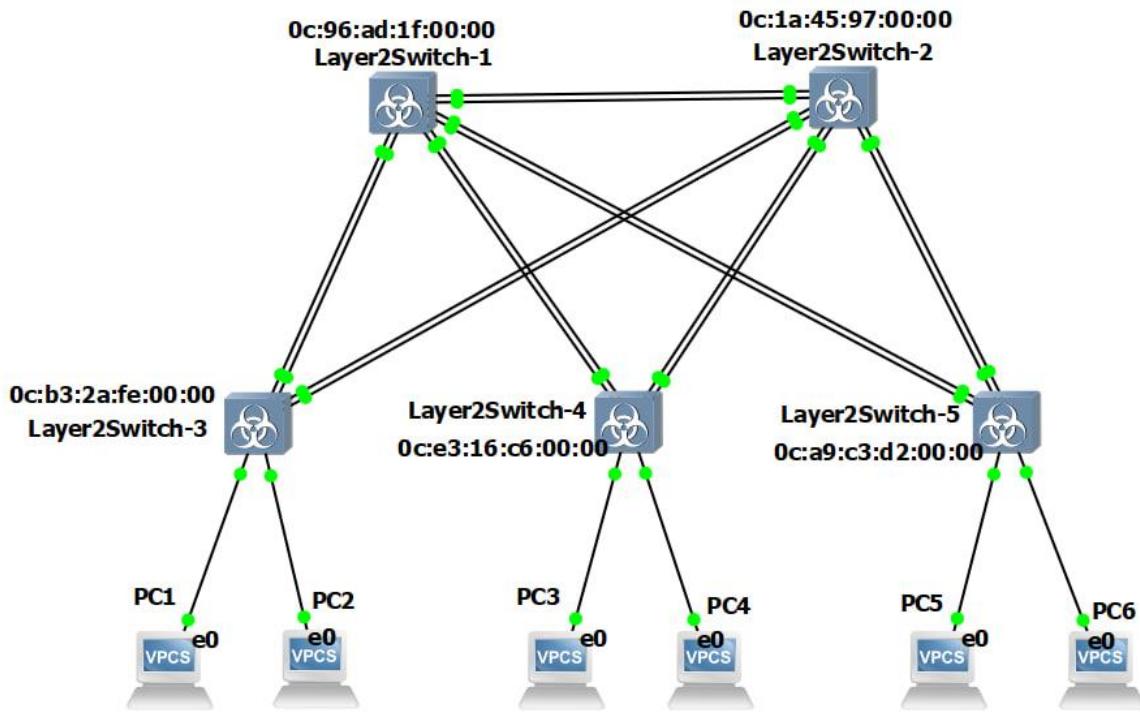


Практика №2

Тема: Настройка протокола STP (IEEE 802.1D)

1) Для заданной на схеме schema-lab2 сети, состоящей из управляемых коммутаторов и персональных компьютеров

Настроить протокол STP, назначив явно один из коммутаторов корневым настройкой приоритета



Корневым коммутатором выбран SW1, изменим его приоритет:

enable

configure terminal

spanning-tree vlan 1 priority 0

end

2) Проверить доступность каждого с каждым всех персональных компьютеров (VPCS), результаты запротоколировать

Проверка доступности на PC1:

```
PC1> ping 192.168.1.2
84 bytes from 192.168.1.2 icmp_seq=1 ttl=64 time=6.154 ms
84 bytes from 192.168.1.2 icmp_seq=2 ttl=64 time=5.427 ms
84 bytes from 192.168.1.2 icmp_seq=3 ttl=64 time=0.429 ms
84 bytes from 192.168.1.2 icmp_seq=4 ttl=64 time=2.461 ms
84 bytes from 192.168.1.2 icmp_seq=5 ttl=64 time=0.651 ms

PC1> ping 192.168.1.3
84 bytes from 192.168.1.3 icmp_seq=1 ttl=64 time=8.708 ms
84 bytes from 192.168.1.3 icmp_seq=2 ttl=64 time=3.079 ms
84 bytes from 192.168.1.3 icmp_seq=3 ttl=64 time=14.140 ms
84 bytes from 192.168.1.3 icmp_seq=4 ttl=64 time=9.210 ms
84 bytes from 192.168.1.3 icmp_seq=5 ttl=64 time=13.813 ms

PC1> ping 192.168.1.4
84 bytes from 192.168.1.4 icmp_seq=1 ttl=64 time=14.318 ms
84 bytes from 192.168.1.4 icmp_seq=2 ttl=64 time=22.285 ms
84 bytes from 192.168.1.4 icmp_seq=3 ttl=64 time=25.012 ms
84 bytes from 192.168.1.4 icmp_seq=4 ttl=64 time=9.192 ms
84 bytes from 192.168.1.4 icmp_seq=5 ttl=64 time=5.069 ms

PC1> ping 192.168.1.5
84 bytes from 192.168.1.5 icmp_seq=1 ttl=64 time=6.941 ms
84 bytes from 192.168.1.5 icmp_seq=2 ttl=64 time=8.533 ms
84 bytes from 192.168.1.5 icmp_seq=3 ttl=64 time=7.832 ms
84 bytes from 192.168.1.5 icmp_seq=4 ttl=64 time=4.317 ms
84 bytes from 192.168.1.5 icmp_seq=5 ttl=64 time=5.565 ms

PC1> ping 192.168.1.6
84 bytes from 192.168.1.6 icmp_seq=1 ttl=64 time=20.827 ms
84 bytes from 192.168.1.6 icmp_seq=2 ttl=64 time=3.757 ms
84 bytes from 192.168.1.6 icmp_seq=3 ttl=64 time=17.293 ms
84 bytes from 192.168.1.6 icmp_seq=4 ttl=64 time=7.735 ms
84 bytes from 192.168.1.6 icmp_seq=5 ttl=64 time=4.787 ms
```

Проверка доступности на PC2

```
PC2> ping 192.168.1.1
84 bytes from 192.168.1.1 icmp_seq=1 ttl=64 time=3.795 ms
84 bytes from 192.168.1.1 icmp_seq=2 ttl=64 time=0.700 ms
84 bytes from 192.168.1.1 icmp_seq=3 ttl=64 time=2.140 ms
84 bytes from 192.168.1.1 icmp_seq=4 ttl=64 time=3.859 ms
84 bytes from 192.168.1.1 icmp_seq=5 ttl=64 time=1.190 ms

PC2> ping 192.168.1.3
84 bytes from 192.168.1.3 icmp_seq=1 ttl=64 time=6.142 ms
84 bytes from 192.168.1.3 icmp_seq=2 ttl=64 time=6.805 ms
84 bytes from 192.168.1.3 icmp_seq=3 ttl=64 time=10.910 ms
84 bytes from 192.168.1.3 icmp_seq=4 ttl=64 time=9.461 ms
84 bytes from 192.168.1.3 icmp_seq=5 ttl=64 time=9.633 ms

PC2> ping 192.168.1.4
84 bytes from 192.168.1.4 icmp_seq=1 ttl=64 time=4.697 ms
84 bytes from 192.168.1.4 icmp_seq=2 ttl=64 time=12.801 ms
84 bytes from 192.168.1.4 icmp_seq=3 ttl=64 time=2.936 ms
84 bytes from 192.168.1.4 icmp_seq=4 ttl=64 time=6.980 ms
84 bytes from 192.168.1.4 icmp_seq=5 ttl=64 time=10.777 ms

PC2> ping 192.168.1.5
84 bytes from 192.168.1.5 icmp_seq=1 ttl=64 time=10.119 ms
84 bytes from 192.168.1.5 icmp_seq=2 ttl=64 time=15.138 ms
84 bytes from 192.168.1.5 icmp_seq=3 ttl=64 time=6.481 ms
84 bytes from 192.168.1.5 icmp_seq=4 ttl=64 time=3.799 ms
84 bytes from 192.168.1.5 icmp_seq=5 ttl=64 time=11.033 ms

PC2> ping 192.168.1.6
84 bytes from 192.168.1.6 icmp_seq=1 ttl=64 time=12.075 ms
84 bytes from 192.168.1.6 icmp_seq=2 ttl=64 time=10.357 ms
84 bytes from 192.168.1.6 icmp_seq=3 ttl=64 time=2.624 ms
84 bytes from 192.168.1.6 icmp_seq=4 ttl=64 time=4.800 ms
84 bytes from 192.168.1.6 icmp_seq=5 ttl=64 time=9.127 ms
```

