



simpli-city

The Road User Information System Of The Future

WP 9 – Exploitation, Dissemination, Collaboration and Standardisation

D9.3.5: Workshop Report II

Deliverable Lead: FGM

Contributing Partners: TU Vienna, TUDA, Ascora

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The second SIMPLI-CITY workshop “Smart Mobility Services for the Smart City: Architectures and Solutions towards a Service Market Place” took place in the framework of the International Motor Show IAA/NewMobilityWorld in Frankfurt on the Main (DE) on the 23rd of September 2015.

SIMPLI-CITY hosted this workshop jointly with 3 further European projects named STREETLIFE, PETRA and MYWAY.



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This deliverable is subject to final acceptance by the European Commission.

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Project Partners



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Executive Summary

The SIMPLI-CITY consortium organised the second workshop "Smart Mobility Services for the Smart City: Architectures and Solutions towards a Service Market Place" took place in the framework of the International Motor Show IAA/NewMobilityWorld (<http://newmobilityworld.com/>) in Frankfurt on the Main (DE) on the 23rd of September 2015.

FGM as work package WP9 leader was responsible for the organisation and the promotion of the workshop. The place and date was selected and approved by the whole project consortium.

SIMPLI-CITY hosted this workshop jointly with 3 further European projects STREETLIFE (www.streetlife-project.eu), PETRA (www.petraproject.eu), and MYWAY (myway-project.eu). The joint workshop was elaborated with the goal to strengthen the collaboration between the 4 projects and moreover to intensify the knowledge transfer. The IAA / NewMobilityWorld was chosen in order to attract the target group of private business actors

Experts from science, business and authorities presented and discussed technical solutions with a special focus on smart mobility services for Smart Cities. The interactive workshop included a mixture of presentations and discussions and featured a panel session.

This document describes the event and its content.

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1 Introduction

SIMPLI-CITY – The Road User Information System of the Future – was a project funded by the Seventh Framework Programme of the European Commission under Grant Agreement No. 318201. Its results provide the technological foundation for bringing the “App Revolution” to road users by facilitating data integration, service development, and end user interaction.

Within this deliverable, the second SIMPLI-CITY workshop is described. The focus in this document lies on the documentation of the organisation, promotion and content of the event.

1.1 SIMPLI-CITY Project Overview

Analogously to the “App Revolution”, SIMPLI-CITY adds a “software layer” to the hardware-driven “product” mobility. SIMPLI-CITY takes advantage of the great success of mobile apps that are currently being provided for systems such as Android, iOS, or Windows Phone. These apps have created new opportunities and even business models by making it possible for developers to produce new apps on top of the mobile device infrastructure. Many of the most advanced and innovative apps have been developed by players formerly not involved in the mobile software market. Hence, SIMPLI-CITY supports third party developers to efficiently realise and sell their mobility-related service and app ideas by a range of methods and tools, including the Mobility Services and App Marketplaces.

In order to foster the wide usage of those services, a holistic framework is needed which structures and bundles potential services that could deliver data from various sources to road user information systems. SIMPLI-CITY provides such a framework by facilitating the following main project results:

- **Mobility Services Framework:** A next-generation European Wide Service Platform (EWSP) allowing the creation of mobility-related services as well as the creation of corresponding apps. This enables third party providers to produce a wide range of interoperable, value-added services, and apps for drivers and other road users.
- **Mobility-related Data as a Service:** The integration of various, heterogeneous data sources like sensors, cooperative systems, telematics, open data repositories, people-centric sensing, and media data streams, which can be modelled, accessed, and integrated in a unified way.
- **Personal Mobility Assistant:** An end user assistant that allows road users to make use of the information provided by apps and to interact with them in a non-distracting way – based on a speech recognition approach. New apps can be integrated into the Personal Mobility Assistant in order to extend its functionalities for individual needs.

To achieve its goals, SIMPLI-CITY conducted original research and applied technologies from the fields of Ubiquitous Computing, Big Data, Media Streaming, the Semantic Web, the Internet of Things, the Internet of Services, and Human-Computer Interaction. For more information, please refer to the project website at <http://www.simpli-city.eu>.

1.2 Deliverable Purpose, Scope and Context

The purpose of this deliverable is to show the organisation, the process and the presentations of the workshop to a wider audience. The workshop had the goal to disseminate SIMPLI-CITY, discuss several specific tasks, to strengthen the collaboration between SIMPLI-CITY and STREETLIFE (www.streetlife-project.eu), PETRA (www.petraproject.eu), and MYWAY (myway-project.eu) and present the project's main tools and outcomes.

1.3 Document Status and Target Audience

This document is listed in the Description of Work (DoW) as “Public”, as it provides general information about the goals and scope of SIMPLI-CITY and can therefore be used by external parties in order to get according insight into the project activities.

This public deliverable is useful for the wider scientific and industrial community, since it provides information about part of the dissemination activities in SIMPLI-CITY. This includes other publicly funded projects, which may be interested in collaborative dissemination activities.

1.4 Abbreviations and Glossary

A definition of common terms and roles related to the realisation of SIMPLI-CITY as well as a list of abbreviations is available in the supplementary document “Supplement: Abbreviations and Glossary”, which is provided in addition to this deliverable.

Further information can be found at <http://www.simpli-city.eu>.

1.5 Document Structure

This deliverable is broken down into the following sections:

Section 1 provides an introduction for this deliverable including a general overview of the project, and outlines the purpose, scope, context, status, and target audience of this deliverable.

Section 2 describes the promotion and event process of the first SIMPLI-CITY workshop.

Section 3 provides a short summary of this document.

In the Annex all presentations that were given by the SIMPLI-CITY partners and the key-note presentation are available.

2 Workshop

The second SIMPLI-CITY workshop "Smart Mobility Services for the Smart City: Architectures and Solutions towards a Service Market Place" took place in the framework of the International Motor Show IAA -Internationale Automobil Ausstellung (www.iaa.de) / New Mobility World (www.newmobilityworld.com) in Frankfurt on the Main (DE) on the 23rd of September 2015. The workshop was organised by the project partner FGM-AMOR.

SIMPLI-CITY hosted this workshop together with 3 further European projects STREETLIFE (www.streetlife-project.eu), PETRA (www.petraproject.eu), and MYWAY (myway-project.eu). This joint workshop was elaborated with the goal to strengthen the collaboration between the 4 projects and moreover to intensify the knowledge transfer.

The New Mobility World on the International Motor Show IAA, one of the biggest motor shows worldwide, was chosen in order to attract the target group of private business actors.

The new exhibition area "New Mobility World" at the IAA in Frankfurt on the Main had attracted more than 150 exhibitors. Besides well-known companies such as Bosch, Continental, Samsung, T-Systems and ZF Friedrichshafen, new start-ups had presented their solutions and ideas for the mobility of tomorrow. On a total of 30,000 square meters – including Hall 3.1 as well as a 12,000-square- meter outdoor course – everything had revolved around five topics: the "Connected Car," "Automated Driving," "E-Mobility," "Urban Mobility" and "Mobility Services." For the first time, this was giving visiting experts, media representatives and the general public the opportunity to gather information at one central location on the most important developments and innovations in this fast-changing market. In the "Smart City Forum", exhibitors had shown what sustainable urban mobility might look like, and already available solutions and business were presented in the "Urban Solutions Market".



Figure 1: Workshop Invitation

During the preparation phase the location for this workshop was discussed, selected and fixed at a WP9 phone conference, which took place from the 20th of March 2015.

Afterwards possible collaboration partners for this workshop were identified and contacted.

