ISIMA ENGINEER

17 years MICHELIN IT, IoT

CLOUD ARCHITECTE bevys shared services

I'm building a secured cloud solution to host sensitive data like heath data, personal data, industrial secrets….

IoT Expert WWW.DISK91.COM

https://www.disk91.com

https://youtube.disk91.com

https://github.com/disk91/stm32-it-sdk

LoRaWAN sigfox THE THINGS NETWORK helium

DEVICE MAKER & STARTUP FOUNDER ingeniousthings

TEACHER and SPEAKER

Author – Paul Pinault / Disk91.com

helium

Helium is a blockchain for LoRaWan Distributed Global crowdsourced IoT Network

helium

Helium is a blockchain for LoRaWan Distributed Global crowdsourced IoT Network

Coverage is provided by a community of people instead of a company. Like TheThingsNetwork

helium

Helium is a blockchain for LoRaWan Distributed Global crowdsourced IoT Network

Investment on hardware is rewarded by a crypto token. Blockchain's rules pilot the deployment and supports the main telecom industry processes.

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Helium is a blockchain for LoRaWan Distributed Global crowdsourced IoT Network

The network is global, it has started in North America, now covering Europe quickly and start in Asia.

helium

Helium is a blockchain for LoRaWan Distributed Global crowdsourced IoT Network

The networks supports multiple LoRa Network Servers (Routers) as private networks on top of the Gateways (Hotspot) public infrastructure.

Helium network growth

Objenious network size
For 95% France coverage

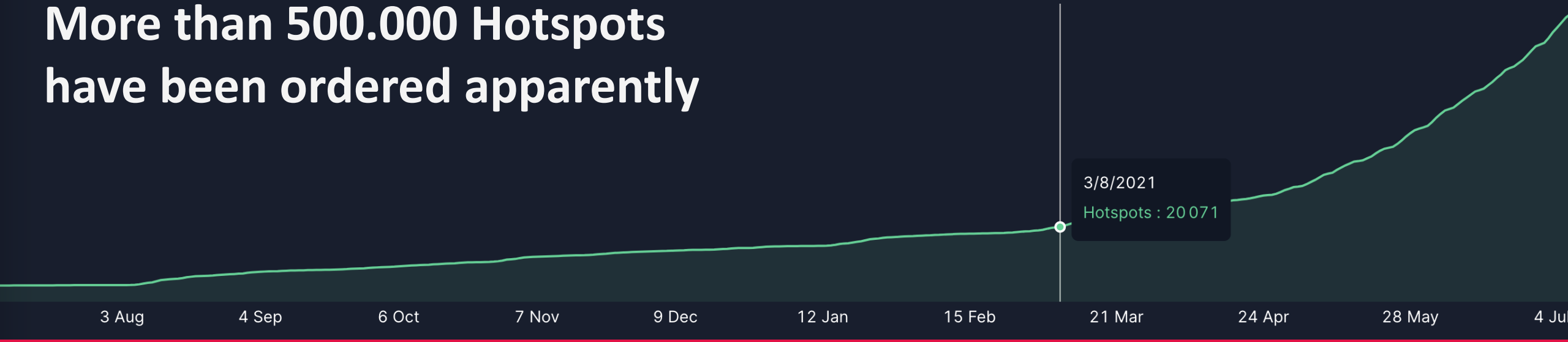
TTN network size 5 years
after being launched

