

LoRaWAN 101

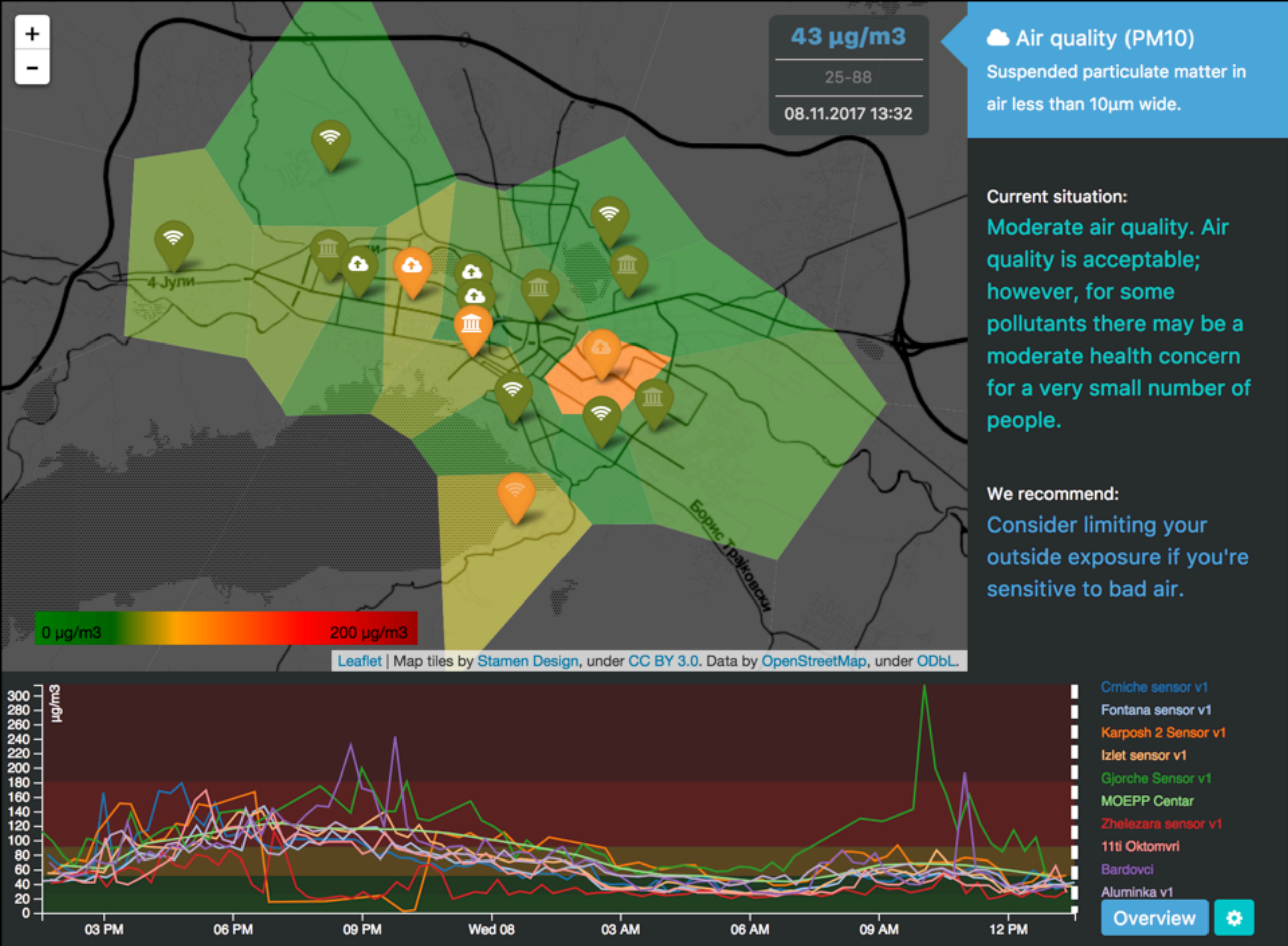
An Introduction To LoRaWAN

SwiNOG 32, 9.11.2017, Berne

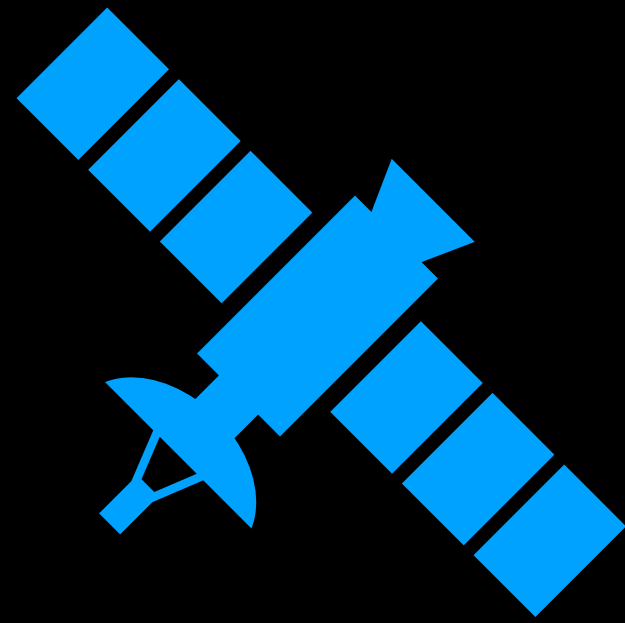


Digital
Cow Bell

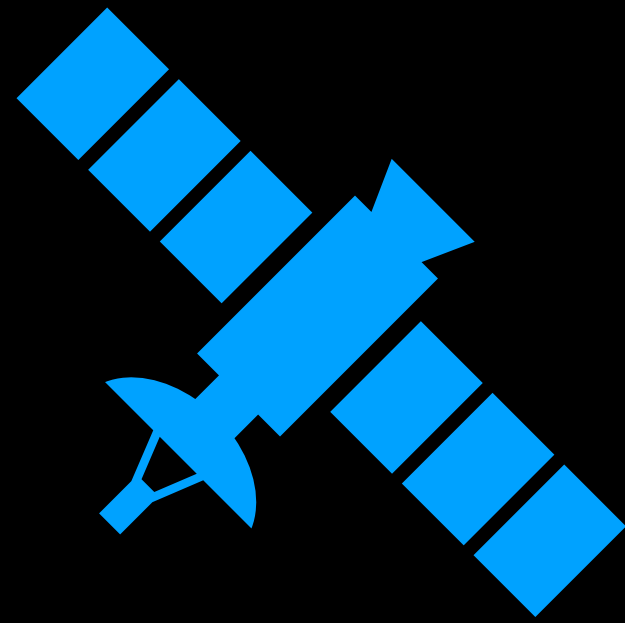
