Verwendung der sicheren BSI Smart Metering Infrastruktur für Anwendungen aus der Wohnungswirtschaft und gewerbliche Liegenschaften

Christian Freudenmann, Dominik Henneke
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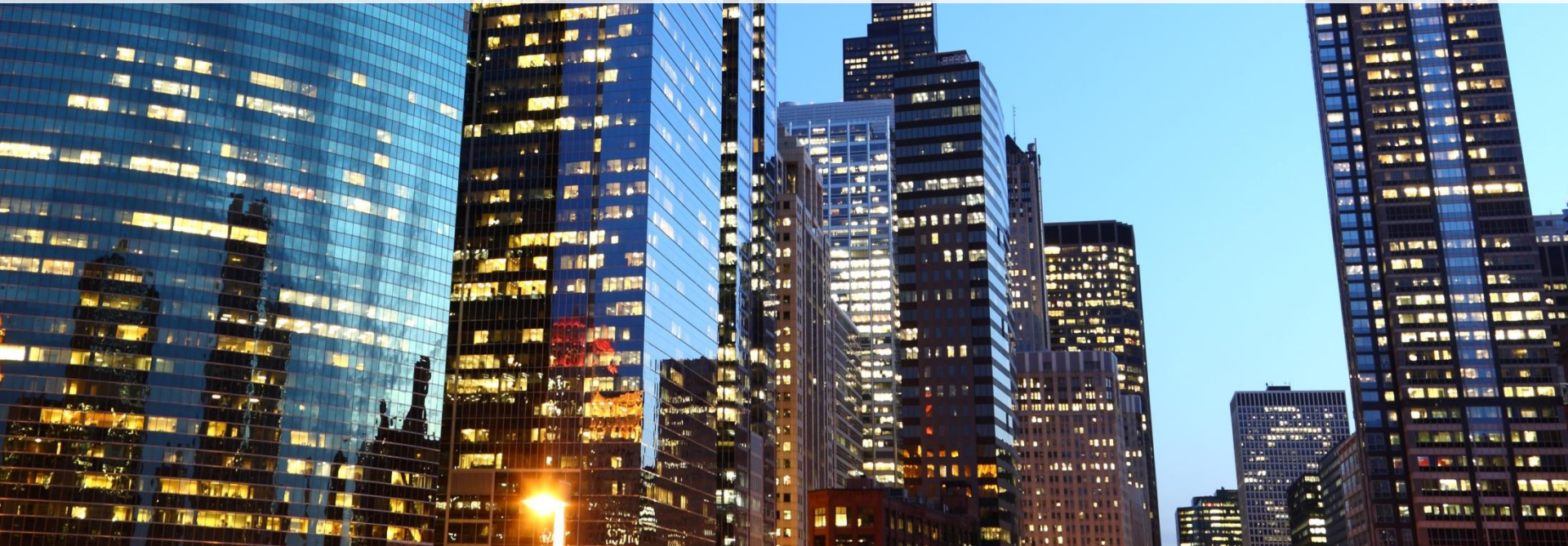
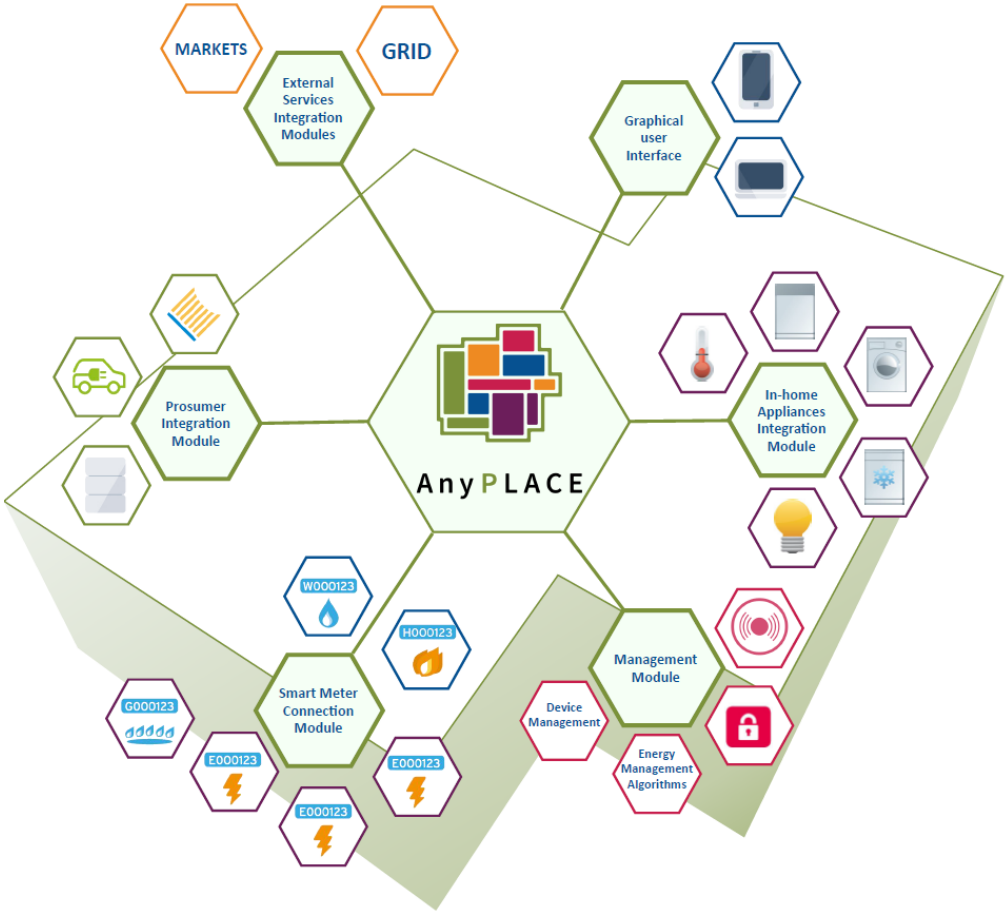


AnyPLACE Project
Overview



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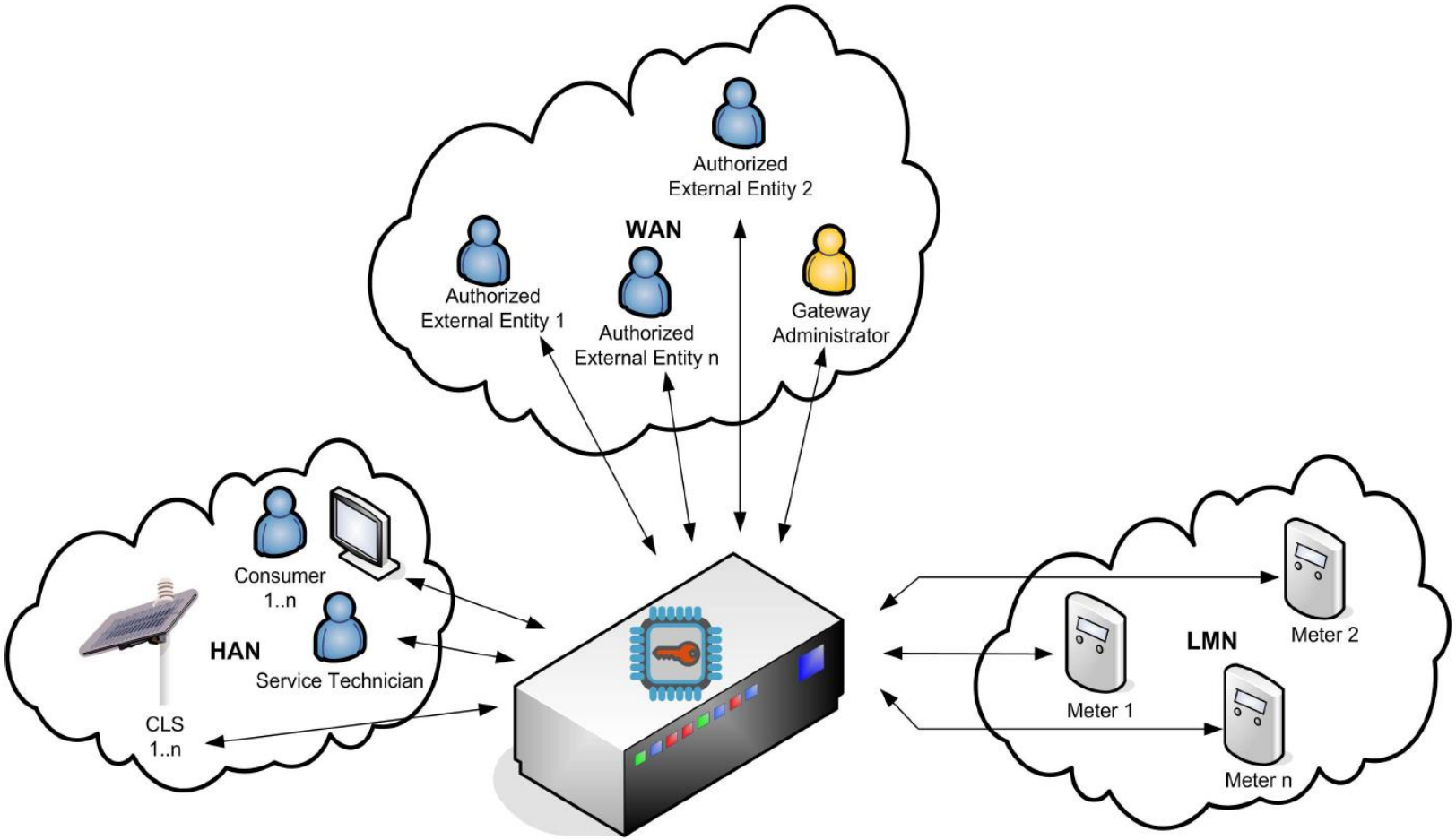
Amending the BSI Smart Metering Infrastructure to Smart Home Applications via the SMGW

