

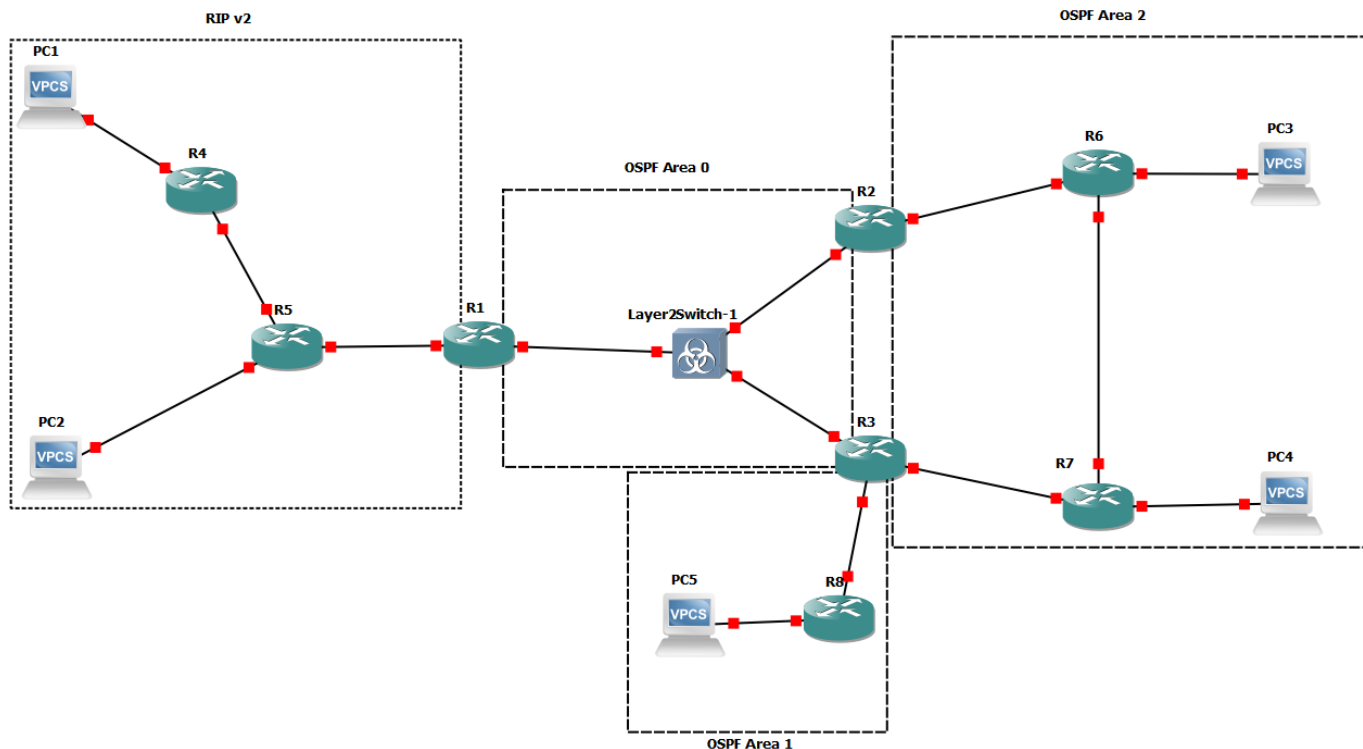
## Тема: Настройка протоколов динамической маршрутизации RIP v2 и OSPF

Все команды для настройки включаются в отчет в текстовом виде, не скриншоты.

nb! - отметка в тексте, "обратите особое внимание"

1) Для заданной на схеме schema-lab5 сети, состоящей из управляемых коммутаторов, маршрутизаторов и персональных компьютеров выполнить планирование и документирование адресного пространства и назначить статические адреса всем устройствам.

nb! Каждое соединение маршрутизатора с маршрутизатором - это отдельная сеть.



Для планирования построения такой сети будем придерживаться таких правил:

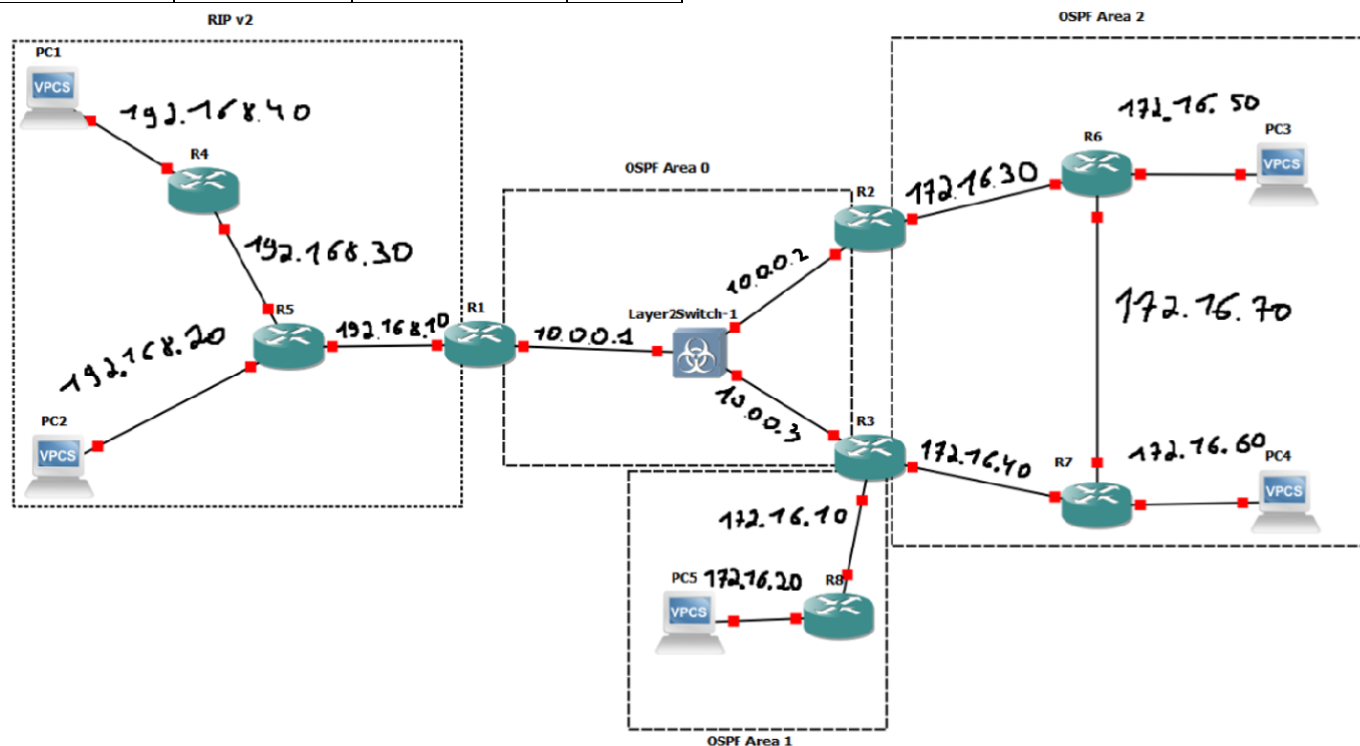
Каждое соединение маршрутизатор-маршрутизатор – это отдельная /30 подсеть

