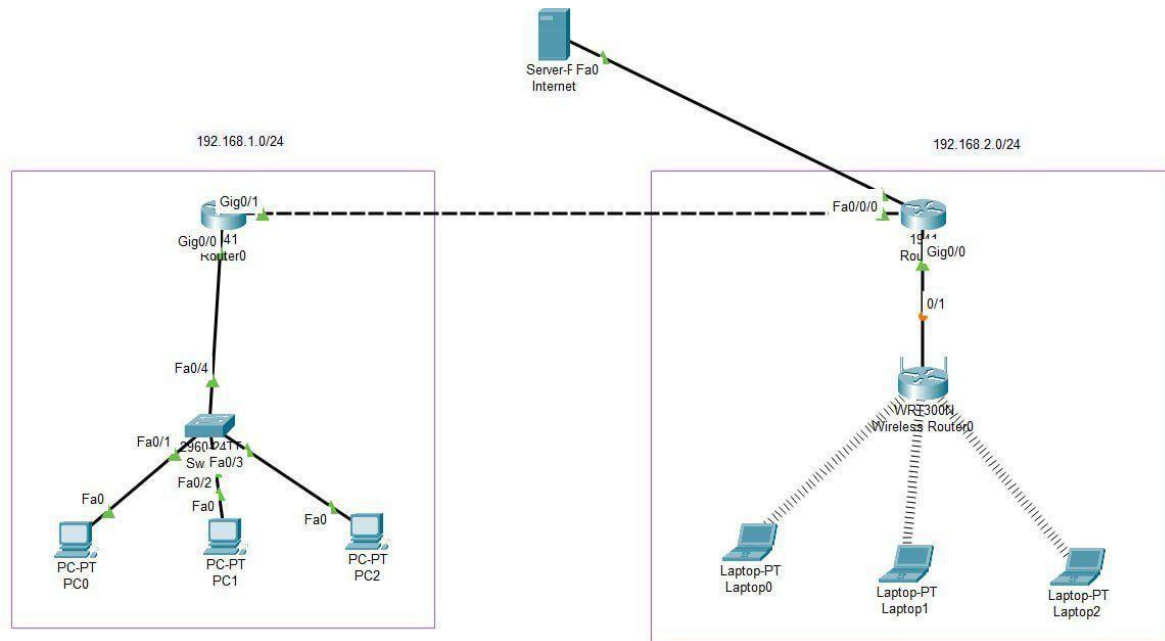


## Network Project



Kamalh Al-amri	444002264	Part 2: Evaluating Network Performance+Part3: Checking Network Security
Reem Al-salhi	444014767	Part 2: Evaluating Network Performance+Part3: Checking Network Security
Salha Alshaeri	444009228	Part 1: Designing a Local Network+Part3: Checking Network Security
Rooa Al-Qarni	444002081	Part 1: Designing a Local Network+Part3: Checking Network Security

## Part 1: Designing a Local Network



- A collection of desktop computers (PC0, PC1, and PC2) connected by a switch make up Subnet 192.168.1.0/24. A FastEthernet (Fa0/1) port connects the switch to the router. Data traffic inside this subnet must be directed by the router.
- 2. Subnet 192.168.2.0/24: This subnet is made up of several laptops (Laptop0, Laptop1, Laptop2) that are linked together by a wireless router. Gigabit Ethernet (G0/0/0) and Fast Ethernet (Fa0/0) ports are used to connect the wireless router to the router. Controlling the data flow in this subnet is another duty of the router.
- 3. Server: The server serves as the gateway to the internet for both subnets and is immediately connected to the router via a FastEthernet (Fa0) port. Devices in both subnets can connect to the internet thanks to the server's internet access.

