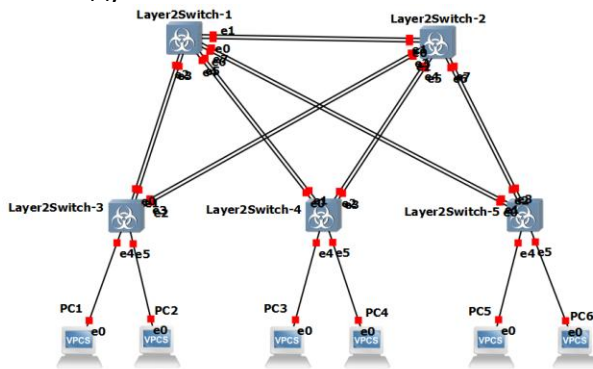


Тема: Настройка протокола STP (IEEE 802.1D)

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	<u>BLK</u>	4	128.2	Shr
Gi0/2	Altn	<u>BLK</u>	4	128.3	Shr
Gi0/3	Altn	<u>BLK</u>	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> █
```

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> █
```

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> █
```

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> █
```

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> █
```

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> █
```

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 BID 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	

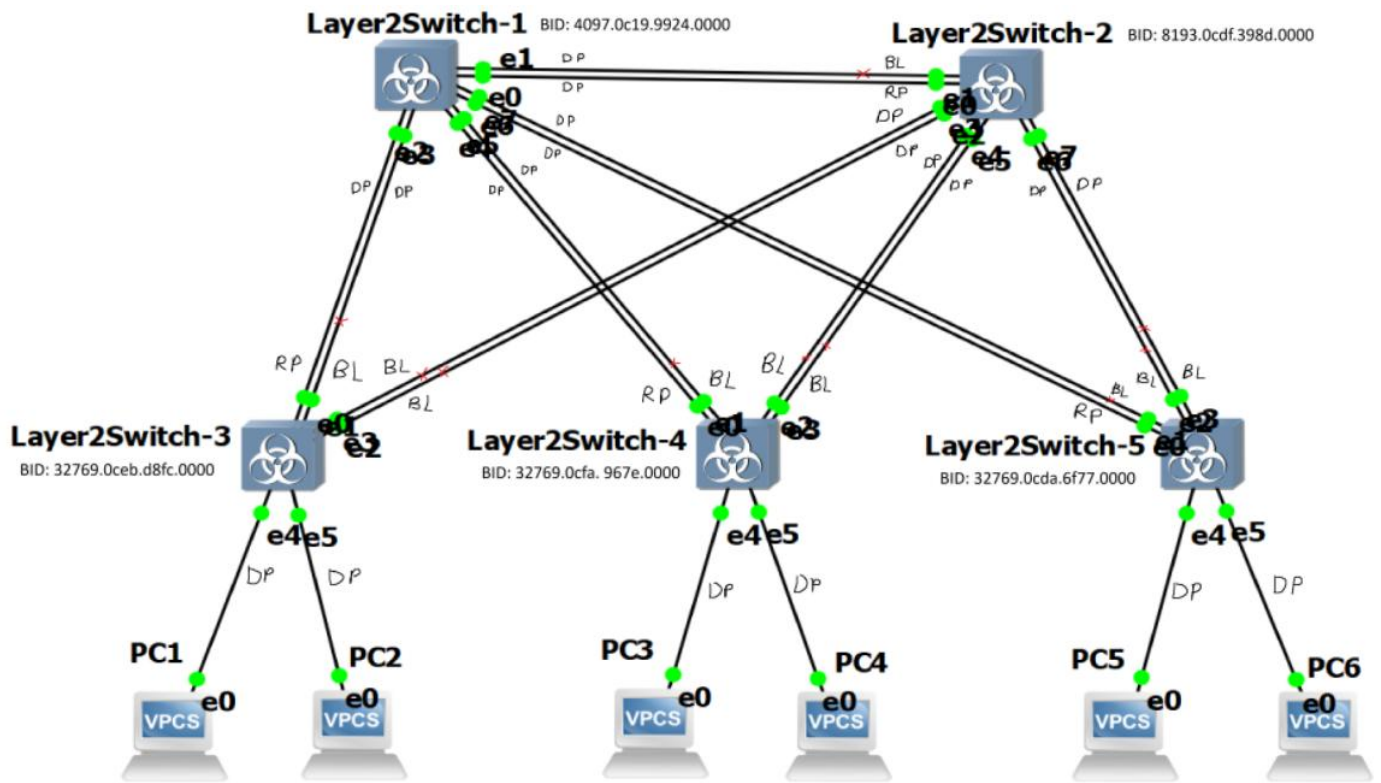
Bridge ID	Priority	32769	(priority 32768 sys-id-ext 1)		
	Address	0cda.6f77.0000			
	Hello Time	2 sec	Max Age 20 sec	Forward Delay 15 sec	
	Aging Time	300 sec			