Проверка доступности на PC3:

```
PC3> ping 192.168.1.1
84 bytes from 192.168.1.1 icmp_seq=1 ttl=64 time=11.352 ms
84 bytes from 192.168.1.1 icmp_seq=2 ttl=64 time=10.409 ms
84 bytes from 192.168.1.1 icmp_seq=3 ttl=64 time=10.481 ms
84 bytes from 192.168.1.1 icmp_seq=4 ttl=64 time=6.603 ms
84 bytes from 192.168.1.1 icmp_seq=5 ttl=64 time=17.262 ms

PC3> ping 192.168.1.2
84 bytes from 192.168.1.2 icmp_seq=1 ttl=64 time=7.471 ms
84 bytes from 192.168.1.2 icmp_seq=2 ttl=64 time=10.808 ms
84 bytes from 192.168.1.2 icmp_seq=3 ttl=64 time=2.837 ms
84 bytes from 192.168.1.2 icmp_seq=4 ttl=64 time=13.553 ms
84 bytes from 192.168.1.2 icmp_seq=5 ttl=64 time=12.494 ms

PC3> ping 192.168.1.4
84 bytes from 192.168.1.4 icmp_seq=1 ttl=64 time=3.961 ms
84 bytes from 192.168.1.4 icmp_seq=2 ttl=64 time=2.996 ms
84 bytes from 192.168.1.4 icmp_seq=3 ttl=64 time=0.389 ms
84 bytes from 192.168.1.4 icmp_seq=4 ttl=64 time=0.963 ms
84 bytes from 192.168.1.4 icmp_seq=5 ttl=64 time=5.739 ms

PC3> ping 192.168.1.5
84 bytes from 192.168.1.5 icmp_seq=1 ttl=64 time=8.190 ms
84 bytes from 192.168.1.5 icmp_seq=2 ttl=64 time=6.478 ms
84 bytes from 192.168.1.5 icmp_seq=3 ttl=64 time=14.324 ms
84 bytes from 192.168.1.5 icmp_seq=4 ttl=64 time=6.987 ms
84 bytes from 192.168.1.5 icmp_seq=5 ttl=64 time=3.200 ms

PC3> ping 192.168.1.6
84 bytes from 192.168.1.6 icmp_seq=1 ttl=64 time=6.493 ms
84 bytes from 192.168.1.6 icmp_seq=2 ttl=64 time=16.771 ms
84 bytes from 192.168.1.6 icmp_seq=3 ttl=64 time=4.989 ms
84 bytes from 192.168.1.6 icmp_seq=4 ttl=64 time=5.140 ms
84 bytes from 192.168.1.6 icmp_seq=5 ttl=64 time=8.341 ms
```

Проверка доступности на PC4

```
PC4> ping 192.168.1.1
84 bytes from 192.168.1.1 icmp_seq=1 ttl=64 time=11.305 ms
84 bytes from 192.168.1.1 icmp_seq=2 ttl=64 time=11.485 ms
84 bytes from 192.168.1.1 icmp_seq=3 ttl=64 time=7.377 ms
84 bytes from 192.168.1.1 icmp_seq=4 ttl=64 time=8.801 ms
84 bytes from 192.168.1.1 icmp_seq=5 ttl=64 time=10.373 ms

PC4> ping 192.168.1.2
84 bytes from 192.168.1.2 icmp_seq=1 ttl=64 time=22.853 ms
84 bytes from 192.168.1.2 icmp_seq=2 ttl=64 time=7.106 ms
84 bytes from 192.168.1.2 icmp_seq=3 ttl=64 time=15.390 ms
84 bytes from 192.168.1.2 icmp_seq=4 ttl=64 time=14.192 ms
84 bytes from 192.168.1.2 icmp_seq=5 ttl=64 time=11.138 ms

PC4> ping 192.168.1.3
84 bytes from 192.168.1.3 icmp_seq=1 ttl=64 time=3.660 ms
84 bytes from 192.168.1.3 icmp_seq=2 ttl=64 time=7.275 ms
84 bytes from 192.168.1.3 icmp_seq=3 ttl=64 time=4.234 ms
84 bytes from 192.168.1.3 icmp_seq=4 ttl=64 time=5.414 ms
84 bytes from 192.168.1.3 icmp_seq=5 ttl=64 time=2.283 ms

PC4> ping 192.168.1.5
84 bytes from 192.168.1.5 icmp_seq=1 ttl=64 time=15.097 ms
84 bytes from 192.168.1.5 icmp_seq=2 ttl=64 time=12.509 ms
84 bytes from 192.168.1.5 icmp_seq=3 ttl=64 time=7.518 ms
84 bytes from 192.168.1.5 icmp_seq=4 ttl=64 time=8.936 ms
84 bytes from 192.168.1.5 icmp_seq=5 ttl=64 time=8.907 ms

PC4> ping 192.168.1.6
84 bytes from 192.168.1.6 icmp_seq=1 ttl=64 time=7.573 ms
84 bytes from 192.168.1.6 icmp_seq=2 ttl=64 time=10.746 ms
84 bytes from 192.168.1.6 icmp_seq=3 ttl=64 time=6.241 ms
84 bytes from 192.168.1.6 icmp_seq=4 ttl=64 time=5.250 ms
84 bytes from 192.168.1.6 icmp_seq=5 ttl=64 time=4.948 ms
```

Проверка доступности на PC5:

```
PC5> ping 192.168.1.1
84 bytes from 192.168.1.1 icmp_seq=1 ttl=64 time=15.699 ms
84 bytes from 192.168.1.1 icmp_seq=2 ttl=64 time=10.231 ms
84 bytes from 192.168.1.1 icmp_seq=3 ttl=64 time=9.257 ms
84 bytes from 192.168.1.1 icmp_seq=4 ttl=64 time=5.884 ms
84 bytes from 192.168.1.1 icmp_seq=5 ttl=64 time=10.291 ms

PC5> ping 192.168.1.2
84 bytes from 192.168.1.2 icmp_seq=1 ttl=64 time=16.404 ms
84 bytes from 192.168.1.2 icmp_seq=2 ttl=64 time=16.638 ms
84 bytes from 192.168.1.2 icmp_seq=3 ttl=64 time=7.900 ms
84 bytes from 192.168.1.2 icmp_seq=4 ttl=64 time=7.124 ms
84 bytes from 192.168.1.2 icmp_seq=5 ttl=64 time=11.244 ms

PC5> ping 192.168.1.3
84 bytes from 192.168.1.3 icmp_seq=1 ttl=64 time=9.083 ms
84 bytes from 192.168.1.3 icmp_seq=2 ttl=64 time=16.864 ms
84 bytes from 192.168.1.3 icmp_seq=3 ttl=64 time=11.293 ms
84 bytes from 192.168.1.3 icmp_seq=4 ttl=64 time=18.801 ms
84 bytes from 192.168.1.3 icmp_seq=5 ttl=64 time=6.031 ms

PC5> ping 192.168.1.4
84 bytes from 192.168.1.4 icmp_seq=1 ttl=64 time=10.294 ms
84 bytes from 192.168.1.4 icmp_seq=2 ttl=64 time=11.680 ms
84 bytes from 192.168.1.4 icmp_seq=3 ttl=64 time=6.681 ms
84 bytes from 192.168.1.4 icmp_seq=4 ttl=64 time=13.379 ms
84 bytes from 192.168.1.4 icmp_seq=5 ttl=64 time=4.953 ms

PC5> ping 192.168.1.6
84 bytes from 192.168.1.6 icmp_seq=1 ttl=64 time=7.691 ms
84 bytes from 192.168.1.6 icmp_seq=2 ttl=64 time=1.019 ms
84 bytes from 192.168.1.6 icmp_seq=3 ttl=64 time=0.620 ms
84 bytes from 192.168.1.6 icmp_seq=4 ttl=64 time=0.869 ms
84 bytes from 192.168.1.6 icmp_seq=5 ttl=64 time=3.640 ms
```

