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PIANO NAZIONALE
DI RIPRESA E RESILIENZA



Spoke 9 - Digital Society & Smart Cities

Nicola Mazzocca

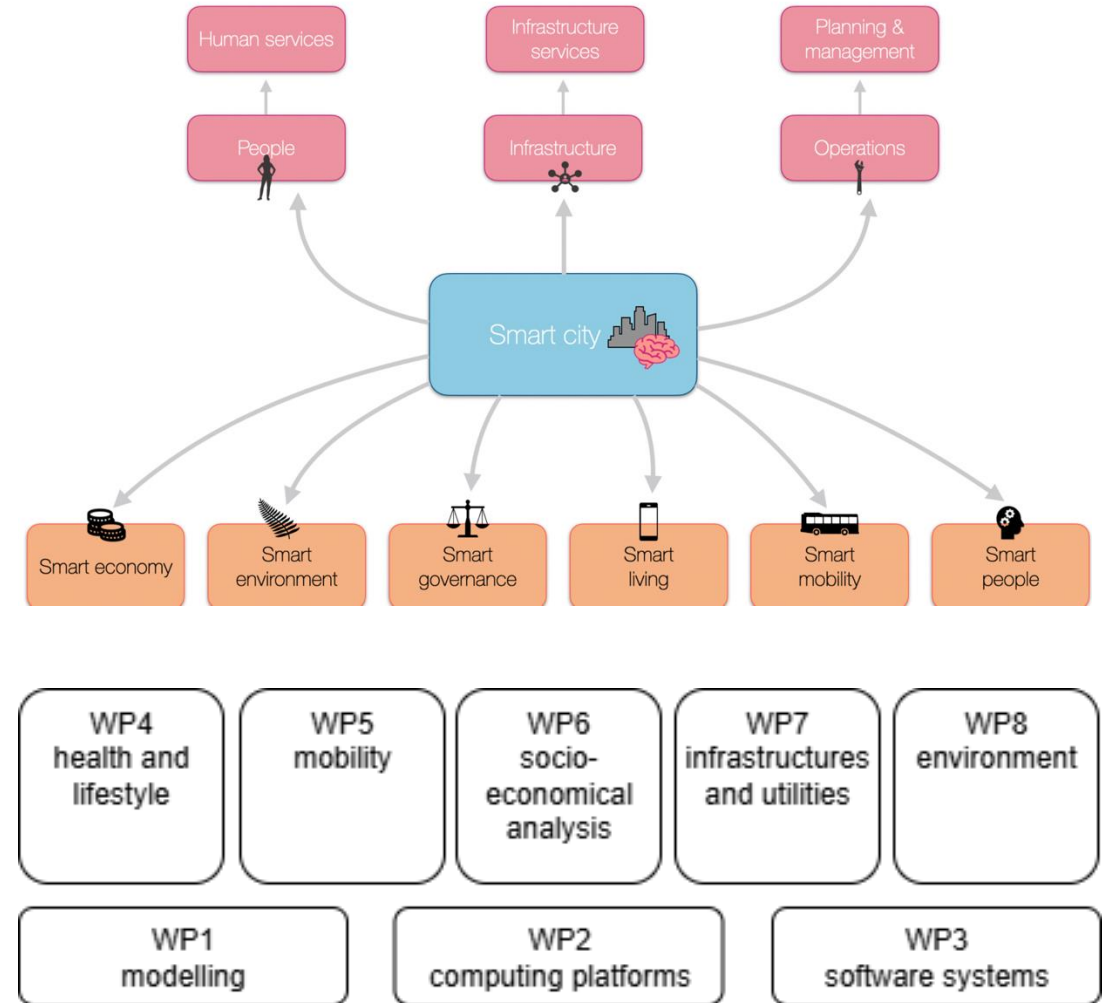
Spoke participants



Spoke 9 activities

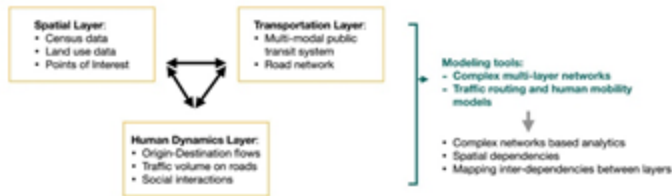
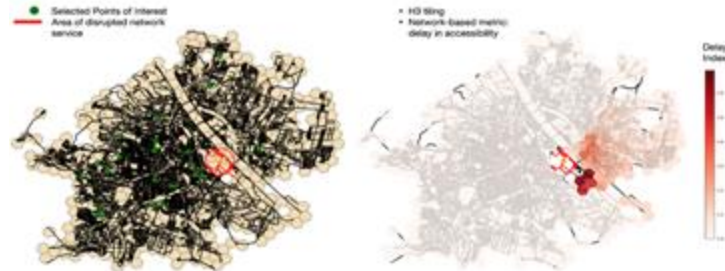
An overview

- Development of hardware and software models and technologies based on **HPC, digital twin** platforms, and **edge** systems for applications in **mobility, environment, health, infrastructure, and logistics**, with particular focus on **smart cities** and the **advancement of the digital society**.
