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EspHuifeng ···   on 16 Oct 🕘

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README.md

[中文]

ESP32-MeshKit Guide

Overview

ESP32-MeshKit is a network configuration solution for smart homes based on ESP-WIFI-MESH.

ESP32-MeshKit currently allows you to integrate the following hardware components:

- ESP32-MeshKit-Light: Smart lighting solution with ESP-WIFI-MESH functioning as the master network. The kit consists of light bulbs with integrated ESP32 chips.

- **ESP32-MeshKit-Sense**: Development board, specifically designed for applications where ESP-WIFI-MESH is in Light-sleep or Deep-sleep mode. The board provides solutions for:

  - Monitoring the power consumption of MeshKit peripherals
  - Controlling MeshKit peripherals based on the data from multiple onboard sensors.

- **ESP32-MeshKit-Button**: Smart button solution, tailored for ESP-WIFI-MESH applications with ultra-low power consumption. The device wakes up only for a short time when the buttons are pressed and transmits packets to ESP-WIFI-MESH devices via ESP-NOW.

To configure and network these hardware components you need:

- Android or iOS phone with installed ESP-Mesh App (See section ESP-Mesh App).
- 2.4 GHz Wi-Fi network to which you connect your phone and one of the ESP-WIFI-MESH devices.

Functions

1. Mconfig (MESH Network Configuration)

   A network configuration solution, which uses ESP-Mesh App to add the first device to ESP-WIFI-MESH network via Bluetooth. After that, the added device transfers network configuration information to other devices waiting to be added.

2. Mlink (MESH LAN Communication)

   A LAN control solution for ESP-WIFI-MESH, where the root node initiates communication between the network configuration app and the HTTP server, and transfers the communication information to other devices.

3. Mupgrade (MESH Upgrade)

   A solution for simultaneous over-the-air (OTA) upgrading of multiple ESP-WIFI-MESH devices on the same wireless network. This solution provides the following functions:

ESP-Mesh App

- **Android**: source code, apk (installation package)
- **iOS**: Go to *App Store* and search for `ESP-Mesh`.
- **WeChat mini program**: Open *WeChat* and search for `ESPMesh`.

> **Note**: The Android version updates are given a higher priority.

ESP-Mesh App is a useful tool for researching the ESP-WIFI-MESH protocol and will help better understand the protocol's potential.

The shared ESP-Mesh App's source code will be helpful in development of your own applications.

Hardware Preparation

- Turn on Bluetooth and Wi-Fi on your smartphone and connect it to the router.

- Make sure the device you want to add is in Network Configuration mode.

  - To establish a network, you have to use one or more ESP32-MeshKit-Light devices, because only ESP32-MeshKit-Light can serve as a root node (master nodes, similar to gateways). You can bring ESP32-MeshKit-Light into Network Configuration mode by turning it off and on for three consecutive times.

  - ESP32-MeshKit-Button and ESP32-MeshKit-Sense can be added to an existing network only. Please refer to their respective guides for the information on how to bring them into Network Configuration mode.

Network Configuration

1. Initial Configuration

- Launch ESP-Mesh App, and it performs scanning via Bluetooth and notifies you about nearby devices in Network Configuration mode.

- Tap on the `Add device` button to see the list of the found ESP-WIFI-MESH devices.

- Tap on the down arrow to the left of the search bar to reveal two filtering options:

  - `RSSI` to filter devices based on their signal strength

  - `Only favorites` to display favorite devices only (to add a device to favorites, tap on the device's icon).

- Choose the devices you want to add and tap `Next`

Add devices for network configuration   Get the device list
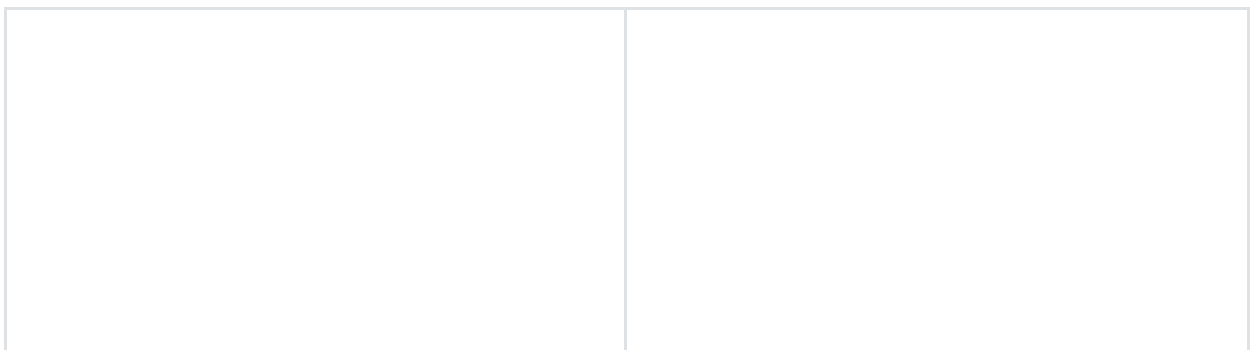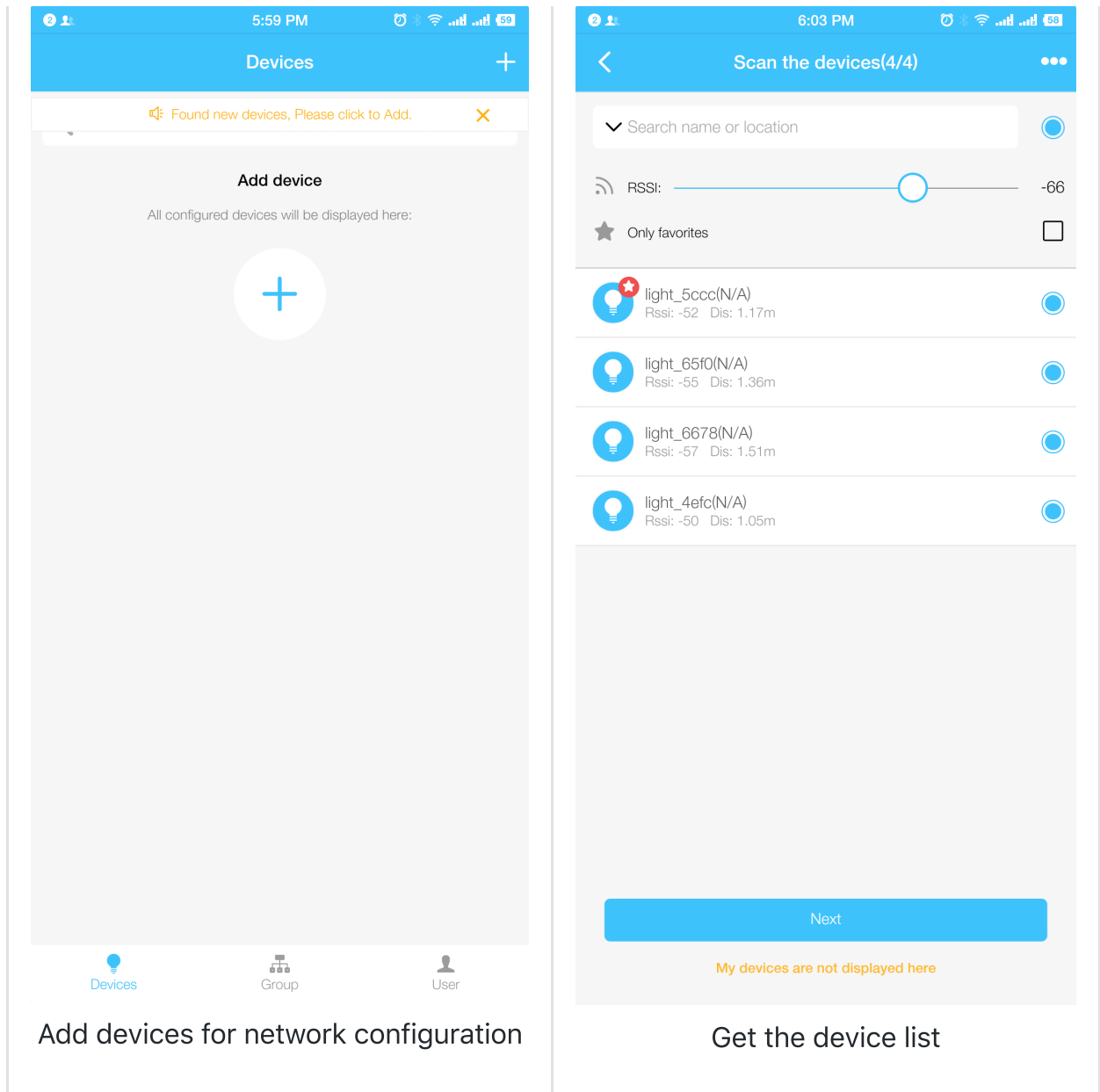
- Enter the required network configuration information:

  - **Wi-Fi name**: Shows the name of the Wi-Fi network to which the smartphone is connected. Note that only 2.4 GHz Wi-Fi networks are supported.

  - **MESH ID**: Suggests the name for the ESP-WIFI-MESH network, which equals to the router's MAC address. If you want to have several ESP-WIFI-MESH networks on the same router, please give them unique names by modifying the initial `MESH ID`. Multiple networks with an identical MESH ID are merged into one network.

  - **Password**: Input the password of the current Wi-Fi network.

  - **More**: Tap to modify the default configuration parameters of the ESP-WIFI-MESH network. For more information on the parameters, please check the ESP-WIFI-MESH Programming Guide.

- After you fill out the required fields, tap `Next`
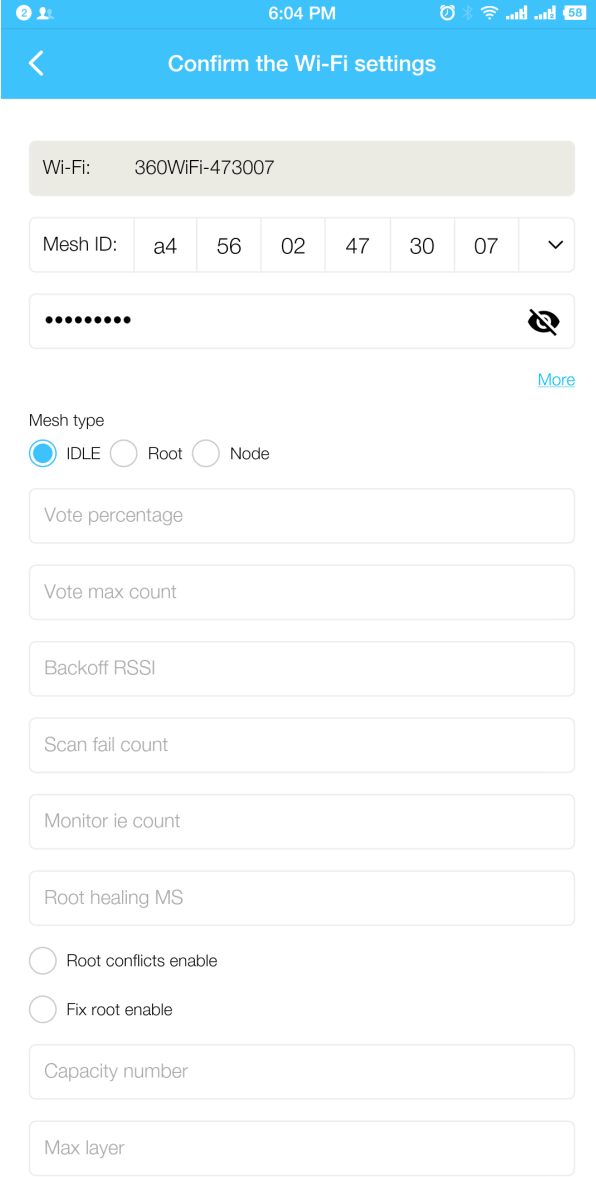
Enter the router information
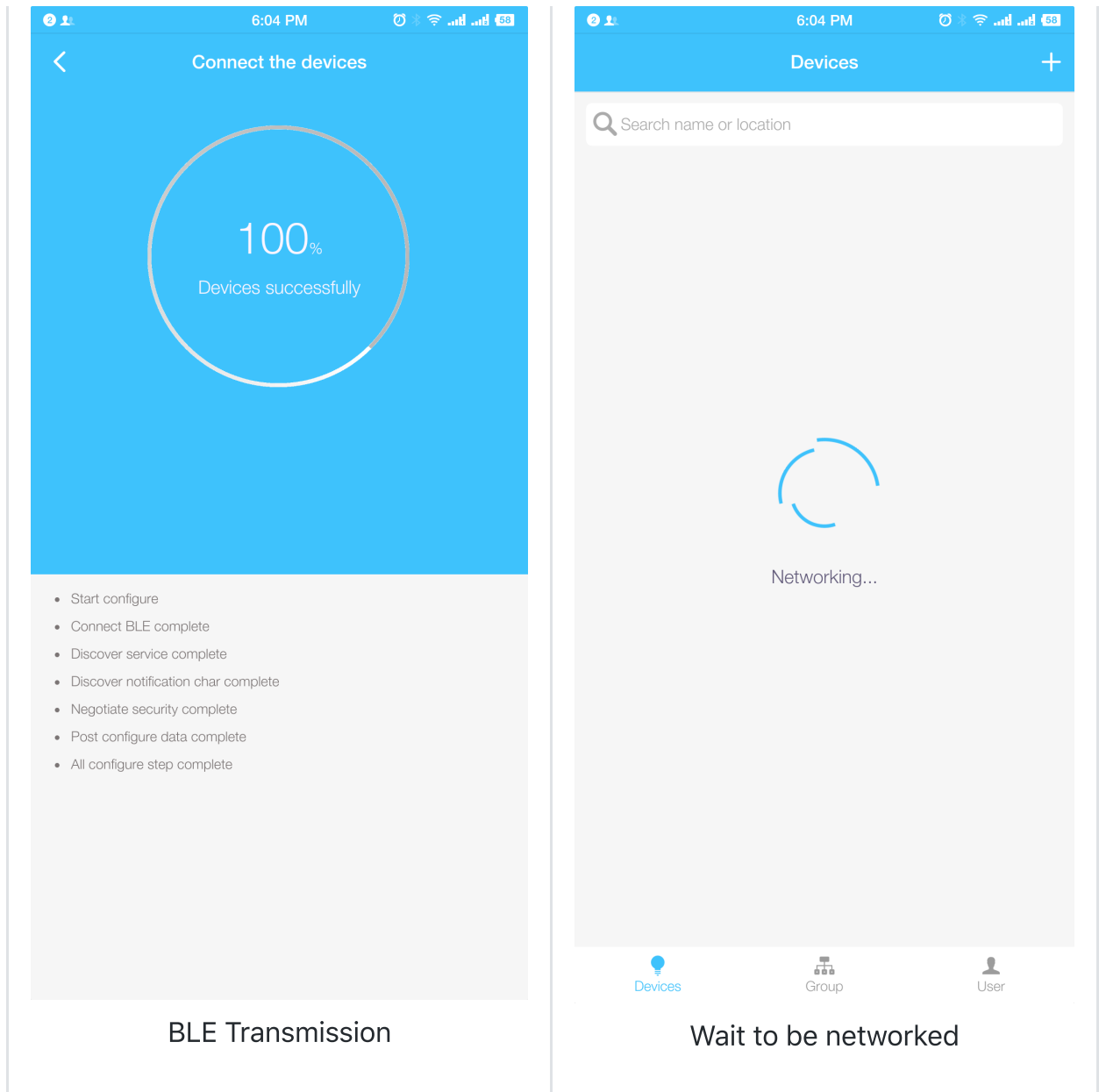

Enter ESP-WIFI-MESH network configuration information

ESP-Mesh App starts uploading the network configuration information and performs the following actions:

- App chooses a device with the strongest Bluetooth signal, connects to it, and sends the network configuration information and device whitelist. The whitelist contains the devices chosen to be added.

- When the device receives the network configuration information, it connects to the router to verify if the information is correct.

- After successful verification, the device notifies App via Bluetooth that configuration is completed, and the device can be networked.

- When the device is successfully networked via Bluetooth, it performs network configuration for the whitelisted devices.

