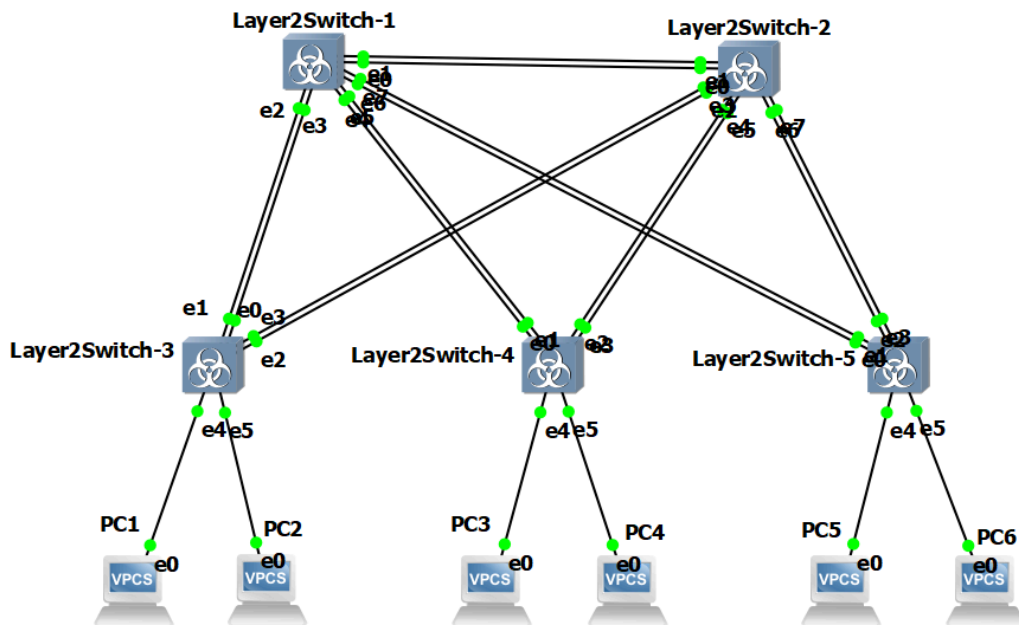


Модуль 4, Лабораторная работа 2

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

Созданная сеть:



Изначальная конфигурация протокола STP на устройствах:

```
Layer2Switch-1 - PuTTY
VLAN0001
Spanning tree enabled protocol ieee
Root ID    Priority    32769
Address    0c13.d686.0000
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     0c42.822d.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       Root LRN 4      128.3   Shr
Gi0/3       Altn BLK 4      128.4   Shr
Gi1/0       Desg FWD 4      128.5   Shr
Gi1/1       Desg LRN 4      128.6   Shr
Gi1/2       Desg FWD 4      128.7   Shr
--More--

Layer2Switch-2 - PuTTY
VLAN0001
Spanning tree enabled protocol ieee
Root ID    Priority    32769
Address    0c13.d686.0000
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     0c66.7baa.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       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
--More--
```

```
Layer2Switch-3 - PuTTY
VLAN0001
Spanning tree enabled protocol ieee
Root ID    Priority    32769
           Address    0c13.d686.0000
           This bridge is the root
           Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec

Bridge ID  Priority    32769 (priority 32768 sys-id-ext 1)
           Address    0c13.d686.0000
           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 FWD 4    128.4 Shr
Gi1/0     Desg FWD 4    128.5 Shr
Gi1/1     Desg FWD 4    128.6 Shr

--More--

Layer2Switch-4 - PuTTY
VLAN0001
Spanning tree enabled protocol ieee
Root ID    Priority    32769
           Address    0c13.d686.0000
           Cost        8
           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    0c31.f851.0000
           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     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--
```

```
Layer2Switch-5 - PuTTY
VLAN0001
Spanning tree enabled protocol ieee
Root ID    Priority    32769
           Address    0c13.d686.0000
           Cost        8
           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    0cd9.8950.0000
           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     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--
```

Корневым коммутатором является третий, сделаем второй коммутатором корневым изменив значение приоритета:

```
vIOS-L2-01#config
```

```
vIOS-L2-01(config)#spanning-tree vlan 1 priority 4096
```

```
vIOS-L2-01(config)#
```

```
Layer2Switch-2 - PuTTY
Root ID Priority 4097
Address 0c66.7baa.0000
This bridge is the root
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec

Bridge ID Priority 4097 (priority 4096 sys-id-ext 1)
Address 0c66.7baa.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 LIS 4 128.1 Shr
Gi0/1 Desg LIS 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
Gi1/2 Desg FWD 4 128.7 Shr
Gi1/3 Desg FWD 4 128.8 Shr

Interface Role Sts Cost Prio.Nbr Type
-----

Layer2Switch-3 - PuTTY
VLAN0001
Spanning tree enabled protocol ieee
Root ID Priority 4097
Address 0c66.7baa.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 0c13.d686.0000
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 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--
```

Второй коммутатор стал корневым

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

Были назначены ip адреса для VPCS командой ip 10.10.10.1x/24 где x- число от 0 до 5 в зависимости от номера устройства

Проверка связи PC1 со всеми остальными компьютерами:

```
PC1 - PuTTY

PC1> ping 10.0.0.11

84 bytes from 10.0.0.11 icmp_seq=1 ttl=64 time=1.119 ms
84 bytes from 10.0.0.11 icmp_seq=2 ttl=64 time=6.657 ms
84 bytes from 10.0.0.11 icmp_seq=3 ttl=64 time=1.777 ms
84 bytes from 10.0.0.11 icmp_seq=4 ttl=64 time=10.987 ms
84 bytes from 10.0.0.11 icmp_seq=5 ttl=64 time=5.844 ms

PC1> ping 10.0.0.12

84 bytes from 10.0.0.12 icmp_seq=1 ttl=64 time=18.797 ms
84 bytes from 10.0.0.12 icmp_seq=2 ttl=64 time=11.787 ms
84 bytes from 10.0.0.12 icmp_seq=3 ttl=64 time=10.311 ms
84 bytes from 10.0.0.12 icmp_seq=4 ttl=64 time=6.898 ms
84 bytes from 10.0.0.12 icmp_seq=5 ttl=64 time=8.864 ms

PC1> ping 10.0.0.13

84 bytes from 10.0.0.13 icmp_seq=1 ttl=64 time=7.062 ms
84 bytes from 10.0.0.13 icmp_seq=2 ttl=64 time=15.857 ms
84 bytes from 10.0.0.13 icmp_seq=3 ttl=64 time=5.343 ms
84 bytes from 10.0.0.13 icmp_seq=4 ttl=64 time=10.210 ms
84 bytes from 10.0.0.13 icmp_seq=5 ttl=64 time=14.159 ms

PC1> ping 10.0.0.14

84 bytes from 10.0.0.14 icmp_seq=1 ttl=64 time=8.207 ms
84 bytes from 10.0.0.14 icmp_seq=2 ttl=64 time=7.897 ms
84 bytes from 10.0.0.14 icmp_seq=3 ttl=64 time=8.069 ms
84 bytes from 10.0.0.14 icmp_seq=4 ttl=64 time=11.248 ms
84 bytes from 10.0.0.14 icmp_seq=5 ttl=64 time=14.694 ms

PC1> ping 10.0.0.15

84 bytes from 10.0.0.15 icmp_seq=1 ttl=64 time=6.542 ms
84 bytes from 10.0.0.15 icmp_seq=2 ttl=64 time=13.053 ms
84 bytes from 10.0.0.15 icmp_seq=3 ttl=64 time=14.106 ms
84 bytes from 10.0.0.15 icmp_seq=4 ttl=64 time=13.381 ms
84 bytes from 10.0.0.15 icmp_seq=5 ttl=64 time=7.129 ms

PC1> █
```

Проверка связи PC2 со всеми остальными компьютерами:

```
PC2> ping 10.0.0.10
```

```
84 bytes from 10.0.0.10 icmp_seq=1 ttl=64 time=9.224 ms
84 bytes from 10.0.0.10 icmp_seq=2 ttl=64 time=1.146 ms
84 bytes from 10.0.0.10 icmp_seq=3 ttl=64 time=8.257 ms
84 bytes from 10.0.0.10 icmp_seq=4 ttl=64 time=11.986 ms
84 bytes from 10.0.0.10 icmp_seq=5 ttl=64 time=14.175 ms
```

```
PC2> ping 10.0.0.12
```

```
84 bytes from 10.0.0.12 icmp_seq=1 ttl=64 time=6.059 ms
84 bytes from 10.0.0.12 icmp_seq=2 ttl=64 time=6.390 ms
84 bytes from 10.0.0.12 icmp_seq=3 ttl=64 time=7.496 ms
84 bytes from 10.0.0.12 icmp_seq=4 ttl=64 time=10.780 ms
84 bytes from 10.0.0.12 icmp_seq=5 ttl=64 time=3.173 ms
```

```
PC2> ping 10.0.0.13
```

```
84 bytes from 10.0.0.13 icmp_seq=1 ttl=64 time=13.962 ms
84 bytes from 10.0.0.13 icmp_seq=2 ttl=64 time=15.180 ms
84 bytes from 10.0.0.13 icmp_seq=3 ttl=64 time=12.050 ms
84 bytes from 10.0.0.13 icmp_seq=4 ttl=64 time=14.954 ms
84 bytes from 10.0.0.13 icmp_seq=5 ttl=64 time=7.319 ms
```

```
PC2> ping 10.0.0.14
```

```
84 bytes from 10.0.0.14 icmp_seq=1 ttl=64 time=12.576 ms
84 bytes from 10.0.0.14 icmp_seq=2 ttl=64 time=6.395 ms
84 bytes from 10.0.0.14 icmp_seq=3 ttl=64 time=16.390 ms
84 bytes from 10.0.0.14 icmp_seq=4 ttl=64 time=4.622 ms
84 bytes from 10.0.0.14 icmp_seq=5 ttl=64 time=10.307 ms
```

```
PC2> ping 10.0.0.15
```

```
84 bytes from 10.0.0.15 icmp_seq=1 ttl=64 time=13.310 ms
84 bytes from 10.0.0.15 icmp_seq=2 ttl=64 time=16.796 ms
84 bytes from 10.0.0.15 icmp_seq=3 ttl=64 time=14.980 ms
84 bytes from 10.0.0.15 icmp_seq=4 ttl=64 time=9.539 ms
84 bytes from 10.0.0.15 icmp_seq=5 ttl=64 time=14.183 ms
```

```
PC2> █
```

Проверка связи PC3 со всеми остальными компьютерами:

```
PC3 - PuTTY
RHOST:PORT : 127.0.0.1:21757
MTU : 1500

PC3> ping 10.0.0.10

84 bytes from 10.0.0.10 icmp_seq=1 ttl=64 time=12.019 ms
84 bytes from 10.0.0.10 icmp_seq=2 ttl=64 time=9.366 ms
84 bytes from 10.0.0.10 icmp_seq=3 ttl=64 time=19.540 ms
84 bytes from 10.0.0.10 icmp_seq=4 ttl=64 time=4.738 ms
84 bytes from 10.0.0.10 icmp_seq=5 ttl=64 time=15.162 ms

PC3> ping 10.0.0.11

84 bytes from 10.0.0.11 icmp_seq=1 ttl=64 time=19.802 ms
84 bytes from 10.0.0.11 icmp_seq=2 ttl=64 time=5.547 ms
84 bytes from 10.0.0.11 icmp_seq=3 ttl=64 time=19.971 ms
84 bytes from 10.0.0.11 icmp_seq=4 ttl=64 time=13.569 ms
84 bytes from 10.0.0.11 icmp_seq=5 ttl=64 time=32.004 ms

PC3> ping 10.0.0.13

84 bytes from 10.0.0.13 icmp_seq=1 ttl=64 time=3.943 ms
84 bytes from 10.0.0.13 icmp_seq=2 ttl=64 time=2.919 ms
84 bytes from 10.0.0.13 icmp_seq=3 ttl=64 time=7.172 ms
84 bytes from 10.0.0.13 icmp_seq=4 ttl=64 time=0.806 ms
84 bytes from 10.0.0.13 icmp_seq=5 ttl=64 time=0.788 ms


PC3> ping 10.0.0.14

84 bytes from 10.0.0.14 icmp_seq=1 ttl=64 time=3.525 ms
84 bytes from 10.0.0.14 icmp_seq=2 ttl=64 time=10.994 ms
84 bytes from 10.0.0.14 icmp_seq=3 ttl=64 time=23.979 ms
84 bytes from 10.0.0.14 icmp_seq=4 ttl=64 time=18.197 ms
84 bytes from 10.0.0.14 icmp_seq=5 ttl=64 time=11.549 ms

PC3> ping 10.0.0.15

84 bytes from 10.0.0.15 icmp_seq=1 ttl=64 time=4.287 ms
84 bytes from 10.0.0.15 icmp_seq=2 ttl=64 time=10.796 ms
84 bytes from 10.0.0.15 icmp_seq=3 ttl=64 time=10.725 ms
84 bytes from 10.0.0.15 icmp_seq=4 ttl=64 time=18.084 ms
84 bytes from 10.0.0.15 icmp_seq=5 ttl=64 time=7.860 ms
```

