

Лабораторная работа №2

• Настройка протокола STP

◦ LW-SW-1

```
L2-SW-1(config)#spanning-tree vlan 1 root primary
```

This bridge is the root

```
Bridge ID  Priority    24577  (priority 24576 sys-id-ext 1)
Address     0c71.d551.0000
Hello Time   2 sec  Max Age 20 sec  Forward Delay 15 sec
Aging Time   300 sec
```

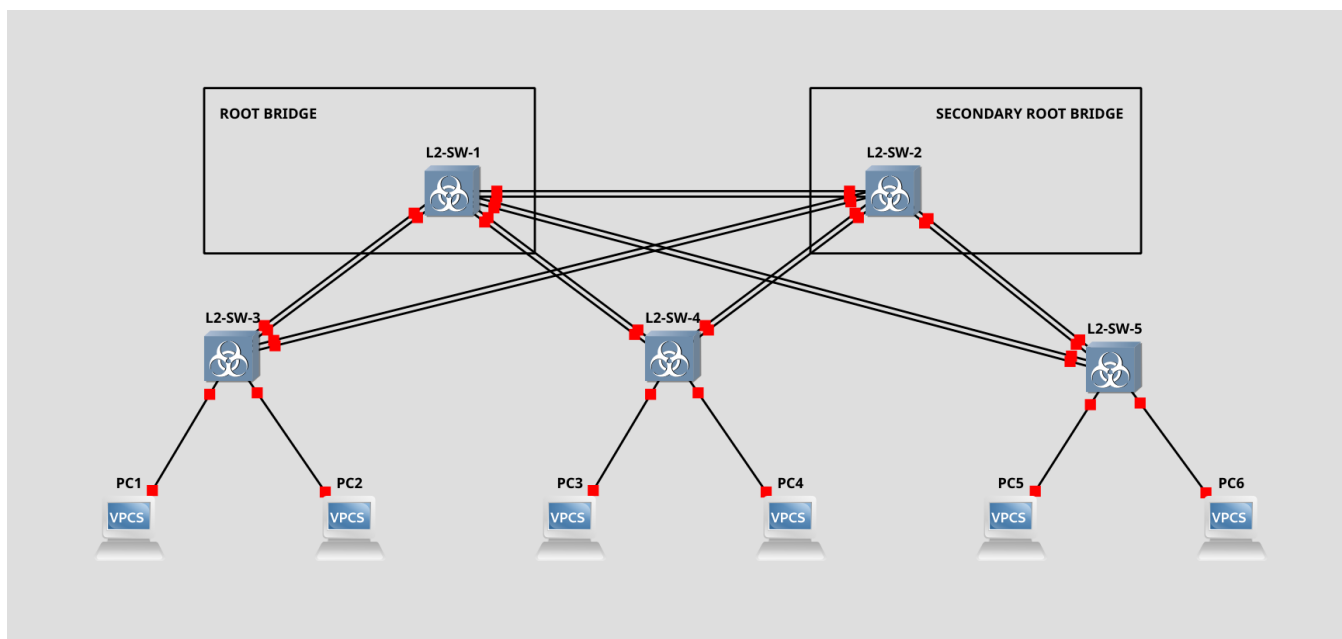
◦ LW-SW-2

```
L2-SW-2(config)#spanning-tree vlan 1 root secondary
```

```
Cost        4
Port        1 (GigabitEthernet0/0)
```

```
Bridge ID  Priority    28673  (priority 28672 sys-id-ext 1)
Address     0c7e.48ca.0000
Hello Time   2 sec  Max Age 20 sec  Forward Delay 15 sec
Aging Time   300 sec
```

◦ Схема сети



• Проверка доступности персональных компьютеров

◦ PC1

■ To PC2

```
PC1> ping 192.168.1.2
```

```
84 bytes from 192.168.1.2 icmp_seq=1 ttl=64 time=0.637 ms
84 bytes from 192.168.1.2 icmp_seq=2 ttl=64 time=0.418 ms
84 bytes from 192.168.1.2 icmp_seq=3 ttl=64 time=0.920 ms
84 bytes from 192.168.1.2 icmp_seq=4 ttl=64 time=0.580 ms
84 bytes from 192.168.1.2 icmp_seq=5 ttl=64 time=0.981 ms
```

