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UNIVERSITY

OCA(Open Charge Alliance)와 OCPP(Open Charge Point Protocol) 프로토콜의 이해

2018. 3. 23.

강 선 무



Agenda

1. Introduction of OCA group
2. Introduction of Korea participants
3. Short overview of OCPP 1.6 and 2.0
4. Translation of OCPP specification into Korean
5. OCPP certification status
6. Next steps



Introduction of OCA group

■ OCA (Open Charge Alliance)

- OCPP 및 OSCP의 채택을 통해 공개 표준을 촉진하기 위해 함께 모인 공공 및 민간 전기자동차 인프라 리더의 글로벌 컨소시엄으로 2009년 부터, 전기자동차 네트워크를 Open하고 Access하기 시작.
- 초기 목표는 다른 업체의 네덜란드 충전소와 중앙시스템이 서로 쉽게 통신 할 수 있도록 하는 개방형 통신 표준을 만드는 것. 허나, 현재, 50개국과 10,000개 이상의 충전소의 de facto 프로토콜 역할을 하고 있다.

■ 목표

- 협업, 교육, 테스트 및 인증 통해 전기차 충전 인프라 및 관련 표준에서 통신 프로토콜의 글로벌 개발, 채택 및 준수 촉진

■ Working Group

- OCPP 및 OSCP 프로토콜 개발, ISO/IEC 15118과 더불어, V2G 및 Plug-and-Charge 제공하기 위한 기술 연구
- 경희대학교의 경우,
Technology Working group과 Task group에 참여하여 국내 환경에 알맞은 통신 프로토콜 개발 및 표준화 모델 연구



Introduction of OCA group

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Open Charge Alliance Members Area

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Your Groups

OCA Compliance WG

OCA Marketing WG

OCA Promotional WG

OCA Technology WG

OCA-TWG > Security TaskGroup

OCA-TWG > Technical Taskgroup OCPP 2.0

Task Group RFC 15118

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Home

Welcome to Open Charge Alliance Standards Development Workflow Engine!

You have reached Causeway Home, the OCA member section within the collaboration platform. Through OCA's workgroups you have access to secure document repositories for file shi

Make the most of your account and get involved today! By participating in workgroups, you will:

- work collaboratively toward common goals;
- keep track of key meetings and deliverables;
- build relationships and network with your pr
- contribute to your organization's best practi

Do you need help getting started? We suggest rea



Group	Chair
 OCA Compliance WG Focus: protocol compliance tools, processes, procedures, etc.	Harmeet Singh Greenlots
 OCA Marketing WG	
 OCA Promotional WG • Congress Participation • Congress Organisation • Updating the website • Assistance for Promotional activities • Inventarisation of Promotional needs	Lucien Joppe iHomer
 OCA Technology WG Focus: protocol specification development and related projects	Robert De Leeuw iHomer
 > Security TaskGroup	Robert De Leeuw iHomer
 > Technical Taskgroup OCPP 2.0 Technical Taskgroup for OCPP 2.0.	Robert De Leeuw iHomer Lonneke Driessen ELaadNL
 > Technical taskgroup OCPP 1.6	Reinier Lamers The New Motion (TNM)
 Task Group RFC 15118 The goal of this Task Group is to write a Request For Change (RFC) for OCPP, in order to extend the current OCPP specification as vehicle to grid to provides additional charging schedules and plug and charge functionalities.	

Introduction of participants

Gridwiz



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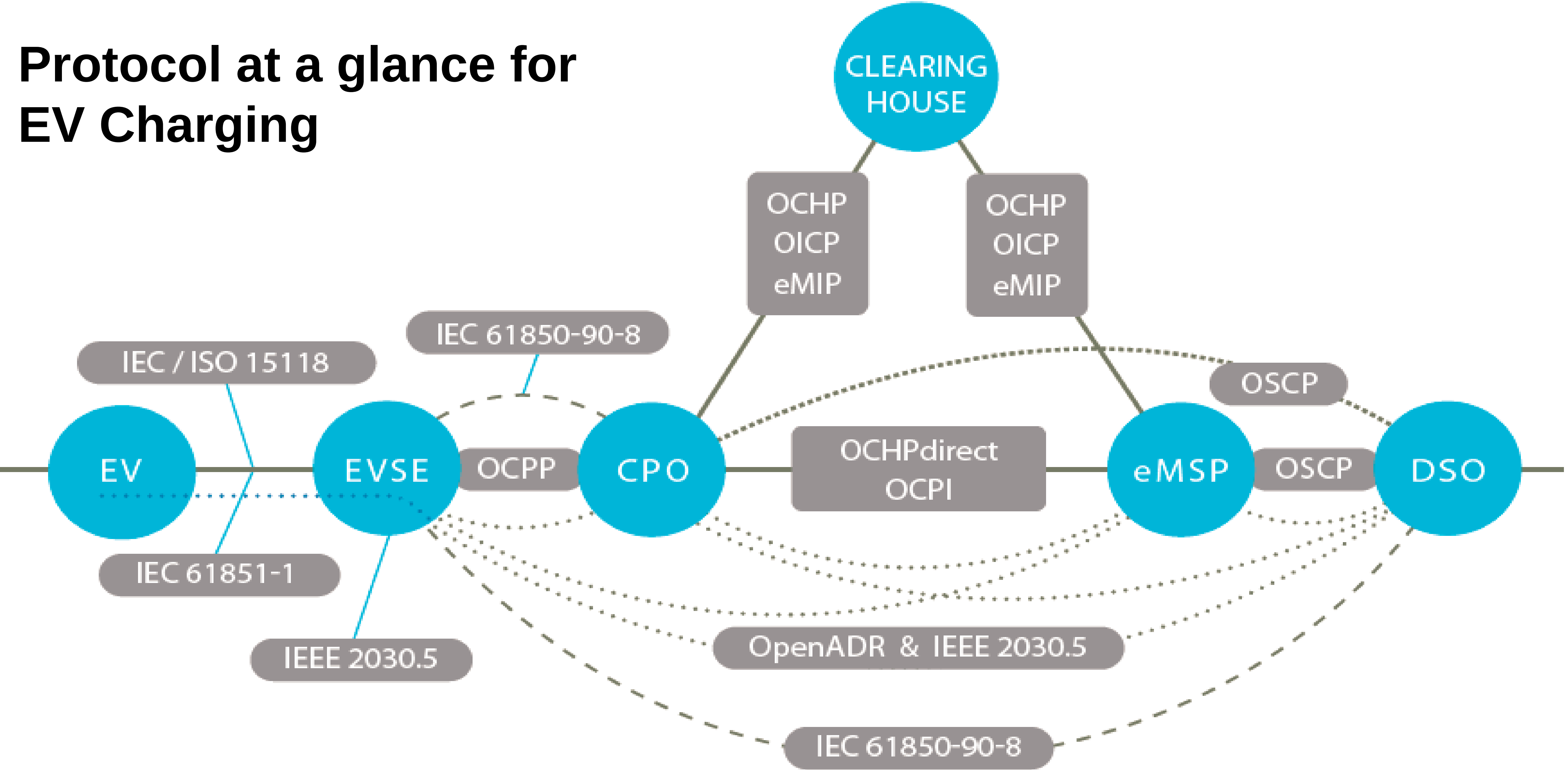
DAEYOUNG
CHAEVI



