COTEVOS Roskilde Workshop

Meeting
Roskilde
20141002
V0.7

COTEVOS' role and interactions with standards

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This project has received funding from the European Union's Seventh Programme for research, technological development and demonstration under grant agreement
No 608934

Agenda

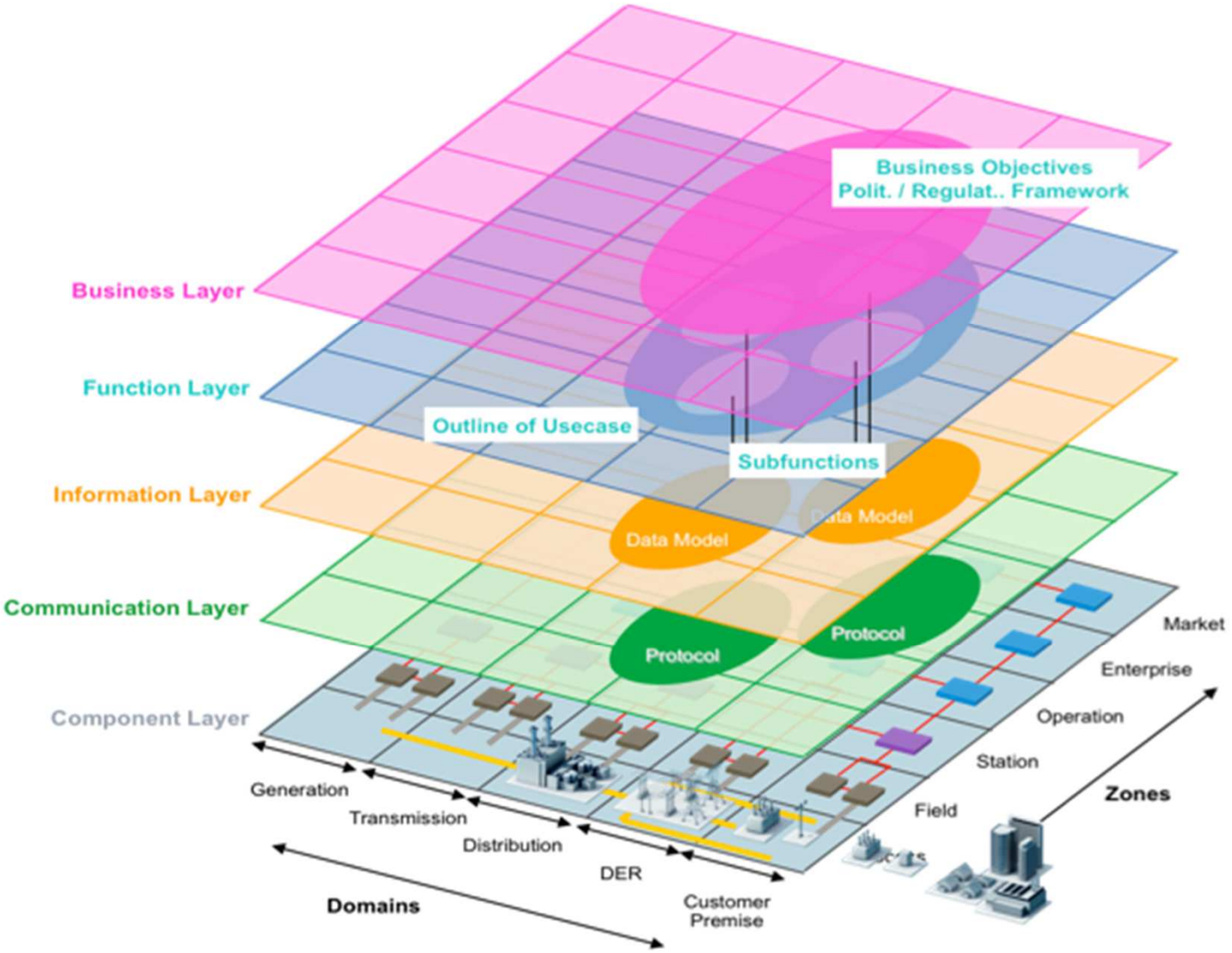
- COTEVOS Introduction, some slides from also Vision and Mission
- Some results highlighted from COTEVOS WP2:
  - Integration and alignment of testing methods with standards and standardization needs
- Cooperation and alignment with M/490 WG Interoperability
- Methodological Architecture Approach
  - Reference Architecture and mapping service to actors, slides from WP3

Main objective of COTEVOS

- COTEVOS aims to develop capacities to test the conformance, **interoperability** and performance of the EV **Smart Charging** Infrastructure.

