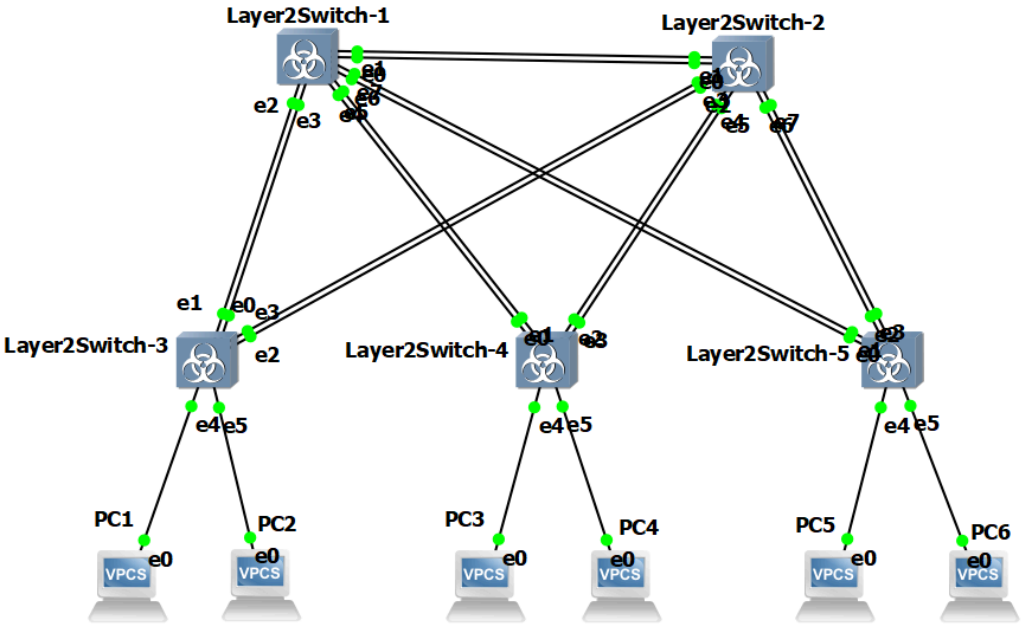
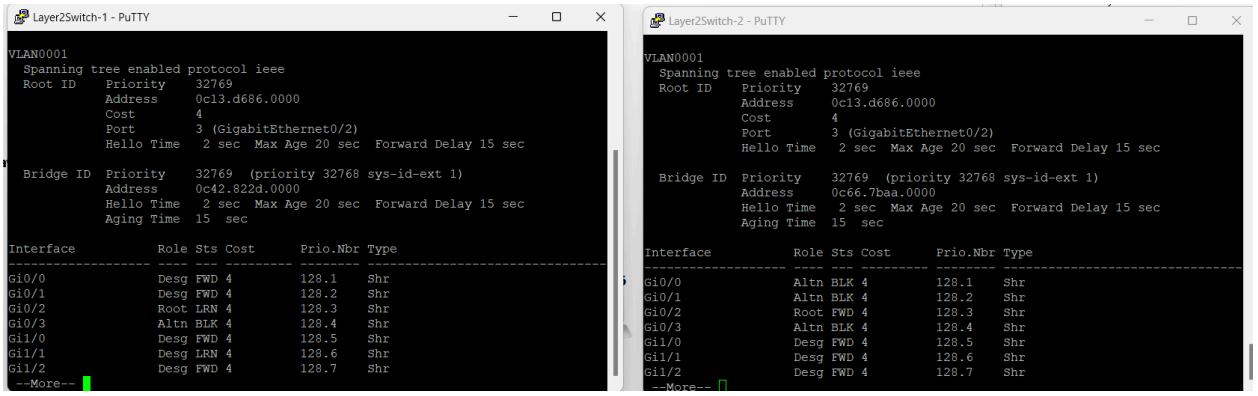
Модуль 4, Лабораторная работа 2

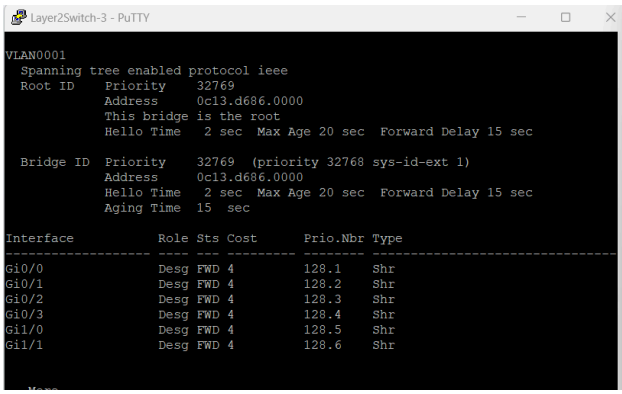
1) Для заданной на схеме schema-lab2 сети, состоящей из управляемых коммутаторов и персональных компьютеров настроить протокол STP, назначив явно один из коммутаторов корневым настройкой приоритета

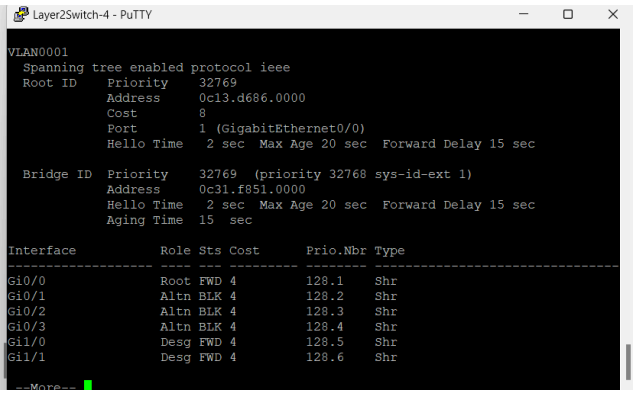
Созданная сеть:

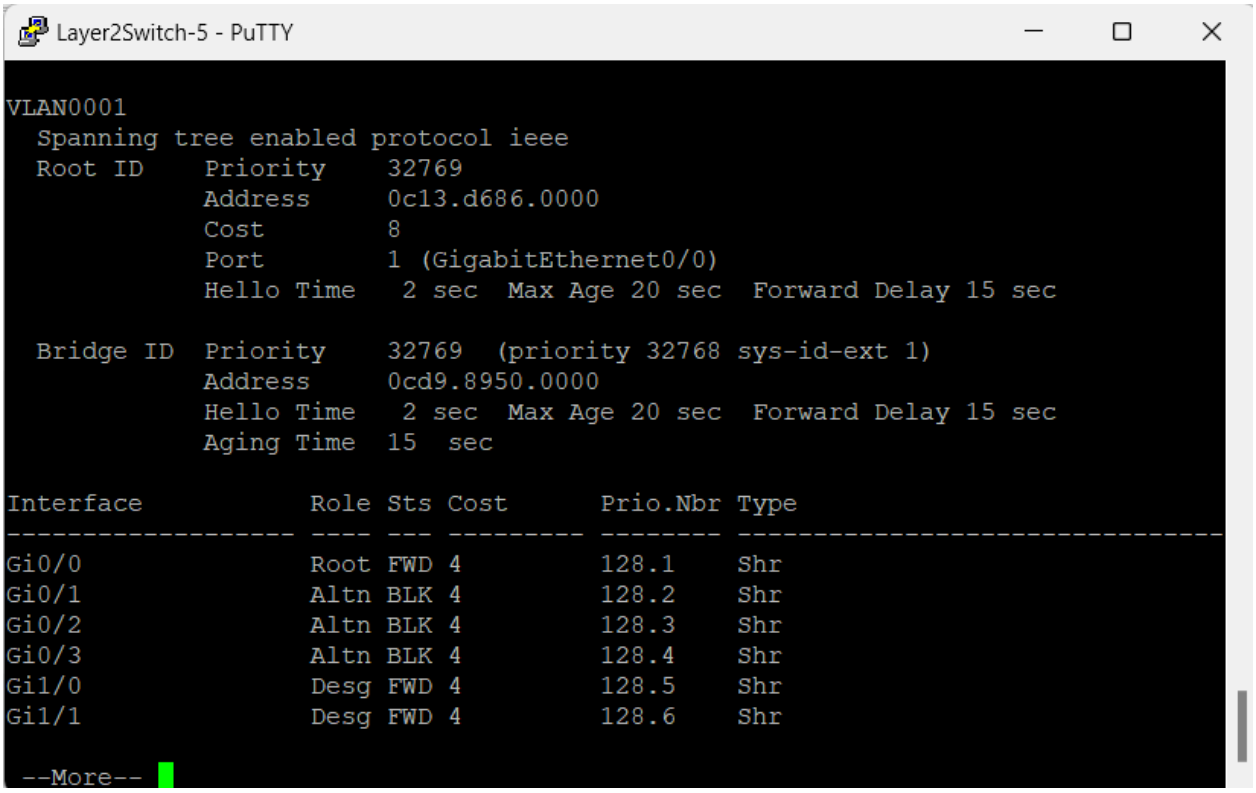


Изначальный конфигурация протокола STP на устройствах:







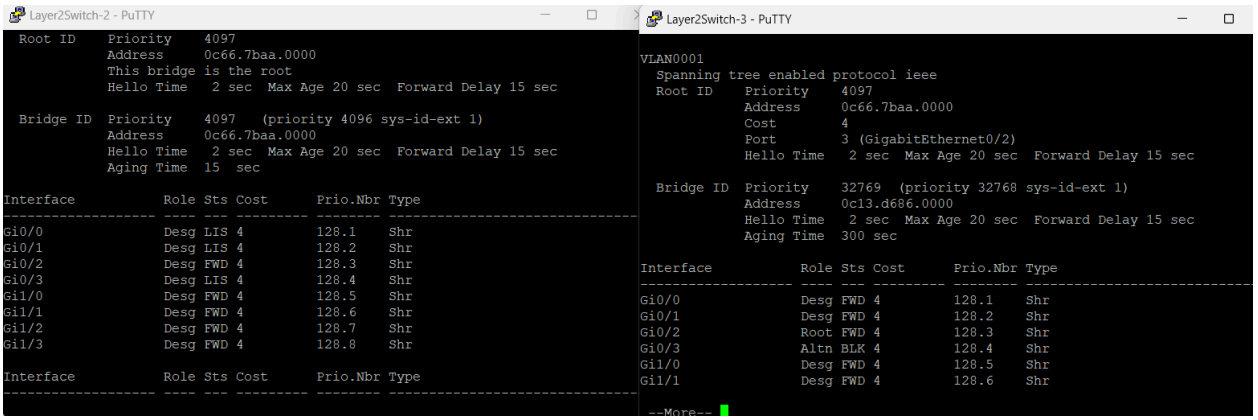


Корневым коммутатором является третий, сделаем второй коммутатором корневым изменив значение приоритета:

vIOS-L2-01#config

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

vIOS-L2-01(config)#

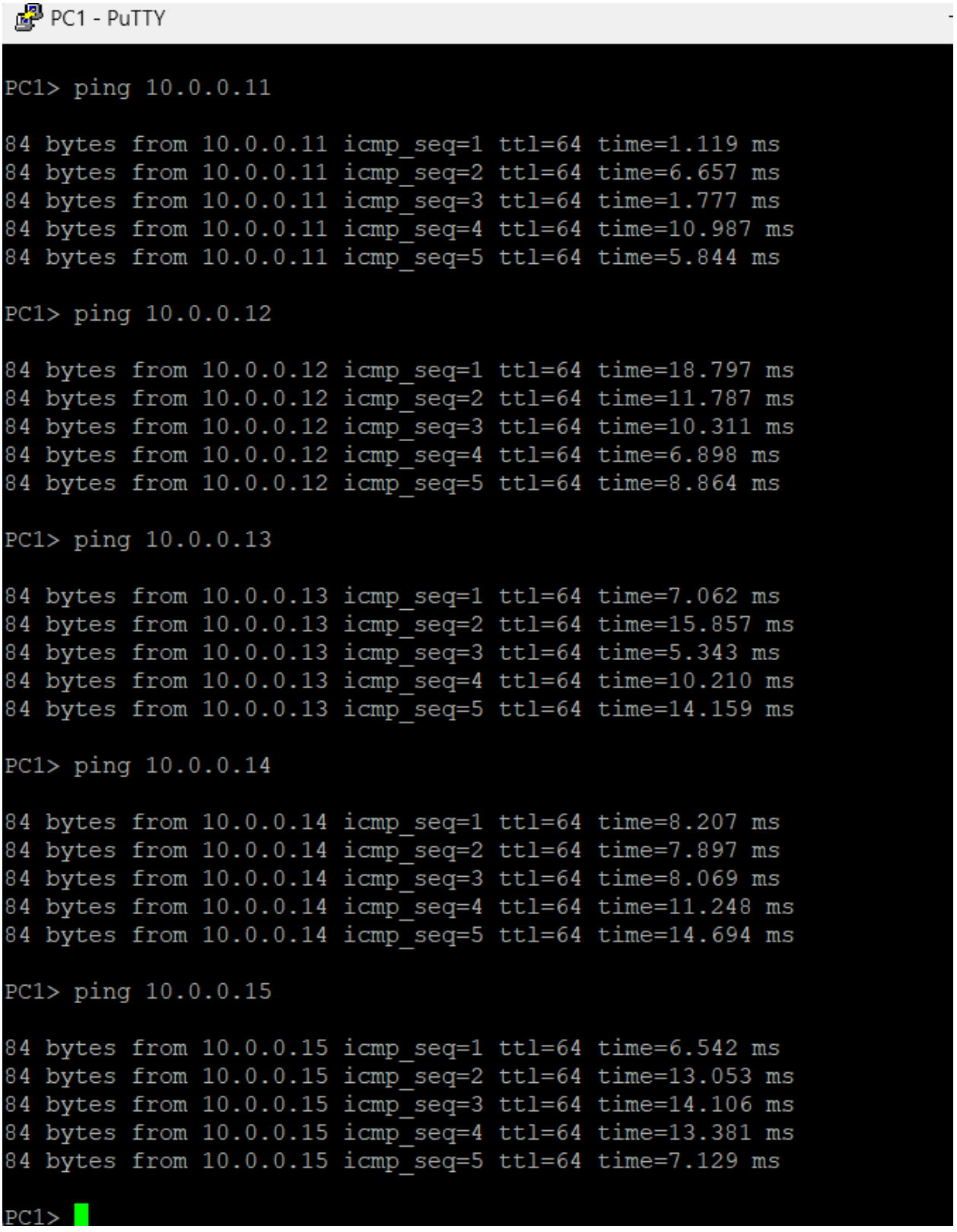


Второй коммутатор стал корневым

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

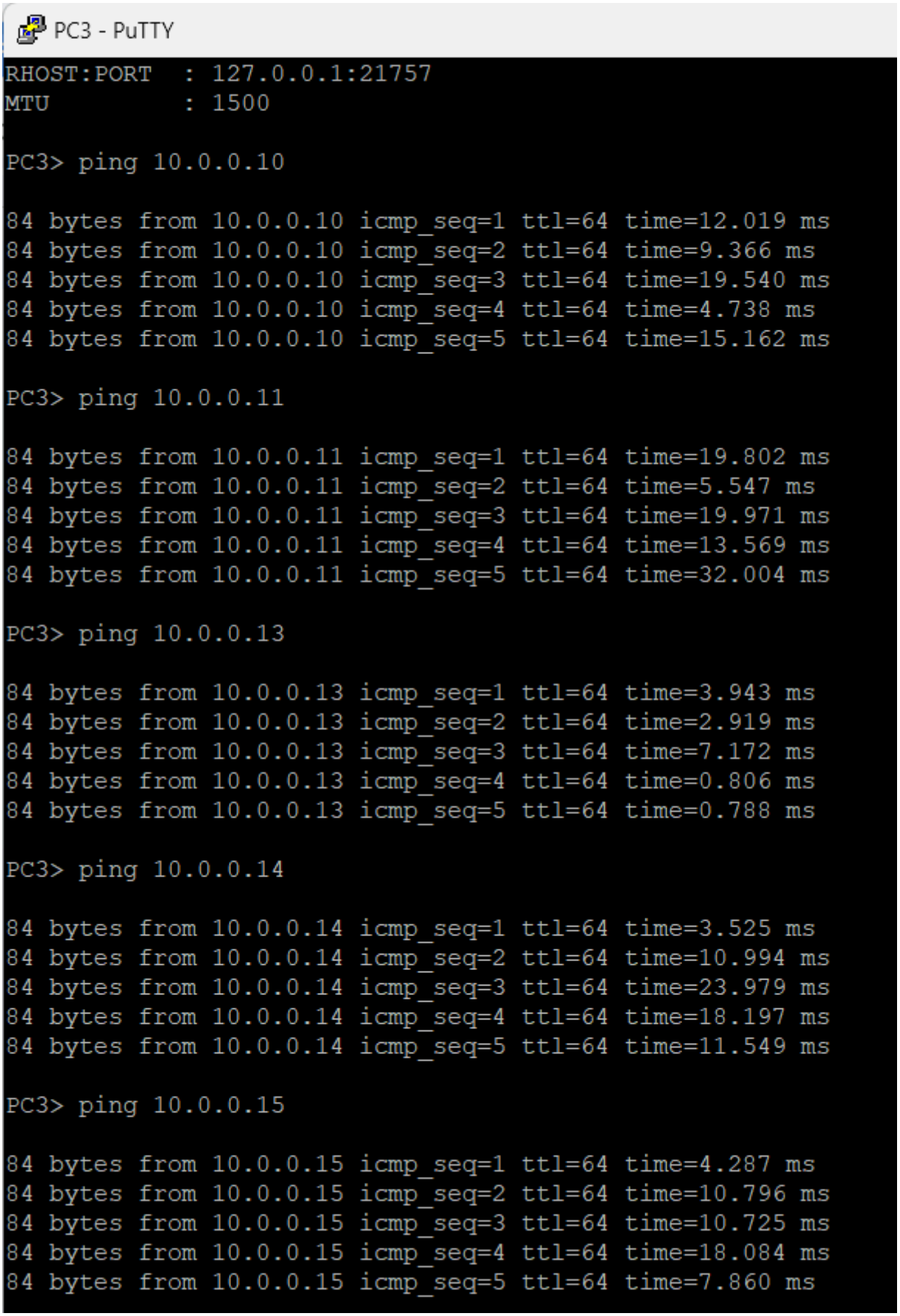
Проверка связи PC1 со всеми остальными компьютерами:



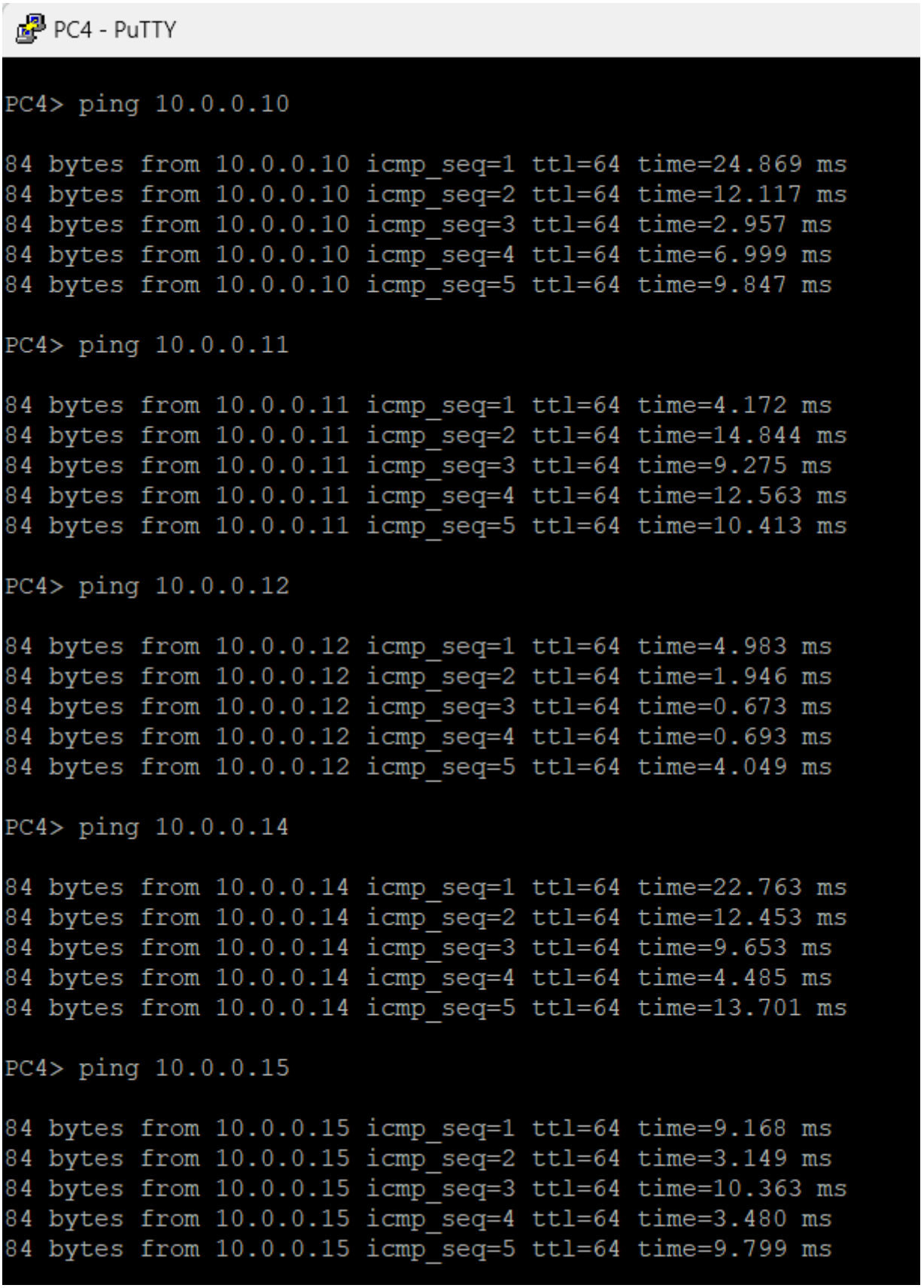
Проверка связи PC2 со всеми остальными компьютерами:

```
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>
```

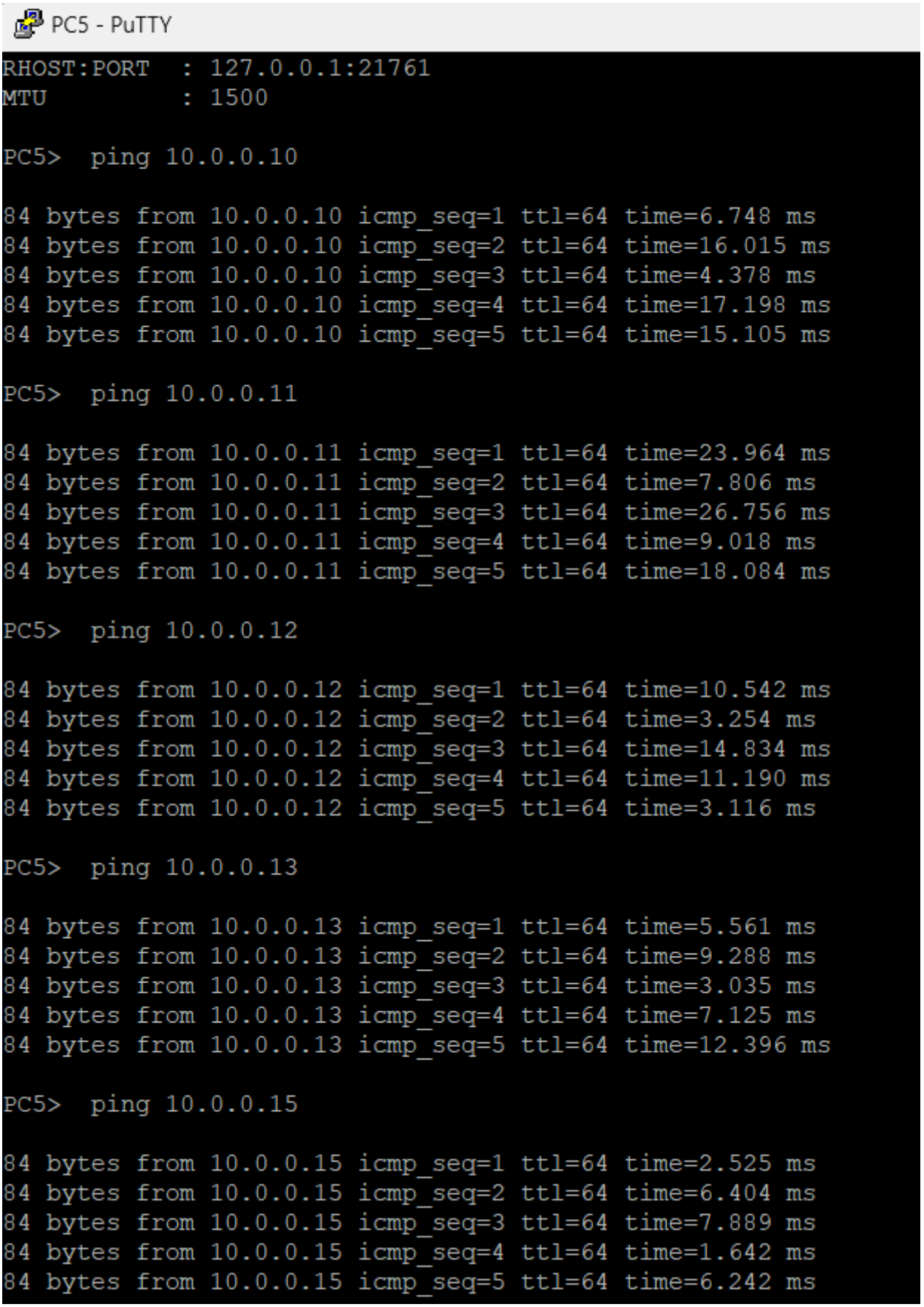
Проверка связи PC3 со всеми остальными компьютерами:



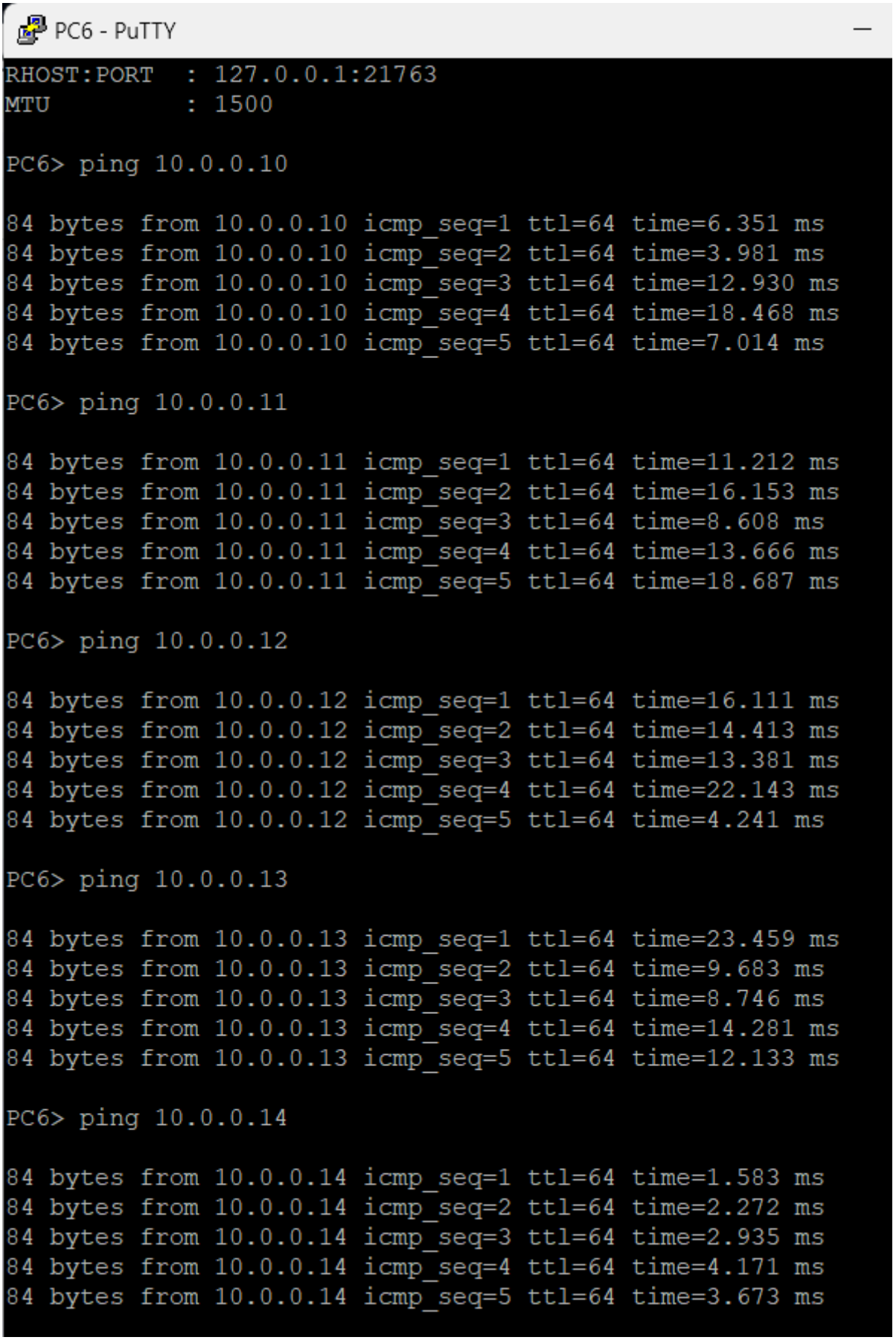
Проверка связи PC4 со всеми остальными компьютерами:



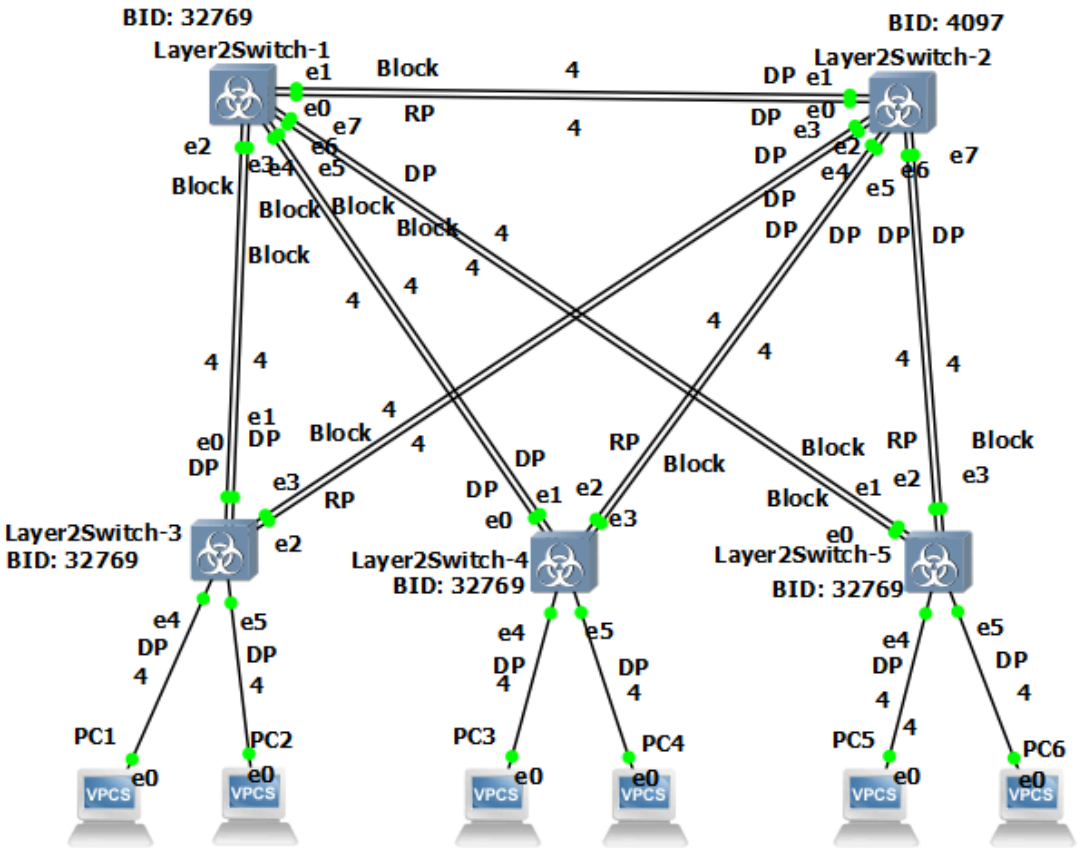
Проверка связи PC5 со всеми остальными компьютерами:



Проверка связи PC6 со всеми остальными компьютерами:

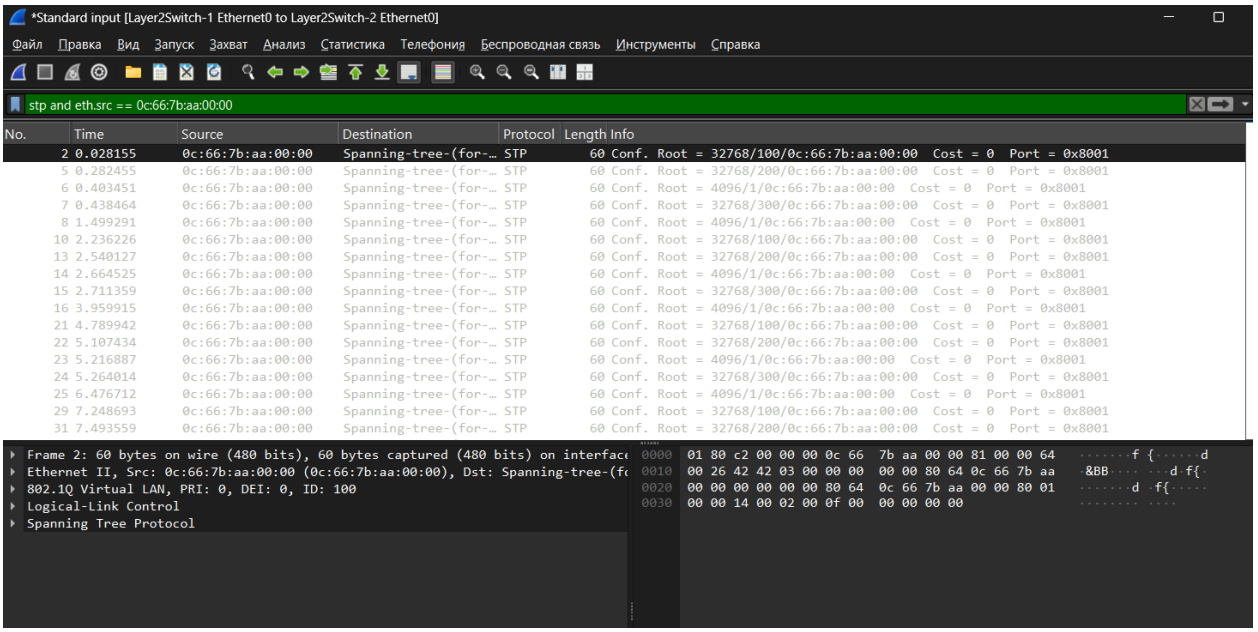


3) На изображении схемы отметить BID каждого коммутатора и режимы работы портов (RP/DP/blocked) и стоимости маршрутов, результат сохранить в файл

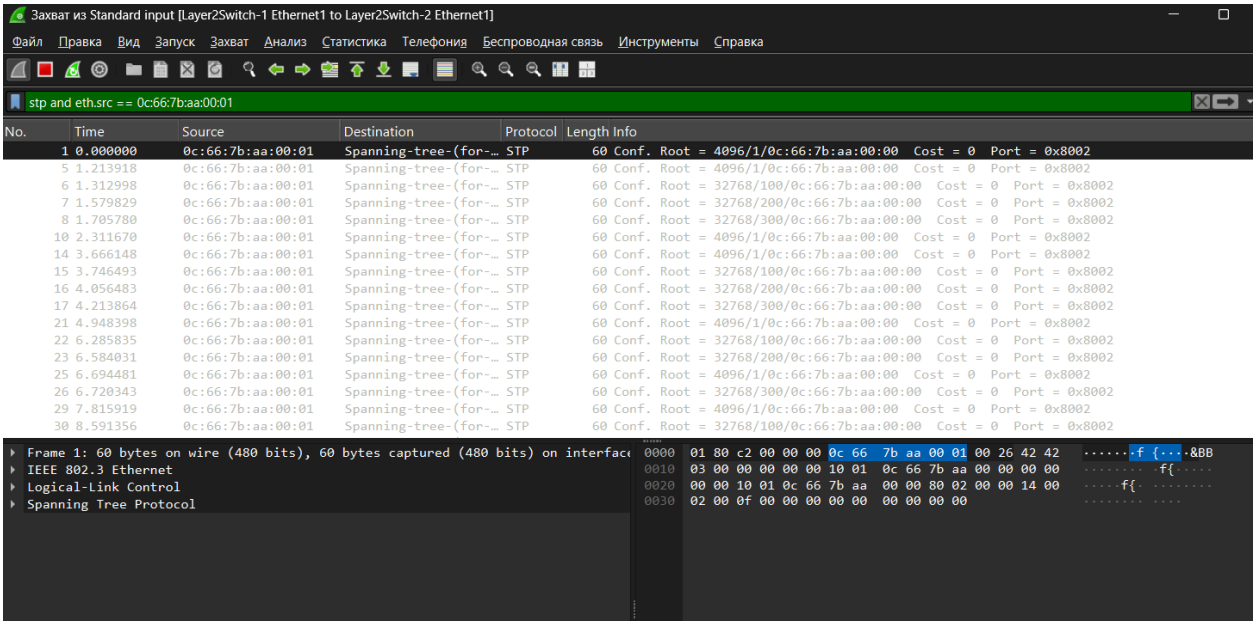


4) При помощи wireshark отследить передачу пакетов hello от корневого коммутатора на всех линках, результаты включить в отчет

