

Mobility Vocabulary Development & Showcase

TEAM: GLYKERIA ALVANOU
YESIM ASLAN
UMUT HATIPOGLU

MENTOR: NIKLAS PETERSEN

EIS LAB, SUMMER SEMESTER 2015

Outline

- MobiVoc - Introduction
- Goal
- Vocabulary Development
- Vocabulary Testing
- End-user Application
- Demo
- Poster
- Future Work

MobiVoc - Introduction

What is MobiVoc?

- Open vocabulary for future-oriented mobility solutions.
Goal is to significantly improve the data mobility between all stakeholders by providing a standardized vocabulary using Semantic Web technologies and ontologies.

Goal

- Offer a standardized vocabulary for fuel data for motor and electrical vehicles. (MobiVoc)
- Implement an application that uses the vocabulary that we created to test our vocabulary.

Vocabulary

- **Fuel.ttl**
List of fuels for vehicles and their properties.
- **FillingStation.ttl**
Facility for motor vehicles or electric motor vehicle.

Vocabulary

Fuel Types:

- Adblue
- Autogas
- Biodiesel
- CompressedNaturalGas
- DieselFuel
- E85
- Ethanol
- ExcelliumDiesel
- ExcelliumSuperPlus
- Hydrogen
- LiquidGas
- LiquidPetroleumGas
- LKWDiesel
- MaxxMotionDiesel
- MaxxMotionSuper100
- Methane
- Petrol
- SuperE5
- SuperE10
- SuperDiesel
- SuperPlus
- UltimateDiesel
- UltimateSuper
- VPowerDiesel
- VPowerRacing

Vocabulary

Fuel Properties:

- AutoignitionTemperature
- ChemicalStructure
- Cost
- Currency
- EnergyContent
- FlashPoint
- FuelMaterial
- GasolineGallonEquivalent
- MethaneNumber
- Payment
- PhysicalState
- Viscosity

Vocabulary

Addblue Properties:

- | | |
|--------------|--------------|
| → Aldehyde | → Iron |
| → Alkalinity | → Insolubles |
| → Aluminium | → Magnesium |
| → Biuret | → Nickel |
| → Calcium | → Phosphate |
| → Chromium | → Potassium |
| → Copper | → Sodium |
| → Currency | → Zinc |
| → Density | |

Vocabulary

Filling Station;

- Fuel Station
- Charging Station

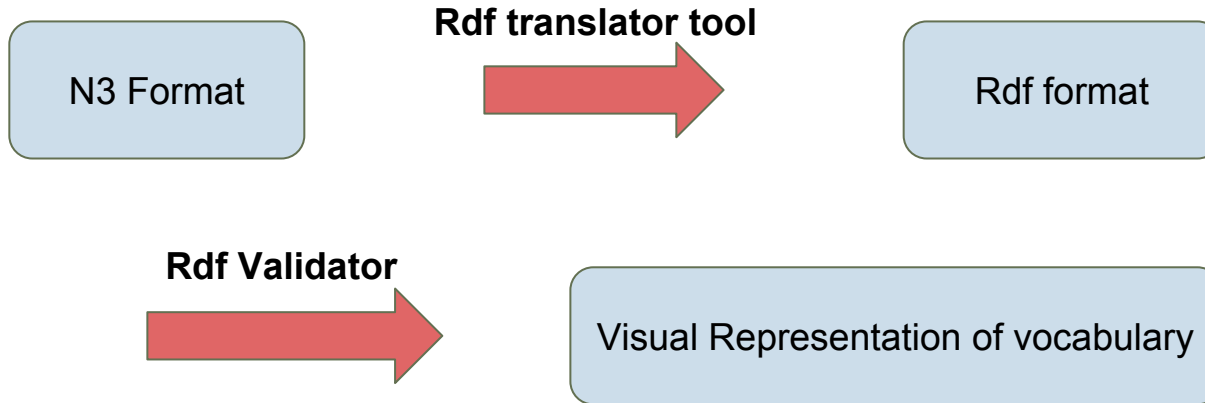
Fuel Station Properties:

