Activity 3.3.4:

Configuring VLANs and Trunks

NOTE TO USER: Although you can complete this activity without printed instructions, a PDF version is available on the text side of the same page from which you launched this activity.

Learning Objectives

- View the default VLAN configuration
- Configure VLANs
- Assign VLANs to ports
- Configure trunking

Introduction

VLANs are helpful in the administration of logical groups, allowing members of a group to be easily moved, changed, or added. This activity focuses on creating and naming VLANs, assigning access ports to specific VLANs, changing the native VLAN, and configure configuring trunk links.

Task 1: View the Default VLAN Configuration

Step 1. Verify the current running configuration on the switches.

On all three switches, enter user EXEC mode with the password **cisco**. Then enter privileged EXEC mode with the password **class**.

From privileged EXEC mode on all three switches, issue the **show running-config** command to verify the current running configuration. The basic configurations are already set, but there are no VLAN assignments.

Step 2. Display the current VLANs.

On S1, issue the **show vlan** command. The only VLANs present are the default ones. By default, all interfaces are assigned to VLAN 1.

Step 3. Verify connectivity between PCs on the same network.

Notice that each PC can ping the other PC that shares the same network:

- PC1 can ping PC4
- PC2 can ping PC5
- PC3 can ping PC6

Pings to PCs in other networks fail.

What benefit will configuring VLANs provide to the current configuration? ***Nos permite tener el control de la información y que los equipos puedan compartir información de manera segura.***

