



# Smart MaaS: The Beacon Of Disruption For Sustainable Transportation Systems





# **C O N T E N T**

Right-click on the name of the article that you want to read

#### **VOICES FROM GLOBAL THOUGHT-LEADERS**

Dr. Walter Mattauch	4
Tilman Liebchen	5
DrIng. Reinhold Achatz	6
Graeme Neill	7
Piia Karjalainen	8

#### **BEST PRACTICES FROM THE SMART MAAS PROJECT**

Mobility Broker - The Multimodal Mobility Platform	10
OHV Mobil - Mobility in Hennigsdorf	12
Cross-domain Interoperability Matters	14
Innovative Digital Ecosystem for the Mobility Sector	16
Making Mobility Smart With the Help of Linked Data	18
Digital Solutions for Handicaped Parking Spaces	20
Smart MaaS World	22

About Smart MaaS	24	ŀ
------------------	----	---





## VOICES FROM GLOBAL THOUGHT-LEADERS\*

**\*Disclaimer:** The following views and opinions expressed in this publication are those of the authors. They do not purport to reflect the opinions or views of FIWARE Foundation. Liability claims against the authors, which refer to material or non-material damages, which were caused by the use or non-use of the provided information or by the use of incorrect and incomplete information, are generally excluded, unless there is no evidence of intentional or negligence of the authors.

4





#### **Dr. WALTER MATTAUCH\*** Federal Ministry for Economic Affairs and Energy (<u>BMWi</u>), Germany

The <u>Smart MaaS</u> - Mobility as a Service - project was funded by BMWi as part of the "Smart Service World" funding program, and focused on public transport and smart cities. In the project, an open and modular service platform was developed in which mobility offers could be utilized in a unique single package across a variety of providers. The following intentions were important for the funding body.

One goal was to create an alternative to business models of the platform economy, in which primarily one large company profits, while others serve as data providers or suppliers. This goal is still some way off, and not just in the mobility sector. While Smart MaaS provides the technical platform, the relevant stakeholders now need to come on board and drive the scaling phase.

A second intention was to use technology building blocks from EU research in the national funding landscape. Mutual permeability of EU research and member state activities has proven to be conducive and necessary. <u>FIWARE Foundation</u>, which emerged in the EU context, not only provides important <u>components</u> for the development of service platforms, but also offers a good model for future collaboration at European level.

Newer initiatives such as <u>GAIA-X</u><sup>1</sup> or <u>EuroHPC-JU</u><sup>2</sup> can benefit from the principles and experiences generated by FIWARE. The mobility sector has severely suffered from Covid-19. In the future, business travel will be under scrutiny. Therefore, it is now important to make traveling from A to B attractive and easy.

I wish the very committed partners of the Smart MaaS project continued success.

\*An experienced researcher, manager and consultant in ICT-related, interdisciplinary research projects, Walter combines broad international experience, education in social sciences, and a profound background in ICT. Following years of experience within Fraunhofer FOKUS and the German Aerospace Center - a research funding organisation supporting the Federal Ministry of Education and Research (BMBF) and the Federal Ministry for Economic Affairs and Energy (BMWi) - Walter joined BMWi earlier in 2021 and focuses on national programs on "Digital Identities" and international cooperation. He is also the author of scientific articles, a book editor, and multimedia author.

<sup>&</sup>lt;sup>1</sup> GAIA-X is a project initiated by Europe for Europe and beyond. Its aim is to develop common requirements for a European data infrastructure. FIWARE is a GAIA-X Foundation Day-1 Member.

<sup>&</sup>lt;sup>2</sup> The EuroHPC Joint Undertaking is a joint initiative between the EU, European countries and private partners to develop a World Class Supercomputing Ecosystem in Europe.





TILMAN LIEBCHEN\* <u>VDI/VDE-IT</u>, Germany

Mobility is a key element of everyday life. Even though the current pandemic has taught us that physical presence might not always be necessary, mobility restrictions continue to be an important issue. It has become increasingly crucial for an efficient mobility system to provide flexible choices that can adapt to changing needs.

Smart cities, regions and communities need comprehensive mobility solutions that are both intelligent and sustainable, account for specific demands and individual requirements, and are open for everybody to contribute their smart services.