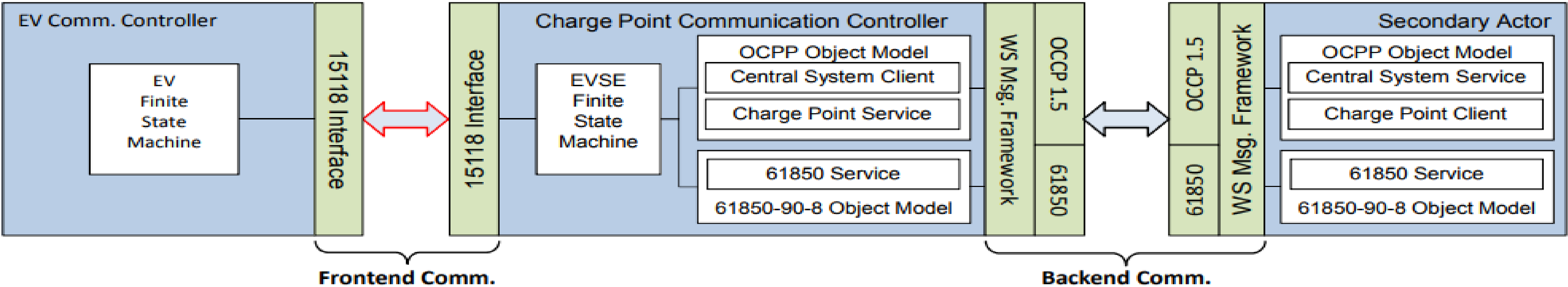
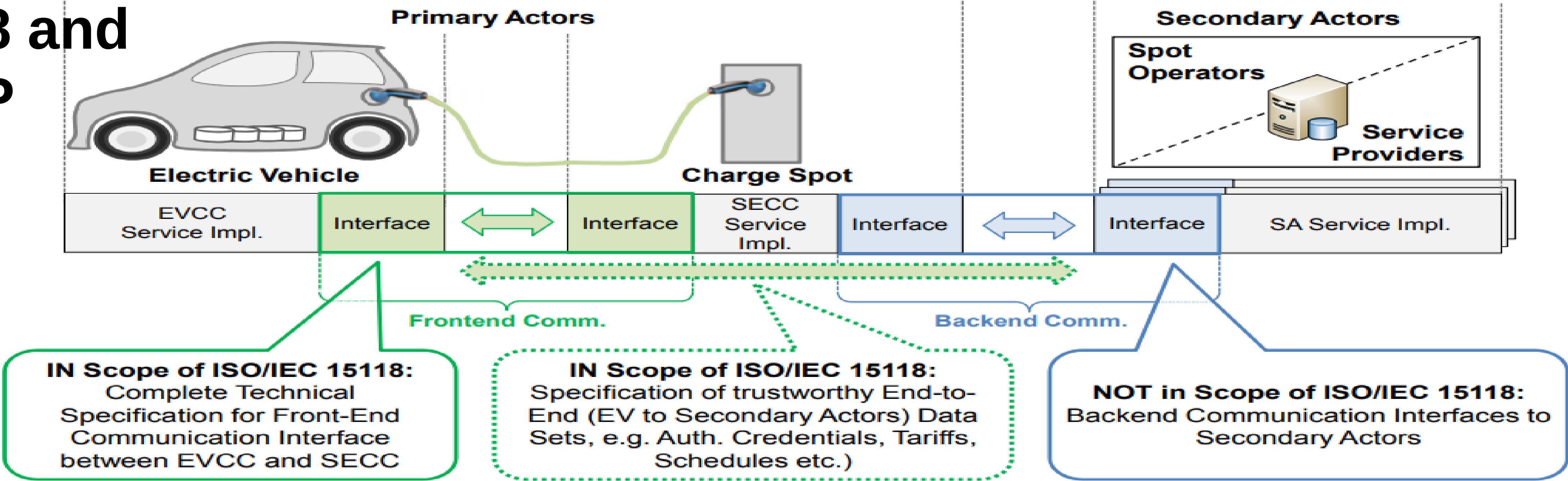
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Protocol at a glance for EV Charging



15118 and OCPP

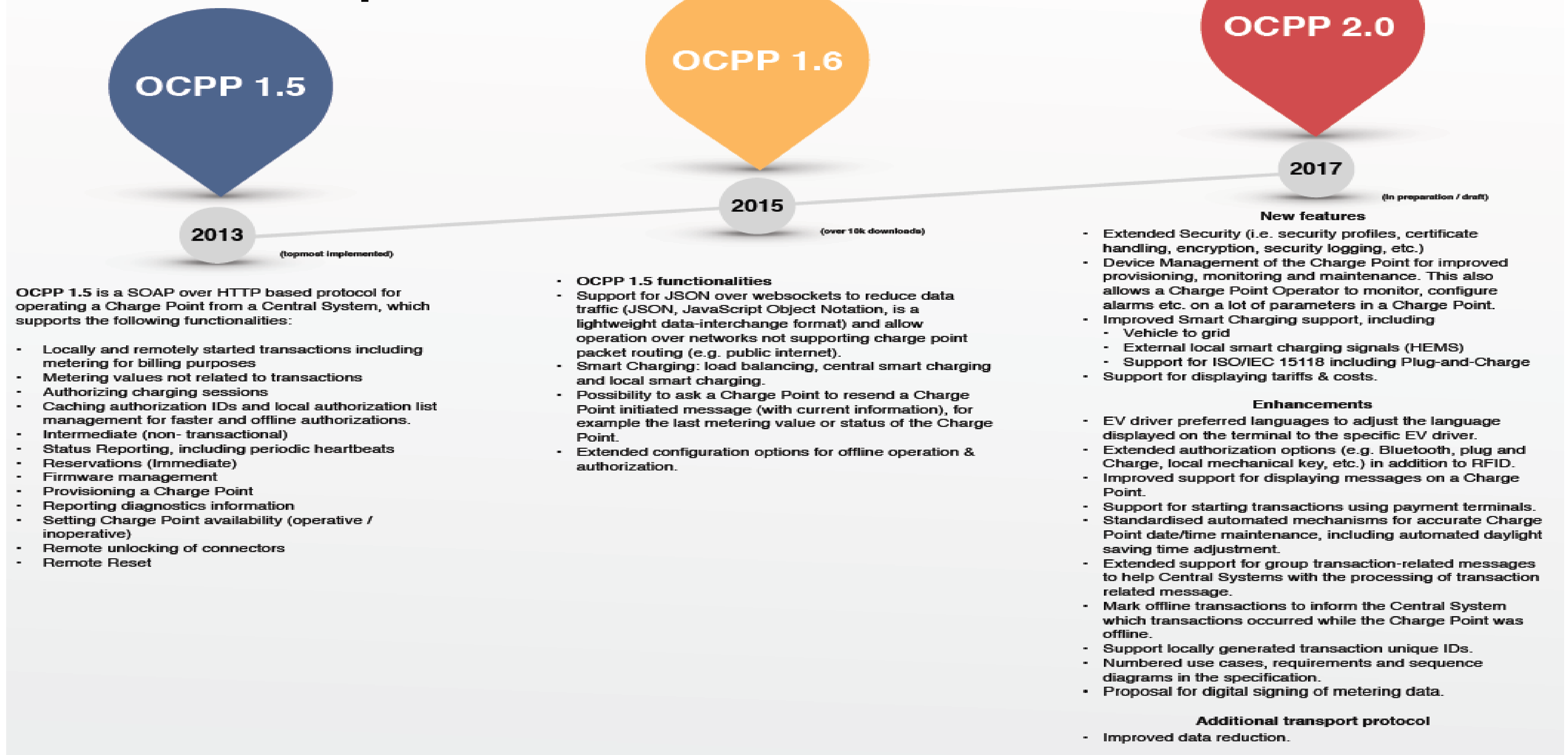


Protocol at a glance for EV Charging

	OSCP	OpenADR	OCPI v0.4	IEEE 2030.5	OCPP	61850-90-8	OCHP	OCPI 2.1	OICP	eMIP	IEC 61851	ISO 15118
PROTOCOL	SMART CHARGING				CS ↔ CP		ROAMING				EV ↔ CP	
Authorize charging session			•		•		•	•	•	•		•
Billing					•		•	•	•	•		
EV Charging											•	•
Handle registration		•		•				•				
Manage grid	•	•		•	•	•						
Operate Charge Point					•	•						
Provide charge point information			•				•	•	•	•		
Reservation			•		•		•	•	•			•
Roaming			•				•	•	•	•		
Smart Charging	•	•	•	•	•	•	•			•	•	•



