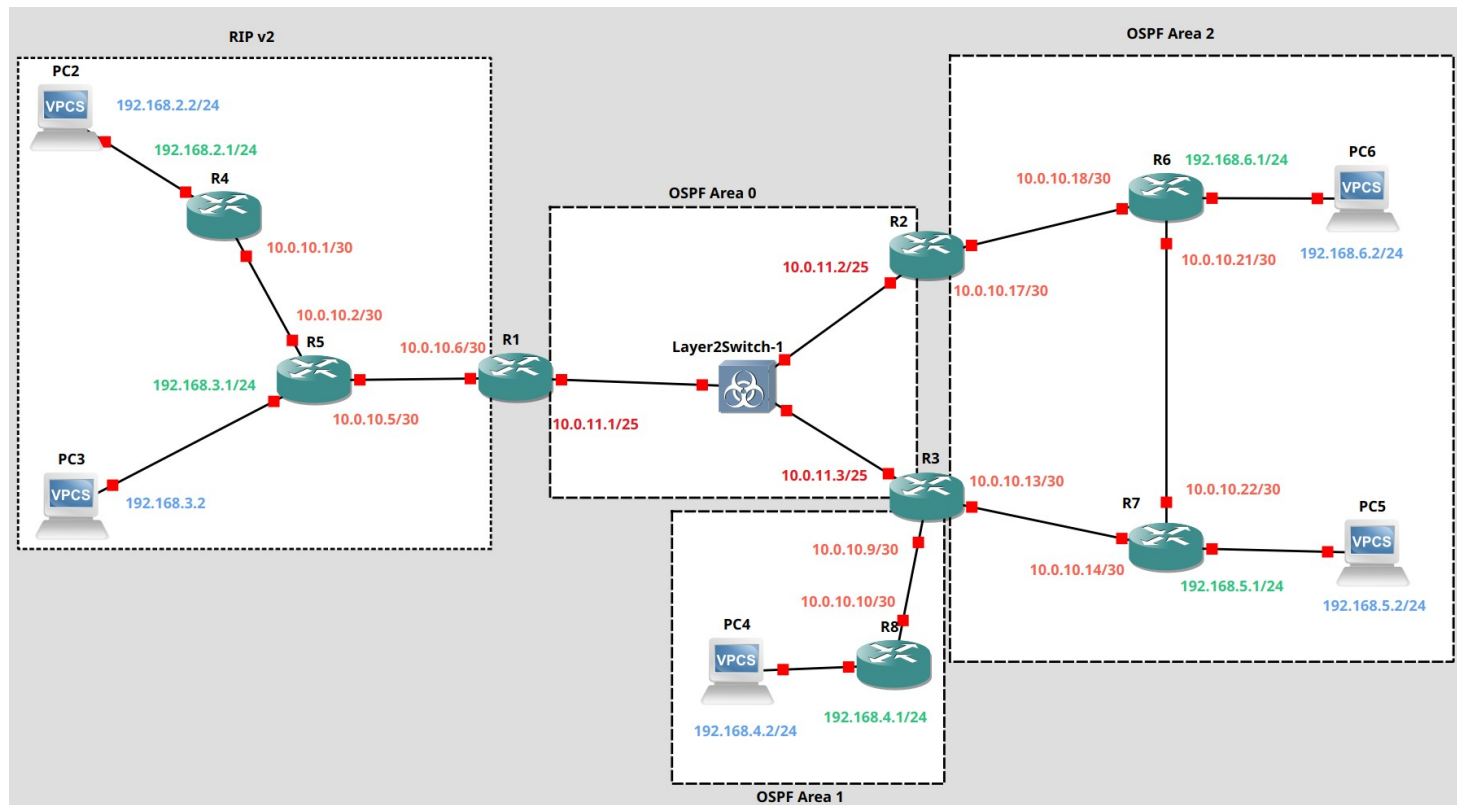


1. Для заданной на схеме schema-lab5 сети, состоящей из управляемых коммутаторов, маршрутизаторов и персональных компьютеров выполнить планирование и документирование адресного пространства и назначить статические адреса всем устройствам. **nb!** Каждое соединение маршрутизатора с маршрутизатором - это отдельная сеть.