Проверка связи PC4 со всеми остальными компьютерами:

 PC4 - PuTTY

```
PC4> ping 10.0.0.10
```

```
84 bytes from 10.0.0.10 icmp_seq=1 ttl=64 time=24.869 ms
84 bytes from 10.0.0.10 icmp_seq=2 ttl=64 time=12.117 ms
84 bytes from 10.0.0.10 icmp_seq=3 ttl=64 time=2.957 ms
84 bytes from 10.0.0.10 icmp_seq=4 ttl=64 time=6.999 ms
84 bytes from 10.0.0.10 icmp_seq=5 ttl=64 time=9.847 ms
```

```
PC4> ping 10.0.0.11
```

```
84 bytes from 10.0.0.11 icmp_seq=1 ttl=64 time=4.172 ms
84 bytes from 10.0.0.11 icmp_seq=2 ttl=64 time=14.844 ms
84 bytes from 10.0.0.11 icmp_seq=3 ttl=64 time=9.275 ms
84 bytes from 10.0.0.11 icmp_seq=4 ttl=64 time=12.563 ms
84 bytes from 10.0.0.11 icmp_seq=5 ttl=64 time=10.413 ms
```

```
PC4> ping 10.0.0.12
```

```
84 bytes from 10.0.0.12 icmp_seq=1 ttl=64 time=4.983 ms
84 bytes from 10.0.0.12 icmp_seq=2 ttl=64 time=1.946 ms
84 bytes from 10.0.0.12 icmp_seq=3 ttl=64 time=0.673 ms
84 bytes from 10.0.0.12 icmp_seq=4 ttl=64 time=0.693 ms
84 bytes from 10.0.0.12 icmp_seq=5 ttl=64 time=4.049 ms
```


```
PC4> ping 10.0.0.14
```

```
84 bytes from 10.0.0.14 icmp_seq=1 ttl=64 time=22.763 ms
84 bytes from 10.0.0.14 icmp_seq=2 ttl=64 time=12.453 ms
84 bytes from 10.0.0.14 icmp_seq=3 ttl=64 time=9.653 ms
84 bytes from 10.0.0.14 icmp_seq=4 ttl=64 time=4.485 ms
84 bytes from 10.0.0.14 icmp_seq=5 ttl=64 time=13.701 ms
```

```
PC4> ping 10.0.0.15
```

```
84 bytes from 10.0.0.15 icmp_seq=1 ttl=64 time=9.168 ms
84 bytes from 10.0.0.15 icmp_seq=2 ttl=64 time=3.149 ms
84 bytes from 10.0.0.15 icmp_seq=3 ttl=64 time=10.363 ms
84 bytes from 10.0.0.15 icmp_seq=4 ttl=64 time=3.480 ms
84 bytes from 10.0.0.15 icmp_seq=5 ttl=64 time=9.799 ms
```


Проверка связи PC5 со всеми остальными компьютерами:

 PC5 - PuTTY

RHOST:PORT : 127.0.0.1:21761

MTU : 1500

PC5> ping 10.0.0.10

84 bytes from 10.0.0.10 icmp_seq=1 ttl=64 time=6.748 ms
84 bytes from 10.0.0.10 icmp_seq=2 ttl=64 time=16.015 ms
84 bytes from 10.0.0.10 icmp_seq=3 ttl=64 time=4.378 ms
84 bytes from 10.0.0.10 icmp_seq=4 ttl=64 time=17.198 ms
84 bytes from 10.0.0.10 icmp_seq=5 ttl=64 time=15.105 ms

PC5> ping 10.0.0.11

84 bytes from 10.0.0.11 icmp_seq=1 ttl=64 time=23.964 ms
84 bytes from 10.0.0.11 icmp_seq=2 ttl=64 time=7.806 ms
84 bytes from 10.0.0.11 icmp_seq=3 ttl=64 time=26.756 ms
84 bytes from 10.0.0.11 icmp_seq=4 ttl=64 time=9.018 ms
84 bytes from 10.0.0.11 icmp_seq=5 ttl=64 time=18.084 ms

PC5> ping 10.0.0.12

84 bytes from 10.0.0.12 icmp_seq=1 ttl=64 time=10.542 ms
84 bytes from 10.0.0.12 icmp_seq=2 ttl=64 time=3.254 ms
84 bytes from 10.0.0.12 icmp_seq=3 ttl=64 time=14.834 ms
84 bytes from 10.0.0.12 icmp_seq=4 ttl=64 time=11.190 ms
84 bytes from 10.0.0.12 icmp_seq=5 ttl=64 time=3.116 ms

PC5> ping 10.0.0.13

84 bytes from 10.0.0.13 icmp_seq=1 ttl=64 time=5.561 ms
84 bytes from 10.0.0.13 icmp_seq=2 ttl=64 time=9.288 ms
84 bytes from 10.0.0.13 icmp_seq=3 ttl=64 time=3.035 ms
84 bytes from 10.0.0.13 icmp_seq=4 ttl=64 time=7.125 ms
84 bytes from 10.0.0.13 icmp_seq=5 ttl=64 time=12.396 ms

PC5> ping 10.0.0.15

84 bytes from 10.0.0.15 icmp_seq=1 ttl=64 time=2.525 ms
84 bytes from 10.0.0.15 icmp_seq=2 ttl=64 time=6.404 ms
84 bytes from 10.0.0.15 icmp_seq=3 ttl=64 time=7.889 ms
84 bytes from 10.0.0.15 icmp_seq=4 ttl=64 time=1.642 ms
84 bytes from 10.0.0.15 icmp_seq=5 ttl=64 time=6.242 ms

Проверка связи PC6 со всеми остальными компьютерами:

```
PC6 - PuTTY
RHOST:PORT : 127.0.0.1:21763
MTU : 1500

PC6> ping 10.0.0.10

84 bytes from 10.0.0.10 icmp_seq=1 ttl=64 time=6.351 ms
84 bytes from 10.0.0.10 icmp_seq=2 ttl=64 time=3.981 ms
84 bytes from 10.0.0.10 icmp_seq=3 ttl=64 time=12.930 ms
84 bytes from 10.0.0.10 icmp_seq=4 ttl=64 time=18.468 ms
84 bytes from 10.0.0.10 icmp_seq=5 ttl=64 time=7.014 ms

PC6> ping 10.0.0.11

84 bytes from 10.0.0.11 icmp_seq=1 ttl=64 time=11.212 ms
84 bytes from 10.0.0.11 icmp_seq=2 ttl=64 time=16.153 ms
84 bytes from 10.0.0.11 icmp_seq=3 ttl=64 time=8.608 ms
84 bytes from 10.0.0.11 icmp_seq=4 ttl=64 time=13.666 ms
84 bytes from 10.0.0.11 icmp_seq=5 ttl=64 time=18.687 ms

PC6> ping 10.0.0.12

84 bytes from 10.0.0.12 icmp_seq=1 ttl=64 time=16.111 ms
84 bytes from 10.0.0.12 icmp_seq=2 ttl=64 time=14.413 ms
84 bytes from 10.0.0.12 icmp_seq=3 ttl=64 time=13.381 ms
84 bytes from 10.0.0.12 icmp_seq=4 ttl=64 time=22.143 ms
84 bytes from 10.0.0.12 icmp_seq=5 ttl=64 time=4.241 ms

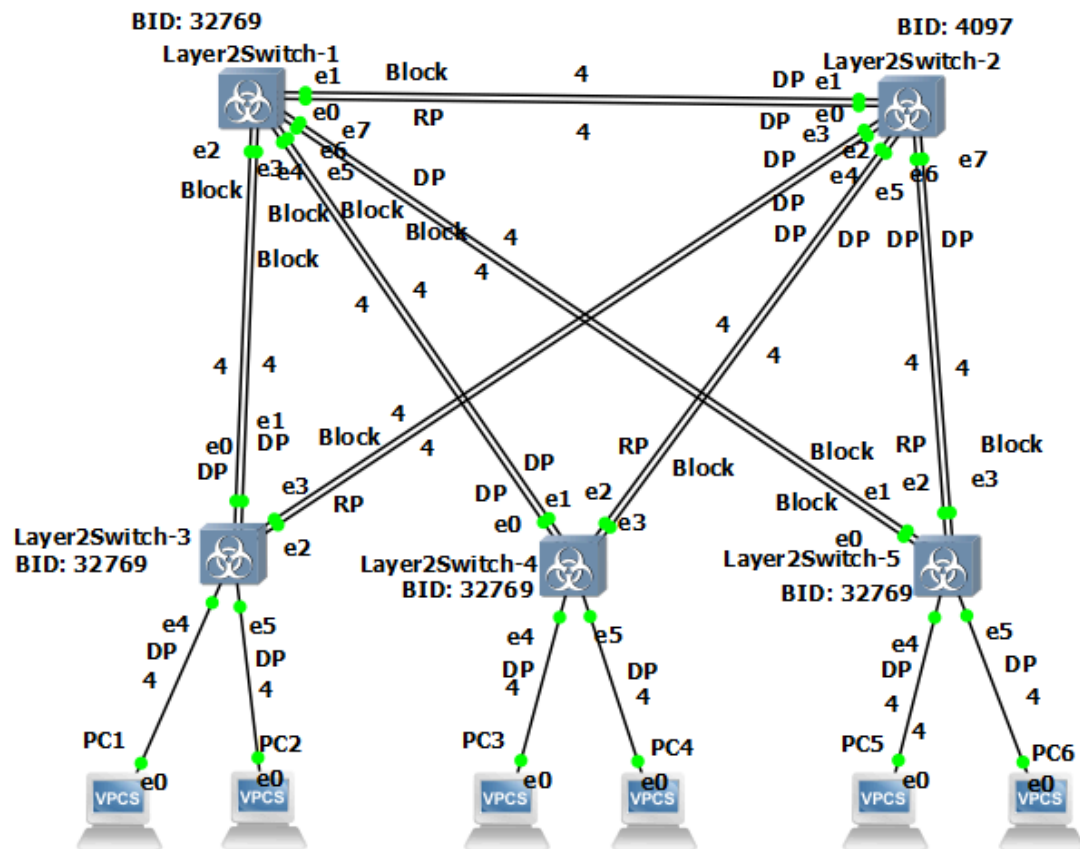
PC6> ping 10.0.0.13

84 bytes from 10.0.0.13 icmp_seq=1 ttl=64 time=23.459 ms
84 bytes from 10.0.0.13 icmp_seq=2 ttl=64 time=9.683 ms
84 bytes from 10.0.0.13 icmp_seq=3 ttl=64 time=8.746 ms
84 bytes from 10.0.0.13 icmp_seq=4 ttl=64 time=14.281 ms
84 bytes from 10.0.0.13 icmp_seq=5 ttl=64 time=12.133 ms

PC6> ping 10.0.0.14

84 bytes from 10.0.0.14 icmp_seq=1 ttl=64 time=1.583 ms
84 bytes from 10.0.0.14 icmp_seq=2 ttl=64 time=2.272 ms
84 bytes from 10.0.0.14 icmp_seq=3 ttl=64 time=2.935 ms
84 bytes from 10.0.0.14 icmp_seq=4 ttl=64 time=4.171 ms
84 bytes from 10.0.0.14 icmp_seq=5 ttl=64 time=3.673 ms
```