- Realization of **demonstrators** referencing individual domains of interest involving:
 - **Data collection and integration**
 - **Analysis** of data and **predictive** models
 - Use of tools supporting **decision-making**



Spoke 9 results (1/2)

- 12 **prototypes** developed, **IoT/edge/HPC labs** established
- 4 **municipalities** involved (Bologna, Brindisi, Catania, Trento)
- 150+ scientific **publications**
- 75+ dissemination **events**

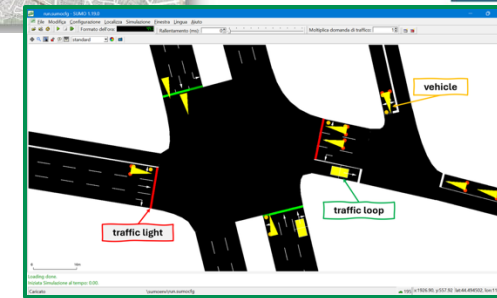
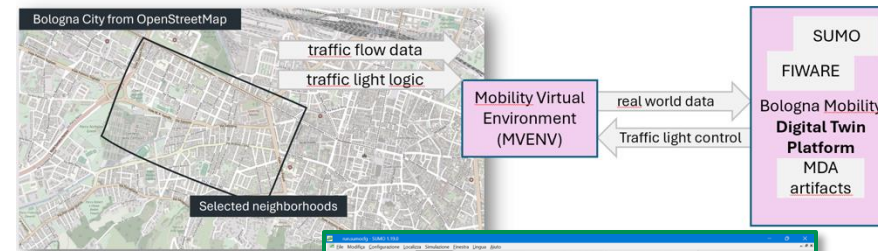
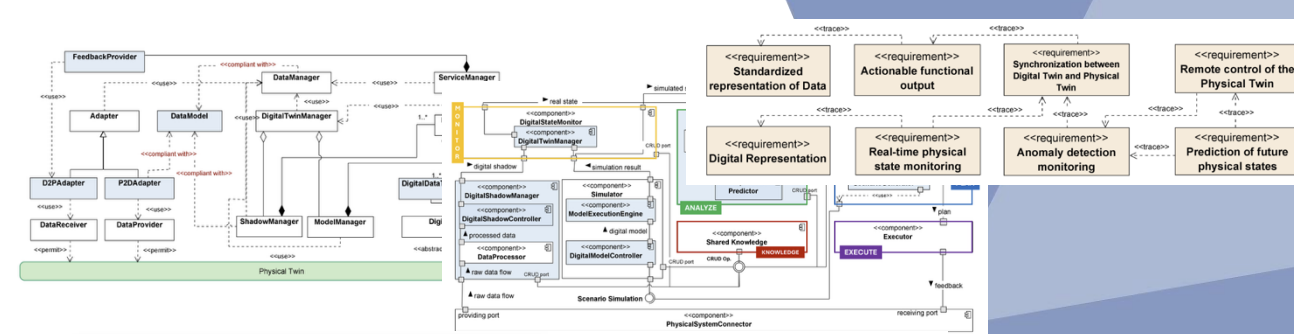


