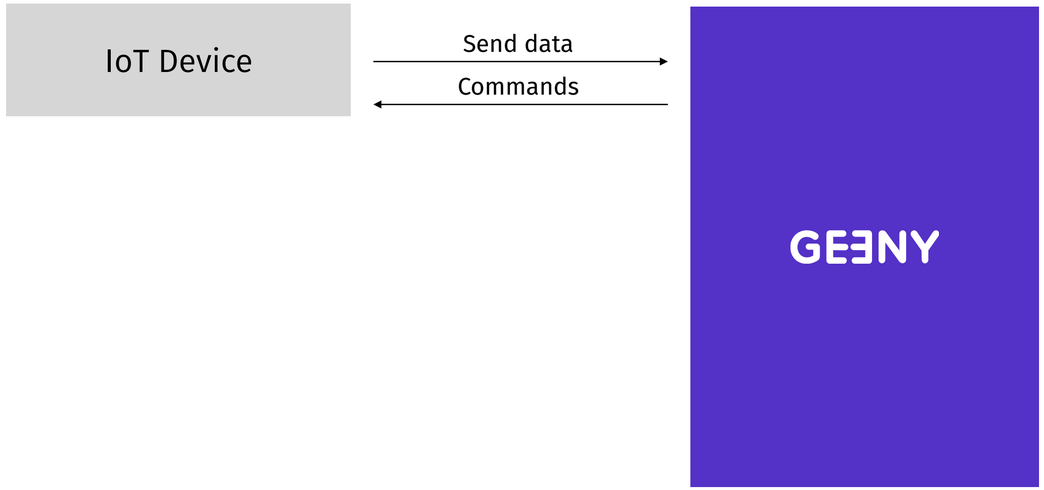
Intro to Making · How to connect the NodeMCU to Geeny

8.3.2018

What is Geeny?

Geeny is the consumer IoT platform by Telefónica NEXT



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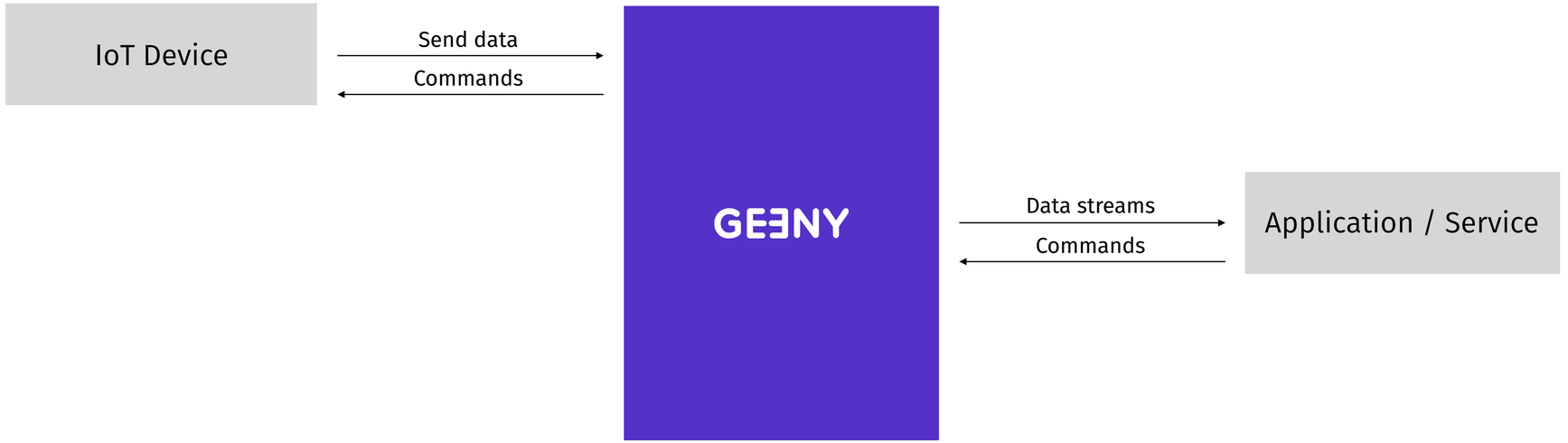

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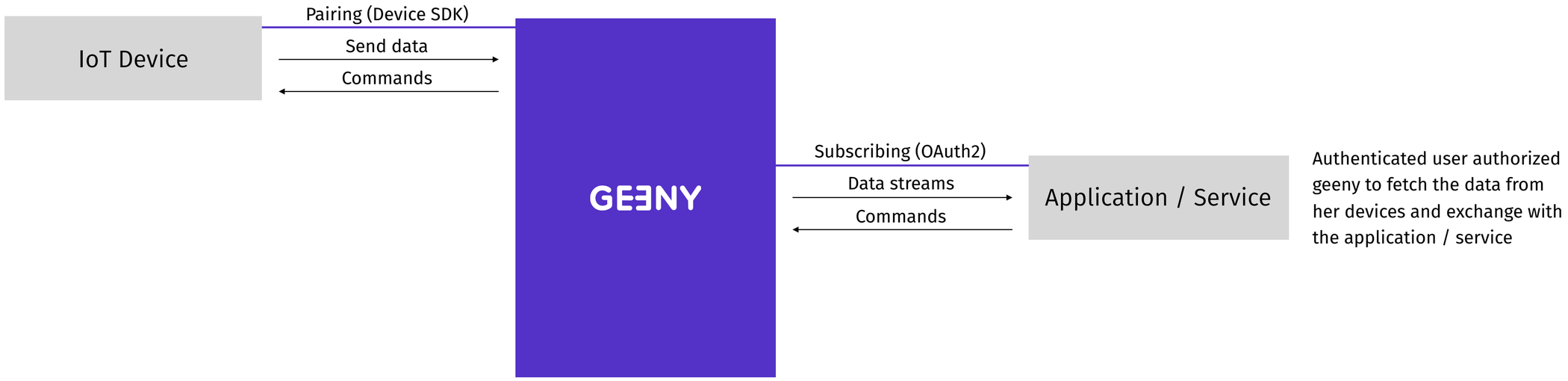

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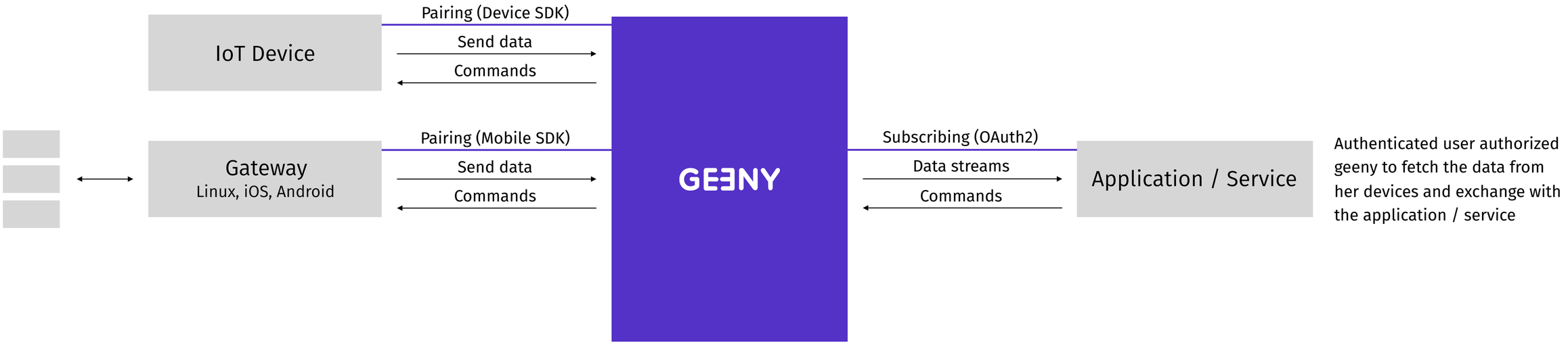

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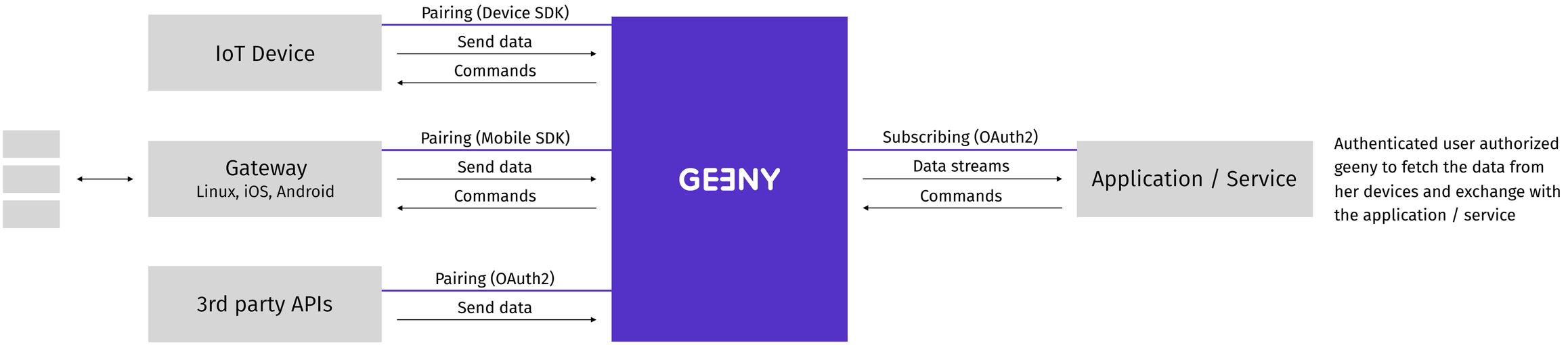


The Journey

The Journey

You are here ▶

The Journey

Set up
IDE

You are here

The Journey

Blink!

Set up IDE

You are here

The Journey

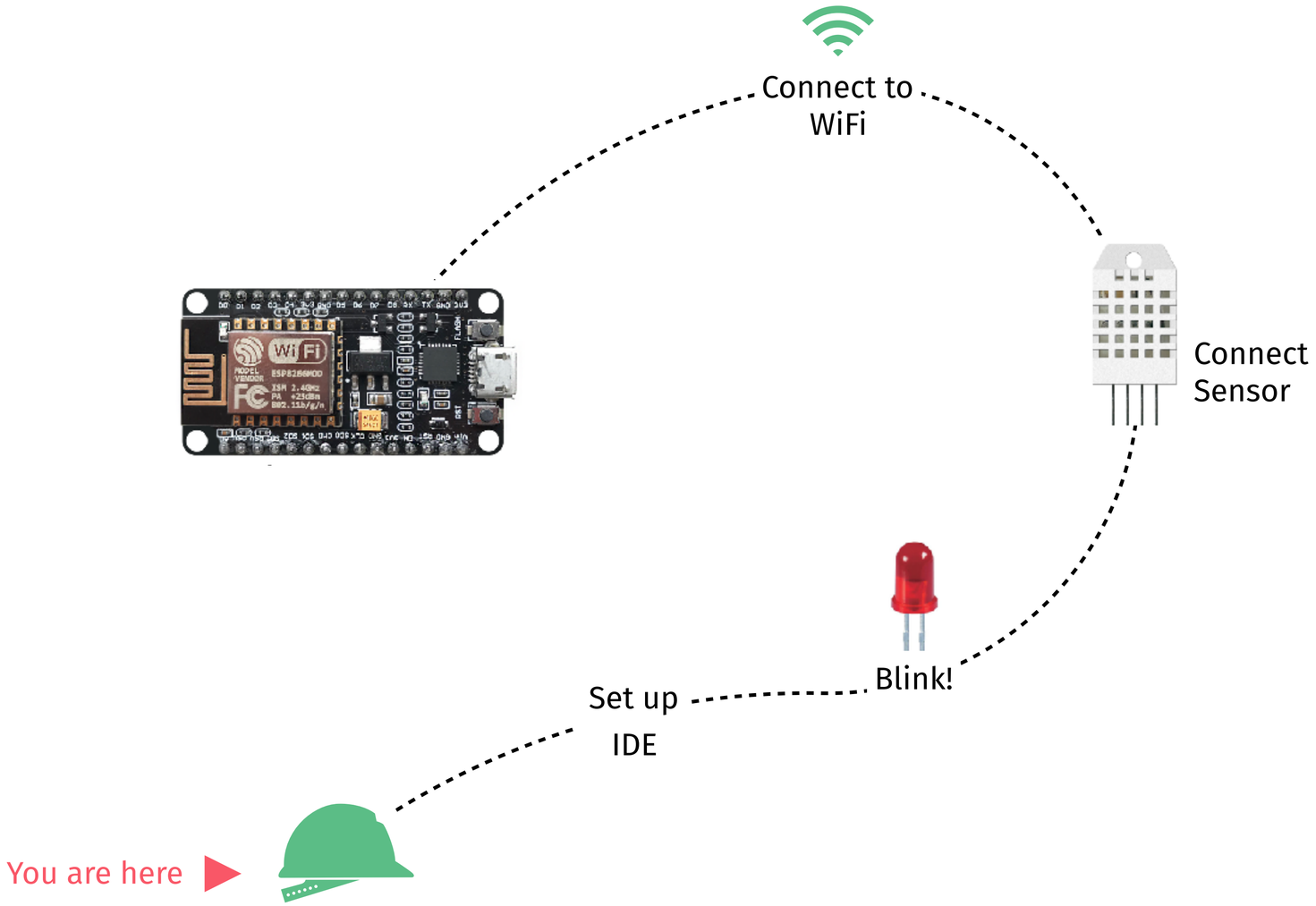
Connect Sensor

Blink!

