# Connecting the Unconnected with Python

an IoT Software Engineer Journey

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Collect the printed photos at Jepret Allegra booth

```
$ whoami
```

Alwin Arrasyid

alwin.ridd@gmail.com twitter.com/alwin_wint3r github.com/alwint3r

# Lead Software Engineer


x@dycode.com | http://dycodex.com


A **movement** to democratize **knowledge**, **hardware** kit, and **cloud** to help makers to start making things in electronics.

**Disclosure**: it's supported by **DycodeX**

# I'll talk about...

- Intro to IoT
- How people do IoT
- Where Python is Applicable

# Internet of Things


Kevin Ashton

# Internet of Things

- Things
- Connectivity
- People & Process

# Things

- Sensors
- Computing Power
- Actuators
- Network Interface
- Power Source


Arduino

Arduino 101

Indonesia-made

Bluino

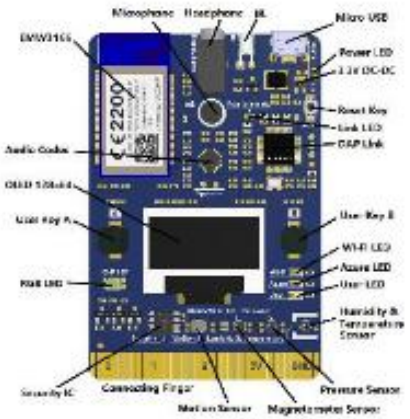
ESP8266

ESP32

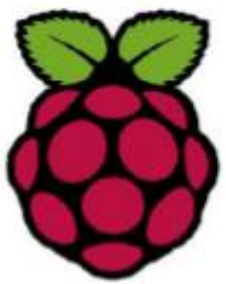
Particle.io

Photon, Electron

Espruino



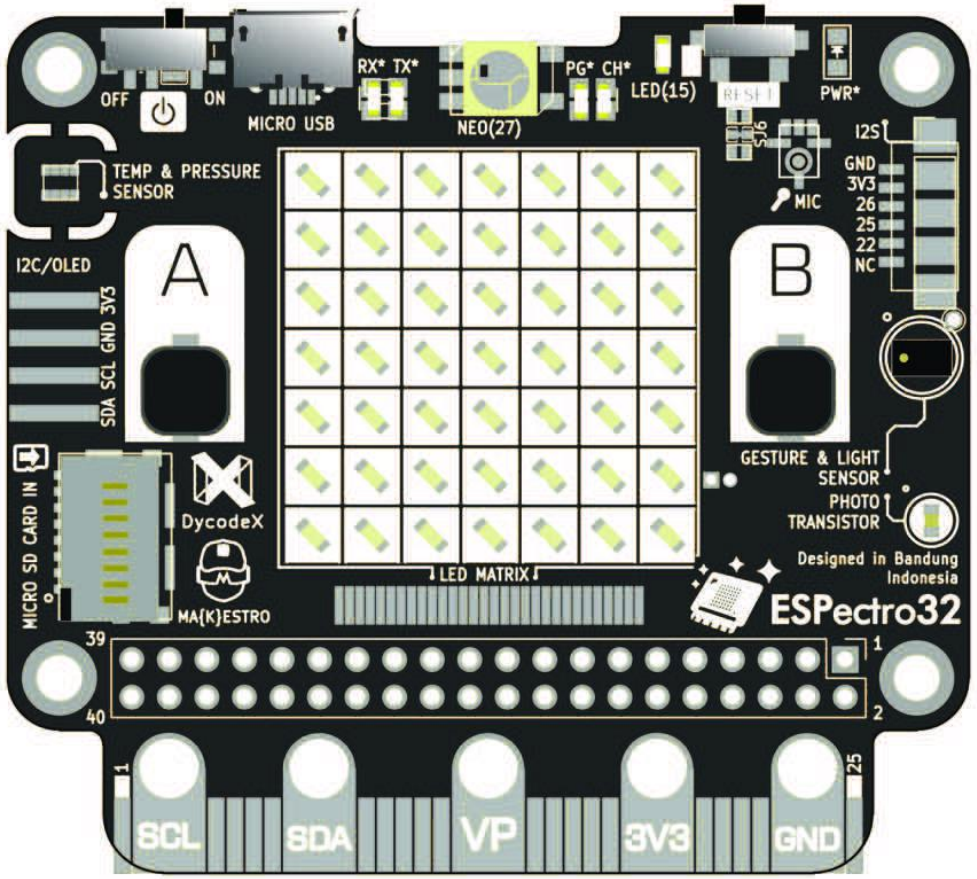
MXChip IoT DevKit



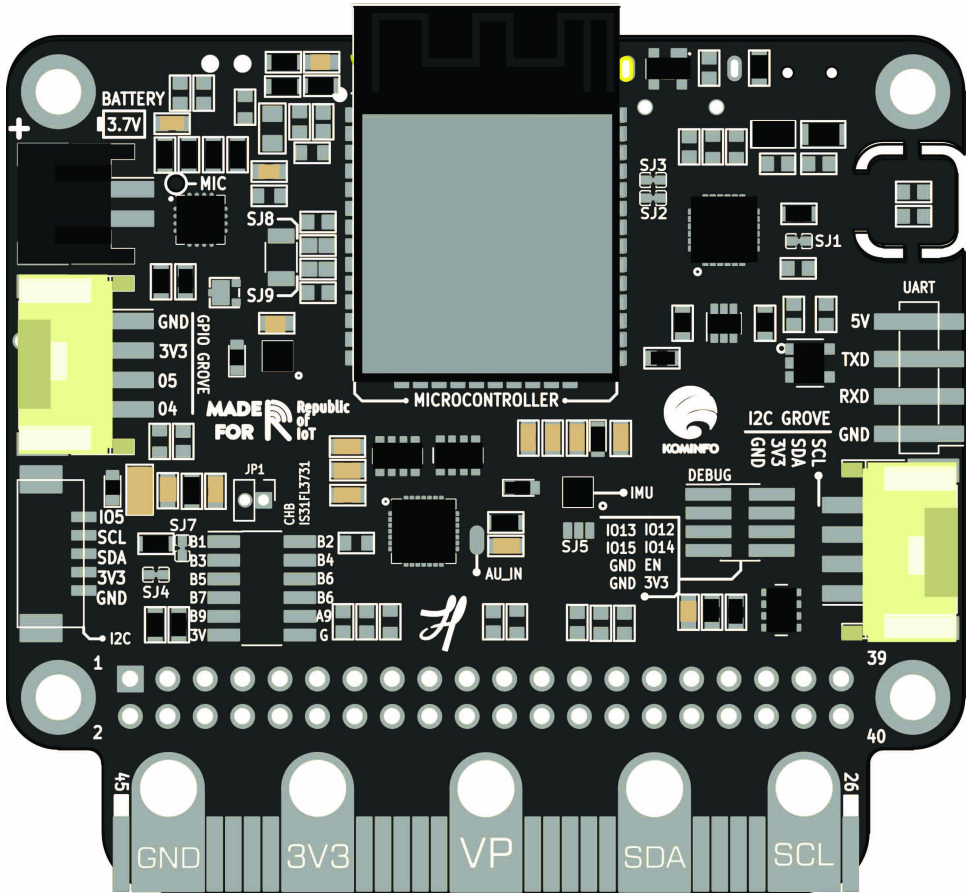
Raspberry Pi

and many more…

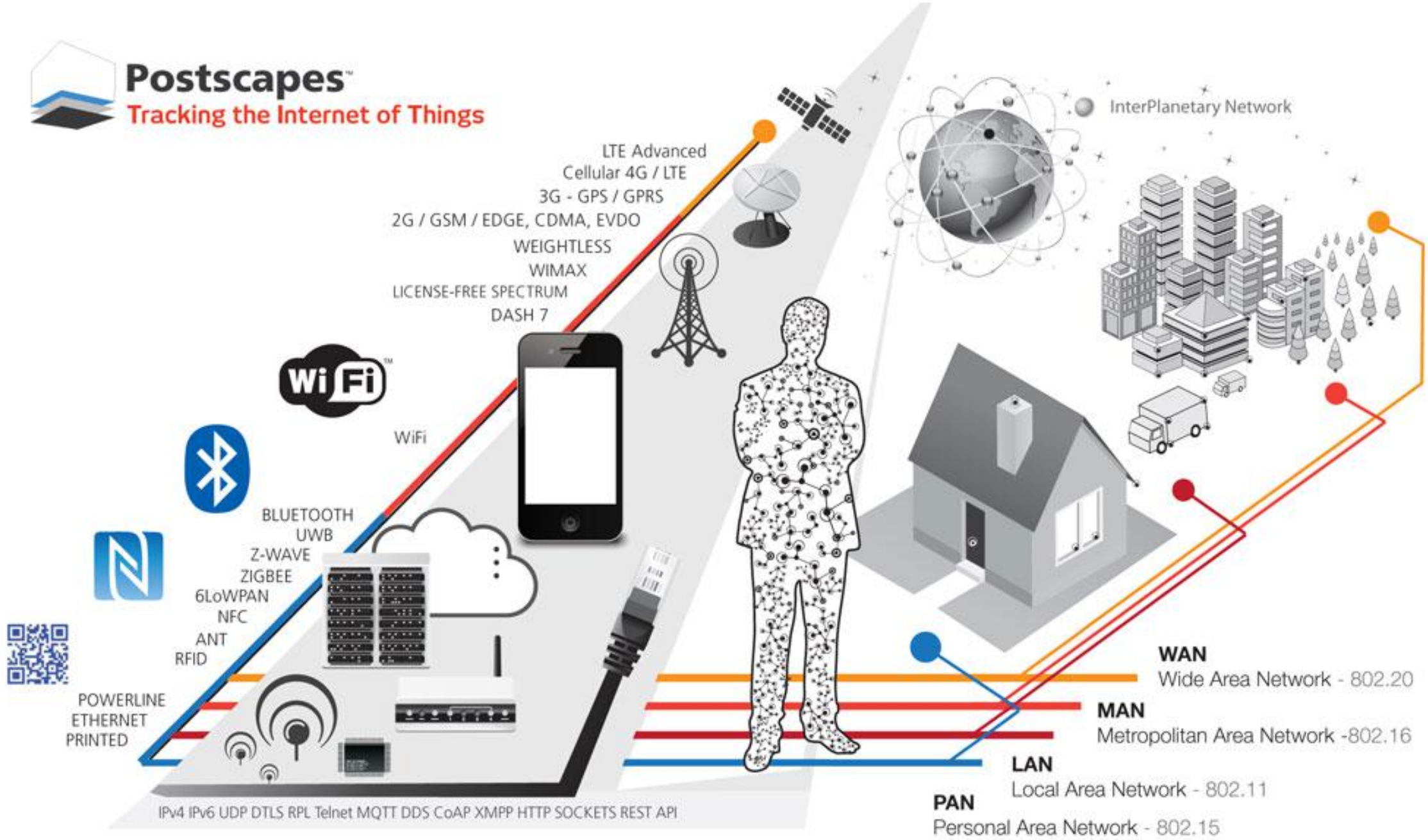
