

# Hackatruck IoT

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Watson IoT Platform Brazil

11/12/2018

# What is IoT?

- A Network of interconnected devices. From a heart monitor to a pump valve
- Integration between physical world and the electronic world
- Not only a connection, but a way to monitor and manage devices
- 26 Bi devices to be connected until 2020 accordingly to Gartner Group
- Focus Areas: Medical and Health Care, Environmental Monitoring, Infrastructure Management, Manufacturing, Energy Management, Building and Home Automation, Transportation, Large scale deployment

# THE INTERNET OF THINGS

Também conhecida como IoT ;-)

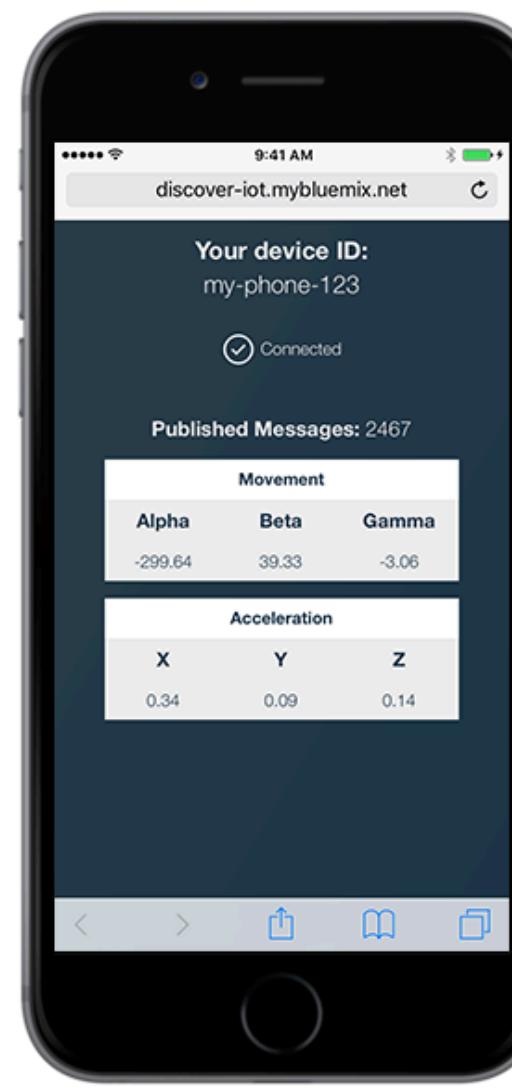
# Experimente o Watson IoT Platform

- <http://discover-iot.eu-gb.mybluemix.net/>



## 1 Select your device

Get going in 2 minutes or less



Smartphone

Load a web page on your smartphone to send live sensor data over the internet to the cloud-based IBM Watson IoT Platform.

SELECT



# IBM Watson IoT Platform

## Conceitos e Arquitetura



# Concepts – Devices

- A device can be anything that has a connection to the internet and has data it wants to get into the cloud.
- A device is not able to directly interact with other devices.
- Devices are able to accept commands from applications.
- Devices uniquely identify themselves to the Watson IoT platform with an authentication token that will only be accepted for that device.
- Devices must be registered before they can connect to the Watson IoT platform.
- Devices are divided into Managed and Unmanaged Devices



# Protocolo MQTT

- O protocolo MQTT é principal canal de comunicação utilizado por dispositivos para se conectarem com o IBM Watson IoT platform
- Esse protocolo foi projetado para troca eficiente de dados em tempo real para sensores e dispositivos móveis
- MQTT roda sobre TCP/IP

## Message Payload

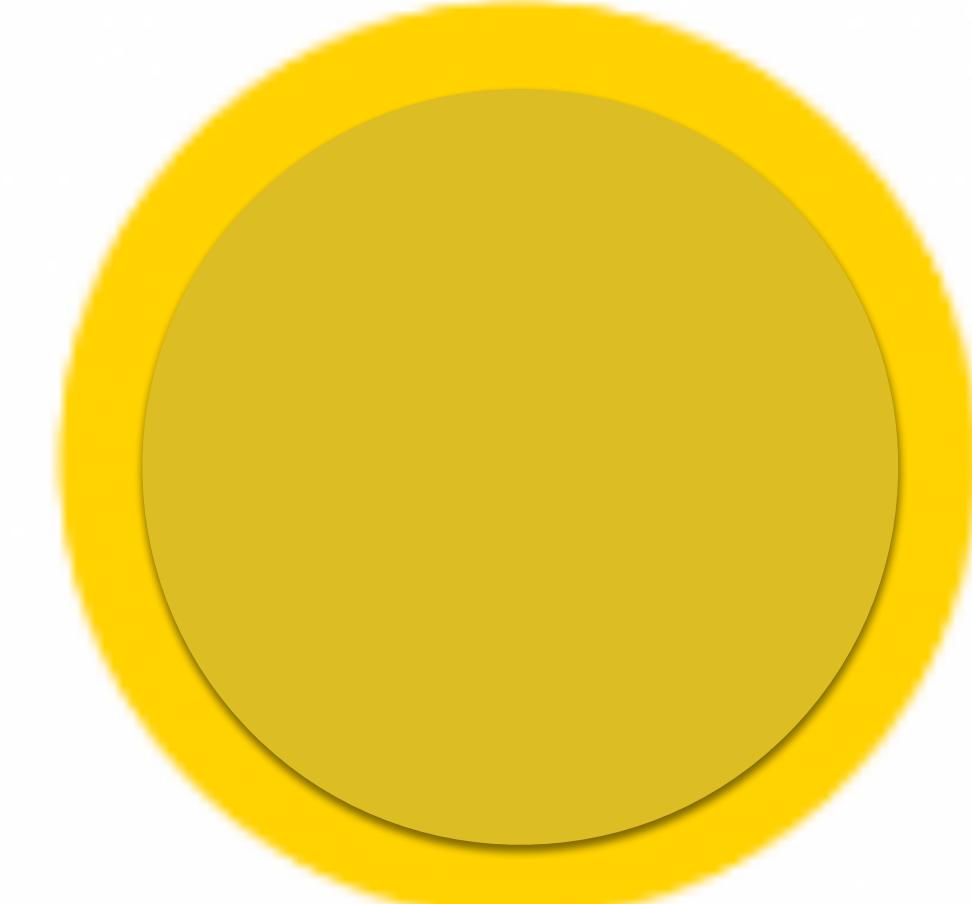
- A Watson IoT platform suporta o envio e recebimento de mensagens em qualquer formato, contudo MQTT é o formato preferido
- O tamanho máximo do payload é de 131072 bytes (128K). Caso mensagens maiores que esse limite forem enviadas, o cliente será desconectado.



temperature  
sensor

1 subscribe to  
topic: "temperature"

publish: "21°C"



MQTT-Broker

2 publish to  
topic: "temperature"

subscribe  
publish: "21°C"

subscribe  
publish: "21°C"



mobile device



laptop



# MQTT Connectivity for Applications

- Every registered organization has a unique endpoint which must be used when connecting MQTT clients for applications in that organization.

org\_id.messaging.internetofthings.ibmcloud.com

- Unencrypted client connection: Connect on port 1883
- Encrypted client connection: Connect on port 8883 or 443 for websockets.



# Criar uma conta no IBM Bluemix

<https://console.ng.bluemix.net/registration/>

The screenshot shows the 'Sign up for IBM Bluemix' registration form. The page has a dark blue header and a white main content area. At the top center is the heading 'Sign up for IBM Bluemix'. Below it is a paragraph of text: 'Your 30-day trial is free, with no credit card required. You get access to 2 GB of runtime and container memory to run apps, unlimited IBM services and APIs, and complimentary support.' To the right of this text is a link 'Already have an IBM ID?'. Below that is another link 'Already signed up for Bluemix? Log in'. The form itself consists of several input fields arranged in pairs across two columns. The left column contains 'First Name\*', 'Last Name\*', 'Phone Number\*', 'Company', and 'Select your country or region.' The right column contains 'Email Address\*', 'Password\*', 'Re-enter Password\*', 'Security Question\*', and 'Security Answer\*'. Each input field is followed by a small asterisk indicating it is required. The bottom right corner of the form area contains the copyright notice '© 2015 IBM Corporation'.

Sign up for IBM Bluemix

Your 30-day trial is free, with no credit card required. You get access to 2 GB of runtime and container memory to run apps, unlimited IBM services and APIs, and complimentary support.

[Already have an IBM ID?](#)

Already signed up for Bluemix? [Log in](#)

First Name\*

Last Name\*

Phone Number\*

Company

Select your country or region.

Email Address\*

Password\*

Re-enter Password\*

Security Question\*

Security Answer\*

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# Preparação do ambiente

Instalar IDE Arduino, escolhendo seu Sistema Operacional (Windows, Mac OS X ou Linux)

<https://www.arduino.cc/en/Main/Software>

Download the Arduino Software



**ARDUINO 1.6.9**  
The open-source Arduino Software (IDE) makes it easy to write code and upload it to the board. It runs on Windows, Mac OS X, and Linux. The environment is written in Java and based on Processing and other open-source software.  
This software can be used with any Arduino board. Refer to the [Getting Started](#) page for Installation instructions.

**Windows** Installer  
**Windows** ZIP file for non admin install

**Mac OS X** 10.7 Lion or newer

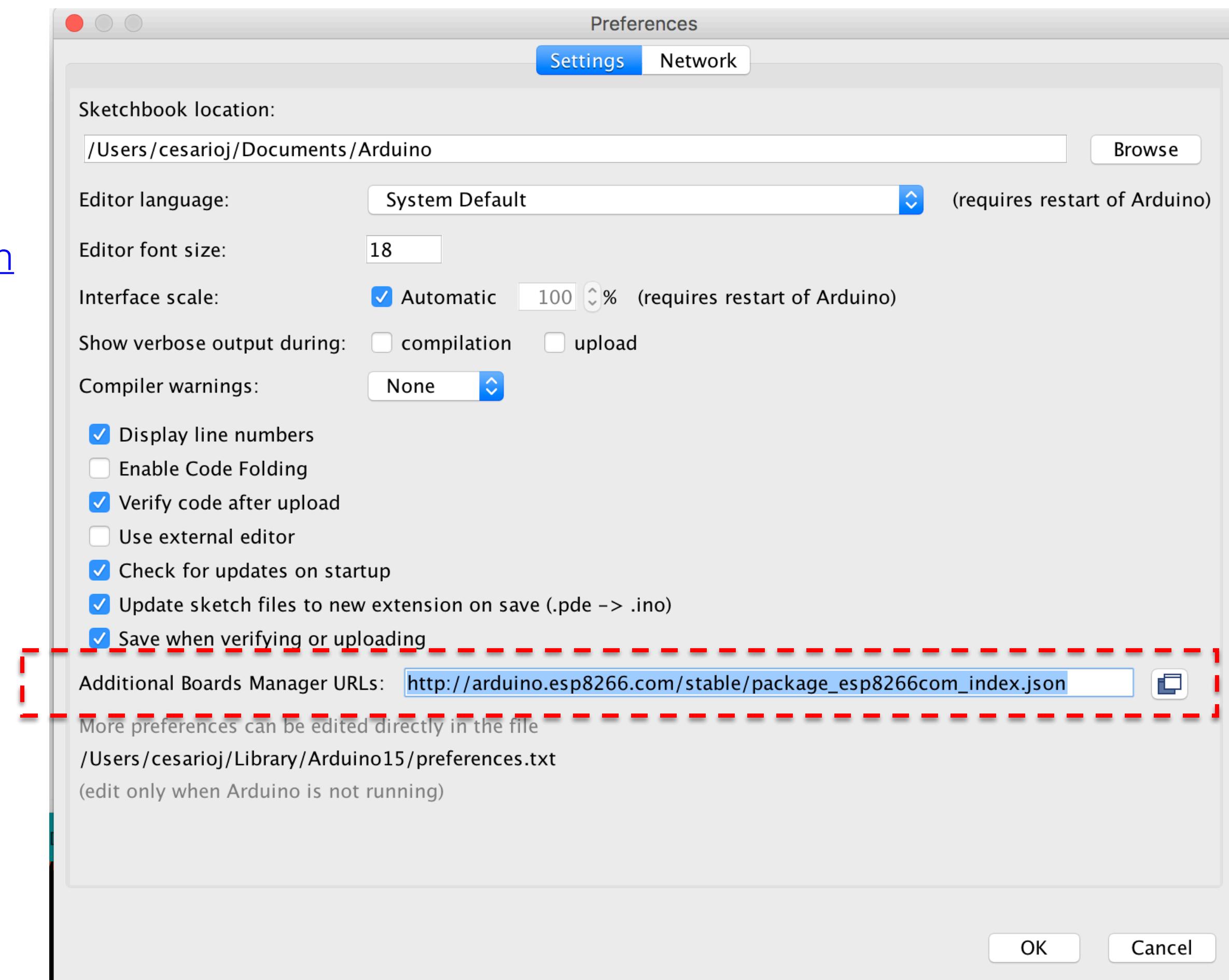
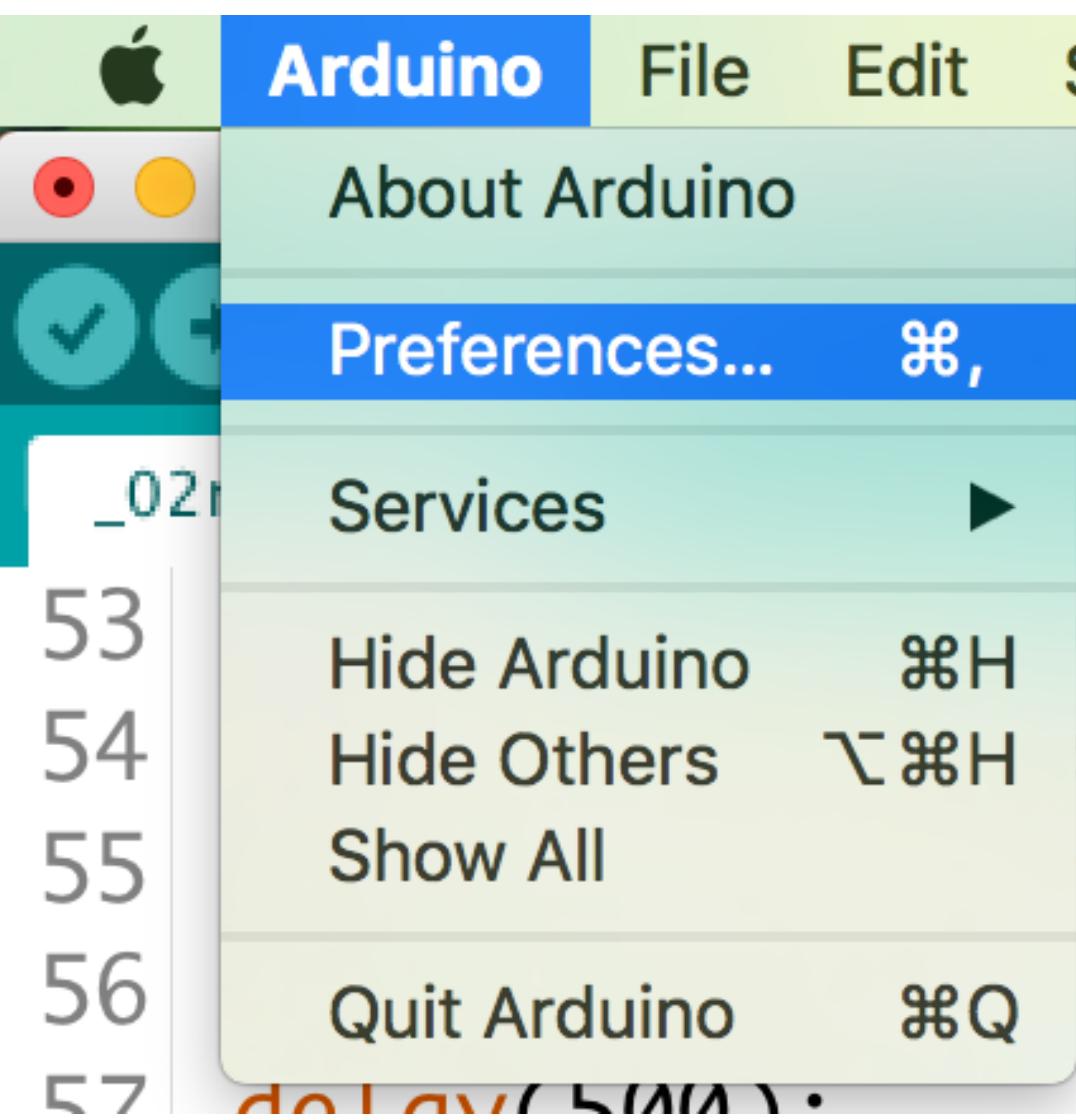
**Linux** 32 bits  
**Linux** 64 bits  
**Linux** ARM (experimental)

