

Be smart in a SNAP!



7-9 November 2023, Barcelona, Spain

Visit Snap4City in Hall 1

## Dashboards and Visual Analytics

Sept. 2023, Course, Part 2

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

<https://www.snap4city.org/577>

LIVING LAB

SCALABLE SMART ANALYTIC APPLICATION BUILDER FOR SENTIENT CITIES



UNIVERSITÀ  
DEGLI STUDI  
FIRENZE

**DINFO**  
DIPARTIMENTO DI  
INGEGNERIA  
DELL'INFORMAZIONE

**DISIT**  
DISTRIBUTED SYSTEMS  
AND INTERNET  
TECHNOLOGIES LAB



# SNAP4CITY



Powered by

## *scalable Smart aNalytic APplication builder for sentient Cities: for Living Lab and co-working with Stakeholders*

<https://www.Snap4City.org>

Dashboards and Visual Analytics

100%  
OPEN  
SOURCE

Sept. 2023, Course, Part 2

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

<https://www.snap4city.org/577>

Paolo Nesi, [paolo.nesi@unifi.it](mailto:paolo.nesi@unifi.it)

<https://www.Km4City.org>

<https://www.disit.org>





# SMART SOLUTIONS AND DECISION SUPPORT SYSTEMS

CONTROL ROOMS - DECISION SUPPORT SYSTEMS - WHAT-IF ANALYSIS - BUSINESS INTELLIGENCE - SIMULATIONS - SMART APPLICATIONS



DASHBOARDS - VISUAL ANALYTICS - SYNOPTICS - DIGITAL TWIN - GRAPHICAL WIDGETS - ANALYTICS - GUI CUSTOM STYLES - VISUAL PROGRAMMING



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 ...

ANY: DATA, BROKER, NETWORK AND VERTICAL

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

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

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

Native and External  
Applications

Smart Parking

Smart Light

Smart Waste

Smart Energy

Social Media Analysis

...



METHODOLOGIES  
LIVING LABS  
COURSES AND COMMUNITY  
DEVELOPMENT TOOLS



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

<https://www.snap4city.org/577>



*On Line Training Material (free of charge)*

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

	1st part	2nd part	3rd part	4th part	5th part	6th part	7th part	8th
What	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
PDF 2022								
Interactive (2022) with video and animations								

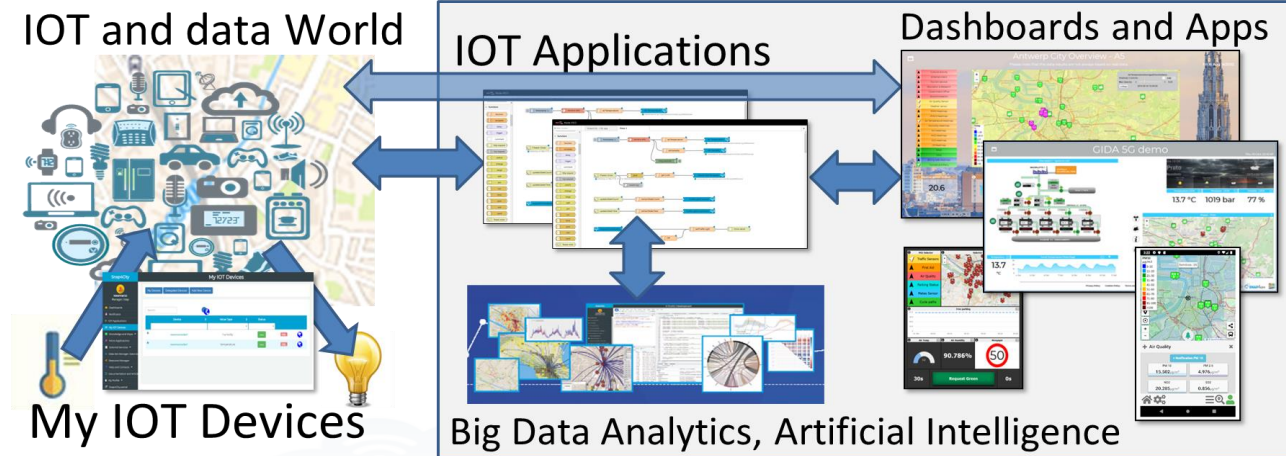
Video1								
Video2								
Video3								
Video4				none		none	none	none

# Note on Training Material

- **Course 2023:** <https://www.snap4city.org/944>
  - Introductionary course to Snap4City technology
- **Course** <https://www.snap4city.org/577>
  - Full training course with much more details on mechanisms and a wider set of cases/solutions of the Snap4City Technology
- **Documentation** includes a deeper round of details
  - Snap4City Platform Overview:
    - <https://www.snap4city.org/drupal/sites/default/files/files/Snap4City-PlatformOverview.pdf>
  - Development Life Cycle:
    - <https://www.snap4city.org/download/video/Snap4Tech-Development-Life-Cycle.pdf>
  - Client Side Business Logic:
    - <https://www.snap4city.org/download/video/ClientSideBusinessLogic-WidgetManual.pdf>
- **On line cases and documentation:**
  - <https://www.snap4city.org/108>
  - <https://www.snap4city.org/78>
  - <https://www.snap4city.org/426>

# Free Trial

- Register on [WWW.snap4city.org](http://WWW.snap4city.org)
  - Subscribe on **DISIT Organization**
- **You can:**
  - Access on basic Tools
  - Access to a large volume of Data
  - Create Dashboards
  - Create IOT Applications
  - Connect your IOT Devices
  - Exploit Tutorials and Demonstrations



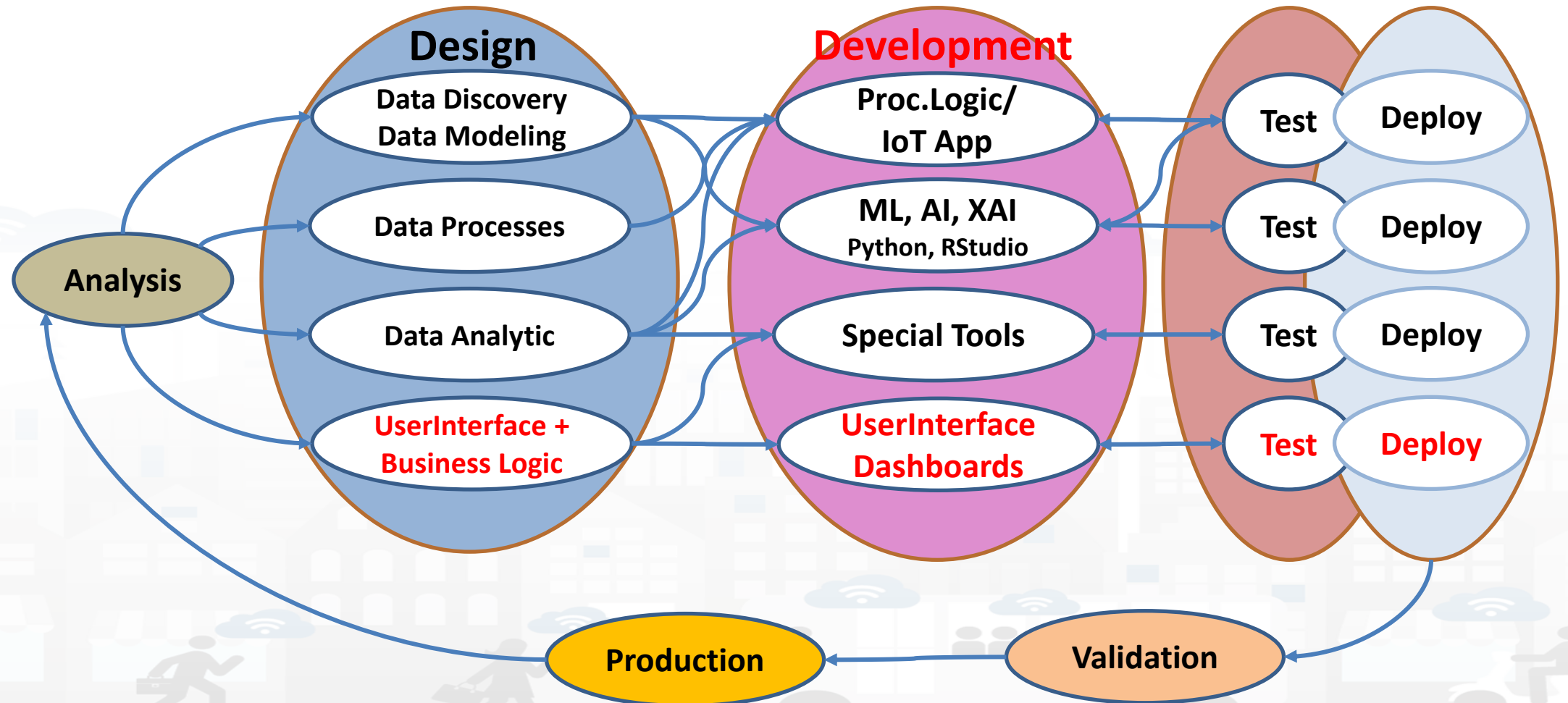
*IF you need to go more in deep you can ask us to pass at the next Role becoming full AreaManager with full rights of development, also for Data Analytics, machine learning, etc.*

# Agenda of this second part

- Recall on Snap4City Architecture
- Snap4City Dashboards Purposes and Uses
  - Snap4City Dashboards vs Technical data monitoring dashboards
  - Snap4City Dashboards main concepts
- Main Data Kinds: data vs representations
- Snap4City DASHBOARDS: Main Concepts and simple Widgets
- Creating a Snap4City Dashboard
  - *Coffe Break*
- Snap4City Multi Data Map Widget
- Snap4City High Level Types
  - Video Streams from TV Cameras
  - External Services (integration of) your or third party web pages
  - Synoptics, Custom Widgets as External Services
- Selector for the Multi Data Map Widget
- Data Inspector vs Data Processes Details
- Dashboard Management
- Training Material

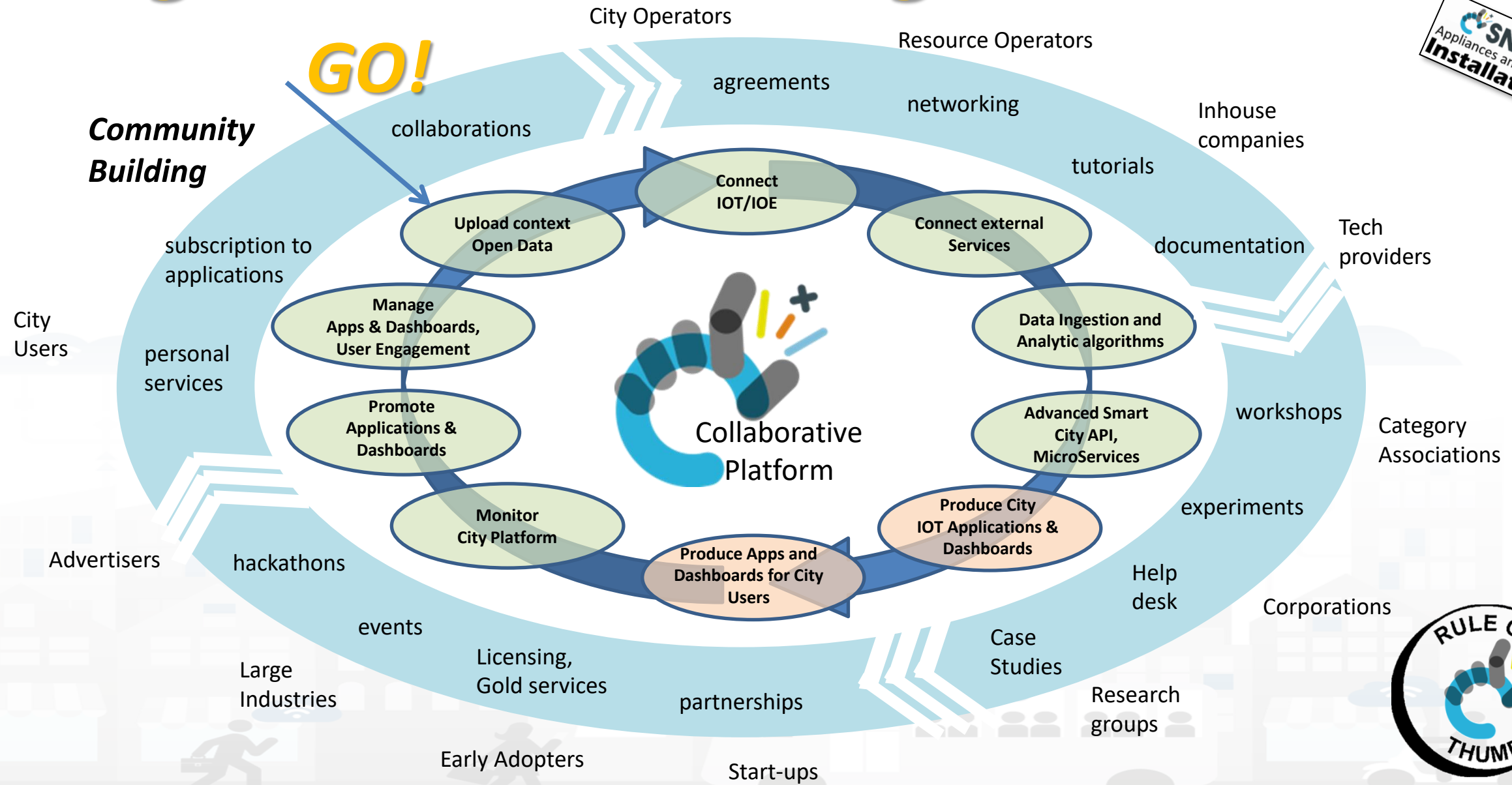
<https://www.snap4city.org/944>

# Development Life Cycle Smart Solutions



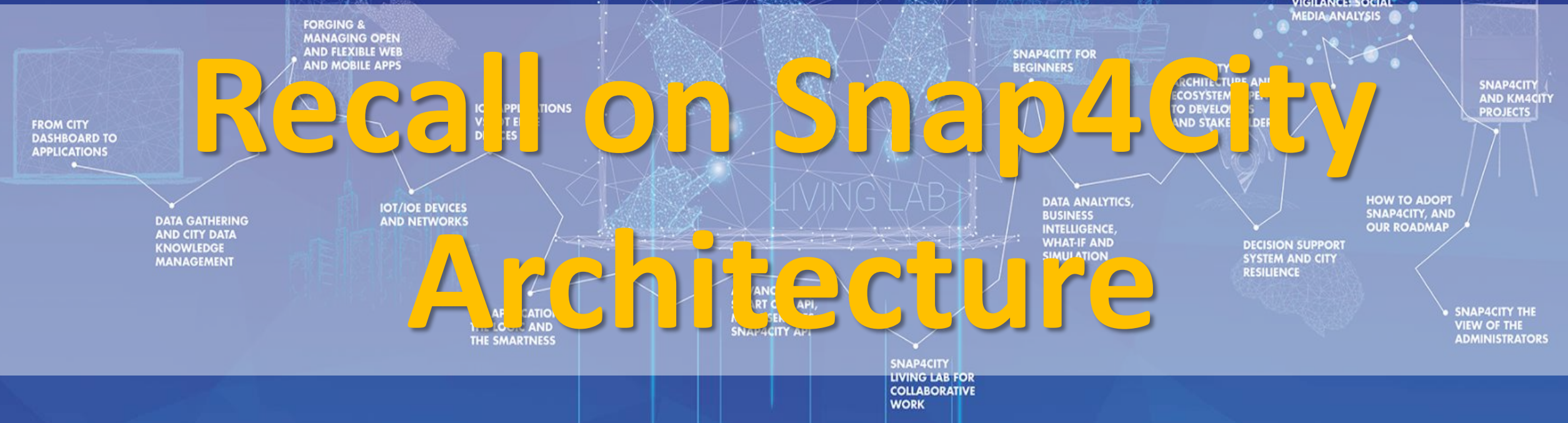


# Living Lab Accelerating

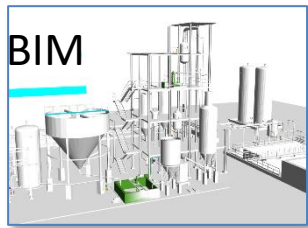


TOP

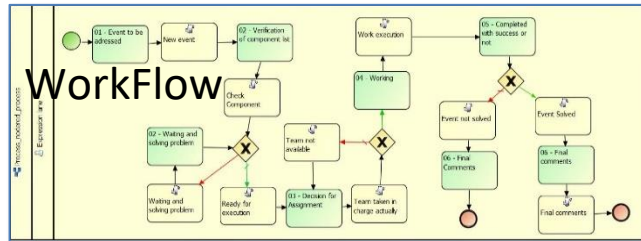
# Recall on Snap4City Architecture



# Concept



KPI, POI, MyKPI, ...  
API, External Services  
Web Scraping



Artwerp City Overview - A5  
GIDA 5G demo  
13.7 °C 1019 bar 77 %  
Air Quality  
My Data Dashboard Kibana  
7,642,593  
Dashboards and Apps

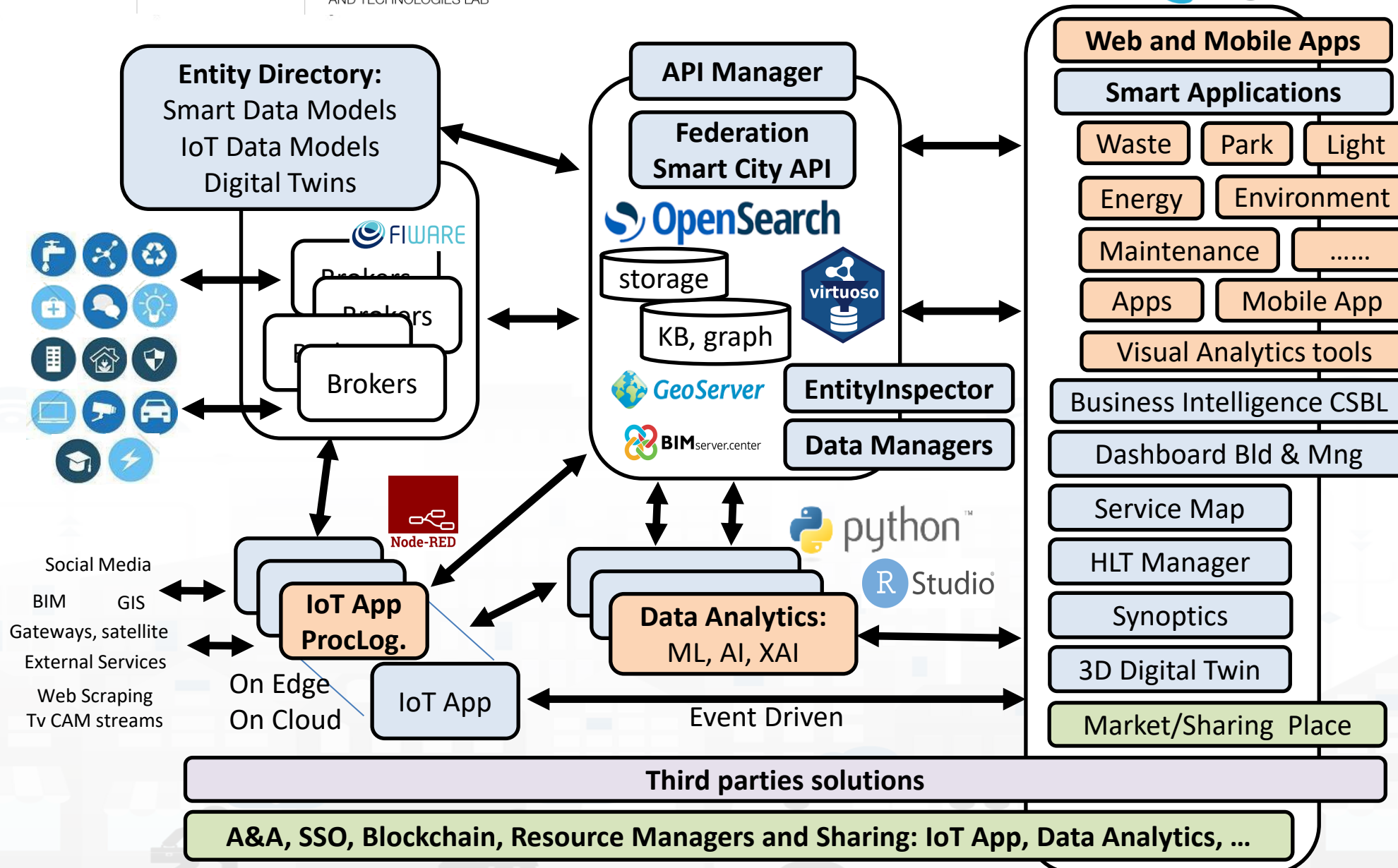


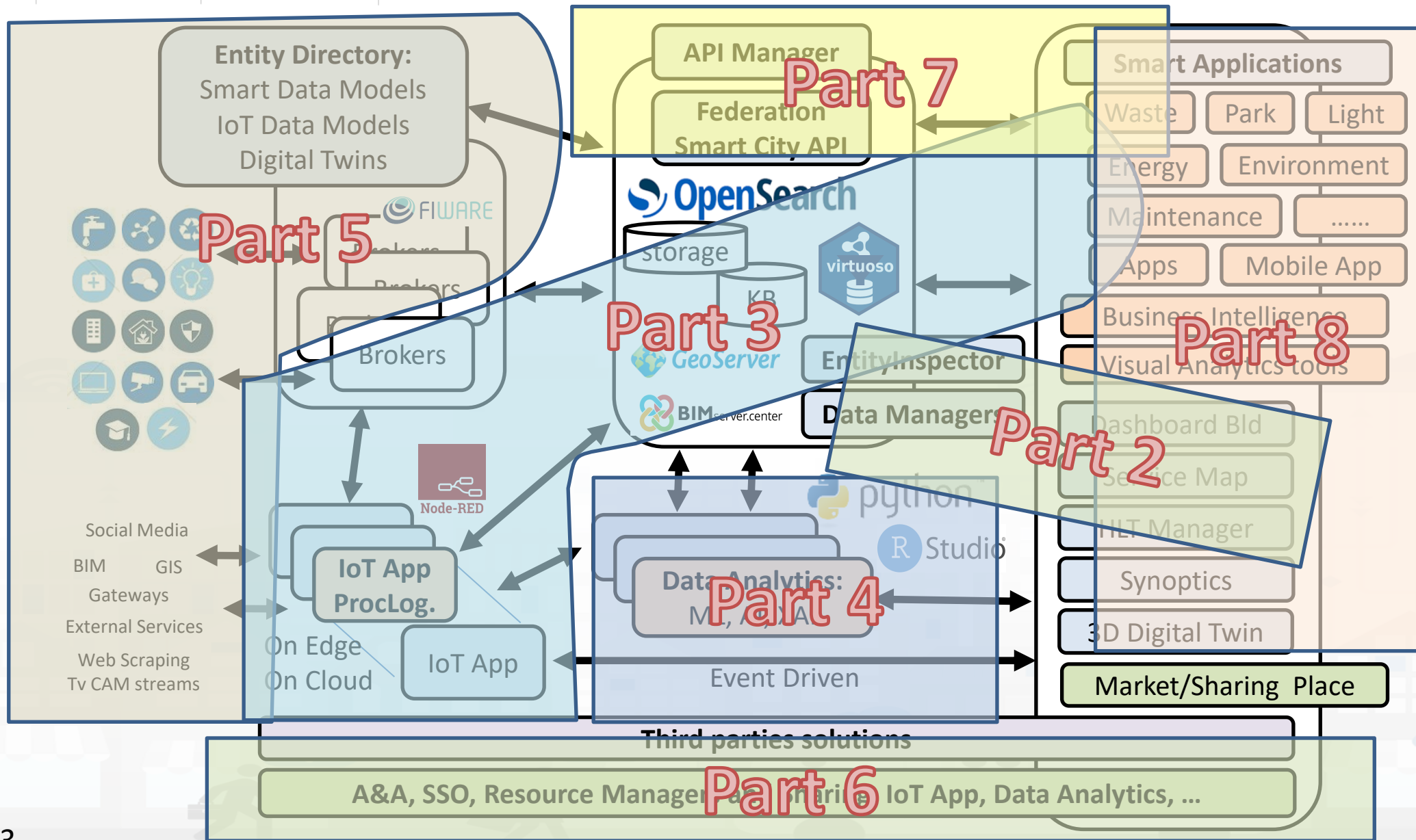
IOT Apps  
Data Analytics,  
Artificial Intelligence

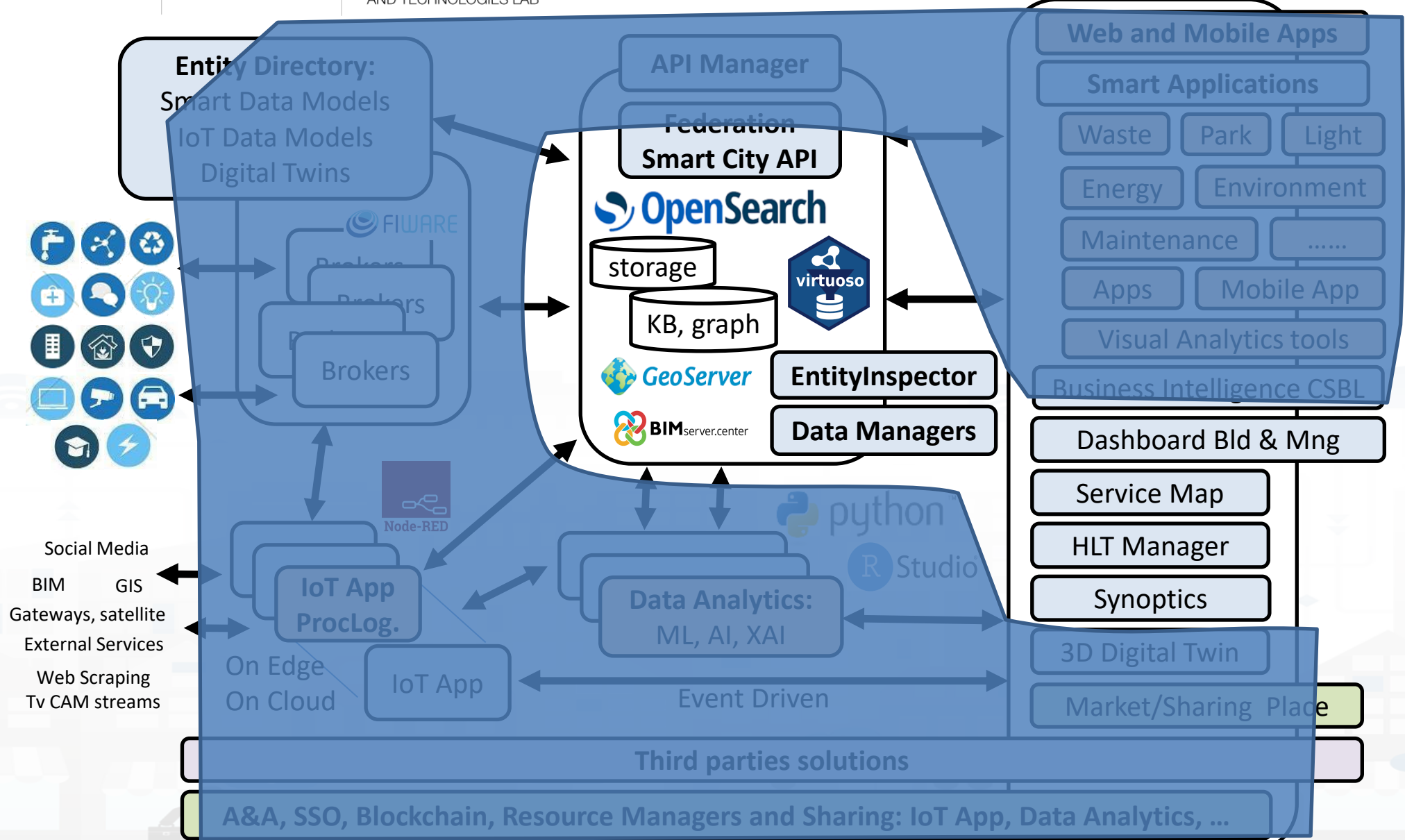


IOT Brokers  
IOT Broker  
IOT Broker





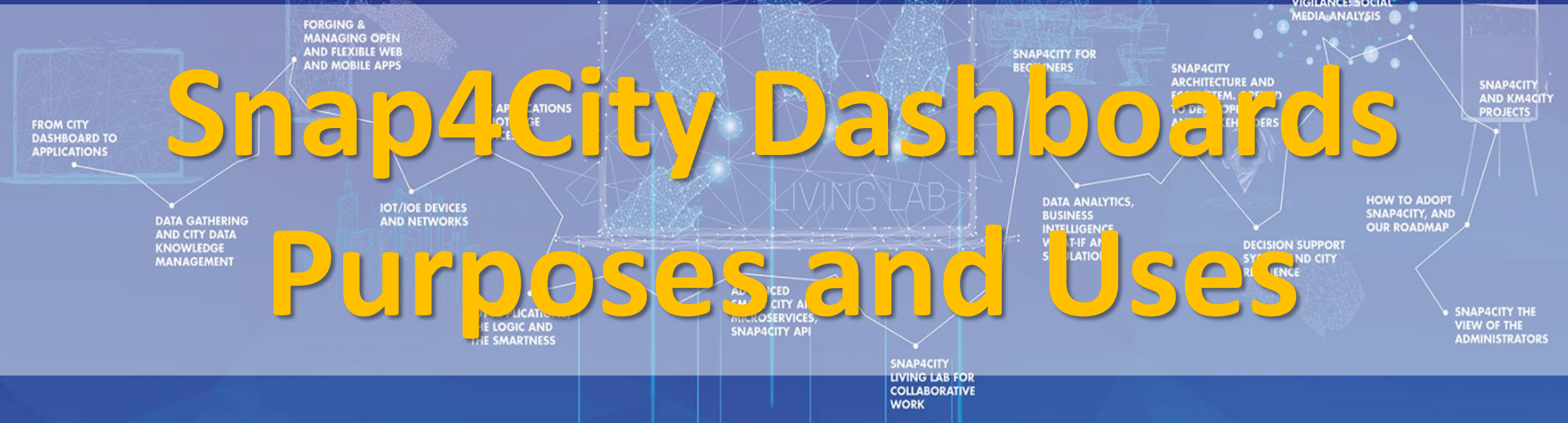




TOP

# Snap4City Dashboards

# Purposes and Uses



# Dashboards and GUI Purposes

- **Real Time: control room, monitoring**
  - H24 Video Wall representation of the status:
- **Quasi Real Time, short term monitoring and management**
  - Situation Rooms: interactive data representation with visual analytics and business intelligence, What-if analysis by scenario
  - Operational management, real time What-if analysis by scenario
- **Mid and Long term, for tactic and strategic planning/restructuring**
  - Visual Analytics and indeep Business Intelligence
  - Long term What-If analysis





# Real Time: control room, monitoring

- **Video Wall:** physical and virtual:
  - control room but also distributed control room: web and mobile views
- **Many Decision Makers** that have to
  - Early Warning: receiving real time notifications in push, telegram, etc.
  - share the same view monitoring a specific situation
    - may be located in multiple places
    - may be connected by using multiple kind of devices
  - Chatting privately on the same context
  - Receiving in real time the same changes and events





# Control Room



<https://www.snap4city.org/621>

# Early Warning, Detection

## Issue:

- Detection of critical condition
- Not easily detected with other means

**P**repare  
**A**bsorb  
**R**ecover  
**A**dapt

## Impact:

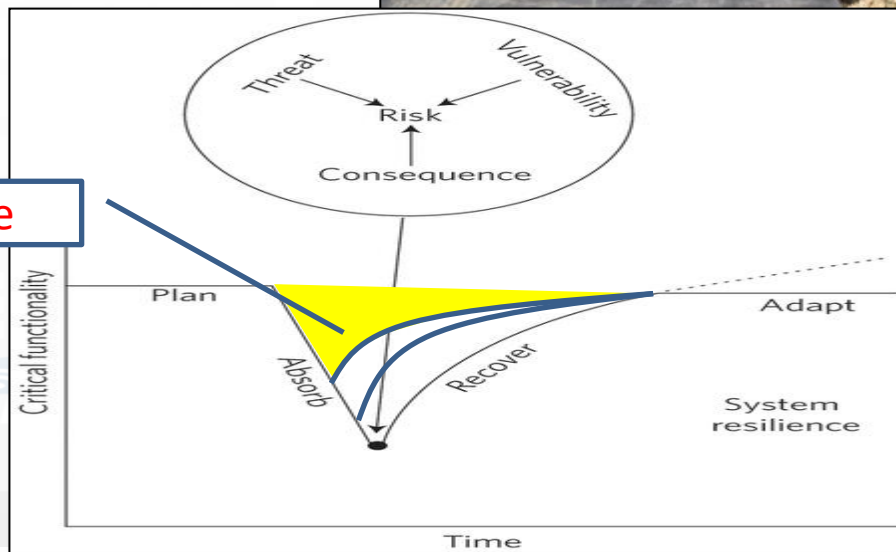
- Early warning, faster reaction
- Increased resilience

## Several metrics related to:

- Volume of retweets
- Sentiment analysis



damage





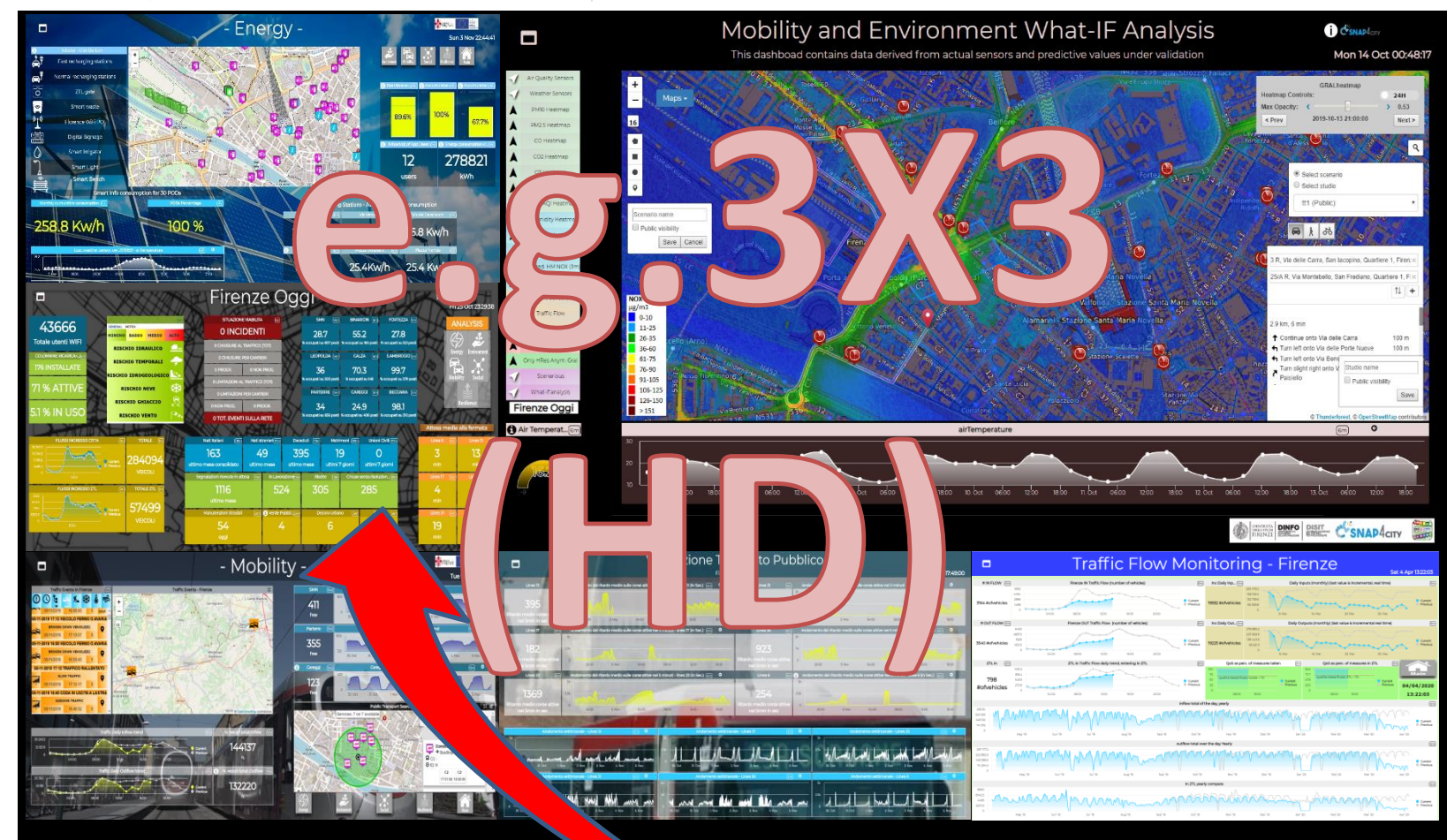
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AND TECHNOLOGIES LAB

# Video Wall

**SNAP4CITY**



e.g. 3x3

(HD)



From Console Operator to the  
Video Wall



### MAPPA FIRENZE

Fri 19 Oct 17:24:39

Colonnine Ricarica  
Colonnine Ricarica Fast  
Pannelli a Messaggio Variabile  
Parcheggi  
Piste Ciclabili  
Sensori del Traffico  
Stazioni Ambientali  
Stazioni meteo  
Traffico Real Time  
Varchi ZTL  
Wi-Fi

METRICI		METRICI		METRICI	
Descrizione	Valore	Last value	Last 24 hours	Last 7 days	Last 30 days
Avg Time	53.26	Last value	Last 24 hours	Last 7 days	Last 30 days
Concentration	74.4	Last value	Last 24 hours	Last 7 days	Last 30 days
Vehicle flow	317.0	Last value	Last 24 hours	Last 7 days	Last 30 days
Average Speed	5.0	Last value	Last 24 hours	Last 7 days	Last 30 days

Concentration - 7 days

Main

DINFD

# Quasi Real Time, short term monitoring and management

- **Situation Rooms:** limited number of people in the same room on the same screen
  - possibility of modifying the data in local simulations to better assess condition and validate proposed solving scenario
  - interactive data representation with
    - visual analytics and business intelligence,
    - What-if analysis by scenario
- **Operational management,**
  - real time What-if analysis by scenario



# Mobility and Environment What-IF Analysis

This dashboard contains data derived from actual sensors and predictive values under validation

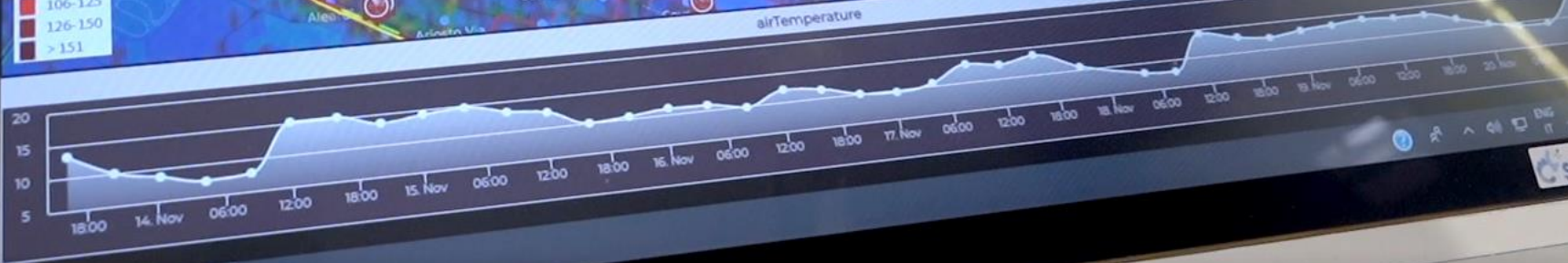
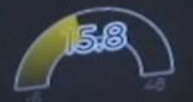
Wed 20 Nov 15:54:30

- ✓ Air Quality Sensors
- ✓ Weather Sensors
- ▲ PM10 Heatmap
- ▲ PM2.5 Heatmap
- ▲ CO Heatmap
- ▲ CO2 Heatmap
- ▲ O3 Heatmap
- ▲ NO2 Heatmap
- ▲ Europ. AQI Heatmap
- ▲ Air Humidity Heatmap
- ▲ Air Temp. Heatmap
- ▲ Wind Speed Heatmap
- ▲ Cral Pred. HM NOx (3m)
- ▲ Cral Pred. HM NOx (6m)
- ▲ Traffic Sensors
- ▲ Traffic Flow
- ▲ Cycling Paths
- ▲ Accident Heatmap
- ▲ Only HRes Anym. Gra
- ▲ Scenarios
- ▲ What-if analysis



Firenze Oggi

Air Temperat... (1m)



<https://www.snap4city.org/511>

ADVANCED SMART  
DATA ANALYTICS



# Citizens Engagement

Fri 6 Sep 16:58:10



- 
- Twitter Hashtags
- #FIORENTINA
  - #FIRENZE
  - #UFFIZI
  - #PONTEVECCHIO
  - #ACCADEMIA
  - #BARGELLO
  - #AEROPORTO #FIRENZE
  - #AEREOPORTO #FIRENZE

- 
- Twitter Chatrooms
- @NAZIONE\_FIRENZE
  - @DISCOVERTUSCANY
  - @UNI\_FIRENZE
  - @NOVEDAFIRENZE
  - @PROTCIVCOMUNEFI
  - @BNCFIRENZE
  - @MUSEONOVECENTO
  - @FIRENZEDIGITALE
  - @PITTI\_IMMAGINE

Civil Protection Alerts - Protezione Civile

NULLO BASSO MEDIO ALTO

- RISCHIO IDRAULICO
- RISCHIO TEMPORALI
- RISCHIO IDROGEOLOGICO
- RISCHIO NEVE
- RISCHIO GHIACCIO
- RISCHIO VENTO
- RISCHIO MAREGGIATE

First Aid - Careggi

Red code	Yellow code	Green code	Blue code	White code
7	7	57	23	9

First Aid - Torregalli

Red code	Yellow code	Green code	Blue code	White code
0	0	0	0	0



<https://www.snap4city.org/511>

# Mid and Long term, for tactic and strategic planning/restructuring

- **Defining Scenarios:** changes in the city, rules, structure, flows, roads, etc.
  - Targeting indicators, KPI, etc.
  - Simulating decisions: visual acting on defined/supposed changes
- **Visual Analytics** in deep Business Intelligence
  - Assessing results, drill down/up on space-time-relations to see the effects of the supposed decisions
- **Long term What-If analysis**
  - Computation of long terms predictions on never seen conditions
  - Simulations of the effects

# indicators



- **United Nations Sustainable Development Goals, SDGs** (for which cities can do more to achieve some of the 17 SDGs, <https://sdgs.un.org/goals>);
- **15 minutes cities** (where primary services must be accessible within 15 minutes on foot);
- **objectives of the European Commission** in terms of pollutant emissions for: NO2, PM10, PM2.5 ([https://environment.ec.europa.eu/topic/air\\_en](https://environment.ec.europa.eu/topic/air_en));
- **PUMS: mobility and transport vs wnv**
- **SUMI: mobility and transport vs env**
- **ISO indicators: city smartness, digitization. Tech level**
- ....

Global  
Vs  
Local



Pollutant	Averaging period	Objective and legal nature and concentration	Comments	WHO guidelines	
				Concentration	Comments
PM <sub>2.5</sub>	One day			25 µg/m <sup>3</sup> (*)	99 <sup>th</sup> percentile (3 days/year)
PM <sub>2.5</sub>	Calendar year	Target value, 25 µg/m <sup>3</sup>	The target value has become a limit value since 1 January 2015	10 µg/m <sup>3</sup>	
PM <sub>10</sub>	One day	Limit value, 50 µg/m <sup>3</sup>	Not to be exceeded on more than 35 days per year.	50 µg/m <sup>3</sup> (*)	99 <sup>th</sup> percentile (3 days/year)
PM <sub>10</sub>	Calendar year	Limit value, 40 µg/m <sup>3</sup> (*)		20 µg/m <sup>3</sup>	
O <sub>3</sub>	Maximum daily 8-hour mean	Target value, 120 µg/m <sup>3</sup>	Not to be exceeded on more than 25 days per year, averaged over three years	100 µg/m <sup>3</sup>	
NO <sub>2</sub>	One hour	Limit value, 200 µg/m <sup>3</sup> (*)	Not to be exceeded more than 18 times a calendar year	200 µg/m <sup>3</sup> (*)	
NO <sub>2</sub>	Calendar year	Limit value, 40 µg/m <sup>3</sup>		40 µg/m <sup>3</sup>	



# SUSTAINABLE DEVELOPMENT GOALS

<b>1</b> NO POVERTY 	<b>2</b> ZERO HUNGER 	<b>3</b> GOOD HEALTH AND WELL-BEING 	<b>4</b> QUALITY EDUCATION 	<b>5</b> GENDER EQUALITY 	<b>6</b> CLEAN WATER AND SANITATION 
<b>7</b> AFFORDABLE AND CLEAN ENERGY 	<b>8</b> DECENT WORK AND ECONOMIC GROWTH 	<b>9</b> INDUSTRY, INNOVATION AND INFRASTRUCTURE 	<b>10</b> REDUCED INEQUALITIES 	<b>11</b> SUSTAINABLE CITIES AND COMMUNITIES 	<b>12</b> RESPONSIBLE CONSUMPTION AND PRODUCTION 
<b>13</b> CLIMATE ACTION 	<b>14</b> LIFE BELOW WATER 	<b>15</b> LIFE ON LAND 	<b>16</b> PEACE, JUSTICE AND STRONG INSTITUTIONS 	<b>17</b> PARTNERSHIPS FOR THE GOALS 	 <b>SUSTAINABLE DEVELOPMENT GOALS</b>



• **15 Minute City Index:**

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

10/22



- Monitoring and Prediction of energy consumption
- Stimulating: Bike sharing, e-bikes, car charge, etc.
- Community of Energy, planning energy plant



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



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



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



- Monitoring and Predicting: NO<sub>2</sub>, NO<sub>x</sub>, CO<sub>2</sub>, Traffic flow, pollutant, landslide, waste, etc.
- Traffic flow reconstruction
- Demand vs Offer of Mobility analysis



- Shortening justice time
- Anonymization and indexing legal docs.
- Prediction of mediation proneness
- Ethical Explainable Artificial Intelligence

# 15MinCityIndex on Bologna

Ciao roottooladmin!