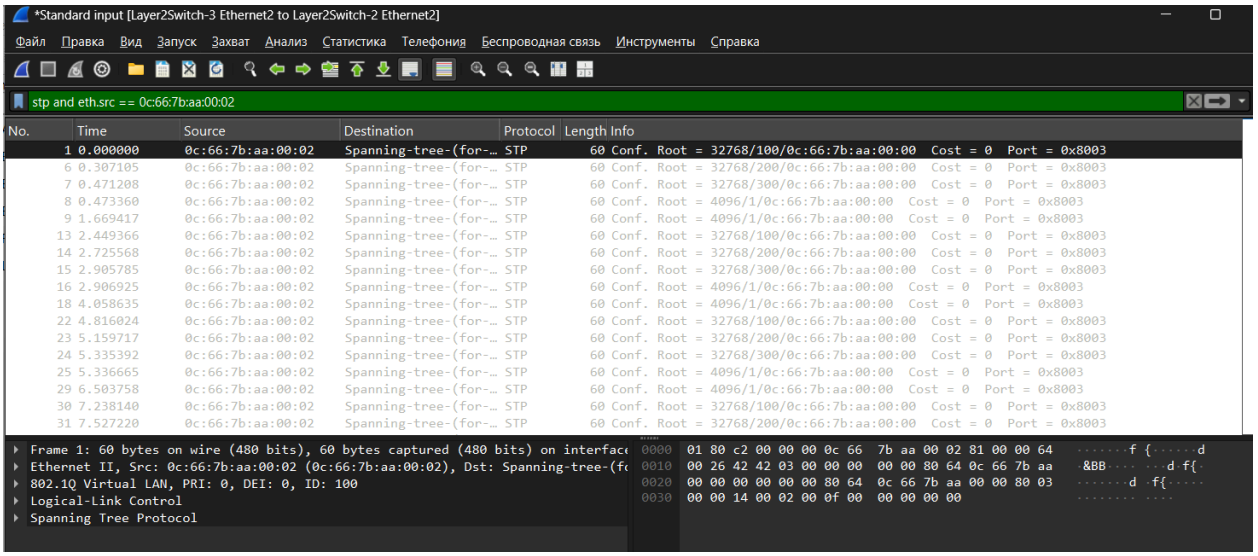
Et0:


*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 5.264014 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 interfac
Ethernet II, Src: 0c:66:7b:aa:00:00 (0c:66:7b:aa:00:00), Dst: Spanning-tree-(f
802.1Q Virtual LAN, PRI: 0, DEI: 0, ID: 100
Logical-Link Control
Spanning Tree Protocol
0000 01 80 c2 00 00 00 0c 66 7b aa 00 00 81 00 00 64
0010 00 26 42 42 03 00 00 00 00 00 80 64 0c 66 7b aa
0020 00 00 00 00 00 00 80 64 0c 66 7b aa 00 00 80 01
0030 00 00 14 00 02 00 0f 00 00 00 00 00

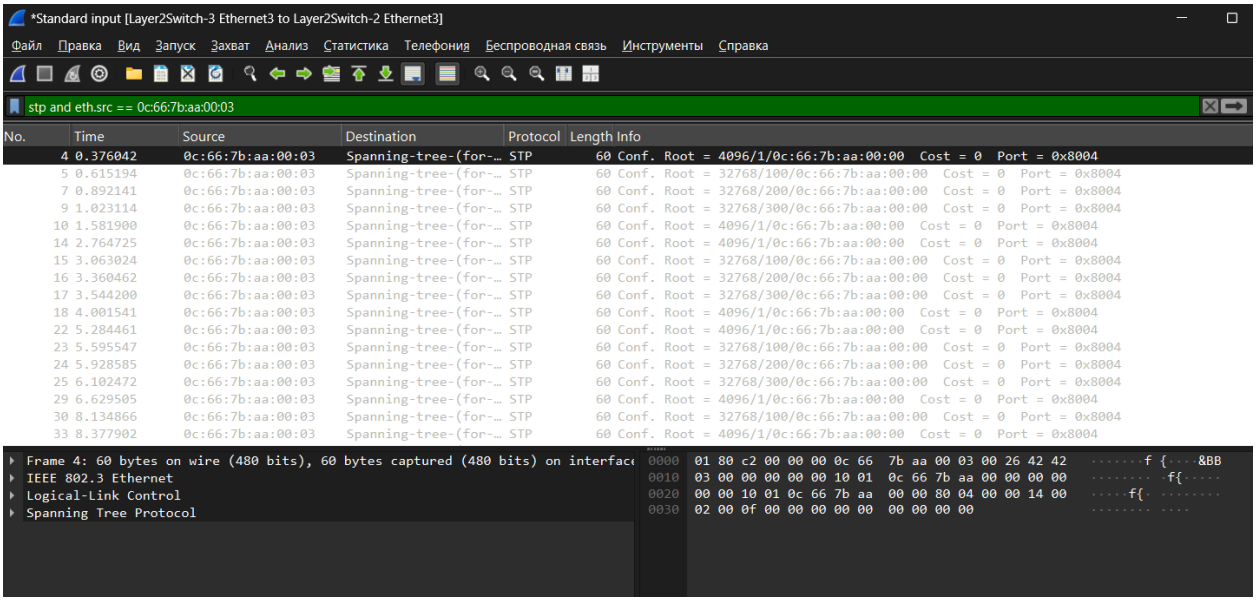
Et1:


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 interfac
IEEE 802.3 Ethernet
Logical-Link Control
Spanning Tree Protocol
0000 01 80 c2 00 00 00 0c 66 7b aa 00 01 00 26 42 42
0010 03 00 00 00 00 00 10 01 0c 66 7b aa 00 00 00 00
0020 00 00 10 01 0c 66 7b aa 00 00 80 02 00 00 14 00
0030 02 00 0f 00 00 00 00 00 00 00 00 00

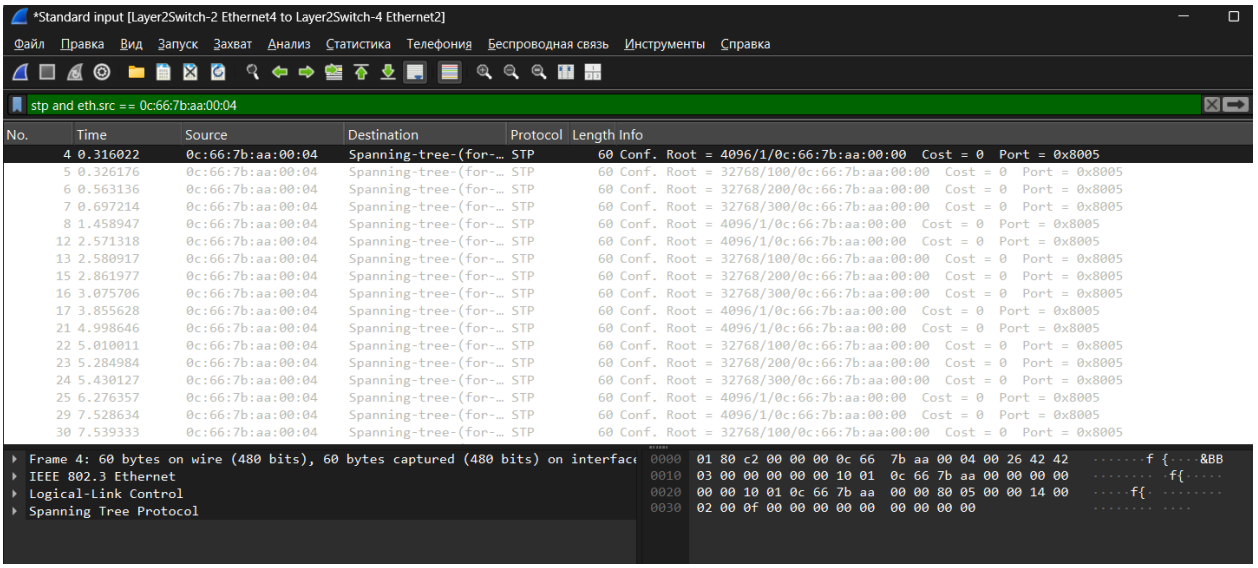
Et2:


*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 == 0c:66:7b: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 0.307105 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 interfac
Ethernet II, Src: 0c:66:7b:aa:00:02 (0c:66:7b:aa:00:02), Dst: Spanning-tree-(f
802.1Q Virtual LAN, PRI: 0, DEI: 0, ID: 100
Logical-Link Control
Spanning Tree Protocol
0000 01 80 c2 00 00 00 0c 66 7b aa 00 02 81 00 00 64
0010 00 26 42 42 03 00 00 00 00 00 80 64 0c 66 7b aa
0020 00 00 00 00 00 00 80 64 0c 66 7b aa 00 00 80 03
0030 00 00 14 00 02 00 0f 00 00 00 00 00

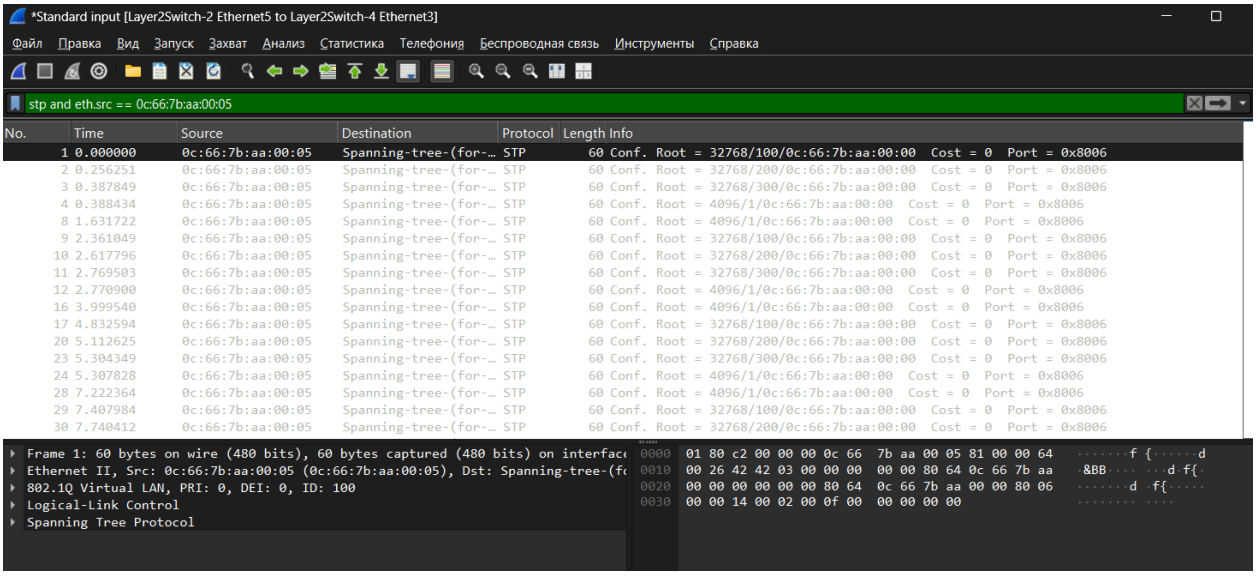
Et3:


*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 == 0c:66:7b: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 3.544200 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 6.629505 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 8.377902 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 interfac
IEEE 802.3 Ethernet
Logical-Link Control
Spanning Tree Protocol
0000 01 80 c2 00 00 00 0c 66 7b aa 00 03 00 26 42 42
0010 03 00 00 00 00 00 10 01 0c 66 7b aa 00 00 00 00
0020 00 00 10 01 0c 66 7b aa 00 00 80 04 00 00 14 00
0030 02 00 0f 00 00 00 00 00 00 00 00 00

