Лабораторная работа №2

Настройка протокола STP (IEEE 802.1D)

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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.

В качестве корневого коммутатора был выбран Switch4. Для настройки коммутатора переходим в режим конфигурации. Пишем сначала *enable*, после в командной строке *configure terminal*.

Включаем STP и назначаем приоритет с помощью команды *spanning-tree vlan 1 root primary*.

```
vIOS-L2-01>enable
vIOS-L2-01#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
vIOS-L2-01(config)#spanning-tree vlan 1 root primary
vIOS-L2-01(config)#exit
vIOS-L2-01#
*Aug 16 05:17:56.501: %SYS-5-CONFIG_I: Configured from console by console
vIOS-L2-01#show spanning-tree

VLAN0001
  Spanning tree enabled protocol ieee
  Root ID    Priority    24577
             Address     0c73.03c9.0000
             This bridge is the root
             Hello Time   2 sec  Max Age 20 sec  Forward Delay 15 sec

  Bridge ID  Priority    24577  (priority 24576 sys-id-ext 1)
             Address     0c73.03c9.0000
             Hello Time   2 sec  Max Age 20 sec  Forward Delay 15 sec
             Aging Time  15  sec

Interface           Role Sts Cost      Prio.Nbr Type
------------------- ---- --- --------- -------- --------------------------------
Gi0/0               Desg LRN 4         128.1    Shr
Gi0/1               Desg LRN 4         128.2    Shr
Gi0/2               Desg FWD 4         128.3    Shr
```

```
Gi0/3               Desg LRN 4         128.4    Shr
Gi1/0               Desg FWD 4         128.5    Shr
Gi1/1               Desg FWD 4         128.6    Shr
```

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

pc1->pc2

```
PC1> ping 192.168.10.3

84 bytes from 192.168.10.3 icmp_seq=1 ttl=64 time=5.486 ms
84 bytes from 192.168.10.3 icmp_seq=2 ttl=64 time=4.066 ms
84 bytes from 192.168.10.3 icmp_seq=3 ttl=64 time=0.827 ms
84 bytes from 192.168.10.3 icmp_seq=4 ttl=64 time=0.676 ms
84 bytes from 192.168.10.3 icmp_seq=5 ttl=64 time=8.939 ms
```

pc1->pc3

```
PC1> ping 192.168.10.4

84 bytes from 192.168.10.4 icmp_seq=1 ttl=64 time=5.691 ms
84 bytes from 192.168.10.4 icmp_seq=2 ttl=64 time=4.649 ms
84 bytes from 192.168.10.4 icmp_seq=3 ttl=64 time=3.951 ms
84 bytes from 192.168.10.4 icmp_seq=4 ttl=64 time=7.182 ms
84 bytes from 192.168.10.4 icmp_seq=5 ttl=64 time=1.907 ms
```

pc1->pc4

```
PC1> ping 192.168.10.5

84 bytes from 192.168.10.5 icmp_seq=1 ttl=64 time=9.010 ms
84 bytes from 192.168.10.5 icmp_seq=2 ttl=64 time=5.712 ms
84 bytes from 192.168.10.5 icmp_seq=3 ttl=64 time=6.639 ms
84 bytes from 192.168.10.5 icmp_seq=4 ttl=64 time=9.162 ms
84 bytes from 192.168.10.5 icmp_seq=5 ttl=64 time=5.807 ms
```

pc1->pc5

```
PC1> ping 192.168.10.6
```

```
84 bytes from 192.168.10.6 icmp_seq=1 ttl=64 time=5.724 ms
84 bytes from 192.168.10.6 icmp_seq=2 ttl=64 time=6.202 ms
84 bytes from 192.168.10.6 icmp_seq=3 ttl=64 time=7.600 ms
84 bytes from 192.168.10.6 icmp_seq=4 ttl=64 time=13.912 ms
84 bytes from 192.168.10.6 icmp_seq=5 ttl=64 time=6.869 ms
```

pc1->pc6

```
PC1> ping 192.168.10.7

84 bytes from 192.168.10.7 icmp_seq=1 ttl=64 time=8.975 ms
84 bytes from 192.168.10.7 icmp_seq=2 ttl=64 time=7.422 ms
84 bytes from 192.168.10.7 icmp_seq=3 ttl=64 time=5.801 ms
84 bytes from 192.168.10.7 icmp_seq=4 ttl=64 time=8.302 ms
84 bytes from 192.168.10.7 icmp_seq=5 ttl=64 time=7.211 ms
```

