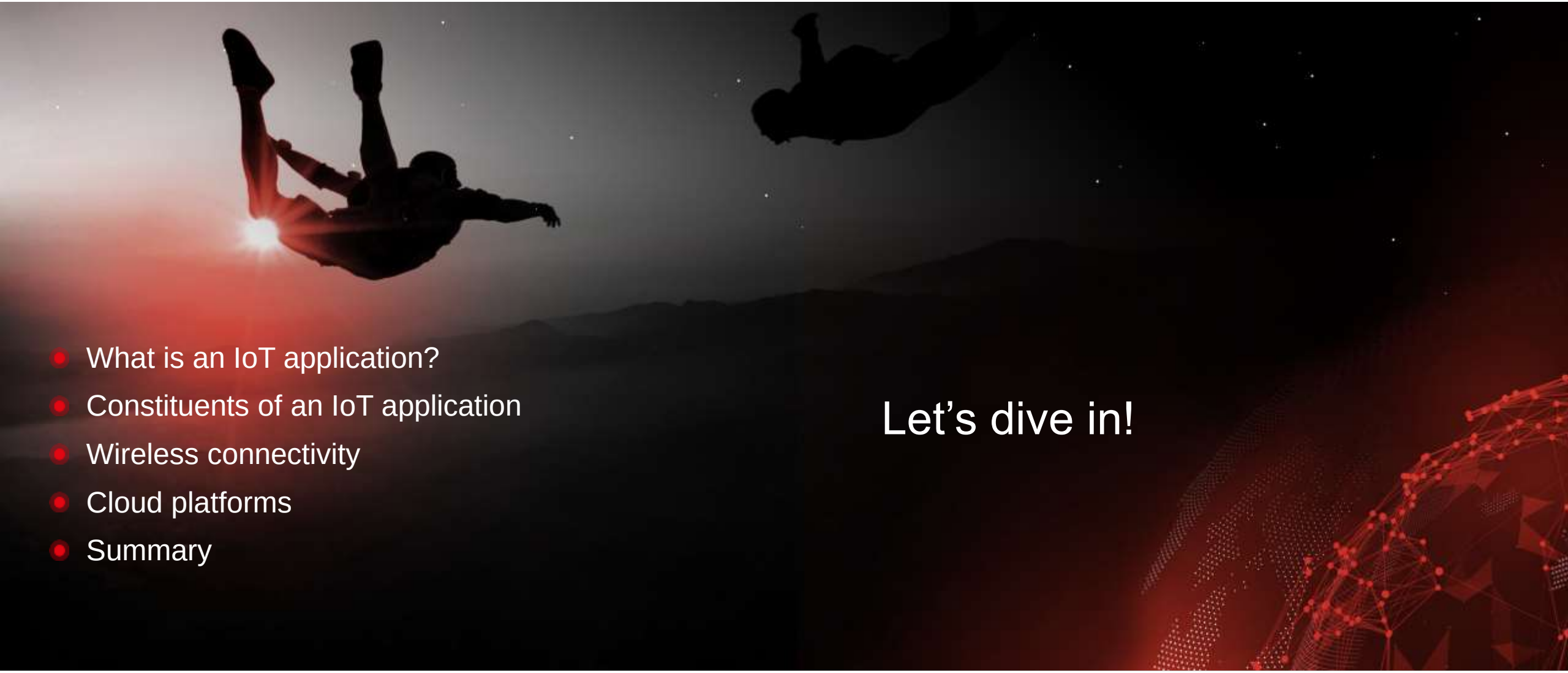
Simple and secure cloud connectivity solution for IoT applications

