IoT and LoRaWAN™

September 14, 2018

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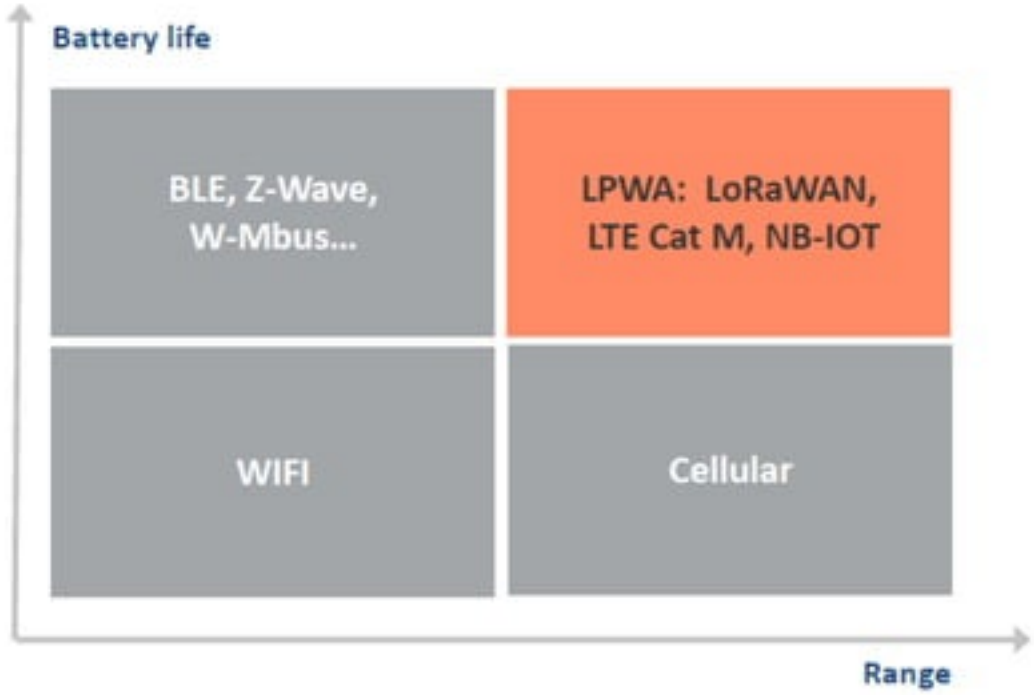
IoT has a broad array of applications

Agriculture & Environment	• Agricultural equipment and workforce • Crops and Livestock • Energy and environmental monitoring
Automotive	• Efficiency improvements • Emerging business models • Safety and Telematics
Construction	• Equipment and Materials monitoring • Site monitoring • Visualization
Consumer Electronics	• Audiovisual • Household consumers goods and fast moving consumers goods • Tracking
Emergency Services	• Emergency Services • National Security • Probation services
Intelligent Buildings	• Building Automation and efficiency • Building infrastructure • Security and safety

IoT Communication Methods



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Where does LPWAN Fit?

