ELISE action
Webinar Series

Improving the use of location intelligence in Smart Spaces

Return on experience from 3 Smart Cities on valuing and analysing the implementation of location intelligence using the Smart Space Benchmarking Framework

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European Location Interoperability Solutions for e-Government

Enabling Digital Government through Geospatial and Location Intelligence

ISA²

What is ELISE?

A BIT OF HISTORY...

2004
IDABC: Interoperable Delivery of European eGovernment Services

2010
ISA: Interoperability solutions for public administrations

- **Actions:**
  - EULF
  - ARE3NA

2016
ISA²: Interoperability Solutions for European Public Administrations, Businesses and Citizens

- ELISE

2021
DIGITAL: Digital Europe Programme

ELISE builds upon the outcomes of the former ISA actions EULF and ARE3NA. It is the only action of the ISA² Programme, aiming to improve Digital Government through Location Interoperability.

WHAT?

ELISE stands for **E**uropean **L**ocation **I**nteroperability **S**olutions for e-Government. It is one of the more than 50 actions in the European Interoperability Programme ISA2

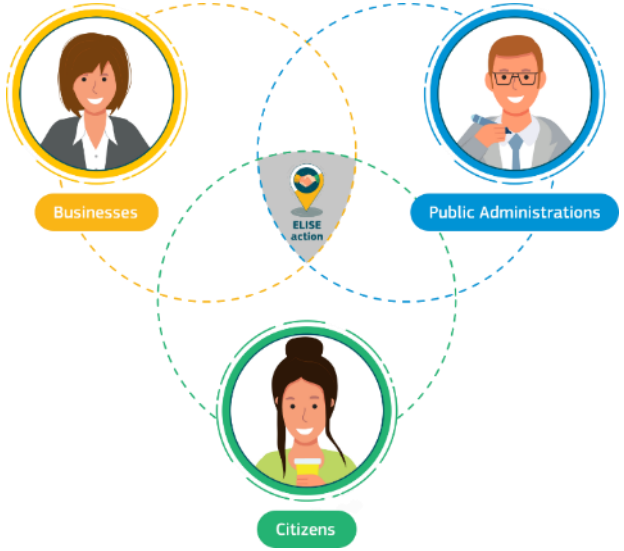
WHAT FOR?

To support Digital Government Transformation by making the best use of location data and technologies in an interoperable manner

FOR WHOM?

For all: citizens, businesses and public administrations

Location-enabled Digital Government Transformation



ELISE action objectives

ELISE action

Policy support

Supporting different policy initiatives at European and national levels

Emerging trends and technologies

Discovering how emerging trends and technologies enable more effective use of location data for policy and digital public services

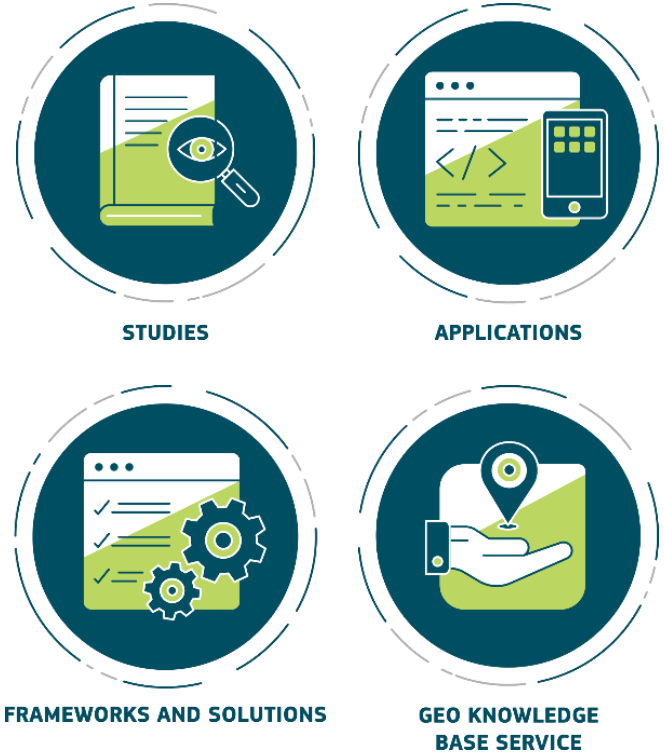
Interoperable frameworks and solutions

Providing reusable interoperable cross-border and cross-sector frameworks and solutions for public administrations, business and citizens

Building a Knowledge base

Building a Geo-Knowledge base to inform and train stakeholders and promote the adoption of good practices and innovations in location data

ELISE outputs and topics



- Evolution of Spatial Data Infrastructures
- Support of data ecosystems
- Technologies for location -enabled innovation
- Collaboration models
- Spatial skills for Digital Government Transformation
- Location data privacy
- Improving access to spatial datasets
- Supporting cross-border and cross-sector data sharing
- Location intelligence for policy and digital public services
- Supporting innovation, growth and Return of Investment
- Managing data quality
- Supporting the creation of common EU public services

Our speakers

Sven Schade
Digital Governance
Joint Research Centre

Simon Vrečar
Moderator
Joint Research Centre, (consultant)

Bart De Lathouwer
Interoperability for Smart Cities
Rotterdam Digital city

Ricardo Vitorino
Smart Cities R&I Manager
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Data Driven Government
Gartner Consulting

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Process Manager Smart Cities
Rotterdam Digital city

The views expressed are purely those of the authors and may not in any circumstances be regarded as stating an official position of the European Commission.