WÜRTH ELEKTRONIK

From sensor to cloud…

29th April, 2021

Overview

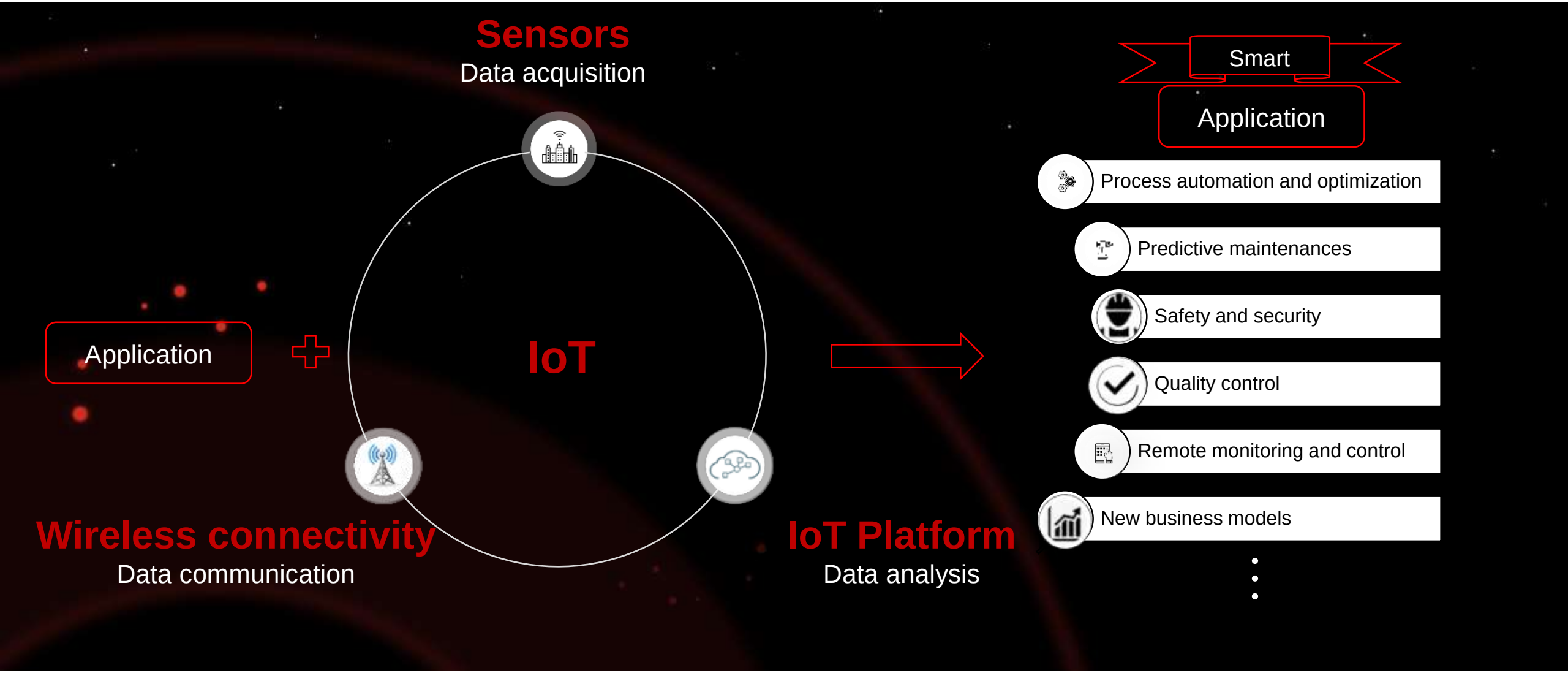


- What is an IoT application?
- Constituents of an IoT application
- Wireless connectivity
- Cloud platforms
- Summary

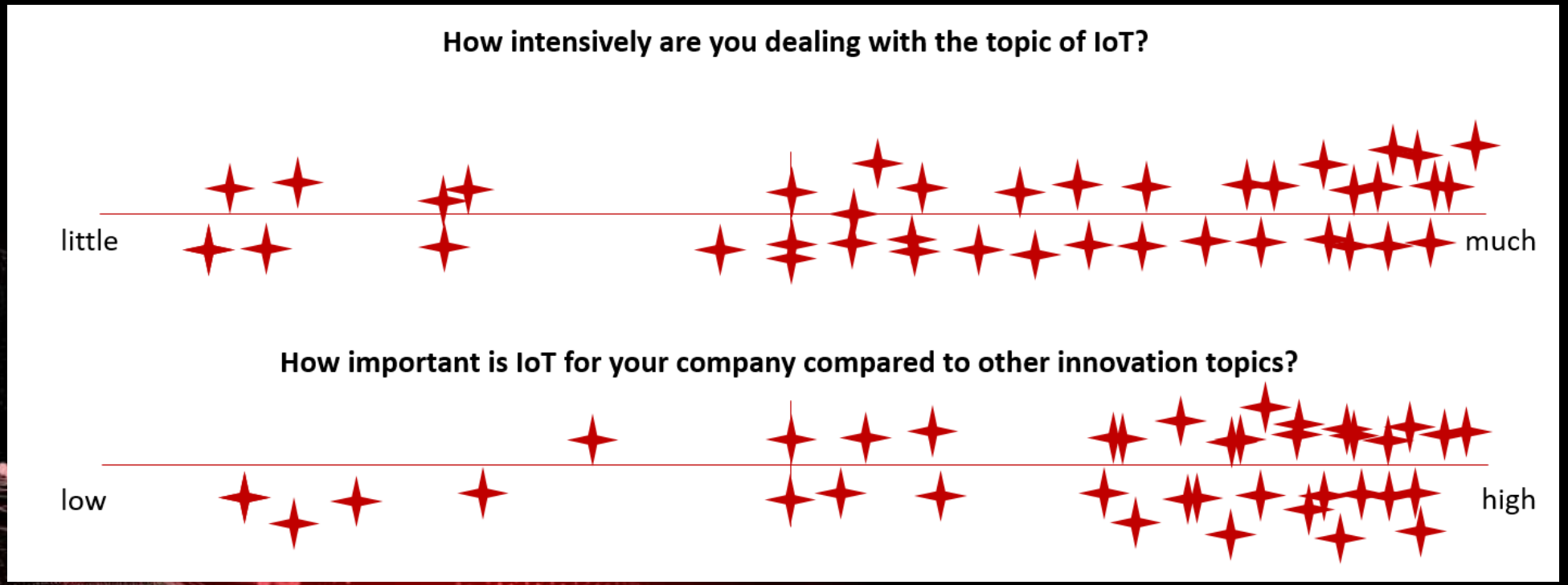
Let’s dive in!

What is an IoT application?

