

---

# Компьютерные сети. Обучение в записи

*Урок 7. Семинар. Основы компьютерных сетей. Сетевой уровень. Протоколы маршрутизации. VLAN*

---

## Оглавление

Задача 1. Работа с CPT. OSPF .....	2
Задача 2. Работа с CPT. VLAN.....	7
Домашнее задание.....	14

## Задача 1. Работа с CPT. OSPF

### Задача 1. Работа с CPT. OSPF

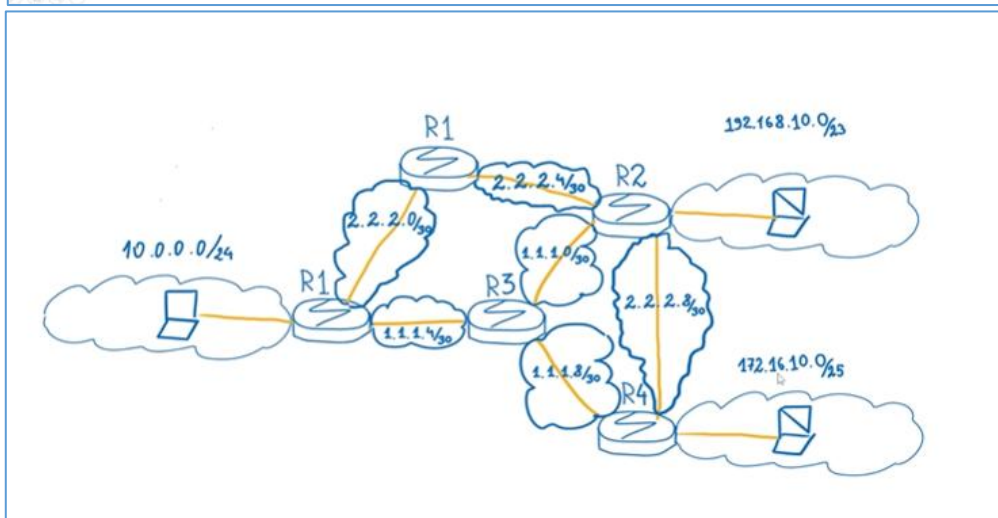
Собрать сеть по схеме ниже (<https://disk.yandex.ru/i/cVwW4dy36JvZrQ>) – следующий слайд.

Необходимо настроить сеть по протоколу OSPF.

Маршруты по OSPF должны «прибежать» на все роутеры.

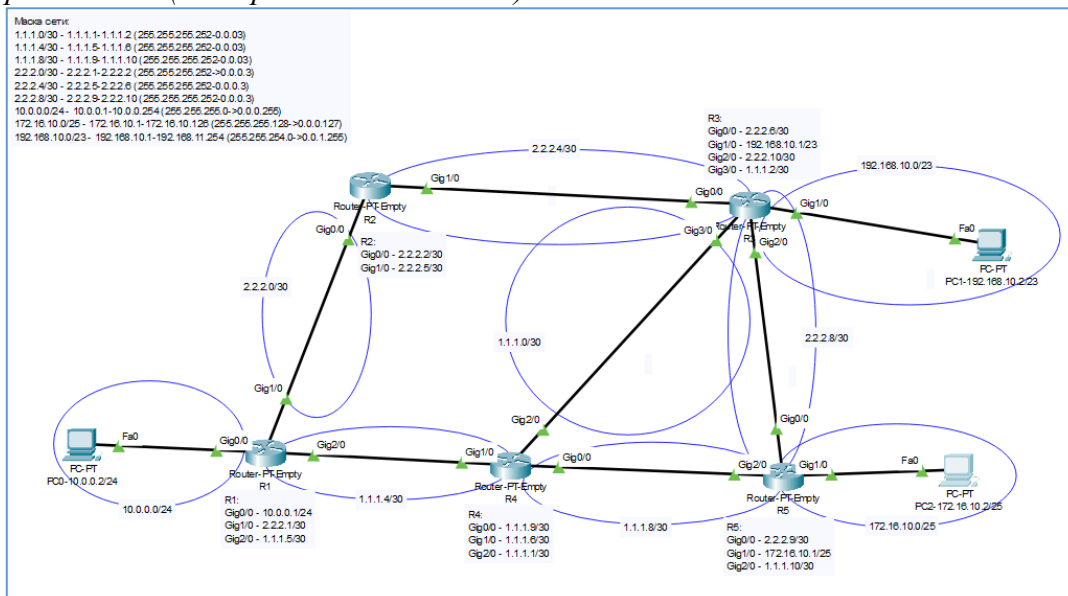


Поставьте видео на паузу и выполните задание



### Ход выполнения задания 1:

*Настройка сети (IP-адресов и маски сети)*



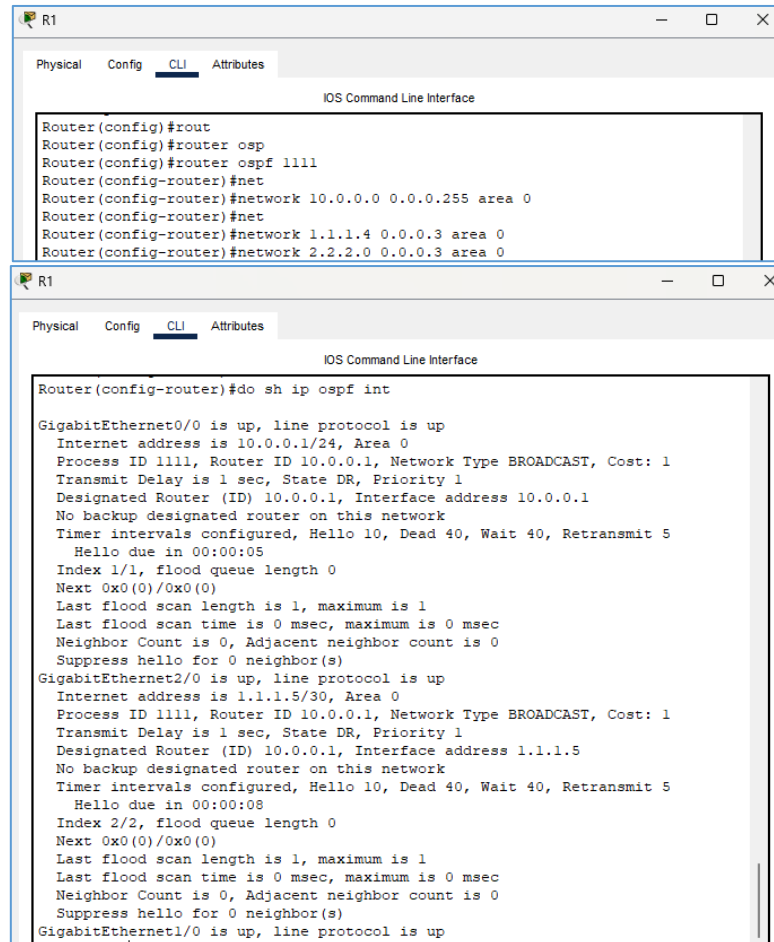
## Настройка сети по протоколу OSPF

### Роутер (R1)

*router ospf 1111 - включение OSPF процесса на роутере*

*network 10.0.0.0 0.0.0.255 area 0 - включение сети 10.0.0.0/24 в OSPF процесс в area 0  
(соответственно и интерфейс из этой сети включается в процесс OSPF)*

*router-id 12.12.12.12 - назначение Router-ID на роутере*



The screenshot shows two windows of the R1 router's CLI. The top window displays the configuration commands: `Router(config)#router ospf 1111`, `Router(config-router)#net 10.0.0.0 0.0.0.255 area 0`, `Router(config-router)#net 1.1.1.4 0.0.0.3 area 0`, and `Router(config-router)#net 2.2.2.0 0.0.0.3 area 0`. The bottom window shows the output of the `show ip ospf int` command, which displays the status of three interfaces: GigabitEthernet0/0 (10.0.0.1/24), GigabitEthernet2/0 (1.1.1.5/30), and GigabitEthernet1/0. All interfaces are up, and the OSPF process 1111 is running on them with Router ID 10.0.0.1.

```
Router(config)#router ospf 1111
Router(config-router)#net 10.0.0.0 0.0.0.255 area 0
Router(config-router)#net 1.1.1.4 0.0.0.3 area 0
Router(config-router)#net 2.2.2.0 0.0.0.3 area 0

Router(config-router)#do sh ip ospf int

GigabitEthernet0/0 is up, line protocol is up
Internet address is 10.0.0.1/24, Area 0
Process ID 1111, Router ID 10.0.0.1, Network Type BROADCAST, Cost: 1
Transmit Delay is 1 sec, State DR, Priority 1
Designated Router (ID) 10.0.0.1, Interface address 10.0.0.1
No backup designated router on this network
Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
Hello due in 00:00:05
Index 1/1, flood queue length 0
Next 0x0(0)/0x0(0)
Last flood scan length is 1, maximum is 1
Last flood scan time is 0 msec, maximum is 0 msec
Neighbor Count is 0, Adjacent neighbor count is 0
Suppress hello for 0 neighbor(s)

GigabitEthernet2/0 is up, line protocol is up
Internet address is 1.1.1.5/30, Area 0
Process ID 1111, Router ID 10.0.0.1, Network Type BROADCAST, Cost: 1
Transmit Delay is 1 sec, State DR, Priority 1
Designated Router (ID) 10.0.0.1, Interface address 1.1.1.5
No backup designated router on this network
Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
Hello due in 00:00:08
Index 2/2, flood queue length 0
Next 0x0(0)/0x0(0)
Last flood scan length is 1, maximum is 1
Last flood scan time is 0 msec, maximum is 0 msec
Neighbor Count is 0, Adjacent neighbor count is 0
Suppress hello for 0 neighbor(s)

GigabitEthernet1/0 is up, line protocol is up
```

### Роутер (R2)



The screenshot shows the R2 router's CLI. It starts with the `en` command to enter enable mode, followed by `conf t` for configuration mode. The configuration commands are: `router ospf 1111`, `network 2.2.2.0 0.0.0.3 area 0`, and `network 2.2.2.4 0.0.0.3 area 0`. A timestamped message indicates the OSPF process is loading. The `show ip ospf int` command is entered, but it is interrupted by an invalid input character (^). The output shows the status of GigabitEthernet0/0 (2.2.2.2/30) and GigabitEthernet2/0 (2.2.2.4/30), both up and running OSPF process 1111 with Router ID 2.2.2.5.

```
Router>en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#router ospf 1111
Router(config-router)#netw
Router(config-router)#network 2.2.2.0 0.0.0.3 area 0
Router(config-router)#network 2.2.2.4 0.0.0.3 area 0
03:15:01: %OSPF-5-ADJCHG: Process 1111, Nbr 10.0.0.1 on GigabitEthernet0/0
from LOADING to FULL, Loading Done

Router(config-router)#do sh ip ospf int br
Router(config-router)#do sh ip ospf int (brea^f)
sh ip ospf int (brea^f)
^
% Invalid input detected at '^' marker.

Router(config-router)#do sh ip ospf int

GigabitEthernet0/0 is up, line protocol is up
Internet address is 2.2.2.2/30, Area 0
Process ID 1111, Router ID 2.2.2.5, Network Type BROADCAST, Cost: 1
Transmit Delay is 1 sec, State BDR, Priority 1
Designated Router (ID) 10.0.0.1, Interface address 2.2.2.1
Backup Designated Router (ID) 2.2.2.5, Interface address 2.2.2.2
Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
Hello due in 00:00:09
Index 1/1, flood queue length 0
Next 0x0(0)/0x0(0)
Last flood scan length is 1, maximum is 1
Last flood scan time is 0 msec, maximum is 0 msec
```

