

# **Лабораторная работа №12**

**Настройка NAT**

Лушин Артём Андреевич

# Содержание

1	Цель работы	4
2	Выполнение лабораторной работы	5
3	Выводы	12

# Список иллюстраций

2.1	Настройка маршрутизатора в провайдере . . . . .	5
2.2	Настройка коммутатора в провайдере . . . . .	5
2.3	Настройка интерфейса маршрутизатора . . . . .	6
2.4	Настройка интерфейса коммутатора . . . . .	7
2.5	Интерфейса маршрутизатора Донская . . . . .	7
2.6	Настройка адресов . . . . .	8
2.7	Настройка списка доступа (Кафедра) . . . . .	8
2.8	Настройка списка доступа (Администрация) . . . . .	8
2.9	Настройка списка доступа (Ноутбук админа) . . . . .	8
2.10	Настройка PAT . . . . .	9
2.11	Интерфейс для NAT . . . . .	9
2.12	Доступ из интернет (WWW) . . . . .	9
2.13	Доступ из интернет (Файловый сервер) . . . . .	9
2.14	Доступ из интернет (Почтовый сервер) . . . . .	9
2.15	Доступ из интернет (Доступ по RDR) . . . . .	10
2.16	Проверка . . . . .	10
2.17	Проверка . . . . .	10
2.18	Проверка . . . . .	11
2.19	Проверка . . . . .	11

# 1 Цель работы

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

## 2 Выполнение лабораторной работы

- 1) Я сделал первоначальную настройку маршрутизатора и коммутатора в сети провайдера.

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

Рис. 2.1: Настройка маршрутизатора в провайдере

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

provider-aalushin-sw-1(config-line)#login
provider-aalushin-sw-1(config-line)#exit
provider-aalushin-sw-1(config)#line console 0
provider-aalushin-sw-1(config-line)#password cisco
provider-aalushin-sw-1(config-line)#login
provider-aalushin-sw-1(config-line)#exit
provider-aalushin-sw-1(config)#enable secret cisco
provider-aalushin-sw-1(config)#service password-encryption
provider-aalushin-sw-1(config)#username admin privilege 1 secret cisco
provider-aalushin-sw-1(config)#exit
provider-aalushin-sw-1#
%SYS-5-CONFIG_I: Configured from console by console

provider-aalushin-sw-1#
```

Рис. 2.2: Настройка коммутатора в провайдере

## 2) Настроил интерфейсы маршрутизатора и коммутатора на провайдерах.

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

provider-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

provider-aalushin-gw-1(config-if)#exit
provider-aalushin-gw-1(config)#int f0/4
%Invalid interface type and number
provider-aalushin-gw-1(config)#int f0/0.4
provider-aalushin-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-aalushin-gw-1(config-subif)#encapsulation dot1Q 4
provider-aalushin-gw-1(config-subif)#ip address 192.51.100.1 255.255.255.240
provider-aalushin-gw-1(config-subif)#description msk-donskaya
provider-aalushin-gw-1(config-subif)#exit
provider-aalushin-gw-1(config)#int f0/1
provider-aalushin-gw-1(config-if)#no shutdown
% Invalid input detected at '^' marker.

provider-aalushin-gw-1(config-if)#
provider-aalushin-gw-1(config-if)#no shutdown

provider-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

provider-aalushin-gw-1(config-if)#ip address 192.0.2.1 255.255.255.0
provider-aalushin-gw-1(config-if)#description internet
provider-aalushin-gw-1(config-if)#exit
provider-aalushin-gw-1(config)#exit
provider-aalushin-gw-1#
%SYS-5-CONFIG_I: Configured from console by console

provider-aalushin-gw-1#wr mem
Building configuration...
[OK]
provider-aalushin-gw-1#
```

Рис. 2.3: Настройка интерфейса маршрутизатора

```

provider-aalushin-sw-1(config)#int f0/1
provider-aalushin-sw-1(config-if)#switchport mode trunk

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

provider-aalushin-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-aalushin-sw-1(config-if)#exit
provider-aalushin-sw-1(config)#vlan 4
provider-aalushin-sw-1(config-vlan)#name nat
provider-aalushin-sw-1(config-vlan)#exit
provider-aalushin-sw-1(config)#int vlan 4
provider-aalushin-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-aalushin-sw-1(config-if)#no shutdown
^
% Invalid input detected at '^' marker.

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

provider-aalushin-sw-1#wr mem
Building configuration...
[OK]
provider-aalushin-sw-1#