Проверка доступности на PC6

```
PC6> ping 192.168.1.1
84 bytes from 192.168.1.1 icmp_seq=1 ttl=64 time=5.740 ms
84 bytes from 192.168.1.1 icmp_seq=2 ttl=64 time=9.749 ms
84 bytes from 192.168.1.1 icmp_seq=3 ttl=64 time=12.695 ms
84 bytes from 192.168.1.1 icmp_seq=4 ttl=64 time=9.169 ms
84 bytes from 192.168.1.1 icmp_seq=5 ttl=64 time=18.518 ms

PC6> ping 192.168.1.2
84 bytes from 192.168.1.2 icmp_seq=1 ttl=64 time=15.547 ms
84 bytes from 192.168.1.2 icmp_seq=2 ttl=64 time=10.723 ms
84 bytes from 192.168.1.2 icmp_seq=3 ttl=64 time=8.371 ms
84 bytes from 192.168.1.2 icmp_seq=4 ttl=64 time=9.171 ms
84 bytes from 192.168.1.2 icmp_seq=5 ttl=64 time=12.100 ms

PC6> ping 192.168.1.3
84 bytes from 192.168.1.3 icmp_seq=1 ttl=64 time=9.558 ms
84 bytes from 192.168.1.3 icmp_seq=2 ttl=64 time=10.053 ms
84 bytes from 192.168.1.3 icmp_seq=3 ttl=64 time=7.072 ms
84 bytes from 192.168.1.3 icmp_seq=4 ttl=64 time=14.828 ms
84 bytes from 192.168.1.3 icmp_seq=5 ttl=64 time=18.778 ms

PC6> ping 192.168.1.4
84 bytes from 192.168.1.4 icmp_seq=1 ttl=64 time=7.722 ms
84 bytes from 192.168.1.4 icmp_seq=2 ttl=64 time=12.136 ms
84 bytes from 192.168.1.4 icmp_seq=3 ttl=64 time=4.021 ms
84 bytes from 192.168.1.4 icmp_seq=4 ttl=64 time=10.825 ms
84 bytes from 192.168.1.4 icmp_seq=5 ttl=64 time=4.914 ms

PC6> ping 192.168.1.5
84 bytes from 192.168.1.5 icmp_seq=1 ttl=64 time=4.861 ms
84 bytes from 192.168.1.5 icmp_seq=2 ttl=64 time=3.206 ms
84 bytes from 192.168.1.5 icmp_seq=3 ttl=64 time=4.937 ms
84 bytes from 192.168.1.5 icmp_seq=4 ttl=64 time=1.144 ms
84 bytes from 192.168.1.5 icmp_seq=5 ttl=64 time=1.000 ms
```

3) На изображении схемы отметить BID каждого коммутатора и режимы работы портов (RP/DP/blocked) и стоимости маршрутов, результат сохранить в файл

show spanning-tree для SW1

```
Layer2Switch-1 - PuTTY

VLAN0001
  Spanning tree enabled protocol ieee
  Root ID    Priority    1
              Address     0c96.ad1f.0000
              This bridge is the root
              Hello Time   2 sec  Max Age 20 sec  Forward Delay 15 sec

  Bridge ID  Priority    1      (priority 0 sys-id-ext 1)
              Address     0c96.ad1f.0000
              Hello Time   2 sec  Max Age 20 sec  Forward Delay 15 sec
              Aging Time   300 sec

  Interface      Role Sts Cost      Prio.Nbr Type
  -----  -----
  Gi0/0          Desg FWD 4        128.1      Shr
  Gi0/1          Desg FWD 4        128.2      Shr
  Gi0/2          Desg FWD 4        128.3      Shr
  Gi0/3          Desg FWD 4        128.4      Shr
  Gi1/0          Desg FWD 4        128.5      Shr
  Gi1/1          Desg FWD 4        128.6      Shr
  Gi1/2          Desg FWD 4        128.7      Shr
  Gi1/3          Desg FWD 4        128.8      Shr
  --More--
```

show spanning-tree для SW2

```
Layer2Switch-2 - PuTTY

VLAN0001
  Spanning tree enabled protocol ieee
  Root ID    Priority    1
              Address     0c96.ad1f.0000
              Cost        4
              Port        1 (GigabitEthernet0/0)
              Hello Time   2 sec  Max Age 20 sec  Forward Delay 15 sec

  Bridge ID  Priority    32769  (priority 32768 sys-id-ext 1)
              Address     0c1a.4597.0000
              Hello Time   2 sec  Max Age 20 sec  Forward Delay 15 sec
              Aging Time   300 sec

  Interface      Role Sts Cost      Prio.Nbr Type
  -----  -----
  Gi0/0          Root FWD 4        128.1      Shr
  Gi0/1          Altn BLK 4       128.2      Shr
  Gi0/2          Desg FWD 4       128.3      Shr
  Gi0/3          Desg FWD 4       128.4      Shr
  Gi1/0          Desg FWD 4       128.5      Shr
  Gi1/1          Desg FWD 4       128.6      Shr
  Gi1/2          Desg FWD 4       128.7      Shr
  --More--
```

show spanning-tree для SW3

```
Layer2Switch-3 - PuTTY

VLAN0001
Spanning tree enabled protocol ieee
Root ID    Priority    1
           Address    0c96.ad1f.0000
           Cost       4
           Port       1 (GigabitEthernet0/0)
Hello Time 2 sec     Max Age 20 sec  Forward Delay 15 sec

Bridge ID  Priority    32769 (priority 32768 sys-id-ext 1)
           Address    0cb3.2afe.0000
           Hello Time 2 sec     Max Age 20 sec  Forward Delay 15 sec
           Aging Time 300 sec

Interface      Role Sts Cost      Prio.Nbr Type
-----  -----  -----  -----  -----
Gi0/0          Root FWD 4        128.1    Shr
Gi0/1          Altn BLK 4       128.2    Shr
Gi0/2          Altn BLK 4       128.3    Shr
Gi0/3          Altn BLK 4       128.4    Shr
Gi1/0          Desg FWD 4       128.5    Shr
Gi1/1          Desg FWD 4       128.6    Shr

--More--
```

show spanning-tree для SW4

```
Layer2Switch-4 - PuTTY

VLAN0001
Spanning tree enabled protocol ieee
Root ID    Priority    1
           Address    0c96.ad1f.0000
           Cost       4
           Port       1 (GigabitEthernet0/0)
Hello Time 2 sec     Max Age 20 sec  Forward Delay 15 sec

Bridge ID  Priority    32769 (priority 32768 sys-id-ext 1)
           Address    0c3e.16c6.0000
           Hello Time 2 sec     Max Age 20 sec  Forward Delay 15 sec
           Aging Time 300 sec

Interface      Role Sts Cost      Prio.Nbr Type
-----  -----  -----  -----  -----
Gi0/0          Root FWD 4        128.1    Shr
Gi0/1          Altn BLK 4       128.2    Shr
Gi0/2          Altn BLK 4       128.3    Shr
Gi0/3          Altn BLK 4       128.4    Shr
Gi1/0          Desg FWD 4       128.5    Shr
Gi1/1          Desg FWD 4       128.6    Shr

--More--
```