- fillingStationHeight
- hasOffer
- hasParkingFacility
- hasPrice
- hasShoppingFacility
- hasWashingFacility
- hasWCFacility

Vocabulary

- **ChargingPoint.ttl**
List of charging points/stations for electric vehicles and their properties,
based on the www.chargemap.com
- **Battery.ttl**
List of different types of batteries used for electric vehicles and their properties
- **Vehicle.ttl**
List of different types of vehicles and their properties
- **Country.ttl**
Information about the fuel/charging stations in each country

Vocabulary



Vocabulary

Example:

N3 Format

```
mv:ChargingPoint
  a rdfs:Class, owl:Class ;
  rdfs:comment "Defines the public or semi-public charging points for electric vehicles available worldwide. " ;
  rdfs:label "Ladestation"@de ;
  rdfs:label "Charging Point"@en ;
  rdfs:label "Point de charge"@fr ;
  rdfs:label "Punto de Recarga"@es ;
  rdfs:label "Oplaadpunt"@nl ;
  rdfs:label "Ponto de Carregamento"@pt .

mv:ChargingPointFees
  a rdfs:Class, owl:Class ;
  rdfs:comment "Captures information about the charging point fees." ;
  rdfs:label "Charging Point Fees"@en .
```



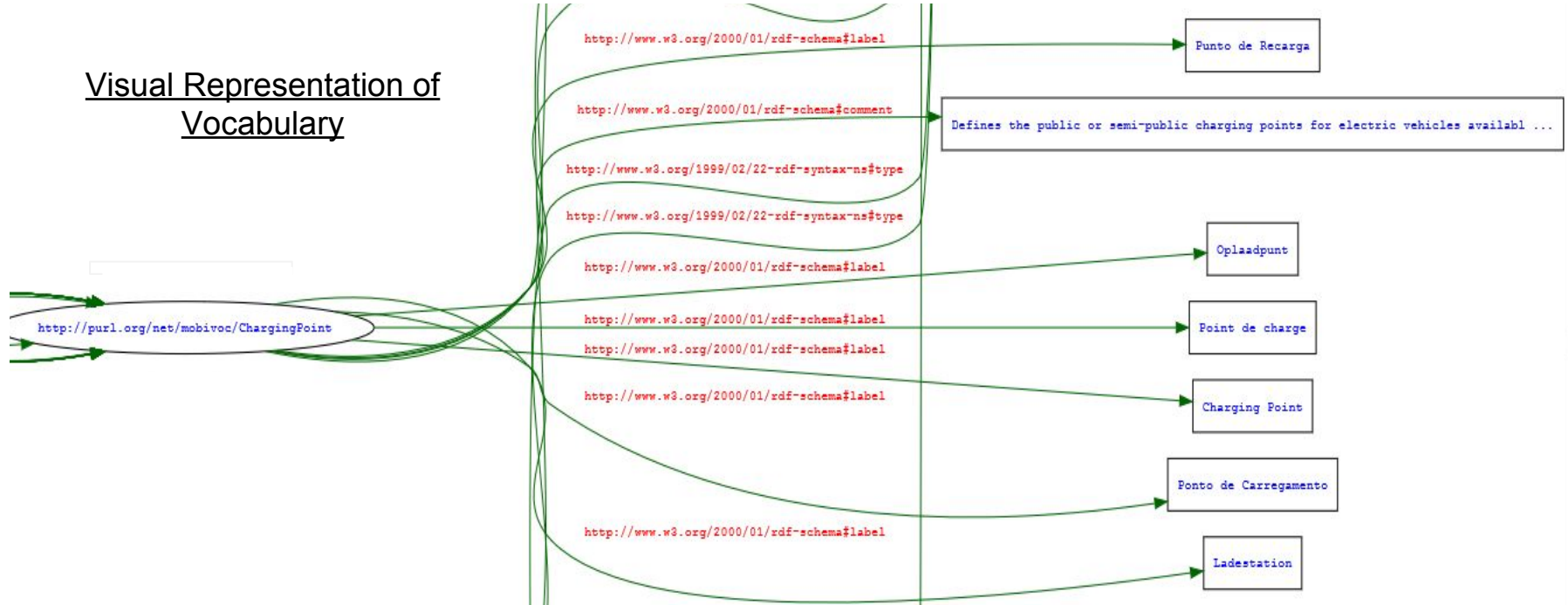
Rdf Format

```
<rdf:Description rdf:about="http://purl.org/net/mobivoc/ChargingPoint">
  <rdf:type rdf:resource="http://www.w3.org/2002/07/owl#Class"/>
  <rdf:type rdf:resource="http://www.w3.org/2000/01/rdf-schema#Class"/>
  <rdfs:label xml:lang="en">Charging Point</rdfs:label>
  <rdfs:label xml:lang="pt">Ponto de Carregamento</rdfs:label>
  <rdfs:label xml:lang="de">Ladestation</rdfs:label>
  <rdfs:label xml:lang="es">Punto de Recarga</rdfs:label>
  <rdfs:comment>Defines the public or semi-public charging points for electric vehicles available worldwide. </rdfs:comment>
  <rdfs:label xml:lang="nl">Oplaadpunt</rdfs:label>
  <rdfs:label xml:lang="fr">Point de charge</rdfs:label>
</rdf:Description>

<rdf:Description rdf:about="http://purl.org/net/mobivoc/ChargingPointFees">
  <rdfs:label xml:lang="en">Charging Point Fees</rdfs:label>
  <rdf:type rdf:resource="http://www.w3.org/2000/01/rdf-schema#Class"/>
  <rdfs:comment>Captures information about the charging point fees.</rdfs:comment>
  <rdf:type rdf:resource="http://www.w3.org/2002/07/owl#Class"/>
</rdf:Description>
```

