N X P S E M I C O N D U C T O R S

EV Charger Proposal

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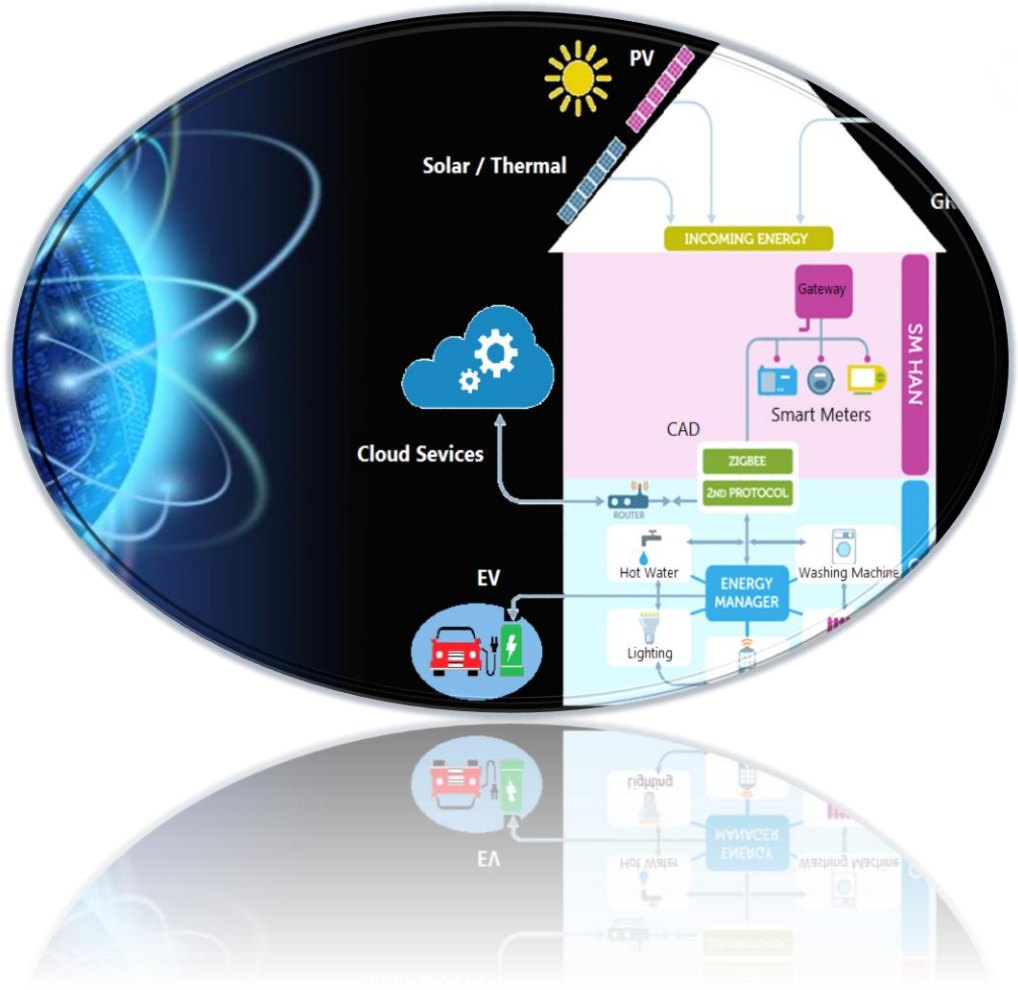


Addressing the needs of:

- **Mass Deployment**
  - Early Adoption to Mass Market Migration
  - Roll out and Scalability
    - Must scale to X00,000 devices
  - Integration
  - Flexibility and re-use
    - OEM Portable (CCID) , Wall mount and On-street

- **Accuracy of power delivery measurement**
  - Market moving to scale increases focus on measurement accuracy
  - New legislation is defining levels of accuracy eg Eichrecht
  - Government fuel tax recovery
  - Grid Load Balancing

