Electric Vehicle Charger Monitoring Application

April 27, 2017 – Gerald Seiler | Serge Fabiano

Confidentiel

Agenda

Current Situation at SAP Labs France

What are the Challenges and Who is Concerned ?

Our Solution

Our Advantages

How our application is working

Standards

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Possible partners and customers

Product overview

Live Demo

Current Situation at SAP Labs France

28 charging points of 22KW each.

The stations are currently working in standalone without any monitoring.

We have 30 EV cars. We plan to have 40 EV in 2018.
We will have more car than the available charging slots, and this will be a common issue for everybody in coming years.

What are the Challenges and Who is Concerned ?

Car Fleet Landscape Overview: No remote view of available stations, no outage alerting, no end of charge notification, no access restriction, no time sharing…

Charging Monetization/Pricing: no cost estimation per user, no cost calculation on the charge points, no energy measurement, no energy limitation and load balancing.

- Electric Vehicle Supply Equipment's Providers, such as Schneider, ABB.
- Energy Providers / Smart Grids / Distribution Grids.
- Car Fleet Providers such as car rentals, hotels and airports such as Hertz.
- Government Organizations of Energy and Public Transports Fleet.

-> The EV Market has an explosive Growth: +641% in 5 years and +37% on the last year

Our Solution

Simple platform, big achievements

- Display the real time status of the stations (charging, idle, failure).
- Display real time Monitoring Energy and Power Consumption.
- Centralized Stations booking, sharing, profiling and advanced predicting.
- Real Time notifications for users to inform about start and end of charge.
- Cost calculation on the charge point and online Payments.

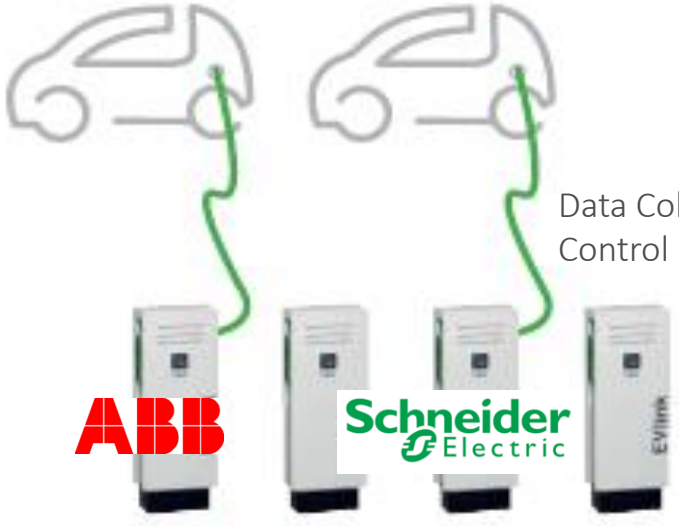
How our application is working

End User Application:

- Check if there are free places
- Get notified when the car is charged
- Report issues with charging stations

Dashboard for Car Fleet Administrators:

- Check Availability
- Energy and Cost Monitoring



Internet

Data Collection
Control

APIs for Energy
providers

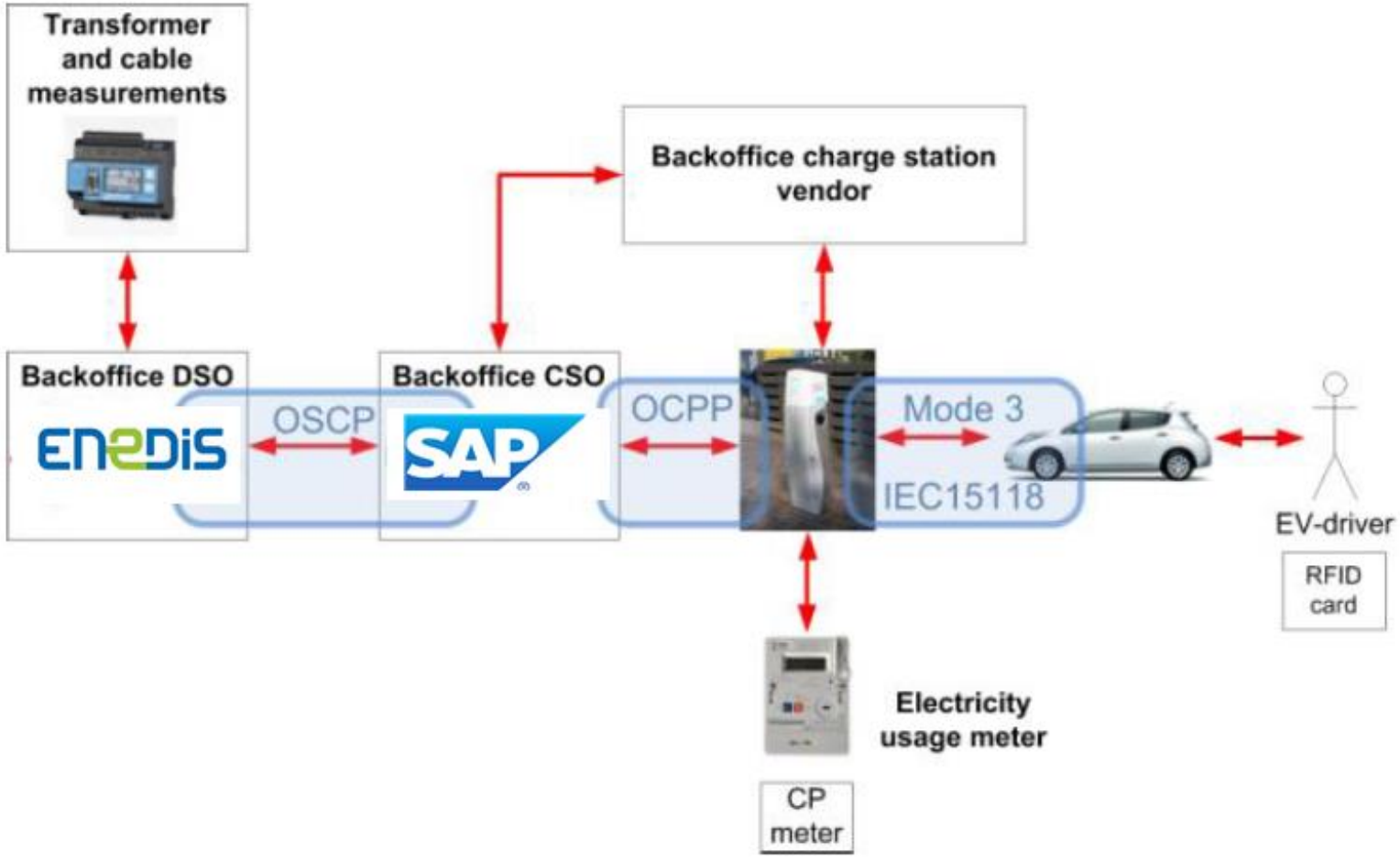
EVSE and Car Fleet Providers

Energy providers – Smart Grid Providers

How our application is working

OCPP Open Charge Point Protocol (ISO 15118): Defines the way to charge from the EV to the CSO (Charging Station Operator).
OSCP Open Smart Charging Protocol: Connection from CSO to DSO (Distribution System Operator) i.e. Smart City and Grid providers.

Example of configuration:



Standards

The version OCPP 2.0 will be the basis for the new IEC 63110 standard "Protocol for Management of Electric Vehicles charging and discharging infrastructures“

Data Communication controls Charging Session for better Integration of renewable Energy

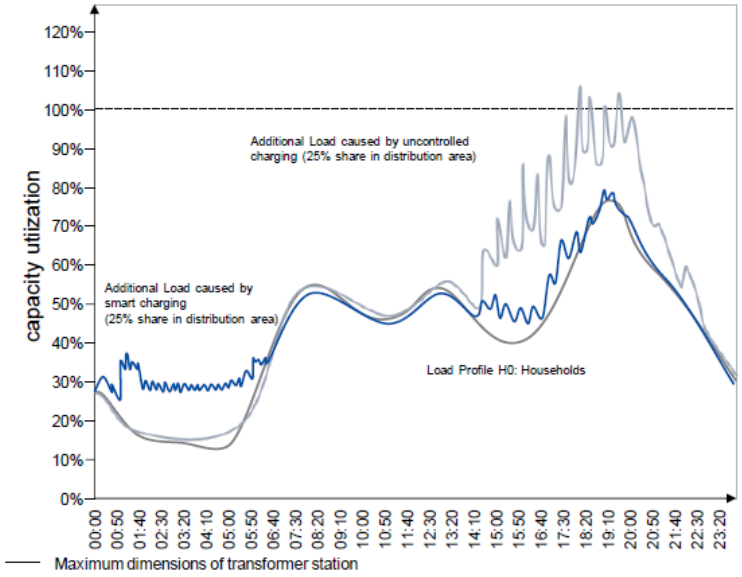
Electric Vehicle		EV Supply Equipment (Charge point)
Cable connected, CP/PWM ok, ask for service available	1	Chose highest protocol version, send service list
I want to charge with costs, my contract ID is “1234”	2	Checking contract ID, perhaps request at eRoaming platform
Calculation of charging profile; chosen price table	3	Valid ID can be used for charging up to 22 kW; load & price table enclosed
Lock connector; I will charge from 2 AM to 6 AM at 5 kW	4	Capacity reservation, perhaps communication with Smart Grid
Charging	5	Contactor closed; send start meter reading
	6	Special wind offer: 4 AM to 6 AM, price minus 10%
Offer accepted: I will charge from 4 AM to 6 AM at 11 kW	7	Capacity reservation, perhaps communication with Smart Grid
I want to stop charging session; open contactor	8	Contactor opened
	9	Send stop meter reading; please sign meter reading
Signing drawn energy, unlock cable, end of communication	10	Provide charge data (Service Detail Record) for billing