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At the start of talks with other European projects and possible collaboration partners the feedback and openness to collaborate was rather humble due to differing approaches and the fact that the projects are in diverse processing status (SIMPLI-CITY at the end of the project duration, other projects at the beginning or in the middle of the runtime). Therefore the planning had faltered. It took more persuasive efforts as phone conferences, collaboration meetings and e-mail communication to convince the project coordinators of the European sister projects to participate. At the end, SIMPLI-CITY achieved the participation of 3 projects for a common workshop. Via one joint phone conference, a Doodle poll and a lot of e-mail communication between all partners a common agenda was set up and the title of the workshop was defined.

The promotion activities for the workshop began 4 weeks before the event. The theme “Smart Mobility Services for the Smart City: Architectures and Solutions towards a Service Market Place”, and the single speakers and topics of the agenda were selected with the aim to attract as many participants as possible. An e-mail invitation (see Figure 1) and a PDF invitation with the agenda were designed (see Figure 2). These invitations were distributed by all partners of the 4 European projects in order to announce the workshop on conferences, fairs and in the respective business networks.

Furthermore, the workshop was advertised via electronic channels, such as the SIMPLI-CITY website, an own workshop page (<http://workshop.fgm.at/>) on social platforms as Facebook (<https://www.facebook.com/groups/787646347985229/?fref=ts>), LinkedIn (<https://www.linkedin.com/grp/home?gid=8273579&sort=POPULAR&trkInfo=clickedVertical%3Agroup%2CclickedEntityId%3A8273579%2Cidx%3A2-13%2CtarId%3A1443797383682%2Ctas%3Asimpli-city&trk=tyah>) and in several information mailings. An announcement of the workshop was part of the fifth issue of the SIMPLI-CITY newsletter, which was distributed as electronic and printed versions (500 copies). Furthermore the project partners promoted the workshop also Face-to-Face on conferences and business meetings.



DEAR LADIES & GENTLEMEN

We are happy to announce the workshop "Smart Mobility Services for the Smart City: Architectures and Solutions towards a Service Market Place" that will take place in the framework of the International Motor Show IAA / New Mobility World (<http://newmobilityworld.com/>) in Frankfurt on the Main (DE) on the 23rd of September 2015.

The 4 European projects STREETLIFE (www.streetlife-project.eu), PETRA (www.petraproject.eu), MYWAY (myway-project.eu) and SIMPLI-CITY (simpli-city.eu/) will host this workshop.

Experts from science, business and authorities will present and discuss technical solutions with a special focus on smart mobility services for Smart Cities.

The interactive workshop includes a mixture of presentations and discussions and features a panel session.

Take the opportunity for knowledge exchange and participate at this international workshop.

The workshop is free of charge and includes coffee breaks and lunch.

Please note, that for access to the workshop you will need a "Day ticket workday" for the IAA/New Mobility World (www.iaa.de/en/tickets/)!

WORKSHOP AGENDA

SMART MOBILITY SERVICES FOR THE SMART CITY // Architectures and Solutions towards a Service Market Place

TIME	TOPIC & SPEAKER *
09.15-09.45	Keynote: Smart cities and mobility services - Needs and opportunities at European level A. Volkery (European Commission, DG MOVE)
09.45-10.30	The Road User Information System of the Future S. Schulte (TU Vienna)
10.30-11.00	Information systems from the science perspective Daniel Burgstahler (TU Darmstadt)
11.00-11.15	>> Coffee Break <<
11.15-12.00	Personal Transport Advisor: an integrated platform of mobility patterns for Smart Cities to enable demand-adaptive transportation system S. Meijer (KTH Royal Institute of Technology)
12.00-13.00	>> Lunch <<
13.00-13.45	Multimodal mobility services for the smart city: the MyWay view and architecture G. Casella, M. Boero & M. Garré (Softeco Sismat)
13.45-14.30	MyWay Services: business perspective S. Persi (ENIDE)
14.30-15.30	The STREETLIFE approach for multi-modal sensor fusion for value added services in Berlin – today and tomorrow Y. Nagappa (Siemens), B. Dittwald (Fraunhofer FOKUS) & R. Kelpin (DLR)
15.30-15.45	>> Coffee Break <<
15.45-16.45	Panel: Technical solutions for the urban mobility of the future

*The workshop program might be changed slightly



Figure 2: Workshop Invitation with Agenda

A registration form was implemented on the workshop website (<http://workshop.fgm.at/>) to manage the registration and to calculate the catering. A conference room was rented from the organisation of the New Mobility World. Additionally to the partners' promotion activities, the workshop was announced at the website of the IAA/New Mobility World. FGM-AMOR took over the registration management and was the contact point for all questions concerning the workshop and its organisation. An additional workshop leaflet was designed.



The projects MYWAY, PETRA, SIMPLI-CITY & STREETLIFE have received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration.

INTERNATIONAL WORKSHOP

SMART MOBILITY SERVICES FOR THE SMART CITY // Architectures and Solutions towards a Service Market Place

23rd of September 2015 / Frankfurt on the Main

We are happy to announce the workshop "Smart Mobility Services for the Smart City: Architectures and Solutions towards a Service Market Place" that will take place in the framework of the International Motor Show IAA / New Mobility World (<http://newmobilityworld.com/>) in **Frankfurt on the Main (DE)** on the **23rd of September 2015**.

The 4 European projects STREETLIFE (www.streetlife-project.eu), PETRA (www.petraproject.eu), MYWAY (myway-project.eu) and SIMPLI-CITY (simpli-city.eu) will host this workshop.

Experts from science, business and authorities will present and discuss technical solutions with a special focus on smart mobility services for Smart Cities.

The interactive workshop includes a mixture of presentations and discussions and features a panel session.

Take the opportunity for knowledge exchange and participate at this international workshop.

The workshop is free of charge and includes coffee breaks and lunch.

Take the chance to register to the workshop until the 21st of September 2015, 12.00 noon [here](#) and feel free to contact us for further information (hoffmann@fgm.at).

[Download workshop agenda](#)

[Register for the workshop](#)

Hosted by the 4 European projects: MYWAY / PETRA / SIMPLI-CITY / STREETLIFE

MyWay
EUROPEAN SMART
MOBILITY RESOURCE
MANAGER

PETRA

simpli-city
The Next Urban Innovation System of the Future

Streetlife

The projects MYWAY, PETRA, SIMPLI-CITY & STREETLIFE have received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration.

Figure 3: Workshop Webpage

32 registrations were made and finally 30 to 40 participants attended the workshop. The workshop was in an open space so that interested persons had the possibility to join the workshop. The workshop itself was divided into 4 main slots, one for each European project and included a panel session at the end with one participant of each project. Volker Hoffmann from FGM-AMOR moderated the whole workshop, announced the speakers, introduced the topics and lead the question and answer session after each presentation.

The keynote speech was held by Axel Volkery, Policy Officer of Research and Innovative Transport Systems from DG MOVE, as representative of the European Commission. He informed the audience about the strategy, objectives and main challenges of the European Commission with the focus on Smart Cities and Smart Mobility Services. Furthermore he illustrated the funds, partnerships on smart cities and communities and possible future

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options in his presentation “Smart cities and mobility services: needs and opportunities at European level”.

After the keynote speech, the project coordinator of SIMPLI-CITY Stefan Schulte (Vienna University of Technology/TU Wien) opened the project slot of SIMPLI-CITY. As the representative of the project consortium he gave an introduction to the project itself in the context of technological solutions for Smart Cities and App market places in Europe. He focused on the mission and approach of SIMPLI-CITY and introduced the project’s main outcomes like the end user interface “Personal Mobility Assistant” as well as the “Mobility Services Framework”.

Subsequently, Daniel Burgstahler from TU Darmstadt presented new research results from the science perspective and showed possible future scenarios of App development in a growing European market. In this context he analysed the state of the art of information systems and took a closer look at the main challenges in interoperability, data privacy and protection.

