Inter-VLAN Configuration Guide for Cisco Packet Tracer Lab

Lab Overview

This lab demonstrates an Inter-VLAN setup to enable communication between the Sales and Accounts departments using a router and a switch. The topology includes:

- One router (Router0)
- One switch (Switch0)
- One server (Server-PT)
- Four PCs (PC0, PC1, PC2, PC3)
- IP addressing as per the diagram

Network Details

- **Sales Department VLAN (VLAN 10):** 192.168.1.0/24
  - PC0: 192.168.1.2
  - PC1: 192.168.1.3

- **Accounts Department VLAN (VLAN 20):** 192.168.2.0/24
  - PC2: 192.168.2.2
  - PC3: 192.168.2.3
  - Server-PT: 192.168.2.4

- **Router Interfaces:**
  - GigabitEthernet0/0.1 (VLAN 10): 192.168.1.1
  - GigabitEthernet0/0.2 (VLAN 20): 192.168.2.1

Step-by-Step Configuration

Step 1: Configure the Switch (Layer 2 and Layer 3 Settings)

1. Enter global configuration mode:

   ```
   enable
   configure terminal
   ```

2. Configure the trunk link to the router:

   ```
   interface GigabitEthernet0/1
   switchport mode trunk
   exit
   ```

3. Create VLANs and assign names:

   ```
   vlan 10
   name Sales
   exit
   vlan 20
   name Accounts
   exit
   ```

4. Assign ports to VLANs:

   ```
   interface range FastEthernet0/1-2
   switchport mode access
   switchport access vlan 10
   exit
   interface range FastEthernet0/3-4
   switchport mode access
   switchport access vlan 20
   exit
   ```

5. Enable IP routing on the switch (if acting as Layer 3):

   ```
   ip routing
   ```

6. Configure IP addresses for VLAN interfaces:

```
interface vlan 10
ip address 192.168.1.1 255.255.255.0
no shutdown
exit
interface vlan 20
ip address 192.168.2.1 255.255.255.0
no shutdown
exit
```

7. Save the configuration:

```
write memory
```

Step 2: Configure the Router

1. Enter global configuration mode:

```
enable
configure terminal
```

2. Enable the physical interface:

```
interface GigabitEthernet0/0
no shutdown
exit
```

3. Configure subinterfaces for VLANs:

```
interface GigabitEthernet0/0.1
encapsulation dot1Q 10
ip address 192.168.1.1 255.255.255.0
exit
interface GigabitEthernet0/0.2
encapsulation dot1Q 20
ip address 192.168.2.1 255.255.255.0
exit
```

4. Save the configuration:

```
write memory
```

Step 3: Configure PCs and Server

1. Configure PC0:

   - IP Address: 192.168.1.2
   - Subnet Mask: 255.255.255.0
   - Gateway: 192.168.1.1

2. Configure PC1:

   - IP Address: 192.168.1.3
   - Subnet Mask: 255.255.255.0
   - Gateway: 192.168.1.1

3. Configure PC2:

   - IP Address: 192.168.2.2
   - Subnet Mask: 255.255.255.0
   - Gateway: 192.168.2.1

4. Configure PC3:

   - IP Address: 192.168.2.3
   - Subnet Mask: 255.255.255.0
   - Gateway: 192.168.2.1

5. Configure Server-PT:

   - IP Address: 192.168.2.4
   - Subnet Mask: 255.255.255.0
   - Gateway: 192.168.2.1

Step 4: Verify Configuration

1. Check VLAN configuration on the switch:

   ```
   show vlan brief
   ```

2. Verify trunk status on the switch:

   ```
   show interfaces trunk
   ```

3. Check routing table on the router:

```
show ip route
```

4. Test intra-VLAN and inter-VLAN connectivity:

   - From PC0, ping PC1 (should succeed).
   - From PC2, ping PC3 (should succeed).
   - From PC0, ping PC2 (should succeed due to inter-VLAN routing).

5. If connectivity fails, troubleshoot:

   - Verify IP configurations on PCs and server.
   - Ensure trunk link is active between switch and router.
   - Check subinterface encapsulation and IP settings on the router.

Troubleshooting Tips

- Use `ping` and `tracert` to diagnose connectivity.

- Verify VLAN assignments with `show vlan brief`.

- Ensure encapsulation matches on router subinterfaces and switch trunk.

Conclusion

This configuration establishes Inter-VLAN routing between the Sales and Accounts departments using a router with subinterfaces. Test connectivity between PCs in different VLANs to confirm proper routing.