Каждое соединение маршрутизатор-компьютер – /24 подсеть

У каждой области свой диапазон IP адресов

Устройство	Интерфейс	IP	Маска
R1	f0/0	192.168.10.1	/30
	f1/0	10.0.0.1	/24
R2	f0/0	10.0.0.2	/24
	f1/0	172.16.30.1	/30
R3	f0/0	10.0.0.3	/24
	f1/0	172.16.40.1	/30
	f2/0	172.16.10.1	/30
R4	f0/0	192.168.40.1	/24
	f1/0	192.168.30.1	/30
R5	f0/0	192.168.20.1	/24
	f1/0	192.168.30.2	/30
	f2/0	192.168.10.2	/30
R6	f0/0	172.16.30.2	/30
	f1/0	172.16.50.1	/24
	f2/0	172.16.70.1	/30
R7	f0/0	172.16.40.2	/30
	f1/0	172.16.60.1	/24
	f2/0	172.16.70.2	/30

R8	f0/0	172.16.10.2	/30
	f1/0	172.16.20.1	/24
PC1	e0	192.168.40.10	/24
PC2	e0	192.168.20.10	/24
PC3	e0	172.16.50.10	/24
PC4	e0	172.16.60.10	/24
PC5	e0	172.16.20.10	/24



Теперь настраиваем так сеть в GNS3.  
КОМАНДЫ

R1

```
enable
configure terminal
hostname R1
interface f0/0
ip address 192.168.10.1 255.255.255.252
no shutdown
exit
interface f1/0
ip address 10.0.0.1 255.255.255.0
no shutdown
exit
end
wr
```

```

R1#
R1#enable
R1#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
R1(config)#hostname R1
R1(config)#interface f0/0
R1(config-if)#ip address 192.168.10.1 255.255.255.252
R1(config-if)#no shutdown
R1(config-if)#exit
R1(config)#interface f1/0
R1(config-if)#ip address 10.0.0.1 255.255.255.0
R1(config-if)#no shutdown
R1(config-if)#exit
R1(config)#end
R1#wr
Building configuration...
[OK]
R1#
*Mar  1 00:00:13.555: %SYS-5-CONFIG_I: Configured from console by console
*Mar  1 00:00:18.723: %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state t
o up
*Mar  1 00:00:18.727: %LINK-3-UPDOWN: Interface FastEthernet1/0, changed state t
o up
R1#
*Mar  1 00:00:19.735: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthern
et0/0, changed state to up
*Mar  1 00:00:19.735: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthern
et1/0, changed state to up
R1#

```

R2

```

enable
configure terminal
hostname R2
interface f0/0
ip address 10.0.0.2 255.255.255.0
no shutdown
exit
interface f1/0
ip address 172.16.30.1 255.255.255.252
no shutdown
exit
end
wr

```

```
R2#
R2#enable
R2#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
R2(config)#hostname R2
R2(config)#interface f0/0
R2(config-if)#ip address 10.0.0.2 255.255.255.0
R2(config-if)#no shutdown
R2(config-if)#exit
R2(config)#interface f1/0
R2(config-if)#ip address 172.16.30.1 255.255.255.252
R2(config-if)#no shutdown
R2(config-if)#exit
R2(config)#end
R2#wr
Building configuration...

*Mar  1 00:01:06.123: %SYS-5-CONFIG_I: Configured from console by console
*Mar  1 00:01:07.939: %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state t
o up
*Mar  1 00:01:08.143: %LINK-3-UPDOWN: Interface FastEthernet1/0, changed state t
o up[OK]
R2#
*Mar  1 00:01:08.955: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthern
et0/0, changed state to up
*Mar  1 00:01:09.155: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthern
et1/0, changed state to up
R2#
```

R3

```
enable
configure terminal
hostname R3
interface f0/0
ip address 10.0.0.3 255.255.255.0
no shutdown
exit
interface f1/0
ip address 172.16.40.1 255.255.255.252
no shutdown
exit
interface f2/0
ip address 172.16.10.1 255.255.255.252
no shutdown
exit
end
wr
```

```

R3#
R3#enable
R3#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
R3(config)#hostname R3
R3(config)#interface f0/0
R3(config-if)#ip address 10.0.0.3 255.255.255.0
R3(config-if)#no shutdown
R3(config-if)#exit
R3(config)#interface f1/0
R3(config-if)#ip address 172.16.40.1 255.255.255.252
R3(config-if)#no shutdown
R3(config-if)#exit
R3(config)#interface f2/0
R3(config-if)#ip address 172.16.10.1 255.255.255.252
R3(config-if)#no shutdown
R3(config-if)#exit
R3(config)#end
R3#wr
Building configuration...

*Mar  1 00:01:20.099: %SYS-5-CONFIG_I: Configured from console by console
*Mar  1 00:01:21.319: %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state t
o up
*Mar  1 00:01:21.527: %LINK-3-UPDOWN: Interface FastEthernet1/0, changed state t
o up
*Mar  1 00:01:21.735: %LINK-3-UPDOWN: Interface FastEthernet2/0, changed state t
o up[OK]
R3#
*Mar  1 00:01:22.347: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthern
et0/0, changed state to up
*Mar  1 00:01:22.559: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthern
et1/0, changed state to up
*Mar  1 00:01:22.763: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthern
et2/0, changed state to up
R3#

