utworzone VLAN-y
VLAN Type SAID MTU Parent RingNo BridgeNo Stp BrdgMode Trans1 Trans2
1 enet 100001 1500 - - - - - 0 0
10 enet 100010 1500 - - - - - 0 0
20 enet 100020 1500 - - - - - 0 0
1002 fddi 101002 1500 - - - - - 0 0
1003 tr 101003 1500 - - - - - 0 0
1004 fdnet 101004 1500 - - - ieee - 0 0
1005 trnet 101005 1500 - - - ibm - 0 0
VLAN Type SAID MTU Parent RingNo BridgeNo Stp BrdgMode Trans1 Trans2
Remote SPAN VLANs
Primary Secondary Type Ports
Switch>exit
Ctrl+F6 to exit CLI focus
Copy
Paste
Top


Switch
Physical
Config
CLI
Attributes
IOS Command Line Interface
Wejście do trybu uprzywilejowanego, a następnie do trybu globalnej konfiguracji
Switch>en
Switch#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#
Switch(config)#
Switch(config)#
Switch(config)#interface fastEthernet 0/1
Switch(config-if)#switchport access vlan 10
Switch(config-if)#
Switch(config-if)#interface fastEthernet 0/2
Switch(config-if)#switchport access vlan 10
Switch(config-if)#
Switch(config-if)#interface fastEthernet 0/3
Switch(config-if)#switchport access vlan 10
Switch(config-if)#
Switch(config-if)#
Switch(config-if)#
Pojedyńcze przypisywanie interfejsów na przełączniku do VLAN-ów
Switch(config-if)#interface range fastEthernet 0/11-13
Switch(config-if-range)#switchport access vlan 20
To co wyżej tylko zbiorczo
Switch(config-if-range)#
Switch(config-if-range)#
Switch(config-if-range)#
Switch(config-if-range)#end
Switch#
%SYS-5-CONFIG_I: Configured from console by console
Wyjście z obu trybów
Switch#^Z
Switch#exit
Ctrl+F6 to exit CLI focus
Copy
Paste
Top


Switch
Physical
Config
CLI
Attributes
IOS Command Line Interface
Switch>
Switch>show vlan
VLAN Name Status Ports
1 default active Fa0/4, Fa0/5, Fa0/6, Fa0/7
Fa0/8, Fa0/9, Fa0/10, Fa0/14
Fa0/15, Fa0/16, Fa0/17, Fa0/18
Fa0/19, Fa0/20, Fa0/21, Fa0/22
10 vlan_test_1 active Fa0/1, Fa0/2, Fa0/3
20 vlan_test_2 active Fa0/11, Fa0/12, Fa0/13
1002 fddi-default active
1003 token-ring-default active
1004 fddinet-default active
1005 trnet-default active
VLAN Type SAID MTU Parent RingNo BridgeNo Stp BrdgMode Trans1 Trans2
1 enet 100001 1500 - - - - - 0 0
10 enet 100010 1500 - - - - - 0 0
20 enet 100020 1500 - - - - - 0 0
1002 fddi 101002 1500 - - - - - 0 0
1003 tr 101003 1500 - - - - - 0 0
1004 fdnet 101004 1500 - - - ieee - 0 0
1005 trnet 101005 1500 - - - ibm - 0 0
VLAN Type SAID MTU Parent RingNo BridgeNo Stp BrdgMode Trans1 Trans2
Remote SPAN VLANs
Primary Secondary Type Ports
Switch>
Switch>
Złącza przypisane do naszych VLAN-ów
Ctrl+F6 to exit CLI focus
Copy
Paste
Top


VLAN10 - PC1
Physical
Config
Desktop
Programming
Attributes
IP Configuration
X
Interface
FastEthernet0
IP Configuration
DHCP
Static
IPv4 Address
10.0.0.1
Subnet Mask
255.0.0.0
Default Gateway
0.0.0.0
DNS Server
0.0.0.0
IPv6 Configuration
Automatic
Static
IPv6 Address
/
Link Local Address
FE80::201:C9FF:FEAB:AED7
Default Gateway
DNS Server
802.1X
Use 802.1X Security
Authentication
MD5
Username
Password
Top

Cisco Packet Tracer

File Edit Options View Tools Extensions Window Help

Logical Physical x: 1907, y: 1263

[Root] 09:29:30

PDU List Window

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
	Successful	VLAN10 - PC1	VLAN10 - PC2	ICMP		0.000	N	0	(edit)	(delete)
	Successful	VLAN10 - PC1	VLAN10 - PC3	ICMP		0.000	N	1	(edit)	(delete)
	Successful	VLAN10 - PC2	VLAN10 - PC3	ICMP		0.000	N	2	(edit)	(delete)

Num	Edit	Delete
0	(edit)	(delete)
1	(edit)	(delete)
2	(edit)	(delete)

VLAN10

PC-PT
VLAN10 - PC

VLAN20

C-PT
20 - PC3

Time: 01:52:00

Realtime Simulation

Copper Straight-Through

Scenario 0

New Delete

Toggle PDU List Window

Cisco Packet Tracer

File Edit Options View Tools Extensions Window Help

Logical Physical x: 1907, y: 1263

[Root] 09:39:00

PDU List Window

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
	Successful	VLAN20 - PC1	VLAN20 - PC2	ICMP		0.000	N	0	(edit)	(delete)
	Successful	VLAN20 - PC1	VLAN20 - PC3	ICMP		0.000	N	1	(edit)	(delete)
	Successful	VLAN20 - PC2	VLAN20 - PC3	ICMP		0.000	N	2	(edit)	(delete)

Num	Edit	Delete
0	(edit)	(delete)
1	(edit)	(delete)
2	(edit)	(delete)

VLAN10

PC-PT
VLAN10 - PC

VLAN20

C-PT
20 - PC3

Time: 01:52:18

Realtime Simulation

Copper Straight-Through

Scenario 1

New Delete

Toggle PDU List Window

Cisco Packet Tracer

File Edit Options View Tools Extensions Window Help

Logical Physical x: 2375, y: 1628

PDU List Window

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
	Failed	VLAN10 - PC1	VLAN20 - PC1	ICMP		0.000	N	0	(edit)	(delete)
	Failed	VLAN10 - PC2	VLAN20 - PC2	ICMP		0.000	N	1	(edit)	(delete)
	Failed	VLAN10 - PC3	VLAN20 - PC3	ICMP		0.000	N	2	(edit)	(delete)
	Failed	VLAN20 - PC3	VLAN10 - PC1	ICMP		0.000	N	3	(edit)	(delete)
	Failed	VLAN20 - PC2	VLAN10 - PC2	ICMP		0.000	N	4	(edit)	(delete)
	Failed	VLAN20 - PC1	VLAN10 - PC3	ICMP		0.000	N	5	(edit)	(delete)

[Root] 09:49:00

Num	Edit	Delete
0	(edit)	(delete)
1	(edit)	(delete)
2	(edit)	(delete)
3	(edit)	(delete)
4	(edit)	(delete)
5	(edit)	(delete)