Power Plus Communications

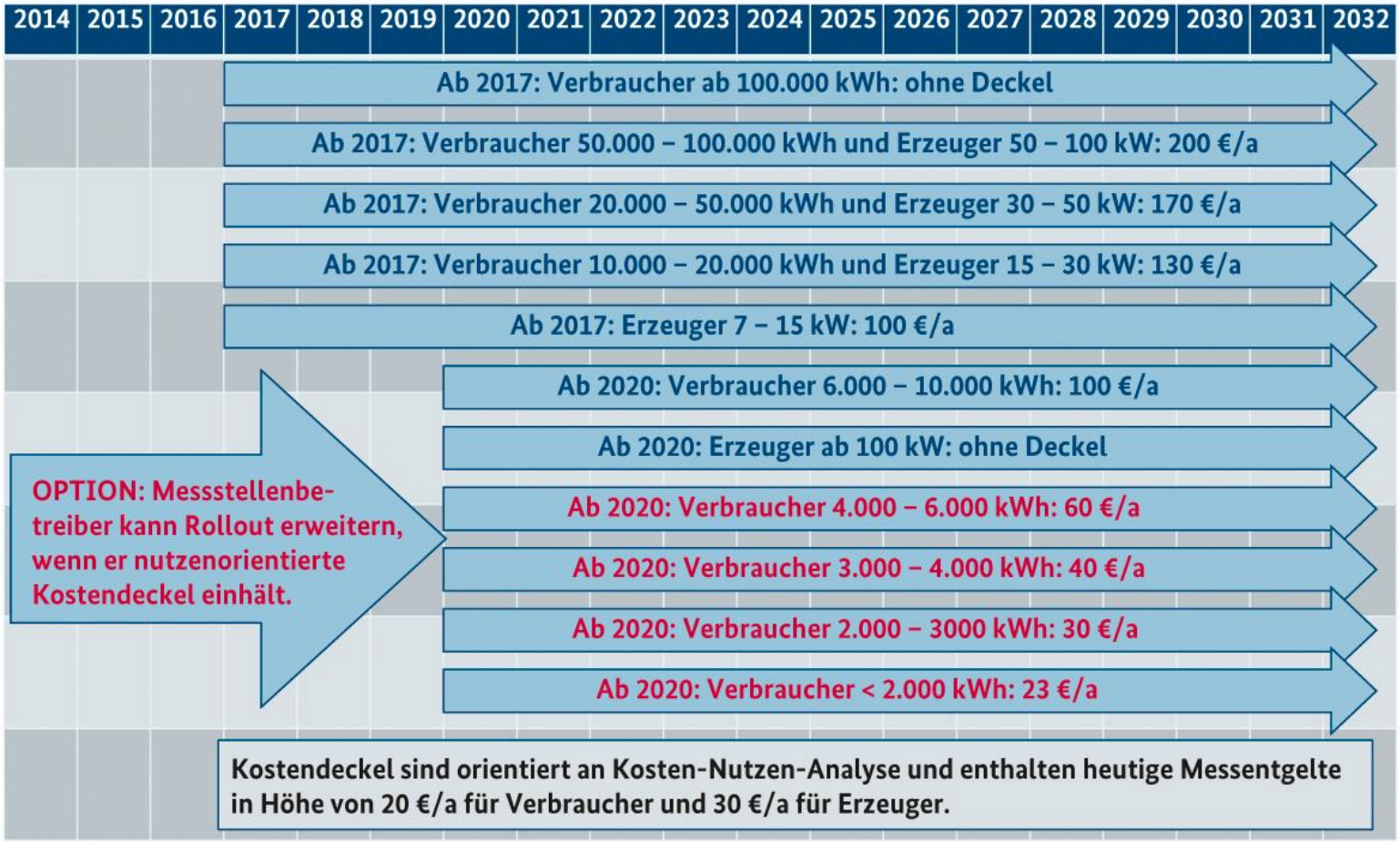
- **BSI Smart Metering Infrastructure**
- **HAN: Three logical interfaces**
- **Connecting Smart Home Systems**
- **Implementation Example**
- **Consumer Interface Binding**
- **CLS Interface Binding**
- **Conclusion & Next Steps**

BSI Smart Metering Infrastructure
Overview



Source: BSI

BSI Smart Metering Infrastructure
Rollout Plan



Source: BMWi

BSI Smart Metering Infrastructure
PPC SMGW Functionalities

The Smart Meter Gateway is developed to be an external communication gateway for communication between end-user devices, Meters and the Wide Area Network.

Major characteristics:

- Enabled to connect several meters of different energies of different households to the same gateway while ensuring data privacy
- End-User interface to enable access to meter data and device information
- Four tariff schemes implemented
- Proxy functionality implemented for secure connection of external entities and controllable local systems (CLS functionality)
- Modularity in WAN communication technologies
- IPv4/IPv6

