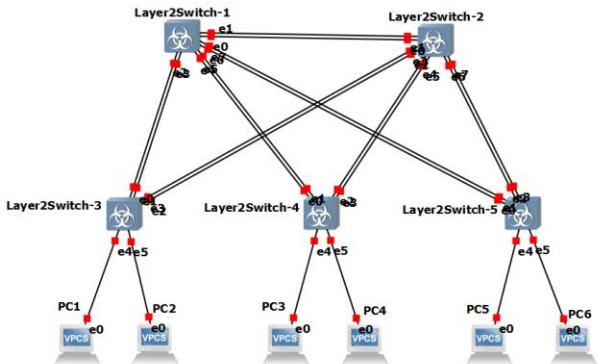


Тема: Настройка протокола STP (IEEE 802.1D)

Делаем дубликат сети:



- 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

Пусть корневым будет Layer2Switch-1.

Настроим его через консоль

КОМАНДЫ:

```
enable
configure terminal
spanning-tree vlan 1 priority 4096
end
show spanning-tree
```

Layer2Switch-1 - PuTTY

```
VIOS-L2-01#enable
VIOS-L2-01#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
VIOS-L2-01(config)#spanning-tree vlan 1 priority 4096
VIOS-L2-01(config)#end
VIOS-L2-01#
*Dec  6 07:39:23.304: %SYS-5-CONFIG_I: Configured from console by console
VIOS-L2-01#show spanning-tree

VLAN0001
  Spanning tree enabled protocol ieee
  Root ID    Priority    4097
              Address     0c19.9924.0000
              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     0c19.9924.0000
              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
Gi1/2          Desg FWD 4        128.7    Shr
Gi1/3          Desg FWD 4        128.8    Shr
Gi2/0          Desg FWD 4        128.9    Shr
```

VIOS-L2-01#

Самый высокий приоритет - самое маленькое число, кратное 4096 из интервала 0-61440. Приоритет 0 нельзя выбрать.

При show приоритет 4097, потому что считывается вся структура с vlan и приоритетом

Пусть запасным корневым будет Layer2Switch-2.

Настроим его через консоль

КОМАНДЫ:

```
enable
configure terminal
spanning-tree vlan 1 priority 8192
end
show spanning-tree
```

```

VIOS-L2-01>enable
VIOS-L2-01#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
VIOS-L2-01(config)#spanning-tree vlan 1 priority 8192
VIOS-L2-01(config)#end
VIOS-L2-01#
*Dec  6 08:03:42.548: %SYS-5-CONFIG_I: Configured from console by console
VIOS-L2-01#show spanning-tree

VLAN0001
  Spanning tree enabled protocol ieee
  Root ID    Priority    4097
              Address     0c19.9924.0000
              Cost         4
              Port        1 (GigabitEthernet0/0)
              Hello Time   2 sec  Max Age 20 sec  Forward Delay 15 sec

  Bridge ID  Priority    8193  (priority 8192 sys-id-ext 1)
              Address     0cdf.398d.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           Desg FWD 4         128.3    Shr
Gi0/3           Desg FWD 4         128.4    Shr
Gi1/0           Desg FWD 4         128.5    Shr
Gi1/1           Desg FWD 4         128.6    Shr
Gi1/2           Desg LIS 4          128.7    Shr
--More-- □

```

Остальные Layer2Switch-3, Layer2Switch-4 и Layer2Switch-5 будут иметь одинаковый приоритет 32768. Настроим их через консоль

КОМАНДЫ:

```

enable
configure terminal
spanning-tree vlan 1 priority 32768
end

```

```

VIOS-L2-01>enable
VIOS-L2-01#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
VIOS-L2-01(config)#spanning-tree vlan 1 priority 32768
VIOS-L2-01(config)#end
VIOS-L2-01#
*Dec  6 08:10:53.554: %SYS-5-CONFIG_I: Configured from console by console
VIOS-L2-01#show spanning-tree

VLAN0001
  Spanning tree enabled protocol ieee
  Root ID    Priority    4097
              Address     0c19.9924.0000
              Cost         4
              Port        1 (GigabitEthernet0/0)
              Hello Time   2 sec  Max Age 20 sec  Forward Delay 15 sec

  Bridge ID  Priority    32769  (priority 32768 sys-id-ext 1)
              Address     0cda.6f77.0000
              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

```

Вот для примера настройка Layer2Switch-5
Настройка других 2 по командам не отличалась

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

FWD ведёт к root
Designated (назначенный порт для своего сегмента) ведёт к VPCS
Три альтернативных пути к root заблокированы.