BLE Transmission
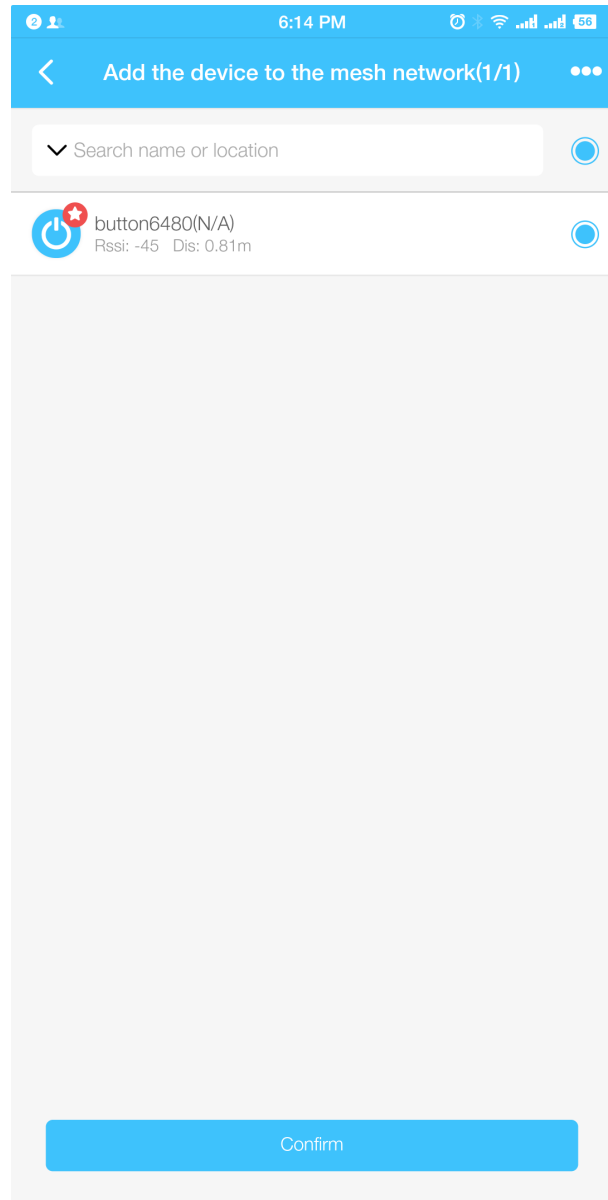

Wait to be networked

2. Adding Devices to an Existing Network

If App finds a new ESP-WIFI-MESH device in Network configuration mode, it shows a prompt. You can add the device by