

# Презентация по лабораторной работе №6

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В логической области проекта разместим маршрутизатор Cisco 2811.

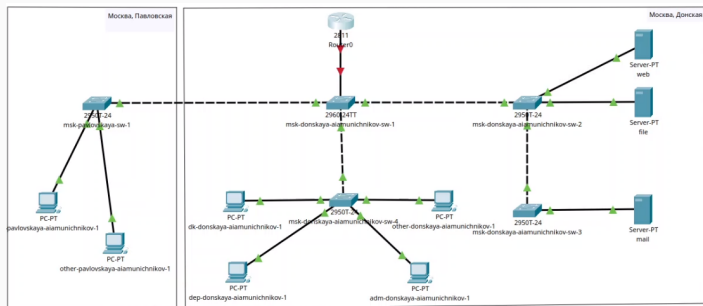
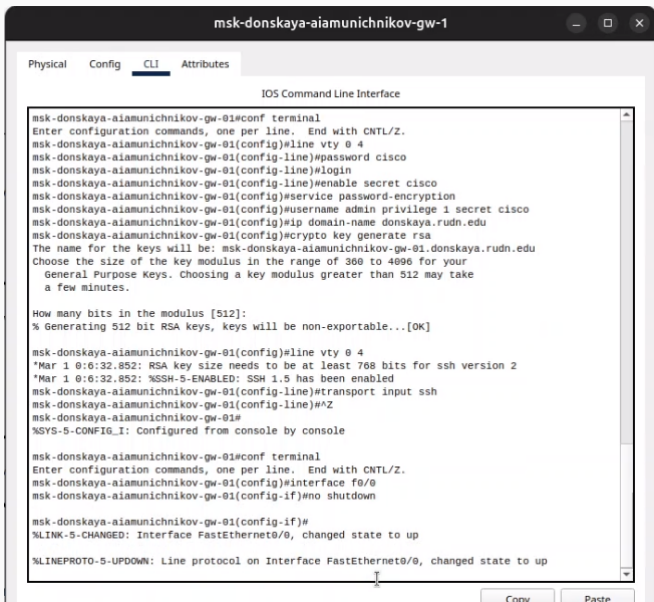


Рис. 1: Логическая область проекта с добавленным маршрутизатором

## Конфигурация маршрутизатора.



The screenshot shows a web-based interface for configuring a Cisco router. The window title is "msk-donskaya-aiamunichnikov-gw-1". At the top, there are tabs for "Physical", "Config", "CLI", and "Attributes", with "CLI" being the active tab. Below the tabs, the text "IOS Command Line Interface" is displayed. The main area contains a terminal window with the following text:

```
msk-donskaya-aiamunichnikov-gw-01#conf terminal
Enter configuration commands, one per line. End with CNTL/Z.
msk-donskaya-aiamunichnikov-gw-01(config)#line vty 0 4
msk-donskaya-aiamunichnikov-gw-01(config-line)#password cisco
msk-donskaya-aiamunichnikov-gw-01(config-line)#login
msk-donskaya-aiamunichnikov-gw-01(config-line)#enable secret cisco
msk-donskaya-aiamunichnikov-gw-01(config)#service password-encryption
msk-donskaya-aiamunichnikov-gw-01(config)#username admin privilege 1 secret cisco
msk-donskaya-aiamunichnikov-gw-01(config)#ip domain-name donskeya.rudn.edu
msk-donskaya-aiamunichnikov-gw-01(config)#crypto key generate rsa
The name for the keys will be: msk-donskaya-aiamunichnikov-gw-01.donskeya.rudn.edu
Choose the size of the key modulus in the range of 360 to 4096 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]

msk-donskaya-aiamunichnikov-gw-01(config)#line vty 0 4
*Mar 1 0:6:32.852: RSA key size needs to be at least 768 bits for ssh version 2
*Mar 1 0:6:32.852: %SSH-5-ENABLED: SSH 1.5 has been enabled
msk-donskaya-aiamunichnikov-gw-01(config-line)#transport input ssh
msk-donskaya-aiamunichnikov-gw-01(config-line)#^Z
msk-donskaya-aiamunichnikov-gw-01#
%SYS-5-CONFIG_I: Configured from console by console

msk-donskaya-aiamunichnikov-gw-01#conf terminal
Enter configuration commands, one per line. End with CNTL/Z.
msk-donskaya-aiamunichnikov-gw-01(config)#interface f0/0
msk-donskaya-aiamunichnikov-gw-01(config-if)#no shutdown

msk-donskaya-aiamunichnikov-gw-01(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
```