■ To PC3

```
PC1> ping 192.168.2.1
```

```
84 bytes from 192.168.2.1 icmp_seq=1 ttl=64 time=9.333 ms
84 bytes from 192.168.2.1 icmp_seq=2 ttl=64 time=2.423 ms
84 bytes from 192.168.2.1 icmp_seq=3 ttl=64 time=11.989 ms
84 bytes from 192.168.2.1 icmp_seq=4 ttl=64 time=3.975 ms
84 bytes from 192.168.2.1 icmp_seq=5 ttl=64 time=5.666 ms
```

- To PC4

```
PC1> ping 192.168.2.2
```

```
84 bytes from 192.168.2.2 icmp_seq=1 ttl=64 time=11.144 ms
84 bytes from 192.168.2.2 icmp_seq=2 ttl=64 time=7.366 ms
84 bytes from 192.168.2.2 icmp_seq=3 ttl=64 time=6.732 ms
84 bytes from 192.168.2.2 icmp_seq=4 ttl=64 time=8.019 ms
84 bytes from 192.168.2.2 icmp_seq=5 ttl=64 time=7.309 ms
```

- To PC5

```
PC1> ping 192.168.3.1
```

```
84 bytes from 192.168.3.1 icmp_seq=1 ttl=64 time=2.549 ms
84 bytes from 192.168.3.1 icmp_seq=2 ttl=64 time=2.088 ms
84 bytes from 192.168.3.1 icmp_seq=3 ttl=64 time=7.229 ms
84 bytes from 192.168.3.1 icmp_seq=4 ttl=64 time=7.482 ms
84 bytes from 192.168.3.1 icmp_seq=5 ttl=64 time=14.778 ms
```

- To PC6

```
PC1> ping 192.168.3.2
```

```
84 bytes from 192.168.3.2 icmp_seq=1 ttl=64 time=9.611 ms
84 bytes from 192.168.3.2 icmp_seq=2 ttl=64 time=3.815 ms
84 bytes from 192.168.3.2 icmp_seq=3 ttl=64 time=4.567 ms
84 bytes from 192.168.3.2 icmp_seq=4 ttl=64 time=6.477 ms
84 bytes from 192.168.3.2 icmp_seq=5 ttl=64 time=6.627 ms
```

- PC2

- To PC3

```
PC2> ping 192.168.2.1
```

```
84 bytes from 192.168.2.1 icmp_seq=1 ttl=64 time=18.684 ms
84 bytes from 192.168.2.1 icmp_seq=2 ttl=64 time=14.516 ms
84 bytes from 192.168.2.1 icmp_seq=3 ttl=64 time=15.761 ms
84 bytes from 192.168.2.1 icmp_seq=4 ttl=64 time=15.579 ms
84 bytes from 192.168.2.1 icmp_seq=5 ttl=64 time=15.927 ms
```

- To PC4

```
PC2> ping 192.168.2.2
```

```
84 bytes from 192.168.2.2 icmp_seq=1 ttl=64 time=13.109 ms
84 bytes from 192.168.2.2 icmp_seq=2 ttl=64 time=7.428 ms
84 bytes from 192.168.2.2 icmp_seq=3 ttl=64 time=6.474 ms
84 bytes from 192.168.2.2 icmp_seq=4 ttl=64 time=5.760 ms
84 bytes from 192.168.2.2 icmp_seq=5 ttl=64 time=9.032 ms
```

- To PC5

```
PC2> ping 192.168.3.1
```

```
84 bytes from 192.168.3.1 icmp_seq=1 ttl=64 time=28.926 ms
84 bytes from 192.168.3.1 icmp_seq=2 ttl=64 time=1.431 ms
84 bytes from 192.168.3.1 icmp_seq=3 ttl=64 time=4.684 ms
84 bytes from 192.168.3.1 icmp_seq=4 ttl=64 time=1.948 ms
84 bytes from 192.168.3.1 icmp_seq=5 ttl=64 time=5.895 ms
```

- To PC6

```
PC2> ping 192.168.3.2
```

```
84 bytes from 192.168.3.2 icmp_seq=1 ttl=64 time=21.236 ms
84 bytes from 192.168.3.2 icmp_seq=2 ttl=64 time=1.329 ms
84 bytes from 192.168.3.2 icmp_seq=3 ttl=64 time=5.296 ms
84 bytes from 192.168.3.2 icmp_seq=4 ttl=64 time=1.666 ms
84 bytes from 192.168.3.2 icmp_seq=5 ttl=64 time=9.738 ms
```