- **Cloud Onboarding**
  - Current provisioning & ownership process is clunky, but we need high security and confidence that we know we're talking to a real device.
    - Zero touch onboard supported , refer to SE050 and EdgeLock2Go services here:
    - Already compliant and working with all leading cloud providers

- **Future Proof**
  - Scalable platform to manage new standards and functionality eg ISO15118 , Plug and Charge, V2X

- **Security at the edge**
  - Network connection can't be 100% guaranteed, Security must be addressed
    - SE050 offers banking grade security and anti tamper
  - ISO15118 PKI based
  - Legislation eg GDPR and Eichrect

- **Device management**
  - Firmware updates must be able to be managed by customers
  - Cloud service providers already carry this functionality.

- **Standardized Device API**
  - "Although today only our own back-end talks to our systems, there is a requirement that we support the standardized API natively in the device. Can we use a more efficient API for our own communication while also providing the standard API to 3rd parties who require it in the future?"
  - OCPP2 and MQTT to cloud

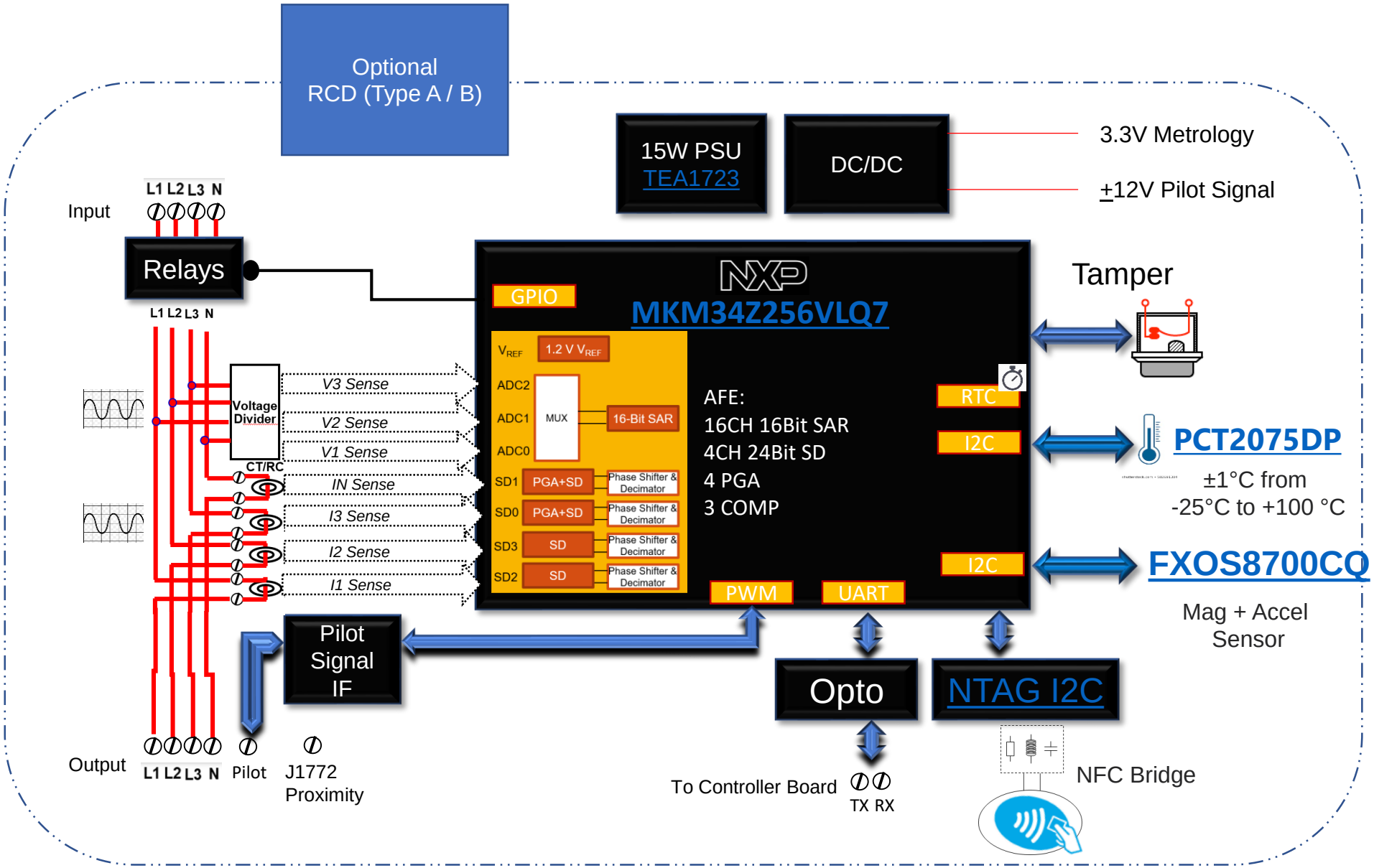
- **Latency**
  - Effective Load management

