Настройка VPN

Лабораторная работа № 16

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27 мая 2025

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Цели и задачи

Получение навыков настройки VPN-туннеля через незащищённое Интернет-соединение.

Выполнение лабораторной работы

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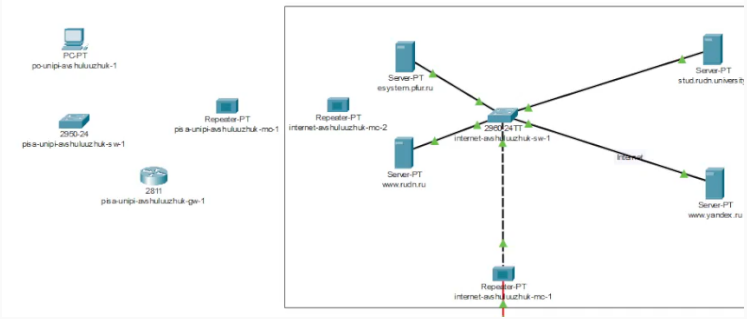


Рис. 1: Раземещение необходимого оборудования в сеть

Рис. 2: Настройка портов на медиаконвертерах

Выполнение лабораторной работы

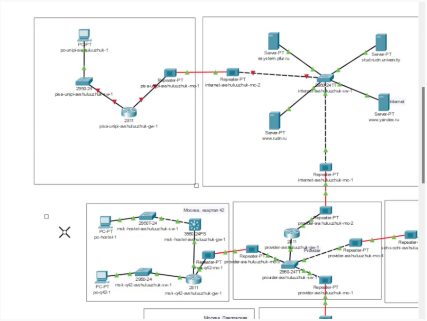


Рис. 3: Проведение соединеия оборудования

Рис. 4: Создание города Пиза

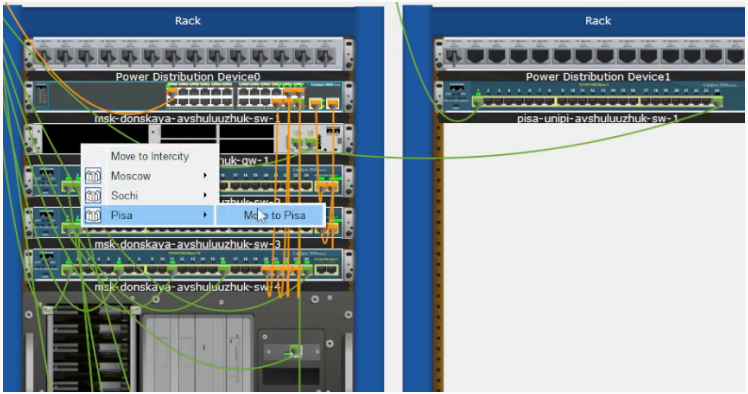


Рис. 5: Перемещение оборудования на соответствующие территории

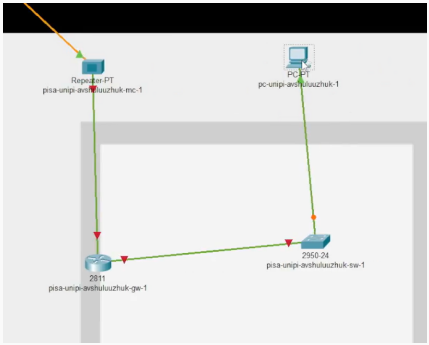
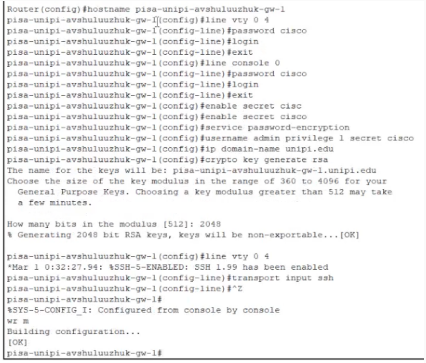