### Poymep (R3)

```
R3
Physical Config CLI Attributes
IOS Command Line Interface

Router(config-router)#router ospf 1111
Router(config-router)#network 2.2.2.4 0.0.0.3 area 0
Router(config-router)#
03:23:35: %OSPF-5-ADJCHG: Process 1111, Nbr 2.2.2.5 on GigabitEthernet0/0 from
LOADING to FULL, Loading Done

Router(config-router)#network 1.1.1.0 0.0.0.3 area 0
Router(config-router)#network 192.168.10.0 0.0.1.255 area 0
```

### Poymep (R4)

```
R4
Physical Config CLI Attributes
IOS Command Line Interface

Router>en
Router#conf ter
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#route ospf 1111
Router(config-router)#netw
Router(config-router)#network 1.1.1.4 0.0.0.3 area 0
Router(config-router)#network 1.1.1.8 0.0.0.3 area 0
03:30:35: %OSPF-5-ADJCHG: Process 1111, Nbr 10.0.0.1 on GigabitEthernet1/0
from
Router(config-router)#network 1.1.1.8 0.0.0.3 area 0
Router(config-router)#network 1.1.1.0 0.0.0.3 area 0
Router(config-router)#do sh ip
03:31:27: %OSPF-5-ADJCHG: Process 1111, Nbr 192.168.10.1 on GigabitEthernet2/0
from LOADING to FULL, Load sh ip ospf int

GigabitEthernet1/0 is up, line protocol is up
 Internet address is 1.1.1.6/30, Area 0
 Process ID 1111, Router ID 1.1.1.9, Network Type BROADCAST, Cost: 1
 Transmit Delay is 1 sec, State BDR, Priority 1
 Designated Router (ID) 10.0.0.1, Interface address 1.1.1.5
 Backup Designated Router (ID) 1.1.1.9, Interface address 1.1.1.6
 Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
 Hello due in 00:00:08
 Index 1/1, flood queue length 0
 Next 0x0(0)/0x0(0)
 Last flood scan length is 1, maximum is 1
 Last flood scan time is 0 msec, maximum is 0 msec
 Neighbor Count is 1, Adjacent neighbor count is 1
 Adjacent with neighbor 10.0.0.1 (Designated Router)
 Suppress hello for 0 neighbor(s)
GigabitEthernet0/0 is up, line protocol is up
 Internet address is 1.1.1.4/30, Area 0
```

### Poymep (R5)

```
R5
Physical Config CLI Attributes
IOS Command Line Interface

Router(config-router)#network 172.16.10.0 0.0.0.127 area 0
Router(config-router)#do sh ip ospf int

GigabitEthernet2/0 is up, line protocol is up
 Internet address is 1.1.1.10/30, Area 0
 Process ID 1111, Router ID 172.16.10.1, Network Type BROADCAST, Cost: 1
 Transmit Delay is 1 sec, State BDR, Priority 1
 Designated Router (ID) 1.1.1.9, Interface address 1.1.1.9
 Backup Designated Router (ID) 172.16.10.1, Interface address 1.1.1.10
 Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
 Hello due in 00:00:05
 Index 1/1, flood queue length 0
 Next 0x0(0)/0x0(0)
 Last flood scan length is 1, maximum is 1
 Last flood scan time is 0 msec, maximum is 0 msec
 Neighbor Count is 1, Adjacent neighbor count is 1
 Adjacent with neighbor 1.1.1.9 (Designated Router)
 Suppress hello for 0 neighbor(s)
GigabitEthernet0/0 is up, line protocol is up
 Internet address is 2.2.2.9/30, Area 0
 Process ID 1111, Router ID 172.16.10.1, Network Type BROADCAST, Cost: 1
 Transmit Delay is 1 sec, State DR, Priority 1
 Designated Router (ID) 172.16.10.1, Interface address 2.2.2.9
 No backup designated router on this network
 Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
 Hello due in 00:00:06
 Index 2/2, flood queue length 0
 Next 0x0(0)/0x0(0)
 Last flood scan length is 1, maximum is 1
 Last flood scan time is 0 msec, maximum is 0 msec
 Neighbor Count is 0, Adjacent neighbor count is 0
```

## Проверка 1: Роутер (R1)

```

R1
Physical Config CLI Attributes
IOS Command Line Interface

Router#sh ip route ospf
1.0.0.0/30 is subnetted, 3 subnets
O    1.1.1.0 [110/2] via 1.1.1.6, 00:18:31, GigabitEthernet2/0
O    1.1.1.8 [110/2] via 1.1.1.6, 00:19:08, GigabitEthernet2/0
2.0.0.0/30 is subnetted, 3 subnets
O    2.2.2.4 [110/2] via 2.2.2.2, 00:35:09, GigabitEthernet1/0
O    2.2.2.8 [110/3] via 1.1.1.6, 00:09:29, GigabitEthernet2/0
O    172.16.0.0/25 is subnetted, 1 subnets
O    172.16.10.0 [110/3] via 1.1.1.6, 00:13:04, GigabitEthernet2/0
O    192.168.10.0 [110/3] via 1.1.1.6, 00:18:31, GigabitEthernet2/0
O    192.168.10.0 [110/3] via 2.2.2.2, 00:18:31, GigabitEthernet1/0

```

## Роутер (R2)

```

R2
Physical Config CLI Attributes
IOS Command Line Interface

Router#sh ip route ospf
1.0.0.0/30 is subnetted, 3 subnets
O    1.1.1.0 [110/2] via 2.2.2.6, 00:17:53, GigabitEthernet1/0
O    1.1.1.4 [110/2] via 2.2.2.1, 00:18:45, GigabitEthernet0/0
O    1.1.1.8 [110/3] via 2.2.2.1, 00:17:53, GigabitEthernet0/0
O    1.1.1.8 [110/3] via 2.2.2.6, 00:17:53, GigabitEthernet1/0
2.0.0.0/30 is subnetted, 3 subnets
O    2.2.2.8 [110/2] via 2.2.2.6, 00:08:51, GigabitEthernet1/0
O    10.0.0.0/24 is subnetted, 1 subnets
O    10.0.0.0 [110/2] via 2.2.2.1, 00:34:30, GigabitEthernet0/0
O    172.16.0.0/25 is subnetted, 1 subnets
O    172.16.10.0 [110/3] via 2.2.2.6, 00:08:51, GigabitEthernet1/0
O    192.168.10.0 [110/2] via 2.2.2.6, 00:17:53, GigabitEthernet1/0

```

## Роутер (R3)

```

R3
Physical Config CLI Attributes
IOS Command Line Interface

Router#sh ip route ospf
1.0.0.0/30 is subnetted, 3 subnets
O    1.1.1.4 [110/2] via 1.1.1.1, 00:21:44, GigabitEthernet3/0
O    1.1.1.8 [110/2] via 1.1.1.1, 00:12:41, GigabitEthernet3/0
O    1.1.1.8 [110/2] via 2.2.2.9, 00:12:41, GigabitEthernet2/0
2.0.0.0/30 is subnetted, 3 subnets
O    2.2.2.0 [110/2] via 2.2.2.5, 00:21:44, GigabitEthernet0/0
O    10.0.0.0/24 is subnetted, 1 subnets
O    10.0.0.0 [110/3] via 2.2.2.5, 00:21:44, GigabitEthernet0/0
O    172.16.0.0/25 is subnetted, 1 subnets
O    172.16.10.0 [110/2] via 1.1.1.1, 00:21:44, GigabitEthernet3/0
O    172.16.10.0 [110/2] via 2.2.2.9, 00:12:41, GigabitEthernet2/0

```

## Роутер (R4)

```

R4
Physical Config CLI Attributes
IOS Command Line Interface

Router#sh ip route ospf
2.0.0.0/30 is subnetted, 3 subnets
O    2.2.2.0 [110/2] via 1.1.1.5, 00:24:38, GigabitEthernet1/0
O    2.2.2.4 [110/2] via 1.1.1.2, 00:23:49, GigabitEthernet2/0
O    2.2.2.8 [110/2] via 1.1.1.10, 00:14:46, GigabitEthernet0/0
O    2.2.2.8 [110/2] via 1.1.1.2, 00:14:46, GigabitEthernet2/0
10.0.0.0/24 is subnetted, 1 subnets
O    10.0.0.0 [110/2] via 1.1.1.5, 00:24:38, GigabitEthernet1/0
O    172.16.0.0/25 is subnetted, 1 subnets
O    172.16.10.0 [110/2] via 1.1.1.10, 00:18:21, GigabitEthernet0/0
O    192.168.10.0 [110/2] via 1.1.1.2, 00:23:49, GigabitEthernet2/0

```

## Роутер (R5)

```

R5
Physical Config CLI Attributes
IOS Command Line Interface

Router#sh ip route ospf
1.0.0.0/30 is subnetted, 3 subnets
O    1.1.1.0 [110/2] via 1.1.1.9, 00:18:36, GigabitEthernet2/0
O    1.1.1.4 [110/2] via 2.2.2.10, 00:18:36, GigabitEthernet0/0
O    1.1.1.4 [110/2] via 1.1.1.9, 00:23:40, GigabitEthernet2/0
2.0.0.0/30 is subnetted, 3 subnets
O    2.2.2.0 [110/3] via 1.1.1.9, 00:18:36, GigabitEthernet2/0
O    2.2.2.4 [110/3] via 2.2.2.10, 00:18:36, GigabitEthernet0/0
O    2.2.2.8 [110/2] via 2.2.2.10, 00:18:36, GigabitEthernet0/0
10.0.0.0/24 is subnetted, 1 subnets
O    10.0.0.0 [110/3] via 1.1.1.9, 00:23:40, GigabitEthernet2/0
O    192.168.10.0 [110/2] via 2.2.2.10, 00:18:36, GigabitEthernet0/0

```

## Проверка 2: Роутер (R1)

```

R1
Physical Config CLI Attributes
IOS Command Line Interface

!
interface GigabitEthernet0/0
ip address 10.0.0.1 255.255.255.0
duplex auto
speed auto
!
interface GigabitEthernet1/0
ip address 2.2.2.1 255.255.255.252
duplex auto
speed auto
!
interface GigabitEthernet2/0
ip address 1.1.1.5 255.255.255.252
duplex auto
speed auto
!
interface GigabitEthernet3/0
no ip address
duplex auto
speed auto
shutdown
!
router ospf 1111
log-adjacency-changes
network 10.0.0.0 0.0.0.255 area 0
network 1.1.1.4 0.0.0.3 area 0
network 2.2.2.0 0.0.0.3 area 0

```

## Роутер (R2)

```

R2
Physical Config CLI Attributes
IOS Command Line Interface

!
interface GigabitEthernet0/0
ip address 2.2.2.2 255.255.255.252
duplex auto
speed auto
!
interface GigabitEthernet1/0
ip address 2.2.2.5 255.255.255.252
duplex auto
speed auto
!
interface GigabitEthernet2/0
no ip address
duplex auto
speed auto
shutdown
!
interface GigabitEthernet3/0
no ip address
duplex auto
speed auto
shutdown
!
router ospf 1111
log-adjacency-changes
network 2.2.2.0 0.0.0.3 area 0
network 2.2.2.4 0.0.0.3 area 0
!