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



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

Et0:

*Standard input [Layer2Switch-1 Ethernet0 to Layer2Switch-2 Ethernet0]

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

stp and eth.src == 0c:66:7b:aa:00:00

No.	Time	Source	Destination	Protocol	Length	Info
2	0.028155	0c:66:7b:aa:00:00	Spanning-tree-(for...	STP	60	Conf. Root = 32768/100/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8001
5	0.282455	0c:66:7b:aa:00:00	Spanning-tree-(for...	STP	60	Conf. Root = 32768/200/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8001
6	0.403451	0c:66:7b:aa:00:00	Spanning-tree-(for...	STP	60	Conf. Root = 4096/1/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8001
7	0.438464	0c:66:7b:aa:00:00	Spanning-tree-(for...	STP	60	Conf. Root = 32768/300/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8001
8	1.499291	0c:66:7b:aa:00:00	Spanning-tree-(for...	STP	60	Conf. Root = 4096/1/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8001
10	2.236226	0c:66:7b:aa:00:00	Spanning-tree-(for...	STP	60	Conf. Root = 32768/100/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8001
13	2.540127	0c:66:7b:aa:00:00	Spanning-tree-(for...	STP	60	Conf. Root = 32768/200/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8001
14	2.664525	0c:66:7b:aa:00:00	Spanning-tree-(for...	STP	60	Conf. Root = 4096/1/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8001
15	2.711359	0c:66:7b:aa:00:00	Spanning-tree-(for...	STP	60	Conf. Root = 32768/300/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8001
16	3.959915	0c:66:7b:aa:00:00	Spanning-tree-(for...	STP	60	Conf. Root = 4096/1/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8001
21	4.789942	0c:66:7b:aa:00:00	Spanning-tree-(for...	STP	60	Conf. Root = 32768/100/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8001
22	5.107434	0c:66:7b:aa:00:00	Spanning-tree-(for...	STP	60	Conf. Root = 32768/200/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8001
23	5.216887	0c:66:7b:aa:00:00	Spanning-tree-(for...	STP	60	Conf. Root = 4096/1/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8001
24	5.264041	0c:66:7b:aa:00:00	Spanning-tree-(for...	STP	60	Conf. Root = 32768/300/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8001
25	6.476712	0c:66:7b:aa:00:00	Spanning-tree-(for...	STP	60	Conf. Root = 4096/1/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8001
29	7.248693	0c:66:7b:aa:00:00	Spanning-tree-(for...	STP	60	Conf. Root = 32768/100/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8001
31	7.493559	0c:66:7b:aa:00:00	Spanning-tree-(for...	STP	60	Conf. Root = 32768/200/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8001

▶ Frame 2: 60 bytes on wire (480 bits), 60 bytes captured (480 bits) on interface 0000 01 80 c2 00 00 00 0c 66 7b aa 00 00 81 00 00 64f {d
 ▶ Ethernet II, Src: 0c:66:7b:aa:00:00 (0c:66:7b:aa:00:00), Dst: Spanning-tree-(f 0010 00 26 42 42 03 00 00 00 00 80 64 0c 66 7b aa &BBd f {
 ▶ 802.1Q Virtual LAN, PRI: 0, DEI: 0, ID: 100 0020 00 00 00 00 00 80 64 0c 65 7b aa 00 00 80 01d f {
 ▶ Logical-Link Control 0030 00 00 14 00 02 00 0f 00 00 00 00 00
 ▶ Spanning Tree Protocol

Et1:

Захват из Standard input [Layer2Switch-1 Ethernet1 to Layer2Switch-2 Ethernet1]

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

stp and eth.src == 0c:66:7b:aa:00:01

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000	0c:66:7b:aa:00:01	Spanning-tree-(for...	STP	60	Conf. Root = 4096/1/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8002
5	1.213918	0c:66:7b:aa:00:01	Spanning-tree-(for...	STP	60	Conf. Root = 4096/1/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8002
6	1.312998	0c:66:7b:aa:00:01	Spanning-tree-(for...	STP	60	Conf. Root = 32768/100/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8002
7	1.579829	0c:66:7b:aa:00:01	Spanning-tree-(for...	STP	60	Conf. Root = 32768/200/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8002
8	1.705780	0c:66:7b:aa:00:01	Spanning-tree-(for...	STP	60	Conf. Root = 32768/300/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8002
10	2.311670	0c:66:7b:aa:00:01	Spanning-tree-(for...	STP	60	Conf. Root = 4096/1/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8002
14	3.666148	0c:66:7b:aa:00:01	Spanning-tree-(for...	STP	60	Conf. Root = 4096/1/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8002
15	3.746493	0c:66:7b:aa:00:01	Spanning-tree-(for...	STP	60	Conf. Root = 32768/100/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8002
16	4.056483	0c:66:7b:aa:00:01	Spanning-tree-(for...	STP	60	Conf. Root = 32768/200/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8002
17	4.213864	0c:66:7b:aa:00:01	Spanning-tree-(for...	STP	60	Conf. Root = 32768/300/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8002
21	4.948398	0c:66:7b:aa:00:01	Spanning-tree-(for...	STP	60	Conf. Root = 4096/1/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8002
22	6.285835	0c:66:7b:aa:00:01	Spanning-tree-(for...	STP	60	Conf. Root = 32768/100/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8002
23	6.584031	0c:66:7b:aa:00:01	Spanning-tree-(for...	STP	60	Conf. Root = 32768/200/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8002
25	6.694481	0c:66:7b:aa:00:01	Spanning-tree-(for...	STP	60	Conf. Root = 4096/1/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8002
26	6.720343	0c:66:7b:aa:00:01	Spanning-tree-(for...	STP	60	Conf. Root = 32768/300/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8002
29	7.815919	0c:66:7b:aa:00:01	Spanning-tree-(for...	STP	60	Conf. Root = 4096/1/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8002
30	8.591356	0c:66:7b:aa:00:01	Spanning-tree-(for...	STP	60	Conf. Root = 32768/100/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8002

▶ Frame 1: 60 bytes on wire (480 bits), 60 bytes captured (480 bits) on interface 0000 01 80 c2 00 00 00 0c 66 7b aa 00 01 00 26 42 42f {&BB
 ▶ IEEE 802.3 Ethernet 0010 03 00 00 00 00 10 01 0c 66 7b aa 00 00 00 00f {
 ▶ Logical-Link Control 0020 00 00 10 01 0c 66 7b aa 00 00 80 02 00 00 14 00f {
 ▶ Spanning Tree Protocol 0030 02 00 0f 00 00 00 00 00 00 00 00 00

Et2:

*Standard input [Layer2Switch-3 Ethernet2 to Layer2Switch-2 Ethernet2]

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

stp and eth.src == 0c66:7b:aa:00:02

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000	0c:66:7b:aa:00:02	Spanning-tree-(for...	STP	60	Conf. Root = 32768/100/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8003
6	0.307185	0c:66:7b:aa:00:02	Spanning-tree-(for...	STP	60	Conf. Root = 32768/200/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8003
7	0.471208	0c:66:7b:aa:00:02	Spanning-tree-(for...	STP	60	Conf. Root = 32768/300/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8003
8	0.473360	0c:66:7b:aa:00:02	Spanning-tree-(for...	STP	60	Conf. Root = 4096/1/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8003
9	1.669417	0c:66:7b:aa:00:02	Spanning-tree-(for...	STP	60	Conf. Root = 4096/1/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8003
13	2.449366	0c:66:7b:aa:00:02	Spanning-tree-(for...	STP	60	Conf. Root = 32768/100/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8003
14	2.725568	0c:66:7b:aa:00:02	Spanning-tree-(for...	STP	60	Conf. Root = 32768/200/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8003
15	2.905785	0c:66:7b:aa:00:02	Spanning-tree-(for...	STP	60	Conf. Root = 32768/300/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8003
16	2.906925	0c:66:7b:aa:00:02	Spanning-tree-(for...	STP	60	Conf. Root = 4096/1/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8003
18	4.058635	0c:66:7b:aa:00:02	Spanning-tree-(for...	STP	60	Conf. Root = 4096/1/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8003
22	4.816024	0c:66:7b:aa:00:02	Spanning-tree-(for...	STP	60	Conf. Root = 32768/100/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8003
23	5.159717	0c:66:7b:aa:00:02	Spanning-tree-(for...	STP	60	Conf. Root = 32768/200/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8003
24	5.335392	0c:66:7b:aa:00:02	Spanning-tree-(for...	STP	60	Conf. Root = 32768/300/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8003
25	5.336665	0c:66:7b:aa:00:02	Spanning-tree-(for...	STP	60	Conf. Root = 4096/1/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8003
29	6.503758	0c:66:7b:aa:00:02	Spanning-tree-(for...	STP	60	Conf. Root = 4096/1/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8003
30	7.238140	0c:66:7b:aa:00:02	Spanning-tree-(for...	STP	60	Conf. Root = 32768/100/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8003
31	7.527220	0c:66:7b:aa:00:02	Spanning-tree-(for...	STP	60	Conf. Root = 32768/200/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8003

Frame 1: 60 bytes on wire (480 bits), 60 bytes captured (480 bits) on interface 0000 01 80 c2 00 00 00 0c 66 7b aa 00 02 81 00 00 64 f { d

Ethernet II, Src: 0c:66:7b:aa:00:02 (0c:66:7b:aa:00:02), Dst: Spanning-tree-(f 0010 00 26 42 42 03 00 00 00 00 80 64 0c 66 7b aa d f{.

802.1Q Virtual LAN, PRI: 0, DEI: 0, ID: 100 0020 00 00 00 00 00 80 64 0c 66 7b aa 00 00 80 03 d f{.

Logical-Link Control 0030 00 00 14 00 02 00 0f 00 00 00 00 00

Spanning Tree Protocol

Et3:

*Standard input [Layer2Switch-3 Ethernet3 to Layer2Switch-2 Ethernet3]

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

stp and eth.src == 0c66:7b:aa:00:03

No.	Time	Source	Destination	Protocol	Length	Info
4	0.376042	0c:66:7b:aa:00:03	Spanning-tree-(for...	STP	60	Conf. Root = 4096/1/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8004
5	0.615194	0c:66:7b:aa:00:03	Spanning-tree-(for...	STP	60	Conf. Root = 32768/100/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8004
7	0.892141	0c:66:7b:aa:00:03	Spanning-tree-(for...	STP	60	Conf. Root = 32768/200/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8004
9	1.023114	0c:66:7b:aa:00:03	Spanning-tree-(for...	STP	60	Conf. Root = 32768/300/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8004
10	1.581900	0c:66:7b:aa:00:03	Spanning-tree-(for...	STP	60	Conf. Root = 4096/1/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8004
14	2.764725	0c:66:7b:aa:00:03	Spanning-tree-(for...	STP	60	Conf. Root = 4096/1/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8004
15	3.063024	0c:66:7b:aa:00:03	Spanning-tree-(for...	STP	60	Conf. Root = 32768/100/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8004
16	3.360462	0c:66:7b:aa:00:03	Spanning-tree-(for...	STP	60	Conf. Root = 32768/200/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8004
17	3.544290	0c:66:7b:aa:00:03	Spanning-tree-(for...	STP	60	Conf. Root = 32768/300/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8004
18	4.001541	0c:66:7b:aa:00:03	Spanning-tree-(for...	STP	60	Conf. Root = 4096/1/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8004
22	5.284461	0c:66:7b:aa:00:03	Spanning-tree-(for...	STP	60	Conf. Root = 4096/1/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8004
23	5.595547	0c:66:7b:aa:00:03	Spanning-tree-(for...	STP	60	Conf. Root = 32768/100/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8004
24	5.928585	0c:66:7b:aa:00:03	Spanning-tree-(for...	STP	60	Conf. Root = 32768/200/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8004
25	6.102472	0c:66:7b:aa:00:03	Spanning-tree-(for...	STP	60	Conf. Root = 32768/300/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8004
29	6.625905	0c:66:7b:aa:00:03	Spanning-tree-(for...	STP	60	Conf. Root = 4096/1/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8004
30	8.134866	0c:66:7b:aa:00:03	Spanning-tree-(for...	STP	60	Conf. Root = 32768/100/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8004
33	8.377992	0c:66:7b:aa:00:03	Spanning-tree-(for...	STP	60	Conf. Root = 4096/1/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8004

Frame 4: 60 bytes on wire (480 bits), 60 bytes captured (480 bits) on interface 0000 01 80 c2 00 00 00 0c 66 7b aa 00 03 00 26 42 42 f { &BB

IEEE 802.3 Ethernet 0010 03 00 00 00 00 00 10 01 0c 66 7b aa 00 00 00 00 f{.

