LoRa and Sigfox

Ultimate Low-Power M2M Networking

Introduction Alcom Electronics

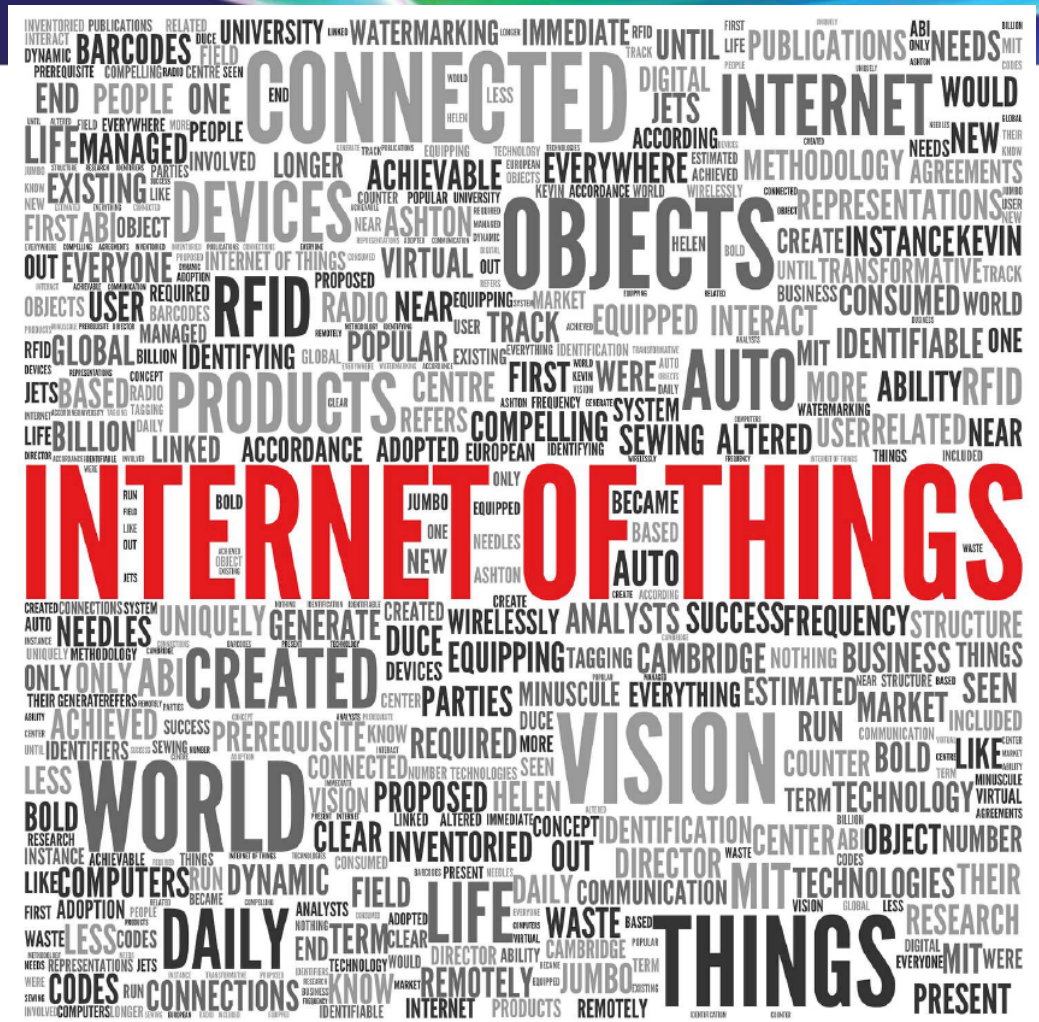
- Independent technical distributor in the Benelux
- 35+ years expertise in semiconductor, modules and wireless solutions
- 50+ people in Netherlands and Belgium
- Technical salesforce and engineering support

- Frans Lutz – Product Manager Wireless Modules
- Mark Korsloot – Product Specialist Semiconductors & Wireless

Alcom electronics

Internet of Things

- Hype or Reality?
- Where are we?
- What is needed to achieve this?