At the end of the presentation he showed the STAR-CITY (Semantic Traffic Analytics and Reasoning for City) tool from IBM Ireland, with digital animations and a small movie. STAR-CITY, the system of SIMPLI-CITY (WP4 and WP7) that won an award at the semantic web challenge at ISWC 2013 (October 21st - 25th) in Sydney, focuses on the knowledge representation and reasoning layer of SIMPLI-CITY, and presents a system supporting semantic traffic analytics and reasoning for cities. This system (video available on <http://dublinked.ie/sandbox/starcity/>), which integrates human and machine-based sensor data using a variety of formats, velocities and volumes, has been designed to provide insights on historical and real-time traffic conditions, all supporting efficient urban planning.

After this first part and a short coffee break, the second project slot started with the presentation by Sebastiaan Meijer from the KTH Royal Institute of Technology. He focused on the “Personal Transport Advisor: an integrated platform of mobility patterns for Smart Cities to enable a demand-adaptive transportation system”. As the representative of the European project PETRA he also illustrated the main challenges and expected outcomes of the project.

After a lunch break, the MyWay project slot started with two presentations.

One presentation with the title “Multimodal mobility services for the smart city: the MyWay view and architecture” was held by Marco Boero from Softeco Sismat and a second presentation with the title “MyWay Services: business perspective” was held by Stefano Persi from ENIDE.

This was followed by the fourth and final project slot. Yogesh Nagappa (Siemens), Benjamin Dittwald (Fraunhofer FOKUS) and René Kelpin (DLR) presented „The STREETLIFE approach for multi-modal sensor fusion for value added services in Berlin – today and tomorrow”.

At the end of the workshop Jose Lorenzo from ATOS moderated the panel session with the topic “Technical solutions for the urban mobility of the future”. Members of all 4 European projects discussed together with the audience possible ICT solutions for Smart Cities. Stefan Schulte of TU Wien as the representative of SIMPLI-CITY took the opportunity to explain the relevance of such ICT projects and their importance for the enhancement of the quality of life in urban areas.



Figure 4: Workshop Impressions

3 Summary

The second SIMPLI-CITY workshop required, similar to the first workshop, a huge effort of planning and promotion. The workshop was organised by FGM-AMOR for the 4 European projects SIMPLI-CITY, PETRA, MyWAY and STREETLIFE. 30-40 participants were present at the venue in the New Mobility World at the IAA in Frankfurt. A lot of parallel sessions and events (organised by other initiatives at the same time) made it difficult to recruit more participants. But during the workshop some visitors came to join the workshop.

Nevertheless the workshop was very successful and all participants were content. Moreover it was helpful to organise this event as a joint workshop in order to strengthen the collaboration and experience exchange between the projects and to start future cooperations.

Annex

Presentations of Workshop II

- 1.) *Keynote: Smart cities and mobility services - Needs and opportunities at European level* by Axel Volkery (European Commission, DG MOVE)
- 2.) *The Road User Information System of the Future* by Stefan Schulte, TU Wien
- 3.) *Information systems from the science perspective* by Daniel Burgstahler, TU Darmstadt



Smart cities and mobility services: needs and support opportunities at European level

Workshop Smart Mobility Services for the Smart City
IAA 2015, Frankfurt, 23 September 2015

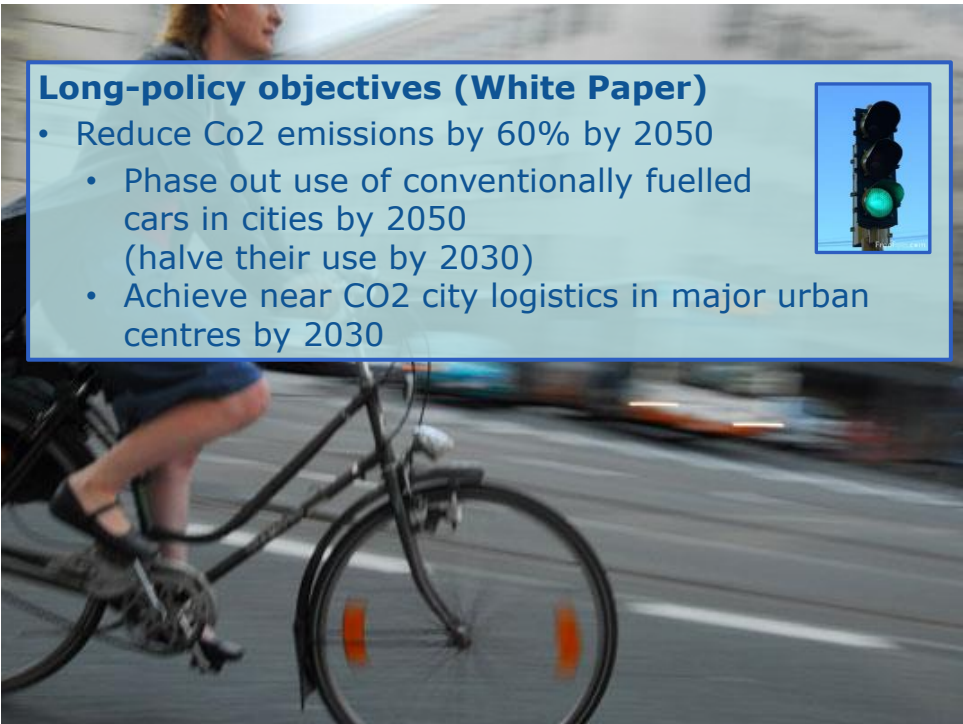
Axel Volkery
Research and Innovative Transport Systems
DG Mobility and Transport

A wide-angle photograph of the Paris skyline at sunset or sunrise. The Eiffel Tower is prominent on the right side, and the city's lights are visible in the foreground. The sky is filled with soft, golden clouds.

CITIES
KEY FOR EUROPE

Our objectives:

- **Smart city:** Accessible, competitive, clean
- **Smart urban mobility and transport:**
a co-operative, inter-connected, data-rich, eco-
system driven by personalised end-user needs.



Long-policy objectives (White Paper)

- Reduce Co2 emissions by 60% by 2050
  - Phase out use of conventionally fuelled cars in cities by 2050 (halve their use by 2030)
  - Achieve near CO2 city logistics in major urban centres by 2030



Opportunities:

- New services (mobility services)
- New technologies (e.g. vehicles, ICT)
- New business models (platforms)
- Tremendous opportunities

Challenges:

- Urban mobility gap in Europe
- Valley of Death: supply does not meet demand
- Lack of joined-up policies and capacity
- Lack of standards

➤ Shortcomings in market uptake



Combination of levers

- Collaborative platforms and dialogue = "learning by doing"
- H2020 support
- EIB ELENA
- H2020 SME instrument
- EFSI / EIB
- European Innovation Partnership on Smart Cities and Communities



Topic	Title	Action type	Stages	Budget (EUR Mio)	
				2016	2017
MG-4.1	Increasing the take up and scale-up of innovative solutions to achieve sustainable urban mobility	IA	2		22
MG-4.2	Supporting "smart electric mobility" in cities	IA	2		
MG-4.3	Innovative approaches for integrating urban nodes in the TEN-T core network corridors	CSA	1		2
MG-4.4	Facilitating public procurement of innovative sustainable transport and urban mobility solutions	CSA	1	2	
MG-4.5	New ways of supporting development and implementation of neighbourhood-level and urban-district-level transport innovations	RIA	2	10	

CSA = Coordination and Support Action

RIA = Research and Innovation Action; IA = Innovation Action

Topic	Title	Action type	Stages	Budget (EUR Mio)	
				2016	2017
MG-6.1	Innovative concepts, systems and services towards 'mobility as a service'	RIA	2	25	
MG-6.2	Large-scale demonstration(s) of cooperative ITS	IA	2		
MG-6.3	Roadmap, new business models, awareness raising, support and incentives for the roll-out of ITS	CSA	1	5	

