

# Лабораторная работа №6

## Статическая маршрутизация VLAN

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# Новый проект

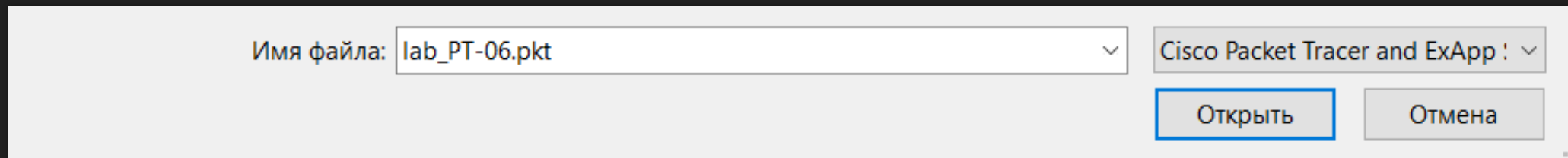
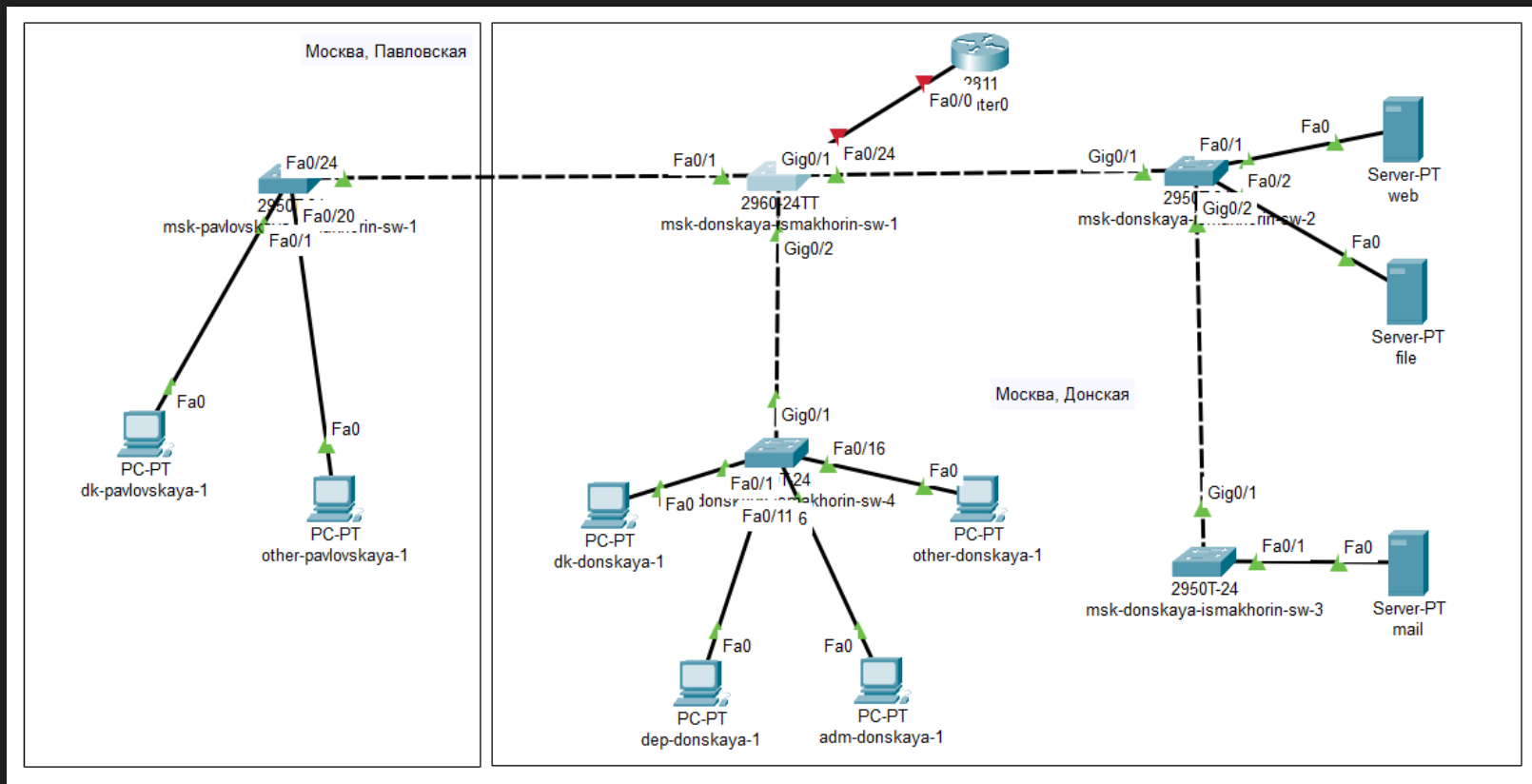


