

# EEBus UC Technical Specification

## EV Commissioning and Configuration

Version 1.0.1

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## 1 Scope of the document

This document describes the Use Case "EV Commissioning and Configuration" (short-name: EVCC). Chapter 2 specifies the High-Level Use Case. Chapter 3 describes the technical solution for SPINE for this Use Case in detail. Within this document a top-down approach is used to derive the requirements for the technical solution from the High-Level description.

### 1.1 References

#### 1.1.1 EEBUS documents

[UseCaseBaseSpecification]	EEBus_UC_TS_UseCaseBaseSpecification.pdf
[ProtocolSpecification]	EEBus_SPINE_TS_ProtocolSpecification.pdf
[ResourceSpecification]	EEBus_SPINE_TS_ResourceSpecification.pdf
[SHIP]	SHIP_Specification_v1.0.0.pdf

#### 1.1.2 Normative references

[RFC2119]	IETF RFC 2119: 1997, Key words for use in RFCs to indicate requirement levels Please see section 1.3.1 for details.
[ISO15118-2_ed1]	ISO 15118-2:2014 (edition 1): Specifies the communication between battery electric vehicles (BEV) or plug-in hybrid electric vehicles (PHEV) (both called EV within this Use Case) and the Electric Vehicle Supply Equipment (EVSE).
[ISO15118-2_ed2]	ISO 15118-2 (edition 2): Edition 2 of the ISO 15118-2.
[IEC61851]	IEC 61851 applies to EV supply equipment for charging electric road vehicles.

### 1.2 Terms and definitions

#### Actor

An Actor models a role within a Use Case definition (e.g. an energy manager or an electric vehicle).

#### CEM

Abbreviation for Customer Energy Manager. The CEM is an energy manager located at the home or premises of the user or in a cloud application. The energy manager enables energy-optimized operation of the connected devices by harmonising energy demand and availability.

#### EV

Electric Vehicle

#### EVCC

EV Commissioning and Configuration (short name of this Use Case)



**158 EVSE**

159 Electric Vehicle Supply Equipment

**160 PWM**

161 Pulse Width Modulation

**162 Scenario**

163 Part of the Use Case. Splitting a Use Case in Scenarios helps to understand the Use Case more  
164 quickly. Some Scenarios are mandatory for a Use Case, whereas others may be recommended or  
165 optional.

**166 Specialization**

167 Reusable data collection for a specific functionality.

**168 SPINE**

169 **S**mart **P**remises **I**nteroperable **N**eutral-message **E**xchange: Technical Specification of EEBus Initiative  
170 e.V.

171

**172 1.3 Requirements****173 1.3.1 Requirements wording**

174 The following keywords are used:

- 175 - SHALL
- 176 - SHALL NOT
- 177 - SHOULD
- 178 - SHOULD NOT
- 179 - MAY

180 Note: They apply only if written in capital letters.

181 For the meaning of the keywords, please refer to [RFC2119].

182

**183 1.3.2 Mapping of High-Level requirements**

184 Within the High-Level Use Case description, the following abbreviation is used:

185 [EVCC-xyz]

186 e.g.: [EVCC-007]

187 The abbreviation is used to mark High-Level requirements or rules of this Use Case with a unique  
188 number xyz. Those requirements are referenced throughout the technical solution to show how each  
189 High-Level requirement is realised in the technical part.

190



## 2 High-Level description

### 2.1 Introduction

This Use Case specifies commissioning and configuration processes between the Actor CEM (the customer energy manager) and the Actor EV (the electric vehicle) as the basis for other Use Cases related to the support of the EV charging process. The Actor EVSE (electric vehicle supply equipment, the charging station) transmits the necessary information between the CEM and EV.

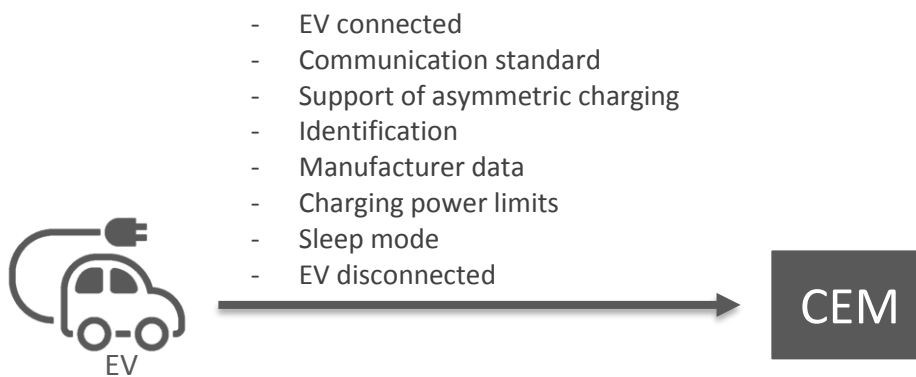


Figure 1: High-Level Use Case functionality overview

The figure shows a simplified view of data exchange between the EV and the CEM. Typically, the CEM will not communicate with the EV directly, but communicates with the EVSE that the EV is connected to.

The main part of the commissioning and configuration processes is to transmit information from the EV to the CEM. Additionally, the CEM needs to be informed when the EV is unplugged from the charging station.

### 2.2 Actors

#### 2.2.1 EV

The Actor EV represents the electric vehicle that wants to participate in energy management.

#### 2.2.2 CEM

The Actor CEM represents the Energy Manager that wants to integrate the EV into the energy management.



## 2.3 Scenarios



Figure 2: Scenario overview

Scenario number	Scenario name	EV	CEM
1	EV connected	M	M
2	EV sends communication standard	M	M
3	EV sends support of asymmetric charging	M	M
4	EV sends identification	R	R
5	EV sends manufacturer information	R	R
6	EV sends charging power limits	R	M
7	EV sleep mode	R	M
8	EV disconnected	M	M

Table 1: Scenario implementation requirement for Actors



### 2.3.1 Scenario 1 - EV connected

#### 2.3.1.1 Description

When the EV connects to an EVSE, the CEM needs to be informed [EVCC-001]. This enables the CEM to start further Use Cases with the connected EV.

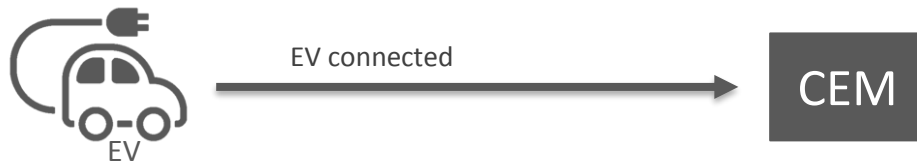


Figure 3: Scenario 1 overview

#### 2.3.1.2 Conditions

##### Triggering Event:

The Scenario is triggered by connecting the EV to the EVSE.

##### Pre-condition:

The CEM assumes that the EV is disconnected.

##### Post-condition:

The CEM assumes that the EV is connected.

### 2.3.2 Scenario 2 - EV sends communication standard

#### 2.3.2.1 Description

The CEM will not directly communicate with the EV but communicates with the EVSE that the EV is connected to according to the implemented standard.

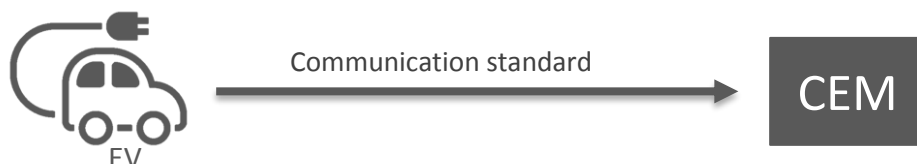


Figure 4: Scenario 2 overview

Depending on the communication standard used between EV and EVSE, the CEM can deduce the capabilities and behaviour of the EV. Therefore, the EV SHALL send the used communication standard to the CEM [EVCC-002]. The used communication standard may alter during runtime.

In the current version of the Use Case the following communication standards are relevant:



- 244 - ISO15118-2 ed1 [EVCC-003]
- 245 - ISO15118-2 ed2 [EVCC-004]
- 246 - IEC61851 [EVCC-005]

247 Note: If only IEC 61851 is supported, the EVSE uses a PWM signal to control the charging power of  
248 the EV. In this case it is not possible for the EVSE to retrieve EV identification information or an  
249 energy demand of the EV. An EVSE may compensate the missing information by allowing the user to  
250 provide an identifier of the EV or its energy demand through the EVSE.

251

### 252 **2.3.2.2 Conditions**

#### 253 **Triggering Event:**

254 The Scenario is typically triggered by connecting the EV to the EVSE.

#### 255 **Pre-condition:**

256 The CEM does not know the communication standard of the EV.

#### 257 **Post-condition:**

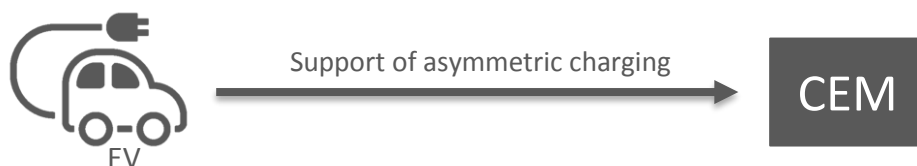
258 The CEM does know the communication standard of the EV. This allows to deduce the capabilities of  
259 the EV, as those strongly depend on the corresponding communication standard. Some Use Case  
260 functionality can only be supported with certain communication standards.

261

### 262 **2.3.3 Scenario 3 - EV sends support of asymmetric charging**

#### 263 **2.3.3.1 Description**

264 One important characteristic of a charging process is the differentiation between symmetric and  
265 asymmetric phase load. Asymmetric charging permits charging with different currents on each  
266 connected phase. Symmetric charging, on the other hand, permits only charging with the same  
267 current magnitude on all connected phases. Therefore, symmetric charging can have disadvantages if  
268 phase specific loads need to be balanced. Depending on the support of asymmetric charging of the  
269 EV, the CEM can estimate the capabilities and behaviour of the EV. Therefore, the EV SHALL indicate  
270 whether asymmetric charging is supported or not [EVCC-006]. The support of asymmetric charging  
271 may change during runtime.



272

273 *Figure 5: Scenario 3 overview*

274



### 2.3.3.2 Conditions

#### Triggering Event:

The Scenario is typically triggered by connecting the EV to the EVSE.

#### Pre-condition:

The CEM does not know if the EV supports asymmetric charging.

#### Post-condition:

The CEM does know if the EV supports asymmetric charging. This allows phase specific management of the charging process.

## 2.3.4 Scenario 4 - EV sends identification

### 2.3.4.1 Description

The EV identification allows a CEM to distinguish between different EVs. If the ISO 15118 communication standard is supported the MAC-Address of the corresponding EV ISO 15118 communication unit [EVCC-007] SHALL be transmitted for EV identification to the CEM [EVCC-008]. If a different communication standard is used, the EV identification may use a respective identifier. With the EV identification the customer can e.g. identify or prioritize different EVs within the energy management.

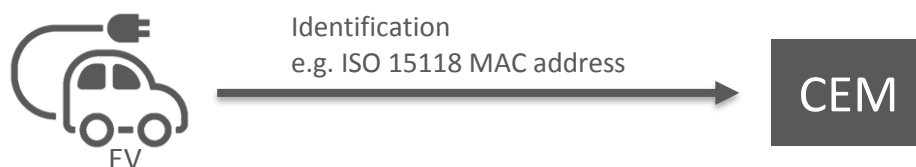


Figure 6: Scenario 4 overview

### 2.3.4.2 Conditions

#### Triggering Event:

The Scenario is typically triggered by connecting the EV to the EVSE.

#### Pre-condition:

The CEM does not know an identifier of the EV.

#### Post-condition:

The CEM does know the identifier of the EV and can use this to recognize the EV later on and prioritize different EVs within its energy management.



## 2.3.5 Scenario 5 - EV sends manufacturer information

### 2.3.5.1 Description

Within this Scenario the EV SHALL send manufacturer information towards the CEM [EVCC-009]. The manufacturer data can provide different information of the corresponding EV and the EV manufacturer. The information can be used to present the corresponding EV in the energy management application. E.g. based on the device code a corresponding icon together with the device name text could be used to show the EV to the user.

The following information SHOULD be available:

- device name [EVCC-010]
- device code [EVCC-011]
- vendor name [EVCC-012]
- vendor code [EVCC-013]
- brand name [EVCC-014]
- manufacturer label [EVCC-015]

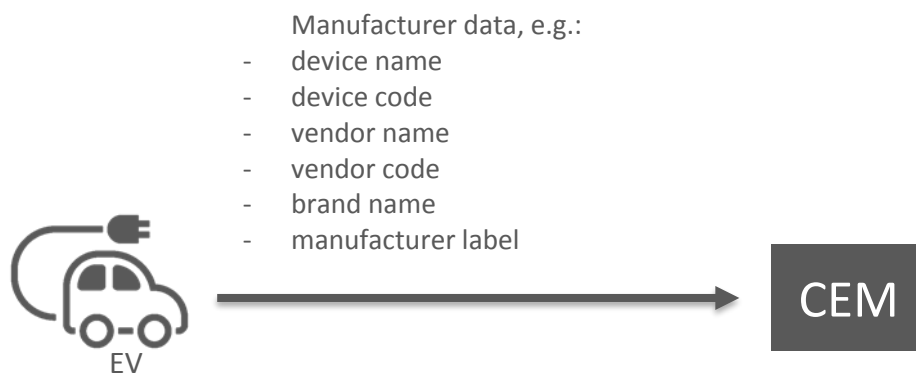


Figure 7: Scenario 5 overview

### 2.3.5.2 Conditions

#### Triggering Event:

The Scenario is typically triggered by connecting the EV to the EVSE.

#### Pre-condition:

The CEM does not know the manufacturer information of the EV.

#### Post-condition:

The CEM does know the manufacturer information of the EV.



## 2.3.6 Scenario 6 - EV sends charging power limits

### 2.3.6.1 Description

An EV may have restrictions on its charging power. Therefore, the EV SHALL send those limits to the CEM [EVCC-016]. If the ISO 15118 communication standard is supported the limits SHALL contain a minimum charging power [EVCC-017]. Note: The minimum charging power is often not zero.

The limits MAY also contain a maximum charging power [EVCC-018] and SHOULD include the standby power [EVCC-019]. The effective charging power of the EV may additionally be limited by the charging power limits of the EVSE the EV is connected to. In this case the EVSE will adjust the limits accordingly.

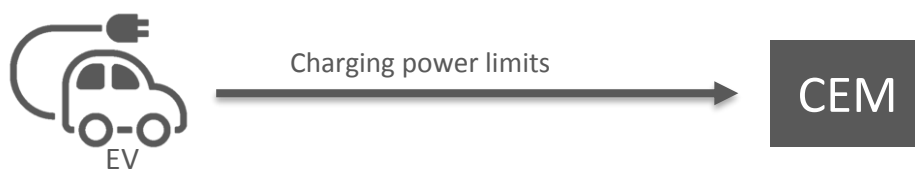


Figure 8: Scenario 6 overview

### 2.3.6.2 Conditions

#### Triggering Event:

The Scenario is typically triggered by connecting the EV to the EVSE.

