

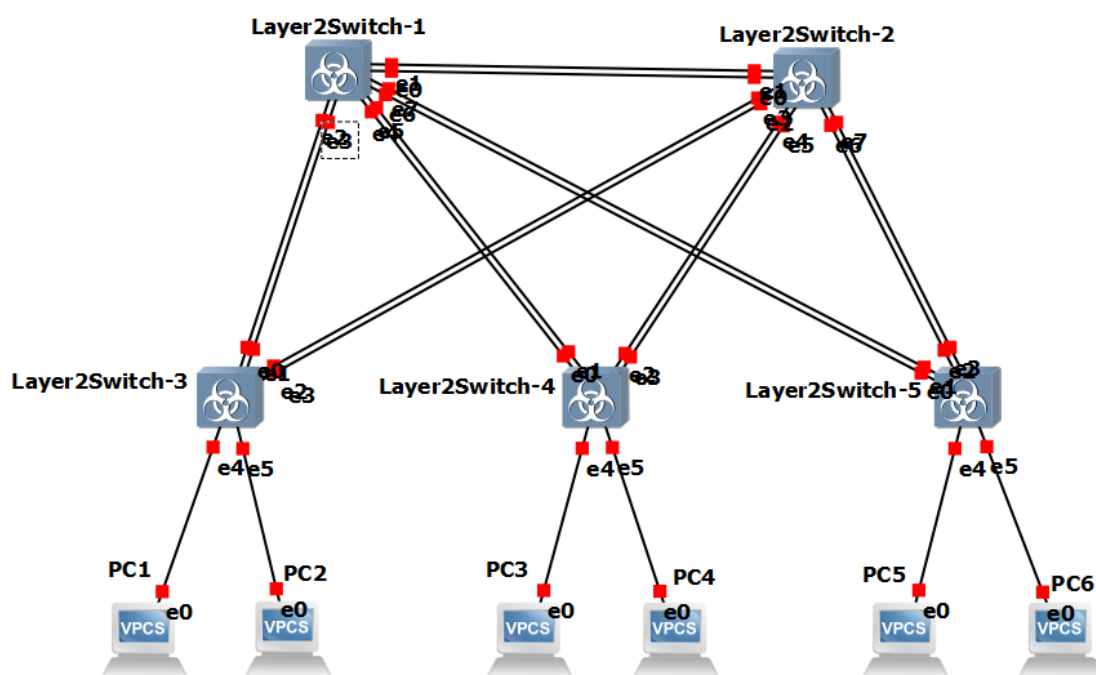
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Лабораторная работа №2.

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

- Исходная схема



Корневым мостом был выбран Layer2Switch - 2, так как при одинаковом приоритете у него оказался самый маленький MAC-адрес.

Явно выберем коммутатор Layer2Switch-3 как корневой. Используем команду `spanning-tree vlan 1 priority 0` для назначения корня.

- Layer2Switch-3

```
Layer2Switch-3 - PuTTY
*May 22 08:00:23.440: %SYS-5-CONFIG_I: Configured from console by console
vIOS-L2-01#show spanning-tree vlan 1

VLAN0001
  Spanning tree enabled protocol ieee
  Root ID    Priority    1
             Address     0c29.0ee1.0000
             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     0c29.0ee1.0000
             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 FWD 4        128.1   Shr
Gi0/1                    Desg FWD 4        128.2   Shr
Gi0/2                    Desg FWD 4        128.3   Shr
Gi0/3                    Desg LIS 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

```
PC1> ping 192.168.1.2

84 bytes from 192.168.1.2 icmp_seq=1 ttl=64 time=6.509 ms
84 bytes from 192.168.1.2 icmp_seq=2 ttl=64 time=5.477 ms
84 bytes from 192.168.1.2 icmp_seq=3 ttl=64 time=4.450 ms
84 bytes from 192.168.1.2 icmp_seq=4 ttl=64 time=6.261 ms
84 bytes from 192.168.1.2 icmp_seq=5 ttl=64 time=1.736 ms

PC1> ping 192.168.1.3

84 bytes from 192.168.1.3 icmp_seq=1 ttl=64 time=7.889 ms
84 bytes from 192.168.1.3 icmp_seq=2 ttl=64 time=11.401 ms
84 bytes from 192.168.1.3 icmp_seq=3 ttl=64 time=2.288 ms
84 bytes from 192.168.1.3 icmp_seq=4 ttl=64 time=5.152 ms
84 bytes from 192.168.1.3 icmp_seq=5 ttl=64 time=10.505 ms

PC1> ping 192.168.1.4

84 bytes from 192.168.1.4 icmp_seq=1 ttl=64 time=14.530 ms
84 bytes from 192.168.1.4 icmp_seq=2 ttl=64 time=3.110 ms
84 bytes from 192.168.1.4 icmp_seq=3 ttl=64 time=2.666 ms
84 bytes from 192.168.1.4 icmp_seq=4 ttl=64 time=11.152 ms
84 bytes from 192.168.1.4 icmp_seq=5 ttl=64 time=1.958 ms

PC1> ping 192.168.1.5

84 bytes from 192.168.1.5 icmp_seq=1 ttl=64 time=4.997 ms
84 bytes from 192.168.1.5 icmp_seq=2 ttl=64 time=11.825 ms
84 bytes from 192.168.1.5 icmp_seq=3 ttl=64 time=5.126 ms
84 bytes from 192.168.1.5 icmp_seq=4 ttl=64 time=9.251 ms
84 bytes from 192.168.1.5 icmp_seq=5 ttl=64 time=7.798 ms

PC1> ping 192.168.1.6

84 bytes from 192.168.1.6 icmp_seq=1 ttl=64 time=8.884 ms
84 bytes from 192.168.1.6 icmp_seq=2 ttl=64 time=8.208 ms
84 bytes from 192.168.1.6 icmp_seq=3 ttl=64 time=2.161 ms
84 bytes from 192.168.1.6 icmp_seq=4 ttl=64 time=9.800 ms
84 bytes from 192.168.1.6 icmp_seq=5 ttl=64 time=12.703 ms

