

Тема: Настройка протоколов динамической маршрутизации RIP v2 и OSPF

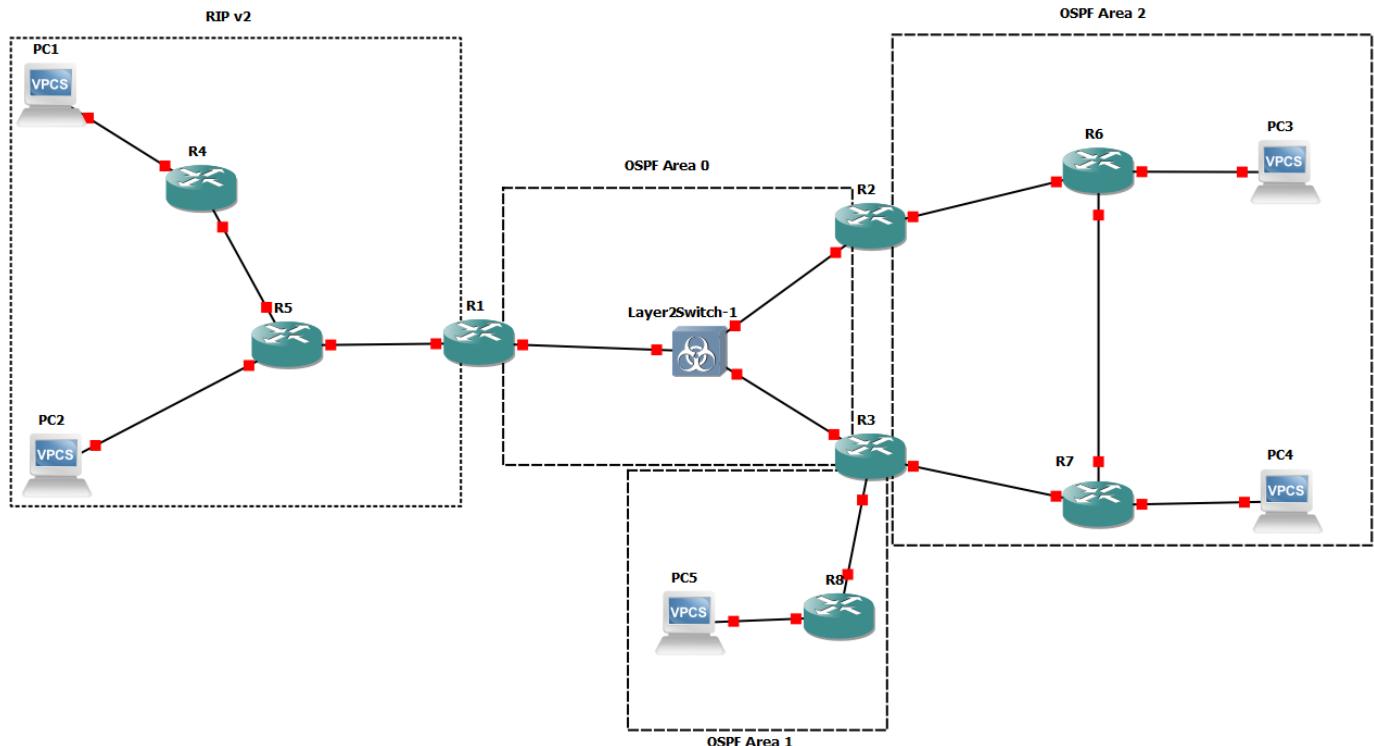
Все команды для настройки вклюаются в отчет в текстовом виде, не скриншоты.

