THE THINGS NETWORK

Switzerland community

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@gnz

THE THINGS NETWORK

A **global** community, building **open source** software and hardware to operate a **crowd-sourced IoT network**.

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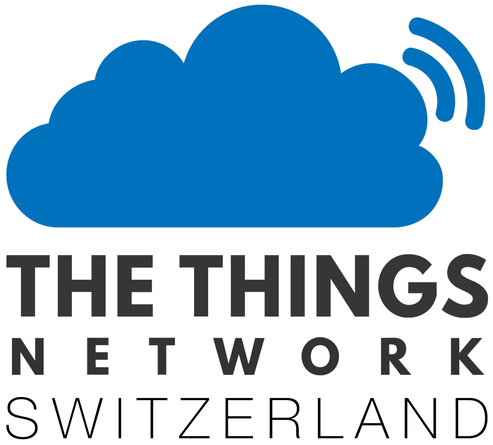
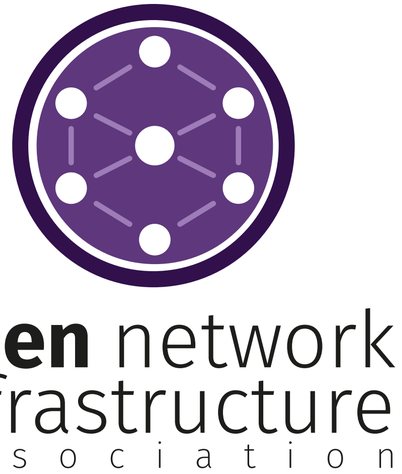
IN SWITZERLAND





WHAT IS LORAWAN?

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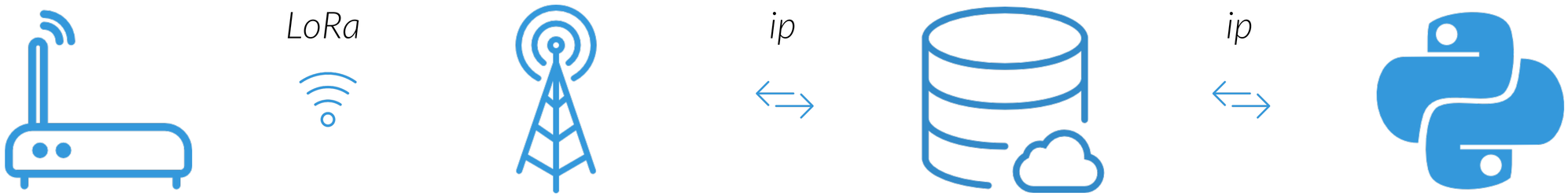
LORAWAN

- **LoRa** (Long Range): Radio modulation technique
- **LoRaWAN**: MAC protocol for Wide Area Networks (OSI Layer 2 and 3)