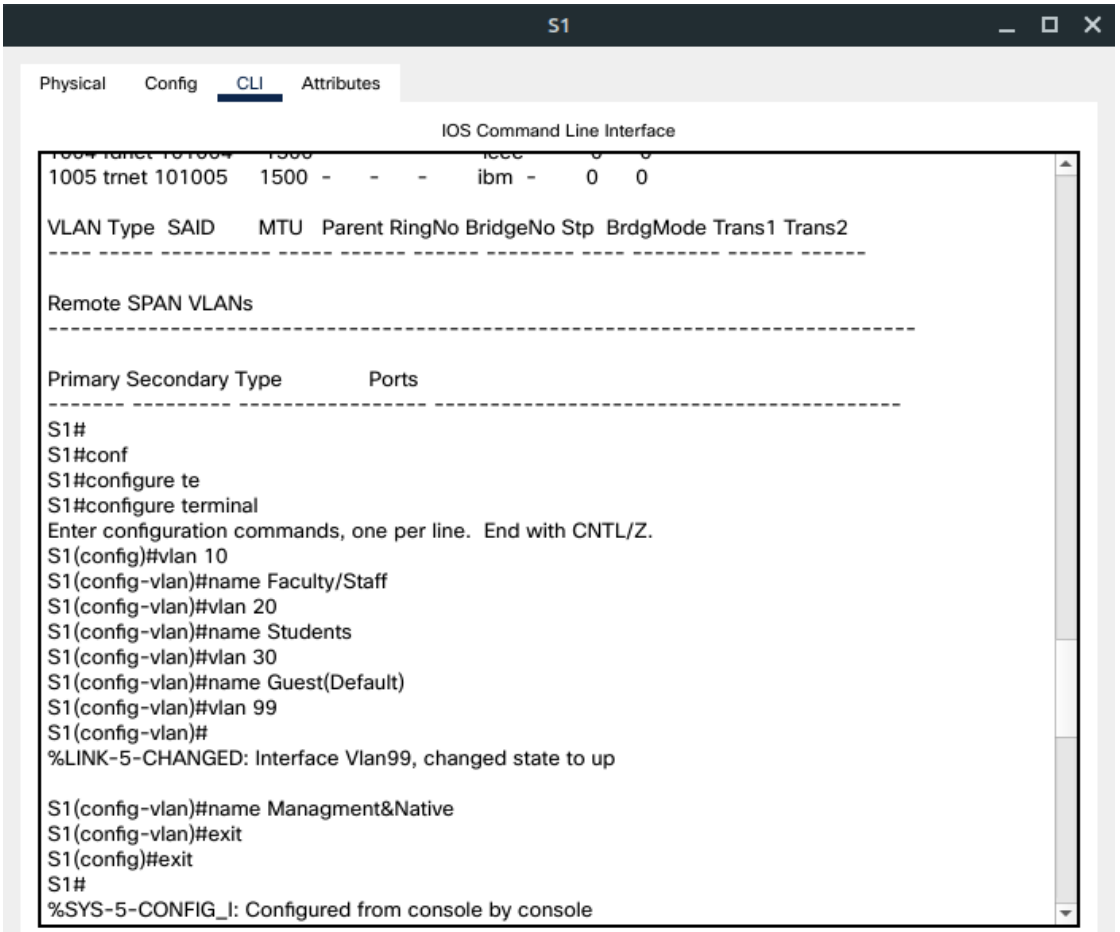
Task 2: Configure VLANs

Step 1. Create VLANs on S1.

The command **vlan** *vlan-id* creates a VLAN. Use the **name** *vlan-name* command to name a VLAN.

On S1, create four VLANs using the *vlan-ids* and the names shown below:

S1(config)**#vlan 10**
S1(config-vlan)**#name Faculty/Staff**
S1(config-vlan)**#vlan 20**
S1(config-vlan)**#name Students**
S1(config-vlan)**#vlan 30**
S1(config-vlan)**#name Guest(Default)**
S1(config-vlan)**#vlan 99**
S1(config-vlan)**#name Management&Native**



Step 2. Verify the VLAN configuration.

After creating the VLANs, return to privileged EXEC and issue the **show vlan brief** command to verify the creation of the new VLANs.

S1#**show vlan brief**

```
VLAN Name                         Status    Ports
---- -------------------------------- --------- -------------------------------
1    default                      active    Fa0/1, Fa0/2, Fa0/3, 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
                                            Gig1/1, Gig1/2
10   Faculty/Staff                active
20   Students                     active
30   Guest(Default)                 active
99   Management&Native                 active
1002 fddi-default                 active
1003 token-ring-default               active
1004 fddinet-default                active
1005 trnet-default                active
S1#
```

```
S1#show vlan brief

VLAN Name                         Status    Ports
---- -------------------------------- --------- -------------------------------
1    default                      active    Fa0/1, Fa0/2, Fa0/3, 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
                                            Gig0/1, Gig0/2
10   Faculty/Staff                active
20   Students                     active
30   Guest(Default)                 active
99   Managment&Native                  active
1002 fddi-default                 active
1003 token-ring-default               active
1004 fddinet-default                active
1005 trnet-default                active
S1#
```

Step 3. Create the VLANs on S2 and S3.

On S2 and S3, use the same commands you used on S1 to create and name the VLANs.

IOS Command Line Interface

```
S2>enabke
Translating "enabke"
% Unknown command or computer name, or unable to find computer address

S2>enabke
Translating "enabke"
% Unknown command or computer name, or unable to find computer address

S2>enable
Password:
S2#conf
S2#configure ter
S2#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
S2(config)#vlan 10
S2(config-vlan)#name Faculty/Staff
S2(config-vlan)#vlan 20
S2(config-vlan)#name Students
S2(config-vlan)#vlan 30
S2(config-vlan)#name Guest(Default)
S2(config-vlan)#vlan 99
S2(config-vlan)#
%LINK-5-CHANGED: Interface Vlan99, changed state to up

S2(config-vlan)#name Managment&Native
S2(config-vlan)#exit
S2(config)#exit
S2#
%SYS-5-CONFIG_I: Configured from console by console

S2#
```

IOS Command Line Interface

```
AUTHORIZED ACCESS ONLY^

User Access Verification

Password:

S3>ena
Password:
S3#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
S3(config)#vlan 10
S3(config-vlan)#name Faculty/Staff
S3(config-vlan)#vlan 20
S3(config-vlan)#name Students
S3(config-vlan)#vlan 30
S3(config-vlan)#name Guest(Default)
S3(config-vlan)#vlan 99
S3(config-vlan)#
%LINK-5-CHANGED: Interface Vlan99, changed state to up

S3(config-vlan)#name Managment&Native
S3(config-vlan)#exit
S3(config)#exit
S3#
%SYS-5-CONFIG_I: Configured from console by console

S3#
```

Step 4. Verify the VLAN configuration.

