

# Packet Tracer – WEP/WPA2 PSK/WPA2 RADIUS

## Addressing Table

| Device         | Private IP Address | Public IP Address | Subnet Mask   | Site               |
|----------------|--------------------|-------------------|---------------|--------------------|
| NTP/AAA Server | 10.44.1.252        | 209.165.201.5     | 255.255.255.0 | Metropolis Bank HQ |

## Objectives

**Part 1: Configure WEP for Healthcare at Home**

**Part 2: Configure WPA2 PSK for Gotham Healthcare Branch**

**Part 3: Configure WPA2 RADIUS for Metropolis Bank HQ**

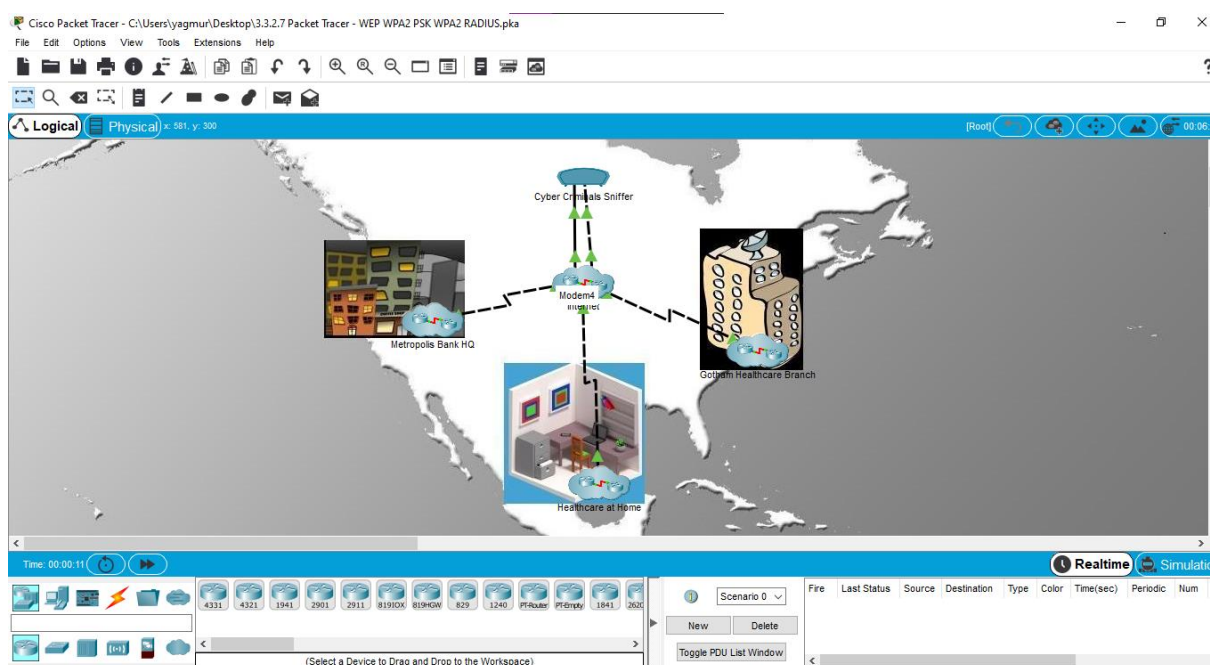
## Background

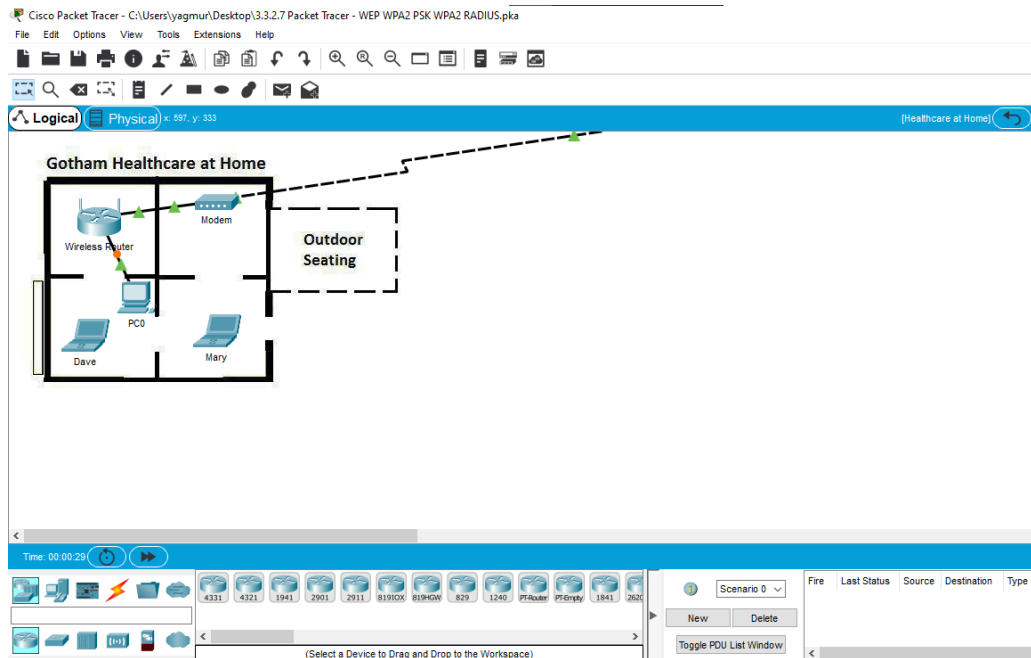
In this activity, you will configure WiFi networks for all three geographic sites. This activity will utilize WEP, WPA2 PSK, and WPA2 RADIUS to demonstrate the varying configuration of WiFi networks and their security considerations. Healthcare at Home will be setup using WEP. Gotham Healthcare Branch will be configured with WPA2 PSK and Metropolis Bank HQ will be using WPA2 Radius. The IP addressing, network configuration, and service configurations are already complete. You will use the wireless routers and client devices in the differing geographic regions to setup multiple secure wireless networks.

## Part 1: Configure WEP for Healthcare at Home

### Step 1: Setup the Wireless SSID.

- Click the **Healthcare at Home** site and click **PC0**.



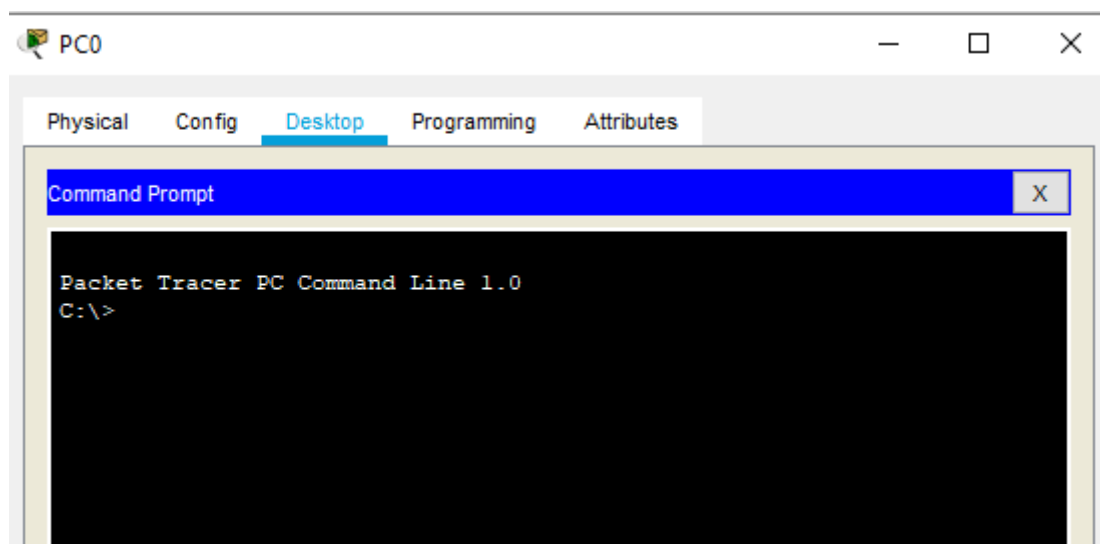


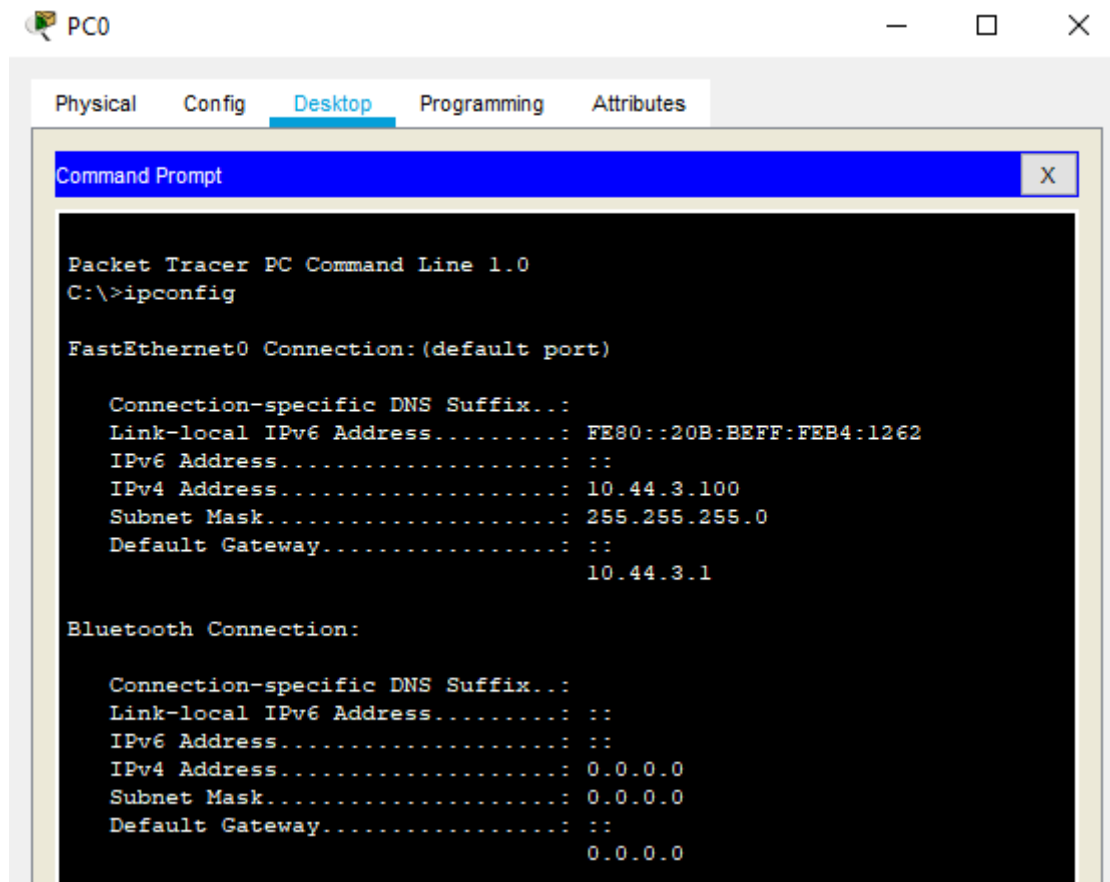
- b. Select **Desktop** tab. Click **Command Prompt**. At the prompt, enter **ipconfig**.

PC> **ipconfig**

FastEthernet0 Connection:(default port)

```
Link-local IPv6 Address.....: FE80::20B:BEFF:FEB4:1262
IP Address.....: 10.44.3.100
Subnet Mask.....: 255.255.255.0
Default Gateway.....: 10.44.3.1
```

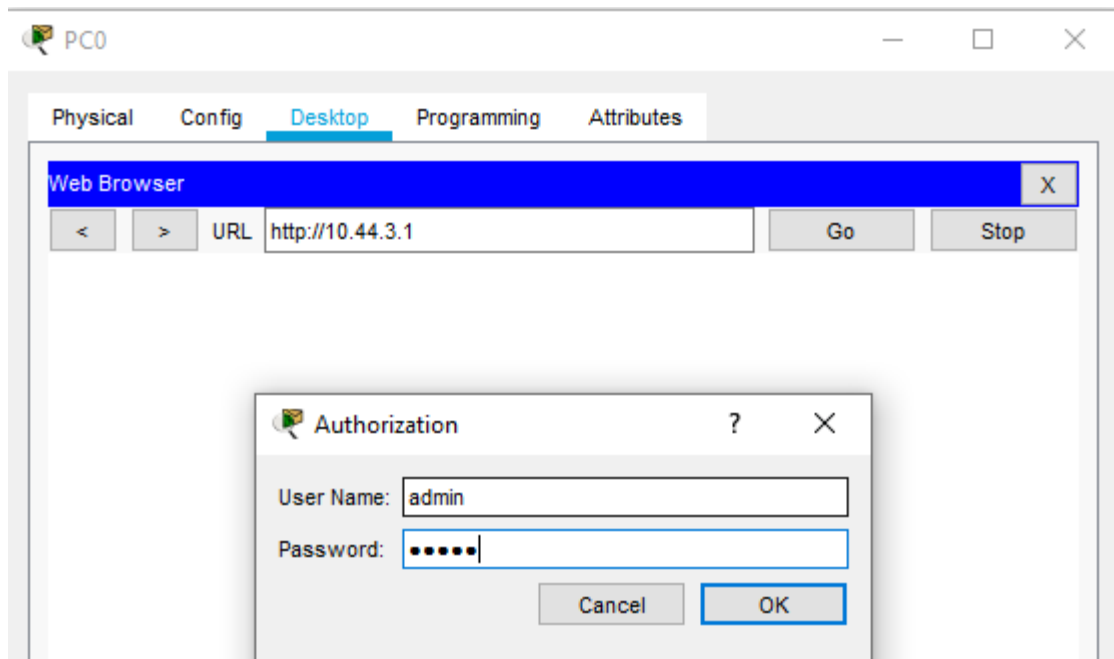




What is the IP address for the default gateway?

*The IP address for the default gateway is 10.44.3.1*

- c. Navigate to the **Web Browser** and enter the IP address for the default gateway. Enter **admin** as the username and password when prompted. Click **OK**.



- d. The **Wireless Router** is the default gateway for this network. Click **Wireless** tab.