tapping on `Add the device to the mesh network` .
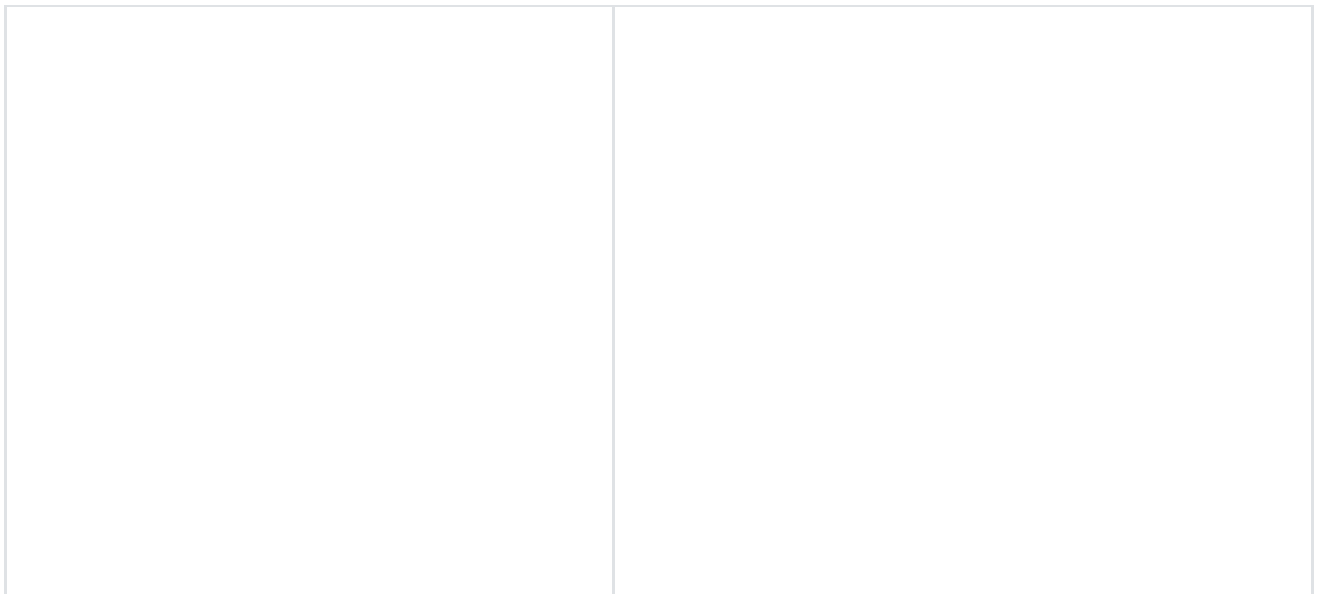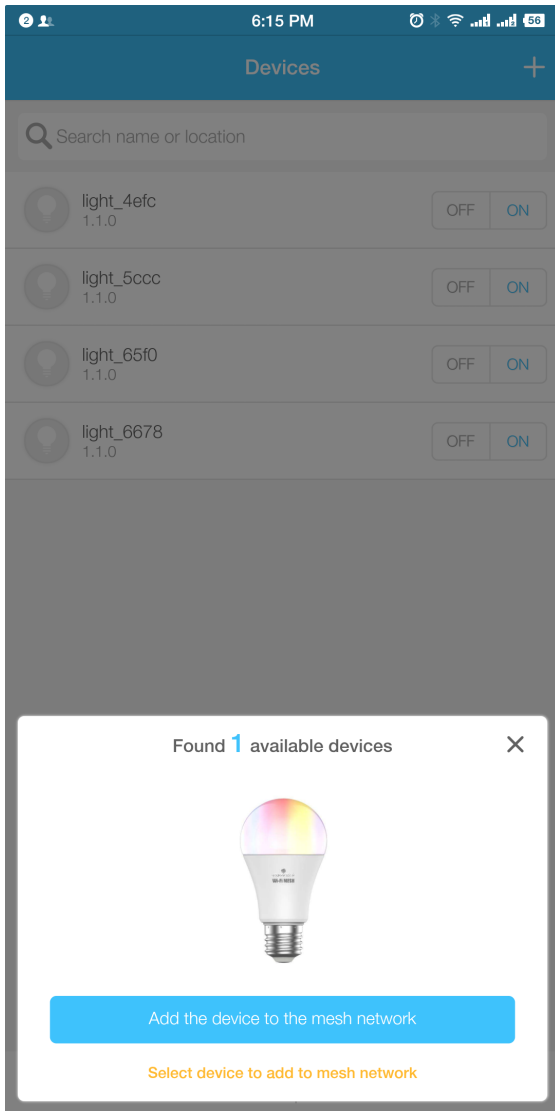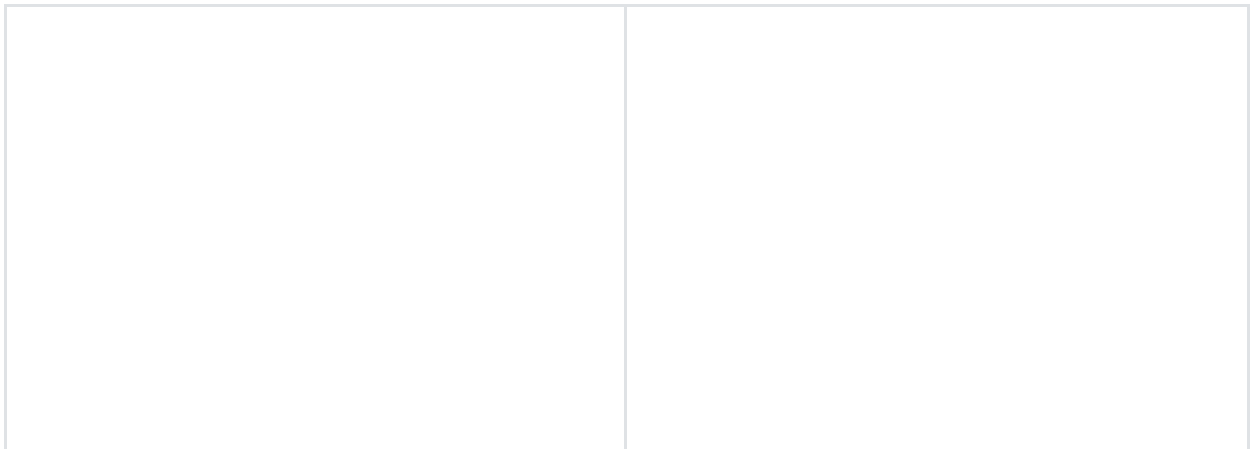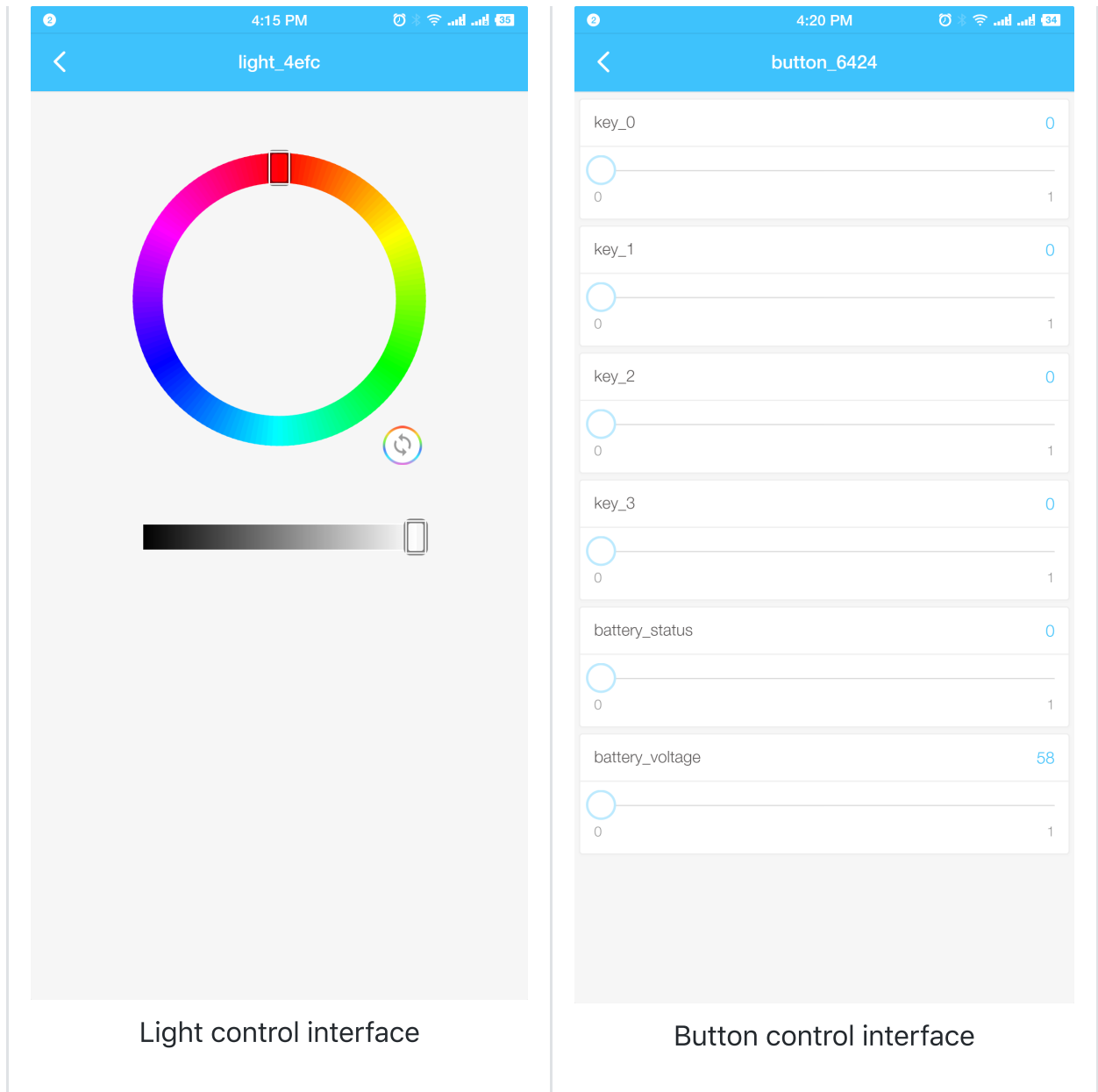
Add the device to MESH network

