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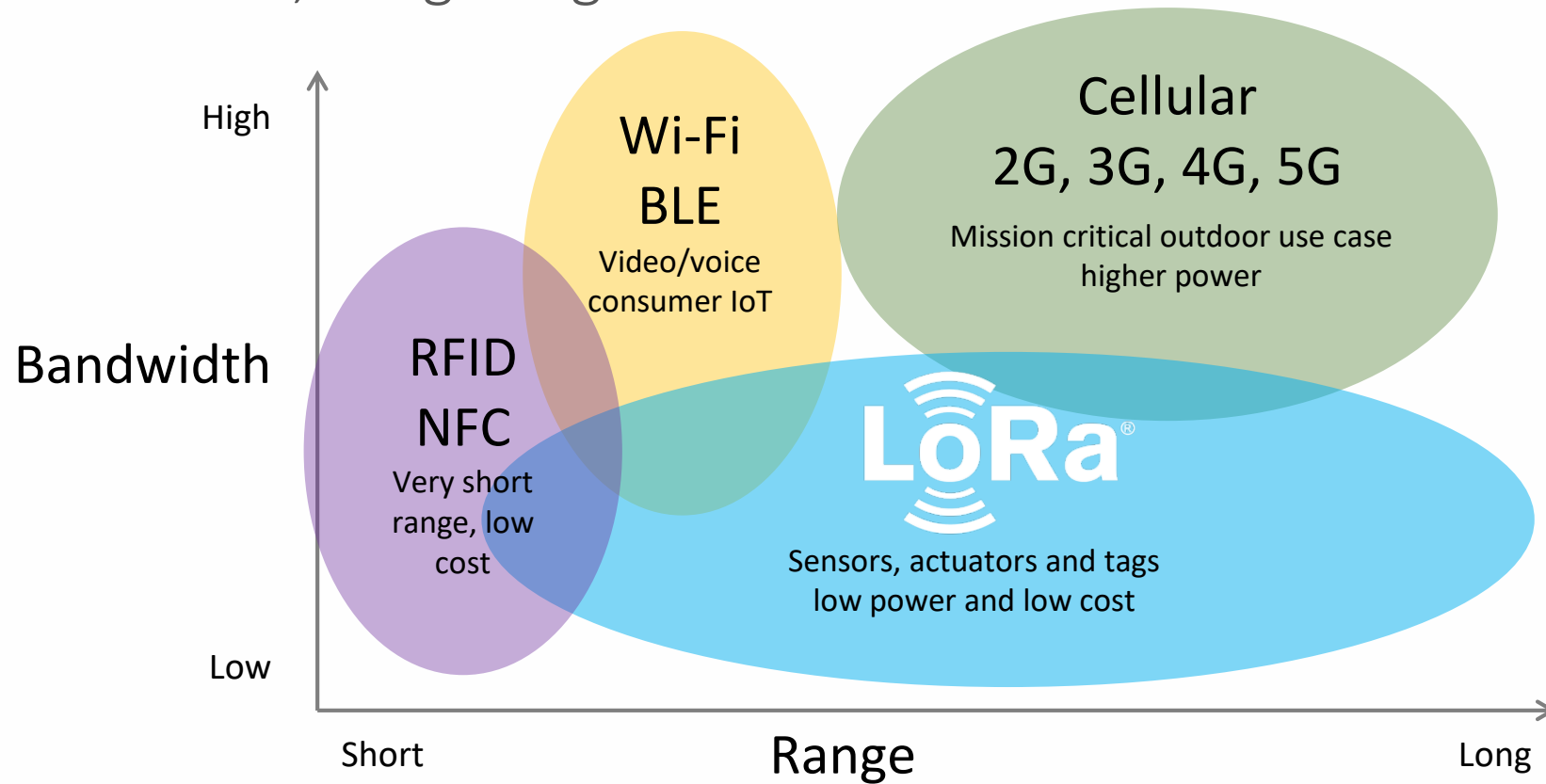
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LoRaWAN® in Logistics
Asset Tracking with Minimal Infrastructure

Roelof Koopmans

Senior Director, Semtech Corporation

LoRa® Fills a Technology Gap in Wireless

Low Bandwidth, Long Range

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LoRa® Key Benefits

Long Range
- Up to 15-30 miles outdoor
- Deep indoor coverage

Low Power
- Up to 10+ year lifetime
- >10x vs. Cellular M2M

Multi-Usage
- Scalable capacity
- Public or private LoRaWAN® network

Cost Effective
- Minimal infrastructure due to large range and affordable gateways