BSI Smart Metering Infrastructure
Modularity in WAN communication technologies

Power Plus Communications

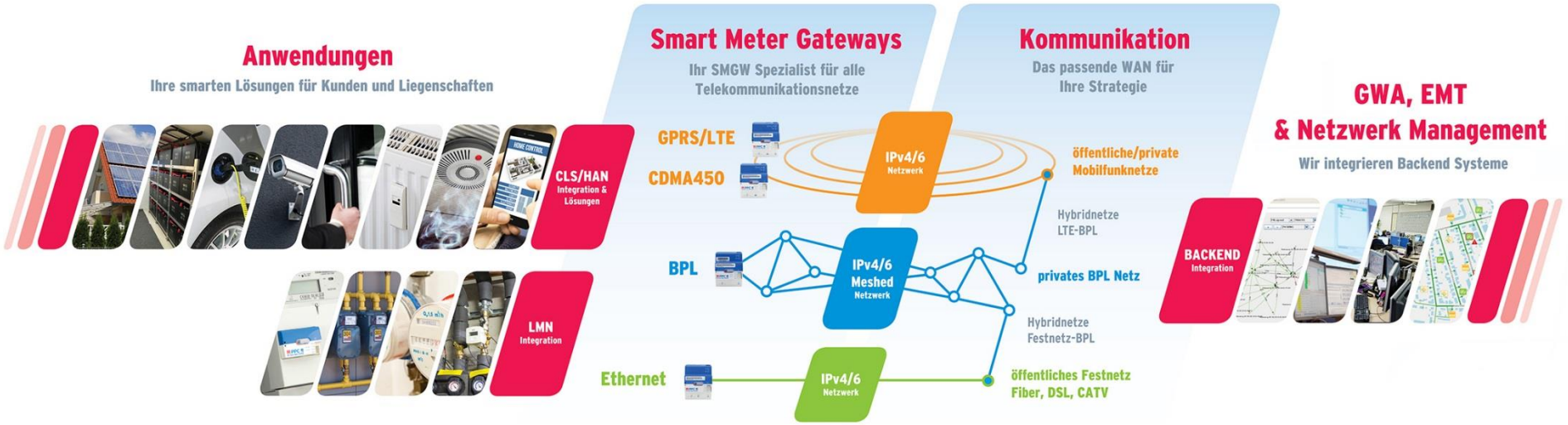
ETH SMGW

CDMA450 SMGW

BPL SMGW

LTE/GPRS SMGW

BSI Smart Metering Infrastructure
Use-Cases



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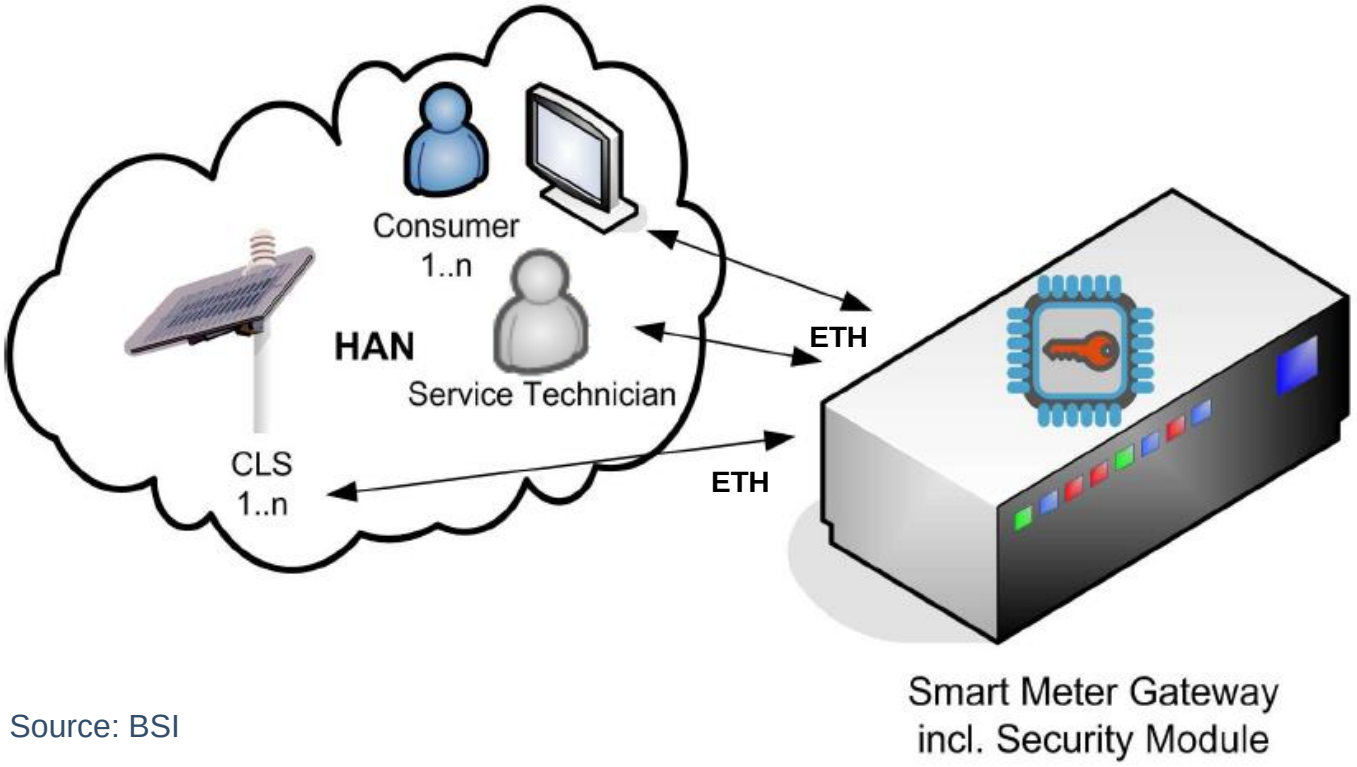
Functionalities of the HAN interface
Overview

HAN - Three logical interfaces:

- Consumer interface (IF_GW_CON)
- Service technician interface (IF_GW_SRV)
- CLS interface (IF_GW_CLS)



Source: BSI

Functionalities of the HAN interface
Consumer interface

HAN - Three logical interfaces:

- **Consumer interface (IF_GW_CON)**
- Service technician interface (IF_GW_SRV)
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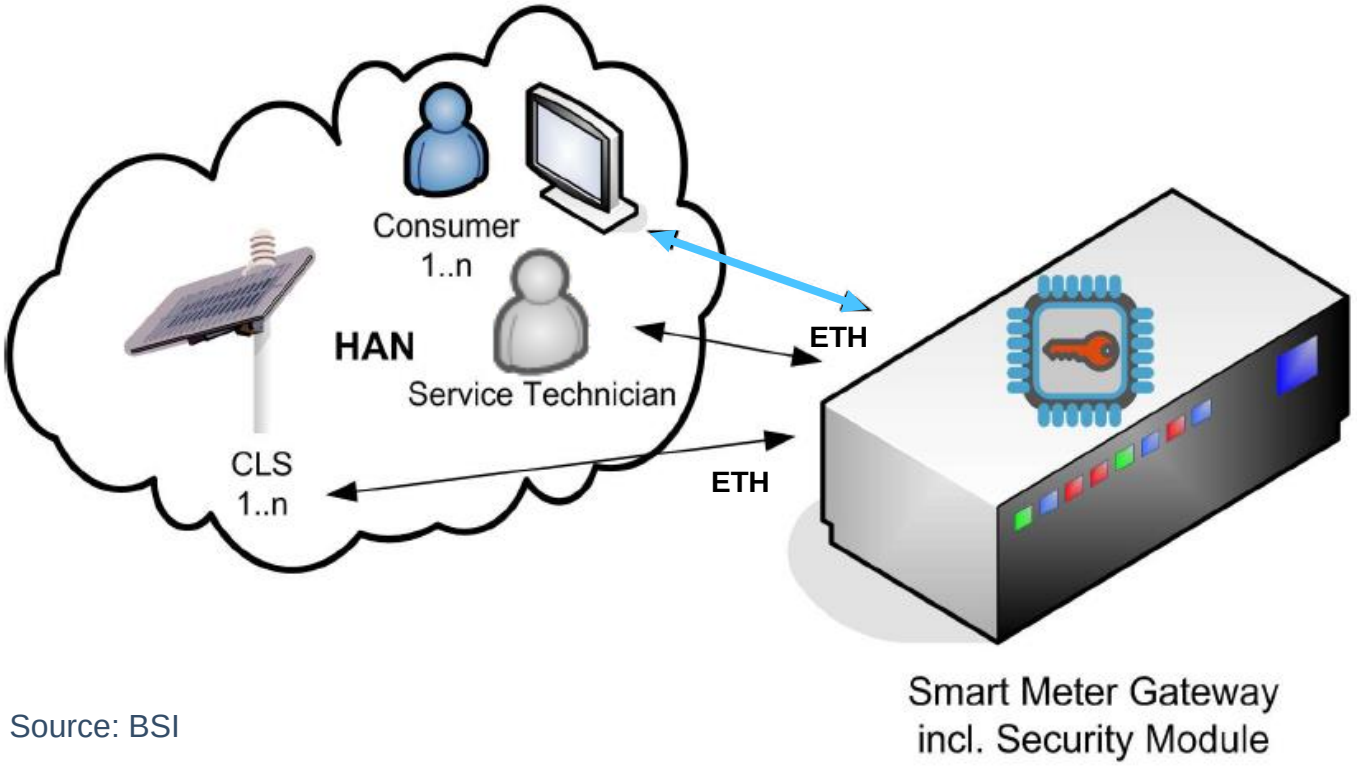
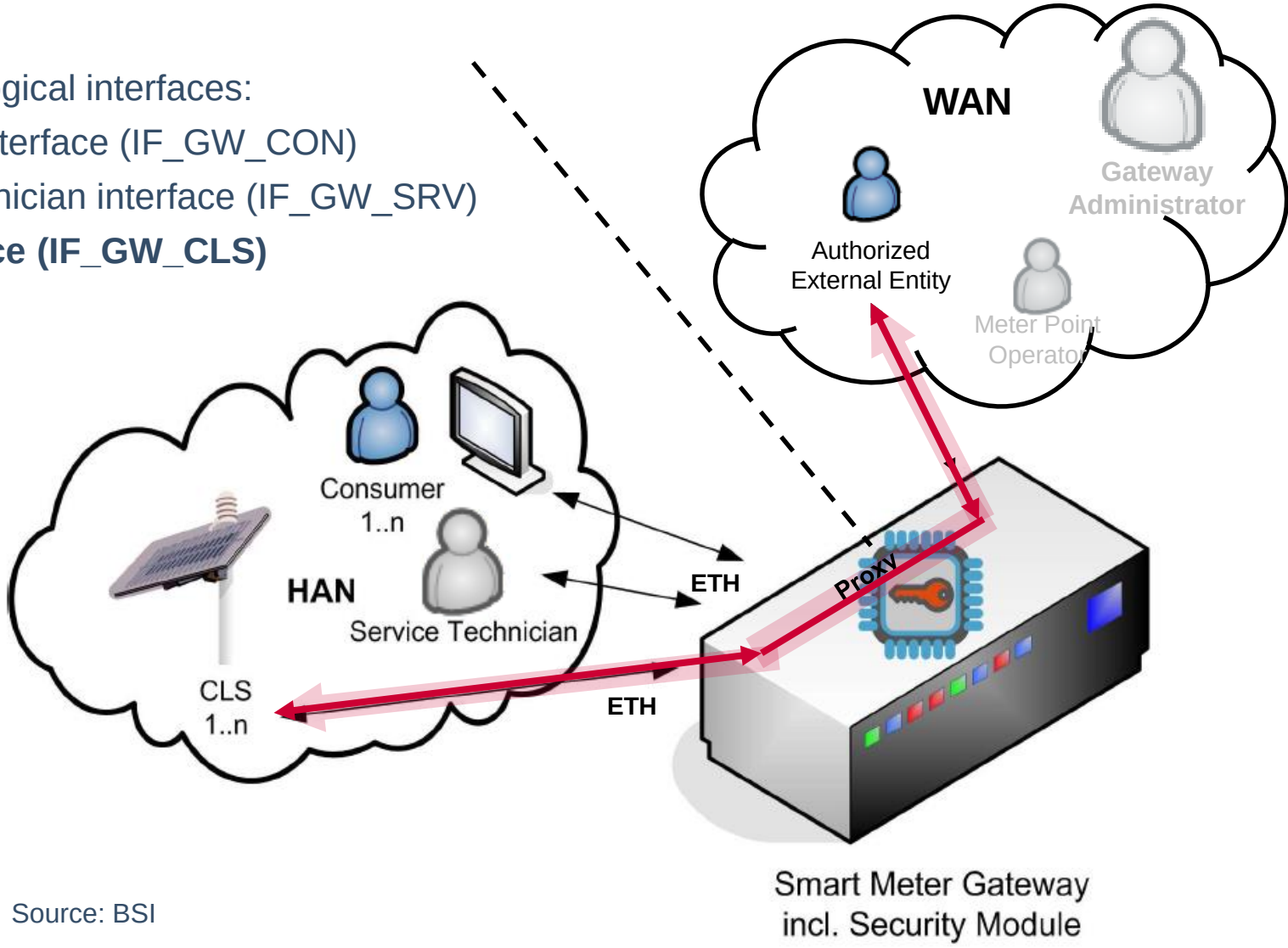


