Internet of Things and LoRaWAN in Berkshire

Thingitude

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Inspiration 1- Oxford 2014

Oxford Flood Network
(oxfloodnet.co.uk)
Ben Ward and Andrew Lindsay

Citizen-built flood detection network

July 2015

GOV.UK

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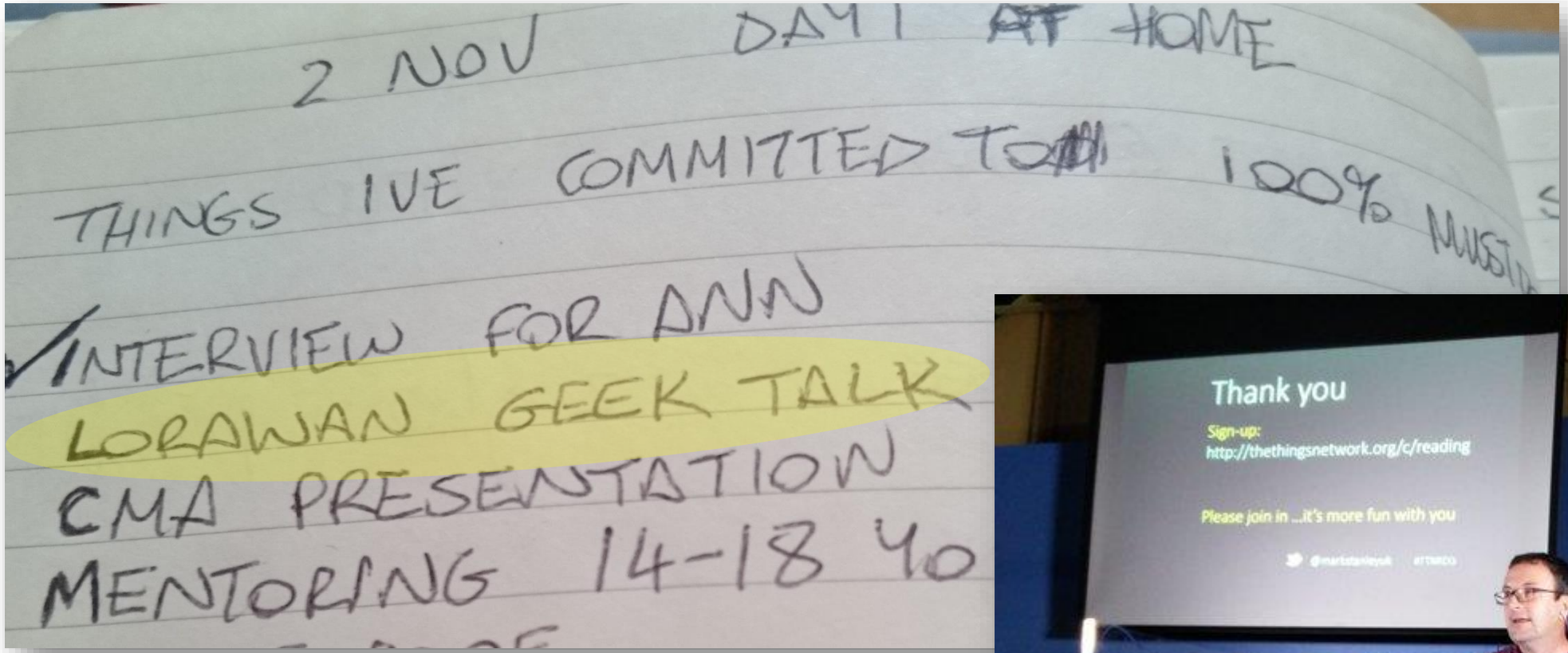
Press release

£10m Internet of Things competition for UK cities launched

Cities and businesses can bid for a £10m government fund to revolutionise the way the Internet of Things benefits citizens.

Published 13 July 2015
From: Department for Digital, Culture, Media & Sport, Innovate UK, and Ed Vaizey

Inspiration 2 - Amsterdam 2015



"This is amazing – why don't we do this where we live?"


Thingitude
THE THINGS NETWORK READING
Mark Stanley
Mike the Bee
GAME CHANGER
20 18
ConnectTVT

Reading Borough Council

Working better with you

THE THINGS NETWORK READING

Residents and businesses need to have a say in Reading's Smart City agenda.

Thingitude

Press release

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The Internet of Things

What is all the fuss about?

The Internet of Things

"The **network of physical devices**, embedded with **software, sensors, actuators, and connectivity** which enables these objects to connect and **exchange data**.