During the last three years, the publicly funded Smart MaaS project and its partners have worked on an open platform and a reference architecture for new mobility services as future building blocks of an interoperable ecosystem enabling smarter mobility solutions, and integrating different means of transportation together with seamless route planning, booking, and payment.

The perfect all-purpose mobility app might never exist, but individual - and precisely tailored - mobility solutions and services will become much easier to design and operate. In this White Paper, the various contributions will provide an insight into the technologies that enable such smart and sustainable mobility solutions.

<sup>\*</sup>Tilman Liebchen holds a degree in Electrical Engineering. After working at the Technical University of Berlin and LG Electronics, he has been a Research Associate at VDI/VDE-IT since 2010. In the last few years, Tilman has been involved in the research accompanying the BMWi technology programs "Smart Service Welt I + II "and "Smarte Datenwirtschaft", where he was responsible for the sub-project management of the project monitoring tasks. He is also the co-author of numerous program and technical publications on digital platforms, IT security, eGovernment, mobile communications, AR/VR and mobility.





Dr.-Ing. REINHOLD ACHATZ\* International Data Space Association (<u>IDSA</u>), Germany

Unlimited mobility and a well-supported life has been a dream for centuries. But, the way we have implemented mobility in the past needs more resources than the world can spare today and in the future. For this reason, new paradigms must be defined.

Digital transformation is offering us an opportunity to address such issues. It will transform future cities into smart, resilient, safe, inclusive and sustainable ones. Data Spaces - based on sovereign data sharing - will give us access to an unprecedented wealth of information.

Especially in the wake of a global pandemic, the need for tech-smart, resilient, cost-effective and sustainable solutions became indispensable. New concepts, implementations and opportunities have already been brought forward, forging new paths ahead of the 'new normal'.

This White Paper follows a problem-solution approach, and asks readers to reflect upon some of the most pressing issues facing today's society.

Throughout this publication, you will find relevant contributions from organisations and companies that have designed a wider range of technologies - using the Smart MaaS platform - that are key to improving mobility across multiple levels.

These technologies will guide the future toward a planet that's ready for the generations to come.

\*Dr.-Ing. Reinhold Achatz is the President and Board Chairman at IDSA. Following his 41 successful years within the industry, including 32 years at Siemens and 9 years at ThyssenKrupp AG, Reinhold is currently supporting companies and organizations to develop innovative, sustainable and resilient strategies and solutions. He also sits on multiple advisory boards across Germany and is a supervisory board member at UNITY. Reinhold Achatz also supports Acatech - the German Academy of Science and Engineering - in the definition and implementation of its Mobility Data Space.





**GRAEME NEILL\*** <u>SmartCitiesWorld</u> (a FIWARE Media Partner), UK

The advent of smart cities is unlocking new technologies as cities seek ways of solving their urban challenges. From smart waste networks to intelligent infrastructure, cities are adapting and innovating to meet the evolving needs of their citizens.

However, it's not just the needs of citizens that are evolving. The era of Covid-19 and its aftereffects require further technological innovations, cost-effective, resilient and sustainable solutions, as well as those that meet the needs of the shift to net zero.

Smart mobility will drive these technologies and open platforms are seen as a means of avoiding cumbersome fragmentation, providing standardised solutions and being flexible and lightweight enough to drive innovation. Our cities underpin our lives and those of our descendants. It's vital that technology is able to keep up with their needs.

This White Paper will explore why Smart Mobility as a Service (Smart MaaS) can meet the challenges of transforming cities into smart, resilient, inclusive and sustainable ones.

It will showcase organisations that have developed a whole range of technologies that are essential to improve mobility at multiple levels. These technologies shape our destiny and help make our planet great today and for future generations.

\*Graeme Neill has been a journalist for almost 20 years, with more than a decade working in the technology and telecoms space. A Belfast native, he started his career at the Northern Irish daily "The Irish News" before moving to London to cover the debt capital markets and book publishing industries during the financial crisis. He has covered the telecoms industry for the past decade, initially focusing on the UK retail industry before shifting to cover the telecoms tech industry for Mobile Europe. Graeme joined SmartCitiesWorld in 2020.





