

Лабораторная работа № 12

Настройка NAT

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Информация

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Приобретение практических навыков 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

```
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname provider-yazgeldi-gw-1
provider-yazgeldi-gw-1(config)#line vty 0 4
provider-yazgeldi-gw-1(config-line)#password cisco
provider-yazgeldi-gw-1(config-line)#login
provider-yazgeldi-gw-1(config-line)#exit
provider-yazgeldi-gw-1(config)#line console 0
provider-yazgeldi-gw-1(config-line)#password cisco
provider-yazgeldi-gw-1(config-line)#login
provider-yazgeldi-gw-1(config-line)#exit
provider-yazgeldi-gw-1(config)#enable secret cisco
provider-yazgeldi-gw-1(config)#service password-encryption
provider-yazgeldi-gw-1(config)#username admin privilege 1 secret cisco
provider-yazgeldi-gw-1(config)#^Z
provider-yazgeldi-gw-1#
%SYS-5-CONFIG_I: Configured from console by console
wr m
Building configuration...
[OK]
```

Рис. 1: Первоначальная настройка маршрутизатора provider-gw-1

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

provider-yazgeldi-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

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

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0.4, changed state to up

provider-yazgeldi-gw-1(config-subif)#encapsulation dot1Q 4
provider-yazgeldi-gw-1(config-subif)#ip address 198.51.100.1 255.255.255.240
provider-yazgeldi-gw-1(config-subif)#description msk-donskaya
provider-yazgeldi-gw-1(config-subif)#exit
provider-yazgeldi-gw-1(config)#int f0/1
provider-yazgeldi-gw-1(config-if)#no shutdown

provider-yazgeldi-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

provider-yazgeldi-gw-1(config-if)#ip address 192.0.2.1 255.255.255.0
provider-yazgeldi-gw-1(config-if)#description internet
provider-yazgeldi-gw-1(config-if)#exit
```

Рис. 2: Первоначальная настройка маршрутизатора provider-sw-1

```
Switch#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#hostname provider-yazgeldi-sw-1
provider-yazgeldi-sw-1(config)#line vty 0 4
provider-yazgeldi-sw-1(config-line)#password cisco
provider-yazgeldi-sw-1(config-line)#login
provider-yazgeldi-sw-1(config-line)#exit
provider-yazgeldi-sw-1(config)#line console 0
provider-yazgeldi-sw-1(config-line)#password cisco
provider-yazgeldi-sw-1(config-line)#login
provider-yazgeldi-sw-1(config-line)#exit
provider-yazgeldi-sw-1(config)#enable secret cisco
provider-yazgeldi-sw-1(config)#service password-encryption
provider-yazgeldi-sw-1(config)#username admin privilege 1 secret cisco
provider-yazgeldi-sw-1(config)#^Z
provider-yazgeldi-sw-1#
```

Рис. 3: Настройка интерфейсов маршрутизатора provider-gw-1


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

provider-yazgeldi-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-yazgeldi-sw-1(config-if)#exit
provider-yazgeldi-sw-1(config)#int f0/2
provider-yazgeldi-sw-1(config-if)#switchport mode trunk

provider-yazgeldi-sw-1(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/2, changed state to down

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/2, changed state to up

provider-yazgeldi-sw-1(config-if)#exit
provider-yazgeldi-sw-1(config)#vlan 4
provider-yazgeldi-sw-1(config-vlan)#name nat
provider-yazgeldi-sw-1(config-vlan)#exit
provider-yazgeldi-sw-1(config)#int vlan4
provider-yazgeldi-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-yazgeldi-sw-1(config-if)#no shutdown
provider-yazgeldi-sw-1(config-if)#exit
provider-yazgeldi-sw-1(config)#^Z
provider-yazgeldi-sw-1#
%SYS-5-CONFIG_I: Configured from console by console
wr m
Building configuration...
[OK]
```