#### Pre-condition:

The CEM has no charging power limits of the EV.

#### Post-condition:

The CEM has charging power limits of the EV and knows in which limits the EV charging can operate.

## 2.3.7 Scenario 7 - EV sleep mode

### 2.3.7.1 Description

The EV communicates if it is in sleep mode to the CEM [EVCC-020]. In sleep mode the EV will not charge.



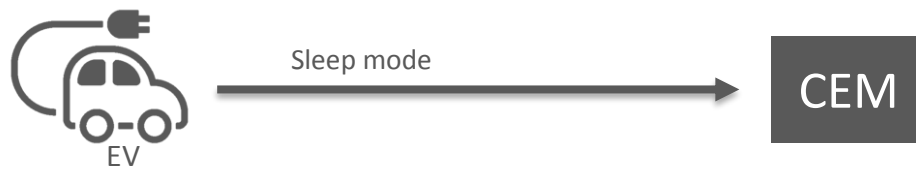


Figure 9: Scenario 7 overview

#### 2.3.7.2 Conditions

##### Triggering Event:

The Scenario is triggered when the EV goes into sleep mode.

##### Pre-condition:

The CEM assumes that the EV operates normally.

##### Post-condition:

The CEM knows that the EV is in sleep mode.

### 2.3.8 Scenario 8 - EV disconnected

#### 2.3.8.1 Description

If the EV is unplugged, the CEM needs to be informed [EVCC-022]. This enables the CEM to remove the EV from the energy management optimization process.

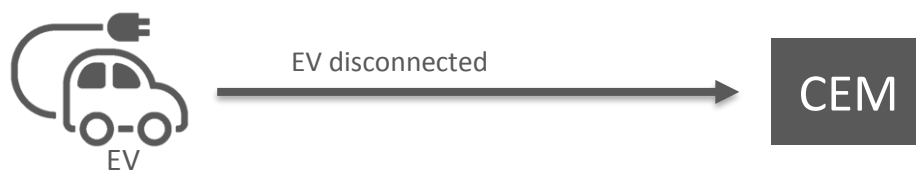


Figure 10: Scenario 8 overview

#### 2.3.8.2 Conditions

##### Triggering Event:

The Scenario is triggered by disconnecting the EV from the EVSE.

##### Pre-condition:

The CEM assumes the EV is connected.



376 **Post-condition:**

377 The CEM assumes the EV is disconnected.

378

## 379 **2.4 Dependencies to other Use Cases**

380 Note: This Use Case is not using other Use Cases but is referenced from many other Use Cases (e.g.  
381 "Coordinated EV Charging", "EV Charging Summary", "Overload Protection by EV Charging Current  
382 Curtailment").

383

## 384 **2.5 Assumptions and Prerequisites**

385 None.

386



### 3 Technical SPINE solution

#### 3.1 General rules and information

##### 3.1.1 Underlying technology documents

This technical solution relies on the SPINE Resources Specification version 1.1.1 [ResourceSpecification].

For interoperable connectivity this technical solution relies on:

- SPINE Protocol Specification version 1.1.1 [ProtocolSpecification] as application protocol.
- SHIP Specification version 1.0 [SHIP] as transport protocol.

Further applicable documents:

- EEBUS Use Case Base Specification version 1.0.0 [UseCaseBaseSpecification].

##### 3.1.2 Use Case Discovery rules

The Use Case Discovery SHALL be supported by each Actor and the following rules SHALL apply:

- The string content for the Element "nodeManagementUseCaseData. useCaseInformation. useCaseSupport. useCaseName" within the Use Case Discovery (please refer to [ProtocolSpecification]) SHALL be "evCommissioningAndConfiguration". The string content SHALL only be defined by this Use Case (regardless of the Use Case version).
- The string content of the Element "nodeManagementUseCaseData. useCaseInformation. actor" within the Use Case Discovery (please refer to [ProtocolSpecification]) SHALL be set to the according value stated within the corresponding Actor's section.
- An Actor A that is implemented to support this Use Case specification SHALL set the Element "nodeManagementUseCaseData. useCaseInformation. useCaseSupport. useCaseVersion" within the Use Case discovery (please refer to [ProtocolSpecification]) to "1.0.1" (for details on the structure of the Use Case version number please refer to [UseCaseBaseSpecification]).
- If an Actor A supports multiple versions of this Use Case with the same major version number, only the highest one SHOULD be set within the Use Case discovery.
- If an Actor A finds a proper counterpart Actor B for this Use Case that supports multiple versions of this Use Case with the same major version number as supported by Actor A, the Actor A SHOULD evaluate from these versions of Actor B only the highest version number.
- If an Actor A supports multiple versions of this Use Case with different major version numbers, for each major version number only the highest version number SHOULD be set within the Use Case discovery.
- If an Actor A finds a proper counterpart Actor B for this Use Case that supports only versions with a major version number not implemented by Actor A, it still might be possible to run the Use Case or parts of the Use Case. Therefore, the Actor A should try to evaluate the Actor B as a valid partner for this Use Case.



### 3.1.3 Rules for "Content of Specialization..." tables and "Content of Function..." tables

#### 3.1.3.1 General presence indication definitions

Abbreviations for the presence indication of Elements listed in the tables are defined as follows:

Abbreviation	Meaning	Link to requirement keywords
M	Mandatory	SHALL
R	Recommended	SHOULD
O	Optional	MAY

Table 2: Presence indication description

An Actor MAY support Elements that are not listed in the tables. However, another Actor MAY ignore these Elements.

The presence indications "M", "R" and "O" are always meant relative to the respective parent Element. I.e. if a parent Element is optional ("O") and a child is mandatory ("M") the child Element can only be present if the parent Element is present as well.

Note: The indications and the aforementioned rules apply for "complete messages" (so-called "full function exchange", please refer to [ProtocolSpecification]). In contrast, the so-called "restricted function exchange" is designed to permit exchange of specific excerpts of data, i.e. fewer Elements than potentially available from the data owner (partially even not all "mandatory" Elements).

#### 3.1.3.2 Presence indications for "Content of Specialization..." tables

This section only defines rules for the client side.

Elements that are marked with "M" SHALL be supported by the client in case of readable as well as writeable data. This Element may be optional on the server side.

The following applies for readable data that is exchanged in a "read/reply" or "notify" operation:

- "R" means that the data SHOULD be supported by the client. In other words: If the server responds with the according Element, the client SHOULD be able to interpret the according Elements.
- "O" means that the data MAY be supported by the client. In other words: If the server responds with the according Element, the client MAY be able to interpret the according Elements.

The following applies for writeable data that is exchanged in a "write" operation:

- "R" means that the data SHOULD be written by the client.
- "O" means that the data MAY be written by the client.
- "F" means that the data SHALL NOT be written by the client.

The following applies for Elements that are not listed in the Actor section:

- In case of a received "reply" message: The client MAY ignore the Element.
- In case of a "write" operation to be created: The client MAY set the Element but SHALL consider that the server may ignore the Element.



- In case of a received "notify" message: The client MAY ignore the Element.

M, R or O may be combined with the suffix "(event)" to express that a supported Element or value only has to be supported during a certain event and hence does not need to be present at all times. If the event is not active the Element may be omitted or another value may be set. In most cases a High-Level requirement reference for the event is given in the rules column.

### **3.1.3.3 Presence indications for "Content of Function..." tables**

This section only defines rules for the server side.

Elements that are marked with "M" SHALL be supported by the server in case of readable as well as writeable data. In case of writeable data (marked with "M \W") the server does not need to set the Element, because the Element is set only by the client.

The following applies for readable data that is exchanged in a "read/reply" or "notify" operation:

- "R" means that the data SHOULD be provided by the server.
- "O" means that the data MAY be provided by the server.
- "F" means that the data SHALL NOT be provided by the server.

The following applies for writeable data that is exchanged in a "write" operation:

- "R" means that the data SHOULD be supported. In other words: If the client writes the Element, the server SHOULD accept those messages and the contained Elements.
- "O" means that the data MAY be supported. In other words: If the client writes the Element, the server MAY accept those messages and the contained Elements.

The following applies for Elements that are not listed in the Actor section:

- In case of a received "read" request: The according Element MAY be set in the reply.
- In case of a received "write" operation: The server MAY ignore the Element.
- In case of a "notify" operation to be created: The server MAY set the Element.

Note: The server will only accept write operations if the result fulfils the server Function requirements (permitted values, e.g.). Write operations on Elements that are not writeable MAY result in an error message.

M, R or O may be combined with the suffix "(event)" to express that a supported Element or value only has to be supported during a certain event and hence does not need to be present at all times. If the event is not active the Element may be omitted or another value may be set. In most cases a High-Level requirement reference for the event is given in the rules column.

### **3.1.3.4 Cardinality indications - Permitted number of occurrences**

A cardinality indication expresses constraints on the number of occurrences of a given Element or data set. In this section we use "X" as representation for such an Element or data set. Furthermore, "a" and "b" represent constraints. The following rules apply for the occurrence of "X" and its content related to a specific Scenario (see note underneath the list):



- 494 1. X  
 495 No cardinality indication.  
 496 2. X (a..b)  
 497 This means "X" SHALL occur at least "a" times and at maximum "b" times.  
 498 3. X (a..)  
 499 This means "X" SHALL occur at least "a" times and MAY occur more than "a" times.  
 500 4. X (..b)  
 501 This means "X" SHALL occur at maximum "b" times and MAY occur less than "b" times (even  
 502 zero occurrences are permissive).

503 Note: These rules apply only under consideration of presence indications and with regards to the  
 504 given Scenario or Function definition for this Use Case.

505 The following table is an example to explain this for two different placements.

Scenario [{...}]: M/R/O [W][C]	Element	Value	[High Level Mapping] Element and value rules
1: O	...		...
2: M \W	xFeatureType. xListData. xData. [UC-002] (1..3)		
2: M \W	xId	<g7> [<g8>] [<g9>]	PRIMARY IDENTIFIER of x
2: M \W	timePeriod		...
2: M \W	timePeriod. startTime	<xs:duration>	
2: M \W	xSlot. (1..)		
2: M \W	xSlot. xSlotId		...
2: M \W	xSlot. duration	<xs:duration>	...
2: M \W	qId	<h3>(-><g7>) [<h4>(-><g8>)] [<h5>(-><g9>)]	FOREIGN IDENTIFIER.
...	...	...	...

506 Table 3: Example table for cardinality indications

507 The field

508 xFeatureType. xListData. xData. [UC-002] (1..3)

509 introduces a data pattern (required Elements and values) for "xData" instances used for Scenario 2.  
 510 The field itself specifies that such an "xData" instance SHALL occur at least 1 time and at maximum 3  
 511 times within "xListData" of Feature Type "xFeatureType". However, this holds only for Scenario 2 and  
 512 only if such "xData" are required. In this case, they are required, as the left field

513 2: M \W

514 denotes that this data set is mandatory for Scenario 2. The "Value" definition

515 <g7> [<g8>] [<g9>]



of the Element "xId" specifies that this is the reason for the cardinality: There must be at least one "xData" instance and the corresponding "Value" placeholder is "<g7>" (see section 3.1.3.6 for the definition of "Value" placeholders). The second and third instance of "xData" are optional, as the corresponding placeholders "<g8>" and "<g9>" are put in brackets. Of course, the placeholders SHALL then have distinct values.

The "Value" definition of the Element "qId" contains the expression

```
<h3>(-><g7>) [<h4>(-><g8>)] [<h5>(-><g9>)]
```

This means that the placeholder "<h3>" is to be used with "<g7>". Likewise, "<h4>" is associated with "<g8>" and "<h5>" is associated with "<g9>".

Some Scenarios may require the association to two or more placeholders. As an example, we consider an expression

```
<t2>(-><v1>,<k3>)
```

In this case the placeholder "<t2>" is to be used with the pair of "<v1>" and "<k3>".

The field

```
xSlot. (1..)
```

expresses that the Element "xSlot" SHALL occur at least one time within its "xData", but MAY occur more than one time.

The remaining fields do not have an explicit cardinality indication.

### 3.1.3.5 Writability and changeability indication

In the same column where the presence indications are denoted, a mark is used to distinguish between writeable, changeable or readable Elements:

- Elements that are marked with "\W" are written by a client and SHALL be writeable at the server according to their presence indications. The client is not obliged to read the according data. Received notifications do not need to be evaluated.
- Elements that are marked with "\C" are changed by a client and SHALL be changeable at the server according to their presence indications. The client is not obliged to read the according data. Received notifications do not need to be evaluated.
- Elements that are marked with "\RW" are read and written by a client and SHALL be writeable and provided by the server according to their presence indications. Received notifications SHALL be evaluated according to their presence indications.
- Elements that are marked with "\RC" are read and changed by a client and SHALL be changeable and provided by the server according to their presence indications. Received notifications SHALL be evaluated according to their presence indications.
- Elements that are not marked are only read by a client and SHALL be provided by the server according to their presence indications. Received notifications SHALL be evaluated according to their presence indications.



"Writeable" means that the Element and its value may be written by a client. This includes the possibility to modify (if the Element is already present), create (if the Element is not present yet), and delete the Element. The server SHALL adjust its Function according to the received "write" operation (unless the server cannot accept the "write" operation according to section 3.1.3.3).

"Changeable" means that the Element's value may be changed by a client. If the Element is not present at the resource before, it probably **cannot** be created by the client via the "write" operation. In this case the server MAY decline such a message.

Note: "\W" includes "\C" already.

Note: Depending on the resource a client might need to request a proper binding before the server accepts a "write" operation.

### **3.1.3.6 Rules for "Value" placeholders**

If the "Value" column contains values for identifiers they are always written as placeholder variable (i.e. placeholder for the real value of the Element) in angle brackets, e.g. <x1>. This means all Elements used within a Scenario that have <x1> (e.g.) in the "Value" column SHALL have set the same content of the Element.

A placeholder variable <xY> (e.g. <x1>) for Scenario A is, in general, independent from a placeholder variable <xY> for Scenario B. However, the server SHOULD combine datasets if possible. If there is the requirement that the same value SHALL be used for different stated Scenarios, the according Scenario numbers in column "Scenario" are put in curly brackets (" {... }") for the Element containing the variable. Several curly bracket groups may exist.

Example: An Element with variable <x1> contains in the column "Scenario" the following expression:  
{2, 3}, {4, 5}

This means that Scenario 2 and 3 SHALL use the same value for the variable (e.g. 5) as well as Scenario 4 and 5 SHALL use the same value for the variable (e.g. 12). The variable values MAY differ between the two groups ({2, 3} and {4, 5}).