## Part2: Evaluating Network Performance

- Speed test



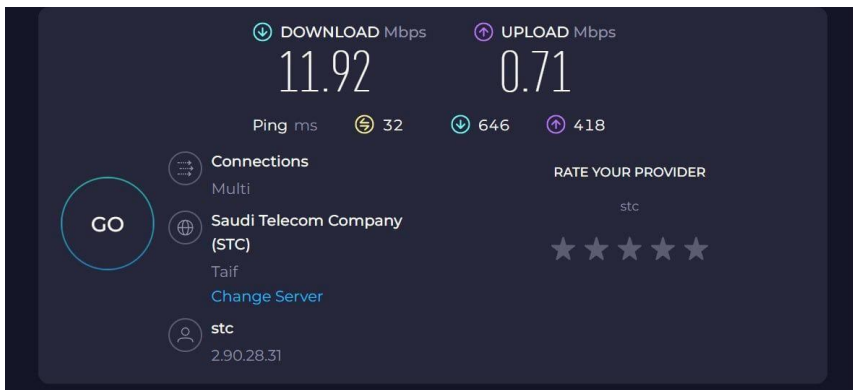
When we tested Speedtest next to the router, the results were as follows:

- Download speed: 8.68 Mbps.
- Upload speed: 0.69 Mbps.
- Ping:
- 120 ms when connecting to the server.
- 104 ms when downloading files.
- 365 ms when uploading files.



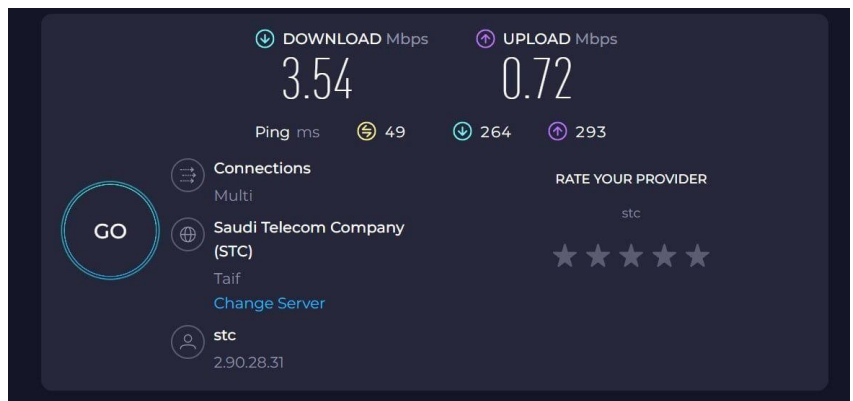
When we tested Speedtest in the middle of the house, the results were as follows:

- Download speed: 6.82 Mbps.
- Upload speed: 0.64 Mbps.
- Ping:
- 34 ms when connecting to the server.
- 628 ms when downloading files.
- 460 ms when uploading files.



When we tested Speedtest in one of the rooms in the house, the results were as follows:

- Download speed: 11.92 Mbps.
- Upload speed: 0.71 Mbps.
- Ping:
- 32 ms when connecting to the server.
- 646 ms when downloading files.
- 418 ms when uploading files.



When we tested Speedtest outside the house, the results were as follows:

- Download speed: 3.54 Mbps.
- Upload speed: 0.71 Mbps.
- Ping:
- 49 ms when connecting to the server.
- 264 ms when downloading files.
- 293 ms when uploading files.

**Results :** The fastest download speed (11.92 Mbps) was in one of the rooms in the house, while the slowest speed was outside the house. We observed that the latency was lowest near the router but was generally good in the room and in the middle of the house for server connections.

## • ping Test

```
C:\Users\MSIReem>ping 192.168.1.1

Pinging 192.168.1.1 with 32 bytes of data:
Reply from 192.168.1.1: bytes=32 time=15ms TTL=64
Reply from 192.168.1.1: bytes=32 time=14ms TTL=64
Reply from 192.168.1.1: bytes=32 time=1574ms TTL=64
Reply from 192.168.1.1: bytes=32 time=14ms TTL=64

Ping statistics for 192.168.1.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 14ms, Maximum = 1574ms, Average = 404ms
```

When we tested the ping to the IP address 192.168.1.1, the following results appeared:

- Minimum ping: 14 milliseconds (ms)
- Maximum ping: 1574 ms
- Average ping: 404 ms

The ping times vary significantly, with some responses being very fast (14-15 ms) and others much slower (up to 1574 ms). This indicates connection instability.