```

### Poymep (R3)

```

R3
Physical Config CLI Attributes
IOS Command Line Interface

interface GigabitEthernet0/0
ip address 2.2.2.6 255.255.255.252
duplex auto
speed auto
!
interface GigabitEthernet1/0
ip address 192.168.10.1 255.255.254.0
duplex auto
speed auto
!
interface GigabitEthernet2/0
ip address 2.2.2.10 255.255.255.252
duplex auto
speed auto
!
interface GigabitEthernet3/0
ip address 1.1.1.2 255.255.255.252
duplex auto
speed auto
!
router ospf 1111
log-adjacency-changes
network 2.2.2.4 0.0.0.3 area 0
network 1.1.1.0 0.0.0.3 area 0
network 192.168.10.0 0.0.1.255 area 0
network 2.2.2.8 0.0.0.3 area 0

```

### Poymep (R4)

```

R4
Physical Config CLI Attributes
IOS Command Line Interface

interface GigabitEthernet0/0
ip address 1.1.1.9 255.255.255.252
duplex auto
speed auto
!
interface GigabitEthernet1/0
ip address 1.1.1.6 255.255.255.252
duplex auto
speed auto
!
interface GigabitEthernet2/0
ip address 1.1.1.1 255.255.255.252
duplex auto
speed auto
!
interface GigabitEthernet3/0
no ip address
duplex auto
speed auto
shutdown
!
router ospf 1111
log-adjacency-changes
network 1.1.1.4 0.0.0.3 area 0
network 1.1.1.8 0.0.0.3 area 0
network 1.1.1.0 0.0.0.3 area 0
!

```

### Poymep (R5)

```

R5
Physical Config CLI Attributes
IOS Command Line Interface

!
!
!
interface GigabitEthernet0/0
ip address 2.2.2.9 255.255.255.252
duplex auto
speed auto
!
interface GigabitEthernet1/0
ip address 172.16.10.1 255.255.255.128
duplex auto
speed auto
!
interface GigabitEthernet2/0
ip address 1.1.1.10 255.255.255.252
duplex auto
speed auto
!
interface GigabitEthernet3/0
no ip address
duplex auto
speed auto
shutdown
!
router ospf 1111
log-adjacency-changes
network 1.1.1.8 0.0.0.3 area 0
network 2.2.2.8 0.0.0.3 area 0
network 172.16.10.0 0.0.0.127 area 0
!

```

### PC2-172.16.10.2/25

```

PC2-172.16.10.2/25
Physical Config Desktop Programming Attributes
Command Prompt

C:\>ping 10.0.0.2

Pinging 10.0.0.2 with 32 bytes of data:

Request timed out.
Reply from 10.0.0.2: bytes=32 time<1ms TTL=125
Reply from 10.0.0.2: bytes=32 time<1ms TTL=125
Reply from 10.0.0.2: bytes=32 time<1ms TTL=125

Ping statistics for 10.0.0.2:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 192.168.10.2

Pinging 192.168.10.2 with 32 bytes of data:

Request timed out.
Reply from 192.168.10.2: bytes=32 time<1ms TTL=126
Reply from 192.168.10.2: bytes=32 time<1ms TTL=126
Reply from 192.168.10.2: bytes=32 time<1ms TTL=126

Ping statistics for 192.168.10.2:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 2.2.2.2

Pinging 2.2.2.2 with 32 bytes of data:

Reply from 2.2.2.2: bytes=32 time<1ms TTL=253
Reply from 2.2.2.2: bytes=32 time<1ms TTL=253
Reply from 2.2.2.2: bytes=32 time<1ms TTL=253
Reply from 2.2.2.2: bytes=32 time<1ms TTL=253

Ping statistics for 2.2.2.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

```

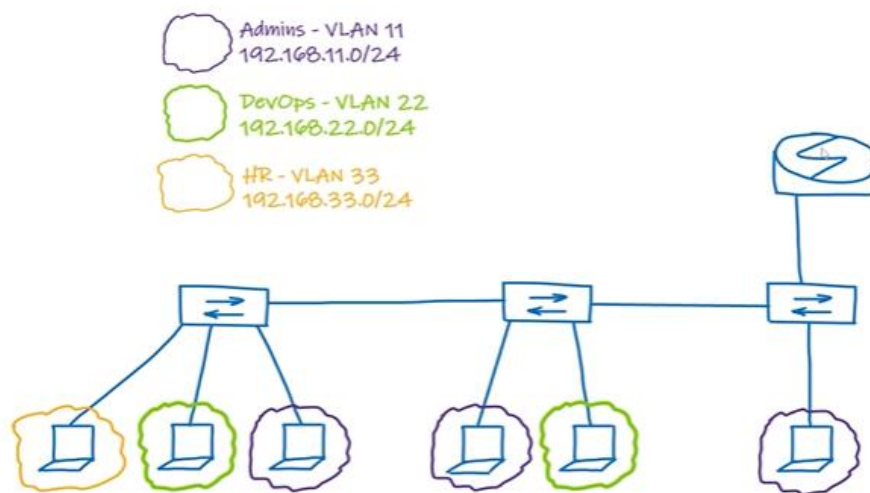
## Задача 2. Работа с CPT. VLAN

### Задача 2. Работа с CPT. VLAN

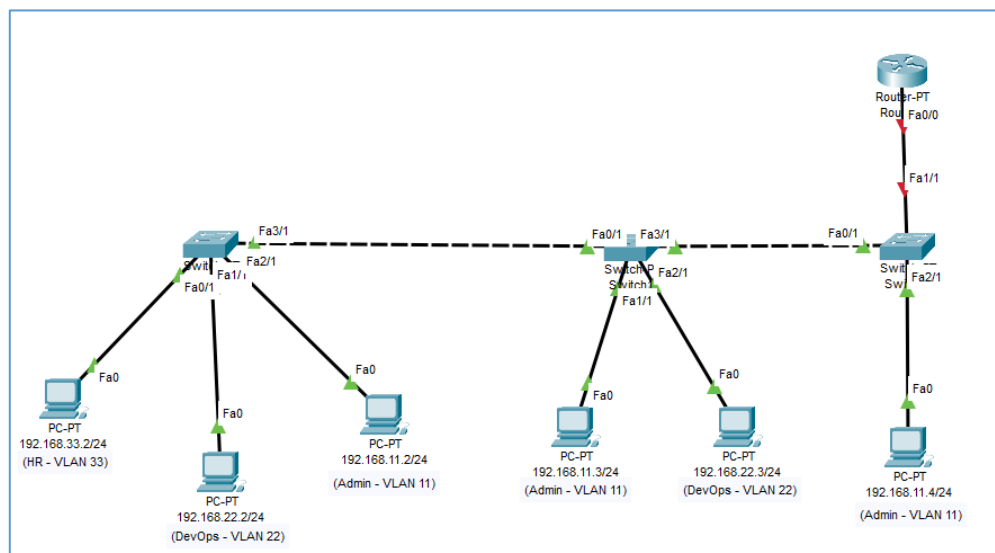
Необходимо собрать сеть по схеме ниже (<https://disk.yandex.ru/i/1--oa-XKmCsWBQ>).  
Компьютеры из этих сетей должны пинговать друг друга через роутер.



Поставьте видео на паузу  
и выполните задание



### Ход выполнения задания 2:



## Создание и настройка vlan (настройка портов в режиме Access) Switch0

The following screenshots show the configuration of VLANs and their associated ports on Switch0.

**Screenshot 1: Initial Configuration**

```
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 33
% Access VLAN does not exist. Creating vlan 33
Switch(config-if)#
Switch#
%SYS-5-CONFIG_I: Configured from console by console

Switch#conf ter
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#vlan 33
Switch(config-vlan)#name HR
```

**Screenshot 2: Further Configuration**

```
Switch(config-vlan)#int Fa1/1
Switch(config-if)#switchport mode access
Switch(config-if)#ex
Switch(config)#vlan 22
Switch(config-vlan)#name DevOps
Switch(config-vlan)#ex
Switch(config)#int Fa2/1
Switch(config-if)#switchport mode access
Switch(config-if)#ex
Switch(config)#vlan 11
Switch(config-vlan)#name Admin
Switch(config-vlan)#ex
Switch(config)#do sh vlan
```

**Screenshot 3: VLAN Status**

```
Switch#sh vlan
```

VLAN Name	Status	Ports
1 default	active	Fa1/1, Fa2/1, Fa3/1, Fa4/1, Fa5/1
11 Admin	active	
22 DevOps	active	
33 HR	active	Fa0/1
1002 fddi-default	active	
1003 token-ring-default	active	
1004 fddinet-default	active	
1005 trnet-default	active	

**Screenshot 4: Final Configuration**

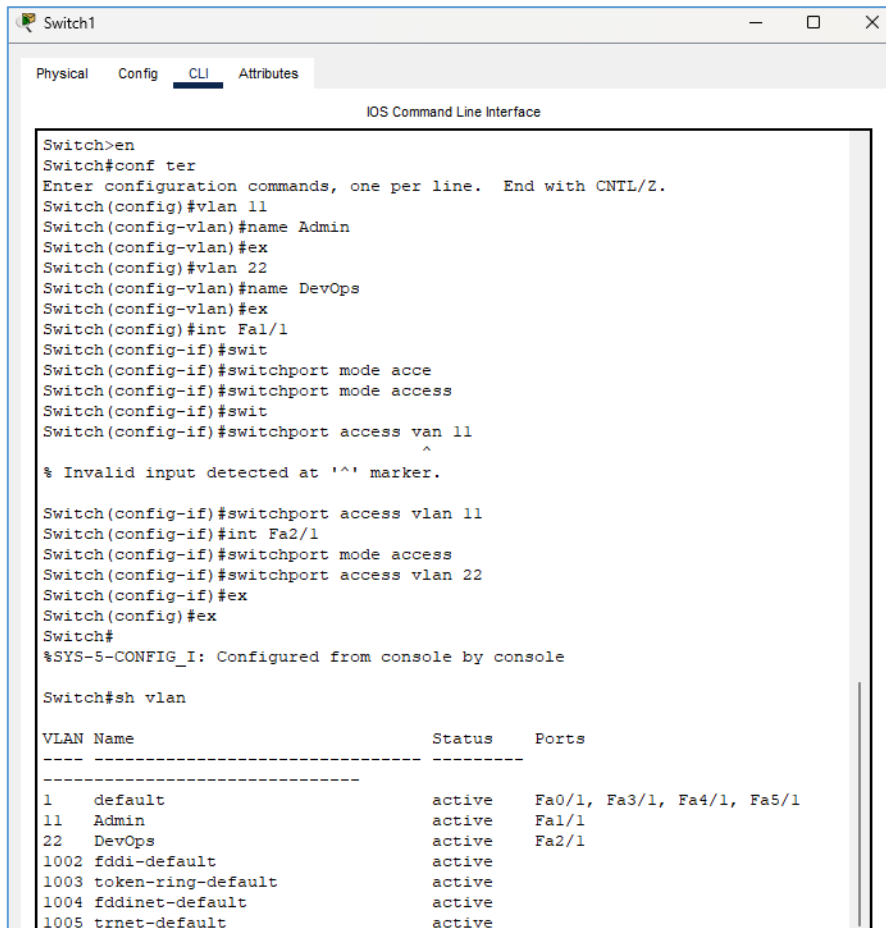
```
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#int Fa1/1
Switch(config-if)#swi
Switch(config-if)#switchport acc
Switch(config-if)#switchport access vlan 22
Switch(config-if)#int Fa2/1
Switch(config-if)#switchport access vlan 11
Switch(config-if)#ex
Switch(config)#ex
Switch#
%SYS-5-CONFIG_I: Configured from console by console

Switch#sh vlan
```

