

Lab2 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

```
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> 
```

```
PC2

PC1 x PC2 x v

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

PC3

PC1 x PC2 x PC3 x PC4 x PC5 x PC6 x v

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

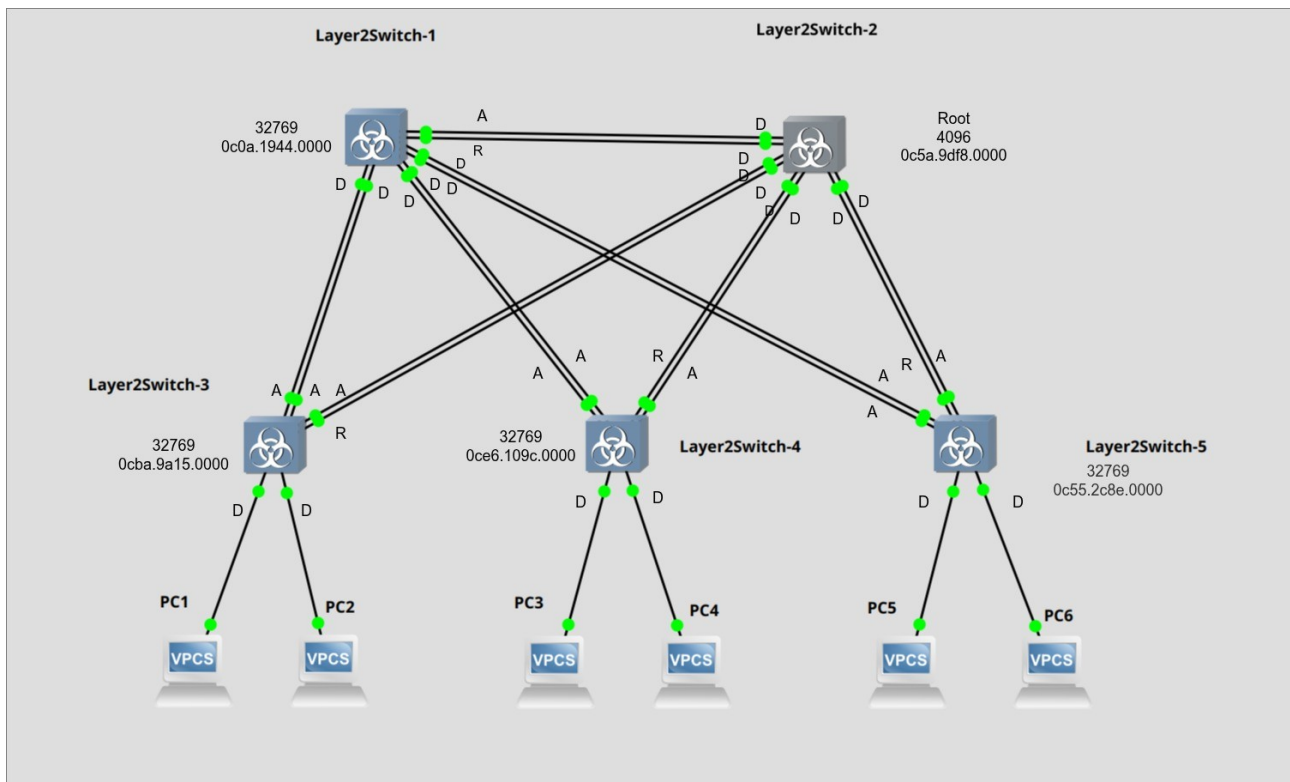
84 bytes from 192.168.3.2 icmp_seq=1 ttl=64 time=14.945 ms
84 bytes from 192.168.3.2 icmp_seq=2 ttl=64 time=7.763 ms
84 bytes from 192.168.3.2 icmp_seq=3 ttl=64 time=1.571 ms
^C
PC6> ping 192.168.3.3

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 VID 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

No.	Time	Source	Destination	Protocol	Length	Info
40	47.992656	0c:0a:19:44:00:02	Spanning-tree-(for...) STP	60	Conf, Root = 4096/1/0c:5a:9d:f8:00:00 Cost = 4 Port = 0x8003	
41	48.101891	0c:ba:9a:15:00:00	0c:ba:9a:15:00:00	LOOP	60	Reply
