

TOURISMO

TOURism Innovative and Sustainable Management
of flows

Obiettivi e attività di TOURISMO

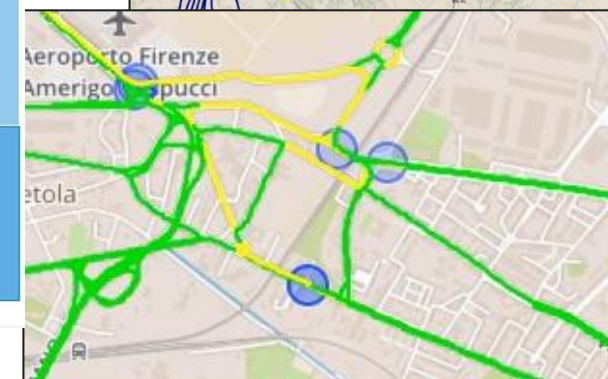
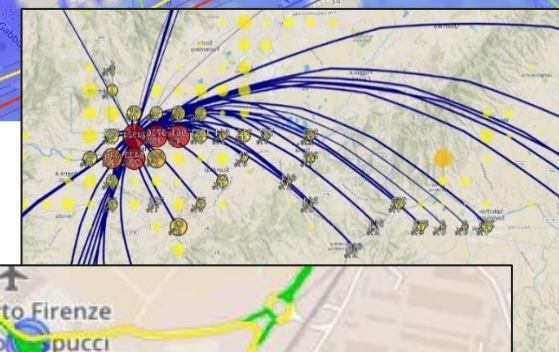
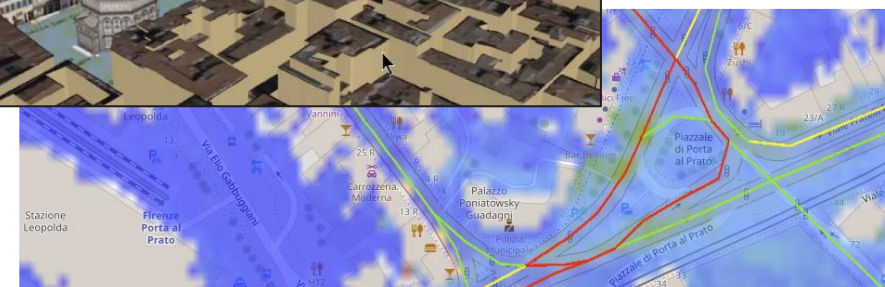
Valutazione degli interventi realizzati negli 8 siti pilota
Presentazione del progetto pilota di Firenze

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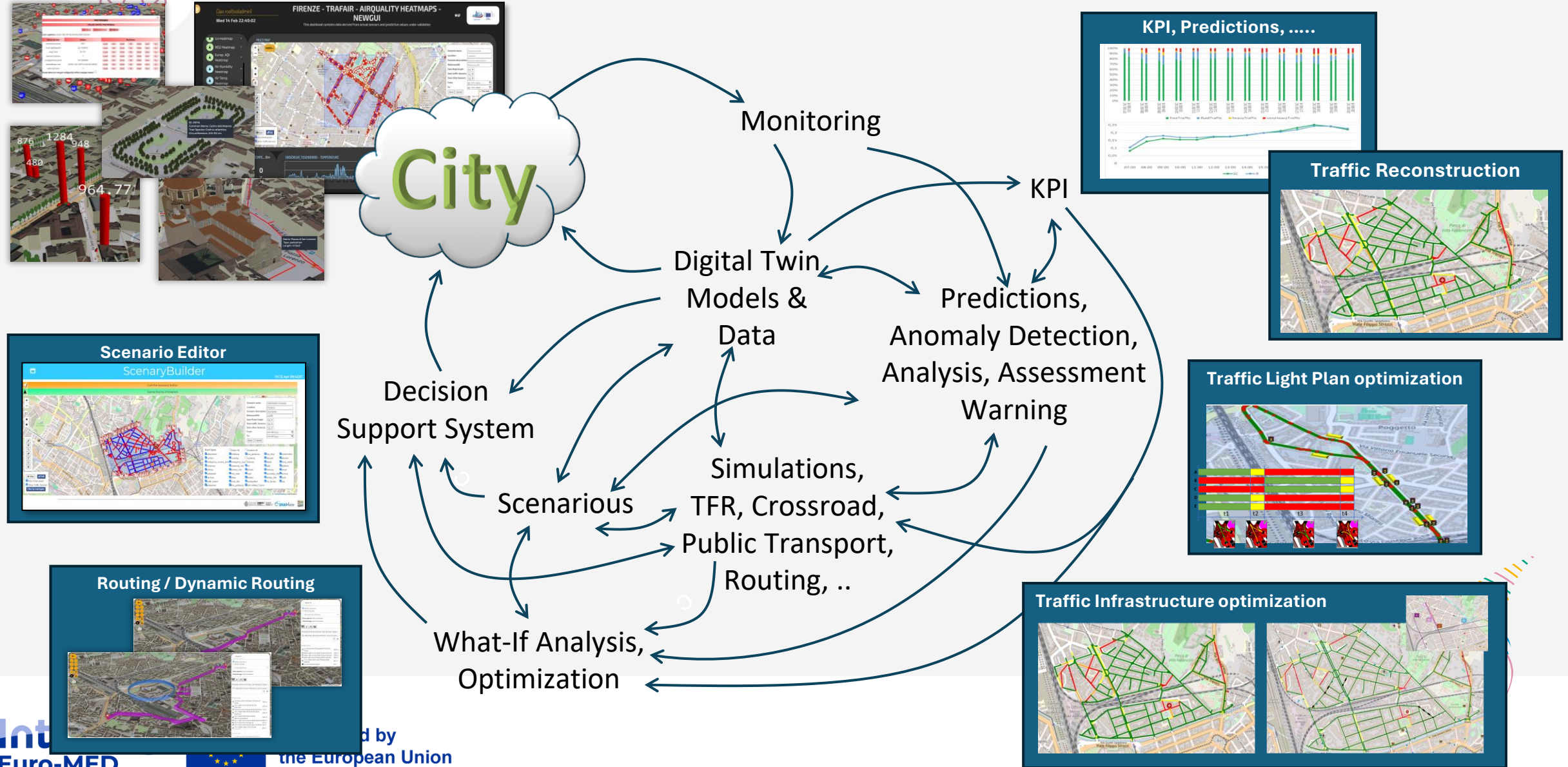