CSA = Coordination and Support Action

RIA⁸ = Research and Innovation Action

IA = Innovation Action



Topic	Title	Action type	Stages	Budget (EUR Mio)	
				2016	2017
ART-01	ICT infrastructure to enable the transition towards road transport automation	IA	2	50	50
ART-03	Multi-Brand platooning in real traffic conditions	IA	2		
ART-07	Full-scale demonstration of urban road transport automation	IA	2		
ART-02	Automation pilots for passenger cars	IA	2	48	
ART-04	Safety and end-user acceptance aspects of road automation in the transition period	RIA	2		
ART-05	Road infrastructure to support the transition to automation and the coexistence of conventional and automated vehicles on the same network	RIA	2	13	
ART-06	Coordination of activities in support of road automation	CSA	1	3	

CSA = Coordination and Support Action
IA = Innovation Action; RIA = Research and Innovation Action



EIB ELENA

- Will have a dedicated transport component in 2016/2017
- EUR 15 million dedicated to smart urban mobility and transport
- ELENA covers up to 90% of the technical support cost needed to prepare, implement and finance the investment programme4
- This could include feasibility and market studies, programme structuring or tendering procedure preparation
- this will also help attract funding from private banks and other sources, including the EIB





SME instrument

- Contribution to SMEInst-10-2016-2017: Small business innovation research for transport and **smart cities mobility**

Fast track to innovation pilot (FTI)

- Fully-bottom-up measure to promote close-to-the-market innovation activities
- Aim:
  - Reduce time from idea to market
  - Stimulate the participation of first-time applicants to EU research funding, and
  - Increase private sector investment in research and innovation

11



European Fund for Strategic Investments and European Impact Advisory Hub

- EFSI guarantee will enable the EIB to take riskier projects, e.g. smart urban mobility projects, on board
- Research and innovation is one of the key priorities, as is urban mobility
- Innovative projects can also employ financial instruments, facilitated by investment platforms
- Advisory Hub will function as a one-stop-shop and work together with a network of national promotional banks

12

European Innovation Partnership on Smart Cities and Communities

1. **Focus on intersections**
→ Energy, Transport and ICT
2. **Support roll-out of mature technologies at large scale**
3. **Build a collaborative market place for cities, companies and research**
4. **Support a pipeline of projects**
5. **6 Action clusters: mobility services a key initiative as part of the urban mobility action cluster**
6. **Join up action for project pipeline development**



New opportunities for support at European level
Build a pipeline through EIP actions



H2020 and CEF calls

H2020 WP 2016/2017 enlarged
EIB ELENA facility: increased project development assistance to cities

European Impact Advisory Hub – EIB

European Strategic Funds for Investments and support through European Structural Investment Funds



Thank you for your attention

Axel Volkery

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The Road User Information Systems of the Future

Frankfurt am Main, 05/10/2015

Dr.-Ing. Stefan Schulte,
TU Wien

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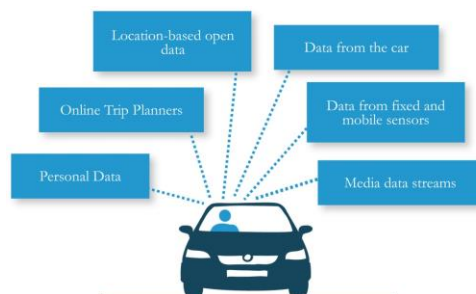
This project has received funding from the European Union's
Seventh Framework Programme for research, technological
development and demonstration under grant agreement no 318201.



Road User Information Systems

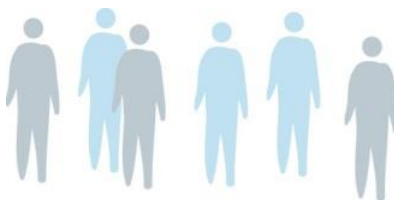
Situation Today:

Ubiquitous internet access makes a multitude of information sources available to road users, e.g.:



Issues from Users' Point of View

- It is difficult to get exactly the information I'm looking for at the time I need it
- Interrelated data should be automatically connected (e.g., calendar and navigation device)
- Information should be given in a non-distracting way



Where is the Mobility App Market Today?

Apple App Store or Google Play show that most ambitious end user services and apps are provided by third parties

Past examples, e.g., Renault R-Link, Toyota Touch & Go Plus, Opel IntelliLink:

- Proprietary
- Closed for third-party developers
- (Mostly) Focus on infotainment and traffic data

Today: Android Auto & Apple CarPlay

- Corresponding car necessary
- Software Development Kit upcoming (for Android Auto)



This project has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under grant agreement no 318201.



5

App Development Today

Some interesting figures:

- 88% use their smartphone while being on their way
- 69% while using public transportation
- 82% use their smartphone to find local information
- 64% say that they won't leave their house without their phone
- 45% during events and presentations



This project has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under grant agreement no 318201.



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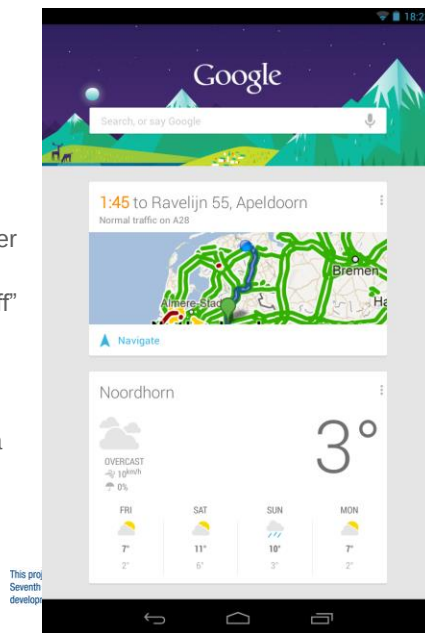
Google Now

Great for end users, but:

- Static data sources
- Controlled by one company
- No way to interconnect this with other user data
- Only works when using Google “stuff”

Bad for app developers

- Not open for app developers
- No interconnection with vehicle data (in case of car users)
- Not available when driving fast (connection problems...)



Issues from Technical Point of View

Backend:

- Heterogeneity and missing interoperability of data sources
- Missing end-to-end integration of data and functionality
- Development, discovery, provision and administration of services is too complicated

Frontend (User Interface):

- There are too many different apps that need to be handled separately
- User devices are not capable to provide easy and safe interaction with apps
- There's no “single stop” for mobility-related services



This project has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under grant agreement no 315201.



The Mission

Develop the technological foundation for bringing the “App Revolution” to road users:

- Provide road users with apps helping to make their journey safer, more comfortable and more environmentally friendly
- Support developers to realise and sell their mobility-related apps and services



The Vision I

Help Software Developers to:

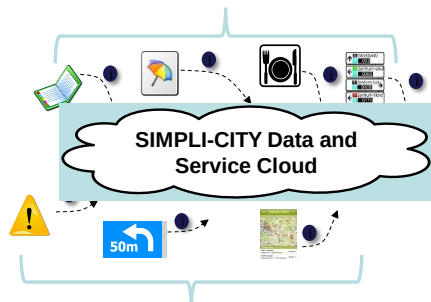
- Exploit Data Sources: Seamless Integration of Data from different Sources
- Build Services and Apps on Top of the Data
- Run their Services and Apps: Provide the Necessary Infrastructure
- Sell their Services and Apps on According Marketplaces

Providing a Unified User Interface to the Apps:

- Integrated Functionalities – One “Meta-App” to Rule them All
- Safe Interaction – Especially for Drivers
- Multimodal – Switch between Input Methods