- PC3

- To PC4

```
PC3> ping 192.168.2.2
```

```
84 bytes from 192.168.2.2 icmp_seq=1 ttl=64 time=0.669 ms
84 bytes from 192.168.2.2 icmp_seq=2 ttl=64 time=2.806 ms
84 bytes from 192.168.2.2 icmp_seq=3 ttl=64 time=7.177 ms
84 bytes from 192.168.2.2 icmp_seq=4 ttl=64 time=0.680 ms
84 bytes from 192.168.2.2 icmp_seq=5 ttl=64 time=6.789 ms
```

- To PC5

```
PC3> ping 192.168.3.1
```

```
84 bytes from 192.168.3.1 icmp_seq=1 ttl=64 time=13.787 ms
84 bytes from 192.168.3.1 icmp_seq=2 ttl=64 time=2.895 ms
84 bytes from 192.168.3.1 icmp_seq=3 ttl=64 time=7.819 ms
84 bytes from 192.168.3.1 icmp_seq=4 ttl=64 time=2.381 ms
84 bytes from 192.168.3.1 icmp_seq=5 ttl=64 time=7.184 ms
```

- To PC6

```
PC3> ping 192.168.3.2
```

```
84 bytes from 192.168.3.2 icmp_seq=1 ttl=64 time=10.929 ms
84 bytes from 192.168.3.2 icmp_seq=2 ttl=64 time=6.957 ms
84 bytes from 192.168.3.2 icmp_seq=3 ttl=64 time=7.512 ms
84 bytes from 192.168.3.2 icmp_seq=4 ttl=64 time=1.966 ms
84 bytes from 192.168.3.2 icmp_seq=5 ttl=64 time=12.268 ms
```

- PC4

- To PC5

```
PC4> ping 192.168.3.1
```

```
84 bytes from 192.168.3.1 icmp_seq=1 ttl=64 time=15.582 ms
84 bytes from 192.168.3.1 icmp_seq=2 ttl=64 time=7.798 ms
84 bytes from 192.168.3.1 icmp_seq=3 ttl=64 time=12.691 ms
84 bytes from 192.168.3.1 icmp_seq=4 ttl=64 time=2.948 ms
84 bytes from 192.168.3.1 icmp_seq=5 ttl=64 time=1.350 ms
```

- To PC6

```
PC4> ping 192.168.3.2
```

```
84 bytes from 192.168.3.2 icmp_seq=1 ttl=64 time=14.132 ms
84 bytes from 192.168.3.2 icmp_seq=2 ttl=64 time=3.531 ms
84 bytes from 192.168.3.2 icmp_seq=3 ttl=64 time=6.322 ms
84 bytes from 192.168.3.2 icmp_seq=4 ttl=64 time=13.398 ms
84 bytes from 192.168.3.2 icmp_seq=5 ttl=64 time=6.513 ms
```

- PC5

- To PC6

```
PC5> ping 192.168.3.2
```

```
84 bytes from 192.168.3.2 icmp_seq=1 ttl=64 time=2.193 ms
84 bytes from 192.168.3.2 icmp_seq=2 ttl=64 time=7.757 ms
84 bytes from 192.168.3.2 icmp_seq=3 ttl=64 time=4.090 ms
84 bytes from 192.168.3.2 icmp_seq=4 ttl=64 time=2.572 ms
84 bytes from 192.168.3.2 icmp_seq=5 ttl=64 time=7.265 ms
```

• Изменить стоимость маршрута для порта RP

◦ Изначальная схема с базовой конфигурацией L2-SW-4

```
L2-SW-4#show spanning-tree
```