Теперь назначим ip для VPCS
ip 192.168.1.1/24

```
PC1> ip 192.168.1.1/24
Checking for duplicate address...
PC1 : 192.168.1.1 255.255.255.0
```

```
PC1> [REDACTED]
```

```
ip 192.168.1.2/24
```

```
PC2> ip 192.168.1.2/24
Checking for duplicate address...
PC2 : 192.168.1.2 255.255.255.0
```

```
PC2> [REDACTED]
```

```
ip 192.168.1.3/24
```

```
PC3> ip 192.168.1.3/24
Checking for duplicate address...
PC3 : 192.168.1.3 255.255.255.0
```

```
PC3> [REDACTED]
```

```
ip 192.168.1.4/24
```

```
PC4> ip 192.168.1.4/24
Checking for duplicate address...
PC4 : 192.168.1.4 255.255.255.0
```

```
PC4> [REDACTED]
```

```
ip 192.168.1.5/24
```

```
PC5> ip 192.168.1.5/24
Checking for duplicate address...
PC5 : 192.168.1.5 255.255.255.0
```

```
PC5> [REDACTED]
```

```
ip 192.168.1.6/24
```

```
PC6> ip 192.168.1.6/24
Checking for duplicate address...
PC6 : 192.168.1.6 255.255.255.0
```

```
PC6> [REDACTED]
```

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

С 1 пингаем 5 остальных

КОМАНДЫ

ping 192.168.1.2

ping 192.168.1.3

ping 192.168.1.4

ping 192.168.1.5

ping 192.168.1.6

```
PC1> ping 192.168.1.2
```

```
84 bytes from 192.168.1.2 icmp_seq=1 ttl=64 time=3.608 ms
84 bytes from 192.168.1.2 icmp_seq=2 ttl=64 time=10.095 ms
84 bytes from 192.168.1.2 icmp_seq=3 ttl=64 time=5.288 ms
84 bytes from 192.168.1.2 icmp_seq=4 ttl=64 time=7.869 ms
84 bytes from 192.168.1.2 icmp_seq=5 ttl=64 time=0.887 ms
```

```
PC1> ping 192.168.1.3
```

```
84 bytes from 192.168.1.3 icmp_seq=1 ttl=64 time=3.442 ms
84 bytes from 192.168.1.3 icmp_seq=2 ttl=64 time=4.728 ms
84 bytes from 192.168.1.3 icmp_seq=3 ttl=64 time=8.369 ms
84 bytes from 192.168.1.3 icmp_seq=4 ttl=64 time=6.669 ms
84 bytes from 192.168.1.3 icmp_seq=5 ttl=64 time=1.903 ms
```

```
PC1> ping 192.168.1.4
```

```
84 bytes from 192.168.1.4 icmp_seq=1 ttl=64 time=10.264 ms
84 bytes from 192.168.1.4 icmp_seq=2 ttl=64 time=7.602 ms
84 bytes from 192.168.1.4 icmp_seq=3 ttl=64 time=6.905 ms
84 bytes from 192.168.1.4 icmp_seq=4 ttl=64 time=5.093 ms
84 bytes from 192.168.1.4 icmp_seq=5 ttl=64 time=4.609 ms
```

```
PC1> ping 192.168.1.5
```

```
84 bytes from 192.168.1.5 icmp_seq=1 ttl=64 time=2.700 ms
84 bytes from 192.168.1.5 icmp_seq=2 ttl=64 time=6.385 ms
84 bytes from 192.168.1.5 icmp_seq=3 ttl=64 time=6.800 ms
84 bytes from 192.168.1.5 icmp_seq=4 ttl=64 time=7.826 ms
84 bytes from 192.168.1.5 icmp_seq=5 ttl=64 time=6.173 ms
```

```
PC1> ping 192.168.1.6
```

```
84 bytes from 192.168.1.6 icmp_seq=1 ttl=64 time=9.691 ms
84 bytes from 192.168.1.6 icmp_seq=2 ttl=64 time=1.608 ms
84 bytes from 192.168.1.6 icmp_seq=3 ttl=64 time=4.379 ms
192.168.1.6 icmp_seq=4 timeout
84 bytes from 192.168.1.6 icmp_seq=5 ttl=64 time=1.967 ms
```

```
PC1> ping 192.168.1.6
```

```
84 bytes from 192.168.1.6 icmp_seq=1 ttl=64 time=7.132 ms
84 bytes from 192.168.1.6 icmp_seq=2 ttl=64 time=7.255 ms
84 bytes from 192.168.1.6 icmp_seq=3 ttl=64 time=2.700 ms
84 bytes from 192.168.1.6 icmp_seq=4 ttl=64 time=4.206 ms
84 bytes from 192.168.1.6 icmp_seq=5 ttl=64 time=6.847 ms
```