# ESPectro32 by DycodeX



# ESPectro32 by DycodeX



# Connectivity

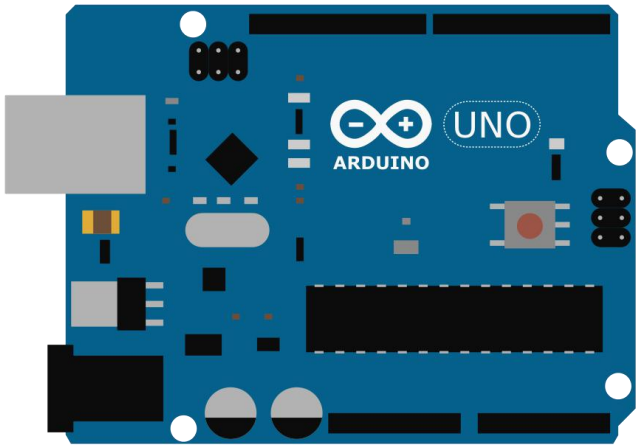

Postscapes
Tracking the Internet of Things
LTE Advanced
Cellular 4G / LTE
3G - GPS / GPRS
2G / GSM / EDGE, CDMA, EVDO
WEIGHTLESS
WIMAX
LICENSE-FREE SPECTRUM
DASH 7
WiFi
BLUETOOTH
UWB
Z-WAVE
ZIGBEE
6LoWPAN
NFC
ANT
RFID
POWERLINE
ETHERNET
PRINTED
IPv4 IPv6 UDP DTLS RPL Telnet MQTT DDS CoAP XMPP HTTP SOCKETS REST API
InterPlanetary Network
WAN
Wide Area Network - 802.20
MAN
Metropolitan Area Network -802.16
LAN
Local Area Network - 802.11
PAN
Personal Area Network - 802.15

