

OPTION



Company Introduction

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Head of Sales
January 2021

OPTION, a Crescent Company

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Texas Distributor of Option

www.bipom.com

OPTION



Driving Innovation since 1986



About 20M turnover in 2019



Qualcomm licensee company



Focus on (wireless)
connectivity solutions



World class recognized
engineering capabilities



Global footprint with HQ in
Leuven, Belgium



Public company
(Euronext listed: OPTI)



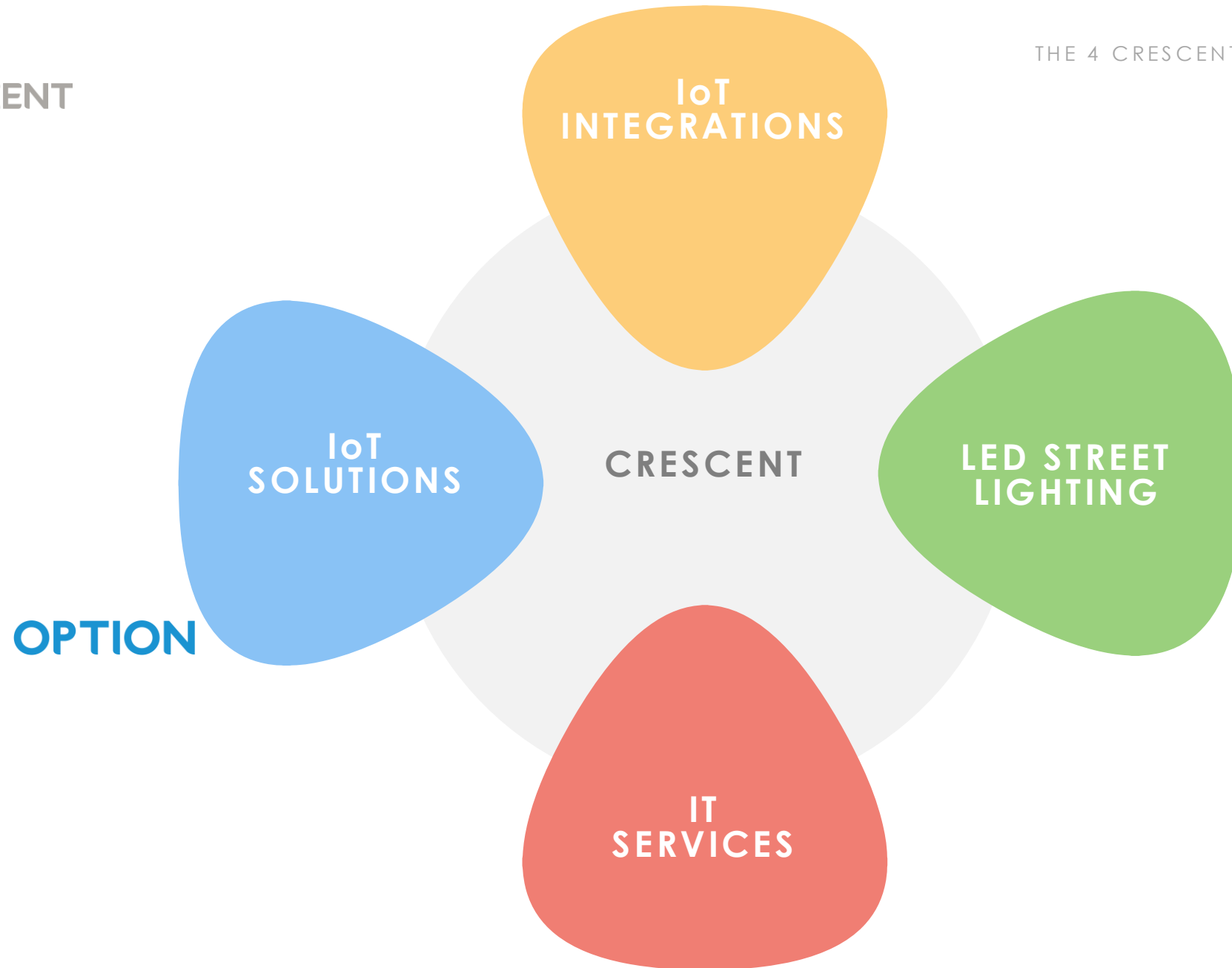
Proven track record in designing
custom communication
products for customers
that ship in millions



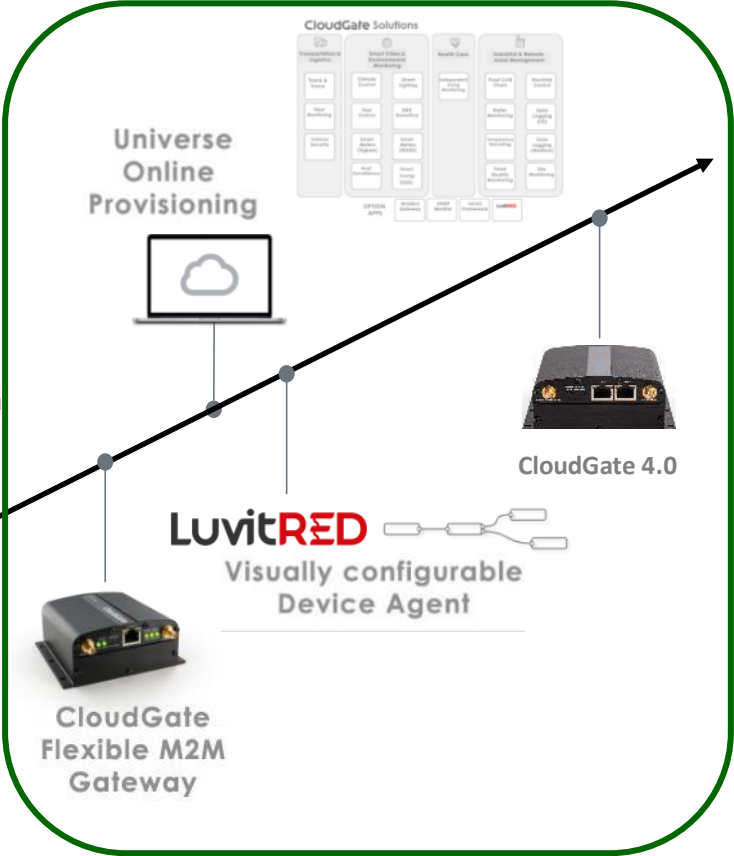
14+ million own
products shipped



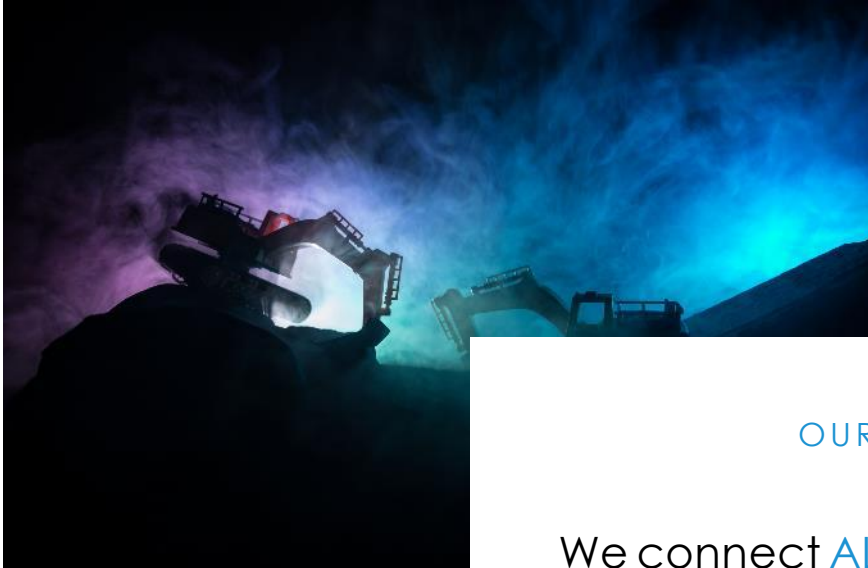
Company Snapshot



OPTION



OPTION



OUR MISSION

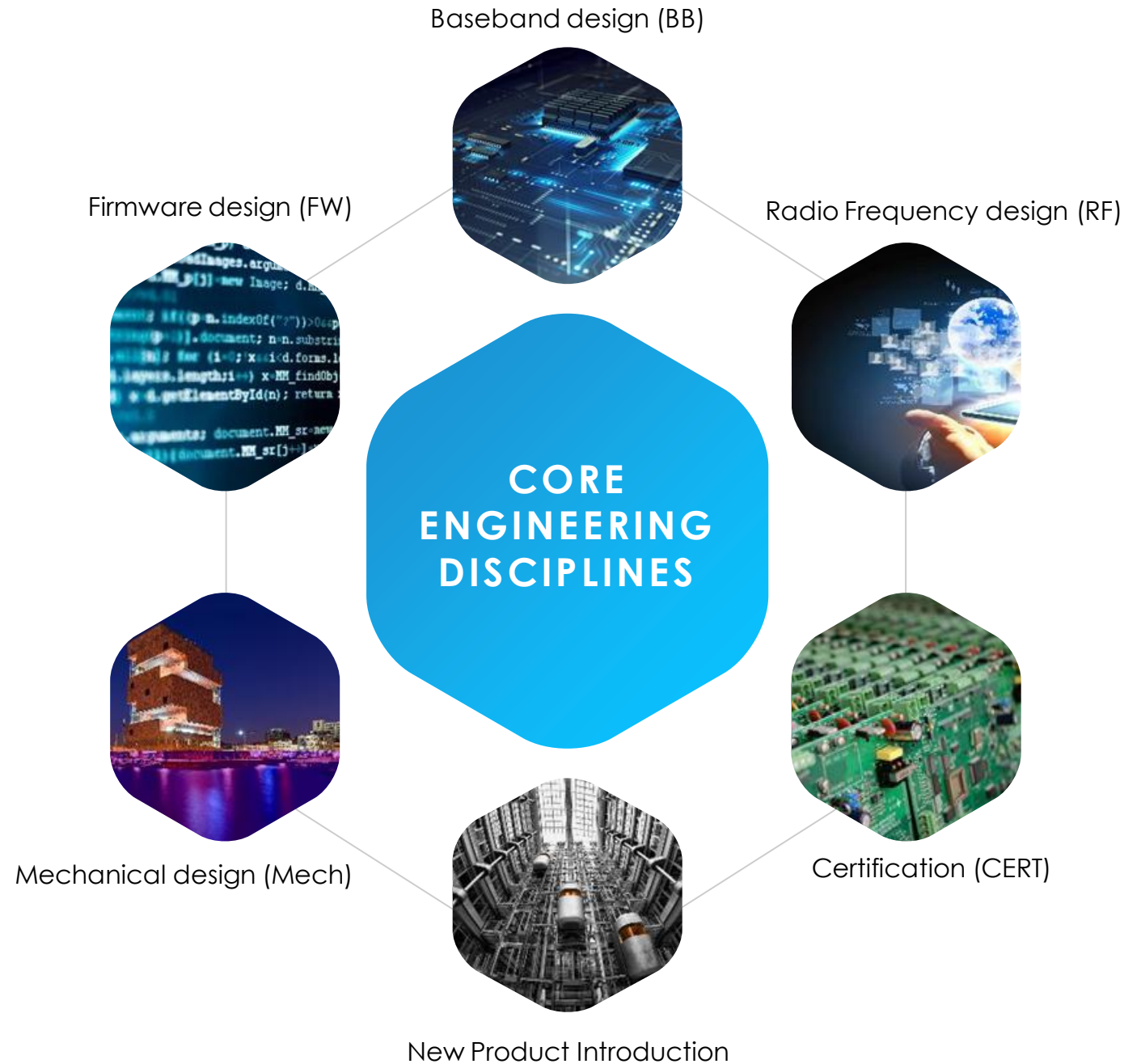
We connect **ALL** your **THINGS** and **SENSORS** securely to **your Cloud**.