Доступны все

С 2 пингаем 3-6

КОМАНДЫ

ping 192.168.1.3

```
ping 192.168.1.4
```

```
ping 192.168.1.5
```

```
ping 192.168.1.6
```

```
PC2> ping 192.168.1.3
```

```
84 bytes from 192.168.1.3 icmp_seq=1 ttl=64 time=8.413 ms
84 bytes from 192.168.1.3 icmp_seq=2 ttl=64 time=11.822 ms
84 bytes from 192.168.1.3 icmp_seq=3 ttl=64 time=6.995 ms
84 bytes from 192.168.1.3 icmp_seq=4 ttl=64 time=1.723 ms
84 bytes from 192.168.1.3 icmp_seq=5 ttl=64 time=12.879 ms
```

```
PC2> ping 192.168.1.4
```

```
84 bytes from 192.168.1.4 icmp_seq=1 ttl=64 time=5.451 ms
84 bytes from 192.168.1.4 icmp_seq=2 ttl=64 time=5.335 ms
84 bytes from 192.168.1.4 icmp_seq=3 ttl=64 time=14.593 ms
84 bytes from 192.168.1.4 icmp_seq=4 ttl=64 time=9.594 ms
84 bytes from 192.168.1.4 icmp_seq=5 ttl=64 time=14.264 ms
^[[A
```

```
PC2> ping 192.168.1.5
```

```
84 bytes from 192.168.1.5 icmp_seq=1 ttl=64 time=12.692 ms
84 bytes from 192.168.1.5 icmp_seq=2 ttl=64 time=5.616 ms
84 bytes from 192.168.1.5 icmp_seq=3 ttl=64 time=2.866 ms
84 bytes from 192.168.1.5 icmp_seq=4 ttl=64 time=10.614 ms
84 bytes from 192.168.1.5 icmp_seq=5 ttl=64 time=4.385 ms
```

```
PC2> ping 192.168.1.6
```

```
84 bytes from 192.168.1.6 icmp_seq=1 ttl=64 time=10.972 ms
84 bytes from 192.168.1.6 icmp_seq=2 ttl=64 time=4.147 ms
84 bytes from 192.168.1.6 icmp_seq=3 ttl=64 time=10.780 ms
84 bytes from 192.168.1.6 icmp_seq=4 ttl=64 time=3.661 ms
84 bytes from 192.168.1.6 icmp_seq=5 ttl=64 time=10.454 ms
```

```
PC2> █
```

Доступны все

С 3 пингаем 4-6

КОМАНДЫ

```
ping 192.168.1.4
```

```
ping 192.168.1.5
```

```
ping 192.168.1.6
```

```
PC3> ping 192.168.1.4
```

```
84 bytes from 192.168.1.4 icmp_seq=1 ttl=64 time=0.717 ms
84 bytes from 192.168.1.4 icmp_seq=2 ttl=64 time=6.657 ms
84 bytes from 192.168.1.4 icmp_seq=3 ttl=64 time=2.071 ms
84 bytes from 192.168.1.4 icmp_seq=4 ttl=64 time=4.739 ms
84 bytes from 192.168.1.4 icmp_seq=5 ttl=64 time=7.295 ms
```

```
PC3> ping 192.168.1.5
```

```
84 bytes from 192.168.1.5 icmp_seq=1 ttl=64 time=10.592 ms
84 bytes from 192.168.1.5 icmp_seq=2 ttl=64 time=4.846 ms
84 bytes from 192.168.1.5 icmp_seq=3 ttl=64 time=9.534 ms
84 bytes from 192.168.1.5 icmp_seq=4 ttl=64 time=14.428 ms
84 bytes from 192.168.1.5 icmp_seq=5 ttl=64 time=7.247 ms
```

```
PC3> ping 192.168.1.6
```

```
84 bytes from 192.168.1.6 icmp_seq=1 ttl=64 time=8.703 ms
84 bytes from 192.168.1.6 icmp_seq=2 ttl=64 time=2.075 ms
84 bytes from 192.168.1.6 icmp_seq=3 ttl=64 time=4.654 ms
84 bytes from 192.168.1.6 icmp_seq=4 ttl=64 time=9.853 ms
84 bytes from 192.168.1.6 icmp_seq=5 ttl=64 time=12.180 ms
```

```
PC3> █
```

Доступны все

С 4 пингаем 5, 6

КОМАНДЫ

ping 192.168.1.5

ping 192.168.1.6

```
PC4> ping 192.168.1.5
```

```
84 bytes from 192.168.1.5 icmp_seq=1 ttl=64 time=12.534 ms
84 bytes from 192.168.1.5 icmp_seq=2 ttl=64 time=11.668 ms
84 bytes from 192.168.1.5 icmp_seq=3 ttl=64 time=3.751 ms
84 bytes from 192.168.1.5 icmp_seq=4 ttl=64 time=7.069 ms
84 bytes from 192.168.1.5 icmp_seq=5 ttl=64 time=4.190 ms
```

```
PC4> ping 192.168.1.6
```

```
84 bytes from 192.168.1.6 icmp_seq=1 ttl=64 time=8.026 ms
84 bytes from 192.168.1.6 icmp_seq=2 ttl=64 time=6.268 ms
84 bytes from 192.168.1.6 icmp_seq=3 ttl=64 time=7.667 ms
84 bytes from 192.168.1.6 icmp_seq=4 ttl=64 time=6.878 ms
84 bytes from 192.168.1.6 icmp_seq=5 ttl=64 time=1.561 ms
```

```
PC4> █
```

Доступны все

С 5 пингаем 6

КОМАНДЫ

ping 192.168.1.6

```
PC5> ping 192.168.1.6
```

```
84 bytes from 192.168.1.6 icmp_seq=1 ttl=64 time=0.829 ms
84 bytes from 192.168.1.6 icmp_seq=2 ttl=64 time=3.851 ms
84 bytes from 192.168.1.6 icmp_seq=3 ttl=64 time=7.391 ms
84 bytes from 192.168.1.6 icmp_seq=4 ttl=64 time=7.722 ms
84 bytes from 192.168.1.6 icmp_seq=5 ttl=64 time=8.170 ms
```

```
PC5> █
```

Он доступен

Все доступны для всех.