Vocabulary

Visual Representation of Vocabulary



Vocabulary Testing

- Syntax Testing
 - RDF Translator Tool
- Semantic Testing
 - OOPS (OntOlogy Pitfall Scanner) tool

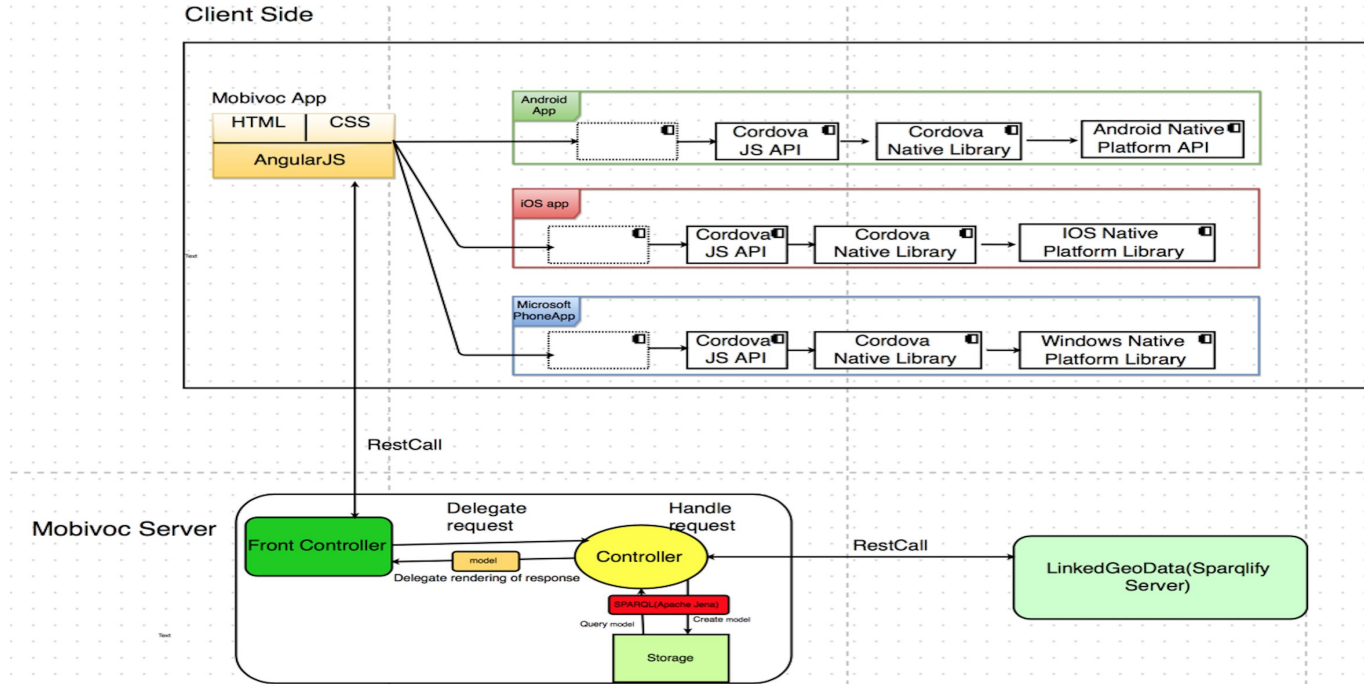
End-user Application Outline

- Application Technology
- Application Architecture
 - Server-Side
 - Client-Side
- Testing
- Application Demo