What we will cover today

1. Introduction to the Smart Space Benchmarking Framework (JRC – 5 min)
2. Case study highlights: The Urban Platform of the city of Guimarães (10 min)
3. Case study highlights: Pametna Mlaka (10 min)
4. Case study highlights: The Digital City of Rotterdam (10 min)
5. Key findings on Improving the use of location intelligence in Smart Spaces (20 min)
6. Reflections from the audience (10 min)

Q&A (10 min)

1

Introduction to Introduction to the Smart Space Benchmarking Framework

Key concepts

- **A Smart Space** can be defined as a combination of physical and digital environments in which people and technology-enabled systems interact in dynamic, inter-connected and intelligent ecosystems [Gartner Research]

- **Location intelligence** is the process of deriving meaningful insight from geospatial data relationships — people, places or things — to solve particular challenges such as demographic or environmental analysis, asset tracking, and traffic planning [Gartner Research]

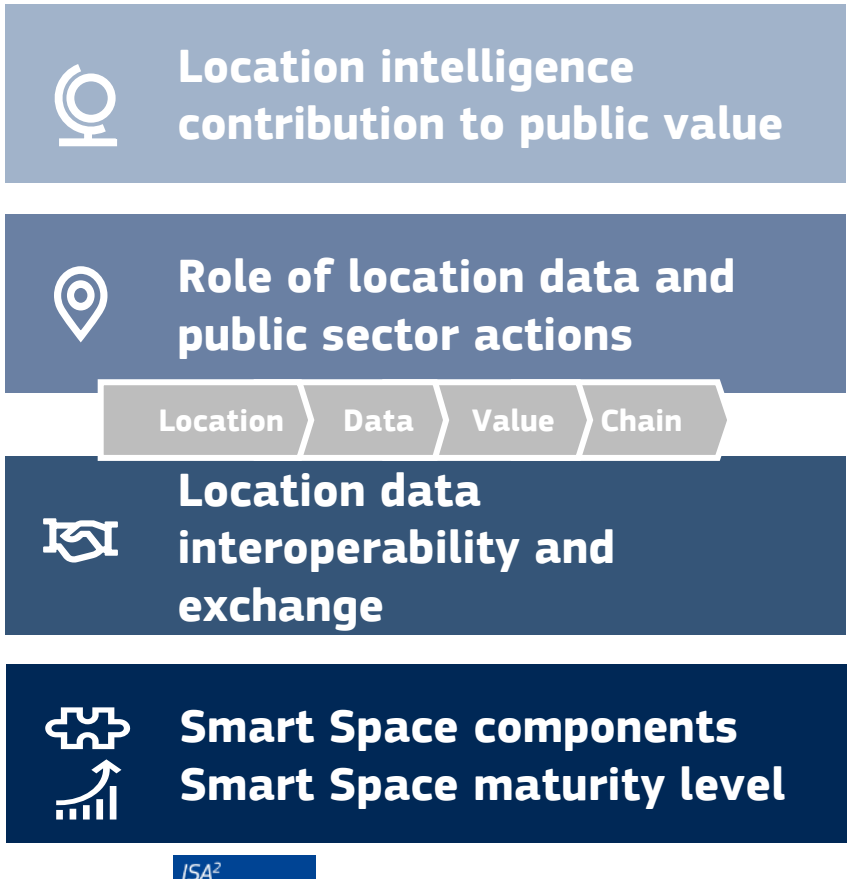
Smart Space Benchmarking Framework
Location intelligence in a Smart Space

Dimension 1
- How does location data provide context?
- How is value generated (e.g.: through use cases)?
- How do we qualify public value?

Dimension 2
- Analysis of the role of location data in the data value chain , the role of the public sector with respect to location data and intelligence, the challenges and enablers of the Smart Spaces and the actions that the public sector can undertake to lower the barriers of a Smart Space

Dimension 3
- In each step of the data value chain, description and analysis of how location data is exchanged in the Smart Space, including the technologies and interoperability initiatives

Dimension 4
- Identification of the components of the Smart Space, and the maturity level of the Smart Space



2

Case study highlights: The Urban Platform of the city of Guimarães

ubiwhere

The Urban Platform of Guimarães.

