Packet Tracer - Wireless Technology Exploration- Physical Mode

# Addressing Table

| Device | Interface | IP Address | Subnet Mask | Default Gateway |
| --- | --- | --- | --- | --- |
| Corporate Office |  |  |  |  |
| Corporate Router | G1/0 | 192.168.1.1 | 255.255.255.0 | N/A |
| R1 | G2/0 | 192.168.4.1 | 255.255.255.252 | N/A |
| R1 | G3/0 | 192.168.3.1 | 255.255.255.252 | N/A |
| Corporate Server | Fa0 | 192.168.1.10 | 255.255.255.0 | 192.168.1.1 |
| Corporate WLC | G2 | 192.168.1.50 | 255.255.255.0 | 192.168.1.1 |
| LAP-C1 to C6 | G0 | DHCP | N/A | N/A |
| Laptop | Fa0 | DHCP | N/A | N/A |
| Branch Office |  |  |  |  |
| Branch Router | G0/0 | 192.168.2.1 | 255.255.255.0 | N/A |
| Branch Router | G2/0 | 192.168.4.2 | 255.255.255.252 | N/A |
| Branch Server | Fa0 | 192.168.2.10 | 255.255.255.0 | 192.168.2.1 |
| Branch WLC | G2 | 192.168.2.50 | 255.255.255.0 | 192.168.2.1 |
| LAP-B1 to B6 | G0 | DHCP | N/A | 192.168.2.1 |
| Central Office (CO) |  |  |  |  |
| CO Server | N/A | 192.168.5.2 | 255.255.255.252 | 192.168.5.1 |
| Cellular | N/A | 172.16.1.1 | 255.255.255.0 | N/A |
| CO Router | G0/0 | 192.168.5.1 | 255.255.255.252 | N/A |
| CO Router | G1/0 | 192.168.6.1 | 255.255.255.252 | N/A |
| CO Router | G3/0 | 192.168.3.2 | 255.255.255.252 | N/A |
| Cell Towers 0-5 | Coaxial 0-2, 4-5 | N/A | N/A | N/A |

Blank Line - no additional information

# Objectives

Part 1: Explore the Wireless Network

Part 2: Add Wi-Fi Connectivity to a Boardroom

Part 3: Add Wireless Connectivity to a Coffee Shop in a Cellular Dead Zone

Part 4: Add Wireless Connectivity to a Home Office

# Background / Scenario

XYZ Corporation is expanding their network capabilities to allow enhanced connectivity at their local offices, as well as connectivity for those wishing to work remotely. In this Packet Tracer Physical Mode (PTPM) activity, you have been asked to assist with this plan by reviewing the current network capabilities and adding wireless functionality as required.

**Note**: This activity is not graded. Your connectivity tests can be used to validate your physical connections and configurations.

# Instructions

## Explore the Wireless Network

In Part 1, you will explore the wireless network and verify connectivity.

**Note**: Wireless and cellular signal representations are **on** in this activity. However, you can turn them off by clicking **View Wireless Signals** (Ctrl+Shift+W) on the top blue toolbar.

### Explore the topology.

1. In **Physical** mode, you will notice that **Home City** contains five different locations: a **Corporate Office**, a **Branch Office**, a **Central Office** (CO), a **Home Office**, and a **Coffee Shop**.

#### Question:

How are the four offices connected and what type of cables connect them?

**The Corporate Office is connected to the Branch Office via fiber. The Corporate Office is connected to the Central Office via fiber. The Home Office is currently unconnected.**

Type your answer here.

1. Navigate inside the **Corporate Office**. Notice that six Lightweight Wireless Access Points (LWAPs) are connected to the wiring closet.

#### Question:

How are the LWAPs connected to the network?

**The LWAPs are connected via copper cable through the switch to the wireless LAN controller.**

Type your answer here.

1. Navigate into the CO wiring closet.

#### Question:

How are the cell towers connected to the **Central Office Server**?

**The cell towers are connected using coaxial cable to a Central Office Server.**

Type your answer here.

1. Navigate to the **Branch Office**. Notice that five LWAPs are connected via copper cable to the **Branch Switch** in the wiring closet. The switch is then connected to the **Branch WLC** (wireless LAN controller).

### Verify connectivity.

1. To verify connectivity, navigate to **Corporate Office** > **Corporate Office Wiring Closet**.
2. Click the laptop, and then **Desktop** tab > **Command Prompt**.
   * + - 1. Ping 192.168.2.10 (the **Branch Office Server**).
         2. Ping 192.168.5.2 (the **Central Office** backbone connection).

**Note**: Packet Tracer can take some time to converge. You may receive **Request time out** messages. However, both of the pings should eventually be successful. At the bottom of the Packet Tracer interface, click **Fast Forward Time** several times to speed up convergence.

