Oracle Startup Summit FollowUp

Credentials

So .. share one tenant

Console:	https://console.us-ashburn-1.oraclecloud.com/a/
tenant:	houska_obpm
User:	IOT_Summit
Pwd:	IOT_Summit_01

Please be aware to spread instances across ADs (5 VMs each per AD 1.2/1.4, etc.)

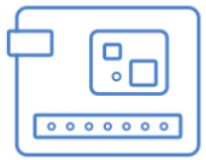
Oracle Startup Summit FollowUp

Low Power Geo Tracker on OCI

LoRaWAN™

Learn about LoRaWAN: the secure messaging protocol used by The Things Network.

Devices



Connect devices to The Things Network.

Gateways

Extend The Things Network by installing a gateway.

Network

Manage your applications and devices.

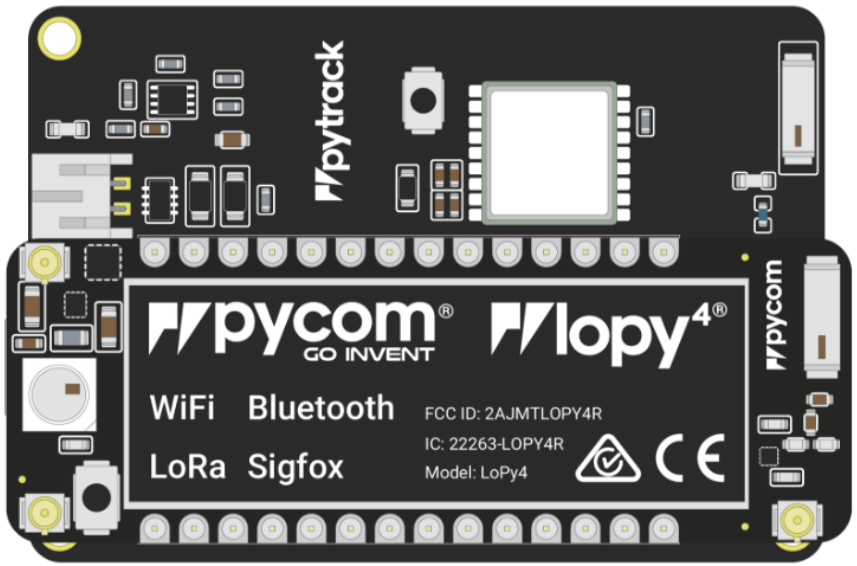
Applications

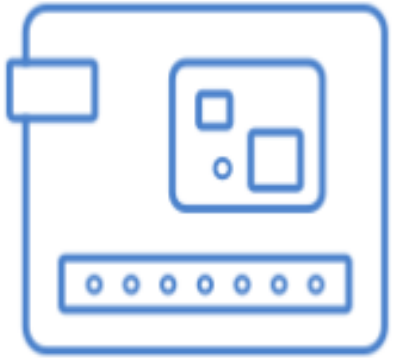
Build applications on The Things Network.

LoPy

With LoRa, Wifi and BLE, the the LoPy is the only triple bearer MicroPython enabled micro controller on the market today – the perfect enterprise grade IoT platform for your connected Things.

https://docs.pycom.io/chapter/gettingstarted/





Step 1: Setting up the hardware

In the first part of this getting started guide, we will take you through setting up your device. Firstly we will cover how to connect the module to your computer either via USB or WiFi. Secondly we will explain how to connect various accessories such as antennas or SIM cards to your module.