Logical-Link Control 0020 00 00 10 01 0c 66 7b aa 00 00 80 04 00 00 14 00 f{.

Spanning Tree Protocol 0030 02 00 0f 00 00 00 00 00 00 00 00 00

Et4:

*Standard input [Layer2Switch-2 Ethernet4 to Layer2Switch-4 Ethernet2]

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

stp and eth.src == 0c66:7b:aa:00:04

No.	Time	Source	Destination	Protocol	Length	Info
4	0.316022	0c:66:7b:aa:00:04	Spanning-tree-(for...	STP	60	Conf. Root = 4096/1/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8005
5	0.326176	0c:66:7b:aa:00:04	Spanning-tree-(for...	STP	60	Conf. Root = 32768/100/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8005
6	0.563136	0c:66:7b:aa:00:04	Spanning-tree-(for...	STP	60	Conf. Root = 32768/200/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8005
7	0.697214	0c:66:7b:aa:00:04	Spanning-tree-(for...	STP	60	Conf. Root = 32768/300/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8005
8	1.458947	0c:66:7b:aa:00:04	Spanning-tree-(for...	STP	60	Conf. Root = 4096/1/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8005
12	2.571318	0c:66:7b:aa:00:04	Spanning-tree-(for...	STP	60	Conf. Root = 4096/1/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8005
13	2.580917	0c:66:7b:aa:00:04	Spanning-tree-(for...	STP	60	Conf. Root = 32768/100/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8005
15	2.861977	0c:66:7b:aa:00:04	Spanning-tree-(for...	STP	60	Conf. Root = 32768/200/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8005
16	3.075706	0c:66:7b:aa:00:04	Spanning-tree-(for...	STP	60	Conf. Root = 32768/300/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8005
17	3.855628	0c:66:7b:aa:00:04	Spanning-tree-(for...	STP	60	Conf. Root = 4096/1/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8005
21	4.998646	0c:66:7b:aa:00:04	Spanning-tree-(for...	STP	60	Conf. Root = 4096/1/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8005
22	5.010011	0c:66:7b:aa:00:04	Spanning-tree-(for...	STP	60	Conf. Root = 32768/100/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8005
23	5.284984	0c:66:7b:aa:00:04	Spanning-tree-(for...	STP	60	Conf. Root = 32768/200/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8005
24	5.430127	0c:66:7b:aa:00:04	Spanning-tree-(for...	STP	60	Conf. Root = 32768/300/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8005
25	6.736357	0c:66:7b:aa:00:04	Spanning-tree-(for...	STP	60	Conf. Root = 4096/1/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8005
29	7.528634	0c:66:7b:aa:00:04	Spanning-tree-(for...	STP	60	Conf. Root = 4096/1/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8005
30	7.539333	0c:66:7b:aa:00:04	Spanning-tree-(for...	STP	60	Conf. Root = 32768/100/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8005

Frame 4: 60 bytes on wire (480 bits), 60 bytes captured (480 bits) on interface 0000 01 80 c2 00 00 00 0c 66 7b aa 00 04 00 26 42 42 f { &BB

IEEE 802.3 Ethernet 0010 03 00 00 00 00 00 10 01 0c 66 7b aa 00 00 00 00 f{.

Logical-Link Control 0020 00 00 10 01 0c 66 7b aa 00 00 80 05 00 00 14 00 f{.

Spanning Tree Protocol 0030 02 00 0f 00 00 00 00 00 00 00 00 00

Et5:

*Standard input [Layer2Switch-2 Ethernet5 to Layer2Switch-4 Ethernet3]

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

stp and eth.src == 0c:66:7b:aa:00:05

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000	0c:66:7b:aa:00:05	Spanning-tree-(for...	STP	60	Conf. Root = 32768/100/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8006
2	0.236251	0c:66:7b:aa:00:05	Spanning-tree-(for...	STP	60	Conf. Root = 32768/200/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8006
3	0.387849	0c:66:7b:aa:00:05	Spanning-tree-(for...	STP	60	Conf. Root = 32768/300/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8006
4	0.388434	0c:66:7b:aa:00:05	Spanning-tree-(for...	STP	60	Conf. Root = 4096/1/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8006
8	1.631722	0c:66:7b:aa:00:05	Spanning-tree-(for...	STP	60	Conf. Root = 4096/1/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8006
9	2.361049	0c:66:7b:aa:00:05	Spanning-tree-(for...	STP	60	Conf. Root = 32768/100/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8006
10	2.617796	0c:66:7b:aa:00:05	Spanning-tree-(for...	STP	60	Conf. Root = 32768/200/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8006
11	2.769503	0c:66:7b:aa:00:05	Spanning-tree-(for...	STP	60	Conf. Root = 32768/300/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8006
12	2.770900	0c:66:7b:aa:00:05	Spanning-tree-(for...	STP	60	Conf. Root = 4096/1/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8006
16	3.999540	0c:66:7b:aa:00:05	Spanning-tree-(for...	STP	60	Conf. Root = 4096/1/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8006
17	4.832594	0c:66:7b:aa:00:05	Spanning-tree-(for...	STP	60	Conf. Root = 32768/100/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8006
20	5.112625	0c:66:7b:aa:00:05	Spanning-tree-(for...	STP	60	Conf. Root = 32768/200/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8006
23	5.304349	0c:66:7b:aa:00:05	Spanning-tree-(for...	STP	60	Conf. Root = 32768/300/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8006
24	5.307828	0c:66:7b:aa:00:05	Spanning-tree-(for...	STP	60	Conf. Root = 4096/1/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8006
28	7.222364	0c:66:7b:aa:00:05	Spanning-tree-(for...	STP	60	Conf. Root = 4096/1/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8006
29	7.407984	0c:66:7b:aa:00:05	Spanning-tree-(for...	STP	60	Conf. Root = 32768/100/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8006
30	7.740412	0c:66:7b:aa:00:05	Spanning-tree-(for...	STP	60	Conf. Root = 32768/200/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8006

Frame 1: 60 bytes on wire (480 bits), 60 bytes captured (480 bits) on interface 0000 01 80 c2 00 00 00 0c 66 7b aa 00 05 81 00 00 64 f { d

Ethernet II, Src: 0c:66:7b:aa:00:05 (0c:66:7b:aa:00:05), Dst: Spanning-tree-(f 0010 00 26 42 42 03 00 00 00 00 00 80 64 0c 66 7b aa &BB d f{

802.1Q Virtual LAN, PRI: 0, DEI: 0, ID: 100 0020 00 00 00 00 00 00 0c 66 7b aa 00 00 80 06 d { f{ d

Logical-Link Control 0030 00 00 14 00 02 00 0f 00 00 00 00 00

Spanning Tree Protocol

Et6:

*Standard input [Layer2Switch-2 Ethernet6 to Layer2Switch-5 Ethernet2]

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

stp and eth.src == 0c:66:7b:aa:00:06

No.	Time	Source	Destination	Protocol	Length	Info
3	0.284986	0c:66:7b:aa:00:06	Spanning-tree-(for...	STP	60	Conf. Root = 4096/1/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8007
4	0.541495	0c:66:7b:aa:00:06	Spanning-tree-(for...	STP	60	Conf. Root = 32768/100/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8007
5	0.847032	0c:66:7b:aa:00:06	Spanning-tree-(for...	STP	60	Conf. Root = 32768/200/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8007
6	1.021337	0c:66:7b:aa:00:06	Spanning-tree-(for...	STP	60	Conf. Root = 32768/300/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8007
7	1.528789	0c:66:7b:aa:00:06	Spanning-tree-(for...	STP	60	Conf. Root = 4096/1/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8007
11	2.705957	0c:66:7b:aa:00:06	Spanning-tree-(for...	STP	60	Conf. Root = 4096/1/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8007
12	2.937151	0c:66:7b:aa:00:06	Spanning-tree-(for...	STP	60	Conf. Root = 32768/100/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8007
13	3.169164	0c:66:7b:aa:00:06	Spanning-tree-(for...	STP	60	Conf. Root = 32768/200/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8007
14	3.315240	0c:66:7b:aa:00:06	Spanning-tree-(for...	STP	60	Conf. Root = 32768/300/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8007
15	3.793087	0c:66:7b:aa:00:06	Spanning-tree-(for...	STP	60	Conf. Root = 4096/1/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8007
19	5.057908	0c:66:7b:aa:00:06	Spanning-tree-(for...	STP	60	Conf. Root = 4096/1/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8007
20	5.297515	0c:66:7b:aa:00:06	Spanning-tree-(for...	STP	60	Conf. Root = 32768/100/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8007
21	5.540350	0c:66:7b:aa:00:06	Spanning-tree-(for...	STP	60	Conf. Root = 32768/200/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8007
22	5.698764	0c:66:7b:aa:00:06	Spanning-tree-(for...	STP	60	Conf. Root = 32768/300/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8007
23	6.198839	0c:66:7b:aa:00:06	Spanning-tree-(for...	STP	60	Conf. Root = 4096/1/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8007
28	7.256748	0c:66:7b:aa:00:06	Spanning-tree-(for...	STP	60	Conf. Root = 4096/1/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8007
29	7.482131	0c:66:7b:aa:00:06	Spanning-tree-(for...	STP	60	Conf. Root = 32768/100/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8007

Frame 3: 60 bytes on wire (480 bits), 60 bytes captured (480 bits) on interface 0000 01 80 c2 00 00 00 0c 66 7b aa 00 06 00 26 42 42 f { &BB

IEEE 802.3 Ethernet 0010 03 00 00 00 00 00 10 01 0c 66 7b aa 00 00 00 00 f{

Logical-Link Control 0020 00 00 10 01 0c 66 7b aa 00 00 80 07 00 00 14 00 f{

Spanning Tree Protocol 0030 02 00 0f 00 00 00 00 00 00 00 00 00

Et7:

*Standard input [Layer2Switch-2 Ethernet7 to Layer2Switch-5 Ethernet3]

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

stp and eth.src == 0c:66:7b:aa:00:07

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000	0c:66:7b:aa:00:07	Spanning-tree-(for...	STP	60	Conf. Root = 32768/200/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8008
2	0.165207	0c:66:7b:aa:00:07	Spanning-tree-(for...	STP	60	Conf. Root = 32768/300/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8008
6	0.712549	0c:66:7b:aa:00:07	Spanning-tree-(for...	STP	60	Conf. Root = 4096/1/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8008
7	2.120216	0c:66:7b:aa:00:07	Spanning-tree-(for...	STP	60	Conf. Root = 32768/100/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8008
8	2.413667	0c:66:7b:aa:00:07	Spanning-tree-(for...	STP	60	Conf. Root = 32768/200/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8008
10	2.568560	0c:66:7b:aa:00:07	Spanning-tree-(for...	STP	60	Conf. Root = 4096/1/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8008
11	2.581682	0c:66:7b:aa:00:07	Spanning-tree-(for...	STP	60	Conf. Root = 32768/300/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8008
14	3.835000	0c:66:7b:aa:00:07	Spanning-tree-(for...	STP	60	Conf. Root = 4096/1/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8008
16	4.681401	0c:66:7b:aa:00:07	Spanning-tree-(for...	STP	60	Conf. Root = 32768/100/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8008
19	4.954525	0c:66:7b:aa:00:07	Spanning-tree-(for...	STP	60	Conf. Root = 32768/200/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8008
20	5.076478	0c:66:7b:aa:00:07	Spanning-tree-(for...	STP	60	Conf. Root = 4096/1/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8008
21	5.090144	0c:66:7b:aa:00:07	Spanning-tree-(for...	STP	60	Conf. Root = 32768/300/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8008
22	6.351244	0c:66:7b:aa:00:07	Spanning-tree-(for...	STP	60	Conf. Root = 4096/1/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8008
26	7.255654	0c:66:7b:aa:00:07	Spanning-tree-(for...	STP	60	Conf. Root = 32768/100/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8008
27	7.579187	0c:66:7b:aa:00:07	Spanning-tree-(for...	STP	60	Conf. Root = 32768/200/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8008
28	7.734809	0c:66:7b:aa:00:07	Spanning-tree-(for...	STP	60	Conf. Root = 4096/1/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8008
29	7.750254	0c:66:7b:aa:00:07	Spanning-tree-(for...	STP	60	Conf. Root = 32768/300/0c:66:7b:aa:00:00 Cost = 0 Port = 0x8008

