## Tutorial 1

1. You have been assigned the role of a network administrator to analyse, illustrate, and configure different types of static routes for the network topology shown in Figure 1-1, which has Internet Protocol version 4 (IPv4) addressing configured on all its devices.

   All devices are addressed as shown in Figure 1-1 and basic Layer 2 connectivity is operational. ORION forwards traffic for non-local destinations to AURORA over the Ethernet link. The Internet Service Provider (ISP) routes towards the ORION_LAB and NEBULA_LAB subnets. With these assumptions and by referring to Figure 1-1, complete the configurations requested on AURORA.

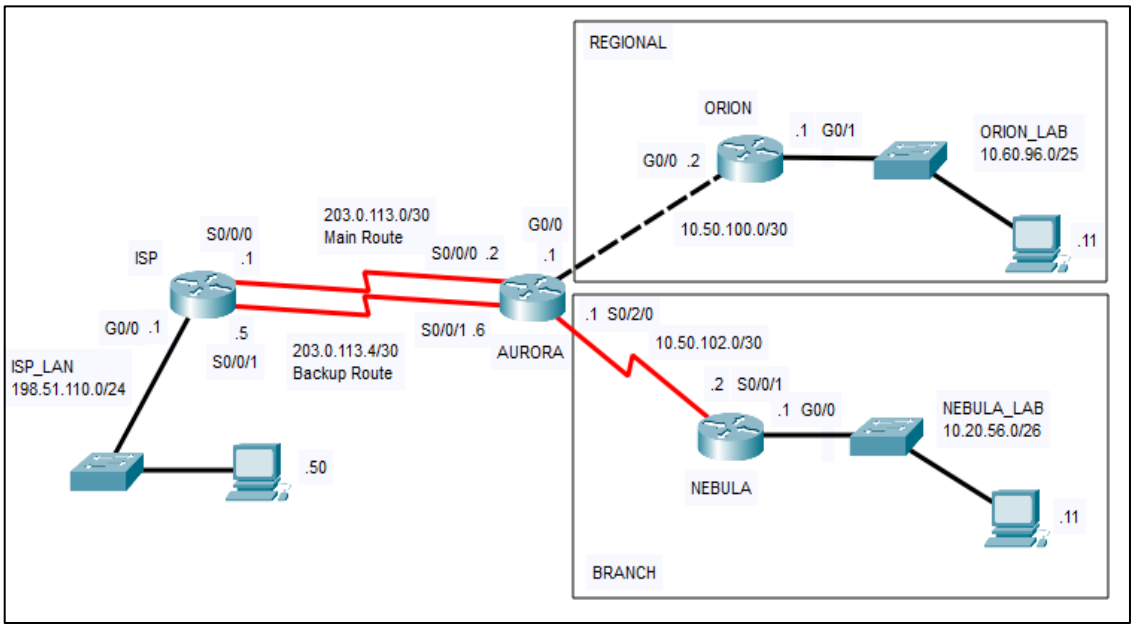



Figure 1-1: A Network Topology

a) On **AURORA**, complete the following configurations.

   (i) Configure a **default static route** and a **floating default static route** using **next-hop IP address** to forward traffic to the **ISP**. State your assumptions for the **floating default static route**. (4 marks)

   (ii) Configure a **standard static route** on **AURORA** using **exit interface** to reach **NEBULA_LAB** via **NEBULA**. (2 marks)

   (iii) Configure a **fully specified standard static route** on **AURORA** to reach **ORION_LAB** via **ORION**. (4 marks)

   (iv) Explain why a **fully specified static route** is required in Question 1 a) (iii). (6 marks)

2. Figure 1-1 network topology is using Internet Protocol version 4 (IPv4) addressing. Ali and you have been assigned by the company CEO to configure the company's network topology with different types of static routes. Answer the following questions to ensure successful communications between all hosts in Figure 1-1. Assume ISP router with static routing configurations have been completed.

