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ФАКУЛЬТЕТ «Информатика и системы управления»

КАФЕДРА «Программное обеспечение ЭВМ и информационные технологии»

Лабораторная работа № 9

Дисциплина: Компьютерные сети

Тема: Изучение технологии виртуальных локальных сетей (VLAN)
в сетевом симуляторе. Настройка маршрутизации между
VLAN

Вариант: 10

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Оценка (баллы) _____

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Цель работы: получить навыки настройки виртуальных локальных сетей и маршрутизации между ними в сетевом эмуляторе.

Задачи:

I. Назначить адреса подсетей

1) Подсеть 1: 192.168.10.0 /24

2) Подсеть 2: 192.168.11.0 /24

3) Подсеть 2: 192.168.12.0 /24

The screenshot shows the configuration window for 'Server0' in a network emulator. The 'Config' tab is selected, and the 'FastEthernet0' interface is chosen from the left sidebar. The interface settings are as follows:

- Port Status:** ☒ On
- Bandwidth:** ☒ 100 Mbps, ☐ 10 Mbps, ☒ Auto
- Duplex:** ☐ Half Duplex, ☒ Full Duplex, ☒ Auto
- MAC Address:** 000B.BE36.7895
- IP Configuration:**
 - ☐ DHCP
 - ☒ Static
 - IPv4 Address:** 192.168.10.1
 - Subnet Mask:** 255.255.255.0
- IPv6 Configuration:**
 - ☐ Automatic
 - ☒ Static
 - IPv6 Address:** [Empty field]
 - Link Local Address:** FE80::20B:BEFF:FE36:7895

At the bottom left, there is a 'Top' button.

Device Name: Server0
Device Model: Server-PT

Port	Link	IP Address	IPv6 Address	MAC Address
FastEthernet0	Up	192.168.10.1/24	<not set>	000B.BE36.7895

Gateway: 192.168.10.254

DNS Server: <not set>

Line Number: <not set>

Physical Location: Intercity > Home City > Corporate Office > Main Wiring Closet > Rack > Server0

Device Name: PC0
Device Model: PC-PT

Port	Link	IP Address	IPv6 Address	MAC Address
FastEthernet0	Up	192.168.12.1/24	<not set>	000A.F334.2712
Bluetooth	Down	<not set>	<not set>	0060.47CD.ADAB

Gateway: 192.168.12.254

DNS Server: <not set>

Line Number: <not set>

Physical Location: Intercity > Home City > Corporate Office > PC0

Device Name: PC3
Device Model: PC-PT

Port	Link	IP Address	IPv6 Address	MAC Address
FastEthernet0	Up	192.168.11.1/24	<not set>	0090.2165.0CA4
Bluetooth	Down	<not set>	<not set>	0001.6463.908D

Gateway: 192.168.11.254

DNS Server: <not set>

Line Number: <not set>

Physical Location: Intercity > Home City > Corporate Office > PC3

II. Настройка Vlan на коммутаторе 3 уровня/маршрутизаторе

Switch0

Physical Config **CLI** Attributes

IOS Command Line Interface

```
Switch>en
Switch#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#int vlan 10
Switch(config-if)#exit
Switch(config)#int vlan 20
Switch(config-if)#exit
Switch(config)#int vlan 30
Switch(config-if)#exit
Switch(config)#interface range Fa0?
/
Switch(config)#interface range Fa0/1-Fa0/2
Switch(config-if-range)#switchport mode access
Switch(config-if-range)#switchport access vlan 10
% Access VLAN does not exist. Creating vlan 10
Switch(config-if-range)#
%LINK-5-CHANGED: Interface Vlan10, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan10, changed state to up

Switch(config-if-range)#exit
Switch(config)#interface range Fa0/3-Fa0/4
Switch(config-if-range)#switchport mode access
Switch(config-if-range)#switchport access vlan 20
% Access VLAN does not exist. Creating vlan 20
Switch(config-if-range)#
%LINK-5-CHANGED: Interface Vlan20, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan20, changed state to up

Switch(config-if-range)#exit
Switch(config)#interface range Fa0/5-Fa0/7
Switch(config-if-range)#switchport mode access
Switch(config-if-range)#switchport access vlan 30
% Access VLAN does not exist. Creating vlan 30
Switch(config-if-range)#
%LINK-5-CHANGED: Interface Vlan30, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan30, changed state to up

Switch(config-if-range)#exit
Switch(config)#interface G0/1
Switch(config-if)#switchport mode trunk

Switch(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

Switch(config-if)#exit
Switch(config)#
```

