

IoT alla LoRaWAN style



Tom Puc

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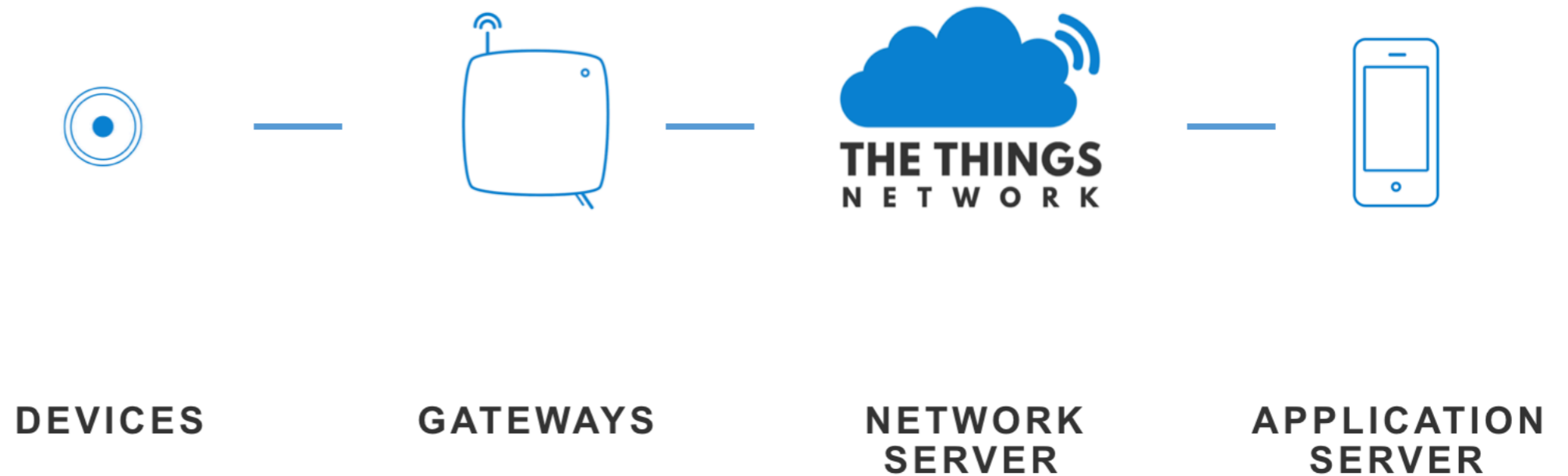
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**THE THINGS
NETWORK
NOVA GORICA**

SEE 8: 16-17 April 2019, Sarajevo, Bosnia and Herzegovina

How it works?



open source: <https://www.loraserver.io/>

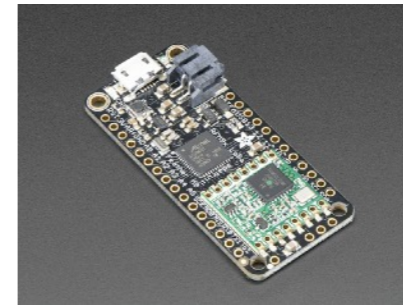
free access: The Things Network

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Devices

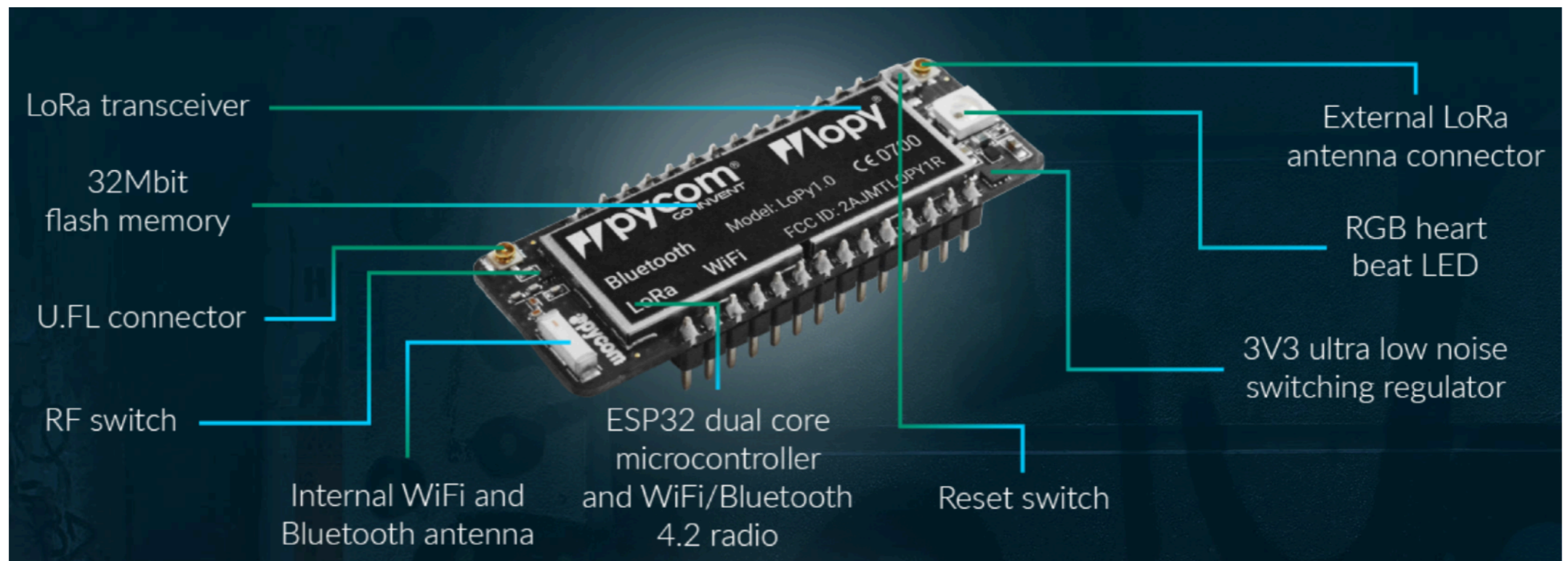


Fast prototyping for PoC

LoPy (€29.95)