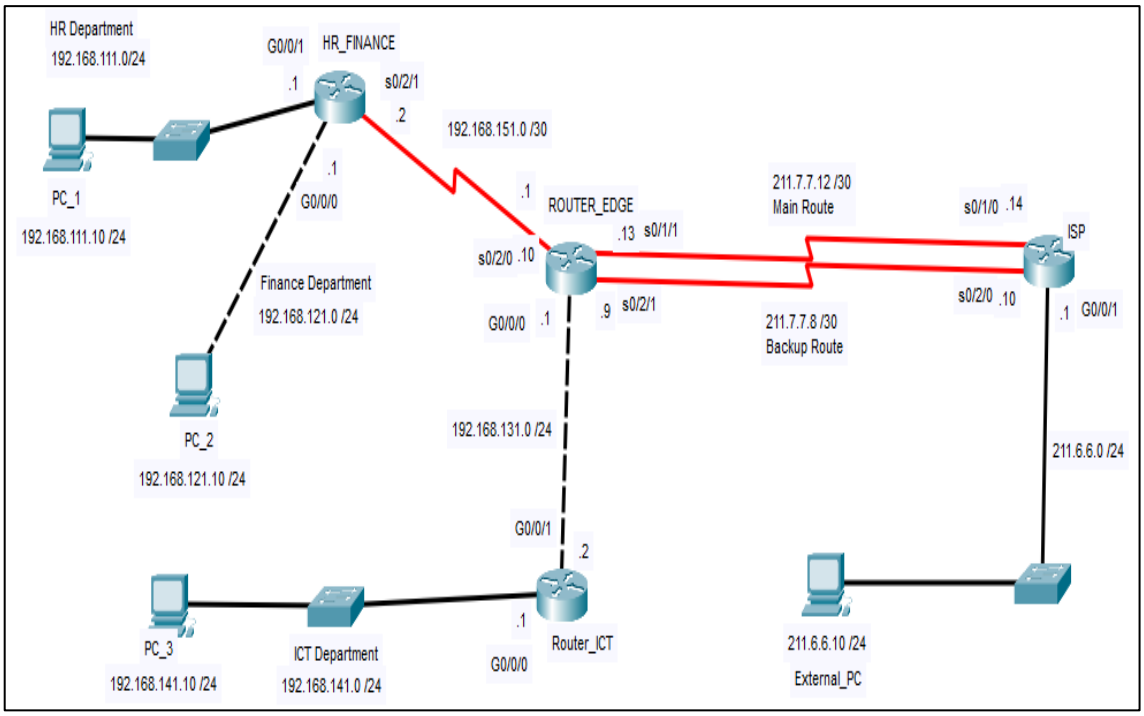



Figure 1-1: A network topology

```
ROUTER_EDGE#show ip route

Gateway of last resort is 211.7.7.14 to network 0.0.0.0

S 192.168.111.0/24 is directly connected, Serial0/2/0
S 192.168.121.0/24 [1/0] via 192.168.151.2
C 192.168.131.0/24 is directly connected, GigabitEthernet0/0/0
C 192.168.151.0/30 is directly connected, Serial0/2/0
C 211.7.7.8/30 is directly connected, Serial0/2/1
C 211.7.7.12/30 is directly connected, Serial0/1/1
```