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:

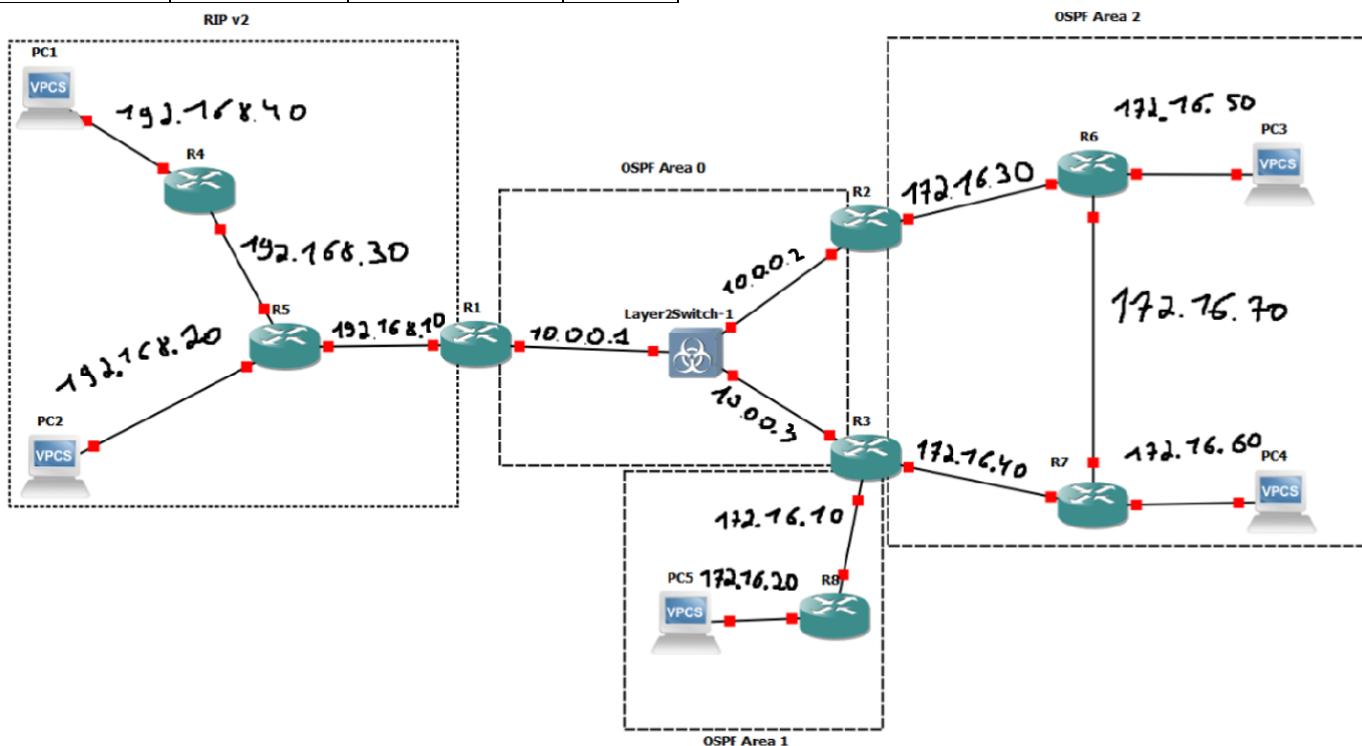
Каждое соединение маршрутизатор-маршрутизатор – это отдельная /30 подсеть

