

**РОССИЙСКИЙ УНИВЕРСИТЕТ ДРУЖБЫ НАРОДОВ**  
**Факультет физико-математических и естественных наук**  
**Кафедра прикладной информатики и теории вероятностей**

**ОТЧЕТ**  
**ПО ЛАБОРАТОРНОЙ РАБОТЕ № 5**

дисциплина: Администрирование локальных сетей

---

Студент: Шутенко Виктория Михайловна

Группа: НФИ-бд-03-19

**МОСКВА**

2022 г.

Цель работы: Получить основные навыки по настройке VLAN на коммутаторах сети.

### Задание

1. На коммутаторах сети настроить Trunk-порты на соответствующих интерфейсах (см. табл. 3.2 из раздела 3.3), связывающих коммутаторы между собой.
2. Коммутатор msk-donskaya-sw-1 настроить как VTP-сервер и прописать на нём номера и названия VLAN согласно табл. 3.1 из раздела 3.3.
3. Коммутаторы msk-donskaya-sw-2 — msk-donskaya-sw-4, mskpavlovskaya-sw-1 настроить как VTP-клиенты, на интерфейсах указать принадлежность к соответствующему VLAN (см. табл. 3.3 из раздела 3.3).
4. На серверах прописать IP-адреса, как указано в табл. 3.2 из раздела 3.3.
5. На окончных устройствах указать соответствующий адрес шлюза и прописать статические IP-адреса из диапазона соответствующей сети, следуя регламенту выделения ip-адресов (см. табл. 3.4 из раздела 3.3).
6. Проверить доступность устройств, принадлежащих одному VLAN, и недоступность устройств, принадлежащих разным VLAN.
7. При выполнении работы необходимо учитывать соглашение об именовании (см. раздел 2.5).

### Последовательность выполнения работы

1. Используя приведённую последовательность команд из примера по конфигурации Trunk-порта на интерфейсе g0/1 коммутатора mskdonskaya-sw-1, настроила Trunk-порты на соответствующих интерфейсах всех коммутаторов.

**msk-donskaya-sw-1>enable**

**msk-donskaya-sw-1#configure terminal**

**msk-donskaya-sw-1(config)#interface g0/1**

**msk-donskaya-sw-1(config-if)#switchport mode trunk**

The screenshot shows a terminal window titled "msk-donskaya-vmshutenko-sw-1". The tab bar includes "Physical", "Config", "CLI" (which is selected), and "Attributes". Below the title is the header "IOS Command Line Interface". Technical support information is displayed: "Technical Support: http://www.cisco.com/techsupport", "Copyright (c) 1986-2013 by Cisco Systems, Inc.", and "Compiled Wed 26-Jun-13 02:49 by mnnguyen". A message "Press RETURN to get started!" is present. The CLI output shows configuration commands for interfaces g0/1 and g0/2:

```
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2013 by Cisco Systems, Inc.
Compiled Wed 26-Jun-13 02:49 by mnnguyen

Press RETURN to get started!

%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 GigabitEthernet0/2, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/2, changed state to up
%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up

User Access Verification

Password: |
msk-donskaya-vmshutenko-sw-1>enable
Password: |
msk-donskaya-vmshutenko-sw-1>conf t
Enter configuration commands, one per line. End with CNTL/Z.
msk-donskaya-vmshutenko-sw-1(config)#interface g0/1
msk-donskaya-vmshutenko-sw-1(config-if)#switchport mode trunk

msk-donskaya-vmshutenko-sw-1(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1, changed state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1, changed state to up
exit
msk-donskaya-vmshutenko-sw-1(config)#interface g0/2
msk-donskaya-vmshutenko-sw-1(config-if)#switchport mode trunk

msk-donskaya-vmshutenko-sw-1(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/2, changed state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/2, changed state to up
```

At the bottom left is the text "Command+F6 to exit CLI focus". On the right are "Copy" and "Paste" buttons. A "Top" button is located at the bottom left of the main window area.

Рисунок 1. Настройка Trunk-портов на msk-donskaya-mvshutenko-sw-1

msk-donskaya-vmshutenko-sw-2

Physical    Config    **CLI**    Attributes

IOS Command Line Interface

```
Press RETURN to get started!

%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 GigabitEthernet0/2, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/2, changed state to up
%LINK-5-CHANGED: Interface FastEthernet0/2, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/2, changed state to up
%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up
%SPANTREE-2-RECV_PVID_ERR: Received 802.1Q BPDU on non trunk GigabitEthernet0/1 VLAN1.
%SPANTREE-2-BLOCK_PVID_LOCAL: Blocking GigabitEthernet0/1 on VLAN0001. Inconsistent port type.

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1, changed state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1, changed state to up

User Access Verification

Password:
msk-donskaya-vmshutenko-sw-2>en
Password:
msk-donskaya-vmshutenko-sw-2#conf t
Enter configuration commands, one per line. End with CNTL/Z.
msk-donskaya-vmshutenko-sw-2(config)#interface g0/1
msk-donskaya-vmshutenko-sw-2(config-if)#switchport mode trunk
msk-donskaya-vmshutenko-sw-2(config-if)#exit
msk-donskaya-vmshutenko-sw-2(config)#interface g0/2
msk-donskaya-vmshutenko-sw-2(config-if)#switchport mode trunk

msk-donskaya-vmshutenko-sw-2(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/2, changed state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/2, changed state to up
```

Command+F6 to exit CLI focus

Top

Рисунок 2. Настройка Trunk-портов на msk-donskaya-mvshutenko-sw-2

msk-donskaya-vmshutenko-sw-3

Physical Config CLI Attributes

IOS Command Line Interface

```
Base ethernet MAC Address: 0001.4220.B819
Motherboard assembly number: 73-5781-09
Power supply part number: 34-0965-01
Motherboard serial number: FOC061004SZ
Power supply serial number: DAB0609127D
Model revision number: C0
Motherboard revision number: A0
Model number: WS-C2950T-24
System serial number: FHK061020WC

Cisco Internetwork Operating System Software
IOS (tm) C2950 Software (C2950-I6Q4L2-M), Version 12.1(22)EA4, RELEASE SOFTWARE (fc1)
Copyright (c) 1986-2005 by cisco Systems, Inc.
Compiled Wed 18-May-05 22:31 by jharirba

Press RETURN to get started!

%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 FastEthernet0/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up
%SPANTREE-2-RECV_PVID_ERR: Received 802.1Q BPDU on non trunk GigabitEthernet0/1 VLAN1.
%SPANTREE-2-BLOCK_PVID_LOCAL: Blocking GigabitEthernet0/1 on VLAN0001. Inconsistent port type.

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1, changed state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1, changed state to up

User Access Verification

Password:

msk-donskaya-vmshutenko-sw-3>en
Password:
msk-donskaya-vmshutenko-sw-3#conf t
Enter configuration commands, one per line. End with CNTL/Z.
msk-donskaya-vmshutenko-sw-3(config)#interface g0/1
msk-donskaya-vmshutenko-sw-3(config-if)#switchport mode trunk
msk-donskaya-vmshutenko-sw-3(config-if)#exit
msk-donskaya-vmshutenko-sw-3(config)#

Command+F6 to exit CLI focus
```

Top

Copy Paste

Рисунок 3. Настройка Trunk-портов на msk-donskaya-mvshutenko-sw-3

msk-donskaya-vmshutenko-sw-4

Physical Config **CLI** Attributes

IOS Command Line Interface

```
Copyright (c) 1986-2005 by cisco Systems, Inc.  
Compiled Wed 18-May-05 22:31 by jharirba  
Press RETURN to get started!  
  
%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 FastEthernet0/5, changed state to up  
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/5, changed state to up  
%LINK-5-CHANGED: Interface FastEthernet0/6, changed state to up  
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/6, changed state to up  
%LINK-5-CHANGED: Interface FastEthernet0/11, changed state to up  
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/11, changed state to up  
%LINK-5-CHANGED: Interface FastEthernet0/16, changed state to up  
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/16, changed state to up  
%SPANTREE-2-RECV_PVID_ERR: Received 802.1Q BPDU on non trunk GigabitEthernet0/1 VLAN1.  
%SPANTREE-2-BLOCK_PVID_LOCAL: Blocking GigabitEthernet0/1 on VLAN0001. Inconsistent port type.  
  
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1, changed state to down  
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1, changed state to up  
  
User Access Verification  
Password:  
msk-donskaya-vmshutenko-sw-1>en  
Password:  
msk-donskaya-vmshutenko-sw-1#conf t  
Enter configuration commands, one per line. End with CNTL/Z.  
msk-donskaya-vmshutenko-sw-1(config)#interface g0/1  
msk-donskaya-vmshutenko-sw-1(config-if)#switchport mode trunk  
msk-donskaya-vmshutenko-sw-1(config-if)#exit  
msk-donskaya-vmshutenko-sw-1(config)#
```

Command+F6 to exit CLI focus Copy Paste

Top

Рисунок 4. Настройка Trunk-портов на msk-donskaya-mvshutenko-sw-4

The screenshot shows a terminal window titled "msk-donskaya-vmshutenko-sw-1". The tab bar includes "Physical", "Config", "CLI" (which is selected), and "Attributes". The main area is titled "IOS Command Line Interface".

```
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/2, changed state to up

msk-donskaya-vmshutenko-sw-1 con0 is now available

Press RETURN to get started.

User Access Verification
Password:
msk-donskaya-vmshutenko-sw-1>en
Password:
msk-donskaya-vmshutenko-sw-1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
msk-donskaya-vmshutenko-sw-1(config)#interface f0/1
msk-donskaya-vmshutenko-sw-1(config-if)#switchport mode trunk
msk-donskaya-vmshutenko-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
```

At the bottom left, there is a "Command+F6 to exit CLI focus" note. On the right side, there are "Copy" and "Paste" buttons. A checkbox labeled "Top" is located at the bottom left of the terminal window.