Main Tasks di un sistema cittadino

- **Controlling Status:** management, and operational
 - Monitoring via KPI
 - Computing predictions data from the field and KPI
 - Anomaly detection
 - Early warning on critical conditions
- **Making plan: tactic and strategic,** medium and long range
 - Optimisation: Prescriptions, suggestions
 - Risk assessment
 - What-if analysis on scenarios
 - Simulation and predictions
 - Resilience
- **Be ready for Unexpected Unknowns**



Main tasks VS Snap4City Tools





Digital Twin

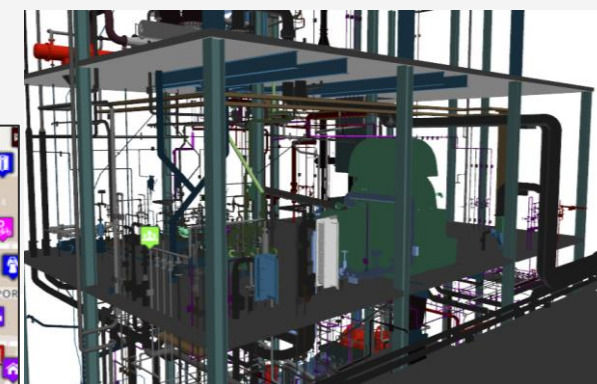
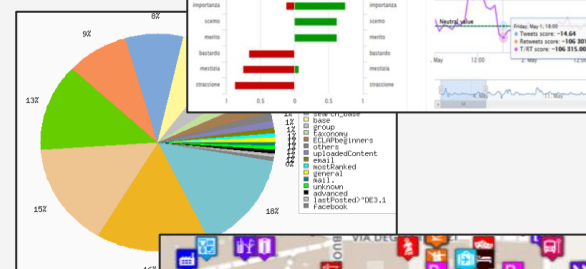
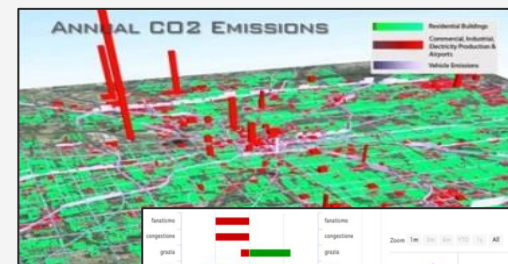
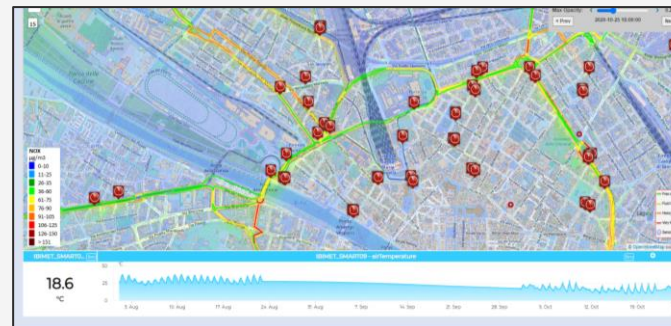
• Digital Twin

- **Connected** with real systems
- **Modelling** aspects: structural, visual, informative, real time data sensors (context), POI, functional, resources, etc.
- **Analytics:** AI/XAI techniques, simulations, users' needs, etc.

