

## 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.

STP – протокол уже настроен, так как некоторые порты закрыты и петель нет. Корневым коммутатором является Layer2Switch-3, так как он имеет наименьший MAC-адрес (приоритеты всех коммутаторов равны 32769). Ниже представлены рисунки (1 - 5) с конфигурацией STP. Для этого использовалась команда *show spanning tree*.

```
vIOS-L2-01>show spanning-tree

VLAN0001
  Spanning tree enabled protocol ieee
  Root ID    Priority    32769
             Address     0c24.0d1e.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     0c26.36cc.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
Gi1/2          Desg  FWD  4          128.7     Shr

Interface      Role  Sts  Cost      Prio.Nbr  Type
-----
Gi1/3          Desg  FWD  4          128.8     Shr
Gi2/0          Desg  FWD  4          128.9     Shr

--More--
```

Рисунок 1 - Layer2Switch-1

```

*****
vIOS-L2-01>show spanning-tree

VLAN0001
  Spanning tree enabled protocol ieee
  Root ID    Priority    32769
            Address     0c24.0d1e.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     0c6c.cd24.0000
            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

Interface                Role Sts Cost      Prio.Nbr Type
-----
Gi1/3                    Desg FWD 4         128.8   Shr
Gi2/0                    Desg FWD 4         128.9   Shr

--More--

```

Рисунок 2 - Layer2Switch-2

```

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* conditions of the Cisco End User License Agreement at
* http://www.cisco.com/go/eula
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* Unauthorized use or distribution of this software is expressly
* Prohibited.
*****
vIOS-L2-01>show spanning-tree

VLAN0001
  Spanning tree enabled protocol ieee
  Root ID    Priority    32769
            Address     0c24.0d1e.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     0c24.0d1e.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--

```

Рисунок 3 - Layer2Switch-3

```

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*****
vIOS-L2-01>ort
Copyright (c) 1986-2014 by Cisco Systems, Inc.
Compiled Thu 05-Jun-14 05:35 by jsfeng
vIOS-L2-01>show spanning-tree

VLAN0001
  Spanning tree enabled protocol ieee
  Root ID    Priority    32769
            Address     0c24.0d1e.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     0c95.9ee7.0000
            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 LRN 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 LRN 4        128.5   Shr
Gi1/1                    Desg LRN 4        128.6   Shr

vIOS-L2-01>

```

Рисунок 4 - Layer2Switch-4

```

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*
* Unauthorized use or distribution of this software is expressly
* Prohibited.
*****
vIOS-L2-01>show spanning-tree

VLAN0001
  Spanning tree enabled protocol ieee
  Root ID    Priority    32769
            Address     0c24.0d1e.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     0cf2.030e.0000
            Hello Time   2 sec  Max Age 20 sec  Forward Delay 15 sec
            Aging Time   300 sec

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

--More--

```

Рисунок 5 - Layer2Switch-5

На схеме отмечены порты: зеленые – открытые (Desg), оранжевые – закрытые (Altn), желтые – открытые, через которые виден корневой коммутатор (Root).

