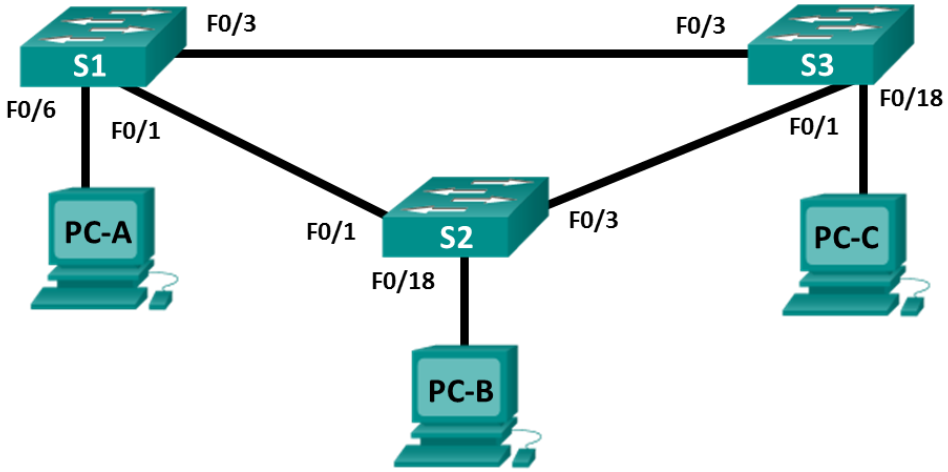
Lab – Configure Extended VLANs, VTP, and DTP

Topology



Addressing Table

Table Heading	Interface	IP Address	Subnet Mask
S1	VLAN 99	192.168.99.1	255.255.255.0
S2	VLAN 99	192.168.99.2	255.255.255.0
S3	VLAN 99	192.168.99.3	255.255.255.0
PC-A	NIC	192.168.10.1	255.255.255.0
PC-B	NIC	192.168.20.1	255.255.255.0
PC-C	NIC	192.168.10.2	255.255.255.0

Objectives

Part 1: Configure VTP

Part 2: Configure DTP

Part 3: Add VLANs and Assign Ports

Part 4: Configure Extended VLAN

Background / Scenario

It can become challenging to manage VLANs and trunks in a network, as the number of switches increases. VLAN trunking protocol (VTP) allows a network administrator to automate the management of VLANs. Automated trunk negotiation between network devices is managed by the Dynamic Trunking Protocol (DTP). DTP is enabled by default on Catalyst 2960 and Catalyst 3560 switches.

In this lab, you will configure trunk links between the switches. You will also configure a VTP server and VTP clients in the same VTP domain. Furthermore, you will configure an extended VLAN on one of the switches, assign ports to VLANs and verify end-to-end connectivity within the same VLAN.

Note: The switches used are Cisco Catalyst 2960s with Cisco IOS Release 15.0(2) (lanbasek9 image). Other switches and Cisco IOS versions can be used. Depending on the model and Cisco IOS version, the commands available and output produced might vary from what is shown in the labs.

Note: Make sure that the switches have been erased and have no startup configurations. If you are unsure, contact your instructor.

Required Resources

- 3 Switches (Cisco 2960 with Cisco IOS Release 15.0(2) lanbasek9 image or comparable)
- 3 PCs (Windows 7 or 8 with terminal emulation program, such as Tera Term)
- Console cables to configure the Cisco IOS devices via the console ports
- Ethernet cables as shown in the topology

Part 1: Configure VTP

All the switches will be configured to use VTP for VLAN updates. S2 will be configured as the server. Switches S1 and S3 will be configure as clients. They will be in the **CCNA** VTP domain using the password **cisco**.

a. Configure S2 as a VTP server in the **CCNA** VTP domain using **cisco** as the VTP password.

```
S2(config)# vtp domain CCNA
Changing VTP domain name from NULL to CCNA
S2(config)#
*Mar  1 00:03:44.193: %SW_VLAN-6-VTP_DOMAIN_NAME_CHG: VTP domain name changed to CCNA.
S2(config)# vtp mode server
Device mode already VTP Server for VLANS.
S2(config)# vtp password cisco
Setting device VTP password to cisco
```

b. Configure S1 and S3 as VTP clients in the **CCNA** VTP domain using **cisco** as the VTP password. VTP configurations are displayed below.

```
S1(config)# vtp domain CCNA
Changing VTP domain name from NULL to CCNA
S1(config)#
*Mar  1 00:03:44.193: %SW_VLAN-6-VTP_DOMAIN_NAME_CHG: VTP domain name changed
to CCNA.
S1(config)# vtp mode client
Device mode VTP client for VLANS.
S1(config)# vtp password cisco
Setting device VTP password to cisco
```

c. Verify VTP configurations by entering the **show vtp status** command on all switches. The VTP status for S3 is displayed below.

```
S3# show vtp status
VTP Version capable             : 1 to 3
VTP version running             : 1
VTP Domain Name                 : CCNA
VTP Pruning Mode                : Disabled
VTP Traps Generation            : Disabled
```

```
Device ID                        : 0cd9.96d2.3580
Configuration last modified by 0.0.0.0 at 0-0-00 00:00:00

Feature VLAN:
--------------
VTP Operating Mode               : Client
Maximum VLANs supported locally  : 255
Number of existing VLANs         : 5
Configuration Revision           : 0
MD5 digest                       : 0x8B 0x58 0x3D 0x9D 0x64 0xBE 0xD5 0xF6
                                   0x62 0xCB 0x4B 0x50 0xE5 0x9C 0x6F 0xF6
```

Part 2: Configure DTP

Step 1: Configure dynamic trunk links between S1 and S2.

a. Enter the **show interfaces f0/1 switchport** command on S1 and S2.

