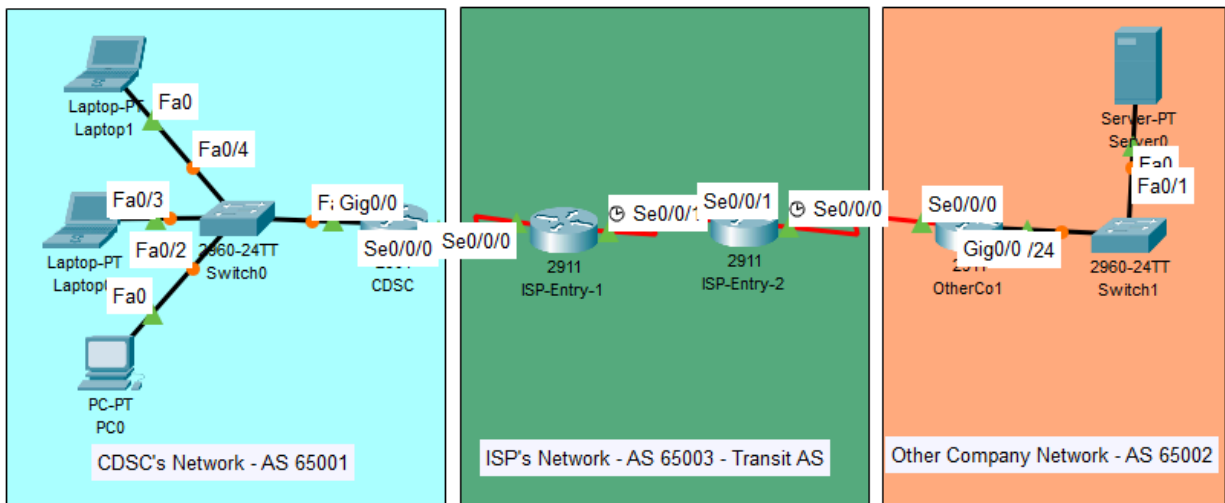


# BGP Configuration and Verification Walkthrough

This guide provides a complete walkthrough for configuring and verifying BGP between two autonomous systems, CDSC Ltd. and Other Company, using a transit ISP.



## Address Table

Device	Interface	IPv4 Address	Subnet Mask	Default Gateway
CDSC	G0/0	192.168.0.1	255.255.255.0	N/A
	S0/0/0	1.1.1.2	255.255.255.252	N/A
OtherCo1	G/0/0	172.16.10.1	255.255.255.0	N/A
	S0/0/0	1.1.1.10	255.255.255.252	N/A
ISP-Entry-1	S0/0/0	1.1.1.1	255.255.255.252	N/A
	S0/0/1	1.1.1.5	255.255.255.252	N/A

			2	
<b>ISP-Entry-2</b>	S0/0/0	1.1.1.9	255.255.255.252	N/A
	S0/0/1	1.1.1.6	255.255.255.252	N/A
<b>PC0</b>	NIC	DHCP	DHCP	192.168.0.1
<b>Laptop0</b>	NIC	DHCP	DHCP	192.168.0.1
<b>Laptop1</b>	NIC	DHCP	DHCP	192.168.0.1
<b>Server</b>	NIC	172.16.10.2	255.255.255.0	172.16.10.1

## Part 1: Configure eBGP on CDSC

The goal here is to establish a connection between your company's network (CDSC) and the ISP.

### Step a: Verify ISP Reachability

The first step is to confirm that the ISP's internal network is properly configured and that its routers can reach each other.

- From **ISP-Entry-1**, ping the **ISP-Entry-2** router's Serial 0/0/0 interface IP address: 1.1.1.9.
- A successful ping confirms that the ISP's network is acting as a valid transit path.

### Step b: Initial Connectivity Test

Before configuring BGP, let's see why the connection doesn't work yet.

- From any device inside the CDSC network (like PC0), attempt to ping the Other Company server at 172.16.10.2.
- The ping will fail because your router, **CDSC**, does not have a route to the 172.16.10.0/24 network. BGP is needed to exchange this routing information.