Рис. 6: Оборудование на территории г. Пиза



```
Router(config)#hostname pisa-unipi-avshuluuzhuk-gw-1
pisa-unipi-avshuluuzhuk-gw-1(config)#line vty 0 4
pisa-unipi-avshuluuzhuk-gw-1(config-line)#password cisco
pisa-unipi-avshuluuzhuk-gw-1(config-line)#login
pisa-unipi-avshuluuzhuk-gw-1(config-line)#exit
pisa-unipi-avshuluuzhuk-gw-1(config)#line console 0
pisa-unipi-avshuluuzhuk-gw-1(config-line)#password cisco
pisa-unipi-avshuluuzhuk-gw-1(config-line)#login
pisa-unipi-avshuluuzhuk-gw-1(config-line)#exit
pisa-unipi-avshuluuzhuk-gw-1(config)#enable secret cisc
pisa-unipi-avshuluuzhuk-gw-1(config)#enable secret cisco
pisa-unipi-avshuluuzhuk-gw-1(config)#service password-encryption
pisa-unipi-avshuluuzhuk-gw-1(config)#username admin privilege 1 secret cisco
pisa-unipi-avshuluuzhuk-gw-1(config)#ip domain-name unipi.edu
pisa-unipi-avshuluuzhuk-gw-1(config)#crypto key generate rsa
The name for the keys will be: pisa-unipi-avshuluuzhuk-gw-1.unipi.edu
Choose the size of the key modulus in the range of 360 to 4096 for your
  General Purpose Keys. Choosing a key modulus greater than 512 may take
  a few minutes.

How many bits in the modulus [512]: 2048
% Generating 2048 bit RSA keys, keys will be non-exportable...[OK]

pisa-unipi-avshuluuzhuk-gw-1(config)#line vty 0 4
*Mar 1 0:32:27.94: %SSH-5-ENABLED: SSH 1.99 has been enabled
pisa-unipi-avshuluuzhuk-gw-1(config-line)#transport input ssh
pisa-unipi-avshuluuzhuk-gw-1(config-line)#^Z
pisa-unipi-avshuluuzhuk-gw-1#
%SYS-5-CONFIG_I: Configured from console by console
wr m
Building configuration...
[OK]
pisa-unipi-avshuluuzhuk-gw-1#
```

Рис. 7: Первоначальная настройка маршрутизатора pisa-unipi-gw-1

```
Switch(config)#hostname pisa-unipi-avshuluuzhuk-sw-1
pisa-unipi-avshuluuzhuk-sw-1(config)#line vty 0 4
pisa-unipi-avshuluuzhuk-sw-1(config-line)#password cisco
pisa-unipi-avshuluuzhuk-sw-1(config-line)#login
pisa-unipi-avshuluuzhuk-sw-1(config-line)#exit
pisa-unipi-avshuluuzhuk-sw-1(config)#line console 0
pisa-unipi-avshuluuzhuk-sw-1(config-line)#password cisco
pisa-unipi-avshuluuzhuk-sw-1(config-line)#login
pisa-unipi-avshuluuzhuk-sw-1(config-line)#exit
pisa-unipi-avshuluuzhuk-sw-1(config)#enable secret cisco
pisa-unipi-avshuluuzhuk-sw-1(config)#
pisa-unipi-avshuluuzhuk-sw-1(config)#service password-encryption
pisa-unipi-avshuluuzhuk-sw-1(config)#username admin privilege 1 secret cisco
pisa-unipi-avshuluuzhuk-sw-1(config)#ip domain-name unipi.edu
pisa-unipi-avshuluuzhuk-sw-1(config)#crypto key generate rsa
The name for the keys will be: pisa-unipi-avshuluuzhuk-sw-1.unipi.edu
Choose the size of the key modulus in the range of 360 to 4096 for your
  General Purpose Keys. Choosing a key modulus greater than 512 may take
  a few minutes.

How many bits in the modulus [512]: 2048
% Generating 2048 bit RSA keys, keys will be non-exportable...[OK]

pisa-unipi-avshuluuzhuk-sw-1(config)#line vty 0 4
*Mar 1 0:34:42.998: %SSH-5-ENABLED: SSH 1.99 has been enabled
pisa-unipi-avshuluuzhuk-sw-1(config-line)#transport input ssh
pisa-unipi-avshuluuzhuk-sw-1(config-line)#^Z
pisa-unipi-avshuluuzhuk-sw-1#
%SYS-5-CONFIG_I: Configured from console by console
wr m
Building configuration...
[OK]
pisa-unipi-avshuluuzhuk-sw-1#
```