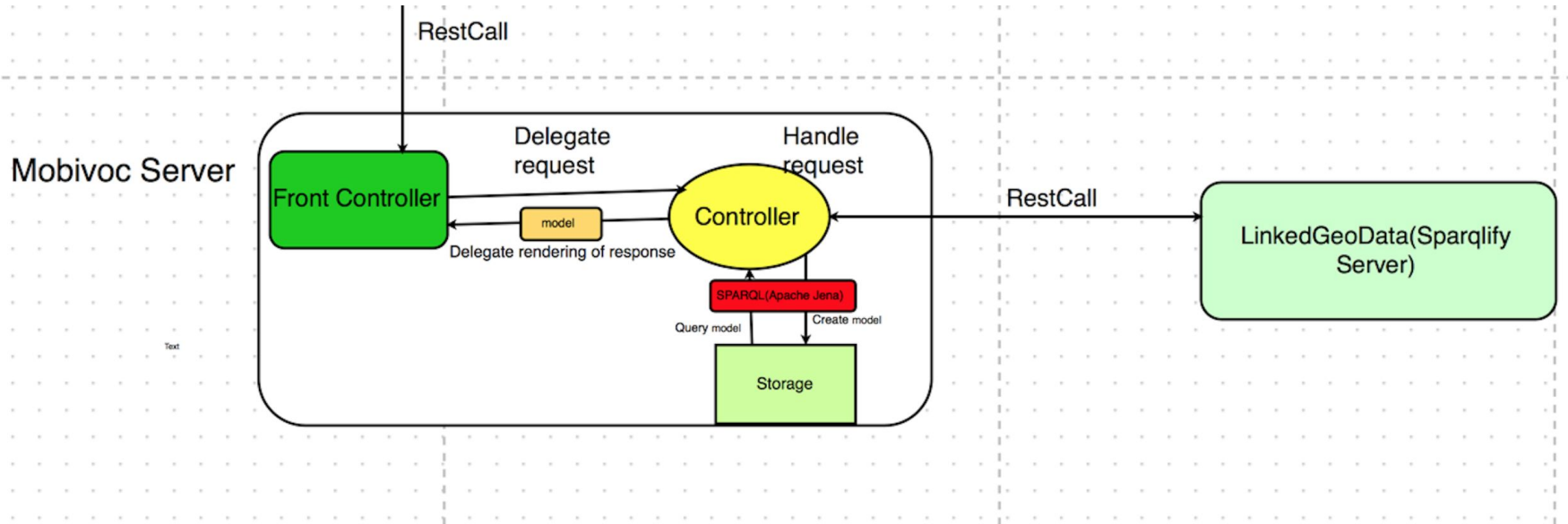
Application Technology

- Server Side Development:
 - Spring Framework for MVC Architecture
 - Apache Jena for SPARQL API
 - Apache Tomcat 8 for Web Server
 - Rest for communication protocol
- Client-Side Development:
 - Apache Cordova for build app for mobile platforms
 - AngularJS for MVC Architecture