OCPP Roadmap



Short overview of OCPP 1.6 and 2.0

OCPP 1.6

- SOAP & JSON
- 부하분산 및 충전 프로파일을 위한 스마트 충전 지원
- 현장 리스트 관리 지원
- 상태 추가
- 충전포인트에서의 상태 메시지 전송 요청 정의

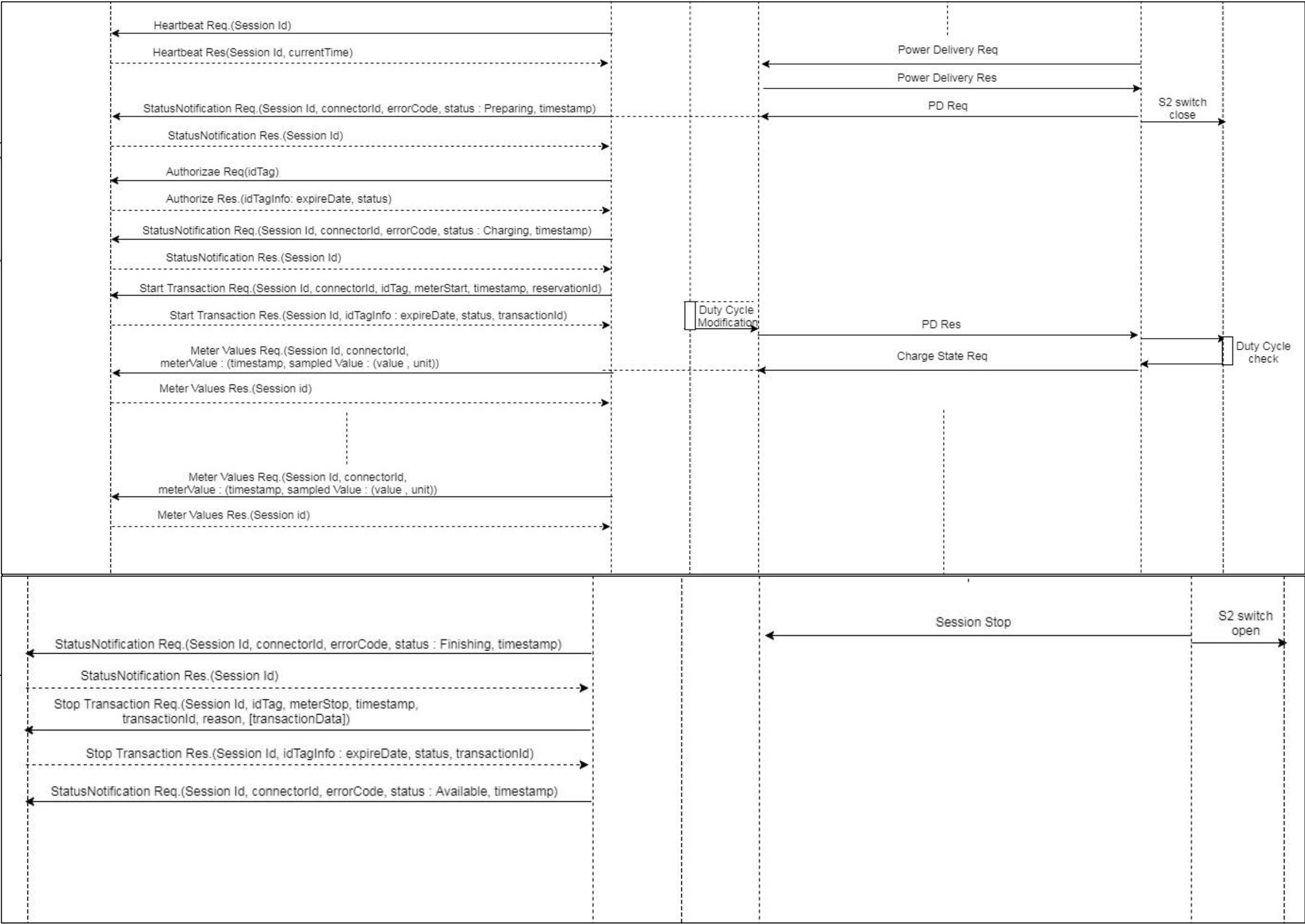
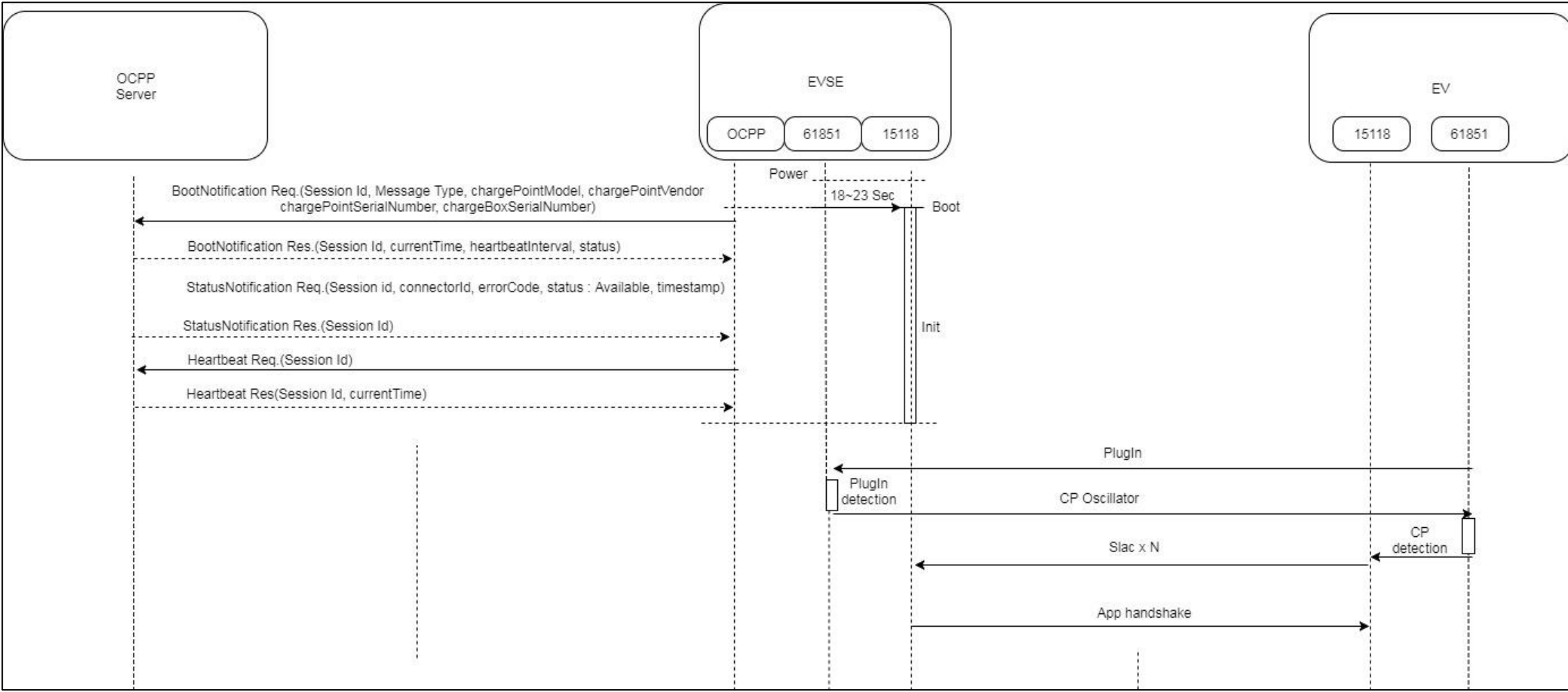
OCPP 2.0