## • Traceroute

```
Tracing route to Xrdlab.io [64:ff9b::aabb:bd41]
over a maximum of 30 hops:

  1      3 ms      3 ms      2 ms    2001:16a4:260:7771:c81f:c493:d6a:1d89
  2      *        *        *      Request timed out.
  3     71 ms     53 ms     38 ms    fc00::181
  4     56 ms     40 ms     57 ms    fc00::ab
  5     52 ms     55 ms     57 ms    fd36:a94c:26e9:4000::3fe
  6     65 ms     64 ms     51 ms    fd36:a94c:26e9:4000::2ca
  7      *        *        *      Request timed out.
  8      *        *        *      Request timed out.
  9      *        *        *      Request timed out.
 10     *        *        *      Request timed out.
 11     *        *        *      Request timed out.
 12     *        *        *      Request timed out.
 13     *        *        *      Request timed out.
 14     *        *        *      Request timed out.
 15     *        *        *      Request timed out.
 16     *        *        *      Request timed out.
 17     *        *        *      Request timed out.
 18     *        *        *      Request timed out.
 18     *        *        *      Request timed out.
```

The image shows the results of a traceroute:

- The first hop responds within 2-3 milliseconds
- The second hop times out
- The subsequent hops up to the sixth hop show varying response times between 38 milliseconds and 65 milliseconds
- From the seventh hop onward, all requests time out
- Hop 2 and hop 7-18 may cause issues

- **Check Network Configuration**

```
Last login: Fri Oct 18 14:51:29 on ttys000
MacBook-Pro-alkhas-b-Badr:~ safaalsalhi$ networksetup -getinfo Wi-Fi
DHCP Configuration
IP address: 192.168.0.102
Subnet mask: 255.255.255.0
Router: 192.168.0.254
Client ID:
IPv6: Automatic
IPv6 IP address: none
IPv6 Router: none
Wi-Fi ID: 98:01:a7:96:68:2d
MacBook-Pro-alkhas-b-Badr:~ safaalsalhi$
```

## Part3: Checking Network Security

- **Access the Router Settings**

The screenshot shows the web interface of a TP-Link Wireless N Access Point WA801N. The browser address bar shows the IP address 192.168.0.254. The interface has a teal header with the TP-Link logo and the device name. A left sidebar contains a menu with options: Status, Quick Setup, Operation Mode, Network, Wireless (highlighted), DHCP, System Tools, and Logout. The main content area is titled 'Wireless Settings' and contains the following configuration options:

- Wireless: ☒ Enable ☐ Disable
- Wireless Network Name: TP-Link\_AP\_63E8 (Also called SSID)
- Mode: 11bgn mixed
- Channel Width: Auto
- Channel: Auto
- ☒ Enable SSID Broadcast

A 'Save' button is located at the bottom of the configuration area. On the right side, there is a 'Wireless Settings Help' section with a note about operating distance and a list of guidelines for placement. Below the list, there are definitions for 'Wireless Network Name', 'Mode', and 'Channel Width'.

**Wireless Settings Help**

**Note:** The operating distance or range of your wireless connection varies significantly based on the physical placement of the AP. For best results, place your AP:

- Near the center of the area in which your wireless stations will operate.
- In an elevated location such as a high shelf.
- Away from the potential sources of interference, such as PCs, microwaves, and cordless phones.
- With the Antenna in the upright position.
- Away from large metal surfaces.

**Note:** Failure to follow these guidelines can result in significant performance degradation or inability to wirelessly connect to the AP.

**Wireless Network Name** - Enter a value of up to 32 characters. The same Name (SSID) must be assigned to all wireless devices in your network.