MicroPython

<https://pycom.io/>



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Gateways

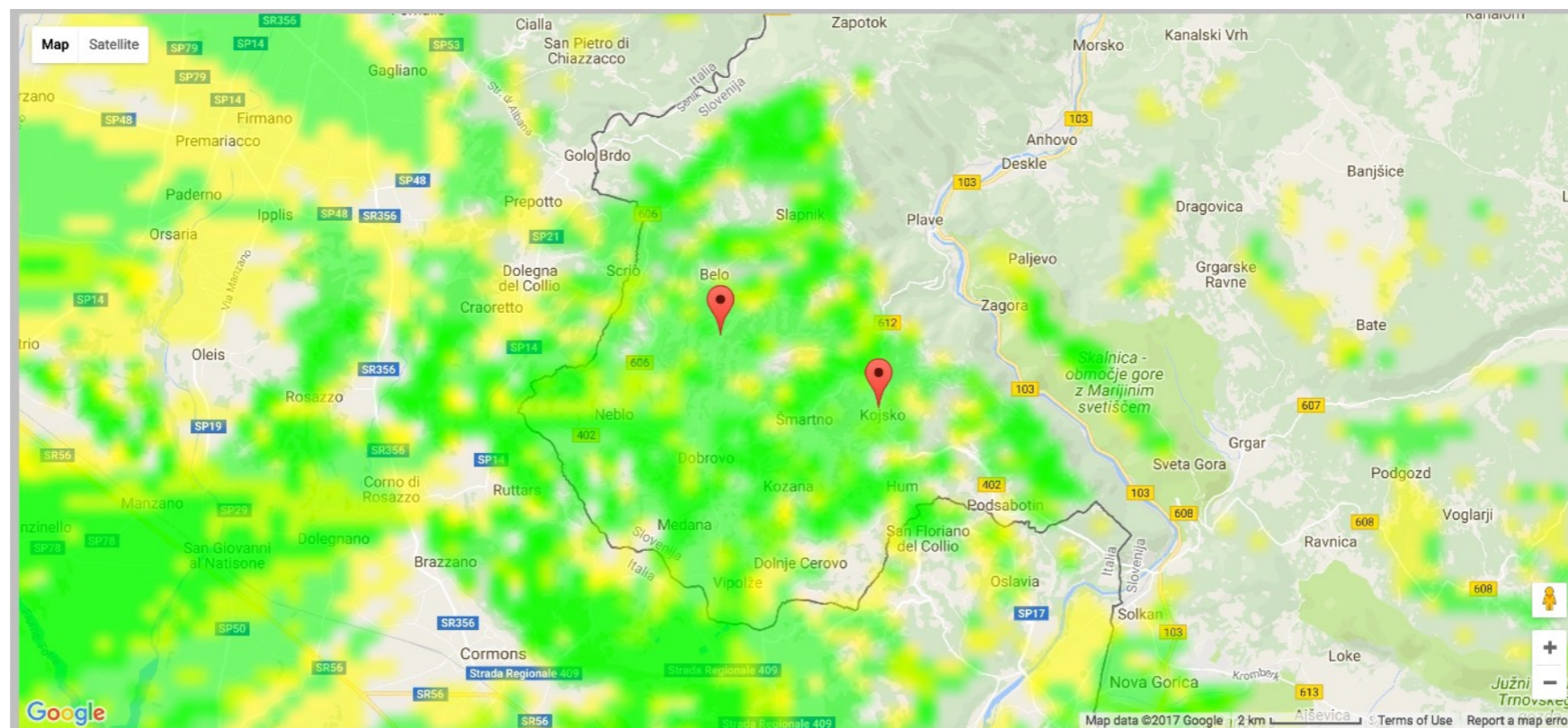


Gateways to internet

- Semtech protocol : UDP port 1700
- TTN Gateway Connector Protocol (gPRC, MQTT)