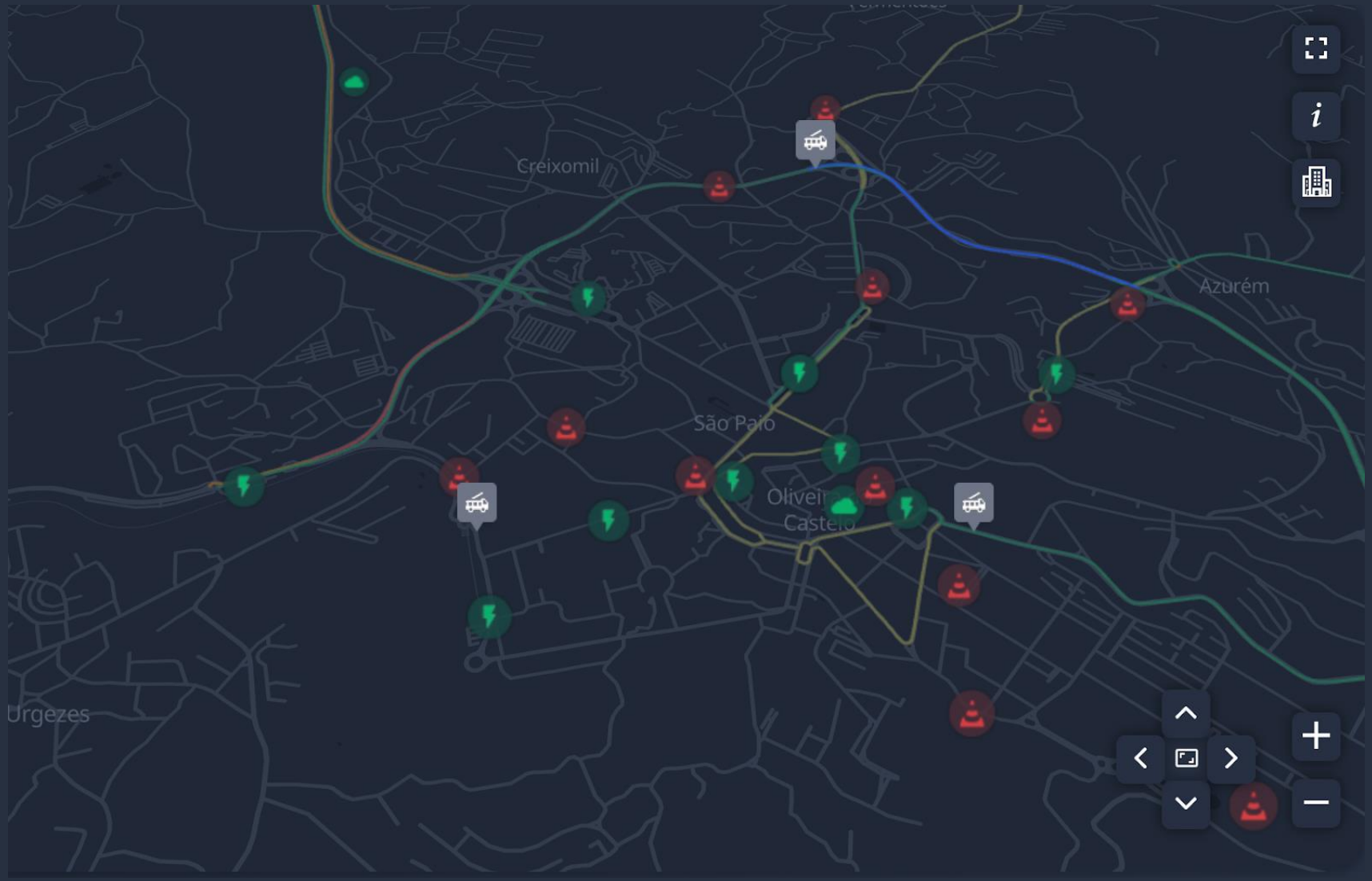
ubiwhere

City dashboard for real-time status

+ information from several domains in a single map (mobility, energy, safety)

+ harmonised data from several sources (sensors, platforms, citizens themselves)