**Mode** - You can choose the appropriate "Mixed" mode.

**Channel Width** - The bandwidth of the wireless channel.

- **Change Default Credentials**

The screenshot shows the web interface of a TP-Link Wireless N Access Point WA801N. The left sidebar contains a menu with options: Status, Quick Setup, Operation Mode, Network, Wireless, DHCP, System Tools (highlighted), Time Settings, Diagnostic, SNMP Settings, Ping WatchDog, Firmware Upgrade, Factory Defaults, Backup & Restore, Reboot, Password, System Log, and Logout. The main content area is titled 'Password' and contains three password input fields: 'Old Password', 'New Password', and 'Confirm password'. The 'New Password' field has three validation rules: it must contain no space(s), must be 6-32 characters long, and must contain at least two types of the following characters: letters, numbers, and symbols. To the right of the input fields is a 'Password Help' section with a note: 'It is strongly recommended that you change the factory default password of the device. All users who try to access the device's web-based utility will be prompted for the device's password. Note: The new password must be 6 - 32 characters in length, may not include spaces, and must contain at least two types of the following characters: letters, numbers and symbols. Enter the new Password twice to confirm it. Click the Save button when finished. Click the Clear All button to clear all.' At the bottom of the form are 'Save' and 'Clear All' buttons.

- **Update Firmware**

The screenshot shows the TP-Link support page for downloading firmware for the TL-WA801N V6.8. The page has a dark header with the TP-Link logo and navigation links: NETWORKING, SMART HOME, BUSINESS, SERVICE PROVIDERS, HOT DEALS, and COMMUNITY. Below the header is a sidebar with icons and links: Download Center, Support Videos, FAQs, TP-Link Community, Contact Technical Support, Replacement & Warranty, and TP-Link Emulators. The main content area is titled 'Download for TL-WA801N V6.8' and contains a section 'Please choose hardware version:' with a dropdown menu showing 'V6.8'. Below this is a link '> How to find the hardware version on a TP-Link device'. An 'IMPORTANT' note states: 'Model and hardware version availability varies by region. Please refer to your TP-Link regional website to determine product availability. Vx.0=Vx.6/Vx.8 (eg:V1.0=V1.6/V1.8) Vx.x0=Vx.x6/Vx.x8 (eg:V1.20=V1.26/V1.28) Vx.30=Vx.32 (eg:V3.30=V3.32)'. At the bottom are two buttons: 'FAQ' and 'Firmware'.

Download for TL-WA801N | TP TL-WA801N

tp-link.com/us/support/download/tl-wa801n/#Firmware

سجلّ عمليات التنزيل الأخيرة

TL-WA801N(US)\_V6\_231222.zip

0.0/3.9 i

سجلّ التنزيل بالكامل

**Important Notice**

Please upgrade firmware/software from the local TP-Link official website of the purchase location for your TP-Link device, otherwise it may cause upgrade failure or mistakes and be against the warranty.

Still Download Go to Local Website

**IMPORTANT:** To prevent upgrade failures, please read the following before proceeding with the upgrade process.

- Please upgrade firmware from the local TP-Link official website of the purchase location for your TP-Link device, otherwise it will be against the warranty. Please click [here](#) to change site if necessary.

Please visit the hardware versions of your devices for the firmware versions: [Monitor Firmware](#)

New Features/Enhancement:

- Optimized wireless connectivity;
- Enhance device security.

Bug Fixed:

- Fixed the bug that failed to connect automatically when moving between APs with the same SSID;
- Fixed the bug that the WOL function can't take effect;
- Fixed the bug that the Allow remote access won't take effect on the Multi-SSID mode.

TP-Link Wireless N Access Point WA801N  
Model No. TL-WA801N

Status  
Quick Setup  
Operation Mode  
Network  
Wireless  
DHCP  
System Tools  
Time Settings  
Diagnostic  
SNMP Settings  
Ping WatchDog  
Firmware Upgrade  
Factory Defaults  
Backup & Restore  
Reboot  
Password  
System Log  
Logout

Firmware Upgrade

Firmware File Path:  TL-WA801N(US)\_V6\_231222.zip

Firmware version: 0.9.1 3.16 v0001.0 Build 200116 Rel.61815n(4555)

Hardware version: TL-WA801N v6 00000006

Upgrade

**Firmware Upgrade Help**

To upgrade the device's firmware, follow these instructions:

- Download a most recent firmware upgrade file from our website ([www.tp-link.com](http://www.tp-link.com)).
- Enter or select the path name where you save the downloaded file on the computer into the File Name blank.
- Click the Upgrade button.
- The device will reboot while the upgrading has been finished.