- latency
- redundancy

Location

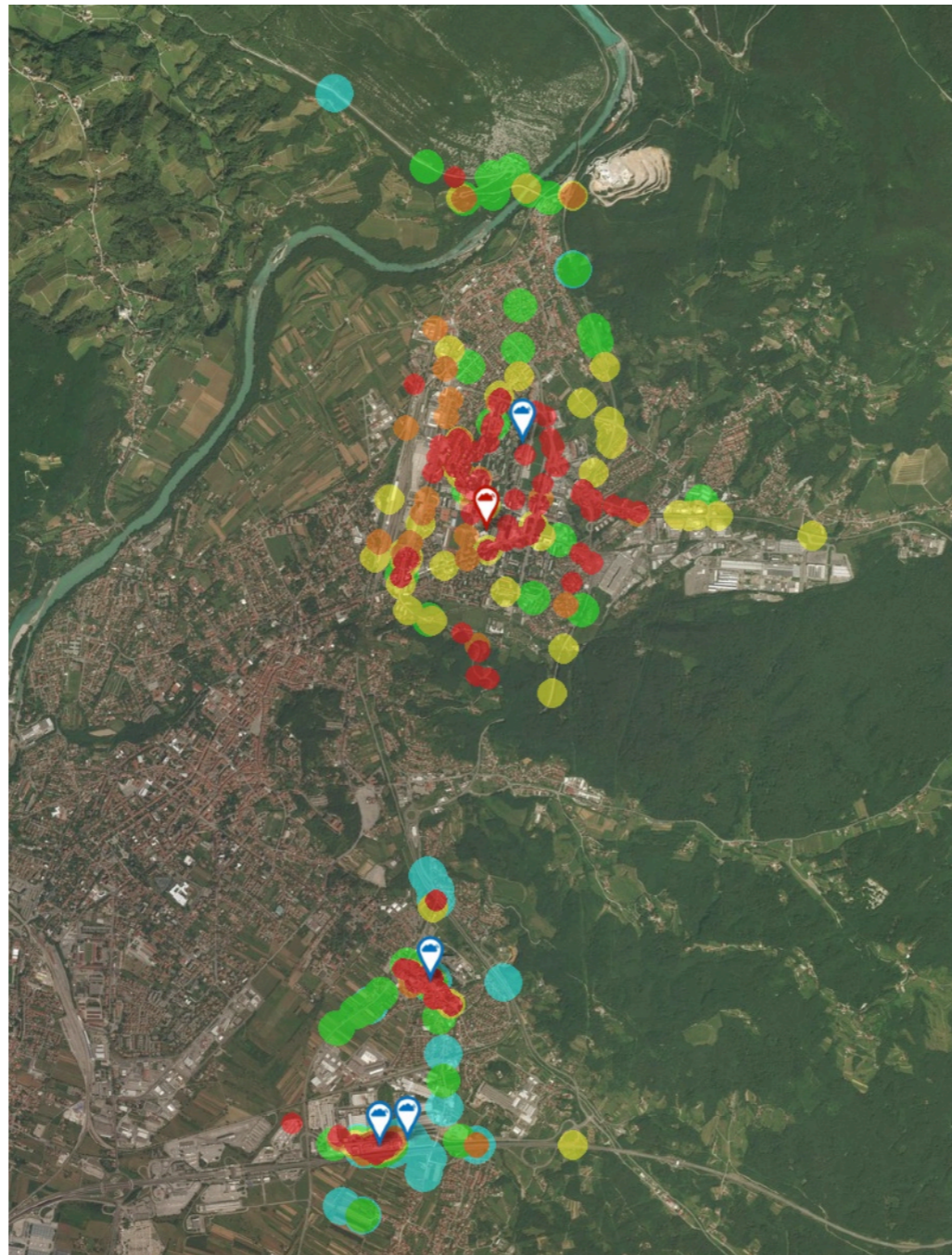


Radio coverage simulation
(Radiomobile : <http://www.ve2dbe.com/english1.html>)

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Coverage



TTN Mapper:

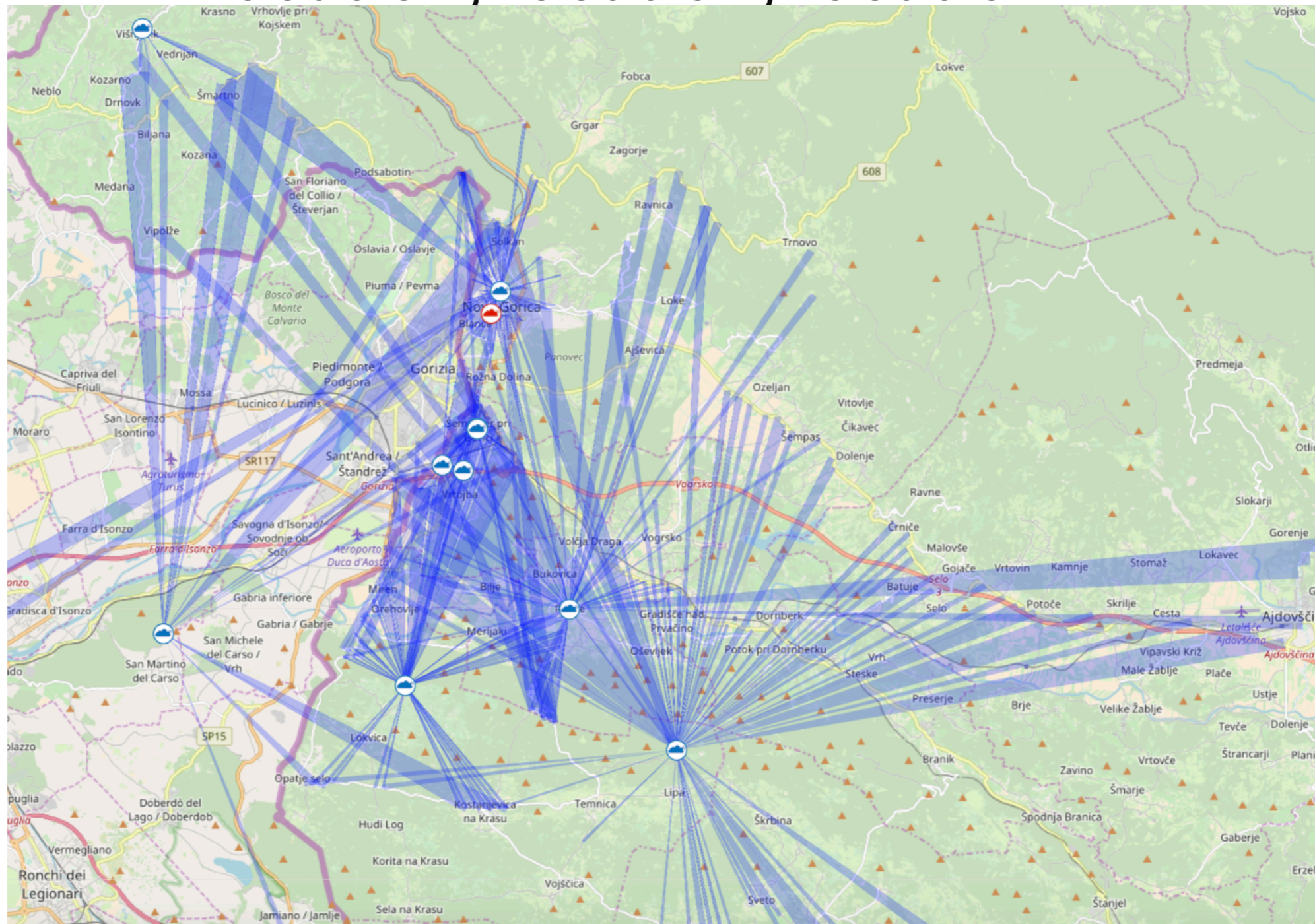
<http://ttnmapper.org/>

- mobile app + node
- “tracker” (GPS)

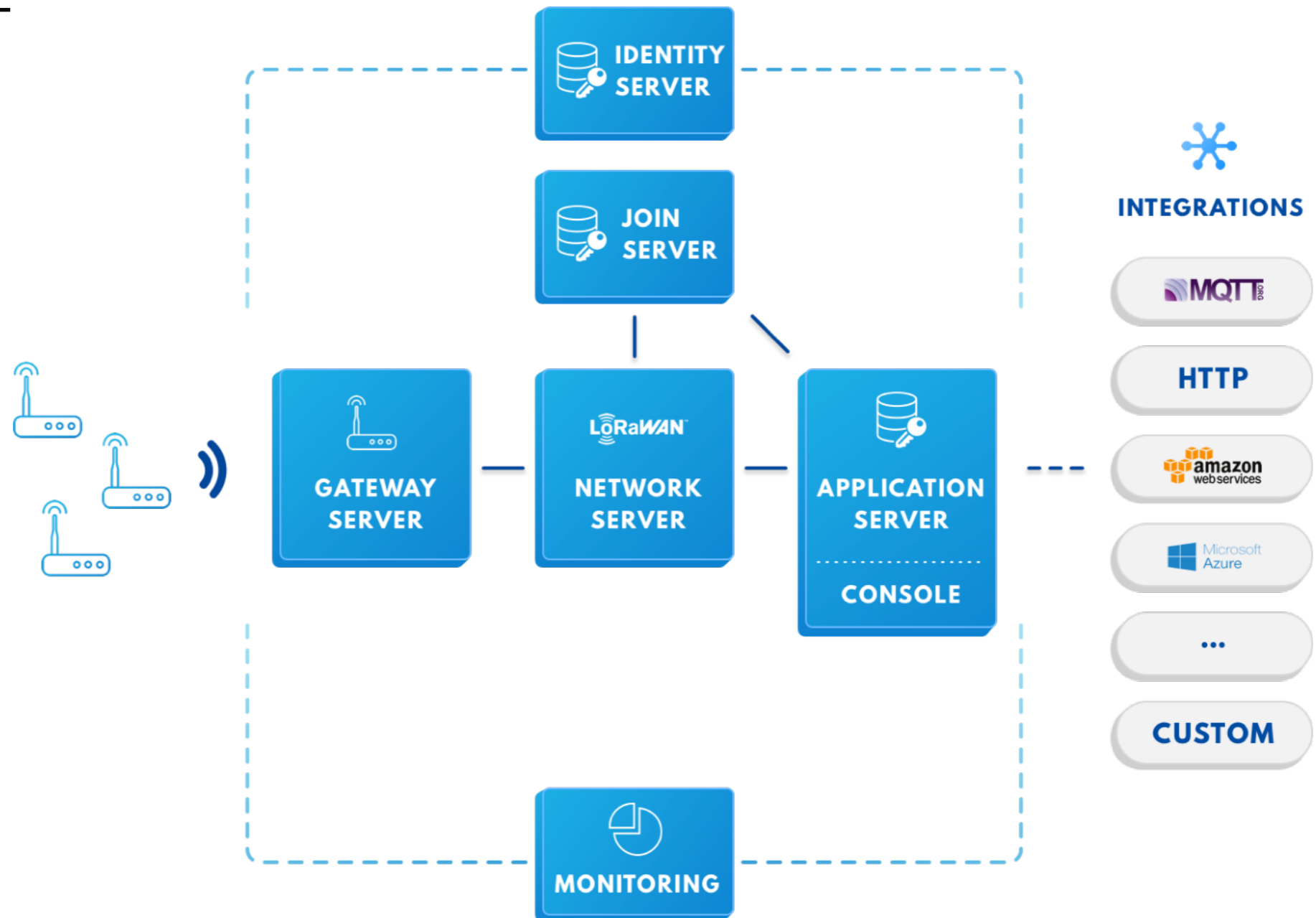
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Location, location, location ...