Option knows how



OPTION Option activities

- Engineering services (20%)
- IoT products & solutions (80%)



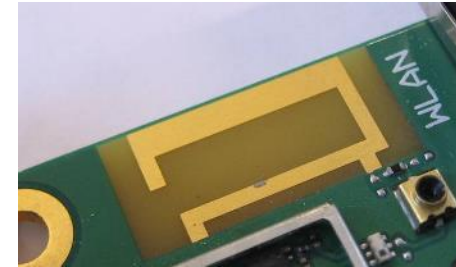
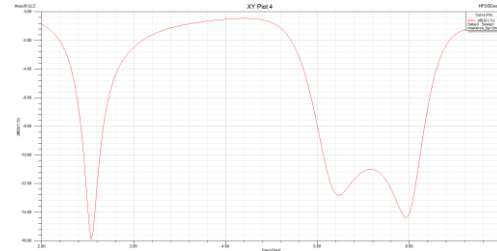
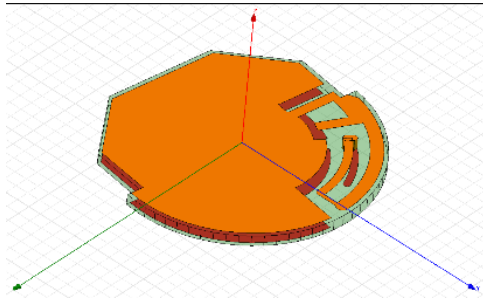
Engineering Services – antenna design

**concept
& design**

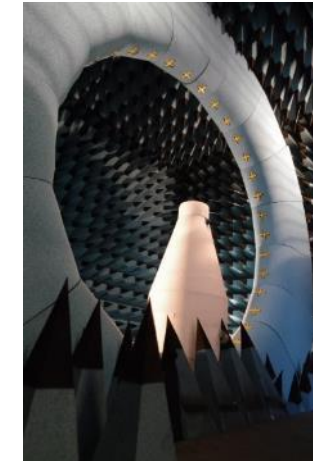
simulation

prototyping

**performance
testing**



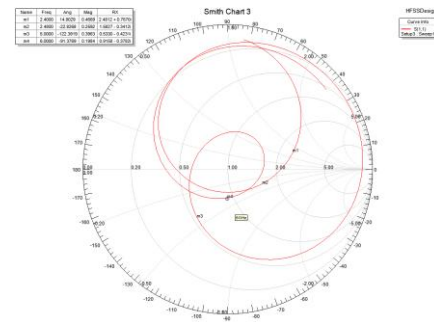
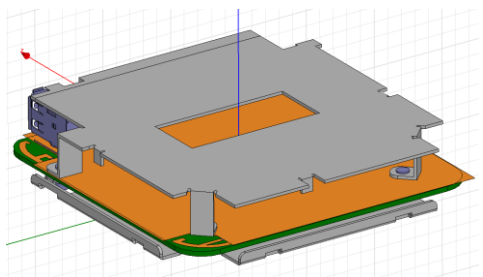
PCB antenna



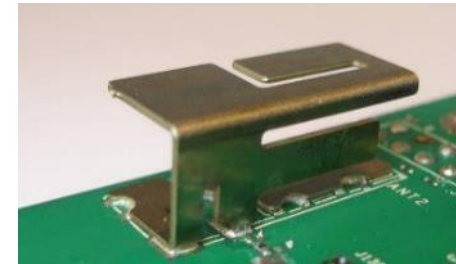
Satimo
Anechoic
chamber
(Full 3D antenna
pattern
measurement)



Bluetest
Reverberation
chamber
(antenna
efficiency,
diversity gain,
TIS, TRP)



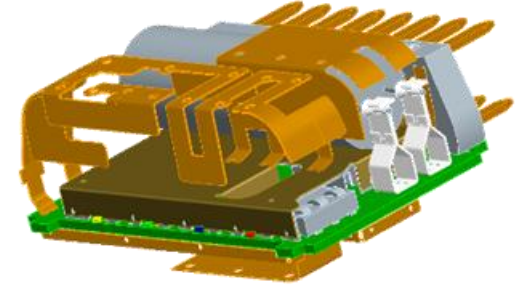
ANSYS HFSS



metal part antenna

Engineering Services - example

OBD2 Data Logger



Custom Schematics & PCB Design

Custom Mechanical design, antennas, shields

Embedded Software Development

Certified with: CE, FCC, IC, PTCRB, AT&T, Wifi Alliance, BT Sig

Calibrated Radio & characterization

Design & Validation of Cellular, Wlan/BLE, and GPS antenna

RF, TIS/TRP, thermal, EMC/EMI, ESD, Mechanical, ...

Engineering Services - example

Apnea Finger Sensor



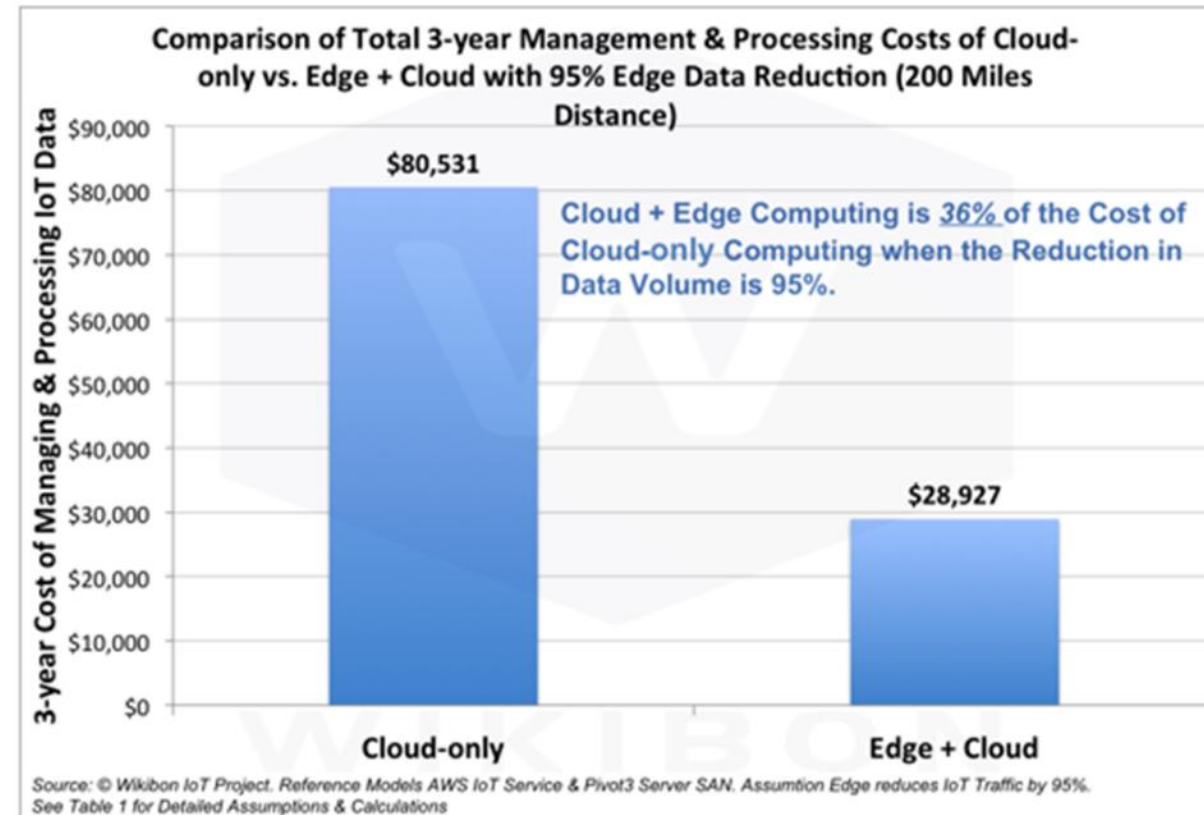
Body worn device

Design of 3D PIFA antenna in
very small device 25x15x10mm
Efficiency on finger > 10%



IoT gateway market

- Bitpipe gateways
 - The past of IOT
 - Characterized by high connectivity costs
 - Create many problems in future IOT development
 - Good in high speed Fixed Line replacement niche
- Traditional protocol gateways
 - Useful but inflexible one trick poneys
 - Have difficulties to connect easily to wireless sensors and clouds
- Smart Edge gateways
 - The real future of IOT
 - Do it Yourself programming vs real Smart Edge Gateways