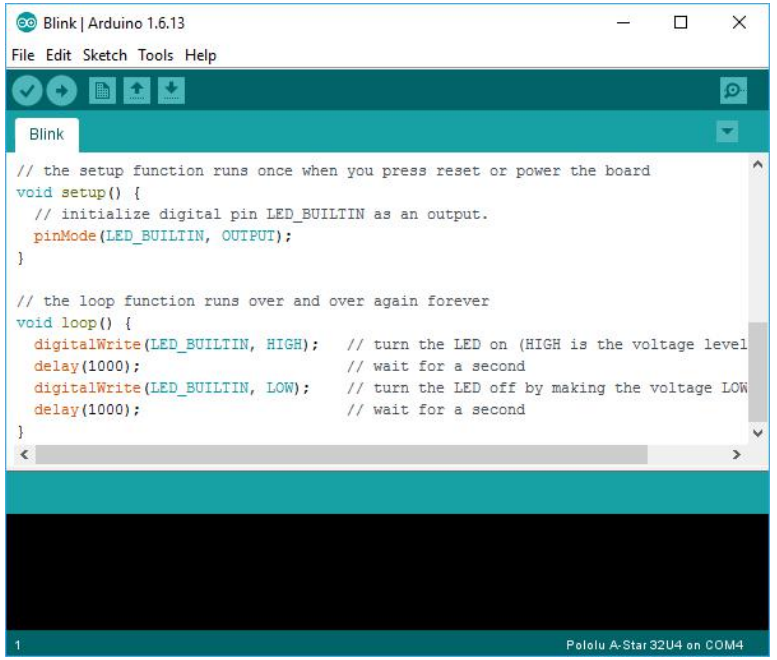
# People & Process


rapidminer
Apache Solr
Dato
elastic
IBM Watson
clarifai
lucene
Spark
ORACLE NOSQL DATABASE
cassandra
TEZ
CouchDB
APACHE HBASE
NumPy
MADlib
SciPy
APACHE STORM™
HIVE
MapReduce
mongoDB
influxdata
DATASTAX
hadoop
TACHYON
SciDB
MESOS
MATLAB
sas
OOZIE
APACHE DRILL
Apache Ambari
nifi
Couchbase
R
SPSS
DataTorrent
redislabs
amazon DynamoDB
mllib
plotly
Scala
FLUME
accumulo
kognitio
mahout
data iku
kibana
HPCC SYSTEMS®
MariaDB
TensorFlow
splunk>
sumologic
NUODB
TERADATA
VERTICA
WEKA The University of Waikato
sense
OrientDB
INFINITEGRAPH
dremio
Clustrix
Pivotal
NLTK
CONTINUUM
DataRobot
neo4j
APACHE GIRAPH
GraphLab
Greenplum
memsql
NETEZZA
SAP HANA
Data Flair