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

Layer2Switch-1:

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

VLAN0001

```
Spanning tree enabled protocol ieee
Root ID      Priority    4097
              Address     0c19.9924.0000
              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     0c19.9924.0000
              Hello Time   2 sec   Max Age 20 sec   Forward Delay 15 sec
              Aging Time   300 sec
```

Interface	Role	Sts	Cost	Prio.Nbr	Type
Gi0/0	Desg	FWD	4	128.1	Shr
Gi0/1	Desg	FWD	4	128.2	Shr
Gi0/2	Desg	FWD	4	128.3	Shr
Gi0/3	Desg	FWD	4	128.4	Shr
Gi1/0	Desg	FWD	4	128.5	Shr
Gi1/1	Desg	FWD	4	128.6	Shr
Gi1/2	Desg	FWD	4	128.7	Shr
Gi1/3	Desg	FWD	4	128.8	Shr
Gi2/0	Desg	FWD	4	128.9	Shr

Layer2Switch-2:

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

VLAN0001

```
Spanning tree enabled protocol ieee
Root ID    Priority    4097
           Address     0c19.9924.0000
           Cost         4
           Port        1 (GigabitEthernet0/0)
Hello Time 2 sec      Max Age 20 sec  Forward Delay 15 sec
```

```
Bridge ID Priority    8193  (priority 8192 sys-id-ext 1)
           Address     0cdf.398d.0000
           Hello Time 2 sec      Max Age 20 sec  Forward Delay 15 sec
           Aging Time 300 sec
```

Interface	Role	Sts	Cost	Prio.Nbr	Type
Gi0/0	Root	FWD	4	128.1	Shr
Gi0/1	Altn	BLK	4	128.2	Shr
Gi0/2	Desg	FWD	4	128.3	Shr
Gi0/3	Desg	FWD	4	128.4	Shr
Gi1/0	Desg	FWD	4	128.5	Shr
Gi1/1	Desg	FWD	4	128.6	Shr
Gi1/2	Desg	FWD	4	128.7	Shr
Gi1/3	Desg	FWD	4	128.8	Shr
Gi2/0	Desg	FWD	4	128.9	Shr

Layer2Switch-3:

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

VLAN0001

```
Spanning tree enabled protocol ieee
Root ID    Priority    4097
           Address     0c19.9924.0000
           Cost         4
           Port        1 (GigabitEthernet0/0)
Hello Time 2 sec      Max Age 20 sec  Forward Delay 15 sec
```

```
Bridge ID Priority    32769  (priority 32768 sys-id-ext 1)
           Address     0ceb.d8fc.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

Layer2Switch-4:

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

VLAN0001

```
Spanning tree enabled protocol ieee
Root ID    Priority    4097
           Address     0c19.9924.0000
           Cost        4
           Port        1 (GigabitEthernet0/0)
Hello Time 2 sec      Max Age 20 sec  Forward Delay 15 sec
```

```
Bridge ID Priority    32769 (priority 32768 sys-id-ext 1)
           Address     0cfa.967e.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

Layer2Switch-5:

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

VLAN0001

```
Spanning tree enabled protocol ieee
Root ID    Priority    4097
           Address     0c19.9924.0000
           Cost        4
           Port        1 (GigabitEthernet0/0)
Hello Time 2 sec      Max Age 20 sec  Forward Delay 15 sec
```