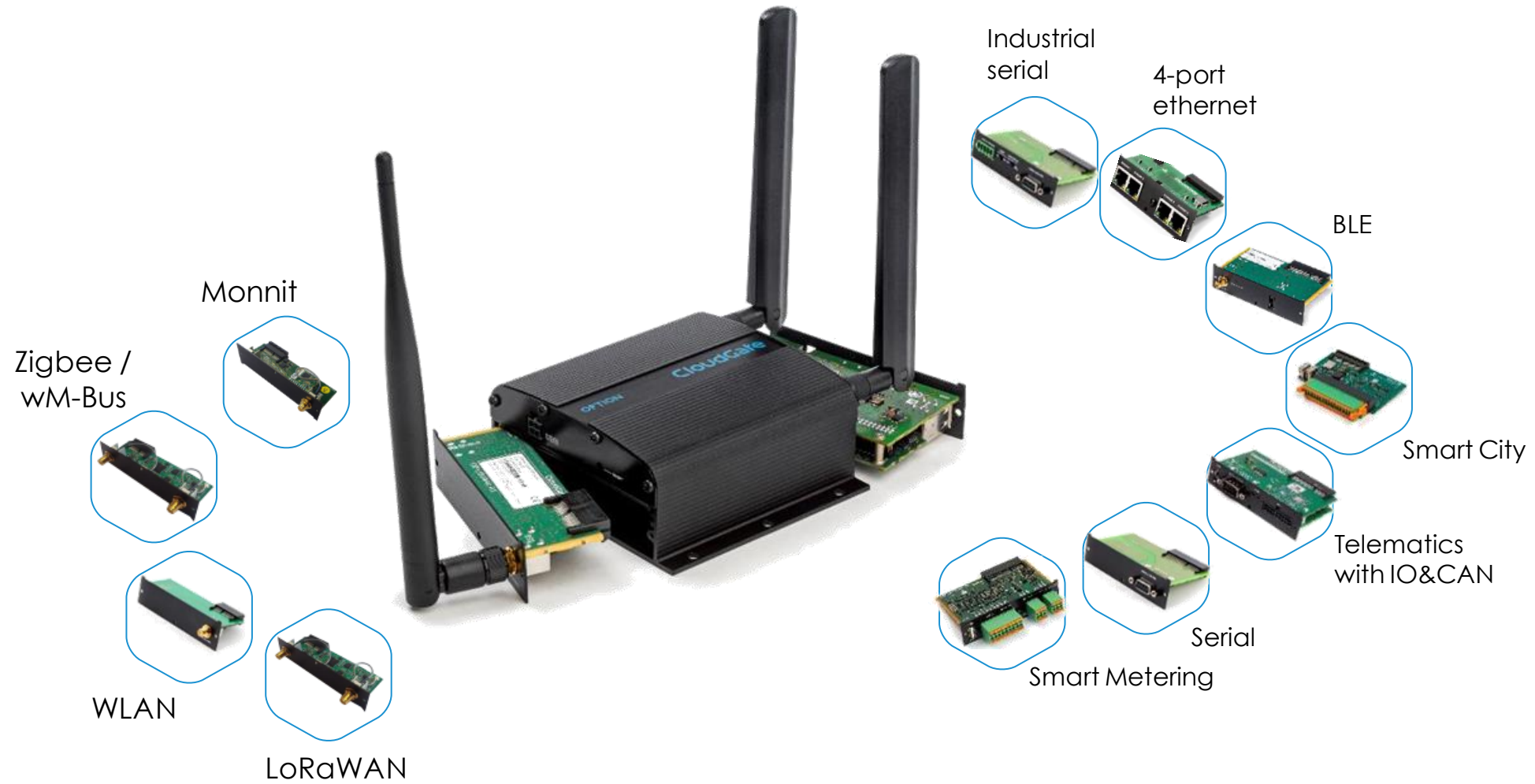


OPTION CloudGate Platform



OPTION

Standard expansion cards



OPTION

Smart metering expansion card



- **Serial port** (5-pins), 2kV galvanically isolated, can be configured for RS232 (Rx/Tx/RTS/CTS/GND) – 500Kbaud max or RS422 or RS485 (full or half duplex A/B/GND). switch for RS485 termination available in the UI.
- **Mbus port** (6-pins)
 - Mbus Master : up to 250 unit loads with 30V power supply, 64 unit loads with 24V power supply or Mbus Slave
 - Power supply + GND pin for Mbus master (also powering CG)
- **IO port** (18-pins connector) for wired interfaces
 - I2C interface 3.3V for environmental sensors used in electricity cabinet (temp, humidity)
 - 5 multi-purpose IO's to monitor alarms in electricity cabinet or drive relays
 - Digital input (0 - 30V) (including dry-contact pulse counter)
 - Analog input (0 - 10V)
 - Current Loop input (4 – 20mA)
 - S0 pulse-counter input
 - Digital output (0 – 3.3V)
 - Open Drain output (< 250mA, 0 – 30V)
 - P1 interface (for electricity meters in BE/NL)
- **USB 2.0 port**



(4 pins)

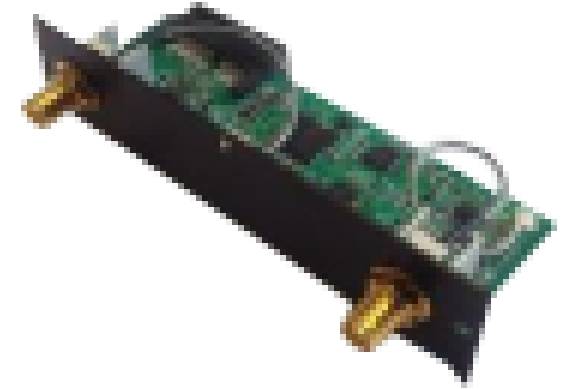
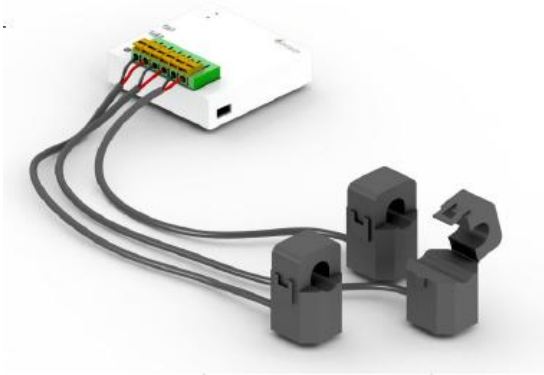
(11 pins)

(3 pins)

Zigbee/wMBus 868 card



- The perfect complement for the Smart Metering card
 - Zigbee to interface with wireless electricity submeters



- wMBus to interface with wireless water/gas meters



Partner expansion cards



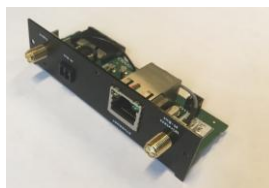
BoilerConnect I/O



Emerson Paksense



Grundfos



Honeywell Enacto

PRIVATE



BiPOM datalogger



BiPOM 4xUSB



BiPOM 2xRS232-USB



BiPOM Zigbee/BT



Airicom IO



µSD card holder (5A)



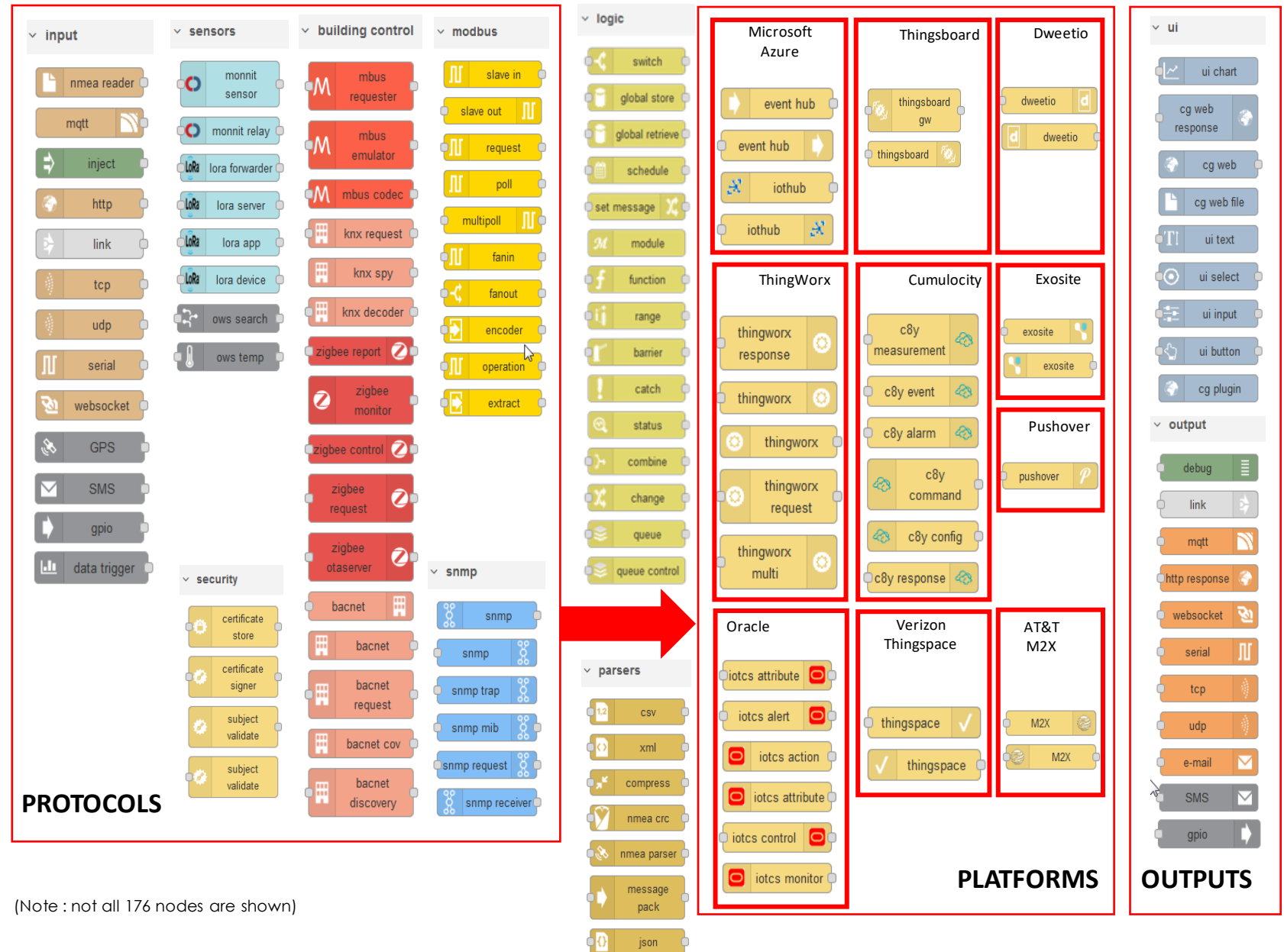
Atim LoRa



Giga Concept RFID

PUBLIC

The glue between protocols & platforms



Applications can be made with **LuvitRED**

The screenshot displays the LuvitRED 2.5.11 application interface. On the left is a sidebar library with various building blocks categorized under 'CloudGate', including GPS, SMS, gpio, gpio query, ows search, ows temp, wan monitor, wan control, datacounters, data trigger, poslock, cloudgate control, siglevel, sysinfo, cg web response, cg web, and cg web file. The main workspace shows a complex flowchart configuration with multiple tabs at the top: Sheet 1, Init, Power, Test Accu, ACCU, Energy Values, KNX, SS, Test SS, and Log P to SD. The flowchart includes nodes for reading devices, processing data, and sending requests. On the right, there is an 'info' and 'debug' window. The 'info' window shows details for a 'modbus request' node, including its type, ID, and properties. The 'debug' window shows the raw modbus request data.

info

debug

Node

Type	modbus request
ID	2f15d24f.d0ea2e

Properties

Sends modbus request to modbus server / slave.

This node sends a raw modbus request to a modbus TCP server or RTU/ASCII slave.

The modbus request is contained in msg.modbus which contains the following keys.

- op - the MODBUS operation code.
- start - for write and read operations that address multiple registers this contains the starting register offset.
- quantity - for write and read operations that address multiple registers this contains the number of registers.
- address - for write operations that address one register this contains the register offset.
- bytes - for write operations this contains the raw bytes for the operation. Please refer to the modbus standard documentation for formatting information.

Properly formatted modbus operations can be created with the modbus operation node.