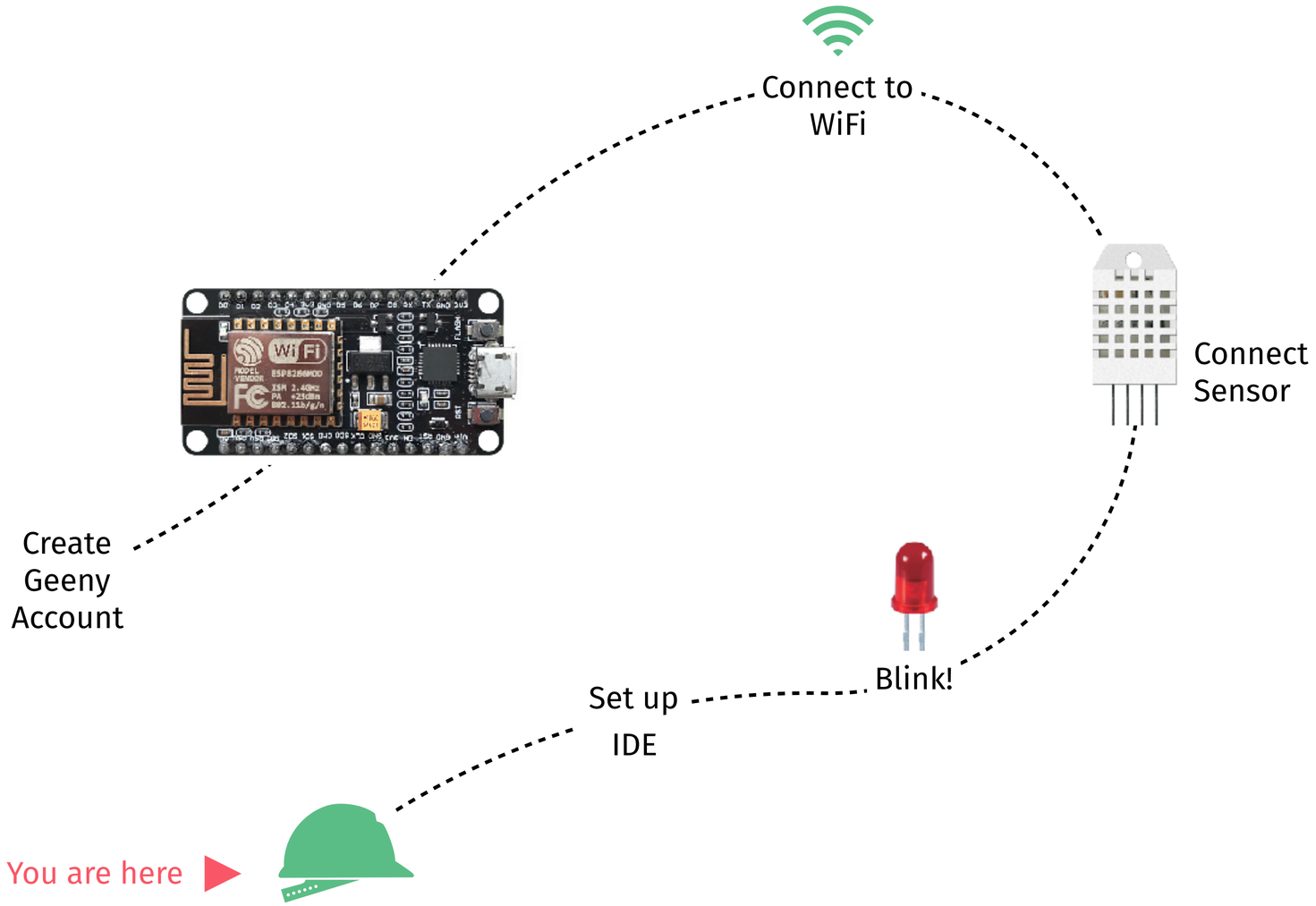
Set up IDE

You are here

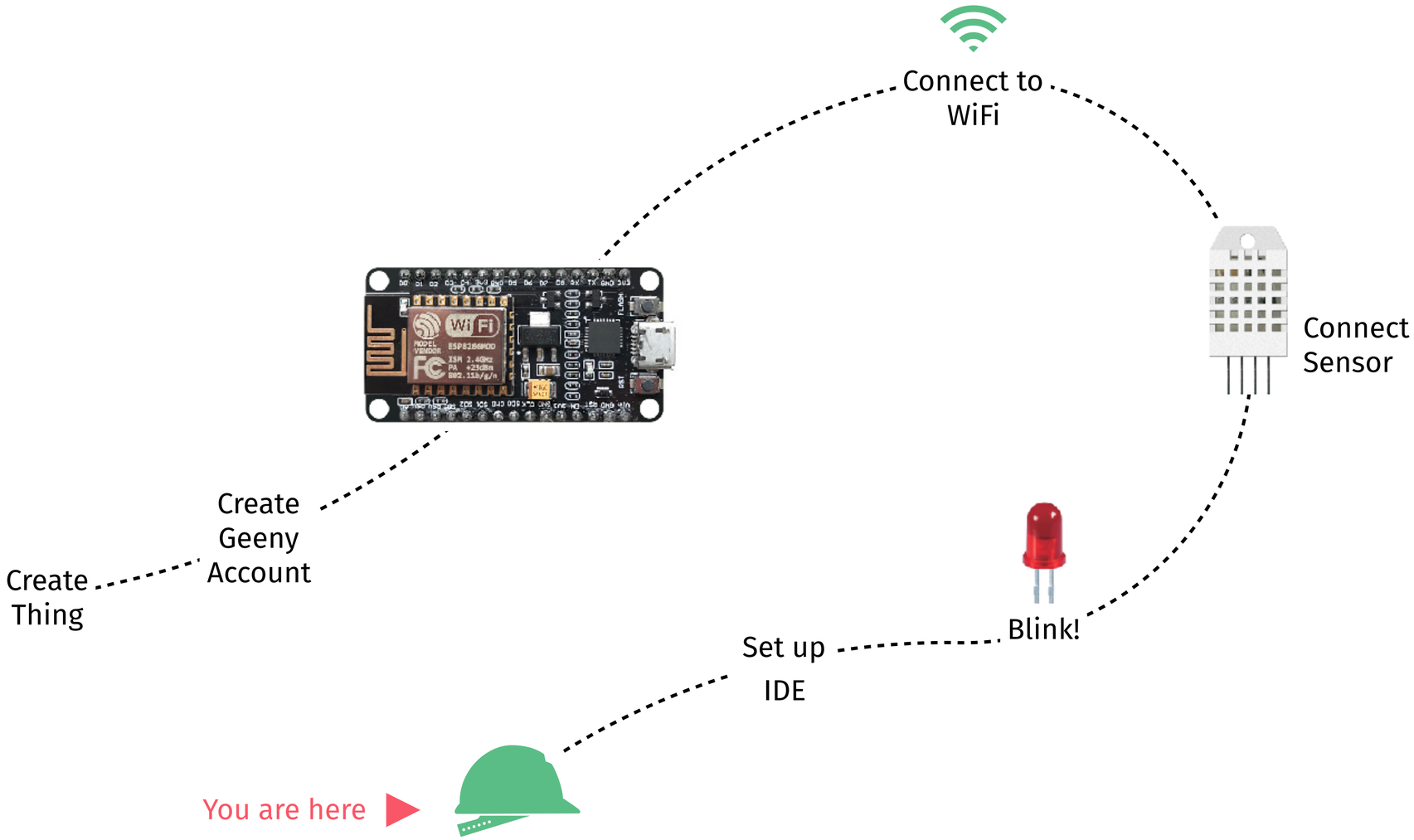
The Journey



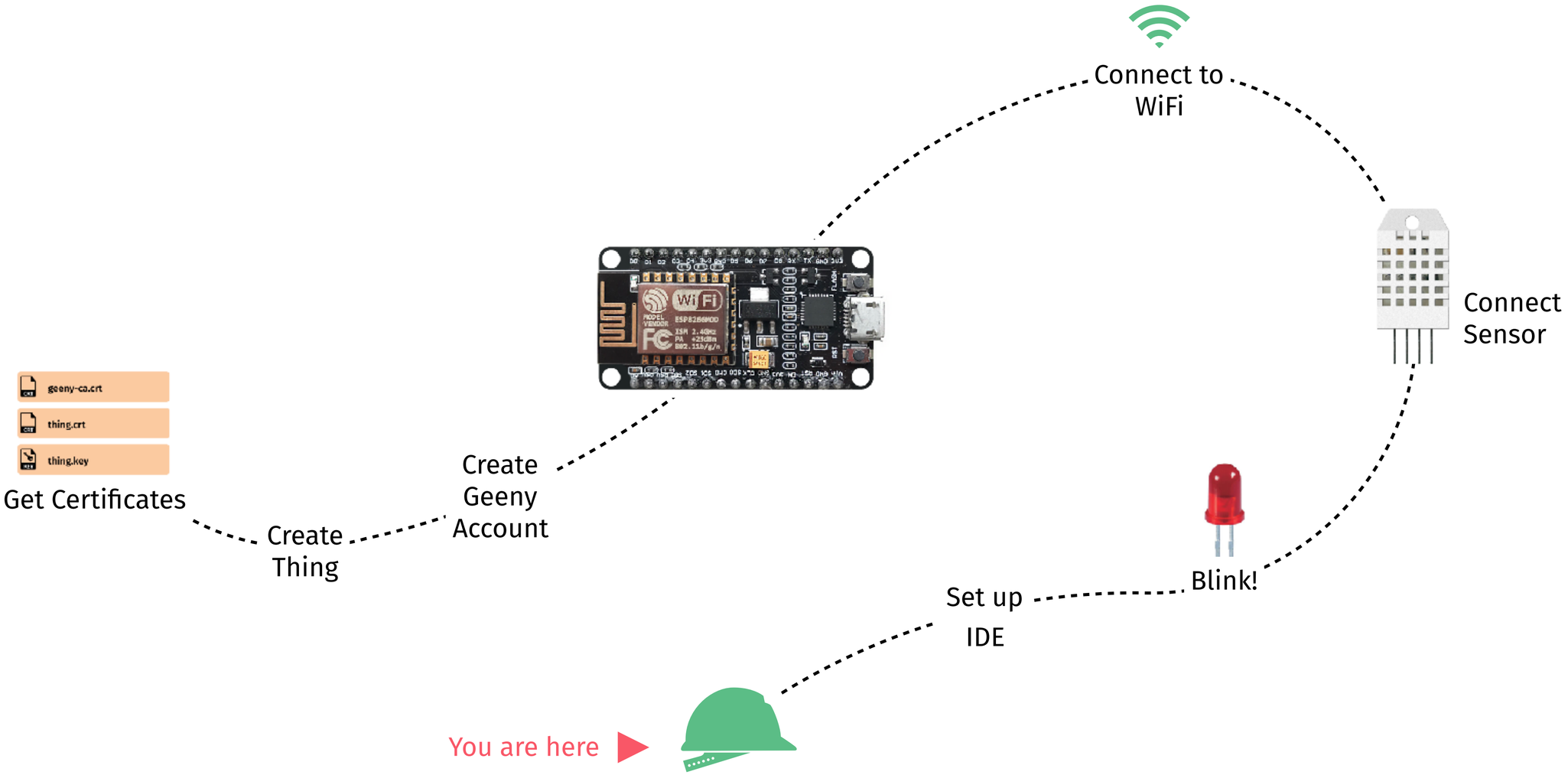
The Journey


Connect to
WiFi
Connect
Sensor
Blink!
Set up
IDE
You are here
Create
Geeny
Account

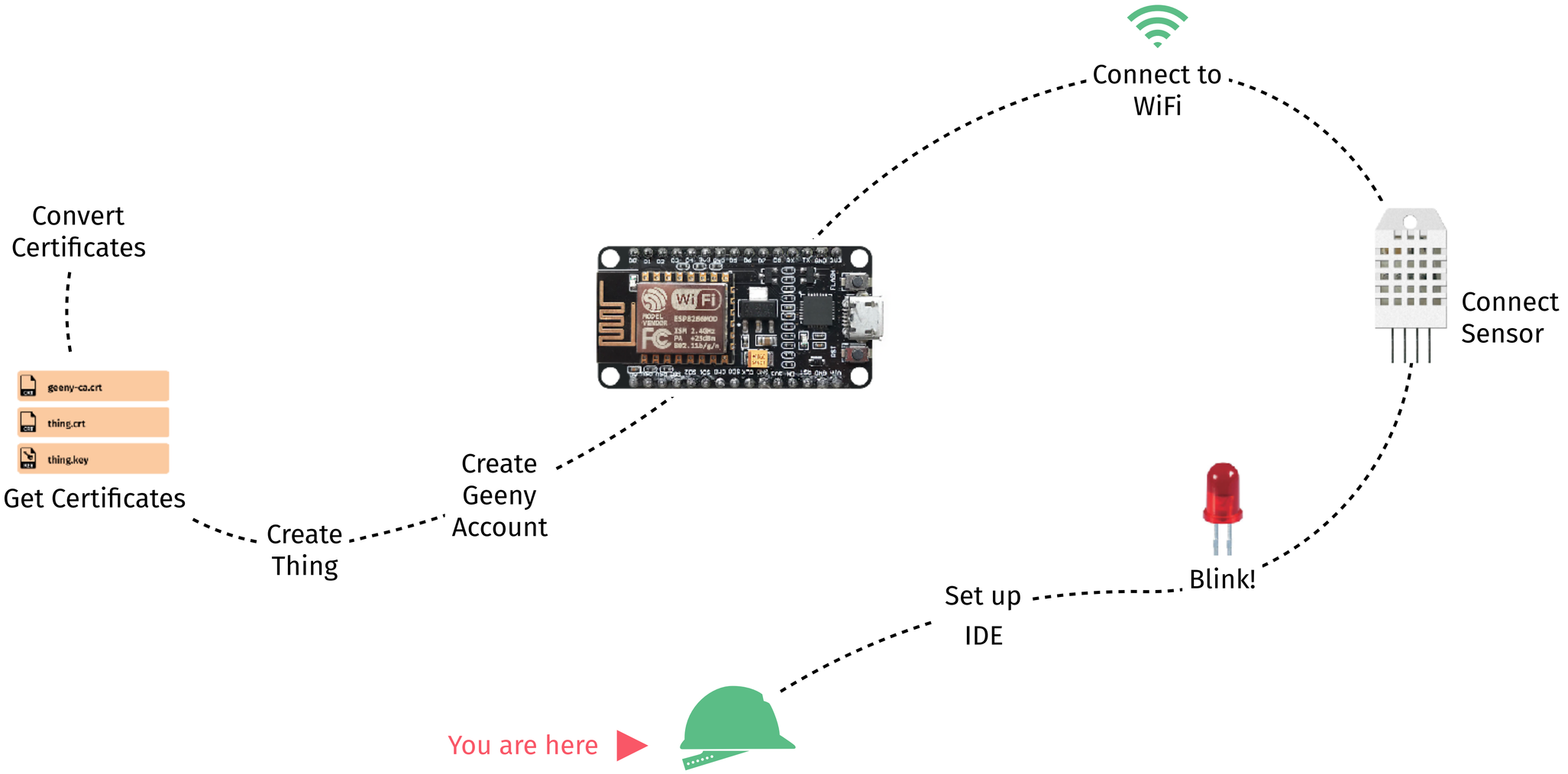
The Journey


Connect to WiFi
Connect Sensor
Blink!
Set up IDE
You are here
Create Thing
Create Geeny Account

The Journey


Connect to WiFi
Connect Sensor
Blink!
Set up IDE
You are here
Get Certificates
geeny-ca.crt
thing.crt
thing.key
Create Thing
Create Geeny Account

The Journey


Connect to WiFi
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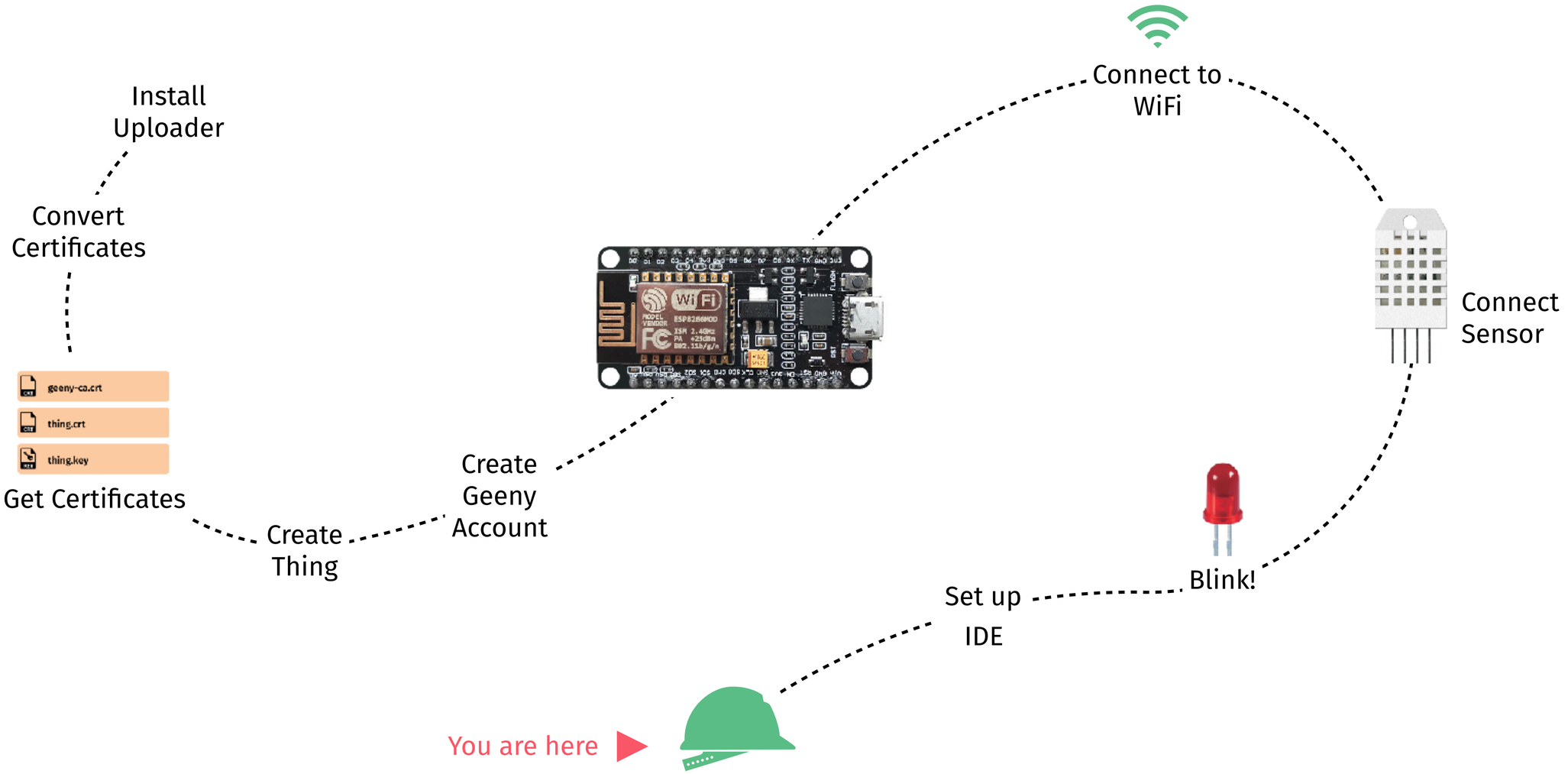
Blink!
Set up IDE
You are here
Create Geeny Account
Create Thing
Get Certificates
geeny-ca.crt
thing.crt
thing.key
Convert Certificates

The Journey


Install Uploader
Convert Certificates
geeny-ca.crt
thing.crt
thing.key
Get Certificates
Create Thing
Create Geeny Account
Connect to WiFi
Connect Sensor
Blink!
Set up IDE
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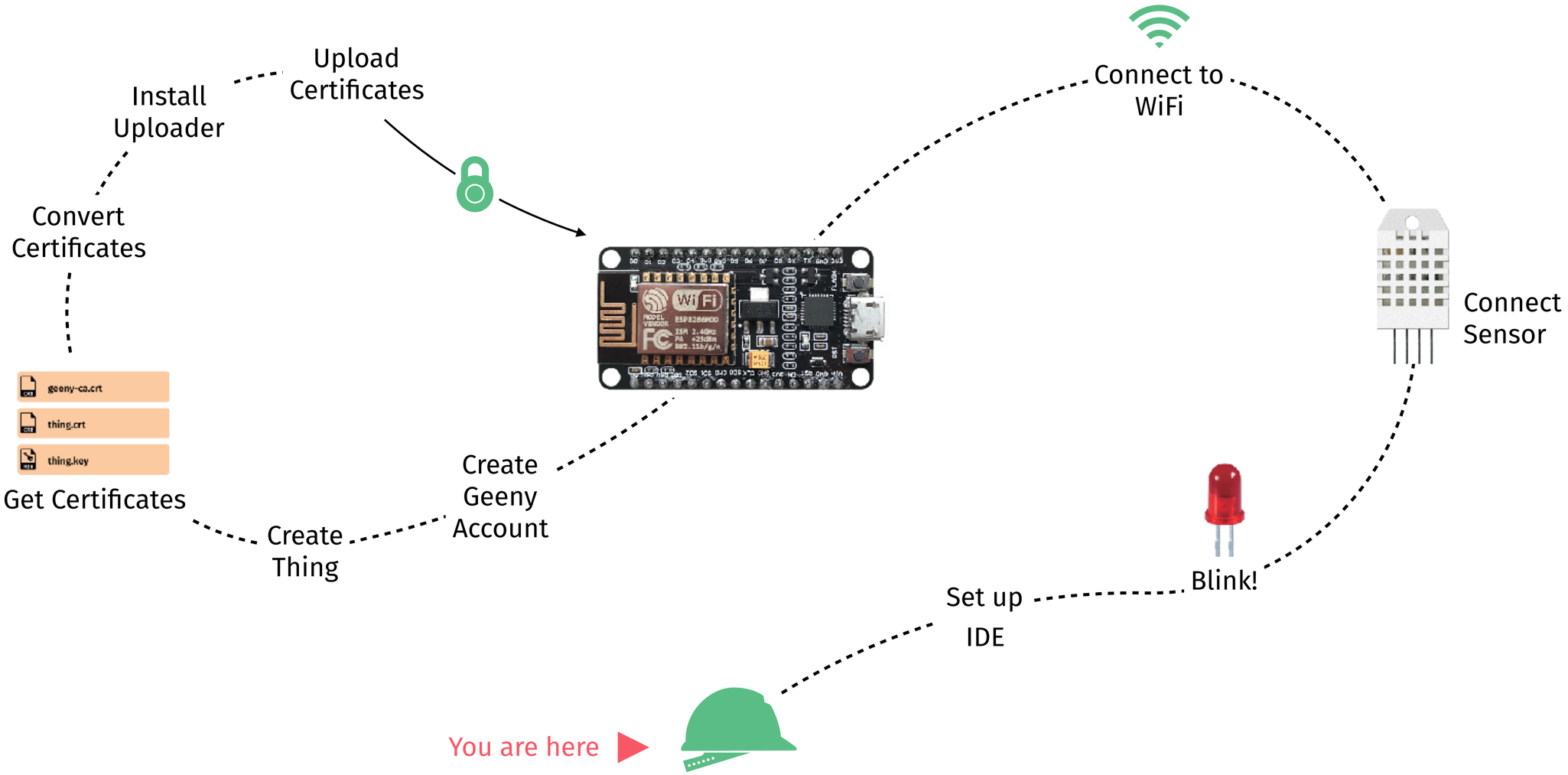
The Journey


Upload Certificates
Install Uploader
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geeny-ca.crt
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Get Certificates
Create Thing
Create Geeny Account
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Connect Sensor
Blink!
Set up IDE
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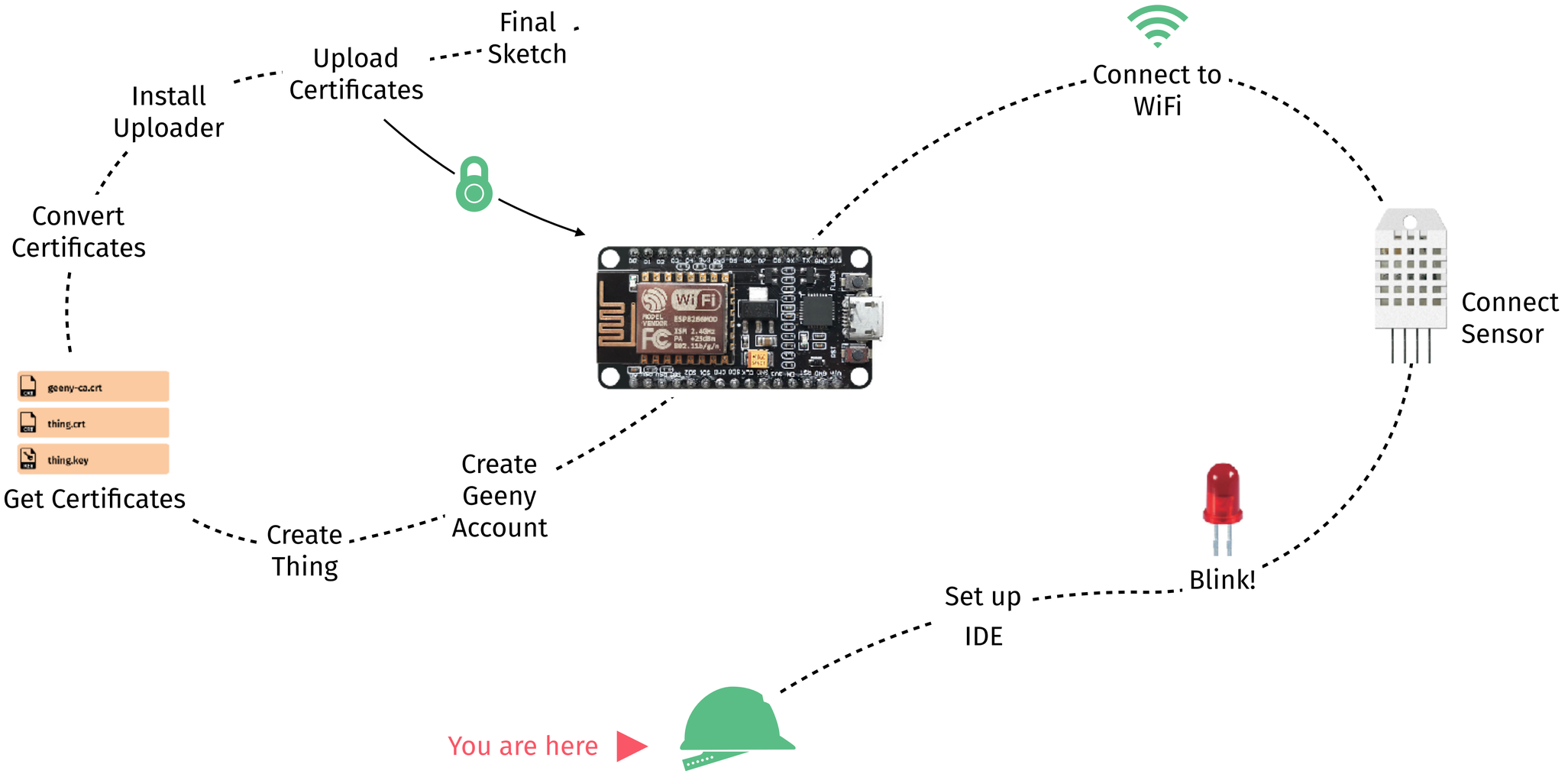
The Journey