show spanning-tree для SW5

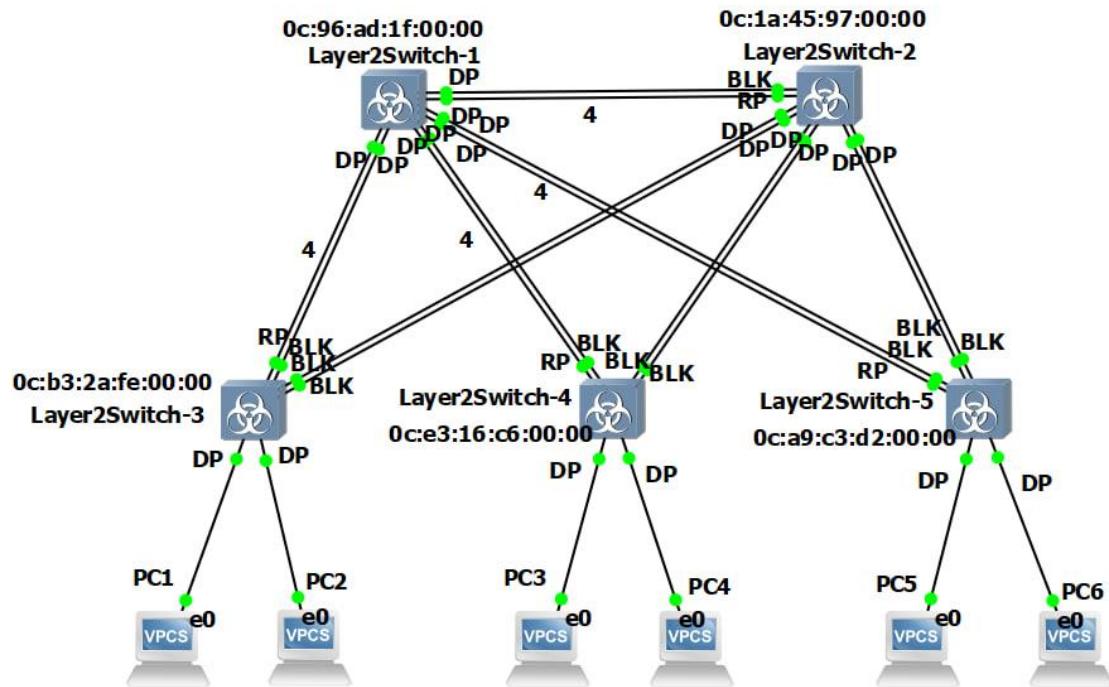
```
Layer2Switch-5 - PuTTY
```

```
VLAN0001
  Spanning tree enabled protocol ieee
  Root ID    Priority    1
              Address     0c96.ad1f.0000
              Cost         4
              Port        1 (GigabitEthernet0/0)
              Hello Time   2 sec  Max Age 20 sec  Forward Delay 15 sec

  Bridge ID  Priority    32769 (priority 32768 sys-id-ext 1)
              Address     0ca9.c3d2.0000
              Hello Time   2 sec  Max Age 20 sec  Forward Delay 15 sec
              Aging Time   300 sec

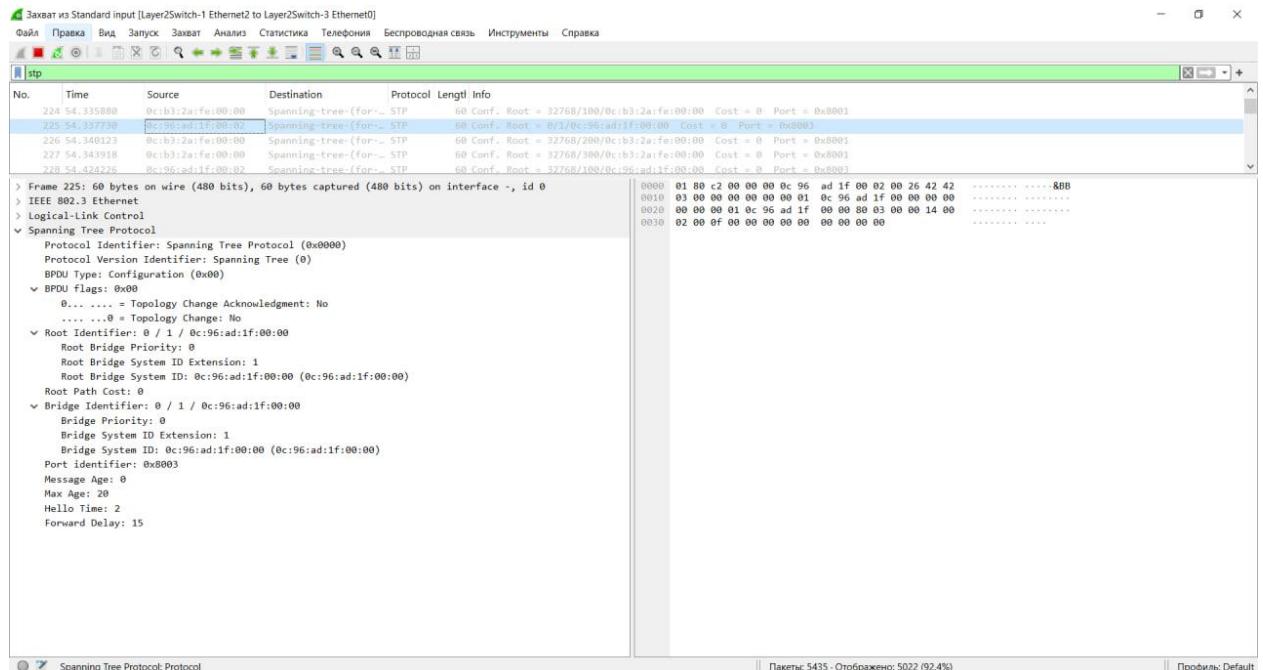
  Interface      Role Sts Cost      Prio.Nbr Type
  -----  -----
  Gi0/0          Root FWD 4          128.1    Shr
  Gi0/1          Altn BLK 4          128.2    Shr
  Gi0/2          Altn BLK 4          128.3    Shr
  Gi0/3          Altn BLK 4          128.4    Shr
  Gi1/0          Desg FWD 4          128.5    Shr
  Gi1/1          Desg FWD 4          128.6    Shr

--More--
```

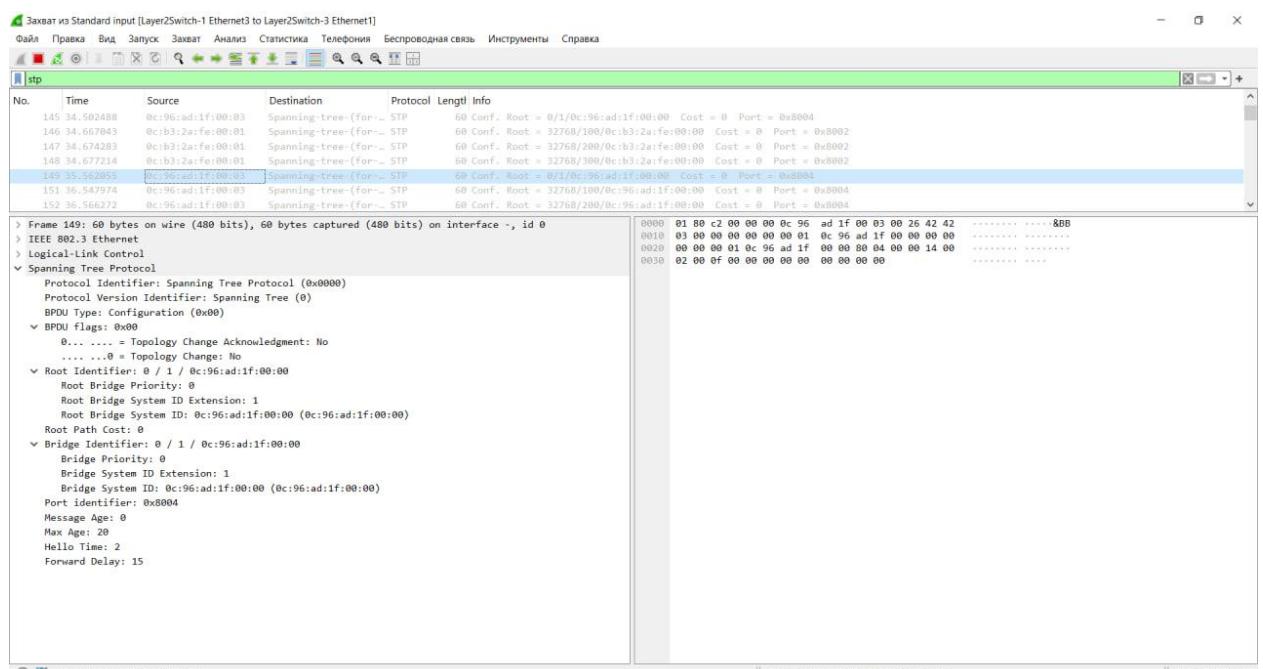


4) При помощи wireshark отследить передачу пакетов hello от корневого коммутатора на всех линках (nb!), результаты включить в отчет

SW1 (eth2) -> SW3 (eth0)



SW1 (eth3) -> SW3 (eth1)



SW1 (eth4) -> SW4 (eth0)

Захват из Standard Input [Layer2Switch-1 Ethernet4 to Layer2Switch-4 Ethernet0]

Файл Правка Вид Запуск Захват Анализ Статистика Телефония Беспроводная связь Инструменты Справка

stp

No.	Time	Source	Destination	Protocol	Length	Info
98	23.027333	0:c:96:ad:1f:00:04	Spanning-tree-(for-> STP	60 Conf. Root = 32768/200/0:c:96:ad:1f:00:00 Cost = 0 Port = 0x8005		
99	23.064054	0:c:96:ad:1f:00:04	Spanning-tree-(for-> STP	60 Conf. Root = 32768/300/0:c:96:ad:1f:00:00 Cost = 0 Port = 0x8005		
100	23.973727	0:c:96:ad:1f:00:04	Spanning-tree-(for-> STP	60 Conf. Root = 0/1/0:c:96:ad:1f:00:00 Cost = 0 Port = 0x8005		
101	24.526266	0:c:3e:16:c6:00:00	Spanning-tree-(for-> STP	60 Conf. Root = 32768/100/0:c:3e:16:c6:00:00 Cost = 0 Port = 0x8001		
102	24.534927	0:c:3e:16:c6:00:00	Spanning-tree-(for-> STP	60 Conf. Root = 32768/200/0:c:3e:16:c6:00:00 Cost = 0 Port = 0x8001		
103	24.540579	0:c:3e:16:c6:00:00	Spanning-tree-(for-> STP	60 Conf. Root = 32768/300/0:c:3e:16:c6:00:00 Cost = 0 Port = 0x8001		
104	25.026508	0:c:96:ad:1f:00:04	Spanning-tree-(for-> STP	60 Conf. Root = 0/1/0:c:96:ad:1f:00:00 Cost = 0 Port = 0x8005	0000 01 80 c2 00 00 00 0c 96 ad 1f 00 04 00 26 42 42 &BB	
105	25.111864	0:c:96:ad:1f:00:04	Spanning-tree-(for-> STP	60 Conf. Root = 32768/100/0:c:96:ad:1f:00:00 Cost = 0 Port = 0x8005	0010 03 00 00 00 00 00 01 0c 96 ad 1f 00 00 00 00 00 00 14 00	
106	25.131539	0:c:96:ad:1f:00:04	Spanning-tree-(for-> STP	60 Conf. Root = 32768/200/0:c:96:ad:1f:00:00 Cost = 0 Port = 0x8005	0020 00 00 00 01 0c 96 ad 1f 00 00 00 05 00 00 00 00 14 00	
					0030 02 00 0f 00 00 00 00 00 00 00 00 00 00 00 00 00	