Source: BSI

Functionalities of the HAN interface
CLS Interface

HAN - Three logical interfaces:

- Consumer interface (IF_GW_CON)
- Service technician interface (IF_GW_SRV)
- **CLS interface (IF_GW_CLS)**



Source: BSI

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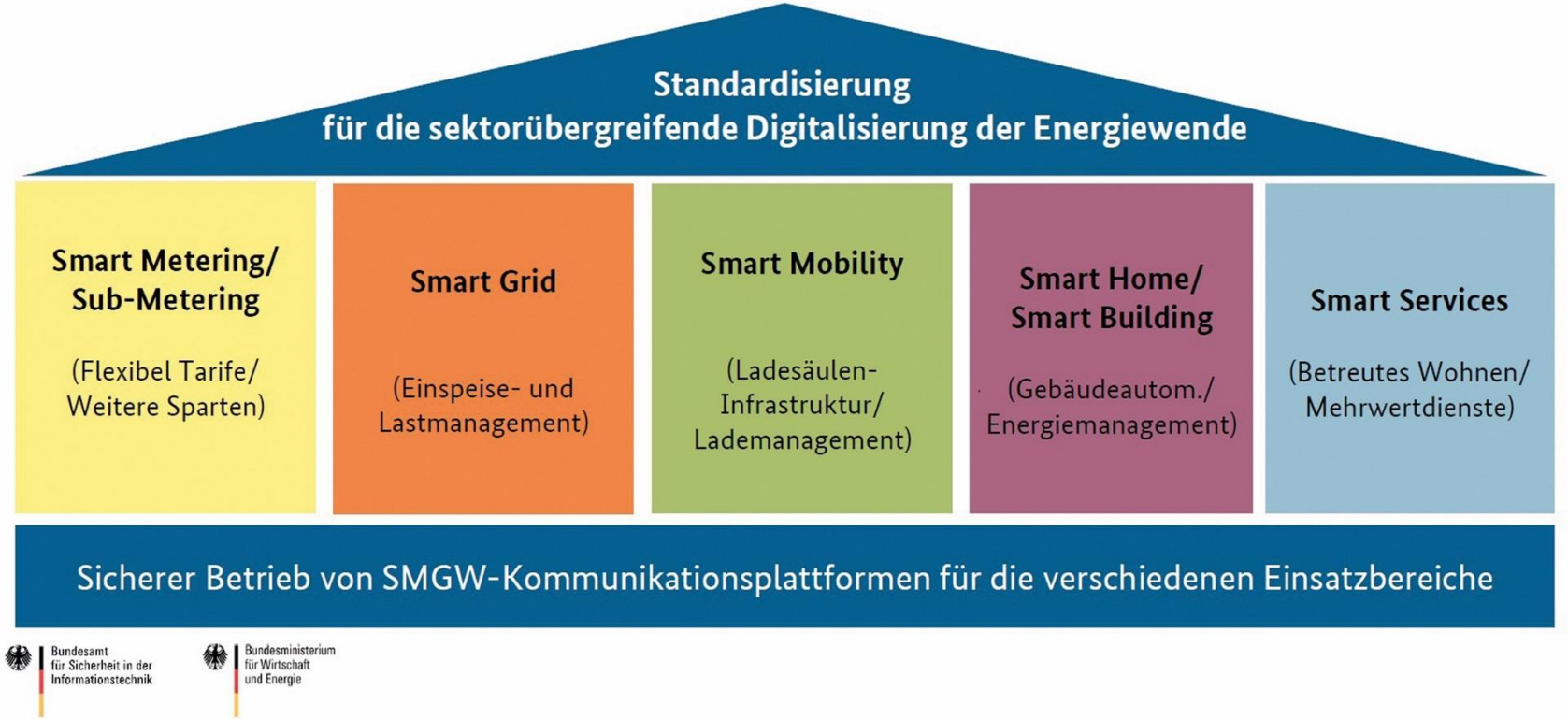
Power Plus Communications

- BSI Smart Metering Infrastructure
- HAN: Three logical interfaces
- **Connecting Smart Home Systems**
- Consumer Interface Binding
- CLS Interface Binding
- Security Tests
- Conclusion & Next Steps

Amending the BSI Smart Metering Infrastructure to Smart Home Applications via the SMGW



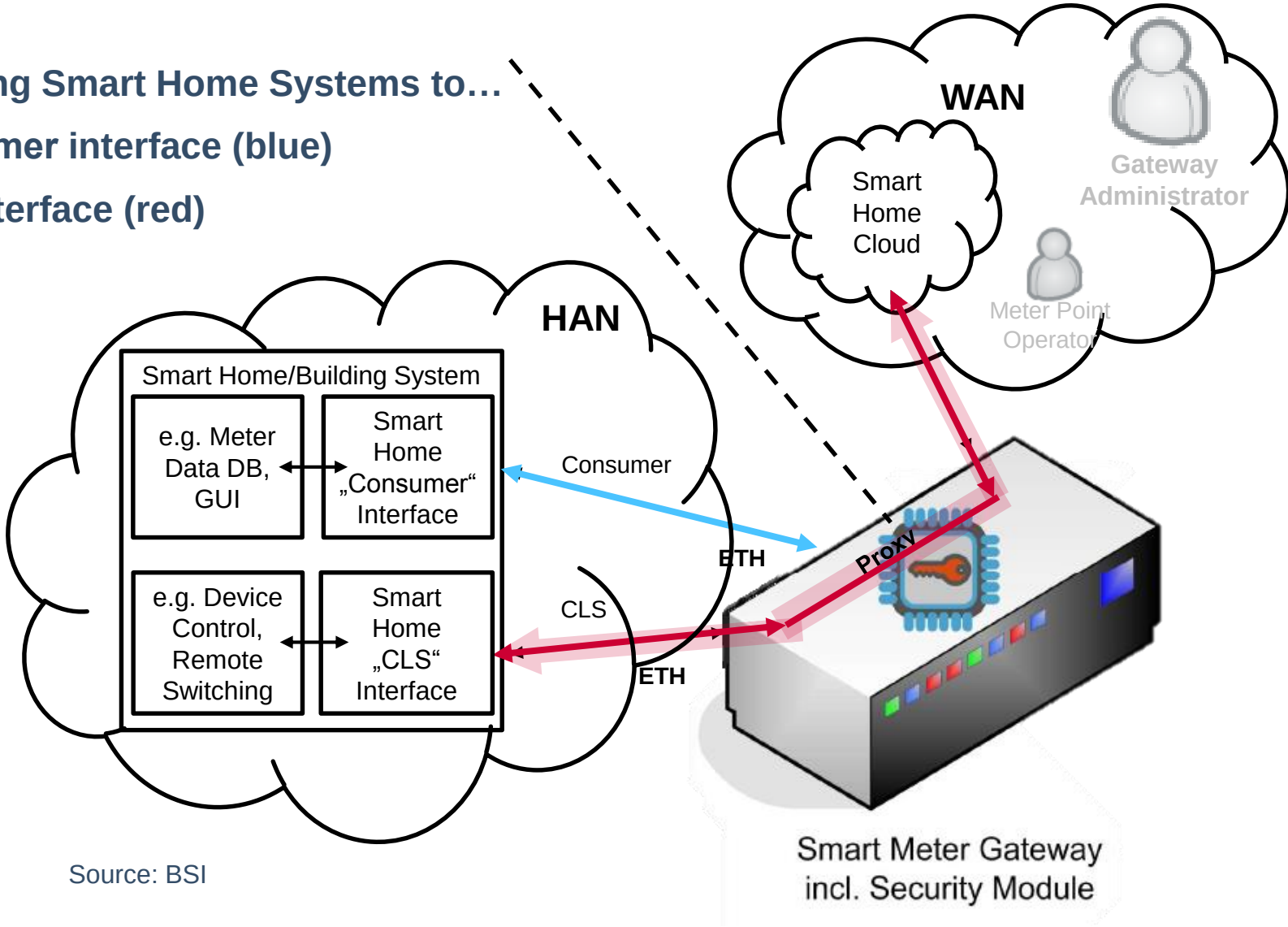
Source: BMWi, BSI

Amending the BSI Smart Metering Infrastructure to Smart Home Applications via the SMGW

