

Лабораторная работа 2 - STP

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

Корневой коммутатор:

```
enable  
conf t  
spanning-tree vlan 1 priority 4096  
end  
copy running-config startup-config
```

На остальных коммутаторах
spanning-tree vlan 1 priority 32768

2. Проверить доступность каждого с каждым всех персональных компьютеров

На хостах установлены ip:
192.168.3.1 — 192.168.3.6
Делаем ping:

```
PC1

Checking for duplicate address...
PC1 : 192.168.3.1 255.255.255.0

PC1> ping 192.168.3.2

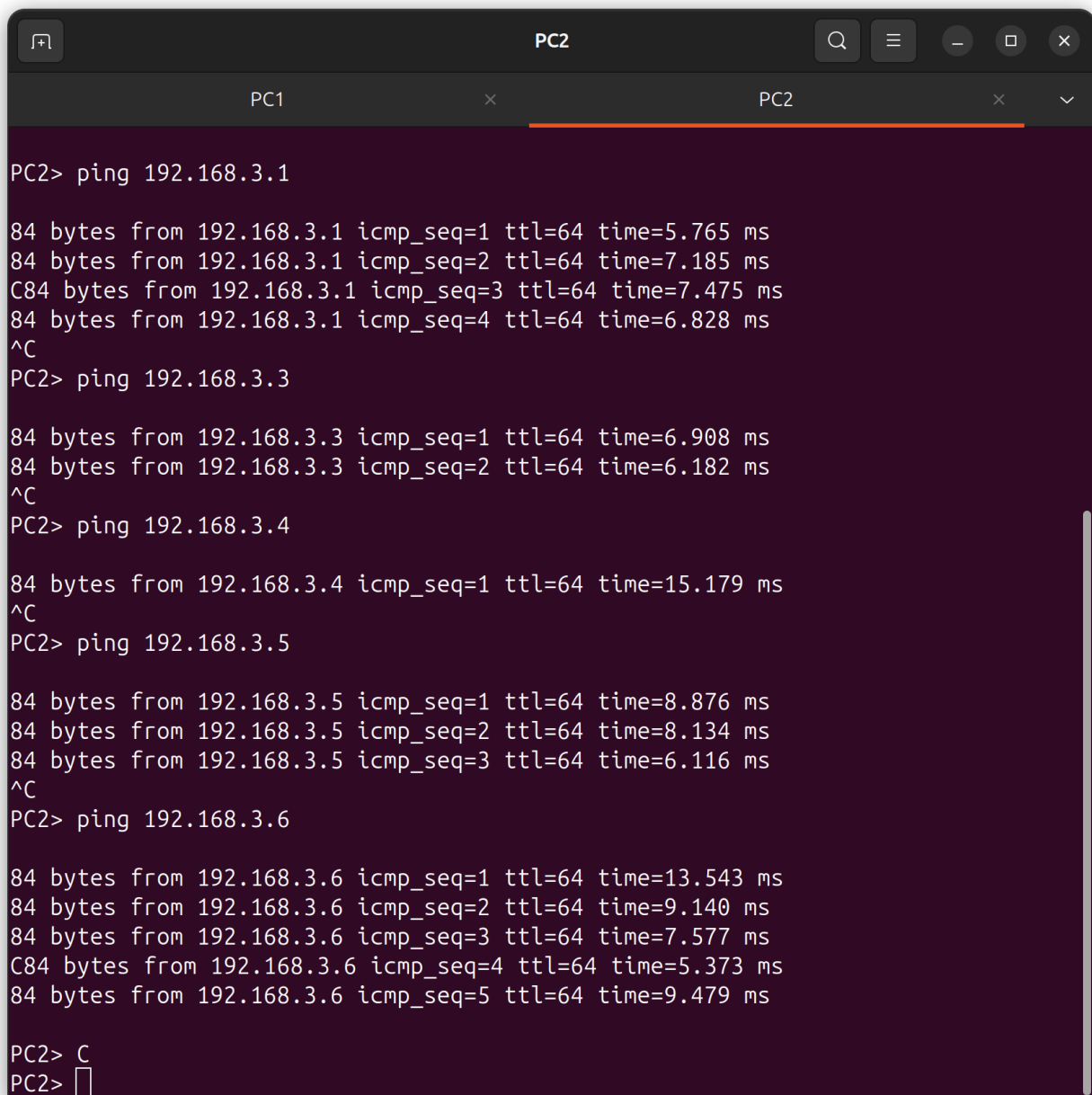
84 bytes from 192.168.3.2 icmp_seq=1 ttl=64 time=1.782 ms
^C
PC1> ping 192.168.3.3

84 bytes from 192.168.3.3 icmp_seq=1 ttl=64 time=7.086 ms
84 bytes from 192.168.3.3 icmp_seq=2 ttl=64 time=8.537 ms
^C
PC1> ping 192.168.3.4

84 bytes from 192.168.3.4 icmp_seq=1 ttl=64 time=7.252 ms
84 bytes from 192.168.3.4 icmp_seq=2 ttl=64 time=8.583 ms
84 bytes from 192.168.3.4 icmp_seq=3 ttl=64 time=8.671 ms
^C
PC1> ping 192.168.3.5

84 bytes from 192.168.3.5 icmp_seq=1 ttl=64 time=7.600 ms
84 bytes from 192.168.3.5 icmp_seq=2 ttl=64 time=6.297 ms
84 bytes from 192.168.3.5 icmp_seq=3 ttl=64 time=5.330 ms
^C
PC1> ping 192.168.3.6

84 bytes from 192.168.3.6 icmp_seq=1 ttl=64 time=12.333 ms
84 bytes from 192.168.3.6 icmp_seq=2 ttl=64 time=9.764 ms
84 bytes from 192.168.3.6 icmp_seq=3 ttl=64 time=12.669 ms
^C
PC1> 
```