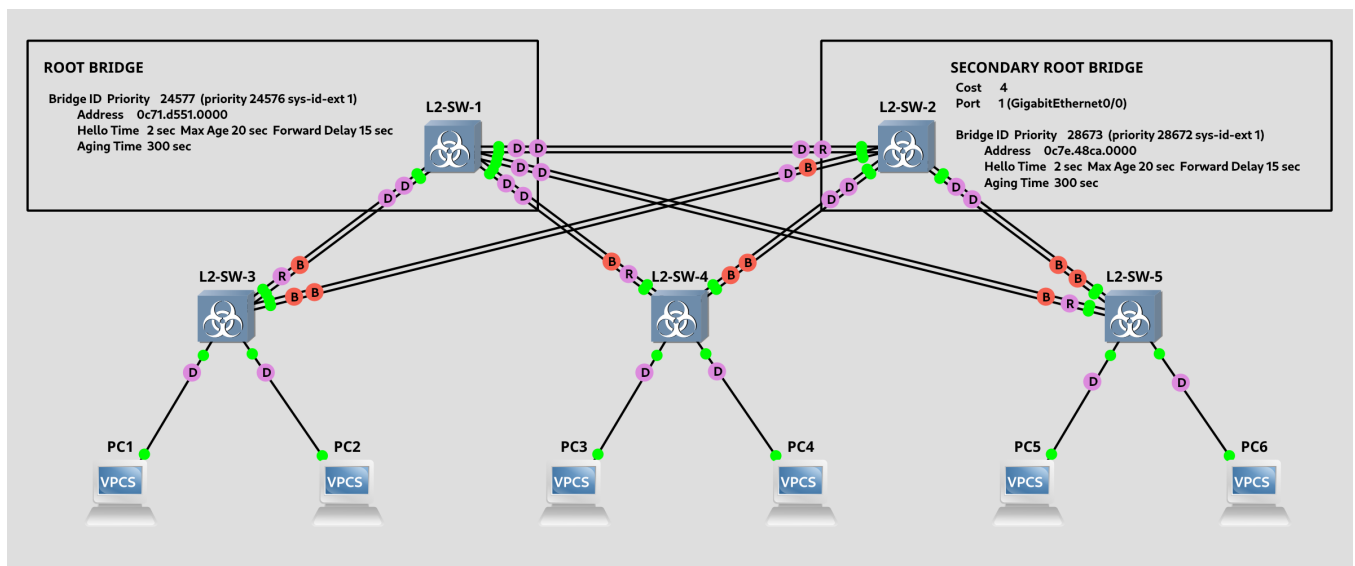
VLAN0001

Spanning tree enabled protocol ieee

```
Root ID    Priority    24577
Address    0c71.d551.0000
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    0c51.c113.0000
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	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



◦ Конфигурация L2-SW-4

```
# После изменений маршрут потока изменится с L2-SW-4 -> LW-SW-1 на L2-SW-4 -> L2-SW-2 -> LW-SW-1
L2-SW-4#conf t
L2-SW-4(config)#int Gi0/0
L2-SW-4(config-if)#span vlan 1 cost 24
L2-SW-4(config-if)#no shut
L2-SW-4(config-if)#exit
L2-SW-4(config)#int Gi0/1
L2-SW-4(config-if)#span vlan 1 cost 24
L2-SW-4(config-if)#no shut
L2-SW-4(config-if)#exit
```

◦ Вывод измененной схемы

```
L2-SW-4#show spanning-tree
```

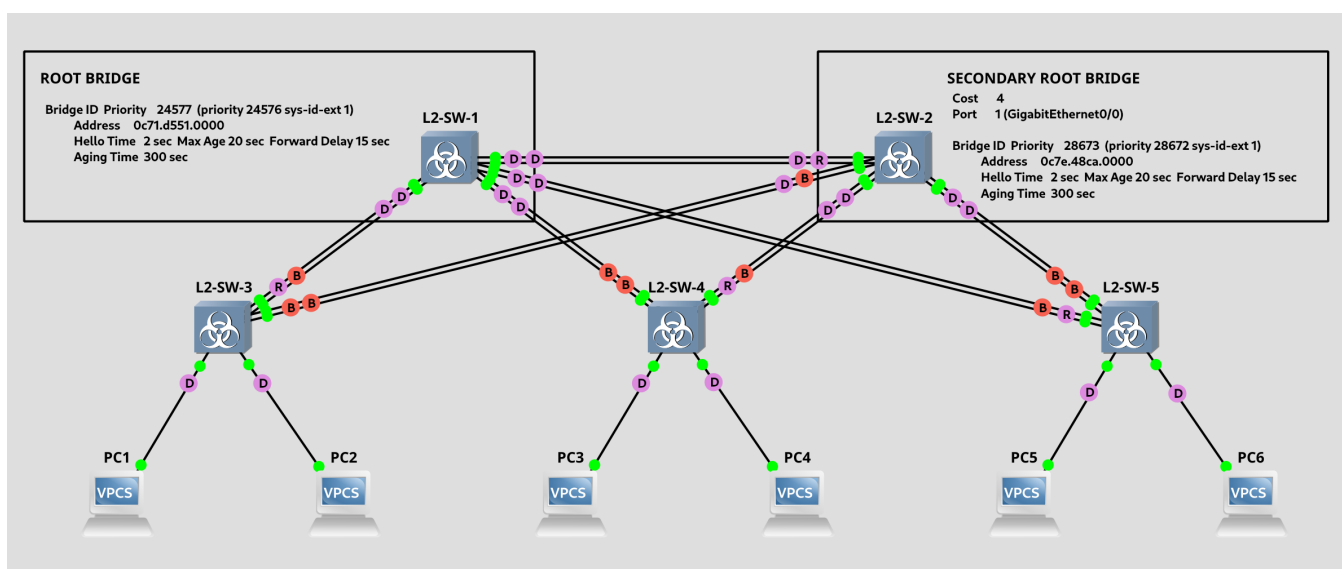
VLAN0001

Spanning tree enabled protocol ieee

Root ID Priority 24577
Address 0c71.d551.0000
Cost 8
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 0c51.c113.0000
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	24	128.1	Shr
Gi0/1	Altn	BLK	24	128.2	Shr
Gi0/2	Root	LIS	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



• Show Running Command Outputs

◦ L2-SW-1