• Easier to understand the context, review from multiple points of view

• Useful to perform

- Discussion with city users
- Support decision makers
- By Case Experiments for analysing
 - New solutions, impact of disaster (natural and provoked)
 - Reduction of costs in the analysis, in reduction of mistakes





Digital Twin Solutions for Sustainability

OPERATION AND PLAN - CONTROL ROOMS - DECISION SUPPORT SYSTEMS - WHAT-IF ANALYSIS - OPTIMIZATION - APPLICATIONS

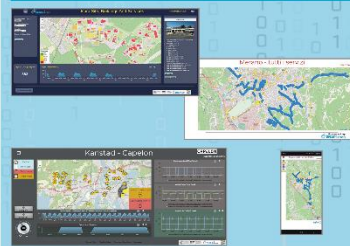
HORIZONTAL AI PLATFORM



MOBILITY AND TRANSPORT



SMART ENERGY AND SMART BUILDING



ENVIRONMENT AND WASTE MANAGEMENT



CITY USER'S SERVICES AND TOURISM MANAGEMENT



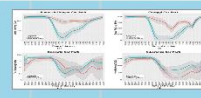
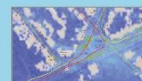
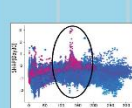
VISUAL ANALYTICS - SYNOPTICS - GRAPHICAL WIDGETS - ANALYTICS - BUSINESS INTELLIGENCE - SIMULATIONS



DASHBOARDS, WIDGETS TEMPLATES

PREDICTION - ANOMALY DETECTION - CLUSTERING - ROUTING - SENTIMENT NLP - TRAFFIC FLOW - PEOPLE FLOWS - SDG 15 MIN CITY INDEX - KPI - HEATMAPS - ORIGIN DESTINATION - ETC...

API - MICROSERVICES - GIS - BPM VIDEO - REPORTS - MAPS - 3D ...



EXPERT SYSTEM, KNOWLEDGE BASE SEMANTIC REASONING SMART DATA MODEL IOT DEVICE MODELS, STORAGE

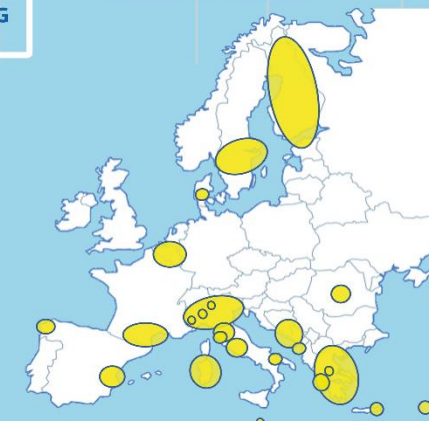
BIG DATA ANALYTICS, ARTIFICIAL INTELLIGENCE EXPLAINABLE AI, MACHINE LEARNING, GENERATIVE AI OPERATIVE RESEARCH, STATISTICS

VISUAL PROGRAMMING, ADAPTERS DATA FLOWS, WORKFLOWS PARALLEL DISTRIBUTED PROCESSING DATA DRIVEN

FULL INTEROPERABILITY, ANY: DATA, BROKERS, NETWORKS AND VERTICALS



- DEVELOPMENT ENVIRONMENT AND METHODOLOGY
- VISUAL PROGRAMMING, ML, AI, HPC
- TRAINING COURSES
- LIVING LABS
- GUI CUSTOM STYLES
- FULL APPLICATIONS, DASHBOARDS AND VIEWS
- MOBILE APPS



