NB-IoT overview

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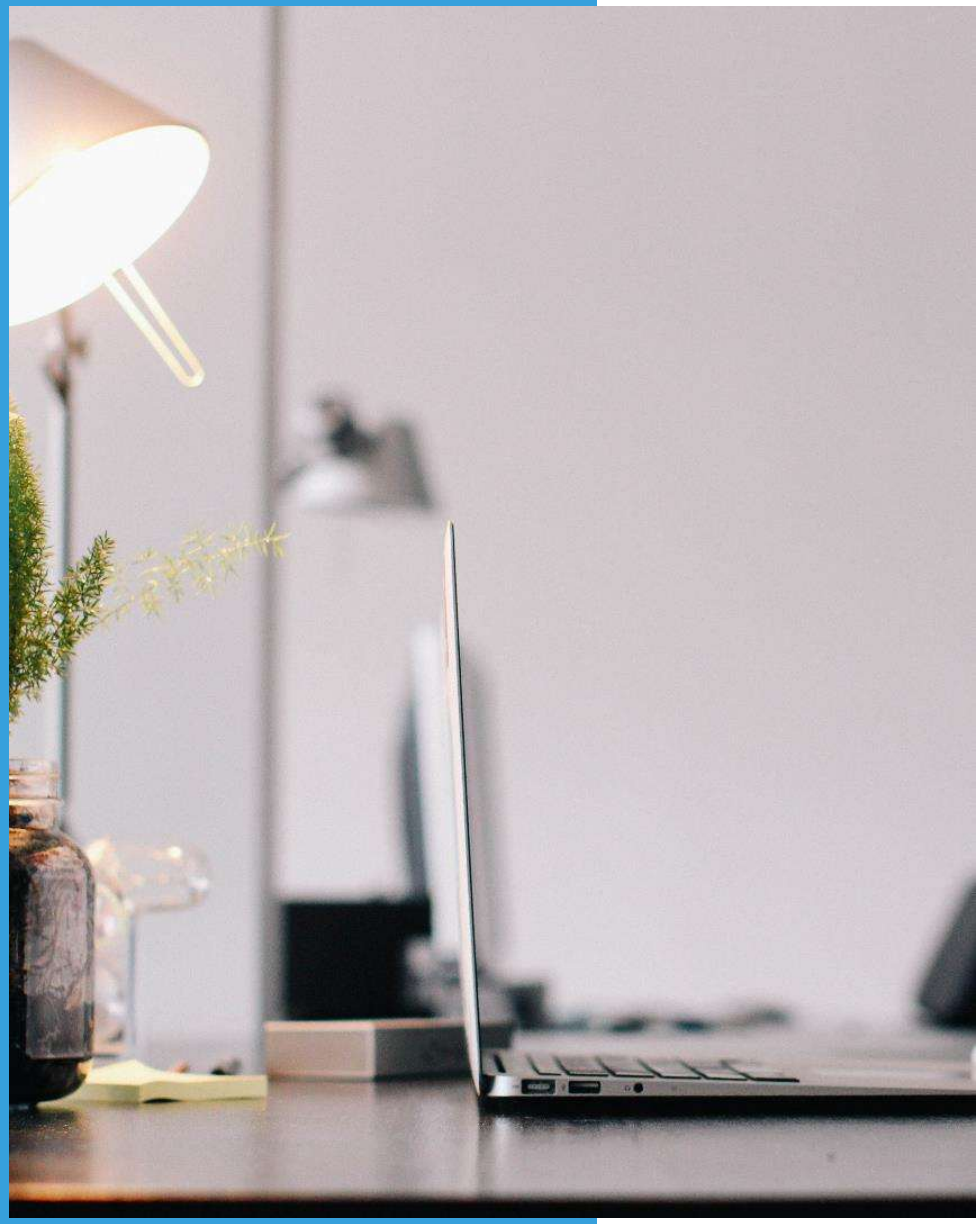


NB-IoT

NB-IoT is a radio technology standard developed by 3GPP which utilizes the **licensed frequency** band. This means that the development is driven by telecom operators.

NB-IoT, like other LPWAN technologies, is developed for applications that require a combination of **long range** and **low battery power consumption**.