- **AI**
  - NILM, Consumption Profiling

- **Availability**
  - 10 and 15 yr Longevity Program

ENERGY MEASUREMENT

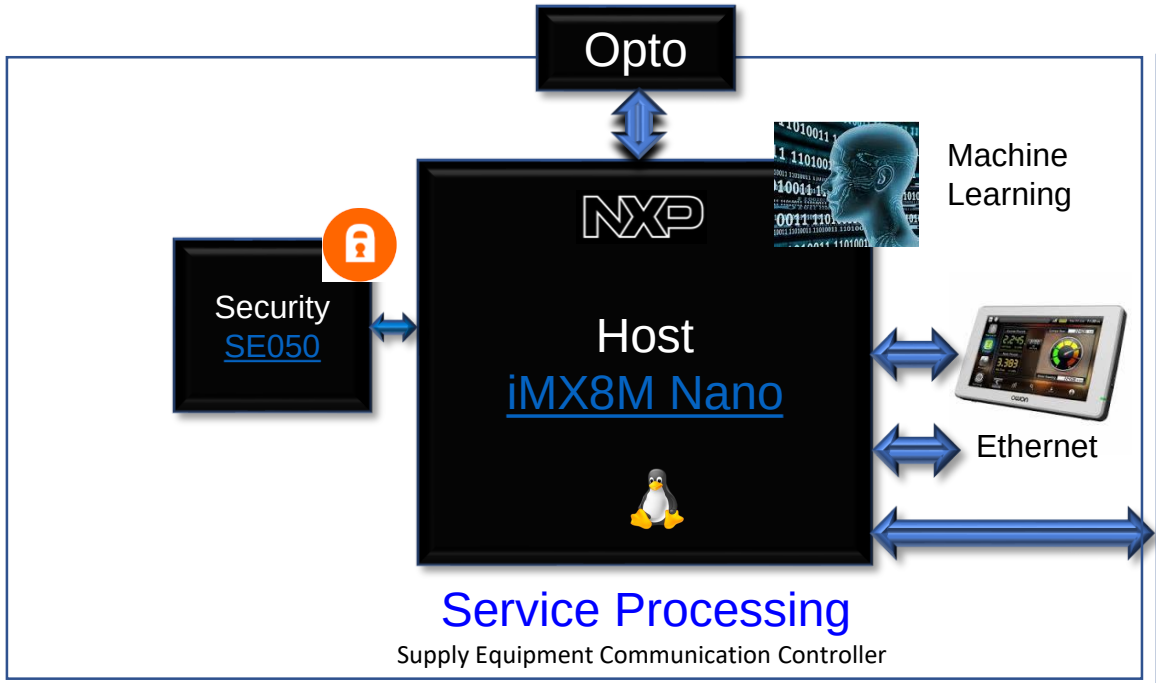
Power Socket Board : 3 Phase 22kW

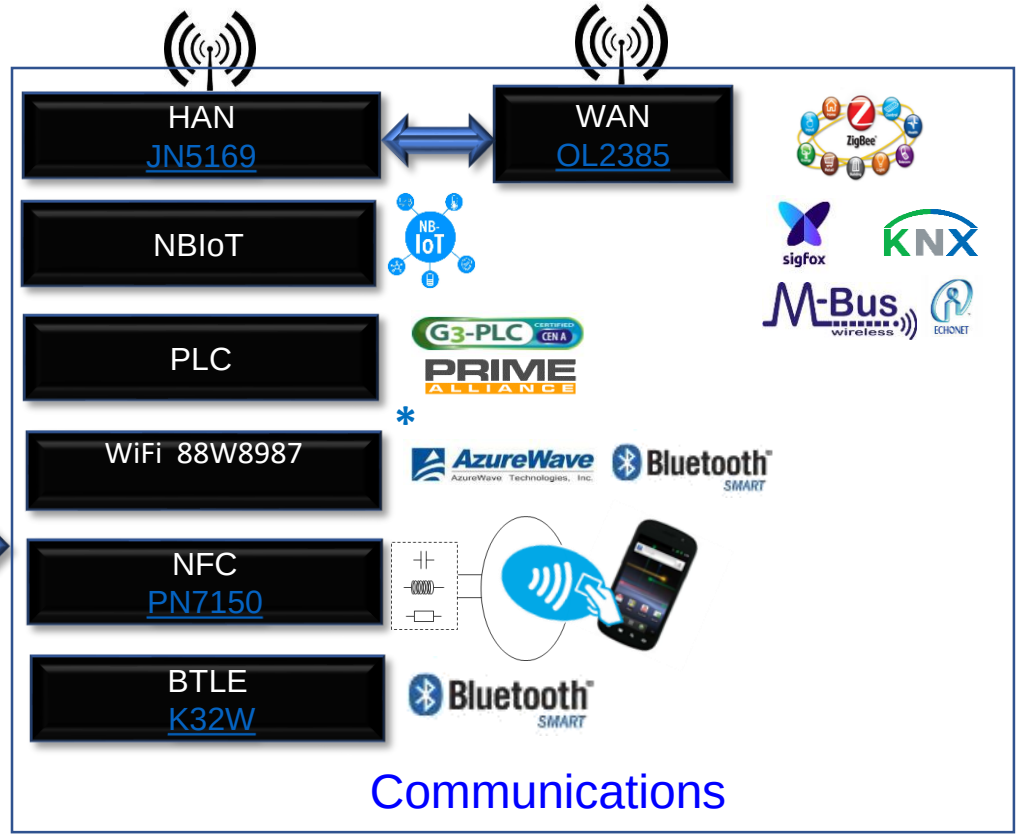


Metrology

SMART CONTROLLER

Smart Controller Linux Based





4x Cortex-A53 core platforms up to 1.5GHz per core
- 32KB L1-I Cache/ 32 kB L1-D Cache
- 512 kB L2 Cache

