COTEVOS

Set-up of the reference architectures in some of COTEVOS' infrastructures

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Abstract

Reporting the results of the Task 3.2 of the COTEVOS project a description of the reference architecture for interoperability testing is given. The three different architectures relevant for the COTEVOS project are described, the COTEVOS basic reference architecture, the COTEVOS service architecture and the COTEVOS Lab architecture. As a result of this definition of three architectures ther is no gap in the COTEVOS Lab Architecture itself as it covers all current and foreseen actors, systems and infrastructures. In addition to the discussion of the reference architecture a set of envisioned architectures is presented.

Executive Summary

This deliverable reports the results from the work conducted in Task 3.2 to define a number of architectures relevant for the COTEVOS project based upon the interoperability assessment conducted in Task 3.1.

In this document we describe different architectures relevant for the COTEVOS-project:

1. The COTEVOS basic reference architecture (Section **Fehler! Verweisquelle konnte nicht gefunden werden.**), which describes all the actors and their interfaces in the e-mobility system. This architecture provides a common and unambiguous context for all use cases and test cases developed in the COTEVOS project. We develop interface reference architectures which describe the COTEVOS basic reference architecture from four viewpoints: the EV-EVSE physical interoperability viewpoint, the charging infrastructure viewpoint, the e-mobility Service Provider (EMSP) interfaces viewpoint, and the metering viewpoint.
2. The COTEVOS Service architecture (Section **Fehler! Verweisquelle konnte nicht gefunden werden.**), which describes the e-mobility system architecture from a (business) service point-of-view. This architecture describes all the services and functions supported by the basic reference architecture and allows us to define the responsibilities of each actor in the e-mobility system, and will therefore constitute the basis for a stable interface reference architecture.
3. The COTEVOS Lab architecture (Section **Fehler! Verweisquelle konnte nicht gefunden werden.**), which describes a common and unambiguous COTEVOS architecture that is used as a (non-compulsory) reference in the labs of the partners. The idea behind a common lab architecture is that all partners that have not yet chosen for a specific lab architecture can adopt the proposed architecture. Moreover, for the partners that adopt the COTEVOS Lab reference architecture it will be easier to re-use each other's test tools.

The basic reference architecture was initially formulated based upon the work of Task 3.1, and building upon the use cases defined in WP 1 and the evaluated standards from WP 2. Furthermore, it

builds upon the results from e.g. FP7 GreenEmotion, the EMi3 group, and the EU Smart Grid-Coordination Group.
In the process of developing the COTEVOS Lab Architecture we combined the envisioned lab architectures from all partners. In the course of this process we developed enhancements to the basic reference architecture through the introduction of additional interfaces and actors.

At this stage we found it useful, and necessary, to develop a service architecture where services are described independently from actors, but can easily be mapped back to actors in the e-mobility system. This allows the approach to be more generalised, to deal with situations where choices are available for which actor performs which function, for example to deal with potential differences in the roles of actors between different EU member countries.

The basic reference architecture has been accepted and agreed upon by all partners in the COTEVOS project. It is well aligned, and shares many similarities with the work produced in the Green eMotion FP7 project, eMI3, and the CEN/CENELEC/ETSI group on Smart Charging and the Smart Grid Coordination Group's activities mandated in M/490 by the European Commission.

The different test cases that are to be implemented by the labs show a neat coverage of the available test cases. It shows that each lab has a different focus (and expertise), together covering the complete e-mobility ecosystem.

The missing standards ('gaps') identified in the basic reference architecture can be dealt with in the laboratories by taking several implementations and combinations of EVSE Operator, EMSP and Clearing House into account that currently exists as a reference. Since the Smart Grid system is much less specified, testing the interfaces of the key actors in this Smart Grid system (e.g. the Energy Supplier and DSO) is difficult. Real implementations do not exist yet, but several use cases are available. Combining this with the Smart Grid knowledge of the COTEVOS partners and their communities will allow COTEVOS to define smart charging use and test cases, covering expected future functionality.

So some of the identified gaps are closed as much as possible by taking the current status of standards and standardisation activities into account. Since one can only test according to a specification or standard, only (expected) use cases can be tested if both are not available.

There is no gap in the COTEVOS Lab Architecture itself. It covers all current and foreseen actors, systems and infrastructures. Furthermore, it shows that COTEVOS is able to test real EV's, EVSE's and EV users in the different laboratories, and as such perform round robin tests for EV's and EVSE's which will be completed in WP 4.
All other actors are either simulated or emulated to create a functional interoperability test. All simulated or emulated actors are available and implemented in at least two laboratories.