TUTORIAL ON ELECTROMOBILITY SERVICE CREATION

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Service Creation in the NeMo Electromobility Network
Webinar, 1 February 2018
Agenda

• Electromobility Service Creation – Motivation & Challenges

• NeMo Service Development - Overview
• Service Process Development with VSDT
• Service Description & Search with SSM
• Service Execution Developer Environment
• Summary
Motivation

• Complexity of distributed systems is increasing
  – Huge amounts of services
  – High degree of dynamics
  – Heterogeneous service providers

• Management of an efficient interoperability gets more and more difficult

• Further, dynamic behaviour in huge distributed systems is a key requirement for intelligent systems/agents/components

• Semantic Web Service concepts, such as Service Matchmaking and Service Composition are promising approaches
Challenges

• An important topic is the autonomic interpretation of services’ functionality

• There are multiple semantic service description languages:
  – WSMO, OWL-S, SAWSDL, SA-REST, etc.

• However:
  – Syntactical complexity of the descriptions high
  – Manual creation cumbersome and error-prone
  – Relation between development effort and benefit still not sufficient
Challenges

• An important topic is the autonomic interpretation of services’ functionality

• There are multiple semantic service description languages:
  – WSMO, OWL-S, SAWSDL, SA-REST, etc.

• However:
  – Syntactical complexity of the descriptions high
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Goals

• Facilitate the development of **E-Mobility services** that automatically find, invoke and combine other NeMo services to fulfill a certain purpose

• Provide solutions for the easy integration of services into the **NeMo Hyperledger Service Network**

• Provide **support for the semantical description of functionalities** without changing the developers workflow completely
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NeMo Service Development

Provide a Service Development Environment that
- allows for the specification of service processes
- integrates service search at design-time based on semantic service descriptions
- enables the composition of services to value-added services
- is itself running within the cloud infrastructure
- comes with testing features
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Service Process Development - Use Case
Service Process Development - Use Case

How to create a complex Electromobility Service?
Service Process Development with VSDT
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How to create a Semantic Service Description for NeMo?
Service Description with SSM

- Eclipse View integrated in a larger tool-suite available as a Docker Image
- Support for the development of OWL-S service descriptions using OWL and SWRL
- Direct Deployment to the NeMo Distributed Registry
Ontology Management with SSM

- IO Parameters and Preconditions/Effects are based upon OWL concepts and relations
- SSM offers an Ontology Browser
  - Integration of local and external ontologies with automatic import reloading
  - Quick Search of concepts over multiple ontologies
  - Overview about concept’s properties including Domain Range
Service Description & Search

How to find the right Service within the NeMo Network?
Service Search with SSM

- Service Designer can **find available services** at design time

- **Search Tab** offers the possibility to define a search template

- SSM invokes a **Service Matchmaker** and searches for appropriate functionalities on the platform

- Direct request on the **NeMo Service Registry**
Develop Processes based on NeMo Services
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Service Execution Developer Environment

How to validate the developed Electromobility Process?
BPMN Process Interpreter

• Process Diagrams are **executed directly**, without code generation
• Processes can be **deployed directly** from within the process modelling tool -> faster development cycle
• Interpreter keeps track of current state for **different processes** and multiple instances of the same process at once
• UI showing the **current state of the interpreted processes**, visualization of executed processes (work in progress)
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Summary

• NeMo Processes can be modeled in BPMN with dynamic behavior features

• **Support for the semantical enhancement of functionalities** via tools like the SSM

• **NeMo Search and Deployment features** within the Service Creation Environment

• Facilitate the development of **E-Mobility services** by adding a semantic layer and integrating a SOA

• All presented tools will be available as a **Docker Image**

• **Hyperledger-based service execution environment** to be shown in a future webinar
Thank you!

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