- Based on the partners' contrasted experience
- And cooperation with research and on-going standardization development like M/453, **M/468 and M/490**
  - Aligned, cooperated and contributed to M/490 WG Interoperability
- Due to Smart Charging **interaction between grid infrastructure and EVs** is explicitly in scope !
  - Special attention and focus on smart charging use/test cases

Key M/490 reference SGAM: Smart Grid Architecture Model



COTEVOS charter is NOT

- COTEVOS charter is NOT to create new standards
  - It is to use the standards and use cases etc. already defined
- But in order to perform interoperability tests some gaps needs to be closed
  - Can be done by assumptions or better definitions/agreements
  - In these cases it needs to be well documented and communicated and fed back into relevant standardisation bodies

COTEVOS WP2: Integration and alignment of testing methods with standards and standardization needs

The specific objectives are the following:

- **Analysis and alignment** of new tests and conformance test procedures **with existing standards**, regulations, standardization activities and standardization needs at European level concerning the interaction between EVs and grid infrastructure

- **Definition of priorities** for new tests and conformance testing methods with broad consensus at European level (both inside and outside COTEVOS)

- Assessment of European priorities for new tests and conformance testing methods by **comparison with the international standardization** scenario

WP2: Align with ongoing standardisation activities

- M/468 eMobility Co-ordination Group
- E-Mobility WG Smart Charging
- M/490 Smart Grid Coordination Group
  - M/490 - Consistent set of standards
  - M/490 - New applications and Methodology
  - M/490 - Interoperability
  - M/490 - Information Security
- IEC TC 69
- CENELEC TC-8X
- National standardisation organisations
- IEC 61851
- ISO-IEC 15118
- eMI3: eMobility ICT Interoperability Innovation Group
- OCA: Open Charge Alliance
- Other organisations: JRC, ETSI CTI, DERLab partners, …
- Other projects: STARGRID, Green eMotion, PowerUp, …

Key standards (missing)

- What are the key standards for testing interoperability
  - IEC 61851
  - ISO-IEC 15118
  - IEC 62196 (plug is also needed for interoperability)
  - ??

- What are the key (interoperability) standards missing
  - Identification/Authentication?
  - EVSE to EVSE-backend interface?
  - ***Smart Grid interaction?***
  - EVSP or Energy Market interaction?
  - ?

From .. Use cases ..to.. Test cases

- There is not (and never will?) be one exact architecture of how the **eMobility system** and all its **actors** will interact
- The different COTEVOS reference architectures are almost ready
- There always will be **use cases** of how interaction between a defined set of actors can work
- This will describe the **interface** and used **standard** between specific elements (like EV, EVSE, …)

- Approach under consideration
  - Define **test suites** (like the WGI BAIOP) that cover a use case
  - The test suite will consist of different **test cases** (steps) that need to conform to a specific standard e.g.
    - EV requests a charge profile to EVSE (e.g. conform 15118)
    - EVSE sends proposed charge profile to EVSE (e.g. conform 15118)
  - Note that on a specific interface/standard multiple test cases and test suites can be necessary to ensure full interoperability.

Standards versus interoperability

- Standards are required for interoperability, but
- Interoperability is much more than a set of standards
  - Interoperability >> set of standards
- IEEE 610: **Interoperability is** the ability of two or more networks, systems, applications, components, or devices from the same vendor, or different vendors, **to exchange and subsequently use that information in order to perform required functions**
- Standards contain options, these often reduce interoperability

