Лабораторная работа №16

Настройка VPN

Лушин Артём Андреевич

Содержание

Список иллюстраций

1 Цель работы

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

2 Выполнение лабораторной работы

1) Я разместил в рабочем проекте новую область - Пиза. Настроил медиаконверет для соединения между областями.

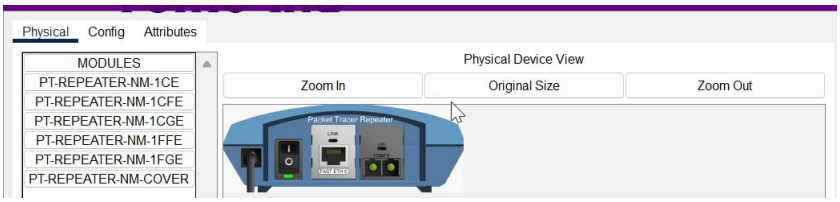

Рис. 2.1: Настройка медиаконвертора

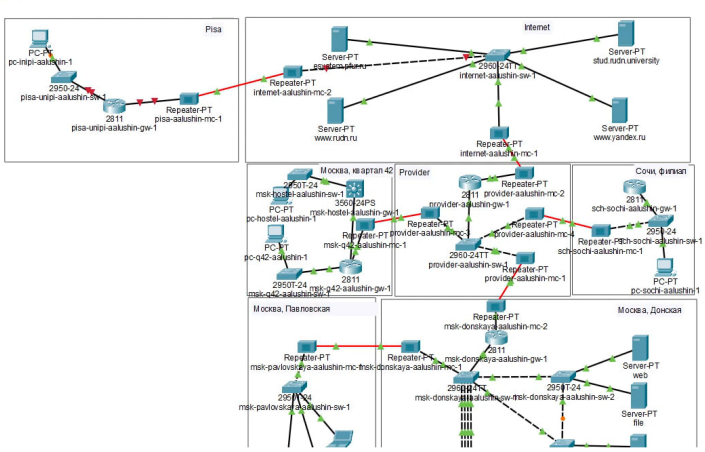

Рис. 2.2: Схема проекта

2) В физическом пространстве добавил ещё один город - Пиза. Переместил туда соответствующее оборудование.

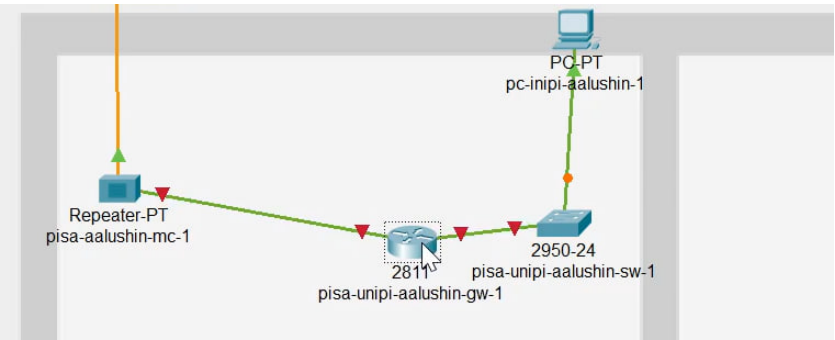

Рис. 2.3: Здание Пиза

3) Произвёл первоначальную настройку и настройку интерфейсов оборудования в Пизе.

```
Router>en
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#line vty 0 4
Router(config-line)#password cisco
Router(config-line)#login
Router(config-line)#exit
Router(config)#line console 0
Router(config-line)#password cisco
Router(config-line)#login
Router(config-line)#exit
Router(config)#enable secret cisco
Router(config)#service password-emc
Router(config)#service password-enc
Router(config)#service password-encryption
Router(config)#username admin privilege 1 secret cisco
Router(config)#ip domain-name unipi.edu
Router(config)#hostname pisa-unipi-aalushin-gw-1
pisa-unipi-aalushin-gw-1(config)#crupto key generate rsa
                                 ^
% Invalid input detected at '^' marker.

pisa-unipi-aalushin-gw-1(config)#crypto key generate rsa
The name for the keys will be: pisa-unipi-aalushin-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-aalushin-gw-1(config)#line vty
*Mar 1 0:10:27.113: %SSH-5-ENABLED: SSH 1.99 has been enabled
% Incomplete command.
pisa-unipi-aalushin-gw-1(config)#line vty 0 4
pisa-unipi-aalushin-gw-1(config-line)#transport input ssh
pisa-unipi-aalushin-gw-1(config-line)#
```

