

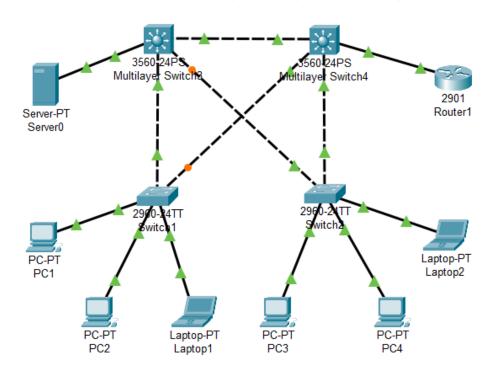
МІНІСТЕРСТВО ОСВІТИ І НАУКИ, МОЛОДІ ТА СПОРТУ УКРАЇНИ НАЦІОНАЛЬНИЙ ТЕХНІЧНИЙ УНІВЕРСИТЕТ УКРАЇНИ «КИЇВСЬКИЙ ПОЛІТЕХНІЧНИЙ ІНСТИТУТ ІМЕНІ ІГОРЯ СІКОРСЬКОГО» ФІЗИКО-ТЕХНІЧНИЙ ІНСТИТУТ Кафедра Інформаційної Безпеки

<u>Практикум з Основ комп'ютерних мереж</u> Налаштування протоколу STP та резервування маршрутизатора

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Відкриємо "проект" мережі - результат виконання 1-ї роботи:

1.18	192.168.18.0/25	192.168.18.176/28
****	172.100.10.0/20	172.100.10.170.20



Варіант 18

subnet 1: 192.168.18.0/25 gateway: 192.168.18.1 broadcast: 192.168.127

subnet 2: 192.168.18.176/28 gateway:192.168.18.177 broadcast: 192.168.18.191

PC1 - 192.168.18.5 PC2 - 192.168.18.6

PC3 - 192.168.18.7 PC4 - 192.168.18.8

Laptop1 - 192.168.18.180 (DHCP) Laptop2 - 192.168.18.181 (DHCP) Server0 - 192.168.18.190

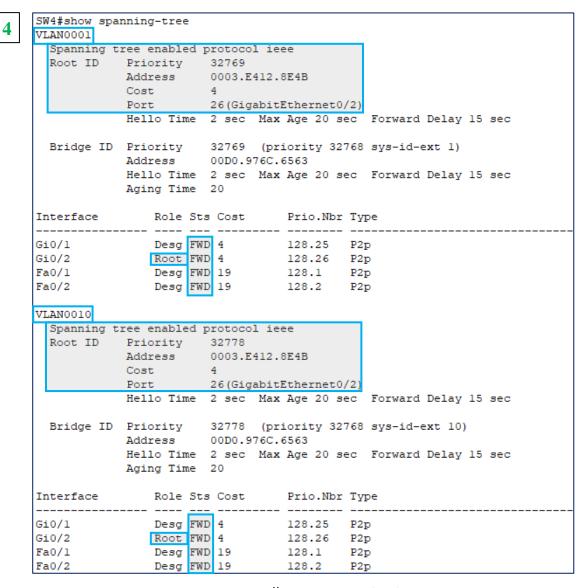
Ознайомимось з відомостями про принципи роботи протоколу STP. Командою show spanning-tree на кожному комутаторі подивимось стан дерева STP.

SW1#show spanning-tree VLAN0001 Spanning tree enabled protocol ieee Priority 32769 Root ID Address 0003.E412.8E4B 12 Cost 25(GigabitEthernet0/1) Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec Bridge ID Priority 32769 (priority 32768 sys-id-ext 1) 0004.9A58.DBED Address Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec Aging Time 20 Role Sts Cost Prio.Nbr Type Interface Fa0/3 Desg FWD 19 128.3 P2p Altn BLK 19 Gi0/2 128.26 P2p Gi0/1 Root FWD 4 128.25 P2p VLAN0010 Spanning tree enabled protocol ieee Root ID Priority 32778 0003.E412.8E4B Address Cost 12 25(GigabitEthernet0/1) Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec 32778 (priority 32768 sys-id-ext 10) Bridge ID Priority 0004.9A58.DBED Address Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec Aging Time 20 Role Sts Cost Prio.Nbr Type Interface Desg FWD 19 128.2 P2p Fa0/2 Fa0/1 Desg FWD 19 128.1 P2p Altn BLK 19 128.26 P2p Gi0/2