4000 | 20000 | 77000

Hotspots

Hotspot Network Growth

More than 500.000 Hotspots have been ordered apparently

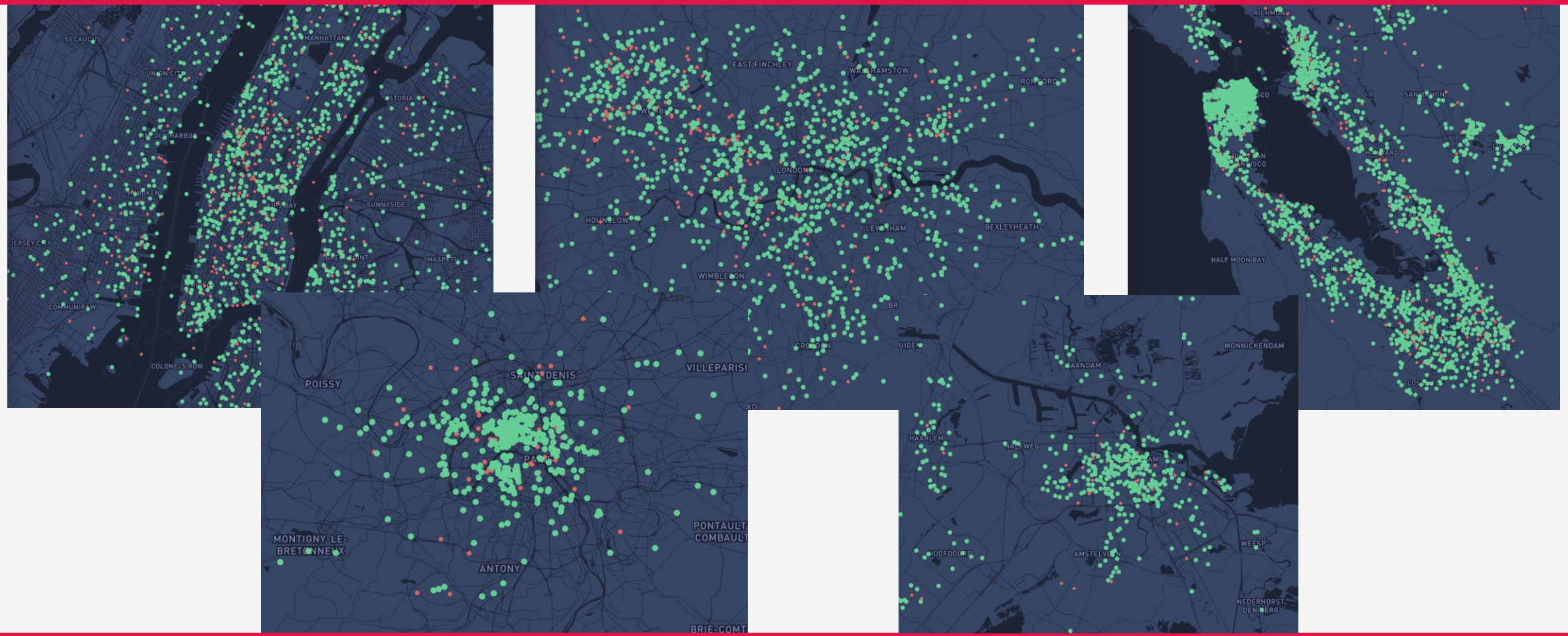


Helium is high density LoRaWan

New York

London

San Francisco



Paris

Amsterdam

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A Blockchain Based Network

Mining is done using Proof of Coverage (PoC). Unlike Proof of Work, it relies on radio communication and has a light power consumption.

FOR NETWORK INFRASTRUCTURE OWNERS

A crypto token (HNT) is mined during PoC and data transfer. Uses are:

- Burn into DC at market rate
- Sell on crypto exchanges

FOR NETWORK USERS

Acquire a specific token (DC) with a fixed price for data transfer

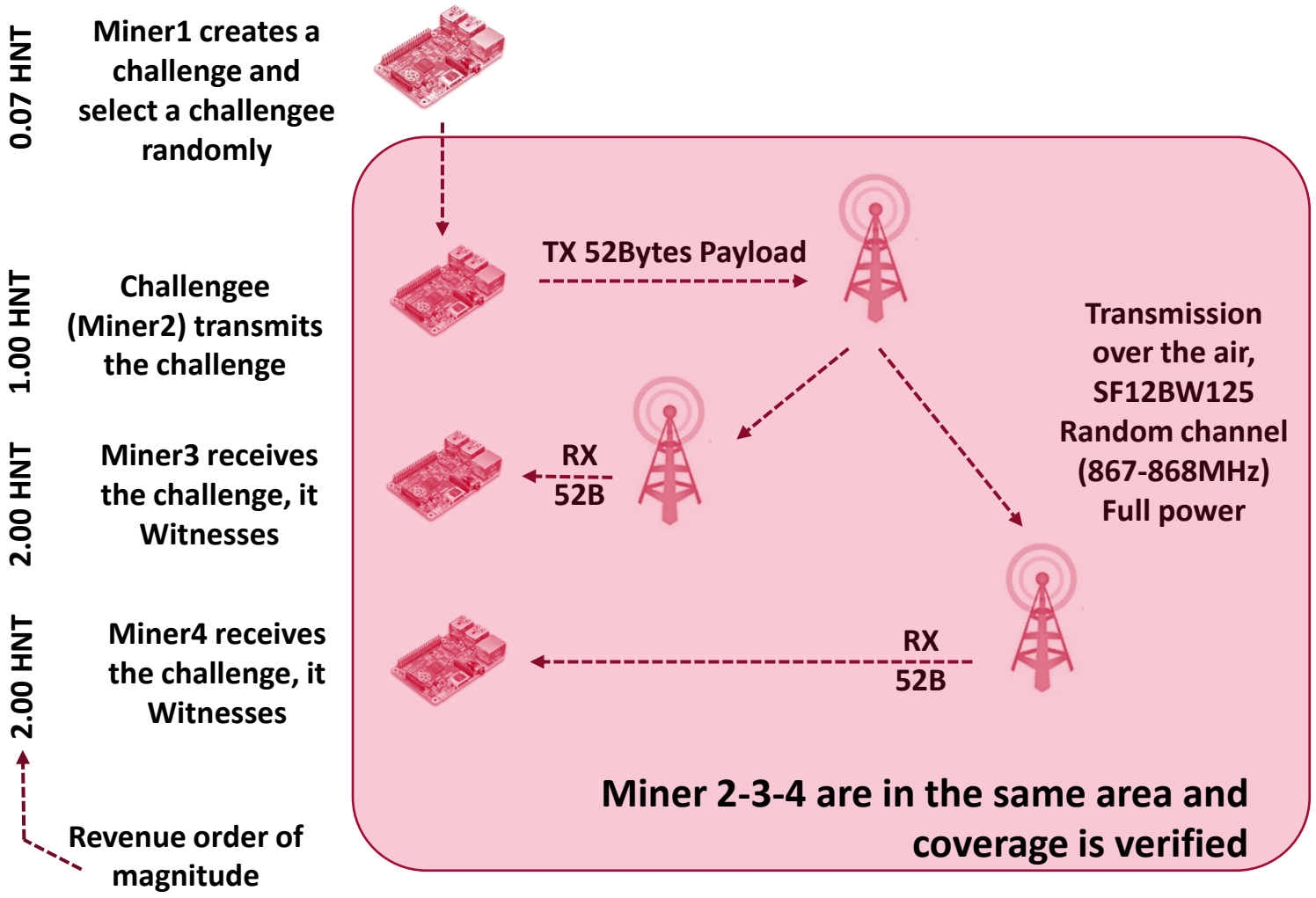
DATA IS ROUTED ON NETWORK SERVERS

Payload is routed to the right network server. Today Helium propose one.

Author – Paul Pinault / Disk91.com

PoC Principles

- Hotspot create Challenge on every 240 blocks (about 4 hours). Challenge goes to a random target : Challengee
- Challengee transmits a 52bytes message over the air. It is the PoC packet.
- Hotspots around receives the message and report reception to the chain. This is a Witness.