Рис. 2.4: Настройка маршрутизатора Пиза

```
Switch>en
Switch#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#hostname pisa-unipi-aalushin-sw-1
pisa-unipi-aalushin-sw-1(config)#line vty 0 4
pisa-unipi-aalushin-sw-1(config-line)#password cisco
pisa-unipi-aalushin-sw-1(config-line)#login
pisa-unipi-aalushin-sw-1(config-line)#exit
pisa-unipi-aalushin-sw-1(config)#line console 0
pisa-unipi-aalushin-sw-1(config-line)#password cisco
pisa-unipi-aalushin-sw-1(config-line)#login
pisa-unipi-aalushin-sw-1(config-line)#exit'
                                        ^
% Invalid input detected at '^' marker.

pisa-unipi-aalushin-sw-1(config-line)#exit
pisa-unipi-aalushin-sw-1(config)#enable secret cisco
pisa-unipi-aalushin-sw-1(config)#service pas
pisa-unipi-aalushin-sw-1(config)#service password-encryption
pisa-unipi-aalushin-sw-1(config)#username admin privilege 1 secret cisco
pisa-unipi-aalushin-sw-1(config)#ip domain-name unipi.edu
pisa-unipi-aalushin-sw-1(config)#crypto key generate rsa
The name for the keys will be: pisa-unipi-aalushin-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-aalushin-sw-1(config)#line vry
*Mar 1 0:12:9.109: %SSH-5-ENABLED: SSH 1.99 has been enabled
                                    ^
% Invalid input detected at '^' marker.
```

Рис. 2.5: Настройка коммутатора Пиза

```
pisa-unipi-aalushin-gw-1(config)#int f0/0
pisa-unipi-aalushin-gw-1(config-if)#no sh
pisa-unipi-aalushin-gw-1(config-if)#no shutdown

pisa-unipi-aalushin-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-aalushin-gw-1(config-if)#exit
pisa-unipi-aalushin-gw-1(config)#int f0/0.401
pisa-unipi-aalushin-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-aalushin-gw-1(config-subif)#enca
pisa-unipi-aalushin-gw-1(config-subif)#encapsulation dot1Q 401
pisa-unipi-aalushin-gw-1(config-subif)#ip address 10.131.0.1 255.255.255.0
pisa-unipi-aalushin-gw-1(config-subif)#des
pisa-unipi-aalushin-gw-1(config-subif)#description internet
pisa-unipi-aalushin-gw-1(config-subif)#exit
pisa-unipi-aalushin-gw-1(config)#int f0/1
pisa-unipi-aalushin-gw-1(config-if)#no sh
pisa-unipi-aalushin-gw-1(config-if)#no shutdown

pisa-unipi-aalushin-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-aalushin-gw-1(config-if)#ip address 192.0.2.20 255.255.255.0
pisa-unipi-aalushin-gw-1(config-if)#des
pisa-unipi-aalushin-gw-1(config-if)#description internet
pisa-unipi-aalushin-gw-1(config-if)#int f0/0.401
pisa-unipi-aalushin-gw-1(config-subif)#des
pisa-unipi-aalushin-gw-1(config-subif)#description unipi-main
pisa-unipi-aalushin-gw-1(config-subif)#exit
pisa-unipi-aalushin-gw-1(config)#ip route 0.0.0.0 0.0.0.0 192.0.2.1
pisa-unipi-aalushin-gw-1(config)#exit
pisa-unipi-aalushin-gw-1#
%SYS-5-CONFIG_I: Configured from console by console

pisa-unipi-aalushin-gw-1#
```