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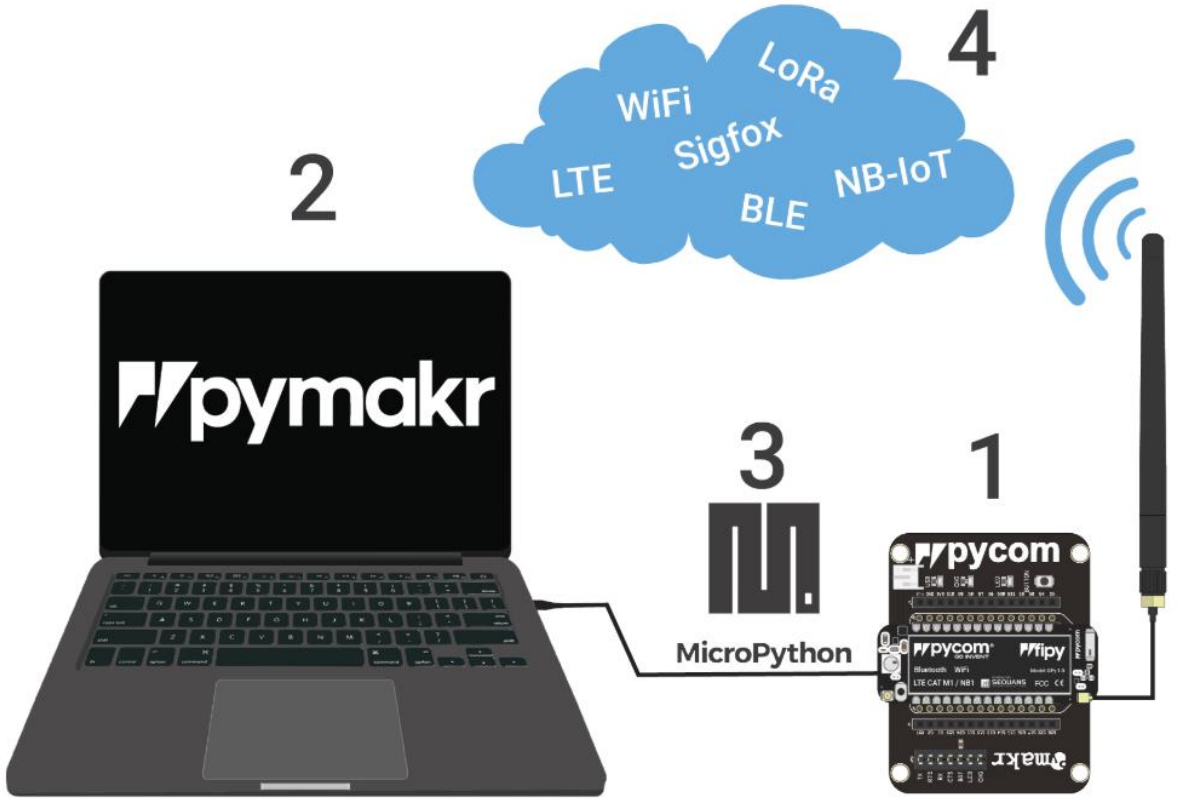
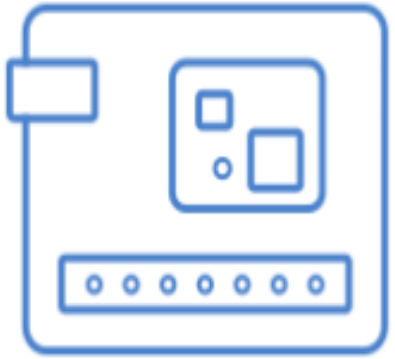
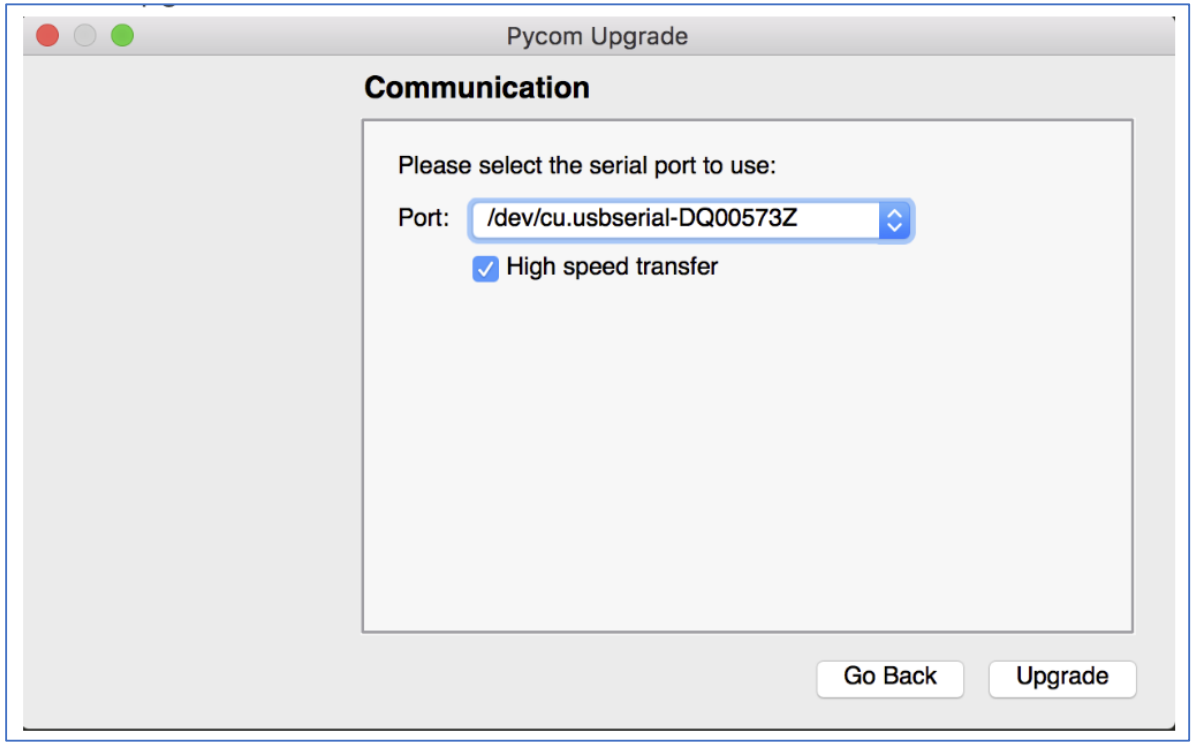
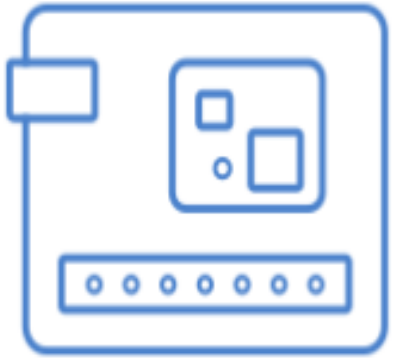