[Release Notes](#)  
[Source Code](#)  
[Checksums](#)

# Preparação do ambiente

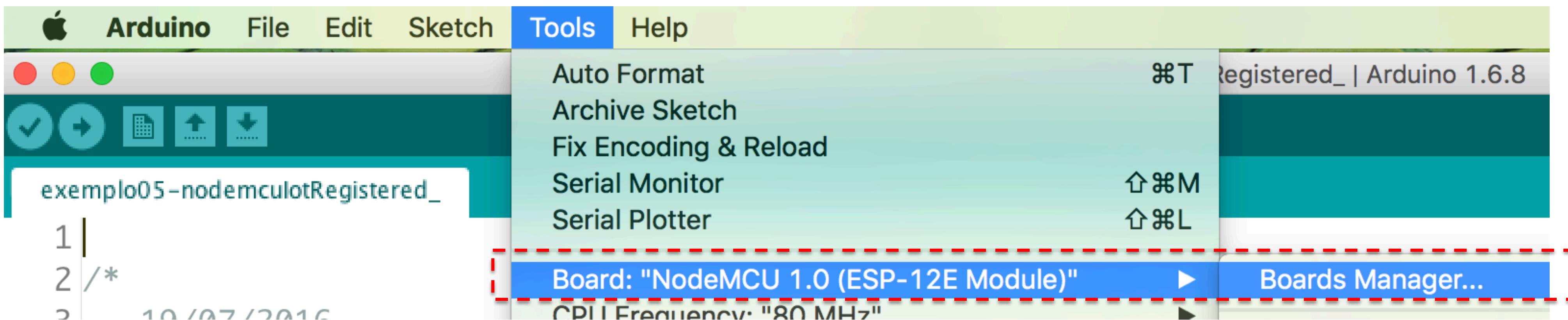
Configurar o suporte para placas ESP8266, através da opção Preferences, adicionando o endereço abaixo na opção “Additional Board Managers URLs”

[http://arduino.esp8266.com/stable/package\\_esp8266com\\_index.json](http://arduino.esp8266.com/stable/package_esp8266com_index.json)



# Preparação do ambiente

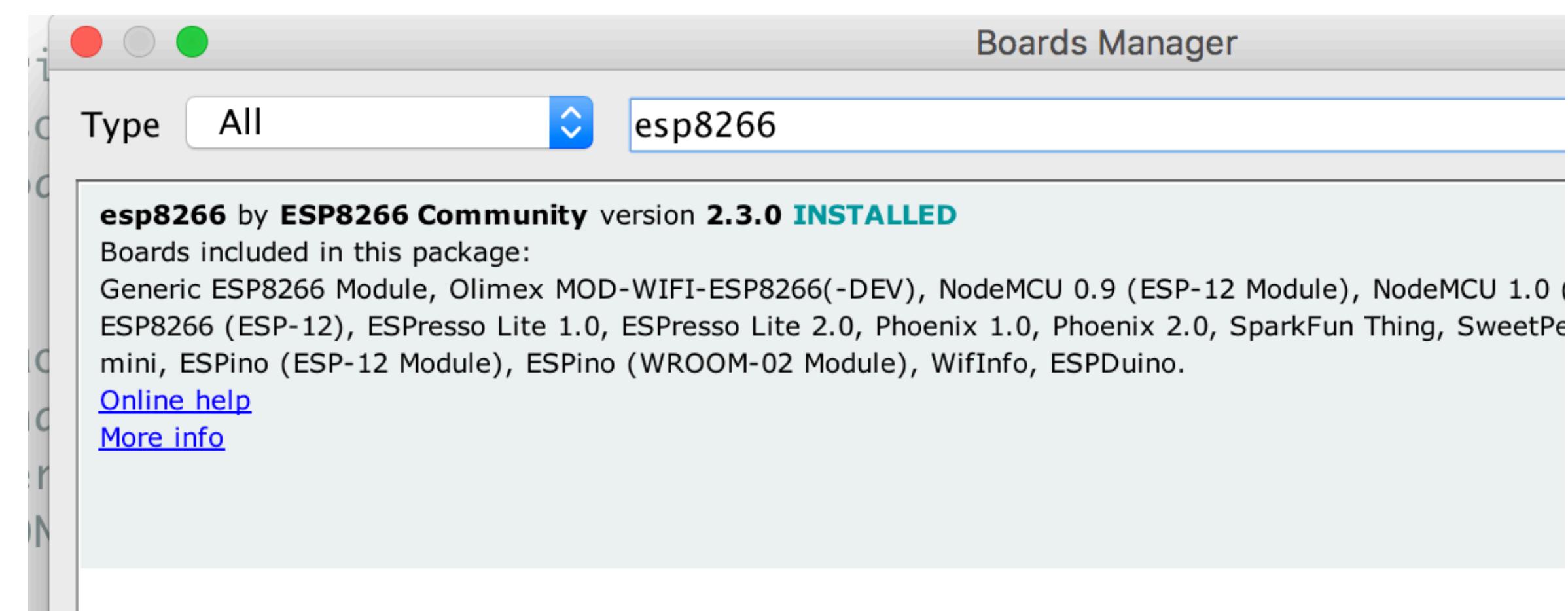
Acesse a opção Tool, Board e Board Manager



No campo de busca digite esp8266.

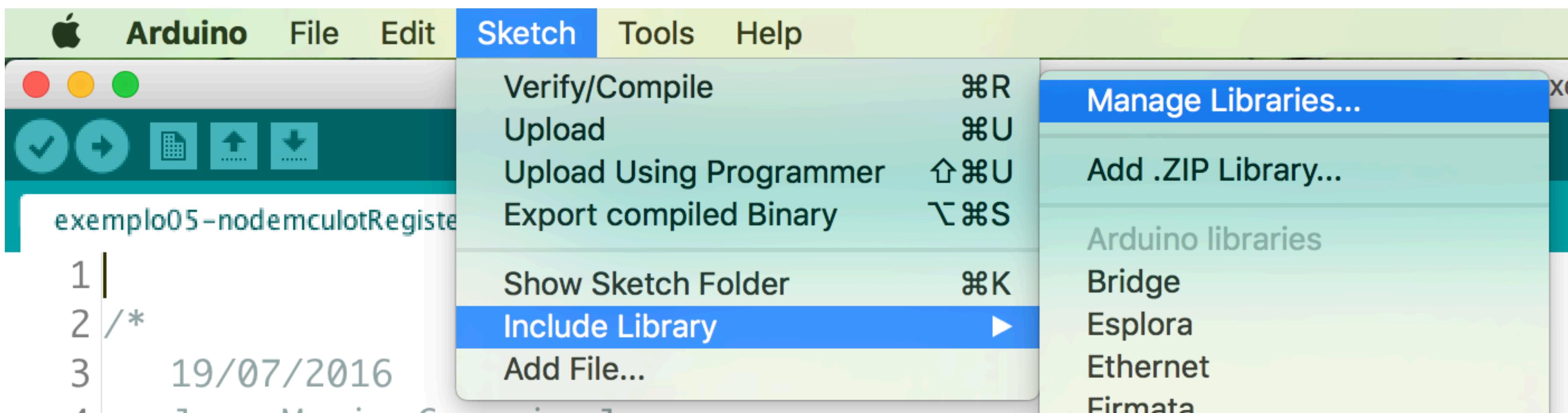
Aguarde até a IDE carregar a opção ao lado.

Clique no botão instalar/install



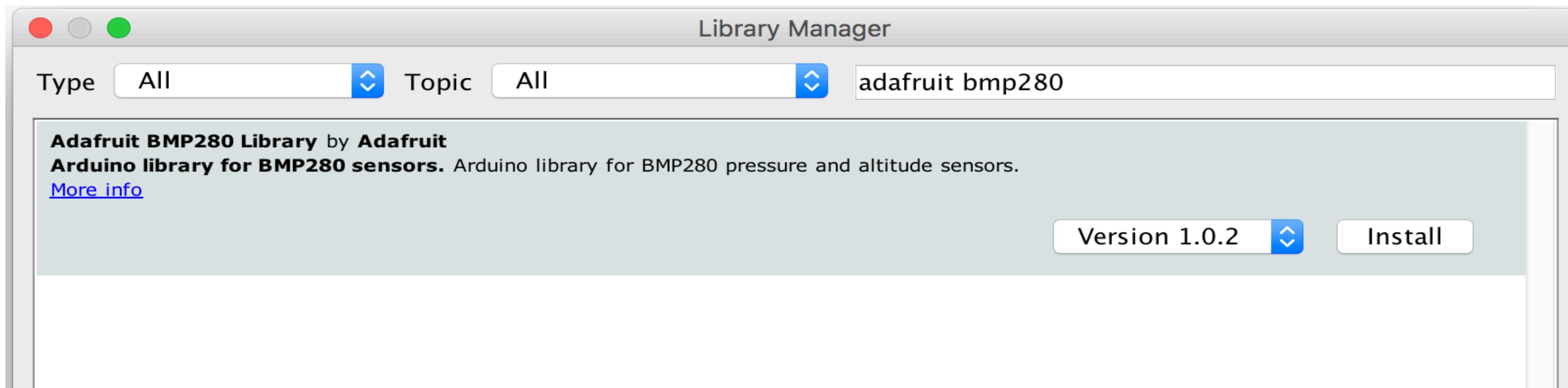
# Preparação do ambiente

Após a instalação do IDE Arduino, acesse o menu Sketch, Include Library e Manage Library



# Preparação do ambiente

Na tela "Library Manager", digite Adafruit\_BMP280 library, selecione a opção abaixo e efetue a instalação da biblioteca





# Preparação do ambiente

Na tela "Library Manager", digite adafruit unified sensor, selecione a opção abaixo e efetue a instalação da biblioteca

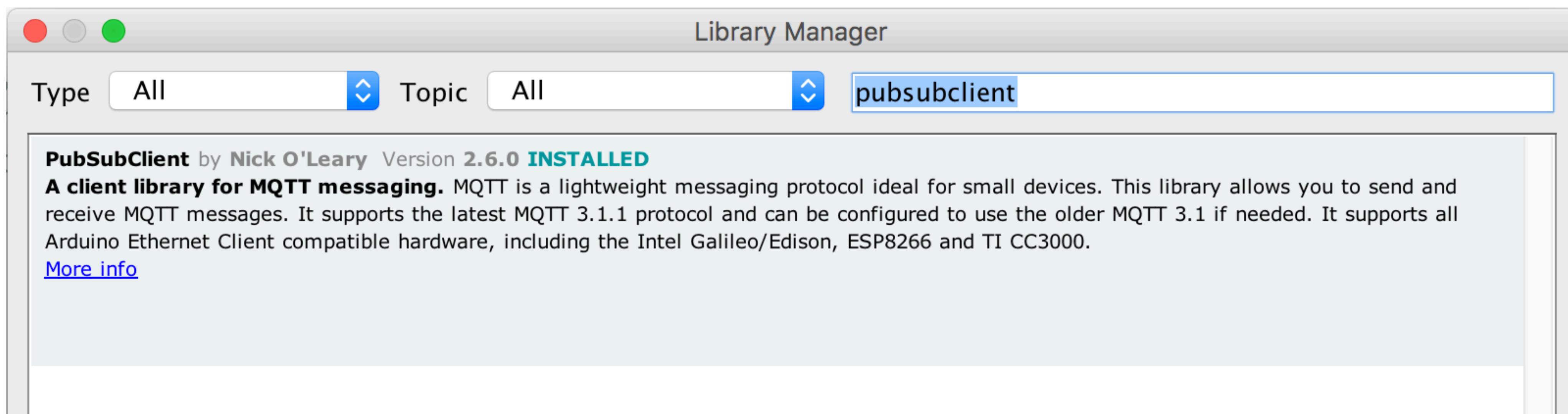
**Adafruit Unified Sensor** by Adafruit Versão 1.0.2 **INSTALLED**

**Required for all Adafruit Unified Sensor based libraries.** A unified sensor abstraction layer used by many Adafruit sensor libraries.

[More info](#)

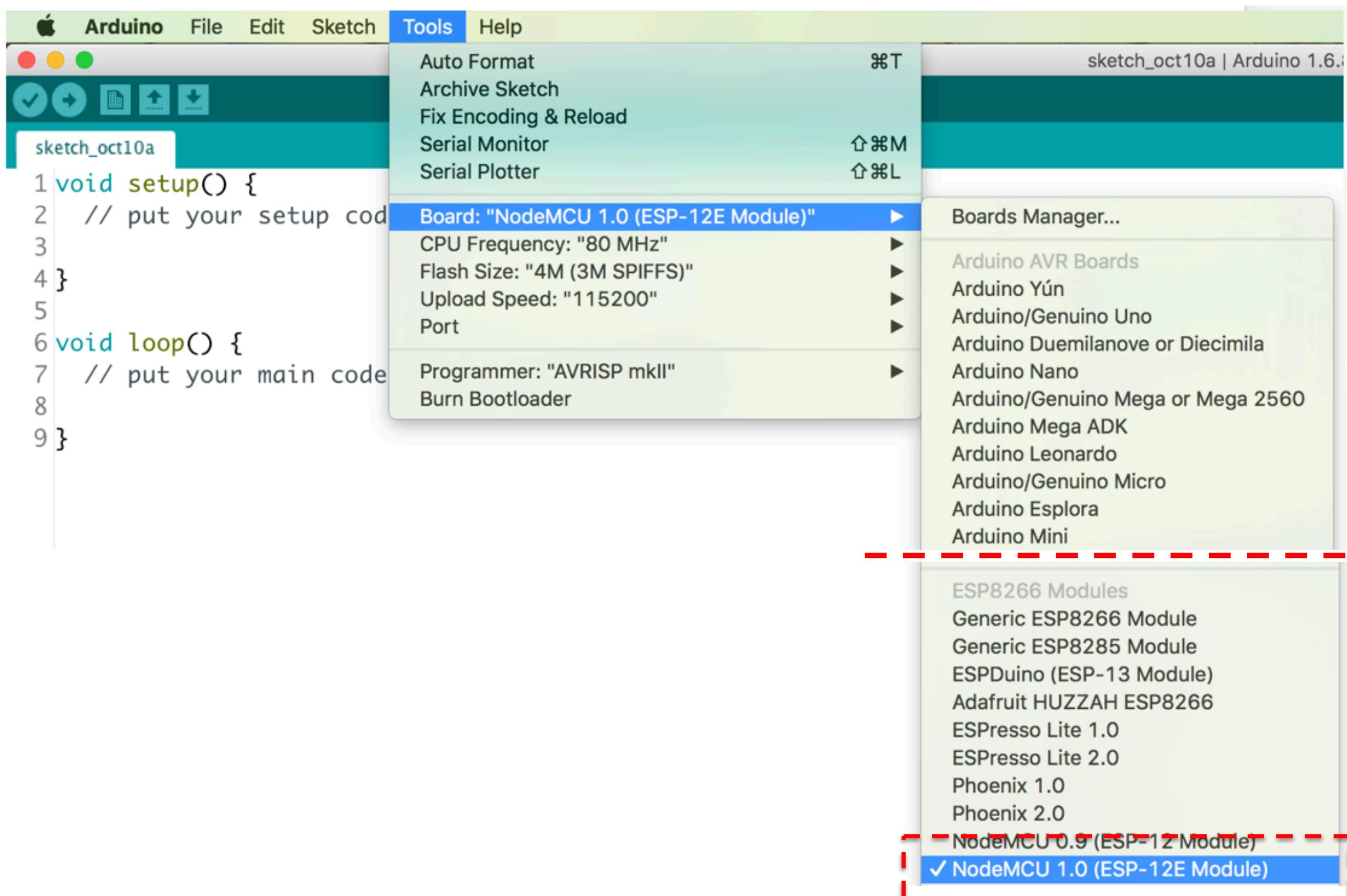
# Preparação do ambiente

Acesse novamente a tela "Library Manager", digite pubsubclient, selecione a opção abaixo e efetue a instalação da biblioteca