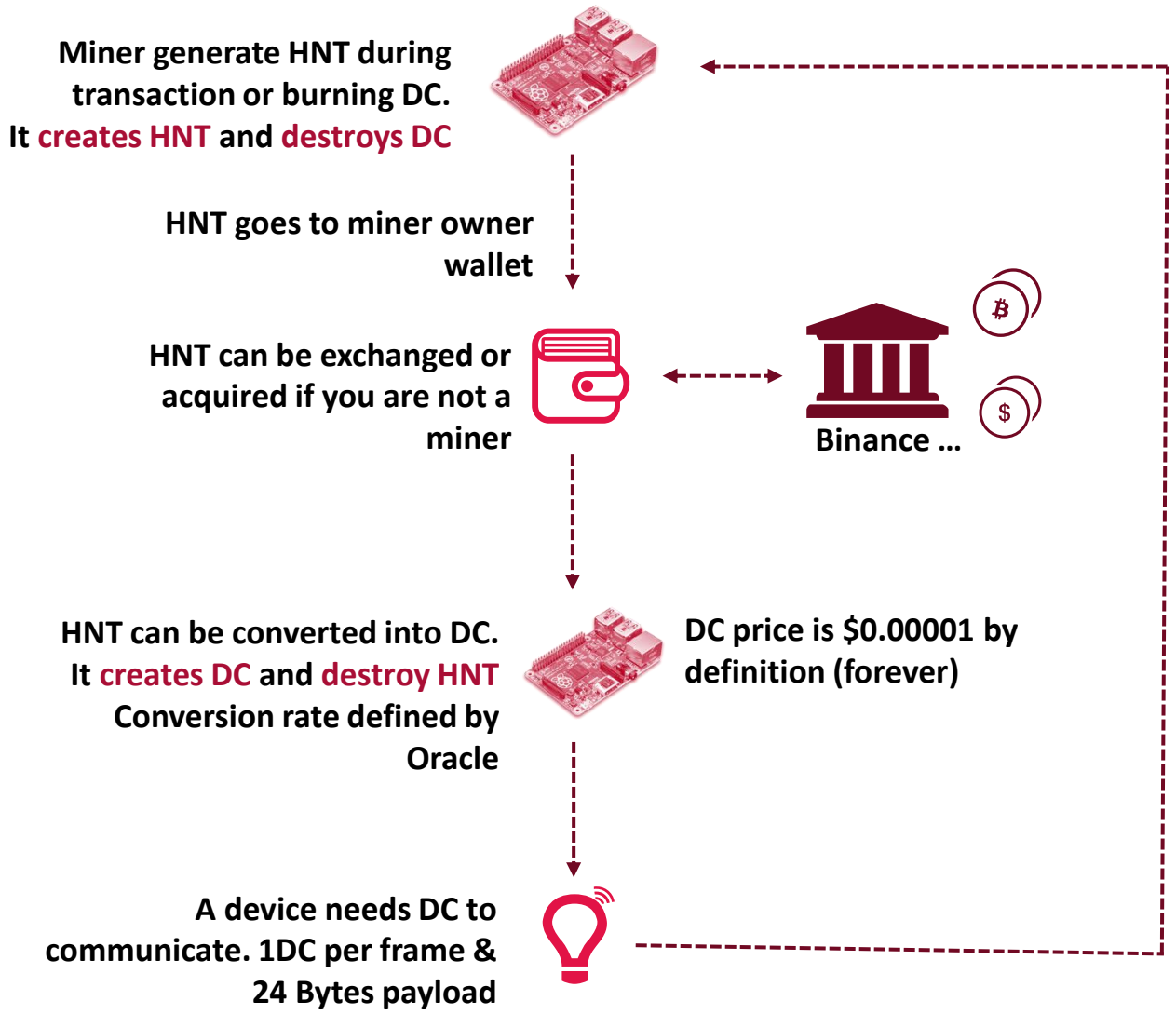


DC Principles

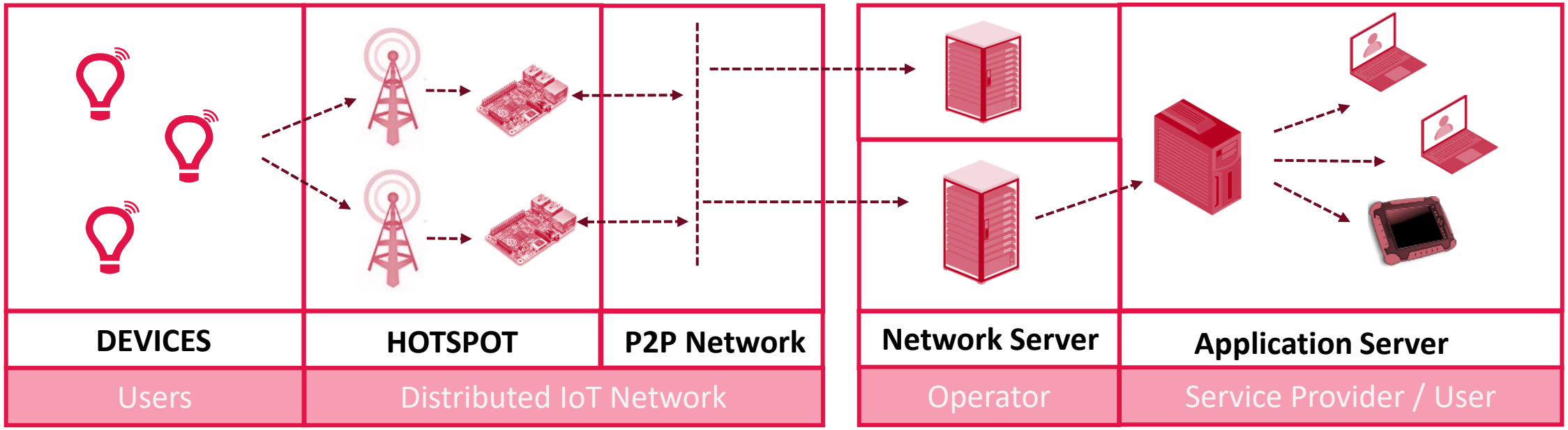
- Blockchain transaction creates HNT
- HNT can convert to DC for communications.
- Every 24 bytes communication burn 1 DC.

With a fixed DC price and the HNT <-> DC burn principle, the HNT value is directly related to the data traffic processed by the network.

	HNT	DC
Value	Market rate	$0.00001
How to acquire?	Mined	Burn HNT
Transferable	Yes	No