```

R4

```

enable
configure terminal
hostname R4
interface f0/0
ip address 192.168.40.1 255.255.255.0
no shutdown
exit
interface f1/0
ip address 192.168.30.1 255.255.255.252
no shutdown
exit
end
wr

```

```

R4#
R4#enable
R4#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
R4(config)#hostname R4
R4(config)#interface f0/0
R4(config-if)#ip address 192.168.40.1 255.255.255.0
R4(config-if)#no shutdown
R4(config-if)#exit
R4(config)#interface f1/0
R4(config-if)#ip address 192.168.30.1 255.255.255.252
R4(config-if)#no shutdown
R4(config-if)#exit
R4(config)#end
R4#wr
Building configuration...

*Mar  1 00:01:35.083: %SYS-5-CONFIG_I: Configured from console by console
*Mar  1 00:01:36.291: %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state t
o up
*Mar  1 00:01:37.103: %LINK-3-UPDOWN: Interface FastEthernet1/0, changed state t
o up
*Mar  1 00:01:37.307: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthern
et0/0, changed state to up[OK]
R4#
*Mar  1 00:01:38.139: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthern
et1/0, changed state to up
R4#

```

R5

```

enable
configure terminal
hostname R5
interface f0/0
ip address 192.168.20.1 255.255.255.0
no shutdown
exit
interface f1/0
ip address 192.168.30.2 255.255.255.252
no shutdown
exit
interface f2/0
ip address 192.168.10.2 255.255.255.252
no shutdown
exit
end
wr

```

```

R5#
R5#enable
R5#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
R5(config)#hostname R5
R5(config)#interface f0/0
R5(config-if)#ip address 192.168.20.1 255.255.255.0
R5(config-if)#no shutdown
R5(config-if)#exit
R5(config)#interface f1/0
R5(config-if)#ip address 192.168.30.2 255.255.255.252
R5(config-if)#no shutdown
R5(config-if)#exit
R5(config)#interface f2/0
R5(config-if)#ip address 192.168.10.2 255.255.255.252
R5(config-if)#no shutdown
R5(config-if)#exit
R5(config)#end
R5#wr
Building configuration...
[OK]
R5#
*Mar  1 00:01:46.323: %SYS-5-CONFIG_I: Configured from console by console
*Mar  1 00:01:47.531: %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state t
o up
*Mar  1 00:01:48.143: %LINK-3-UPDOWN: Interface FastEthernet1/0, changed state t
o up
*Mar  1 00:01:48.347: %LINK-3-UPDOWN: Interface FastEthernet2/0, changed state t
o up
*Mar  1 00:01:48.551: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthern
et0/0, changed state to up
*Mar  1 00:01:49.159: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthern
et1/0, changed state to up
R5#
*Mar  1 00:01:49.363: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthern
et2/0, changed state to up
R5#

```

R6

```

enable
configure terminal
hostname R6
interface f0/0
ip address 172.16.30.2 255.255.255.252
no shutdown
exit
interface f1/0
ip address 172.16.50.1 255.255.255.0
no shutdown
exit
interface f2/0
ip address 172.16.70.1 255.255.255.252
no shutdown
exit
end
wr

```

```

R6#
R6#enable
R6#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
R6(config)#hostname R6
R6(config)#interface f0/0
R6(config-if)#ip address 172.16.30.2 255.255.255.252
R6(config-if)#no shutdown
R6(config-if)#exit
R6(config)#interface f1/0
R6(config-if)#ip address 172.16.50.1 255.255.255.0
R6(config-if)#no shutdown
R6(config-if)#exit
R6(config)#interface f2/0
R6(config-if)#ip address 172.16.70.1 255.255.255.252
R6(config-if)#no shutdown
R6(config-if)#exit
R6(config)#end
R6#wr
Building configuration...
[OK]
R6#
*Mar  1 00:01:57.167: %SYS-5-CONFIG_I: Configured from console by console
*Mar  1 00:02:04.911: %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state t
o up
*Mar  1 00:02:04.911: %LINK-3-UPDOWN: Interface FastEthernet1/0, changed state t
o up
*Mar  1 00:02:04.911: %LINK-3-UPDOWN: Interface FastEthernet2/0, changed state t
o up
R6#
*Mar  1 00:02:05.915: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthern
et0/0, changed state to up
*Mar  1 00:02:05.919: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthern
et1/0, changed state to up
*Mar  1 00:02:05.919: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthern
et2/0, changed state to up
R6#

```

R7

```

enable
configure terminal
hostname R7
interface f0/0
ip address 172.16.40.2 255.255.255.252
no shutdown
exit
interface f1/0
ip address 172.16.60.1 255.255.255.0
no shutdown
exit
interface f2/0
ip address 172.16.70.2 255.255.255.252
no shutdown
exit
end
wr