The image shows a terminal window titled "PC2" with a dark background and light-colored text. The window has standard macOS-style window controls (red, yellow, green buttons) in the top-left corner and a search bar, menu icon, and window management icons in the top-right corner. Below the title bar, there are two tabs: "PC1" and "PC2", with "PC2" being the active tab. The terminal content shows a series of ping commands and their results:

```
PC2> ping 192.168.3.1
84 bytes from 192.168.3.1 icmp_seq=1 ttl=64 time=5.765 ms
84 bytes from 192.168.3.1 icmp_seq=2 ttl=64 time=7.185 ms
84 bytes from 192.168.3.1 icmp_seq=3 ttl=64 time=7.475 ms
84 bytes from 192.168.3.1 icmp_seq=4 ttl=64 time=6.828 ms
^C
PC2> ping 192.168.3.3
84 bytes from 192.168.3.3 icmp_seq=1 ttl=64 time=6.908 ms
84 bytes from 192.168.3.3 icmp_seq=2 ttl=64 time=6.182 ms
^C
PC2> ping 192.168.3.4
84 bytes from 192.168.3.4 icmp_seq=1 ttl=64 time=15.179 ms
^C
PC2> ping 192.168.3.5
84 bytes from 192.168.3.5 icmp_seq=1 ttl=64 time=8.876 ms
84 bytes from 192.168.3.5 icmp_seq=2 ttl=64 time=8.134 ms
84 bytes from 192.168.3.5 icmp_seq=3 ttl=64 time=6.116 ms
^C
PC2> ping 192.168.3.6
84 bytes from 192.168.3.6 icmp_seq=1 ttl=64 time=13.543 ms
84 bytes from 192.168.3.6 icmp_seq=2 ttl=64 time=9.140 ms
84 bytes from 192.168.3.6 icmp_seq=3 ttl=64 time=7.577 ms
84 bytes from 192.168.3.6 icmp_seq=4 ttl=64 time=5.373 ms
84 bytes from 192.168.3.6 icmp_seq=5 ttl=64 time=9.479 ms

PC2> C
