IoT mit dem Wlan Chip Esp8266

dotnet Cologne 2017

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Quelle: https://github.com/nodemcu/nodemcu-devkit-v1.0

Wer sind wir?

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BRICKMAKERS ACANDO

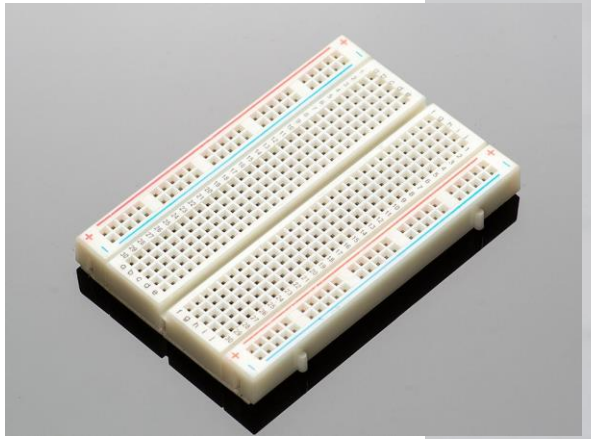
ESP8266, Arduino und Raspberry Pi?!

	ESP8266 **(LoLin Nodemcu V2)**	**Arduino Uno**	**Raspberry Pi 3 Model B**
CPU	60Mhz 32-Bit	16Mhz 8-Bit	4x1,2Ghz 64-Bit
RAM	64KB + 96KB	2KB	1 GB
Speicher	4MB	32 KB + 1 KB	SD Karte
GPIO Pins	15	20	40
"Betriebssystem"	Arduino Bootloader, MicroPython, ...	Arduino Bootloader, ...	Raspian, Windows 10 IoT, ...
Wlan?	✓	✗	✓
Preis	Ab 2€	Ab 2€	Ab 35€

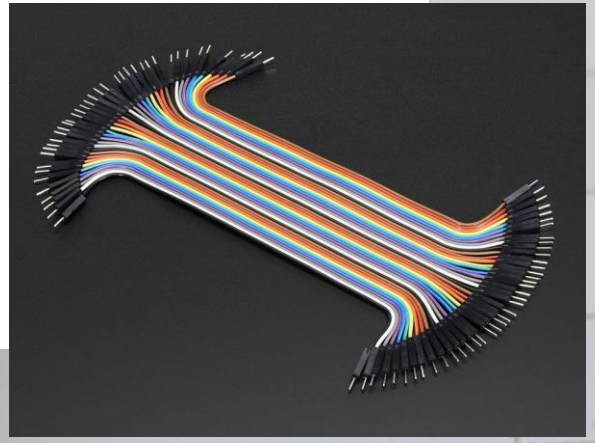
Was brauch ich für den Einstieg?

- Nodemcu oder ein anderes ESP8266 Dev Board
- Breadboard
- Jumperwires
- Sensoren/LEDs/…

Quelle: https://github.com/nodemcu/nodemcu-devkit-v1.0



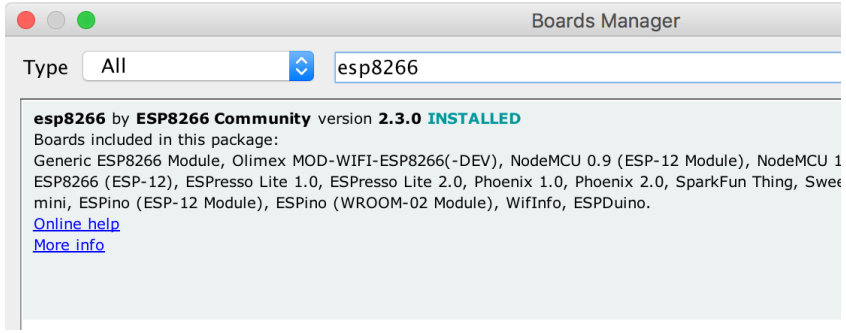
Quelle: https://www.adafruit.com/product/64



Quelle: https://www.adafruit.com/product/758

ESP8266 mit Arduino IDE

1. Arduino IDE herunterladen
2. Settings > Additional Boards Manager Url:
    1. https://github.com/esp8266/Arduino/releases/download/2.3.0/package_esp8266com_index.json
    2. http://arduino.esp8266.com/ ist down
3. Tools > Board > Board Manager: Nach esp8266 suchen
4. Wenn nötig USB Treiber installieren
    1. Z.B. für CH340G
5. Settings für ESP8266 einstellen