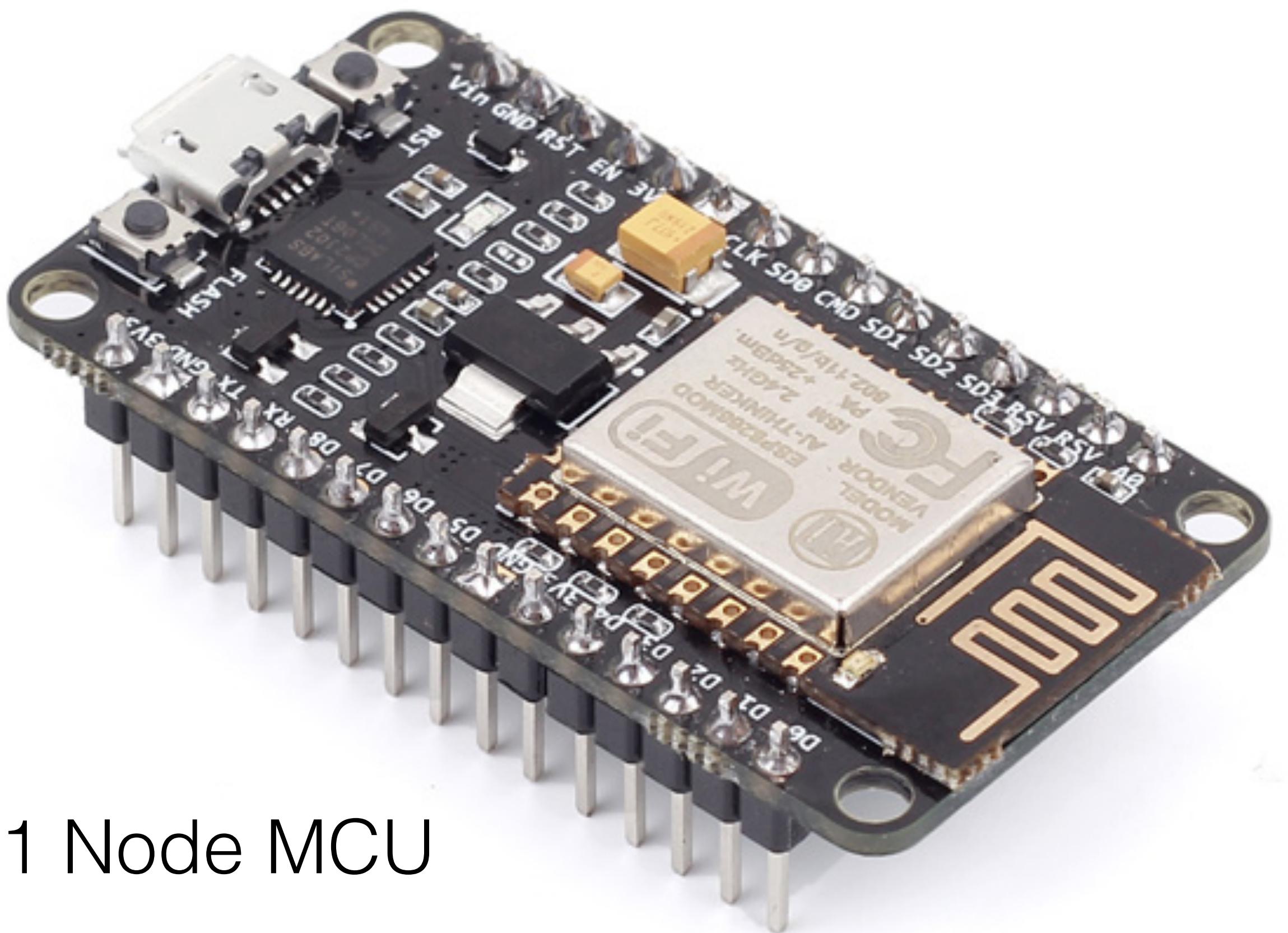


# Preparação do ambiente

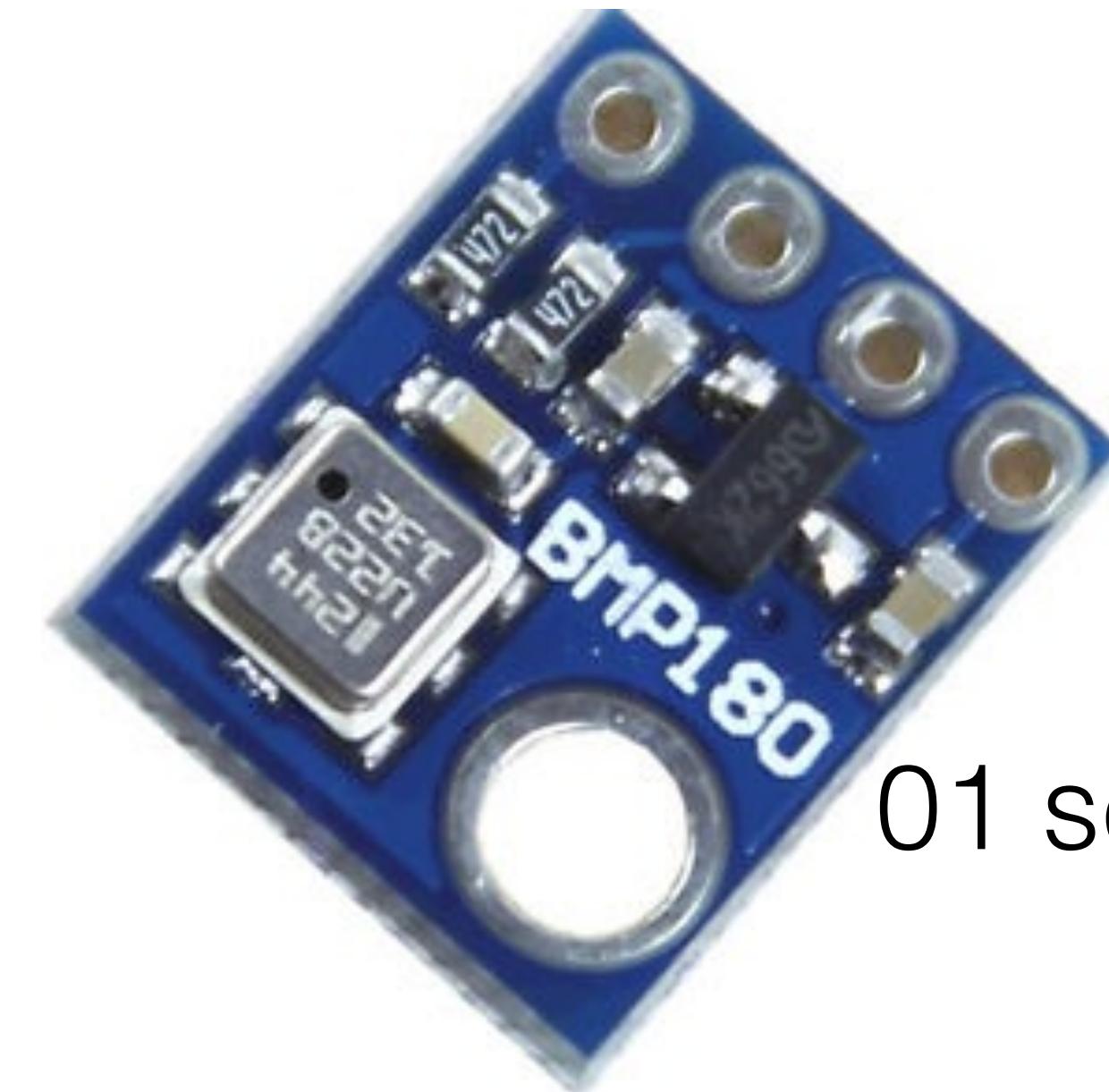
Após completar a instalação reinicie o Arduino IDE, acesse o menu Tools, Board e selecione a opção NodeMCU 1.0 (ESP-12E Module)



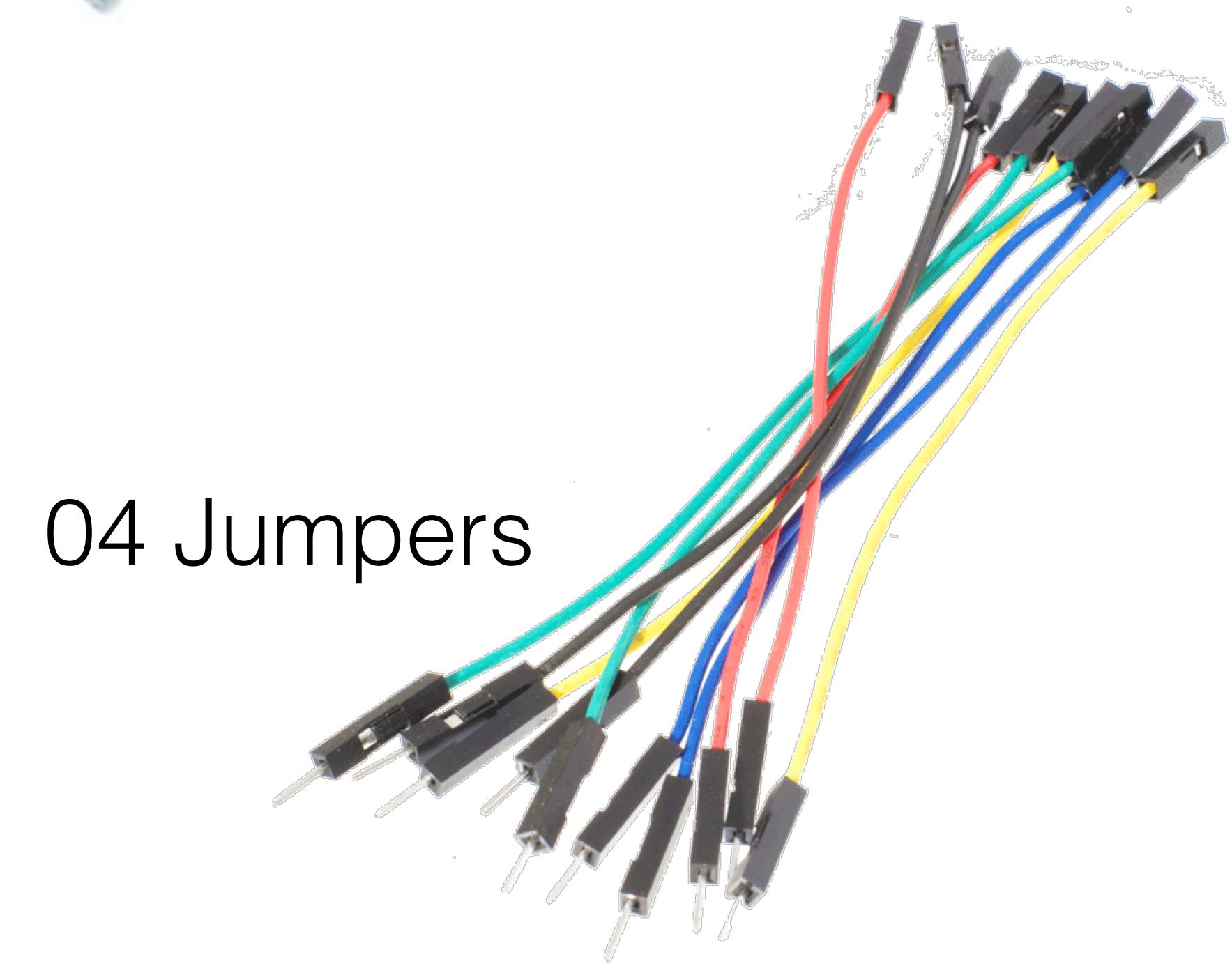
# O que iremos usar?



01 Node MCU



01 sensor Barômetro  
BMP280



04 Jumpers

# BMP280

- O sensor BMP280 é um sensor digital de pressão barométrica de alta precisão, capaz de efetuar leituras entre 300 até 1100 hPa com precisão de 0,02 hPa no modo avançado.
- Esse sensor já vem totalmente calibrado de fábrica e funciona com uma alimentação de 1,8 até 3,6V, pode ser alimentado através com 5V, porém é recomendada a utilização de alimentação regulada de 3,3V.
- Sua comunicação é feita através de I2C.



# ESP8266

- O módulo ESP8266 é um dispositivo com um microprocessador de arquitetura 32 bits com suporte embutido à rede WIFI e memória flash integrada.
- Essa arquitetura permite que ele possa ser programado de forma independente, sem a necessidade de outros microcontroladores como o Arduino, por exemplo.