PC2> 
```

```
PC3

Checking for duplicate address...
PC3 : 192.168.3.3 255.255.255.0

PC3> ping 192.168.3.1

84 bytes from 192.168.3.1 icmp_seq=1 ttl=64 time=7.837 ms
^C
PC3> ping 192.168.3.2

84 bytes from 192.168.3.2 icmp_seq=1 ttl=64 time=8.338 ms
84 bytes from 192.168.3.2 icmp_seq=2 ttl=64 time=7.146 ms
^C
PC3> ping 192.168.3.4

84 bytes from 192.168.3.4 icmp_seq=1 ttl=64 time=1.530 ms
84 bytes from 192.168.3.4 icmp_seq=2 ttl=64 time=5.215 ms
84 bytes from 192.168.3.4 icmp_seq=3 ttl=64 time=8.852 ms
^C
PC3> ping 192.168.3.5

84 bytes from 192.168.3.5 icmp_seq=1 ttl=64 time=11.763 ms
84 bytes from 192.168.3.5 icmp_seq=2 ttl=64 time=9.385 ms
84 bytes from 192.168.3.5 icmp_seq=3 ttl=64 time=5.113 ms
^C
PC3> ping 192.168.3.6

84 bytes from 192.168.3.6 icmp_seq=1 ttl=64 time=6.294 ms
84 bytes from 192.168.3.6 icmp_seq=2 ttl=64 time=2.081 ms
84 bytes from 192.168.3.6 icmp_seq=3 ttl=64 time=5.098 ms
^C
PC3> 
```

```
PC5

Checking for duplicate address...
PC5 : 192.168.3.5 255.255.255.0

PC5> ping 192.168.3.1

84 bytes from 192.168.3.1 icmp_seq=1 ttl=64 time=3.962 ms
84 bytes from 192.168.3.1 icmp_seq=2 ttl=64 time=2.135 ms
^C
PC5> ping 192.168.3.2

84 bytes from 192.168.3.2 icmp_seq=1 ttl=64 time=13.763 ms
84 bytes from 192.168.3.2 icmp_seq=2 ttl=64 time=6.865 ms
^C
PC5> ping 192.168.3.3

84 bytes from 192.168.3.3 icmp_seq=1 ttl=64 time=7.202 ms
84 bytes from 192.168.3.3 icmp_seq=2 ttl=64 time=7.478 ms
^C
PC5> ping 192.168.3.4