**Firmware Version** - Displays the current firmware version.

**Hardware Version** - Displays the current hardware version. The hardware version of the upgrade file must accord with the current hardware version.

**Note:** The firmware version must correspond to the hardware. The upgrade process takes a few moments and the device restarts automatically when the upgrade is complete. It is important to keep power applied during the entire process. Loss of power during the upgrade could damage the device.

TP-Link Wireless N Access Point WA801N  
Model No. TL-WA801N

Status  
Quick Setup  
Operation Mode  
Network  
Wireless  
DHCP  
System Tools  
Time Settings  
Diagnostic  
SNMP Settings  
Ping WatchDog  
Firmware Upgrade  
Factory Defaults  
Backup & Restore  
Reboot  
Password  
System Log  
Logout

Upgrading

After the upgrade, please wait for the device to reboot...

5%

**Firmware Upgrade Help**

To upgrade the device's firmware, follow these instructions:

- Download a most recent firmware upgrade file from our website ([www.tp-link.com](http://www.tp-link.com)).
- Enter or select the path name where you save the downloaded file on the computer into the File Name blank.
- Click the Upgrade button.
- The device will reboot while the upgrading has been finished.

**Firmware Version** - Displays the current firmware version.

**Hardware Version** - Displays the current hardware version. The hardware version of the upgrade file must accord with the current hardware version.

**Note:** The firmware version must correspond to the hardware. The upgrade process takes a few moments and the device restarts automatically when the upgrade is complete. It is important to keep power applied during the entire process. Loss of power during the upgrade could damage the device.



- Network Name (SSID)

TP-Link Wireless N Access Point WA801N  
Model No. TL-WA801N

Wireless Settings

Wireless: ☒ Enable ☐ Disable

Wireless Network Name:  (Also called SSID)

Mode:

Channel Width:

Channel:

☒ Enable SSID Broadcast

Save

**Wireless Settings Help**

**Note:** The operating distance or range of your wireless connection varies significantly based on the physical placement of the AP. For best results, place your AP:

- Near the center of the area in which your wireless stations will operate.
- In an elevated location such as a high shelf.
- Away from the potential sources of interference, such as PCs, microwaves, and cordless phones.
- With the Antenna in the upright position.
- Away from large metal surfaces.

**Note:** Failure to follow these guidelines can result in significant performance degradation or inability to wirelessly connect to the AP.

**Wireless Network Name** - Enter a value of up to 32 characters. The same Name (SSID) must be assigned to all wireless devices in your network.

**Mode** - You can choose the appropriate "Mixed" mode.

**Channel Width** - The bandwidth of the wireless channel.

TP-Link Wireless N Access Point WA801N  
Model No. TL-WA801N

Wireless Settings

Wireless: ☒ Enable ☐ Disable

Wireless Network Name:  (Also called SSID)

Mode:

Channel Width:

Channel:

☒ Enable SSID Broadcast

Save

**Wireless Settings Help**

**Note:** The operating distance or range of your wireless connection varies significantly based on the physical placement of the AP. For best results, place your AP:

- Near the center of the area in which your wireless stations will operate.
- In an elevated location such as a high shelf.
- Away from the potential sources of interference, such as PCs, microwaves, and cordless phones.
- With the Antenna in the upright position.
- Away from large metal surfaces.

**Note:** Failure to follow these guidelines can result in significant performance degradation or inability to wirelessly connect to the AP.

**Wireless Network Name** - Enter a value of up to 32 characters. The same Name (SSID) must be assigned to all wireless devices in your network.