helium Network Architecture

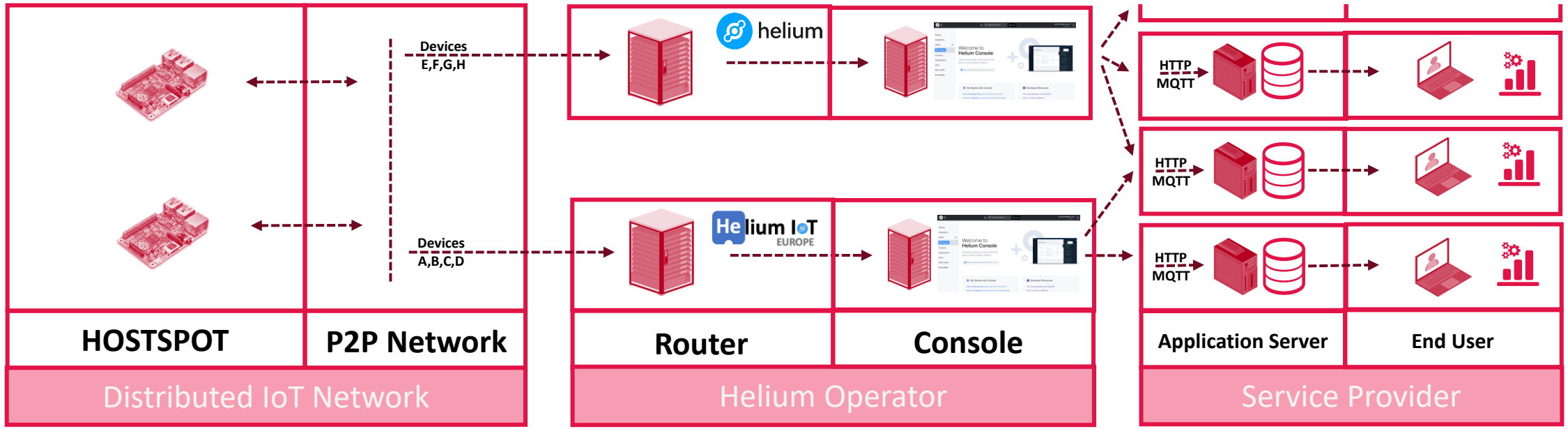


Helium distributed architecture

The HELIUM network is composed by hotspots. A Hotspot is a LoRaWan gateway associated to a Miner. A miner is lightweight and can run on a raspberry Pi. It is running in a docker container.
The miners are connected altogether over a P2P network. They are maintaining / running the blockchain.

Device communication passes through these different layers and are routed up to their specific Network Server. The distributed network supports multiple Network Servers. (Network Servers are centralized components in this architecture). Application servers works on helium as on any other Network Server. Nothing specific.
The data itself is not inside the blockchain.

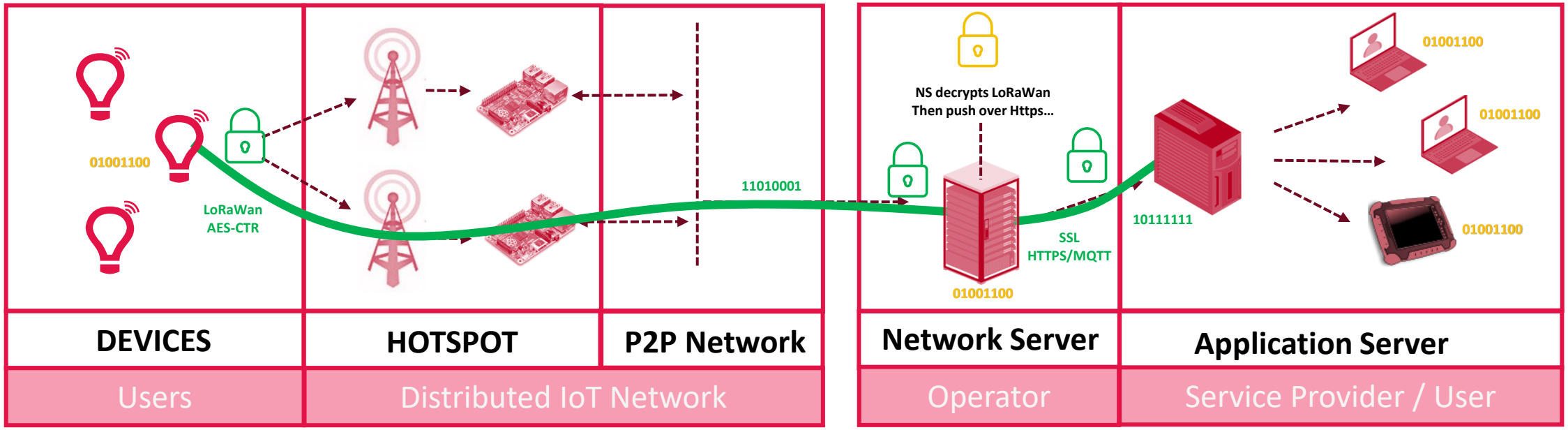
helium Network Server Architecture



Helium Network Server Architecture

Devices are declared by Service Provider in a console. This one is belonging to a Helium Operator. There is no restriction to become a Helium Network Operator, so you can build your “private” network on top of Helium. The router is registering these devices on the blockchain to create a direct route from the Hotspots to the router the devices are belonging to. Router receives only data concerning its registered devices. Router is accepting or rejecting the data. Once accepted, the router pays for the communication. So basically, its not the device burning DC but the Router, devices are belonging to. The Helium integrator then pass the data to the service provider. This on stores the data. No data are stored in the previously described stages.

helium End to End Encryption principle



Helium data protection

The HELIUM network rely on LoRaWan technology. The communications are encrypted with a session key negotiated with the Network Server. Only the device and the network server can decrypt the payload. In an architecture you can have a private Network Server on a public infrastructure, it means you can protect the device data from End-to-End with no tiers manipulating the raw data. This is unusual in the classical LoRaWan public architecture. Usually, you need to add an applicative encryption layer to ensure an End-t—End security. Something not a lot of devices support.