Рисунок 5. Настройка Trunk-портов на msk-donskaya-mvshutenko-sw-1 (f0/1)

msk-pavlovskaya-vmshutenko-sw-1

Physical Config **CLI** Attributes

IOS Command Line Interface

```
Motherboard serial number: FOC061004SZ
Power supply serial number: DAB0609127D
Model revision number: C0
Motherboard revision number: A0
Model number: WS-C2950T-24
System serial number: FHK0610Z0WC

Cisco Internetwork Operating System Software
IOS (tm) C2950 Software (C2950-I6Q4L2-M), Version 12.1(22)EA4, RELEASE SOFTWARE(fcl)
Copyright (c) 1986-2005 by cisco Systems, Inc.
Compiled Wed 18-May-05 22:31 by jharirba

Press RETURN to get started!

%LINK-5-CHANGED: Interface FastEthernet0/24, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/24, changed state to up
%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up
%LINK-5-CHANGED: Interface FastEthernet0/20, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/20, changed state to up
%SPANTREE-2-RECV_PVID_ERR: Received 802.1Q BPDU on non trunk FastEthernet0/24 VLAN1.
%SPANTREE-2-BLOCK_PVID_LOCAL: Blocking FastEthernet0/24 on VLAN0001. Inconsistent port type.

%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

User Access Verification

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

Command+F6 to exit CLI focus

Top

**Copy** **Paste**

Рисунок 6. Настройка Trunk-портов на msk-pavlovskaya-mvshutenko-sw-1

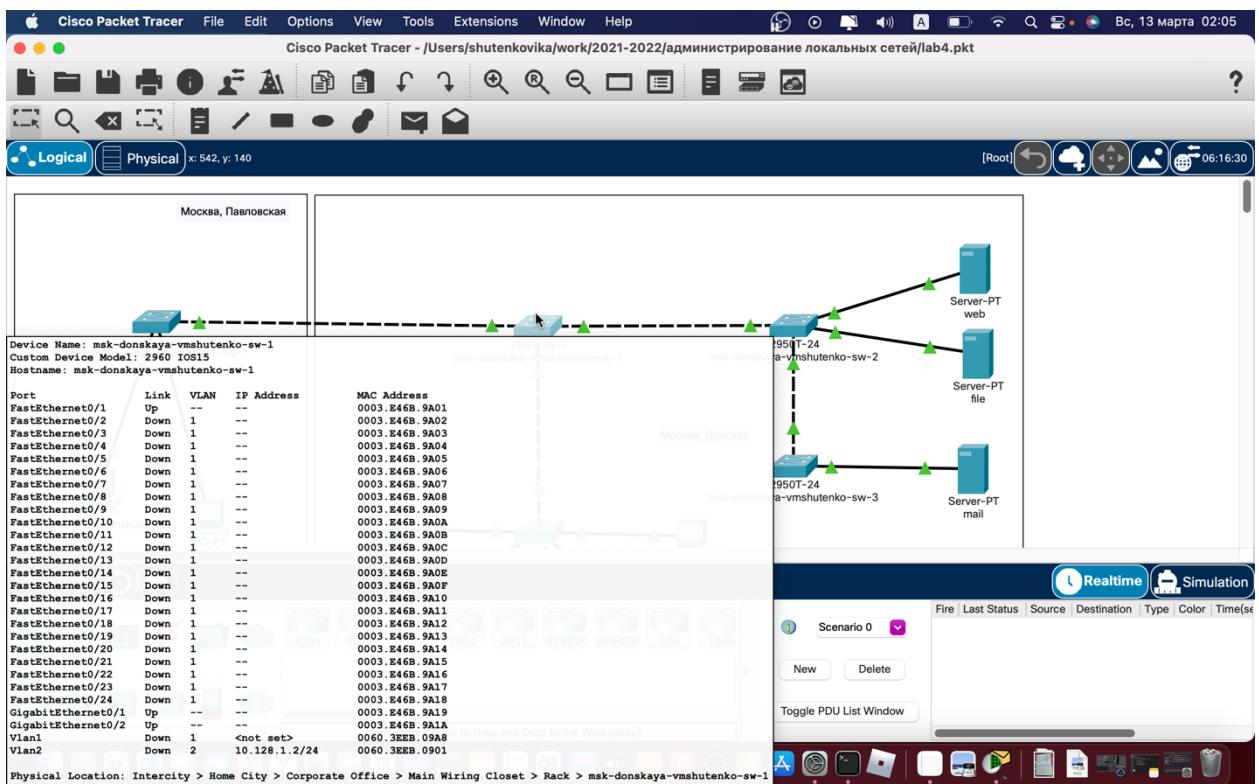


Рисунок 7. Проверка поднятых портов на msk-donskaya-mvshutenko-sw-1

2. Используя приведённую последовательность команд по конфигурации VTP, настроила коммутатор msk-donskaya-sw-1 как VTP-сервер и прописала на нём номера и названия VLAN (см. табл. 3.1 из раздела 3.3).

**msk-donskaya-sw-1>enable**

```
msk-donskaya-sw-1#configure terminal
msk-donskaya-sw-1(config)#vtp mode server
msk-donskaya-sw-1(config)#vtp domain donskaya
msk-donskaya-sw-1(config)#vtp password cisco
msk-donskaya-sw-1(config-vlan)#vlan 2
msk-donskaya-sw-1(config-vlan)#name management
msk-donskaya-sw-1(config-vlan)#vlan 3
msk-donskaya-sw-1(config-vlan)#name servers
msk-donskaya-sw-1(config-vlan)#vlan 101
msk-donskaya-sw-1(config-vlan)#name dk
msk-donskaya-sw-1(config-vlan)#vlan 102
msk-donskaya-sw-1(config-vlan)#name departaments
msk-donskaya-sw-1(config-vlan)#vlan 103
msk-donskaya-sw-1(config-vlan)#name adm
msk-donskaya-sw-1(config-vlan)#vlan 104
msk-donskaya-sw-1(config-vlan)#name other
```

**msk-donskaya-vmshutenko-sw-1**

Physical    Config    **CLI**    Attributes

**IOS Command Line Interface**

```

msk-donskaya-vmshutenko-sw-1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
msk-donskaya-vmshutenko-sw-1(config)#vlan 2
msk-donskaya-vmshutenko-sw-1(config-vlan)#
%LINK-5-CHANGED: Interface Vlan2, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan2, changed state to up

msk-donskaya-vmshutenko-sw-1(config-vlan)#name management
msk-donskaya-vmshutenko-sw-1(config-vlan)#vlan 3
msk-donskaya-vmshutenko-sw-1(config-vlan)#name servers
msk-donskaya-vmshutenko-sw-1(config-vlan)#vlan 101
msk-donskaya-vmshutenko-sw-1(config-vlan)#name dk
msk-donskaya-vmshutenko-sw-1(config-vlan)#vlan 102
msk-donskaya-vmshutenko-sw-1(config-vlan)#name departaments
msk-donskaya-vmshutenko-sw-1(config-vlan)#vlan 103
msk-donskaya-vmshutenko-sw-1(config-vlan)#name adm
msk-donskaya-vmshutenko-sw-1(config-vlan)#vlan 104
msk-donskaya-vmshutenko-sw-1(config-vlan)#name other
msk-donskaya-vmshutenko-sw-1(config-vlan)%^Z
msk-donskaya-vmshutenko-sw-1#
%SYS-5-CONFIG_I: Configured from console by console
wr mem
Building configuration...
[OK]
msk-donskaya-vmshutenko-sw-1#sh vlan

VLAN Name          Status      Ports
---- ----
1    default        active     Fa0/2, Fa0/3, Fa0/4, Fa0/5
                           Fa0/6, Fa0/7, Fa0/8, Fa0/9
                           Fa0/10, Fa0/11, Fa0/12, Fa0/13
                           Fa0/14, Fa0/15, Fa0/16, Fa0/17
                           Fa0/18, Fa0/19, Fa0/20, Fa0/21
                           Fa0/22, Fa0/23, Fa0/24

2    management     active
3    servers         active
101   dk             active
102   departaments  active
103   adm            active
104   other           active
1002  fddi-default  active
1003  token-ring-default  active
1004  fddinet-default active
1005  trnet-default  active

VLAN Type SAID      MTU      Parent RingNo BridgeNo Stp  BrdgMode Trans1 Trans2
---- ----
--More-- |

```

Command+F6 to exit CLI focus

Top

Рисунок 8. Настройка на msk-donskaya-vmshutenko-sw-1 номера и названия VLAN

The screenshot shows a Mac OS X window titled "msk-donskaya-vmshutenko-sw-1". The window has tabs at the top: Physical, Config, CLI (which is selected), and Attributes. Below the tabs is the text "IOS Command Line Interface". The main area contains the following CLI session output:

```
User Access Verification  
Password:  
msk-donskaya-vmshutenko-sw-1>en  
Password:  
msk-donskaya-vmshutenko-sw-1#conf t  
Enter configuration commands, one per line. End with CNTL/Z.  
msk-donskaya-vmshutenko-sw-1(config)#vtp domain donskaya  
Changing VTP domain name from NULL to donskaya  
msk-donskaya-vmshutenko-sw-1(config)#vtp mode server  
Device mode already VTP SERVER.  
msk-donskaya-vmshutenko-sw-1(config)#vtp password cisco  
Setting device VLAN database password to cisco  
msk-donskaya-vmshutenko-sw-1(config)#^Z  
msk-donskaya-vmshutenko-sw-1#  
%SYS-5-CONFIG_I: Configured from console by console  
wr mem  
Building configuration...  
[OK]  
msk-donskaya-vmshutenko-sw-1#sh vtp status  
VTP Version capable : 1 to 2  
VTP version running : 2  
VTP Domain Name : donskaya  
VTP Pruning Mode : Disabled  
VTP Traps Generation : Disabled  
Device ID : 0003.E46B.9A00  
Configuration last modified by 10.128.1.2 at 3-1-93 00:22:00  
Local updater ID is 10.128.1.2 on interface V12 (lowest numbered VLAN interface found)  
Feature VLAN :  
-----  
VTP Operating Mode : Server  
Maximum VLANs supported locally : 255  
Number of existing VLANs : 11  
Configuration Revision : 0  
MD5 digest : 0x89 0xBC 0x41 0x28 0xCE 0x5B 0x7C 0x1D  
0x42 0xCC 0xCA 0xD2 0xC9 0xBC 0x0F 0x01  
msk-donskaya-vmshutenko-sw-1#
```

At the bottom left, there is a "Command+F6 to exit CLI focus" placeholder. On the right side, there are "Copy" and "Paste" buttons. A "Top" button is located at the bottom left.

Рисунок 9. Настройка коммутатора msk-donskaya-vmshutenko-sw-1 как VTP-сервер

3. Используя приведённую последовательность команд по конфигурации диапазонов портов, настроила коммутаторы msk-donskaya-sw-2 — msk-donskaya-sw-4, msk-pavlovskaya-sw-1 как VTP-клиенты и на интерфейсах укажите принадлежность к VLAN (см. табл. 3.3 из раздела 3.3).

```
msk-donskaya-sw-4#conf terminal  
msk-donskaya-sw-4(config)#vtp mode client  
msk-donskaya-sw-4(config)#interface range f0/1 – 5  
msk-donskaya-sw-4(config-if-range)#switchport mode access  
msk-donskaya-sw-4(config-if-range)#switchport access vlan 101
```

msk-donskaya-vmshutenko-sw-2

Physical Config **CLI** Attributes

IOS Command Line Interface

```
% Invalid input detected at '^' marker.

msk-donskaya-vmshutenko-sw-2#conf t
Enter configuration commands, one per line. End with CNTL/Z.
msk-donskaya-vmshutenko-sw-2(config)#vtp mode client
Device mode already VTP CLIENT.
msk-donskaya-vmshutenko-sw-2(config)#vtp password cisco
Setting device VLAN database password to cisco
msk-donskaya-vmshutenko-sw-2(config)#
msk-donskaya-vmshutenko-sw-2#
%SYS-5-CONFIG_I: Configured from console by console
wr mem
Building configuration...
[OK]
msk-donskaya-vmshutenko-sw-2#sh vtp status
VTP Version : 2
Configuration Revision : 0
Maximum VLANs supported locally : 255
Number of existing VLANs : 11
VTP Operating Mode : Client
VTP Domain Name : donskaya
VTP Pruning Mode : Disabled
VTP V2 Mode : Disabled
VTP Traps Generation : Disabled
MDS digest : 0x89 0xBC 0x41 0x28 0x5B 0x7C 0x1D
Configuration last modified by 10.128.1.2 at 3-1-93 00:22:00
msk-donskaya-vmshutenko-sw-2#sh vlan

VLAN Name Status Ports
--- -----
1 default active Fa0/1, Fa0/2, Fa0/3, Fa0/4
Fa0/5, Fa0/6, Fa0/7, Fa0/8
Fa0/9, Fa0/10, Fa0/11, Fa0/12
Fa0/13, Fa0/14, Fa0/15, Fa0/16
Fa0/17, Fa0/18, Fa0/19, Fa0/20
Fa0/21, Fa0/22, Fa0/23, Fa0/24
2 management active
3 servers active
101 dk active
102 departaments active
103 lab active
104 other active
1002 fddi-default active
1003 token-ring-default active
1004 fddinet-default active
1005 trnet-default active

VLAN Type SAID MTU Parent RingNo BridgeNo Stp BrdgMode Transl Trans2
--- -----
--More--

Command+F6 to exit CLI focus Copy Paste
```

Top

msk-donskaya-vmshutenko-sw-2

Physical Config **CLI** Attributes

IOS Command Line Interface

```
msk-donskaya-vmshutenko-sw-2#en
Password:
msk-donskaya-vmshutenko-sw-2#conf t
Enter configuration commands, one per line. End with CNTL/Z.
msk-donskaya-vmshutenko-sw-2(config)#interface range f0/1 - 2
msk-donskaya-vmshutenko-sw-2(config-if-range)#switchport mode access
msk-donskaya-vmshutenko-sw-2(config-if-range)#switchport access vlan 3
msk-donskaya-vmshutenko-sw-2(config-if-range)#
msk-donskaya-vmshutenko-sw-2#
%SYS-5-CONFIG_I: Configured from console by console
wr mem
Building configuration...
[OK]
msk-donskaya-vmshutenko-sw-2#sh ru
Building configuration...

Current configuration : 1549 bytes
!
version 12.1
no service timestamps log datetime msec
no service timestamps debug datetime msec
service password-encryption
!
hostname msk-donskaya-vmshutenko-sw-2
!
enable secret 5 $1$MER$hx5rVt7rPNoS4wqbXKX7m0
!
!
ip domain-name donskaya.rudn.edu
!
username admin secret 5 $1$MER$hx5rVt7rPNoS4wqbXKX7m0
!
!
spanning-tree mode pvst
spanning-tree extend system-id
!
interface FastEthernet0/1
switchport access vlan 3
switchport mode access
!
interface FastEthernet0/2
switchport access vlan 3
switchport mode access
!
interface FastEthernet0/3
!
interface FastEthernet0/4
!
interface FastEthernet0/5
--More--
```

Command+F6 to exit CLI focus Copy Paste

Top

Рисунок 10. Настройка коммутатора msk-donskaya-vmshutenko-sw-2 как VTP-клиент и указание на нём номера и названия VLAN.

**msk-donskaya-vmshutenko-sw-3**

Physical Config **CLI** Attributes

IOS Command Line Interface

```

msk-donskaya-vmshutenko-sw-3>enable
Enter configuration commands, one per line. End with CNTL/Z.
msk-donskaya-vmshutenko-sw-3(config)#vtp mode client
Setting device to VTP CLIENT mode.
msk-donskaya-vmshutenko-sw-3(config)#vtp password cisco
Setting device VLAN database password to cisco
msk-donskaya-vmshutenko-sw-3(config)#
%LINK-5-CHANGED: Interface Vlan2, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan2, changed state to up
%Z
msk-donskaya-vmshutenko-sw-3#
%SYS-5-CONFIG_I: Configured from console by console
wr mem
Building configuration...
[OK]
msk-donskaya-vmshutenko-sw-3#sh vtp status
VTP Version : 2
Configuration Revision : 0
Maximum VLANs supported locally : 255
Number of existing VLANs : 11
VTP Operating Mode : Client
VTP Domain Name : donskaya
VTP Pruning Mode : Disabled
VTP V2 Mode : Disabled
VTP Traps Generation : Disabled
MDS digest : 0x89 0xBC 0x41 0x28 0xCE 0x5B 0x7C 0x1D
Configuration last modified by 10.128.1.2 at 3-1-93 00:22:00
msk-donskaya-vmshutenko-sw-3#sh vlan

VLAN Name          Status     Ports
---- ----
1    default        active    Fa0/1, Fa0/2, Fa0/3, Fa0/4
                           Fa0/5, Fa0/6, Fa0/7, Fa0/8
                           Fa0/9, Fa0/10, Fa0/11, Fa0/12
                           Fa0/13, Fa0/14, Fa0/15, Fa0/16
                           Fa0/17, Fa0/18, Fa0/19, Fa0/20
                           Fa0/21, Fa0/22, Fa0/23, Fa0/24
                           Gig0/2
2    management     active
3    servers        active
101   dk           active
102   departments   active
103   sec           active
104   other          active
1002  fddi-default  active
1003  token-ring-default  active
1004  fddinet-default  active
1005  trnet-default  active

VLAN Type SAID      MTU Parent RingNo BridgeNo Stp BrdgMode Transl Trans2
--More--

```

Command+F6 to exit CLI focus     

Top

**t5 msk-donskaya-vmshutenko-sw-3**

Physical Config **CLI** Attributes

IOS Command Line Interface

```

Password:
msk-donskaya-vmshutenko-sw-3>en
Password:
msk-donskaya-vmshutenko-sw-3#conf t
Enter configuration commands, one per line. End with CNTL/Z.
msk-donskaya-vmshutenko-sw-3(config)#interface f0/1
msk-donskaya-vmshutenko-sw-3(config-if)#switchport mode access
msk-donskaya-vmshutenko-sw-3(config-if)#switchport access vlan 3
msk-donskaya-vmshutenko-sw-3(config-if)#*Z
msk-donskaya-vmshutenko-sw-3#
%SYS-5-CONFIG_I: Configured from console by console
wr mem
Building configuration...
[OK]
msk-donskaya-vmshutenko-sw-3#sh ru
Building configuration...