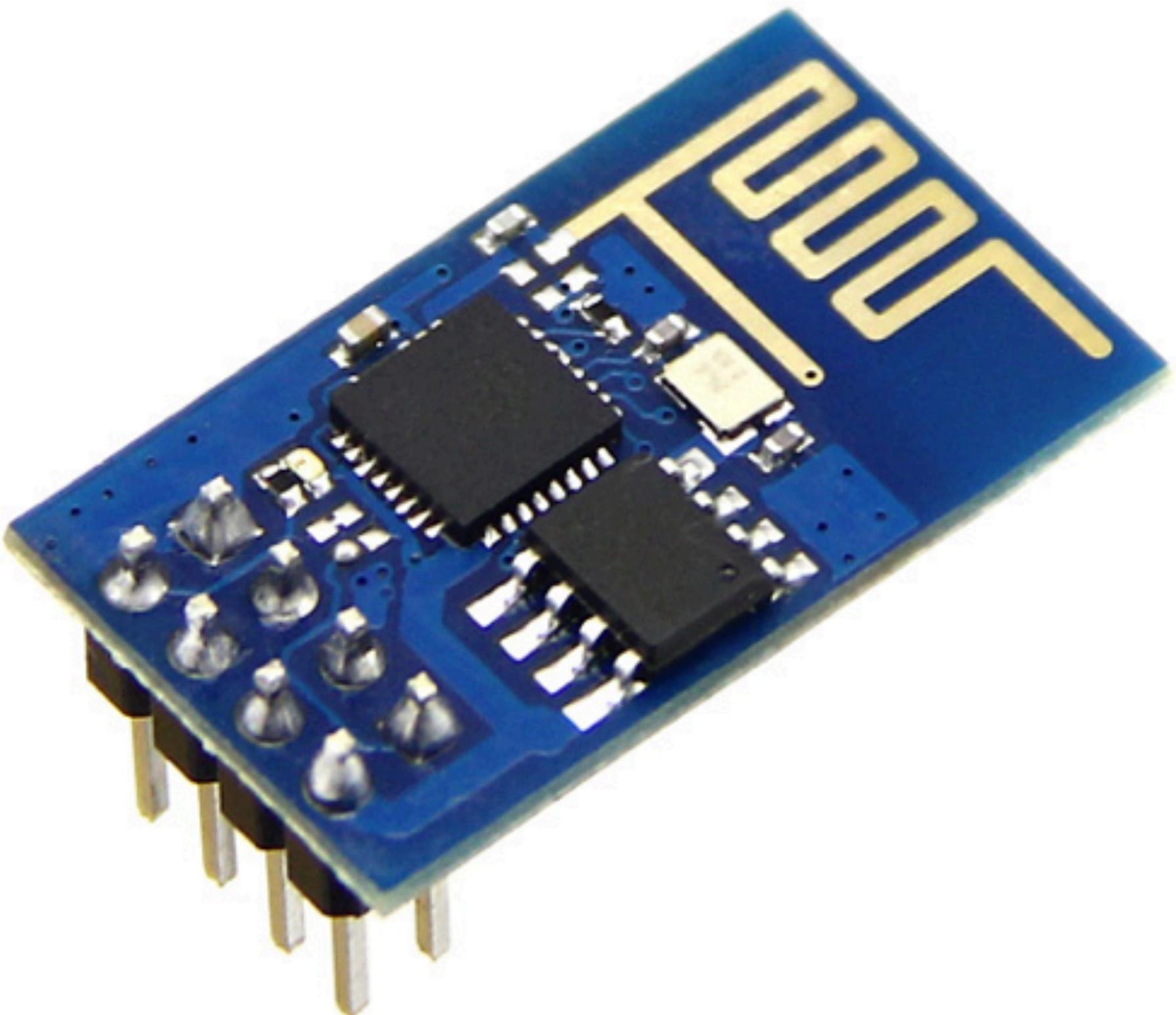


Figura 1 - ESP8266 Modelo ESP-01

# ESP8266 - Características

- System-On-Chip com Wi-Fi embutido;
- Conexão WiFi 802.11 B/G/N, alcance ~91 metros
- Tensão de operação : 3.3 VDC
- Operação : Cliente, Access Point, Cliente+Access Point
- Segurança wireless : OPEN, WEP, WPA\_PSK, WPA2\_PSK, WPA\_WPA2\_PSK.
- Comunicação TCP e UDP, até 5 conexões
- Antena embutida, conector de 8 pinos, leds indicadores de funcionamento (vermelho) e comunicação (azul)
- Conectores GPIO, barramentos I2C, SPI, UART, entrada ADC, saída PWM e sensor interno de temperatura;

- CPU 80MHz (até 160MHz configurável);
- Arquitetura de 32 bits;
- 32KBytes de RAM para instruções;
- 96KBytes de RAM para dados;
- 64KBytes de ROM para boot;
- Memória Flash SPI Winbond W25Q40BVNIG de 512KBytes;
- O núcleo é baseado no IP Diamond Standard LX3 da Tensilica;
- Fabricado pela Espressif;
- Existem módulos de diferentes tamanhos e fabricantes.

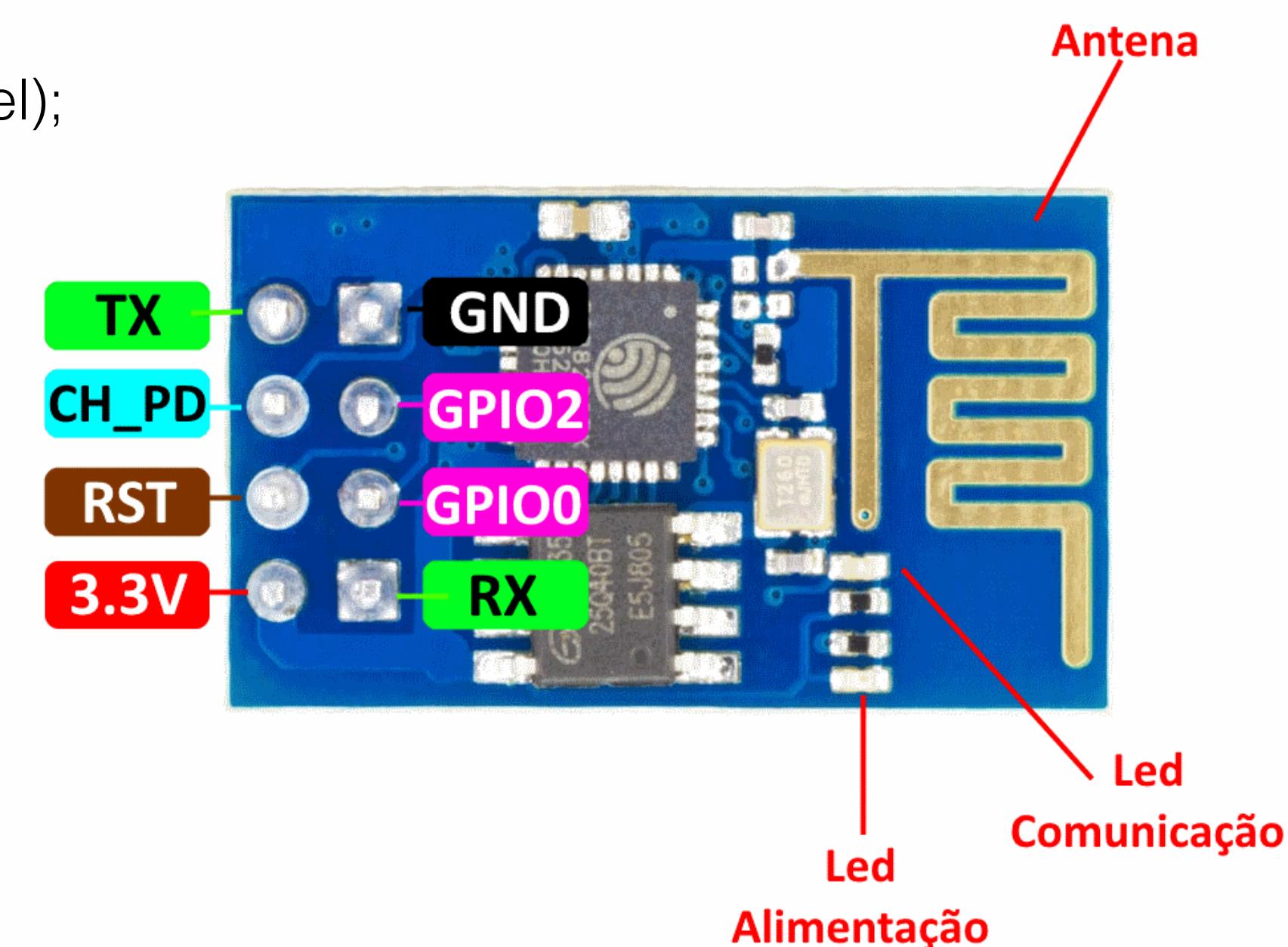


Figura 2 - ESP8266 Modelo ESP-01

# Família ESP8266

Em constante atualização



ESP-01



ESP-02



ESP-03



ESP-04



ESP-05



ESP-06



ESP-07



ESP-08



ESP12E – Coração do NodeMCU



ESP-09



ESP-10



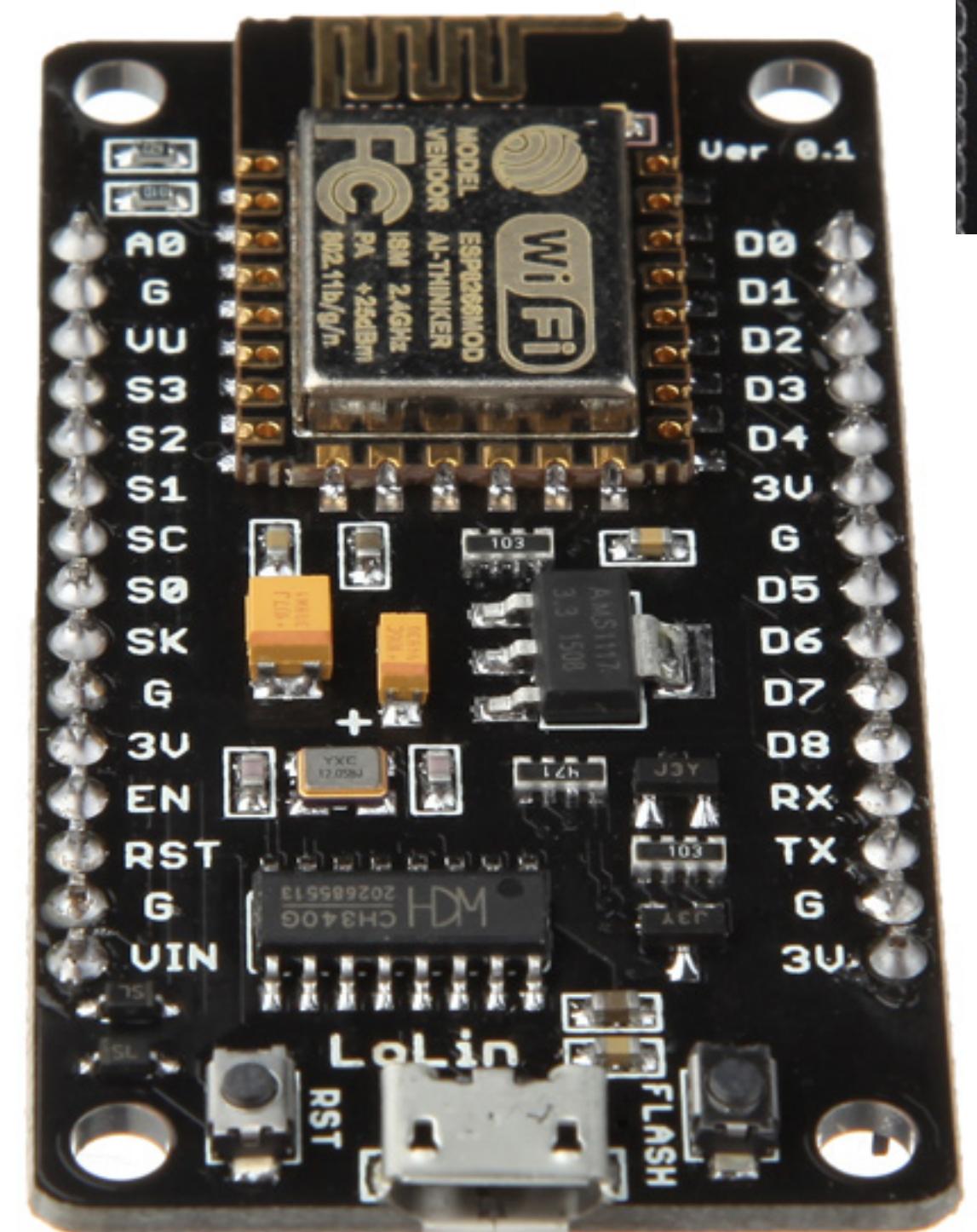
ESP-11

Figura 3 - Família ESP8266

# NodeMCU



NodeMCU 0.9 (ESP-12 Module)



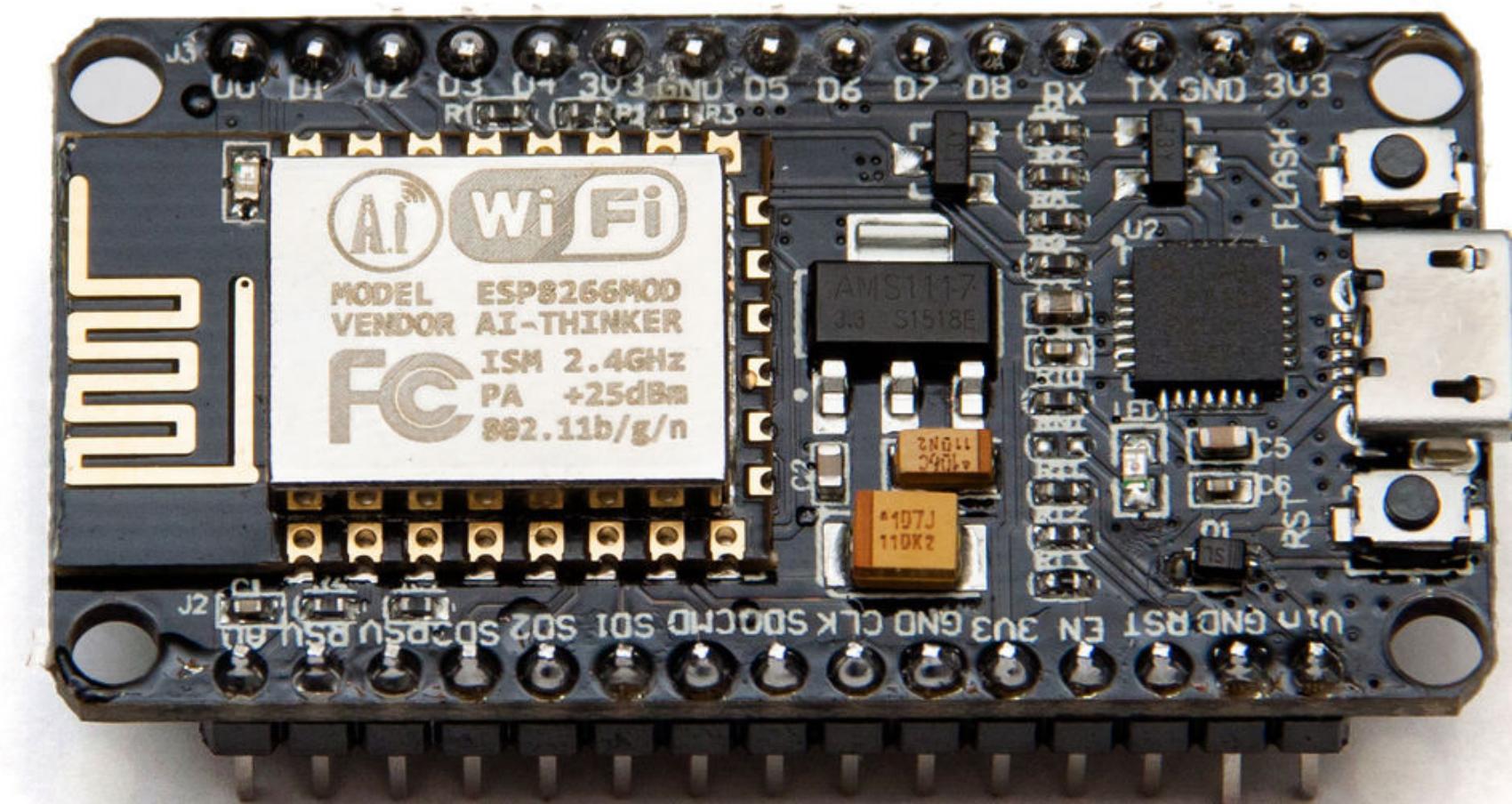
NodeMCU 1.0 (ESP-12E Module)



