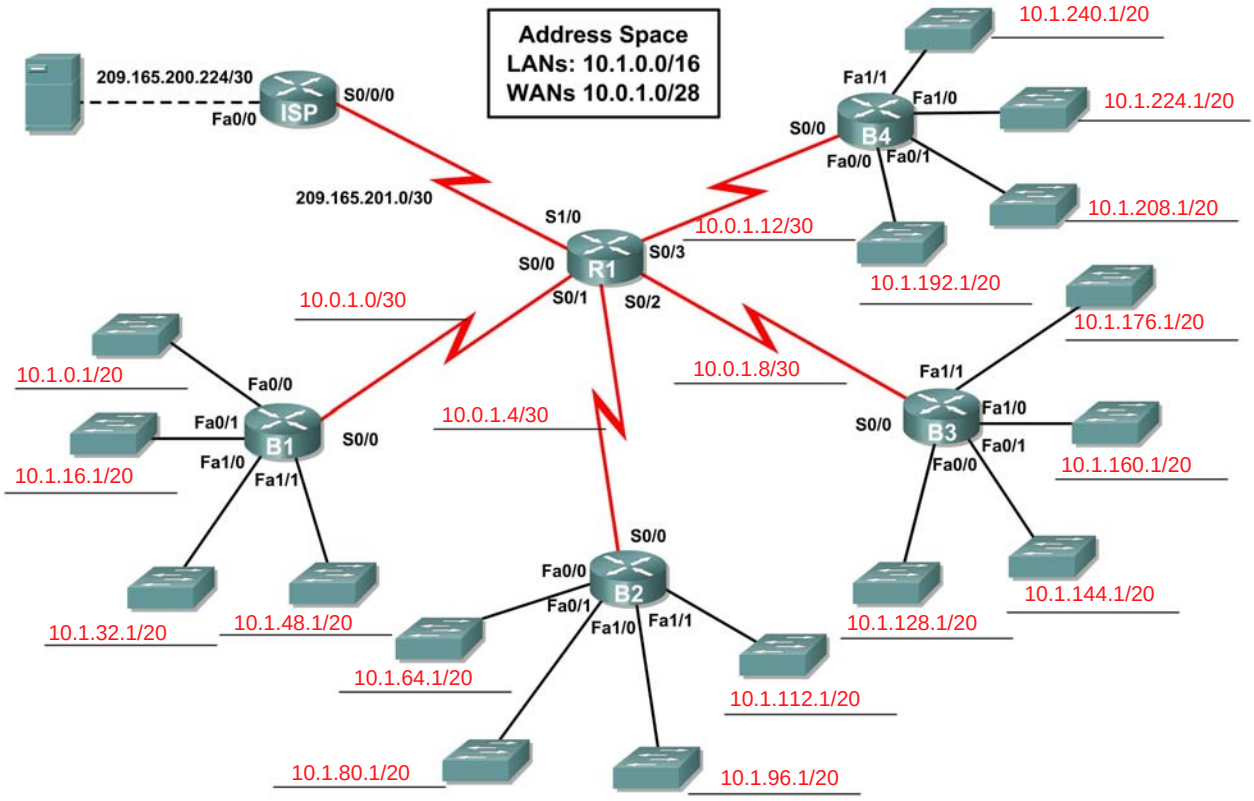
Ch4 - Packet Tracer Skills Integration Challenge

Topology Diagram



Addressing Table

Device	Interface	IP Address	Subnet Mask
R1	S0/0	10.0.1.1/30	255.255.255.252
	S0/1	10.0.1.5/30	255.255.255.252
	S0/2	10.0.1.9/30	255.255.255.252
	S0/3	10.0.1.13/30	255.255.255.252
	S1/0	209.165.201.2	255.255.255.252
B1	Fa0/0	10.1.0.1/20	255.255.240.0
	Fa0/1	10.1.16.1/20	255.255.240.0
	Fa1/0	10.1.32.1/20	255.255.240.0
	Fa1/1	10.1.48.0/20	255.255.240.0
	S0/0	10.0.1.2/30	255.255.255.252
B2	Fa0/0	10.1.64.1/20	255.255.240.0
	Fa0/1	10.1.80.1/20	255.255.240.0
	Fa1/0	10.1.96.1/20	255.255.240.0
	Fa1/1	10.1.112.0/20	255.255.240.0
	S0/0	10.0.1.6/30	255.255.255.252
B3	Fa0/0	10.1.128.1/20	255.255.240.0
	Fa0/1	10.1.144.1/20	255.255.240.0
	Fa1/0	10.1.160.1/20	255.255.240.0
	Fa1/1	10.1.176.0/20	255.255.240.0
	S0/0	10.0.1.10/30	255.255.255.252
B4	Fa0/0	10.1.192.1/20	255.255.240.0
	Fa0/1	10.1.8.1/20	255.255.240.0
	Fa1/0	10.1.24.1/20	255.255.240.0
	Fa1/1	10.1.40.0/20	255.255.240.0
	S0/0	10.0.1.14/30	255.255.255.252
ISP	S0/0	209.165.201.1	255.255.255.252
	Fa0/0	209.165.200.225	255.255.255.252
Web Server	NIC	209.165.200.226	255.255.255.252