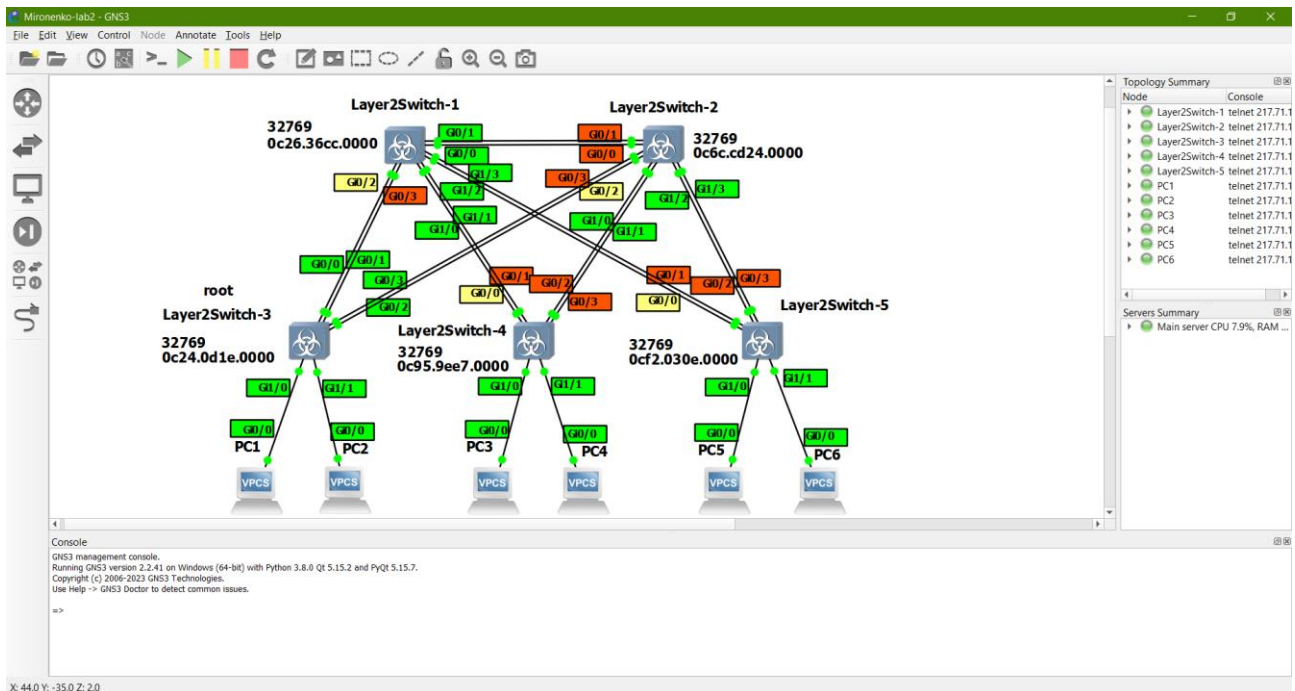


Рисунок 6 - Схема

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

PC 1-6 присвоены ip 10.0.0.1 – 10.0.0.6 соответственно. Ниже представлены рисунки (7 - 12) с результатом команды *ping*. Все VPCS видят друг друга.

```
PC1 : 10.0.0.1 255.255.255.0

PC1> ping 10.0.0.2

84 bytes from 10.0.0.2 icmp_seq=1 ttl=64 time=8.073 ms
84 bytes from 10.0.0.2 icmp_seq=2 ttl=64 time=15.429 ms
84 bytes from 10.0.0.2 icmp_seq=3 ttl=64 time=0.552 ms
84 bytes from 10.0.0.2 icmp_seq=4 ttl=64 time=0.814 ms
84 bytes from 10.0.0.2 icmp_seq=5 ttl=64 time=2.775 ms

PC1> ping 10.0.0.3

84 bytes from 10.0.0.3 icmp_seq=1 ttl=64 time=7.736 ms
84 bytes from 10.0.0.3 icmp_seq=2 ttl=64 time=9.263 ms
84 bytes from 10.0.0.3 icmp_seq=3 ttl=64 time=7.720 ms
84 bytes from 10.0.0.3 icmp_seq=4 ttl=64 time=7.776 ms
84 bytes from 10.0.0.3 icmp_seq=5 ttl=64 time=6.690 ms

PC1> ping 10.0.0.4

84 bytes from 10.0.0.4 icmp_seq=1 ttl=64 time=12.426 ms
84 bytes from 10.0.0.4 icmp_seq=2 ttl=64 time=6.141 ms
84 bytes from 10.0.0.4 icmp_seq=3 ttl=64 time=1.311 ms
84 bytes from 10.0.0.4 icmp_seq=4 ttl=64 time=5.043 ms
84 bytes from 10.0.0.4 icmp_seq=5 ttl=64 time=7.784 ms

PC1> ping 10.0.0.5

84 bytes from 10.0.0.5 icmp_seq=1 ttl=64 time=3.260 ms
84 bytes from 10.0.0.5 icmp_seq=2 ttl=64 time=8.603 ms
84 bytes from 10.0.0.5 icmp_seq=3 ttl=64 time=6.721 ms
84 bytes from 10.0.0.5 icmp_seq=4 ttl=64 time=3.077 ms
84 bytes from 10.0.0.5 icmp_seq=5 ttl=64 time=10.048 ms

PC1> ping 10.0.0.6

84 bytes from 10.0.0.6 icmp_seq=1 ttl=64 time=15.724 ms
84 bytes from 10.0.0.6 icmp_seq=2 ttl=64 time=9.593 ms
84 bytes from 10.0.0.6 icmp_seq=3 ttl=64 time=5.126 ms
84 bytes from 10.0.0.6 icmp_seq=4 ttl=64 time=9.391 ms
84 bytes from 10.0.0.6 icmp_seq=5 ttl=64 time=7.577 ms

PC1> █
```

