

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

>show spa на всех коммутаторах

```

Layer2Switch-1 - Putty
G11/3 Desg FWD 4 128.8 Shr
G12/0 Desg FWD 4 128.9 Shr

vIOS-L2-01>show spa
VLAN0001
Spanning tree enabled protocol ieee
Root ID Priority 32769
Address 0c01.6a73.0000
Cost 4
Port 5 (GigabitEthernet1/0)
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
Bridge ID Priority 32769 (priority 32768 sys-id-ext 1)
Address 0c1a.3c4f.0000
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
Aging Time 300 sec

Interface Role Sts Cost Prio.Nbr Type
-----
G10/0 Desg FWD 4 128.1 Shr
G10/1 Altn BLK 4 128.2 Shr
G10/2 Desg FWD 4 128.3 Shr
G10/3 Desg FWD 4 128.4 Shr
G11/0 Root FWD 4 128.5 Shr
G11/1 Altn BLK 4 128.6 Shr
G11/2 Desg FWD 4 128.7 Shr
G11/3 Desg FWD 4 128.8 Shr
G12/0 Desg FWD 4 128.9 Shr

Layer2Switch-2 - Putty
G12/0 Desg FWD 4 128.9 Shr

vIOS-L2-01>show spa
VLAN0001
Spanning tree enabled protocol ieee
Root ID Priority 32769
Address 0c01.6a73.0000
Cost 4
Port 5 (GigabitEthernet1/0)
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
Bridge ID Priority 32769 (priority 32768 sys-id-ext 1)
Address 0c15.5427.0000
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
Aging Time 300 sec

Interface Role Sts Cost Prio.Nbr Type
-----
G10/0 Desg FWD 4 128.1 Shr
G10/1 Desg FWD 4 128.2 Shr
G10/2 Desg FWD 4 128.3 Shr
G10/3 Desg FWD 4 128.4 Shr
G11/0 Root FWD 4 128.5 Shr
G11/1 Altn BLK 4 128.6 Shr
G11/2 Desg FWD 4 128.7 Shr
G11/3 Desg FWD 4 128.8 Shr
G12/0 Desg FWD 4 128.9 Shr

Layer2Switch-3 - Putty
G11/0 Desg FWD 4 128.5 Shr
G11/1 Desg FWD 4 128.6 Shr

vIOS-L2-01>show spa
VLAN0100
Spanning tree enabled protocol ieee
Root ID Priority 32769
Address 0c01.6a73.0000
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 0c18.3075.0000
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
Aging Time 300 sec

Interface Role Sts Cost Prio.Nbr Type
-----
G10/0 Altn BLK 4 128.1 Shr
G10/1 Altn BLK 4 128.2 Shr
G10/2 Root FWD 4 128.3 Shr
G10/3 Altn BLK 4 128.4 Shr
G11/0 Desg FWD 4 128.5 Shr
G11/1 Desg FWD 4 128.6 Shr

Layer2Switch-4 - Putty
G10/0 Desg FWD 4 128.3 Shr
G11/0 Desg FWD 4 128.5 Shr
G11/1 Desg FWD 4 128.6 Shr

vIOS-L2-01>show spa
VLAN0001
Spanning tree enabled protocol ieee
Root ID Priority 32769
Address 0c01.6a73.0000
Cost 4
Port 5 (GigabitEthernet1/0)
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
Bridge ID Priority 32769 (priority 32768 sys-id-ext 1)
Address 0c01.6a73.0000
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
Aging Time 300 sec

Interface Role Sts Cost Prio.Nbr Type
-----
G10/0 Desg FWD 4 128.1 Shr
G10/1 Altn BLK 4 128.2 Shr
G10/2 Desg FWD 4 128.3 Shr
G10/3 Desg FWD 4 128.4 Shr
G11/0 Root FWD 4 128.5 Shr
G11/1 Desg FWD 4 128.6 Shr

Layer2Switch-5 - Putty
G10/3 Altn BLK 4 128.4 Shr
G11/0 Desg FWD 4 128.5 Shr
G11/1 Desg FWD 4 128.6 Shr

vIOS-L2-01>show spa
VLAN0001
Spanning tree enabled protocol ieee
Root ID Priority 32769
Address 0c01.6a73.0000
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 0c3.d902.0000
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
Aging Time 300 sec

Interface Role Sts Cost Prio.Nbr Type
-----
G10/0 Altn BLK 4 128.1 Shr
G10/1 Altn BLK 4 128.2 Shr
G10/2 Root FWD 4 128.3 Shr
G10/3 Altn BLK 4 128.4 Shr
G11/0 Desg FWD 4 128.5 Shr
G11/1 Desg FWD 4 128.6 Shr