PIIA KARJALAINEN\* MaaS Alliance, Brussels

Mobility-as-a-Service (MaaS) allows us to recreate a new, sustainable freedom of mobility and increase accessibility. Without a compelling service that ensures strong buy-in from users, the benefits of MaaS cannot be fully unlocked.

Thus, our main focus should be on users and how we can increase their where-to-go-network and their freedom to choose amongst an array of green and healthy mobility options. Although people mostly move within the domain of one city or region, covering only one area is not enough to fulfil all their mobility needs.

However, the urban mobility market, even in Europe, remains very fragmented. For the market players this translates into high scalability costs, whereas users may see this as an absence of services all together.

Open digital platforms and interoperability frameworks are key to creating an environment for versatile and scalable services, matching users' high expectations, as acknowledged by this White Paper, put together by the Smart MaaS project consortium partners.

Progress with MaaS calls for a relentless and trust-based collaboration between governments, international institutions and communities, such as FIWARE and MaaS Alliance, as well as all public and private players. The result will mean significant benefits for users, societies, the environment and economies in future.

Good reading.

\*Ms Piia Karjalainen is the Secretary General of the MaaS Alliance, leading and coordinating all the activities of this international Mobility as a Service community. Previously, she has worked in various positions at the European Parliament and the Finnish Ministry of Transport and Communications, mainly dealing with transport strategies, ITS, Mobility as a Service, policymaking and EU regulation.





## BEST PRACTICES FROM THE SMART MAAS PROJECT\*

\*Disclaimer: This White Paper has been issued by FIWARE, with contributions from the Smart MaaS Project Consortium. The following views and opinions are those of the authors. They do not purport to reflect the opinions or views of FIWARE. Liability claims against the authors, which refer to material or non-material damages, which were caused by the use or non-use of the provided information or by the use of incorrect and incomplete information, are generally excluded, unless there is no evidence of intentional or negligence of the authors.

10





## **Mobility Broker - The Multimodal Mobility Platform**

In today's cities, there is too little space, too much traffic, high noise pollution and environmental emissions exceed the permitted limits in many places.

By Lisanne Futter,\* Mobility Consultant & Project Consultant, Better Mobility

Currently, there are plenty of innovative and sustainable mobility solutions in the market. But, how can they be used in a more streamlined way? How can citizens be motivated to use these mobility solutions? "Mobility-as-a-Service" (MaaS) is an initial step away from private transport towards more sustainable solutions. The next step is to link different MaaS-options to give citizens access to a networked, digital mobility platform that connects public transport with the available regional mobility services.

The goal of such a MaaS platform is to ensure individual means of transportation no longer compete in the future but complement each other to form a useroriented mobility mix. For example, regional public transport will be networked with sharing services, e-scooters and bicycles. This diverse mobility mix enables cities to reduce traffic in the long term and helps optimize infrastructure, as well as urban planning in line with new mobility needs.



Image provided courtesy of Better Mobility.



"movA - you can have them all!" - All mobility offers for Aachen in one app. Image provided courtesy of Better Mobility.

## Mobility-as-a-Service - one app for all mobility services

<u>Better Mobility</u> offers a mobility platform for the intelligent bundling of mobilities and is called Mobility Broker. With Mobility Broker, all participating mobility offers of a region are linked to a central, multi-modal mobility platform.

Mobility Broker is more than just a smart information service because the mobility options are not merely displayed but rather can be viewed, booked and paid for immediately, without users having to register with various mobility providers beforehand.

The white-label mobility platform Mobility Broker is characterized by its open, expandable and versatile infrastructure as well as the ability to be customized according to the needs of the customer. In addition to integrating both public and corporate mobility services, Mobility Broker can also interface with other services, such as weather data or environmental data. This context data can be used to develop exciting smart city approaches and to perform further data analyses.

11

In the <u>Smart MaaS</u> research project, for example, a particulate matter (PM) alarm was implemented which informs the user when particulate matter levels are too high and encourages a change to a more sustainable mobility behaviour. With the <u>Aachener</u> <u>Straßenbahn</u> and Energieversorgungs-AG (ASEAG), this mobility platform has been implemented since 2017 and is available in the app stores under the name movA.

