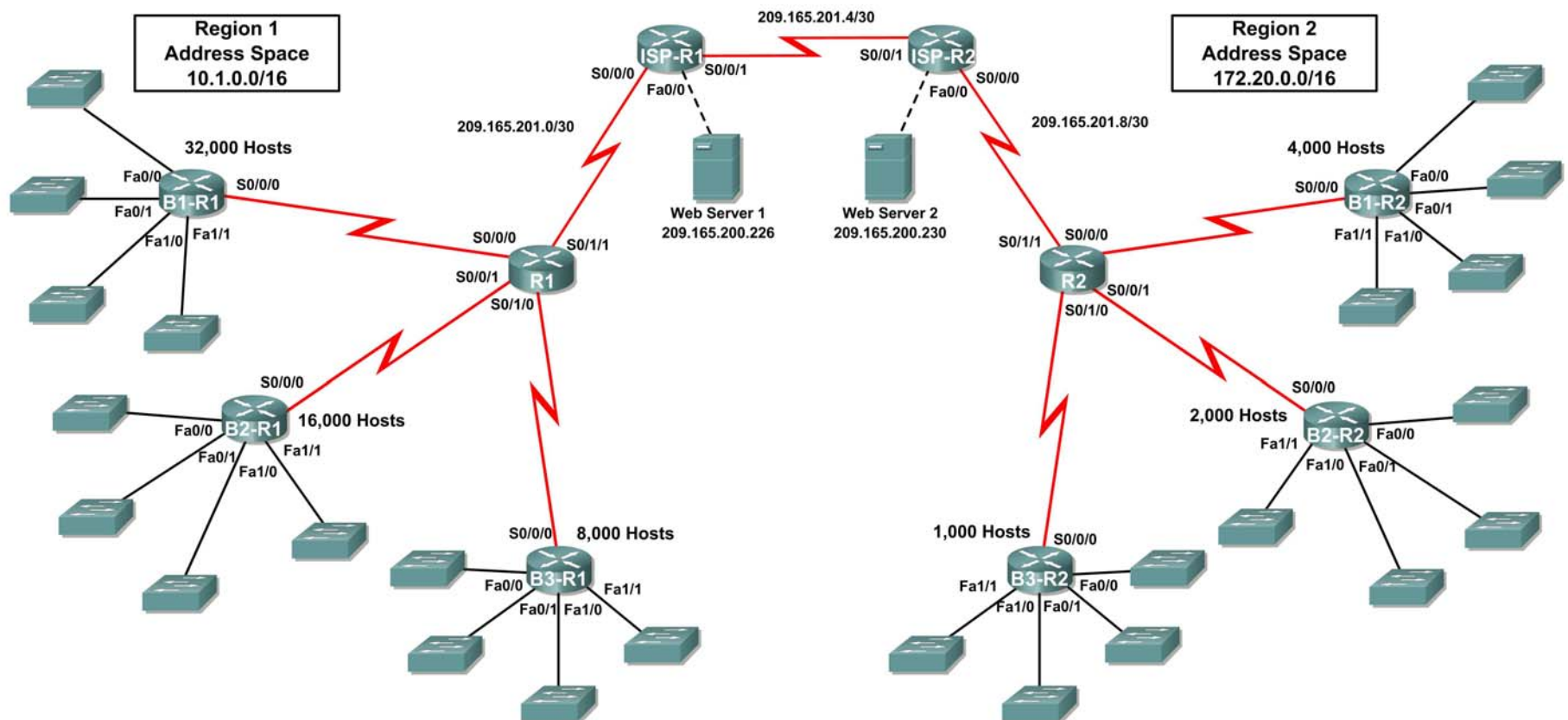


Ch6 – Packet Tracer Skills Integration Challenge (Instructor Version)

Topology Diagram



Addressing Table for R1

Device	Interface	IP Address	Subnet Mask
R1	S0/0/0	10.1.255.241	255.255.255.252
	S0/0/1	10.1.255.245	255.255.255.252
	S0/1/0	10.1.255.249	255.255.255.252
	S0/1/1	209.165.201.2	255.255.255.252
B1-R1	Fa0/0	10.1.0.1	255.255.224.0
	Fa0/1	10.1.32.1	255.255.224.0
	Fa1/0	10.1.64.1	255.255.224.0
	Fa1/1	10.1.96.1	255.255.224.0
	S0/0/0	10.1.255.242	255.255.255.252
B2-R1	Fa0/0	10.1.128.1	255.255.240.0
	Fa0/1	10.1.144.1	255.255.240.0
	Fa1/0	10.1.160.1	255.255.240.0
	Fa1/1	10.1.176.1	255.255.240.0
	S0/0/0	10.1.255.246	255.255.255.252
B3-R1	Fa0/0	10.1.192.1	255.255.248.0
	Fa0/1	10.1.200.1	255.255.248.0
	Fa1/0	10.1.208.1	255.255.248.0
	Fa1/1	10.1.216.1	255.255.248.0
	S0/0/0	10.1.255.250	255.255.255.252
ISP-R1	S0/0/0	209.165.201.1	255.255.255.252
	S0/0/1	209.165.201.5	255.255.255.252
	Fa0/0	209.165.200.225	255.255.255.252
Web Server 1	NIC	209.165.200.226	255.255.255.252