- JSON
- 개선된 모니터링 및 유지관리를 위한 충전포인트의 장치 관리
- 향상된 스마트 충전 지원
- V2G 지원
- 요금 계산서 명시 및 과금 지원
- Plug-and-Charge를 포함한 ISO/IEC 15118 국제 표준 지원

- + Improvements
- + Better documentation
- + More functionalities



Total Sequence on 1.6



Market requirements

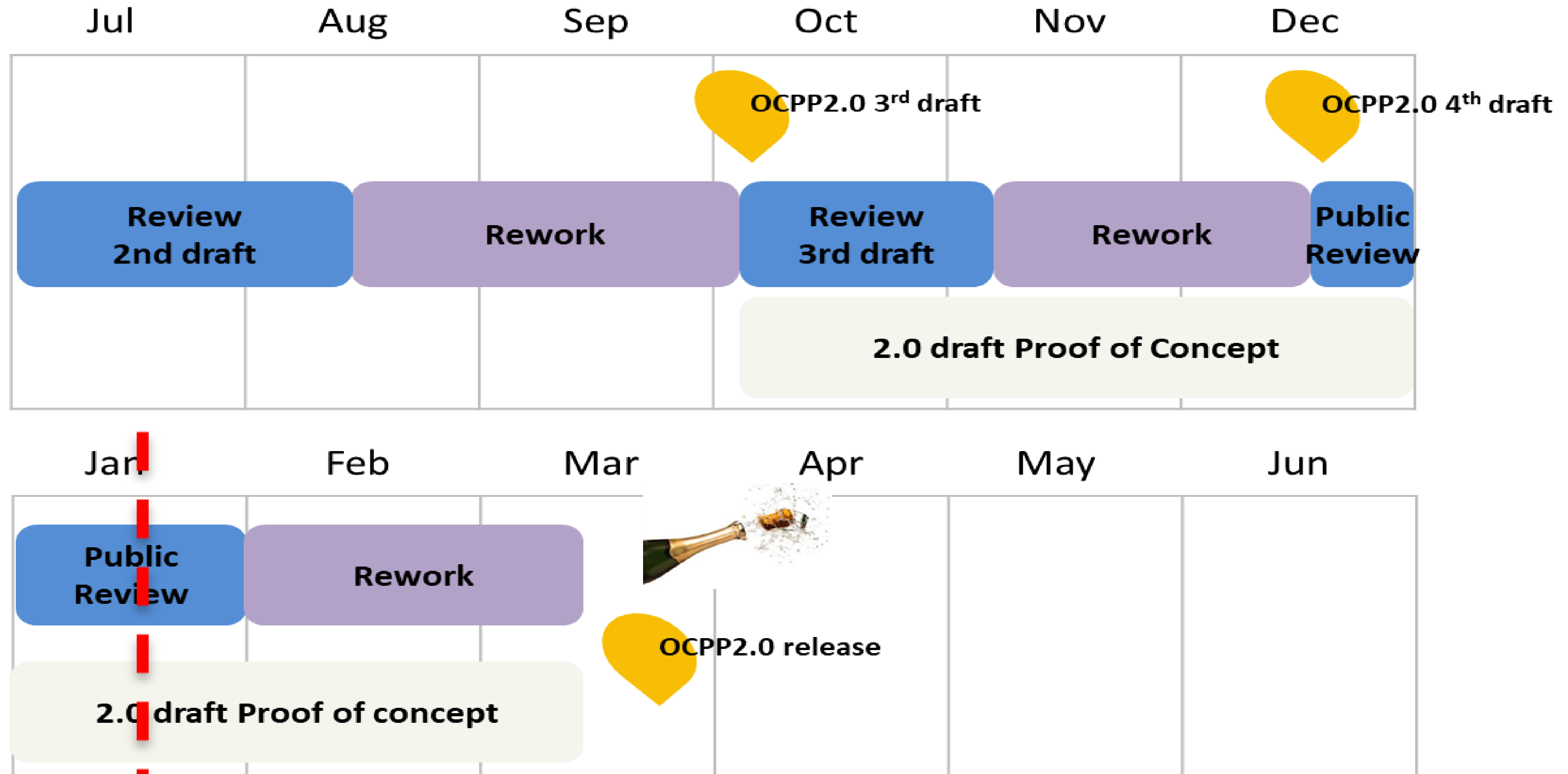
- Security
- Pricing
- Credit card payment support
- Advanced Smart Charging: 15118 and Vehicle to grid
- Monitoring

Structure

- Split messages and functional requirements
- Testability
- Modular/extensibility
- Innovations
- Regional profiles
- Maintainability



Planning



OCPP 2.0 has a new documentation structure

OCPP 1.6 specification

4.7. Meter Values

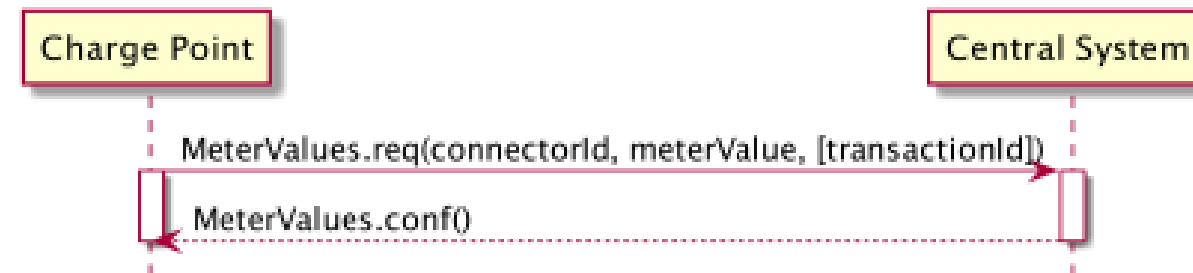


Figure 18. Sequence Diagram: Meter Values

A Charge Point MAY sample the energy meter or other sensor/transducer hardware to provide extra information about its meter values. It is up to the Charge Point to decide when it will send meter values. This can be configured using the [ChangeConfiguration.req](#) message to data acquisition intervals and specify data to be acquired & reported.

The Charge Point SHALL send a [MeterValues.req](#) PDU for offloading meter values. The request PDU SHALL contain for each sample:

1. The id of the Connector from which samples were taken. If the connectorId is 0, it is associated with the entire Charge Point. If the connectorId is 0 and the [Measurand](#) is energy related, the sample SHOULD be taken from the main energy meter.
2. The transactionId of the transaction to which these values are related, if applicable. If there is no transaction in progress or if the values are taken from the main meter, then transaction id may be omitted.
3. One or more [meterValue](#) elements, of type [MeterValue](#), each representing a set of one or more data values taken at a particular point in time.

Each [MeterValue](#) element contains a timestamp and a set of one or more individual [sampledValue](#) elements, all captured at the same point in time. Each [sampledValue](#) element contains a single value datum. The nature of each [sampledValue](#) is determined by the optional [measurand](#), [context](#), [location](#), [unit](#), [phase](#), and [format](#) fields.

