

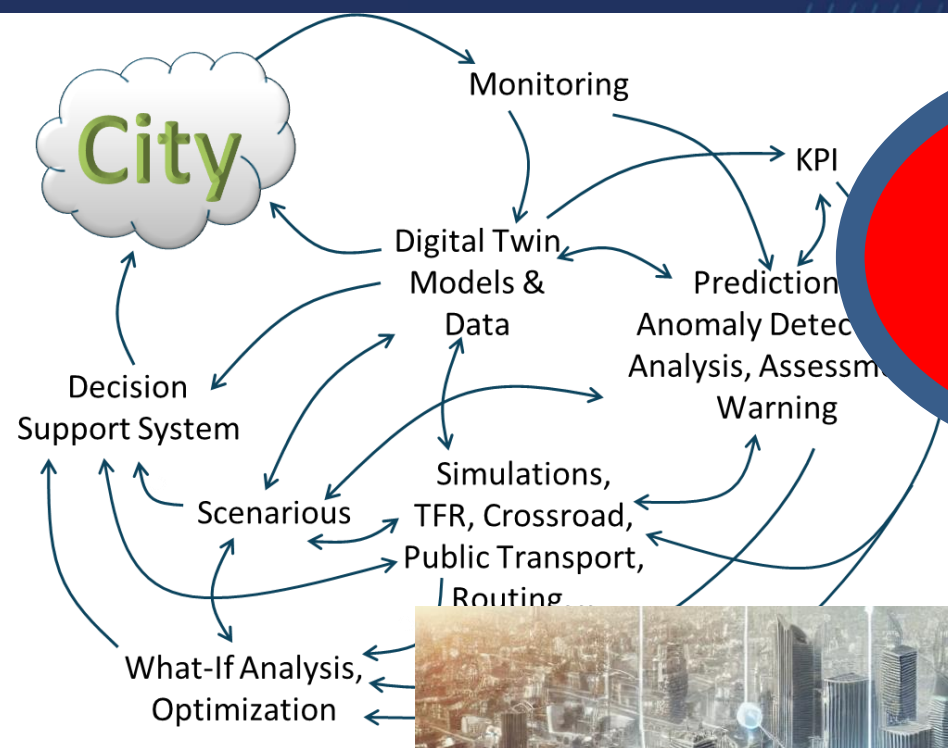


www.snap4city.org
www.snap4solutions.org

SMARTCITY
EXPO WORLD CONGRESS

5 - 7 NOV 2024
BARCELONA

THE EVENT
FOR BETTER
CITIES



VISIT US
HALL 2
D160

For Mobility, Transport, and Tourism Management Digital Twin

DIGITAL TWIN SOLUTIONS TO SETUP SUSTAINABLE DECISION SUPPORT SYSTEMS



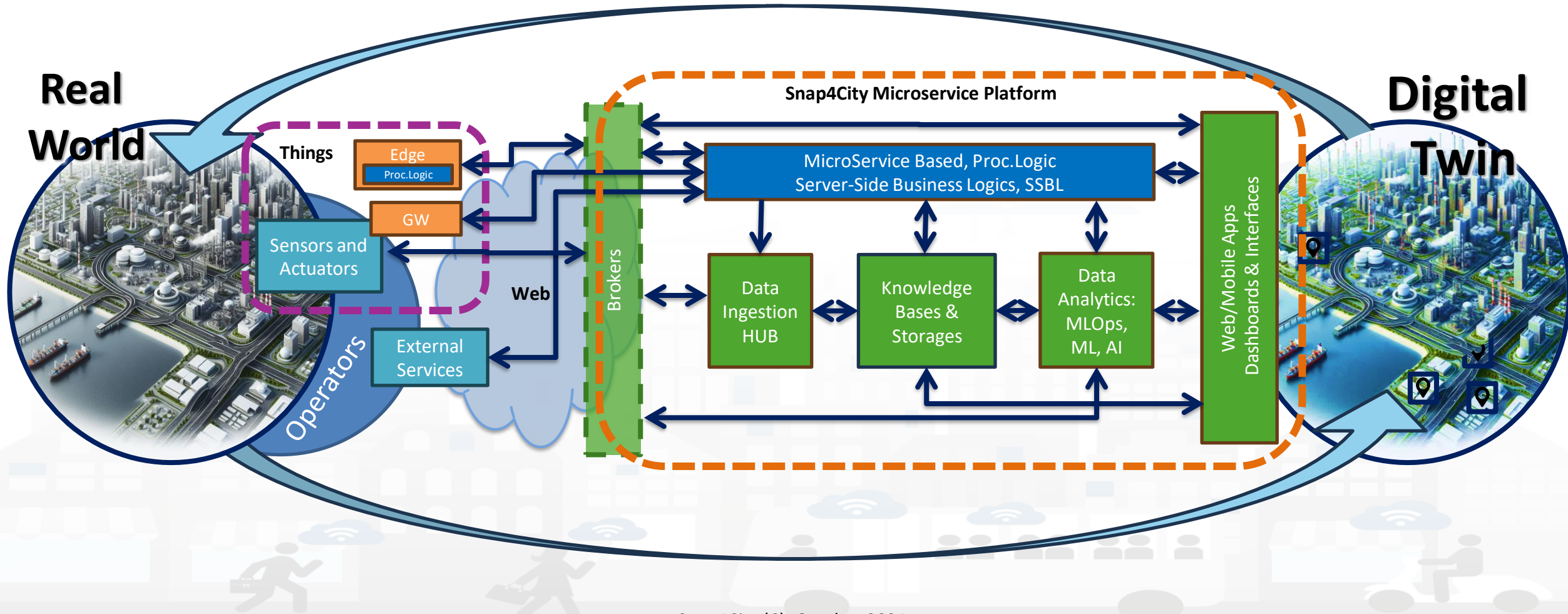
UNIVERSITÀ
DEGLI STUDI
FIRENZE

DINFO
DIPARTIMENTO DI
INGEGNERIA
DELL'INFORMAZIONE

DISIT
DISTRIBUTED SYSTEMS
AND INTERNET
TECHNOLOGIES LAB



Digital Twin Development Platform





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

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



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

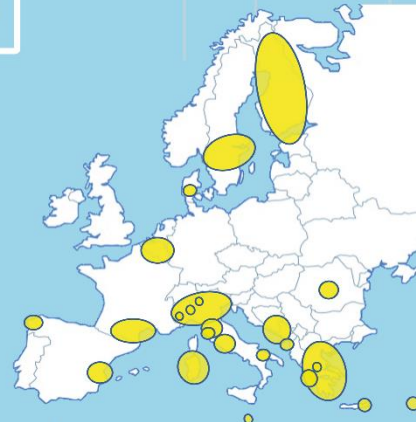
VIDEO - REPORTS - MAPS - 3D ...

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



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

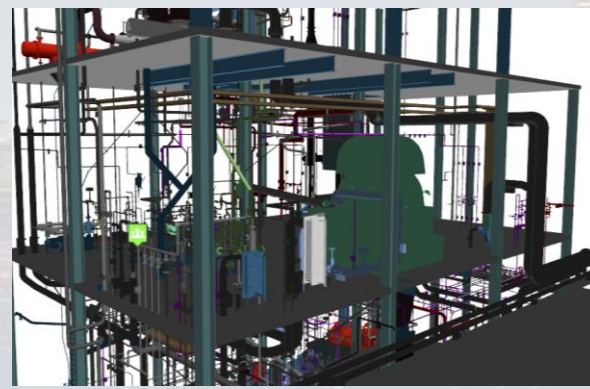
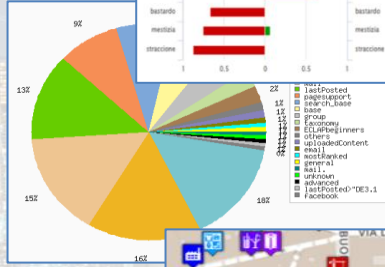
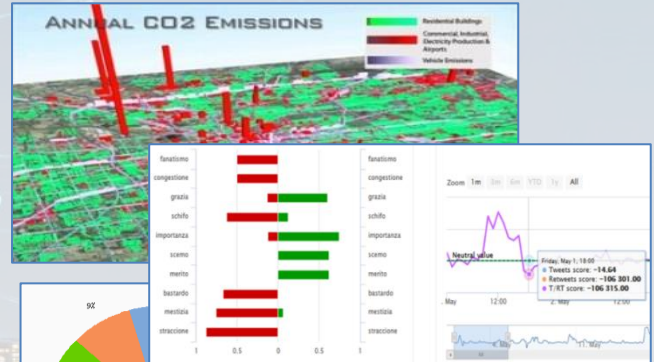
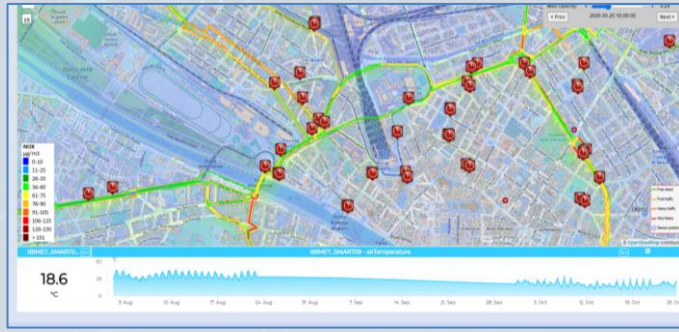
Digital Twin