Addressing Table for R2

Device	Interface	IP Address	Subnet Mask
R2	S0/0/0	172.20.255.241	255.255.255.252
	S0/0/1	172.20.255.245	255.255.255.252
	S0/1/0	172.20.255.249	255.255.255.252
	S0/1/1	209.165.201.10	255.255.255.252
B1-R2	Fa0/0	172.20.0.1	255.255.252.0
	Fa0/1	172.20.4.1	255.255.252.0
	Fa1/0	172.20.8.1	255.255.252.0
	Fa1/1	172.20.12.1	255.255.252.0
	S0/0/0	172.20.255.242	255.255.255.252
B2-R2	Fa0/0	172.20.16.1	255.255.254.0
	Fa0/1	172.20.18.1	255.255.254.0
	Fa1/0	172.20.20.1	255.255.254.0
	Fa1/1	172.20.22.1	255.255.254.0
	S0/0/0	172.20.255.246	255.255.255.252
B3-R2	Fa0/0	172.20.24.1	255.255.255.0
	Fa0/1	172.20.25.1	255.255.255.0
	Fa1/0	172.20.26.1	255.255.255.0
	Fa1/1	172.20.27.1	255.255.255.0
	S0/0/0	172.20.255.250	255.255.255.252
ISP-R2	S0/0/0	209.165.201.6	255.255.255.252
	S0/0/1	209.165.201.9	255.255.255.252
	Fa0/0	209.165.200.229	255.255.255.252
Web Server 2	NIC	209.165.200.230	255.255.255.252

Introduction:

This activity focuses on subnetting skills with VLSM, basic device configurations, static routing and RIP routing. Once you have configured all devices, you will test for end to end connectivity and examine your configuration.

Objectives

- Design and document an addressing scheme based on requirements.
- Apply a basic configuration to the devices.
- Configure static routing between ISP routers.
- Configure RIPv2 routing in Region 1 (commands provided) and static routing Region 2

- Disable RIP updates on appropriate interfaces
- Configure default routes and redistribute through RIP
- Verify full connectivity between all devices in the topology.

Task 1: Design and document an addressing scheme.

Step 1: Design an addressing scheme.

Using the topology and the following requirements, design an addressing scheme:

- The WAN links between R1 and R2 and their respective ISP routers are already configured. Also, the links between the ISPs and the Web Servers are already configured.
- The address space for Region 1 is 10.1.0.0/16. Each branch router (B1-R1, B2-R1, and B3-R1) should be allotted address space based on the following requirements. Starting with the largest requirement, assign address space to each router
 - B1-R1 needs space for 32,000 hosts _____ **10.1.0.0/17**
 - B2-R1 needs space for 16,000 hosts _____ **10.1.128.0/18**
 - B3-R1 needs space for 8,000 hosts _____ **10.1.192.0/19**
 -
- Divide the address space for each branch router into four equal subnets. Record the subnets in the table below.

Router	Subnet Number	Subnet Address
B1-R1 Fa0/0	0	10.1.0.0/19
B1-R1 Fa0/1	1	10.1.32.0/19
B1-R1 Fa1/0	2	10.1.64.0/19
B1-R1 Fa1/1	3	10.1.96.0/19

Router	Subnet Number	Subnet Address
B2-R1 Fa0/0	0	10.1.128.0/20
B2-R1 Fa0/1	1	10.1.144.0/20
B2-R1 Fa1/0	2	10.1.160.0/20
B2-R1 Fa1/1	3	10.1.176.0/20

Router	Subnet Number	Subnet Address
B3-R1 Fa0/0	0	10.1.192.0/21
B3-R1 Fa0/1	1	10.1.200.0/21
B3-R1 Fa1/0	2	10.1.208.0/21
B3-R1 Fa1/1	3	10.1.216.0/21

- For the WANs in Region 1, subnet the address space 10.1.255.240/28. B1-R1 to R1 uses the first subnet, B2-R1 to R1 uses the second and B3-R1 to R1 the third. Record the subnets in the table below.