```

Рис. 2.4: Настройка интерфейса коммутатора

### 3) Настроил интерфейсы маршрутизатора сети Донская для доступа к сети провайдера.

```

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)#interface f0/1
msk-donskaya-aalushin-gw-1(config-if)#no shutdown

msk-donskaya-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

msk-donskaya-aalushin-gw-1(config-if)#exit
msk-donskaya-aalushin-gw-1(config)#interface f0/1.4
msk-donskaya-aalushin-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-aalushin-gw-1(config-subif)#encapsulation dot1Q 4
msk-donskaya-aalushin-gw-1(config-subif)#ip address 198.51.100.2 255.255.255.240
msk-donskaya-aalushin-gw-1(config-subif)#description internet
msk-donskaya-aalushin-gw-1(config-subif)#exit
msk-donskaya-aalushin-gw-1(config)#exit
msk-donskaya-aalushin-gw-1#
%SYS-5-CONFIG_I: Configured from console by console

msk-donskaya-aalushin-gw-1#wr mem
Building configuration...
[OK]
msk-donskaya-aalushin-gw-1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
msk-donskaya-aalushin-gw-1(config)#ip route 0.0.0.0 0.0.0.0 198.51.100.1
msk-donskaya-aalushin-gw-1(config)#exit
msk-donskaya-aalushin-gw-1#
%SYS-5-CONFIG_I: Configured from console by console

msk-donskaya-aalushin-gw-1#wr

```

Рис. 2.5: Интерфейса маршрутизатора Донская

#### 4) Настроил на маршрутизаторе сети Донская NAT с правилами, указанными в лабораторной.

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

Рис. 2.6: Настройка адресов

```
msk-donskaya-aalushin-gw-1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
msk-donskaya-aalushin-gw-1(config)#ip access-list extended nat-inet
msk-donskaya-aalushin-gw-1(config-ext-nacl)#remark department
msk-donskaya-aalushin-gw-1(config-ext-nacl)#permit tcp 10.128.4.0 0.0.0.255 host 192.0.2.13 eq
80
msk-donskaya-aalushin-gw-1(config-ext-nacl)#^Z
msk-donskaya-aalushin-gw-1#
%SYS-5-CONFIG_I: Configured from console by console
msk-donskaya-aalushin-gw-1#we
```

Рис. 2.7: Настройка списка доступа (Кафедра)

```
msk-donskaya-aalushin-gw-1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
msk-donskaya-aalushin-gw-1(config)#ip access-list extended nat-inet
msk-donskaya-aalushin-gw-1(config-ext-nacl)#remark adm
msk-donskaya-aalushin-gw-1(config-ext-nacl)#permit tcp 10.128.0.5 0.0.0.255 host 192.0.2.14 eq
80
msk-donskaya-aalushin-gw-1(config-ext-nacl)#^Z
msk-donskaya-aalushin-gw-1#
%SYS-5-CONFIG_I: Configured from console by console

msk-donskaya-aalushin-gw-1#wr mem
Building configuration...
[OK]
```

Рис. 2.8: Настройка списка доступа (Администрация)

```
msk-donskaya-aalushin-gw-1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
msk-donskaya-aalushin-gw-1(config)#ip access-list extended nat-inet
msk-donskaya-aalushin-gw-1(config-ext-nacl)#remark admin
msk-donskaya-aalushin-gw-1(config-ext-nacl)#permit ip host 10.128.6.200 any
msk-donskaya-aalushin-gw-1(config-ext-nacl)#^Z
msk-donskaya-aalushin-gw-1#
%SYS-5-CONFIG_I: Configured from console by console

msk-donskaya-aalushin-gw-1#wr mem
Building configuration...
[OK]
```

Рис. 2.9: Настройка списка доступа (Ноутбук админа)

#### 5) Настроил NAT.



```
msk-donskaya-aalushin-gw-1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
msk-donskaya-aalushin-gw-1(config)#ip nat inside source list nat-inet pool main-pool overload
msk-donskaya-aalushin-gw-1(config)#^Z
msk-donskaya-aalushin-gw-1#
%SYS-5-CONFIG_I: Configured from console by console
```

Рис. 2.10: Настройка PAT

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

msk-donskaya-aalushin-gw-1#wr mem
Building configuration...
[OK]
```

Рис. 2.11: Интерфейс для NAT

## 6) Настроил доступ из Интернета.

```
msk-donskaya-aalushin-gw-1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
msk-donskaya-aalushin-gw-1(config)#ip nat inside source static tcp 10.128.0.2 80 198.51.100.2 80
```

Рис. 2.12: Доступ из интернет (WWW)

```
msk-donskaya-aalushin-gw-1(config)#ip nat inside source static tcp 10.128.0.3 20 198.51.100.3 20
msk-donskaya-aalushin-gw-1(config)#ip nat inside source static tcp 10.128.0.3 21 198.51.100.3 21
msk-donskaya-aalushin-gw-1(config)#^Z
msk-donskaya-aalushin-gw-1#
%SYS-5-CONFIG_I: Configured from console by console
```

Рис. 2.13: Доступ из интернет (Файловый сервер)

```
msk-donskaya-aalushin-gw-1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
msk-donskaya-aalushin-gw-1(config)#ip nat inside source static tcp 10.128.0.4 25 198.51.100.4 25
msk-donskaya-aalushin-gw-1(config)#ip nat inside source static tcp 10.128.0.4 110 198.51.100.4
110
msk-donskaya-aalushin-gw-1(config)#^Z
msk-donskaya-aalushin-gw-1#
%SYS-5-CONFIG_I: Configured from console by console
```

Рис. 2.14: Доступ из интернет (Почтовый сервер)