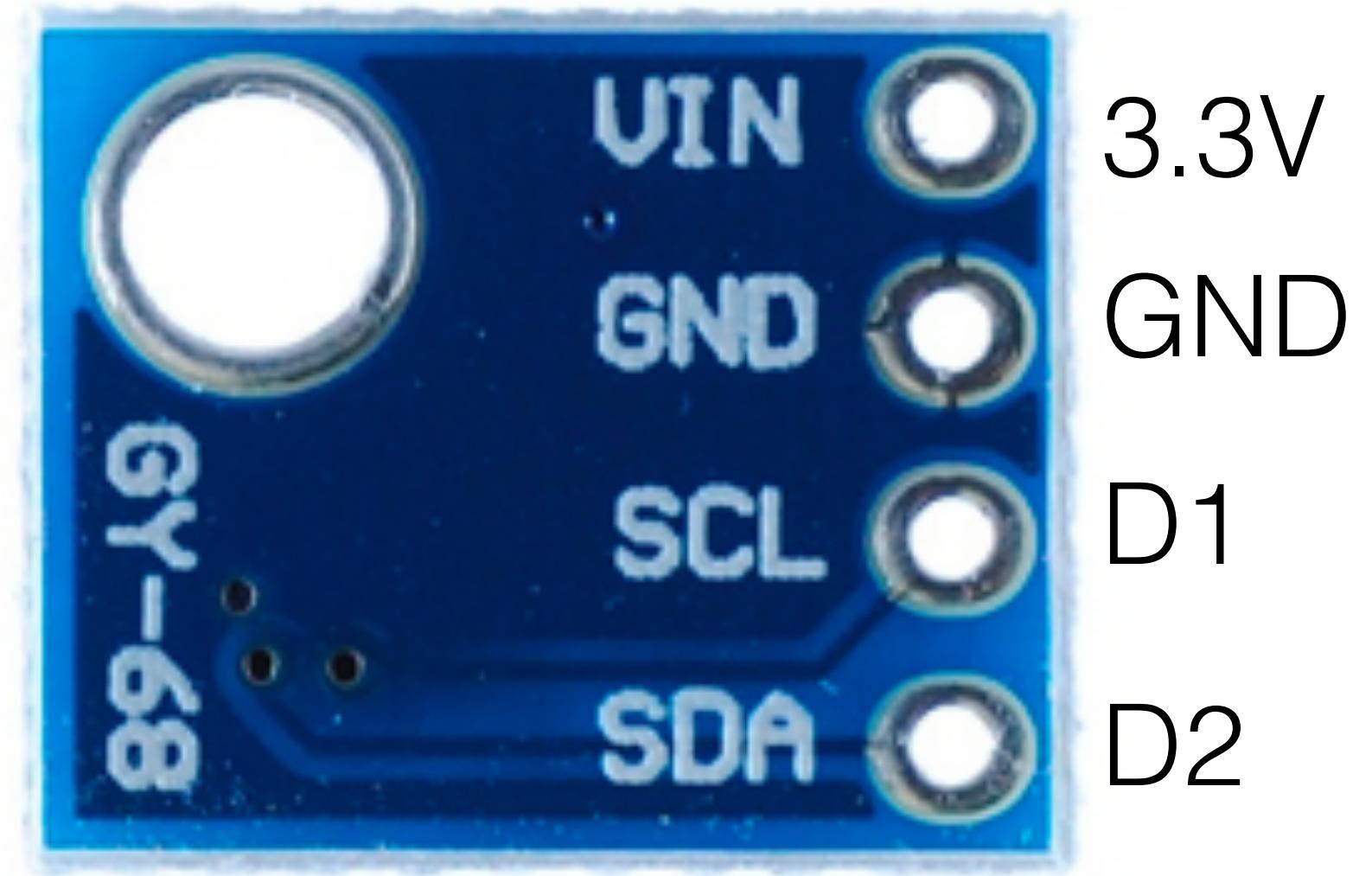
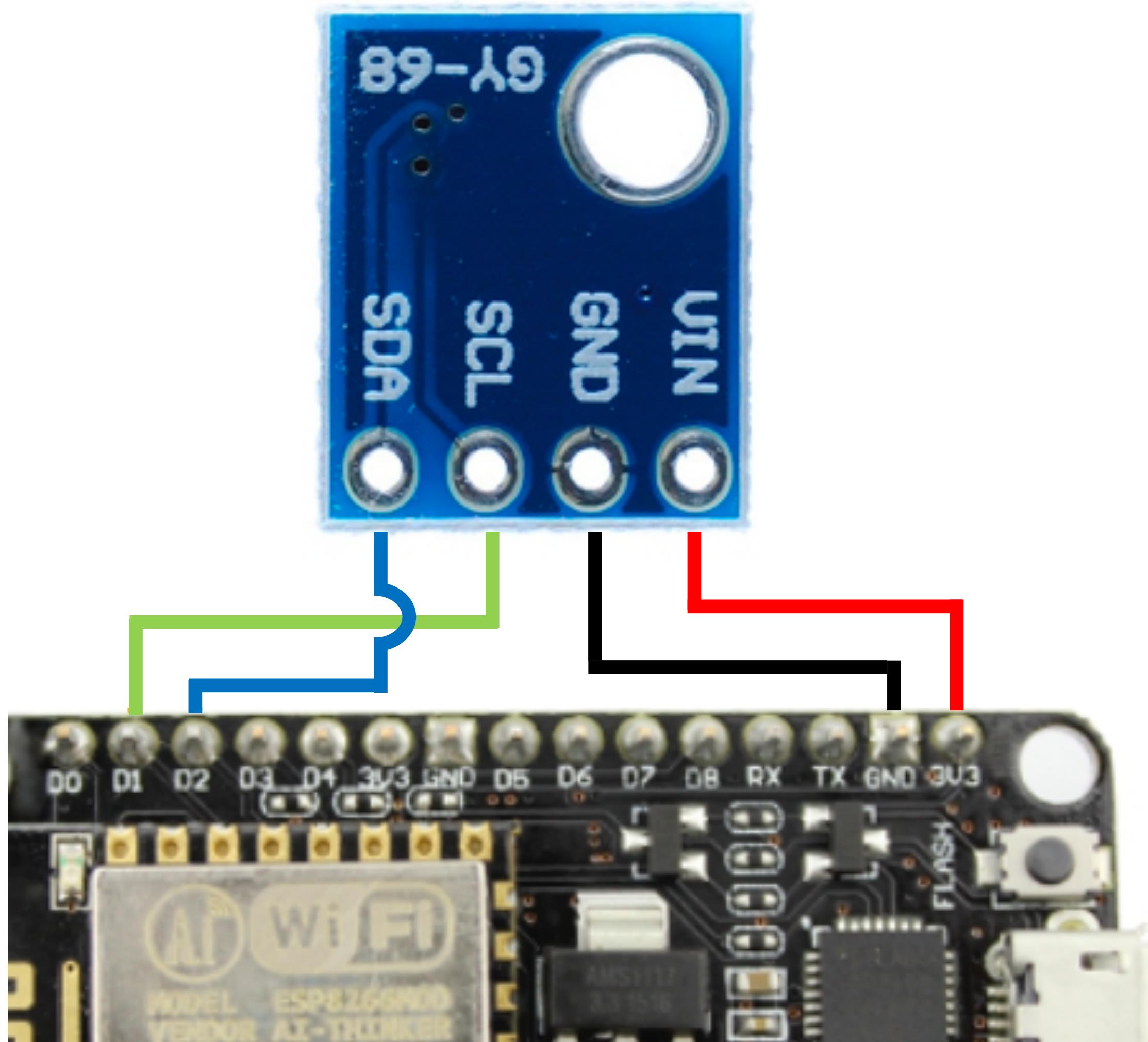
Versão LoLin não se encaixa totalmente na protoboard



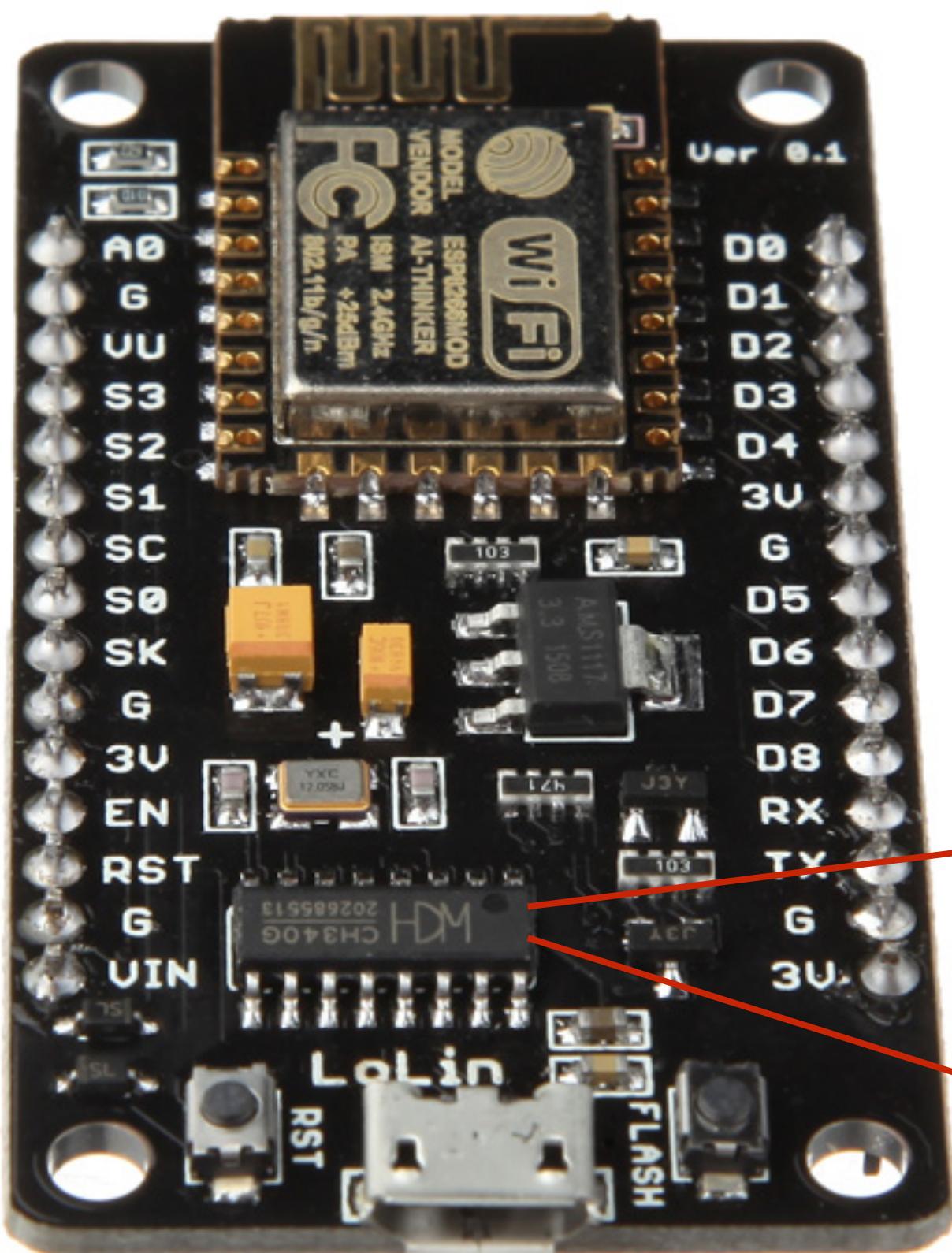
Versão Amica se encaixa totalmente na protoboard



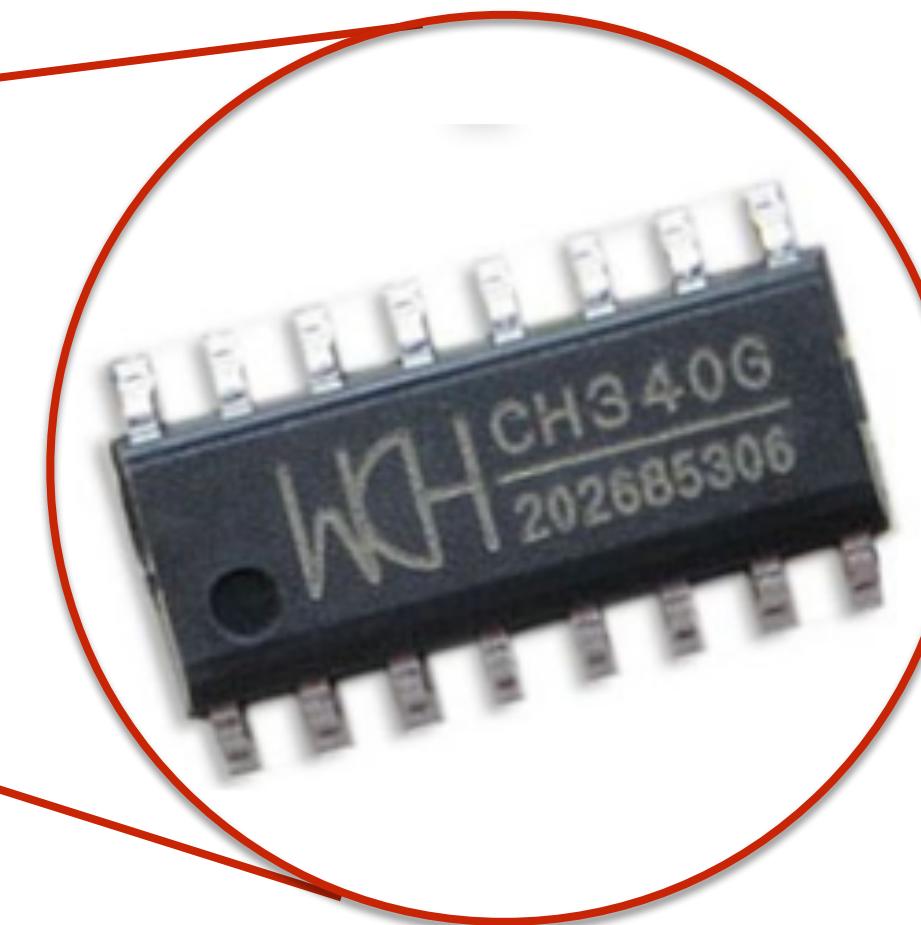
# Ligaçāo NodeMCU-BMP180



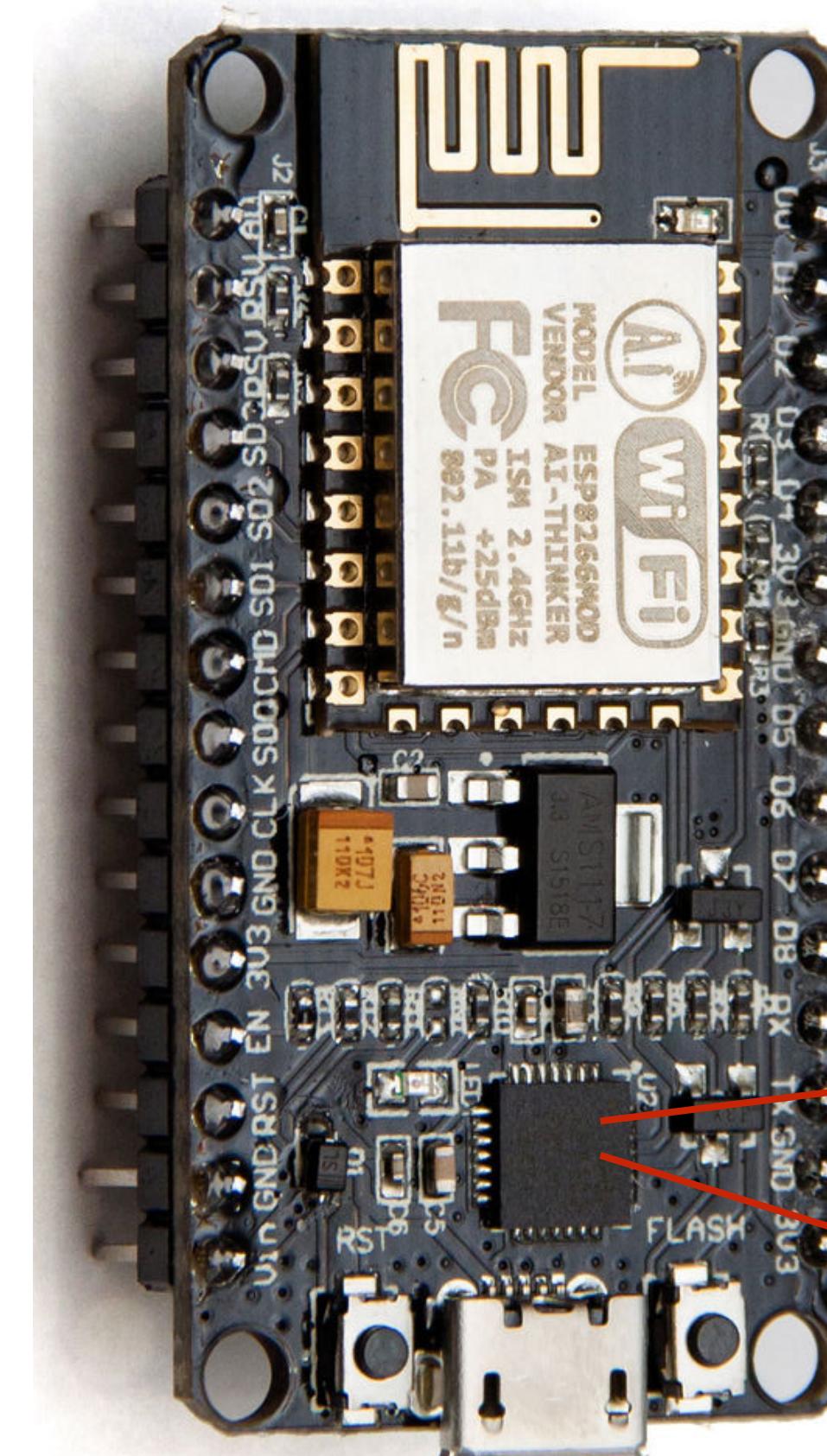
# Instalação do driver CH340G NodeMCU Lolin



