

# Презентация лабораторной работы №16

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# Цель работы

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

# Задачи

- Разместить в рабочей области проекта в соответствии с модельными предположениями оборудование для сети Университета г. Пиза.
- В физической рабочей области проекта создать город Пиза, здание Университета г. Пиза. Переместить туда соответствующее оборудование.
- Сделать первоначальную настройку и настройку интерфейсов оборудования сети Университета г. Пиза.
- Настроить VPN на основе протокола GRE.
- Проверить доступность узлов сети Университета г. Пиза с ноутбука администратора сети «Донская».

# Результаты выполнения

- Разместить в рабочей области проекта в соответствии с модельными предположениями оборудование для сети Университета г. Пиза.

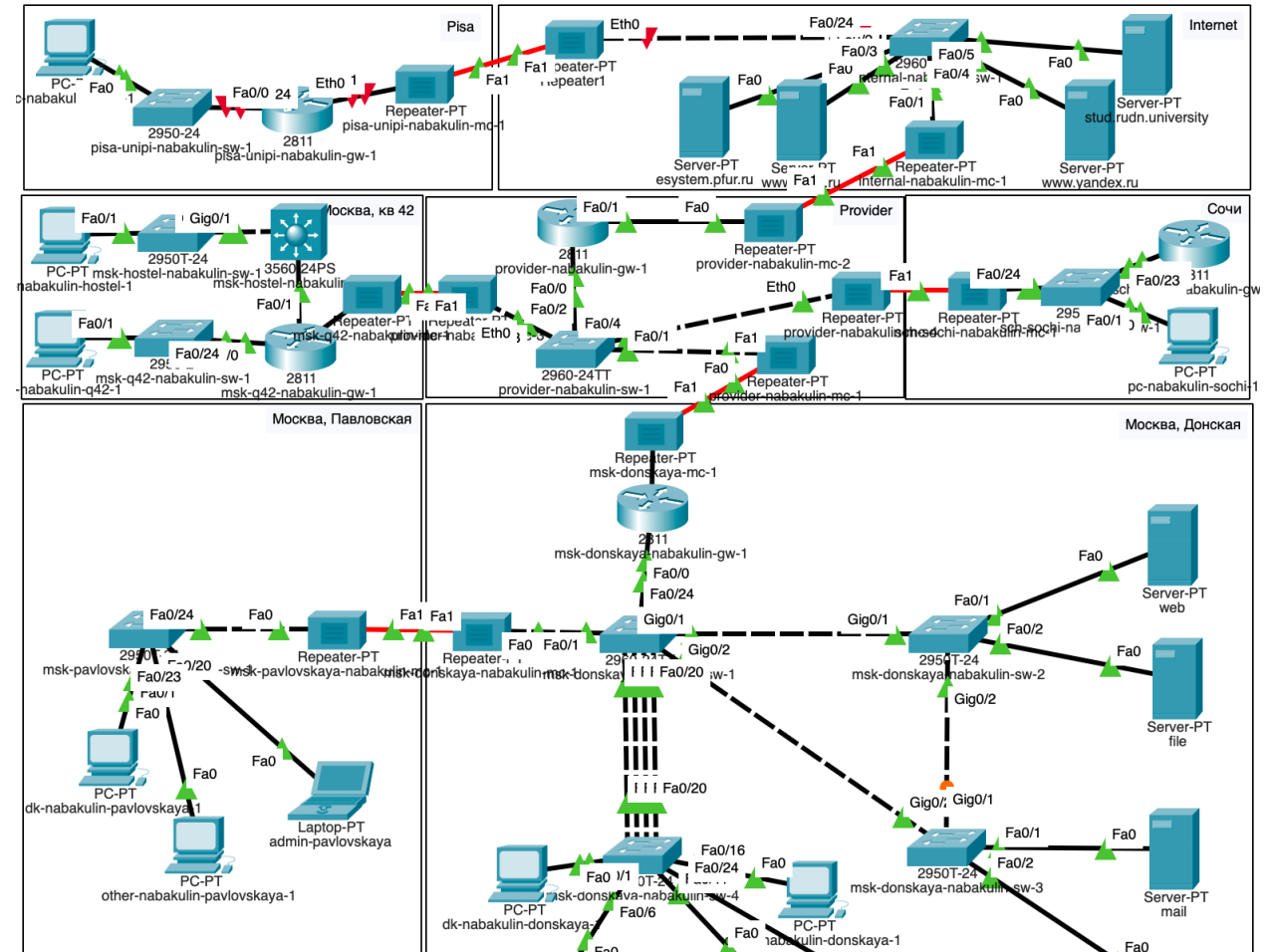


Рис. 1

# Результаты выполнения

- В физической рабочей области проекта создать город Пиза, здание Университета г. Пиза. Переместить туда соответствующее оборудование.