Final Sketch
Upload Certificates
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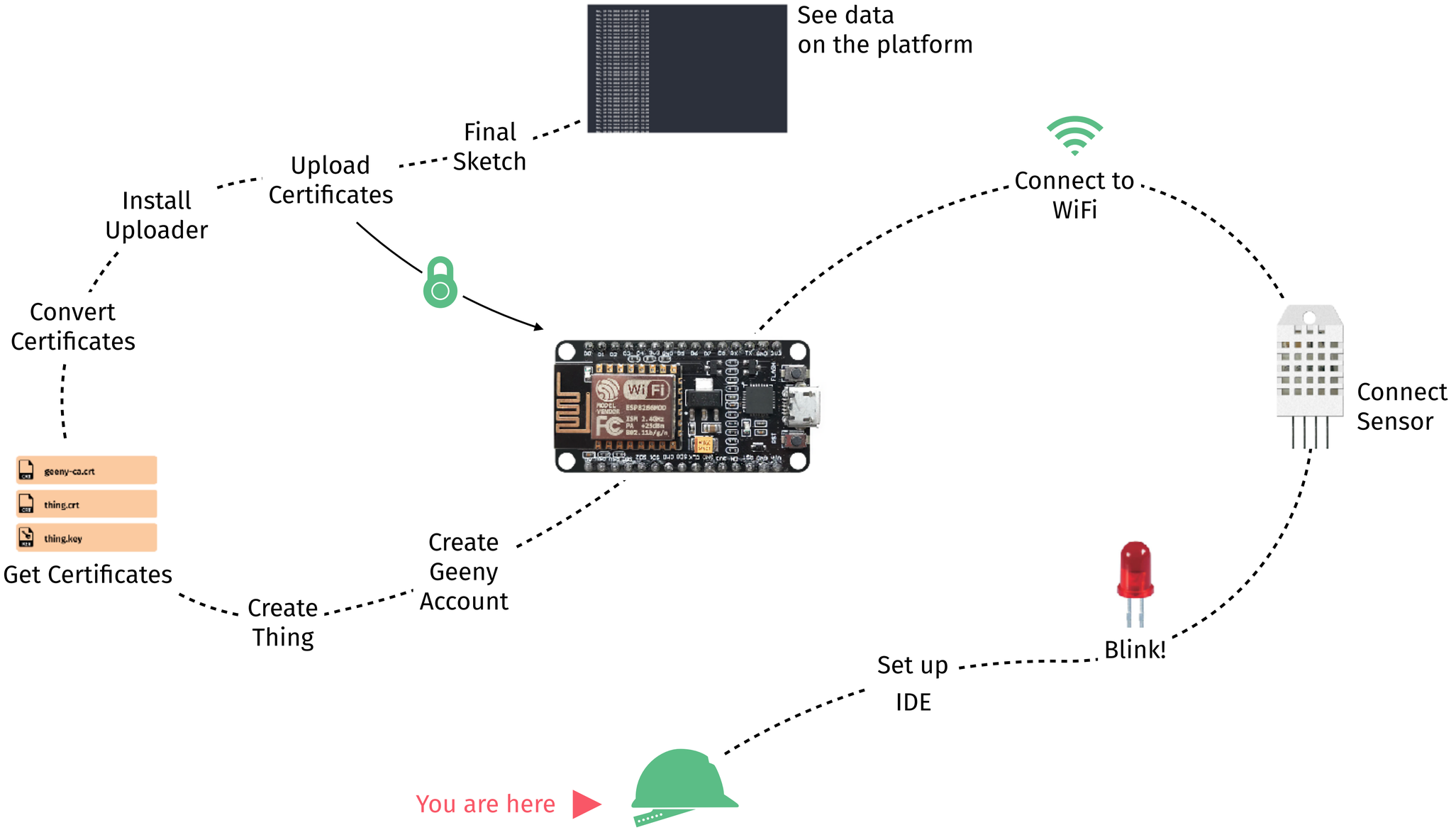
See data
on the platform
Final
Sketch
Upload
Certificates
Install
Uploader
Convert
Certificates
geeny-ca.crt
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thing.key
Get Certificates
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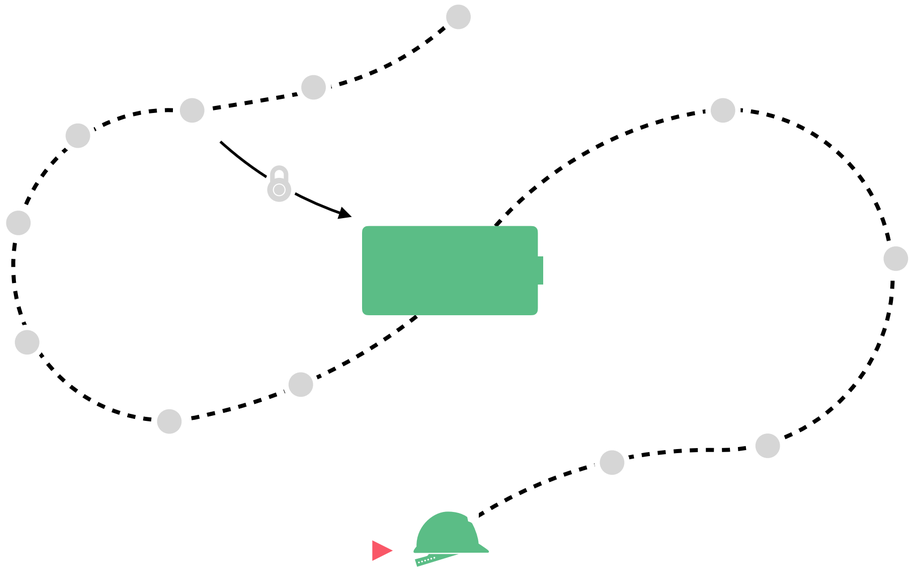
First Steps



First Steps

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3. Copy the below link in the *Additional boards Manager* field:

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5. Search for esp8266 *(by esp8266 community)* and install it

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6. Select from *Tools>Board* the NodeMCU 1.0 (ESP12E module)

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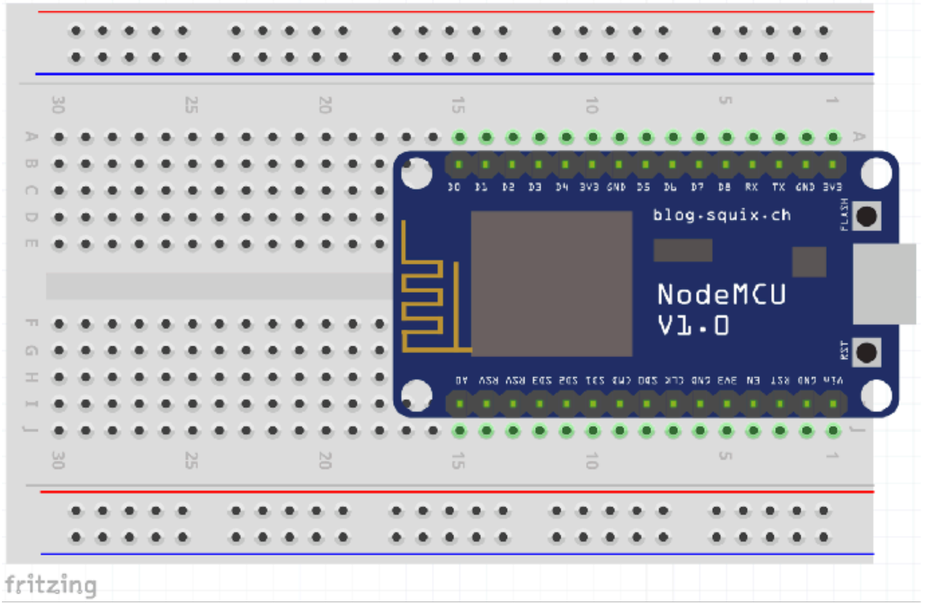
4. Go to *Tools>Boards>Board Manager*
5. Search for esp8266 *(by esp8266 community)* and install it
6. Select from *Tools>Board* the NodeMCU 1.0 (ESP12E module)
7. Maybe: Install USB driver from https://www.silabs.com/products/development-tools/software/usb-to-uart-bridge-vcp-drivers

First Steps

2. Blink()

1. Open *Files>Examples>Basics>Blink*
2. Go to *Tools>Port* and select (usually) the last entry
3. Upload the code to the NodeMCU:

   Sketch>Upload or click the upload button in the menu

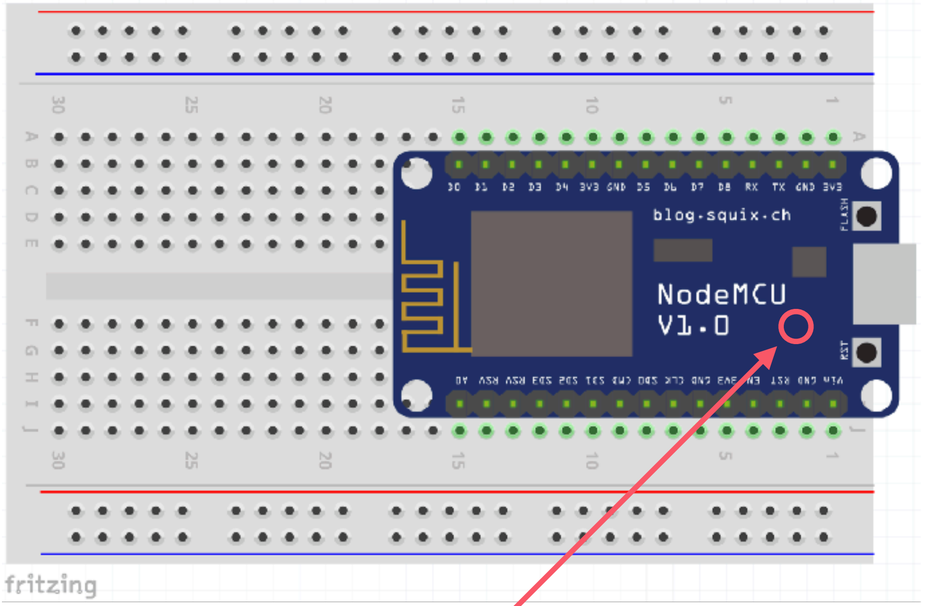


First Steps

2. Blink()

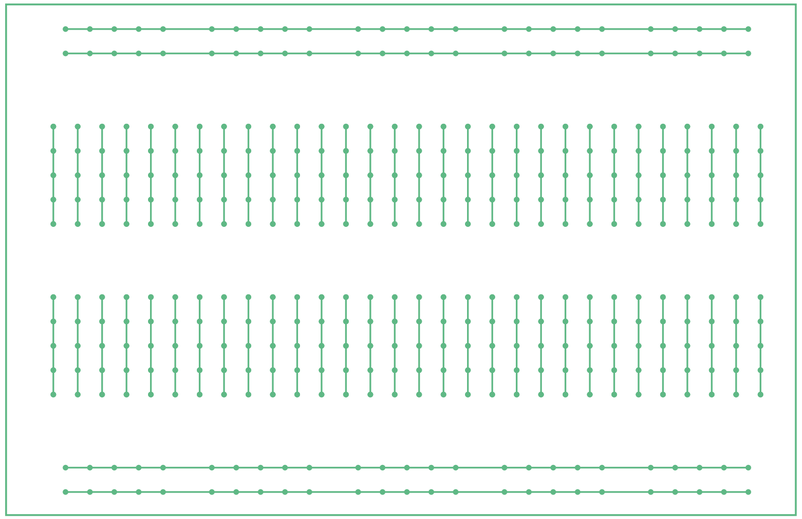
```
void setup() {
  pinMode(LED_BUILTIN, OUTPUT);
}

void loop() {
  digitalWrite(LED_BUILTIN, HIGH);
  delay(1000);
  digitalWrite(LED_BUILTIN, LOW);
  delay(1000);
}
```

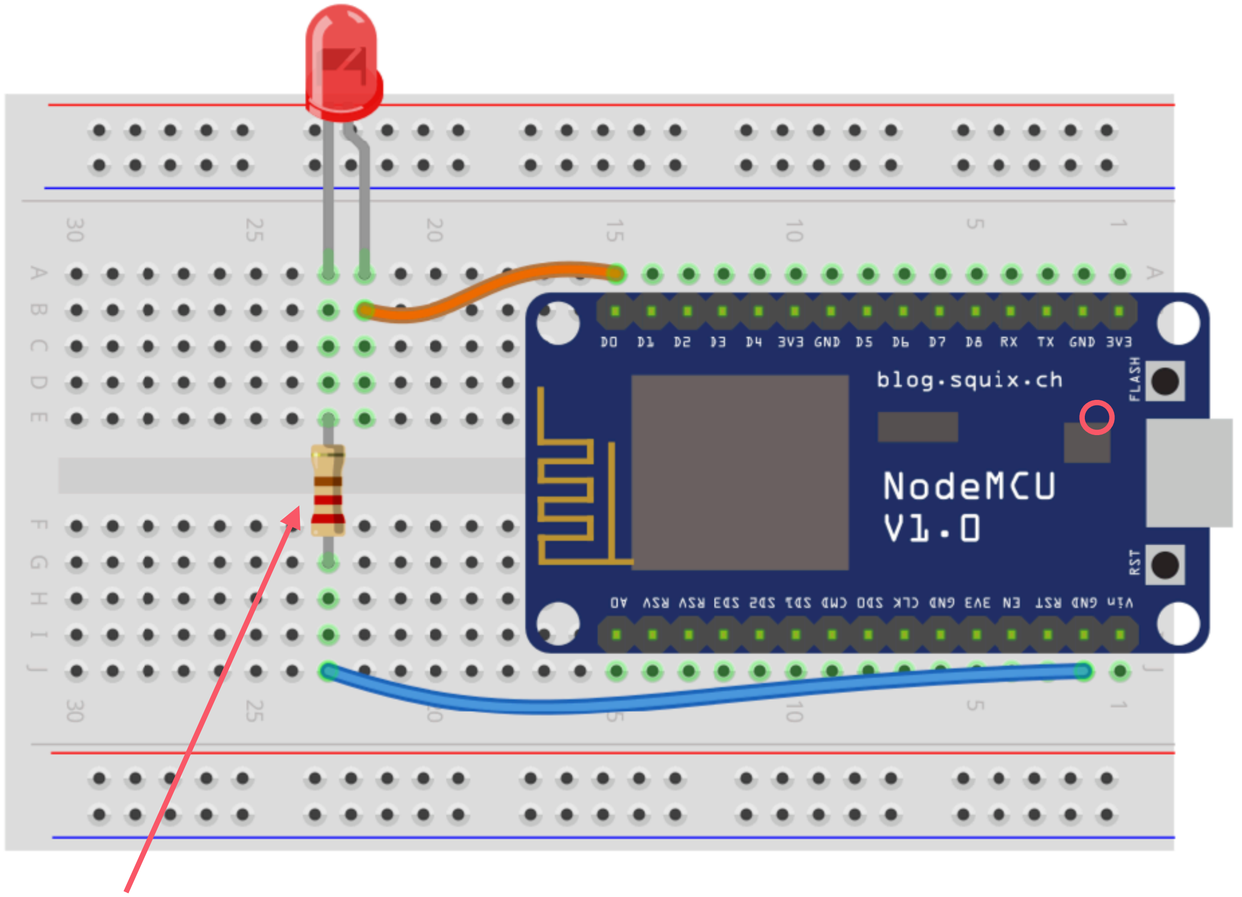


LED_BUILTIN

First Steps



Interconnections of the Breadboard



220 Ω resistor  4 band resistor (red, red, brown) or

 5 band resistor (red, red, black, black)

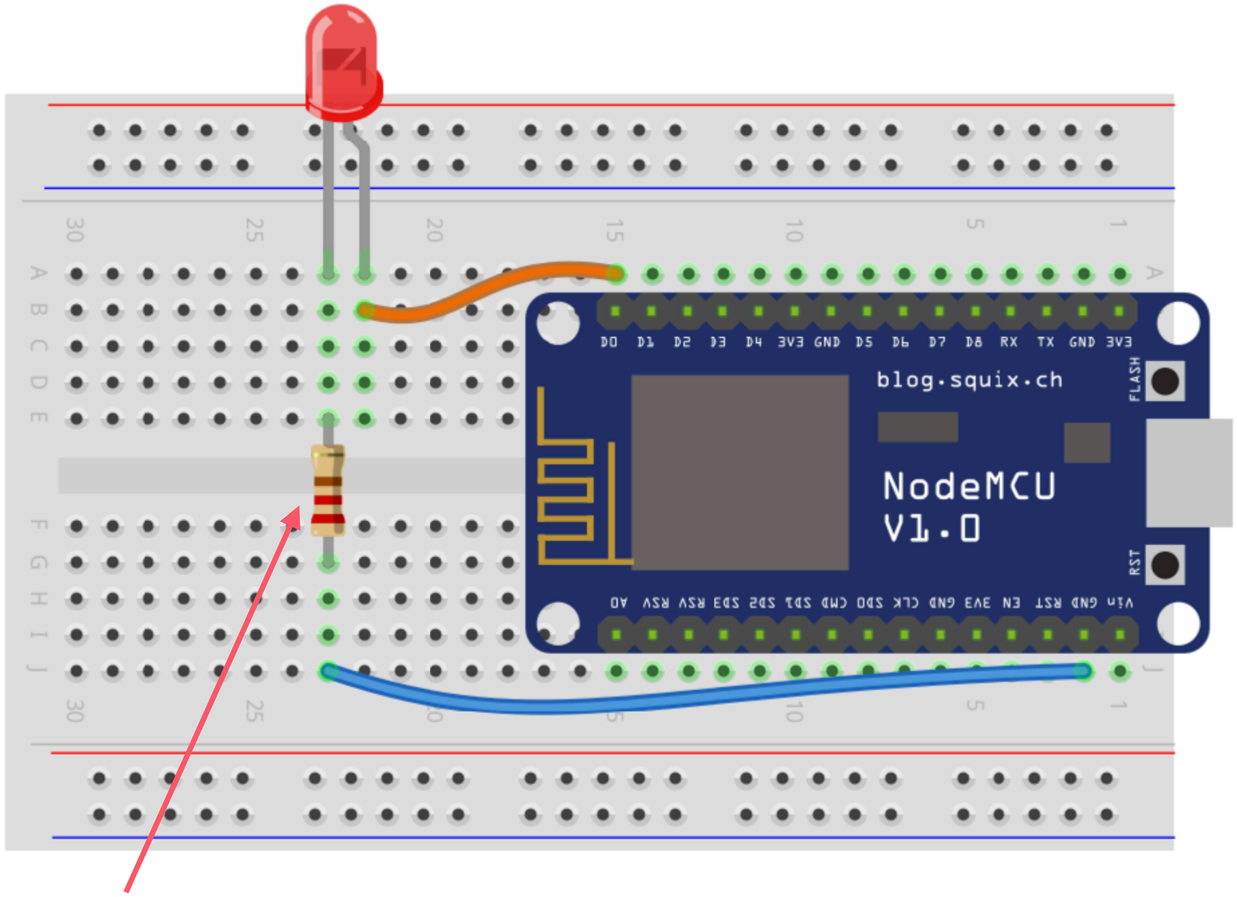
First Steps

2. Blink()

```
int ledPin = D0;

void setup() {
  pinMode(ledPin, OUTPUT);
}

void loop() {
  digitalWrite(ledPin, HIGH);
  delay(1000);
  digitalWrite(ledPin, LOW);
  delay(1000);
}
```