NB-IoT™

Licensed frequency spectrum

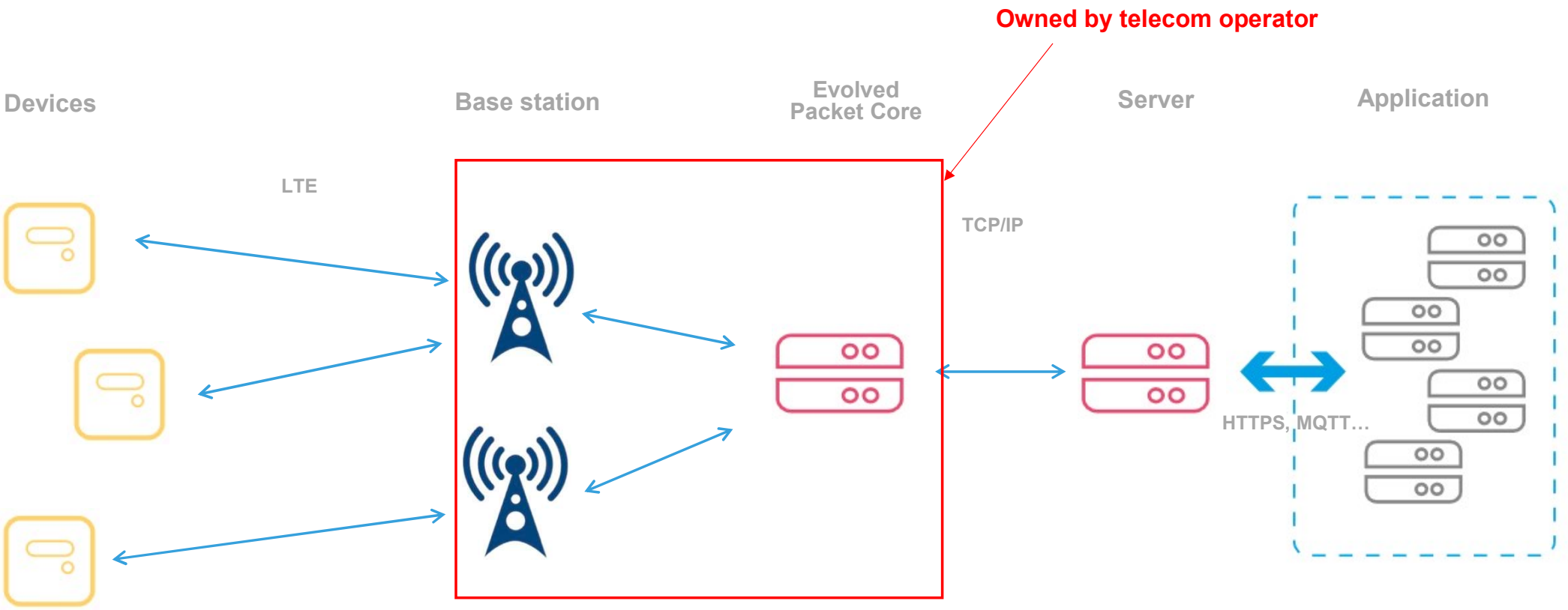
Benefits:

- Licensed company (operator) responsible for optimizing the network performance and minimizing interferences.
- No manual registration in network required (SIM card operation)

Drawbacks:

- Not possible to build your own network. Dependent on operator.

NB-IoT architecture



NB-IoT - Downlink

When connected to a PSU (power supply), the unit can listen continuously.

When battery driven, the unit only listens for incoming downlink messages in direct connection to transmission