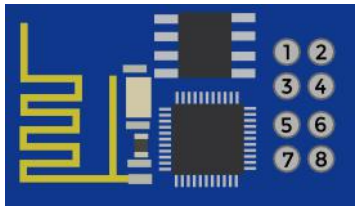
# How People Do IoT

# Common Starter Kit

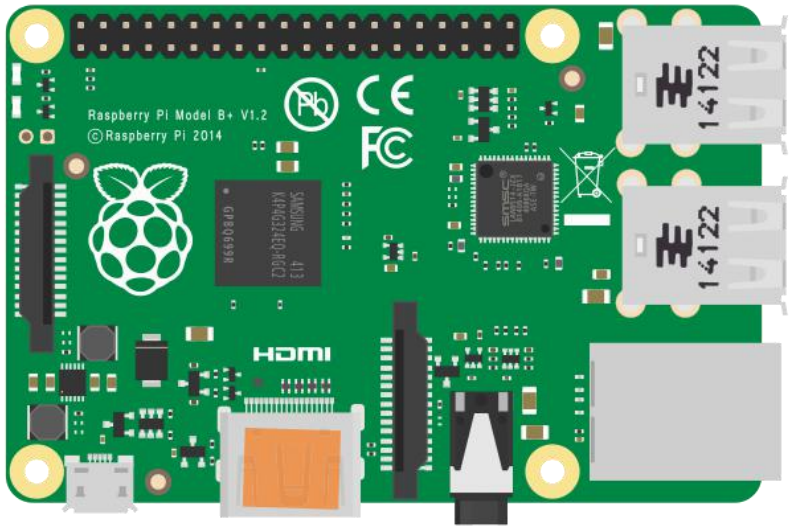


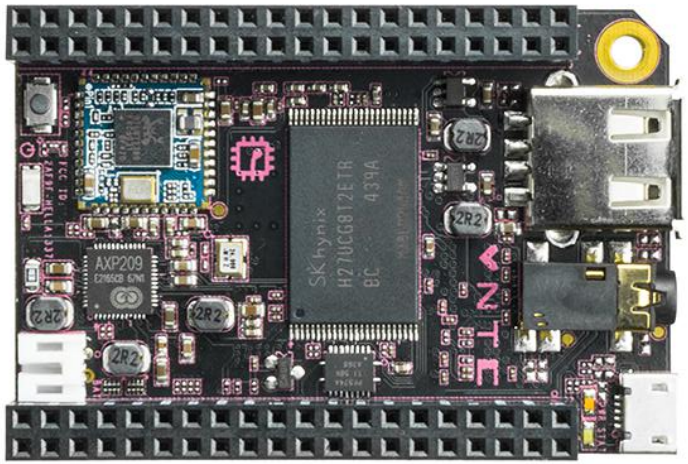





# My Starter Kit

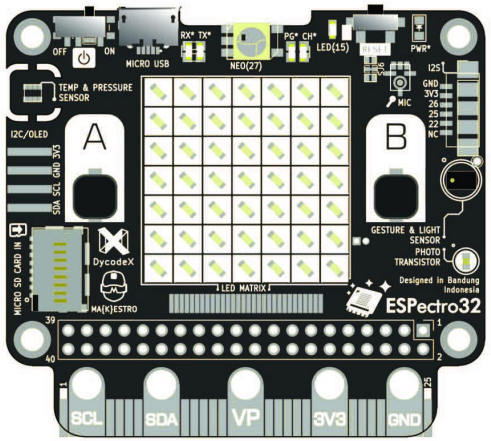


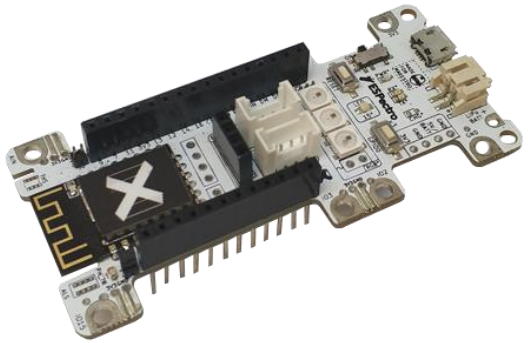



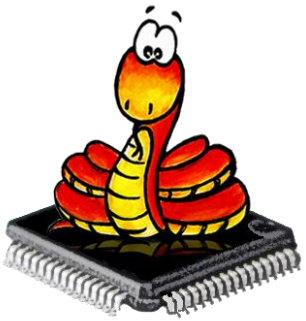