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:

No.	Time	Source	Destination	Protocol	Length	Info
208	47.812938	0c:19:99:24:00:01	Nearest-Customer-Bridge	STP	60	Conf. Root = 32768/200/0c:19:99:24:00:00 Cost = 0 Port = 0x8002
209	47.814887	0c:19:99:24:00:01	Nearest-Customer-Bridge	STP	60	Conf. Root = 32768/300/0c:19:99:24:00:00 Cost = 0 Port = 0x8002
210	47.898221	0c:19:99:24:00:01	Nearest-Customer-Bridge	STP	60	Conf. Root = 4096/1/0c:19:99:24:00:00 Cost = 0 Port = 0x8002
211	47.993620	0c:df:39:8d:00:01	Nearest-Customer-Bridge	STP	60	Conf. Root = 32768/100/0c:df:39:8d:00:00 Cost = 0 Port = 0x8002
212	47.996196	0c:df:39:8d:00:01	Nearest-Customer-Bridge	STP	60	Conf. Root = 32768/200/0c:df:39:8d:00:00 Cost = 0 Port = 0x8002
213	47.996463	0c:df:39:8d:00:01	Nearest-Customer-Bridge	STP	60	Conf. Root = 32768/300/0c:df:39:8d:00:00 Cost = 0 Port = 0x8002
214	48.898155	0c:19:99:24:00:01	Nearest-Customer-Bridge	STP	60	Conf. Root = 4096/1/0c:19:99:24:00:00 Cost = 0 Port = 0x8002

No.	Time	Source	Destination	Protocol	Length	Info
46	10.912630	0c:19:99:24:00:00	Nearest-Customer-Bridge	STP	60	Conf. Root = 32768/100/0c:19:99:24:00:00 Cost = 0 Port = 0x8001
47	10.915316	0c:19:99:24:00:00	Nearest-Customer-Bridge	STP	60	Conf. Root = 32768/200/0c:19:99:24:00:00 Cost = 0 Port = 0x8001
48	10.916663	0c:19:99:24:00:00	Nearest-Customer-Bridge	STP	60	Conf. Root = 32768/300/0c:19:99:24:00:00 Cost = 0 Port = 0x8001
49	10.999325	0c:19:99:24:00:00	Nearest-Customer-Bridge	STP	60	Conf. Root = 4096/1/0c:19:99:24:00:00 Cost = 0 Port = 0x8001
50	11.100981	0c:df:39:8d:00:00	Nearest-Customer-Bridge	STP	60	Conf. Root = 32768/100/0c:df:39:8d:00:00 Cost = 0 Port = 0x8001
51	11.103642	0c:df:39:8d:00:00	Nearest-Customer-Bridge	STP	60	Conf. Root = 32768/200/0c:df:39:8d:00:00 Cost = 0 Port = 0x8001

На двух линках между 2 и 5 коммутаторами:

Wireshark capture window titled "*Standard input [Layer2Switch-2 Ethernet7 to Layer2Switch-5 Ethernet3]". The packet list shows STP frames from Nearest-Customer-Bridge to Nearest-Customer-Bridge. The packet details pane shows Frame 50: Packet, 60 bytes on wire (480 bits), 60 bytes captured (480 bits) on interface Ethernet II, Src: 0c:da:6f:77:00:07 (0c:da:6f:77:00:07), Dst: Nearest-Customer-Bridge. The packet bytes pane shows the raw data in hexadecimal and ASCII.

Wireshark capture window titled "wireshark_Standard inputC2V6G3.pcapng". The packet list shows STP frames from Nearest-Customer-Bridge to Nearest-Customer-Bridge. The packet details pane shows 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. The packet bytes pane shows the raw data in hexadecimal and ASCII.