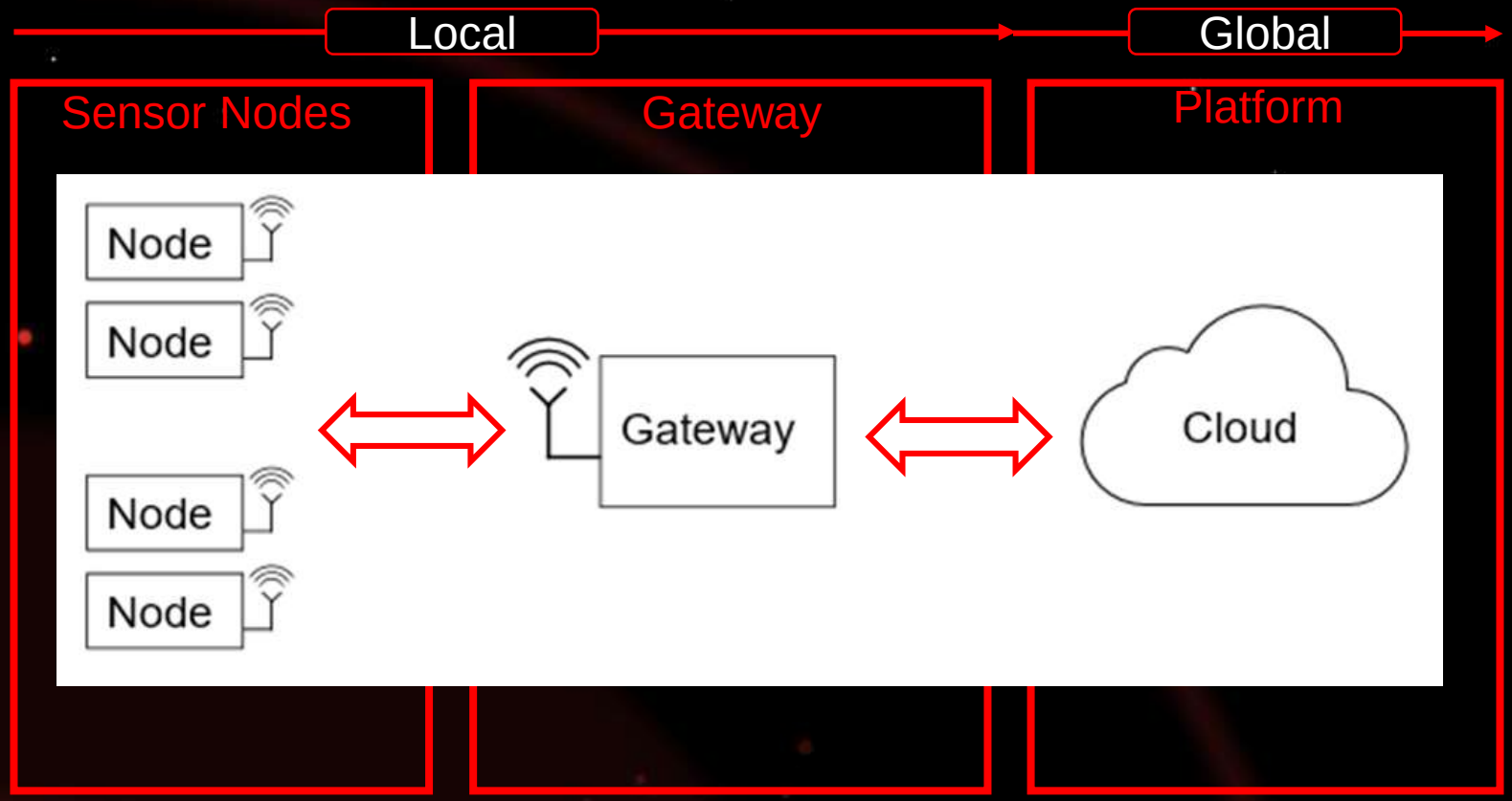
IoT application simplified



WE asked our customers



From sensor to cloud



Constituents of an IoT system

User interface
- Data visualization
- Command and control

Data platform
- Data aggregation
- Data analysis
- Data presentation

Gateway
- Bridge to the Internet
- Edge computing

Wireless connectivity
- Transfer data securely
- Flexibility and reachability

Sensors and actuators
- Measure physical environment
- Digitize measurements
- Actuate

Cloud

Gateway

Sensor /Actuator | Sensor /Actuator | ... | Sensor /Actuator

Design considerations

Cloud domain
- High processing power
- Scalability
- Security
- Flexibility
- Data processing (AI & ML)

Security

Embedded domain
- Low processing power
- Small size
- Low power
- Higher range
- No/low installation effort

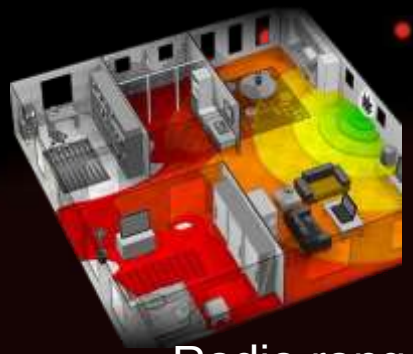
Wireless connectivity design considerations