Current configuration : 1476 bytes
!
version 12.1
no service timestamps log datetime msec
no service timestamps debug datetime msec
service password-encryption
!
hostname msk-donskaya-vmshutenko-sw-3
!
enable secret 5 $1$mERr$hx5rVt7rPNoS4wqbXX7m0
!
!
!
ip domain-name donskaya.rudn.edu
!
username admin secret 5 $1$mERr$hx5rVt7rPNoS4wqbXX7m0
!
!
!
spanning-tree mode pvst
spanning-tree extend system-id
!
interface FastEthernet0/1
switchport access vlan 3
switchport mode access
!
interface FastEthernet0/2
!
interface FastEthernet0/3

```

Command+F6 to exit CLI focus     

Top

Рисунок 11. Настройка коммутатора msk-donskaya-vmshutenko-sw-3 как VTP-клиент и указание на нём номера и названия VLAN.

msk-donskaya-vmshtutenko-sw-4

Physical Config **CLI** Attributes

IOS Command Line Interface

```
msk-donskaya-vmshtutenko-sw-1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
msk-donskaya-vmshtutenko-sw-1(config)#vtp mode client
Setting device to VTP CLIENT mode.
msk-donskaya-vmshtutenko-sw-1(config)#vtp password cisco
Setting device VLAN database password to cisco
msk-donskaya-vmshtutenko-sw-1(config)#
$LINK-5-CHANGED: Interface Vlan2, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan2, changed state to up
^Z
msk-donskaya-vmshtutenko-sw-1#
%SYS-5-CONFIG_I: Configured from console by console
wr mem
Building configuration...
[OK]
msk-donskaya-vmshtutenko-sw-1#sh vtp status
VTP Version : 2
Configuration Revision : 0
Maximum VLANs supported locally : 255
Number of existing VLANs : 11
VTP Operate Mode : Client
VTP Domain Name : donskaya
VTP Pruning Mode : Disabled
VTP V2 Mode : Disabled
VTP Traps Generation : Disabled
MDS digest : 0x89 0xBC 0x41 0x28 0xCE 0x5B 0x7C 0x1D
Configuration last modified by 10.128.1.2 at 3-1-93 00:22:00
msk-donskaya-vmshtutenko-sw-1#sh vlan

VLAN Name Status Ports
---- -----
1 default active Fa0/1, Fa0/2, Fa0/3, Fa0/4
Fa0/5, Fa0/6, Fa0/7, Fa0/8
Fa0/9, Fa0/10, Fa0/11, Fa0/12
Fa0/13, Fa0/14, Fa0/15, Fa0/16
Fa0/17, Fa0/18, Fa0/19, Fa0/20
Fa0/21, Fa0/22, Fa0/23, Fa0/24
Gig0/2

2 management active
3 servers active
101 dk active
102 departaments active
103 lab active
104 other active
1002 fddi-default active
1003 token-ring-default active
1004 fddinet-default active
1005 trnet-default active

VLAN Type SAID MTU Parent RingNo BridgeNo Stp BrdgMode Transl Trans2

Command+F6 to exit CLI focus
```

Top

как увеличить

How can I

+

msk-donskaya-vmshtutenko-sw-4

Physical Config **CLI** Attributes

IOS Command Line Interface

```
msk-donskaya-vmshtutenko-sw-1 con0 is now available

Press RETURN to get started.

User Access Verification
Password:
msk-donskaya-vmshtutenko-sw-1>en
Password:
msk-donskaya-vmshtutenko-sw-1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
msk-donskaya-vmshtutenko-sw-1(config)#vtp mode client
Device mode already VTP CLIENT
msk-donskaya-vmshtutenko-sw-1(config)#interface range f0/1 5
^
% Invalid input detected at '^' marker.

msk-donskaya-vmshtutenko-sw-1(config)#interface range f0/1-5
msk-donskaya-vmshtutenko-sw-1(config-if-range)#switchport mode access
msk-donskaya-vmshtutenko-sw-1(config-if-range)#switchport access vlan 101
msk-donskaya-vmshtutenko-sw-1(config-if-range)#

Command+F6 to exit CLI focus
```

msk-donskaya-vmshutenko-sw-4

Physical Config **CLI** Attributes

IOS Command Line Interface

```
msk-donskaya-vmshutenko-sw-1(config)#interface range f0/1-5
msk-donskaya-vmshutenko-sw-1(config-if-range) #switchport mode access
msk-donskaya-vmshutenko-sw-1(config-if-range) #switchport access vlan 101
msk-donskaya-vmshutenko-sw-1(config-if-range) #interface range f0/1 - 5
msk-donskaya-vmshutenko-sw-1(config-if-range) #switchport mode access
msk-donskaya-vmshutenko-sw-1(config-if-range) #switchport access vlan 101
msk-donskaya-vmshutenko-sw-1(config-if-range) #interface range f0/6 - 10
msk-donskaya-vmshutenko-sw-1(config-if-range) #switchport mode access
msk-donskaya-vmshutenko-sw-1(config-if-range) #switchport access vlan 102
msk-donskaya-vmshutenko-sw-1(config-if-range) #interface range f0/11 - 15
msk-donskaya-vmshutenko-sw-1(config-if-range) #switchport mode access
msk-donskaya-vmshutenko-sw-1(config-if-range) #switchport access vlan 103
msk-donskaya-vmshutenko-sw-1(config-if-range) #interface range f0/16 - 24
msk-donskaya-vmshutenko-sw-1(config-if-range) #switchport mode access
msk-donskaya-vmshutenko-sw-1(config-if-range) #switchport access vlan 104
msk-donskaya-vmshutenko-sw-1#^Z
SYS-5-CONFIG_I: Configured from console by console
wr mem
Building configuration...
[OK]
msk-donskaya-vmshutenko-sw-1#sh ru
Building configuration...

Current configuration : 2674 bytes
!
version 12.1
n service timestamps log datetime msec
n service timestamps debug datetime msec
service password-encryption
!
hostname msk-donskaya-vmshutenko-sw-1
!
enable secret 5 $1$mERr$hx5rv7rPNoS4wqbXKX7m0
!
!
ip domain-name donskaya.rudn.edu
!
username admin secret 5 $1$mERr$hx5rv7rPNoS4wqbXKX7m0
!
!
spanning-tree mode pvst
spanning-tree extend system-id
!
interface FastEthernet0/1
switchport access vlan 101
switchport mode access
!
interface FastEthernet0/2
switchport access vlan 101
```

Command+F6 to exit CLI focus     

Рисунок 12. Настройка коммутатора msk-donskaya-vmshutenko-sw-4 как VTP-клиент и указание на нём номера и названия VLAN.

**msk-pavlovskaya-vmshutenko-sw-1**

Physical Config **CLI** Attributes

IOS Command Line Interface

```

Enter configuration commands, one per line. End with CNTL/Z.
msk-pavlovskaya-vmshutenko-sw-1(config)#vtp mode client
Setting device to VTP CLIENT mode.
msk-pavlovskaya-vmshutenko-sw-1(config)#vtp password cisco
Setting device VLAN database password to cisco
msk-pavlovskaya-vmshutenko-sw-1(config)#
%LINK-5-CHANGED: Interface Vlan2, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan2, changed state to up
^Z
msk-pavlovskaya-vmshutenko-sw-1#  
%SYS-3-CONFIG_I: Configured from console by console
wr mem
Building configuration...
[OK]
msk-pavlovskaya-vmshutenko-sw-1#sh vtp status
VTP Version : 2
Configuration Revision : 0
Maximum VLANs supported locally : 255
Number of existing VLANs : 11
VTP Operating Mode : Client
VTP Domain Name : pavlovskaya
VTP Tuning Mode : Disabled
VTP V2 Mode : Disabled
VTP Traps Generation : Disabled
MD5 digest : 0x89 0xBc 0x41 0x28 0xCE 0x5B 0x7C 0x1D
Configuration last modified by 10.128.1.2 at 3-1-93 00:22:00
msk-pavlovskaya-vmshutenko-sw-1#sh vlan
-----  
VLAN Name Status Ports
-----  
1 default active F0/1, F0/2, F0/3, Fa0/4  
Fa0/5, Fa0/6, Fa0/7, Fa0/8  
Fa0/9, Fa0/10, Fa0/11, Fa0/12  
Fa0/13, Fa0/14, Fa0/15, Fa0/16  
Fa0/17, Fa0/18, Fa0/19, Fa0/20  
Fa0/21, Fa0/22, Fa0/23, Gig0/2
2 management active
3 servers active
101 dk active
102 departaments active
103 admin active
104 other active
1002 fddi-default active
1003 token-ring-default active
1004 fddinet-default active
1005 trnet-default active
-----  
VLAN Type SAID MTU Parent RingNo BridgeNo Stp BrdgMode Transl Trans2
--More--

```

Command+F6 to exit CLI focus

Top

**msk-pavlovskaya-vmshutenko-sw-1**

Physical Config **CLI** Attributes

IOS Command Line Interface