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

## Настройка порта 24 коммутатора.



```
msk-donskaya-aiamunichnikov-sw-1
Physical Config CLI Attributes
IOS Command Line Interface
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan2, changed state to up
%LINK-5-CHANGED: Interface GigabitEthernet0/2, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/2, changed state to up
%LINK-5-CHANGED: Interface GigabitEthernet0/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1, changed state to up
%LINK-5-CHANGED: Interface FastEthernet0/24, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/24, changed state to up

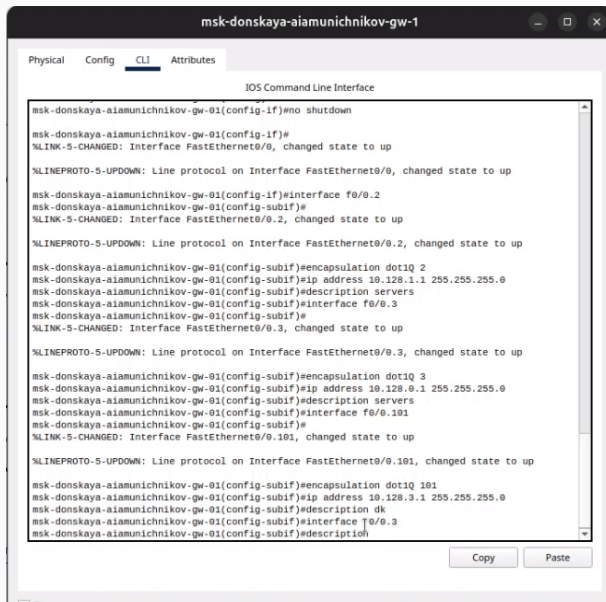
User Access Verification
Password:

msk-donskaya-aiamunichnikov-sw-1>enable
Password:
msk-donskaya-aiamunichnikov-sw-1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
msk-donskaya-aiamunichnikov-sw-1(config)#interface f0/24
msk-donskaya-aiamunichnikov-sw-1(config-if)#switchport mode trunk

msk-donskaya-aiamunichnikov-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
^Z
msk-donskaya-aiamunichnikov-sw-1#
%SYS-5-CONFIG_I: Configured from console by console

msk-donskaya-aiamunichnikov-sw-1#wr m
Building configuration...
[OK]
msk-donskaya-aiamunichnikov-sw-1#
```

## Настройка виртуальных интерфейсов.



The screenshot shows a network configuration window titled "msk-donskaya-aiamunichnikov-gw-1". It has tabs for "Physical", "Config", "CLI", and "Attributes", with "CLI" selected. The main area is labeled "IOS Command Line Interface" and contains a list of configuration commands and their outputs. The commands configure three subinterfaces: f0/0.2, f0/0.3, and f0/0.101, each with encapsulation dot1Q, IP address, and description.

```
msk-donskaya-aiamunichnikov-gw-01(config-if)#no shutdown
msk-donskaya-aiamunichnikov-gw-01(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
msk-donskaya-aiamunichnikov-gw-01(config-if)#interface f0/0.2
msk-donskaya-aiamunichnikov-gw-01(config-subif)#
%LINK-5-CHANGED: Interface FastEthernet0/0.2, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0.2, changed state to up
msk-donskaya-aiamunichnikov-gw-01(config-subif)#encapsulation dot1Q 2
msk-donskaya-aiamunichnikov-gw-01(config-subif)#ip address 10.128.1.1 255.255.255.0
msk-donskaya-aiamunichnikov-gw-01(config-subif)#description servers
msk-donskaya-aiamunichnikov-gw-01(config-subif)#interface f0/0.3
msk-donskaya-aiamunichnikov-gw-01(config-subif)#
%LINK-5-CHANGED: Interface FastEthernet0/0.3, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0.3, changed state to up
msk-donskaya-aiamunichnikov-gw-01(config-subif)#encapsulation dot1Q 3
msk-donskaya-aiamunichnikov-gw-01(config-subif)#ip address 10.128.0.1 255.255.255.0
msk-donskaya-aiamunichnikov-gw-01(config-subif)#description servers
msk-donskaya-aiamunichnikov-gw-01(config-subif)#interface f0/0.101
msk-donskaya-aiamunichnikov-gw-01(config-subif)#
%LINK-5-CHANGED: Interface FastEthernet0/0.101, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0.101, changed state to up
msk-donskaya-aiamunichnikov-gw-01(config-subif)#encapsulation dot1Q 101
msk-donskaya-aiamunichnikov-gw-01(config-subif)#ip address 10.128.3.1 255.255.255.0
msk-donskaya-aiamunichnikov-gw-01(config-subif)#description dk
msk-donskaya-aiamunichnikov-gw-01(config-subif)#interface f0/0.3
msk-donskaya-aiamunichnikov-gw-01(config-subif)#description
```

