

Лабораторная работа №12

Настройка NAT

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Информация

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Приобрести практические навыки по настройке доступа локальной сети к внешней сети посредством NAT.

1. Сделать первоначальную настройку маршрутизатора provider-gw-1 и коммутатора provider-sw-1 провайдера: задать имя, настроить доступ по паролю и т.п.
2. Настроить интерфейсы маршрутизатора provider-gw-1 и коммутатора provider-sw-1 провайдера.
3. Настроить интерфейсы маршрутизатора сети «Донская» для доступа к сети провайдера.
4. Настроить на маршрутизаторе сети «Донская» NAT с правилами.
5. Настроить доступ из внешней сети в локальную сеть организации.
6. Проверить работоспособность заданных настроек.
7. При выполнении работы необходимо учитывать соглашение об именовании.

Проведем первоначальную настройку маршрутизатора provider-gw-1 (рис. ??). Зададим имя, настроим доступ по паролю.

```
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-encryption
Router(config)#username admin privilege 1 secret cisco
Router(config)#^Z
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#wr m
Building configuration...
[OK]
Router#
```

```
Switch>en
Switch#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#line vty 0 4
Switch(config-line)#password cisco
Switch(config-line)#login
Switch(config-line)#exit
Switch(config)#line console 0
Switch(config-line)#password cisco
Switch(config-line)#login
Switch(config-line)#exit
Switch(config)#enable secret cisco
Switch(config)#service password-encryption
Switch(config)#username admin privilege 1 secret cisco
Switch(config)#^Z
Switch#
%SYS-5-CONFIG_I: Configured from console by console

Switch#wr m
Building configuration...
[OK]
Switch#
```


Выполнение лабораторной работы

```
Router#en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname provider-cahanqirov-qw-1
provider-cahanqirov-qw-1(config)#interface f0/0
provider-cahanqirov-qw-1(config-if)#no shutdown

provider-cahanqirov-qw-1(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

provider-cahanqirov-qw-1(config-if)#exit
provider-cahanqirov-qw-1(config)#interface f0/0.4
provider-cahanqirov-qw-1(config-subif)#
%LINK-5-CHANGED: Interface FastEthernet0/0.4, changed state to up

provider-cahanqirov-qw-1(config-subif)#encapsulation dot1Q 4
provider-cahanqirov-qw-1(config-subif)#ip address 198.51.100.1 255.255.255.240
provider-cahanqirov-qw-1(config-subif)#description mks-donskaya
provider-cahanqirov-qw-1(config-subif)#exit
provider-cahanqirov-qw-1(config)#interface f0/1
provider-cahanqirov-qw-1(config-if)#no shutdown

provider-cahanqirov-qw-1(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to up

provider-cahanqirov-qw-1(config-if)#ip address 192.0.2.1 255.255.255.0
provider-cahanqirov-qw-1(config-if)#description internet
provider-cahanqirov-qw-1(config-if)#exit
provider-cahanqirov-qw-1(config)#exit
provider-cahanqirov-qw-1#
%SYS-5-CONFIG I: Configured from console by console
```

Выполнение лабораторной работы

```
provider-cahanqirov-sw-1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
provider-cahanqirov-sw-1(config)#interface f0/1
provider-cahanqirov-sw-1(config-if)#switchport mode trunk

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

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

provider-cahanqirov-sw-1(config-if)#exit
provider-cahanqirov-sw-1(config)#interface f0/2
provider-cahanqirov-sw-1(config-if)#switchport mode trunk
provider-cahanqirov-sw-1(config-if)#exit
provider-cahanqirov-sw-1(config)#vlan 4
provider-cahanqirov-sw-1(config-vlan)#name nat
provider-cahanqirov-sw-1(config-vlan)#exit
provider-cahanqirov-sw-1(config)#interface vlan4
provider-cahanqirov-sw-1(config-if)#
%LINK-5-CHANGED: Interface Vlan4, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan4, changed state to up

provider-cahanqirov-sw-1(config-if)#no shutdown
provider-cahanqirov-sw-1(config-if)#exit
provider-cahanqirov-sw-1(config)#^Z
provider-cahanqirov-sw-1#
%SYS-5-CONFIG_I: Configured from console by console

provider-cahanqirov-sw-1#wr m
Building configuration...
[OK]
provider-cahanqirov-sw-1#
```

Выполнение лабораторной работы

Password:

```
msk-donskaya-cahanqirov-gw-1>en
```

Password:

```
msk-donskaya-cahanqirov-gw-1#conf t
```

Enter configuration commands, one per line. End with CNTL/Z.

```
msk-donskaya-cahanqirov-gw-1(config)#interface f0/1
```

```
msk-donskaya-cahanqirov-gw-1(config-if)#no shutdown
```

```
msk-donskaya-cahanqirov-gw-1(config-if)#
```