**Mode** - You can choose the appropriate "Mixed" mode.

**Channel Width** - The bandwidth of the wireless channel.

TP-Link Wireless N Access Point WA801N  
Model No. TL-WA801N

WPS (Wi-Fi Protected Setup)

WPS: ☒ Enabled ☐ Disabled

Current PIN:

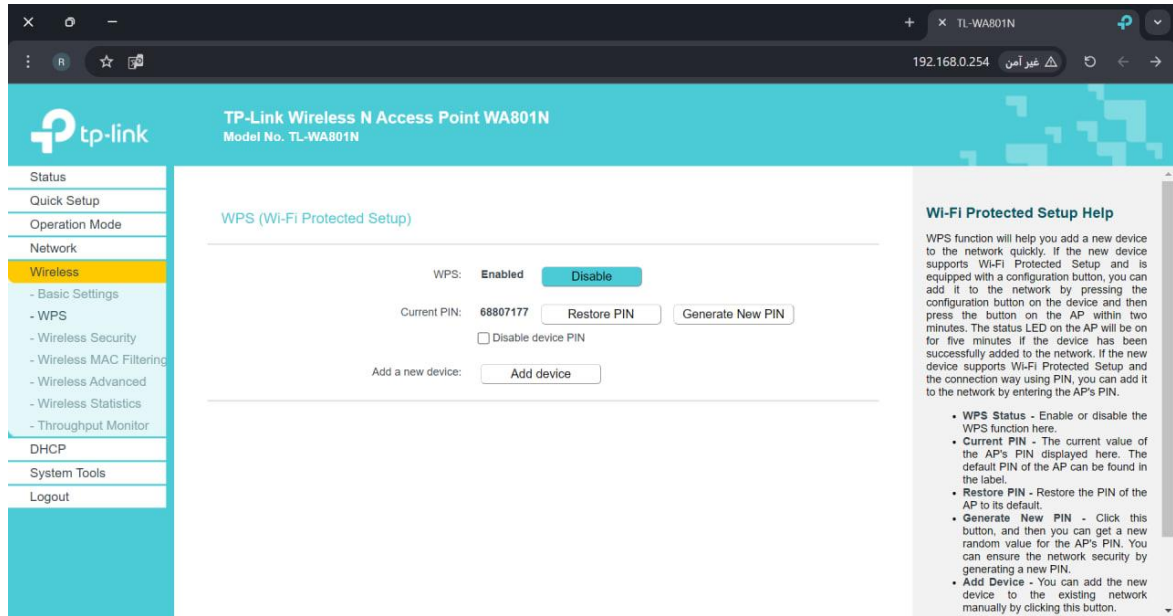
☐ Disable device PIN

Add a new device:

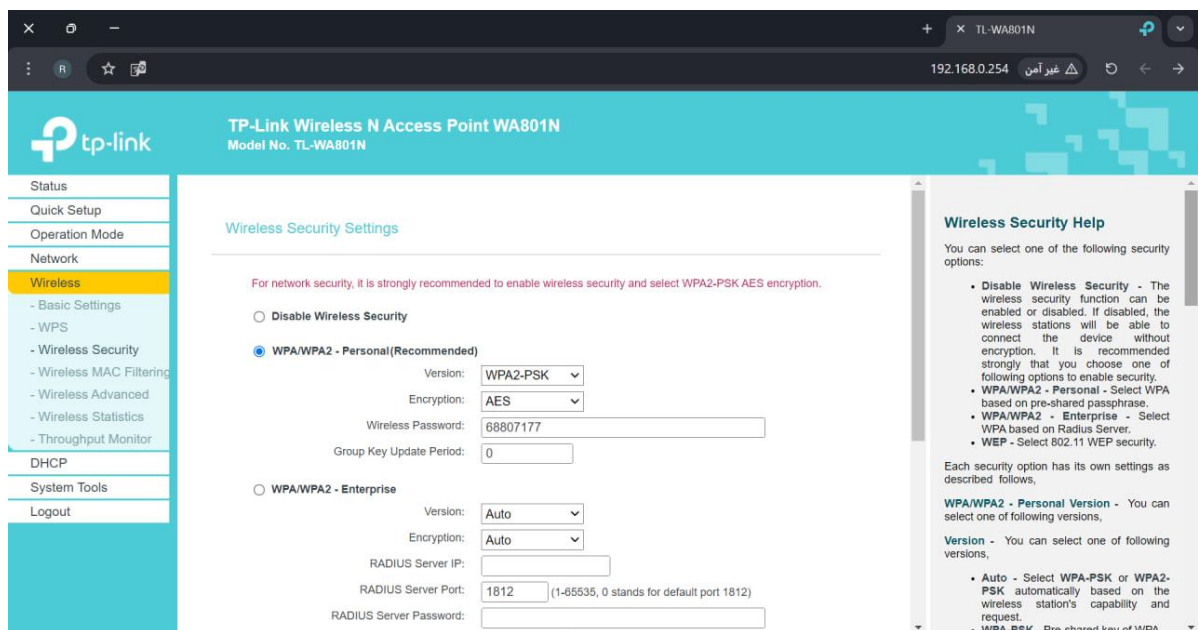
**Wi-Fi Protected Setup Help**

WPS function will help you add a new device to the network quickly. If the new device supports Wi-Fi Protected Setup and is equipped with a configuration button, you can add it to the network by pressing the configuration button on the device and then press the button on the AP within two minutes. The status LED on the AP will be on for five minutes if the device has been successfully added to the network. If the new device supports Wi-Fi Protected Setup and the connection way using PIN, you can add it to the network by entering the AP's PIN.

- **WPS Status** - Enable or disable the WPS function here.
- **Current PIN** - The current value of the AP's PIN displayed here. The default PIN of the AP can be found in the label.
- **Restore PIN** - Restore the PIN of the AP to its default.
- **Generate New PIN** - Click this button, and then you can get a new random value for the AP's PIN. You can ensure the network security by generating a new PIN.
- **Add Device** - You can add the new device to the existing network manually by clicking this button.



## • Wi-Fi Security Protocol



- **Disable WPS**

TP-Link Wireless N Access Point WA801N  
Model No. TL-WA801N

WPS (Wi-Fi Protected Setup)

WPS: **Disabled**

Current PIN: **68807177**

☐ Disable device PIN

Add a new device:

**Wi-Fi Protected Setup Help**

WPS function will help you add a new device to the network quickly. If the new device supports Wi-Fi Protected Setup and is equipped with a configuration button, you can add it to the network by pressing the configuration button on the device and then press the button on the AP within two minutes. The status LED on the AP will be on for five minutes if the device has been successfully added to the network. If the new device supports Wi-Fi Protected Setup and the connection way using PIN, you can add it to the network by entering the AP's PIN.

- **WPS Status** - Enable or disable the WPS function here.
- **Current PIN** - The current value of the AP's PIN displayed here. The default PIN of the AP can be found in the label.
- **Restore PIN** - Restore the PIN of the AP to its default.
- **Generate New PIN** - Click this button, and then you can get a new random value for the AP's PIN. You can ensure the network security by generating a new PIN.
- **Add Device** - You can add the new device to the existing network manually by clicking this button.

## 2. Wireless Network Security

- **Check Encryption (AES)**

TP-Link Wireless N Access Point WA801N  
Model No. TL-WA801N

Wireless Security Settings

For network security, it is strongly recommended to enable wireless security and select WPA2-PSK AES encryption.