Рис. 2.6: Настройка интерфейсов маршрутизатора Пиза

```
pisa-unipi-aalushin-sw-1#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
pisa-unipi-aalushin-sw-1(config)#int f0/24
pisa-unipi-aalushin-sw-1(config-if)#swi
pisa-unipi-aalushin-sw-1(config-if)#switchport mode trunk
pisa-unipi-aalushin-sw-1(config-if)#exit
pisa-unipi-aalushin-sw-1(config)#int f0/1
pisa-unipi-aalushin-sw-1(config-if)#sw
pisa-unipi-aalushin-sw-1(config-if)#switchport mode access
pisa-unipi-aalushin-sw-1(config-if)#switchport access vlan 401
% Access VLAN does not exist. Creating vlan 401
pisa-unipi-aalushin-sw-1(config-if)#exit
pisa-unipi-aalushin-sw-1(config)#vlan 301
pisa-unipi-aalushin-sw-1(config-vlan)#exit
pisa-unipi-aalushin-sw-1(config)#vlan 401
pisa-unipi-aalushin-sw-1(config-vlan)#name unipi-main
pisa-unipi-aalushin-sw-1(config-vlan)#exit
pisa-unipi-aalushin-sw-1(config)#int vlan 401
pisa-unipi-aalushin-sw-1(config-if)#
%LINK-5-CHANGED: Interface Vlan401, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan401, changed state to up

pisa-unipi-aalushin-sw-1(config-if)#no sh
pisa-unipi-aalushin-sw-1(config-if)#no shutdown
```

Рис. 2.7: Настройка интерфейсов коммутатора Пиза

4) Настроил VPN на основе протокола GRE.

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

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

pisa-unipi-aalushin-gw-1(config-if)#ip address 10.128.255.254 255.255.255.252
pisa-unipi-aalushin-gw-1(config-if)#tunnel source f0/1
pisa-unipi-aalushin-gw-1(config-if)#tunnel de
pisa-unipi-aalushin-gw-1(config-if)#tunnel destination 198.51.100.2
pisa-unipi-aalushin-gw-1(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Tunnel0, changed state to up

pisa-unipi-aalushin-gw-1(config-if)#ex
pisa-unipi-aalushin-gw-1(config)#int loopback0

pisa-unipi-aalushin-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

pisa-unipi-aalushin-gw-1(config-if)#ip address 10.128.254.5 255.255.255.255
pisa-unipi-aalushin-gw-1(config-if)#ex
pisa-unipi-aalushin-gw-1(config)#ip route 10.128.254.1 255.255.255.255 10.128.255.253
pisa-unipi-aalushin-gw-1(config)#router ospf 1
pisa-unipi-aalushin-gw-1(config-router)#router-id 10.128.254.5
pisa-unipi-aalushin-gw-1(config-router)#network 10.0.0.0 0.255.255.255 area 0
pisa-unipi-aalushin-gw-1(config-router)#exit
pisa-unipi-aalushin-gw-1(config)#exit
pisa-unipi-aalushin-gw-1#
%SYS-5-CONFIG_I: Configured from console by console

pisa-unipi-aalushin-gw-1#
```

Рис. 2.8: Настройка маршрутизатора Пиза

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

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

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

msk-donskaya-aalushin-gw-1(config-if)#exit
msk-donskaya-aalushin-gw-1(config)#int loopback0

msk-donskaya-aalushin-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-aalushin-gw-1(config-if)#ip address 10.128.254.1 255.255.255.255
msk-donskaya-aalushin-gw-1(config-if)#exit
msk-donskaya-aalushin-gw-1(config)#ip route 10.128.254.5 255.255.255.255 10.128.255.254
msk-donskaya-aalushin-gw-1(config)#exit
```

Рис. 2.9: Настройка маршрутизатора Донская

5) Проверил работоспособность VPN.

3 Выводы

Я получил навыки настройки VPN-туннеля через незащищённое Интернет-соединение.