Use the **show vlan brief** command to verify all VLANs are configured and named.

IOS Command Line Interface

```
S2(config-vlan)#name Guest(Default)
S2(config-vlan)#vlan 99
S2(config-vlan)#
%LINK-5-CHANGED: Interface Vlan99, changed state to up

S2(config-vlan)#name Managment&Native
S2(config-vlan)#exit
S2(config)#exit
S2#
%SYS-5-CONFIG_I: Configured from console by console

S2#show vlan brief

VLAN Name                              Status    Ports
---- --------------------------------- --------- -------------------------------
1    default                           active    Fa0/1, Fa0/2, Fa0/3, 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
                                                 Gig0/1, Gig0/2
10   Faculty/Staff                     active
20   Students                          active
30   Guest(Default)                    active
99   Managment&Native                  active
1002 fddi-default                      active
1003 token-ring-default                active
1004 fddinet-default                   active
1005 trnet-default                     active
S2#
```

IOS Command Line Interface

```
S3(config-vlan)#name Guest(Default)
S3(config-vlan)#vlan 99
S3(config-vlan)#
%LINK-5-CHANGED: Interface Vlan99, changed state to up

S3(config-vlan)#name Managment&Native
S3(config-vlan)#exit
S3(config)#exit
S3#
%SYS-5-CONFIG_I: Configured from console by console

S3#show vlan brief

VLAN Name                              Status    Ports
---- --------------------------------- --------- -------------------------------
1    default                           active    Fa0/1, Fa0/2, Fa0/3, 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
                                                 Gig0/1, Gig0/2
10   Faculty/Staff                     active
20   Students                          active
30   Guest(Default)                    active
99   Managment&Native                  active
1002 fddi-default                      active
1003 token-ring-default                active
1004 fddinet-default                   active
1005 trnet-default                     active
S3#
```

Step 5. Check results.

Your completion percentage should be 38%. If not, click **Check Results** to see which required components are not yet completed.

Task 3: Assign VLANs to Ports

The **range** command greatly reduces the amount of repetitive commands you must enter when configuring the same commands on multiple ports. However, Packet Tracer does not support the **range** command. So only the active interfaces are graded for the **switchport mode access** command.

Step 1. Assign VLANs to the active ports on S2.

The **switchport mode access** command configures the interface as an access port. The **switchport access vlan** *vlan-id* command assigns a VLAN to the port. An access port can only be assigned one access VLAN. Enter the following commands on S2.

S2(config)**#interface fastEthernet 0/6**
S2(config-if)**#switchport mode access**
S2(config-if)**#switchport access vlan 30**
S2(config-if)**#interface fastEthernet 0/11**
S2(config-if)**#switchport mode access**
S2(config-if)**#switchport access vlan 10**
S2(config-if)**#interface fastEthernet 0/18**
S2(config-if)**#switchport mode access**
S2(config-if)**#switchport access vlan 20**

```
S2(config)#interface fastEthernet 0/6
S2(config-if)#switchport mode access
S2(config-if)#switchport access vlan 30
S2(config-if)#interface fastEthernet 0/11
S2(config-if)#switchport mode access
S2(config-if)#switchport access vlan 10
S2(config-if)#interface fastEthernet 0/18
S2(config-if)#switchport mode access
S2(config-if)#switchport access vlan 20
S2(config-if)#
```

Step 2. Assign VLANs to the active ports on S3.

Assign VLANs to the active ports on S3. S3 uses the same VLAN access port assignments that you configured on S2.

```
S3(config)#interface fastEthernet 0/6
S3(config-if)#switchport mode access
S3(config-if)#switchport access vlan 30
S3(config-if)#interface fastEthernet 0/11
S3(config-if)#switchport mode access
S3(config-if)#switchport access vlan 10
S3(config-if)#interface fastEthernet 0/18
S3(config-if)#switchport mode access
S3(config-if)#switchport access vlan 20
S3(config-if)#ex
S3(config)#ex
```

Step 3. Verify loss of connectivity.