### **3.1.3.7 Rules for content of "Value" column**

For a given Scenario the "Value" column may restrict the permitted content of a Function's Element to one or more particular values. This means that Elements with values deviating from the restriction (i.e. from the permitted values) do not belong to the respective Scenario and need to be considered as if the Element is not set. If more than one particular value is permitted for an Element the values are in a single line each.

If a presence indication is set for the value (in an additional column before the value) the following rules SHALL be applied:

- "M" means that the value SHALL be supported. This means the value needs to be set at a certain point in time (depending on the value rules) or for a certain Element within a list entry.
- "R" means that the value SHOULD be supported.



- "O" means that the value MAY be supported.

If all possible values of a given mandatory Element are optional or recommended and this Element is used for the purpose of the respective Scenario, one of the values SHALL be set. If all possible values of a given optional or recommended Element are optional or recommended, this Element MAY contain also other values, but then this Element SHALL NOT be considered as part of the respective Scenario.

M, R or O may be combined with the suffix "(event)" to express that a supported value only has to be supported during a certain event and hence does not need to be present at all times. If the event is not active another value may be set. In most cases a High-Level requirement reference for the event is given in the rules column.

If no presence indication is set for the value, the following rules SHALL be applied:

- In case of Elements where the server may set or change an Element on its own (see section 3.1.3.5):
  - within the tables in the "Server data - Resources" sections:
    - the server SHALL support at least one of the listed values.
  - within the tables in the "Client data - Specializations" sections:
    - the client SHALL support all listed values.
- In case of Elements that are writable or changeable (see section 3.1.3.5):
  - within the tables in the "Server data - Resources" sections:
    - the server SHALL support all listed values.
  - within the tables in the "Client data - Specializations" sections:
    - the client SHALL support at least one of the listed values.

Depending on the Element, different values may be used during runtime. If this is the case, those rules are described within the value rules.

If a value is placed in parenthesis, the corresponding value is a recommendation. The actual value MAY deviate from this, e.g. "(1024)".

### **3.1.3.8 General information on how to interpret the "Content of Function..." and "Content of Specialization..." tables**

Within the "Client data - Specializations" sections each Specialization is described in an own sub-section with the name "Specialization "<name of the Specialization>" (e.g. "Specialization "Measurement\_GridFeedInEnergy"). It contains only one table that includes all Elements needed for this Specialization. The different Functions are mentioned in a continuous row, highlighted with grey background colour. This row contains the following parts:

<Feature Type>. <Function>.[ <list entry instance name>.]

The <list entry instance name> is only included if the <Function> is a list-based Function. An example could be:

DeviceConfiguration. deviceConfigurationKeyValueDescriptionListData.  
deviceConfigurationKeyValueDescriptionData.



In the following rows, only the names of the Elements are stated, without the prefix described above.

Within the "Server data - Resources" sections each Feature Type is described in an own sub-section with the name "Feature Type "<name of the Feature Type>" (e.g. "Feature Type "Measurement"). It contains sub-sections for each Function named "Function "<name of the Function>" (e.g. "Function "measurementListData"). These sections contain one table with all Elements needed for this resource. The list entries are mentioned in a continuous row, highlighted with grey background colour. This row contains the following parts:

<Feature Type>. <Function>.[ <list entry instance name>.]

The <list entry instance name> is only included if the <Function> is a list-based Function. An example could be:

Measurement. measurementDescriptionListData. measurementDescriptionData.

In the following rows, only the names of the Elements are stated, without the prefix described above.

For both kinds of tables, the following applies:

- Parent Elements are marked with a dot at the end of the name:  
     <parent Element>.  
     E.g.:  
     value.
- If there are sub-Elements, they are described in own rows with the name of the parent Element as prefix, separated by a dot and a blank space:  
     <parent Element>. <sub-Element>  
     E.g.:  
     value. number

### 3.1.4 Rules for "Feature Types and Functions..." tables

#### 3.1.4.1 Presence indications for "Feature Types and Functions..." tables

The following presence indications are used:

Abbreviation	Meaning	Link to requirement keywords
M	Mandatory	SHALL
R	Recommended	SHOULD
O	Optional	MAY

Table 4: Presence indication of Feature Types and Functions support

If at least one Function of a Feature has the presence indication "M", it is mandatory to support the Feature.



**3.1.4.2 Rules for "Possible operations" column**

Within the "Feature Types and Functions..." tables the column "Possible operations" state whether the Function is read- or writeable (as defined in the detailed discovery mechanism, see [ProtocolSpecification]).

If the "partial" concept (also called "restricted function exchange") SHALL be supported, the following notation is used (separated for read and write access):

read (M). partial (M)

write (M). partial (M)

If the "partial" concept SHOULD be supported, the following notation is used:

read (M). partial (R)

write (M). partial (R)

If the "partial" concept MAY be supported, the following notation is used:

read (M). partial (O)

write (M). partial (O)

The server can decide whether a notification is submitted complete or partial (as described in [ProtocolSpecification]) if not defined differently within this Use Case Specification.

**3.1.5 "Actor ... overview" diagram rules**

Within the "Actor [...] overview" diagrams in the "Actors" sub-sections the complete functionality of this Use Case is provided, including optional Scenarios. Which Scenarios are optional can be found in Table 1. The Actor MAY have more functionality implemented than needed for this Use Case.

For the following Actor overview example, a brief description of the graphical symbols will be described.



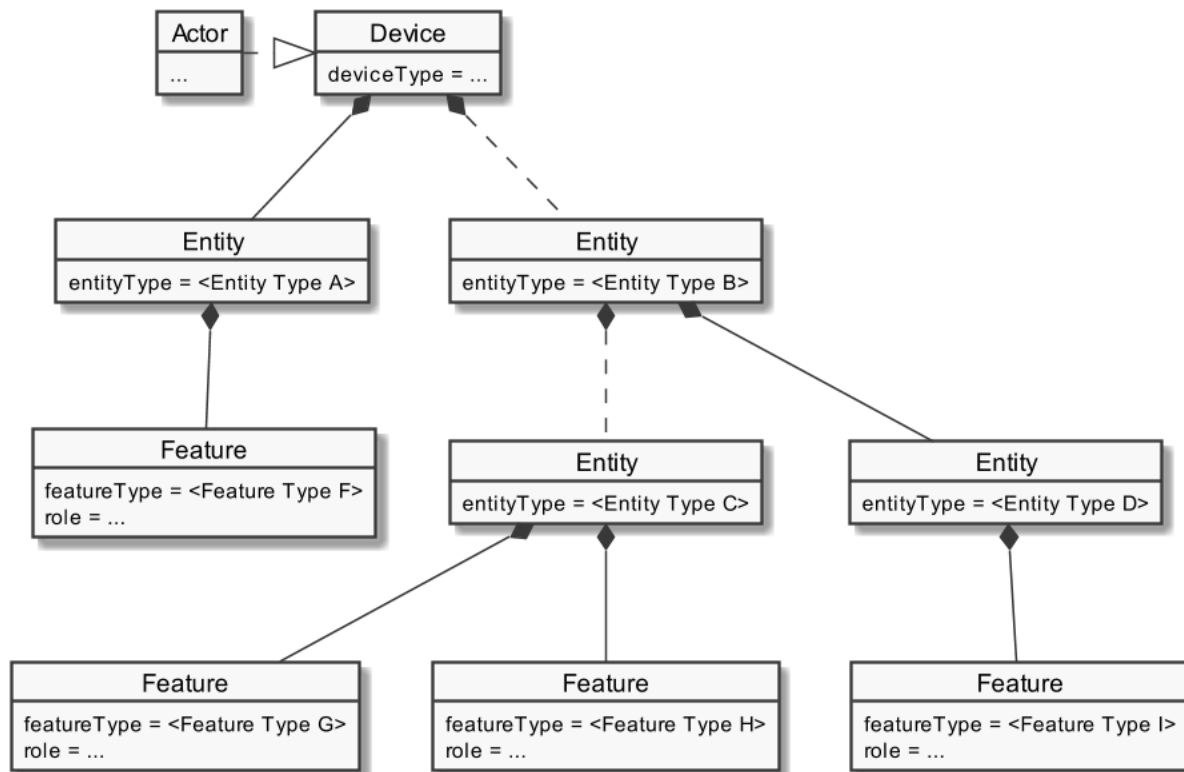


Figure 11: Actor overview example

The solid lines in the figure represent an immediate parent-childhood relation: The Entity with "<Entity Type A>" is a direct child of "Device". The Entity with "<Entity Type D>" is a direct child of the Entity with "<Entity Type B>". All Features are immediate child of the respective Entity.

The dashed lines in the figure express that there MAY be additional Entities between the shown Entities: A vendor's implementation MAY have one or more Entities between "Device" and the Entity with "<Entity Type B>". Likewise, a vendor's implementation MAY have one or more Entities between the Entity with "<Entity Type B>" and the Entity with "<Entity Type D>".

### 3.1.6 Specializations

Within the "Actors" sub-sections Specializations are referenced. A Specialization describes a dataset necessary to fulfil the specific requirements of a High-Level Use Case and its Scenarios. Often data from multiple different Features and Functions are needed to fulfil the requirements. Therefore, a Specialization defines a dataset that may encompass multiple related Functions from one or more different Features.

As different Use Cases sometimes share similar requirements, Specializations are also important from a re-usability perspective. This approach is used to improve consistency across Use Cases and avoid multiple variances of basically the same dataset. This is especially important in the case when an implementation supports multiple Use Cases. E.g. if a power measurement is necessary in two different Use Cases, both Use Cases could define slightly different datasets. In this case the server as well as the client functionality would have to implement both variances if both Use Cases are supported. This means, depending on the number of Use Cases, two or more datasets need to be



generated, transmitted and stored instead of one. Therefore, already existing Specializations specified within [UseCaseBaseSpecification] are used in this Use Case to avoid such problems.

If a Feature server can provide the data of a Specialization, the data does not necessarily always need to be available at the Feature server. There might be situations where the user deactivates a Use Case. There may also be other reasons why Use Case data cannot be provided currently. Therefore, a client always needs to be subscribed (as described in section 3.3.4) on the corresponding dataset to stay updated.

The SPINE resource description given in the "SPINE resources of the Actor" sections are derived from the Specializations given in the Actor's overview diagram. Please refer to [UseCaseBaseSpecification] for a detailed description of all Specializations.

### **3.1.7 Order of messages within the sequence diagrams**

There are several sequence diagrams in this document describing message flows. The order of the messages SHOULD be kept by the communications partners, but there might be cases where a different order makes sense. The communications partners SHALL be able to handle the Scenario functionalities even if the messages are transmitted in a different order by the other Actor(s). The sequence diagrams can be seen as examples.

### **3.1.8 Further information and rules**

None.

## **3.2 Actors**

### **3.2.1 EV**

#### **3.2.1.1 Resource hierarchy**

Within the Use Case discovery this Actor SHALL be denoted as "EV" in the Element "nodeManagementUseCaseData. useCaseInformation. actor".

The following diagram provides an overview of the Actor EV resource hierarchy.



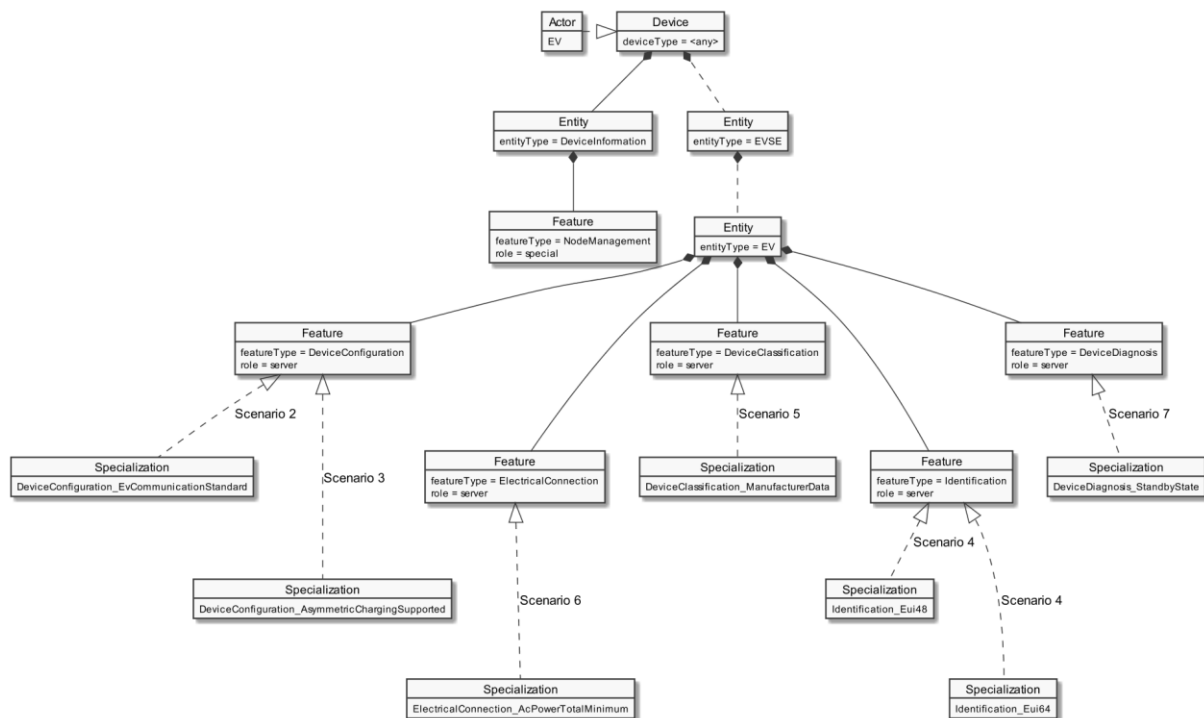


Figure 12: Actor "EV" overview

The "Actor ... overview" diagram rules" section describes how to interpret the diagram above. See the "Specializations" section for more information regarding the Specializations given in the diagram above.

Note: The entityType "DeviceInformation" with the featureType "NodeManagement" is required by the SPINE protocol and therefore SHALL be supported. Both types are added in the figure for completeness but are not directly linked to the Use Case.

The Use Case specific data follows behind the entityType "EV" which is a sub-Entity of the "EVSE" Entity. The Specializations represent the Scenario specific data that has to be supported for each Scenario and are realized with the according featureTypes.

If a Specialization is connected to a Feature with the role "client", the Actor has a client role for this data. This means the Actor accesses the data set described by the Specialization at a corresponding server Feature. Further details are described in the sub-section "Client data - Specializations".

If a Specialization is connected to a Feature with the role "server", the Actor has the server role for this data. This means the Actor must provide the corresponding data set of the Specialization on its Features. Further details are described in the sub-section "Server data - Resources".

### 3.2.1.2 Server data - Resources

#### 3.2.1.2.1 Overview

Behind the entityType "EV" the Actor EV SHALL offer the Feature Types and Functions given in the table below.