```

msk-pavlovskaya-vmshutenko-sw-1>en
Password:   
#conf t
Enter configuration commands, one per line. End with CNTL/Z.
msk-pavlovskaya-vmshutenko-sw-1(config)#interface range F0/1 - 15
msk-pavlovskaya-vmshutenko-sw-1(config-if-range)#switchport mode access
msk-pavlovskaya-vmshutenko-sw-1(config-if-range)#switchport access vlan 101
msk-pavlovskaya-vmshutenko-sw-1(config-if-range)#interface F0/20
msk-pavlovskaya-vmshutenko-sw-1(config-if)#switchport mode access
msk-pavlovskaya-vmshutenko-sw-1(config-if)#switchport access vlan 104
msk-pavlovskaya-vmshutenko-sw-1(config-if)#
%LINK-5-CONFIG_I: Configured from console by console
wr mem
Building configuration...
[OK]
msk-pavlovskaya-vmshutenko-sw-1#sh ru
Building configuration...
-----  
Current configuration : 2261 bytes
!
version 12.1
no service timestamps log datetime msec
no service timestamps debug datetime msec
service password-encryption
!
hostname msk-pavlovskaya-vmshutenko-sw-1
!
enable secret 5 $1$eRz$hx5rVt7rPNoS4wqbXKX7m0
!
!
!
ip domain-name donskaya.rudn.edu
!
username admin secret 5 $1$eRz$hx5rVt7rPNoS4wqbXKX7m0
!
!
spanning-tree mode pvtst
spanning-tree extend system-id
!
interface FastEthernet0/1
switchport access vlan 101
switchport mode access
!
interface FastEthernet0/2
switchport access vlan 101
switchport mode access
!
interface FastEthernet0/3
switchport access vlan 101
switchport mode access

```

Command+F6 to exit CLI focus

Top

Рисунок 13. Настройка коммутатора msk-pavlovskaya-vmshutenko-sw-1 как VTP-клиент и указание на нём номера и названия VLAN.

4. После указания статических IP-адресов на оконечных устройствах проверила с помощью команды ping доступность устройств, принадлежащих одному VLAN, и недоступность устройств, принадлежащих разным VLAN.

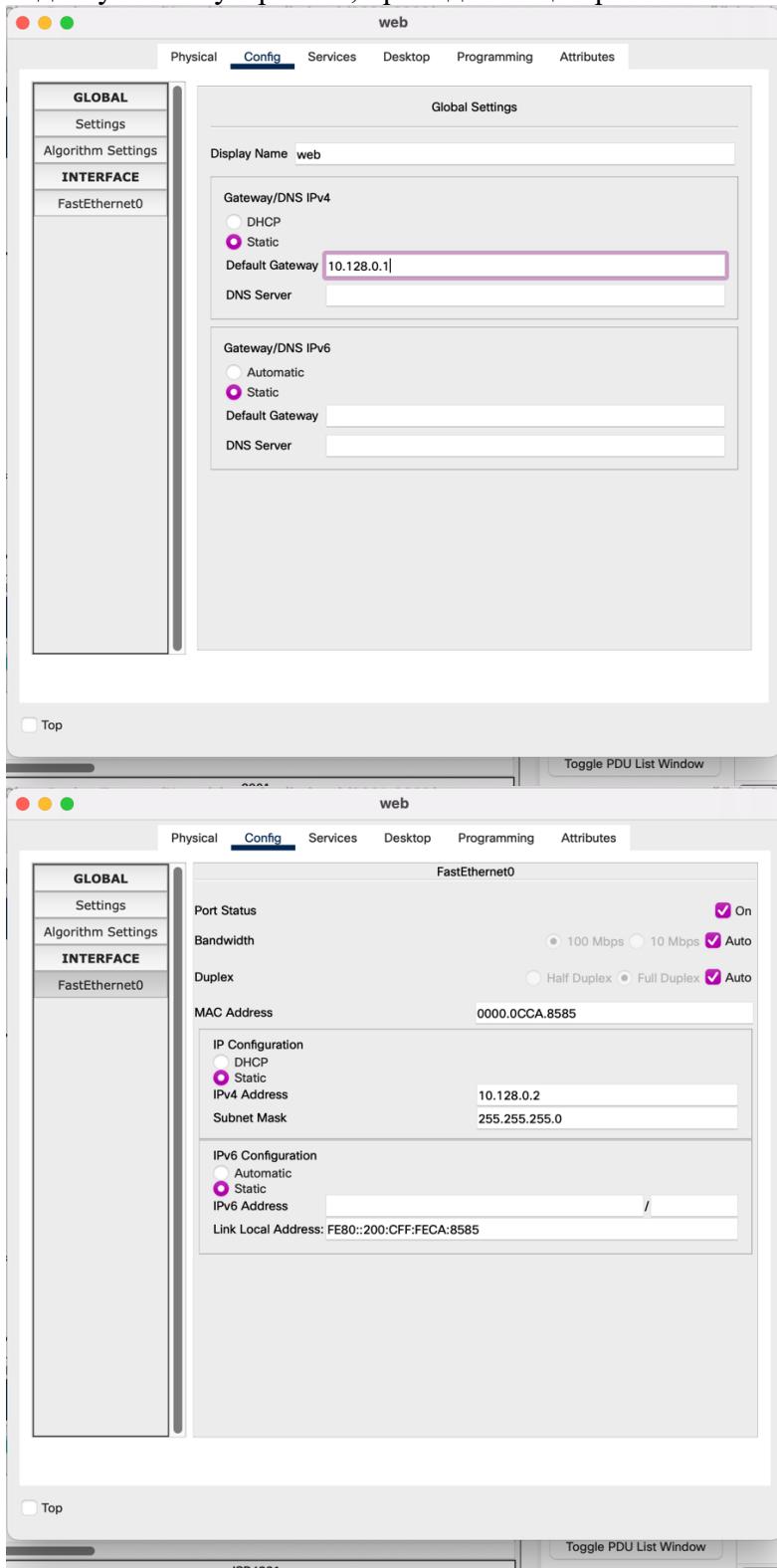


Рисунок 14. Шлюз и ip-адрес для web

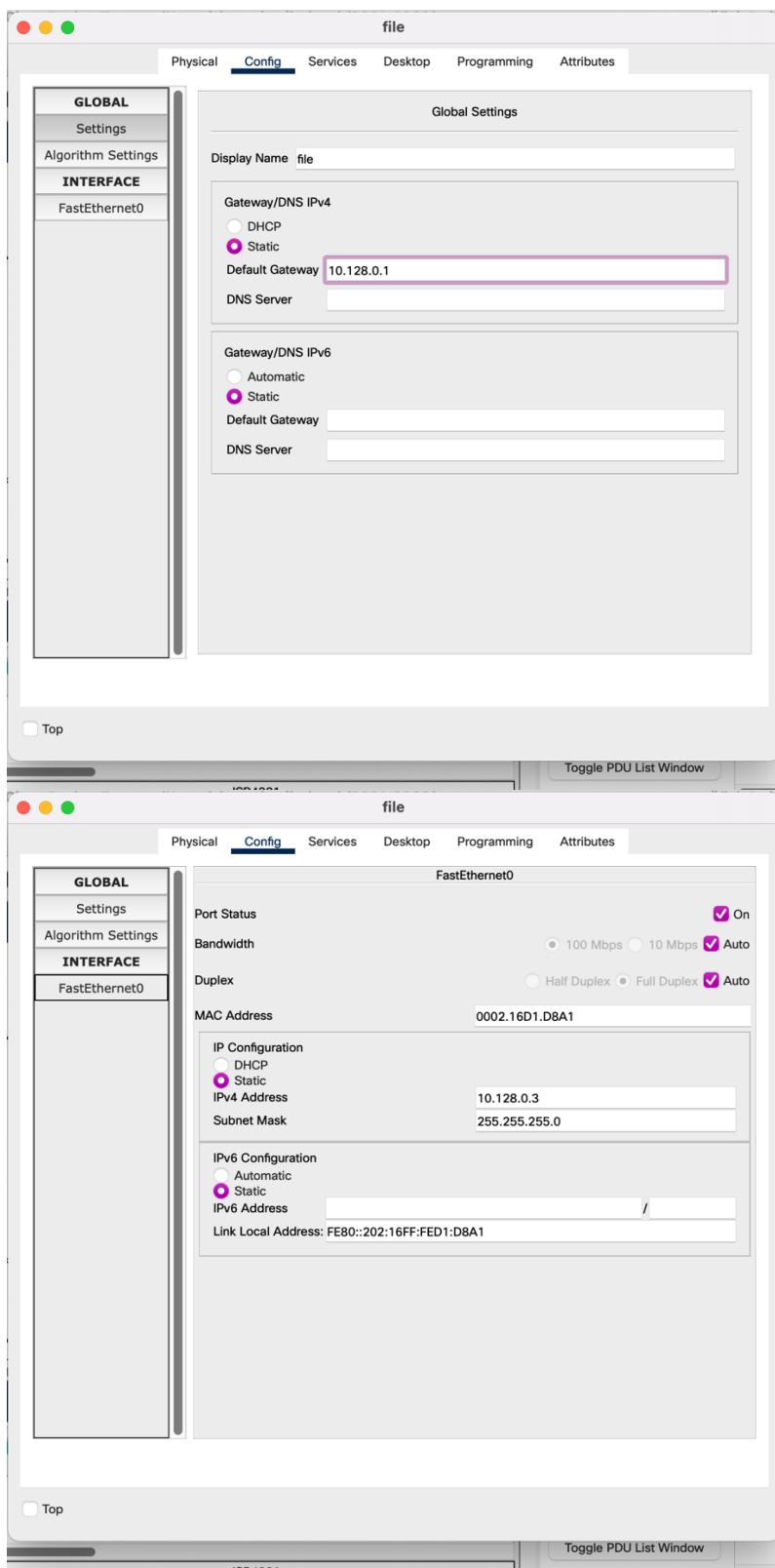


Рисунок 15. Шлюз и ip-адрес для file

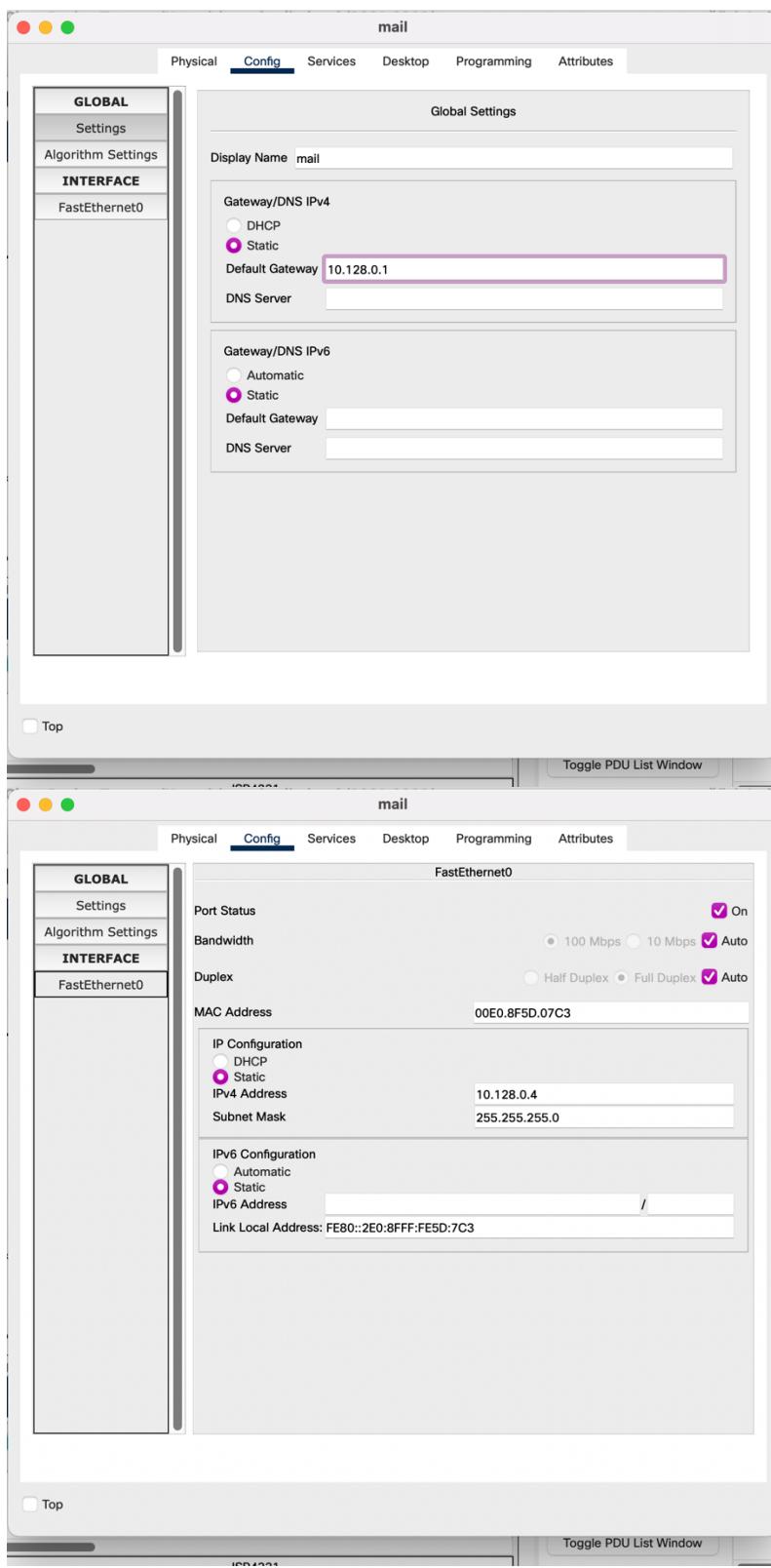


Рисунок 16. Шлюз и ip-адрес для mail

**Top Window: Global Settings**

Display Name: dk-donskaya-vmshutenko-1

Interfaces: FastEthernet0

**Gateway/DNS IPv4**

- DHCP (radio button)
- Static** (radio button)

Default Gateway: 10.128.3.1

**Gateway/DNS IPv6**

- Automatic (radio button)
- Static** (radio button)

**Bottom Window: FastEthernet0 Configuration**

Port Status: On

Bandwidth: 100 Mbps  10 Mbps  Auto

Duplex: Half Duplex  Full Duplex  Auto

MAC Address: 0001.9701.DC14

**IP Configuration**

- DHCP (radio button)
- Static** (radio button)

IPv4 Address: 10.128.3.201

Subnet Mask: 255.255.255.0

**IPv6 Configuration**

- Automatic (radio button)
- Static** (radio button)

IPv6 Address: /

Link Local Address: FE80::201:97FF:FE01:DC14

Рисунок 17. Шлюз и ip-адрес для dk-donskaya-vmshutenko-1

**Global Settings (Top Screenshot):**

- Display Name: dep-donskaya-vmshutenko-1
- Interfaces: FastEthernet0
- Gateway/DNS IPv4:
  - Default Gateway: 10.128.4.1
- Gateway/DNS IPv6:
  - Default Gateway:

**FastEthernet0 Settings (Bottom Screenshot):**

- Port Status: On
- Bandwidth: 100 Mbps
- Duplex: Auto
- MAC Address: 00E0.8FB4.7D26
- IP Configuration:
  - IPv4 Address: 10.128.4.201
  - Subnet Mask: 255.255.255.0
- IPv6 Configuration:
  - IPv6 Address: /
- Link Local Address: FE80::2E0:8FFF:FE84:7D26

Рисунок 18. Шлюз и ip-адрес для dep-donskaya-vmshutenko-1

The image displays two screenshots of the ICP-1024 configuration interface, both titled "adm-donskaya-vmshutenko-1".

**Top Screenshot (Global Configuration):**

- Left Sidebar:** GLOBAL, Settings, Algorithm Settings, INTERFACE, FastEthernet0, Bluetooth.
- Top Bar:** Physical, **Config**, Desktop, Programming, Attributes.
- Central Area:** Global Settings. Display Name: adm-donskaya-vmshutenko-1. Interfaces: FastEthernet0. Gateway/DNS IPv4: Static (selected), Default Gateway: 10.128.5.1, DNS Server: [empty]. Gateway/DNS IPv6: Static (selected), Default Gateway: [empty], DNS Server: [empty].