Рис. 8: Первоначальная настройка коммутатора pisa-unipi-sw-1

```
pisa-unipi-avshuluuzhuk-gw-1#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
pisa-unipi-avshuluuzhuk-gw-1(config)#interface f0/0
pisa-unipi-avshuluuzhuk-gw-1(config-if)#no shutdown

pisa-unipi-avshuluuzhuk-gw-1(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up

pisa-unipi-avshuluuzhuk-gw-1(config-if)#exit
pisa-unipi-avshuluuzhuk-gw-1(config)#interface f0/0.401
pisa-unipi-avshuluuzhuk-gw-1(config-subif)#
%LINK-5-CHANGED: Interface FastEthernet0/0.401, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0.401, changed state to up

pisa-unipi-avshuluuzhuk-gw-1(config-subif)#encapsulation dot1Q 401
pisa-unipi-avshuluuzhuk-gw-1(config-subif)#ip address 10.131.0.1 255.255.255.0
pisa-unipi-avshuluuzhuk-gw-1(config-subif)#description unipi-main
pisa-unipi-avshuluuzhuk-gw-1(config-subif)#exit
pisa-unipi-avshuluuzhuk-gw-1(config)#interface f0/1
pisa-unipi-avshuluuzhuk-gw-1(config-if)#no shutdown

pisa-unipi-avshuluuzhuk-gw-1(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up

pisa-unipi-avshuluuzhuk-gw-1(config-if)#ip address 192.0.2.20 255.255.255.0
pisa-unipi-avshuluuzhuk-gw-1(config-if)#description internet
pisa-unipi-avshuluuzhuk-gw-1(config-if)#exit
pisa-unipi-avshuluuzhuk-gw-1(config)#ip route 0.0.0.0 0.0.0.0 192.0.2.1
pisa-unipi-avshuluuzhuk-gw-1(config)#^Z
pisa-unipi-avshuluuzhuk-gw-1#
%SYS-5-CONFIG_I: Configured from console by console
wr m
Building configuration...
[OK]
pisa-unipi-avshuluuzhuk-gw-1#
```