+ capability to make faster decisions based on real-time data analysis



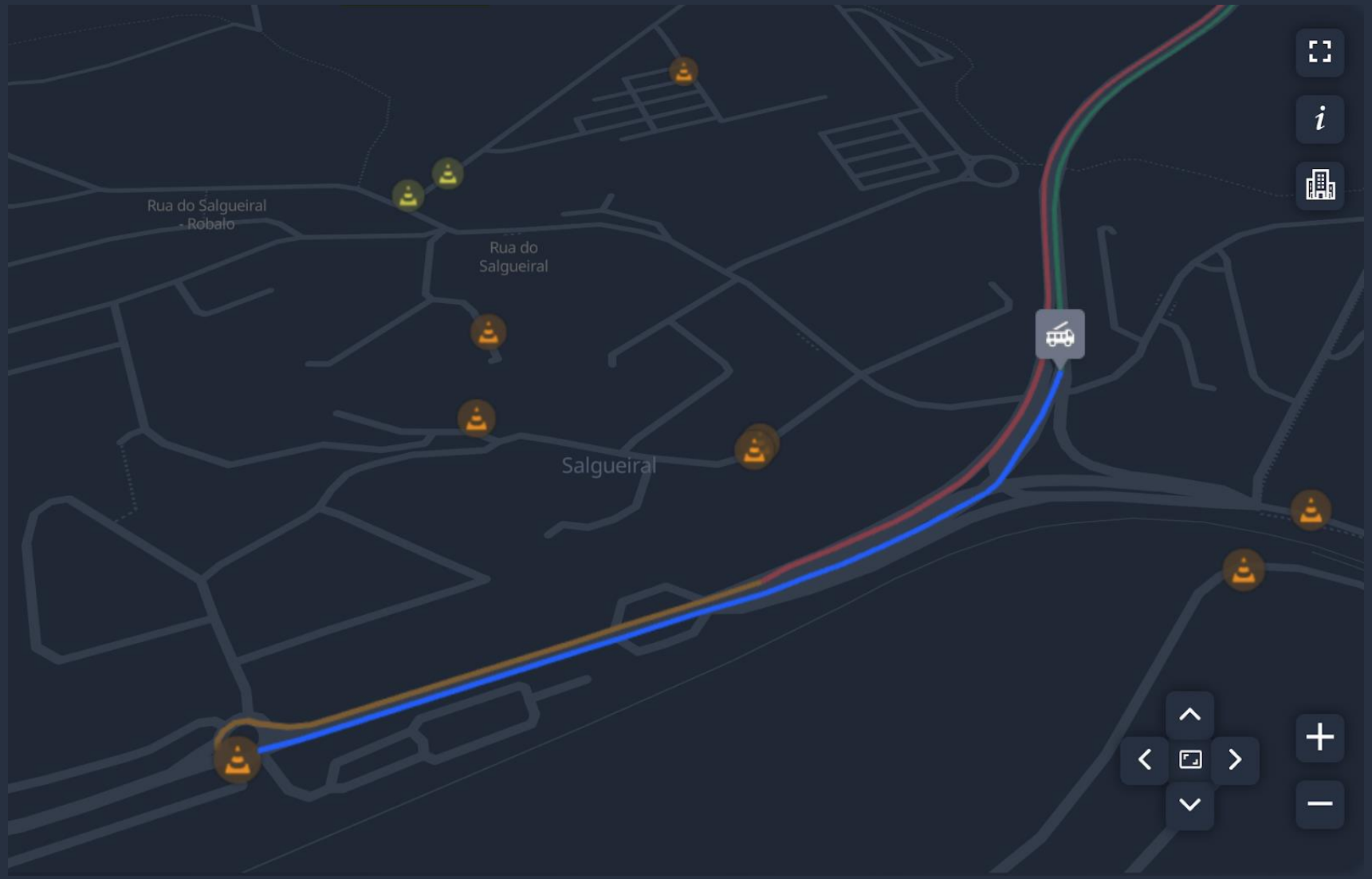
ubiwhere

Real-time vehicle location tracking

+ use case with real-time location information on fleets of vehicles

+ assessment of mobility performance and correlation with incidents

+ improved operational efficiency for first responders and public authorities



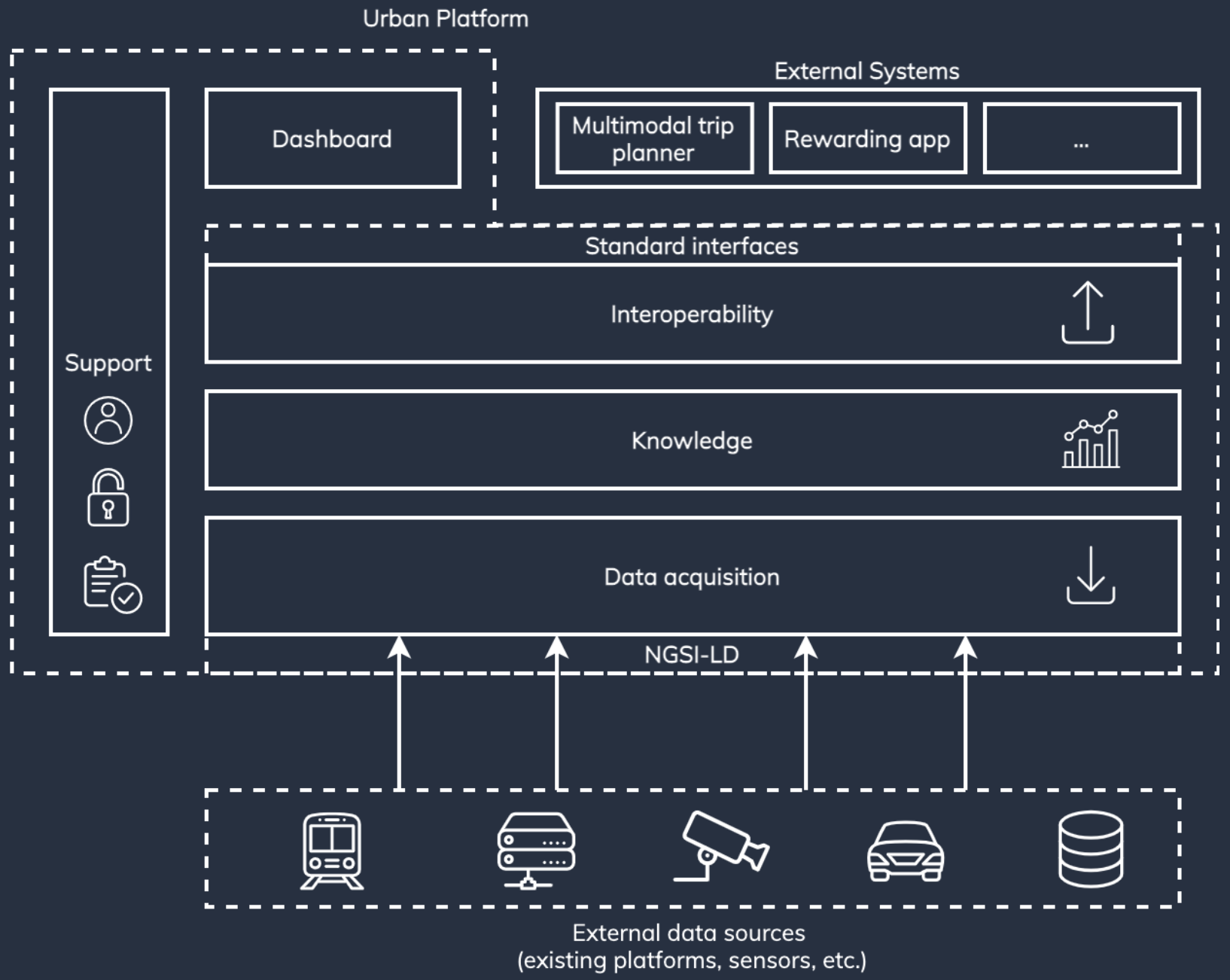
ubiwhere

Location Intelligence

+ association between traffic flow conditions, traffic incidents and road attributes