PC1> █
```

- PC2

```
PC2> ping 192.168.1.1

84 bytes from 192.168.1.1 icmp_seq=1 ttl=64 time=10.260 ms
84 bytes from 192.168.1.1 icmp_seq=2 ttl=64 time=4.534 ms
84 bytes from 192.168.1.1 icmp_seq=3 ttl=64 time=8.968 ms
84 bytes from 192.168.1.1 icmp_seq=4 ttl=64 time=8.302 ms
84 bytes from 192.168.1.1 icmp_seq=5 ttl=64 time=2.378 ms

PC2> ping 192.168.1.3

84 bytes from 192.168.1.3 icmp_seq=1 ttl=64 time=2.932 ms
84 bytes from 192.168.1.3 icmp_seq=2 ttl=64 time=5.135 ms
84 bytes from 192.168.1.3 icmp_seq=3 ttl=64 time=8.396 ms
84 bytes from 192.168.1.3 icmp_seq=4 ttl=64 time=5.039 ms
84 bytes from 192.168.1.3 icmp_seq=5 ttl=64 time=13.659 ms

PC2> ping 192.168.1.4

84 bytes from 192.168.1.4 icmp_seq=1 ttl=64 time=8.671 ms
84 bytes from 192.168.1.4 icmp_seq=2 ttl=64 time=14.188 ms
84 bytes from 192.168.1.4 icmp_seq=3 ttl=64 time=6.294 ms
84 bytes from 192.168.1.4 icmp_seq=4 ttl=64 time=8.010 ms
84 bytes from 192.168.1.4 icmp_seq=5 ttl=64 time=8.323 ms

PC2> ping 192.168.1.5

84 bytes from 192.168.1.5 icmp_seq=1 ttl=64 time=8.974 ms
84 bytes from 192.168.1.5 icmp_seq=2 ttl=64 time=13.645 ms
84 bytes from 192.168.1.5 icmp_seq=3 ttl=64 time=6.017 ms
84 bytes from 192.168.1.5 icmp_seq=4 ttl=64 time=6.336 ms
84 bytes from 192.168.1.5 icmp_seq=5 ttl=64 time=12.147 ms

PC2> ping 192.168.1.6

84 bytes from 192.168.1.6 icmp_seq=1 ttl=64 time=6.088 ms
84 bytes from 192.168.1.6 icmp_seq=2 ttl=64 time=14.600 ms
84 bytes from 192.168.1.6 icmp_seq=3 ttl=64 time=5.455 ms
84 bytes from 192.168.1.6 icmp_seq=4 ttl=64 time=4.096 ms
84 bytes from 192.168.1.6 icmp_seq=5 ttl=64 time=7.521 ms

PC2> █
```

- PC3

```
PC3> ping 192.168.1.1

84 bytes from 192.168.1.1 icmp_seq=1 ttl=64 time=8.272 ms
84 bytes from 192.168.1.1 icmp_seq=2 ttl=64 time=5.843 ms
84 bytes from 192.168.1.1 icmp_seq=3 ttl=64 time=8.910 ms
84 bytes from 192.168.1.1 icmp_seq=4 ttl=64 time=7.092 ms
84 bytes from 192.168.1.1 icmp_seq=5 ttl=64 time=3.411 ms

PC3> ping 192.168.1.2

84 bytes from 192.168.1.2 icmp_seq=1 ttl=64 time=14.620 ms
84 bytes from 192.168.1.2 icmp_seq=2 ttl=64 time=4.521 ms
84 bytes from 192.168.1.2 icmp_seq=3 ttl=64 time=4.885 ms
84 bytes from 192.168.1.2 icmp_seq=4 ttl=64 time=5.316 ms
84 bytes from 192.168.1.2 icmp_seq=5 ttl=64 time=6.577 ms

PC3> ping 192.168.1.4

84 bytes from 192.168.1.4 icmp_seq=1 ttl=64 time=2.665 ms
84 bytes from 192.168.1.4 icmp_seq=2 ttl=64 time=6.166 ms
84 bytes from 192.168.1.4 icmp_seq=3 ttl=64 time=1.110 ms
84 bytes from 192.168.1.4 icmp_seq=4 ttl=64 time=0.673 ms
84 bytes from 192.168.1.4 icmp_seq=5 ttl=64 time=2.990 ms

PC3> ping 192.168.1.5

84 bytes from 192.168.1.5 icmp_seq=1 ttl=64 time=20.466 ms
84 bytes from 192.168.1.5 icmp_seq=2 ttl=64 time=8.928 ms
84 bytes from 192.168.1.5 icmp_seq=3 ttl=64 time=7.747 ms
84 bytes from 192.168.1.5 icmp_seq=4 ttl=64 time=6.652 ms
84 bytes from 192.168.1.5 icmp_seq=5 ttl=64 time=17.873 ms

PC3> ping 192.168.1.6

84 bytes from 192.168.1.6 icmp_seq=1 ttl=64 time=14.292 ms
84 bytes from 192.168.1.6 icmp_seq=2 ttl=64 time=6.157 ms
84 bytes from 192.168.1.6 icmp_seq=3 ttl=64 time=9.369 ms
84 bytes from 192.168.1.6 icmp_seq=4 ttl=64 time=8.698 ms
84 bytes from 192.168.1.6 icmp_seq=5 ttl=64 time=8.085 ms