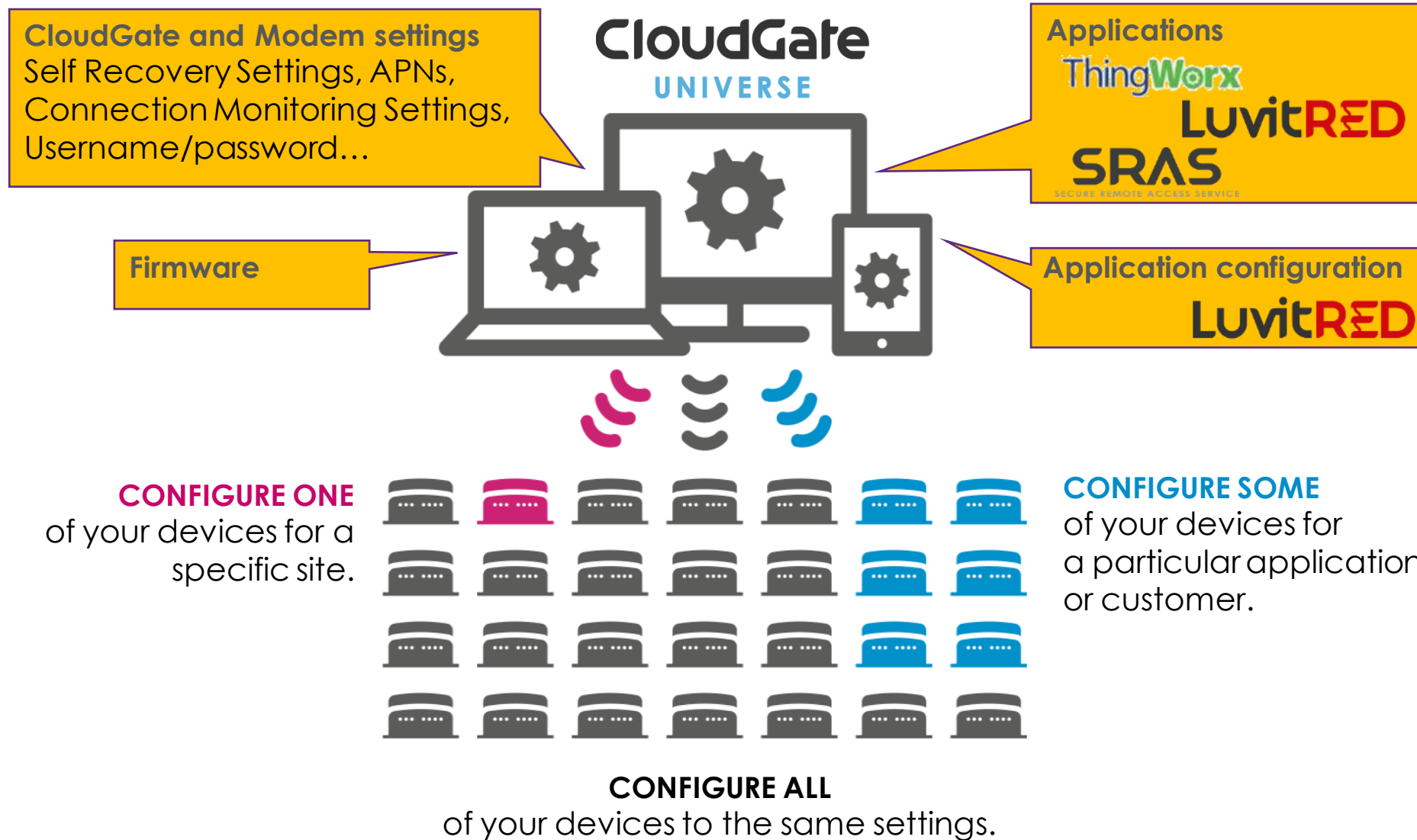
If a key msg.modbus_opts is present and it contains a table with keys host and/or port and the requester is in modbus TCP mode then if the host and port is different to the set host and port the requester will connect to the new host and port and all subsequent requests will be made to this device (until a new host and/or port is received).

library with
building blocks

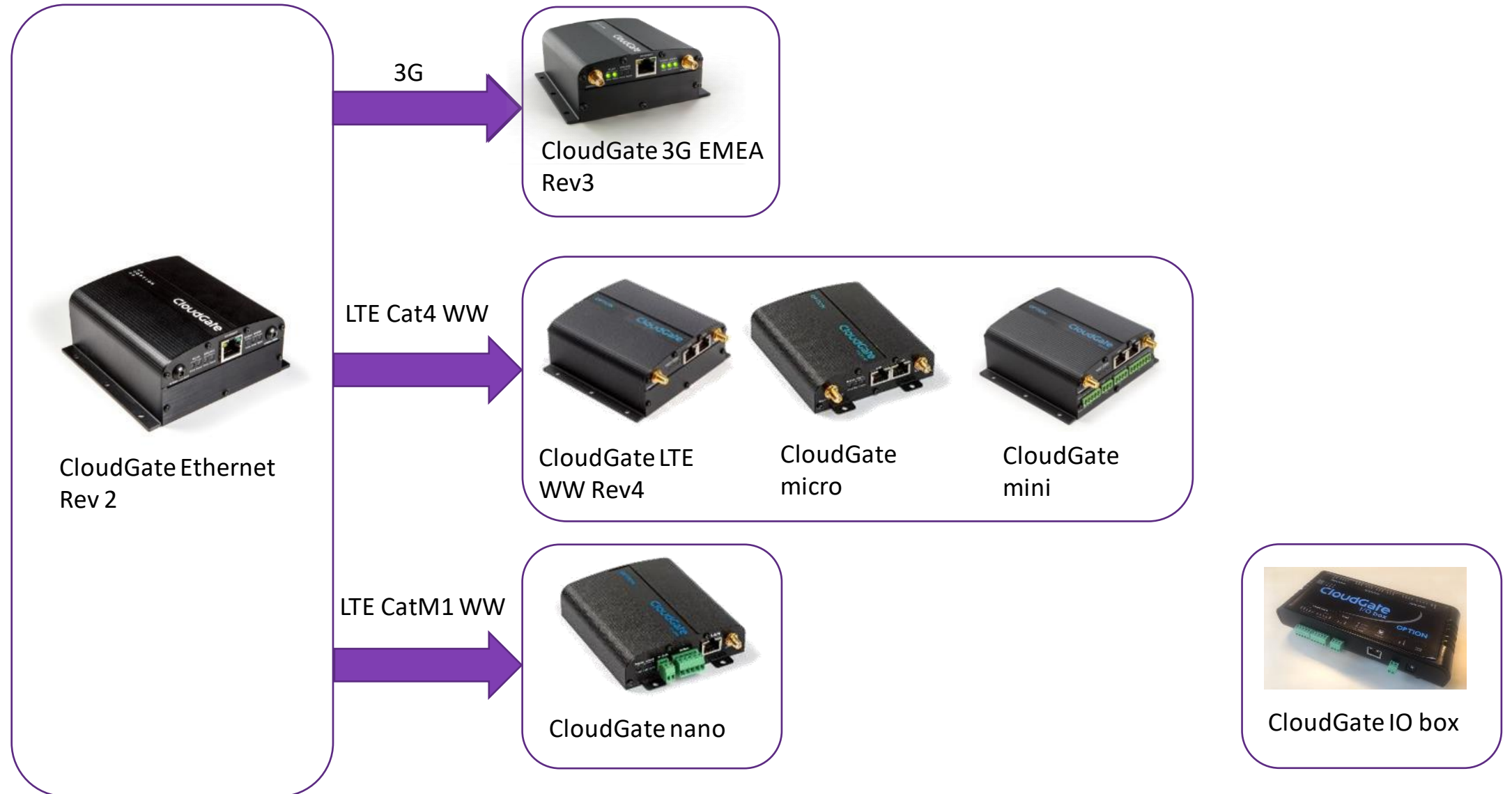
configuration of IoT flow
(can be multiple tabs)

info and debug
window

CloudGate Universe – provisioning server



CloudGate portfolio - 2020



CloudGate LTE WW rev4

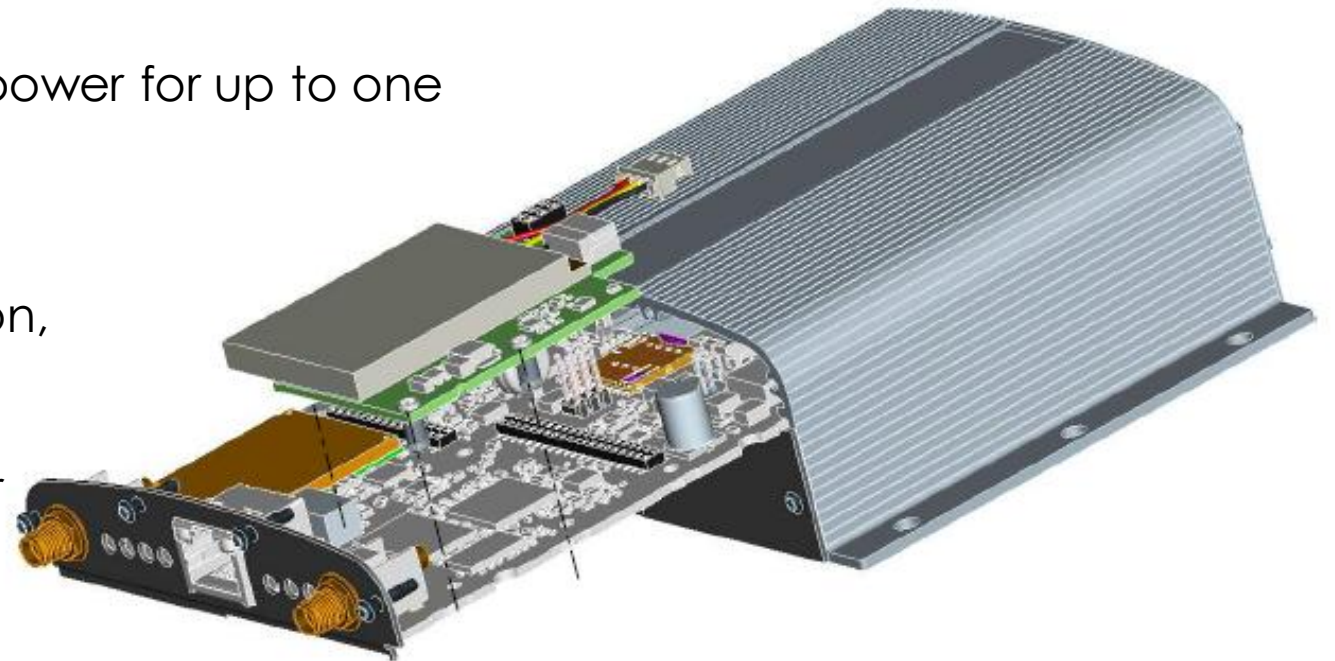
- CloudGate family features
 - High temp range (-30 to +70 °C)
 - Ruggedized aluminum housing
 - Flexible hardware configuration with expansion cards
- New CloudGate 4.0 features
 - New LTE Cat4 modem
 - Real worldwide coverage with 20 LTE bands, covering EU, Americas and ASIA (even the TDD bands in China).
 - 3G and 2G fallback
 - 2 Ethernet ports
 - MicroSD card holder
 - Optional 980mAh battery
 - 5 years warranty !



OPTION

Battery option for all CloudGate 4.0

- 980 mAH battery that can be mounted on main card
 - Available as option when ordering a CloudGate 4.0 or as kit to retrofit a CloudGate 4.0 in stock (for distributors and VARs)
 - Allows operation without mains power for up to one hour.
- Target use cases
 - Provide non-interrupted operation, even during a power loss
 - Allow alerting in case of a power loss (to Cloud platform, with SMS, with email ...)



