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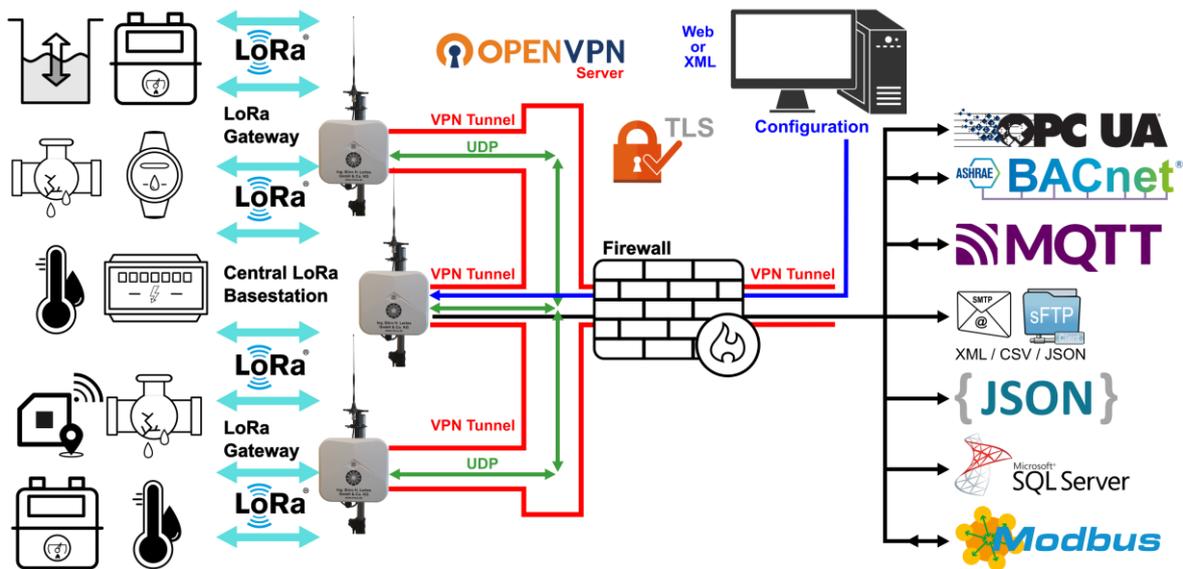
LoRa-Basestation / LoRaWAN to X Multi Protocol Gateway

LoRa Basestation
LoRaWAN to X Multi Protocol Gateway

DSGVO + ISO 27001 compliant ✓

Firmware 6.14.x, january 2026

Available for

RmCU V 4.0 DIN Rail	RmCU V 4.5 DIN Rail	MiDASS V4.0 Allround Indoor / Outdoor	vRmCU virtual machine/physical Linux computer

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LoRa-Basestation / LoRaWAN to X Multi Protocol Gateway

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LoRa-Basestation / LoRaWAN to X Multi Protocol Gateway

1   System description

The LoRa-Basestation is an extension of the existing MiDASS / RmCU concept to connect consumption meters and smart city sensors with LoRaWAN interface to higher-level portals such as energy management systems.

Our LoRa-Basestations and LoRa-Gateways can be used to build self sufficient LoRa-Networks that do not require an internet cloud server.
LoRaWAN end devices class A (sensors such as water meters) and class C (actuators such as switches) are supported.

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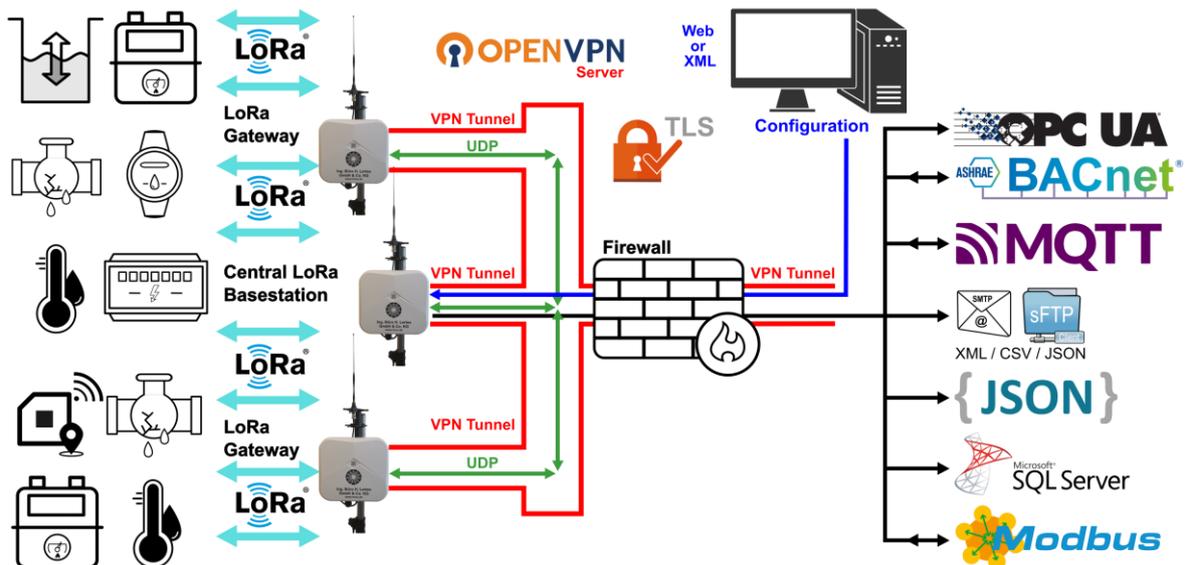
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Possible application scenarios:

- Consumption data acquisition in sub meter and ISO 50001 Environment (electricity, water, district or long distance heating, cooling, gas)

- Data acquisition in buildings for smart building and facility management

- Smart city sensor technology (e.g. parking lot monitoring, mousetrap and humidity sensors)

- Control of actuators (door openers, setpoints, pump controllers, heating thermostats, etc.)

- PTB- A 50.7 compliant power metering

The LoRa data protocols are received by the LoRa-Gateways and decoded by the **central** LoRa-Basestation, which contains the Network- and Application-Server, and made available via the standard interfaces XML / CSV (freely configurable), BACnet, MQTT, JSON, OPC UA or Modbus, known from RmCU / MiDASS.

There are no monthly administration costs for the sensors or costs per delivered data point.

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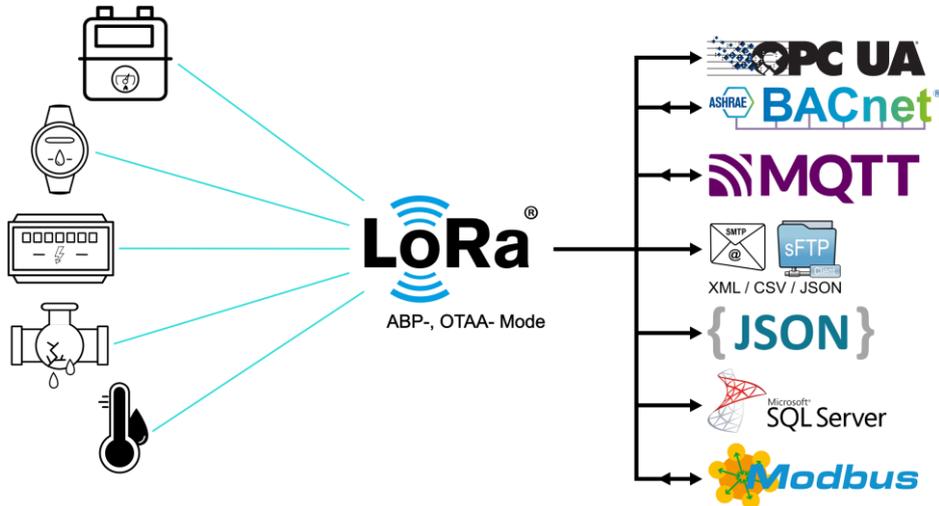**Fax: +49 6142 406873**
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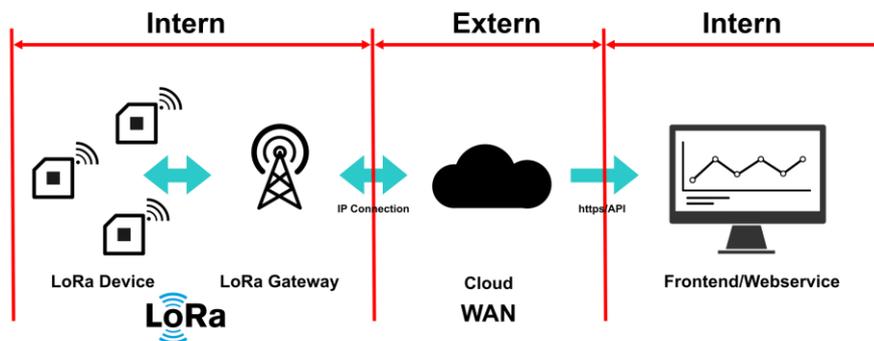
1.1 Basic system structure

