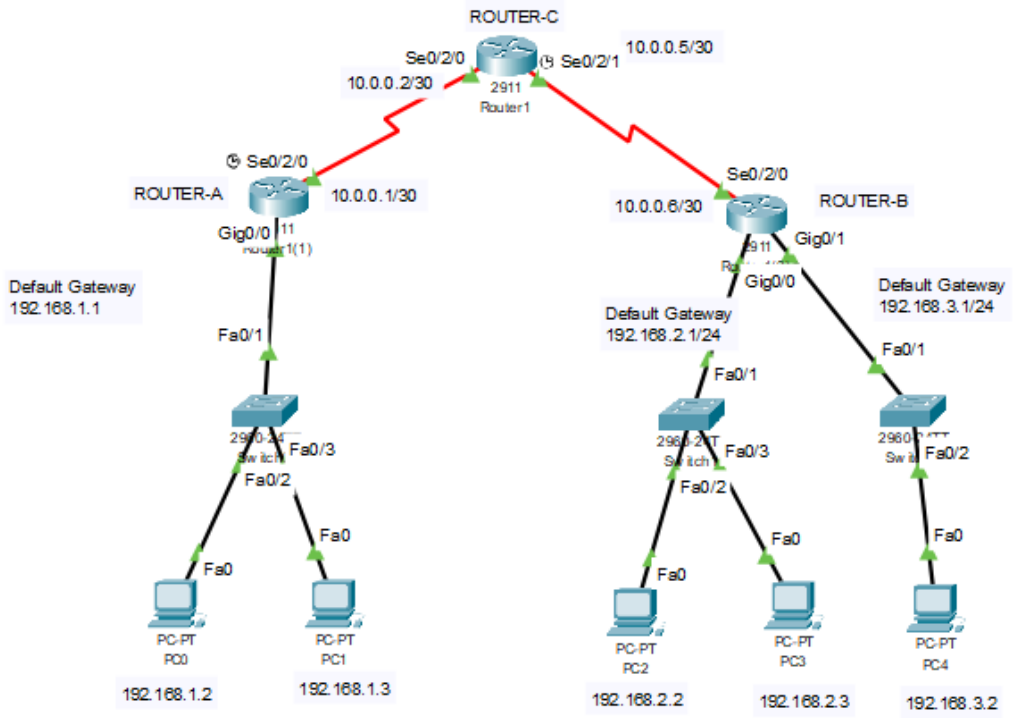
Lab 7: EIGRP Packet Tracer Lab

Objective: This lab will guide you through configuring EIGRP on a multi-router topology in Cisco Packet Tracer. You will learn to enable EIGRP, understand its basic configuration, disable auto-summary, configure passive interfaces, and verify routing table entries.

Topology Overview:

The lab consists of three routers (Router-A, Router-B, Router-C), two switches, and five PCs. The routers are interconnected using serial links, and the PCs are connected to the switches, which are then connected to the routers via Gigabit Ethernet interfaces.



1. IP Address Table

Before we dive into EIGRP, let's confirm the IP addressing for the entire topology. This table will be your reference for all configurations.

Device	Interface	IP Address	Subnet Mask	Default Gateway
Router-A	Gig0/0	192.168.1.1	255.255.255.0	N/A
	Se0/2/0	10.0.0.1	255.255.255.252	N/A

PC0	NIC	192.168.1.2	255.255.255.0	192.168.1.1
PC1	NIC	192.168.1.3	255.255.255.0	192.168.1.1
Router-C	Se0/2/0	10.0.0.2	255.255.255.252	N/A
	Se0/2/1	10.0.0.5	255.255.255.252	N/A
Router-B	Gig0/0	192.168.2.1	255.255.255.0	N/A
	Gig0/1	192.168.3.1	255.255.255.0	N/A
	Se0/2/0	10.0.0.6	255.255.255.252	N/A
PC2	NIC	192.168.2.2	255.255.255.0	192.168.2.1
PC3	NIC	192.168.2.3	255.255.255.0	192.168.2.1
PC4	NIC	192.168.3.2	255.255.255.0	192.168.3.1

2. EIGRP Configuration

Now, let's configure EIGRP on each router. We will use Autonomous System (AS) number 100 for all routers.

