Readying CERN for connected device era

Speaker: Rodrigo Sierra
Hubert Odziemczyk

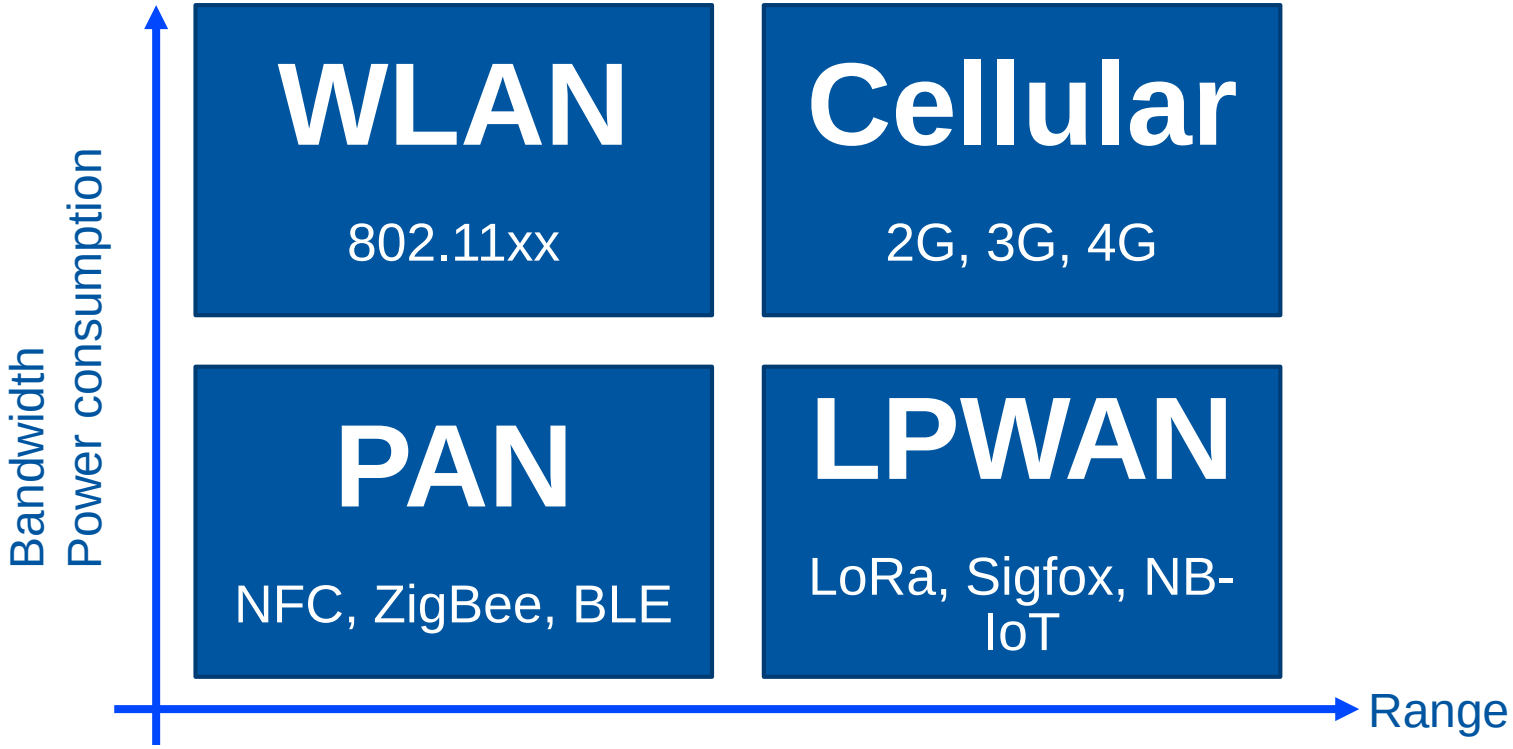
Devices

"Everything that can be connected will be connected"