Architecture Design

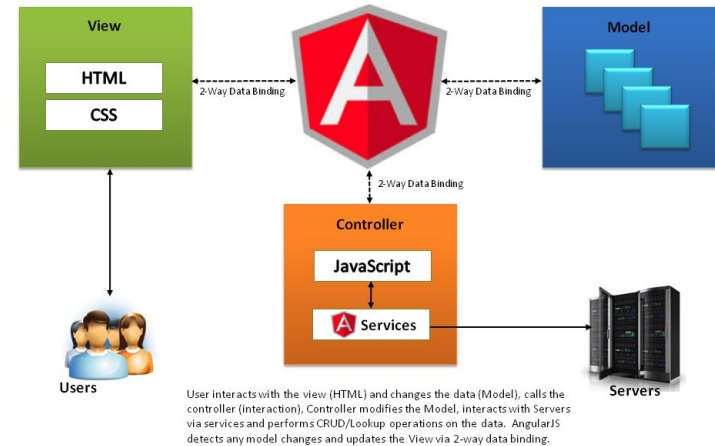


Mobivoc Server-Side



Mobivoc App

- Build Single-Page Application(SPA)
 - all necessary code – **HTML**, **JavaScript**, and **CSS** – is retrieved with a single page load
- MVC Architecture with using AngularJS



Mobivoc App(ScreenShots)



Filling Station Type

Select FillingStationType

NEXT

Location

CurrentLocation

Fuel Type

Biodiesel

Parking Facility

Yes

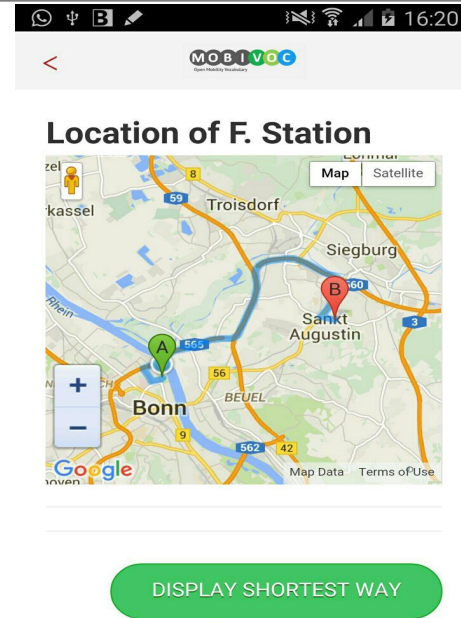
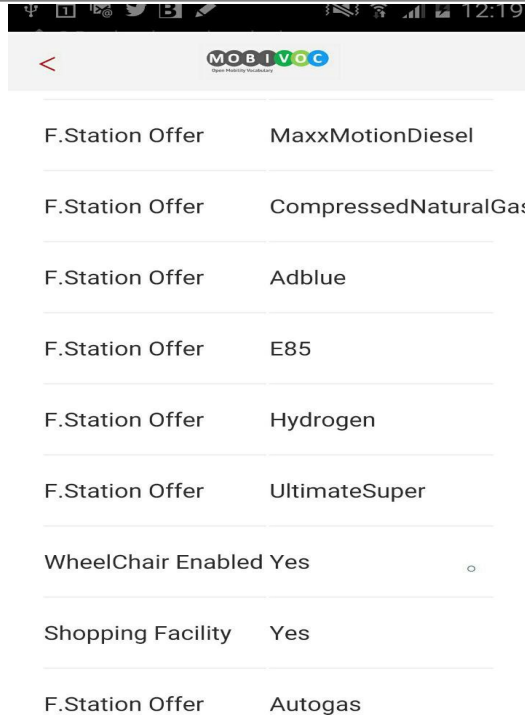
Washing Facility