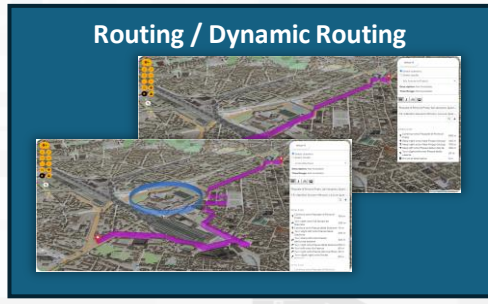
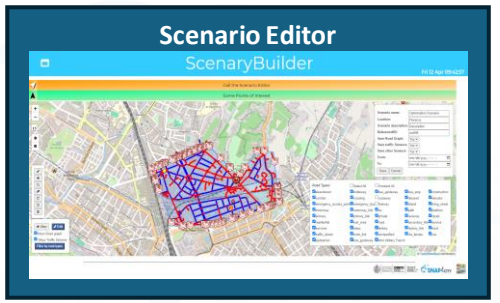
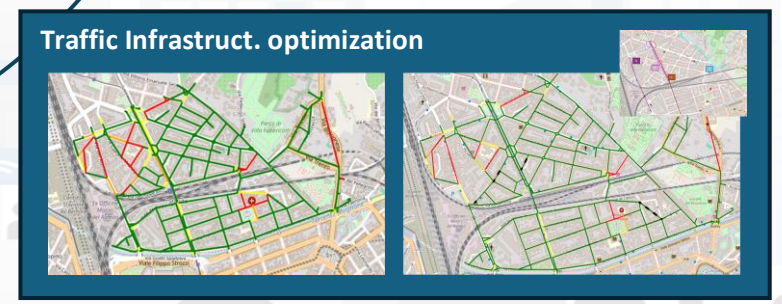
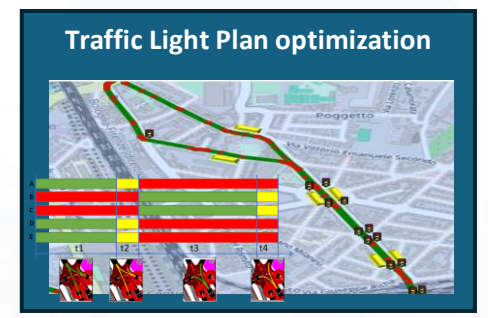
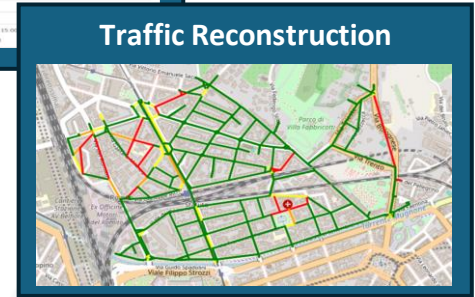
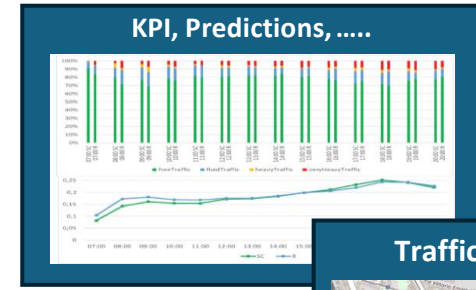
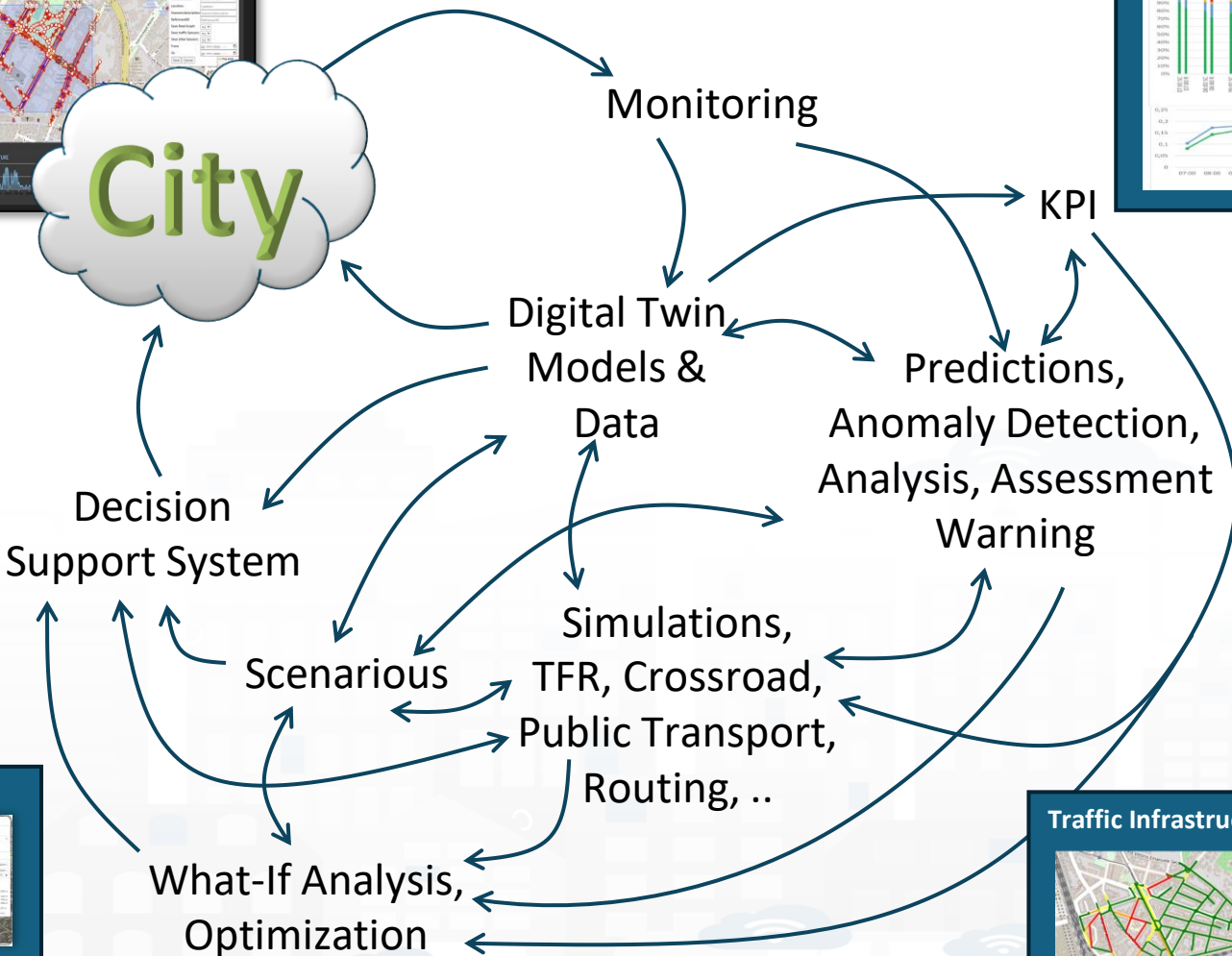
- **Connected** with real systems
- **Modelling** aspects: structural, visual, informative, real time data sensors (context), POI, functional, resources, etc.
- **Analytics:** AI/XAI techniques, simulations, users' needs, etc.

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

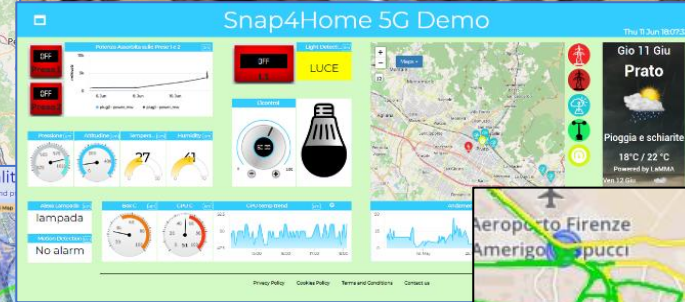
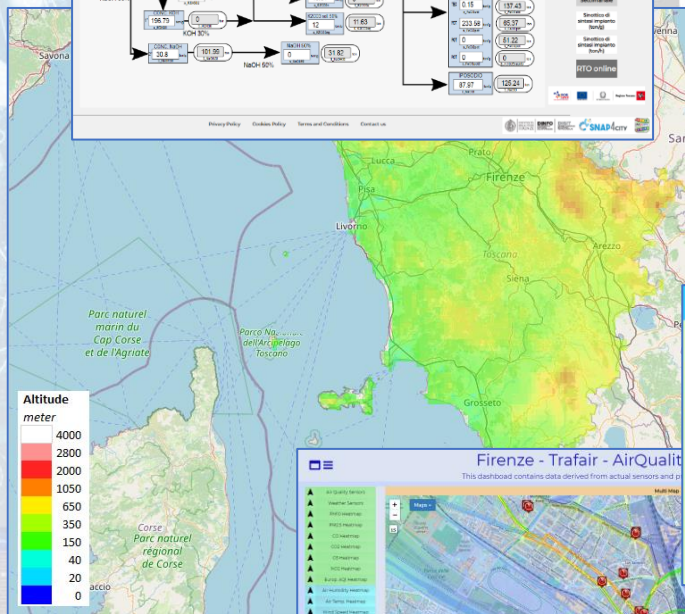
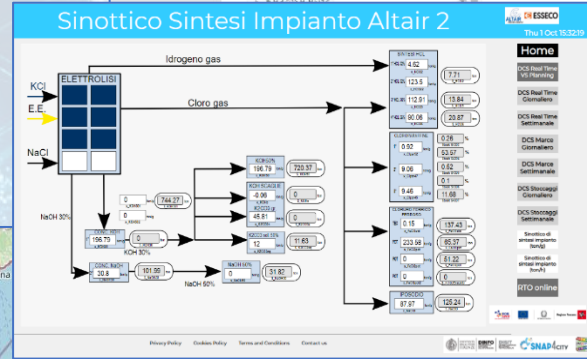
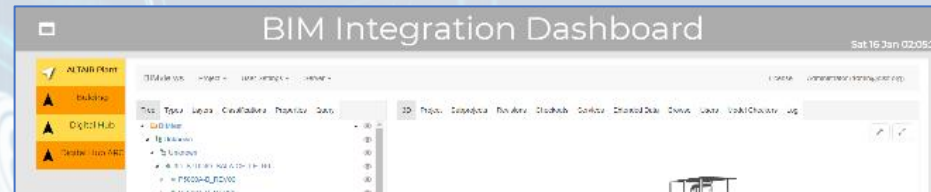




High Level Types

Snap4City (C), October 2024

- POI, IOT Devices, shapes, ...
 - FIWARE Smart Data Models,
 - IoT Device Models
- GIS, maps, orthomaps, WFS/WMS, GeoTiff, calibrated heatmaps, ...
- Satellite data, ...
- 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, ...
- City area scenarios,
- etc.