Рисунок 7 - PC 1

```
PC2 : 10.0.0.2 255.255.255.0

PC2> ping 10.0.0.1

84 bytes from 10.0.0.1 icmp_seq=1 ttl=64 time=1.367 ms
84 bytes from 10.0.0.1 icmp_seq=2 ttl=64 time=0.491 ms
84 bytes from 10.0.0.1 icmp_seq=3 ttl=64 time=5.813 ms
84 bytes from 10.0.0.1 icmp_seq=4 ttl=64 time=15.288 ms
84 bytes from 10.0.0.1 icmp_seq=5 ttl=64 time=2.264 ms

PC2> ping 10.0.0.3

84 bytes from 10.0.0.3 icmp_seq=1 ttl=64 time=10.965 ms
84 bytes from 10.0.0.3 icmp_seq=2 ttl=64 time=8.433 ms
84 bytes from 10.0.0.3 icmp_seq=3 ttl=64 time=4.317 ms
84 bytes from 10.0.0.3 icmp_seq=4 ttl=64 time=15.125 ms
84 bytes from 10.0.0.3 icmp_seq=5 ttl=64 time=22.107 ms

PC2> ping 10.0.0.4

84 bytes from 10.0.0.4 icmp_seq=1 ttl=64 time=7.544 ms
84 bytes from 10.0.0.4 icmp_seq=2 ttl=64 time=2.730 ms
84 bytes from 10.0.0.4 icmp_seq=3 ttl=64 time=7.573 ms
84 bytes from 10.0.0.4 icmp_seq=4 ttl=64 time=3.006 ms
84 bytes from 10.0.0.4 icmp_seq=5 ttl=64 time=11.337 ms

PC2> ping 10.0.0.5

84 bytes from 10.0.0.5 icmp_seq=1 ttl=64 time=11.668 ms
84 bytes from 10.0.0.5 icmp_seq=2 ttl=64 time=8.847 ms
84 bytes from 10.0.0.5 icmp_seq=3 ttl=64 time=7.126 ms
84 bytes from 10.0.0.5 icmp_seq=4 ttl=64 time=7.694 ms
84 bytes from 10.0.0.5 icmp_seq=5 ttl=64 time=8.771 ms

PC2> ping 10.0.0.6

84 bytes from 10.0.0.6 icmp_seq=1 ttl=64 time=14.515 ms
84 bytes from 10.0.0.6 icmp_seq=2 ttl=64 time=3.479 ms
84 bytes from 10.0.0.6 icmp_seq=3 ttl=64 time=3.189 ms
84 bytes from 10.0.0.6 icmp_seq=4 ttl=64 time=11.530 ms
84 bytes from 10.0.0.6 icmp_seq=5 ttl=64 time=2.785 ms

PC2> █
```

Рисунок 8 - PC 2

```

PC3 : 10.0.0.3 255.255.255.0
PC3> ping 10.0.0.1
84 bytes from 10.0.0.1 icmp_seq=1 ttl=64 time=10.777 ms
84 bytes from 10.0.0.1 icmp_seq=2 ttl=64 time=1.430 ms
84 bytes from 10.0.0.1 icmp_seq=3 ttl=64 time=3.860 ms
84 bytes from 10.0.0.1 icmp_seq=4 ttl=64 time=7.246 ms
84 bytes from 10.0.0.1 icmp_seq=5 ttl=64 time=4.700 ms
PC3> ping 10.0.0.2
84 bytes from 10.0.0.2 icmp_seq=1 ttl=64 time=12.183 ms
84 bytes from 10.0.0.2 icmp_seq=2 ttl=64 time=7.137 ms
84 bytes from 10.0.0.2 icmp_seq=3 ttl=64 time=7.506 ms
84 bytes from 10.0.0.2 icmp_seq=4 ttl=64 time=9.766 ms
84 bytes from 10.0.0.2 icmp_seq=5 ttl=64 time=4.312 ms
C:\>
PC3> ping 10.0.0.4
84 bytes from 10.0.0.4 icmp_seq=1 ttl=64 time=3.058 ms
84 bytes from 10.0.0.4 icmp_seq=2 ttl=64 time=7.608 ms
84 bytes from 10.0.0.4 icmp_seq=3 ttl=64 time=6.849 ms
84 bytes from 10.0.0.4 icmp_seq=4 ttl=64 time=0.699 ms
84 bytes from 10.0.0.4 icmp_seq=5 ttl=64 time=0.797 ms
PC3> ping 10.0.0.5
84 bytes from 10.0.0.5 icmp_seq=1 ttl=64 time=1.534 ms
84 bytes from 10.0.0.5 icmp_seq=2 ttl=64 time=20.202 ms
84 bytes from 10.0.0.5 icmp_seq=3 ttl=64 time=8.135 ms
84 bytes from 10.0.0.5 icmp_seq=4 ttl=64 time=6.029 ms
84 bytes from 10.0.0.5 icmp_seq=5 ttl=64 time=9.135 ms
PC3> ping 10.0.0.6
84 bytes from 10.0.0.6 icmp_seq=1 ttl=64 time=14.479 ms
84 bytes from 10.0.0.6 icmp_seq=2 ttl=64 time=7.366 ms
84 bytes from 10.0.0.6 icmp_seq=3 ttl=64 time=4.736 ms
84 bytes from 10.0.0.6 icmp_seq=4 ttl=64 time=18.186 ms
84 bytes from 10.0.0.6 icmp_seq=5 ttl=64 time=4.900 ms
PC3> █