VLAN10

PC-PT
VLAN10 - PC

VLAN20

C-PT
20 - PC3

Time: 01:52:38

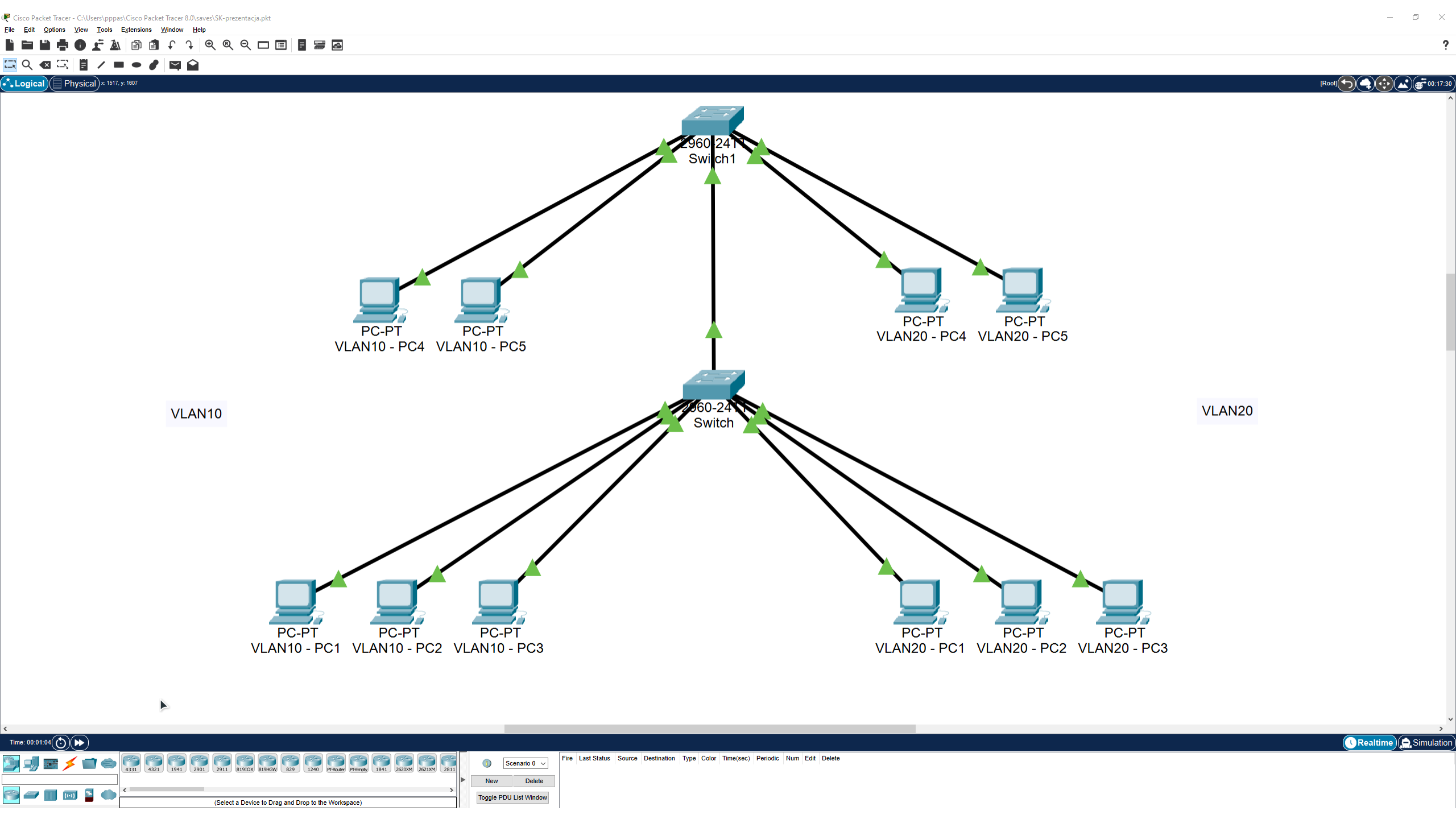
Realtime Simulation

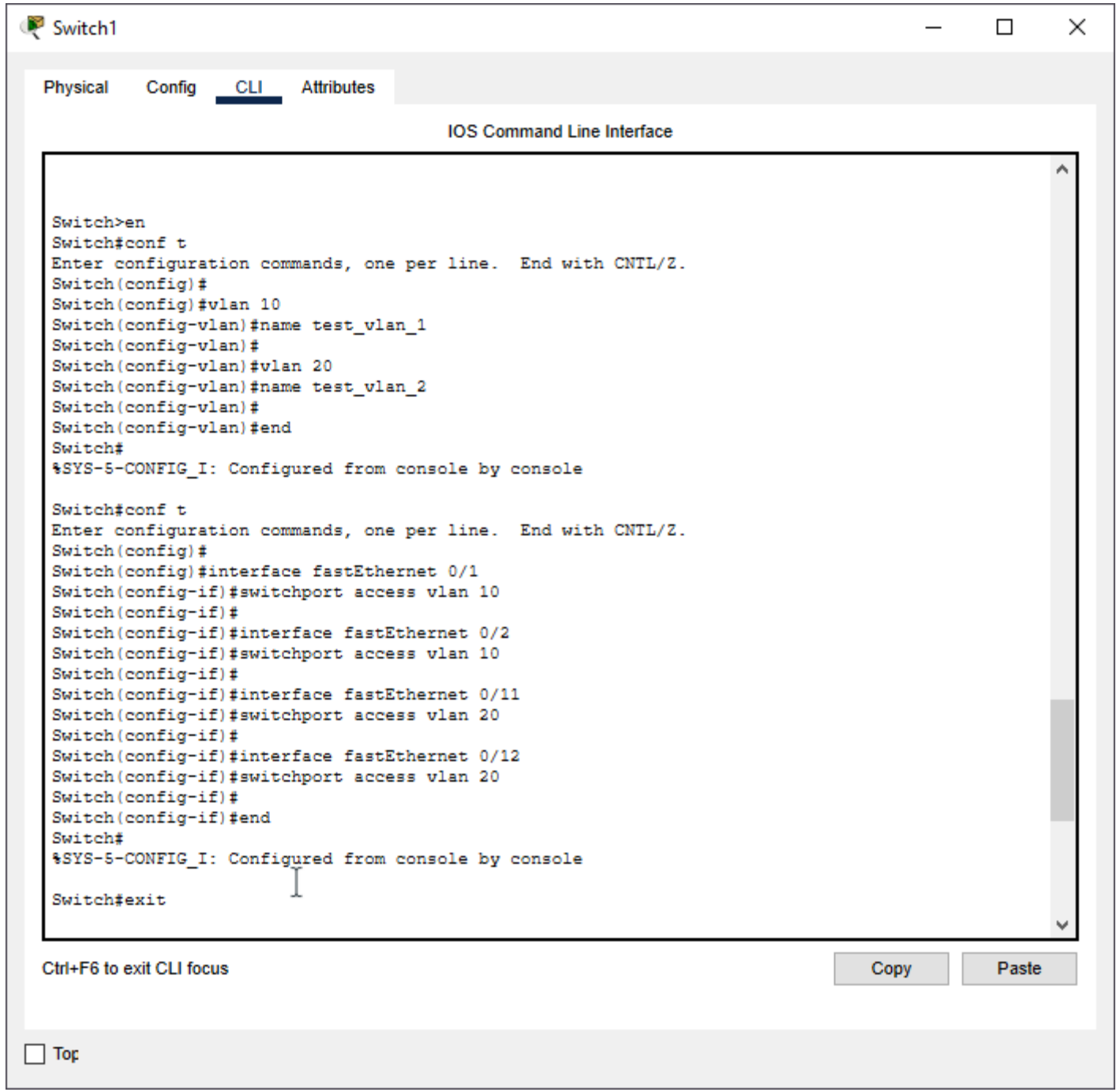
Copper Straight-Through

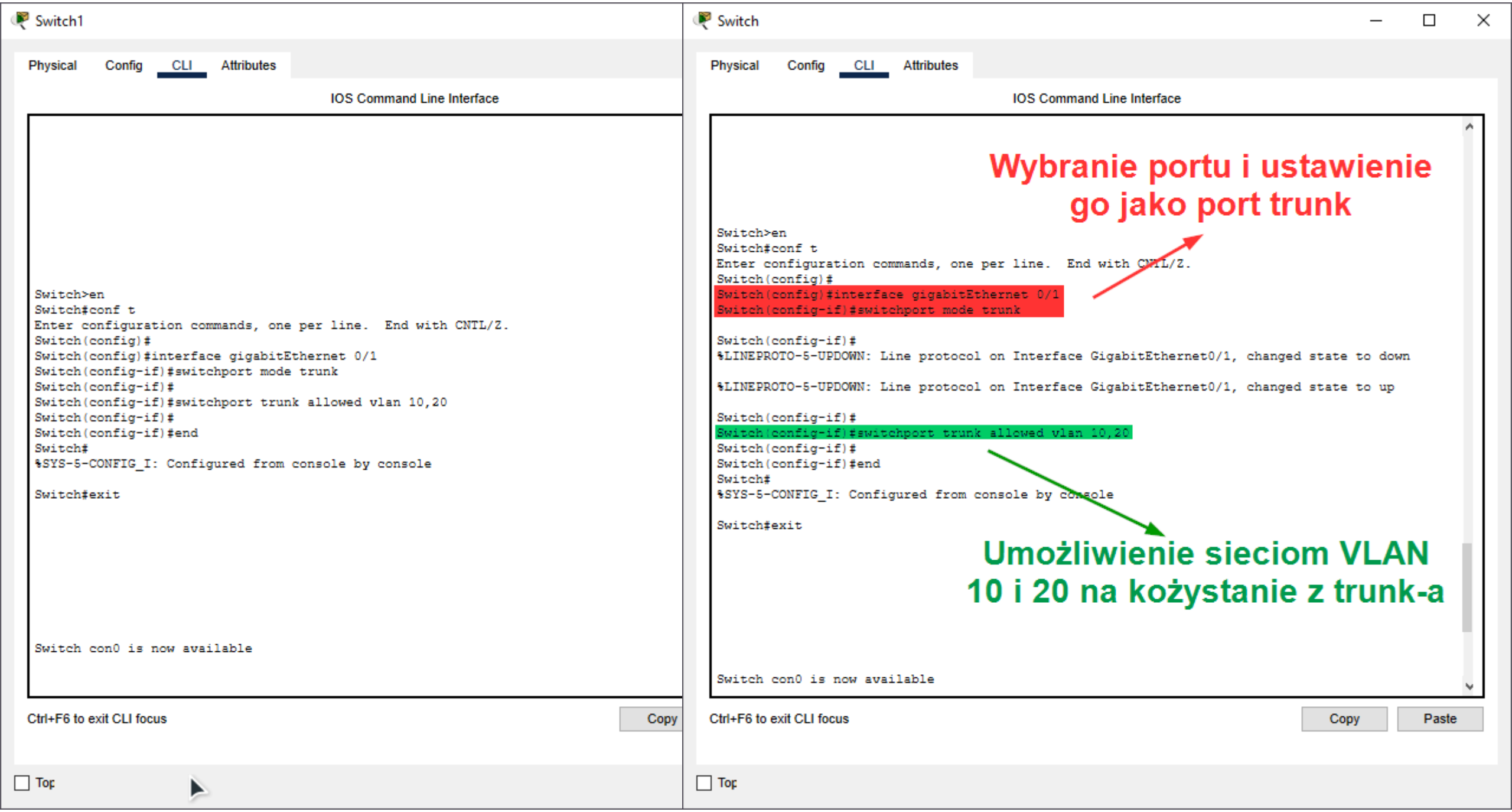
Scenario 2

New Delete

Toggle PDU List Window


Cisco Packet Tracer - C:\Users\pppas\Cisco Packet Tracer 8.0\saves\SK-prezentacja.pkt
File Edit Options View Tools Extensions Window Help
Logical Physical x: 1517, y: 1607
[Root] 00:17:30
2960-24TT
Switch1
PC-PT
VLAN10 - PC4
PC-PT
VLAN10 - PC5
PC-PT
VLAN20 - PC4
PC-PT
VLAN20 - PC5
VLAN10
2960-24TT
Switch
VLAN20
PC-PT
VLAN10 - PC1
PC-PT
VLAN10 - PC2
PC-PT
VLAN10 - PC3
PC-PT
VLAN20 - PC1
PC-PT
VLAN20 - PC2
PC-PT
VLAN20 - PC3
Time: 00:01:04
Realtime
Simulation
(Select a Device to Drag and Drop to the Workspace)
Scenario 0
New
Delete
Toggle PDU List Window
Fire Last Status Source Destination Type Color Time(sec) Periodic Num Edit Delete


Switch1
Physical
Config
CLI
Attributes
IOS Command Line Interface
Switch>en
Switch#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#
Switch(config)#vlan 10
Switch(config-vlan)#name test_vlan_1
Switch(config-vlan)#
Switch(config-vlan)#vlan 20
Switch(config-vlan)#name test_vlan_2
Switch(config-vlan)#
Switch(config-vlan)#end
Switch#
%SYS-5-CONFIG_I: Configured from console by console
Switch#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#
Switch(config)#interface fastEthernet 0/1
Switch(config-if)#switchport access vlan 10
Switch(config-if)#
Switch(config-if)#interface fastEthernet 0/2
Switch(config-if)#switchport access vlan 10
Switch(config-if)#
Switch(config-if)#interface fastEthernet 0/11
Switch(config-if)#switchport access vlan 20
Switch(config-if)#
Switch(config-if)#interface fastEthernet 0/12
Switch(config-if)#switchport access vlan 20
Switch(config-if)#
Switch(config-if)#end
Switch#
%SYS-5-CONFIG_I: Configured from console by console
Switch#exit
Ctrl+F6 to exit CLI focus
Copy
Paste
Top


Switch1
Physical
Config
CLI
Attributes
IOS Command Line Interface
Switch>en
Switch#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#
Switch(config)#interface gigabitEthernet 0/1
Switch(config-if)#switchport mode trunk
Switch(config-if)#
Switch(config-if)#switchport trunk allowed vlan 10,20
Switch(config-if)#
Switch(config-if)#end
Switch#
%SYS-5-CONFIG_I: Configured from console by console
Switch#exit
Switch con0 is now available
Ctrl+F6 to exit CLI focus
Copy
Top
Switch
Physical
Config
CLI
Attributes
IOS Command Line Interface
Wybranie portu i ustawienie go jako port trunk
Switch>en
Switch#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#
Switch(config)#interface gigabitEthernet 0/1
Switch(config-if)#switchport mode trunk
Switch(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1, changed state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1, changed state to up
Switch(config-if)#
Switch(config-if)#switchport trunk allowed vlan 10,20
Switch(config-if)#
Switch(config-if)#end
Switch#
%SYS-5-CONFIG_I: Configured from console by console
Switch#exit
Umożliwienie sieciom VLAN 10 i 20 na kożystanie z trunk-a
Switch con0 is now available
Ctrl+F6 to exit CLI focus
Copy
Paste
Top

Cisco Packet Tracer

File Edit Options View Tools Extensions Window Help

Logical Physical x: 2287, y: 1304

[Root] 02:57:30

PDU List Window

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
	Successful	VLAN10 - PC1	VLAN10 - PC5	ICMP		0.000	N	0	(edit)	(delete)
	Successful	VLAN10 - PC4	VLAN10 - PC3	ICMP		0.000	N	1	(edit)	(delete)
	Failed	VLAN10 - PC4	VLAN20 - PC1	ICMP		0.000	N	2	(edit)	(delete)
	Failed	VLAN10 - PC3	VLAN20 - PC4	ICMP		0.000	N	3	(edit)	(delete)
	Successful	VLAN20 - PC4	VLAN20 - PC3	ICMP		0.000	N	4	(edit)	(delete)
	Successful	VLAN20 - PC1	VLAN20 - PC5	ICMP		0.000	N	5	(edit)	(delete)

VLAN10

PC-PT
VLAN10 - PC1

Time: 02:25:46

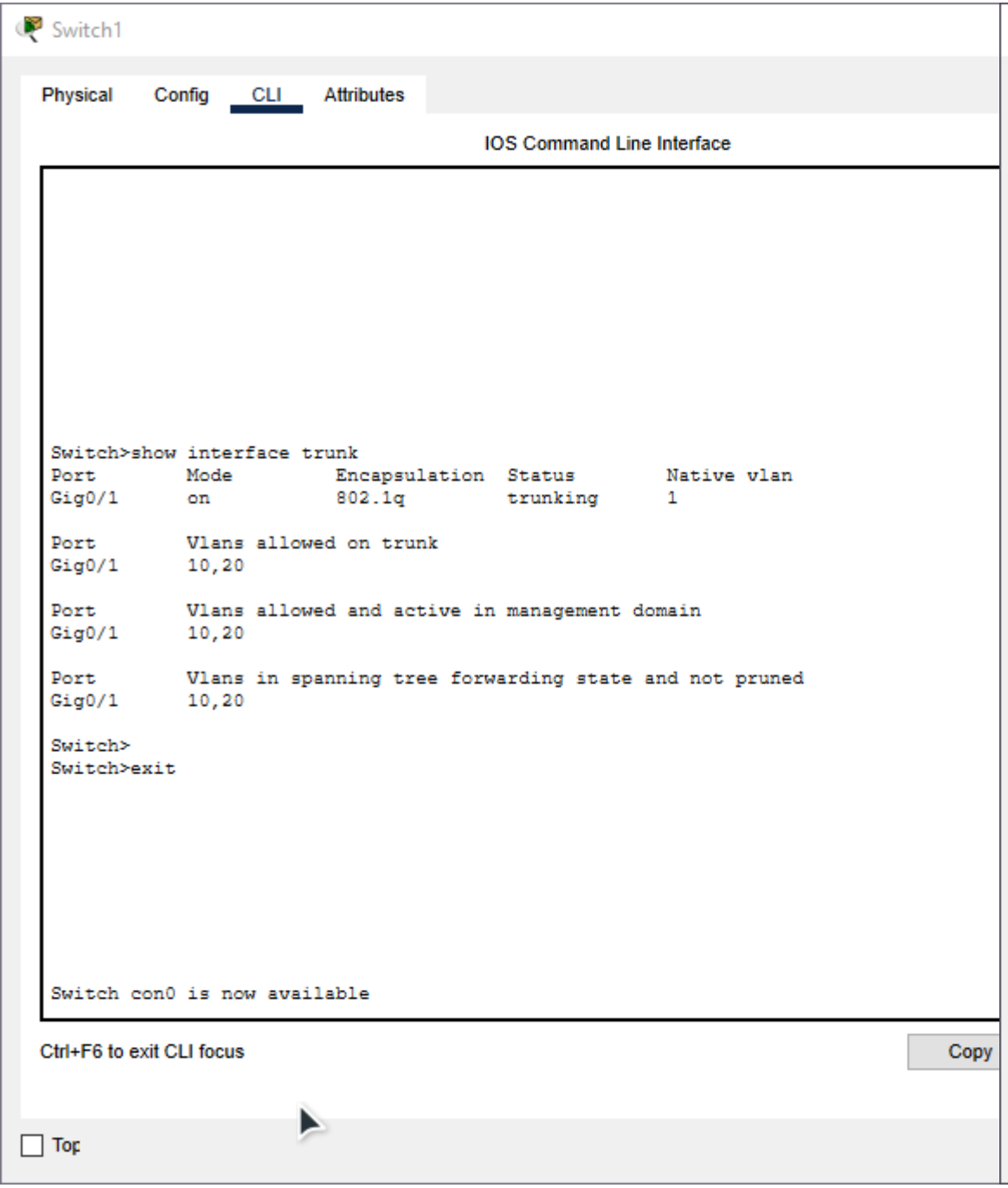
Realtime Simulation

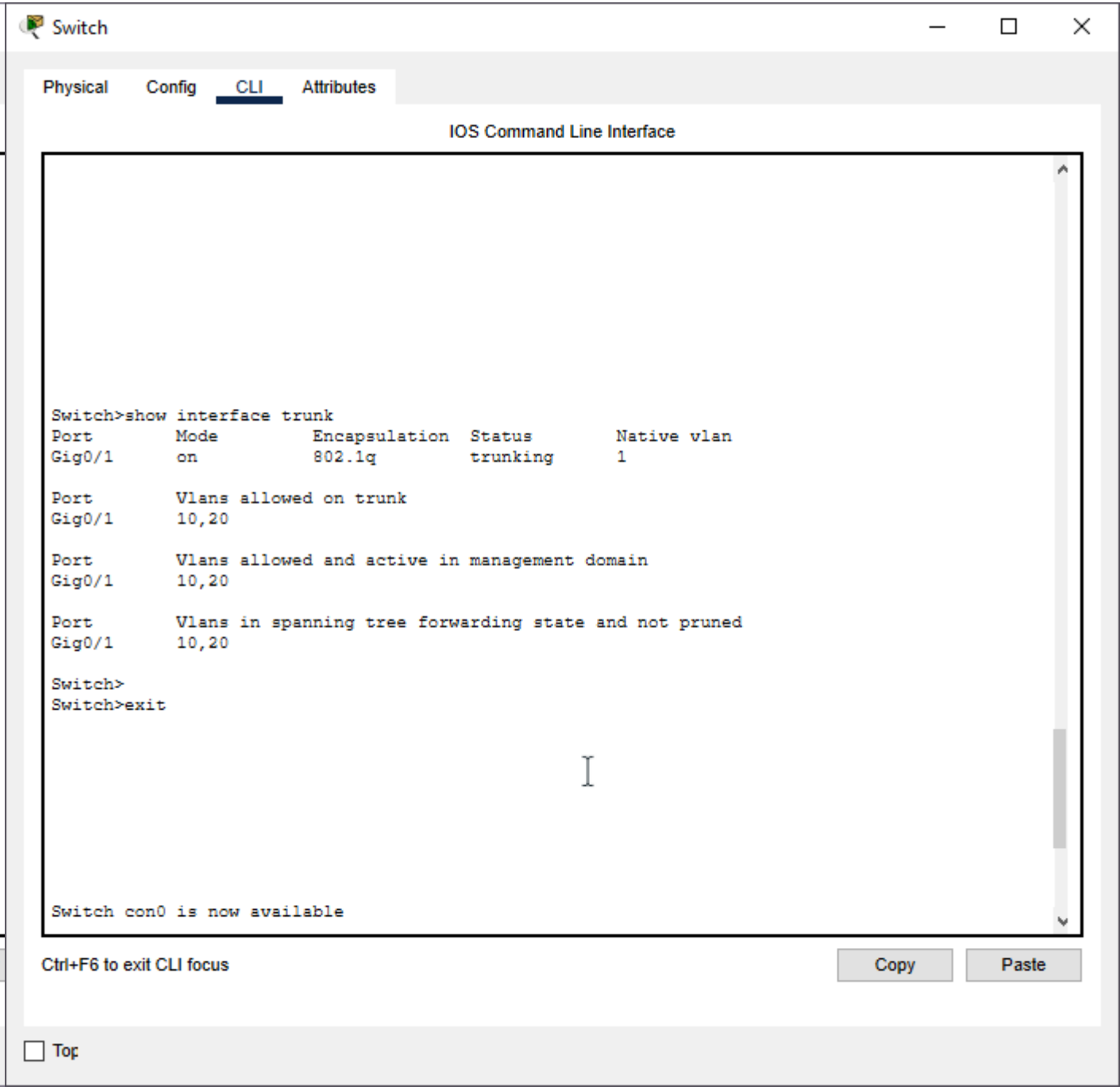
Copper Straight-Through

Scenario 0

New Delete

Toggle PDU List Window

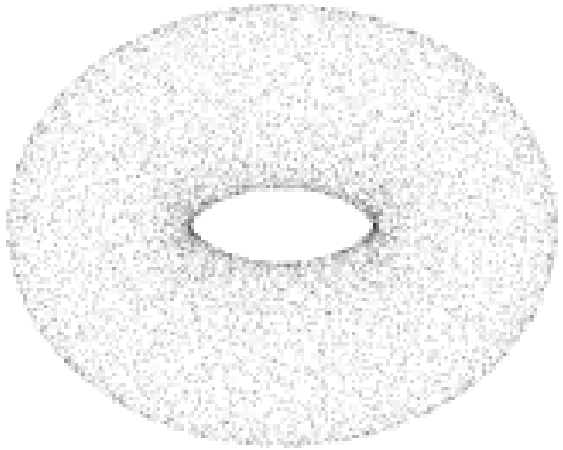

Switch1
Physical
Config
CLI
Attributes
IOS Command Line Interface
Switch>show interface trunk
Port Mode Encapsulation Status Native vlan
Gig0/1 on 802.1q trunking 1
Port Vlans allowed on trunk
Gig0/1 10,20
Port Vlans allowed and active in management domain
Gig0/1 10,20
Port Vlans in spanning tree forwarding state and not pruned
Gig0/1 10,20
Switch>
Switch>exit
Switch con0 is now available
Ctrl+F6 to exit CLI focus
Copy
Top


Switch
Physical
Config
CLI
Attributes
IOS Command Line Interface
Switch>show interface trunk
Port Mode Encapsulation Status Native vlan
Gig0/1 on 802.1q trunking 1
Port Vlans allowed on trunk
Gig0/1 10,20
Port Vlans allowed and active in management domain
Gig0/1 10,20
Port Vlans in spanning tree forwarding state and not pruned
Gig0/1 10,20
Switch>
Switch>exit
Switch con0 is now available
Ctrl+F6 to exit CLI focus
Copy
Paste
Top