The Vision II

1. Integration of Data from Heterogeneous Sources



2. Building Services on Top of the Data

1. Integration of Data from Heterogeneous Sources

3. Providing a Unified User Interface to the Services



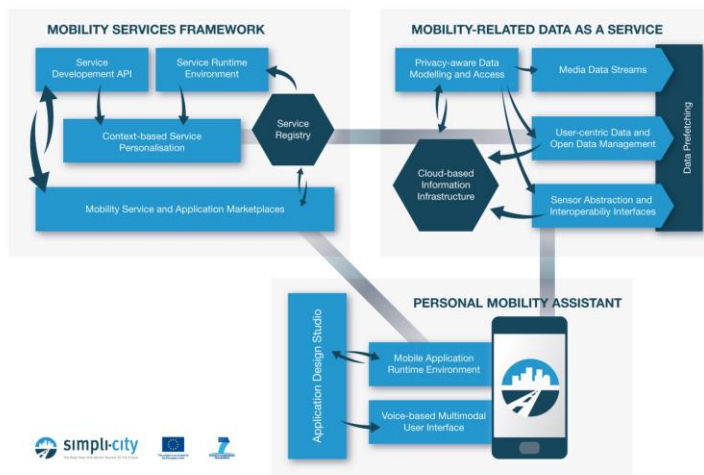
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SIMPLI-CITY – The Approach

SIMPLI-CITY Components



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Mobility Services Framework

- Aimed at service providers / developers
- Core backend for all functionalities facilitated by SIMPLI-CITY
- Allows development, description, discovery, interoperability, execution and monitoring of services
- First and foremost: A Service Runtime Environment
- Identification of which data or service is relevant to the user in a certain situation



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Mobility-related Data as a Service

- Allows applications and services to access data from various, technologically heterogeneous sources such as e.g., personal calendar, music data streams, road sensors, vehicle sensors, open data repositories such as local weather, event information, etc.
- Provides a holistic interface to the data sources
- Semantic- and AI-based data analysis
- Allows completely new services that compare different decisions and behaviour, trace and verify past journeys, etc.



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Personal Mobility Assistant

- SIMPLI-CITY's end user interface: Proactive, voice-based multimodal user frontend
- Single stop to all apps and their integration
- New apps may be added at all times
- Apps provide frontend to backend services



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Conclusions

Smart Cities offer heaps and heaps of different information:

- The question is rather how to get the data to the user
- Support developers to exploit data sources

Current Road User Information Systems are proprietary, closed systems

To Build the Road User Information Systems of the Future, 3 Aspects Need to be Regarded:

- Ease data access
- Support service/app development
- Provide safe user interfaces



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Outlook: European Wide Service Platform

Basic Idea:

- European-Wide Service Platform (EWSP) for cooperative system enabled services
- Aiming at energy efficiency, mobility, comfort and safety related services to the driver

Implementation:

- Two projects working on it – MOBiNET and SIMPLI-CITY
- SIMPLI-CITY: Rather technical approach to support complete service lifecycle
- MOBiNET: Focusing on marketplace functionalities



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SIMPLI-CITY - The Road User Information System of the Future



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More about SIMPLI-CITY



Subscribe to the newsletter!

Under:
<http://simpli-city.eu/>



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More about SIMPLI-CITY



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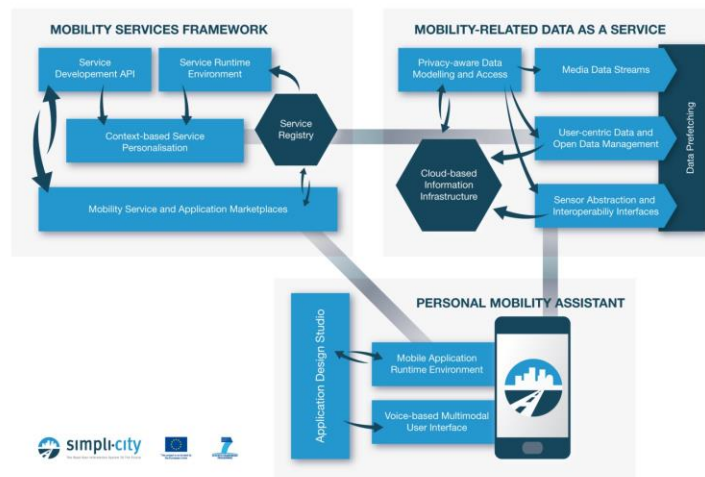


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Backup Slides

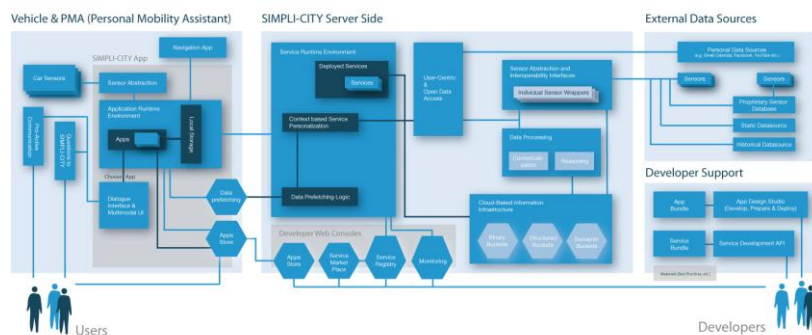
SIMPLI-CITY – The Approach

SIMPLI-CITY Components



SIMPLI-CITY's Architecture

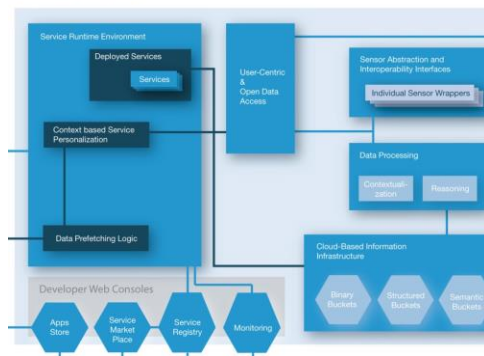
SIMPLI-CITY Architecture



Mobility Services Framework

- Aimed at service providers / developers
- First and foremost: A Service Runtime Environment
- Allows development, description, discovery, execution and monitoring of services
- Identification of which data or service is relevant to the user in a certain situation

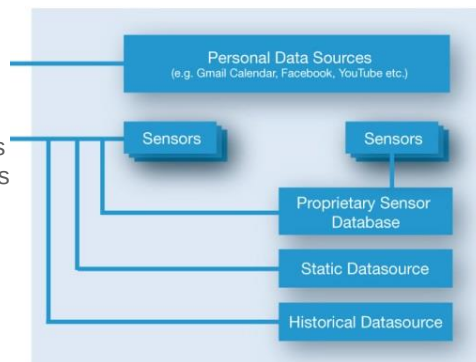
SIMPLI-CITY Server Side



Mobility-related Data as a Service

- Provides a holistic interface to the data sources
- Allows apps and services to access data from various, technologically heterogeneous sources
- Allows completely new services that compare different decisions and behaviour, trace and verify past journeys, etc.
- Semantic- and AI-based data analysis

External Data Sources



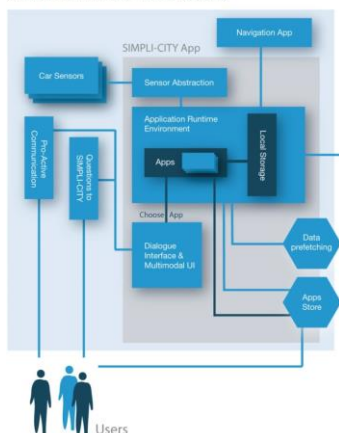
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Personal Mobility Assistant

Vehicle & PMA (Personal Mobility Assistant)



- SIMPLI-CITY's end user interface: Proactive, voice-based multimodal user frontend
- Single stop to all apps and their integration
- New apps may be added at all times
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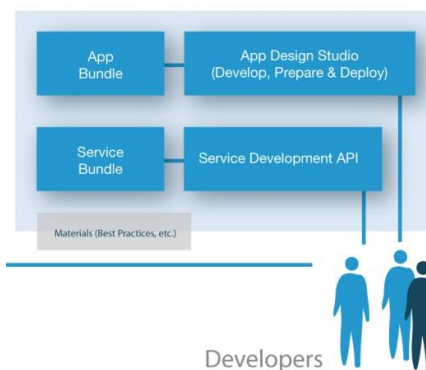
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Developer Support