220 Ω resistor  4 band resistor (red, red, brown) or

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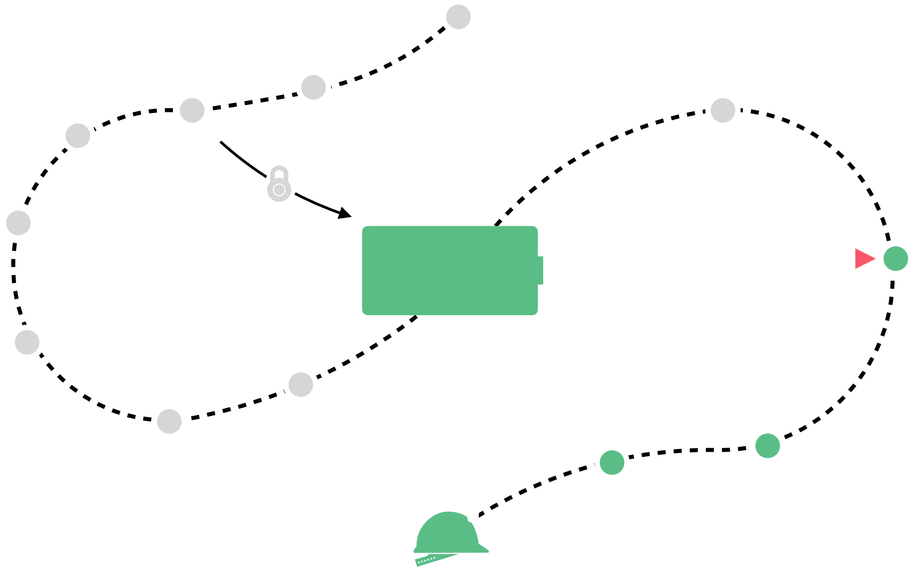
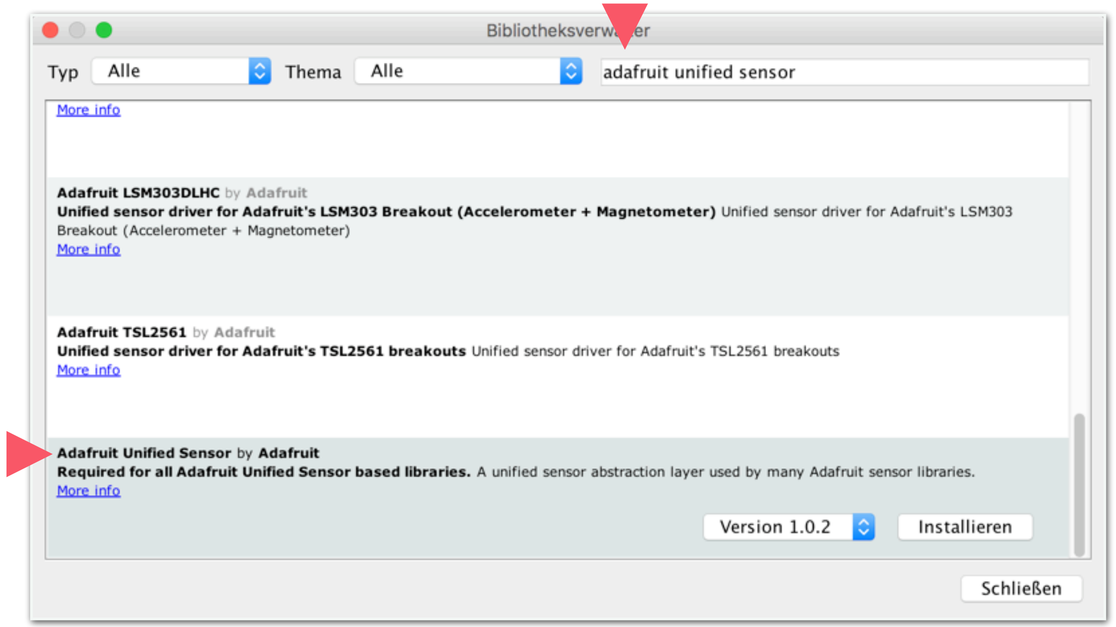
DHT22 Temperature and Humidity

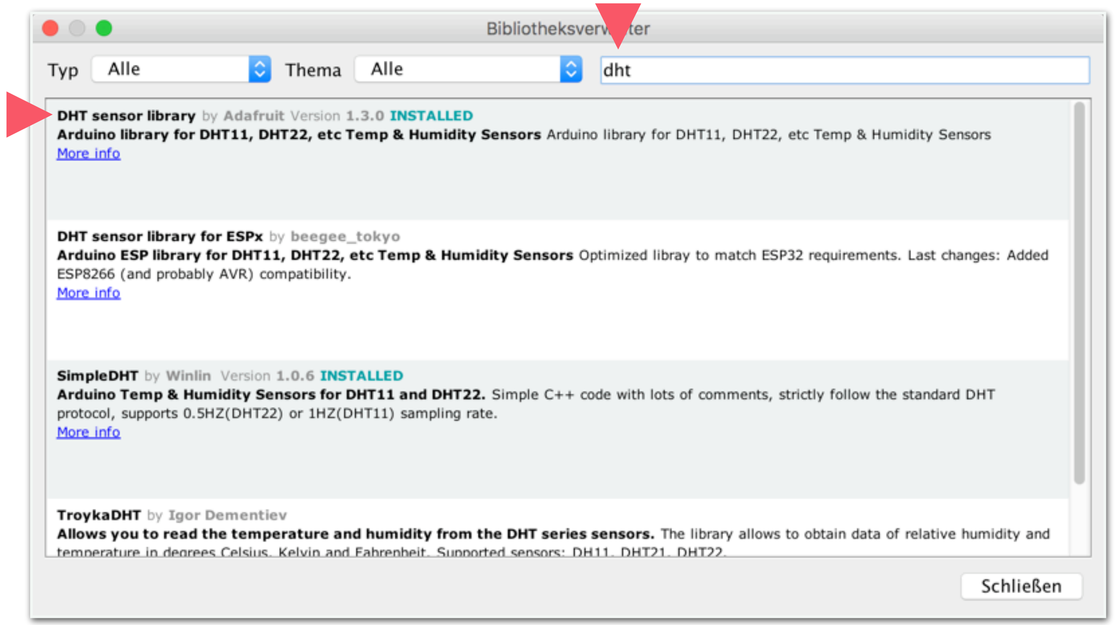


DHT22 Temperature and Humidity

1. Install library

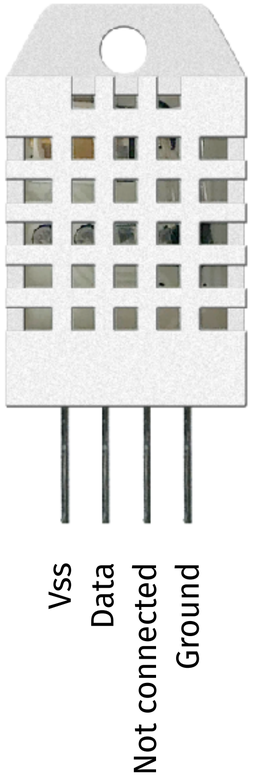
1. In the Arduino IDE go to *Sketch>Include Library>Manage libraries* ... and search for adafruit unified sensor
2. Install the Adafruit Unified Sensor by Adafruit library
3. Once again but this time search for dht
4. Install the DHT sensor library by Adafruit library

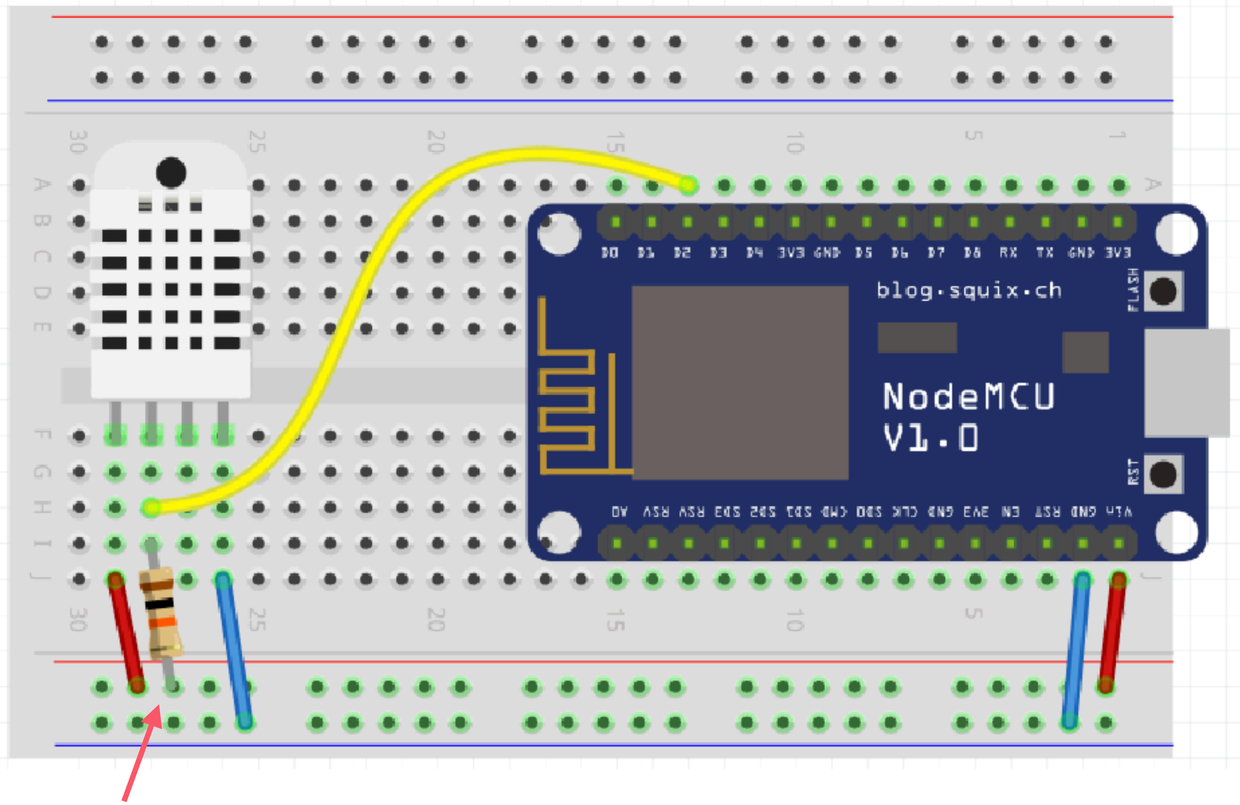




DHT22 Temperature and Humidity

2. Build the circuit





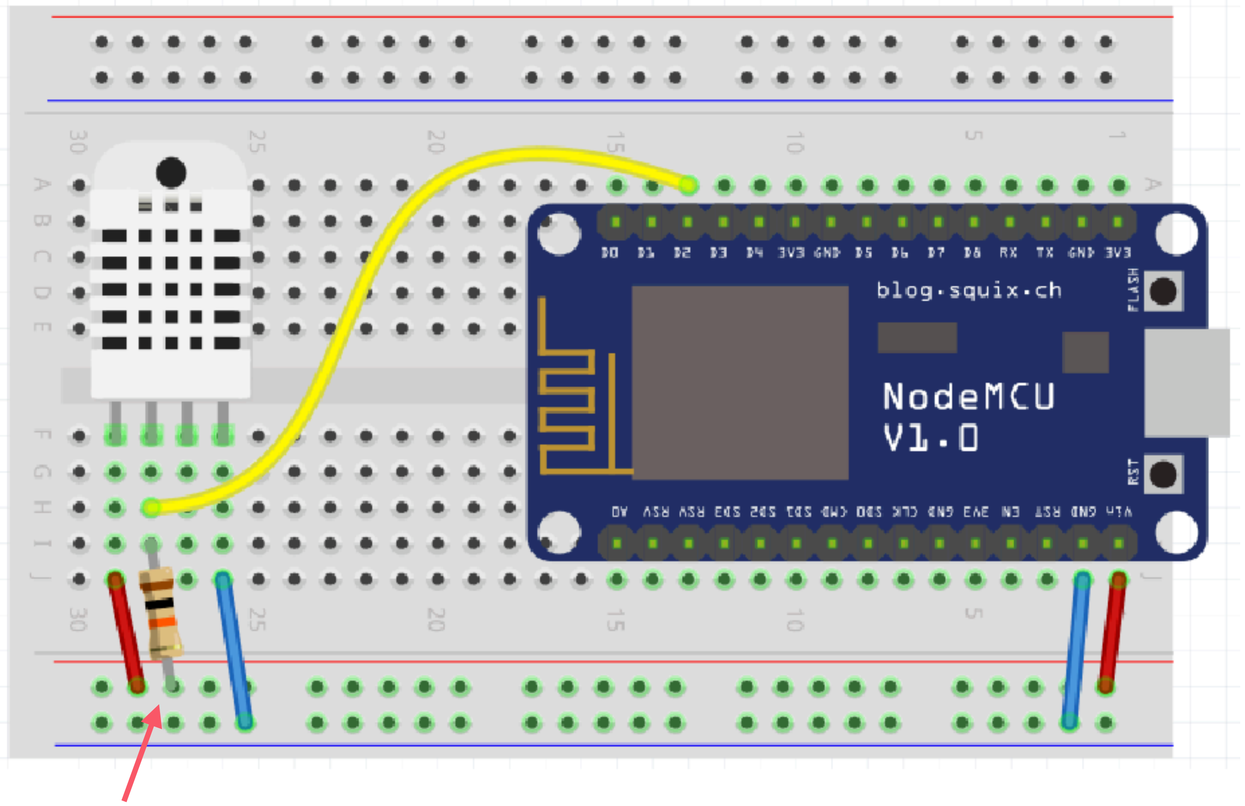
10 kΩ resistor  4 band resistor (brown, black, orange) or

 5 band resistor (brown, black, black, red)

DHT22 Temperature and Humidity

3. The sketch (*2_DHT22.ino*)

```
#include <ESP8266WiFi.h>
#include <DHT.h>

#define DHTPIN D2
#define DHTTYPE DHT22
DHT dht(DHTPIN, DHTTYPE);

unsigned long lastMillis = 0;

void setup() {
  Serial.begin(115200);
  Serial.println("Startup");
}

void loop() {
  if (millis() - lastMillis > 1000) {
    lastMillis = millis();
    sendSensorData();
  }
}
```



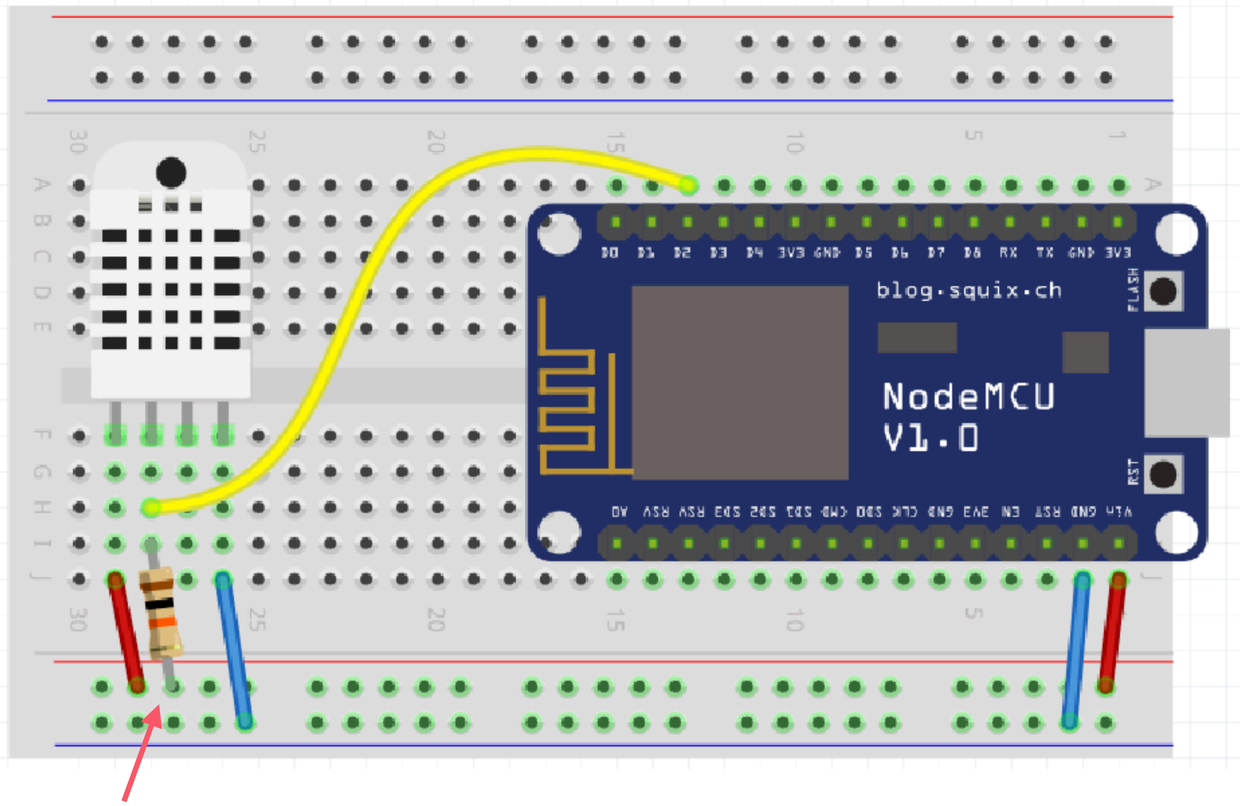
10 kΩ resistor  4 band resistor (brown, black, orange) or

 5 band resistor (brown, black, black, red)

