

Best practices on smart meter handling and roaming

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This document is a joint definition of the best practices for a well-functioning roaming operation under the utilization of calibrated metering values and smart meters.

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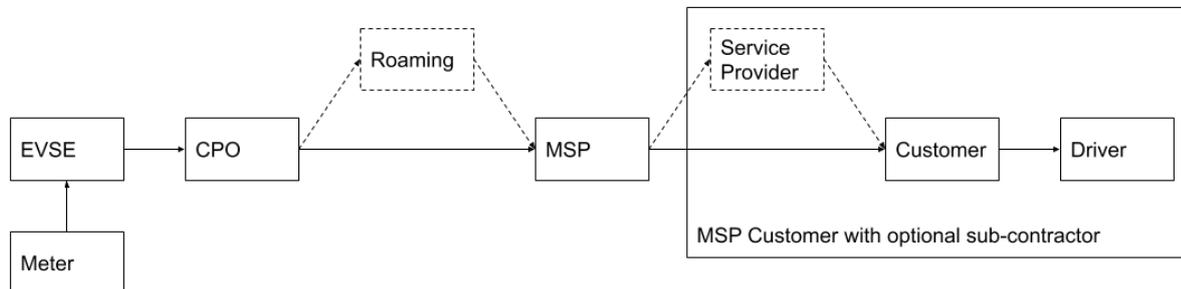
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Authors: Authors: Achim Friedland (Charge-IT Mobility), Nicolai Woyczehowski (Virta), Sergi Tcaciuc (Wirelane), Andreas Weber (Allego), Michael Roeder (Chargepoint), Karl Wendrich (Emonvia), Simon Schilling (SMATRICS)

Definitions

This section describes the anticipated process flow and definitions. It is the underlying basis for all other chapters. Figure 1 gives an overview of the defined roles and the data flow between them.

Figure 1: Data flow and role overview



Process steps

1. Charging unit commissioning or recommissioning
 - a. The CPO commissions a new hardware or installs a smart meter in an existing hardware for the first time.
 - b. The hardware already has a key pair or generates one within this first step
 - c. The CPO registers the public key of the EVSE(s) in [the] public key database.
2. Charge point publication
 - a. The CPO publishes POI data about the respective EVSE via roaming interface(s).
 - b. A MSP customer finds the POI data in the MSPs app for the first time.
3. Charging session
 - a. A MSP customer generates a session at the respective EVSE
 - b. During the session metering values are generated, signed and stored. The CPO might receive intermediate values during the session.
 - c. A valid session has a signed start and end value
 - d. The CPO might send real-time information to the MSP, the MSP might display it to the customer
4. CDR exchange with validation by MSP
 - a. CPO sends the CDR of the session containing the signed values to the MSP
 - b. The MSP validates the received CDR and signatures
 - c. The MSP might display the CDR before invoicing to the customer
5. B2C Invoicing between MSP and MSP customer
 - a. MSP rates the CDR and generates the invoice
 - b. The invoice is sent to the MSP customer

- c. The metering values and signatures are made available to the MSP customer at the moment they receive the invoice.
- 6. The MSP customer validates the metering session
 - a. The MSP customer receives the invoice with a detailed list of charging sessions
 - b. The MSP customer receives or fetches the metering data and signatures of one or many charging sessions
 - c. The MSP customer uses the transparency software to validate the sessions on the invoice
- 7. B2B invoicing between MSP and CPO is out of scope, validation happens in step 4

Glossary

Term	Definition
driver	The end-user initiating a charging session at a charging station.
MSP Customer	A end-user or intermediate actor purchasing charging products from the MSP
charging station	The location/POS for EV charging. Consists of one or multiple charging units with one or multiple charge points.
“Rechnungsschuldner” (ger.)	party owing the invoice amount
meter data validation	Meter data may be validated at various steps in the process by the different Messdatenverwenders. The goal of validation is to prove the correctness of the data in terms of the five objectives of protection.
5 objectives of protection	Truthfulness, Integrity, Authenticity, Imputability, Availability
“Messdatenverwender” (ger.)	Any party using measuring data

Best practices on smart meter handling and roaming

Description of foreseeable smart meter handling processes, challenges and guidance.

Assumptions for this chapter:

- Reliable public key database:

- Every key is checked for plausibility
- Every registration is confirmed to the CPO
- Confirmation is never given before publication
- The serial numbers and public keys are stored in the commissioning documentation for later proof of existence of a calibrated meter (even after destruction)

Exchange of charging station hardware while meter is re-used at the same location

The hardware of a charging station is being replaced. The meter of the old hardware is being re-used in the new hardware at the same location.

Best practice:

- The new hardware should always be of the same model as the old one.
- The meter has to be assigned to the same logical charge point (same EVSE-ID)
- There is no change in the data and no message will be routed to the MSP
- There is no need for an off-time until recommissioning.

Initial commissioning of a new charging station

A new charging station is being set up with a new meter and EVSE-ID for the first time.

Best practice:

- The commissioning process shall be finalized before process step 2 “Charge point publication” can begin. This includes the confirmation of the public key register.
- For the phase where a technically commissioned charge points key publication is pending, the CPO should...
 - ...not publish a POI data set reflecting eichrecht-compliant information.
 - ...not authorize charging sessions based on white lists as long as there is no confirmation of the MSP that compliance is not needed for the customers tariff.

Decommissioning of a charging station

The charging station is discontinued. The installed hardware is removed from that location and may be discarded or re-used at a different station.

Best practice:

- The public key should be marked as deactivated in the public key database by the CPO.
- If the signing unit is to be re-used at a different location, the public key database shall record the change revision-safe.

CDR-Exchange between CPO and MSP

In process step 4 the CPO generates a CDR and sends it to the MSP.

Best practice:

- CPO shall always do a validation of the metering data before sending a CDR
 - The CPO should do a full validation of the complete metering data set.
 - If the validation fails, the CDR shall be sent with a marker for invalid metering data.
 - For validation errors that indicate a possible invalidity of previous values, the handling and reconciliation of these is to be handled separately.
- MSP should always validate incoming CDRs metering data in order to ensure correct invoicing to their customer.
 - If the validation fails, the metering data may not be used for invoicing.
 - Invalid charging sessions may be displayed to the customer as non-billable.
 - Any validation errors should be reported to the sending CPO.

The MSP does not receive the meter data of CDR

For a charge point which is reported a calibrated device, the MSP receives a CDR without calibrated metering data.

Best practice:

- The MSP shall handle this charging session as a validation error. (see [CDR-Exchange between CPO and MSP](#))
- As the POI data might be incorrect, the MSP shall investigate the source of the error (own POI database, synchronization error, source data incorrect, ...)

Replacement of a meter in an operative charging station

The meter and/or signing module of a charging station is being replaced. The properties of the charging station will not change.

Typical cases:

- Re-calibration with exchange of the meter, e.g. after 8 years of operation
- Repair of a meter and/or signing module

Best practice:

- The new hardware should always be of the same model than the old one.

- In case the signing module has been replaced, the new public key needs to be submitted before the station is being used again.
- The meter has to be assigned to the same logical charge point (same EVSE-ID)
- There is no change in the data and no message will be routed to the MSP
- There is no need for an off-time until recommissioning.

Firmware-update with re-generation of key-pairs

The firmware-update process causes the key-pairs of a signing module to be re-generated.

Take-over of a charge point by a different CPO

A charging station is taken over by a new CPO. The hardware and energy meter remains in the charging station.

Best practice:

- The charging station gets new EVSE-IDs assigned by the new CPO
- The meter-id is assigned to the new EVSE-ID.
- The meters has to be registered at the public key database