42	49.992399	0c:0a:19:44:00:02	Spanning-tree-(for...) STP	60	Conf, Root = 4096/1/0c:5a:9d:f8:00:00 Cost = 4 Port = 0x8003	
43	51.992130	0c:0a:19:44:00:02	Spanning-tree-(for...) STP	60	Conf, Root = 4096/1/0c:5a:9d:f8:00:00 Cost = 4 Port = 0x8003	
44	52.184903	0c:0a:19:44:00:02	0c:0a:19:44:00:02	LOOP	60	Reply
45	53.992159	0c:0a:19:44:00:02	Spanning-tree-(for...) STP	60	Conf, Root = 4096/1/0c:5a:9d:f8:00:00 Cost = 4 Port = 0x8003	
46	55.991407	0c:0a:19:44:00:02	Spanning-tree-(for...) STP	60	Conf, Root = 4096/1/0c:5a:9d:f8:00:00 Cost = 4 Port = 0x8003	
47	57.964362	0c:ba:9a:15:00:00	CDP/VTP/DTP/PagP/UD...	62	Dynamic Trunk Protocol	
48	57.991523	0c:0a:19:44:00:02	Spanning-tree-(for...) STP	60	Conf, Root = 4096/1/0c:5a:9d:f8:00:00 Cost = 4 Port = 0x8003	
49	58.101340	0c:ba:9a:15:00:00	0c:ba:9a:15:00:00	LOOP	60	Reply