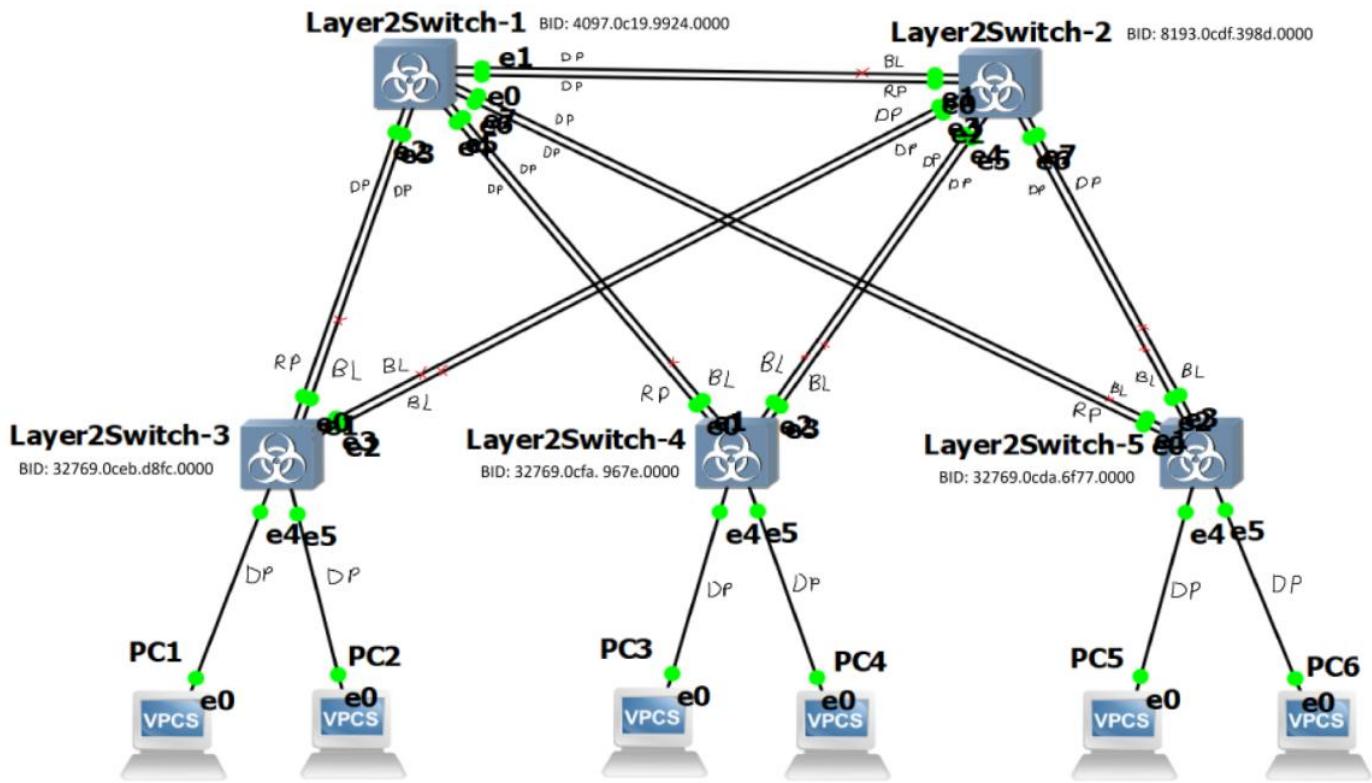
```
Bridge ID Priority    32769 (priority 32768 sys-id-ext 1)
           Address     0cda.6f77.0000
           Hello Time 2 sec      Max Age 20 sec  Forward Delay 15 sec
           Aging Time 300 sec
```

