# Emerging Technologies and Interoperability: OASC & the MIMs

OPEN & AGILE SMART CITIES & COMMUNITIES


oascities.org

Open and Agile Smart Cities

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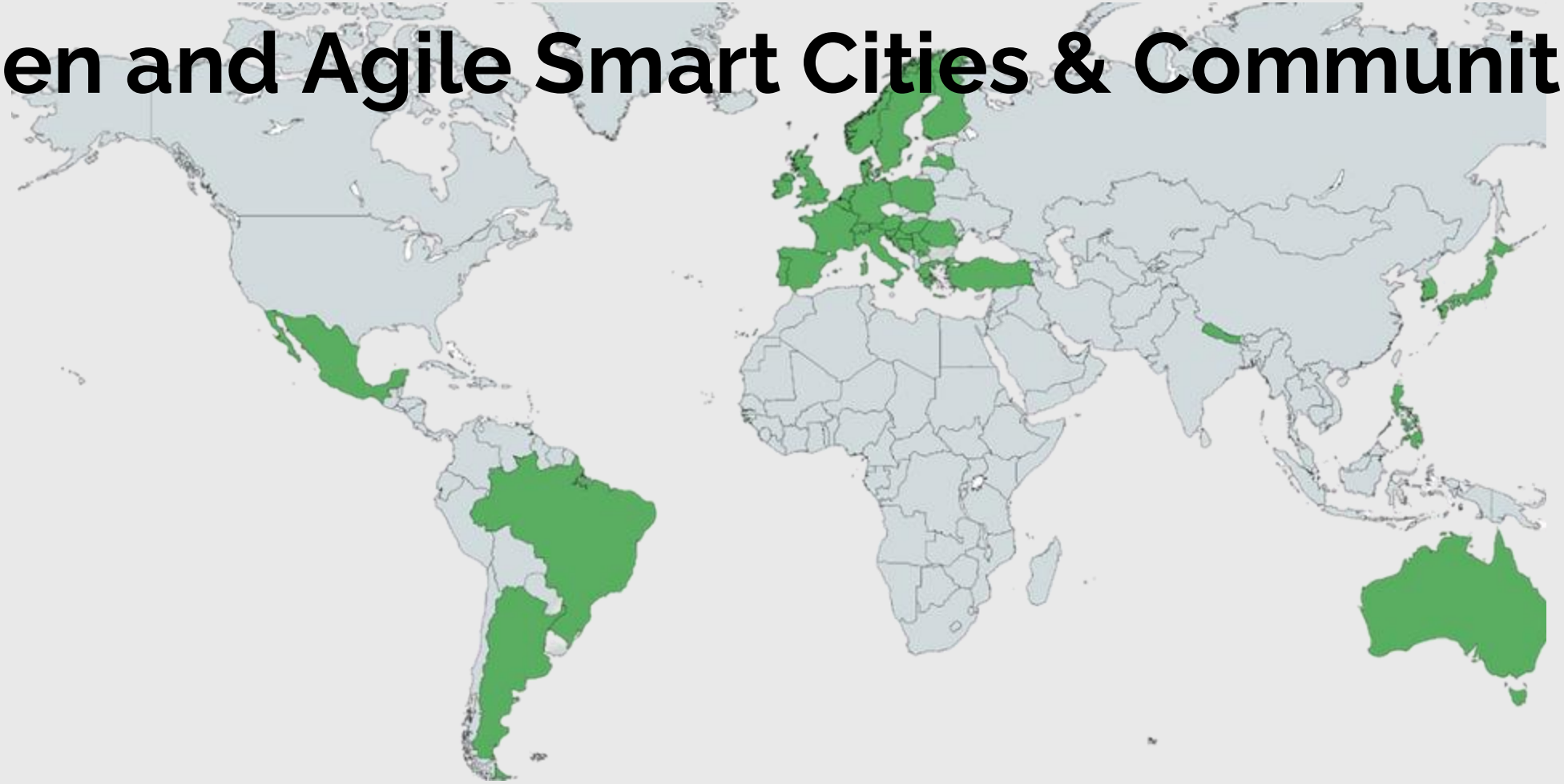
Valencia, 3 November 2025


Karl-Filip Coenegrachts

# Open and Agile Smart Cities & Communities



**193 cities and communities in 43 countries around the world**

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# Our mission & vision:

We are a **global network of communities** that supports local and regional administrations of all sizes and digital maturity levels in their **digital transformation journey**.

We work with our members, partners and independent experts to create **sustainable impact** for our communities via their digital tools and systems.

We focus on **interoperability** (technical, semantic, organisational and legal).

This facilitates **seamless sharing and re-use** of digital, data-driven solutions and helps to avoid vendor lock-in, to reduce costs and resources, improve efficiency and the ability to use technology to solve local and global societal challenges.

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# OASC Council of Cities:

The Council of Cities represents the member cities and communities of OASC and is one of the governing bodies of the network. It is headed by the Council of Cities Coordinator who is elected every two years.