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LoRa® Communication Features

Bidirectional

- Broadcast and acknowledge
- Firmware Updates Over The Air (FUOTA)

LoRaWAN®

- Global standard kept by LoRa Alliance®
- Seamless interoperability between devices, gateways and networks

Security

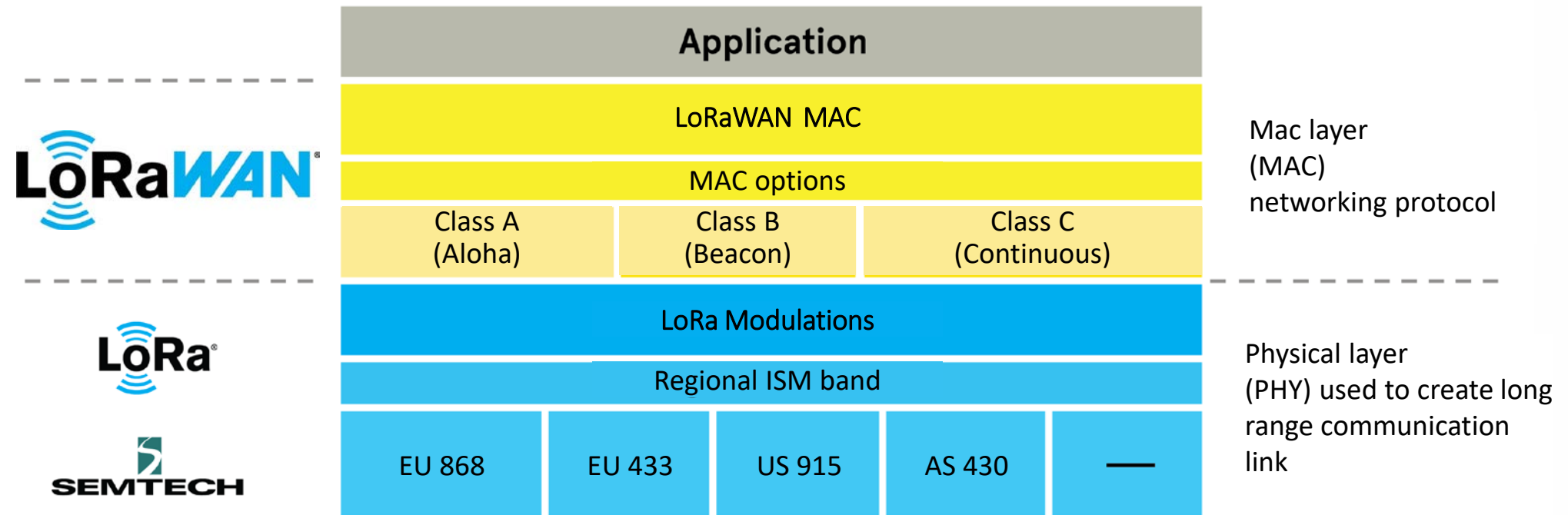- End-to-end AES-128 encryption on network and application level

Geolocation

- Indoor and outdoor location when combining LoRa with GNSS, Wi-Fi and BLE scanning

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How LoRa® and LoRaWAN® Relate

Application				
LoRaWAN MAC				
MAC options				
Class A (Aloha)		Class B (Beacon)	Class C (Continuous)	
LoRa Modulations				
Regional ISM band				
EU 868	EU 433	US 915	AS 430	—