CloudGate micro

- A cost-down version of CloudGate LTE WW rev 4 (no expansion cards, no 2G)
- Many IoT use cases only require Ethernet-to-4G
 1. *Intelligent Cloud bit pipe for your equipment*

Connect your equipment with Ethernet cable to CG Micro
Use the LTE modem of CG Micro to send data to the backend
'Intelligent' because processing is possible on CG micro with LuvitRED (eg BACnet)
 2. *Connectivity backup*

CloudGate Micro has 2 Ethernet ports.
Connect one port to the WAN (eg ADSL router) and other port to the LAN (eg a switch)
If the WAN port loses connectivity, the LTE modem takes over
 3. *Secure Remote Access*

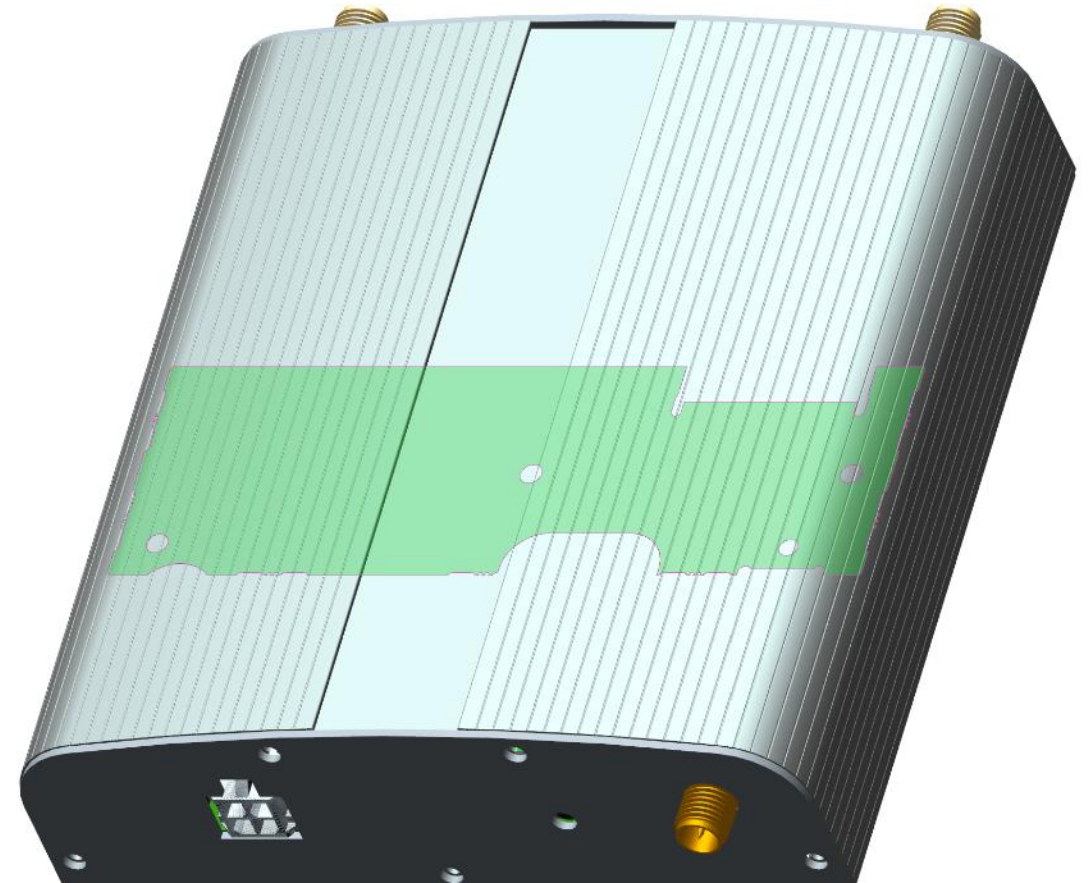
Connect equipment to CG Micro with Ethernet cable
Allow to login on your equipment from your laptop/smartphone with CloudVIU or SRAS
- Optional battery or WiFi or LoRaWAN (Q4)



OPTION

CloudGate micro with LoRaWAN (roadmap Q4)

- On-board connector on CG micro main board can be used for one of these 3 optional plugon cards :
 - Battery card
 - WiFi card
 - LoRaWAN card (available Dec)
- Cards are mounted ex-factory
- LoRAWAN card supports 868MHz and 9xx MHz regions. Selection of region can be done in LuvitRED.



OPTION

CloudGate mini

- CloudGate micro with a non-exchangeable front expansion card (optional WiFi or LoRa)
- Target use cases :
 1. *Industrial vehicle gateway (lifttrucks, cranes ...)*
 - Using the CAN bus to read vehicle parameters and active GPS to indicate vehicle position
 2. *Industrial machine gateway (production machines, professional kitchens..)*
 - Using the serial interface (RS232/RS485) to communicate and GPIO to listen to machine sensors
 3. *Street cabinet gateway (electricity cabinets, cable TV cabinets, fiber cabinets...)*
 - Using the Modbus interface to measure power consumption
 - Using the digital inputs and outputs to monitor/control access doors
 - Using the I2C interface to interface to local sensors (temp, humidity etc)
 - Using the GPS to give cabinet position on overview map
 - Using the battery backup to indicate a power loss

- Digital input (0 - 30V) (including dry-contact pulse counter)
- Analog input (0 – 3.3V)
- Current Loop input (4 – 20mA)
- S0 pulse-counter input
- Digital output (0 – 3.3V)
- Open Drain output (< 250mA, 0 – 30V)

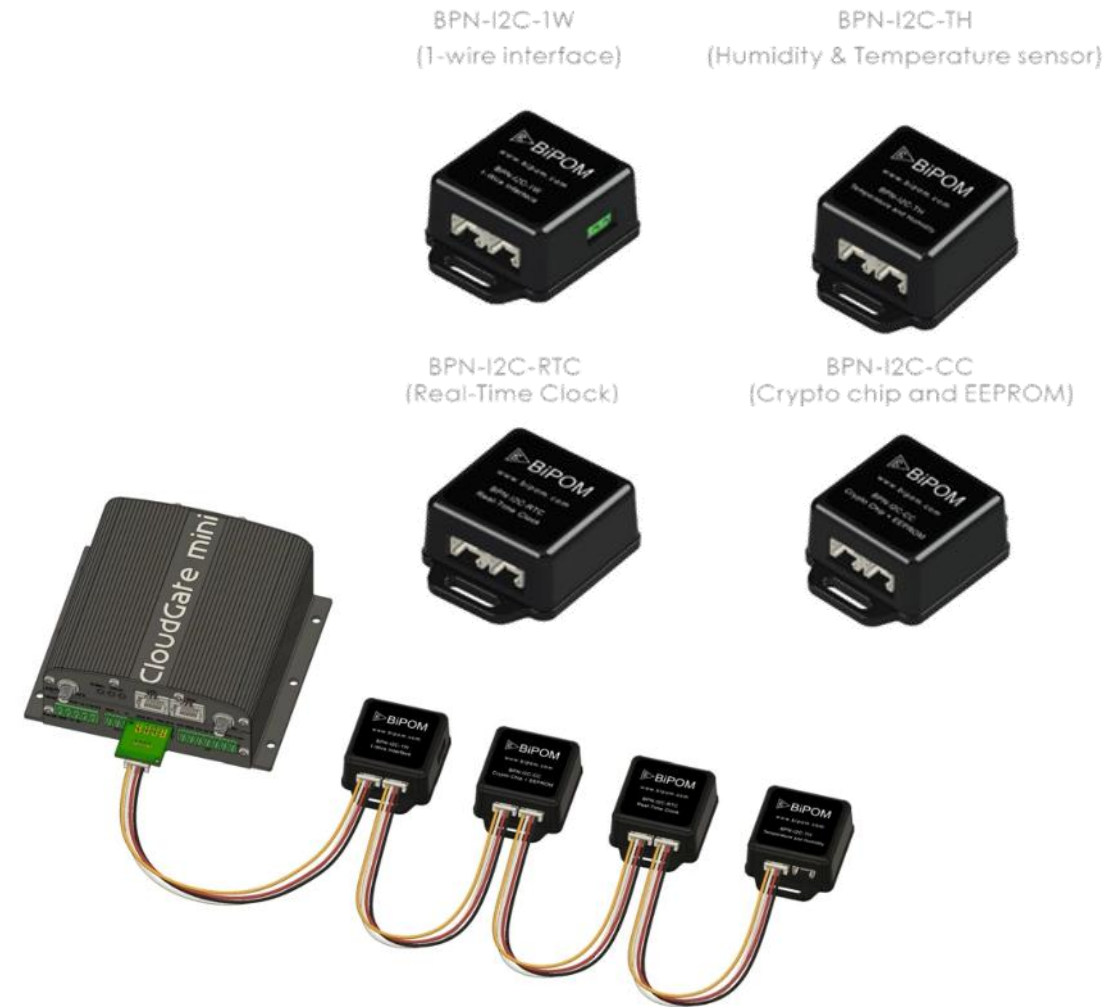
- I2C @3.3V for sensor interfaces (SCL, SDA) (4-pin Würth screw connector)
- 3 GPIO's, each can be configured through firmware (7-pin Würth screw connector)
- RS485 (TxA, TxB, GND), 2 wire, half-duplex OR RS232 (Rx, Tx, RTS, CTS, GND) (5-pin Würth screw connector)
- CAN bus (1Mbps) (3pin Würth screw connector)



CloudGate Ethernet with mini IO



- Industrial grade cost-efficient alternative to PLC's
- Same IO card as CloudGate mini but without the LTE modem inside
 - Can be used with I2C sensor range provided by BiPOM with Grove converter



CloudGate nano



- The gateway for low-bandwidth IoT applications
 - LTE Cat4 WW modem is replaced by LTE Cat M1/Cat NB1/EGPRS WW modem (BG96)
 - 2nd Ethernet port and GPS antenna are removed and replaced by RS485 and M-bus master interface
 - Optional battery or GPS or WiFi or LoRaWAN
- Target market
 - Future-proof cost-effective replacement of 2G gateways
 - Analog line replacement
 - Connecting Modbus/Mbus devices (buildings, smart meters, industrial equipment)
- New reduced-height housing for easy DIN rail mounting (120mm x96.5mm x29mm)



CloudGate I/O box

- We have the CG mini (with 3 GPIO)
- We have the metering card (with 5 GPIO)
- We have the telematics card (with 10 GPIO)
- But sometimes you need a **LOT** of GPIO



Here's the CloudGate I/O box

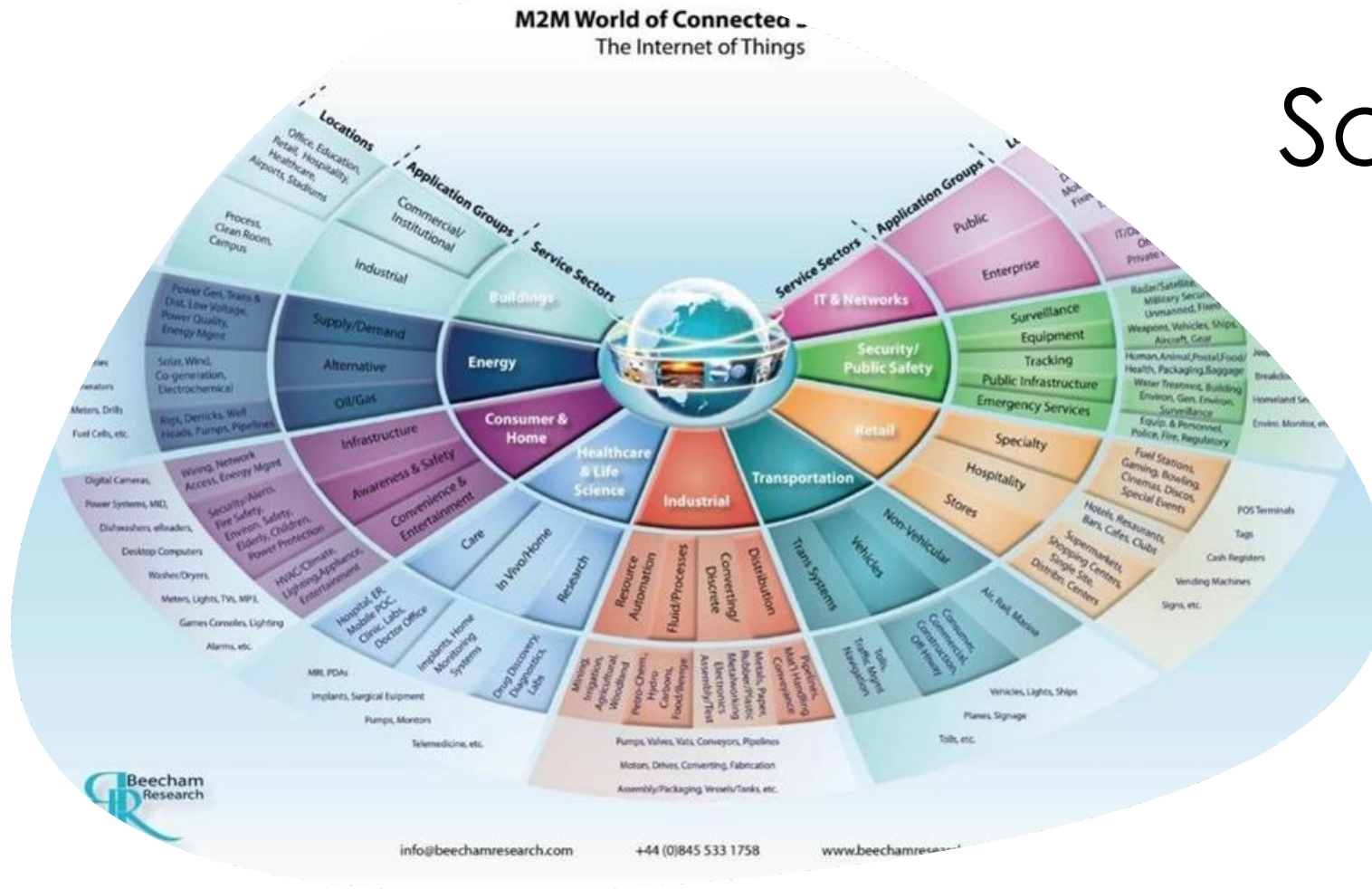
- 4 analog in
- 8 digital in
- 4 digital out
- 4 relay out