```

Рисунок 9 - PC 3

```

PC4 : 10.0.0.4 255.255.255.0
PC4> ping 10.0.0.1
84 bytes from 10.0.0.1 icmp_seq=1 ttl=64 time=14.174 ms
84 bytes from 10.0.0.1 icmp_seq=2 ttl=64 time=7.070 ms
84 bytes from 10.0.0.1 icmp_seq=3 ttl=64 time=9.357 ms
84 bytes from 10.0.0.1 icmp_seq=4 ttl=64 time=3.991 ms
84 bytes from 10.0.0.1 icmp_seq=5 ttl=64 time=17.268 ms
PC4> ping 10.0.0.2
84 bytes from 10.0.0.2 icmp_seq=1 ttl=64 time=7.048 ms
84 bytes from 10.0.0.2 icmp_seq=2 ttl=64 time=15.344 ms
84 bytes from 10.0.0.2 icmp_seq=3 ttl=64 time=7.344 ms
84 bytes from 10.0.0.2 icmp_seq=4 ttl=64 time=7.636 ms
84 bytes from 10.0.0.2 icmp_seq=5 ttl=64 time=1.891 ms
PC4> ping 10.0.0.3
84 bytes from 10.0.0.3 icmp_seq=1 ttl=64 time=0.624 ms
84 bytes from 10.0.0.3 icmp_seq=2 ttl=64 time=5.068 ms
84 bytes from 10.0.0.3 icmp_seq=3 ttl=64 time=7.552 ms
84 bytes from 10.0.0.3 icmp_seq=4 ttl=64 time=6.993 ms
84 bytes from 10.0.0.3 icmp_seq=5 ttl=64 time=0.473 ms
PC4> ping 10.0.0.5
84 bytes from 10.0.0.5 icmp_seq=1 ttl=64 time=17.810 ms
84 bytes from 10.0.0.5 icmp_seq=2 ttl=64 time=5.838 ms
84 bytes from 10.0.0.5 icmp_seq=3 ttl=64 time=9.260 ms
84 bytes from 10.0.0.5 icmp_seq=4 ttl=64 time=11.341 ms
84 bytes from 10.0.0.5 icmp_seq=5 ttl=64 time=1.134 ms
PC4> ping 10.0.0.6
84 bytes from 10.0.0.6 icmp_seq=1 ttl=64 time=6.799 ms
84 bytes from 10.0.0.6 icmp_seq=2 ttl=64 time=6.362 ms
84 bytes from 10.0.0.6 icmp_seq=3 ttl=64 time=6.403 ms
84 bytes from 10.0.0.6 icmp_seq=4 ttl=64 time=10.968 ms
84 bytes from 10.0.0.6 icmp_seq=5 ttl=64 time=11.289 ms
PC4> █

```

Рисунок 10 - PC 4

```

PC5 : 10.0.0.5 255.255.255.0

PC5> ping 10.0.0.1

84 bytes from 10.0.0.1 icmp_seq=1 ttl=64 time=13.619 ms
84 bytes from 10.0.0.1 icmp_seq=2 ttl=64 time=6.142 ms
84 bytes from 10.0.0.1 icmp_seq=3 ttl=64 time=9.332 ms
84 bytes from 10.0.0.1 icmp_seq=4 ttl=64 time=3.448 ms
84 bytes from 10.0.0.1 icmp_seq=5 ttl=64 time=7.094 ms

PC5> ping 10.0.0.2

84 bytes from 10.0.0.2 icmp_seq=1 ttl=64 time=8.074 ms
84 bytes from 10.0.0.2 icmp_seq=2 ttl=64 time=6.896 ms
84 bytes from 10.0.0.2 icmp_seq=3 ttl=64 time=4.093 ms
84 bytes from 10.0.0.2 icmp_seq=4 ttl=64 time=9.144 ms
84 bytes from 10.0.0.2 icmp_seq=5 ttl=64 time=5.760 ms

PC5> ping 10.0.0.3

84 bytes from 10.0.0.3 icmp_seq=1 ttl=64 time=13.726 ms
84 bytes from 10.0.0.3 icmp_seq=2 ttl=64 time=3.739 ms
84 bytes from 10.0.0.3 icmp_seq=3 ttl=64 time=4.823 ms
84 bytes from 10.0.0.3 icmp_seq=4 ttl=64 time=4.373 ms
84 bytes from 10.0.0.3 icmp_seq=5 ttl=64 time=10.512 ms

PC5> ping 10.0.0.4

84 bytes from 10.0.0.4 icmp_seq=1 ttl=64 time=7.615 ms
84 bytes from 10.0.0.4 icmp_seq=2 ttl=64 time=14.611 ms
84 bytes from 10.0.0.4 icmp_seq=3 ttl=64 time=7.112 ms
84 bytes from 10.0.0.4 icmp_seq=4 ttl=64 time=9.745 ms
84 bytes from 10.0.0.4 icmp_seq=5 ttl=64 time=7.271 ms

PC5> ping 10.0.0.6

84 bytes from 10.0.0.6 icmp_seq=1 ttl=64 time=2.929 ms
84 bytes from 10.0.0.6 icmp_seq=2 ttl=64 time=0.767 ms
84 bytes from 10.0.0.6 icmp_seq=3 ttl=64 time=0.721 ms
84 bytes from 10.0.0.6 icmp_seq=4 ttl=64 time=4.932 ms
84 bytes from 10.0.0.6 icmp_seq=5 ttl=64 time=7.422 ms

PC5> █