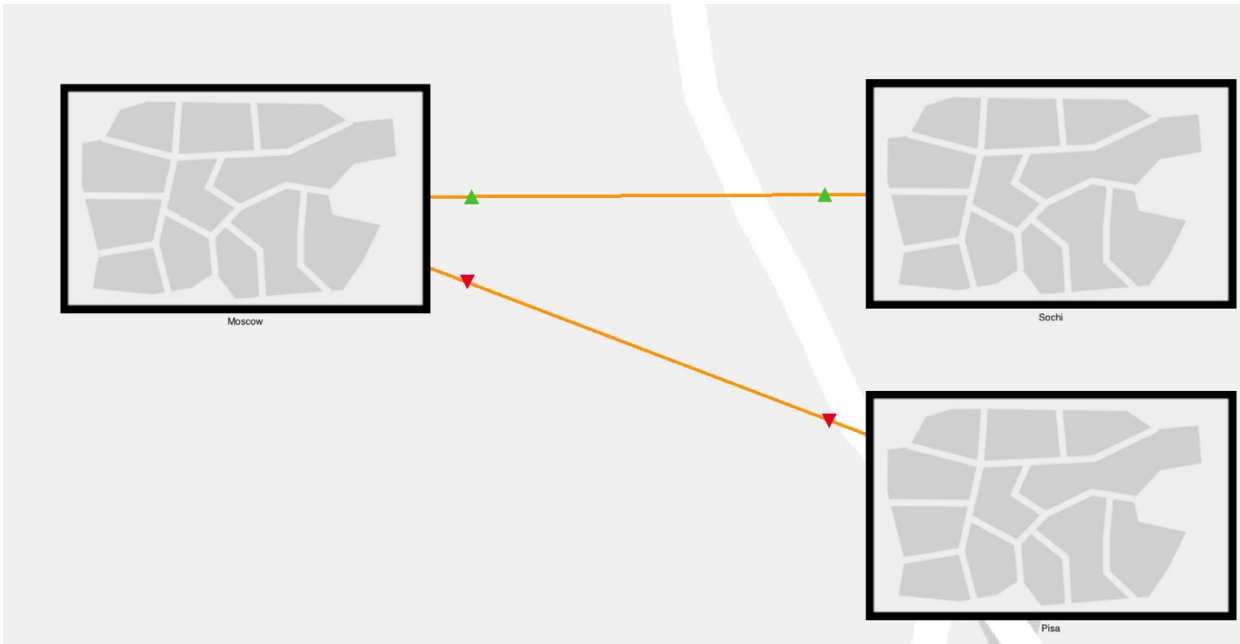


Рис. 2

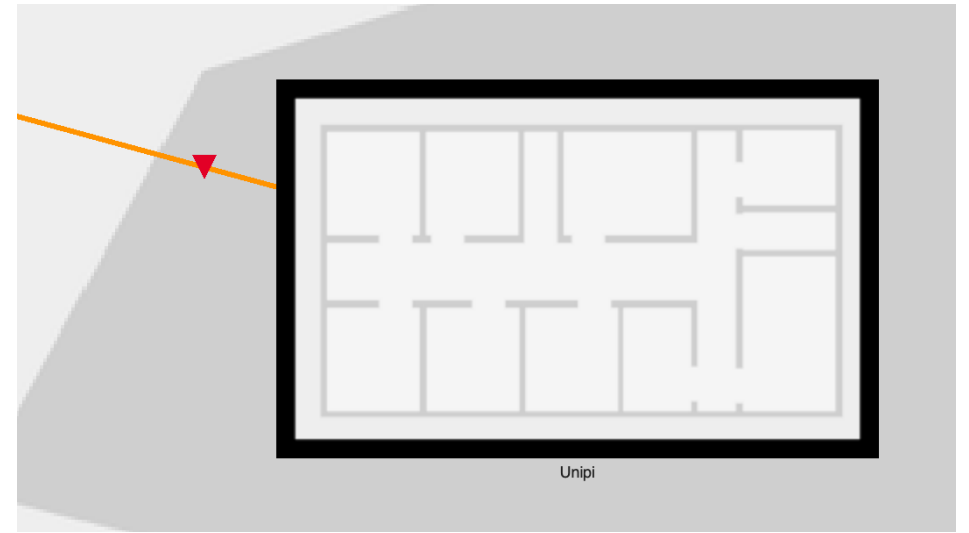


Рис. 3

# Результаты выполнения

- Сделать первоначальную настройку и настройку интерфейсов оборудования сети Университета г. Пиза.

```
pisa-unipi-nabakulin-gw-1>enable
pisa-unipi-nabakulin-gw-1#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
pisa-unipi-nabakulin-gw-1(config)#line vty 0 4
pisa-unipi-nabakulin-gw-1(config-line)#password cisco
pisa-unipi-nabakulin-gw-1(config-line)#login
pisa-unipi-nabakulin-gw-1(config-line)#exit
pisa-unipi-nabakulin-gw-1(config)#line console 0
pisa-unipi-nabakulin-gw-1(config-line)#password cisco
pisa-unipi-nabakulin-gw-1(config-line)#login
pisa-unipi-nabakulin-gw-1(config-line)#exit
pisa-unipi-nabakulin-gw-1(config)#enable secret cisco
pisa-unipi-nabakulin-gw-1(config)#service password-encryption
pisa-unipi-nabakulin-gw-1(config)#username admin privilege 1 secret cisco
pisa-unipi-nabakulin-gw-1(config)#ip domain-name unipi.edu
pisa-unipi-nabakulin-gw-1(config)#crypto key generate rsa
The name for the keys will be: pisa-unipi-nabakulin-gw-1.unipi.edu
Choose the size of the key modulus in the range of 360 to 2048 for your
  General Purpose Keys. Choosing a key modulus greater than 512 may take
  a few minutes.
```

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

```
pisa-unipi-nabakulin-gw-1(config)#line vty 0 4