Support for software developers during the complete app/service lifecycle:

- App Design Studio
- Service Development API

Developer Support



SIMPLI-CITY – In Practice

Use Case I : Meeting the Increased Mobility Demand

Topic I.1: Routing to a big event

- Context-based control of navigation
- Initial alternative routes and transport modes planning
- Individual traffic updates during the journey
- Recommendations of other transport modes during travel
- Best (closest) parking area, Park-and-ride facilities
- Individual parking situation updates during the journey

Topic I.2: Personalised City Access

- For different traffic areas, e.g., city centre, neighbourhoods, single streets
- Adapted to the current day and time
- Based on real-time traffic information

SIMPLI-CITY – In Practice

Topic I.1: Routing to a big event: Road Traffic Prediction

Goals and objectives

- Identify the nature and causes of congestions
- Jointly exploitation of 1) relevant data sets, 2) their correlation, and 3) historical traffic conditions
- Diagnosis of cause-effect relationships

Description

- Use data sources from cities to decrypt the reason of congestion
- Use of the automatic diagnosis method, core reasoning service of SIMPLI-CITY
- Automatically detect real-time congestions and retrieve their diagnosis as the set of possible events that could be the causes



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SIMPLI-CITY – In Practice

Topic I.2: Personalised Traffic Restrictions

Goals and objectives

- Provision of information about accessibility of roads, due to time-related issues such as e.g.,
  - Traffic restrictions to specific areas of the city
  - Traffic congestions
- Provision of alternative route and means of transportation

Description

- Use data sources from cities to provide road availability



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SIMPLI-CITY – In Practice

Use Case II : Enhancing the Driving Experience

Topic II.1: Environmental Awareness Rising

- Real fuel consumption of a journey
- Carbon footprint calculation
- Eco-efficiency comparison
- Driver's log
- Different route and driving styles comparison
- Eco-aware driving style recommendation
- Eco-driving Contest



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SIMPLI-CITY – In Practice

Topic II.2: Rising the Driver's Comfort

- Multimedia guide integration
- Remotely control selected functionalities of the car
- Accident prevention warning
- Media stream access
- Data integration into social networks



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Information Systems

SIMPLI-CITY WORKSHOP 2015



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Prof. Dr.-Ing. Ralf Steinmetz
KOM - Multimedia Communications Lab

Information_Systems__DBu__IAA2015__2015.09.23.pptx

23 September 2015

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Image source: <http://blog.nomalyz.com/wp-content/uploads/2014/08/applications-mobiles-entreprise-crm-erp-di-ged.png>

Definition: Information System



Depends on User, many different definitions available [1][2][3]

- End-User
- Business
- Government
- ...

General/Simple Definition:

- A complementary system of hardware and software to
  - Collect,
  - Filter,
  - Process,
  - Create,
  - Distribute data,
  - Present data

History of Information Systems With Respect to Information Propagation

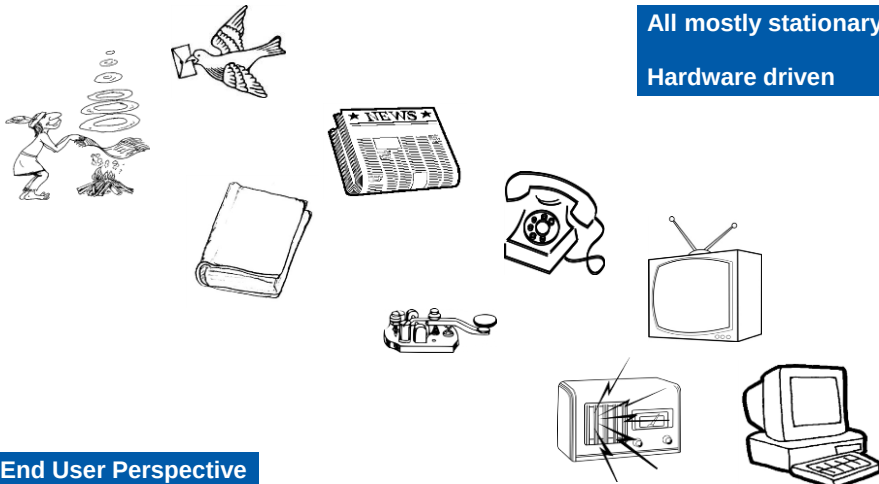


Image source(s): [11, 12, 13, 14, 15, 16, 17, 18, 19, 110]

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Today's Information Systems With Respect to Information Propagation

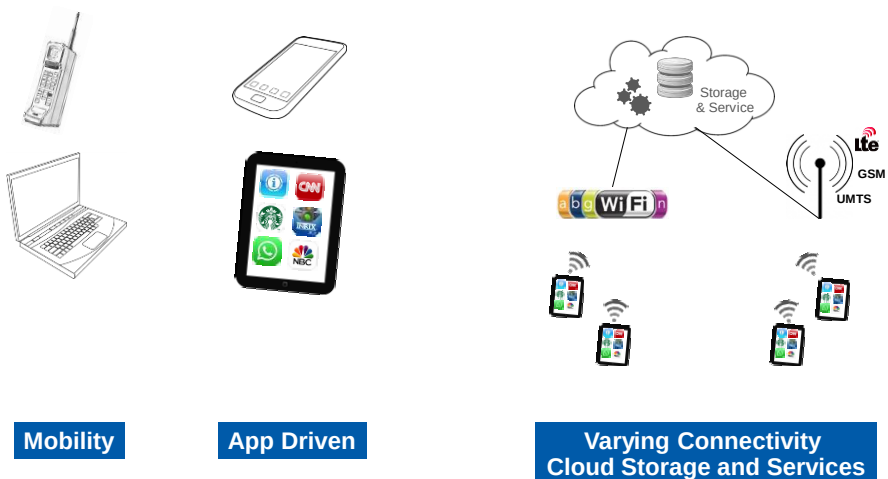


Image source(s): [11 – 23]

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Example: Car2X

Communication between cars and infrastructure

- Improve road safety
- Improve economic driving
- Improve traffic flow



But also new information sources

- Every Car and RSU is also an information source
- Precise near real time information about traffic conditions

But this will need some time

High investments necessary

New features are mostly introduced in the luxury class

72% of cars in use in the EU are compact size cars (in 2009) [6]

Average age of cars in the EU is about 9 years [7,8,9]

Image source(s): [27]

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A Change in the Automotive Domain

Situation Today:

- Expensive built-in navigation with simple internet functionality
- Window mount navigation systems
- Simple smartphone apps

Next Future:

- Software cycles are much faster than hardware cycles
  - App execution platform needed
- Market penetration for built-in systems is too long
- Extension of IVI and smartphone integration

Not next Future:

- Car2X: many open challenges: costs, functionalities, safety and security,...
  - Basic message types are standardized: CAM, DENM, TOPO, SPAT
- Also intelligent infrastructure, new information sources
  - HERE, Google, Apple, ...