Feature Type	Scenario: M/R/O	Function	Possible operations
DeviceDiagnosis	2: M 3: M	deviceConfigurationKeyValueDescriptionListData	read (M). partial (R)
	2: M 3: M	deviceConfigurationKeyValueListData	read (M). partial (R)
Identification	4: M	identificationListData	read (M). partial (R)
DeviceClassification	5: M	deviceClassificationManufacturerData	read(M)
ElectricalConnection	6: M	electricalConnectionParameterDescriptionListData	read(M). partial(R)
	6: M	electricalConnectionPermittedValueSetListData	read(M). partial(R)
DeviceDiagnosis	7: M	deviceDiagnosisStateData	read(M)

Table 5: Feature Types and Functions used within this Use Case by the Actor EV

For each of these Feature Types the following rule applies: There SHALL be at maximum one Feature with the Feature Type in the Entity.

Note: As a consequence of the previous rule, an implementation may need to have Feature data from different Scenarios/Specializations or even Use Cases in a given Feature.

The Scenario number shows in which Scenarios the EV acts as server and which Feature Types and Functions are relevant in each Scenario.

A detailed definition of the Elements and values that shall be supported in each Function is given in the following sub-sections.

Note: If in the table above "partial" read is not mentioned or is only optional, it still might be mandatory to support partial notifications. The details of "partial" support are described within the Scenario sections.

Note: The presence indications stated above are meant relative to the ones of the according Scenario stated in Table 1. I.e. if a Scenario is optional ("O") and a Feature Type is mandatory ("M") the Feature Type must only be supported if the Scenario is supported, too.

Note: Further Features MAY be implemented on the same Entities, as well as further Functions MAY be implemented in the used Entities.



## 776 3.2.1.2.2 Feature Type "DeviceConfiguration"

## 777 3.2.1.2.2.1 Function "deviceConfigurationKeyValueDescriptionListData"

Scenario [...]: M/R/O [\W][\C]	Element	Value	[High Level Mapping] Element and value rules
2: M	DeviceConfiguration. deviceConfigurationKeyValueDescriptionListData. deviceConfigurationKeyValueDescriptionData.		
2: M	keyId	<x1>	SHALL be set as PRIMARY IDENTIFIER.
2: M	keyName	"communicationStandard"	If used, the content of the Element "valueType" SHALL be "string" and the Element "unit" SHALL be omitted. As content of the Element "value. string" within the linked deviceConfigurationKeyValueData entry, only one of the following strings SHALL be used: - iso15118-2ed1 - iso15118-2ed2 iec61851
2: M	valueType	"string"	The corresponding key value SHALL be of type xs:string.
3: M	DeviceConfiguration. deviceConfigurationKeyValueDescriptionListData. deviceConfigurationKeyValueDescriptionData.		
3: M	keyId	<x2>	SHALL be set as PRIMARY IDENTIFIER.
3: M	keyName	"asymmetricChargingSupported"	If used, the content of the Element "valueType" SHALL be "boolean" and the Element "unit" SHALL be omitted.
3: M	valueType	"boolean"	The corresponding key value SHALL be of type xs:boolean.

778 Table 6: Content of Function "deviceConfigurationKeyValueDescriptionListData" at Actor EV

779



## 780 3.2.1.2.2.2 Function "deviceConfigurationKeyValueListData"

Scenario [{...}]: M/R/O [W][C]	Element	Value	[High Level Mapping] Element and value rules
2: M	DeviceConfiguration. deviceConfigurationKeyValueListData. deviceConfigurationKeyValueData.		
2: M	keyId	<x1>	SHALL be set as PRIMARY IDENTIFIER.
2: M	value.		Exactly one of the child Elements SHALL be set. This SHALL match with the content of Element <i>valueType</i> within the key value description part.
2: M	value. string  Note: Only one of the following values SHALL be used.	"iso15118-2ed1"	[EVCC-003]
		"iso15118-2ed2"	[EVCC-004]
		"iec61851"	[EVCC-005]
3: M	DeviceConfiguration. deviceConfigurationKeyValueListData. deviceConfigurationKeyValueData.		
3: M	keyId	<x2>	SHALL be set as PRIMARY IDENTIFIER.
3: M	value.		Exactly one of the child Elements SHALL be set. This SHALL match with the content of Element <i>valueType</i> within the key value description part.
3: M	value. boolean	false	[EVCC-006]
		true	[EVCC-006]

781 Table 7: Content of Function "deviceConfigurationKeyValueListData" at Actor EV

782

## 783 3.2.1.2.3 Feature Type "Identification"

## 784 3.2.1.2.3.1 Function "identificationListData"

Scenario [{...}]: M/R/O [W][C]	Element	Value	[High Level Mapping] Element and value rules
4: M	Identification. identificationListData. identificationData.		
4: M	identificationId	<w1>	SHALL be set as PRIMARY IDENTIFIER.
4: M	identificationType	"eui48"	[EVCC-007]



			<p>The identificationValue SHALL be interpreted as eui48 MAC address.</p> <p>The following pattern SHALL be used:</p> <p>(( [A-F]   [0-9] ) {2} \- ) {5} ( [A-F]   [0-9] ) {2}</p>
		"eui64"	<p>[EVCC-007]</p> <p>The identificationValue SHALL be interpreted as eui64 MAC address.</p> <p>The following pattern SHALL be used:</p> <p>(( [A-F]   [0-9] ) {2} \- ) {7} ( [A-F]   [0-9] ) {2}</p>
4: M	identificationValue		<p>The string-length SHOULD NOT be longer than 256 characters. If it is longer, the sender SHALL consider the possibility that the receiver will shorten the string to 256 characters.</p>

Table 8: Content of Function "identificationListData" at Actor EV

## 3.2.1.2.4 Feature Type "DeviceClassification"

## 3.2.1.2.4.1 Function "deviceClassificationManufacturerData"

Scenario [{...}]: M/R/O [W][C]	Element	Value	[High Level Mapping] Element and value rules
5: M	DeviceClassification. deviceClassificationManufacturerData.		
5: R	deviceName		<p>[EVCC-010]</p> <p>The string-length SHOULD NOT be longer than 256 characters. If it is longer, the sender SHALL consider the possibility that the receiver will shorten the string to 256 characters.</p>
5: R	deviceCode		<p>[EVCC-011]</p> <p>The string-length SHOULD NOT be longer than 256 characters. If it is longer, the sender SHALL consider the possibility that the receiver will shorten the string to 256 characters.</p>
5: O	serialNumber		<p>The string-length SHOULD NOT be longer than 256 characters. If</p>



			it is longer, the sender SHALL consider the possibility that the receiver will shorten the string to 256 characters.
5: O	softwareRevision		The string-length SHOULD NOT be longer than 256 characters. If it is longer, the sender SHALL consider the possibility that the receiver will shorten the string to 256 characters.
5: O	hardwareRevision		The string-length SHOULD NOT be longer than 256 characters. If it is longer, the sender SHALL consider the possibility that the receiver will shorten the string to 256 characters.
5: R	vendorName		[EVCC-012] The string-length SHOULD NOT be longer than 256 characters. If it is longer, the sender SHALL consider the possibility that the receiver will shorten the string to 256 characters.
5: R	vendorCode		[EVCC-013] The string-length SHOULD NOT be longer than 256 characters. If it is longer, the sender SHALL consider the possibility that the receiver will shorten the string to 256 characters.
5: R	brandName		[EVCC-014] The string-length SHOULD NOT be longer than 256 characters. If it is longer, the sender SHALL consider the possibility that the receiver will shorten the string to 256 characters.
5: R	manufacturerLabel		[EVCC-015] The string-length SHOULD NOT be longer than 256 characters.
5: O	manufacturerDescription		The string-length SHOULD NOT be longer than 4096 characters

Table 9: Content of Function "deviceClassificationManufacturerData" at Actor EV



## 3.2.1.2.5 Feature Type "ElectricalConnection"

## 3.2.1.2.5.1 Function "electricalConnectionParameterDescriptionListData"

Scenario [...]: M/R/O [W][C]	Element	Value	[High Level Mapping] Element and value rules
6: M	ElectricalConnection. electricalConnectionParameterDescriptionListData. electricalConnectionParameterDescriptionData.		
6: M	electricalConnectionId	<y1>	SHALL be set as PRIMARY IDENTIFIER.
6: M	parameterId	<z1>	SHALL be set as SUB IDENTIFIER.
6: M	acMeasuredPhases		
6: M	scopeType	"acPowerTotal"	

Table 10: Content of Function "electricalConnectionParameterDescriptionListData" at Actor EV

## 3.2.1.2.5.2 Function "electricalConnectionPermittedValueSetListData"

Scenario [...]: M/R/O [W][C]	Element	Value	[High Level Mapping] Element and value rules
6: M	ElectricalConnection. electricalConnectionPermittedValueSetListData. electricalConnectionPermittedValueSetData.		
6: M	electricalConnectionId	<y1>	SHALL be set as PRIMARY IDENTIFIER.
6: M	parameterId	<z1>	SHALL be set as SUB IDENTIFIER.
6: M	permittedValueSet.		At least one set of permitted values SHALL be stated.
6: M	permittedValueSet. range		
6: M	permittedValueSet. range. min.		[EVCC-017] The sub-Elements "number" and "scale" represent a value according to the following formula: $\text{number} * 10^{\text{scale}}$
6: M	permittedValueSet. range. min. number		SHALL be used.
6: O	permittedValueSet. range. min. scale		MAY be used. If absent, a default value of "0" applies.
6: O	permittedValueSet. range. max.		[EVCC-018] The sub-Elements "number" and "scale" represent a value according to the following formula: $\text{number} * 10^{\text{scale}}$
6: M	permittedValueSet. range. max. number		SHALL be used.



6: O	permittedValueSet. range. max. scale		MAY be used. If absent, a default value of "0" applies.
6: R	permittedValueSet.		
6: R	permittedValueSet. value.		[EVCC-019] The sub-Elements "number" and "scale" represent a value according to the following formula: $\text{number} * 10^{\text{scale}}$
6: M	permittedValueSet. value. number		SHALL be used.
6: O	permittedValueSet. value. scale		MAY be used. If absent, a default value of "0" applies.

Table 11: Content of Function "electricalConnectionPermittedValueSetListData" at Actor EV

### 3.2.1.2.6 Feature Type "DeviceDiagnosis"

#### 3.2.1.2.6.1 Function "deviceDiagnosisStateData"

Scenario [{...}]: M/R/O [W][C]	Element	Value	[High Level Mapping] Element and value rules
7: M	DeviceDiagnosis. deviceDiagnosisStateData.		
7: M	operatingState	7: M "normalOperation"	
		7: M "standby"	[EVCC-020]

Table 12: Content of Function "deviceDiagnosisStateData" at Actor EV

### 3.2.1.3 Client data - Specializations

As this Actor has only server functionality, no Specializations are described within this section.

## 3.2.2 CEM

### 3.2.2.1 Resource hierarchy

Within the Use Case discovery this Actor SHALL be denoted as "CEM" in the Element "nodeManagementUseCaseData. useCaseInformation. actor".

The following diagram provides an overview of the Actor CEM resource hierarchy.



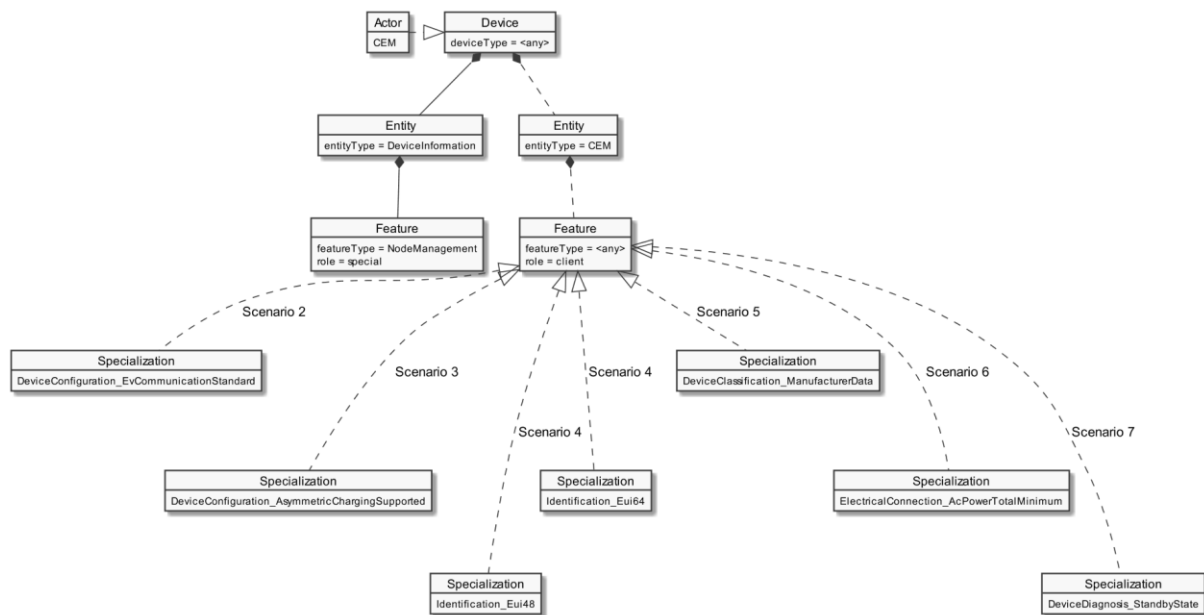


Figure 13: Actor "CEM" overview

The "Actor ... overview" diagram rules" section describes how to interpret the diagram above. See the "Specializations" section for more information regarding the Specializations given in the diagram above.

Note: The entityType "DeviceInformation" with the featureType "NodeManagement" is required by the SPINE protocol and therefore SHALL be supported. They are added for completeness but not directly linked to the Use Case.

The Use Case specific data follow behind the entityType "CEM". The Specializations represent the Scenario specific data that SHALL be supported for each Scenario.

If a Specialization is connected to a Feature with the role "client", the Actor has a client role for this data. This means, the Actor accesses the data set described by the Specialization at a corresponding server Feature. Further details are described in the sub section "Client data - Specializations".

If a Specialization is connected to a Feature with the role "server", the Actor has the server role for this data. This means, the Actor must provide the corresponding data set described by the Specialization. Further details are described in the sub section "Server data - Resources".

### 3.2.2.2 Server data - Resources

As this Actor has only client functionality, no resources are described within this section.