Example: Controlling charging session according to ISO 15118-2

RWE The energy to lead

Smart Charging combines security of energy supply and customer convenience.

Effects of EV’s and charging scenarios on the load curve

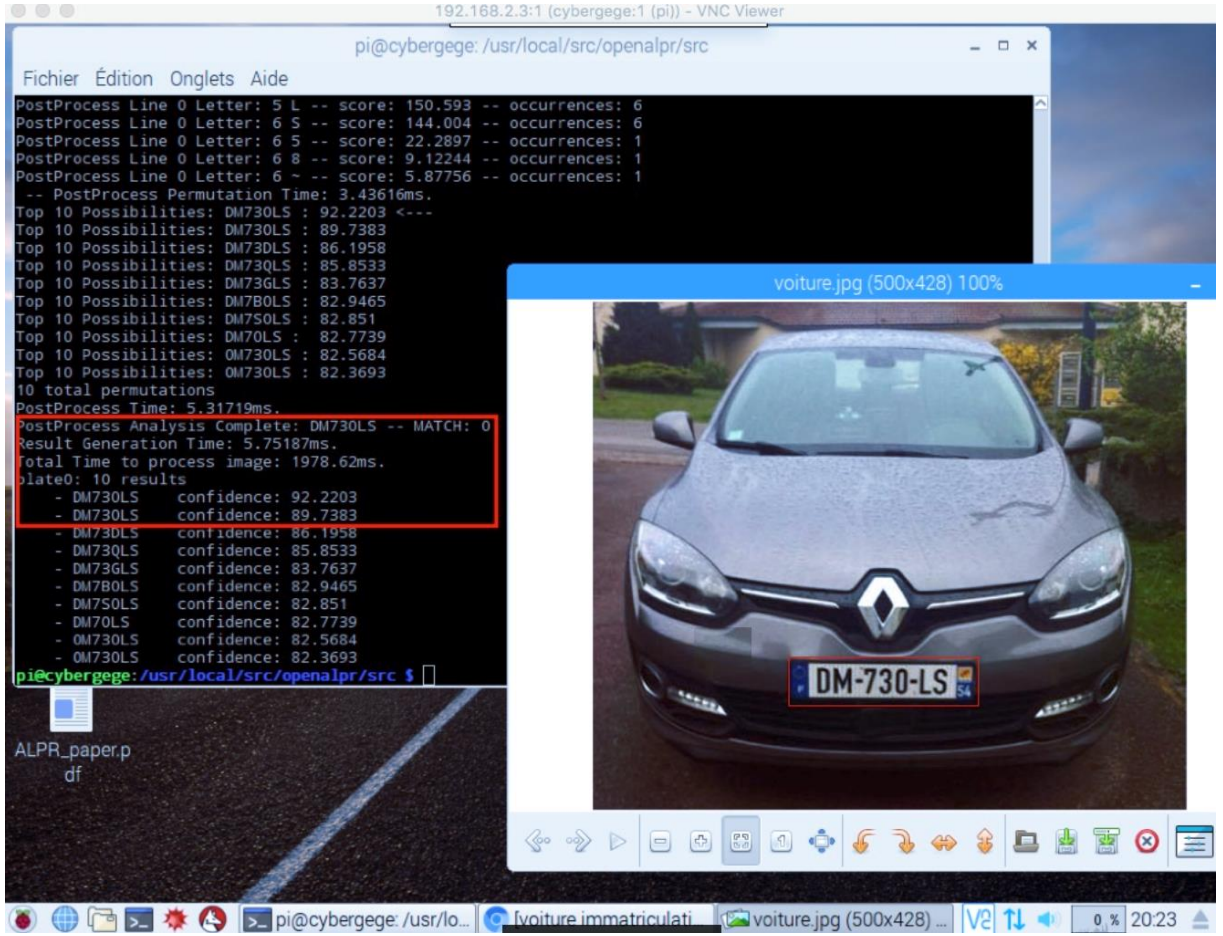


- Smart Charging limits the effects of additional loads on the distribution grid caused by EV’s
- Overload situations can be avoided up to a high market share of EV’s (~50%)