Frame 1: 60 bytes on wire (480 bits), 60 bytes captured (480 bits) on interface 0000 01 80 c2 00 00 00 0c 66 7b aa 00 07 81 00 00 c8 f {
Ethernet II, Src: 0c:66:7b:aa:00:07 (0c:66:7b:aa:00:07), Dst: Spanning-tree-(f 0010 00 26 42 42 03 00 00 00 00 80 c8 0c 66 7b aa &BB f {
802.1Q Virtual LAN, PRI: 0, DEI: 0, ID: 200 0020 00 00 00 00 00 00 c8 0c 66 7b aa 00 00 80 08 f {
Logical-Link Control 0030 00 00 14 00 02 00 0f 00 00 00 00 00
Spanning Tree Protocol

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

Изменим значение на 4 коммутаторе на порте gi0/1

vIOS-L2-01>en

vIOS-L2-01#config

vIOS-L2-01(config)#interface gi0/1

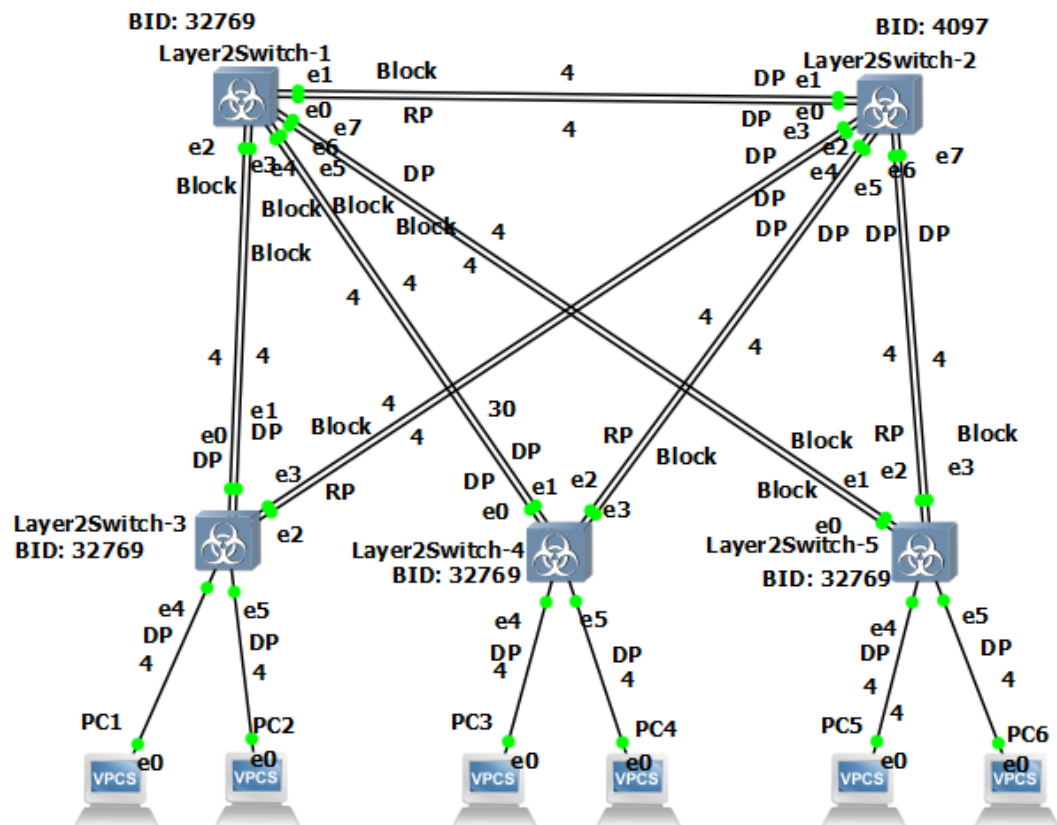
vIOS-L2-01(config-if)#spanning-tree cost 30

```
VLAN0001
Spanning tree enabled protocol ieee
Root ID    Priority    4097
           Address    0c66.7baa.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    0c31.f851.0000
           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	30	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

Обновленная схема:



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

Папка STP_config

7*) Опциональное задание: заменить STP на RSTP (IEEE 802.1w), повторить 1-6, отметить резервные порты в п.3 и п.5, отличие работы протокола RSTP от протокола STP в п.4

Заменим на всех коммутаторах протокол с помощью команды:

```
vIOS-L2-01(config)#spanning-tree mode rapid-pvst
```

Сделаем первый коммутатор корневым поменяв значение приоритета командой:

spanning-tree vlan 1 priority 4096

Layer2Switch-1 - PuTTY

```
VLAN0001
Spanning tree enabled protocol rstp
Root ID    Priority    4097
           Address    0c42.822d.0000
           This bridge is the root
           Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec

Bridge ID  Priority    4097  (priority 4096 sys-id-ext 1)
           Address    0c42.822d.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 BLK 4         128.1  Shr
Gi0/1              Desg FWD 4         128.2  Shr
Gi0/2              Desg BLK 4         128.3  Shr
Gi0/3              Desg BLK 4         128.4  Shr
Gi1/0              Desg BLK 4         128.5  Shr
Gi1/1              Desg BLK 4         128.6  Shr
Gi1/2              Desg BLK 4         128.7  Shr
Gi1/3              Desg BLK 4         128.8  Shr

vIOS-L2-01(config)#
```

Проверить доступность каждого с каждым всех персональных компьютеров (VPCS):

Проверка связи PC1 со всеми остальными компьютерами:

```
PC1> ping 10.0.0.11
```

```
84 bytes from 10.0.0.11 icmp_seq=1 ttl=64 time=5.201 ms
84 bytes from 10.0.0.11 icmp_seq=2 ttl=64 time=5.657 ms
84 bytes from 10.0.0.11 icmp_seq=3 ttl=64 time=9.894 ms
84 bytes from 10.0.0.11 icmp_seq=4 ttl=64 time=2.980 ms
84 bytes from 10.0.0.11 icmp_seq=5 ttl=64 time=2.313 ms
```

```
PC1> ping 10.0.0.12
```

```
84 bytes from 10.0.0.12 icmp_seq=1 ttl=64 time=37.160 ms
84 bytes from 10.0.0.12 icmp_seq=2 ttl=64 time=11.991 ms
84 bytes from 10.0.0.12 icmp_seq=3 ttl=64 time=14.781 ms
84 bytes from 10.0.0.12 icmp_seq=4 ttl=64 time=10.494 ms
84 bytes from 10.0.0.12 icmp_seq=5 ttl=64 time=35.497 ms
```

```
PC1> ping 10.0.0.13
```

```
84 bytes from 10.0.0.13 icmp_seq=1 ttl=64 time=15.908 ms
84 bytes from 10.0.0.13 icmp_seq=2 ttl=64 time=29.585 ms
84 bytes from 10.0.0.13 icmp_seq=3 ttl=64 time=19.228 ms
84 bytes from 10.0.0.13 icmp_seq=4 ttl=64 time=12.070 ms
84 bytes from 10.0.0.13 icmp_seq=5 ttl=64 time=15.751 ms
```

```
PC1> ping 10.0.0.14
```

```
84 bytes from 10.0.0.14 icmp_seq=1 ttl=64 time=20.933 ms
84 bytes from 10.0.0.14 icmp_seq=2 ttl=64 time=13.035 ms
84 bytes from 10.0.0.14 icmp_seq=3 ttl=64 time=14.912 ms
84 bytes from 10.0.0.14 icmp_seq=4 ttl=64 time=26.566 ms
84 bytes from 10.0.0.14 icmp_seq=5 ttl=64 time=19.524 ms
```

```
PC1> ping 10.0.0.15
```

```
84 bytes from 10.0.0.15 icmp_seq=1 ttl=64 time=23.345 ms
84 bytes from 10.0.0.15 icmp_seq=2 ttl=64 time=9.819 ms
84 bytes from 10.0.0.15 icmp_seq=3 ttl=64 time=54.824 ms
84 bytes from 10.0.0.15 icmp_seq=4 ttl=64 time=16.861 ms
84 bytes from 10.0.0.15 icmp_seq=5 ttl=64 time=12.908 ms
```

Проверка связи PC2 со всеми остальными компьютерами:

```
PC2 - PuTTY

PC2> ip 10.0.0.11/24
Checking for duplicate address...
PC2 : 10.0.0.11 255.255.255.0

PC2> ping 10.0.0.10

84 bytes from 10.0.0.10 icmp_seq=1 ttl=64 time=3.759 ms
84 bytes from 10.0.0.10 icmp_seq=2 ttl=64 time=6.407 ms
84 bytes from 10.0.0.10 icmp_seq=3 ttl=64 time=10.695 ms
84 bytes from 10.0.0.10 icmp_seq=4 ttl=64 time=6.364 ms
84 bytes from 10.0.0.10 icmp_seq=5 ttl=64 time=11.774 ms

PC2> ping 10.0.0.12

84 bytes from 10.0.0.12 icmp_seq=1 ttl=64 time=6.325 ms
84 bytes from 10.0.0.12 icmp_seq=2 ttl=64 time=69.602 ms
84 bytes from 10.0.0.12 icmp_seq=3 ttl=64 time=42.713 ms
84 bytes from 10.0.0.12 icmp_seq=4 ttl=64 time=11.926 ms
84 bytes from 10.0.0.12 icmp_seq=5 ttl=64 time=30.969 ms

PC2> ping 10.0.0.13

84 bytes from 10.0.0.13 icmp_seq=1 ttl=64 time=6.045 ms
84 bytes from 10.0.0.13 icmp_seq=2 ttl=64 time=14.859 ms
84 bytes from 10.0.0.13 icmp_seq=3 ttl=64 time=12.483 ms
84 bytes from 10.0.0.13 icmp_seq=4 ttl=64 time=10.792 ms
84 bytes from 10.0.0.13 icmp_seq=5 ttl=64 time=16.663 ms

PC2> ping 10.0.0.14

84 bytes from 10.0.0.14 icmp_seq=1 ttl=64 time=32.088 ms
84 bytes from 10.0.0.14 icmp_seq=2 ttl=64 time=25.057 ms
84 bytes from 10.0.0.14 icmp_seq=3 ttl=64 time=13.810 ms
84 bytes from 10.0.0.14 icmp_seq=4 ttl=64 time=15.801 ms
84 bytes from 10.0.0.14 icmp_seq=5 ttl=64 time=19.274 ms

PC2> ping 10.0.0.15

84 bytes from 10.0.0.15 icmp_seq=1 ttl=64 time=18.547 ms
84 bytes from 10.0.0.15 icmp_seq=2 ttl=64 time=8.103 ms
84 bytes from 10.0.0.15 icmp_seq=3 ttl=64 time=17.578 ms
84 bytes from 10.0.0.15 icmp_seq=4 ttl=64 time=7.210 ms
84 bytes from 10.0.0.15 icmp_seq=5 ttl=64 time=19.198 ms
```

Проверка связи PC3 со всеми остальными компьютерами:

```
PC3> ping 10.0.0.10
```

```
84 bytes from 10.0.0.10 icmp_seq=1 ttl=64 time=23.063 ms
84 bytes from 10.0.0.10 icmp_seq=2 ttl=64 time=5.807 ms
84 bytes from 10.0.0.10 icmp_seq=3 ttl=64 time=9.119 ms
84 bytes from 10.0.0.10 icmp_seq=4 ttl=64 time=43.337 ms
84 bytes from 10.0.0.10 icmp_seq=5 ttl=64 time=19.910 ms
```