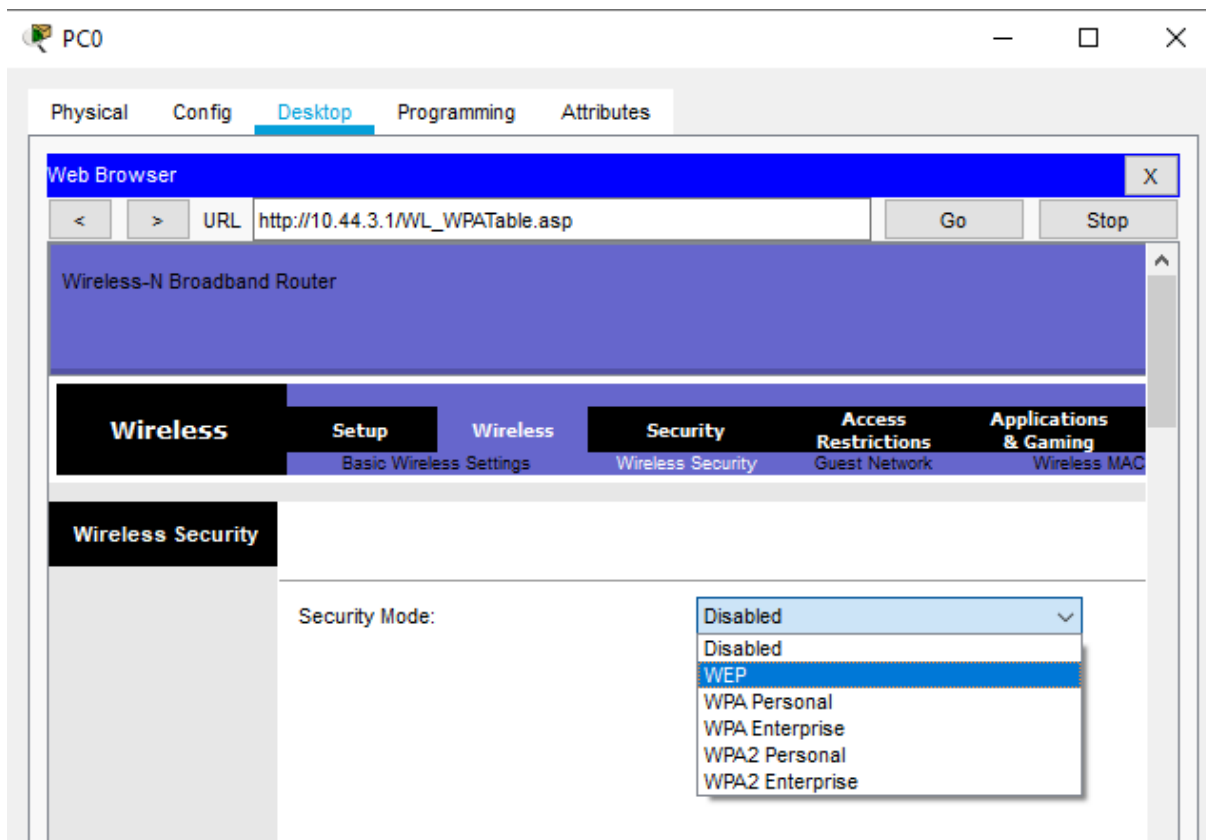
The screenshot shows the configuration page of a Wireless-N Broadband Router (Firmware Version: v0.93.3) accessed via a web browser at http://10.44.3.1. The 'Setup' tab is selected, and the 'Internet Setup' section is active. The 'Internet Connection type' is set to 'Automatic Configuration - DHCP'. Under 'Optional Settings', the 'Host Name' and 'Domain Name' fields are empty, and the 'MTU' is set to 1500. In the 'Network Setup' section, the 'Router IP' is 10.44.3.1 with a 'Subnet Mask' of 255.255.255.0. The 'DHCP Server' is 'Enabled', with a 'Start IP Address' of 10.44.3.100, a 'Maximum number of Users' of 50, and an 'IP Address Range' of 10.44.3.100 - 149. A 'Help...' link is visible on the right side of the page.

- e. Change the **SSID** from **DefaultWIFI** to **Home**.
- f. Set the SSID to **Broadcast**.
- g. Click **Save Settings**. Click **Continue**.

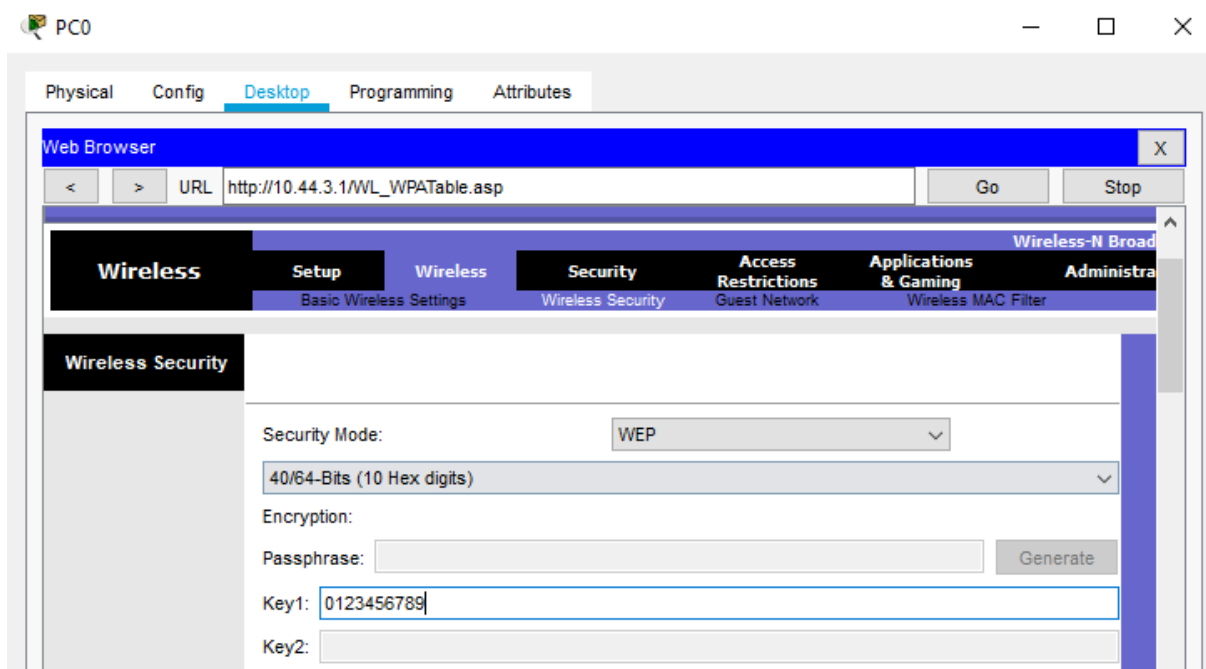
The screenshot shows the configuration page of the same Wireless-N Broadband Router, now with the 'Wireless' tab selected. The 'Basic Wireless Settings' section is active. The 'Network Mode' is set to 'Mixed', the 'Network Name (SSID)' is 'Home', the 'Radio Band' is 'Auto', the 'Wide Channel' is 'Auto', and the 'Standard Channel' is '1 - 2.412GHz'. The 'SSID Broadcast' is set to 'Enabled'. A 'Help...' link is visible on the right side of the page.

### Step 2: Setup Wireless Security.

- Within the Wireless Router, click **Wireless > Wireless Security**.
- Click the drop down menu and set the Security Mode to **WEP**.



- Keep the encryption option set to 40/64-bits and enter the key **0123456789** as Key 1.
- Click **Save Settings**. Click **Continue**.

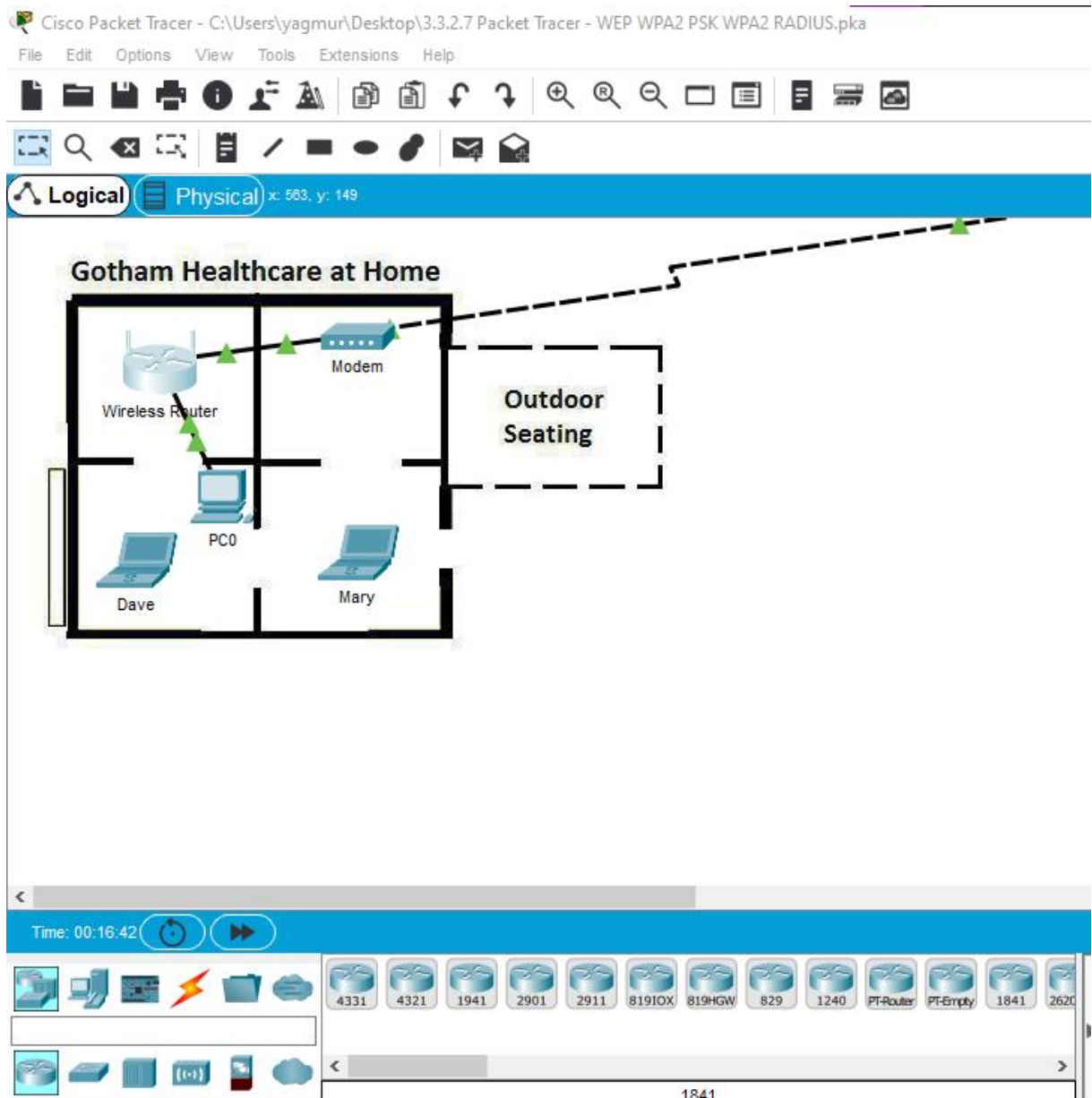


**WEP and the key 0123456789 are not secure. Why is WEP not recommended for use in securing wireless networks?**

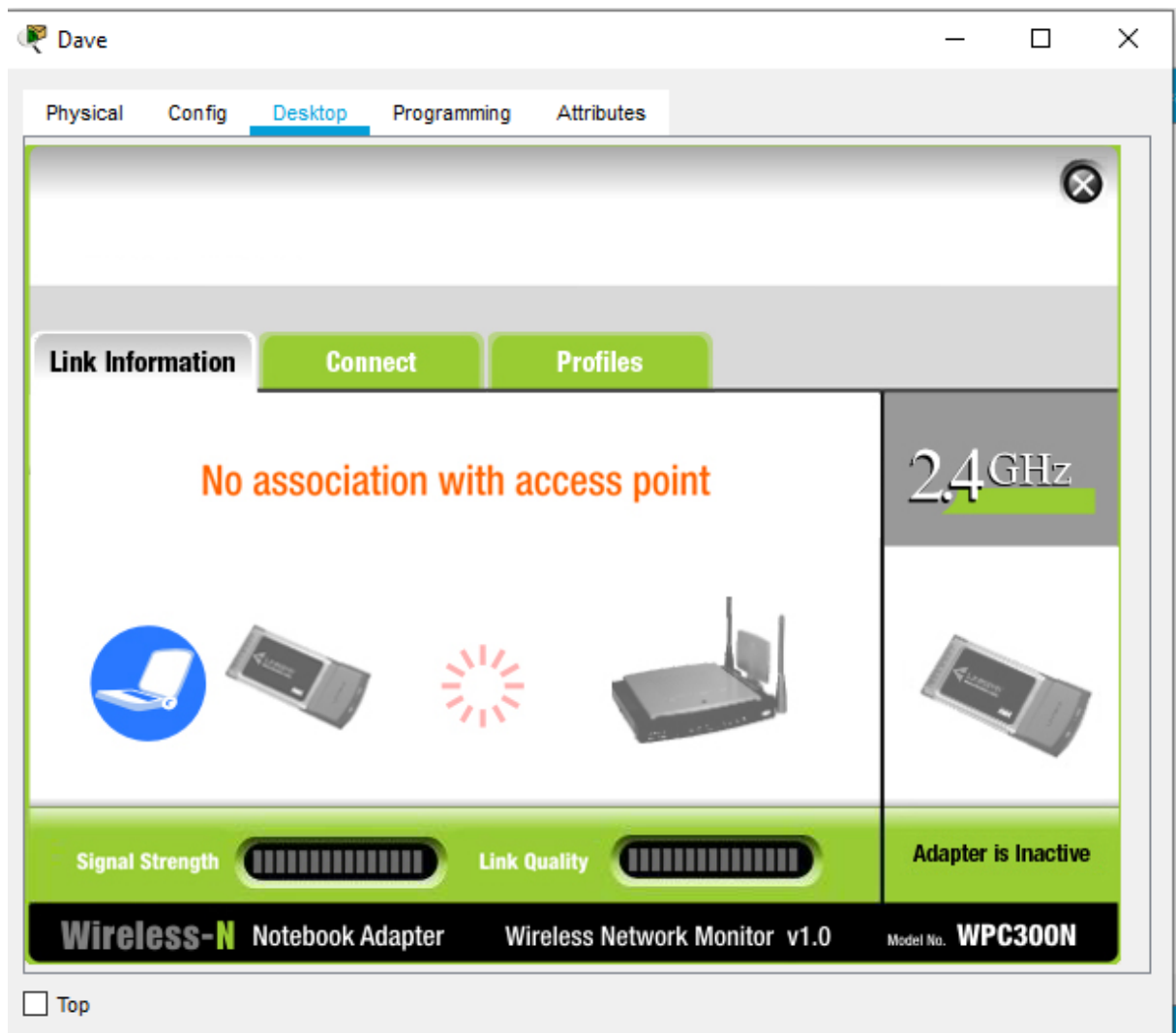
*WEP doesn't provide key management and uses weak encryption keys.*

### Step 3: Connect the Clients.

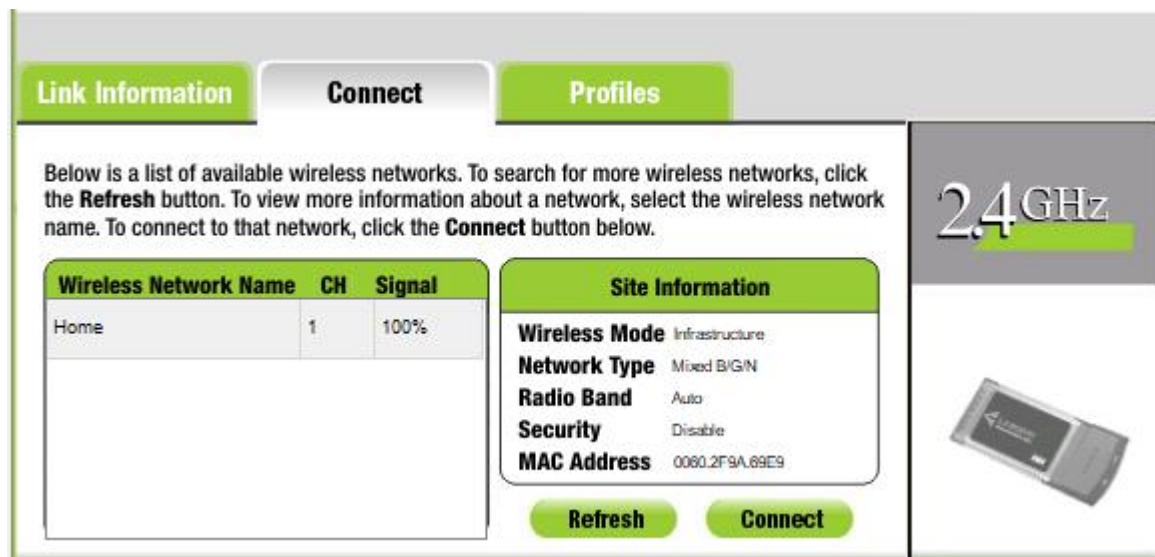
- Within the **Healthcare at Home** site, click **Dave's Laptop**.