Step 2: Setting up your computer

Now that your module is successfully connected, you will need to install some software on your computer to interface with it. The second part of this guide will guide you through installing drivers; performing firmware updates for your module/accessories to ensure you have the most stable and feature packed version; and how to setup the software use to program the device.





https://docs.pycom.io/chapter/gettingstarted/

done

Install homebrew:

- /usr/bin/ruby -e "$(curl -fsSL https://raw.githubusercontent.com/Homebrew/install/master/install)"

Updating Firmware of Expansion Board via USB Cable

- Download Firmware: Pytrack DFU (current: pytrack_0.0.8.dfu)
- Install DFU Util: brew install dfu-util
- Update: dfu-util -D pytrack_0.0.8.dfu (via Serial USB)

Updating Device Firmware via Serial USB

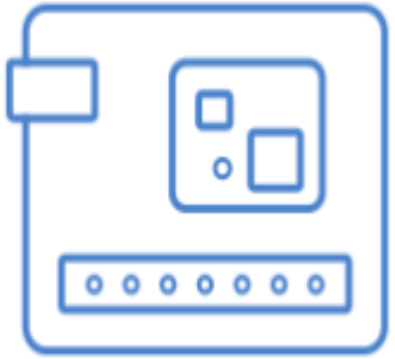
- https://software.pycom.io/findupgrade?product=pycom-firmware-updater&type=all&platform=macos&redirect=true
- Install ./*.dmg

Your **LoPy4** was successfully updated.