PC3> █
```

- PC4

```
PC4> ping 192.168.1.1

84 bytes from 192.168.1.1 icmp_seq=1 ttl=64 time=13.477 ms
84 bytes from 192.168.1.1 icmp_seq=2 ttl=64 time=12.154 ms
84 bytes from 192.168.1.1 icmp_seq=3 ttl=64 time=9.407 ms
84 bytes from 192.168.1.1 icmp_seq=4 ttl=64 time=7.717 ms
84 bytes from 192.168.1.1 icmp_seq=5 ttl=64 time=8.244 ms

PC4> ping 192.168.1.2

84 bytes from 192.168.1.2 icmp_seq=1 ttl=64 time=5.191 ms
84 bytes from 192.168.1.2 icmp_seq=2 ttl=64 time=13.098 ms
84 bytes from 192.168.1.2 icmp_seq=3 ttl=64 time=9.747 ms
84 bytes from 192.168.1.2 icmp_seq=4 ttl=64 time=5.940 ms
84 bytes from 192.168.1.2 icmp_seq=5 ttl=64 time=18.069 ms

PC4> ping 192.168.1.3

84 bytes from 192.168.1.3 icmp_seq=1 ttl=64 time=7.454 ms
84 bytes from 192.168.1.3 icmp_seq=2 ttl=64 time=0.700 ms
84 bytes from 192.168.1.3 icmp_seq=3 ttl=64 time=0.953 ms
84 bytes from 192.168.1.3 icmp_seq=4 ttl=64 time=1.257 ms
84 bytes from 192.168.1.3 icmp_seq=5 ttl=64 time=3.643 ms

PC4> ping 192.168.1.5

84 bytes from 192.168.1.5 icmp_seq=1 ttl=64 time=2.986 ms
84 bytes from 192.168.1.5 icmp_seq=2 ttl=64 time=7.281 ms
84 bytes from 192.168.1.5 icmp_seq=3 ttl=64 time=8.914 ms
84 bytes from 192.168.1.5 icmp_seq=4 ttl=64 time=2.696 ms
84 bytes from 192.168.1.5 icmp_seq=5 ttl=64 time=7.717 ms

PC4> ping 192.168.1.6

84 bytes from 192.168.1.6 icmp_seq=1 ttl=64 time=2.930 ms
84 bytes from 192.168.1.6 icmp_seq=2 ttl=64 time=10.218 ms
84 bytes from 192.168.1.6 icmp_seq=3 ttl=64 time=8.877 ms
84 bytes from 192.168.1.6 icmp_seq=4 ttl=64 time=5.067 ms
84 bytes from 192.168.1.6 icmp_seq=5 ttl=64 time=3.030 ms

PC4> █
```

- PC5


```
PC5> ping 192.168.1.1

84 bytes from 192.168.1.1 icmp_seq=1 ttl=64 time=9.294 ms
84 bytes from 192.168.1.1 icmp_seq=2 ttl=64 time=9.075 ms
84 bytes from 192.168.1.1 icmp_seq=3 ttl=64 time=10.603 ms
84 bytes from 192.168.1.1 icmp_seq=4 ttl=64 time=4.598 ms
84 bytes from 192.168.1.1 icmp_seq=5 ttl=64 time=9.273 ms

PC5> ping 192.168.1.2

84 bytes from 192.168.1.2 icmp_seq=1 ttl=64 time=14.854 ms
84 bytes from 192.168.1.2 icmp_seq=2 ttl=64 time=8.466 ms
84 bytes from 192.168.1.2 icmp_seq=3 ttl=64 time=2.417 ms
84 bytes from 192.168.1.2 icmp_seq=4 ttl=64 time=11.656 ms
84 bytes from 192.168.1.2 icmp_seq=5 ttl=64 time=7.192 ms

PC5> ping 192.168.1.3

84 bytes from 192.168.1.3 icmp_seq=1 ttl=64 time=10.600 ms
84 bytes from 192.168.1.3 icmp_seq=2 ttl=64 time=5.212 ms
84 bytes from 192.168.1.3 icmp_seq=3 ttl=64 time=10.753 ms
84 bytes from 192.168.1.3 icmp_seq=4 ttl=64 time=10.147 ms
84 bytes from 192.168.1.3 icmp_seq=5 ttl=64 time=5.907 ms

PC5> ping 192.168.1.4

84 bytes from 192.168.1.4 icmp_seq=1 ttl=64 time=9.587 ms
84 bytes from 192.168.1.4 icmp_seq=2 ttl=64 time=8.223 ms
84 bytes from 192.168.1.4 icmp_seq=3 ttl=64 time=16.777 ms
84 bytes from 192.168.1.4 icmp_seq=4 ttl=64 time=14.489 ms
84 bytes from 192.168.1.4 icmp_seq=5 ttl=64 time=7.859 ms

PC5> ping 192.168.1.6

84 bytes from 192.168.1.6 icmp_seq=1 ttl=64 time=0.698 ms
84 bytes from 192.168.1.6 icmp_seq=2 ttl=64 time=9.545 ms
84 bytes from 192.168.1.6 icmp_seq=3 ttl=64 time=1.061 ms
84 bytes from 192.168.1.6 icmp_seq=4 ttl=64 time=6.253 ms
84 bytes from 192.168.1.6 icmp_seq=5 ttl=64 time=7.626 ms

PC5> 
```

- PC6

```
PC6> ping 192.168.1.1

84 bytes from 192.168.1.1 icmp_seq=1 ttl=64 time=13.983 ms
84 bytes from 192.168.1.1 icmp_seq=2 ttl=64 time=9.401 ms
84 bytes from 192.168.1.1 icmp_seq=3 ttl=64 time=3.466 ms
84 bytes from 192.168.1.1 icmp_seq=4 ttl=64 time=10.709 ms
84 bytes from 192.168.1.1 icmp_seq=5 ttl=64 time=5.604 ms