CMi6110

Integrated MCM for L+G UH50/UC50, NB-IoT

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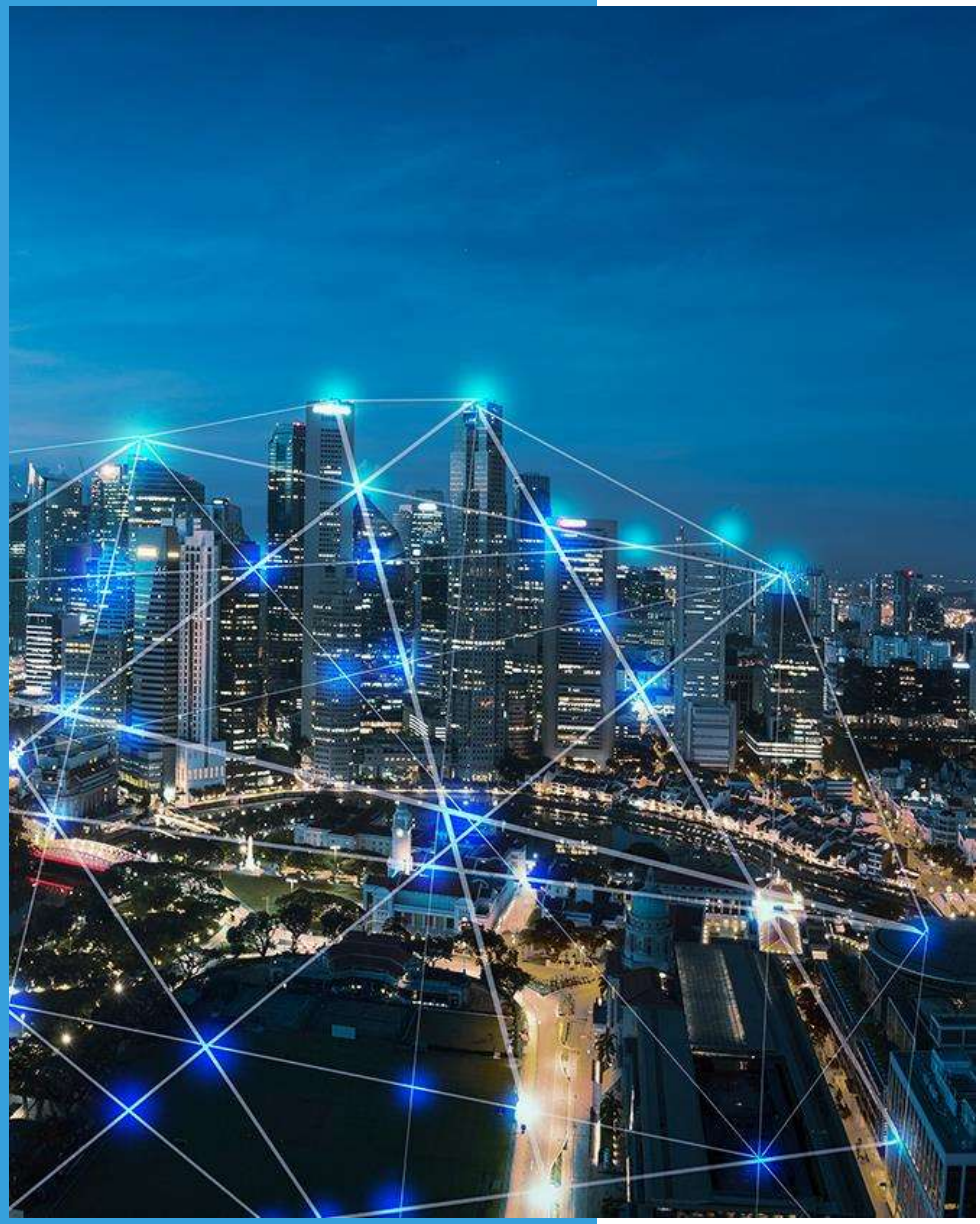

CMi6110 – Overview

CMi6110 is a meter connectivity module that is mounted in a Landis+Gyr UH50 heat meter to collect data from the meter and deliver it to a receiving system via a NB-IoT network.

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Customer benefits

- **Customization through several different message formats**
- **Historical readouts and retries**
- **Encrypted data**
- **Elvaco One-Touch Commissioning for secure and flexible deployment / configuration**
  Elvaco OTC App lets you configure the module via the NFC of your phone.
- **Elvaco Evo for decoding, storing and visualization of your meter data.**

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Specifications

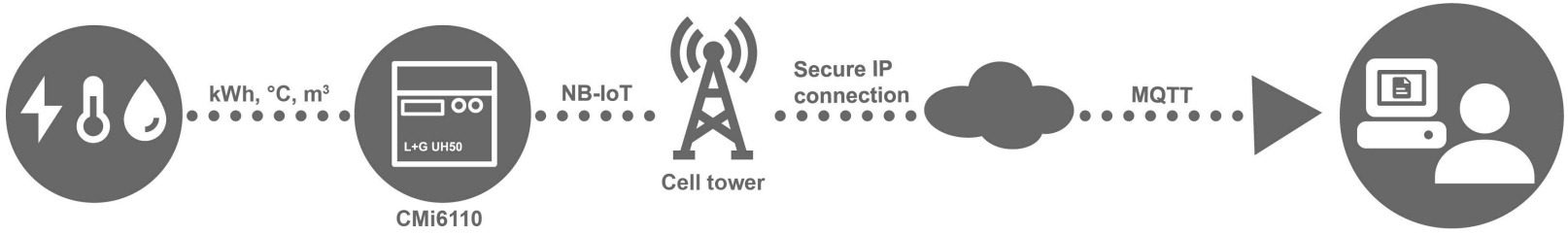
Mounted inside a Landis+Gyr UH50/UC50

(SIM card needed)

Power supply: PSU (Battery Q2)

Antenna: External

Interface:
Android app / NFC
Downlink



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Connect a device to the NB-IoT network

1. Mount a NB-IoT SIM card in the product.
2. Configure the device with the right APN settings and server addresses.
3. Activate the device (via push button or Elvaco OTC App.)