Рис. 9: Настройка интерфейсов маршрутизатора pisa-unipi-gw-1

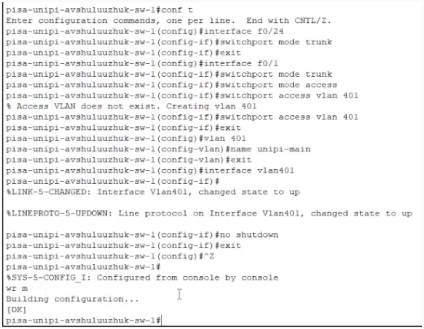


Рис. 10: Настройка интерфейсов коммутатора pisa-unipi-sw-1

Выполнение лабораторной работы

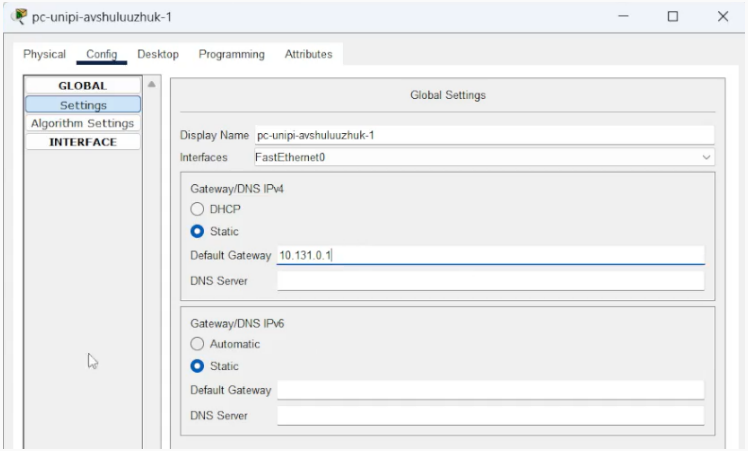


Рис. 11: Шлюз

Выполнение лабораторной работы

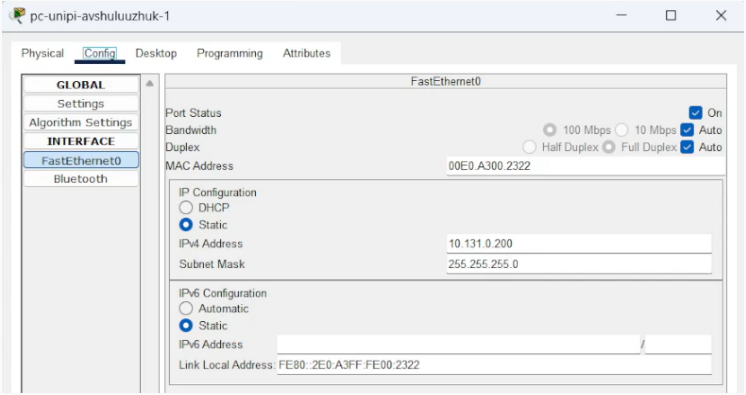


Рис. 12: IP-адресс

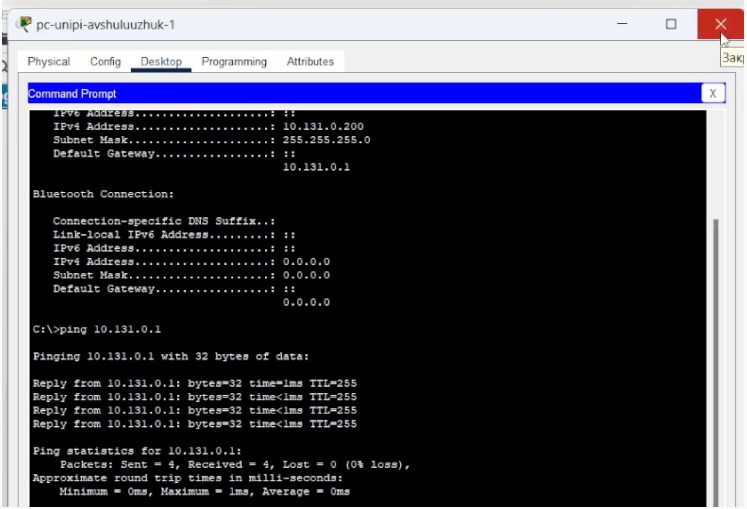
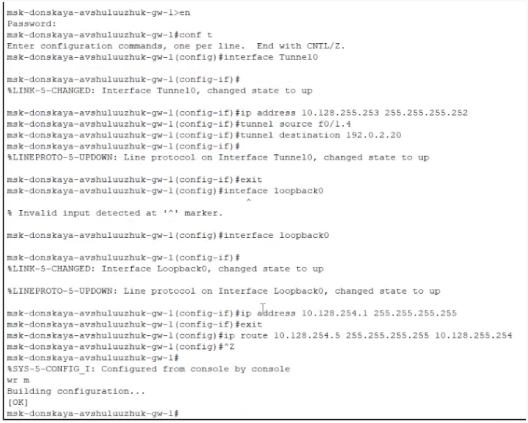


Рис. 13: Пингование устройств



```
msk-donskaya-avshuluuzhuk-gw-1>en
Password:
msk-donskaya-avshuluuzhuk-gw-1#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
msk-donskaya-avshuluuzhuk-gw-1(config)#interface Tunnel0

msk-donskaya-avshuluuzhuk-gw-1(config-if)#
%LINK-5-CHANGED: Interface Tunnel0, changed state to up

msk-donskaya-avshuluuzhuk-gw-1(config-if)#ip address 10.128.255.253 255.255.255.252
msk-donskaya-avshuluuzhuk-gw-1(config-if)#tunnel source f0/1.4
msk-donskaya-avshuluuzhuk-gw-1(config-if)#tunnel destination 192.0.2.20
msk-donskaya-avshuluuzhuk-gw-1(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Tunnel0, changed state to up

msk-donskaya-avshuluuzhuk-gw-1(config-if)#exit
msk-donskaya-avshuluuzhuk-gw-1(config)#inteface loopback0
                                      ^
% Invalid input detected at '^' marker.

msk-donskaya-avshuluuzhuk-gw-1(config)#interface loopback0

msk-donskaya-avshuluuzhuk-gw-1(config-if)#
%LINK-5-CHANGED: Interface Loopback0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback0, changed state to up

msk-donskaya-avshuluuzhuk-gw-1(config-if)#ip address 10.128.254.1 255.255.255.255
msk-donskaya-avshuluuzhuk-gw-1(config-if)#exit
msk-donskaya-avshuluuzhuk-gw-1(config)#ip route 10.128.254.5 255.255.255.255 10.128.255.254
msk-donskaya-avshuluuzhuk-gw-1(config)#^Z
msk-donskaya-avshuluuzhuk-gw-1#
%SYS-5-CONFIG_I: Configured from console by console
wr m
Building configuration...
[OK]
msk-donskaya-avshuluuzhuk-gw-1#
```