Tue 3 May 20:14:59

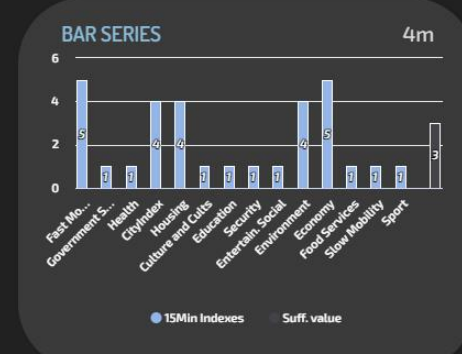
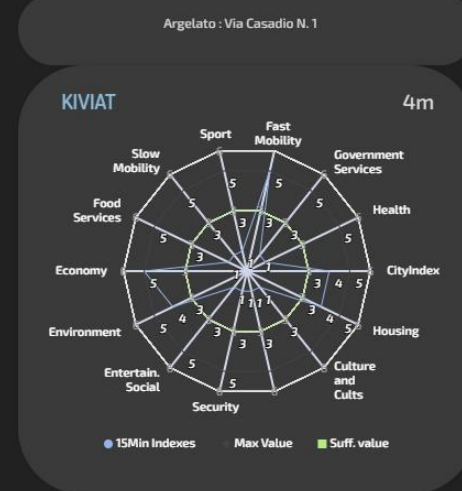
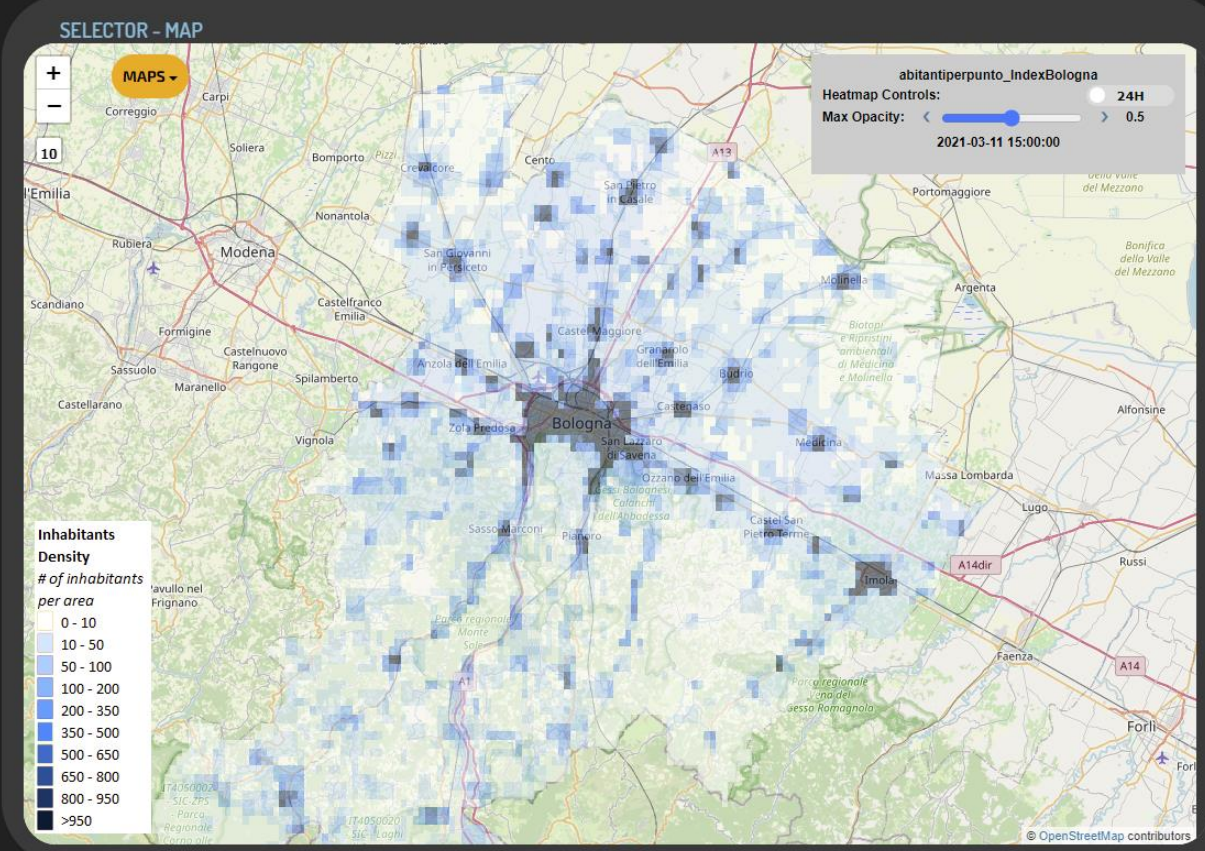
## 15 MINUTI INDEX BOLOGNA CITTÀ METROPOLITANA - NEWGUI



- # of Inhabitants >
- Green factor >
- Civil factor >
- Industrialization factor >
- Environment Index >
- 15Min Economy Index >
- 15Min Housing Index >
- 15Min Health Index >
- 15Min Food Index >
- 15Min Education Index >
- 15Min Slow Mob Index >

**THE PICKED POINT** 9m

City: Argelato  
Address: Via Casadio N. 1  
lat,lon: 44.61882,11.35437



**1 NO POVERTY**

**2 ZERO HUNGER**

**3 GOOD HEALTH AND WELL-BEING**

**4 QUALITY EDUCATION**

**7 AFFORDABLE AND CLEAN ENERGY**

**9 INDUSTRY, INNOVATION AND INFRASTRUCTURE**

**11 SUSTAINABLE CITIES AND COMMUNITIES**

**12 RESPONSIBLE CONSUMPTION AND PRODUCTION**

**13 CLIMATE ACTION**

**15 LIFE ON LAND**

# Decision Support Systems, What-if

## ○ Event planning, via what-if analysis

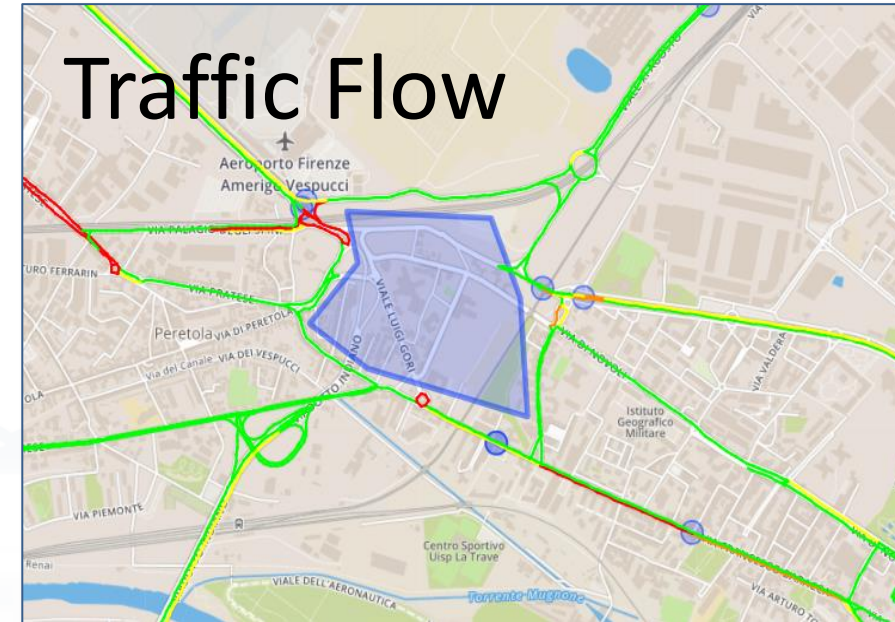
- Change in the graph structure of the city
- Impact on the flow of people and vehicles
- Adaptation: public transport, traffic, pedestrian management, etc.

## ○ Immediate reaction to natural events or not

- Everything is ready and updated in real time
- Each view is contextualized in terms of data: descriptive and prescriptive

## ○ Digital Twin

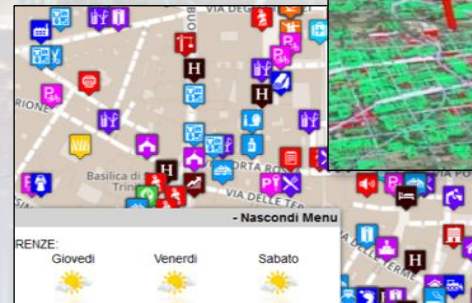
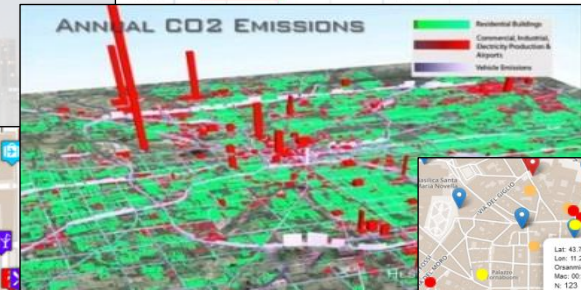
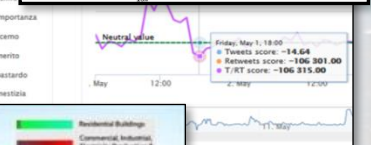
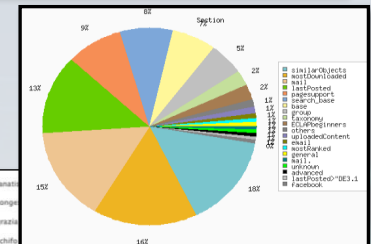
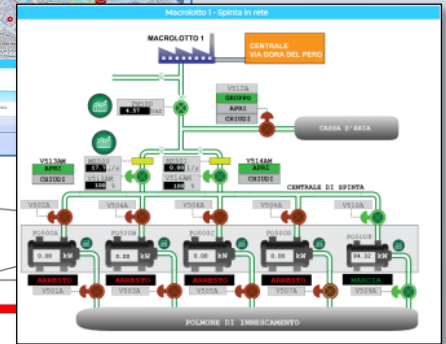
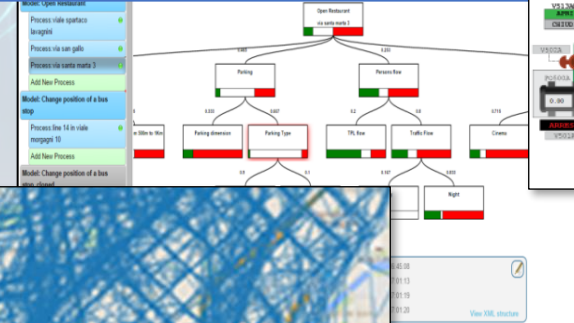
- More detail in the context integrated data
- Greater realism in deductions and representations
- Less fragmentation and non-uniformity in the views to support decisions



# Data Driven Decision Support



- Decision Support system
- Assessment / Strategies
- Data Rendering, visual analytics
- Data Processing
- Data aggregation, Storage, indexing
- Data Ingestion

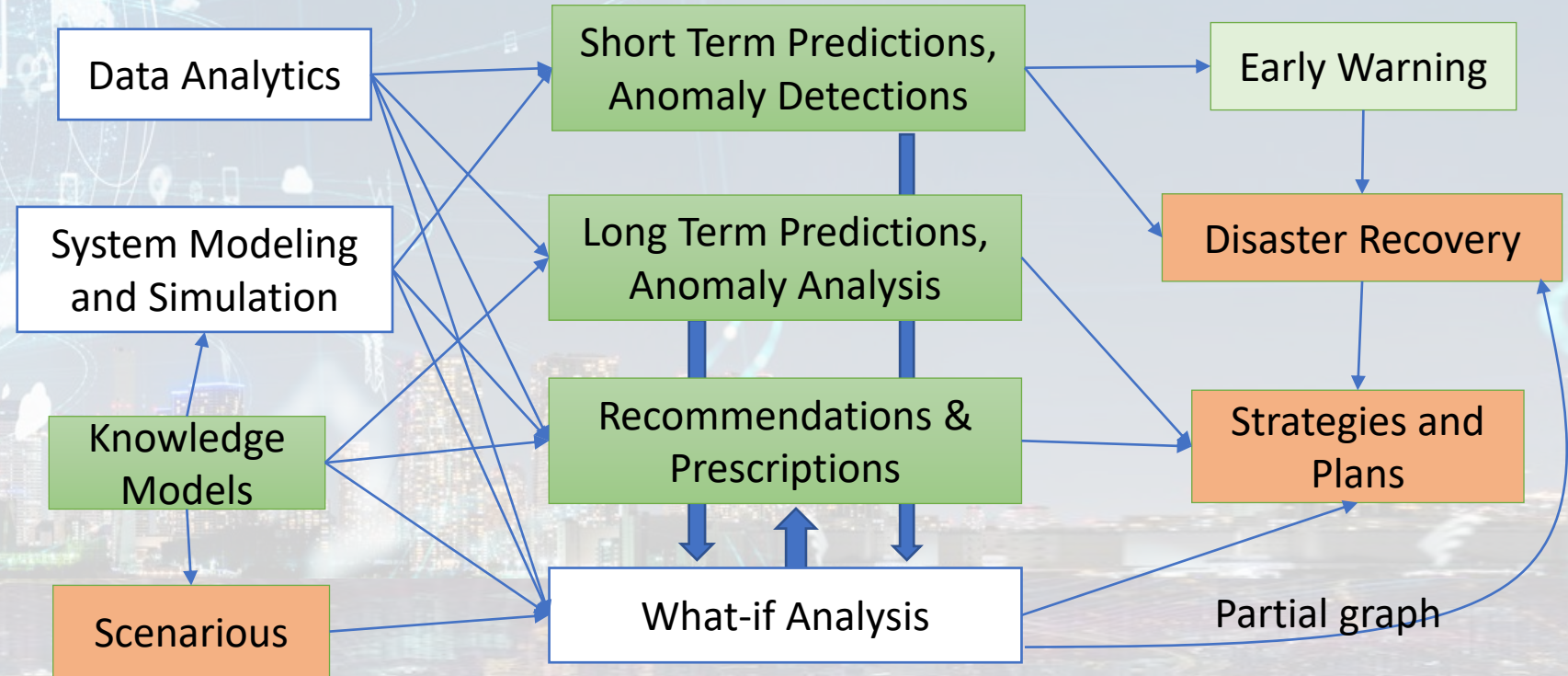
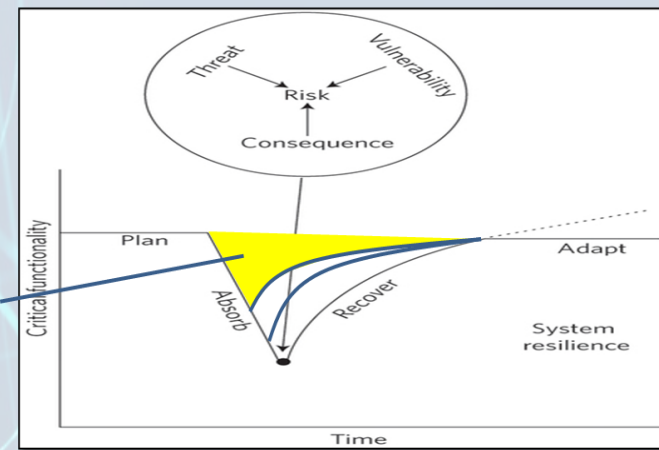




# Snap4City Analytics

- Decision support systems
- Improvement of life quality
- Sustainable Solutions
- Reduction of costs
- Risk Assessment
- Resilience

**P**repare  
**A**bsorb  
**R**ecover  
**A**dapt



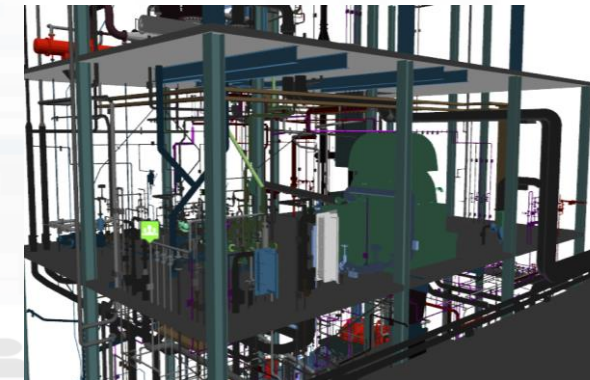
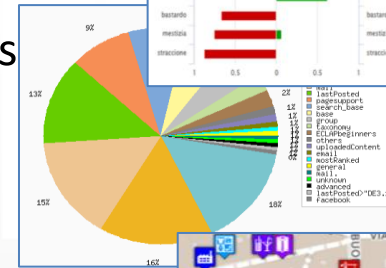
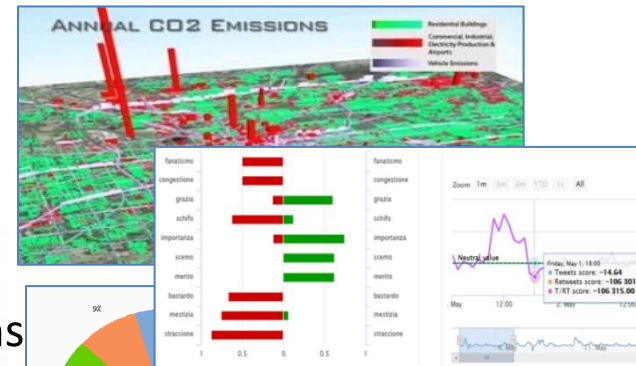
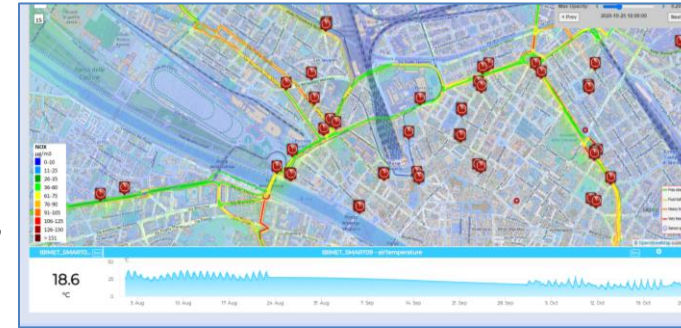
Decision Support System, targeting: Quality of Life, KPI, SDG, 15MinIndex,...

## Digital Twin

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

## Utility to

- Experiment via simulations and analysis by case
  - Reduction of costs to experiments new solutions
  - Share the possibilities with city users
- Virtual Representation
  - Easier to understand the context, review from multiple points of view
- Who
  - Discussion with city users, decision makers
  - Support: decision makers, proposers of solutions



### 3D Map



Traffic

FirenzeTrafficRealtime

Traffic Controls: 24H

Max Opacity:

< Prev 2023-05-22 08:01:00

- Free street
- Fluid traffic
- Heavy traffic
- Very heavy
- Sensor position

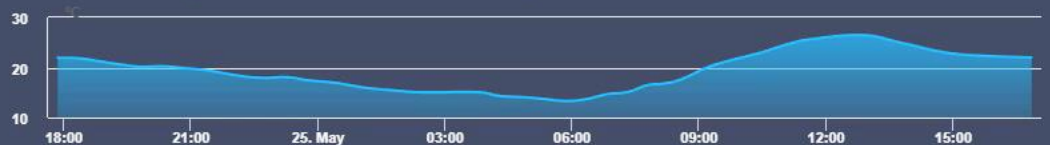
### Air Quality FI-BASSI - NO2

6m



### Weather\_sensor\_Open Weather 3176959 - Air Temperature

6m



<https://youtu.be/JLzT9k3Xbc0>



Ciao

Sun 2 Jul 12:58:18

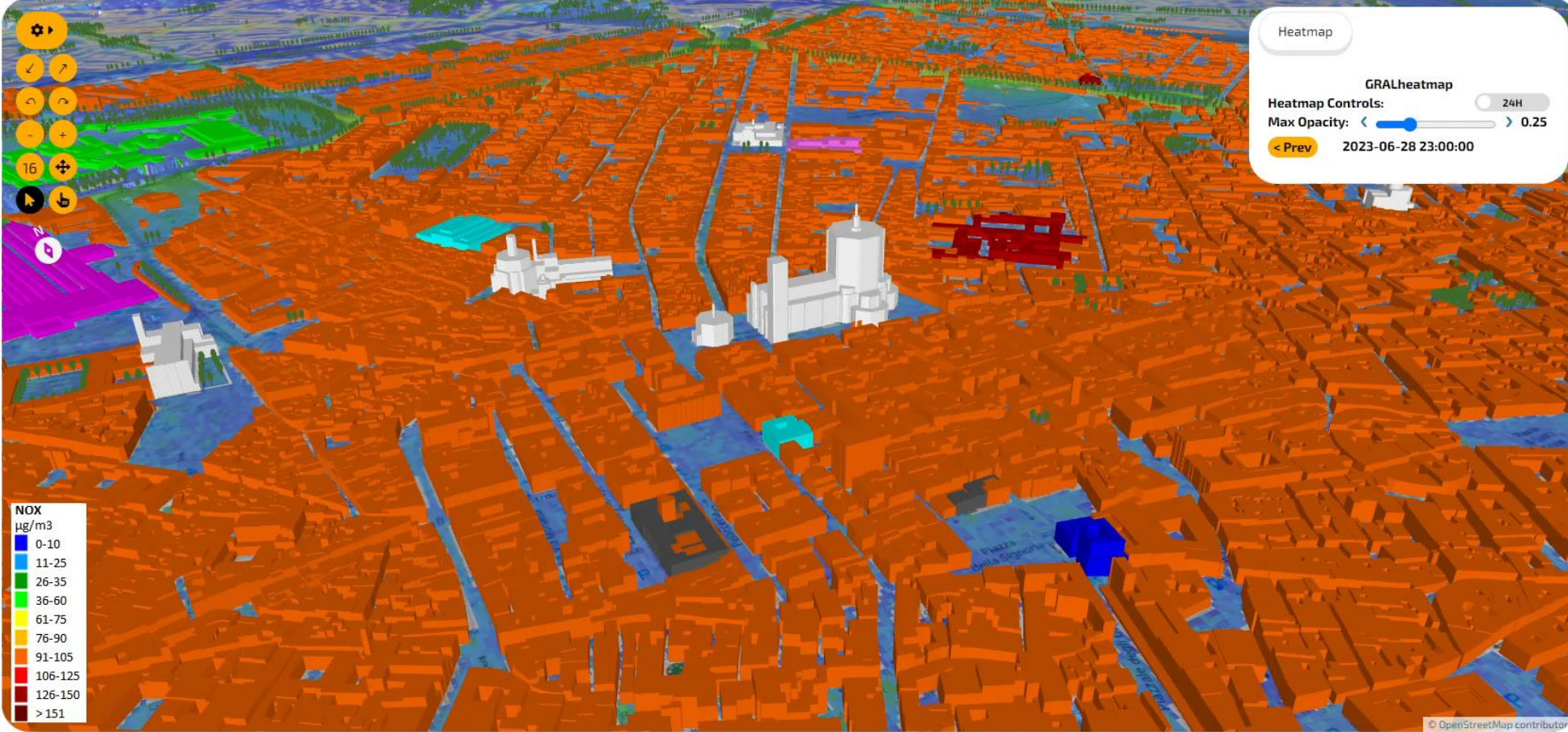
# FLORENCE SCDT



SELECT...

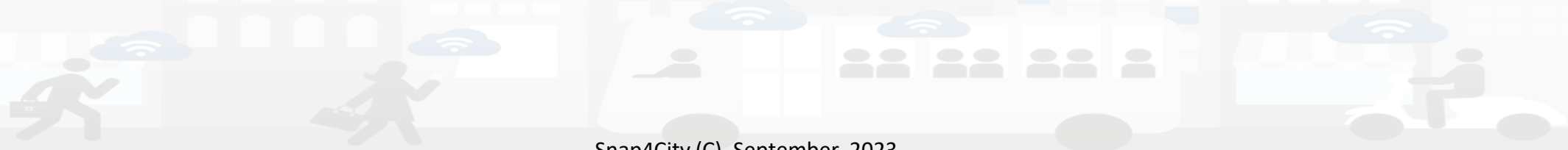
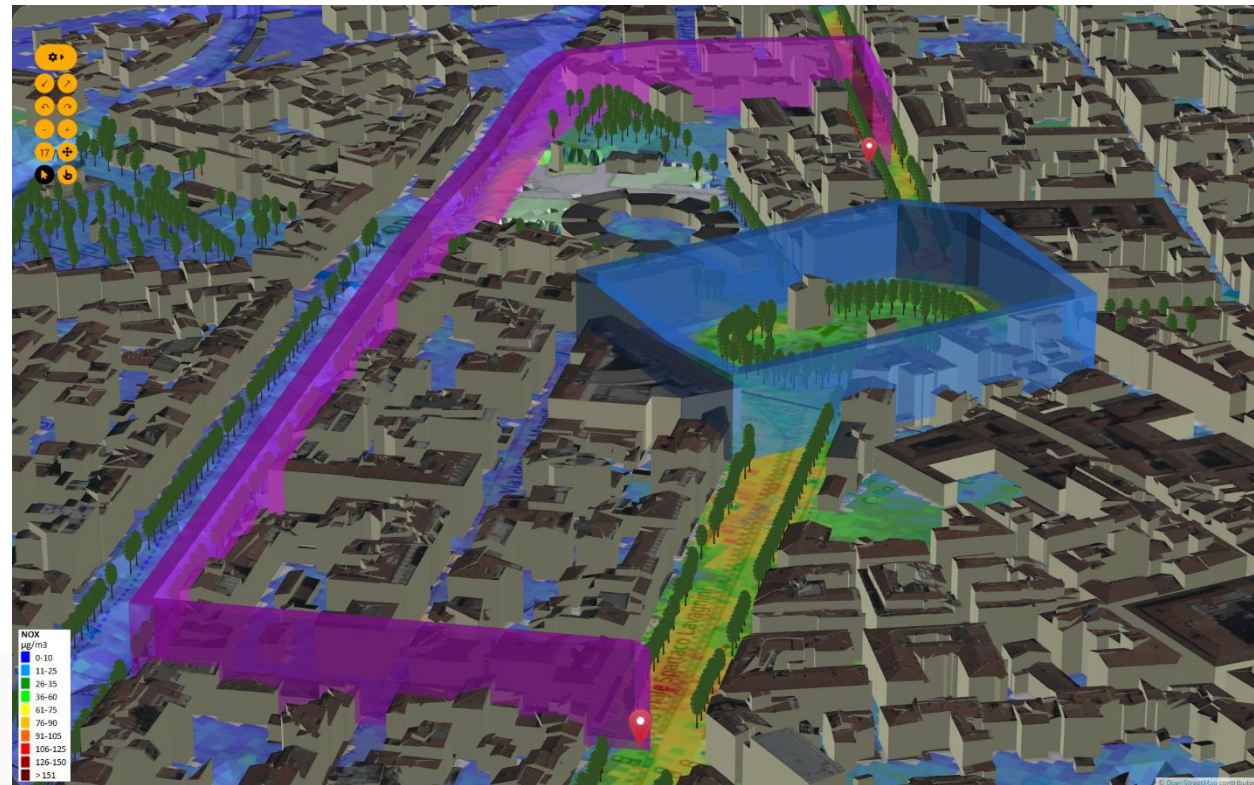
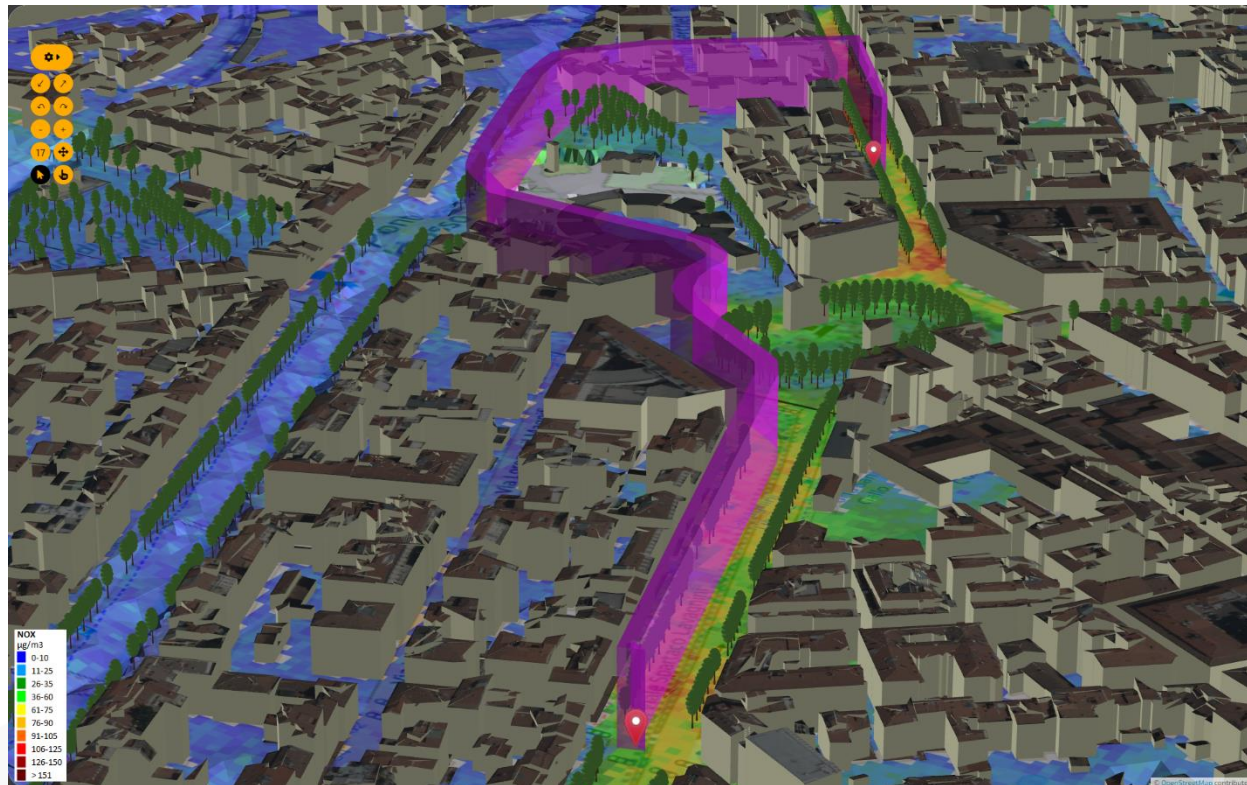
-  >
-  >
-  >
-  >
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-  >
-  >
-  >
-  >

DOUBLE MAP



© OpenStreetMap contributors

# Dyamic Routing in 3D space

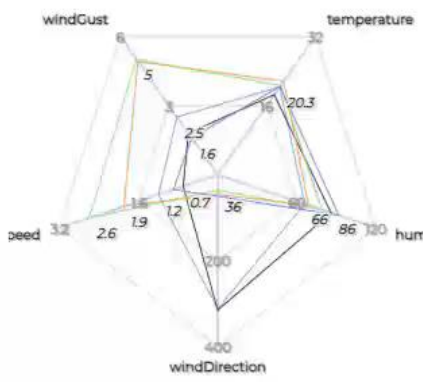


# BIM Airport

Thu 25 May 18:16:22

- Select the view of interest
- Airport Building 1
  - Airport Heatmap dash
  - Terminal Heatmap

Sensor Data 4m



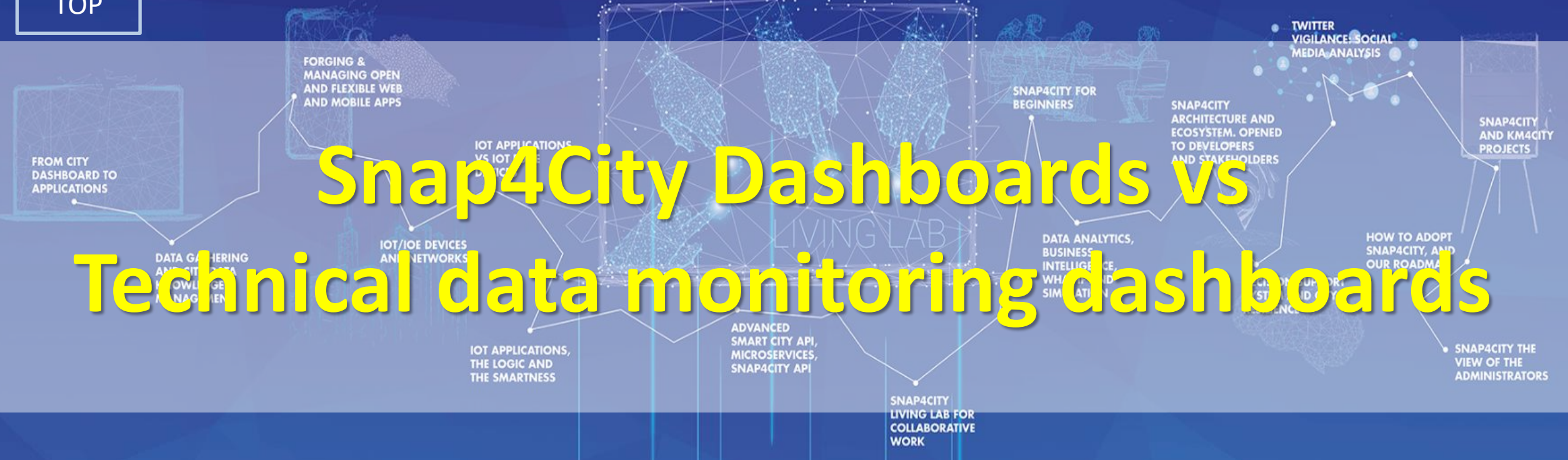
- Sensor\_TOS926
- Sensor\_TOS1096
- Sensor\_TOS1215
- Sensor\_TOS811
- Sensor\_TOS1205



Last Value	Time Trend Chart
No data	

TOP

# Snap4City Dashboards vs Technical data monitoring dashboards



# Two Main Lines for Dashboarding

- DevDash, My Dashboard (Dev) Kibana )

Ready to use  
You can customize  
Limited details



- Dashboard Builder of Snap4City

You need to create / customize  
Full Control  
Professional details





# My Dev Dash (DevDash)

- For accessing and browsing data on Open Search (Elastic Search) storage and other sources supported
  - Family of Grafana, Kibana, Banana
- **No Support for real time event driven widgets/panels, actuators and synoptics, no sophisticated maps, etc.**
- **Not suitable for control room, decision makers, etc.**
- **Limited Business Intelligence, Custom widgets, animation, external services.**
- **Oriented to developers, complex production of custom views, etc.**
- **Partial support of GDPR and deep control of access.**
- Snap4City uses this technology only for monitoring data flow into the Storage with tools named: DevDash, or MyDevDash



# DevDash: My Data Dashboard

## Snap4City

User: rootooladmin1, Org: DISIT  
Role: RootAdmin, Level: 7

[LOGOUT](#)

- My Snap4City.org
- Dashboards
- My Dashboards in All Org.
- Dashboards of My Organization
- My Dashboards in My Organization
- My Data Dashboard Dev Kibana
- My Data Dashboard Kibana**
- Extra Dashboard Widgets
- Notificator
- Data, my Data, OpenData
- Knowledge and Maps
- IOT Applications
- IOT Directory and Devices
- Resource Manager
- Development Tools
- Management
- Decision Support Systems
- Settings
- User Management and Auditing
- Help and Contacts
- Documentation and Articles
- My Profile
- Km4City portal
- DISIT Lab portal

### My Data Dashboard Kibana

+ Add filter

#### COUNTEVENTS

date_time per day	Count
2020-12-12	~1,000,000
2020-12-13	~1,000,000
2020-12-14	~1,000,000
2020-12-15	~1,000,000
2020-12-16	~1,000,000
2020-12-17	~1,000,000
2020-12-18	~1,000,000

#### HITS

**7,642,593**  
TOTAL HITS

#### EVENT COUNTS

#### FACET FIELDS v1

organization: Select...

nature: Select...

sub\_nature: Select...

groups: Select...

kind: Select...

value\_name: Select...

device\_name: Select...

#### DEVICE NAME

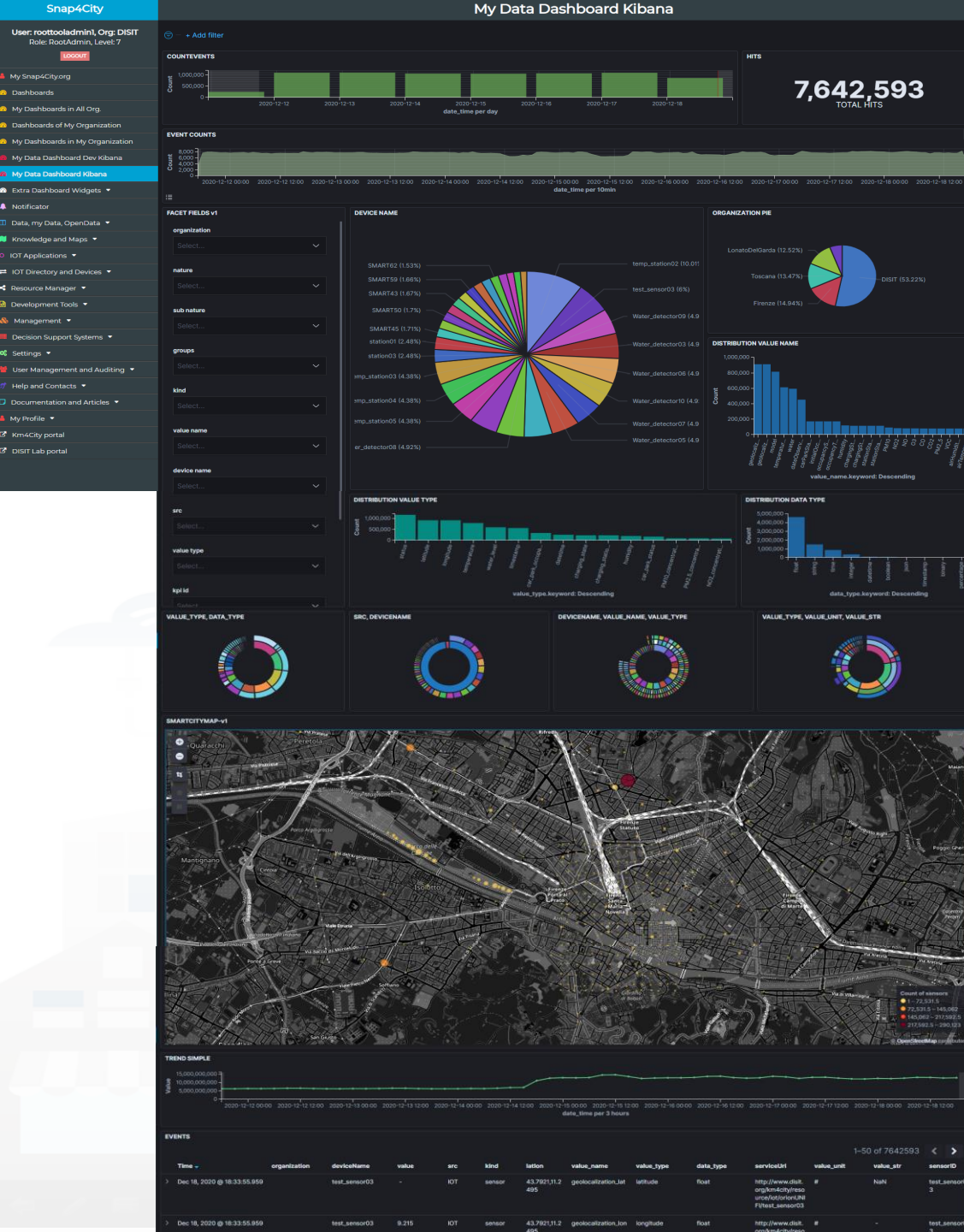
Device Name	Percentage
temp_station02	10.01%
test_sensor03	6%
Water_detector09	4.9%
Water_detector03	4.9%
Water_detector06	4.9%
Water_detector10	4.9%
Water_detector07	4.9%
Water_detector05	4.9%
er_detector08	4.92%
SMART62	1.53%
SMART59	1.66%
SMART43	1.67%
SMART50	1.7%
SMART45	1.71%
station01	2.48%
station03	2.48%
mp_station03	4.38%
mp_station04	4.38%
mp_station05	4.38%

#### ORGANIZATION PIE

Organization	Percentage
DISIT	53.22%
Toscana	13.47%
Firenze	14.94%
LonatoDelGarda	12.52%

#### DISTRIBUTION VALUE NAME

value_name.keyword: Descending	Count
geolocali...	~900,000
geolocali...	~850,000
model	~800,000
temperatur...	~600,000
water	~550,000
dateObser...	~450,000
carParkSta...	~150,000
initialOcc...	~150,000
occupancyS...	~150,000
occupancy...	~150,000
humidity	~150,000
chargingSt...	~150,000
chargingSt...	~150,000
stationSta...	~150,000
stationSta...	~150,000
PM10	~150,000
NO2	~150,000
NO	~150,000
O3	~150,000
CO	~150,000
CO2	~150,000
PM2.5	~150,000
VOC	~150,000
airHumidit...	~150,000
airTempera...	~150,000



# Business Analysis Dashboards For all kind of users: DevDash

- Dynamic Filtering, Adaptable, ...
- Full data details, drill down,...
- Synergic with **Data Inspector** which addresses data relationships, processing and information
- **Only Your Data for**
  - Manager and Area Managers
- **All Accessible Data for**
  - ToolAdmin and RootAdmin

# Dashboard Builder of Snap4City

- For accessing and browsing data on: OpenSearch, Mongo, MySQL, Smart City API, Super and thus from federated Smart City API, etc.
- **Supports sensors/actuators:** data driven data, maps in extended manner, data driven widgets, large collection of widgets, direct IoT Connections, custom widgets, animated PIN on maps, a large set of panel/widgets, etc.
- **Very simple to be used for control room,** decision makers, situation rooms, operators, tactic, strategic, etc.
- **Very well integrated with custom widgets,** animation, external services.
- **Very simple to be customized** for non programmers since all the tools are visual.
- **Custom Business Intelligence,** Visual Analytics
- **Custom Widgets**
- **Support for GDPR** and deep control of access.





# Snap4City Dashboard Builder (2023) vs Kibana/Grafana

Features	Snap4City Dashboard Builder	Kibana, Grafana
Large Collection of Widgets, also from D3 library	YES	Nothing
Custom Widgets SVG of any kind, full defined process for customization	YES	Nothing
Real time event driven widgets and data	YES	Nothing
Server/Client Side Business Logic for data transformation with visual programming: Node-RED	YES: visual/coding	coding
Maps with custom PIN, bubbles, animated and moving, etc.	YES	Nothing
Maps with paths, shapes, traffic flow, scenarios, routing, heatmaps, what-if, Origin Destination Matrix, ...	YES	Nothing
Maps with Orthomaps from WFS, WMS, GIS connection, etc.	YES	Nothing
TV camera integration and selection	YES	Nothing
Widgets for business logic integration on real time: buttons, selector, switch, etc.	YES	Nothing
Kiviat, Spider net, Calendar (also any other D3 Widgets)	YES	Nothing
Typical Time Trends: day hours, month week, month days, ....	YES	Nothing
Time Trend Compare: day, week, month, year	YES	Nothing
Selectors/Menus: text, icons, etc., also in connection with IOT APP, Node-RED	YES	Nothing
Full control of graphic layout, font, colours, refresh per widget, etc.	YES	Nothing
Iframe integration of third party widgets and web pages, nesting dashboards, embedding Kibana	YES	Nothing
Connection among multiple Dashboards and Widgets	YES	Nothing
Synchronization with Video Wall, and Operators Views	YES	Nothing
Multiseries, bar lines, charts, pie, donut, simple selectors, trends, etc., also from business logic	YES	Limited
Single content, string, html, any data, etc.	YES	Limited
Special widgets: Weather forecast, civil protection, road plates, Twitter, SVG, etc...	YES	Nothing
Digital Twin Local (BIM) and Global (3D city representation) with 3D traffic, Heatmaps, Devices, ...	YES	Nothing
Faceted search	YES: selectors, forms, buttons	YES

TOP

# Snap4City Dashboards main concepts



Dashboards (Public)

www.snap4solutions.org

Extra Dashboard Widgets

Data Management, HLT

Knowledge and Maps

Processing Logics / IOT App

Entity Directory and Devices

Resource Manager

Development Tools

Management

Decision Support Systems

Deploy and Installation

Help and Contacts

Documentation and Articles

Km4City portal



Prev 1 ... 34 35 36 37 38 Next

Filter by dashboard

**Traffic Flow Manager test**

Passive

Public (DISIT)

**Traffic Flow Monitoring - Firenze - Cloned2**

Passive

Public (Firenze)

**D3 library -- newgui2**

Proc.Logic / IoT App

Public (DISIT)

**Traffic Flow Reconstruction - Sii-Mobility**

Passive

Public (Other)

**Traffic Flow Reconstruction for the cities**

Passive

Public (Other)

**3D Map Global Digital Twin - newgui2**

Passive

Public (DISIT)

**3D Multi Data Map - Digital Twin Global - Firenze**

Passive

Public (DISIT)

**Trends transparencies - newgui**

Passive

Public (DISIT)

**Tuscany TRAFAIR Data Dashboard**

Passive

Public (DISIT)

**Tuscany weather dashboard 1**

Passive

Public (DISIT)



# Snap4City Dashboards main concepts



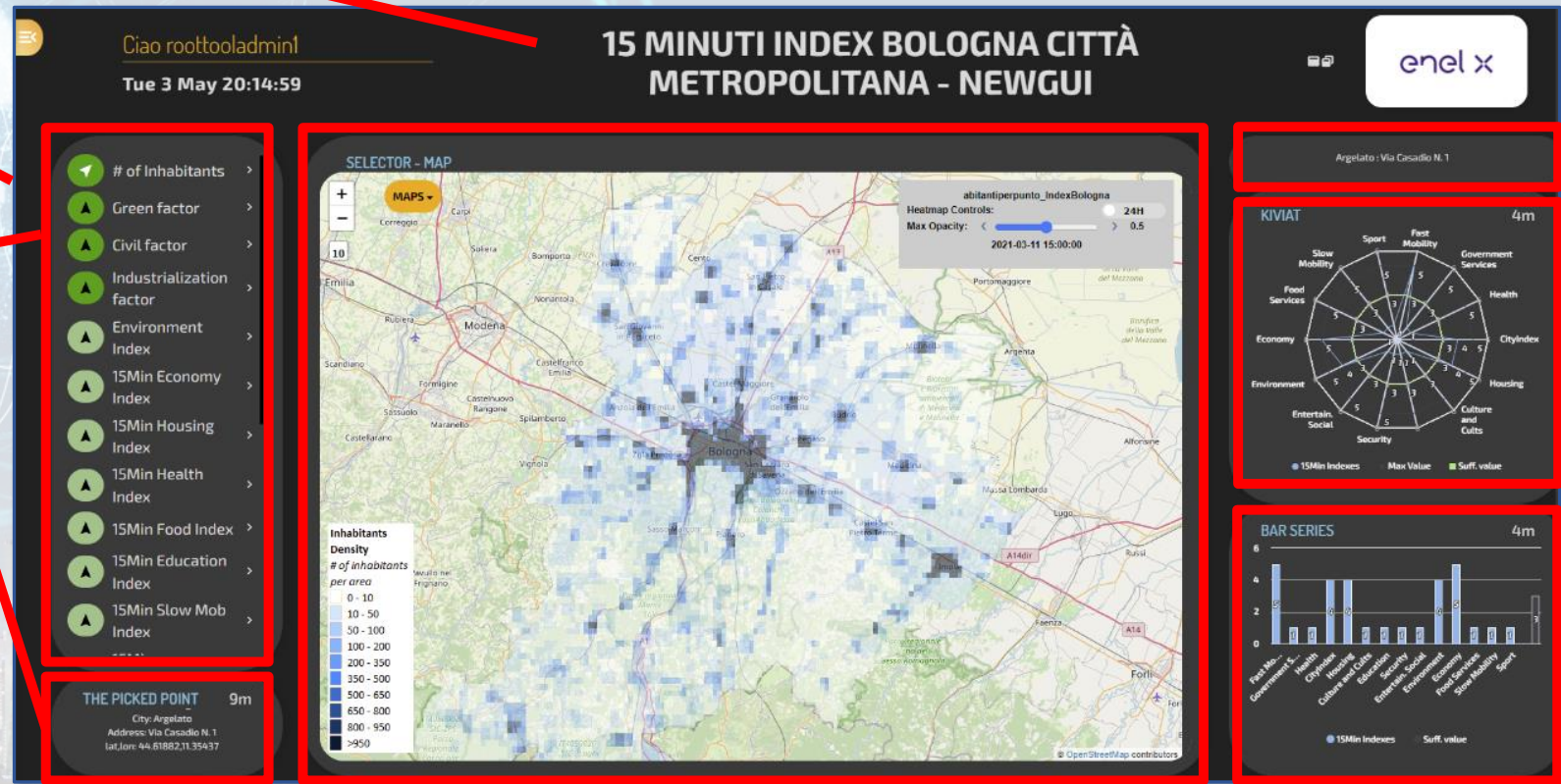
Header

Dashboard

Interactive Widgets

## Server Communication

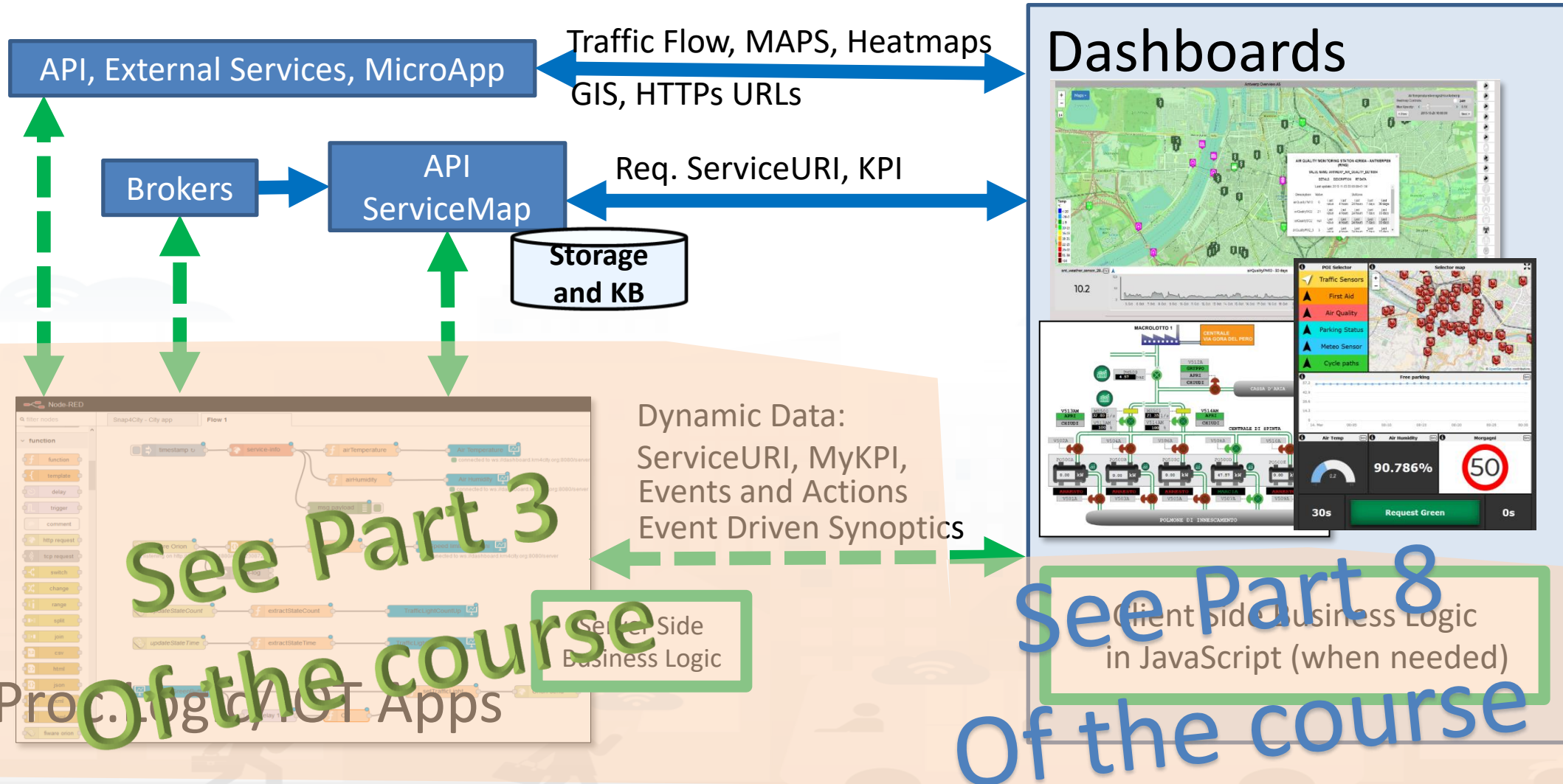
- Real Time data requests/send
- Event Driven
- Server Side Business Logic
  - See Part 3 of the course

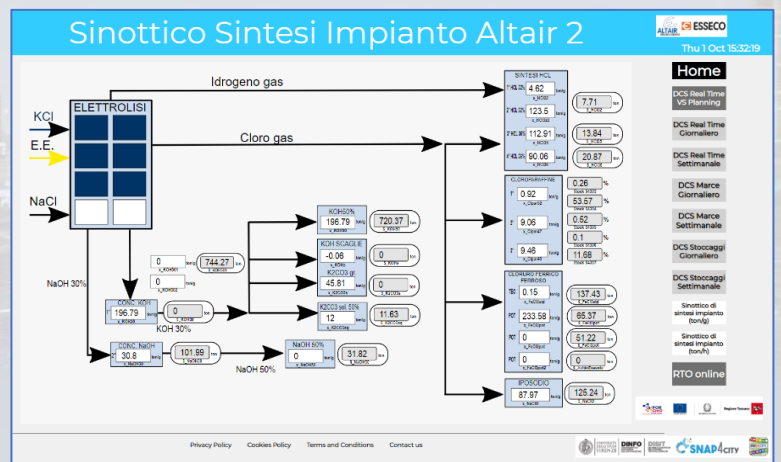
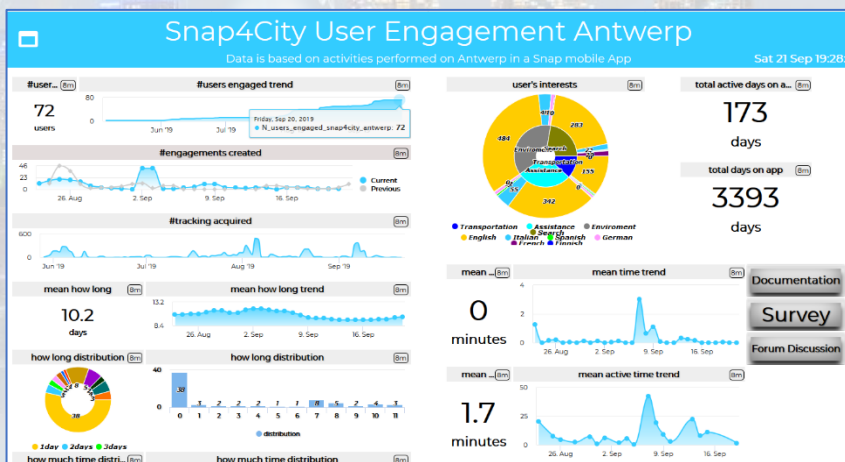
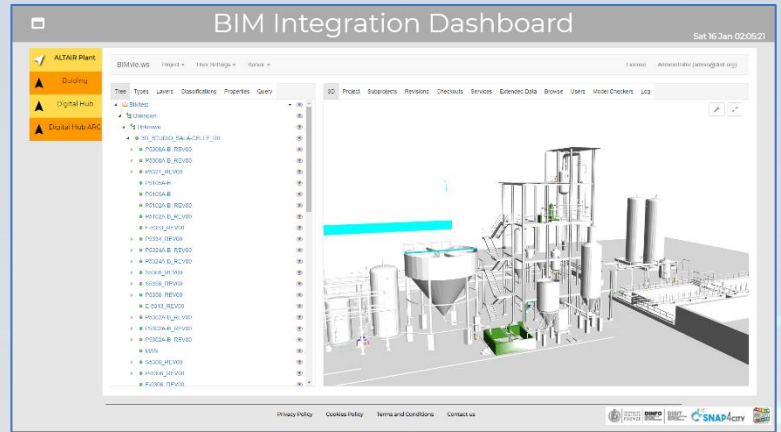
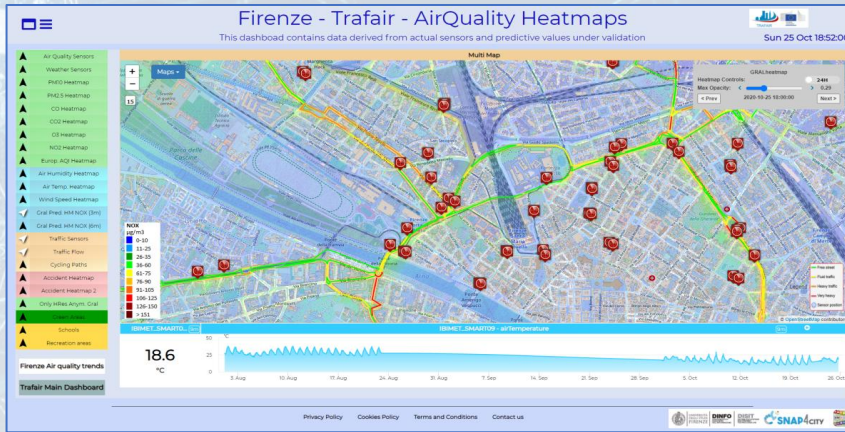
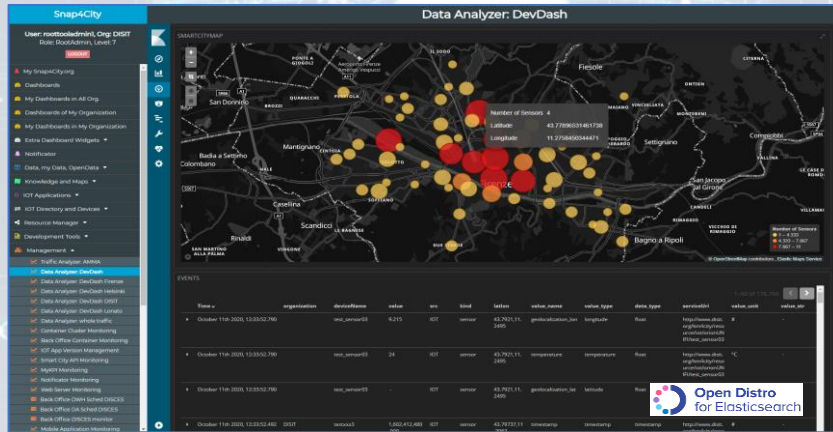
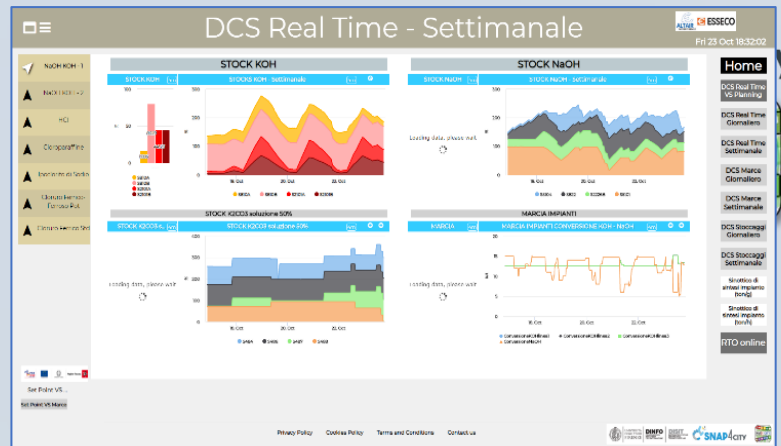
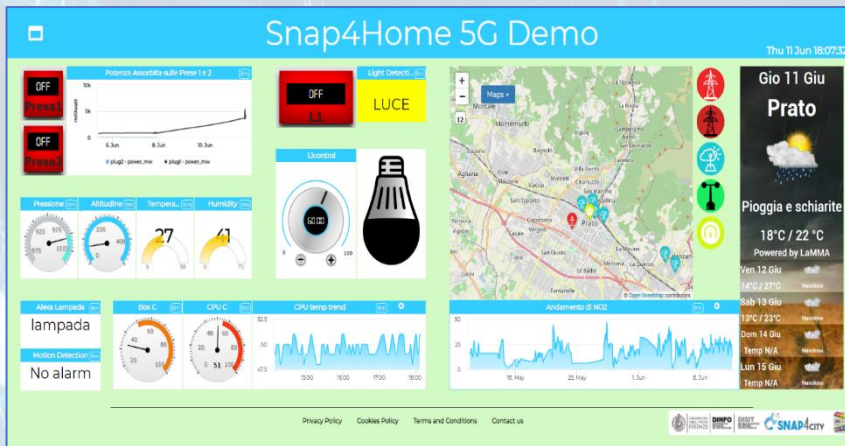
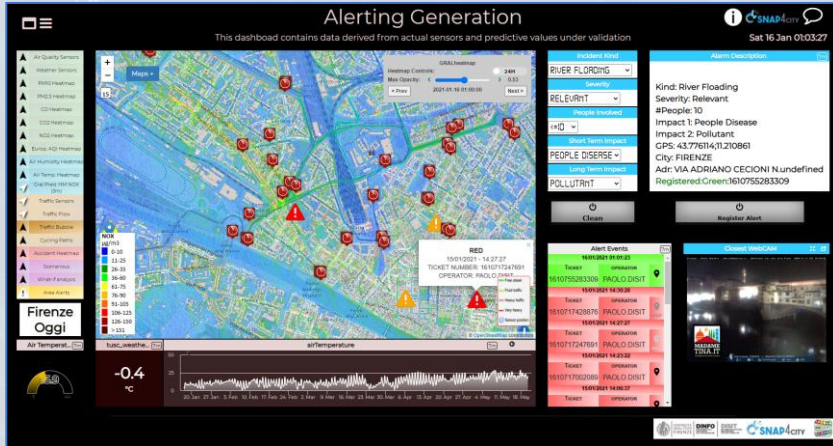


Inter Widget Communication:  
Client Side Business Logic  
See part 8 of the Course

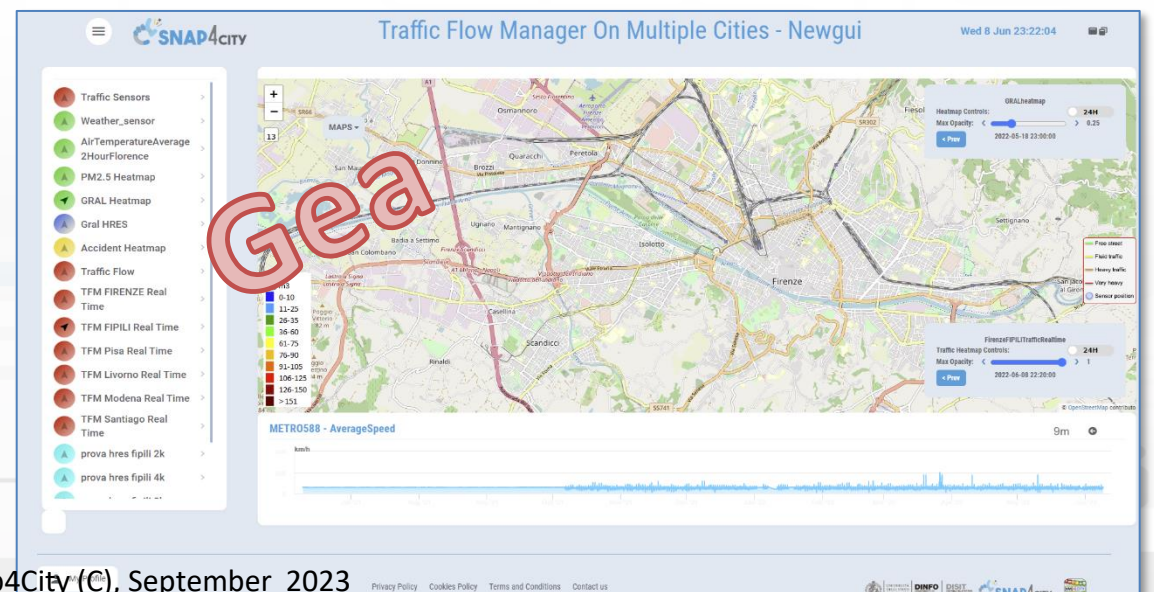
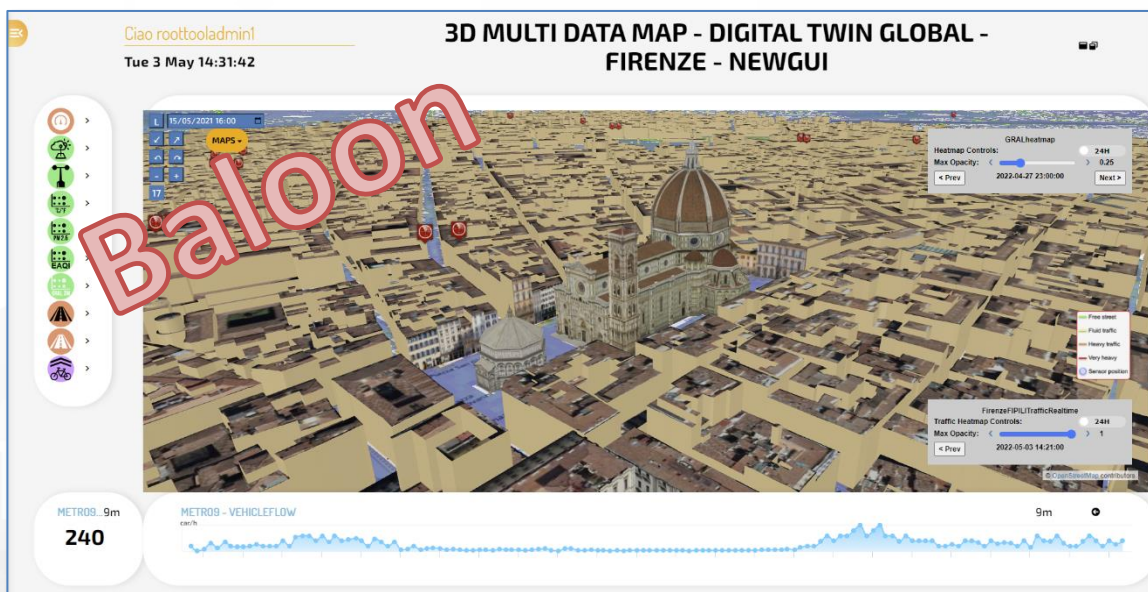
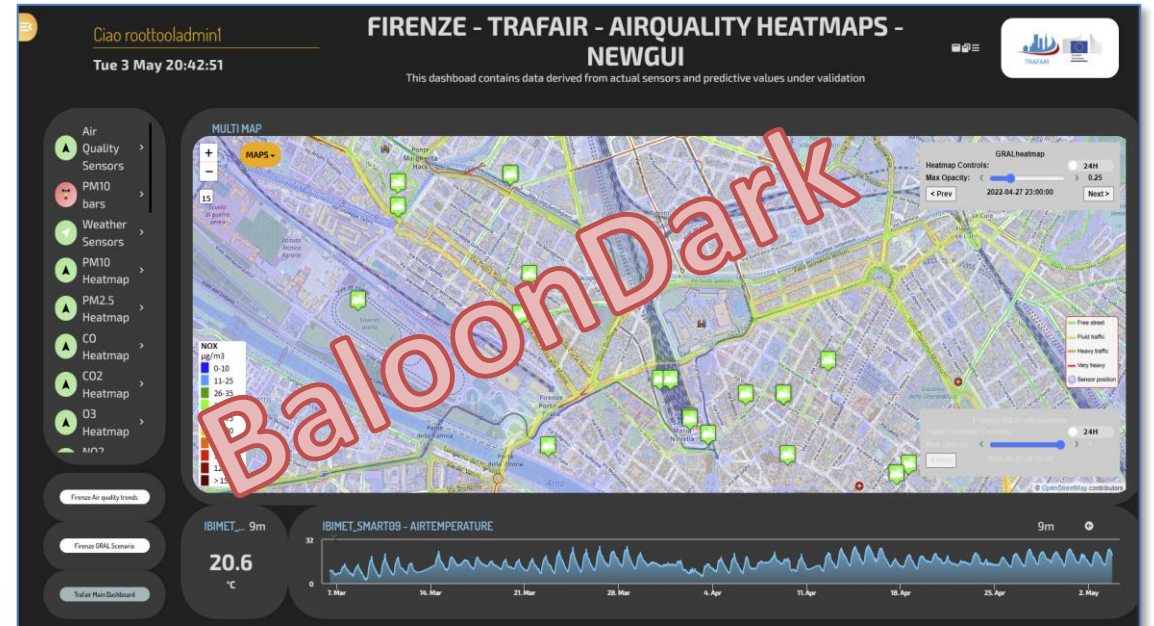
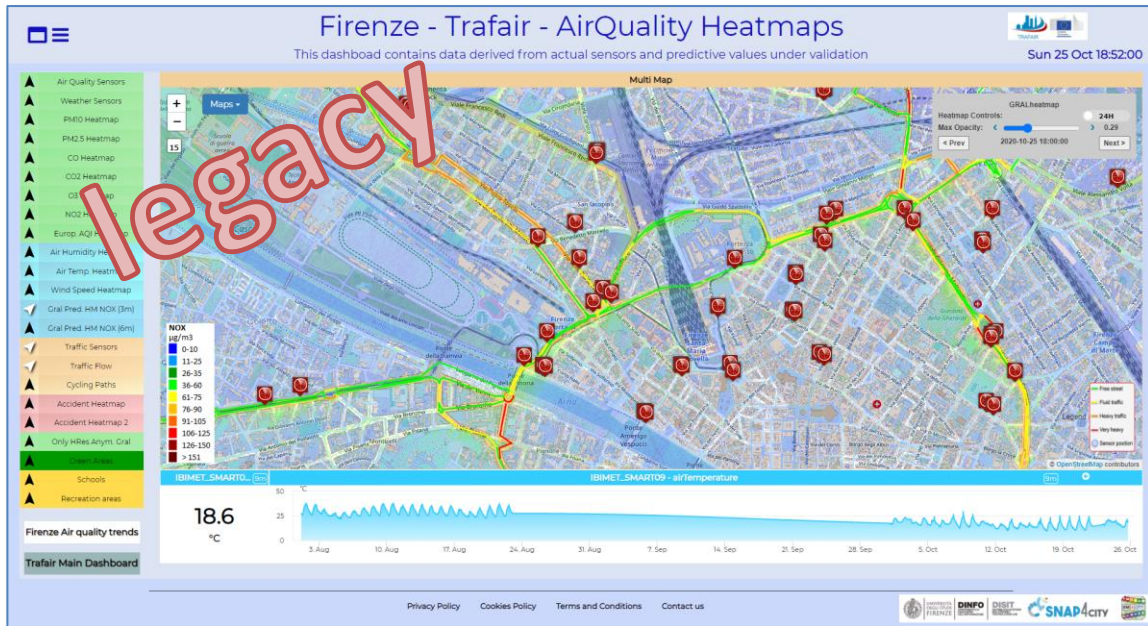


# How the Dashboards exchange data

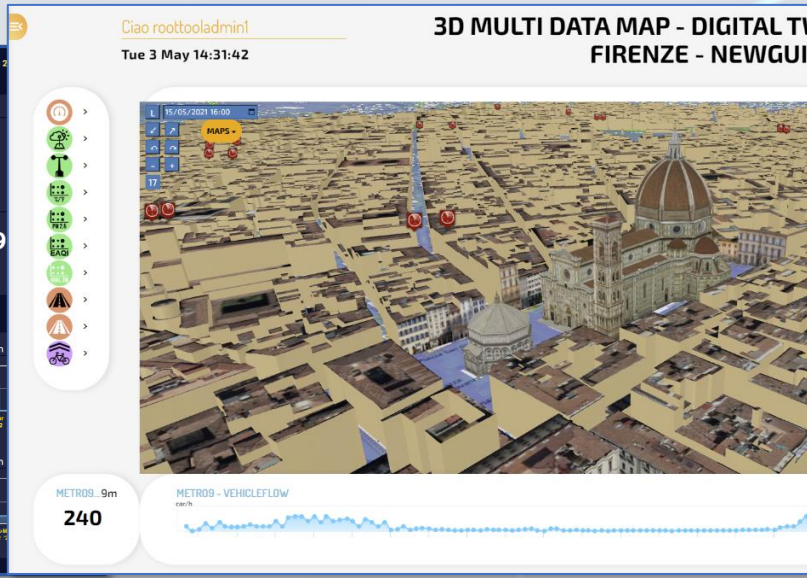
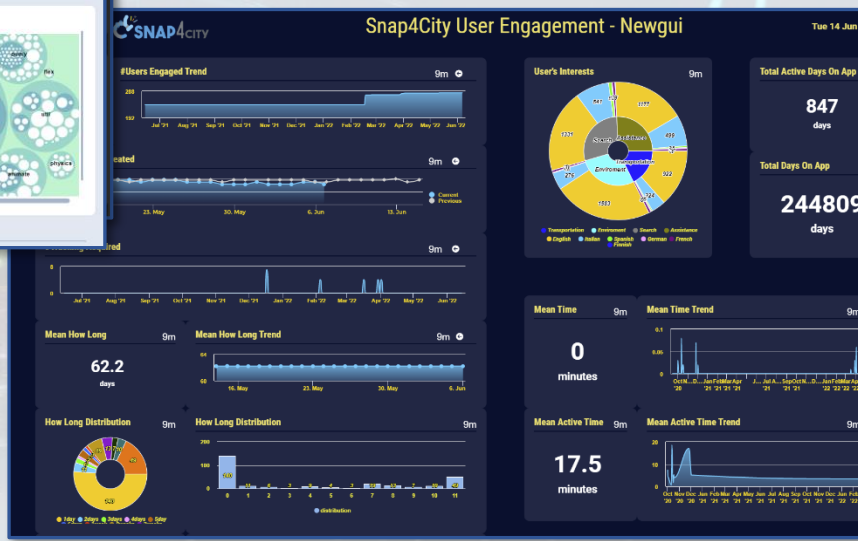
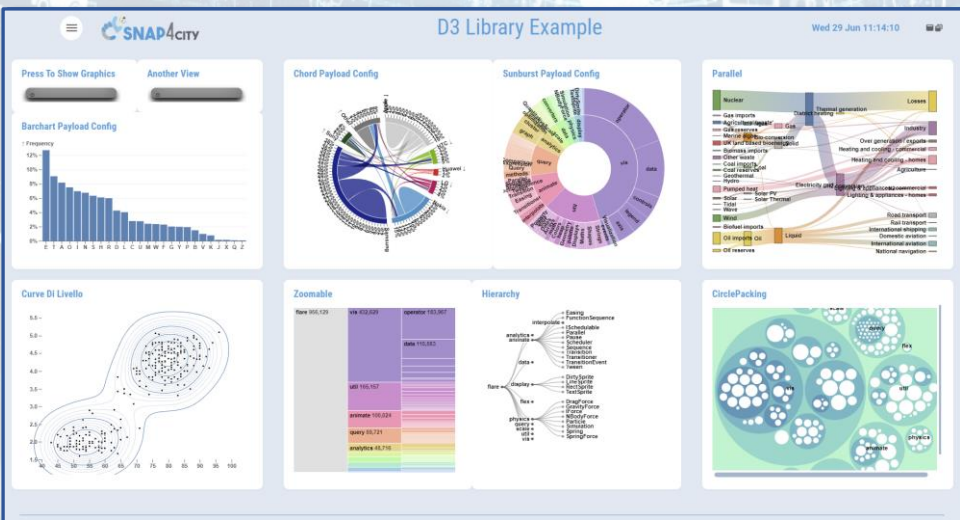
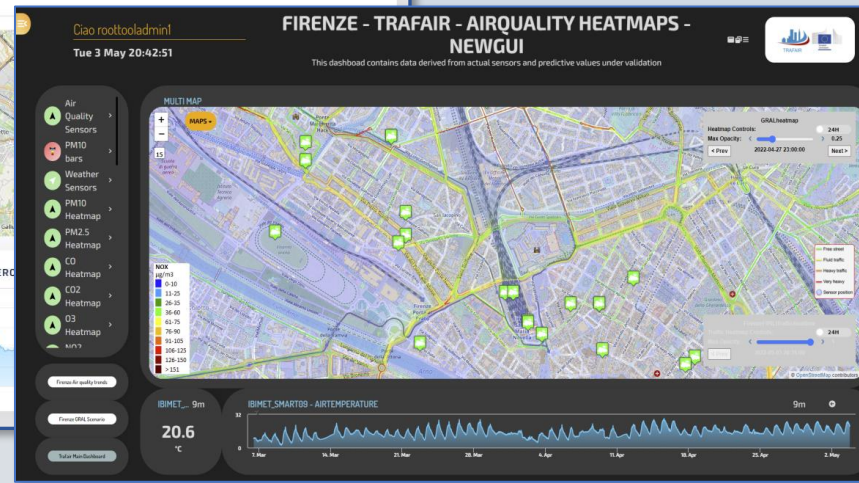
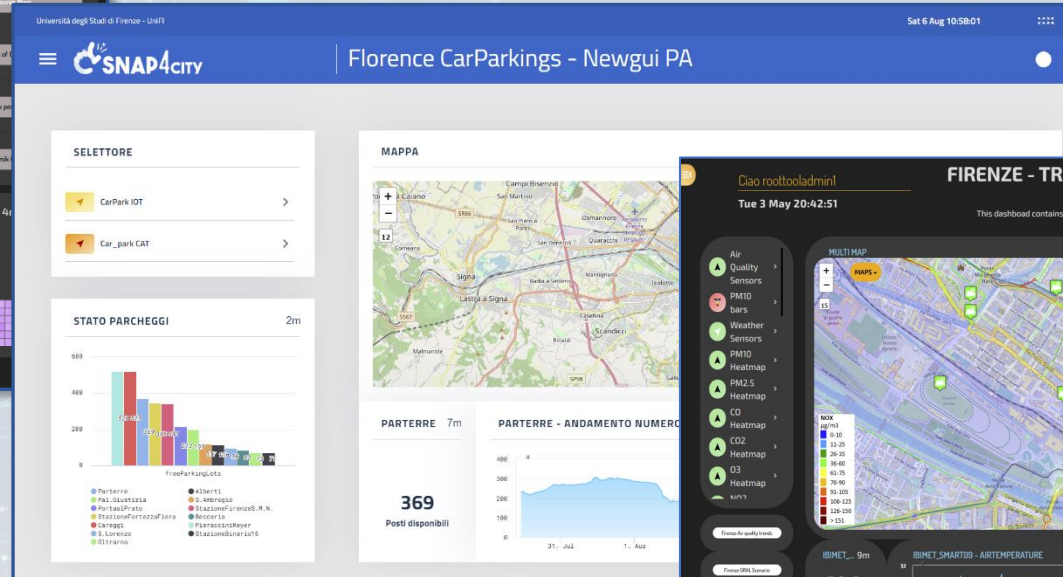
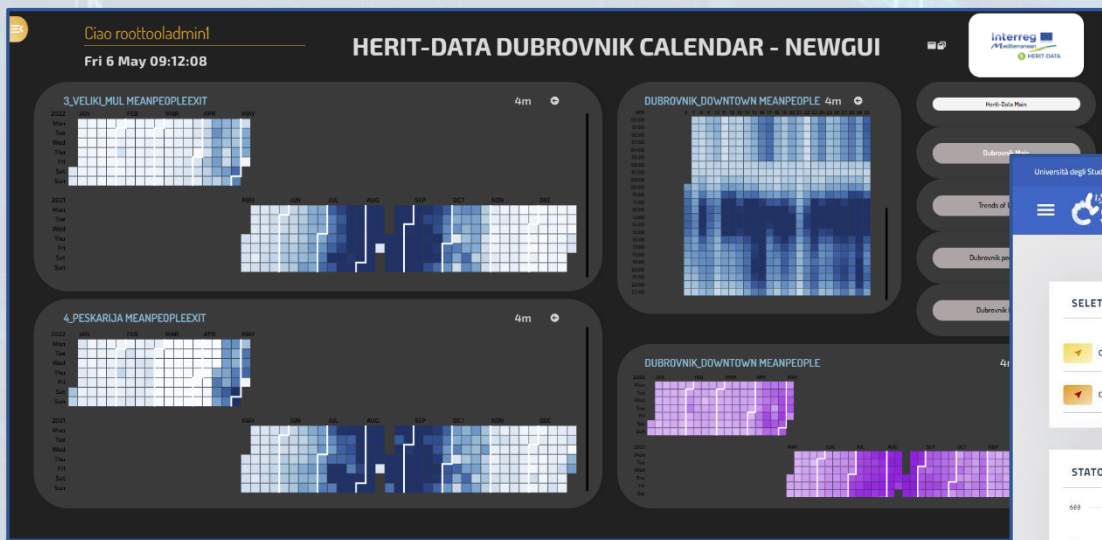




# Themes



# Different Themes



New styles/themes can be developed by specializing a few files from open source

<https://www.snap4city.org/793>

# Changing Theme

**Select Theme**

Please note that the edit works only on Legacy Theme for the size of the widgets. Different themes your select are visible only on Preview and production

Current theme : Legacy

Select a Theme ▾

- Baloon
- Baloon-Dark
- Gea
- Gea-Night
- Legacy
- PA

Cancel Confirm

**258.8 Kw/h**

Monthly cumulative consump... (9m) | PODs Percentage (9m) | tusc\_weather\_sensor\_ow\_3176959 - airTemperature

Viale Guldoni (9m) | Piazza Donatello (9m) | Via del Cavallaccio (9m) | Piazza Giorgini (9m) | Via Venosta (9m) | Piazza Franca (9m)

Environment | Mobility | Social | Resilience | Main

Real tim... | Accumul... | Accumul...

Loading data, please wait

N. of App Users (9m) | Energy consumpti... (9m)

Loading data, please wait

Fast Recharging Stations - Average Weekly consumption

Viale Guldoni (9m) | Piazza Donatello (9m) | Via del Cavallaccio (9m)

Piazza Giorgini (9m) | Via Venosta (9m) | Piazza Franca (9m)

Save | Preview

Tue 20 Jun 18:34:4

UNIVERSITÀ DEGLI STUDI FIRENZE | DINFO | DISIT | SNAP4CITY

# Dashboard Builder: Development

Data Transformation  
Business Logic

IOT Applications

Knowledge Base,  
Km4City

Knowledge and Storage  
Data from the Field and  
City + MyKPI ++



Widget Collection

Micro Applications

External Services

Custom Widgets/  
Synoptics



Dashboard Wizard

Dashboard Editor

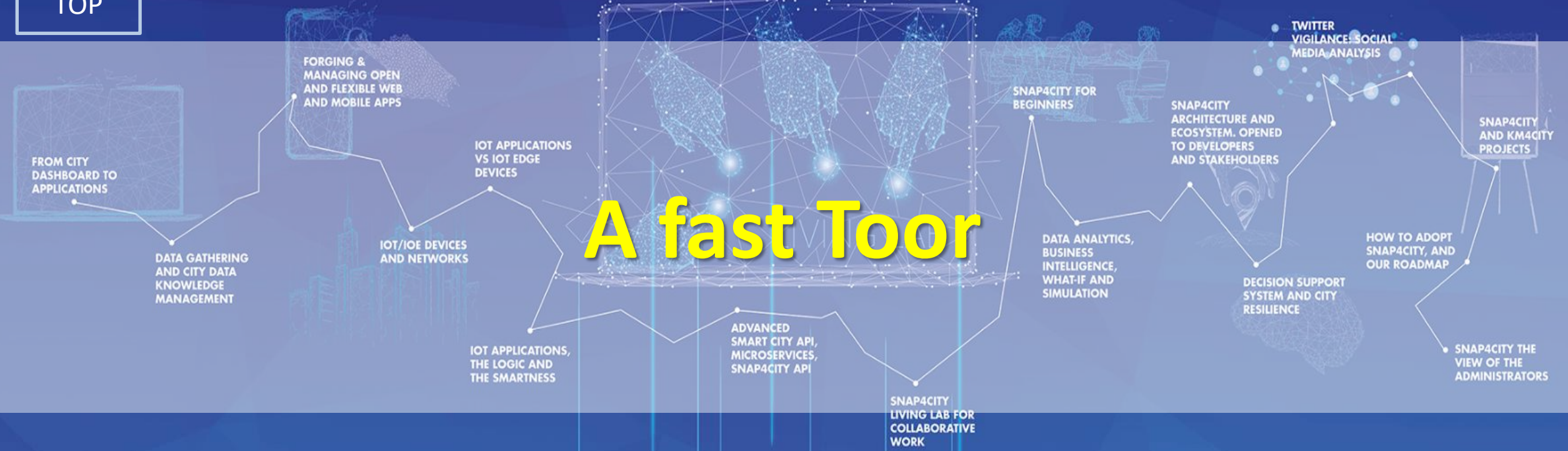
Public Dashboard Collection

My Own Dash/App

Create, save, load,  
delegate, grant access,  
change ownership



TOP



Snap4City is a full-featured platform to manage, aggregate, visualize and analyze big data, IoT. These operations can be customized to accommodate any business need

This short tour is going to show you the main features of the platform.

Leave the tour

Take the tour

- Extra Dashboard Widgets
- Data Management, HLT
- Knowledge and Maps
- Processing Logics / IOT App
- Entity Directory and Devices
- Resource Manager
- Development Tools
- Management
- Decision Support Systems
- Deploy and Installation
- Help and Contacts
- Documentation and Articles



Home Snap4City: Smart aNalytic APp builder for sentient Cities and IOT

# Snap4City: Smart aNalytic APp builder for sentient Cities and IOT

WHAT IS Snap4City | LATEST NEWS | SELECT for Cities 1<sup>st</sup> Place award to SNAP4CITY | Snap4City Training on Tools and Platform | Tutorials | Scenarios | Organizations

SMARTCITY EXPO WORLD CONGRESS 15 - 17 NOVEMBER 2022 BARCELONA & ONLINE GET YOUR PASS | Flyers | Data Analytics | Innovations | Interoperability

Installations | What People say | Mobile Apps | IOT Devices | IOT Applications | Data Analytics | Dashboards | Living Lab | Smart City API

Smart City Ontology | Work with Us | Articles | SNAP4CITY on EUROPEAN OPEN SCIENCE CLOUD MARKETPLACE | SNAP4CITY HACKATHON | INDUSTRY 4.0 | Snap4Home

Login

## Registration

- New Registration
- Request a new password
- Recover your registration

## Search

Search

-Any-

Training on Tools and Platform

Powered by www.km4city.org





TOP

# Main Data Kinds:

# data vs representations



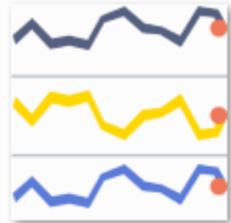
# From Data to Visualization



# Visual Representations



Slider with multiple steps for KPI



sparklines



kpi



histogram



heatmap



flow-maps



geo-maps



donut-chart



Data-grid



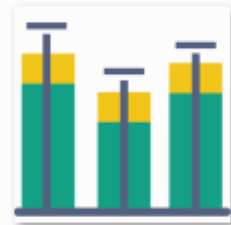
chord



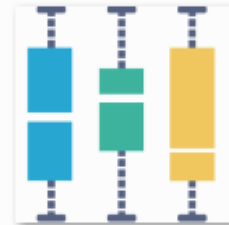
Cone



Bubble-matrix-chart



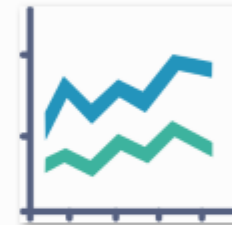
Bullet



Box-plot



stacked-area



Stacked-line-chart



Stacked-combination-Chart



spider-maps



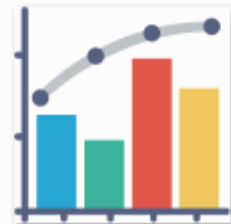
Sequence-Sunburst



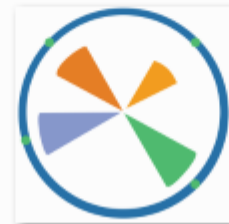
Pivot



pie-chart-1



Pareto-chart



radar



Bubble-maps



waterfall

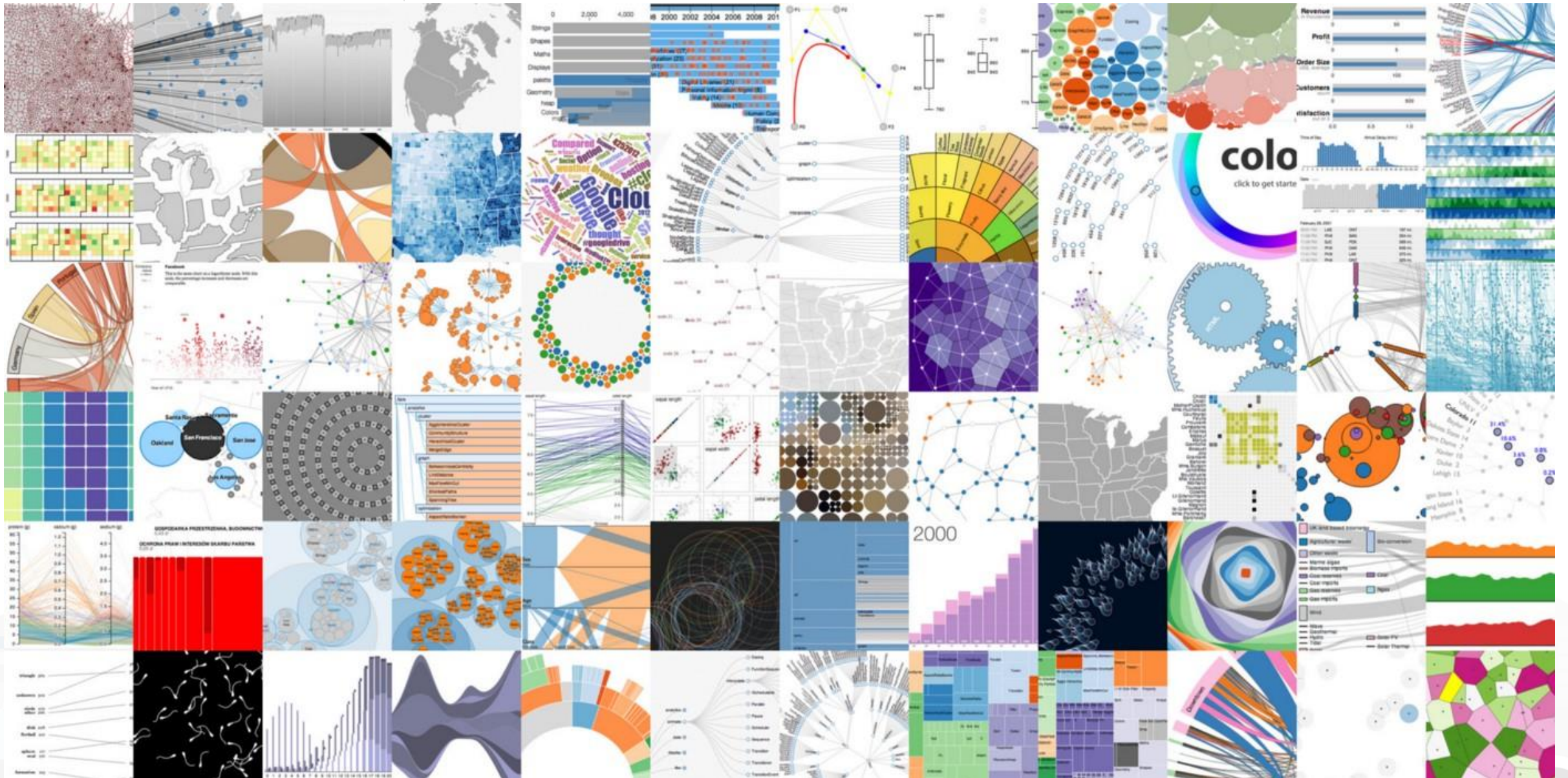


Sunburst



Sankey

# D3.js graphs



# Main Concepts

- **Time Series**
  - Data sources (sensors / actuators) which provide changes of time. E.g., a sensor of some kind.
- **Geolocated Data on maps (PINs)** can be:
  - Structural info.: roads, building, etc.
  - Maps, orthomaps, Heatmaps (HM)
  - Elements and their positions as
    - Points of Interest
    - Shapes: garden, building, cycling paths, etc.
    - Entities/Devices as Time Series: which may move over time, e.g., tracking a Car
  - Origin Destination Maps, ODM
  - Trajectories, people and traffic flows, etc.
  - etc.
- **Static non GeoLocated Data:**
  - almost nothing since.....

A single Data Kind  
may have multiple  
representations:

e.g.: the position of the car  
at 15:30, the trajectory of  
yesterday, the ODM with set  
of travels performed in the  
last year, the most freq.  
Visited places as HM

TOP

# Time Series, multi series



IOT Device

# What About IoT Devices, Time Series



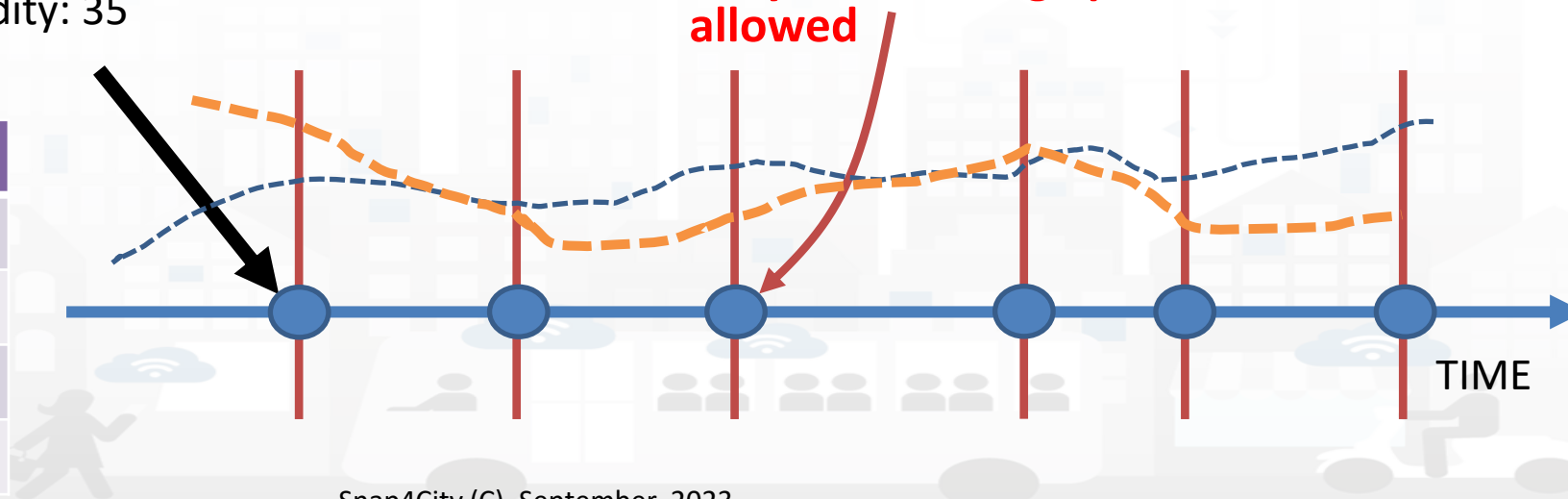
IOT Device

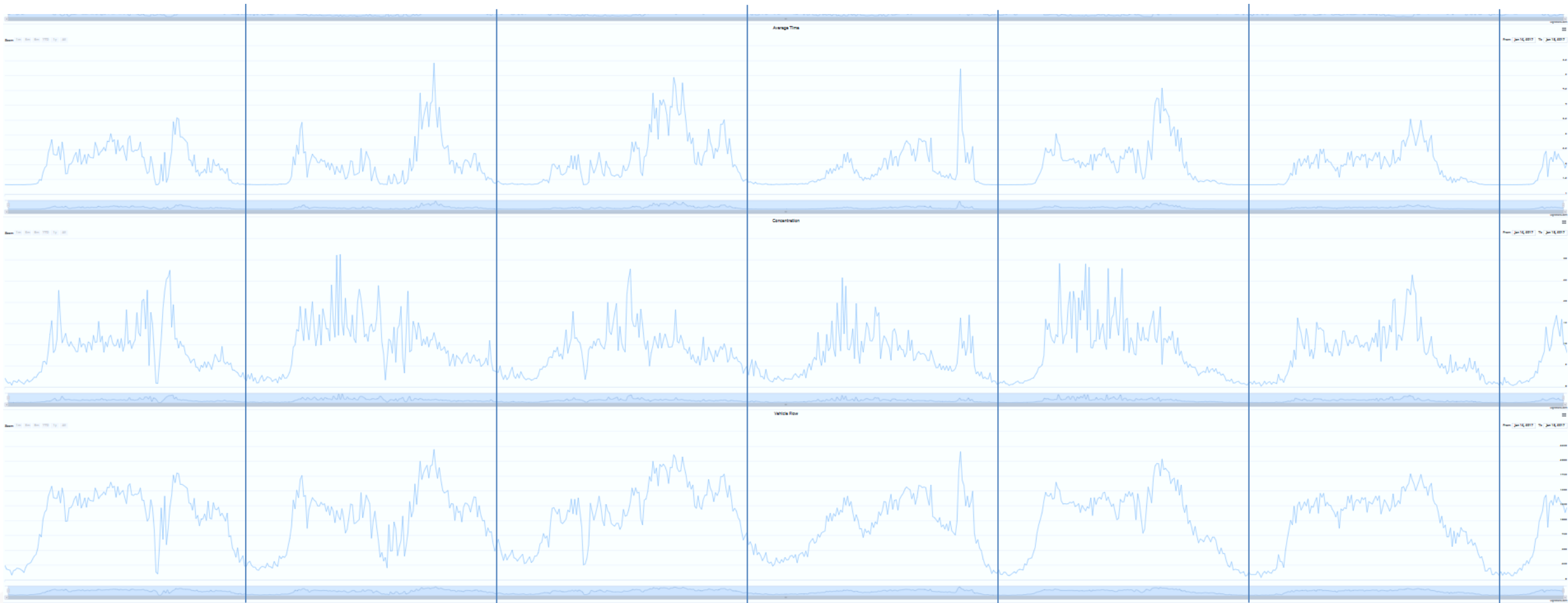
Sends a message

Message ( timestamp: 02-04-2020 at 10:30, Temperature: 29.34, Humidity: 35 )

dateObserved	Temp	Humidity
02-04-2020 10:30	34.5	23
02-04-2020 10:40	36.5	24
02-04-2020 10:50	36.0	22.5

- A set of data coming from an IoT Device with multiple sensor become a time series of values for devices.
  - For example: taking a new measure every 10 minutes (**Red Lines**)
  - Non regular rates can be valid data as well.
- Each new measure in Snap4City is conventionally time located in «**dateObserved**», which has to be **Unique**.
  - **Only one message per dateObserved is allowed**



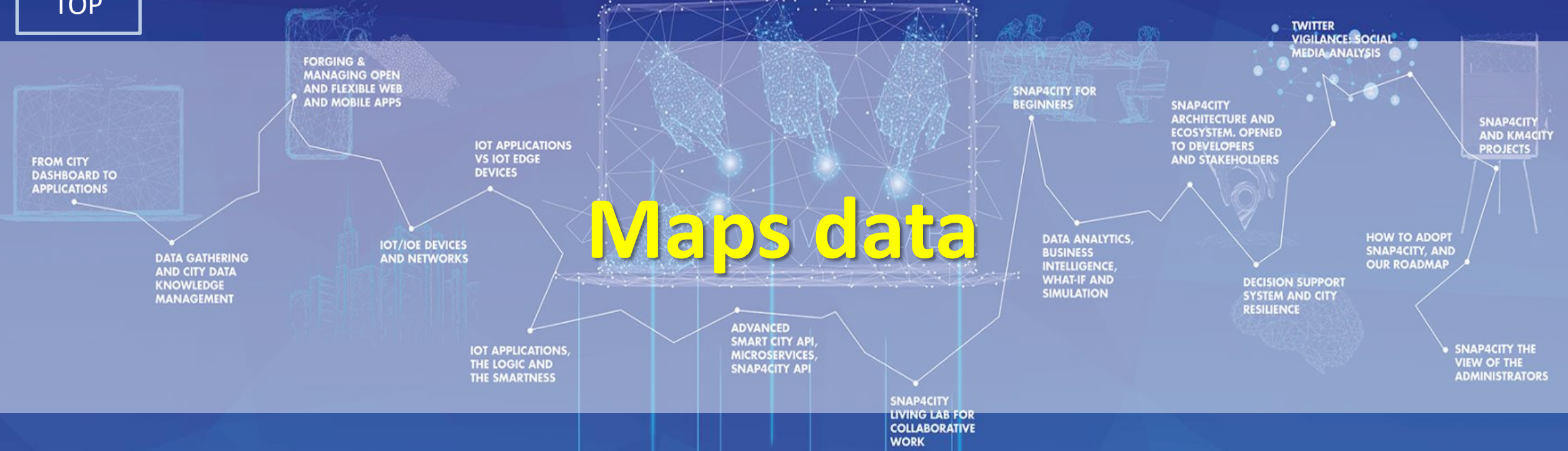


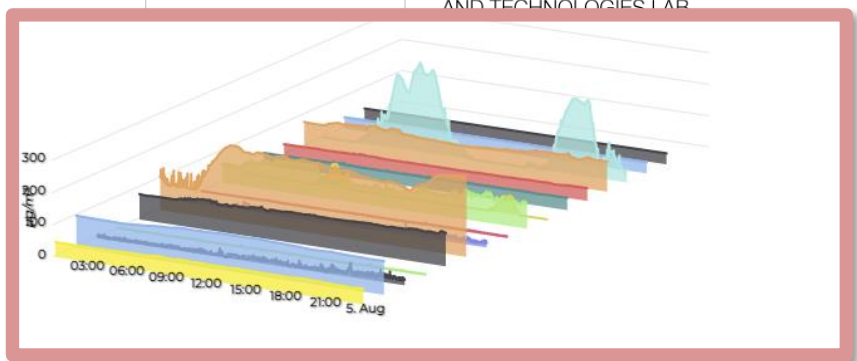
- Day by day traffic flow, on the week data from 3 sensors



TOP

## Maps data





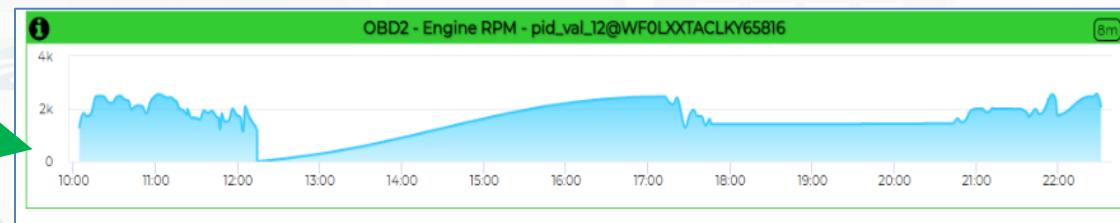
Longitude

Latitude

Values

Sensors of Devices,  
KPI, etc.

time



Snap4City

User: roottooladmin1, Org: DISIT  
Role: RootAdmin, Level: 7

LOGOUT

- My Snap4City.org
- Dashboards
- My Dashboards in All Org.
- Dashboards of My Organization
- My Dashboards in My Organization
- My Data Dashboard Dev Kibana
- My Data Dashboard Kibana
- Extra Dashboard Widgets
- Notificator
- Data, my Data, OpenData
- Knowledge and Maps
  - Service Map (Toscana)**
  - Service Map 3D (Firenze)
  - Helsinki Service Map
  - Antwerp Service Map
  - Garda Lake Service Map
  - Cagliari Service Map
  - Lonato Del Garda Service Map
  - Valencia Service Map
  - Pont Du Gard Service Map
  - Dubrovnik Service Map
  - WestGreece Service Map
  - Mostar-Bosnia Service Map
  - Svealand Service Map
  - Roma Service Map
  - Pisa Service Map
  - Creating WKT
  - Service Map 3D (Antwerp)
  - Service Map 3D (Helsinki)
  - Producing POI triples for KB
  - Load WKT on ServiceMap (Helsinki)
  - Load WKT on ServiceMap (Toscana)
  - Load WKT on ServiceMap (Antwerp)

## Service Map (Toscana)

Public transport | Municipalities | Text Search | Address Search | Events

Select an agency:  
- Select an Agency -

Select a line:  
- Select a Line -

Select a route:  
- Select a Route -

Select a bus stop:  
- Select a Bus Stop -

**Position of selected Buses**

Actual Selection  
Service: METRO758

Serviceuri: <http://www.disit.org/km4city/resource/METRO758>

Name: METRO758  
Nature: TransferServiceAndRenting  
Subnature: SensorSite  
Address: Lavagnini dir. Viale Strozzi (38)  
DBpedia: "Spartaco\_Lavagnini"

Property/Value Type	Value
avgDistance	Not Available
avgTime	14.291604
occupancy	Not Available
concentration	8.25
vehicleFlow	1344.0
averageSpeed	29.613344
thresholdPerc	Not Available
speedPercentile	Not Available
congestionLevel	119.0967
anomalyLevel	101.56058

Latest Update: 2021-01-18T13:...

Regular Services | Transversal Services

De/Select All

- Accommodation +
- Advertising +
- AgricultureAndLivestock +
- CivilAndEdilEngineering +
- CulturalActivity +
- EducationAndResearch +
- Emergency -
- Carabinieri
- Civil\_protection
- Coast\_guard
- Economic\_safety
- Corps\_of\_forest\_rangers
- Emergency\_medical\_care
- Emergency\_services
- Fire\_brigade
- First\_aid
- Italian\_finance\_police
- Entertainment +
- Environment +
- Fire\_service +
- GovernmentOffice +
- HealthCare +
- IndustryAndManufacturing +
- IoTDevice +
- MiningAndQuarrying +
- ShoppingAndService +
- TourismService +
- TransferServiceAndRenting +
- UtilitiesAndSupply +
- Wholesale +
- WineAndFood +

Filter:  
search text into service

Select value type  
N. results: 500

Search Range: 2 km  
Search Area: select...

Weather Forecast for Municipality of: FIRENZE

Day	Weather	Temp
Saturday	bit cloudy	-2°C / 7°C
Sunday	overcast	-2°C / 6°C
Monday	cloudless	-3°C / 7°C
Tuesday	cloudy	-3°C / 6°C
Wednesday	overcast	5°C / 10°C

Latest Update: 2021-01-18T07:57:00+01:00  
<http://www.disit.org/km4city/resource/Firenze1610780220000>

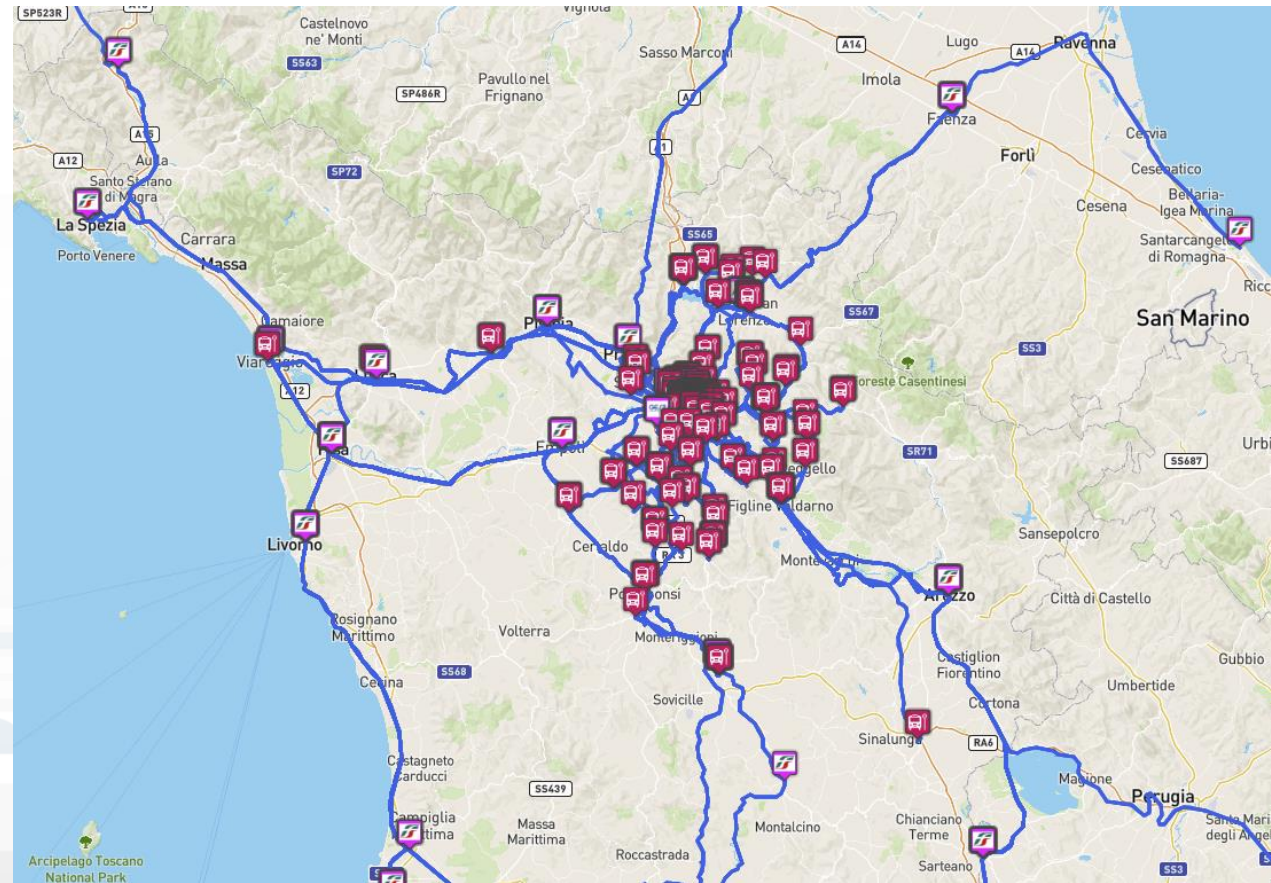
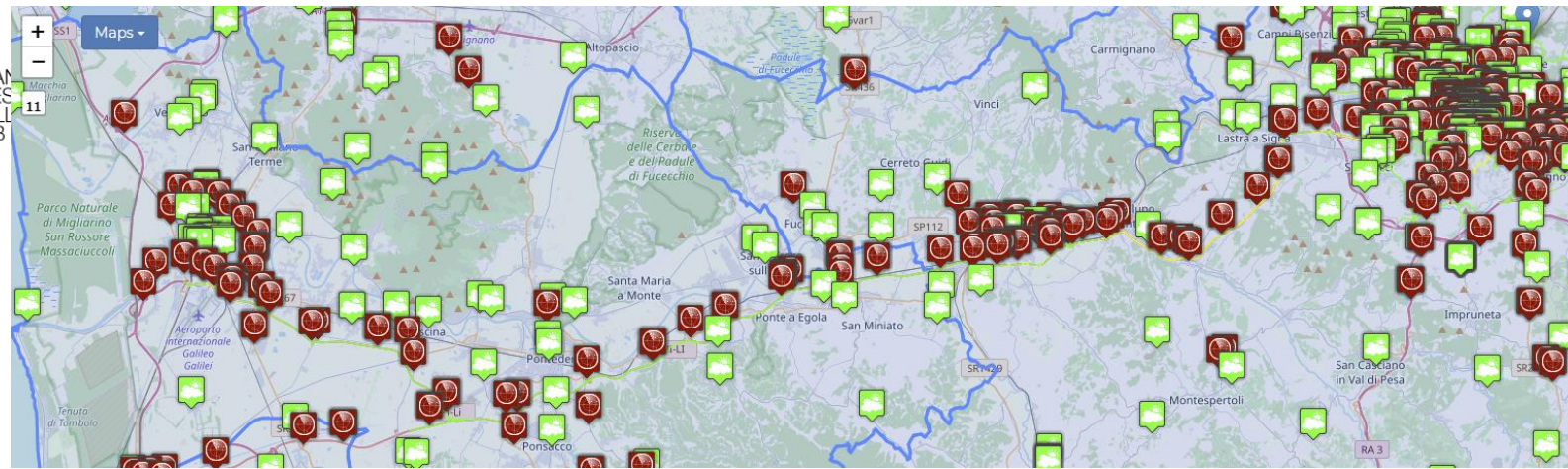
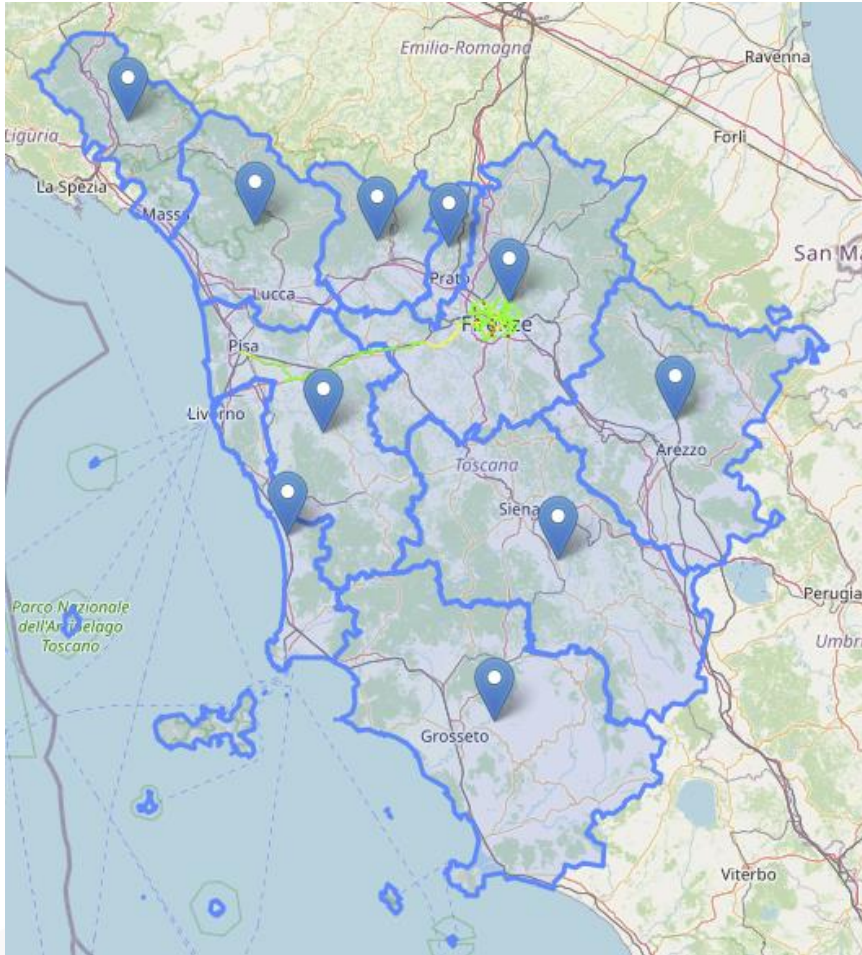
Entity/Device

Structural information

POI

Entity/Device

Map: Struct. Information



# Admin Models & limitations



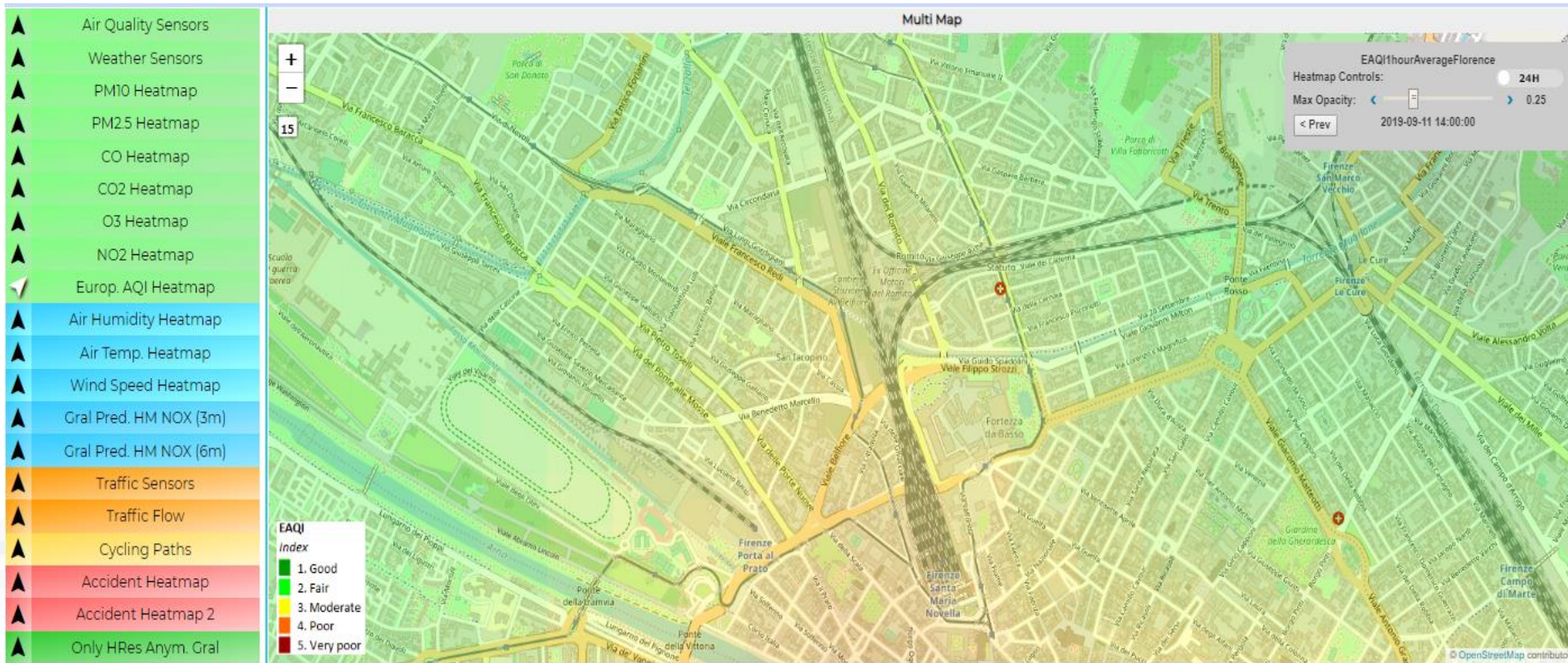
# Cycling Paths

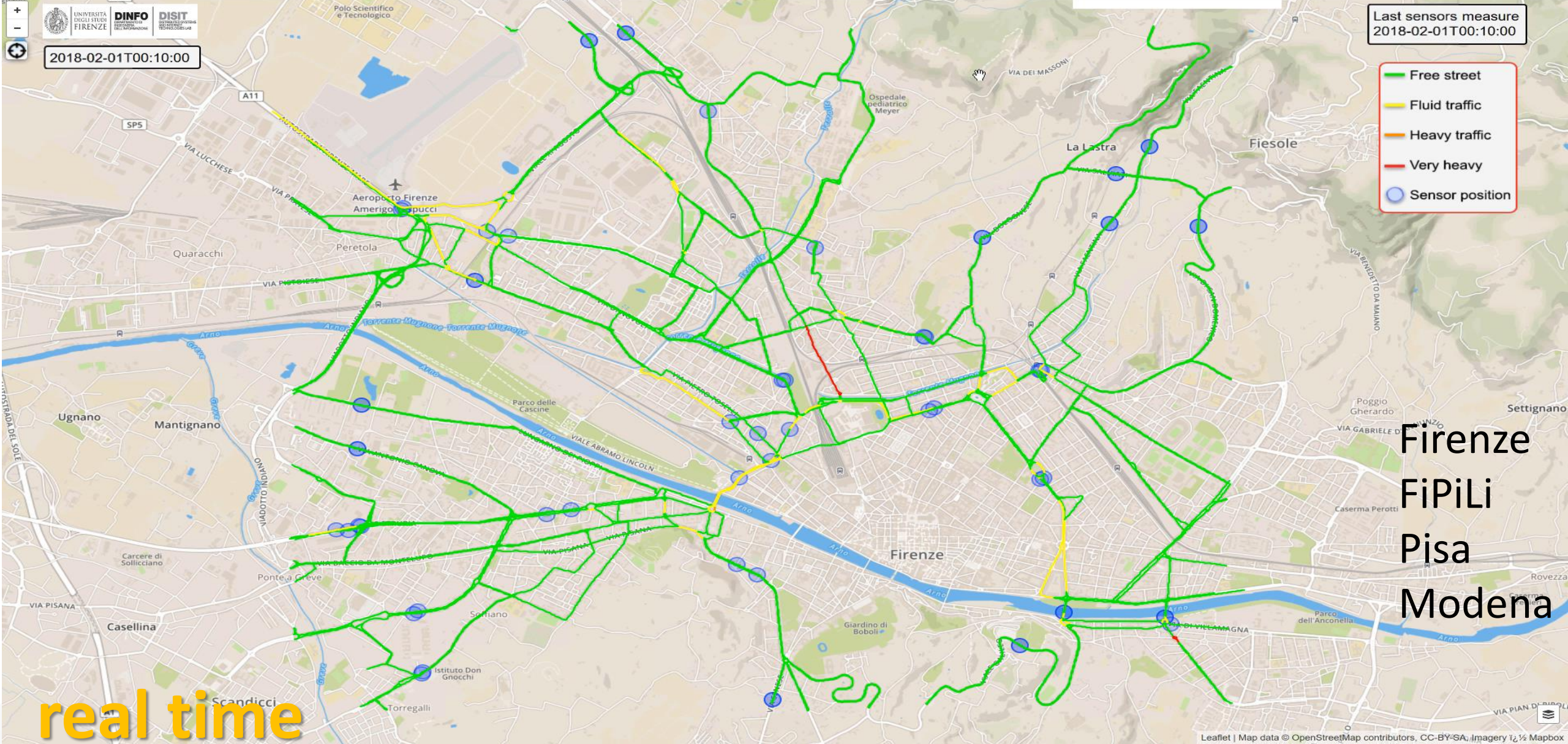


**ServiceMap: <https://servicemap.km4city.org>**

**Knowledge Base Semantic Reasoners**

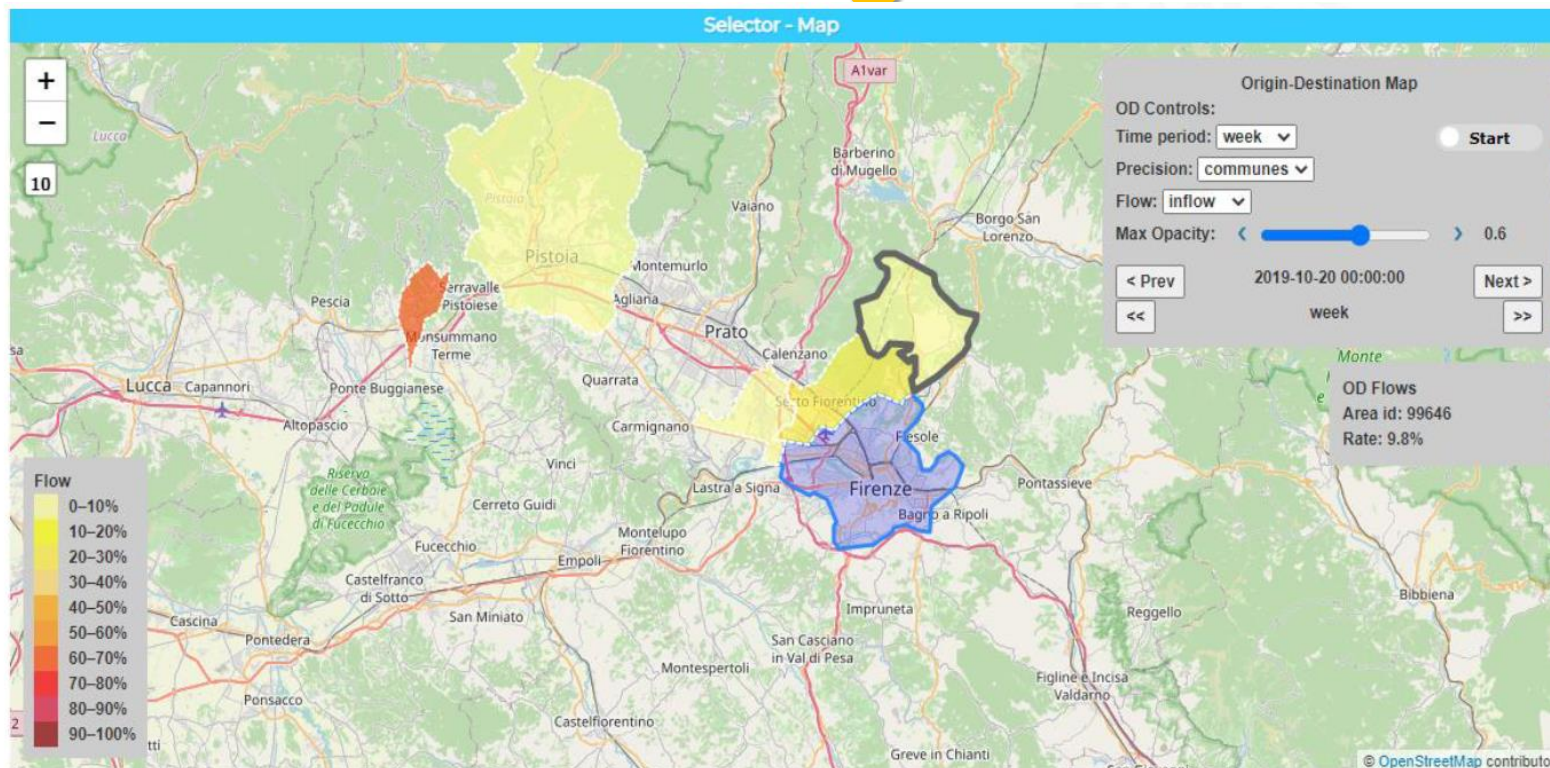
# EAQI Heatmap and sequence





# Traffic Flow Reconstruction

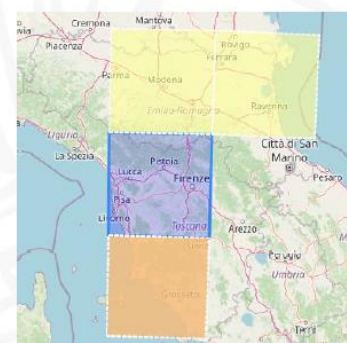
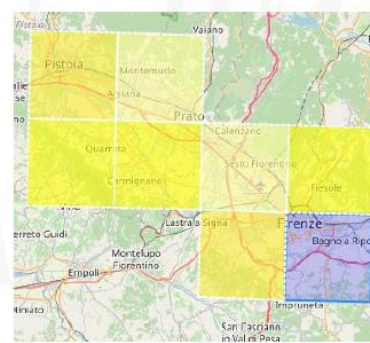
# Different Origin Destination Matrices



- Get specific value
- Time window
- Opacity
- Animation
- Inflow/outflow
- Sequence of OD matrices: next/prev

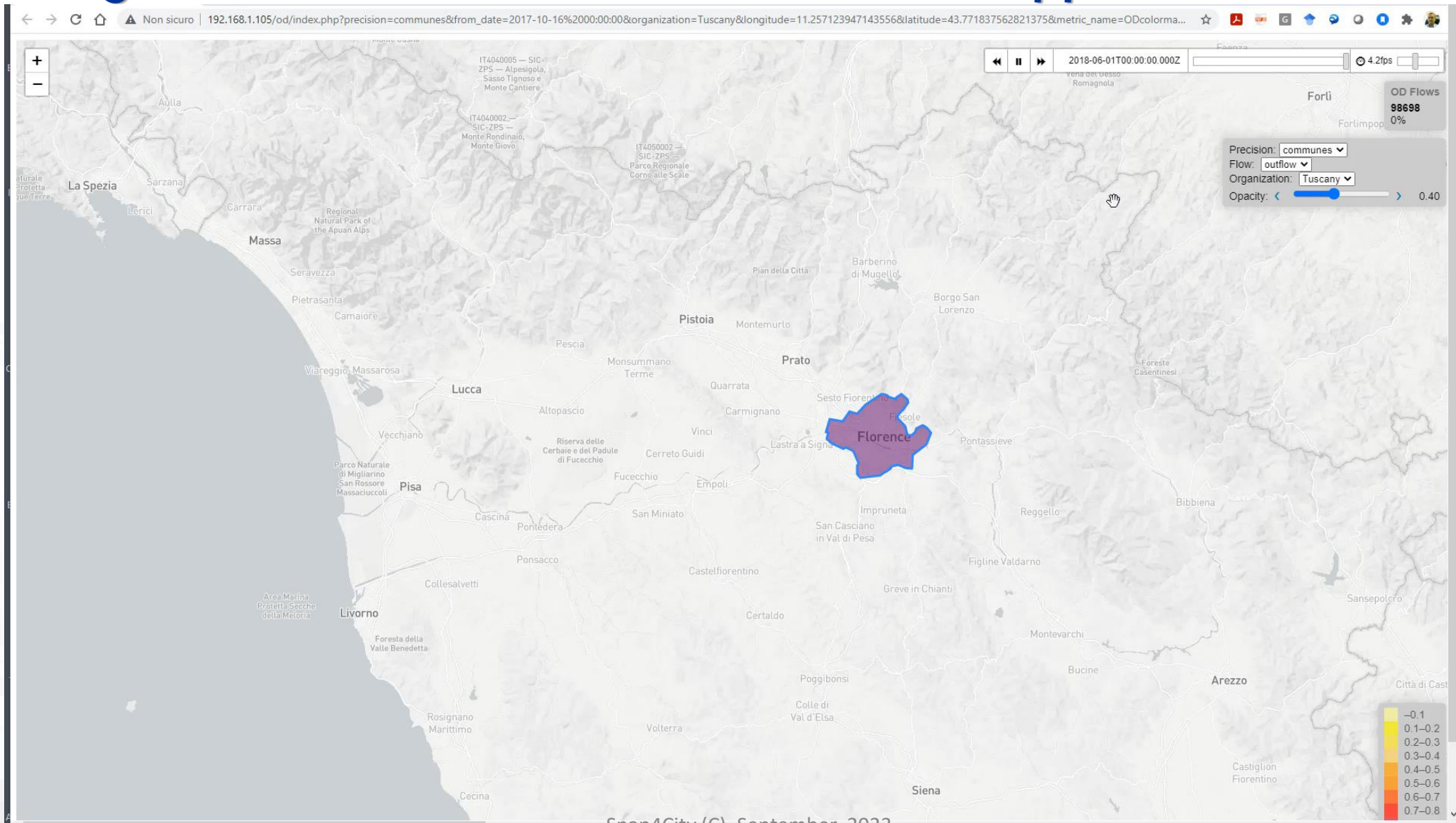
## shapes

- Shapes: city, region, territories, etc.
  - GADM <https://gadm.org/>, and ACE
- Squared MGRS:
  - 1m, 10m, 100m, 1Km, 10Km, 100Km