The LoRa-Gateways fit into the existing MiDASS / RmCU V 4.0 concept and also enable the expansion of existing RmCU / MiDASS installations to a large LoRa-Network.

Several LoRa-Gateways can be combined via a **central** LoRa-Basestation, which contains the Network- and Application-Server, in order to collect data over a wide area.

The integrated Network- and Application-Server (private LoRaWAN-Network) replaces the internet cloud connection required in standard LoRaWAN-systems.
The collected data remain "confidential" in the sense of the DSGVO in your own IP network and there are no operating costs for sensor management or decoding of the measured values.
At the same time, the system supports bidirectional communication, i.e. commands can also be sent to the LoRaWAN end devices via the **central** LoRa-Basestation.

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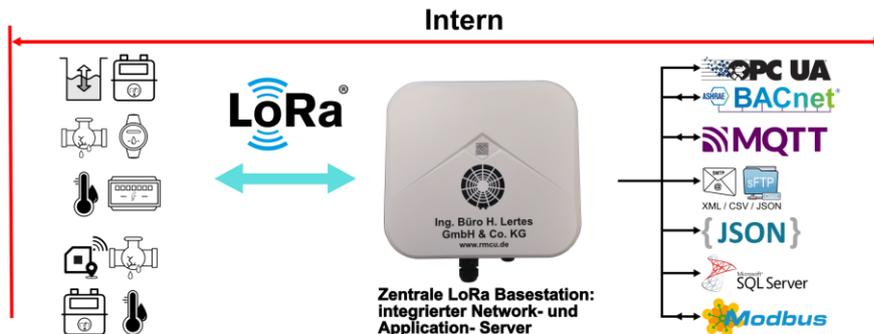
LoRa-Basestation / LoRaWAN to X Multi Protocol Gateway

1.2 Single LoRa-Basestation

The Single LoRa-Basestation consists of a **central** LoRa-Basestation with an integrated LoRaWAN Network- and Application-Server.
It is suitable for data acquisition in buildings / properties and smaller industrial complexes.
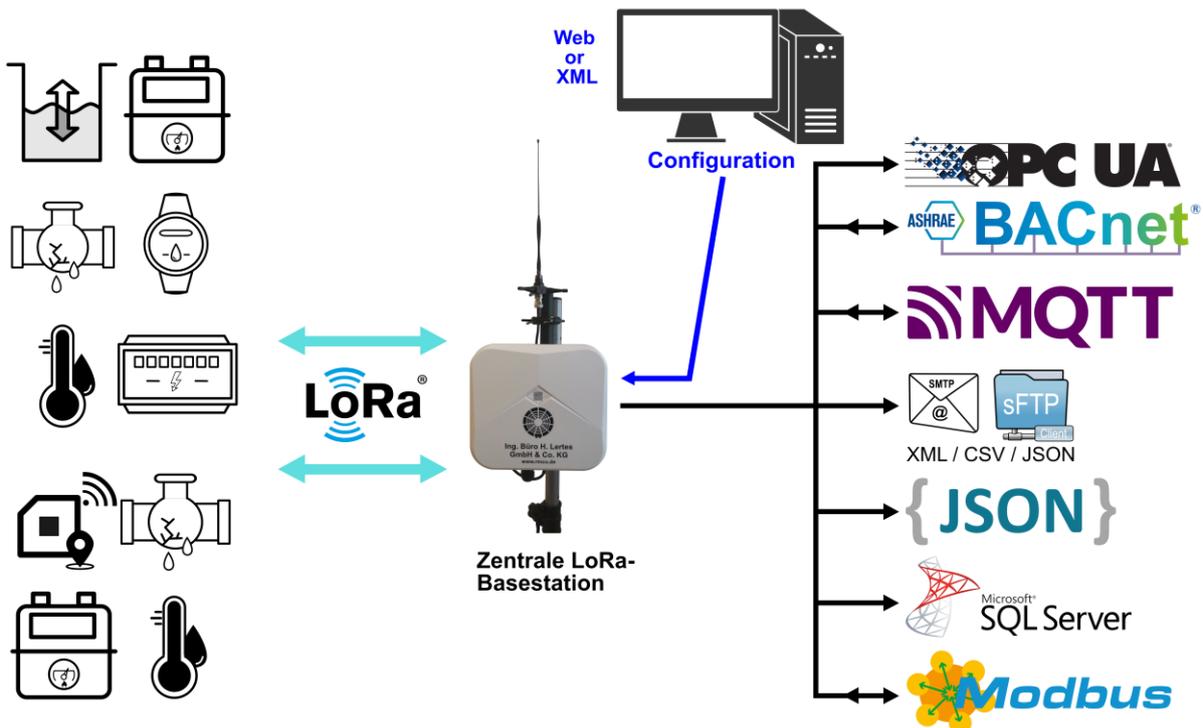
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The following figure shows an exemplary setup of a single LoRa-Basestation in the case of submetering.
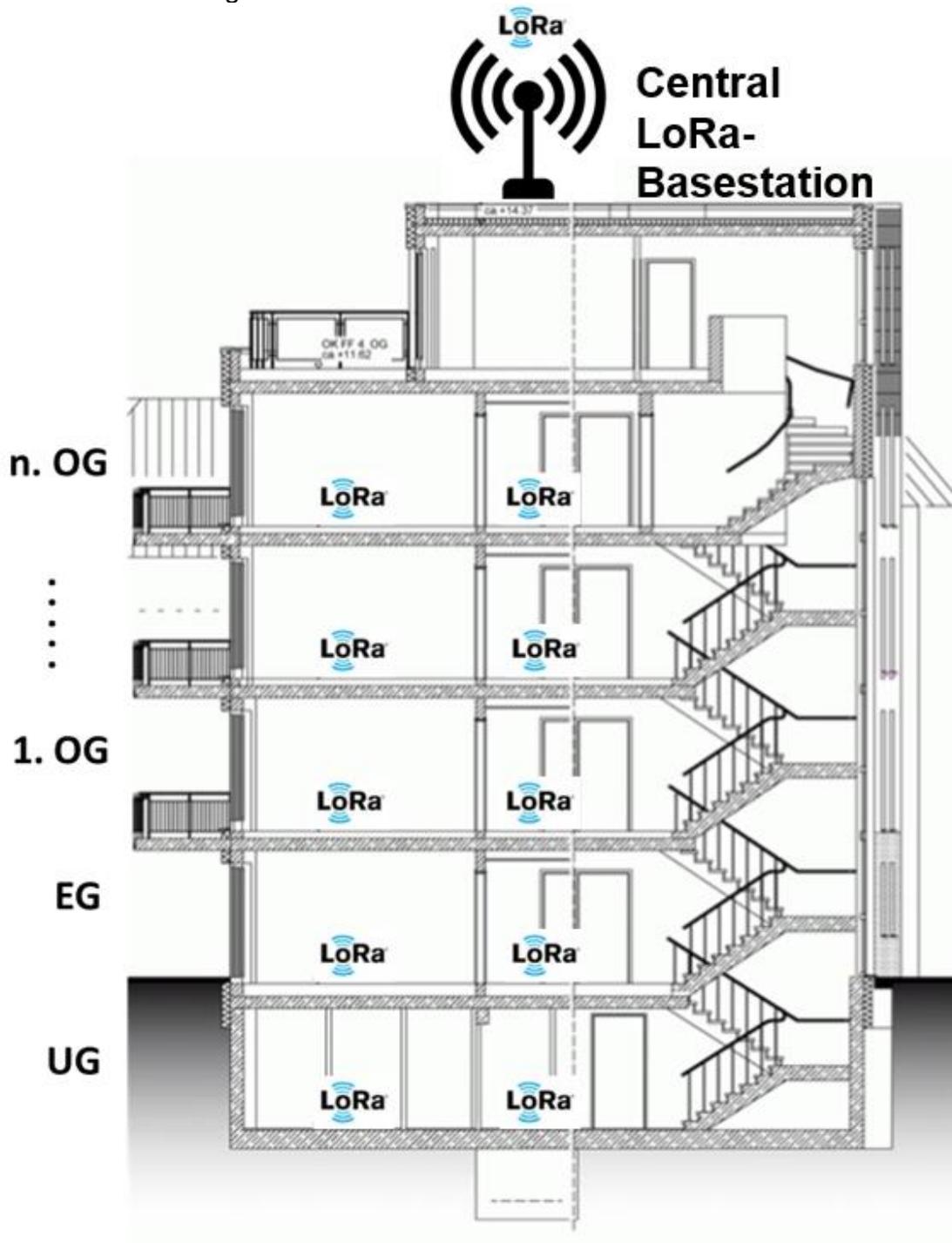
With a **central** LoRa-Basestation, the energy data of all sensors and consumption meters within the building are received, processed and made available for further processing via the various interfaces.