Select Washing Facility



ID	F.Station	More Info
50	BFT	More Info
23	Auto Greuel GmbH & Co KG	More Info
49	Heinrich Ludwig GmbH	More Info
19	Tankstelle Schumacher	More Info
18	Esso	More Info
8	star	More Info
9	Tankstelle Heinrichs	More Info

Mobivoc App(ScreenShots)



Testing

- End-User Application Testing / Test Case:
 - ➔ Define relationships based on use cases and requirements
 - ➔ Create test cases with SPARQL

Testing

- Test Cases;
 - “Fuel Stations that have washing and shopping facility with giving location”
“
<http://localhost:8080/Mobivoc/testwashingshopping?location=Leipzig&washingChoice=Yes&shoppingChoice=Yes>
”
 - “Fuel Stations that have parking facility all over the germany”
“
<http://localhost:8080/Mobivoc/testparking?parkingChoice=Yes>
”
 - “Fuel Stations that have WC facility with giving location”
“
localhost:8080/Mobivoc/testwc?location=Bonn&wcChoice=Yes
”

Testing

- “Fuel Stations that have washing and WC facility with giving location”

“
<http://localhost:8080/Mobivoc/testwashingwc?location=Bonn&parkingChoice=Yes&wcChoice=Yes>”

- “Fuel Stations that have shopping facility all over the Germany”

“
<http://localhost:8080/Mobivoc/testshopping?shoppingChoice=Yes>”

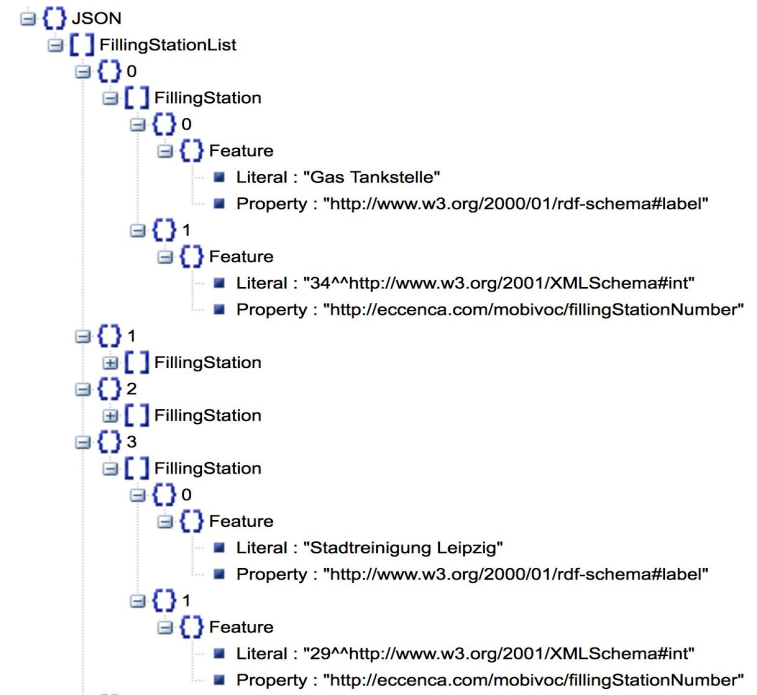
- “Fuel Stations that are wheelchair friendly all over the Germany ”

“
<http://localhost:8080/Mobivoc/testwheelChair?wheelChair=Yes>”