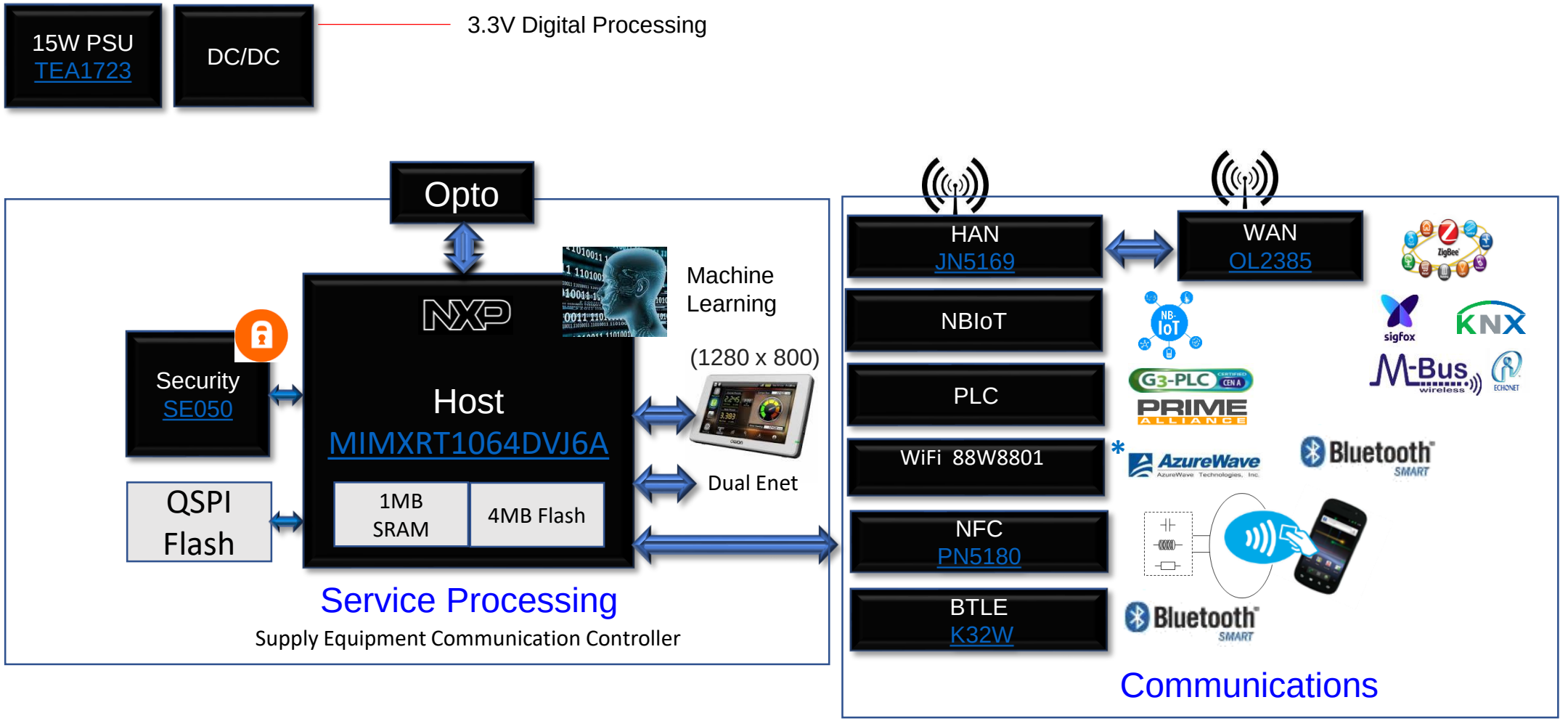
1x Cortex-M7 core up to 750MHz

* AzureWave Wifi Module pn:
AW-CM191NF
AW-CM389NF
Other module vendors available on request

Smart Controller RTOS Based

Microsoft Azure RTOS

FreeRTOS™



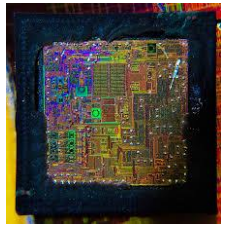
ARM® Cortex® M7 upto 600mHz with scalable Flash and SRAM

*AzureWave Wifi Module pn: AW-NM191NF
Other module vendors available on request

Smart Controller Entry Level

Microsoft Azure RTOS

FreeRTOS™



Bare Metal

15W PSU TEA1723

DC/DC

3.3V Digital Processing

Opto

Machine Learning

(640 x 480)

Security SE050

SPI Flash

Host LPC55S69

ARM TRUSTZONE System security

Service Processing

Supply Equipment Communication Controller

HAN JN5169

WAN OL2385

NBIoT

PLC

WiFi 88W8801 *

NFC PN5180

BTLE K32W

ZigBee, sigfox, KNX, NB-IoT, G3-PLC, PRIME ALLIANCE, M-Bus wireless, ECHONET, AzureWave, Bluetooth SMART