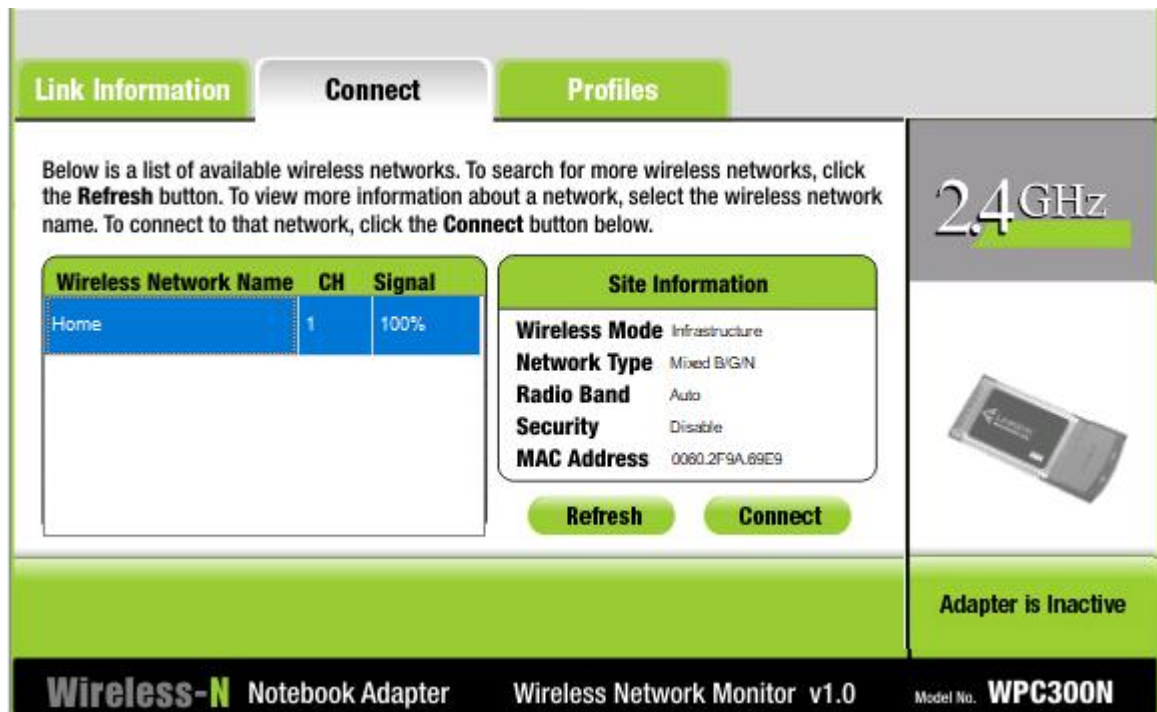
- b. Click the **Desktop** tab and click **PC Wireless**.



- c. Click the **Connect** tab and click **Refresh**.

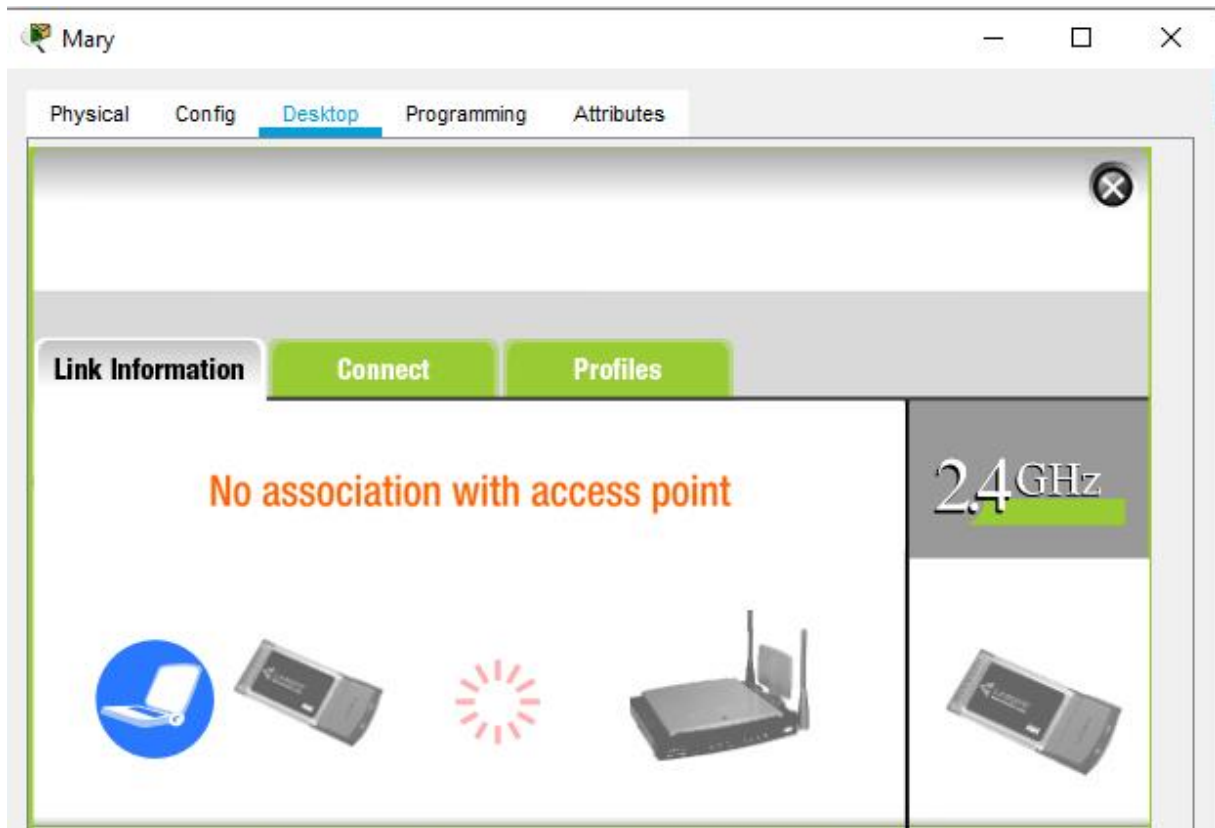


- d. Select the Wireless Network Name of **Home** and click **Connect**.

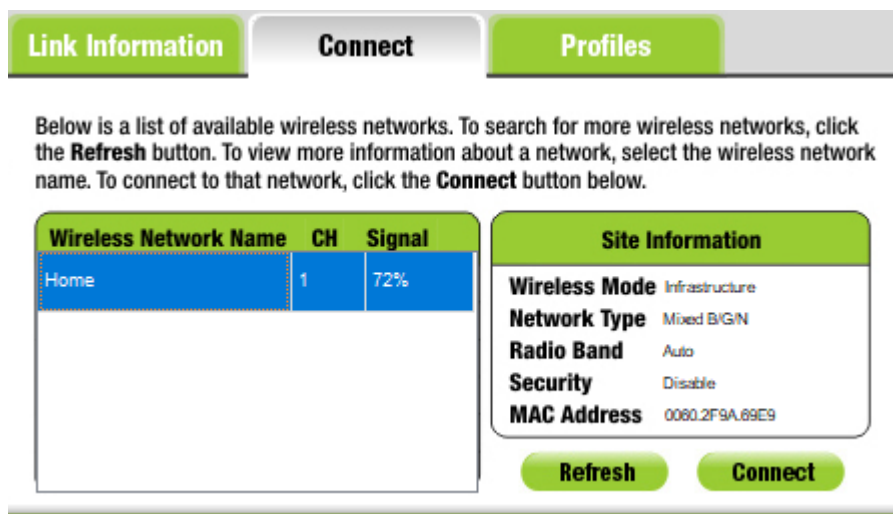


- e. Enter the key **0123456789** as WEP Key 1 and click **Connect**.

- f. Repeat steps a - e for **Mary's** Laptop.



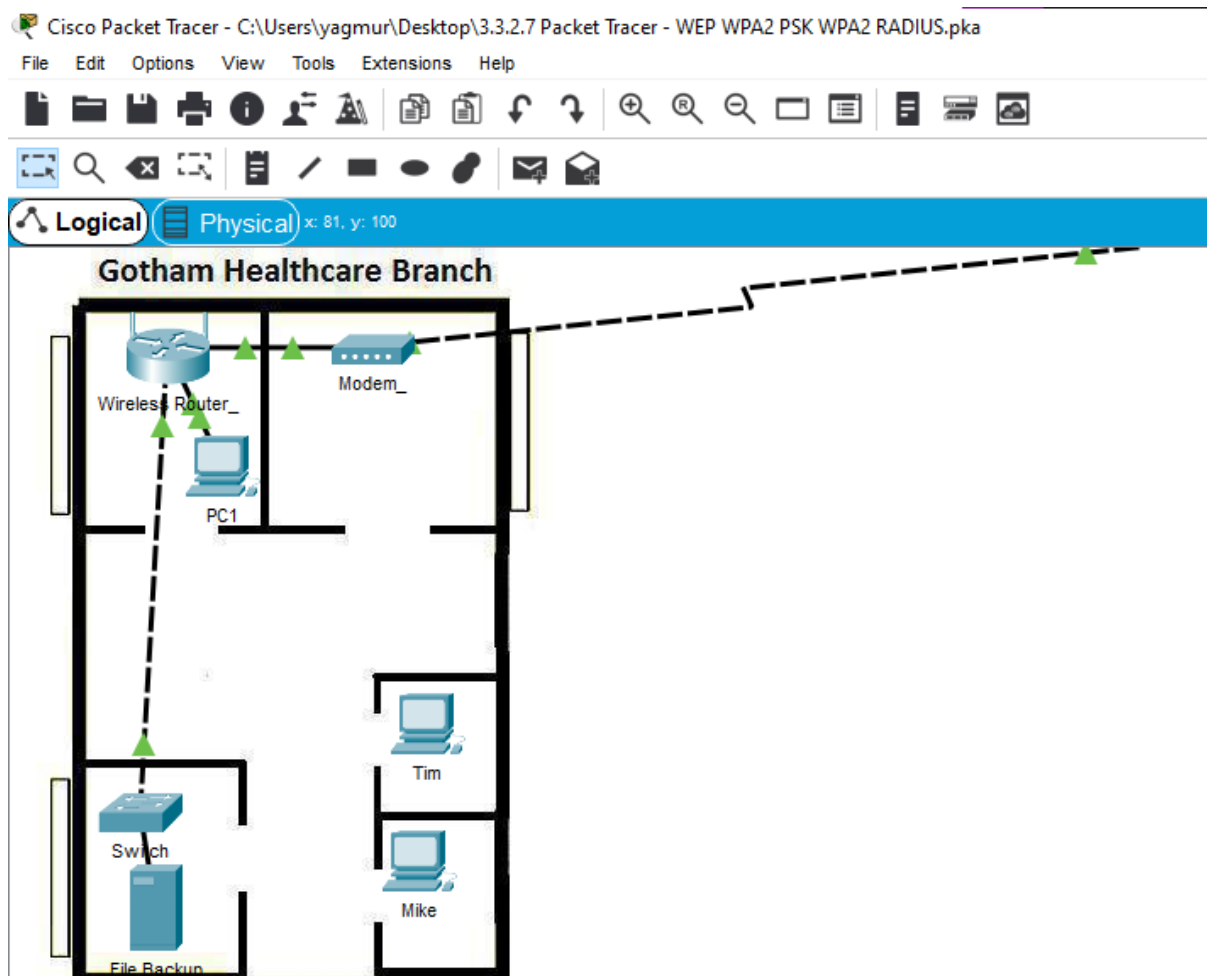




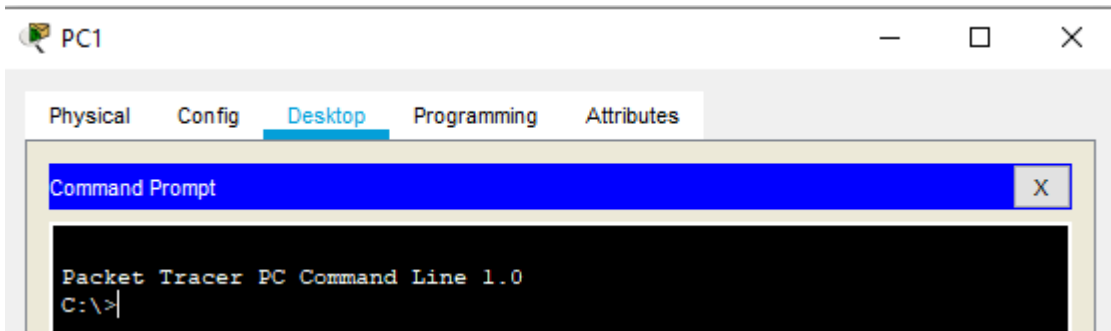
## Part 2: Configure WPA2 PSK for Gotham Healthcare Branch

### Step 1: Setup the Wireless SSID.

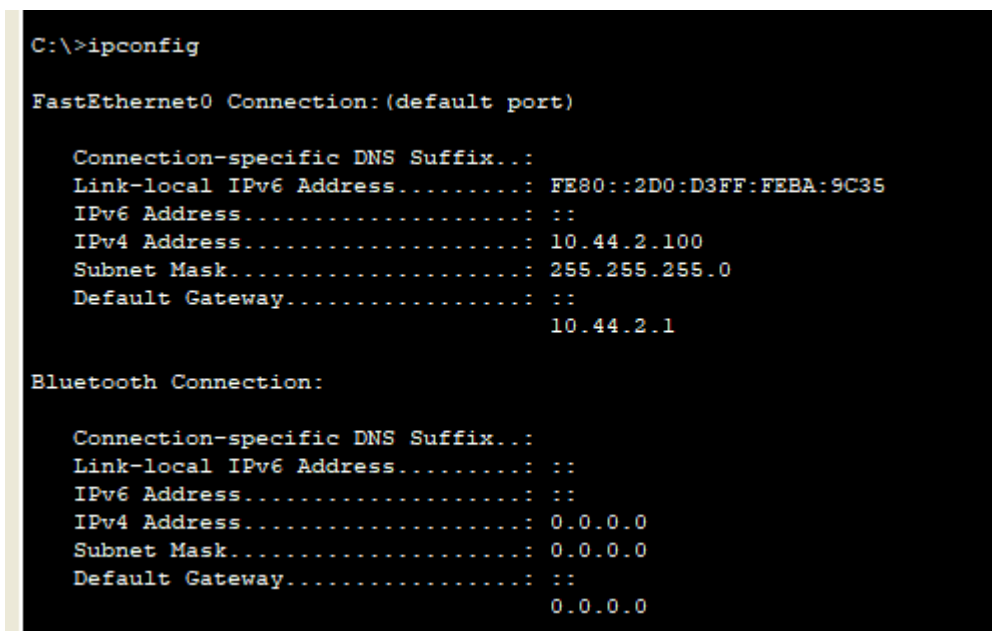
- Click the **Gotham Healthcare Branch** site and click **PC1**.