DHT22 Temperature and Humidity

3. The sketch (*2_DHT22.ino*)

```
void sendSensorData() {
  float theTemparature = dht.readTemperature();
  float theHumidity = dht.readHumidity();
  if (isnan(theHumidity) || isnan(theTemparature)) {
    Serial.println("Failed to read from DHT sensor!“);
    return;
  }

  Serial.print(theTemparature);
  Serial.print(" °C\t");
  Serial.print(theHumidity);
  Serial.println(" %");
}
```



10 kΩ resistor

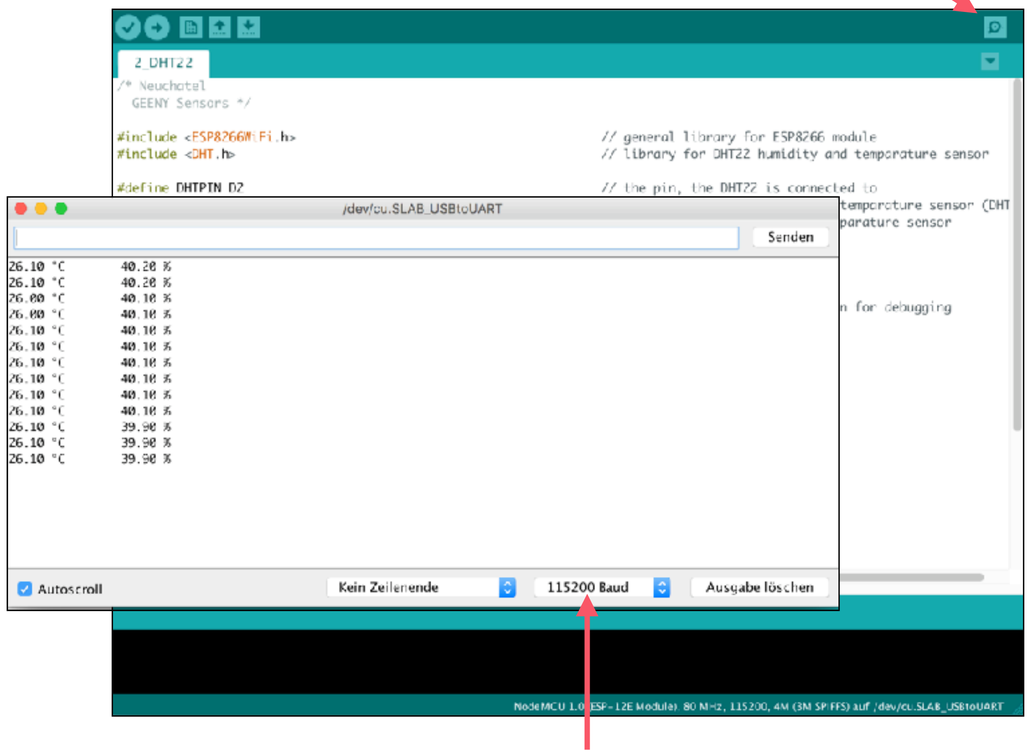
4 band resistor (brown, black, orange) or

5 band resistor (brown, black, black, red)

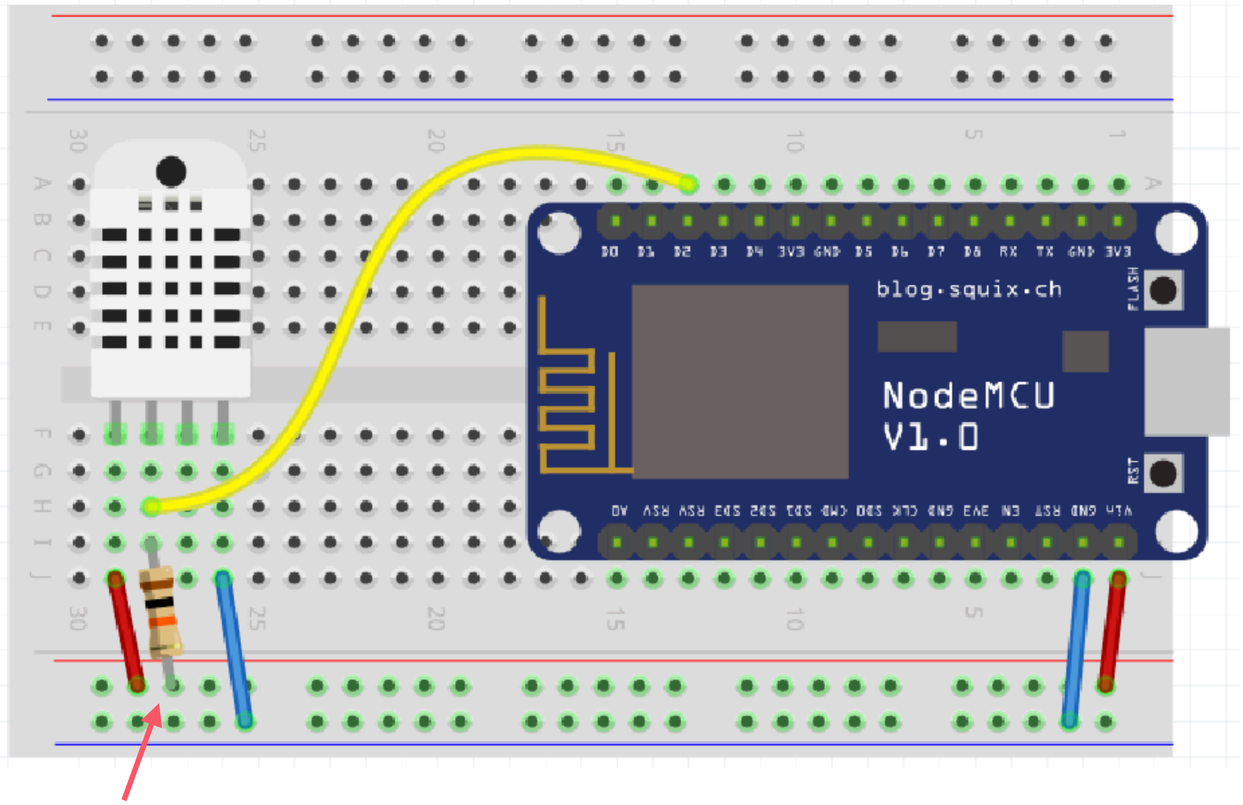
DHT22 Temperature and Humidity

3. The sketch (*2_DHT22.ino*)

Click to open SerialMonitor



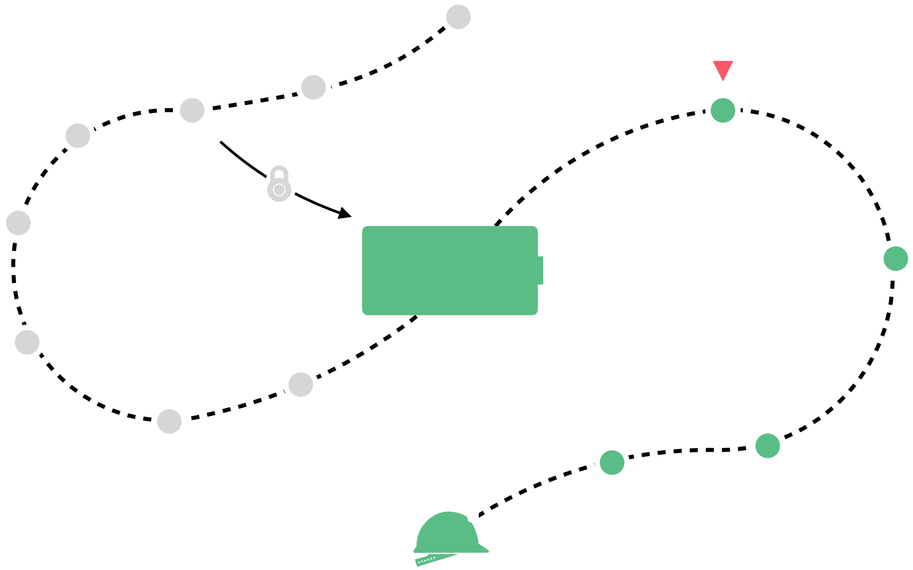
Make sure to set the baud rate to 115200



10 kΩ resistor  4 band resistor (brown, black, orange) or

 5 band resistor (brown, black, black, red)

Connect to Wifi

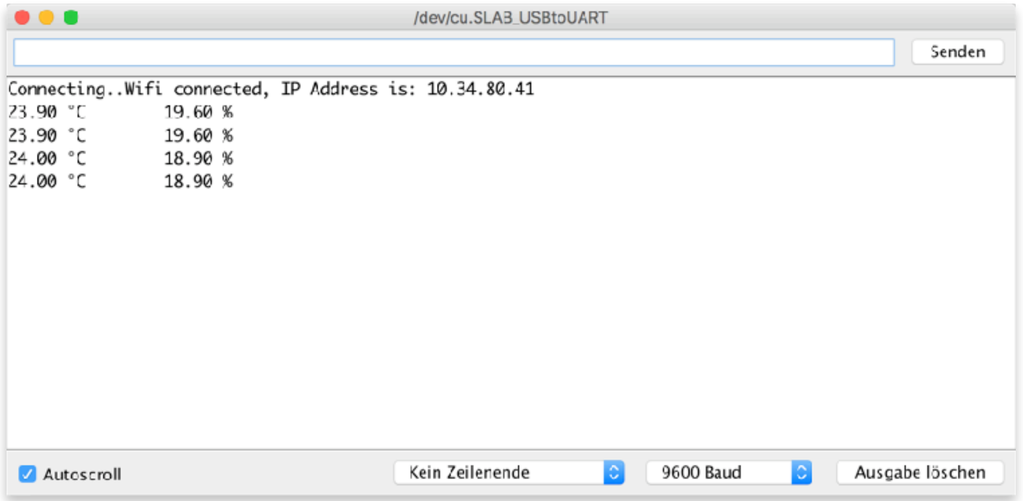


DHT22 Temperature and Humidity

3. The sketch (*3_DHT22Wifi.ino*)

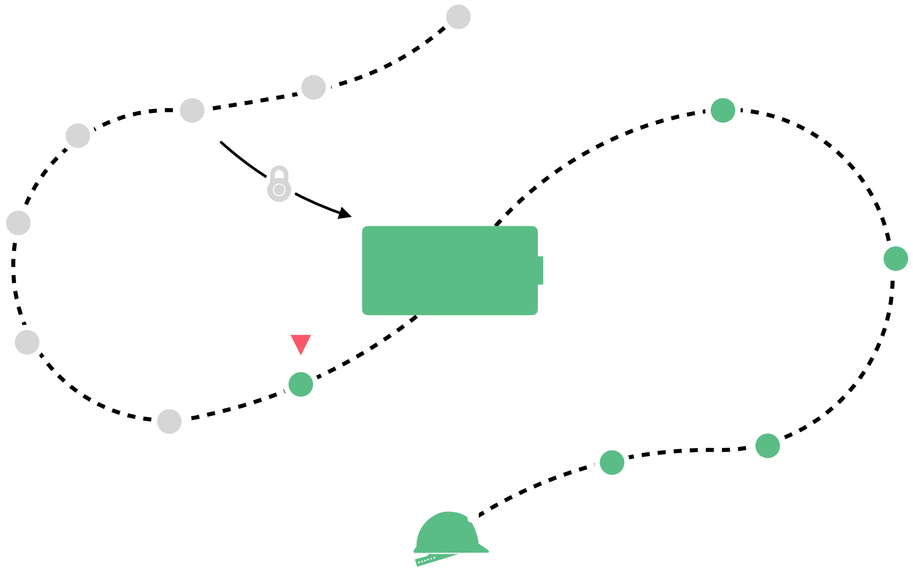
1. Change the wifi settings and upload the sketch

```
#include <ESP8266WiFi.h>
#include <DHT.h>

#define DHTPIN D2
#define DHTTYPE DHT22
DHT dht(DHTPIN, DHTTYPE);
const char* ssid     = "############";
const char* password = "############";

WiFiClient net;
unsigned long lastMillis = 0;
```



2. Open the Serial Monitor

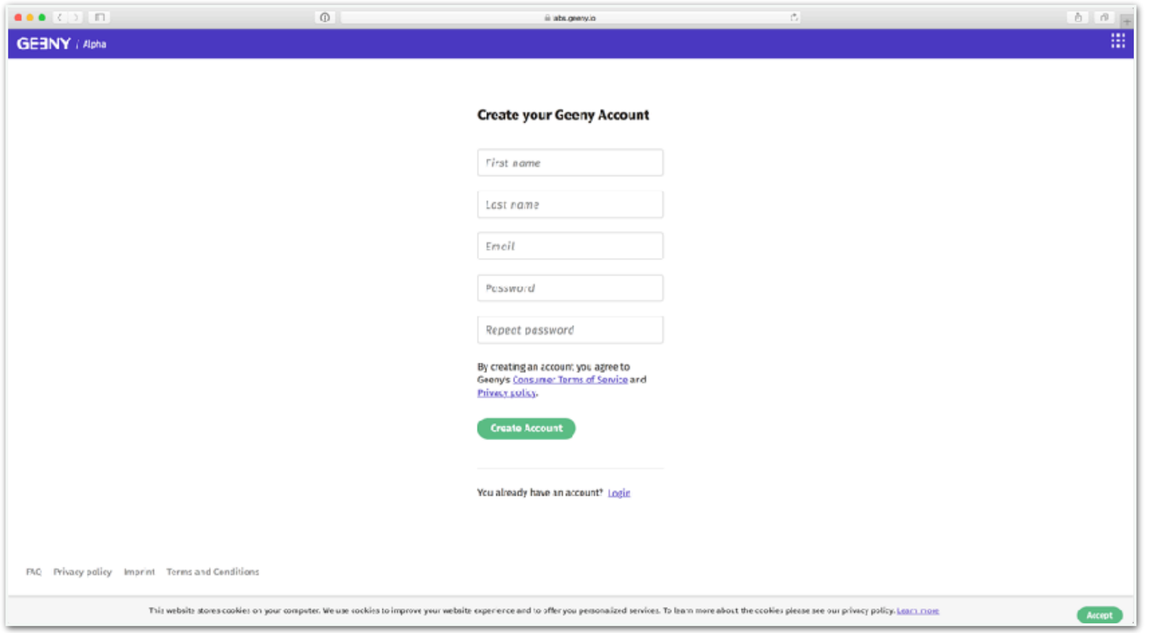
Create Geeny Account



Create Geeny Account

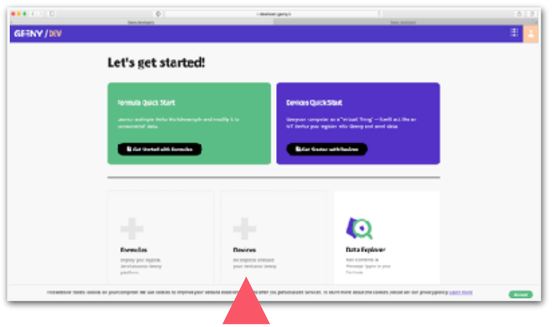
1. **Create a Geeny account**

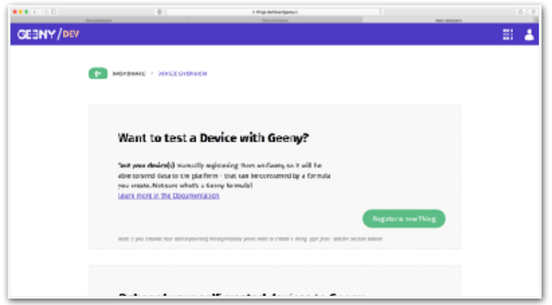
    1. Go to Geeny.io and create a new account
    2. Click on *Become a developer*

