COTEVOS

Requirements for infrastructure for interoperability assessment

Main Author(s) of deliverable	Company	Contact
R. Rodríguez, C. Madina, E. Zabala	TECNALIA	raul.rodriguez@tecnalia.com
Deliverable number - date	D1.3 - 28/11/2014	
Dissemination level of deliverable	Public	
Date of abstract	16/02/2015	

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Abstract

The state of art analysis performed in the frame of COTEVOS project permitted, among other things, to depict market solutions available today in the electro-mobility field. These were used as input by project partners to help define their future strategies for interoperability assessment. In this way, this deliverable presents an approach of that vision at the date of its publication.

The summary of the **state of art analysis** is presented below classified by aspects related to the Smart Grid Architecture Model (SGAM) layers (Smart Grid Coordination Group approach):

- **Regulation**: it sets the highest level framework for the development of activities in a region and therefore it has a relevant impact on the development of both regulated and private business models. Even if harmonisation is being pursued at EU level, structural differences exist between countries resulting in diverse market conditions, which are characterised by players' roles, electricity system operation procedures, small consumers' participation in energy markets, low voltage codes, etc. This poses risks for interoperability.
- **Business**: business models rely on product and/or service sale. Those related to e-mobility have to take into account ICT requirements in order to estimate costs. Several solutions exist and companies will deploy the ones suiting better their models, e.g., end-to-end communications involving many different stakeholders might be required.
- **Services/Functions**: they are the basis of business models. Use cases can be utilized to describe them, at high level or in a more detailed way going down to, for example, data exchange definition. Services definition permits to know the required interactions between components (stakeholders or systems) and the functions that will have to be covered.
- **Communication and information**: the interaction between components requires the use of communication and information protocols. This is a fundamental aspect to achieve interoperability. The state of art analysis permitted to identify candidates for the communication between stakeholders, considering not just the e-mobility but other related domains, such as the smart grid, ITS and home automation. The next Figure 1 shows part of this outcome.
- **Components**: they can refer to devices, applications, persons and organizations. They will use communication and information protocols to exchange data and they will carry out the functionalities required to fulfil services. Similarities may exist between the devices or applications of different stakeholders and this helps simplify, up to certain extent, the interoperability problem.