Czas na trochę praktyki

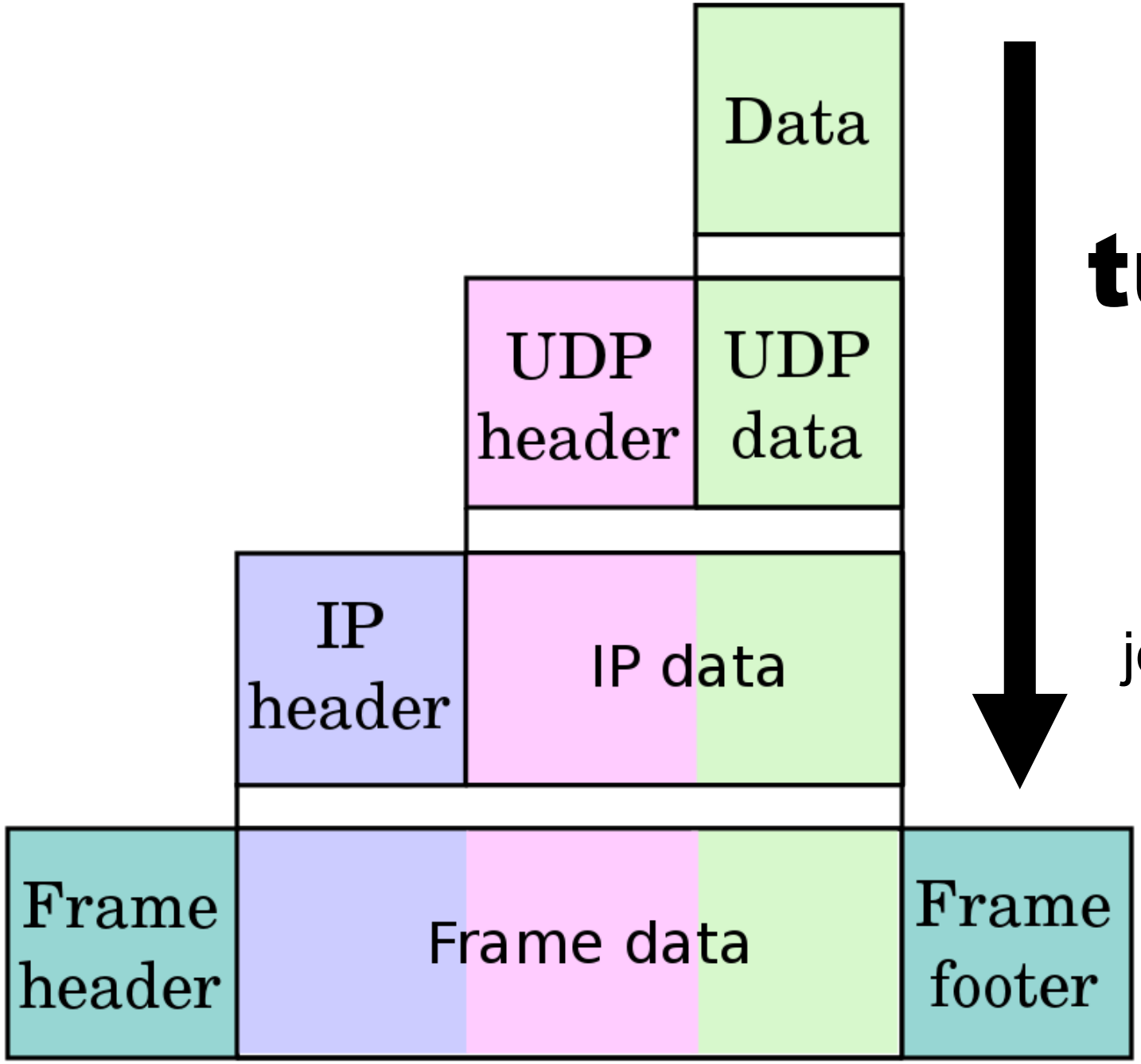
Teraz do sieci utworzonej na poprzednich slajdach utworzymy kolejny VLAN na żywo.

Tunelowanie



Definicja tunelowania

Tunelowanie to zestawianie połączenia pomiędzy dwoma hostami dające wrażenie połączenia bezpośredniego.

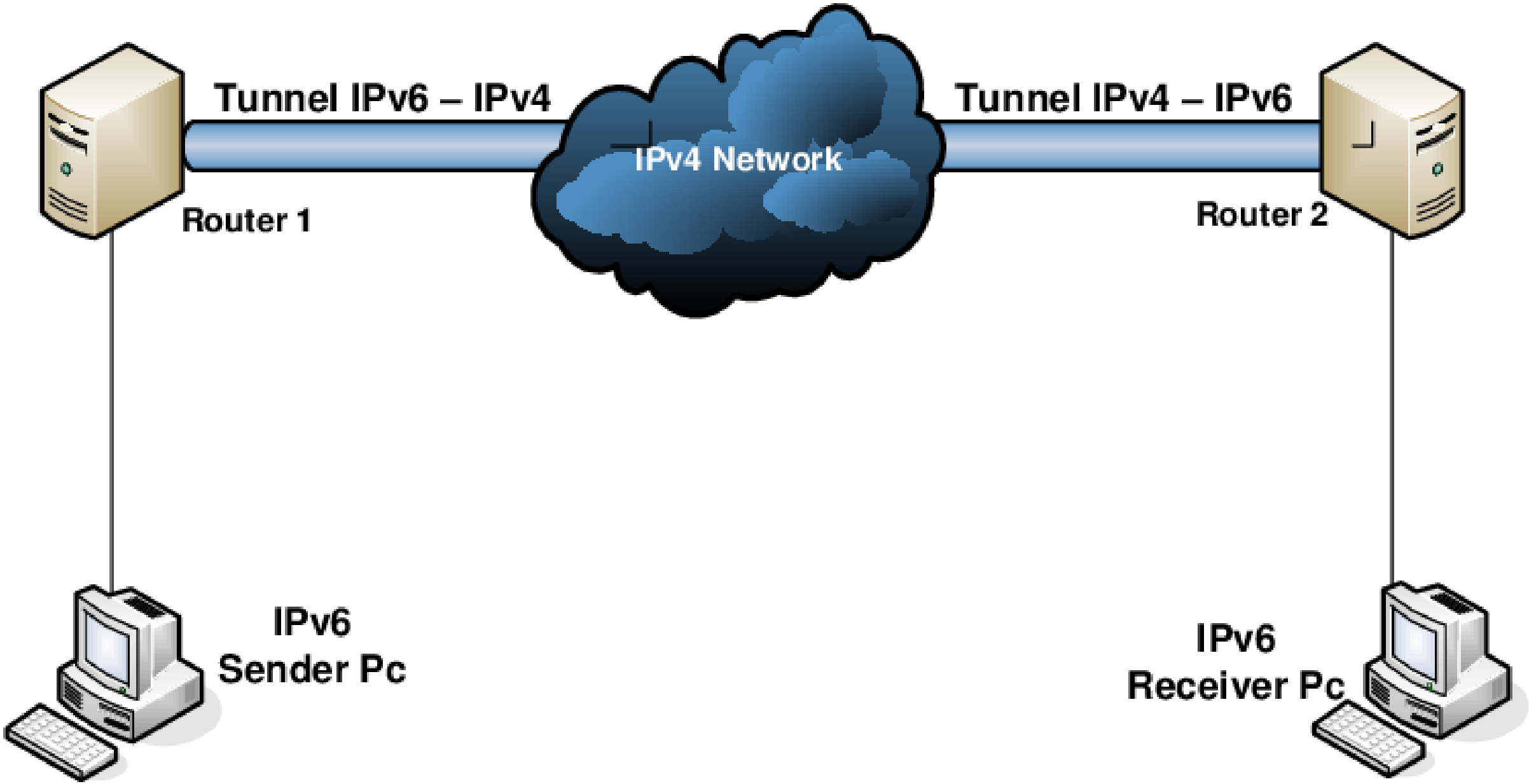


Jak działa tunelowanie?

Tunelowanie wykorzystuje technikę enkapsulacji, jednego protokołu w innym. Enkapsulacja polega na upakowaniu danych z wyższej warstwy modelu OSI do warstwy niższej.

Tunelowanie w oparciu o SSH

Tunelowanie w oparciu o SSH polega na przesyłaniu niezabezpieczonych pakietów protokołów TCP przez bezpieczny protokół SSH.


Tunnel IPv6 – IPv4
IPv4 Network
Tunnel IPv4 – IPv6
Router 1
Router 2
IPv6
Sender Pc
IPv6
Receiver Pc

Techniki tunelowania

Techniki datagramowe:

- L2TP (Layer2 TunnelingProtocol)
- GRE (GenericRoutingEncapsulation)
- GTP (GPRS TunnellingProtocol)
- PPTP (Point-to-PointTunnelingProtocol)
- PPPoE(Point-to-PointProtocoloverEthernet)
- PPPoA(Point-to-PointProtocoloverATM)
- IP-IPTunneling,
- Ipsec
- IEEE 802.1Q (Ethernet VLANs)

Techniki strumieniowe:

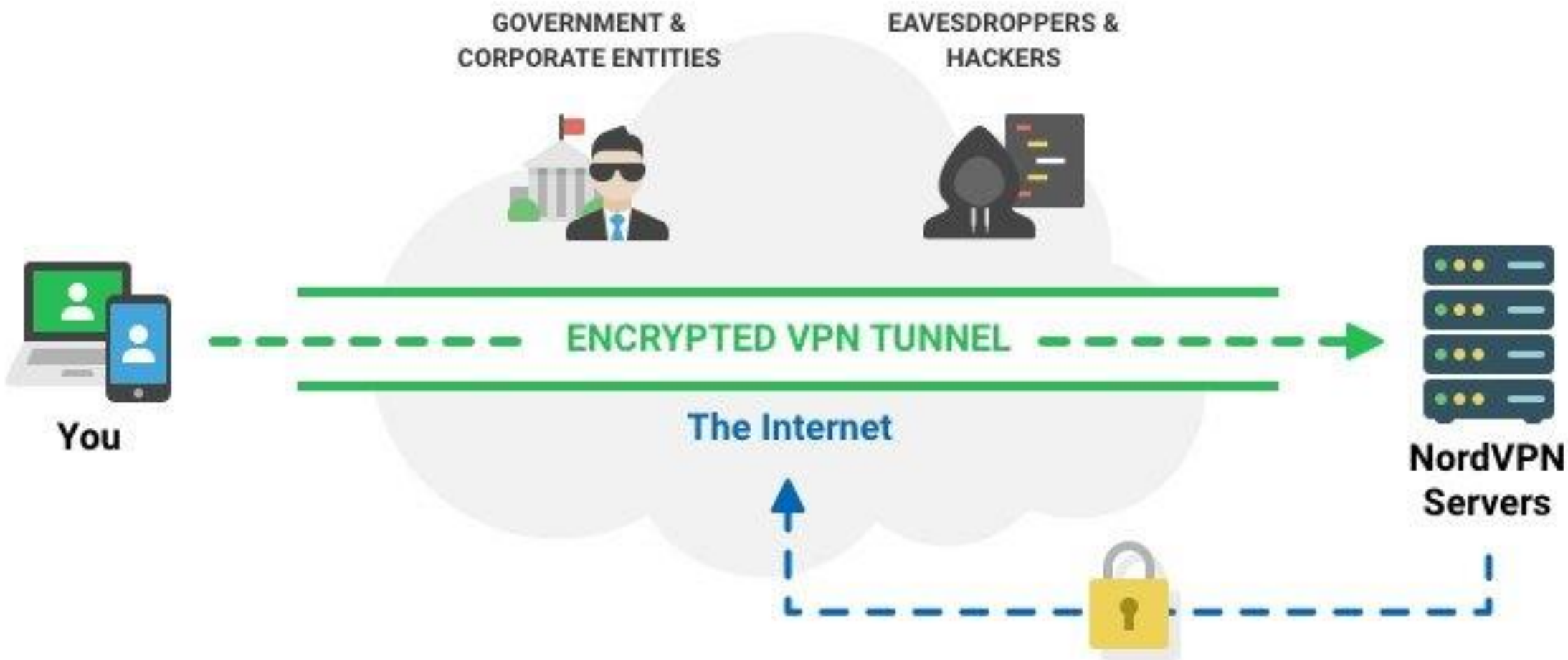
- TLS (Transport LayerSecurity)
- SSL (SecureSocketLayer)

Wprowadzenie do Wirtualnych Sieci Prywatnych

Czyli czy warto płacić za VPN-a?

Czym jest VPN?

VPN jest skrótem rozwijanym jako „Virtual Private Network”, co oznacza „wirtualną sieć prywatną”. Taka sieć VPN szyfruje Twoje działania w Internecie, ukrywa adres IP i chroni Twoją tożsamość online.


GOVERNMENT &
CORPORATE ENTITIES
EAVESDROPPERS &
HACKERS
ENCRYPTED VPN TUNNEL
The Internet
You
NordVPN
Servers

Wady i zalety sieci VPN

Wady:

- Spowolnienie sieci
- Jakość usług
- Blokady sieci VPN
- Brak 100% prywatności

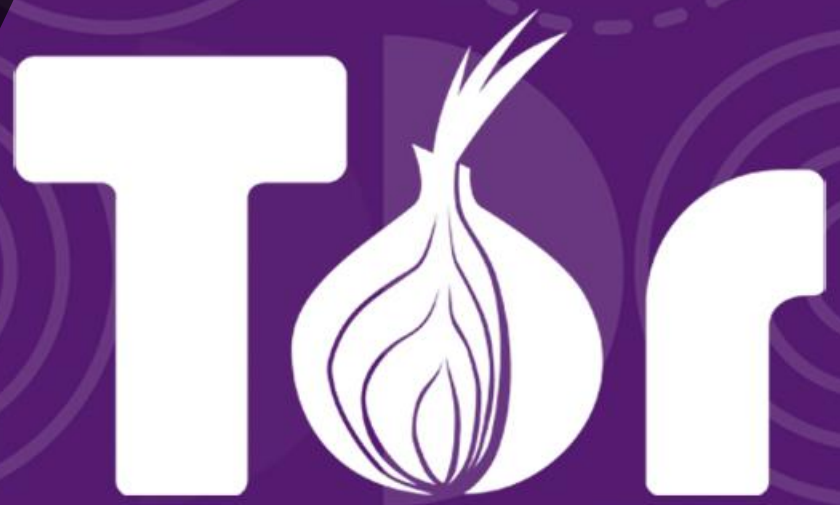
Najpopularniejsi dostawcy VPN

- NordVPN
- Private Intenet Access VPN
- Surfshark VPN
- CyberGhost VPN
- TunnelBear VPN
- ExpressVPN
- ProtonVPN
- Mullvad VPN
- Itd.

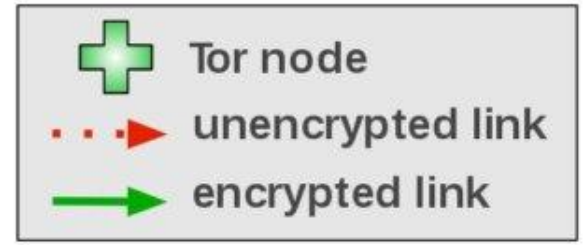
Czym jest TOR?