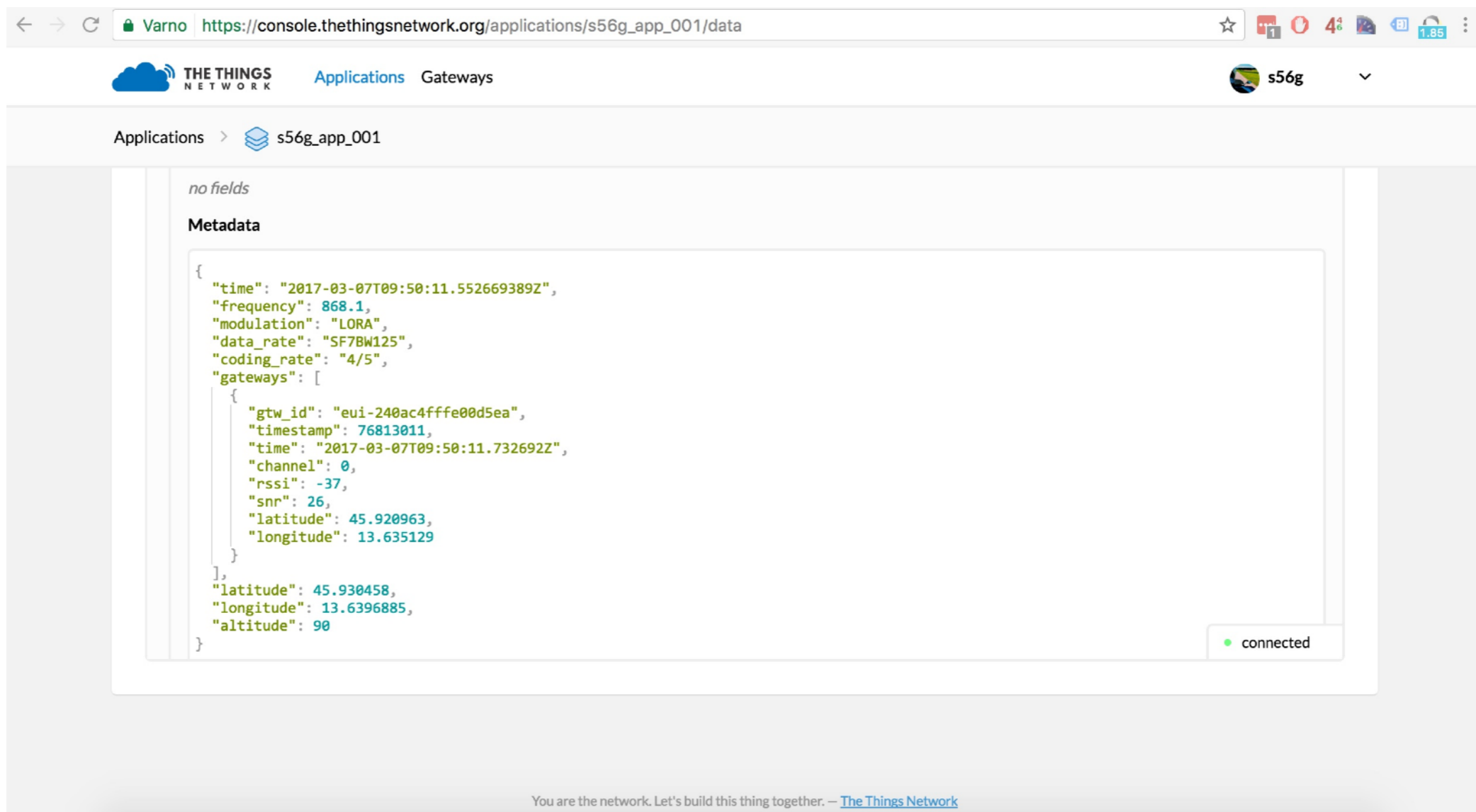
The Things Network.org



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Console TheThingsNetwork.org












The screenshot shows a web browser window with the URL `https://console.thethingsnetwork.org/applications/s56g_app_001/data`. The page header includes the The Things Network logo and navigation links for "Applications" and "Gateways". The current application is "s56g_app_001". The main content area displays "no fields" and "Metadata" with a JSON object:

```
{
  "time": "2017-03-07T09:50:11.552669389Z",
  "frequency": 868.1,
  "modulation": "LORA",
  "data_rate": "SF7BW125",
  "coding_rate": "4/5",
  "gateways": [
    {
      "gtw_id": "eui-240ac4fffe00d5ea",
      "timestamp": 76813011,
      "time": "2017-03-07T09:50:11.732692Z",
      "channel": 0,
      "rssi": -37,
      "snr": 26,
      "latitude": 45.920963,
      "longitude": 13.635129
    }
  ],
  "latitude": 45.930458,
  "longitude": 13.6396885,
  "altitude": 90
}
```

A "connected" status indicator is visible in the bottom right corner of the data area. At the bottom of the page, there is a footer message: "You are the network. Let's build this thing together. – [The Things Network](#)".