84 bytes from 192.168.3.4 icmp_seq=1 ttl=64 time=6.382 ms
84 bytes from 192.168.3.4 icmp_seq=2 ttl=64 time=13.174 ms
84 bytes from 192.168.3.4 icmp_seq=3 ttl=64 time=6.927 ms
^C
PC5> ping 192.168.3.6

84 bytes from 192.168.3.6 icmp_seq=1 ttl=64 time=2.691 ms
84 bytes from 192.168.3.6 icmp_seq=2 ttl=64 time=0.800 ms
84 bytes from 192.168.3.6 icmp_seq=3 ttl=64 time=4.892 ms
^C
PC5> 
```

```
PC6

Checking for duplicate address...
PC6 : 192.168.3.6 255.255.255.0

PC6> ping 192.168.3.1

84 bytes from 192.168.3.1 icmp_seq=1 ttl=64 time=7.972 ms
84 bytes from 192.168.3.1 icmp_seq=2 ttl=64 time=7.572 ms
84 bytes from 192.168.3.1 icmp_seq=3 ttl=64 time=5.710 ms
^C
PC6> ping 192.168.3.2

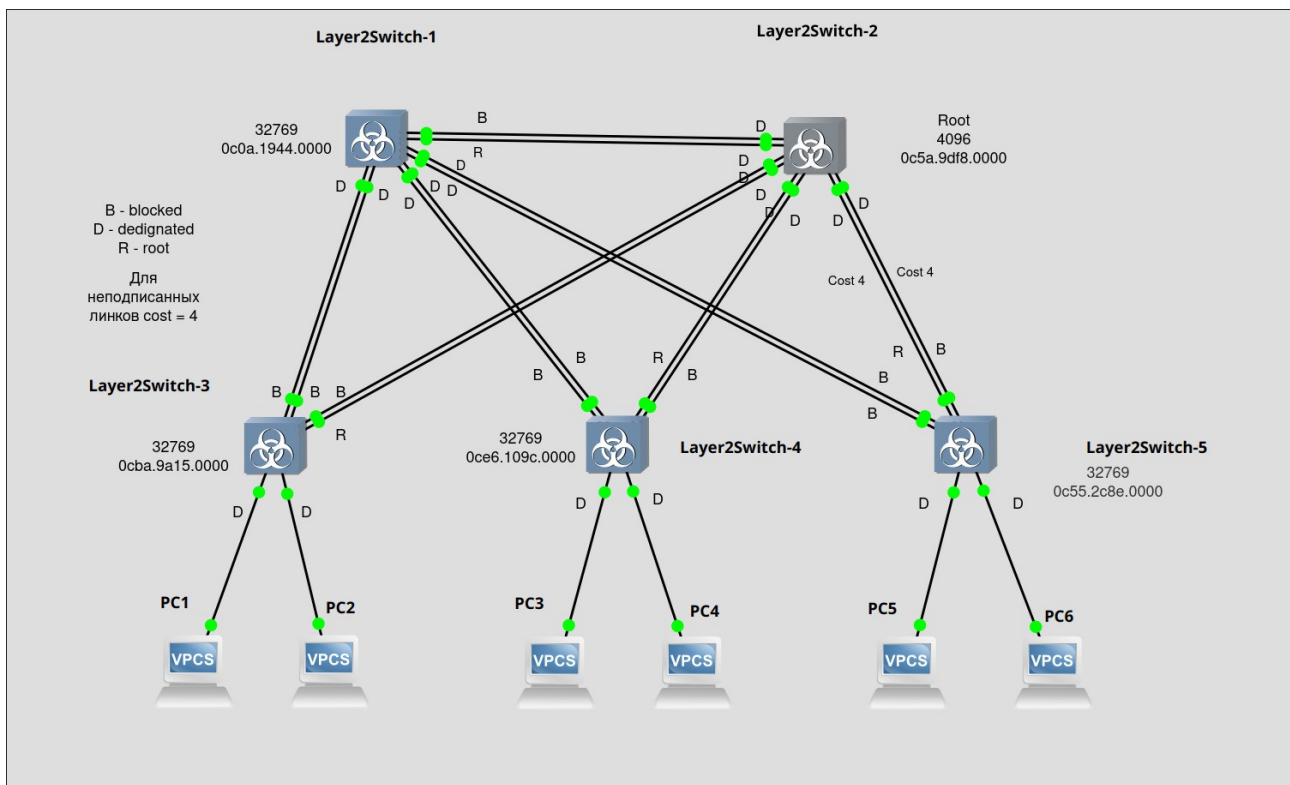
84 bytes from 192.168.3.2 icmp_seq=1 ttl=64 time=14.945 ms
84 bytes from 192.168.3.2 icmp_seq=2 ttl=64 time=7.763 ms
84 bytes from 192.168.3.2 icmp_seq=3 ttl=64 time=1.571 ms
^C
PC6> ping 192.168.3.3

84 bytes from 192.168.3.3 icmp_seq=1 ttl=64 time=1.881 ms
84 bytes from 192.168.3.3 icmp_seq=2 ttl=64 time=9.320 ms
84 bytes from 192.168.3.3 icmp_seq=3 ttl=64 time=9.765 ms
^C
PC6> ping 192.168.3.4

84 bytes from 192.168.3.4 icmp_seq=1 ttl=64 time=7.060 ms
84 bytes from 192.168.3.4 icmp_seq=2 ttl=64 time=8.804 ms
^C
PC6> ping 192.168.3.5

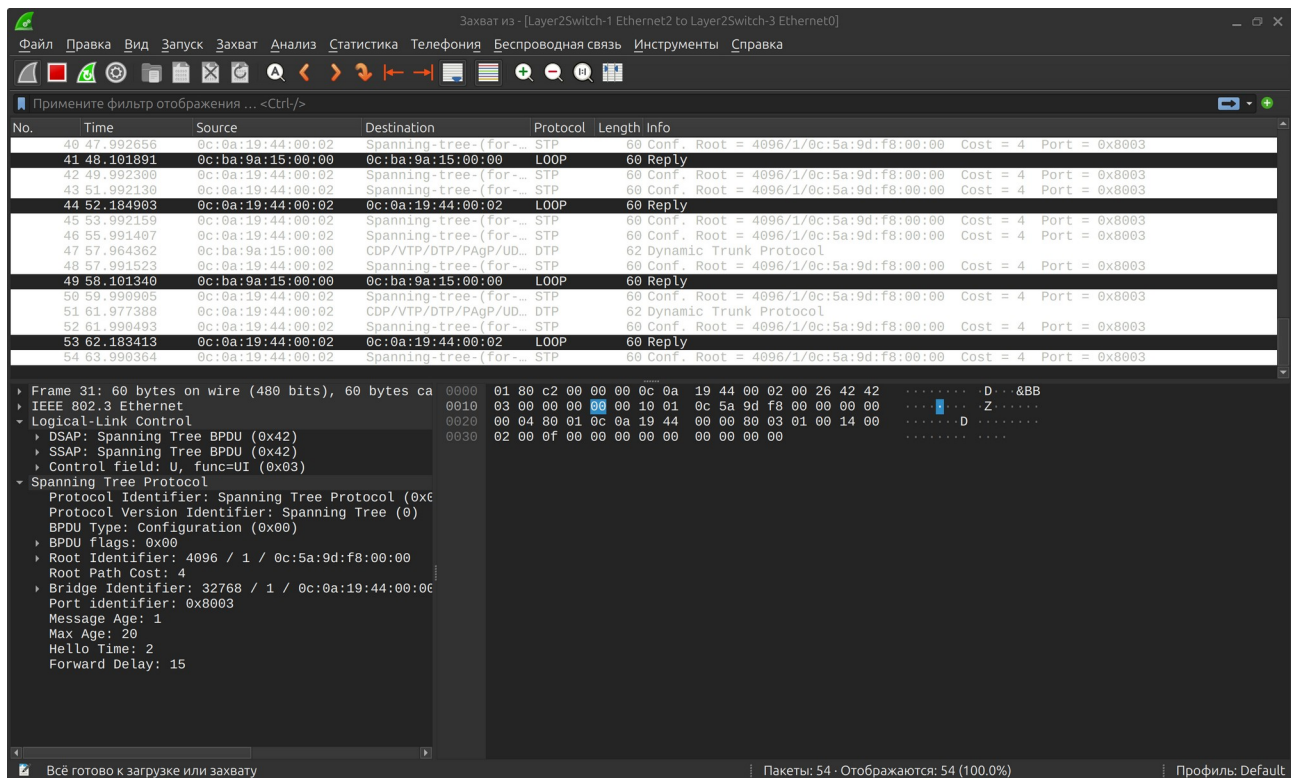
84 bytes from 192.168.3.5 icmp_seq=1 ttl=64 time=0.596 ms
84 bytes from 192.168.3.5 icmp_seq=2 ttl=64 time=3.231 ms
^C
PC6> 
```