Powered by
FIWARE

FREE
TRIAL

PEN Test
Passed

EU GDPR
COMPLIANT

SNAP4
Appliances and Dockers
Installations

EUROPEAN OPEN
SCIENCE CLOUD

Node-RED

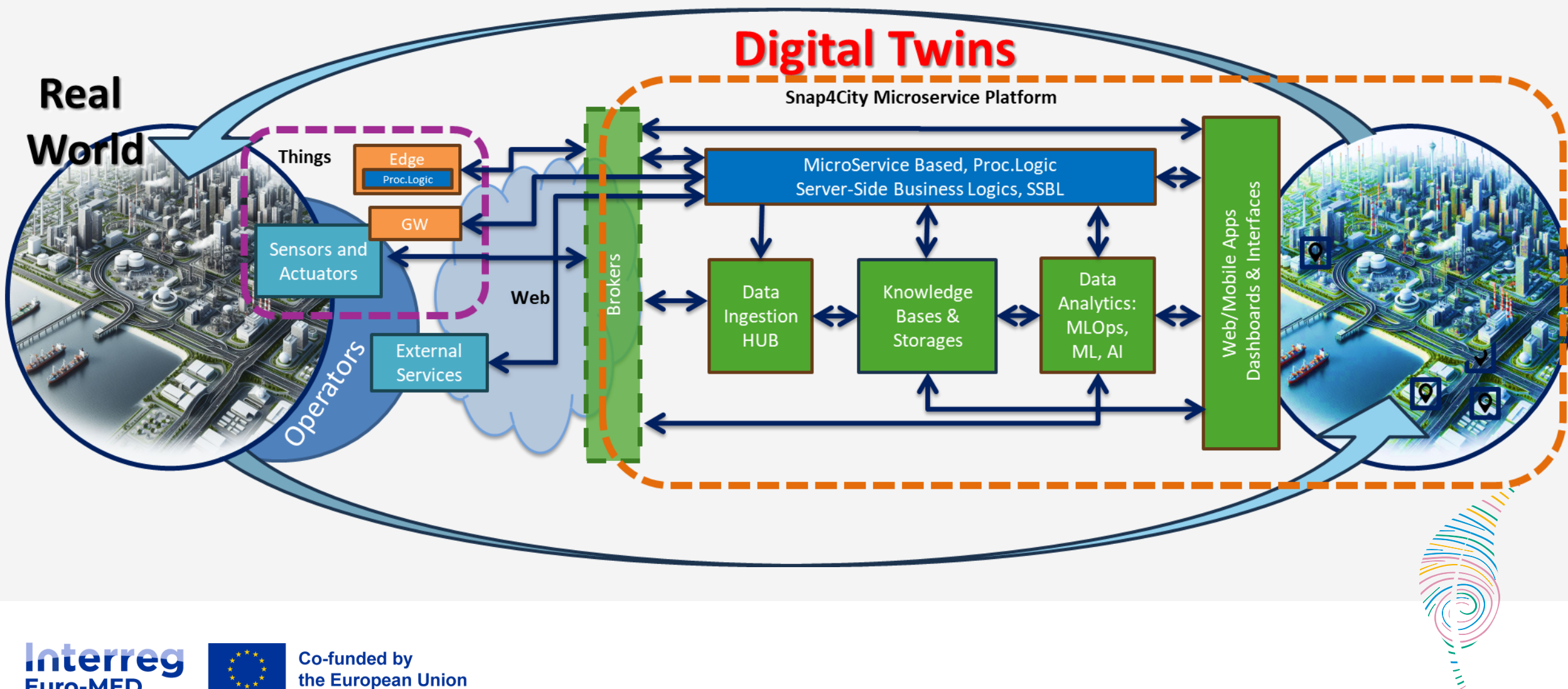
JS Foundation

E015
digital ecosystem

NVIDIA



Digital Twin Development Platform

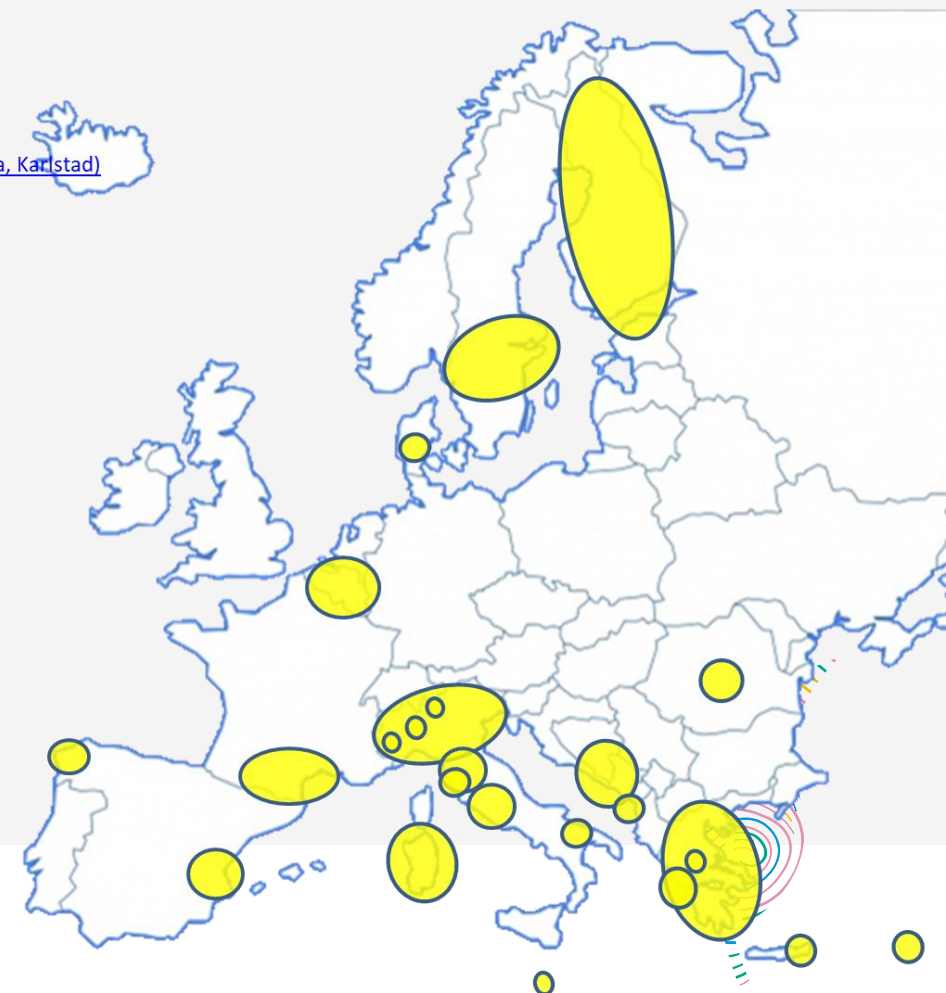


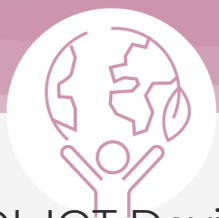


- 11 running installations in Europe
 - Snap4.city.org, Greece, Merano, Cuneo, ...
 - Toscana, Pisa, Sweden, ISPRA, Snap4.eu,
 - Altair, Italmatic, Romania,
- 18 projects, 12 pilots on 10 Countries
 - >40 cities/area
- **Widest MULTI-tenant deploy has**
 - 26 Organizations / tenant
 - > 9200 users on
 - > 1800 Dashboards e applicazioni
 - > 17 mobile Apps
 - **> 2.4 Million of structured data per day**
 - > 600 IoT Applications/node-RED
 - > 750 web pages with training
 - > 75 videos, training videos