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1.3 Small LoRa-Network (Central LoRa-Basestation + LoRa-Gateways)

A small LoRa-Network consists of a **central** LoRa-Basestation and a small number of LoRa-Gateways.
The LoRa-Gateways, which act as additional receivers / senders, can be used to equip larger areas, such as terraced housing estates or industrial areas, with a comprehensive LoRa-Network.
The communication with the sensors is bidirectional across all stations.
The LoRa-Gateways are connected to the Central LoRa-Basestation via LAN or LTE modem. In terms of the german BSI basic protection, the IP connection can be TLS encrypted via OpenVPN.
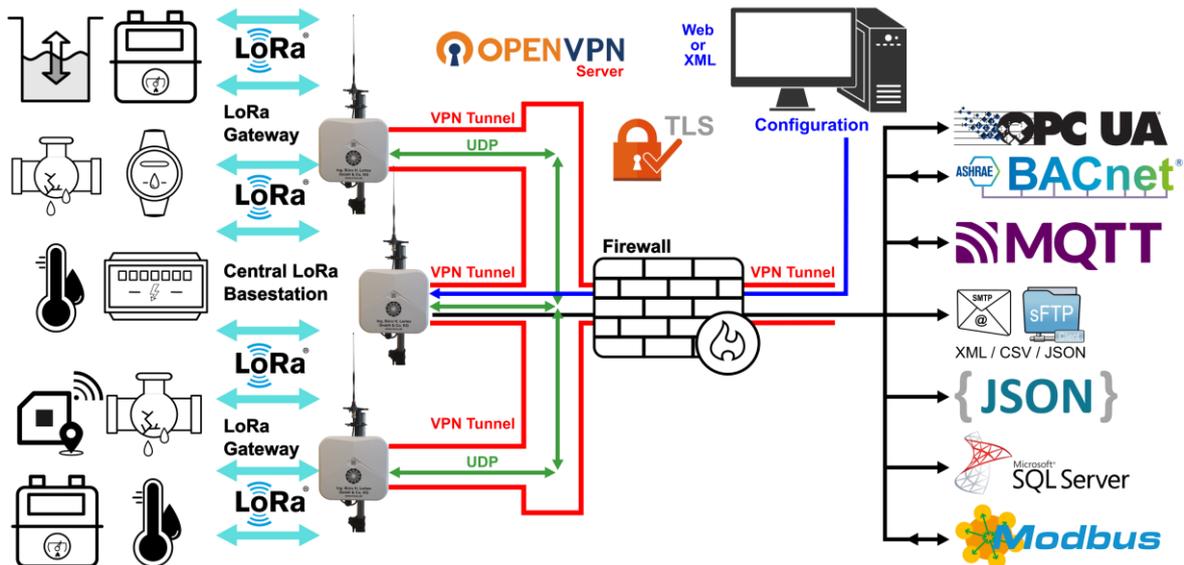
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The following figure shows an exemplary setup of a LoRa-Network for monitoring a local heating network. The heat meters are located in the basement, about 1 *m* below ground level.

Colour	Meaning	Measurement Range [*dbm*]
Green	high strength Signal	up to -111
Yellow	good Signal	from -111 up to -116
Orange	Signal is OK	from -116 up to -121
Red	bad Signal	from -121
Black	no Signal	n/a

Connection of Heat Meters (located in basement)

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1.4 Medium LoRa-Network (RmCU as Network- and Application-Server in the data center + X LoRa-Gteways)

A medium LoRa-Network for covering a larger area consists of a Network- and Application-Server and several LoRa-Gateways.
The Network- and Application-Server can be operated here in terms of DSGVO and ISO 27001 in your data center on a specially adapted RmCU, so that several hundred sensors or consumption meters can be managed.