%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to up

```
msk-donskaya-cahanqirov-gw-1(config-if)#exit
```

```
msk-donskaya-cahanqirov-gw-1(config)#interface f0/1.4
```

```
msk-donskaya-cahanqirov-gw-1(config-subif)#
```

%LINK-5-CHANGED: Interface FastEthernet0/1.4, changed state to up

```
msk-donskaya-cahanqirov-gw-1(config-subif)#encapsulation dot1Q 4
```

```
msk-donskaya-cahanqirov-gw-1(config-subif)#ip address 198.51.100.2 255.255.255.240
```

```
msk-donskaya-cahanqirov-gw-1(config-subif)#description internet
```

```
msk-donskaya-cahanqirov-gw-1(config-subif)#exit
```

```
msk-donskaya-cahanqirov-gw-1(config)#exit
```

```
msk-donskaya-cahanqirov-gw-1#
```

%SYS-5-CONFIG_I: Configured from console by console

```
msk-donskaya-cahanqirov-gw-1#wr m
```

Building configuration...

[OK]

```
msk-donskaya-cahanqirov-gw-1#conf t
```

Enter configuration commands, one per line. End with CNTL/Z.

```
msk-donskaya-cahanqirov-gw-1(config)#ip route 0.0.0.0 0.0.0.0 198.51.100.1
```

```
msk-donskaya-cahanqirov-gw-1(config)#exit
```

```
msk-donskaya-cahanqirov-gw-1#
```

%SYS-5-CONFIG_I: Configured from console by console

```
msk-donskaya-cahanqirov-gw-1#^Z
```

```
msk-donskaya-cahanqirov-gw-1#wr m
```

Building configuration...

[OK]

```
msk-donskaya-cahanqirov-gw-1#
```

```
[OK]
msk-donskaya-cahanqirov-gw-1#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
msk-donskaya-cahanqirov-gw-1(config)#ip nat pool main pool 198.51.100.2 198.51.100.14 netmask
255.255.255.240
                                     ^
% Invalid input detected at '^' marker.

msk-donskaya-cahanqirov-gw-1(config)#ip nat pool main-pool 198.51.100.2 198.51.100.14 netmask
255.255.255.240
msk-donskaya-cahanqirov-gw-1(config)#^Z
msk-donskaya-cahanqirov-gw-1#
%SYS-5-CONFIG_I: Configured from console by console

msk-donskaya-cahanqirov-gw-1#wr m
```

Figure 6: Проверка доступности маршрутизатора

Теперь настроим список доступа к nat на всех подсетях для пользователей(рис. ??).

```
[OK]
msk-donskaya-cahanqirov-gw-1#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
msk-donskaya-cahanqirov-gw-1(config)#ip access-list extended nat-inet
msk-donskaya-cahanqirov-gw-1(config-ext-nacl)#remark dk
msk-donskaya-cahanqirov-gw-1(config-ext-nacl)#permit tcp 10.128.3.0 0.0.0.255 host 192.0.2.11 eq 80
msk-donskaya-cahanqirov-gw-1(config-ext-nacl)#permit tcp 10.128.3.0 0.0.0.255 host 192.0.2.12 eq 80
msk-donskaya-cahanqirov-gw-1(config-ext-nacl)#remark departments
msk-donskaya-cahanqirov-gw-1(config-ext-nacl)#permit tcp 10.128.4.0 0.0.0.255 host 192.0.2.13 eq 80
msk-donskaya-cahanqirov-gw-1(config-ext-nacl)#remark admin
msk-donskaya-cahanqirov-gw-1(config-ext-nacl)#permit ip host 10.128.6.200 any
msk-donskaya-cahanqirov-gw-1(config-ext-nacl)#^Z
msk-donskaya-cahanqirov-gw-1#
%SYS-5-CONFIG_I: Configured from console by console

msk-donskaya-cahanqirov-gw-1#wr m
Building configuration...
[OK]
msk-donskaya-cahanqirov-gw-1#
```