### 3.2.2.3 Client data - Specializations

#### 3.2.2.3.1 Topic "DeviceConfiguration"

##### 3.2.2.3.1.1 Specialization "DeviceConfiguration\_EvCommunicationStandard"

Scenario {...}: M/R/O [W][\C]	Element	Value	[High Level Mapping] Element and value rules
2: M	DeviceConfiguration. deviceConfigurationKeyValueDescriptionListData. deviceConfigurationKeyValueDescriptionData.		
2: M	keyId	<x1>	SHALL be set as PRIMARY IDENTIFIER.
2: M	keyName	"communicationStandard"	If used, the content of the Element "valueType" SHALL be "string" and the Element "unit" SHALL be omitted. As content of the Element "value. string" within the linked deviceConfigurationKeyValueData entry, only one of the following strings SHALL be used: <ul style="list-style-type: none"> <li>- iso15118-2ed1</li> <li>- iso15118-2ed2</li> <li>- iec61851</li> </ul>
2: M	valueType	"string"	The corresponding key value SHALL be of type xs:string.
2: M	DeviceConfiguration. deviceConfigurationKeyValueListData. deviceConfigurationKeyValueData.		
2: M	keyId	<x1>	SHALL be set as PRIMARY IDENTIFIER.
2: M	value.		Exactly one of the child Elements SHALL be set. This SHALL match with the content of Element <i>valueType</i> within the key value description part.
2: M	value. string  Note: Only one of the following values SHALL be used.	"iso15118-2ed1"	[EVCC-003]
		"iso15118-2ed2"	[EVCC-004]
		"iec61851"	[EVCC-005]

Table 13: Content of Specialization "DeviceConfiguration\_EvCommunicationStandard" at Actor CEM



## 835 3.2.2.3.1.2 Specialization "DeviceConfiguration\_AsymmetricChargingSupported"

Scenario [{...}]: M/R/O [\W][\C]	Element	Value	[High Level Mapping] Element and value rules
3: M	DeviceConfiguration. deviceConfigurationKeyValueDescriptionListData. deviceConfigurationKeyValueDescriptionData.		
3: M	keyId	<x2>	SHALL be set as PRIMARY IDENTIFIER.
3: M	keyName	"asymmetricChargingSupported"	If used, the content of the Element "valueType" SHALL be "boolean" and the Element "unit" SHALL be omitted.
3: M	valueType	"boolean"	The corresponding key value SHALL be of type xs:boolean.
3: M	DeviceConfiguration. deviceConfigurationKeyValueListData. deviceConfigurationKeyValueData.		
3: M	keyId	<x2>	SHALL be set as PRIMARY IDENTIFIER.
3: M	value.		Exactly one of the child Elements SHALL be set. This SHALL match with the content of Element <i>valueType</i> within the key value description part.
3: M	value. boolean	false	[EVCC-006]
		true	[EVCC-006]

836 Table 14: Content of Specialization "DeviceConfiguration\_AsymmetricChargingSupported" at Actor CEM

837

## 838 3.2.2.3.2 Topic "Identification"

## 839 3.2.2.3.2.1 Specialization "Identification\_Eui48" and "Identification\_Eui64"

Scenario [{...}]: M/R/O [\W][\C]	Element	Value	[High Level Mapping] Element and value rules
4: M	Identification. identificationListData. identificationData.		
4: M	identificationId	<w1>	SHALL be set as PRIMARY IDENTIFIER.
4: M	identificationType	"eui48"	[EVCC-007] The identificationValue SHALL be interpreted as eui48 MAC address.



			The following pattern SHALL be used: ( ([A-F]   [0-9] ) {2} \- ) {5} ( [A-F]   [0-9] ) {2}
		"eui64"	[EVCC-007] The identificationValue SHALL be interpreted as eui64 MAC address. The following pattern SHALL be used: ( ([A-F]   [0-9] ) {2} \- ) {7} ( [A-F]   [0-9] ) {2}
4: M	identificationValue		The string-length SHOULD NOT be longer than 256 characters. If it is longer, the sender SHALL consider the possibility that the receiver will shorten the string to 256 characters.

Table 15: Content of Specialization "Identification\_Eui48" and "Identification\_Eui64" at Actor CEM

## 3.2.2.3.3 Topic "DeviceClassification"

## 3.2.2.3.3.1 Specialization "DeviceClassification\_ManufacturerData"

Scenario [...]: M/R/O [W][C]	Element	Value	[High Level Mapping] Element and value rules
5: M	DeviceClassification. deviceClassificationManufacturerData.		
5: R	deviceName		[EVCC-010] The string-length SHOULD NOT be longer than 256 characters. If it is longer, the sender SHALL consider the possibility that the receiver will shorten the string to 256 characters.
5: R	deviceCode		[EVCC-011] The string-length SHOULD NOT be longer than 256 characters. If it is longer, the sender SHALL consider the possibility that the receiver will shorten the string to 256 characters.
5: O	serialNumber		The string-length SHOULD NOT be longer than 256 characters. If it is longer, the sender SHALL consider the possibility that the



			receiver will shorten the string to 256 characters.
5: O	softwareRevision		The string-length SHOULD NOT be longer than 256 characters. If it is longer, the sender SHALL consider the possibility that the receiver will shorten the string to 256 characters.
5: O	hardwareRevision		The string-length SHOULD NOT be longer than 256 characters. If it is longer, the sender SHALL consider the possibility that the receiver will shorten the string to 256 characters.
5: R	vendorName		[EVCC-012] The string-length SHOULD NOT be longer than 256 characters. If it is longer, the sender SHALL consider the possibility that the receiver will shorten the string to 256 characters.
5: R	vendorCode		[EVCC-013] The string-length SHOULD NOT be longer than 256 characters. If it is longer, the sender SHALL consider the possibility that the receiver will shorten the string to 256 characters.
5: R	brandName		[EVCC-014] The string-length SHOULD NOT be longer than 256 characters. If it is longer, the sender SHALL consider the possibility that the receiver will shorten the string to 256 characters.
5: R	manufacturerLabel		[EVCC-015] The string-length SHOULD NOT be longer than 256 characters.
5: O	manufacturerDescription		The string-length SHOULD NOT be longer than 4096 characters

Table 16: Content of Specialization "DeviceClassification\_ManufacturerData" at Actor CEM



## 846 3.2.2.3.4 Topic "ElectricalConnection"

## 847 3.2.2.3.4.1 Specialization "ElectricalConnection\_AcPowerTotalMinimum"

Scenario [...]: M/R/O [W][V]	Element	Value	[High Level Mapping] Element and value rules
6: M	ElectricalConnection. electricalConnectionParameterDescriptionListData. electricalConnectionParameterDescriptionData.		
6: M	electricalConnectionId	<y1>	SHALL be set as PRIMARY IDENTIFIER.
6: M	parameterId	<z1>	SHALL be set as SUB IDENTIFIER.
6: M	acMeasuredPhases		States the phase, which is measured.
6: M	scopeType	"acPowerTotal"	
6: M	ElectricalConnection. electricalConnectionPermittedValueSetListData. electricalConnectionPermittedValueSetData.		
6: M	electricalConnectionId	<y1>	SHALL be set as PRIMARY IDENTIFIER.
6: M	parameterId	<z1>	SHALL be set as SUB IDENTIFIER.
6: M	permittedValueSet.		At least one set of permitted values SHALL be stated.
6: M	permittedValueSet. range		
6: M	permittedValueSet. range. min.		[EVCC-017] The sub-Elements "number" and "scale" represent a value according to the following formula: $\text{number} * 10^{\text{scale}}$
6: M	permittedValueSet. range. min. number		SHALL be used.
6: M	permittedValueSet. range. min. scale		MAY be used. If absent, a default value of "0" applies.
6: O	permittedValueSet. range. max.		[EVCC-018] The sub-Elements "number" and "scale" represent a value according to the following formula: $\text{number} * 10^{\text{scale}}$
6: M	permittedValueSet. range. max. number		SHALL be used.
6: M	permittedValueSet. range. max. scale		MAY be used. If absent, a default value of "0" applies.
6: R	permittedValueSet.		
6: R	permittedValueSet. value.		[EVCC-019] The sub-Elements "number" and "scale" represent a value according to the following formula: $\text{number} * 10^{\text{scale}}$
6: M	permittedValueSet. value. number		SHALL be used.



6: M	permittedValueSet. value. scale		MAY be used. If absent, a default value of "0" applies.
------	------------------------------------	--	--

Table 17: Content of Specialization "ElectricalConnection\_AcPowerTotalMinimum" at Actor CEM

### 3.2.2.3.5 Topic "DeviceDiagnosis"

#### 3.2.2.3.5.1 Specialization "DeviceDiagnosis\_StandbyState"

Scenario {...]: M/R/O [W][\C]	Element	Value	[High Level Mapping] Element and value rules
7: M	DeviceDiagnosis. deviceDiagnosisStateData.		
7: M	operatingState	"normalOperation"	
		"standby"	[EVCC-020]

Table 18: Content of Specialization "DeviceDiagnosis\_StandbyState" at Actor CEM

## 3.3 Pre-Scenario communication

### 3.3.1 General information

The Pre-Scenario communication is needed if a client does not know the corresponding addresses on the server or if the required subscriptions or bindings are not active. In this case certain general communication mechanisms SHALL be used within SPINE:

- Detailed discovery: allows to discover resource addresses.
- Binding: allows to bind to resource address, which is frequently necessary to obtain write privileges.
- Subscription: allows to subscribe to resource addresses, which is necessary to receive unsolicited notifications if a resource changes during runtime.

It is possible to combine those steps for multiple Scenarios or also multiple Use Cases:

- E.g. if multiple Scenarios in multiple Use Cases use the same Feature, only one subscription needs to occur.
- E.g. a complete detailed discovery or a subscription to the NodeManagement Feature needs to occur only once for all Use Cases.

Depending on which Entity, Feature and Functions are used within a Scenario the payload of the corresponding messages may slightly differ, but the basic principles and messages used stay the same.

The subsequent messages SHALL be exchanged for those parts that have not already been performed since the current connection is established or if those parts are outdated for another reason (e.g. if the detailed discovery is needed, but the bindings and subscriptions are still active from a previous connection only the detailed discovery messages need to be exchanged). If all Pre-Scenario



communication parts are up-to-date, this section MAY be skipped, and the implementation can proceed as described in the corresponding "Scenario communication" sections.

After the connection is re-established (e.g. due to a power loss or a firmware update) the Pre-Scenario communication SHALL be performed as well. There may be circumstances where messages from the Pre-Scenario communication may be exchanged again.

Often the necessary messages of different Scenarios can be combined, so that only one single message is needed instead of multiple messages for the different Scenarios. This also is the case for the Pre-Scenario communication. In most cases only one "read" operation on the detailed discovery is necessary, as well as only one subscription request or binding request is needed for each Feature. Often multiple Scenarios within a Use Case access the same Feature, so only one subscription or binding is necessary.

### 3.3.2 Detailed discovery

For the functionality where a client already has current detailed discovery information (i.e. independent of this Use Case or any Scenario of it) the remainder of this section SHOULD be skipped.

Otherwise, the following procedure SHALL be performed in the given order:

1. If a client is not subscribed to the primary NodeManagement instance, the client SHALL acquire a subscription according to the figure provided within this sub-section.
2. A client SHALL read the detailed discovery information according to the figure provided within this sub-section. It SHALL keep the received information as far as it concerns mandatory and supported optional Entity Types, Feature Types and Functions of this Use Case that are needed by the client. This means that a client may choose how to store the necessary information. E.g. a client Actor can store the information how to address the necessary Features of the implemented Scenarios but may discard the Entity information.
3. If and as long as a client has a subscription to the detailed discovery information of an Actor and receives proper notifications, it SHALL consider (i.e. integrate into the kept detailed discovery information) the received information as far as it concerns mandatory and supported optional Entity Types, Feature Types and Functions of this Use Case.



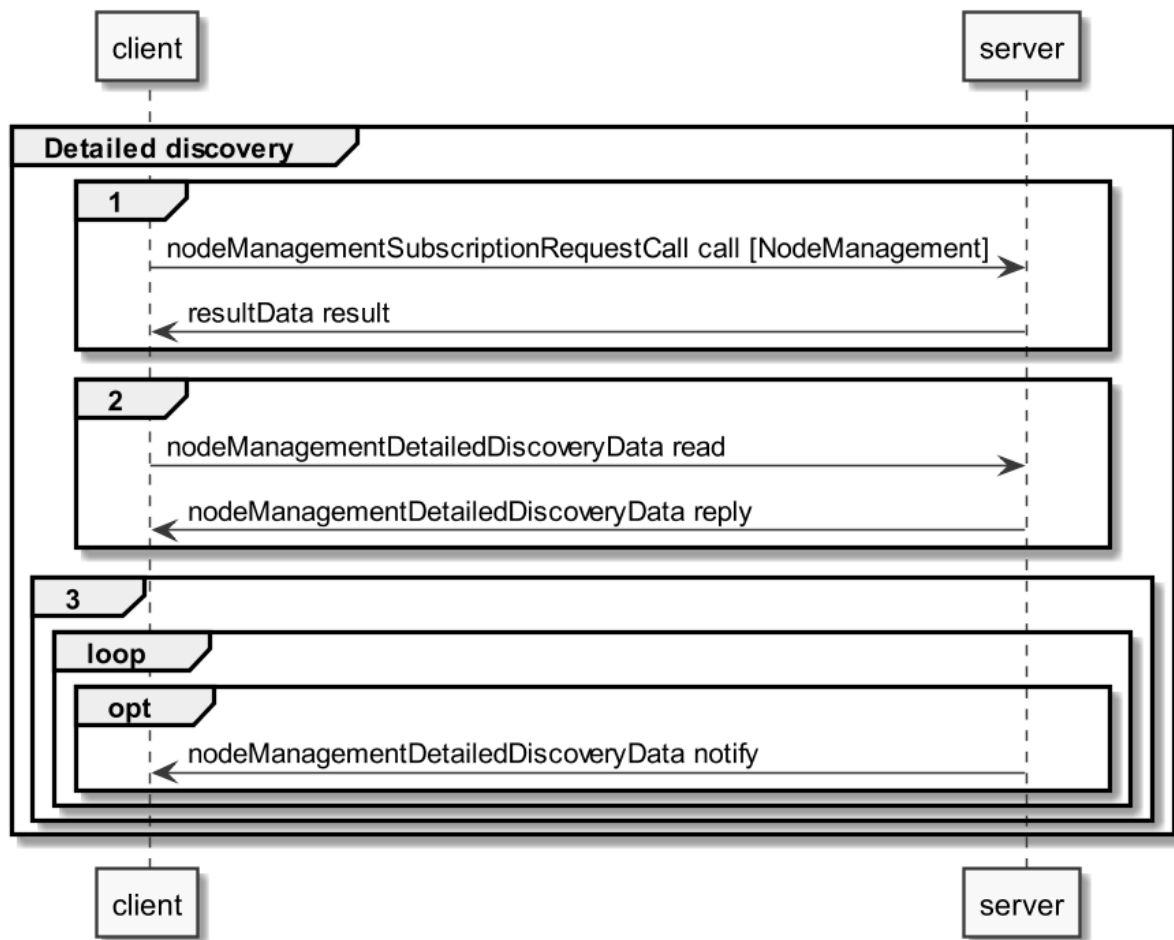


Figure 14: Pre-Scenario communication - Detailed discovery sequence diagram

If the "nodeManagementDetailedDiscoveryData read" fails, the client SHOULD retry to read the detailed discovery information until the "nodeManagementDetailedDiscoveryData reply" message was received successfully.