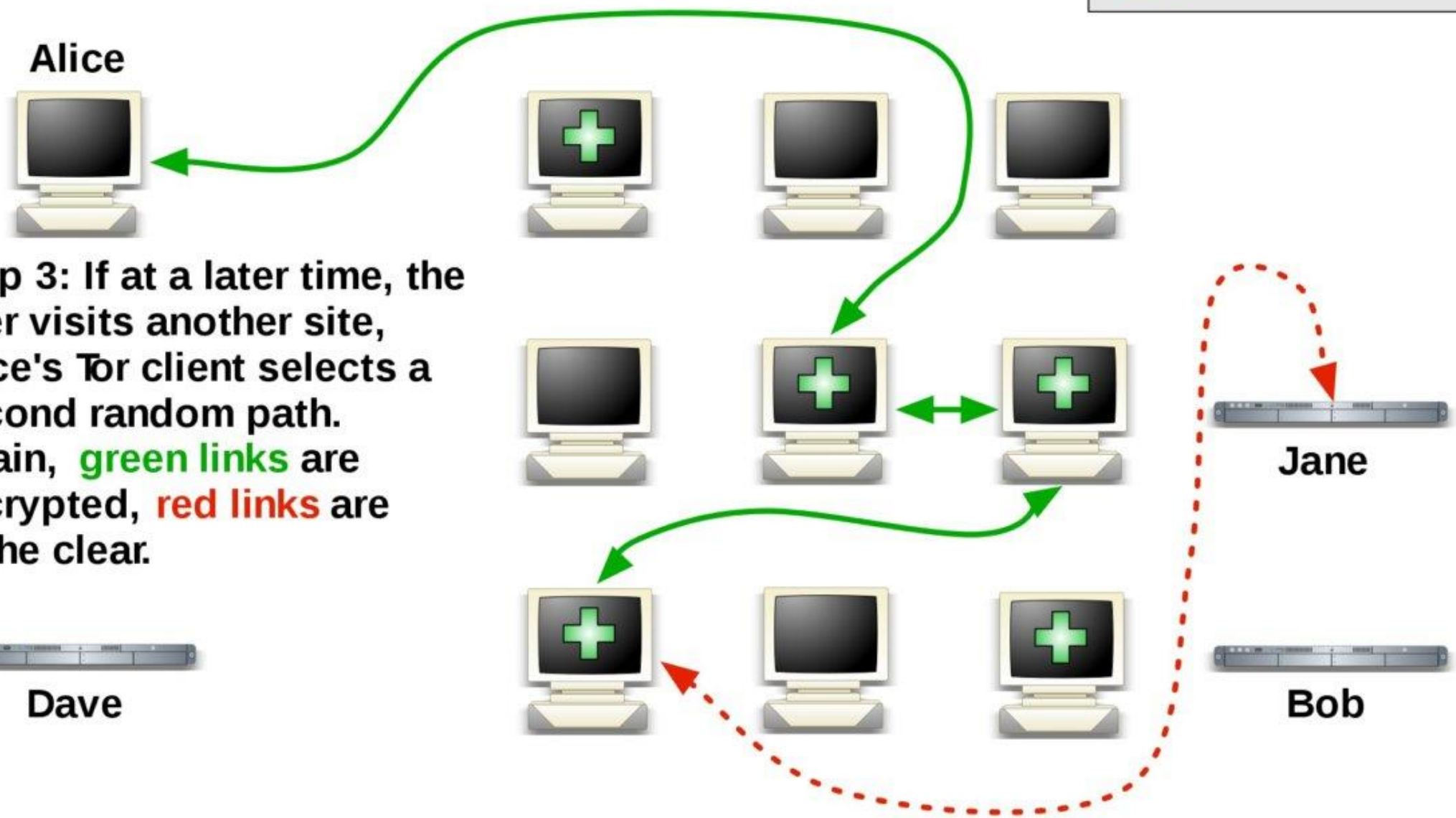
Tor (ang. The Onion Router) – wirtualna sieć komputerowa implementująca trasowanie cebulowe drugiej generacji.

Pozwala na anonimowe przeglądanie internetu, jak i dostęp do tzw. Dark Webu.



How Tor Works: 3





Mały poradnik do tworzenia własnego VPN-a

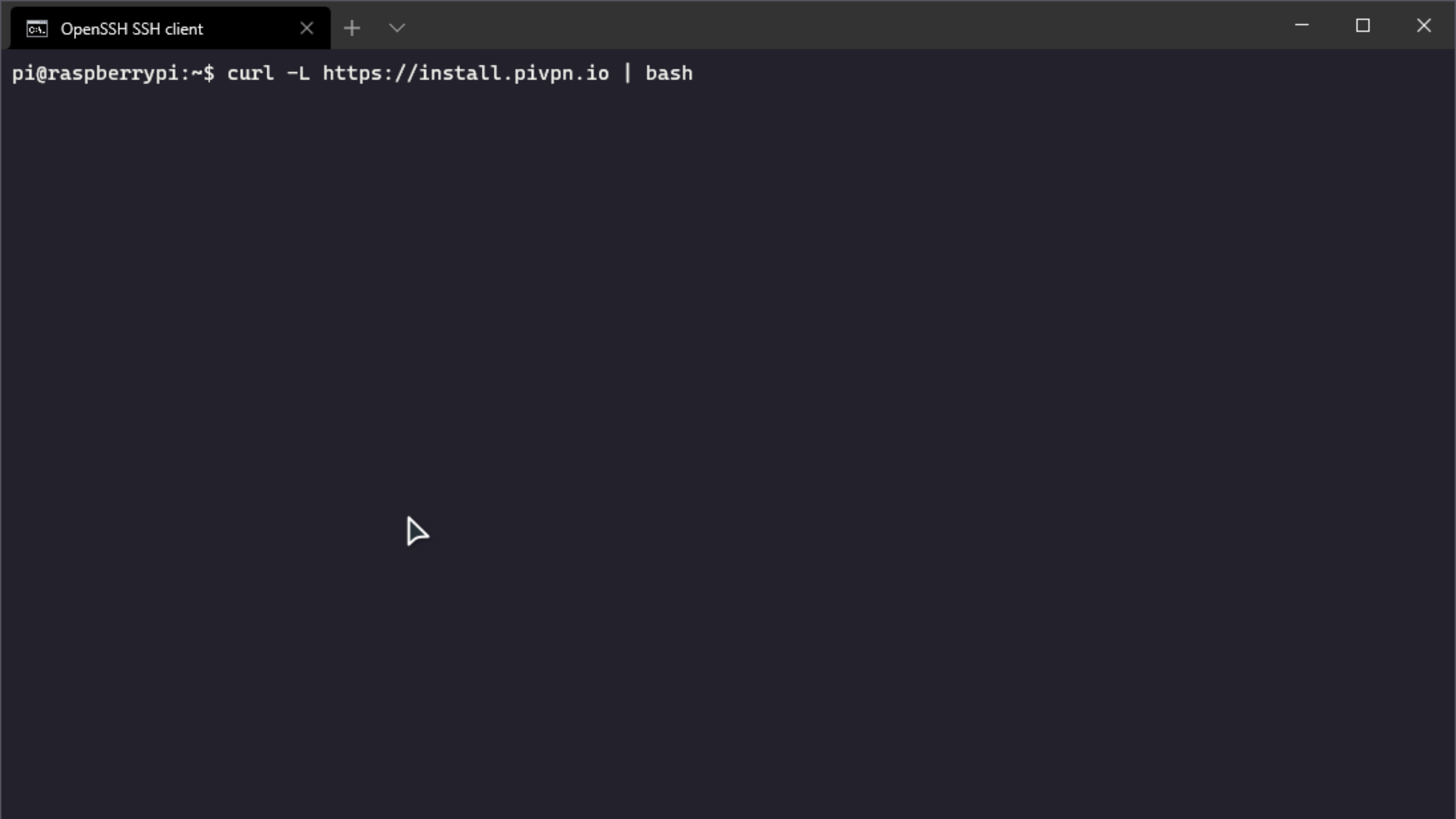
Projekt DIY, chyba za dużo już spędziłem czasu nad tą prezentacją.

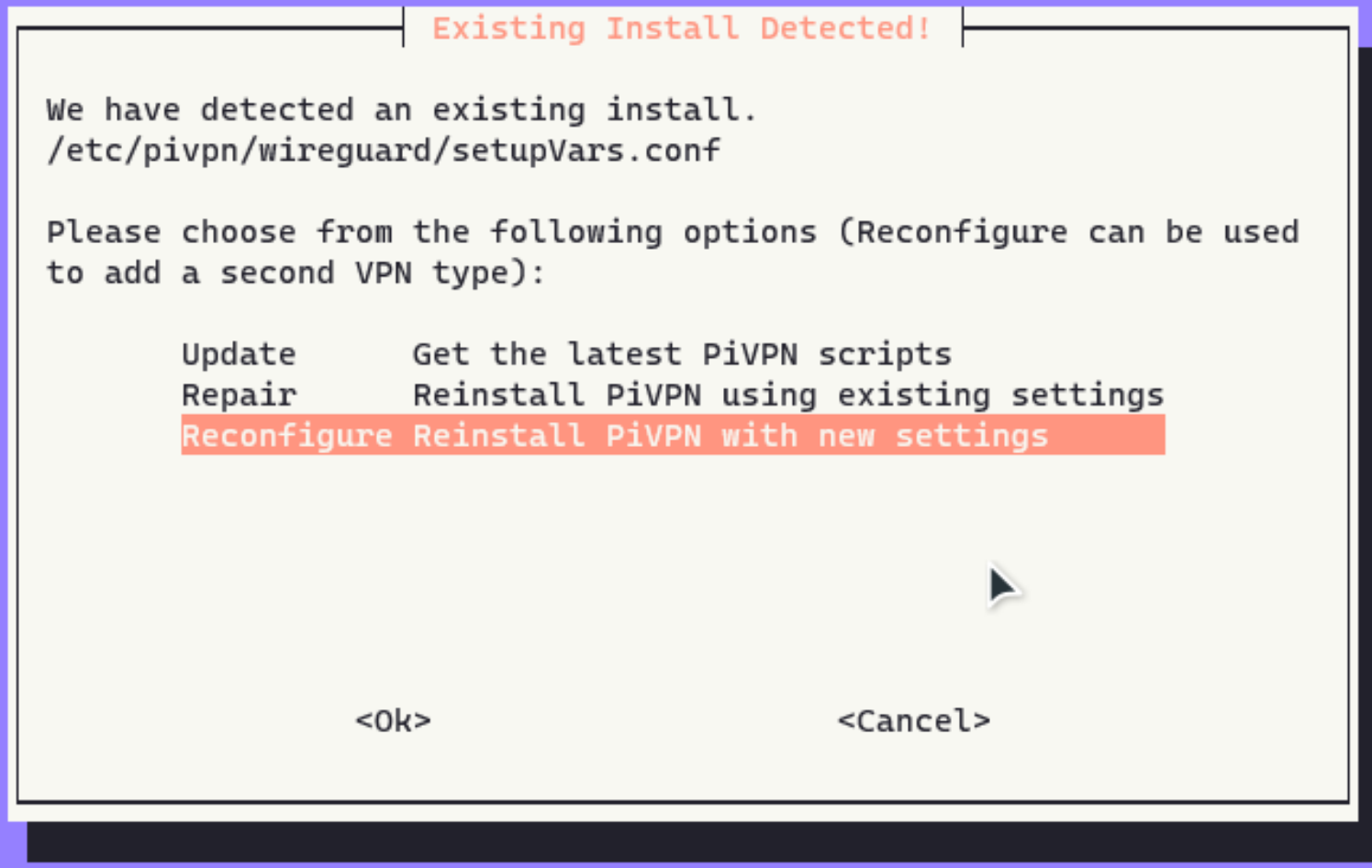
OpenVPN, a Wireguard

W wielkim skrócie Wireguard jest nowszy, szybszy i bezpieczniejszy, ale przechowuje adres IP naszego komputera, żeby móc poprawnie działać. Czego nie robi OpenVPN.

Jak zainstalować i ustawić VPN

Na urządzeniach z system RaspbianOS, Ubuntu i innych dystrybucjach bazujących na Debianie.


OpenSSH SSH client
pi@raspberrypi:~$ curl -L https://install.pivpn.io | bash


Existing Install Detected!
We have detected an existing install.
/etc/pivpn/wireguard/setupVars.conf
Please choose from the following options (Reconfigure can be used
to add a second VPN type):
Update Get the latest PiVPN scripts
Repair Reinstall PiVPN using existing settings
Reconfigure Reinstall PiVPN with new settings
<Ok>
<Cancel>


Welcome
PiVPN Automated Installer
This installer will transform your Raspberry Pi into an OpenVPN or WireGuard server!
<Ok>

Initiating network interface

Static IP Needed

The PiVPN is a SERVER so it needs a STATIC IP ADDRESS to function properly.

In the next section, you can choose to use your current network settings (DHCP) or to manually edit them.

<Ok>

Calibrating network interface

DHCP Reservation

Are you Using DHCP Reservation on your Router/DHCP Server?
These are your current Network Settings:

IP address: 192.168.1.30/24
Gateway: 192.168.1.1

Yes: Keep using DHCP reservation
No: Setup static IP address
Don't know what DHCP Reservation is? Answer No.

<Yes> <No>

Calibrating network interface

Static IP Address

Do you want to use your current network settings as a static address?

IP address: 192.168.1.30/24
Gateway: 192.168.1.1

<Yes> <No>

IP information

FYI: IP Conflict

It is possible your router could still try to assign this IP to a device, which would cause a conflict. But in most cases the router is smart enough to not do that.
If you are worried, either manually set the address, or modify the DHCP reservation pool so it does not include the IP you want.
It is also possible to use a DHCP reservation, but if you are going to do that, you might as well set a static address.