**Bo Fristed**
**Coordinator, City of Aarhus, Denmark**

**Anni Joela**
**Deputy Coordinator, City of Tampere, Finland**

# OASC Technology Council:

The purpose of the OASC Technology Council (TC) is threefold:

1. To oversee the overall roadmap of the Minimal Interoperability Mechanisms.
2. To support the technical development of existing MIMs and explores the technical possibilities for proposed MIMs.
3 To provide the OASC network and its members with impartial technical advice and guidance on relevant technologies and standards that underpin the MIMs.

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# Strategic and Enterprise partners

NEC

## Collaborating with

KEREVAL

FUTURE INSIGHT

libelium

askem

beyond civic

iLabs
a trustworthy internet of everything

OASC
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AIOTI
Alliance for Internet of Things Innovation

CERTH
CENTRE FOR RESEARCH & TECHNOLOGY HELLAS

BDV
BIG DATA VALUE ASSOCIATION

European Network of Living Labs

EURO CITIES

UNIVERSITY OF TWENTE.

E.O.E.Σ. ΑΜΦΙΚΤΥΟΝΙΑ
E.G.T.C. AMPHICTYONY
G.E.C.T. AMFIZIONIA
G.E.C.T. AMPHICTYONIE

FEMP

FIWARE

Foundation for Public Code

G20 Global Smart Cities Alliance

WORLD ECONOMIC FORUM

ICT4D
CENTRE FOR INFORMATION AND COMMUNICATION TECHNOLOGY FOR DEVELOPMENT

THE METAVERSE INSTITUTE

ICMC USP
SÃO CARLOS

MaaS
ALLIANCE

MyData

URBAN INNOVATORS GLOBAL

Smart City Association

SMARTCITY
EXPO WORLD CONGRESS

Smart City Institute Japan

standICT.eu2026

anciLAB
SOCIETÀ BENEFIT

tmforum

IEEE Smart Cities

ITU

CENTRO TECNOLÓGICO
ESPECIALIZADO EN TIC

POLITECNICO
MILANO 1863

ARSC
ASOCIAȚIA ROMÂNĂ SMART CITY

Fira Barcelona

# SynchroniCity (2017-2019)

The SyncroniCity project was a European Large-Scale Pilot for smart cities & communities. The project developed and validated a technical framework based on the OASC Minimal Interoperability Mechanisms.
Thereby, SynchroniCity laid the foundations for a digital single market for IoT- and AI-enabled services.

SYNCHRONICITY-IOT.EU
TECHNOLOGY & LIFE

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# Digital Urban Twins (2019-2022)


DUET Digital Twins provide virtual city replicas which make it easy to understand the complex interrelation between traffic, air quality, noise and other urban factors. Powerful analytics model the expected impacts of potential change to help you make better evidence-based operational decisions and longer term policy choices.

DUET (Digital Urban European Twins) was a European innovation initiative which leverages the advanced capabilities of cloud, sensor data and analytics in the form of Digital Twins, and provided the technical and governance frameworks, and a maturity model for EU Local Digital Twins.

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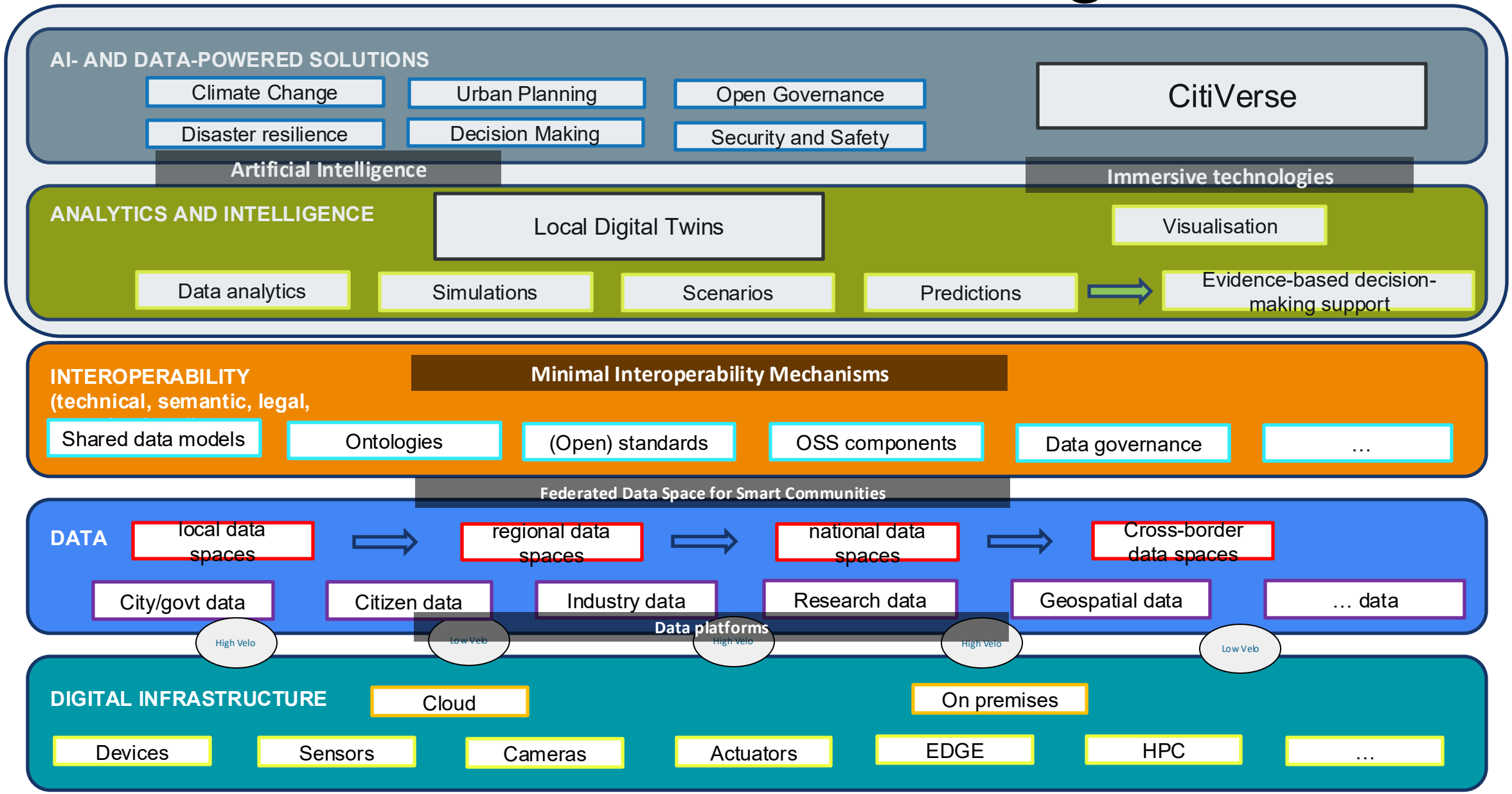
# Smart Communities working model