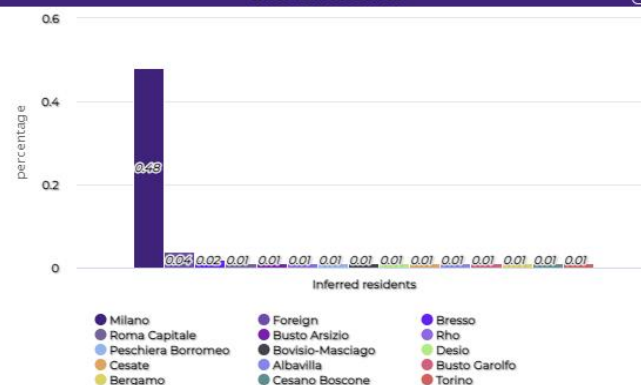
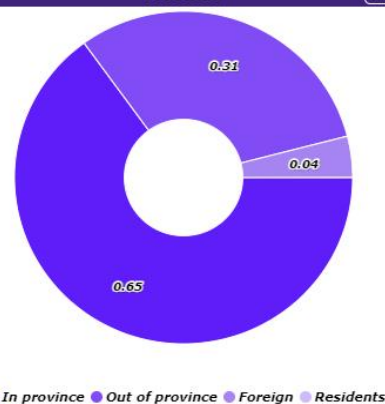
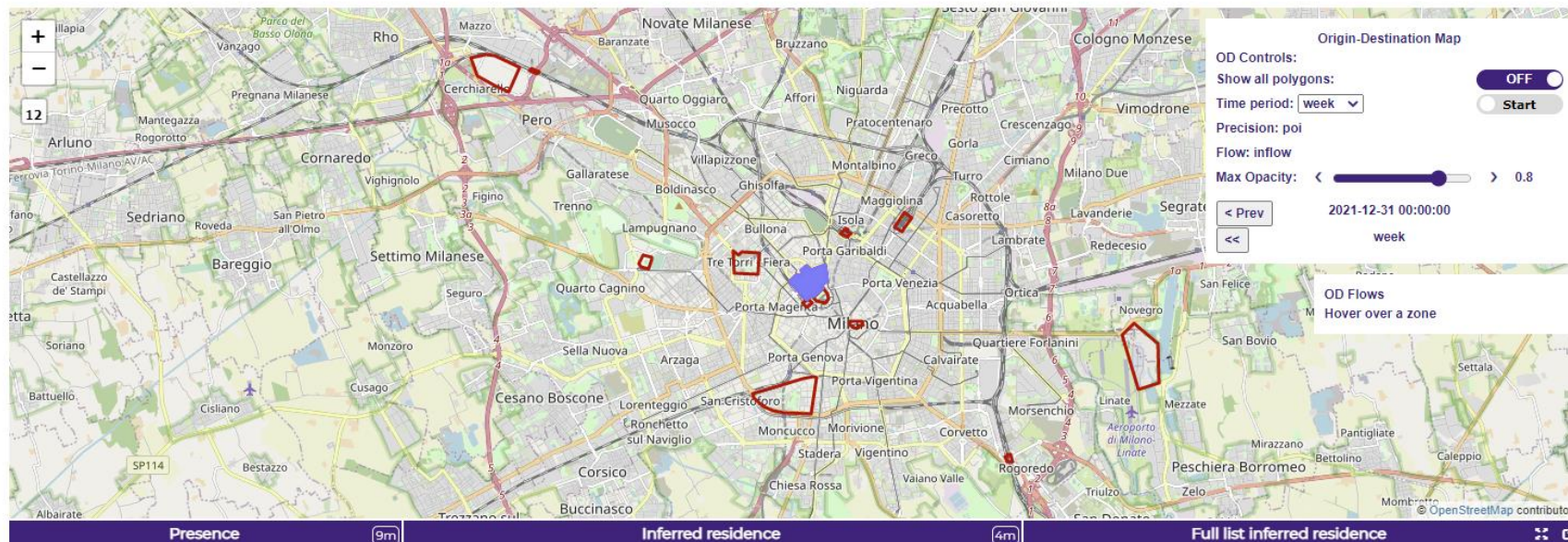




# Origin Destination Matrix based on Mobile App data



# ODM Visual Analytic on Milan Area

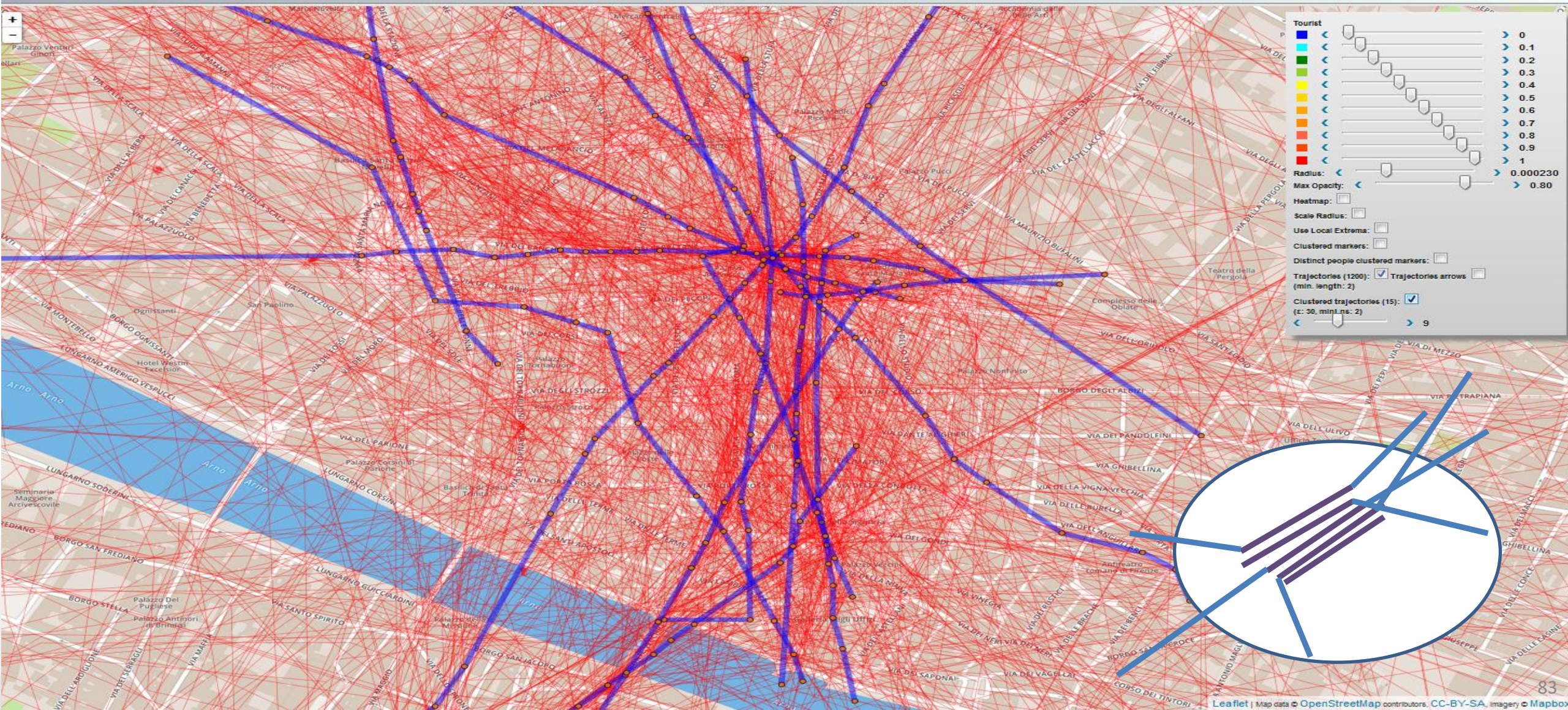


## Parco Sempione

Region Province Municipality Census block

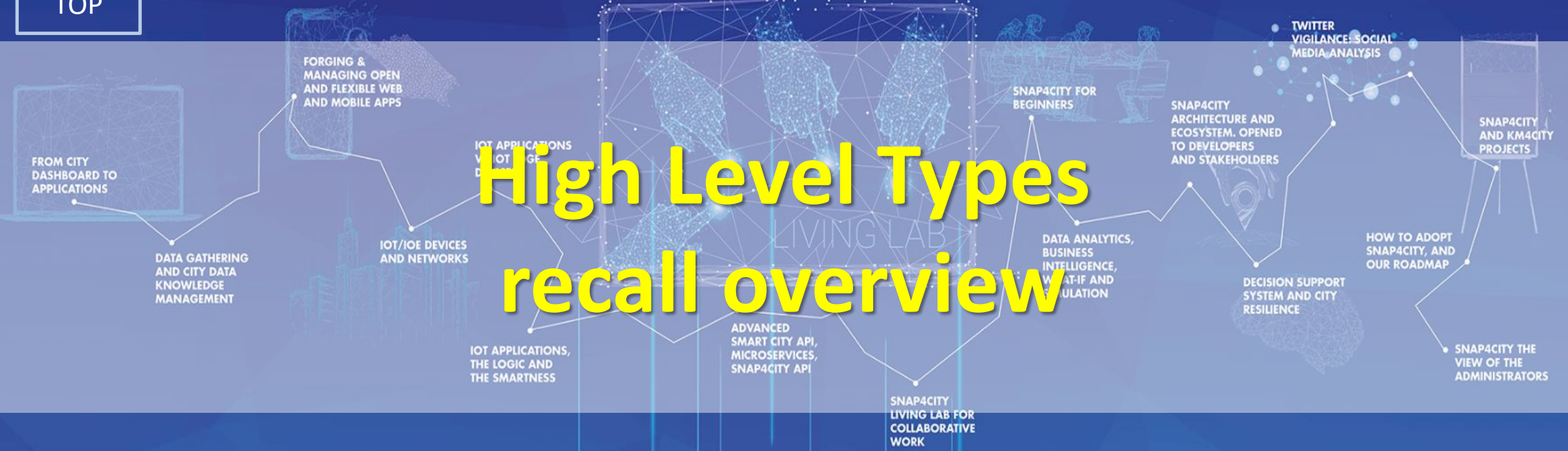
Milano	48.078%
Foreign	4.229%
Bresso	1.741%
Roma Capitale	1.392%
Busto Arsizio	1.044%
Rho	1.044%
Peschiera Borromeo	1.044%
Bovisio-Masciago	1.044%
Desio	1.044%
Cesate	0.696%
Albavilla	0.696%
Busto Garolfo	0.696%

# Cluster di Trajectories



TOP

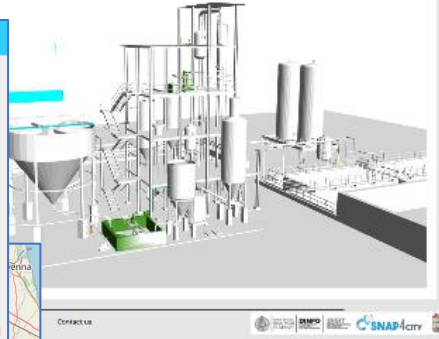
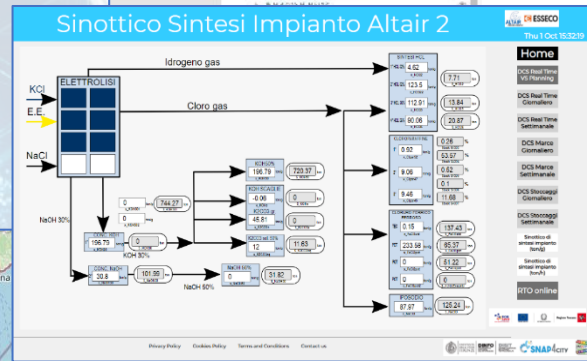
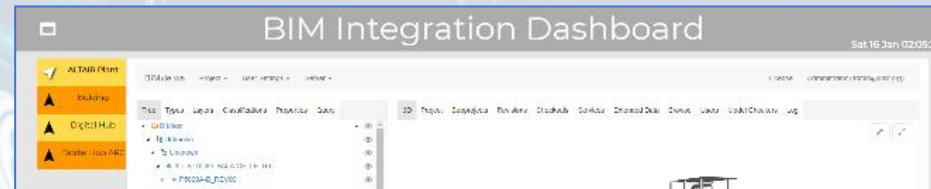
# High Level Types recall overview



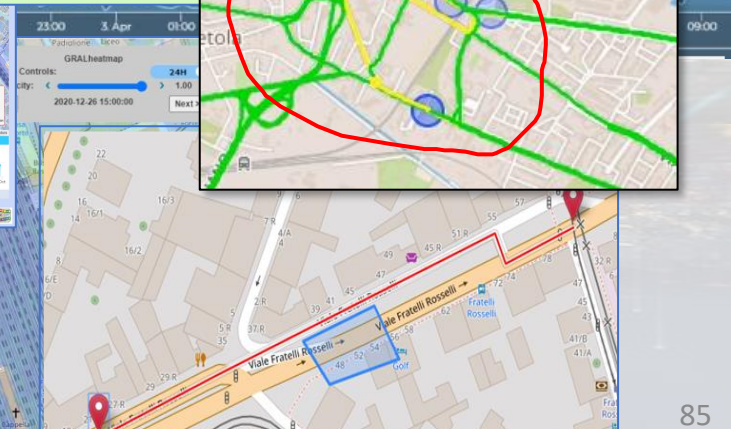
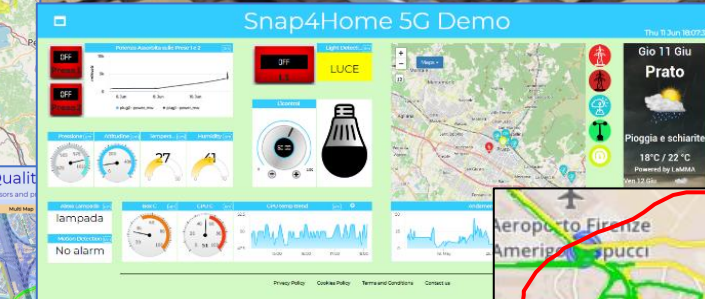
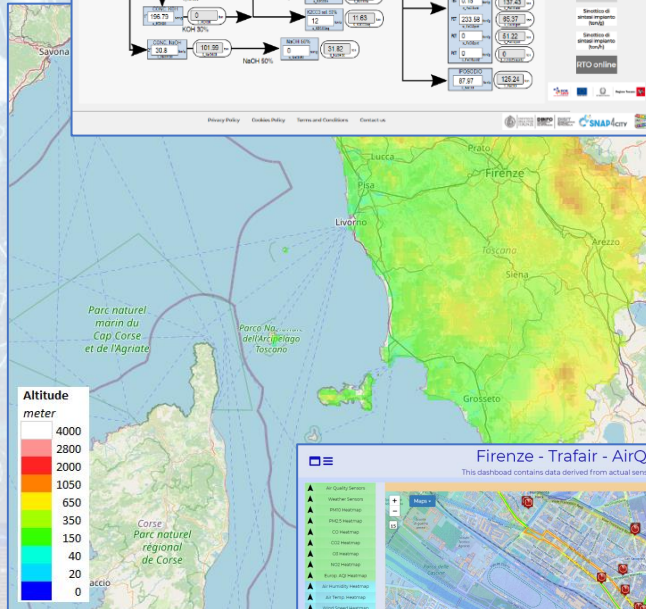
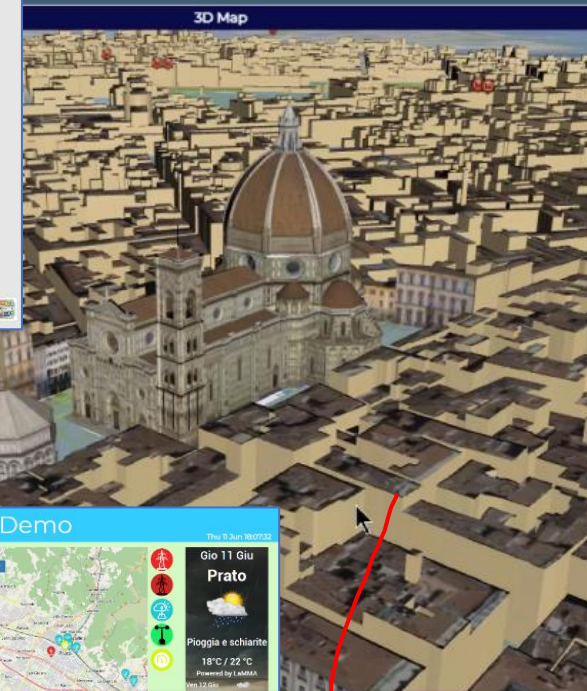
# High Level Types

Snap4City (C), September 2023

- 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, ...
- decision scenarios, ....
- etc.



**SNAP4CITY**  
- Digital Twin Global - Fire  
demonstrator



UNIVERSITÀ  
DEGLI STUDI  
FIRENZE

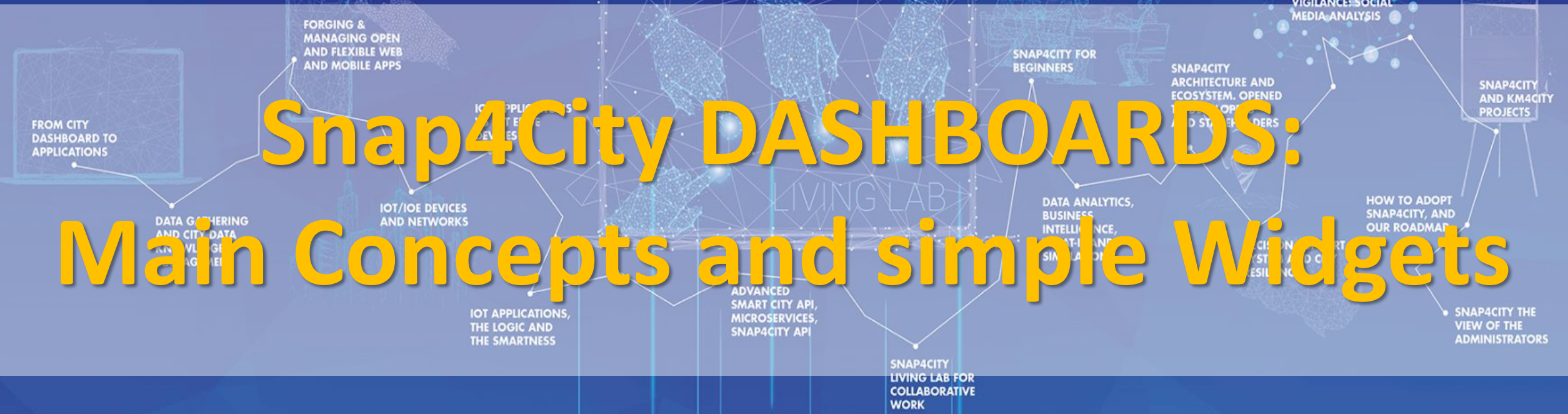
**DINFO**  
DIPARTIMENTO DI  
INGEGNERIA  
DELL'INFORMAZIONE

**DISIT**  
DISTRIBUTED SYSTEMS  
AND INTERNET  
TECHNOLOGIES LAB

TOP

# Snap4City DASHBOARDS:

# Main Concepts and simple Widgets

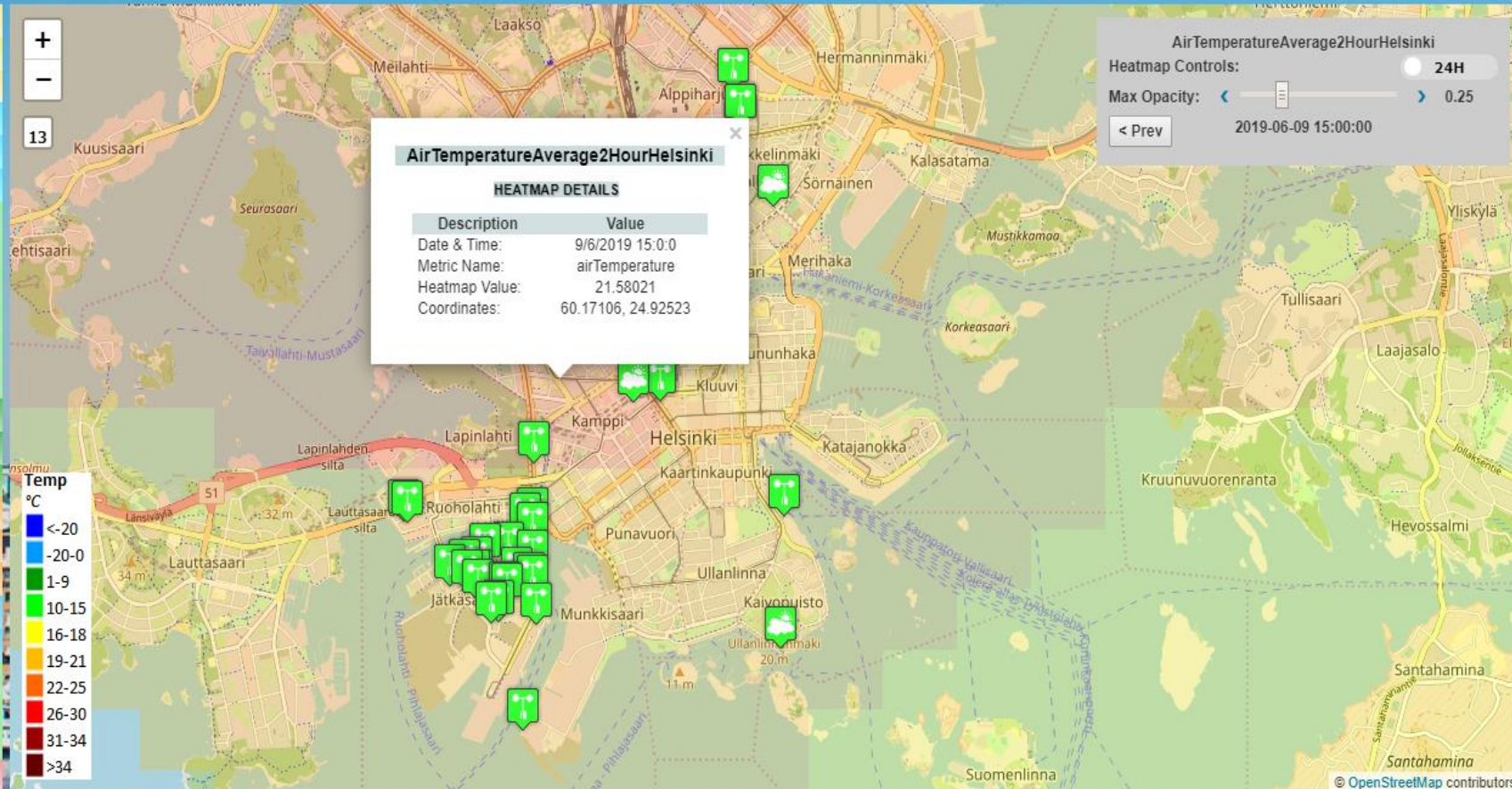


# Helsinki City Overview (H5a)

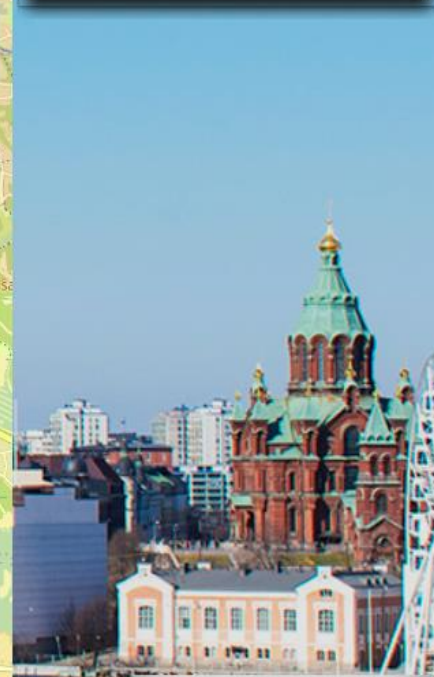
Please note that the data results are not always based on real data.

Sun 9 Jun 17:07:25

- ▲ BusStop
- ▲ Ticket sale
- ▲ Traffic Sensor
- ▼ Weather sensor
- ▼ Air Temp heatmap
- ▲ Humidity Heatmap
- ▼ Air Quality Sensors
- ▲ Noise sensors
- ▲ Noise Heatmap
- ▲ PM10 heatmap
- ▲ PM2.5 Heatmap
- ▲ NO2 heatmap
- ▲ Air Quality Index heatmap
- ▲ EAQI
- ▲ CAQI
- ▲ Enfuser pred. AQI
- ▲ Enfuser pred. PM10
- ▲ Enfuser pred. PM2.5
- ▲ Gral pred. PM10
- ▲ Gral pred. PM10 (6m)
- ▲ PM10 Jatkasaari
- ▲ PM2.5 Jatkasaari
- ▲ EAQI Jatkasaari
- ▲ Appreciated POIs



The Life of Helsinki



Documentation

Forum Discussion

Survey

<https://www.snap4city.org/dashboardSmartCity/view/index.php?iddasboard=MTQwNg==>

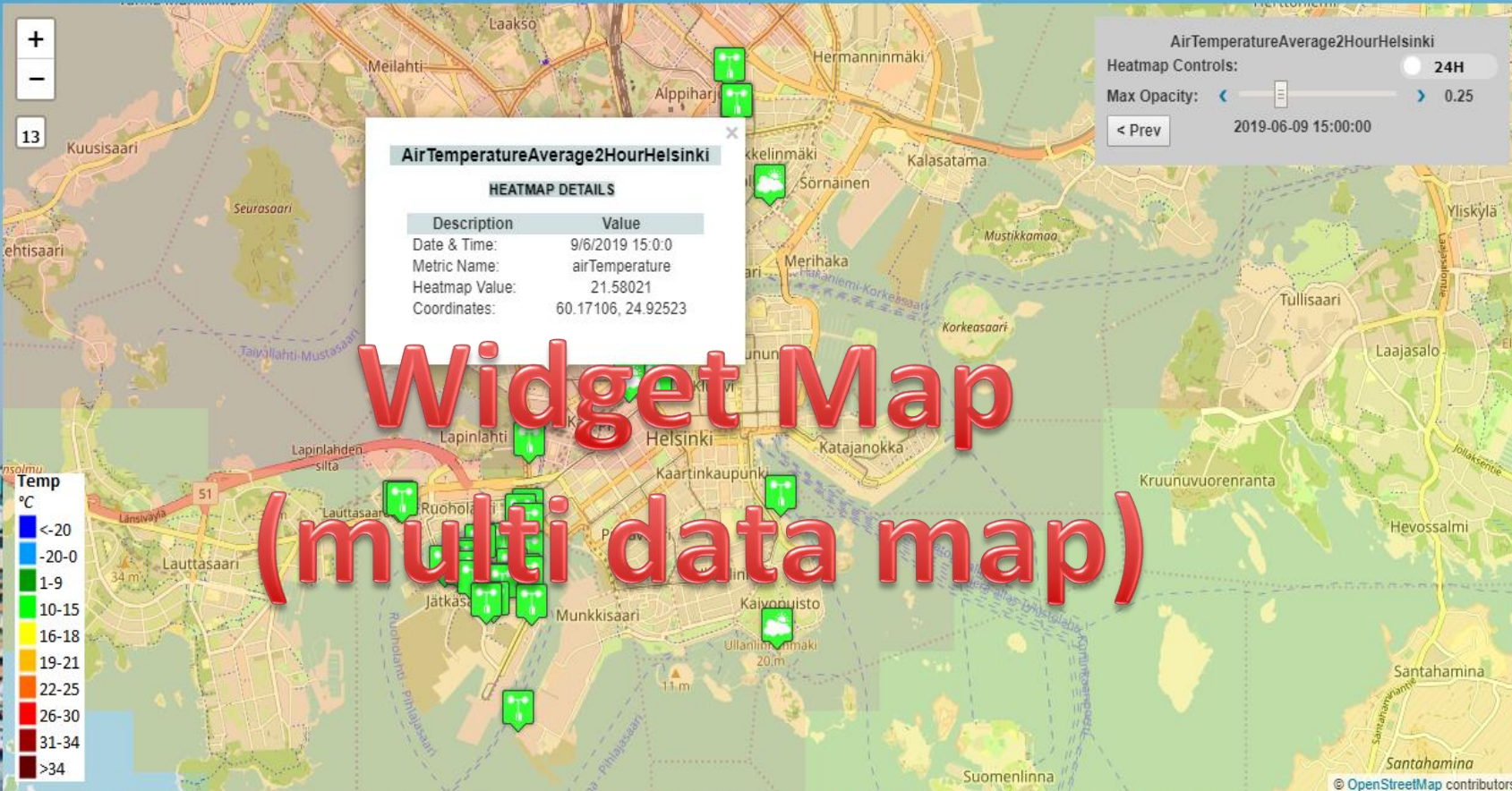


# Helsinki City Overview (H5a)

Please note that the data results are not always based on real data.

Sun 9 Jun 17:07:25

- ▲ Bus stop
- ▲ Ticket sale
- ▲ Traffic sensor
- ▼ Weather sensor
- ▼ Air Temperature heatmap
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- ▲ Noise Heatmap
- ▲ PM10 heatmap
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- ▲ EAQI
- ▲ CAQI
- ▲ Enfuser pred. AQI
- ▲ Enfuser pred. PM10
- ▲ Enfuser pred. PM2.5
- ▲ Gral pred. PM10
- ▲ Gral pred. PM10 (6m)
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- ▲ PM2.5 Jatkasaari
- ▲ EAQI Jatkasaari
- ▲ Appreciated POIs



**Widget Map  
(multi data map)**

The Life of Helsinki  
**Button**



Documentation

Forum Discussion

Survey

**External Content**



**Single Content**

**Time Trend**

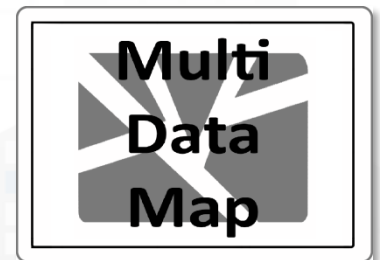
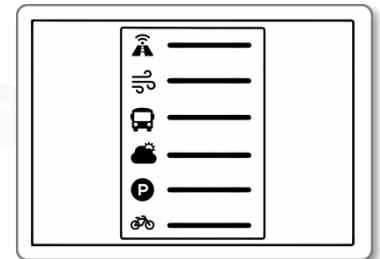
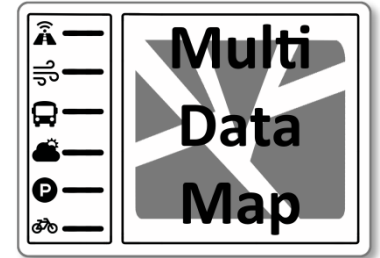
<https://www.snap4city.org/dashboardSmartCity/view/index.php?iddashboard=MTQwNg==>





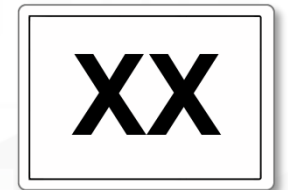
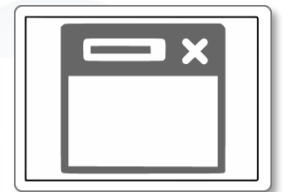
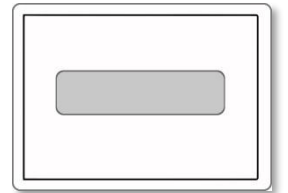
# Dashboard Usage & Recipe

- <https://www.snap4city.org/dashboardSmartCity/view/index.php?iddashboard=MTQwNg==>
- **Selector Widget:** (of different kinds) present “Information”, according to the HighLevelType (**HLT**), as overlapped layers on Target
  - **Additive:** PIN (POI, sensors, etc.), Cycling Paths, shapes, ...
  - **Mutual Exclusive by group:**
    - Heatmaps,
    - traffic,
    - Scenarios + what-if,
    - etc.
- **MultiDataMap Widget (Target:** (may be of different kind), this one may manage
  - Multiple representations on the same map
  - Each representation may provide specific interaction modalities and controls



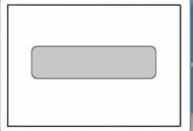
# Other Widgets in the dashboard

- **Button Widget** may be of different kind and may
  - Open external web pages, services, forum, surveys, etc.
  - Send messages on the field (IOT), etc.
- **External Content:**
  - Web pages (HTML + CSS + etc..), Video Streams
  - Many many other tools see next exercise
- **Single Content**
  - Single value: numeric, string, HTML, etc.
- **Time Trend**
  - Time Series: numeric values over time



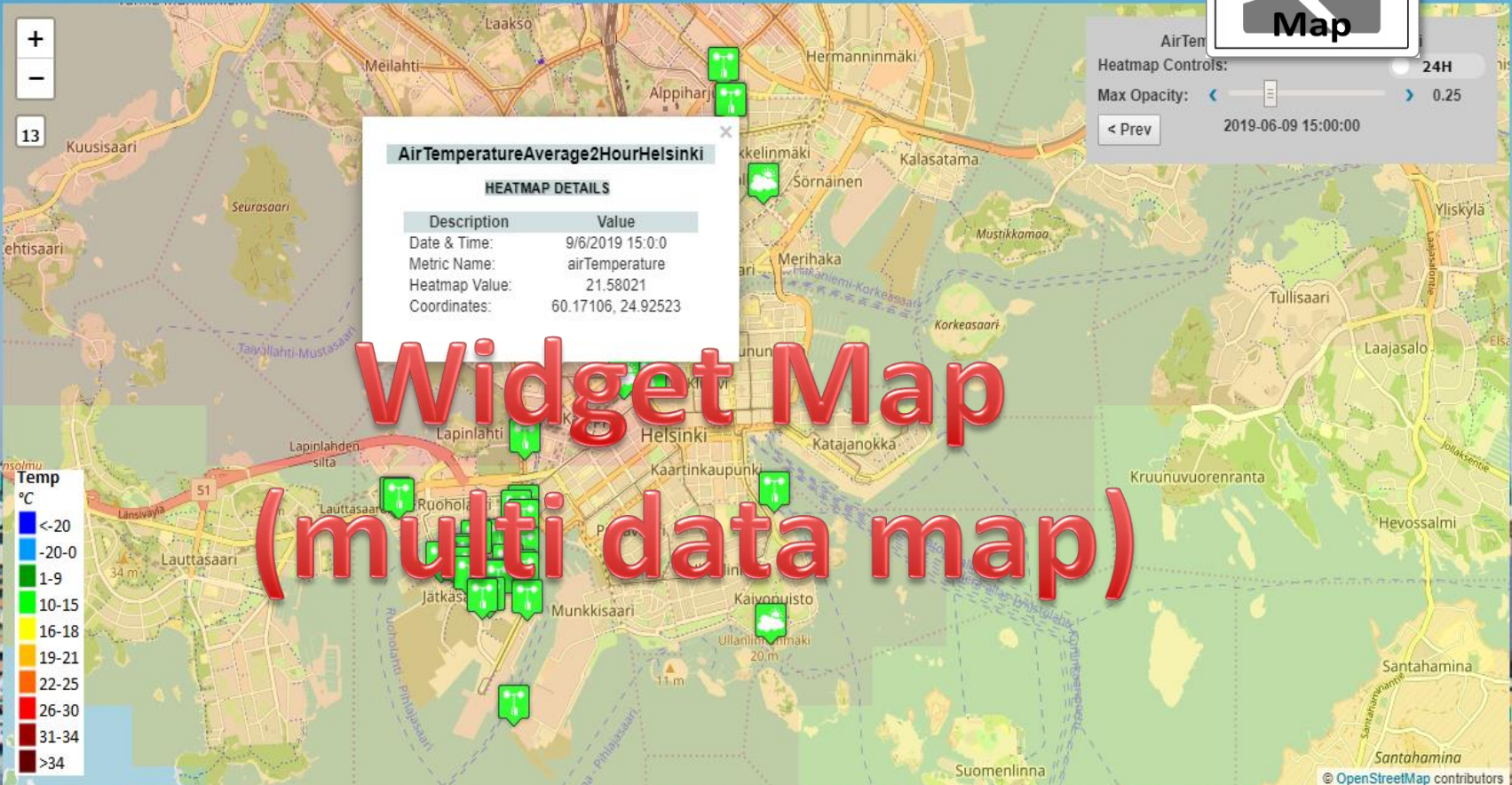
# Helsinki City Overview (H5a)

Please note that the data results are not always based on real data.



9 Jun 17:07:25

- ▲ Bus stop
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- ▲ Enfuser pred. PM10 (6m)
- ▲ PM10 Jatkasaari
- ▲ PM2.5 Jatkasaari
- ▲ EAQI Jatkasaari
- ▲ Appreciated POIs



## Widget Map (multi data map)

## The Life of Helsinki Button



## External Content



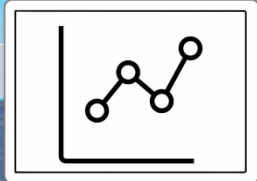
## Single Content



## Documentation

## Forum Discussion

## Survey



# Unique Dashboard builder Multiple Styles

**Antwerp Overview A5**

**AIR QUALITY MONITORING STATION 42R804 - ANTWERPEN (RING)**  
VALUE NAME: ANTWERP\_AIR\_QUALITY\_BETR804

DETAILS DESCRIPTION RT DATA  
Last update: 2019-11-13 14:00:00+01:00

Description	Value	Buttons				
airQualityPM10	15	Last value	Last 4 hours	Last 24 hours	Last 7 days	Last 30 days
airQualityNO2	54	Last value	Last 4 hours	Last 24 hours	Last 7 days	Last 30 days
airQualitySO2	null	Last value	Last 4 hours	Last 24 hours	Last 7 days	Last 30 days
airQualityPM2_5	8	Last value	Last 4 hours	Last 24 hours	Last 7 days	Last 30 days

**NO2  $\mu\text{g}/\text{m}^3$**

- 0-20
- 21-50
- 51-70
- 71-120
- 121-150
- 151-180
- 181-200
- 201-250
- 251-300
- >300

**airQualityNO2 - 7 days**

8.3

13/11/2019 15:26:45

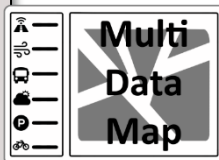
0:00

<https://www.snap4city.org/dashboardSmartCity/view/index.php?iddashboard=MjM1MA==>

Privacy Policy Cookies Policy Terms and Conditions Contact us

# Widget Multi Data Map

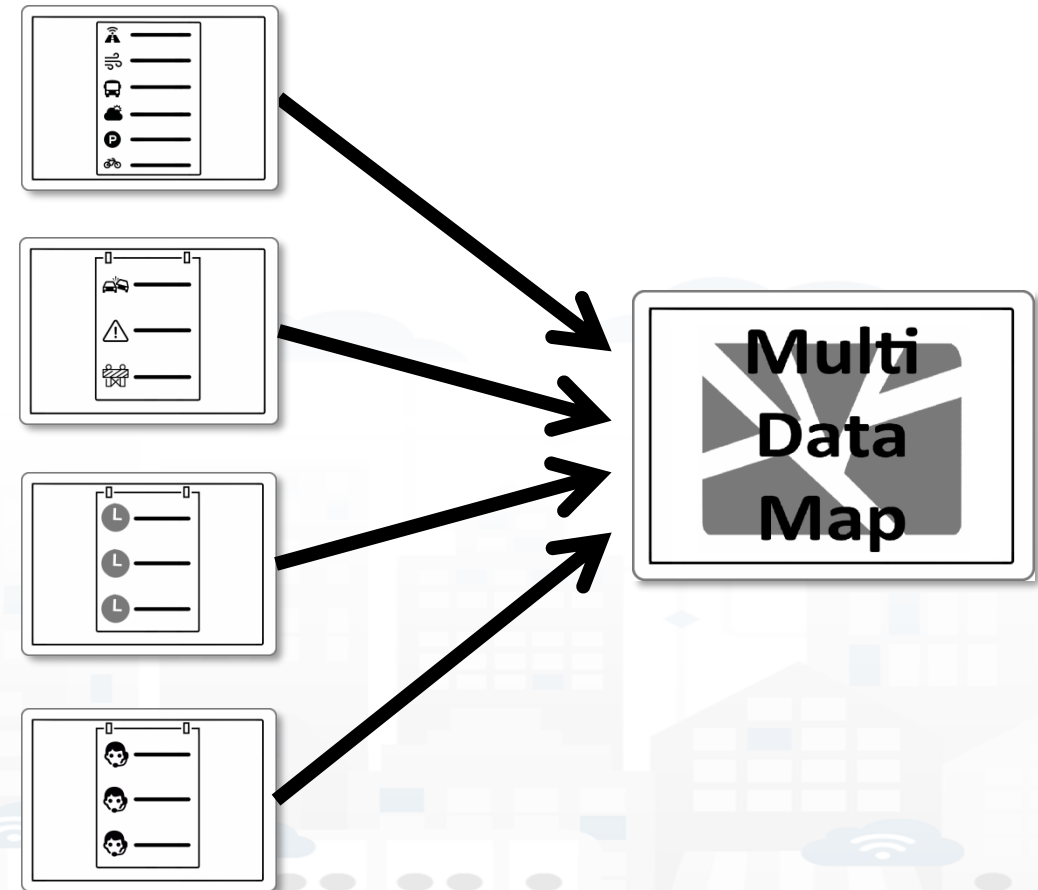
# Icons and PINS



XX

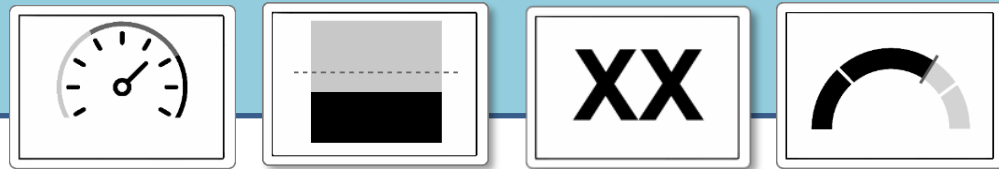
# Dashboard Usage and recipe: Event map target

- **Selector to Show on Map a**
  - category of Map positioned elements
  - Single Entity
  - Heatmap among many
  - Traffic flow
  - Origin Destination Map
- **Events which are also PIN on map**



TOP

# Main Single Values Widgets

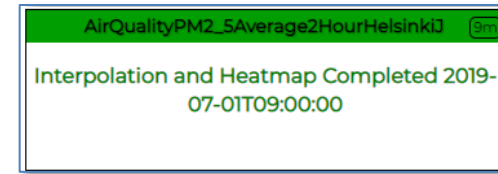


# Single Value Widgets

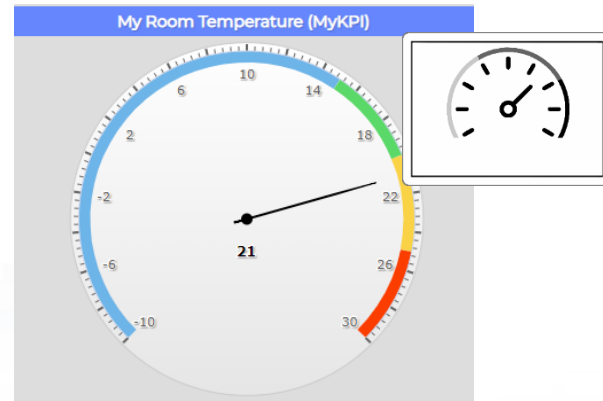
- Entity/device can be a Time Series
- They can be connected to some Entity/device to show the last value associated with the widget
- They can be controlled to show a specific value over time

# Single values

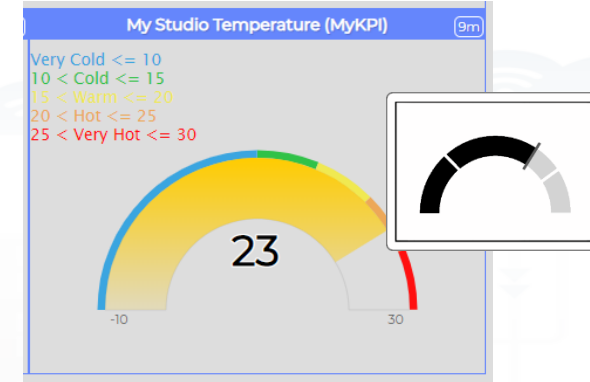
- **Single Content**



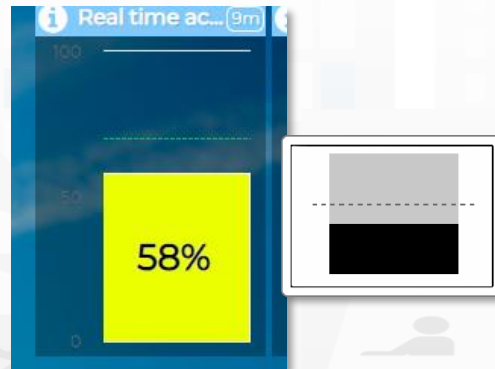
- **Speedometer**



- **Gauge**



- **Single Bar**



*Most of the multi xxxx widgets can show also single values*



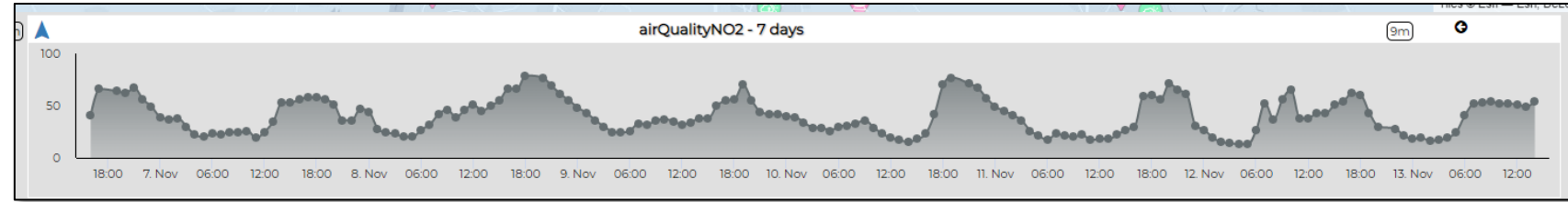
TOP

# Time Series, Multi Series

## Widgets

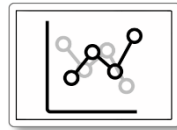


## • Time Trend

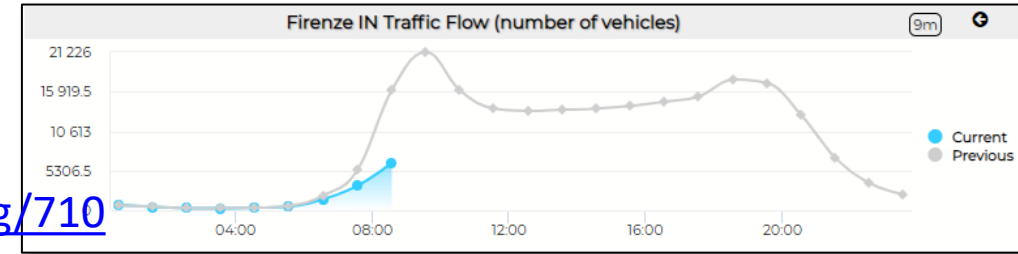


## • Time Trend Compare

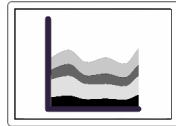
- Comparing trends of the same time series