Mac layer (MAC) networking protocol

Physical layer (PHY) used to create long range communication link

© LoRa Alliance®

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LoRa Alliance® 2015 - 2020

Hundreds of Member Companies

Including leading players:
- Orange
- British Telecom
- Google
- Amazon
- Tencent
- Alibaba
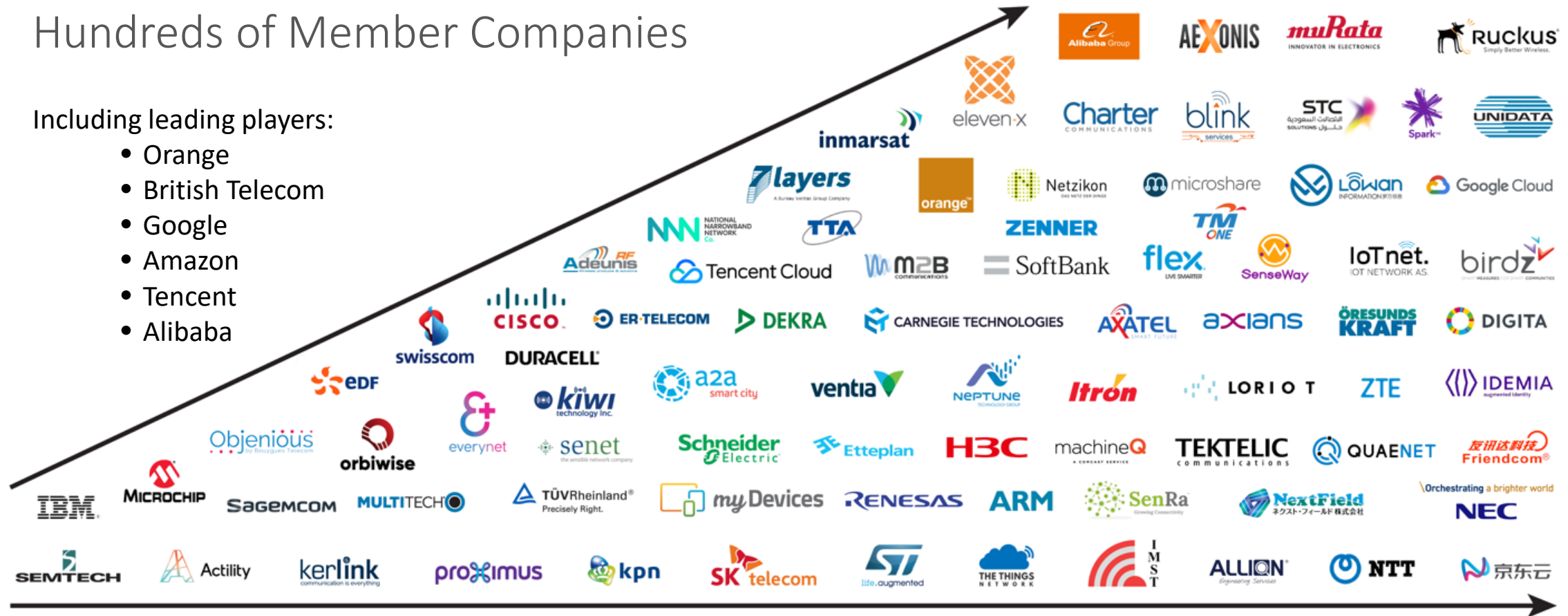
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LoRaWAN® Networks: Private or Public?

- Nationwide public networks enable simple customer utilization
  - For example: Netherlands, Switzerland, France, Belgium, South Korea

- Companies can deploy private LoRaWAN networks similar to Wi-Fi
  - When no (national) network is available or needed
  - No recurring costs to the operator
  - Offers security advantages

- LoRaWAN Network Server through Cloud-based providers or open source
  - For example: The Things Industries, Actility, Everynet, Loriot

Asset Tracking Use Cases

European car manufacturer tracking high-value assets*

- Car OEM with around 30 factories and 400,000 trackers per year
- Losing 5-15% of assets which need to be replaced each year
- Private LoRaWAN® network at 30 sites including Tier-1 suppliers
- **Benefit:** Capex reduction - fewer assets needed for same number of loops; fewer replacement costs (5% of 400,000 racks costs ~10M€/year)

LAUAK** (French aircraft parts manufacturer) tracking work order assets throughout facility

- 14,000 transport boxes based on LoRa® deployed
- Indoor geo-fencing and crate identification by LED
- LoRa replaced a RFID system, further reducing manual intervention and human error
- **Benefit:** Reduction of 20% for production lead times, and 10% in production line down-times

Manheim** Car Auctioning

- Finding individual cars at large parking lots: 100,000+ cars across 80+ location
- Private LoRaWAN network with outdoor GPS-LoRa trackers

*Semtech customer feedback
**Semtech use case
***Press release 2018

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LoRa Edge™ and LoRa Cloud™

LoRa Edge

- New chip-set combining three radio transceivers on one IC:
    - LoRa®
    - GNSS (GPS, Beidou) scanning
    - Wi-Fi scanning
- Chip-to-Cloud by design allowing customer to achieve the best balance among features, performance and power consumption

LoRa Cloud

- Higher geolocation accuracy due to algorhythms
- Lower costs of provisioning sensors at scale
- Higher security due to security keys from Cloud
- Lower power consumption due to optimized design (up to one tenth that of GPS)
- Less coding and integration effort/cost required by customers, solution providers or systems integrators

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LoRa Edge™ Geolocation Solution

