

Презентация по лабораторной работе № 12

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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.

Выполнение лабораторной работы

```
provider-aiaamunichnikov-gw-1

Physical  Config  CLI  Attributes

IOS Command Line Interface

http://www.cisco.com/ww1/export/crypto/tool/stqrg.html

If you require further assistance please contact us by sending email to
export@cisco.com.

cisco 2811 (MPC860) processor (revision 0x200) with 60416K/5120K bytes of memory
Processor board ID JAD05190MTZ (4292891495)
2 FastEthernet interface(s)
DRAM configuration is 64 bits wide with parity disabled.
255K bytes of non-volatile configuration memory.
249856K bytes of ATA System CompactFlash 0 (Read/Write)

Press RETURN to get started!


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
      ^
% Invalid input detected at '^' marker.

Router(config)#
Router(config)#username admin privilege 1 secret cisco
Router(config)#
```

Copy Paste

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Выполнение лабораторной работы



The screenshot shows a Cisco IOS Command Line Interface (CLI) window. The title bar reads 'provider-aiamunichnikov-sw-1'. The window has tabs for 'Physical', 'Config', 'CLI' (selected), and 'Attributes'. The main content area displays the following text:

```
IOS Command Line Interface

Top Assembly Revision Number : A0
Version ID : V02
CLEI Code Number : COM3L00BRA
Hardware Board Revision Number : 0x01

Switch Ports Model          SW Version        SW Image
-----
*   1 26   WS-C2960-24TT-L   15.0(2)SE4       C2960-LANBASEK9-M

Cisco IOS Software, C2960 Software (C2960-LANBASEK9-M), Version 15.0(2)SE4, RELEASE SOFTWARE (fc1)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2013 by Cisco Systems, Inc.
Compiled Wed 26-Jun-13 02:49 by mnguyen

Press RETURN to get started!

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

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

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)#
```

At the bottom of the window, there are 'Copy' and 'Paste' buttons.

Выполнение лабораторной работы

```
IOS Command Line Interface
Router(config-line)#exit
Router(config)#enable secret cisco
Router(config)#service password-encryption
Router(config)#username admin privilege 1 secret cisco
Router(config)#
% Invalid input detected at 'A' marker.
Router(config)#
Router(config)#username admin privilege 1 secret cisco
Router(config)#int f0/0
Router(config-if)#no shutdown

Router(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

Router(config-if)#exit
Router(config)#int f0/0.4
Router(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

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

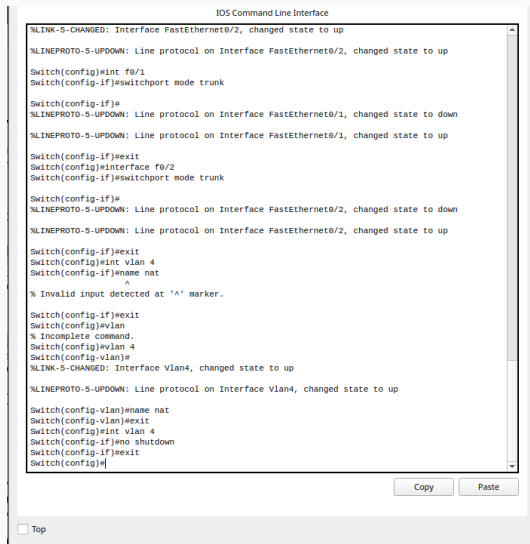
Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to up

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

Router(config-if)#ip address 192.0.2.1 255.255.255.0
Router(config-if)#description internet
Router(config-if)#exit
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console
```

Copy Paste

Выполнение лабораторной работы



```
IOS Command Line Interface

%LINK-5-CHANGED: Interface FastEthernet0/2, changed state to up

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

Switch(config)#int f0/1
Switch(config-if)#switchport mode trunk

Switch(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

Switch(config-if)#exit
Switch(config)#interface f0/2
Switch(config-if)#switchport mode trunk

Switch(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

Switch(config-if)#exit
Switch(config)#int vlan 4
Switch(config-if)#name nat
A
% Invalid input detected at 'A' marker.

Switch(config-if)#exit
Switch(config)#vlan
% Incomplete command.
Switch(config)#vlan 4
Switch(config-vlan)#
%LINK-5-CHANGED: Interface Vlan4, changed state to up

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

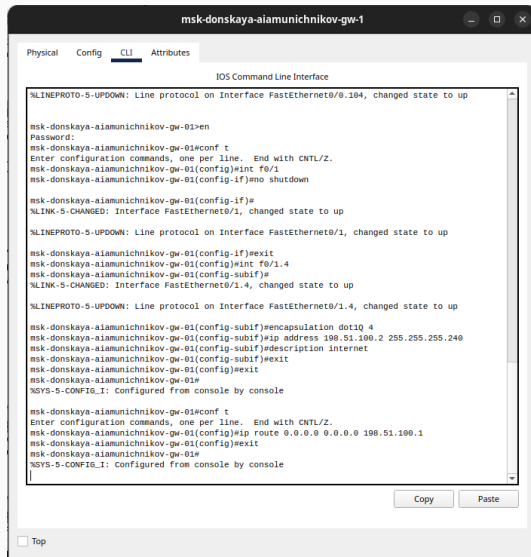
Switch(config-vlan)#name nat
Switch(config-vlan)#exit
Switch(config)#int vlan 4
Switch(config-if)#no shutdown
Switch(config-if)#exit
Switch(config)#
```