pc2->pc3

```
PC2> ping 192.168.10.4

84 bytes from 192.168.10.4 icmp_seq=1 ttl=64 time=6.611 ms
84 bytes from 192.168.10.4 icmp_seq=2 ttl=64 time=7.830 ms
84 bytes from 192.168.10.4 icmp_seq=3 ttl=64 time=13.454 ms
84 bytes from 192.168.10.4 icmp_seq=4 ttl=64 time=2.731 ms
84 bytes from 192.168.10.4 icmp_seq=5 ttl=64 time=1.821 ms
```

pc2->pc4

```
PC2> ping 192.168.10.5

84 bytes from 192.168.10.5 icmp_seq=1 ttl=64 time=4.458 ms
84 bytes from 192.168.10.5 icmp_seq=2 ttl=64 time=1.569 ms
84 bytes from 192.168.10.5 icmp_seq=3 ttl=64 time=1.752 ms
84 bytes from 192.168.10.5 icmp_seq=4 ttl=64 time=8.788 ms
84 bytes from 192.168.10.5 icmp_seq=5 ttl=64 time=8.274 ms
```

pc2->pc5

```
PC2> ping 192.168.10.6
```

```
84 bytes from 192.168.10.6 icmp_seq=1 ttl=64 time=6.157 ms
84 bytes from 192.168.10.6 icmp_seq=2 ttl=64 time=2.334 ms
84 bytes from 192.168.10.6 icmp_seq=3 ttl=64 time=3.803 ms
84 bytes from 192.168.10.6 icmp_seq=4 ttl=64 time=9.515 ms
84 bytes from 192.168.10.6 icmp_seq=5 ttl=64 time=5.492 ms
```

pc2->pc6

```
PC2> ping 192.168.10.7

84 bytes from 192.168.10.7 icmp_seq=1 ttl=64 time=3.440 ms
84 bytes from 192.168.10.7 icmp_seq=2 ttl=64 time=1.819 ms
84 bytes from 192.168.10.7 icmp_seq=3 ttl=64 time=13.554 ms
84 bytes from 192.168.10.7 icmp_seq=4 ttl=64 time=7.525 ms
84 bytes from 192.168.10.7 icmp_seq=5 ttl=64 time=13.765 ms
```

pc3->pc4

```
PC3> ping 192.168.10.5

84 bytes from 192.168.10.5 icmp_seq=1 ttl=64 time=0.805 ms
84 bytes from 192.168.10.5 icmp_seq=2 ttl=64 time=6.395 ms
84 bytes from 192.168.10.5 icmp_seq=3 ttl=64 time=7.827 ms
84 bytes from 192.168.10.5 icmp_seq=4 ttl=64 time=4.228 ms
84 bytes from 192.168.10.5 icmp_seq=5 ttl=64 time=1.819 ms
```

pc3->pc5

```
PC3> ping 192.168.10.6

84 bytes from 192.168.10.6 icmp_seq=1 ttl=64 time=6.552 ms
84 bytes from 192.168.10.6 icmp_seq=2 ttl=64 time=2.863 ms
84 bytes from 192.168.10.6 icmp_seq=3 ttl=64 time=3.526 ms
84 bytes from 192.168.10.6 icmp_seq=4 ttl=64 time=1.593 ms
84 bytes from 192.168.10.6 icmp_seq=5 ttl=64 time=7.909 ms
```

pc3->pc6

```
PC3> ping 192.168.10.7
```

```
84 bytes from 192.168.10.7 icmp_seq=1 ttl=64 time=6.821 ms
84 bytes from 192.168.10.7 icmp_seq=2 ttl=64 time=1.715 ms
84 bytes from 192.168.10.7 icmp_seq=3 ttl=64 time=13.471 ms
84 bytes from 192.168.10.7 icmp_seq=4 ttl=64 time=8.754 ms
84 bytes from 192.168.10.7 icmp_seq=5 ttl=64 time=9.104 ms
```