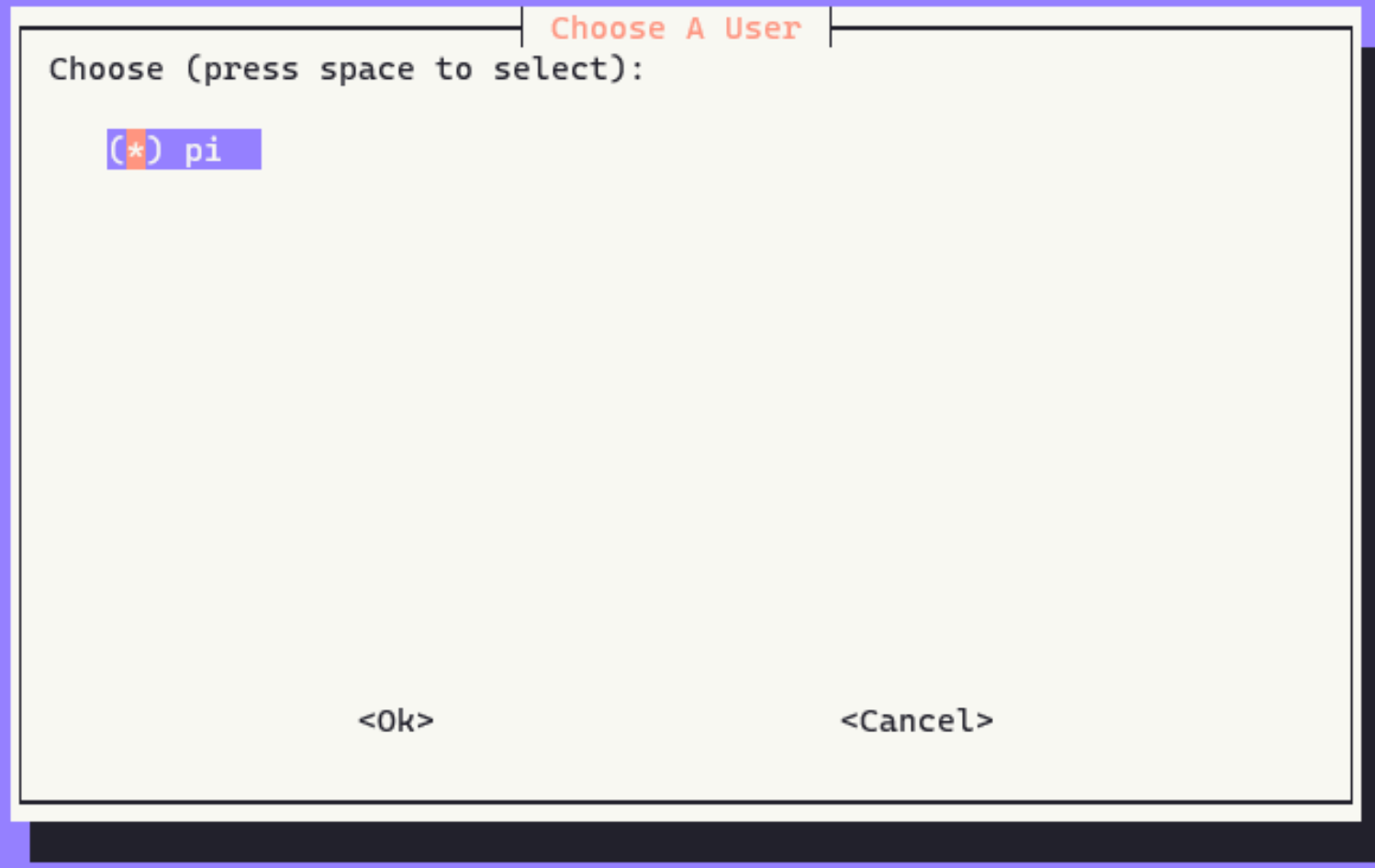
<Ok>

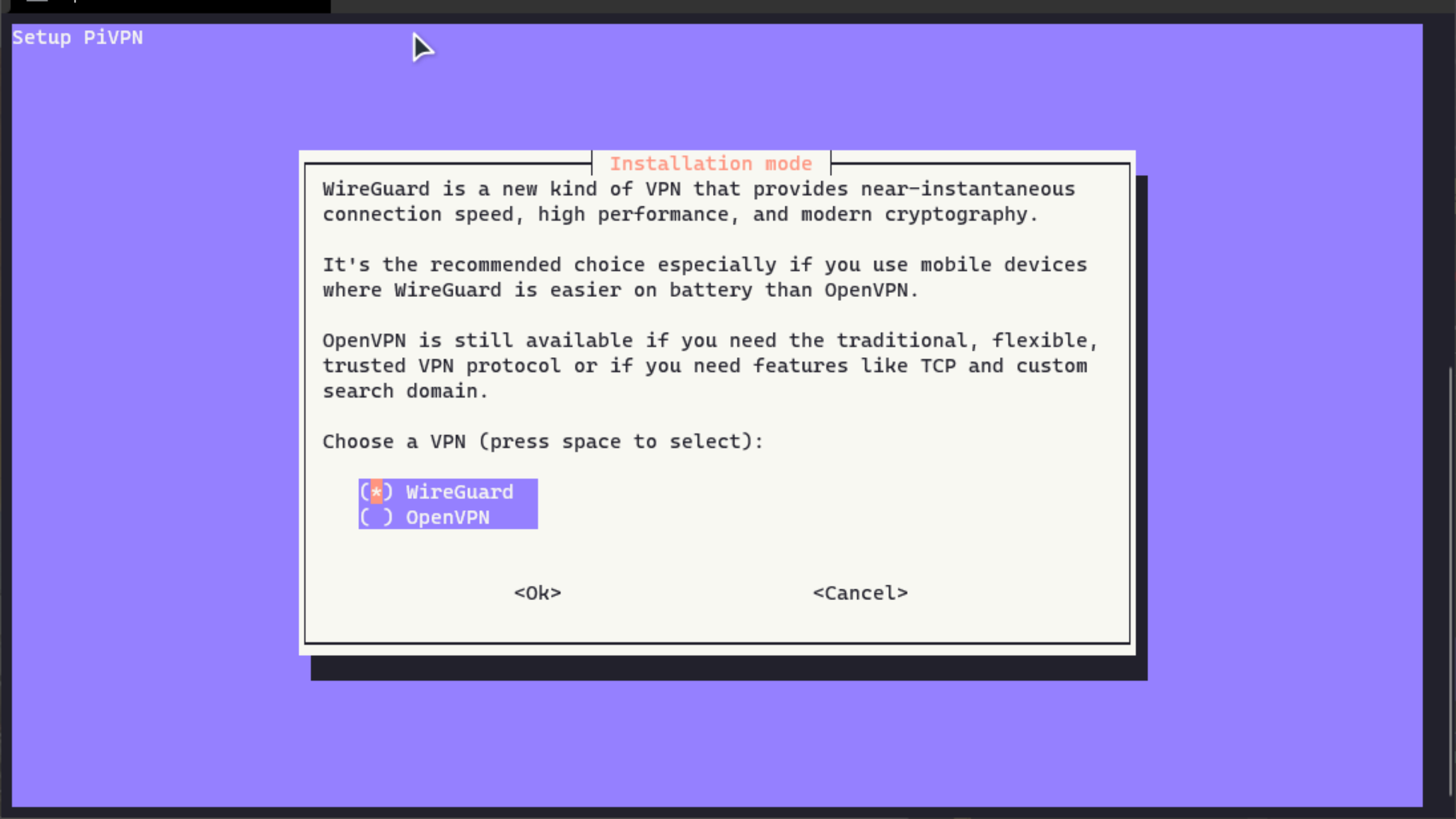
Parsing User List

Local Users

Choose a local user that will hold your ovpn configurations.

<Ok>


Choose A User
Choose (press space to select):
(*) pi
<Ok>
<Cancel>


Setup PiVPN
Installation mode
WireGuard is a new kind of VPN that provides near-instantaneous connection speed, high performance, and modern cryptography.
It's the recommended choice especially if you use mobile devices where WireGuard is easier on battery than OpenVPN.
OpenVPN is still available if you need the traditional, flexible, trusted VPN protocol or if you need features like TCP and custom search domain.
Choose a VPN (press space to select):
(*) WireGuard
( ) OpenVPN
<Ok>
<Cancel>

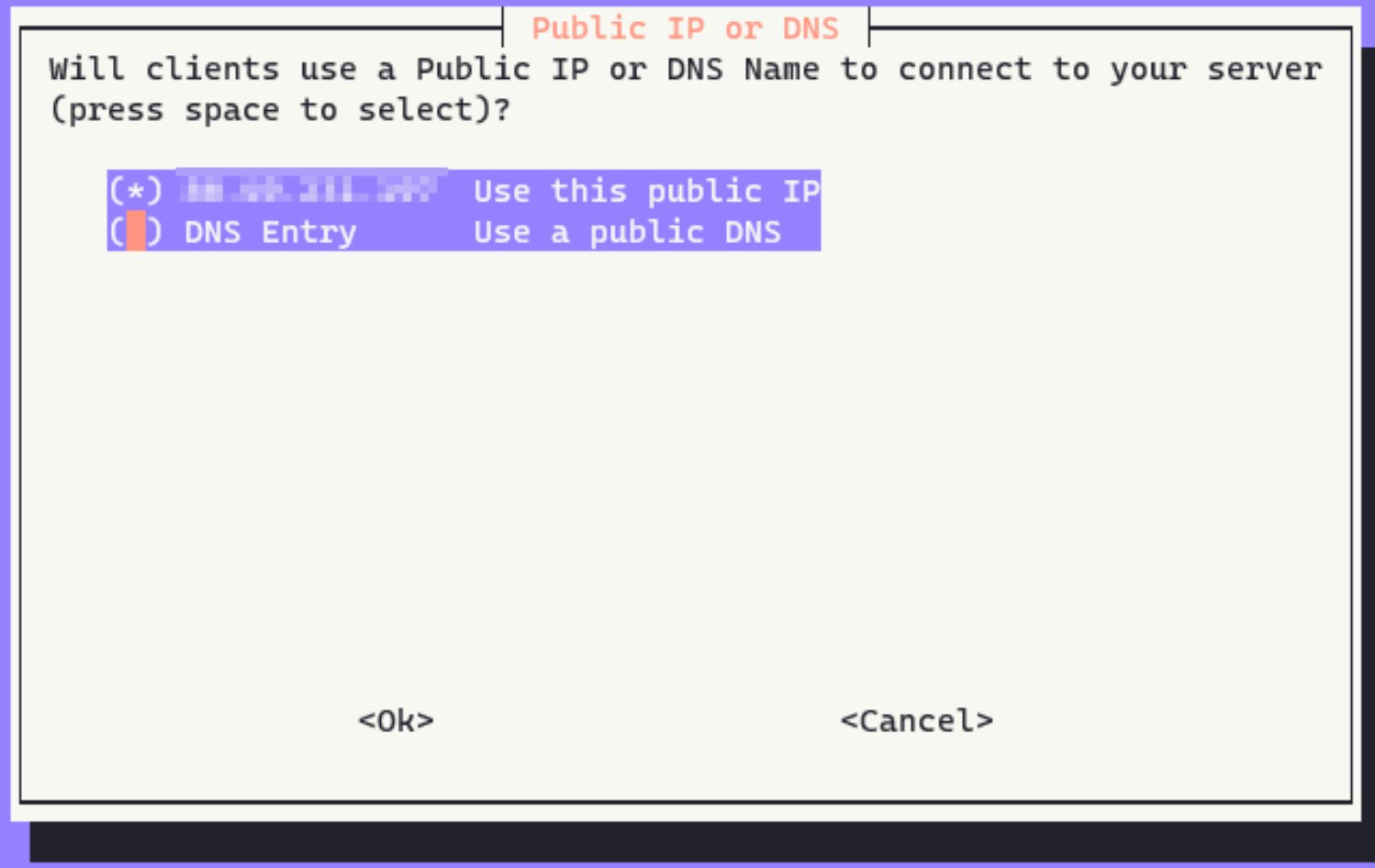

Default wireguard Port
You can modify the default wireguard port.
Enter a new value or hit 'Enter' to retain the default
51820
<Ok>
<Cancel>

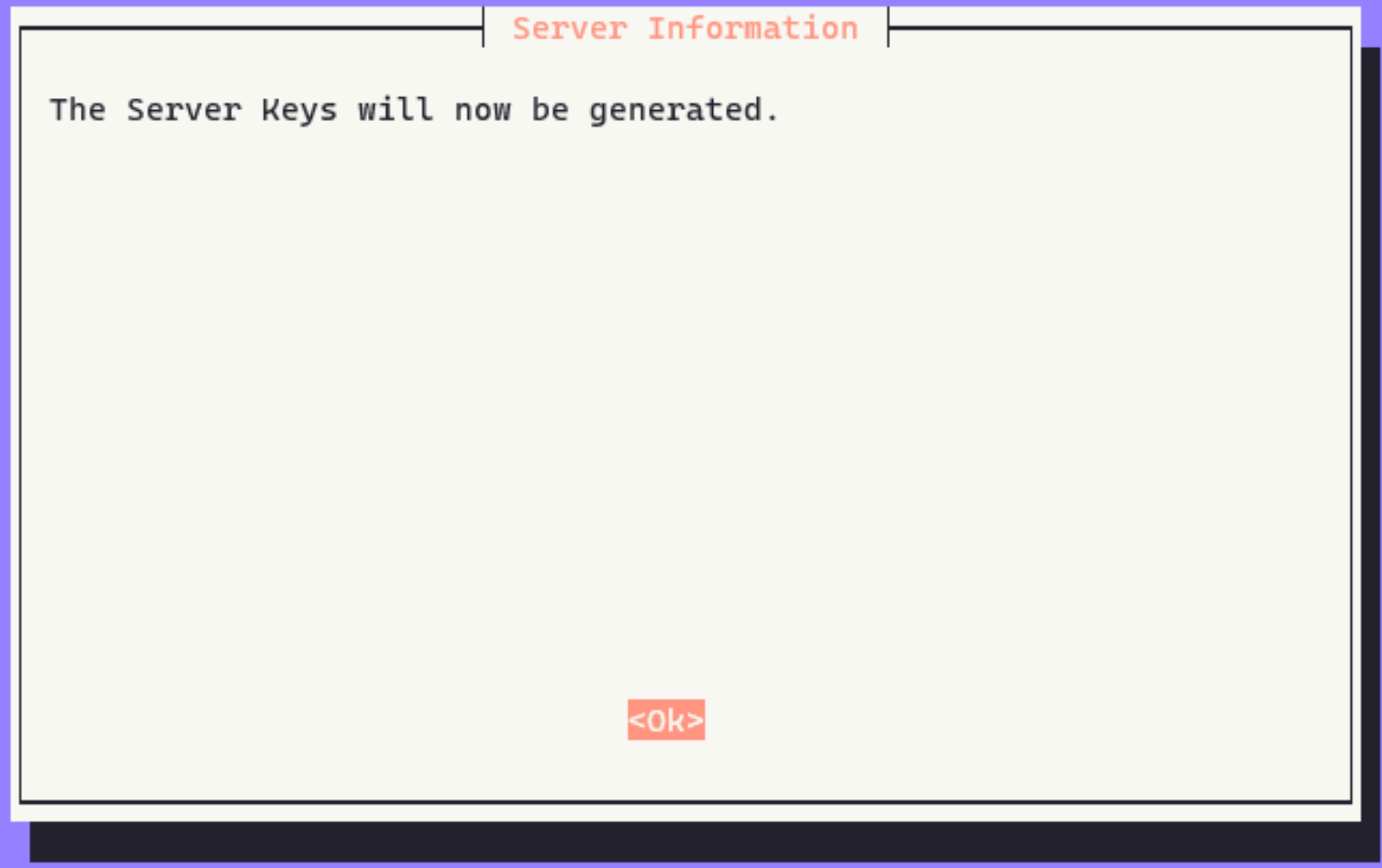
Specify Custom Port

Confirm Custom Port Number

Are these settings correct?
    PORT: 51820

<Yes> <No>


Public IP or DNS
Will clients use a Public IP or DNS Name to connect to your server
(press space to select)?
(*) [redacted] Use this public IP
( ) DNS Entry Use a public DNS
<Ok>
<Cancel>


Server Information
The Server Keys will now be generated.
<Ok>

Security Updates

Unattended Upgrades

Since this server will have at least one port open to the
internet, it is recommended you enable unattended-upgrades.
This feature will check daily for security package updates only
and apply them when necessary.
It will NOT automatically reboot the server so to fully apply some
updates you should periodically reboot.