Learn more about Better Mobility at <u>www.bettermobility.de</u>.

\*With extensive experience in the areas of sustainable mobility and smart city, Lisanne is actively shaping the development of Better Mobility. Better Mobility's goal is to make public mobility in cities attractive for everyone, through easy access and innovative approaches.





## **OHV Mobil - Mobility in Hennigsdorf**

How MaaS solutions can be implemented in cities.

By Detlef Olschewski,\* CEO, Cleopa

Mobility is a matter that affects everyone. In large cities, there is a huge and often confusing range of different providers. There is public transportation such as trains, buses, suburban trains, streetcars and subways, but also the possibility to rent cars, scooters or bicycles or to use them via sharing. In smaller towns or villages, the issue of mobility has a completely different significance.

In the best case, there is a connection to public transportation, but usually the route network is not optimally developed to reach a destination quickly and flexibly.

According to public sources in Germany, more than 70% of passenger transport is attributed to passenger cars and motorized two-wheelers. Likewise, the ratio between the number of motor vehicles and the number of inhabitants is constantly increasing. More cars also means a higher environmental impact.

#### Commuting made easier

One way to improve this scenario is shown by the use case in Hennigsdorf, Germany. This is an approach that <u>Cleopa</u> has taken - as part of the <u>Smart MaaS</u> project - to develop the OHV Mobility solution. Cleopa is headquartered in Hennigsdorf, a modern city near Berlin. In the 20th century the city



Use Case Hennigsdorf, Oberhavel (Germany). Image provided courtesy of Cleopa.



O

Smart MaaS Marketplace, powered by Cleopa. Image provided courtesy of Cleopa.

was characterized by the local locomotive industry, however, in the last 20 years it has evolved into a modern technology location. The city houses many companies that employ thousands of employees who commute daily.

In Hennigsdorf, a connection to the S-Bahn and regional transport is available, but many commuters are travelling from places that are not well served by public transport, which means cars are the best and sometimes, only option. With the OHV Mobil app, journeys to and from Hennigsdorf are made easier.

Technology such as the OHV Mobil app could potentially lead to less cars jamming the streets, resulting in lower levels of carbon emissions and noise pollution. In addition, one can travel more flexibly and save the cost and trouble of looking for a parking space by using the ridesharing application.

Especially in the surrounding areas of Hennigsdorf, where the commuter population is high, mobility can be simplified and improved with such a service. With OHV Mobil, ridesharing opportunities can be found or offered in seconds, making it a more sustainable, affordable and at times, more comfortable mobility option.

Learn more about Cleopa and its services at www.cleopa.de.

\*Detlef is passionate about innovation and is a serial entrepreneur. As the CEO of Cleopa, he is promoting sustainable technologies and services, which are available from sensor data, artificial intelligence or third parties.





### **Cross-domain Interoperability Matters**

NGSI-LD, common and standard interfaces pave the way for easy and efficient mobility data exchange.

By Gernot Boege,\* Solution Architect, FIWARE Foundation

Technological change is key in fostering growth with open source software promoting collaboration in urban centres to solve climate change, resource scarcity and mobility issues. The goal of <u>Smart MaaS</u> is to provide an open source, standardised mobility service platform allowing SMEs and service providers to offer their innovative mobility-related services. The purpose is to facilitate the unified integration of existing services, promoting a quicker time to market.

The Smart MaaS platform builds on domain-neutral <u>FIWARE technologies</u> and standards. The simple, yet powerful, <u>NGSI-LD API</u> provides coherent access to semantic context information to ease the development of smart cross-domain applications. A strategic cooperation with the MaaS Alliance drives the implementation of mobility-relevant smart data models to ensure consistent data interoperability.

#### Easing the pain of data integration

Data from multiple sources, protocols and formats will be integrated, transformed into and made accessible in NGSI-LD. This applies to modern real-time technologies as well as legacy systems struggling to keep up with today's technology development. External systems can be connected in powerful and scalable ways with extensive means of security, control, data provenance and load management. Configuration files can be easily stored, version-managed and shared publicly via central repositories to support efficient partner integrations.

