Sigfox – Getting started

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Sigfox: Global LPWA network

Low power,
to provide autonomy

Global,
to be used everywhere

Low cost,
to address everything

Easy to use,
and adopted quickly

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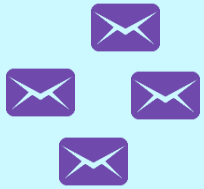
WHAT DO WE PROVIDE?

A network for connected objects transporting the data from your device to your IT systems

Object data

0 to 12-byte messages optimized for sensor data

Transmitted through its radio protocol on the **public spectrum**



0 to 140 messages per day per device

Global network

High capacity network: over 1 million messages per Base station per day

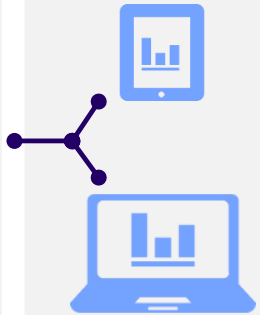
SIGFOX cloud

Identification and authentication integrity

Big Data analytics platforms

Data storage and intelligence for verticals

Customer IT



Partners with specific applications for your business

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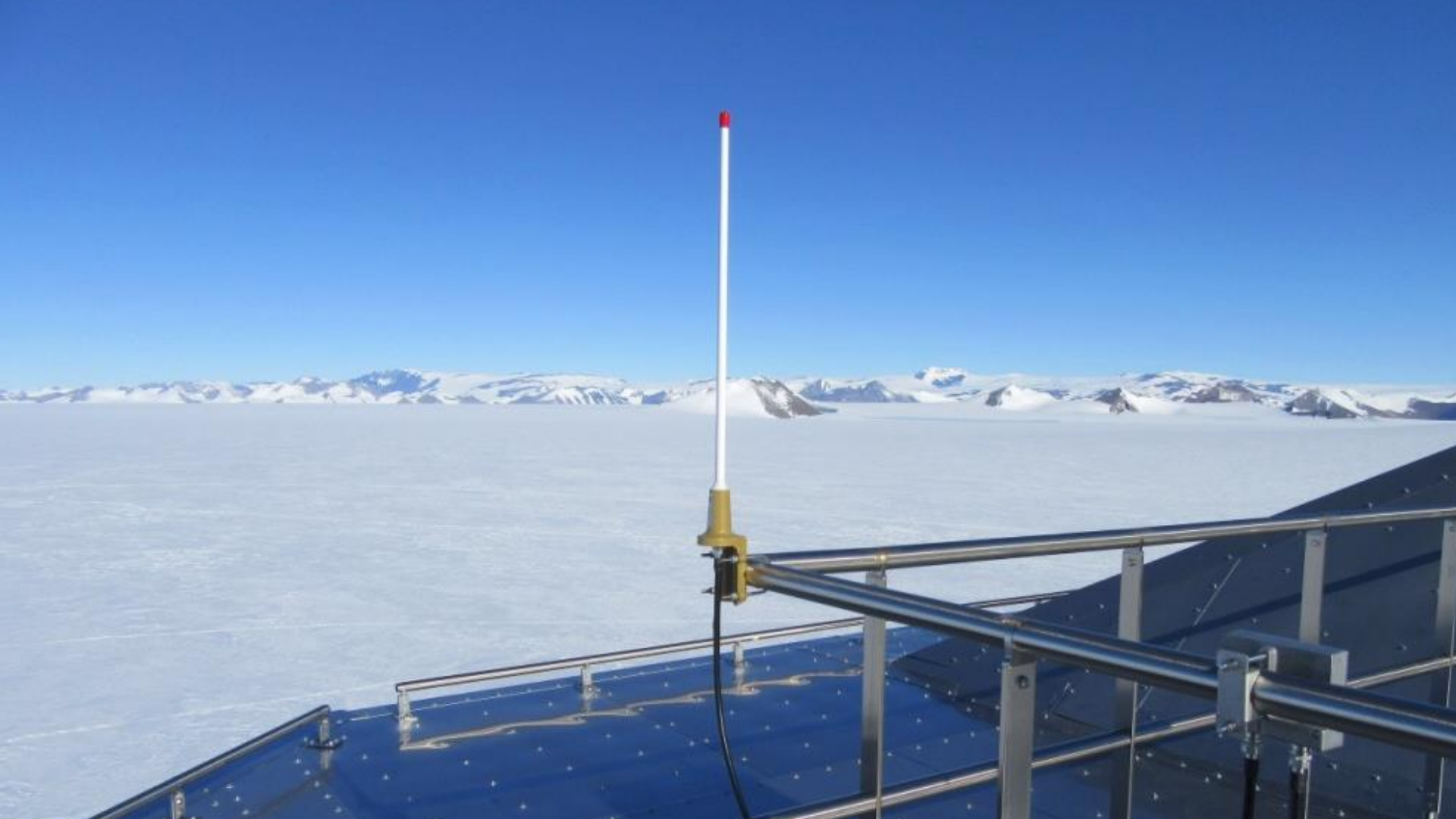
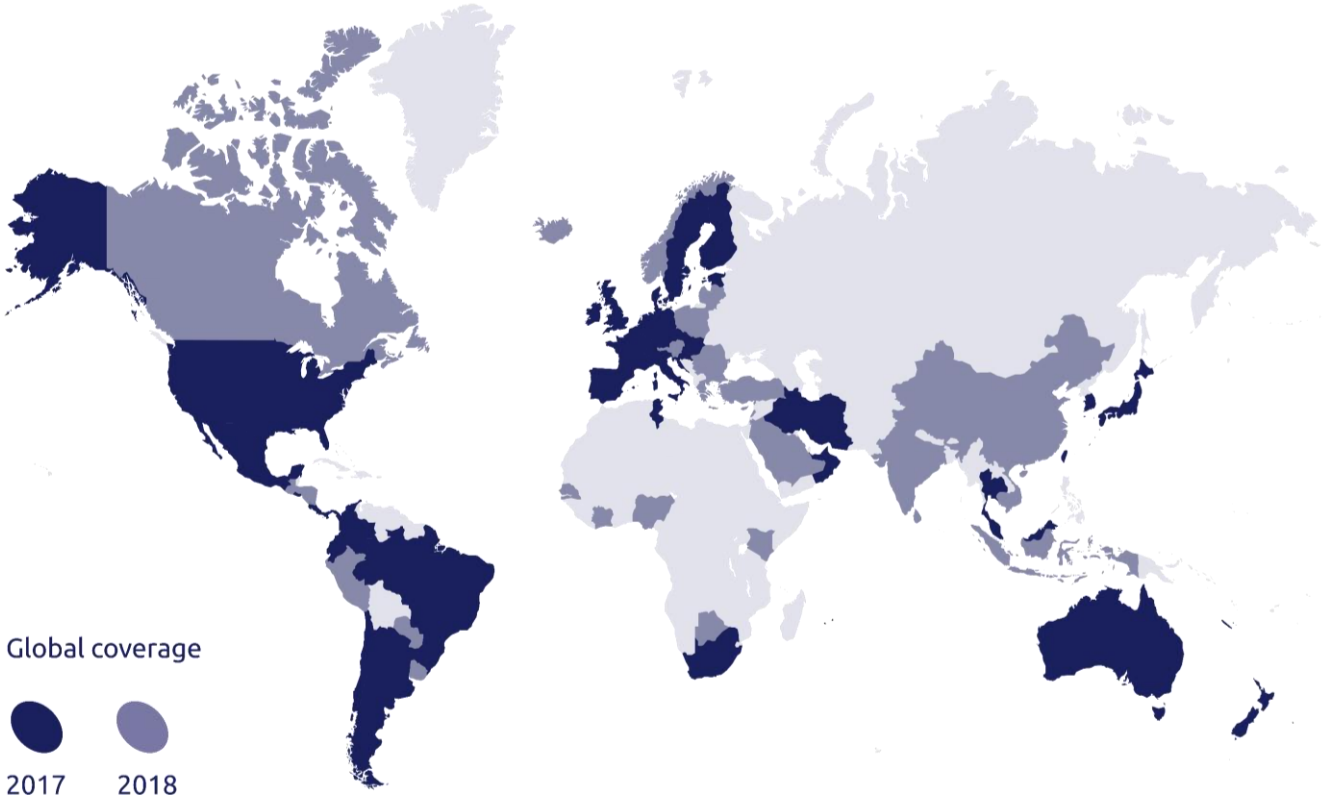


Presence in 45 countries



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Home Alarm Syster

Challenge

Alarms are traditionally connected through GSM to central system and burglar intrusion can be facilitated by GSM jammers. There is a need for effective backup connectivity to ensure more robust alarm transmissions.

Solution

Sigfox has upgraded Securitas Direct's alarm systems to provide a back-up connectivity in case jamming is detected.

The upgrade was possible over the air as a Sub-GHz chip was already inside.