```

Рисунок 11 - PC 5

```

PC6> ping 10.0.0.1

84 bytes from 10.0.0.1 icmp_seq=1 ttl=64 time=9.289 ms
84 bytes from 10.0.0.1 icmp_seq=2 ttl=64 time=7.597 ms
84 bytes from 10.0.0.1 icmp_seq=3 ttl=64 time=5.255 ms
84 bytes from 10.0.0.1 icmp_seq=4 ttl=64 time=7.681 ms
84 bytes from 10.0.0.1 icmp_seq=5 ttl=64 time=15.258 ms

PC6> ping 10.0.0.2

84 bytes from 10.0.0.2 icmp_seq=1 ttl=64 time=9.955 ms
84 bytes from 10.0.0.2 icmp_seq=2 ttl=64 time=6.072 ms
84 bytes from 10.0.0.2 icmp_seq=3 ttl=64 time=15.543 ms
84 bytes from 10.0.0.2 icmp_seq=4 ttl=64 time=14.726 ms
84 bytes from 10.0.0.2 icmp_seq=5 ttl=64 time=5.308 ms

PC6> ping 10.0.0.3

84 bytes from 10.0.0.3 icmp_seq=1 ttl=64 time=12.264 ms
84 bytes from 10.0.0.3 icmp_seq=2 ttl=64 time=13.199 ms
84 bytes from 10.0.0.3 icmp_seq=3 ttl=64 time=9.139 ms
84 bytes from 10.0.0.3 icmp_seq=4 ttl=64 time=5.728 ms
84 bytes from 10.0.0.3 icmp_seq=5 ttl=64 time=9.026 ms

PC6> ping 10.0.0.4

84 bytes from 10.0.0.4 icmp_seq=1 ttl=64 time=4.864 ms
84 bytes from 10.0.0.4 icmp_seq=2 ttl=64 time=10.457 ms
84 bytes from 10.0.0.4 icmp_seq=3 ttl=64 time=3.777 ms
84 bytes from 10.0.0.4 icmp_seq=4 ttl=64 time=7.336 ms
84 bytes from 10.0.0.4 icmp_seq=5 ttl=64 time=8.768 ms

PC6> ping 10.0.0.5

84 bytes from 10.0.0.5 icmp_seq=1 ttl=64 time=0.488 ms
84 bytes from 10.0.0.5 icmp_seq=2 ttl=64 time=0.513 ms
84 bytes from 10.0.0.5 icmp_seq=3 ttl=64 time=3.169 ms
84 bytes from 10.0.0.5 icmp_seq=4 ttl=64 time=1.672 ms
84 bytes from 10.0.0.5 icmp_seq=5 ttl=64 time=5.455 ms

PC6> █

```

Рисунок 12 - PC 6

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

BID – bridge id, число длиной 8 байт, первые два из которых – приоритет, последние шесть – MAC-адрес. На схему добавлен приоритет над MAC-адресами. DP – открытый порт, RP – порт,

через который коммутаторы знают корневого коммутатора, blocked – заблокированный. Стоимость каждого соединения 4.