OCPP 2.0 specification

J01 - Sending Meter Values not related to a transaction

Table 139. J01 - Sending Meter Values

No.	Type	Description
1	Name	Sending Meter Values not related to a transaction
2	ID	J01
	Functional block	J. Meter Values
3	Objective(s)	To sample the electrical meter or other sensor/transducer hardware to provide information about the Charging Stations' Meter Values.
4	Description	The Charging Station samples the electrical meter or other sensor/transducer hardware to provide information about its Meter Values. Depending on configuration settings, the Charging Station will send Meter Values.
	Actors	Charging Station, CSMS
	Scenario description	1. The Charging Station sends a MeterValuesRequest message, for offloading Meter Values to the CSMS. 2. Upon receipt of a MeterValuesRequest message, the CSMS responds with a MeterValuesResponse message.
5	Prerequisite(s)	The Charging Station is configured to send Meter values every XX seconds. No transaction is running.
6	Postcondition(s)	Successful postcondition: n/a Failure postcondition: n/a

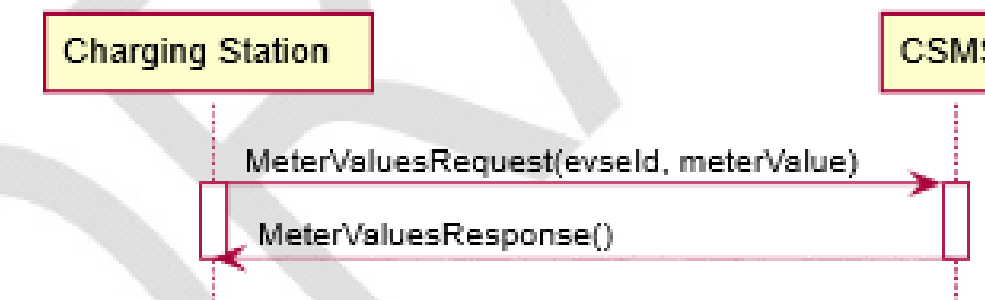


Figure 88. Sequence Diagram: Sending Meter Values

7	Error handling	Any Meter Values that don't belong to a transaction MAY be discarded.
8	Remark(s)	The phase field is not applicable to all Measurands . Each sampledValue element contains a single value datum. The nature of each sampledValue is determined by the optional Measurand , context , location , unit and phase fields. The optional SignedMeterValue field can contain digitally signed binary meter value data.

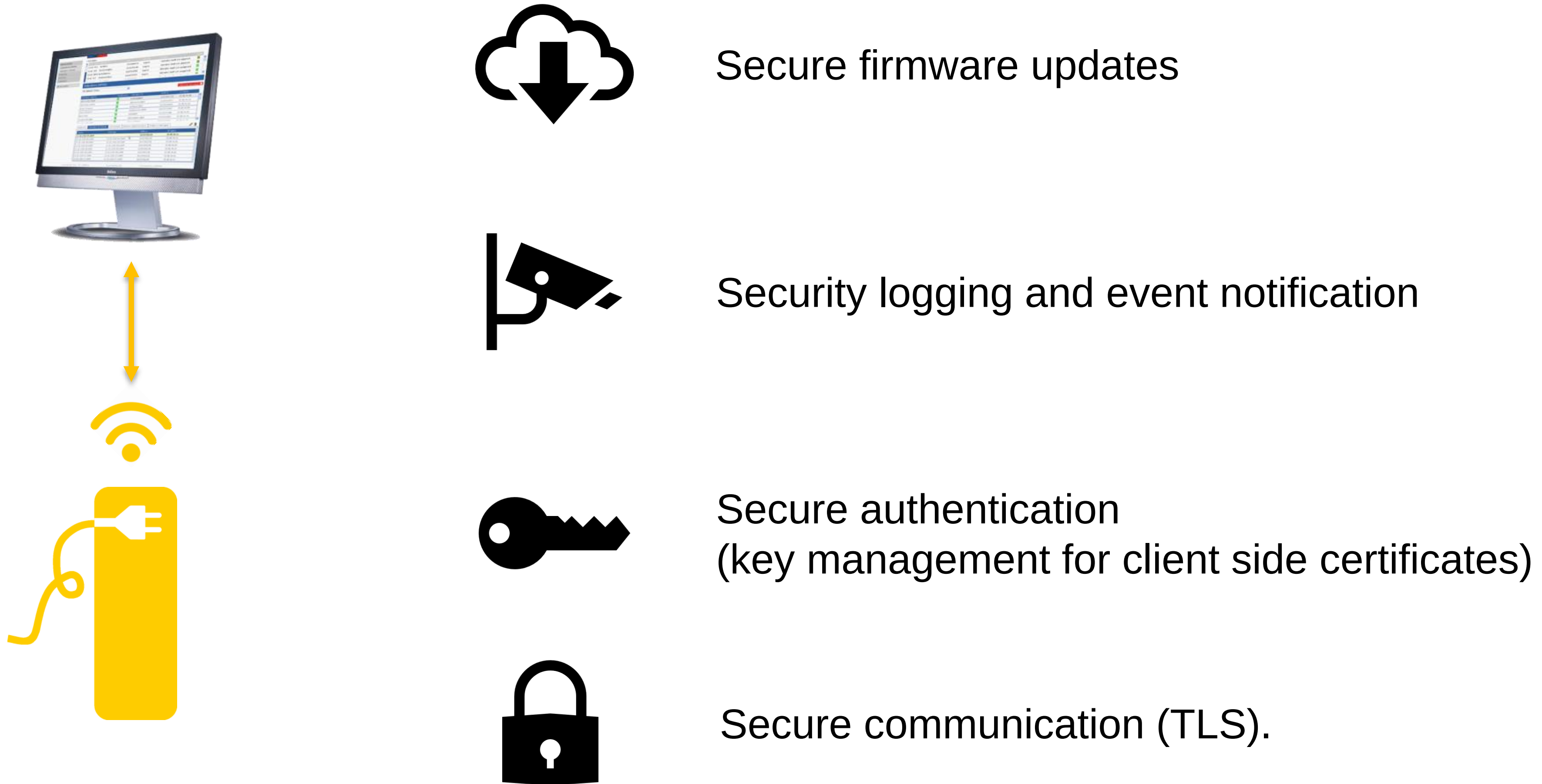


OCPP 2.0 has more functionalities

	Functional 'blocks'	# Use cases	Δ with 1.6
A	Security	4	New
B	Provisioning	12	Plus 5 use cases
C	Authorization	16	Plus 6 use cases
D	Local Authorization list management	2	–
E	Transactions	15	Plus 2
F	Remote control	6	Plus 1
G	Availability	4	Plus 1
H	Reservation	4	–
I	Tariff & Cost	6	New
J	Meter values	3	Plus 1
K	Smart charging	20	Plus 10
L	Firmware management	6	Plus 2
M	15118 Certificate management	6	New
N	Diagnostics	8	Plus 7
O	Display message	6	New
P	Data Transfer	2	–