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Proprietary Approaches Smartphone IVI Integration



Result: Execution platform for Apps in the car
Usability has to be mostly defined by the Apps
No focus on data integration

Integration of Smartphone and In-Vehicle-Infotainment (IVI)

- Defines connection protocols
- Allows the use of in-car HMI to control Smartphone Apps
- Some allow IVI Apps that use smartphone resources
- Restriction of what can be used during driving

Image source(s): [i41-i]

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A Change in the Automotive Domain

Cars will change from pure hardware to an execution platform for software

- A platform to execute/provide information from a software layer

**Cars are changing from mechanical engineering domain
to information engineering domain**

Cars become both

- Mobile sensors
- Execution platform for future information systems
- Part of an information based mobility system

Challenges and Opportunities

- Security issues: Hacked Jeep, OnStar, BMW, ...
- Legal issues: Volkswagen
- Update possibilities: Tesla updates Autopilot functionality

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Future of Information Systems Some Important Aspects

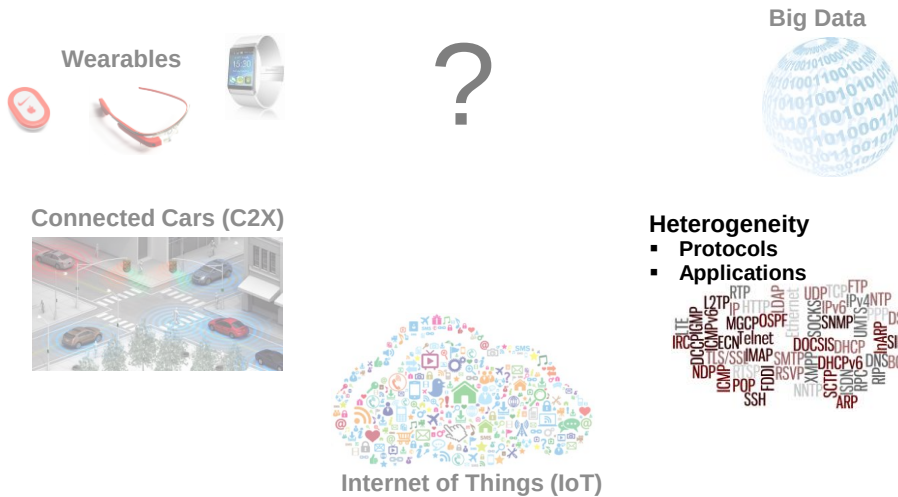
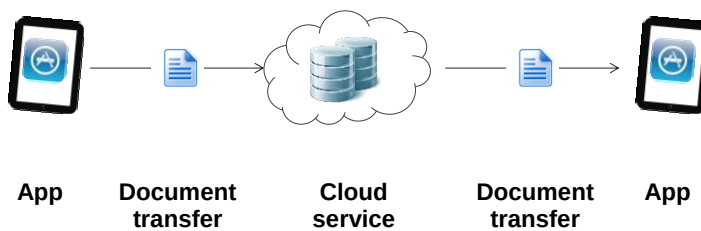


Image source(s): [124 – 127]

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Example: Data Services Document Sharing



Operations

Read, Write, Modify, Move, Share, ...

Image source(s): [129, 133, 134]

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Example of Document Sharing

Same Functionality by Different Services

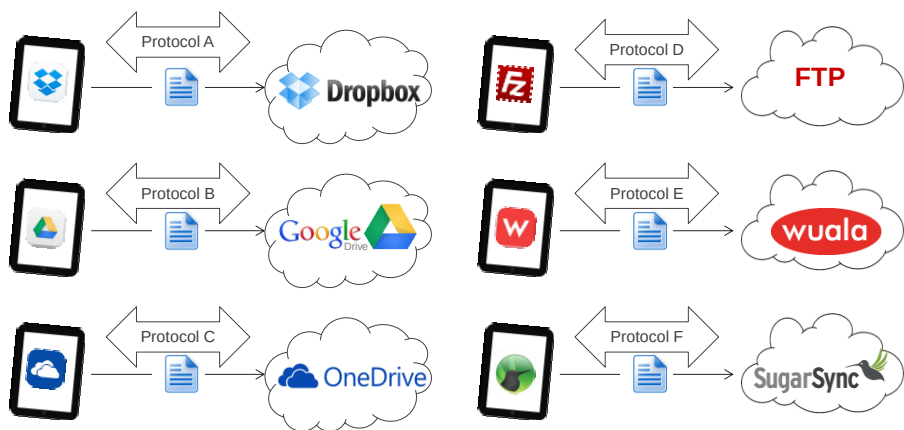


Image source(s): [129-140]

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Example of Document Sharing

Future: Interoperability

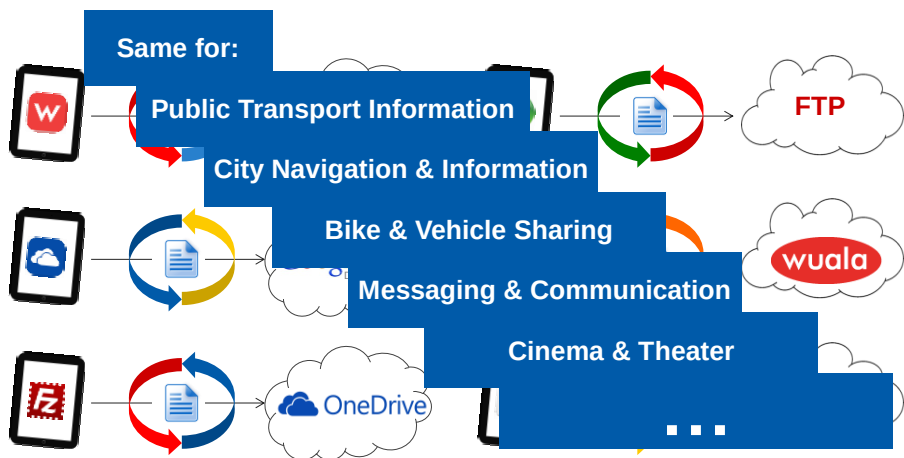
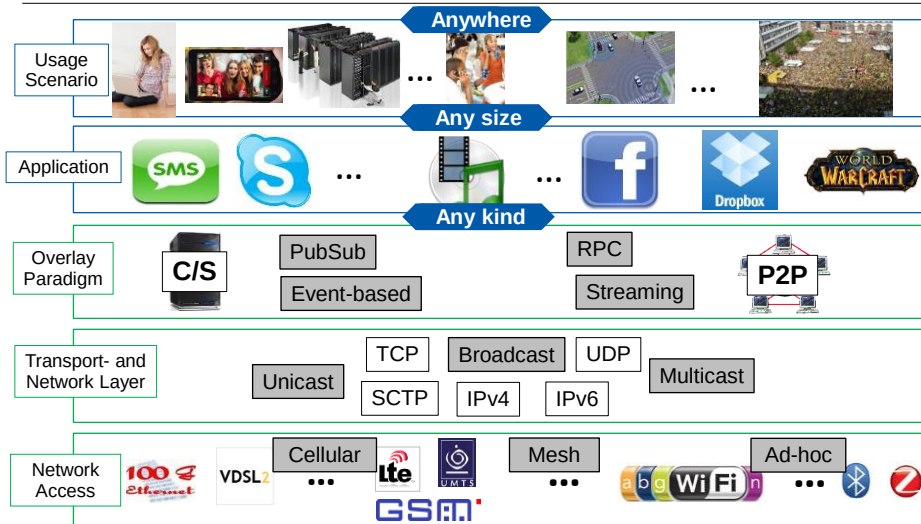