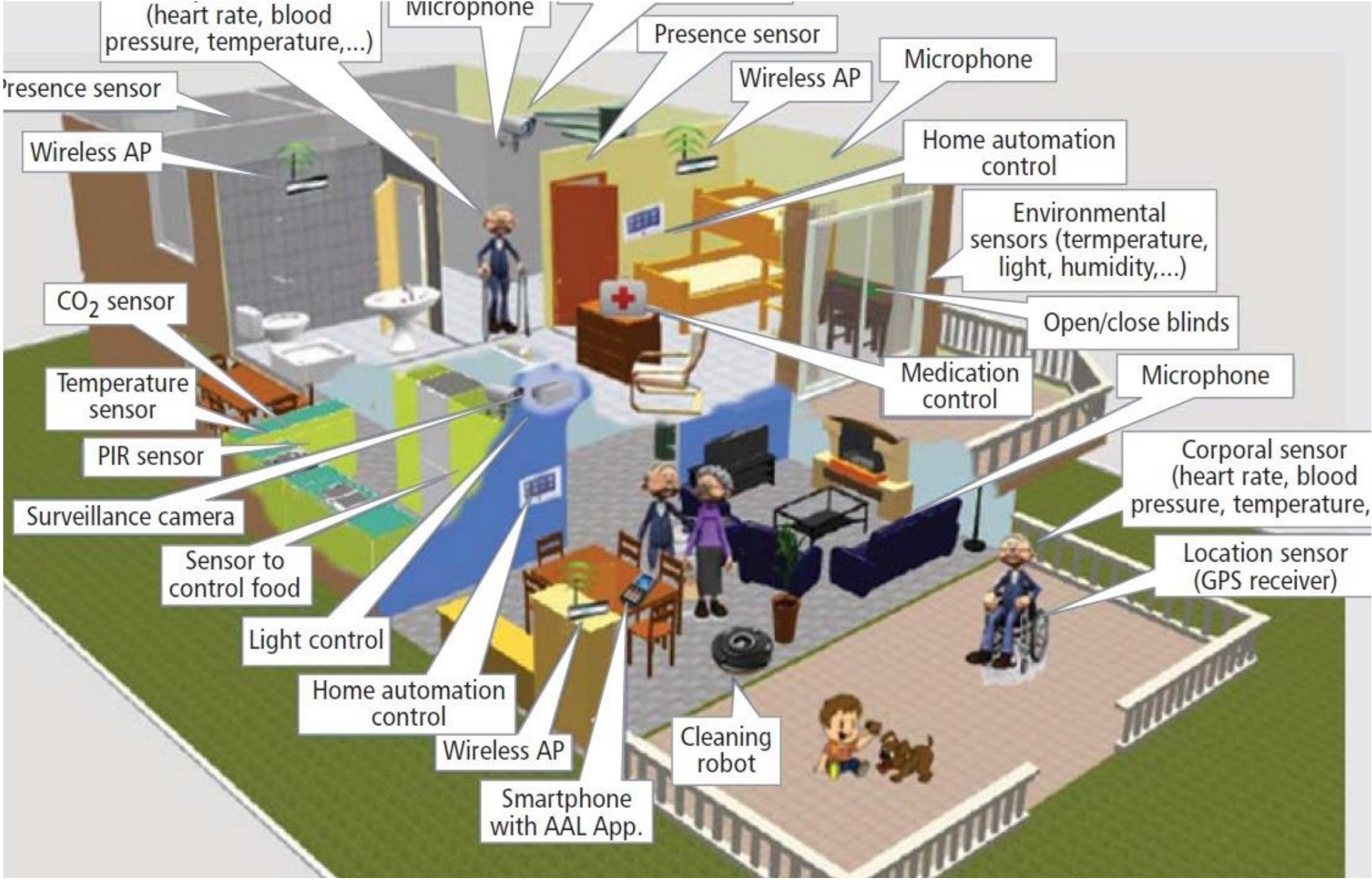
Each thing is **uniquely identifiable** through its embedded computing system and is able to **operate within the Internet infrastructure**.

***Source**: Wikipedia - https://en.wikipedia.org/wiki/Internet_of_things*


Smart Society
Smart care
Big Data
Smart Working
Smart Energy
IOT
Smart Retail
End user driven Innovation
Smart product management
Smart building
Smart Home
Smart Mobility

Smart buildings

Smart home


(heart rate, blood pressure, temperature,...)
Microphone
Presence sensor
Wireless AP
Microphone
Presence sensor
Wireless AP
Home automation control
Environmental sensors (termperature, light, humidity,...)
CO_2 sensor
Open/close blinds
Medication control
Microphone
Temperature sensor
PIR sensor
Corporal sensor (heart rate, blood pressure, temperature,
Surveillance camera
Sensor to control food
Location sensor (GPS receiver)
Light control
Home automation control
Wireless AP
Cleaning robot
Smartphone with AAL App.

Why bother?

- **Better decision making**
  - ✓ Realtime information and predictive analytics
  - ✓ Provide new information (bus temperature)
- **Service quality**
  - ✓ Identify and repair faults before they occur
  - ✓ 24x7 reliable monitoring
- **Save money**
  - ✓ Reduce/avoid cost of manual inspections
  - ✓ Reduce running costs (smart bins, energy bill)

Network Rail / InnovateUK

"Reaching world-class predictive maintenance strategies could deliver the following benefits":

25-35% reduction in maintenance costs

70%+ reduction in number of service failures

35-45% reduction in downtime following failure

20%+ increase in workforce productivity

InnovateUK: Accelerating Innovation in Rail 5 – January 2018

IoT Architecture

Cloud

Network mgt
Data storage
Complex analytics
Integrations
Apps and dashboards

Gateways

Edge analytics
Pass data over wireless and internet
Local storage

"Things"

Basic processing
Send/receive data
Sensing/actuation

Question

What one thing do ALL IoT devices need?