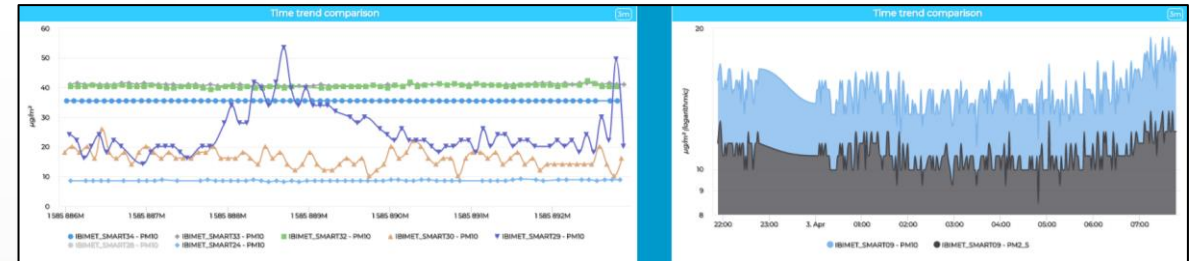
<https://www.snap4city.org/710>



## • Multi Series



- Showing multiple trends of multiple time series with same unit



## • Typical Time Trend

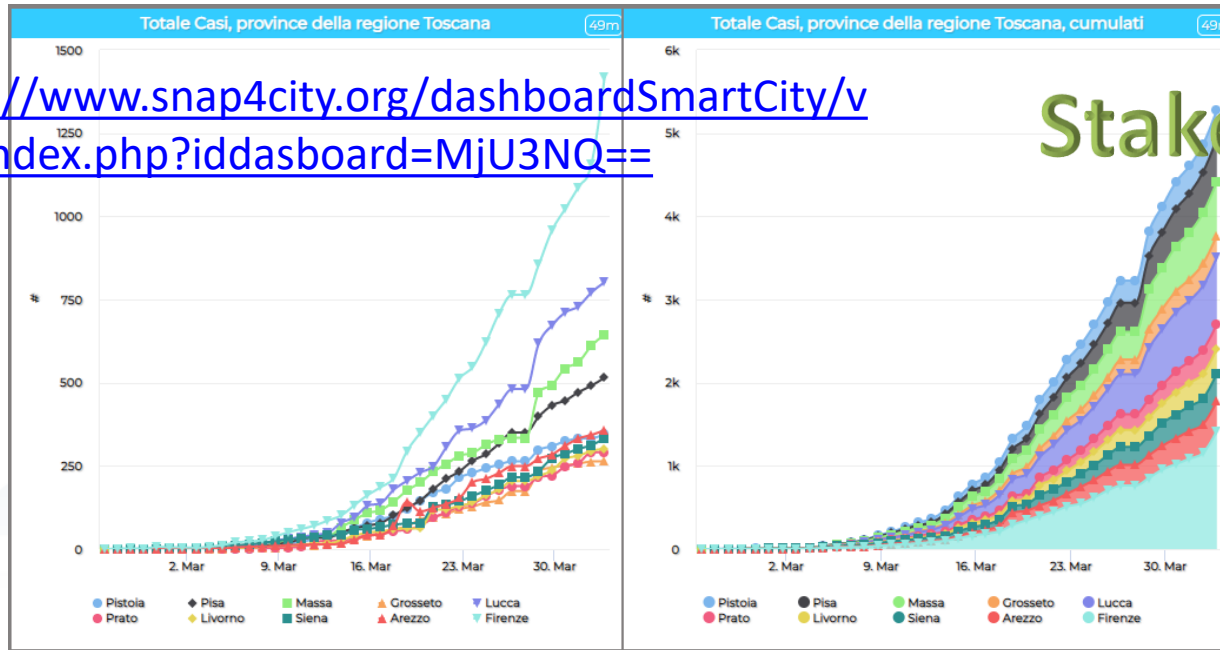


- Showing the typical trend of a time serie: multiple modalities

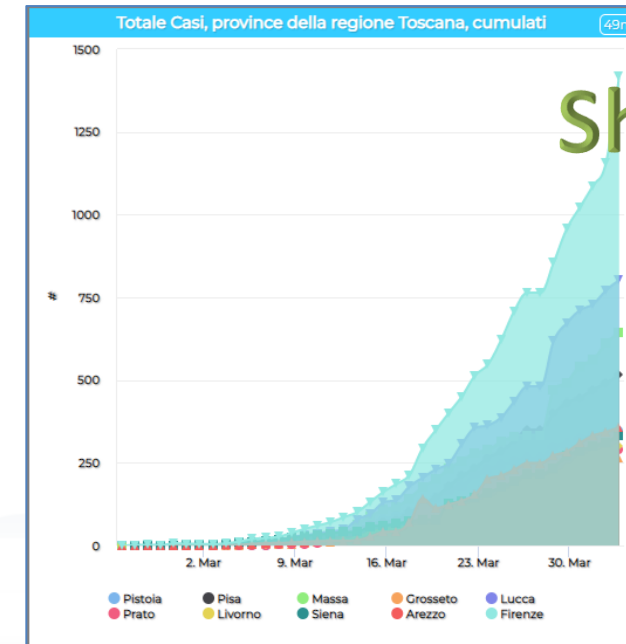
<https://www.snap4city.org/705>



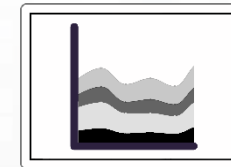
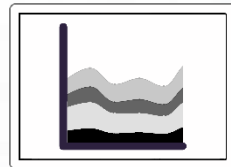
<https://www.snap4city.org/dashboardSmartCity/view/index.php?iddashboard=MjU3NQ==>



Stacked



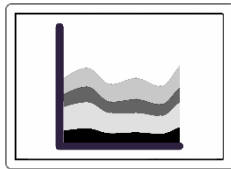
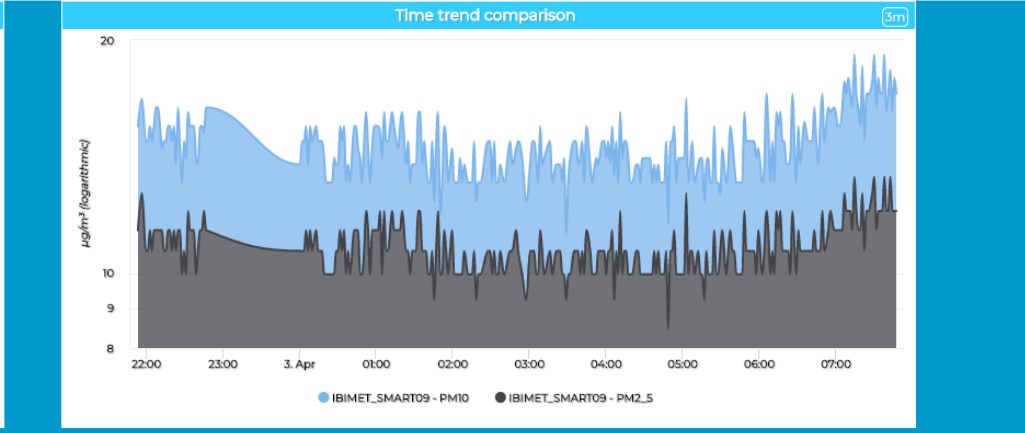
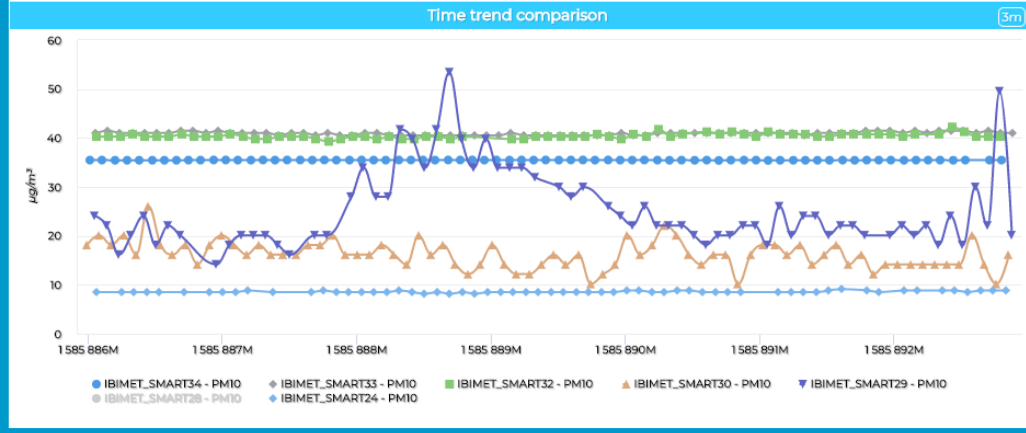
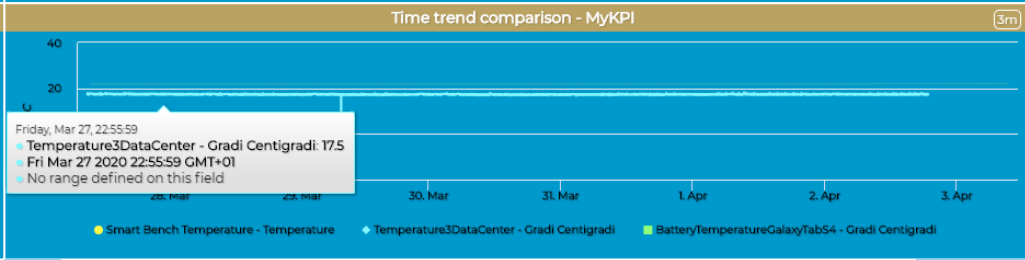
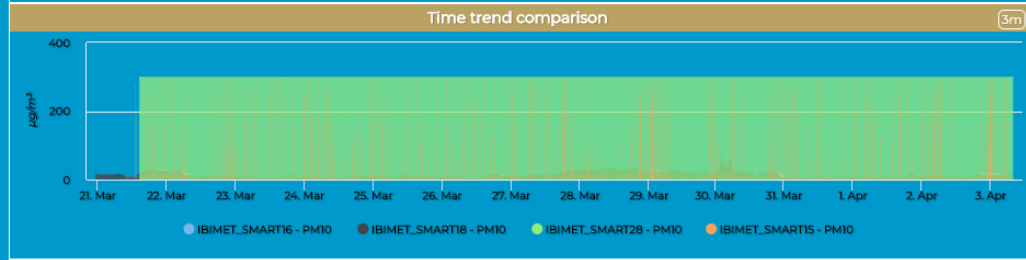
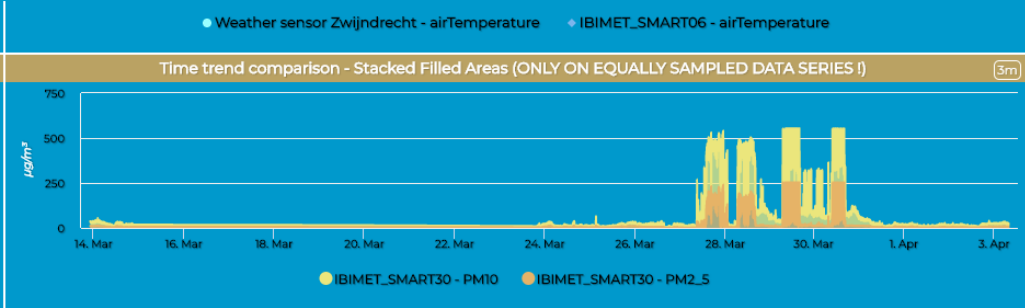
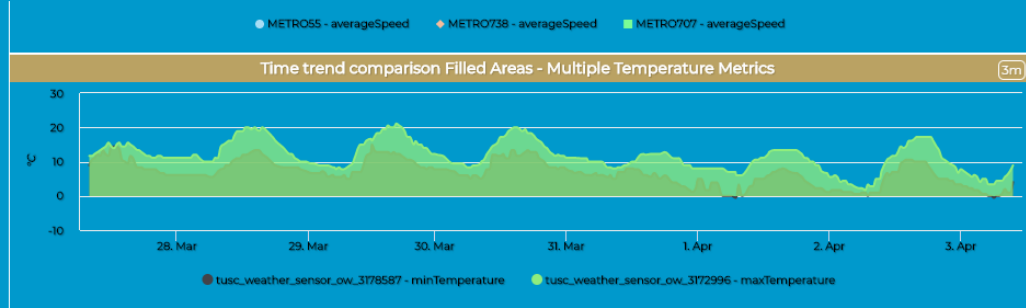
Shaded



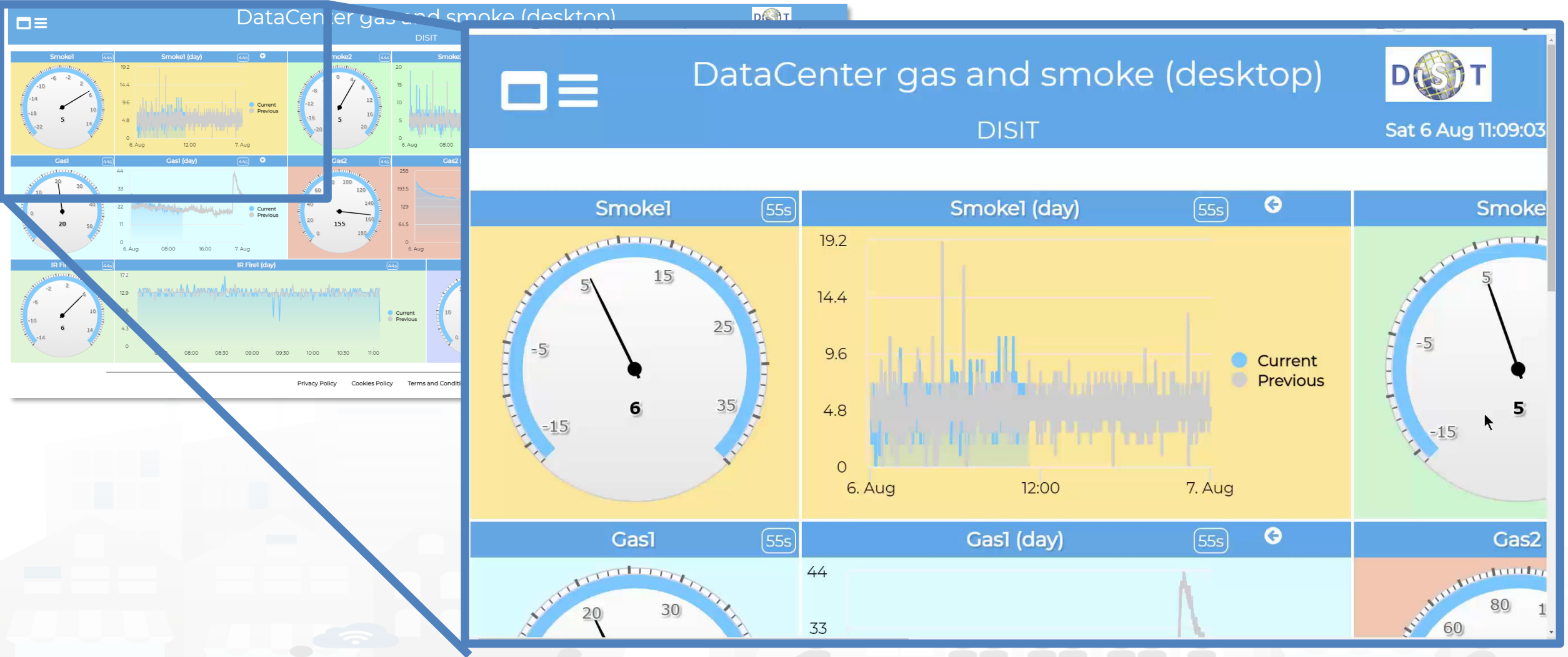
- **Stacked, shaded or regular,**
- Grouped by Value\_unit, **linear** or **Logarithmic**
- From historical data and/or **dynamic** data from IOT Applications

# Time Series Test - Cloned

Fri 3 Apr 09:54:08



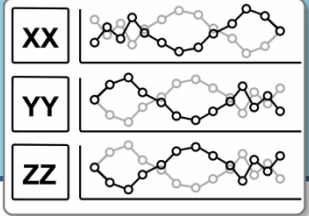
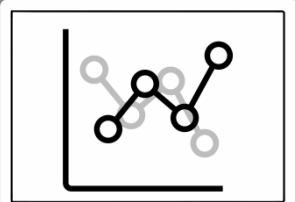
# Drill Down over time



<https://www.snap4city.org/dashboardSmartCity/view/index.php?iddashboard=MjA1>

TOP

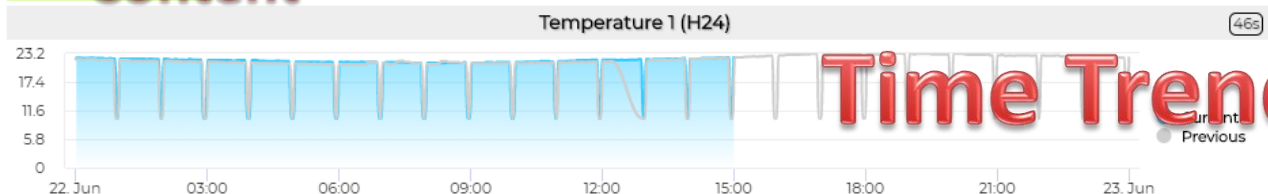
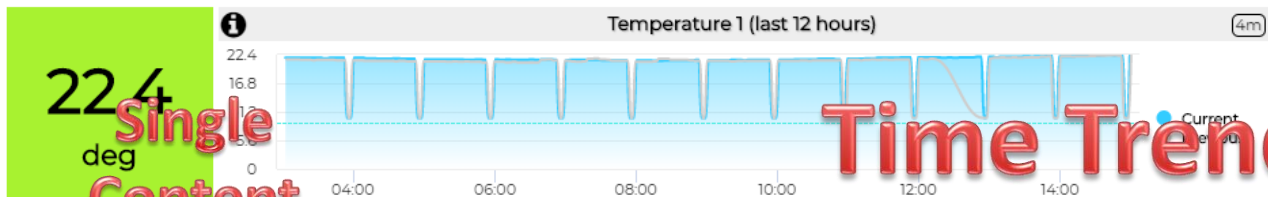
# *Time Trend Compare Widgets for Time Series*



<https://www.snap4city.org/710>

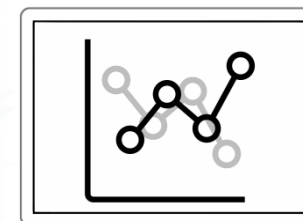
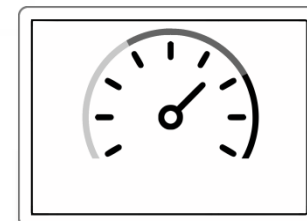
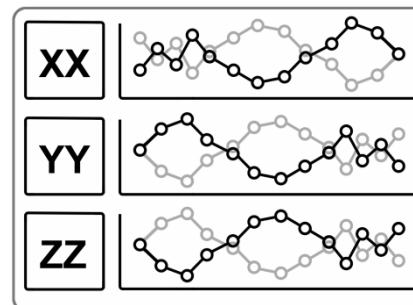
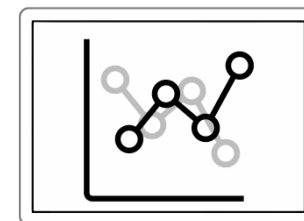
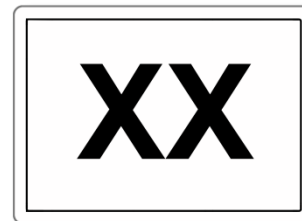
# Temperatures - Room of machine 166

DISIT

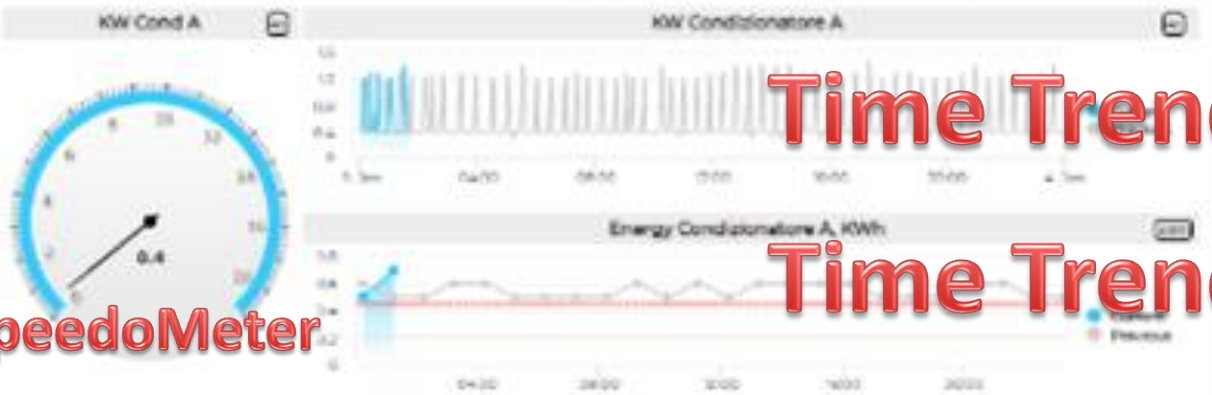


Time Trend Compare

Time Trend Compare



# Datacenter Energy Consumption



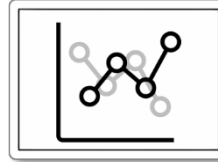
Time Trend Compare

Time Trend Compare

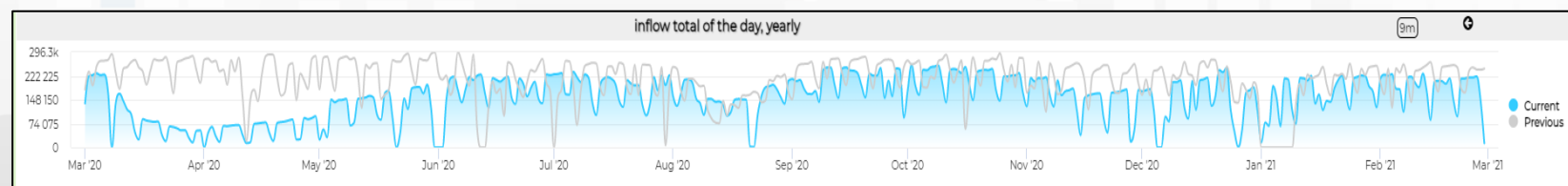
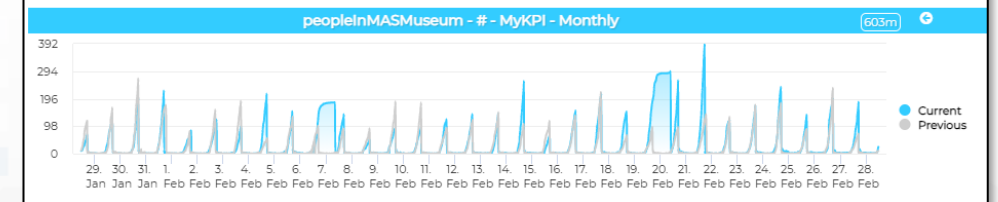
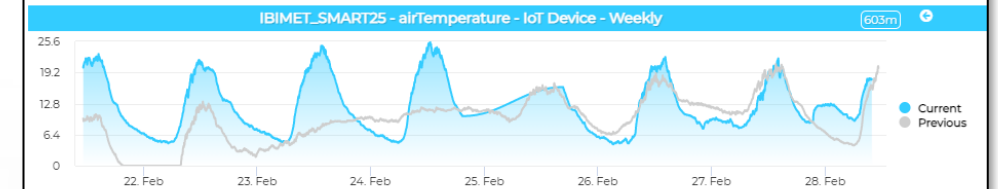
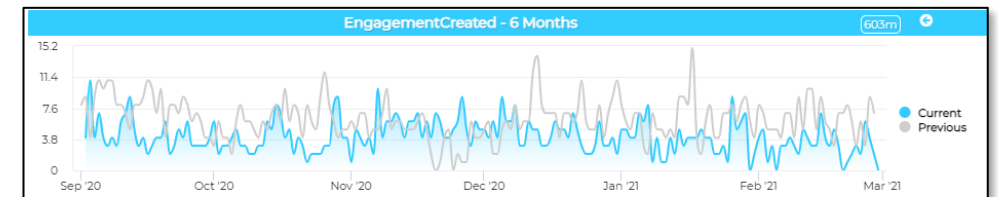
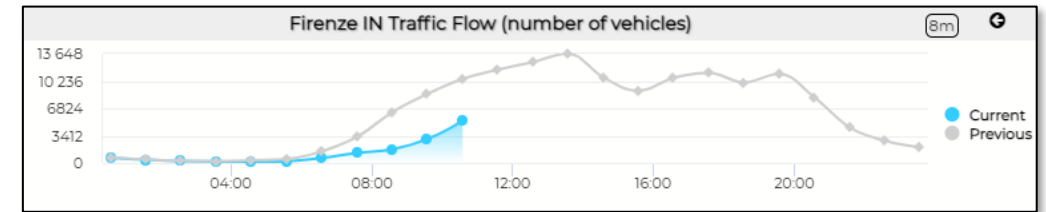
They manage  
HLT: Sensor

# Time Trend Compare

## A tool for visual Analytics, Comparing



- **4 hours** wrt those before, or same hours of previous day
- **12 hours** wrt those before, or same hours of previous day
- **Day** wrt day before, or same day of previous week or month
- **Week** wrt to previous week, or
  - week starting on Monday
- **Month** wrt to previous month, or
  - previous month starting 1<sup>st</sup> day, or
  - same month of the previous year
- **6 Months** wrt to previous 6 months, or
  - Aligned day 1 or same 6 months previous year day 1 or
  - 6 months previous year day 1 aligned 1<sup>st</sup> or 2<sup>nd</sup> semester
- **Year** wrt to previous year, or
  - previous year starting 1<sup>st</sup> day, or
  - previous year starting same month





TOP

# *Typical Time Trend, Visual Analytic on Time Series*

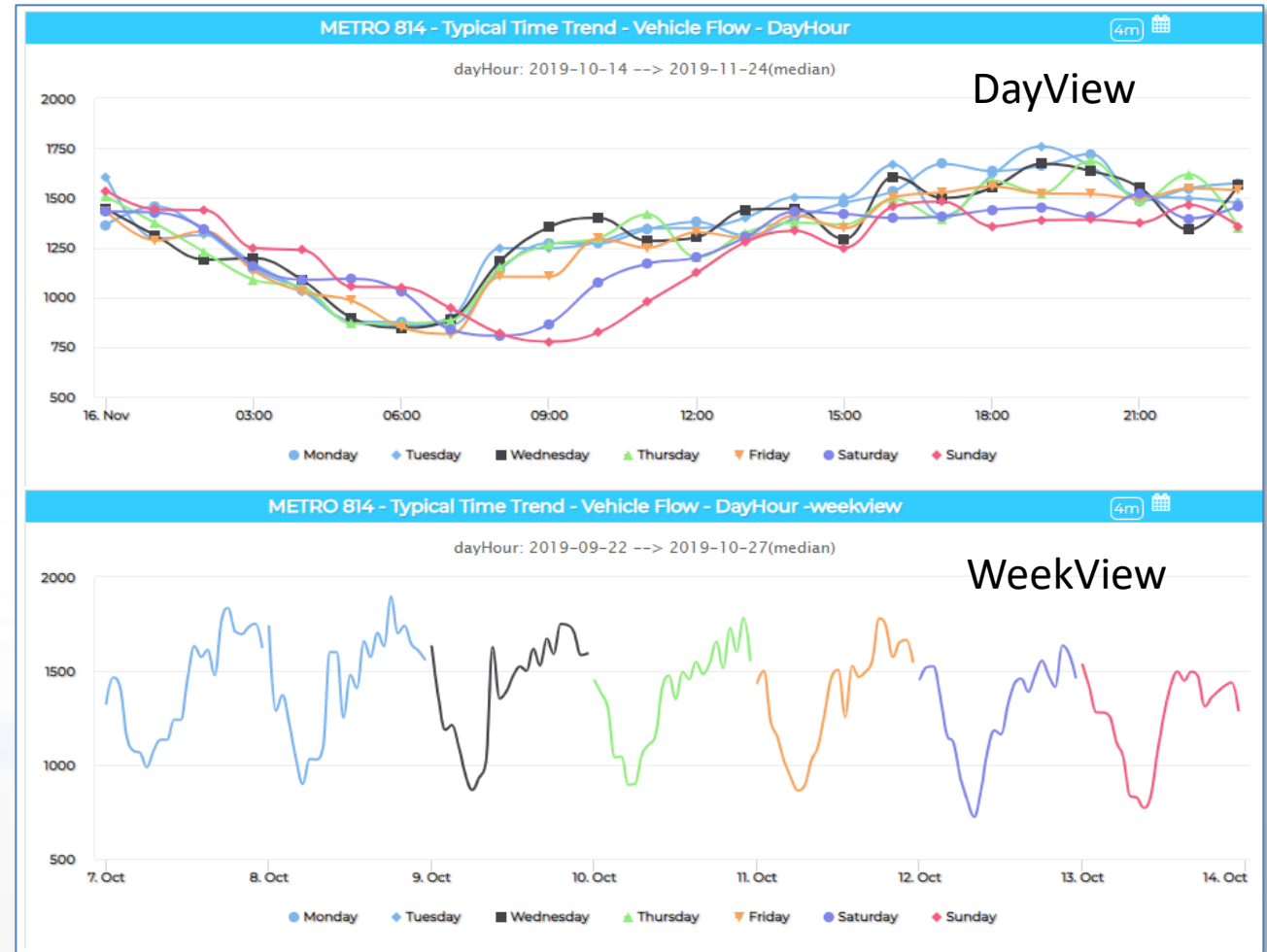


<https://www.snap4city.org/705>

# Typical Time Trend



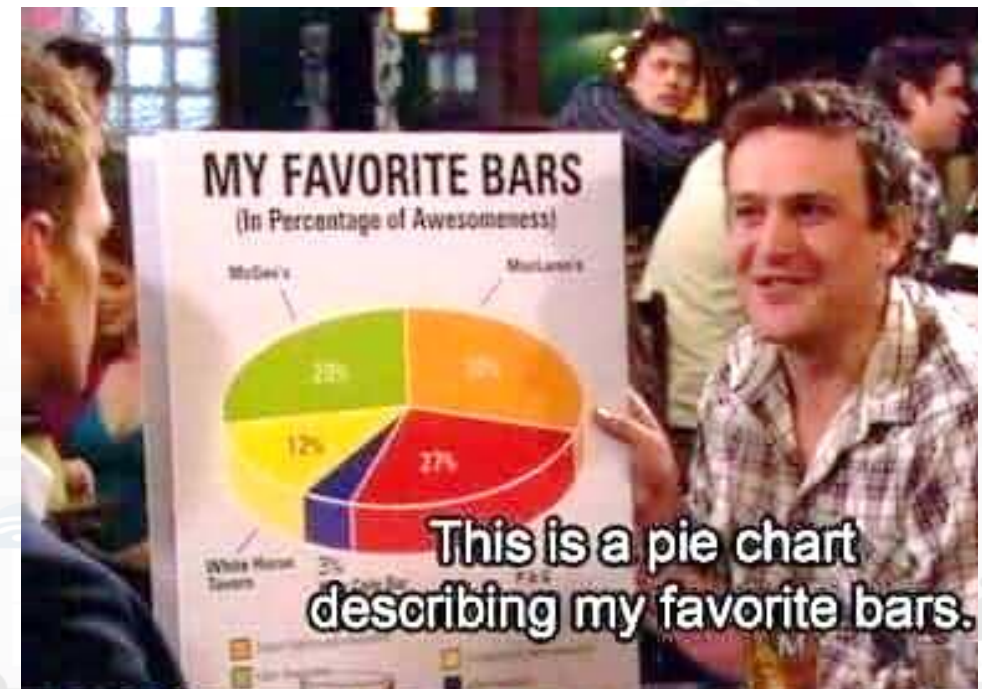
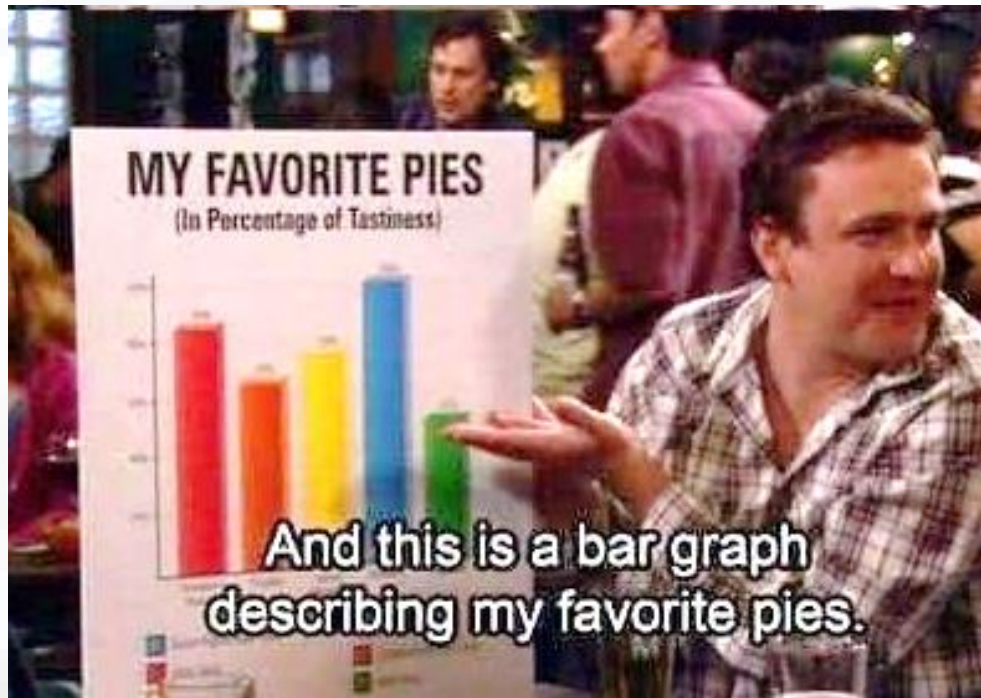
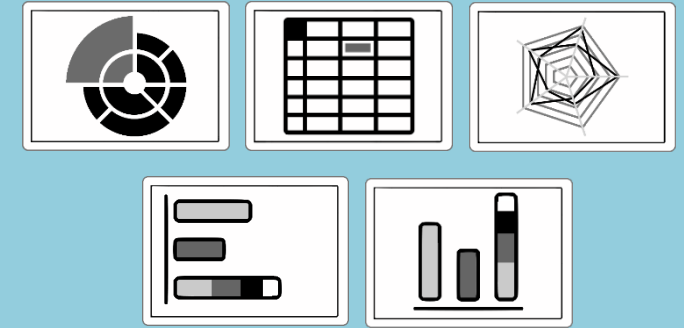
- They:
  - need to be computed in advance on the basis of a Time Serie variable, and a reference period of computation.
  - represent typical trends of: min, max, average, median
  - You can change the data on view
- Formats:
  - **DayHour**: 7 time trends, one for each day of the week, each hour, 24 values.
    - As DayView or WeekView, start monday
  - **MonthDay**: a value per day, 30 values of the month.
  - **MonthWeek**: a value per day aligned to week days: 28 values, 4 weeks.
    - 1<sup>st</sup> Monday of the month
    - 3<sup>rd</sup> Friday, etc.

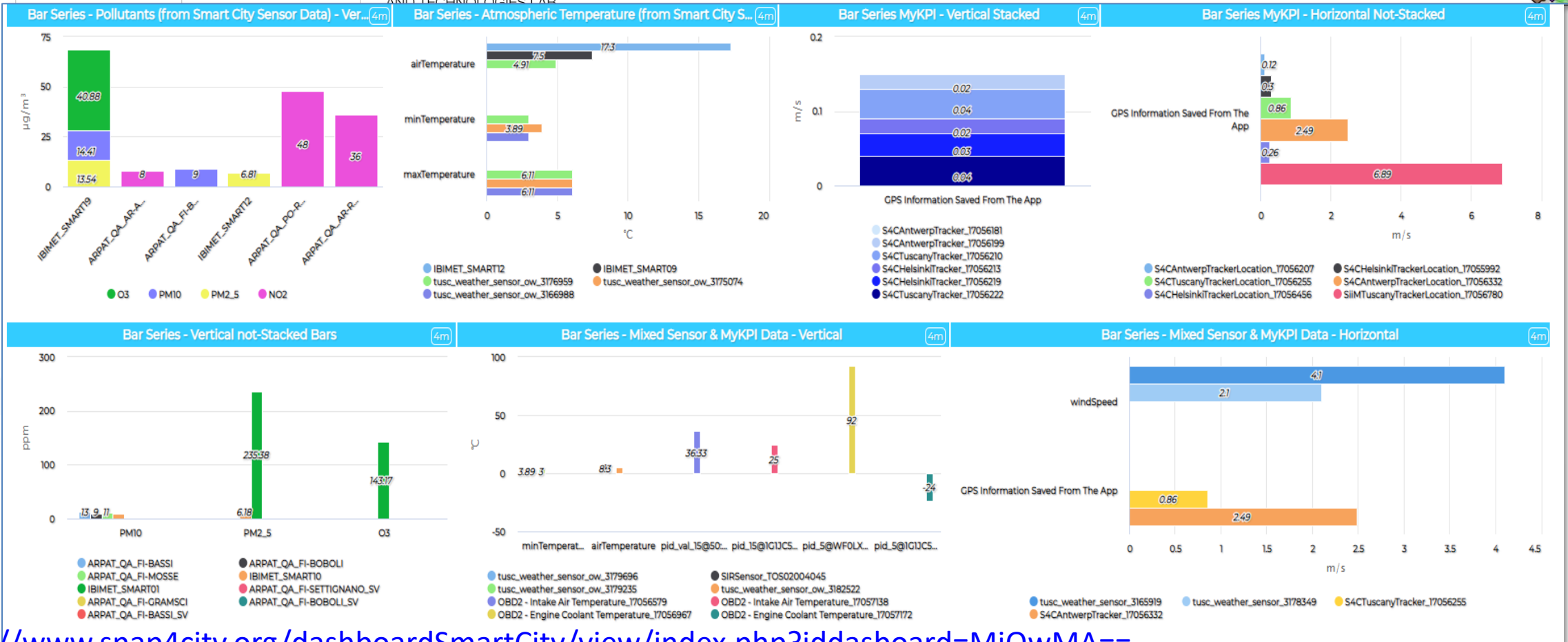


<https://www.snap4city.org/dashboardSmartCity/view/index.php?iddashboard=MzA4NA==>

TOP

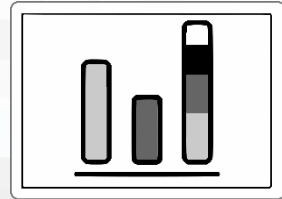
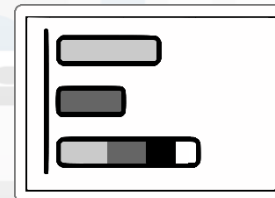
# Bars, Pies, Donut, Spiders, Tables Widgets



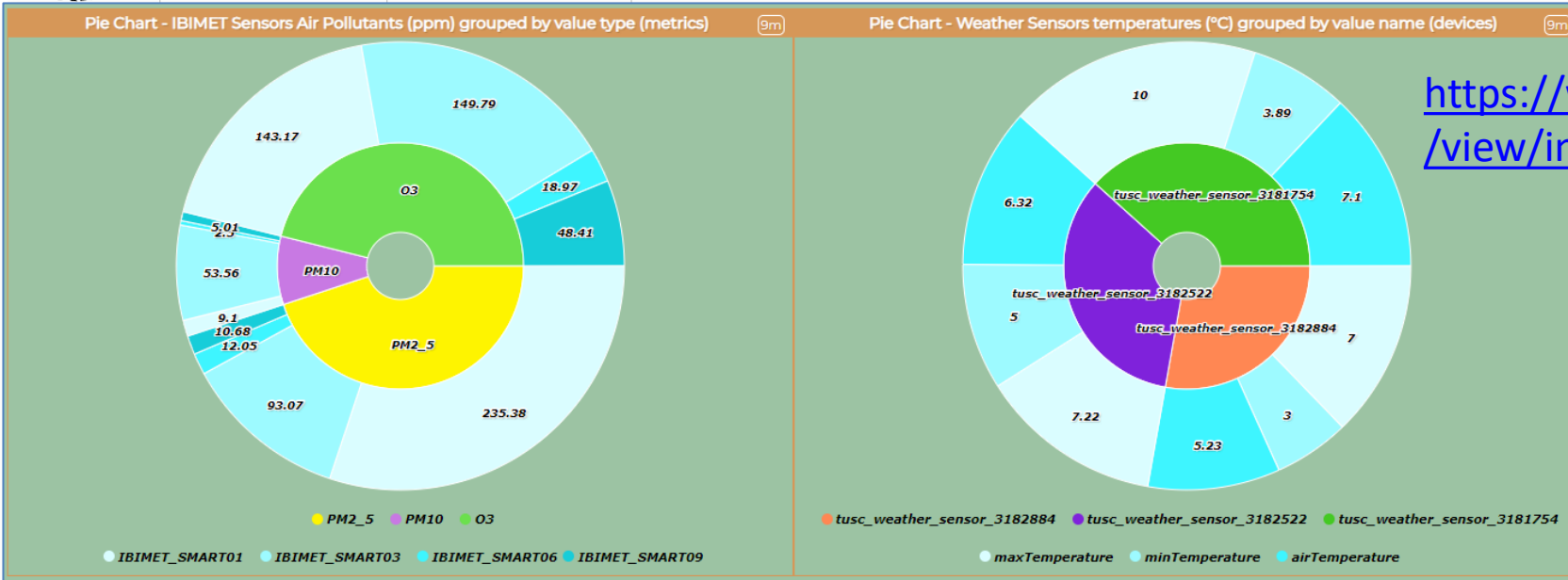


<https://www.snap4city.org/dashboardSmartCity/view/index.php?iddashboard=MjQwMA==>

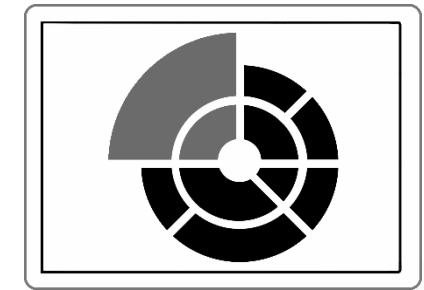
- **Staked and grouped** by Value\_Name / Value\_Type
- **Oriented:** Vertical and Orizontal
- **ordered** by value: crescent, descendent
- From historical data and/or dynamic data from IOT Applications



# Pie & Donut

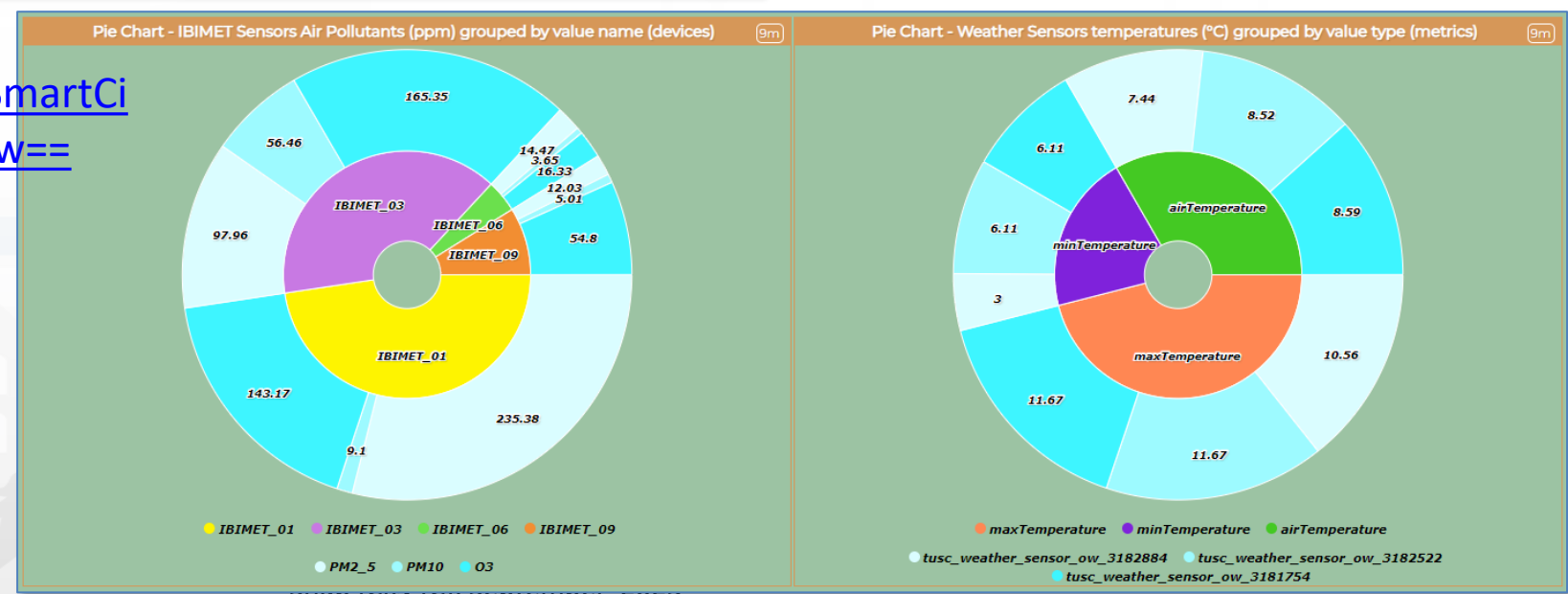


<https://www.snap4city.org/dashboardSmartCity/view/index.php?iddashboard=MjUxNw==>