Communication to the box over
Modbus RTU (RS485) or Modbus TCP (Ethernet)

Can be powered by PoE or 24V DC



OPTION



Some use cases

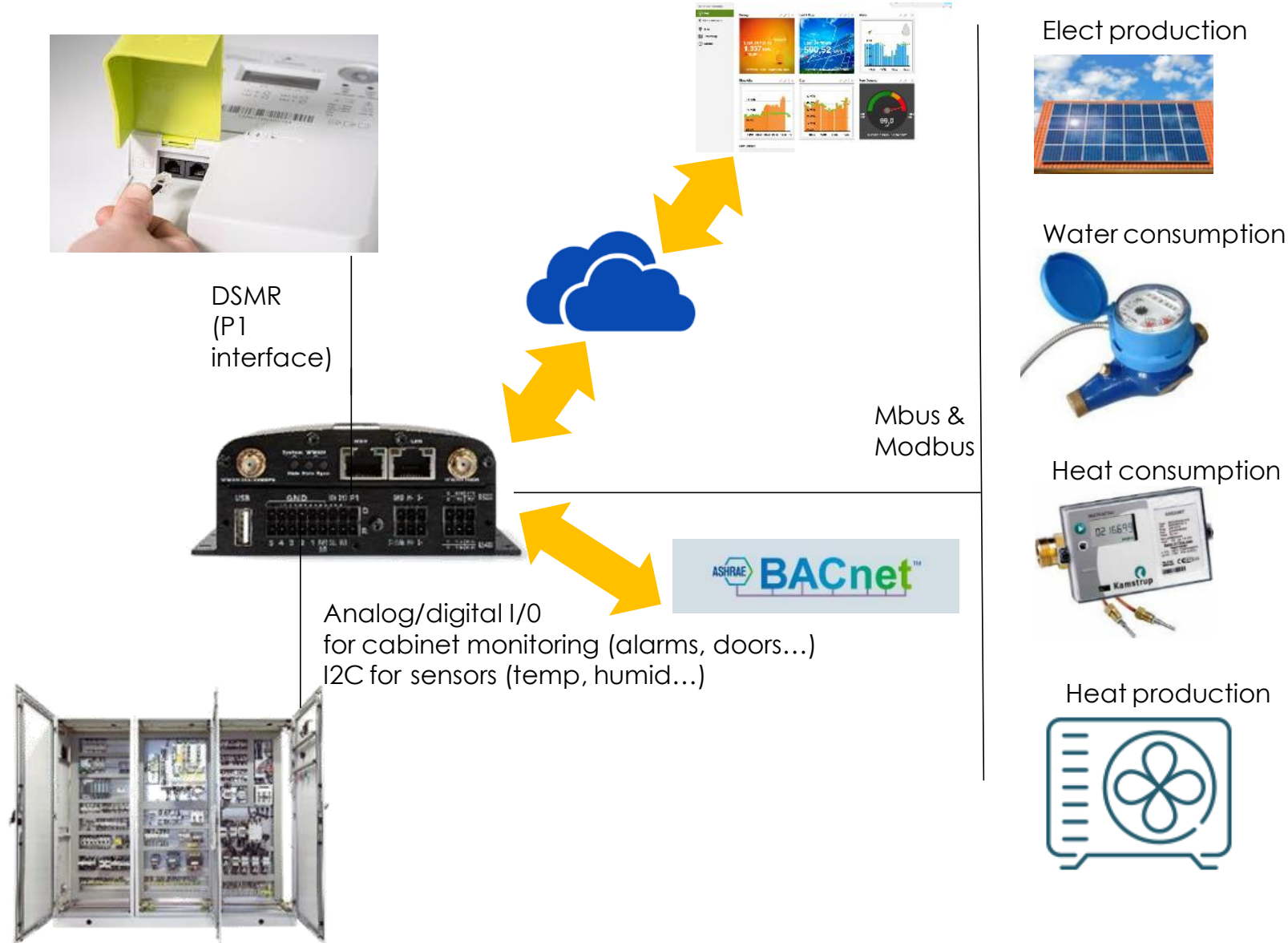
OPTION



Energy management in buildings (BE)

OPTION

(smart metering expansion card)



OPTION

District cooling (Empower, Dubai)

- Components
 - CloudGate 3G with LoRaWAN card inside buildings (one CloudGate for every 6 floors)
 - Smart Valves with embedded LoRaWAN module for every apartment in these buildings
 - Manufactured by Strega (Belgium)
 - Industrial grade design in IP68 enclosure, up to 140°C
 - 2x Lithium 3.6V DC batteries for long-lasting performance
 - Available for most common pipe widths
 - Worldwide certification
- Use case
 - Empower provides cooled water @5°C to all apartment buildings in neighborhood of plant. Used as air conditioning for apartments
 - Empower can remotely cut water supply
 - when customer did not pay the bill
 - when water leak is detected
 - Server application available to remotely monitor the valve condition
 - Smartphone application available to register valves with QR code and link to a specific CloudGate



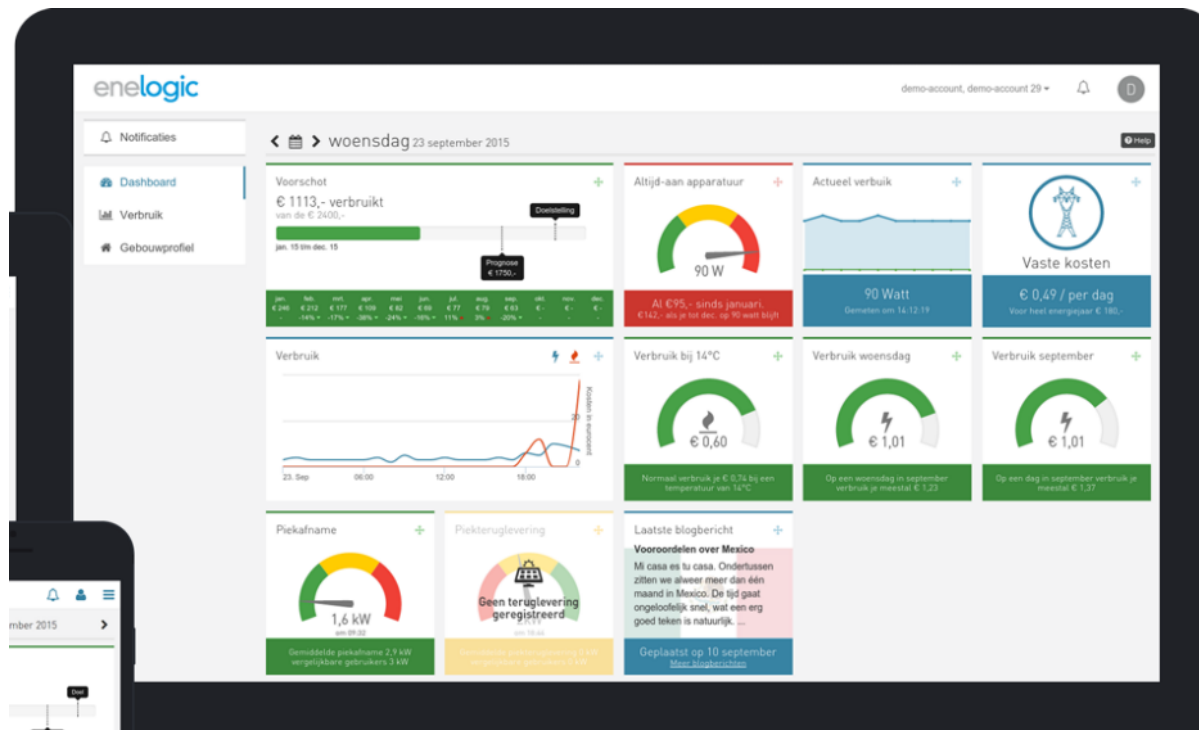
Information				Last update				Last command		
flat	when	status	tamper	mode	battery	snr	when	mode	status	
Flat_0510	1 minute	CLOSED	OPEN	OPERATION		7.3	1 d	OPERATION	CLOSED	
Flat_1209	10min	OPEN	CLOSED	OPERATION		9.5	7 days	OPERATION	OPEN	
Flat_0104	11min	OPEN	CLOSED	OPERATION		6.8	7 days	OPERATION	OPEN	
Flat_0906	11min	OPEN	CLOSED	OPERATION		7.8	7 days	OPERATION	OPEN	
Flat_0602	18min	OPEN	CLOSED	OPERATION		9.5	7 days	OPERATION	OPEN	

OPTION LoRa electricity metering (Enelogic, NL)

- Specialize in energy monitoring for buildings in Netherlands/Flanders
- Use CloudGate LTE + Smart Metering card + LoRaWAN card
- They can monitor digital electricity meter (P1), electricity submeters (LoRa), solar cell production (Modbus)
- User dashboard provides insight, especially for NOM buildings (NL)



Eastron SDM630MCT-LoRa 3-Phase Wireless Din Rail Multi-function Energy Meter with LoRa communication