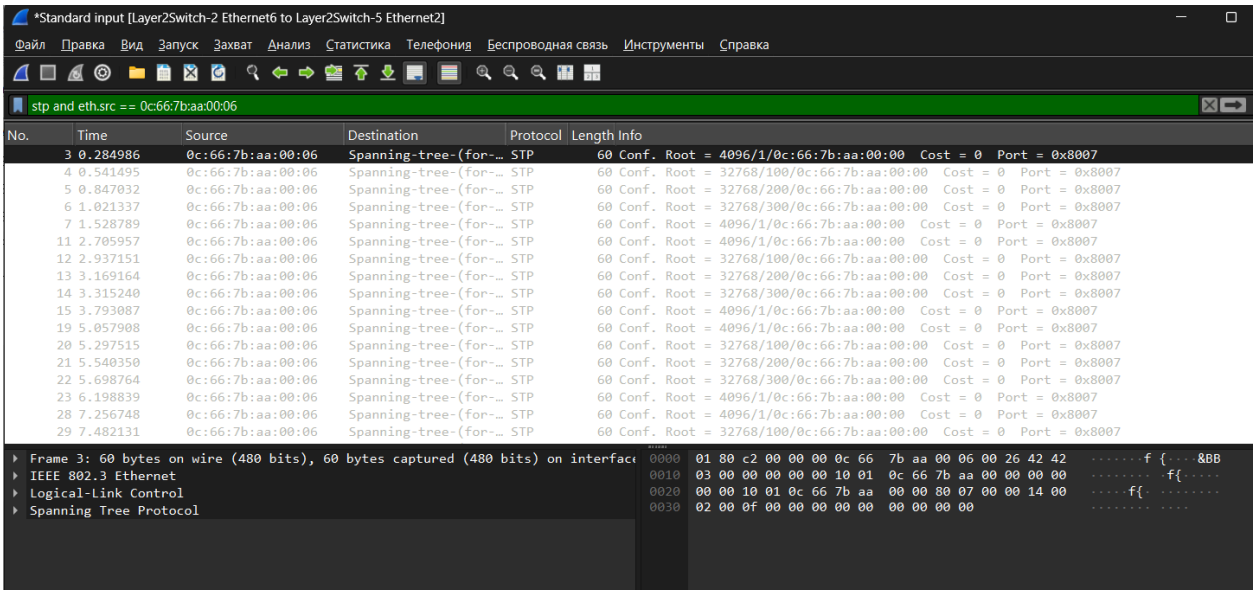
Et4:


*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 == 0c:66:7b: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 6.276357 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 interfac
IEEE 802.3 Ethernet
Logical-Link Control
Spanning Tree Protocol
0000 01 80 c2 00 00 00 0c 66 7b aa 00 04 00 26 42 42
0010 03 00 00 00 00 00 10 01 0c 66 7b aa 00 00 00 00
0020 00 00 10 01 0c 66 7b aa 00 00 80 05 00 00 14 00
0030 02 00 0f 00 00 00 00 00 00 00 00 00

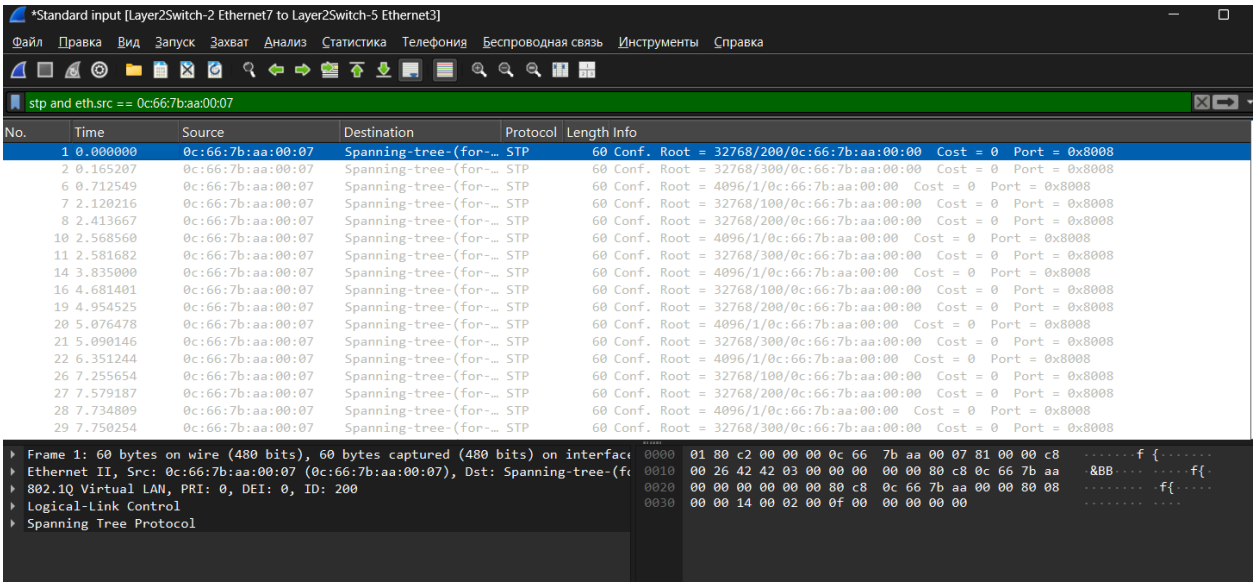
Et5:


*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 0.256251 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 interfac
Ethernet II, Src: 0c:66:7b:aa:00:05 (0c:66:7b:aa:00:05), Dst: Spanning-tree-(f
802.1Q Virtual LAN, PRI: 0, DEI: 0, ID: 100
Logical-Link Control
Spanning Tree Protocol
0000 01 80 c2 00 00 00 0c 66 7b aa 00 05 81 00 00 64
0010 00 26 42 42 03 00 00 00 00 00 80 64 0c 66 7b aa
0020 00 00 00 00 00 80 64 0c 66 7b aa 00 00 80 06
0030 00 00 14 00 02 00 0f 00 00 00 00 00

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 interfac
IEEE 802.3 Ethernet
Logical-Link Control
Spanning Tree Protocol
0000 01 80 c2 00 00 00 0c 66 7b aa 00 06 00 26 42 42
0010 03 00 00 00 00 00 10 01 0c 66 7b aa 00 00 00 00
0020 00 00 10 01 0c 66 7b aa 00 00 80 07 00 00 14 00
0030 02 00 0f 00 00 00 00 00 00 00 00 00

Et7:



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

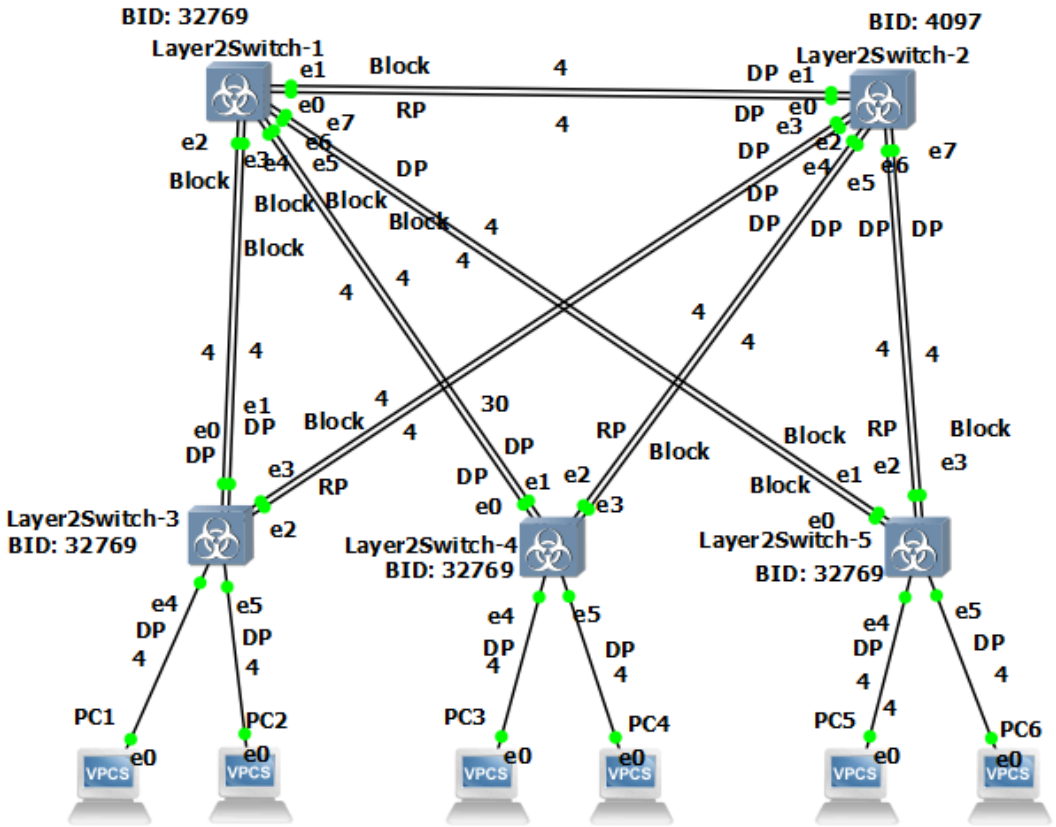
vIOS-L2-01#config

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

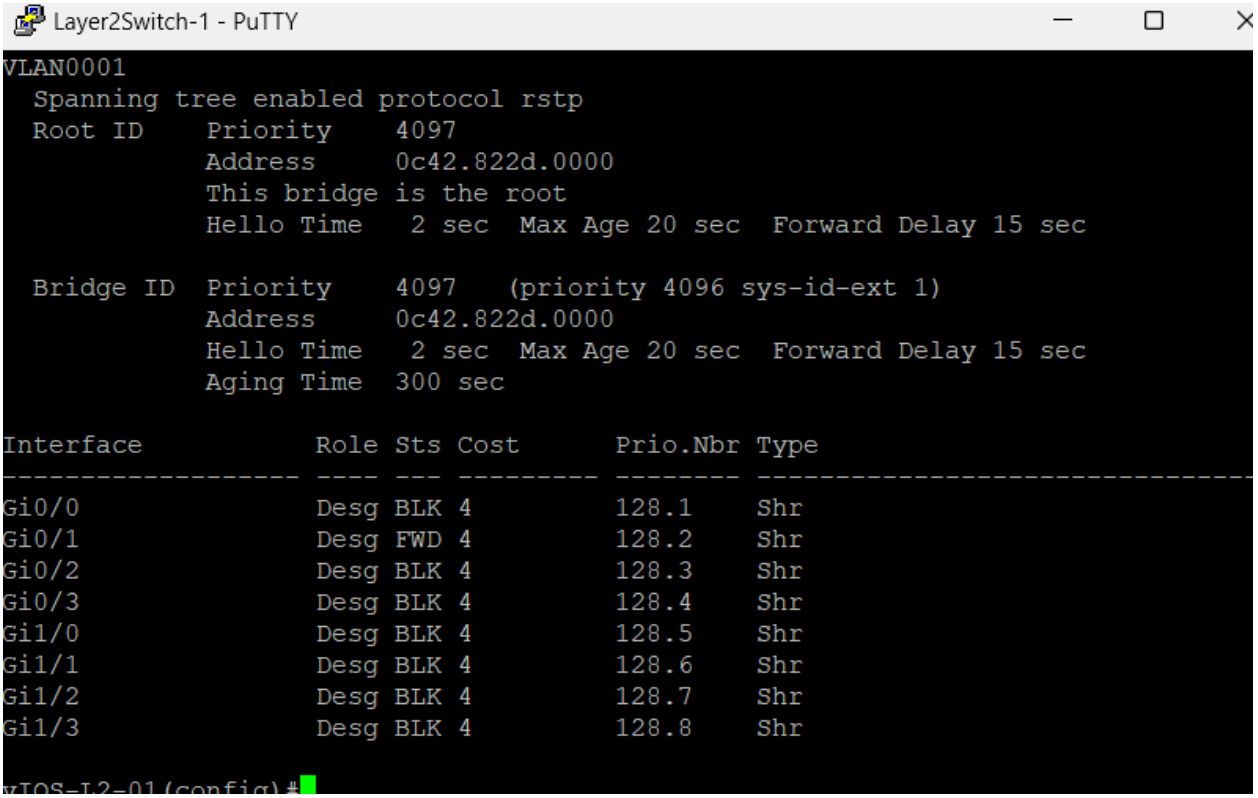
Папка STP_config

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

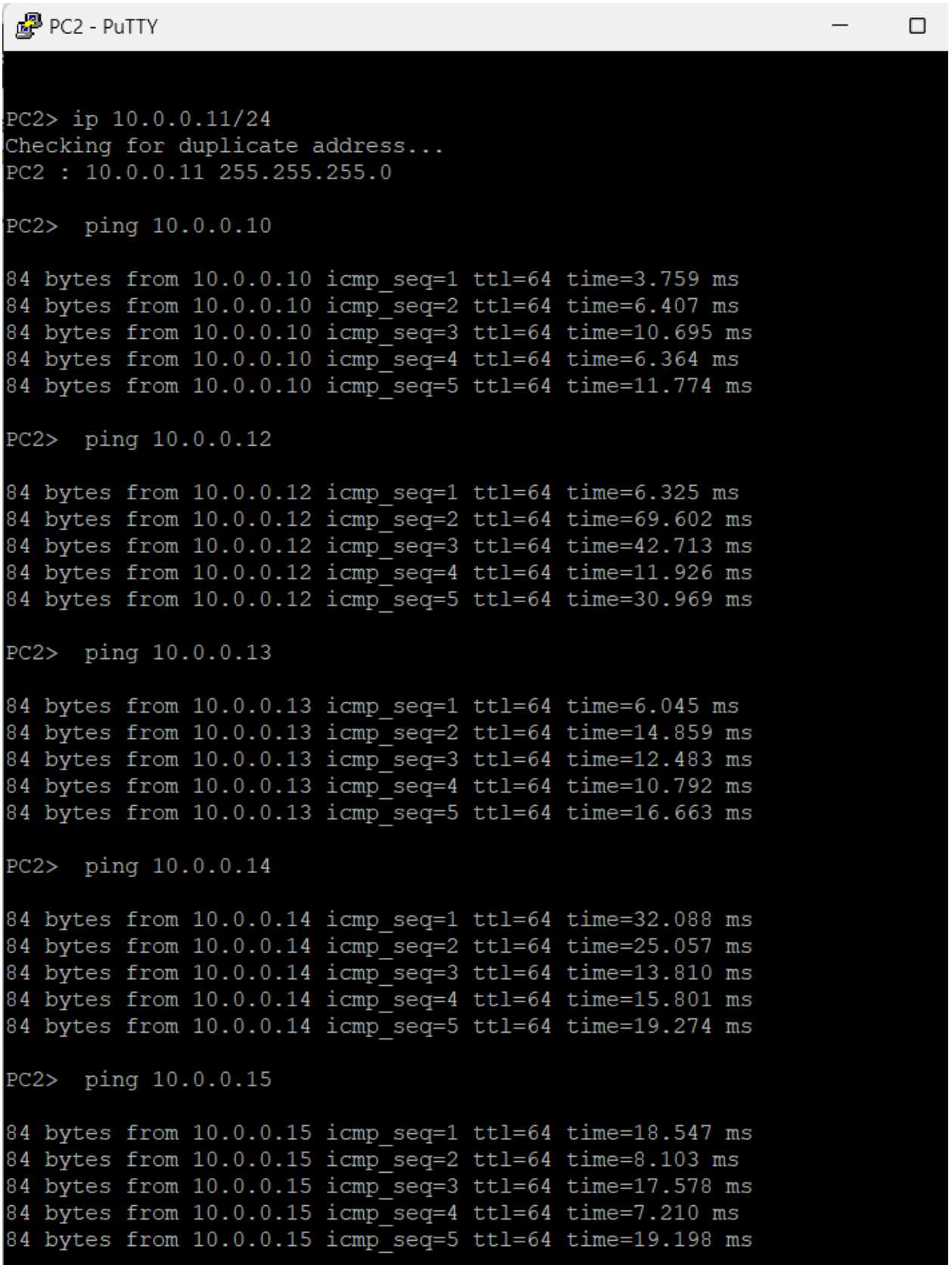


Проверить доступность каждого с каждым всех персональных компьютеров (VPCS):

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:



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
```

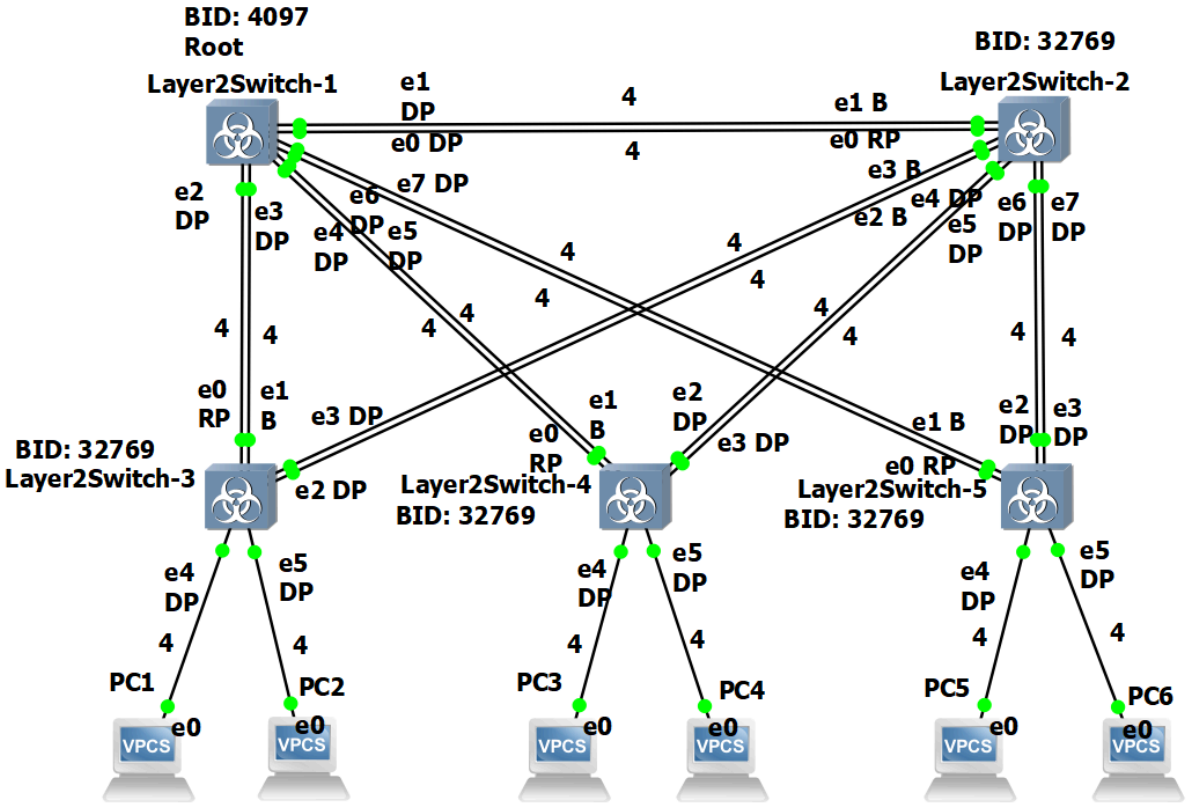
Проверка связи PC5 со всеми остальными компьютерами:

```
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:

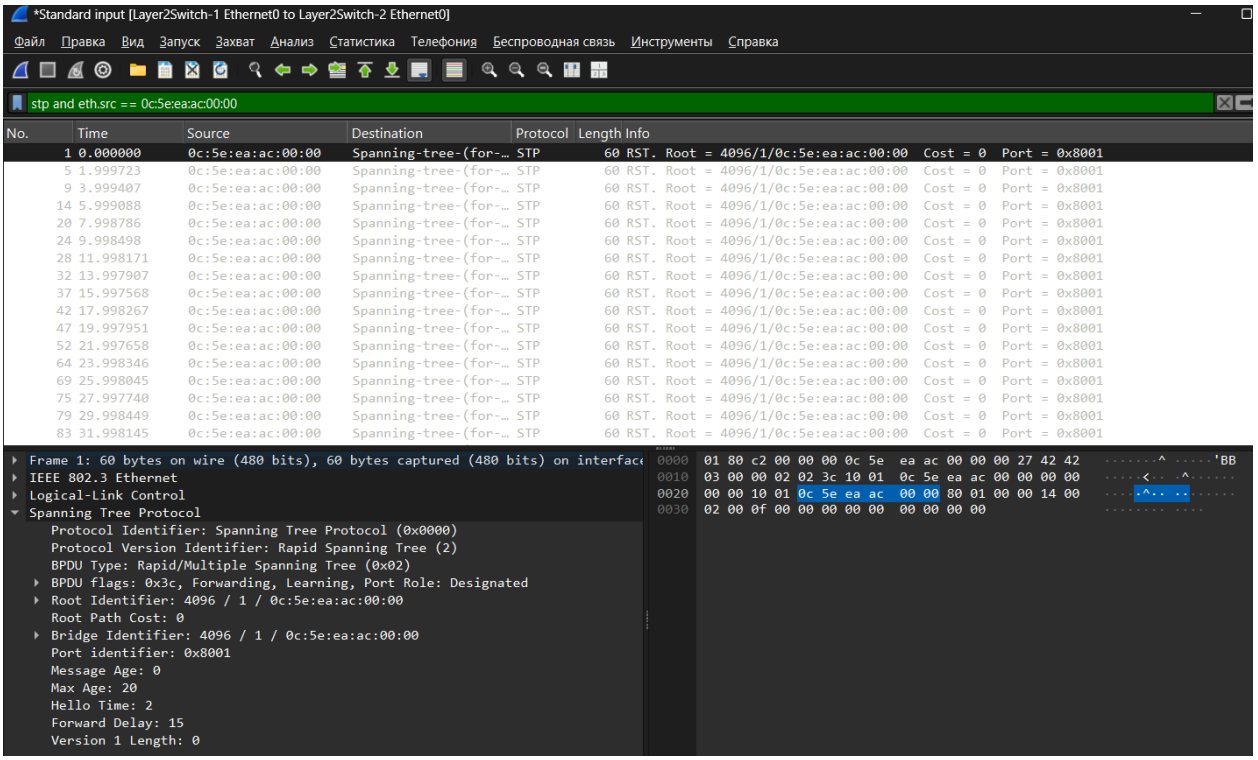
```
PC6> ping 10.0.0.10

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

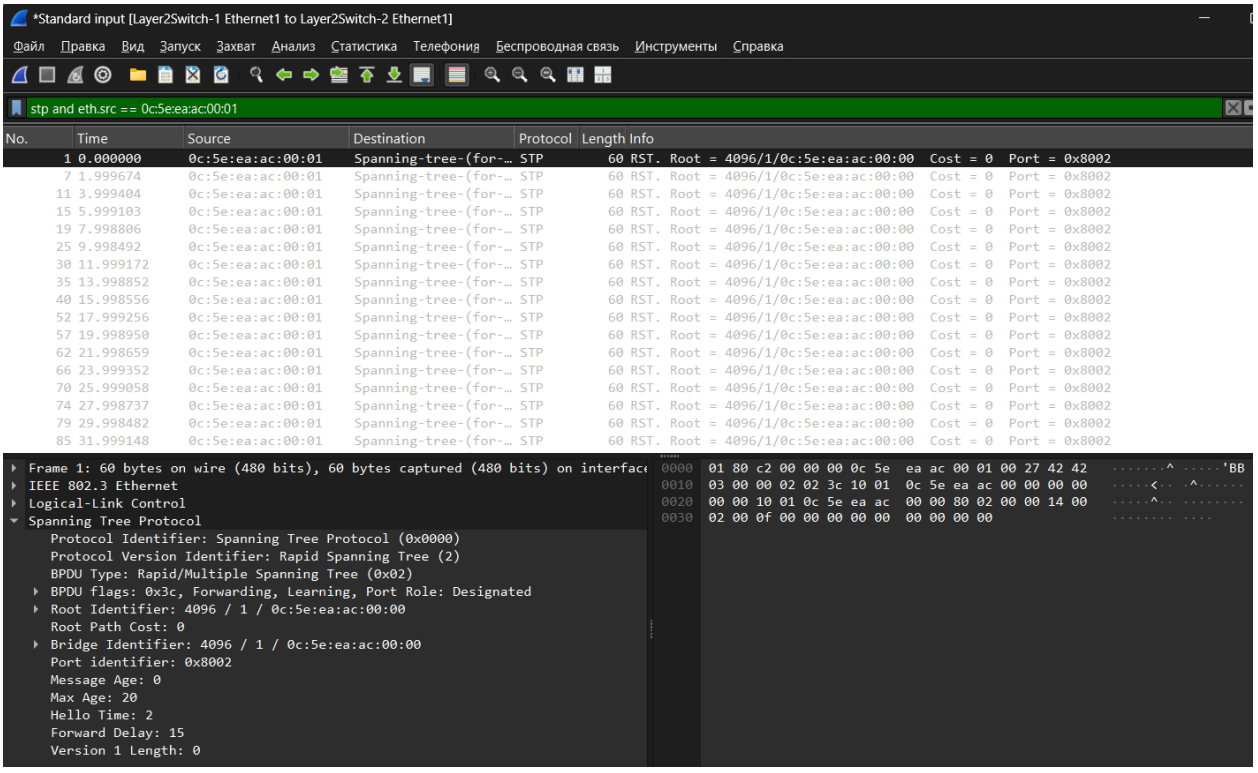


Захват пакетов hello при помощи Wireshark

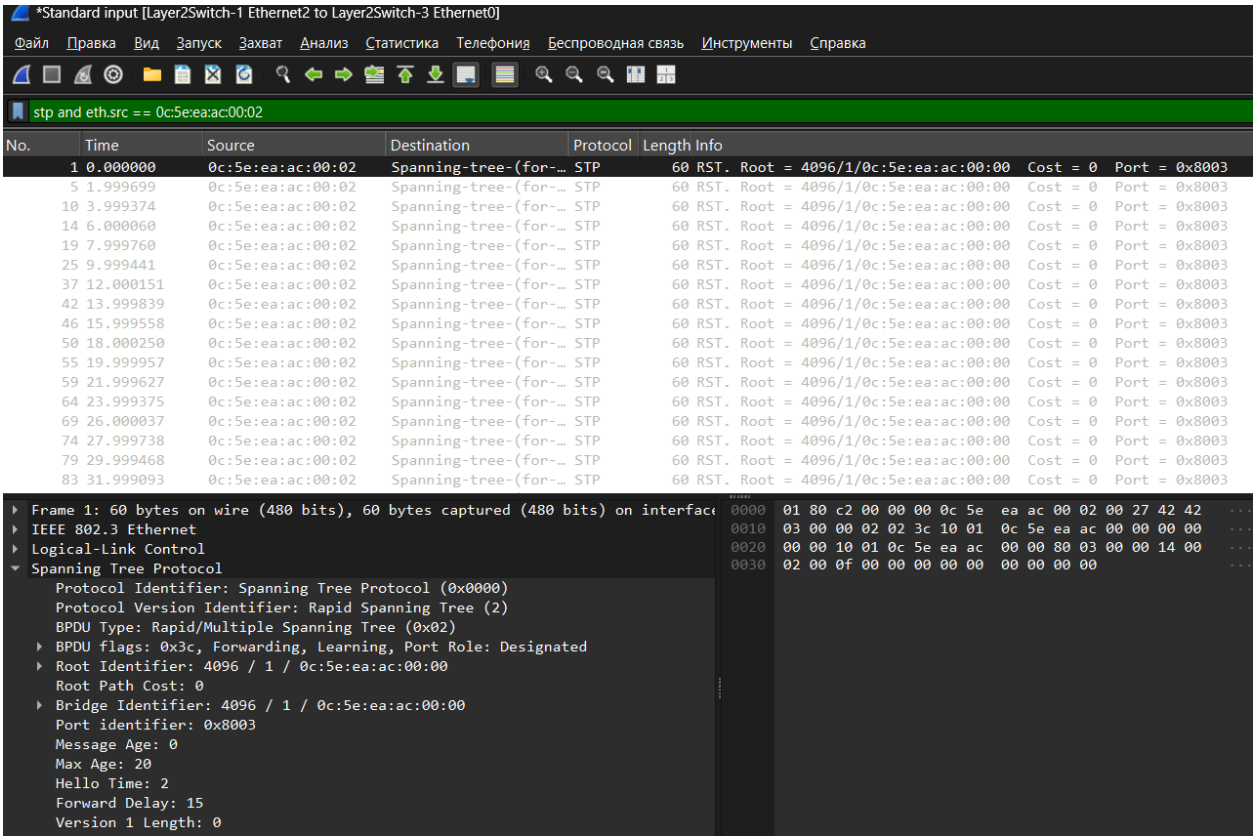
Et0:


*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 == 0c:5e: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
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: 0x8001
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 00 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 01 00 00 14 00
0030 02 00 0f 00 00 00 00 00 00 00 00 00

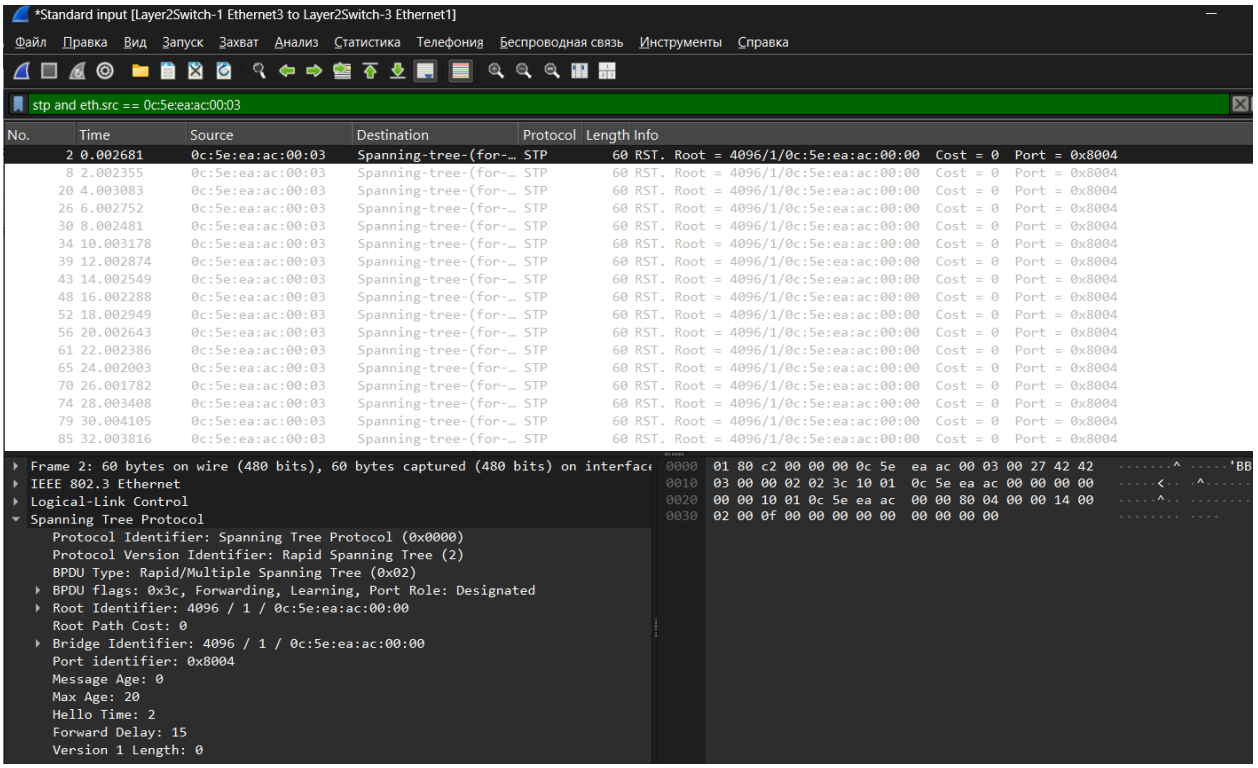
Et1:


*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 == 0c:5e: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
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: 0x8002
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 01 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 02 00 00 14 00
0030 02 00 0f 00 00 00 00 00 00 00 00 00

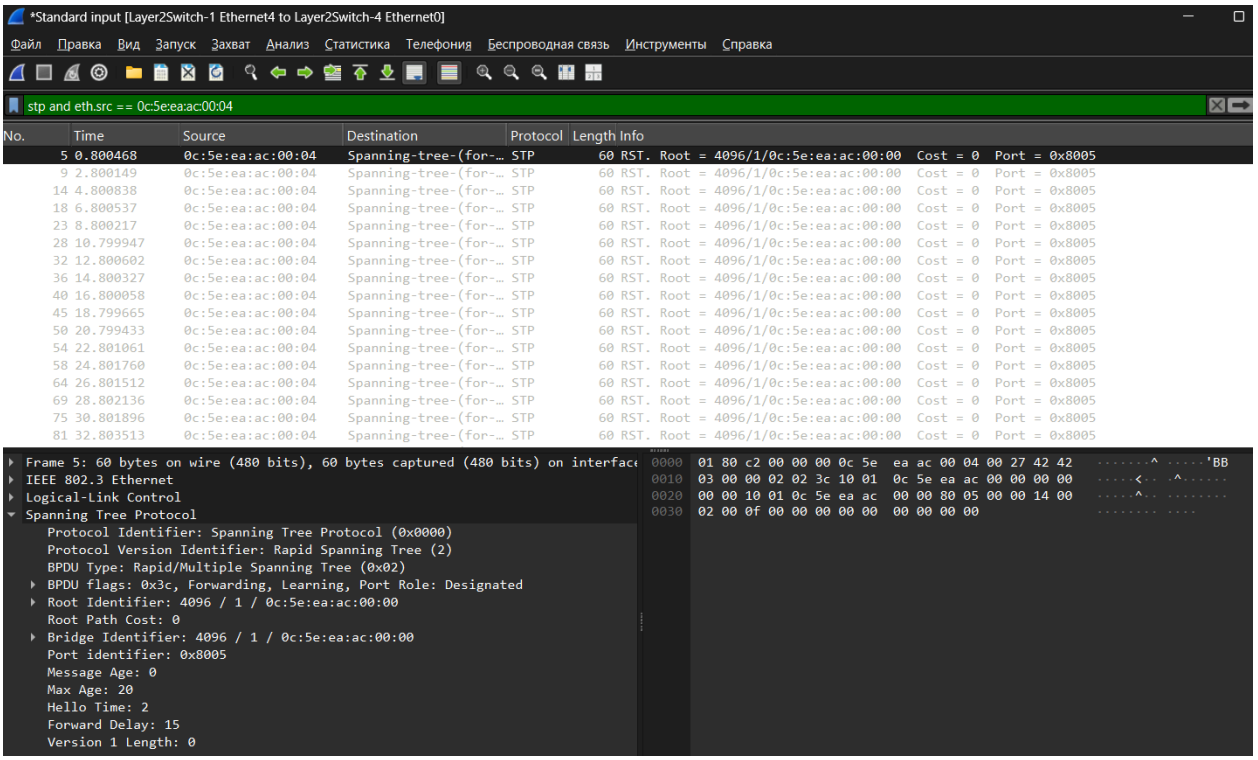
Et2:


*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
0000 01 80 c2 00 00 00 0c 5e ea ac 00 02 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 03 00 00 14 00
0030 02 00 0f 00 00 00 00 00 00 00 00 00

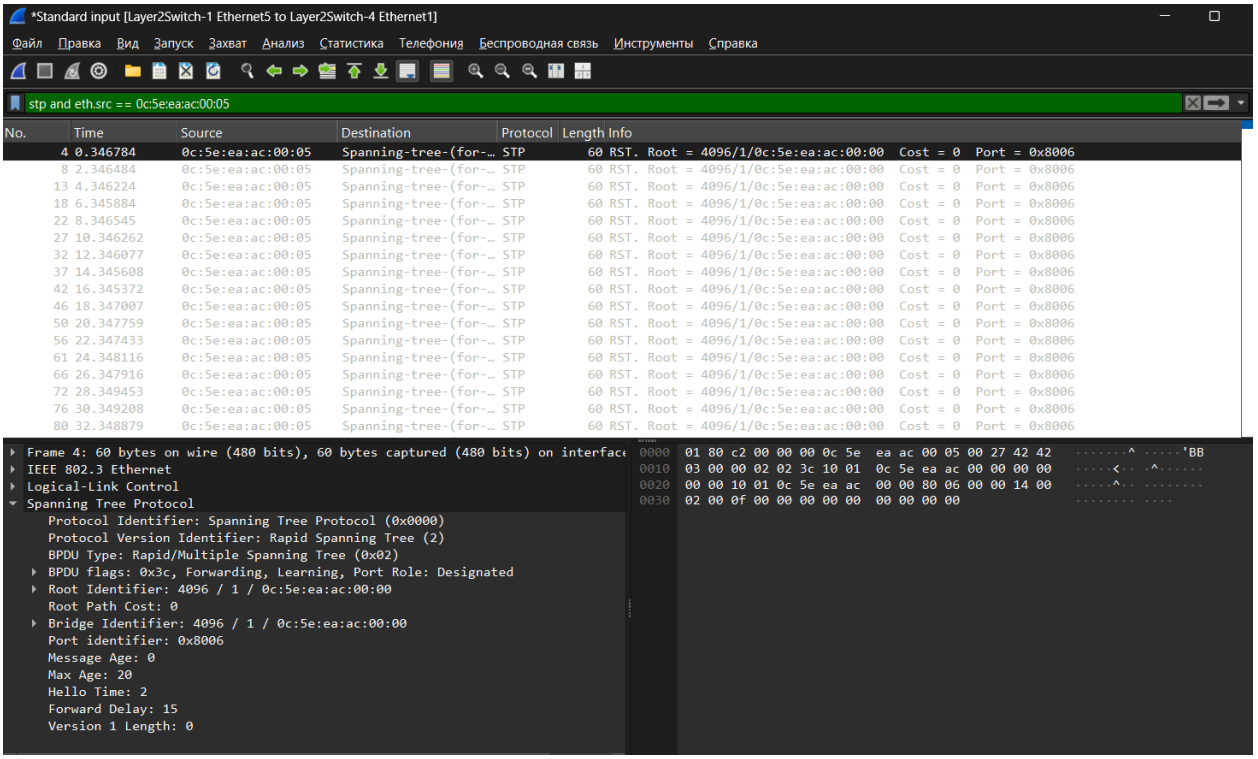
Et3:


*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