VLAN Name	Status	Ports
1 default	active	Fa3/1, Fa4/1, Fa5/1
11 Admin	active	Fa2/1
22 DevOps	active	Fa1/1
33 HR	active	Fa0/1
1002 fddi-default	active	
1003 token-ring-default	active	
1004 fddinet-default	active	
1005 trnet-default	active	



## Switch1



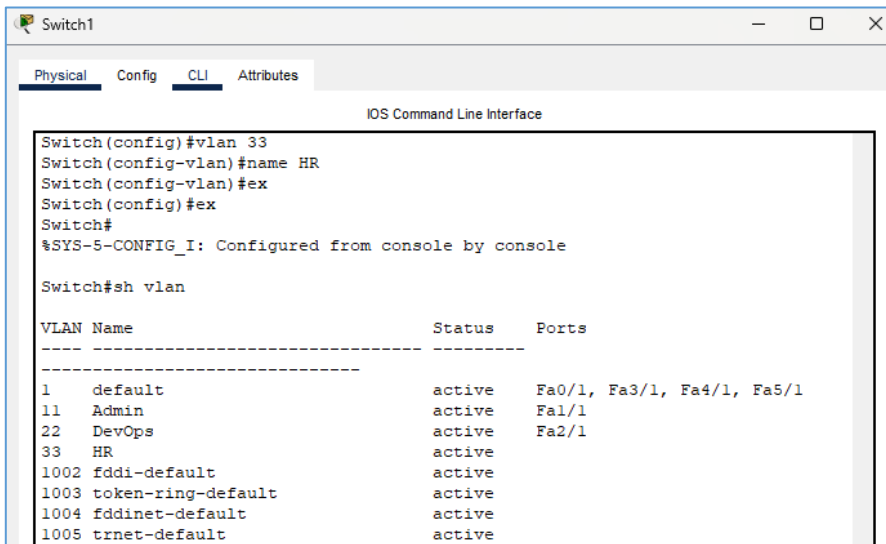
```
Switch1
Physical Config CLI Attributes
IOS Command Line Interface

Switch>en
Switch#conf ter
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#vlan 11
Switch(config-vlan)#name Admin
Switch(config-vlan)#ex
Switch(config)#vlan 22
Switch(config-vlan)#name DevOps
Switch(config-vlan)#ex
Switch(config)#int Fa1/1
Switch(config-if)#swit
Switch(config-if)#switchport mode acce
Switch(config-if)#switchport mode access
Switch(config-if)#swit
Switch(config-if)#switchport access van 11
^
% Invalid input detected at '^' marker.

Switch(config-if)#switchport access vlan 11
Switch(config-if)#int Fa2/1
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 22
Switch(config-if)#ex
Switch(config)#ex
Switch#
%SYS-5-CONFIG_I: Configured from console by console

Switch#sh vlan

VLAN Name                Status    Ports
-----
1      default                active    Fa0/1, Fa3/1, Fa4/1, Fa5/1
11     Admin                  active    Fa1/1
22     DevOps                 active    Fa2/1
1002   fddi-default           active
1003   token-ring-default     active
1004   fddinet-default        active
1005   trnet-default          active
```



```
Switch1
Physical Config CLI Attributes
IOS Command Line Interface

Switch(config)#vlan 33
Switch(config-vlan)#name HR
Switch(config-vlan)#ex
Switch(config)#ex
Switch#
%SYS-5-CONFIG_I: Configured from console by console

Switch#sh vlan

VLAN Name                Status    Ports
-----
1      default                active    Fa0/1, Fa3/1, Fa4/1, Fa5/1
11     Admin                  active    Fa1/1
22     DevOps                 active    Fa2/1
33     HR                     active
1002   fddi-default           active
1003   token-ring-default     active
1004   fddinet-default        active
1005   trnet-default          active
```

## Switch2

The image displays two screenshots of a network switch's Command Line Interface (CLI), specifically the 'Switch2' window. The top screenshot shows the configuration of VLAN 11, named 'Admin', and the assignment of Fa2/1 to it. The bottom screenshot shows the configuration of VLANs 22 (named 'DevOps') and 33 (named 'HR'), along with the same Fa2/1 assignment. Both screenshots include a table showing the status of all VLANs on the switch.

**Top Screenshot: VLAN 11 Configuration**

```
Switch>en
Switch#conf ter
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#vlan 11
Switch(config-vlan)#name Admin
Switch(config-vlan)#ex
Switch(config)#int Fa2/1
Switch(config-if)#swit
Switch(config-if)#switchport mode acc
Switch(config-if)#switchport mode access
Switch(config-if)#swit
Switch(config-if)#switchport acc
Switch(config-if)#switchport access vlan 11
Switch(config-if)#ex
Switch(config)#ex
Switch#
%SYS-5-CONFIG_I: Configured from console by console

Switch#sh vlan
```

VLAN Name	Status	Ports
1 default	active	Fa0/1, Fa1/1, Fa3/1, Fa4/1
11 Admin	active	Fa5/1
1002 fddi-default	active	Fa2/1

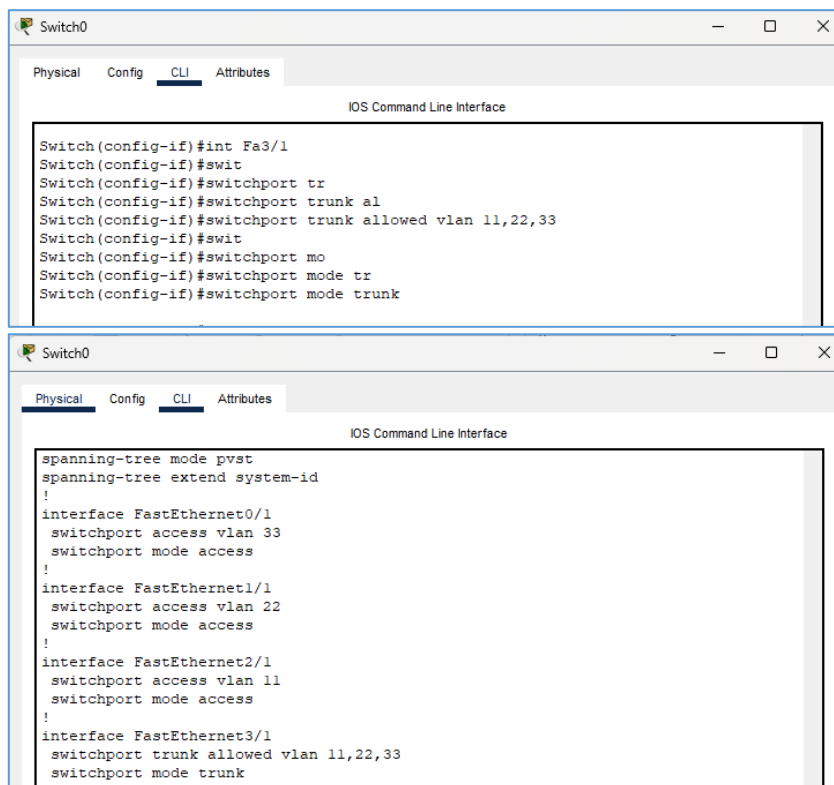
**Bottom Screenshot: VLAN 22 and 33 Configuration**

```
Switch>en
Switch#conf ter
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#vlan 22
Switch(config-vlan)#name DevOps
Switch(config-vlan)#ex
Switch(config)#vlan 33
Switch(config-vlan)#name HR
Switch(config-vlan)#ex
Switch(config)#ex
Switch#
%SYS-5-CONFIG_I: Configured from console by console

Switch#sh vlan
```

VLAN Name	Status	Ports
1 default	active	Fa0/1, Fa1/1, Fa3/1, Fa4/1
11 Admin	active	Fa5/1
22 DevOps	active	Fa2/1
33 HR	active	
1002 fddi-default	active	

## Настройка vlan (настройка портов в режиме Trunk) *Switch0*



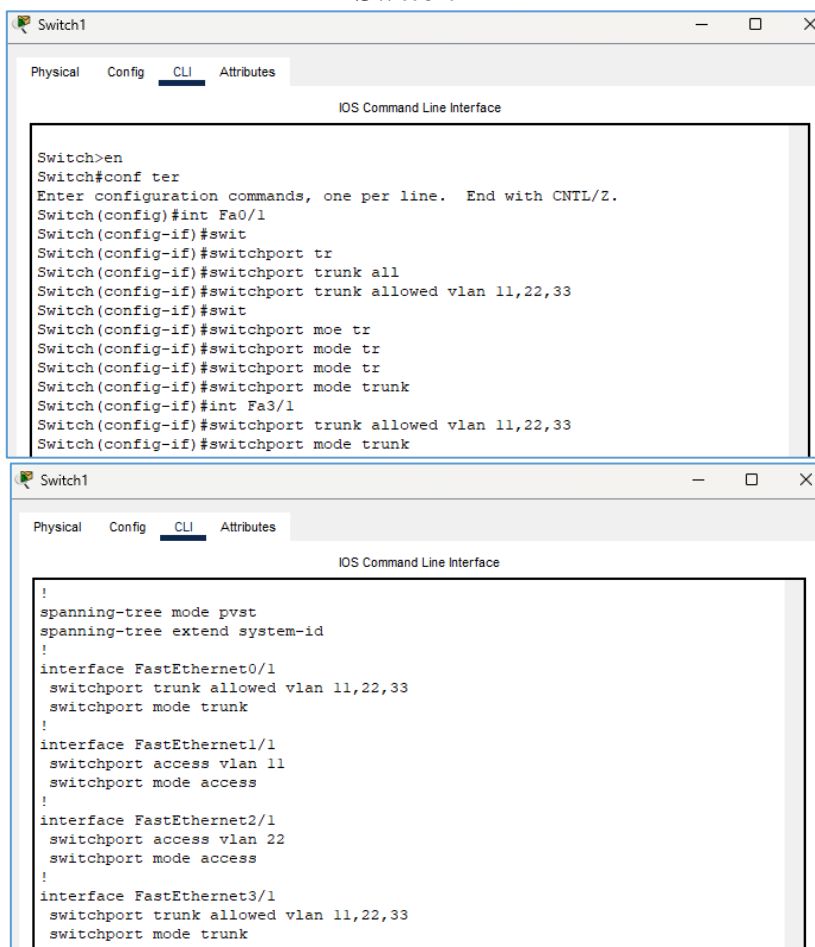
The first screenshot shows the configuration of interface Fa3/1 on Switch0. The commands entered are:

```
Switch(config-if)#int Fa3/1
Switch(config-if)#swit
Switch(config-if)#switchport tr
Switch(config-if)#switchport trunk al
Switch(config-if)#switchport trunk allowed vlan 11,22,33
Switch(config-if)#swit
Switch(config-if)#switchport mo
Switch(config-if)#switchport mode tr
Switch(config-if)#switchport mode trunk
```

The second screenshot shows the configuration of spanning-tree and access ports on Switch0. The commands entered are:

```
spanning-tree mode pvst
spanning-tree extend system-id
!
interface FastEthernet0/1
switchport access vlan 33
switchport mode access
!
interface FastEthernet1/1
switchport access vlan 22
switchport mode access
!
interface FastEthernet2/1
switchport access vlan 11
switchport mode access
!
interface FastEthernet3/1
switchport trunk allowed vlan 11,22,33
switchport mode trunk
```

## *Switch1*



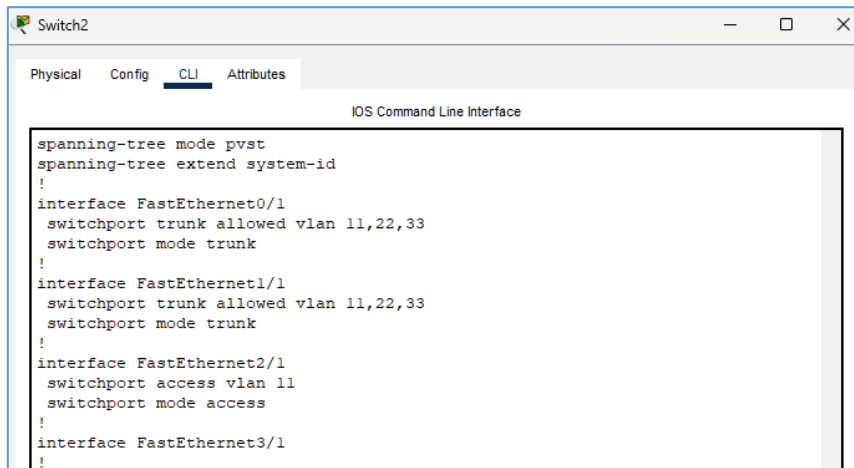
The first screenshot shows the configuration of interface Fa0/1 on Switch1. The commands entered are:

```
Switch>en
Switch#conf ter
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#int Fa0/1
Switch(config-if)#swit
Switch(config-if)#switchport tr
Switch(config-if)#switchport trunk all
Switch(config-if)#switchport trunk allowed vlan 11,22,33
Switch(config-if)#swit
Switch(config-if)#switchport moe tr
Switch(config-if)#switchport mode tr
Switch(config-if)#switchport mode tr
Switch(config-if)#switchport mode trunk
Switch(config-if)#int Fa3/1
Switch(config-if)#switchport trunk allowed vlan 11,22,33
Switch(config-if)#switchport mode trunk
```

The second screenshot shows the configuration of spanning-tree and access ports on Switch1. The commands entered are:

```
!
spanning-tree mode pvst
spanning-tree extend system-id
!
interface FastEthernet0/1
switchport trunk allowed vlan 11,22,33
switchport mode trunk
!
interface FastEthernet1/1
switchport access vlan 11
switchport mode access
!
interface FastEthernet2/1
switchport access vlan 22
switchport mode access
!
interface FastEthernet3/1
switchport trunk allowed vlan 11,22,33
switchport mode trunk
!
```

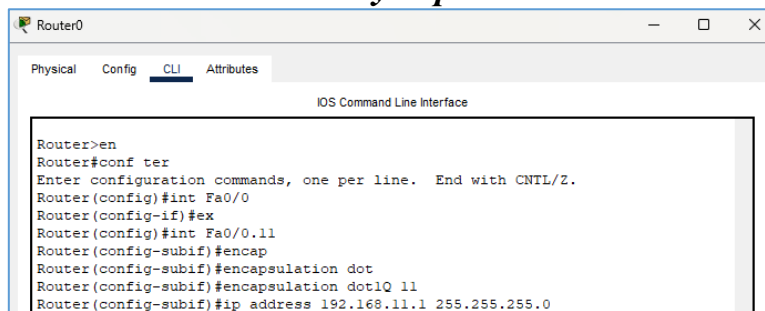
## Switch2



The screenshot shows a window titled 'Switch2' with tabs for Physical, Config, CLI, and Attributes. The CLI tab is active, displaying the following configuration in the 'IOS Command Line Interface' area:

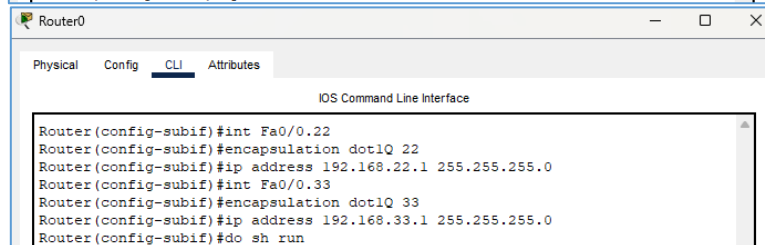
```
spanning-tree mode pvst
spanning-tree extend system-id
!
interface FastEthernet0/1
switchport trunk allowed vlan 11,22,33
switchport mode trunk
!
interface FastEthernet1/1
switchport trunk allowed vlan 11,22,33
switchport mode trunk
!
interface FastEthernet2/1
switchport access vlan 11
switchport mode access
!
interface FastEthernet3/1
!
```

## Poymep



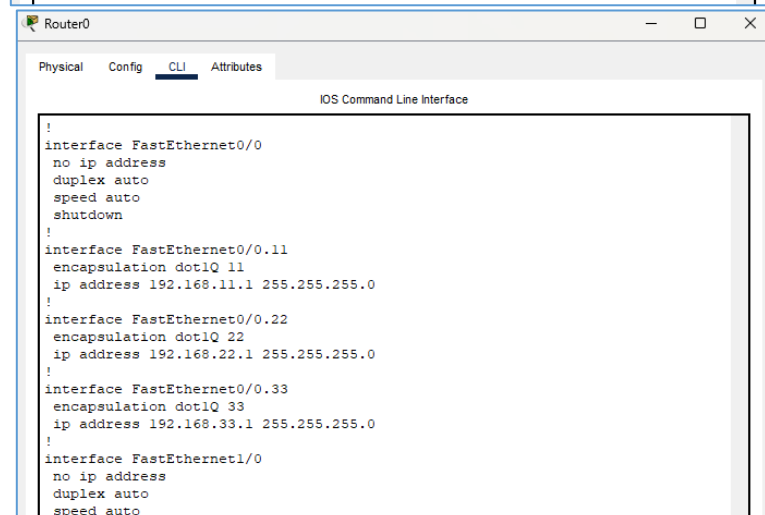
The screenshot shows a window titled 'Router0' with tabs for Physical, Config, CLI, and Attributes. The CLI tab is active, displaying the following configuration in the 'IOS Command Line Interface' area:

```
Router>en
Router#conf ter
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#int Fa0/0
Router(config-if)#ex
Router(config)#int Fa0/0.11
Router(config-subif)#encap
Router(config-subif)#encapsulation dot
Router(config-subif)#encapsulation dot1Q 11
Router(config-subif)#ip address 192.168.11.1 255.255.255.0
```



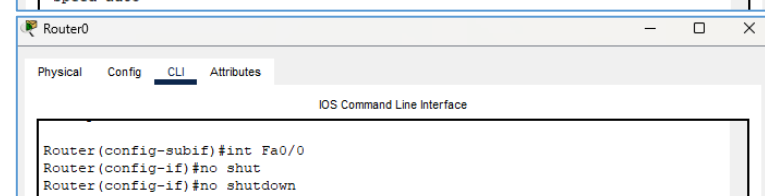
The screenshot shows a window titled 'Router0' with tabs for Physical, Config, CLI, and Attributes. The CLI tab is active, displaying the following configuration in the 'IOS Command Line Interface' area:

```
Router(config-subif)#int Fa0/0.22
Router(config-subif)#encapsulation dot1Q 22
Router(config-subif)#ip address 192.168.22.1 255.255.255.0
Router(config-subif)#int Fa0/0.33
Router(config-subif)#encapsulation dot1Q 33
Router(config-subif)#ip address 192.168.33.1 255.255.255.0
Router(config-subif)#do sh run
```



The screenshot shows a window titled 'Router0' with tabs for Physical, Config, CLI, and Attributes. The CLI tab is active, displaying the following configuration in the 'IOS Command Line Interface' area:

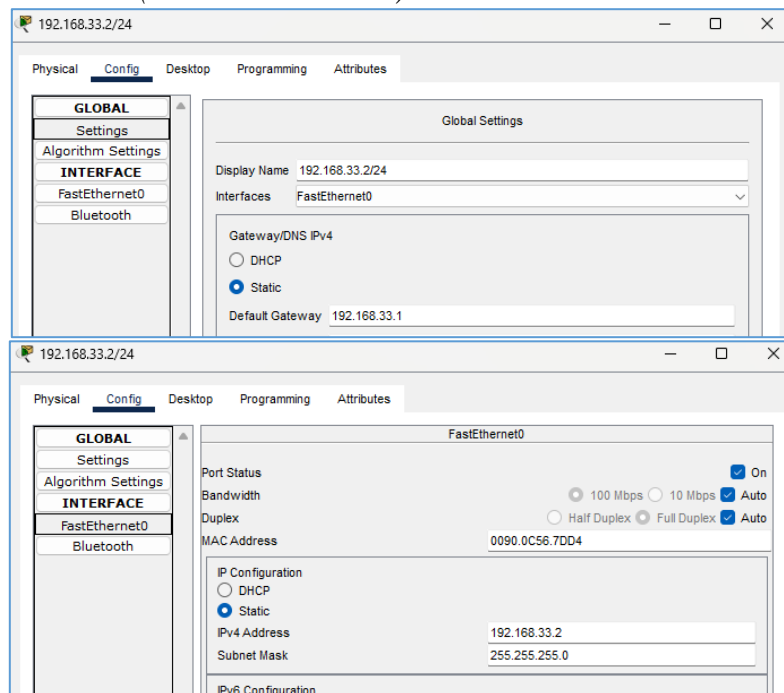
```
!
interface FastEthernet0/0
no ip address
duplex auto
speed auto
shutdown
!
interface FastEthernet0/0.11
encapsulation dot1Q 11
ip address 192.168.11.1 255.255.255.0
!
interface FastEthernet0/0.22
encapsulation dot1Q 22
ip address 192.168.22.1 255.255.255.0
!
interface FastEthernet0/0.33
encapsulation dot1Q 33
ip address 192.168.33.1 255.255.255.0
!
interface FastEthernet1/0
no ip address
duplex auto
speed auto
```



The screenshot shows a window titled 'Router0' with tabs for Physical, Config, CLI, and Attributes. The CLI tab is active, displaying the following configuration in the 'IOS Command Line Interface' area:

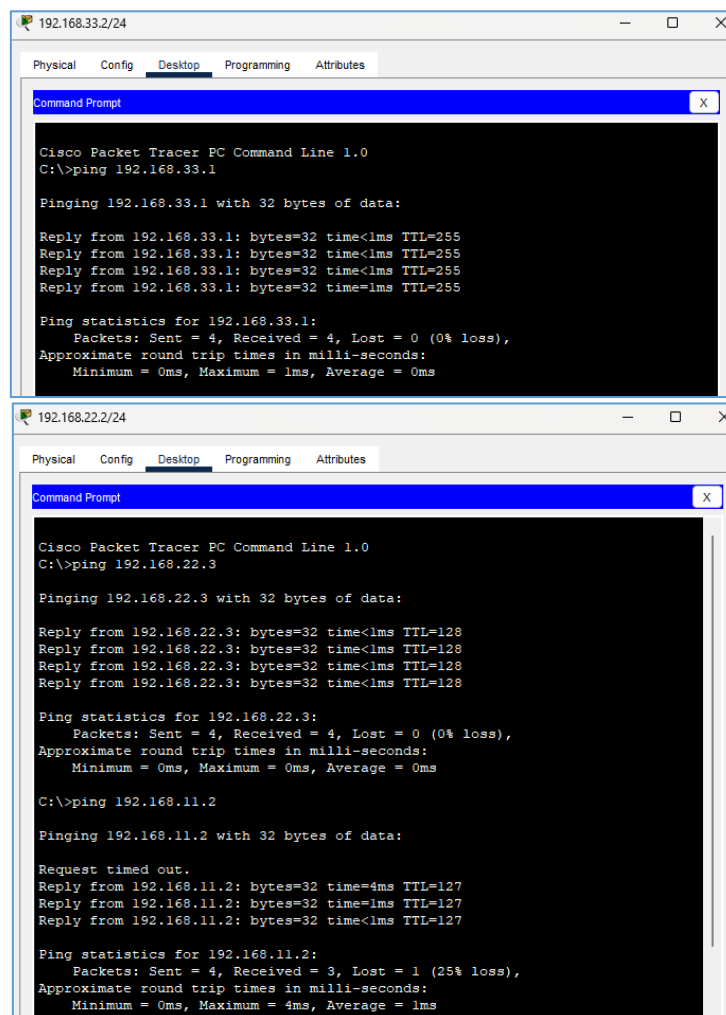
```
Router(config-subif)#int Fa0/0
Router(config-if)#no shut
Router(config-if)#no shutdown
```

## Настройка сети для PC (192.168.33.2/24)



и т.д. для других PC

## Ping

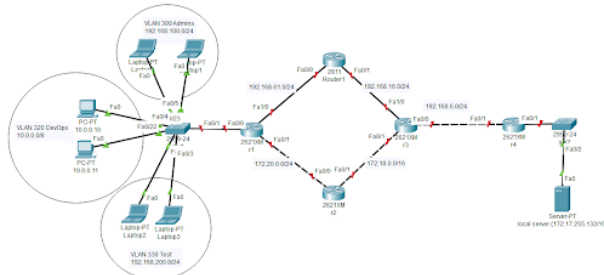


и т.д.

## Домашнее задание

### Урок 7. Семинар. Основы компьютерных сетей. Сетевой уровень. Протоколы маршрутизации. VLAN

1. Настроить сеть согласно схеме в файле с помощью OSPF и VLAN. Починить неработающие линки.



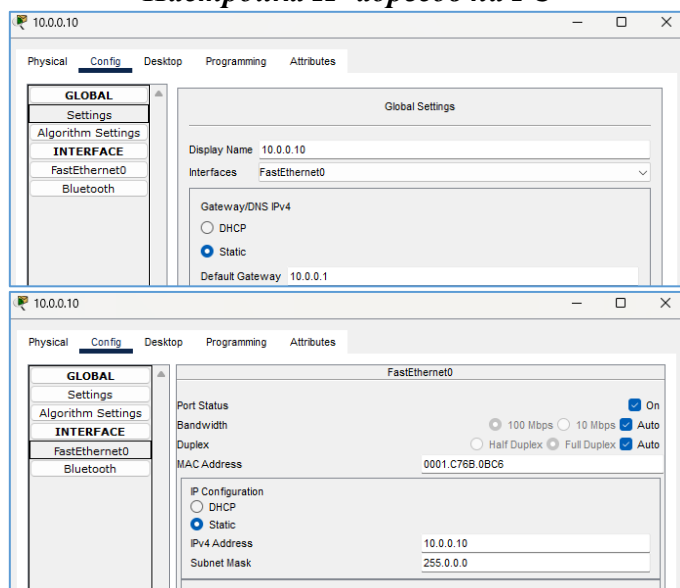
2. Убедиться что трафик от компов до сервера ходит через два маршрута с помощью ECMP.
3. Скинуть скриншот с таблицей маршрутизации с r1. Должны быть сети Connected для VLAN'ов.
4. Поймать трейс на любом компе, когда он пойдет через r5. Удалить один из линков на r5. Снова сделать трейс, убедиться что трафик пошел по резервному пути. Скинуть скриншот с разными трейсами.

Скинуть еще один скриншот с изменившейся таблицей маршрутизации с r1.

## Ход выполнения домашнего задания:

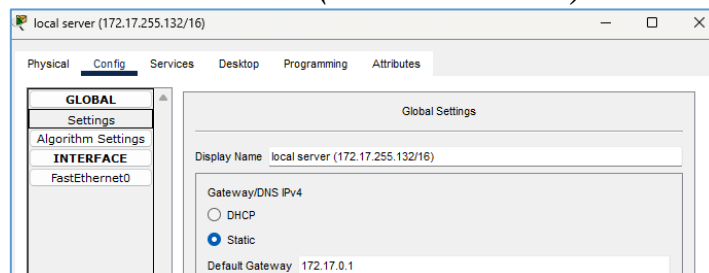
*Задание 1: Настроить сеть согласно схеме с помощью OSPF и VLAN. Починить неработающие линки.*

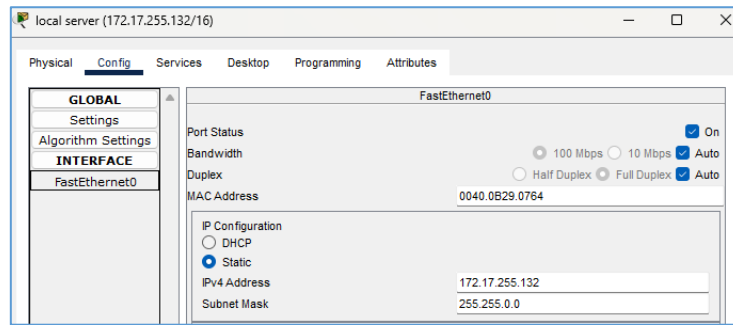
### Настройка IP-адресов на PC



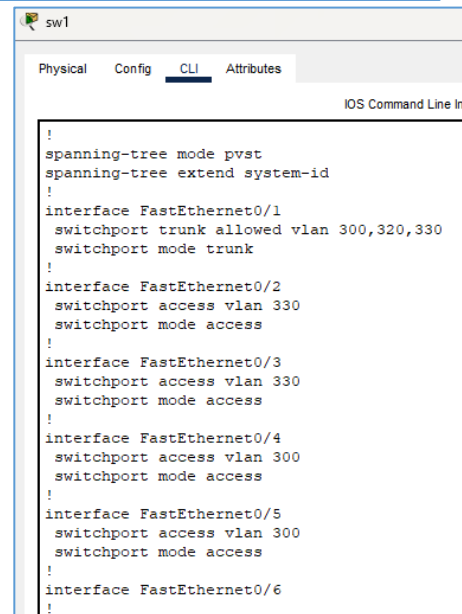
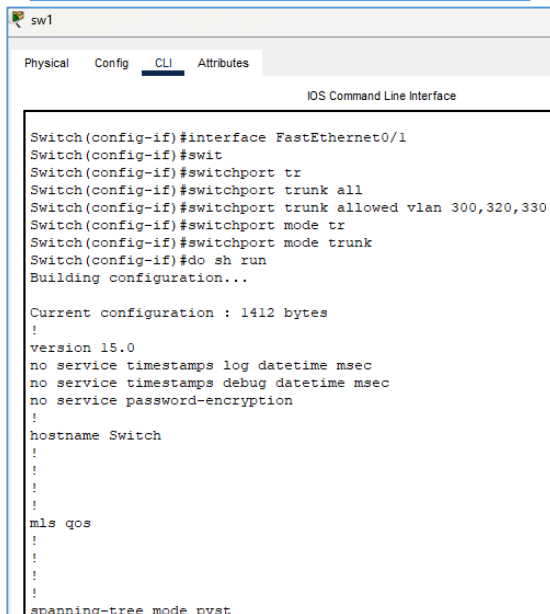
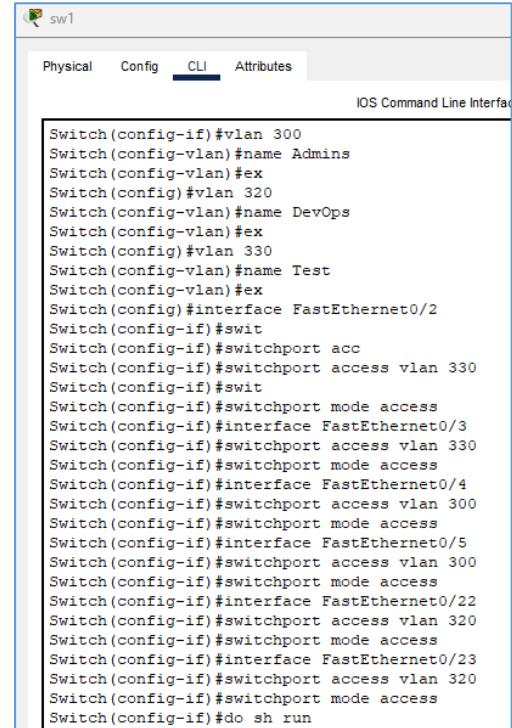
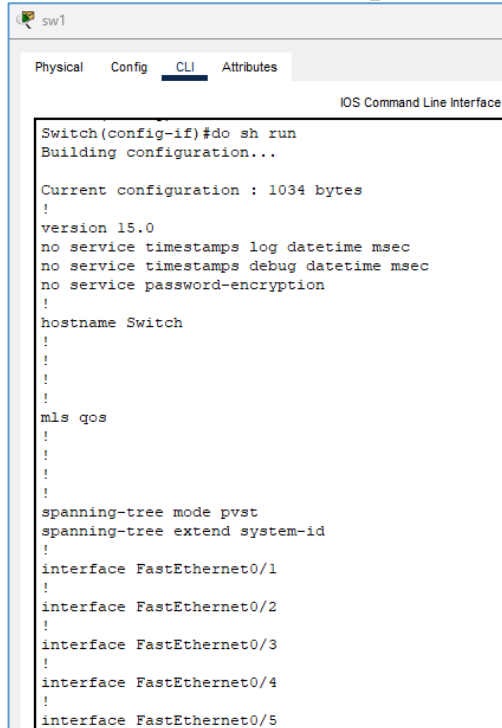
и т.д.

### Local server (172.17.255.132/16)





## Настройка vlan на Switch (sw1)



VLAN Name			Status	Ports
1	default		active	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 Fa0/24
300	Admins		active	Fa0/4, Fa0/5
320	DevOps		active	Fa0/22, Fa0/23
330	Test		active	Fa0/2, Fa0/3
1002	fddi-default		active	
1003	token-ring-default		active	
1004	fddinet-default		active	
1005	trnet-default		active	

## Настройка роутеров

### Роутер (r1) – настройка IP-адресов, vlan, OSPF

```

Router#conf ter
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface FastEthernet0/1
Router(config-if)#ip add
Router(config-if)#ip address 172.20.0.1 255.255.255.0
Router(config-if)#no sh
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to up

Router(config-if)#interface FastEthernet1/0
Router(config-if)#ip address 192.168.61.1 255.255.255.0
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet1/0, changed state to up

Router(config-if)#interface FastEthernet0/0
Router(config-if)#interface FastEthernet0/0.300
Router(config-subif)#enca
Router(config-subif)#encapsulation dot
Router(config-subif)#encapsulation dot1Q 300
Router(config-subif)#ip address 192.168.100.1 255.255.255.0
Router(config-subif)#interface FastEthernet0/0.320
Router(config-subif)#encapsulation dot1Q 320
Router(config-subif)#ip address 10.0.0.1 255.0.0.0
Router(config-subif)#interface FastEthernet0/0.330
Router(config-subif)#encapsulation dot1Q 330

Router(config-subif)#ip address 192.168.200.1 255.255.255.0
Router(config-subif)#ex
Router(config)#do sh run
Building configuration...