- Smart Charging offers the possibility to use the fluctuating generation of renewables
- No loss of convenience for the customer as the charging time is derived from customer preferences

RWE The energy to lead

How about security ?

We have 3 ways to identify Users: By RFID Badge Authentication, With Plate OCR Recognition and third, by exchanging Certificates between cars and Providers.

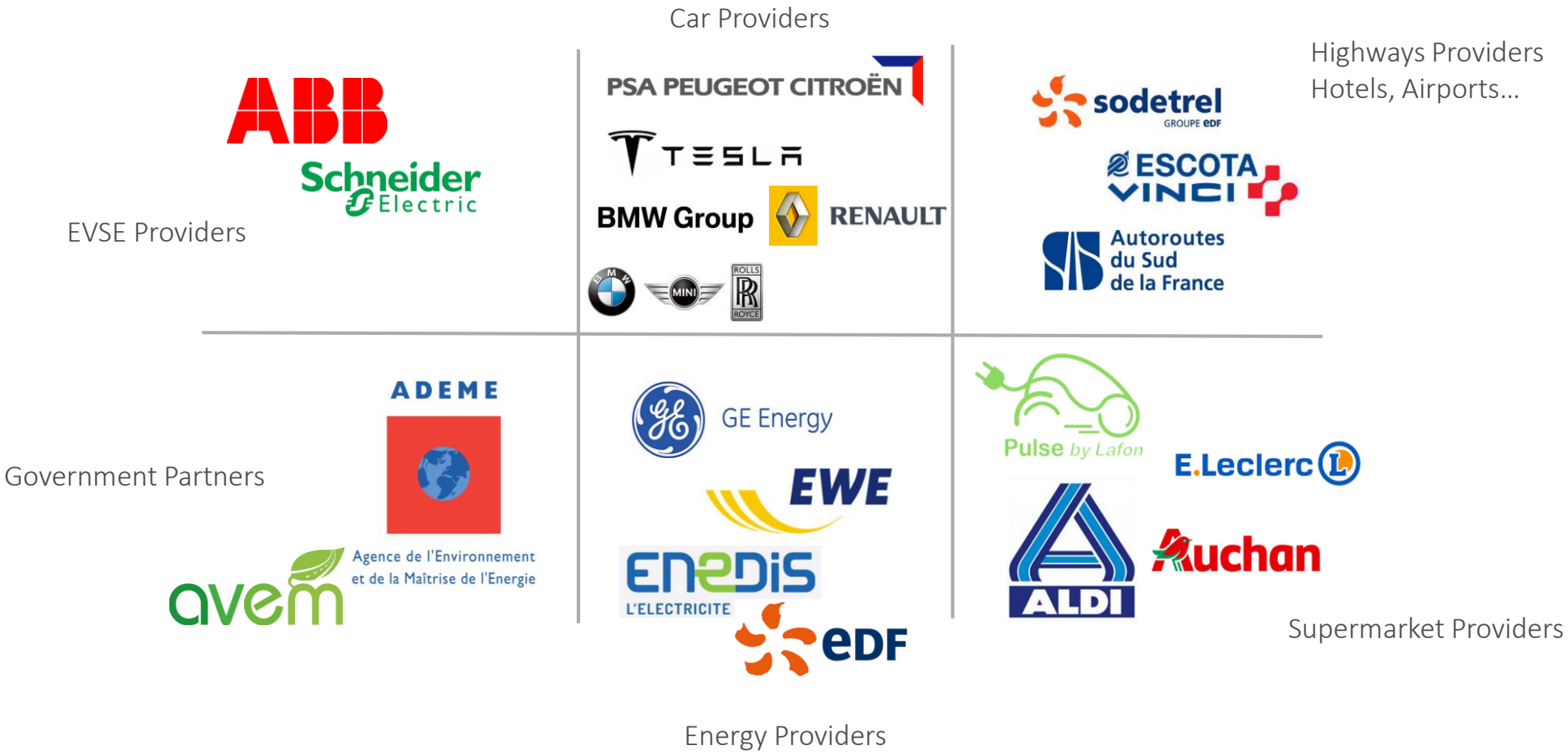


How about security ?