If all functionality is present at all times: The "nodeManagementDetailedDiscoveryData reply" message contains at least the mandatory Entities and Features given in the "Actor [...] overview" diagrams as well as the used Functions and their "possible operations" described in section 3.2 and its sub-sections.

If functionality is added or removed dynamically: The "nodeManagementDetailedDiscoveryData reply" message does not need to contain all mandatory Entities and Features given in the "Actor [...] overview" diagrams as well as all needed Functions and their "possible operations" described in section 3.2 and its sub-sections. However, as soon as the functionality is available it will be announced via a "nodeManagementDetailedDiscoveryData notify" message.

For the nodeManagementDetailedDiscoveryData read Function it is recommended to use a partial read with separated Selectors that may use one of the following Elements:

- entityType
- featureType



Note: Even with the usage of Selectors Features and Entities that are not relevant for this Use Case may be discovered. However, only Features and Entities that fulfil the hierarchical order as described within the Actors' sections shall be considered for this Use Case.

A "partial" notify SHALL be supported without using Selectors and Elements. Partial "delete" notify SHOULD also be supported with separated Selectors that may use one of the following Elements:

- entityAddress
- featureAddress

### 3.3.3 Binding

A server SHALL support binding for all Features that contain writeable or changeable data. Before a write on a Function of a Feature occurs, the client SHALL create a binding to the corresponding Feature. For this the nodeManagementBindingRequestCall Function is used as shown in the following sequence diagram:

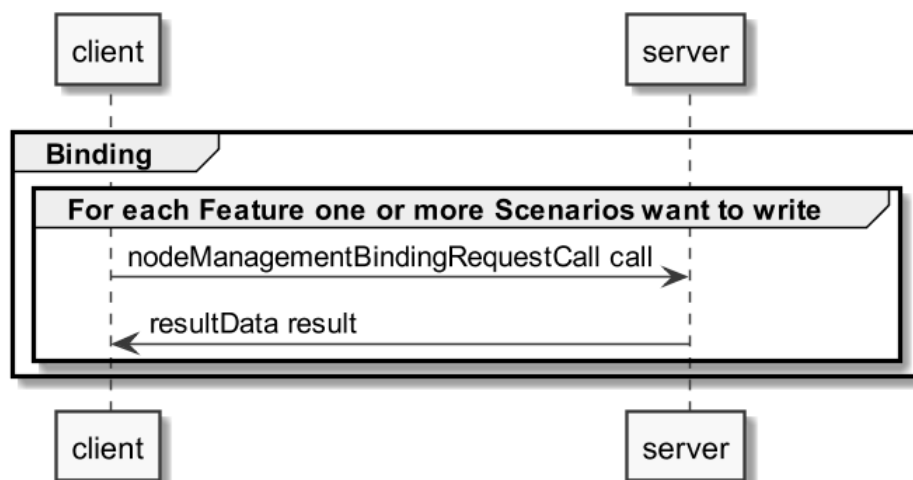


Figure 15: Pre-Scenario communication - Binding sequence diagram

If functionality is added or removed dynamically, binding may not be possible at all times on the required Functions. A client SHALL retry to create a binding again when receiving according updated detailed discovery information.

### 3.3.4 Subscription

A server SHALL support subscription for all Features that contain readable data that may change during runtime. The client SHALL create a subscription for all Features that the client wants to read. For this the nodeManagementSubscriptionRequestCall Function is used as shown in the following sequence diagram:



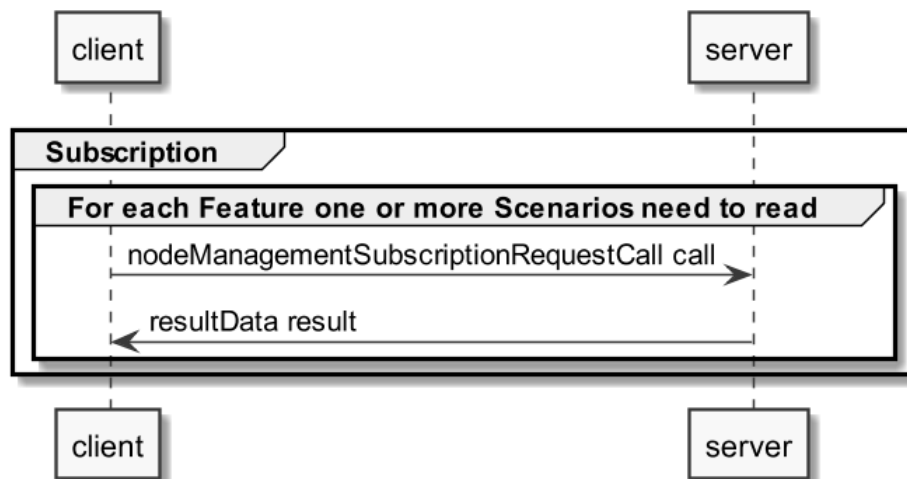


Figure 16: Pre-Scenario communication - Subscription sequence diagram

If the subscription request fails (e.g. because it is not supported by the server or the maximum number of possible subscriptions is reached), the client SHOULD read the data periodically (so-called "polling").

If functionality is added or removed dynamically, subscription may not be possible at all times on the required Functions. A client SHALL retry its subscription procedure again when receiving according updated detailed discovery information.

### 3.3.5 Dynamic behaviour

In case Entities or Features are removed, a nodeManagementDetailedDiscoveryData "notify" is transmitted that informs about the deleted Entities and Features. All existing binding or subscription entries on the deleted Features SHALL be deleted by each device.

In case Entities or Features are added the Pre-Scenario communication starts with transmitting a nodeManagementDetailedDiscoveryData "notify" that contains the added Entities and Features.

## 3.4 Scenarios

### 3.4.1 Scenario 1 - EV connected

#### 3.4.1.1 Pre-Scenario communication

1. **Detailed Discovery:** Actors that act as client within this Scenario, need to know the addresses of the server Features used in the Initial Scenario communication. If an address of a particular server Feature is not known, the detailed discovery has to be used, as described in section 3.3.2.

#### 3.4.1.2 Initial Scenario communication

If the EV is connected to the EVSE, an EV Entity is added as sub-Entity of the EVSE Entity. This triggers an update of the Detailed Discovery as described in the Pre-Scenario communication.



**3.4.1.3 Runtime Scenario communication**

None.

**3.4.1.4 Additional information**

None.

**3.4.2 Scenario 2 - EV sends communication standard****3.4.2.1 Pre-Scenario communication**

1. **Detailed Discovery:** Actors that act as client within this Scenario, need to know the addresses of the server Features used in the Initial Scenario communication. If an address of a particular server Feature is not known, the detailed discovery has to be used, as described in section 3.3.2.
2. **Binding:** Binding SHOULD NOT be used for this Scenario.
3. **Subscription:** Actors SHALL create a subscription for each server Feature that is relevant for the corresponding Actor within this Scenario, as described in section 3.3.4.

The Initial Scenario communication SHALL start at the latest when the required resources on an Actor are known and the necessary binding and subscription procedures have been finished. However, as soon as an address of a required resource is known, the Initial Scenario communication for this resource MAY start already, even if addresses of other required resources are not known yet.

If required resources are removed and added again, they are re-discovered, and the Initial Scenario communication is triggered again for those resources.

**3.4.2.2 Initial Scenario communication**

Each time a (re-)connection is established, even if the Pre-Scenario communication phase is skipped, the messages as shown in the following sequence diagram SHALL be exchanged, as the corresponding resources may have changed in the meantime:



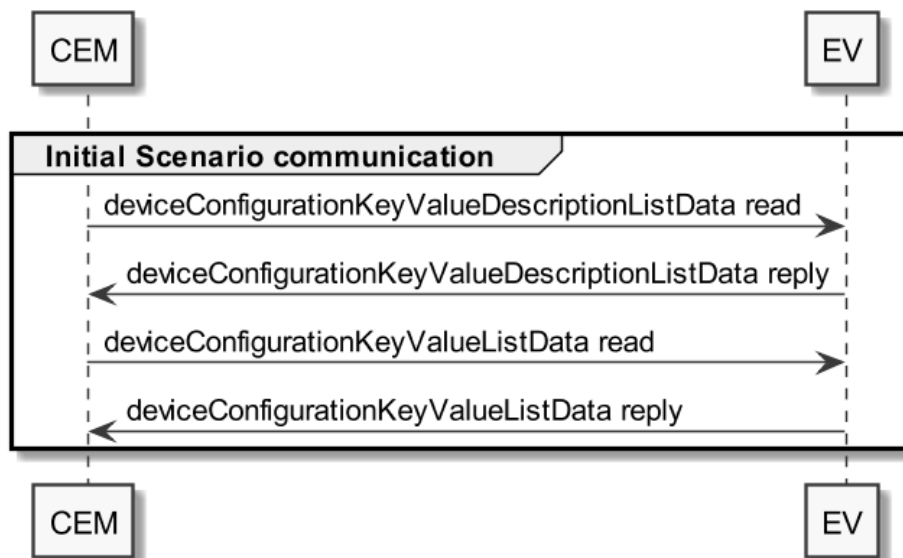


Figure 17: Scenario 2 - Initial Scenario communication sequence diagram

The deviceConfigurationKeyValueDescriptionListData read SHOULD be a "partial" read operation with the following Selectors:

- keyName = "communicationsStandard"

The deviceConfigurationKeyValueListData read SHOULD be a "partial" read operation with the following Selectors:

- keyId (derived from the deviceConfigurationKeyValueDescriptionListData reply)

Note: If partial read is not supported a full read SHALL be performed.

The following table shows where the necessary content of the messages from the sequence diagram is described:

Message name from sequence diagram	Content description in table	Scenario number in table
deviceConfigurationKeyValueDescriptionListData reply	Table 6	2
deviceConfigurationKeyValueListData reply [EVCC-002]	Table 7	2

Table 19: Initial Scenario communication content references for Scenario 2

Note: Within the Initial Scenario communication the content required by this scenario MAY not be provided completely but later on during Runtime Scenario communication.

### 3.4.2.3 Runtime Scenario communication

Based on the Initial Scenario communication the Runtime Scenario communication provides updates during runtime.

If one of the referenced server Functions' data change, the server SHALL submit the change as shown in the following figure:



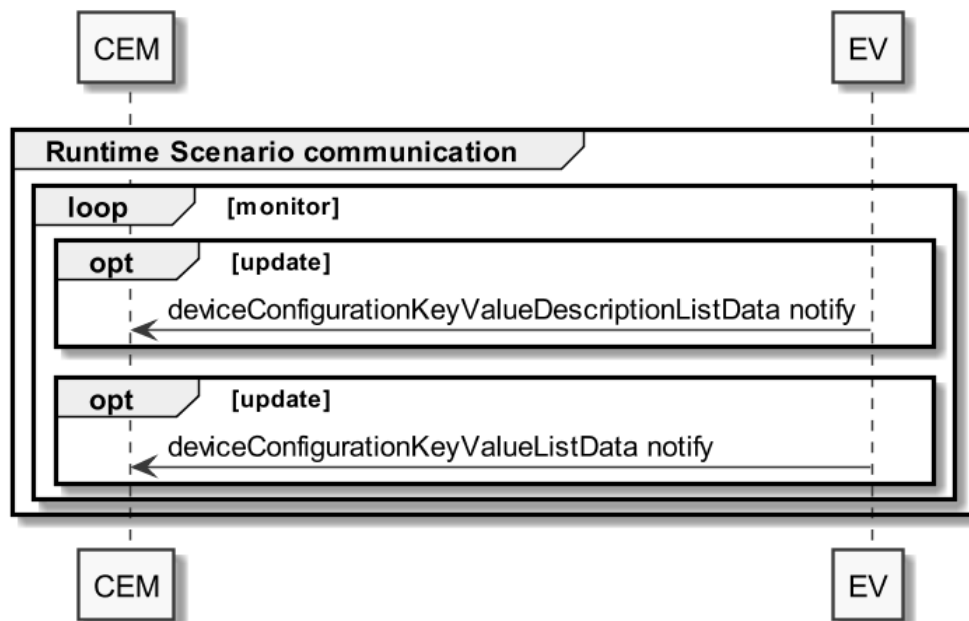


Figure 18: Scenario 2 - Runtime Scenario communication sequence diagram

Partial notifications without Selectors or Elements SHALL be supported for all Functions used in this Scenario.

For deviceConfigurationKeyValueDescriptionListData notify and deviceConfigurationKeyValueListData notify "partial" delete notifications SHOULD be supported with the Selector:

- keyId

Note: To interpret partial notification messages correctly the information obtained during the Initial Scenario communication phase is necessary.

Note: A read operation ("polling") on all Functions is possible at any time, e.g. if a notification could not be evaluated.

The following table shows where the necessary content of the messages of the sequence diagram is described:

Message name from sequence diagram	Content description in table	Scenario number in table
deviceConfigurationKeyValueDescriptionListData notify	Table 6	2
deviceConfigurationKeyValueListData notify [EVCC-002]	Table 7	2

Table 20: Runtime Scenario communication content references for Scenario 2

#### 3.4.2.4 Additional information

None.



### 1040 3.4.3 Scenario 3 - EV sends support of asymmetric charging

#### 1041 3.4.3.1 Pre-Scenario communication

- 1042 1. **Detailed Discovery:** Actors that act as client within this Scenario, need to know the addresses  
1043 of the server Features used in the Initial Scenario communication. If an address of a  
1044 particular server Feature is not known, the detailed discovery has to be used, as described in  
1045 section 3.3.2.
- 1046 2. **Binding:** Binding SHOULD NOT be used for this Scenario.
- 1047 3. **Subscription:** Actors SHALL create a subscription for each server Feature that is relevant for  
1048 the corresponding Actor within this Scenario, as described in section 3.3.4.

