**Lab 14: Default Route – Real Scenario Lab**

**🧠 Real-World Scenario**

You work for a **small office**. Your network has:

* A few PCs connected to a **switch**
* A **router** connecting your office to the **internet via ISP router**

You want the office users to access **the internet**. To do this, you will configure a **default route** on your office router so any unknown traffic (like internet traffic) is sent to the **ISP router**.

**🌐 Network Topology**

less

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[PC] ───── [SWITCH] ───── [Router1] ───── [Router2 (ISP)]

|

(Simulated Internet)

**🖧 IP Address Plan**

| **Device** | **Interface** | **IP Address** | **Purpose** |
| --- | --- | --- | --- |
| PC | NIC | 192.168.1.10/24 | Office PC |
| Router1 | G0/0 | 192.168.1.1/24 | Connects to Switch |
| Router1 | G0/1 | 10.0.0.2/30 | Connects to ISP |
| Router2 | G0/0 | 10.0.0.1/30 | ISP Router |

**🔧 Step-by-Step Configuration**

**✅ 1. PC Configuration**

* IP Address: 192.168.1.10
* Subnet Mask: 255.255.255.0
* Default Gateway: 192.168.1.1

**✅ 2. Router1 (Office Router)**

bash

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enable

configure terminal

hostname R1

interface g0/0

ip address 192.168.1.1 255.255.255.0

no shutdown

interface g0/1

ip address 10.0.0.2 255.255.255.252

no shutdown

# Default route to ISP router

ip route 0.0.0.0 0.0.0.0 10.0.0.1

**✅ 3. Router2 (ISP Router)**

bash

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enable

configure terminal

hostname R2

interface g0/0

ip address 10.0.0.1 255.255.255.252

no shutdown

# Simulate Internet - Add Loopback as 8.8.8.8

interface loopback0

ip address 8.8.8.8 255.255.255.255

**🧪 Testing the Lab**

From **PC**, do:

bash

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ping 192.168.1.1 ✅ (Router1 - Gateway)

ping 10.0.0.1 ✅ (Router2 - ISP)

ping 8.8.8.8 ✅ (Simulated Internet)

From **Router1**, check default route:

bash

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show ip route

**✅ Why Use a Default Route?**

* Instead of configuring many routes, you say:

"If you don't know where to go, send traffic to the ISP."

This is used in **home routers**, **small offices**, and **branch sites** in enterprise networks.

### 🚨 Problem: PC1 can’t ping outside (like 10.0.0.1 or 8.8.8.8)

This is a **typical NAT issue** — because the ISP router doesn't know how to route **192.168.1.10** (private IP from PC1), and Router1 hasn't translated it.

## ✅ Solution: Configure NAT on ****Router1****

You’ll enable **PAT (Port Address Translation)** so private IPs (like PC1: 192.168.1.10) are translated into the Router1's WAN IP (10.0.0.2) before going to the ISP.

### 🔧 Step-by-Step NAT Configuration on ****Router1****

#### ✅ 1. **Define Inside and Outside Interfaces**

bash

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interface g0/0

ip nat inside

interface g0/1

ip nat outside

#### ✅ 2. **Create NAT Overload Rule**

bash

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access-list 1 permit 192.168.1.0 0.0.0.255

ip nat inside source list 1 interface g0/1 overload

### 📈 What This Does:

* Translates any IP from **192.168.1.0/24** going out through G0/1 into 10.0.0.2
* Makes return traffic work properly

### 🧪 Final Test:

On **PC1**, try:

bash

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ping 10.0.0.1 ✅ (Should work now)

ping 8.8.8.8 ✅ (Should work now)

**Output:**

C:\>ping 8.8.8.8

Pinging 8.8.8.8 with 32 bytes of data:

Reply from 8.8.8.8: bytes=32 time<1ms TTL=254

Reply from 8.8.8.8: bytes=32 time<1ms TTL=254

Reply from 8.8.8.8: bytes=32 time<1ms TTL=254

Reply from 8.8.8.8: bytes=32 time<1ms TTL=254

Ping statistics for 8.8.8.8:

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

Approximate round trip times in milli-seconds:

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

C:\>ping 10.0.0.1

Pinging 10.0.0.1 with 32 bytes of data:

Reply from 10.0.0.1: bytes=32 time<1ms TTL=254

Reply from 10.0.0.1: bytes=32 time<1ms TTL=254

Reply from 10.0.0.1: bytes=32 time<1ms TTL=254

Reply from 10.0.0.1: bytes=32 time<1ms TTL=254

Ping statistics for 10.0.0.1:

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

Approximate round trip times in milli-seconds:

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