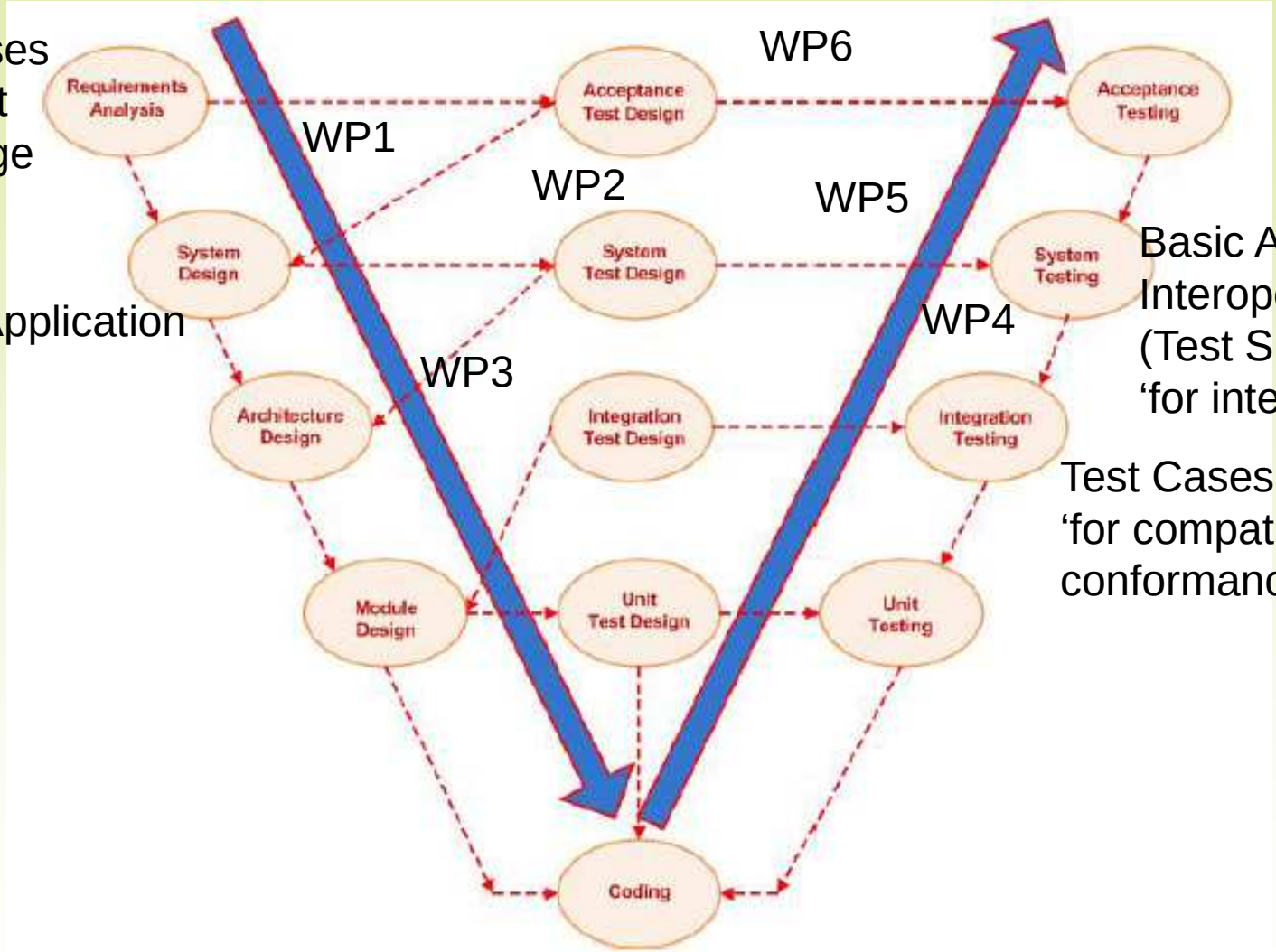
- M/490 Basic Application Profile (BAPs) reduce these options
- Therefore
  - Interoperability = set of standards + BAPs + ???

CoTeVoS

Alignment with M/490 WG Interoperability

Use Cases
- Smart Charge
- V2G

Basic Application Profile



Basic Application Interoperability Profile (Test Suites) 'for interoperability'

Test Cases 'for compatibility/ conformance'