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 to up
*Mar  1 00:00:18.727: %LINK-3-UPDOWN: Interface FastEthernet1/0, changed state to up
R1#
*Mar  1 00:00:19.735: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
*Mar  1 00:00:19.735: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet1/0, 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 to up
*Mar 1 00:01:08.143: %LINK-3-UPDOWN: Interface FastEthernet1/0, changed state to up[OK]
R2#
*Mar 1 00:01:08.955: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
*Mar 1 00:01:09.155: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet1/0, 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 to  
o up  
*Mar 1 00:01:21.527: %LINK-3-UPDOWN: Interface FastEthernet1/0, changed state to  
o up  
*Mar 1 00:01:21.735: %LINK-3-UPDOWN: Interface FastEthernet2/0, changed state to  
o up[OK]  
R3#  
*Mar 1 00:01:22.347: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up  
*Mar 1 00:01:22.559: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet1/0, changed state to up  
*Mar 1 00:01:22.763: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet2/0, 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 to  
o up  
*Mar 1 00:01:37.103: %LINK-3-UPDOWN: Interface FastEthernet1/0, changed state to  
o up  
*Mar 1 00:01:37.307: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0,  
changed state to up[OK]  
R4#  
*Mar 1 00:01:38.139: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet1/0,  
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 to up  
*Mar 1 00:01:48.143: %LINK-3-UPDOWN: Interface FastEthernet1/0, changed state to up  
*Mar 1 00:01:48.347: %LINK-3-UPDOWN: Interface FastEthernet2/0, changed state to up  
*Mar 1 00:01:48.551: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up  
*Mar 1 00:01:49.159: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet1/0, changed state to up  
R5#  
*Mar 1 00:01:49.363: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet2/0, 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 to up
*Mar 1 00:02:04.911: %LINK-3-UPDOWN: Interface FastEthernet1/0, changed state to up
*Mar 1 00:02:04.911: %LINK-3-UPDOWN: Interface FastEthernet2/0, changed state to up
R6#
*Mar 1 00:02:05.915: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
*Mar 1 00:02:05.919: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet1/0, changed state to up
*Mar 1 00:02:05.919: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet2/0, 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	60 Reply
9	25.439192	cc:01:42:16:00:00	cc:01:42:16:00:00	LOOP	60	60 Reply
10	31.175626	cc:05:42:8e:00:20	cc:05:42:8e:00:20	LOOP	60	60 Reply
11	33.361878	cc:05:42:8e:00:20	CDP/FTP/DTP/PAgP/UDL_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	60 Reply
13	41.399319	192.168.10.1	224.0.0.9	RIPv2	206	206 Response
14	41.456383	cc:05:42:8e:00:20	cc:05:42:8e:00:20	LOOP	60	60 Reply
15	44.302587	192.168.10.2	224.0.0.9	RIPv2	106	106 Response
16	44.332623	cc:05:42:8e:00:20	cc:05:42:8e:00:20	LOOP	60	60 Reply
17	51.826132	cc:05:42:8e:00:20	cc:05:42:8e:00:20	LOOP	60	60 Reply
18	55.436728	cc:01:42:16:00:00	cc:01:42:16:00:00	LOOP	60	60 Reply
19	62.276352	cc:05:42:8e:00:20	cc:05:42:8e:00:20	LOOP	60	60 Reply
20	65.446251	cc:01:42:16:00:00	cc:01:42:16:00:00	LOOP	60	60 Reply
21	71.371682	192.168.10.1	224.0.0.9	RIPv2	206	206 Response
22	72.622447	192.168.10.2	224.0.0.9	RIPv2	106	106 Response
23	72.692853	cc:05:42:8e:00:20	cc:05:42:8e:00:20	LOOP	60	60 Reply
24	75.436708	cc:01:42:16:00:00	cc:01:42:16:00:00	LOOP	60	60 Reply
25	78.761893	cc:05:42:16:00:00	CDP/FTP/DTP/PAgP/UDL_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	60 Reply
27	85.308168	cc:05:42:8e:00:20	cc:05:42:8e:00:20	LOOP	60	60 Reply
28	86.306968	cc:05:42:8e:00:20	cc:05:42:8e:00:20	LOOP	60	60 Reply
29	99.441600	cc:01:42:16:00:00	cc:01:42:16:00:00	LOOP	60	60 Reply
30	95.606523	cc:05:42:8e:00:20	cc:05:42:8e:00:20	CDP/FTP/DTP/PAgP/UDL_CDP	338	Device ID: R5 Port ID: FastEthernet2/0
31	98.553704	192.168.10.1	224.0.0.9	RIPv2	206	206 Response
32	99.315347	192.168.10.2	224.0.0.9	RIPv2	106	106 Response

```

Frame 13: 206 bytes on wire (1648 bits), 206 bytes captured (1648 bits) on interface -, id 0
> Ethernet II Src: 01:42:16:00:00 (cc:01:42:16:00:00), Dst: IPv4mcast_09 (01:00:5e:00:00:09)
> Internet Protocol Version 4, Src: 192.168.10.1, Dst: 224.0.0.9
    0100 ... = Version: 4
    0101 ... = Header Length: 20 bytes (5)
    > Differentiated Services Field: 0x0 (DSCP: CS6, ECN: Not-ECT)
    Total Length: 192
    Identification: 0x0000 (0)
    > 000... = Flags: 0x0
    ...0 0000 0000 0000 = Fragment Offset: 0
    > Time to Live: 2
    Protocol: UDP (17)
    Header Checksum: 0xb0bb [validation disabled]
    [Header checksum status: Unverified]
    Source IP 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.

No.	Time	Source	Destination	Protocol	Length	Info

На линке R1->R5 пакетов ospf нет

Захватим на линке R2->R6

No.	Time	Source	Destination	Protocol	Length	Info
2	0.014291	172.16.30.2	224.0.0.5	OSPF	94	Hello Packet
3	1.500465	172.16.30.1	224.0.0.5	OSPF	94	Hello Packet
6	10.035465	172.16.30.2	224.0.0.5	OSPF	94	Hello Packet
7	11.510899	172.16.30.1	224.0.0.5	OSPF	94	Hello Packet
10	20.015813	172.16.30.2	224.0.0.5	OSPF	94	Hello Packet
11	21.488912	172.16.30.1	224.0.0.5	OSPF	94	Hello Packet
15	30.012758	172.16.30.2	224.0.0.5	OSPF	94	Hello Packet
16	31.492737	172.16.30.1	224.0.0.5	OSPF	94	Hello Packet
19	40.029443	172.16.30.2	224.0.0.5	OSPF	94	Hello Packet
20	41.506365	172.16.30.1	224.0.0.5	OSPF	94	Hello Packet
23	47.593282	172.16.30.1	224.0.0.5	OSPF	90	LS Update
25	50.015371	172.16.30.2	224.0.0.5	OSPF	94	Hello Packet
26	50.095860	172.16.30.2	224.0.0.5	OSPF	78	LS Acknowledge
27	51.502717	172.16.30.1	224.0.0.5	OSPF	94	Hello Packet
30	60.014587	172.16.30.2	224.0.0.5	OSPF	94	Hello Packet
31	61.510766	172.16.30.1	224.0.0.5	OSPF	94	Hello Packet
34	70.014191	172.16.30.2	224.0.0.5	OSPF	94	Hello Packet
35	71.506740	172.16.30.1	224.0.0.5	OSPF	94	Hello Packet
38	80.015735	172.16.30.2	224.0.0.5	OSPF	94	Hello Packet
39	81.491622	172.16.30.1	224.0.0.5	OSPF	94	Hello Packet
41	85.000320	172.16.30.2	224.0.0.5	OSPF	90	LS Update