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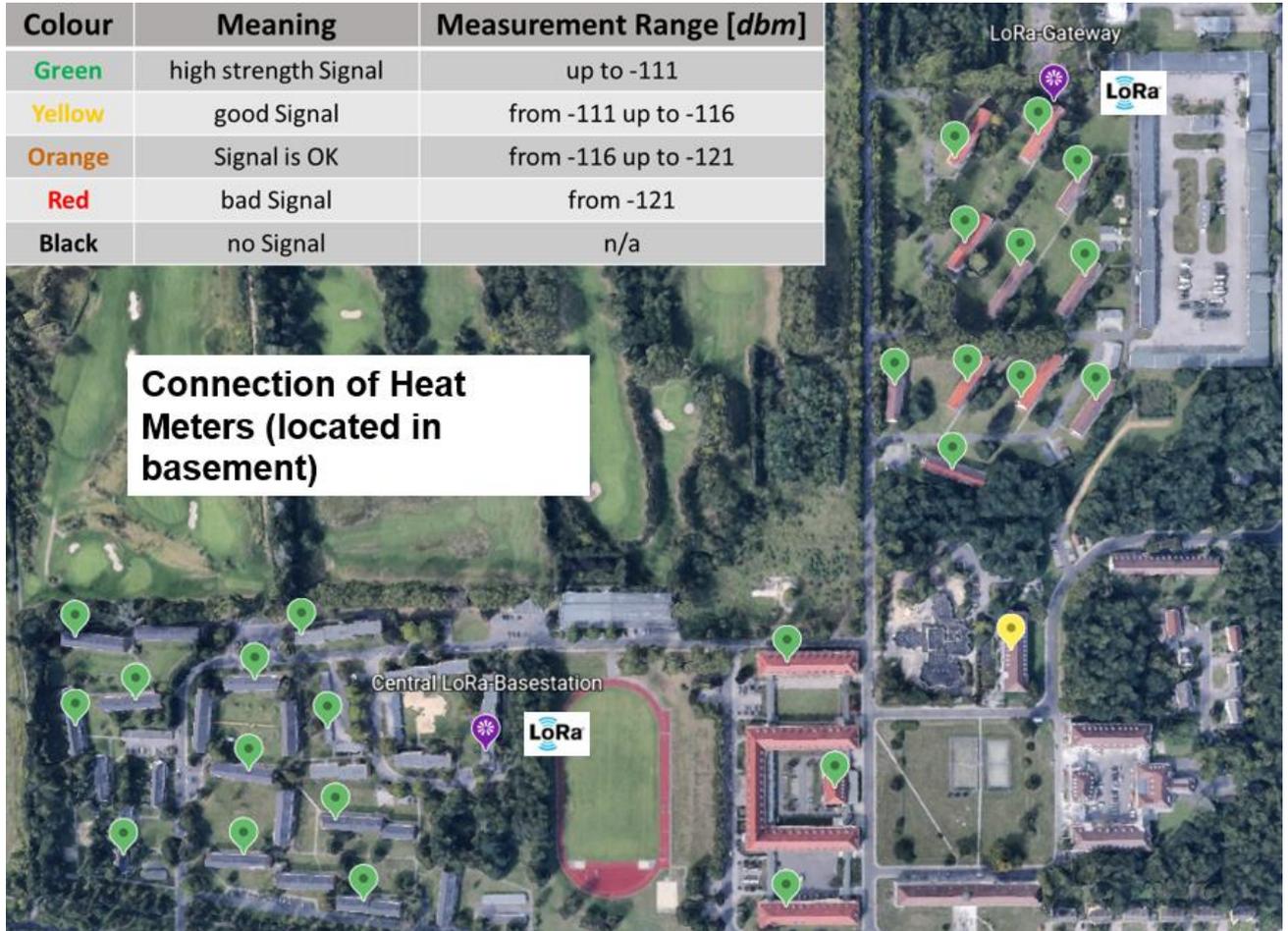Fax: **+49 6142 406873**
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The following figure shows an exemplary setup of a medium sized LoRa-Network and the results of the random radio measurement we performed for it.
In this case, it is about the connection of 1500 water meters in the basement.

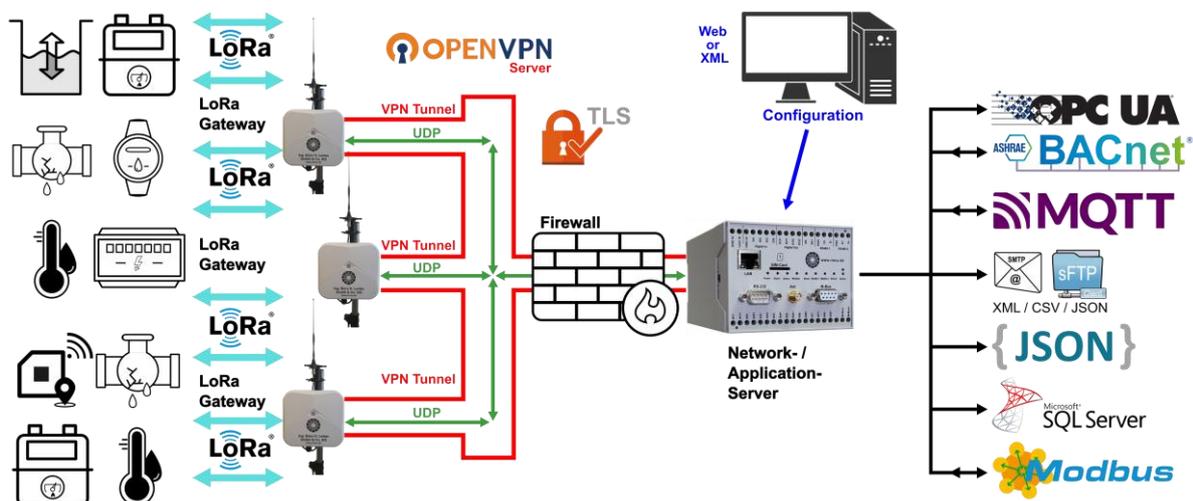| Colour	Meaning	Measurement Range [*dbm*]
Green	high strength Signal	up to -111
Yellow	good Signal	from -111 up to -116
Orange	Signal is OK	from -116 up to -121
Red	bad Signal	from -121
Black	no Signal	n/a

Connection of Water Meters (located in basement) approx. 1500 pcs.

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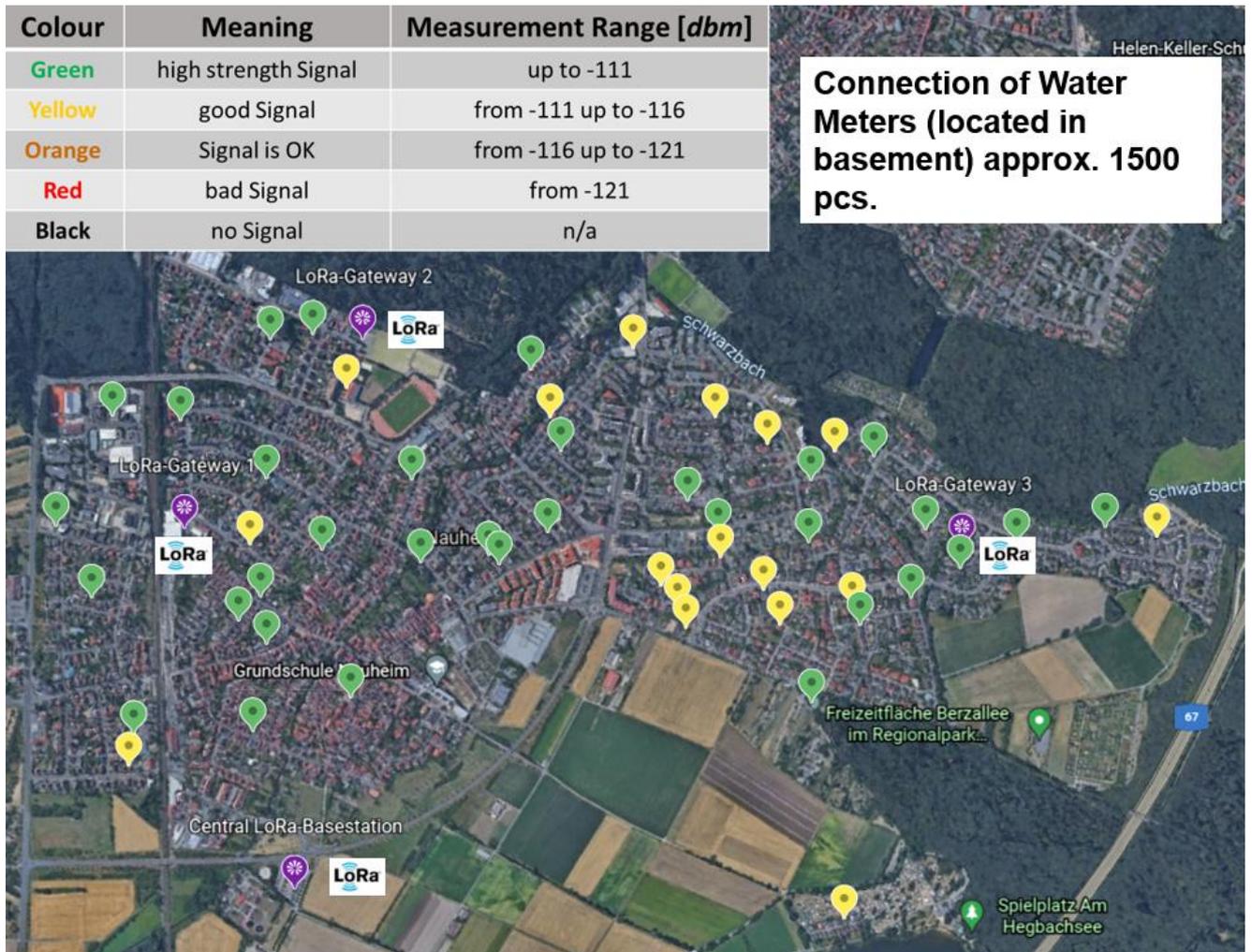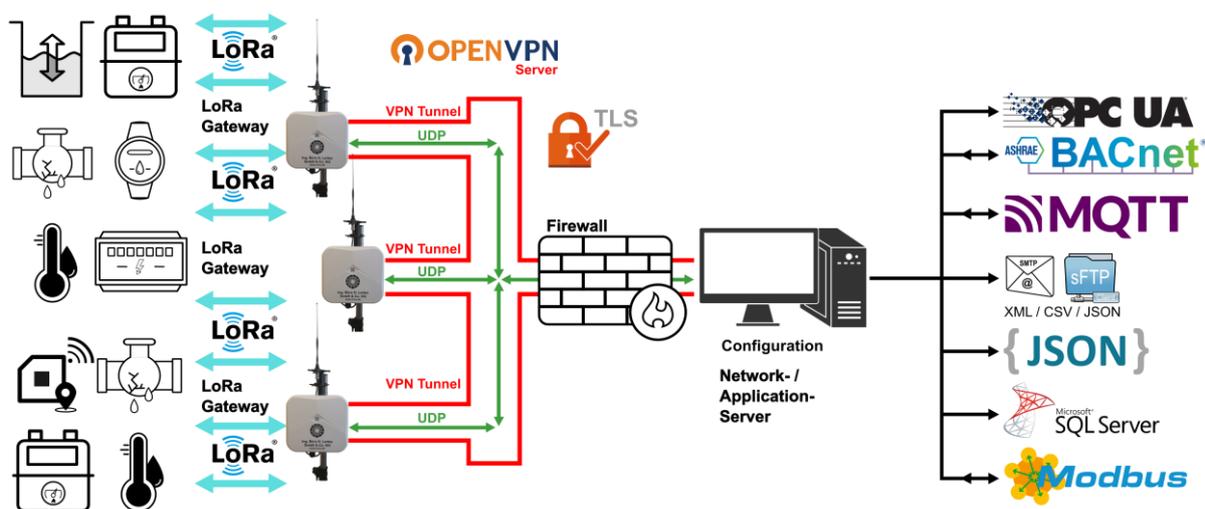### 1.5 Large LoRa-Network (Linux computer as Network- and Application-Server in data center+ X LoRa-Gateways)