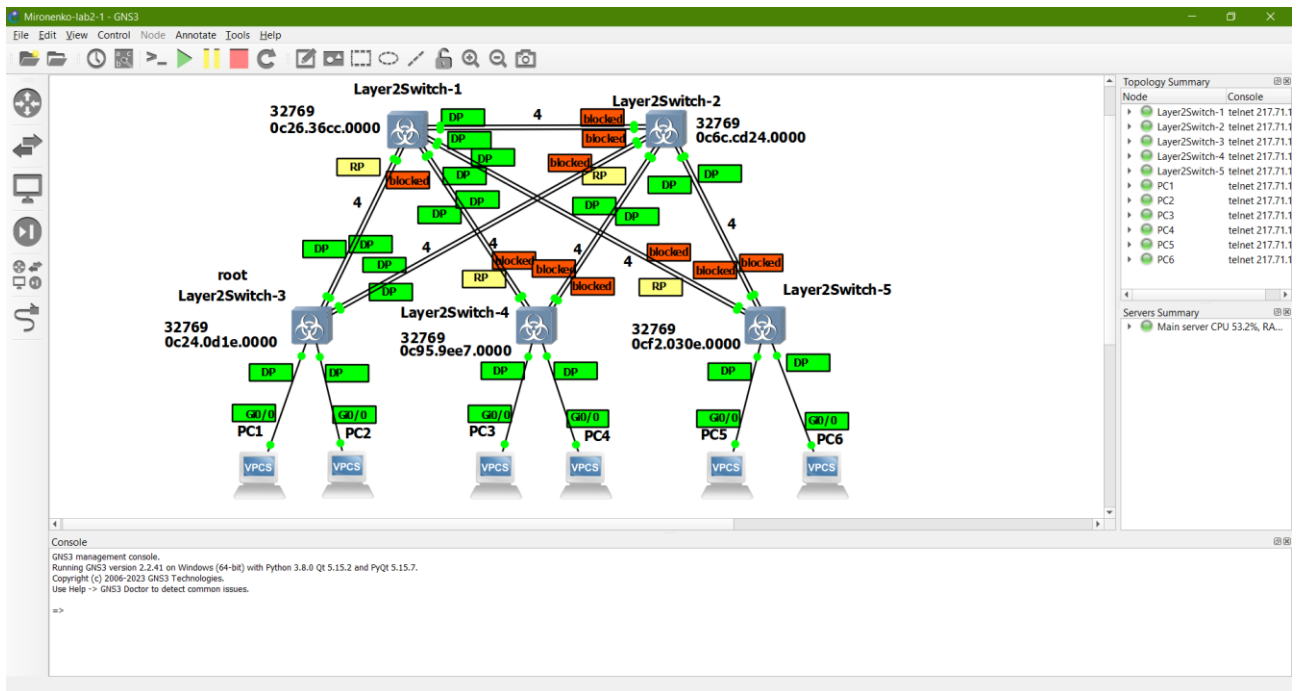


Рисунок 13 - схема с приоритетами коммутаторов

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

Будет отслеживаться соединение от корневого (Layer2Switch-3) до Layer2Switch-1.



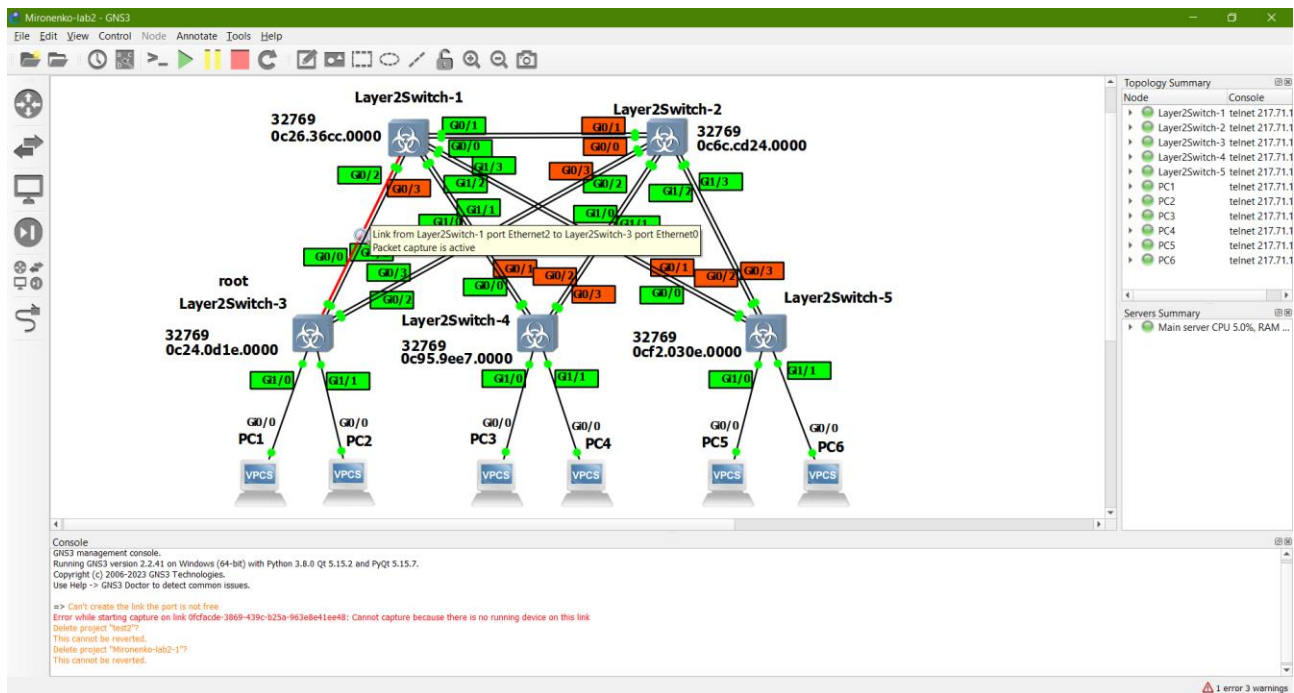


Рисунок 14 - отслеживаемое соединение

TSP отправляет либо BPDU (hello), либо TCN. С корневого коммутатора был отправлен пакет BPDU. На рисунке 15 представлена структура BPDU, среди полей которой можно выделить приоритет ( $32769 = 32768 + 1(\text{vlan})$ ) и MAC-адрес отправителя пакета. Вместе два данных значения составляют BID.

Изначально каждый коммутатор считается корневым. Коммутатору Layer2Switch-3 приходит BPDU – пакет, в котором сообщается, что Layer2Switch-1 (0c26.36cc.0000) – корневой, но так как Layer2Switch-3 обладает меньшим BID, то в качестве корневого выбирается Layer2Switch-3.