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LORAWAN

3 * 10

10 km range

10 USD/node

10 years battery life

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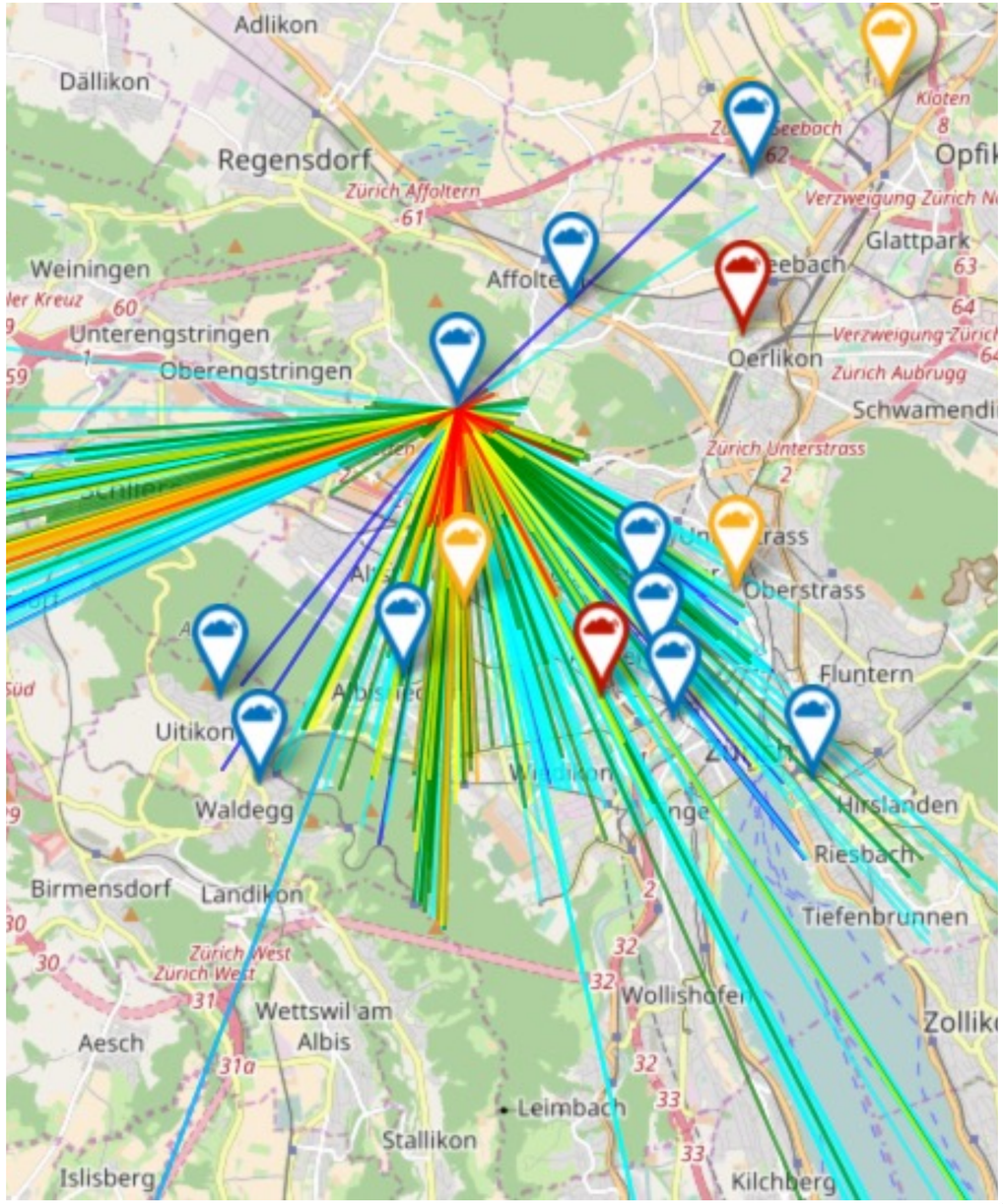
LONG RANGE

2km - 5km in urban setting

40km+ in rural setting

© ttnmapper.org , Open Street Map



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INSANELY
LONG RANGE

(under extreme conditions)