Previously, PCs that shared the same network could ping each other successfully. Try pinging between PC1 and PC4. Although the access ports are assigned to the appropriate VLANs, the ping fails. Why?

Porque las interfaces entre S2 y S1 y entre S3 y S1 aún no están configuradas como trunks (troncales), entonces tampoco están configuradas como enlaces de acceso para VLAN, no reenvían el tráfico de la VLAN 10.

Task 4: Configure Trunking

Step 1. Configure S1 Fa0/1 and Fa0/3 for trunking and to use VLAN 99 as the native VLAN.

S1(config)**#interface FastEthernet 0/1**
S1(config-if)**#switchport mode trunk**
S1(config-if)**#switchport trunk native vlan 99**
S1(config-if)**#interface FastEthernet 0/3**
S1(config-if)**#switchport mode trunk**
S1(config-if)**#switchport trunk native vlan 99**

```
S1(config)#interface fastEthernet 0/1
S1(config-if)#switch
S1(config-if)#switchport mode trunk

S1(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to down

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan99, changed state to up

S1(config-if)#sw
S1(config-if)#switchport trunk native vlan 99
S1(config-if)#exit
S1(config)#interface f
%CDP-4-NATIVE_VLAN_MISMATCH: Native VLAN mismatch discovered on FastEthernet0/1 (99), with
S2 FastEthernet0/1 (1%SPANTREE-2-RECV_PVID_ERR: Received BPDU with inconsistent peer vlan id 1
on FastEthernet0/1 VLAN99.

%SPANTREE-2-BLOCK_PVID_LOCAL: Blocking FastEthernet0/1 on VLAN0099. Inconsistent local vlan.


%CDP-4-NATIVE_VLAN_MISMATCH: Native VLAN mismatch discovered on FastEthernet0/1 (99), with
S2 FastEthernet0/1 (1).
```

```
S1(config)#interface fastEthernet 0/3
S1(config-if)#switch
S1(config-if)#switchport mode trunk

S1(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/3, changed state to down

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/3, changed state to up

S1(config-if)#swit
S1(config-if)#switchport trunk nati
S1(config-if)#switchport trunk native vlan 99
S1(config-if)#
%CDP-4-NATIVE_VLAN_MISMATCH: Native VLAN mismatch discovered on FastEthernet0/1 (99), with
S2 FastEthernet0/1 (1).

%CDP-4-NATIVE_VLAN_MISMATCH: Native VLAN mismatch discovered on FastEthernet0/3 (99), with
S3 FastEthernet0/3 (1).

%CDP-4-NATIVE_VLAN_MISMATCH: Native VLAN mismatch discovered on FastEthernet0/1 (99), with
```

The trunk port takes about a minute to become active again. You can switch between Realtime and Simulation modes three or four times to quickly bring the port back up.

Then, the ports on S2 and S3 that connect to S1 become inactive. Again, switch between Realtime and Simulation modes three or four times to quickly bring the ports back up.

Once the ports become active, you periodically receive the following syslog messages:

%CDP-4-NATIVE_VLAN_MISMATCH: Native VLAN mismatch discovered on FastEthernet0/1 (99), with S2 FastEthernet0/1 (1).
%CDP-4-NATIVE_VLAN_MISMATCH: Native VLAN mismatch discovered on FastEthernet0/3 (99), with S3 FastEthernet0/3 (1).

You configured the native VLAN on S1 to be VLAN 99. However, the native VLAN on S2 and S3 is set to the default VLAN 1.

Step 2. Verify connectivity between devices on the same VLAN.

Although there is currently a native VLAN mismatch, pings between PCs on the same VLAN are now successful. Why?

Porque se ha habilitado el enlace troncal en S1 y ahora S2 y S3 han configurado automáticamente los puertos conectados a S1 como puertos de enlace.

Step 3. Verify trunking is enabled on S2 and configure VLAN 99 as the native VLAN.

