

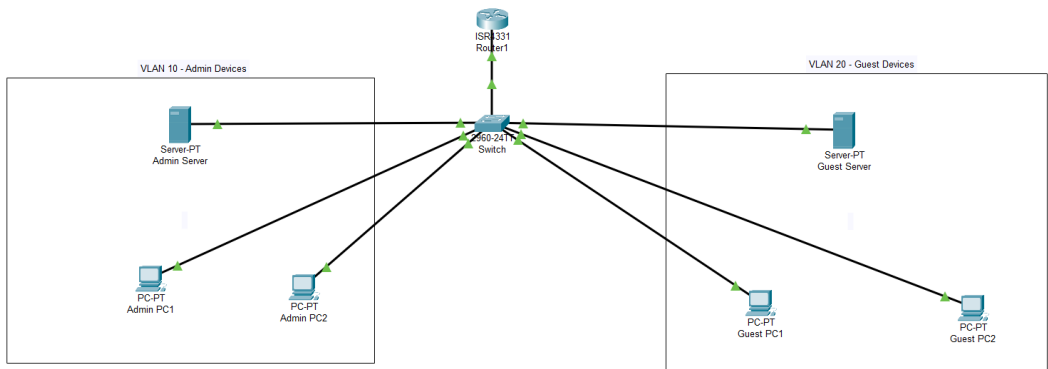
# Networking Foundations Lab: VLAN & IP Address Configuration

## 1. Objective

To design and implement a segmented virtual network using VLANs and IP addressing to enhance network security, organization, and performance.

### Network Design Overview

VLAN	Purpose	Subnet
VLAN 10	Administrative Traffic	192.168.10.0/24
VLAN 20	Guest Traffic	192.168.20.0/24



Network Topology

```
C:\>ping 192.168.10.2

Pinging 192.168.10.2 with 32 bytes of data:

Reply from 192.168.10.2: bytes=32 time<1ms TTL=128
Reply from 192.168.10.2: bytes=32 time<1ms TTL=128
Reply from 192.168.10.2: bytes=32 time<1ms TTL=128
Reply from 192.168.10.2: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.10.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

Intra-VLAN Ping (Same VLAN communication)

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.168.20.4

Pinging 192.168.20.4 with 32 bytes of data:

Request timed out.
Reply from 192.168.20.4: bytes=32 time=1ms TTL=127
Reply from 192.168.20.4: bytes=32 time<1ms TTL=127
Reply from 192.168.20.4: bytes=32 time<1ms TTL=127

Ping statistics for 192.168.20.4:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\>ipconfig

FastEthernet0 Connection:(default port)

    Connection-specific DNS Suffix...:
    Link-local IPv6 Address . . . . .: FE80::260:5CFF:FE9D:4739
    IPv6 Address . . . . .: ::
    IPv4 Address . . . . .: 192.168.10.3
    Subnet Mask . . . . .: 255.255.255.0
    Default Gateway . . . . .: ::
                                   192.168.10.1
```

Inter-VLAN Ping (Cross VLAN communication)

```
C:\>tracert 192.168.20.4

Tracing route to 192.168.20.4 over a maximum of 30 hops:

  0  0 ms    0 ms    0 ms    192.168.10.1
  1  0 ms    4 ms    0 ms    192.168.20.4

Trace complete.
```

TraceRoute Output

### Brief Summary

In this lab, VLAN segmentation and Inter-VLAN Routing were successfully implemented using Cisco Packet Tracer. VLAN 10 (Admin) and VLAN 20 (Guest) were configured to isolate traffic, and a Router-on-a-Stick setup enabled secure communication between VLANs.

This project demonstrates:

- ✓ Practical network segmentation for traffic isolation
- ✓ Efficient Inter-VLAN Routing to maintain controlled communication
- ✓ Foundational understanding of VLANs, IP management, and routing