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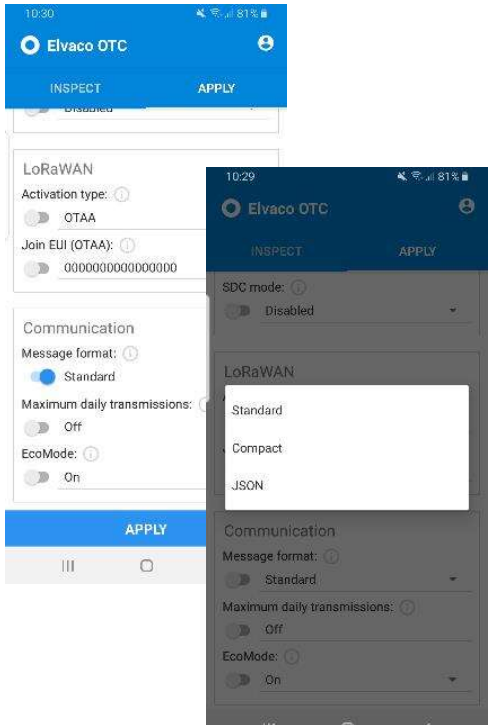
Message formats

- Elvaco products offer a range of message formats to make it possible to customize the payload to the specific demands of your project.



