Standards for Connected and Autonomous Transportation
Nurturing the Era of e2e Mobility as a Service (MaaS)

IBM & NeMo "Hyper-Network for electroMobility"
in the context of Standardization, Marketplace, Block Chain
& Electro Mobility

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VCARD
Content:

- IBM in Automotive
- NeMo - Hyper-Network for electroMobility
- Overview of Standards and protocols in NeMo
- Neutral Server @ IBM
- Q&A
Strategy of IBM is to be the leading Artificial Intelligence solutions and cloud platform company with a strong industry focus

Our focus is **Industries**

Our solutions are **Cognitive**

Our platform is **Cloud**
IBM is able to deliver value across the full IT-solution value chain.

**Projects & Services**
- Global Business Services
  - Automotive/ IoT Knowledge
  - Definition of User Stories
  - Software Development (Agile, DevOps based)
  - Integration of backends / others
  - Application Maintenance/ Operating
  - IBM Design Studios
  - Watson IoT Center Munich

**Software & Technology**
- Cognitive Solutions & Cloud Platform
  - IBM Cloud/Bluemix as key development and runtime platform
  - Deployment, Runtime and Integration in the Cloud
  - IoT for Automotive, Watson Personal Assistant and other Cloud Services (e.g. Analytics, Commerce, Watson)

**Global Infrastructure**
- Hosting
  - SoftLayer Cloud (IaaS)
  - Public / Private/ Dedicated
  - Hybrid Cloud
  - On-Premise (data center of clients)
  - ~40 data centers around globe

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**Solution-as-a-Service**
We focus strongly on the new business environment of our automotive clients including data monetization.

Industrialize Infrastructure - Monetize Data – Compete in Customer Experience
Build Ecosystems – Time to Market & Scale
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NeMo at a glance

**Call identifier:** H2020-GV-2015

**Topic:** GV-8-2015 Electric vehicles’ enhanced performance and integration into the transport system and the grid

**EC funding:** € 7.8 million

**Duration:** October 2016 – September 2019

19 partners

5 test sites & 1 cross-country demonstration

**Coordinator:** Institute of Communication and Computer Systems (ICCS), Greece (Dr. Angelos Amditis, a.amditis@iccs.gr)

**Website:** [http://nemo-emobility.eu](http://nemo-emobility.eu)

**Join us at:**

LinkedIn NeMo_Electro Twitter @NeMo_Electro
NeMo IT Challenges:

- How to develop **interoperable** and seamless electro-mobility services **without a central hosted system**
- Integration of services of **different stakeholders** still a challenge due to **missing interoperability** and **discovery mechanisms**
- No **community based** IT environment existent that enables the search, **development** and deployment of **value-added services** for the E-Mobility domain
- Lack of **common information model** for all stakeholders
- Stakeholders and business partners **not visible / transparent** **across Europe**
- Still difficult to establish **collaboration and contracts** between stakeholders and business partners
NeMo’s strategic objectives

- Common Information Models
- Standard ICT interfaces
- Core system for provision of ICT services
- Horizontal services
- Open APIs that will enable an open B2B cloud Marketplace for electromobility

Hyper-Network of tools, models and services, to enable the provision of seamless and interoperable electromobility services creating an open, distributed and widely accepted ecosystem for e-mobility

- Develop a self-certification mechanism;
- Pan-European eRoaming Framework
- Increased B2B connectivity
Expected impact

- Enhanced driver satisfaction: “Charge anywhere & anytime” across Europe via a single identification, authorisation & payment method

- Easy creation and delivery to a wide audience of innovative, interoperable electromobility services via an open cloud marketplace

- Improved attractiveness of electric vehicles
- Facilitation of EVs mass adoption
NeMo Common Information Models

• One of the pillars of the NeMo Hyper-Network is the possibility to exchange data using a common NeMo meta-language

  – Common Information Models (CIM)
  – Data translators and common interfaces
  – Smart Processing and Data Management algorithms
NeMo Hyper-Network

Common data-set stored in distributed databases / Ledger
All participants have access to same data
Nemo Nodes to be installed by Business partners
# Example NeMo services & e2e UC

<table>
<thead>
<tr>
<th>Horizontal Hyper-Network services:</th>
<th>Electromobility actors’ monitoring and profiling</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Finder and optimiser</td>
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<tr>
<td></td>
<td>Brokerage</td>
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<tr>
<td></td>
<td>Service pricing (static and dynamic)</td>
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<tr>
<td>EV driver / owner services:</td>
<td>Smart navigation and journey planning</td>
</tr>
<tr>
<td></td>
<td>Wireless authentication solution</td>
</tr>
<tr>
<td>Grid related services:</td>
<td>Navigation to Charging Point based on user and grid requirements</td>
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<tr>
<td></td>
<td>Global customer charging behaviour</td>
</tr>
<tr>
<td></td>
<td>Grid load management</td>
</tr>
<tr>
<td></td>
<td>Load forecasting due to EV charging</td>
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<tr>
<td></td>
<td>Local energy management</td>
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<tr>
<td>EV and battery related services:</td>
<td>Adaptive State-of-Charge limit</td>
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<tr>
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<td>Capacity calculation; Load management; etc.</td>
</tr>
</tbody>
</table>

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*Sample Use case*  
Trip planning with involved Services
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Standardized Interfaces According to Use Cases for Seamless Hypernetwork Connections