Integrations

 <p>AllThingsTalk Maker v2.6.0 AllThingsTalk</p>	 <p>Cayenne v2.6.0 myDevices</p>	 <p>COLLOS collaborative location service v2.7.4 Semtech Corporation</p>	 <p>IFTTT Maker v2.6.0 The Things Industries B.V.</p>	 <p>OpenSensors v2.6.0 The Things Industries B.V.</p>	 <p>TTN Mapper v2.7.1 JP Meijers</p>
 <p>Data Storage v2.0.1 The Things Industries B.V.</p>	 <p>EVRYTHNG v2.6.0 EVRYTHNG</p>	 <p>HTTP Integration v2.6.0 The Things Industries B.V.</p>			

Data presentation on Cayenne

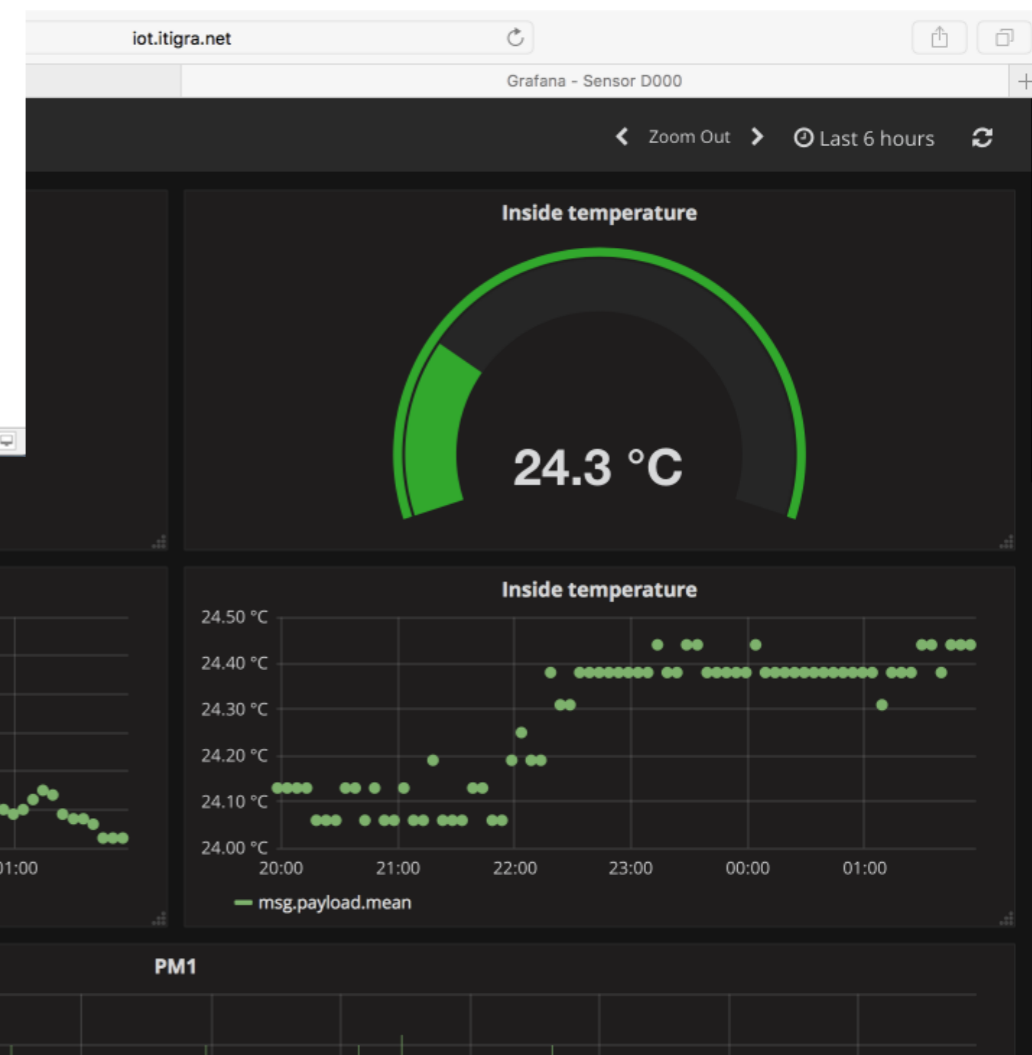
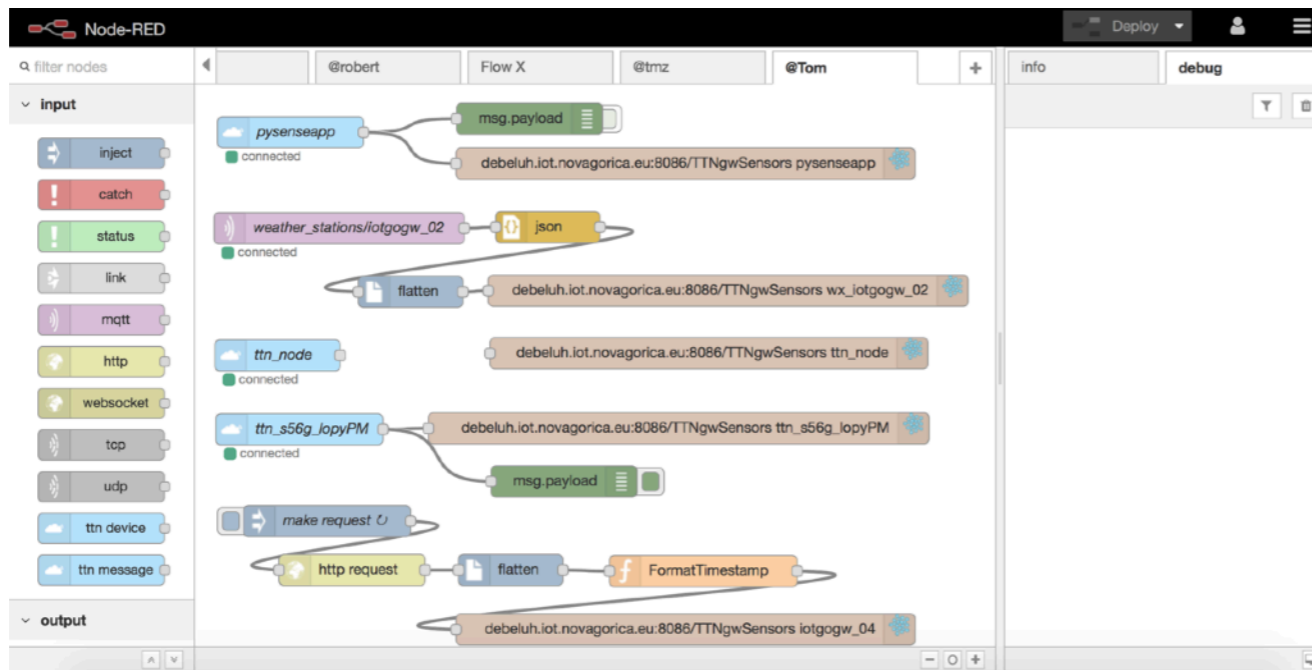
The screenshot displays the Cayenne IoT dashboard interface. At the top, the 'Cayenne' logo is visible, along with navigation options like '+ Create n...', 'Create App', 'Submit Project', 'Community', 'Docs', and 'User Menu'. The main content area is divided into a left sidebar and a main data display. The sidebar lists various sensors for the 'Cayenne LPP' device, including Accelerometer (7), Bat, Digital Input (1-3), Location, Luminosity (6), RSSI, SNR, and Temperature (5). The main display shows a 'Data' view with several sensor cards: Temperature (16.50 Celsius), Luminosity (0.00 Lux), RSSI (-63.00 dBm), SNR (10.75 Decibels), and Accelerometer (7) with X, Y, and Z axis readings (0.004 g, 0.005 g, 0.995 g). Below these is a 'Location' map showing the device's position on a street grid, with a date selector for 'Mar 27'. The bottom status bar indicates 'Last data packet sent: March 27, 2018 2:09:04 PM'.