node.js

MQTT

# Eventually…

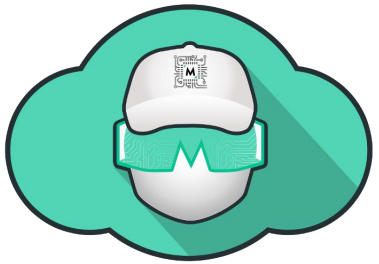




ARDUINO

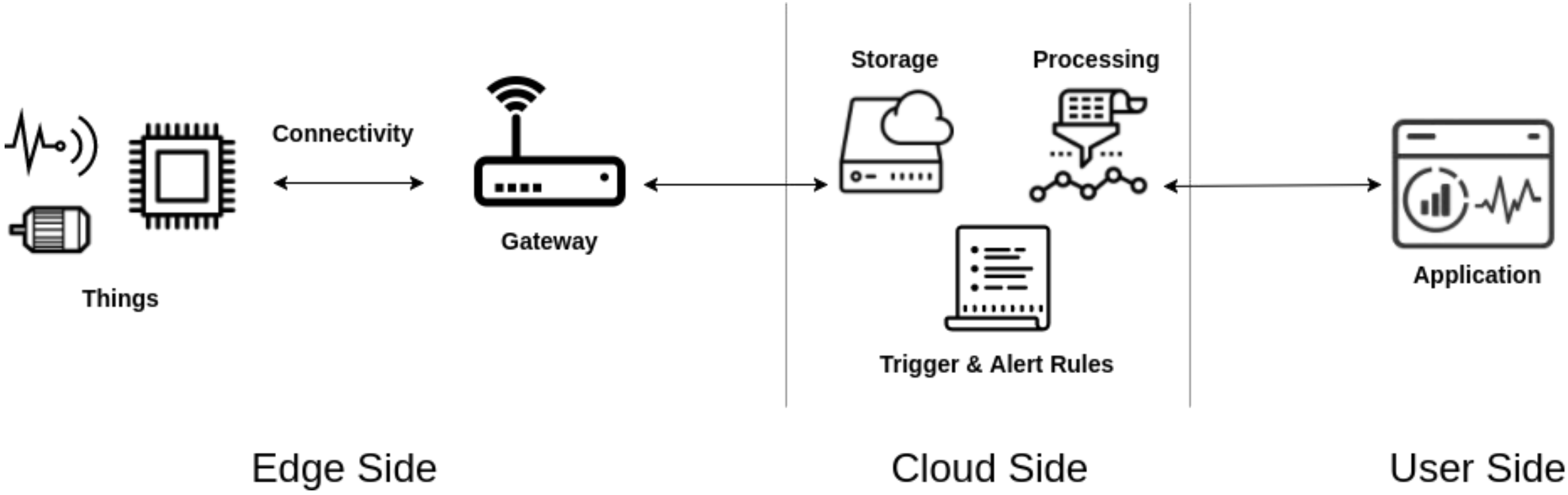
ESP-IDF



MQTT

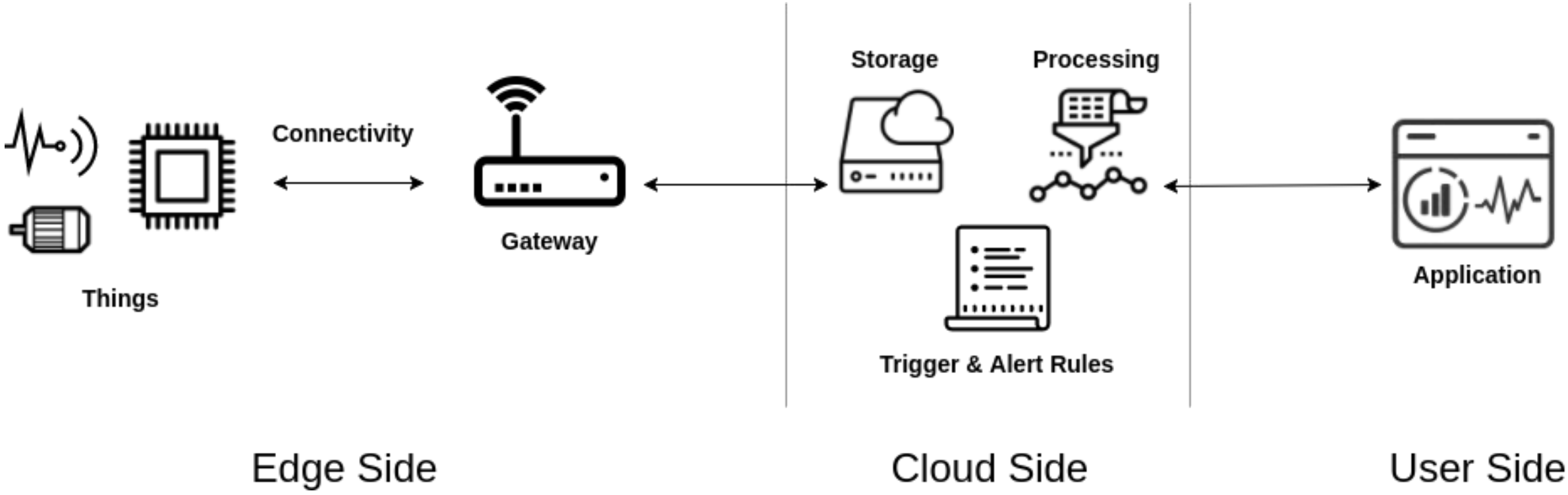
node
JS

# Common IoT Architecture



# Where Python is Applicable

# Common IoT Architecture

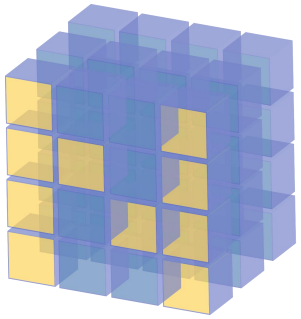