<Ok>

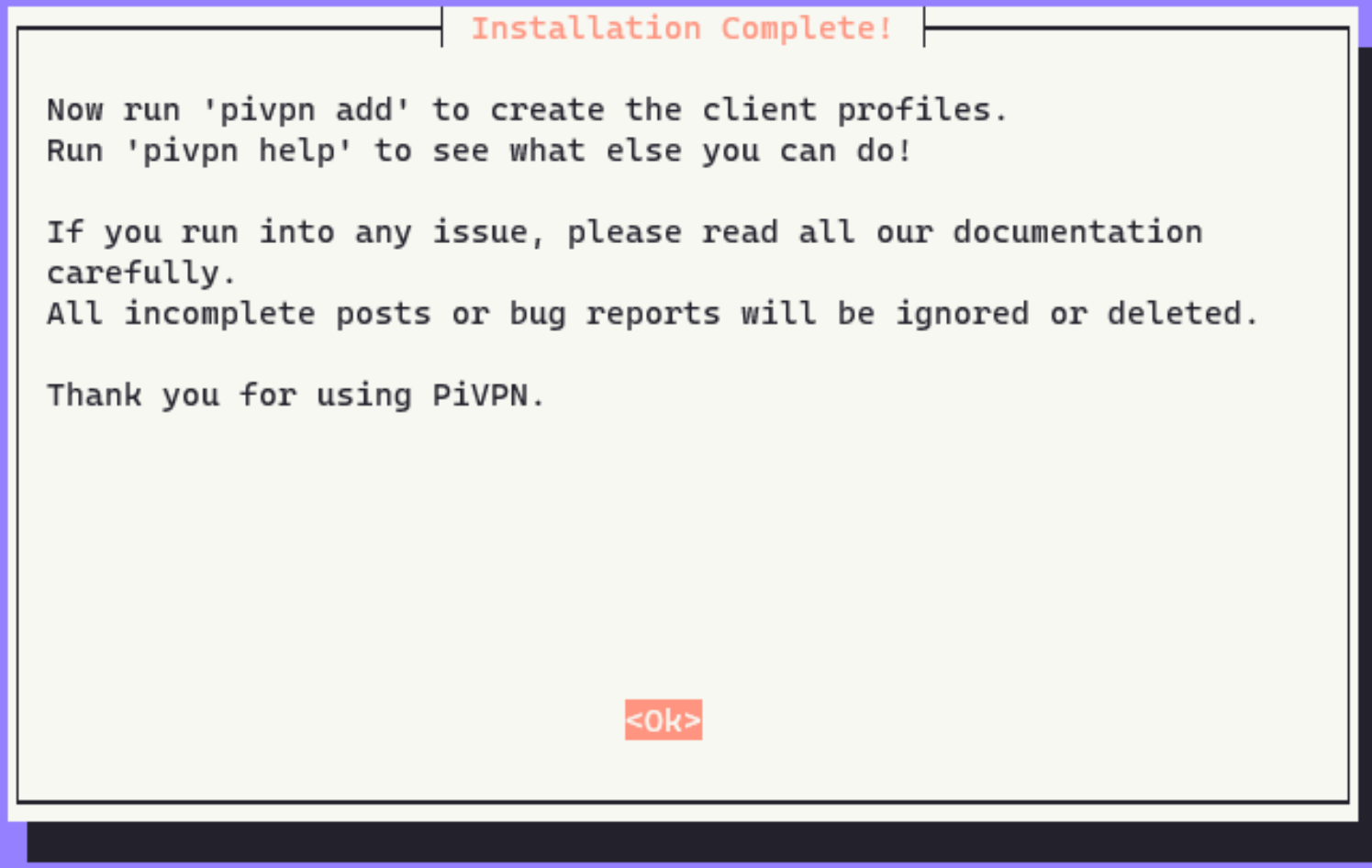
Security Updates

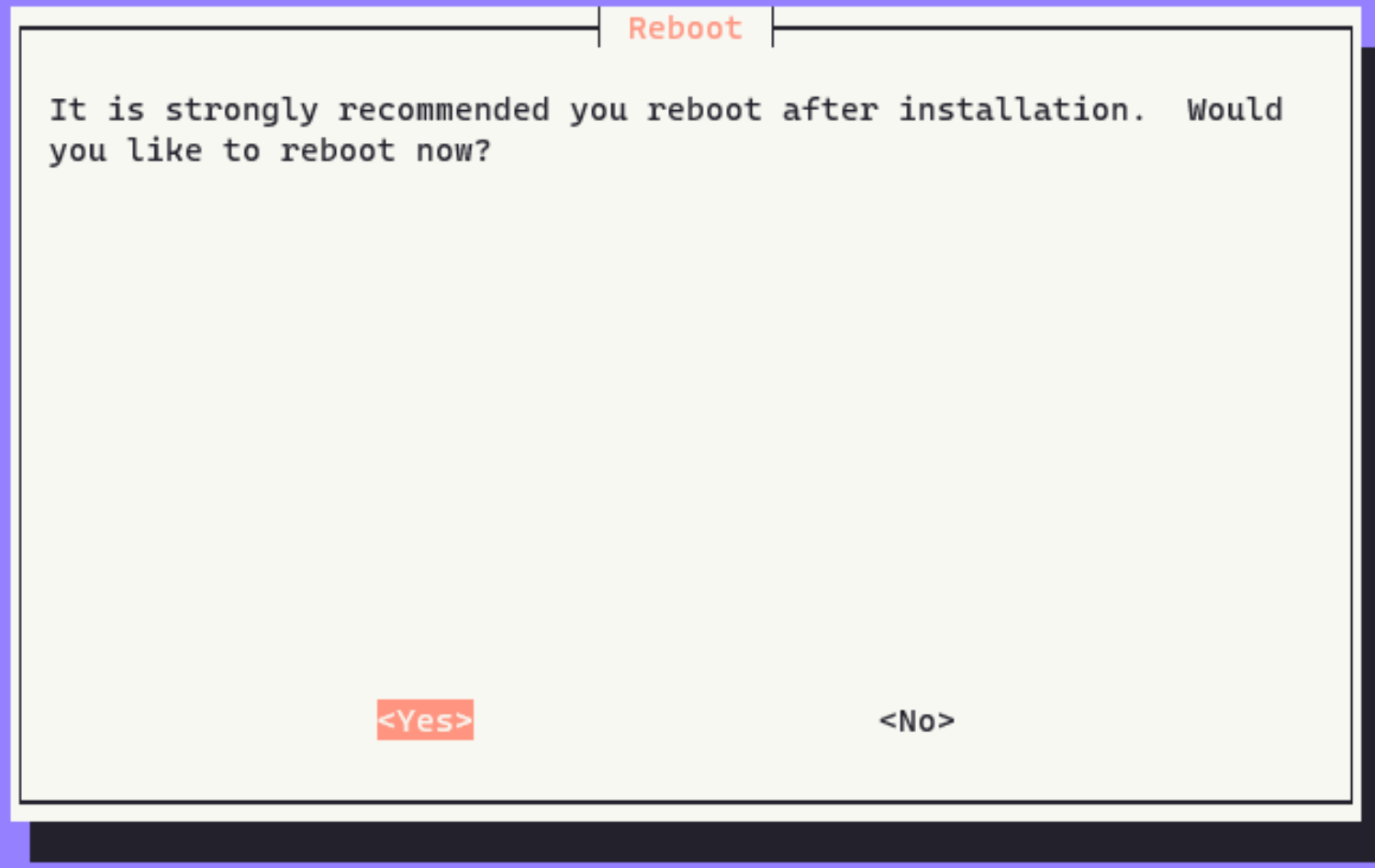
Unattended Upgrades

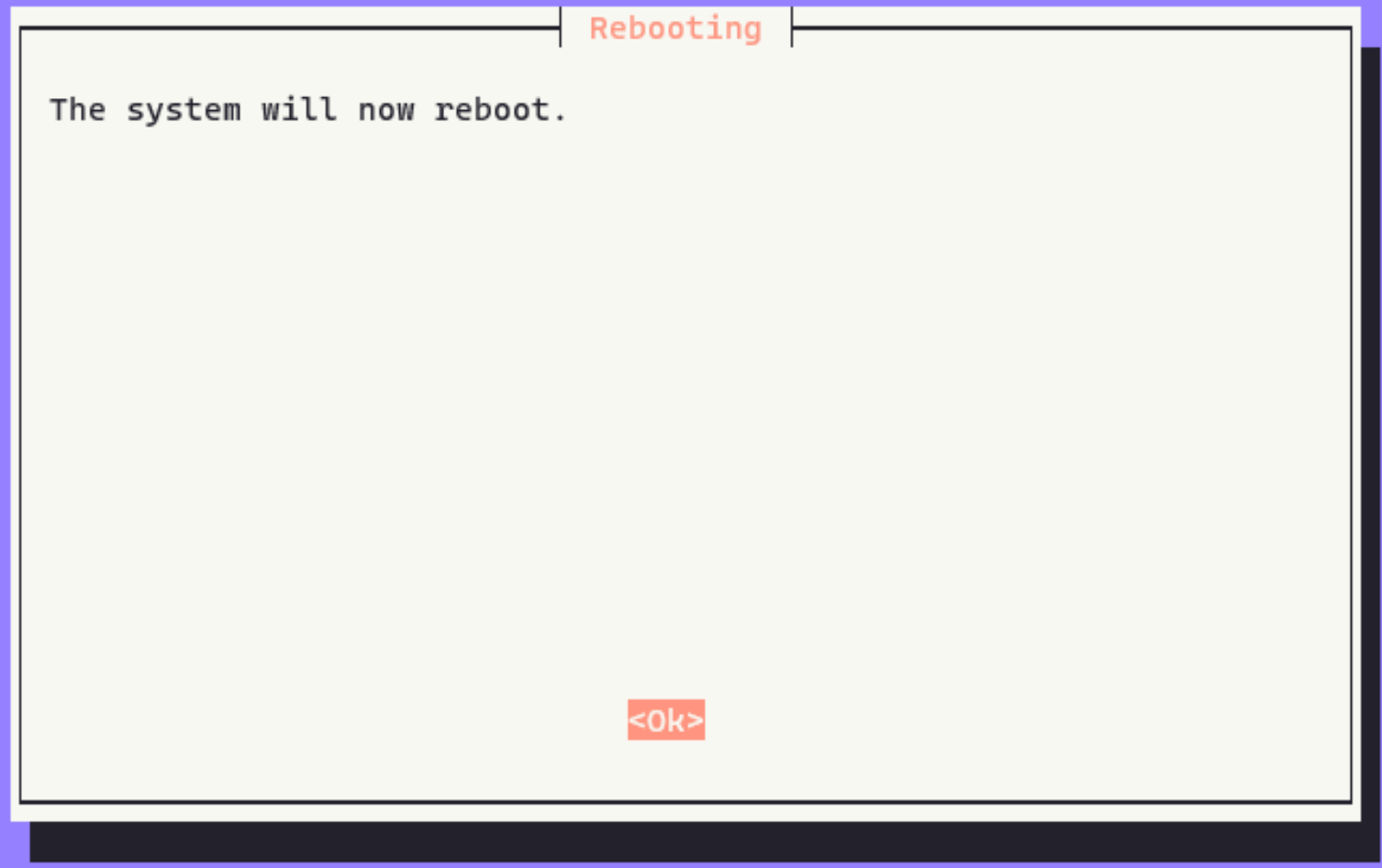
Do you want to enable unattended upgrades of security patches to this server?

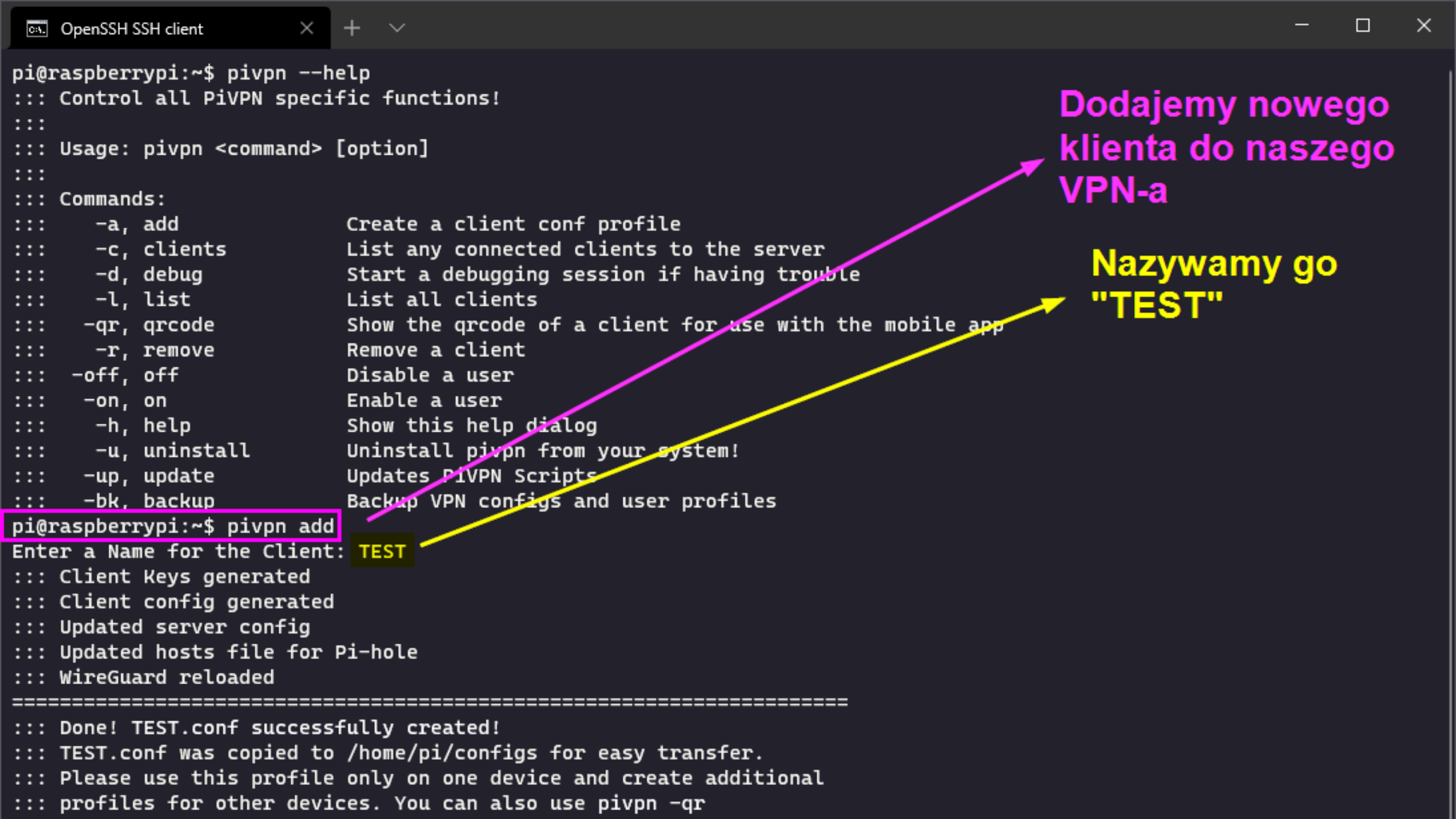
<Yes> <No>

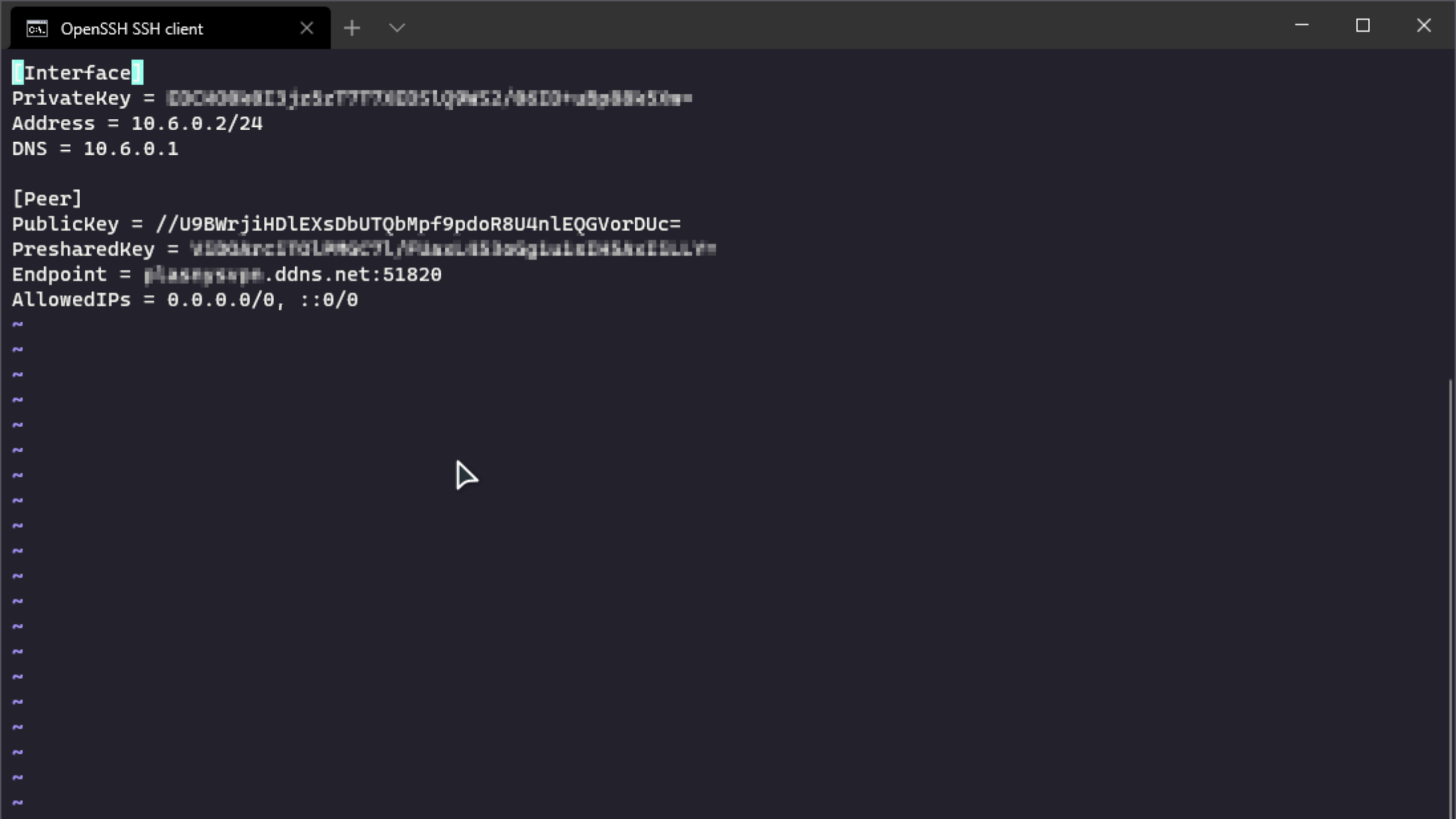
Make it so.