Connecting Smart Home Systems to…

… Consumer interface (blue)

… CLS interface (red)



Source: BSI

Using the BSI concept for Smart Home Applications & Services

Power Plus Communications

Required Elements:

Driver for the Consumer Interface of the Smart Meter Gateway

- to read out meter data (generally supports generation as well as consumption data of electricity, gas, water, and heat meters)

Driver for the CLS interface of the Smart Meter Gateway

- for secure interconnections between external service providers such as the DSO and the energy provider with the Smart Home System.
- This allows the end-user to to switch loads and generation units in reaction to price signals or external switch requests. At the same time this switching process is reproducible by the service provider to be accounted for in the billing process.
- Secure proxy connection for any Use case which requires a connection from a house hold to an external market entity

Concept for backend connection

- Smart Home Service is authorized external market entity

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Implementation – Example OpenHAB

Power Plus Communications

OpenHAB is a vendor-neutral open source home automation software

- **Connectivity to different smart devices and services through bindings**
- **Different user interfaces**
- **Provides API to third-parties**
- **Will be used as device Gateway in AnyPLACE**

Idea: Include openHAB (and all connected devices) into the BSI infrastructure

Result Recovery Potentials

OpenHAB provides bindings for many services and devices. Further are expected to be developed in the future.

Source: http://www.kaikreuzer.de/2017/01/23/openhab2/

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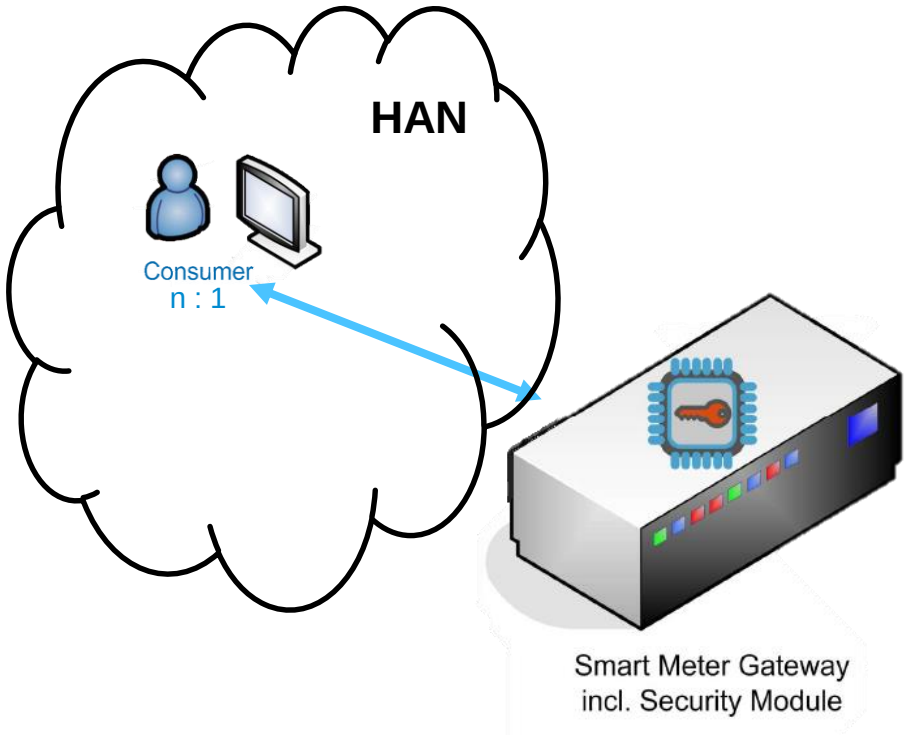
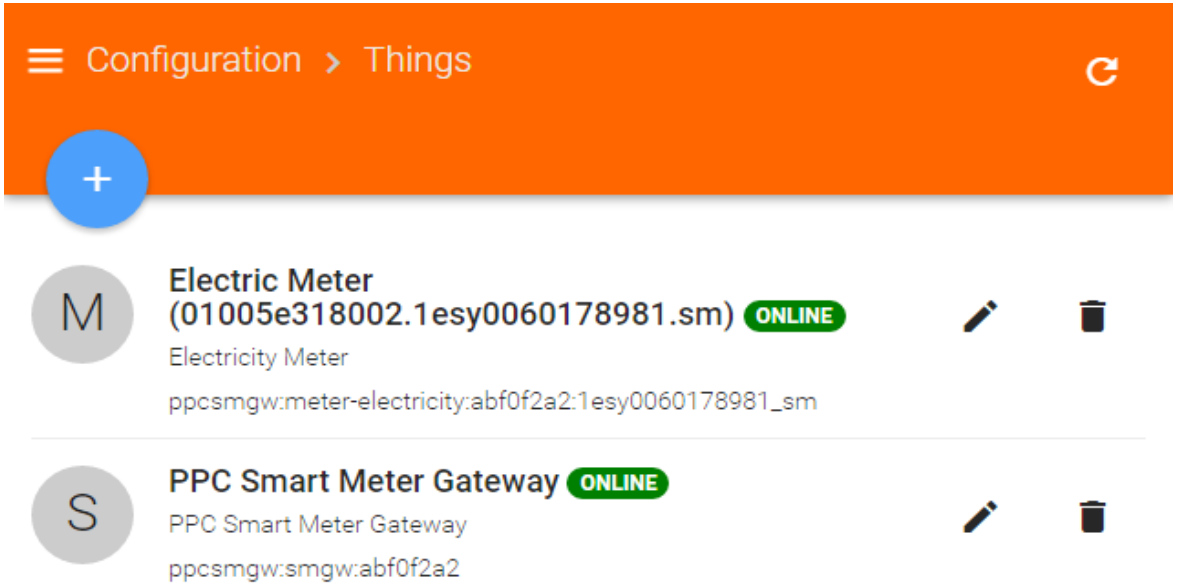


Implementation HAN Consumer Interface in Smart Home Systems – Example OpenHAB

OpenHAB HAN Consumer Interface binding characteristics:

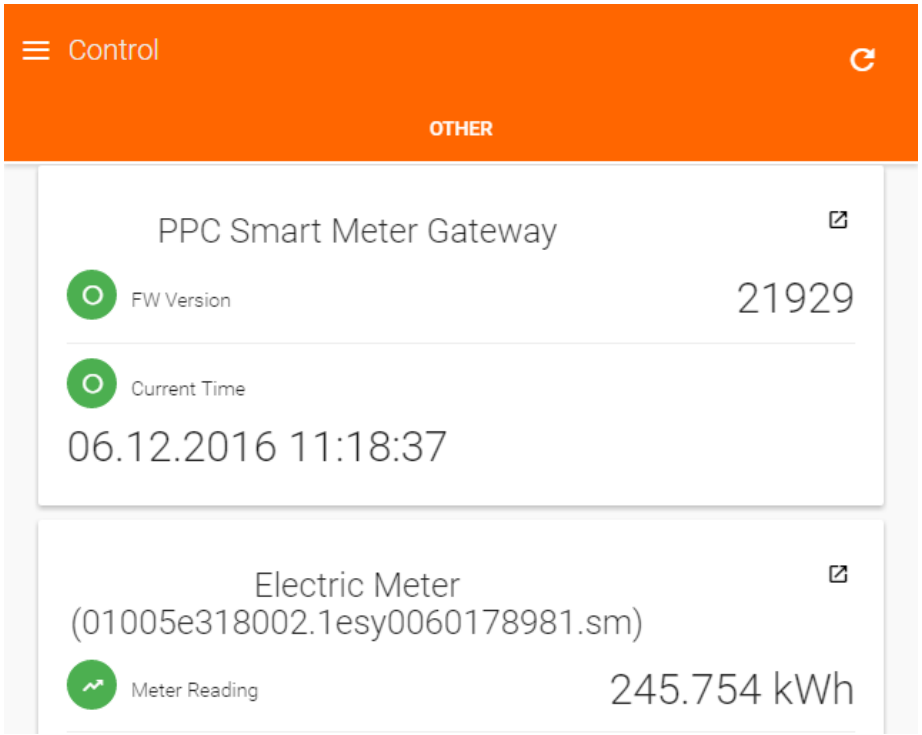
- **SMGW abstracted as openHAB gateway**
- **Abstraction of meters connected to the SMGW as openHAB things**
- **Auto-configuration: Automatic detection of all meters connected to the SMGW**
- **Two Authentication Procedures realized:**
  - Username & Password
  - Certificate-based