```

```

!
interface FastEthernet0/0
no ip address
duplex auto
speed auto
shutdown
!
interface FastEthernet0/0.300
encapsulation dot1Q 300
ip address 192.168.100.1 255.255.255.0
!
interface FastEthernet0/0.320
encapsulation dot1Q 320
ip address 10.0.0.1 255.0.0.0
!
interface FastEthernet0/0.330
encapsulation dot1Q 330
ip address 192.168.200.1 255.255.255.0
!
interface FastEthernet0/1
ip address 172.20.0.1 255.255.255.0
duplex auto
speed auto
!

Router(config)#interface FastEthernet0/0.300
Router(config-subif)#no shu
Router(config-subif)#no shutdown
Router(config-subif)#interface FastEthernet0/0.320
Router(config-subif)#no shutdown
Router(config-subif)#interface FastEthernet0/0.330
Router(config-subif)#no shutdown
Router(config-subif)#interface FastEthernet0/0
Router(config-if)#no shutdown

```



```

r1
Physical Config CLI Attributes
IOS Command Line Interface

Router#conf ter
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#router ospf 1111
Router(config-router)#network
Router(config-router)#network 192.168.100.0 0.0.0.255 area 0
Router(config-router)#network 192.168.200.0 0.0.0.255 area 0
Router(config-router)#network 10.0.0.0 0.255.255.255 area 0
Router(config-router)#do sh ip ospf int

r1
Physical Config CLI Attributes
IOS Command Line Interface

!
!
interface FastEthernet0/0
no ip address
duplex auto
speed auto
!
interface FastEthernet0/0.300
encapsulation dot1Q 300
ip address 192.168.100.1 255.255.255.0
!
interface FastEthernet0/0.320
encapsulation dot1Q 320
ip address 10.0.0.1 255.0.0.0
!
interface FastEthernet0/0.330
encapsulation dot1Q 330
ip address 192.168.200.1 255.255.255.0
!
interface FastEthernet0/1
ip address 172.20.0.1 255.255.255.0
duplex auto
speed auto
!
interface FastEthernet1/0
ip address 192.168.61.1 255.255.255.0
duplex auto
speed auto
!
router ospf 1111
log-adjacency-changes
network 192.168.100.0 0.0.0.255 area 0
network 192.168.200.0 0.0.0.255 area 0
network 10.0.0.0 0.255.255.255 area 0
network 172.20.0.0 0.0.0.255 area 0
network 192.168.61.0 0.0.0.255 area 0
!

Router#sh ip route ospf
O    172.17.0.0 [110/4] via 172.20.0.2, 00:04:49, FastEthernet0/1
      [110/4] via 192.168.61.2, 00:04:49, FastEthernet1/0
O    172.18.0.0 [110/2] via 172.20.0.2, 00:15:39, FastEthernet0/1
O    192.168.6.0 [110/3] via 172.20.0.2, 00:11:34, FastEthernet0/1
      [110/3] via 192.168.61.2, 00:11:34, FastEthernet1/0
O    192.168.16.0 [110/2] via 192.168.61.2, 00:15:12, FastEthernet1/0

```

### Роутер (r2) – настройка IP-адресов, OSPF

```

r2
Physical Config CLI Attributes
IOS Command Line Interface

Router#conf ter
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface FastEthernet0/0
Router(config-if)#ip address 172.20.0.2 255.255.255.0
Router(config-if)#no sh
Router(config-if)#no shutdown

Router(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

Router(config-if)#interface FastEthernet0/1
Router(config-if)#ip address 172.18.0.1 255.255.0.0
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to up

Router(config-if)#ex

```

```
Router(r2)
Physical Config CLI Attributes
IOS Command Line Interface

Router(config)#route ospf 1111
Router(config-router)#network 172.20.0.0 0.0.0.255 area 0
Router(config-router)#network 172.18.0.0 0.0.255.255 area 0
Router(config-router)#ex
Router(config)#do sh ip route ospf
Router(config)#do sh ip route

!
!
interface FastEthernet0/0
ip address 172.20.0.2 255.255.255.0
duplex auto
speed auto
!
interface FastEthernet0/1
ip address 172.18.0.1 255.255.0.0
duplex auto
speed auto
!
interface FastEthernet1/0
no ip address
duplex auto
speed auto
shutdown
!
interface FastEthernet1/1
no ip address
duplex auto
speed auto
shutdown
!
router ospf 1111
log-adjacency-changes
network 172.20.0.0 0.0.0.255 area 0
network 172.18.0.0 0.0.255.255 area 0
!

Router#sh ip route ospf
O 10.0.0.0 [110/2] via 172.20.0.1, 00:25:21, FastEthernet0/0
O 172.17.0.0 [110/3] via 172.18.0.2, 00:06:35, FastEthernet0/1
O 192.168.6.0 [110/2] via 172.18.0.2, 00:13:20, FastEthernet0/1
O 192.168.16.0 [110/2] via 172.18.0.2, 00:16:58, FastEthernet0/1
O 192.168.61.0 [110/2] via 172.20.0.1, 00:25:21, FastEthernet0/0
O 192.168.100.0 [110/2] via 172.20.0.1, 00:25:21, FastEthernet0/0
O 192.168.200.0 [110/2] via 172.20.0.1, 00:25:21, FastEthernet0/0
```

### *Роутер (r3) – настройка IP-адресов, OSPF*

```
Router(r3)
Physical Config CLI Attributes
IOS Command Line Interface

Router(config)#interface FastEthernet0/0
Router(config-if)#ip address 192.168.6.1 255.255.255.0
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

Router(config-if)#interface FastEthernet0/1
Router(config-if)#ip address 172.18.0.2 255.255.0.0
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to up

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

Router(config-if)#interface FastEthernet1/0
Router(config-if)#ip address 192.168.16.1 255.255.255.0
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet1/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet1/0, changed state to up
```

```
r3
Physical Config CLI Attributes
IOS Command Line Interface

Router(config-router)#ex
Router(config)#router ospf 1111
Router(config-router)#network 172.18.0.0 0.0.255.255 area 0
Router(config-router)#
02:28:03: %OSPF-5-ADJCHG: Process 1111, Nbr 172.20.0.2 on FastEthernet0/1 from
LOADING to FULL, Loading Done

Router(config-router)#network 192.168.16.0 0.0.0.255 area 0
Router(config-router)#network 192.168.6.0 0.0.0.255 area 0

r3
Physical Config CLI Attributes
IOS Command Line Interface

!
!
interface FastEthernet0/0
ip address 192.168.6.1 255.255.255.0
duplex auto
speed auto
!
interface FastEthernet0/1
ip address 172.18.0.2 255.255.0.0
duplex auto
speed auto
!
interface FastEthernet1/0
ip address 192.168.16.1 255.255.255.0
duplex auto
speed auto
!
router ospf 1111
log-adjacency-changes
network 172.18.0.0 0.0.255.255 area 0
network 192.168.16.0 0.0.0.255 area 0
network 192.168.6.0 0.0.0.255 area 0

Router#sh ip route ospf
O   10.0.0.0 [110/3] via 172.18.0.1, 00:18:08, FastEthernet0/1
    [110/3] via 192.168.16.2, 00:18:08, FastEthernet1/0
O   172.17.0.0 [110/2] via 192.168.6.2, 00:07:45, FastEthernet0/0
    172.20.0.0/24 is subnetted, 1 subnets
O     172.20.0.0 [110/2] via 172.18.0.1, 00:18:08, FastEthernet0/1
O   192.168.61.0 [110/2] via 192.168.16.2, 00:18:08, FastEthernet1/0
O   192.168.100.0 [110/3] via 172.18.0.1, 00:18:08, FastEthernet0/1
    [110/3] via 192.168.16.2, 00:18:08, FastEthernet1/0
O   192.168.200.0 [110/3] via 172.18.0.1, 00:18:08, FastEthernet0/1
    [110/3] via 192.168.16.2, 00:18:08, FastEthernet1/0
```

### ***Роутер (r4) – настройка IP-адресов, OSPF***

```
r4
Physical Config CLI Attributes
IOS Command Line Interface

Router#conf ter
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface FastEthernet0/0
Router(config-if)#ip address 172.17.0.1 255.255.0.0
Router(config-if)#no shutdown

Router(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

Router(config-if)#interface FastEthernet0/1
Router(config-if)#ip address 192.168.6.2 255.255.255.0
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state
to up
```

```
r4
Physical Config CLI Attributes
IOS Command Line Interface
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#router ospf 1111
Router(config-router)#network 192.168.6.0 0.0.0.255 area 0
Router(config-router)#ex
02:32:03: %OSPF-5-ADJCHG: Process 1111, Nbr 192.168.16.1 on FastEthernet0/1
from LOADING to FULL, Loading Done

Router(config)#router ospf 1111
Router(config-router)#network 172.17.0.0 0.0.255.255 area 0

r4
Physical Config CLI Attributes
IOS Command Line Interface

interface FastEthernet0/0
ip address 172.17.0.1 255.255.0.0
duplex auto
speed auto
!
interface FastEthernet0/1
ip address 192.168.6.2 255.255.255.0
duplex auto
speed auto
!
router ospf 1111
log-adjacency-changes
network 192.168.6.0 0.0.0.255 area 0
network 172.17.0.0 0.0.255.255 area 0
!

Router#sh ip route ospf
O    10.0.0.0 [110/4] via 192.168.6.1, 00:15:48, FastEthernet0/1
O    172.18.0.0 [110/2] via 192.168.6.1, 00:15:48, FastEthernet0/1
    172.20.0.0/24 is subnetted, 1 subnets
O      172.20.0.0 [110/3] via 192.168.6.1, 00:15:48, FastEthernet0/1
O    192.168.16.0 [110/2] via 192.168.6.1, 00:15:48, FastEthernet0/1
O    192.168.61.0 [110/3] via 192.168.6.1, 00:15:48, FastEthernet0/1
O    192.168.100.0 [110/4] via 192.168.6.1, 00:15:48, FastEthernet0/1
O    192.168.200.0 [110/4] via 192.168.6.1, 00:15:48, FastEthernet0/1
```