201 km ground-to-ground

by Andreas Spiess, TTN Basel

http://www.sensorsiot.org/

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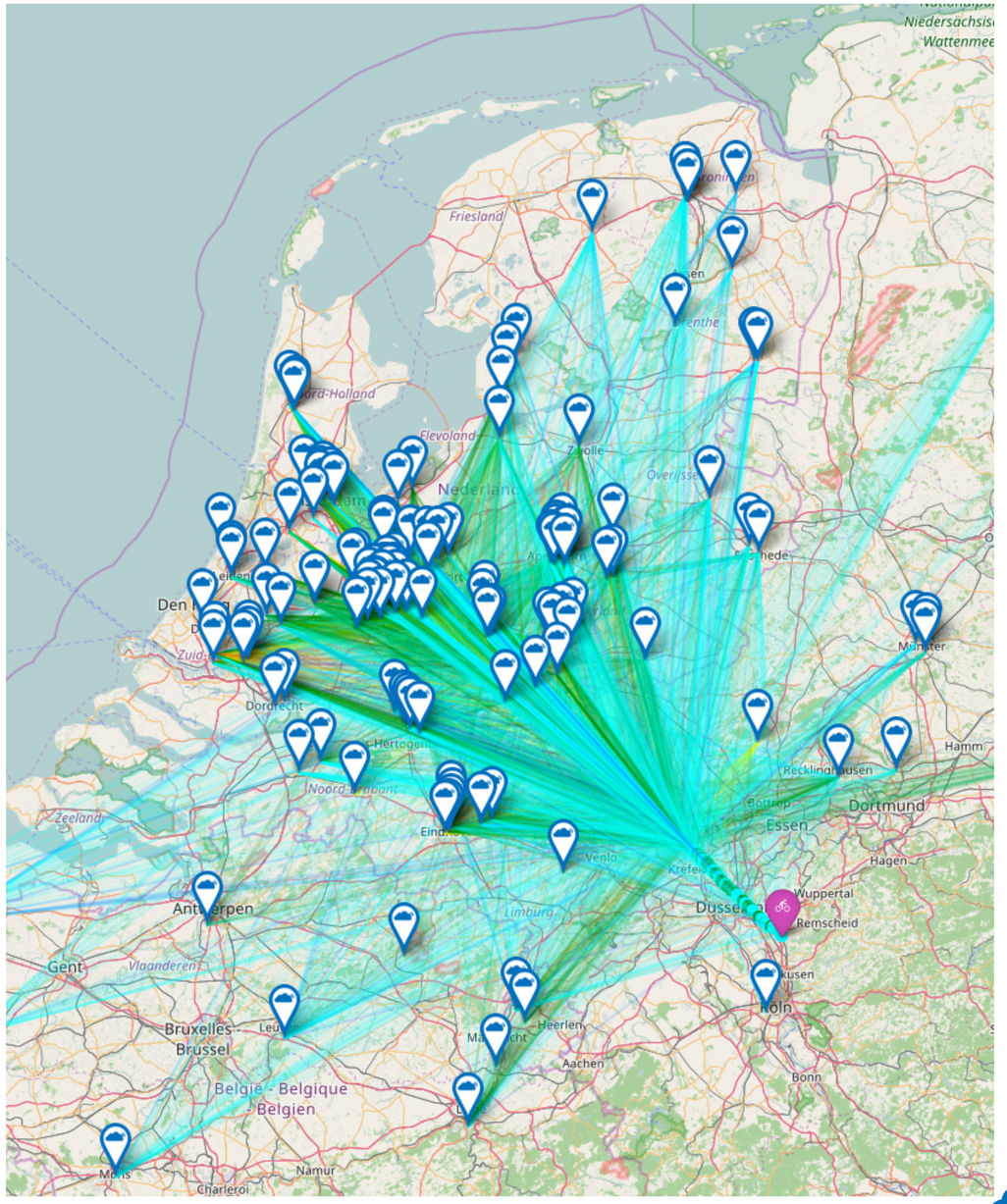
INSANELY
LONG RANGE

(under extreme conditions)

333 km air-to-ground (helium balloon)

by @telkamp (mapping @jpmeijers)



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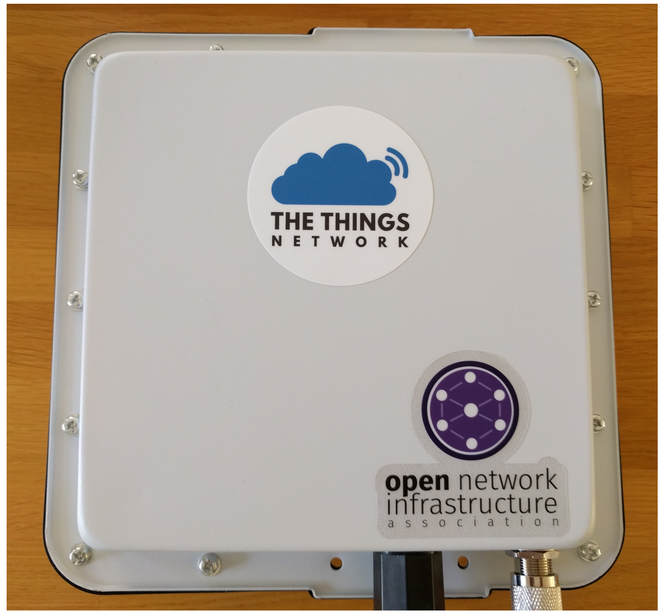
LOW COST