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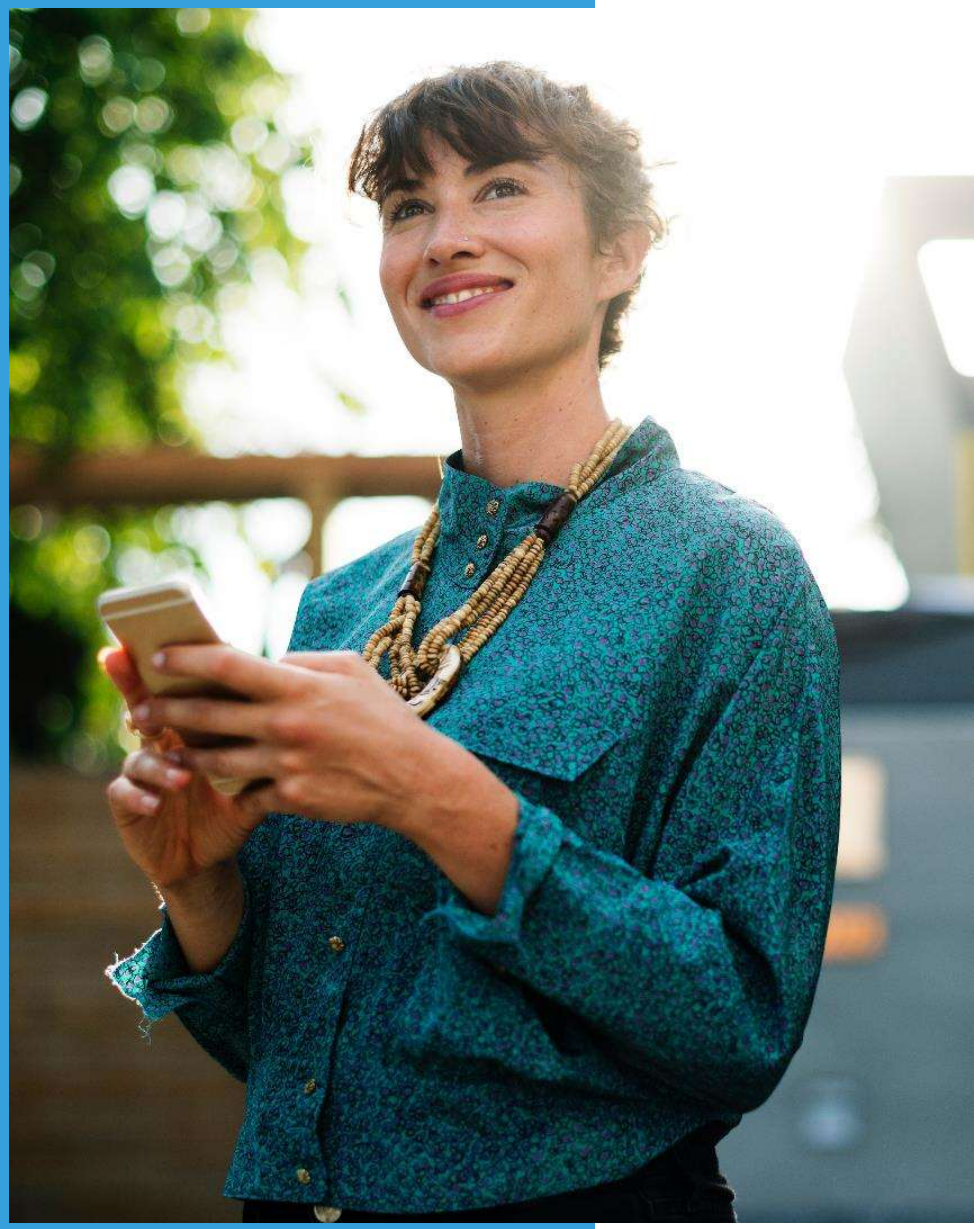
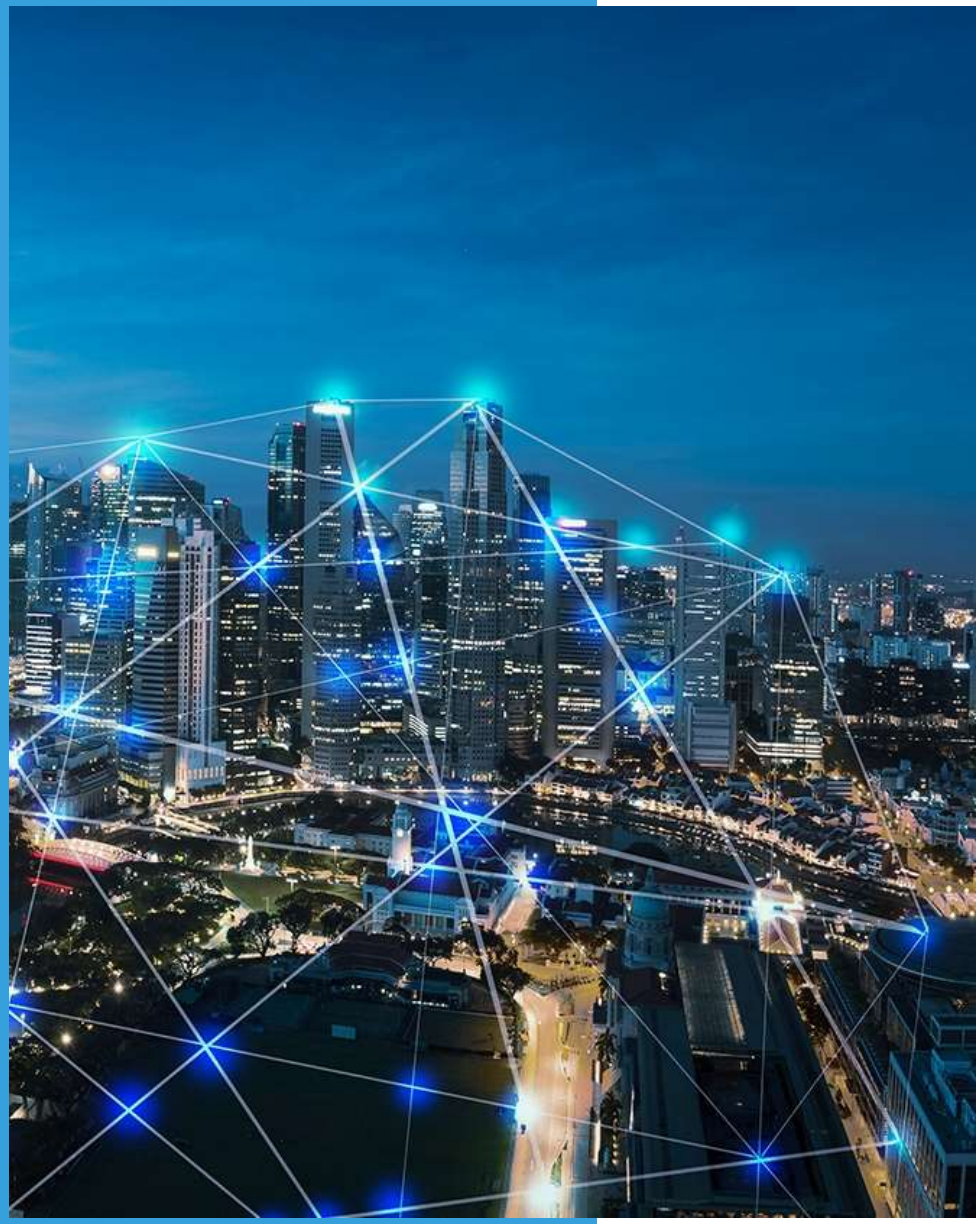
Message format specification

