

Презентация по лабораторной работе №6

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В логической области проекта разместим маршрутизатор Cisco 2811.

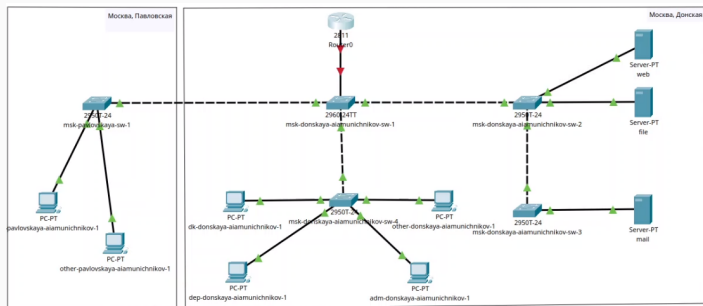
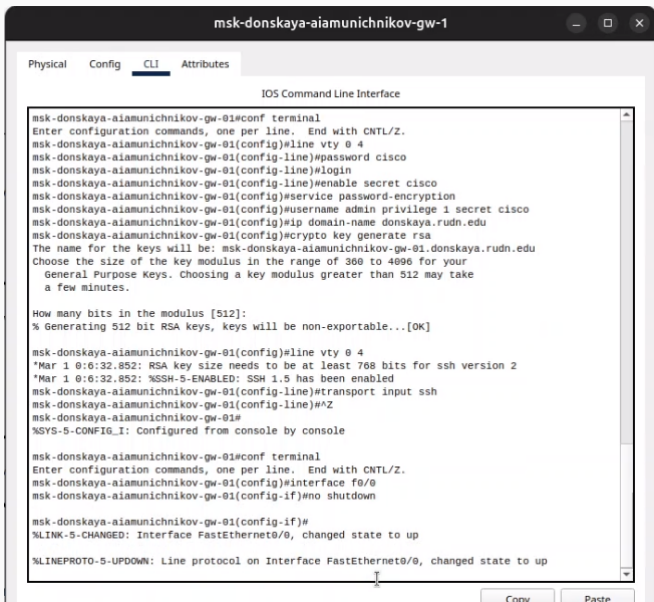


Рис. 1: Логическая область проекта с добавленным маршрутизатором

Конфигурация маршрутизатора.



```
msk-donskaya-aiamunichnikov-gw-1
Physical Config CLI Attributes
IOS Command Line Interface

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
```

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

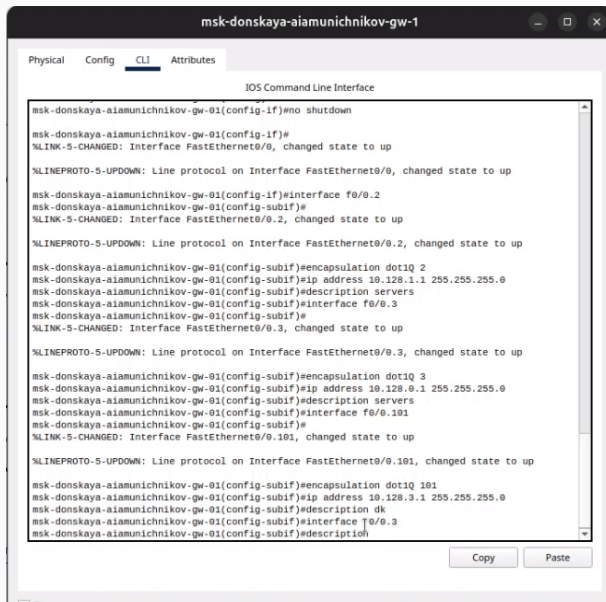
Password:

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.

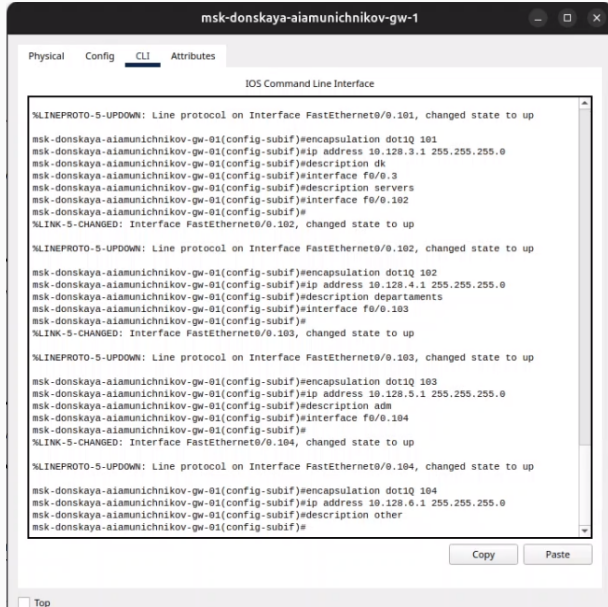


Рис. 5: Конфигурация VLAN-интерфейсов маршрутизатора

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.

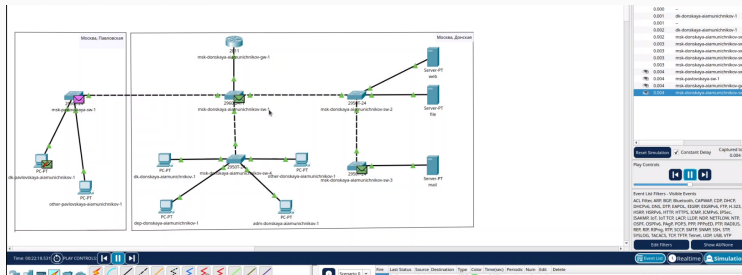


Рис. 8: Логическая область проекта с добавленным маршрутизатором

Теперь попробуем передать пакет между устройствами разных сетей.

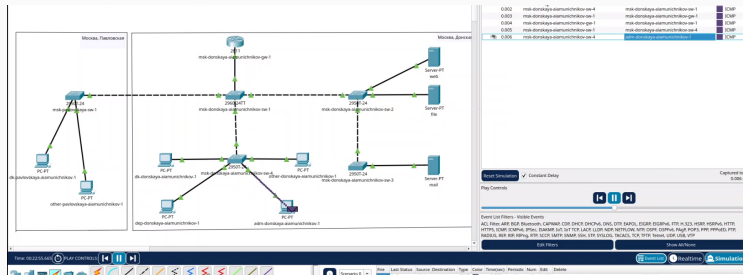


Рис. 9: Передвижения пакета ICMP по сети

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

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