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

Christian Freudenmann, Dominik Henneke
PPC, 09.11.2017, Smart Energy 2017, Dortmund
AnyPLACE Project
Overview

This project has received funding from the European Union’s Horizon 2020 research and innovation programme under grant agreement No 646580.
Amending the BSI Smart Metering Infrastructure to Smart Home Applications via the SMGW

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

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<td>Ab 2017: Verbraucher ab 100.000 kWh: ohne Deckel</td>
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<td>Ab 2020: Erzeuger ab 100 kW: ohne Deckel</td>
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<td>Ab 2020: Verbraucher &lt; 2.000 kWh: 23 €/a</td>
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**OPTION:** Messtellenbetreiber kann Rollout erweitern, wenn er nutzenorientierte Kostendeckel einhält.

Kostendeckel sind orientiert an Kosten-Nutzen-Analyse und enthalten heutige Messentgelte in Höhe von 20 €/a für Verbraucher und 30 €/a für Erzeuger.

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

ETH SMGW

CDMA450 SMGW

BPL SMGW

LTE/GPRS SMGW
BSI Smart Metering Infrastructure
Use-Cases

Smart Meter Gateways
Ihr SMGW Spezialist für alle Telekommunikationsnetze

Kommunikation
Das passende WAN für Ihre Strategie

GWA, EMT & Netzwerk Management
Wir integrieren Backend Systeme
Amending the BSI Smart Metering Infrastructure to Smart Home Applications via the SMGW

BSI Smart Metering Infrastructure

HAN: Three logical interfaces

Connecting Smart Home Systems

Implementation Example

Consumer Interface Binding

CLS Interface Binding

Conclusion & Next Steps
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)
- CLS interface (IF_GW_CLS)

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

BSI Smart Metering Infrastructure

HAN: Three logical interfaces

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Consumer Interface Binding

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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

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 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 household to an external market entity

Concept for backend connection
• Smart Home Service is authorized external market entity
Amending the BSI Smart Metering Infrastructure to Smart Home Applications via the SMGW

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Conclusion & Next Steps
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
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/
Amending the BSI Smart Metering Infrastructure to Smart Home Applications via the SMGW

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Smart Meter Gateway incl. Security Module
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
OpenHAB HAN Consumer Interface binding characteristics:

- Time and FW status available
- Meter readings (consumption) available with time-stamp
- Reading interval can be specified
Implementation HAN Consumer Interface in Smart Home Systems – Example OpenHAB
Implementation HAN Consumer Interface in Smart Home Systems – Example OpenHAB
Amending the BSI Smart Metering Infrastructure to Smart Home Applications via the SMGW

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Conclusion & Next Steps
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
2nd approach: Single Items

Provision of single items (i.e. channels of a thing) to be accessed and controlled by an external market entity
Amending the BSI Smart Metering Infrastructure to Smart Home Applications via the SMGW

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

CLS-Ökosystem

Smart Building, Mieterinformation
Submetering, Rauchmelder
Smart Home, AAL, Sicherheit, Verbrauchsvisionisierung

E-Mobilität

GWA

Hochsichere Kommunikationsplattform

EMT

$14a$ EnWG, Speicher, Sektorkopplung, …

Questions?

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Thank you!

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