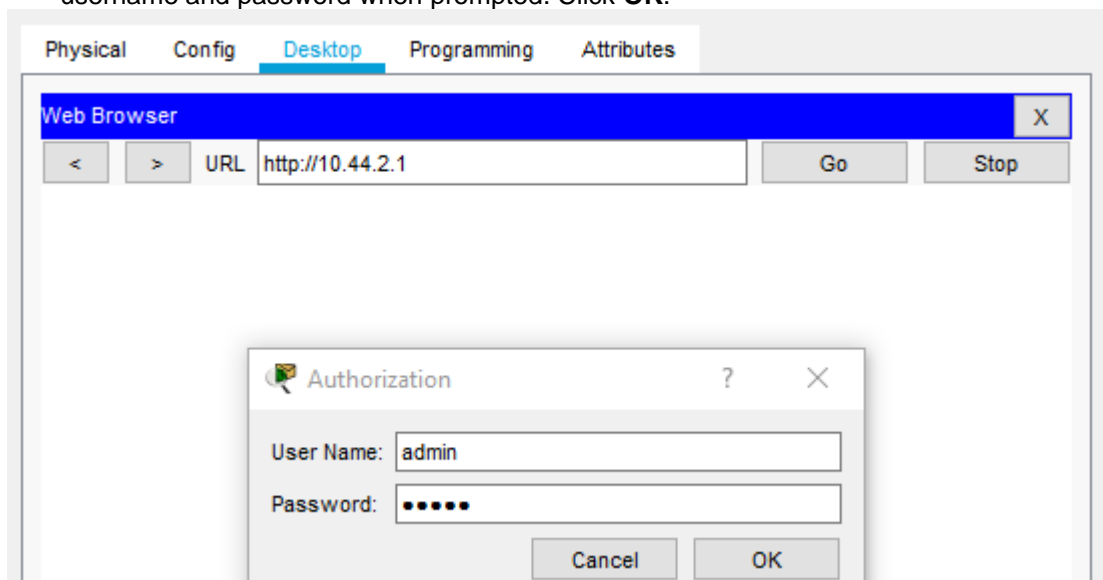
- b. Select **Desktop** tab. Click **Command Prompt**. At the prompt, enter **ipconfig**.



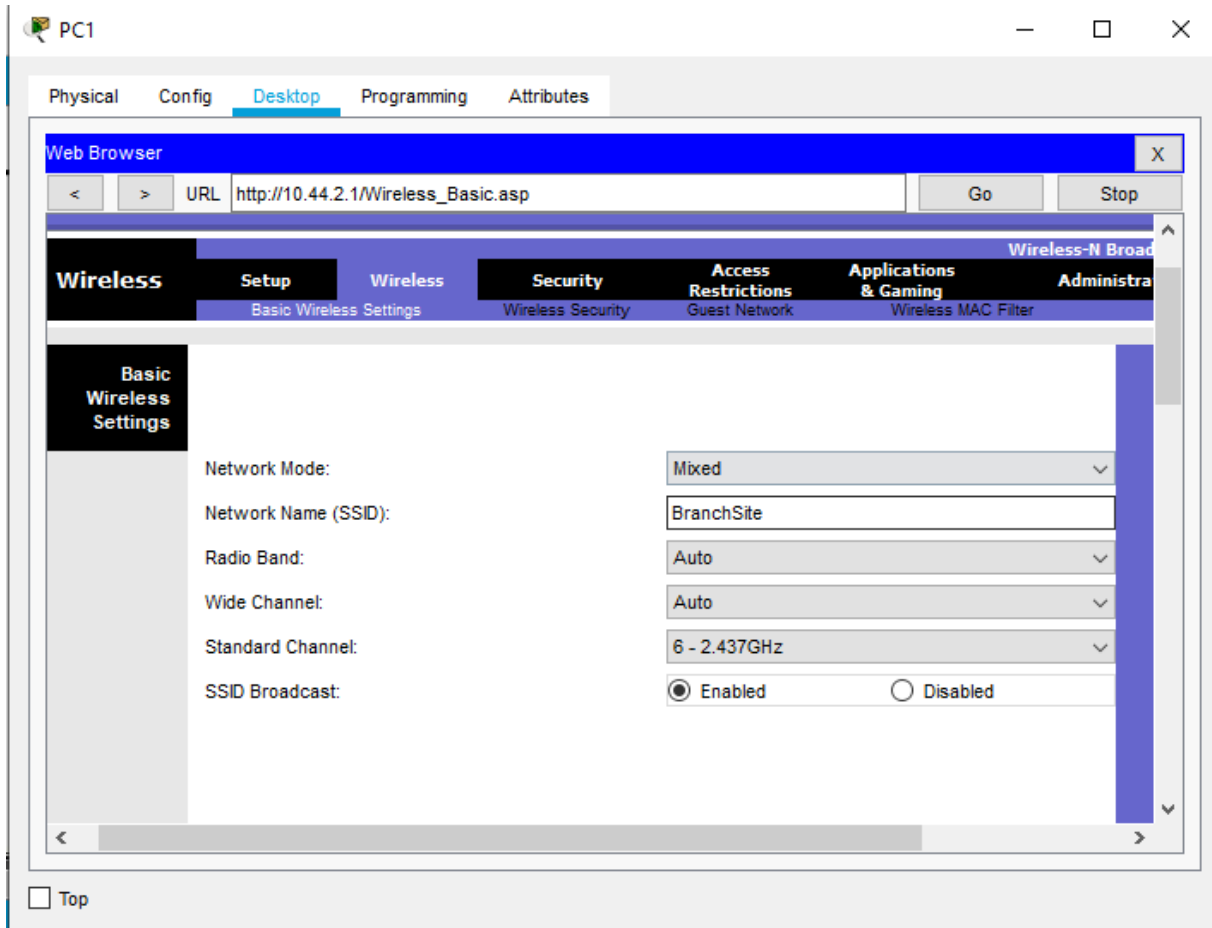
Record the IP address for the default gateway:



- c. Navigate to the **Web Browser** and enter the IP address for the default gateway. Enter **admin** as the username and password when prompted. Click **OK**.



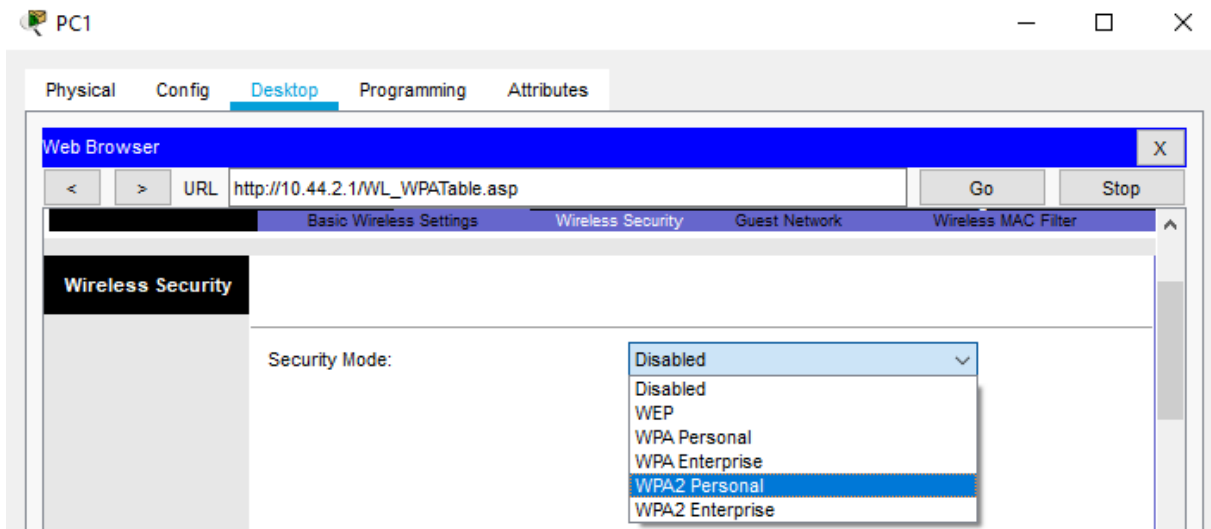
- d. Click **Wireless** tab.
- e. Change the **SSID** from **DefaultWIFI** to **BranchSite**.
- f. Change the Standard Channel to **6 – 2.437GHz**.
- g. Set the SSID to **Broadcast**.
- h. Click **Save Settings**. Click **Continue**.



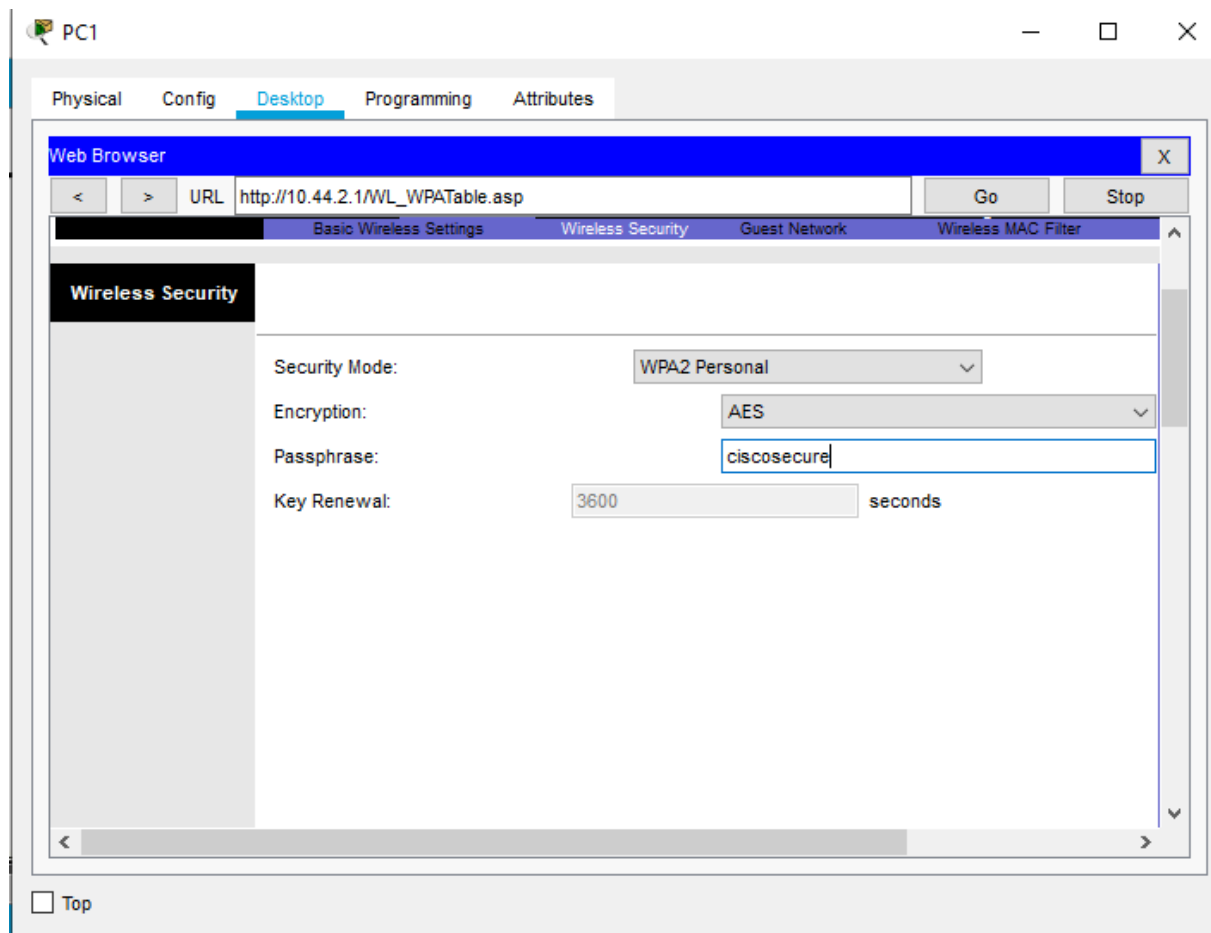
### Step 2: Setup Wireless Security.

- a. Within the wireless router, click on **Wireless > Wireless Security**.

- b. Click the drop down menu and set the Security Mode to **WPA2 Personal**.

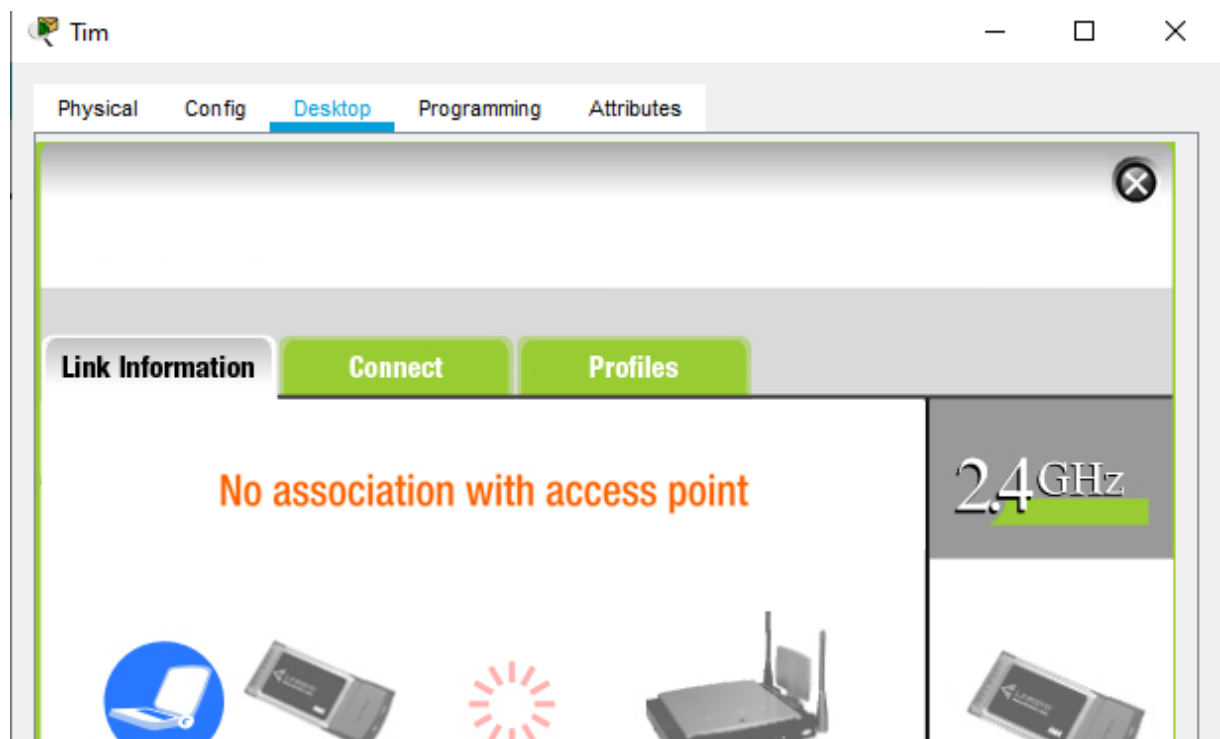


- c. Keep the encryption option set to **AES** and enter the passphrase **ciscosecure**.  
d. Click **Save Settings**. Click **Continue**.