Local Area Network
Short Range Communication
WiFi / Bluetooth

- ✓ Well established standards
- ✓ In building

- × Battery lifetime
- × Provisioning
- × Network cost & dependencies

Low Power Wide Area Network (LPWAN)
Internet of Things

- ✓ Lower power consumption
- ✓ Low cost
- ✓ Sensor Positioning

- × High data rate
- × Emerging standards

Cellular Network
Traditional M2M

- ✓ Existing coverage
- ✓ High data rate

- × Battery lifetime
- × Total cost of ownership
- × Closed ecosystem

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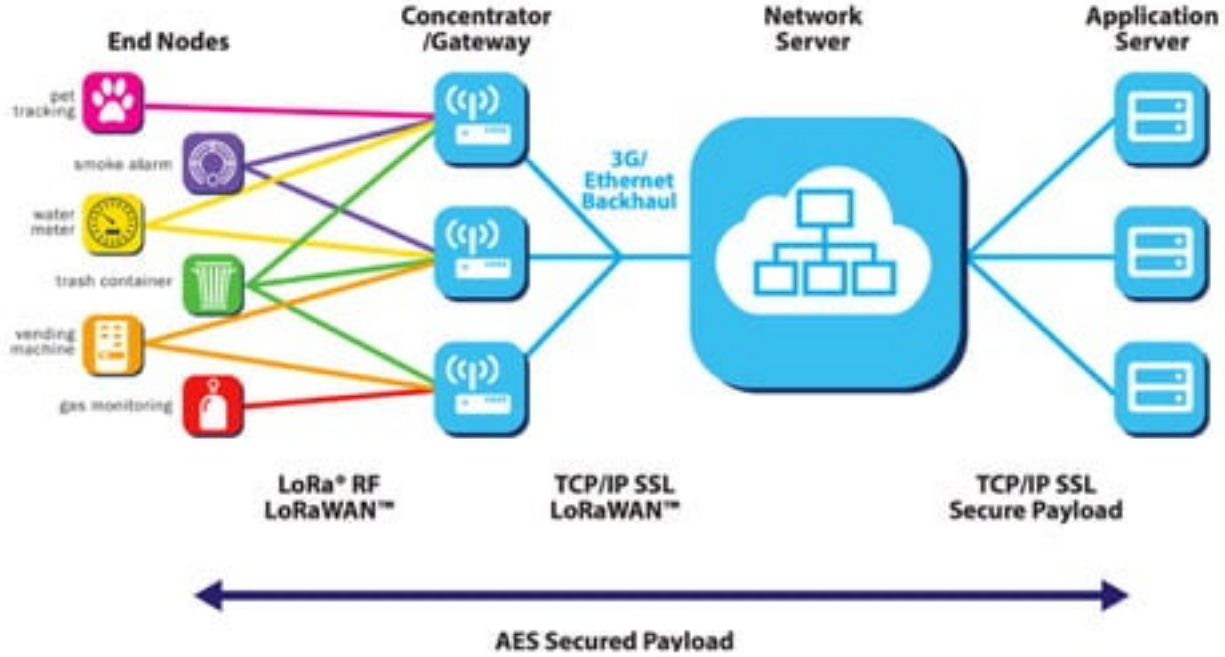
LoRaWAN Architecture



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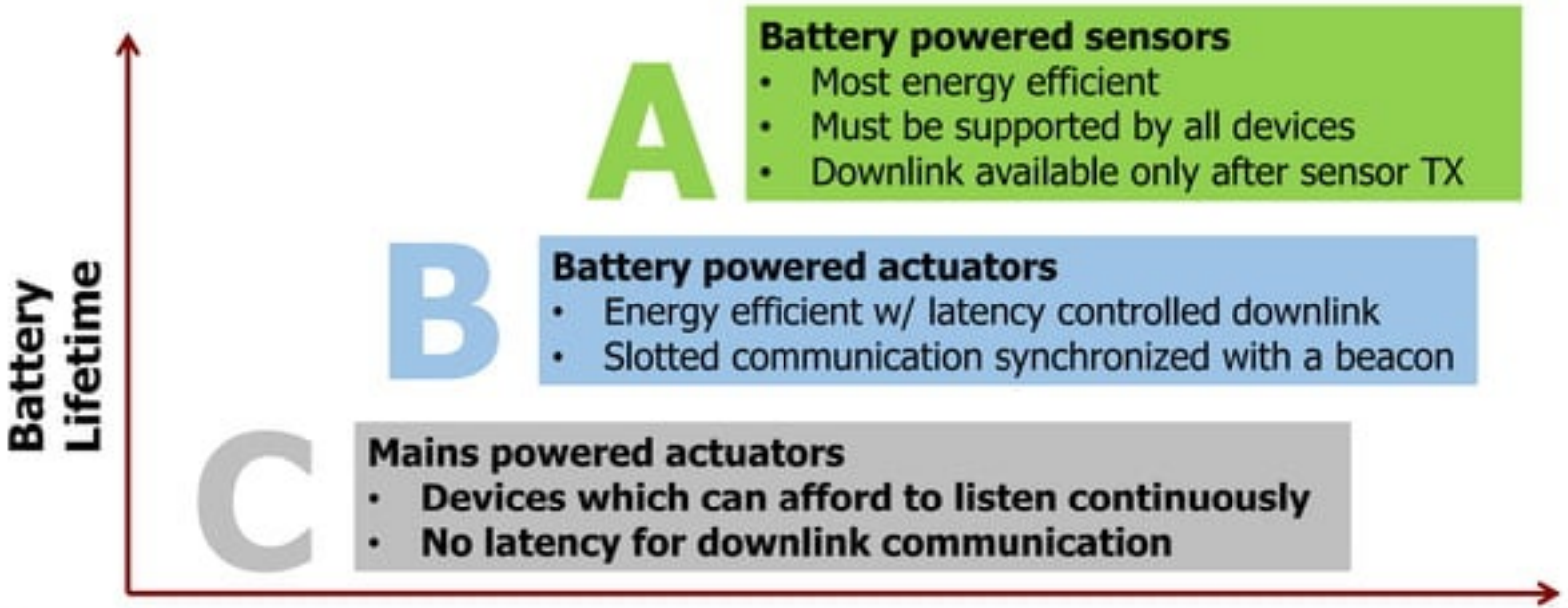
LoRaWAN Device Classes