# Application Side



Pyramid™

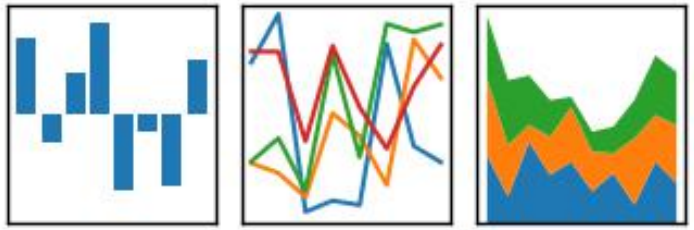
# Data Processing & Machine Learning

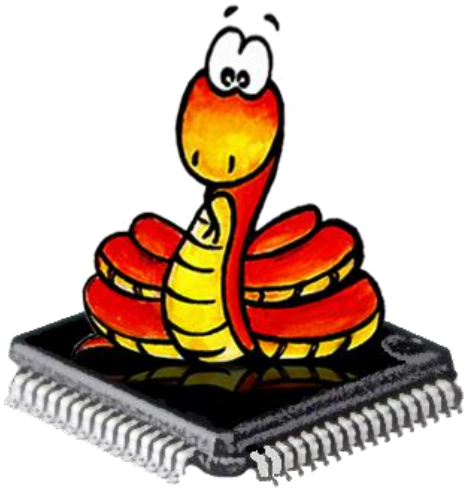
NumPy

pandas

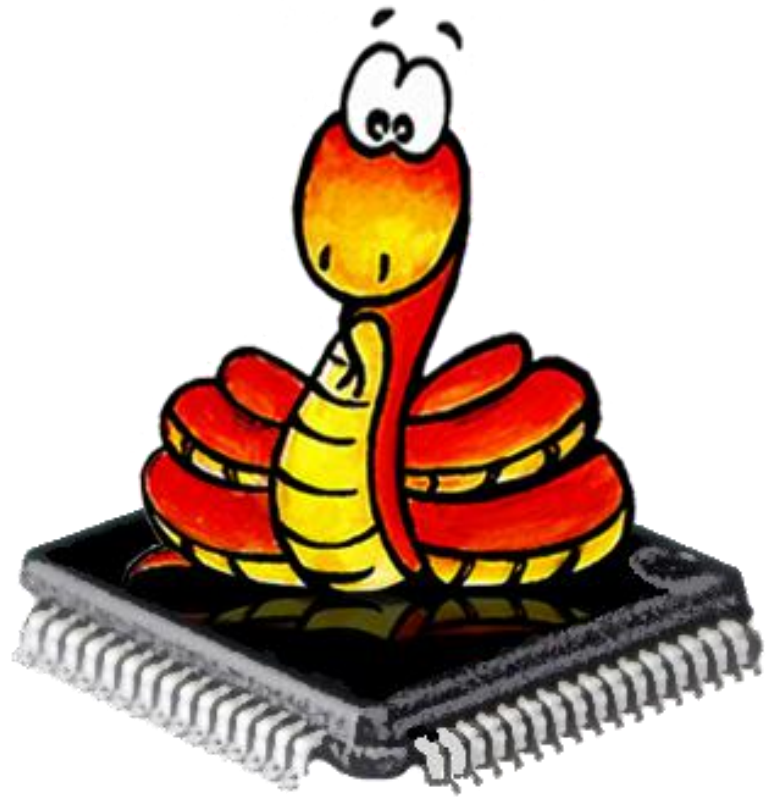
$$y_{it} = \beta' x_{it} + \mu_i + \epsilon_{it}$$