At the bottom right of the CLI window are "Copy" and "Paste" buttons.

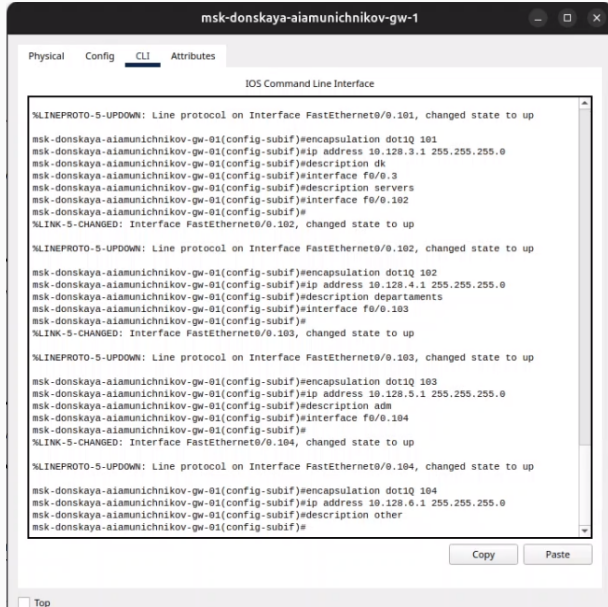


Рис. 5: Конфигурация VLAN-интерфейсов маршрутизатора



# Проверка доступности оконечных устройств из разных VLAN.

```
dk-donskaya-aiaunichnikov-1
Physical Config Desktop Programming Attributes
Command Prompt

Cisco Packet Tracer PC Command Line 1.0
C:\>ipconfig

FastEthernet0 Connection:(default port)

    Connection-specific DNS Suffix...:
    Link-local IPv6 Address . . . . .: FE80::267:ECFF:FE87:6365
    IPv6 Address . . . . .: ::
    IPv4 Address . . . . .: 10.128.3.2
    Subnet Mask . . . . .: 255.0.0.0
    Default Gateway . . . . .: ::
                                10.128.3.1

Bluetooth Connection:

    Connection-specific DNS Suffix...:
    Link-local IPv6 Address . . . . .: ::
    IPv6 Address . . . . .: ::
    IPv4 Address . . . . .: 0.0.0.0
    Subnet Mask . . . . .: 0.0.0.0
    Default Gateway . . . . .: ::
                                0.0.0.0

C:\>ping 10.128.3.3

Pinging 10.128.3.3 with 32 bytes of data:

Reply from 10.128.3.3: bytes=32 time=31ms TTL=128
Reply from 10.128.3.3: bytes=32 time<1ms TTL=128
Reply from 10.128.3.3: bytes=32 time<1ms TTL=128
Reply from 10.128.3.3: bytes=32 time<1ms TTL=128

Ping statistics for 10.128.3.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 31ms, Average = 7ms

C:\>
```