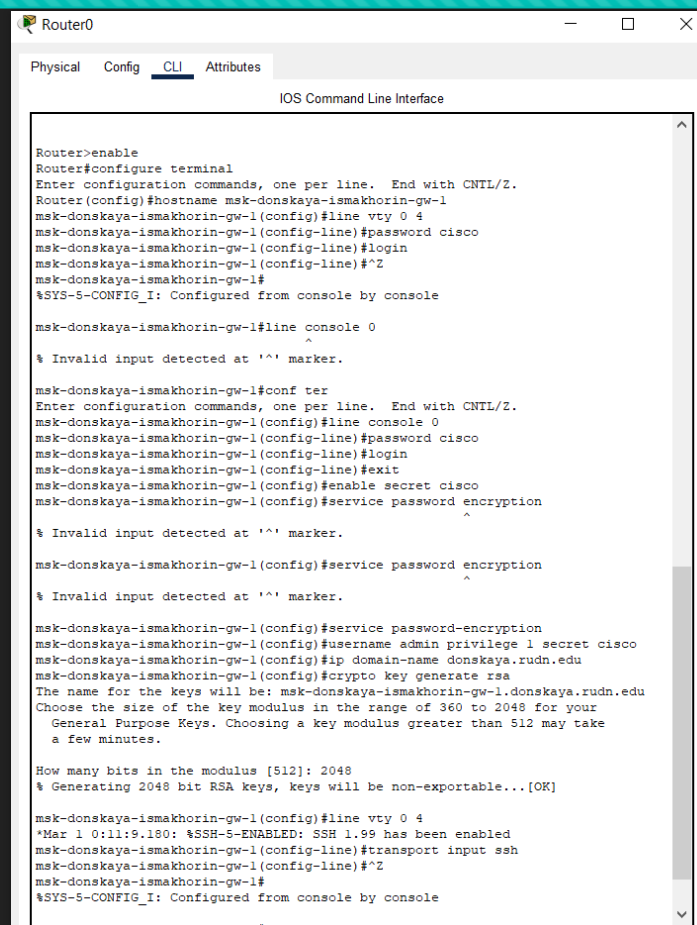
Рис. 1.1. Открытие проекта lab\_PT-06.pkt.

# Размещение и подключение Cisco 2811



**Рис. 1.2.** Размещение маршрутизатора Cisco 2811 в логической области проекта и подключение его к порту 24 коммутатора msk-donskaya-ismakhorin-sw-1.