```
PC3> ping 10.0.0.11
```

```
84 bytes from 10.0.0.11 icmp_seq=1 ttl=64 time=22.220 ms
84 bytes from 10.0.0.11 icmp_seq=2 ttl=64 time=12.018 ms
84 bytes from 10.0.0.11 icmp_seq=3 ttl=64 time=16.373 ms
84 bytes from 10.0.0.11 icmp_seq=4 ttl=64 time=7.168 ms
84 bytes from 10.0.0.11 icmp_seq=5 ttl=64 time=30.869 ms
```

```
PC3> ping 10.0.0.13
```

```
84 bytes from 10.0.0.13 icmp_seq=1 ttl=64 time=2.485 ms
84 bytes from 10.0.0.13 icmp_seq=2 ttl=64 time=0.709 ms
84 bytes from 10.0.0.13 icmp_seq=3 ttl=64 time=0.829 ms
84 bytes from 10.0.0.13 icmp_seq=4 ttl=64 time=5.085 ms
84 bytes from 10.0.0.13 icmp_seq=5 ttl=64 time=2.112 ms
```

```
PC3> ping 10.0.0.14
```

```
84 bytes from 10.0.0.14 icmp_seq=1 ttl=64 time=27.715 ms
84 bytes from 10.0.0.14 icmp_seq=2 ttl=64 time=30.095 ms
84 bytes from 10.0.0.14 icmp_seq=3 ttl=64 time=29.437 ms
84 bytes from 10.0.0.14 icmp_seq=4 ttl=64 time=40.606 ms
84 bytes from 10.0.0.14 icmp_seq=5 ttl=64 time=3.502 ms
```

```
PC3> ping 10.0.0.15
```

```
84 bytes from 10.0.0.15 icmp_seq=1 ttl=64 time=15.159 ms
84 bytes from 10.0.0.15 icmp_seq=2 ttl=64 time=23.646 ms
84 bytes from 10.0.0.15 icmp_seq=3 ttl=64 time=11.778 ms
84 bytes from 10.0.0.15 icmp_seq=4 ttl=64 time=7.796 ms
84 bytes from 10.0.0.15 icmp_seq=5 ttl=64 time=4.914 ms
```

Проверка связи PC4 со всеми остальными компьютерами:

```
PC4> ping 10.0.0.10
```

```
84 bytes from 10.0.0.10 icmp_seq=1 ttl=64 time=20.030 ms
84 bytes from 10.0.0.10 icmp_seq=2 ttl=64 time=21.602 ms
84 bytes from 10.0.0.10 icmp_seq=3 ttl=64 time=3.377 ms
84 bytes from 10.0.0.10 icmp_seq=4 ttl=64 time=24.663 ms
84 bytes from 10.0.0.10 icmp_seq=5 ttl=64 time=7.755 ms
```

```
PC4> ping 10.0.0.11
```

```
84 bytes from 10.0.0.11 icmp_seq=1 ttl=64 time=10.535 ms
84 bytes from 10.0.0.11 icmp_seq=2 ttl=64 time=20.639 ms
84 bytes from 10.0.0.11 icmp_seq=3 ttl=64 time=19.041 ms
84 bytes from 10.0.0.11 icmp_seq=4 ttl=64 time=23.233 ms
84 bytes from 10.0.0.11 icmp_seq=5 ttl=64 time=32.224 ms
```

```
PC4> ping 10.0.0.12
```

```
84 bytes from 10.0.0.12 icmp_seq=1 ttl=64 time=2.166 ms
84 bytes from 10.0.0.12 icmp_seq=2 ttl=64 time=2.866 ms
84 bytes from 10.0.0.12 icmp_seq=3 ttl=64 time=5.696 ms
84 bytes from 10.0.0.12 icmp_seq=4 ttl=64 time=0.681 ms
84 bytes from 10.0.0.12 icmp_seq=5 ttl=64 time=5.411 ms
```

```
PC4> ping 10.0.0.14
```

```
84 bytes from 10.0.0.14 icmp_seq=1 ttl=64 time=20.467 ms
84 bytes from 10.0.0.14 icmp_seq=2 ttl=64 time=9.536 ms
84 bytes from 10.0.0.14 icmp_seq=3 ttl=64 time=5.477 ms
84 bytes from 10.0.0.14 icmp_seq=4 ttl=64 time=12.558 ms
84 bytes from 10.0.0.14 icmp_seq=5 ttl=64 time=12.563 ms
```

```
PC4> ping 10.0.0.15
```

```
84 bytes from 10.0.0.15 icmp_seq=1 ttl=64 time=21.120 ms
84 bytes from 10.0.0.15 icmp_seq=2 ttl=64 time=23.415 ms
84 bytes from 10.0.0.15 icmp_seq=3 ttl=64 time=4.080 ms
84 bytes from 10.0.0.15 icmp_seq=4 ttl=64 time=4.935 ms
84 bytes from 10.0.0.15 icmp_seq=5 ttl=64 time=3.470 ms
```


Проверка связи PC5 со всеми остальными компьютерами:

```
PC5> ping 10.0.0.10
```

```
84 bytes from 10.0.0.10 icmp_seq=1 ttl=64 time=9.881 ms
84 bytes from 10.0.0.10 icmp_seq=2 ttl=64 time=19.119 ms
84 bytes from 10.0.0.10 icmp_seq=3 ttl=64 time=48.804 ms
84 bytes from 10.0.0.10 icmp_seq=4 ttl=64 time=33.251 ms
84 bytes from 10.0.0.10 icmp_seq=5 ttl=64 time=3.300 ms
```

```
PC5> ping 10.0.0.11
```

```
84 bytes from 10.0.0.11 icmp_seq=1 ttl=64 time=23.315 ms
84 bytes from 10.0.0.11 icmp_seq=2 ttl=64 time=9.980 ms
84 bytes from 10.0.0.11 icmp_seq=3 ttl=64 time=6.116 ms
84 bytes from 10.0.0.11 icmp_seq=4 ttl=64 time=6.223 ms
84 bytes from 10.0.0.11 icmp_seq=5 ttl=64 time=18.831 ms
```

```
PC5> ping 10.0.0.12
```

```
84 bytes from 10.0.0.12 icmp_seq=1 ttl=64 time=7.521 ms
84 bytes from 10.0.0.12 icmp_seq=2 ttl=64 time=9.463 ms
84 bytes from 10.0.0.12 icmp_seq=3 ttl=64 time=24.155 ms
84 bytes from 10.0.0.12 icmp_seq=4 ttl=64 time=17.486 ms
84 bytes from 10.0.0.12 icmp_seq=5 ttl=64 time=16.839 ms
```

```
PC5> ping 10.0.0.13
```

```
84 bytes from 10.0.0.13 icmp_seq=1 ttl=64 time=5.819 ms
84 bytes from 10.0.0.13 icmp_seq=2 ttl=64 time=9.305 ms
84 bytes from 10.0.0.13 icmp_seq=3 ttl=64 time=24.873 ms
84 bytes from 10.0.0.13 icmp_seq=4 ttl=64 time=14.279 ms
84 bytes from 10.0.0.13 icmp_seq=5 ttl=64 time=12.237 ms
```

```
PC5> ping 10.0.0.15
```

```
84 bytes from 10.0.0.15 icmp_seq=1 ttl=64 time=1.104 ms
84 bytes from 10.0.0.15 icmp_seq=2 ttl=64 time=2.500 ms
84 bytes from 10.0.0.15 icmp_seq=3 ttl=64 time=1.591 ms
84 bytes from 10.0.0.15 icmp_seq=4 ttl=64 time=7.626 ms
84 bytes from 10.0.0.15 icmp_seq=5 ttl=64 time=9.633 ms
```

Проверка связи PC6 со всеми остальными компьютерами:

```
PC6> ping 10.0.0.10
```

```
84 bytes from 10.0.0.10 icmp_seq=1 ttl=64 time=11.516 ms
84 bytes from 10.0.0.10 icmp_seq=2 ttl=64 time=18.608 ms
84 bytes from 10.0.0.10 icmp_seq=3 ttl=64 time=28.889 ms
84 bytes from 10.0.0.10 icmp_seq=4 ttl=64 time=27.344 ms
84 bytes from 10.0.0.10 icmp_seq=5 ttl=64 time=19.396 ms
```

```
PC6> ping 10.0.0.11
```

```
84 bytes from 10.0.0.11 icmp_seq=1 ttl=64 time=12.688 ms
84 bytes from 10.0.0.11 icmp_seq=2 ttl=64 time=11.588 ms
84 bytes from 10.0.0.11 icmp_seq=3 ttl=64 time=13.288 ms
84 bytes from 10.0.0.11 icmp_seq=4 ttl=64 time=4.297 ms
84 bytes from 10.0.0.11 icmp_seq=5 ttl=64 time=20.261 ms
```

```
PC6> ping 10.0.0.12
```

```
84 bytes from 10.0.0.12 icmp_seq=1 ttl=64 time=13.360 ms
84 bytes from 10.0.0.12 icmp_seq=2 ttl=64 time=11.320 ms
84 bytes from 10.0.0.12 icmp_seq=3 ttl=64 time=21.068 ms
84 bytes from 10.0.0.12 icmp_seq=4 ttl=64 time=34.507 ms
84 bytes from 10.0.0.12 icmp_seq=5 ttl=64 time=6.101 ms
```

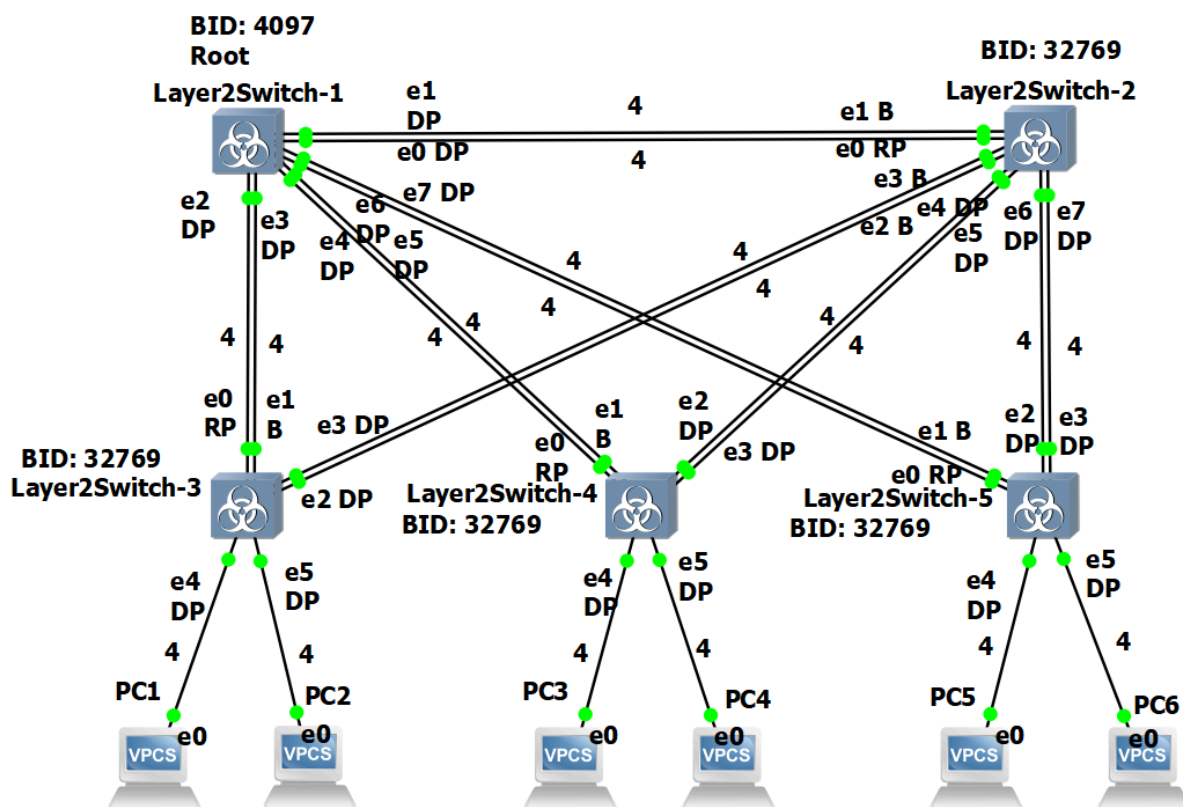
```
PC6> ping 10.0.0.13
```