50	59.990905	0c:0a:19:44:00:02	Spanning-tree-(for...) STP	60	Conf, Root = 4096/1/0c:5a:9d:f8:00:00 Cost = 4 Port = 0x8003	
51	61.977388	0c:0a:19:44:00:02	CDP/VTP/DTP/PagP/UD...	62	Dynamic Trunk Protocol	
52	61.990493	0c:0a:19:44:00:02	Spanning-tree-(for...) STP	60	Conf, Root = 4096/1/0c:5a:9d:f8:00:00 Cost = 4 Port = 0x8003	
53	62.183413	0c:0a:19:44:00:02	0c:0a:19:44:00:02	LOOP	60	Reply
54	63.999364	0c:0a:19:44:00:02	Spanning-tree-(for...) STP	60	Conf, Root = 4096/1/0c:5a:9d:f8:00:00 Cost = 4 Port = 0x8003	

Frame 31: 60 bytes on wire (480 bits), 60 bytes captured on interface 0, 60 bytes from 0c:0a:19:44:00:02 to 0c:ba:9a:15:00:00 on interface 0

Ethernet II, Src: 0c:0a:19:44:00:02, Dst: 0c:ba:9a:15:00:00

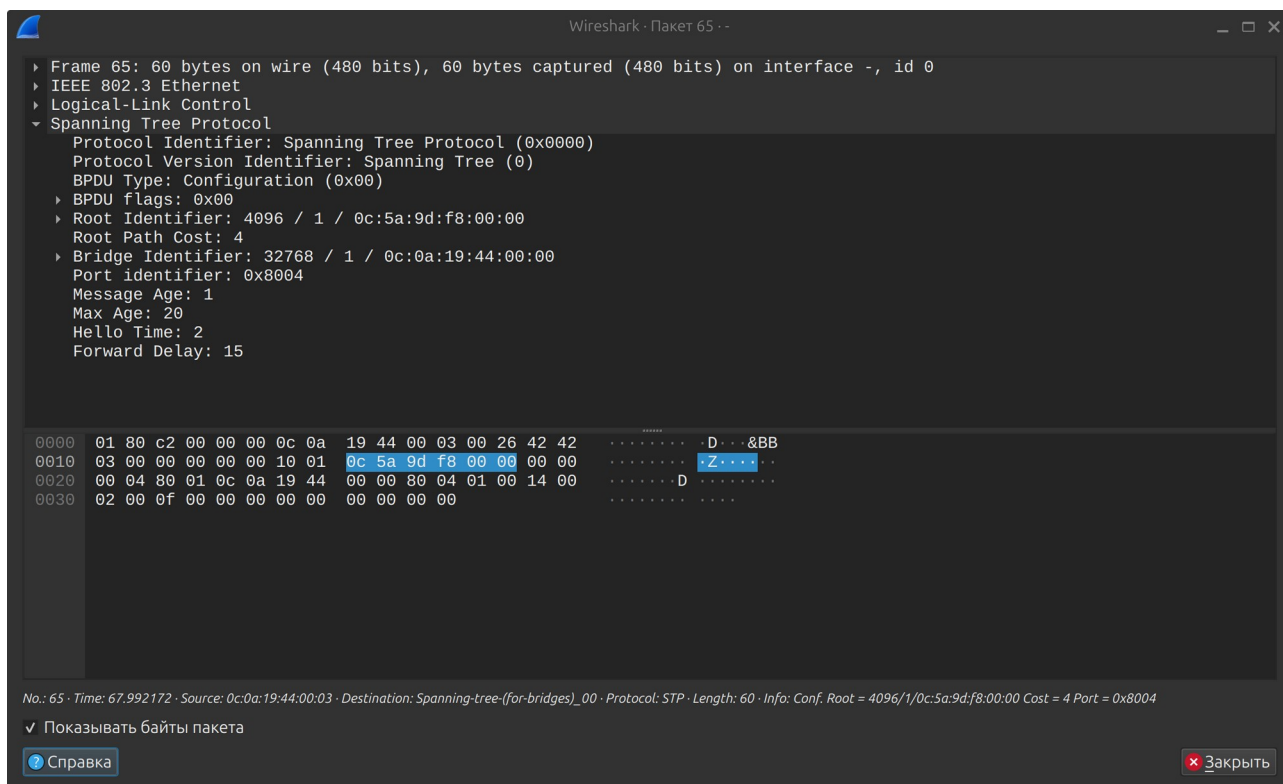
Logical-Link Control

- DSAP: Spanning Tree BPDV (0x42)
- SSAP: Spanning Tree BPDV (0x42)
- Control field: U, func=UI (0x03)