New European Bauhaus

2021 2022 2023 2024 2025 2026

LIVING-IN.EU

OASC MIMs
**Go Li.eu**
Living-in.EU MIMs Plus

**#1 LDT Toolbox**
Tech Specs

**#2 LDT Advancing Initial Stages**
Support services: SCN, procurement helpdesk and templates, MIMs Plus compliance testing and certification

EU LDT TOOLBOX

**#3 EU LDT Toolbox**
Development of the Toolbox

LDT CitiVERSE EDIC

LDT CitiVERSE **EDIC**

European data space for smart communities

**DS4SSCC** – Data Space for Smart Communities blueprint

**DS4SSCC DEP** – Data Space for Smart Communities Deployment, validation

**LDT4SSC**
EU LDT Ecosystem
Common Interoperability Blueprint


**Developing CitiVERSE**: x-CITE, SENSE, 3DxVERSE, CU-project

SENSE 3DxVERSE x-cite European Citiverses Uniting for Inclusiveness

**AI**
EU Artificial Intelligence

CitCom.ai

**CitCom.ai**
AI Testing & Experimentation Facility for SCC

DeployAI

AI




**EU Interoperability Framework**
EIF4SSC

ITB
Interoperability Test Bed

interoperable europe


European data space
for smart communities

# DS4SSCC & DS4SSCC-DEP

Digital Twin as a Common Good (DT a CoGo)


The aim of the European Data Space for Smart Communities and its Call for Pilots, is to validate in practice an EU-wide cross-sectorial data space, and to advance its development and implementation to support policy priorities of cities and communities within the European Union, including the green-digital transformation based on secure and sovereign data infrastructure.

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# EU Local Digital Twins (LDTs) Toolbox tenders

3 tenders:

1. Procurement of the Technical Specifications for the Local Digital Twins (LDTs) Toolbox (2023)

2. Advancing initial stages for the transformation of smart communities (2023-2025)
   Lot 1: Increase the awareness and readiness of EU communities
   Lot 2: Scale the Deployment of an Enabling Digital Infrastructure

3. Development of the Local Digital Twins (LDT) toolbox for Advancing the transformation of Smart Communities (2024-2026)