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Device Classes & Examples

Class A: Smart Bins
Report status a few times per day
No planned actuation required
Extremely low energy

Class B: Irrigation
Report moisture, a few times per day
Turn valves on or off
with a few minutes latency
Very low-energy,
which depends on latency

Class C: Smart Lighting
Maintenance and index info a few times per day
Constantly listens for network «ping»
For low-latency actuation

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LoRaWAN™ Network Features

Long Range

- Greater than cellular
- Indoor coverage
- Star topology

Max Lifetime

- Low power optimized
- 5-10yr lifetime
- >10x vs cellular M2M

Multi Usage

- High capacity
- Multi-tenant
- Public network

Low Cost

- Minimal infrastructure
- Low cost end-node
- Open SW

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LoRaWAN - Differentiators & Benefits

Bidirectional

- Acknowledge
- Scalable Capacity
- Broadcast

LoRaWAN

- Global Standard
- True Mobility
- Seamless
- Roaming

Security

- Unique ID
- Application
- Network

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LoRa Alliance®

Sponsor and Contributor Members as of May 2018
+ >300 Adopter Members

LoRa Alliance

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LoRaWAN Global Rollouts

83
Network Operators

~100 Countries with LoRaWAN Deployments

Alliance Member Public Networks

Other LoRaWAN™ Deployments

LoRa Alliance™

May 2018

MONITOR, CONTROL AND ANALYZE ALL THINGS CONNECTED ON A RELIABLE, COST-EFFECTIVE NETWORK

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TURRIS

&


Accelero
CAPITAL

The QuaeNet Advantage

- LoRaWAN™ is an open global standard for secure, carrier-grade IoT connectivity
- QuaeNet is a LoRa Alliance Contributor member. Members include: IBM, Cisco, Google, Comcast, Orange, SK Telecom and others.
- Proven LoRa deployments in Europe, Asia and the US
- Certification program for sensor manufacturing and applications
- QuaeNet's Canadian network is Operator Grade Network Quality with a lean, nimble and open eco system

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Reliable Infrastructure

Tektelic Kona Gateways

- 64 Channels
- Ethernet and LTE connectivity
- UPS with battery back-up

Actility Network Server

- LoRa founding member
- Trusted by over 50% of the Public Network Operators globally

Southern Ontario

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Eastern Ontario

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Western Canada

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LoRaWAN
Solutions

Parking Occupancy - PNI

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Parking Sensors

In-Ground

Surface Mount

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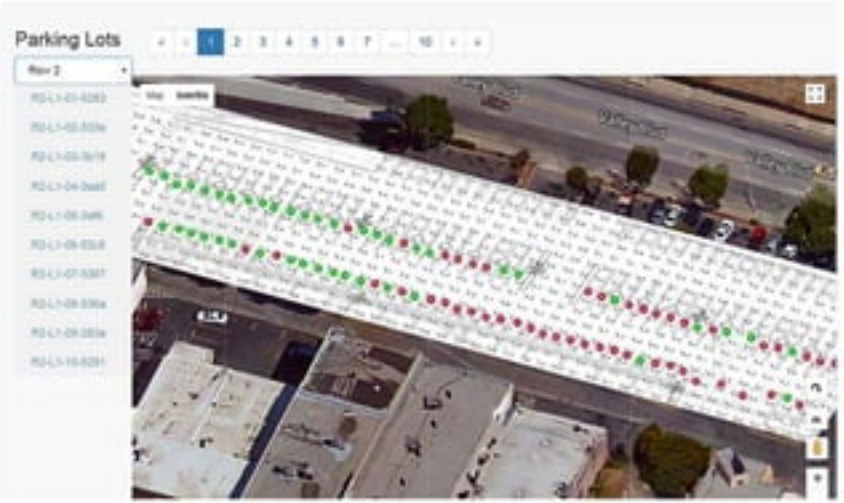
End-to-End Smart Parking Solution

Turn existing parking assets into a more efficient and profitable managed resource with:

- Accurate, real-time occupancy status for all parking spaces
- Precise location of available parking spaces
- Comprehensive dashboard for managing all parking resources