New: OCPP 2.0 Security extensions

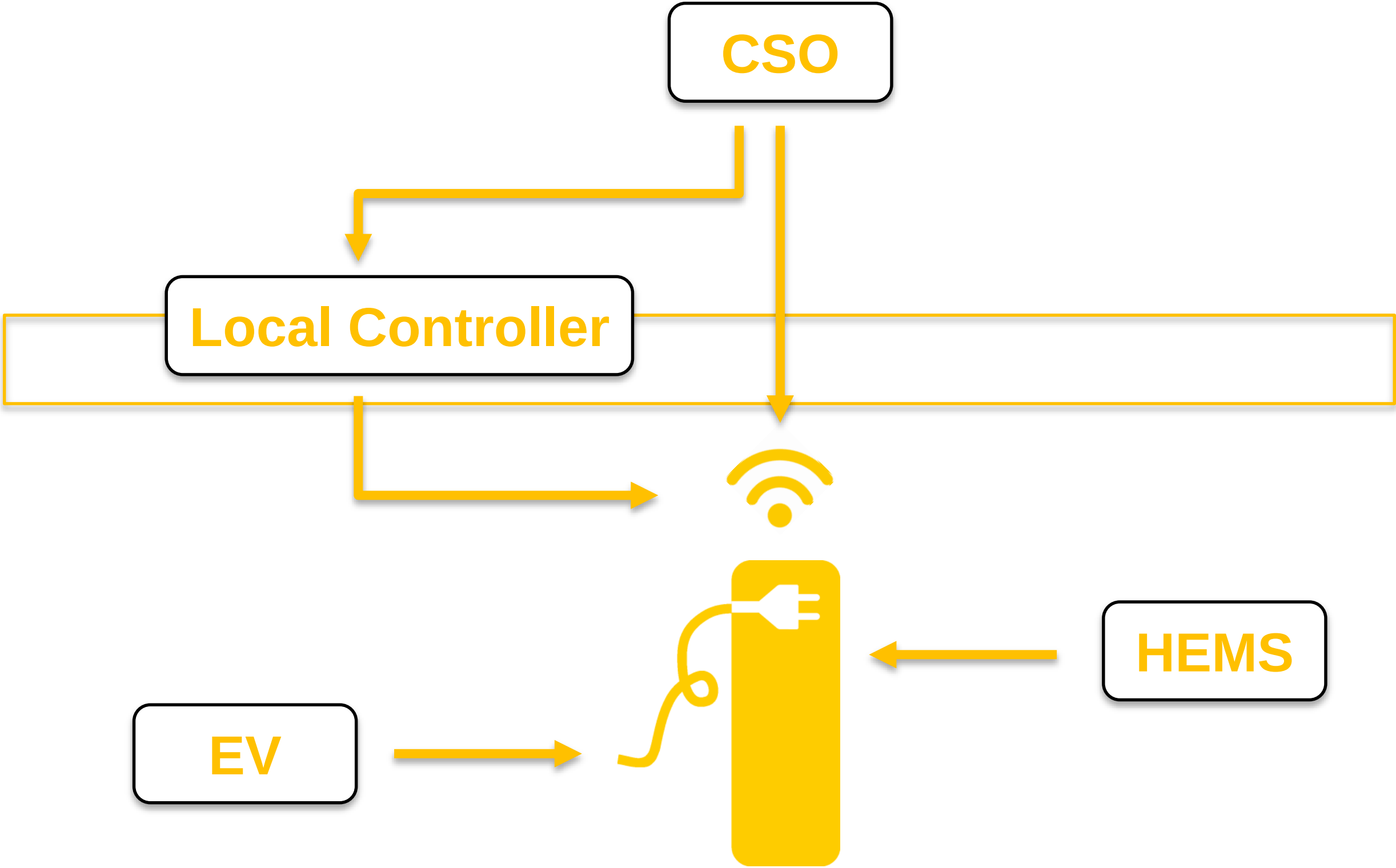


Extended: Smart Charging

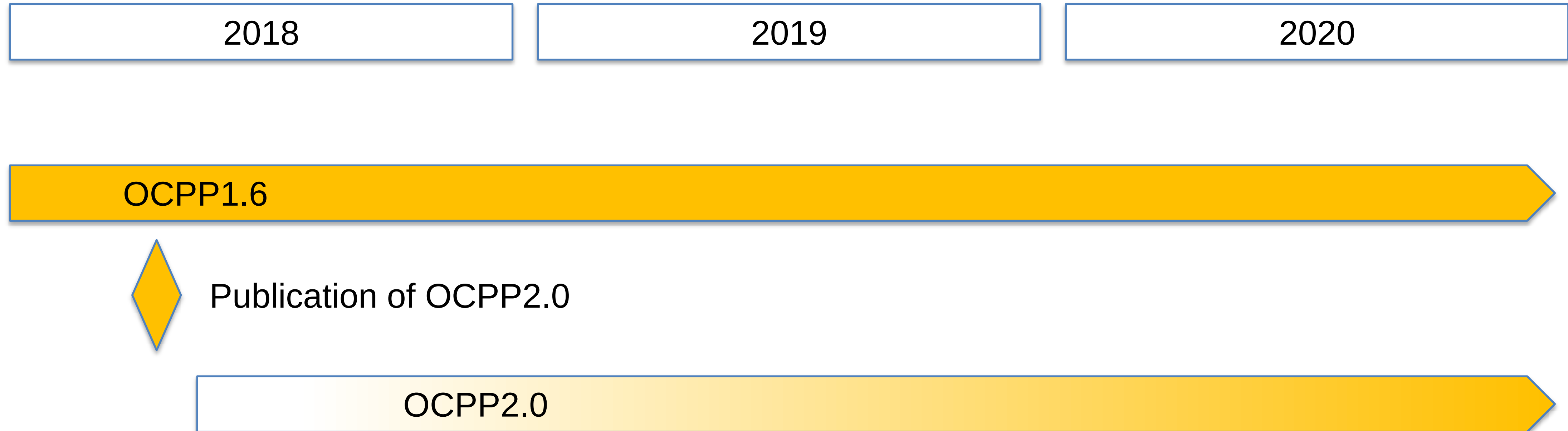
OCPP 1.6



OCPP 2.0



Market adoption of OCPP



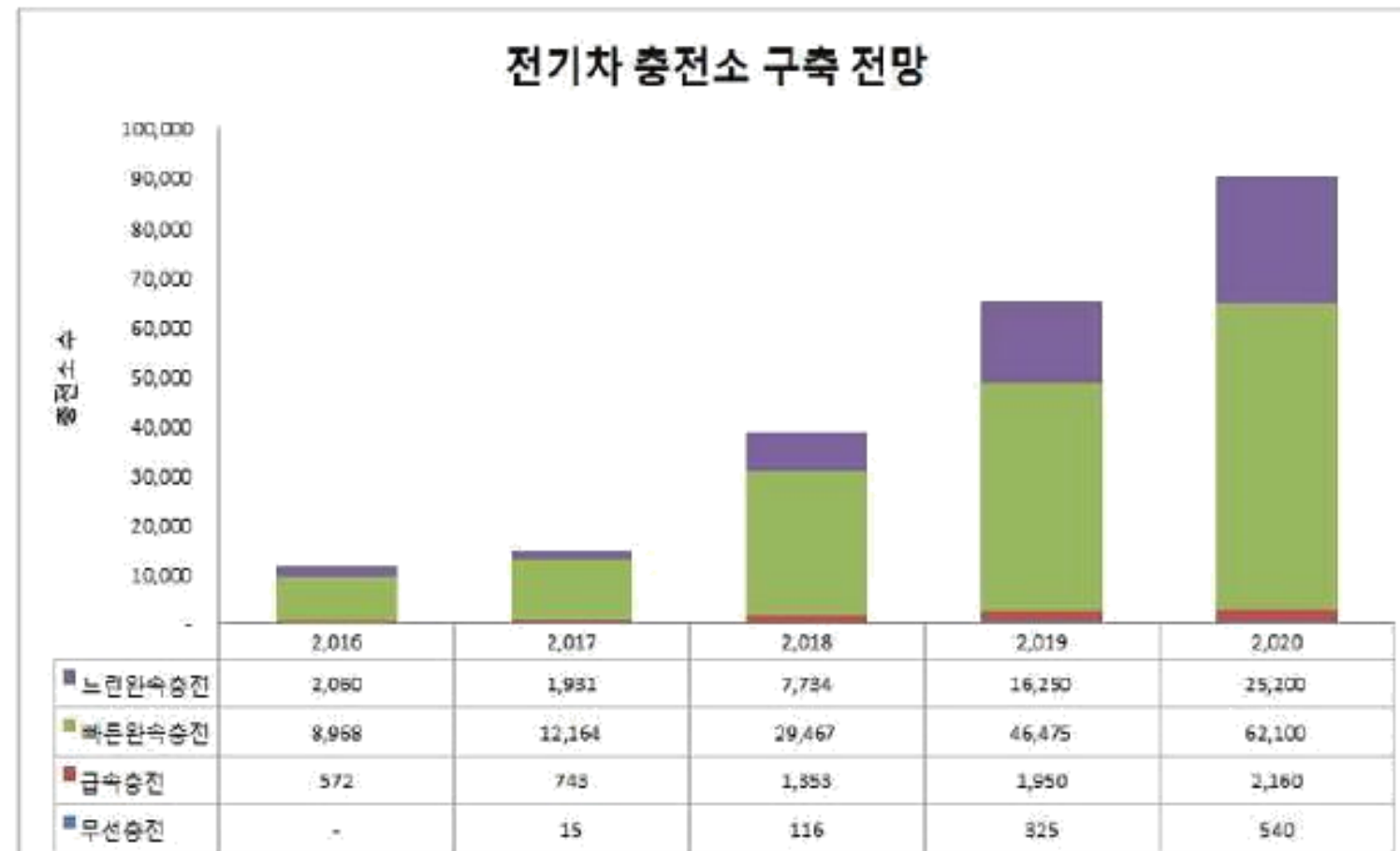
Market adoption of OCPP2.0 will depend on the need of various markets for the added features