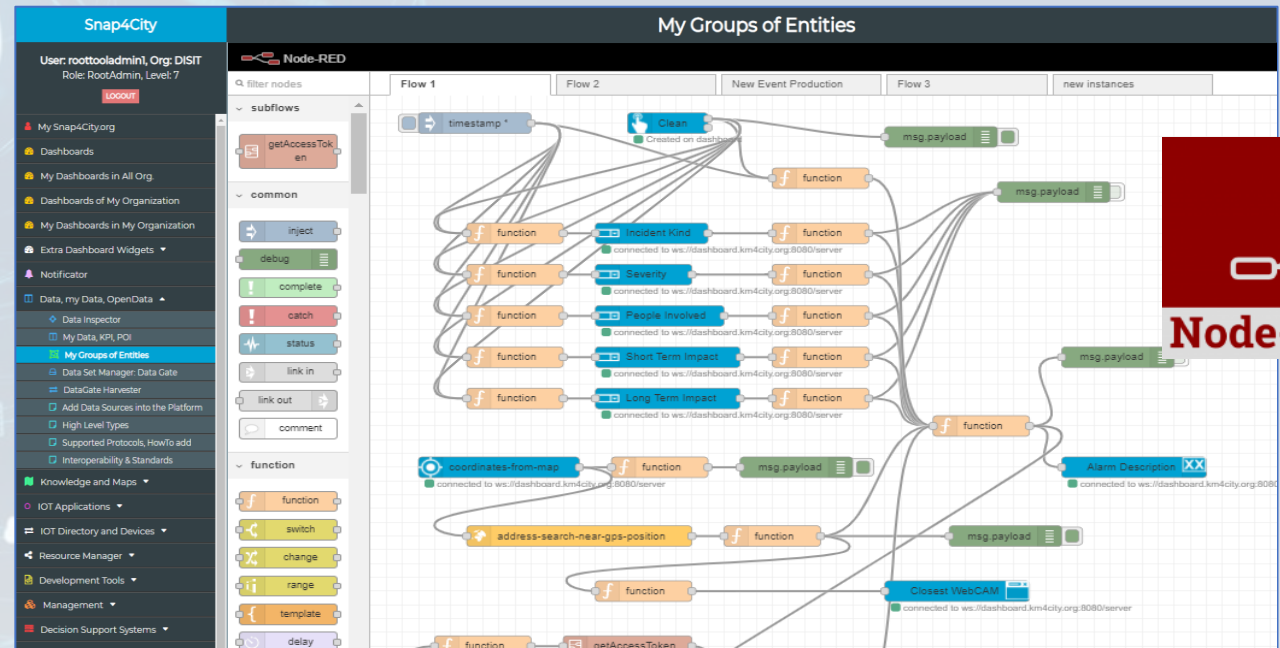


Ingestion, aggreg. → exploitation



IoT App Visual Programming, no coding

- Data transformation
- Integration, Interoperab.
- Scripting Data Analytics
- Data ingestion
- Business logic



Edge and Cloud

MicroServices data driven develop via visual language Node-RED

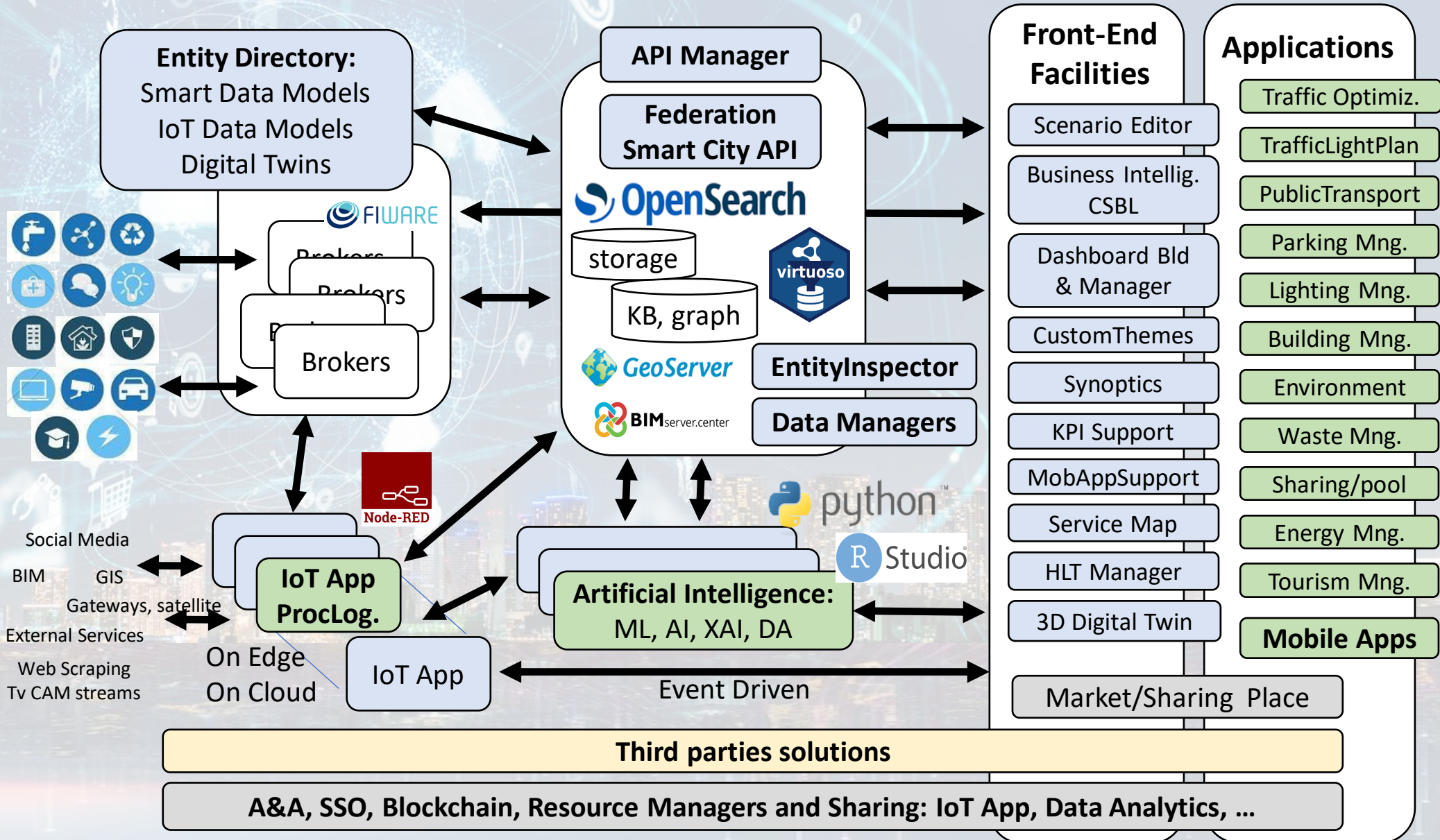
<https://flows.nodered.org/search?term=snap4city>

We suggest also to install:

- AND: From Resource Manager
- UserCreated
- Twitter Heart Data
- Twitter Heart Data Time Series Channel
- Twitter Heart Data Time Series Channel Search
- Twitter Vigilance Heart Data Time Series Channel
- Twitter Vigilance Heart Data Time Series Channel Search
- Twitter Vigilance Heart Data Time Series Channel Search
- Twitter Vigilance Heart Data Time Series Channel Search

Snap4City (C), May 2021

Technical Architecture



Visual Development Tools



My IOT Sensors and Actuators

Add My New Device

Select Latitude/Longitude on Map

ID	NAME	TYPE	STATUS
1	SENSOR	ACTIVE	ONLINE
2	ACTUATOR	ACTIVE	ONLINE

Entities/Devices Management

ID	NAME	TYPE	STATUS
1	SENSOR	ACTIVE	ONLINE
2	ACTUATOR	ACTIVE	ONLINE

Service Map (Toscana)

Map showing various service locations and data points in Toscana.

Data Inspector

Map view with data points and a detailed data table.

My Data Dashboard Dev Kibana

29,146,065

Dashboard with charts and data visualizations.

Proc.Logic / IoT App

Grid of application tiles for Data Analytics, IoT Application, etc.

Node-RED

ISMIndex

Flowchart diagram showing process logic and data flow.

Jupyter2-[75] Hub - Python

```
code
```

My Dashboards in My Organization

Grid of various dashboard widgets and charts.

3D MAP GLOBAL DIGITAL TWIN - NEWGUI

3D city model visualization.

Client-Side Business Logic - Test

Map and charts for testing business logic.

FIRENZE - TRAFFAIR - AIRQUALITY HEATMAPS - NEWGUI

Heatmap visualization of traffic and air quality in Firenze.

Custom Widgets / Synopsics

Grid of custom widgets and synopsics.

Third parties solutions

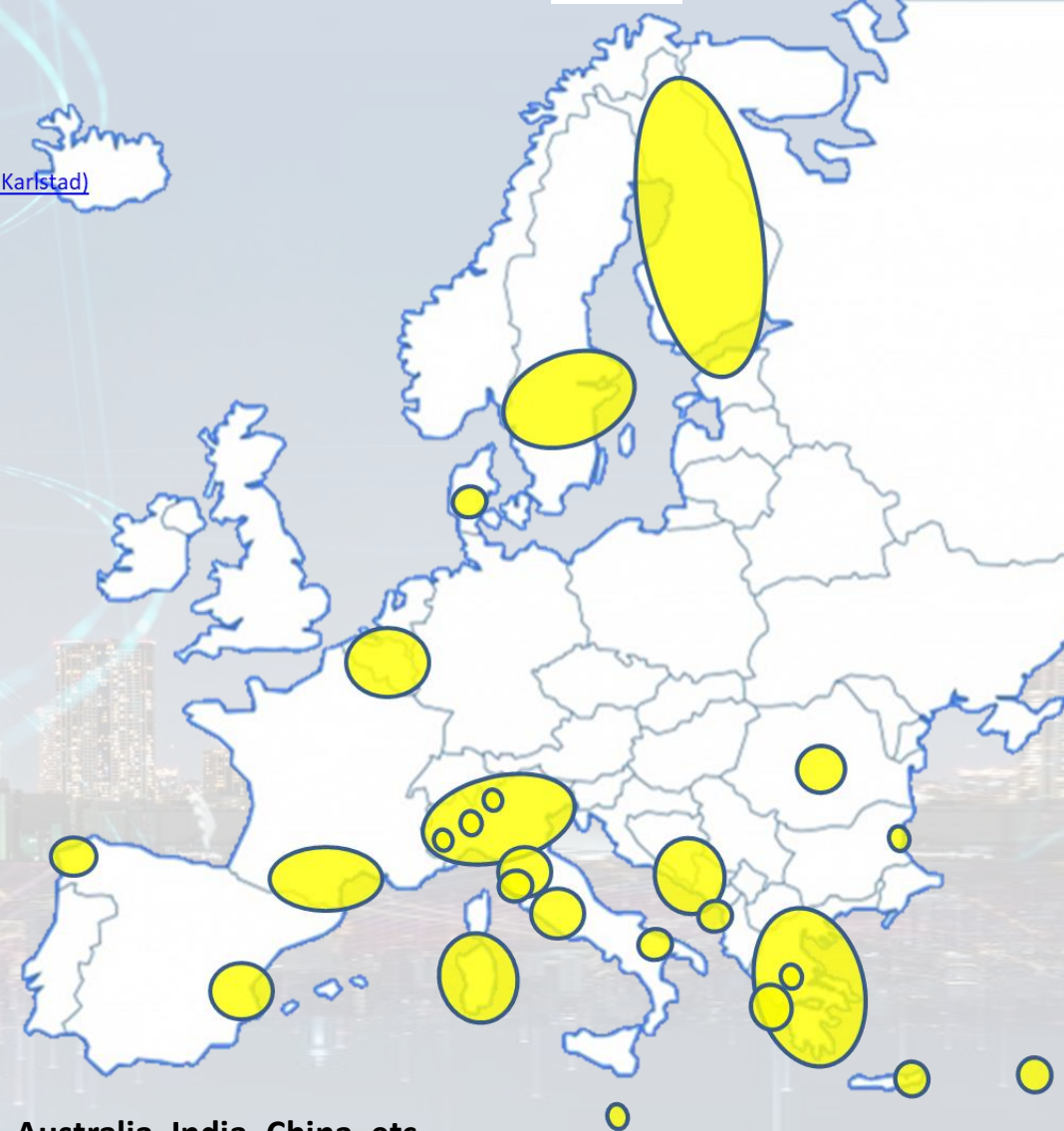
A&A, SSO, Blockchain, Resource Managers and Sharing: IoT App, Data Analytics