```

> Frame 23: Packet, 90 bytes on wire (720 bits), 90 bytes captured (720 bits) on interface -
> Ethernet II, Src: cc:02:42:34:00:10 (cc:02:42:34:00:10), Dst: IPv4mcast_05 (01:00:5e:00:00:05)
> Internet Protocol Version 4, Src: 172.16.30.1, Dst: 224.0.0.5
> Open Shortest Path First

```

No.	Time	Source	Destination	Protocol	Length	Info
0000	01:00:5e:00:00:05	cc:02:42:34:00:10	0c:4c:ac:10:0e:00	Ethernet II	84	E
0010	00:4c:02:37:00:00	01:59	0c:4c:ac:10:0e:00	Internet Protocol Version 4	8	L-7-Y-L-----
0020	00:05:02:04:00:38	02:02	02:02:00:00:00:28	Open Shortest Path First	288.....(
0030	00:00:00:00:00:00	00:00	00:00:00:00:00:01
0040	22:03:ac:10:14:00	02:02	02:02:80:00:00:02	59	".....
0050	00:1c:ff:ff:00:00	00:03	00:00:00:00:00:00Y

Видим пакеты по 224.0.0.5, бывают частые hello, бывают пореже LS Update и LS Acknowledge.

No.	Time	Source	Destination	Protocol	Length	Info

RIPv2 пакеты не ловим в OSPF Area. Что логично.

7) Сохранить в отдельные файлы с префиксом `rt_` и именем маршрутизатора таблицы маршрутизации всех маршрутизаторов.

КОМАНДА

`show ip route`

У R8 особенно короткий log.

Сохранил

8) Сохранить файлы конфигураций устройств в виде набора файлов с именами, соответствующими именам устройств.

Сохранил