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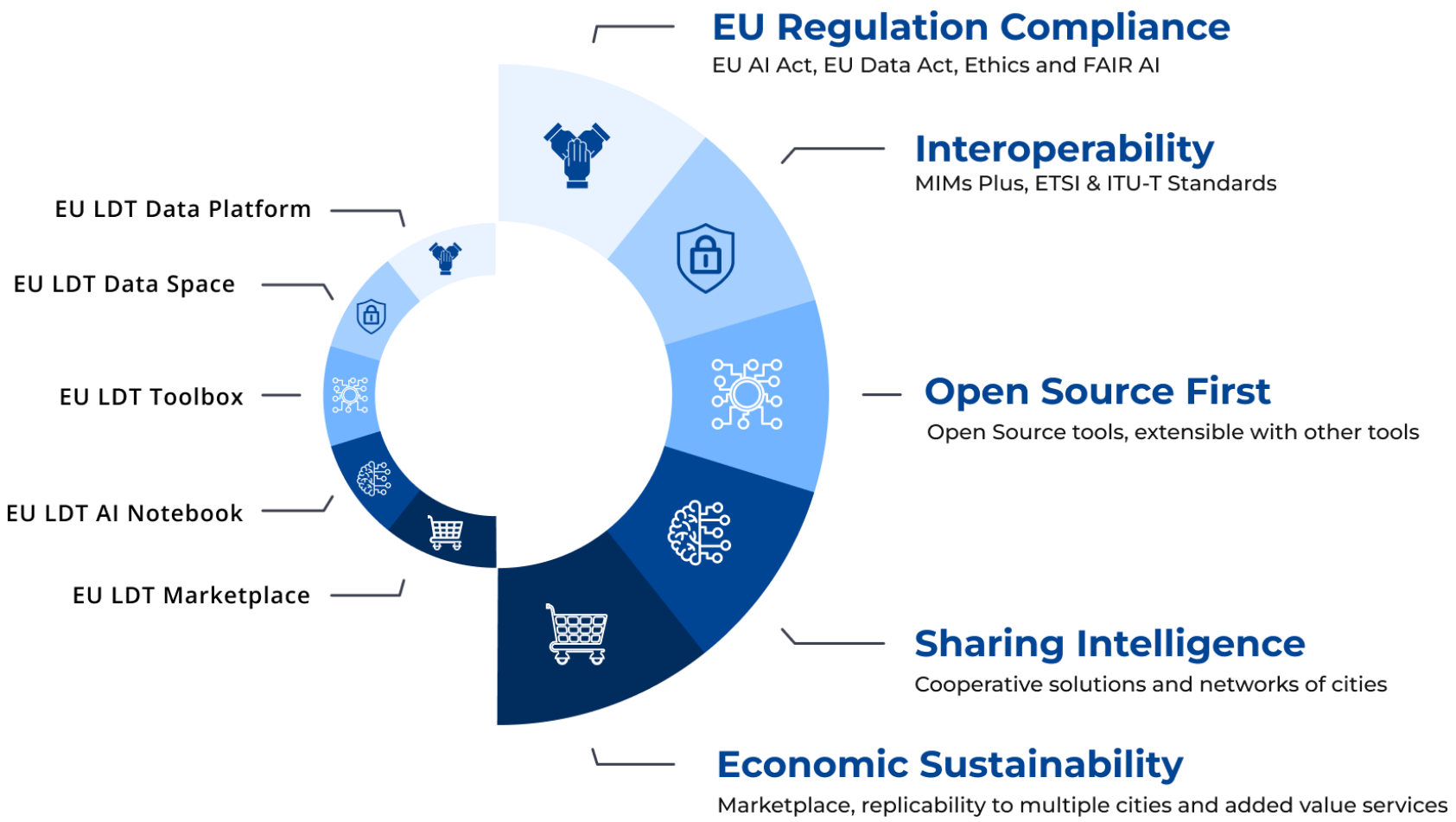
# Why the EU LDT Toolbox




- **Digital Single Market** solution for Cities
- **EU Green Deal** support for impact and ROI analysis
- Common **EU Standards** and frameworks to address emerging **EU AI and EU Data Acts**
- **Digital Europe:**
  - Marketplace
  - Interoperability
  - Sandboxes (TEF)
  - Data Spaces (SIMPL)
  - Ethical AI best practices
- **European Digital Infrastructure Consortium (EDIC)** maintenance, valorisation and economic sustainability

# Developing CitiVerse

The projects define what the ‘CitiVerse’ means for Europe building on the smart communities’ data.
The objective is to bring EU CitiVerse industry, including SMEs, together in developing the different layers of VR/AR worlds useful for local authorities and citizens. The projects will take into account potential EDIC in the field.
The action could build on existing local digital twins expanding their capabilities.
The projects will propose a roadmap to expand CitiVerse solutions in Europe using Minimal Interoperability Mechanisms (MIM)-compliant standards and EU technology solutions and make recommendations for interoperable and open CitiVerse platforms in line with EU values and policy landscape.

LDT4SSC

# Local Digital Twins 4 Smart Sustainable Communities

1. Connecting data platforms and LDTs from cities and communities that already have a LDT in place, to create an EU “federation” of LDTs.
2. Developing open-source pilots of LDT services based on shared needs of cities and communities that already have a local data platform and/or an LDT and want to expand them with new real-life use case services.
3. Complementing the EU LDT Toolbox launched under WP2021-22 with additional complex AI-based and innovative services (e.g. for adaptable multi-sector considerations, advanced simulation and modelling approaches including bottom-up selforganised models).

