**Scenario-Based Lab: Inter-VLAN Routing Using Trunking**

**🧩 Scenario:**

Your company **"NetCorp Pvt Ltd"** has recently expanded its departments into two different VLANs:

* **HR Department** (VLAN 10) is located on **Floor 1**.
* **IT Department** (VLAN 20) is located on **Floor 2**.

You are the network engineer assigned to:

* Segment users using VLANs
* Connect both floors using trunk ports
* Enable communication between departments using **Router-on-a-Stick**

The devices are already physically connected as per the diagram. You must **configure logical connectivity** so both PCs can communicate across VLANs via the router.

**🖥️ Topology Overview**

scss

CopyEdit

[PC1-HR] -- SW1 (Floor 1) -- Trunk -- Router -- Trunk -- SW2 (Floor 2) -- [PC2-IT]

**🛠️ Requirements:**

**1️⃣ VLAN Configuration:**

* Create VLAN 10 (HR) and VLAN 20 (IT) on both switches.
* Assign:
  + PC1 (connected to SW1 Fa0/1) to VLAN 10
  + PC2 (connected to SW2 Fa0/2) to VLAN 20

**2️⃣ Trunking:**

* Configure trunk links:
  + Between Router & SW1 (Fa0/5 on SW1)
  + Between SW1 & SW2 (Fa0/24 on both)

**3️⃣ Inter-VLAN Routing:**

* Configure **Router-on-a-Stick** with subinterfaces for both VLANs on interface G0/0.

**4️⃣ IP Addressing:**

| **Device** | **IP Address** | **VLAN** | **Gateway** |
| --- | --- | --- | --- |
| PC1 | 192.168.10.2/24 | 10 | 192.168.10.1 |
| PC2 | 192.168.20.2/24 | 20 | 192.168.20.1 |

**🧪 Tasks:**

**🔹 Switch 1 (Floor 1)**

bash

CopyEdit

enable

configure terminal

vlan 10

name HR

vlan 20

name IT

exit

interface fa0/1

switchport mode access

switchport access vlan 10

exit

interface fa0/5

switchport mode trunk

exit

interface fa0/24

switchport mode trunk

exit

**🔹 Switch 2 (Floor 2)**

bash

CopyEdit

enable

configure terminal

vlan 10

vlan 20

exit

interface fa0/2

switchport mode access

switchport access vlan 20

exit

interface fa0/24

switchport mode trunk

exit

**🔹 Router Configuration**

bash

CopyEdit

enable

configure terminal

interface g0/0.10

encapsulation dot1q 10

ip address 192.168.10.1 255.255.255.0

exit

interface g0/0.20

encapsulation dot1q 20

ip address 192.168.20.1 255.255.255.0

exit

interface g0/0

no shutdown

exit

**🔹 PC Configuration**

**PC1:**

* IP: 192.168.10.2
* Subnet: 255.255.255.0
* Gateway: 192.168.10.1

**PC2:**

* IP: 192.168.20.2
* Subnet: 255.255.255.0
* Gateway: 192.168.20.1

**✅ Verification**

On PC1:

bash

CopyEdit

ping 192.168.20.2

On Router:

bash

CopyEdit

ping 192.168.10.2

ping 192.168.20.2

**🎯 Success Criteria:**

* PC1 and PC2 can successfully ping each other.
* VLANs are correctly assigned.
* Trunk ports are operational.
* Router subinterfaces are up and routing between VLANs.

**Output**

C:\>ping 192.168.20.2

Pinging 192.168.20.2 with 32 bytes of data:

Reply from 192.168.20.2: bytes=32 time<1ms TTL=127

Reply from 192.168.20.2: bytes=32 time<1ms TTL=127

Reply from 192.168.20.2: bytes=32 time=1ms TTL=127

Reply from 192.168.20.2: bytes=32 time<1ms TTL=127

Ping statistics for 192.168.20.2:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\>ping 192.168.10.1

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 = 0ms, Average = 0ms

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=25ms TTL=127

Reply from 192.168.10.2: bytes=32 time<1ms TTL=127

Reply from 192.168.10.2: bytes=32 time<1ms TTL=127

Reply from 192.168.10.2: bytes=32 time=19ms TTL=127

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Router#sh arp

Protocol Address Age (min) Hardware Addr Type Interface

Internet 192.168.10.2 0 0030.F286.9286 ARPA GigabitEthernet0/0.10

Internet 192.168.20.2 0 0001.C7E3.88AB ARPA GigabitEthernet0/0.20

Router#