Select the device to be added to MESH network

3. Device Tab

Go to the list of added devices and do the following:

- Tap on an ESP-MeshKit-Light device to open its lighting settings.

Light control interface

Button control interface

- Long press on a device to edit its configuration settings:

  - **Device association**: Any ESP-WIFI-MESH device can be associated with other devices.

    Note: an association works in one direction only.

    For example, if you set a *light A > light B* association, then as soon as you turn on *light A*, *light B* will come on. But turning off light B will not affect light A, until you set a *light B > light A* association.

  An *ESP32-MeshKit-Button > ESP32-MeshKit-Light* or *ESP32-MeshKit-Sense > ESP32-MeshKit-Light* association gives you direct control over the lighting settings of the *ESP32-MeshKit-Light*.

  - **Send command**: You can send device debugging commands or your own commands.

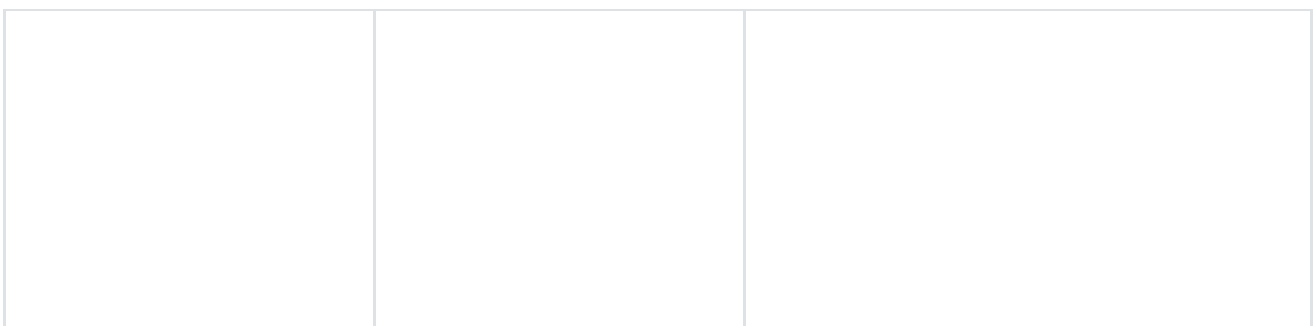| Select device association	Device association	Send command
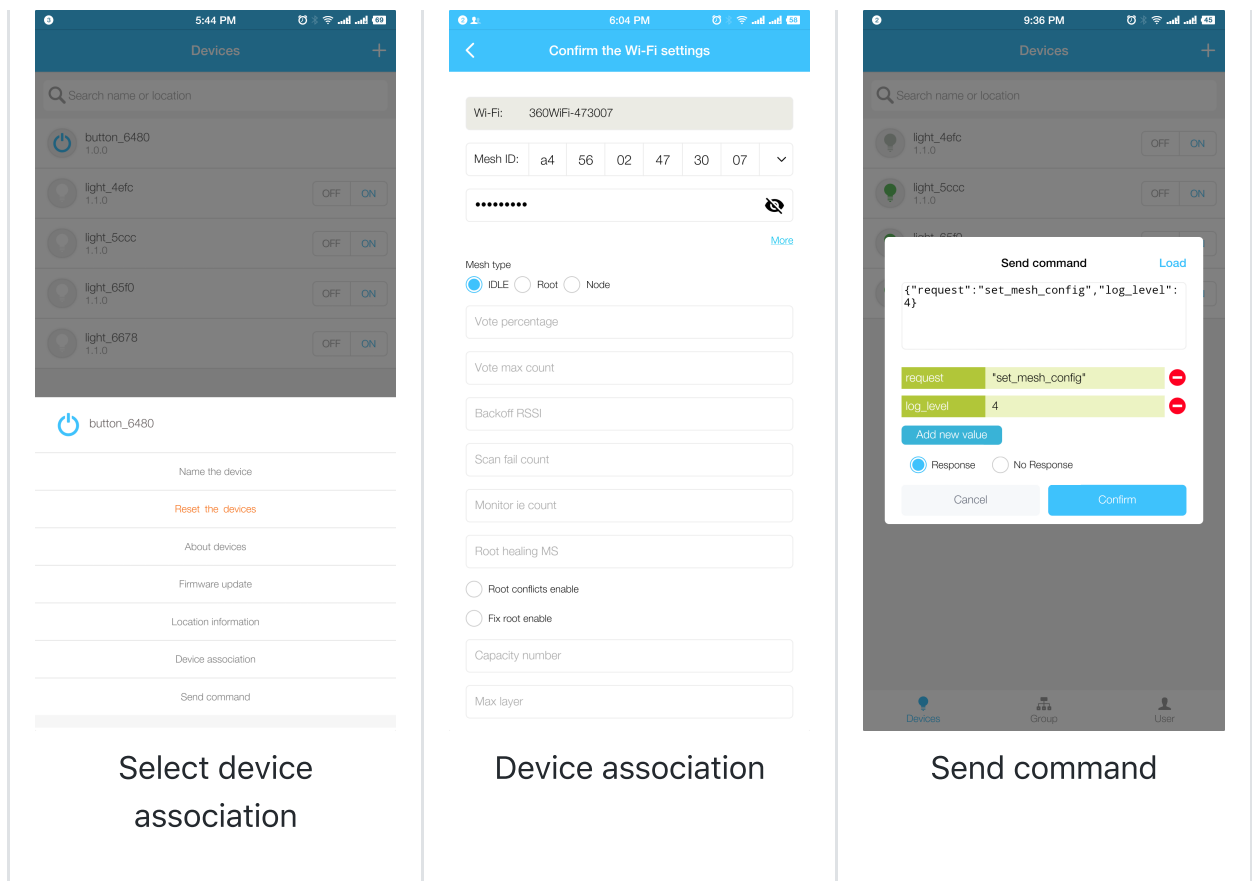
4. Group Tab

- **Default group**: App groups the added devices according to their type, which means the number of default groups equals to the number of device types. A default group cannot be deleted.

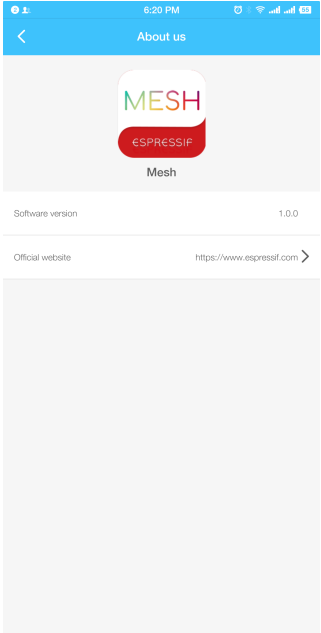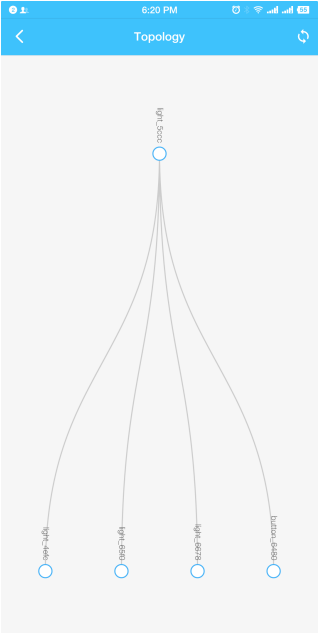- **Custom group**: User-defined group for simultaneous control of included devices.