- CMi6110 has support for M-Bus and JSON encoded messages
- The following meter indexes will be collected from the meter and included in the data telegram:
  - *Energy*
  - *Volume*
  - *Power*
  - *Flow*
  - *Fw temp*
  - *Rt temp*
  - *Error flags*
  - *Meter ID (secondary ID)*
  - *Meter date/time*
  - *Tariff 1*
  - *Tariff 2*
  - *Tariff 3*
  - *Error time*
- The following information will be sent once per hour in a status message:
  - *Operation time*
  - *RSSI*
  - *SNR*
  - *Network classification*
  - *Accumulated energy consumption, 24h*



Triggered readouts and retries

- **Retries:** CMi6110 will perform up to three attempts to deliver a message. After three failed attempts, the message will be dropped.
- **Momentaneous readout**: A momentaneous readout can be triggered via the DM system at any time.
- **Historical meter data**: Historical meter data (for a selected time period) can be requested via the DM system. About 20 weeks of hourly values can be stored in the module.



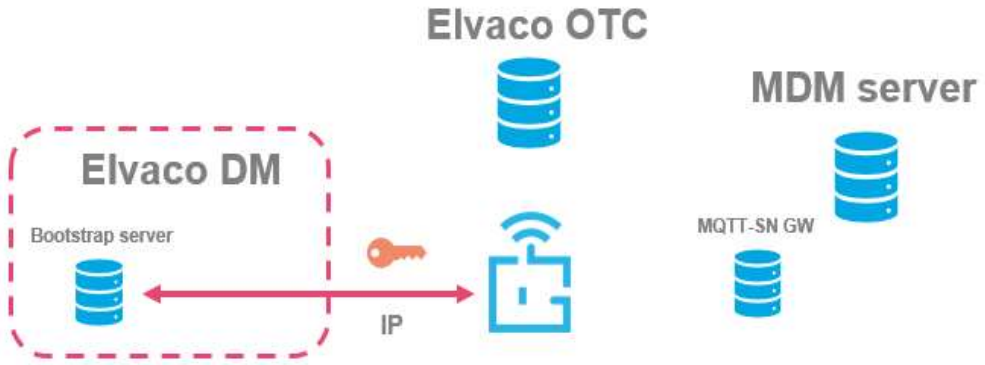
Security / Encryption

- In the first release, the device will use dTLS encryption (transport layer encryption) when communicating with DM / MDM server.
- In the future, OSCORE will be added as a payload encryption.
- Session keys are generated in an initial handshake process between device and server

Start-up procedure

Step 1: Device is claimed in OTC and pre-shared key is added in the MQTT-SN gateway.

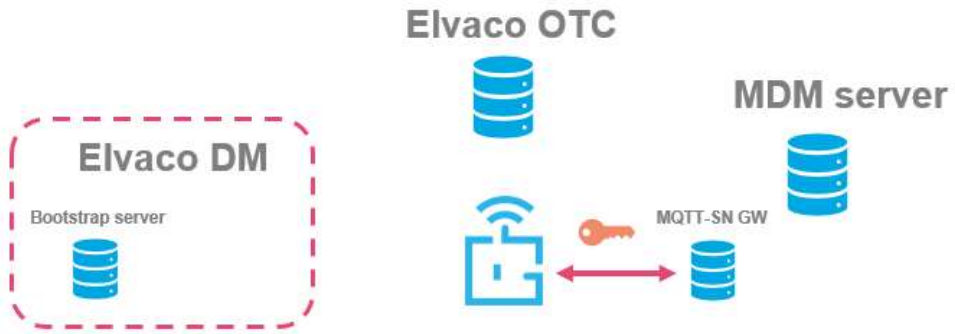
Step 2: Device is activated and connects to a bootstrap server (Elvaco's server by default). It receives a pre-shared key for DM-device encryption and IP address to MQTT-SN gateway.