Copy Paste

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

Выполнение лабораторной работы



The screenshot shows a web-based configuration interface for a network device named 'msk-donskaya-aiamunichnikov-gw-1'. The 'CLI' tab is selected, displaying the 'IOS Command Line Interface'. The interface shows a series of configuration commands being entered and executed, along with system messages indicating the state of the interfaces.

```
msk-donskaya-aiamunichnikov-gw-01>en
Password:
msk-donskaya-aiamunichnikov-gw-01#conf t
Enter configuration commands, one per line. End with CNTL/Z.
msk-donskaya-aiamunichnikov-gw-01(config)#int f0/1
msk-donskaya-aiamunichnikov-gw-01(config-if)#no shutdown

msk-donskaya-aiamunichnikov-gw-01(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-aiamunichnikov-gw-01(config-if)#exit
msk-donskaya-aiamunichnikov-gw-01(config)#int f0/1.4
msk-donskaya-aiamunichnikov-gw-01(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

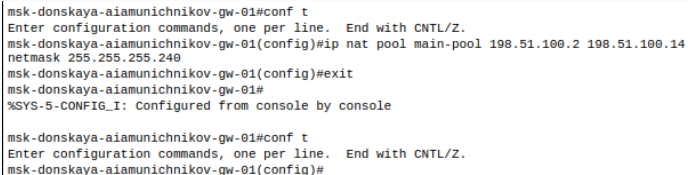
msk-donskaya-aiamunichnikov-gw-01(config-subif)#encapsulation dot1q 4
msk-donskaya-aiamunichnikov-gw-01(config-subif)#ip address 198.51.100.2 255.255.255.240
msk-donskaya-aiamunichnikov-gw-01(config-subif)#description internet
msk-donskaya-aiamunichnikov-gw-01(config-subif)#exit
msk-donskaya-aiamunichnikov-gw-01(config)#exit
msk-donskaya-aiamunichnikov-gw-01#
%SYS-5-CONFIG_I: Configured from console by console

msk-donskaya-aiamunichnikov-gw-01#conf t
Enter configuration commands, one per line. End with CNTL/Z.
msk-donskaya-aiamunichnikov-gw-01(config)#ip route 0.0.0.0 0.0.0.0 198.51.100.1
msk-donskaya-aiamunichnikov-gw-01(config)#exit
msk-donskaya-aiamunichnikov-gw-01#
%SYS-5-CONFIG_I: Configured from console by console
|
```

At the bottom of the CLI window, there are 'Copy' and 'Paste' buttons. Below the CLI window, there is a 'Top' button with a checkbox next to it.

```
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 = 0/2/12 ms  
msk-donskaya-aiaamunichnikov-gw-01#
```

Рис. 6: Проверка доступности маршрутизатора



```
msk-donskaya-aiamunichnikov-gw-01#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
msk-donskaya-aiamunichnikov-gw-01(config)#ip nat pool main-pool 198.51.100.2 198.51.100.14
netmask 255.255.255.240
msk-donskaya-aiamunichnikov-gw-01(config)#exit
msk-donskaya-aiamunichnikov-gw-01#
%SYS-5-CONFIG_I: Configured from console by console

msk-donskaya-aiamunichnikov-gw-01#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
msk-donskaya-aiamunichnikov-gw-01(config)#
```