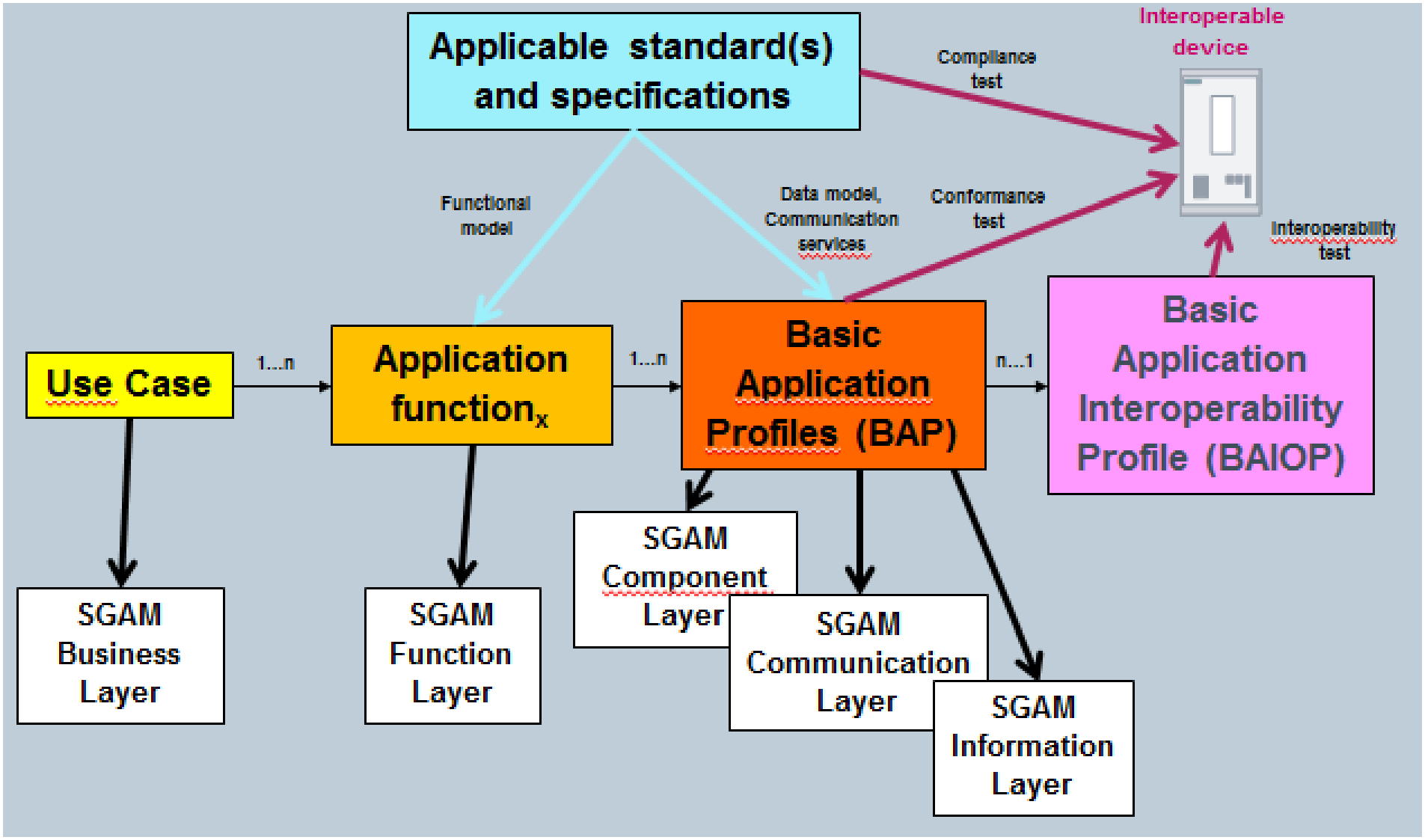


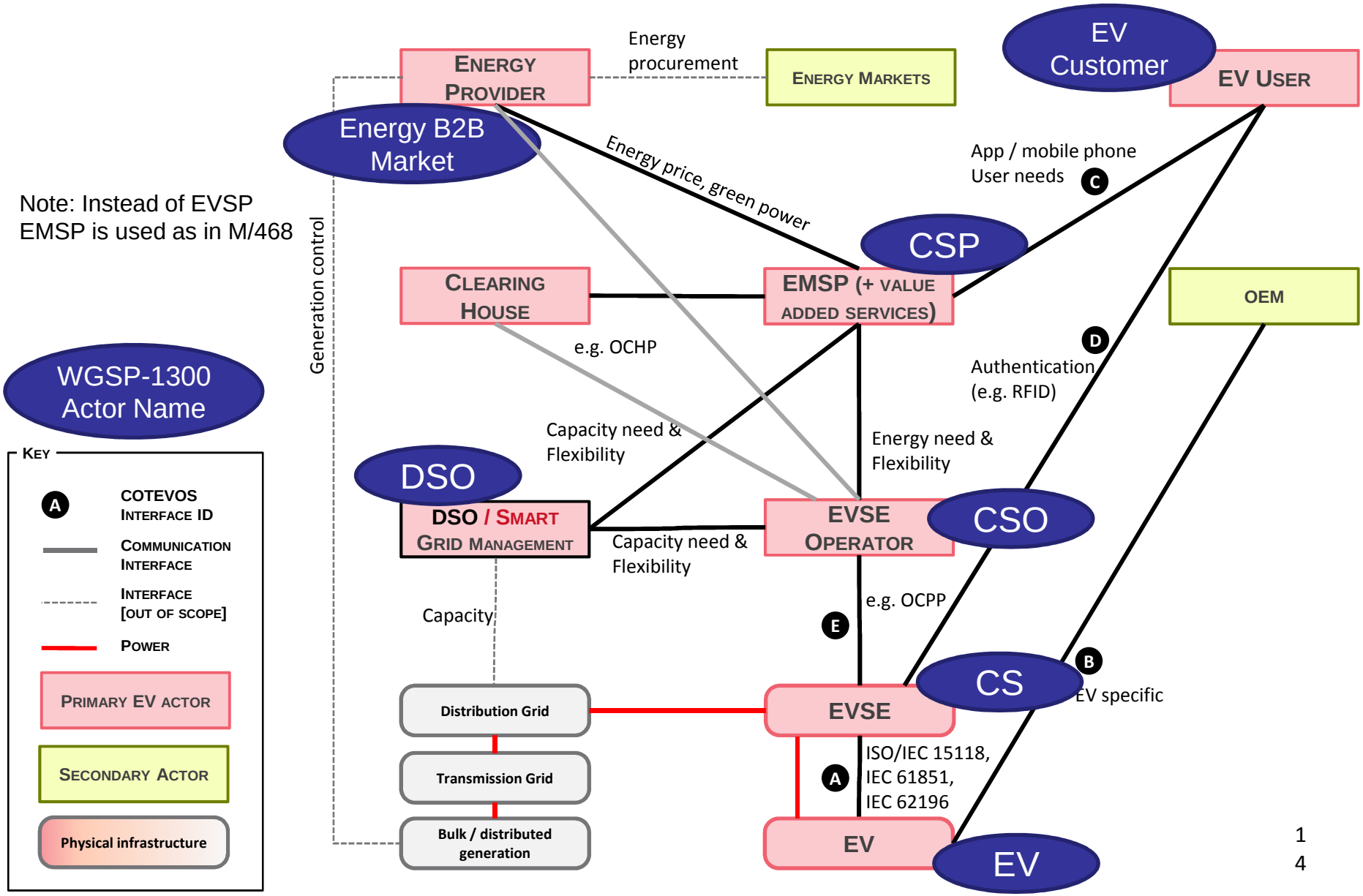
Figure 4 - Process from Use Case to Interoperability on SGAM function layer
(Source DRAFT Report of the Working Group Interoperability to the SGCG Mandate M/490)

M/490 BAP

- A BAP is an agreed-upon ***selection and interpretation*** of relevant parts of the applicable standards and specifications and is intended to be used as building blocks for interoperable user/project specifications.
- The key ideas of BAPs are:
  - BAPs are elements in a modular framework for specific application systems/subsystems
  - Combinations of different BAPs are used in real projects as building blocks
  - …
- We also came to the conclusion that an information flow with intermediate routing links is one BAP, so one BAP can cover multiple protocols and standards. Also timing and conversion issues are covered better with this approach, ensuring interoperability much better

CoTeVoS

Use case smart charging: Actors in the system mapped on COTEVOS Reference Architecture (proposal)