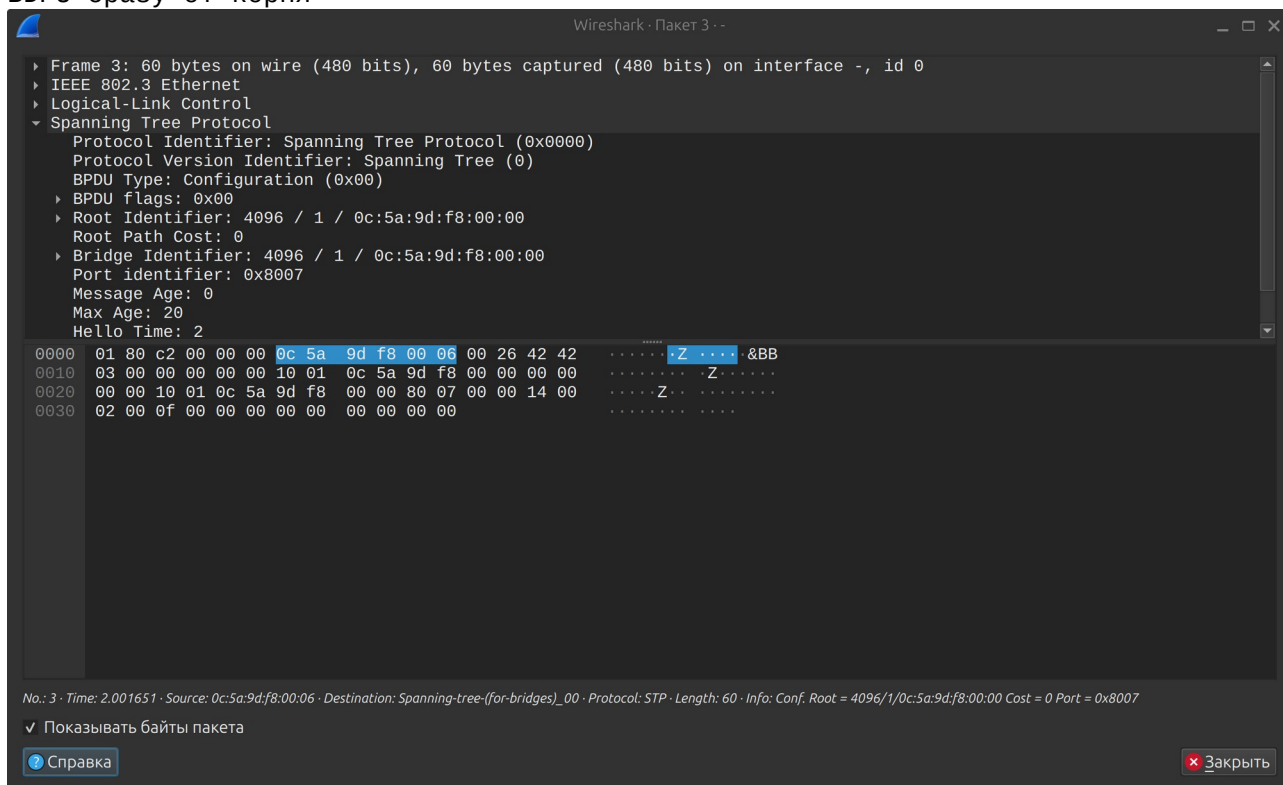
Spanning Tree Protocol

- Protocol Identifier: Spanning Tree Protocol (0x00)
- Protocol Version Identifier: Spanning Tree (0)
- BPDV Type: Configuration (0x00)
- BPDV flags: 0x00
- Root Identifier: 4096 / 1 / 0c:5a:9d:f8:00:00
- Root Path Cost: 4
- Bridge Identifier: 32768 / 1 / 0c:0a:19:44:00:02
- Port identifier: 0x8003
- Message Age: 1
- Max Age: 20
- Hello Time: 2
- Forward Delay: 15

Пакет который коммутатор switch – 1 переслал



BDPY сразу от корня



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

На switch-5 root 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
```

Layer2Switch-5

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)

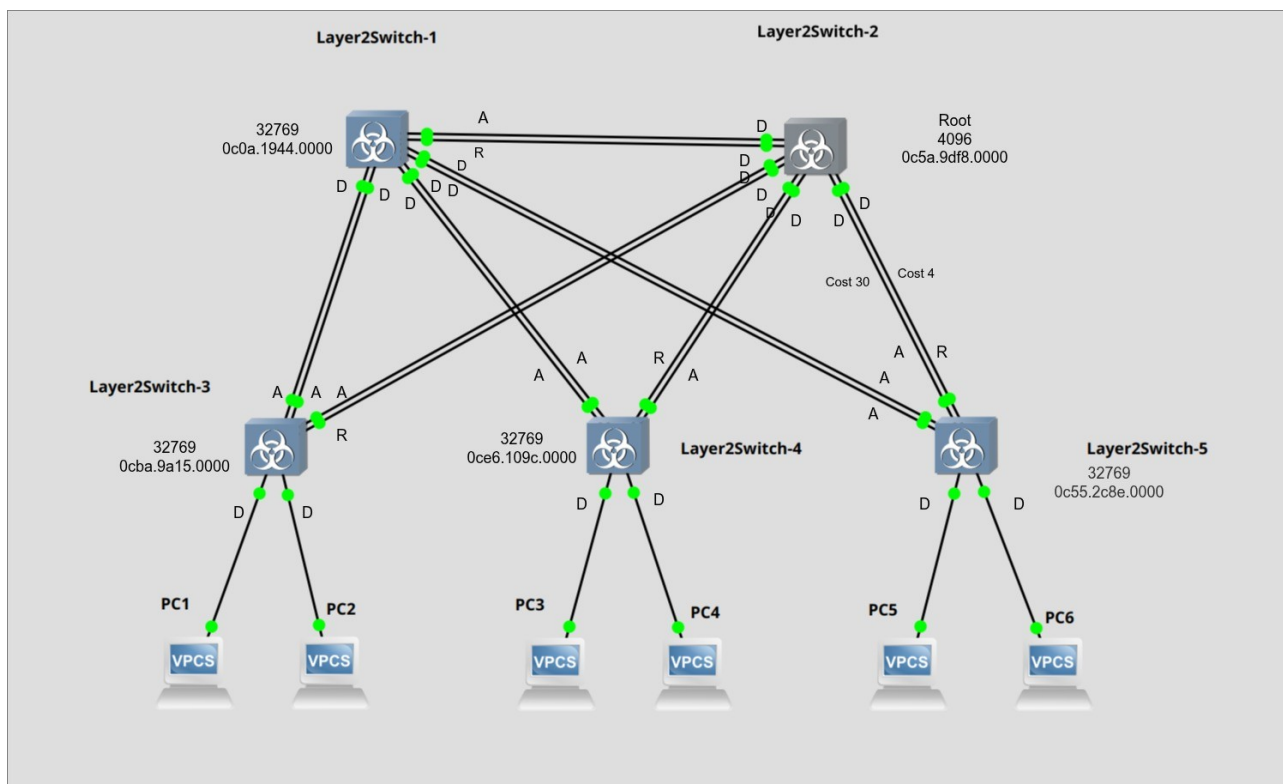
Address 0c55.2c8e.0000

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#



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