Карта сети:



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

#### R4

```
interface FastEthernet0/0
```

```
ip address 192.168.2.1 255.255.255.0
```

```
interface FastEthernet1/0
```

```
ip address 10.0.10.1 255.255.255.252
```

```
router rip
```

```
version 2
```

```
network 10.0.0.0
```

```
network 192.168.2.0
```

```
no auto-summary
```

#### R5

```
interface FastEthernet0/0
```

```
ip address 192.168.3.1 255.255.255.0
```

```
interface FastEthernet1/0  
ip address 10.0.10.2 255.255.255.252
```

```
interface FastEthernet2/0  
ip address 10.0.10.5 255.255.255.252
```

```
router rip  
version 2  
network 10.0.0.0  
network 192.168.3.0  
no auto-summary
```

### **R1**

```
interface FastEthernet0/0  
ip address 10.0.10.6 255.255.255.252
```

```
interface FastEthernet1/0  
ip address 10.0.11.1 255.255.255.128
```

```
router rip  
version 2  
network 10.0.0.0  
no auto-summary
```

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

### **R1**

```
router ospf 1  
network 10.0.11.0 0.0.0.127 area 0
```

### **R3**

```
interface FastEthernet0/0  
ip address 10.0.11.3 255.255.255.128
```

```
interface FastEthernet1/0  
ip address 10.0.10.13 255.255.255.252
```

```
interface FastEthernet2/0
ip address 10.0.10.9 255.255.255.252
```

```
router ospf 1
area 1 stub
network 10.0.10.8 0.0.0.3 area 1
network 10.0.10.12 0.0.0.3 area 2
network 10.0.11.0 0.0.0.127 area 0
```

## **R2**

```
interface FastEthernet0/0
ip address 10.0.11.2 255.255.255.128

interface FastEthernet1/0
ip address 10.0.10.17 255.255.255.252
```

```
router ospf 1
network 10.0.10.16 0.0.0.3 area 2
network 10.0.11.0 0.0.0.127 area 0
```

## **R6**

```
interface FastEthernet0/0
ip address 10.0.10.18 255.255.255.252

interface FastEthernet1/0
ip address 192.168.6.1 255.255.255.0
```

```
interface FastEthernet2/0
ip address 10.0.10.21 255.255.255.252
```

```
router ospf 1
network 10.0.10.16 0.0.0.3 area 2
network 10.0.10.20 0.0.0.3 area 2
network 192.168.6.0 0.0.0.255 area 2
```

## **R7**

```
interface FastEthernet0/0
ip address 10.0.10.14 255.255.255.252

interface FastEthernet1/0
ip address 192.168.5.1 255.255.255.0
```

```
interface FastEthernet2/0
ip address 10.0.10.22 255.255.255.252
```

```
router ospf 1
network 10.0.10.12 0.0.0.3 area 2
network 10.0.10.20 0.0.0.3 area 2
network 192.168.5.0 0.0.0.255 area 2
```

## **R8**

```
interface FastEthernet0/0
ip address 10.0.10.10 255.255.255.252
```

```
interface FastEthernet1/0
ip address 192.168.4.1 255.255.255.0
```

```
router ospf 1
area 1 stub
network 10.0.10.8 0.0.0.3 area 1
network 192.168.4.0 0.0.0.255 area 1
```

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

На маршрутизаторе R1:

```
router rip
redistribute ospf 1 metric 3
```

```
router ospf 1
redistribute rip subnets metric 5 metric-type 2
```

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

```
PC2
```

PC2 x PC3 x PC4 x PC5 x PC6 x

Escape character is '^['.