Sensor	Value	Unit
Temperature	16.50	Celsius
Luminosity	0.00	Lux
RSSI	-63.00	dBm
SNR	10.75	Decibels
Accelerometer X	0.004	g
Accelerometer Y	0.005	g
Accelerometer Z	0.995	g

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Node-RED & Grafana



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Use case : Precision agriculture



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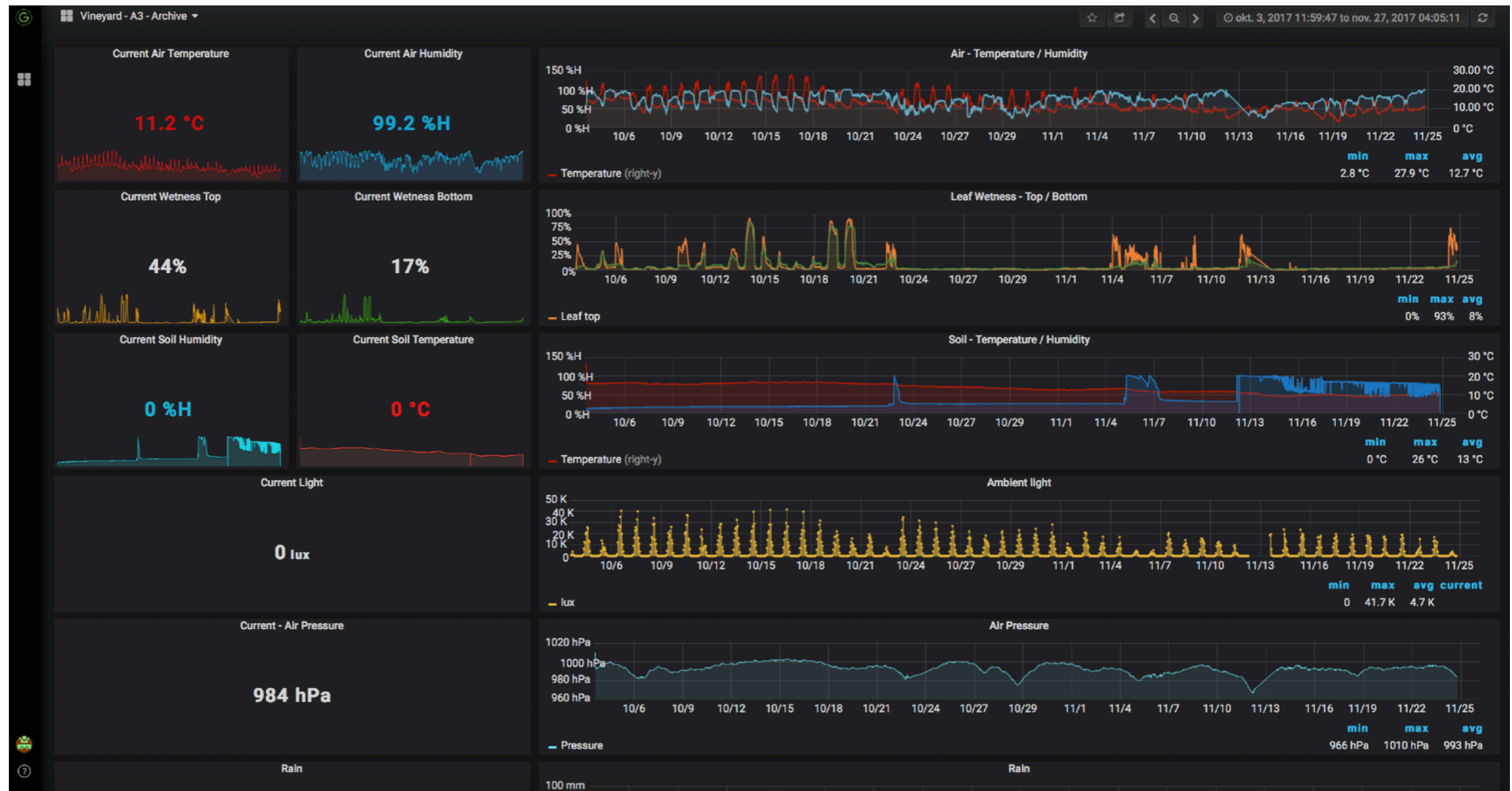
Use case : Precision agriculture