# Конфигурация маршрутизатора



```
Router0
Physical Config CLI Attributes
IOS Command Line Interface

Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname msk-donskaya-ismakhorin-gw-1
msk-donskaya-ismakhorin-gw-1(config)#line vty 0 4
msk-donskaya-ismakhorin-gw-1(config-line)#password cisco
msk-donskaya-ismakhorin-gw-1(config-line)#login
msk-donskaya-ismakhorin-gw-1(config-line)#^Z
msk-donskaya-ismakhorin-gw-1#
%SYS-5-CONFIG_I: Configured from console by console

msk-donskaya-ismakhorin-gw-1#line console 0
^
% Invalid input detected at '^' marker.

msk-donskaya-ismakhorin-gw-1#conf ter
Enter configuration commands, one per line. End with CNTL/Z.
msk-donskaya-ismakhorin-gw-1(config)#line console 0
msk-donskaya-ismakhorin-gw-1(config-line)#password cisco
msk-donskaya-ismakhorin-gw-1(config-line)#login
msk-donskaya-ismakhorin-gw-1(config-line)#exit
msk-donskaya-ismakhorin-gw-1(config)#enable secret cisco
msk-donskaya-ismakhorin-gw-1(config)#service password encryption
^
% Invalid input detected at '^' marker.

msk-donskaya-ismakhorin-gw-1(config)#service password encryption
^
% Invalid input detected at '^' marker.

msk-donskaya-ismakhorin-gw-1(config)#service password-encryption
msk-donskaya-ismakhorin-gw-1(config)#username admin privilege 1 secret cisco
msk-donskaya-ismakhorin-gw-1(config)#ip domain-name donskeya.rudn.edu
msk-donskaya-ismakhorin-gw-1(config)#crypto key generate rsa
The name for the keys will be: msk-donskaya-ismakhorin-gw-1.donskaya.rudn.edu
Choose the size of the key modulus in the range of 360 to 2048 for your
General Purpose Keys. Choosing a key modulus greater than 512 may take
a few minutes.

How many bits in the modulus [512]: 2048
% Generating 2048 bit RSA keys, keys will be non-exportable...[OK]

msk-donskaya-ismakhorin-gw-1(config)#line vty 0 4
*Mar 1 0:11:9.180: %SSH-5-ENABLED: SSH 1.99 has been enabled
msk-donskaya-ismakhorin-gw-1(config-line)#transport input ssh
msk-donskaya-ismakhorin-gw-1(config-line)#^Z
msk-donskaya-ismakhorin-gw-1#
%SYS-5-CONFIG_I: Configured from console by console
```

**Рис. 1.3.** Конфигурация маршрутизатора: имя, пароль для доступа к консоли и настройка удалённого подключения к нему по ssh.

# Настройка Trunk-порта



```
msk-donskaya-ismakhorin-sw-1
Physical  Config  CLI  Attributes
IOS Command Line Interface

Press RETURN to get started!

User Access Verification

Password:
msk-donskaya-ismakhorin-sw-1>enable
Password:
msk-donskaya-ismakhorin-sw-1#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
msk-donskaya-ismakhorin-sw-1(config)#sw
^
% Invalid input detected at '^' marker.

msk-donskaya-ismakhorin-sw-1(config)#interface f0/24
msk-donskaya-ismakhorin-sw-1(config-if)#switchport mode trunk
msk-donskaya-ismakhorin-sw-1(config-if)#^Z
msk-donskaya-ismakhorin-sw-1#
%SYS-5-CONFIG_I: Configured from console by console

msk-donskaya-ismakhorin-sw-1#wr me
Building configuration...
[OK]
msk-donskaya-ismakhorin-sw-1#sh ru
Building configuration...

Current configuration : 1495 bytes
!
version 15.0
no service timestamps log datetime msec
no service timestamps debug datetime msec
service password-encryption
!
hostname msk-donskaya-ismakhorin-sw-1
!
enable secret 5 $1$mERr$hx5rVt7rPNoS4wqbXKX7m0
!
!
!
ip domain-name dons kaya.rudn.edu
!
username admin secret 5 $1$mERr$hx5rVt7rPNoS4wqbXKX7m0
!
!
!
spanning-tree mode pvst
--More--
```

Рис. 1.4. Настройка порта 24 коммутатора msk-donskaya-ismakhorin-sw-1 как trunk-порт.