```
Current configuration : 5209 bytes
!
! Last configuration change at 15:48:07 UTC Thu Aug 15 2024
!
version 15.0
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
service compress-config
!
hostname L2-SW-1
!
boot-start-marker
boot-end-marker
!
!
!
no aaa new-model
!
!
!
vtp domain CISCO-vIOS
vtp mode transparent
!
!
```

```

!
ip cef
no ipv6 cef
!
!
!
spanning-tree mode pvst
spanning-tree extend system-id
spanning-tree vlan 1 priority 24576
!
vlan internal allocation policy ascending
!
vlan 100
    name VLAN100
!
vlan 200,300
!
!
!
interface GigabitEthernet0/0
    media-type rj45
    negotiation auto
!
interface GigabitEthernet0/1
    media-type rj45
    negotiation auto
!
interface GigabitEthernet0/2
    media-type rj45
    negotiation auto
!
interface GigabitEthernet0/3
    media-type rj45
    negotiation auto
!
interface GigabitEthernet1/0
    media-type rj45
    negotiation auto
!
interface GigabitEthernet1/1
    media-type rj45
    negotiation auto
!
interface GigabitEthernet1/2
    media-type rj45
    negotiation auto
!
interface GigabitEthernet1/3
    media-type rj45
    negotiation auto
!
ip forward-protocol nd
!
no ip http server
no ip http secure-server
!
!
!
line con 0
line aux 0
line vty 0 4
line vty 5 15
!
!
end

```

◦ L2-SW-2

```

Current configuration : 5209 bytes
!
! Last configuration change at 15:48:54 UTC Thu Aug 15 2024
!
version 15.0
service timestamps debug datetime msec
service timestamps log datetime msec

```

```
no service password-encryption
service compress-config
!
hostname L2-SW-2
!
boot-start-marker
boot-end-marker
!
!
!
no aaa new-model
!
!
!
vtp domain CISCO-vIOS
vtp mode transparent
!
!
!
ip cef
no ipv6 cef
!
!
!
spanning-tree mode pvst
spanning-tree extend system-id
spanning-tree vlan 1 priority 28672
!
vlan internal allocation policy ascending
!
vlan 100
    name VLAN100
!
vlan 200,300
!
!
!
interface GigabitEthernet0/0
    media-type rj45
    negotiation auto
!
interface GigabitEthernet0/1
    media-type rj45
    negotiation auto
!
interface GigabitEthernet0/2
    media-type rj45
    negotiation auto
!
interface GigabitEthernet0/3
    media-type rj45
    negotiation auto
!
interface GigabitEthernet1/0
    media-type rj45
    negotiation auto
!
interface GigabitEthernet1/1
    media-type rj45
    negotiation auto
!
interface GigabitEthernet1/2
    media-type rj45
    negotiation auto
!
interface GigabitEthernet1/3
    media-type rj45
    negotiation auto
!
ip forward-protocol nd
!
no ip http server
no ip http secure-server
!
!
!
line con 0
```

```
line aux 0
line vty 0 4
line vty 5 15
!
!
end
```