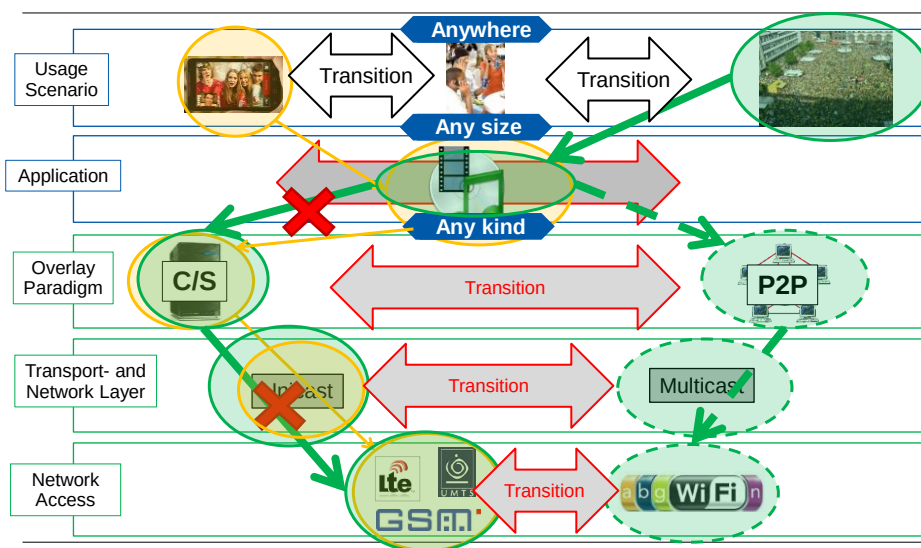
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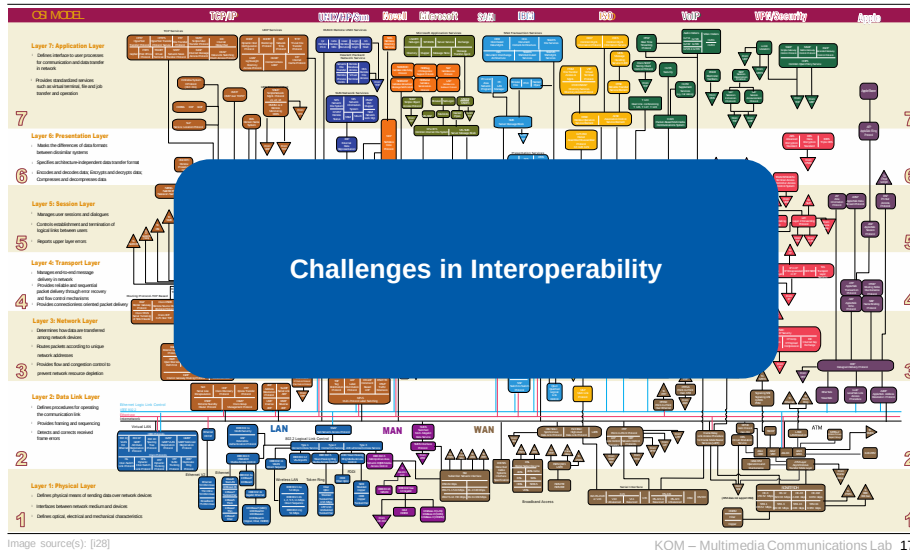
Concrete Situation in the „Future Internet“



Concrete Situation in the „Future Internet“



Networking Protocol Map of Today



Data Privacy and Protection

Nearly nobody cares about, why should I ?

Similar to traffic situations:

Who owns data produced by cars?

- Manufacturer ?
- Car owner ?
- Government ?
- Only as long as necessary

Data security

- Technically, Organizationally

Data transparency

- Information to interested parties / inspection rights
- Earmarking

Stick always to law regulations

Conclusions

Future Needs of Information Systems



Challenges

- Heterogeneity: Applications, Protocols, Devices
- Many Data Sources: IoT, C2X, Smart City
- Big Data: All data sources potentially produce data

On all layers between clients and servers

→ **Transitions**

Service Platforms

→ **Data integration of various heterogeneous sources**

Increasing Connectivity and Data Integration

→ **New information flows allow new concepts**

Improvement of Accuracy



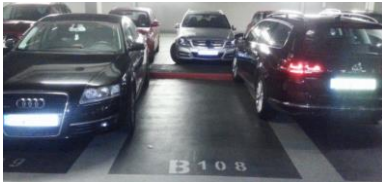
An advanced parking sensor

- Fine grained vehicle detection
- TU Darmstadt

StarCity

- Semantic Traffic Analytics and Reasoning for City
- IBM

An Advanced Parking Sensor Motivation



To find an appropriate parking space is getting more and more challenging

Parking spaces are often too small

Parking spaces are often not usable because of neighboring cars

Causes a need for intelligent parking systems

Image source(s): [6]

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An Advanced Parking Sensor Existing Parking Space Sensors



Single parking space granularity



Ultrasonic



Magnetic



Camera

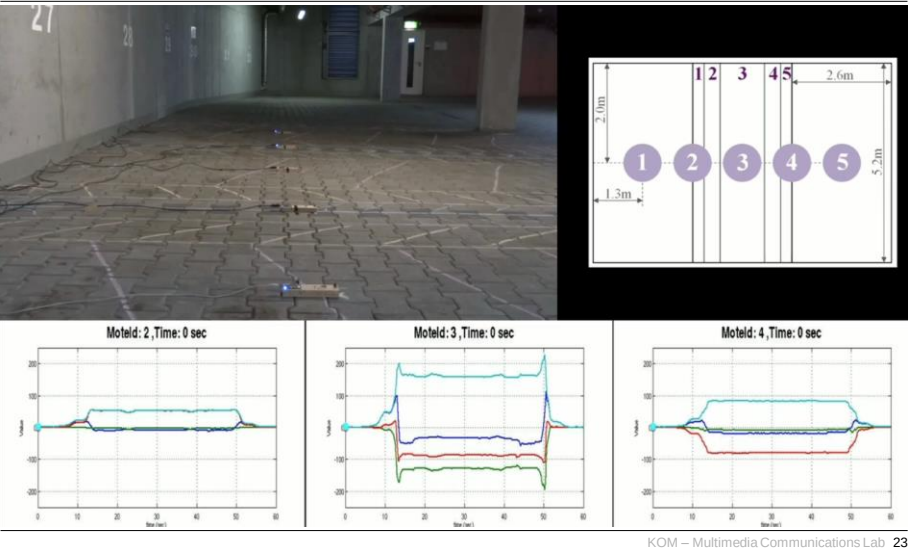


**All existing systems can only detect
if a parking space is occupied,
but not how.**

Image source(s): [7]

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An Advanced Parking Sensor Setup



An Advanced Parking Sensor Detection



STAR-CITY

Semantic Traffic Analytics and Reasoning for City



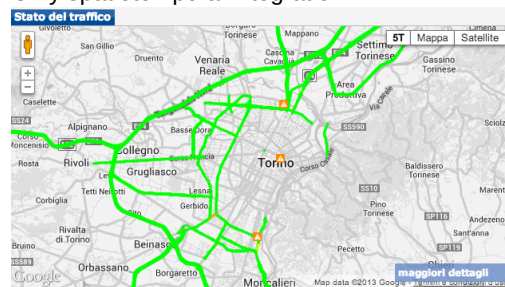
Urban traffic costs

- 5.5 billion hours of travel delay
- 2.9 billion gallons of wasted fuel in the USA
- \$121 billion / year



Existing Systems

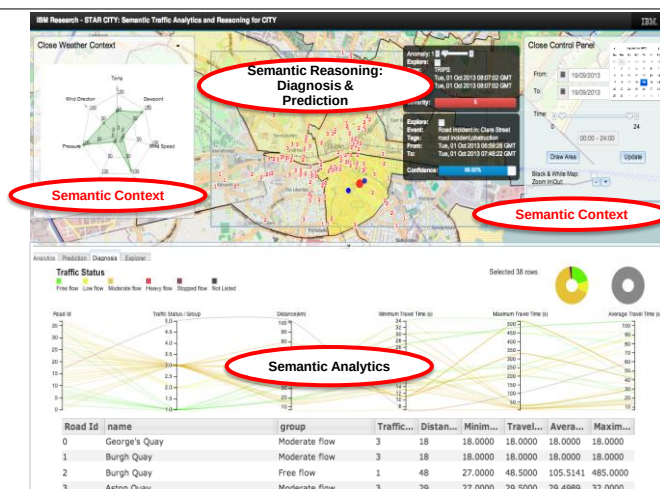
Only spatiotemporal integration



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Preview: STAR-CITY

Semantic Traffic Analytics and Reasoning for City



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Questions & Contact



Department of Electrical Engineering
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