Version: **1.17.5.b2** [pybytes]

The Sigfox ID is: 004D357A

The Sigfox PAC is: FD114BD165EEBA51

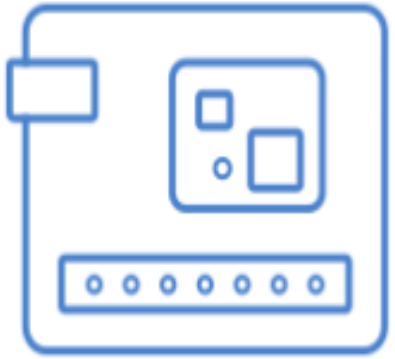


Development Environment: Pymakr is a plug-in for Atom and Visual Studio Code developed by Pycom to make development for Pycom modules super easy. It allows you to use your favourite text editor while simplifying the process of uploading code to the device.

To make it as easy as possible Pycom has developed a plugin for two popular text editors, called Pymakr. These Plugins have been built and are available for the following platforms:

ATOM

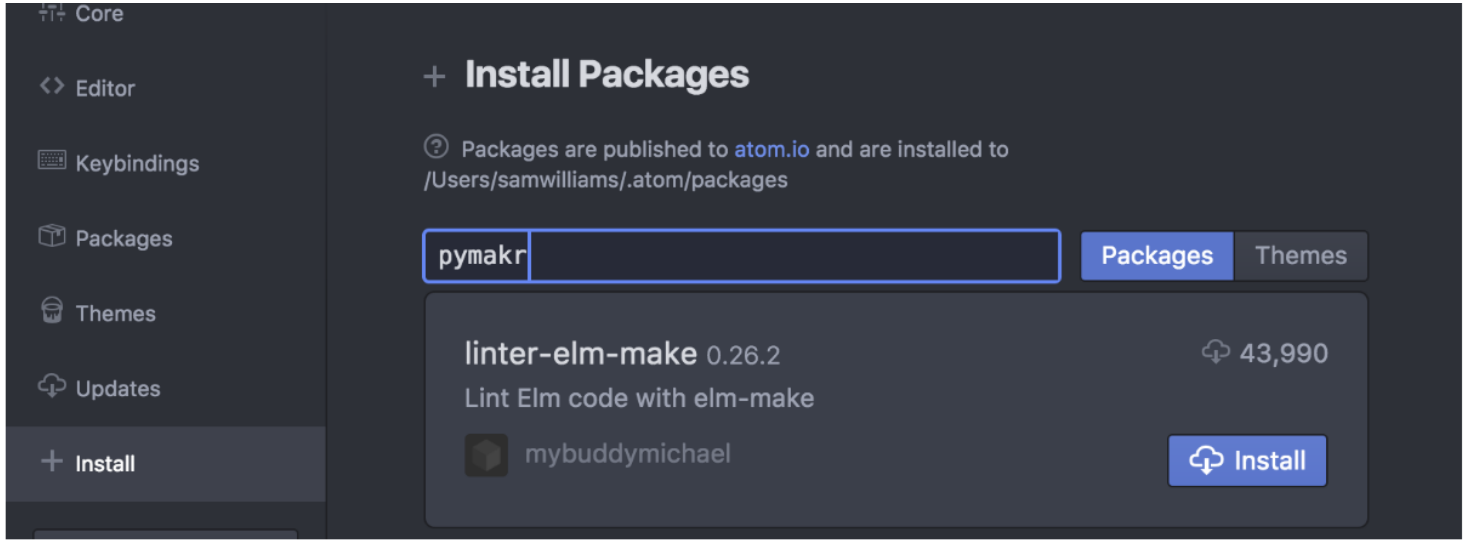
VS Code

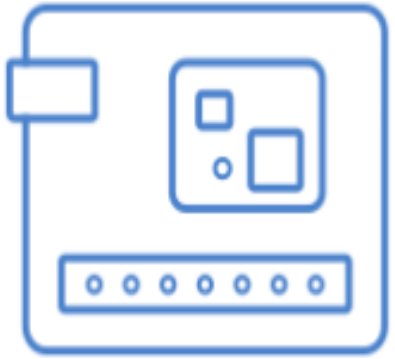


Install ATOM (or VS Code)