Purpose of the standardization group

■ 전기자동차 및 충전인프라 보급 현황 및 계획

- ▣ “2020년 국내 전기차 충전기는 총 9만대 설치될 전망, 시장 규모 4,195억 원 수준으로 성장할 전망”[1]
- ▣ 2025년까지 “전기자동차 10(25)만대 공급” 중장기 목표 [2]



[1]전기차 충전소 시장성장 기대에 따른 유료시장진출확대,디지털밸리뉴스2017.03.07



<서울시 전기자동차 연차별 보급계획>						
(단위 : 대<누적>)						
구 분	~ 2017년	2018년	2019년	2020년	2021~2023년	2023~2025년
계	6,358	10,388	23,988	42,288	83,758	150,458
승용	5,504	8,904	17,404	26,904	48,404	85,504
버스,트럭	35	65	765	2,065	7,035	20,035
전기택시	60	160	4,060	11,060	25,060	40,060
전기이륜차	759	1,259	1,759	2,259	3,259	4,859

[2]서울시, 전기차 1만대 시대 ...2025년까지 친환경차 15만대 추진,
스틸앤메탈뉴스2018.02.08(목)



Translation of OCPP specification into Korean

- ISO는 전기자동차의 성능, 안전성 관련 국제표준 및 IEC와의 공동작업반 형태 표준화 진행
- 유럽의 경우 IEC 61851-1, 미국의 경우 SAE J1772와 같은 고유 표준 존재
- 전기자동차 충전 통신 인프라 관련 **국내 표준화 부재**
 - ▣ OCPP 1.6 기반 부합화 표준 진행 및 국내 환경에 알맞은 충전인프라 표준 모델 제안 예정



Translation of OCPP specification into Korean



Translation agreement

The parties,

The Foundation Open Charge Alliance under Dutch law, having its place of business in Arnhem and registered with the Dutch Chamber of Commerce under number 59720352 hereafter: OCA,

And,

The organization under Korean law Kyung Hee University, having its place of business in and registered with the Korean Chamber of Commerce under number hereafter: Kyung Hee University,

- Considering, that,
 - OCPP has created and is promoting the OCPP standard worldwide,
 - Kyung Hee University has specific expertise and experience on OCPP with regards to the Korean-language markets,
 - Kyung Hee University desires to prepare a Korean translation of the 1.6 and 2.0 versions of the OCPP standard and to have this translation published by OCA,
 - OCA is willing to so permit Kyung Hee University under the terms and conditions below,

Have agreed as follows:

Article 1. Grant of permission

1.1 OCA hereby grants Kyung Hee University permission to create a translation in the Korean language of version 1.6 and 2.0 of the OCPP standard, including any annexes.

1.2 Kyung Hee University shall ensure the translation matches the original English text. Where ambiguities may arise, Kyung Hee University shall consult with OCA on the best choice of words.

1.3 Kyung Hee University shall make no changes to the protocol or technical information included in the standard.

Article 2. Copyrights

2.1 All copyrights and related rights, such as moral rights, in the translation shall vest with OCA. This assignment shall be for all rights and worldwide.

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2.2 If requested by OCA, Kyung Hee University shall perform all acts and sign or otherwise make legally binding all documents to complete the assignment of copyright under article 2.1.

2.3 To the extent certain rights are not transferrable, Kyung Hee University hereby grants to OCA an unlimited, perpetual and exclusive license under such rights.

Article 3. Publication

3.1 OCA shall keep the translation of version 1.6 and 2.0 available at no charge to the public through its website and other channels it uses to distribute the OCPP standard.

3.2 In any publication of the translation both OCA and Kyung Hee University will be mentioned as authors.

3.3 The parties will make it clear to readers of the translation that the English language version is leading in any issue relating to interpretation of the standard.

Article 4. Other provisions

4.1 OCA has a right to have an independent agency (e.g. a Korean OCA member) validate the translation.

4.3 Any charges associated with the validation shall be borne by Kyung Hee University.

4.4 Upon completion of the translation, Kyung Hee University will provide to OCA the source files (e.g. AsciiDoc, PlantUML, Word documents, etc.) of the translation.

Was signed,

- Considering, that,
 - OCPP has created and is promoting the OCPP standard worldwide,
 - Kyung Hee University has specific expertise and experience on OCPP with regards to the Korean-language markets,
 - Kyung Hee University desires to prepare a Korean translation of the 1.6 and 2.0 versions of the OCPP standard and to have this translation published by OCA,
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Translation of OCPP specification into Korean

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전기자동차 충전 인프라관리용
통신 인터페이스

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OCPP specification to apply on the device

OCPP Compliance Testing Tool 프로그램 설명 및 메뉴얼

목적	이동형 충전기 통신 인프라 및 전기안전 표준 개발		
작성일	2017. 11. 22.	버전	Ver. 2.0
작성자	강성우, 김영기, 이민경	부서명	컴퓨터공학과
피제수행기관	경희대학교 산학협력단		

Revision

Ver	Date	Name	Revision	note
1.0	2017/11/11	김영기	초안 작성	
1.1	2017/11/13	이민경	세부내용 작성	
2.0	2017/11/22	이민경	수정	

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4.3 테스트 세션

4.4 테스트 케이스 설정

4.5 테스트 케이스 실행

4.6 세부 결과

4.7 테스트 케이스 실행 세부 결과

4.8 테스트 결과 다운로드



Ocpp specification to apply on the device

Ocpp Compliance Testing Tool

테스트 케이스 정의서

과제명	이동형 충전기 통신 인프라 및 전기안전 표준 개발		
작성일	2017. 11. 21.	버전	Ver 2.0
작성자	강선우, 김영기, 이민경	부서명	컴퓨터공학과
과제수행기관	건국대학교 산학협력단		

Revision

Ver.	Date	Name	Revision	note
1.0	2017/11/09	김영기	초안 작성	
1.1	2017/11/10	이민경	수정	
1.2	2017/11/13	이민경	수정	
1.3	2017/11/20	김영기	세부내용 작성	
2.0	2017/11/21	이민경	수정	