- Update: 29-10-2024
- 12 running installations in Europe
 - Snap4.city.org, Greece, Merano, Cuneo, ..
 - Toscana, Pisa, Sweden, ISPRA, Snap4.eu,
 - Altair, Italmatic, Romania, Rhodes,
- 16 projects, 12 pilots on 10 Countries
 - >40 cities/area
- **Widest MULTI-tenant deploy has**
 - 24 Organizations / tenant
 - > 8850 users on
 - > 1800 Dashboards
 - > 17 mobile Apps
 - > **2.2 Million of structured data per day**
 - > 580 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 \(S\)](#)
- [Varna \(Bulgaria\)](#)
- [Venezia area \(I\)](#)
- [WestGreece area \(Gr\)](#)



- + Israel, Colombia, Brasile, Australia, India, China, etc.

Monitoring and control

FROM CITY DASHBOARD TO APPLICATIONS

DATA GATHERING AND CITY DATA KNOWLEDGE MANAGEMENT

FORGING & MANAGING OPEN AND FLEXIBLE WITH AND JOB MAP

IOT APPLICATIONS VS IOT EDGE DEVICES

SNAP4CITY FOR BEING

SNAP4CITY ARCHITECTURE AND CITY SYSTEM. CAPABILITY TO DEVELOPERS AND STAKEHOLDERS

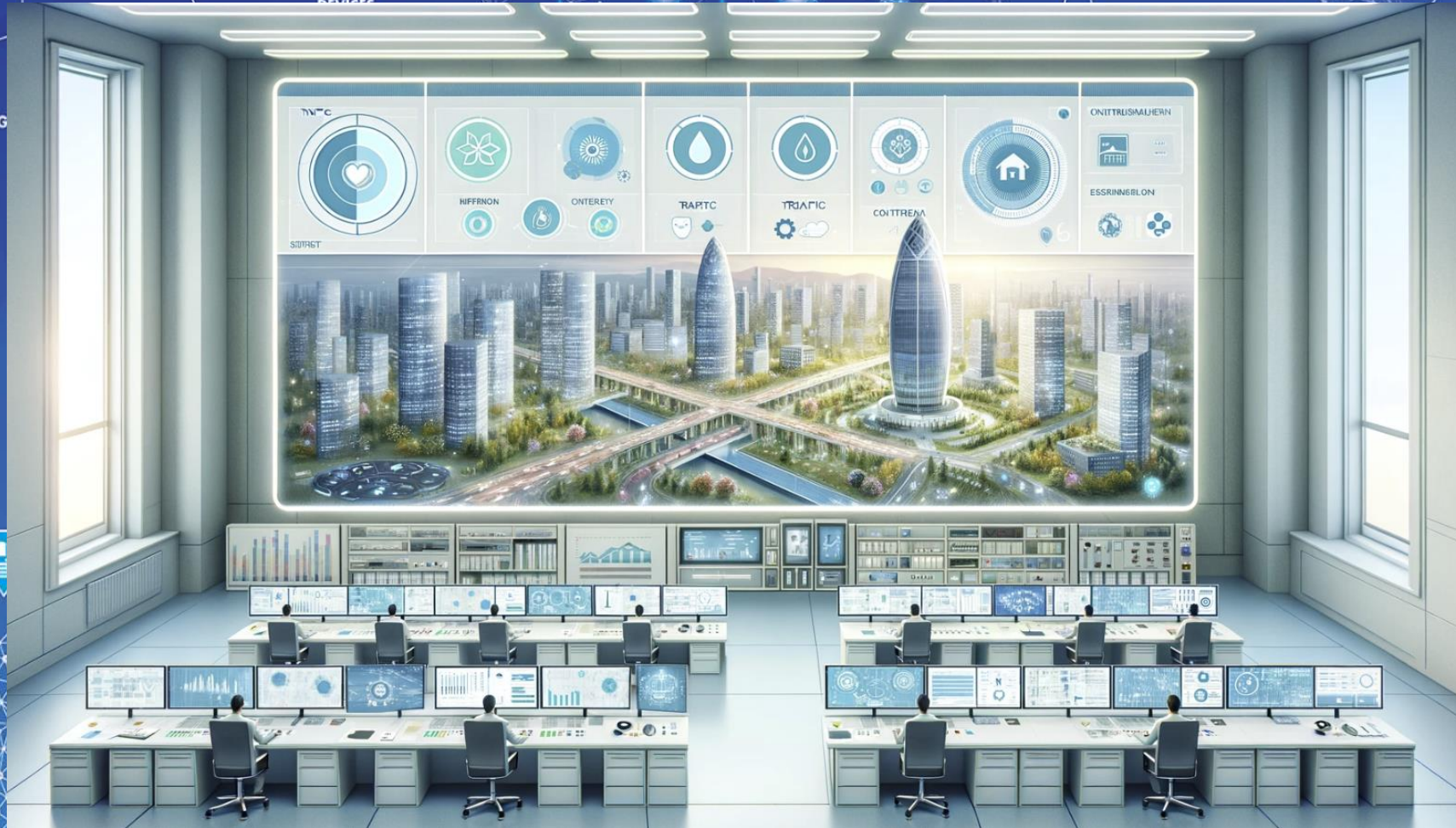
TWITTER VIGILANCE SOCIAL MEDIA ANALYSIS

SNAP4CITY AND KM4CITY PROJECTS

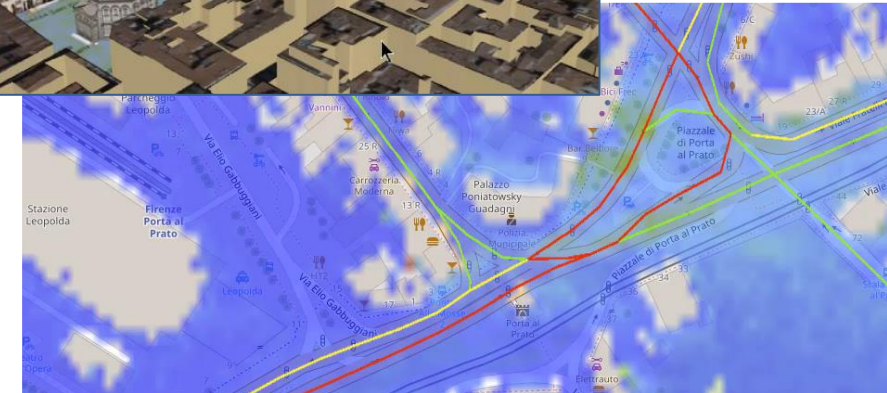
HOW TO ADOPT SNAP4CITY, AND OUR ROADMAP

PORT CITY

SNAP4CITY THE VIEW OF THE ADMINISTRATORS



- **Controlling Status: management, and operational**
 - Monitoring via KPI
 - Computing predictions and KPI
 - Anomaly detection, Early warning
 - Control Rooms, situation rooms
- **Reacting: Computing in real time**
 - Changing semaphore maps
 - Changing Dynamic signage
 - Real time Info Mobility
 - User engagement via Mobile Apps
 - What-if analysis
 - etc.,



Control Room



Decision Support System:

Immediate response and Tactical and Strategic Plans, via What-if Analysis

FROM CITY DASHBOARD TO APPLICATIONS

FORGING & MANAGING OPEN ARCHITECTURE AND ECOSYSTEMS

IOT APPLICATIONS

CAPACITY FOR PLANNERS

SNAP4CITY ARCHITECTURE AND ECOSYSTEM, OPENED TO DEVELOPERS AND STAKEHOLDERS

TWITTER VIGILANCE SOCIAL MEDIA ANALYSIS

SNAP4CITY AND KM4CITY PROJECTS



**VISIT US
HALL 2
D160**



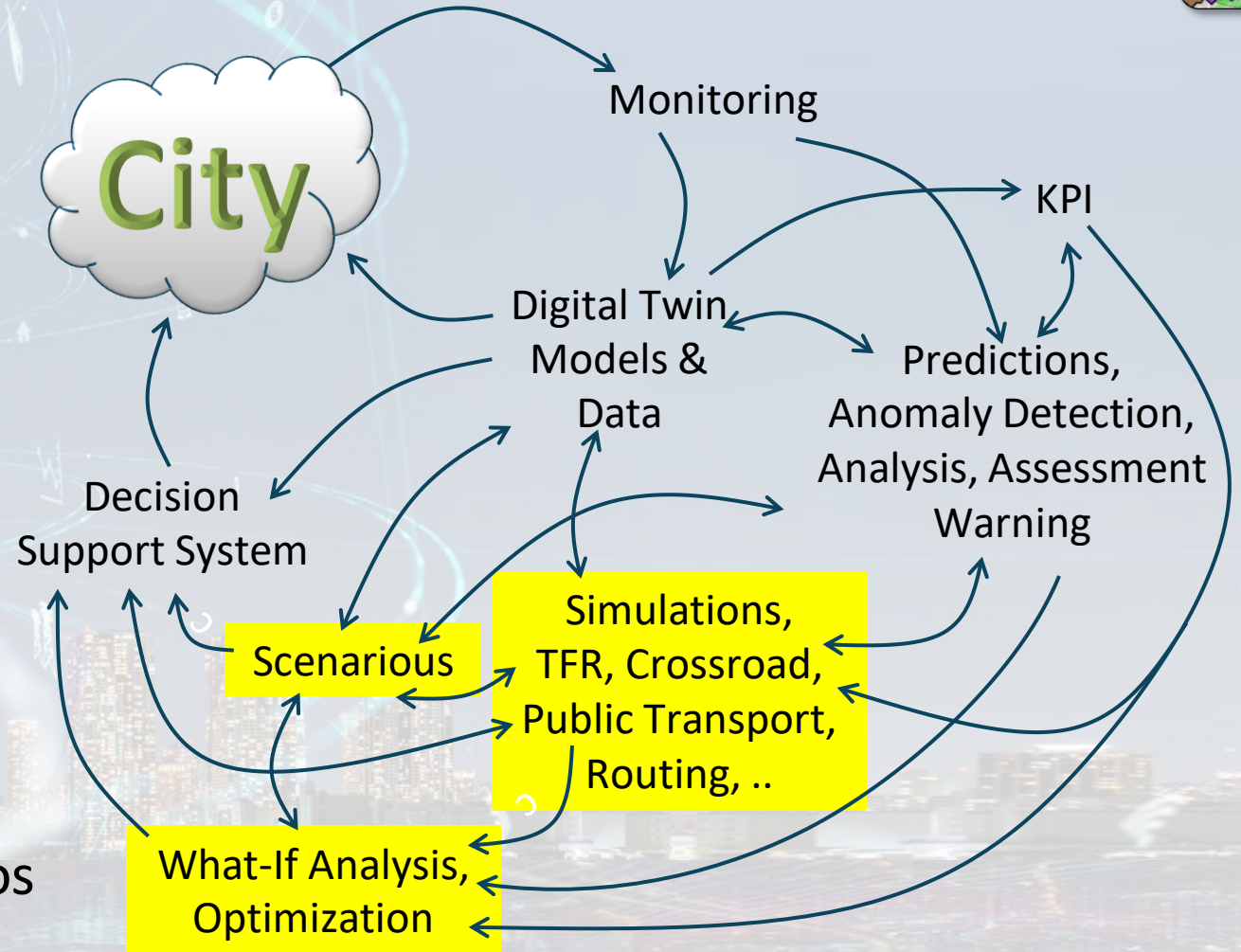
From What-If to Decision Support System

- **Controlling Status:** management, and operational

- Monitoring via KPI
- Predictions vs KPI
- Anomaly detection
- Neuro-Symbolic analysis
- Risk assessment
- Early warning on critical conditions

- **Making plan:** tactic and strategic, medium and long range, micro/macro

- Simulation & optimization
- Generative AI Prescriptions, scenarios
- Resilience to Unexpected unknowns
- What-if analysis wrt scenarios





Ciao roottooladmin!

Fri 2 Sep 19:13:07

3D MAP GLOBAL DIGITAL TWIN - NEWGUI



3D MAP

Enable Lights

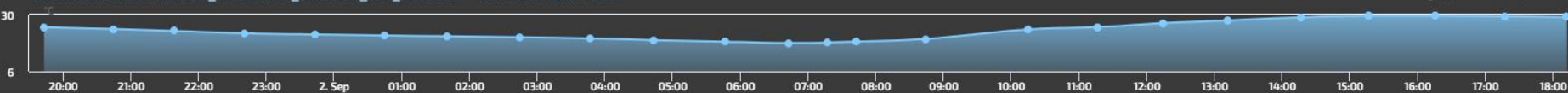
Datetime: 02/08/2022 10:11

Enable dynamic shadows (experimental)

Free street
Fluid traffic
Heavy traffic
Very heavy
Sensor position

FirenzeFIPILITrafficRealtime
Traffic Heatmap Controls: 24H
Max Opacity: 1
< Prev 2022-09-02 18:56:00

DISIT:ORIONUNIFI:TUSC_WEATHER_SENSOR_OW_3176959 - AIRTEMPERATURE





Ciao

Fri 13 Oct 18:29:18

FLORENCE SCDT

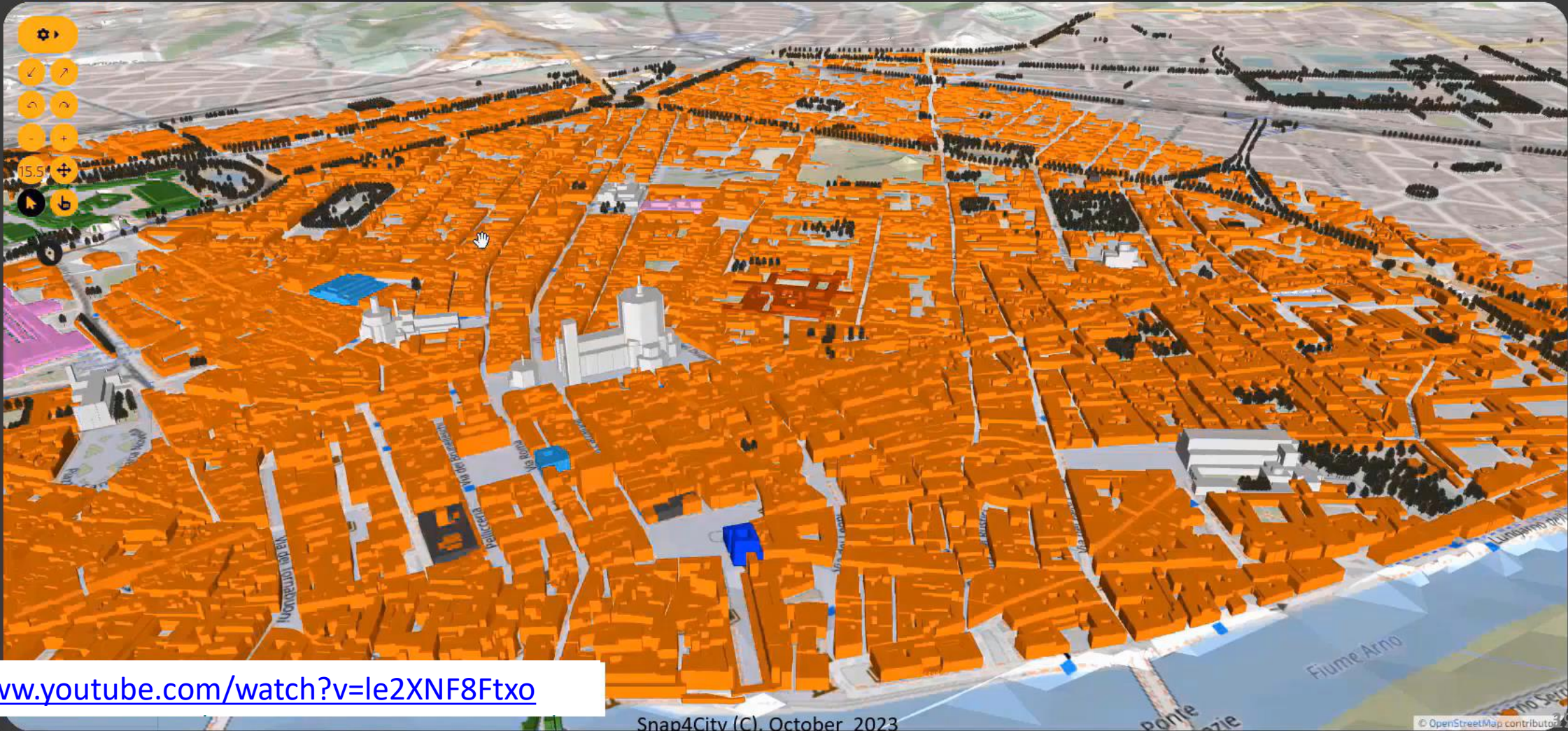


SELECT...

- GRAL HD
- NO 2
- Mobile
- Bar chart
- Highway
- Highway
- Bus
- WHAT-IF
- Car
- Person
- Bicycle

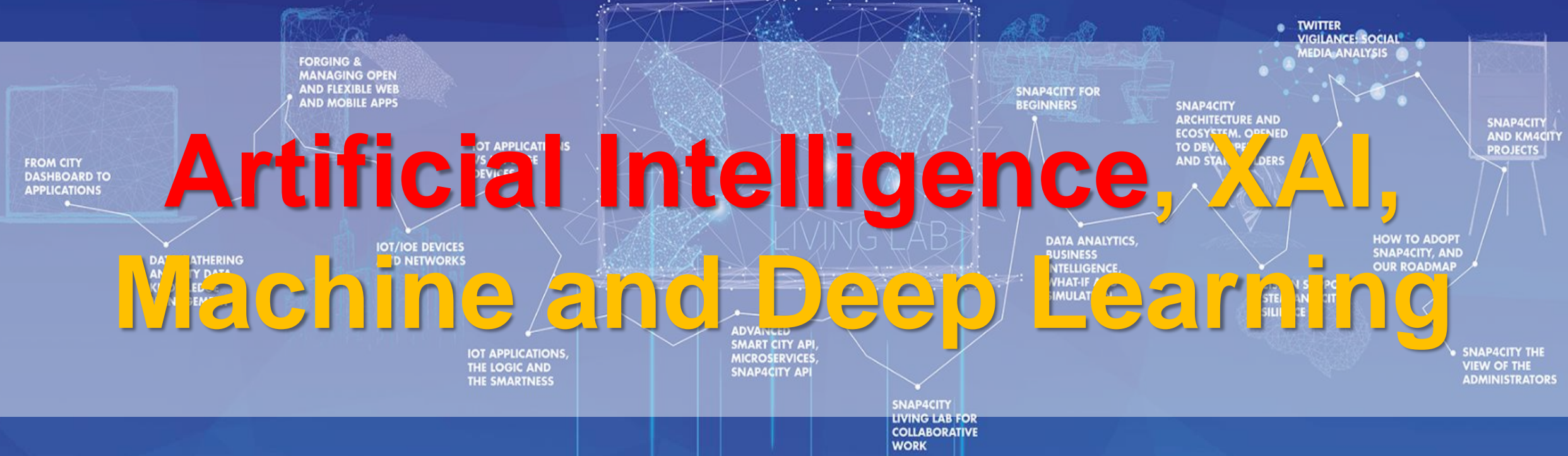
DOUBLE MAP

- Settings
- Home
- Navigation
- Layers
- Zoom 15.5
- Map rotation
- Map style



<https://www.youtube.com/watch?v=le2XNF8Ftxo>

Artificial Intelligence, XAI, Machine and Deep Learning





Available AI Solutions on Snap4City

<https://www.snap4city.org/997>

More than 80 Available Solutions & 300 AI applic.