For large LoRa-Networks connecting several thousand sensors or consumption meters, the Network- and Application-Server in your data center can also be operated on a Linux computer.

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The following figure shows an exemplary network structure of a large LoRa-Network. It shows a large number of LoRa gateways that are networked via a central Network- and Application-Server on a Linux computer in a data center and collect the data from several thousand sensors and consumption meters.

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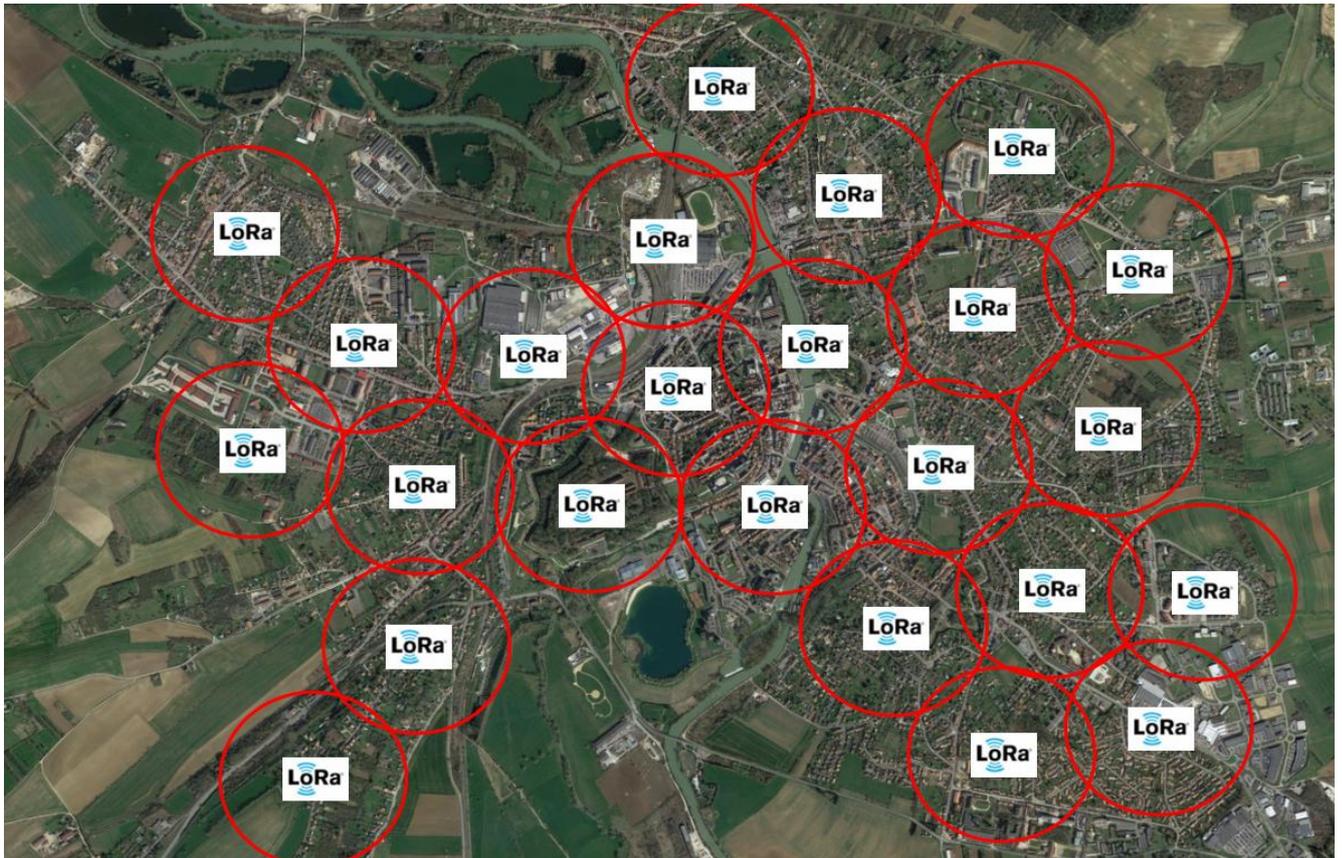
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1.6 LoRaWAN-Network with multiple Application-Servers (seperation of end users)

Our new LoRaWAN system offers the possibility to operate the central LoRaWAN -
Network-Server with multiple Application-Servers.
The individual LoRaWAN-Sensors are assigned to the different application servers,
i.e. the end users.
Each end user can have its own interface for the connection to its head-end system.
In accordance with ISO 27001 and DSGVO, the operator of the LoRaWAN-Network
has sovereignty over the network operation and the connected LoRaWAN-Sensors,
while the end users are provided with the data for further processing.
This feature enables the owner of the LoRaWAN-Network to make its
infrastructure to third parties.

