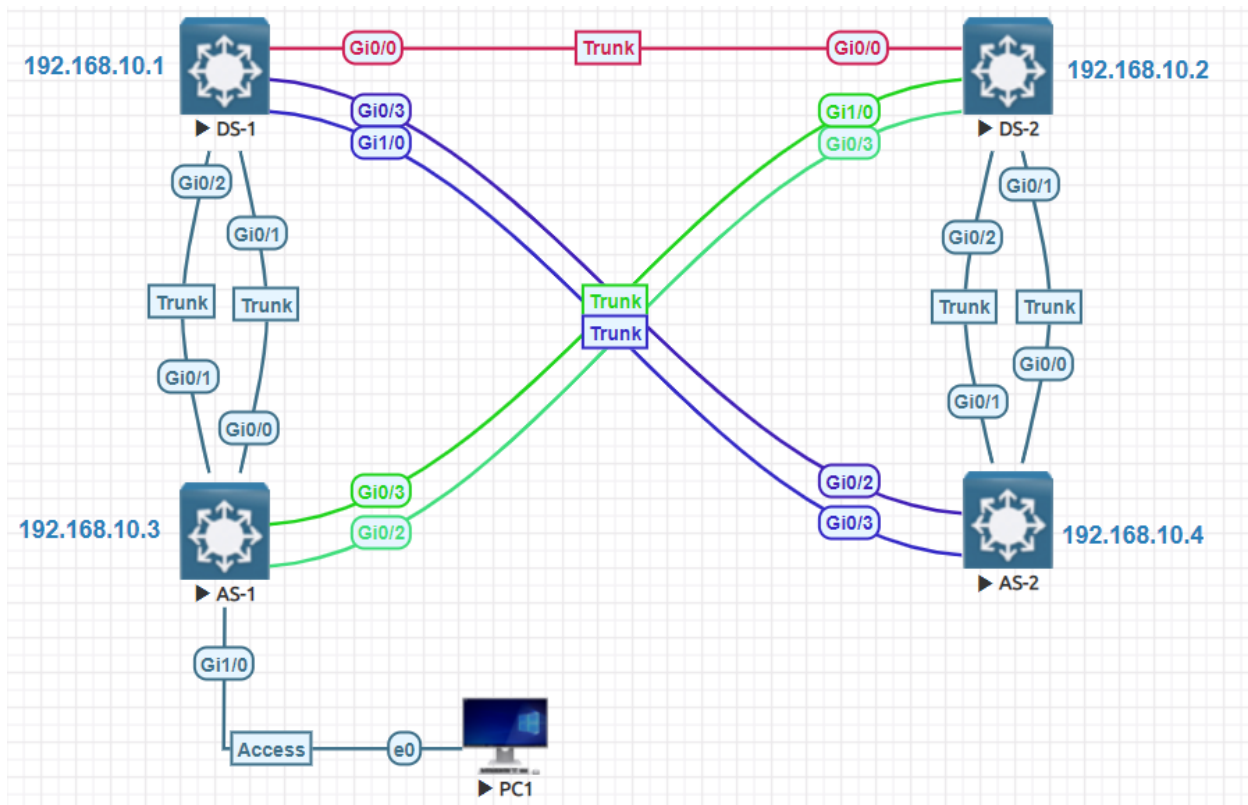


Adv STP Lab:



Switch Images	vios_l2-adventerprisek9-m.ssa.high_iron_20190423
Client PC	Linux-Slax-9.11.0 or VPCS
VLANs	VLAN1 and VLAN10
DS-1 VLAN 10 IP Address	192.168.10.1
DS-2 VLAN 10 IP Address	192.168.10.2
AS-1 VLAN 10 IP Address	192.168.10.3
AS-2 VLAN 10 IP Address	192.168.10.4
DS-1 Trunk Interfaces	G0/0, G0/1, G0/2, G0/3, G1/0
DS-2 Trunk Interfaces	G0/0, G0/1, G0/2, G0/3, G1/0
AS-1 Trunk Interfaces	G0/0, G0/1, G0/2, G0/3
AS-2 Trunk Interfaces	G0/0, G0/1, G0/2, G0/3
AS-1 Access Interface	G1/0
Spanning Tree Mode	PVST
DS-1 Access Interface	G1/1
DS-2 Access Interface	G1/1
AS-1 Access Interface	G1/1
AS-2 Access Interface	G1/1