Frequency of operation

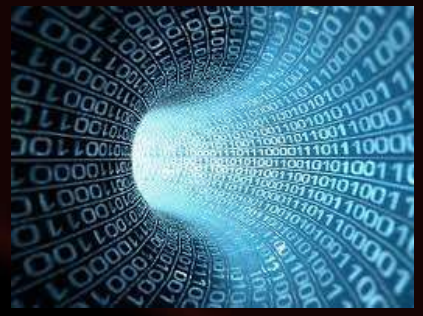
Energy budget

Protocol

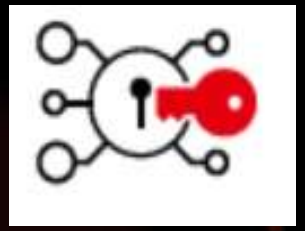
Regulatory compliance



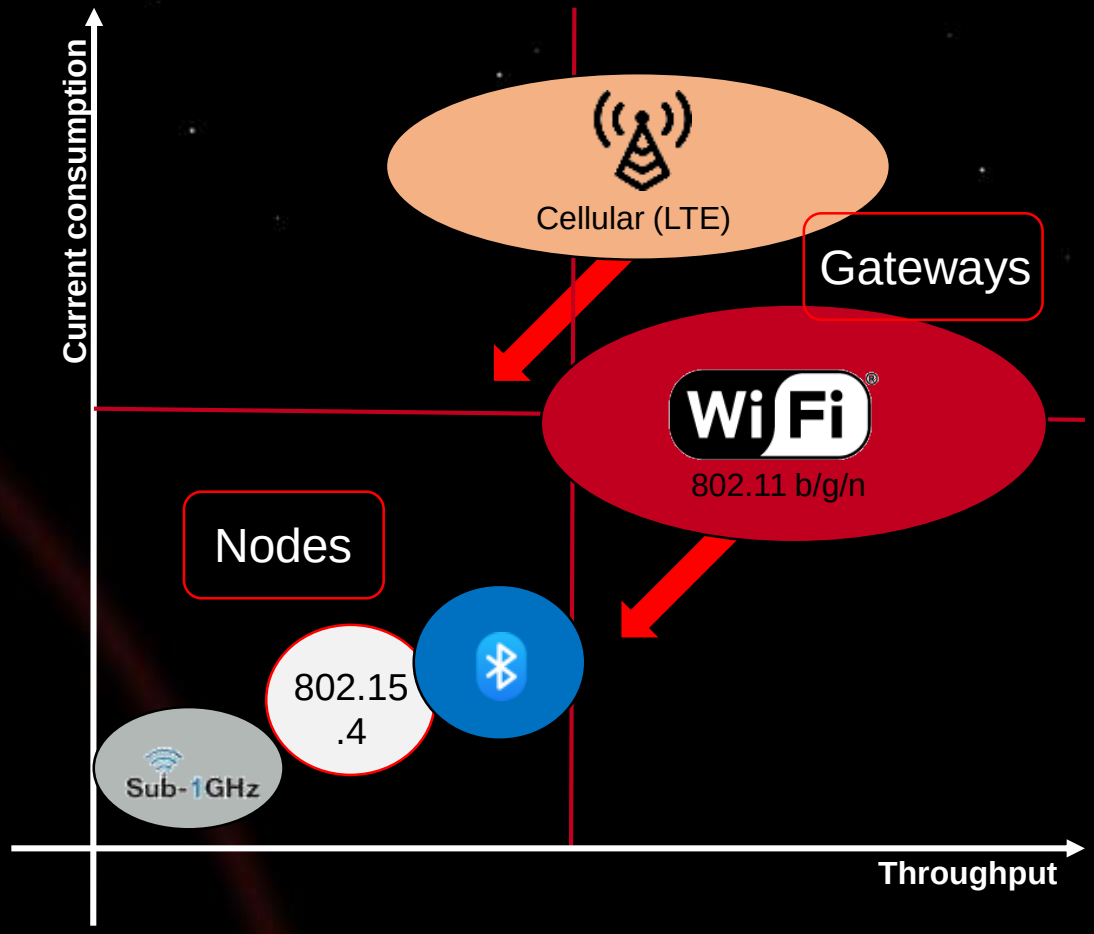
Radio range



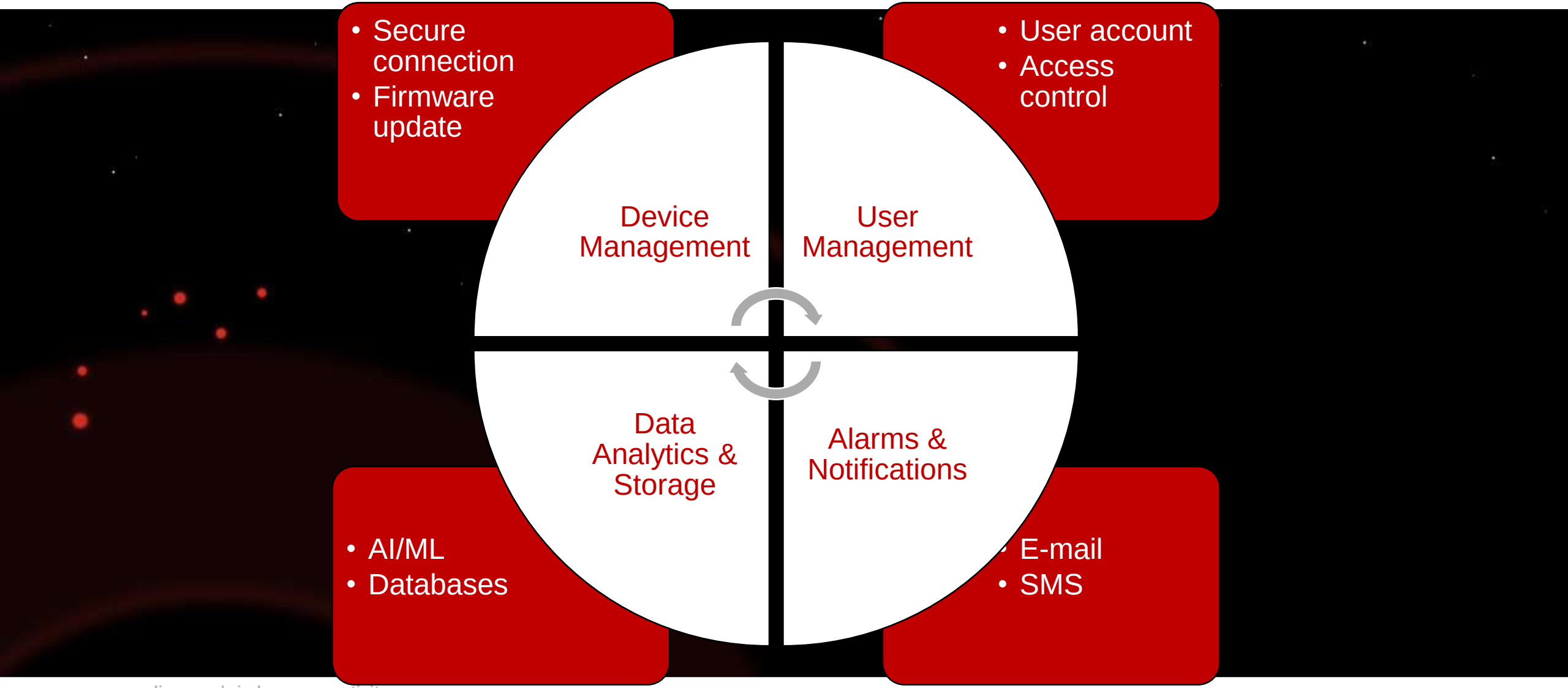
Data throughput



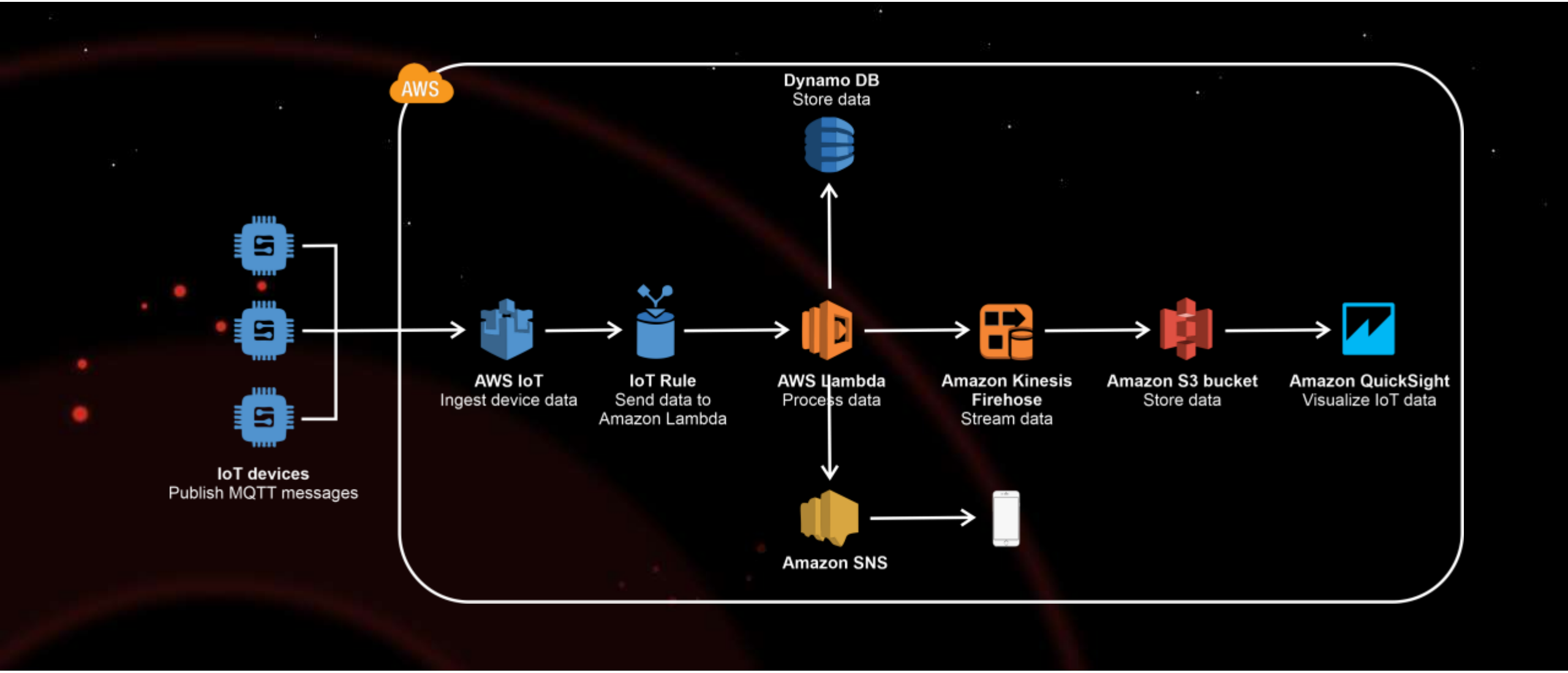