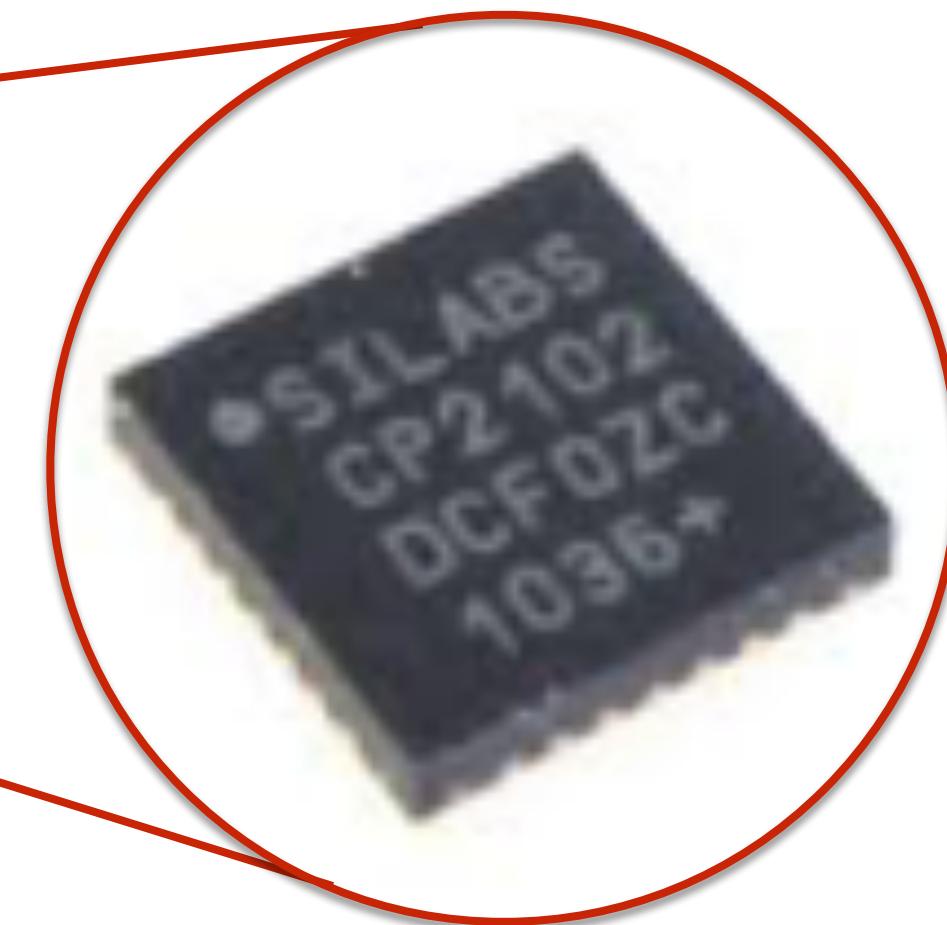
Platform	OS	Link
Mac	Sierra	<a href="https://blog.sengotta.net/signed-mac-os-driver-for-winchiphead-ch340-serial-bridge/">https://blog.sengotta.net/signed-mac-os-driver-for-winchiphead-ch340-serial-bridge/</a>
Mac	Sierra	<a href="https://tzapu.com/ch340-ch341-serial-adapters-macos-sierra/">https://tzapu.com/ch340-ch341-serial-adapters-macos-sierra/</a>
Mac	El Capitan	<a href="https://tzapu.com/making-ch340-ch341-serial-adapters-work-under-el-capitan-os-x/">https://tzapu.com/making-ch340-ch341-serial-adapters-work-under-el-capitan-os-x/</a>
PC	Windows 8-10	<a href="http://www.arduined.eu/ch340-windows-8-driver-download/">http://www.arduined.eu/ch340-windows-8-driver-download/</a>



# Instalação do driver CP2102 NodeMCU Amica



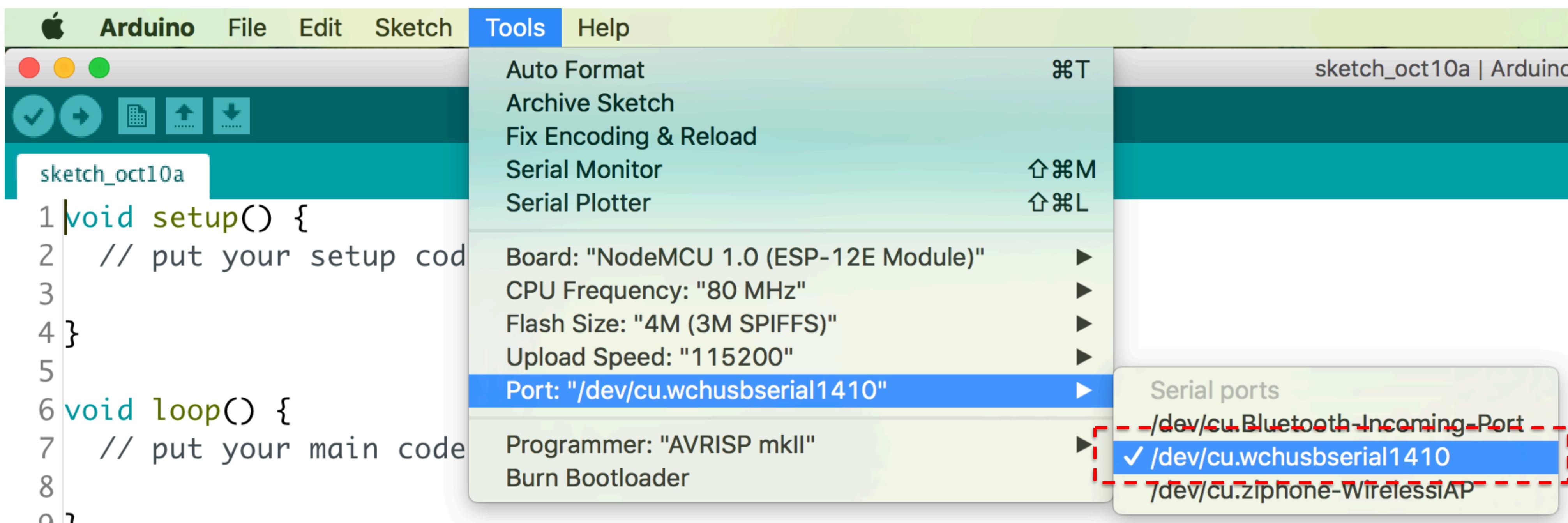
Platform	OS	Link
All	All	<a href="https://www.silabs.com/products/mcu/Pages/USBtoUARTBridgeVCPDrivers.aspx">https://www.silabs.com/products/mcu/Pages/USBtoUARTBridgeVCPDrivers.aspx</a>



# Preparação do ambiente

Após instalar o driver e reiniciar seu computador, conecte o NodeMCU com o cabo micro USB na porta USB do seu computador.

Se o módulo e driver USB foram instalados corretamente, acesse o menu Tools, Port e selecione a opção "/dev/cu.wchusbserial1410" (para Mac) ou a porta COM equivalente (para PC)





**DESLIGUE O CABO USB DO SEU COMPUTADOR  
OU DO DEVICE NODEMCU**

# Configuração do Watson IoT Platform

Acesse o endereço <https://console.ng.bluemix.net/> e selecione a opção "Catálogo" ou Catalog

The screenshot shows the top navigation bar of the IBM Bluemix Apps interface. On the left, there are icons for 'Docs' and 'IBM Bluemix Apps'. In the center, it displays 'Jose Maria Cesario's Acco...' and 'US South : cesarioj@br.ibm.com : dev'. To the right are buttons for '233', 'Catalog' (which is circled in red), 'Support', and 'Account'. Below the navigation bar is a search bar with the placeholder 'Search Items'. At the bottom, there are buttons for 'All Applications (2)' and 'Create Application +'. A large red arrow points from the text above to the 'Catalog' button.

# Configuração do Watson IoT Platform

Dentro do Catálogo, procure a opção Internet of Things Platform e selecione-a.

The screenshot shows the IBM Bluemix Catalog interface. At the top, there is a navigation bar with links for 'Docs', 'IBM Bluemix Catalog', '233', 'Catalog', 'Support', and 'Account'. A user profile for 'Jose Maria Cesario's Acco...' is also visible. Below the navigation bar, there is a search bar with the text 'internet of things' and a magnifying glass icon. A red dashed oval highlights this search bar. To the left, there is a sidebar with categories like 'All Categories (19)', 'Infrastructure', 'Compute', 'Storage', 'Network', 'Security', and 'Apps (1)'. The main content area displays search results for 'internet of things' across six categories. It includes sections for 'Boilerplates' (with a link to 'Internet of Things Platform Starter') and 'Cloud Foundry Apps'. A red dashed oval highlights the 'Internet of Things Platform Starter' entry. The bottom right corner of the page has an 'IBM' logo.

Docs

Jose Maria Cesario's Acco... | US South : cesarioj@br.ibm.com : dev

IBM Bluemix Catalog

233 Catalog Support Account

All Categories (19) >

internet of things

Filter

Infrastructure

Compute

Storage

Network

Security

Apps (1)

Boilerplates

Show 19 results for "internet of things" in 6 categories

Get started with a new app, now.

Internet of Things Platform Starter

Get started with IBM Watson IoT platform usin

IBM

# Configuração do Watson IoT Platform

Preencha o nome da sua aplicação e o host name.

Após isso, clique no botão Create

App name:

Host name:

 The value is required.

mybluemix.net

Selected Plan:

SDK for Node.js™

Default

Cloudant NoSQL DB

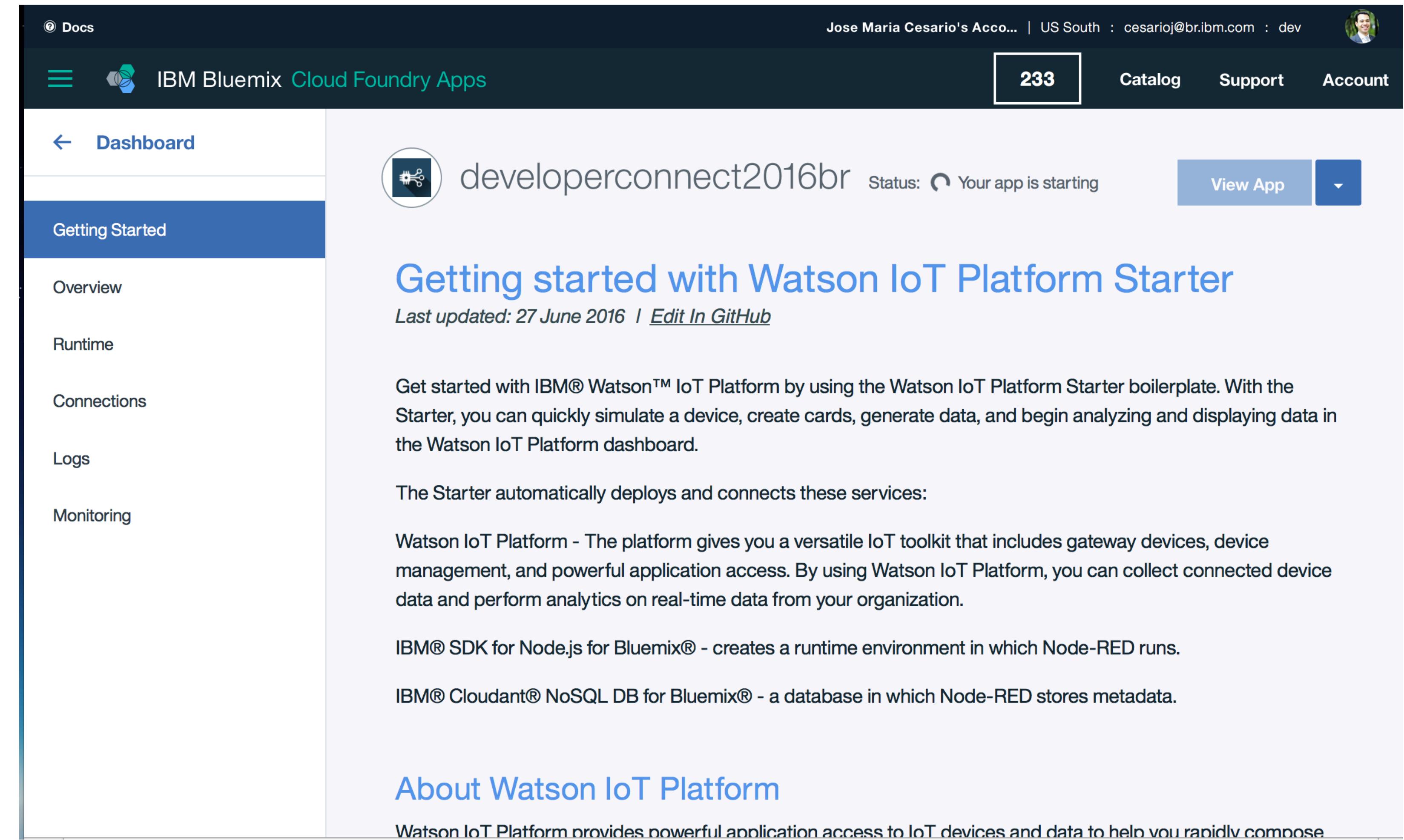
Lite

Internet of Things Platform

Standard

# Configuração do Watson IoT Platform

Navegue pelas opções para se familiarizar com as configurações.



The screenshot shows the IBM Bluemix Cloud Foundry Apps dashboard. At the top, there's a navigation bar with 'Docs', the user profile 'Jose Maria Cesario's Acco...', a notification count '233', and links for 'Catalog', 'Support', and 'Account'. Below the navigation is a search bar with the placeholder 'Search' and a dropdown arrow. The main area displays the 'developerconnect2016br' application. It includes a circular icon with a gear and wrench, the app name 'developerconnect2016br', its status 'Status: Your app is starting', and a 'View App' button. To the right of the app card is a dropdown menu with a downward arrow. On the left, a sidebar titled 'Dashboard' contains links for 'Getting Started' (which is highlighted in blue), 'Overview', 'Runtime', 'Connections', 'Logs', and 'Monitoring'. The main content area features a section titled 'Getting started with Watson IoT Platform Starter' with a last update date of '27 June 2016' and a link to 'Edit In GitHub'. It describes the Starter as a boilerplate for Watson IoT Platform, mentioning it can simulate devices, create cards, generate data, and analyze data. It also lists the services deployed: Watson IoT Platform, IBM® SDK for Node.js for Bluemix®, and IBM® Cloudant® NoSQL DB for Bluemix®. At the bottom, there's a section titled 'About Watson IoT Platform' with a note about its purpose: 'Watson IoT Platform provides powerful application access to IoT devices and data to help you rapidly compose'.