Add a group

Edit the group name
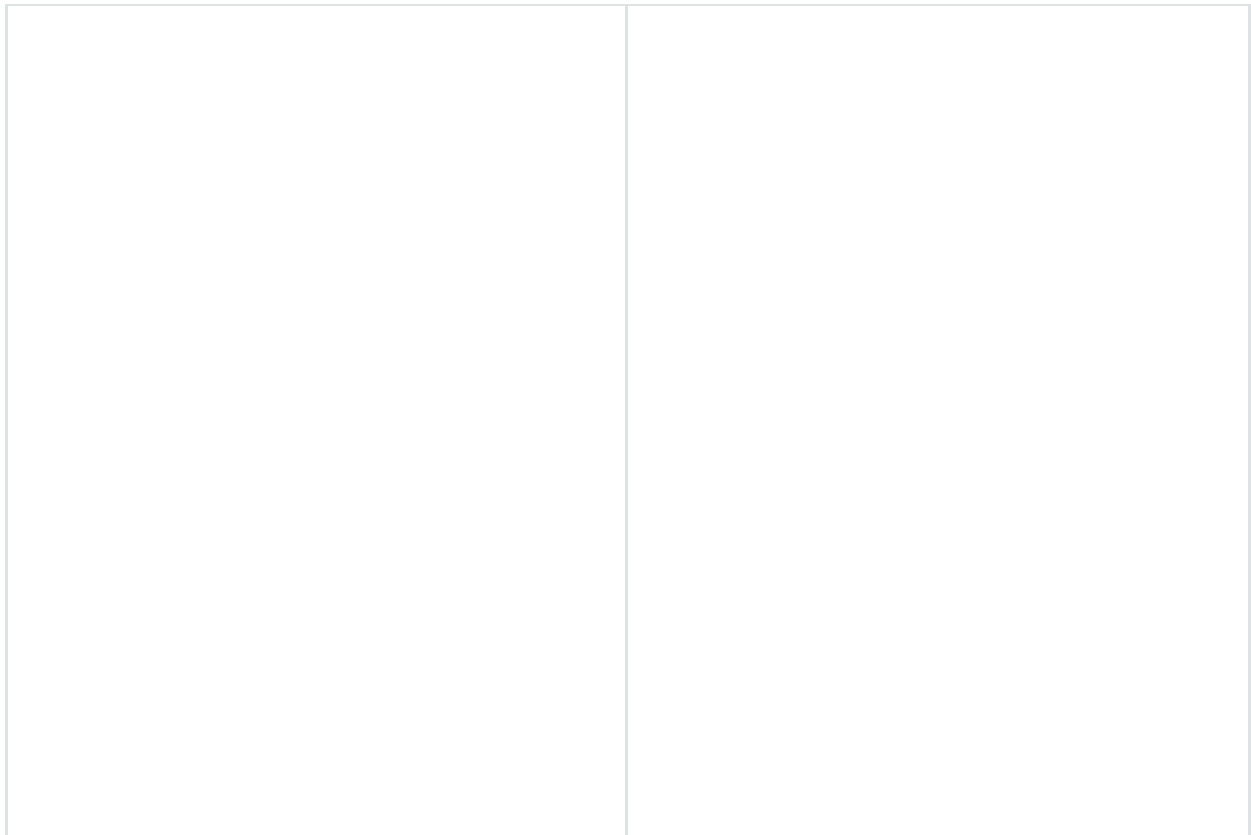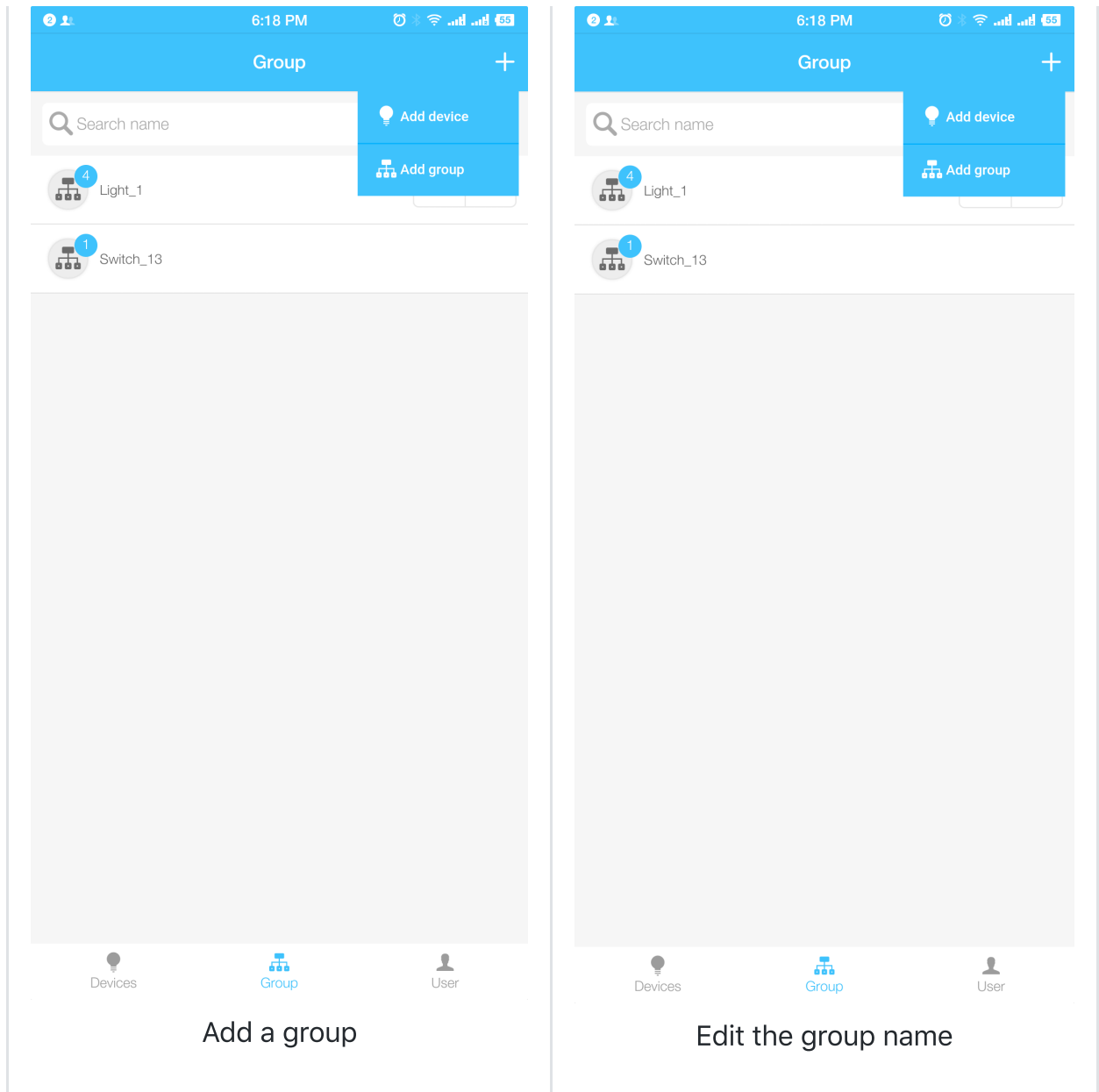
5. User Tab