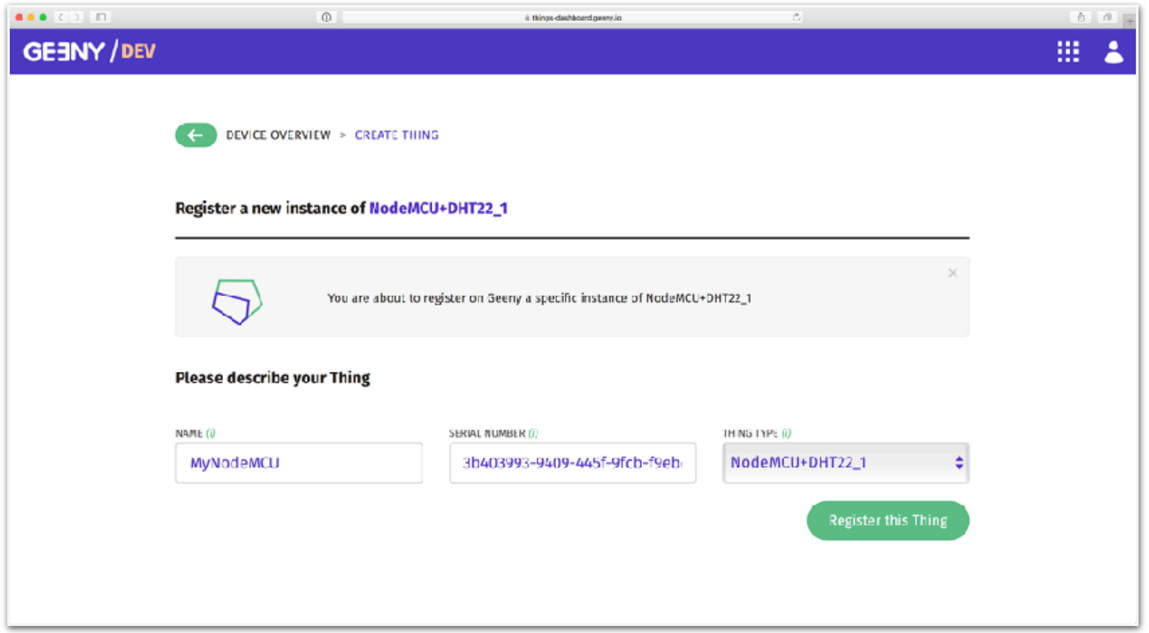


Create Geeny Account

2. Create a new *Thing*



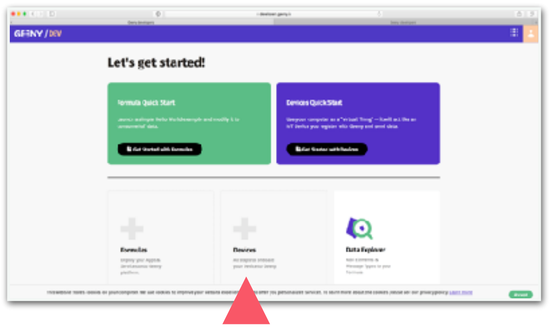


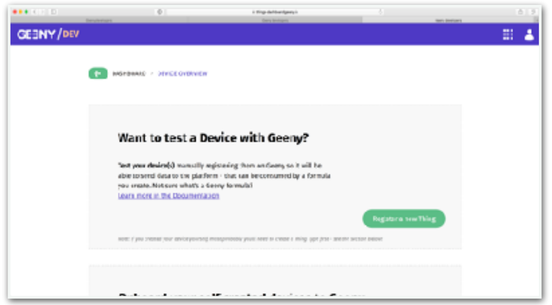


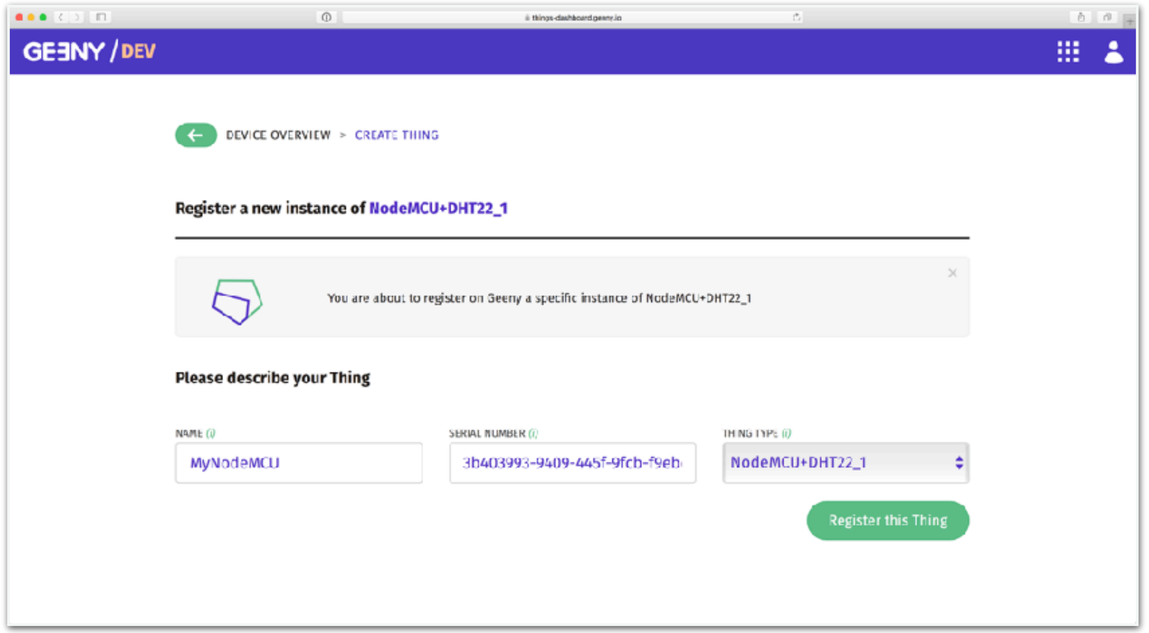
Create Geeny Account

2. Create a new *Thing*

1. Click on *Devices*



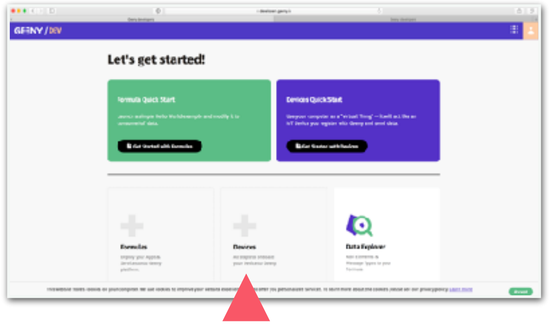


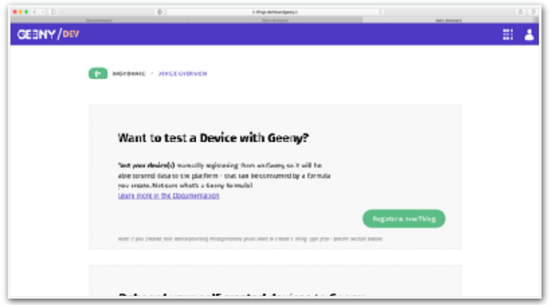


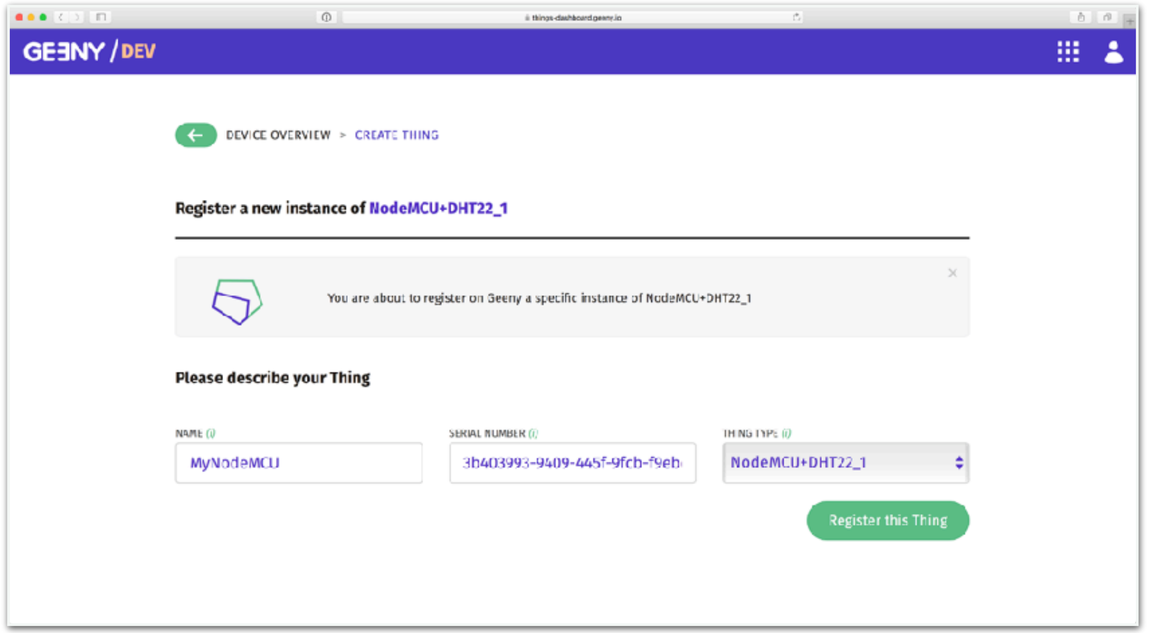
Create Geeny Account

2. Create a new *Thing*

1. Click on *Devices*
2. Click on *Register a new Thing*



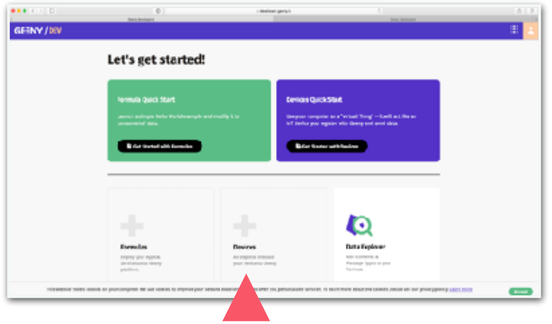


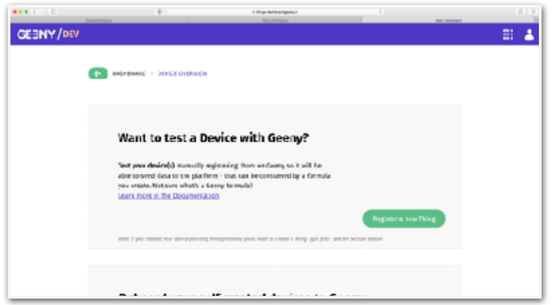


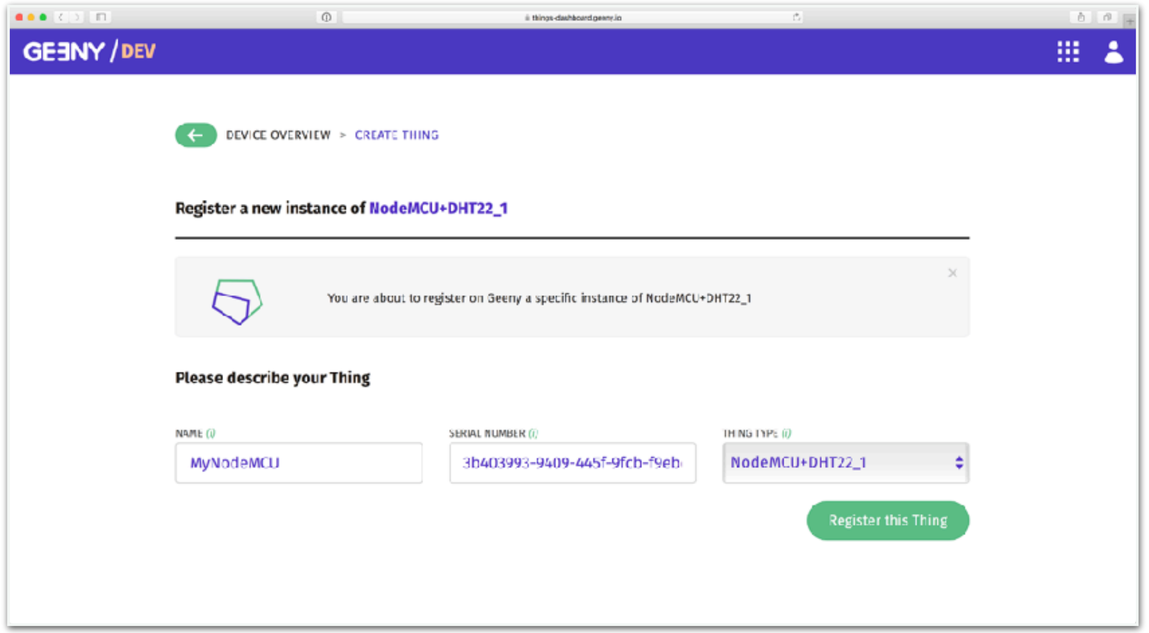
Create Geeny Account

2. Create a new *Thing*

1. Click on *Devices*
2. Click on *Register a new Thing*
3. fill out the form:



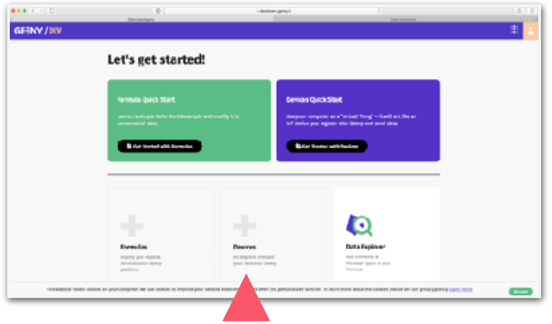


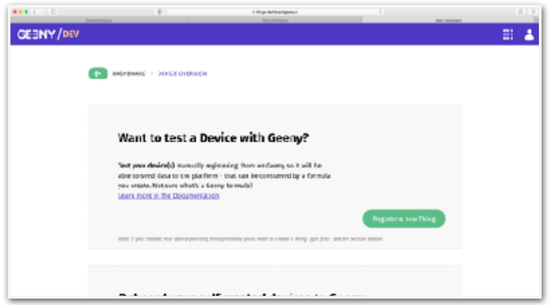


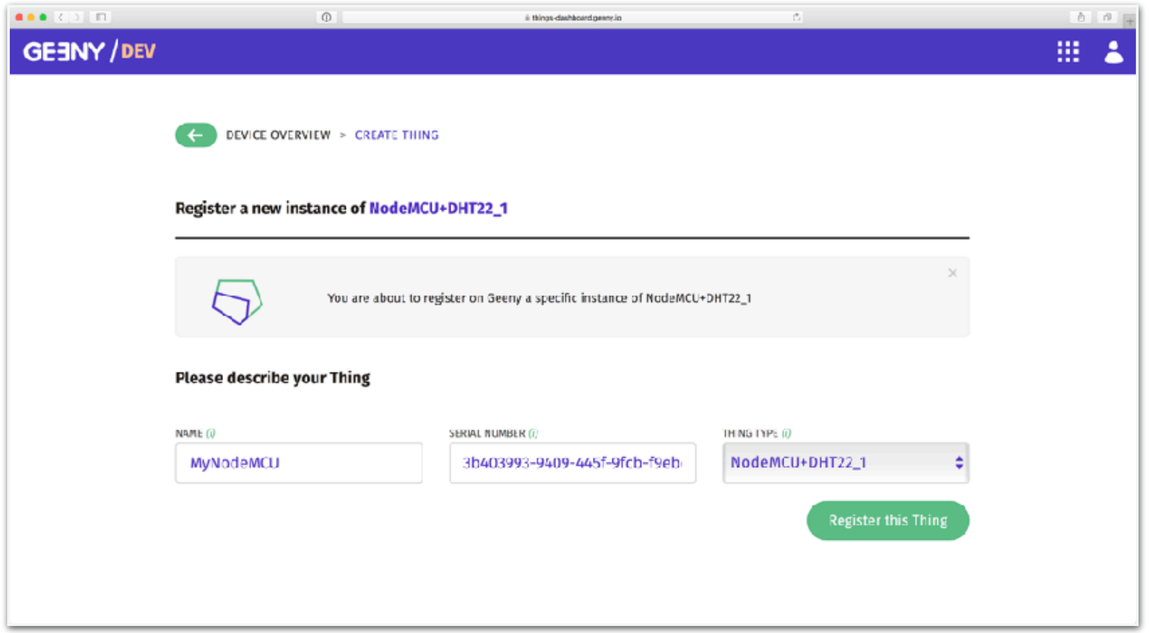
Create Geeny Account

2. Create a new *Thing*

1. Click on *Devices*
2. Click on *Register a new Thing*
3. fill out the form:
    1. give it a name you like,





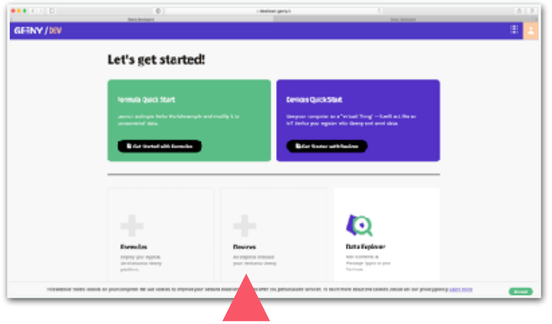


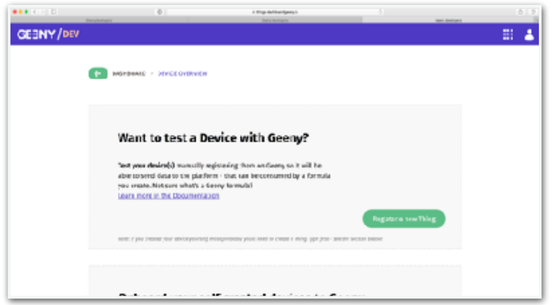
Create Geeny Account

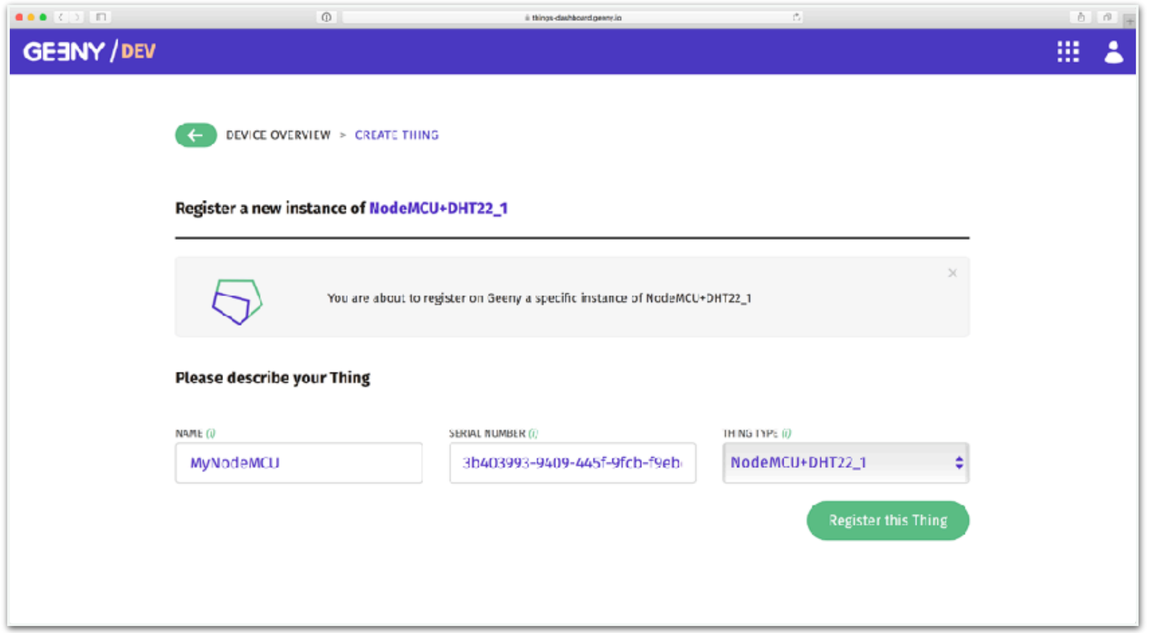
2. Create a new *Thing*

1. Click on *Devices*
2. Click on *Register a new Thing*
3. fill out the form:
    1. give it a name you like,
    2. serial number

       (a new UUID e.g. from *www.uuidgenerator.net*)





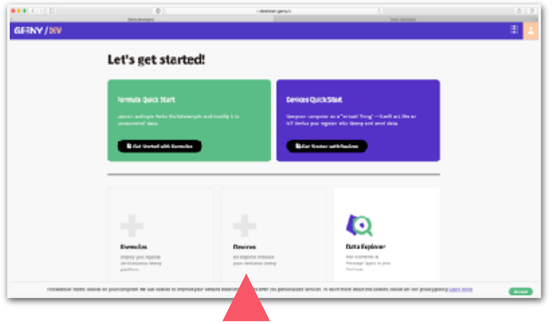


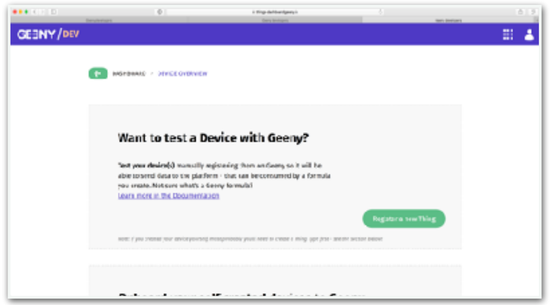
Create Geeny Account

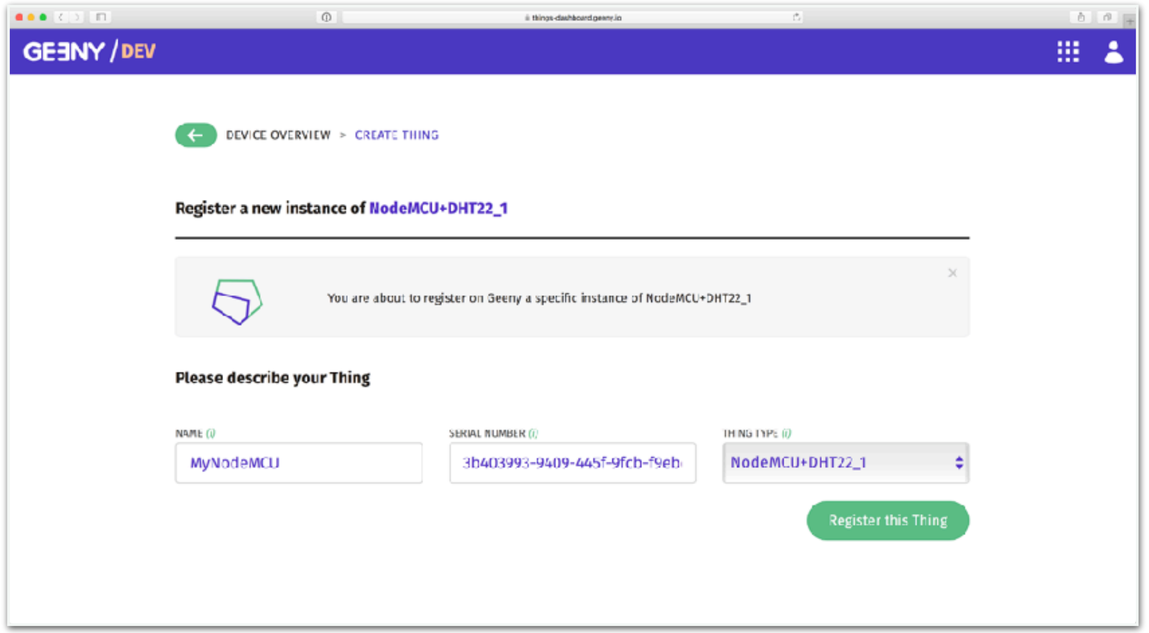
2. Create a new *Thing*

1. Click on *Devices*
2. Click on *Register a new Thing*
3. fill out the form:
    1. give it a name you like,
    2. serial number