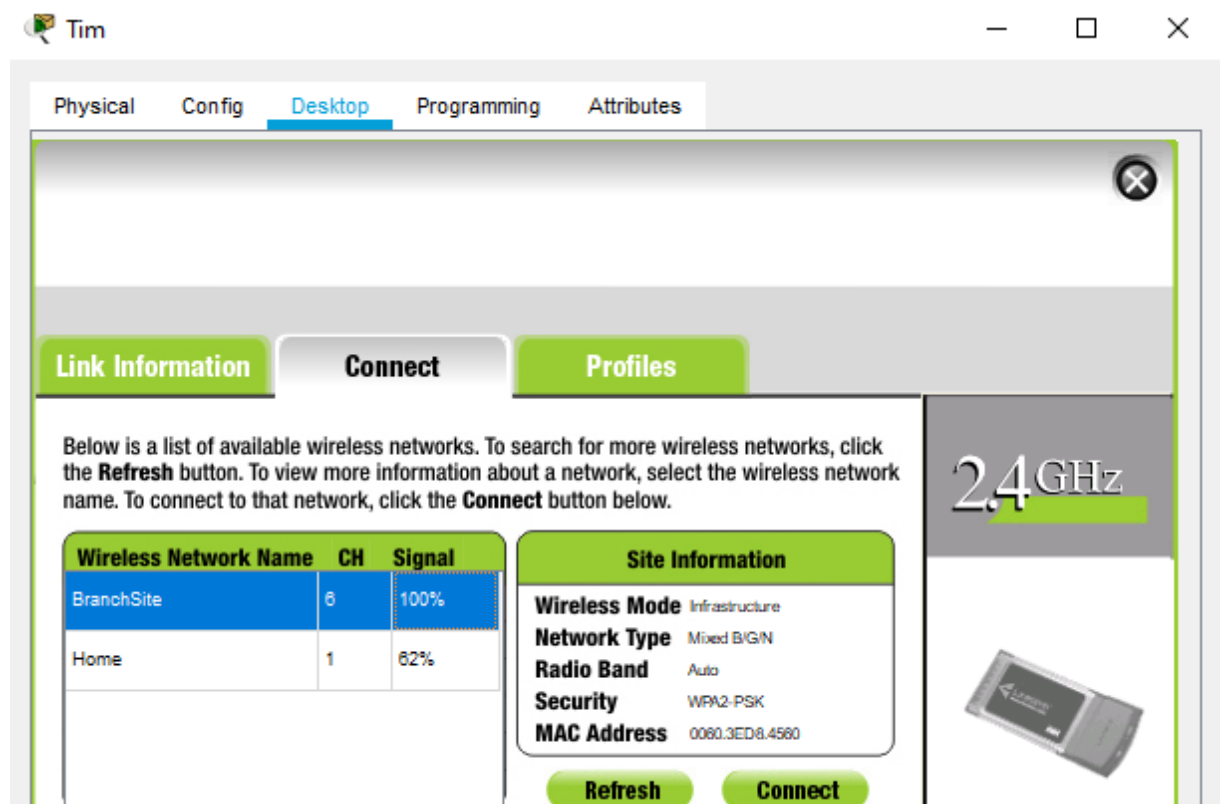


### Step 3: Connect the Clients.

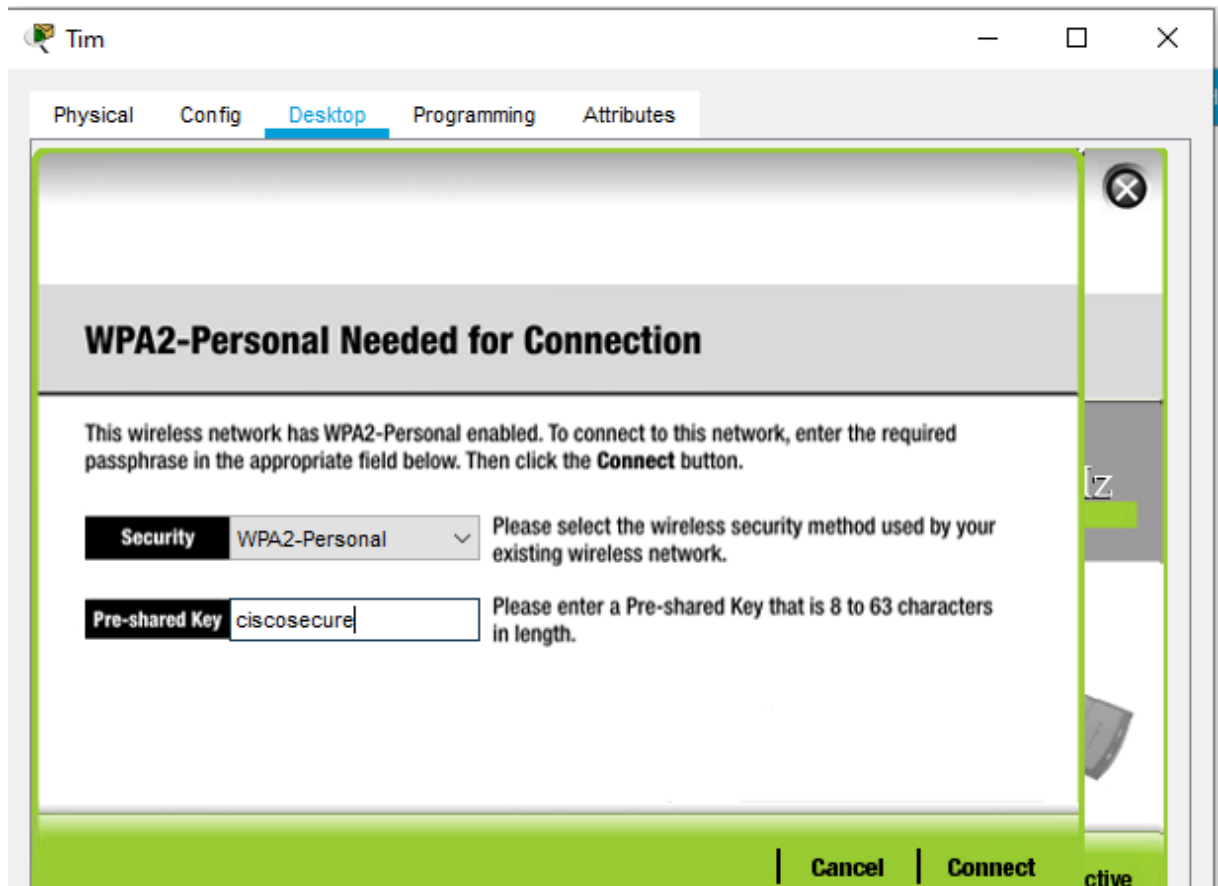
- Within the **Gotham Healthcare Branch** site, click **Tim's** computer.
- Click the **Desktop** tab and click on **PC Wireless**.



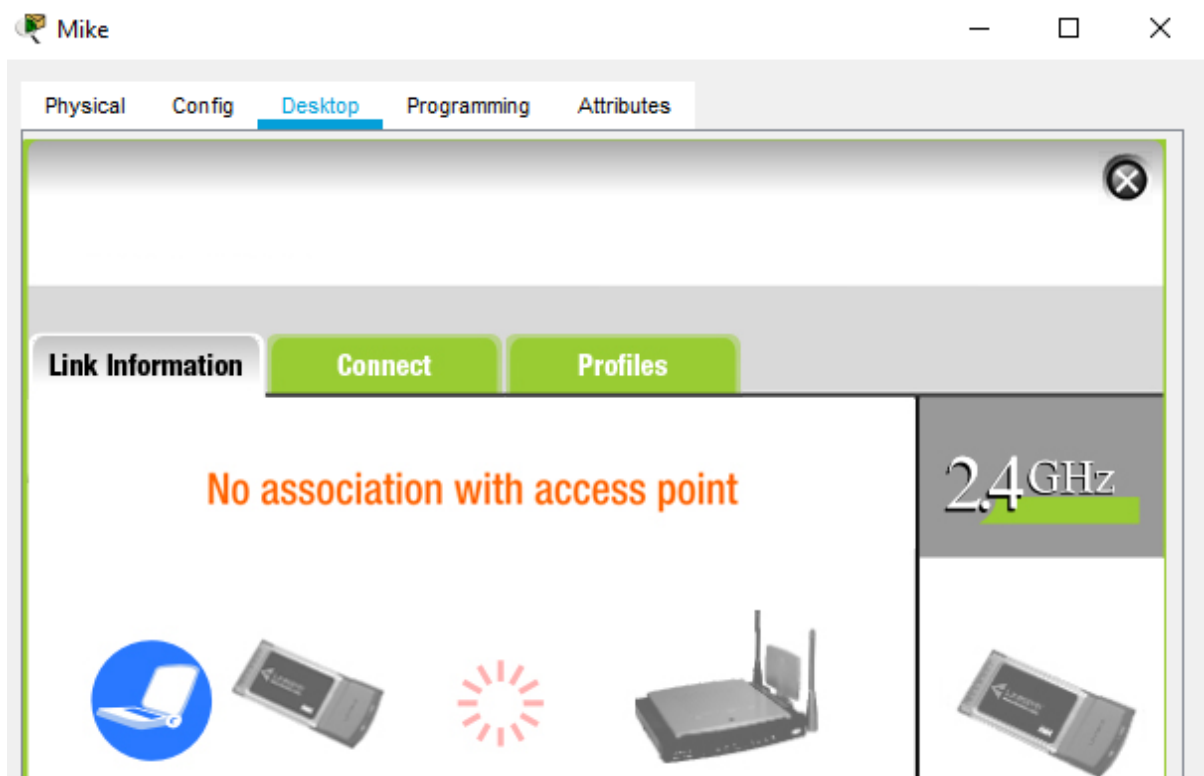
- Click the **Connect** tab and click **Refresh**.
- Select the Wireless Network Name of **BranchSite** and click the **Connect**.

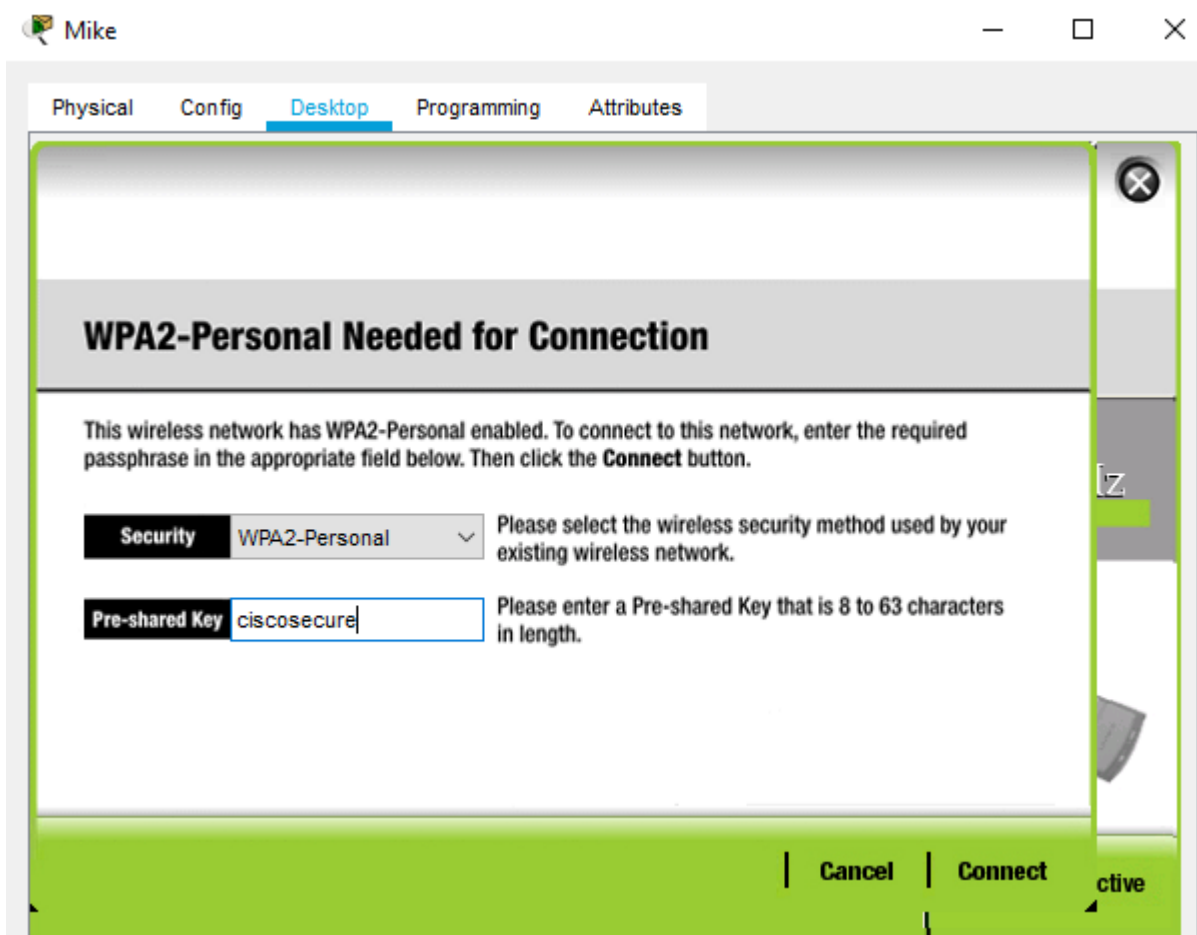
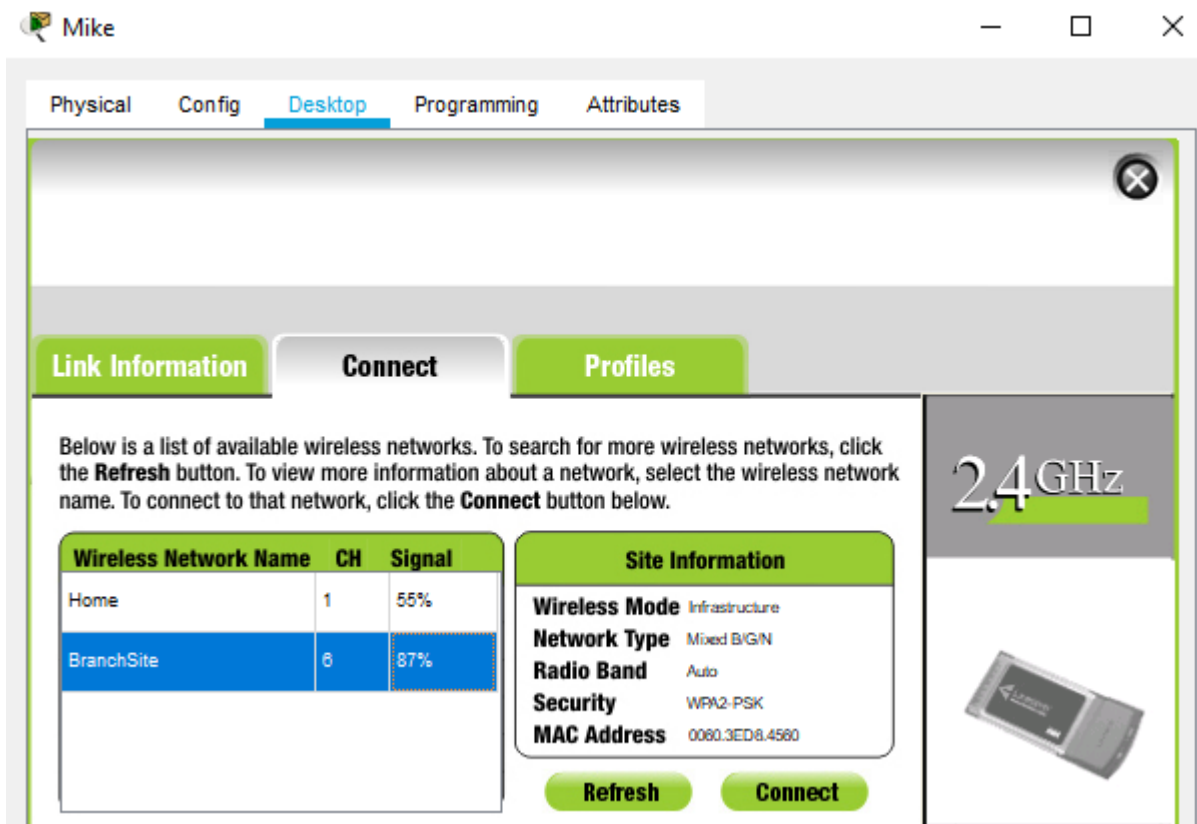