- **Node/transceiver:** CHF 8.5
- **Gateway:** ~CHF 250 (indoor)
- **Open source** stack + ISM bands
- Low CAPEX, almost negligible OPEX

Photos by @gnz, CC-BY-SA



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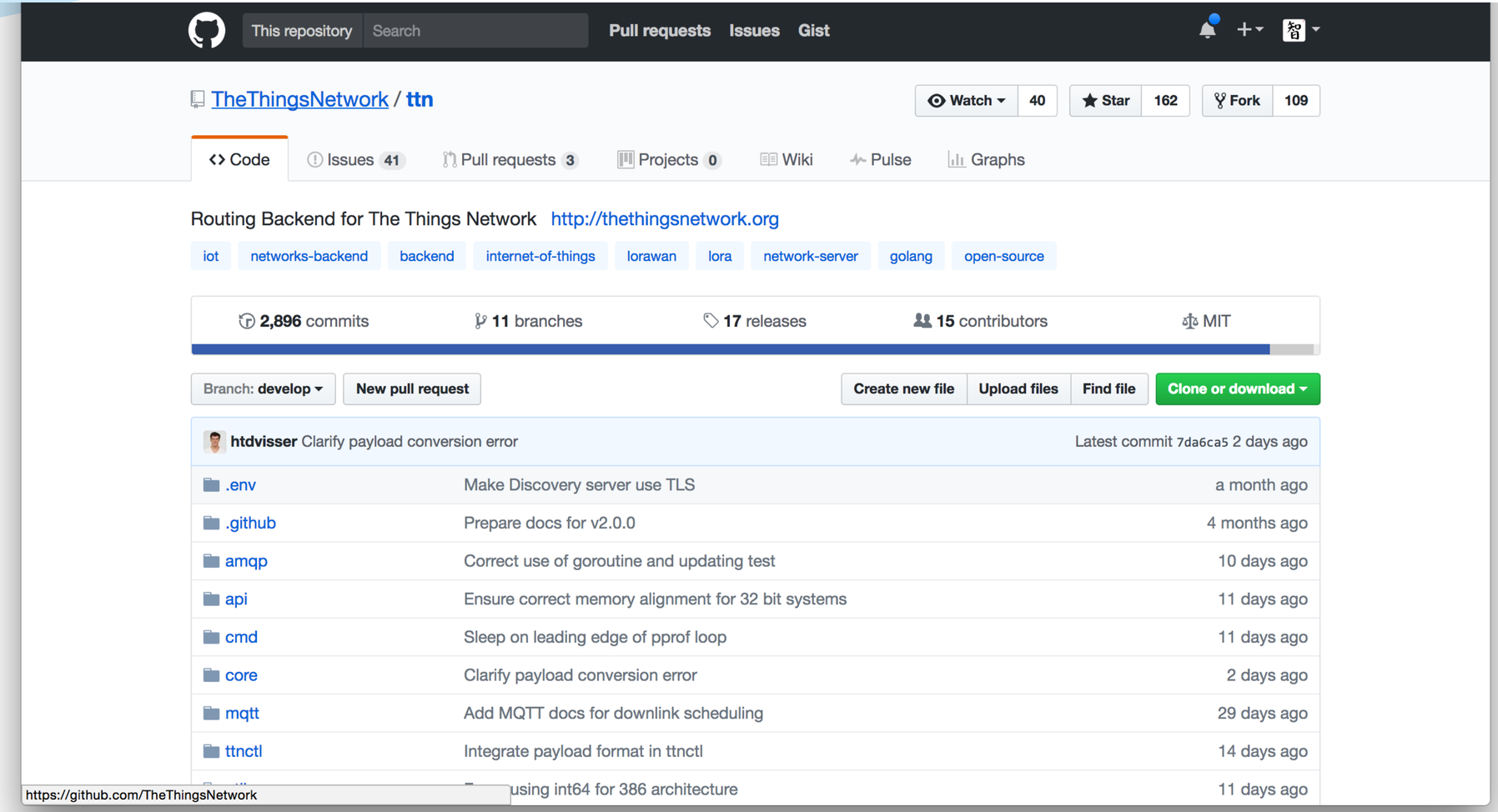
NETWORK