**Bottom Screenshot (Interface Configuration):**

- Left Sidebar:** GLOBAL, Settings, Algorithm Settings, INTERFACE, FastEthernet0, Bluetooth.
- Top Bar:** Physical, **Config**, Desktop, Programming, Attributes.
- Central Area:** FastEthernet0. Port Status: On (checked). Bandwidth: 100 Mbps (radio button), 10 Mbps (radio button), Auto (checked). Duplex: Half Duplex (radio button), Full Duplex (radio button), Auto (checked). MAC Address: 0002.4AD7.BEBO. IP Configuration: Static (selected). IPv4 Address: 10.128.5.201, Subnet Mask: 255.255.255.0. IPv6 Configuration: Static (selected). IPv6 Address: [empty]. Link Local Address: FE80::202:4AFF:FED7:BEBO.

Рисунок 19. Шлюз и ip-адрес для adm-donskaya-vmshutenko-1

**Global Settings (Top Window)**

- Display Name:** other-donskaya-vmshutenko-1
- Interfaces:** FastEthernet0
- Gateway/DNS IPv4:**
  - DHCP
  - Static
- Default Gateway:** 10.128.6.1
- Gateway/DNS IPv6:**
  - Automatic
  - Static
- Default Gateway:** [empty]
- DNS Server:** [empty]

**FastEthernet0 Configuration (Bottom Window)**

- Port Status:** On
- Bandwidth:** 100 Mbps (radio button)
- Duplex:** Full Duplex (radio button)
- MAC Address:** 0001.439D.CCE2
- IP Configuration:**
  - DHCP
  - Static
- IPv4 Address:** 10.128.6.201
- Subnet Mask:** 255.255.255.0
- IPv6 Configuration:**
  - Automatic
  - Static
- IPv6 Address:** FE80::201:43FF:FE9D:CCE2
- Link Local Address:** FE80::201:43FF:FE9D:CCE2

Рисунок 20. Шлюз и ip-адрес для other-donskaya-vmshutenko-1

**dk-pavlovskaya-vmshutenko-1**

**Physical Config Desktop Programming Attributes**

**GLOBAL**

- Settings
- Algorithm Settings
- INTERFACE**
- FastEthernet0
- Bluetooth

**Global Settings**

Display Name: dk-pavlovskaya-vmshutenko-1

Interfaces: FastEthernet0

**Gateway/DNS IPv4**

- DHCP
- Static**

Default Gateway: 10.128.3.1

DNS Server:

**Gateway/DNS IPv6**

- Automatic
- Static**

Default Gateway:

DNS Server:

Top

**Toggle PDU List Window**

**dk-pavlovskaya-vmshutenko-1**

**Physical Config Desktop Programming Attributes**

**GLOBAL**

- Settings
- Algorithm Settings
- INTERFACE**
- FastEthernet0
- Bluetooth

**FastEthernet0**

**Port Status**:  On

**Bandwidth**:  100 Mbps  10 Mbps  Auto

**Duplex**:  Half Duplex  Full Duplex  Auto

**MAC Address**: 0009.7CD7.3906

**IP Configuration**

- DHCP
- Static**

IPv4 Address: 10.128.3.202

Subnet Mask: 255.255.255.0

**IPv6 Configuration**

- Automatic
- Static**

IPv6 Address:

Link Local Address: FE80::209:7CFF:FED7:3906

Top

**Toggle PDU List Window**

Рисунок 21. Шлюз и ір-адрес для dk-pavlovskaya-vmshutenko-1

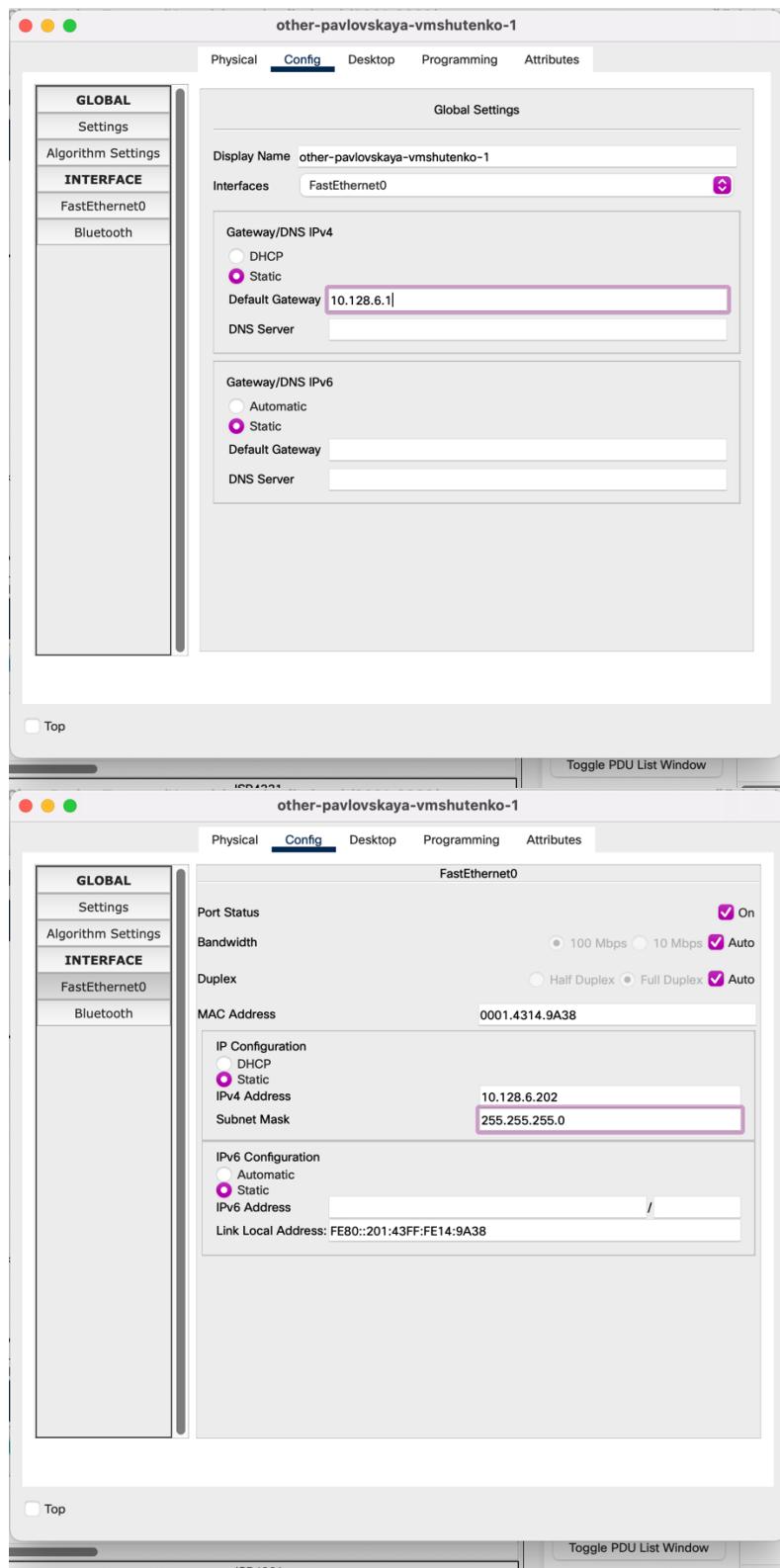


Рисунок 22. Шлюз и ip-адрес для other-pavlovskaya-vmshutenko-1

The screenshot shows a software interface titled "dk-donskaya-vmshutenko-1". At the top, there are tabs: Physical, Config, Desktop (which is selected), Programming, and Attributes. Below the tabs is a "Command Prompt" window with a blue header bar containing the title "Command Prompt" and a close button (X). The main area of the window displays the following text:

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

FastEthernet0 Connection:(default port)

Connection-specific DNS Suffix.:
Link-local IPv6 Address.....: FE80::201:97FF:FE01:DC14
IPv6 Address.....: ::
IPv4 Address.....: 10.128.3.201
Subnet Mask.....: 255.255.255.0
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 10.128.3.202

Pinging 10.128.3.202 with 32 bytes of data:

Reply from 10.128.3.202: bytes=32 time<1ms TTL=128
Reply from 10.128.3.202: bytes=32 time=<1ms TTL=128
Reply from 10.128.3.202: bytes=32 time<1ms TTL=128
Reply from 10.128.3.202: bytes=32 time<1ms TTL=128

Ping statistics for 10.128.3.202:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\>ping 10.128.4.201

Pinging 10.128.4.201 with 32 bytes of data:

Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 10.128.4.201:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
C:\>
```