PC6> ping 192.168.1.2

84 bytes from 192.168.1.2 icmp_seq=1 ttl=64 time=20.080 ms
84 bytes from 192.168.1.2 icmp_seq=2 ttl=64 time=6.036 ms
84 bytes from 192.168.1.2 icmp_seq=3 ttl=64 time=14.506 ms
84 bytes from 192.168.1.2 icmp_seq=4 ttl=64 time=9.229 ms
84 bytes from 192.168.1.2 icmp_seq=5 ttl=64 time=6.776 ms

PC6> ping 192.168.1.3

84 bytes from 192.168.1.3 icmp_seq=1 ttl=64 time=8.575 ms
84 bytes from 192.168.1.3 icmp_seq=2 ttl=64 time=6.621 ms
84 bytes from 192.168.1.3 icmp_seq=3 ttl=64 time=2.889 ms
84 bytes from 192.168.1.3 icmp_seq=4 ttl=64 time=9.112 ms
84 bytes from 192.168.1.3 icmp_seq=5 ttl=64 time=17.313 ms

PC6> ping 192.168.1.4

84 bytes from 192.168.1.4 icmp_seq=1 ttl=64 time=5.786 ms
84 bytes from 192.168.1.4 icmp_seq=2 ttl=64 time=9.029 ms
84 bytes from 192.168.1.4 icmp_seq=3 ttl=64 time=19.407 ms
84 bytes from 192.168.1.4 icmp_seq=4 ttl=64 time=10.095 ms
84 bytes from 192.168.1.4 icmp_seq=5 ttl=64 time=8.984 ms

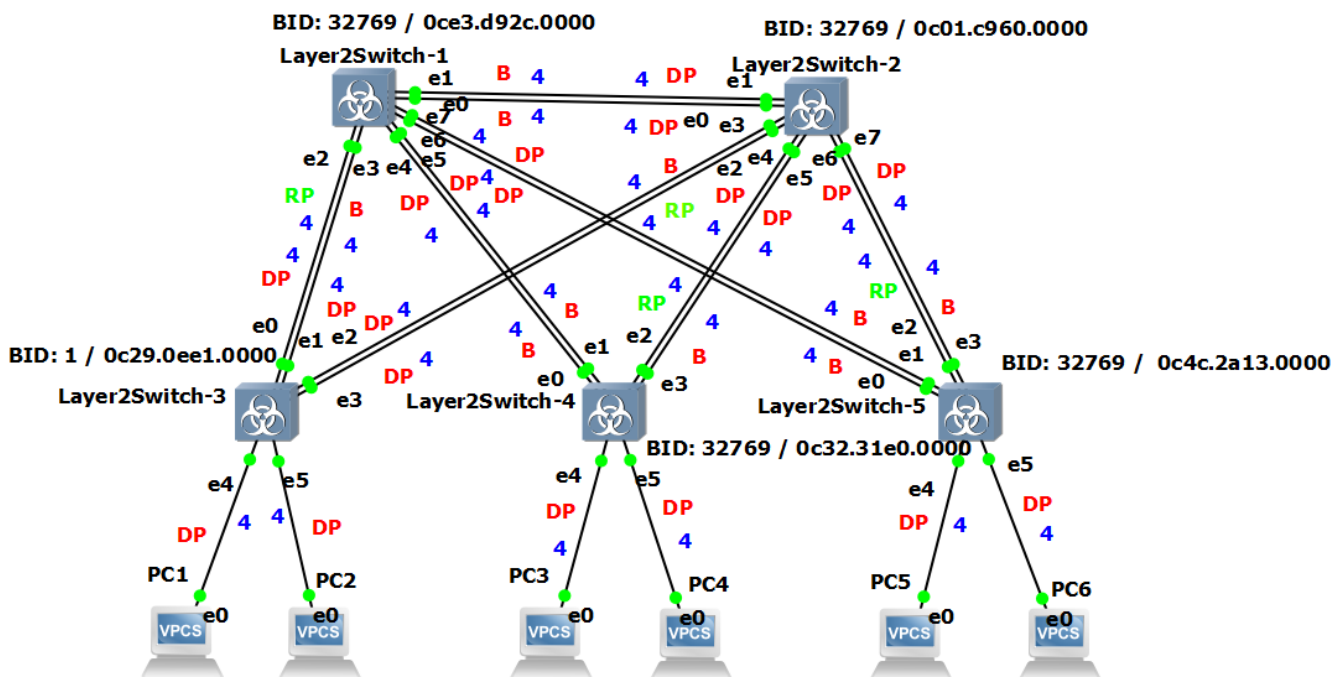
PC6> ping 192.168.1.5

84 bytes from 192.168.1.5 icmp_seq=1 ttl=64 time=0.744 ms
84 bytes from 192.168.1.5 icmp_seq=2 ttl=64 time=9.382 ms
84 bytes from 192.168.1.5 icmp_seq=3 ttl=64 time=1.595 ms
84 bytes from 192.168.1.5 icmp_seq=4 ttl=64 time=2.005 ms
84 bytes from 192.168.1.5 icmp_seq=5 ttl=64 time=3.737 ms