Industry-first Low Power, Highly Integrated Multi-technology Geolocation Solution

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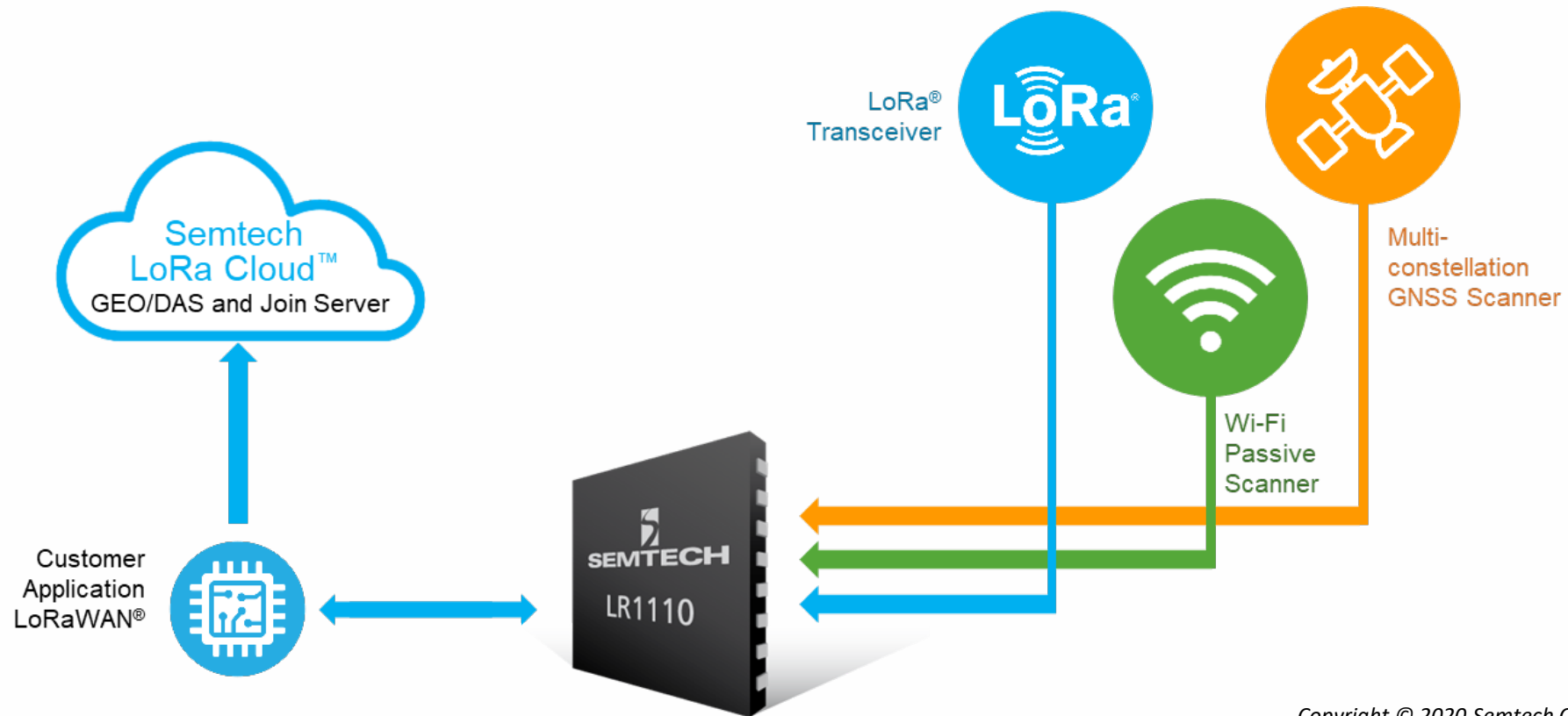
Key Takeaways

1. LoRaWAN®: de-facto wireless connectivity for battery powered IoT devices

2. Battery lifetime is key driver for ROI of IoT projects (can last 10+ years)

3. Geolocation (in/outdoor) by combining LoRa® with Wi-Fi and GNSS scan

4. Global open standard (LoRaWAN) for seamless connectivity

5. Devices based on LoRa deploy via public or private networks

6. LoRa Edge™ and LoRa Cloud™ deliver affordable geolocation

7. Identification by RFID and outdoor geolocation by LoRa: **best of both worlds!**

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Questions?

Learn more about LoRa® devices, LoRa Edge™ and LoRa Cloud™, and engage with members of Semtech Sales

Visit the Semtech Virtual Booth

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