- PM10
- PM25
- NOISE
- TEMPERATURE
- HUMIDITY



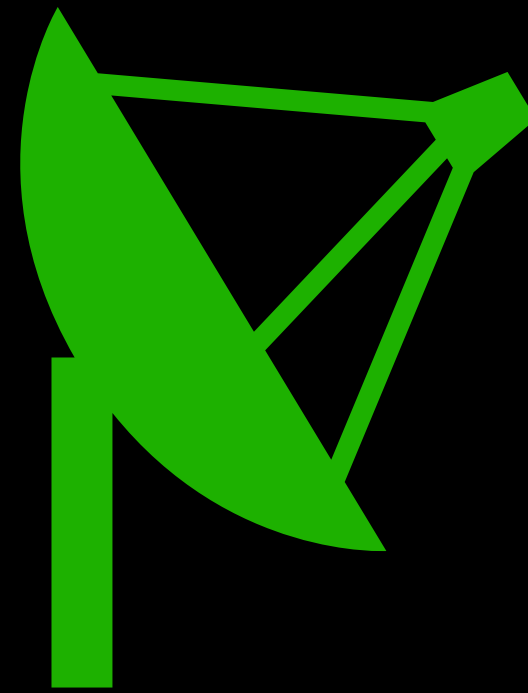
Disclaimer: The data shown comes directly from the used sensors. We do not guarantee of their correctness. [Details](#)