- **Mobility and Transport**
- **Environment, Weather, Waste, Water**
- **City Users Behaviour and Social analysis**
- **Energy and Control**
- **Tourism and People**
- **Security and Safety**
- **High Level Decision Support Solutions**
 - **Asset management**
 - **Resilience and Risks Analysis**
- **Low level Techniques**



https://www.snap4city.org/download/video/DPL_SNAP4SOLU.pdf

<https://www.snap4city.org/download/video/course/p4/>



• **15 Minute City Index:**

- 13 subindexes: energy, slow mobility, fast mobility, housing, economy education, culture and cults, health, entertainment, gov, food, security...



- Optimization of car sharing/pooling
- Monitoring and Prediction of energy consumption
- Stimulating: Bike sharing, e-bikes, car charge, etc.
- Sizing energy plants



- Predictive maintenance
- Decisions Support Systems
- Process optimization, control
- Industry 4.0 integrated solutions



- Reduction of emission, reduction of congestion
- Smart City infrastructure: monitoring and resilience, long terms predictions
- Effective and Low cost smart solutions
- What-if analysis, Simulations
- Origin Destination matrices computation



- Optimization of Waste Collection
- business intelligence tools for decision makers
- Reduction production costs
- Monitoring resource consumption



- Reduction of emission, reduction of congestion
- Monitoring and Predicting: NO2, NOX, CO2, Traffic flow, pollutant, landslide, waste, etc.
- Traffic flow reconstruction
- Demand vs Offer of Mobility analysis



- Shortening justice time
- Prediction of mediation proneness
- Assisting institution is taking legal decisions
- Anonymization and indexing legal docs.
- Ethical Explainable Artificial Intelligence

Predictions and Heatmaps in Real Time

The screenshot displays the SNAP4CITY web application interface, titled "Computing Predictions And Heatmaps". The interface is divided into several sections:

- Left Sidebar:** A navigation menu with icons for Scenario Editor, Air quality Sensors, Weather Sensors, Traffic Sensors, OpenWeather, and Traffic Flow.
- Map Area:** A central map of Florence showing traffic sensors (red icons) and heatmaps. A "Selector - Map" panel is visible, including a "MAPS" dropdown, zoom controls, and a "Vehicle Flow" legend with categories: Free (green), Fluid (yellow), Heavy (orange), and Very heavy (red). There are also "View" and "Edit" buttons, and checkboxes for "Show Road graph" and "Show Traffic Sensors".
- Right Panel:** A control panel with buttons for "Compute Predictions", "Compute Heatmaps", and "Show Heatmaps". It includes a "Data Update" button, a "Select a Scenario" dropdown (currently showing "paolo6"), a "Scenario Version" dropdown (showing "2024-10-11 22:46:45"), and "Load Scenario" and "Clean" buttons. Below these are sliders for "Heatmap Controls" (Max Opacity: 0.35, 2024-10-09 12:47:00) and "Traffic Heatmap Controls" (Max Opacity: 0.94, 2024-10-13 16:56:00+02:00). There are also options for "Clustered" (Yes/No), "File" (Yes/No), and "Model" (IDW). Date pickers for "From Date" and "To Date" are present, along with a "Generate Heatmap" button.
- Bottom Left:** A chart titled "CongestionLevel - 4 Hours" showing a line graph of congestion levels over time (20:00 to 16:00 on 13 Oct). The y-axis ranges from 0 to 1000. A zoom level of "6m" is indicated.
- Bottom Right:** A chart titled "Selected Trend And Predictions" showing a line graph of vehicle flow over time (20:00 to 20:00 on 13 Oct). The y-axis ranges from 0 to 800. It compares "METRO1128 - vehicleFlow" (actual) and "METRO1128 - Predicted - vehicleFlow" (predicted). A zoom level of "11m" is indicated.

Mobility and Transport

FROM CITY DASHBOARD TO APPLICATIONS

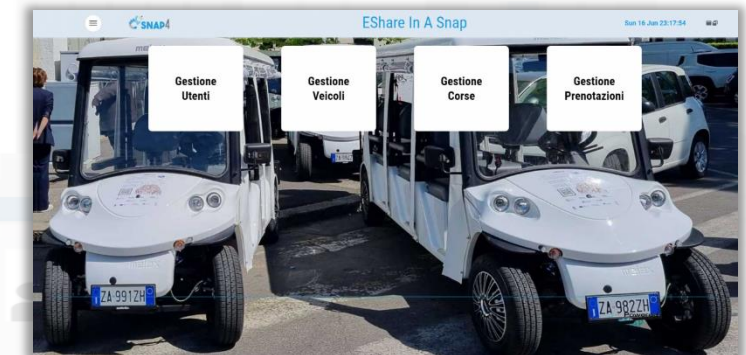
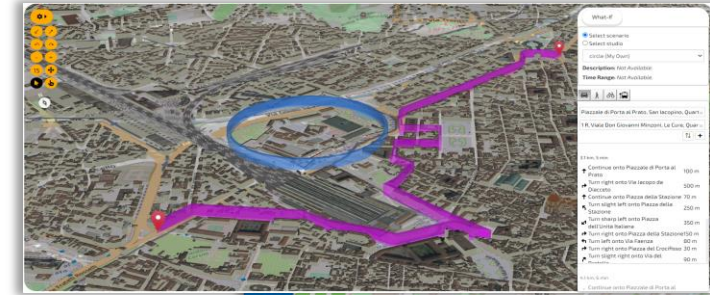
DATA GATHERING AND CITY DATA KNOWLEDGE MANAGEMENT

TWITTER VIGILANCE SOCIAL



Mobility

- **Goals:**
 - Decongestion, Decarbonization, costs reductions
 - Improve Accessibility to services
 - Improve Security/Safety of city users
- **Operation and Plan:**
 - Traffic monitoring, prediction, reconstruction, identification of critical conditions (early warning), fleet management, dynamic routing, multimodal routing, city user behaviour analysis
- **Optimization and what-if analysis traffic light, infrastructure**
 - **Reduction:** travel time, waiting time, stops, CO2 emissions, consume fuel, travel time for tramways
- **Public Transport:** analysis of Mobility Demand vs Offer of Transportation
- **Parking Management:** monitoring, prediction, any payments, on/off-road
- **Sharing / Pooling Management:** eShare and mobile app, bikesharing, smart bike, fleet management
- **KPI:** SUMI/SUMP, travel time, emissions, traffic status, accessibility, ..
- **Mobile App:** final users and operators
 - Info Mobility, traffic reconstruction, charging, participation,
 - Parking, payments, overparking, fine reporting, ..
- **Participatory:** problem reporting, ticketing, etc.
- **Data Integration of any kind:** env, weather. Tickets, presences, POI, sat, etc.



What-if on TFR

Traffic Flow Analysis By Scenario

Mon 23 Sep 12:53:12

- ▶ Scenario Editor
- ▶ Some Points of Interest
- ▶ Traffic Sensors
- ▶ Air Quality Sensors
- ▶ Weather Sensors (OW)
- ▶ Bus Stops
- ▶ Tram Stops

INIT to ACC
Compute TFRS
Compute KPI
Show TFR

enrico909 2024-09-23 12:06:03 (tfr)

2024-09-23T15:00:00+02:00

KPI	Value
Total CO2 emissions [ug/m^3]	13,979.071
Total fuel consumed [l]	0.249
Traffic state objective function [#]	3.935
number of vehicles [#]	51.394
total kilometers [km]	3.886
total travel time [s]	314.575

DISIT:OrionUNIFI:METRO1098 - VehicleFlow 8m ↻

Time Series 3m ↻

My Profile

Optimization of Traffic Light Plan

Traffic Flow Analysis By Scenario Fri 25 Oct 17:56:16

Scenario Editor
Some Points of Interest
Traffic Sensors
Air Quality Sensors
Weather Sensors (OW)
Bus Stops
Tram Stops

Load Scenario: Init Acc
Scenarios waiting to be processed: StatutoCase1
Scenario version: 2024-10-25 16:36:59

INIT to ACC **Compute TFRS** **Compute KPI** **Show TFR**

Data Update
FortezzaCase1
Execution

DISIT:OrionUNIFI:METRO1098 - VehicleFlow 8m

Time Series 3m

© DISIT:orionUNIFI:METRO1098 - concentration

Current Scenario: downtown-toron...