# Изменение наименования

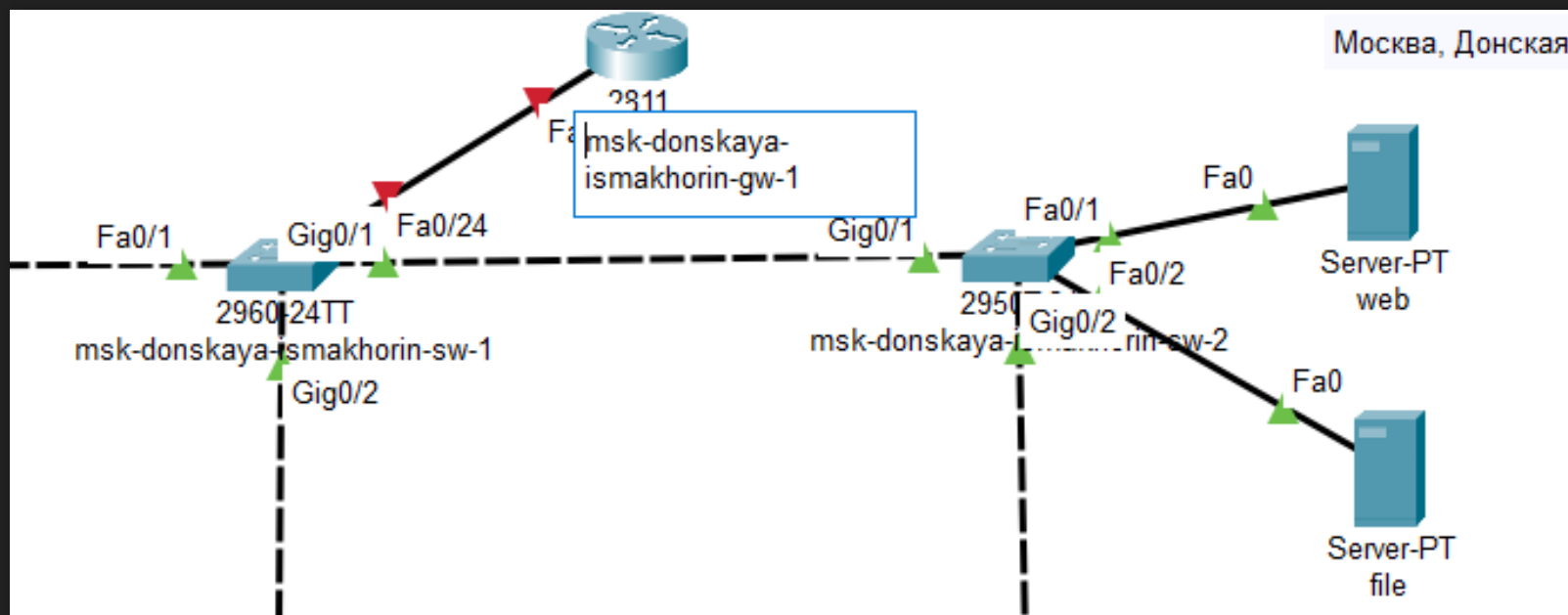


Рис. 1.5. Изменение на схеме наименование маршрутизатора Cisco 2811.

# Настройки



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

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0.101, changed
state to up

msk-donskaya-ismakhorin-gw-1(config-subif)#encapsulation dot1Q 101
msk-donskaya-ismakhorin-gw-1(config-subif)#ip address 10.128.3.1
255.255.255.0
msk-donskaya-ismakhorin-gw-1(config-subif)#description dk
msk-donskaya-ismakhorin-gw-1(config-subif)#interface f0/0.102
msk-donskaya-ismakhorin-gw-1(config-subif)#
%LINK-5-CHANGED: Interface FastEthernet0/0.102, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0.102, changed
state to up

msk-donskaya-ismakhorin-gw-1(config-subif)#encapsulation dot1Q 102
msk-donskaya-ismakhorin-gw-1(config-subif)#ip address 10.128.4.1
255.255.255.0
msk-donskaya-ismakhorin-gw-1(config-subif)#description departments
msk-donskaya-ismakhorin-gw-1(config-subif)#exit
msk-donskaya-ismakhorin-gw-1(config)#interface f0/0.103
msk-donskaya-ismakhorin-gw-1(config-subif)#
%LINK-5-CHANGED: Interface FastEthernet0/0.103, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0.103, changed
state to up

msk-donskaya-ismakhorin-gw-1(config-subif)#encapsulation dot1Q 103
msk-donskaya-ismakhorin-gw-1(config-subif)#ip address 10.128.5.1
255.255.255.0
msk-donskaya-ismakhorin-gw-1(config-subif)#description adm
msk-donskaya-ismakhorin-gw-1(config-subif)#exit
msk-donskaya-ismakhorin-gw-1(config)#interface f0/0.104
msk-donskaya-ismakhorin-gw-1(config-subif)#
%LINK-5-CHANGED: Interface FastEthernet0/0.104, changed state to up