Main Organizations/areas

- [Antwerp area \(Be\)](#)
- [Bari \(I\)](#)
- [Bisevo, Croatia](#)
- [Bologna \(I\)](#)
- [Brasov \(Ro\)](#), by ICEBERG
- [Capelon \(Sweden: Västerås, Eskilstuna, Karlstad\)](#)
- [Cuneo \(I\)](#)
- [DISIT demo \(multiple\)](#)
- [Dubrovnik, Croatia](#)
- [Firenze area \(I\)](#)
- [Garda Lake area \(I\)](#)
- [Greece \(Gr\)](#)
- [Helsinki area \(Fin\)](#)
- [Limassol \(Cy\)](#)
- [Livorno area \(I\)](#)
- [Lonato del Garda \(I\)](#)
- [Malta \(Malta\)](#)
- [Merano \(I\)](#)
- [Modena \(I\)](#)
- [Mostar, Bosnia-Herzegovina](#)
- [Oslo & Padova \(Impetus\)](#)
- [Pisa area \(I\)](#)
- [Pistoia \(I\)](#)
- [Pont du Gard, Occitanie \(Fr\)](#)
- [Prato \(I\)](#)
- [Rhodes \(Gr\)](#)
- [Roma \(I\)](#)
- [Santiago de Compostela \(S\)](#)
- [Sardegna Region \(I\)](#)
- [Siena \(I\)](#)
- [SmartBed \(multiple\)](#)
- [Toscana Region \(I\), SM](#)
- [Valencia \(S\)](#)
- [Venezia area \(I\)](#)
- [WestGreece area \(Gr\)](#)





High Level Types

- POI, IOT Devices, shapes,..
 - FIWARE Smart Data Models,
 - IoT Device Models
- GIS, maps, orthomaps, WFS/WMS, GeoTiff, calibrated heatmaps, Satellite data, any kind
- traffic flow, typical trends, ..
- trajectories, events, Workflow, ..
- 3D Models, BIM, Digital Twins, ..
- OD Matrices of several kinds, ..
- Dynamic icons/pins, ..
- Synoptics, animations, ..
- KPI, personal KPI,..
- social media data, TV Stream,
- routing, multimodal, constraints, ..
- decision scenarios,
- etc.