> Frame 104: 60 bytes on wire (480 bits), 60 bytes captured (480 bits) on interface -, id 0

> IEEE 802.3 Ethernet

> Logical-Link Control

> Spanning Tree Protocol

- Protocol Identifier: Spanning Tree Protocol (0x0000)
- Protocol Version Identifier: Spanning Tree (0)
- BPDUs Type: Configuration (0x00)
- BPDU Flags: 0x00
 - 0... = Topology Change Acknowledgment: No
 -0 = Topology Change: No
- Root Identifier: 0 / 1 / 0:c:96:ad:1f:00:00
 - Root Bridge Priority: 0
 - Root Bridge System ID Extension: 1
 - Root Bridge System ID: 0:c:96:ad:1f:00:00 (0:c:96:ad:1f:00:00)
- Root Path Cost: 0
- Bridge Identifier: 0 / 1 / 0:c:96:ad:1f:00:00
 - Bridge Priority: 0
 - Bridge System ID Extension: 1
 - Bridge System ID: 0:c:96:ad:1f:00:00 (0:c:96:ad:1f:00:00)
- Port identifier: 0x8005
- Message Age: 0
- Max Age: 20
- Hello Time: 2
- Forward Delay: 15

SW1 (eth5) -> SW4 (eth1)

Захват из Standard Input [Layer2Switch-1 Ethernet5 to Layer2Switch-4 Ethernet1]

Файл Правка Вид Запуск Захват Анализ Статистика Телефония Беспроводная связь Инструменты Справка

stp

No.	Time	Source	Destination	Protocol	Length	Info
176	40.986625	0:c:96:ad:1f:00:05	Spanning-tree-(for-> STP	60 Conf. Root = 32768/300/0:c:96:ad:1f:00:00 Cost = 0 Port = 0x8006		
177	41.888053	0:c:96:ad:1f:00:05	Spanning-tree-(for-> STP	60 Conf. Root = 0/1/0:c:96:ad:1f:00:00 Cost = 0 Port = 0x8006		
178	42.668579	0:c:3e:16:c6:00:01	Spanning-tree-(for-> STP	60 Conf. Root = 32768/100/0:c:3e:16:c6:00:00 Cost = 0 Port = 0x8002		
179	42.677586	0:c:3e:16:c6:00:01	Spanning-tree-(for-> STP	60 Conf. Root = 32768/200/0:c:3e:16:c6:00:00 Cost = 0 Port = 0x8002		
180	42.686432	0:c:3e:16:c6:00:01	Spanning-tree-(for-> STP	60 Conf. Root = 32768/300/0:c:3e:16:c6:00:00 Cost = 0 Port = 0x8002		
181	42.923894	0:c:96:ad:1f:00:05	Spanning-tree-(for-> STP	60 Conf. Root = 0/1/0:c:96:ad:1f:00:00 Cost = 0 Port = 0x8006	0000 01 80 c2 00 00 00 0c 96 ad 1f 00 05 00 26 42 42 &BB	
182	42.933667	0:c:96:ad:1f:00:05	Spanning-tree-(for-> STP	60 Conf. Root = 32768/100/0:c:96:ad:1f:00:00 Cost = 0 Port = 0x8006	0010 03 00 00 00 00 00 01 0c 96 ad 1f 00 00 00 00 00 00 14 00	
183	42.955602	0:c:96:ad:1f:00:05	Spanning-tree-(for-> STP	60 Conf. Root = 32768/200/0:c:96:ad:1f:00:00 Cost = 0 Port = 0x8006	0020 00 00 00 01 0c 96 ad 1f 00 00 00 05 00 00 00 00 14 00	
184	42.984124	0:c:96:ad:1f:00:05	Spanning-tree-(for-> STP	60 Conf. Root = 32768/300/0:c:96:ad:1f:00:00 Cost = 0 Port = 0x8006	0030 02 00 0f 00 00 00 00 00 00 00 00 00 00 00 00 00	

> Frame 181: 60 bytes on wire (480 bits), 60 bytes captured (480 bits) on interface -, id 0