Overview Wireless Technologies for IoT

PAN
Short Range
Communicating Devices

Well established standards

Good for:
- Mobile
- In-home
- Short range

Not good for:
- Battery life
- Long range

Cellular
Long Range w/ Power
Traditional M2M

Well established standards

Good for:
- Long range
- High data-rate
- Coverage

Not good for:
- Battery life

Low-Power WAN
Long Range w/ Battery
Internet of Objects

Emerging PHY standards

Good for:
- Long range
- Long battery
- Low cost

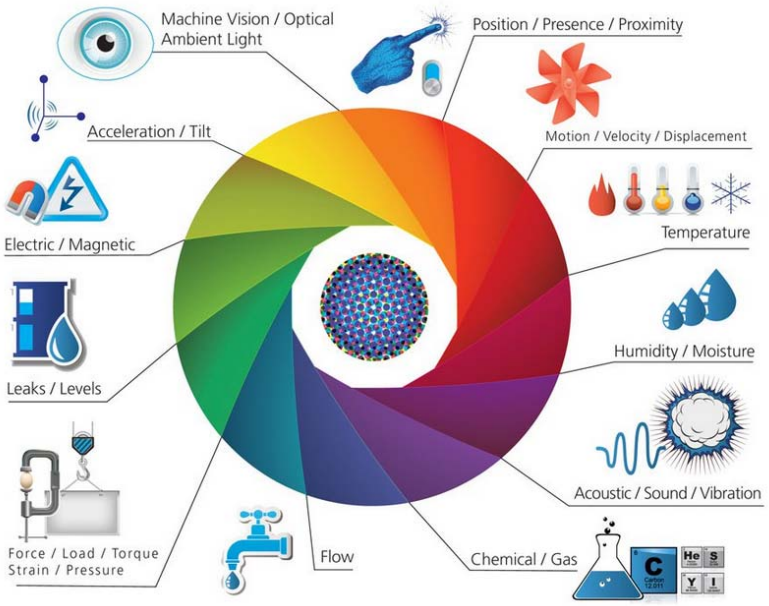
Not good for:
- High data-rate

LPWAN Technology – Characteristics

- Sub GHz ISM bands (Europe 433 / 868MHz) for long range
- Restrictions on duty cycle to 1% (transmit time per hour) - ETSI
- To ACK or not to ACK (reliability vs. power)
- 1-way or 2-way communication
- Payload restrictions due to lower data rate
- Not suitable for real-time interfacing

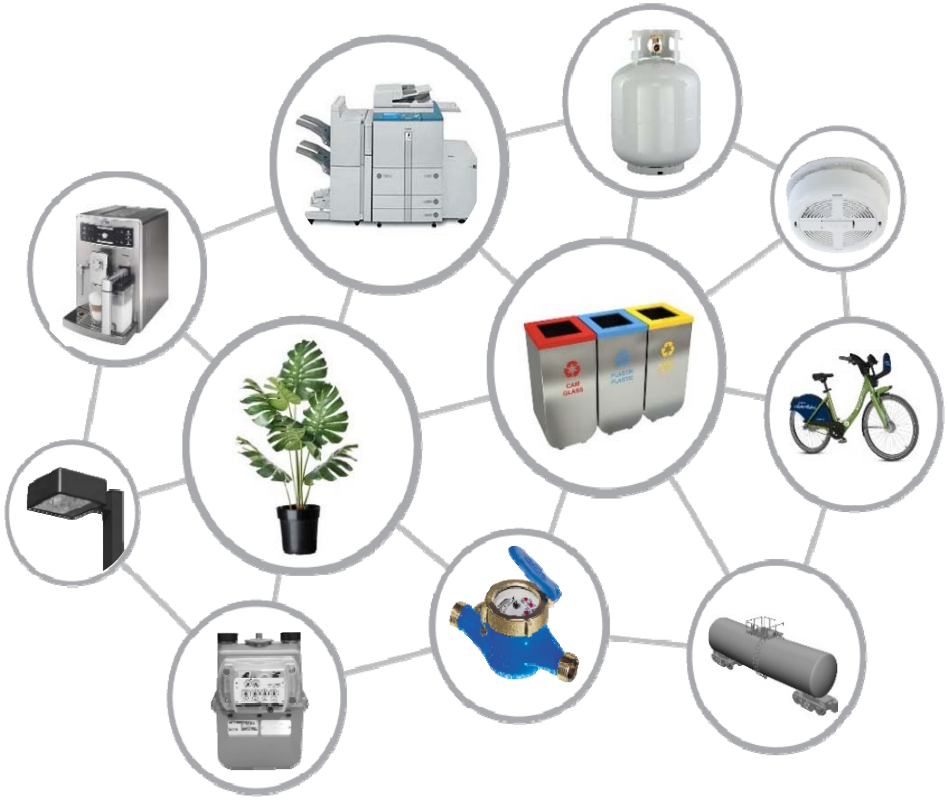
Applications Fitting LPWAN Communication

- Low power requirements (battery operated)
- (Typical) Outdoor applications
- Low communication content (payload & frequency of messages)
- No need for “real-time” communications, delays are acceptable
- Possible need for dense networks



Typical examples

- Waste Management
- Leak Detection
- Alarm & Security (backup communication)
- Monitoring (infrastructure, agriculture, assets)
- Healthcare