Communications

ARM® Cortex® M33 Dual core upto 150mHz with scalable Flash and SRAM

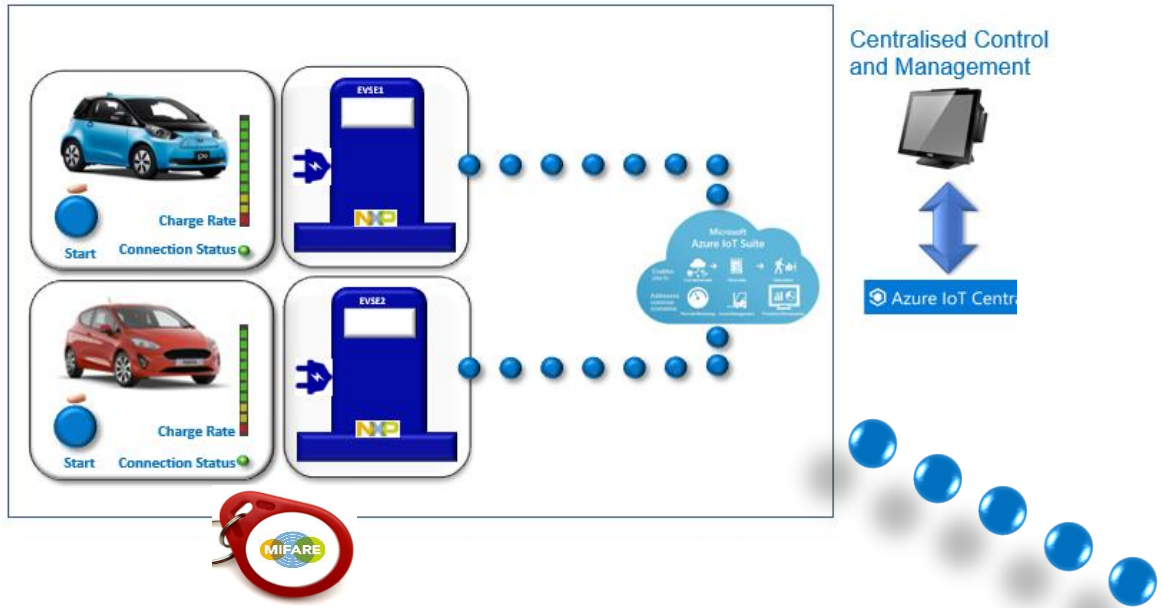
*AzureWave Wifi Module pn: AW-NM191NF
Other module vendors available on request