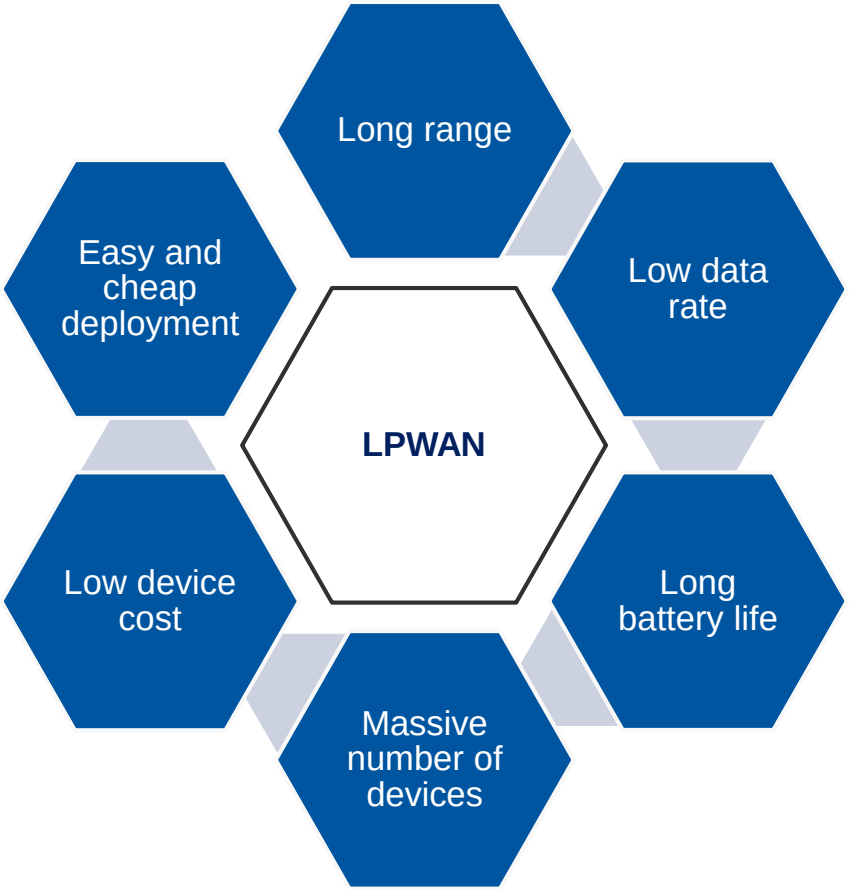
IoT networking

- Range
- Data rate
- Traffic pattern
- Power
- Mobility
- Number of devices
- Price
- Security
- Coverage
- Spectrum

IoT networking…



LPWAN


Long range
Low data rate
Long battery life
Massive number of devices
Low device cost
Easy and cheap deployment
LPWAN

LoRaWAN

- LoRa Alliance (Semtech, Orange, IBM, Cisco… up to 500)
- Mature: several national-wide and private networks deployed
- Unlicensed spectrum: independent of national operators (and borders)
- High sensitivity (-137dBm): indoor coverage
- Datarate between 0.3 and 50 kbps
- Symmetric encryption and authentication using AES
- Downlink capabilities (although primarily uplink)