Рис. 14: Настройка маршрутизатора msk-donskaya-gw-1

```
pisa-unipi-avshuluuzhuk-gw-1#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
pisa-unipi-avshuluuzhuk-gw-1(config)#interface Tunnel0

pisa-unipi-avshuluuzhuk-gw-1(config-if)#
%LINK-5-CHANGED: Interface Tunnel0, changed state to up

pisa-unipi-avshuluuzhuk-gw-1(config-if)#ip address 10.128.255.254 255.255.255.252
pisa-unipi-avshuluuzhuk-gw-1(config-if)#tunnel source f0/1.4
%ERROR: Source interface does not exist.
pisa-unipi-avshuluuzhuk-gw-1(config-if)#tunnel source f0/1
pisa-unipi-avshuluuzhuk-gw-1(config-if)#tunnel destination 198.51.100.2
pisa-unipi-avshuluuzhuk-gw-1(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Tunnel0, changed state to up

pisa-unipi-avshuluuzhuk-gw-1(config-if)#exit
pisa-unipi-avshuluuzhuk-gw-1(config)#interface loopback0

pisa-unipi-avshuluuzhuk-gw-1(config-if)#
%LINK-5-CHANGED: Interface Loopback0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback0, changed state to up
\
                                      ^
% Invalid input detected at '^' marker.

pisa-unipi-avshuluuzhuk-gw-1(config-if)#ip address 10.128.254.5 255.255.255.255
pisa-unipi-avshuluuzhuk-gw-1(config-if)#exit
pisa-unipi-avshuluuzhuk-gw-1(config)#ip route 10.128.254.1 255.255.255.255 10.128.255.253
pisa-unipi-avshuluuzhuk-gw-1(config)#router ospf 1
pisa-unipi-avshuluuzhuk-gw-1(config-router)#router-id 10.128.254.5
pisa-unipi-avshuluuzhuk-gw-1(config-router)#network 10.0.0.0 0.255.255.255 area 0
pisa-unipi-avshuluuzhuk-gw-1(config-router)#exit
pisa-unipi-avshuluuzhuk-gw-1(config)#
01:23:19: %OSPF-5-ADJCHG: Process 1, Nbr 10.128.254.1 on Tunnel0 from LOADING to FULL, Loading Done
```

Рис. 15: Настройка маршрутизатора pisa-unipi-gw-1

Выполнение лабораторной работы

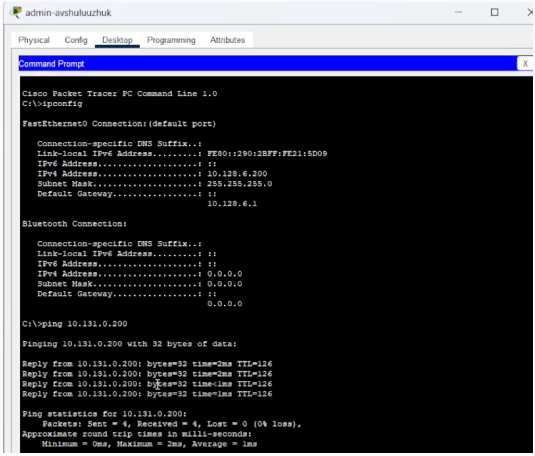


Рис. 16: Проверка доступности узлов г. Пиза

Выводы

Результаты работы

В результате выполнения лабораторной работы были получечены навыки настройки VPN-туннеля через незащищённое Интернет-соединение.