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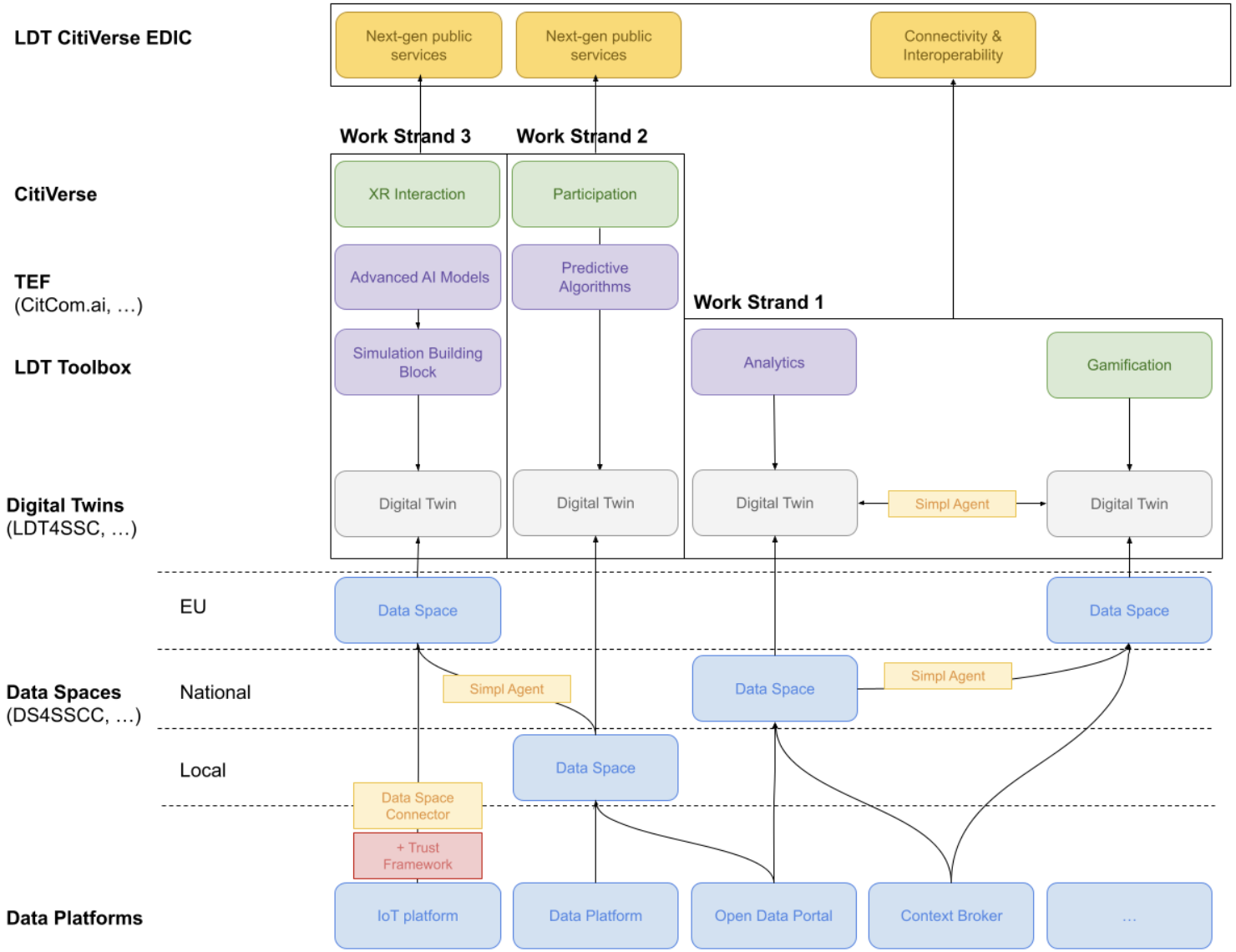
# Part of the Meta-architecture for AI-based LDTs



# Many other Projects contribute

**OASC is active in many projects – together with its members - with the aim of using them to test and develop MIMs, data spaces, LDTs and the Citiverse and other useful tools and resources for cities around the world**

omega-x

Interreg Co-funded by the European Union
North-West Europe
MultiRoofs

exPEDite
Enabling Positive Energy Districts through Digital Twins

BIPED

SPACE 4Cities

URBREATH

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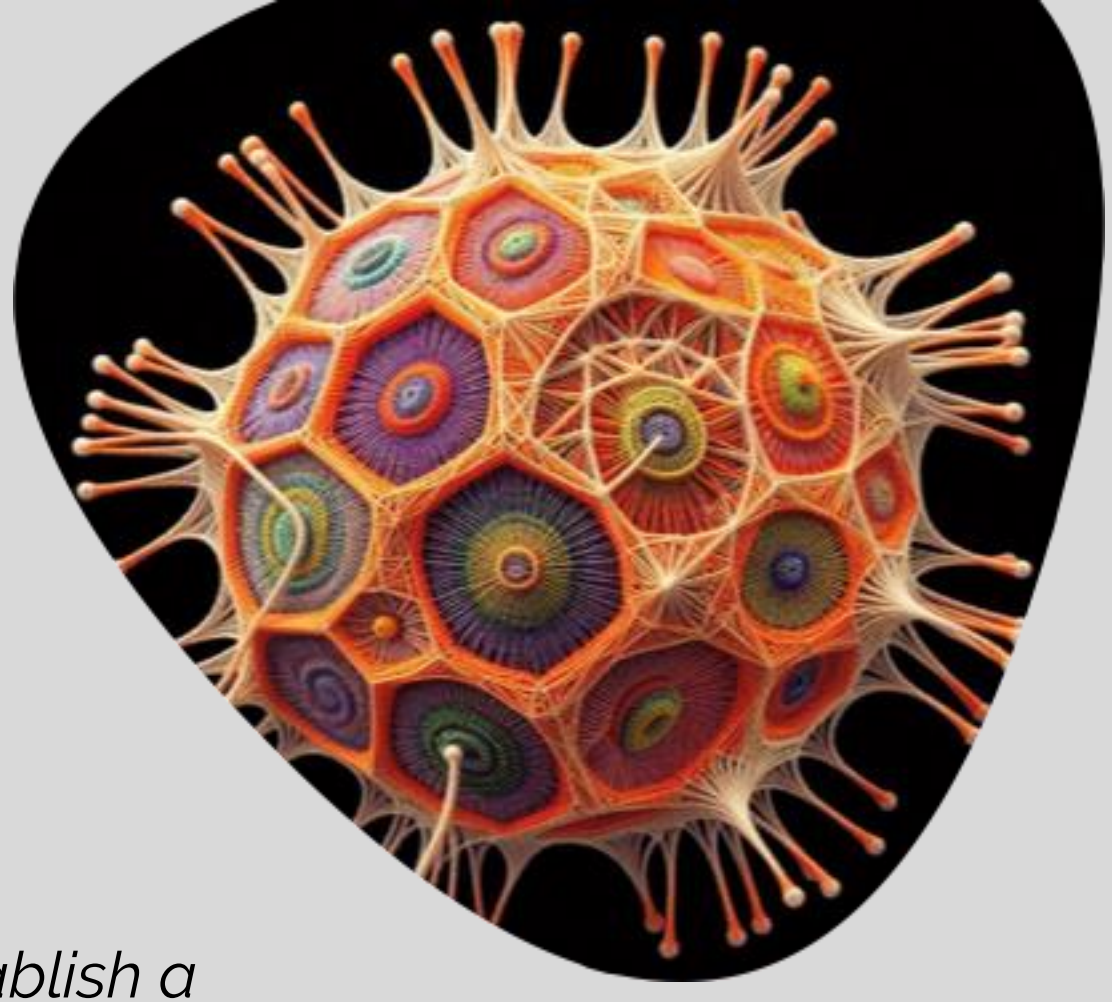
# What is a MIM?