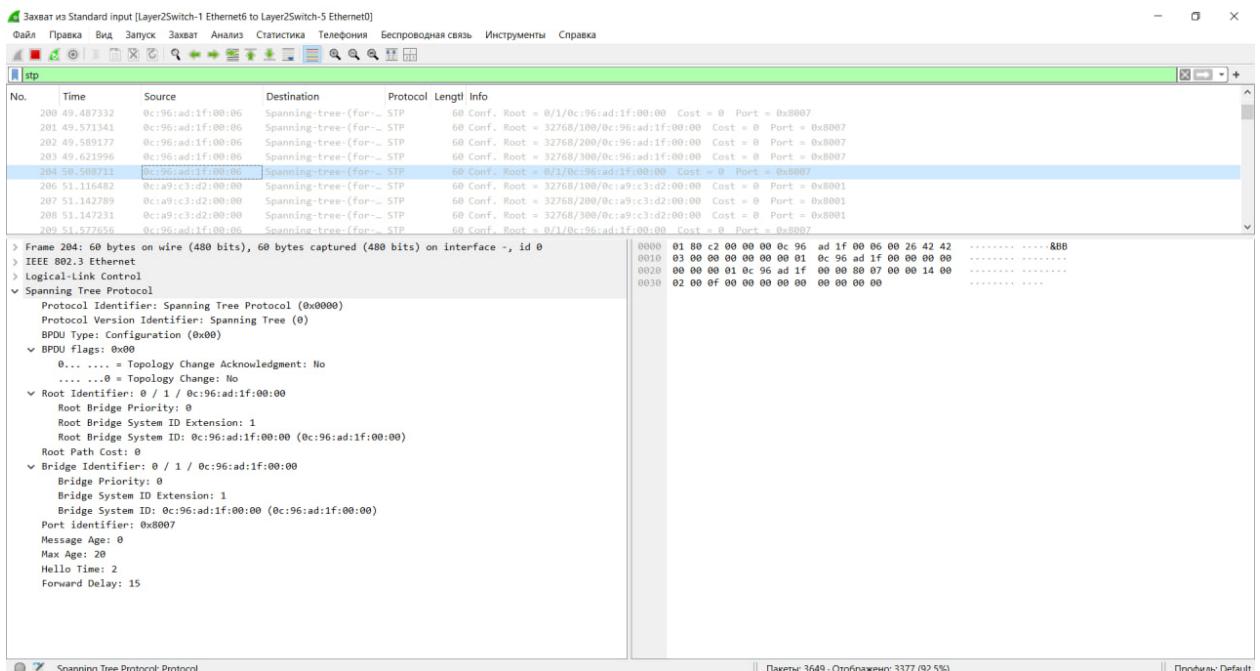
> IEEE 802.3 Ethernet

> Logical-Link Control

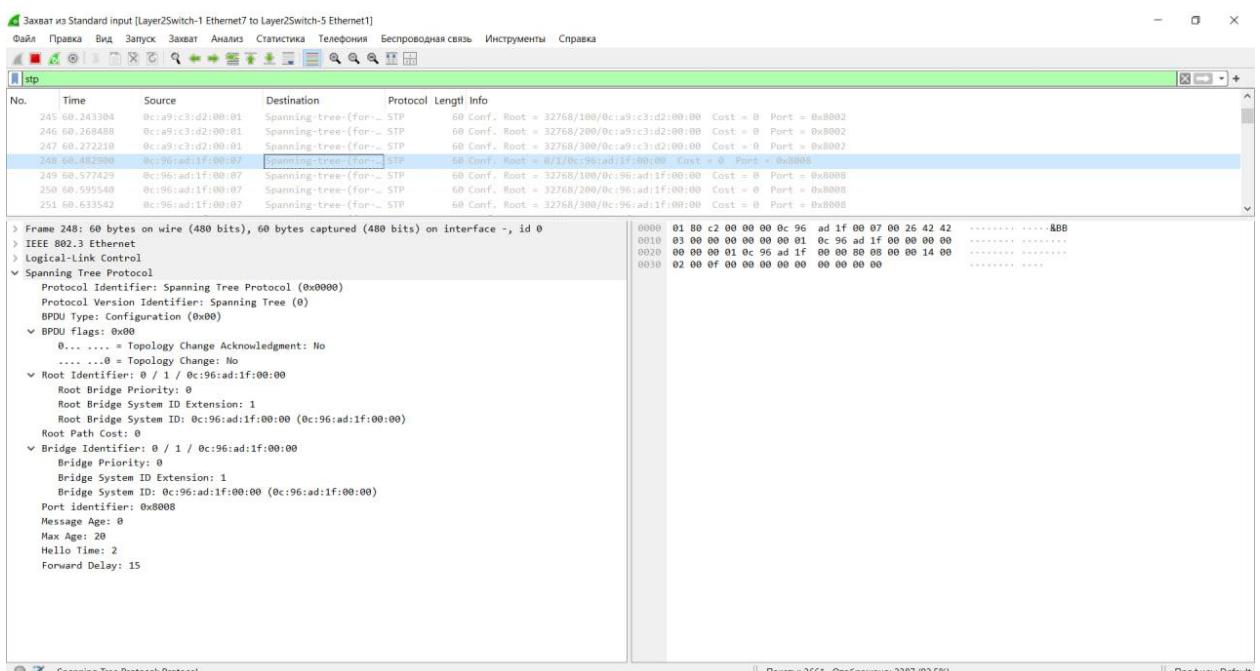
> Spanning Tree Protocol

- Protocol Identifier: Spanning Tree Protocol (0x0000)
- Protocol Version Identifier: Spanning Tree (0)
- BPDUs Type: Configuration (0x00)
- BPDU Flags: 0x00
 - 0... = Topology Change Acknowledgment: No
 -0 = Topology Change: No
- Root Identifier: 0 / 1 / 0:c:96:ad:1f:00:00
 - Root Bridge Priority: 0
 - Root Bridge System ID Extension: 1
 - Root Bridge System ID: 0:c:96:ad:1f:00:00 (0:c:96:ad:1f:00:00)
- Root Path Cost: 0
- Bridge Identifier: 0 / 1 / 0:c:96:ad:1f:00:00
 - Bridge Priority: 0
 - Bridge System ID Extension: 1
 - Bridge System ID: 0:c:96:ad:1f:00:00 (0:c:96:ad:1f:00:00)
- Port identifier: 0x8006
- Message Age: 0
- Max Age: 20
- Hello Time: 2
- Forward Delay: 15

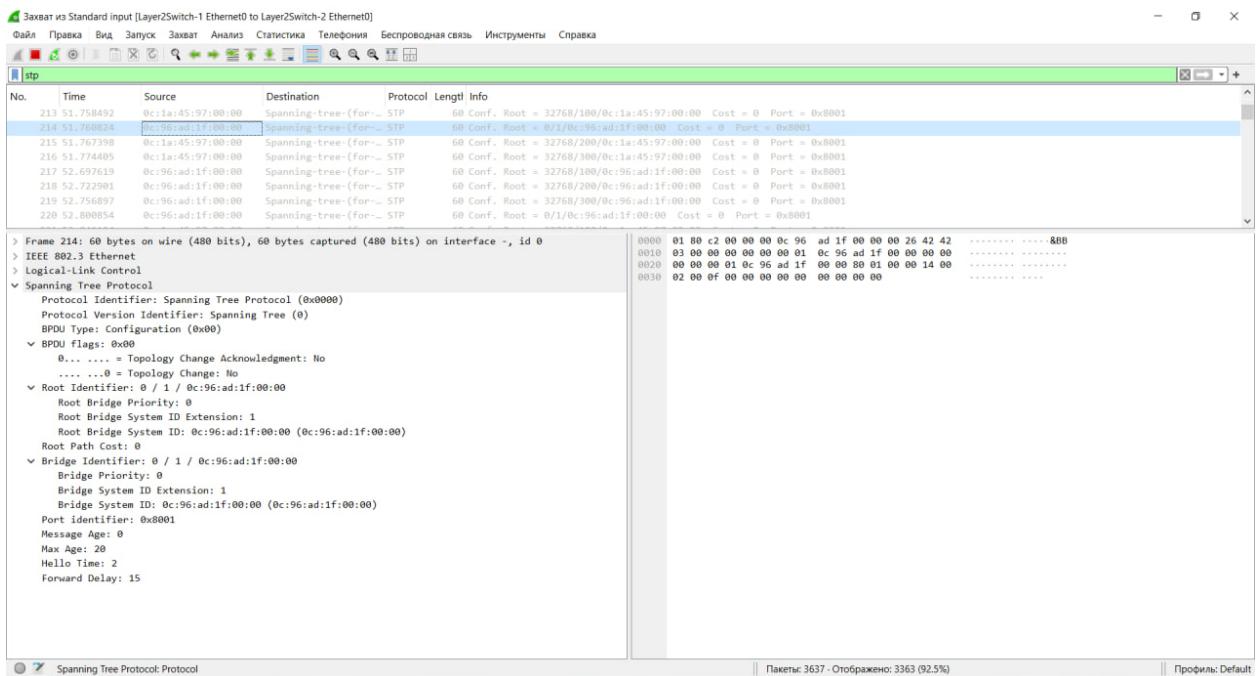
SW1 (eth6) -> SW5 (eth0)



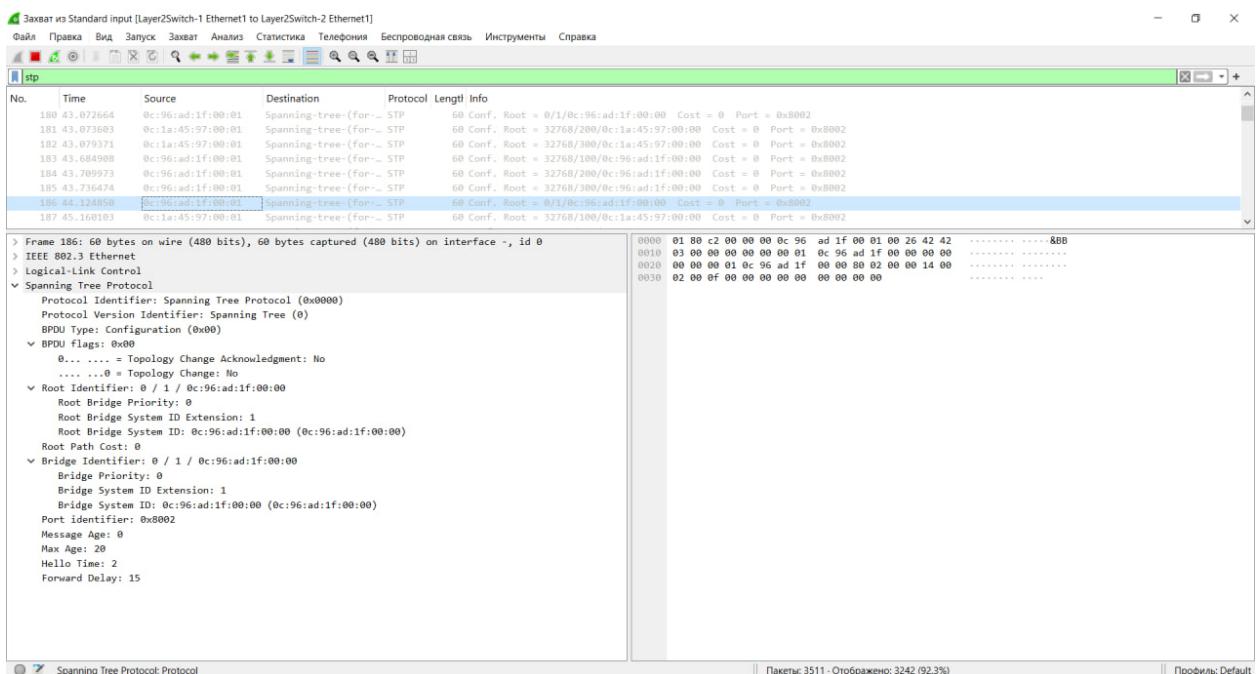
SW1 (eth7) -> SW5 (eth1)



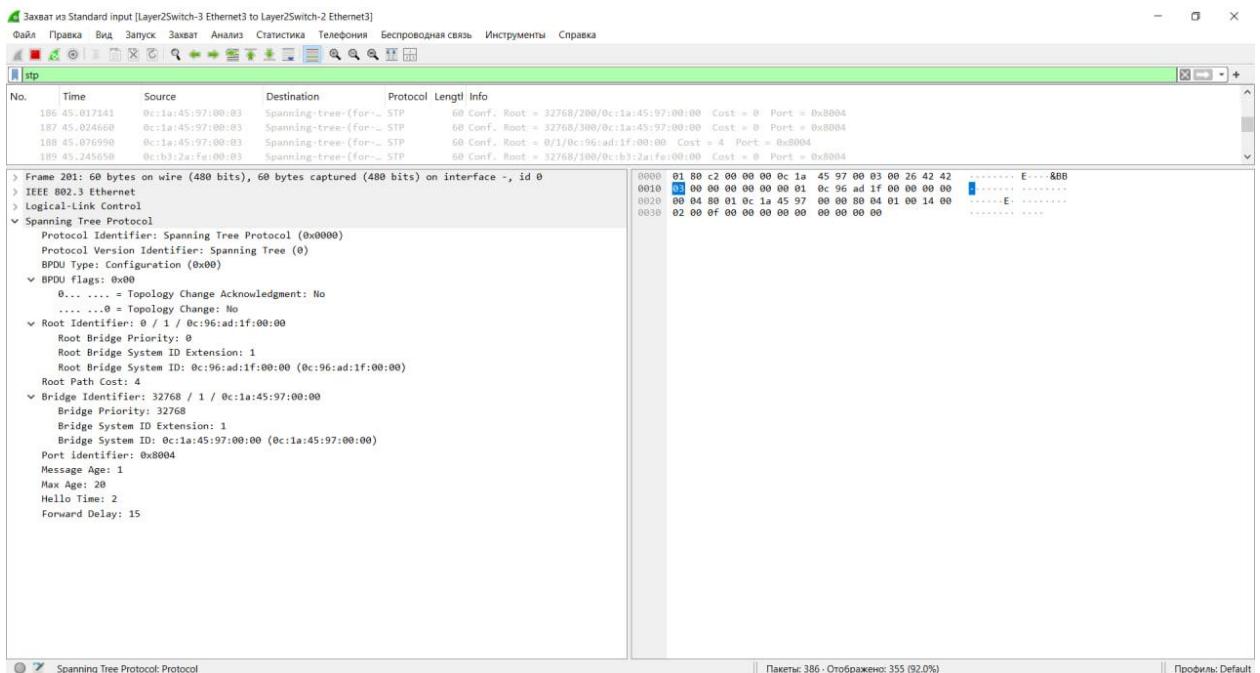
SW1 (eth0) -> SW2 (eth0)