3

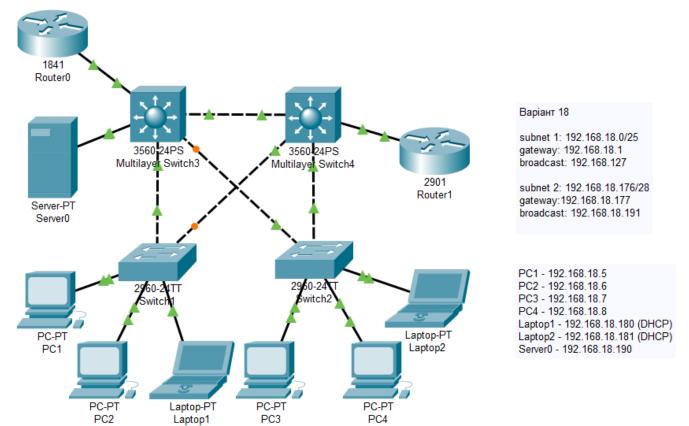
```
SW2#show spanning-tree
VLAN0001
  Spanning tree enabled protocol ieee
  Root ID
            Priority 32769
                         0003.E412.8E4B
            This bridge is the root
             Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
  Bridge ID Priority 32769 (priority 32768 sys-id-ext 1)
            Address 0003.E412.8E4B
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
Aging Time 20
               Role Sts Cost
Interface
                                  Prio.Nbr Type
Fa0/3 Desg FWD 19 128.3 P2p
Gi0/2 Desg FWD 19 128.26 P2p
Gi0/1
                Desg FWD 4
                                  128.25 P2p
VLAN0010
  Spanning tree enabled protocol ieee
           Priority 32778

Address 0003.E412.8E4B
 Root ID
            This bridge is the root
             Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
 Bridge ID Priority 32778 (priority 32768 sys-id-ext 10)
Address 0003.E412.8E4B
            Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
            Aging Time 20
Interface
               Role Sts Cost
                                 Prio.Nbr Type
 Desg FWD 19 128.1 P2p
Desg FWD 19 128.2 P2p
Fa0/1
Fa0/2
               Desg FWD 19
                                128.26 P2p
128.25 P2p
Gi0/2
               Desg FWD 4
Gi0/1
SW3#show spanning-tree
VLAN0001
 Spanning tree enabled protocol ieee
  Root ID
           Priority 32769
            Address
                       0003.E412.8E4B
            Cost 8
Port 25(GigabitEthernet0/1)
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
 Bridge ID Priority 32769 (priority 32768 sys-id-ext 1)
                       0009.7C24.D7DD
            Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
            Aging Time 20
Interface
               Role Sts Cost
                                  Prio.Nbr Type
 Desg FWD 19 128.2 P2p
Altn BLK 19 128.1 P2p
Fa0/2
Fa0/1
               Root FWD 4
                                  128.25 P2p
Gi0/1
                Desg FWD 4
Gi0/2
                                  128.26 P2p
VLAN0010
  Spanning tree enabled protocol ieee
           Priority 32778
Address 0003.E412.8E4B
 Root ID
            Address
                       8
                    25(GigabitEthernet0/1)
            Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
  Bridge ID Priority 32778 (priority Address 0009.7C24.D7DD
                        32778 (priority 32768 sys-id-ext 10)
            Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
            Aging Time 20
                                Prio.Nbr Type
Interface
              Role Sts Cost
Fa0/1 Altn BLK 19 128.1 P2p
Gi0/1 Root FWD 4 128.25 P2p
Gi0/2 Desg FWD 4 128.26 P2p
```



Кореневий комутатор: SW2;

Кореневі порти: GigabitEthernet0/1 (комутатор SW1), GigabitEthernet0/1 (комутатор SW3), GigabitEthernet0/2 (комутатор SW4);



Перевірка статусу HSRP маршрутизаторів.