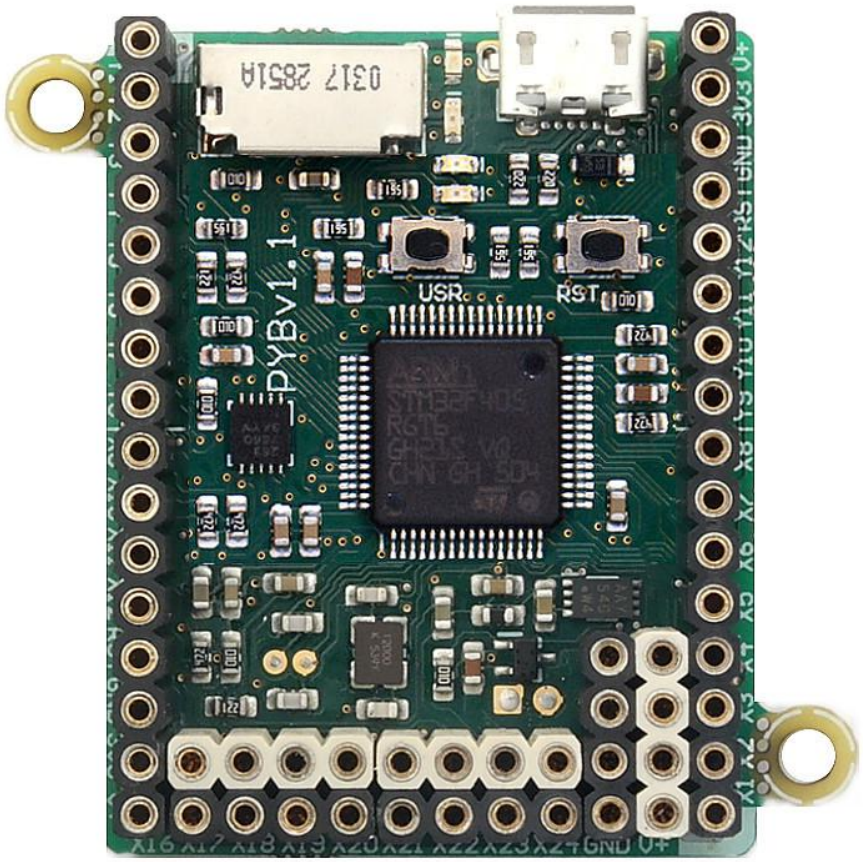


# Things Side

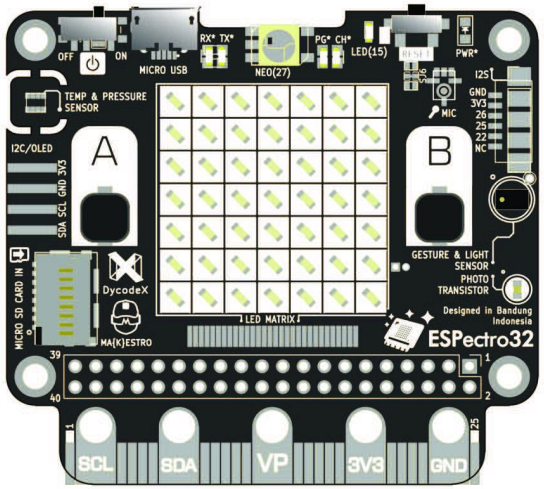


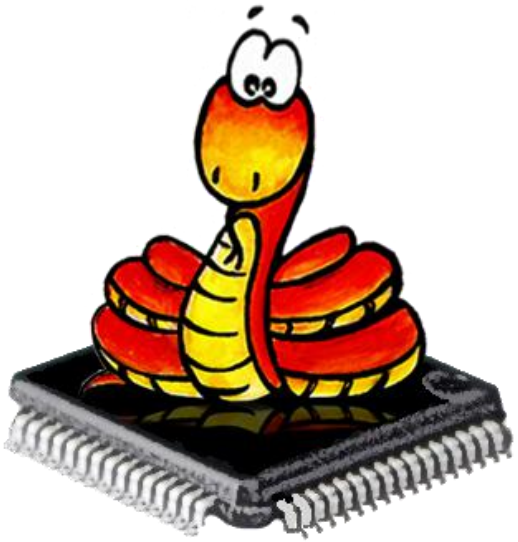
python™



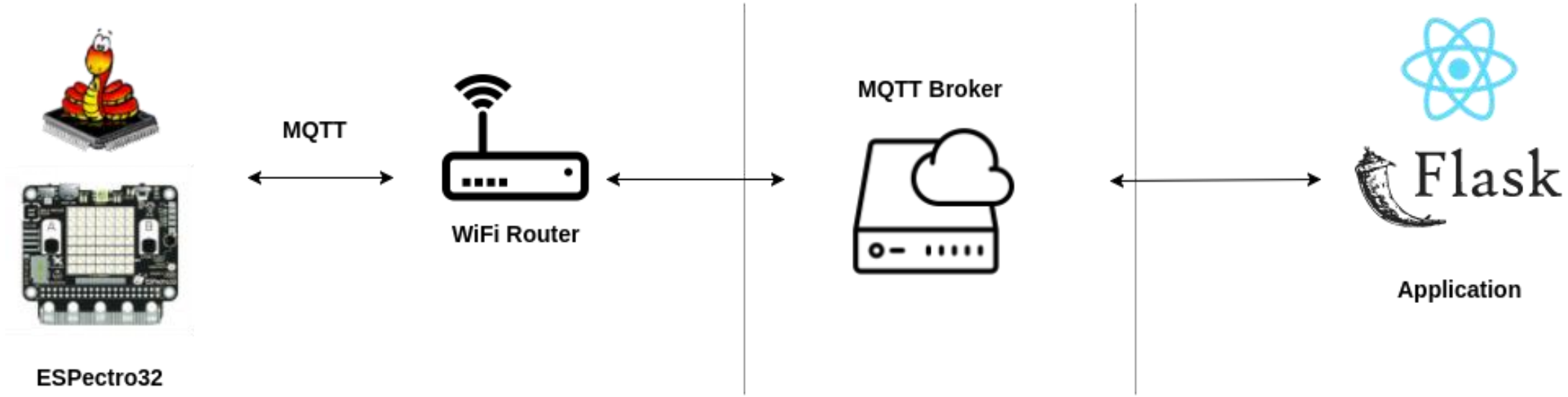



# MicroPython Pyboard


OFF
ON
MICRO USB
RX* TX*
NEO(27)
PG* CH*
LED(15)
PWR*
I2S
GND
3V3
26
25
22
NC
MIC
TEMP & PRESSURE SENSOR
I2C/OLED
SDA SCL GND 3V3
A
B
GESTURE & LIGHT SENSOR
PHOTO TRANSISTOR
MICRO SD CARD IN
DycodeX
MA(K)ESTRO
LED MATRIX
Designed in Bandung Indonesia
ESPectro32
39
40
1
2
SCL
SDA
VP
3V3
GND
25



# Simple Demo


MQTT
WiFi Router
MQTT Broker
Flask
ESPectro32
Application

# Downsides of MicroPython for ESP32

# Conclusion

- IoT brings people with different backgrounds togehter.
- Arduino still dominates the IoT & maker world.
- You can use Python almost everywhere.
- MicroPython is good tool to start learning how to program microcontrollers as a Python programmer.
- MicroPython for ESP32 can't utilize the full power of ESP32.

# Thank You!