

Packet Tracer Problem Statement

Title: Forcing Longest-Path Routing in a Multi-Router Network

Objective

Design and configure a routed network in Cisco Packet Tracer consisting of four routers such that **packets always traverse the longest available path** (in terms of number of router hops) when communicating between end networks.

Network Topology

You are given **four routers**:

- R1
- R2
- R3
- R4

Each router has:

- One **directly connected LAN**
- **Point-to-point links** to **two other routers**

The physical topology forms a **partial mesh**, where every router is connected to exactly two other routers.

Logical Connectivity Example

- R1 connected to R2 and R3
- R2 connected to R1 and R4
- R3 connected to R1 and R4
- R4 connected to R2 and R3

This creates **multiple possible paths** between any two networks.

IP Addressing Plan

Each router connects to a unique LAN:

| Router | LAN Network |
|--------|-----------------|
| R1 | 192.168.1.0 /24 |
| R2 | 192.168.2.0 /24 |
| R3 | 192.168.3.0 /24 |
| R4 | 192.168.4.0 /24 |

Use /30 subnets for all inter-router links.

Requirements

1. End Devices

- Connect at least one PC to each router's LAN.
- PCs must be able to communicate with PCs in all other LANs.

2. Routing

- Configure routing so that **packets do not take the shortest path**.
- Instead, traffic must **always follow the longest available path** (maximum hop count) to reach the destination network.

3. Routing Control

- You may use:
 - A dynamic routing protocol with modified metrics
 - Or static routing
- Default routing behavior must be overridden.

4. Verification

- Use ping and tracert / traceroute to prove that:
 - Connectivity exists between all LANs
 - Traffic follows the longest path, even when a shorter path is available
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Deliverables

1. Packet Tracer (.pkt) file
2. A short report including:
 - Network diagram
 - Routing method used
 - Explanation of how longest-path routing was enforced
 - Screenshots of routing tables and traceroute outputs