+ optimal locations when designing transportation routes to optimise service coverage

+ monitor the itineraries performed to optimise the route planner results



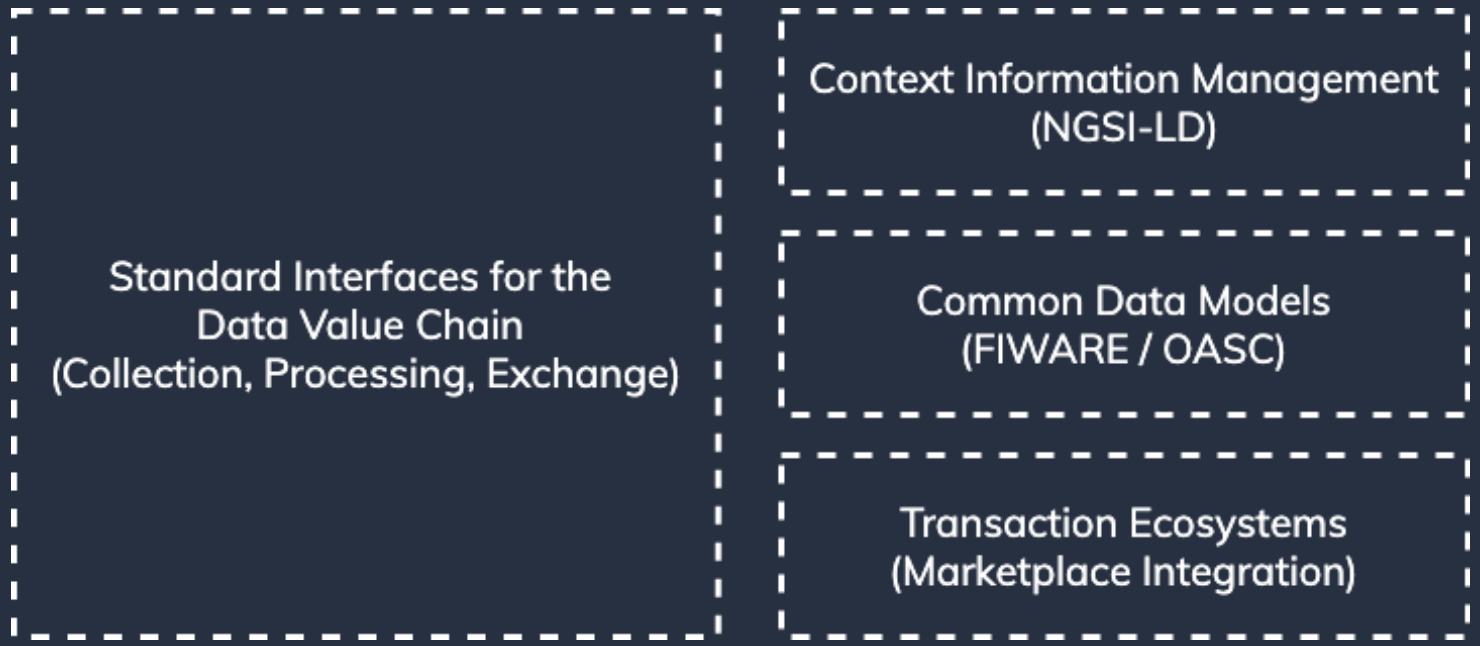
ubiwhere

Location Data Interoperability

+ compliance with OASC Minimal Interoperability Mechanisms (MIMs)

+ multiple standards available for Internet of Things and Event Stream Processing (NGSI / NGSI-LD, oneM2M, MQTT, LwM2M, etc.)

+ missing harmonisation in open data structure across cities and missing standards for Artificial Intelligence



ubiwhere

Guimarães

Contribution to public value

+ economic and financial value, including efficiency

+ administrative value and effectiveness, including innovation and quality

+ citizen value and user attractiveness, including social and environmental sustainability

ubiwhere

Suiting the future of sustainable cities.

3

Case study highlights: Pametna Mlaka

Smart Mlaka

- The City council of Kranj has created a business playground in Mlaka) with a straightforward call to action: “innovative companies, we are here to lower the barriers of innovation and integration for you to develop your smart city concepts and solutions ready for the future”. The result is a “public cloud first” smart city solution, developed in a lean and agile way and in a close relationship between city council and IoT innovation companies.
- The use case of “**Digital twin proof of concept through augmented reality**” allows the user to
  - observe all the data inputs in a 3D model of the city, including how weather and time affect the visual presentations
  - “drag” the timeline into the future.