1. Navigate to the **Home City**. Click the **Smartphone** next to the cell tower above the **Central Office** building.
2. Click **Desktop** tab, and then **Command Prompt**.
   * + - 1. Ping 172.16.1.1 (the cellular connection at the **Central Office**).
         2. Ping 192.168.1.10 (the **Corporate Office Server**).

You may receive one or two **Request time out** messages. However, both of the pings should be successful.

#### Question:

What are the different physical connections used between **Smartphone1** and the **Corporate Office Server**?

**Smartphone to the Cell Tower uses cellular. Cell Tower to the CO uses coaxial cable. The CO to the Corporate Office uses fiber.**

Type your answer here.

## Add Wi-Fi Connectivity to a Boardroom

A new boardroom is being created within the **Branch Office**. Currently the boardroom is in a Wi-Fi dead zone. In Part 2, your task is to provide connectivity for devices within that room.

### Install a new LAP-PT device to provide coverage for the new boardroom.

1. Navigate to the **Branch Office**. The laptop inside the new boardroom has no access to a Wi-Fi signal.
2. Click and drag the access point on the **Inventory Shelf** to the **Boardroom**.
3. Click the new access point to open it. From the **Modules** menu, click and drag an **ACCESS\_POINT\_POWER\_ADAPTER** and connect it to the power port next to the **Reset** button.
4. Click the **Config** tab. Under **GLOBAL** **Settings** name the device **LAP-B6**.
5. Under **INTERFACE Dot11Radio0** set the **Coverage Range** to **75.00** meters. Packet Tracer does not grade this setting.
6. Close the window for **LAP-B6**. If you have **View Wireless Signals** on, you will notice that there is now coverage in the boardroom.
7. From the **Bottom Toolbar**, click **Connections** > **Copper Straight-Through** cable.
8. Connect one end of the cable to the **GigabitEtherent0** interface on the new access point. Click the rack of equipment and connect the other end of the cable to the **Rack** > **Branch Switch** > **Fa0/22 interface**.

### Verify Connectivity.

* + - 1. In the boardroom, click the laptop, and then **Desktop** tab > **IP Configuration**. The laptop should now have full IPv4 configuration under **IP Configuration**. However, the DHCP processes may take a few minutes to complete. If necessary, toggle between DHCP and Static to resend a DHCP request. You may also need to click **Fast Forward Time** several times to speed up convergence.
      2. When the IP addressing is provided, you can verify connectivity. Close the **IP Configuration** window, and then click **Command Prompt**.
         1. Ping 192.168.2.1 (the **default gateway**).
         2. Ping 192.168.1.10 (the **Corporate Server**).

## Add Wireless Connectivity to a Coffee Shop in a Cellular Dead Zone

A new **Coffee Shop** has opened in the **Home City**, but there is currently no cellular service in this area. Your task is to provide cellular service for customers and employees of the coffee shop.

### Connect a new cell tower.

* + - 1. Navigate to the **Home City**.
      2. Notice that the **Cell Tower** next to the **Coffee Shop** is not connected to the **Central Office**.
      3. From the Bottom Toolbar, click Connections > Coaxial cable.
      4. Connect one end to the Coaxial0 interface on the unconnected Cell Tower. Then click Central Office > Central Office Wiring Closet > Table > Central Office Server > Coaxial0/3 interface.

### Tether a laptop to the smartphone.

* + - 1. A remote worker wants to work at the coffee shop. Navigate to the **Coffee Shop** and locate the smartphone and laptop on the table.
      2. Click **Smartphone** > **Config** tab > **3G/4G Cell1** to verify that the smartphone has received an IP address. It may take a few seconds to get addressing information. Click **DHCP Refresh**, if necessary.
      3. Click **Settings** and verify the smartphone has received a default gateway and DNS server address.
      4. Under **Cellular Tethering**, enable Bluetooth.
      5. Under **INTERFACE**, click **Bluetooth**, and set **Port Status** to **On**. Verify that **Discoverable** is enabled.
      6. In the Coffee Shop, click Laptop > Desktop tab > Bluetooth, and set Port Status to On.
      7. Select **Discover** to display **Smartphone1** under discoverable devices.
      8. Select the **Smartphone1**, click **Pair**, and then answer **Yes** to the **Bluetooth Pairing** popup message.
      9. Click the laptop again, reselect the **Smartphone1**, and then click **Tether**. It may be necessary to move the smartphone and laptop close together for Bluetooth pairing to work.
      10. After a few seconds, you should see valid addressing information in the **IP Configuration** section. If not, repeat the previous steps.
      11. To verify connectivity, close the **Bluetooth Configuration** window, and then click **Command Prompt**. Ping the **cellular gateway** (172.16.1.1) and the **Corporate Office Server** (192.168.1.10). If the first ping to the **Corporate Office Server** is not successful, try another ping.

