## Lab 8: IPv4 Static Routing

**🏢 Real-Time Scenario: Static Routing Between Branch Offices**

**📘 Company Background**

A company named **"CloudCore Solutions"** has two office branches:

* **Head Office** in **Hyderabad**
* **Branch Office** in **Bangalore**

Each office has its own internal network. The company has recently set up a private WAN link (leased line) between the two sites for secure communication.

**🌐 Network Details**

| **Location** | **Network** | **Gateway IP** |
| --- | --- | --- |
| Hyderabad Office | 192.168.10.0/24 | 192.168.10.1 |
| Bangalore Office | 192.168.20.0/24 | 192.168.20.1 |
| WAN Link | 192.168.100.0/30 | (point-to-point) |

* Hyderabad is managed by **Router1**
* Bangalore is managed by **Router2**
* The WAN link (leased line) connects **Router1 ↔ Router2**

**🎯 Goal**

Employees in the **Hyderabad Office** need to **access files and services** hosted in Bangalore (and vice versa). Since there is **no dynamic routing protocol** like OSPF or EIGRP in use, the **IT team decides to configure static routing** on both routers.

**🧰 How Static Routing Helps**

* **Router1** is told: “To reach the **192.168.20.0** network, send traffic to Router2 via the WAN link.”
* **Router2** is told: “To reach the **192.168.10.0** network, send traffic to Router1 via the WAN link.”

These static routes are manually configured, and don’t change unless the administrator modifies them.

### 🎯 ****Objective****

To configure **static routes** between routers to enable communication between networks in different geographic locations or departments.

## 🧱 ****Topology Overview****

css

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[PC1]---[Switch1]---[Router1]---[Router2]---[Switch2]---[PC2]

VLAN 10 R1 G0/0 R2 G0/0 VLAN 20

192.168.10.1 192.168.20.1

* **Router1** connects to **Network A (192.168.10.0/24)**
* **Router2** connects to **Network B (192.168.20.0/24)**
* Routers connected with a point-to-point link: 192.168.100.0/30

## 🧾 ****IP Addressing Plan****

| **Device** | **Interface** | **IP Address** | **Subnet Mask** |
| --- | --- | --- | --- |
| PC1 | — | 192.168.10.2 | 255.255.255.0 |
| Router1 | G0/0 | 192.168.10.1 | 255.255.255.0 |
| Router1 | G0/1 | 192.168.100.1 | 255.255.255.252 |
| Router2 | G0/0 | 192.168.100.2 | 255.255.255.252 |
| Router2 | G0/1 | 192.168.20.1 | 255.255.255.0 |
| PC2 | — | 192.168.20.2 | 255.255.255.0 |

* Full router configuration (Router1 and Router2)
* Switch configuration (Switch1 and Switch2)
* IP assignments for all PCs
* Static routing setup
* VLAN and trunk configuration (if used)

**🏗️ Lab 8 Topology Overview**

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[PC1]---[Switch1]---(G0/0)Router1(G0/1)---(G0/0)Router2(G0/1)---[Switch2]---[PC2]

**🧾 IP Addressing Plan**

**🔹 Network A (Hyderabad)**

* Network: 192.168.10.0/24
* Default Gateway: 192.168.10.1 (Router1 G0/0)
* PC1: 192.168.10.10 /24

**🔹 Network B (Bangalore)**

* Network: 192.168.20.0/24
* Default Gateway: 192.168.20.1 (Router2 G0/1)
* PC2: 192.168.20.10 /24

**🔹 WAN Link (Router1 ↔ Router2)**

* Network: 192.168.100.0/30
* Router1 G0/1: 192.168.100.1
* Router2 G0/0: 192.168.100.2

**🖧 Router Configuration**

**🔹 Router1**

bash

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enable

configure terminal

interface g0/0

ip address 192.168.10.1 255.255.255.0

no shutdown

interface g0/1

ip address 192.168.100.1 255.255.255.252

no shutdown

ip route 192.168.20.0 255.255.255.0 192.168.100.2

exit

**🔹 Router2**

bash

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enable

configure terminal

interface g0/0

ip address 192.168.100.2 255.255.255.252

no shutdown

interface g0/1

ip address 192.168.20.1 255.255.255.0

no shutdown

ip route 192.168.10.0 255.255.255.0 192.168.100.1

exit

**🔌 Switch Configuration**

**🔹 Switch1 (Hyderabad - VLAN 10)**

bash

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enable

configure terminal

vlan10

name hyd

interface range fa0/1 - 2

switchport mode access

switchport access vlan 10

no shut

📝 *Port Fa0/2 connects to Router1's G0/0.*

**🔹 Switch2 (Bangalore - VLAN 20)**

bash

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enable

configure terminal

vlan 20

name bng

interface range fa0/1 - 3

switchport mode access

switchport access vlan 20

no shut

exit

📝 *Port Fa0/2 connects to Router2's G0/1.*

**🖥️ PC IP Configuration**

**🔸 PC1 (Hyderabad)**

* IP: 192.168.10.10
* Subnet: 255.255.255.0
* Gateway: 192.168.10.1

**🔸 PC2 (Bangalore)**

* IP: 192.168.20.10
* Subnet: 255.255.255.0
* Gateway: 192.168.20.1

**✅ Testing**

**From PC1:**

bash

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ping 192.168.10.1 # Router1

ping 192.168.100.2 # Router2

ping 192.168.20.10 # PC2

**From PC2:**

bash

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ping 192.168.20.1 # Router2

ping 192.168.100.1 # Router1

ping 192.168.10.10 # PC1

## Output

## Pc1:

C:\>ping 192.168.20.10

Pinging 192.168.20.10 with 32 bytes of data:

Reply from 192.168.20.10: bytes=32 time<1ms TTL=126

Reply from 192.168.20.10: bytes=32 time<1ms TTL=126

Reply from 192.168.20.10: bytes=32 time=20ms TTL=126

Reply from 192.168.20.10: bytes=32 time<1ms TTL=126

Ping statistics for 192.168.20.10:

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

Approximate round trip times in milli-seconds:

Minimum = 0ms, Maximum = 20ms, Average = 5ms

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=254

Reply from 192.168.20.1: bytes=32 time<1ms TTL=254

Reply from 192.168.20.1: bytes=32 time=1ms TTL=254

Reply from 192.168.20.1: bytes=32 time<1ms TTL=254

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

## Pc2:

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 = 7ms, Average = 1ms

C:\>ping 192.168.10.10

Pinging 192.168.10.10 with 32 bytes of data:

Reply from 192.168.10.10: bytes=32 time<1ms TTL=126

Reply from 192.168.10.10: bytes=32 time<1ms TTL=126

Reply from 192.168.10.10: bytes=32 time<1ms TTL=126

Reply from 192.168.10.10: bytes=32 time<1ms TTL=126

Ping statistics for 192.168.10.10:

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

Approximate round trip times in milli-seconds:

## Minimum = 0ms, Maximum = 0ms, Average = 0ms