What is a Telecom blockchain

Hotspot Registration

Traffic routing

Traffic Billing

DC creation

Token transfer

Consensus Group election

Proof of Coverage

DC/HNT Price Oracle

Hotspot Assert Location

Burn 4M DC
$40

Burn 40k DC to register new devices
Burn 90M DC for new network server

Burn 1 DC per 24B data
$0,00001

HNT BURN
Based on Oracle price & $0,00001 / DC

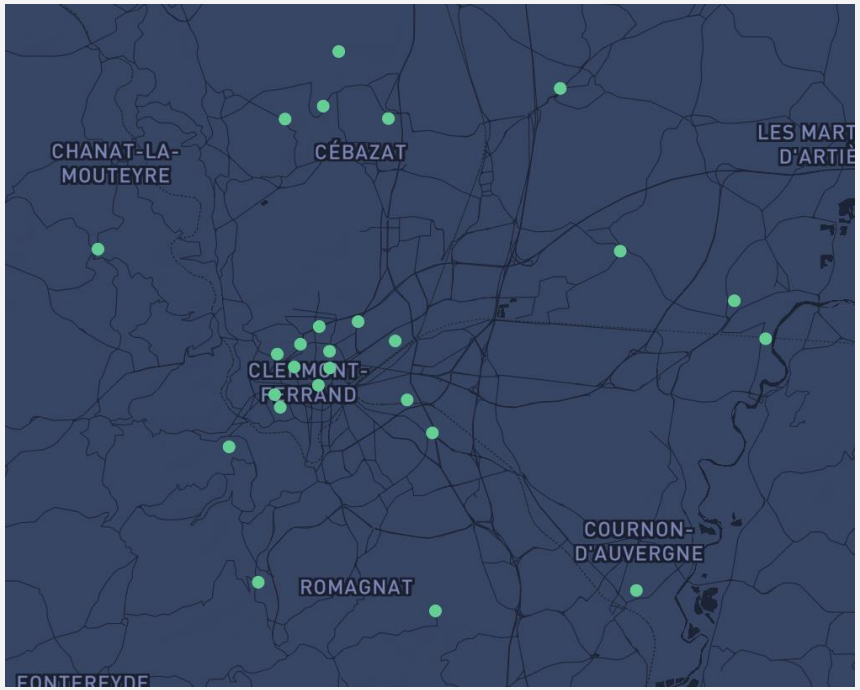
Burn 30K DC
