



2.1. Configure and verify VLANs spanning multiple switches & 2.2. Configure and verify interswitch connectivity

Objective:

Configure and verify VLANs spanning multiple switches, including access (data and voice), default VLAN behavior, inter-VLAN connectivity, and trunking with 802.1Q encapsulation and native VLAN assignment.

Topology

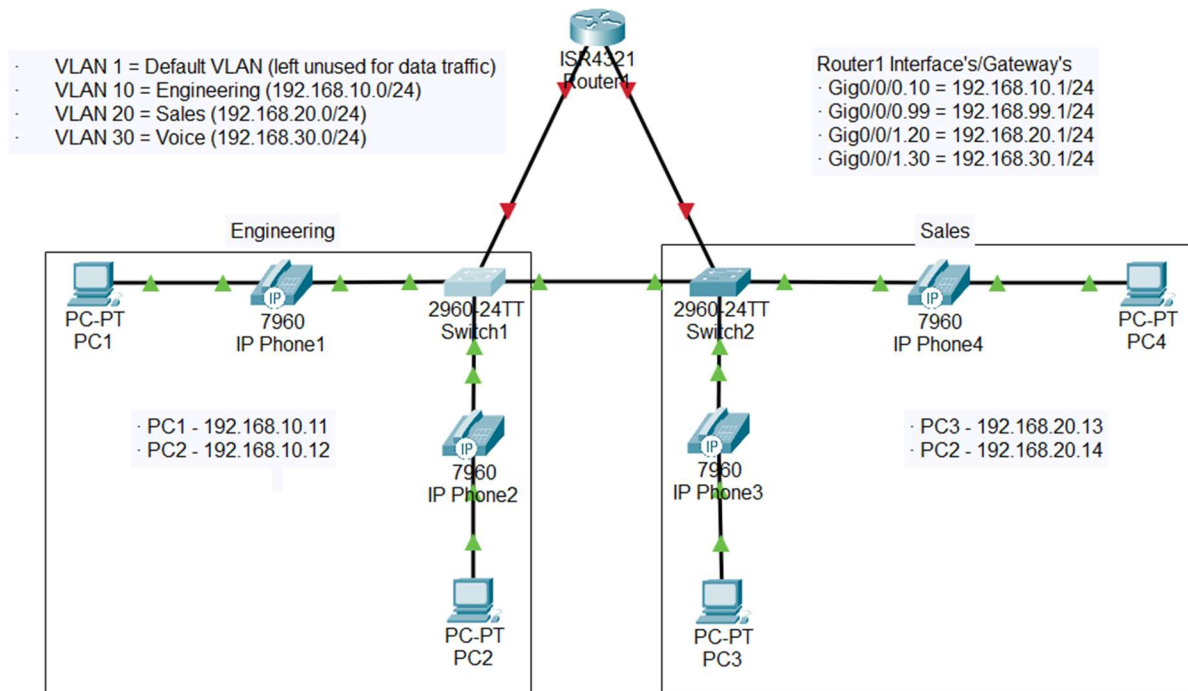
- **Switch1** and **Switch2** connected via trunk (Gig0/2 ↔ Gig0/2).
- **Router1** connected to **Switch1** via Trunk (Gig0/0/0 ↔ Gig0/1).
- **Router1** connected to **Switch2** via Trunk (Gig0/0/1 ↔ Gig0/1).
- **PC1 (Engineering – VLAN 10) ↔ IP Phone (VLAN 30)** on **Switch1** Fa0/1
- **PC2 (Engineering - VLAN 10) ↔ IP Phone (VLAN 30)** on **Switch1** Fa0/2
- **PC3 (Sales – VLAN 20) ↔ IP Phone (VLAN 30)** on **Switch2** Fa0/3
- **PC4 (Sales – VLAN 20) ↔ IP Phone (VLAN 30)** on **Switch2** Fa0/4

VLAN Assignment

- **VLAN 1** = Default VLAN (left unused for data traffic)
- **VLAN 10** = **Engineering** (192.168.10.0/24)
- **VLAN 20** = **Sales** (192.168.20.0/24)
- **VLAN 30** = **Voice** (192.168.30.0/24)

This is an unofficial practice lab. Not affiliated with Cisco Systems, Inc.