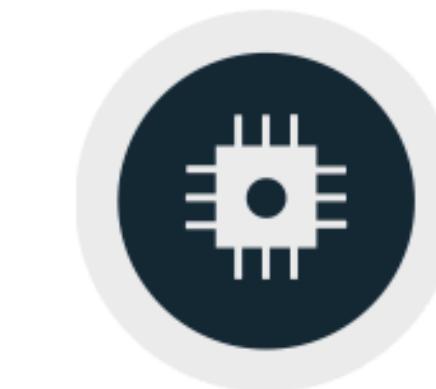
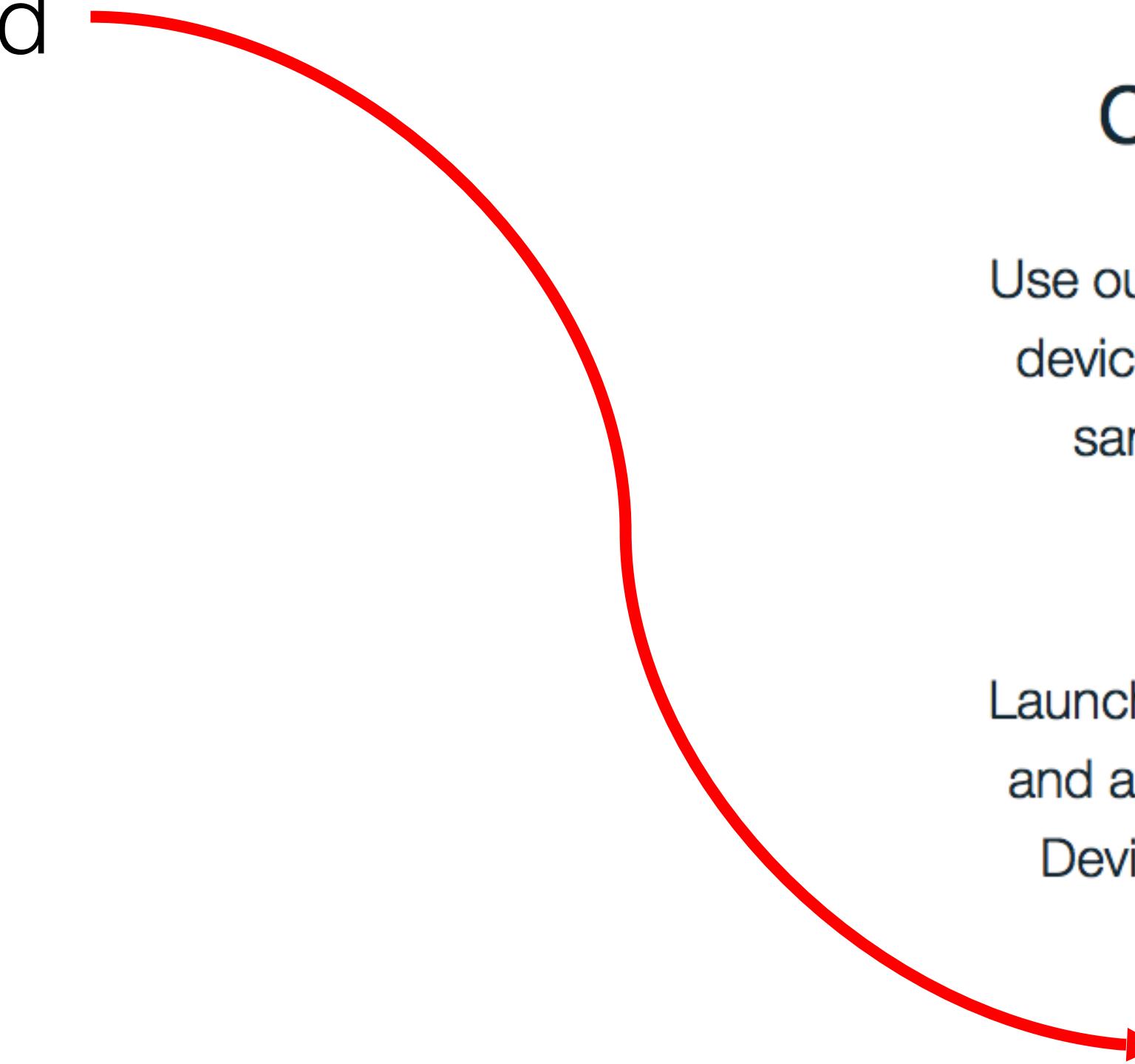
# Configuração do Watson IoT Platform

Acesse a opção Connections no menu da esquerda e clique na opção Internet of Things Platform

The screenshot shows the IBM Bluemix Cloud Foundry Apps interface. The top navigation bar includes 'Docs', 'IBM Bluemix Cloud Foundry Apps', '233', 'Catalog', 'Support', and 'Account'. The left sidebar has links for 'Dashboard', 'Getting Started', 'Overview', 'Runtime', 'Connections' (which is highlighted in blue), 'Logs', and 'Monitoring'. The main area displays an application named 'developerconnect2016br' with a status of 'Your app is running'. Below the application details, there are two service cards: 'Cloudant NoSQL DB Lite' and 'Internet of Things Platform iotf-service-standard'. The 'Internet of Things Platform' card is circled with a dashed red line and has a red arrow pointing to it from the 'Connections' link in the sidebar.

# Configuração do Watson IoT Platform

Dentro do componente, selecione a opção Launch Dashboard



## Connect your devices

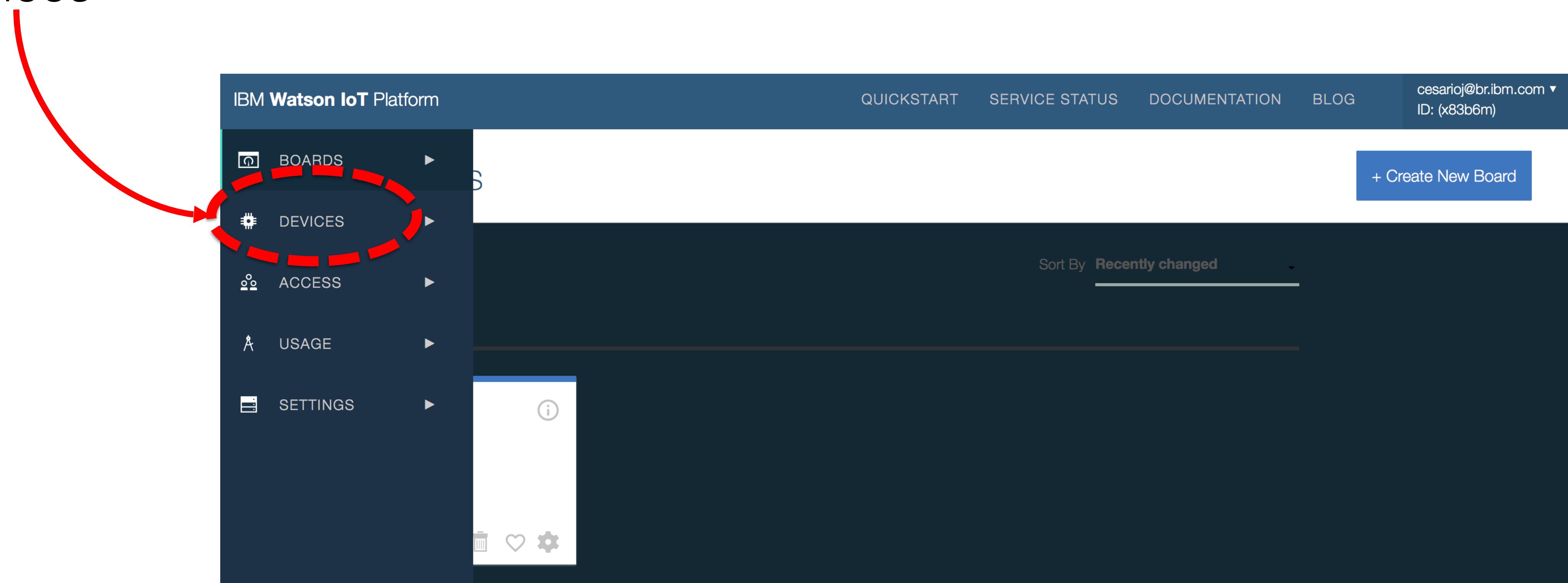
Use our [recipes](#) to find out how to add your devices. We work with partners and have sample connection recipes for many devices.

Launch the Watson IoT Platform dashboard and add your devices by clicking the 'Add Device' button under the 'Devices' tab.

Launch dashboard

# Configuração do Watson IoT Platform

Dentro do Dashboard, selecione a opção Devices



# Configuração do Watson IoT Platform

Selecione a opção Add Devices

The screenshot shows the 'Devices' section of the Watson IoT Platform. At the top, there are navigation links: 'Browse' (highlighted in blue), 'Diagnose', 'Action', and 'Device Types'. To the right are buttons for 'Refresh' and '+ Add Device', which is circled with a red dashed line. Below the header is a search bar with filters for 'Device ID', 'Device Type', 'Class ID', 'Date Added', and 'Location', along with icons for refresh, search, and delete. The main area displays a table titled 'Results 1-2 of 2' with two rows of device data. Each row includes a checkbox, a warning icon, the device name, its type, its gateway, and the date it was added.

	Device ID	Device Type	Class ID	Date Added	Location
<input type="checkbox"/>	rpiSwLab	rpi	Gateway	Jun 7, 2016 11:24:51 AM	
<input type="checkbox"/>	nodemcu00	esp8266	Device	Jul 2, 2016 1:45:09 PM	



# Configuração do Watson IoT Platform

- Crie um Device Type
- Crie um Device
- Defina uma Token
- **GUARDE AS INFORMAÇÕES EM UM REPOSITÓRIO SEGURO**

The image shows a screenshot of the IBM Internet of Things Foundation interface. At the top, there are several blue decorative icons: a location pin, a hexagon with a windmill, two suns, a speech bubble, a lock, and a user profile.

The main header reads "Organization ID: n6k1gh". Below it, a sub-header says "Bluemix Free (go to Bluemix service)".

The left sidebar contains the following navigation items:

- OVERVIEW
- DEVICES
- Browse

**Device Connection Information**

- Device ID: n6k1gh
- Recent Events: Results 1-0 of 0
- Sensor Information: Test1

**Metadata**

**Device Information**

**Diagnostic Logs**

**Error Codes**

**Connection Log** Add Device

The main content area is titled "Device Test1". It features a section titled "Your Device Credentials" with an information icon (i). A note states: "You have registered your device to the organization. To get it connected, you need to add these credentials to your device. Once you've added these, you should see the messages sent from your device in the 'Sensor Information' section on this page."

A table displays the following device credentials:

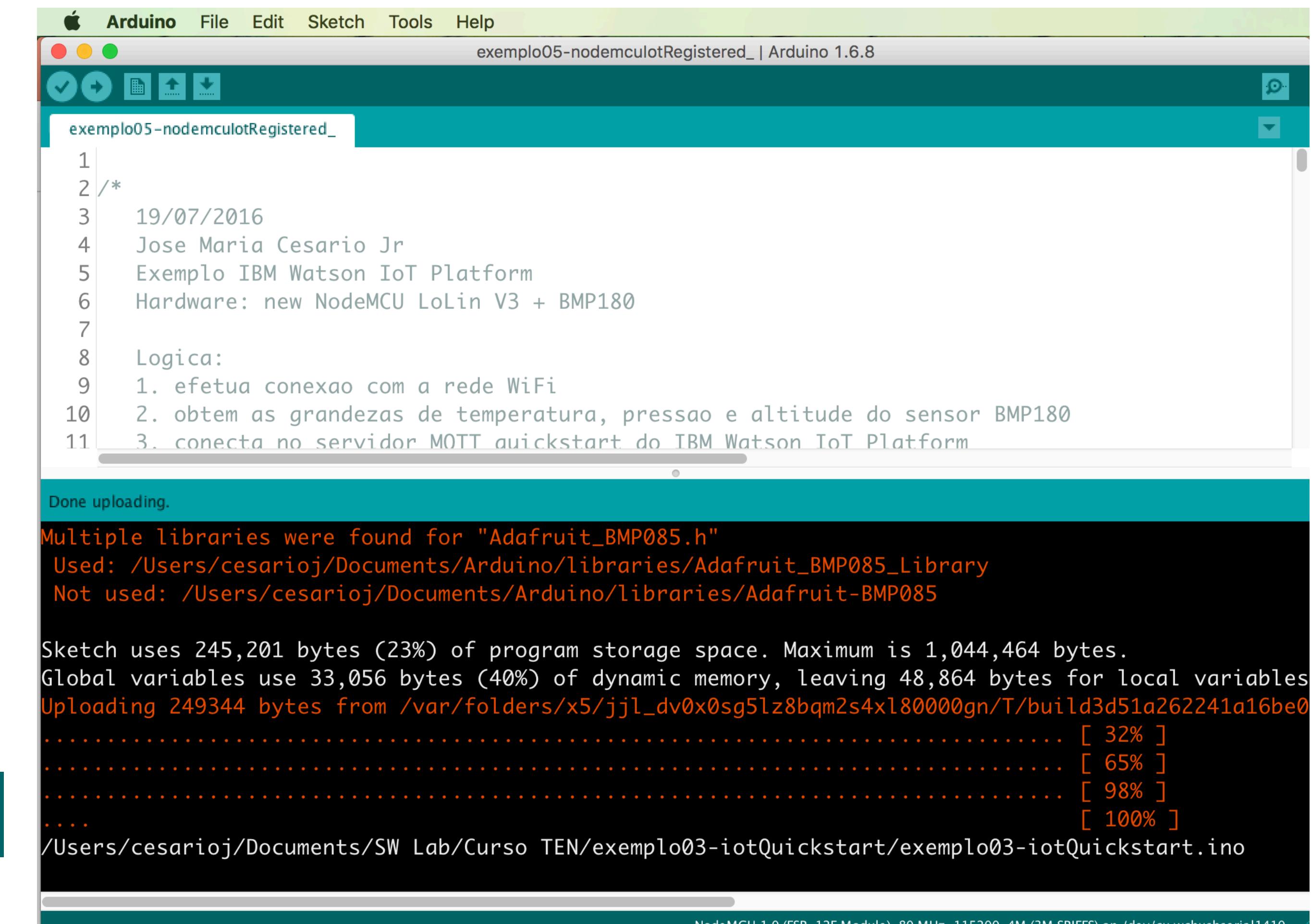
Organization ID	n6k1gh
Device Type	ESP8266
Device ID	Test1
Authentication Method	token
Authentication Token	_ZF5D(a3iW3A*oX1BU

A red dashed circle highlights the "Authentication Token" row. Below the table, a note says: "Authentication tokens are non-recoverable. If you misplace this token, you will need to re-register the device to generate a new authentication token." A link "Find out how to add these credentials to your device" is provided.