OPEN SOURCE BACKEND

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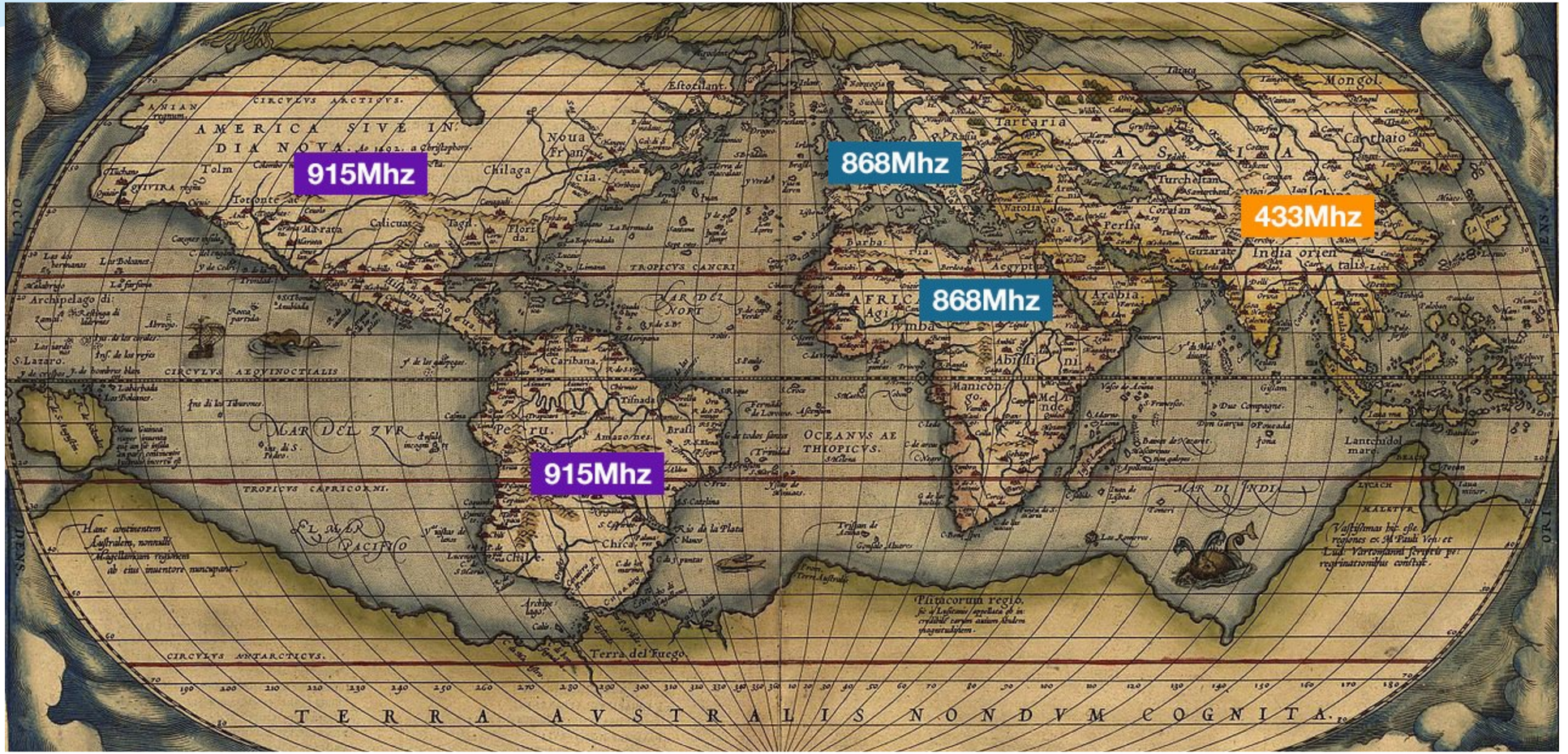