Wp1

- a model for **spatial network generation** able to recover the structure of transportation and mobility networks
- a modeling framework for **characterizing individual and collective behaviors** and routines in urban settings

Wp2

- a **Digital Twin reference architecture** and a related **prototype** in the mobility domain
- A framework for AI-based 3D interior building modelling
- Data space connectors



Spoke 9 results (2/2)

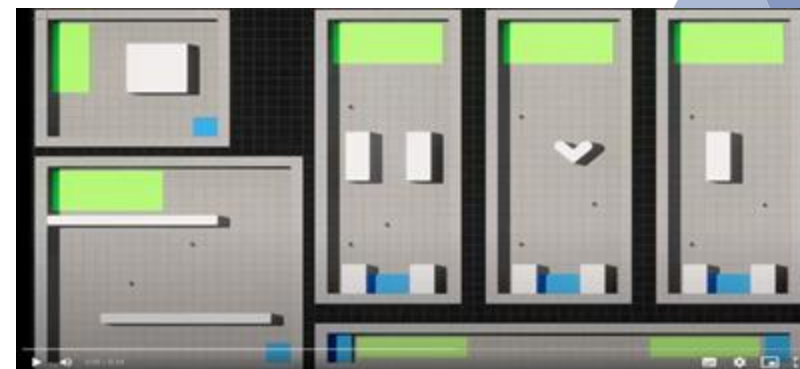


Wp3

- ML techniques to forecast the behavior of a containerized application
- a **development board** equipped with an Edge TPU and an RGB **camera to monitor driver distraction** through video analysis
- a framework for **efficient traffic management**
- an application to compute drivers' aggressiveness

WP4

Development of Digital Twin for Health and Well Being in a Smart City (physiological control systems/crowd analysis and management for emergency planning)



Spoke 9 projects

Innovation and cascade funds

Innovation funds

- **13 projects** on mobility/intelligent transportation, urban simulation, environmental sustainability, finance and insurance, imaging
- 7 companies involved
- All 8 WPs covered
- Collaborations with 4 other Spokes
- Total cost: 5.620.481,55
 - South: 2.997.574,3 (53%)

Cascade funds

- **16 projects** on urban digitalization, AI, environmental sustainability and smart mobility
- 20 companies involved
- 7 WPs covered
- Total funding: 4.446.218,74 €
 - In the south: 3.969.954 (89%)

DD307 – ECHO-TWIN - Edge-Cloud-HPC Optimized Twins based on Workflow-enhanced Inference Networks (1/2)

- **ECHO-TWIN** was created as a continuation of the investments made in the HPC Center; It pursues three interconnected objectives, implemented through the three linked projects:
 - **ECHO-TWIN-RISE** (RISE: *Research and Innovation for Scalable Edge-computing*): aims to develop methodologies, models, algorithms, and techniques for building **intelligent ecosystems based on digital twins (DTSE)**—dynamic, interconnected environments that integrate devices, systems, and services to operate in a coordinated, automated, and adaptive way. These ecosystems leverage advanced technologies such as **IoT, cloud computing, AI, and simulation** to enhance resource management, sustainability, and user experience introducing significant technological advances in strategic research areas (health, digital, climate and environment, and sustainable mobility) (*action 1.1.2*); **6.995.318,00 €**
 - **ECHO-TWIN-NET** (NET: *Networking for Excellence and Technology transfer*): Strengthens and extends the positioning of the Innovation Hub connected to the National Center by expanding and networking existing technological infrastructure and activating new hardware/software laboratories (*action 1.1.3b*); **6.314.142,00 €**
 - **ECHO-TWIN-UP** (UP: *Upskilling for Progress*): Strengthens business skills through training programs and networking activities with the research system (*action 1.4.3*). **1.000.000 €**