*Mar 1 0:12:51.834: RSA key size needs to be at least 768 bits for ssh version 2
*Mar 1 0:12:51.834: %SSH-5-ENABLED: SSH 1.5 has been enabled
pisa-unipi-nabakulin-gw-1(config-line)#transport input ssh
```

Рис. 4

```
pisa-unipi-nabakulin-sw-1>enable
pisa-unipi-nabakulin-sw-1#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
pisa-unipi-nabakulin-sw-1(config)#line vty 0 4
pisa-unipi-nabakulin-sw-1(config-line)#password cisco
pisa-unipi-nabakulin-sw-1(config-line)#login
pisa-unipi-nabakulin-sw-1(config-line)#exit
pisa-unipi-nabakulin-sw-1(config)#line console 0
pisa-unipi-nabakulin-sw-1(config-line)#password cisco
pisa-unipi-nabakulin-sw-1(config-line)#exit
pisa-unipi-nabakulin-sw-1(config)#line console 0
pisa-unipi-nabakulin-sw-1(config-line)#password cisco
pisa-unipi-nabakulin-sw-1(config-line)#login
pisa-unipi-nabakulin-sw-1(config-line)#exit
pisa-unipi-nabakulin-sw-1(config)#enable secret cisco
pisa-unipi-nabakulin-sw-1(config)#service password-encryption
pisa-unipi-nabakulin-sw-1(config)#username admin privilege 1 secret cisco
pisa-unipi-nabakulin-sw-1(config)#ip domain-name unipi.edu
pisa-unipi-nabakulin-sw-1(config)#crypto key generate rsa
The name for the keys will be: pisa-unipi-nabakulin-sw-1.unipi.edu
Choose the size of the key modulus in the range of 360 to 2048 for your
  General Purpose Keys. Choosing a key modulus greater than 512 may take
  a few minutes.
```