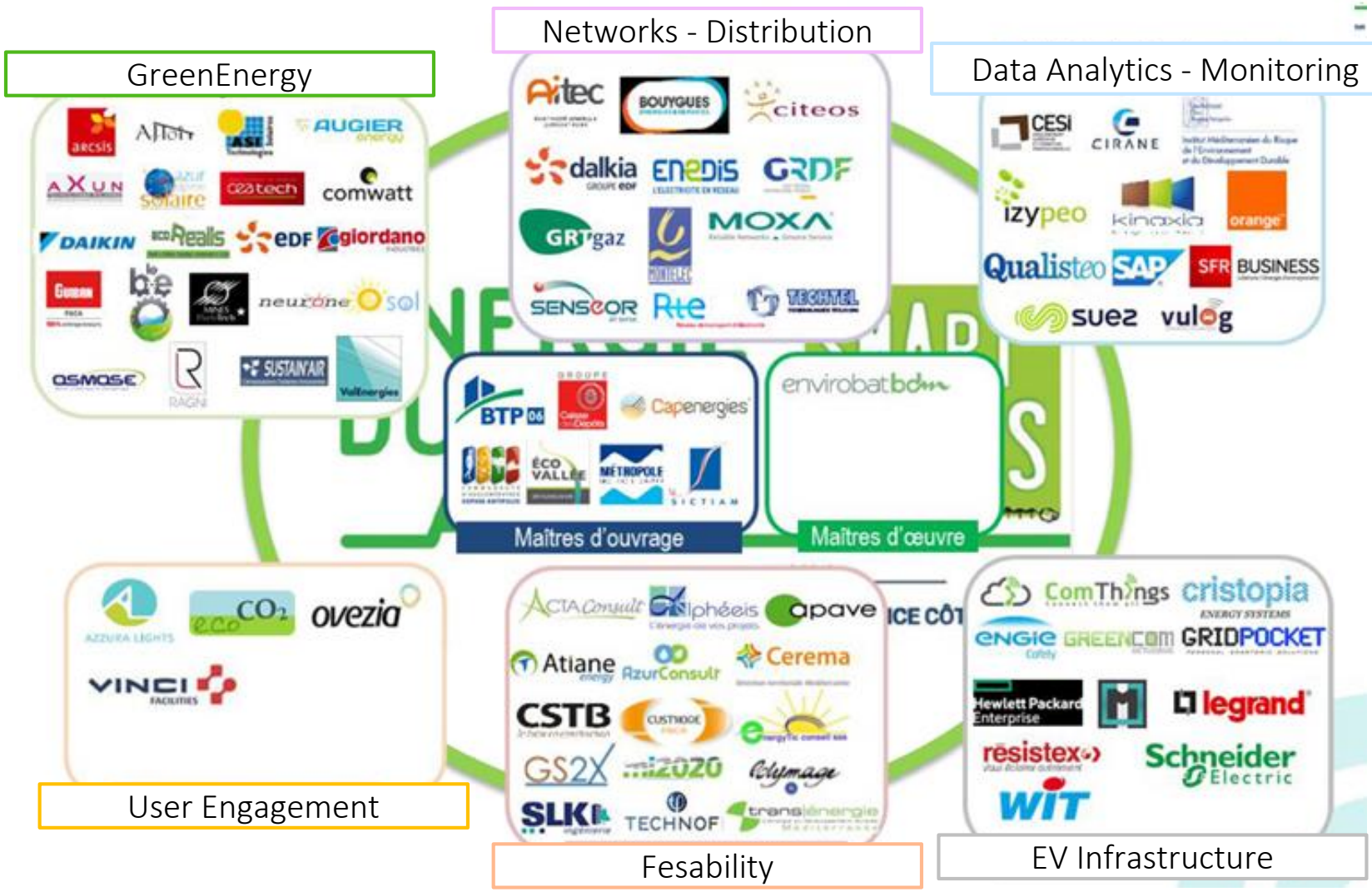
The OCPP, as of version 2.0 which is currently being specified within the OCA, will incorporate the necessary data structures and messages needed to transmit ISO 15118 related paramerters between EVSE (charging station) and IT backend. Those messages are for example needed to transmit SalesTariff data, X.509 certificates and cryptographic key material.