```



```

R7#
R7#enable
R7#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
R7(config)#hostname R7
R7(config)#interface f0/0
R7(config-if)#ip address 172.16.40.2 255.255.255.252
R7(config-if)#no shutdown
R7(config-if)#exit
R7(config)#interface f1/0
R7(config-if)#ip address 172.16.60.1 255.255.255.0
R7(config-if)#no shutdown
R7(config-if)#exit
R7(config)#interface f2/0
R7(config-if)#ip address 172.16.70.2 255.255.255.252
R7(config-if)#no shutdown
R7(config-if)#exit
R7(config)#end
R7#wr
Building configuration...

*Mar  1 00:02:06.871: %SYS-5-CONFIG_I: Configured from console by console[OK]
R7#
*Mar  1 00:02:08.487: %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state to up
*Mar  1 00:02:08.691: %LINK-3-UPDOWN: Interface FastEthernet1/0, changed state to up
*Mar  1 00:02:08.903: %LINK-3-UPDOWN: Interface FastEthernet2/0, changed state to up
*Mar  1 00:02:09.507: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
*Mar  1 00:02:09.715: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet1/0, changed state to up
*Mar  1 00:02:09.919: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet2/0, changed state to up
R7#

```

R8

```

enable
configure terminal
hostname R8
interface f0/0
ip address 172.16.10.2 255.255.255.252
no shutdown
exit
interface f1/0
ip address 172.16.20.1 255.255.255.0
no shutdown
exit
end
wr

```

```
R8#
R8#enable
R8#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
R8(config)#hostname R8
R8(config)#interface f0/0
R8(config-if)#ip address 172.16.10.2 255.255.255.252
R8(config-if)#no shutdown
R8(config-if)#exit
R8(config)#interface f1/0
R8(config-if)#ip address 172.16.20.1 255.255.255.0
R8(config-if)#no shutdown
R8(config-if)#exit
R8(config)#end
R8#wr
Building configuration...

*Mar  1 00:02:14.563: %SYS-5-CONFIG_I: Configured from console by console
*Mar  1 00:02:15.779: %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state to up
*Mar  1 00:02:16.583: %LINK-3-UPDOWN: Interface FastEthernet1/0, changed state to up
*Mar  1 00:02:16.791: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up[OK]
R8#
*Mar  1 00:02:17.607: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet1/0, changed state to up
R8#
```

PC1

ip 192.168.40.10 255.255.255.0 192.168.40.1

```
PC1>
PC1> ip 192.168.40.10 255.255.255.0 192.168.40.1
Checking for duplicate address...
PC1 : 192.168.40.10 255.255.255.0 gateway 192.168.40.1
PC1>
```

PC2

ip 192.168.20.10 255.255.255.0 192.168.20.1

```
PC2> ip 192.168.20.10 255.255.255.0 192.168.20.1
Checking for duplicate address...
PC2 : 192.168.20.10 255.255.255.0 gateway 192.168.20.1
PC2>
```

PC3

ip 172.16.50.10 255.255.255.0 172.16.50.1

```
PC3>
PC3> ip 172.16.50.10 255.255.255.0 172.16.50.1
Checking for duplicate address...
PC3 : 172.16.50.10 255.255.255.0 gateway 172.16.50.1
PC3>
```

PC4

ip 172.16.60.10 255.255.255.0 172.16.60.1

```
PC4>
PC4> ip 172.16.60.10 255.255.255.0 172.16.60.1
Checking for duplicate address...
PC4 : 172.16.60.10 255.255.255.0 gateway 172.16.60.1
PC4>
```

PC5

ip 172.16.20.10 255.255.255.0 172.16.20.1

```
PC5>
PC5> ip 172.16.20.10 255.255.255.0 172.16.20.1
Checking for duplicate address...
PC5 : 172.16.20.10 255.255.255.0 gateway 172.16.20.1
PC5>
```

SW1

enable  
configure terminal  
hostname SW1  
exit  
write memory

```
vIOS-L2-01>
vIOS-L2-01>enable
vIOS-L2-01#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
vIOS-L2-01(config)#hostname SW1
SW1(config)#exit
SW1#write memory
*Dec 13 13:45:45.877: %SYS-5-CONFIG_I: Configured from console by console
SW1#write memory
```

2) Настроить протокол динамической маршрутизации RIP v2 для области, указанной на схеме schema-lab5.

Настроим это КОМАНДОЙ

R1

enable  
configure terminal  
router rip  
version 2  
network 192.168.10.0  
no auto-summary  
exit

end  
wr

```
R1#enable
R1#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#router rip
R1(config-router)#version 2
R1(config-router)#network 192.168.10.0
R1(config-router)#no auto-summary
R1(config-router)#exit
R1(config)#end
R1#wr
Building configuration...
[OK]
R1#
*Mar  1 00:14:52.147: %SYS-5-CONFIG_I: Configured from console by console
R1#
```

R4

enable  
configure terminal  
router rip  
version 2  
network 192.168.30.0  
network 192.168.40.0  
no auto-summary  
exit  
end  
wr

```
R4#enable
R4#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
R4(config)#router rip
R4(config-router)#version 2
R4(config-router)#network 192.168.30.0
R4(config-router)#network 192.168.40.0
R4(config-router)#no auto-summary
R4(config-router)#exit
R4(config)#end
R4#wr
Building configuration...

*Mar  1 00:13:09.959: %SYS-5-CONFIG_I: Configured from console by console[OK]
R4#
```

R5

enable  
configure terminal  
router rip  
version 2  
network 192.168.10.0  
network 192.168.20.0  
network 192.168.30.0

```
no auto-summary
exit
end
wr
```

```
R5#enable
R5#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
R5(config)#router rip
R5(config-router)#version 2
R5(config-router)#network 192.168.10.0
R5(config-router)#network 192.168.20.0
R5(config-router)#network 192.168.30.0
R5(config-router)#no auto-summary
R5(config-router)#exit
R5(config)#end
R5#wr
Building configuration...
[OK]
R5#
*Mar  1 00:13:14.999: %SYS-5-CONFIG_I: Configured from console by console
R5#
```

3) Настроить протокол динамической маршрутизации OSPF для зон 0, 1, 2. Зону 1 настроить как полностью (nb!) тупиковую.