OPTION

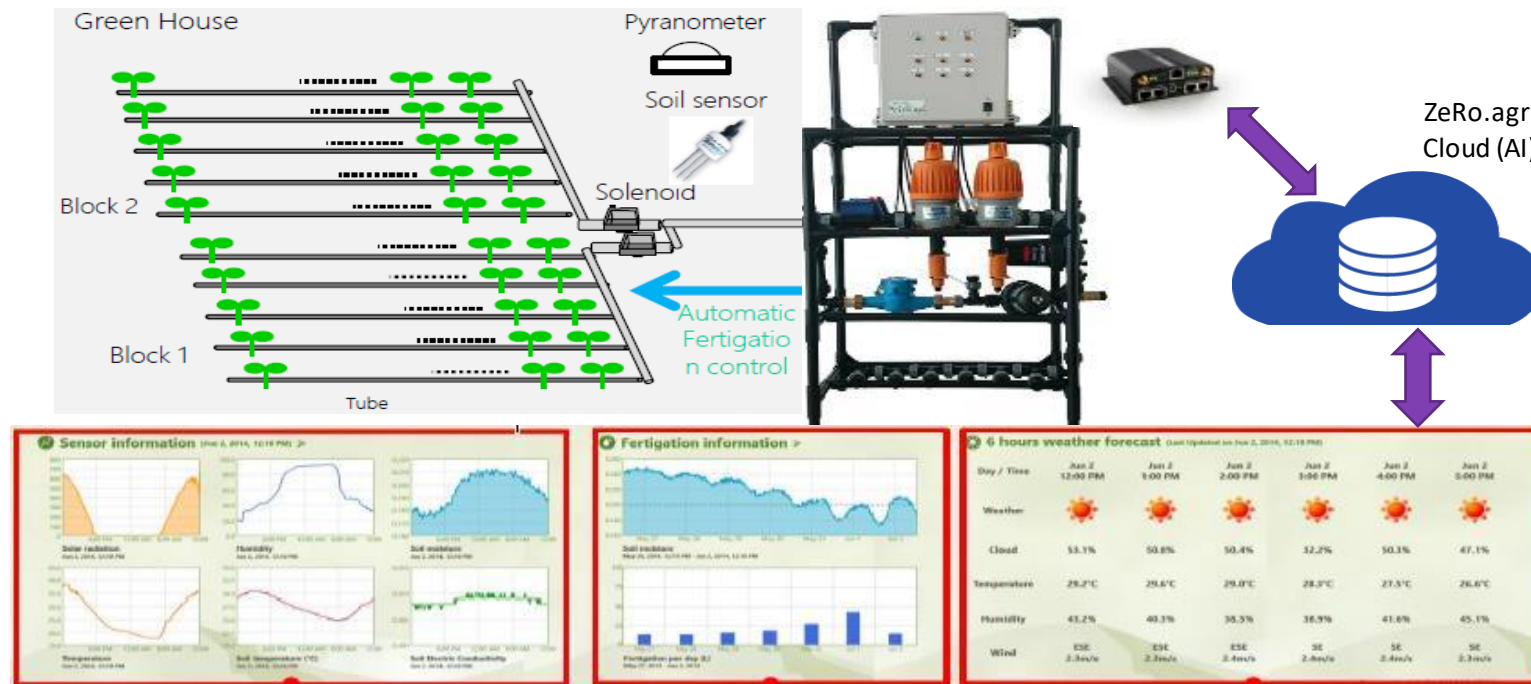
Temperature logging (Emerson, US) (PakSense expansion card)

- Product : PakSense AutoSense Inbound
- Purpose :
 - Monitor the temperature of food/medicine during transport by logging the temperature every minute in a tag
 - Wireless upload of temperature history before a product is unloaded saves time on the receiving dock
- Implementation components:
 - Tags (<https://www.paksense.com/products/ultra-wireless>)
 - Digitally record time and temperature data, up to 30 days
 - Automatically mesh together when turned on
 - Transmit data wirelessly over a proprietary protocol
 - CloudGate
 - Connects the tags to the cloud repository over cellular connection
 - Rebranded logo
 - Using a custom expansion card, developed by Paksense that receives wireless data from the tags
 - Backend system
 - Text and email alerts are created and delivered to predefined individuals
 - Temp, alert condition, serial number, supplier name, receiving location, high/low/avg temp, graph



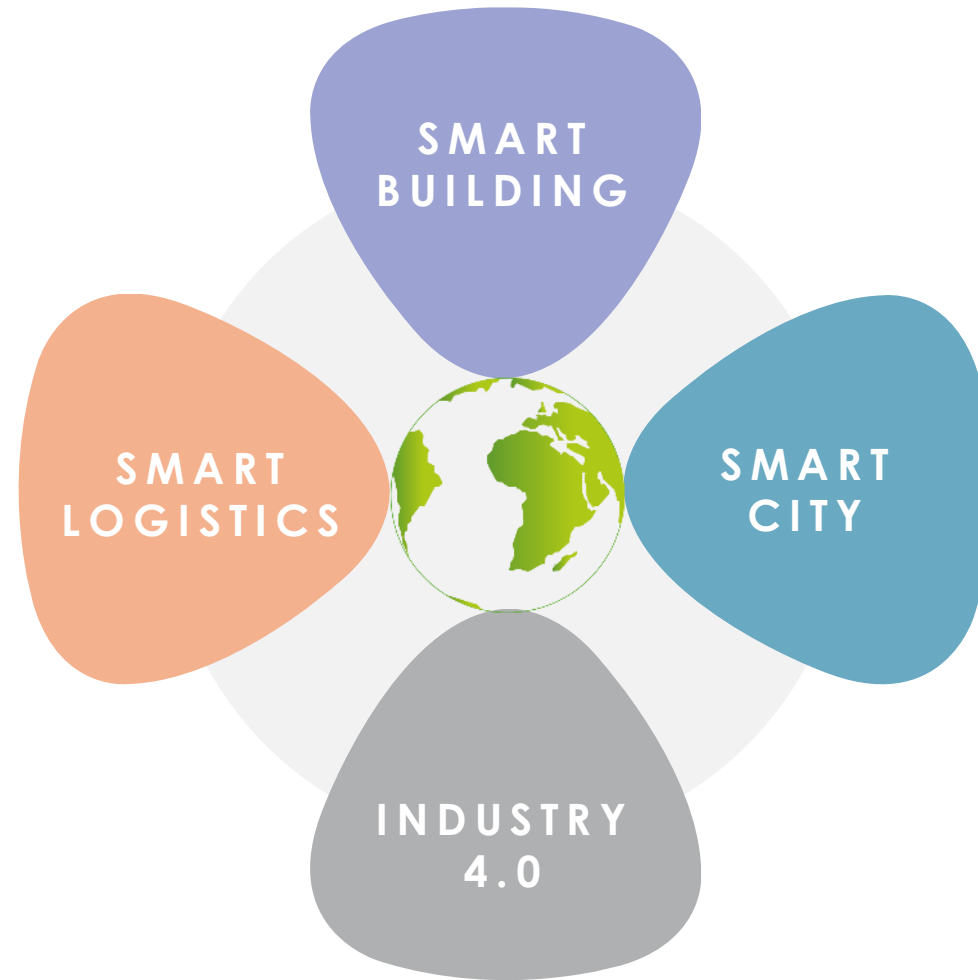
OPTION Smart irrigation and fertilization (Japan)

- JFE Shoji Electronics, part of JFE Shoji Trade Group which is part of JFE Holdings Inc (60K employees, 25B €)
- JFE Shoji has developed ZeRo.agri product together with Routrek for smart irrigation and fertilization



OPTION

We also make **solutions** for a **smarter** and **greener** world.

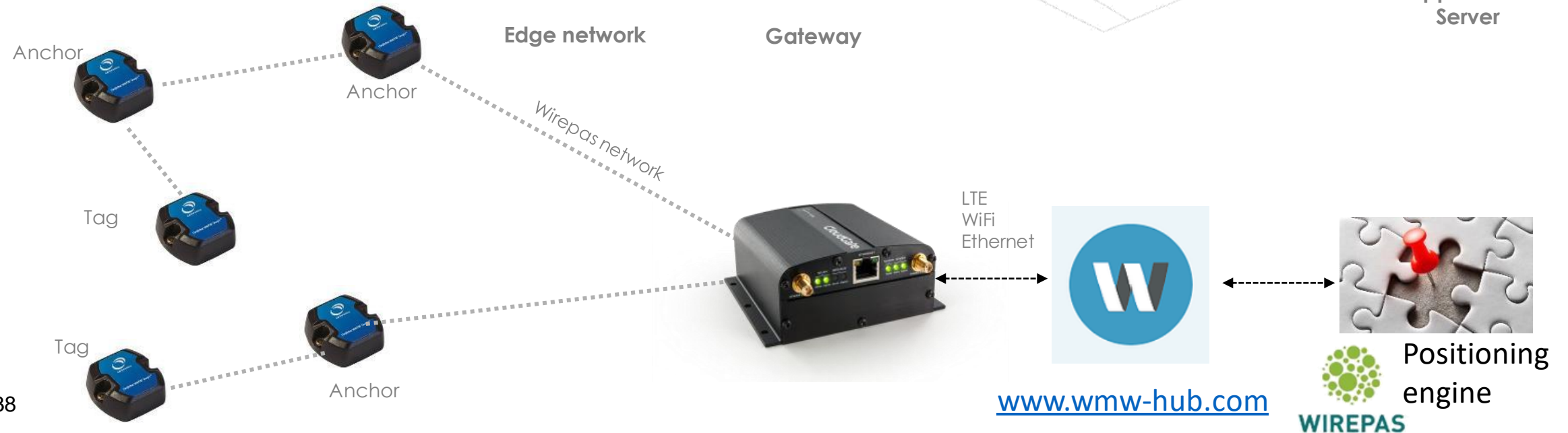
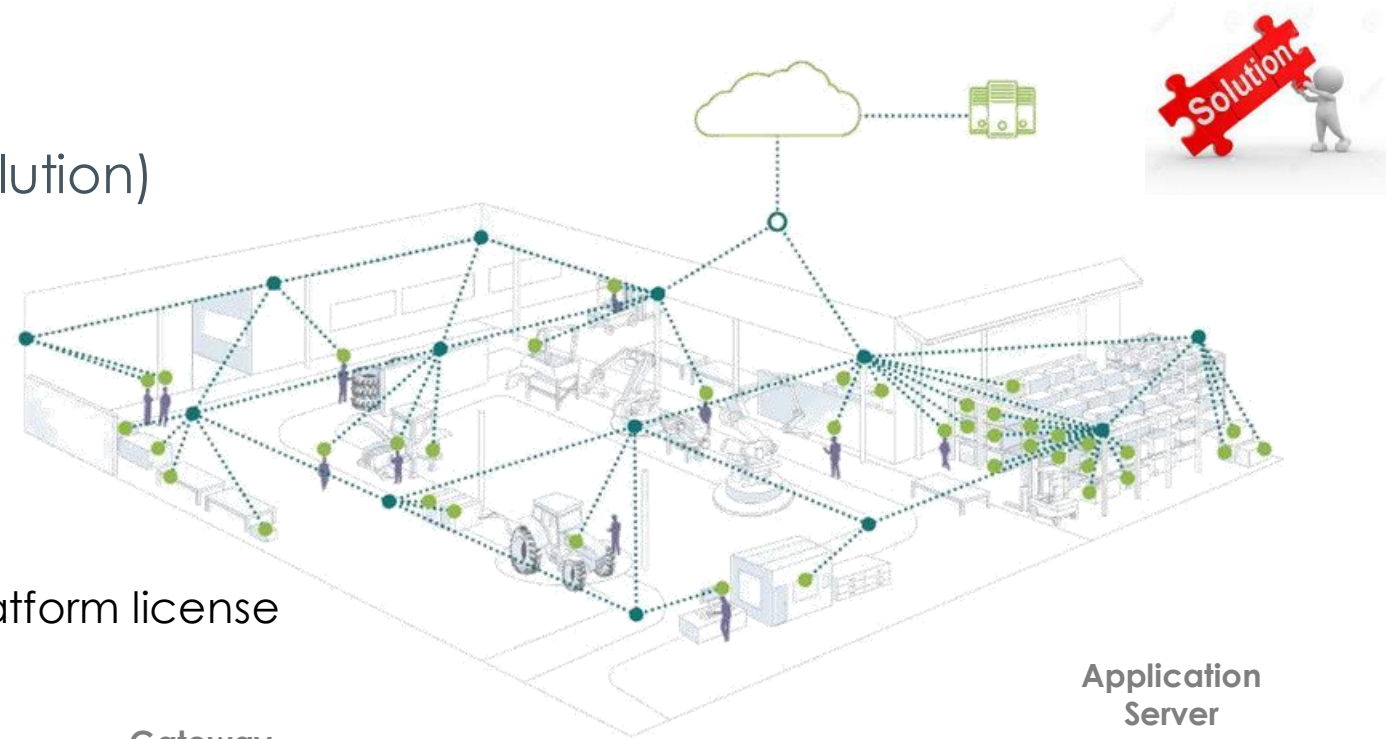