ISO 15118 will become the next Standard Generation of identification using PKI (Public Key Infrastructure Certificates) and HTTPS.
Used medias could be the cable, the application or the car itself remotely. Will be adopted soon by Car industry.

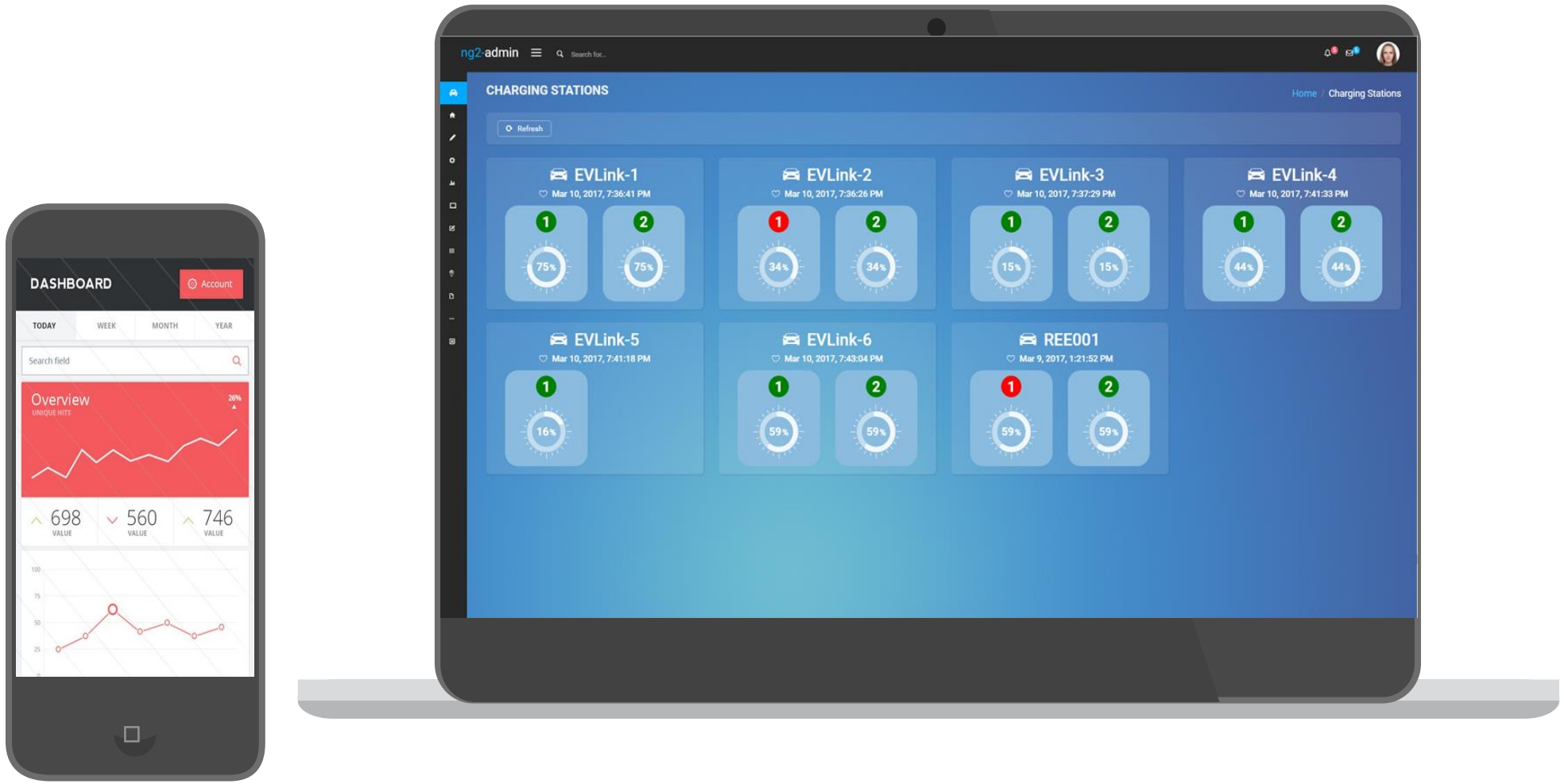
Possible partners and customers



Possible Local French Partners Ecosystem



Product overview: Availability Dashboard



Product overview: Charging Curves