A way to communicate

A way to communicate

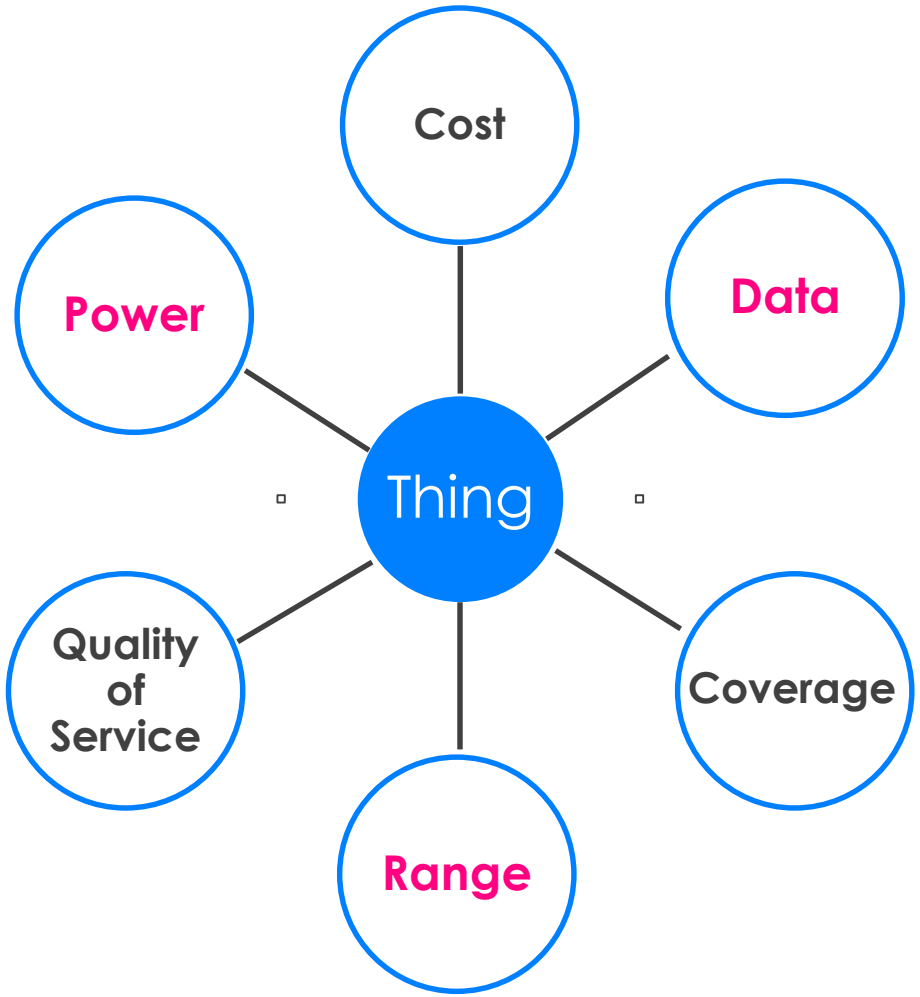
RFID

Bluetooth®

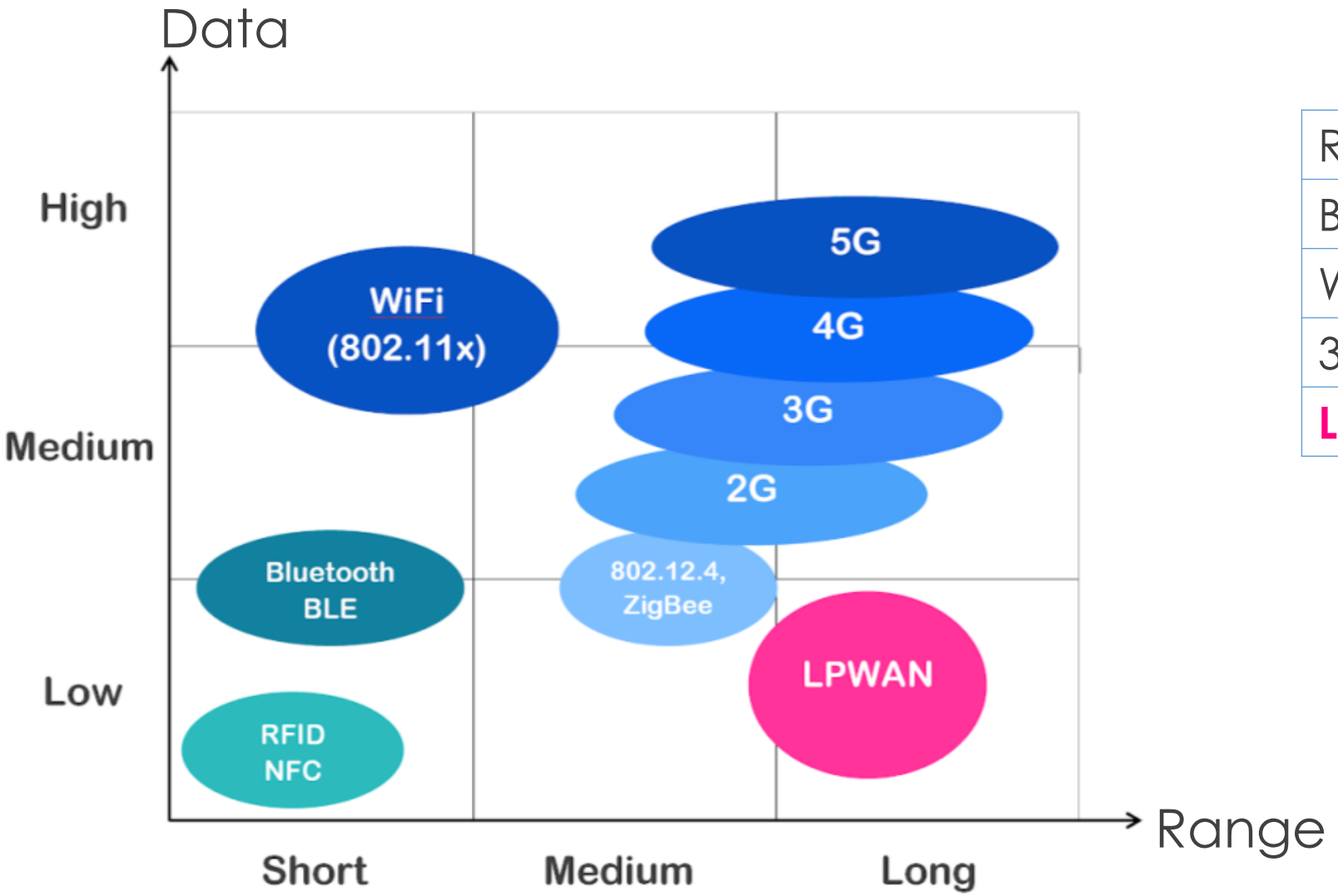
Wi Fi™

3GPP
A GLOBAL INITIATIVE

LPWAN
Low-Power Wide-Area Network



Network technology comparison



Typical battery life

RFID	n/a
Bluetooth	Weeks
Wifi	Days
3G/4G	Days
LPWAN	**Years**

Key features of LPWAN

Battery life	Range	Data
Years	1-10km	Very low

- Long battery life – months and years
- Low cost of ownership
- Ease of deployment – devices and gateways
- Reaching hard to connect areas – farms, basements