UNLICENSED SPECTRUM

Anyone can deploy a LoRaWAN network!

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LOW POWER

Class A

Always send,
receive after send.

Up to 10 years.

Deep sleep: ~10 µA
TX ~40 mA
RX ~14 mA

Class B

Time-synchronized
receive windows.

Not supported

Class C

Always-on receive
mode.

**Support not ready,
but planned**

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LIMITATIONS

Bandwidth	0.3 bps to 50 kbps
Payload size	51 bytes (DR0) 222 bytes (DR4)
Regulatory limits	1% Duty Cycle
Fair usage policy	30 seconds/day airtime 10 downlinks/day

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ARCHITECTURE

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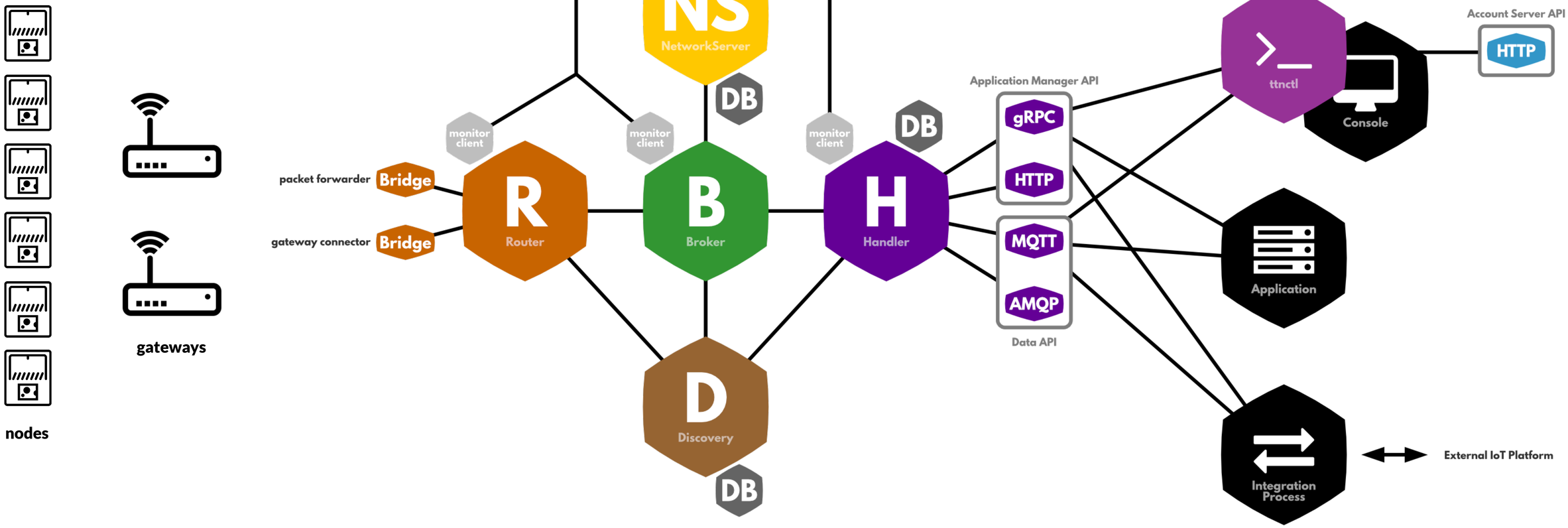