The Smart MaaS platform offers interoperability for multi-source data via a standardized interface, it reduces the repeated efforts of implementation and provides the necessary tools to create innovative smart applications, not just limited to the mobility sector, but also open to all areas affected by digital transformation.





Illustration adaptation by Phuong-Quy Le, FIWARE Foundation.

For more information on how FIWARE is addressing the issue of mobility, visit the <u>website</u>. If you want to learn more about the <u>FIWARE ecosystem</u> and how to join the movement that is committed to ensuring continuous adaptation to cutting-edge technology trends in order to stay competitive, check out our members <u>page</u>.

\*Gernot joined FIWARE Foundation in 2018 and has extensive experience in the architecture and modeling of FIWARE solutions. He is also involved in FIWARE coaching, eLearning and consultancy activities. The combined analytical thinking skills, problem-solving abilities and solid experience allow him to successfully architect concepts and deliver solutions across multiple disciplines.





### **Innovative Digital Ecosystem for the Mobility Sector**

Improving cooperation among organizations in the mobility sector to deliver a better user experience for transport users.

By **Karina Villela**,\* PhD, Project Manager and Requirements Engineering Expert, Fraunhofer Institute for Experimental Software Engineering (<u>IESE</u>)

The mobility sector is a thriving market. Several modalities have arisen to offer more flexibility for end consumers. Carsharing, bikesharing, and scooters can be found on every corner in German cities. In a few urban areas, end consumers even have access to several options from one single provider. However, the burden of contract negotiations and the integration of services and software solutions prevent more urban areas from benefiting from cooperation among sector players and close the market to emergent players.

#### The opportunity

With that aim in mind - and in the framework of the Smart MaaS project -Fraunhofer IESE devised an innovative digital ecosystem based on the Smart MaaS platform to improve cooperation among companies and organizations in the mobility sector. The goal was to allow them to easily build upon each other's data and services in order to address the needs of end customers in a more timely and effective manner, whilst allowing continuous exploitation of new business opportunities.



Tangible Ecosystem Design workshop in 2018 - Identification of Problems and Potential Solutions. Image provided courtesy of Fraunhofer IESE.



Evaluation of the concept of the Digital Ecosystem based on the Smart MaaS platform. Image provided courtesy of Fraunhofer IESE.

The neutral role of the platform operator and contract templates are expected to facilitate contract negotiation. Devising such an ecosystem is, however, challenging as the resulting concept must be attractive not only to potential partners (different companies offering data and services related to mobility) but also to all participants of the ecosystem, which includes end consumers who do not at all interact directly with the platform.

Several questions needed to be answered in order to develop the business strategy, including: What ecosystem services would really deliver added value to end customers? Who are the players in the digital ecosystem? What could value flow, cash flow, operational data flow, and contractual relationships look like? Which services should the Smart MaaS platform provide?

Fraunhofer IESE used its broad set of lightweight and flexible methods in Smart MaaS to meet this challenge. To begin, we performed a Tangible Ecosystems Design workshop, where experts discussed the problems in the sector and explored how these problems can be addressed. We then combined this knowledge with the results of market research, conducted on mobility platforms and data platforms.

17

Next up, following our framework of relevant decisions and core activities for devising digital ecosystems, we arrived at a preliminary concept of the Smart MaaS digital ecosystem. This concept was refined with the support of experts from different areas and then discussed in five workshops with 35 representatives from mobility-related companies and organizations. The concept is flexible, which allows it to be realized in different constellations, and has the potential to integrate the mobility sector beyond the regional level.

Mobility is only one of the domains we are working in. To learn more about our competencies in devising digital ecosystems and our success stories in this area, visit the website. To discuss a challenge that you may be facing and work out a solution with us, contact Karina Vilella.

\*With a M.Sc. and PhD degrees in Software Engineering from the Federal University of Rio de Janeiro (Brazil), in 2006 Karina was granted a fellowship from the Alexander von Humboldt Foundation and started at the Fraunhofer IESE. Ever since, she has contributed to various research and industry projects. More recently, she has developed her competencies in Digital Ecosystems Modeling.





## Making Mobility Smart With the Help of Linked Data

Data exchange in a modern smart city is not only the exchange of words, but the exchange of meaning and knowledge.