- https://docs.pycom.io/chapter/pymakr/installation/atom.html

Install PyMkr Plug-In





Step 3: Using your module

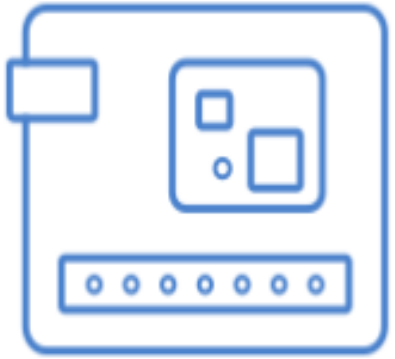
Now that you have a connected module and all the required software installed it is time to begin programming your device. This part of the guide will get you started with a basic example and point you in the right direction for getting your device connected to your chosen network.

3/4

- **Introduction to MicroPython:** This page will explain what Micropython is and its relation to Python.
- **MicroPython Examples:** We also recommend you browse these short MicroPython examples to familiarise yourself with its syntax. This is not meant as a comprehensive guide to MicroPython programming but rather a reference to those who already know programming. If you are new to python, or programming all together, we highly recommend searching the internet for Python tutorials. There are many very good tutorials available for free and the skills you learn will be easily transferable to our platform.
- **Your first Pymakr project:** Once you understand what MicroPython is, this guide will take you through setting up your first Pymakr project to blink the on-board RGB LED. This guide will explain the structure of a MicroPython project as well as how to upload it to your module.

Once you are familiar with MicroPython and Pymakr, the recommended way of uploading code to your module, you can explore the pages below. These will discuss in greater detail the various mechanisms for running code on your device as well as how to recover it if something goes wrong.

- **REPL:** The REPL (Read Evaluate Print Loop) is an interactive terminal that allows you to type in and



Connect via USB Cable using Atom (prep. DONE, just fyi)

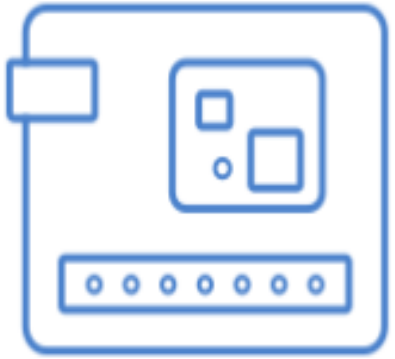
```
Found 1 serialport
/dev/tty.usbmodemPy0d1df1 (Pycom) (copied to clipboard)
Connecting on /dev/tty.usbmodemPy0d1df1...

>>>
```

Connected to sensor via the IP interface:

1. Connect local host (notebook) to the Lopy4 WiFi AP
   - LoPy4-wlan-cde4 & LoPy4-wlan-4f80 (pwd: www.pycom.io)
2. Connect to 192.168.4.1 using telnet/ATOM.
   User: micro, pwd: python

```
>>>
>>> import pycom # we need this module to control the LED
>>> pycom.heartbeat(False) # disable the blue blinking
>>> pycom.rgbled(0x00ff00) # make the LED light up green in colour
>>>
```



Step 4: Connecting to a network

Now that you familiar with programming your device you will no doubt be keen to get it connected to one of the advertised wireless networks. This usually requires some registration. This step will detail how to get registered and connected to various wireless networks.

4/4

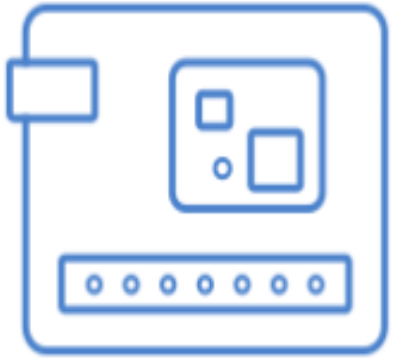
Some of our devices require registration before you can utilise specific features such as certain types of networking. Please see the list below for setup guides to ensure that your device is registered and activated on the various platforms required to access all of the available features.