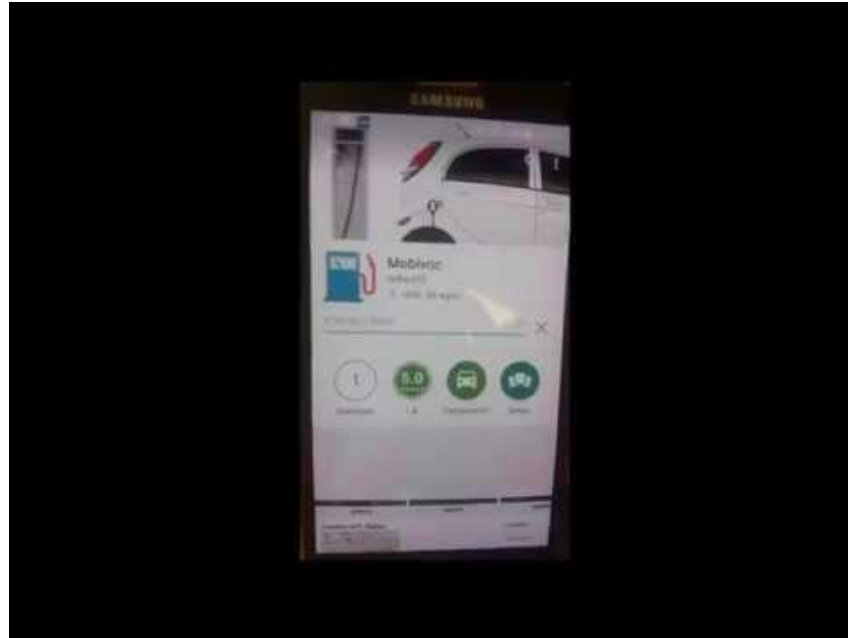
Testing

→ “Fuel Stations that have WC facility with giving location”


localhost:8080/Mobivoc/testwc?location=Bonn&wcChoice=Yes



Application Demo



Poster



Open Mobility Vocabulary

Mobility Vocabulary Development & Showcase

Summer Semester 2015

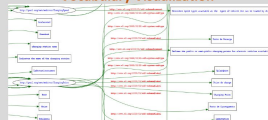
Goal

- Development of a standardised vocabulary for fuel data and for electrical vehicles
- Creation of an end-user application which uses the developed vocabulary

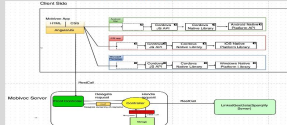
Technology

- Mobivoc
- R2J
- SPARQL API (Apache Jena)
- OWL 2.0
- R2JS
- Apache Cordova
- Java Spring
- REST
- AngularJS
- Apache Tomcat

Vocabulary Visualization

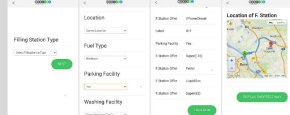


Architecture



End-user Application

The system shows the functionality of the new vocabulary that is developed. It is written in Java on Eclipse, implemented in Java spring, works on mobiles as well as pads. Application uses data from Geoportal. It queries on Geoportal and returns the results which are stored as turtle format in the server side. Application has also client side which shows the query results within the proper format. Data exchange between client and server side is implemented with JSON.



Testing

Syntax
Rdf
Translator
Tool

Semantic
Checks
(OntoOgy
Pitfall Scanner)

End-user
Application
Text cases using
SPARQL queries

Virtual Machine Description

Hostname: Windows15-Mobivoc
Installed on: ES02
Software installed: JDK 1.8, IaaS Spring Framework, Apache Tomcat 8, Apache Cordova, Eclipse Luna


Local Access:
OS User: root
Password: root@1234

Remote Access:
Partner ID: root@1234
Password: root@1234

GitHub Link:
<https://github.com/EIS-Bonn/Mobivoc-2015-Lab-SS2015/tree/master/Group4>

EIS Enterprise
Information Systems

Mentor: Niklas Petersen
Glykeria Alvanou
Yesim Aslan
Umut Hatipoglu

universität **bonn** 

Future Work

- Extension of the vocabulary
 - Extension for more means of transport like buses, trains etc..
 - Add more properties and facilities in the existing vocabulary

Thank you!

Questions?