PC2> ping 192.168.3.2

84 bytes from 192.168.3.2 icmp\_seq=1 ttl=62 time=22.387 ms  
84 bytes from 192.168.3.2 icmp\_seq=2 ttl=62 time=25.349 ms  
84 bytes from 192.168.3.2 icmp\_seq=3 ttl=62 time=26.231 ms  
^C  
PC2>

PC2> ping 192.168.4.2

192.168.4.2 icmp\_seq=1 timeout  
84 bytes from 192.168.4.2 icmp\_seq=2 ttl=59 time=50.784 ms  
84 bytes from 192.168.4.2 icmp\_seq=3 ttl=59 time=56.293 ms  
84 bytes from 192.168.4.2 icmp\_seq=4 ttl=59 time=55.290 ms  
^C  
PC2>

PC2> ping 192.168.5.2

192.168.5.2 icmp\_seq=1 timeout  
84 bytes from 192.168.5.2 icmp\_seq=2 ttl=59 time=55.997 ms  
84 bytes from 192.168.5.2 icmp\_seq=3 ttl=59 time=56.163 ms  
^C  
PC2>

PC2> ping 192.168.6.2

192.168.6.2 icmp\_seq=1 timeout  
84 bytes from 192.168.6.2 icmp\_seq=2 ttl=59 time=59.963 ms  
84 bytes from 192.168.6.2 icmp\_seq=3 ttl=59 time=55.552 ms  
^C  
PC2>

```
PC3

Checking for duplicate address...
PC3 : 192.168.3.2 255.255.255.0 gateway 192.168.3.1

PC3> ping 192.168.2.2

84 bytes from 192.168.2.2 icmp_seq=1 ttl=62 time=39.994 ms
84 bytes from 192.168.2.2 icmp_seq=2 ttl=62 time=25.878 ms
84 bytes from 192.168.2.2 icmp_seq=3 ttl=62 time=25.569 ms
^C
PC3> ping 192.168.4.2

84 bytes from 192.168.4.2 icmp_seq=1 ttl=60 time=44.140 ms
84 bytes from 192.168.4.2 icmp_seq=2 ttl=60 time=46.029 ms
84 bytes from 192.168.4.2 icmp_seq=3 ttl=60 time=45.727 ms
^C
PC3> ping 192.168.5.2

84 bytes from 192.168.5.2 icmp_seq=1 ttl=60 time=47.431 ms
84 bytes from 192.168.5.2 icmp_seq=2 ttl=60 time=45.995 ms
84 bytes from 192.168.5.2 icmp_seq=3 ttl=60 time=45.845 ms
^C
PC3> ping 192.168.6.2

84 bytes from 192.168.6.2 icmp_seq=1 ttl=60 time=44.264 ms
84 bytes from 192.168.6.2 icmp_seq=2 ttl=60 time=45.898 ms
84 bytes from 192.168.6.2 icmp_seq=3 ttl=60 time=45.467 ms
^C
PC3>
```

```
PC4

Checking for duplicate address...
PC4 : 192.168.4.2 255.255.255.0 gateway 192.168.4.1

PC4> ping 192.168.2.2

84 bytes from 192.168.2.2 icmp_seq=1 ttl=59 time=59.330 ms
84 bytes from 192.168.2.2 icmp_seq=2 ttl=59 time=56.236 ms
84 bytes from 192.168.2.2 icmp_seq=3 ttl=59 time=55.343 ms
^C
PC4> ping 192.168.3.2

84 bytes from 192.168.3.2 icmp_seq=1 ttl=60 time=49.940 ms
84 bytes from 192.168.3.2 icmp_seq=2 ttl=60 time=45.641 ms
84 bytes from 192.168.3.2 icmp_seq=3 ttl=60 time=45.116 ms
^C
PC4> ping 192.168.5.2

84 bytes from 192.168.5.2 icmp_seq=1 ttl=61 time=32.892 ms
84 bytes from 192.168.5.2 icmp_seq=2 ttl=61 time=35.226 ms