Линки к VPCS 1 и VPCS 2:

Wireshark capture window titled "*Standard input [Layer2Switch-3 Ethernet4 to PC1 Ethernet0]". The packet list shows STP frames from Nearest-Customer-Bridge to Nearest-Customer-Bridge. The packet details pane shows Frame 131: Packet, 60 bytes on wire (480 bits), 60 bytes captured (480 bits) on interface IEEE 802.3 Ethernet. The packet bytes pane shows the raw data in hexadecimal and ASCII.

Wireshark capture window titled "wireshark_Standard inputBUY8G3.pcapng". The packet list shows STP frames from Nearest-Customer-Bridge to Nearest-Customer-Bridge. The packet details pane shows Frame 1: Packet, 60 bytes on wire (480 bits), 60 bytes captured (480 bits) on interface IEEE 802.3 Ethernet. The packet bytes pane shows the raw data in hexadecimal and ASCII.

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
-------	------	-----	---	-------	-----

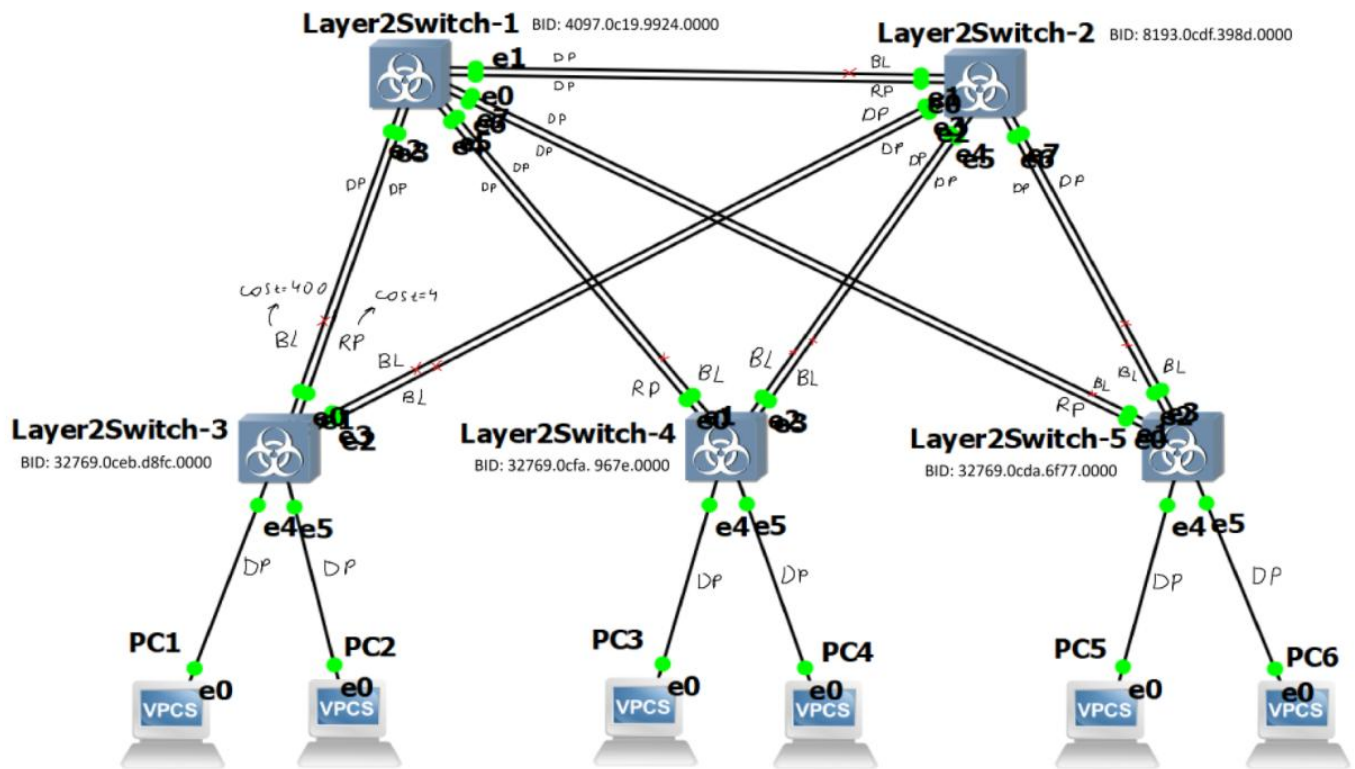
Gi0/3	Altn	BLK	4	128.4	Shr
-------	------	-----	---	-------	-----

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