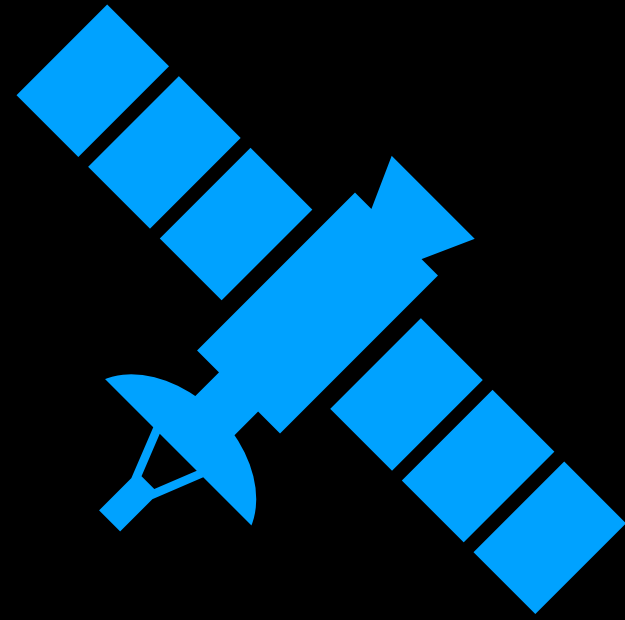
Observe



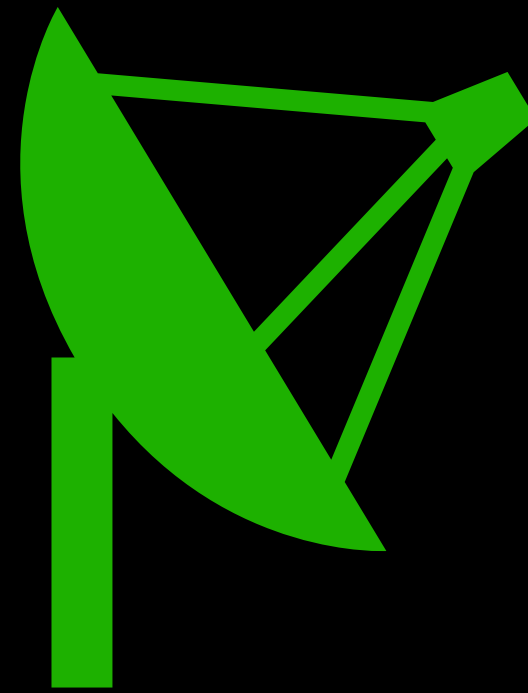
Observe



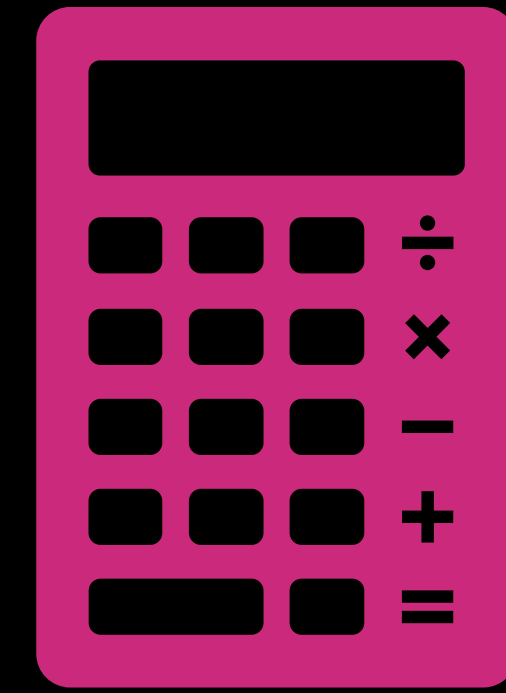
Transmit



Observe



Transmit



Process

LoRaWAN is a media access control layer protocol for managing communication between LPWAN* gateways and end-node devices, maintained by the LoRa Alliance.

en.wikipedia.org/wiki/LPWAN, CC BY-SA

* LPWAN = Low Power WAN

LoRaWAN is a media access control layer protocol for managing communication between LPWAN* gateways and end-node devices, maintained by the LoRa Alliance.

en.wikipedia.org/wiki/LPWAN, CC BY-SA

* LPWAN = Low Power WAN

LoRaWAN is a media access control layer protocol for managing communication between LPWAN* gateways and end-node devices, maintained by the LoRa Alliance.

en.wikipedia.org/wiki/LPWAN, CC BY-SA

* LPWAN = Low Power WAN

LoRaWAN is a **media access control layer protocol** for **managing communication** between **LPWAN*** **gateways and end-node devices**, maintained by the LoRa Alliance.