pc4->pc5

```
PC4> ping 192.168.10.6

84 bytes from 192.168.10.6 icmp_seq=1 ttl=64 time=10.034 ms
84 bytes from 192.168.10.6 icmp_seq=2 ttl=64 time=3.798 ms
84 bytes from 192.168.10.6 icmp_seq=3 ttl=64 time=23.159 ms
84 bytes from 192.168.10.6 icmp_seq=4 ttl=64 time=1.946 ms
84 bytes from 192.168.10.6 icmp_seq=5 ttl=64 time=13.259 ms
```

pc4->pc6

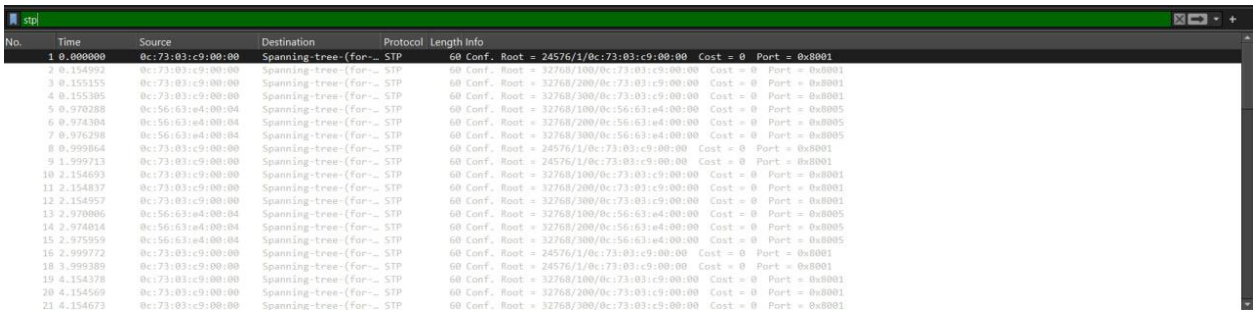
```
PC4> ping 192.168.10.7

84 bytes from 192.168.10.7 icmp_seq=1 ttl=64 time=8.918 ms
84 bytes from 192.168.10.7 icmp_seq=2 ttl=64 time=7.164 ms
84 bytes from 192.168.10.7 icmp_seq=3 ttl=64 time=2.510 ms
84 bytes from 192.168.10.7 icmp_seq=4 ttl=64 time=4.288 ms
84 bytes from 192.168.10.7 icmp_seq=5 ttl=64 time=9.795 ms
```

pc5->pc6

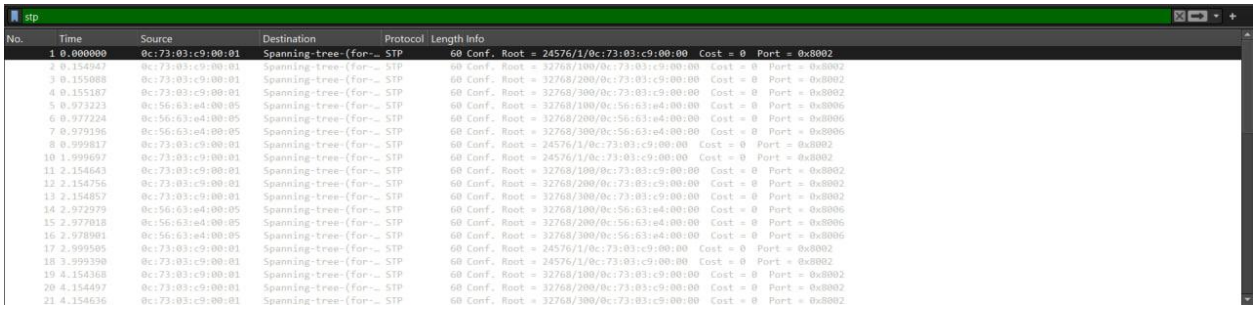
```
PC5> ping 192.168.10.7

84 bytes from 192.168.10.7 icmp_seq=1 ttl=64 time=2.169 ms
84 bytes from 192.168.10.7 icmp_seq=2 ttl=64 time=0.913 ms
84 bytes from 192.168.10.7 icmp_seq=3 ttl=64 time=4.414 ms
84 bytes from 192.168.10.7 icmp_seq=4 ttl=64 time=6.983 ms
84 bytes from 192.168.10.7 icmp_seq=5 ttl=64 time=7.834 ms
```