Implementation HAN Consumer Interface in Smart Home Systems – Example OpenHAB

OpenHAB HAN Consumer Interface binding characteristics:

- **Time and FW status available**
- **Meter readings (consumption) available with time-stamp**
- **Reading interval can be specified**



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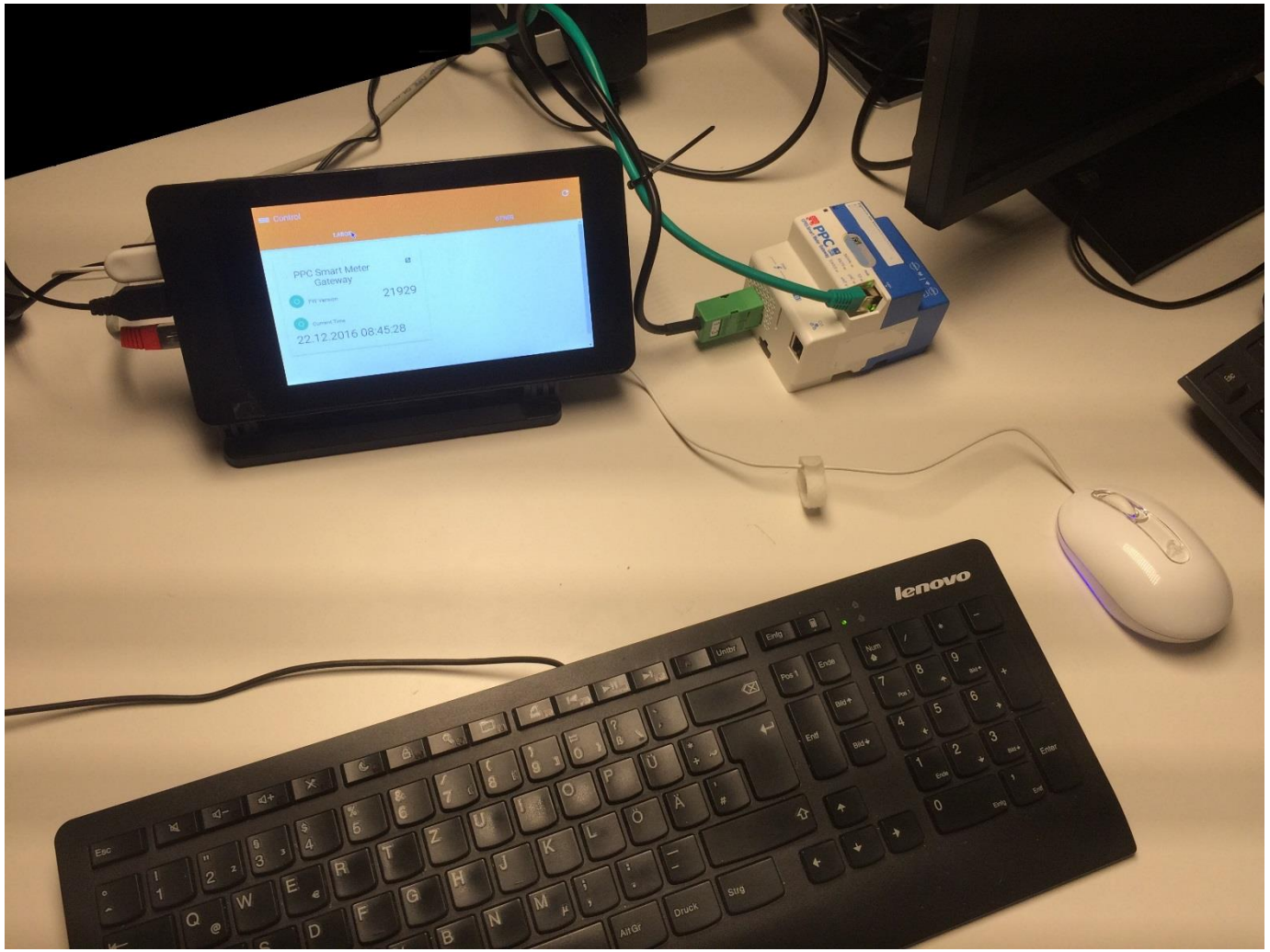

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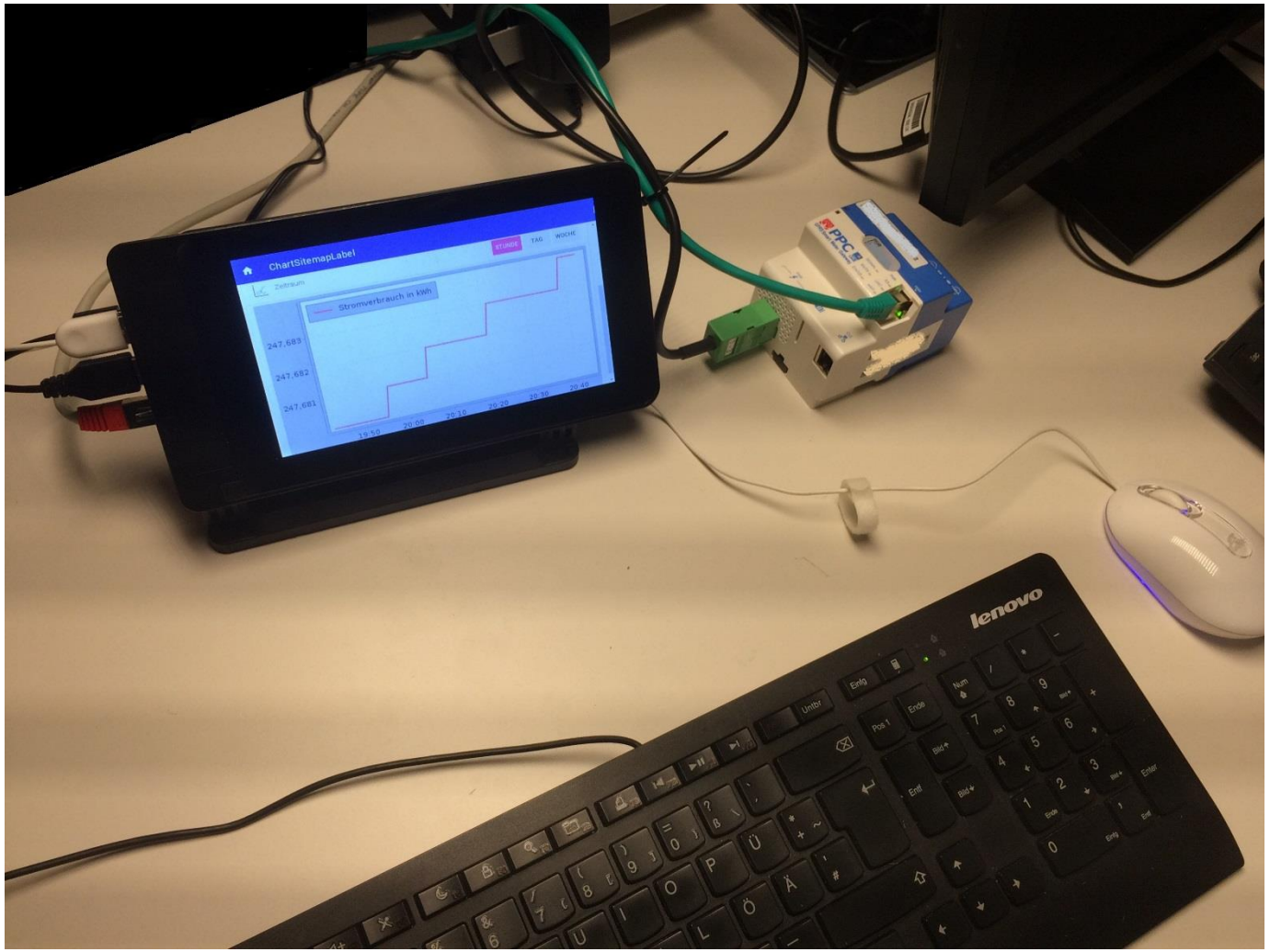