Рис. 4: Настройка интерфейсов коммутатора provider-sw-1

```
msk-donskaya-yazgeldi-gw-1>en
Password:
msk-donskaya-yazgeldi-gw-1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
msk-donskaya-yazgeldi-gw-1(config)#int f0/1
msk-donskaya-yazgeldi-gw-1(config-if)#no shutdown

msk-donskaya-yazgeldi-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

msk-donskaya-yazgeldi-gw-1(config-if)#exit
msk-donskaya-yazgeldi-gw-1(config)#int f0/1.4
msk-donskaya-yazgeldi-gw-1(config-subif)#
%LINK-5-CHANGED: Interface FastEthernet0/1.4, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1.4, changed state to up

msk-donskaya-yazgeldi-gw-1(config-subif)#encapsulation dot1Q 4
      ^
% Invalid input detected at '^' marker.

msk-donskaya-yazgeldi-gw-1(config-subif)#encapsulation dot1Q 4
msk-donskaya-yazgeldi-gw-1(config-subif)#ip address 198.51.100.2 255.255.255.240
msk-donskaya-yazgeldi-gw-1(config-subif)#description internet
msk-donskaya-yazgeldi-gw-1(config-subif)#exit
msk-donskaya-yazgeldi-gw-1(config)#^Z
msk-donskaya-yazgeldi-gw-1#
%SYS-5-CONFIG_I: Configured from console by console
wr m
Building configuration...
[OK]
msk-donskaya-yazgeldi-gw-1#en
msk-donskaya-yazgeldi-gw-1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
msk-donskaya-yazgeldi-gw-1(config)#ip route 0.0.0.0 0.0.0.0 198.51.100.1
msk-donskaya-yazgeldi-gw-1(config)#exit
msk-donskaya-yazgeldi-gw-1#
%SYS-5-CONFIG_I: Configured from console by console

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

Рис. 5: Настройка интерфейсов маршрутизатора msk-donskaya-gw-1

```
msk-donskaya-yazgeldi-gw-1#ping 198.51.100.1  
  
Type escape sequence to abort.  
Sending 5, 100-byte ICMP Echos to 198.51.100.1, timeout is 2 seconds:  
!!!!!!  
Success rate is 100 percent (5/5), round-trip min/avg/max = 0/6/15 ms
```

Рис. 6: Проверка доступности маршрутизатора

```
msk-donskaya-yazgeldi-gw-1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
msk-donskaya-yazgeldi-gw-1(config)#ip nat pool main-pool 198.51.100.2 198.51.100.14 netmask
255.255.255.240
msk-donskaya-yazgeldi-gw-1(config)#^Z
msk-donskaya-yazgeldi-gw-1#
%SYS-5-CONFIG_I: Configured from console by console
wr m
Building configuration...
[OK]
```

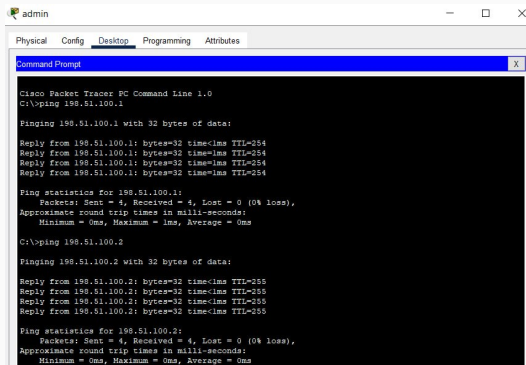
Рис. 7: Настройка пула адресов для NAT

```
msk-donskaya-yazgeldi-gw-1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
msk-donskaya-yazgeldi-gw-1(config)#ip access-list extended nat-inet
msk-donskaya-yazgeldi-gw-1(config-ext-nacl)#remark dk
msk-donskaya-yazgeldi-gw-1(config-ext-nacl)#permit tcp 10.128.3.0 0.0.0.255 host 192.0.2.11 eq 80
msk-donskaya-yazgeldi-gw-1(config-ext-nacl)#permit tcp 10.128.3.0 0.0.0.255 host 192.0.2.12 eq 80
msk-donskaya-yazgeldi-gw-1(config-ext-nacl)#remark departments
msk-donskaya-yazgeldi-gw-1(config-ext-nacl)#permit tcp 10.128.4.0 0.0.0.255 host 192.0.2.13 eq 80
msk-donskaya-yazgeldi-gw-1(config-ext-nacl)#remark adm
msk-donskaya-yazgeldi-gw-1(config-ext-nacl)#permit tcp 10.128.5.0 0.0.0.255 host 192.0.2.14 eq 80
msk-donskaya-yazgeldi-gw-1(config-ext-nacl)#remark admin
msk-donskaya-yazgeldi-gw-1(config-ext-nacl)#permit ip host 10.128.6.200 any
msk-donskaya-yazgeldi-gw-1(config-ext-nacl)#2
msk-donskaya-yazgeldi-gw-1#
%SYS-5-CONFIG_I: Configured from console by console
VR #
Building configuration...
[OK]
```

Рис. 8: Настройка списка доступа для NAT

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

Рис. 9: Настройка Port Address Translation



The screenshot shows a Cisco Packet Tracer PC Command Line window for a device named 'admin'. The window has tabs for 'Physical', 'Config', 'Desktop', 'Programming', and 'Attributes', with 'Desktop' currently selected. The Command Prompt displays the output of two ping commands. The first command is 'C:\>ping 198.51.100.1', which shows four successful replies from 198.51.100.1 with 32 bytes of data, a time of 1ms, and a TTL of 254. The ping statistics for 198.51.100.1 show 4 packets sent, 4 received, 0 lost, and approximate round trip times of 0ms, 1ms, and 0ms. The second command is 'C:\>ping 198.51.100.2', which also shows four successful replies from 198.51.100.2 with 32 bytes of data, a time of 1ms, and a TTL of 255. The ping statistics for 198.51.100.2 show 4 packets sent, 4 received, 0 lost, and approximate round trip times of 0ms, 0ms, and 0ms.