**Device Connection Information** (with i icon)

# Hands On NodeMCU/ESP8266

1. Conectar o nodeMCU e configure os parâmetros no menu Tools
2. Acessar [www.github.com/cesariojr](https://www.github.com/cesariojr)
3. Carregar o programa exemplo05-nodemculotRegistered no seu Arduino IDE
4. Configure o programa com os dados de de ORG (exemplo "x83b6m"), DEVICE\_TYPE e DEVICE
5. Altere os valores de acesso a rede WiFi (SSID e password)
6. Clique no botão Verify 
7. Caso não houver erros, clique em Upload 

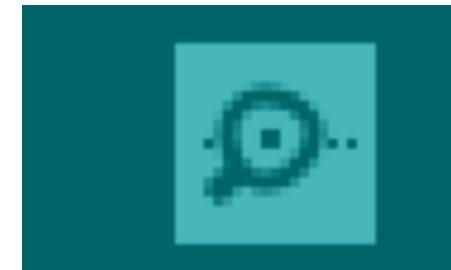


The screenshot shows the Arduino IDE interface with the following details:

- Title Bar:** Arduino 1.6.8, exemplo05-nodemculotRegistered\_
- Code Editor:** The code for "exemplo05-nodemculotRegistered\_" is displayed, containing comments about the date (19/07/2016), author (Jose Maria Cesario Jr), and platform (Exemplo IBM Watson IoT Platform). It also specifies the hardware: "new NodeMCU LoLin V3 + BMP180". The logic is described as: 1. efetua conexao com a rede WiFi, 2. obtém as grandezas de temperatura, pressao e altitude do sensor BMP180, and 3. conecta no servidor MQTT quickstart do TBM Watson IoT Platform.
- Status Bar:** Done uploading.
- Message Area:** Multiple libraries were found for "Adafruit\_BMP085.h": Used: /Users/cesarioj/Documents/Arduino/libraries/Adafruit\_BMP085\_Library; Not used: /Users/cesarioj/Documents/Arduino/libraries/Adafruit-BMP085.
- Progress Bar:** Shows the upload progress from 32% to 100%.
- File Path:** /Users/cesarioj/Documents/SW Lab/Curso TEN/exemplo03-iotQuickstart/exemplo03-iotQuickstart.ino
- Bottom Status:** NodeMCU 1.0 (ESP-12E Module) 80 MHz 115200 4M (3M SPIFFS) on /dev/cu.wchusbserial1410

# Hands On NodeMCU/ESP8266

1. Abra o Serial Terminal do Arduino IDE



2. Defina os parâmetros No Line ending e 115200 baud

3. Resultado esperado



A screenshot of a Mac OS X terminal window titled '/dev/cu.wchusbserial1410'. The window shows the output of an ESP8266 microcontroller. The text in the terminal is as follows:

```
1384, room 16
tail 8
chksum 0x2d
csum 0x2d
v00000000
~ld
[INFO] Conectado WiFi IP: 172.20.10.2
Reconnecting client to x83b6m.messaging.internetofthings.ibmcloud.com

Temperatura = 23.60 *C
Pressao = 95311 Pa
Altitude = 513.98 m

Data length70
Sending payload: {"d":{"temperatura": "23.6","pressao": "95313.00","altitude": "513.63"}}
Publish ok
Temperatura = 23.60 *C
Pressao = 95306 Pa
Altitude = 513.28 m
```

The terminal also displays configuration settings at the bottom: 'Autoscroll' (unchecked), 'No line ending' (selected), and '115200 baud' (selected).

# Hands On NodeMCU/ESP8266

1. Acessar o Watson IoT Platform, opção Dashboard, Devices
2. Nesse painel, procure o device configurado e dê um duplo clique

The screenshot shows the 'Devices' page of the IBM Watson IoT Platform. The top navigation bar includes links for QUICKSTART, SERVICE STATUS, DOCUMENTATION, BLOG, and a user account section. The left sidebar has icons for location, hexagon, sun, speech bubble, lock, and person. The main area displays a table of devices with columns for Device ID, Device Type, Class ID, Date Added, and Location. There are four entries:

Device ID	Device Type	Class ID	Date Added	Location
8587ce9b-561c-4b9a-b61a-36aa5ce5a522	test	Device	Aug 29, 2016 3:40:15 PM	
rpiSwLab	rpi	Gateway	Jun 7, 2016 11:24:51 AM	
nodemcu00	esp8266	Device	Jul 2, 2016 1:45:09 PM	
envNode	arduino2009	Device	Oct 4, 2016 12:06:52 AM	

# Dashboard

1. Os dados do sensor devem aparecer em tempo real no painel, conforme figura ao lado

Device nodemcu00

Device

Refresh

## Connection Information

Device ID	nodemcu00
Device Type	esp8266
Date Added	Saturday, July 2, 2016
Added By	cesarioj@br.ibm.com
Connection State	Connected on Monday, October 10, 2016 at 11:32:14 PM from 177.79.13.39 with an insecure connection <a href="#">Refresh</a>

## Recent Events

Event	Format	Time Received
status	json	Oct 11, 2016 12:07:04 AM
status	json	Oct 11, 2016 12:07:18 AM

## Sensor Information

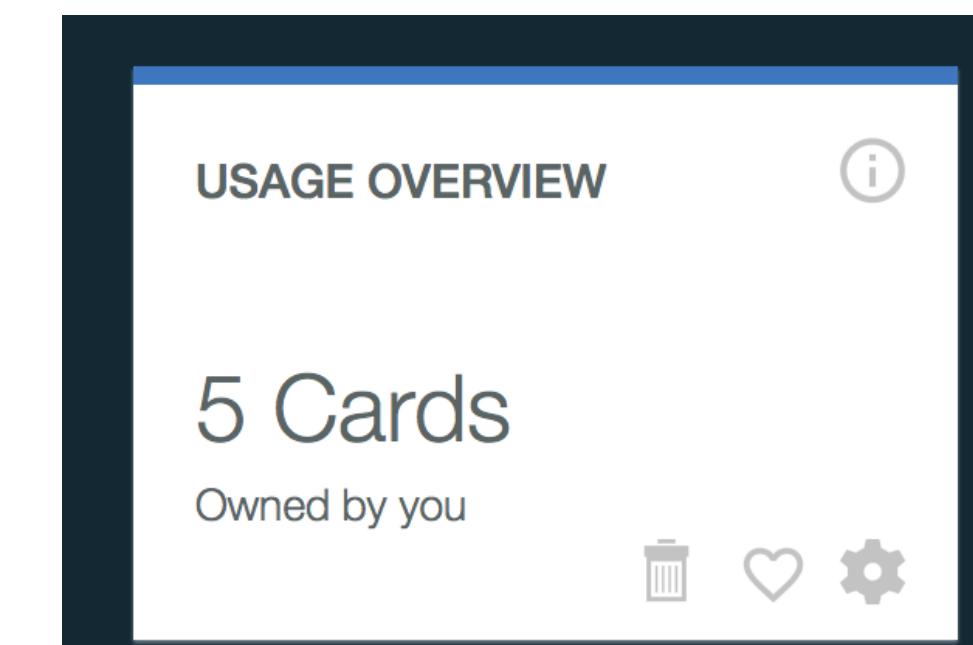
Event	Datapoint	Value	Time Received
status	d.temperatura	23.8	Oct 11, 2016 12:07:18 AM
status	d.pressao	95251.00	Oct 11, 2016 12:07:18 AM
status	d.altitude	518.96	Oct 11, 2016 12:07:18 AM

# Cards e Gráficos

1. Feche a tela anterior e acesse a opção BOARDS

The screenshot shows the IBM Watson IoT Platform interface. At the top, there is a header bar with the platform name and navigation links for 'QUICKSTART' and 'SERVICE STATUS'. Below the header is a dark sidebar containing six menu items: 'BOARDS', 'DEVICES', 'MEMBERS', 'APPS', 'USAGE', and 'SETTINGS'. The 'BOARDS' item is highlighted with a teal vertical bar. To the right of the sidebar is a main content area titled 'DEVICES'. It features a table with columns for 'Device ID', 'Device Type', and 'Class ID'. A single row is visible, showing '37ce9b-561c-4b9a-1a-36aa5ce5a522' under Device ID, 'test' under Device Type, and 'SwLab' under Class ID. At the bottom of the content area is a large blue button labeled '+ Add New Card'.

2. Após isso, selecione a opção Usage Overview e depois o botão Add New Card



+ Add New Card

# Cards e Gráficos

Configure um novo Card conforme as figuras e selecione a opção  [Connect new data set](#)

Card source data  
nodemcu00

Card preview

Edit Value Card

Specify the data source for the card

Devices

Search for data sources using the filter

Device ID	Device Type
8587ce9b-561c-4b9ab61a-36aa5ce5a522	test
rpiSwLab	rpi
<input checked="" type="radio"/> nodemcu00	esp8266
<input type="radio"/> envNode	arduino2009

Next

Card source data  
nodemcu00

Card preview

Edit Value Card

Connect data set

Event  
**status**

Property  
**altitude**

Name  
**altitude**

Type      Unit

**Number**      **m**

Min      Max

Back      Next

# Cards e Gráficos

Configure um novo Card conforme as figuras

**Edit Value Card**

**Card source data**  
nodemcu00

**Card preview**

**Card information**

**Connect data set**

pressao atm

Event

status

**Property**

pressao

**Name**

pressao atm

**Type** Number **Unit** hPa

**Min** **Max**

[Back](#) [Next](#)

**Edit Value Card**

**Card source data**  
nodemcu00

**Card preview**

**Card information**

**Connect data set**

altitude

pressao atm

temperatura

Event

status

**Property**

temperatura

**Name**

temperatura

**Type** Number **Unit** °C

[Back](#) [Next](#)

# Cards e Gráficos

Escolha o tipo do gráfico conforme figura abaixo e depois clique em

Submit

Select the card size and specify additional information

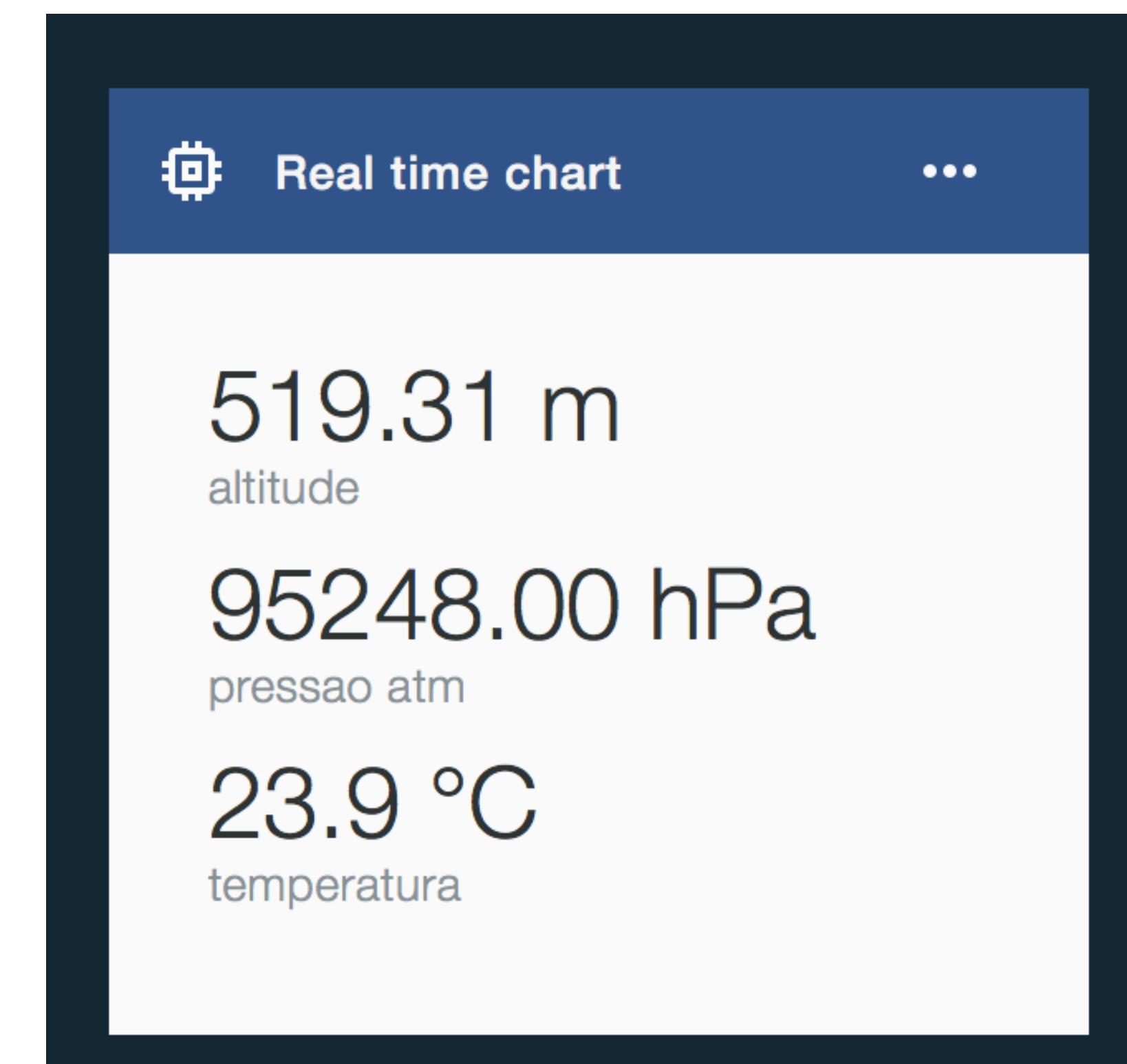
S M L XL XXL

Real time chart

519.58 m  
altitude

23.9 °C  
temperatura

O resultado final deve ser similar a figura abaixo



Thanks!

A woman with long blonde hair tied back, wearing large black headphones and a patterned green and yellow shawl over a grey top, is sitting at a wooden table. She is looking down at a pink tablet and a spiral-bound notebook, writing with a pen. On the table in front of her are a clear Starbucks coffee cup with a straw, a white ceramic mug, and a pink smartphone case. A man's face is partially visible in the background.

# What's Next?

IBM IoT on Internet:  
[internetofthings.ibmcloud.com](http://internetofthings.ibmcloud.com)

IBM Watson IoT Platform:  
<http://bit.ly/IoTBrazil>

# Demonstração: Quickstart

- [Quickstart](#) is an open sandbox allowing developers to quickly and easily get devices connected to the Watson IoT platform with registration required
- Any device that can run an MQTT client can be connected to Quickstart within minimum fuss, [DeveloperWorks Recipes](#) features dozens of community produced tutorials for connecting different devices to the service
- Simulated Device
- <http://quickstart.internetofthings.ibmcloud.com/otsensor>





<https://quickstart.internetofthings.ibmcloud.com/#/>

IBM Watson IoT Platform

QUICKSTART SERVICE STATUS DOCUMENTATION BLOG cesarioj@br.ibm.com ▾  
ID: (select org)

## Quickstart

No sign-up required to see how easy it is to connect your device to Watson IoT Platform and view live sensor data

I accept [IBM's Terms of Use](#)

Device ID eg. 580b0c07ac01 [Go](#)

Get your device (or simulate one)

Follow a recipe to get it connected

View live data from your device

## Got a physical device?

We have a partner program for IoT along with a set of verified instructions, or 'recipes', for connecting devices, sensors, and gateways.

[VIEW RECIPES](#)

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## Don't have a device?

You don't need to have a physical device to see Quickstart in action. Try it out by using our simulator.

[FIND OUT MORE](#)



# Reference Material

- [https://docs.internetofthings.ibmcloud.com/getting\\_started/concepts.html](https://docs.internetofthings.ibmcloud.com/getting_started/concepts.html)
- <https://www.youtube.com/watch?v=8Q7039Vz1Gg>
- <https://www.coursera.org/learn/developer-iot>
- <https://media.readthedocs.org/pdf/iotf/latest/iotf.pdf>
- <https://www.iot-academy.info/>