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Smart Lighting - Flashnet

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Smart Lighting Controllers

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Asset Management

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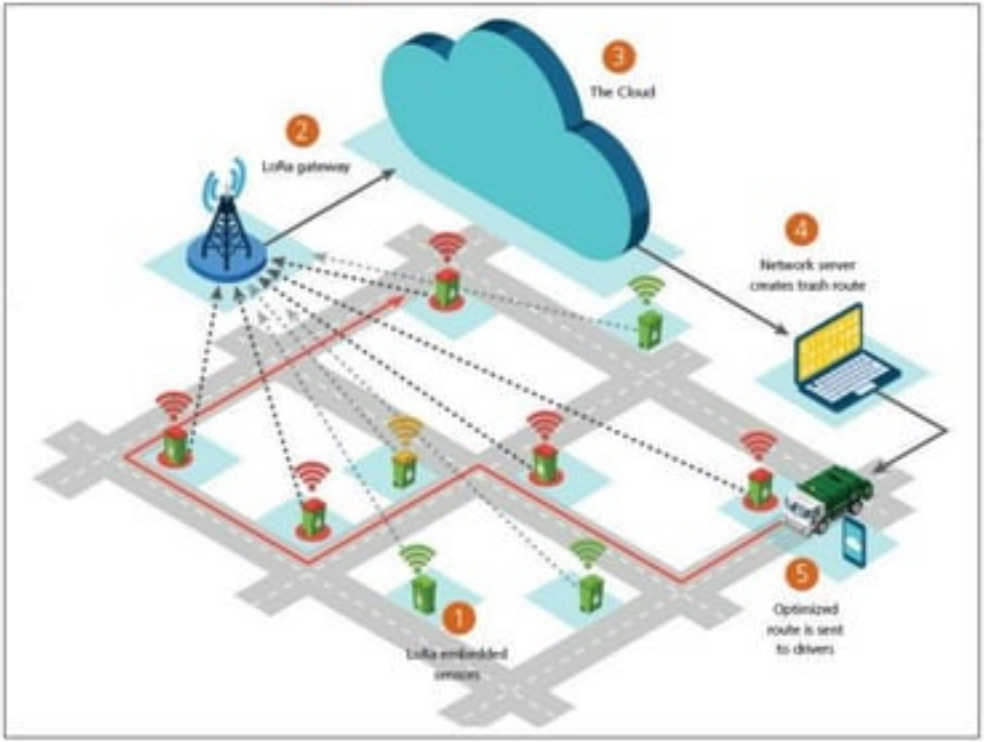
Smart Waste Management



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Smart Metering

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Smart Environment

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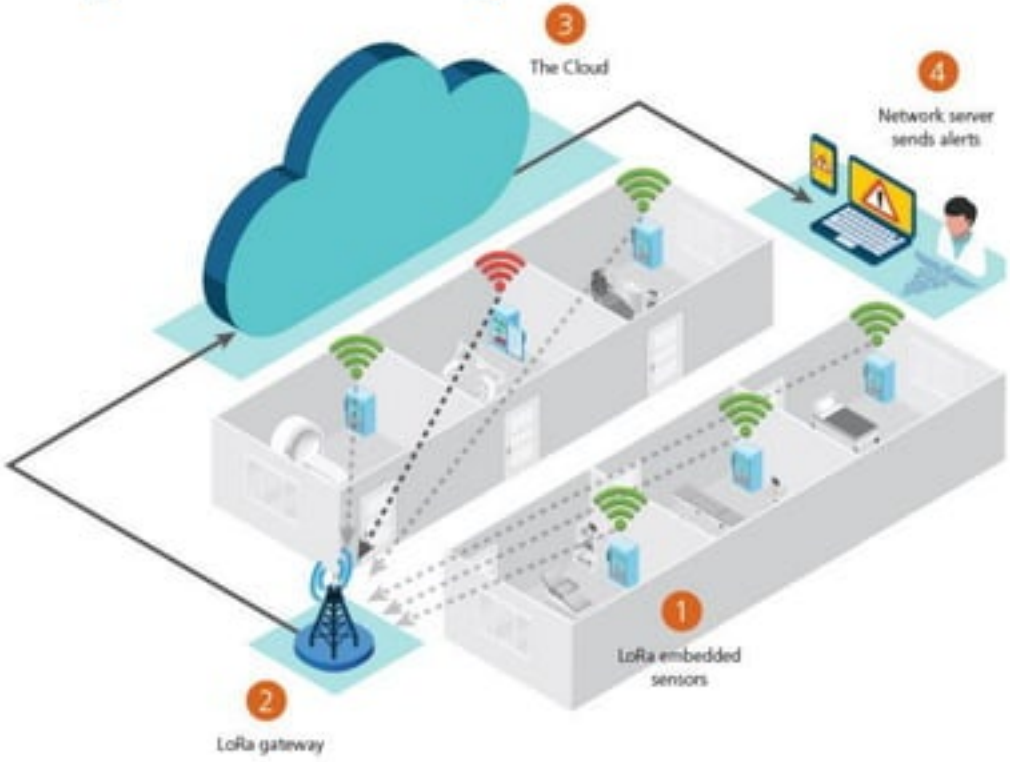
Cold Storage Monitoring



