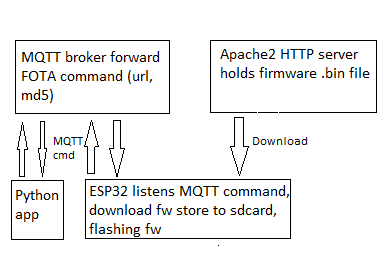
# **[Demo 35: firmware update OTA for ESP32 directly using HTTP](http://www.iotsharing.com/2017/11/firmware-update-ota-for-esp32-using-http.html)**

**[1. Introduction](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)** [This tutorial is similar to](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)[Demo 34](http://www.iotsharing.com/2017/11/firmware-update-ota-for-esp32-using-http-sdcard.html)[but without using sdcard. It means](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)[firmware will be flashed to ESP directly from HTTP downloading process.](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)[Here is the model of this demo:](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)

[[](https://3.bp.blogspot.com/-xJi97R-fahU/WhJA45wscOI/AAAAAAAAFsg/8E_LYfp6CzQQD8OJexTxBC1wmDfnWRCPgCLcBGAs/s1600/httpota.png)](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)

**[Figure: model of demo](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)**

**[2. Hardware](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)** [Refer](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)[Demo 7](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-store-data-to-sdcard.html" \t "http://www.iotsharing.com/2017/11/_blank)[to connect ESP32 pins with sdcard module. And](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)[Demo 1](http://www.iotsharing.com/2017/05/blinky-hello-world-on-arduino-esp32.html" \t "http://www.iotsharing.com/2017/11/_blank)[to connect ESP to LED.](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)**[3. Software](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)** [I made the library in](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)[github](https://github.com/nhatuan84/esp32-http-fota)[. Just download, install it and run example](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)**[esp32httpota2](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)**[.](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)**[Change the Wifi ssid, password and IP of MQTT server according to yours](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)**[. The code will be explained below.](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)

|  |
| --- |
| [#include <WiFi.h>](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [#include <HttpFOTA.h>](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [#include <PubSubClient.h>](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [typedef enum {](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [Runnning\_e = 0x01,](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [Fota\_e](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [}SysState;](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [const char\* ssid = "dd-wrt";](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [const char\* password = "0000000000";](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [const char\* mqtt\_server = "192.168.1.107";](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [char url[100];](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [char md5[50];](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [WiFiClient espClient;](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [PubSubClient client(espClient);](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [SysState state = Runnning\_e;](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [/\* topics \*/](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [#define OTA\_TOPIC "smarthome/room1/ota"](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [void progress(DlState state, int percent){](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [Serial.printf("state = %d - percent = %d\n", state, percent);](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [}](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [void receivedCallback(char\* topic, byte\* payload, unsigned int length) {](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)    [if(strncmp(OTA\_TOPIC, topic, strlen(OTA\_TOPIC)) == 0){](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [memset(url, 0, 100);](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [memset(md5, 0, 50);](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [char \*tmp = strstr((char \*)payload, "url:");](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [char \*tmp1 = strstr((char \*)payload, ",");](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [memcpy(url, tmp+strlen("url:"), tmp1-(tmp+strlen("url:")));](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)    [char \*tmp2 = strstr((char \*)payload, "md5:");](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [memcpy(md5, tmp2+strlen("md5:"), length-(tmp2+strlen("md5:")-(char \*)&payload[0]));](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [Serial.printf("started fota url: %s\n", url);](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [Serial.printf("started fota md5: %s\n", md5);](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [state = Fota\_e;](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [}](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [}](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [void mqttconnect() {](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [/\* Loop until reconnected \*/](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [while (!client.connected()) {](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [Serial.print("MQTT connecting ...");](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [/\* client ID \*/](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [String clientId = "ESP32Client";](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [/\* connect now \*/](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [if (client.connect(clientId.c\_str())) {](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [Serial.println("connected");](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [/\* subscribe topic \*/](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [client.subscribe(OTA\_TOPIC);](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [} else {](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [Serial.print("failed, status code =");](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [Serial.print(client.state());](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [Serial.println("try again in 5 seconds");](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [/\* Wait 5 seconds before retrying \*/](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [delay(5000);](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [}](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [}](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [}](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [void error(char \*message){](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [printf("%s\n", message);](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [}](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [void startDl(void){](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [}](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [void endDl(void){](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [}](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [void setup() {](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [// put your setup code here, to run once:](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [// put your setup code here, to run once:](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [Serial.begin(115200);](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [Serial.print("Connecting to ");](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [Serial.print(ssid);](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [WiFi.begin(ssid, password);](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [while (WiFi.status() != WL\_CONNECTED) {](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [delay(500);](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [Serial.print(".");](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [}](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [Serial.println("");](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)    [Serial.print("WiFi connected, IP address: ");](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [Serial.println(WiFi.localIP());](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [/\* configure the MQTT server with IPaddress and port \*/](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [client.setServer(mqtt\_server, 1883);](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [/\* this receivedCallback function will be invoked](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [when client received subscribed topic \*/](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [client.setCallback(receivedCallback);](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [}](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)    [void loop() {](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [switch(state)](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [{](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [case Runnning\_e:](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [/\* if client was disconnected then try to reconnect again \*/](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [if (!client.connected()) {](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [mqttconnect();](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [}](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [/\* this function will listen for incomming](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [subscribed topic-process-invoke receivedCallback \*/](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [client.loop();](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [break;](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [case Fota\_e:](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [DlInfo info;](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [info.url = url;](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [info.md5 = md5;](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [info.startDownloadCallback = startDl;](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [info.endDownloadCallback = endDl;](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [info.progressCallback = progress;](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [info.errorCallback = error;](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [httpFOTA.start(info);](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)    [client.publish(OTA\_TOPIC, "ok");](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [break;](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [default:](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [break;](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [}](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html)  [}](http://www.iotsharing.com/2017/05/how-to-use-arduino-esp32-to-display-oled.html) |