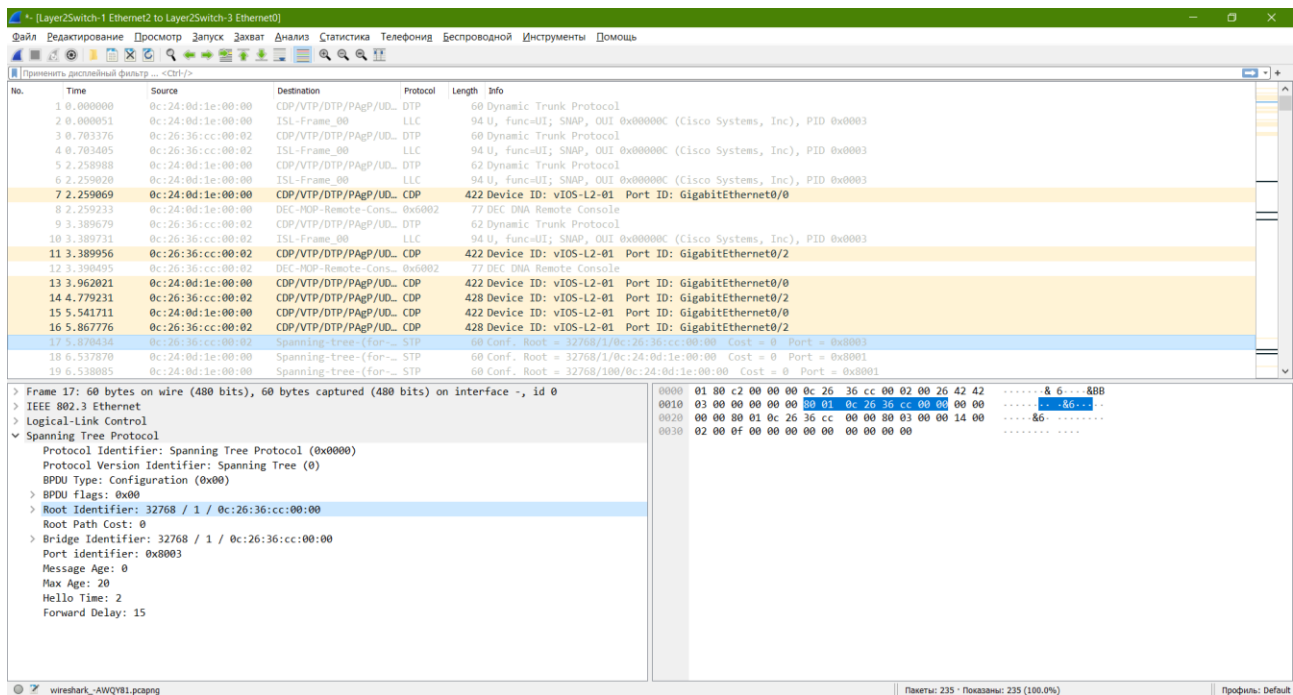


Рисунок 15 - пакет от Layer2Switch-1 -> корневому

В данном пакете видно, что корневым уже является Layer2Switch-3 (0c24.0d1e.0000).