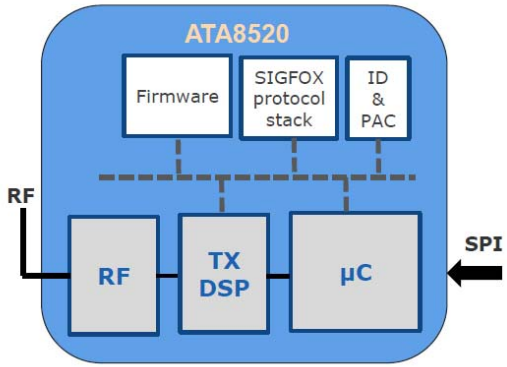


Sigfox

- Provider of network for Internet connectivity
- Ultra narrow band technology
- 140 messages / day / device
- 12 bytes payload uplink /
  8 bytes payload down-link
- Cloud platform with Sigfox-defined API for server access
- Roaming capability
- All products must be certified by Sigfox

Alcom Sigfox Solutions

- Atmel ATA8520(D) –RF Transmitter / Transceiver
- Certified Sigfox Stack on-board
- “Sigfox Ready” Evaluation Kits



Atmel

- **Mission:**
  To standardize Low Power Wide Area Networks
  to enable IoT, M2M, smart-city and industrial applications
- LoRa Alliance has defined the LoRaWAN standard

- Open House for non-members: 10 November in Rotterdam

LoRa Technology

- Long-Range RF Technology, developed by Semtech
- Spread-Spectrum Technology with Adaptive Data Rate
- Two-way communication with 0.3 – 50kbps data rate
- Max. payload 256 bytes (but longer air time)
- No subscription needed for private network, customers can form own Microcells
- Public networks by national operators, such as KPN in the Netherlands
- Multiple levels of encryption
- Roaming not yet finalized

LoRa™ Alliance
Wide Area Networks for IoT

Alcom LoRa Solutions

Multitech MultiConnect Conduit Gateway

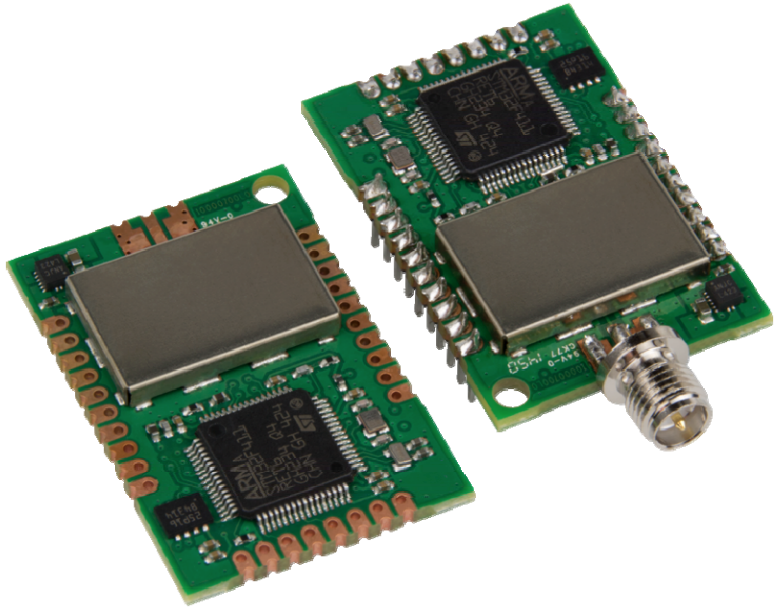
- LoRaWAN 1.0 compliant
- Universal Gateway with LoRa support
- Open & highly Programmable with mLinux
- Develop Graphically with IBM Node-RED and Java
- Easy connectivity to Webserver or User API
- Cellular & Ethernet Communication

Alcom LoRa Solutions

MULTITECH

Multitech Multiconnect mDot

- Programmable LoRa module (mbed)
- LoRaWAN 1.0 Class A stack included
- Two-Way Communication
- FCC/CE end-certified module
- mbed LoRaWAN libraries available for embedded development



Alcom LoRa Solutions

Nemeus LoRa / Sigfox module

- Multiprotocol with dynamic switching
- Two-way communication
- Sigfox-Ready Certified
- LoRaWAN 1.0 Class A & C Compliant
- EN300-220 Pre-certified

NEMEUS
Long Range wireless solution

Alcom LoRa Solutions

- Semtech developed LoRa technology
- SX1272 / SX1276 low-power LoRa Transceiver
- Link Budget 168dBm (-148dBm sensitivity, +20dBm output power)
- Open-source LoRaWAN stack available from Semtech

SEMTECH

LPWAN – The Road Ahead

- Choice for technology depends on business model
- Fundamental technological differences are limited
- LoRa more suited for applications demand higher bandwidths and two-way communication

- Coming Alternatives
  - LTE-0 1Mbps up/down – 2017
  - LTE-M M2M applications, 200kbps, > 2018
  - IEEE 802.11ah Low-power WiFi in sub-GHz bands, support for meshing

LPWAN - Conclusions

- No clear winner at this point
- 2016 looks to be a interesting year, both on national and international level
- For the Netherlands, short term nationwide coverage is expected
- LoRa appears to better when 2-way communication is more important, but power budget will play a crucial role
- Sigfox is better at this point for “roaming” applications

Thank you !

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