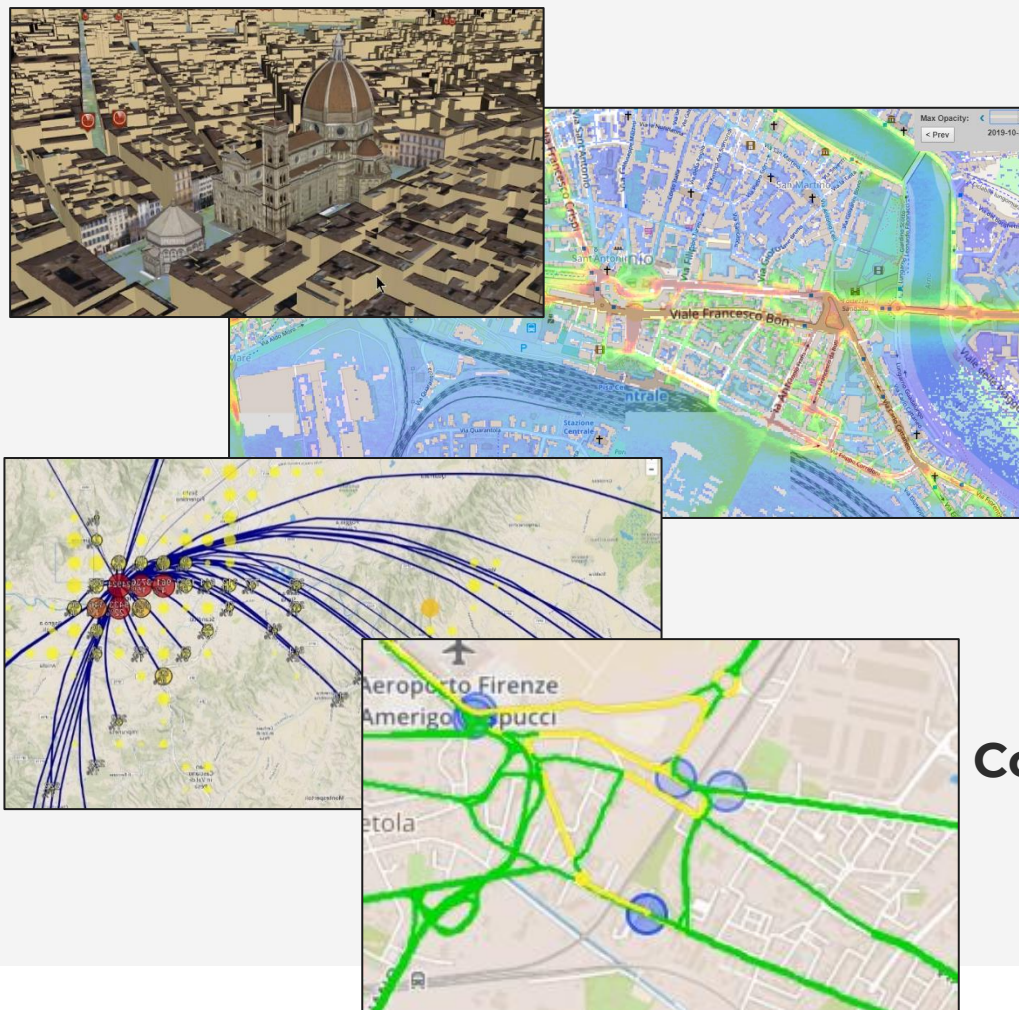


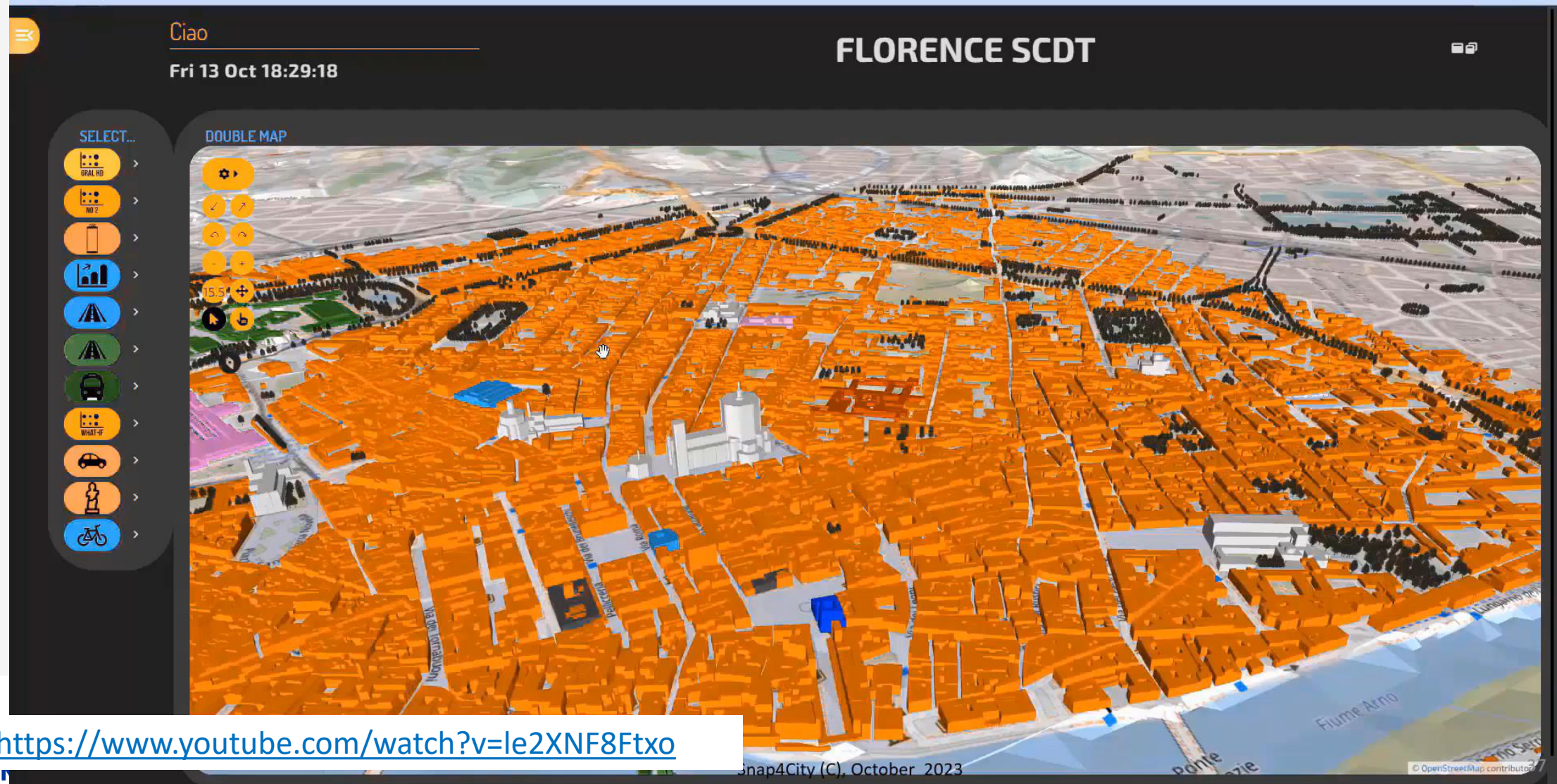
City Digital Model with...