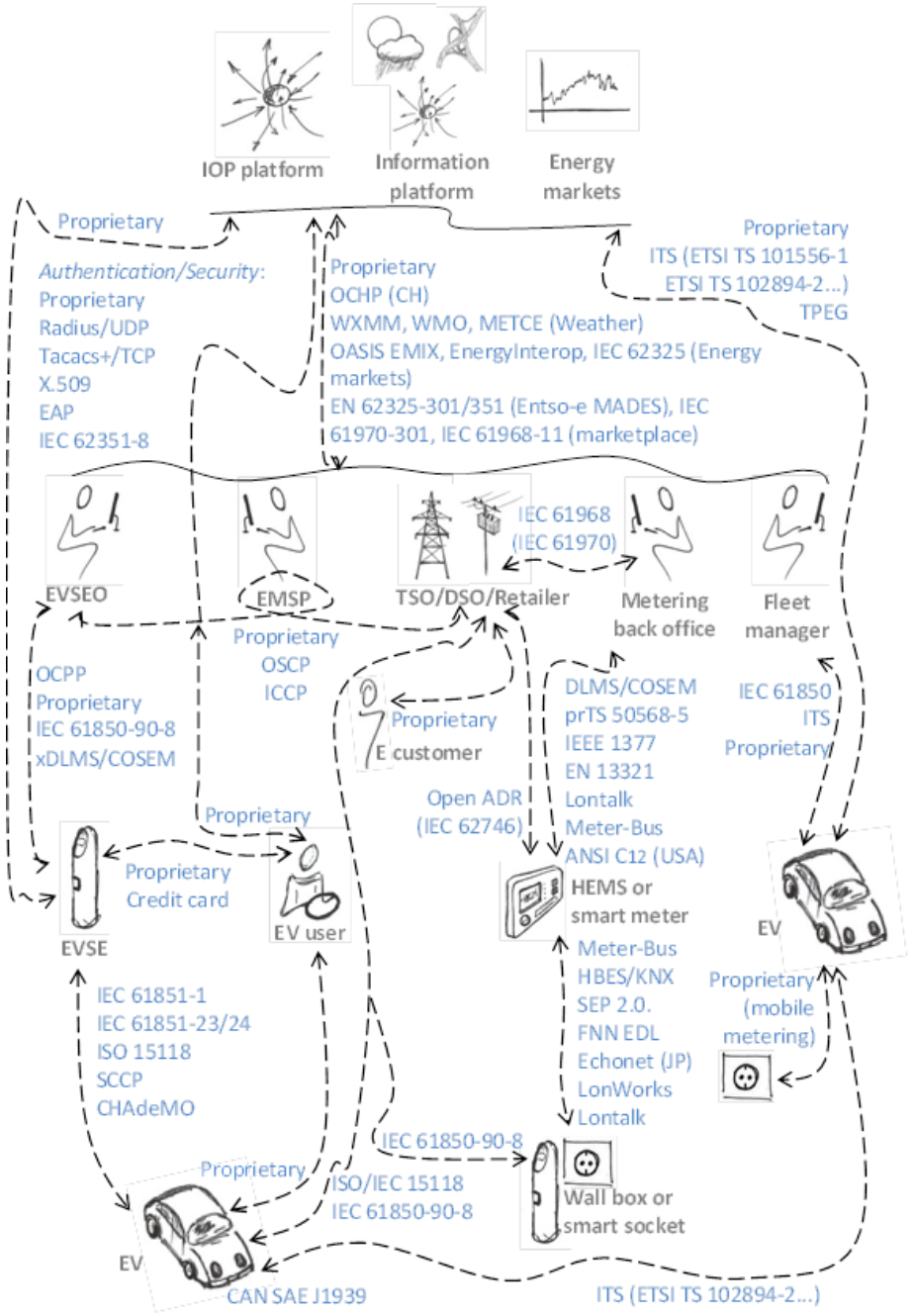

Figure 1 Information protocols summary

This state of the art information helped COTEVOS partners define their vision and **present strategy** in the e-mobility interoperability assessment field. The interfaces between stakeholders together with the available communication and information protocols were reviewed and evaluated, mainly by partners who will offer testing services in the future.

As it would be expected, the diverse points of view are not uniform, leading to complementarity within the project. The following Table 1 summarizes partners' opinions and strategy. The latter is represented by the protocols that will be presumably implemented in laboratory environments (last column). The vision on standardization relevance of the interfaces between actors, as well as on the expected market interest and implementation costs for each of them, is summed up in columns 3 to 6 in the table. Possible answers for concept assessment were limited to High (H), Medium (M) or Low (L).

Table 1 Summary of IOP vision and strategy by COTEVOS partners

Communication		Standardization relevance	Market interest		Cost	COTEVOS partners expected services
from	to		Short term	Medium / long		
Secondary Actor system	ICT platform	L-M	L-M	M-H	L-M	OCHP: 1 partner
EVSE	ICT platform	M-H	L-M	H	L-M	
Secondary Actor	Secondary Actor	M-H	L-M	M-H	M	IEC 62746: 1 Open ADR, OSCP, PowerMatcher: 1
DSO	HEMS	H	L	M-H	L-M	
DSO	EV	M	L	L-M	M-H	Not specified: 1 IEC 61850, OpenADR, Proprietary: 1
DSO	EVSE	M-H	L	M-H	M-H	Not specified: 1 IEC 61850, OpenADR, Proprietary: 1 IEC 61850-90-8: 1
DSO / Retailer	Energy customer	M	M-H	H	L	
HEMS / smart meter	EVSE/smart socket	M	L	M	L-M	
Fleet manager	EV	M-H	L	M-H	M	
EVSEO	EVSE	H	M	M-H	M	OCPP: 4
EV user	Secondary Actor and ICT systems	L-M	L	M	L	
EV user	EVSE	H	H	H	L-M	RFID: 1
EVSE	EVSE	L	L	L	L	
EV	ITS platforms	M-H	L	M	M	
EV	EVSE	H	M-H	M-H	M-H	IEC 61851: 6 partners IEC/ISO 15118: 5
EV	Smart socket	M	L-M	M-H	L-M	
EV	EV user	L-M	L	M-H	L	
EV	EV (ITS)	M	L	M-H	M	
EV	EV (Inside the Vehicle)	L-M	L	L-M	L	

The main **conclusions** of the report are presented below:

- The uncertain market evolution and the broad options spectrum in the e-mobility sector and smart grid field make it advisable that interoperability assessment is based on flexible laboratory architectures able to adapt to different business models requirements.
- In order to benefit from the complementarity of COTEVOS partners' approaches, sharing infrastructures through remote internet connections (cloud) could be an interesting option to move towards a unified laboratory concept and contribute to the cost effectiveness of test procedures.
- Other several ongoing developments within the project are also paving the way towards the setting up of the unified laboratory:

- Common conceptual approach.
- Common laboratory reference architecture.
- Definition of test cases and testing procedures.
- Inter-laboratory comparison.
- The presentation of results for evaluation in the international arena.

Acronyms

CH	Clearing House
DR	Demand Response
DSO	Distribution System Operator
EMSP	Electro-Mobility Service Provider
EV	Electric Vehicle
EVSE	EV Supply Equipment
EVSEO	EVSE Operator
HEMS	Home Energy Management System
ICT	Information and Communications Technology
IOP	Interoperability
ITS	Intelligent Transport Systems
SGAM	Smart Grid Reference Architecture Model
TSO	Transmission System Operator