By **Daniel Spieldenner** and **Torsten Spieldenner**,\* Researchers, German Research Institute for Artificial Intelligence (<u>DFKI</u>)

The first step to connect people in a modern city is to provide efficient connections for the city itself. As we witness the challenges of a wide mosaic of needs, services and data present in a modern smart city, our vision for the future is to help the city understand the needs of people and data exchanged, by speaking a common language. Data should not be defined by its structure, but by its meaning.

Within the vision of Smart Mobility as a Service, this means that public transport providers should no longer be bound by software interface restrictions, but easily enter offers into the pool of available options in an intuitive way, and have the city understand their data.

For this, our Linked Data approaches tear down the borders between data formats, interfaces and users, the residents of cities. Any necessary resource is lifted to a unified representation that allows services to operate entirely on the semantic meaning of the data. That means to abstract away from technical structural differences that an ecosystem of many different providers may bring.





Image provided courtesy of the German Research Institute for Artificial Intelligence (DFKI).

## User-centric solutions at the heart of Smart MaaS

O

This does not stop at the service providers: every resident of the city, every customer of the public transport system, should be able to express concerns, problems or merely suggestions for improvement.

Using the same kind of semantic representation to store their valuable feedback data, this user feedback contributes to the overall knowledge of the city, just as much as the data provided by the services connected to the Smart MaaS platform.

Be it by finding the best intermodal connection to the desired destination, booking tickets for all kinds of public transport providers or receiving suggestions for the optimal route on the current mode of transport, our semantic linked data representations not only connect the city, but also the people in it.

Browse our published technologies and plan your next bus trip by visiting our Smart MaaS project <u>page</u>.

\*Researchers at the German Research Institute for Artificial Intelligence (DFKI), Daniel and Torsten Spieldenner work on the latest developments in the field of linked data and the semantic web. With Smart MaaS, the expertise in this field was applied successfully to the domain of smart mobility.





### **Digital Solutions for Handicaped Parking Spaces**

regio iT enables a transferable solution for managing handicapped parking, based on NGSI and FIWARE tech and standards.

By Sascha Weidenhaupt,\* Project Manager/Consultant, regio iT

Designated parking spaces - for people with restricted body mobility - for short parking are frequently abused by non-permitted people, as they are well located at the entrance of public sites. Moreover, existing solutions only apply for specific areas or municipalities. Disabled people traveling between municipalities would need several different solutions when looking for available parking slots.

The standardized NGSI data model of this approach is agnostic to sensor types (data acquisition) and user applications such as apps and thus, enables municipalities to integrate data from existing IoT infrastructures and utilize the data in their existing solutions or even introduce the app described below.

Since existing solutions only comprise a single factor (e.g. a ground mounted parking lot sensor), <u>regio iT</u> added a second sensor in this approach, which checks the permission of a parked car and consequently helps municipalities to improve ad hoc actions and enables long-term analysis to gain deeper insights in local parking



regio iT Parking Space Monitor. Image provided courtesy of regio iT.



Digital solutions for handicaped parking spaces. Image provided courtesy of regio iT.

behavior and demands. As such solutions should be independent from Data suppliers and technology like LoRaWAN, Sigfox or NB IoT, regio iT utilized the NGSI v2 data format as a standardization layer, to represent the parking lot availability information with the corresponding permission information in a harmonized way.

#### When data generates added value

This leverages a vast amount of possibilities as this data model is independent from source systems and target applications. To gain value from the data, regio iT developed a mobile app primarily to target groups. The app is used to inform disabled people where to find available parking slots and handicapped accessibility of corresponding sites.

With a slightly different configuration, this app is also used by local authorities to improve their actions against parking without permission. This solution can be integrated into any existing smart city platform utilizing the NGSI data standardization and it is thus, highly scalable.

To learn more about smart city solutions from regio iT, visit the <u>website</u>.

\*Sascha Weidenhaupt is a state-certified Mechanical Engineering Technician and he is also an Energy Specialist. In his 24 years of professional experience, 11 years were dedicated to consulting in the field of digitisation. Currently, Sascha is the Project Manager of numerous projects in research and development, as well as funding projects.





#### Smart MaaS World

Communication in a complex setting such as smart cities.