PC6> █
```

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

- Схема



Стоимость пути к корневому мосту для Layer2switch-1, Layer2switch-2 равна 4.

Стоимость пути к корневому мосту для Layer2switch-4, Layer2switch-5 равна 8.

4) При помощи wireshark отследить передачу пакетов hello от корневого коммутатора на всех линках (nb!), результаты включить в отчет. Корневой у нас Layer2switch-3.

- Линк Layer2Switch-1_Ethernet2_to_Layer2Switch-3_Ethernet0.

Захват из Standard input [Layer2Switch-1 Ethernet2 to Layer2Switch-3 Ethernet0]

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

stp

No.	Time	Source	Destination	Protocol	Leng	Info
1	0.000000	0c:29:0e:e1:00:00	Spanning-tree-(for-...	STP	60	Conf. Root = 32768/100/0c:29:0e:e1:00:00 Cost = 0 Port = 0x8001
2	0.050286	0c:29:0e:e1:00:00	Spanning-tree-(for-...	STP	60	Conf. Root = 32768/200/0c:29:0e:e1:00:00 Cost = 0 Port = 0x8001
3	0.052099	0c:29:0e:e1:00:00	Spanning-tree-(for-...	STP	60	Conf. Root = 32768/300/0c:29:0e:e1:00:00 Cost = 0 Port = 0x8001
4	0.146056	0c:29:0e:e1:00:00	Spanning-tree-(for-...	STP	60	Conf. Root = 0/1/0c:29:0e:e1:00:00 Cost = 0 Port = 0x8001
5	1.147174	0c:29:0e:e1:00:00	Spanning-tree-(for-...	STP	60	Conf. Root = 0/1/0c:29:0e:e1:00:00 Cost = 0 Port = 0x8001
6	1.255011	0c:e3:d9:2c:00:02	Spanning-tree-(for-...	STP	60	Conf. Root = 32768/100/0c:e3:d9:2c:00:00 Cost = 0 Port = 0x8003

> Frame 1: 60 bytes on wire (480 bits), 60 bytes captured (480 bits) on interface 0

▼ Ethernet II, Src: 0c:29:0e:e1:00:00 (0c:29:0e:e1:00:00), Dst: Spanning-tree-0 (01:80:c2:00:00:00)

> Destination: Spanning-tree-(for-bridges)_00 (01:80:c2:00:00:00)

> Source: 0c:29:0e:e1:00:00 (0c:29:0e:e1:00:00)

Type: 802.1Q Virtual LAN (0x8100)

[Stream index: 0]

> 802.1Q Virtual LAN, PRI: 0, DEI: 0, ID: 100

> Logical-Link Control

▼ Spanning Tree Protocol

Protocol Identifier: Spanning Tree Protocol (0x0000)

Protocol Version Identifier: Spanning Tree (0)

BPDU Type: Configuration (0x00)

> BPDU flags: 0x00

> Root Identifier: 32768 / 100 / 0c:29:0e:e1:00:00

Root Path Cost: 0

> Bridge Identifier: 32768 / 100 / 0c:29:0e:e1:00:00

Port identifier: 0x8001

Message Age: 0

Max Age: 20

Hello Time: 2

Forward Delay: 15

Spanning Tree Protocol: Protocol

Пакеты: 2274 · Отображено: 2104 (92.5%)

Профиль: Default

- Линк Layer2Switch-1_Ethernet3_to_Layer2Switch-3_Ethernet1.

Захват из Standard input [Layer2Switch-1 Ethernet3 to Layer2Switch-3 Ethernet1]

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

stp

No.	Time	Source	Destination	Protocol	Leng	Info
1	0.000000	0c:29:0e:e1:00:01	Spanning-tree-(for...	STP	60	Conf. Root = 32768/100/0c:29:0e:e1:00:00 Cost = 0 Port = 0x8002
2	0.015607	0c:e3:d9:2c:00:03	Spanning-tree-(for...	STP	60	Conf. Root = 32768/100/0c:e3:d9:2c:00:00 Cost = 0 Port = 0x8004
3	0.016629	0c:29:0e:e1:00:01	Spanning-tree-(for...	STP	60	Conf. Root = 0/1/0c:29:0e:e1:00:00 Cost = 0 Port = 0x8002
4	0.020596	0c:e3:d9:2c:00:03	Spanning-tree-(for...	STP	60	Conf. Root = 32768/200/0c:e3:d9:2c:00:00 Cost = 0 Port = 0x8004
5	0.051423	0c:29:0e:e1:00:01	Spanning-tree-(for...	STP	60	Conf. Root = 32768/200/0c:29:0e:e1:00:00 Cost = 0 Port = 0x8002
6	0.054703	0c:29:0e:e1:00:01	Spanning-tree-(for...	STP	60	Conf. Root = 32768/300/0c:29:0e:e1:00:00 Cost = 0 Port = 0x8002
7	0.104633	0c:e3:d9:2c:00:03	Spanning-tree-(for...	STP	60	Conf. Root = 32768/300/0c:e3:d9:2c:00:00 Cost = 0 Port = 0x8004
8	1.020432	0c:29:0e:e1:00:01	Spanning-tree-(for...	STP	60	Conf. Root = 0/1/0c:29:0e:e1:00:00 Cost = 0 Port = 0x8002