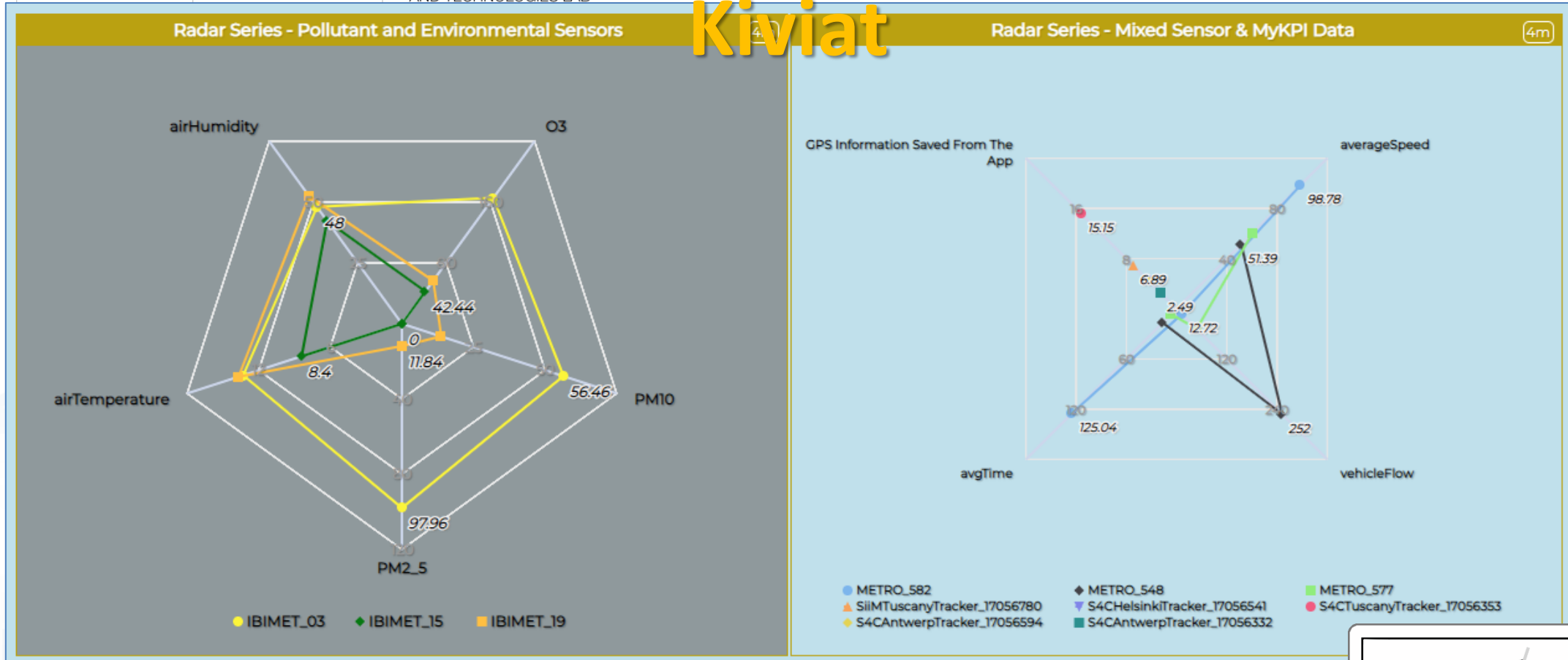


<https://www.snap4city.org/dashboardSmartCity/view/index.php?iddashboard=MjUyNw==>

- Single level Pie and two levels as Donut
- Grouped ValueType, ValueUnit

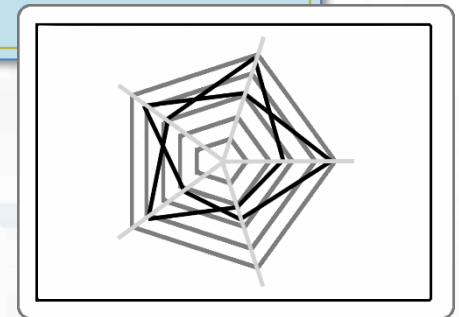


# Radar, SpiderNet Kiviat



<https://www.snap4city.org/dashboardSmartCity/view/index.php?iddashboard=MjUwNQ==>

- Normalized, multiple value units
- Hystorical, KPI and Dynamic from IOT App



# Florence data overview

A table based overview over city main data

Wed 18 Jan @ 19:19:10

Air Quality Index					Weather stations					Citizens satisfaction index							
Substances / Quarters	OZN-	PM2-	PM10-	CO2-	NO2-	Date / Station	Wind speed (km/h)-	Direction	Temperature (°C)-	Humidity (%)	Rain today (mm)-	Pressure (mbar)	Criteria / Services	Quality (%)	Cost (%)	Availability time (%)	Emergency handling (%)
Q1	120	41	165	36	4	Sesto Fiorentino	50	N	12	12	0	922	Water	92	67	95	42
Q2	33	25	66	123	45	Livorno	65	NE	17	17	0	876	Public transportation	36	29	27	31
Q3	225	153	342	193	217	Grosseto	78	E	4	22	0	1022	Public safety	77	64	58	62
Q4	174	221	87	122	93	Vade	42	S	6	0	34	895	Roads management	28	42	27	25
Q5	79	87	23	27	65	Follonica	102	N	7.2	23	0	913	Healthcare	72	64	23	23
						Cigliolo	97	O	3	19	0	957	Welfare	43	51	38	38
													Public administration	58	16	18	18

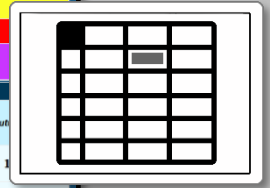
  

Tourists flow				Florence events 2017 overview						
Categories / Vehicle	Total arrivals	Overnights	Day trippers	Fields / Categories	Free	Paid	Winter	Spring	Summer	Aut
Airplane	56	36	20	Classical music, opera, ballet	7	23	6	10	4	1
Train	122	81	41	Exhibitions	4	16	3	7	6	4
Car	215	133	82	Guided tours	60	140	15	100	50	35
Bus	157	110	47	Film festival	0	0	0	0	0	0
Cruise	0	0	0	Markets, fairs	7	7	2	6	2	4
Boat	0	0	0	Readings, conferences	35	15	10	22	9	9
Total	550	360	190	Contemporary music	30	42	8	25	30	9
				Sport	20	192	55	104	27	26

<https://main.snap4city.org/view/index.php?iddashboard=Nzc=>

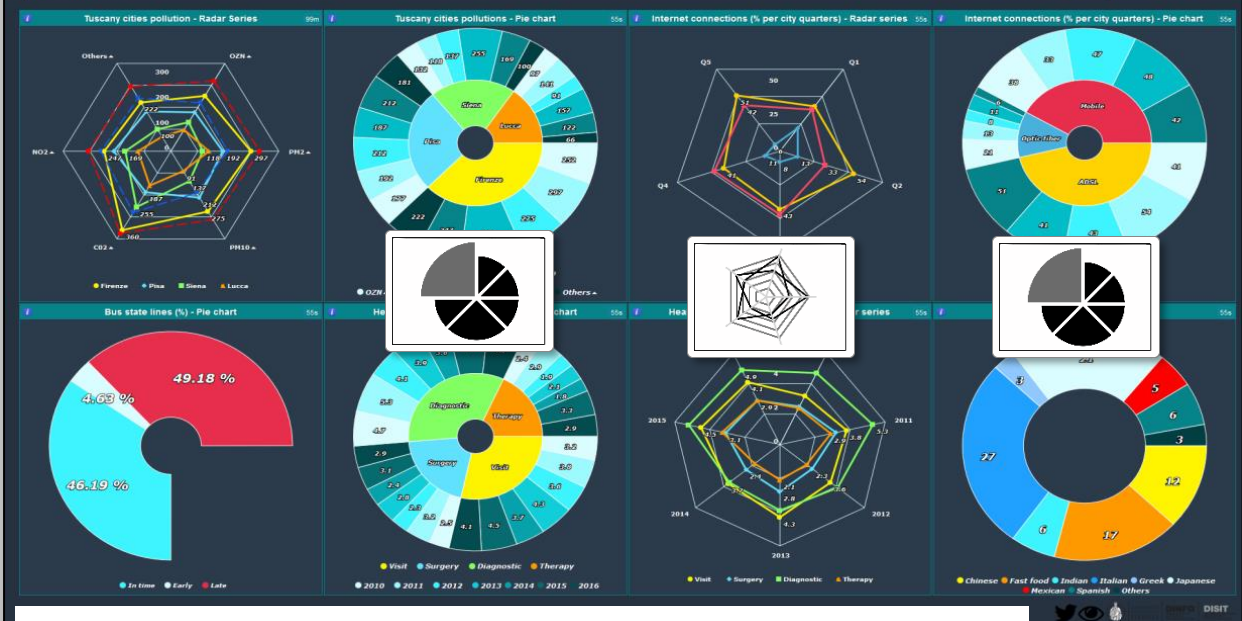
Kiviat and Pies

Table



Curved Lines (stacked)

# Smart City Data Overview 2



<https://main.snap4city.org/view/index.php?iddashboard=MTAw=>

# Smart City Data Overview

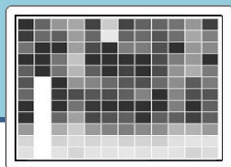


<https://main.snap4city.org/view/index.php?iddashboard=ODM=>

Barlines (stacked)

TOP

# *Calendar Widgets for Time Series*

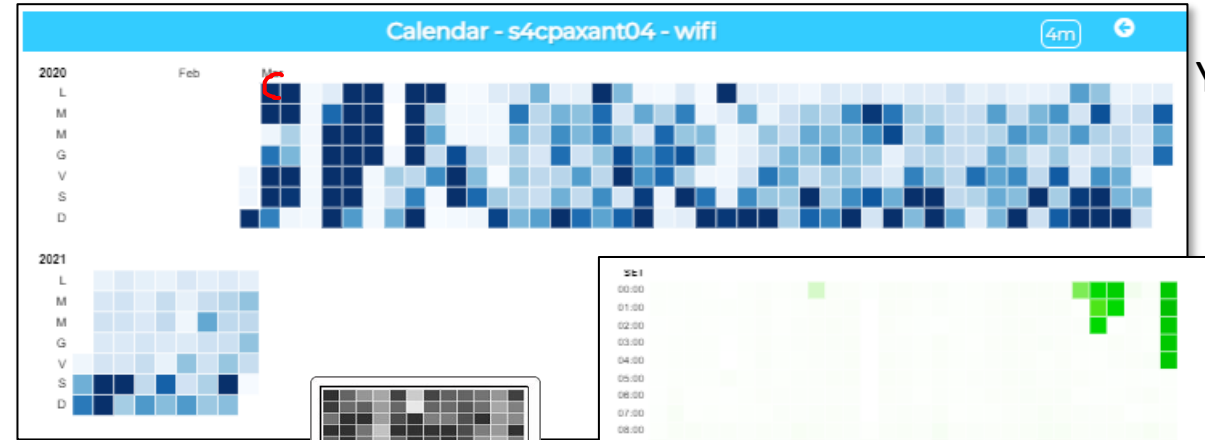




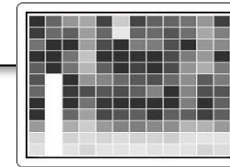
<https://www.snap4city.org/706>

Showing: **Sum, Average or Median** value of a variable as a colored calendar:

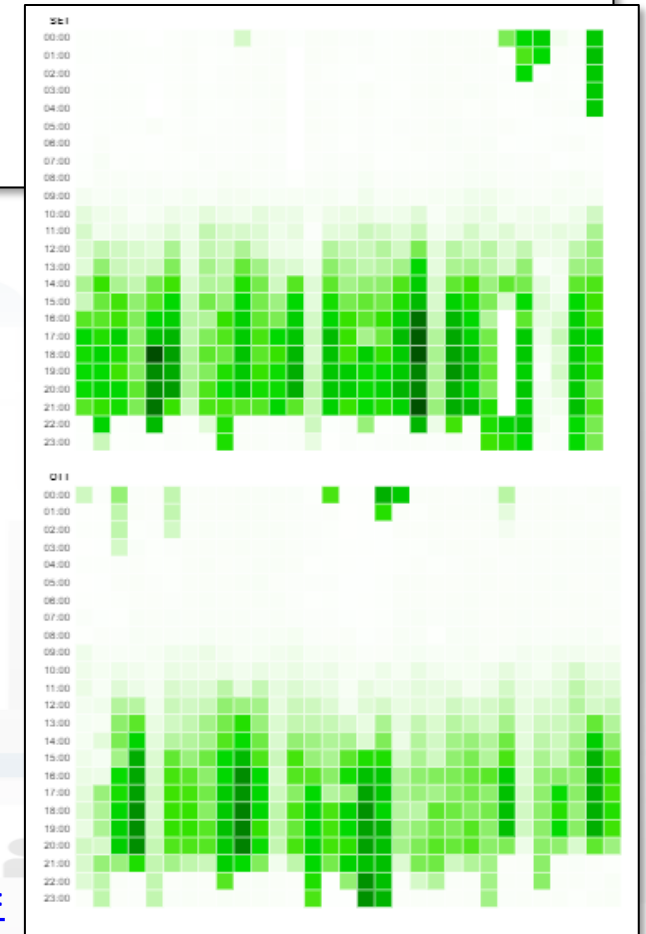
- **Year**
  - 1 Year, 12 months, by weeks, per days
  - Time Range: 1D, 7D, 1M, 6M, 1Y
- **Month**
  - 30 days, 24 hours
  - Time Range: 1D, 7D, 1M, 6M, 1Y
- **You can scroll in history**
- **They manage HLT: Sensor, MyKPI and work receiving Dynamic data from IOT App**



Year, 1Y



Month, 6M



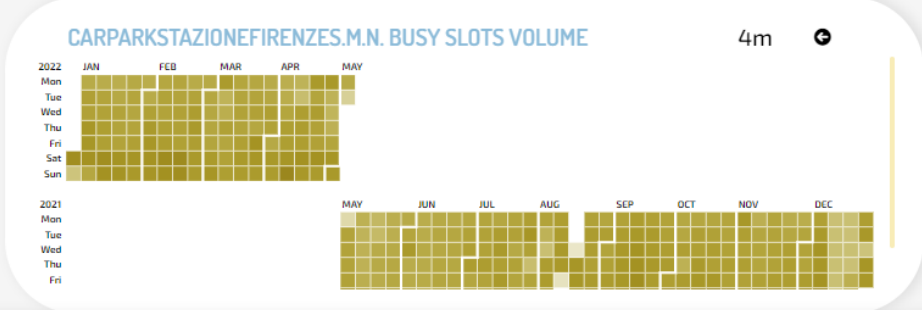
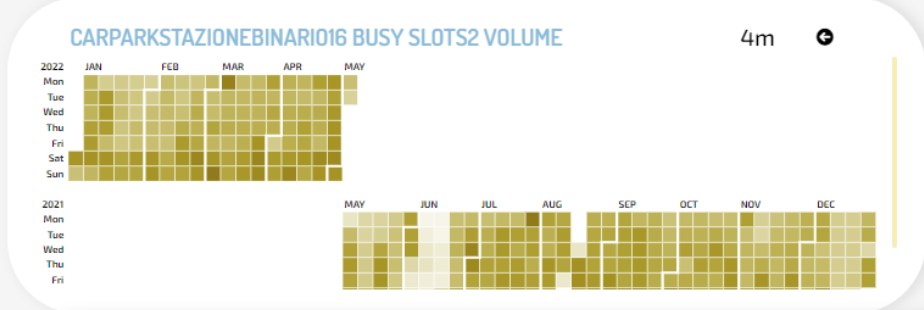
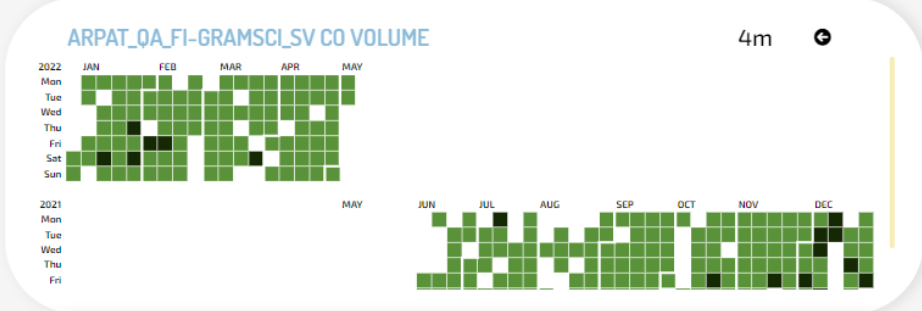
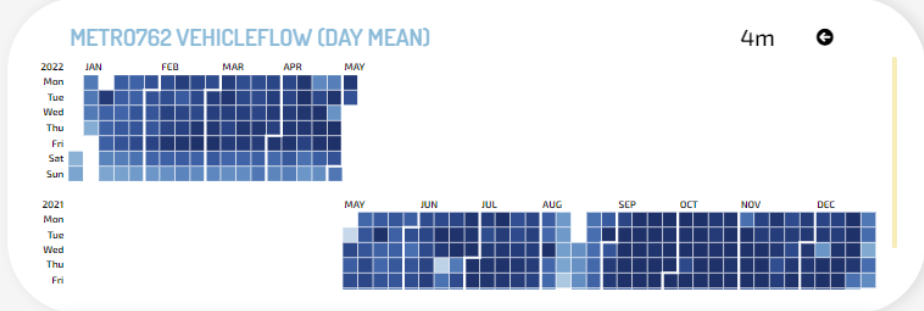
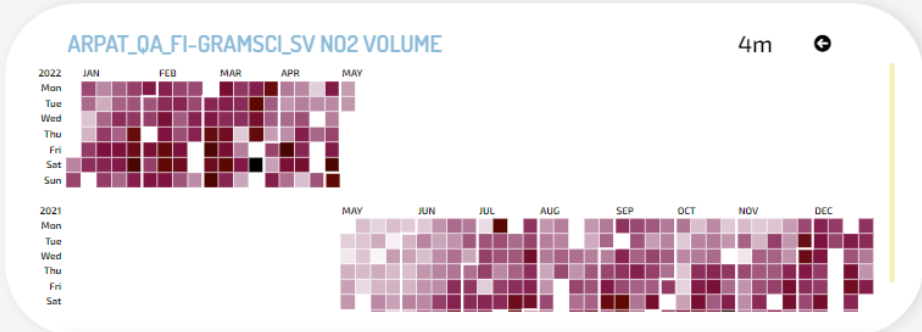
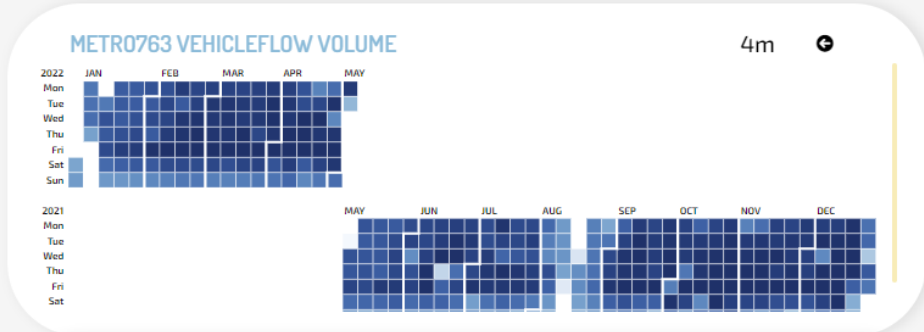
<https://www.snap4city.org/dashboardSmartCity/view/index.php?iddashboard=MzA4MA==>



Ciao roottooladmin!

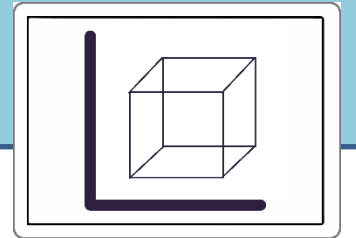
Tue 3 May 13:59:05

# HERIT-DATA - ACTIVITIES CALENDAR - NEWGUI

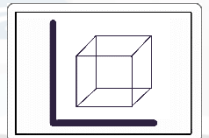
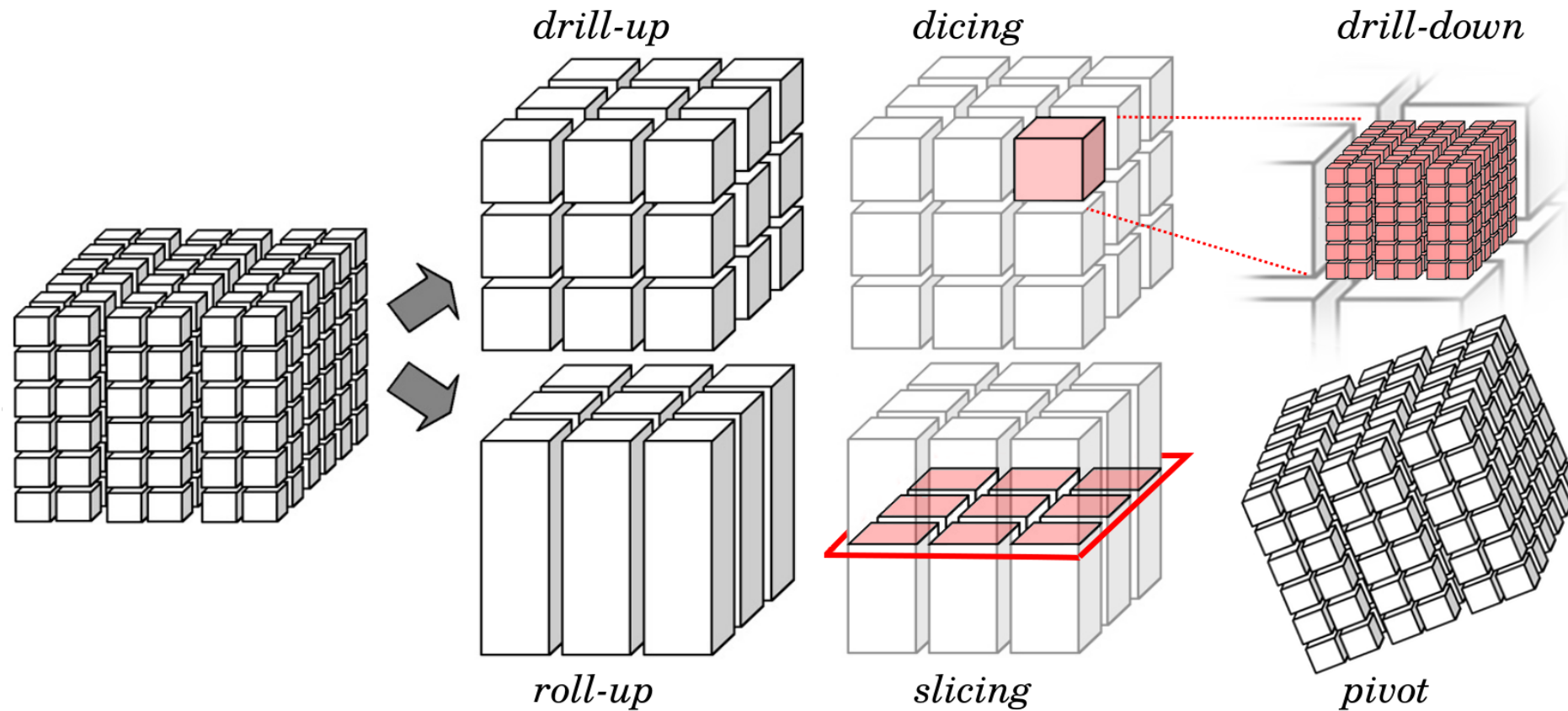


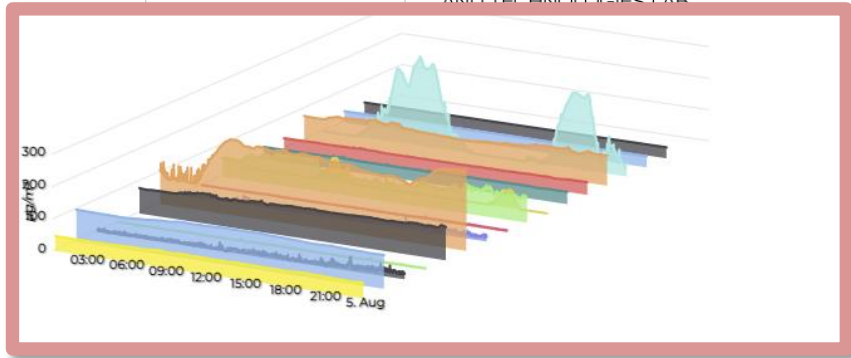
TOP

# *OLAP Data Cubes Widgets*



- Using Dashboard Wizard with Widgets all the different transformations may be possible with different representations.
- The IoT App allows to make them Dynamic





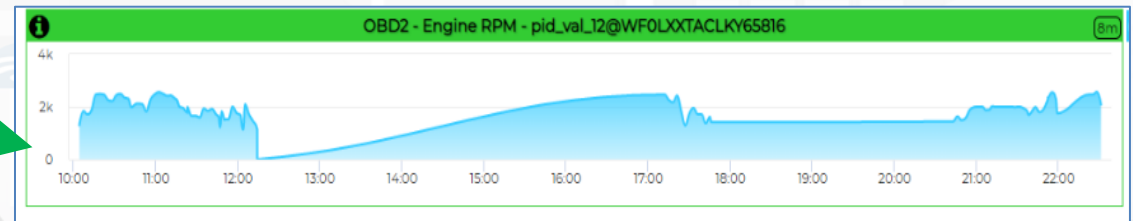
Longitude

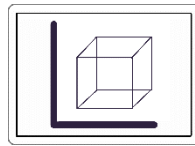
Latitude

Values

Sensors of Devices,  
KPI, etc.

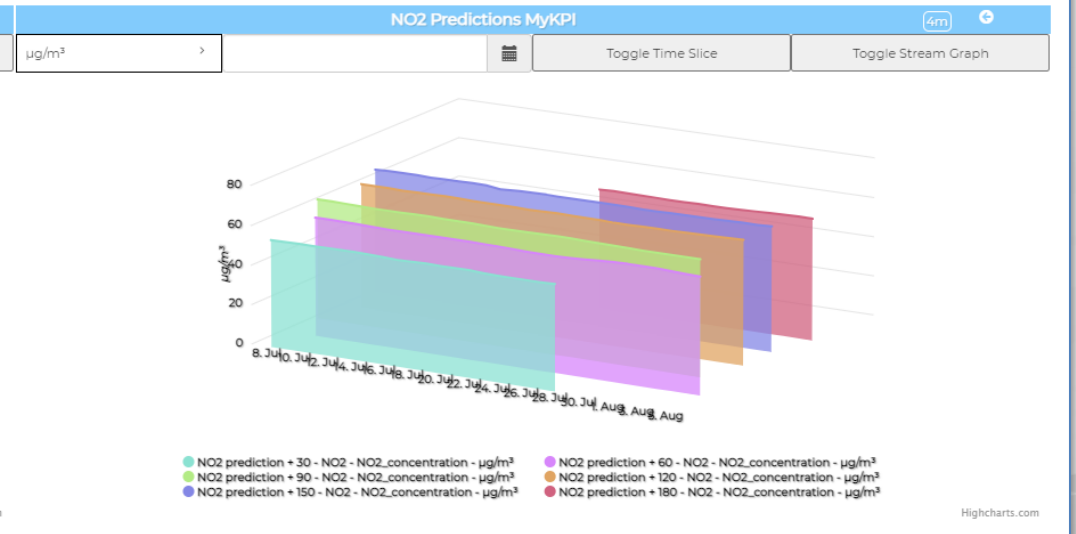
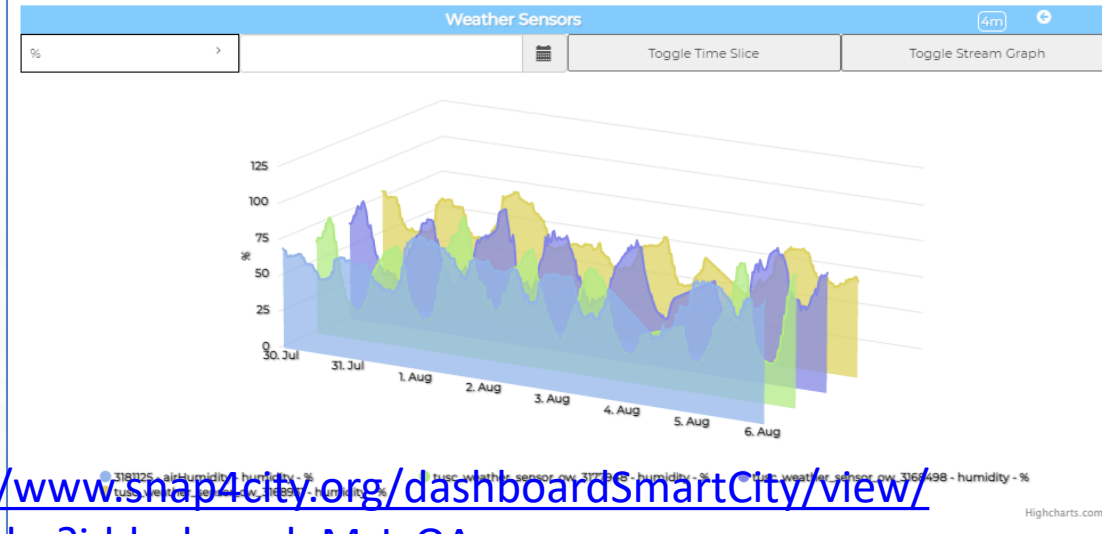
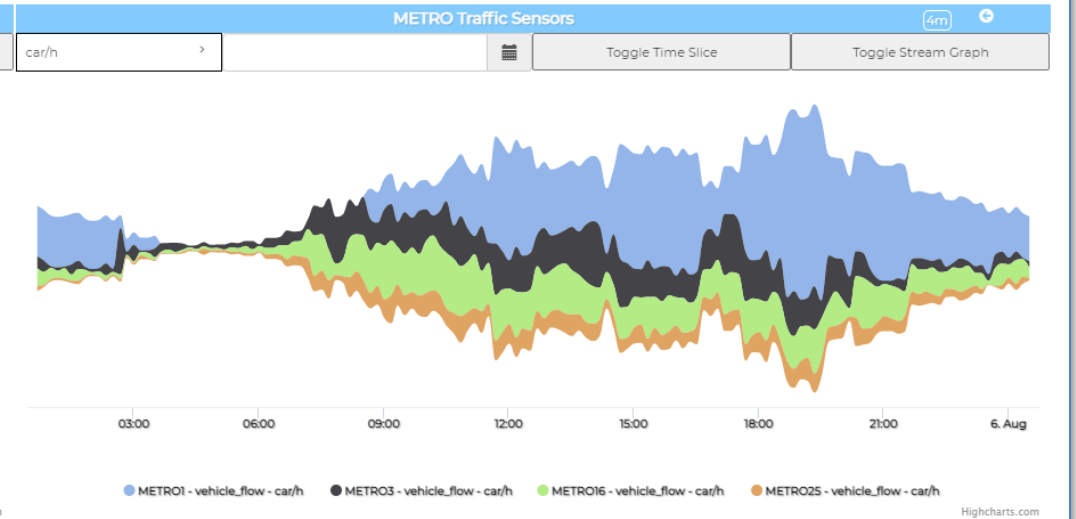
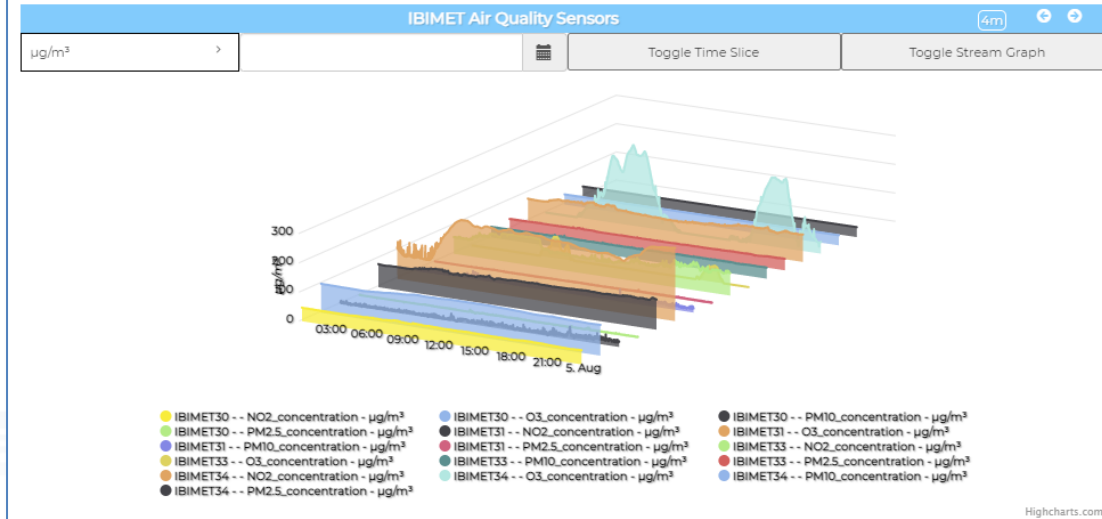
time





# Data Cube 3D Olap

Fri 6 Aug 00:34:27



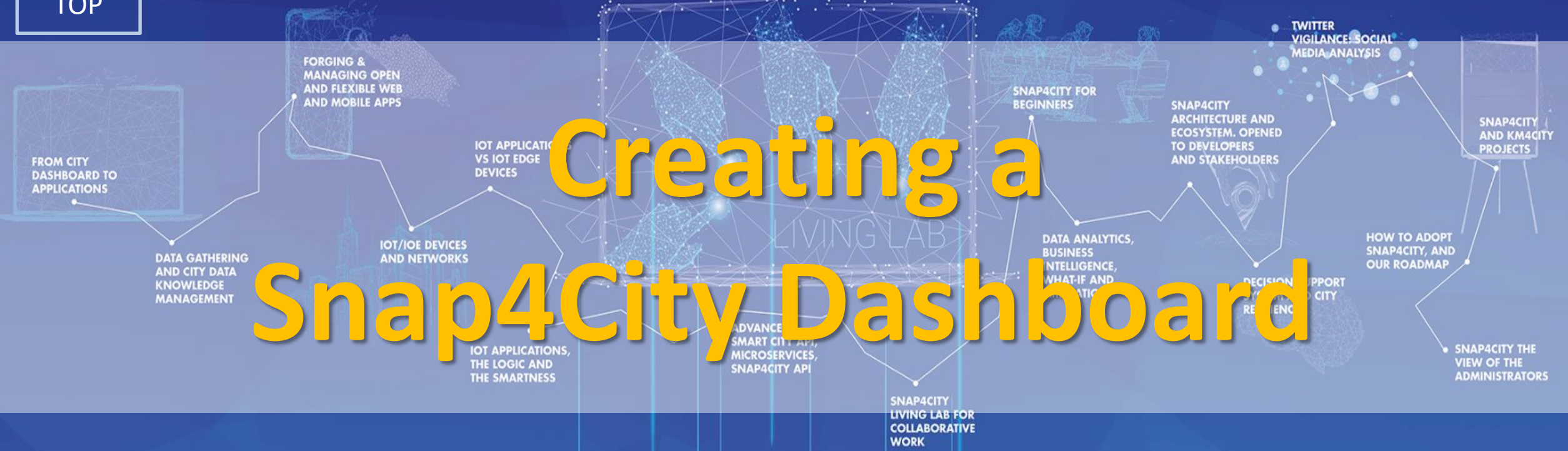
<https://www.snap4city.org/dashboardSmartCity/view/index.php?iddashboard=MzlyOA==>



# COFFEE BREAK

TOP

# Creating a Snap4City Dashboard





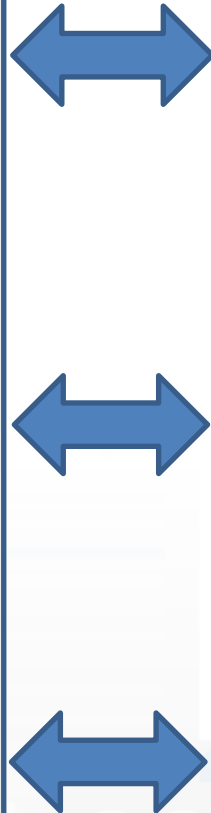


# Dashboard Development

IOT Applications

Knowledge Base, Km4City

Knowledge and Storage Data from the Field and City + MyKPI ++

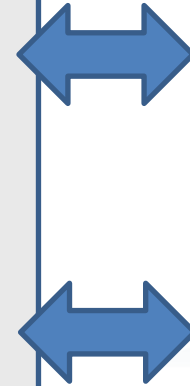


Widget Collection

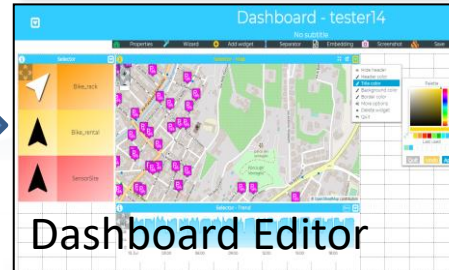
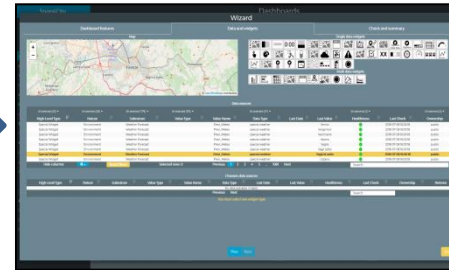
Micro Applications

External Services

Custom Widgets/Synoptics



Dashboard Wizard



Public Dashboard Collection

Create, save, load, delegate, grant access



My Own Dash/App



# New Dash ?

**My Dashboards in My Organization**

User: paolo.disit, Org: DISIT  
Role: AreaManager, Level: 3  
LOGOUT

Switch to Legacy Layout

NEW DASHBOARD

Grid of Dashboards:

- Alerting Generation (Proc.Logic / IoT App, My own: Public (DISIT))
- Andamenti Nazionali e Regionali infezione COVID-19 (Proc.Logic / IoT App, My own (DISIT))
- Andamento Regione Toscana e Province, COVID-19 (Proc.Logic / IoT App, My own (DISIT))
- Case 1 SVG ws3 (Proc.Logic / IoT App, My own (DISIT))
- case 2 SVG WS3 (Proc.Logic / IoT App, My own (DISIT))
- Case4 svg (Passive, My own (DISIT))
- Change Alert Color Status (Proc.Logic / IoT App, My own: Public (DISIT))
- DataCenter new Device DHT (Proc.Logic / IoT App, My own: Public (DISIT))
- Device Table Testing double (Proc.Logic / IoT App, My own (DISIT))
- DIDA data 2 (Passive, My own: Public (DISIT))

Left sidebar menu:

- www.snap4solutions.org
- Dashboards of My Organization
- My Dashboards in My Organization
- My Data Dashboard Dev Kibana
- Extra Dashboard Widgets
- Data Management, HLT
- Knowledge and Maps
- Processing Logics / IOT App
- Entity Directory and Devices
- Resource Manager
- Development Tools
- Management
- Decision Support Systems

Bottom footer:

Privacy Policy | Cookies Policy | Università degli Studi Firenze | DINFO | DISIT

# From Templates to Wizard and Dashboards

**Dashboard template**  
Click on a template to choose it, click on it again to unselect it

<p><b>Selector and POI</b> Preset widget choice</p>	<p><b>Selector, POI, trend</b> Preset widget choice</p>	<p><b>Data and trends</b> Preset widget choice</p>	<p><b>Events vs. map</b> Manual widget choice</p>
<p><b>MicroApp and services</b> Preset widget choice</p>	<p><b>Fully custom</b> Manual widget choice</p>	<p><b>IOT devices</b> Manual widget choice</p>	<p><b>IOT applications</b> Manual widget choice</p>
<p><b>My Private Data</b> Manual widget choice</p>	<p><b>Empty Dashboard</b> Empty dashboard</p>	<p><i>You must choose one template</i></p>	

- to create a new Dashboard
- to add widgets and/or groups of them on any Dashboard

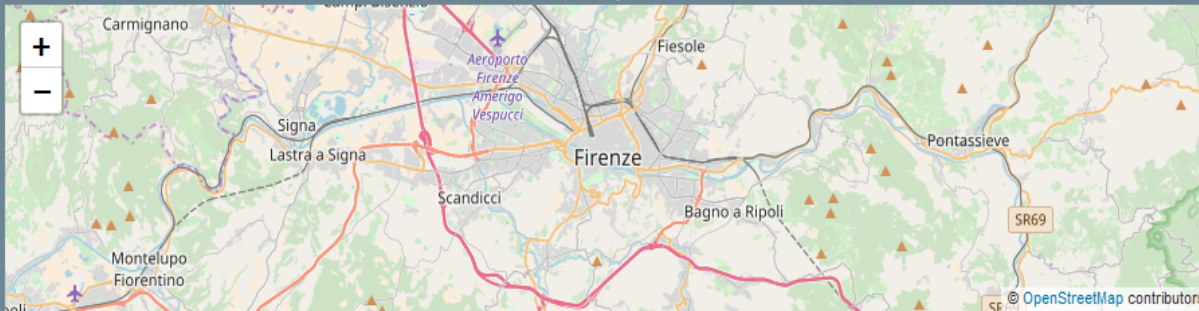
## Wizard



## Dashboard features

## Data and widgets

## Map



## Single data widgets



## Multi data widgets



## Data sources

High-Level Type	Nature	Subnature	Value Type	Value Name	Data Type	Last Date	Healthiness	Last Check	Ownership
Special Widget	Environment	Weather Forecast	Previ_Meteo	Previ_Meteo	special weather			2018-07-08 16:00:18	public
Special Widget	Environment	Weather Forecast	Previ_Meteo	Previ_Meteo	special weather			2018-07-08 16:00:18	public
Special Widget	Environment	Weather Forecast	Previ_Meteo	Previ_Meteo	special weather			2018-07-08 16:00:18	public
Special Widget	Environment	Weather Forecast	Previ_Meteo	Previ_Meteo	special weather			2018-07-08 16:00:18	public
Special Widget	Environment	Weather Forecast	Previ_Meteo	Previ_Meteo	special weather			2018-07-08 16:00:18	public
Special Widget	Environment	Weather Forecast	Previ_Meteo	Previ_Meteo	special weather			2018-07-08 16:00:18	public
Special Widget	Environment	Weather Forecast	Previ_Meteo	Previ_Meteo	special weather			2018-07-08 16:00:18	public
Special Widget	Environment	Weather Forecast	Previ_Meteo	Previ_Meteo	special weather			2018-07-08 16:00:18	public
Special Widget	Environment	Weather Forecast	Previ_Meteo	Previ_Meteo	special weather			2018-07-08 16:00:18	public

• Select the area of your interest: panning and zooming

• Select the

• graphic aspect of your interest, or

• High Level Type of your interest, or

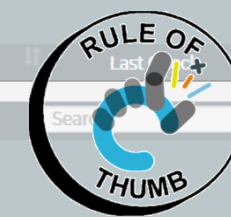
• Make a search if you have a precise idea or

• Act on filters: nature, subnature, type, name, value, date, health, owner, ...