- **Settings**: The following options are available

  - App version
  - Update App
  - Help provides the FAQ section

- **Topology**: Layout of the current ESP-WIFI-MESH network structure. You can long press on a certain node to open the device's network configuration information.
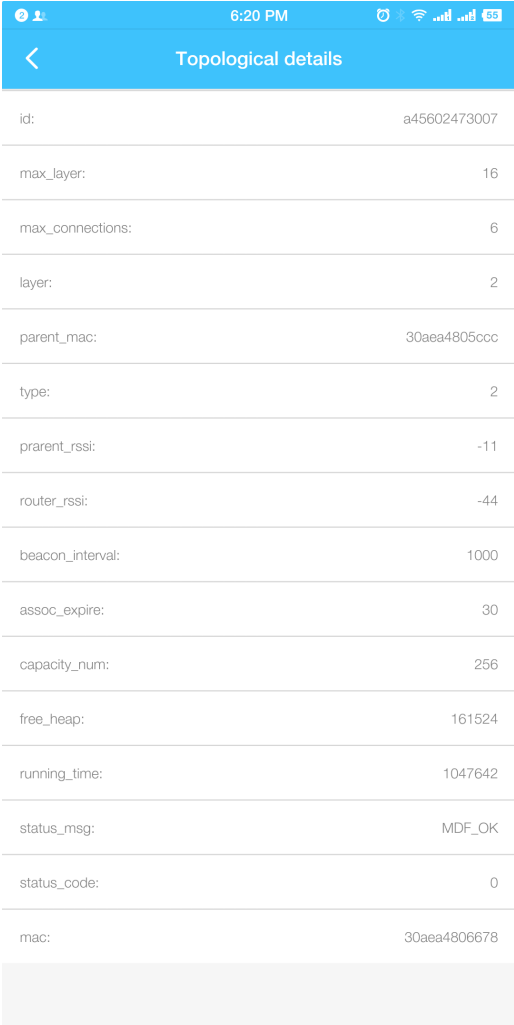
App version

Topology

Network configuration information
for an ESP-WIFI-MESH device

6. Firmware Update

Long press on a certain ESP-WIFI-MESH device on the list of added devices and in the pop-up menu choose *Firmware update*. Choose one of the two ways to update the firmware:

- **Download the bin**: Directly copy the firmware update to your smartphone's folder `File Management/Phone Storage/Espressif/Esp32/upgrade` .

- **Enter bin URL**: Save the firmware update on a cloud, such as GitHub, or on an HTTP server created within LAN, and enter the link to the saved firmware into the appeared dialog box.

Download the bin

Enter bin URL

Update in Process
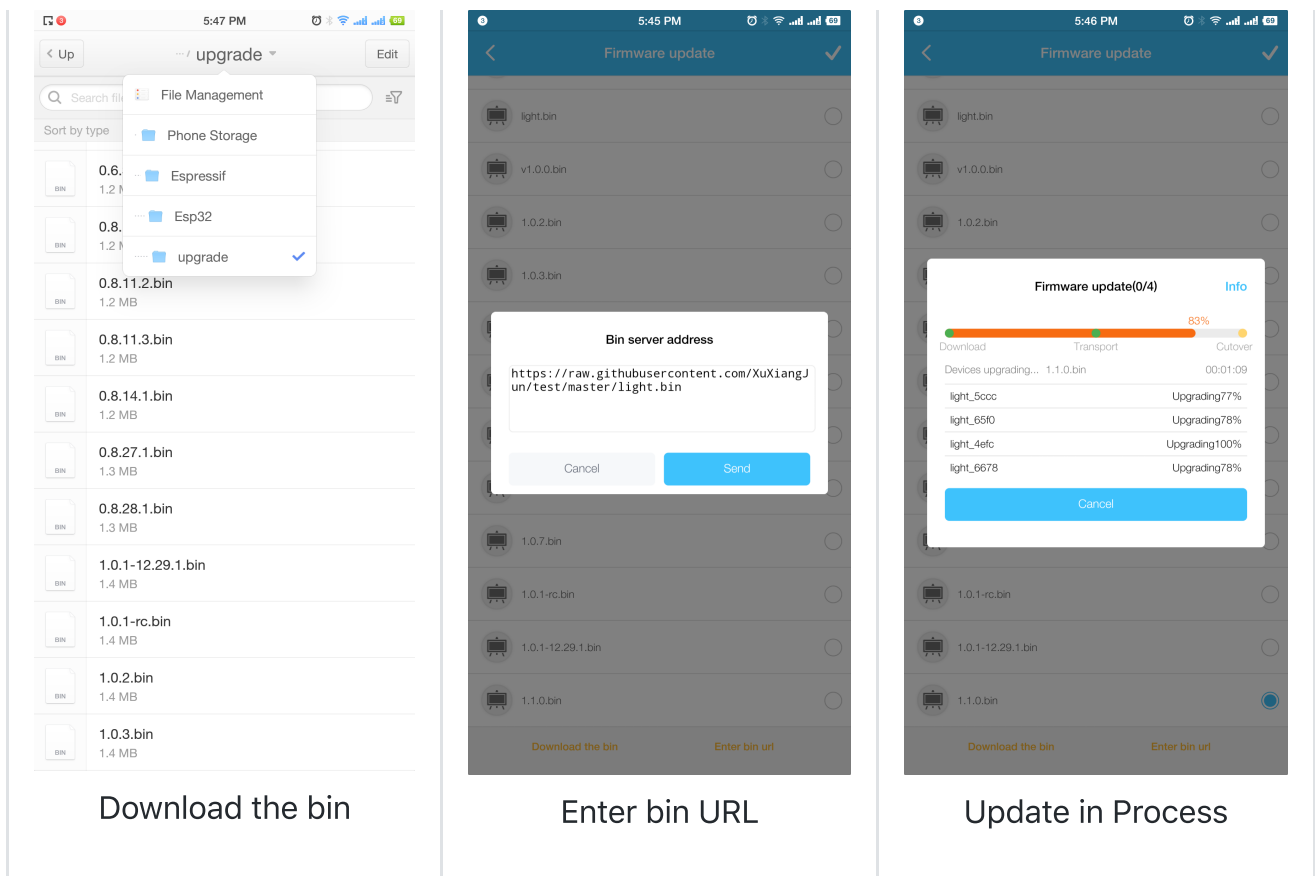
Drivers

All the hardware drivers for ESP32-MeshKit use the corresponding driver code in esp-iot-solution. You can visit this repository for any code update.