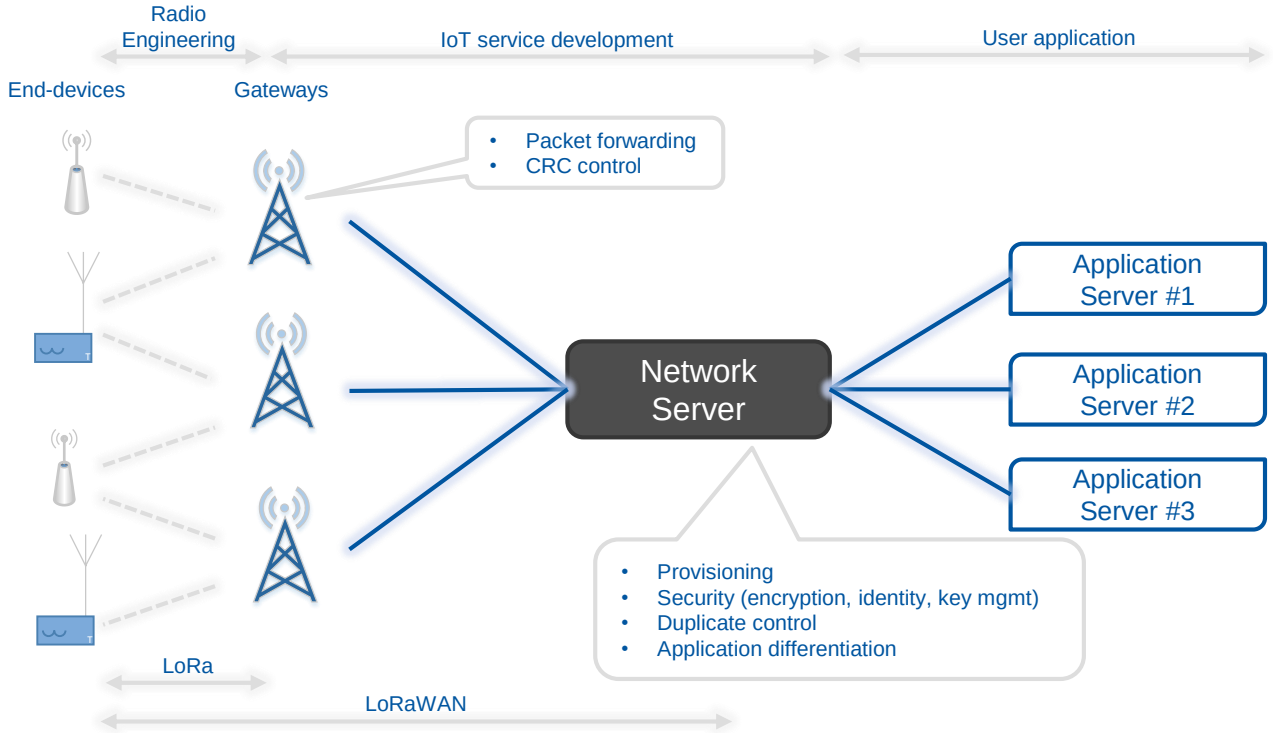
LoRa Physical layer

- Enables long-range link
- Proprietary modulation technology from Semtech

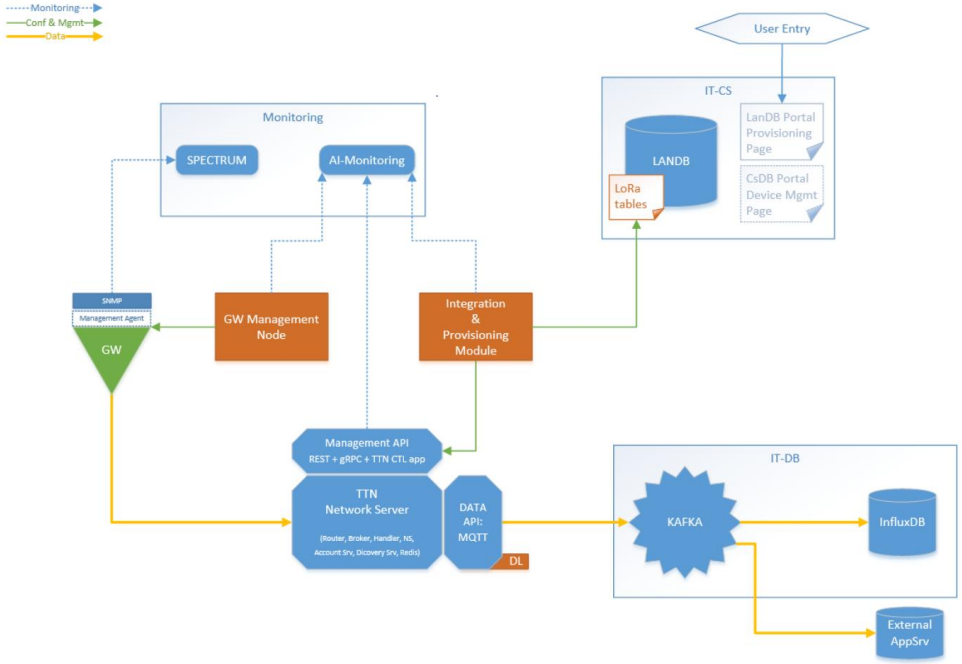
LoRaWAN Medium Access Control

- Open standard developed by the LoRa Alliance

LoRaWAN architecture



CERN LoRaWAN architecture

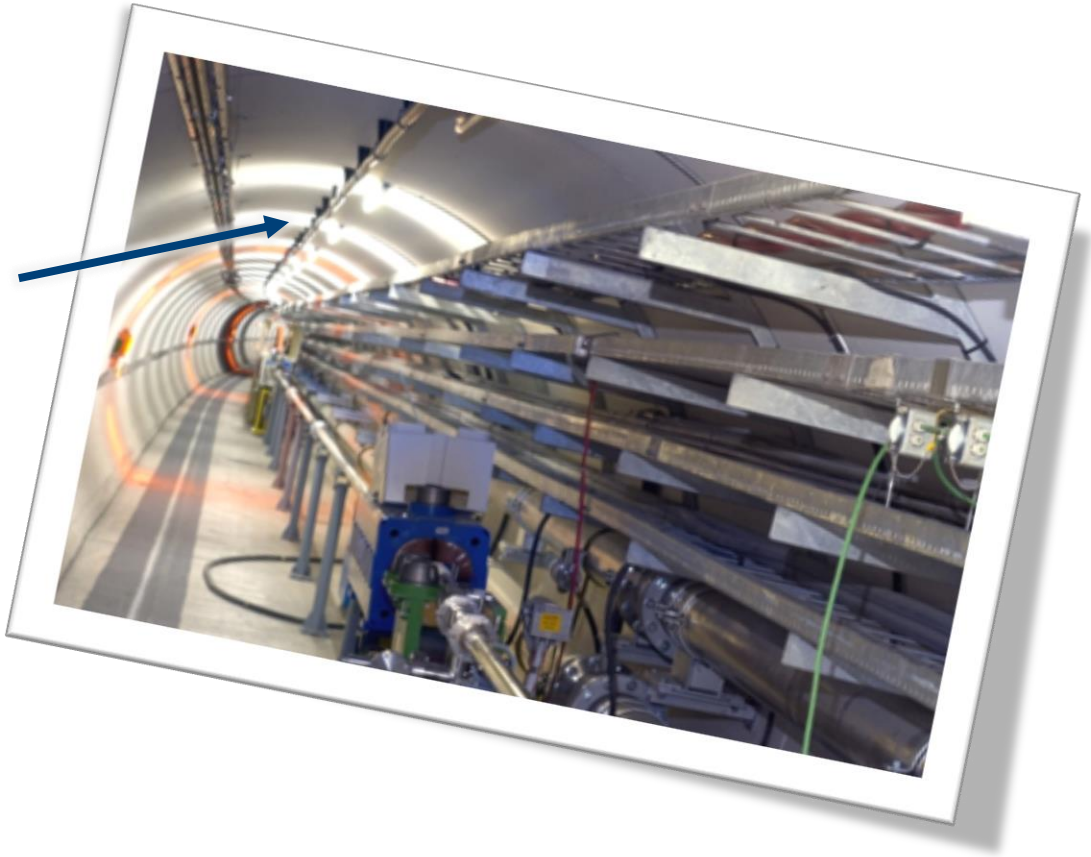


CERN LoRaWAN architecture

- Central IT services:
  - Service orchestration
  - Monitoring & operation
  - Device provisioning
  - Network configuration
- Central IT data services for the end user:
  - Kafka connection
  - AAA managed by the data services
  - User decides processing, storage and access

Tunnels

- Coverage
- Radiation tolerance
- Specific services



What’s coming?

- New requirements and use cases
- New technologies and standards
- Wireless is cool
- Challenges will remain:
  - Interoperability
  - Security
  - Privacy
  - Scalability
  - Coverage
  - QoS
  - IoT as a Service
  - …
- Control BYOD 2.0