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Use case : Precision agriculture



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Use case : Particulate matter



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Use case : Particulate matter



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Use case : Particulate matter



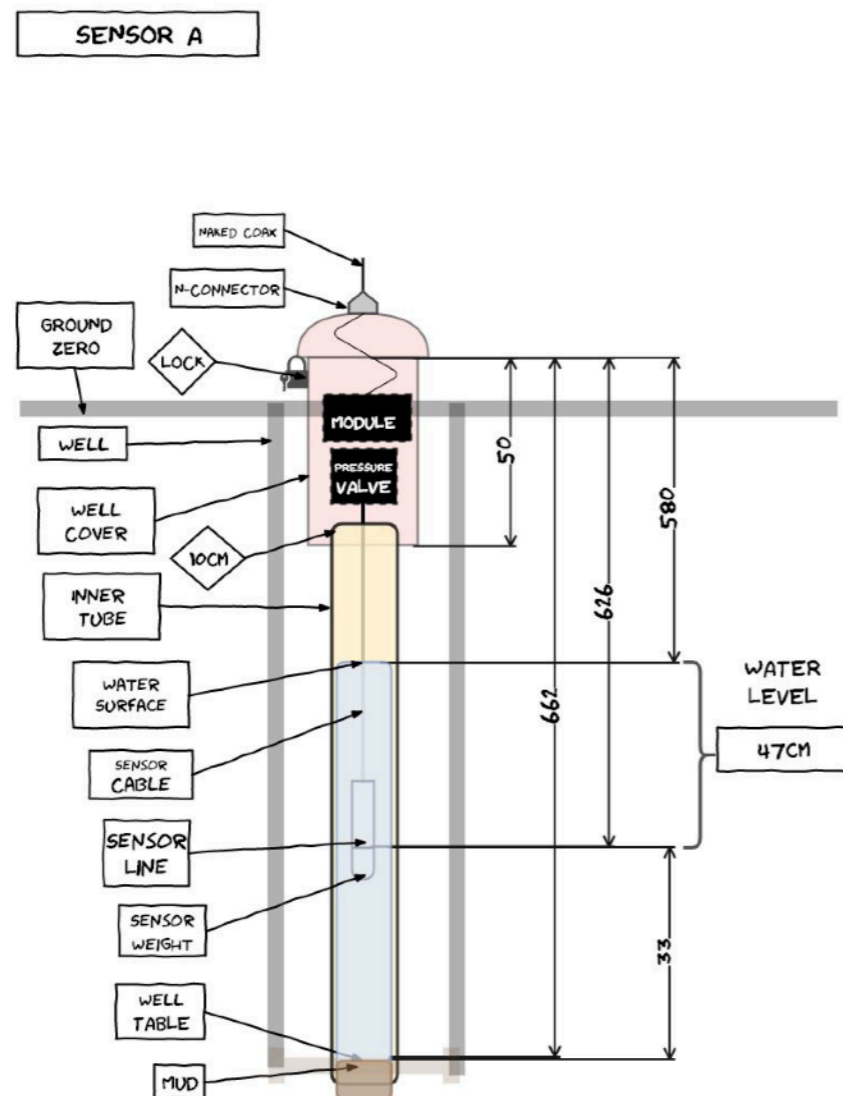
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Use case : **Water level**



Use case : Groundwater level



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Use case : Groundwater level



Use case : Groundwater level



Lesson learned:
Do not deploy edible antenna in production

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Use case : Groundwater level



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