

etc.; Improve security/Safety of city users, risk reduction; Costs reduction of emissions and EC taxations.

- **Horizontal homogeneous platform Uniform Technology for Any Vertical operation/plan**: mobility, energy, environment, security, tourism, infrastructure and assets control, buildings, etc.
- **AI Solutions**: early warning, predictions, simulation, what-if, optimization; Deep Learning, ML, BERT, LLM, XAI (Shap/Lime), etc.
- **Development Environment for any vertical, Digital Twin**: City Global and Local, IoT, VR, Visual Programming, business intelligence, CSBL, SSB, Blockchain, etc.
- **Interoperability**: any format, any protocol, any video management system, any sensor, any device, etc.
- **KPI**: multidomain KPI, general management, early warning, early detection of critical conditions, 15MinCityIndex, SDG, etc.
- **Mobile App**: modular applications, operators' modules, multiple cities, etc.

**Interoperability**: In this large range of solutions, Snap4City is compliant with more than 180 protocols and formats, and it capable to fully interoperate and/or integrate legacy systems. The interoperability, flexibility and modularity of Snap4City together enable the creation of business intelligence applications in a wide range of scenarios and domains. Snap4City enables the creation of federations of Smart solutions via Smart City API. All Snap4City APIs are accessible and well documented for developers, allowing customization and online development.

**Data Integration, ingestion and distribution**: Snap4City provides effective and simple tools and solutions for immediate data ingestion and data aggregation exploiting a large range of protocols and standards. Snap4City provides a range of tools (event driven, real time, push/pull) for shortening the processes for manipulating simple and complex data such as POI, KPI, IoT Devices, Satellite, Digital Twins, BIM, OD Matrices, Traffic Flows, Heatmaps, 3D Shapes/patterns, Typical Time trends, Color Maps, Trajectories, Flows, Video Streams, Scenarios, User profiles, Terrain, Maps, Orthomaps, SVG graphics, etc.

**Security and Privacy**: Snap4City platform passed the penetration and vulnerability tests and has been proven to be GDPR compliant. Snap4City provides end-to-end event-driven secure applications with real time connections from devices to dashboards and vice versa, including data processing, storage and data analytics. <https://www.snap4city.org/549>

Industrial plants optimization, photovoltaic plant simulation; consumption / usage, energy vs temperature, ...

- **Mobile App**: monitoring, info-recharge, e-sharing, booking, ...
- **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, origin destination matrices, sentiment, etc.;
- **Multiple sources**: thermal & TV cameras, radar sensors, PAX sniffers, mobile data, Wi-Fi, traffic data, mobile phone data, card data, etc.
- **Suggestions**: into Tourism, digital signages, engagement, ...
- **Tourists Flows & Retail Management**: predictions of presences, services' reputations, suggestions on second offer, over-tourism mitigation, 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, into mobility, sharing, participation, engagement, ...
- **Goals**: reduction of emissions and EC taxations; cost reduction for waste collection; reduction of waste collection impact on mobility
- **Environment and Waste Management solutions and applications**: short-term predictions, early warning; GHG, emissions, pollutants, aerosol, chemical plants analysis; land and slide, coastal erosion (blue economy); Traffic Flow impact emissions, predictions.
- **Waste Management and Optimization**: costs reduction, optimal routing production on bins, alarms.
- **KPI**: SDG, 15MinCityIndex, QOS, costs, Km, collecting time, EC KPI, emissions
- **Mobile App**: final users services/informing and operators; Info Waste for operators; participation, optimal routing, RAE Collection, ...
- **the above plus: governance, security, asset management, solutions and applications**
- **Goals**: Increase quality of Life, quality of services; Decongestion, Decarbonization, Sustainability; Increase efficiency and production optimization; Improve accessibility to services: citizens, tourists, commuters, etc.

**Mobility and transport solutions and applications**:

- **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), dynamic routing, multimodal routing, city user behaviour analysis.
- **Optimization and what-if analysis**: traffic light plans, traffic infrastructure. Reduction of: travel time, waiting time, stops, CO2 emissions, consume fuel, travel time for tramways.
- **Public Transport**: Analysis of Mobility Demand vs Offer of Transportation (DORAM2)
- **Parking Management**: monitoring, prediction, any payments, on-road/off-road.
- **Sharing / Pooling Management**: eShare and mobile app, bike-sharing, smart bike, fleet management.
- **KPI**: SUMI/SUMT, travel time, emissions, traffic status, accessibility, ...
- **Mobile App**: final users and operators: Info Mobility, traffic, parking, payment, fine management, city user participation, charging, ...
- **Goals**: Energy consumption reduction; increase of efficiency; areas and building sustainability; Improve accessibility to services, security and safety.
- **Energy Monitoring**: Building, floors, rooms, recharging poles, cabinets, Community of Energy, Data centres, Energy for Hot / cold, air condition, energy vs temperature and usage, etc.
- **Energy Management**: Predictions, early warning, identification of critical conditions
- **Smart Light Management**: LED/mix, cabinets; lights control vs traffic, lights vs security, luminaires profiling, group management, ...
- **Smart Building Management**: consumption, number of people, communities of energy, photovoltaic plants, sustainability, ...
- **KPI**: Energy consumption, efficiency, light profiling and adaptation; out/closure