## Пингование устройства другой сети.

```
dk-donskaya-aiaunichnikov-1
Physical Config Desktop Programming Attributes
Command Prompt
Reply from 10.128.3.3: bytes=32 time=31ms TTL=128
Reply from 10.128.3.3: bytes=32 time<1ms TTL=128
Reply from 10.128.3.3: bytes=32 time<1ms TTL=128
Reply from 10.128.3.3: bytes=32 time<1ms TTL=128
Ping statistics for 10.128.3.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 31ms, Average = 7ms
C:\>ping 10.128.4.2
Pinging 10.128.4.2 with 32 bytes of data:
Request timed out.
Reply from 10.128.4.2: bytes=32 time=20ms TTL=127
Reply from 10.128.4.2: bytes=32 time<1ms TTL=127
Reply from 10.128.4.2: bytes=32 time<1ms TTL=127
Ping statistics for 10.128.4.2:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 20ms, Average = 0ms
C:\>ping 10.128.4.2
Pinging 10.128.4.2 with 32 bytes of data:
Reply from 10.128.4.2: bytes=32 time<1ms TTL=127
Reply from 10.128.4.2: bytes=32 time<1ms TTL=127
Reply from 10.128.4.2: bytes=32 time<1ms TTL=127
Reply from 10.128.4.2: bytes=32 time<1ms TTL=127
Ping statistics for 10.128.4.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms
C:\>
```

# Изучение процесса передвижения пакета ICMP по сети.

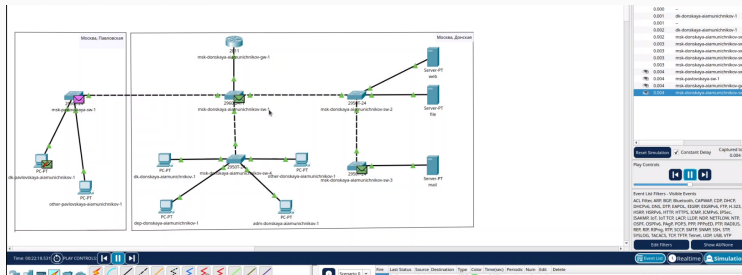


Рис. 8: Логическая область проекта с добавленным маршрутизатором

Теперь попробуем передать пакет между устройствами разных сетей.

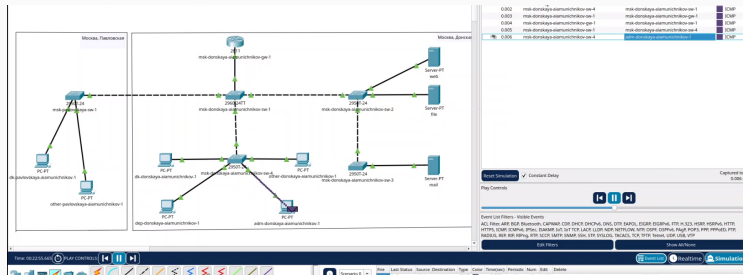


Рис. 9: Передвижения пакета ICMP по сети

## Посмотр содержимого пакета.

PDU Information at Device: dk-donskaya-aiamunichnikov-1

OSI Model Outbound PDU Details

PDU Formats

EthernetII

0		4		8		Bytes	
PREAMBLE: 101010..10				S		DEST ADDR:000C.8514.8101	
SRC ADDR:0007.EC87.6365		TYPE:0x080		DATA (VARIABLE LENGTH)		FCS:0x00000000	

IP

0		4		8		16		20		24		Bits	
VER:4		IHL:5		DSCP:0x00		TL:28							
ID:0x0013				FLAGS:0x0		FRAG OFFSET:0x000							
TTL:255				PRO:0x01		CHKSUM							
SRC IP:10.128.3.2													
DST IP:10.128.5.2													
DATA (VARIABLE LENGTH)													

ICMP

PC-PT  
adm-donskaya-aiamunichnikov-1

Event List  
ACL Filter  
HTTPS, ICA  
RADIUS, R

## Выводы

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В результате выполнения лабораторной работы мы настроили статистическую маршрутизацию VLAN в сети.