```

msk-donskaya-aalushin-gw-1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
msk-donskaya-aalushin-gw-1(config)#ip nat inside source static tcp 10.128.0.4 25 198.51.100.4 25
msk-donskaya-aalushin-gw-1(config)#ip nat inside source static tcp 10.128.0.4 110 198.51.100.4
110
msk-donskaya-aalushin-gw-1(config)#^Z
msk-donskaya-aalushin-gw-1#
%SYS-5-CONFIG I: Configured from console by console

```

Рис. 2.15: Доступ из интернет (Доступ по RDR)

7) Проверил работоспособность заданных настроек.

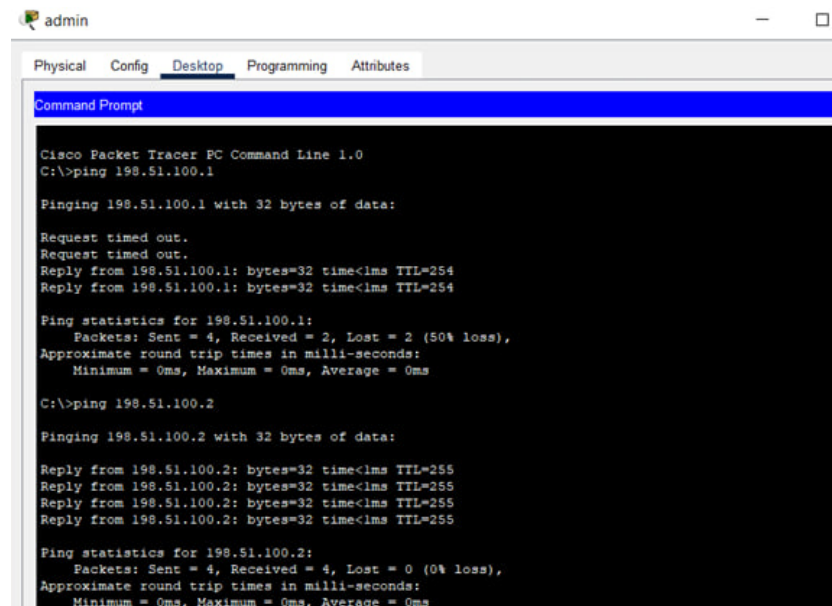


Рис. 2.16: Проверка

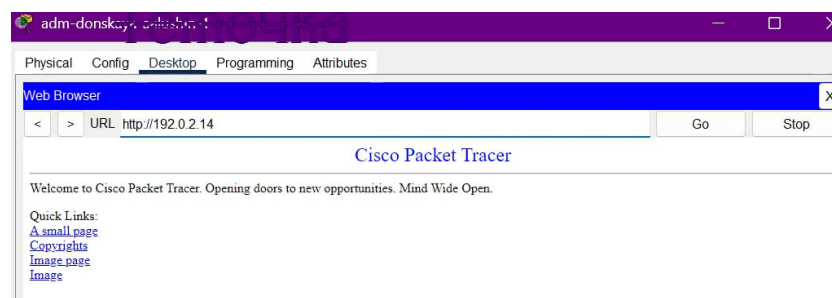


Рис. 2.17: Проверка

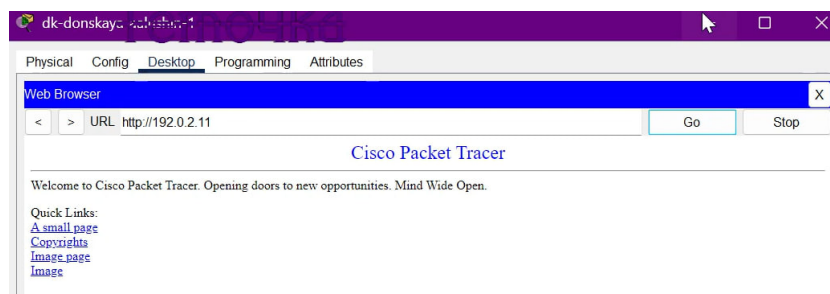


Рис. 2.18: Проверка

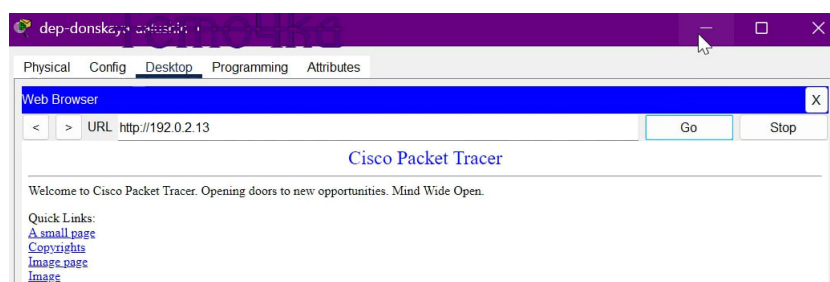


Рис. 2.19: Проверка

## **3 Выводы**

Я приобрёл практические навыки по настройке доступа локальной сети к внешней сети по средствам NAT.