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

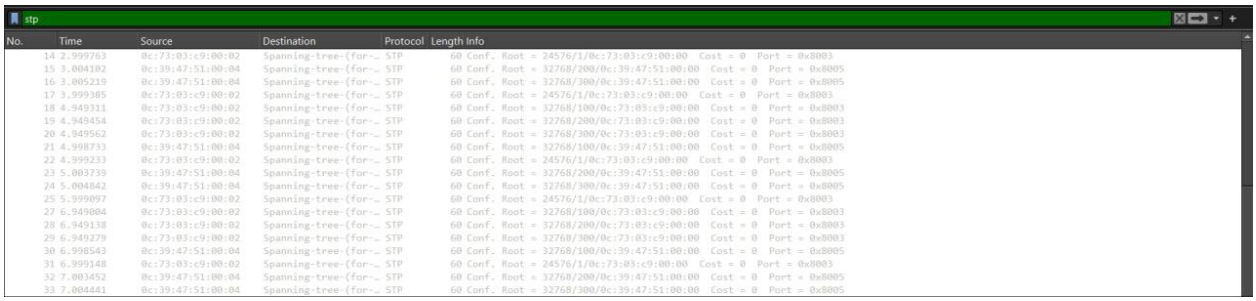
Layer2Switch-1_Ethernet4_to_Layer2Switch-4_Ethernet0



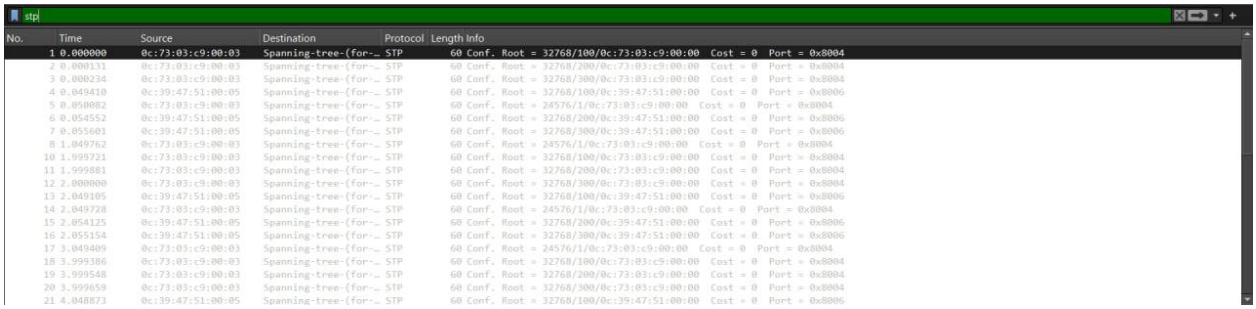
Layer2Switch-1_Ethernet5_to_Layer2Switch-4_Ethernet1



Layer2Switch-2_Ethernet4_to_Layer2Switch-4_Ethernet2



Layer2Switch-2_Ethernet5_to_Layer2Switch-4_Ethernet3



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

Для изменения стоимости выберем Switch1. Заходим в режим конфигурации. Идём дальше и вводим команду *interface GigabitEthernet1/1*. Меняем стоимость с помощью команды *spanning-tree vlan 1 cost 50*.

```
vIOS-L2-01>enable
vIOS-L2-01#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
vIOS-L2-01(config)#interface GigabitEthernet1/1
vIOS-L2-01(config-if)#spanning-tree vlan 1 cost 50
vIOS-L2-01(config-if)#exit
vIOS-L2-01(config)#exit
vIOS-L2-01#show spanning-tree

VLAN0001
  Spanning tree enabled protocol ieee
  Root ID    Priority    24577
             Address     0c73.03c9.0000
             Cost        4
             Port        5 (GigabitEthernet1/0)
             Hello Time   2 sec  Max Age 20 sec  Forward Delay 15 sec

  Bridge ID  Priority    32769  (priority 32768 sys-id-ext 1)
             Address     0c56.63e4.0000
             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 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               Root FWD 4         128.5    Shr
Gi1/1               Altn BLK 50        128.6    Shr
Gi1/2               Desg FWD 4         128.7    Shr
```