```

На первом коммутаторе:

>enable

#conf t

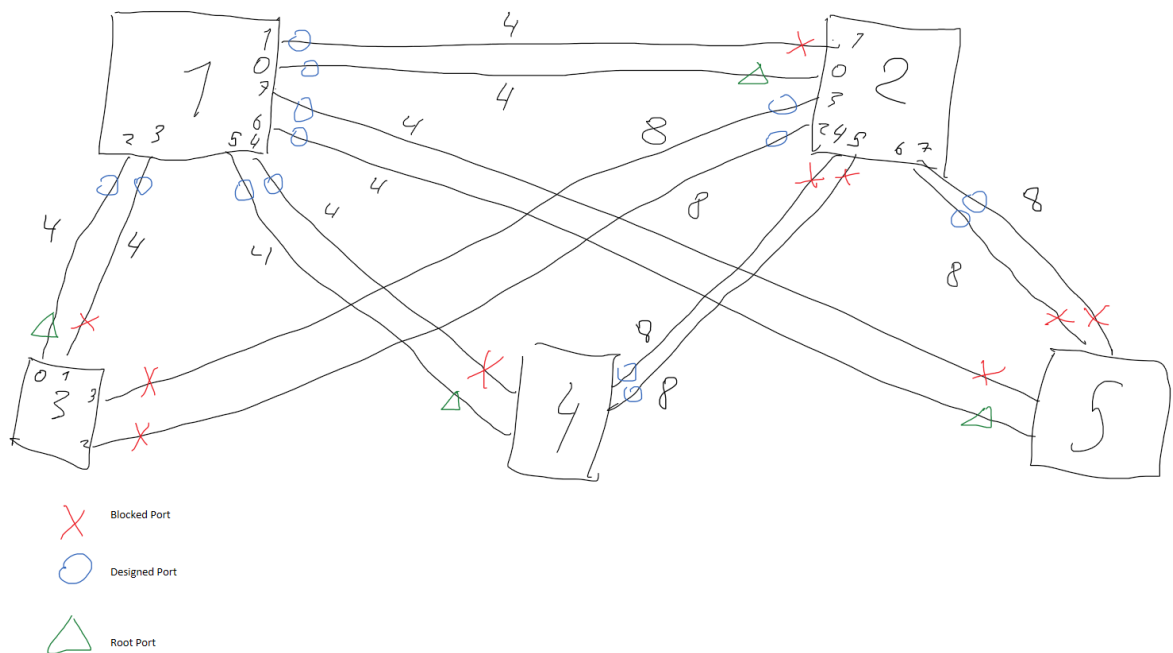
```
# write
```

The image displays six terminal windows arranged in a 2x3 grid, showing network connectivity tests. Each window is titled 'PCx - PuTTY' where x is 2, 3, or 4. The tests are performed from a Kali Linux host to a Windows 10 VM.