Рис. 7: Настройка пула адресов для NAT

Выполнение лабораторной работы

```
msk-donskaya-aiamunichnikov-gw-1
Physical Config CLI Attributes
IOS Command Line Interface
Enter configuration commands, one per line. End with CNTL/Z.
msk-donskaya-aiamunichnikov-gw-01(config)#exit
msk-donskaya-aiamunichnikov-gw-01#
%SYS-5-CONFIG_I: Configured from console by console

msk-donskaya-aiamunichnikov-gw-01#ping 108.51.100.1

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 108.51.100.1, timeout is 2 seconds:
.U.U.
Success rate is 0 percent (0/5)

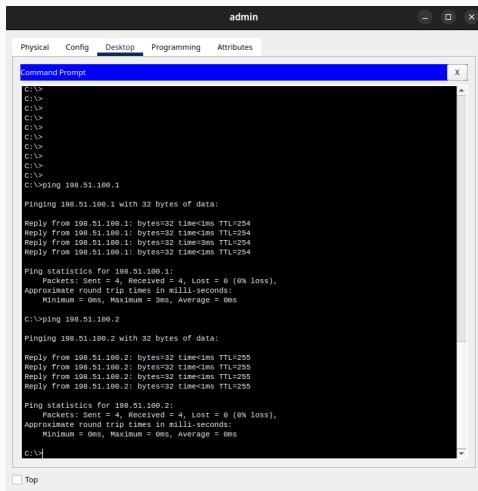
msk-donskaya-aiamunichnikov-gw-01#conf y
^
% Invalid input detected at '^' marker.

msk-donskaya-aiamunichnikov-gw-01#conf t
Enter configuration commands, one per line. End with CNTL/Z.
msk-donskaya-aiamunichnikov-gw-01(config)#ip access-list extend nat-inet
msk-donskaya-aiamunichnikov-gw-01(config-ext-nacl)#exit
msk-donskaya-aiamunichnikov-gw-01(config)#ip access-list extend nat-inet
msk-donskaya-aiamunichnikov-gw-01(config-ext-nacl)#remark dk
msk-donskaya-aiamunichnikov-gw-01(config-ext-nacl)#permit tcp 10.128.3.0 0.0.0.255 host 192.0.2.11
eq 80
msk-donskaya-aiamunichnikov-gw-01(config-ext-nacl)#permit tcp 10.128.3.0 0.0.0.255 host 192.0.2.12
eq 80
msk-donskaya-aiamunichnikov-gw-01(config-ext-nacl)#remark departments
msk-donskaya-aiamunichnikov-gw-01(config-ext-nacl)#permit tcp 10.128.4.0 0.0.0.255 host 192.0.2.13
eq 80
msk-donskaya-aiamunichnikov-gw-01(config-ext-nacl)#remark adm
msk-donskaya-aiamunichnikov-gw-01(config-ext-nacl)#permit tcp 10.128.5.0 0.0.0.255 host 192.0.2.14
eq 80
msk-donskaya-aiamunichnikov-gw-01(config-ext-nacl)#remark admin
msk-donskaya-aiamunichnikov-gw-01(config-ext-nacl)#permit ip host 10.128.6.200
% Incomplete command.
msk-donskaya-aiamunichnikov-gw-01(config-ext-nacl)#permit ip host 10.128.6.200 any
msk-donskaya-aiamunichnikov-gw-01(config-ext-nacl)#
```

```
msk-donskaya-aiamunichnikov-gw-01(config)#int f0/0.3
msk-donskaya-aiamunichnikov-gw-01(config-subif)#ip nat inside
msk-donskaya-aiamunichnikov-gw-01(config-subif)#int f0/0.101
msk-donskaya-aiamunichnikov-gw-01(config-subif)#ip nat inside
msk-donskaya-aiamunichnikov-gw-01(config-subif)#int f0/0.102
msk-donskaya-aiamunichnikov-gw-01(config-subif)#ip nat inside
msk-donskaya-aiamunichnikov-gw-01(config-subif)#int f0/0.103
msk-donskaya-aiamunichnikov-gw-01(config-subif)#ip nat inside
msk-donskaya-aiamunichnikov-gw-01(config-subif)#int f0/0.104
msk-donskaya-aiamunichnikov-gw-01(config-subif)#ip nat inside
msk-donskaya-aiamunichnikov-gw-01(config-subif)#int f0/1.4
msk-donskaya-aiamunichnikov-gw-01(config-subif)#ip nat outside
msk-donskaya-aiamunichnikov-gw-01(config-subif)#wr m
```

^

Рис. 9: Настройка NAT



The screenshot shows a Windows command prompt window titled "admin" with tabs for Physical, Config, Desktop, Programming, and Attributes. The Desktop tab is active, and a Command Prompt window is open. The command prompt shows the following text:

```
C:\>
C:\>
C:\>
C:\>
C:\>
C:\>
C:\>
C:\>
C:\>
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=3ms 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 = 3ms, 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

C:\>
```

At the bottom of the window, there is a checkbox labeled "Top" which is currently unchecked.