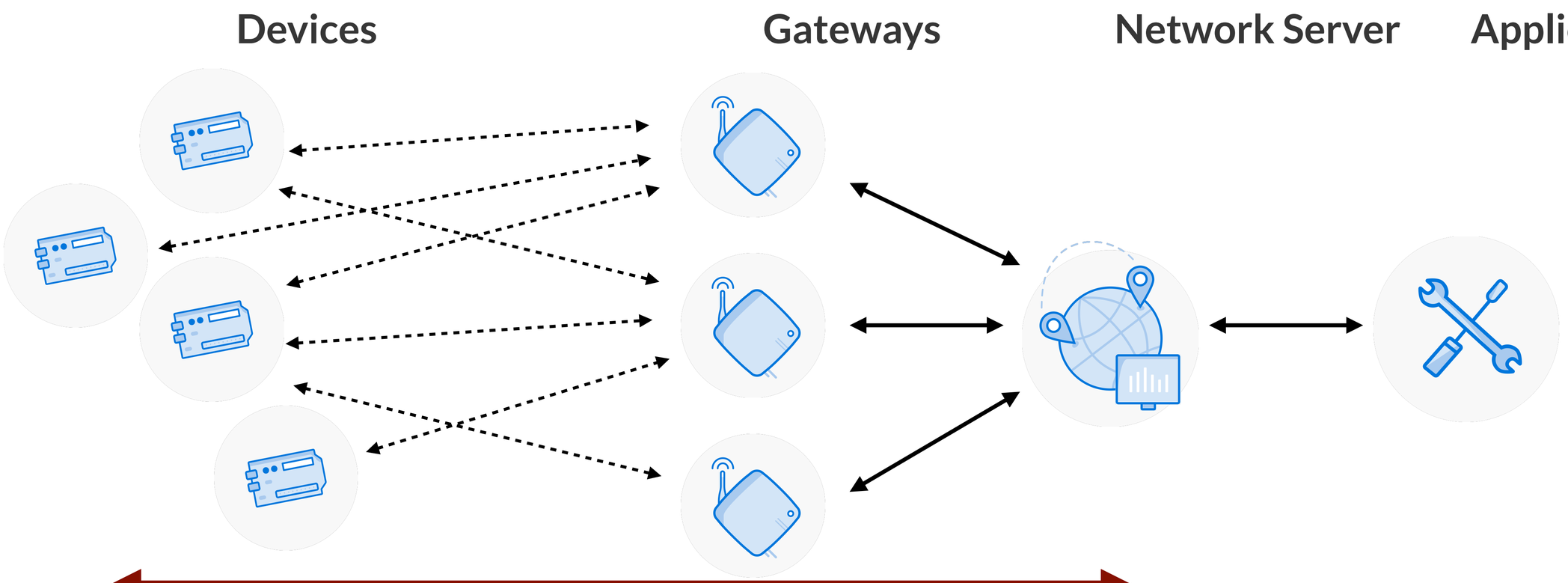

nodes
gateways
DB
DB
VX Tracker
DB
DB
NOC
* Unstable APIs
gRPC
HTTP
gRPC
HTTP
IN
Network Operations Center APIs
OUT
monitor client
NS
NetworkServer
DB
Account Server API
HTTP
ttnctl
Console
Application Manager API
gRPC
HTTP
MQTT
AMQP
Data API
packet forwarder
Bridge
gateway connector
Bridge
monitor client
R
Router
monitor client
B
Broker
monitor client
H
Handler
DB
Application
D
Discovery
DB
Integration Process
External IoT Platform

END-TO-END SECURITY



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LINKS

slack

https://ttn-ch.herokuapp.com/

https://opennetworkinfrastructure.org/

https://www.thethingsnetwork.org/country/switzerland/