Bad uses of LPWAN

Battery life	Range	Data
Years	1-10km	Very low

- Transmitting/receiving larger quantities of data
- Continuous transmission of data
- Truly mission critical / life or death use cases
- Truly instantaneous response

Good uses of LPWAN

Battery life	Range	Data
Years	1-10km	Very low

- Avoid the cost of manual inspections
- Preventative maintenance on equipment ..or people!
- Security monitoring / alerts
- Asset location tracking (e.g. street cleaning vehicles)
- Regular measuring of conditions – air quality, moisture
- Counting – people, vehicles, potholes, power usage
- Alerts when thresholds are breached
- Remote control – irrigation, heating, locks

LPWAN: main contenders

	LoRaWAN	SIGFOX	NB-IoT
Modulation	Chirp spread	Ultra narrowband	OFDMA
Frequency (EU)	868 MHz	868 MHz	800 MHz (licensed)
Data rate	300 bps – 50 kbps	100 bps	250 kbps
Max payload size	51-242 bytes depending on power/SF	12 bytes	512 bytes (likely)
Max messages per day	No max, subject to 1% duty cycle	140 uplink, 4 downlink	Depends on subscription
UK operator	Anybody – us! Several private operators	WND-UK	Nobody yet in UK, but Vodafone plan to start deploying at the end of this year
Coverage	Patchwork in the UK, but **you can put it where you need it**	Growing coverage in England and NI	None yet in the UK outside of test beds

Manchester wins £10m prize to become world leader in 'smart city' technology

Ordnance Survey is part of a public – private consortium that is celebrating winning a £10m competition for Manchester to be the UK's Internet of Things (IoT) Demonstrator, awarded by the Department for Culture, Media and Sport.

04 December 2015

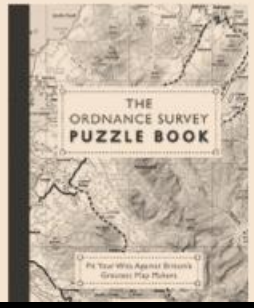
Ordnance Survey is part of a public – private consortium that is celebrating winning a £10m competition for Manchester to be the UK's Internet of Things (IoT) Demonstrator, awarded by the Department for Culture, Media and Sport.

The city will now become an arena for in-field innovation trials that demonstrate the capability of the IoT. The 'CityVerve' proposition aligns with Manchester's on going devolution commitment to deliver innovative solutions to local needs and priorities and focus on the continued growth of the digital economy, and the more efficient and effective delivery of

LATEST NEWS

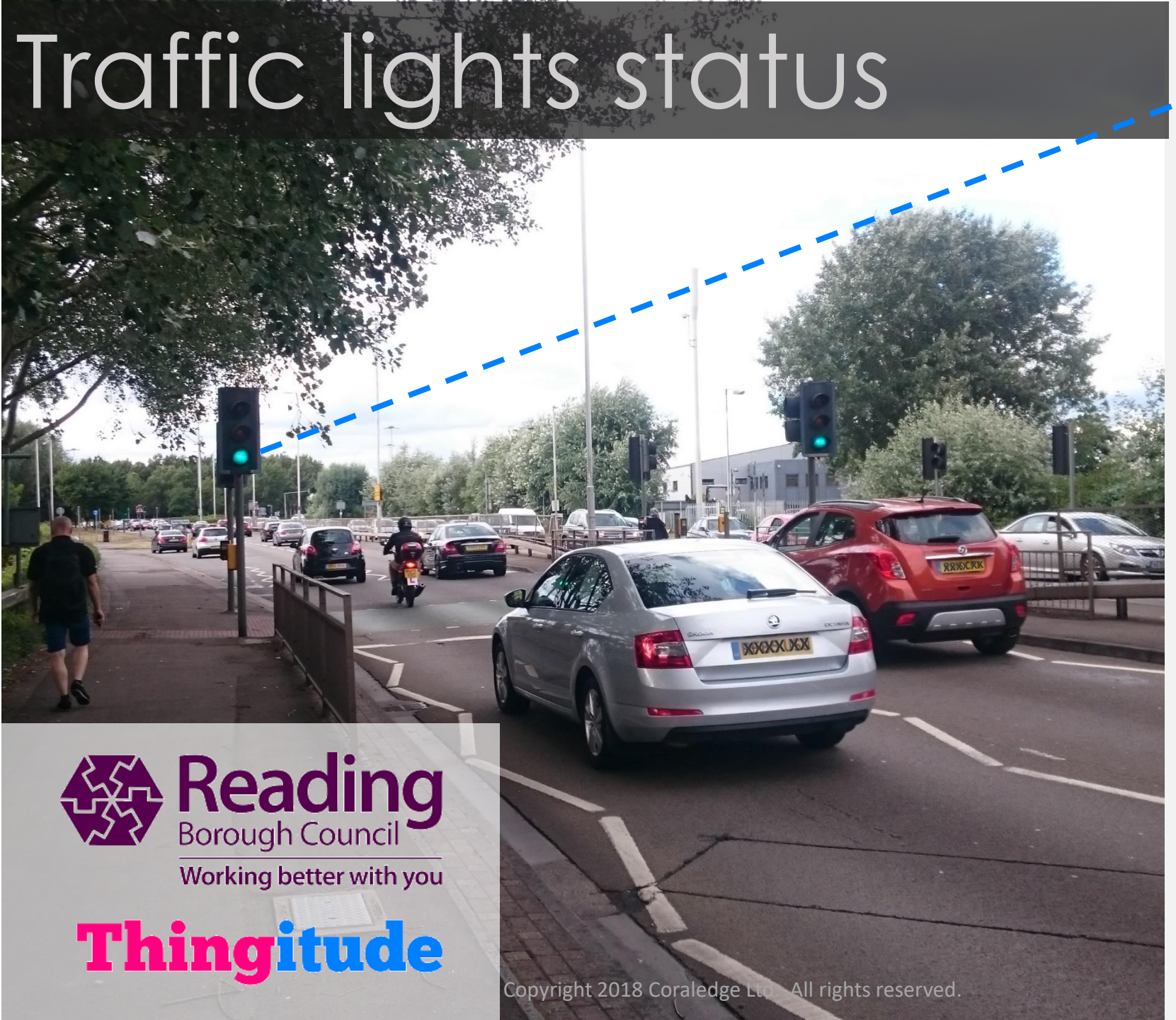
12 February 2019

New high-altitude platform



If you don't have £10m...

Traffic lights status



LoRaWAN Gateway

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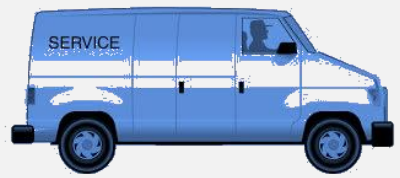