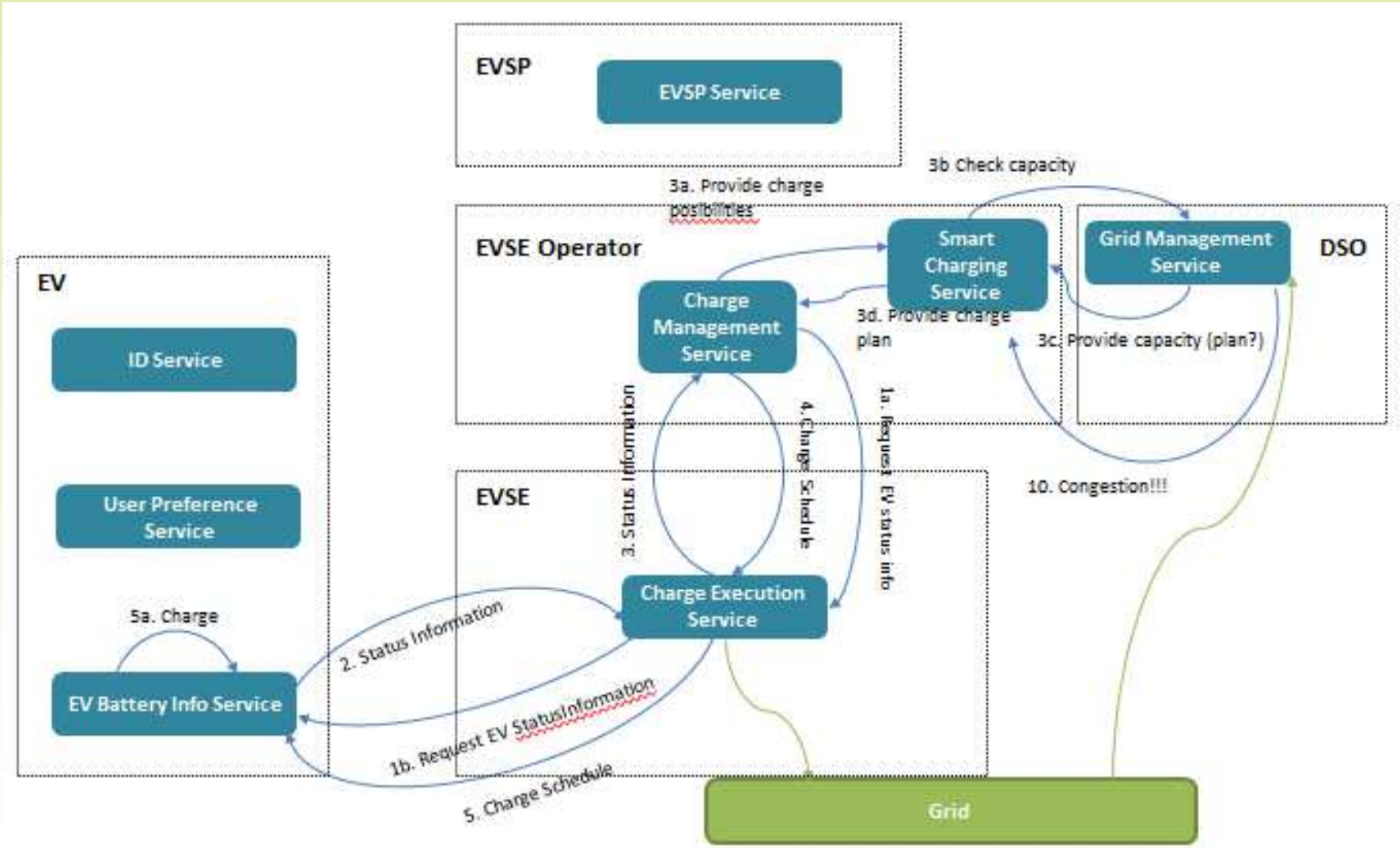


Actors or roles or services

- Actors can lead to discussion on allocation of their role and or services

- In COTEVOS we are verifying if we can agree on service view (as reference starting point)
  - Then the information flows between services can be mapped on the different interfaces between actors
  - ….

