**1 VLAN Configuration**



|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Device** | **Interface** | **IP Address** | **Subnet Mask** | **Gateway (if needed)** |
| ESW1 | VLAN 99 | 172.17.99.11 | 255.255.255.0 | N/A |
| ESW2 | VLAN 99 | 172.17.99.12 | 255.255.255.0 | N/A |
| ESW3 | VLAN 99 | 172.17.99.13 | 255.255.255.0 | N/A |
| ESW4 | VLAN 99 | 172.17.99.14 | 255.255.255.0 | N/A |
| PC1 | NIC | 172.17.10.21 | 255.255.255.0 | 172.17.10.1 |
| PC2 | NIC | 172.17.20.22 | 255.255.255.0 | 172.17.20.1 |
| PC3 | NIC | 172.17.10.24 | 255.255.255.0 | 172.17.10.1 |
| PC4 | NIC | 172.17.20.25 | 255.255.255.0 | 172.17.20.1 |

**Initial Port Assignments (Switches 2 and 3)**

|  |  |  |
| --- | --- | --- |
| **Ports** | **Assignment** | **Network** |
| Fa0/1 - 1/2 | 802.1q Trunks (Native VLAN 99) | 172.17.99.0 /24 |
| FA1/3 - 1/7 | VLAN 10 - Faculty/Staff | 172.17.10.0 /24 |
| FA1/8 - 1/15 | VLAN 20 – Students | 172.17.20.0 /24 |

**Learning Objectives**

Upon completion of this lab, you will be able to:

 Cable a network according to the topology diagram

 Erase the startup configuration and reload a switch to the default state

 Perform basic configuration tasks on a switch

 Create VLANs

 Assign switch ports to a VLAN

 Add, move, and change ports

 Verify VLAN configuration

 Enable trunking on inter-switch connections

 Verify trunk configuration

 Save the VLAN configuration

**Task 1: Prepare the Network**

**Step 1: Cable a network that is similar to the one in the topology diagram.**

**Step 2: Disable all ports by using the shutdown command.**

Ensure that the initial switch port states are inactive with the **shutdown** command. Use the

**interfacerange** command to simplify this task.

ESW1(config)#**interface range fa1/1 - 15**

ESW1(config-if-range)#**shutdown**

ESW2(config)#**interface range fa1/1 - 15**

ESW2(config-if-range)#**shutdown**

ESW3(config)#**interface range fa1/1 - 15**

ESW3(config-if-range)#**shutdown**

ESW4(config)#**interface range fa1/1 - 15**

ESW4(config-if-range)#**shutdown**

**Task 2: Re-enable the user ports on ESW2 and ESW3 in access mode.**

ESW2(config)#**interface range FA1/3 , FA1/8**

ESW2(config-if)#**switchport mode access**

ESW2(config-if)#**no shutdown**

ESW3(config)# **interface range FA1/3 , FA1/8**

ESW3(config-if)#**switchport mode access**

ESW3(config-if)#**no shutdown**

**Task 3: Configure Host PCs**

Configure the Ethernet interfaces of PC1, PC2, PC3, and PC4 with the IP address, subnet mask, and gateway indicated in the addressing table at the beginning of the lab.

**PC-1> ip 172.17.10.21/24**

**PC-2> ip 172.17.20.22/24**

**PC-3> ip 172.17.10.24/24**

**PC-4> ip 172.17.20.25/24**

**Task 4: Configure VLANs on the Switch**

**Step 1: Create VLANs on ESW1.**

Use the **vlan** *vlan****-****id* command in global configuration mode to add a VLAN to switch ESW1. There are four VLANS configured for this lab: VLAN 10 (faculty/staff); VLAN 20 (students) and VLAN 99 (management). After you create the VLAN, you will be in vlan configuration mode, where you can assign a name to the VLAN with the name vlan name command.

**Configure and name VLANs on switches ESW1, ESW2, ESW3 and ESW4. See the example below:**

**ESW1(config)#vlan 10**

**ESW1(config-vlan)#name faculty/staff**

**ESW1(config)#vlan 20**

**ESW1(config-vlan)#name students**

**ESW1(config)#vlan 99**

**ESW1(config-vlan)#name management**

**ESW1(config-vlan)#end**

**Step 2: Verify that the VLANs have been created on all switches.**

Use the show vlan switch command to verify that the VLANs have been created.

**ESW1#show vlan-switch**

**Step 3: Assign switch ports to VLANs on ESW2 and ESW3.**

Refer to the port assignment table on page 2. Ports are assigned to VLANs in interface configuration mode, using the **switchport access vlan *vlan-id*** command. You can assign each port individually or you can use the **interface range** command to simplify this task, as shown here. The commands are **shown** for **ESW3 only**, but **you** should **configure ESW2** similarly. Save your configuration when done.