en.wikipedia.org/wiki/LPWAN, CC BY-SA

* LPWAN = Low Power WAN

A LoRaWAN Network



IoT Device

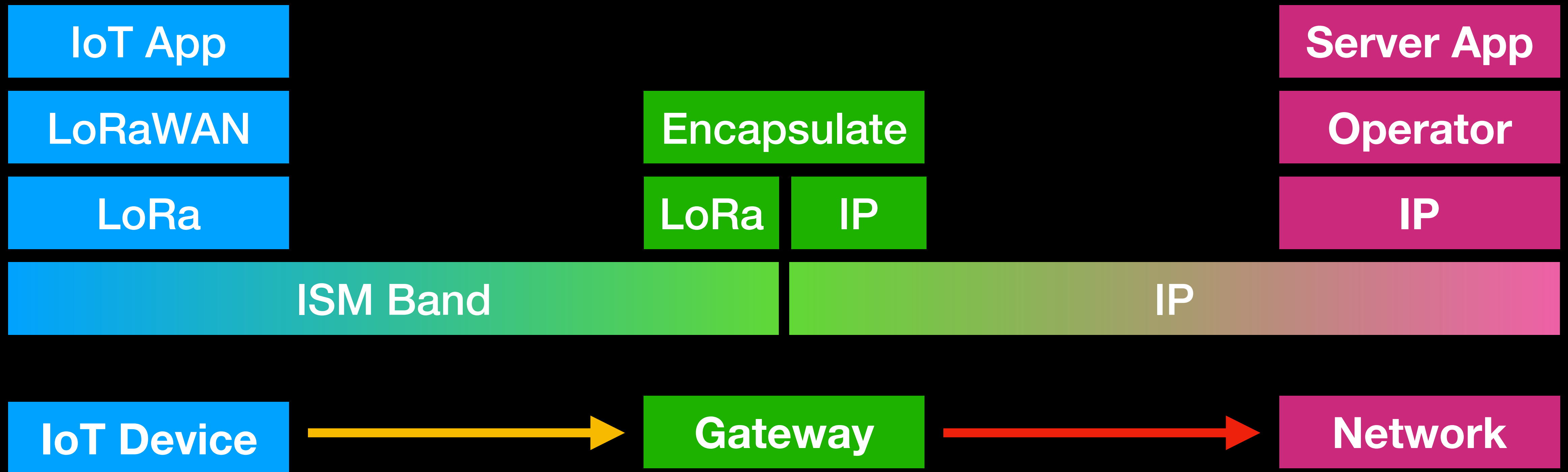
Gateway

Network

A LoRaWAN Network



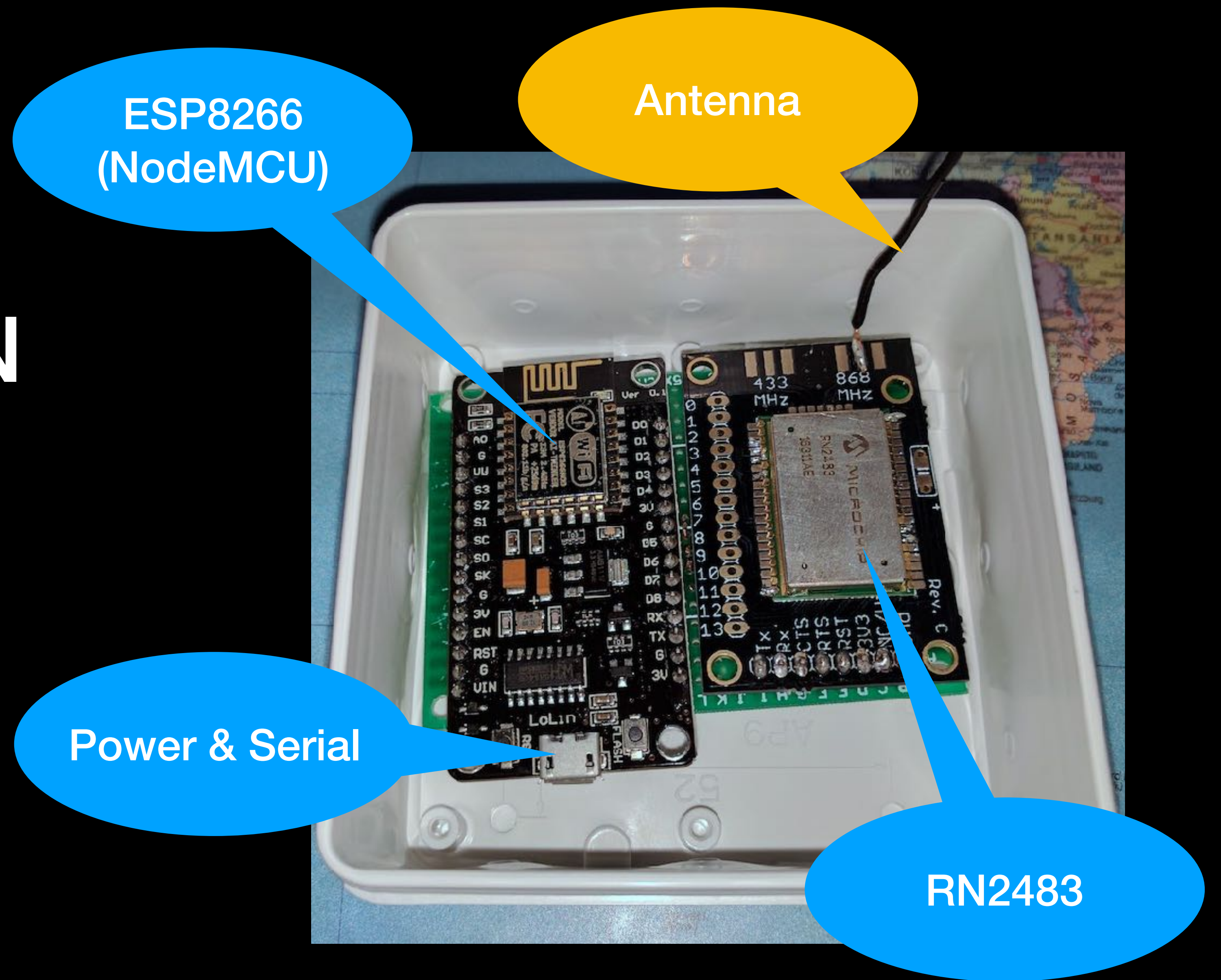
A LoRaWAN Network



A LoRaWAN Device