Figure 7: Настройка списка доступа для NAT

Выполнение лабораторной работы

```
msk-donskaya-cahanqirov-gw-1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
msk-donskaya-cahanqirov-gw-1(config)#ip nat inside source list nat-inet pool main-pool overload
msk-donskaya-cahanqirov-gw-1(config)#int f0/0.3
msk-donskaya-cahanqirov-gw-1(config-subif)#ip nat inside
msk-donskaya-cahanqirov-gw-1(config-subif)#interface f0/0.101
msk-donskaya-cahanqirov-gw-1(config-subif)#ip nat inside
msk-donskaya-cahanqirov-gw-1(config-subif)#interface f0/0.102
msk-donskaya-cahanqirov-gw-1(config-subif)#ip nat inside
msk-donskaya-cahanqirov-gw-1(config-subif)#interface f0/0.103
msk-donskaya-cahanqirov-gw-1(config-subif)#exit
msk-donskaya-cahanqirov-gw-1(config)#int f0/0.3
msk-donskaya-cahanqirov-gw-1(config-subif)#ip nat inside
msk-donskaya-cahanqirov-gw-1(config-subif)#interface f0/0.101
msk-donskaya-cahanqirov-gw-1(config-subif)#ip nat inside
msk-donskaya-cahanqirov-gw-1(config-subif)#exit
msk-donskaya-cahanqirov-gw-1(config)#interface f0/0.102
msk-donskaya-cahanqirov-gw-1(config-subif)#ip nat inside
msk-donskaya-cahanqirov-gw-1(config-subif)#exit
msk-donskaya-cahanqirov-gw-1(config)#interface f0/0.103
msk-donskaya-cahanqirov-gw-1(config-subif)#
msk-donskaya-cahanqirov-gw-1(config-subif)#ip nat inside
msk-donskaya-cahanqirov-gw-1(config-subif)#exit
msk-donskaya-cahanqirov-gw-1(config)#interface f0/0.104
msk-donskaya-cahanqirov-gw-1(config-subif)#ip nat inside
msk-donskaya-cahanqirov-gw-1(config-subif)#exit
msk-donskaya-cahanqirov-gw-1(config)#interface f0/1.4
msk-donskaya-cahanqirov-gw-1(config-subif)#ip nat outside
msk-donskaya-cahanqirov-gw-1(config-subif)#exit
msk-donskaya-cahanqirov-gw-1(config)#^Z
msk-donskaya-cahanqirov-gw-1#
%SYS-5-CONFIG_I: Configured from console by console

msk-donskaya-cahanqirov-gw-1#wr m
Building configuration...
[OK]
msk-donskaya-cahanqirov-gw-1#
```

Выполнение лабораторной работы

```
C:\>ping 198.51.100.1
```

```
Pinging 198.51.100.1 with 32 bytes of data:
```

```
Reply from 198.51.100.1: bytes=32 time<1ms TTL=254
```

```
Reply from 198.51.100.1: bytes=32 time<1ms TTL=254
```

```
Request timed out.
```

```
Reply from 198.51.100.1: bytes=32 time=1ms TTL=254
```

```
Ping statistics for 198.51.100.1:
```

```
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
```

```
Approximate round trip times in milli-seconds:
```

```
    Minimum = 0ms, Maximum = 1ms, Average = 0ms
```

```
C:\>ping 198.51.100.2
```

```
Pinging 198.51.100.2 with 32 bytes of data:
```

```
Reply from 198.51.100.2: bytes=32 time<1ms TTL=255
```

```
Reply from 198.51.100.2: bytes=32 time<1ms TTL=255
```

```
Reply from 198.51.100.2: bytes=32 time<1ms TTL=255
```

```
Reply from 198.51.100.2: bytes=32 time<1ms TTL=255
```

```
Ping statistics for 198.51.100.2:
```

```
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
```

```
Approximate round trip times in milli-seconds:
```

```
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

```
msk-donskaya-cahanqirov-gw-1#
msk-donskaya-cahanqirov-gw-1#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
msk-donskaya-cahanqirov-gw-1(config)#ip nat inside source static tcp 10.128.0.2 80 198.51.100.2 80
msk-donskaya-cahanqirov-gw-1(config)#ip nat inside source static tcp 10.128.0.3 20 198.51.100.3 20
msk-donskaya-cahanqirov-gw-1(config)#ip nat inside source static tcp 10.128.0.3 21 198.51.100.3 21
msk-donskaya-cahanqirov-gw-1(config)#ip nat inside source static tcp 10.128.0.4 25 198.51.100.4 25
msk-donskaya-cahanqirov-gw-1(config)#ip nat inside source static tcp 10.128.0.4 110 198.51.100.4
110
msk-donskaya-cahanqirov-gw-1(config)#ip nat inside source static tcp 10.128.6.200 3389
198.51.100.10 3389
msk-donskaya-cahanqirov-gw-1(config)#^Z
msk-donskaya-cahanqirov-gw-1#
%SYS-5-CONFIG_I: Configured from console by console