84 bytes from 192.168.5.2 icmp_seq=3 ttl=61 time=35.555 ms
^C
PC4> ping 192.168.6.2

84 bytes from 192.168.6.2 icmp_seq=1 ttl=60 time=49.695 ms
84 bytes from 192.168.6.2 icmp_seq=2 ttl=60 time=46.030 ms
84 bytes from 192.168.6.2 icmp_seq=3 ttl=60 time=55.537 ms
^C
PC4> [2~
```

```
PC5

Checking for duplicate address...
PC5 : 192.168.5.2 255.255.255.0 gateway 192.168.5.1

PC5> ping 192.168.2.2

84 bytes from 192.168.2.2 icmp_seq=1 ttl=59 time=59.971 ms
84 bytes from 192.168.2.2 icmp_seq=2 ttl=59 time=66.138 ms
84 bytes from 192.168.2.2 icmp_seq=3 ttl=59 time=55.498 ms
^C
PC5> ping 192.168.3.2

84 bytes from 192.168.3.2 icmp_seq=1 ttl=60 time=47.942 ms
84 bytes from 192.168.3.2 icmp_seq=2 ttl=60 time=45.396 ms
84 bytes from 192.168.3.2 icmp_seq=3 ttl=60 time=46.065 ms
^C
PC5> ping 192.168.4.2

84 bytes from 192.168.4.2 icmp_seq=1 ttl=61 time=54.435 ms
84 bytes from 192.168.4.2 icmp_seq=2 ttl=61 time=35.782 ms
84 bytes from 192.168.4.2 icmp_seq=3 ttl=61 time=46.236 ms
^C
PC5> ping 192.168.6.2

84 bytes from 192.168.6.2 icmp_seq=1 ttl=62 time=31.335 ms
84 bytes from 192.168.6.2 icmp_seq=2 ttl=62 time=25.851 ms
84 bytes from 192.168.6.2 icmp_seq=3 ttl=62 time=25.283 ms
^C
PC5> [2~
```



```
PC6

Checking for duplicate address...
PC6 : 192.168.6.2 255.255.255.0 gateway 192.168.6.1

PC6> ping 192.168.2.2

84 bytes from 192.168.2.2 icmp_seq=1 ttl=59 time=61.664 ms
84 bytes from 192.168.2.2 icmp_seq=2 ttl=59 time=55.548 ms
84 bytes from 192.168.2.2 icmp_seq=3 ttl=59 time=55.610 ms
^C
PC6> ping 192.168.3.2

84 bytes from 192.168.3.2 icmp_seq=1 ttl=60 time=59.942 ms
84 bytes from 192.168.3.2 icmp_seq=2 ttl=60 time=46.002 ms
84 bytes from 192.168.3.2 icmp_seq=3 ttl=60 time=46.002 ms
^C
PC6> ping 192.168.4.2

84 bytes from 192.168.4.2 icmp_seq=1 ttl=60 time=57.714 ms
84 bytes from 192.168.4.2 icmp_seq=2 ttl=60 time=45.621 ms
84 bytes from 192.168.4.2 icmp_seq=3 ttl=60 time=45.495 ms
^C
PC6> ping 192.168.5.2

84 bytes from 192.168.5.2 icmp_seq=1 ttl=62 time=23.835 ms
84 bytes from 192.168.5.2 icmp_seq=2 ttl=62 time=25.593 ms
84 bytes from 192.168.5.2 icmp_seq=3 ttl=62 time=35.425 ms
^C
PC6> 
```

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

Сообщение Rip:

Тип сообщения : Response (2)

Отправляется на multicast адрес 224.0.0.9

Содержит список маршрутов того маршрутизатора который отправил сообщение (В данном случае R5).