Dimension 4: Smart Space Maturity Level

Stage	Phase 1 Isolated Systems	Phase 2 Connected Systems	Phase 3 Coordinated Systems	Phase 4 Intelligent Environments
Openness	none	Internal	**External**	Fully
Openness refers to the degree of accessibility to the elements in a smart space, including data. In an open model, systems can interact with each other with data exposed and accessible through standardised mechanisms.				
Connectedness	none	Yes	**Yes**	Yes
Connectedness refers to the depth, breadth and robustness of the connections between the elements in a smart space. Connectedness is closely linked to openness. As the mechanisms to access the attributes, data and functions of an application increase, so does the degree of openness. Trends such as IoT, IoT platforms, digital twins, edge computing, APIs and API gateways, and mesh app and service architecture all contribute to greater connectedness in a smart space.				
Coordination	none	Integration	**Coordination**	Coordination
Coordination refers to the depth and strength of coordination between the elements in a smart space. Coordination is a more active aspect of smart spaces that builds on connectedness. While connectedness looks at the opportunity to connect various elements, coordination looks at the actual level of interaction and cooperation between the elements. For example, two applications operating in a smart space that shared login credentials would have a very low coordination score. However, if they also shared data and had tightly integrated process execution, they would have a much higher coordination score. Trends such as MASA, APIs and events also factor into coordination.				
Intelligence	none	**none**	Semi-intelligent	**Intelligent**
Intelligence refers to the use of machine learning and other AI techniques to drive automation into the smart space and deliver services to augment the activities of people within it. Intelligence can manifest itself in the form of autonomous things or augmented intelligence, including augmented analytics. An important aspect is the use of AI to deliver intelligent multimodal and multidevice immersive experiences to enhance how users perceive and interact with the various elements in the smart space.				
Scope	Team	Department	One organisation	**Ecosystem**
Scope refers to the breadth of a smart space and its participants. A smart space with a very narrow scope might focus on a single team within a department of a large organization. A smart space with a broader scope might focus more across the organization but within a bounded problem space. A smart space with an even broader scope might include elements external to the organization with an ecosystem of participants. Openness, connectedness and coordination set the stage for increasing the scope of a smart space. Intelligence promotes simplified access and automated management as the scope of a smart space increases.				

Dimension 4:Components

Smart Space Component Category	Component description
Data Sources	
Static data	
Dynamic data	Raw measurements
Location data	IOT Sensors External IoT Platform that connect to IoT sensors (ex: data from electricity is gathered from the Electricity provider)
Data capturing devices	A variety of sensor (electricity, water, gas, traffic, environment…) OpenWeatherAPI
Cloud	
Public	Microsoft Azure
Private	
Analytics	
Location Intelligence	Microsoft Azure Machine Learning The analytical tool is the dashboard The solution is ready for smart services – such as traffic jam detection The solution has implemented air quality degradation measurement in specific areas
Integration and interoperability	
API Gateway	Microsoft Azure API Management
Context Broker	Ready for, not fully implementing NGSI v2
ESB	Microsoft Azure Service Bus (publish/subscribe)
MIMs	
Platforms	
Digital Twin	AWAKE digital twin platform creates a virtual city (Proprietary to 3fs, initially made for medical technology sector, as a HoloLens-based simulation solution)
Formalised Ecosystems	
OASC	
FIWARE	Yes
OGC	

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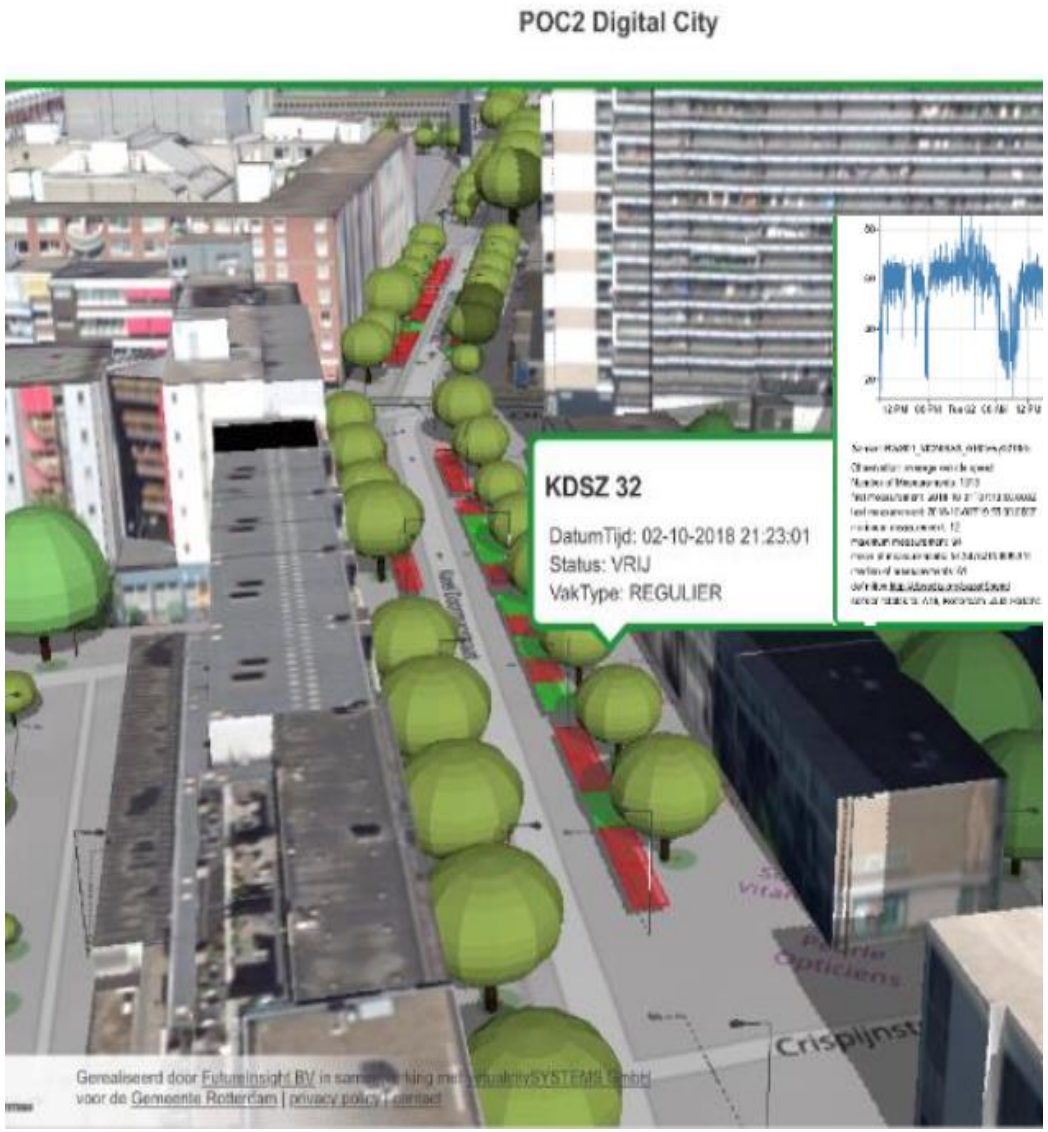
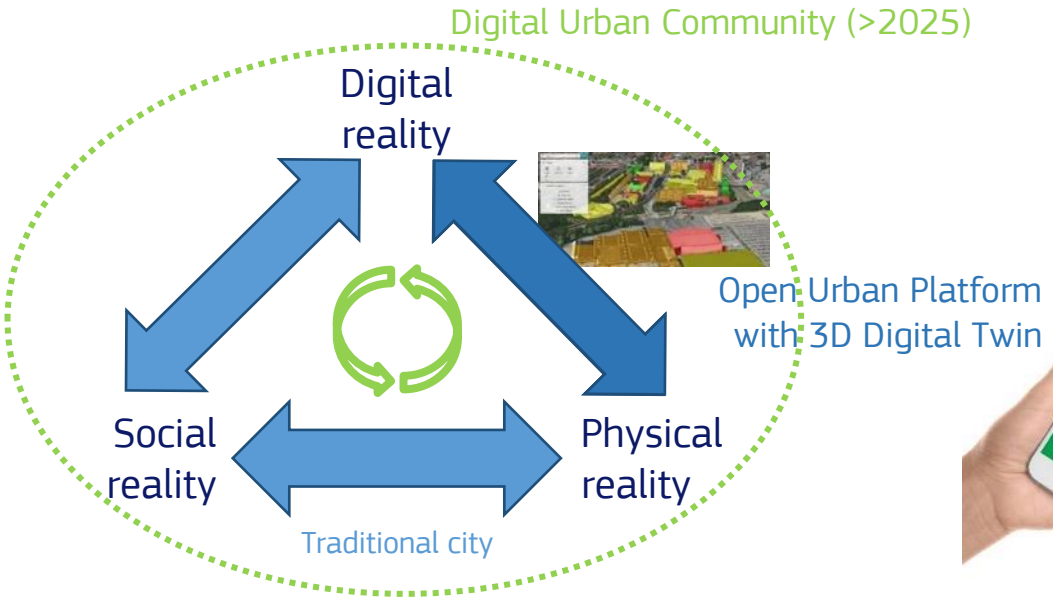
Case study highlights: The Digital City of Rotterdam