From Oct. 2016

≈ 20 €



TTN Node with ESP8266 and RN2483

<https://www.thethingsnetwork.org/labs/story/ttn-node-with-esp8266-and-rn2483>

A LoRaWAN Gateway

From Oct. 2016

≈ 200 €

Raspberry PI 3

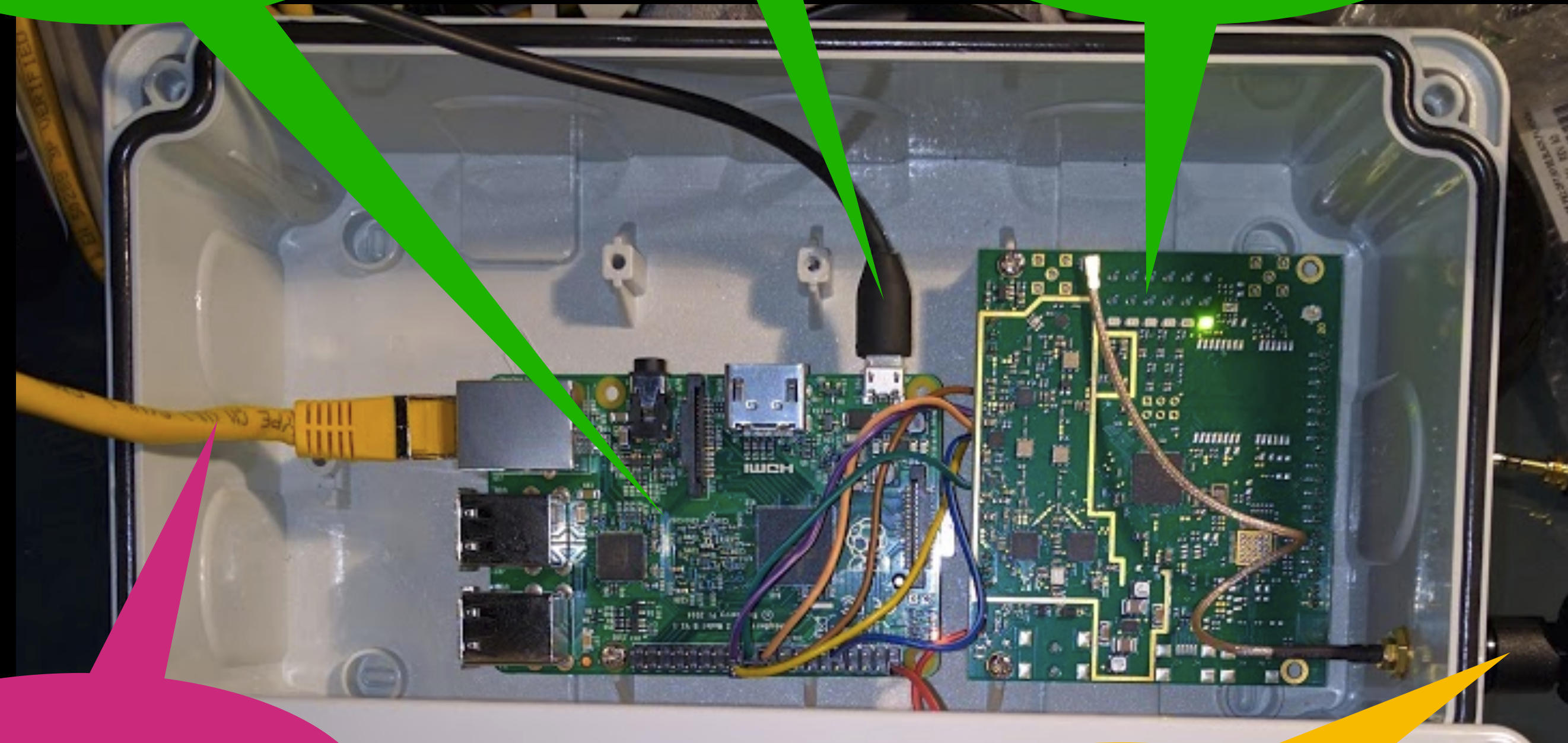
Power
(~2A)