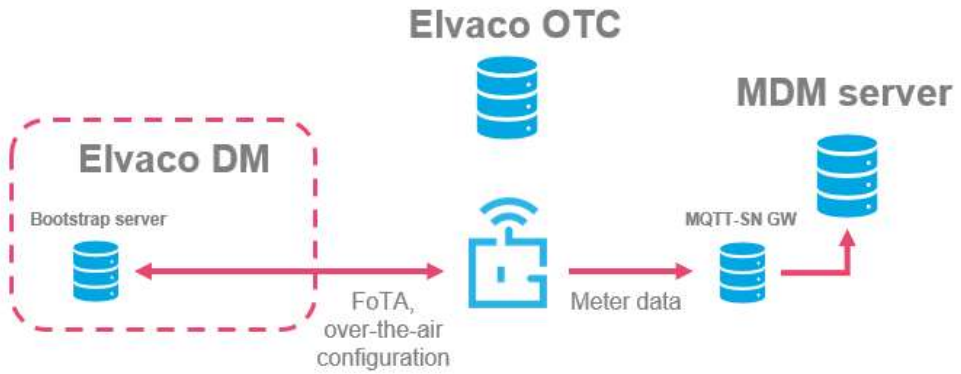
Start-up procedure

Step 3: Device connects to DM server to generate session key.

Step 4: Device connects to MQTT-SN gateway to generate session key.



Step 5: Device receives commands/updates from DM server and sends meter data to MQTT-SN gateway



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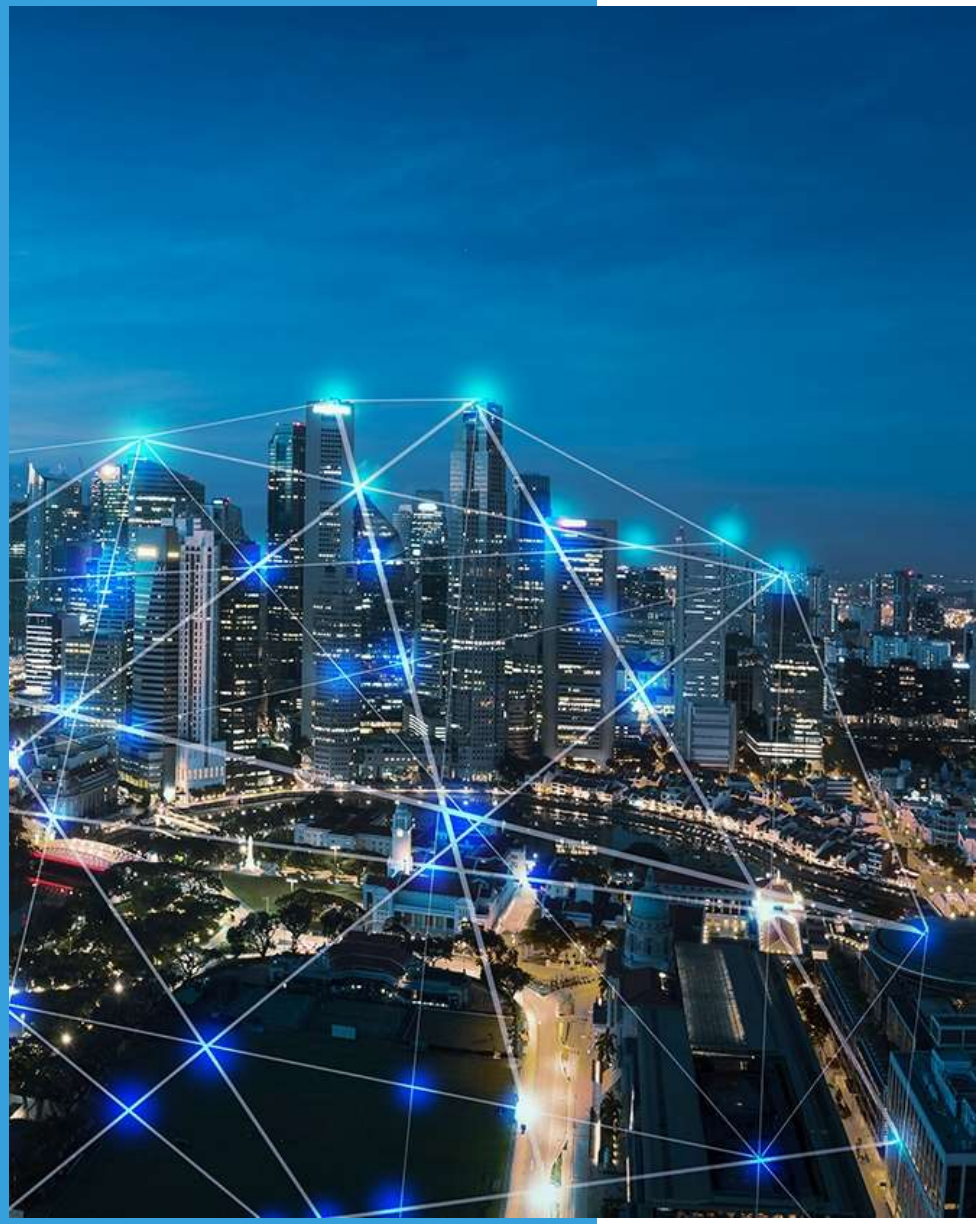
Typical challenges with a traditional process