DD307 – ECHO-TWIN – Partners



Università
di Catania



ALMA MATER STUDIORUM
UNIVERSITÀ DI BOLOGNA



Politecnico
di Bari



UNIVERSITÀ
DI TORINO



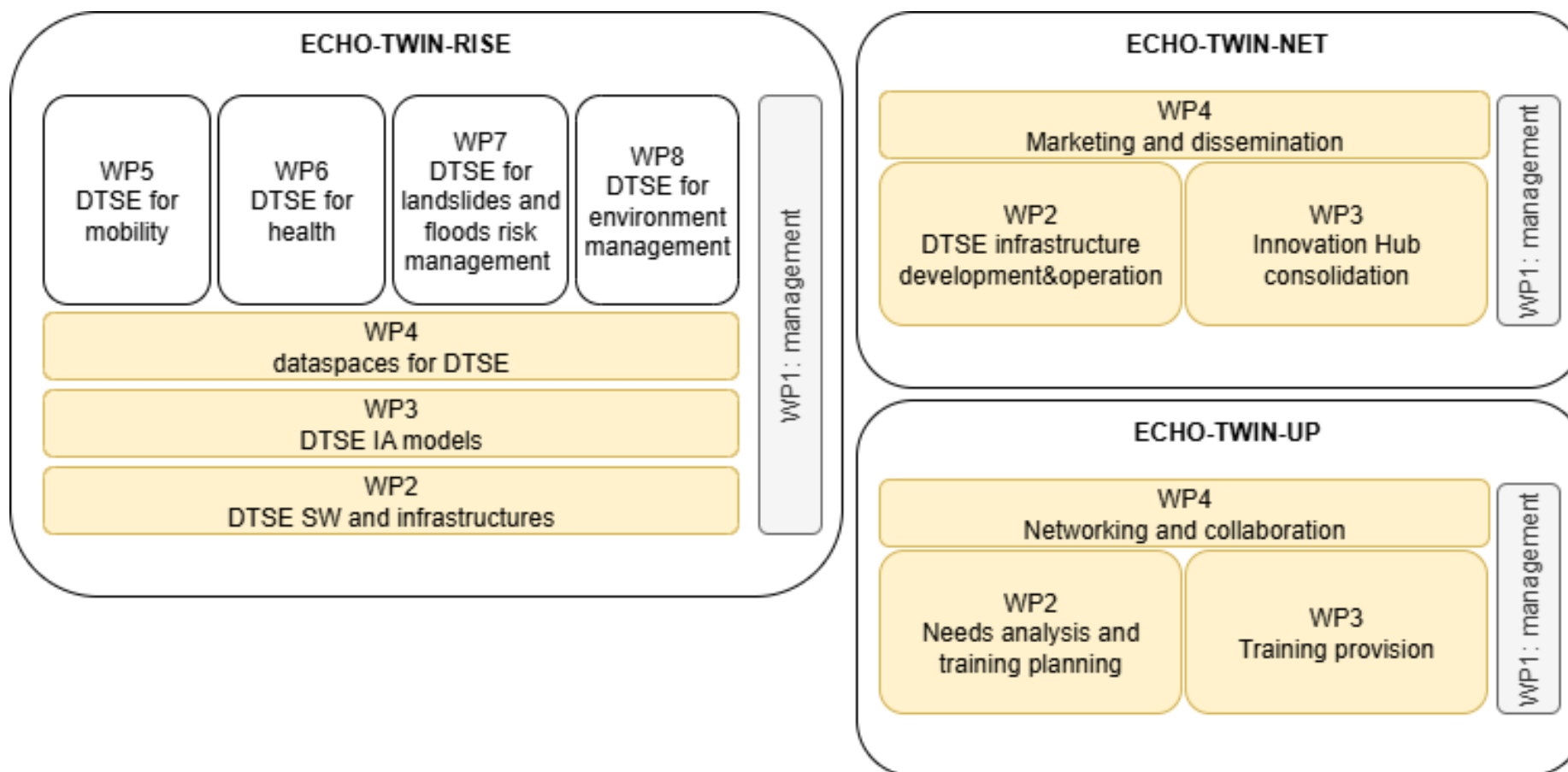
INAF
ISTITUTO NAZIONALE
DI ASTROFISICA



- 15 partners
 - Hub + 9 Universities /Research Centers
 - 5 PMI
- 33 operating units

DD307 – ECHO-TWIN - Structure

Workpackage structure





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Centro Nazionale di Ricerca in HPC,
Big Data and Quantum Computing