- Intuitive platform
- Any Data TYPE, any data source, any protocol
- Data storage seamless
- Data analytics → artificial intelligence, AI/XAI
- Data Ethics, AI Ethics, GDPR
- Interactive Data Representation, any kind
- Key Performance Indicators, any kind
- What-IF analysis – Simulation, prediction, 2D/3D
- Micro, Meso e macro scales
- Operation, planning tactic and strategic / optimization
- Collaborative and shared representation
- Sustainable, shared, open source 100%

Complex and heterogeneous information, interoperability

- GIS, ITS, AVM, IoT, BIM, CKAN, etc.
- Satellite services
- MaaS, last-mile delivery HUBs
- etc.







2020



Contract



- Smart Tourism
- 6 Pilots
- Data Analytics
- Extended platform



- Smart Mobility
- PISA, PUMS
- Living lab



Km4City 1.6.7

Smart Ambulance (2021-22)



enel x Contract



Contract

2021

PC4City (2020-21) Monitoring Terrain

Winner of Open Data Challenge of enel x

CAPELON

- Smart Light
- Sweden

Enterprise (2021-22) Industry 4.0

Almafluida Industry 4.0 (2021-22)

AMPERE (2021-22) Industry 4.0

SYN-RG-AI SmartCity



Industry 4.0

uni.systems

SmartCity, 2021-23



AXIS collab SmartCity

2022



Asymmetrica Smart City, 2022-23



Contract, 2022-23



Contract, 2022-23



2022-2023

enel x Contract, 15min



Security and Risk



Italferr, Smart City



CN MOST, 2022-26



EI THE, 2022-26

G. Agile, 2021-23



2023-26



Merano, smart light

OceanRace, Genova, AWS

Cuneo, smart city

2024

Km4City 1.6.8

TOURISMO



ELLIE IA 2025-2027



UrbanDT4TF



Contract, 2024-25

CAI4DSA



OPTIFaaS



Rhodes, smart city

eShare

UNIFI TUSS



AMMIRARE

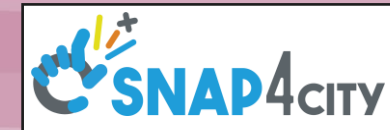


2024/25

- **UrbanDT4TF**, CN HPC: Digital Twin mobility
- **DI-DTPlatform**, CN HPC: Digital Twin, mobility, environment
- **Sasuam**, CN MOST, PNRR: AI, mobility
- **OPTIFaaS**, CN MOST, PNRR: AI, mobility, DSS
- **LeverageOPTIFaaS**, CN MOST: PNRR, mobility
- **TOURISMO**, Interreg, EC: Tourism, NLP, DSS
- **ELLIE**, Horizon Europe, EC: AI, VR
- **CN MOST**, PNRR: sustainable mobility, platform
- **ISPRA JRC contract**, EC: DSS, SOC, control room, energy
- **The IE**, PNRR: AI, NLP, Legal Aspects
- **AMMIRARE**, Interreg, EC: AI, environment, Big Data
- **CAI4DSA**, FAIR PE1, PNRR: AI, Neuro-Symbolic, PINN, NG-DSS
- **SADI-MIAC**, RT, partner: AI, Tourism, Retail, Computer Vision
- **Energia**, RT, conv: AI, PINN, DSS
- **RFI contract**: mobility, AI, DSS
- **PRIN UNICagliari**: mobility, DSS
- **Talent Hub**, ECRF, conv: NLP, match demand vs offer

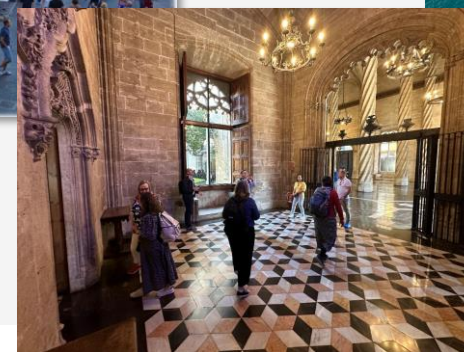
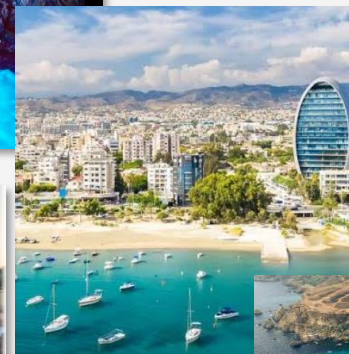
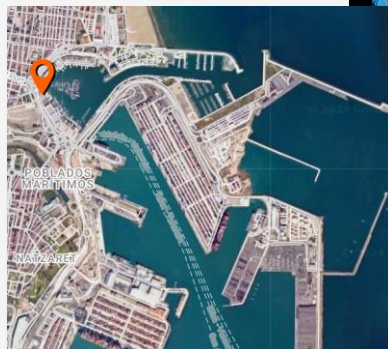


