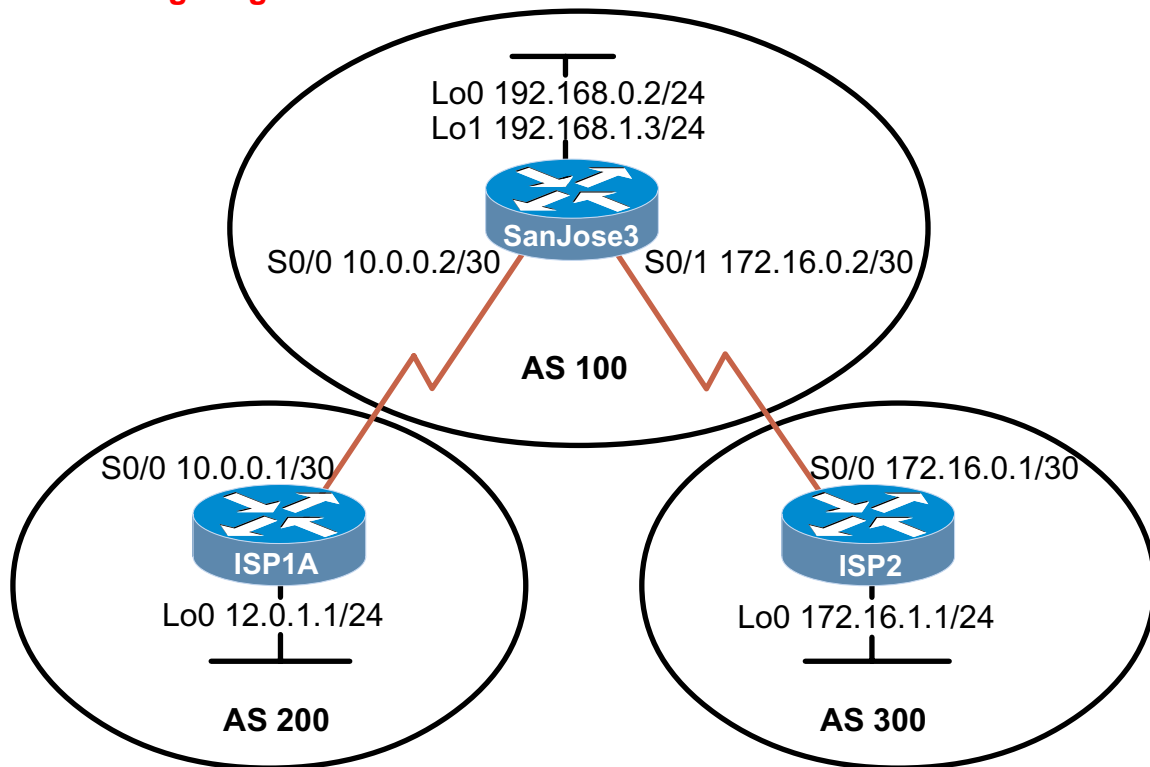


## 8.8.1 Configuring BGP



### Objective

In this lab, you configure BGP to exchange routing information with the two Internet service providers (ISPs).

### Scenario

The International Travel Agency relies extensively on the Internet for sales. The company has contracted with two separate service providers for fault-tolerant Internet connectivity. You must configure BGP to run between the company's SanJose3 boundary router and the two ISP routers.

### Step 1

Build and configure the network according to the diagram, but do not configure a routing protocol. Configure a loopback interface with an IP address for each ISP router, as shown. These loopbacks simulate real networks that can be reached through the ISP. Configure two loopback interfaces with the IP addresses for the SanJose3 router. These loopbacks simulate the connections between the core routers.

Use **ping** to test connectivity between the directly connected routers.

**Note:** The ISP1A router will not be able to reach the ISP2 router.

## Step 2

Configure the ISP routers. In this lab, you must configure the providers' equipment as well as the International Travel Agency's boundary router, SanJose3. On the ISP1A router, enter the following configuration:

```
ISP1A(config)#router bgp 200
ISP1A(config-router)#neighbor 10.0.0.2 remote-as 100
ISP1A(config-router)#network 12.0.1.0 mask 255.255.255.0
```

On ISP2's router, configure BGP (as shown here):

```
ISP2(config)#router bgp 300
ISP2(config-router)#neighbor 172.16.0.2 remote-as 100
ISP2(config-router)#network 172.16.1.0 mask 255.255.255.0
```

With the ISP routers configured, you can now set up the International Travel Agency's boundary router, SanJose3.

