LPWA connectivity for IoT

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November 10 2017
Chet Babla
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• Defining Arm’s IoT Device strategy through discussions with ecosystem partners
• 25 years in semiconductor industry
• Previous roles include MediaTek, CSR, several start-ups
• Adviser to UK government on trade policy
IoT - everything connects

New classes of connectivity for a new era of IoT

Healthcare  Industrial  Consumer  City  Environment

Transport  Agriculture  Energy  Metering
Short range vs long-range IoT

Local Area IoT

Wide Area IoT

Source: Amazon

Source: LG

Source: fiorentini.cn

Source: Max Pixel

Source: ofo

Source: bdk
IoT - connectivity technologies

Multiple standards, different attributes

Throughput

- >100Mbps
- <10Mbps
- <1Mbps
- <100Kbps
- <10Kbps
- <1Kbps

Coverage

- <10m
- <100m
- <1Km
- <10Km

- Bluetooth
- 802.15.4
- Wi-Fi
- LTE-A
- LTE-M
- LTE
- Sigfox
- NB-IoT
- LoRa
- Sigfox

Unlicensed spectrum

Licensed spectrum

Short Range - Long Range
LPWA requirements

Low Power Wide Area wireless connects low bandwidth, low power devices and provides long-range coverage.

Includes cellular (NB-IoT, LTE-M/Cat-M1) and non-cellular (Sigfox, LoRa etc) technologies.
IoT - the connectivity pyramid

- **High data rate IoT services**
  - LTE Advanced, 5G NR
  - LTE
  - LTE-M
  - NB-IoT, LTE-M, Sigfox, LoRa
- **Simple, low cost IoT: LPWA**
  - Short range solutions
  - Short range: Wi-Fi, Zigbee, Bluetooth, etc.
LPWA market opportunity

Source: Machina 2017
Cellular LPWA example applications
Real use cases being deployed now [NB-IoT]

**Bike share**

- ofo
- Source: ofo.so. mobike.com

**Smart agriculture**

- 7Sense®
- Telia
- Source: richardvanhooijdonk.com

**Smart meters**

- Shanghai Fiorentini®
- Source: fiorentini.cn
Connecting 1T devices - securely

Security across entire value chain

Scalable to the tiniest, low-cost devices

Secure connection and management of devices

From device to data