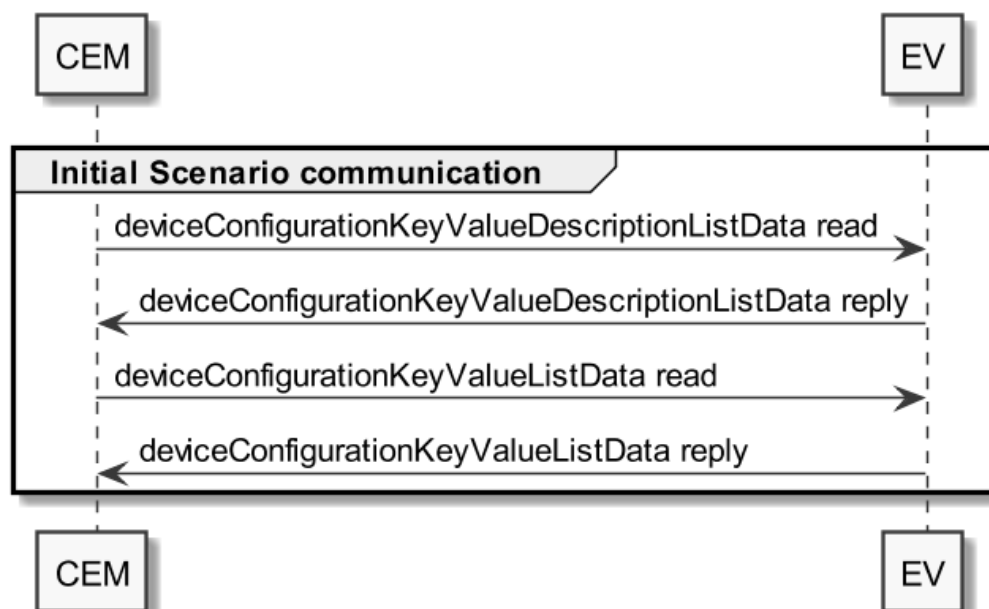
1049 The Initial Scenario communication SHALL start at the latest when the required resources on an Actor  
1050 are known and the necessary binding and subscription procedures have been finished. However, as  
1051 soon as an address of a required resource is known, the Initial Scenario communication for this  
1052 resource MAY start already, even if addresses of other required resources are not known yet.

1053 If required resources are removed and added again, they are re-discovered, and the Initial Scenario  
1054 communication is triggered again for those resources.

1055

#### 1056 3.4.3.2 Initial Scenario communication

1057 Each time a (re-)connection is established, even if the Pre-Scenario communication phase is skipped,  
1058 the messages as shown in the following sequence diagram SHALL be exchanged, as the  
1059 corresponding resources may have changed in the meantime:



1060

1061 *Figure 19: Scenario 3 - Initial Scenario communication sequence diagram*

1062 The deviceConfigurationKeyValueDescriptionListData read SHOULD be a "partial" read operation  
1063 with the following Selectors:

- 1064 - keyName = "asymmetricChargingSupported"



1065 The deviceConfigurationKeyValueListData read SHOULD be a "partial" read operation with the  
 1066 following Selectors:

1067 - keyId (derived from the deviceConfigurationKeyValueDescriptionListData reply)

1068 Note: If partial read is not supported a full read SHALL be performed.

1069

1070 The following table shows where the necessary content of the messages from the sequence diagram  
 1071 is described:

Message name from sequence diagram	Content description in table	Scenario number in table
deviceConfigurationKeyValueDescriptionListData reply	Table 6	3
deviceConfigurationKeyValueListData reply [EVCC-006]	Table 7	3

1072 *Table 21: Initial Scenario communication content references for Scenario 3*

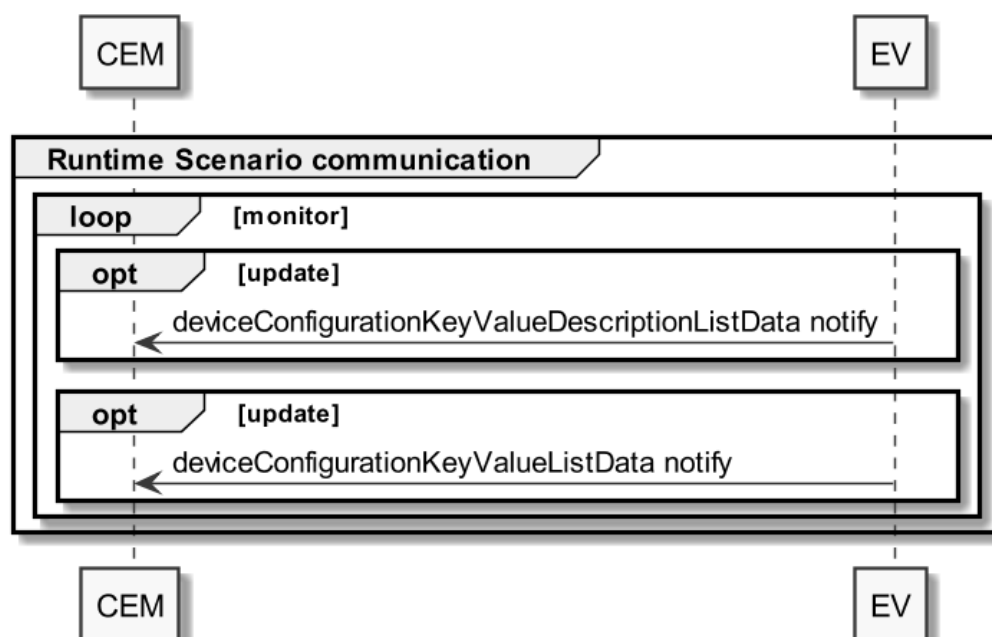
1073 Note: Within the Initial Scenario communication the content required by this Scenario MAY not be  
 1074 provided completely but later on during Runtime Scenario communication.

1075

### 1076 3.4.3.3 Runtime Scenario communication

1077 Based on the initial scenario communication the runtime scenario communication provides updates  
 1078 during runtime.

1079 If one of the referenced server Functions' data change, the server SHALL submit the change as shown  
 1080 in the following figure:



1081

1082 *Figure 20: Scenario 3 - Runtime Scenario communication sequence diagram*



1083 Partial notifications without Selectors or Elements SHALL be supported for all Functions used in this  
1084 Scenario.

1085 For deviceConfigurationKeyValueDescriptionListData notify and  
1086 deviceConfigurationKeyValueListData notify "artial" delete notifications SHOULD be supported with  
1087 the Selector:

1088 - keyId

1089 Note: To interpret partial notification messages correctly the information obtained during the Initial  
1090 Scenario communication phase is necessary.

1091 Note: A read operation ("polling") on all Functions is possible at any time, e.g. if a notification could  
1092 not be evaluated.

1093

1094 The following table shows where the necessary content of the messages of the sequence diagram is  
1095 described:

Message name from sequence diagram	Content description in table	Scenario number in table
deviceConfigurationKeyValueDescriptionListData notify	Table 6	3
deviceConfigurationKeyValueListData notify [EVCC-006]	Table 7	3

1096 *Table 22: Runtime Scenario communication content references for Scenario 3*

1097

#### 1098 **3.4.3.4 Additional information**

1099 None.

1100

### 1101 **3.4.4 Scenario 4 - EV sends identification**

#### 1102 **3.4.4.1 Pre-Scenario communication**

- 1103 1. **Detailed Discovery:** Actors that act as client within this Scenario, need to know the addresses  
1104 of the server Features used in the Initial Scenario communication. If an address of a  
1105 particular server Feature is not known, the detailed discovery has to be used, as described in  
1106 section 3.3.2.
- 1107 2. **Binding:** Binding SHOULD NOT be used for this Scenario.
- 1108 3. **Subscription:** Actors SHALL create a subscription for each server Feature that is relevant for  
1109 the corresponding Actor within this Scenario, as described in section 3.3.4.

1110 The Initial Scenario communication SHALL start at the latest when the required resources on an Actor  
1111 are known and the necessary binding and subscription procedures have been finished. However, as  
1112 soon as an address of a required resource is known, the Initial Scenario communication for this  
1113 resource MAY start already, even if addresses of other required resources are not known yet.

1114 If required resources are removed and added again, they are re-discovered, and the Initial Scenario  
1115 communication is triggered again for those resources.



**3.4.4.2 Initial Scenario communication**

Each time a (re-)connection is established, even if the Pre-Scenario communication phase is skipped, the messages as shown in the following sequence diagram SHALL be exchanged, as the corresponding resources may have changed in the meantime:

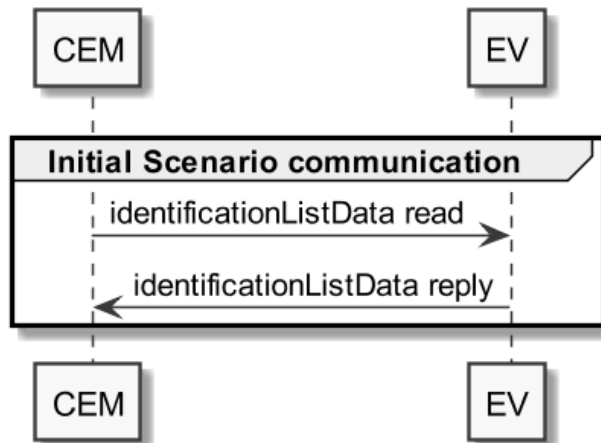


Figure 21: Scenario 4 - Initial Scenario communication sequence diagram

The identificationListData read SHOULD be a "partial" read operation with the following Selectors:

- identificationType = "eui48" | "eui64"

Note: If partial read is not supported a full read SHALL be performed.

The following table shows where the necessary content of the messages from the sequence diagram is described:

Message name from sequence diagram	Content description in table	Scenario number in table
identificationListData reply [EVCC-008]	Table 8	4

Table 23: Initial Scenario communication content references for Scenario 4

Note: Within the initial Scenario communication the content required by this scenario MAY not be provided completely but later on during Runtime Scenario communication.

**3.4.4.3 Runtime Scenario communication**

Based on the initial scenario communication the runtime scenario communication provides updates during runtime.

If one of the referenced server Functions' data change, the server SHALL submit the change as shown in the following figure:



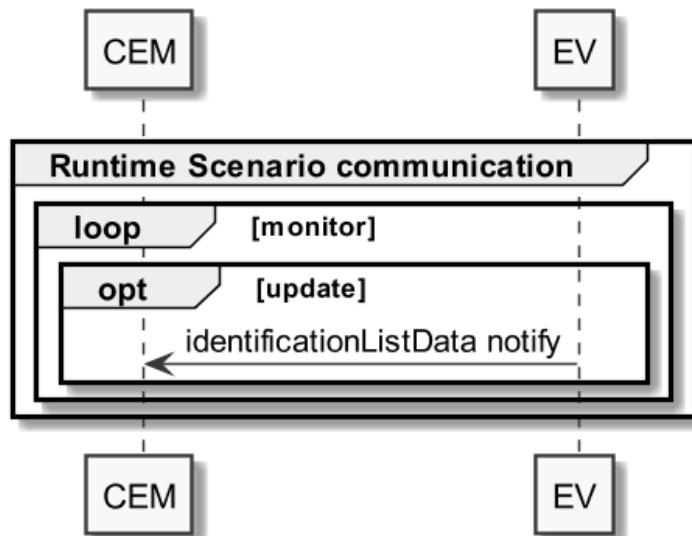


Figure 22: Scenario 4 - Runtime Scenario communication sequence diagram

Partial notifications without Selectors or Elements SHALL be supported for all Functions used in this Scenario.

For identificationListData notify "partial" delete notifications SHOULD be supported with the Selector:

- identificationId

Note: To interpret partial notification messages correctly the information obtained during the Initial Scenario communication phase is necessary.

Note: A read operation ("polling") on all Functions is possible at any time, e.g. if a notification could not be evaluated.

The following table shows where the necessary content of the messages of the sequence diagram is described:

Message name from sequence diagram	Content description in table	Scenario number in table
identificationListData notify [EVCC-008]	Table 8	4

Table 24: Runtime Scenario communication content references for Scenario 4

#### 3.4.4.4 Additional information

None.



### 3.4.5 Scenario 5 - EV sends manufacturer information

#### 3.4.5.1 Pre-Scenario communication

1. **Detailed Discovery:** Actors that act as client within this Scenario, need to know the addresses of the server Features used in the Initial Scenario communication. If an address of a particular server Feature is not known, the detailed discovery has to be used, as described in section 3.3.2.
2. **Binding:** Binding SHOULD NOT be used for this Scenario.
3. **Subscription:** Actors SHALL create a subscription for each server Feature that is relevant for the corresponding Actor within this Scenario, as described in section 3.3.4.

The Initial Scenario communication SHALL start at the latest when the required resources on an Actor are known and the necessary binding and subscription procedures have been finished. However, as soon as an address of a required resource is known, the Initial Scenario communication for this resource MAY start already, even if addresses of other required resources are not known yet.

If required resources are removed and added again, they are re-discovered, and the Initial Scenario communication is triggered again for those resources.

#### 3.4.5.2 Initial Scenario communication

Each time a (re-)connection is established, even if the Pre-Scenario communication phase is skipped, the messages as shown in the following sequence diagram SHALL be exchanged, as the corresponding resources may have changed in the meantime:

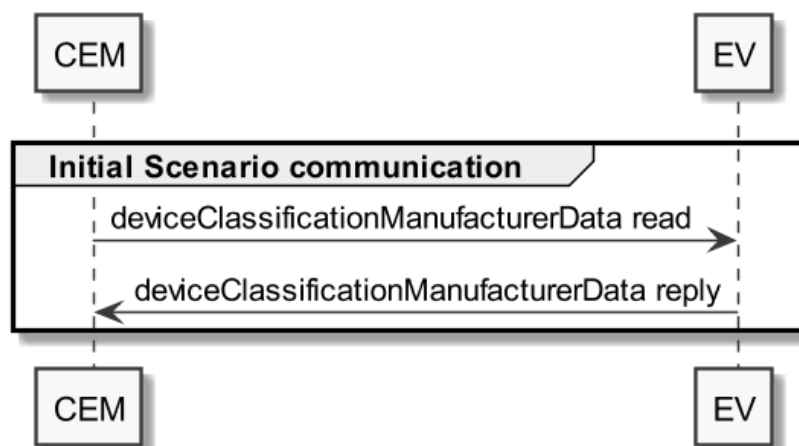


Figure 23: Scenario 5 - Initial Scenario communication sequence diagram

The following table shows where the necessary content of the messages from the sequence diagram is described:

Message name from sequence diagram	Content description in table	Scenario number in table
deviceClassificationManufacturerData reply [EVCC-009]	Table 9	5

Table 25: Initial Scenario communication content references for Scenario 5



Note: Within the initial Scenario communication the content required by this scenario MAY not be provided completely but later on during Runtime Scenario communication.

### 3.4.5.3 Runtime Scenario communication

Based on the initial scenario communication the runtime scenario communication provides updates during runtime.