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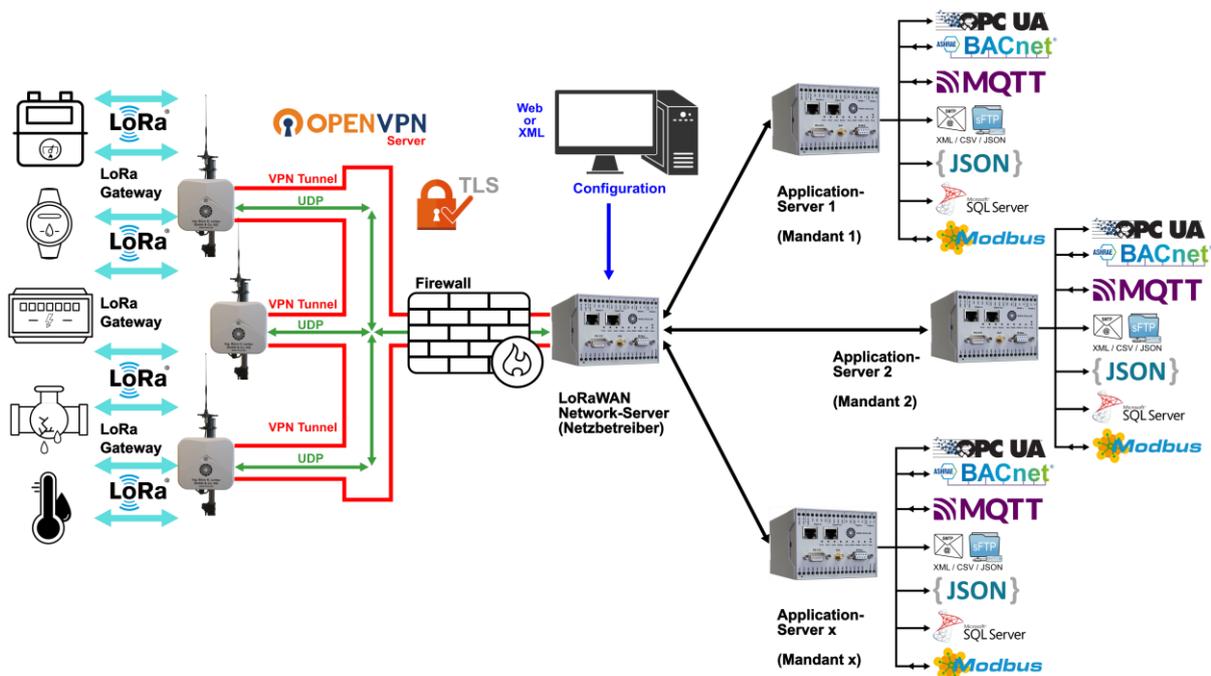
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Depending on the number of connected sensors, the LoRaWAN-Network-Server can also be operated on a Linux computer.

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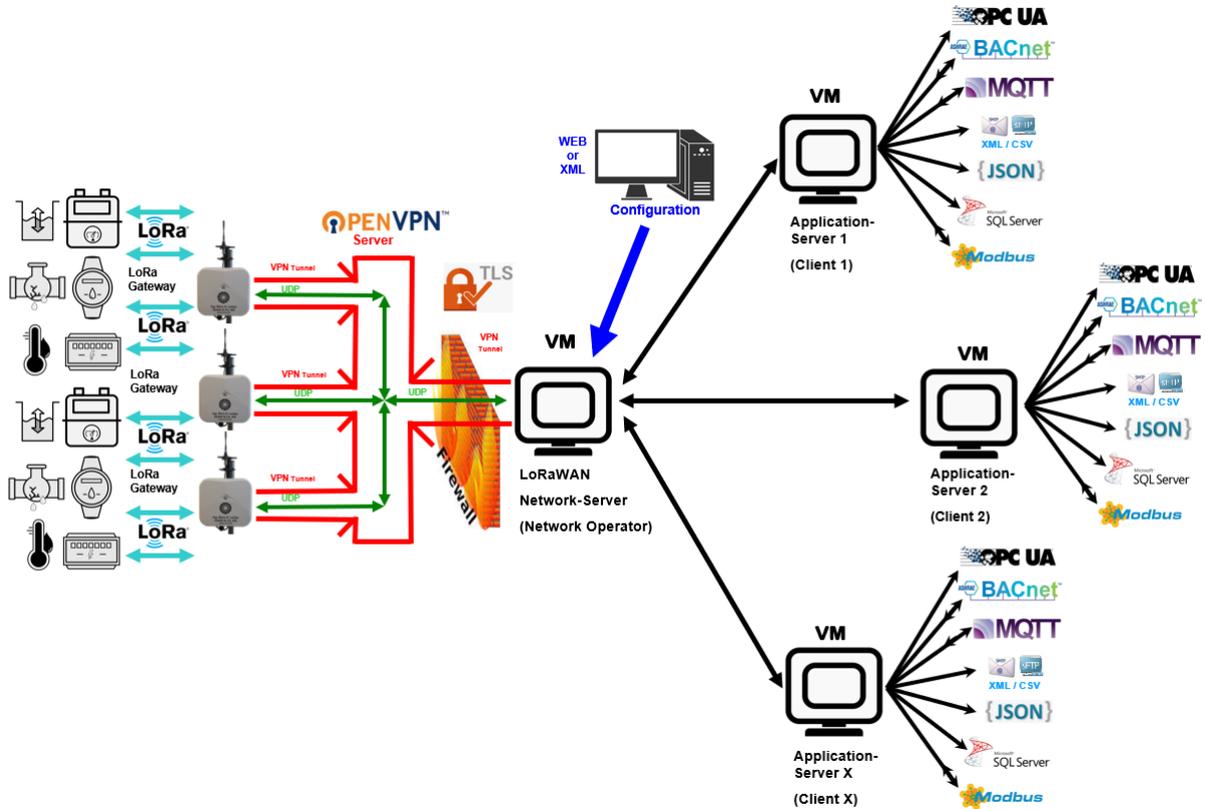
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1.7 PTB– A 50.7 compliant Power Metering

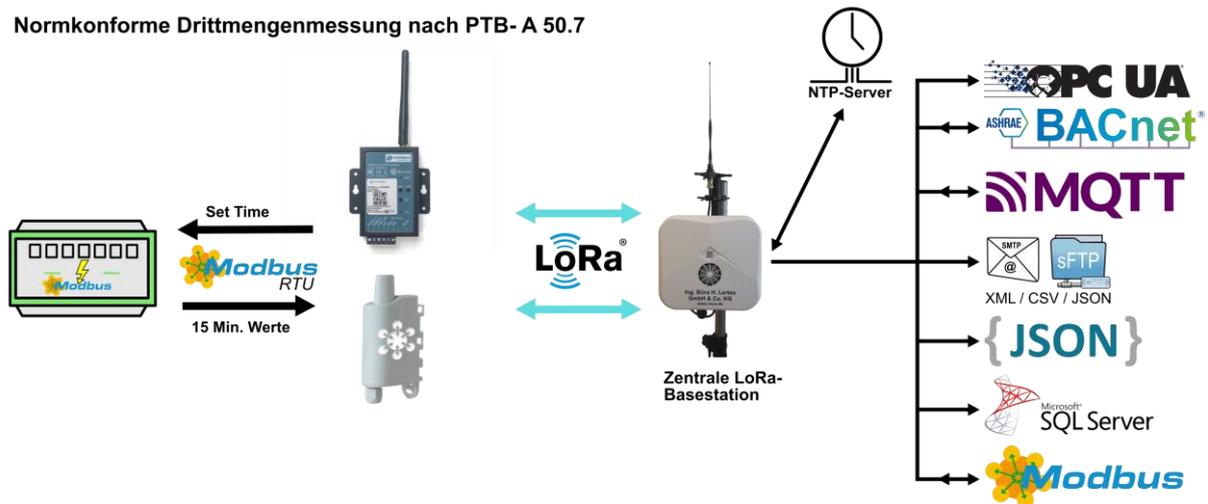The system provides 15 min values with pinpoint accuracy in accordance with PTB A 50.7 and automatically performs the time synchronization of the consumption meters required by law.