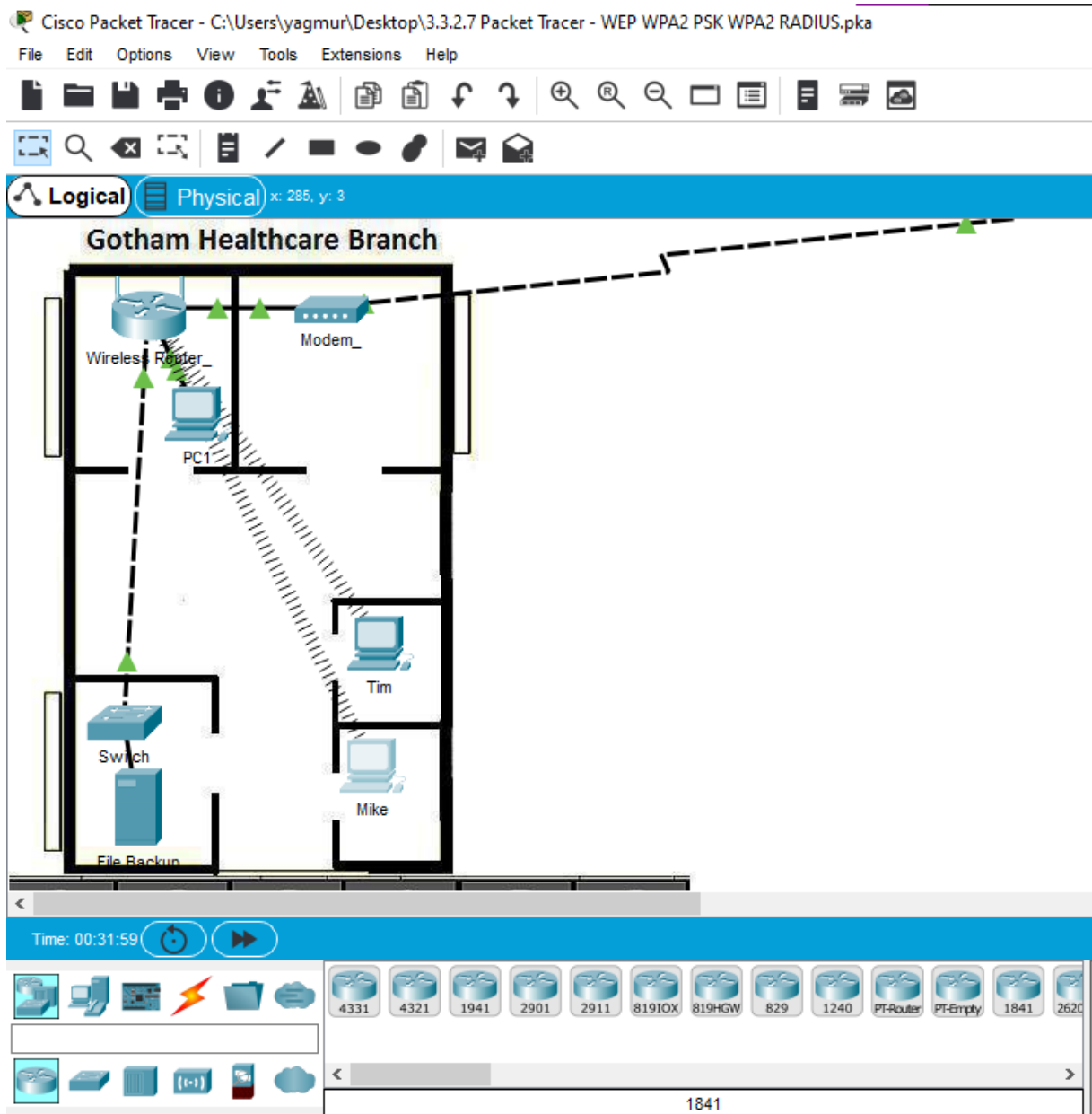
- e. Enter the Pre-shared Key **ciscosecure** and click **Connect**.



- f. Repeat steps a - e for **Mike's** computer.





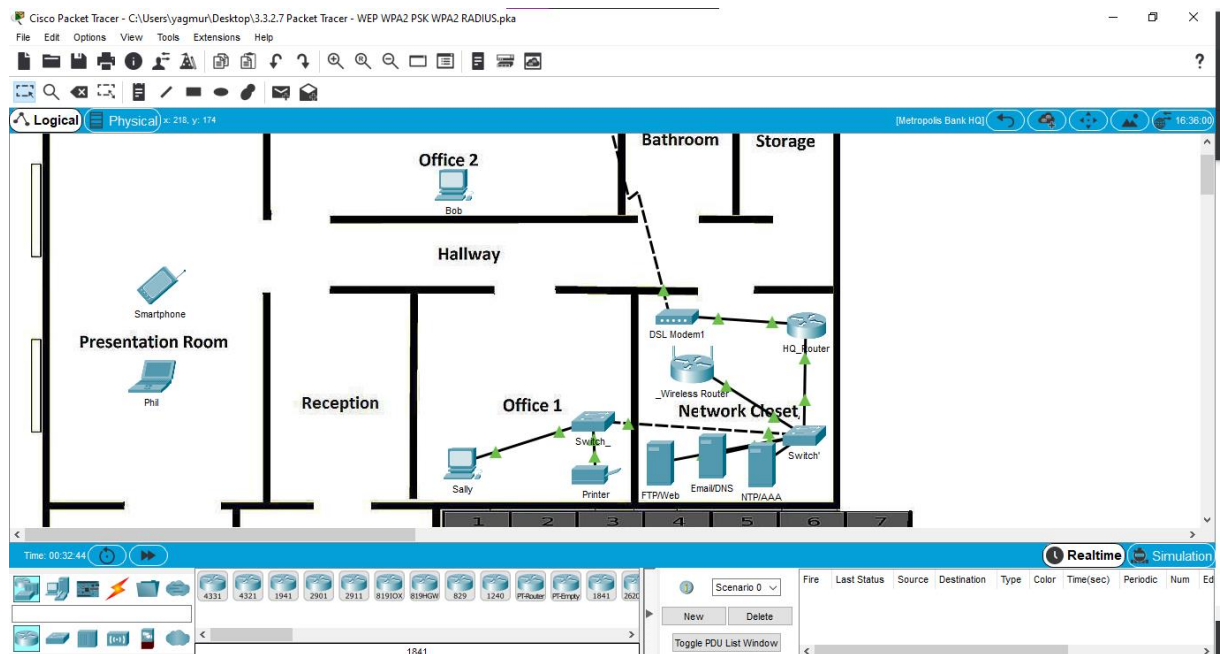
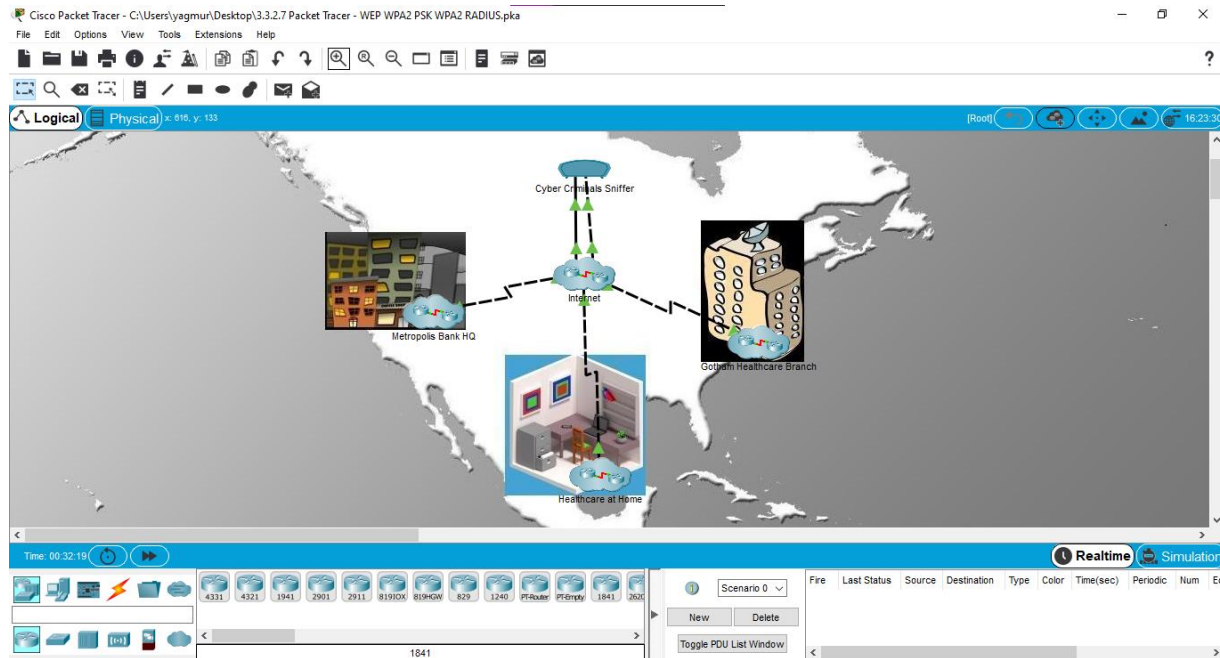




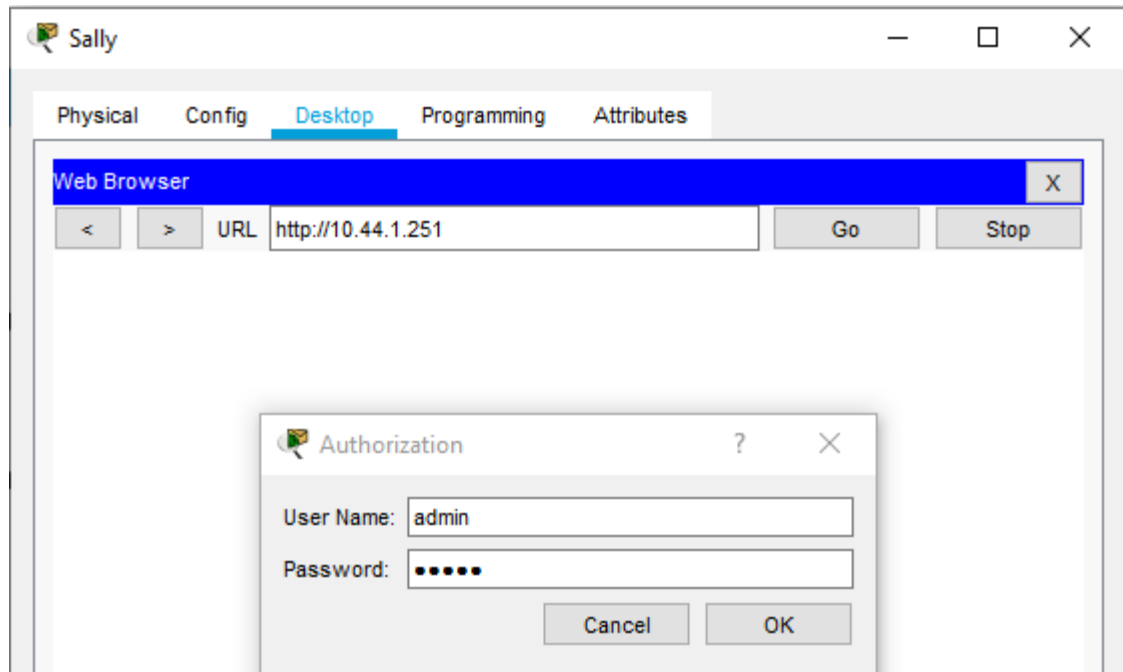
## Part 3: Configure WPA2 RADIUS for Metropolis Bank HQ

### Step 1: Setup the Wireless SSID.

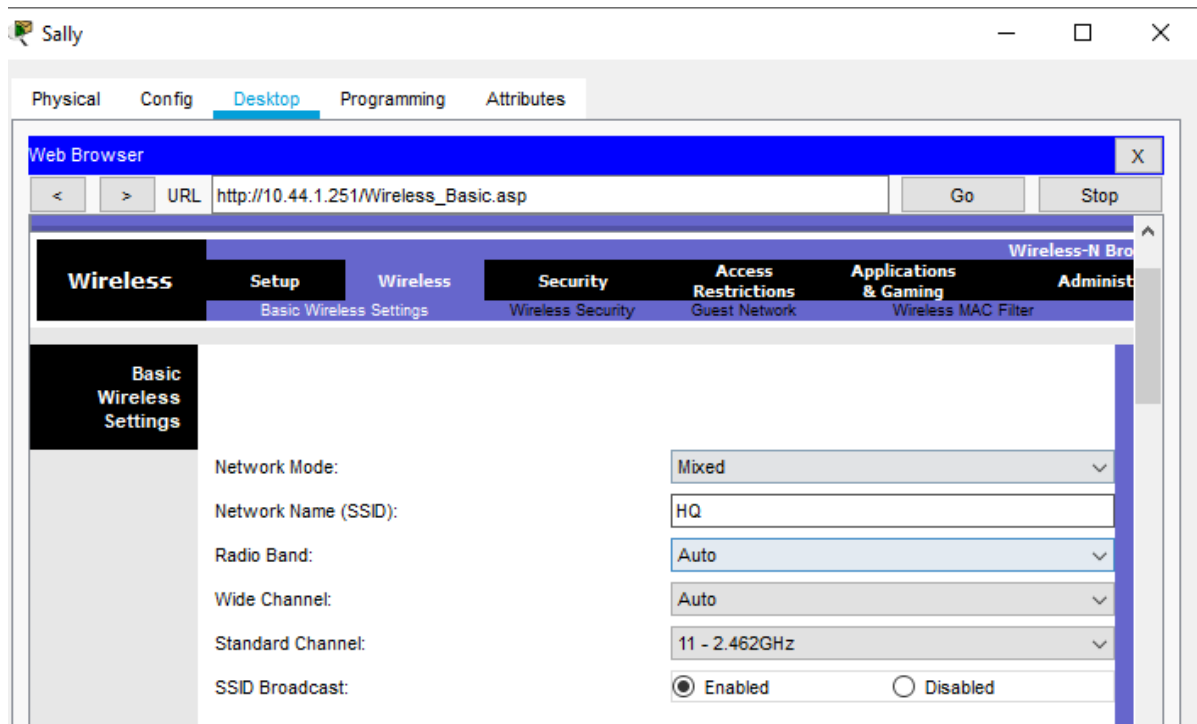
- a. Click the **Metropolis Bank HQ** site and click **Sally**.



- b. Navigate to the **Web Browser** and enter the IP address for the wireless router (**10.44.1.251**). Enter **admin** as the username and password when prompted. Click **OK**.

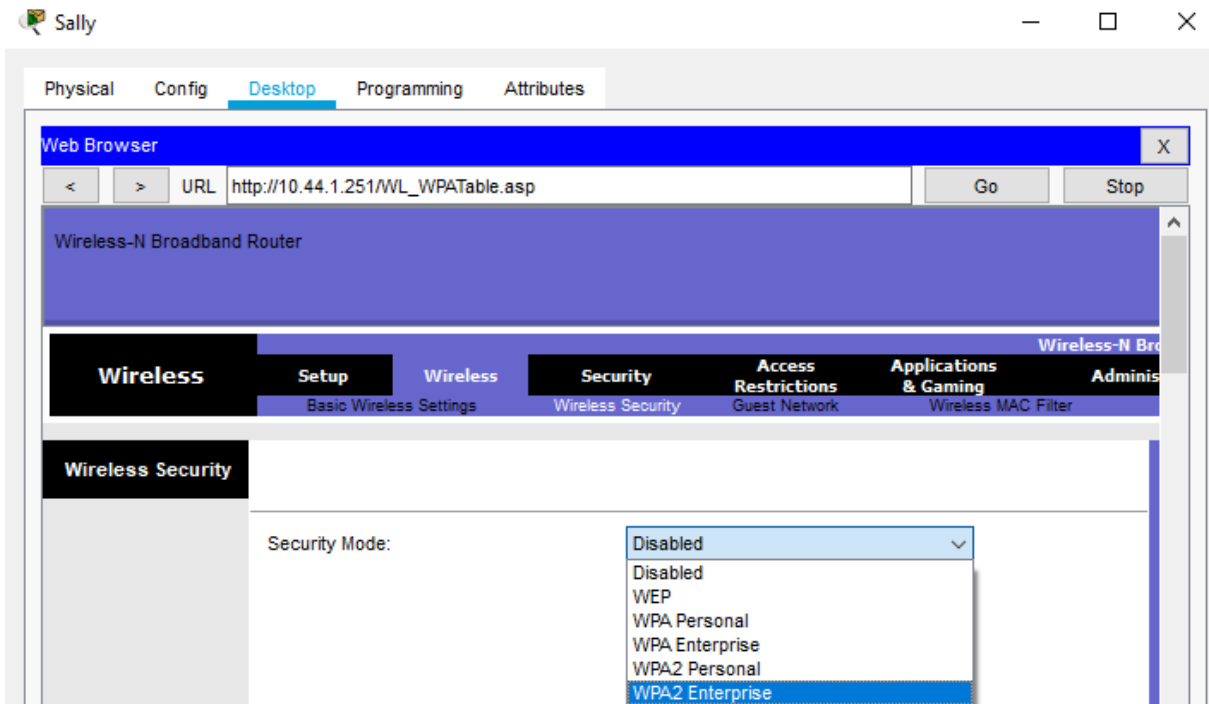


- c. Click the **Wireless** tab. Change the **SSID** from **DefaultWIFI** to **HQ**.  
d. Change the Standard Channel to **11 – 2.462GHz**.  
e. Set the SSID to **Broadcast**.  
f. Click **Save Settings**. Click **Continue**.