9	2.004155	0c:29:0e:e1:00:01	Spanning-tree-(for...	STP	60	Conf. Root = 32768/100/0c:29:0e:e1:00:00 Cost = 0 Port = 0x8002
10	2.018273	0c:e3:d9:2c:00:03	Spanning-tree-(for...	STP	60	Conf. Root = 32768/100/0c:e3:d9:2c:00:00 Cost = 0 Port = 0x8004
11	2.021414	0c:29:0e:e1:00:01	Spanning-tree-(for...	STP	60	Conf. Root = 0/1/0c:29:0e:e1:00:00 Cost = 0 Port = 0x8002
12	2.023270	0c:e3:d9:2c:00:03	Spanning-tree-(for...	STP	60	Conf. Root = 32768/200/0c:e3:d9:2c:00:00 Cost = 0 Port = 0x8004
13	2.056090	0c:29:0e:e1:00:01	Spanning-tree-(for...	STP	60	Conf. Root = 32768/200/0c:29:0e:e1:00:00 Cost = 0 Port = 0x8002
14	2.059123	0c:29:0e:e1:00:01	Spanning-tree-(for...	STP	60	Conf. Root = 32768/300/0c:29:0e:e1:00:00 Cost = 0 Port = 0x8002

Spanning Tree Protocol

Protocol Identifier: Spanning Tree Protocol (0x0000)
 Protocol Version Identifier: Spanning Tree (0)
 BPDU Type: Configuration (0x00)
 > BPDU flags: 0x00
 > Root Identifier: 32768 / 100 / 0c:29:0e:e1:00:00
 Root Path Cost: 0
 > Bridge Identifier: 32768 / 100 / 0c:29:0e:e1:00:00
 Port identifier: 0x8002
 Message Age: 0
 Max Age: 20
 Hello Time: 2
 Forward Delay: 15

Spanning Tree Protocol: Protocol

Пакеты: 1290 · Отображено: 1195 (92.6%)

Профиль: Default

- Линк Layer2Switch-3_Ethernet3_to_Layer2Switch-2_Ethernet3

Захват из Standard input [Layer2Switch-3 Ethernet3 to Layer2Switch-2 Ethernet3]

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

stp

No.	Time	Source	Destination	Protocol	Leng	Info
1	0.000000	0c:29:0e:e1:00:03	Spanning-tree-(for...	STP	60	Conf. Root = 32768/200/0c:29:0e:e1:00:00 Cost = 0 Port = 0x8004
2	0.003933	0c:29:0e:e1:00:03	Spanning-tree-(for...	STP	60	Conf. Root = 32768/300/0c:29:0e:e1:00:00 Cost = 0 Port = 0x8004
3	0.106851	0c:29:0e:e1:00:03	Spanning-tree-(for...	STP	60	Conf. Root = 0/1/0c:29:0e:e1:00:00 Cost = 0 Port = 0x8004
4	0.173006	0c:01:c9:60:00:03	Spanning-tree-(for...	STP	60	Conf. Root = 32768/100/0c:01:c9:60:00:00 Cost = 0 Port = 0x8004
5	0.242090	0c:01:c9:60:00:03	Spanning-tree-(for...	STP	60	Conf. Root = 32768/200/0c:01:c9:60:00:00 Cost = 0 Port = 0x8004

> Frame 1: 60 bytes on wire (480 bits), 60 bytes captured (480 bits) on interface 0

> Ethernet II, Src: 0c:29:0e:e1:00:03 (0c:29:0e:e1:00:03), Dst: Spanning-tree-00 (01:80:c2:00:00:00)

> Destination: Spanning-tree-(for-bridges)_00 (01:80:c2:00:00:00)
 > Source: 0c:29:0e:e1:00:03 (0c:29:0e:e1:00:03)
 Type: 802.1Q Virtual LAN (0x8100)
 [Stream index: 0]

> 802.1Q Virtual LAN, PRI: 0, DEI: 0, ID: 200

> Logical-Link Control

> Spanning Tree Protocol

Protocol Identifier: Spanning Tree Protocol (0x0000)
 Protocol Version Identifier: Spanning Tree (0)
 BPDU Type: Configuration (0x00)
 > BPDU flags: 0x00
 > Root Identifier: 32768 / 200 / 0c:29:0e:e1:00:00
 Root Path Cost: 0
 > Bridge Identifier: 32768 / 200 / 0c:29:0e:e1:00:00
 Port identifier: 0x8004
 Message Age: 0
 Max Age: 20
 Hello Time: 2
 Forward Delay: 15

Spanning Tree Protocol: Protocol

Пакеты: 116 · Отображено: 108 (93.1%)

Профиль: Default

- Линк Layer2Switch-3_Ethernet2_to_Layer2Switch-2_Ethernet2

Захват из Standard input [Layer2Switch-3 Ethernet2 to Layer2Switch-2 Ethernet2]

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

stp

No.	Time	Source	Destination	Protocol	Leng	Info
1	0.000000	0c:01:c9:60:00:02	Spanning-tree-(for-...	STP	60	Conf. Root = 32768/100/0c:01:c9:60:00:00 Cost = 0 Port = 0x8003
2	0.071051	0c:01:c9:60:00:02	Spanning-tree-(for-...	STP	60	Conf. Root = 32768/200/0c:01:c9:60:00:00 Cost = 0 Port = 0x8003