IMST iC880a

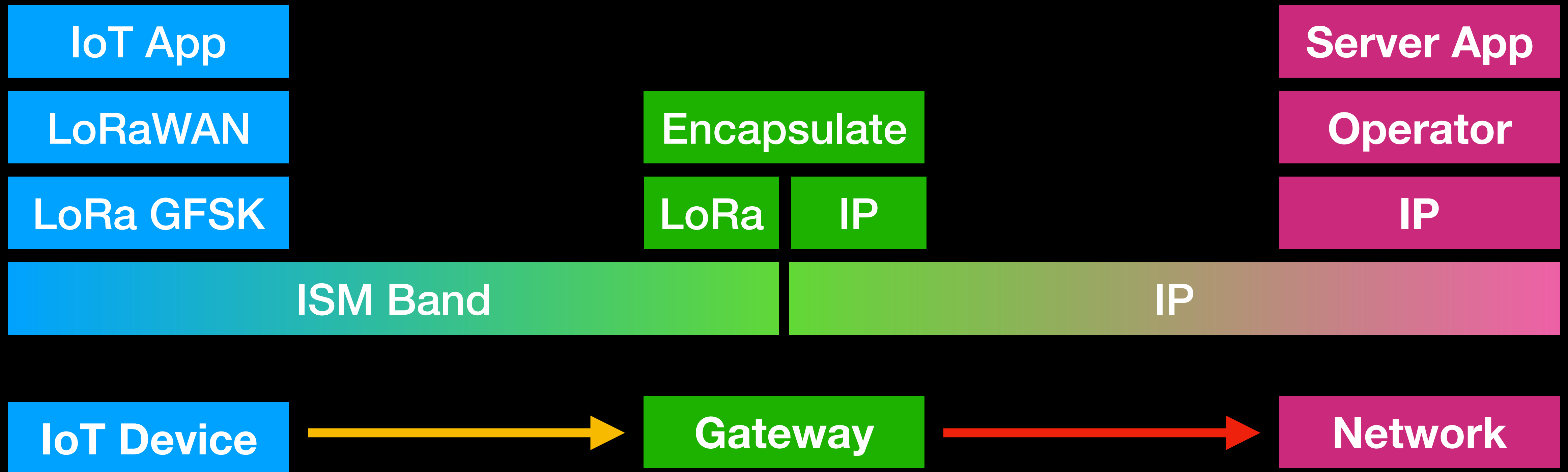
Internet

Antenna

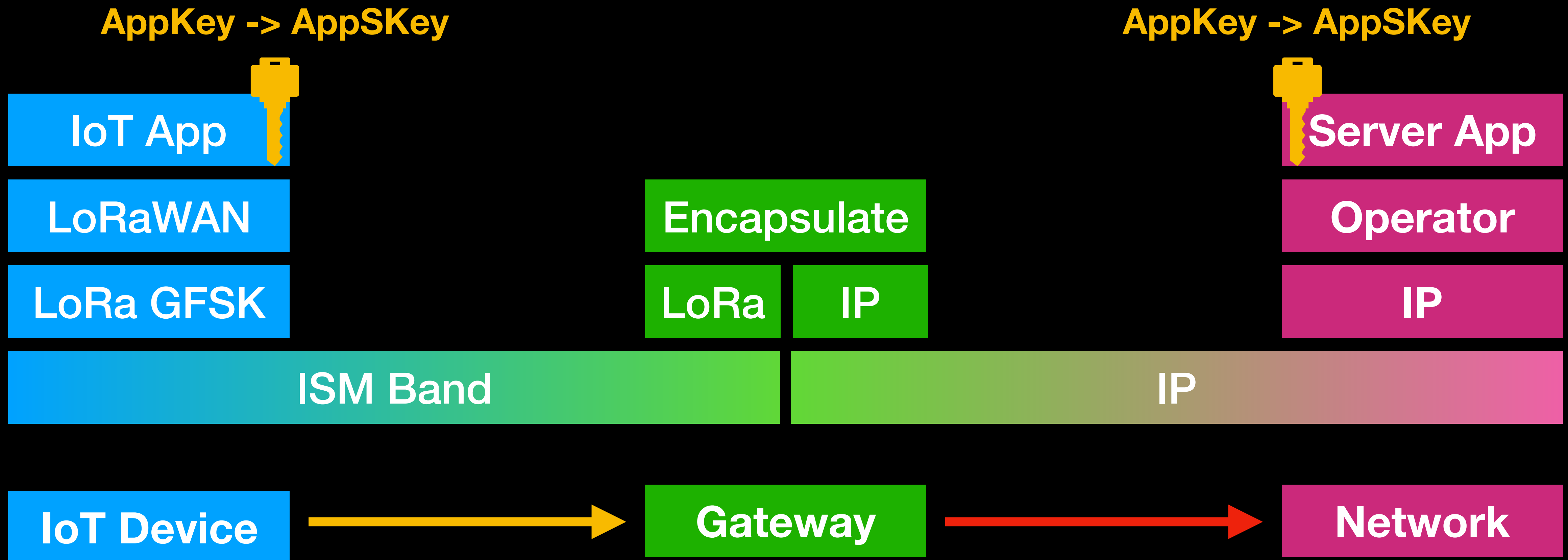
From zero to LoRaWAN in a weekend:
<https://github.com/ttn-zh/ic880a-gateway/wiki>