0000 01 80 c2 00 00 00 0c 5e ea ac 00 03 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 04 00 00 14 00
0030 02 00 0f 00 00 00 00 00 00 00 00 00

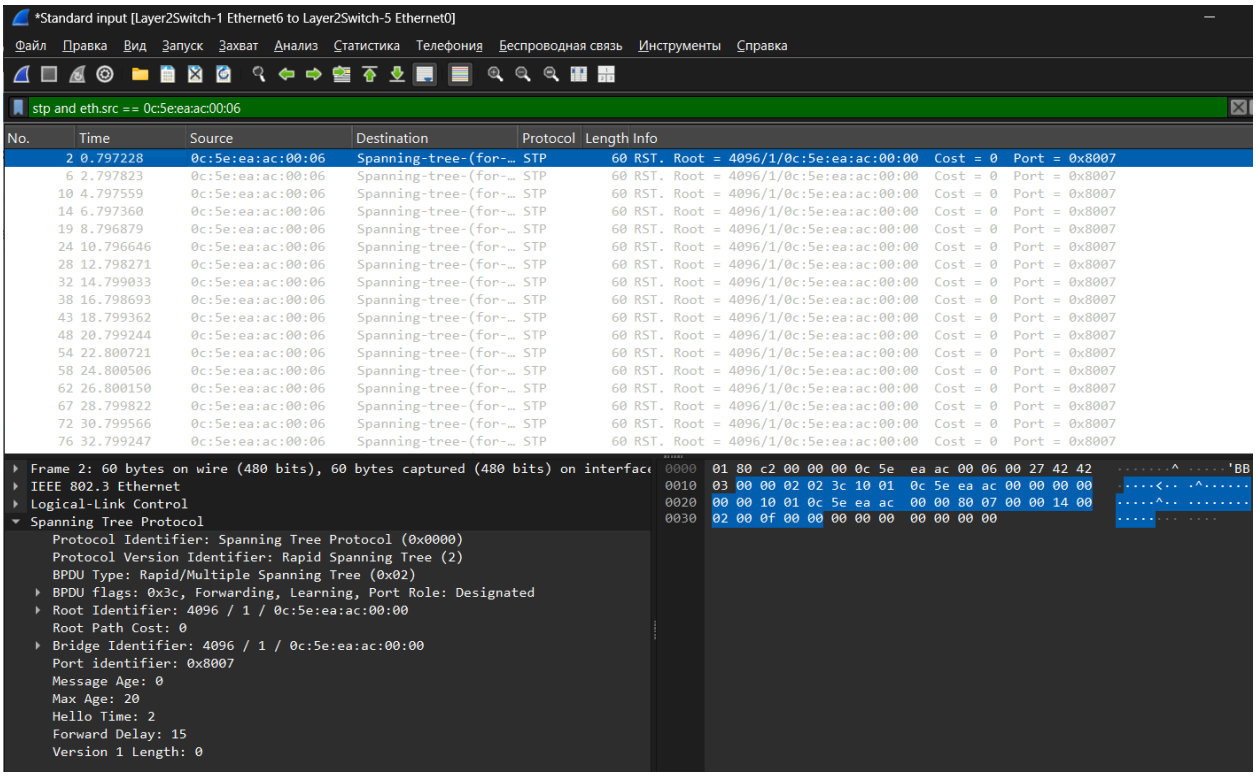
Et4:


*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 16.800058 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 interfac
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: 0x8005
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 04 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 05 00 00 14 00
0030 02 00 0f 00 00 00 00 00 00 00 00 00

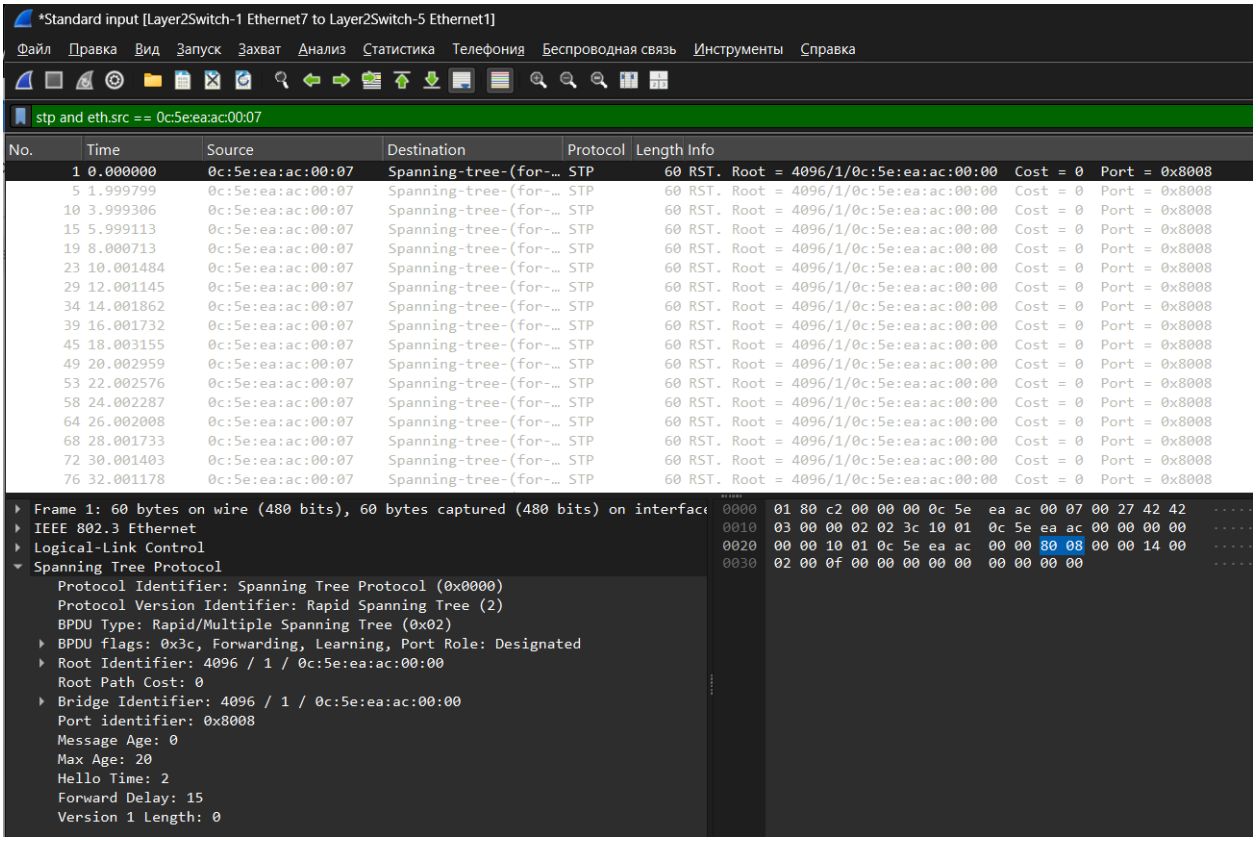
Et5:


*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 interfac
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: 0x8006
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 05 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 06 00 00 14 00
0030 02 00 0f 00 00 00 00 00 00 00 00 00

Et6:



Et7:



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

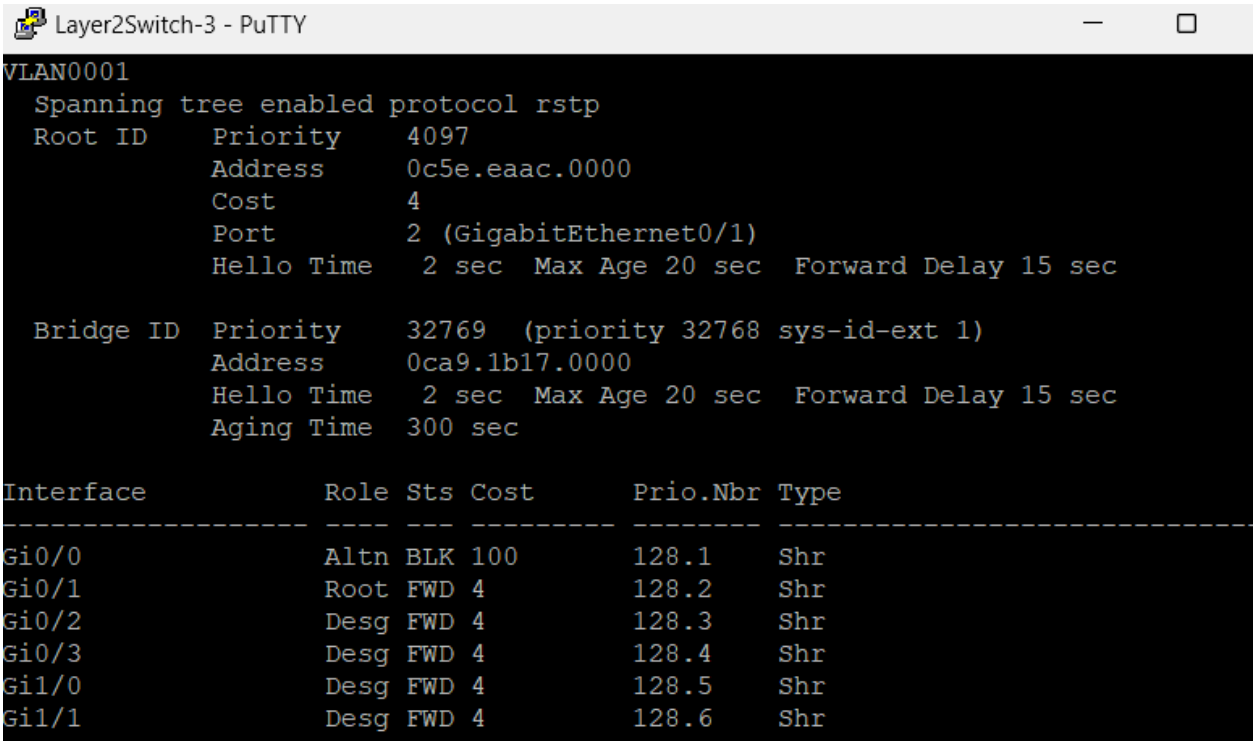
Смена стоимости маршрута для порта gi0/0 на 3 коммутаторе:

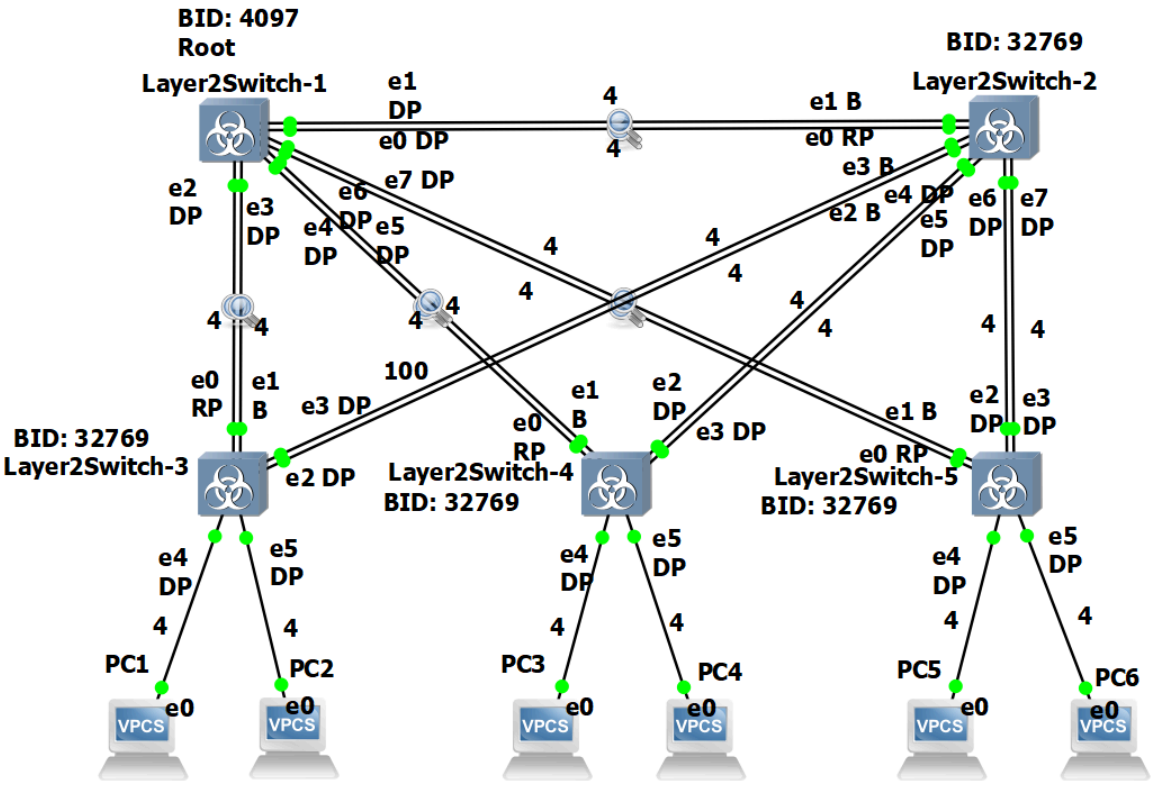
vIOS-L2-01>en

vIOS-L2-01#conf t

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

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





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

Папка RSTP_config