- **No validation of installation, risking a revisit.**
- **Spending a lot of time on site on configuration.**
- **Compromised security**
  - Devices left with insecure default passwords.
  - Passwords/keys are transferred without proper security measures.
  - Third party gains knowledge about keys/passwords as part of their work commissioning products.

- **Manual administration to keep track of where and when devices have been installed.**



One-Touch Commissioning

- Effortless “One-Touch” inspection/configuration via NFC.
- Immediate validation on end-to-end connectivity.
- Secure and flexible commissioning.

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Product Migration Plan - Overview

2G (GPRS) PRODUCTS

CMe2100 GPRS
DIN-Rail M-Bus Metering Gateway used for connecting any type of M-Bus slave.

Option 1

REPLACEMENT PRODUCTS

CMe2100 LTE
DIN-Rail M-Bus Metering Gateway used for reading any type of M-Bus slave.

Migration comments
- Identical or better.

CMi2110 GPRS
Connectivity Module used for connecting L+G UH50 heat/cold meter.

Option 1

CMi6110 NB-IoT
Connectivity Module used for connecting L+G UH50 heat/cold meter.

Migration comments
- New system integration
- Lower connectivity cost
- Lower bandwidth
- Battery support

Option 2

CMe2100 LTE
DIN-Rail M-Bus Metering Gateway used for reading any type of M-Bus slave.

Migration comments
- Keep existing system integration
- Meter must have M-Bus support

Product Migration Plan - Overview

2G (GPRS) PRODUCTS

CMi2130 GPRS
Connectivity Module used for connecting Itron CF ECHO II heat/cold meter.

Option 1

Option 2

REPLACEMENT PRODUCTS

2022

CMi6130 NB-IoT
Connectivity Module used for connecting Itron CF ECHO II heat/cold meter.

Migration comments
- New system integration
- Lower connectivity cost
- Lower bandwidth
- Battery support

CMe2100 LTE
DIN-Rail M-Bus Metering Gateway used for reading any type of M-Bus slave.

Migration comments
- Keep existing system integration
- Meter must have M-Bus support

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New generation of Heat/Cold connectivity modules

Landis+Gyr

UH50 / CMi6110
NB-IoT
10+1Y

UH50 / CMi4110
LoRaWAN
10+1Y

T230/T330 / CMi4111
LoRaWAN
10+1Y

DIEHL Metering

2021

SHARKY 775 / CMi6160
NB-IoT
10+1Y

SHARKY 775 / CMi4160
LoRaWAN
10+1Y

kamstrup

2022

Multical 403/603/803 / CMi6140
NB-IoT
10+1Y

Multical 403/603/803 / CMi4140
LoRaWAN
10+1Y

Itron

2022

CF ECHOO II / CMi6130
NB-IoT
10+1Y

CF ECHOO II / CMi4130
LoRaWAN
10+1Y

engelmann

Sensostar / CMi4170
LoRaWAN
10+1Y

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2022 More info Q4 2021

One platform – Any meter
Elvaco provides world largest portfolio of connectivity modules to all leading meter manufacturers.

- ✓ World class security
- ✓ Digitalized lifecycle
- ✓ Extendable features with firmware upgrade
- ✓ One system integration


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