Начнём с настройки OSPF в OSPF Area 0:  
КОМАНДЫ

R1

```
enable
configure terminal
router ospf 1
router-id 1.1.1.1
network 10.0.0.1 0.0.0.0 area 0
exit
end
wr
```

```
R1#enable
R1#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#router ospf 1
R1(config-router)#router-id 1.1.1.1
R1(config-router)#network 10.0.0.1 0.0.0.0 area 0
R1(config-router)#exit
R1(config)#end
R1#wr
Building configuration...
[OK]
R1#
*Mar  1 00:28:39.875: %SYS-5-CONFIG_I: Configured from console by console
R1#
```

R2

```
enable
configure terminal
```

```
router ospf 1
router-id 2.2.2.2
network 10.0.0.2 0.0.0.0 area 0
network 172.16.30.1 0.0.0.0 area 2
exit
end
wr
```

```
R2#enable
R2#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#router ospf 1
R2(config-router)#router-id 2.2.2.2
R2(config-router)#network 10.0.0.2 0.0.0.0 area 0
R2(config-router)#network 172.16.30.1 0.0.0.0 area 2
R2(config-router)#exit
R2(config)#end
R2#wr
Building configuration...

*Mar  1 00:27:42.299: %SYS-5-CONFIG_I: Configured from console by console[OK]
R2#
```

R3

```
enable
configure terminal
router ospf 1
router-id 3.3.3.3
network 10.0.0.3 0.0.0.0 area 0
network 172.16.10.1 0.0.0.0 area 1
network 172.16.40.1 0.0.0.0 area 2
exit
end
wr
```

```
R3#enable
R3#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#router ospf 1
R3(config-router)#router-id 3.3.3.3
R3(config-router)#network 10.0.0.3 0.0.0.0 area 0
R3(config-router)#network 172.16.10.1 0.0.0.0 area 1
R3(config-router)#network 172.16.40.1 0.0.0.0 area 2
R3(config-router)#exit
R3(config)#end
R3#wr
Building configuration...
[OK]
R3#
*Mar  1 00:27:50.919: %SYS-5-CONFIG_I: Configured from console by console
R3#
```

Продолжим настройкой OSPF Area 1, тупиковой нашей («area 1 stub no-summary» отвечает за тупиковость. Полную):

КОМАНДЫ

R3

```
enable
configure terminal
router ospf 1
area 1 stub no-summary
exit
end
wr
```

```
R3#enable
R3#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
R3(config)#router ospf 1
R3(config-router)#area 1 stub no-summary
R3(config-router)#exit
R3(config)#end
R3#wr
Building configuration...
[OK]
R3#
*Mar  1 00:36:05.095: %SYS-5-CONFIG_I: Configured from console by console
R3#
```

R8

```
enable
configure terminal
router ospf 1
router-id 8.8.8.8
network 172.16.10.2 0.0.0.0 area 1
network 172.16.20.1 0.0.0.0 area 1
area 1 stub
exit
end
write memory
```

```
R8#enable
R8#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
R8(config)#router ospf 1
R8(config-router)#router-id 8.8.8.8
R8(config-router)#network 172.16.10.2 0.0.0.0 area 1
R8(config-router)#network 172.16.20.1 0.0.0.0 area 1
R8(config-router)#area 1 stub
R8(config-router)#exit
R8(config)#end
R8#write memory
Building configuration...

*Mar  1 00:35:08.563: %SYS-5-CONFIG_I: Configured from console by console[OK]
R8#
```

Настал черёд OSPF Area 2:  
КОМАНДЫ

R6

```
enable
configure terminal
router ospf 1
router-id 6.6.6.6
network 172.16.30.2 0.0.0.0 area 2
network 172.16.50.1 0.0.0.0 area 2
network 172.16.70.1 0.0.0.0 area 2
exit
end
wr
```

```
R6#enable
R6#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
R6(config)#router ospf 1
R6(config-router)#router-id 6.6.6.6
R6(config-router)#network 172.16.30.2 0.0.0.0 area 2
R6(config-router)#network 172.16.50.1 0.0.0.0 area 2
R6(config-router)#network 172.16.70.1 0.0.0.0 area 2
R6(config-router)#exit
R6(config)#end
R6#wr
Building configuration...
[OK]
R6#
*Mar  1 00:39:13.207: %SYS-5-CONFIG_I: Configured from console by console
R6#
*Mar  1 00:39:21.755: %OSPF-5-ADJCHG: Process 1, Nbr 2.2.2.2 on FastEthernet0/0
from LOADING to FULL, Loading Done
R6#
```

R7

```
enable
configure terminal
router ospf 1
router-id 7.7.7.7
network 172.16.40.2 0.0.0.0 area 2
network 172.16.60.1 0.0.0.0 area 2
network 172.16.70.2 0.0.0.0 area 2
exit
end
wr
```



```

R7#enable
R7#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
R7(config)#router ospf 1
R7(config-router)#router-id 7.7.7.7
R7(config-router)#network 172.16.40.2 0.0.0.0 area 2
R7(config-router)#network 172.16.60.1 0.0.0.0 area 2
R7(config-router)#network 172.16.70.2 0.0.0.0 area 2
R7(config-router)#exit
R7(config)#end
R7#wr
Building configuration...

*Mar  1 00:39:35.495: %SYS-5-CONFIG_I: Configured from console by console[OK]
R7#
*Mar  1 00:39:50.383: %OSPF-5-ADJCHG: Process 1, Nbr 6.6.6.6 on FastEthernet2/0
from LOADING to FULL, Loading Done
*Mar  1 00:39:50.659: %OSPF-5-ADJCHG: Process 1, Nbr 3.3.3.3 on FastEthernet0/0
from LOADING to FULL, Loading Done
R7#

```

Настроили

4) Настроить редистрибуцию маршрутов между протоколами RIP v2 и OSPF.