- PC2 - PuTTY:** Shows a series of ping commands to IP addresses 192.0.0.1 through 192.0.6. The first command is 'PC2> ping 192.0.0.1'. Subsequent commands are '84 bytes from 192.0.0.1 icmp_seq=1 ttl=64 time=11.311 ms', '84 bytes from 192.0.0.2 icmp_seq=1 ttl=64 time=9.534 ms', '84 bytes from 192.0.0.3 icmp_seq=1 ttl=64 time=10.686 ms', '84 bytes from 192.0.0.4 icmp_seq=1 ttl=64 time=10.686 ms', '84 bytes from 192.0.0.5 icmp_seq=1 ttl=64 time=10.686 ms', and '84 bytes from 192.0.0.6 icmp_seq=1 ttl=64 time=10.686 ms'. The final command is 'PC2> !'.
- PC3 - PuTTY:** Shows a series of ping commands to IP addresses 192.0.0.1 through 192.0.6. The first command is 'PC3> ping 192.0.0.1'. Subsequent commands are '84 bytes from 192.0.0.1 icmp_seq=1 ttl=64 time=9.442 ms', '84 bytes from 192.0.0.2 icmp_seq=1 ttl=64 time=9.553 ms', '84 bytes from 192.0.0.3 icmp_seq=1 ttl=64 time=9.700 ms', '84 bytes from 192.0.0.4 icmp_seq=1 ttl=64 time=12.152 ms', '84 bytes from 192.0.0.5 icmp_seq=1 ttl=64 time=10.956 ms', and '84 bytes from 192.0.0.6 icmp_seq=1 ttl=64 time=10.956 ms'. The final command is 'PC3> !'.
- PC4 - PuTTY:** Shows a series of ping commands to IP addresses 192.0.0.1 through 192.0.6. The first command is 'PC4> ping 192.0.0.1'. Subsequent commands are '84 bytes from 192.0.0.1 icmp_seq=1 ttl=64 time=4.908 ms', '84 bytes from 192.0.0.2 icmp_seq=1 ttl=64 time=7.195 ms', '84 bytes from 192.0.0.3 icmp_seq=1 ttl=64 time=1.800 ms', '84 bytes from 192.0.0.4 icmp_seq=1 ttl=64 time=13.941 ms', '84 bytes from 192.0.0.5 icmp_seq=1 ttl=64 time=7.442 ms', and '84 bytes from 192.0.0.6 icmp_seq=1 ttl=64 time=7.442 ms'. The final command is 'PC4> !'.

The background of the collage is a blurred image of a person's face.

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

1-2

797 183.368039	0c:1a:3c:6f:00:01	Nearest-Customer-Bridge STP	60 Conf. Root = 0/1/0c:1a:3c:6f:00:00 Cost = 0 Port = 0x8002
798 184.146991	0c:15:54:27:00:01	Nearest-Customer-Bridge STP	60 Conf. Root = 32768/100/0c:15:54:27:00:00 Cost = 0 Port = 0x8002
799 184.150968	0c:15:54:27:00:01	Nearest-Customer-Bridge STP	60 Conf. Root = 32768/200/0c:15:54:27:00:00 Cost = 0 Port = 0x8002
800 184.159965	0c:15:54:27:00:01	Nearest-Customer-Bridge STP	60 Conf. Root = 32768/300/0c:15:54:27:00:00 Cost = 0 Port = 0x8002

1-3

323 74.062058	0c:1a:3c:6f:00:02	Nearest-Customer-Bridge STP	60 Conf. Root = 0/1/0c:1a:3c:6f:00:00 Cost = 0 Port = 0x8003
324 74.102883	0c:1a:3c:6f:00:02	Nearest-Customer-Bridge STP	60 Conf. Root = 32768/100/0c:1a:3c:6f:00:00 Cost = 0 Port = 0x8003
325 74.111853	0c:1a:3c:6f:00:02	Nearest-Customer-Bridge STP	60 Conf. Root = 32768/200/0c:1a:3c:6f:00:00 Cost = 0 Port = 0x8003
326 74.115881	0c:1a:3c:6f:00:02	Nearest-Customer-Bridge STP	60 Conf. Root = 32768/300/0c:1a:3c:6f:00:00 Cost = 0 Port = 0x8003
328 74.604058	0c:18:30:79:00:00	Nearest-Customer-Bridge STP	60 Conf. Root = 32768/100/0c:18:30:79:00:00 Cost = 0 Port = 0x8001
329 74.606135	0c:18:30:79:00:00	Nearest-Customer-Bridge STP	60 Conf. Root = 32768/200/0c:18:30:79:00:00 Cost = 0 Port = 0x8001
330 74.608043	0c:18:30:79:00:00	Nearest-Customer-Bridge STP	60 Conf. Root = 32768/300/0c:18:30:79:00:00 Cost = 0 Port = 0x8001
331 75.065036	0c:1a:3c:6f:00:02	Nearest-Customer-Bridge STP	60 Conf. Root = 0/1/0c:1a:3c:6f:00:00 Cost = 0 Port = 0x8003