If one of the referenced server Functions' data change, the server SHALL submit the change as shown in the following figure:

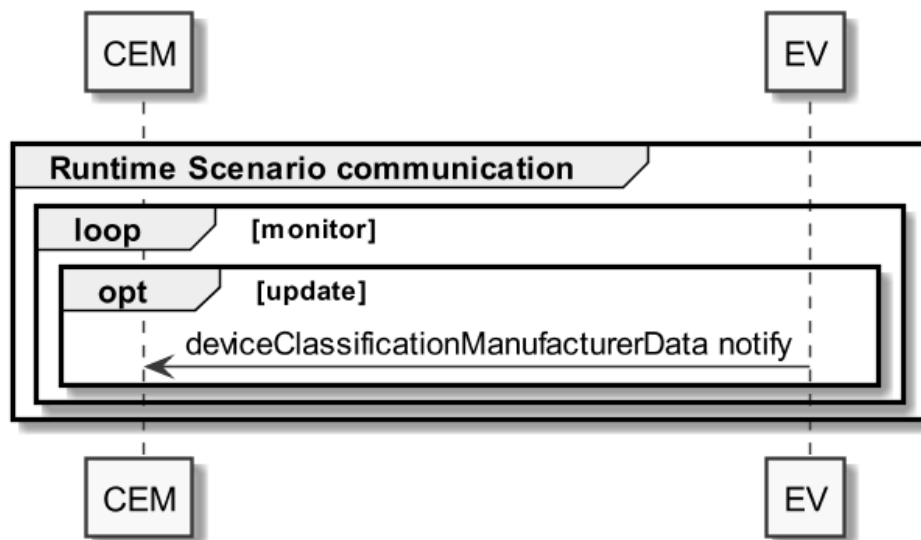


Figure 24: Scenario 5 - Runtime Scenario communication sequence diagram

The following table shows where the necessary content of the messages of the sequence diagram is described:

Message name from sequence diagram	Content description in table	Scenario number in table
deviceClassificationManufacturerData notify [EVCC-009]	Table 9	5

Table 26: Runtime Scenario communication content references for Scenario 5

### 3.4.5.4 Additional information

None.



### 1200 3.4.6 Scenario 6 - EV sends charging power limits

#### 1201 3.4.6.1 Pre-Scenario communication

- 1202 1. **Detailed Discovery:** Actors that act as client within this Scenario, need to know the addresses
- 1203 of the server Features used in the Initial Scenario communication. If an address of a
- 1204 particular server Feature is not known, the detailed discovery has to be used, as described in
- 1205 section 3.3.2.
- 1206 2. **Binding:** Binding SHOULD NOT be used for this Scenario.
- 1207 3. **Subscription:** Actors SHALL create a subscription for each server Feature that is relevant for
- 1208 the corresponding Actor within this Scenario, as described in section 3.3.4.

1209 The Initial Scenario communication SHALL start at the latest when the required resources on an Actor

1210 are known and the necessary binding and subscription procedures have been finished. However, as

1211 soon as an address of a required resource is known, the Initial Scenario communication for this

1212 resource MAY start already, even if addresses of other required resources are not known yet.

1213 If required resources are removed and added again, they are re-discovered, and the Initial Scenario

1214 communication is triggered again for those resources.

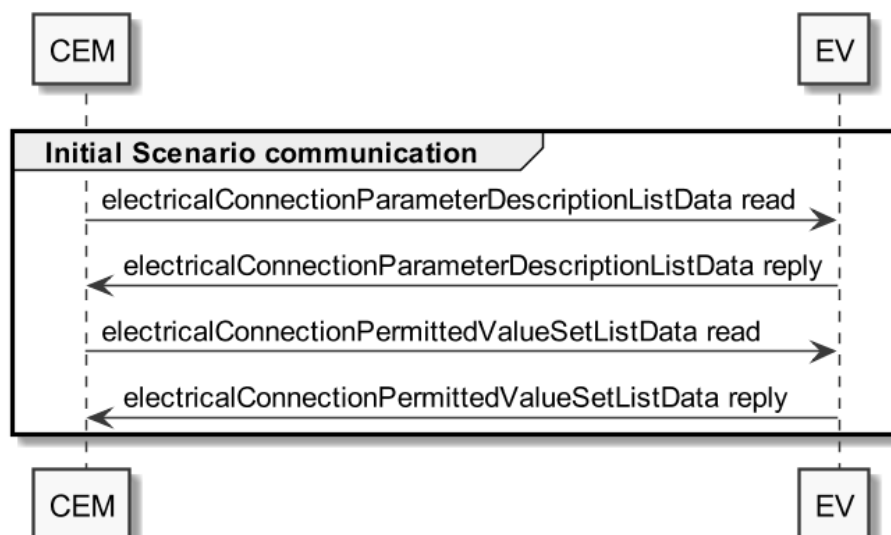
1215

#### 1216 3.4.6.2 Initial Scenario communication

1217 Each time a (re-)connection is established, even if the Pre-Scenario communication phase is skipped,

1218 the messages as shown in the following sequence diagram SHALL be exchanged, as the

1219 corresponding resources may have changed in the meantime:



1220

1221 *Figure 25: Scenario 6 - Initial Scenario communication sequence diagram*

1222 The electricalConnectionParameterDescriptionListData read SHOULD be a "partial" read operation

1223 with the following Selectors:

- 1224 - scopeType = "acPowerTotal"

1225 The electricalConnectionPermittedValueSetListData read SHOULD be a "partial" read operation with

1226 the following Selectors:



- 1227 - electricalConnectionId (derived from the electricalConnectionParameterDescriptionListData  
 1228 reply)  
 1229 - parameterId (derived from the electricalConnectionParameterDescriptionListData reply)

1230 Note: If partial read is not supported a full read SHALL be performed.

1231

1232 The following table shows where the necessary content of the messages from the sequence diagram  
 1233 is described:

Message name from sequence diagram	Content description in table	Scenario number in table
electricalConnectionParameterDescriptionListData reply	Table 10	6
electricalConnectionPermittedValueSetListData reply [EVCC-016]	Table 11	6

1234 Table 27: Initial Scenario communication content references for Scenario 6

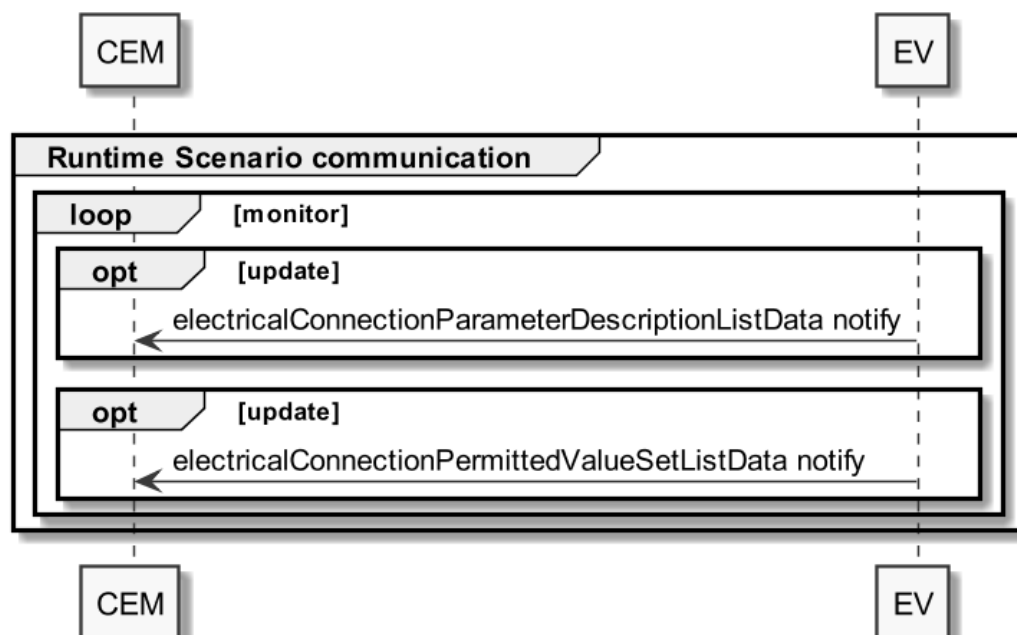
1235 Note: Within the initial Scenario communication the content required by this scenario MAY not be  
 1236 provided completely but later on during Runtime Scenario communication.

1237

### 1238 3.4.6.3 Runtime Scenario communication

1239 Based on the initial scenario communication the runtime scenario communication provides updates  
 1240 during runtime.

1241 If one of the referenced server Functions' data change, the server SHALL submit the change as shown  
 1242 in the following figure:



1243

1244 Figure 26: Scenario 6 - Runtime Scenario communication sequence diagram



1245 Partial notifications without Selectors or Elements SHALL be supported for all Functions used in this  
1246 Scenario.

1247 For electricalConnectionParameterDescriptionListData notify "partial" delete notifications SHOULD  
1248 also be supported with the Selectors:

- 1249 - electricalConnectionId
- 1250 - parameterId
- 1251 - measurementId

1252 For electricalConnectionPermittedValueSetListData notify "partial" delete notifications SHOULD also  
1253 be supported with the Selectors:

- 1254 - electricalConnectionId
- 1255 - parameterId

1256 Note: To interpret partial notification messages correctly the information obtained during the Initial  
1257 Scenario communication phase is necessary.

1258 Note: A read operation ("polling") on all Functions is possible at any time, e.g. if a notification could  
1259 not be evaluated.

1260

1261 The following table shows where the necessary content of the messages of the sequence diagram is  
1262 described:

Message name from sequence diagram	Content description in table	Scenario number in table
electricalConnectionParameterDescriptionListData reply	Table 10	6
electricalConnectionPermittedValueSetListData reply [EVCC-016]	Table 11	6

1263 *Table 28: Runtime Scenario communication content references for Scenario 6*

1264

#### 1265 **3.4.6.4 Additional information**

1266 None.

1267

#### 1268 **3.4.7 Scenario 7 - EV sleep mode**

##### 1269 **3.4.7.1 Pre-Scenario communication**

- 1270 1. **Detailed Discovery:** Actors that act as client within this Scenario, need to know the addresses  
1271 of the server Features used in the Initial Scenario communication. If an address of a  
1272 particular server Feature is not known, the detailed discovery has to be used, as described in  
1273 section 3.3.2.
- 1274 2. **Binding:** Binding SHOULD NOT be used for this Scenario.



3. **Subscription:** Actors SHALL create a subscription for each server Feature that is relevant for the corresponding Actor within this Scenario, as described in section 3.3.4.

The Initial Scenario communication SHALL start at the latest when the required resources on an Actor are known and the necessary binding and subscription procedures have been finished. However, as soon as an address of a required resource is known, the Initial Scenario communication for this resource MAY start already, even if addresses of other required resources are not known yet.

If required resources are removed and added again, they are re-discovered, and the Initial Scenario communication is triggered again for those resources.

#### 3.4.7.2 Initial Scenario communication

Each time a (re-)connection is established, even if the Pre-Scenario communication phase is skipped, the messages as shown in the following sequence diagram SHALL be exchanged, as the corresponding resources may have changed in the meantime:

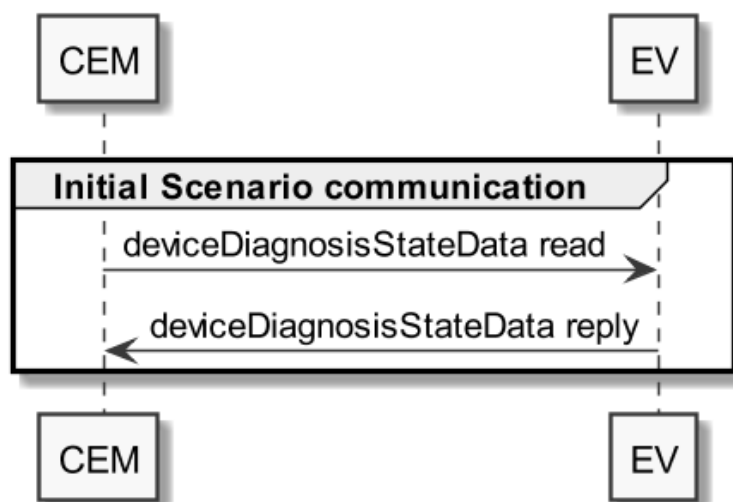


Figure 27: Scenario 7 - Initial Scenario communication sequence diagram

The following table shows where the necessary content of the messages from the sequence diagram is described:

Message name from sequence diagram	Content description in table	Scenario number in table
deviceDiagnosisStateData reply [EVCC-020]	Table 12	7

Table 29: Initial Scenario communication content references for Scenario 7

Note: Within the initial Scenario communication the content required by this scenario MAY not be provided completely but later on during Runtime Scenario communication.



**3.4.7.3 Runtime Scenario communication**

Based on the initial scenario communication the runtime scenario communication provides updates during runtime.

If one of the referenced server Functions' data change, the server SHALL submit the change as shown in the following figure:

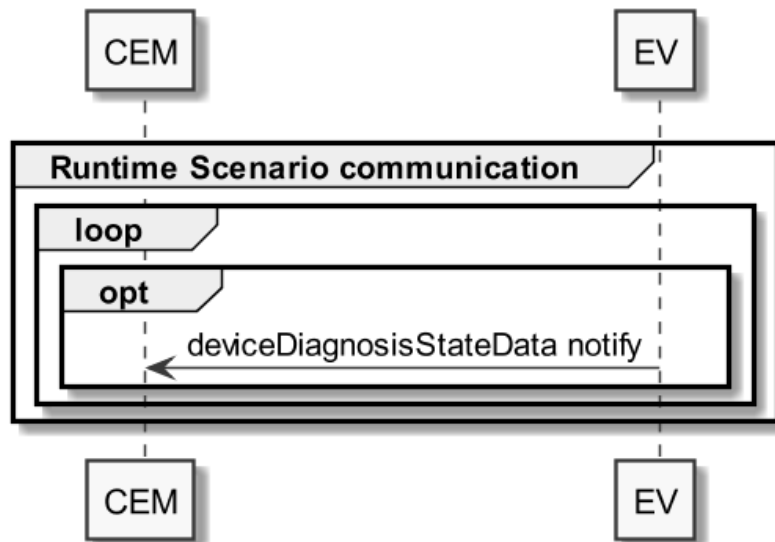


Figure 28: Scenario 7 - Runtime Scenario communication sequence diagram

Note: The notification messages may contain only added or changed data if "partial notification" is used. Therefore, the information obtained during the Initial Scenario communication phase is necessary to interpret the notification messages correctly.

Note: A read operation ("polling") on all Functions is possible at any time.

The following table shows where the necessary content of the messages of the sequence diagram is described:

Message name from sequence diagram	Content description in table	Scenario number in table
deviceDiagnosisStateData notify [EVCC-20]	Table 12	7

Table 30: Runtime Scenario communication content references for Scenario 7

**3.4.7.4 Additional information**

None.



1316 **3.4.8 Scenario 8 - EV disconnected**

1317 **3.4.8.1 Pre-Scenario communication**

- 1318 1. **Detailed Discovery:** Actors that act as client within this Scenario, need to know the addresses  
1319 of the server Features used in the Initial Scenario communication. If an address of a  
1320 particular server Feature is not known, the detailed discovery has to be used, as described in  
1321 section 3.3.2.

1322

1323 **3.4.8.2 Initial Scenario communication**

1324 If the EV is disconnected from the EVSE, the EV sub-Entity is removed from the EVSE Entity. This  
1325 triggers an update of the Detailed Discovery as described in the Pre-Scenario communication.

1326

1327 **3.4.8.3 Runtime Scenario communication**

1328 None.

1329

1330 **3.4.8.4 Additional information**

1331 None.

1332