EXAMPLE OF EDGE TO CLOUD

EV Battery Charger Solution

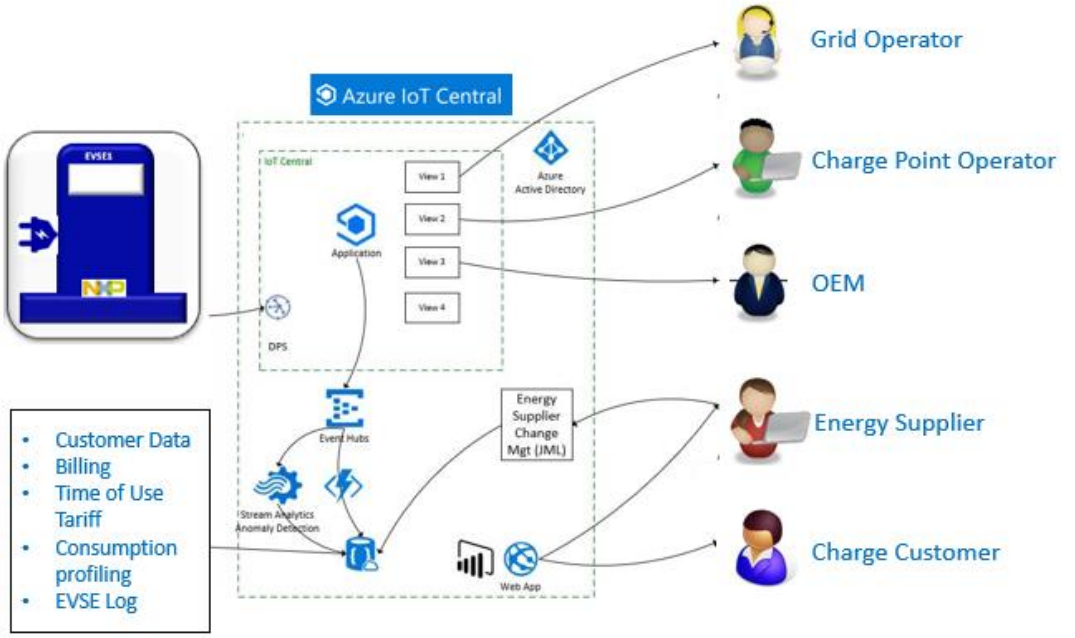
Delivering an edge to Cloud Solution

NXP and Microsoft Concept
of Azure Cloud Based EV Charge System



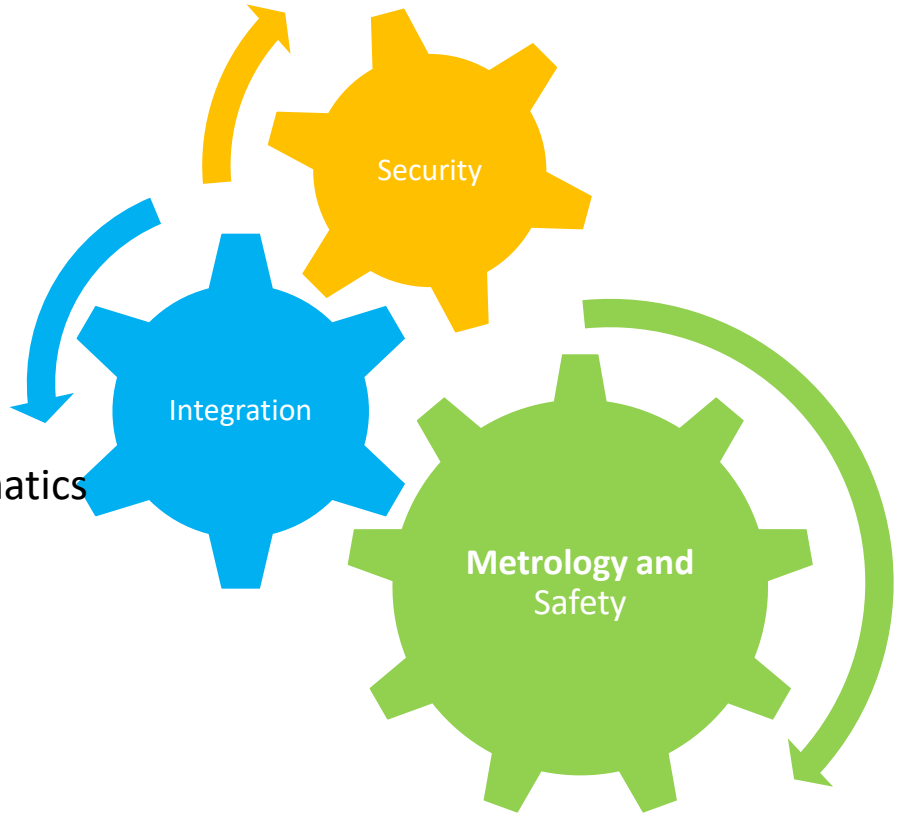
Centralised Control and Management

Azure Resource Block Diagram



- Demo Functionality
  - Security at the edge via NFC and embedded secure element:
  - Authenticated Connection to Azure IoT Central
  - Device to Cloud and Cloud to Device Control and Communication
  - Metered Billing Accuracy via pre-certified KM34x device
  - Multi perspective cloud functionality

Summary



- **Reduced Time to Market**
  - The NXP metrology is widely used globally in stand-alone electricity meter products thus reducing efforts in achieving **standard compliancy** such as “Eichrecht” in Germany and MID .
  - Customer enablement is greatly enhanced using our reference designs, schematics and metrology software.
  - The solution approach brings both hardware and software integration.
- **Reducing complexity**
  - Interoperability with global standards and multiple cloud providers.
- **Cost Optimised**
  - Tailored performance to each product requirement.
- **Project de-risking**
  - NXP has several years experience in accurate energy measurement, safety and reliability, security and connectivity.