Это делается на R1 КОМАНДАМИ:

```

enable
configure terminal
router ospf 1
redistribute rip subnets
exit
router rip
redistribute ospf 1 metric 5
exit
end
wr

```

```

R1#enable
R1#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
R1(config)#router ospf 1
R1(config-router)#redistribute rip subnets
R1(config-router)#exit
R1(config)#router rip
R1(config-router)#redistribute ospf 1 metric 5
R1(config-router)#exit
R1(config)#end
R1#wr
Building configuration...
[OK]
R1#
*Mar  1 00:47:23.827: %SYS-5-CONFIG_I: Configured from console by console
R1#

```

RIP -> OSPF: subnets сохраняет точные маски

OSPF -> RIP: metric 5 – 5 хопов для редистрибутированных маршрутов

5) Проверить работоспособность маршрутизации, выполнив ping VPC "все между всеми" (nb!: в обе стороны).

КОМАНДЫ:

PC1

~~ping 192.168.40.10~~

ping 192.168.20.10

ping 172.16.50.10

ping 172.16.60.10

ping 172.16.20.10

```
PC1> ping 192.168.20.10
```

```
192.168.20.10 icmp_seq=1 timeout
84 bytes from 192.168.20.10 icmp_seq=2 ttl=62 time=23.866 ms
84 bytes from 192.168.20.10 icmp_seq=3 ttl=62 time=28.136 ms
84 bytes from 192.168.20.10 icmp_seq=4 ttl=62 time=36.630 ms
84 bytes from 192.168.20.10 icmp_seq=5 ttl=62 time=36.896 ms
```

```
PC1> ping 172.16.50.10
```

```
172.16.50.10 icmp_seq=1 timeout
84 bytes from 172.16.50.10 icmp_seq=2 ttl=59 time=57.447 ms
84 bytes from 172.16.50.10 icmp_seq=3 ttl=59 time=68.303 ms
84 bytes from 172.16.50.10 icmp_seq=4 ttl=59 time=56.170 ms
84 bytes from 172.16.50.10 icmp_seq=5 ttl=59 time=57.619 ms
```

```
PC1> ping 172.16.60.10
```

```
172.16.60.10 icmp_seq=1 timeout
84 bytes from 172.16.60.10 icmp_seq=2 ttl=59 time=68.230 ms
84 bytes from 172.16.60.10 icmp_seq=3 ttl=59 time=58.946 ms
84 bytes from 172.16.60.10 icmp_seq=4 ttl=59 time=67.384 ms
84 bytes from 172.16.60.10 icmp_seq=5 ttl=59 time=56.834 ms
```

```
PC1> ping 172.16.20.10
```

```
172.16.20.10 icmp_seq=1 timeout
84 bytes from 172.16.20.10 icmp_seq=2 ttl=59 time=50.827 ms
84 bytes from 172.16.20.10 icmp_seq=3 ttl=59 time=58.097 ms
84 bytes from 172.16.20.10 icmp_seq=4 ttl=59 time=56.720 ms
84 bytes from 172.16.20.10 icmp_seq=5 ttl=59 time=57.961 ms
```

Доступны все

PC2

ping 192.168.40.10

~~ping 192.168.20.10~~

ping 172.16.50.10

ping 172.16.60.10

ping 172.16.20.10

```
PC2> ping 192.168.40.10

84 bytes from 192.168.40.10 icmp_seq=1 ttl=62 time=40.362 ms
84 bytes from 192.168.40.10 icmp_seq=2 ttl=62 time=26.024 ms
84 bytes from 192.168.40.10 icmp_seq=3 ttl=62 time=27.135 ms
84 bytes from 192.168.40.10 icmp_seq=4 ttl=62 time=27.625 ms
84 bytes from 192.168.40.10 icmp_seq=5 ttl=62 time=28.609 ms

PC2> ping 172.16.50.10

84 bytes from 172.16.50.10 icmp_seq=1 ttl=60 time=55.421 ms
84 bytes from 172.16.50.10 icmp_seq=2 ttl=60 time=47.243 ms
84 bytes from 172.16.50.10 icmp_seq=3 ttl=60 time=47.934 ms
84 bytes from 172.16.50.10 icmp_seq=4 ttl=60 time=46.927 ms
84 bytes from 172.16.50.10 icmp_seq=5 ttl=60 time=57.353 ms

PC2> ping 172.16.60.10

84 bytes from 172.16.60.10 icmp_seq=1 ttl=60 time=56.611 ms
84 bytes from 172.16.60.10 icmp_seq=2 ttl=60 time=46.580 ms
84 bytes from 172.16.60.10 icmp_seq=3 ttl=60 time=47.433 ms
84 bytes from 172.16.60.10 icmp_seq=4 ttl=60 time=47.499 ms
84 bytes from 172.16.60.10 icmp_seq=5 ttl=60 time=68.471 ms

PC2> ping 172.16.20.10

84 bytes from 172.16.20.10 icmp_seq=1 ttl=60 time=51.415 ms
84 bytes from 172.16.20.10 icmp_seq=2 ttl=60 time=57.962 ms
84 bytes from 172.16.20.10 icmp_seq=3 ttl=60 time=46.513 ms
84 bytes from 172.16.20.10 icmp_seq=4 ttl=60 time=57.182 ms
84 bytes from 172.16.20.10 icmp_seq=5 ttl=60 time=47.571 ms
```