What is the administrative and operational mode of switchport f0/1?

b. In interface configuration mode, configure a dynamic trunk link between S1 and S2. Because the default mode is dynamic auto, only one side of the link needs to be configured as dynamic desirable.

```
S1(config)# interface f0/1
S1(config-if)# switchport mode dynamic desirable
S1(config-if)#
*Mar  1 00:30:45.082: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1,
changed state to down
*Mar  1 00:30:48.102: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1,
changed state to up
```

c. Verify trunking link between S1 and S2 using the **show interfaces trunk** command.

```
S1# show interfaces trunk

Port        Mode             Encapsulation  Status        Native vlan
Fa0/1       desirable        802.1q         trunking      1

Port        Vlans allowed on trunk
Fa0/1       1-4094

Port        Vlans allowed and active in management domain
Fa0/1       1

Port        Vlans in spanning tree forwarding state and not pruned
Fa0/1       none

S2# show interfaces trunk

Port        Mode             Encapsulation  Status        Native vlan
Fa0/1       auto             802.1q         trunking      1
```

```
Port        Vlans allowed on trunk
Fa0/1       1-4094

Port        Vlans allowed and active in management domain
Fa0/1       1

Port        Vlans in spanning tree forwarding state and not pruned
Fa0/1       1
```

Step 2: Configure static trunk link between S1 and S3.

a. Between S1 and S3, configure a static trunk link using the **switchport mode trunk** command in the interface configuration mode for port F0/3.

```
S1(config)# interface f0/3
S1(config-if)# switchport mode trunk
```

b. Verify the trunks using **show interfaces trunk** command on S1.

```
S1# show interface trunk

Port        Mode             Encapsulation  Status        Native vlan
Fa0/1       desirable        802.1q         trunking      1
Fa0/3       on               802.1q         trunking      1

Port        Vlans allowed on trunk
Fa0/1       1-4094
Fa0/3       1-4094

Port        Vlans allowed and active in management domain
Fa0/1       1
Fa0/3       1

Port        Vlans in spanning tree forwarding state and not pruned
Fa0/1       none
Fa0/3       none
```

c. Configure a permanent trunk between S2 and S3.

d. Record the commands you used to create the static trunk.

Part 3: Add VLANs and Assign Ports

Step 1: Add VLANs on the switches.

a. On S1, add VLAN 10.

```
S1(config)# vlan 10
```

Were you able to create VLAN 10 on S1? Explain.

b. On S2, add the following VLANs.

VLAN	Name
10	Red
20	Blue
30	Yellow
99	Management

```
S2(config)# vlan 10
S2(config-vlan)# name Red
S2(config-vlan)# vlan 20
S2(config-vlan)# name Blue
S2(config-vlan)# vlan 30
S2(config-vlan)# name Yellow
S2(config-vlan)# vlan 99
S2(config-vlan)# name Management
S2(config-vlan)# end

S2# show vlan brief

VLAN Name                             Status    Ports
---- -------------------------------- --------- -------------------------------
1    default                          active    Fa0/2, Fa0/4, Fa0/5, Fa0/6
                                                Fa0/7, Fa0/8, Fa0/9, Fa0/10
                                                Fa0/11, Fa0/12, Fa0/13, Fa0/14
                                                Fa0/15, Fa0/16, Fa0/17, Fa0/18
                                                Fa0/19, Fa0/20, Fa0/21, Fa0/22
                                                Fa0/23, Fa0/24, Gi0/1, Gi0/2
10   Red                              active
20   Blue                             active
30   Yellow                           active
99   Management                       active
<output omitted>
```

Step 2: Verify VTP updates on S1 and S3.

Because S2 is configured as a VTP server, and S1 and S3 are configured as VTP clients, S1 and S3 should learn and implement the VLAN information from S2.

What **show** commands did you use to verify the VTP updates on S1 and S3?

Step 3: Assign ports to VLANs.

In this step, you will associate ports to VLANs and configure IP addresses according to the table below.

Port Assignment	VLAN	Attached PC IP Address and Prefix
S1 F0/6	VLAN 10	PC-A: 192.168.10.1 / 24
S2 F0/18	VLAN 20	PC-B: 192.168.20.1 /24
S3 F0/18	VLAN 10	PC-C: 192.168.10.2 /24

a. On S1, configure F0/6 to access mode and assign F0/6 to VLAN 10.

```
S1(config)# interface f0/6
S1(config-if)# switchport mode access
S1(config-if)# switchport access vlan 10
```

b. Repeat the procedure for switchport F0/18 on S2 and S3. Assign the VLAN according to the table above.

c. Assign the IP addresses to the PCs according to the table above.