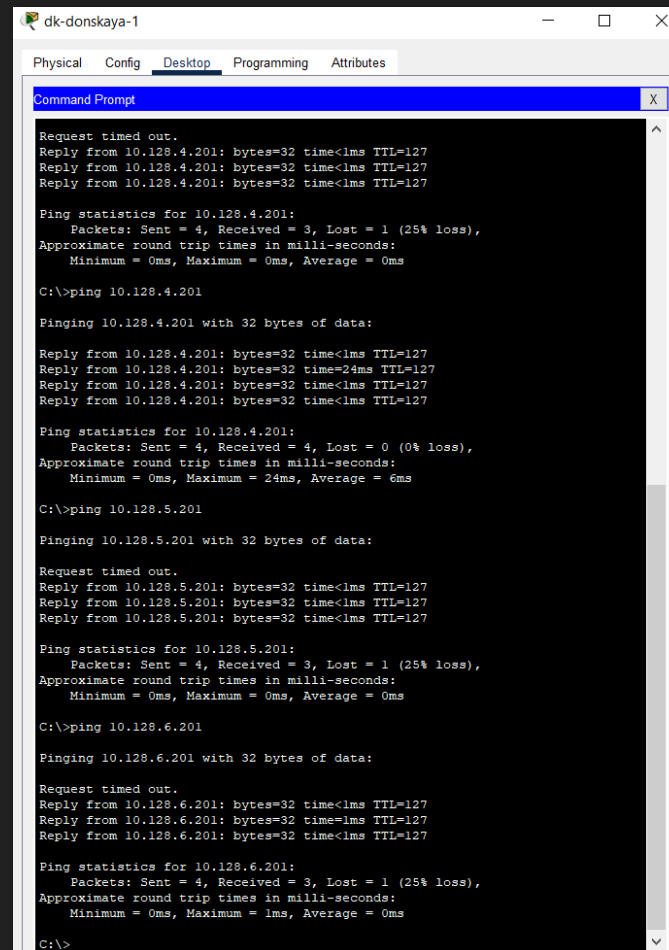
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0.104, changed
state to up

msk-donskaya-ismakhorin-gw-1(config-subif)#encapsulation dot1Q 104
msk-donskaya-ismakhorin-gw-1(config-subif)#ip address 10.128.6.1
255.255.255.0
msk-donskaya-ismakhorin-gw-1(config-subif)#
msk-donskaya-ismakhorin-gw-1(config-subif)#description other
msk-donskaya-ismakhorin-gw-1(config-subif)#^Z
msk-donskaya-ismakhorin-gw-1#
%SYS-5-CONFIG_I: Configured from console by console

msk-donskaya-ismakhorin-gw-1#
Building configuration...
[OK]
msk-donskaya-ismakhorin-gw-1#
```

**Рис. 1.6.** Настройка на интерфейсе f0/0 маршрутизатора msk-donskaya-ismakhorin-gw-1 виртуальных интерфейсов, соответствующих номерам VLAN. Настройка соответствующих IP-адресов на виртуальных интерфейсах согласно таблице IP-адресов.

# Ping



```
Request timed out.  
Reply from 10.128.4.201: bytes=32 time<1ms TTL=127  
Reply from 10.128.4.201: bytes=32 time<1ms TTL=127  
Reply from 10.128.4.201: bytes=32 time<1ms TTL=127  
  
Ping statistics for 10.128.4.201:  
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),  
    Approximate round trip times in milli-seconds:  
        Minimum = 0ms, Maximum = 0ms, Average = 0ms  
  
C:\>ping 10.128.4.201  
  
Pinging 10.128.4.201 with 32 bytes of data:  
  
Reply from 10.128.4.201: bytes=32 time<1ms TTL=127  
Reply from 10.128.4.201: bytes=32 time=24ms TTL=127  
Reply from 10.128.4.201: bytes=32 time<1ms TTL=127  
Reply from 10.128.4.201: bytes=32 time<1ms TTL=127  
  