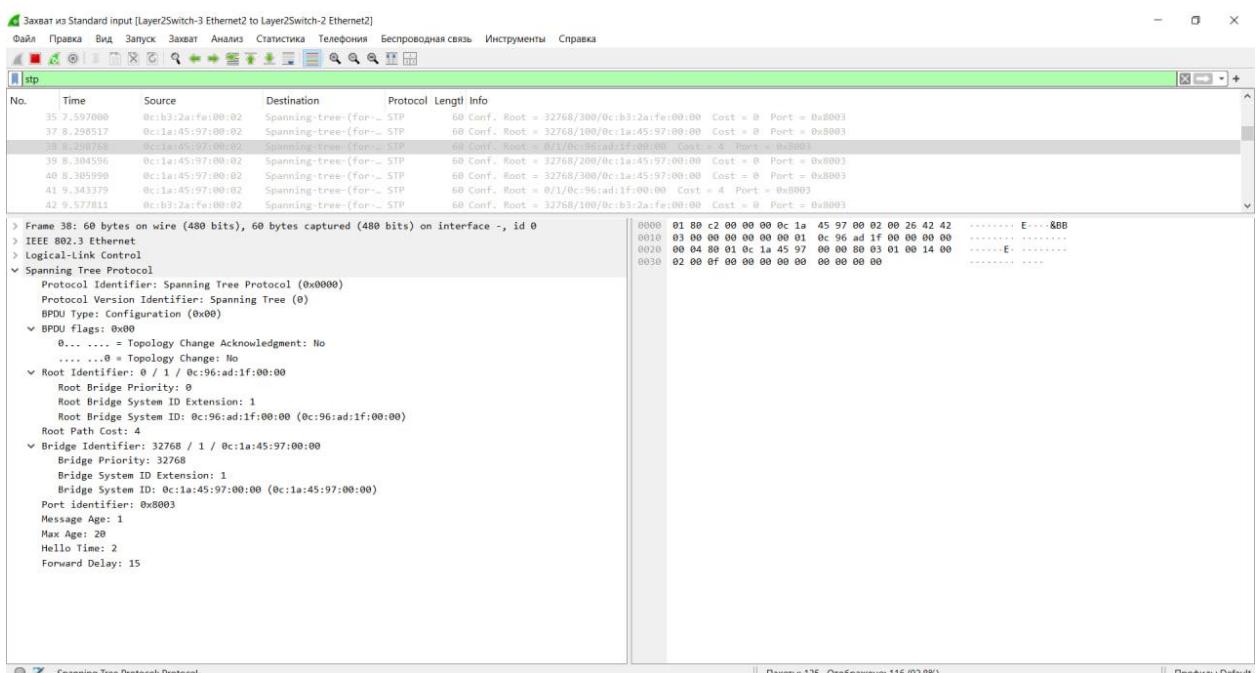
SW1 -> SW2 (eth1)



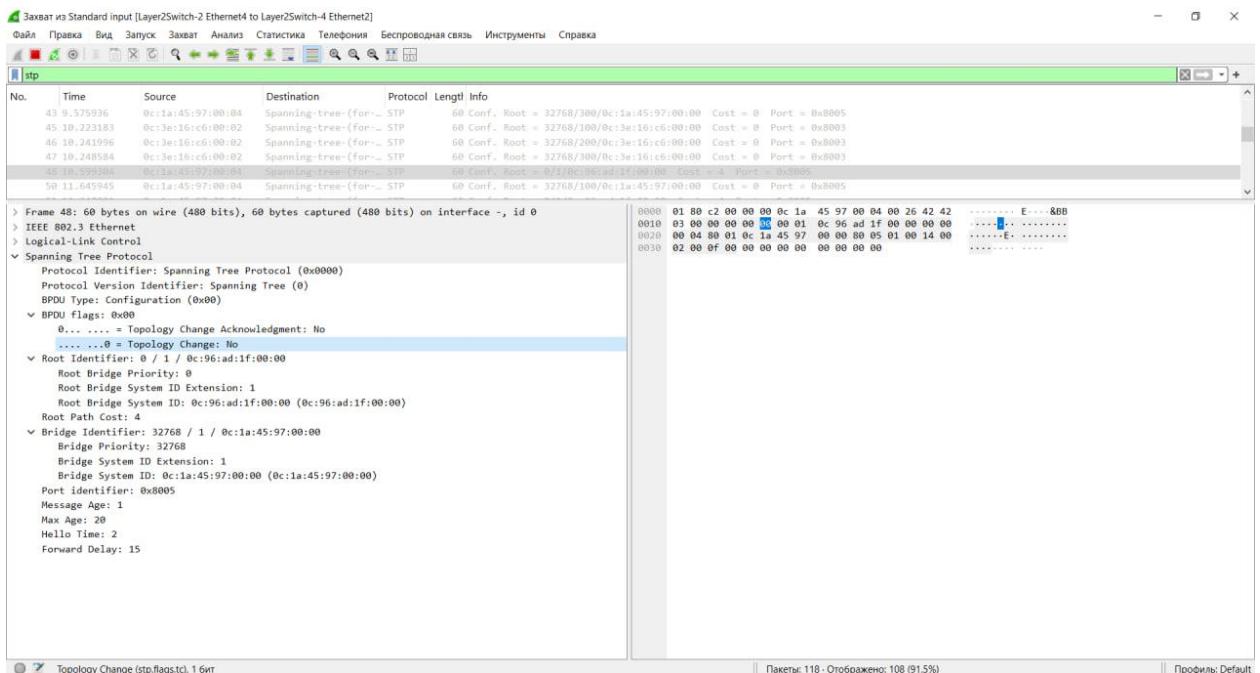
SW3 (eth3) -> SW2 (eth3)



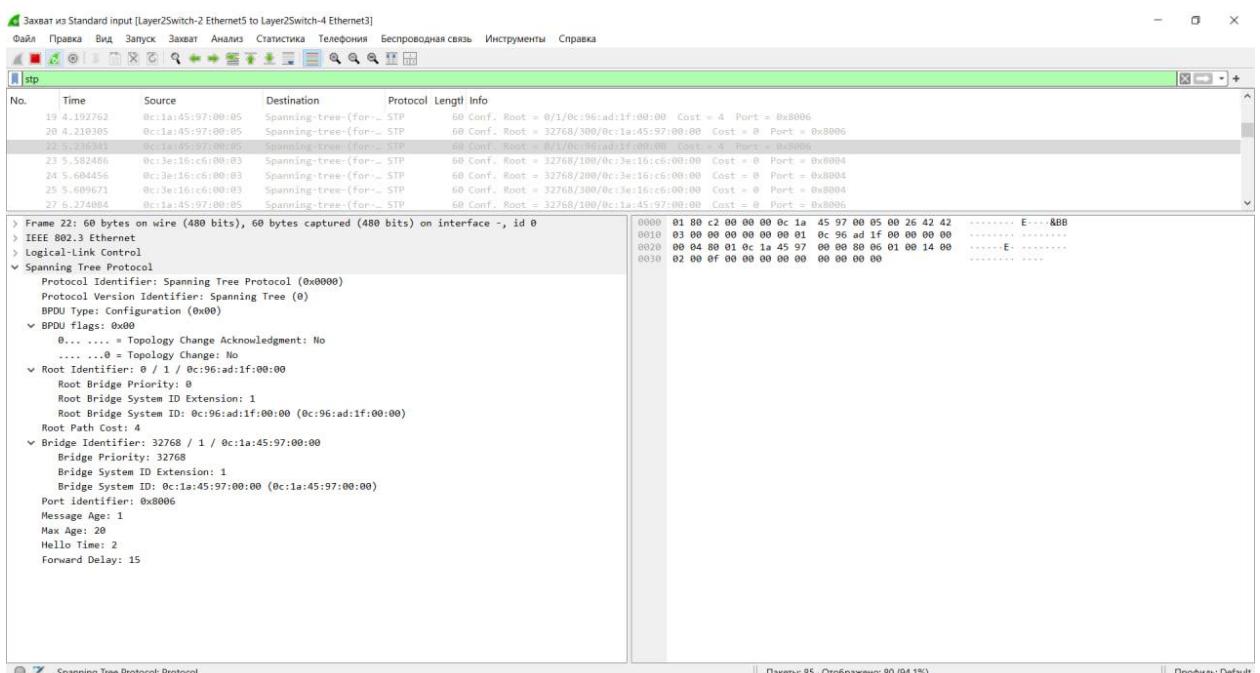
SW3 (eth2) -> SW2 (eth2)