sigfox

LoRaWAN™

LTE-M

NB-IoT™

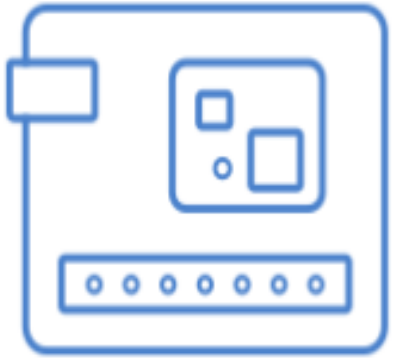


Create an application

In order to register your device to connect to the things network, you must first create an application for these devices to belong to. This way the Network will know where to send the devices data to.

https://docs.pycom.io/chapter/gettingstarted/registration/lora/ttn.html

Application ID	oracle_iot-summit_app
Description	iot application to register and connect lopy4 to gw
Created	21 seconds ago
Handler	ttn-handler-eu *(current handler)*

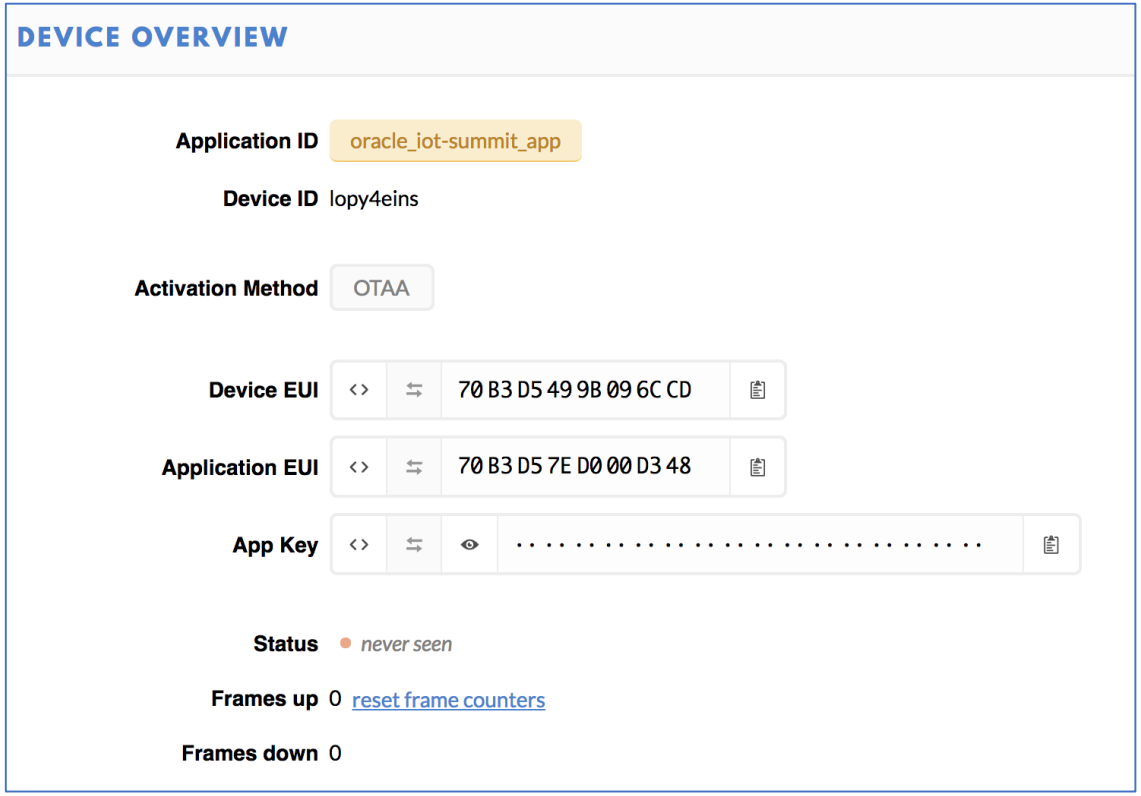


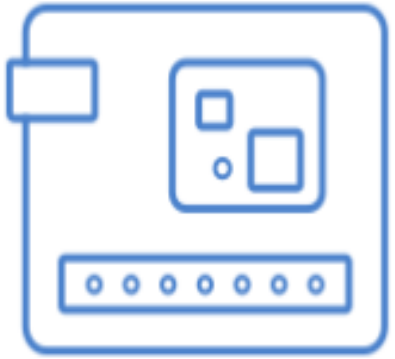
https://docs.pycom.io/chapter/gettingstarted/registration/lora/ttn.html

done

Register Devices (Lopy4eins and lopy4zwei)