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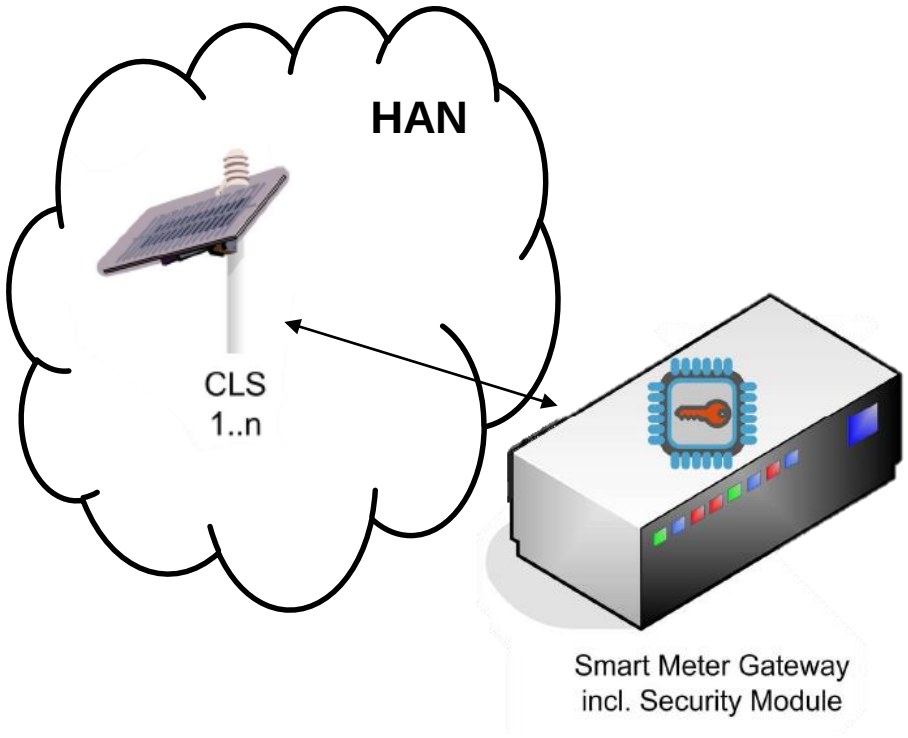
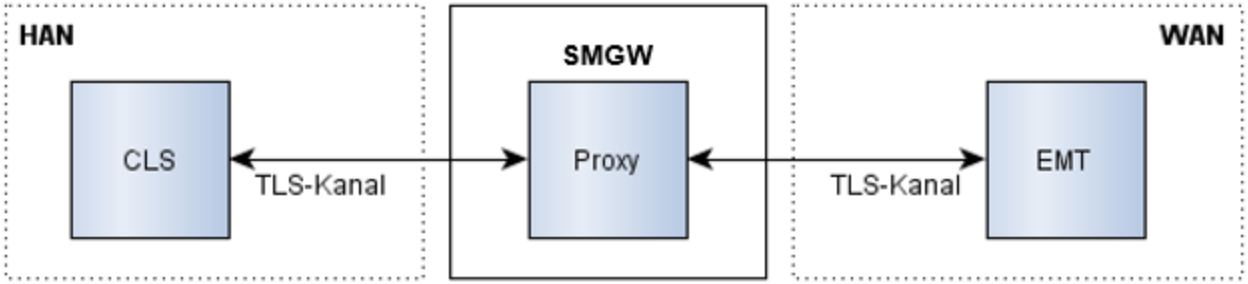


Implementation HAN CLS interface in Smart Home Systems

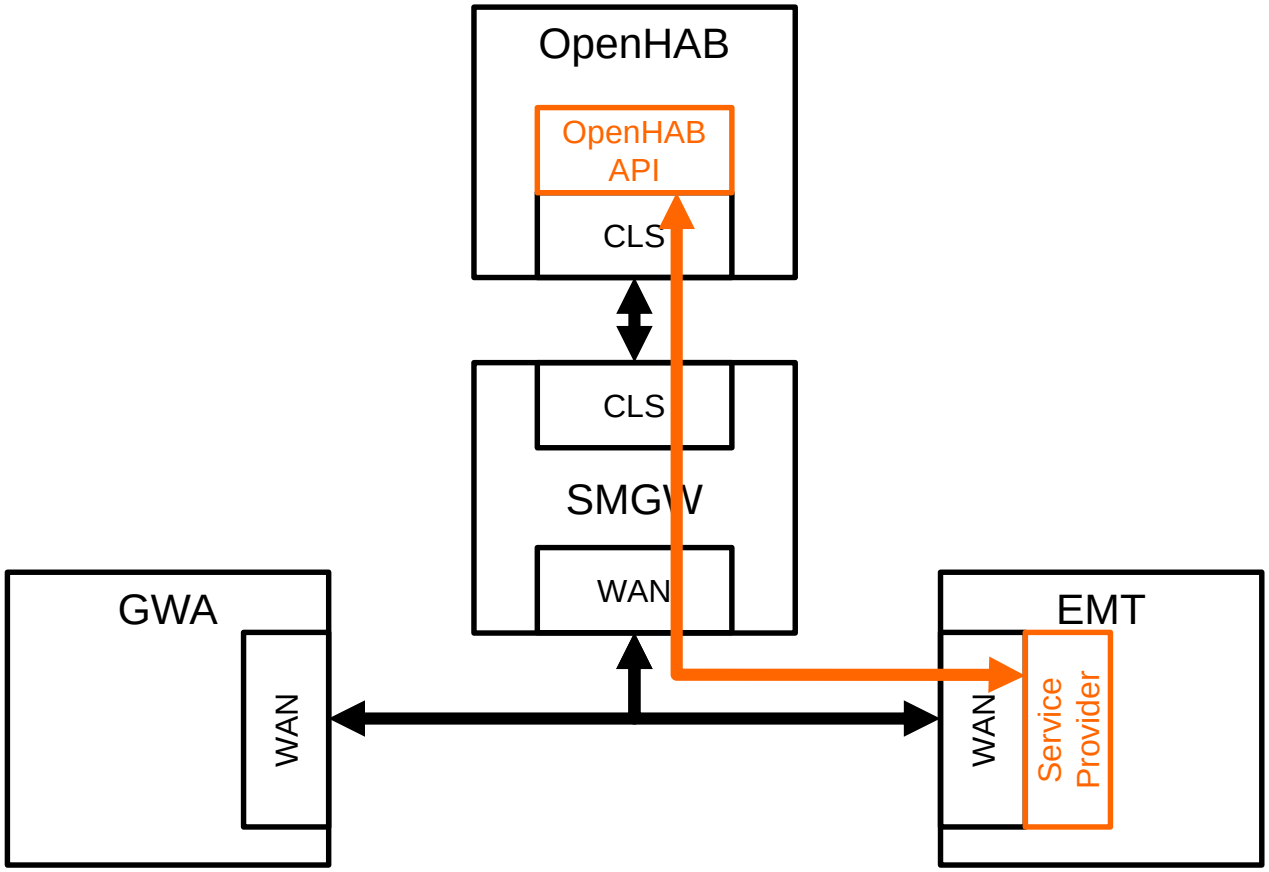


Source: BSI

Implementation HAN CLS interface in Smart Home Systems

1st approach: RESTful API

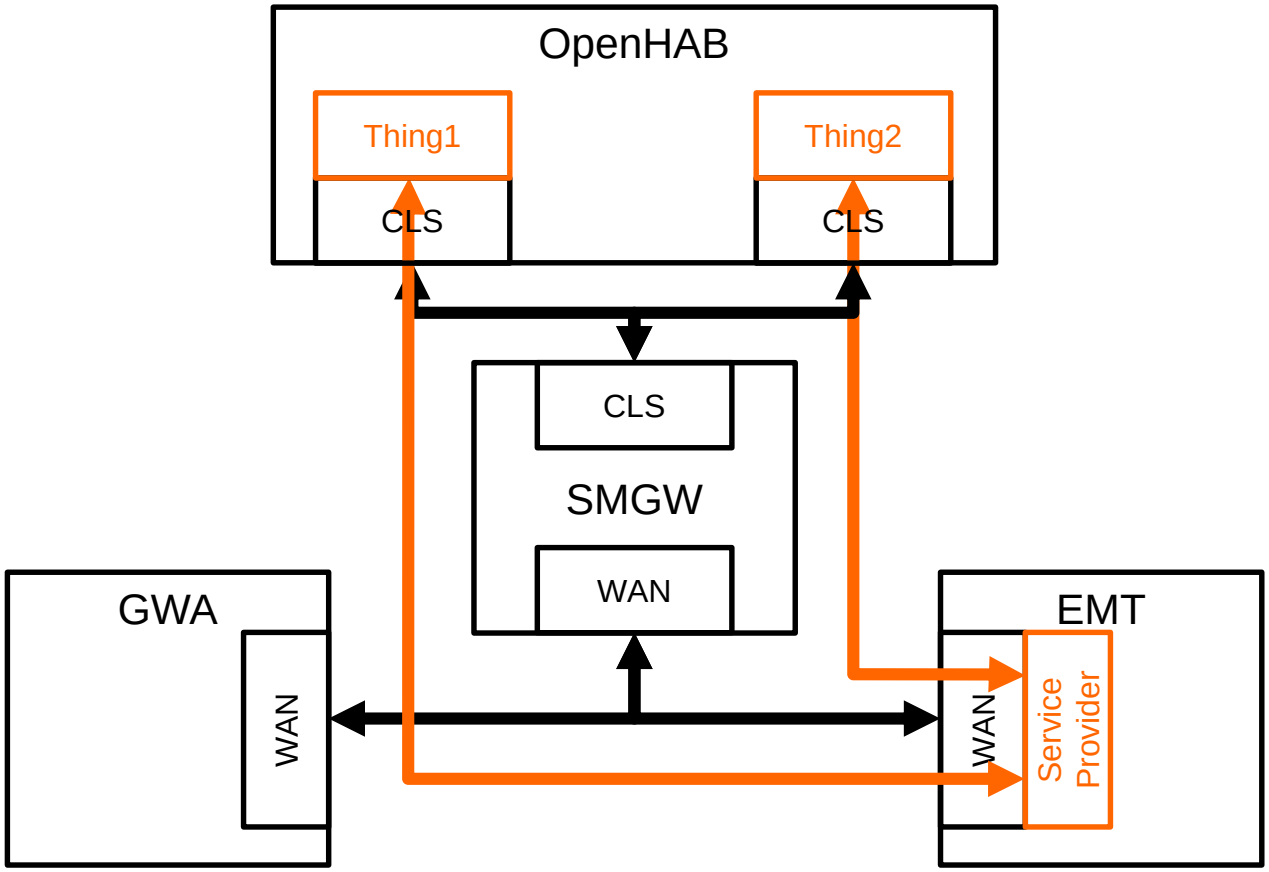
Used to access and control all connected devices to External Market Entities