Traffic Mgt System



Reading Borough Council

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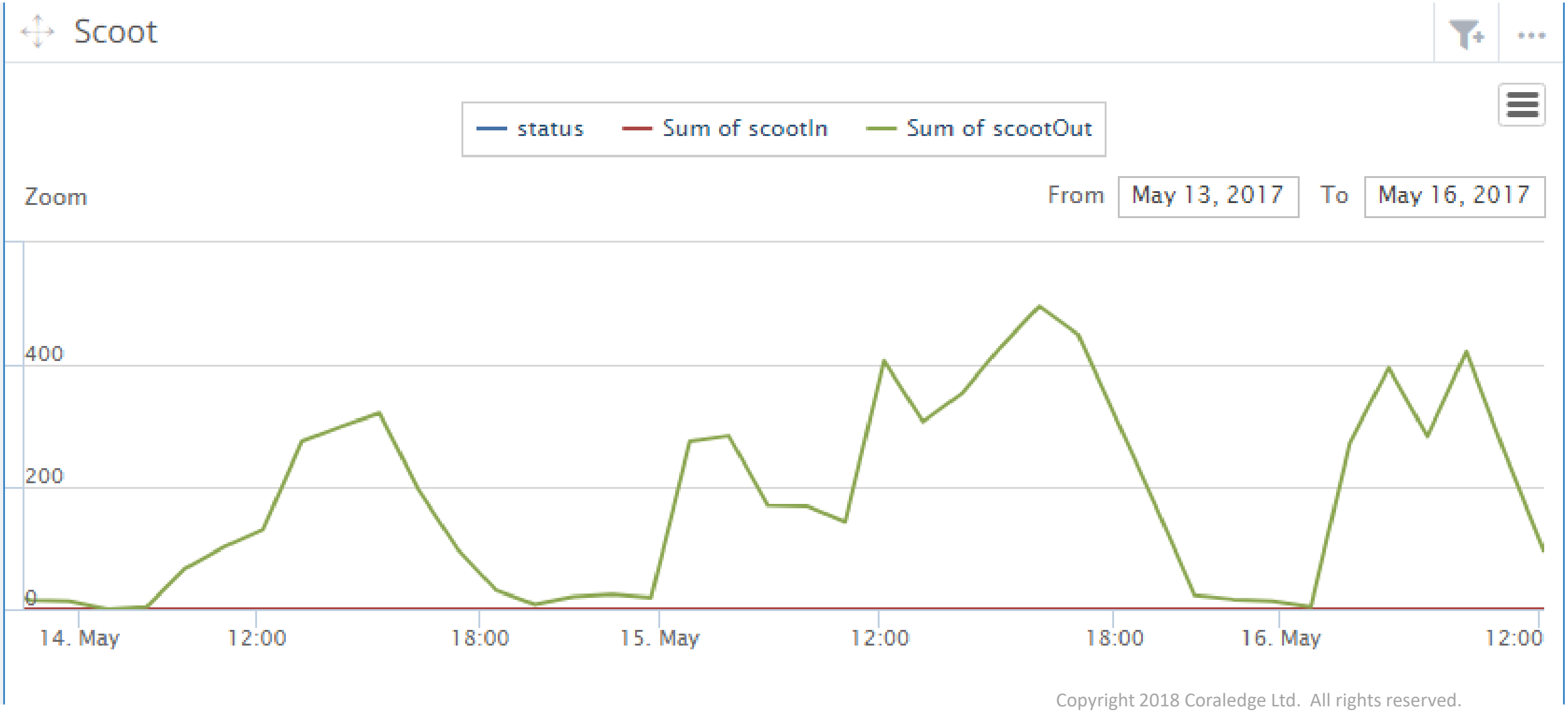
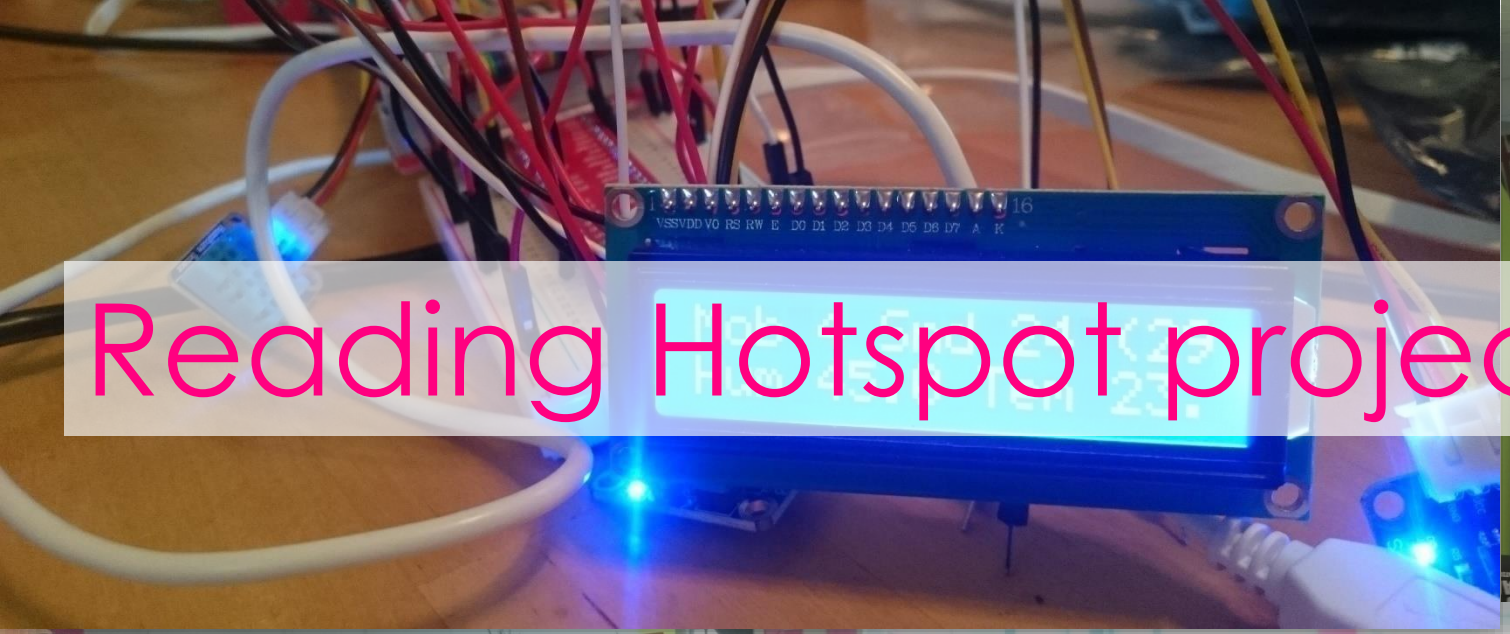
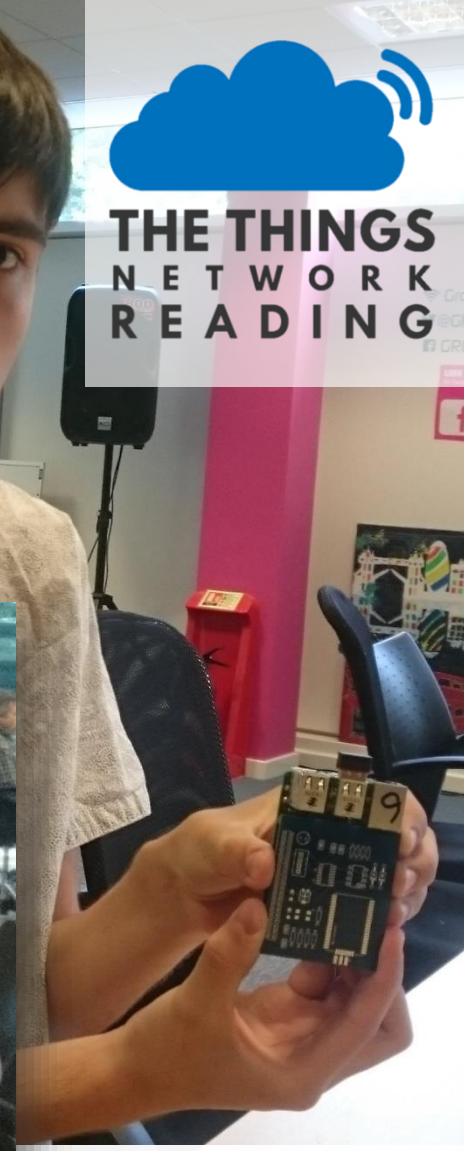
Traffic flow data