Доступны все

PC3

ping 192.168.40.10

ping 192.168.20.10

~~ping 172.16.50.10~~

ping 172.16.60.10

ping 172.16.20.10

```
PC3> ping 192.168.40.10

84 bytes from 192.168.40.10 icmp_seq=1 ttl=59 time=57.001 ms
84 bytes from 192.168.40.10 icmp_seq=2 ttl=59 time=57.178 ms
84 bytes from 192.168.40.10 icmp_seq=3 ttl=59 time=57.819 ms
84 bytes from 192.168.40.10 icmp_seq=4 ttl=59 time=67.041 ms
84 bytes from 192.168.40.10 icmp_seq=5 ttl=59 time=55.901 ms

PC3> ping 192.168.20.10

84 bytes from 192.168.20.10 icmp_seq=1 ttl=60 time=43.684 ms
84 bytes from 192.168.20.10 icmp_seq=2 ttl=60 time=47.517 ms
84 bytes from 192.168.20.10 icmp_seq=3 ttl=60 time=46.561 ms
84 bytes from 192.168.20.10 icmp_seq=4 ttl=60 time=47.032 ms
84 bytes from 192.168.20.10 icmp_seq=5 ttl=60 time=48.202 ms

PC3> ping 172.16.60.10

84 bytes from 172.16.60.10 icmp_seq=1 ttl=62 time=21.524 ms
84 bytes from 172.16.60.10 icmp_seq=2 ttl=62 time=26.365 ms
84 bytes from 172.16.60.10 icmp_seq=3 ttl=62 time=29.470 ms
84 bytes from 172.16.60.10 icmp_seq=4 ttl=62 time=26.463 ms
84 bytes from 172.16.60.10 icmp_seq=5 ttl=62 time=27.445 ms

PC3> ping 172.16.20.10

84 bytes from 172.16.20.10 icmp_seq=1 ttl=60 time=59.803 ms
84 bytes from 172.16.20.10 icmp_seq=2 ttl=60 time=46.902 ms
84 bytes from 172.16.20.10 icmp_seq=3 ttl=60 time=47.379 ms
84 bytes from 172.16.20.10 icmp_seq=4 ttl=60 time=49.227 ms
84 bytes from 172.16.20.10 icmp_seq=5 ttl=60 time=48.428 ms
```

Доступны все

PC4

ping 192.168.40.10

ping 192.168.20.10

ping 172.16.50.10

~~ping 172.16.60.10~~

ping 172.16.20.10

```
PC4> ping 192.168.40.10

84 bytes from 192.168.40.10 icmp_seq=1 ttl=59 time=62.509 ms
84 bytes from 192.168.40.10 icmp_seq=2 ttl=59 time=56.844 ms
84 bytes from 192.168.40.10 icmp_seq=3 ttl=59 time=56.659 ms
84 bytes from 192.168.40.10 icmp_seq=4 ttl=59 time=56.826 ms
84 bytes from 192.168.40.10 icmp_seq=5 ttl=59 time=56.832 ms

PC4> ping 192.168.20.10

84 bytes from 192.168.20.10 icmp_seq=1 ttl=60 time=43.705 ms
84 bytes from 192.168.20.10 icmp_seq=2 ttl=60 time=46.699 ms
84 bytes from 192.168.20.10 icmp_seq=3 ttl=60 time=57.271 ms
84 bytes from 192.168.20.10 icmp_seq=4 ttl=60 time=48.200 ms
84 bytes from 192.168.20.10 icmp_seq=5 ttl=60 time=47.779 ms

PC4> ping 172.16.50.10

84 bytes from 172.16.50.10 icmp_seq=1 ttl=62 time=22.350 ms
84 bytes from 172.16.50.10 icmp_seq=2 ttl=62 time=27.157 ms
84 bytes from 172.16.50.10 icmp_seq=3 ttl=62 time=27.018 ms
84 bytes from 172.16.50.10 icmp_seq=4 ttl=62 time=36.132 ms
84 bytes from 172.16.50.10 icmp_seq=5 ttl=62 time=28.412 ms

PC4> ping 172.16.20.10

84 bytes from 172.16.20.10 icmp_seq=1 ttl=61 time=32.014 ms
84 bytes from 172.16.20.10 icmp_seq=2 ttl=61 time=38.502 ms
84 bytes from 172.16.20.10 icmp_seq=3 ttl=61 time=36.804 ms
84 bytes from 172.16.20.10 icmp_seq=4 ttl=61 time=38.610 ms
84 bytes from 172.16.20.10 icmp_seq=5 ttl=61 time=38.479 ms
```

Доступны все

PC5

ping 192.168.40.10

ping 192.168.20.10

ping 172.16.50.10

ping 172.16.60.10

~~ping 172.16.20.10~~

```

PC5> ping 192.168.40.10

84 bytes from 192.168.40.10 icmp_seq=1 ttl=59 time=70.193 ms
84 bytes from 192.168.40.10 icmp_seq=2 ttl=59 time=67.066 ms
84 bytes from 192.168.40.10 icmp_seq=3 ttl=59 time=58.003 ms
84 bytes from 192.168.40.10 icmp_seq=4 ttl=59 time=58.456 ms
84 bytes from 192.168.40.10 icmp_seq=5 ttl=59 time=56.441 ms

PC5> ping 192.168.20.10

84 bytes from 192.168.20.10 icmp_seq=1 ttl=60 time=42.228 ms
84 bytes from 192.168.20.10 icmp_seq=2 ttl=60 time=47.725 ms
84 bytes from 192.168.20.10 icmp_seq=3 ttl=60 time=47.182 ms
84 bytes from 192.168.20.10 icmp_seq=4 ttl=60 time=47.740 ms
84 bytes from 192.168.20.10 icmp_seq=5 ttl=60 time=46.965 ms

PC5> ping 172.16.50.10

84 bytes from 172.16.50.10 icmp_seq=1 ttl=60 time=45.092 ms
84 bytes from 172.16.50.10 icmp_seq=2 ttl=60 time=57.374 ms
84 bytes from 172.16.50.10 icmp_seq=3 ttl=60 time=57.662 ms
84 bytes from 172.16.50.10 icmp_seq=4 ttl=60 time=46.616 ms
84 bytes from 172.16.50.10 icmp_seq=5 ttl=60 time=41.657 ms

PC5> ping 172.16.60.10

84 bytes from 172.16.60.10 icmp_seq=1 ttl=61 time=44.497 ms
84 bytes from 172.16.60.10 icmp_seq=2 ttl=61 time=37.232 ms
84 bytes from 172.16.60.10 icmp_seq=3 ttl=61 time=37.325 ms
84 bytes from 172.16.60.10 icmp_seq=4 ttl=61 time=37.214 ms
84 bytes from 172.16.60.10 icmp_seq=5 ttl=61 time=36.462 ms

```

Все доступны... Хотя он тупиковый... Либо я что-то сделал не так, либо что-то не понял, либо оба.