### Step c: Configure BGP on CDSC

Now, let's configure your border router, CDSC, to peer with the ISP.

- **CDSC's** AS number is **65001**.
- The **ISP's** AS number is **65003**.
- The ISP's neighbor IP address is 1.1.1.1.
- The internal network you need to advertise is 192.168.0.0/24.

Here are the commands for **CDSC**:

```
CDSC(config)# router bgp 65001
CDSC(config-router)# neighbor 1.1.1.1 remote-as 65003
CDSC(config-router)# network 192.168.0.0 mask 255.255.255.0
```

### Explanation:

- router bgp 65001: This command enables BGP on the router and specifies the local Autonomous System number.
- neighbor 1.1.1.1 remote-as 65003: This command identifies the BGP neighbor (1.1.1.1) and its remote AS number (65003). This is what makes it an **eBGP** session.
- network 192.168.0.0 mask 255.255.255.0: This command tells BGP to advertise the specified network from its routing table to its neighbors.

### Post-Configuration Ping:

- Try pinging 172.16.10.2 again. The ping will still fail. Why? Because the Other Company's router is not yet configured for BGP, so it's not advertising its network to the ISP, and the ISP cannot forward that information to CDSC.

## Part 2: Configure eBGP on Other Company Inc.

The next step is to configure the BGP peer on the other side of the network.

- **OtherCo1's** AS number is **65002**.
- The **ISP's** AS number is **65003**.
- The ISP's neighbor IP address is 1.1.1.9.
- The internal network to advertise is 172.16.10.0/24.

Here are the commands for **OtherCo1**:

```
OtherCo1(config)# router bgp 65002
OtherCo1(config-router)# neighbor 1.1.1.9 remote-as 65003
OtherCo1(config-router)# network 172.16.10.0 mask 255.255.255.0
```

With both sides configured, the BGP sessions should now come up.

## Part 3: eBGP Verification

Now it's time to confirm that everything is working as expected.

### Step a: Verify BGP Adjacency

- From your router, **CDSC**, use the *show ip bgp summary* command.

- Look at the "State/PfxRcd" column. If the value is a number (e.g., 1), it means the BGP session is up and the router has received that many prefixes (routes) from its neighbor. A value of Active or Idle indicates a problem.

#### **Step b: Verify Learned Routes**

- On **CDSC**, use the *show ip bgp* command. You should see an entry for the 172.16.10.0/24 network. The "Next Hop" IP address should be the neighbor's IP: 1.1.1.1. This confirms that CDSC has learned the route to the Other Company's network.

#### **Step c: Check Routing Tables**

- Use the *show ip route* command on both **CDSC** and **OtherCo1**.
- On **CDSC**, you should now see a route to 172.16.10.0/24 with a B designation, indicating it was learned via BGP.
- Similarly, on **OtherCo1**, you should see a BGP-learned route to 192.168.0.0/24.

#### **Step d & e: End-to-end Connectivity**

- From a CDSC device (like Laptop0), try to access the web server at 172.16.10.2 or ping it.
- The pings and web browser connection should now be successful because all routers in the path have the necessary routing information to forward traffic between the two networks.

## Key BGP Terms Explained

- **Autonomous System (AS):** An **Autonomous System** is a collection of IP networks and routers that are under the control of a single entity, like a company or an organization. Each AS is assigned a unique AS number. Think of it as a single administrative domain for routing. In this scenario, **CDSC** is in AS 65001, and **Other Company** is in AS 65002.
- **eBGP:** The 'e' stands for **external**. **eBGP** is the protocol used to exchange routing information between different Autonomous Systems. When **CDSC** (AS 65001) peers with the **ISP** (AS 65003), they form an eBGP relationship because they are in different ASes.
- **Transit AS:** A **transit AS** is a network that provides a path for traffic to flow between two or more other Autonomous Systems. The **ISP** in this lab is a **transit AS** because it carries traffic between AS 65001 and AS 65002. It doesn't originate the traffic itself but provides the crucial link for communication.