Security



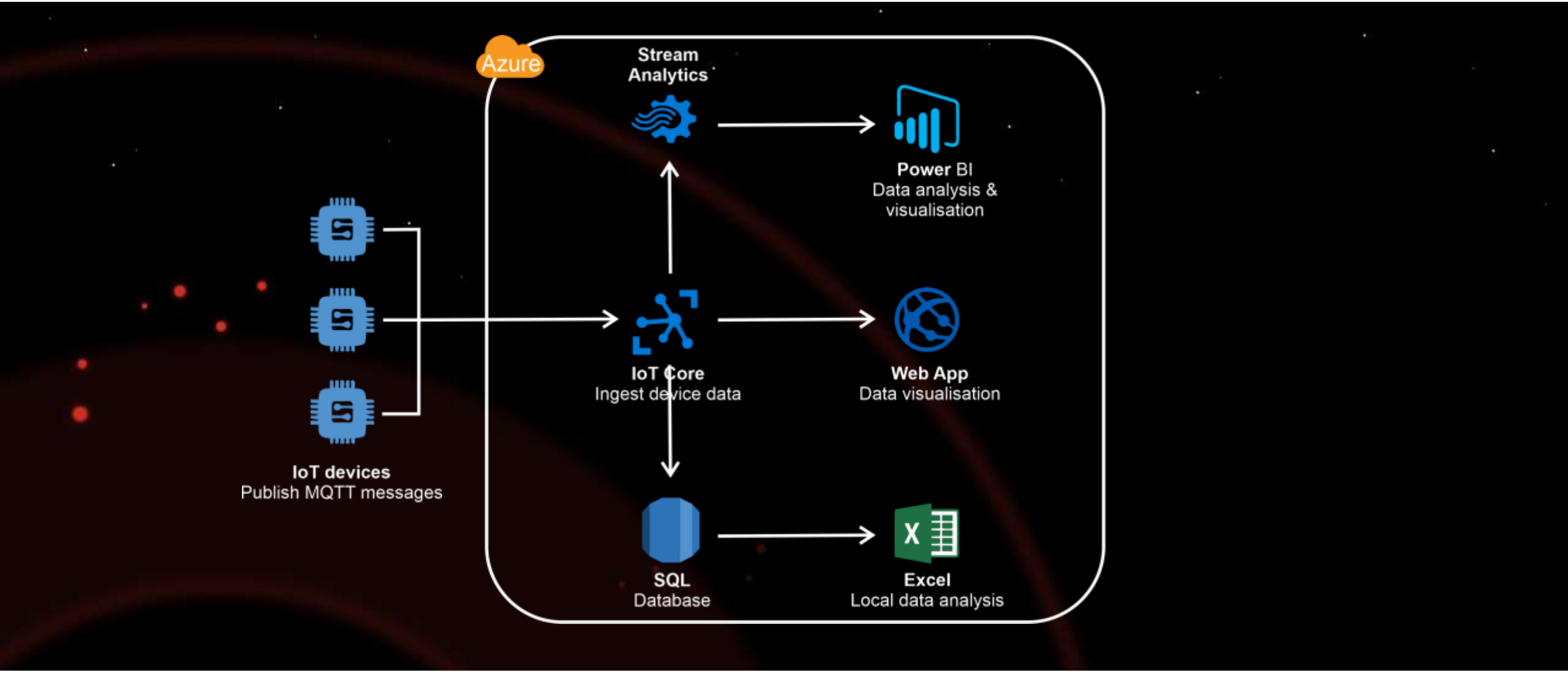
IoT platform – essential components



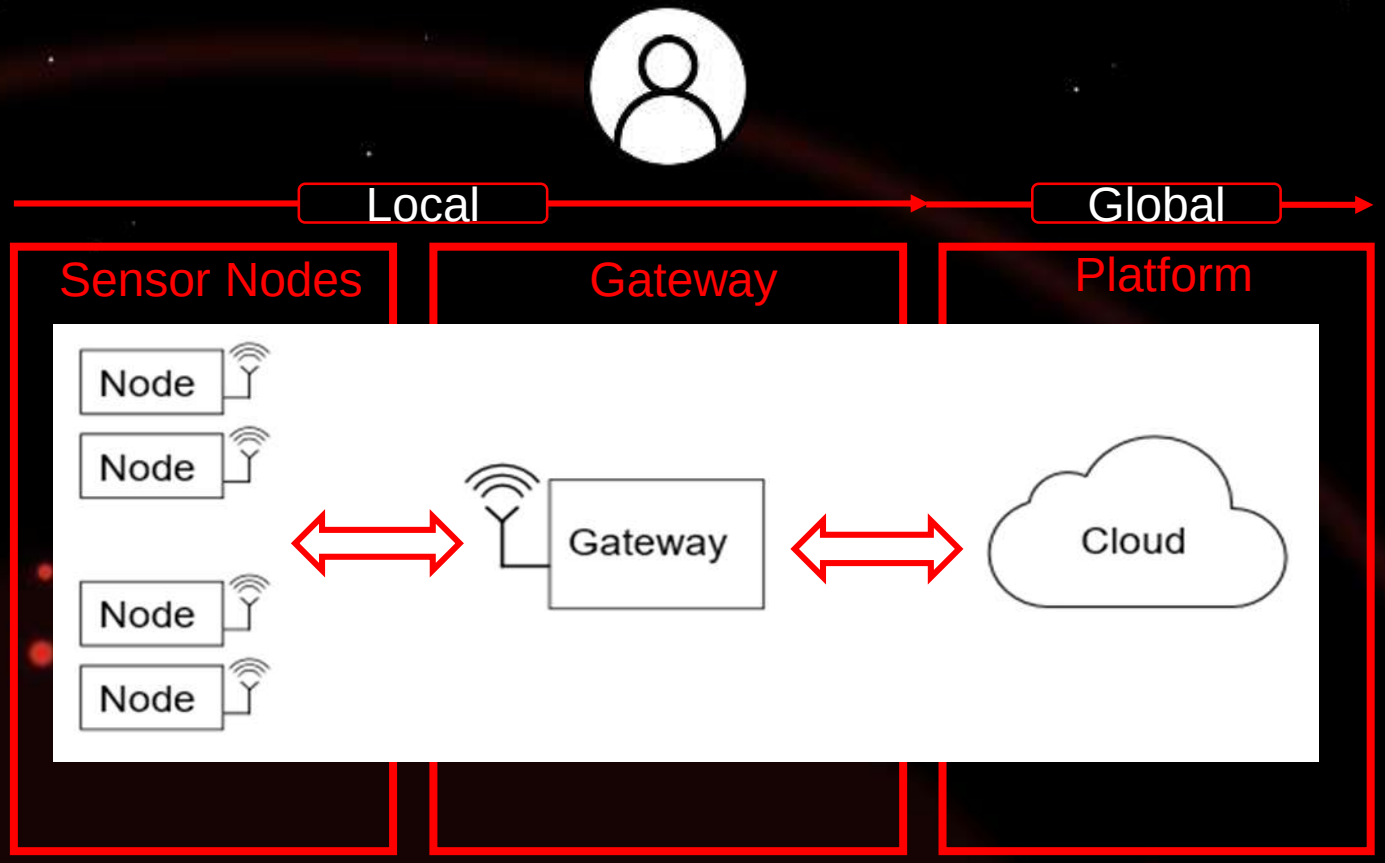
IoT platform example – AWS



IoT platform example - Azure

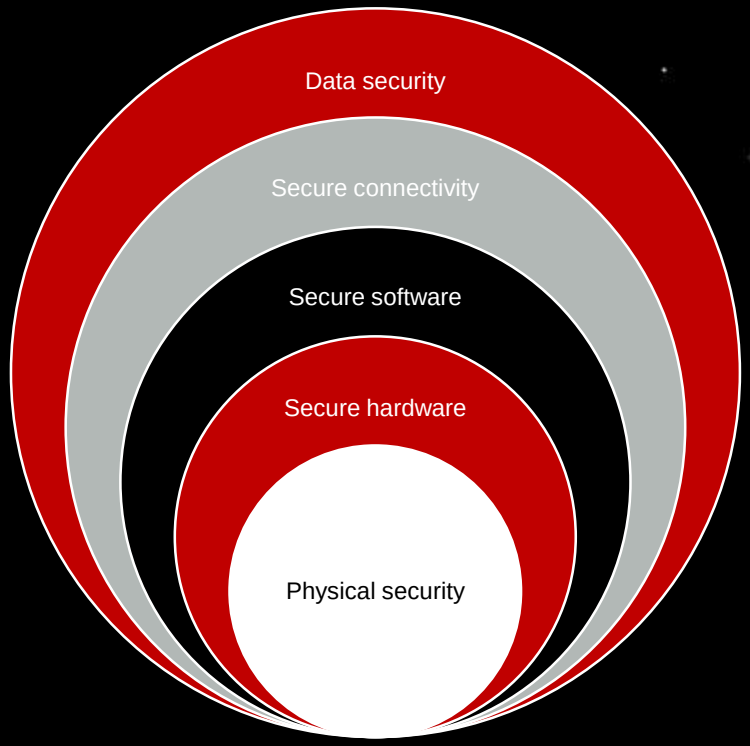


IoT security



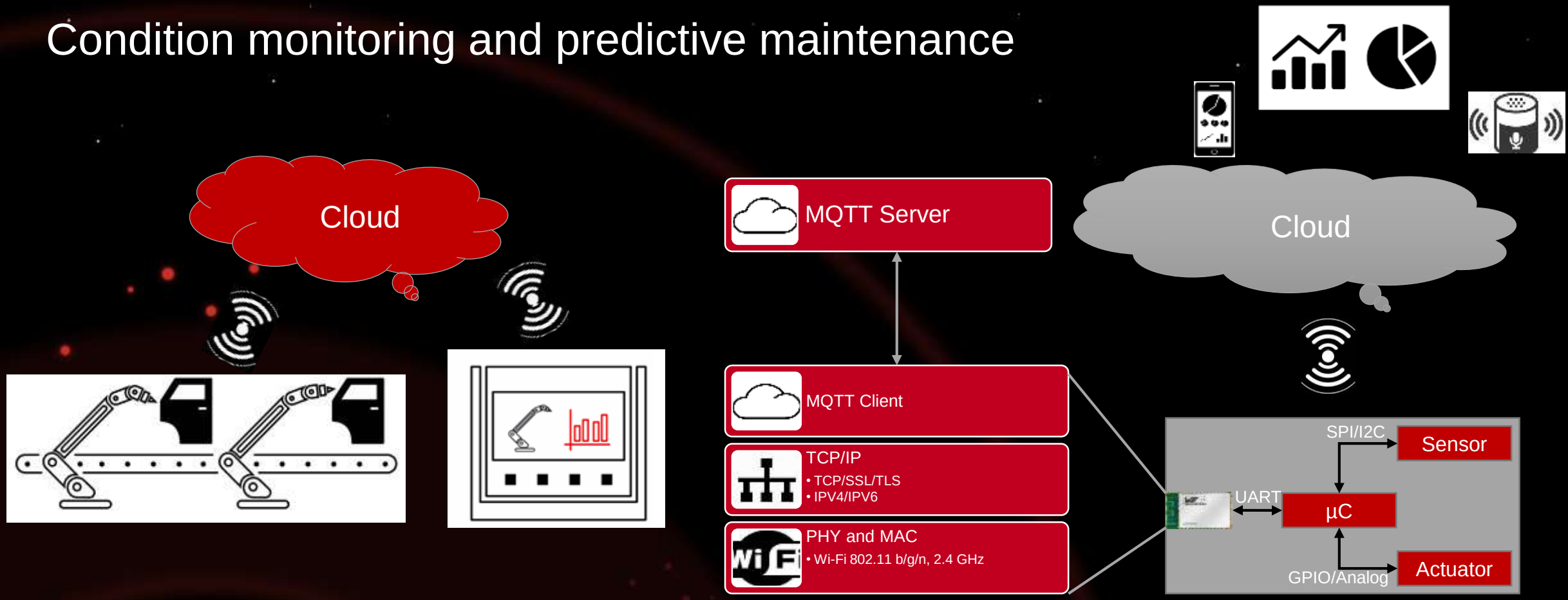
Security by design!