       (a new UUID e.g. from *www.uuidgenerator.net*)
    3. and select the Thing Type *NodeMCU+DHT22_1*





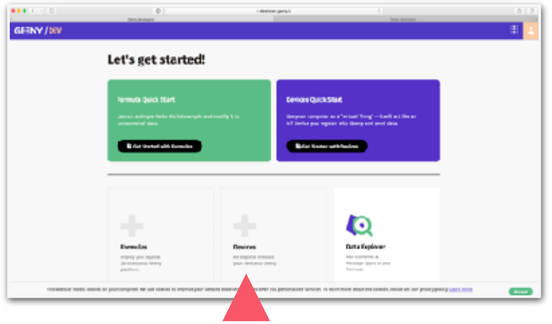


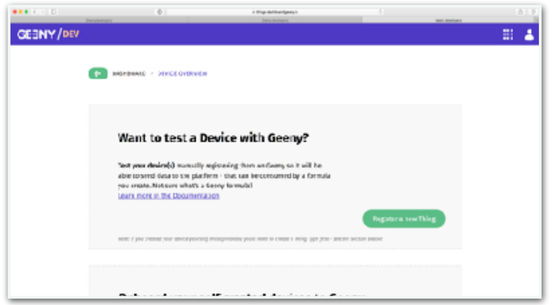
Create Geeny Account

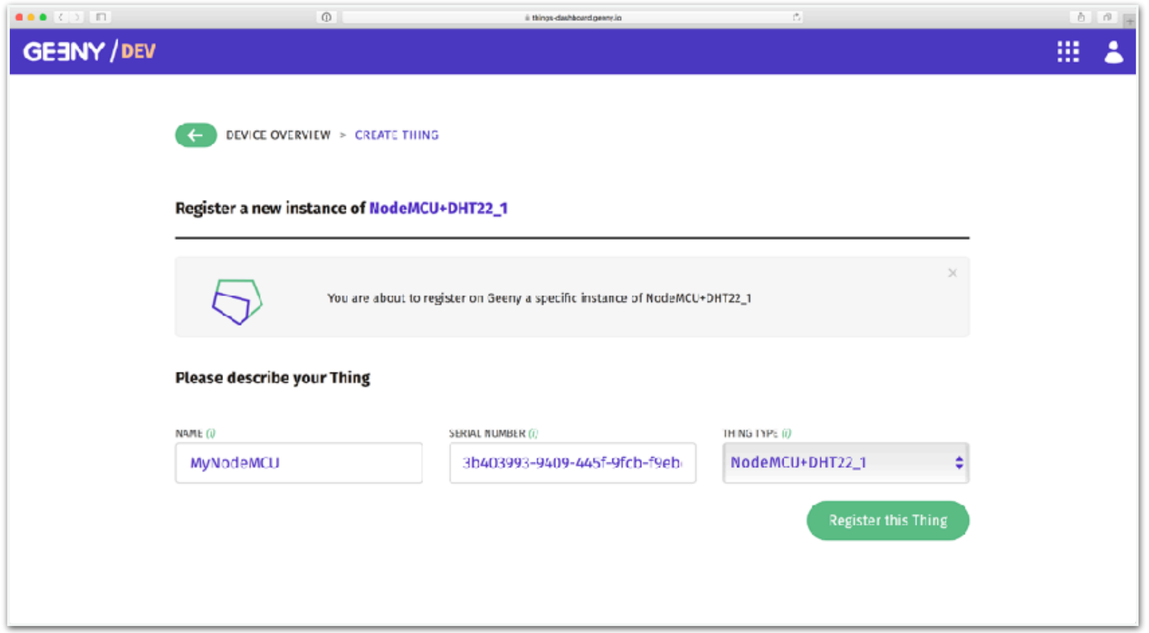
2. Create a new *Thing*

1. Click on *Devices*
2. Click on *Register a new Thing*
3. fill out the form:
    1. give it a name you like,
    2. serial number

       (a new UUID e.g. from *www.uuidgenerator.net*)
    3. and select the Thing Type *NodeMCU+DHT22_1*
4. Click on *Register this Thing*



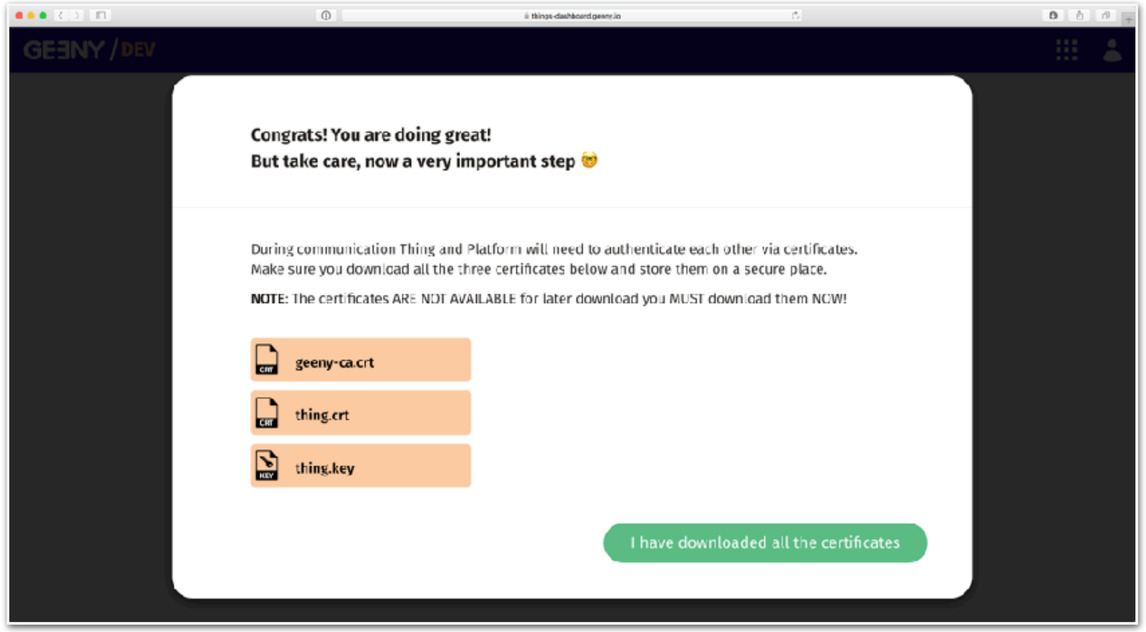




Create Geeny Account

3. Download the certificates*

1. Now a screen opens asking to download the certificate files. Save the files on your computer by clicking each file.



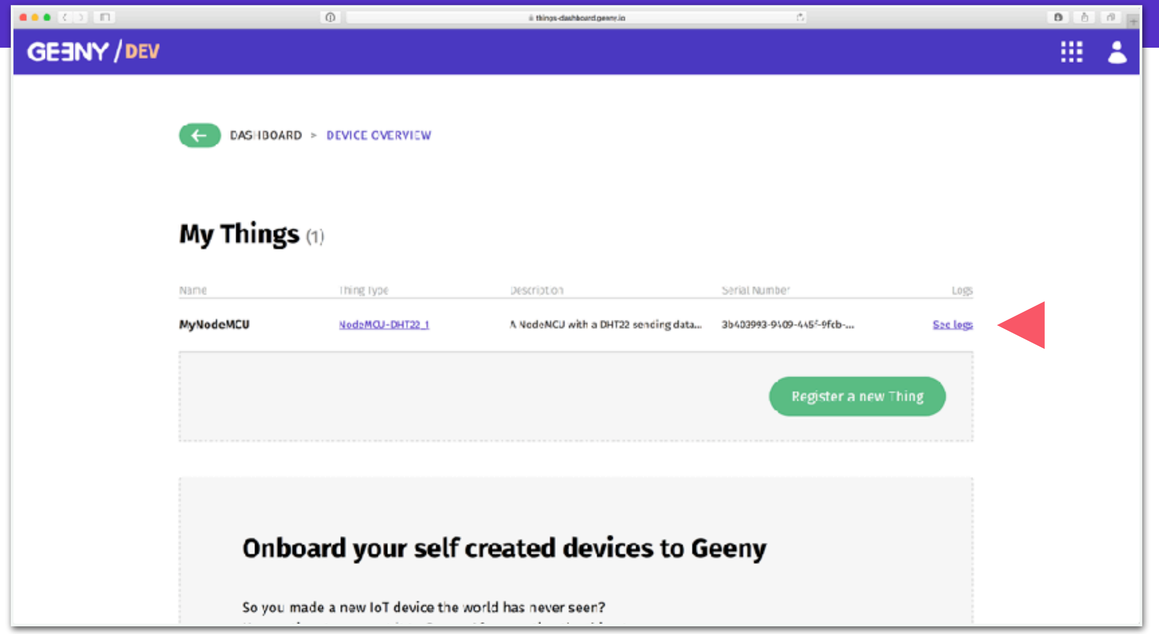
**Certificates are used to authenticate the participants in a secure communication process. In this example it authenticates the NodeMCU and Geeny.*

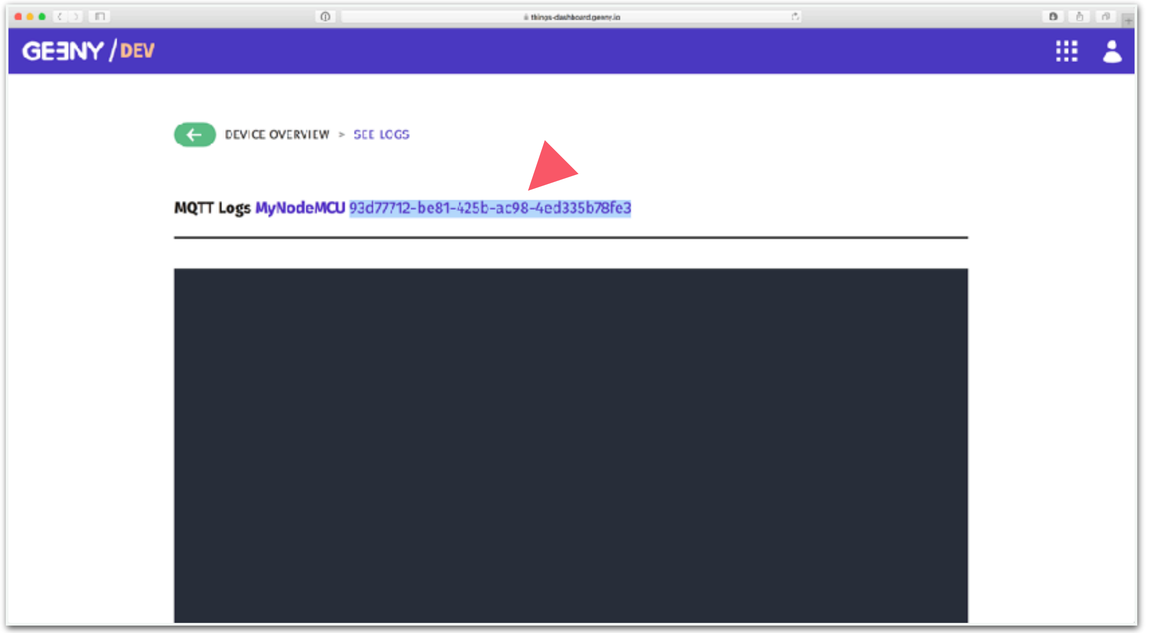
Create Geeny Account

4. Get your *Thing-ID*

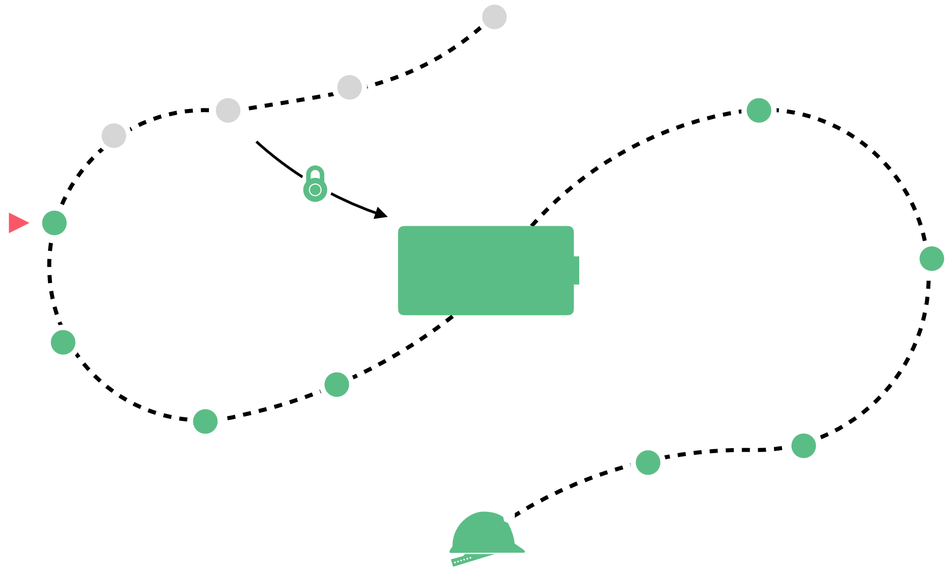
1. On the *Device overview* page you see your newly created Thing. Click on *See logs*
2. Copy the *Thing-ID* shown on top of the page and save it somewhere

   BTW: this is where we will see the data later on





Upload Certificates



Upload Certificates

1. Generate DER files

OSX

1. Open a Terminal window and navigate to the folder where you stores the certificate files
2. Enter the two following commands

```
openssl rsa -outform der -in thing.key -out thing-key.der

openssl x509 -outform der -in thing.crt -out thing-crt.der
```

3. Now you should see two new files in your folder with the file extension .der
4. Copy this files into the *data* folder of your Sketch (*4_DHT22Geeny)*

Windows

1. Download and install OpenSSL from slproweb.com/products/Win32OpenSSL.html (File: *Win32 OpenSSL v1.1.0g Light*)
2. Copy the Certificates to *C:\Geeny*
3. Open a Command Window (Windows+R and enter CMD)
4. Go to *C:\OpenSSL-Win32\bin* and run openssl.exe
5. Enter the two following commands

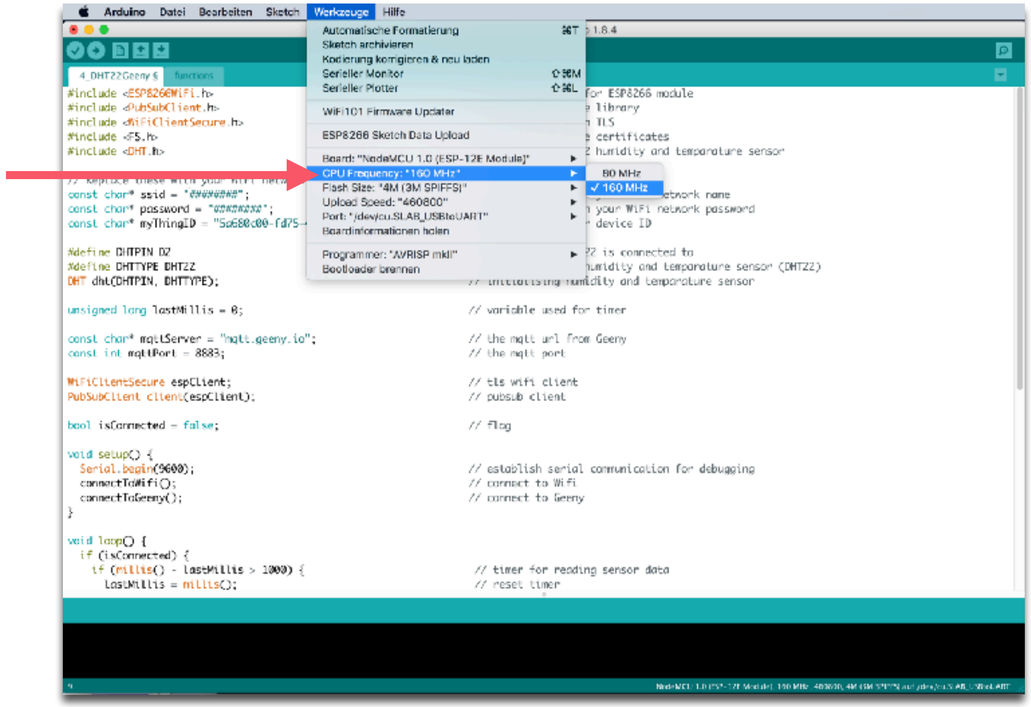
```
openssl rsa -outform der -in c:\Geeny\thing.key
-out c:\Geeny\thing-key.der

openssl x509 -outform der -in c:\Geeny\thing.crt
-out c:\Geeny\thing-crt.der
```

6. Now you should see two new files with the file extension .der in this folder
7. Copy this files into the *data* folder of your Sketch (*4_DHT22Geeny)*

Upload Certificates

2. Upload DER files to NodeMCU

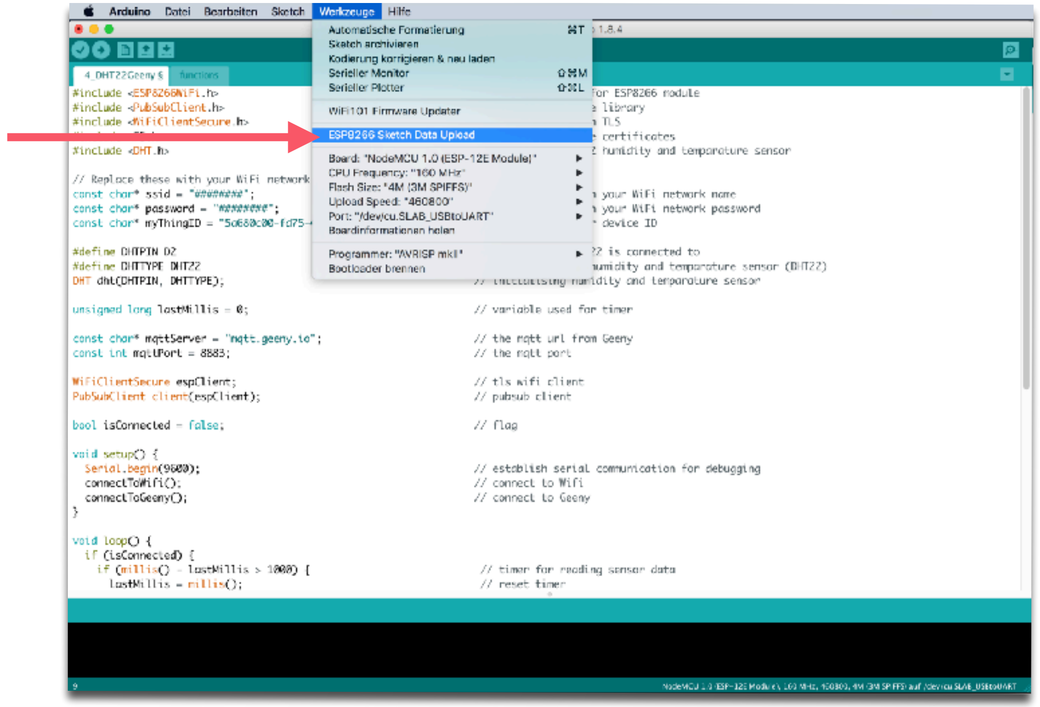
1. In order to upload the certificates to the NodeMCE, you need a plugin for the Arduino IDE. Download the plugin from: *https://github.com/esp8266/arduino-esp8266fs-plugin/releases/download/0.2.0/ESP8266FS-0.2.0.zip*
2. In your Arduino sketchbook directory, create tools directory if it doesn't exist yet
3. Unpack the tool into tools directory (*../Arduino/tools/ESP8266FS/tool/esp8266fs.jar*)
4. Restart Arduino IDE
5. Set the CPU frequency to 160 MHz