1. Service Creation, Delivery and Brokerage Environment
   - IEC 60870 DSO-EV transmission protocol
   - TPEG Data Protocol for the transmission of traffic and travel information
   - IEC 27001 Management System for information security

2. Horizontal Services
   - SAE J2847 Communication between plug-in vehicles and the utility grid
   - SAE J2931 Digital communications for plug-in electric vehicles
   - ISO 14443A RFID Card communication to proximity coupling device
   - IEC 62831 User identification in EVSE
   - ISO 8583 SMS payment requirements
   - CHAdeMO DC charging standard for EV
   - OCPP Protocol for service providers to connect to infrastructure providers
   - OCPP Protocol between CPO and EMP
   - OSCP Protocol for smart charging for CPO, energy management, and DSO

3. Distributed ledger
   - ETSI TS 101 556-3 Infrastructure to vehicle communications
   - ISO 25001 Quality criteria and the evaluation of digital software products
   - ISO 7816 RFID Card requirements
   - ISO 8583 SMS payment requirements
   - WWCP Secure internet protocol to connect market actors in e-mobility field

4. Electromobility Services
   - ISO 15118 Vehicle to grid communication standard
   - DIN SPEC 70121 Electric vehicle for controlling DC Charge
   - IEC 61970 Application program interfaces for energy management system
   - IEC 62325 Standards to deregulated energy market communications
   - IEC 60870 DSO-EV transmission
   - ISO 8583 Electronic transactions initiated by cardholders using payment cards
   - ISO 27001 Management System for information security
   - GOSSIP Protocol to ensure data integrity and consistency
   - NOBEL-API Database of charging stations in Norway
   - Now! Innovations Protocol Industry standard for various hardware platform
NeMo Test sites

**French Test Site**
- eMobility Report
- Vehicle preconditioning

**German Test Site**
- Capabilities of NeMo Hyper-Network

**Austrian Test Site**
- Smart charging services
- Grid services

**Spanish Test Site**
- Local Interoperability
- Horizontal services
- Booking service

**Italian Test Site**
- Itinerary planning considering security features
Summary and Conclusion:

NeMo will provide:

- a **distributed service IT environment** where partner, service & contract information are stored in a decentralized manner using a **distributed ledger technology** (HyperLedger, Blockchain)
- an IT environment, that lets developer **search & use third party services**
- a BPMN-based tool-suite, that provides the possibility to **specify value-added E-Mobility IT services**
- an IT deployment /delivery mechanism that lets business users easily take part in the NeMo Open Marketplace
- a **common information model** to unify the business objects for all electro-Mobility services
- increased innovation towards **Digital Single Market** for Europe
Invitation to NeMo

✓ JOIN the NeMo Stakeholder Forum via our website
  • Register via https://nemo-emobility.eu/nemo-forum/
  • Be updated on all project news, results and events
  • Provide direct comments and feedback on the project outputs

✓ Follow us
  • Website: http://nemo-emobility.eu
  • Join us at: NeMo_Electro @NeMo_Electro
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Today, there is a high demand for personalized car data by service providers to create consumer services – yet, no standardization.
A Neutral Server can provide standardization in order to decrease complexity for both sides while fostering the ecosystem.
Moreover, a Neutral Server satisfies the service providers demand for freedom from discrimination in compliance with EU regulation.
Additionally, a Neutral Server represents a promising business opportunity for OEMs by monetizing car data across industries.
OEMs can build data monetization on IBM’s E2E neutral server and monetization framework, leveraging our existing industry relationships

- accelerate the overall approach by following a multi-stage approach - gaining business benefits fast
- building the envisioned revenue streams on IBM’s cross industry network and relations
- reduce risk by leveraging IBM platform and technologies and experiences from various previous projects
- join a partnership approach to build a flexible and strong ecosystem to drive digital re-envention and harvest the potential of OEM data

“Data is the new Oil”

is a commonly soundbite to point out that data is a resource with high value, which can be used for new business models.

The challenge is to make monetization of the data real.

OEMs are collecting and owning a special type of hugely valuable data from their end-customers and connected cars.

To monetize those data assets, OEMs need new business models, partnerships and technologies.
We focused on the fulfilment of the EU “guiding principles” and on data privacy including its “double consent” approach.

1. Product/Service Offer
2. Acceptance of product/service offer incl. data transfer from OEM via Trustee to 3rd party
3. Consent to transfer data to unknown Third Party via Trustee

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Manage access to your vehicle's data for VIN FNM122DIGO75464841

Welcome, Erika Mustermann!

We are happy to add value with BMW vehicle data. Below you see a list of data containers that we will provide to third parties on your request and with your consent only. You are in full control of your data privacy.

Enjoy BMW vehicle data

Clearance edited successfully.

| 3rd Party Data Container Request Date Correlation ID Status Action |
|-------------------|---------------------|------------------|-----------------|
| IBM Trustee (Demo) Personalized Marketing 05.03.2017 19:42 24868739343755 approved |

To make you eligible for these deals, we need your current fuel level, then your car manufacturer can provide us. Once you run low on gas, we will issue gas discount vouchers for you. Simply show it at the gas station and get an amazing deal. And when you are running out of gas, there will always be a special offer for you...
And it works already! To be experienced at the Watson IoT Center Munich
Interfacing the OEM backend

- Neutral Server/Trustee server to anonymize the application provider and the OEM and vice versa, including double consent concept
- Compliant with the "Extended vehicle" standards ISO 20078
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- Next presentation
  Q&A