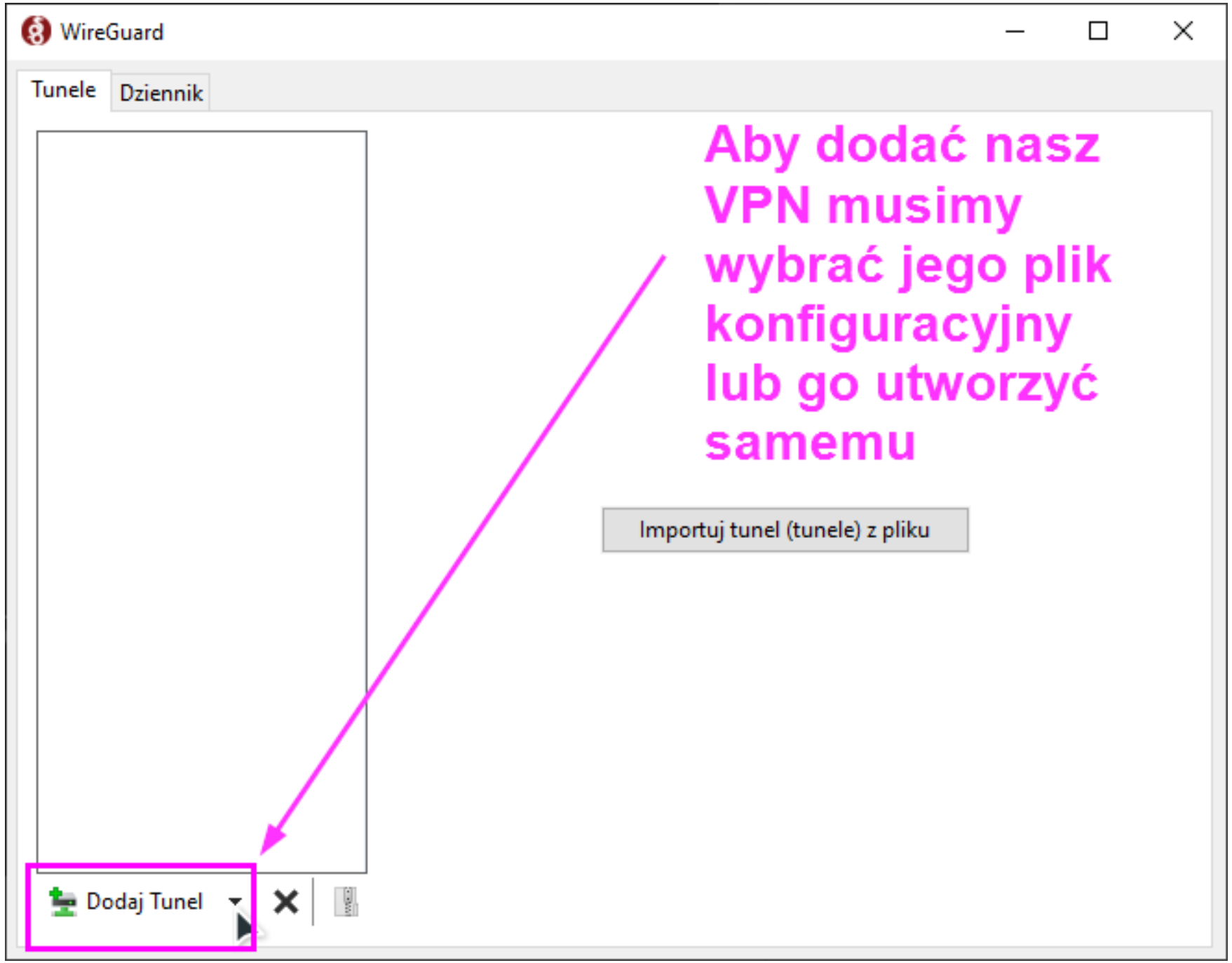

Installation Complete!
Now run 'pivpn add' to create the client profiles.
Run 'pivpn help' to see what else you can do!
If you run into any issue, please read all our documentation carefully.
All incomplete posts or bug reports will be ignored or deleted.
Thank you for using PiVPN.
<Ok>

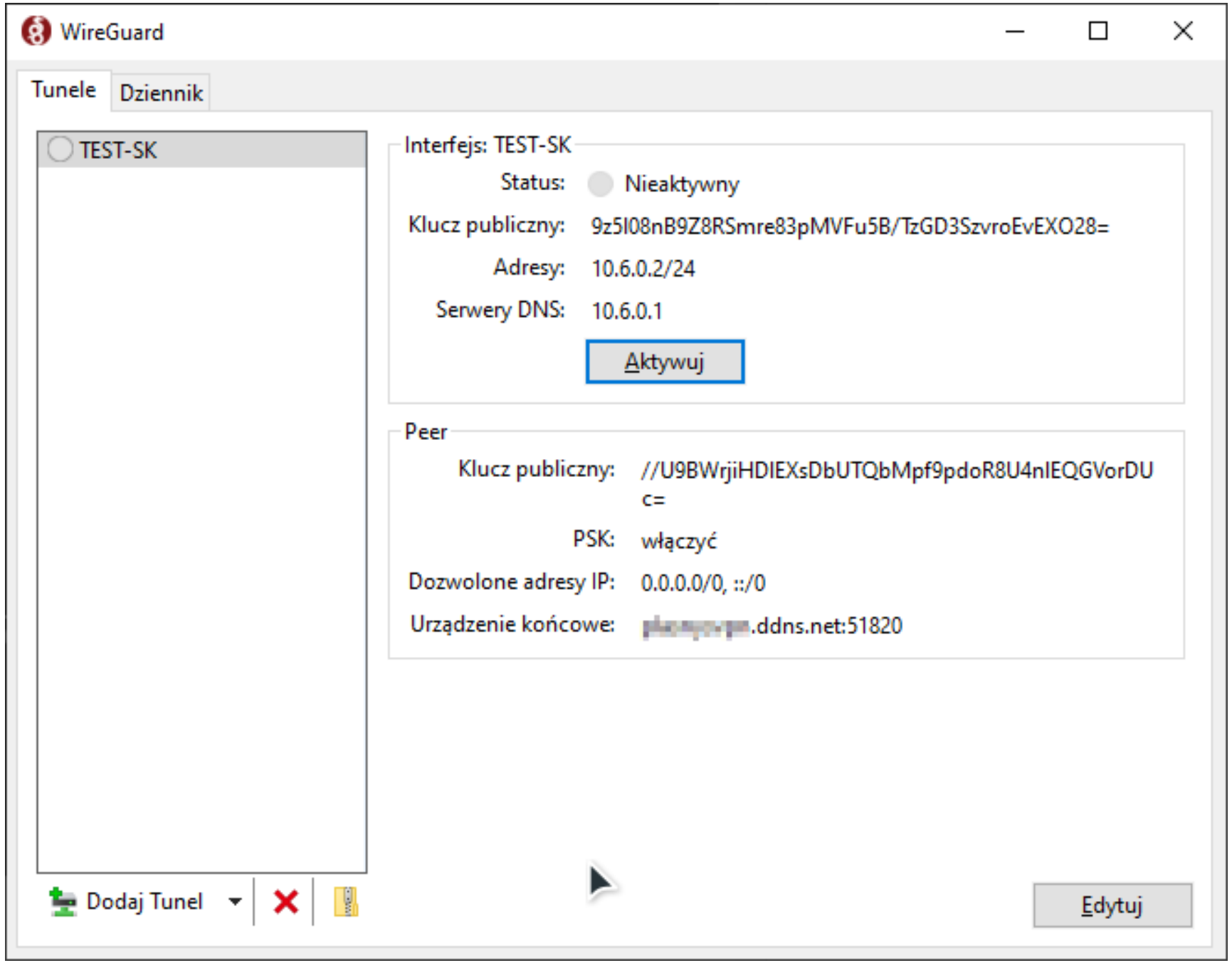

Reboot
It is strongly recommended you reboot after installation. Would you like to reboot now?
<Yes>
<No>


Rebooting
The system will now reboot.
<Ok>


OpenSSH SSH client
pi@raspberrypi:~$ pivpn --help
::: Control all PiVPN specific functions!
:::
::: Usage: pivpn <command> [option]
:::
::: Commands:
:::   -a, add   Create a client conf profile
:::   -c, clients   List any connected clients to the server
:::   -d, debug   Start a debugging session if having trouble
:::   -l, list   List all clients
:::   -qr, qrcode   Show the qrcode of a client for use with the mobile app
:::   -r, remove   Remove a client
::: -off, off   Disable a user
:::   -on, on   Enable a user
:::   -h, help   Show this help dialog
:::   -u, uninstall   Uninstall pivpn from your system!
:::   -up, update   Updates PiVPN Scripts
:::   -bk, backup   Backup VPN configs and user profiles
pi@raspberrypi:~$ pivpn add
Enter a Name for the Client: TEST
::: Client Keys generated
::: Client config generated
::: Updated server config
::: Updated hosts file for Pi-hole
::: WireGuard reloaded
==
::: Done! TEST.conf successfully created!
::: TEST.conf was copied to /home/pi/configs for easy transfer.
::: Please use this profile only on one device and create additional
::: profiles for other devices. You can also use pivpn -qr
Dodajemy nowego klienta do naszego VPN-a
Nazywamy go "TEST"


OpenSSH SSH client
[Interface]
PrivateKey = [redacted]
Address = 10.6.0.2/24
DNS = 10.6.0.1
[Peer]
PublicKey = //U9BWrjiHDlEXsDbUTQbMpf9pdoR8U4nlEQGVorDUc=
PresharedKey = [redacted]
Endpoint = [redacted].ddns.net:51820
AllowedIPs = 0.0.0.0/0, ::0/0

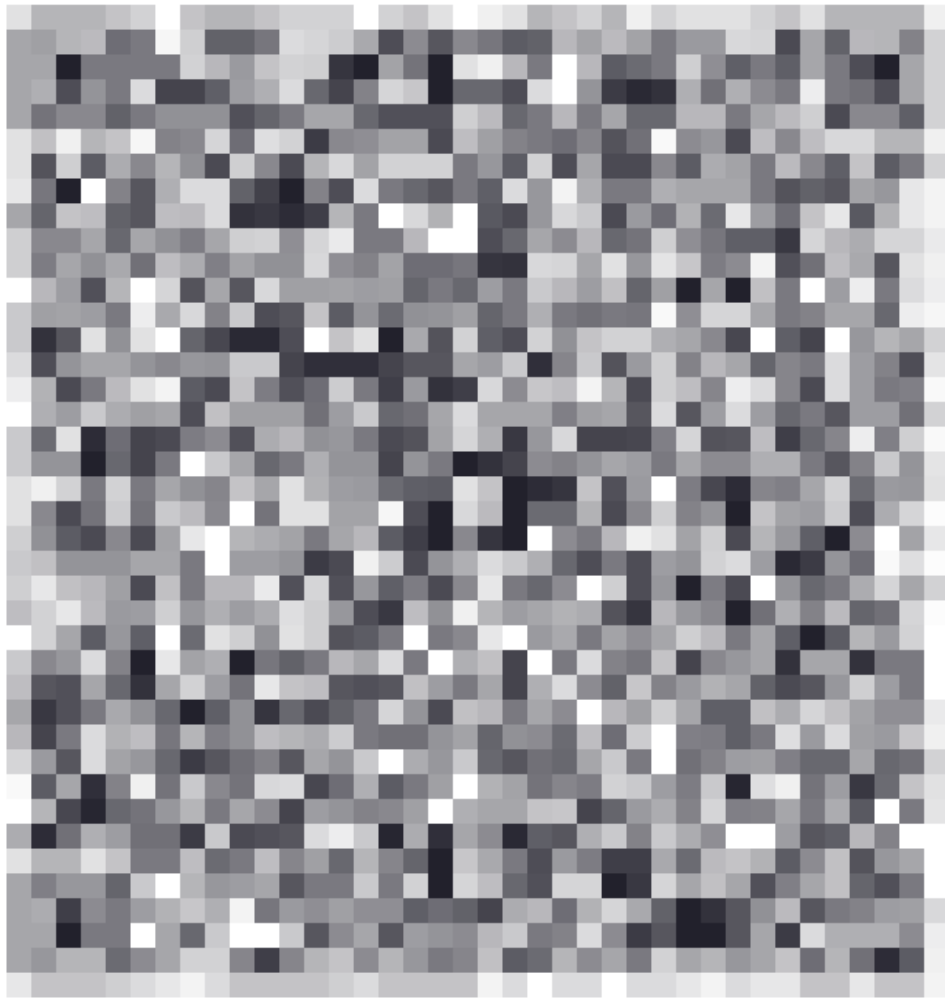

WireGuard
Tunele
Dziennik
Aby dodać nasz VPN musimy wybrać jego plik konfiguracyjny lub go utworzyć samemu
Importuj tunel (tunele) z pliku
Dodaj Tunel


WireGuard
Tunele
Dziennik
TEST-SK
Interfejs: TEST-SK
Status:
Nieaktywny
Klucz publiczny:
9z5I08nB9Z8RSmre83pMVFu5B/TzGD3SzvroEvEXO28=
Adresy:
10.6.0.2/24
Serwery DNS:
10.6.0.1
Aktywuj
Peer
Klucz publiczny:
//U9BWrjiHDIEXsDbUTQbMpf9pdoR8U4nIEQGVorDUc=
PSK:
włączyć
Dozwolone adresy IP:
0.0.0.0/0, ::/0
Urządzenie końcowe:
.ddns.net:51820
Dodaj Tunel
Edytuj