Introduction:

This activity focuses on subnetting skills, basic device configurations and static 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 and default routing.
- 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 link between R1 and ISP is already configured.
- For the WAN links between R1 and the branch routers (B1, B2, B3 and B4), subnet the address space 10.0.1.0/28 to provide the necessary WAN subnets. Assign the subnets using the following guidelines:
  - Subnet 0: R1 <--> B1 10.0.1.0/30
  - Subnet 1: R1 <--> B2 10.0.1.4/30
  - Subnet 2: R1 <--> B3 10.0.1.8/30
  - Subnet 3: R1 <--> B4 10.0.1.12/30
- For the LANs attached to the branch routers, divide the address space 10.1.0.0/16 into four equal subnets. Assign the subnets using the following guidelines:
  - Subnet 0: B1 LANs 10.1.0.0/18
  - Subnet 1: B2 LANs 10.1.64.0/18
  - Subnet 2: B3 LANs 10.1.128.0/18
  - Subnet 3: B4 LANs 10.1.192.0/18

Subnet mask is 16
So, 32-16 = 16
2^{16} = 65536 ;
Now, divide 65536 by 4 as four equal subnet is needed;
so, 65536/4 = 16384 ;
so, each subnet need 16384. i.e. the subnet is now 2^{14}
so, the mask is 32-14 = 18

- For each branch router, divide that router's LAN subnet into four equal subnets. Assign the subnets using the following guidelines:
- B1 LANs
  - Subnet 0: B1 Fa0/0 10.1.0.0/20
  - Subnet 1: B1 Fa0/1 10.1.16.0/20
  - Subnet 2: B1 Fa1/0 10.1.32.0/20
  - Subnet 3: B1 Fa1/1 10.1.48.0/20
- B2 LANs
  - Subnet 0: B2 Fa0/0 10.1.64.0/20
  - Subnet 1: B2 Fa0/1 10.1.80.0/20
  - Subnet 2: B2 Fa1/0 10.1.96.0/20
  - Subnet 3: B2 Fa1/1 10.1.112.0/20
- B3 LANs
  - Subnet 0: B3 Fa0/0 10.1.128.0/20
  - Subnet 1: B3 Fa0/1 10.1.144.0/20
  - Subnet 2: B3 Fa1/0 10.1.160.0/20

Now, this statement says again four equal subnet.
From previous we got 18 for each router.
So, 32 - 18 = 14.
Now dividing 2^{14} / 4 = 4096

Now, each Fa port need 4096 address space

4096 => 2^{12} = 32 - 12 = 20. i.e. subnet is 20

for 20
11111111.11111111.11110000.00000000
255.255.240.0

4096/256 = 16, So address increment 16 at a time

like,
1st address = 192.168.0.1 then
2nd would be = 192.168.16.1, then
3rd would be = 192.168.32.1

  - Subnet 3: B3 Fa1/1 10.1.176.0/20
- B4 LANs
  - Subnet 0: B4 Fa0/0 10.1.192.0/20
  - Subnet 1: B4 Fa0/1 10.1.208.0/20
  - Subnet 2: B4 Fa1/0 10.1.224.0/20
  - Subnet 3: B4 Fa1/1 10.1.240.0/20

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.

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. ISP is the DCE to HQ and HQ is the DCE to all the B routers.

Task 4: Configure static and default routing

Configure static and default routing using the exit interface argument.

- R1 should have four static routes and one default route.
- B1, B2, B3, and B4 should have one default route each.
- ISP should have two static routes: one for the WAN address space and one for the LAN address space.

Task 4: Test connectivity and examine the configuration.

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 the Web Server.
- Use extended ping to test LAN connectivity to the Web Server. For example, the test the Fa0/0 interface on B1, you would do the following:

```
B1#ping
Protocol [ip]:
Target IP address: 209.165.200.226
Repeat count [5]:
Datagram size [100]:
Timeout in seconds [2]:
Extended commands [n]: yes
Source address or interface: 10.1.0.1
Type of service [0]:
Set DF bit in IP header? [no]:
Validate reply data? [no]:
Data pattern [0xABCD]:
Loose, Strict, Record, Timestamp, Verbose[none]:
```



```
Sweep range of sizes [n]:
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 209.165.200.226, timeout is 2 seconds:
Packet sent with a source address of 10.1.0.1
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 67/118/138 ms
```

- Troubleshoot until pings are successful.

Step 2: Examine the configuration.

Use verification commands to make sure your configurations are complete.

Here is my examined proof

```
Bl#ping
Protocol [ip]:
Target IP address:
Bl#ping
Protocol [ip]:
Target IP address: 209.165.200.226
Repeat count [5]:
Datagram size [100]:
Timeout in seconds [2]:
Extended commands [n]: yes
Source address or interface: 10.1.0.1
Type of service [0]:
Set DF bit in IP header? [no]:
Validate reply data? [no]:
Data pattern [0xABCD]:
Loose, Strict, Record, Timestamp, Verbose[none]:
Sweep range of sizes [n]:
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 209.165.200.226, timeout is 2 seconds:
Packet sent with a source address of 10.1.0.1
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 2/6/15 ms
```