**ESW3(config)#interface range FA1/3 - 7**

**ESW3(config-if-range)#switchport access vlan 10**

**ESW3(config)#interface range FA1/8 - 15**

**ESW3(config-if-range)#switchport access vlan 20**

**ESW3(config-if-range)#end**

**ESW3#copy running-config startup-config**

**Step 4: Determine which ports have been added.**

Use the **show vlan id vlan-number** command on ESW2 and ESW3 to see which ports are assigned to

VLAN 10 and VLAN 20.

**ESW2#show vlan-switch id 10**

**ESW2#show vlan-switch id 20**

Which ports are assigned to VLAN 10?

Faculty/staff

Which ports are assigned to VLAN 20?

Students

**Step 5: Assign the management VLAN.**

From interface configuration mode, use the **ip address** command to assign the management IP address to the switches.

**ESW1(config)#interface vlan 99**

**ESW1(config-if)#ip address 172.17.99.11 255.255.255.0**

**ESW1(config-if)#no shutdown**

**ESW2(config)#interface vlan 99**

**ESW2(config-if)#ip address 172.17.99.12 255.255.255.0**

**ESW2(config-if)#no shutdown**

**ESW3(config)#interface vlan 99**

**ESW3(config-if)#ip address 172.17.99.13 255.255.255.0**

**ESW3(config-if)#no shutdown**

**ESW4(config)#interface vlan 99**

**ESW4(config-if)#ip address 172.17.99.14 255.255.255.0**

**ESW4(config-if)#no shutdown**

**Step 6**: **Configure trunking and the native VLAN for the trunking ports on all switches.**

Trunks are connections between the switches that allow the switches to exchange information for all VLANS. By default, a trunk port belongs to all VLANs, as opposed to an access port, which can only belong to a single VLAN. If the switch supports both ISL and 802.1Q VLAN encapsulation, the trunks must specify which method is being used. Because the 2960 switch only supports 802.1Q trunking, it is not specified in this lab.

A native VLAN is assigned to an 802.1Q trunk port. In the topology, the native VLAN is VLAN 99. An 802.1Q trunk port supports traffic coming from many VLANs (tagged traffic) as well as traffic that does not come from a VLAN (untagged traffic). The 802.1Q trunk port places untagged traffic on the native VLAN. Untagged traffic is generated by a computer attached to a switch port that is configured with the native VLAN. One of the IEEE 802.1Q specifications for Native VLANs is to maintain backward compatibility with untagged traffic common to legacy LAN scenarios. For the purposes of this lab, a native VLAN serves as a common identifier on opposing ends of a trunk link. It is a best practice to use a VLAN other than VLAN 1 as the native VLAN.

Use the **interface range** command in global configuration mode to simplify configuring trunking.

**ESW1(config)#interface range fa1/1 - 2**

**ESW1(config-if-range)#switchport mode trunk**

**ESW1(config-if-range)#switchport trunk native vlan 99**

**ESW1(config-if-range)#no shutdown**

**ESW1(config-if-range)#end**

**ESW2(config)# interface range fa1/1 - 2**

**ESW2(config-if-range)#switchport mode trunk**

**ESW2(config-if-range)#switchport trunk native vlan 99**

**ESW2(config-if-range)#no shutdown**

**ESW2(config-if-range)#end**

**ESW3(config)# interface range fa1/1 - 2**

**ESW3(config-if-range)#switchport mode trunk**

**ESW3(config-if-range)#switchport trunk native vlan 99**

**ESW3(config-if-range)#no shutdown**

**ESW3(config-if-range)#end**

**ESW4(config)# interface range fa1/1 - 2**

**ESW4(config-if-range)#switchport mode trunk**

**ESW4(config-if-range)#switchport trunk native vlan 99**

**ESW4(config-if-range)#no shutdown**

**ESW4(config-if-range)#end**

Verify that the trunks have been configured with the **show interface trunk** command.

ESW1# **show interface trunk**

ESW2# **show interface trunk**

ESW3# **show interface trunk**

ESW4# **show interface trunk**

**Step 7: Verify that the switches can communicate.**

From ESW1, ping the management address on ESW2, ESW3, ESW4.

ESW1# **ping 172.17.99.12**

ESW1# **ping 172.17.99.13**

ESW1# **ping 172.17.99.14**

**Step 8: Ping several hosts.**

Ping from host PC2 to host PC1 (172.17.10.21). Is the ping attempt successful? \_\_no

Ping from host PC1 to host PC4 (172.17.20.25). Is the ping attempt successful? no

Ping from host PC2 to the switch VLAN 99 IP address 172.17.99.12. Is the ping attempt

successful? no

Because these hosts are on different subnets and in different VLANs, they cannot communicate

without a Layer 3 device to route between the separate subnetworks.

Ping from host PC1 to host PC3. Is the ping attempt successful

Yes

Ping from host PC2 to host PC4. Is the ping attempt successful?

yes

**Answer all of the above questions in the document. Copy and paste running configurations from each switch below:**

**Esw1,2,3 and 4 in order below.**

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