Reading Hotspot project





THE THINGS NETWORK READING

Reading 2016

GROW@GREENPARK

Thingitude

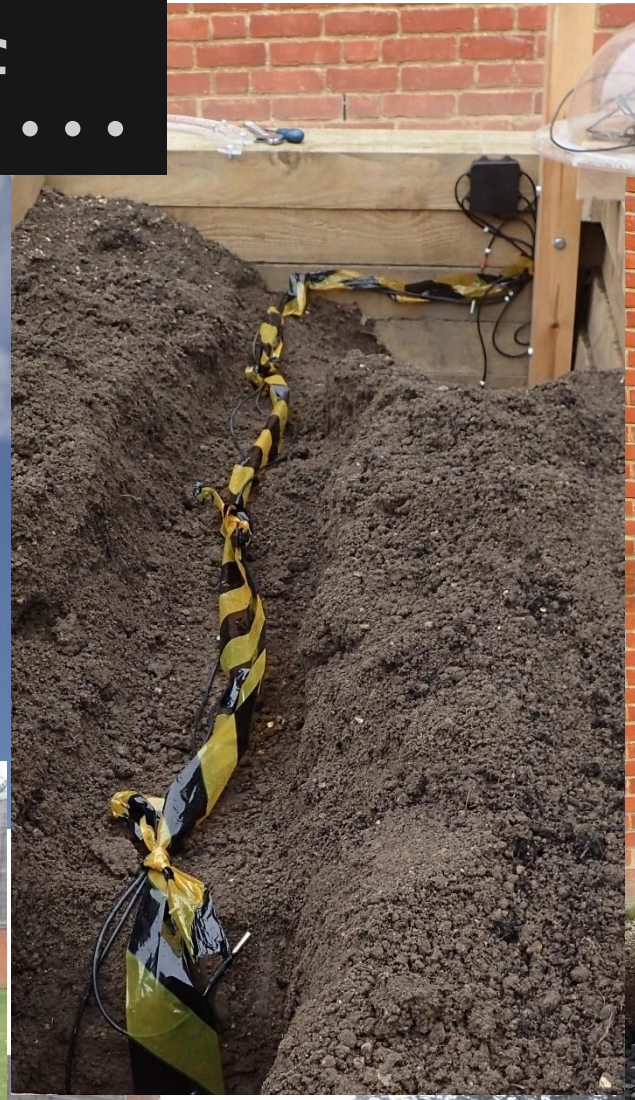
darta

DATA+ART

16 artists and geeks exploring the possibilities of creating new art using data about Reading

Reading 2016

The Internet of... Vegetables!