### *Роутер (r5) – настройка IP-адресов, OSPF*

```
r5
Physical Config CLI Attributes
IOS Command Line Interface

Router#conf ter
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface FastEthernet0/0
Router(config-if)#ip address 192.168.61.2 255.255.255.0
Router(config-if)#no shutdown

Router(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

Router(config-if)#interface FastEthernet0/1
Router(config-if)#ip address 192.168.16.2 255.255.255.0
Router(config-if)#no shutdown

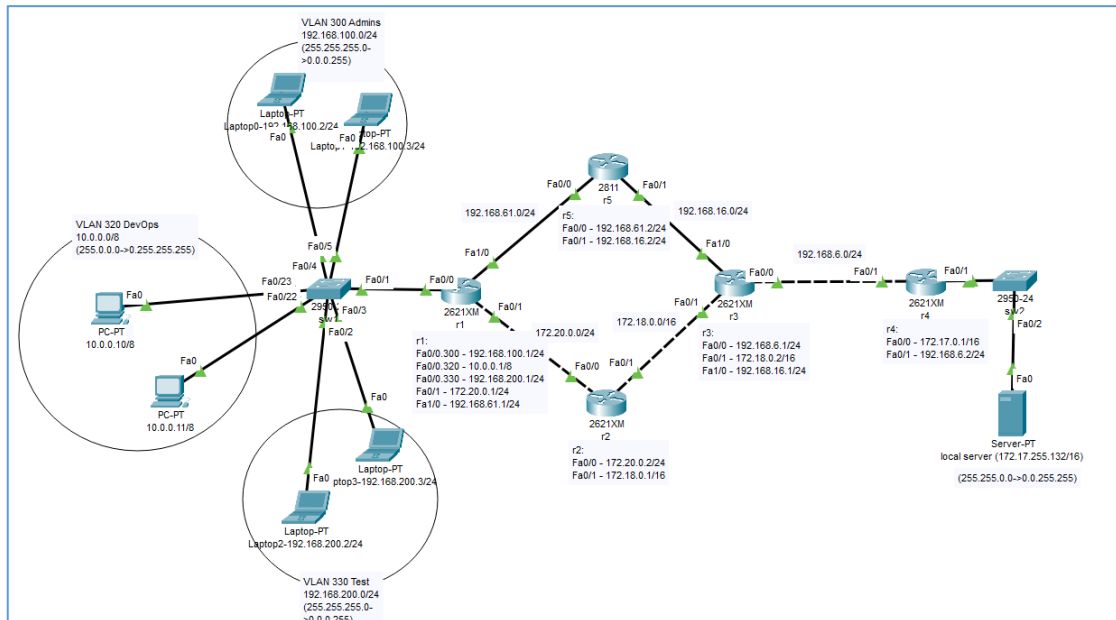
Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to up

Router(config-if)#ex
Router(config)#router ospf 1111
Router(config-router)#network 192.168.61.0 0.0.0.255 area 0
Router(config-router)#network 192.168.16.0 0.0.0.255 area 0
```

```

Router#sh ip route ospf
O 10.0.0.0 [110/2] via 192.168.61.1, 00:21:31, FastEthernet0/0
O 172.18.0.0 [110/2] via 192.168.16.1, 00:10:08, FastEthernet0/1
172.20.0.0/24 is subnetted, 1 subnets
O 172.20.0.0 [110/2] via 192.168.61.1, 00:18:31, FastEthernet0/0
O 192.168.6.0 [110/2] via 192.168.16.1, 00:06:35, FastEthernet0/1
O 192.168.100.0 [110/2] via 192.168.61.1, 00:21:31, FastEthernet0/0
O 192.168.200.0 [110/2] via 192.168.61.1, 00:21:31, FastEthernet0/0

```



*Задание 2: Убедиться, что трафик от комп-ов до сервера ходит через два маршрута с помощью ECPM.*

```

Laptop2-192.168.200.2/24
Physical Config Desktop Programming Attributes
Command Prompt
C:\>ping 172.17.255.132

Pinging 172.17.255.132 with 32 bytes of data:

Reply from 172.17.255.132: bytes=32 time<1ms TTL=124
Reply from 172.17.255.132: bytes=32 time<1ms TTL=124
Reply from 172.17.255.132: bytes=32 time<1ms TTL=124
Reply from 172.17.255.132: bytes=32 time<1ms TTL=124

Ping statistics for 172.17.255.132:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\>tracert 172.17.255.132

Tracing route to 172.17.255.132 over a maximum of 30 hops:

  0  0 ms    0 ms    1 ms    192.168.200.1
  1  0 ms    0 ms    1 ms    172.20.0.2
  2  0 ms    0 ms    1 ms    172.18.0.2
  3  0 ms    0 ms    1 ms    192.168.6.2
  4 10 ms    0 ms    0 ms    172.17.255.132

Trace complete.

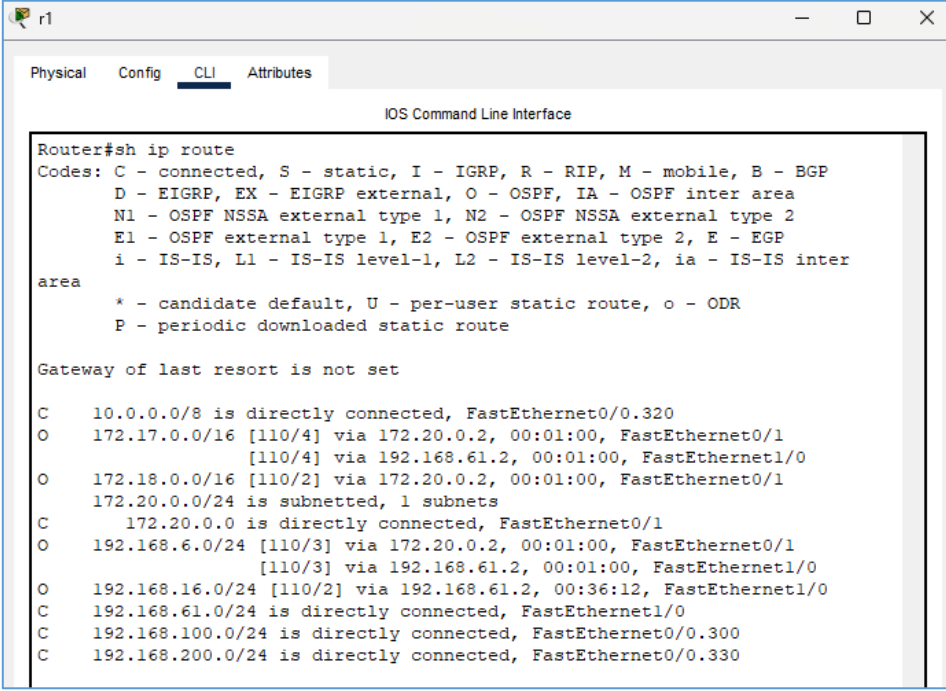
C:\>tracert 172.17.255.132

Tracing route to 172.17.255.132 over a maximum of 30 hops:

  0  0 ms    0 ms    1 ms    192.168.200.1
  1  0 ms    1 ms    0 ms    172.20.0.2
  2  0 ms    1 ms    0 ms    192.168.16.1
  3  0 ms    0 ms    0 ms    192.168.6.2

```

Задание 3: Скинуть скриншот с таблицей маршрутизации с r1. Должны быть сети Connected для VLAN'ов.

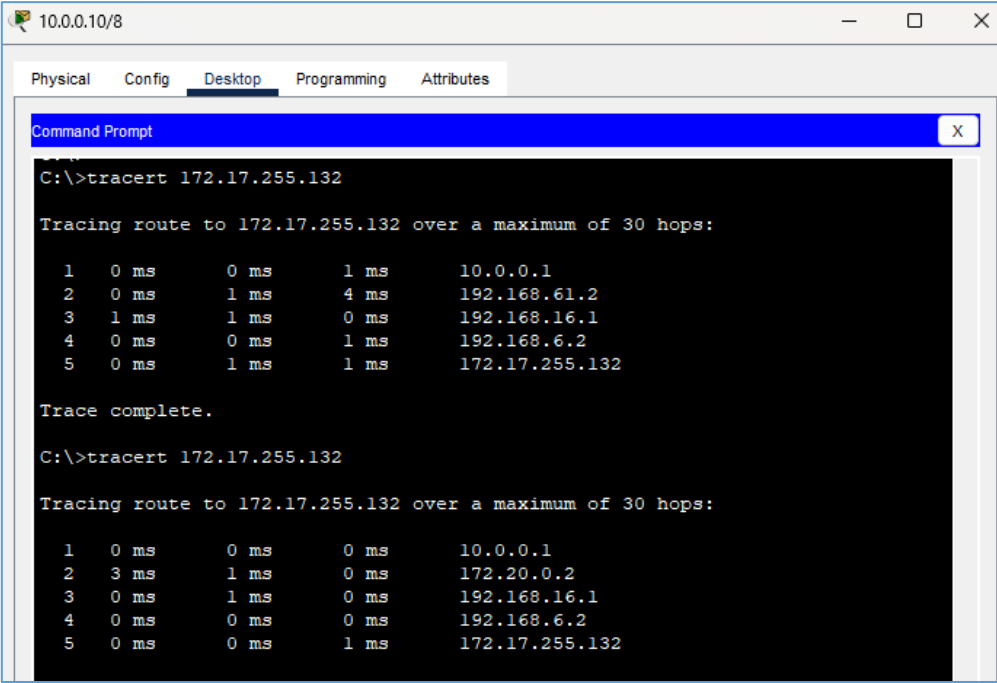


```
Router#sh ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter
       area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

C    10.0.0.0/8 is directly connected, FastEthernet0/0.320
O    172.17.0.0/16 [110/4] via 172.20.0.2, 00:01:00, FastEthernet0/1
      [110/4] via 192.168.61.2, 00:01:00, FastEthernet1/0
O    172.18.0.0/16 [110/2] via 172.20.0.2, 00:01:00, FastEthernet0/1
      172.20.0.0/24 is subnetted, 1 subnets
C    172.20.0.0 is directly connected, FastEthernet0/1
O    192.168.6.0/24 [110/3] via 172.20.0.2, 00:01:00, FastEthernet0/1
      [110/3] via 192.168.61.2, 00:01:00, FastEthernet1/0
O    192.168.16.0/24 [110/2] via 192.168.61.2, 00:36:12, FastEthernet1/0
C    192.168.61.0/24 is directly connected, FastEthernet1/0
C    192.168.100.0/24 is directly connected, FastEthernet0/0.300
C    192.168.200.0/24 is directly connected, FastEthernet0/0.330
```

Задание 4: Поймать трейс на любом комп-е, когда он пойдет через r5. Удалить один из линков на r5. Снова сделать трейс, убедиться, что трафик пошел по резервному пути. Скинуть скриншот с разными трейсами.



```
10.0.0.10/8
Physical Config Desktop Programming Attributes

Command Prompt

C:\>tracert 172.17.255.132

Tracing route to 172.17.255.132 over a maximum of 30 hops:

  1  0 ms    0 ms    1 ms    10.0.0.1
  2  0 ms    1 ms    4 ms    192.168.61.2
  3  1 ms    1 ms    0 ms    192.168.16.1
  4  0 ms    0 ms    1 ms    192.168.6.2
  5  0 ms    1 ms    1 ms    172.17.255.132

Trace complete.

C:\>tracert 172.17.255.132

Tracing route to 172.17.255.132 over a maximum of 30 hops:

  1  0 ms    0 ms    0 ms    10.0.0.1
  2  3 ms    1 ms    0 ms    172.20.0.2
  3  0 ms    1 ms    0 ms    192.168.16.1
  4  0 ms    0 ms    0 ms    192.168.6.2
  5  0 ms    0 ms    1 ms    172.17.255.132
```

Ссылка на репозиторий:

<https://github.com/olgashenkel/GeekBrains-specialization-ELECTIVES/tree/main/08.%20Computer%20networks>