Integrazione dati TOURISMO in Snap4City



Snap4City è la piattaforma di riferimento di TOURISMO

- Integrazione di diverse tecnologie e sorgenti dati provenienti da 8 piloti:
 - Bisevo, Croazia
 - Firenze, Italia
 - Limassol, Cipro
 - Golden Bay, Malta
 - Rodi, Grecia
 - Valencia La Lonja e Museo della Città, Spagna
 - Porto di Valencia, Spagna
 - Varna, Bulgaria
- Maggiore differenziazione nei siti pilota rispetto ad Herit-Data
- E' aumentato lo spettro delle tecnologie implementate





Integrazione dati TOURISMO in Snap4City



- Applicazioni per support alle decisioni
- Soluzioni AI per predizioni, causalità, suggerimenti e raccomandazioni
- Acquisizione e aggregazione dati da sorgenti diverse, in Digital Twin:
 - Contesto e valutazioni
 - Grafo strade, reti, POI, Punti di interesse
 - Analisi del sentiment da questionnaire e altri servizi
 - Dati storici di diversa tipologia (soprattutto a Firenze e Toscana)
 - Conteggi e flussi, persone e mezzi
 - Pax counter/Sniffer Wi-Fi, radar
 - Dati da telecamere termiche
 - CCTV per conteggio persone e veicoli
 - Dati da droni con telecamere termiche ad alta risoluzione
 - Parcheggi
 - Ambiente
 - Open weather, Open pollution, Maree
 - Dati da sensori ambientali indoor e outdoor
 - Dati di contesto: OpenWeather, Open Pollution, Maree...



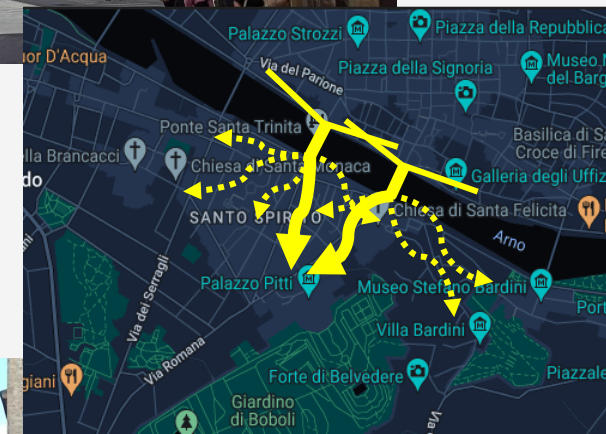


Il pilota di Firenze



Firenze – Oltrarno

- Integrazione di diverse tecnologie e sorgenti dati:
 - Pax counter
 - Telecamere termiche
 - Parcheggi
 - Punti di interesse e attrazioni turistiche
 - Servizi di mobilità pubblica e timetables
 - Open weather, Open pollution, Sensori SIR, ARPAT, ecc.
 - Molti dati storici





Il pilota di Firenze (ipotesi)





Il pilota di Firenze



Dati di interesse

- Dati da sensori WiFi,
- Conteggio e tracciamento delle persone per comprendere le traiettorie primarie,
- Profilazione (e.g. age, gender, et al.),
- Comportamento (spending profile, e.g. Mastercard-geospending, trajectories, Vodafone phone data, API rest Data Appeal (reputation) et al.),
- Eventi a Firenze,
- Dati di presenza nei musei

Possibili altri dati:

- Domanda di trasporto: dati da TIM, ODM
- traffico, dati da Here
- Dati ambientali e meteo, inquinamento,
- parcheggi,
- POI e attrazioni turistiche,
- Mobilità pubblica (orari e fermate), GTFS
- Dati storici (Open Toscana, ISTAT)
- Analisi del sentiment da varie sorgenti da QR
-

Obiettivi: anticipare e mitigare eventi inaspettati, prevedere i flussi e orientarli virtuosamente, migliorare le esperienze digitali e al., bilanciare la presenza dei turisti con quella dei residenti e migliorare la vivibilità della città.





Risultati finali di TOURISMO

Le soluzioni sperimentate e l'uso dell'AI nei vari piloti potranno preodurre un metodo valido e trasferibile in altri contesti. Includendo nella best practice:

- Confronto fra tipologie di sensori
- Efficienza ed efficacia delle varie soluzioni
- Modeli e processi di acquisizione
- Modelli predittivi, causali, e di gestione
- Correlazioni e cause per reputation e valutazioni, di servizi e strutture
- Applicazioni e dashboard





On Line Training Material (free of charge)

Course: <https://www.snap4city.org/944> (ENG)

Introductionary course to Snap4City technology

In Italiano: <https://www.snap4city.org/1068>



1st part	2nd part	3rd part	4th part	5th part	6th part	7th part	8th
Overview	Dashboards	IOT App, IOT Network	Data Analytics	Data Ingestion processes	System and Deploy Install	Smart City API: Web & Mob. App	Design and Develop Smart Solutions



Interreg
Euro-MED



Co-funded by
the European Union



Making the **Mediterranean** **Green Transition** happen

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