Step 4: Configure IP addresses on the switches.

a. On S1, assign an IP address to the SVI for VLAN 99 according to the Addressing Table and activate the interface.

```
S1(config)# interface vlan 99
S1(config-if)# ip address 192.168.99.1 255.255.255.0
S1(config-fi)# no shutdown
```

b. Repeat step a. for S2 and S3.

Step 5: Verify end-to-end connectivity

a. Ping PC-A from PC-B. Was it successful? Explain.

b. Ping PC-A from PC-C. Was it successful? Explain.

c. Ping PC-A from S1. Was it successful? Explain.

d. Ping S1 from S2. Was it successful? Explain.

Part 4: Configure Extended VLAN

An extended VLAN is a VLAN between 1025 and 4096. Because the extended VLANs cannot be managed with VTP, VTP must be configured in transparent mode. In this part, you will change the VTP mode on S1 to transparent and create an extended VLAN on S1.

Step 1: Configure VTP mode to transparent on S1.

a. On switch S1, set VTP mode to transparent.

```
S1(config)# vtp mode transparent
Setting device to VTP Transparent mode for VLANS.
S1(config)# exit
```

b. Verify the VTP mode on S1.

```
S1# show vtp status
VTP Version capable             : 1 to 3
VTP version running             : 1
VTP Domain Name                 : CCNA
VTP Pruning Mode                : Disabled
VTP Traps Generation            : Disabled
Device ID                       : 0cd9.96e2.3d00
Configuration last modified by 0.0.0.0 at 3-1-93 02:36:11

Feature VLAN:
--------------
VTP Operating Mode                : Transparent
Maximum VLANs supported locally   : 255
Number of existing VLANs          : 9
Configuration Revision            : 0
MD5 digest                        : 0xB2 0x9A 0x11 0x5B 0xBF 0x2E 0xBF 0xAA
                                    0x31 0x18 0xFF 0x2C 0x5E 0x54 0x0A 0xB7
```

Step 2: Configure an extended VLAN on S1.

a. Display the current VLAN configurations on S1.

b. Create an extended VLAN 2000.

```
S1# conf t
Enter configuration commands, one per line.  End with CNTL/Z.
S1(config)# vlan 2000
S1(config-vlan)# end
```

c. Verify the VLAN creation.

```
S1# show vlan brief

VLAN Name                              Status    Ports
---- --------------------------------- --------- -------------------------------
1    default                           active    Fa0/2, Fa0/4, Fa0/5, Fa0/7
                                                 Fa0/8, Fa0/9, Fa0/10, Fa0/11
                                                 Fa0/12, Fa0/13, Fa0/14, Fa0/15
                                                 Fa0/16, Fa0/17, Fa0/18, Fa0/19
                                                 Fa0/20, Fa0/21, Fa0/22, Fa0/23
                                                 Fa0/24, Gi0/1, Gi0/2
10   Red                               active    Fa0/6
20   Blue                              active
30   Yellow                            active
99   Management                        active
1002 fddi-default                      act/unsup
1003 token-ring-default                act/unsup
1004 fddinet-default                   act/unsup
1005 trnet-default                     act/unsup
2000 VLAN2000                          active
```

Reflection

What are the advantages and disadvantages of using VTP?

Router Interface Summary Table

Router Interface Summary				
Router Model	**Ethernet Interface #1**	**Ethernet Interface #2**	**Serial Interface #1**	**Serial Interface #2**
1800	Fast Ethernet 0/0 (F0/0)	Fast Ethernet 0/1 (F0/1)	Serial 0/0/0 (S0/0/0)	Serial 0/0/1 (S0/0/1)
1900	Gigabit Ethernet 0/0 (G0/0)	Gigabit Ethernet 0/1 (G0/1)	Serial 0/0/0 (S0/0/0)	Serial 0/0/1 (S0/0/1)
2801	Fast Ethernet 0/0 (F0/0)	Fast Ethernet 0/1 (F0/1)	Serial 0/1/0 (S0/1/0)	Serial 0/1/1 (S0/1/1)
2811	Fast Ethernet 0/0 (F0/0)	Fast Ethernet 0/1 (F0/1)	Serial 0/0/0 (S0/0/0)	Serial 0/0/1 (S0/0/1)
2900	Gigabit Ethernet 0/0 (G0/0)	Gigabit Ethernet 0/1 (G0/1)	Serial 0/0/0 (S0/0/0)	Serial 0/0/1 (S0/0/1)

Note: To find out how the router is configured, look at the interfaces to identify the type of router and how many interfaces the router has. There is no way to effectively list all the combinations of configurations for each router class. This table includes identifiers for the possible combinations of Ethernet and Serial interfaces in the device. The table does not include any other type of interface, even though a specific router may contain one. An example of this might be an ISDN BRI interface. The string in parenthesis is the legal abbreviation that can be used in Cisco IOS commands to represent the interface.