CloudGate Track

OPTION

(indoor localization solution)

- Show the position of tags on a building map
- Configuration
 - Anchors on fixed locations in building
 - Tags moving around in the building
 - Wirepas mesh network to connect anchors and tags
 - CloudGate as a sink in Wirepas network
- Starting kit, including SIM card and WMW platform license

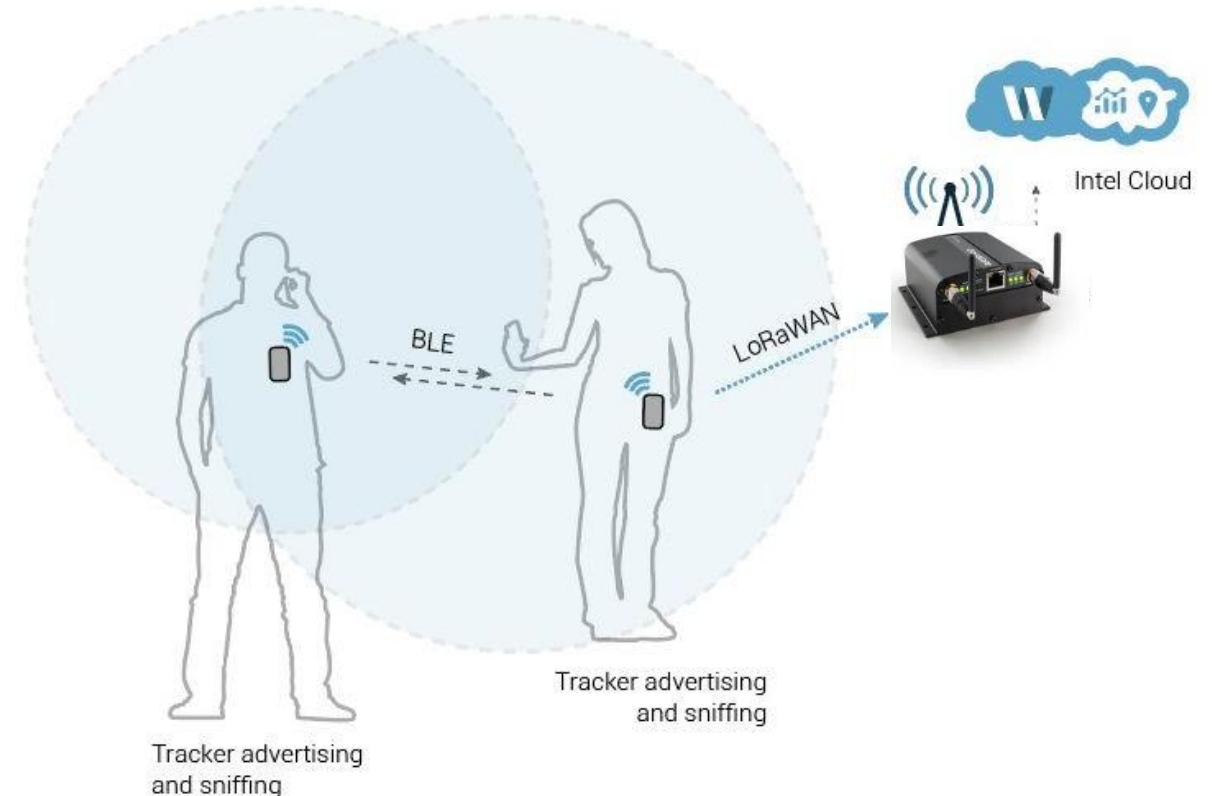


CloudGate Safe Distance

OPTION

(Social Distance Monitoring solution)

- Monitors the presence of other employees in the neighbourhood
- When the distance is closer than 2m
 - Starts a buzzer to notify the employees
 - Sends a notification to a cloud platform
- Configuration
 - A badge for every employee
 - A CloudGate LoRaWAN gateway for the building
 - The WMW platform in the Cloud



The devices look for a signal with high enough proximity.
If it is picked up, it will be logged on the server.
An alert sound can be played.



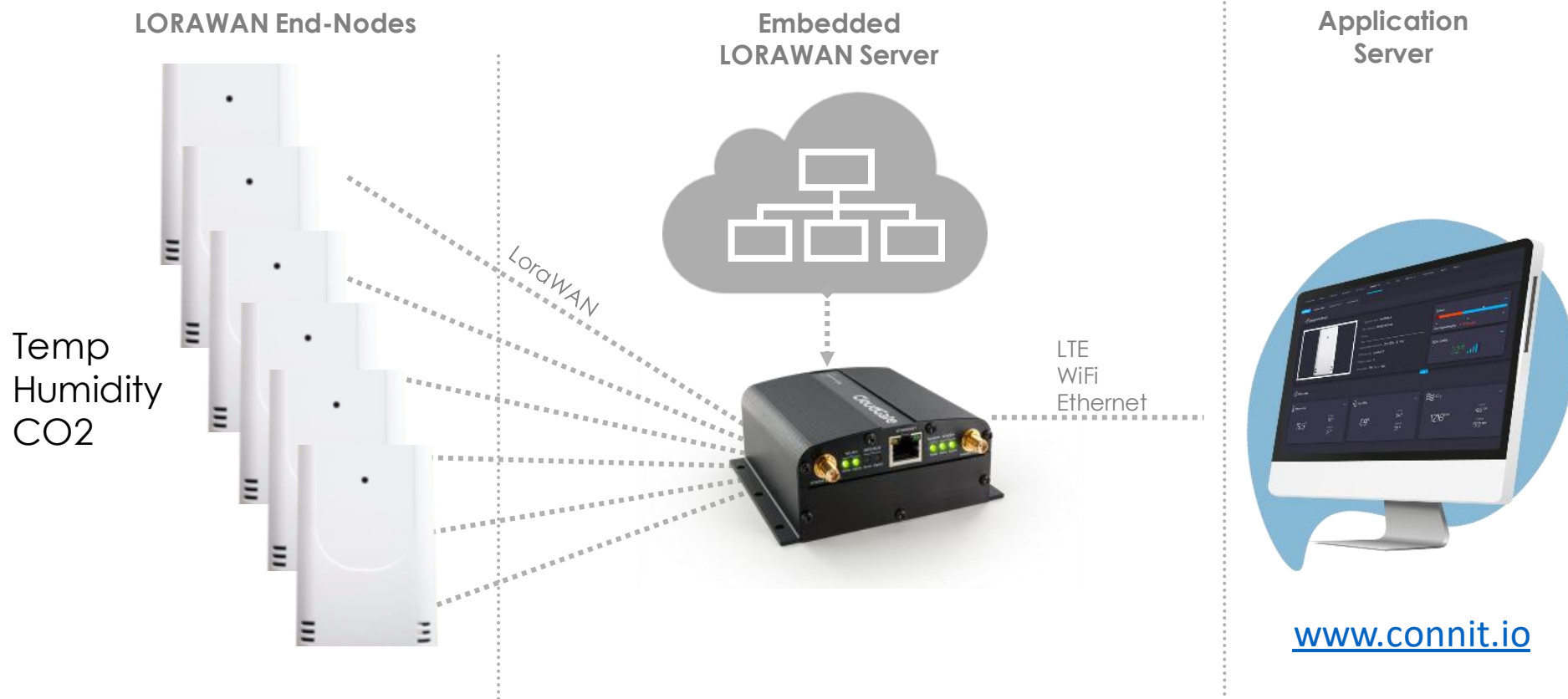
CloudGate Air

(Office air quality solution)



- CloudGate is used as a private basestation for LoRaWAN sensors.
- Allows transparent connection from LoRa sensor to application server of choice :
 - Microsoft Azure
 - Amazon AWS
 - Google Cloud
 - Waylay
 - AllThingsTalk
 - Thingworks
 - Cumulocity
 - Etc.

- Legislation in Belgium :
KB May 2, 2019:
mandatory after
Jan 1 2020



CloudGate Energy

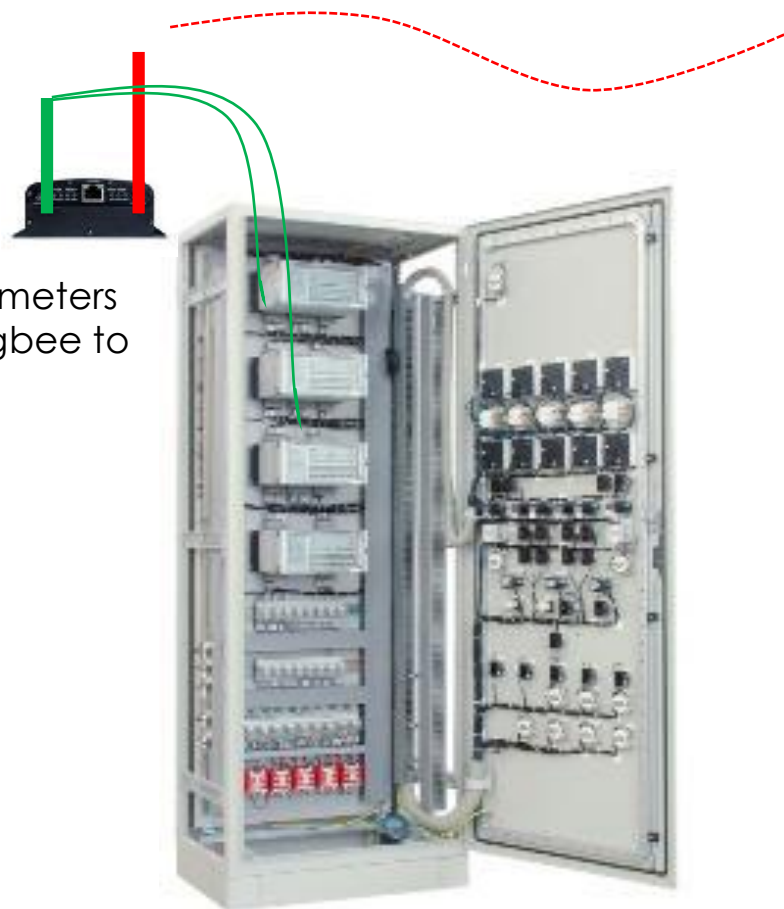
(Energy monitoring solution)



Application
Server



Local electricity meters connect over Zigbee to CloudGate.



www.dexma.com

CLIENTS THAT RELY ON **OPTION**

ORBCOMM

Honeywell

FLEXTRONICS

KONECRANES

e-on

ABB

SNCF

DANLAW

JABIL

EMERSON

SGS

VEOLIA

dalkia
GROUPE EDF

AT&T

CMC

BT

Option knows how

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