To connect nodes to a things network gateway, devices need to be added to the application. To do this, navigate to the Devices tab on the Application home page and click the Register Device button.





https://docs.pycom.io/chapter/tutorials/lora/lorawan-otaa.html

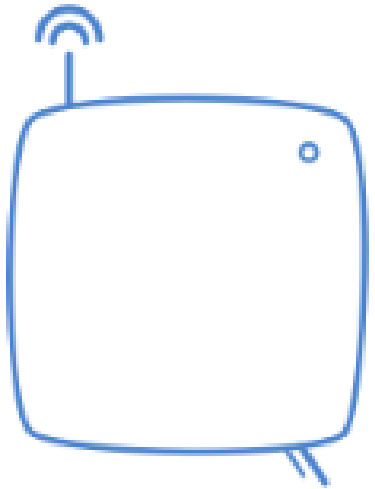
done

Connect Sensor to App-EUI and App-key (LoRaWan Gateway)

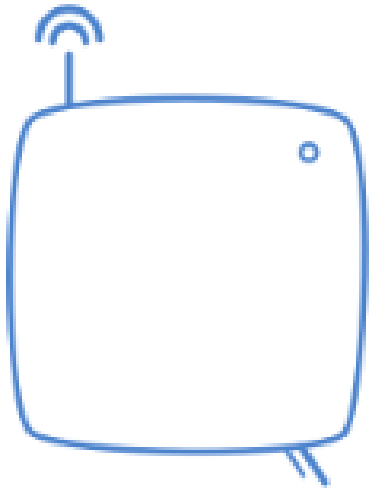
```
from network import LoRa
import socket
import time
import binascii
lora = LoRa(mode=LoRa.LORAWAN, region=LoRa.EU868)

# create an OTAA authentication with parameters (from lopy4eins)
app_eui = binascii.unhexlify('70B3D57ED000D348’)
app_key = binascii.unhexlify(‘initiated_on_gateway’)

# join a network using OTAA (Over the Air Activation)
lora.join(activation=LoRa.OTAA, auth=(app_eui, app_key), timeout=0)
```



The Things Gateway enables devices such as sensors and embedded computers to connect to the internet. With an easy to connect process, you are creating the most substantial aspect of your IoT data network. Activate the gateway in just 5 minutes and create your own local network. With the capacity to serve thousands of nodes, the gateway is the main building block of your connected network. This version operates at 868MHz for use in the EU and 915Mhz for use in US.