CANCEL PAUSE HELP

slow fast

Delay: 450.0 ms

Stats

time: 112.000 s
payload: 5.0 KB
simulate: 12.35 ms
snapshot: 1.68 ms

Vehicle Summary

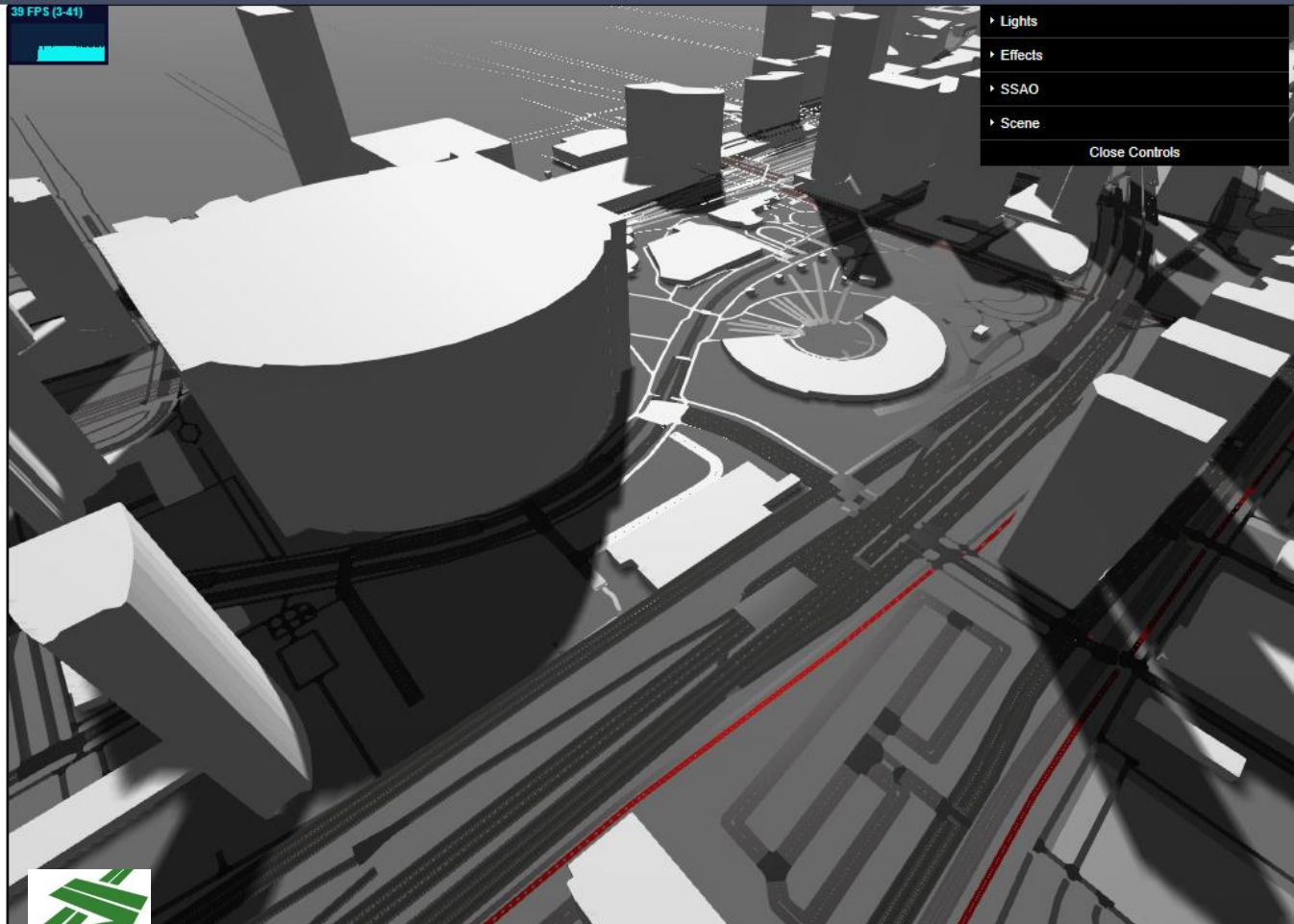
bike(s): 48
car(s): 55
person(s): 5

Quick Find

OSM ID / Lat, Long (float, float) / X,Y (int, int)

SEARCH

CAR BIKE TRAIN
TRAM PERSON BUS
LIGHT



Prepare Simulation Execute Simulation KPI Simulation

AlessandroScenario30_20240926095651

Get KPI

Vehicles in simulation

- car: 1548
- tram: 16

Totals

- Mean Arrival Speed (m/s): 13.723
- Total Duration (s): 1193.980
- Total Time Loss (s): 601.207
- Total Waiting Count (#): 6.177
- Total Waiting Time (s): 63.047

Flow	Arrival Speed (m/s)	Duration (s)	Time Loss (s)	Waiting Count (#)	Waiting Time (s)
flow1	13.634	41.161	25.211	0.036	0.089
flow10	16.611	95.131	58.090	0.404	2.253
flow11	17.330	23.485	12.397	0.000	0.000
flow12	15.420	94.908	60.891	0.980	8.082



Traffic Infrastructure Optimization

☰
SNAP4CITY
Traffic Infrastructure Optimization
Mon 14 Oct 19:45:10

- ▶ Scenario Editor
- ▶ Some Points of Interest
- ▶ Traffic Sensors
- ▶ Air Quality Sensors
- ▶ Weather Sensors (OW)

Load Scenario: Init Acc

Scenarios waiting to be processed: AlessandroScenario30

Scenario version: 2024-09-26 11:52:20

Load Scenario Clean

Road Types:

<input checked="" type="checkbox"/> abandoned	<input type="checkbox"/> Select All	<input type="checkbox"/> Unselect All
<input checked="" type="checkbox"/> corridor	<input checked="" type="checkbox"/> bridleway	<input checked="" type="checkbox"/> bus_guideway
<input checked="" type="checkbox"/> emergency_access_point	<input checked="" type="checkbox"/> crossing	<input checked="" type="checkbox"/> bicycleway
<input checked="" type="checkbox"/> motorway	<input checked="" type="checkbox"/> emergency_bay	<input type="checkbox"/> highway
<input checked="" type="checkbox"/> primary	<input checked="" type="checkbox"/> motorway_link	<input checked="" type="checkbox"/> no
<input checked="" type="checkbox"/> residential	<input checked="" type="checkbox"/> primary_link	<input checked="" type="checkbox"/> private
<input checked="" type="checkbox"/> services	<input checked="" type="checkbox"/> rest_area	<input checked="" type="checkbox"/> road
<input checked="" type="checkbox"/> traffic_island	<input checked="" type="checkbox"/> ramps	<input checked="" type="checkbox"/> tertiary
<input checked="" type="checkbox"/> secondary	<input checked="" type="checkbox"/> yes	<input type="checkbox"/> pedestrian

INIT to ACC
Optimize Scenario
Optimization results

Data Update

deviceNameAlessandroScenario30_2024-09-26 09-56-51

v1

Fetch Data

Optimization completed!

Objective	Before	After
Traffic State	5.28	5.1610000000000005
Fuel	0.6710494492002909	0.3491240463440088
CO2	17002.113327545154	13283.979223768334

Before

After



UNIVERSITÀ
DEGLI STUDI
FIRENZE

DINFO
DIPARTIMENTO DI
INGEGNERIA
DELL'INFORMAZIONE

DISIT
DISTRIBUTED SYSTEMS
AND INTERNET
TECHNOLOGIES LAB

SNAP4CITY



Human Behavior: analysis & security

PROGRAMMING & MANAGING CONTENT AND FLEXIBLE WEB AND MOBILE APPS

SNAP4CITY FOR BEGINNERS

SNAP4CITY ARCHITECTURE AND PROJECTS

SNAP4CITY AND KM4CITY PROJECTS

FROM CITY DASHBOARD TO APPLICATIONS



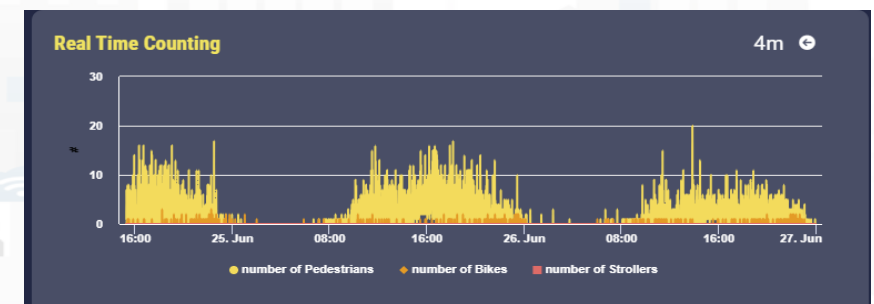
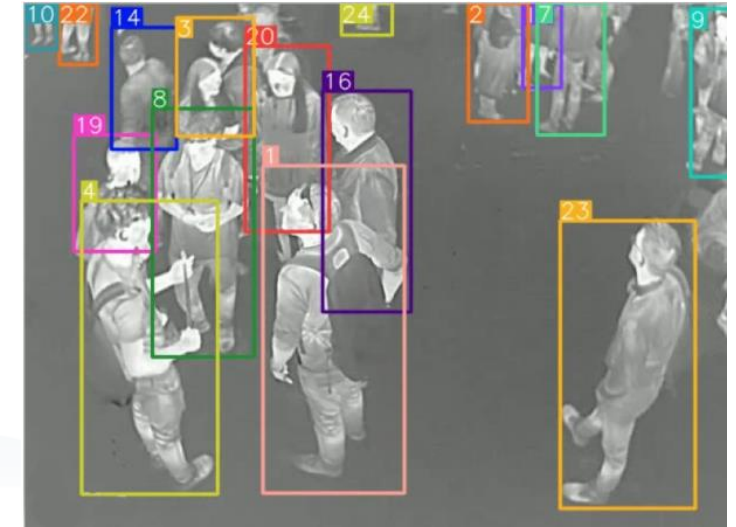
SNAP4CITY THE VIEW OF THE ADMINISTRATORS

**VISIT US
HALL 2
D160**

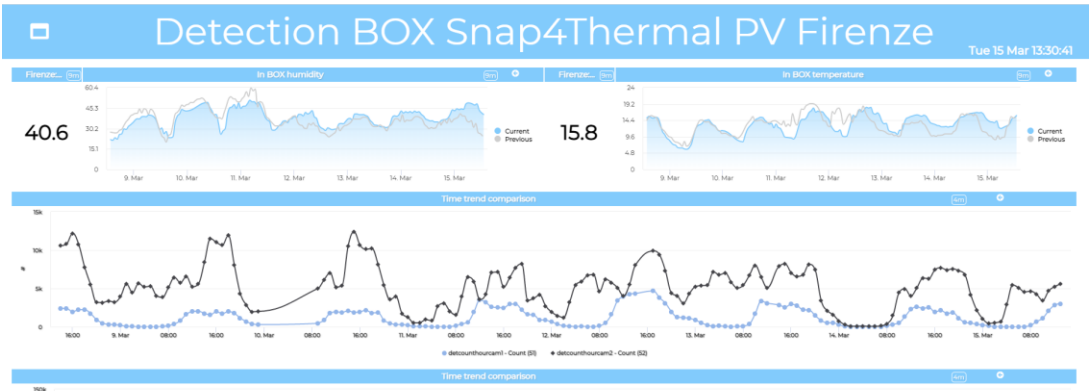


City User Behaviour/services, Tourism and Safety

- **Goals:**
 - Improve Quality of Life and quality of services,
 - Over tourism mitigation, sustainability
 - Costs reduction of services
 - Improve accessibility to services: citizens, Tourists, commuters, etc.
 - Improve Security/Safety of city users
- **People Flow Analysis / Management:** in/out-door, retail, attractions
 - Counting, tracking, Flows, ODM, sentiment, etc.,
 - multiple sources: thermal & TV cameras, radar sensors, PAX sniffers, mobile data, ...
 - Data and/or OD matrices from: Wi-Fi, traffic data, mobile phone data
 - **Suggestions:** info Tourism, digital signages, engagement, ..
- **Tourists Flows & Retail Management:** predictions of presences, services' reputations, suggestions on second offer, over-tourism, notifications, early warning,
- **KPI:** 15 MinCityIndex, energy vs people, over-tourism, accepted suggestions, precision
- **Mobile App:** final users services/informing and operators
 - Info Tourism, people flows, info mobility, sharing, ...
 - Participation, engagement, ..
- **Participatory:** problem reporting, ticketing, etc.
- **Integration of any kind:** env/weather, mobility, ticketing, presences, POI, ..