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

```
pisa-unipi-nabakulin-sw-1(config)#line vty 0 4
*Mar 1 0:14:21.412: RSA key size needs to be at least 768 bits for ssh version 2
*Mar 1 0:14:21.412: %SSH-5-ENABLED: SSH 1.5 has been enabled
pisa-unipi-nabakulin-sw-1(config-line)#transport input ssh
```

Рис. 5

# Результаты выполнения

- Сделать первоначальную настройку и настройку интерфейсов оборудования сети Университета г. Пиза.

```
pisa-unipi-nabakulin-gw-1(config)#interface f0/0
pisa-unipi-nabakulin-gw-1(config-if)#no shutdown

pisa-unipi-nabakulin-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-nabakulin-gw-1(config-if)#exit
pisa-unipi-nabakulin-gw-1(config)#interface f0/0.401
pisa-unipi-nabakulin-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-nabakulin-gw-1(config-subif)#encapsulation dot1Q 401
pisa-unipi-nabakulin-gw-1(config-subif)#ip address 10.131.0.1 255.255.255.0
pisa-unipi-nabakulin-gw-1(config-subif)#description unipi-main
pisa-unipi-nabakulin-gw-1(config-subif)#exit
pisa-unipi-nabakulin-gw-1(config)#interface f0/1
pisa-unipi-nabakulin-gw-1(config-if)#no shutdown

pisa-unipi-nabakulin-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-nabakulin-gw-1(config-if)#ip address 192.0.2.20 255.255.255.0
pisa-unipi-nabakulin-gw-1(config-if)#description internet
pisa-unipi-nabakulin-gw-1(config-if)#exit
pisa-unipi-nabakulin-gw-1(config)#ip route 0.0.0.0 0.0.0.0 192.0.2.1
```

Рис. 6

```
pisa-unipi-nabakulin-sw-1(config)#interface f0/24
pisa-unipi-nabakulin-sw-1(config-if)#switchport mode trunk

pisa-unipi-nabakulin-sw-1(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/24, changed state to down

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/24, changed state to up

pisa-unipi-nabakulin-sw-1(config-if)#exit
pisa-unipi-nabakulin-sw-1(config)#interface f0/1
pisa-unipi-nabakulin-sw-1(config-if)#switchport mode access
pisa-unipi-nabakulin-sw-1(config-if)#switchport access vlan 401
% Access VLAN does not exist. Creating vlan 401
pisa-unipi-nabakulin-sw-1(config-if)#exit
pisa-unipi-nabakulin-sw-1(config)#vlan 401
pisa-unipi-nabakulin-sw-1(config-vlan)#name unipi-main
pisa-unipi-nabakulin-sw-1(config-vlan)#exit
pisa-unipi-nabakulin-sw-1(config)#interface vlan401
pisa-unipi-nabakulin-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-nabakulin-sw-1(config-if)#no shutdown
pisa-unipi-nabakulin-sw-1(config-if)#exit
```

Рис. 7

# Результаты выполнения

- Настроить VPN на основе протокола GRE.

```
msk-donskaya-nabakulin-gw-1(config)#interface Tunnel0

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

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

msk-donskaya-nabakulin-gw-1(config-if)#exit
msk-donskaya-nabakulin-gw-1(config)#interface loopback0

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

Рис. 8

```
pisa-unipi-nabakulin-gw-1(config)#interface Tunnel0

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

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

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

pisa-unipi-nabakulin-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-nabakulin-gw-1(config-if)#ip address 10.128.254.5 255.255.255.255
pisa-unipi-nabakulin-gw-1(config-if)#exit
pisa-unipi-nabakulin-gw-1(config)#ip route 10.128.254.1 255.255.255.255 10.128.255.253
^
% Invalid input detected at '^' marker.