msk-donskaya-cahanqirov-gw-1#wr m
Building configuration...
```

Figure 10: Настройка доступа из Интернета

Добавим ноутбук на территории Интернета (рис. ??).

Выполнение лабораторной работы

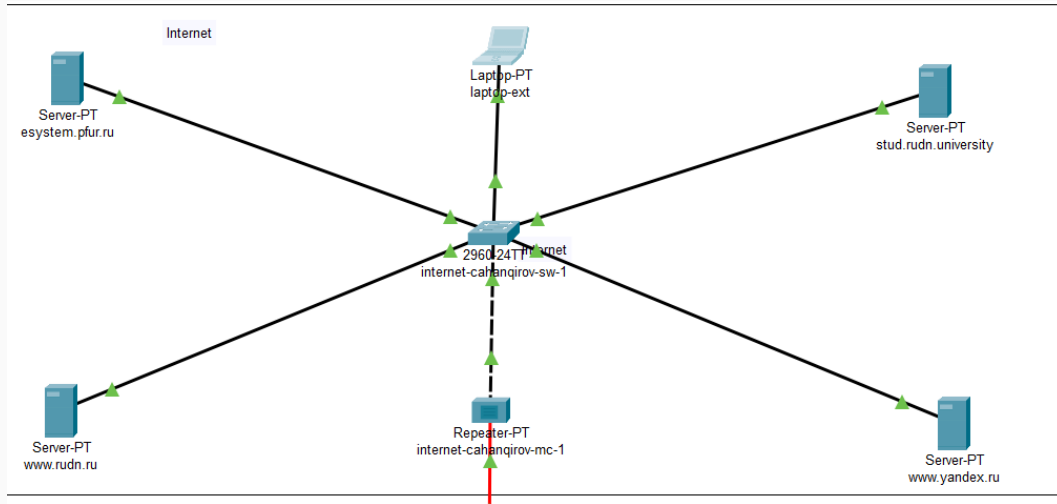


Figure 11: Добавление ноутбука на территорию Интернет

Выполнение лабораторной работы

```
C:\>ping 192.0.2.1
```

```
Pinging 192.0.2.1 with 32 bytes of data:
```

```
Reply from 192.0.2.1: bytes=32 time<1ms TTL=255
```

```
Reply from 192.0.2.1: bytes=32 time<1ms TTL=255
```

```
Reply from 192.0.2.1: bytes=32 time<1ms TTL=255
```

```
Reply from 192.0.2.1: bytes=32 time<1ms TTL=255
```

```
Ping statistics for 192.0.2.1:
```

```
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
```

```
Approximate round trip times in milli-seconds:
```

```
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

```
C:\>ftp 10.128.0.3
```

```
Trying to connect...10.128.0.3
```

```
C:\>ftp 198.51.100.3
```

```
Trying to connect...198.51.100.3
```

```
Connected to 198.51.100.3
```

```
220- Welcome to PT Ftp server
```

```
Username:cisco
```

```
331- Username ok, need password
```

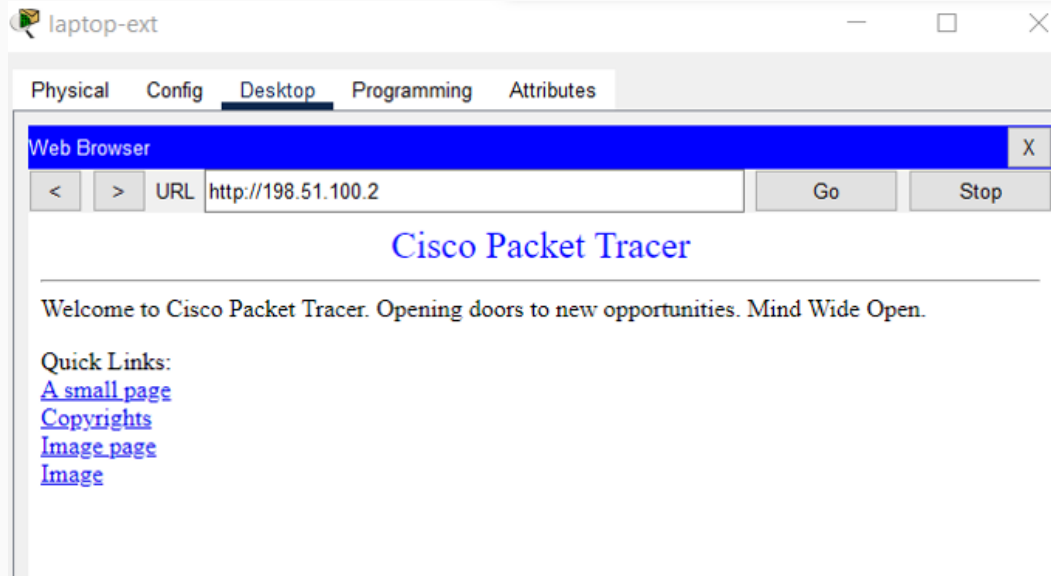
```
Password:
```

```
230- Logged in
```

```
(passive mode On)
```

```
ftp>
```

```
C:\>
```



В результате выполнения данной лабораторной работы я приобрел практические навыки по настройке доступа локальной сети к внешней сети посредством NAT.