Ctrl+F6 to exit CLI focus

Copy Paste

☐ Top

Switch0

Physical Config CLI Attributes

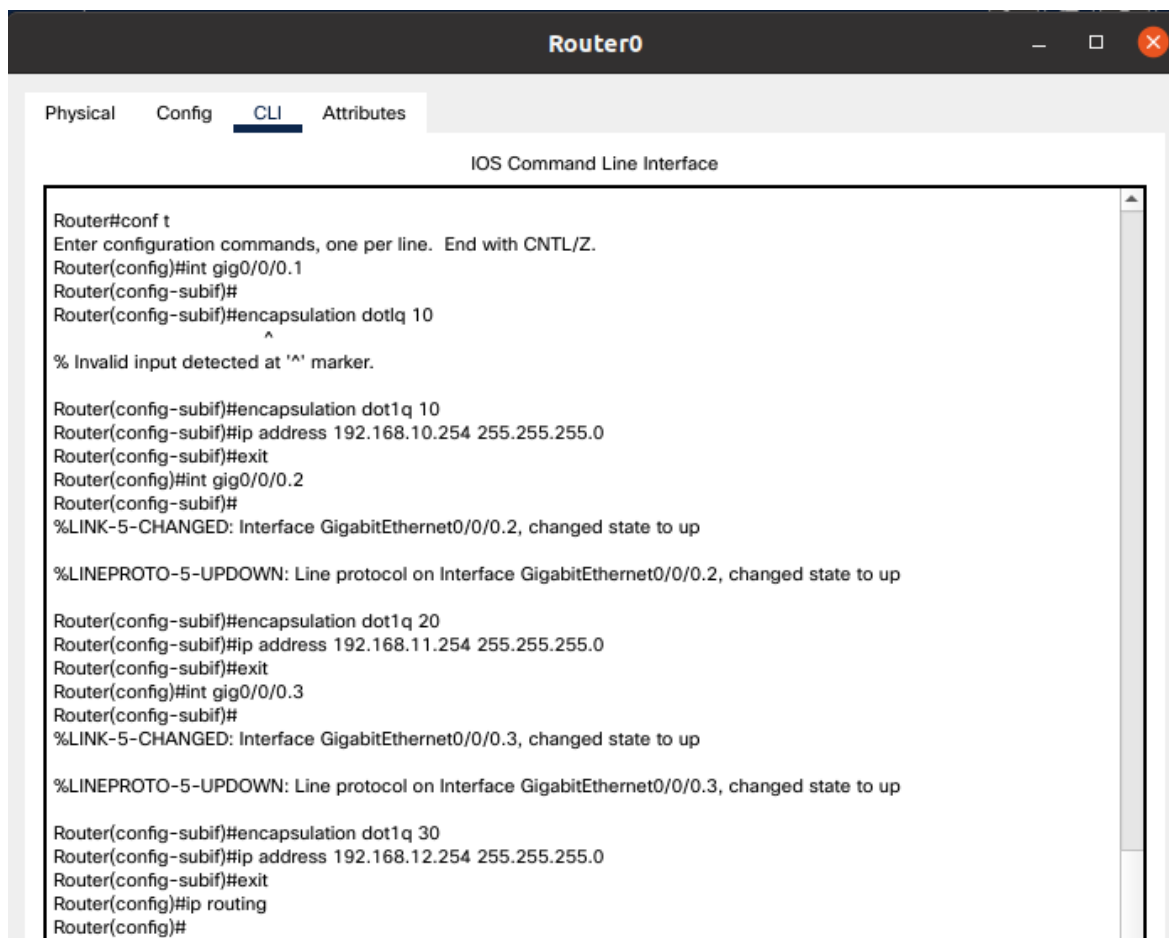
IOS Command Line Interface

Switch#show vlan

VLAN Name	Status	Ports
1 default	active	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
10 VLAN0010	active	Fa0/1, Fa0/2
20 VLAN0020	active	Fa0/3, Fa0/4
30 VLAN0030	active	Fa0/5, Fa0/6, Fa0/7
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
1	enet	100001	1500	-	-	-	-	0	0	
10	enet	100010	1500	-	-	-	-	0	0	
20	enet	100020	1500	-	-	-	-	0	0	
30	enet	100030	1500	-	-	-	-	0	0	

III. Настроить маршрутизацию между виртуальными локальными сетями на маршрутизаторе



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

Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#int gig0/0/0.1
Router(config-subif)#
Router(config-subif)#encapsulation dot1q 10
^
% Invalid input detected at '^' marker.

Router(config-subif)#encapsulation dot1q 10
Router(config-subif)#ip address 192.168.10.254 255.255.255.0
Router(config-subif)#exit
Router(config)#int gig0/0/0.2
Router(config-subif)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0/0.2, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0/0.2, changed state to up

Router(config-subif)#encapsulation dot1q 20
Router(config-subif)#ip address 192.168.11.254 255.255.255.0
Router(config-subif)#exit
Router(config)#int gig0/0/0.3
Router(config-subif)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0/0.3, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0/0.3, changed state to up

Router(config-subif)#encapsulation dot1q 30
Router(config-subif)#ip address 192.168.12.254 255.255.255.0
Router(config-subif)#exit
Router(config)#ip routing
Router(config)#
```

Command Prompt

Packet Tracer PC Command Line 1.0

C:\>ping 192.168.12.1

Pinging 192.168.12.1 with 32 bytes of data:

Request timed out.

Reply from 192.168.12.1: bytes=32 time<1ms TTL=127

Reply from 192.168.12.1: bytes=32 time<1ms TTL=127

Reply from 192.168.12.1: bytes=32 time<1ms TTL=127

Ping statistics for 192.168.12.1:

Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),

Approximate round trip times in milli-seconds:

Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 192.168.12.1

Pinging 192.168.12.1 with 32 bytes of data:

Reply from 192.168.12.1: bytes=32 time<1ms TTL=127

Reply from 192.168.12.1: bytes=32 time<1ms TTL=127

Reply from 192.168.12.1: bytes=32 time<1ms TTL=127

Reply from 192.168.12.1: bytes=32 time<1ms TTL=127

Ping statistics for 192.168.12.1:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>

IV. Выделить и озаглавить на схеме каждую виртуальную локальную сеть