## SNAP4CITY SOLUTIONS

**Snap4City** provides solutions for city operation and plan in multiple domains. Snap4City is a 100% open-source platform used in many cities and areas, includes Km4City (<https://www.snap4city.org/467>, <https://www.fiware.org/>), EOSC Platform, official Node-RED Library, official E015 API, etc. Snap4City is provided "as a Service" or installed on private and public clouds, and on your premise (from yourself, as well as using a number of Snap4City certified companies), no licence fee is needed.

From security and privacy aspects, Snap4City is GDPR compliant, and passed PENTest. With Snap4City you can create your certified entities, and sequences of events using the provided Blockchain support. End-2-end secure connections are established from devices to dashboards. Snap4City is compliant with OpenID Connect, SSO, European Identity Card, SPID, EU Login, etc.

**Snap4City** platform can cope with any data and information covering multiple domains/scenarios (<https://www.snap4city.org/4>) with integrated Digital Twins (CityVerse, LDT, MIMS Plus, etc.), for operational management, simulation, what if analysis, and strategic plan. Snap4City offer a number of Verticals and Applications.

### SCENARIOS

<https://www.snap4city.org/4>

### ORGANIZATIONS

<https://www.snap4city.org/download/video/cov/>

### INTEROPERABILITY

<https://www.snap4city.org/65>

### APPLICATIONS / PROCESSING

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

### CLIENT SIDE BUSINESS LOGIC

<https://www.snap4city.org/911>

### INSTALLATIONS

<https://www.snap4city.org/738>

### DEVELOPMENT LIFE CYCLE

<https://www.snap4city.org/download/video/Snap4Tech-Development-Life-Cycle.pdf>  
<https://www.snap4city.org/download/video/ClientSideBusinessLogic-WidgetManual.pdf>

### TECHNICAL OVERVIEW

<https://www.snap4city.org/download/video/Snap4City-PlatformOverview.pdf>

### SNAP4CITY FIWARE IMPACT STORY

[https://www.snap4city.org/drupal/sites/default/files/files/FF\\_ImpactStories\\_Snap4City.pdf](https://www.snap4city.org/drupal/sites/default/files/files/FF_ImpactStories_Snap4City.pdf)



### TUTORIAL

<https://www.snap4city.org/944>

### INNOVATIONS

<https://www.snap4city.org/343>

### MOBILE APPS

<https://www.snap4city.org/489>

### ARTIFICIAL INTELLIGENCE

<https://www.snap4city.org/524>

### ARTICLES

<https://www.snap4city.org/78>

**SNAP4CITY SOLUTIONS**

[www.snap4city.org](http://www.snap4city.org)  
[www.snap4solutions.org](http://www.snap4solutions.org)

Smart Energy  
 Operation and Plan  
 Horizontal AI Platform  
 Smart Building  
 Tourism Management  
 Mobility and Transport  
 Environment and Waste Management  
 City Users' Services

100% OPEN SOURCE

[www.km4city.org](http://www.km4city.org)

#snap4city  
 #km4city  
 #disitlab  
 @snap4city

DIGITAL TWIN SOLUTIONS TO SETUP SUSTAINABLE DECISION SUPPORT SYSTEMS AND BUSINESS INTELLIGENCE

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

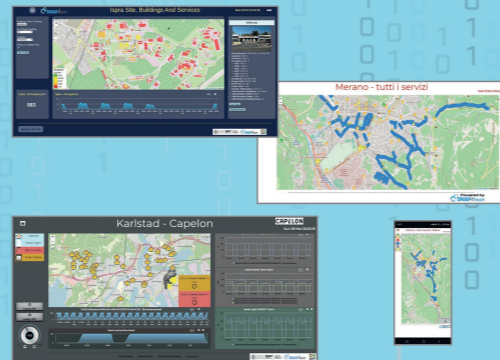
## HORIZONTAL AI PLATFORM



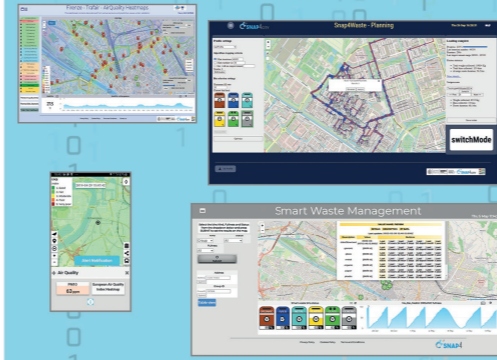
## MOBILITY AND TRANSPORT



## 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