Dynamic Trunking Protocol (DTP) has automatically enabled the Fast Ethernet 0/1 port on S2 for trunking. Once you configured the mode to trunking on S1, DTP messages sent from S1 to S2 automatically informed S1 to move the state of Fa0/1 to trunking. This can be verified with the following command on S1:

S2#**show interface fastEthernet 0/1 switchport**
Name: Fa0/1
Switchport: Enabled
Administrative Mode: dynamic auto
Operational Mode: trunk
Administrative Trunking Encapsulation: dot1q
Operational Trunking Encapsulation: dot1q
Negotiation of Trunking: On
Access Mode VLAN: 1 (default)
Trunking Native Mode VLAN: 1 (default)
<output omitted>
S2#

```
S2#show interface fastEthernet 0/1 switchport
Name: Fa0/1
Switchport: Enabled
Administrative Mode: dynamic auto
Operational Mode: trunk
Administrative Trunking Encapsulation: dot1q
Operational Trunking Encapsulation: dot1q
Negotiation of Trunking: On
Access Mode VLAN: 1 (default)
Trunking Native Mode VLAN: 1 (default)
Voice VLAN: none
```

Notice that the administrative mode is set to **dynamic auto**. This is the default state of all ports on a Cisco IOS switch. However, DTP has negotiated trunking, so the operation mode is **trunk**, resulting in a native VLAN mismatch.

As a best practice, configure the administrative mode of the trunking interface to be in trunk mode. This ensures that the interface is statically configured as a trunk port and never negotiates a different mode.

S2(config)**#interface FastEthernet 0/1**
S2(config-if)**#switchport mode trunk**

To correct the native VLAN mismatch, configure the trunking port with the switchport trunk native vlan 99 command.

S2(config-if)**#switchport trunk native vlan 99**

```
S2(config)#inter
S2(config)#interface fast
S2(config)#interface fastEthernet 0/1
S2(config-if)#sw
S2(config-if)#switchport mode trunk
S2(config-if)#sw
S2(config-if)#switchport trunk native vlan 99
S2(config-if)#%SPANTREE-2-UNBLOCK_CONSIST_PORT: Unblocking FastEthernet0/1 on VLAN0099.
Port consistency restored.

%SPANTREE-2-UNBLOCK_CONSIST_PORT: Unblocking FastEthernet0/1 on VLAN0001. Port
consistency restored.
```

Step 4. Verify trunking is enabled on S3 and configure VLAN 99 as the native VLAN.

DTP has also successfully negotiated a trunk between S1 and S3.

S3#**show interfaces fastEthernet 0/3 switchport**
Name: Fa0/3
Switchport: Enabled
Administrative Mode: dynamic auto
Operational Mode: trunk
Administrative Trunking Encapsulation: dot1q
Operational Trunking Encapsulation: dot1q
Negotiation of Trunking: On
Access Mode VLAN: 1 (default)
Trunking Native Mode VLAN: 1 (default)
<output omitted>
S3#

```
S3#show interfaces fastEthernet 0/3 switchport
Name: Fa0/3
Switchport: Enabled
Administrative Mode: dynamic auto
Operational Mode: trunk
Administrative Trunking Encapsulation: dotlq
Operational Trunking Encapsulation: dotlq
Negotiation of Trunking: On
Access Mode VLAN: 1 (default)
Trunking Native Mode VLAN: 1 (default)
Voice VLAN: none
```

Configure the administrative mode of the trunking interface to be in trunk mode, and correct the native VLAN mismatch with the **switchport trunk native vlan 99** command.

```
S3(config-if)#interface fastEthernet 0/3
S3(config-if)#sw
S3(config-if)#switchport mode trunk
S3(config-if)#s
S3(config-if)#sw
S3(config-if)#switchport trunk native vlan 99
S3(config-if)#%SPANTREE-2-UNBLOCK_CONSIST_PORT: Unblocking FastEthernet0/3 on VLAN0099.
Port consistency restored.

%SPANTREE-2-UNBLOCK_CONSIST_PORT: Unblocking FastEthernet0/3 on VLAN0001. Port
consistency restored.
```