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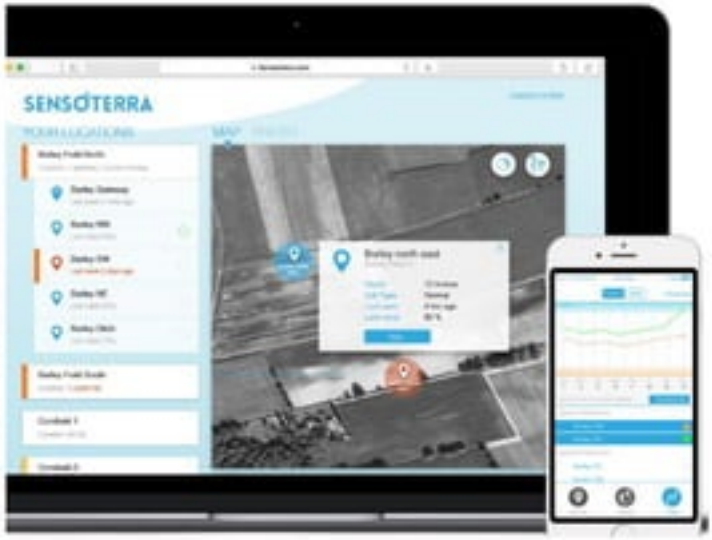
Smart Irrigation- Sensoterra



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Tank Monitoring

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Tank Monitoring - Wesroc

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Cattle Tracking and Health

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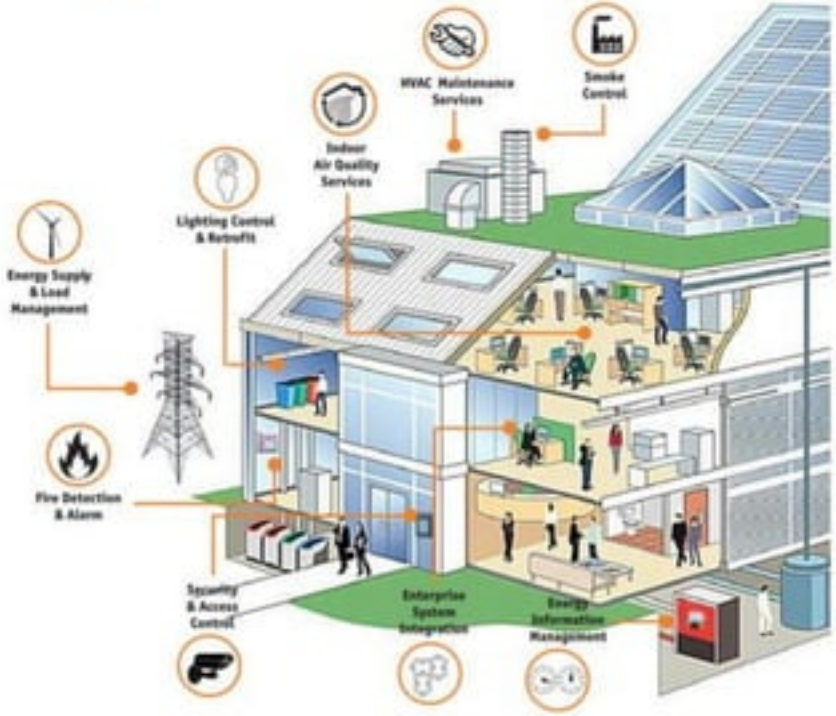
Smart Building



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Possible
Partnerships

Partnership Opportunities

- Mobile Virtual Network Operator (MVNO)
  - You own all aspects of the relationship with the customer
- Channel Partnership
  - Joint relationship with the customer

Development Opportunities

- Access to QuaeNet's Dev platform at MEVIC or in your lab
- Assistance to migrate your solution
- Funding of solution through Accelero

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