Benefits

- Robustness of solution is a commercial differentiator
- Continuity of service
- Soft deployment via over the air update - no HW swap. No user impact
- Network available to handle millions of devices

Connected Defibrillators

PYRES.COM

AIVIA

IMPROVE YOUR UPTIME

Challenge

Defibrillators are often located in remote areas where it is hard to regularly perform auto tests of equipment to ensure they are functioning correctly. Customers who own several defibrillators (e.g. industry) want central supervision. Previously connected boxes were expensive (GSM) and needed to be wired.

Solution

A wall mounted box compatible with Philips HS1 defibrillator, sending monitoring information :

- Door status (open / close)
- Defibrillator's status (OK / NOK)
- Daily Auto test & Battery test

Benefits

- Working defibrillator guaranteed
- Easy installation
- Added value services: notifications, central supervision
- Fully wireless: no mains power
- Low power: 4 year autonomy (LR)
- Plug & Play customer installation

Alternative partners for this application

Laerdal helping save lives

AED MAP

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Connected bee hives

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Technology Concepts

Complex ?

You send an AT command to your module

You receive the answer on your server

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SMALL MESSAGES

Payload size examples

- 6 bytes: GPS coordinates
- 2 bytes: temperature reporting
- 1 byte: speed reporting
- 1 byte: object state reporting
- 0 byte: heartbeat (demonstrate when an object is alive)

SIGFOX CLOUD

UPLINK
12-Byte payload

- Sensor data
- Event status
- GPS fix
- Application data

1 % duty cycle for Objects
Up to 6 messages/hour

DOWNLINK
8-Byte payload

- Action / actuator trigger
- Device management
- Application parameter setting

10 % duty cycle for Base Stations
4 guaranteed downlink msg/day

Long range

Ideal cases

+200 kms(record at 1151km) ~ Free Space

Reality

City: 2-10 km (Longley-Rice model)

Rural: up to 100km

= Network cheaper to deploy

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OUTBOUND INTERFACES

1. Web application (aka the Sigfox backend)
   - Technical interface : devices, device types, groups, users management…
   - Raw payload view : No analytics, BI or business application.
2. HTTP REST API
   - Same features as the backend, but scriptable,
   - Customer applications pulls messages from the backend,
3. Callbacks
   - Push messages to a specified URL / email
   - Multiple callbacks are possible.

SILICON SOLUTIONS CLUSTERING

Different silicon solutions for different design approaches

Dev Kits / Evaluation Board

- First steps with sigfox technology
- Evaluation of Transceiver, SoC, modules

Modules (Sigfox only or Multi-connectivity)

- Complete modem Sigfox certified and type approved

Transceiver / SoC

- Standalone chipset(s) used for reference designs, modules and/or combos

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Getting started with Sigfox and Pycom board

Requirements

- SiPy board
- Extension board
- Antenna with u.FL connector
- Micro-USB cable (not provided)
- Atom IDE (atom.io) with pymakr plugin
  - Instructions: https://docs.pycom.io/pycom_esp32/pycom_esp32/pymakr.html
- Source code examples
  - https://github.com/aureleq/sipy-workshop

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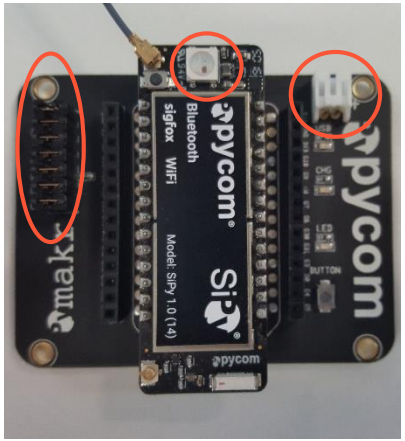
First steps



- Connect SiPy to extension board
  - Check the pinout (LED on same side as USB connector)
  - Check jumpers on the left are all in place
- Connect antenna cable to the u.FL connector near the LED
- Connect the micro-USB to your PC/Mac and launch atom

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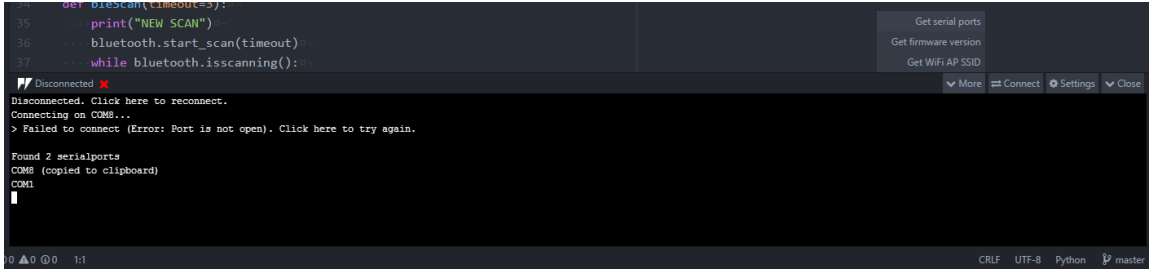
First steps