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

Записывает BID для каждого как приоритет.адрес

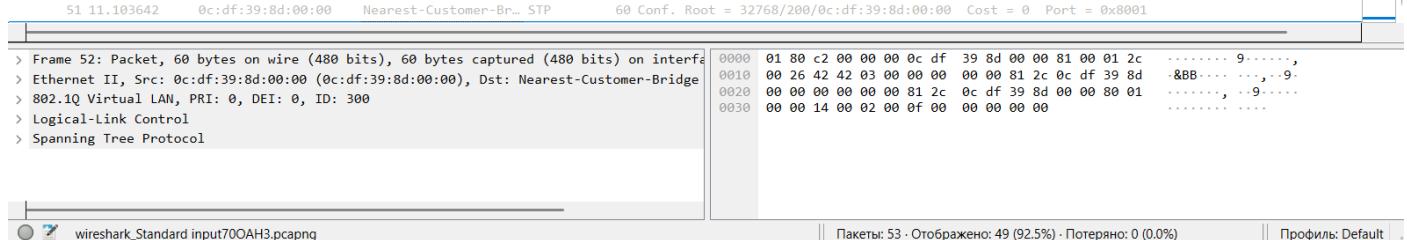
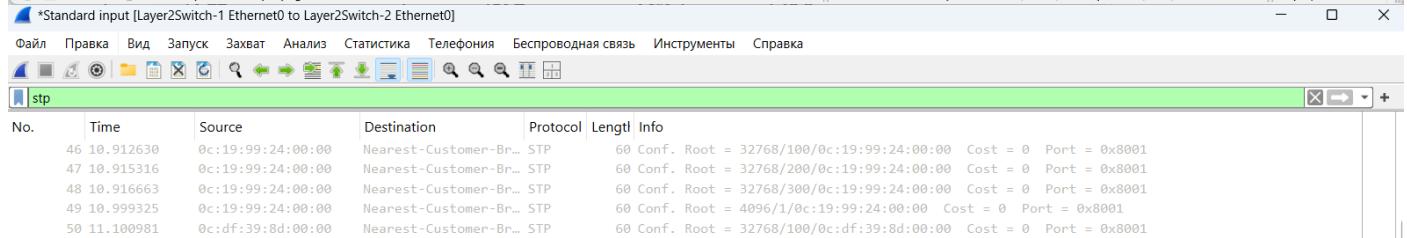
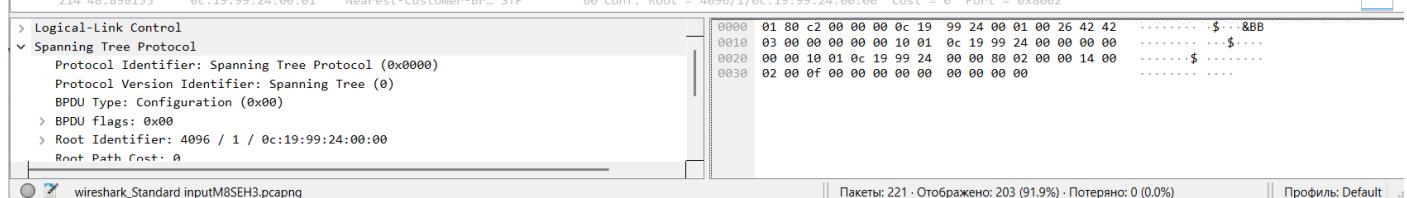
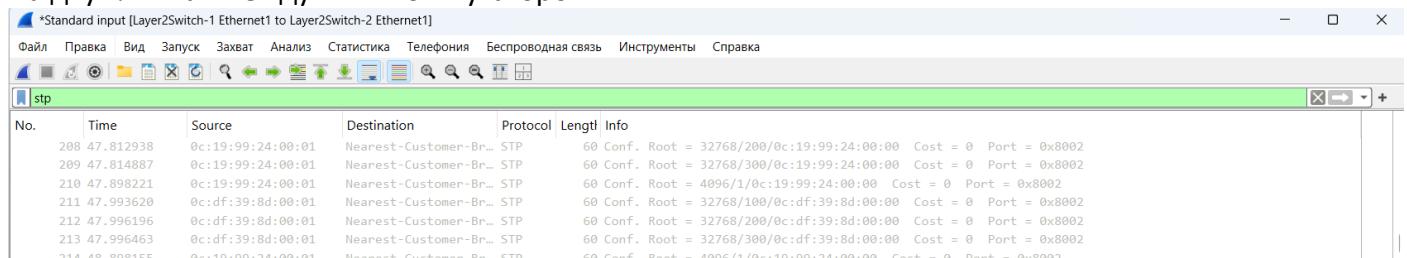
Например, для первого - 4097.0c19.9924.0000, для второго - 8193.0cdf.398d.0000 и т.д.

Cost везде равен 4, поэтому на рисунке не отражён:



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

На двух линках между 1 и 2 коммутатором:



На двух линкам между 2 и 5 коммутаторами:

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

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

Примените фильтр отображения ... <Ctrl-/>

No.	Time	Source	Destination	Protocol	Length	Info
45	10.0001640	0c:da:6f:77:00:03	Nearest-Customer-Bridge	STP	60	Conf. Root = 32768/200/0c:da:6f:77:00:00 Cost = 0 Port = 0x8004
46	10.0002666	0c:da:6f:77:00:03	Nearest-Customer-Bridge	STP	60	Conf. Root = 32768/300/0c:da:6f:77:00:00 Cost = 0 Port = 0x8004
47	10.188371	0c:df:39:8d:00:07	Nearest-Customer-Bridge	STP	60	Conf. Root = 4096/1/0c:19:99:24:00:00 Cost = 4 Port = 0x8008
48	10.292564	0c:df:39:8d:00:07	Nearest-Customer-Bridge	STP	60	Conf. Root = 32768/100/0c:df:39:8d:00:00 Cost = 0 Port = 0x8008
49	10.294164	0c:df:39:8d:00:07	Nearest-Customer-Bridge	STP	60	Conf. Root = 32768/200/0c:df:39:8d:00:00 Cost = 0 Port = 0x8008
50	10.295503	0c:df:39:8d:00:07	Nearest-Customer-Bridge	STP	60	Conf. Root = 32768/300/0c:df:39:8d:00:00 Cost = 0 Port = 0x8008

```
> Frame 50: Packet, 60 bytes on wire (480 bits), 60 bytes captured (480 bits) on interface
> Ethernet II, Src: 0c:df:39:8d:00:07 (0c:df:39:8d:00:07), Dst: Nearest-Customer-Bridge
> 802.1Q Virtual LAN, PRI: 0, DEI: 0, ID: 300
> Logical-Link Control
> Spanning Tree Protocol
```

wireshark_Standard inputC2V6G3.pcapng | Пакеты: 50 · Потеряно: 0 (0.0%) | Профиль: Default

Захват с Standard input [Layer2Switch-2 Ethernet6 to Layer2Switch-5 Ethernet2]