Ping statistics for 10.128.4.201:  
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),  
    Approximate round trip times in milli-seconds:  
        Minimum = 0ms, Maximum = 24ms, Average = 6ms  
  
C:\>ping 10.128.5.201  
  
Pinging 10.128.5.201 with 32 bytes of data:  
  
Request timed out.  
Reply from 10.128.5.201: bytes=32 time<1ms TTL=127  
Reply from 10.128.5.201: bytes=32 time<1ms TTL=127  
Reply from 10.128.5.201: bytes=32 time<1ms TTL=127  
  
Ping statistics for 10.128.5.201:  
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),  
    Approximate round trip times in milli-seconds:  
        Minimum = 0ms, Maximum = 0ms, Average = 0ms  
  
C:\>ping 10.128.6.201  
  
Pinging 10.128.6.201 with 32 bytes of data:  
  
Request timed out.  
Reply from 10.128.6.201: bytes=32 time<1ms TTL=127  
Reply from 10.128.6.201: bytes=32 time<1ms TTL=127  
Reply from 10.128.6.201: bytes=32 time<1ms TTL=127  
  
Ping statistics for 10.128.6.201:  
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),  
    Approximate round trip times in milli-seconds:  
        Minimum = 0ms, Maximum = 1ms, Average = 0ms  
  
C:\>
```

Рис. 1.7. Проверка доступности конечных устройств из разных VLAN.



# Режим симуляции

The screenshot displays the 'Simulation Panel' window in Packet Tracer. It features an 'Event List' table that tracks the movement of an ICMP packet through the network. The table includes columns for visibility, time in seconds, the last device, the current device, and the packet type. The sequence shows the packet originating from 'dk-donskaya-1' and traversing through various intermediate devices like 'msk-donskaya-ismakhorin-sw-4' and 'adm-donskaya-1' before reaching its destination. Below the table, there are controls for resetting the simulation, a checkbox for 'Constant Delay', and a progress bar. At the bottom, filters are set to show only 'Visible Events' of type 'ICMP'.

Vis.	Time(sec)	Last Device	At Device	Type
	0.000	--	dk-donskaya-1	ICMP
	0.001	dk-donskaya-1	msk-donskaya-ismakhorin-sw-4	ICMP
	0.002	msk-donskaya-ismakhorin-sw-4	msk-donskaya-ismakhorin-sw-1	ICMP
	0.003	msk-donskaya-ismakhorin-sw-1	msk-donskaya-ismakhorin-gw-1	ICMP
	0.004	msk-donskaya-ismakhorin-gw-1	msk-donskaya-ismakhorin-sw-1	ICMP
	0.005	msk-donskaya-ismakhorin-sw-1	msk-donskaya-ismakhorin-sw-4	ICMP
	0.006	msk-donskaya-ismakhorin-sw-4	adm-donskaya-1	ICMP
	0.007	adm-donskaya-1	msk-donskaya-ismakhorin-sw-4	ICMP
	0.008	msk-donskaya-ismakhorin-sw-4	msk-donskaya-ismakhorin-sw-1	ICMP
	0.009	msk-donskaya-ismakhorin-sw-1	msk-donskaya-ismakhorin-gw-1	ICMP
	0.010	msk-donskaya-ismakhorin-gw-1	msk-donskaya-ismakhorin-sw-1	ICMP
	0.011	msk-donskaya-ismakhorin-sw-1	msk-donskaya-ismakhorin-sw-4	ICMP
Visible	0.012	msk-donskaya-ismakhorin-sw-4	dk-donskaya-1	ICMP

Reset Simulation ☒ Constant Delay Captured to: 82.624 s

Play Controls

Event List Filters - Visible Events  
ICMP

Edit Filters Show All/None

Рис. 1.8. Изучение процесса передвижения пакета ICMP по сети в режиме симуляции в Packet Tracer.

# ВЫВОД

- В ходе выполнения лабораторной работы мы научились настраивать статическую маршрутизацию VLAN в сети.

Спасибо за внимание!