By Olaf-Gerd Gemein,\* Business Architect and Co-founder, Smart Cities Lab

Thanks to a grant awarded by the Federal Ministry for Economic Affairs and Energy (BMWi), we were presented with the unique opportunity of showing what a smart city looks like, from a mobility standpoint using a digitized and modular combination of over 250.000 LEGO bricks.

The initial idea dates back to 2013 when a colleague in Brussels described the analogy between the software components of a "Middleware Components Stack" and the building blocks at LEGO in the context of FIWARE.

Then in 2018, an opportunity arose to build a simulator as part of the <u>Smart MaaS project</u> to experience the project results from a practical angle that includes the complex interrelationships present within a city, its mobility needs, and how best to communicate the benefits of a "middleware".

The result is the <u>Smart World by FIWARE</u>, which now serves as a <u>model</u> for cities worldwide.

One could argue that those who believe in standards - when designing and building - make more effective and faster progress. This applies to software implementations as well as to "physical models" of reality. <u>FIWARE's technology framework</u> uses uniform communication standards - commonly known as NGSI-LD API - for this purpose, in the same way that LEGO has a standard size, position

and location of the building blocks and studs. Just like LEGO blocks, FIWARE allows you to assemble a complex product from a set of building blocks in a modular fashion.

#### The model in a nutshell

A physical image of a city project on a scale of approximately 1:100 allows visitors to really get a feel for context, in a completely different way than one would consume texts or pictures in brochures.

Divided into sectors - each with equally sized square scenarios that relate to each other and tell a story - the model showcases how FIWARE is powering up smart cities with connected mobility, highlighting various domains and their interactions, in an everyday life scenario.

Neighborhoods, functional spaces and projects allow a new grouping and can be adapted in an agile way. A joint collaboration between the Smart MaaS project consortium partners, the standard square assemblies are built by interdisciplinary teams at different locations in Europe and then assembled, based on technical interoperability, up to the state size of 12 modules/scenarios.

The Smart World by FIWARE is an "in-between world" - digital on one side, real on the other. This allows the user and viewer to recreate the concepts represented because the 'LEGO' world is perceived as quasi-real. Through



The Smart World by FIWARE on display at the Smart City Expo World Congress in Barcelona, Spain. Image provided courtesy of FIWARE Foundation.

augmented reality and live dashboards, we have increased this perception. In the conception phase, the team already built and prominently integrated an important building for every respective trade fair location.

#### What we have learned

The model was launched in just four months and first shown at the IoT Week in Aarhus (Denmark) in June 2019. Throughout 2019 and early 2020, the Smart World by FIWARE stood out in international smart mobility trade fairs and has so far captivated more than 20,000 people. The model has been repeatedly improved and adapted, which proves its high flexibility.

In spite of the fact that the Smart MaaS project ends in March 2021, the model lives on as it has developed a life of its own. To check where you can see the model next, contact <u>FIWARE Foundation</u>.

<sup>\*</sup>Co-founder at Smart Cities Lab, Olaf-Gerd is also the Smart MaaS initiator. He has been working on smart city projects for a decade on a global scale, supporting many cities, NGOs and 100+ entrepreneurs. Currently, he is focused on the GAIA-X implementation. Contact Olaf on <u>oggemein@googlemail.com</u>.



## About the Smart MaaS project

The goal of <u>Smart MaaS</u> is to build an open source, standardised mobility service platform and reference architecture that promotes the creation of new innovative mobility services. This trusted marketplace has empowered interoperability between different modes of transport. As part of the project, new mobility services were designed and tried.

The Smart MaaS platform uses the domain-neutral <u>FIWARE infrastructures and technologies</u> developed as a service-oriented generic service platform under EU funding programs. FIWARE is increasingly seen as the international standard for open source middleware for IoT and smart city applications. The Smart MaaS project is part of the technology program "Smart Service Welt II", which is funded by the Federal Ministry for Economic Affairs and Energy (BMWi).

## **PROJECT PARTNERS**



Editing: Val De Oliveira (FIWARE Foundation) Design: Phuong-Quy Le (FIWARE Foundation)



**Click here** to subscribe to our newsletter!



**Apply here** to be featured in the FIWARE Marketplace