1-4

119 27.145266	0c:1a:3c:6f:00:04	Nearest-Customer-Bridge STP	60 Conf. Root = 0/1/0c:1a:3c:6f:00:00 Cost = 0 Port = 0x8005
121 28.000942	0c:01:6a:73:00:00	Nearest-Customer-Bridge STP	60 Conf. Root = 32768/100/0c:01:6a:73:00:00 Cost = 0 Port = 0x8001
122 28.003672	0c:01:6a:73:00:00	Nearest-Customer-Bridge STP	60 Conf. Root = 32768/200/0c:01:6a:73:00:00 Cost = 0 Port = 0x8001
123 28.007923	0c:01:6a:73:00:00	Nearest-Customer-Bridge STP	60 Conf. Root = 32768/300/0c:01:6a:73:00:00 Cost = 0 Port = 0x8001
124 28.145432	0c:1a:3c:6f:00:04	Nearest-Customer-Bridge STP	60 Conf. Root = 0/1/0c:1a:3c:6f:00:00 Cost = 0 Port = 0x8005
125 28.247331	0c:1a:3c:6f:00:04	Nearest-Customer-Bridge STP	60 Conf. Root = 32768/100/0c:1a:3c:6f:00:00 Cost = 0 Port = 0x8005
126 28.256618	0c:1a:3c:6f:00:04	Nearest-Customer-Bridge STP	60 Conf. Root = 32768/200/0c:1a:3c:6f:00:00 Cost = 0 Port = 0x8005
127 28.261309	0c:1a:3c:6f:00:04	Nearest-Customer-Bridge STP	60 Conf. Root = 32768/300/0c:1a:3c:6f:00:00 Cost = 0 Port = 0x8005

1-5

65 15.012064	0c:1a:3c:6f:00:07	Nearest-Customer-Bridge STP	60 Conf. Root = 0/1/0c:1a:3c:6f:00:00 Cost = 0 Port = 0x8008
66 15.110060	0c:1a:3c:6f:00:07	Nearest-Customer-Bridge STP	60 Conf. Root = 32768/100/0c:1a:3c:6f:00:00 Cost = 0 Port = 0x8008
67 15.118029	0c:1a:3c:6f:00:07	Nearest-Customer-Bridge STP	60 Conf. Root = 32768/200/0c:1a:3c:6f:00:00 Cost = 0 Port = 0x8008
68 15.123051	0c:1a:3c:6f:00:07	Nearest-Customer-Bridge STP	60 Conf. Root = 32768/300/0c:1a:3c:6f:00:00 Cost = 0 Port = 0x8008
69 16.012924	0c:1a:3c:6f:00:07	Nearest-Customer-Bridge STP	60 Conf. Root = 0/1/0c:1a:3c:6f:00:00 Cost = 0 Port = 0x8008
70 16.605597	0c:e3:d9:02:00:01	Nearest-Customer-Bridge STP	60 Conf. Root = 32768/100/0c:e3:d9:02:00:00 Cost = 0 Port = 0x8002
71 16.607095	0c:e3:d9:02:00:01	Nearest-Customer-Bridge STP	60 Conf. Root = 32768/200/0c:e3:d9:02:00:00 Cost = 0 Port = 0x8002
72 16.611170	0c:e3:d9:02:00:01	Nearest-Customer-Bridge STP	60 Conf. Root = 32768/300/0c:e3:d9:02:00:00 Cost = 0 Port = 0x8002

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

На втором коммутаторе:

```
> ena
```

```
# conf t
```

```
(config)# int gi0/0
```

```
(config-if)# spa cost 50
```

```
(config-if)# end
```

```
# write
```