```
84 bytes from 10.0.0.13 icmp_seq=1 ttl=64 time=8.428 ms
84 bytes from 10.0.0.13 icmp_seq=2 ttl=64 time=16.507 ms
84 bytes from 10.0.0.13 icmp_seq=3 ttl=64 time=11.149 ms
84 bytes from 10.0.0.13 icmp_seq=4 ttl=64 time=22.128 ms
84 bytes from 10.0.0.13 icmp_seq=5 ttl=64 time=11.882 ms
```

```
PC6> ping 10.0.0.14
```

```
84 bytes from 10.0.0.14 icmp_seq=1 ttl=64 time=1.144 ms
84 bytes from 10.0.0.14 icmp_seq=2 ttl=64 time=8.158 ms
84 bytes from 10.0.0.14 icmp_seq=3 ttl=64 time=3.988 ms
84 bytes from 10.0.0.14 icmp_seq=4 ttl=64 time=0.798 ms
84 bytes from 10.0.0.14 icmp_seq=5 ttl=64 time=9.303 ms
```

Схема с дополненными BID коммутаторов, режимами работы коммутаторов и стоимостями маршрутов



Захват пакетов hello при помощи Wireshark

Et0:

*Standard input [Layer2Switch-1 Ethernet0 to Layer2Switch-2 Ethernet0]

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

stp and eth.src == 0c5e:ea:ac:00:00

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000	0c:5e:ea:ac:00:00	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8001
5	1.999723	0c:5e:ea:ac:00:00	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8001
9	3.999407	0c:5e:ea:ac:00:00	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8001
14	5.999088	0c:5e:ea:ac:00:00	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8001
20	7.998786	0c:5e:ea:ac:00:00	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8001
24	9.998498	0c:5e:ea:ac:00:00	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8001
28	11.998171	0c:5e:ea:ac:00:00	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8001
32	13.997907	0c:5e:ea:ac:00:00	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8001
37	15.997568	0c:5e:ea:ac:00:00	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8001
42	17.998267	0c:5e:ea:ac:00:00	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8001
47	19.997951	0c:5e:ea:ac:00:00	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8001
52	21.997658	0c:5e:ea:ac:00:00	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8001
64	23.998346	0c:5e:ea:ac:00:00	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8001
69	25.998045	0c:5e:ea:ac:00:00	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8001
75	27.997740	0c:5e:ea:ac:00:00	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8001
79	29.998449	0c:5e:ea:ac:00:00	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8001
83	31.998145	0c:5e:ea:ac:00:00	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8001

Frame 1: 60 bytes on wire (480 bits), 60 bytes captured (480 bits) on interface 00000001 01 80 c2 00 00 00 0c 5e ea ac 00 00 00 27 42 42^.....'BB
IEEE 802.3 Ethernet 0010 03 00 00 02 02 3c 10 01 0c 5e ea ac 00 00 00 00<.....
Logical-Link Control 0020 00 00 10 01 0c 5e ea ac 00 00 80 01 00 00 14 00^.....
Spanning Tree Protocol 0030 02 00 0f 00 00 00 00 00 00 00 00 00 00^.....

Protocol Identifier: Spanning Tree Protocol (0x0000)
Protocol Version Identifier: Rapid Spanning Tree (2)
BPDU Type: Rapid/Multiple Spanning Tree (0x02)
BPDU flags: 0x3c, Forwarding, Learning, Port Role: Designated
Root Identifier: 4096 / 1 / 0c:5e:ea:ac:00:00
Root Path Cost: 0
Bridge Identifier: 4096 / 1 / 0c:5e:ea:ac:00:00
Port identifier: 0x8001
Message Age: 0
Max Age: 20
Hello Time: 2
Forward Delay: 15
Version 1 Length: 0

Et1:

*Standard input [Layer2Switch-1 Ethernet1 to Layer2Switch-2 Ethernet1]

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

stp and eth.src == 0c5e:ea:ac:00:01

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000	0c:5e:ea:ac:00:01	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8002
7	1.999674	0c:5e:ea:ac:00:01	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8002
11	3.999404	0c:5e:ea:ac:00:01	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8002
15	5.999103	0c:5e:ea:ac:00:01	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8002
19	7.998806	0c:5e:ea:ac:00:01	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8002
25	9.998492	0c:5e:ea:ac:00:01	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8002
30	11.999172	0c:5e:ea:ac:00:01	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8002
35	13.998852	0c:5e:ea:ac:00:01	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8002
40	15.998556	0c:5e:ea:ac:00:01	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8002
52	17.999256	0c:5e:ea:ac:00:01	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8002
57	19.998950	0c:5e:ea:ac:00:01	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8002
62	21.998659	0c:5e:ea:ac:00:01	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8002
66	23.999352	0c:5e:ea:ac:00:01	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8002
70	25.999058	0c:5e:ea:ac:00:01	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8002
74	27.998737	0c:5e:ea:ac:00:01	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8002
79	29.998482	0c:5e:ea:ac:00:01	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8002
85	31.999148	0c:5e:ea:ac:00:01	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8002

Frame 1: 60 bytes on wire (480 bits), 60 bytes captured (480 bits) on interface 00000001 01 80 c2 00 00 00 0c 5e ea ac 00 01 00 27 42 42^.....'BB
IEEE 802.3 Ethernet 0010 03 00 00 02 02 3c 10 01 0c 5e ea ac 00 00 00 00<.....
Logical-Link Control 0020 00 00 10 01 0c 5e ea ac 00 00 80 02 00 00 14 00^.....
Spanning Tree Protocol 0030 02 00 0f 00 00 00 00 00 00 00 00 00 00^.....

Protocol Identifier: Spanning Tree Protocol (0x0000)
Protocol Version Identifier: Rapid Spanning Tree (2)
BPDU Type: Rapid/Multiple Spanning Tree (0x02)
BPDU flags: 0x3c, Forwarding, Learning, Port Role: Designated
Root Identifier: 4096 / 1 / 0c:5e:ea:ac:00:00
Root Path Cost: 0
Bridge Identifier: 4096 / 1 / 0c:5e:ea:ac:00:00
Port identifier: 0x8002
Message Age: 0
Max Age: 20
Hello Time: 2
Forward Delay: 15
Version 1 Length: 0

Et2:

*Standard input [Layer2Switch-1 Ethernet2 to Layer2Switch-3 Ethernet0]

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

stp and eth.src == 0c:5e:ea:ac:00:02

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000	0c:5e:ea:ac:00:02	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8003
5	1.999699	0c:5e:ea:ac:00:02	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8003
10	3.999374	0c:5e:ea:ac:00:02	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8003
14	6.000060	0c:5e:ea:ac:00:02	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8003
19	7.999760	0c:5e:ea:ac:00:02	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8003
25	9.999441	0c:5e:ea:ac:00:02	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8003
37	12.000151	0c:5e:ea:ac:00:02	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8003
42	13.999839	0c:5e:ea:ac:00:02	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8003
46	15.999558	0c:5e:ea:ac:00:02	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8003
50	18.000250	0c:5e:ea:ac:00:02	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8003
55	19.999957	0c:5e:ea:ac:00:02	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8003
59	21.999627	0c:5e:ea:ac:00:02	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8003
64	23.999375	0c:5e:ea:ac:00:02	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8003
69	26.000037	0c:5e:ea:ac:00:02	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8003
74	27.999738	0c:5e:ea:ac:00:02	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8003
79	29.999468	0c:5e:ea:ac:00:02	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8003
83	31.999093	0c:5e:ea:ac:00:02	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8003

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

IEEE 802.3 Ethernet

Logical-Link Control

Spanning Tree Protocol

- Protocol Identifier: Spanning Tree Protocol (0x0000)
- Protocol Version Identifier: Rapid Spanning Tree (2)
- BPDU Type: Rapid/Multiple Spanning Tree (0x02)
- BPDU flags: 0x3c, Forwarding, Learning, Port Role: Designated
- Root Identifier: 4096 / 1 / 0c:5e:ea:ac:00:00
- Root Path Cost: 0
- Bridge Identifier: 4096 / 1 / 0c:5e:ea:ac:00:00
- Port identifier: 0x8003
- Message Age: 0
- Max Age: 20
- Hello Time: 2
- Forward Delay: 15
- Version 1 Length: 0

E3:

*Standard input [Layer2Switch-1 Ethernet3 to Layer2Switch-3 Ethernet1]

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

stp and eth.src == 0c:5e:ea:ac:00:03

No.	Time	Source	Destination	Protocol	Length	Info
2	0.002681	0c:5e:ea:ac:00:03	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8004
8	2.002355	0c:5e:ea:ac:00:03	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8004
20	4.003083	0c:5e:ea:ac:00:03	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8004
26	6.002752	0c:5e:ea:ac:00:03	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8004
30	8.002481	0c:5e:ea:ac:00:03	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8004
34	10.003178	0c:5e:ea:ac:00:03	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8004
39	12.002874	0c:5e:ea:ac:00:03	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8004
43	14.002549	0c:5e:ea:ac:00:03	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8004
48	16.002288	0c:5e:ea:ac:00:03	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8004
52	18.002949	0c:5e:ea:ac:00:03	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8004
56	20.002643	0c:5e:ea:ac:00:03	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8004
61	22.002386	0c:5e:ea:ac:00:03	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8004
65	24.002003	0c:5e:ea:ac:00:03	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8004
70	26.001782	0c:5e:ea:ac:00:03	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8004
74	28.003408	0c:5e:ea:ac:00:03	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8004
79	30.004105	0c:5e:ea:ac:00:03	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8004
85	32.003816	0c:5e:ea:ac:00:03	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8004

Frame 2: 60 bytes on wire (480 bits), 60 bytes captured (480 bits) on interface

IEEE 802.3 Ethernet

Logical-Link Control

Spanning Tree Protocol

- Protocol Identifier: Spanning Tree Protocol (0x0000)
- Protocol Version Identifier: Rapid Spanning Tree (2)
- BPDU Type: Rapid/Multiple Spanning Tree (0x02)
- BPDU flags: 0x3c, Forwarding, Learning, Port Role: Designated
- Root Identifier: 4096 / 1 / 0c:5e:ea:ac:00:00
- Root Path Cost: 0
- Bridge Identifier: 4096 / 1 / 0c:5e:ea:ac:00:00
- Port identifier: 0x8004
- Message Age: 0
- Max Age: 20
- Hello Time: 2
- Forward Delay: 15
- Version 1 Length: 0

E4:

*Standard input [Layer2Switch-1 Ethernet4 to Layer2Switch-4 Ethernet0]

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

stp and eth.src == 0c:5e:ea:ac:00:04

No.	Time	Source	Destination	Protocol	Length	Info
5	0.800468	0c:5e:ea:ac:00:04	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8005
9	2.800149	0c:5e:ea:ac:00:04	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8005
14	4.800838	0c:5e:ea:ac:00:04	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8005
18	6.800537	0c:5e:ea:ac:00:04	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8005
23	8.800217	0c:5e:ea:ac:00:04	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8005
28	10.799947	0c:5e:ea:ac:00:04	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8005
32	12.800602	0c:5e:ea:ac:00:04	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8005
36	14.800327	0c:5e:ea:ac:00:04	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8005
40	16.800558	0c:5e:ea:ac:00:04	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8005
45	18.799665	0c:5e:ea:ac:00:04	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8005
50	20.799433	0c:5e:ea:ac:00:04	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8005
54	22.801061	0c:5e:ea:ac:00:04	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8005
58	24.801760	0c:5e:ea:ac:00:04	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8005
64	26.801512	0c:5e:ea:ac:00:04	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8005
69	28.802136	0c:5e:ea:ac:00:04	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8005
75	30.801896	0c:5e:ea:ac:00:04	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8005
81	32.803513	0c:5e:ea:ac:00:04	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8005

Frame 5: 60 bytes on wire (480 bits), 60 bytes captured (480 bits) on interface 0000
 IEEE 802.3 Ethernet 0010 03 00 00 02 02 3c 10 01 0c 5e ea ac 00 00 00 00
 Logical-Link Control 0020 00 00 10 01 0c 5e ea ac 00 00 80 05 00 00 14 00
 Spanning Tree Protocol 0030 02 00 0f 00 00 00 00 00 00 00 00 00

Protocol Identifier: Spanning Tree Protocol (0x0000)
 Protocol Version Identifier: Rapid Spanning Tree (2)
 BPDU Type: Rapid/Multiple Spanning Tree (0x02)
 BPDU flags: 0x3c, Forwarding, Learning, Port Role: Designated
 Root Identifier: 4096 / 1 / 0c:5e:ea:ac:00:00
 Root Path Cost: 0
 Bridge Identifier: 4096 / 1 / 0c:5e:ea:ac:00:00
 Port identifier: 0x8005
 Message Age: 0
 Max Age: 20
 Hello Time: 2
 Forward Delay: 15
 Version 1 Length: 0

Et5:

*Standard input [Layer2Switch-1 Ethernet5 to Layer2Switch-4 Ethernet1]

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

stp and eth.src == 0c:5e:ea:ac:00:05

No.	Time	Source	Destination	Protocol	Length	Info
4	0.346784	0c:5e:ea:ac:00:05	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8006
8	2.346484	0c:5e:ea:ac:00:05	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8006
13	4.346224	0c:5e:ea:ac:00:05	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8006
18	6.345884	0c:5e:ea:ac:00:05	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8006
22	8.346545	0c:5e:ea:ac:00:05	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8006
27	10.346262	0c:5e:ea:ac:00:05	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8006
32	12.346077	0c:5e:ea:ac:00:05	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8006
37	14.345608	0c:5e:ea:ac:00:05	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8006
42	16.345372	0c:5e:ea:ac:00:05	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8006
46	18.347007	0c:5e:ea:ac:00:05	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8006
50	20.347759	0c:5e:ea:ac:00:05	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8006
56	22.347433	0c:5e:ea:ac:00:05	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8006
61	24.348116	0c:5e:ea:ac:00:05	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8006
66	26.347916	0c:5e:ea:ac:00:05	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8006
72	28.349453	0c:5e:ea:ac:00:05	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8006
76	30.349208	0c:5e:ea:ac:00:05	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8006
80	32.348879	0c:5e:ea:ac:00:05	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8006

Frame 4: 60 bytes on wire (480 bits), 60 bytes captured (480 bits) on interface 0000
 IEEE 802.3 Ethernet 0010 03 00 00 02 02 3c 10 01 0c 5e ea ac 00 00 00 00
 Logical-Link Control 0020 00 00 10 01 0c 5e ea ac 00 00 80 06 00 00 14 00
 Spanning Tree Protocol 0030 02 00 0f 00 00 00 00 00 00 00 00 00

Protocol Identifier: Spanning Tree Protocol (0x0000)
 Protocol Version Identifier: Rapid Spanning Tree (2)
 BPDU Type: Rapid/Multiple Spanning Tree (0x02)
 BPDU flags: 0x3c, Forwarding, Learning, Port Role: Designated
 Root Identifier: 4096 / 1 / 0c:5e:ea:ac:00:00
 Root Path Cost: 0
 Bridge Identifier: 4096 / 1 / 0c:5e:ea:ac:00:00
 Port identifier: 0x8006
 Message Age: 0
 Max Age: 20
 Hello Time: 2
 Forward Delay: 15
 Version 1 Length: 0

Et6:

*Standard input [Layer2Switch-1 Ethernet6 to Layer2Switch-5 Ethernet0]

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

stp and eth.src == 0c5e:ea:ac:00:06

No.	Time	Source	Destination	Protocol	Length	Info
2	0.797228	0c:5e:ea:ac:00:06	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8007
6	2.797823	0c:5e:ea:ac:00:06	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8007
10	4.797559	0c:5e:ea:ac:00:06	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8007
14	6.797360	0c:5e:ea:ac:00:06	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8007
19	8.796879	0c:5e:ea:ac:00:06	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8007
24	10.796646	0c:5e:ea:ac:00:06	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8007
28	12.798271	0c:5e:ea:ac:00:06	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8007
32	14.799033	0c:5e:ea:ac:00:06	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8007
38	16.798693	0c:5e:ea:ac:00:06	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8007
43	18.799362	0c:5e:ea:ac:00:06	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8007
48	20.799244	0c:5e:ea:ac:00:06	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8007
54	22.800721	0c:5e:ea:ac:00:06	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8007
58	24.800506	0c:5e:ea:ac:00:06	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8007
62	26.800150	0c:5e:ea:ac:00:06	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8007
67	28.799822	0c:5e:ea:ac:00:06	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8007
72	30.799566	0c:5e:ea:ac:00:06	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8007
76	32.799247	0c:5e:ea:ac:00:06	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8007

Frame 2: 60 bytes on wire (480 bits), 60 bytes captured (480 bits) on interface 0000

IEEE 802.3 Ethernet

Logical-Link Control

Spanning Tree Protocol

Protocol Identifier: Spanning Tree Protocol (0x0000)

Protocol Version Identifier: Rapid Spanning Tree (2)

BPDU Type: Rapid/Multiple Spanning Tree (0x02)

BPDU flags: 0x3c, Forwarding, Learning, Port Role: Designated

Root Identifier: 4096 / 1 / 0c:5e:ea:ac:00:00

Root Path Cost: 0

Bridge Identifier: 4096 / 1 / 0c:5e:ea:ac:00:00

Port identifier: 0x8007

Message Age: 0

Max Age: 20

Hello Time: 2

Forward Delay: 15

Version 1 Length: 0

0000 01 80 c2 00 00 00 0c 5e ea ac 00 06 00 27 42 42 BB

0010 03 00 00 02 02 3c 10 01 0c 5e ea ac 00 00 00 00

0020 00 00 10 01 0c 5e ea ac 00 00 80 07 00 00 14 00

0030 02 00 0f 00 00 00 00 00 00 00 00 00

Et7:

*Standard input [Layer2Switch-1 Ethernet7 to Layer2Switch-5 Ethernet1]

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

stp and eth.src == 0c5e:ea:ac:00:07

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000	0c:5e:ea:ac:00:07	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8008
5	1.999799	0c:5e:ea:ac:00:07	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8008
10	3.999306	0c:5e:ea:ac:00:07	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8008
15	5.999113	0c:5e:ea:ac:00:07	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8008
19	8.000713	0c:5e:ea:ac:00:07	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8008
23	10.001484	0c:5e:ea:ac:00:07	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8008
29	12.001145	0c:5e:ea:ac:00:07	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8008
34	14.001862	0c:5e:ea:ac:00:07	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8008
39	16.001732	0c:5e:ea:ac:00:07	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8008
45	18.003155	0c:5e:ea:ac:00:07	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8008
49	20.002959	0c:5e:ea:ac:00:07	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8008
53	22.002576	0c:5e:ea:ac:00:07	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8008
58	24.002287	0c:5e:ea:ac:00:07	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8008
64	26.002008	0c:5e:ea:ac:00:07	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8008
68	28.001733	0c:5e:ea:ac:00:07	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8008
72	30.001403	0c:5e:ea:ac:00:07	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8008
76	32.001178	0c:5e:ea:ac:00:07	Spanning-tree-(for...	STP	60	RST. Root = 4096/1/0c:5e:ea:ac:00:00 Cost = 0 Port = 0x8008

Frame 1: 60 bytes on wire (480 bits), 60 bytes captured (480 bits) on interface 0000

IEEE 802.3 Ethernet

Logical-Link Control

Spanning Tree Protocol

Protocol Identifier: Spanning Tree Protocol (0x0000)

Protocol Version Identifier: Rapid Spanning Tree (2)

BPDU Type: Rapid/Multiple Spanning Tree (0x02)

BPDU flags: 0x3c, Forwarding, Learning, Port Role: Designated

Root Identifier: 4096 / 1 / 0c:5e:ea:ac:00:00

Root Path Cost: 0

Bridge Identifier: 4096 / 1 / 0c:5e:ea:ac:00:00

Port identifier: 0x8008

Message Age: 0

Max Age: 20

Hello Time: 2

Forward Delay: 15

Version 1 Length: 0

0000 01 80 c2 00 00 00 0c 5e ea ac 00 07 00 27 42 42

0010 03 00 00 02 02 3c 10 01 0c 5e ea ac 00 00 00 00

0020 00 00 10 01 0c 5e ea ac 00 00 80 08 00 00 14 00

0030 02 00 0f 00 00 00 00 00 00 00 00 00

В RSTP в отличие от STP версия протокола стоит вторая, тип BPDU также второй, в поле Flags — биты для Port Role, Proposal, Agreement

Смена стоимости маршрута для порта gi0/0 на 3 коммутаторе:

```
vIOS-L2-01>en
```

```
vIOS-L2-01#conf t
```

```
vIOS-L2-01(config)#interface gigabitEthernet0/0
```

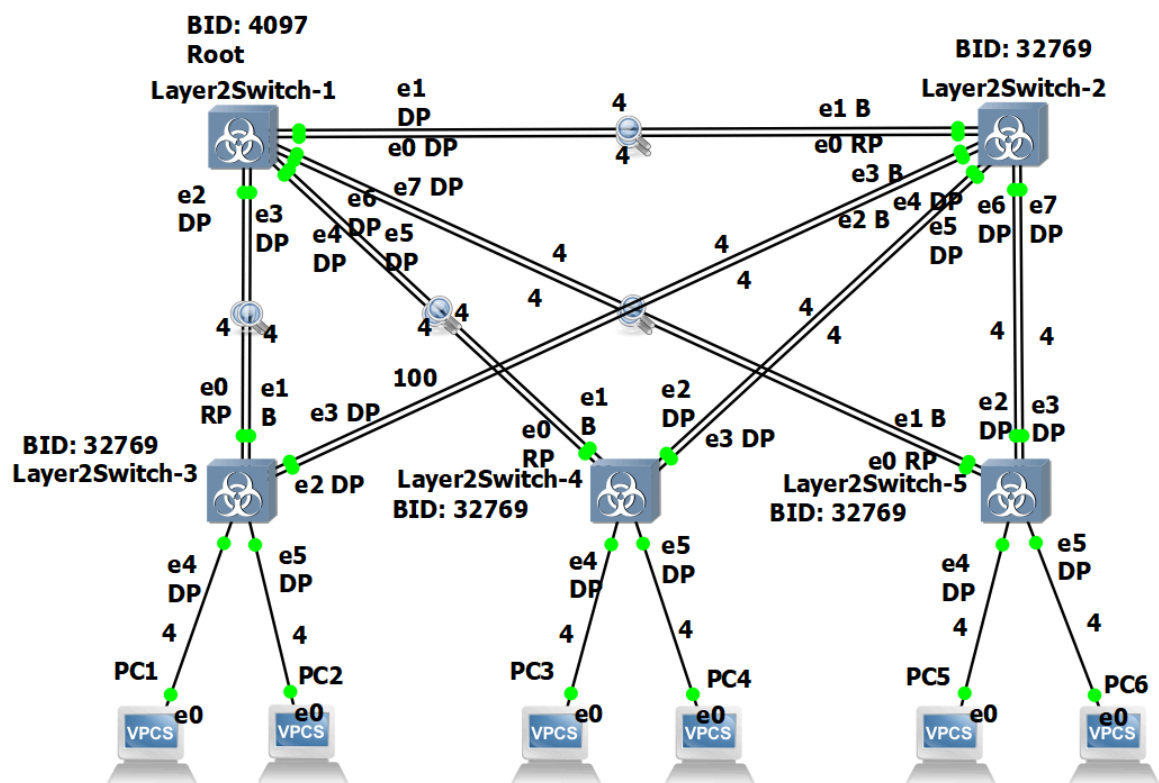
```
vIOS-L2-01(config-if)#spanning-tree cost 100
```

```
Layer2Switch-3 - PuTTY
```

```
VLAN0001
Spanning tree enabled protocol rstp
Root ID    Priority    4097
           Address    0c5e.eaac.0000
           Cost       4
           Port       2 (GigabitEthernet0/1)
           Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec

Bridge ID  Priority    32769 (priority 32768 sys-id-ext 1)
           Address    0ca9.1b17.0000
           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  100        128.1     Shr
Gi0/1              Root  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
```



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

Папка RSTP_config