SW2 (eth4) -> SW4 (eth2)



SW2 (eth5) -> SW4 (eth3)



5) Изменить стоимость маршрута для порта RP произвольного назначенного (designated) коммутатора, повторить действия из п.3, результат сохранить в отдельный файл

Выполняем команды чтобы изменить стоимость двух маршрутов на SW3 с 4 на 10 (от SW3 до SW1)

```

enable
configure terminal
interface gigabitEthernet 0/1
spanning-tree cost 10
interface gigabitEthernet 0/0
spanning-tree cost 10
end

```

show spanning-tree для SW2 после изменений

```

Layer2Switch-2 - PuTTY

VLAN0001
  Spanning tree enabled protocol ieee
  Root ID  Priority  1
            Address   0c96.ad1f.0000
            Cost      4
            Port      1 (GigabitEthernet0/0)
            Hello Time 2 sec  Max Age 20 sec  Forward Delay 15 sec

  Bridge ID Priority  32769  (priority 32768 sys-id-ext 1)
            Address   0c1a.4597.0000
            Hello Time 2 sec  Max Age 20 sec  Forward Delay 15 sec
            Aging Time 300 sec

  Interface      Role Sts Cost      Prio.Nbr Type
  -----  -----
  Gi0/0          Root FWD 4        128.1    Shr
  Gi0/1          Altn BLK 4       128.2    Shr
  Gi0/2          Desg FWD 4       128.3    Shr
  Gi0/3          Desg FWD 4       128.4    Shr
  Gi1/0          Desg FWD 4       128.5    Shr
  Gi1/1          Desg FWD 4       128.6    Shr
  Gi1/2          Desg FWD 4       128.7    Shr
  --More--  █

```

show spanning-tree для SW3 после изменений

```

Layer2Switch-3 - PuTTY

VLAN0001
  Spanning tree enabled protocol ieee
  Root ID  Priority  1
            Address   0c96.ad1f.0000
            Cost      8
            Port      3 (GigabitEthernet0/2)
            Hello Time 2 sec  Max Age 20 sec  Forward Delay 15 sec

  Bridge ID Priority  32769  (priority 32768 sys-id-ext 1)
            Address   0cb3.2afe.0000
            Hello Time 2 sec  Max Age 20 sec  Forward Delay 15 sec
            Aging Time 300 sec

  Interface      Role Sts Cost      Prio.Nbr Type
  -----  -----
  Gi0/0          Altn BLK 10     128.1    Shr
  Gi0/1          Altn BLK 10     128.2    Shr
  Gi0/2          Root FWD 4      128.3    Shr
  Gi0/3          Altn BLK 4      128.4    Shr
  Gi1/0          Desg FWD 4      128.5    Shr
  Gi1/1          Desg FWD 4      128.6    Shr
  --More--  █

```

show spanning-tree для SW4 после изменений

```
Layer2Switch-4 - PuTTY

VLAN0001
  Spanning tree enabled protocol ieee
  Root ID  Priority    1
            Address      0c96.ad1f.0000
            Cost          4
            Port         1 (GigabitEthernet0/0)
            Hello Time   2 sec  Max Age 20 sec  Forward Delay 15 sec

  Bridge ID Priority    32769  (priority 32768 sys-id-ext 1)
            Address      0c3e.16c6.0000
            Hello Time   2 sec  Max Age 20 sec  Forward Delay 15 sec
            Aging Time   300 sec

  Interface      Role Sts Cost      Prio.Nbr Type
  -----  -----
  Gi0/0           Root FWD 4       128.1    Shr
  Gi0/1           Altn BLK 4      128.2    Shr
  Gi0/2           Altn BLK 4      128.3    Shr
  Gi0/3           Altn BLK 4      128.4    Shr
  Gi1/0           Desg FWD 4      128.5    Shr
  Gi1/1           Desg FWD 4      128.6    Shr

--More--
```

show spanning-tree для SW5 после изменений

```
Layer2Switch-5 - PuTTY

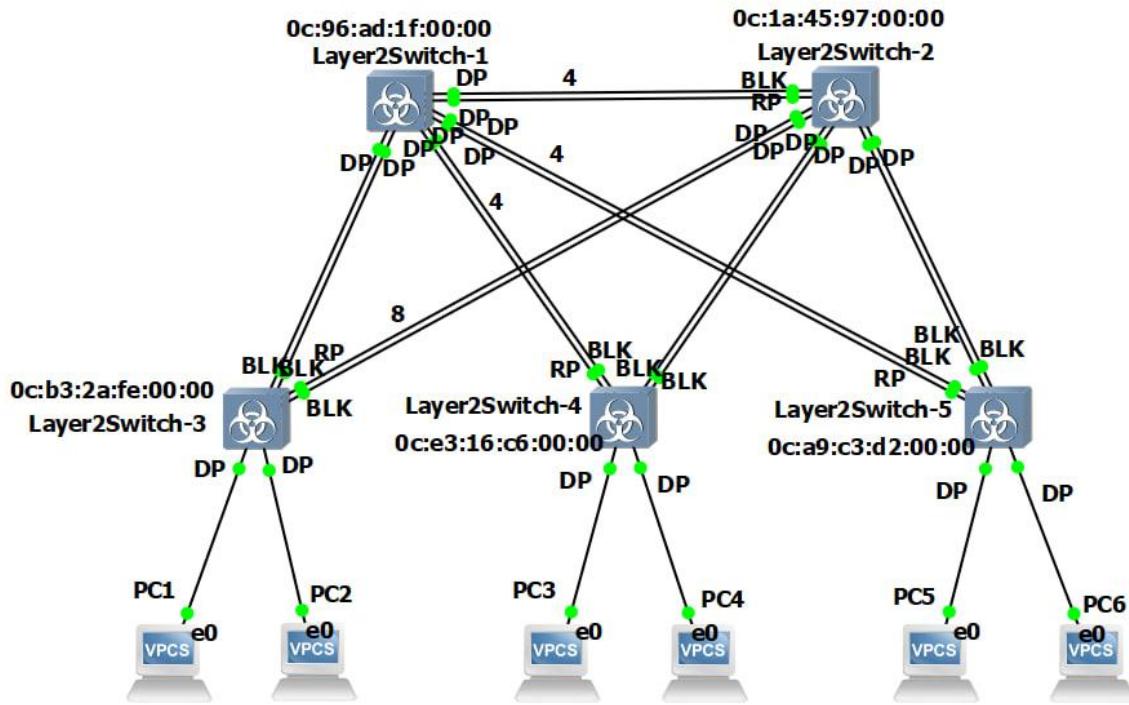
VLAN0001
  Spanning tree enabled protocol ieee
  Root ID  Priority    1
            Address      0c96.ad1f.0000
            Cost          4
            Port         1 (GigabitEthernet0/0)
            Hello Time   2 sec  Max Age 20 sec  Forward Delay 15 sec

  Bridge ID Priority    32769  (priority 32768 sys-id-ext 1)
            Address      0ca9.c3d2.0000
            Hello Time   2 sec  Max Age 20 sec  Forward Delay 15 sec
            Aging Time   300 sec

  Interface      Role Sts Cost      Prio.Nbr Type
  -----  -----
  Gi0/0           Root FWD 4       128.1    Shr
  Gi0/1           Altn BLK 4      128.2    Shr
  Gi0/2           Altn BLK 4      128.3    Shr
  Gi0/3           Altn BLK 4      128.4    Shr
  Gi1/0           Desg FWD 4      128.5    Shr
  Gi1/1           Desg FWD 4      128.6    Shr

--More--
```

Схема после изменения стоимости двух маршрутов:



Теперь путь к корневому коммутатору от SW3 идёт через SW2, а не напрямую, как раньше.

- 6) Сохранить файлы конфигураций устройств в виде набора файлов с именами, соответствующими именам устройств