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

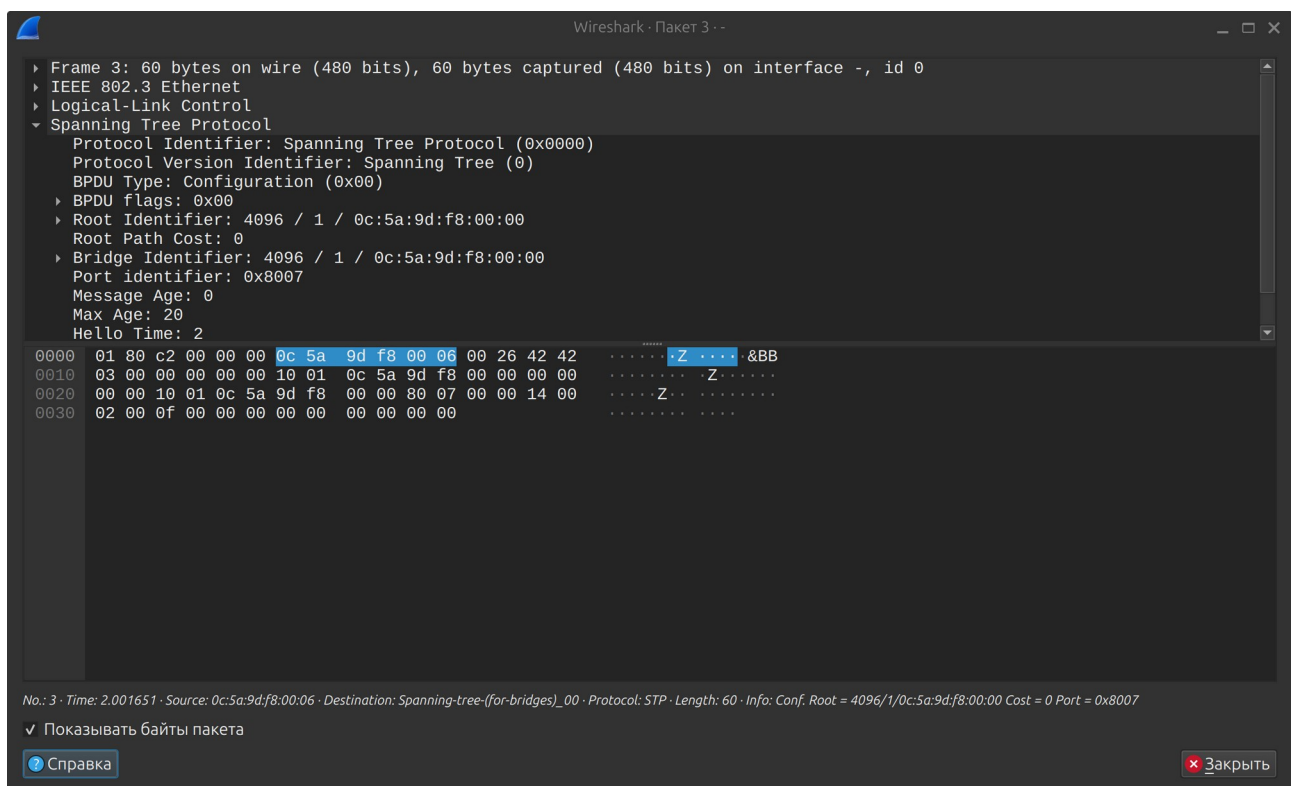


4. При помощи wireshark отследить передачу пакетов hello от корневого коммутатора на всех линках (nb!), результаты включить в отчет

Пакет который коммутатор switch-1 переслал, поэтому Bridge ID != Root Id и Root Path cost = 4:



BDPU сразу от корня. Bridge ID = Root Id и Root Path cost = 0:

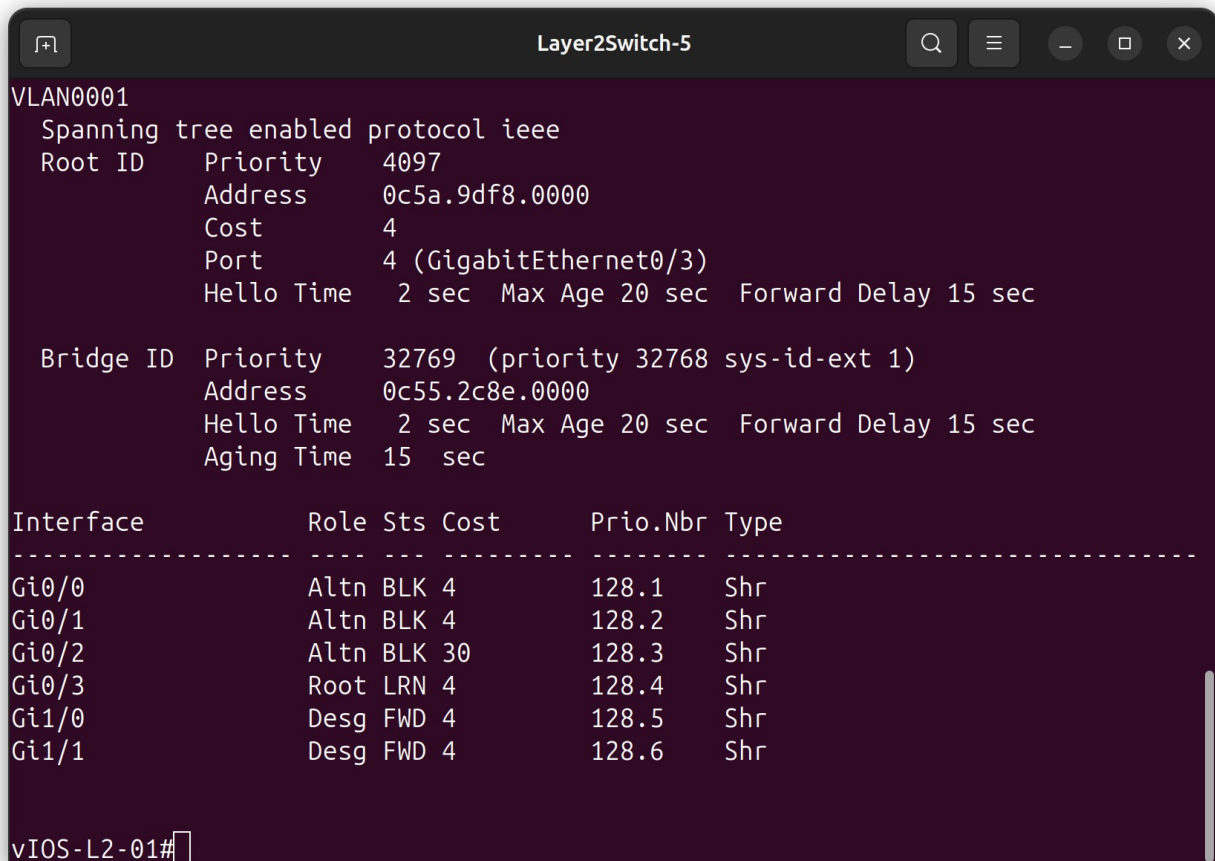


На всех остальных линках точно такие же пакеты.

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

На switch-5 для порта (Gi 0/2) ставим cost = 30. Видим что порт Gi 0/2 стал в состояние blocked, а альтернативный порт (Gi 0/3) стал root портом.

```
#interface gigabitEthernet 0/2
vIOS-L2-01(config-if)#spanning-tree cost 30
vIOS-L2-01(config-if)#end
```



```
VLAN0001
Spanning tree enabled protocol ieee
Root ID    Priority    4097
           Address    0c5a.9df8.0000
           Cost      4
           Port      4 (GigabitEthernet0/3)
           Hello Time 2 sec  Max Age 20 sec  Forward Delay 15 sec

Bridge ID  Priority    32769 (priority 32768 sys-id-ext 1)
           Address    0c55.2c8e.0000
           Hello Time 2 sec  Max Age 20 sec  Forward Delay 15 sec
           Aging Time 15 sec

Interface      Role Sts Cost      Prio.Nbr Type
-----
Gi0/0          Altn BLK 4          128.1   Shr
Gi0/1          Altn BLK 4          128.2   Shr
Gi0/2          Altn BLK 30        128.3   Shr
Gi0/3          Root LRN 4          128.4   Shr
Gi1/0          Desg FWD 4          128.5   Shr
Gi1/1          Desg FWD 4          128.6   Shr

vIOS-L2-01#
```

Новая схема сети:

