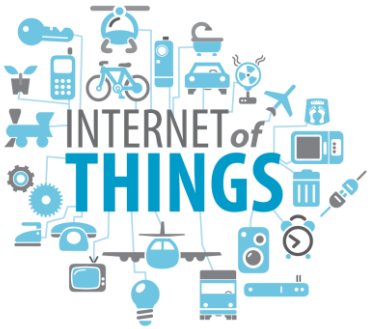
UNIVERSITY OF SCIENCE - VNUHCM
Faculty of Information Technology

INTERNET OF THINGS

4.3

ESP32 IS A CLIENT



The Basic Client

GET CONTENT OF A WEBSITE

```
#include <ESP8266Wifi.h>

const char* ssid = "your wifi name";
const char* pwd = "your wifi password";

const char* host = "www.example.com";
const uint16_t port = 80;

void setup() {
  Serial.begin(115200);

  //We start by connecting to a WIFI network. DIY

  sendRequest();
}
```

Define host and port of server

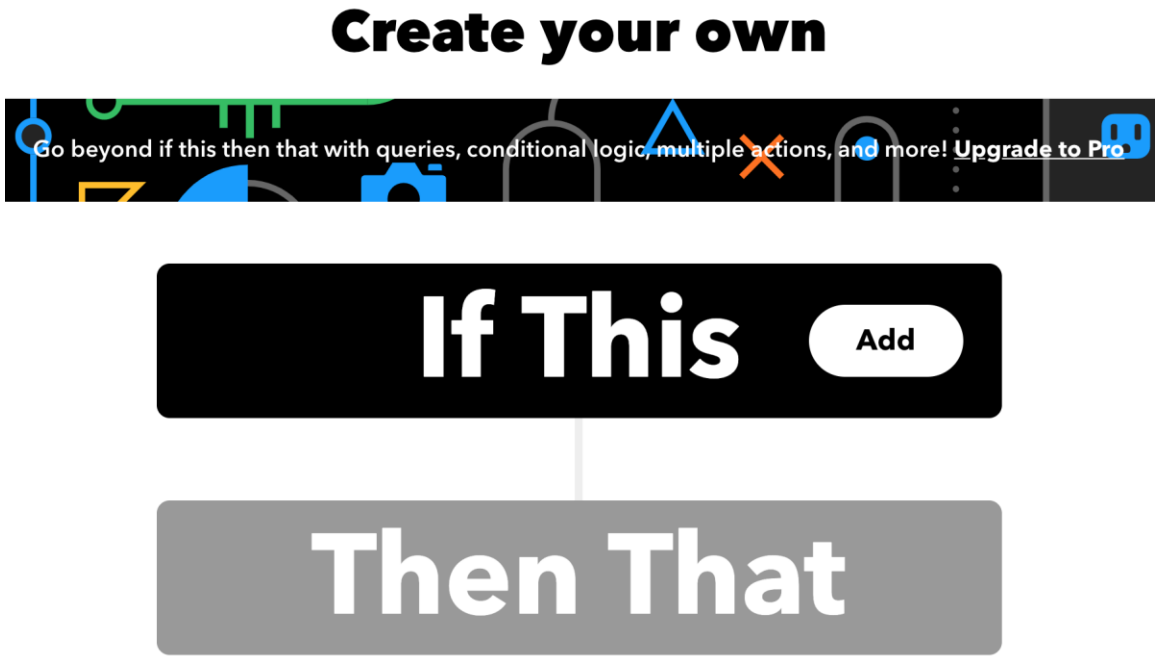
```
void sendRequest() {
  Serial.print("connecting to ");
  Serial.print(host);
  Serial.print(":");
  Serial.println(port);

  WiFiClient client;
  while (!client.connect(host, port)) {
    Serial.println("connection fail");
    delay(1000);
  }

  client.print(String("GET /") + " HTTP/1.1\r\n" +
               "Host: " + host + "\r\n" +
               "Connection: close\r\n\r\n");
  delay(500);

  while(client.available()) {
    String line = client.readStringUntil('\R');
    Serial.print(line);
  }
  Serial.println();
}
```


if this then that
Want to build your own service? Build on the platform

Step 1: Sign up new account in **ifttt.com**

Step 2: Sign in

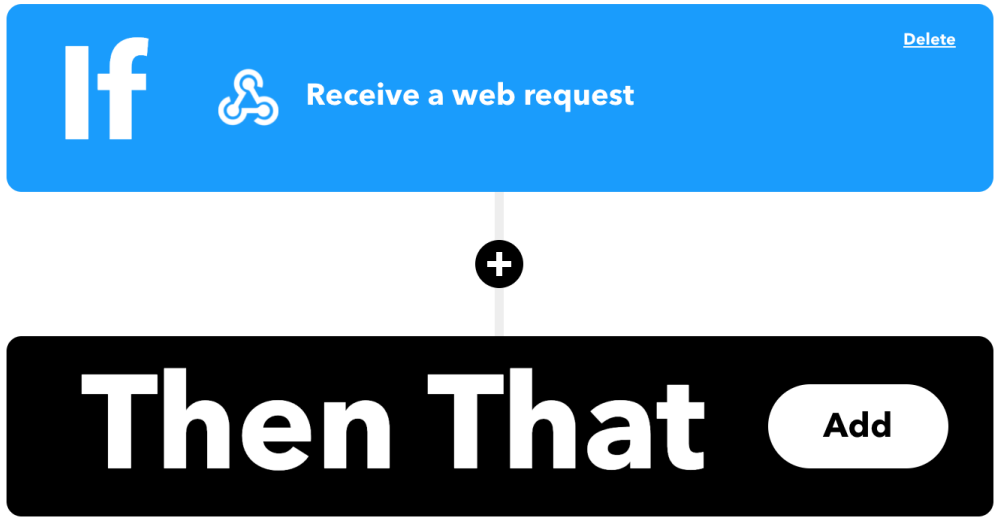
Step 3: Select menu Create



Step 4: Select **button Add (If this)**

Step 5: Search "**Webhooks**" > Select **WebHooks** in the result list

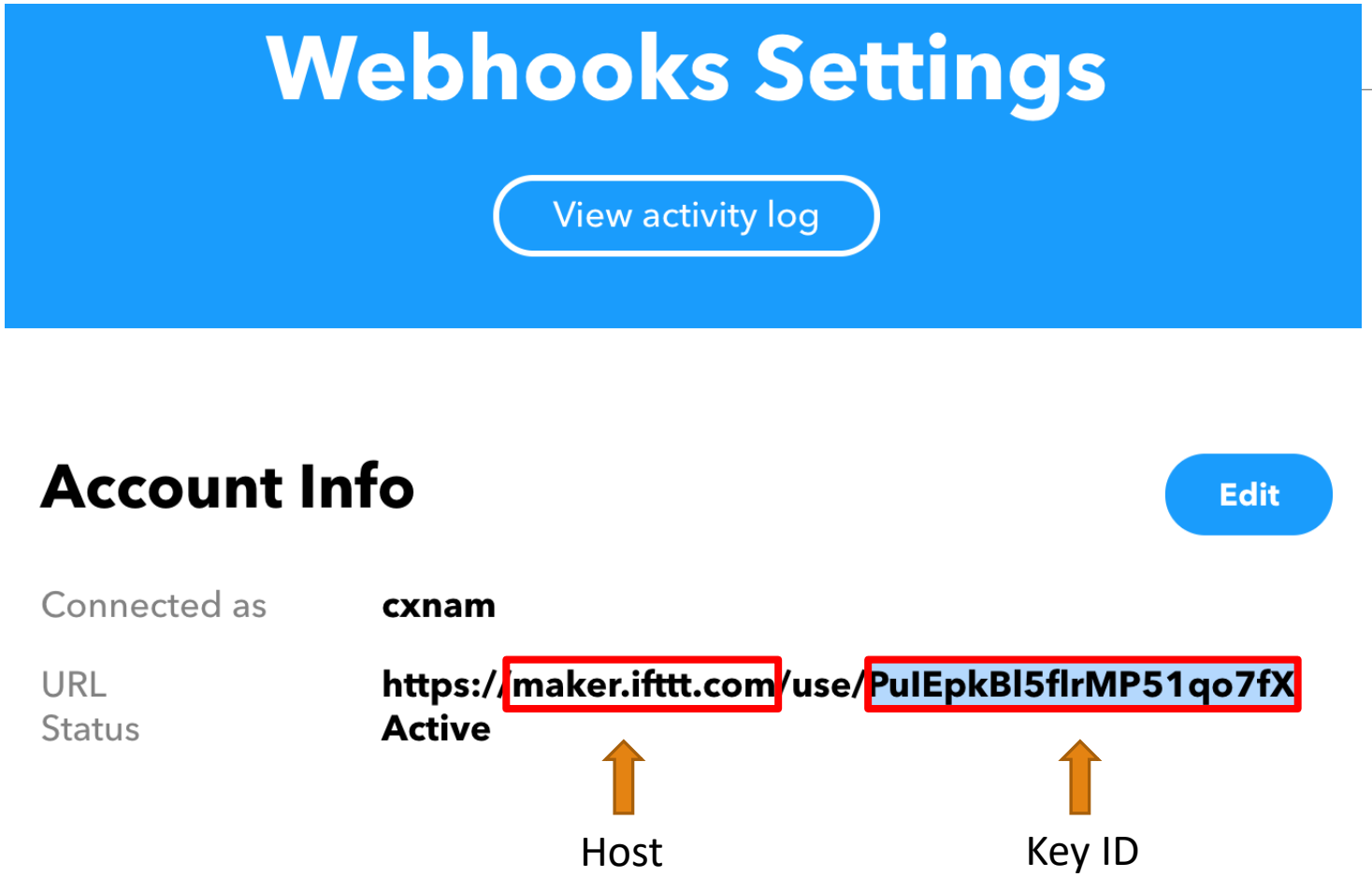
Step 6: Select **Receive a web request** > Enter **Event Name** > Create trigger



Step 7: Select **button Add (Then That)**

Step 8: Search "**Notifications**" > Select **Notifications** in the result list

Step 9: Select **Send a notification from IFTTT app** > Change Message > Create action



Step 10: Select Avatar > My Services > WebHooks > Settings

Step 11: Copy host + key Id

Press button + Send notification

Hint:

Host: maker.ifttt.com

URL: /trigger/{{event_name}}/with/key/{{your_key}}

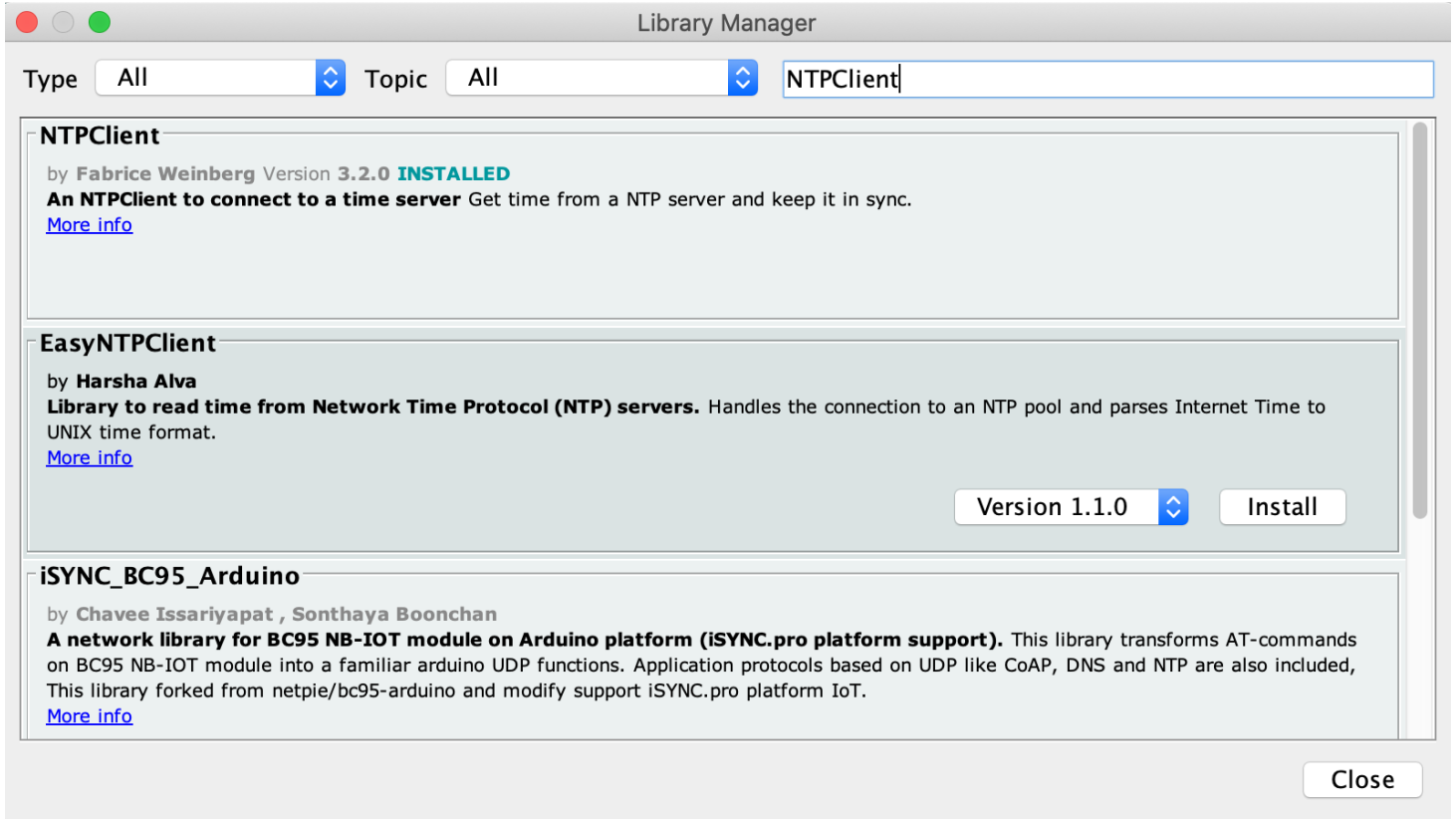
Press button + Send Email

Press button + Facebook Page

NTP Server

NETWORK TIME PROTOCOL

NTP stands for Network Time Protocol, and it is an Internet protocol used to synchronize the clocks of computers to some time reference



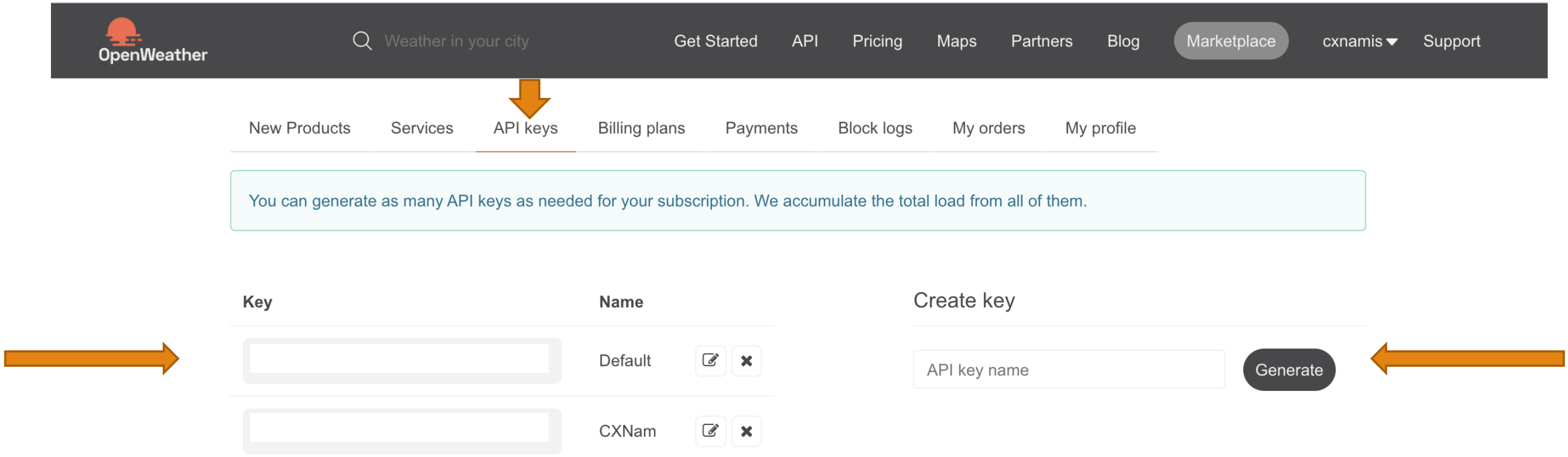
Step 1: Open ***Sketch > Include Library > Manage Libraries…***