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

Примените фильтр отображения ... <Ctrl-/>

No.	Time	Source	Destination	Protocol	Length	Info
27	6.081707	0c:df:39:8d:00:06	Nearest-Customer-Bridge	STP	60	Conf. Root = 4096/1/0c:19:99:24:00:00 Cost = 4 Port = 0x8007
28	6.893946	0c:da:6f:77:00:02	Nearest-Customer-Bridge	STP	60	Conf. Root = 32768/100/0c:da:6f:77:00:00 Cost = 0 Port = 0x8003
29	6.896135	0c:da:6f:77:00:02	Nearest-Customer-Bridge	STP	60	Conf. Root = 32768/200/0c:da:6f:77:00:00 Cost = 0 Port = 0x8003
30	6.897118	0c:da:6f:77:00:02	Nearest-Customer-Bridge	STP	60	Conf. Root = 32768/300/0c:da:6f:77:00:00 Cost = 0 Port = 0x8003
31	7.081983	0c:df:39:8d:00:06	Nearest-Customer-Bridge	STP	60	Conf. Root = 4096/1/0c:19:99:24:00:00 Cost = 4 Port = 0x8007
32	7.186125	0c:df:39:8d:00:06	Nearest-Customer-Bridge	STP	60	Conf. Root = 32768/100/0c:df:39:8d:00:00 Cost = 0 Port = 0x8007
33	7.187733	0c:df:39:8d:00:06	Nearest-Customer-Bridge	STP	60	Conf. Root = 32768/200/0c:df:39:8d:00:00 Cost = 0 Port = 0x8007
34	7.189038	0c:df:39:8d:00:06	Nearest-Customer-Bridge	STP	60	Conf. Root = 32768/300/0c:df:39:8d:00:00 Cost = 0 Port = 0x8007

```
> Frame 30: Packet, 60 bytes on wire (480 bits), 60 bytes captured (480 bits) on interface
> Ethernet II, Src: 0c:da:6f:77:00:02 (0c:da:6f:77:00:02), Dst: Nearest-Customer-Bridge
> 802.1Q Virtual LAN, PRI: 0, DEI: 0, ID: 300
> Logical-Link Control
> Spanning Tree Protocol
```

Standard input: <live capture in progress> | Пакеты: 34 | Профиль: Default

Линки к VPCS 1 и VPCS 2:

*Standard input [Layer2Switch-3 Ethernet4 to PC1 Ethernet0]

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

Примените фильтр отображения ... <Ctrl-/>

No.	Time	Source	Destination	Protocol	Length	Info
128	105.985679	0c:eb:d8:fc:00:04	Nearest-Customer-Bridge	STP	60	Conf. Root = 4096/1/0c:19:99:24:00:00 Cost = 4 Port = 0x8005
129	106.985528	0c:eb:d8:fc:00:04	Nearest-Customer-Bridge	STP	60	Conf. Root = 4096/1/0c:19:99:24:00:00 Cost = 4 Port = 0x8005
130	107.985430	0c:eb:d8:fc:00:04	Nearest-Customer-Bridge	STP	60	Conf. Root = 4096/1/0c:19:99:24:00:00 Cost = 4 Port = 0x8005
131	108.985225	0c:eb:d8:fc:00:04	Nearest-Customer-Bridge	STP	60	Conf. Root = 4096/1/0c:19:99:24:00:00 Cost = 4 Port = 0x8005
132	109.985082	0c:eb:d8:fc:00:04	Nearest-Customer-Bridge	STP	60	Conf. Root = 4096/1/0c:19:99:24:00:00 Cost = 4 Port = 0x8005
133	110.984949	0c:eb:d8:fc:00:04	Nearest-Customer-Bridge	STP	60	Conf. Root = 4096/1/0c:19:99:24:00:00 Cost = 4 Port = 0x8005

```
> Frame 131: Packet, 60 bytes on wire (480 bits), 60 bytes captured (480 bits) on interface
> IEEE 802.3 Ethernet
> Logical-Link Control
> Spanning Tree Protocol
```

wireshark_Standard inputBUY8G3.pcapng | Пакеты: 133 · Отображено: 112 (84.2%) · Потеряно: 0 (0.0%) | Профиль: Default

*Standard input [Layer2Switch-3 Ethernet5 to PC2 Ethernet0]

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

Примените фильтр отображения ... <Ctrl-/>

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000	0c:eb:d8:fc:00:05	Nearest-Customer-Bridge	STP	60	Conf. Root = 4096/1/0c:19:99:24:00:00 Cost = 4 Port = 0x8006
2	0.999863	0c:eb:d8:fc:00:05	Nearest-Customer-Bridge	STP	60	Conf. Root = 4096/1/0c:19:99:24:00:00 Cost = 4 Port = 0x8006
3	1.667839	0c:eb:d8:fc:00:05	0c:eb:d8:fc:00:05	LOOP	60	Reply
4	1.999686	0c:eb:d8:fc:00:05	Nearest-Customer-Bridge	STP	60	Conf. Root = 4096/1/0c:19:99:24:00:00 Cost = 4 Port = 0x8006
5	2.999570	0c:eb:d8:fc:00:05	Nearest-Customer-Bridge	STP	60	Conf. Root = 4096/1/0c:19:99:24:00:00 Cost = 4 Port = 0x8006
6	3.999510	0c:eb:d8:fc:00:05	Nearest-Customer-Bridge	STP	60	Conf. Root = 4096/1/0c:19:99:24:00:00 Cost = 4 Port = 0x8006

```
> Frame 1: Packet, 60 bytes on wire (480 bits), 60 bytes captured (480 bits) on interface
> IEEE 802.3 Ethernet
> Logical-Link Control
> Spanning Tree Protocol
```

wireshark_Standard inputEBC0G3.pcapng | Пакеты: 6 · Потеряно: 0 (0.0%) | Профиль: Default

hello пакеты есть во всех линках, даже если порт у коммутатора к этому линку заблокирован.