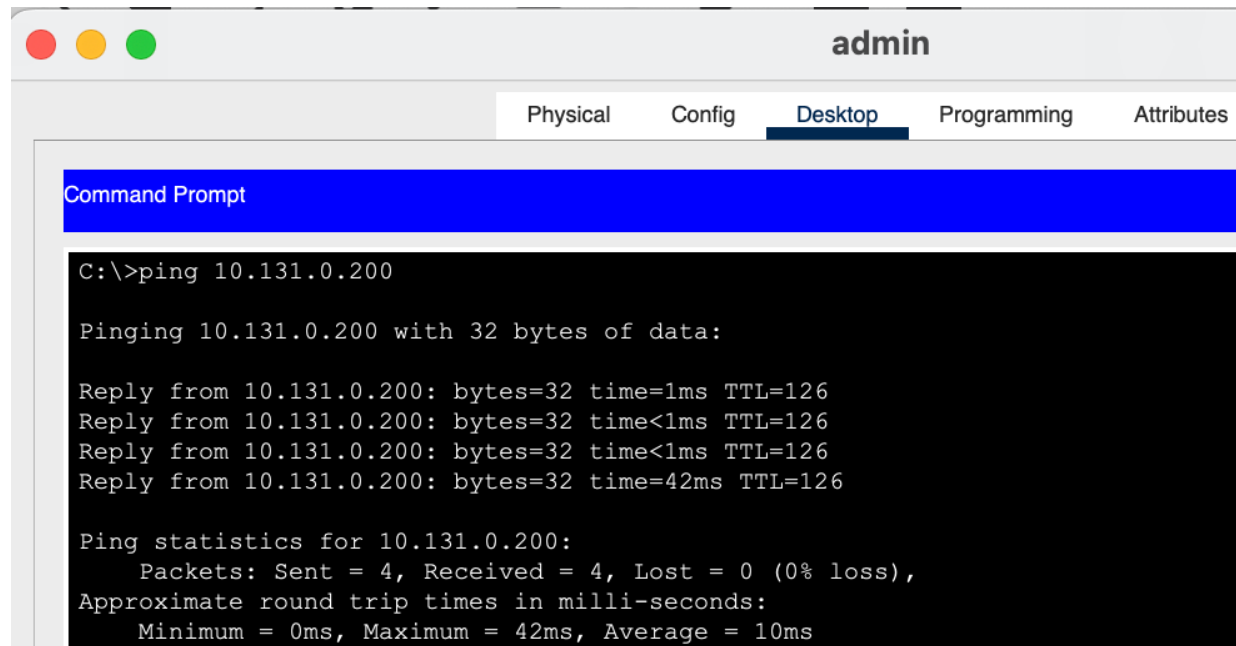
pisa-unipi-nabakulin-gw-1(config)#ip route 10.128.254.1 255.255.255.255 10.128.255.253
pisa-unipi-nabakulin-gw-1(config)#router ospf 1
pisa-unipi-nabakulin-gw-1(config-router)#router-id 10.128.254.5
pisa-unipi-nabakulin-gw-1(config-router)#network 10.0.0.0 0.255.255.255 area 0
```

Рис. 9



# Результаты выполнения

- Проверить доступность узлов сети Университета г. Пиза с ноутбука администратора сети «Донская».



The screenshot shows a window titled 'admin' with tabs for 'Physical', 'Config', 'Desktop', 'Programming', and 'Attributes'. The 'Desktop' tab is active, displaying a 'Command Prompt' window. The command prompt shows the execution of a ping command to the IP address 10.131.0.200. The output indicates that the ping was successful, with 4 packets sent and received, and a 0% loss rate. The round trip times are listed as Minimum = 0ms, Maximum = 42ms, and Average = 10ms.

```
C:\>ping 10.131.0.200

Pinging 10.131.0.200 with 32 bytes of data:

Reply from 10.131.0.200: bytes=32 time=1ms TTL=126
Reply from 10.131.0.200: bytes=32 time<1ms TTL=126
Reply from 10.131.0.200: bytes=32 time<1ms TTL=126
Reply from 10.131.0.200: bytes=32 time=42ms TTL=126

Ping statistics for 10.131.0.200:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 42ms, Average = 10ms
```

Рис. 10