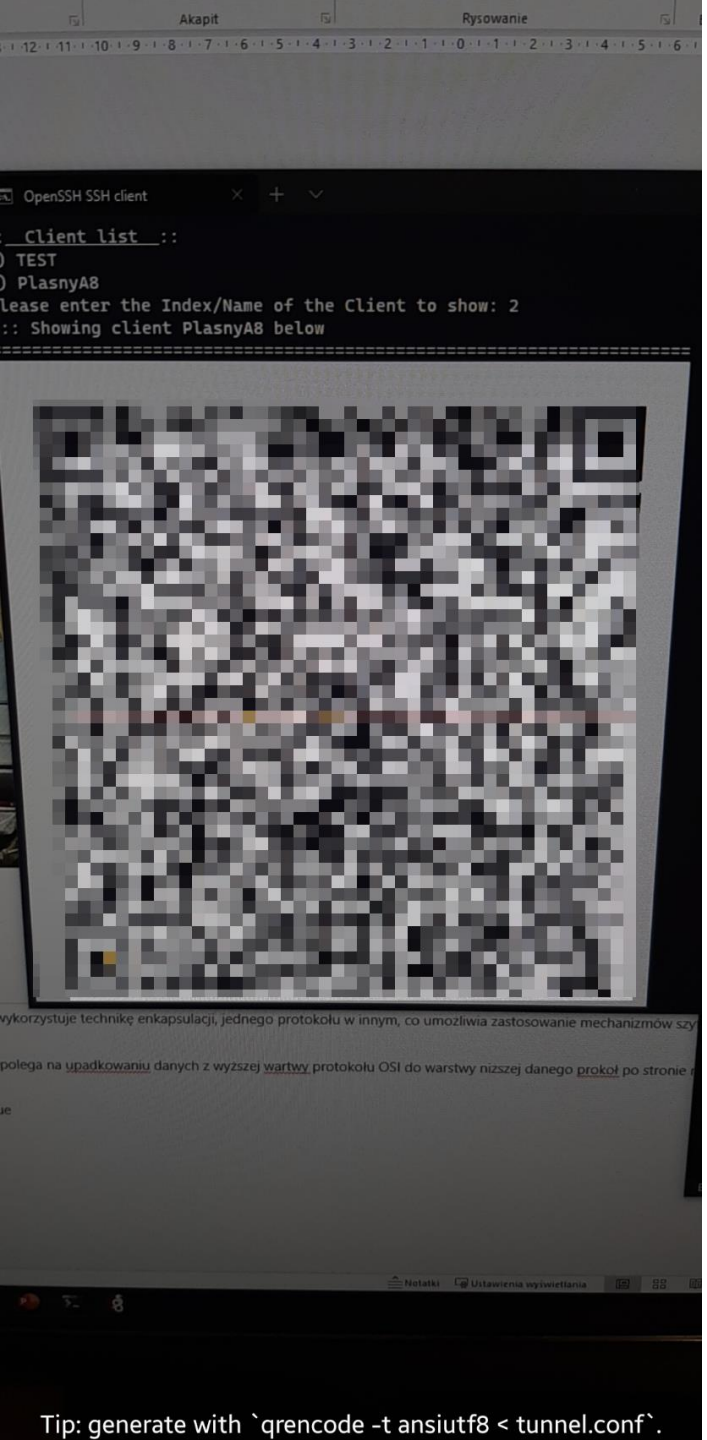
OpenSSH SSH client

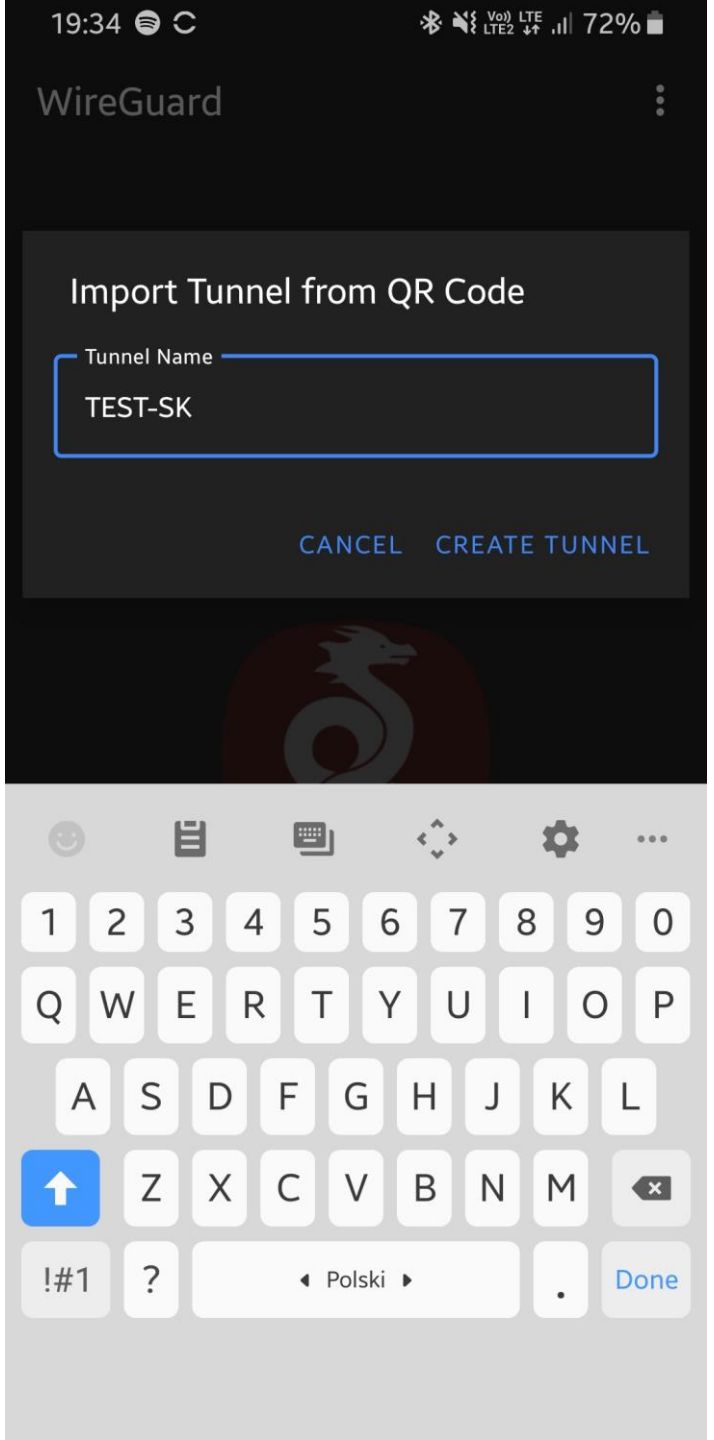
OpenSSH SSH client

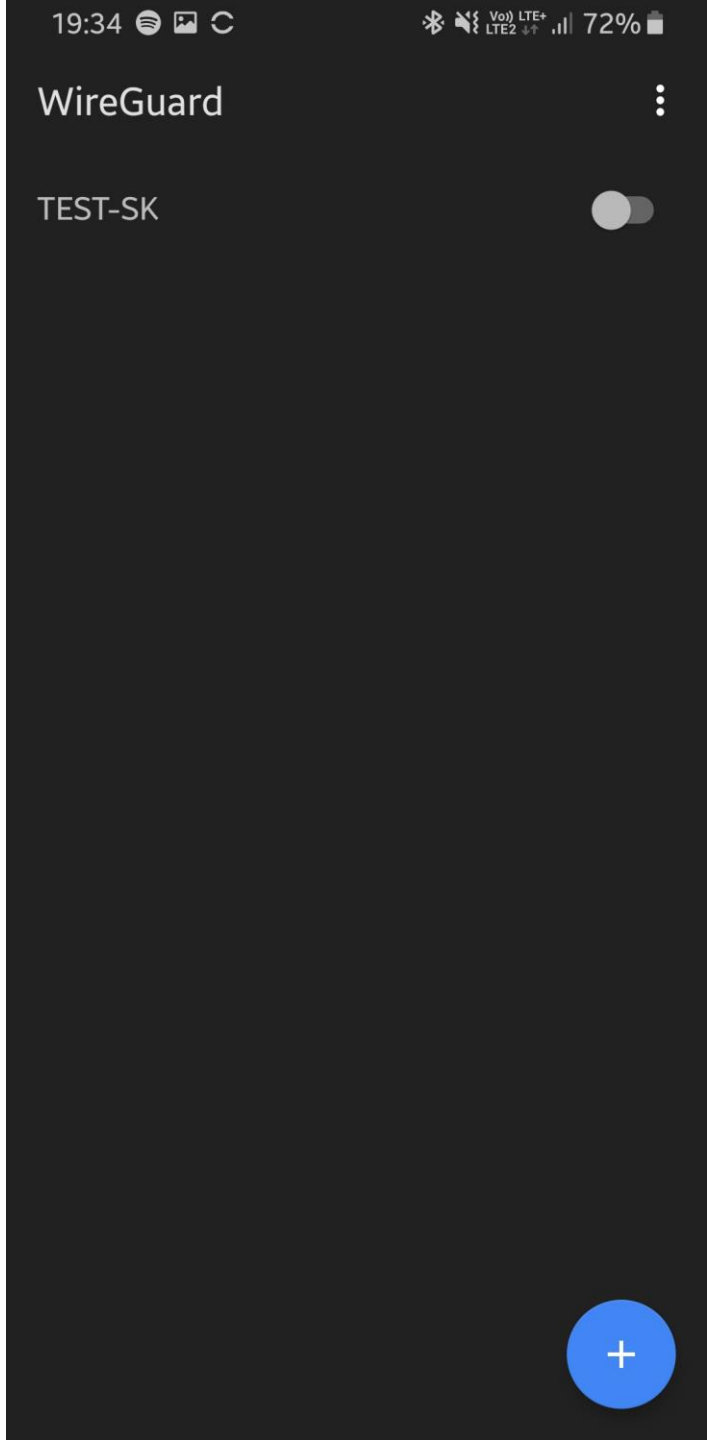
```
pi@raspberrypi:~$ pivpn -qr
::  Client list  ::
1) TEST
2) PlasnyA8
Please enter the Index/Name of the Client to show: 1
::: Showing client TEST below
================================================================
```

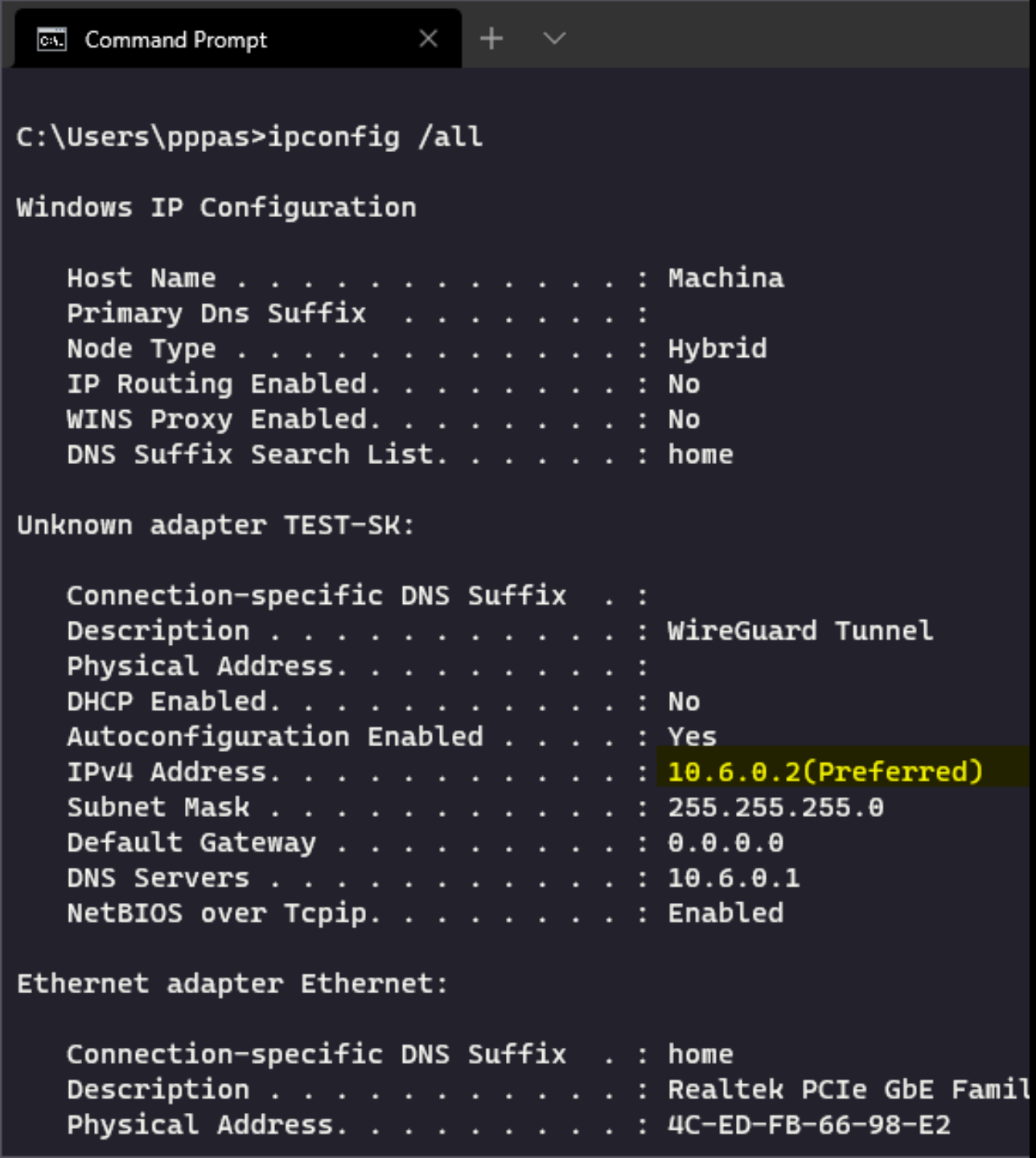


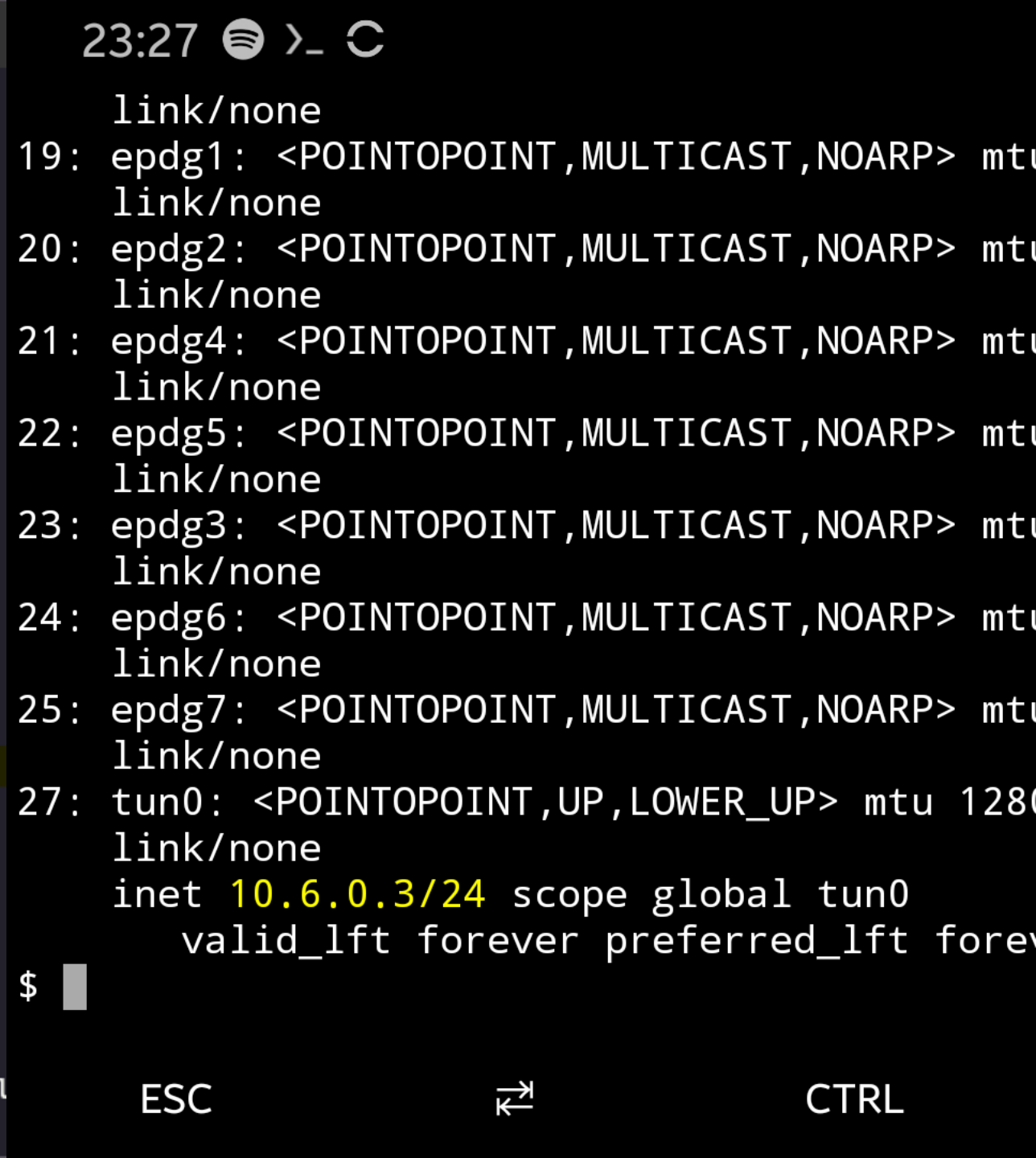
```
================================================================
```


OpenSSH SSH client
Client list ::
TEST
PlasnyA8
lease enter the Index/Name of the Client to show: 2
:: Showing client PlasnyA8 below
Tip: generate with `qrencode -t ansiutf8 < tunnel.conf`.


19:34
72%
WireGuard
Import Tunnel from QR Code
Tunnel Name
TEST-SK
CANCEL
CREATE TUNNEL
Polski
Done


19:34
72%
WireGuard
TEST-SK


Command Prompt
C:\Users\pppas>ipconfig /all
Windows IP Configuration
Host Name . . . . . : Machina
Primary Dns Suffix . . . . . :
Node Type . . . . . : Hybrid
IP Routing Enabled. . . . . : No
WINS Proxy Enabled. . . . . : No
DNS Suffix Search List. . . . . : home
Unknown adapter TEST-SK:
Connection-specific DNS Suffix . :
Description . . . . . : WireGuard Tunnel
Physical Address. . . . . :
DHCP Enabled. . . . . : No
Autoconfiguration Enabled . . . . : Yes
IPv4 Address. . . . . : 10.6.0.2(Preferred)
Subnet Mask . . . . . : 255.255.255.0
Default Gateway . . . . . : 0.0.0.0
DNS Servers . . . . . : 10.6.0.1
NetBIOS over Tcpip. . . . . : Enabled
Ethernet adapter Ethernet:
Connection-specific DNS Suffix . : home
Description . . . . . : Realtek PCIe GbE Famil
Physical Address. . . . . : 4C-ED-FB-66-98-E2


23:27
link/none
19: epdg1: <POINTOPOINT,MULTICAST,NOARP> mtu
link/none
20: epdg2: <POINTOPOINT,MULTICAST,NOARP> mtu
link/none
21: epdg4: <POINTOPOINT,MULTICAST,NOARP> mtu
link/none
22: epdg5: <POINTOPOINT,MULTICAST,NOARP> mtu
link/none
23: epdg3: <POINTOPOINT,MULTICAST,NOARP> mtu
link/none
24: epdg6: <POINTOPOINT,MULTICAST,NOARP> mtu
link/none
25: epdg7: <POINTOPOINT,MULTICAST,NOARP> mtu
link/none
27: tun0: <POINTOPOINT,UP,LOWER_UP> mtu 128
link/none
inet 10.6.0.3/24 scope global tun0
valid_lft forever preferred_lft forev
$
ESC
CTRL

Źródła:

- https://eia.pg.edu.pl/documents/1113028/0/PSI%20-%20VLAN%20i%20tunelowanie%202015.pdf
- https://pasja-informatyki.pl/sieci-komputerowe/vlan-wprowadzenie/
- https://pl.wikipedia.org/wiki/Wirtualna_sieć_lokalna
- https://pl.wikipedia.org/wiki/Model_OSI
- https://www.omnisecu.com/cisco-certified-network-associate-ccna/vlan-membership-types.php
- https://www.educba.com/types-of-vlan/
- https://sieci.infopl.info/index.php/rodzaje/lan/rodzajevlan
- https://youtu.be/GrqX1enJ12E
- https://innasiec.pl/konfiguracja-vlan-cisco-switch/
- https://community.cisco.com/t5/small-business-switches/general-vs-trunk-mode/td-p/2281870
- https://www.thomas-krenn.com/pl/wiki/Podstawowe_informacje_o_VLAN
- http://home.agh.edu.pl/~pmarynow/pliki/sieci2019/Tunelowanie.pdf
- https://vpnekspert.com/dostawca-internetu-wie-jakie-strony-przegladasz-ale-mozna-to-zmienic/

DZIĘKUJĘ ZA UWAGĘ

Paweł Pasternak 2Ib