The LoRaWAN Stack



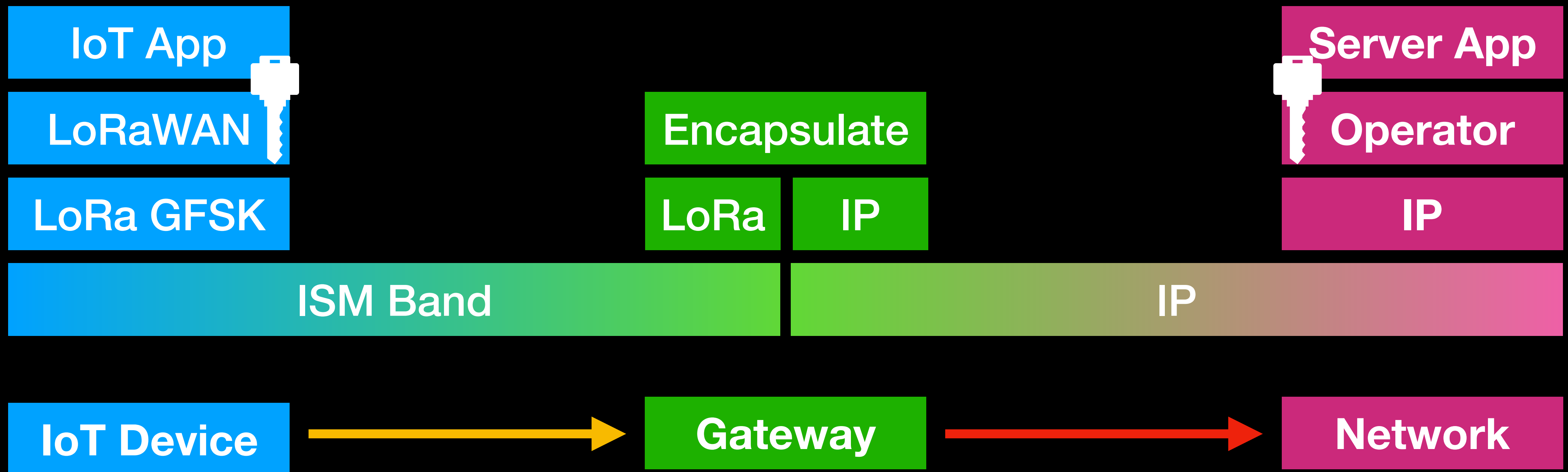
Confidentiality in LoRaWAN



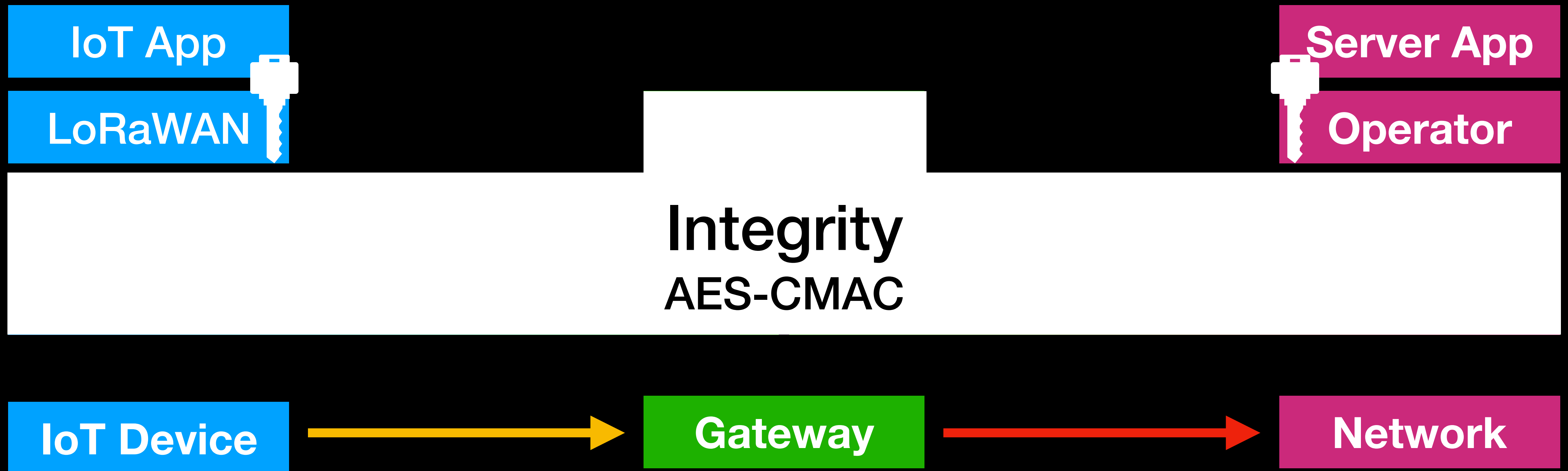
Confidentiality in LoRaWAN



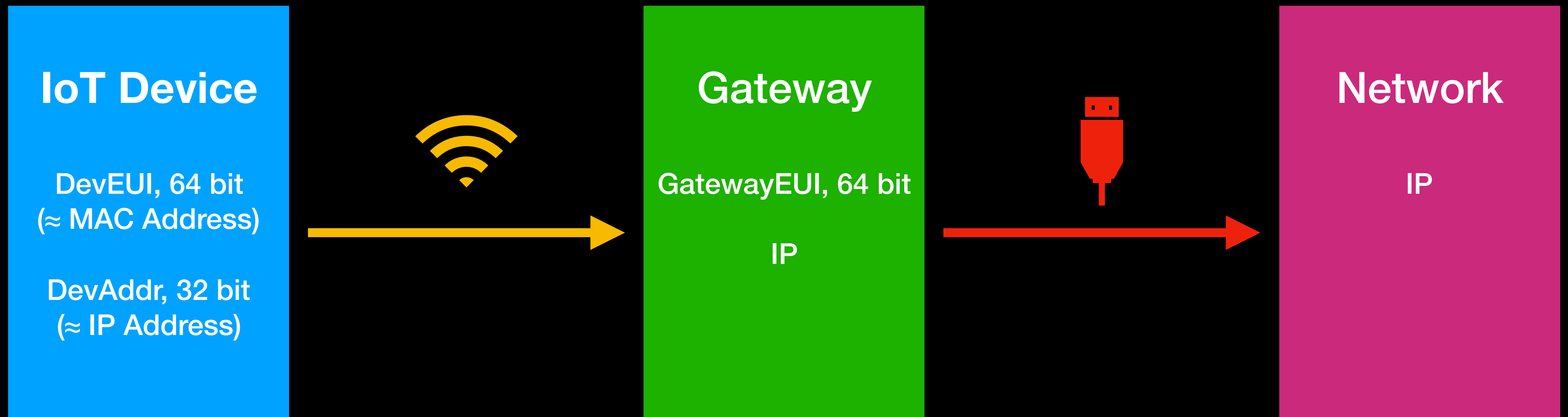
Integrity in LoRaWAN



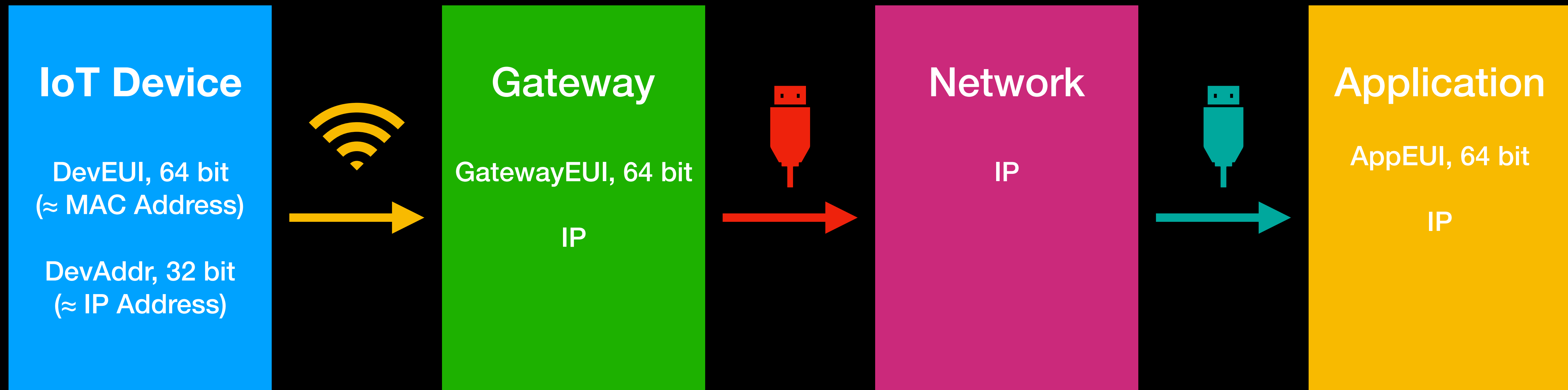
Integrity in LoRaWAN



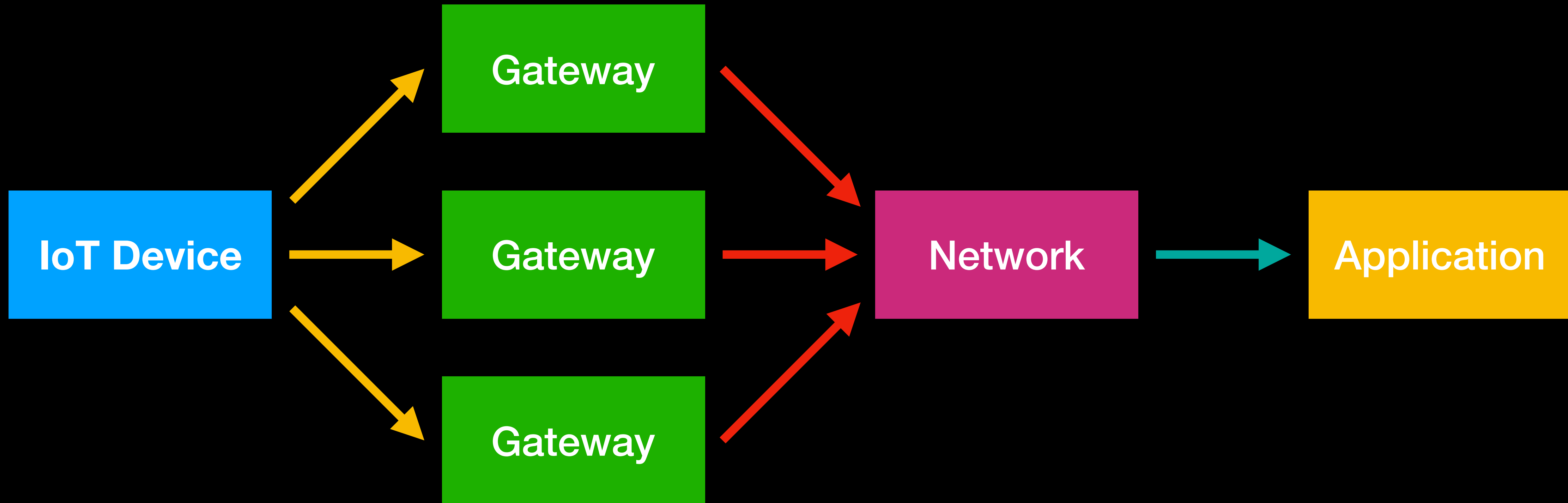
Addressing in LoRaWAN



Addressing in LoRaWAN



Deduplication



LoRaWAN Provider in



swisscom

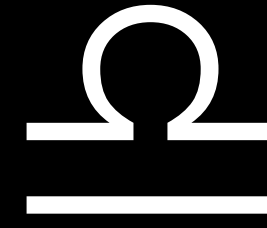
Commercial
Claims Wide Coverage
National



Commercial
Only HW & SW
International



Community (Free)
Covers Mostly Urban Areas
International



- Long Range
(hence "LoRa")
- Low Power
- Cheap
- Readily Available
- Proprietary Chips
- Patented PHY
- Operator
- Low Data Rate &
Small Payloads

We're hiring!



nine

Christian Mäder

@cimnine | cma■nine■ch