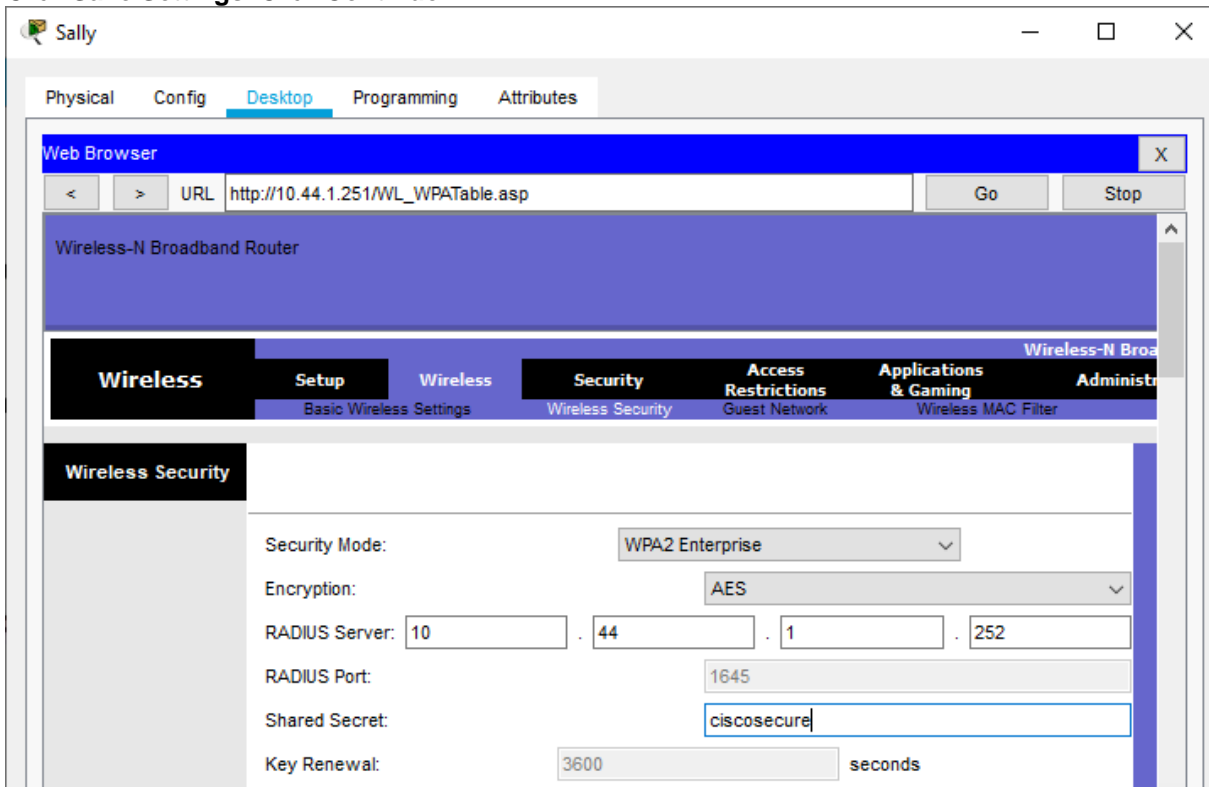


### Step 2: Setup Wireless Security.

- Within the **Wireless Router**, click on **Wireless > Wireless Security**.
- Click the drop down menu and set the Security Mode to **WPA2-Enterprise**.



- Keep the encryption option set to **AES** and enter the following RADIUS server credentials:  
RADIUS SERVER IP: **10.44.1.252**  
Shared Secret: **ciscosecure**
- Click **Save Settings**. Click **Continue**.



### Step 3: Configure the RADIUS server.

- Within the **Metropolis Bank HQ** site, click the **NTP/AAA** server.
- Click the **Services** tab and click on **AAA**.
- Enter the following information in **Network Configuration**:  
 Client Name: .... **HQ**  
 Client IP: ..... **10.44.1.251**  
 Secret ..... **ciscosecure**  
 ServerType ..... **Radius**
- Click **Add**.

**NTP/AAA**

Physical Config **Services** Desktop Programming Attributes

**SERVICES**

- HTTP
- DHCP
- DHCPv6
- TFTP
- DNS
- SYSLOG
- AAA**
- NTP
- EMAIL
- FTP
- IoT
- VM Management
- Radius EAP

**AAA**

Service ☒ On ☐ Off Radius Port

**Network Configuration**

Client Name  Client IP

Secret  ServerType

|   | Client Name | Client IP   | Server Type | Key         |        |
|---|-------------|-------------|-------------|-------------|--------|
| 1 | HQ_Router   | 10.44.1.1   | Radius      | cisco123    | Add    |
| 2 | HQ          | 10.44.1.251 | Radius      | ciscosecure | Save   |
|   |             |             |             |             | Remove |

**User Setup**

Username  Password

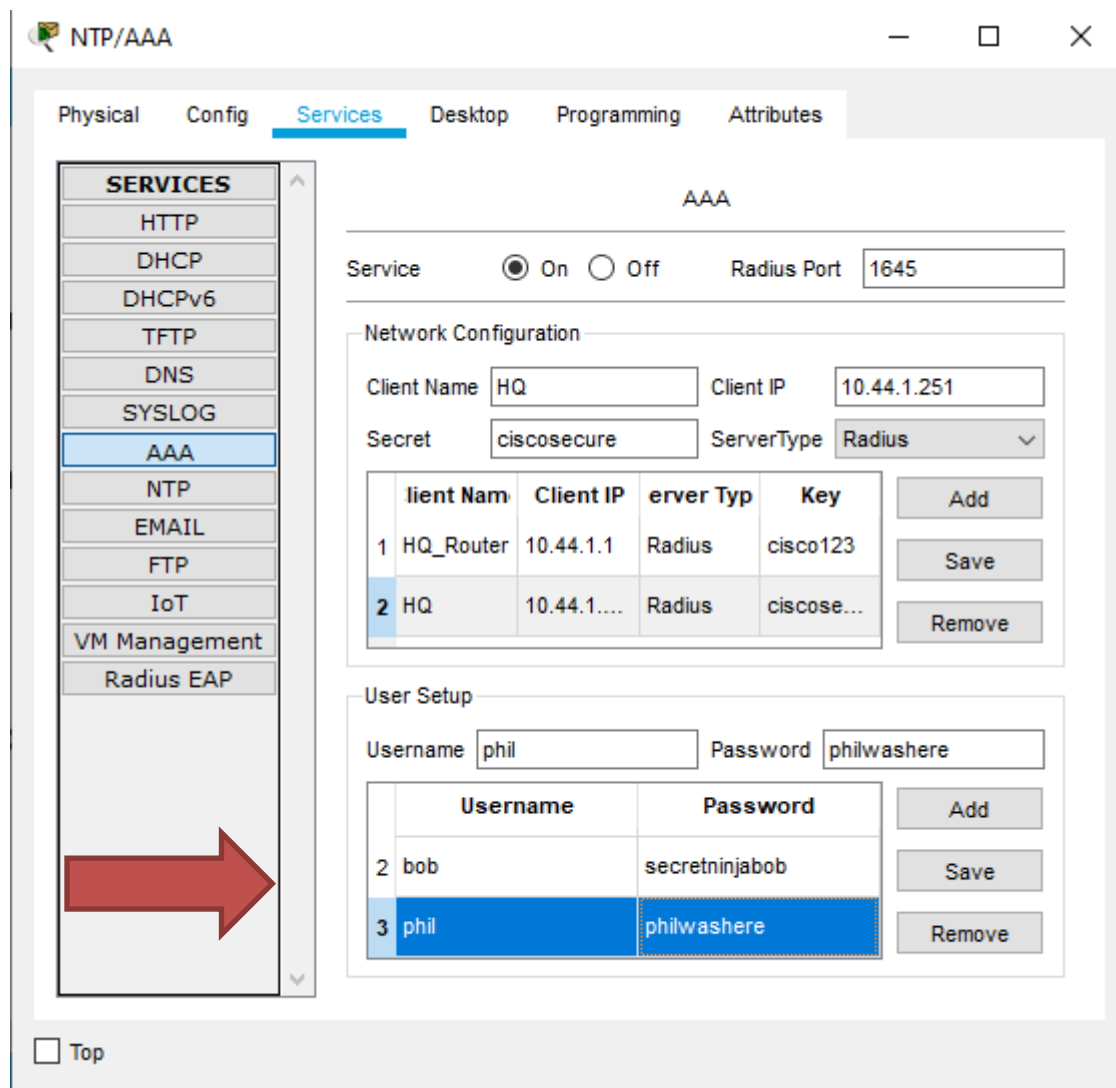
|   | Username | Password |        |
|---|----------|----------|--------|
| 1 | admin    | cisco123 | Add    |
|   |          |          | Save   |
|   |          |          | Remove |

☐ Top

- e. Enter the following information in **User Setup** and click **Add** to add the new username:

Username: **bob** Password: **secretninjabob**

Username: **phil** Password: **philwashere**



**NTP/AAA**

Physical Config **Services** Desktop Programming Attributes

**SERVICES**

- HTTP
- DHCP
- DHCPv6
- TFTP
- DNS
- SYSLOG
- AAA**
- NTP
- EMAIL
- FTP
- IoT
- VM Management
- Radius EAP

**AAA**

Service ☒ On ☐ Off Radius Port

**Network Configuration**

Client Name  Client IP

Secret  ServerType

|   | Client Name | Client IP   | Server Type | Key        |
|---|-------------|-------------|-------------|------------|
| 1 | HQ_Router   | 10.44.1.1   | Radius      | cisco123   |
| 2 | HQ          | 10.44.1.... | Radius      | ciscose... |

**User Setup**

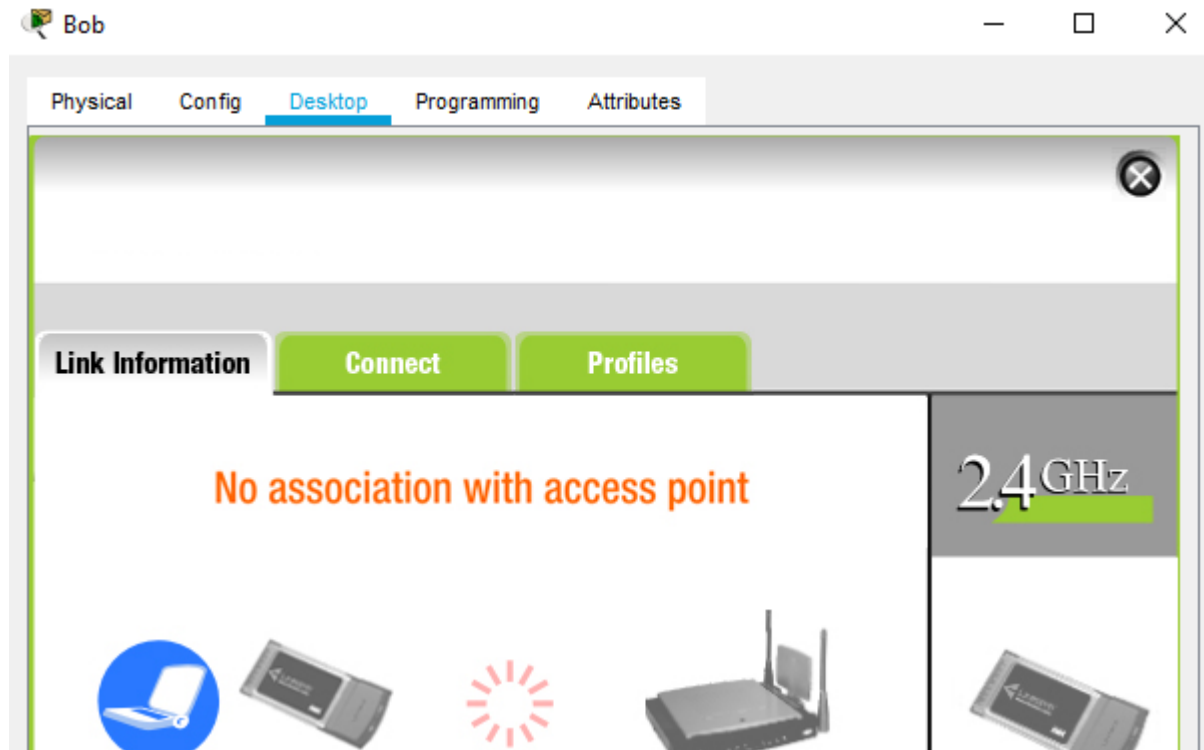
Username  Password

|   | Username | Password       |
|---|----------|----------------|
| 2 | bob      | secretninjabob |
| 3 | phil     | philwashere    |

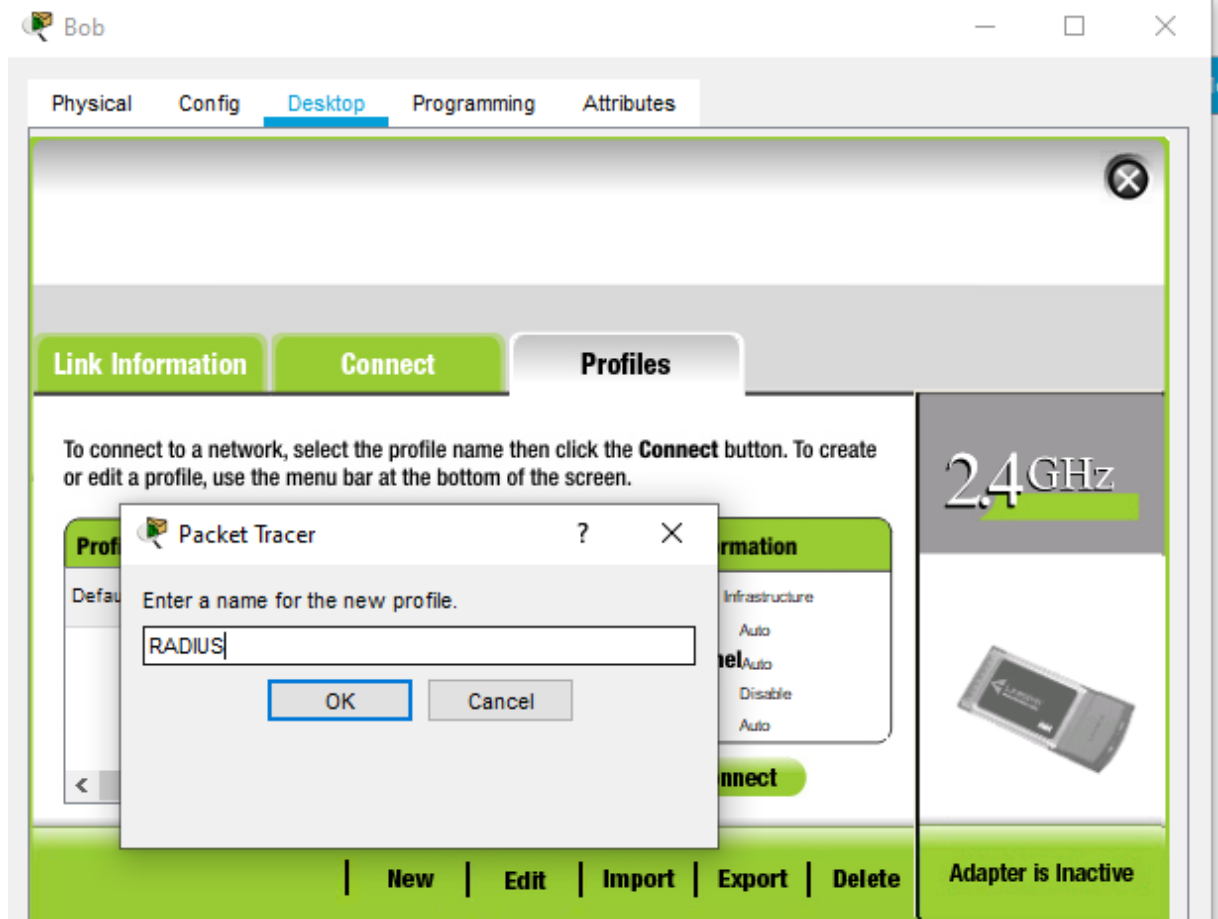
☐ Top

### Step 4: Connect the Clients.

- Within the **Metropolis Bank HQ** site, click **Bob's** computer.
- Click the **Desktop** tab and click on **PC Wireless**.