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1.8 IP Connection

The IP connection to the higher-level system and the UDP-based communication of
the LoRa-Gateways with the Central LoRa-Basestation takes place via LAN or an
integrated LTE modem.
A 450 MHz and a 5G variant of the modem are available.
Optionally, the Central LoRa-Basestation and LoRa-Gateways can be connected via
an OpenVPN server with TLS encryption.
This enables communication via mobile networks or the Internet to be End-to End-
secured in accordance with the german BSI basic protection.

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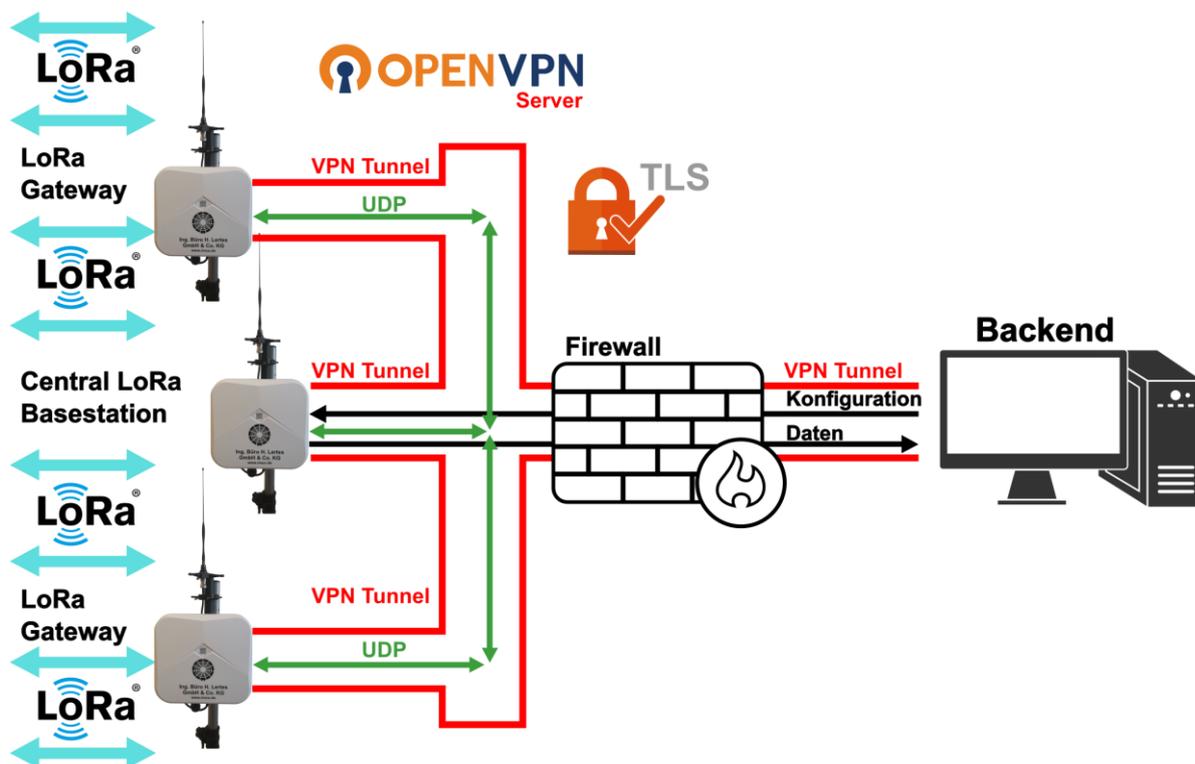
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2   LoRa Features

The LoRa receiver fits into the modular RmCU / MiDASS V 4.0 concept and can be combined with other fieldbus protocols such as wireless M-Bus, M-Bus, Modbus RTU / TCP, BACnet and 1-Wire.

2.1 LoRa Hardware / Protocol Stack

- LoRaWAN transceiver with 868 MHz, 8 Channels

- Supports LoRaWAN class A and class B endpoints

- Activation Modes:

  ➢ ABP (Activation By Personalization) Mode (DevAddr / NwkSKey / AppSKey)

  ➢ OTAA (Over-The-Air Activation) Mode (AppEUI / DevEUI / AppKey)

- Decryption of the uplink message of the end devices, parsing of the payload

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2.2 Central LoRa-Basestation

Integrated LoRaWAN Network-Server

The management of the LoRa sensors incl. the necessary keys is done manually via the integrated web interface (German/English) or automated via an XML or JSON interface.

All quality parameters recorded for the LoRa radio system are logged and displayed.

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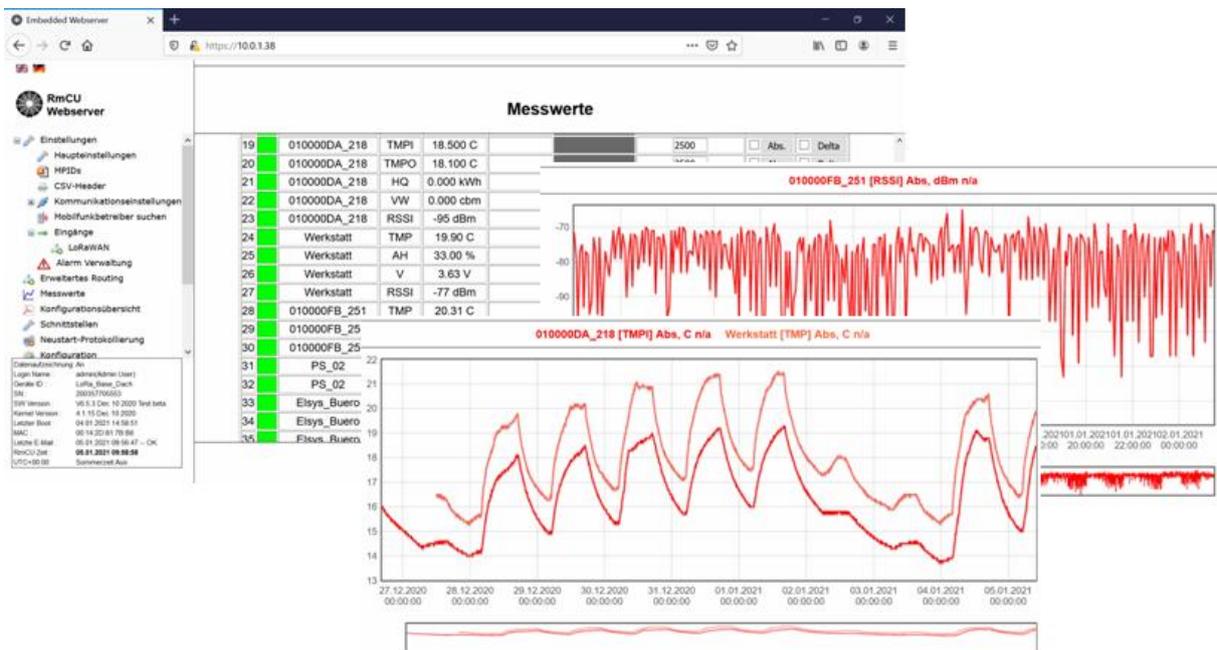**Email: sales@lertes.de**
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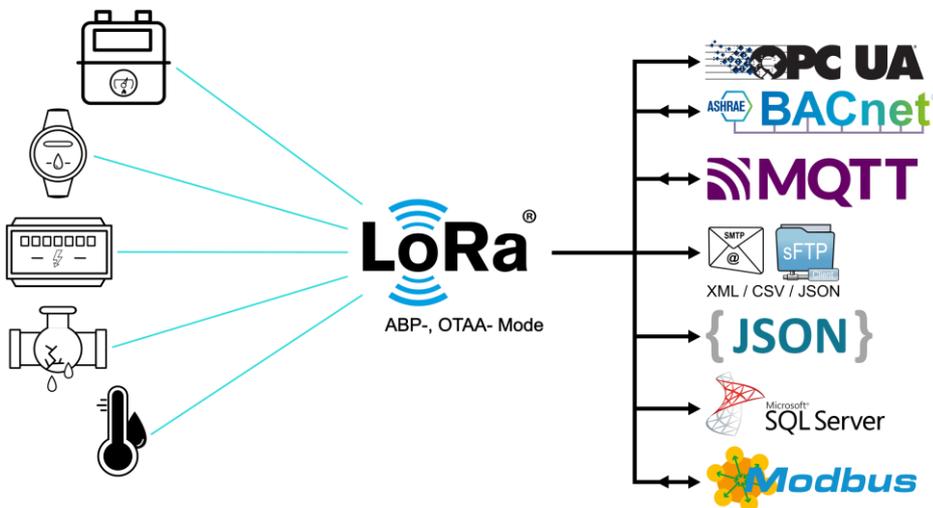
Integrated Application-Server

The recorded measured values can be mapped to data points, depending on the sensor system.
Current and historical measured values are displayed via the measured value table integrated in the web interface (german/english).