1. Core Profile – Basic Actions Happy Flow

1.1 Cold Boot Charge Point

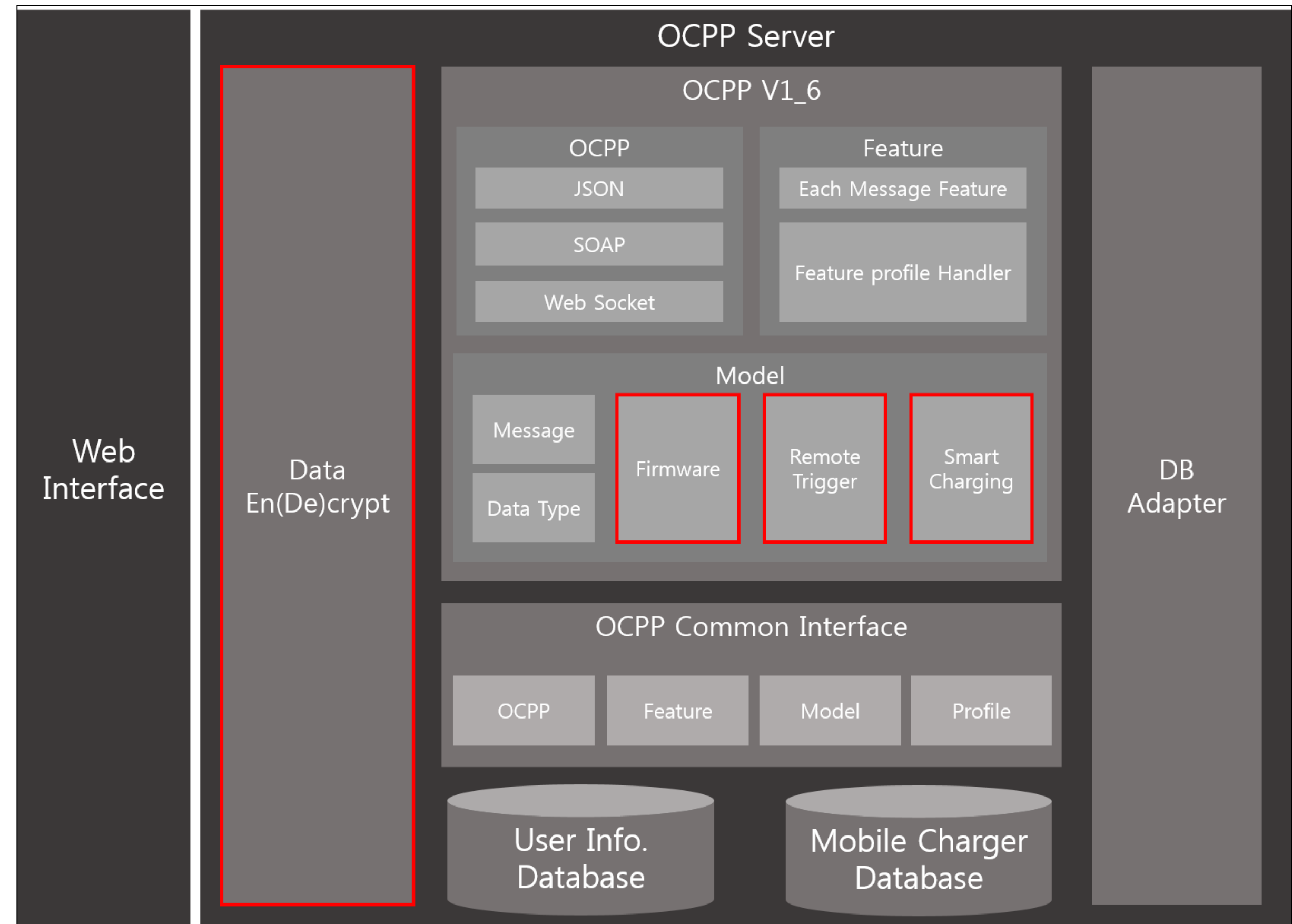
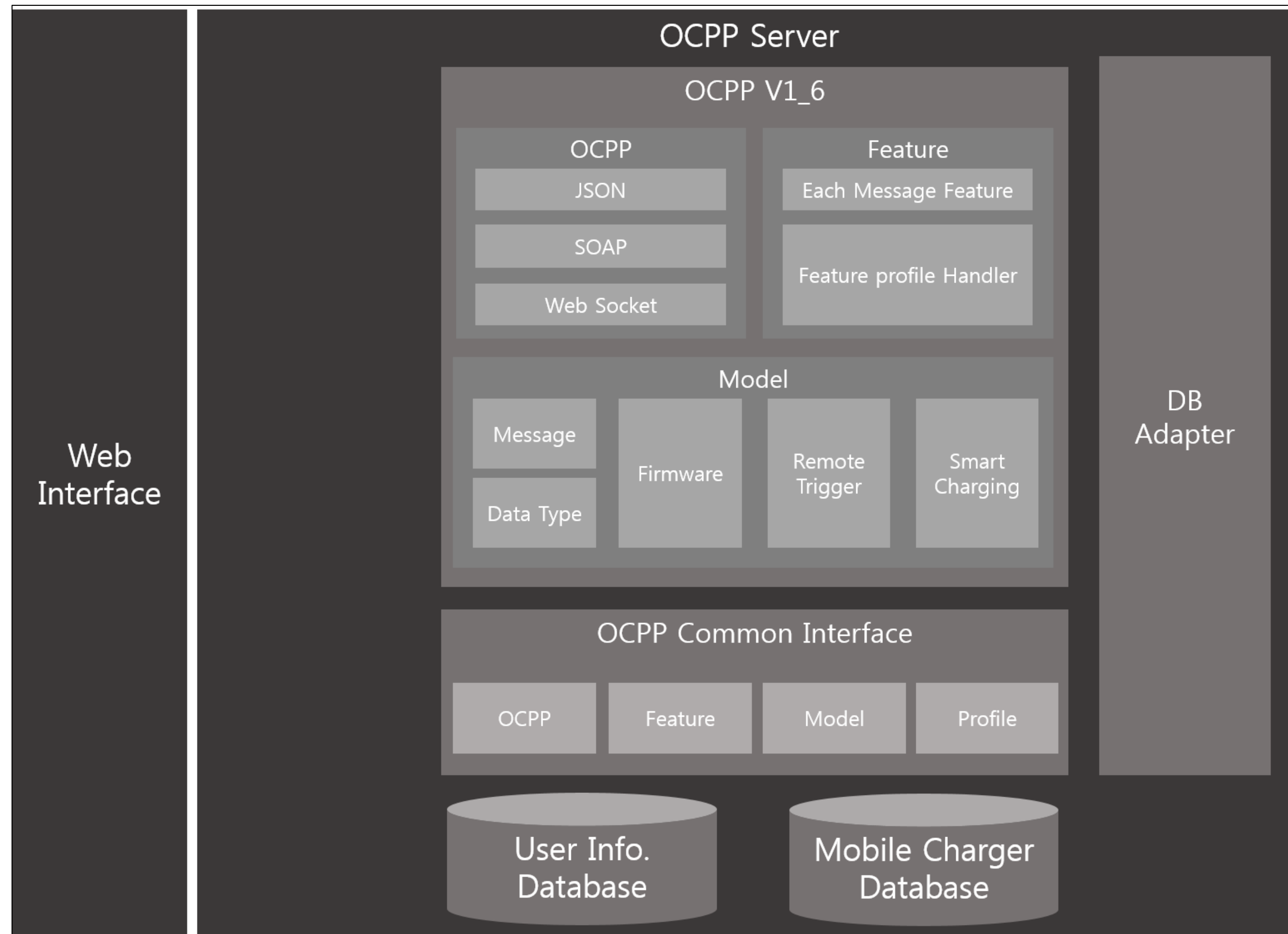
Test Case Root Id: 001

Sec – 2.1.1

	Charge Point	Central system
Prerequisite(s)	General pre(post)condition 을 참고	n/a
Scenario Detail(s)	1. Manual Action: CP 전원을 켜다가 켜다. 2. CP 는 BootNotification 메시지를 가장 먼저 전송해야 한다. 3. CP 는 응답을 받을 때까지 BootNotification 메시지를 전송해야 한다. 4. BootNotification 메시지에 대한 응답을 받으면, CP 는 모든 커넥터에 대해 사용 가능한 상태에서 StatusNotification 메시지를 전송한다. 5. 모든 커넥터가 사용 가능한 상태가 되면, CP 는 heartbeats 를 위한 메시지를 전송한다.	n/a
Expected Result(s)	1. Pass/Fail 2. CP 가 일정 시간 내에 BootNotification 메시지를 보내지 않으면 테스트 케이스를 종료해야 한다.	n/a



OCPP specification to apply on the device





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Thanks