```
admin
Physical Config Desktop Programming Attributes
Command Prompt
Cisco Packet Tracer PC Command Line 1.0
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
Reply from 198.51.100.1: bytes=32 time=1ms TTL=254
Reply from 198.51.100.1: bytes=32 time=1ms TTL=254

Ping statistics for 198.51.100.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% 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
```

Рис. 10: Проверка доступности маршрутизатора

```
msk-donskaya-yazgeldi-gw-1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
msk-donskaya-yazgeldi-gw-1(config)#ip nat inside source static tcp 10.128.0.2 80 198.51.100.2 80
msk-donskaya-yazgeldi-gw-1(config)#ip nat inside source static tcp 10.128.0.3 80 198.51.100.3 80
msk-donskaya-yazgeldi-gw-1(config)#no ip nat inside source static tcp 10.128.0.3 80 198.51.100.3 80
msk-donskaya-yazgeldi-gw-1(config)#ip nat inside source static tcp 10.128.0.3 20 198.51.100.3 20
msk-donskaya-yazgeldi-gw-1(config)#ip nat inside source static tcp 10.128.0.3 21 198.51.100.3 21
msk-donskaya-yazgeldi-gw-1(config)#ip nat inside source static tcp 10.128.0.4 25 198.51.100.4 25
msk-donskaya-yazgeldi-gw-1(config)#ip nat inside source static tcp 10.128.0.4 110 198.51.100.4 110
msk-donskaya-yazgeldi-gw-1(config)#ip nat inside source static tcp 10.128.6.200 3389 198.51.100.10 3389
msk-donskaya-yazgeldi-gw-1(config)#exit
msk-donskaya-yazgeldi-gw-1#
%SYS-5-CONFIG_I: Configured from console by console
wr m
Building configuration...
[OK]
```

Рис. 11: Проверка доступности маршрутизатора

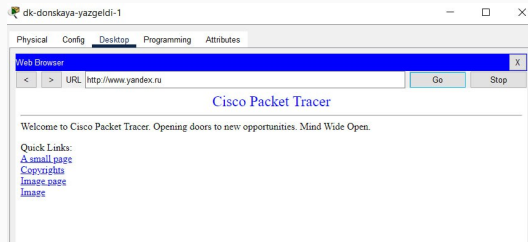


Рис. 12: Доступ dk-donskaya к www.yandex.ru



Рис. 13: Доступ dep-donskaya к 192.0.2.13

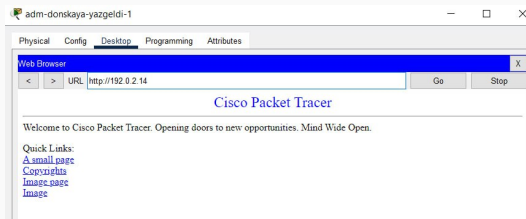


Рис. 14: Доступ adm-donskaya к 192.0.2.14

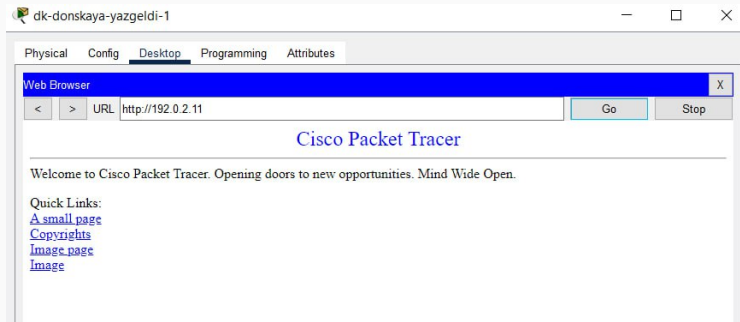


Рис. 15: Доступ dk-donskaya к 192.0.2.11

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