3	0.175026	0c:01:c9:60:00:02	Spanning-tree-(for-...	STP	60	Conf. Root = 32768/300/0c:01:c9:60:00:00 Cost = 0 Port = 0x8003
4	0.474036	0c:29:0e:e1:00:02	Spanning-tree-(for-...	STP	60	Conf. Root = 0/1/0c:29:0e:e1:00:00 Cost = 0 Port = 0x8003
5	1.318787	0c:29:0e:e1:00:02	Spanning-tree-(for-...	STP	60	Conf. Root = 32768/100/0c:29:0e:e1:00:00 Cost = 0 Port = 0x8003
6	1.366716	0c:29:0e:e1:00:02	Spanning-tree-(for-...	STP	60	Conf. Root = 32768/200/0c:29:0e:e1:00:00 Cost = 0 Port = 0x8003

> Frame 1: 60 bytes on wire (480 bits), 60 bytes captured (480 bits) on interface 0
 > Ethernet II, Src: 0c:01:c9:60:00:02 (0c:01:c9:60:00:02), Dst: Spanning-tree-
 > Destination: Spanning-tree-(for-bridges)_00 (01:80:c2:00:00:00)
 > Source: 0c:01:c9:60:00:02 (0c:01:c9:60:00:02)
 > Type: 802.1Q Virtual LAN (0x8100)
 [Stream index: 0]
 > 802.1Q Virtual LAN, PRI: 0, DEI: 0, ID: 100
 > Logical-Link Control
 > Spanning Tree Protocol
 > Protocol Identifier: Spanning Tree Protocol (0x0000)
 > Protocol Version Identifier: Spanning Tree (0)
 > BPDU Type: Configuration (0x00)
 > BPDU flags: 0x00
 > Root Identifier: 32768 / 100 / 0c:01:c9:60:00:00
 > Root Path Cost: 0
 > Bridge Identifier: 32768 / 100 / 0c:01:c9:60:00:00
 > Port identifier: 0x8003
 > Message Age: 0
 > Max Age: 20
 > Hello Time: 2
 > Forward Delay: 15

Spanning Tree Protocol: Protocol

Пакеты: 69 · Отображено: 64 (92.8%)

Профиль: Default

- Линк Layer2Switch-3_Ethernet5_to_PC2_Ethernet0

Захват из Standard input [Layer2Switch-3 Ethernet5 to PC2 Ethernet0]

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

Примените фильтр отображения ... <Ctrl-/>

No.	Time	Source	Destination	Protocol	Leng	Info
1	0.000000	0c:29:0e:e1:00:05	Spanning-tree-(for-...	STP	60	Conf. Root = 0/1/0c:29:0e:e1:00:00 Cost = 0 Port = 0x8006
2	2.001725	0c:29:0e:e1:00:05	Spanning-tree-(for-...	STP	60	Conf. Root = 0/1/0c:29:0e:e1:00:00 Cost = 0 Port = 0x8006
3	2.389808	0c:29:0e:e1:00:05	0c:29:0e:e1:00:05	LOOP	60	Reply
4	4.001394	0c:29:0e:e1:00:05	Spanning-tree-(for-...	STP	60	Conf. Root = 0/1/0c:29:0e:e1:00:00 Cost = 0 Port = 0x8006
5	6.002139	0c:29:0e:e1:00:05	Spanning-tree-(for-...	STP	60	Conf. Root = 0/1/0c:29:0e:e1:00:00 Cost = 0 Port = 0x8006
6	8.001798	0c:29:0e:e1:00:05	Spanning-tree-(for-...	STP	60	Conf. Root = 0/1/0c:29:0e:e1:00:00 Cost = 0 Port = 0x8006

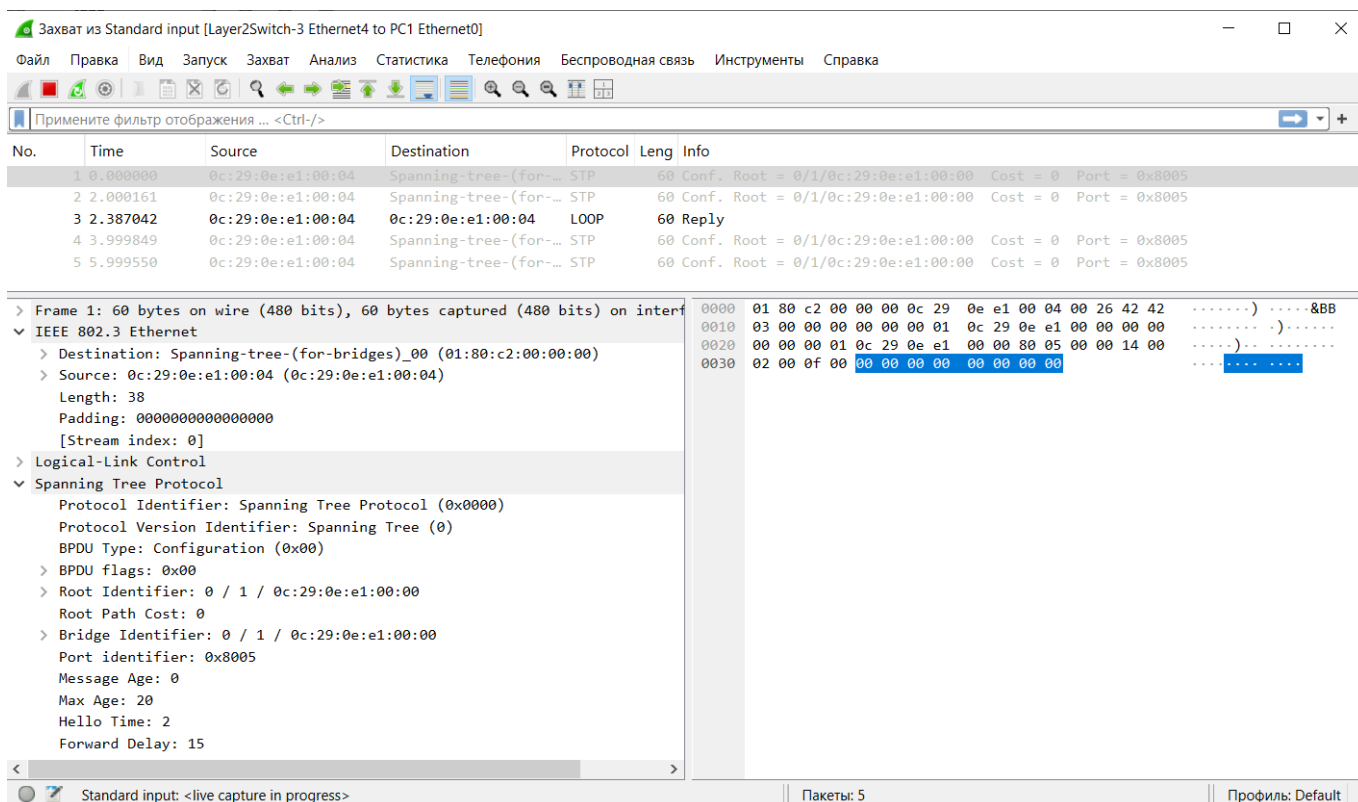
> Frame 1: 60 bytes on wire (480 bits), 60 bytes captured (480 bits) on interface 0
 > IEEE 802.3 Ethernet
 > Destination: Spanning-tree-(for-bridges)_00 (01:80:c2:00:00:00)
 > Source: 0c:29:0e:e1:00:05 (0c:29:0e:e1:00:05)
 > Length: 38
 > Padding: 0000000000000000
 [Stream index: 0]
 > Logical-Link Control
 > Spanning Tree Protocol
 > Protocol Identifier: Spanning Tree Protocol (0x0000)
 > Protocol Version Identifier: Spanning Tree (0)
 > BPDU Type: Configuration (0x00)
 > BPDU flags: 0x00
 > Root Identifier: 0 / 1 / 0c:29:0e:e1:00:00
 > Root Path Cost: 0
 > Bridge Identifier: 0 / 1 / 0c:29:0e:e1:00:00
 > Port identifier: 0x8006
 > Message Age: 0
 > Max Age: 20
 > Hello Time: 2
 > Forward Delay: 15

wireshark_Standard inputEUMJ62.pcapng

Пакеты: 17

Профиль: Default

- Линк Layer2Switch-3_Ethernet4_to_PC1_Ethernet0



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

Изменим стоимость маршрута у **Layer2Switch-1**.

vIOS-L2-01>enable

vIOS-L2-01#conf ter

Enter configuration commands, one per line. End with CNTL/Z.

vIOS-L2-01(config)#interface GigabitEthernet0/2

vIOS-L2-01(config-if)#spanning-tree cost 19

- ДО