Рис. 10: Проверка доступности маршрутизаторов

```
msk-donskaya-aiaamunichnikov-gw-01(config)#ip nat inside source static tcp 10.128.0.2 80
198.51.100.2 80
msk-donskaya-aiaamunichnikov-gw-01(config)#ip nat inside source static tcp 10.128.0.3 20
198.51.100.3 20
msk-donskaya-aiaamunichnikov-gw-01(config)#ip nat inside source static tcp 10.128.0.3 21
198.51.100.3 21
msk-donskaya-aiaamunichnikov-gw-01(config)#ip nat inside source static tcp 10.128.0.4 25
198.51.100.4 25
msk-donskaya-aiaamunichnikov-gw-01(config)#ip nat inside source static tcp 10.128.0.4 110
198.51.100.4 110
msk-donskaya-aiaamunichnikov-gw-01(config)#ip nat inside source static tcp 10.128.6.200 3389
198.51.100.10 3389
msk-donskaya-aiaamunichnikov-gw-01(config)#
```

Рис. 11: Настройка доступа из Интернета

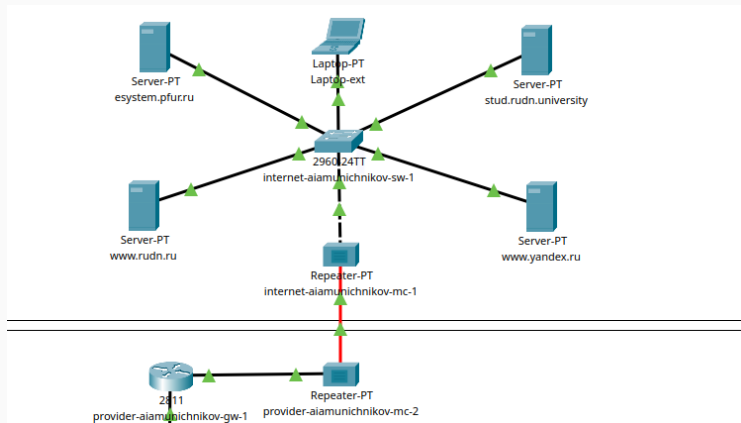


Рис. 12: Добавление ноутбука на территорию Интернет

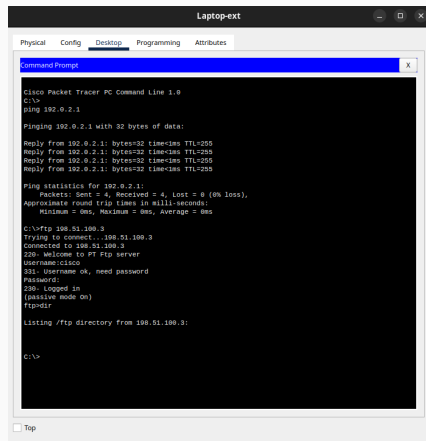
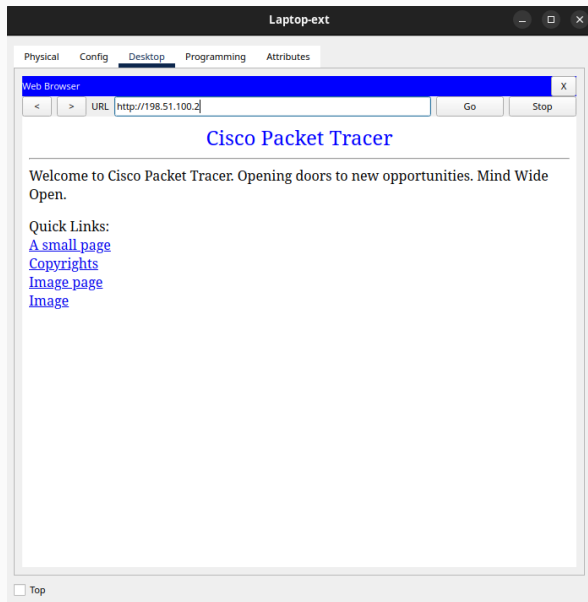
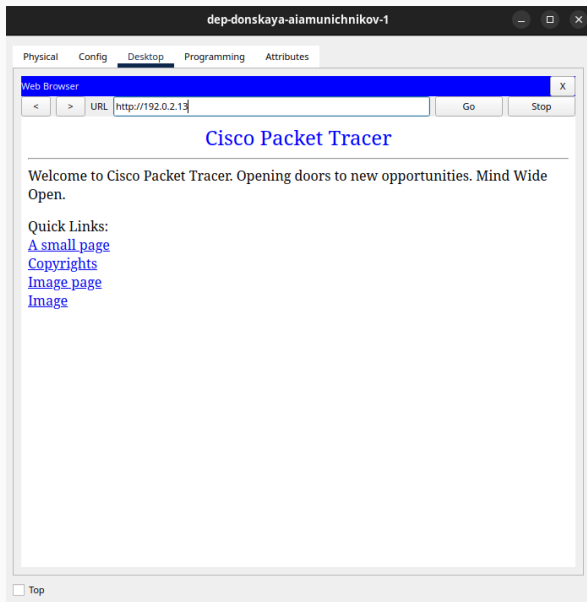