Hello World

DEMO

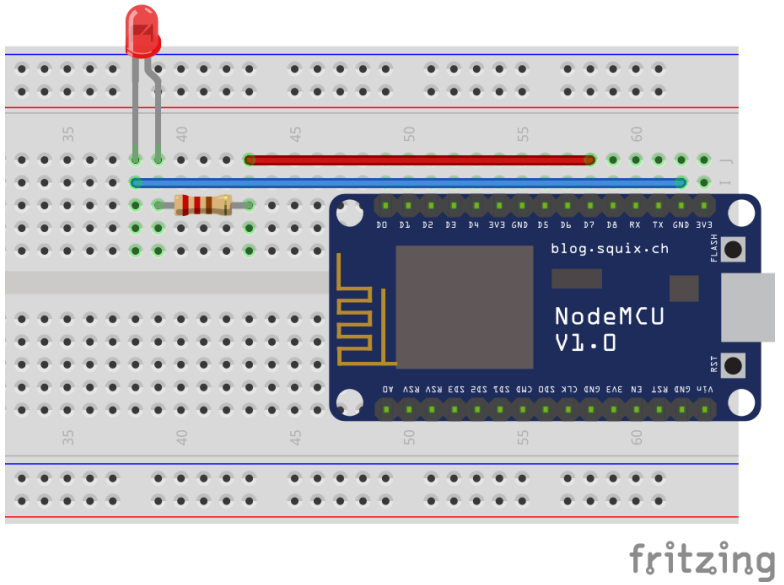
Hello World

Code:

```
void setup() {
  pinMode(13, OUTPUT); //GPIO 13 = Pin D7
}

void loop() {
  digitalWrite(13, HIGH);
  delay(1000);
  digitalWrite(13, LOW);
  delay(1000);
}
```

Schaltplan:



Wifi verbinden

DEMO

Wifi verbinden

Code:

```
#include <ESP8266WiFi.h>

const char* ssid = "SSID";
const char* password = "PW";

void setup() {
  …
}

void loop() {
  connect();
  delay(1000);
}
```

```
void connect() {
 delay(10);

 if(WiFi.status() == WL_CONNECTED) {
  …
  return;
 }
 …
 WiFi.begin(ssid, password);
 …
 while (WiFi.status() != WL_CONNECTED) {
  delay(500);
  …
 }
 …
}
```

Get Request

DEMO

Get Request

Code:

```
#include <ESP8266WiFi.h>
#include <ESP8266HTTPClient.h>

const String serverAdress = "adress";
const char* ssid = "SSID";
const char* password = "PW";

void setup() {
  …
}

void loop() {
  connect();
  getStatus();
  delay(1000);
}
```

```
void getStatus() {
  HTTPClient http;
  http.begin(serverAdress);

  int httpCode = http.GET();

  if (httpCode > 0) {
    Serial.println(http.getString());
  }
  else {
    …
  }

  http.end();
}
```

Get LED Status

DEMO

Get LED Status

Code:

```
#include <ESP8266WiFi.h>
#include <ESP8266HTTPClient.h>

const String serverAdress = "adress";
const char* ssid = "SSID";
const char* password = "PW";

void setup() {
  pinMode(13, OUTPUT);//GPIO 13 = Pin D7
  …
}

void loop() {
  …
}
```

```
void getStatus() {
  …
  int httpCode = http.GET();

  if (httpCode > 0) {
    String answer = http.getString();
    Serial.println(answer);
    if (answer.toInt() == 1)
      digitalWrite(13, HIGH);
    else
      digitalWrite(13, LOW);
  }
  …
}
```

Micropython einrichten

1. Firmware herunterladen
2. Esptool installieren: `pip install esptool`
3. Flash löschen: `esptool.py --port /dev/ttyUSB0 erase_flash`
4. Neue Firmware draufspielen: `esptool.py --port /dev/ttyUSB0 --baud 115200 write_flash --flash_size=detect 0 esp8266-20170108-v1.8.7.bin`

REPL

DEMO

Danke für die Aufmerksamkeit!

- Folien und Code unter : https://github.com/duglah/dotnetcologne2017

Links

- Arduino IDE einrichten für ESP8266 + Code + Beispiele:
  - https://github.com/esp8266/Arduino
- MicroPython einrichten für Esp8266 + Beispiele:
  - https://docs.micropython.org/en/latest/esp8266/esp8266/tutorial/intro.html
- Belegung der Pins und Schaltplan für Nodemcu:
  - https://github.com/nodemcu/nodemcu-devkit-v1.0