GATEWAYS

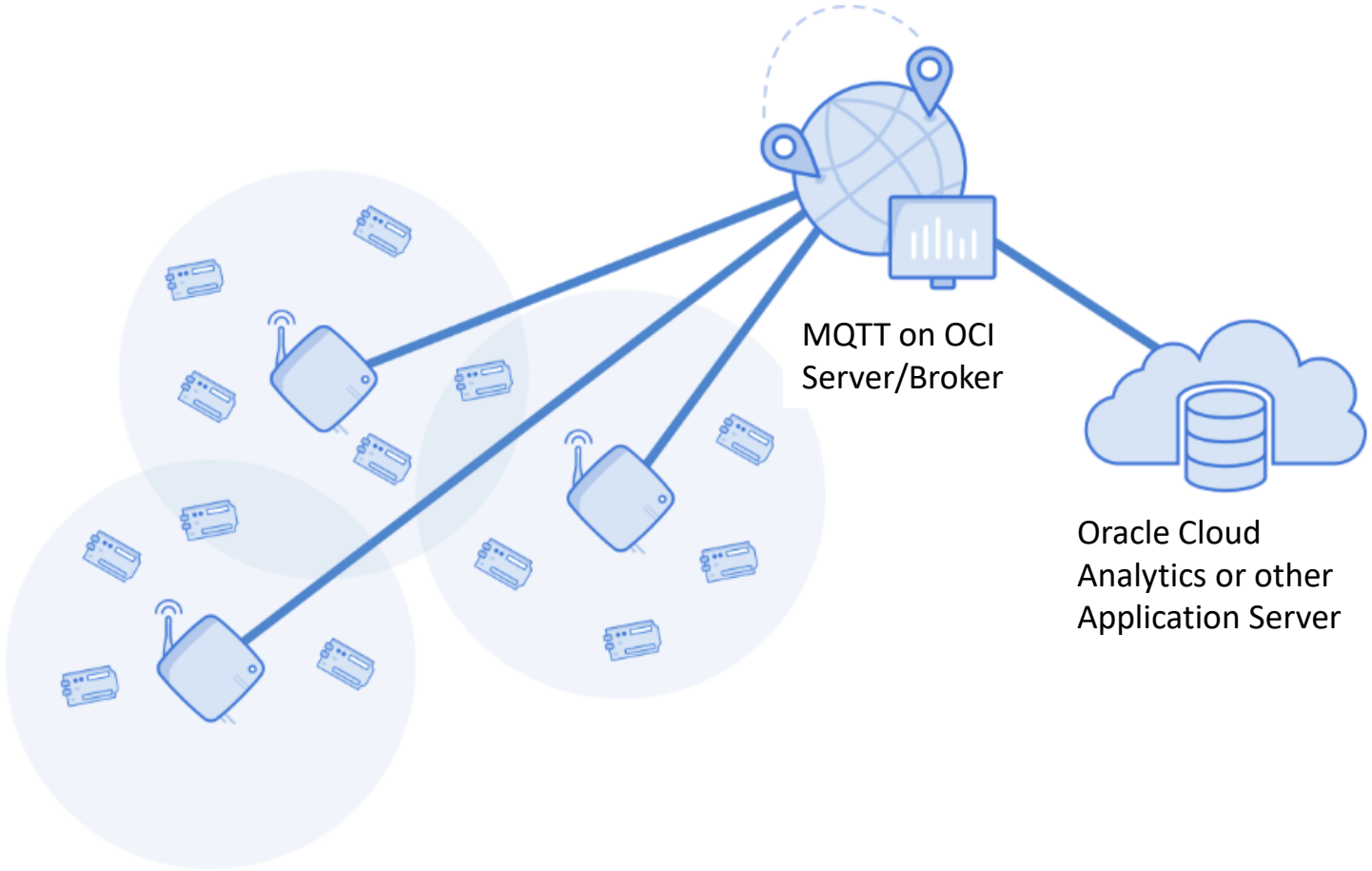
register gateway

oracle_summit | IOT Gateway for Startup Summit FollowUp on 14th.05.2018 (have fun) | connected | EU_863_870

Activation:	https://activate.thethingsnetwork.org (needed to connect Gtw to internet, step2)
	http://activate.thethingsnetwork.org/?gw_id=oracle_summit
WLAN/Inet:	use your phone as hotspot (remark: clear-guest doesn't work due to user/pwd lim.)
Console:	https://console.thethingsnetwork.org/gateways/oracle_summit
	check if Gtw is connected (reamark: can take few mins)
Gateway:	oracle_summit
User:	oracle_iot_summit
pwd:	oracle
Owner:	Robert.houska@oracle.com (in case)
Router:	ttn-router-eu
Gatewaykey:	https://console.thethingsnetwork.org/gateways/oracle_summit

. . . . . base64

ttn-account-v2.EViTGDlwBKEkCp2wb8QdcvdZYEnnwtiIw42PJNnSImbKAzB439n4OBdw2WJsSpP3EZO0i9OijSlFq8klQGMJhg



MQTT is a machine-to-machine (M2M)/"Internet of Things" connectivity protocol. It was designed as an extremely lightweight publish/subscribe messaging transport.