R0#show standby

FastEthernet0/0.1 - Group 110

State is **Active**

5 state changes, last state change 00:05:28

Virtual IP address is 192.168.18.1

Active virtual MAC address is 0000.0C07.AC6E

Local virtual MAC address is 0000.0C07.AC6E (v1 default)

Hello time 3 sec, hold time 10 sec

Next hello sent in 1.759 secs

Preemption enabled

Active router is local

Standby router is 192.168.18.3

Priority 150 (configured 150)

Group name is hsrp-Fa-110 (default)

FastEthernet0/0.2 - Group 101

State is **Standby**

6 state changes, last state change 00:05:39

Virtual IP address is 192.168.18.177

Active virtual MAC address is 0000.0C07.AC65

Local virtual MAC address is 0000.0C07.AC65 (v1 default)

Hello time 3 sec. hold time 10 sec

Next hello sent in 0.132 secs

Preemption enabled

Active router is 192.168.18.179

Standby router is local

Priority 100 (default 100)

Group name is hsrp-Fa-101 (default)

R1#show standby

GigabitEthernet0/0.1 - Group 110

State is **Standby**

14 state changes, last state change 00:20:48

Virtual IP address is 192.168.18.1

Active virtual MAC address is 0000.0C07.AC6E

Local virtual MAC address is 0000.0C07.AC6E (v1 default)

Hello time 3 sec, hold time 10 sec

Next hello sent in 0.941 secs

Preemption enabled

Active router is 192.168.18.2

Standby router is local

Priority 100 (default 100)

Group name is hsrp-Gig-110 (default)

GigabitEthernet0/0.2 - Group 110

State is **Active**

5 state changes, last state change 00:00:17

Virtual IP address is 192.168.18.177

Active virtual MAC address is 0000.0C07.AC6E

Local virtual MAC address is 0000.0C07.AC6E (v1 default)

Hello time 3 sec, hold time 10 sec

Next hello sent in 1.487 secs

Preemption enabled

Active router is local

Standby router is 192.168.18.178

Priority 150 (configured 150)

Group name is hsrp-Gig-110 (default)