*“MIMs are the mechanisms that allow to establish a minimal yet sufficient interoperability between systems in order to create value”*

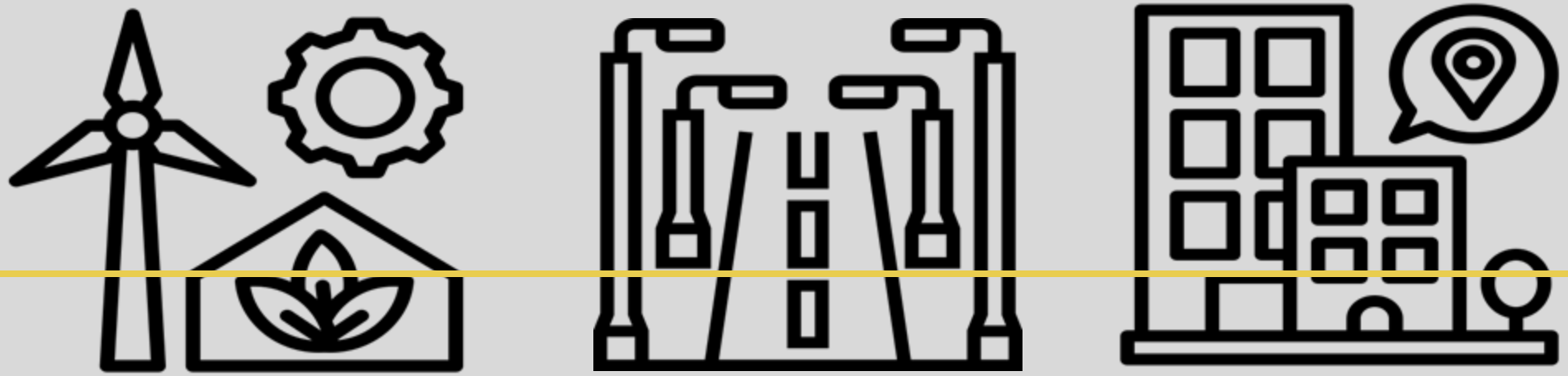
**How MIMs enable collaboration**

Services

Applications

Solutions

From across domains



# ESTABLISHING A MINIMAL LEVEL OF INTEROPERABILITY

## Minimal Interoperability Mechanisms (MIMs)

# Value Proposition

Common list of standards & technical specifications

Key Enablers - Available for all

Common Marketplace

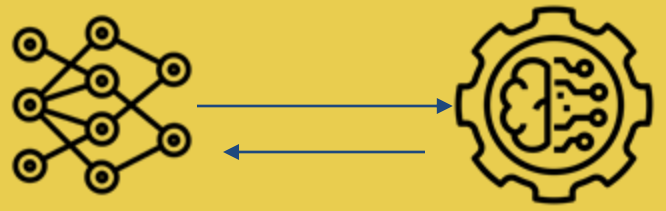
Cities & Communities

Innovation consortia


Businesses

Policy Makers

# How To Use MIMs



You want to procure different technologies while maintaining the same capabilities and data

You work with a mechanism and want to access/exchange with different mechanisms

You want to build and use interoperable solutions

# How do we structure a MIM?

To streamline knowledge exchange we need a common language / format to describe our experiences:

**ITU Y.4505 or “Y.MIM”**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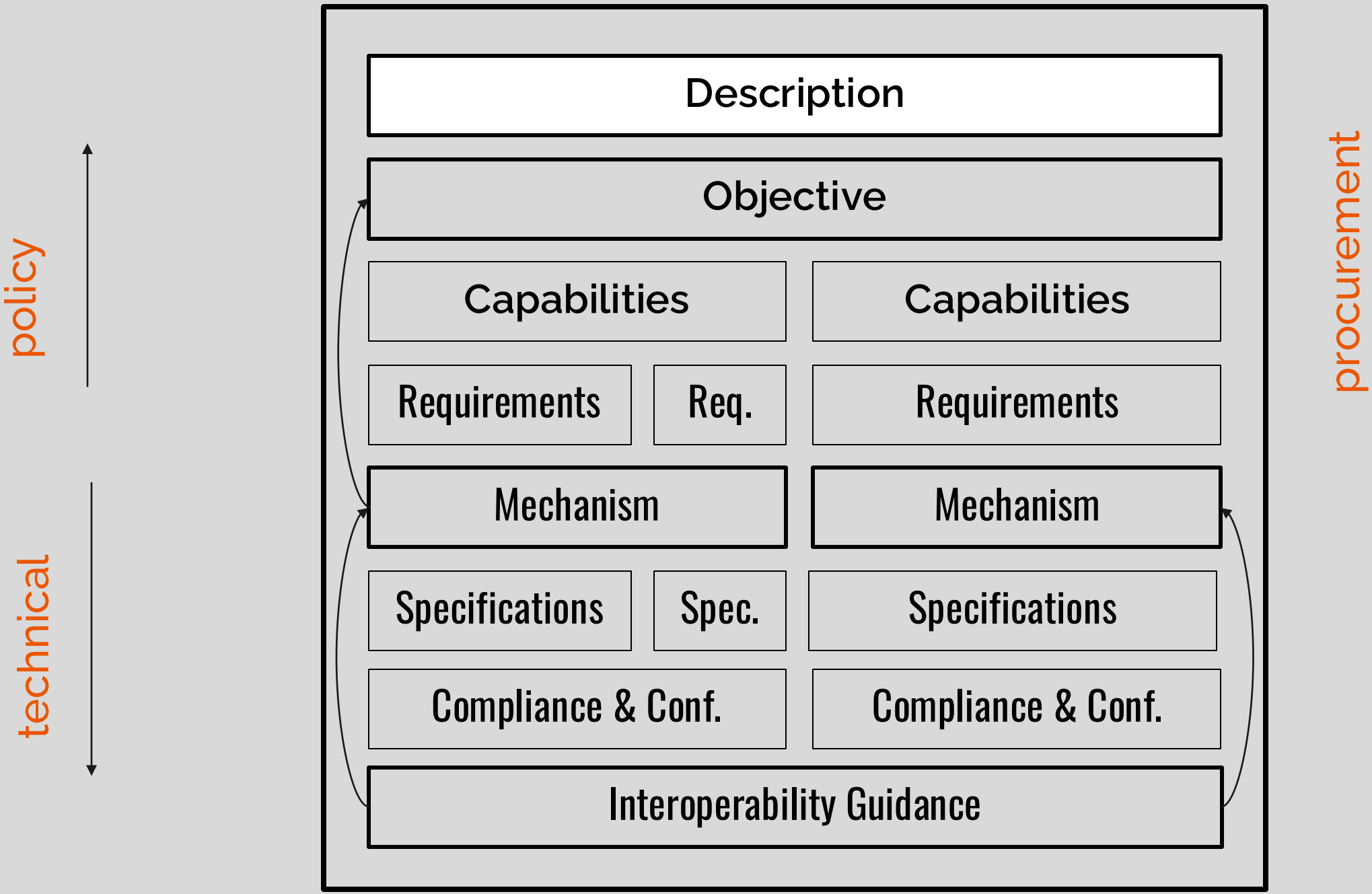
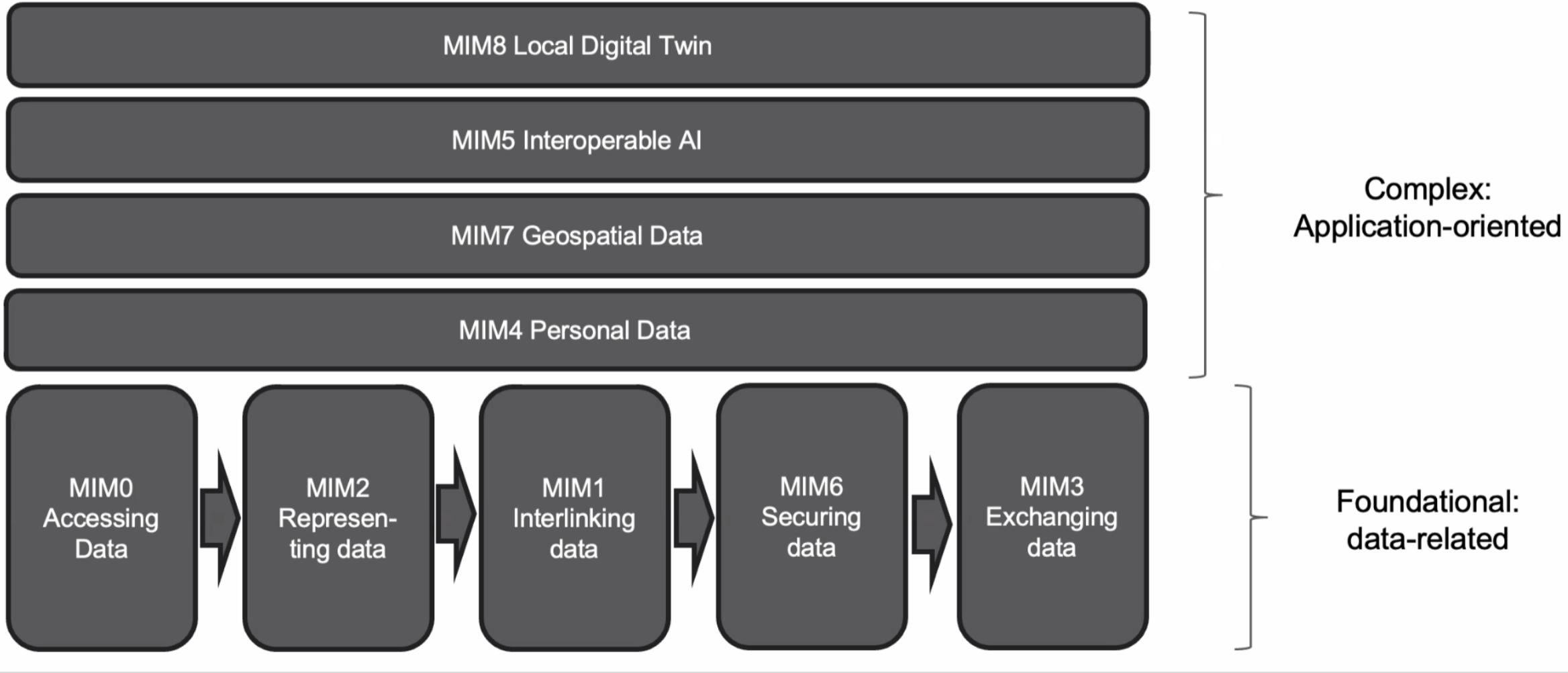
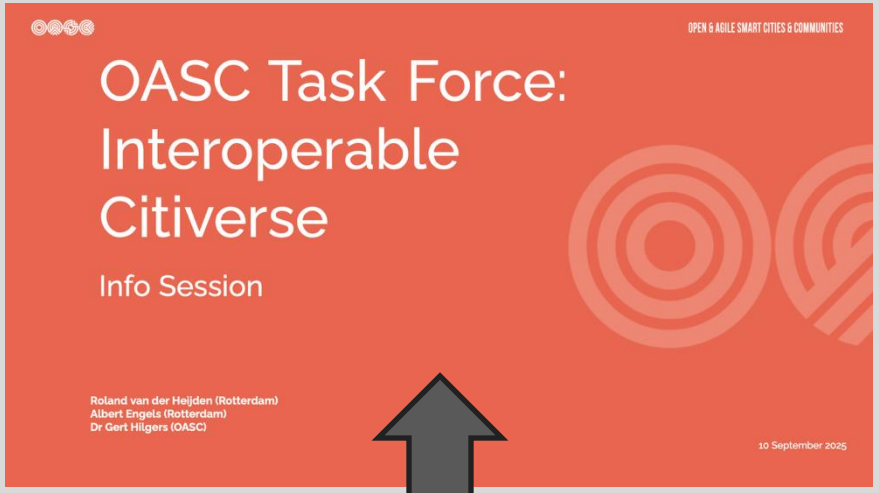