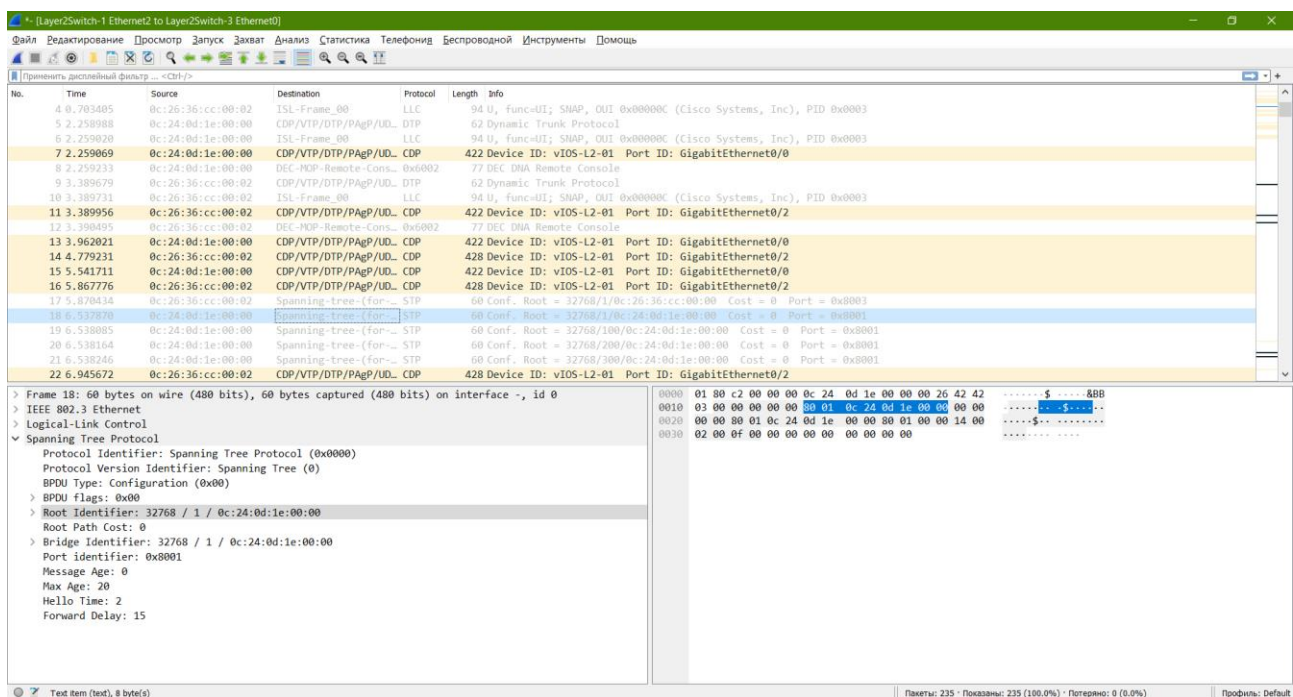


Рисунок 16 – пакет корневого -> Layer2Switch-1

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

Будет изменяться порт Gi0/2 у Layer2Switch-1. Стоимость 4 изменится на стоимость 2.

```

*
* By using the software, you agree to abide by the terms and conditions
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* conditions of the Cisco End User License Agreement at
* http://www.cisco.com/go/eula
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*****
vIOS-L2-01>show spanning-tree

VLAN0001
  Spanning tree enabled protocol ieee
  Root ID    Priority    32769
             Address     0c24.0d1e.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     0c26.36cc.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
Gi1/2                    Desg FWD 4         128.7 Shr
--More--

```

Рисунок 17 - стоимость до изменения

```

% Incomplete command.

vIOS-L2-01(config-if)#spanning-tree cost ?
  <1-2000000000> port path cost

vIOS-L2-01(config-if)#spanning-tree cost 2
vIOS-L2-01(config-if)#^Z
vIOS-L2-01#
*Aug  5 07:47:03.902: %SYS-5-CONFIG_I: Configured from console by console
vIOS-L2-01#show spanning-tree

VLAN0001
  Spanning tree enabled protocol ieee
  Root ID    Priority    32769
             Address     0c24.0d1e.0000
             Cost         2
             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     0c26.36cc.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 2         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--

```

Рисунок 18 - стоимость после изменения

На схеме по аналогии с п.3: DP - зеленые, RP – желтые, closed – оранжевые.

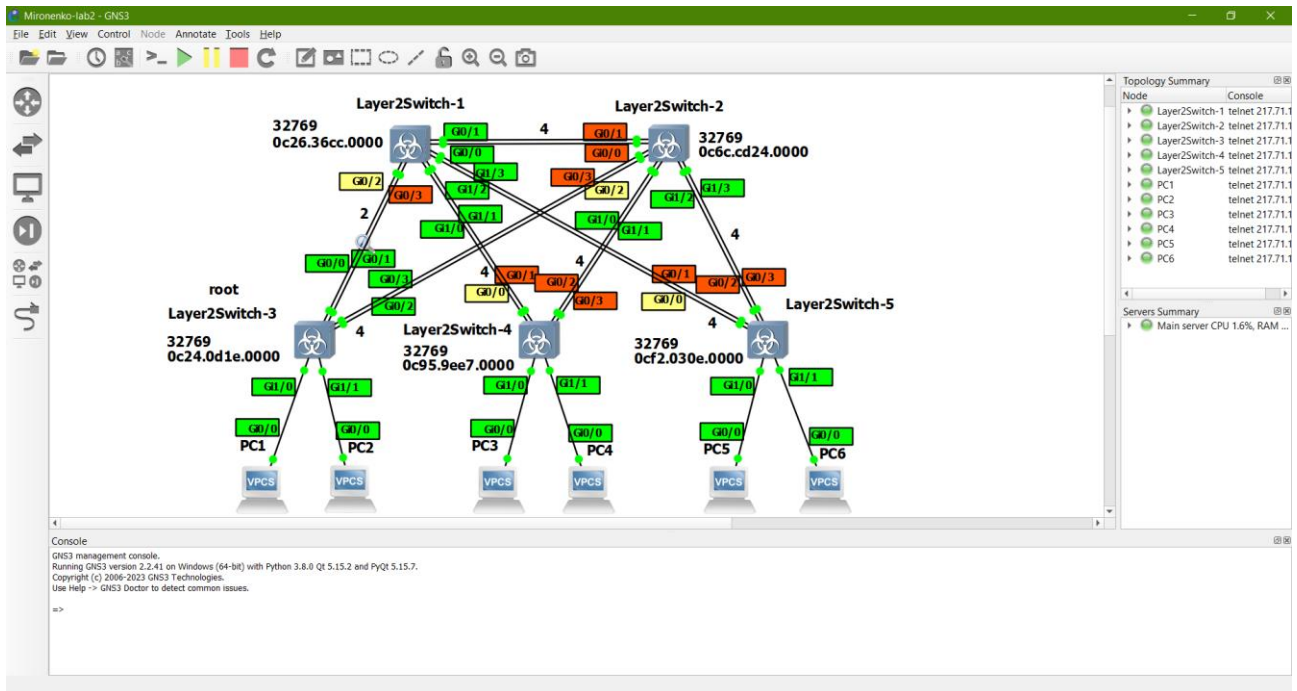


Рисунок 19 - Схема с измененной стоимостью маршрута

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