За аналогією з п.2 перевірте, які порти на яких комутаторах є кореневими, а які заблоковані.

```
SWl#show spanning-tree
VLAN0001
 Spanning tree enabled protocol ieee
  Root ID
           Priority 20481
            Address
                      0002.4AD6.9318
                      8
            Cost
            Cost 8
Port 25(GigabitEthernet0/1)
            Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
 Bridge ID Priority 32769 (priority 32768 sys-id-ext 1)
                     00D0.BC49.535D
            Address
            Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
           Aging Time 20
Interface
              Role Sts Cost
                                Prio.Nbr Type
___________
Gi0/2 Altn BLK 19 128.26 P2p
Gi0/1 Root FWD 4 128.25 P2p
Fa0/3 Desg FWD 19 128.3 P2p
VLAN0010
 Spanning tree enabled protocol ieee
 Root ID Priority 24586
           Address 000A.F3EB.03A5
            Cost 4
Port 25 (GigabitEthernet0/1)
            Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
 Bridge ID Priority 32778 (priority 32768 sys-id-ext 10)
Address 00D0.BC49.535D
            Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
            Aging Time 20
Interface
               Role Sts Cost
                                 Prio.Nbr Type
______ ____
               Altn BLK 19 128.26
Gi0/2
                                         P2p
                                 128.25 P2p
Gi0/1
               Root FWD 4
                             128.1 P2p
128.2 P2p
              Desg FWD 19
Fa0/1
              Desg FWD 19
Fa0/2
SW2#show spanning-tree
VLAN0001
 Spanning tree enabled protocol ieee
  Root ID
           Priority 20481
           Address
                      0002.4AD6.9318
            Cost 4
Port 25(GigabitEthernet0/1)
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
 Bridge ID Priority 32769 (priority 32768 sys-id-ext 1)
                      000A.F376.308D
            Address
            Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
            Aging Time 20
            Role Sts Cost Prio.Nbr Type
Interface
Desg FWD 19 128.3 P2p
Root FWD 4 128.25 P2p
Gi0/1
Gi0/2
               Altn BLK 19
                                128.26 P2p
VLAN0010
 Spanning tree enabled protocol ieee
          Priority 24586
Address 000A.F3EB.03A5
Cost 8
 Root ID
            Cost 8
Port 25(GigabitEthernet0/1)
            Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
  Bridge ID Priority 32778 (priority 32768 sys-id-ext 10)
            Address 000A.F376.308D
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
            Aging Time 20
                                Prio.Nbr Type
Interface
              Role Sts Cost
          Desg FWD 19 128.2 P2p
Desg FWD 19 128.1 P2p
Fa0/2
Fa0/1
           Root FWD 4 128.25 P2p
Altn BLK 19 128.26 P2p
Gi0/1
Gi0/2
```

```
SW3#show spanning-tree
VLAN0001
 Spanning tree enabled protocol ieee
 Root ID
           Priority 20481
            Address
                       0002.4AD6.9318
                   4
25(GigabitEthernet0/1)
            Cost
            Port
            Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
 Bridge ID Priority 28673 (priority 28672 sys-id-ext 1)
Address 000A.F3EB.03A5
            Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
            Aging Time 20
                                 Prio.Nbr Type
Interface
               Role Sts Cost
              Desg FWD 19 128.2 P2p
Desg FWD 19 128.3 P2p
Fa0/2
                Desg FWD 19
                                  128.3
                                           P2p
                                 128.1 P2p
               Desg FWD 19
Fa0/1
Gi0/1
               Root FWD 4
                                 128.25 P2p
               Desg FWD 4
                                 128.26 P2p
Gi0/2
VLAN0010
 Spanning tree enabled protocol ieee
 Root ID Priority 24586
Address 000A.F3EB.03A5
            This bridge is the root
            Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
Bridge ID Priority 24586 (priority 24576 sys-id-ext 10)
Address 000A.F3EB.03A5
            Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
            Aging Time 20
               Role Sts Cost
Interface
                                 Prio.Nbr Type
______ ____
      Desg FWD 19 128.2 P2p
Desg FWD 19 128.1 P2p
Desg FWD 4 128.25 P2p
Desg FWD 4 128.26 P2p
Fa0/1
Gi0/1
Gi0/2
```

SW4#show spa	nning-tree				
VLAN0001	IIIIIIg-tiee				
	ree enabled protocol is				
	Root ID Priority 20481 Address 0002.4AD6.9318 This bridge is the root				
	_	x Age 20 sec Forward Delay 15 sec			
	nerro rime i beo na	inge by bed forward beray to bed			
Bridge ID	Priority 20481 (pr	riority 20480 sys-id-ext 1)			
	Address 0002.4AD6.9318				
		x Age 20 sec Forward Delay 15 sec			
	Aging Time 20				
Interface	Role Sts Cost				
Fa0/2					
Fa0/1	Desg FWD 19 Desg FWD 19	128.1 P2p			
Gi0/2	Desg FWD 4 128.26 P2p				
	Desg FWD 4				
		-			
VLAN0010					
	ree enabled protocol i				
Root ID	Priority 24586 Address 000A.F3EB				
	Cost 4				
	Port 25(GigabitEthernet0/1)				
	Hello Time 2 sec Max	x Age 20 sec Forward Delay 15 sec			
Bridge ID		riority 28672 sys-id-ext 10)			
	Address 0002.4AD6				
		x Age 20 sec Forward Delay 15 sec			
	Aging Time 20				
Interface	Role Sts Cost	Prio.Nbr Type			
Fa0/2	Desg FWD 19	128.2 P2p			
Fa0/1	Desg FWD 19	128.1 P2p			
Gi0/2	Desg FWD 4	128.26 P2p			
	Root FWD 4				