$0,30

HNT Creation
6848 HNT / hour until 2021-08-01
Max Caping 223M HNT

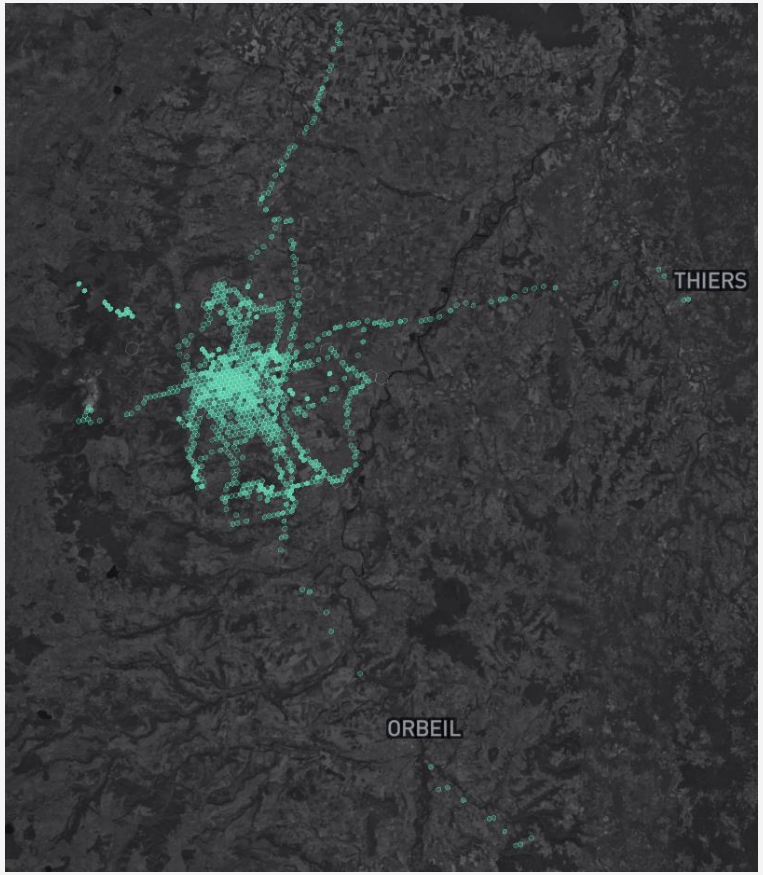
Burn 10M DC
$10

Helium at Clermont-Ferrand

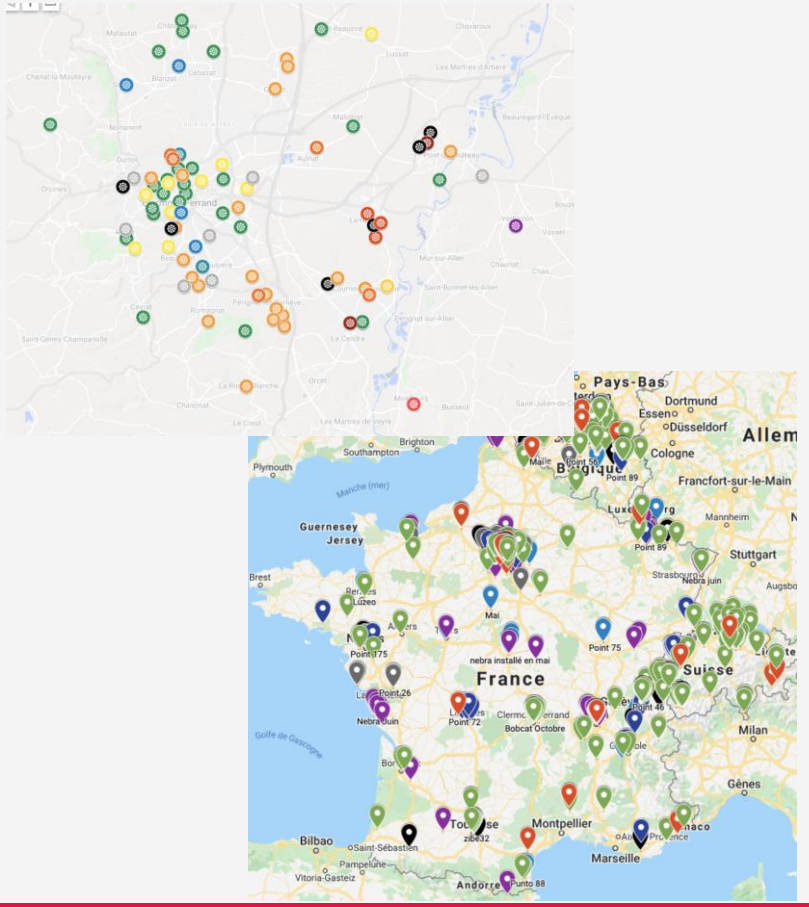
Current MAP



Coverage Map



Planned Hotspots



Some resources – feel free to use

SCAN ME

IoT training

YouTube 2h

SCAN ME

Sigfox training

YouTube 1h

SCAN ME

Helium playlist

YouTube 4h+

SCAN ME

IoT Slide Deck

PDF