In order to start fota updating process, using the Python code below and type "1" to publish FOTA command to ESP. The ESP will receive  the command, parse it and starting FOTA process. **Change the url and md5 value according to yours.**  
The library is simple. It only has 1 interface that is start with input is **DlInfo**structure. When calling this function, it will block the **loop()** function. We must initialize the structure before using it. The structure includes:  
- **url**: is the http url of the firmware file.  
- **md5**: is the md5 checksum of the firmware file.  
- **startDownloadCallback**: is the function that will be invoked before starting downloading. I left it empty in this demo.  
- **endDownloadCallback**: is the function that will be invoked after downloading was finished. I left it empty in this demo.  
- **progressCallback**: is the function that will be invoked to show the progress of downloading and flashing process.  
- **errorCallback**: is the function that will be invoked to show the error of downloading and flashing process.  
The functions: s**aveData, readData, progress, error, startDl, endDl, startFl, endFl** will be invoked by the library in the update process. They are assigned to the members of **DlInfo** structure.  
The function **receiveCallback** will be invoked whenever ESP received the MQTT command. It will check if the topic is OTA\_TOPIC then parsing the payload to get url and md5 value of firmware file. After that, it change the state of system to **Fota\_e** to start updating process.  
After finishing the whole process, the code "**client.publish(OTA\_TOPIC, "ok");**" will publish message "ok" back to Python application.   
When the system is in **Running\_e**, it just listen the MQTT command.

|  |
| --- |
| from random import randint  import thread  import sys  try:  import paho.mqtt.client as mqtt  except ImportError:  import os  import inspect  cmd\_subfolder = os.path.realpath(os.path.abspath(os.path.join(os.path.split(inspect.getfile( inspect.currentframe() ))[0],"../src")))  if cmd\_subfolder not in sys.path:  sys.path.insert(0, cmd\_subfolder)  import paho.mqtt.client as mqtt  server = "192.168.1.107";  topic = "smarthome/room1/ota"  def on\_connect(mqttc, obj, flags, rc):  print("rc: "+str(rc))  def on\_message(mqttc, obj, msg):  print(msg.topic+" "+str(msg.qos)+" "+str(msg.payload))  def on\_publish(mqttc, obj, mid):  print("mid: "+str(mid))  def on\_subscribe(mqttc, obj, mid, granted\_qos):  print("Subscribed: "+str(mid)+" "+str(granted\_qos))  def on\_log(mqttc, obj, level, string):  print(string)  mqttc = mqtt.Client()  mqttc.on\_message = on\_message  mqttc.on\_connect = on\_connect  mqttc.on\_publish = on\_publish  mqttc.on\_subscribe = on\_subscribe  mqttc.connect(server, 1883, 60)  mqttc.subscribe(topic, 0)  def fotaControl( threadName, delay):  while True:  val = raw\_input('Enter 1 to update firmware OTA ')  if(val == "1"):  mqttc.publish(topic, "url:http://192.168.1.107/phphello/led.bin,md5:6bd07139c21f572370242905c4465056")  try:  thread.start\_new\_thread( fotaControl, ("Fota Control", 0, ) )  except:  print "Error: unable to start thread"  mqttc.loop\_forever() |