Сообщение OSPF:

335 290.029367	10.0.11.2	224.0.0.5	OSPF	98 Hello Packet
344 299.994730	10.0.11.3	224.0.0.5	OSPF	98 Hello Packet
345 300.001623	10.0.11.1	224.0.0.5	OSPF	98 Hello Packet
347 300.039288	10.0.11.2	224.0.0.5	OSPF	98 Hello Packet
355 309.986132	10.0.11.3	224.0.0.5	OSPF	98 Hello Packet
357 310.020459	10.0.11.2	224.0.0.5	OSPF	98 Hello Packet
358 310.026331	10.0.11.1	224.0.0.5	OSPF	98 Hello Packet
367 319.987193	10.0.11.3	224.0.0.5	OSPF	98 Hello Packet
369 320.020806	10.0.11.2	224.0.0.5	OSPF	98 Hello Packet
370 320.027016	10.0.11.1	224.0.0.5	OSPF	98 Hello Packet
378 329.988120	10.0.11.3	224.0.0.5	OSPF	98 Hello Packet
380 330.021560	10.0.11.2	224.0.0.5	OSPF	98 Hello Packet
381 330.028326	10.0.11.1	224.0.0.5	OSPF	98 Hello Packet
388 339.989570	10.0.11.1	224.0.0.5	OSPF	98 Hello Packet
Frame 367: 98 bytes on wire (784 bits), 98 byte captured on interface (784 bits) capture filter "eth0" (0 bytes dropped)				
Ethernet II, Src: cc:03:46:77:00:00 (cc:03:46:77:00:00), Dst: 01:00:5e:00:00:05 (01:00:5e:00:00:05), Protocol: OSPF (0x05)				
Internet Protocol Version 4, Src: 10.0.11.3, Destination: 224.0.0.5				
Open Shortest Path First				
OSPF Header				
Version: 2				
Message Type: Hello Packet (1)				
Packet Length: 52				
Source OSPF Router: 10.0.11.3				
Area ID: 0.0.0.0 (Backbone)				
Checksum: 0x830b [correct]				
Auth Type: Null (0)				
Auth Data (none): 0000000000000000				
OSPF Hello Packet				
Network Mask: 255.255.255.128				
Hello Interval [sec]: 10				
Options: 0x12, (L) LLS Data block, (E) External route advertisement				
Router Priority: 1				
Router Dead Interval [sec]: 40				
Designated Router: 10.0.11.3				
Backup Designated Router: 10.0.11.2				
Active Neighbor: 10.0.11.1				
Active Neighbor: 10.0.11.2				
OSPF LLS Data Block				
22 157.678136	10.0.10.2	224.0.0.9	RIPv2	246 Response
27 206.840589	10.0.10.1	224.0.0.9	RIPv2	66 Response
30 221.294924	10.0.10.2	224.0.0.9	RIPv2	246 Response
Frame 22: 246 bytes on wire (1968 bits), 246 bytes captured on interface (1968 bits) capture filter "eth0" (0 bytes dropped)				
Ethernet II, Src: cc:05:46:b3:00:10 (cc:05:46:b3:00:10), Dst: 01:00:5e:00:00:09 (01:00:5e:00:00:09), Protocol: Internet Protocol Version 4 (0x04)				
Internet Protocol Version 4, Src: 10.0.10.2, Destination: 224.0.0.9				
User Datagram Protocol, Src Port: 520, Dst Port: 520				
Routing Information Protocol				
Command: Response (2)				
Version: RIPv2 (2)				
IP Address: 10.0.10.4, Metric: 1				
IP Address: 10.0.10.8, Metric: 4				
IP Address: 10.0.10.12, Metric: 4				
IP Address: 10.0.10.16, Metric: 4				
IP Address: 10.0.10.20, Metric: 4				
IP Address: 10.0.11.0, Metric: 2				
IP Address: 192.168.3.0, Metric: 1				
IP Address: 192.168.4.0, Metric: 4				
IP Address: 192.168.5.0, Metric: 4				
IP Address: 192.168.6.0, Metric: 4				

Тип сообщения: Hello пакет

Отправляются на mulicast адрес 224.0.0.5

Area ID : 0 - Идентификатор области

Hello Interval — интервал рассылки hello пакетов

Router Dead Interval [sec]: 40 — Сосед будет считаться "мертвым", если его Hello не придут в течение 40 сек