Below the Command Prompt window, there is a "Top" checkbox and a "Toggle PDU List Window" button.

Рисунок 23. Проверка с помощью команды ping доступность устройств, принадлежащих одному VLAN, и недоступность устройств, принадлежащих разным VLAN.

5. Используя режим симуляции в Packet Tracer, изучила процесс передвижения пакета ICMP по сети. Изучила содержимое передаваемого пакета и заголовки задействованных протоколов.

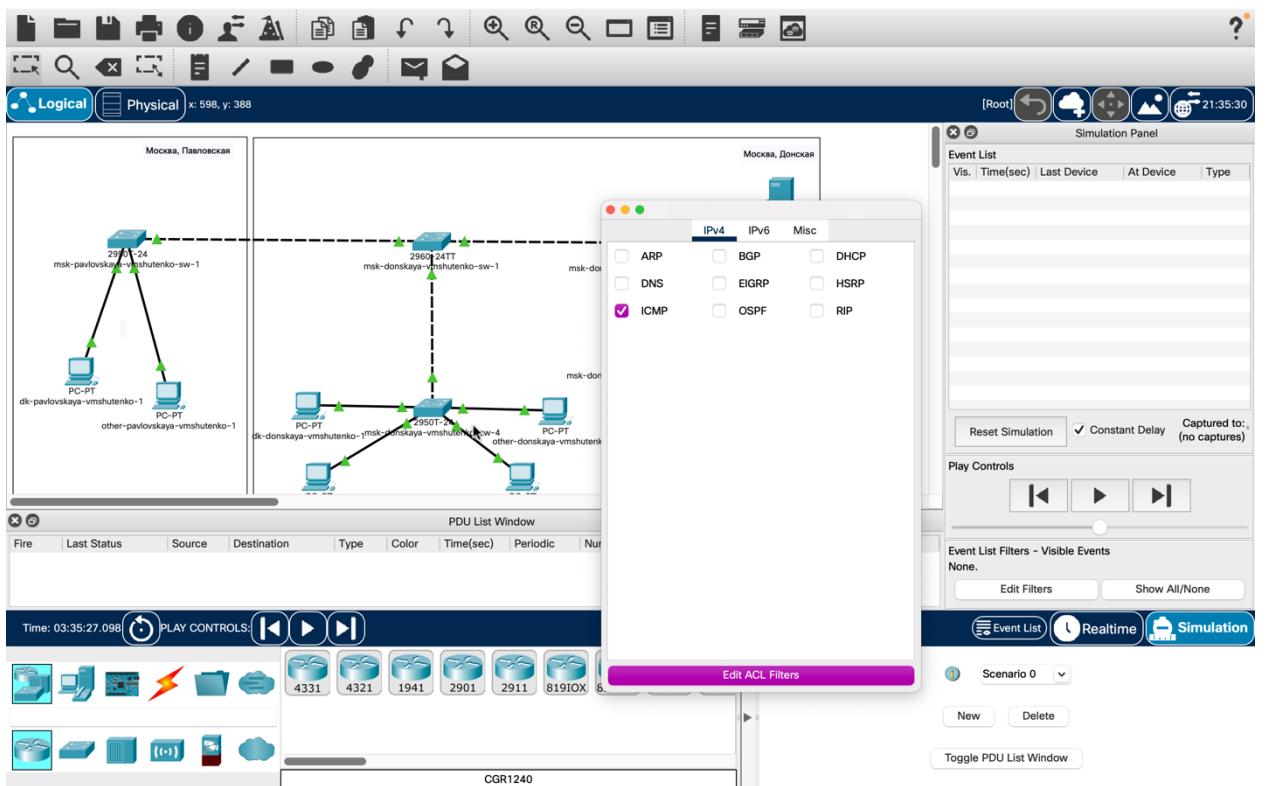


Рисунок 24. Настройка фильтрации пакетов по ICMP.