## Add Wireless Connectivity to a Home Office

A remote worker for XYZ Corporation has just moved and the new house does not have a network setup yet. Your task is to set up a network to provide wireless access throughout the house and connectivity to the Corporate Office.

### Select and cable the devices.

* + - 1. Navigate to the **Home City**, and then **Home Office**.

On the shelf behind the desk chair, there is a wireless router with external antennae. There is also a cable modem directly to the right of the wireless router. On the table in front of the couch, there is a laptop.

* + - 1. Click **Connections** > **Copper Straight-Through**.
      2. Connect one end of the cable to **Port 1** of **Cable Modem**. Connect the other end to the **Internet** port on **Wireless Router**.
      3. Navigate to the **Home City** view.
      4. From the **Bottom Toolbar**, click **Connections** > **Coaxial** cable.
      5. Click **Home Office** > **Cable Modem0** > **Port 0**, and then click the **Central Office** > **Central Office Wiring Closet** > **Rack** > **CMTS** > **Coaxial7** port.

### Configure the wireless router.

* + - 1. Navigate to the **Home Office**, and click **Wireless Router** > **GUI** tab.
      2. The **Setup** tab is already selected. For **Internet Connection Type**, verify **Automatic Configuration - DHCP** is selected.
      3. Under **Network Setup**, verify that the following information is configured:

IP Address: **192.168.0.1**

Subnet Mask: **255.255.255.0**

DHCP: **Enabled**

Starting IP Address: **192.168.0.100**

Maximum number of users: **50**

* + - 1. Scroll back to the top and click the **Status** tab. Under **Internet Connection**, the wireless router should have DHCP addressing from the **Central Office**. If not, click **IP Address Renew** to resend DHCP messages.
      2. Click the **Wireless** tab.
      3. Configure the 2.4 GHz network with **homesweethome** as the **Network Name (SSID)**. Scroll to the bottom and click **Save Settings**.
      4. Scroll back to the top and select the **Wireless Security** subtab.
      5. For the 2.4 GHz **Security Mode**, select **WPA2-Personal**, and then configure **mySecureNet** as the **Passphrase**. Scroll to the bottom and click **Save Settings**.

### Verify connectivity.

* + - 1. On the table in front of the couch, click the laptop, and then the **Config** tab. Next, select **Wireless0** under **INTERFACE**.
      2. Enter the SSID **homesweethome**.
      3. Select **WPA2-PSK** for the **Authentication** method, and then configure **mySecureNet** as the **PSK Pass Phrase**.
      4. Under **IP Configuration**, the laptop should receive DHCP addressing. You may need to toggle between DHCP and Static a few times to resend DHCP requests.
      5. Click **Desktop** tab > **Command Prompt**. Ping various addresses throughout the network. For example, the following pings should be successful:

ping 192.168.6.1 (**Central Office router G1/0**)

ping 192.168.1.10 (**Corporate Office Server**)

ping 192.168.2.10 (**Branch Office Server**)

## Reflection

* 1. What overall benefit does wireless technology provide to the end user?

**Wireless technology provides untethered access to network resources freeing the user from the physical constraints of the traditional wired network.**

Type your answer here.

* 1. Which form of wireless networking is the most beneficial?

**Wireless technology should not be seen as one versus another but rather how they can collectively contribute to the overall goal of providing untethered access to network resources. A good example of this is seen in the activity where Bluetooth is used to tether a laptop computer to a smartphone which then uses Cellular technology to connect back to the CO and eventually to the desired resource.**

Type your answer here.

* 1. How could each of the following groups benefit from the various wireless technologies presented in this activity?
* Student
* Salesperson
* R&D Engineer
* Corporate Executive

**Bluetooth**  
**————**  
**Ability to communicate over short distances with network devices and peripherals. This includes such things as mice, headsets, printers, laptops, smartphones, etc. It can also be used to enable internet access for laptops and tablets through a smartphone’s cellular network connection.**  
**————**  
**Cellular**  
**————**  
**Ability to have long range, untethered access to remote resources without the necessity of being in a location that has Wi–Fi or physical access. This includes such things as corporate databases, printers, web sites, etc. Because cellular technology has become widely available it is often the only way to connect to corporate resources when physical connections such as cable and DSL are not readily available.**  
**————**  
**Wi–Fi**  
**————**  
**This technology provides the same benefits as cellular technology but is confined to shorter distances and normally under the control of a physical establishment. It does not have the same coverage as cellular technology often forcing people to relocate to a physical premise were Wi–Fi is provided thus reducing user mobility.**

Type your answer here.

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