## Step 3

Configure the SanJose3 router to run BGP with both providers. Use the following configuration:

```
SanJose3(config)#router bgp 100
SanJose3(config-router)#neighbor 10.0.0.1 remote-as 200
SanJose3(config-router)#neighbor 172.16.0.1 remote-as 300
SanJose3(config-router)#network 192.168.0.0
SanJose3(config-router)#network 192.168.1.0
```

This completes the BGP configuration. Check SanJose3's routing table with the **show ip route** command:

```
SanJose3#show ip route

Gateway of last resort is not set

      172.16.0.0/16 is variably subnetted, 2 subnets, 2 masks
B       172.16.0.0/16 [20/0] via 172.16.0.1, 00:01:24
C       172.16.0.0/30 is directly connected, Serial0
      10.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
B       10.0.0.0/8 [20/0] via 10.0.0.1, 00:01:47
C       10.0.0.0/30 is directly connected, Serial1
C       192.168.0.0/24 is directly connected, Loopback0
C       192.168.1.0/24 is directly connected, Loopback1
```

SanJose3 has routes to the loopback networks at each ISP router. Verify that SanJose3 has connectivity to these networks by pinging each loopback address from SanJose3's console. These pings should be successful.

#### Step 4

Use **show** commands to verify SanJose3's operation. On SanJose3, issue the **show ip bgp** command:

```
SanJose3#show ip bgp
```

```
BGP table version is 5, local router ID is 192.168.1.3
Status codes: s suppressed, d damped, h history, * valid,>best,
               I-internal
Origin codes: i - IGP, e - EGP, ? - incomplete
```

Network	Next Hop	Metric	LocPrf	Weight	Path
*> 10.0.0.0	10.0.0.1	0		0	200 i
*> 172.16.0.0	172.16.0.1	0		0	300 i
*> 192.168.0.0	0.0.0.0	0		32768	i
*> 192.168.1.0	0.0.0.0	0		32768	I

1. What do the asterisks (\*) next to each route indicate?

---

2. What do the > symbols next to each route indicate?

---

3. What is the local router ID?

---

4. Which table version is displayed?

---

On the ISP1A router, issue the **shutdown** command on Loopback0. Return to SanJose3 and issue the **show ip bgp** command again.

5. Which table version is displayed?

---

The version number will vary, but the **shutdown** command would have caused a routing update, so the version should be one higher than the last.

Bring the ISP1A router Loopback0 back up by issuing the **no shutdown** command.

On SanJose3, issue the **show ip bgp neighbors** command. Here is a partial sample output:

```
BGP neighbor is 172.16.0.1, remote AS 300, external link
Index 2, Offset 0, Mask 0x4
BGP version 4, remote router ID 172.16.1.1
BGP state = Established, table version = 5, up for 00:02:24
Last read 00:00:24, hold time is 180
```

6. Based on the output of this command, what is the BGP state between this router and ISP2?  

---
7. How long has this connection been up?  

---

### Step 5

Check ISP2's routing table with the **show ip route** command. ISP2 should have a route that belongs to ISP1A (12.0.1.0).

If SanJose3 advertises a route belonging to ISP1A, and ISP2 installs that route in its table, ISP2 might then attempt to route transit traffic via the International Travel Agency. You need to configure the SanJose3 router so that it advertises only International Travel Agency networks (192.168.0.0 and 192.168.1.0) to both providers. On the SanJose3 router, configure the following access list:

```
SanJose3(config)#access-list 1 permit 192.168.0.0 0.0.255.255
```

Then apply this access list as a route filter using the **distribute-list** keyword with the BGP **neighbor** statement:

```
SanJose3(config)#router bgp 100
SanJose3(config-router)#neighbor 10.0.0.1 distribute-list 1 out
SanJose3(config-router)#neighbor 172.16.0.1 distribute-list 1 out
```

After you configure the route filter, check ISP2's routing table again. The route to 12.0.1.0 (ISP1) should still be in the table.

Return to SanJose3 and issue the **clear ip bgp \*** command. You have to wait until the routers reach the Established state, which might take several seconds.

After the routers reach the Established state, check ISP2's routing table again. The route to 12.0.1.0 (ISP1) should no longer be in the routing table.

The route to 172.16.1.0 (ISP2) should not be in ISP1A's routing table.