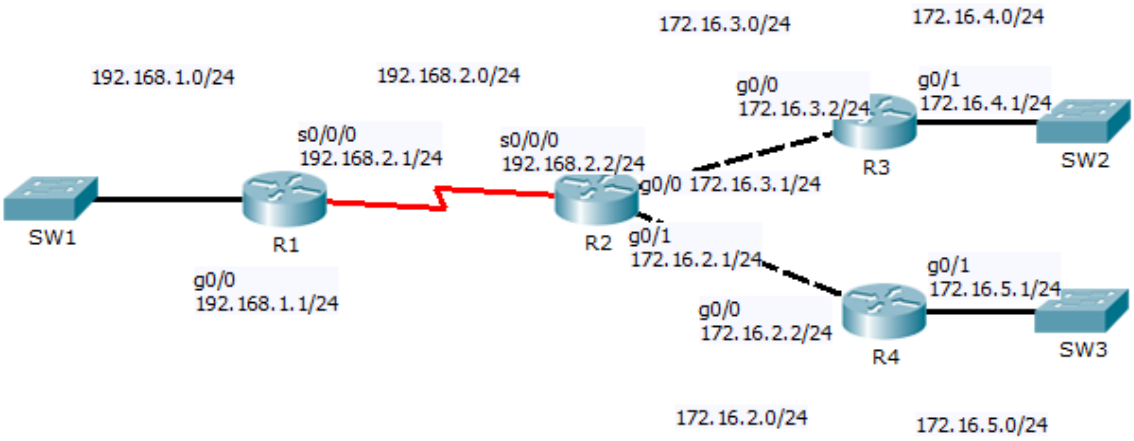
Figure 1-2: Partial output of "show ip route"

a) In **ROUTER_EDGE**, two **standard static routes** are configured, and the partial output of show ip route command is shown in Figure 1-2. Analyse Figure 1-1 and Figure 1-2 and illustrate **TWO (2)** differences between these standard static routes.

b) Explain the following output of show ip route in **ROUTER_EDGE**.
S* 0.0.0.0/0 [5/0] via 211.7.7.10

c) Explain **TWO (2)** differences between a **default static route** and a **floating default static route**.

3. Based on the network topology below, answer the following questions:




(a) In router R1, write a command to configure a **default static route** using the **exit interface**.

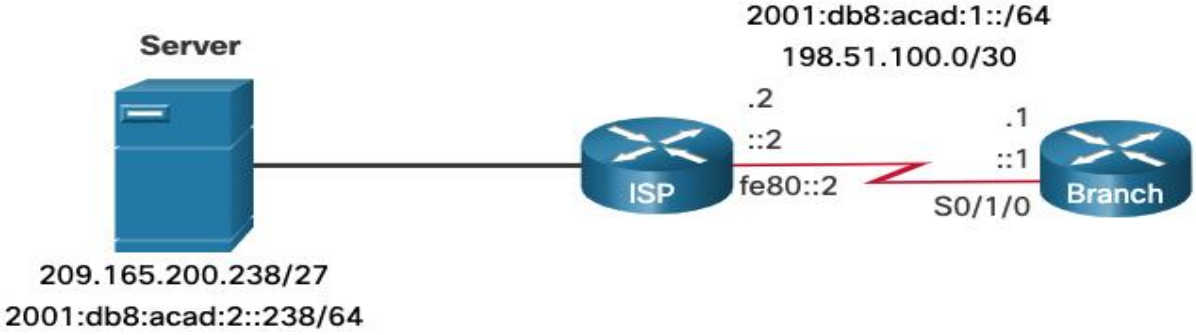
(b) In router R1, write a command to configure a **summary static route** for network 172.16.2.0/24 – 172.16.5.0/24 using the **next hop IP address**.

(c) In router R2, write a command to configure a **standard static route** for network 192.168.1.0/24 using the **exit interface**.

(d) In router R2, write two commands to configure **fully specified static routes** for network 172.16.4.0/24 and 172.16.5.0/24.

4. Illustrate in detail the **FIVE (5)** steps to obtain a Summary static route for the following networks with the same exit interface s0/0/0:
192.168.98.0, 192.168.99.0, 192.168.100.0, 192.168.101.0, 192.168.102.0

5. (i) Based on the following diagram, configure an IPv4 Static Host Route and IPv6 Static Host Route using next hop IP address in Branch to direct traffic to a Server.




(ii) Explain a host route.

(iii) Explain **TWO (2)** ways a host route can be added to the routing table.