VLAN Segmentation on Packet Tracer

WE Innovate X Zero$ploit

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Topology Requirements

- 1 Router (Cisco 2911 or similar)
- 1 Switch (Layer 2, e.g., 2960)
- 25 PCs (5 assigned per VLAN)
- 1 Trunk Link between router and switch

VLAN Design

Department	VLAN ID	Subnet	Example IP Range	Default Gateway
HR	10	192.168.10.0/24	192.168.10.1 – 192.168.10.254	192.168.10.1
Sales	20	192.168.20.0/24	192.168.20.1 – 192.168.20.254	192.168.20.1
DEV	30	192.168.30.0/24	192.168.30.1 – 192.168.30.254	192.168.30.1
PR	40	192.168.40.0/24	192.168.40.1 – 192.168.40.254	192.168.40.1
Finance	50	192.168.50.0/24	192.168.50.1 – 192.168.50.254	192.168.50.1

Each PC will be manually assigned an IP address within its VLAN subnet.

Step-by-Step Configuration

Configuration Steps

1. Switch Configuration

On the switch, we will configure VLANs and assign ports to the respective VLANs. Each department's PCs will be connected to access ports belonging to their VLAN.

Example commands:

```
Switch> enable
Switch# configure terminal
Switch(config)# vlan 10
Switch(config-vlan)# name HR
Switch(config-vlan)# exit
Switch(config)# vlan 20
Switch(config-vlan)# name Sales
...
Switch(config)# interface fa0/1
Switch(config-if)# switchport mode access
Switch(config-if)# switchport access vlan 10
```

Repeat this process for all VLANs and assign ports accordingly.

2. Trunk Link Configuration

We configure the link between the router and the switch as a trunk link so it can carry multiple VLANs' traffic.

```
Switch(config)# interface fa0/24
Switch(config-if)# switchport mode trunk
```

3. Router-on-a-Stick Configuration

We enable inter-VLAN routing by configuring sub-interfaces on the router (Router-on-a-Stick method). Each sub-interface will be assigned an IP address that acts as the default gateway for its VLAN.

Example commands:

```
Router> enable
Router# configure terminal
Router(config)# interface fa0/0
```

```
Router(config-if)# no shutdown
Router(config)# interface fa0/0.10
Router(config-subif)# encapsulation dot1Q 10
Router(config-subif)# ip address 192.168.10.1 255.255.255.0
Router(config)# interface fa0/0.20
Router(config-subif)# encapsulation dot1Q 20
Router(config-subif)# ip address 192.168.20.1 255.255.255.0
...
Router(config)# interface fa0/0.50
Router(config-subif)# encapsulation dot1Q 50
Router(config-subif)# ip address 192.168.50.1 255.255.255.0
```

Repeat this for all VLANs.

4. PC Configuration

Each PC should be configured with a static IP address within its VLAN subnet, along with the correct default gateway. For example, HR PCs (VLAN 10) might be configured in the range 192.168.10.2 - 192.168.10.6 with gateway 192.168.10.1.

Verification & Testing

Once configuration is complete:

- Test connectivity within the same VLAN using ping.
- Test inter-VLAN connectivity by pinging devices across VLANs.
- Ensure all PCs can reach the Finance VLAN.
- Verify that VLAN segmentation prevents unauthorized cross-department communication.