On the buses

Monitoring the effectiveness of the bus heating system.

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Build a community, not a club

READING GEEK NIGHT

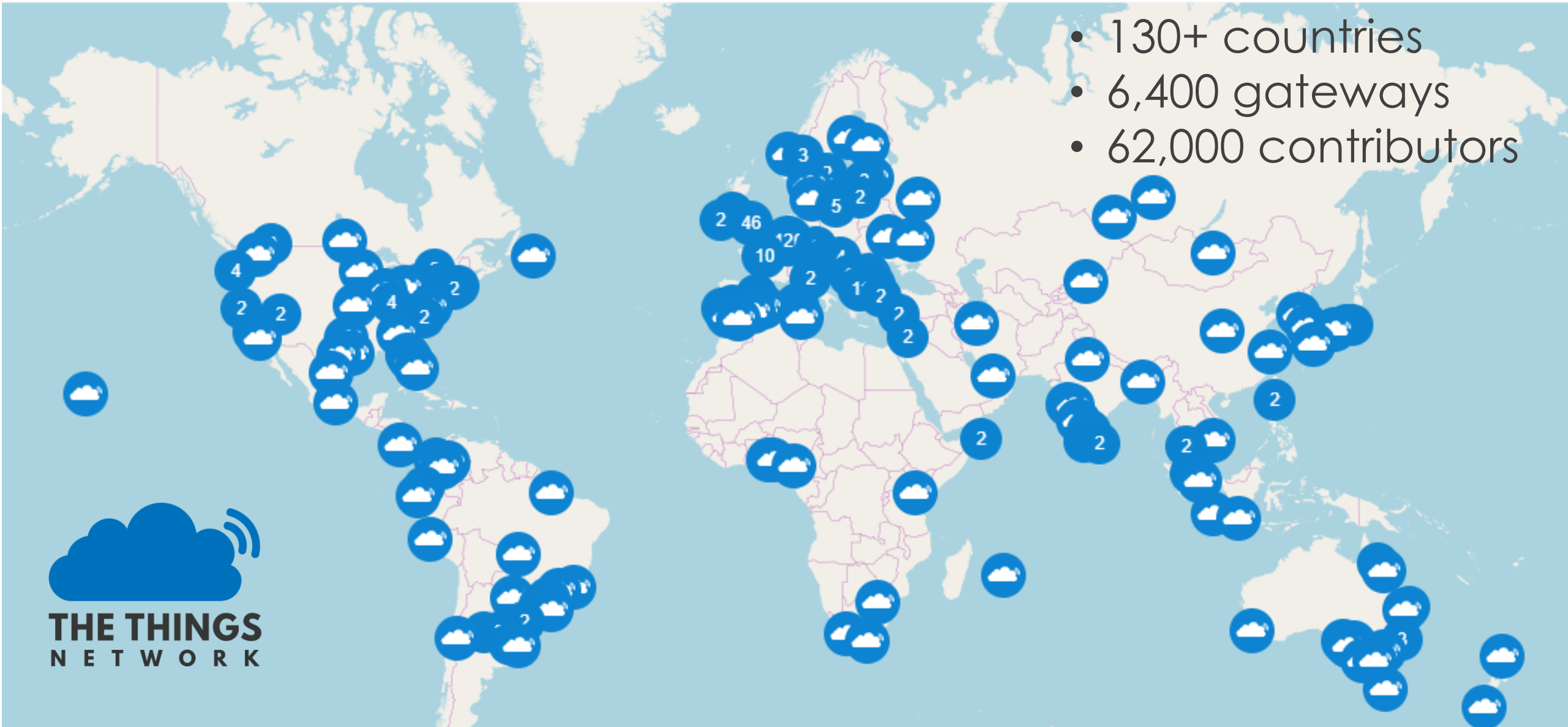
We are not alone…

Amsterdam 2015

We're on a mission…

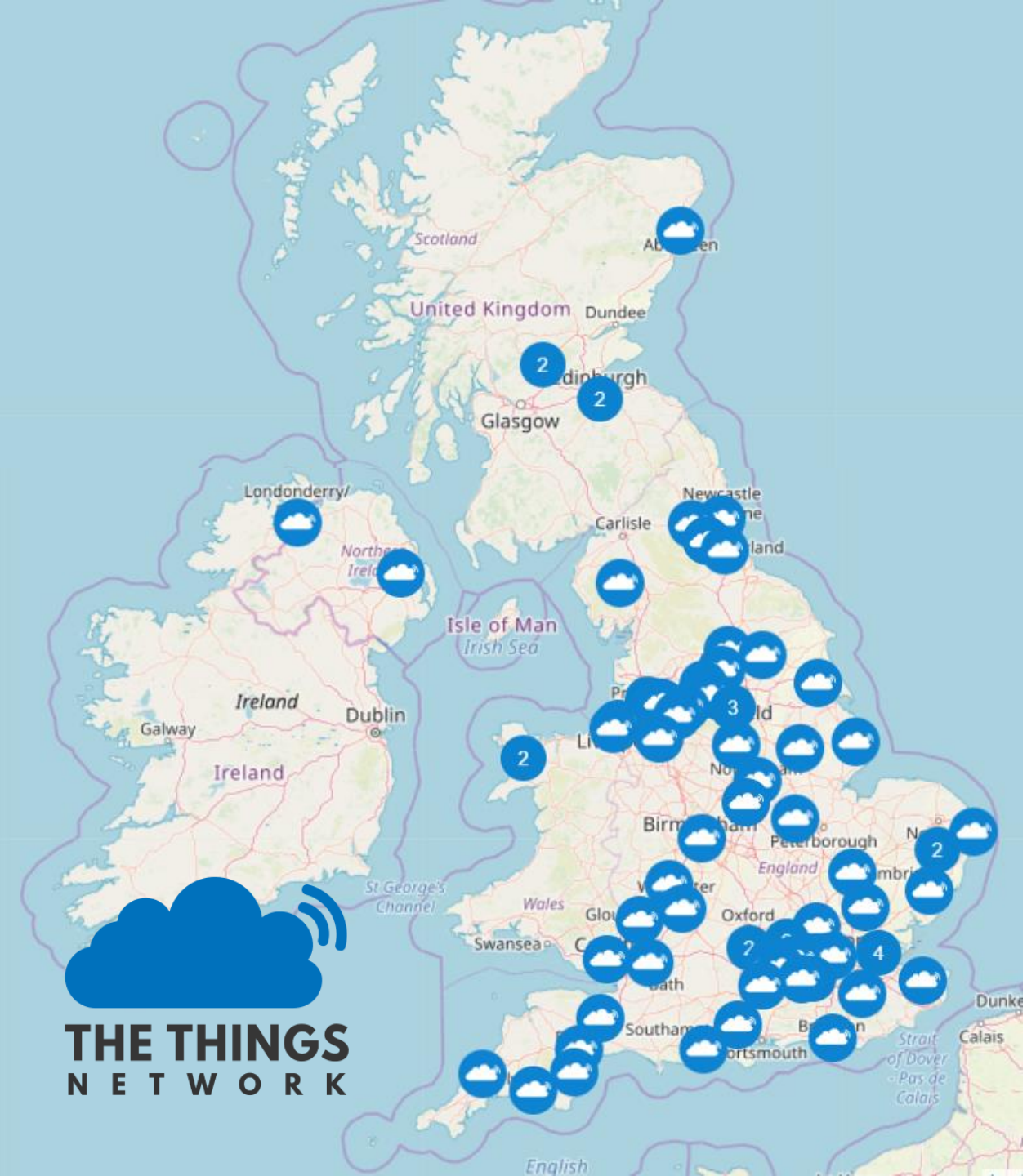
…to build a global open crowdsourced Internet of Things data network

The Things Network – worldwide Feb 2019



In the UK Feb 2018

- 46 communities
- 192 gateways – let's make it 200!
- 480 contributors



In the UK Feb 2019

- 77 communities
- 510 gateways
- 750 contributors

…and GROWING!

Reading Borough Council

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3 years later…

£1.7m LGF grant for Smart Berkshire

- Reading
- Bracknell
- Wokingham
- West Berks

Coverage forecast for 80 gateways (draft)

Sorry, I am not able to share the map
- but feel free to contact me if you want to know more

THE THINGS NETWORK

£900k INNOVATION FUND FOR LOCAL AUTHORITY CHALLENGES

Example Local Authority use cases

Independent Living

Created by Francisca Arévalo
from Noun Project

- Early intervention (eg UTI)
- Falls prevention
- Reducing home visits
- Reducing night monitoring

Well-being

Created by Nithinan Tatah
from Noun Project

- Reducing social isolation
- Air quality monitoring/alerts
- Water quality alerts
- Legionella monitoring

Example Local Authority use cases

Roads

Created by Sergey Krivoy
from Noun Project

- Pothole detection
- Gritting
- Traffic congestion
- Swing bridges
- Cycle safety

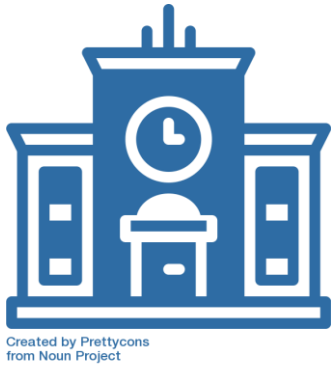
Housing

Created by Andrejs Kirma
from Noun Project

- Empty lets – mould detection/prevention
- Preventative maintenance
- Fire safety
- Energy efficiency

Example Local Authority use cases

Other uses



- Smart bins
- Monitoring council assets - security
- Smart signage
- Flood monitoring
- Cliff and footpath erosion
- Antisocial behaviour detection / evidence
- Domestic violence evidence

EXTENDING COVERAGE OF

FOR EVERYONE

TTN community network is free to use

Sorry, I am not able to share the map
- but feel free to contact me if you want to know more

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THE THINGS NETWORK READING

You can have a say in Reading's Smart City agenda.

Thingitude

Our next event:

https://is.gd/uRANvp

MAR
10

The Things Network spring gathering - March 10th

by The Things Network community (Reading, Wokingham, Ealing, your town?)

Free

Register

Description

Whether you are an artist, a technologist, an entrepreneur, a student ...as long as you are human (ish) - you are warmly invited to join our gathering of people interested or involved in The Things Network.

We gather to discuss potential projects, technology, programming and how to grow The Things Network in our different areas. It is friendly, supportive and aims to strengthen the bonds between the TTN community groups. We can also update you on our work with the local authorities to get TTN across Berkshire.

If you have something you'd particularly like to discuss, please let me or

Date And Time

Sun, 10 March 2019
10:00 – 13:00 GMT
Add to Calendar

Location

The MERL - Museum of English Rural Life cafe
6 Redlands Road
Reading
RG1 5EX

THANK YOU

Any questions?

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Thingitude

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https://is.gd/uRANvp