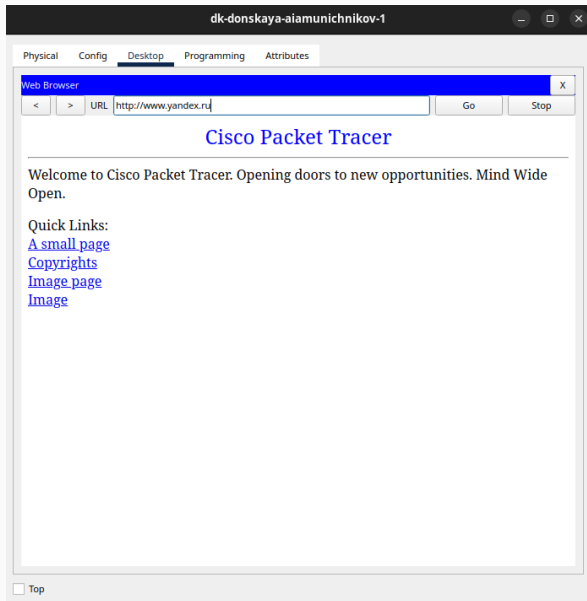
Рис. 13: Проверка доступа из Интернета по ftp

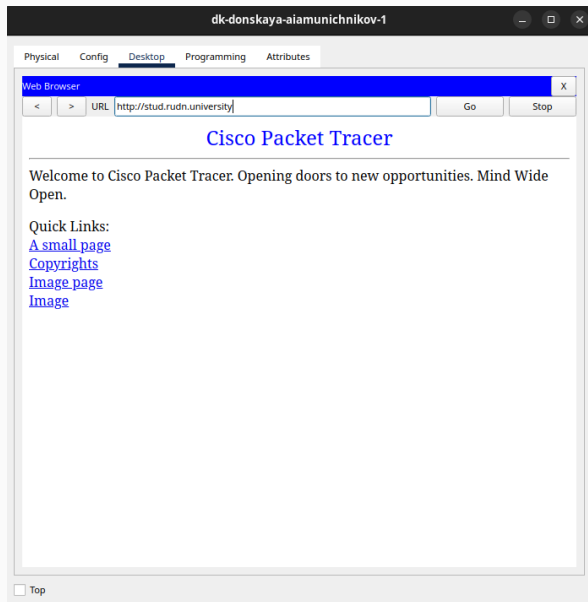


Выполнение лабораторной работы

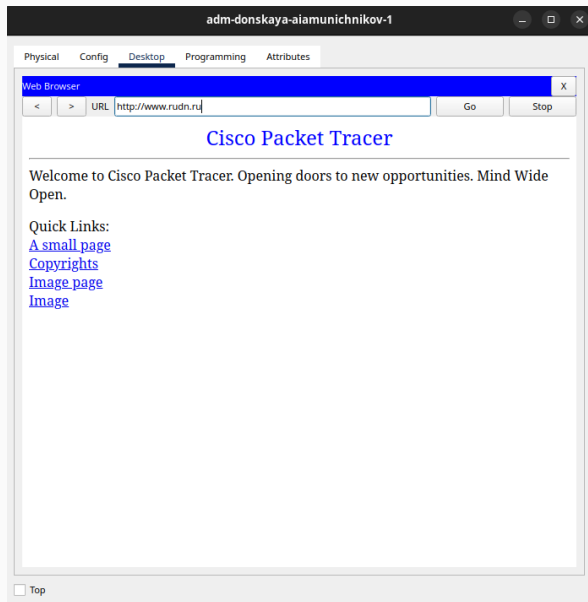


Выполнение лабораторной работы





Выполнение лабораторной работы



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