policy
technical
Description
Objective
Capabilities
Capabilities
Requirements
Req.
Requirements
Mechanism
Mechanism
Specifications
Spec.
Specifications
Compliance & Conf.
Compliance & Conf.
Interoperability Guidance
procurement

# MIMs Framework 2025



# Preparing for MIM9: The Interoperable Citiverse

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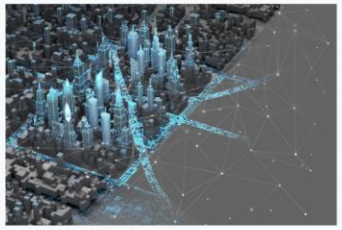
Global Initiative on Virtual Worlds and AI > Pillar 2 – Connecting Cities with the Virtual and Real Worlds

## Pillar 2 – Connecting Cities with the Virtual and Real Worlds



Pillar 2 – Connecting Cities with the Virtual and Real Worlds translates strategic vision into real-world experimentation. It empowers cities to lead the development of AI-powered virtual worlds by integrating emerging technologies, identifying high-impact use cases, and providing tools and environments for hands-on innovation.

Through five practical tracks, this pillar enables urban stakeholders to explore, test, and apply virtual world solutions—bridging the gap between ambition and implementation, and helping shape the citiverse from the ground up.

**Track 16**

**Interoperable Citiverse**

The track focuses on interoperability challenges related to the Citiverse. Interoperability in relation to immersive technologies, AI and virtual worlds in the context of local and regional authorities and communities will be discussed in all its aspects, both on the technical (semantic and technical) and the non-technical level (public service governance, legal, organisational, cultural). Best practices and use cases from cities and communities around the world will be collected for every layer of interoperability and the potential of ensuring minimal interoperability through defining a new Minimal Interoperability Mechanism (MIM, as defined in ITU-T Y.4505) will be assessed.

# Thank you!

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