Security for the systems as a whole



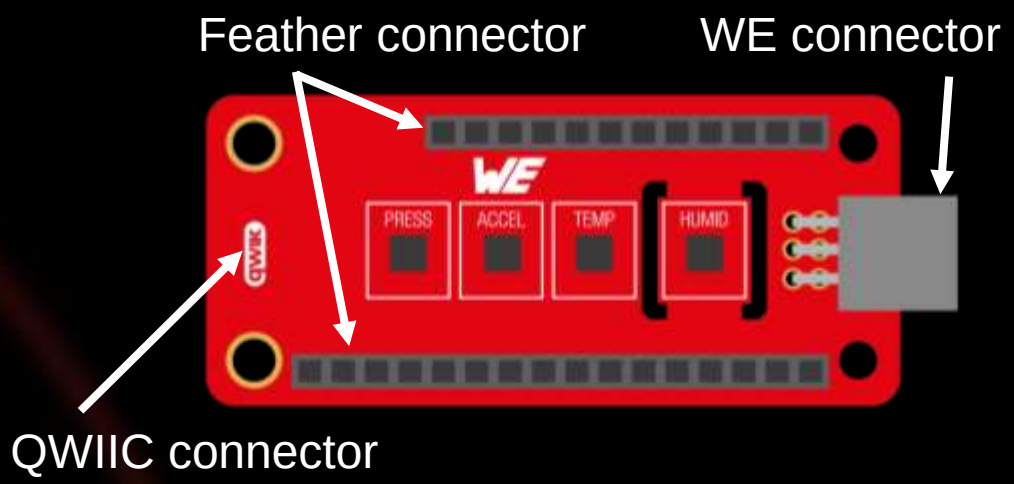
IoT application using Calypso Wi-Fi module

Condition monitoring and predictive maintenance



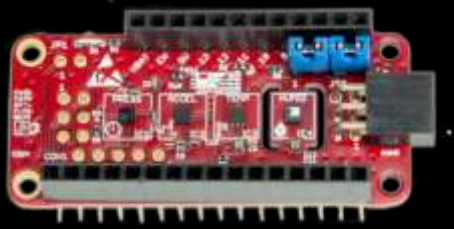
Prototyping

- **Prototyping using WE FeatherWings**
- Any Feather Microcontroller (M0 supported out of the box)
- Connect one or multiple WE FeatherWings
- Connect external sensors using
  - 6-pin WE connector I^2C or SPI or
  - 4-pin JST QWIIC connector (2 connectors for chaining)
- Extend WE FeatherWings system with
  - Adafruit FeatherWings
  - Sparkfun QWIIC products
- Git repository with kickstart code



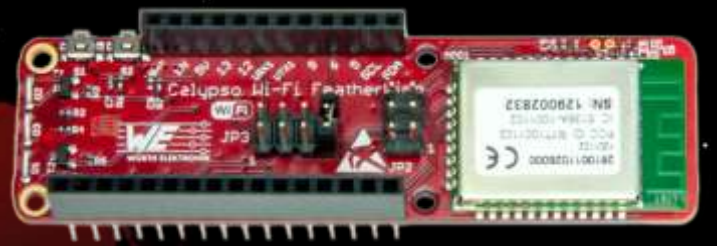
Excellent for PROTOTYPING!

Sensor FeatherWing



- Sensor FeatherWing consists of the following four sensors
  - **WSEN-PADS** - Absolute pressure sensor (2511020213301)
  - **WSEN-ITDS** - 3-axis acceleration sensor (2533020201601)
  - **WSEN-TIDS** - Temperature sensor (2521020222501)
  - **WSEN-HIDS** - Humidity sensor (2525020210001)
- The Sensor FeatherWing also has a
  - 4-pin JST QWIIC connector on-board (and one extra space for a second one to daisy-chain)
  - 6 pin connector - enables the extension with **Würth Elektronik evaluation boards – I²C**
  - 6 pin connector space - enables the extension with **Würth Elektronik evaluation boards – SPI**
- More about the Sensor FeatherWing including:
  - **Documentation**,
  - **Hardware** - schematics + BOM, and
  - **Software** - example code for Feather M0 Express Microcontroller
- https://github.com/WurthElektronik/FeatherWings/tree/main/SensorFeatherWing

Calypso Wi-Fi FeatherWing



- The Calypso Wi-Fi FeatherWing consists of the Calypso radio module
- It offers Wi-Fi connectivity based on **IEEE 802.11 b/g/n** with
  - Fully featured TCP/IP stack.
  - out-of-the-box support to commonly used network applications like
    - **SNTP**,
    - **HTTP(S)**,
    - **MQTT(S)**,
- Essential security features
  - Secure boot
  - Secure Storage
  - Secure file system
  - Secure sockets (TLS)
  - WPA2
- More about the Calypso Wi-Fi FeatherWing including:
  - **Documentation**,
  - **Hardware** - schematics + BOM, and
  - **Software** - example code for Feather M0 Express Microcontroller

- https://github.com/WurthElektronik/FeatherWings/tree/main/CalypsoFeatherWing

Requirements

- **IDE**: Use your favourite development IDE (we recommend Visual Studio Code with the PlatformIO extension).
- **PlatformIO**: Can be found under platformio.org.
- **WE FeatherWing SDK**: https://github.com/WurthElektronik/FeatherWings
- **User application**: The SDK currently implements a quick start example for each of the FeatherWings
- The complete code with documentation and examples can be found here: https://github.com/WurthElektronik/FeatherWings

Prototyping using WE FeatherWings

WÜRTH ELEKTRONIK

Sensor to Cloud Connectivity

Live Demo

Thank you for your attention!

And now we will stand by to answer your questions via the webinar tool.

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