- **VLAN 99 = Management** (192.168.99.0/24) (Native VLAN/Management)



Lab Tasks

Step 1 – Create VLANs on Switch1 (S1) and Switch2 (S2):

- **VLAN 10** = Engineering (192.168.10.0/24)
- **VLAN 20** = Sales (192.168.20.0/24)
- **VLAN 30** = Voice (192.168.30.0/24)
- **VLAN 99** = Management VLAN (192.168.99.0/24) (Native VLAN)

Step 2 – Create Trunk Links:

- **Switch1 Gig0/2 → Switch2 Gig0/2**

Step 3 – Assign Native VLAN to trunk ports:

- **VLAN 99**

Step 4 – Assign Access and Voice Switchports:

- PC1 (VLAN 10) & IP Phone 1 (Voice VLAN 30) → S1 Fa0/1
- PC2 (VLAN 10) & IP Phone 2 (Voice VLAN 30) → S1 Fa0/2
- PC3 (VLAN 20) & IP Phone 3 (Voice VLAN 30) → S2 Fa0/3
- PC4 (VLAN 20) & IP Phone 4 (Voice VLAN 30) → S2 Fa0/4

Step 5 – Assign IP Addresses to PCs:

- PC1: 192.168.10.11/24 → GW 192.168.10.1
- PC2: 192.168.10.12/24 → GW 192.168.10.1
- PC3: 192.168.20.13/24 → GW 192.168.20.1
- PC4: 192.168.20.14/24 → GW 192.168.20.1

Step 6 – Verify Connectivity

- Each PC can ping its default gateway.
- PCs on different subnets can ping each other.

ANSWERS BEYOND THIS POINT.
LET’S SEE HOW YOU DID!.....

Solution Key

Step 1 – Create VLANs on Switch1 (S1) and Switch2 (S2):

Switch1> enable

Switch1# configure terminal

Switch1(config)# vlan 10

Switch1(config-vlan)# name Engineering

Switch1(config-vlan)# exit

```
Switch1>en
Switch1#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Switch1(config)#vlan 10
Switch1(config-vlan)#name Engineering
Switch1(config-vlan)#exit
Switch1(config)#
```

- Repeat steps above to create VLAN 20, 30, and 99 on Switch1 AND Switch2. Ensure you name each VLAN with the correct name found on page 1 & 2.

Step 2 – Create Trunk Links:

Switch1> enable

Switch1# configure terminal

Switch1(config)# interface range g0/1-2

Switch1(config-if-range)# switchport trunk encapsulation dot1q

Switch1(config-if-range)# switchport mode trunk

(Note: Some Cisco switch's and router's use 802.1q encapsulation by default, so this command may not be needed or allowed. Use the "show interface trunk" command AFTER trunking the interface to verify what encapsulation protocol is being used.)

```
Switch1#show interface trunk
Port      Mode      Encapsulation  Status        Native vlan
Gig0/1    on        802.1q         trunking      99
Gig0/2    on        802.1q         trunking      99
```

- Repeat these steps on Switch2 AND the links connecting to Router1

Step 3 – Assign Native VLAN to trunk ports:

Switch1> enable

Switch1# configure terminal

Switch1(config)# interface range g0/1-2

Switch1(config-if-range)# switchport trunk native vlan 99

- Repeat these steps on Switch2 AND the links connecting to Router1

Step 4 – Assign Access and Voice Switchports:

Switch1> enable

Switch1# configure terminal

Switch1(config)# interface range fa0/1-2

Switch1(config-if-range)# switchport mode access

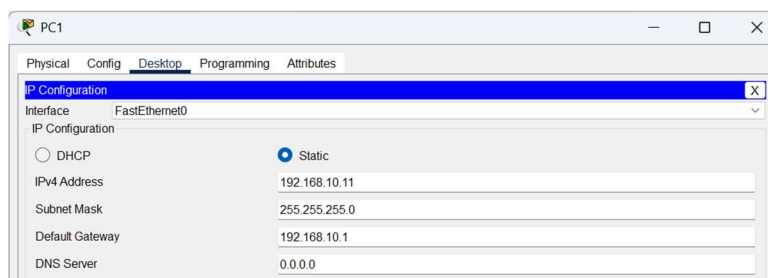
Switch1(config-if-range)# switchport access vlan 10

Switch1(config-if-range)# switchport voice vlan 30

- Repeat these steps on Switch2 on ports fa0/3 and fa0/4. Be sure to assign the Sales VLAN to the Sales computers, not the Engineering VLAN.

Step 5 – Assign IP Addresses to PCs:

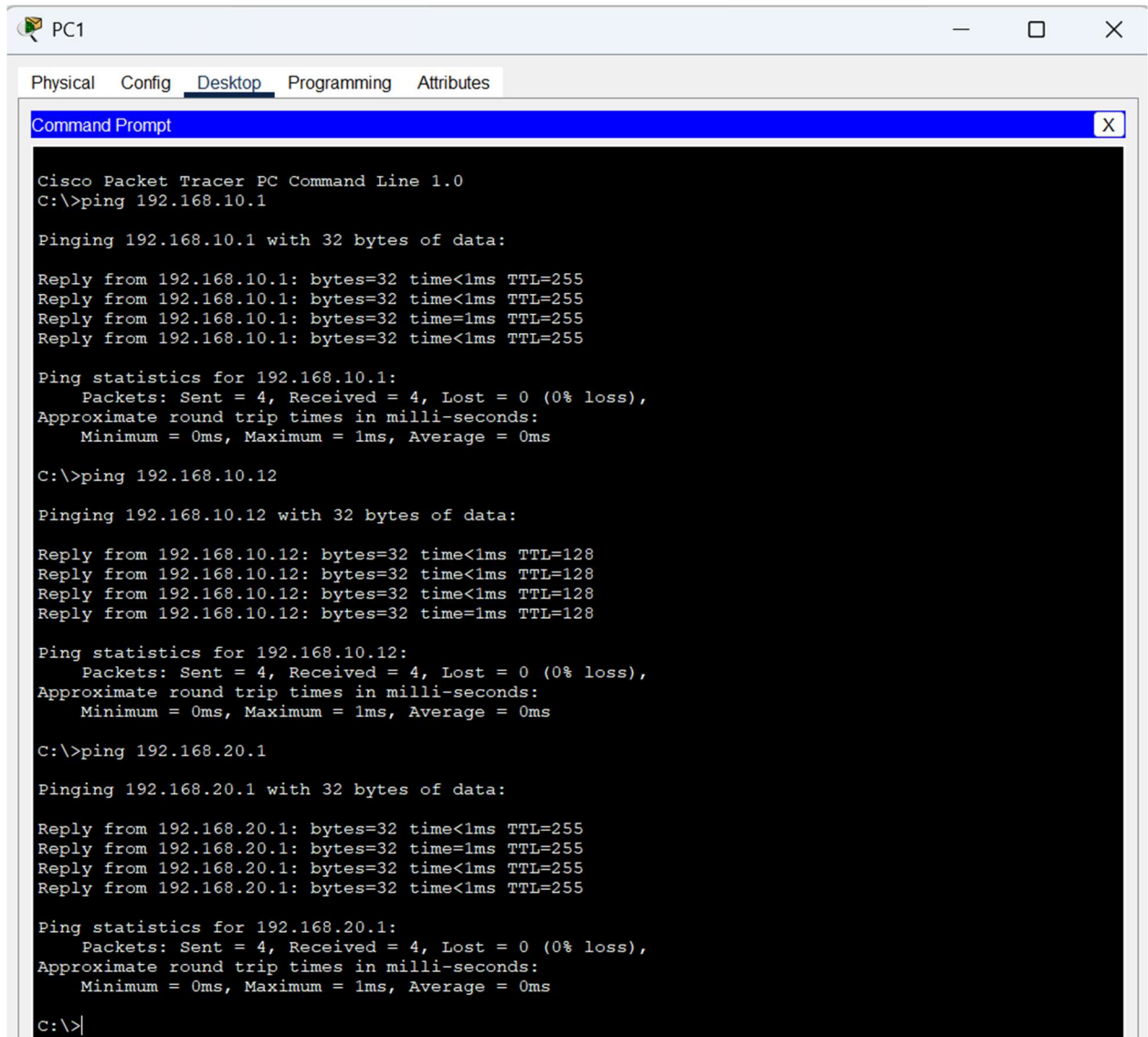
- PC1: 192.168.10.11/24 → GW 192.168.10.1
- PC2: 192.168.10.12/24 → GW 192.168.10.1
- PC3: 192.168.20.13/24 → GW 192.168.20.1
- PC4: 192.168.20.14/24 → GW 192.168.20.1



This is an unofficial practice lab. Not affiliated with Cisco Systems, Inc.

Step 6 – Confirm Connectivity:

- Each PC should be able to ping every default gateway and every PC



```
PC1
Physical Config Desktop Programming Attributes
Command Prompt
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.168.10.1

Pinging 192.168.10.1 with 32 bytes of data:

Reply from 192.168.10.1: bytes=32 time<1ms TTL=255
Reply from 192.168.10.1: bytes=32 time<1ms TTL=255
Reply from 192.168.10.1: bytes=32 time=1ms TTL=255
Reply from 192.168.10.1: bytes=32 time<1ms TTL=255

Ping statistics for 192.168.10.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\>ping 192.168.10.12

Pinging 192.168.10.12 with 32 bytes of data:

Reply from 192.168.10.12: bytes=32 time<1ms TTL=128
Reply from 192.168.10.12: bytes=32 time<1ms TTL=128
Reply from 192.168.10.12: bytes=32 time<1ms TTL=128
Reply from 192.168.10.12: bytes=32 time=1ms TTL=128

Ping statistics for 192.168.10.12:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\>ping 192.168.20.1

Pinging 192.168.20.1 with 32 bytes of data:

Reply from 192.168.20.1: bytes=32 time<1ms TTL=255
Reply from 192.168.20.1: bytes=32 time=1ms TTL=255
Reply from 192.168.20.1: bytes=32 time<1ms TTL=255
Reply from 192.168.20.1: bytes=32 time<1ms TTL=255

Ping statistics for 192.168.20.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\>|
```