DS-1 Basic Configuration

```
DS-1(config)#hostname DS-1
DS-1(config)#spanning-tree mode pvst
DS-1(config)#line con 0
DS-1(config-line)#exec-timeout 0 0
DS-1(config-line)#logging synchronous
DS-1(config-line)#exit
DS-1(config)#interface range g0/0-3, g1/0-3
DS-1(config-if-range)#shutdown
DS-1(config-if-range)#exit
```

DS-1 Trunk Configuration

```
DS-1(config)#interface range g0/0-3, g1/0
DS-1(config-if-range)#switchport trunk encapsulation dot1q
DS-1(config-if-range)#switchport mode trunk
DS-1(config-if-range)#no shutdown
```

DS-1 VLAN & SVI Configuration

```
DS-1(config)#interface vlan 10
DS-1(config-if)#ip address 192.168.10.1 255.255.255.0
DS-1(config-if)#no shutdown
DS-1(config-if)#exit
```

DS-1 Interfaces Configuration

```
DS-1(config)#interface g1/1
DS-1(config-if)#switchport access vlan 10
DS-1(config-if)#no shutdown
```

DS-2 Basic Configuration

```
DS-2(config)#hostname DS-2
DS-2(config)#spanning-tree mode pvst
DS-2(config)#line con 0
DS-2(config-line)#exec-timeout 0 0
DS-2(config-line)#logging synchronous
DS-2(config-line)#exit
DS-2(config)#interface range g0/0-3, g1/0-3
DS-2(config-if-range)#shutdown
DS-2(config-if-range)#exit
```

DS-2 Trunk Configuration

```
DS-2(config)#interface range g0/0-3, g1/0
DS-2(config-if-range)#switchport trunk encapsulation dot1q
DS-2(config-if-range)#switchport mode trunk
DS-2(config-if-range)#no shutdown
DS-2(config-if-range)#exit
```

DS-2 VLAN & SVI Configuration

```
DS-2(config)#interface vlan 10
DS-2(config-if)#ip address 192.168.10.2 255.255.255.0
DS-2(config-if)#no shutdown
DS-2(config-if)#exit
```

DS-2 Interfaces Configuration

```
DS-2(config)#interface g1/1
DS-2(config-if)#switchport access vlan 10
DS-2(config-if)#no shutdown
```

AS-1 Basic Configuration

```
AS-1(config)#hostname AS-1
AS-1(config)#spanning-tree mode pvst
AS-1(config)#line con 0
AS-1(config-line)#exec-timeout 0 0
AS-1(config-line)#logging synchronous
AS-1(config-line)#exit
AS-1(config)#interface range g0/0-3, g1/0-3
AS-1(config-if-range)#shutdown
AS-1(config-if-range)#exit
```

AS-1 Trunk Configuration

```
AS-1(config)#interface range g0/0-3
AS-1(config-if-range)#switchport trunk encapsulation dot1q
AS-1(config-if-range)#switchport mode trunk
AS-1(config-if-range)#no shutdown
AS-1(config-if-range)#exit
```

AS-1 VLAN & SVI Configuration

```
AS-1(config)#interface vlan 10
AS-1(config-if)#ip address 192.168.10.3 255.255.255.0
AS-1(config-if)#no shutdown
AS-1(config-if)#exit
```

AS-1 Interfaces Configuration

```
AS-1(config)#interface g1/1
AS-1(config-if)#switchport access vlan 10
AS-1(config-if)#no shutdown
```

AS-2 Basic Configuration

```
AS-2(config)#hostname AS-2
AS-2(config)#spanning-tree mode pvst
AS-2(config)#line con 0
AS-2(config-line)#exec-timeout 0 0
AS-2(config-line)#logging synchronous
AS-2(config-line)#exit
AS-2(config)#interface range g0/0-3, g1/0-3
AS-2(config-if-range)#shutdown
AS-2(config-if-range)#exit
```

AS-2 Trunk Configuration

```
AS-2(config)#interface range g0/0-3
AS-2(config-if-range)#switchport trunk encapsulation dot1q
AS-2(config-if-range)#switchport mode trunk
AS-2(config-if-range)#no shutdown
AS-2(config-if-range)#exit
```

AS-2 VLAN & SVI Configuration

```
AS-2(config)#interface vlan 10
AS-2(config-if)#ip address 192.168.10.4 255.255.255.0
AS-2(config-if)#no shutdown
AS-2(config-if)#exit
```

AS-2 Interfaces Configuration

```
AS-2(config)#interface g1/1
AS-2(config-if)#switchport access vlan 10
AS-2(config-if)#no shutdown
```