Important Note on Wildcard Masks: EIGRP uses wildcard masks in its `network` statements, which are the inverse of the subnet mask. For example, a subnet mask of `255.255.255.0` has a wildcard mask of `0.0.0.255`. A subnet mask of `255.255.255.252` has a wildcard mask of `0.0.0.3`.

ROUTER-A Configuration

1. Access Router-A's CLI.
2. Enter privileged EXEC mode, then global configuration mode.

```
ROUTER-A>enable
ROUTER-A#configure terminal
```

3. Enable EIGRP process with AS 100.

```
ROUTER-A(config)#router eigrp 100
```

4. Disable auto-summary. This is crucial for proper routing with discontiguous subnets and VLSM.

```
ROUTER-A(config-router)#no auto-summary
```

5. Advertise the directly connected networks. Remember to use wildcard masks.

```
ROUTER-A(config-router)#network 192.168.1.0 0.0.0.255
ROUTER-A(config-router)#network 10.0.0.0 0.0.0.3
```

6. Configure the Gigabit Ethernet interface (Gig0/0) as a passive interface. This prevents EIGRP updates from being sent out of this interface, as it's connected to a switch with end devices (PCs) and not another router.

```
ROUTER-A(config-router)#passive-interface Gig0/0
```

7. Save running configuration and Exit configuration mode.

```
ROUTER-A(config-router)#do write
ROUTER-A(config-router)#end
```

ROUTER-C Configuration

Follow similar Steps as in ROUTER-A.

ROUTER-B Configuration

Follow similar Steps as in ROUTER-A.

3. Verification and Troubleshooting

Now that EIGRP is configured, let's verify its operation and explore the routing tables.

Question 1: EIGRP Neighbors

- On Router-A, Router-B, and Router-C, use the command `show ip eigrp neighbors`.
- What output do you see?
- Can Router-A see Router-B as a neighbor directly? Why or why not?

Question 2: EIGRP Topology Table

- On Router-A, use the command `show ip eigrp topology`.
- What networks are listed in the topology table?
- Can you identify the Feasible Successor (FS) for any routes? (Look for `P` for Passive, which means stable, and then look for a backup path if available).

Question 3: Routing Table

- On Router-A, use the command `show ip route`.
- What routes do you see that are learned via EIGRP (indicated by 'D')?
- Can Router-A reach all the networks in the topology now? Specifically, can it reach 192.168.2.0/24 and 192.168.3.0/24?

Question 4: Ping Test

- From PC0, try to ping PC2 (192.168.2.2).
- From PC0, try to ping PC4 (192.168.3.2).
- Are the pings successful? If not, what might be the issue? (Hint: Think about default gateways and end-to-end connectivity).

Question 5: EIGRP Interface Status

- On any router, use the command `show ip eigrp interfaces`.
- What is the difference between an active EIGRP interface and a passive EIGRP interface in terms of sending/receiving EIGRP updates?

4. Advanced Verification (Optional)

These commands provide more in-depth information about EIGRP's operation.

- `show ip protocols`: Displays information about active routing protocols.
- `show ip eigrp traffic`: Shows the number of EIGRP packets sent and received.
- `debug eigrp packets`: (Use with caution in a lab environment, can generate a lot of output!) Shows EIGRP packet exchanges in real-time. Use `undebug all` to stop.

Troubleshooting Tips:

- `show ip interface brief`: Verify that all interfaces are "up/up" and have the correct IP addresses.
- `ping <destination_ip>`: Test connectivity between directly connected devices first, then progressively further.
- `show running-config | section eigrp`: Review your EIGRP configuration for any typos or missing commands.
- `clear ip eigrp neighbors`: If you suspect neighbor issues, this command can reset the neighbor adjacency.

Congratulations! You have successfully configured and verified EIGRP in your Packet Tracer lab. This hands-on experience is vital for understanding how EIGRP operates in a real-world network environment.