Implementation HAN CLS interface in Smart Home Systems

2nd approach: Single Items

Provision of single items (i.e. channels of a thing) to be accessed and controlled by an external market entity



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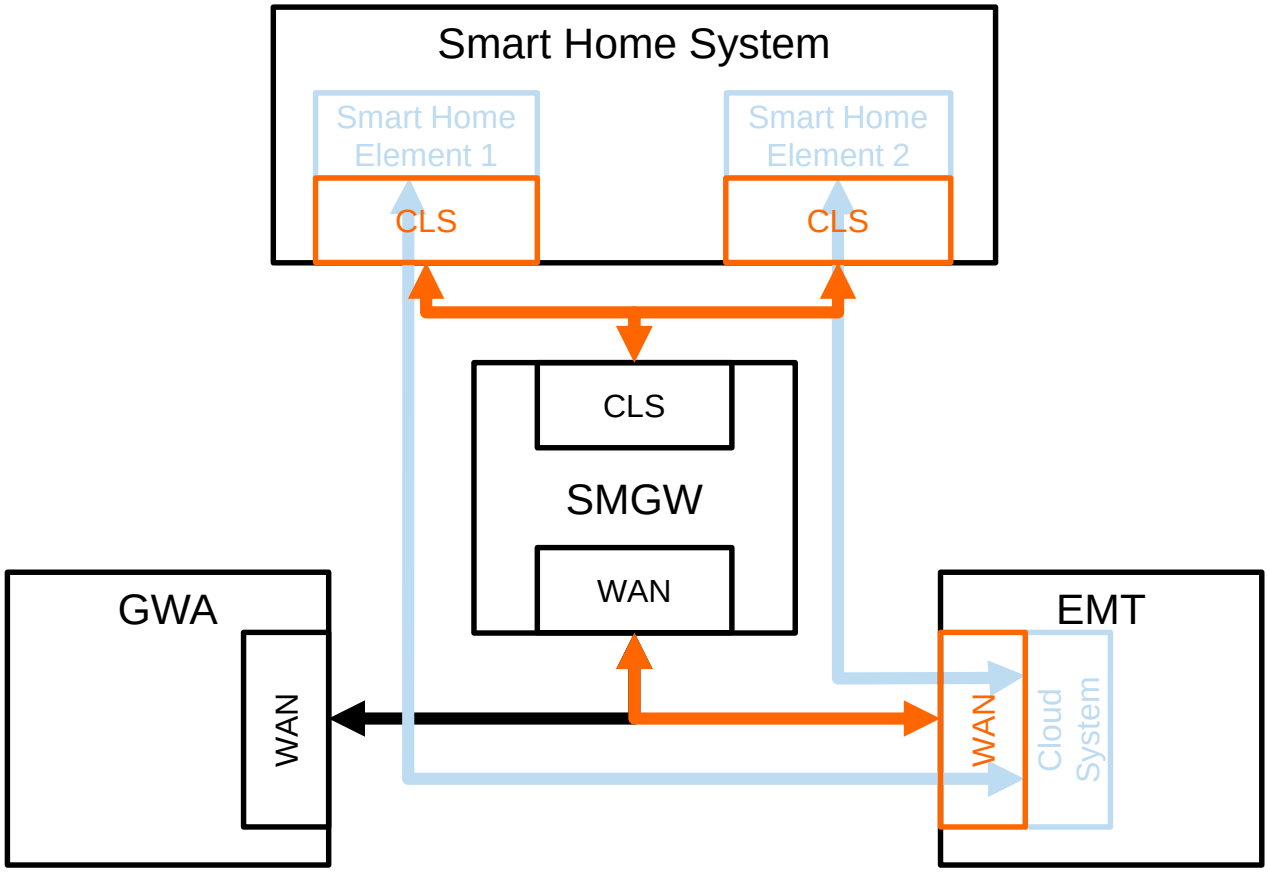
Conclusion & Next Steps
Add your Use-Case as CLS-Device

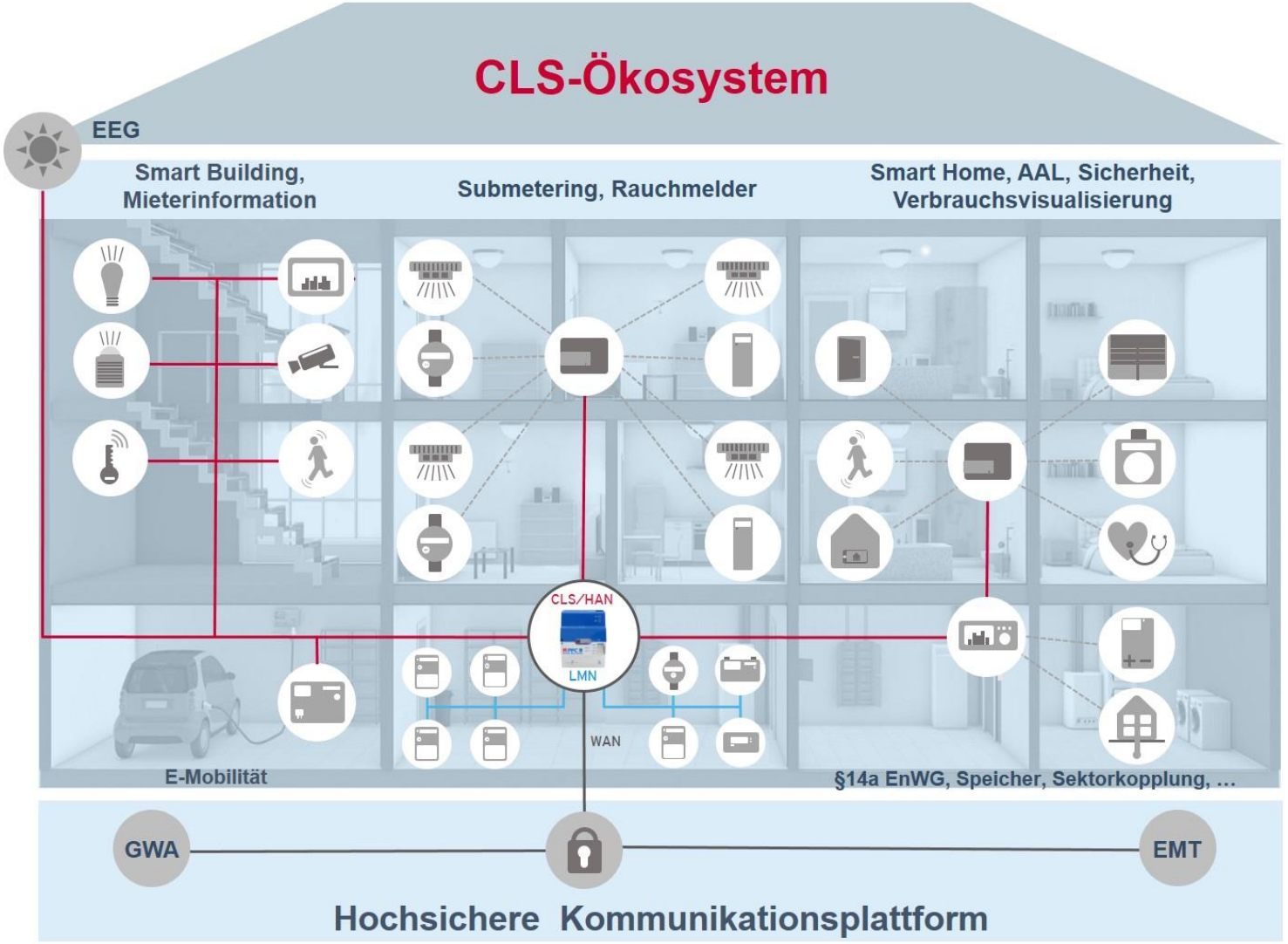
Generic approach for any Use Case:

- Implement CLS-Connection in Smart Home System

- Implement EMT in Backend-System



Conclusion & Next Steps
Add your Use-Case as CLS-Device



Questions?

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Thank you!

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