The following interfaces are available for connection to higher-level systems:

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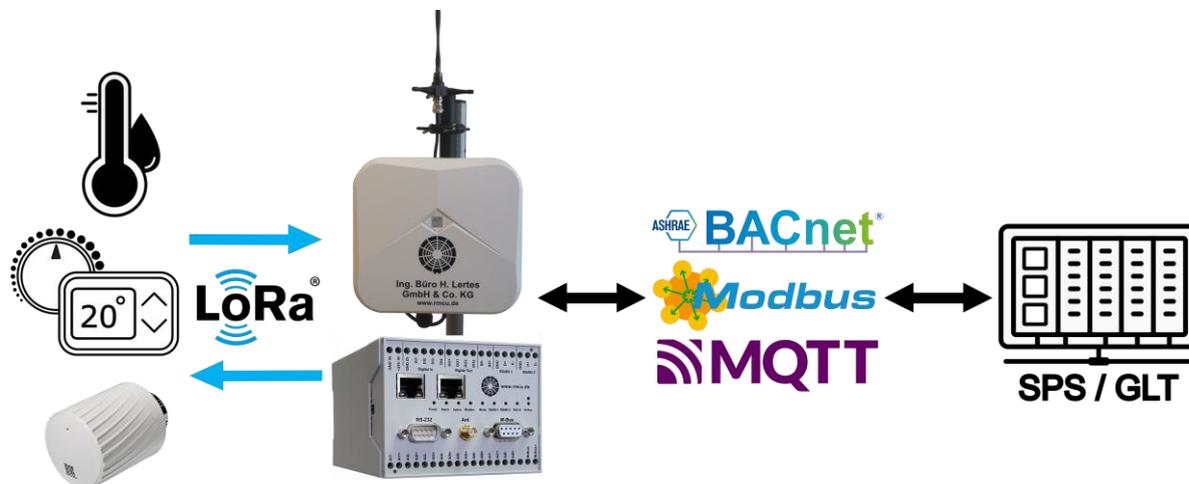### 2.3 Remote configuration via LoRa-Downlink

It is possible to remotely configure sensors through the system via LoRa-Downlink. This enables the individual adjustment of various parameters on a sensor-by-sensor basis. Configurable settings include, for example, the transmission cycle and the data to be transmitted.

2.4 Bi-directional connection

The system is bidirectional and allows for the transmission of control commands and set points to actuator and controllers. This enables, for example, pumps to be switched, ventilation to be regulated and heating thermostats to be controlled.

The system also communicates directly with the PLC/BMS (Programmable Logic Controller / Building Management System). In contrast to conventional LoRaWAN systems, the data remains within the local IP network.

Switching can be realized through the interfaces BACnet, Modbus or MQTT.

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3   Designs

LoRa-Gateways and the Central LoRa-Basestation can each be supplied as RmCU DIN Rail, MiDASS Indoor or MiDASS Outdoor. The scope of functions is identical.

	RmCU V4.0 DIN Rail	**MiDASS Allround Indoor/Outdoor**	**MiDASS Outdoor**
General	• **Prozessor Cortex A-5, 400 MHz** • **128 MB Flash, 4 GB Data-Storage (optional up to 16 GB possible)** • **128 MB RAM** • **Hardware-Watchdog** • **Real Time Clock – RTC (Gold-Cap buffered)**		
Housing	**DIN Rail Housing 100x75x110 mm**	**Wall-mounted housing 255x275x92 mm**	**Wall-mounted housing 300x220x50 mm**
Protection class	**IP20**	**IP66**	**IP65 bis IP67**
Temperature-Range	**0 bis +60 °C**	**-20 ... +60 °C**	**-30 ... +70 °C**
Pole Mounting possible	**No**	**Yes**	**Yes**
Additional Casing available	**Yes**	**No**	**No**
Power supply	**24 V DC**	**230V AC / 12 V DC**	**230V AC / 12 V DC**
Power consumption	**typ.: 5 Watt** **max.: 10 Watt**	**typ.: 5 Watt** **max.: 10 Watt**	**typ.: 5 Watt** **max.: 10 Watt**

External Ports	• **1x Antenna cabel LoRa (SMA-socket)**
	 • **1x Antenna cabel LTE (SMA-socket)**
	 • **1x 9-pin D-SUB-connector**
	 • **1x 9-pin D-SUB-Socket**
	 • **Choice of:**
	  ➢ **2x RJ45**
	  ➢ **1x RJ45 and LTE Modem**
	 • **Additional Ports over screw**
		• **1x Antenna cabel-LoRa (N-connector)**
		 • **1x Antenna cabel-LTE (N-connector)**
		 • **1x Ethernet-Interface RJ45**
		 • **1x screw fitting M16**
			• **1x Antenna cabel-LoRa (N-connector)**
			 • **1x Antenna cabel-LTE (N-connector)**
			 • **1x Ethernet-Interface RJ45**
			 • **1x screw fitting M16**

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	terminals		

3.1 MiDASS V 4.0: Allround Indoor / Outdoor IP66

- Wall-mounted housings (W = 255 mm, H = 275 mm, D = 92 mm)

- Protection class IP66

  - Temperature range -20…+60 °C

- Port-Slots:
  - 3x Slot for Antenna cable fitting
  - 1x Slot for Ethernet port RJ45
  - 1x Slot for Cable gland M16

- 230 V power supply, integrated (90-250 V AC, 47 up to 440 Hz)

- Connection via screw terminals (max. 2,5 qmm)

- Power consumption type 5 W, max. 10 W (depending on equipment)

- Optionally 12 V DC supply

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3.2 MiDASS V 4.0: Outdoor wall-mounted housing IP65

- Wall-mounted housings (W = 300 mm, H = 220 mm, D = 55 mm)

- Also suitable for pole mounting

- Protection class IP 65

- Temperature range -20 bis +60 °C

- 230 V power supply, integrated (90-260 V AC, 47 up to 63 Hz)

- Connection via screw terminals (max. 2,5 qmm)

- Power consumption type 3 W, max. 6 W (depending on equipment)

- Antenna connection via N socket

- Optional external LAN connector socket

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LoRa-Basestation / LoRaWAN to X Multi Protocol Gateway

- Optionally 12 V DC supply

3.3 RmCU V4.0 DIN Rail

The additional power consumption compared to RmCU DIN Rail is approx. 2 W.
If RmCU is operated as Central LoRa-Basestation or as LoRa-Gateway, a delivery
with analog inputs is not possible.

From a connection of several hundred sensors, we recommend the version with SSD
memory when used as a Central LoRa-Basestation or as a LoRa-Gateway.

Note: For very large projects, with several thousand sensors, our Network- and
Application-Server can also be run on a Linux computer.