☐ Disable Wireless Security

☒ **WPA/WPA2 - Personal(Recommended)**

Version: **WPA2-PSK**

Encryption: **AES**

Wireless Password: **68807177**

Group Key Update Period: **0**

☐ **WPA/WPA2 - Enterprise**

Version: **Auto**

Encryption: **Auto**

RADIUS Server IP:

RADIUS Server Port: **1812** (1-65535, 0 stands for default port 1812)

RADIUS Server Password:

**Wireless Security Help**

You can select one of the following security options:

- **Disable Wireless Security** - The wireless security function can be enabled or disabled. If disabled, the wireless stations will be able to connect the device without encryption. It is recommended strongly that you choose one of following options to enable security.
- **WPA/WPA2 - Personal** - Select WPA based on pre-shared passphrase.
- **WPA/WPA2 - Enterprise** - Select WPA based on Radius Server.
- **WEP** - Select 802.11 WEP security.

Each security option has its own settings as described follows.

**WPA/WPA2 - Personal Version** - You can select one of following versions.

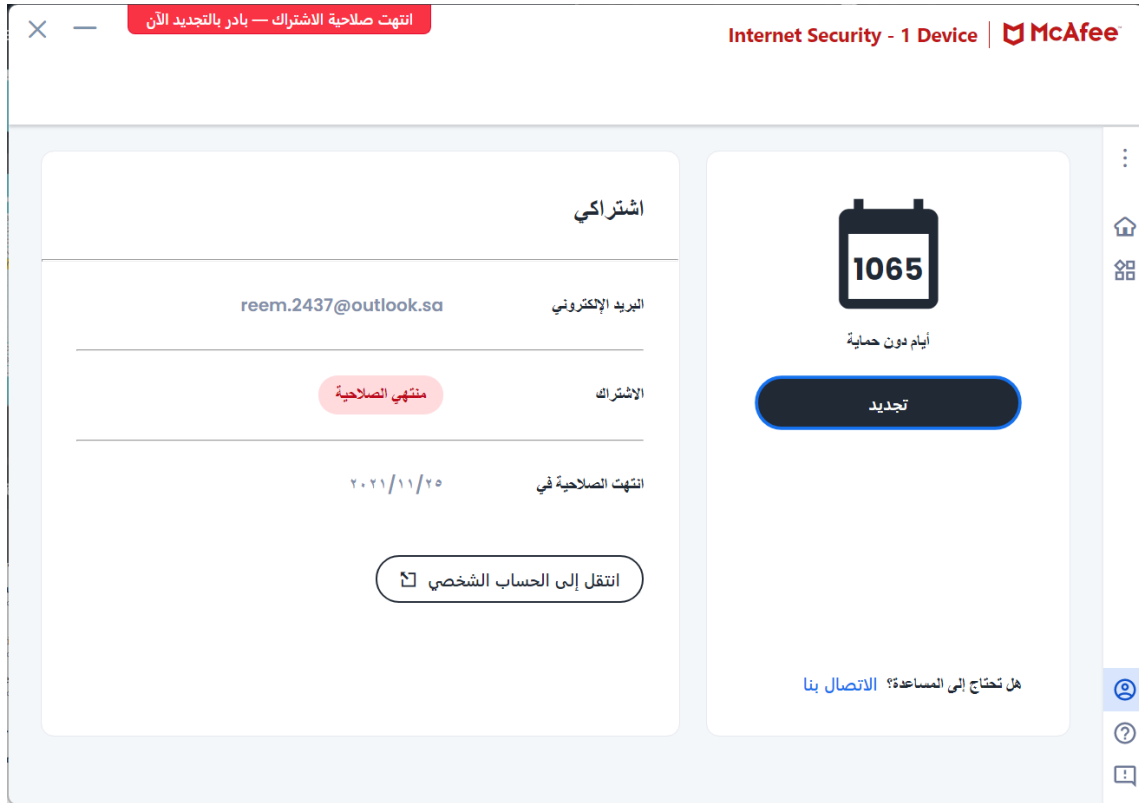
**Version** - You can select one of following versions.

- **Auto** - Select **WPA-PSK** or **WPA2-PSK** automatically based on the wireless station's capability and request.
- **WPA-PSK** - Pre-shared key of WPA.

### 3. Device Security

- Secure Connected Devices

(I used to use McAfee as My PC security software but my subscription has expired )



- Firewall Configuration