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

КОМАНДЫ:

```
enable
configure terminal
interface Gi0/0
spanning-tree cost 400
end
write memory
```

```
VIOS-L2-01#show spanning-tree
```

VLAN0001

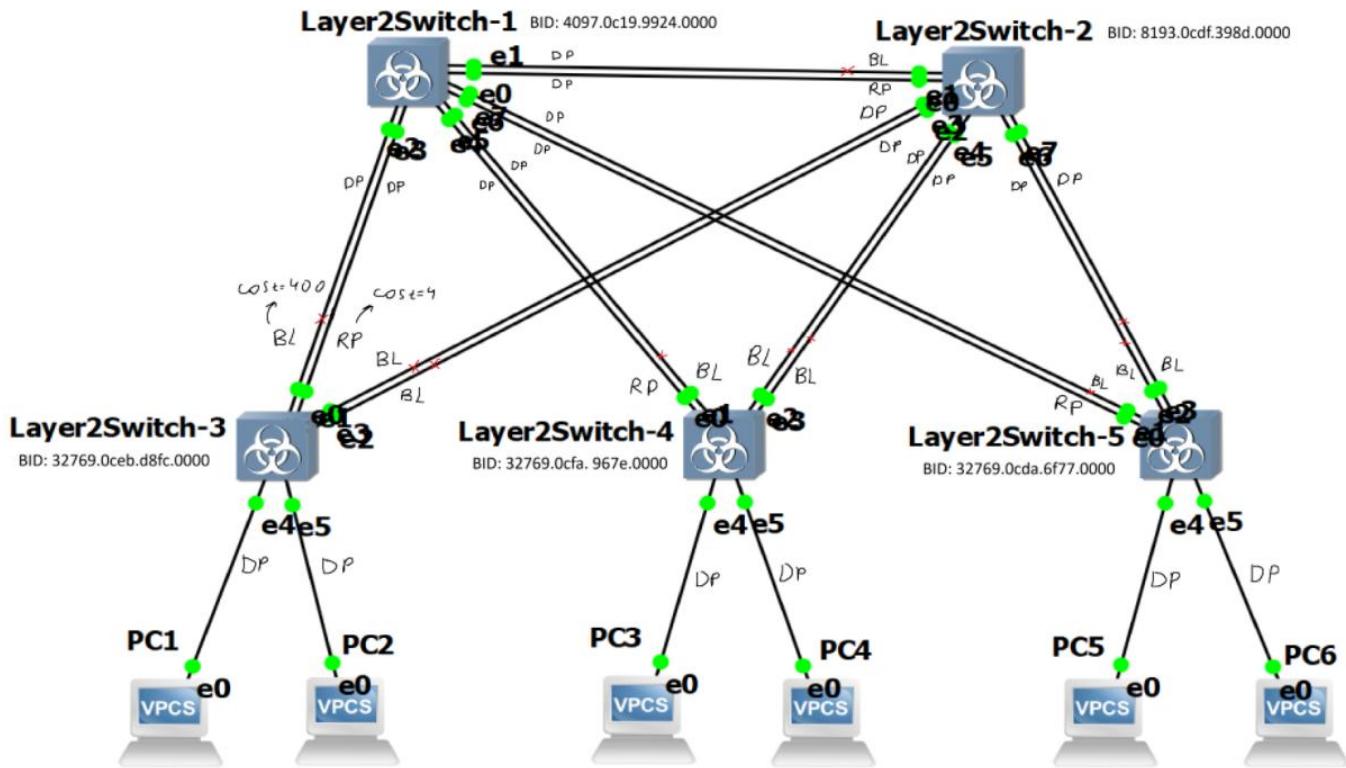
```
Spanning tree enabled protocol ieee
Root ID    Priority    4097
           Address     0c19.9924.0000
           Cost         4
           Port        2 (GigabitEthernet0/1)
Hello Time 2 sec      Max Age 20 sec  Forward Delay 15 sec

Bridge ID  Priority    32769  (priority 32768 sys-id-ext 1)
           Address     0ceb.d8fc.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	400	128.1	Shr
Gi0/1	Root	FWD	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-- 

Можно заметить, что теперь альтернативный заблокированный Gi0/1 стал ROOT FWD, а Gi0/0 стал Altn BLK.



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

Нашёл на диске save_l2switch_config.pdf

В репозиторий прикрепил

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

Не сегодня