LPWAN – The State Of Play

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SIGFOX

- "OPEN STANDARD"
  - 868MHZ LICENSE EXEMPT IN UK
  - 900MHZ IN US
  - UNB
- NODE -> NETWORK
  - UP TO 140 X 12 BYTE MESSAGES PER DAY
- NETWORK -> NODE
  - MAX 4 MESSAGES OF 8 BYTES PER DAY
- BIT PACKED FORMAT

LORA

- CHIPS/SPEC MADE BY SEMTECH
  - 868MHZ EU/900MHZ US
  - SPREADSPECTRUM
- DATA RATES 0.3 KBPS TO 50 KBPS
  - SF7 – SF12 (51BYTES TO 222 BYTES APPROX)
- THE MODES OF OPERATION
  - CLASS-A (ALOHA TYPE)
  - CLASS-B EXTRA RECEIVE WINDOWS
  - CLASS-C ALWAYS LISTENING EXCEPT WHEN TRANSMITTING

WEIGHTLESS

- WEIGHTLESS-N
  - 868MHZ

- WEIGHTLESS-P
  - 868MHZ
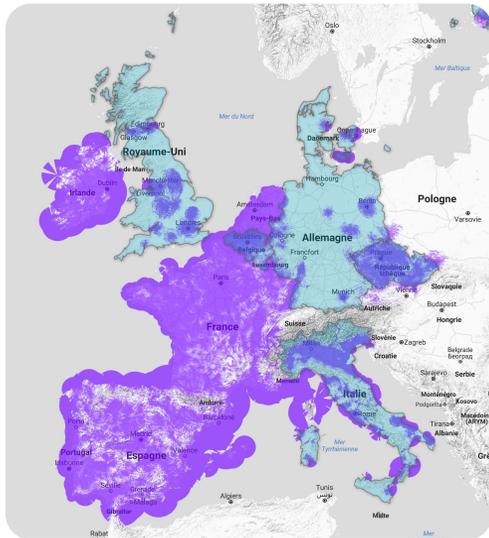
- WEIGHTLESS-W
  - TV WHITESPACE

3GPP

- NB-IOT
  - SPEC EARLY 2016
  - LTE/3G EXTENSION

- LTE-M
  - V13 OF 3GPP SPEC
  - BETTER SPEED/SECURITY NB-IOT
  - BETTER IN BUILDING

- CARRIERS WANT TO MONETISE

OTHER TECHNOLOGIES

- GREENWAVES, A LOW-POWER, LONG RANGE OFFERING.

- HAYSTACK, A DASH7 LOW-POWER WIRELESS NETWORK DEVELOPMENT PLATFORM.

- RPMA, ON-RAMP WIRELESS'S RANDOM PHASE MULTIPLE ACCESS.

- SYMPHONY LINK FROM LINK LAB.

- WAVIOT NARROWBAND M2M PROTOCOL.

- POTENTIALLY ALSO 802.15.4
  - THREAD
  - ZIGBEE

- WIFI 802.11AH

- ZWAVE

- BLUETOOTH 5.X

SIGFOX IN UK

- RUN BY ARQIVA

- ROLLOUT TO 10 CITIES
    - BIRMINGHAM
    - BRISTOL
    - EDINBURGH
    - GLASGOW
    - LEEDS
    - LEICESTER
    - LIVERPOOL
    - LONDON
    - MANCHESTER
    - SHEFFIELD

- EVERYTHING UNDER NDA
    - GO TO HTTP://MAKERS.SIGFOX.COM
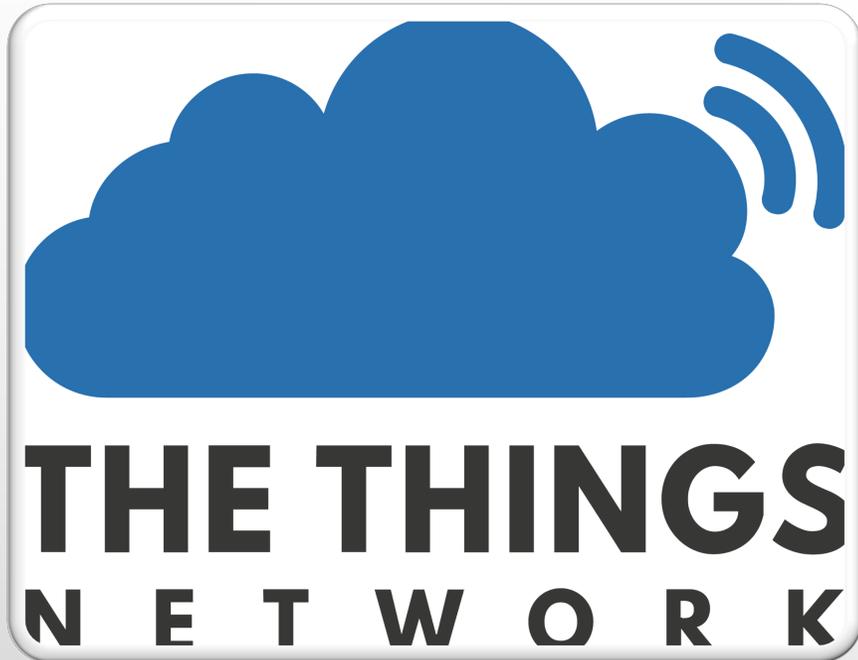
THINGS CONNECTED

- DIGITAL CATAPULT
  - WANT TO SUPPORT SEVERAL LPWAN PROTOCOLS
  - LORA INITIALLY
  - LONDON ONLY (50 SITES IN 2017)
- PARTNERS
  - BT
  - FUTURE CITIES CATAPULT
  - EVERYNET
  - BEECHAM RESEARCH
  - ALLTHINGSTALK
  - BRE
  - IMPERIAL COLLEGE
  - KINGS COLLEGE
  - UCL
  - QUEEN MARY UNIVERSITY
- USERS HAVE TO REGISTER A VALID MOBILE NUMBER TO ACCESS NETWORK
  - ACCESS TO LIVE OR SANDBOX SERVICES

WEIGHTLESS-N

- NWAVE
  - ROLLING OUT IN LONDON
- DEV KITS AVAILABLE
  - (BASESTATION AND END-NODES)

THE THINGS NETWORK

- KICKSTARTER FOR GATEWAY, NODE, ARDUINO

- LOTS OF OPEN SOURCE OUT THERE

- TTN RUN BACK-END NETWORK "ROUTER"

- GATEWAYS SIT ON 'NORMAL ISP' CONNECTIONS
  - ANYONE CAN REGISTER A BACKEND SERVICE
  - ANY DEVICE CAN CONNECT THROUGH ANY GATEWAY
  - INITIALLY SUPPORT 5-10K DEVICES

- NODES ARE LIMITED TO 30S TRANSMIT TIME PER DAY

LEGAL

- SPECTRUM IN THE UK IS COVERERED BY THE WTA 2006
  - EXTREMELY PUNITIVE FOR THE 'CRIME'

- NO SUCH THING AS LICENSE FREE SPECTRUM
  - LICENSE EXEMPT (BIG DIFFERENCE)
  - ALL LICENSE EXEMPT SPECTRUM HAS BEEN EXEMPTED BY AN ACT OF PARLIAMENT

- 868MHZ TECHNICAL REGS EN300 220 / IR 2030
  - ALL EQUIPMENT MUST BE CE MARKED
  - TEST RANGE LESS THAN 100M

- OFCOM TEST LICENSES ARE AVAILABLE
  - £50 PER NODE