Web Technologies in EV and Smart Grid Applications

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Why WoT? Why now?

What drives WoT?
- Simple optimization of automation processes
- Across industry domains
- Across the automation layers
- Involving multiple stakeholders

Enablers
- Well, IoT ;-
- Processing power in uC
- ComSoCs

Let’s have a concrete look at examples
- Smart grid
- EVs
A Smart Grid Application – Virtual Power Plants (VPP)

- Key technology for Smart Grid
- Orchestration of Distributed Energy Resources (DER)
- Loosely coupled control
- Unreliable communication over public networks
- Aggregation of data vs. distribution of automation function
VPP automation among multiple Stakeholders

- Observations:
  - Multiple domains (e.g. building mngmt. vs. energy trading)
  - Multiple stakeholders
  - Divergent Priorities (e.g. voltage control vs. energy trading)
What interaction paradigms have persons and these distributed things in common?

- participation in a chat room
- Local storage participating in a Virtual power plant (VPP)

Can web technology for chats be used to organize the collaboration of distributed energy resources?
E-Mobility: Relevant stakeholders

- Demand clearing house
- Original Equipment Manufacturer
- Fleet Operator
- E-Mobility Operator
- EV
- Chargespot
- User
- Energy Provider
- Meter Operator
- Distribution System Operator
- Financial clearing house
ISO/IEC 15118
Charge Control and Aux Services with Web Technology

Visit Demo for details

Supp.Apps  Charge Ctrl  Aux Sevices  ...

V2G Message Format (XSD)

EXI (XML)

TLS & V2GTP

TCP

IPv6

SLAC

Homeplug GreenPHY

APP

PRE

SES

NET

TRA

MAC

PHY
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Let’s have a concrete look at examples
- Multiple stakeholders: from automation to collaboration
- Multiple domains: use of web technologies by means of extensibility
- Challenge: resource efficiency, security, …
Requirements and Approaches

Support of Stakeholder Use Cases
- Do not limit to concrete application use cases
- Support Add-On Services

Provide an extensible framework
- Extensible & generic technology
- Not domain specific
- Widely accepted specs and standards for the interfaces

Support E2E security aspects

Simple Implementation
- Standard SW development tools
- Integration in IT infrastructure
- Limit to basic tool box (20:80 principle)

Define a platform for heterogeneous, loosely coupled applications
- lessons learned from www
- define platform for identification- and interaction mechanisms
  - breakout session on activity streams