Rotterdam Digital City



- The Municipality of Rotterdam is investigating the possibilities for the future city in the Digital City program. The core of this program is the development of a digital Open Urban Platform with a 3D Digital Twin of Rotterdam. Knowledge is now being gained through projects and pilots that can further stimulate these developments. Specific use cases focus on integrating Building Information Models (BIM) with geospatial models, which will provide insight into the interoperability challenges across different types of Smart Spaces.
- The city-scale digital twin model is created using data sourced from a multitude of data-streams, including IoT sensors and geospatial technologies such as LIDAR (LIght Detection And Ranging), Drones, etc. The data collected from these sources were integrated into CAD/BIM software. Artificial intelligence was used to process the data and depict the current reality of the city to improve the urban planning process radically. As a result, the current system supports a rich set of diverse use cases.
    - Spatial planning 3D gaming
    - Integrated environmental permit
    - SAFE 3D physical safety of people near and in buildings
    - 3D building information and augmented reality (AR)

City in transition



Dimension 2: Barriers and public sector actions

Barriers		Enablers	Related public sector actions
Economic	Low demand: Lack of trust in the use cases and technology, value not perceived Ex: Difficulty to get a business case for an infrastructure (easier for applications)	Cost / benefit Analysis and ROI	Public-private partnerships: Digital infrastructure is important for government Spread the cost of infrastructure on projects, problem of transversal investment
Organisational	Lack of data Difficulty in accessing data	Data platforms Availability of sensors for data capture and common data capturing devices for multiple systems Contractual obligation to deliver data	Because of the siloed approach to data ownership, the implementation of a data platform across organisations makes data available. Encourage “single truth” approaches – similar / comparable data points, and synergies in hardware for sensors capturing data Ensure availability of a service to send the data to the municipality automatically.