Router	Subnet Number	Subnet Address
B1-R1 <--> R1	0	10.1.255.240/30
B2-R1 <--> R1	1	10.1.255.244/30
B3-R1 <--> R1	2	10.1.255.248/30

- The address space for Region 2 is 172.20.0.0/16. Each branch router (B1-R2, B2-R2, and B3-R2) should be allotted address space based on the following requirements. Starting with the largest requirement, assign address space to each router
 - B1-R2 needs space for 4,000 hosts _____ 172.20.0.0/20
 - B2-R2 needs space for 2,000 hosts _____ 172.20.16.0/21
 - B3-R2 needs space for 1,000 hosts _____ 172.20.24.0/22
- Divide the address space for each branch router into four equal subnets. Record the subnets in the table below.

Router	Subnet Number	Subnet Address
B1-R2 Fa0/0	0	172.20.0.0/22
B1-R2 Fa0/1	1	172.20.4.0/22
B1-R2 Fa1/0	2	172.20.8.0/22
B1-R2 Fa1/1	3	172.20.12.0/22

Router	Subnet Number	Subnet Address
B2-R2 Fa0/0	0	172.20.16.0/23
B2-R2 Fa0/1	1	172.20.18.0/23
B2-R2 Fa1/0	2	172.20.20.0/23
B2-R2 Fa1/1	3	172.20.22.0/23

Router	Subnet Number	Subnet Address
B3-R2 Fa0/0	0	172.20.24.0/24
B3-R2 Fa0/1	1	172.20.25.0/24
B3-R2 Fa1/0	2	172.20.26.0/24
B3-R2 Fa1/1	3	172.20.27.0/24

- For the WANs in Region 2, subnet the address space 172.20.255.240/28. B1-R2 to R2 uses the first subnet, B2-R2 to R2 uses the second and B3-R2 to R2 the third. Record the subnets in the table below.

Router	Subnet Number	Subnet Address
B1-R2 <--> R2	0	172.20.255.240/30
B2-R2 <--> R2	1	172.20.255.244/30
B3-R2 <--> R2	2	172.20.255.248/30

Step 2: Document the addressing scheme.

- Document the IP addresses and subnet masks. Assign the first IP address to the router interface.
- For the WAN links, assign the first IP address to R1 and R2 for links to each router's perspective B1, B2, and B3 routers.

Task 2: Apply a basic configuration.

Using your documentation, configure the routers with basic configurations including addressing and hostnames. Use **cisco** as the line passwords and **class** as the secret password. Use 64000 as the clock rate.

Task 3: Configure static routing between ISP routers.

Each ISP router already has two static routes to the other ISP router's directly connected WANs. Implement static routing on each ISP router to insure connectivity between the two regions.

Task 4: Configure RIPv2 routing in Region 1 and static routing Region 2.

Step 1: Configure RIPv2 routing in Region 1.

Configure all routers in Region 1 (R1, B1-R1, B2-R1, and B3-R1) with RIP as the dynamic routing protocol. In order to fully appreciate the implementation of your VLSM design in a dynamic routing environment, add the following two commands to your RIP configurations:

```
Router(config-router)#version 2
```

```
Router(config-router)#no auto-summary
```

The **version 2** command enables RIPv2 which includes the sending of subnet mask information in routing updates. By default, RIPv2 summarizes updates at classful boundaries just like RIPv1. The **no auto-summary** command disables. These two commands will be fully explained in the next chapter.

Step 2: Configure static routing Region 2.

Region 2 is not using a dynamic routing protocol. Configure the routers with the necessary static and default routes to insure full end-to-end connectivity.

- R2 should have three static routes and one default route.
- B1-R2, B2-R2, and B3-R2 should have one default route each.

Task 5: Disable RIP updates on appropriate interfaces.

RIP updates do not need to be sent out all the router interfaces. Disable RIP updates on appropriate interfaces.

Task 6: Configure default routes and redistribute through RIP.

In Region 1, determine which router needs a default route. Then configure that router to redistribute the default route to other routers in the region.

Task 7: Verify full connectivity between all devices in the topology.

Step 1: Test connectivity.

- You should now have end-to-end connectivity. Use ping to test connectivity across the network. Each router should be able to ping all other router interfaces and both Web Servers.
- Troubleshoot until pings are successful.

Step 2: Examine the configuration.

Use verification commands to make sure your configurations are complete.