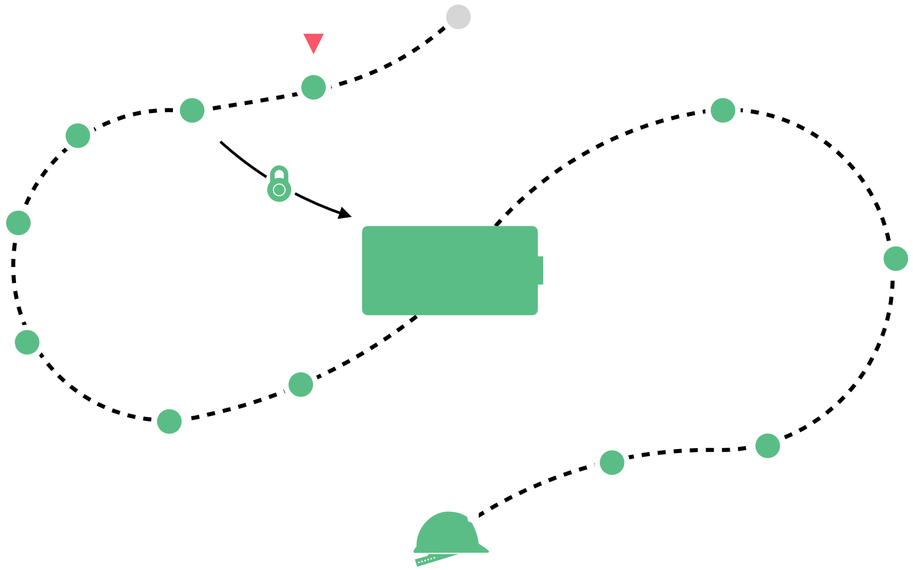
Upload Certificates

2. Upload DER files to NodeMCU

1. Click on *Tools>ESP8266 Sketch Data Upload*



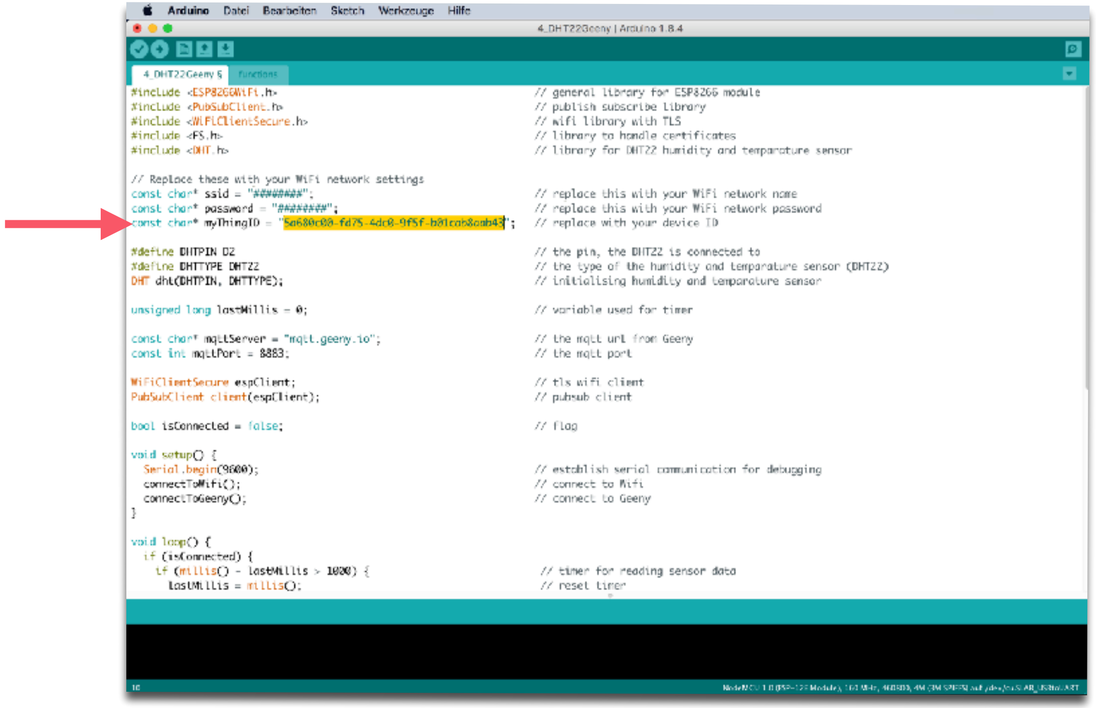
The Final Sketch



Final Sketch

2. Upload DER files to NodeMCU

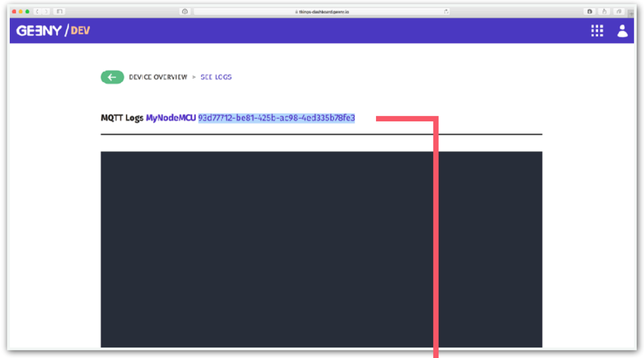
1. Click on *Tools>ESP8266 Sketch Data Upload*



Final Sketch

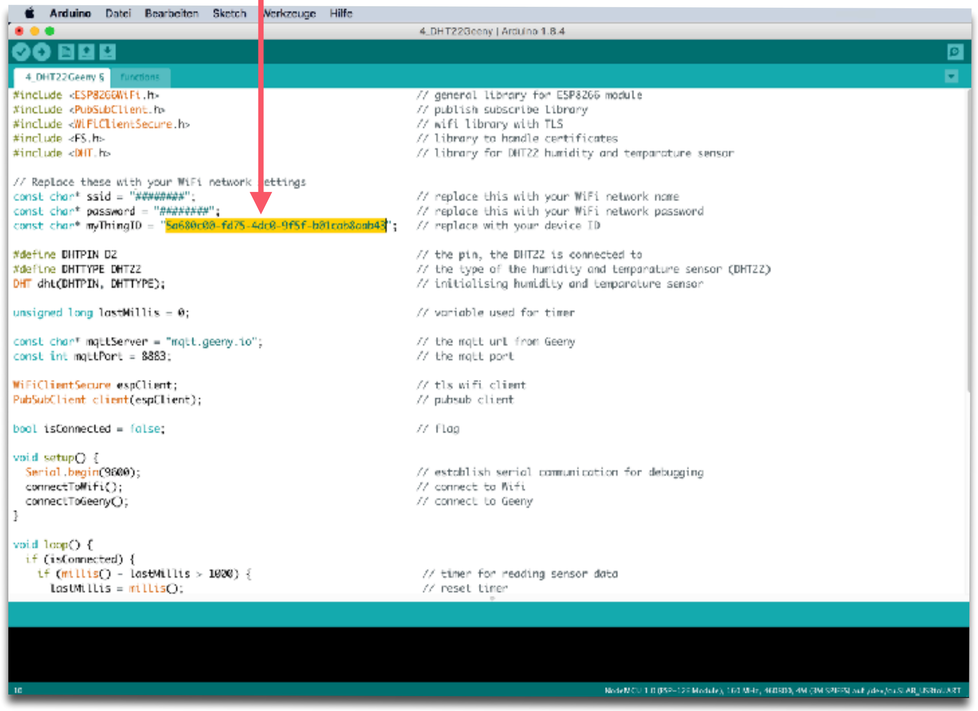
1. Upload sketch to NodeMCU

1. Open the Sketch *4_DHT22Geeny*
2. Change your Wifi settings
3. Change myThingID to the one you copied from the *Device logs* page
4. Upload the sketch to your NodeMCU
5. You should now see data on the Device log page!



Device logs page

Things ID

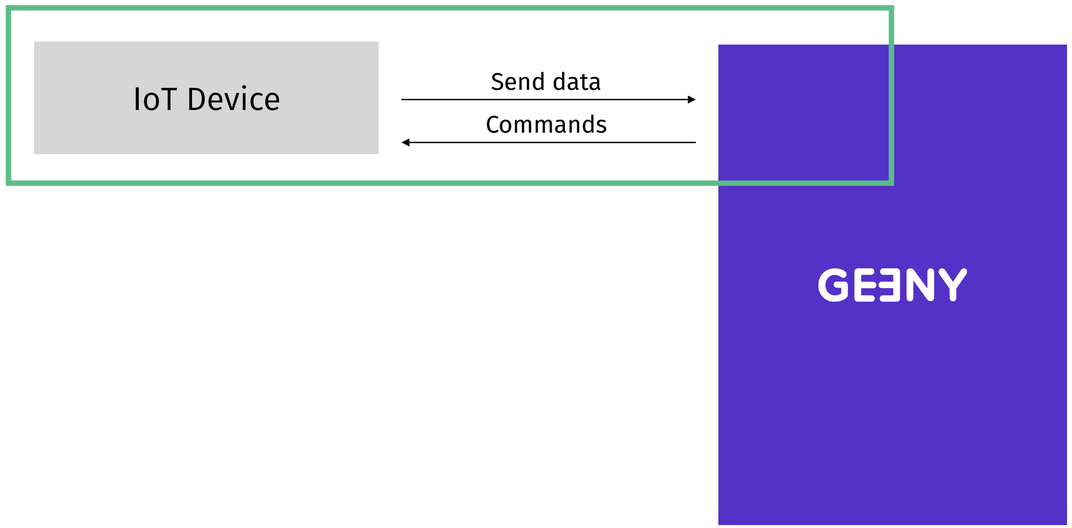


Final Sketch

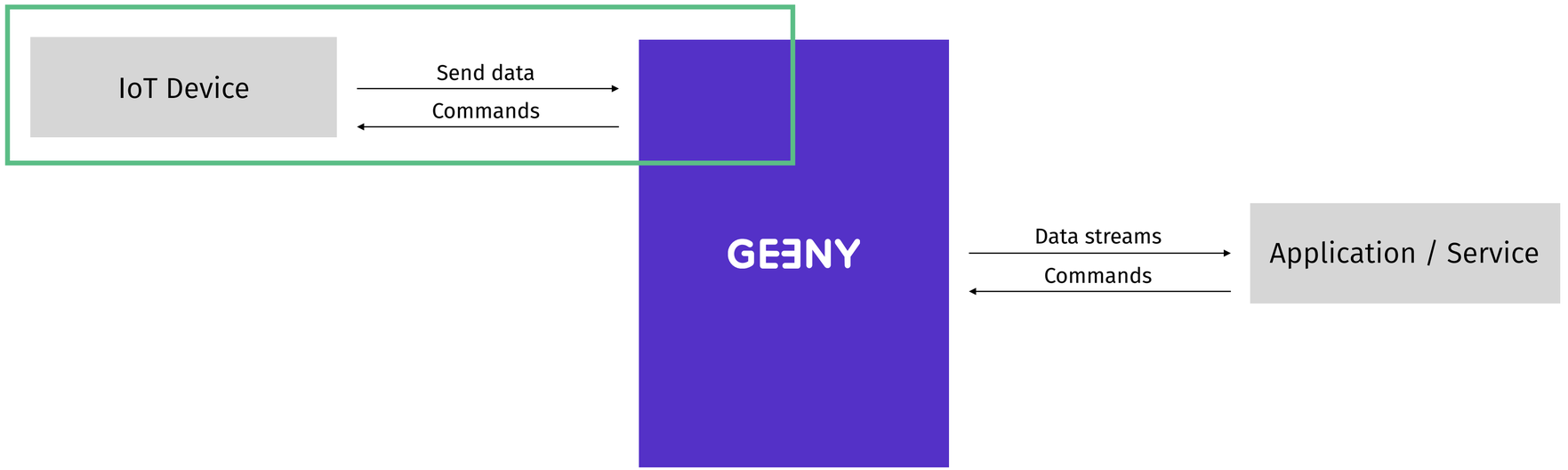
1. Upload sketch to NodeMCU

1. Open the Sketch *4_DHT22Geeny*
2. Change your Wifi settings
3. Change myThingID to the one you copied from the *Device logs* page
4. Upload the sketch to your NodeMCU
5. You should now see data on the Device log page!

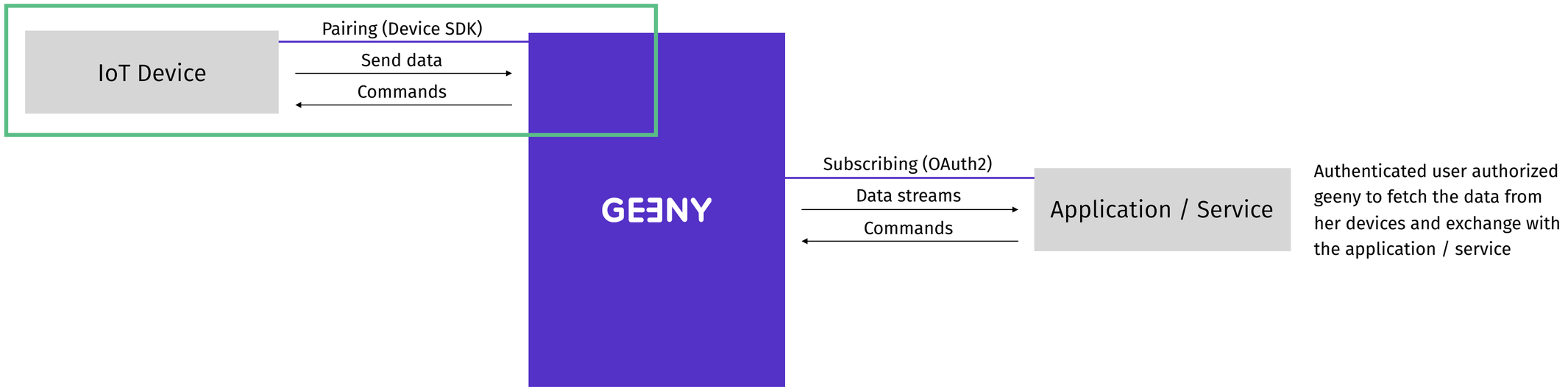
Outlook



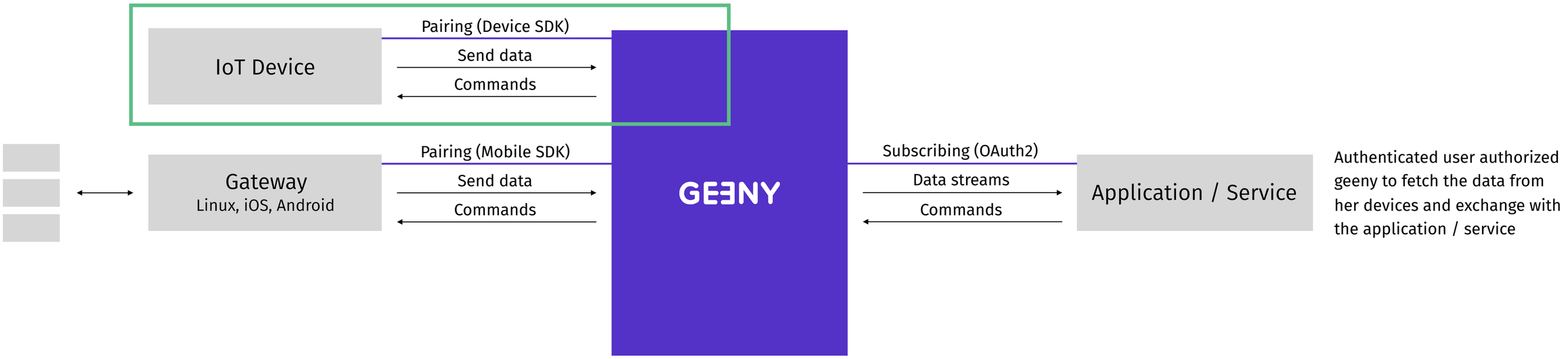
Outlook


IoT Device
Send data
Commands
GEENY
Data streams
Commands
Application / Service

Outlook

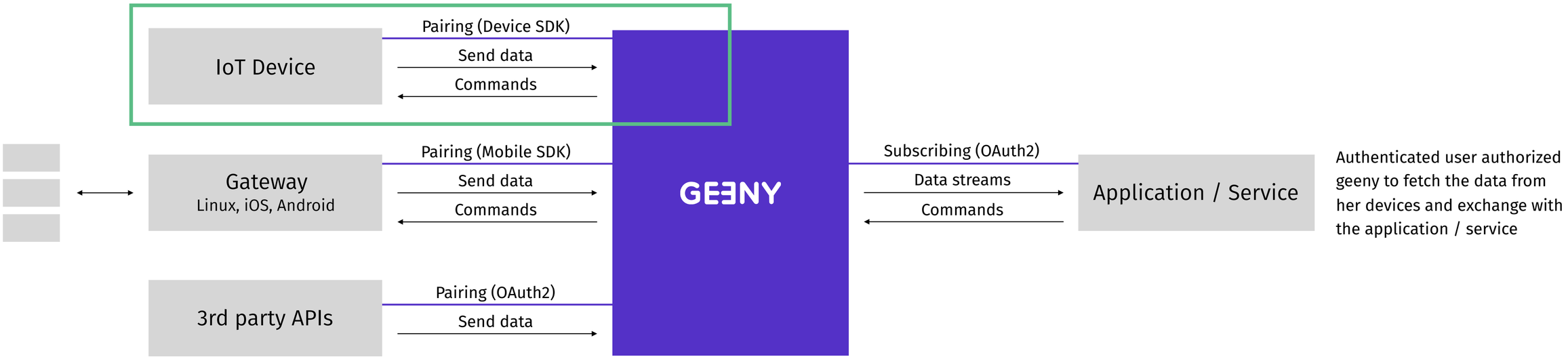

IoT Device
Pairing (Device SDK)
Send data
Commands
GEENY
Subscribing (OAuth2)
Data streams
Commands
Application / Service
Authenticated user authorized geeny to fetch the data from her devices and exchange with the application / service

Outlook

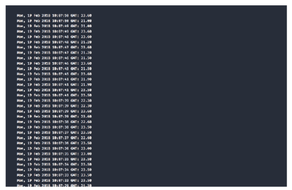


Authenticated user authorized geeny to fetch the data from her devices and exchange with the application / service

Outlook


IoT Device
Pairing (Device SDK)
Send data
Commands
Gateway
Linux, iOS, Android
Pairing (Mobile SDK)
Send data
Commands
3rd party APIs
Pairing (OAuth2)
Send data
GEENY
Subscribing (OAuth2)
Data streams
Commands
Application / Service
Authenticated user authorized geeny to fetch the data from her devices and exchange with the application / service

The Journey



See data
on the platform

Final
Sketch

Upload
Certificates

Install
Uploader

Convert
Certificates

Get Certificates

Create
Thing

Create
Geeny
Account

Connect to
WiFi

Connect
Sensor

Blink!

Set up
IDE

You are here

That's all folks!

Let's stay in touch!

1. Geeny.io
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2. Stefan Hermann
   stefan.h@geeny.io
   @stefanhermann
3. Joelle Katz
   joelle@geeny.io
   @joellekatz