```
Layer2Switch-1 - PuTTY
*****
vIOS-L2-01>show spanning-tree vlan 1

VLAN0001
  Spanning tree enabled protocol ieee
  Root ID    Priority    1
             Address    0c29.0ee1.0000
             Cost        4
             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    0ce3.d92c.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                    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
Gi1/2                    Desg FWD 4         128.7   Shr
Gi1/3                    Desg FWD 4         128.8   Shr
Gi2/0                    Desg FWD 4         128.9   Shr

--More--
```

- После

```
Layer2Switch-1 - PuTTY
VLAN0001
Spanning tree enabled protocol ieee
Root ID    Priority    1
           Address    0c29.0ee1.0000
           Cost       4
           Port       4 (GigabitEthernet0/3)
           Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec

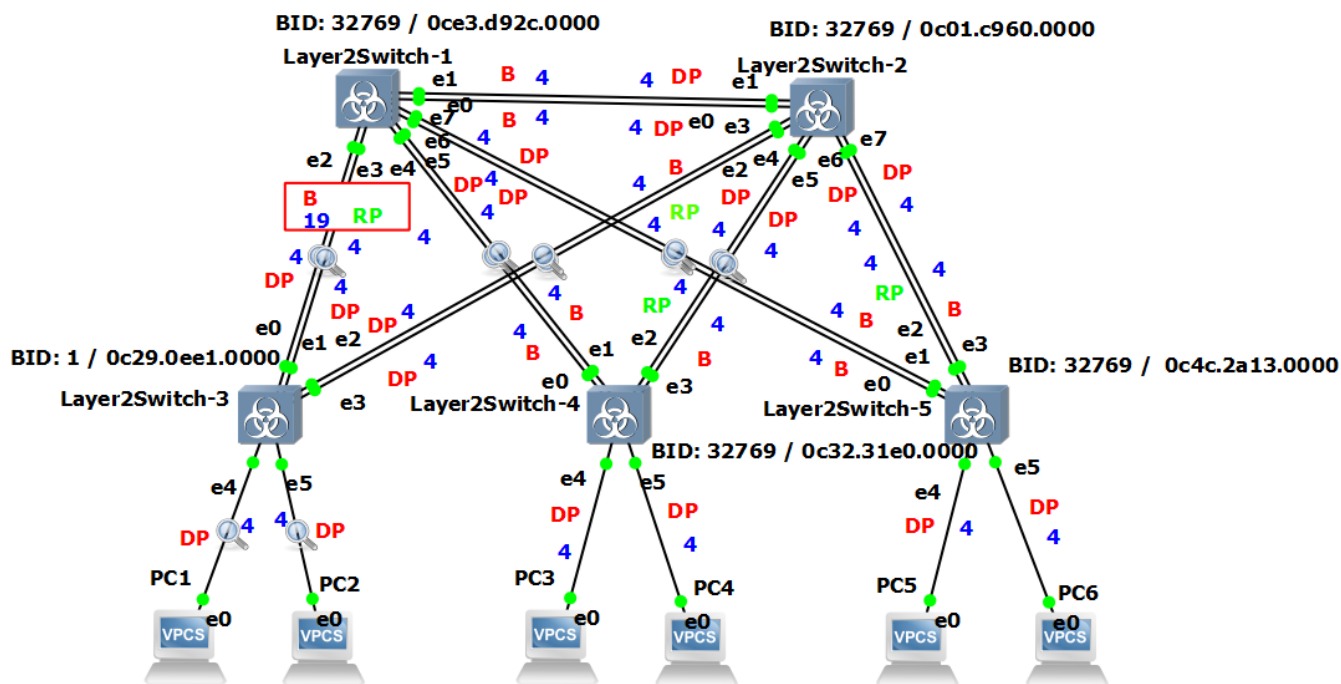
Bridge ID   Priority    32769 (priority 32768 sys-id-ext 1)
           Address    0ce3.d92c.0000
           Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec
           Aging Time  15 sec

Interface      Role Sts Cost      Prio.Nbr Type
-----
Gi0/0          Altn BLK 4         128.1   Shr
Gi0/1          Altn BLK 4         128.2   Shr
Gi0/2          Altn BLK 19        128.3   Shr
Gi0/3          Root 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
Gi2/0          Desg FWD 4         128.9   Shr

--More--
```

Стоимость Gi0/2 изменилась с 4 на 19 и порт Gi0/2 заблокировался (**B**), а порт Gi0/3 стал **RD**. Для остальных коммутаторов Layer2switch-1, Layer2switch-2, Layer2switch-4, Layer2switch-5 режимы работы портов не изменился.

- Layer2switch-1, Layer2switch-2 равна 4.
- Layer2switch-4, Layer2switch-5 равна 8.
- Схема



Конфигурация была сохранена в файл **Layer2Switch-1_after_change_cost.conf**

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