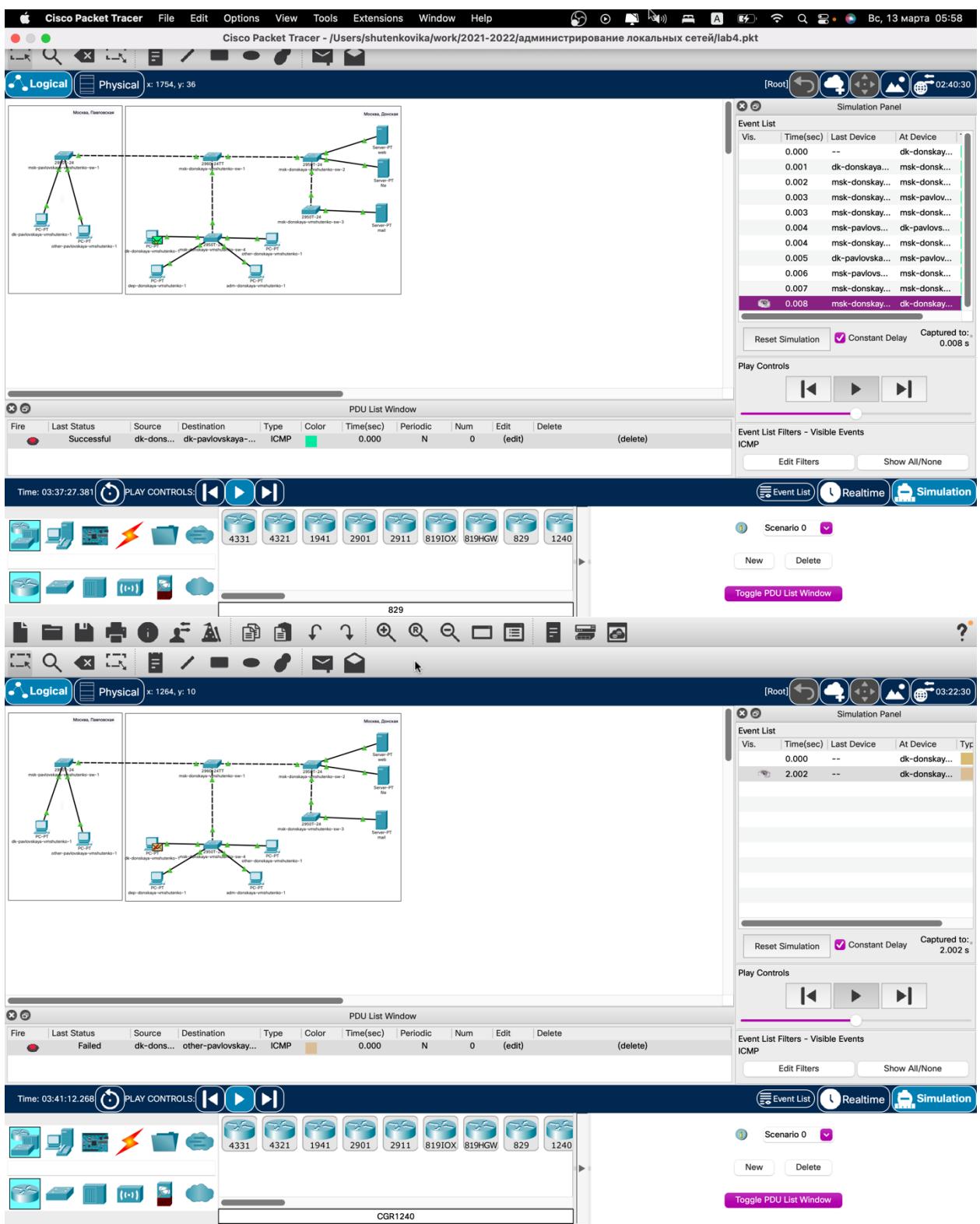


Рисунок 25. Процесс передвижения пакета ICMP по сети.

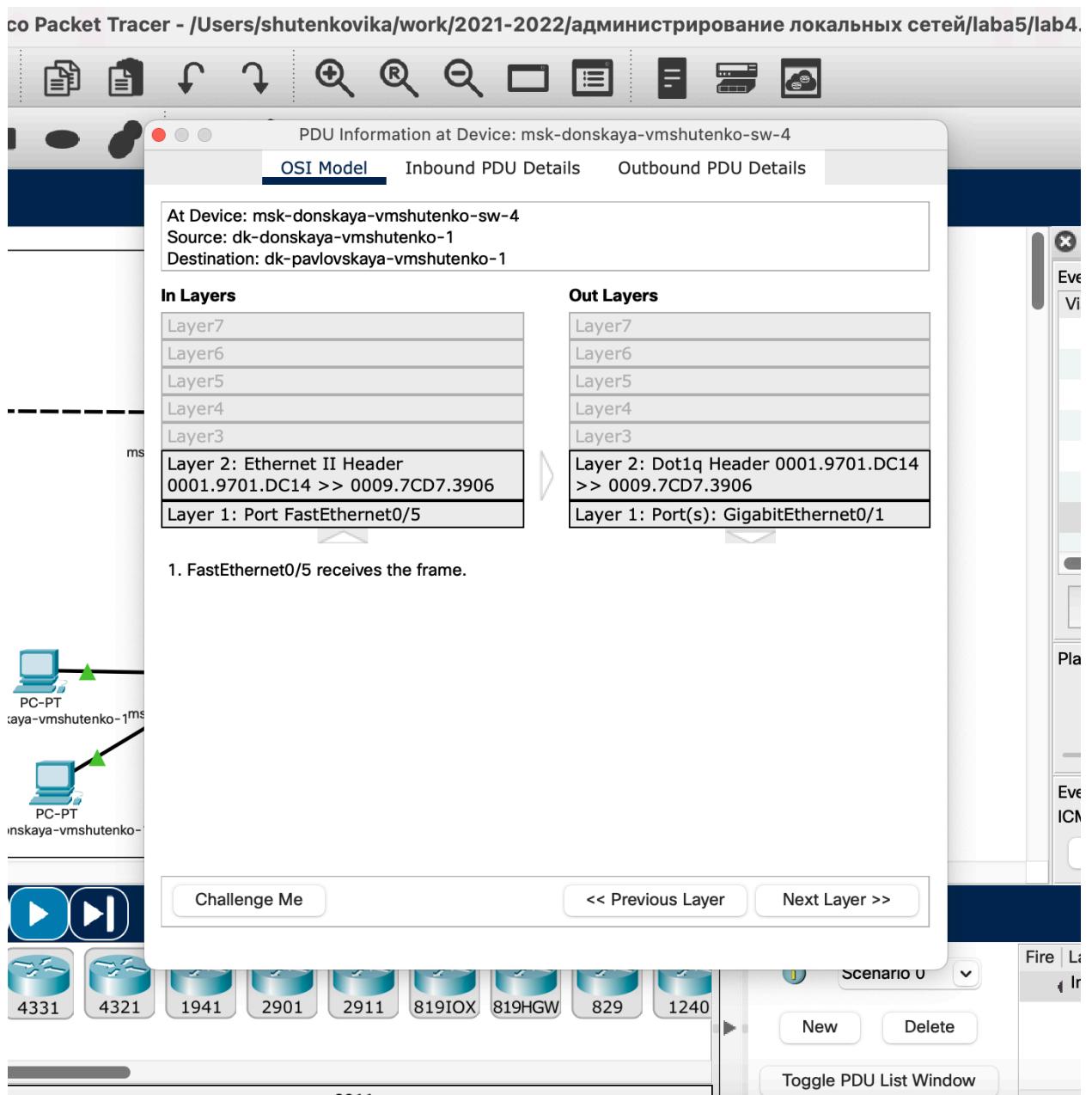


Рисунок 26. Содержимое передаваемого пакета.

#### Контрольные вопросы

1. Какая команда используется для просмотра списка VLAN на сетевом устройстве?  
Для просмотра базы данных VLAN используется команда `show vlan`.

2. Охарактеризуйте VLAN Trunking Protocol (VTP). Приведите перечень команд с пояснениями для настройки и просмотра информации о VLAN.

VLAN Trunk Protocol – проприetaryный протокол компании Cisco (работает только на cisco-устройствах), предназначенный для динамического распространения базы VLAN-ов на сетевых устройствах.

VTP домен – область, состоящая из одного или нескольких коммутаторов, которые, благодаря vtp, используют одну базу `vlan`.

#### Режимы работы VTP

Выставляя режим работы VTP, вы предоставляете коммутатору те или иные права.

VTP server – коммутатор может создавать, изменять и удалять VLAN-ы. В этом режиме устройство распространяет информацию о своей базе VLAN, в пределах настроенного домена. Этот режим включен по умолчанию.

VTP client – коммутатор не может создавать, изменять и удалять VLAN-ы. В этом режиме устройство слушает сеть на предмет vtp-обновлений и время от времени обновляет базу VLAN.

VTP transparent(прозрачный) – коммутатор может создавать, изменять и удалять VLAN-ы. В этом режиме устройство не объявляет и не обрабатывает приходящие vtp-обновления, но при этом все приходящие обновления передаются дальше (вероятно поэтому этот режим называется прозрачным).

VTP off – коммутатор может создавать, изменять и удалять VLAN-ы. В этом режиме устройство не объявляет и не обрабатывает приходящие vtp-обновления.

3. Охарактеризуйте Internet Control Message Protocol (ICMP). Опишите формат пакета ICMP.

ICMP (англ. Internet Control Message Protocol — протокол межсетевых управляющих сообщений) — сетевой протокол, входящий в стек протоколов TCP/IP. В основном ICMP используется для передачи сообщений об ошибках и других исключительных ситуациях, возникших при передаче данных, например, запрашиваемая услуга недоступна или хост, или маршрутизатор не отвечают. Также на ICMP возлагаются некоторые сервисные функции (services).

Каждое ICMP-сообщение инкапсулируется непосредственно в пределах одного IP-пакета, и, таким образом ICMP является т.н. "ненадежным" (не контролирующим доставку и её правильность).

4. Охарактеризуйте Address Resolution Protocol (ARP). Опишите формат пакета ARP.

Для определения соответствия между логическим адресом сетевого уровня (IP) и физическим адресом устройства (MAC) используется описанный в RFC 826 протокол ARP (Address Resolution Protocol, протокол разрешения адресов).

ARP состоит из двух частей. Первая – определяет физический адрес при посылке пакета, вторая – отвечает на запросы других станций.

Протокол имеет буферную память (ARP-таблицу), в которой хранятся пары адресов (IP-адрес, MAC-адрес) с целью уменьшения количества посылаемых запросов, следовательно, экономии трафика и ресурсов.

5. Что такое MAC-адрес? Какова его структура?

MAC - адрес представляет собой уникальную комбинацию цифр и букв длиной 48 символов. Фактически, это аппаратный номер оборудования (компьютера, сервера, роутера, порта коммутатора, да чего угодно), который, присваивается сетевой карте устройства еще на фабрике, то есть в момент производства.

MAC - адрес еще называют уникальным физическим адресом устройства, помогающим идентифицировать устройство среди миллионов других устройств. В стандарте IEEE 802, канальный (второй, Data Link) уровень модели OSI разделен на два подуровня: Logical Link Control (LLC) или подуровень управления логической связью Media Access Control (MAC) или подуровень управления доступом к среде