A view and data from the Thermal Camera



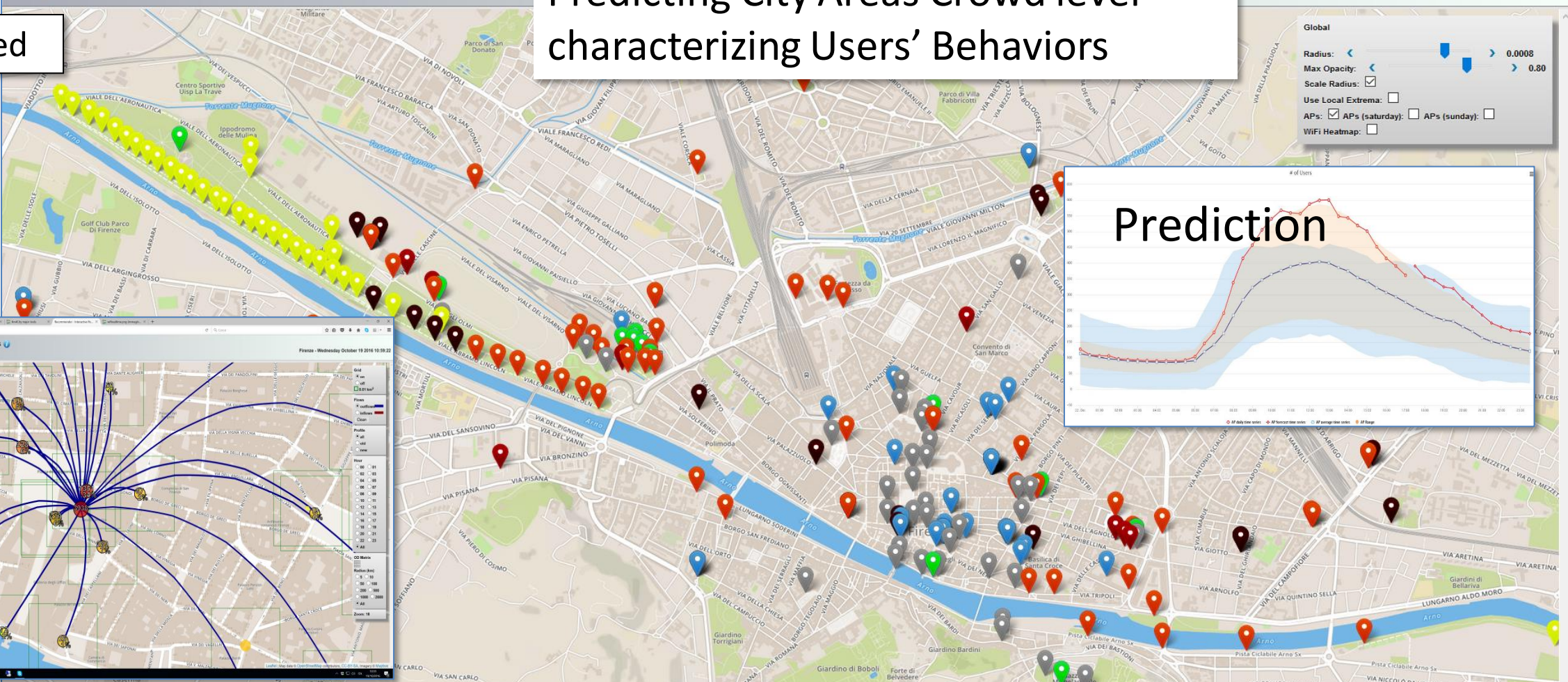
Characterizing City Areas



Firenze Wi-Fi: Access Points Clusters Coverage Map
DISIT - Distributed Systems and Internet Technologies Lab

Predicting City Areas Crowd level characterizing Users' Behaviors

Wi-Fi based



Global

Radius: < 0.0008 >

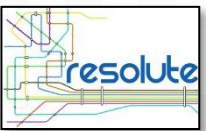
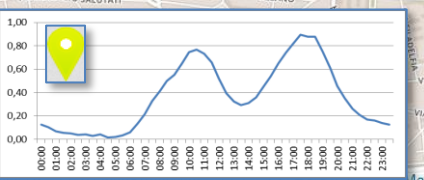
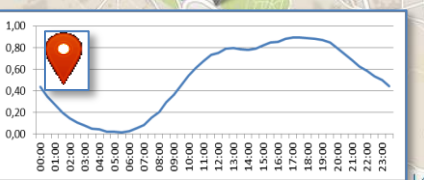
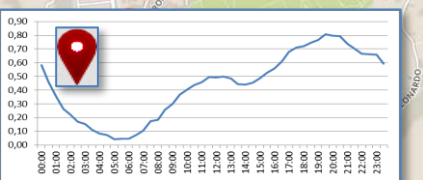
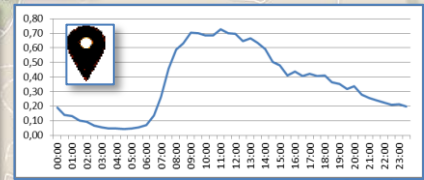
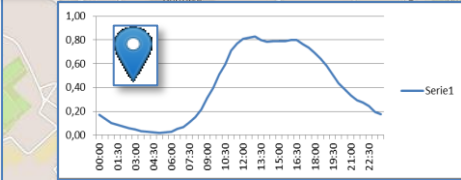
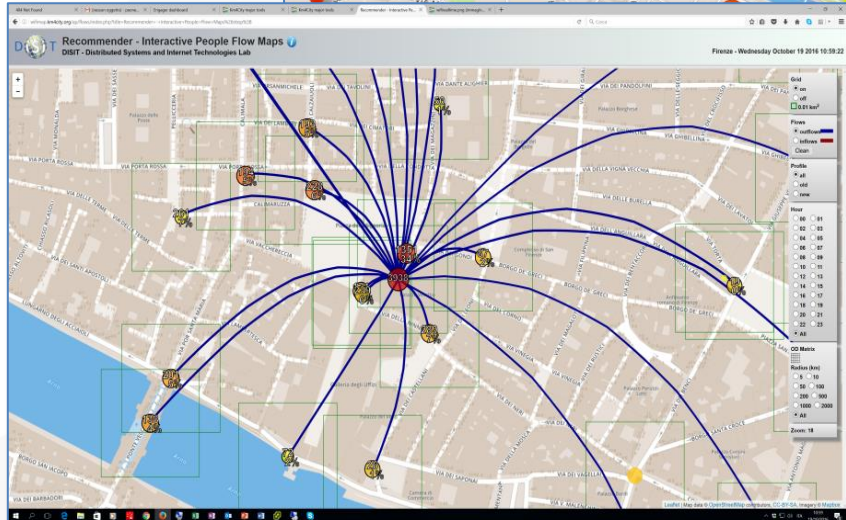
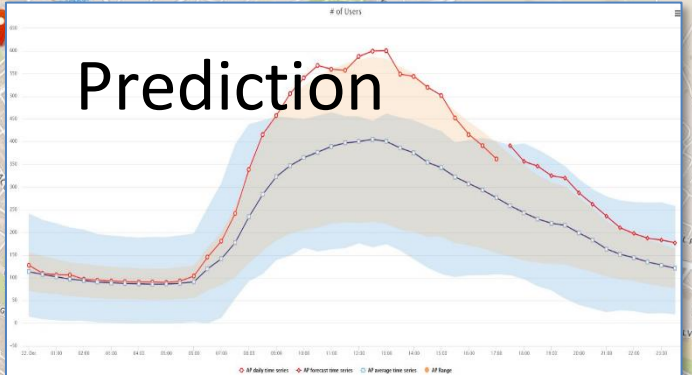
Max Opacity: < > 0.80

Scale Radius:

Use Local Extrema:

APs: APs (saturday) APs (sunday)

WiFi Heatmap:





2020



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



- Smart Mobility
- PISA, PUMS
- Living lab



Km4City 1.6.7

Smart Ambulance (2021-22)



Contract

2021

PC4City (2020-21) Monitoring Terrain



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



2023



Contract, 2022-23



2022-2023



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



UrbanDT4TF

ELLIE IA 2025-2027



Contract, 2024-25

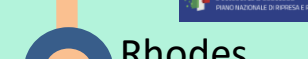
CAI4DSA



OPTIFaaS



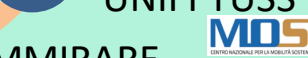
SASUAM



Rhodes, smart city

eShare

UNIFI TUSS



AMMIRARE



SNAP4CITY



CITY



INDUSTRY



ARTIFICIAL INTELLIGENCE

FROM CITY DASHBOARD TO APPLICATIONS

SNAP4CITY AND KM4CITY PROJECTS



SASUAM, OPTIFaas



UNIVERSITÀ DEGLI STUDI DI NAPOLI FEDERICO II



CAI4DSA



AMMIRARE



MARITTIMO-IT FR-MARITIME



UNIVERSITÀ DEGLI STUDI DI CAGLIARI



ASM Merano Stadtwerke Meran



Città di Cuneo



Rodhes



Santa María la Real fundación



FUNDACIÓN VALENCIAPORT



READ S.A. Development Agency of South Aegean Region

CAPELON



rerasd



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European Commission Joint Research Centre



FREE TRIAL



gaia-x



E015 digital ecosystem

AP4CITY THE W OF THE MINISTRATORS

booklets



- Smart City



https://www.snap4city.org/download/video/DPL_SNAP4CITY.pdf

- Industry



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- Artificial Intelligence



https://www.snap4city.org/download/video/DPL_SNAP4SOLU.pdf