- Retrieve serial port and set it in pymakr global settings



- Click Connect to get the prompt

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Hello World example

sigfox-helloworld.py — C:\Users\AurélienLequertier\OneDrive - SIGFOX\Code\Pycom\hackathon-casino — Atom

File Edit View Selection Find Packages Help PlatformIO

Project

- hackathon-casino
  - example-ble-sigfox
    - boot.py
    - main.py
  - example-sigfox
    - sigfox-downlink.py
    - sigfox-helloworld.py
  - README.md

main.py | sigfox-helloworld.py

```python
from network import Sigfox
import socket
import binascii

# init Sigfox for RCZ1 (Europe)
sigfox = Sigfox(mode=Sigfox.SIGFOX, rcz=Sigfox.RCZ1)

# create a Sigfox socket
s = socket.socket(socket.AF_SIGFOX, socket.SOCK_RAW)

# print Sigfox Device ID
print("ID: ", binascii.hexlify(sigfox.id()))
# print Sigfox PAC number
print("PAC: ", binascii.hexlify(sigfox.pac()))

# make the socket blocking
s.setblocking(True)

# configure it as uplink only
s.setsockopt(socket.SOL_SIGFOX, socket.SO_RX, False)

# send some bytes
s.send(bytes([0x48, 0x65, 0x6C,  0x6C, 0x6F, 0x20, 0x50, 0x79, 0x63, 0x6F, 0x6D, 0x21]))
```

Connected | More | Reconnect | Sync | Run | Settings | Close

```
>>>
>>> Running C:\Users\AurélienLequertier\OneDrive - SIGFOX\Code\Pycom\hackathon-casino\example-sigfox\sigfox-helloworld.p
y

>>>
>>>
>>>
>>>
ID:  b'004d2b0e'
PAC:  b'a89dc765e3fca6f3'
>
MicroPython v1.8.6-650-g9bacbbd4 on 2017-06-09; SiPy with ESP32
Type "help()" for more information.
>>>
>>>
```

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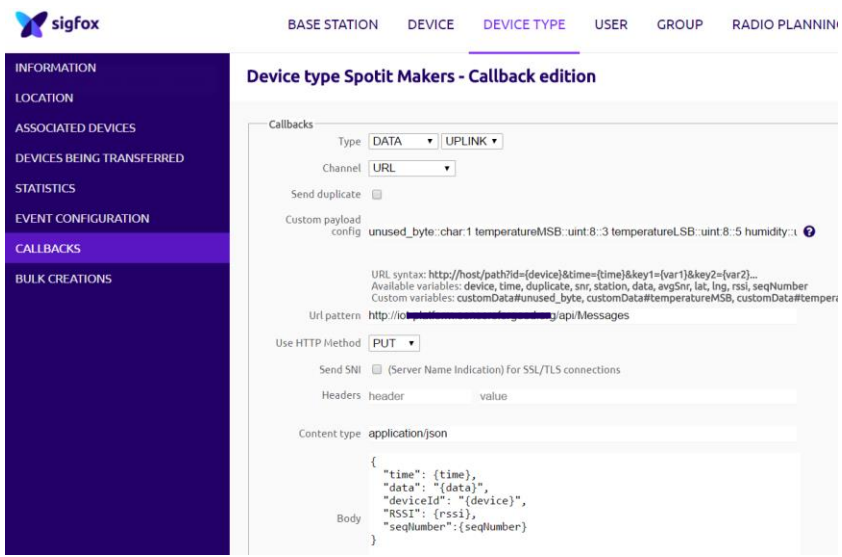
First steps

- Go to https://backend.sigfox.com/activate/ to register your board
  - Enter the ID and PAC values given by the previous example
- Select your device type to configure the callback to your application server



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Next

- https://github.com/aureleq/sipy-workshop to read about other examples
  - example-ble-sigfox

- Check online documentation
  - Pycom: https://docs.pycom.io/pycom_esp32/index.html
  - Callbacks: https://backend.sigfox.com/apidocs/callback
  - Sigfox geolocation: https://github.com/luisomoreau/iot-platform#add-sigfox-geolocalisation-service

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Thank you!

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