Spanning Tree Configuration DS-1 and DS-2

```
DS-1(config)#spanning-tree vlan 1 root primary
DS-1(config)#spanning-tree vlan 10 root secondary
DS-2(config)#spanning-tree vlan 1 root secondary
DS-2(config)#spanning-tree vlan 10 root primary
```

```
DS-1#show spanning-tree vlan 1
```

```
VLAN0001
```

```
Spanning tree enabled protocol ieee
```

```
Root ID    Priority    24577
Address    500a.0001.0000
```

```
This bridge is the root
```

```
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
```

```
Bridge ID  Priority    24577 (priority 24576 sys-id-ext 1)
```

```
Address    500a.0001.0000
```

```
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	P2p
Gi0/1	Desg	FWD	4	128.2	P2p
Gi0/2	Desg	FWD	4	128.3	P2p
Gi0/3	Desg	FWD	4	128.4	P2p
Gi1/0	Desg	FWD	4	128.5	P2p

```
DS-1#show spanning-tree vlan 10
```

```
VLAN0010
```

```
Spanning tree enabled protocol ieee
```

```
Root ID    Priority    24586
Address    500a.0002.0000
```

```
Cost       4
```

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

```
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
```

```
Bridge ID  Priority    28682 (priority 28672 sys-id-ext 10)
```

```
Address    500a.0001.0000
```

```
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	Root	FWD	4	128.1	P2p
Gi0/1	Desg	FWD	4	128.2	P2p
Gi0/2	Desg	FWD	4	128.3	P2p
Gi0/3	Desg	FWD	4	128.4	P2p
Gi1/0	Desg	FWD	4	128.5	P2p
Gi1/1	Desg	FWD	4	128.6	P2p

```
DS-2#show spanning-tree vlan 1
```

```
VLAN0001
```

```
Spanning tree enabled protocol ieee
```

```
Root ID    Priority    24577  
Address    500a.0001.0000  
Cost       4  
Port       1 (GigabitEthernet0/0)  
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
```

```
Bridge ID  Priority    28673 (priority 28672 sys-id-ext 1)  
Address    500a.0002.0000  
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	Root	FWD	4	128.1	P2p
Gi0/1	Desg	FWD	4	128.2	P2p
Gi0/2	Desg	FWD	4	128.3	P2p
Gi0/3	Desg	FWD	4	128.4	P2p
Gi1/0	Desg	FWD	4	128.5	P2p

```
DS-2#show spanning-tree vlan 10
```

```
VLAN0010
```

```
Spanning tree enabled protocol ieee
```

```
Root ID    Priority    24586  
Address    500a.0002.0000  
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    500a.0002.0000  
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	P2p
Gi0/1	Desg	FWD	4	128.2	P2p
Gi0/2	Desg	FWD	4	128.3	P2p
Gi0/3	Desg	FWD	4	128.4	P2p
Gi1/0	Desg	FWD	4	128.5	P2p
Gi1/1	Desg	FWD	4	128.6	P2p

Configure Port Cost

```
AS-1(config)#interface range g0/0-1
AS-1(config-if-range)#shutdown
AS-1(config-if-range)#exit
AS-1(config)#interface g0/1
AS-1(config-if)#spanning-tree cost 2
AS-1(config-if)#exit
AS-1(config)#interface range g0/0-1
AS-1(config-if-range)#no shutdown
AS-1(config-if-range)#exit
```

```
AS-1#show spanning-tree vlan 1
```

```
VLAN0001
```

```
Spanning tree enabled protocol ieee
```

```
Root ID    Priority    24577
           Address    500a.0001.0000
           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    500a.0003.0000
           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	Root	FWD	4	128.1	P2p
Gi0/1	Altn	BLK	4	128.2	P2p
Gi0/2	Altn	BLK	4	128.3	P2p
Gi0/3	Altn	BLK	4	128.4	P2p

```
AS-1#show spanning-tree vlan 10
```

```
VLAN0010
```

```
Spanning tree enabled protocol ieee
Root ID    Priority    24586
           Address    500a.0002.0000
           Cost      4
           Port      3 (GigabitEthernet0/2)
           Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec

Bridge ID  Priority    32778 (priority 32768 sys-id-ext 10)
           Address    500a.0003.0000
           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	Altn	BLK	4	128.1	P2p
Gi0/1	Altn	BLK	4	128.2	P2p
Gi0/2	Root	FWD	4	128.3	P2p
Gi0/3	Altn	BLK	4	128.4	P2p
Gi1/1	Desg	FWD	4	128.6	P2p

```
AS-1#show spanning-tree vlan 1
```

```
VLAN0001
```

```
Spanning tree enabled protocol ieee
Root ID    Priority    24577
           Address    500a.0001.0000
           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    500a.0003.0000
           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	Root	FWD	4	128.1	P2p
Gi0/1	Altn	BLK	4	128.2	P2p
Gi0/2	Altn	BLK	4	128.3	P2p
Gi0/3	Altn	BLK	4	128.4	P2p

```
AS-1#show spanning-tree vlan 10
```

```
VLAN0010
```

```
Spanning tree enabled protocol ieee  
Root ID    Priority    24586  
           Address    500a.0002.0000  
           Cost      4  
           Port      3 (GigabitEthernet0/2)  
Hello Time  2 sec    Max Age 20 sec    Forward Delay 15 sec
```

```
Bridge ID  Priority    32778 (priority 32768 sys-id-ext 10)  
           Address    500a.0003.0000  
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	Altn	BLK	4	128.1	P2p
Gi0/1	Altn	BLK	2	128.2	P2p
Gi0/2	Root	FWD	4	128.3	P2p
Gi0/3	Altn	BLK	4	128.4	P2p
Gi1/1	Desg	FWD	4	128.6	P2p

Configure Port Priority

```
DS-2(config)#interface range g1/0, g0/3  
DS-2(config-if-range)#shutdown  
DS-2(config-if-range)#exit  
DS-2(config)#interface g1/0  
DS-2(config-if)#spanning-tree port-priority 64  
DS-2(config-if)#exit  
DS-2(config)#interface range g1/0, g0/3  
DS-2(config-if-range)#no shutdown  
DS-2(config-if-range)#exit
```

```
DS-2#show spanning-tree vlan 10
```

```
VLAN0010
```

```
Spanning tree enabled protocol ieee
```

```
Root ID    Priority    24586  
Address    500a.0002.0000
```

```
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    500a.0002.0000
```

```
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	P2p
Gi0/1	Desg	FWD	4	128.2	P2p
Gi0/2	Desg	FWD	4	128.3	P2p
Gi0/3	Desg	FWD	4	128.4	P2p
Gi1/0	Desg	FWD	4	64.5	P2p
Gi1/1	Desg	FWD	4	128.6	P2p

Access Port

```
AS-1#debug spanning-tree events
```

```
AS-1(config)#interface g1/0
```

```
AS-1(config-if)#shutdown
```

```
AS-1(config-if)#no shutdown
```

```
AS-1#
```

```
*Aug 13 10:03:48.652: set portid: VLAN0001 Gi1/0: new port id 8005
```

```
*Aug 13 10:03:48.653: STP: VLAN0001 Gi1/0 -> listening
```

```
AS-1#
```

```
*Aug 13 10:03:49.571: %SYS-5-CONFIG_I: Configured from console by console
```

```
AS-1#
```

```
*Aug 13 10:03:50.417: %LINK-3-UPDOWN: Interface GigabitEthernet1/0, changed state to u  
p
```

```
*Aug 13 10:03:51.428: %LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet1  
/0, changed state to up
```

```
AS-1#
```

```
*Aug 13 10:04:03.662: STP: VLAN0001 Gi1/0 -> learning
```

```
AS-1#
```

```
*Aug 13 10:04:18.697: STP[1]: Generating TC trap for port GigabitEthernet1/0
```

```
*Aug 13 10:04:18.701: STP: VLAN0001 sent Topology Change Notice on Gi0/1
```

```
*Aug 13 10:04:18.702: STP: VLAN0001 Gi1/0 -> forwarding
```

```
AS-1#
```

Portfast Configuration

```
AS-1(config)#interface g1/0
AS-1(config-if)#spanning-tree portfast
AS-1(config)#interface g1/0
AS-1(config-if)#shutdown
AS-1(config-if)#no shutdown
```

```
*Aug 13 10:08:28.216: set portid: VLAN0001 Gi1/0: new port id 8005
*Aug 13 10:08:28.217: STP: VLAN0001 Gi1/0 ->jump to forwarding from blocking
AS-1(config-if)#
*Aug 13 10:08:29.977: %LINK-3-UPDOWN: Interface GigabitEthernet1/0, changed state to u
p
AS-1(config-if)#
*Aug 13 10:08:30.977: %LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet1
/0, changed state to up
```