6) Перехватить в wireshark сообщения протоколов RIP v2 и OSPF, идентифицировать их тип и содержание.

Захватим линк R1->R5

No.	Time	Source	Destination	Protocol	Length	Info
8	20.811811	cc:05:42:8e:00:20	cc:05:42:8e:00:20	LOOP	60	Reply
9	25.439192	cc:01:42:16:00:00	cc:01:42:16:00:00	LOOP	60	Reply
10	31.175626	cc:05:42:8e:00:20	cc:05:42:8e:00:20	LOOP	60	Reply
11	35.361878	cc:05:42:8e:00:20	CDP/VTP/DTP/PagP/JUD...	CDP	338	Device ID: R5 Port ID: FastEthernet2/0
12	35.436778	cc:01:42:16:00:00	cc:01:42:16:00:00	LOOP	60	Reply
13	41.398319	192.168.10.1	224.0.0.9	RIPv2	206	Response
14	41.456303	cc:05:42:8e:00:20	cc:05:42:8e:00:20	LOOP	60	Reply
15	44.852587	192.168.10.2	224.0.0.9	RIPv2	106	Response
16	45.433562	cc:01:42:16:00:00	cc:01:42:16:00:00	LOOP	60	Reply
17	51.826132	cc:05:42:8e:00:20	cc:05:42:8e:00:20	LOOP	60	Reply
18	55.436728	cc:01:42:16:00:00	cc:01:42:16:00:00	LOOP	60	Reply
19	62.276352	cc:05:42:8e:00:20	cc:05:42:8e:00:20	LOOP	60	Reply
20	65.446251	cc:01:42:16:00:00	cc:01:42:16:00:00	LOOP	60	Reply
21	71.371682	192.168.10.1	224.0.0.9	RIPv2	206	Response
22	72.622447	192.168.10.2	224.0.0.9	RIPv2	106	Response
23	72.692853	cc:05:42:8e:00:20	cc:05:42:8e:00:20	LOOP	60	Reply
24	75.436701	cc:01:42:16:00:00	cc:01:42:16:00:00	LOOP	60	Reply
25	78.761893	cc:01:42:16:00:00	CDP/VTP/DTP/PagP/JUD...	CDP	338	Device ID: R1 Port ID: FastEthernet0/0
26	83.058363	cc:05:42:8e:00:20	cc:05:42:8e:00:20	LOOP	60	Reply
27	85.432618	cc:01:42:16:00:00	cc:01:42:16:00:00	LOOP	60	Reply
28	93.369598	cc:05:42:8e:00:20	cc:05:42:8e:00:20	LOOP	60	Reply
29	95.441600	cc:01:42:16:00:00	cc:01:42:16:00:00	LOOP	60	Reply
30	95.606523	cc:05:42:8e:00:20	CDP/VTP/DTP/PagP/JUD...	CDP	338	Device ID: R5 Port ID: FastEthernet2/0
31	98.553704	192.168.10.1	224.0.0.9	RIPv2	206	Response
32	99.315347	192.168.10.2	224.0.0.9	RIPv2	106	Response

> Frame 13: Packet, 206 bytes on wire (1648 bits), 206 bytes captured (1648 bits) on interface -, id 0	0000 01 00 5e 00 00 09 cc 01 42 16 00 00 08 00 45 c0 ..A.....B.....E..
> Ethernet II, Src: cc:01:42:16:00:00 (cc:01:42:16:00:00), Dst: [Pv4mcast_09 (01:00:5e:00:00:09)]	0010 00 c0 00 00 00 00 02 11 0c 1b c0 a8 0a 01 e0 00 .....{.....
> Internet Protocol Version 4, Src: 192.168.10.1, Dst: 224.0.0.9	0020 00 09 02 08 02 08 00 ac 7b 2b 02 02 00 00 00 02 .....{.....
> 0100 .... = Version: 4	0030 00 00 0a 00 00 00 ff ff ff 00 00 00 00 00 00 .....{.....
> .... 0101 = Header Length: 20 bytes (5)	0040 00 05 00 02 00 00 ac 10 0a 00 ff ff ff fc 00 00 .....{.....
> Differentiated Services Field: 0xc0 (DSCP: CS6, ECN: Not-ECT)	0050 00 00 00 00 00 05 02 00 00 ac 10 14 00 ff ff .....{.....
> Total Length: 192	0060 ff 00 00 00 00 00 00 00 05 00 02 00 00 ac 10 .....{.....
> Identification: 0x0000 (0)	0070 1e 00 ff ff ff fc 00 00 00 00 00 00 05 00 02 .....{.....
> 000. .... = Flags: 0x0	0080 00 00 ac 10 20 00 ff ff ff fc 00 00 00 00 00 .....{.....
> ...0 0000 0000 0000 = Fragment Offset: 0	0090 00 05 00 02 00 00 ac 10 32 00 ff ff ff 00 00 .....{.....
> Time to Live: 2	00a0 00 00 00 00 00 05 00 02 00 00 ac 10 3c 00 ff ff .....{.....
> Protocol: UDP (17)	00b0 ff 00 00 00 00 00 00 00 05 00 02 00 00 ac 10 .....{.....
> Header Checksum: 0xbcb (validation disabled)	00c0 46 00 ff ff ff fc 00 00 00 00 00 00 05 .....F.....
> [Header checksum status: Unverified]	
> Source Address: 192.168.10.1	
> Destination Address: 224.0.0.9	
> [Stream Index: 0]	
> User Datagram Protocol, Src Port: 520, Dst Port: 520	
> Routing Information Protocol	

Наблюдаем, что пакеты RIPv2 отправляются на 224.0.0.9 с заголовком Response.

Сохранил