Step 2: Search ***"NTPClient"*** and install the latest version

```
#include <ESP8266WiFi.h>
#include <NTPClient.h>
#include <WiFiUdp.h>

char *ssid      = "your wifi name";
char *password  = "your wifi password";

WiFiUDP ntpUDP;
NTPClient timeClient(ntpUDP);

void setup() {
  //Connect to WiFi Network. DIY

  timeClient.begin();
}

void loop() {
  timeClient.update();
  Serial.println(timeClient.getFormattedTime());
  delay(1000);
}
```

Alarm Clock

WEATHER FORECAST STATION



Step 1: Sign up new account

Step 2: Sign in

Step 3: Go to **API keys > Use Default Key or Generate new key**

Step 4: Open Google Maps > Search location that you want to get forecast info

Step 5: Get **latitude**, **longitude** of location.

https://www.google.com/maps/@**10.7571534**,**106.6880955**,15z

Step 6: Modify this URL

http://api.openweathermap.org/data/2.5/weather?lat=**xxxxx**&lon=**yyyyy**&units=metric&appid=**zzzzz**


```
{"coord":{"lon":106.69,"lat":10.76},"weather":
[{"id":803,"main":"Clouds","description":"broken
clouds","icon":"04d"}],"base":"stations","main":
{"temp":33,"feels_like":36.59,"temp_min":33,"temp_max":33,"pressure":1003,"humidity":59},
"visibility":10000,"wind":{"speed":3.1,"deg":260},"clouds":
{"all":75},"dt":1591944869,"sys":
{"type":1,"id":9314,"country":"VN","sunrise":1591914651,"sunset":1591960532},"timezone":2
5200,"id":1566083,"name":"Ho Chi Minh City","cod":200}
```

Get Temperature & Humidity using OpenWeatherMap

Hint:

Host = "api.openweathermap.org"

URL = "/data/2.5/weather?lat=**xxxxx**&lon=**yyyyy**&units=metric&appid=**zzzzz**"

```
String line = "";
while (client.available()) {
  line = client.readStringUntil('\n');
}
Serial.println(line);
```

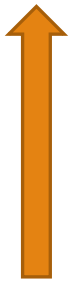
Get last line of response

Step 1: Open ***Sketch > Include Library > Manage Libraries…***
Step 2: Search ***"ArduinoJson"*** and install the latest version (v6.x)
Step 3: Include library in code

#include <ArduinoJson.h>

Step 4: Modify code to parse String to JSON

```
//create a json buffer where to store the json data
DynamicJsonDocument doc(1024);
DeserializationError error = deserializeJson(doc, line);
if (error)
  return;
int value = doc["main"]["temp"];
Serial.println(value);
```



Parse String to JSON Object

Get Temperature & Humidity indoor and outdoor

AJAX

```
void handleRoot() {
  String MAIN_page = R"=====(
  <!DOCTYPE html>
  <html>
    <head>
        <script src="https://ajax.googleapis.com/ajax/libs/jquery/3.5.1/jquery.min.js"></script>
    </head>
    <body>
      <center>
        <div id="ext_temp"></div>
        <div id="ext_humidity"></div>
        <script>
        $.ajax({url: "http://api.openweathermap.org/data/2.5/weather?lat=xxxxx&lon=yyyyy&units=metric&appid=zzzzz"
        success: function(result){
          $("#ext_temp").html(result.main.temp);
          $("#ext_humidity").html(result.main.humidity);
        }});
        </script>
      </center>
    </body>
  </html>
  )=====";

  server.send(200, "text/html", MAIN_page);
}
```