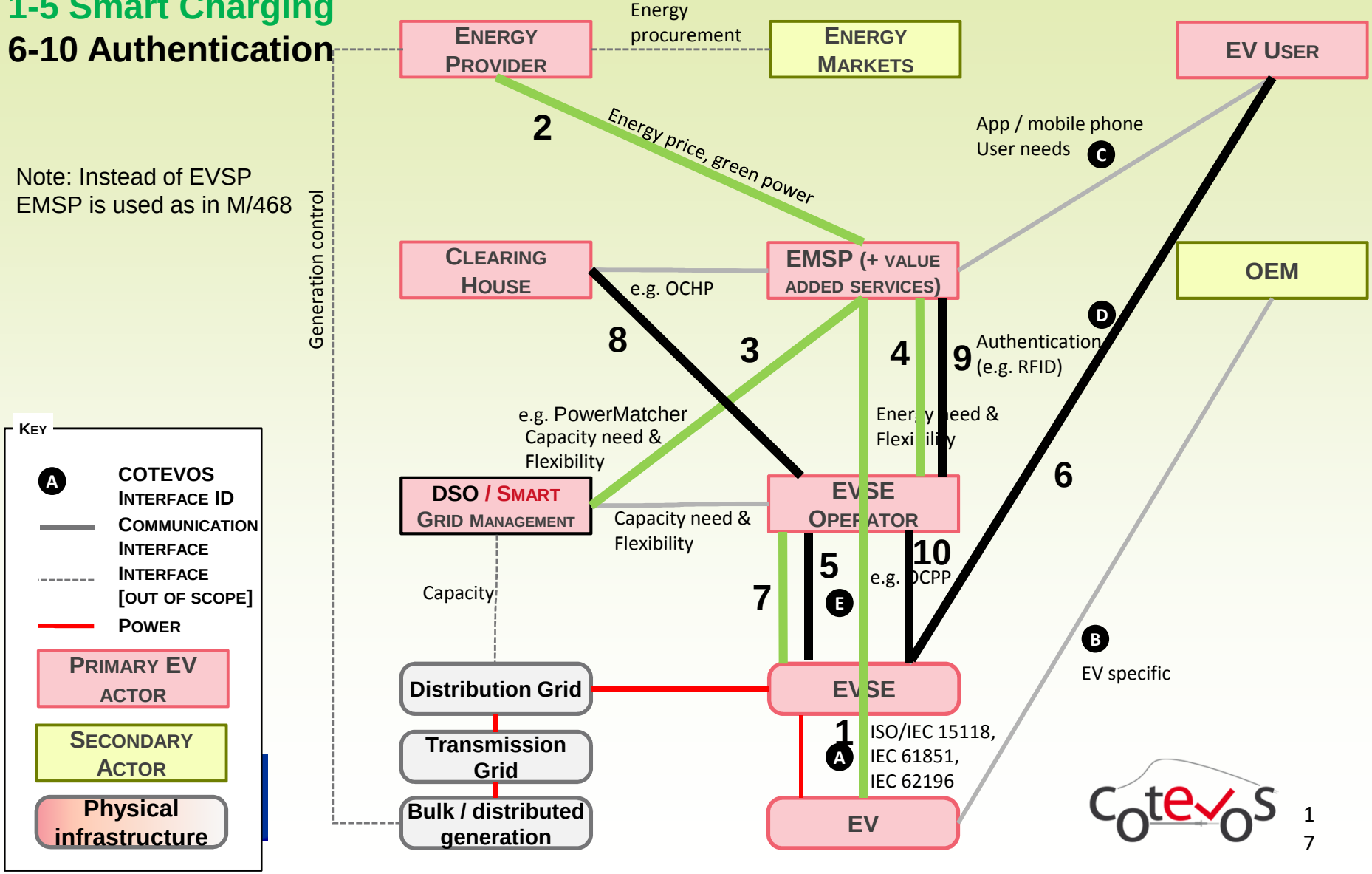
Smart Charge Loop Use Case, example only



Use case smart charging and authorization & roaming, mapped on COTEVOS Reference Architecture (preliminary)

1-5 Smart Charging
6-10 Authentication

Note: Instead of EVSP
EMSP is used as in M/468



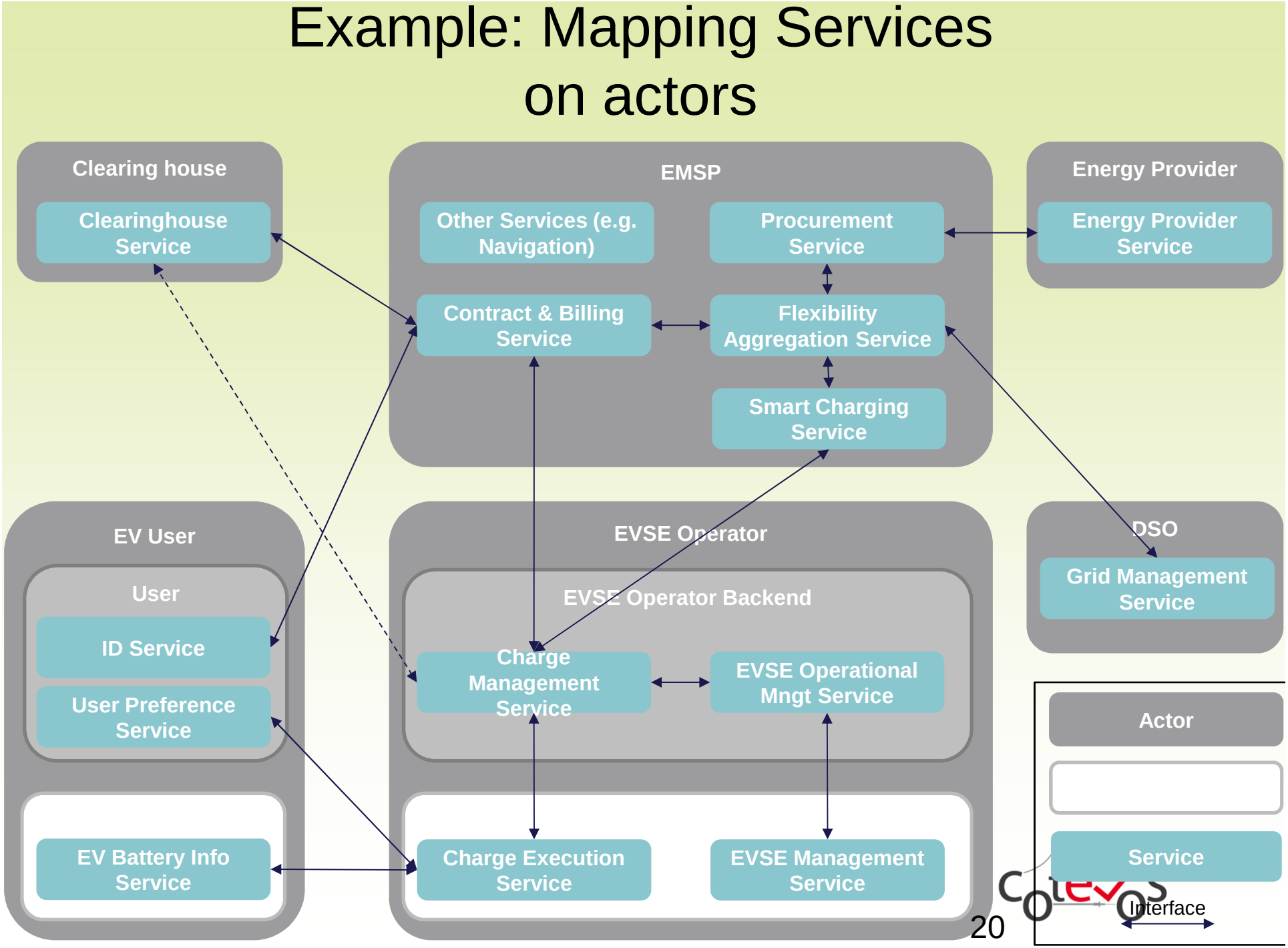
Comments, Questions?