- c. Click the **Profiles** tab and click **New**.
- d. Name the Profile **RADIUS** and click **OK**.



- e. Click **Advanced Setup**.
- f. Enter the Wireless Network Name **HQ** and click **Next**.
- g. Do not modify the Network Settings and click **Next**.

The screenshot shows the 'Creating a Profile' window in Packet Tracer. The 'Desktop' tab is selected. Under 'Wireless Mode', the 'Infrastructure Mode' radio button is selected. The 'Wireless Network Name' field contains 'HQ'. The 'Back' and 'Next' buttons are at the bottom right.

**Creating a Profile**

**Wireless Mode**

Please choose the Wireless Mode that best suits your needs.

☒ **Infrastructure Mode** Select Infrastructure Mode if you want to connect to a wireless router or access point.

☐ **Ad-Hoc Mode** Select Ad-Hoc Mode if you want to connect to another wireless device directly without using a wireless router or access point.

Please enter the wireless network name (SSID) for your wireless network.  
The wireless network name is shared by all devices in a wireless network and is case-sensitive.

**Wireless Network Name**

**Back** **Next**

- h. Change the Wireless Security drop down menu to **WPA2-Enterprise** and click **Next**.

The screenshot shows the 'Creating a Profile' window in Packet Tracer. The 'Wireless Security' section has a dropdown menu open, showing 'WPA2-Enterprise' selected. The 'Back' and 'Next' buttons are at the bottom right.

**Creating a Profile**

**Wireless Security**

**Security**  **Disable**  
Disable  
WEP  
WPA-Personal  
WPA-Enterprise  
WPA2-Personal  
**WPA2-Enterprise**

Please select the wireless security method used by your existing wireless network.

**WEP** stands for Wired Equivalent Privacy.

**WPA-Personal**, also known as Pre-shared Key, is a security standard stronger than WEP encryption.

**WPA2-Personal** is the newer version with stronger encryption than WPA-Personal.

**WPA-Enterprise, WPA2-Enterprise and RADIUS** use Remote Authentication Dial-In User Service (RADIUS).

**Back** **Next**

- i. Enter the login name of **bob** and the password of **secretninjabob** and click **Next**.

**Creating a Profile**

**Wireless Security - WPA2 Enterprise**

|                       |            |  |
|-----------------------|------------|--|
| <b>Authentication</b> | PEAP       | Please select the authentication method that you use to access your network. |
| <b>Login Name</b>     | bob        | Enter the Login Name used for authentication.                                |
| <b>Password</b>       | .....      | Enter the Password used for authentication.                                  |
| <b>Server Name</b>    |            | Enter the Server Name used for authentication. <b>(Optional)</b>             |
| <b>Certificate</b>    | Trust Any  | Please select the certificate used for authentication.                       |
| <b>Inner Authen.</b>  | TOKEN CARD | Please select the inner authentication method used inside the PEAP tunnel.   |

| **Back** | **Next**

- j. Click **Save** and then **Connect to Network**.

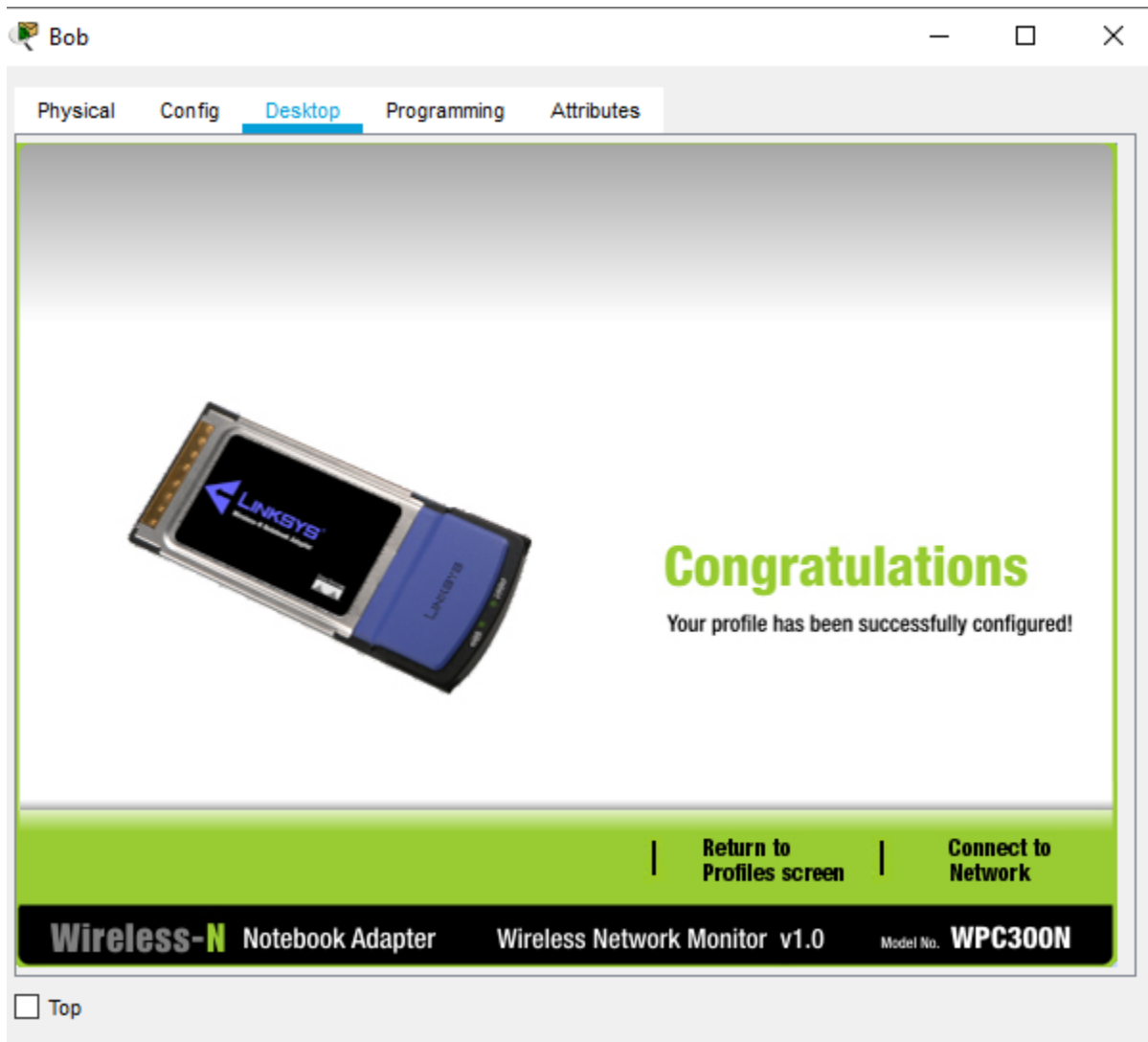
**Confirm New Settings**

| Profile Settings             |                 |
|------------------------------|-----------------|
| <b>Wireless Network Name</b> | HQ              |
| <b>Wireless Mode</b>         | Infrastructure  |
| <b>Network Mode</b>          | Mixed Mode      |
| <b>Radio Band</b>            | Auto            |
| <b>Wide Channel</b>          | Auto            |
| <b>Standard Channel</b>      | Auto            |
| <b>Security</b>              | WPA2 Enterprise |
| <b>Authentication</b>        | Auto            |

| **Exit** | **Back** | **Save**



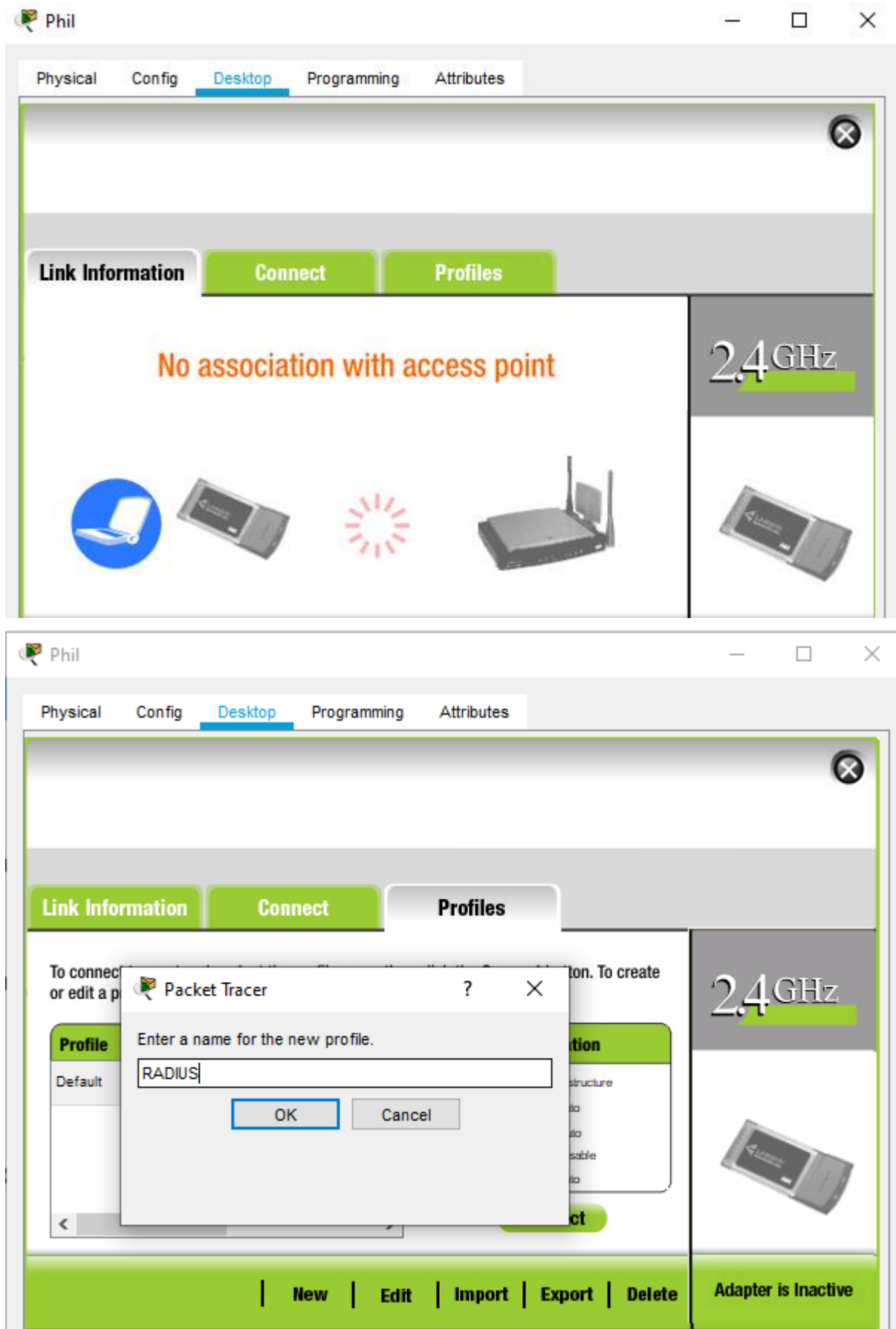
- k. **Bob's** computer will connect automatically.



- l. Repeat steps **a-j** for **Phil's** laptop using the authentication information from Step 3e.

**When considering a large organization, why is WPA2 RADIUS more beneficial than WPA2 PSK?**

*WPA2 RADIUS allows each user to have their own unique credentials to access the wireless network. When a single user is no longer employed their specific account can be disabled/removed.*



Phil
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Physical
 Config
 Desktop
 Programming
 Attributes

## Creating a Profile

### Wireless Mode

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☐ **Ad-Hoc Mode**

Select Ad-Hoc Mode if you want to connect to another wireless device directly without using a wireless router or access point.

Please enter the wireless network name (SSID) for your wireless network.  
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Wireless Network Name

Back
 Next

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## Creating a Profile

### Wireless Security

**Security**

Disable
 Disable
 WEP
 WPA-Personal
 WPA-Enterprise
 WPA2-Personal
 WPA2-Enterprise

Please select the wireless security method used by your existing wireless network.

**WEP** stands for Wired Equivalent Privacy.

**WPA-Personal**, also known as Pre-shared Key, is a security standard stronger than WEP encryption.

**WPA2-Personal** is the newer version with stronger encryption than WPA-Personal.

**WPA-Enterprise**, **WPA2-Enterprise** and **RADIUS** use Remote Authentication Dial-In User Service (RADIUS).

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 Next

Phil
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## Creating a Profile

### Wireless Security - WPA2 Enterprise

|                |            |  |
|----------------|------------|--|
| Authentication | PEAP       | Please select the authentication method that you use to access your network. |
| Login Name     | phil       | Enter the Login Name used for authentication.                                |
| Password       | .....      | Enter the Password used for authentication.                                  |
| Server Name    |            | Enter the Server Name used for authentication. <b>(Optional)</b>             |
| Certificate    | Trust Any  | Please select the certificate used for authentication.                       |
| Inner Authen.  | TOKEN CARD | Please select the inner authentication method used inside the PEAP tunnel.   |

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Next

Physical
 Config
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## Confirm New Settings

### Profile Settings

|                       |                 |                 |      |
|-----------------------|-----------------|-----------------|------|
| Wireless Network Name | HQ              | IP Address      | Auto |
| Wireless Mode         | Infrastructure  | Subnet Mask     | Auto |
| Network Mode          | Mixed Mode      | Default Gateway | Auto |
| Radio Band            | Auto            | DNS1            | Auto |
| Wide Channel          | Auto            | DNS2            |      |
| Standard Channel      | Auto            |                 |      |
| Security              | WPA2 Enterprise |                 |      |
| Authentication        | Auto            |                 |      |

Exit
Back
Save



## Packet Tracer – WEP/WPA2 PSK/WPA2 RADIUS