Barriers		Enablers	Related public sector actions
Legal	Data Privacy issues	Legal compliance	Compliance with GDPR and other regulation Implement a data life cycle management strategy (destroy the data, enforce the right to be forgotten)
	Legal clarity on data rights	Ensure ownership of data by Public sector	Clarify data ownership in contractual aspects
Technical	Interoperability/ Standards	Open, agnostic technologies Consolidation of standards amongst various industries (i.e. energy, building and ICT sector alliances	Encourage/ enforce usage of Minimal Interoperability Mechanisms Open data standards Support standards development
	Lack of skills	Technology skills for implementing and using the Smart Space	Public-private partnerships Outsourcing to university and research institutes Training and Skills Acquisition (need digital nativeness)

5

Key findings on improving the use of location intelligence in Smart Spaces

Five areas where the public sector can act in order to lower the barriers of implementing Smart Spaces

Funding and financing of Smart Spaces

Trusting and valuing the investment

Stimulating availability of (location) data

Ensuring interoperability

Building uptake

The importance of (location) data

- The importance of location data and its contribution to public value through location intelligence will continue to grow. Approximately 80% of the informational needs of a local government policymaker is related to a geographical location.
- Gartner predicts that by 2023, 20% of GIS departments will become the office of the chief data officer due to the growing significance of geospatial data in government.
- Policy makers need to address the quality of data generated – notably by the billions of IoT devices - in order to ensure that these devices can work together in a way to benefit ends users.

The importance of interoperability

- Interoperability policies exist, and their impact was illustrated in the case studies. Interoperability eases integration between systems.
- Gartner expects an increase of integration efforts and expenditure to approximately $36 billion in 2025. Gartner research shows that these investments have enabled organisations to experience business value in four areas:
  - Build competitive advantage, by creatively assembling custom and standard systems,
  - Enable business agility and change, by adding innovation to legacy processes,
  - Provide insights and situation awareness, by identifying critical events in a timely manner,
  - Reduce costs and improve efficiency, by streamlining processes.
- There is an opportunity for innovating in the area of integration, and fFor new systems developed in a strong interoperability setting, integration costs will be lower, meaning that the impact of an interoperability regulation would reach business value.

Current and possible initiatives that can further improve the situation for the lack of data and interoperability

Barrier	Public sector actions, incl. policy	Private sector actions
Lack of data	Champion data sharing policies: EU Data Strategy including the Data Spaces, INSPIRE Directive, Open Data Directive, (upcoming) Data Act, Digital Europe Programme Drive location intelligence initiatives Procure data sets, clarify ownership of data Procure common data capturing devices for multiple systems	Contribute to building EU Data Spaces Promote a culture of data sharing
	Develop Public-Private Partnerships: Common data platforms and market-places such as Copernicus with Data and Information Access Services (DIAS) Promote common initiatives between cities (Living in EU) Consider the billions of IoT devices as a shared infrastructure and ensure the monitoring of their quality and maintenance under common programmes	
Lack of interoperability	Champion interoperability policies: EU Standardisation rolling plan, European Interoperability Framework, Location Interoperability Framework, DEP policies on reuse of existing solutions, including open-source ones Encourage/ enforce usage of open standards including usage of Open API for integration Mature an Interoperability Regulation, supporting MIMs or similar	Innovate integration mechanisms, technology and tools
	Participate in common standardisation activities	

Lessons learned from designing and using the framework

Effectiveness of the Framework to identify public sector actions improving the development of Smart Spaces

Generic applicability of the Framework to any type of Smart Space

Richness of the knowledge collected in case studies and concrete guidance it can provide

Structured analysis approach allowing for comparisons between Smart Spaces

Need for a light version in focused areas (e.g.: interoperability landscape, role of the public sector)

6

Reflections from the audience

Our discussants

Andrea Halmos
Technologies for Smart Communities
European Commission - DG Connect

Michael Mulquin
Minimal Interoperability Mechanisms (MIMs) Ambassador
Open and Agile Smart Cities

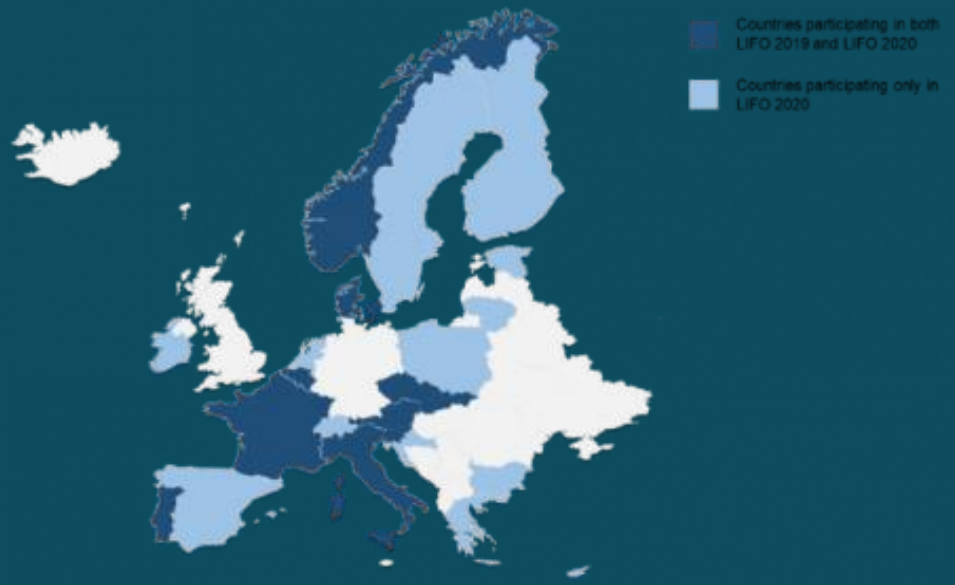
Greta Nasi
Policy Analysis and Public Management
Bocconi University

Marco Minghini
Open Source and architectures for data interoperability
European Commission - Joint Research Centre

Q&A

Next ELISE Webinar

- 20/01/2022 at 14:00 CET
  - Location Interoperability State of Play – Results of a Europewide Maturity Assessment
  - https://joinup.ec.europa.eu/node/704859



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