- Comments?

- Questions?

Backup

Example: Mapping Services on actors



Use Case authenticate, steps below, WP1					
Send ID to EVSE					
Send ID to CMS					
Send ID to EVSP					
EVSP check ID					
EVSP authorizes the ID					
CMS repeats this message					
EVSE receives this authorization and can initiate charging					
EVSE confirm the authorization to the EV/User					

Use Case authenticate, steps below, WP1	Interface (or not) WP3				
Send ID to EVSE	EV - EVSE				
Send ID to CMS	EVSE - CMS				
Send ID to EVSP	CMS - EVSP				
EVSP check ID	(EVSP)				
EVSP authorizes the ID	EVSP - CMS				
CMS repeats this message	CMS - EVSE				
EVSE receives this authorization and can initiate charging	(EVSE)				
EVSE confirm the authorization to the EV/User	EVSE - EV				

Use Case authenticate, steps below, WP1	Interface (or not) WP3	Conform Standard WP2			
Send ID to EVSE	EV - EVSE	e.g. 15118			
Send ID to CMS	EVSE - CMS	e.g. OCPP			
Send ID to EVSP	CMS - EVSP	tbd/gap 3			
EVSP check ID	(EVSP)	-			
EVSP authorizes the ID	EVSP - CMS	tbd/gap 3			
CMS repeats this message	CMS - EVSE	e.g. OCPP			
EVSE receives this authorization and can initiate charging	(EVSE)	-			
EVSE confirm the authorization to the EV/User	EVSE - EV	e.g. 15118			

Use Case authenticate, steps below, WP1	Interface (or not) WP3	Conform Standard WP2	Conformance Test Case WP4	Interoperability Test Suite 1 WP4-5	Interoperability Test Suite 2 WP4-5
Send ID to EVSE	EV - EVSE	e.g. 15118	Send ID to EVSE	Yes	Yes
Send ID to CMS	EVSE - CMS	e.g. OCPP	Send ID to CMS	Yes	Yes
Send ID to EVSP	CMS - EVSP	tbd/gap 3	Send ID to EVSP	Yes	-
EVSP check ID	(EVSP)	-		(simulated)	-
EVSP authorizes the ID	EVSP - CMS	tbd/gap 3	EVSP authorizes the ID	Yes	(simulated)
CMS repeats this message	CMS - EVSE	e.g. OCPP	CMS repeats this message	Yes	Yes
EVSE receives this authorization and can initiate charging	(EVSE)	-		(happens in DUT)	(happens in DUT)
EVSE confirm the authorization to the EV/User	EVSE - EV	e.g. 15118	EVSE confirms the authorization to the EV/User	Yes	Yes