• Combine them as you like

• Select the lines of your interest

• Then click on Next and get the Dashboard by wizard



Close

# Widgets' Icons

## Single data

Single data widgets



## Multi data

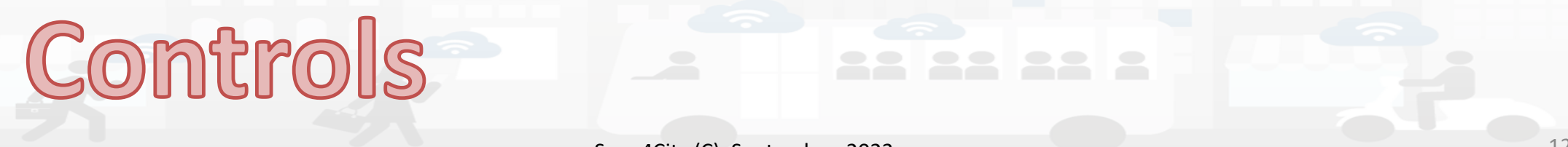
Multi data widgets



Map Controls:



## Map Controls



# Widget selection

Single data widgets

Multi data widgets

Map Co

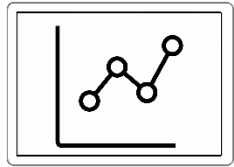
FilterMap GPSUser GPSOrg

ources

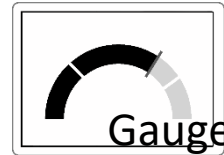
All selected (1626) All selected (73) All selected (95) selected (3)

Widget showing a multi-data list of point of interests, IOT devices, heatmaps and geometries (e.g.: traffic flows, cycle paths), with a map showing the position of the POIs, a set of sources have to be provided

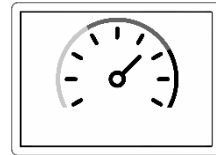
# Selection of Main Widgets icons



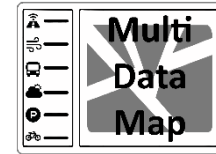
Time Trend



Gauge



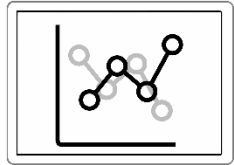
Speedometer



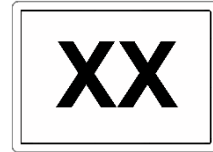
Selector +  
Multi Data  
Map



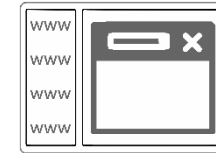
Clock



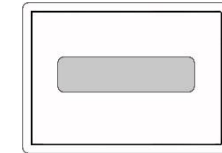
Time Trend  
Compare



Single  
Content



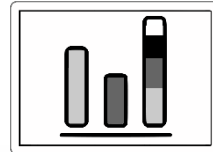
Selector +  
External  
Service



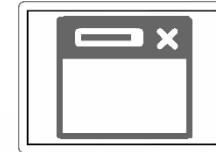
Button



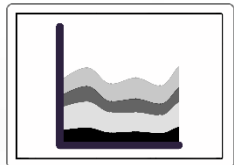
MultiSeries



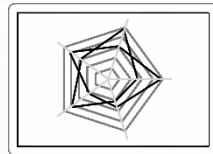
Barseries



External  
Service



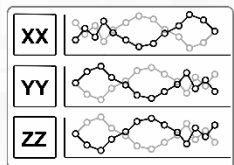
MultiSeries  
(stacked)



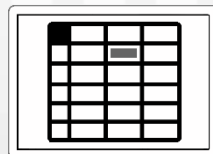
Spider /  
Kiviat



Pie / Donut



Multi  
TimeTrend



Table

SNAP4City Dashboards Wizard

Dashboard features | Data and widgets | Check and summary

Map

Single data widgets

Multi data widgets

Data sources

High-Level Type	Nature	Subnature	Value Type	Value Name	Last Date	Last Value	Healthiness	Last Check	Ownership
Special Widget	Environment	Weather Forecast	Prevl_Meteo	special weather	Vernio		●	2018-07-08 16:00:18	public
Special Widget	Environment	Weather Forecast	Prevl_Meteo	special weather	Vergemoli		●	2018-07-08 16:00:18	public
Special Widget	Environment	Weather Forecast	Prevl_Meteo	special weather	Vecchiano		●	2018-07-08 16:00:18	public
Special Widget	Environment	Weather Forecast	Prevl_Meteo	special weather	Valano		●	2018-07-08 16:00:18	public
Special Widget	Environment	Weather Forecast	Prevl_Meteo	special weather	Vaglia		●	2018-07-08 16:00:18	public
Special Widget	Environment	Weather Forecast	Prevl_Meteo	special weather	Vagli sotto		●	2018-07-08 16:00:18	public
Special Widget	Environment	Weather Forecast	Prevl_Meteo	special weather	Vagli di sotto		●	2018-07-08 16:00:18	public
Special Widget	Environment	Weather Forecast	Prevl_Meteo	special weather	Uzzano		●	2018-07-08 16:00:18	public

Hide columns | Filters | Selected rows: 0 | Previous | 1 | 2 | 3 | 4 | 5 | ... | 1081 | Next

Chosen data sources

High-Level Type	Subnature	Value Type	Value Name	Data Type	Last Date	Last Value

No data available in table

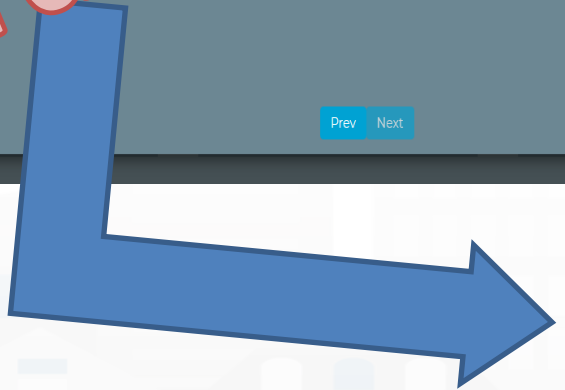
You must select one widget type

Prev Next



# Dashboard Wizard

**Wizard**



Università degli Studi di Firenze - UniFI

SNAP4city


Florence CarParkings - Newgui PA

Sat 6 Aug 10:58:01

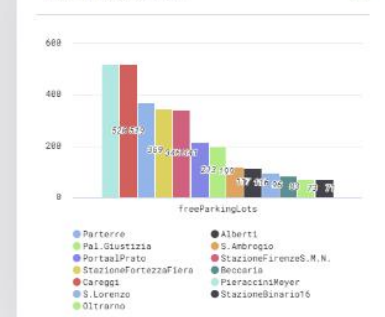
SELETTORE

- CarPark IOT
- Car\_park CAT

MAPPA



STATO PARCHEGGI 2m




freeParkingLots

- Parterre
- Pal. Giustizia
- Porta al Prato
- Stazione Forzezza Fiera
- Careggi
- S. Lorenzo
- Oltarno
- Alberti
- S. Ambrogio
- Stazione Firenze S. M. N.
- Beccaria
- Pieraccini Meyer
- Stazione Binario 76

PARTERRE 7m

369 Posti disponibili

PARTERRE - ANDAMENTO NUMERO POSTI LIBERI 7m



The Wizard help you in selecting only possible combination of data vs graphic representation



Wizard

Dashboard - tester14

No subtitle

Fri 13 Jul 19:57:32

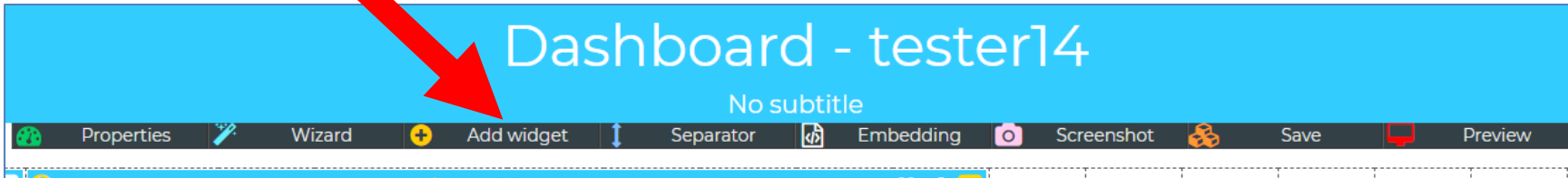
Properties Wizard Add widget Separator Embedding Screenshot Save Preview

The screenshot shows the Snap4City dashboard interface. On the left is a 'Selector' panel with three options: 'Bike\_rack' (orange), 'Bike\_rental' (yellow), and 'SensorSite' (red). The main area contains two widgets: 'Selector - Map' and 'Selector - Trend'. The map widget displays a street map with numerous purple 'P' icons representing bike racks. The trend widget shows a blue line graph with a light blue shaded area underneath, representing data over time from 13 Jul to 18:00. A context menu is open over the map, listing options like 'Hide header', 'Header color', 'Title color', 'Background color', 'Border color', 'More options', 'Delete widget', and 'Quit'. A color palette is also visible, showing a gradient from black to yellow and a 'Last used' section.

CONTEXTUAL  
MENU to  
edit features

Use Wizard to add more widgets

# Manual Addition of Widgets



**Add new widget to dashboard**

**Metric and widget choice**

Widget category: Actuator  
Data viewer

**Generic widget properties**

Title:   
Content font size:   
Header color: rgba(z)   
Background color: rgba(z)   
Content font color: rgba(c)   
Header text color: rgba(c)

**Metric and widget choice**

Widget category: Data viewer  
Metrics category: Shared metrics  
Metric: Bolognese\_Pressione  
Metric description: Description: Pressione atmosferica via Bolognese. Metric Typology: Float.  
Widget type: widgetGaugeChart  
Widget link: widgetTimeTrendCompare, widgetSingleContent, widgetSpeedometer, widgetTimeTrend, widgetCarrierPosition

**Specific widget properties**

Cancel Confirm

# Dashboards summary and further exercises

- **Suitable** as: City Dashboard, App interface, and Control Room Dashboards, Situation Room Dashboard, Operator Dashboard
- **Created** visually compounding graphic Widgets
  - Each widget can be set to have an autonomous update
  - Each metric/data-source may have associated with an alarm: blinking and sending events to people and machines in different manners
- **Can be:** public or private, private dash can be delegated or passed in ownership
- See [https://main.snap4city.org/management/dashboards.php?linkId=dashboardsLink&fromSubmenu=false&sorts\[title\\_header\]=1](https://main.snap4city.org/management/dashboards.php?linkId=dashboardsLink&fromSubmenu=false&sorts[title_header]=1)
- See the following tutorials
  - [HOW TO: create a Dashboard in Snap4City](#)
  - [HOW TO: add data sources to the Snap4City Platform](#)
  - [US1. Using City Dashboards](#)
  - [US2. Using and Creating Snap4City Applications with Dashboards](#)
  - [US4. Creating City Dashboards and related Event Monitoring and Actions](#)



- Dashboards (Public)
- My snap4City.org
- My snap4City.org
- www.snap4solutions.org
- Dashboards of My Organization
- My Dashboards in My Organization
- My Data Dashboard Kibana
- Extra Dashboard Widgets
- Data Management, HLT
- Knowledge and Maps
- Processing Logics / IOT App
- Entity Directory and Devices
- Decision Support Systems
- Deploy and Installation
- Help and Contacts
- Documentation and Articles
- Km4City portal



Home / Snap4City: Smart aNalytic App builder for sentient Cities and IOT

# Snap4City: Smart aNalytic APP builder for sentient Cities and IOT

Username: nicola.mitolo

## Search

Search input field with dropdown menu showing '-Any-'

WHAT IS Snap4City | LATEST NEWS | SELECT 1<sup>st</sup> Place award to SNAP4CITY | Snap4City Training on Tools and Platform | Tutorials | Scenarios | Organizations

SMARTCITY EXPO WORLD CONGRESS 15 - 17 NOVEMBER 2022 BARCELONA & ONLINE | GET YOUR PASS

What People say | Mobile Apps | IOT Devices | IOT Applications | Data Analytics | Dashboards | Living Lab | Smart City API | Smart City Ontology | Work with Us

Articles | SNAP4CITY on EUROPEAN OPEN SCIENCE CLOUD MARKETPLACE | SNAP4CITY HACKATHON | INDUSTRY 4.0 Snap4Industry | Snap4Home



Powered by www.km4city.org

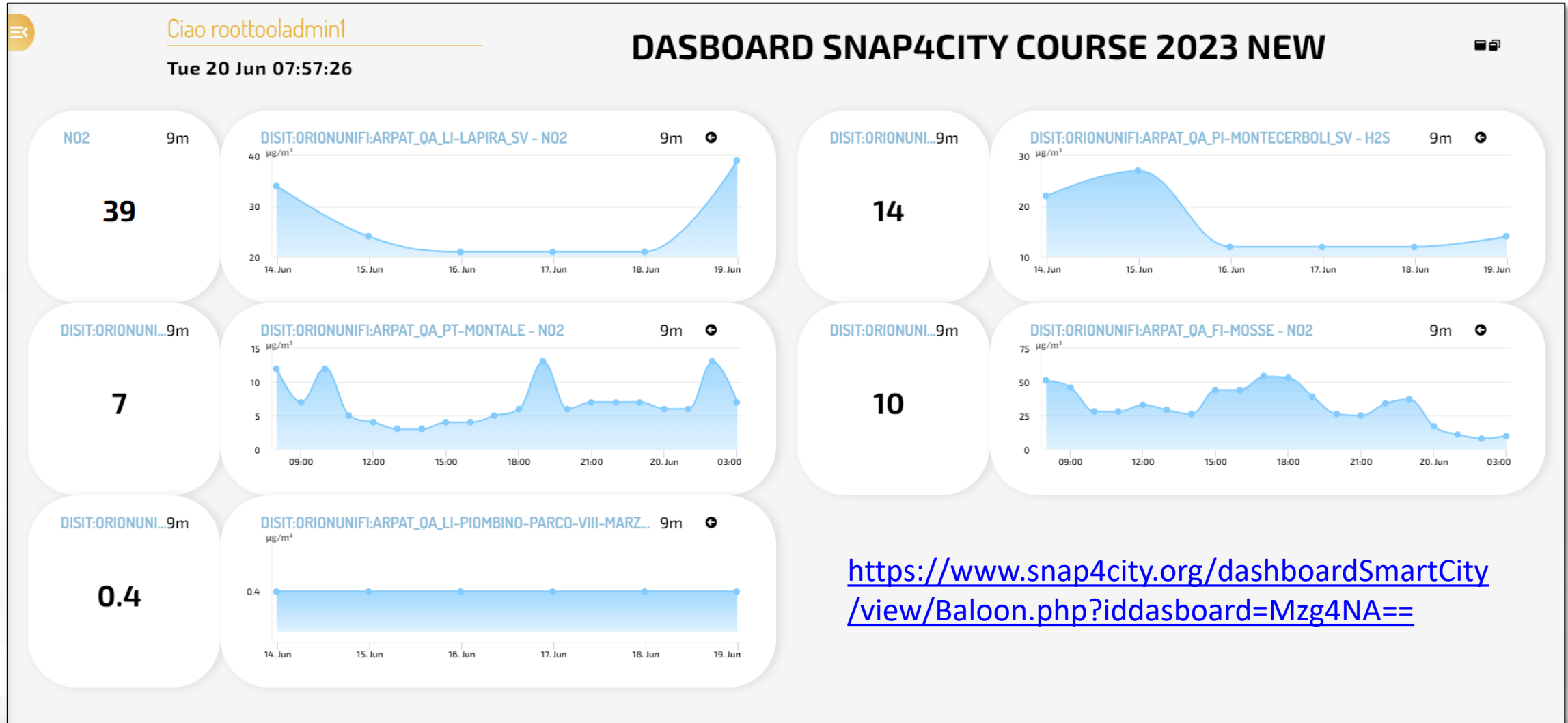


## Organization Groups

DISIT

- TECHNICAL OVERVIEW: <https://www.snap4city.org/download/video/Snap4City-PlatformOverview.pdf>
- Development Life Cycle: <https://www.snap4city.org/download/video/Snap4Tech-Development-Life-Cycle.pdf>
- Client-Side Business Logic Widget Manual: <https://www.snap4city.org/download/video/Client-Side-Business-Logic-WidgetManual.pdf>

# First Example



<https://www.snap4city.org/dashboardSmartCity/view/Baloon.php?iddashboard=Mzg4NA==>

# Second Example with some improvement

Dashboard Snap4City Course 2023 2 Tue 20 Jun 08:13:07

**Selector**

- 15MinIndex\_CultureAndCultsIndex
- 15MinIndex\_FoodServicesIndex
- 15MinIndex\_HealthIndex
- CarParkPortaalPrato
- CarParkParterre
- CarParkPieracciniMeyer
- All Car Park by Model
- DISIT:orionUNIFI:ARPAT\_QA\_FI-BASSI\_SV
- DISIT:orionUNIFI:ARPAT\_QA\_FI-MOSSE\_SV
- DISIT:orionUNIFI:ARPAT\_QA\_FI-SIGNA\_SV
- All Bank POI

**Selector - Map**

**DISIT:OrionUNIFI:ARPA... 9m**

**DISIT:OrionUNIFI:ARPAT\_QA\_LI-CARDUCCI\_SV - PM10**

Date	PM10 (µg/m³)
14. Jun	14
15. Jun	13
16. Jun	17
17. Jun	17
18. Jun	17
19. Jun	17

<https://www.snap4city.org/dashboardSmartCity/view/Geo.php?iddashboard=Mzg4NQ==>

Dashboard title

[Empty text input field]

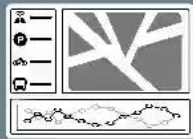
Dashboard title can't be empty

Dashboard template

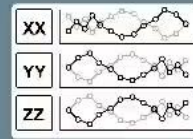
Click on a template to choose it, click on it again to unselect it



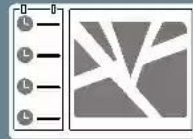
Selector and map  
Preset widget choice



Selector, map, trend  
Preset widget choice



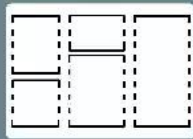
Data and trends  
Preset widget choice



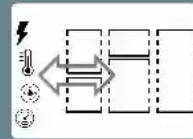
Events vs. map  
Manual widget choice



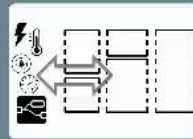
MicroApp and Services  
Preset widget choice



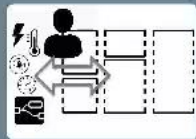
Fully custom  
Manual widget choice



IOT devices  
Manual widget choice



IOT applications  
Manual widget choice



My Private Data  
Manual widget choice



Empty Dashboard  
Empty dashboard

You must choose one template

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

Prev Next

Close

# Example Case 3

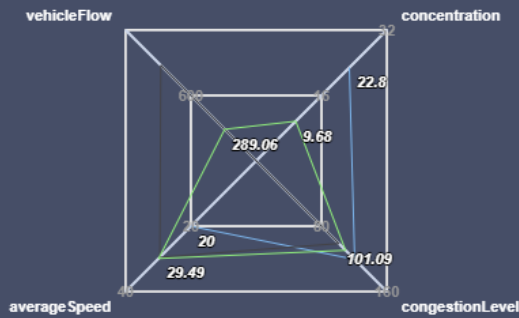
## Course 2023 Case 3

Tue 20 Jun 08:45:52

### Radars Series

05/09/2023 8:43

2m

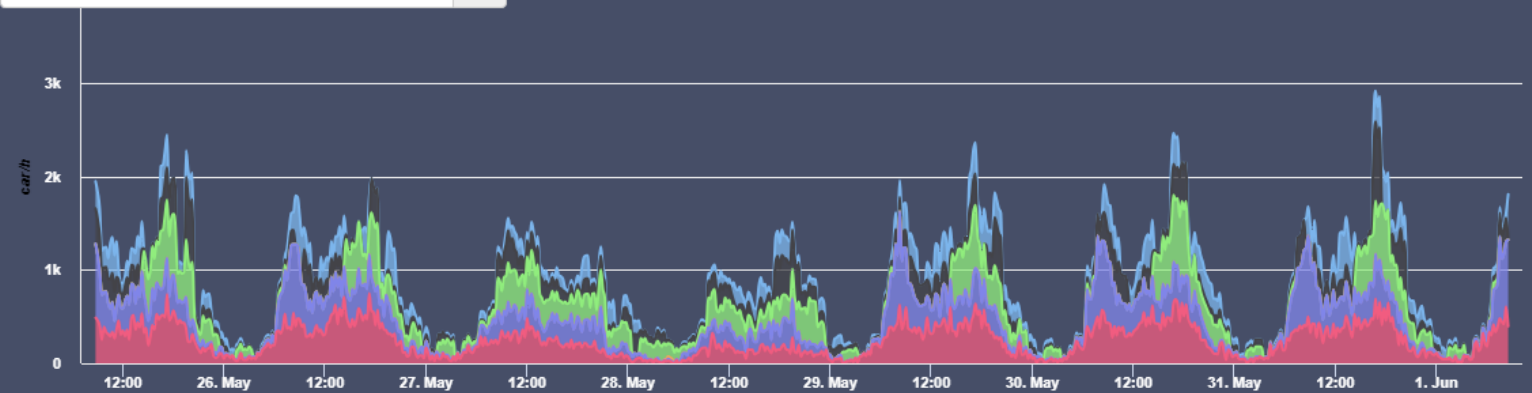


- DISIT:orionUNIFI:METRO758
- DISIT:orionUNIFI:METRO781
- DISIT:orionUNIFI:METRO960

### Time Trend Comparison

06/01/2023 8:44 AM

2m



- DISIT:orionUNIFI:METRO658 - vehicleFlow
- DISIT:orionUNIFI:METRO806 - vehicleFlow
- DISIT:orionUNIFI:METRO24 - vehicleFlow
- DISIT:orionUNIFI:METRO792 - vehicleFlow
- DISIT:orionUNIFI:METRO15 - vehicleFlow
- DISIT:orionUNIFI:METRO559 - vehicleFlow

My Profile

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TOP

# *Combining Widgets: Nesting & Linking Dashboards*



# Mixt per Roma

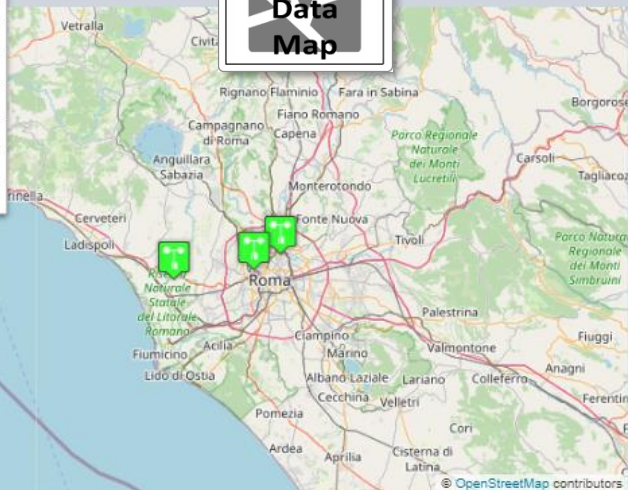
## Roma Demo3 (Qualità dell'Aria)

Thu 23 Jul 13:35:09

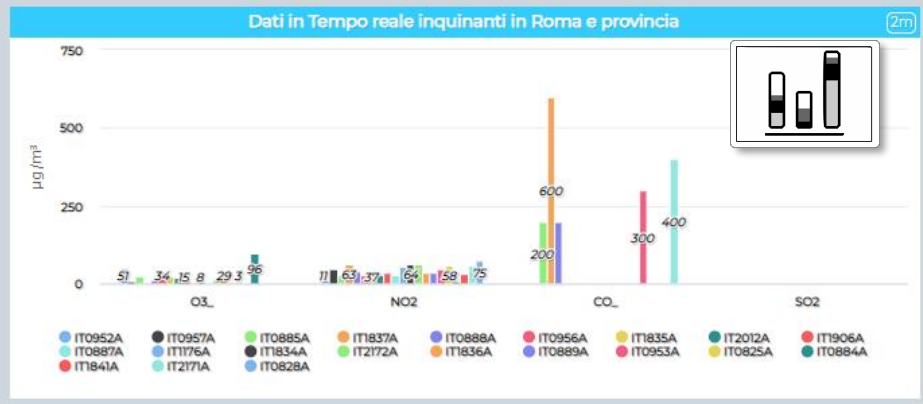
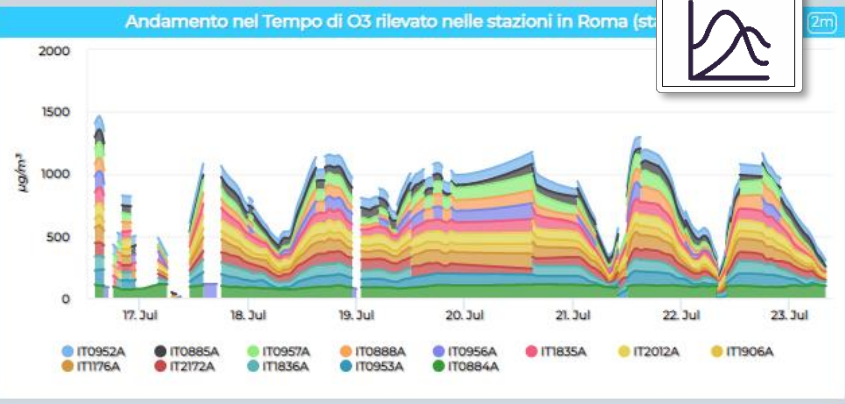
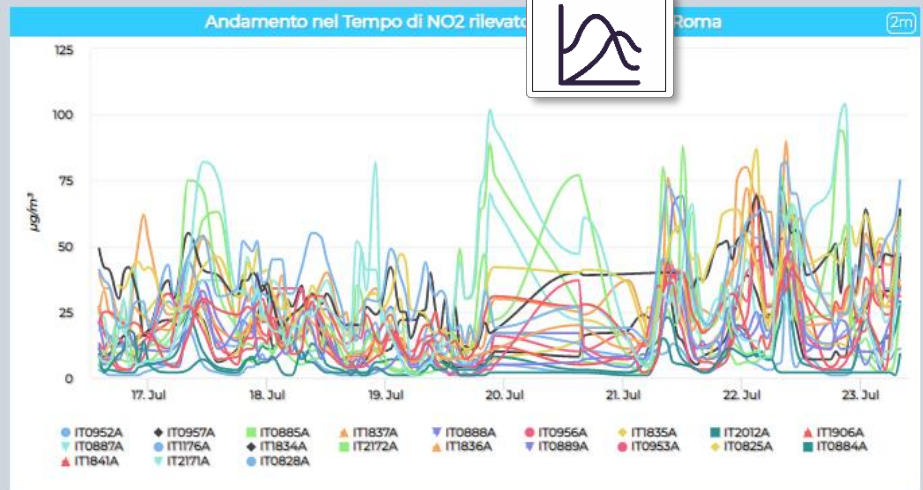
**MENU**

- Home
- Hotspots
- Mobility and Transport
- Environment
- Social
- Some Services
- Infrastructure
- Quit

**Multi Data Map**



- ▲ IT1836A
- ▲ IT0957A
- ▲ IT0828A
- ▲ IT2171A
- ▲ IT0952A
- ▲ IT0885A
- ▲ IT1837A
- ▲ IT0888A
- ▲ IT1176A
- ▲ IT1835A
- ▲ IT1834A
- ▲ O3
- ▲ NO2

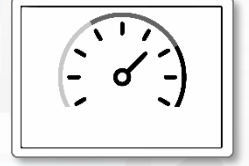
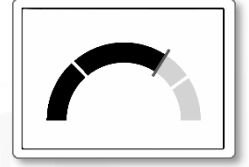
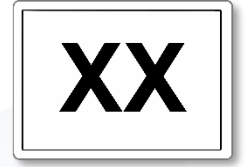
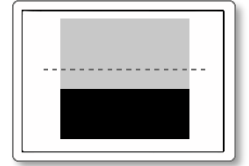
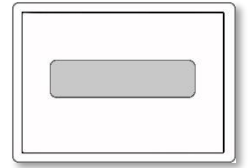
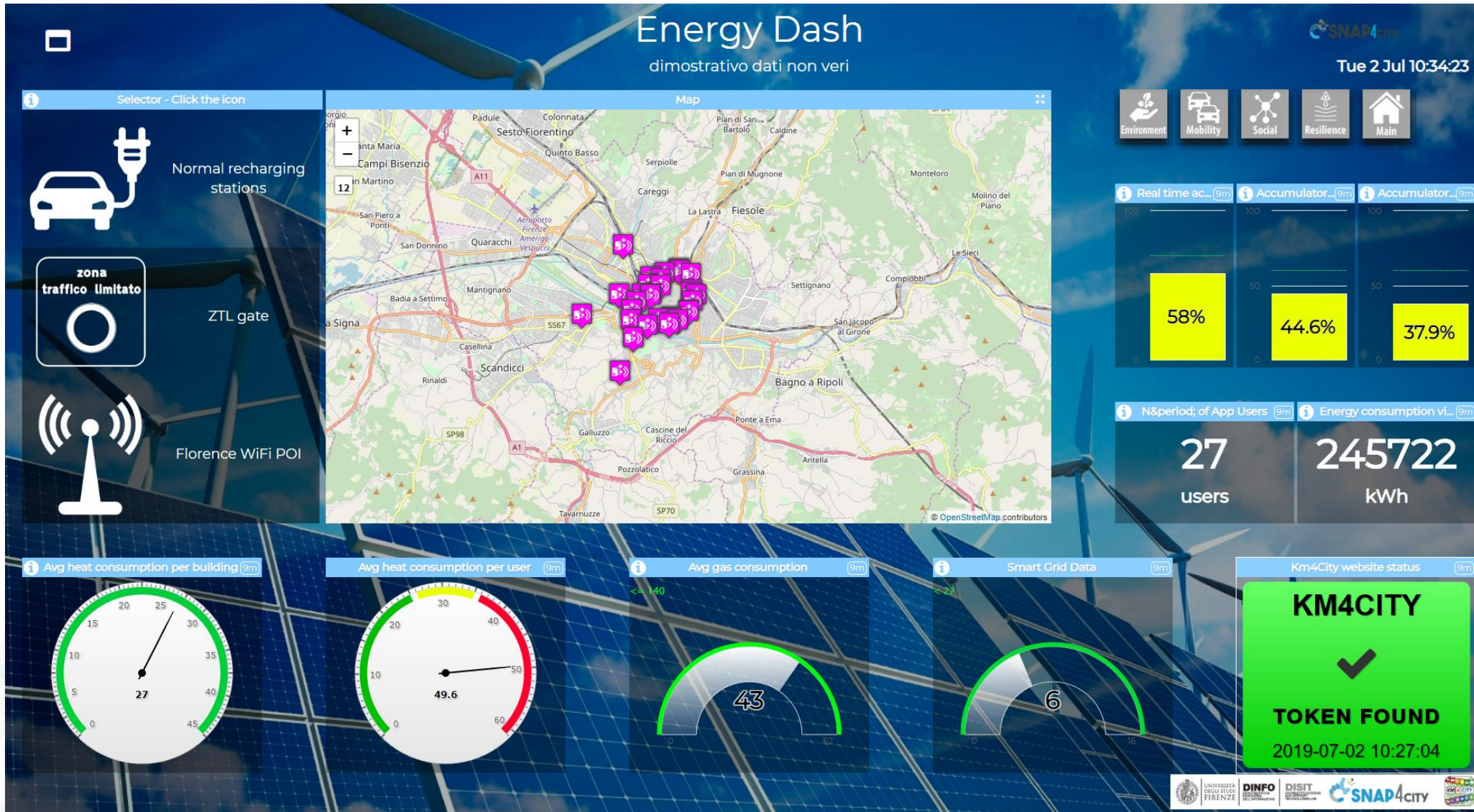


Valori inquinanti in tempo reale, mappe

value type / value name	O3	NO2	CO	SO2
IT0952A	51	11		
IT0957A	7	46		
IT0885A	25	29	200	
IT1837A		63	600	
IT0888A	11	37	200	
IT0956A	34	29		
IT1835A	24	37		
IT2012A	20	29		
IT1906A	15	34		
IT0887A		28		
IT1176A	8	54		
IT1834A		64		
IT2172A	15	61		
IT1836A	29	35		
IT0953A	3	47	300	1.3
IT0889A		34		
IT0825A		58		
IT0884A	96	9		
IT1841A		31		
IT2171A		57	400	
IT0828A		75		

Home Trasporti

# Match Widget vs Icon

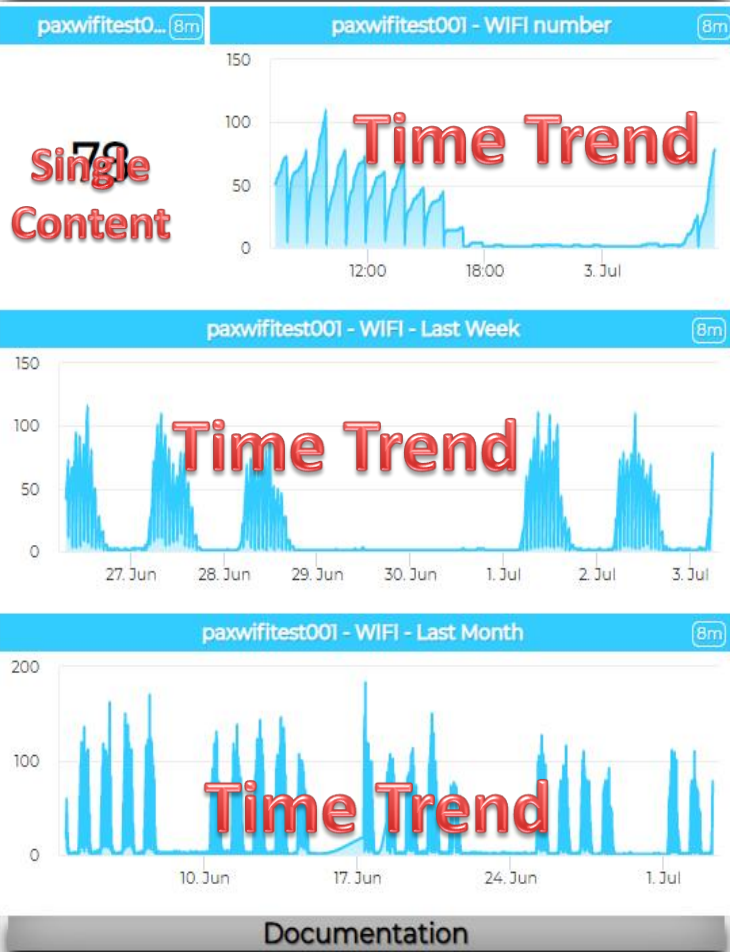


# Monitoring My PAXCounter and Tracks (example)

Please note that the data results are not always based on real data.

Wed 3 Jul 09:18:07

## Your PAX Counter



Single Content

Time Trend

Time Trend

Time Trend

Documentation

Button

The screenshot shows a mobile application interface. On the left is a map of Belgium with several purple location pins. On the right is a list of services, each with a purple pin icon and a distance value. The services listed are:

- S4cantw 6.2 krr
- S4cantw 6.3 krr
- S4cantw 51.5 krr
- S4cantw 51.5 krr
- S4cantw 87.7 krr
- S4cantw 87.7 krr
- S4cantw 964.7
- S4cantw 970.9
- S4cantw

Below the list is a table with columns for 'Values' and 'Data'. The table contains several rows with values like 'bikeSharing', 'transportMenu', 'settings', and 'suggestionsNearYou'. The interface also includes a search bar, a date selector (2019-07-01), and various navigation icons at the bottom.

Micro Application

External Content

- Origin Dest. Matrix
- Typical Trajectories
- My Talk
- Delegated Tracks
- Multi Tracks
- Twitter Vigilance
- Twitter Vig. Real Time
- Air Quality
- Web
- Forum Discussion

Survey

# FIRENZE

INDICI DI CRITICITA' DELLA QUALITA' DELL'ARIA (ICQA)

**2**

inviata comunicazione alla cittadinanza

OZONO

**200**  $\mu/m^3$

superata la soglia di informazione

**39492** Utenti WiFi

STATI DI ALLERTA

GENERAL METEO

MINIMO BASSO MEDIO ALTO

**RISCHIO IDRAULICO**

**RISCHIO TEMPORALI**

**RISCHIO IDROGEOLOGICO**

**RISCHIO NEVE**

**RISCHIO GHIACCIO**

Mar 16 Ott  
**Firenze**

Nuvoloso  
19°C / 24°C  
Powered by LAMMA

Mer 17 Ott  
16°C / 24°C  
Nuvoloso

Gio 18 Ott  
15°C / 26°C  
Nuvoloso

Ven 19 Ott  
Temp N/A  
Sereni

Sab 20 Ott  
Temp N/A  
Sereni

TPL

N **14 57 21**

3' 2' 8' 0' 5' 2'

COLONNINE RICARICA

**180** INSTALLATE

81.1 % ATTIVE

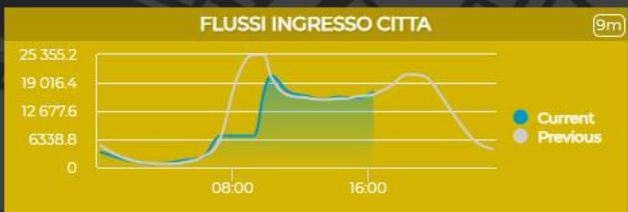
8.9 % IN USO

REPLICATE

FLORENCE DASHBOARD

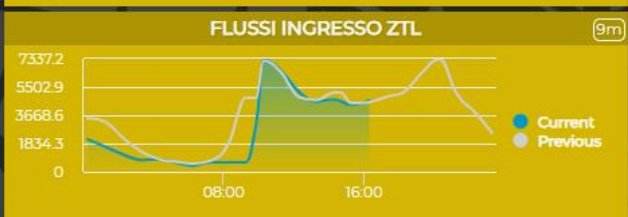
This dashboard is the main entry point to access dashboards realised in the REPLICATE H2020 EC project.

REPLICATE has received funding from the European Union's Horizon 2020 Research and Innovation Programme under grant agreement No. 691735.



TOTALE

**141608** VEICOLI



TOTALE ZTL

**41146** VEICOLI

SITUAZIONE VIABILITA

**4 INCIDENTI**

0 CHIUSURE AL TRAFFICO (TOT)

0 CHIUSURE PER CANTIERI

0 PROGR. 0 NON PROG.

0 LIMITAZIONI AL TRAFFICO (TOT)

0 LIMITAZIONI PER CANTIERI

0 NON PROG. 0 PROGR.

**4 TOT. EVENTI SULLA RETE**

SMN <b>63.4</b> % occupati su 901 posti	BINARIO16 <b>83</b> % occupati su 165 posti	FORTEZZA <b>17.9</b> % occupati su 521 posti
LEOPOLDA <b>36.3</b> % occupati su 300 posti	CALZA <b>69.3</b> % occupati su 218	S.AMBROGIO <b>67</b> % occupati su 379 posti
PARTERRE <b>64.9</b> % occupati su 106 posti	CAREGGI <b>90.4</b> % occupati su 406 posti	BECCARIA <b>78.6</b> % occupati su 210 posti

STATO TRIAGE CAREGGI

Red code Yellow code Green code Blue code White code

3 12 83 37 9

PM10

**26** superamenti/anno

Riciclo rifiuto

**56%**

Rifiuto per abitante

**0,629** t/pers/anno

PIL residenti

**23.606** euro/pers

Tasso di disoccupazione

**6,8%**

Piste Ciclabili

**19.7%** km ciclabili/km totali

MAPPA

Energy Environment

Mobility Social

Resilience

Most of the widgets are connected to an URL to jump to other views/dashboards

# FIRENZE



Tue 16 Oct 16:18:39

**Single Content**

invia la tua opinione alla cittadinanza

**Single Content**

superiori alla soglia di informazione

**Single Content**

39492 Utenti WiFi

**Civil Protection**

**SOC**

RISCHIO IDRAULICO

RISCHIO TEMPORALI

RISCHIO IDROGEOLOGICO

RISCHIO NEVE

RISCHIO GHIACCIO



**Meteo**

Mar 16 Ott  
Firenze  
19°C / 24°C

Mer 17 Ott  
16°C / 24°C

Gio 18 Ott  
15°C / 26°C

Ven 19 Ott  
Temp N/A

Sab 20 Ott  
Temp N/A

**External Content**

TPL

N 14 57 21

**External Content**

COLONNINE RICARICA

12 INSTALLATE

81.1 % IN USO

8.9 % IN USO

**External Content**

FLORENCE DASHBOARD

REPLICATE H2020 EC project

REPLICATE has received funding from the European Union's Horizon 2020 Research and Innovation Programme under grant agreement No. 691735.



**Single Content**

TOTALE

14130



**Single Content**

TOTALE ZTL

4130

**10 Single Content**

SITUAZIONE VIABILITA

4 INCIDENTI

0 CHIUSURE AL TRAFFICO (TOT)

0 CHIUSURE PER CANTIERI

0 PROG.

0 NON PROG.

0 PROG.

4 TOT. EVENTI SULLA RETE

**9 Single Content**

SMN 63.4 % occupati su 901 posti	BINARIO16 83 % occupati su 165 posti	FORTEZZA 17.9 % occupati su 521 posti
LEOPOLDA 36.3 % occupati su 300 posti	LEOPOLDA 69.3 % occupati su 218	AMBROGIO 67 % occupati su 379 posti
PARTERRI 64.9 % occupati su 106 posti	PARTERRI 30.0 % occupati su 406 posti	BECCARIA 78.6 % occupati su 210 posti

**First Aid**

STATO TRIAGE CAREGGI

Red code 3

Yellow code 3

Green code 3

Blue code 9

White code 9

**6 Buttons**

PM10 superamenti/anno 26	Rifiuto per abitante 56%	PIL residenti 0,629 t/pers/anno	Tasso di disoccupazione 6,8%	Piste Ciclabili 19.7% km ciclabili/km totali
-----------------------------	-----------------------------	------------------------------------	---------------------------------	---

**MAPPA**

Energy

Environment

Mobility

Social

Resilience

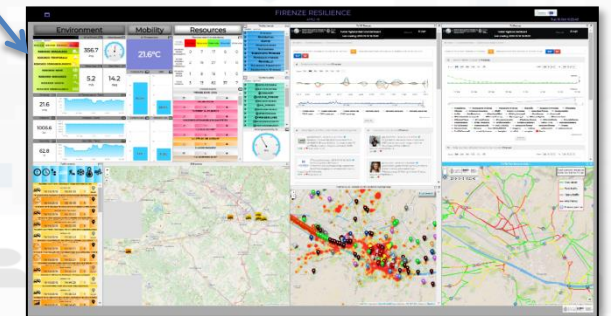
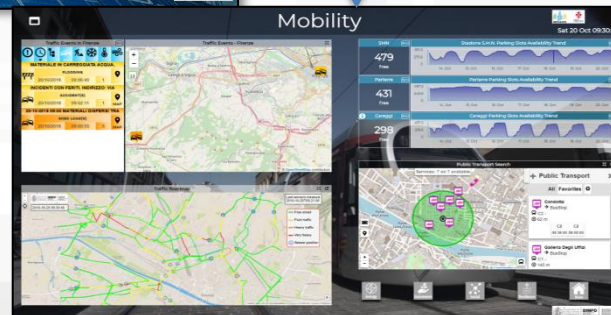
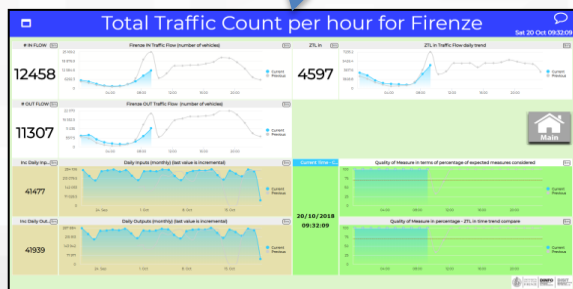
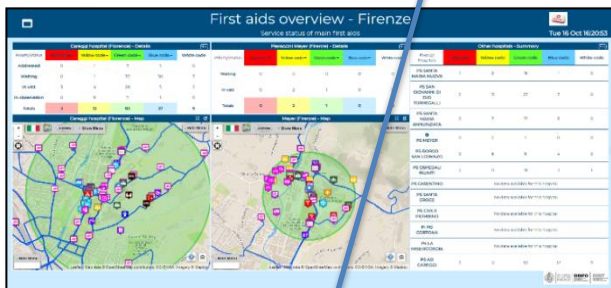
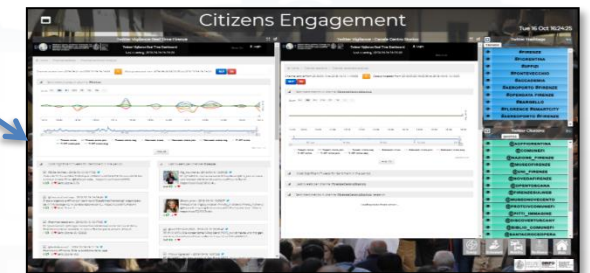
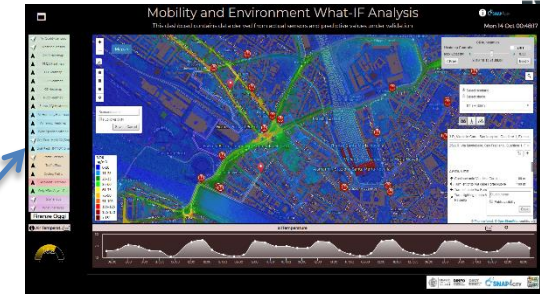
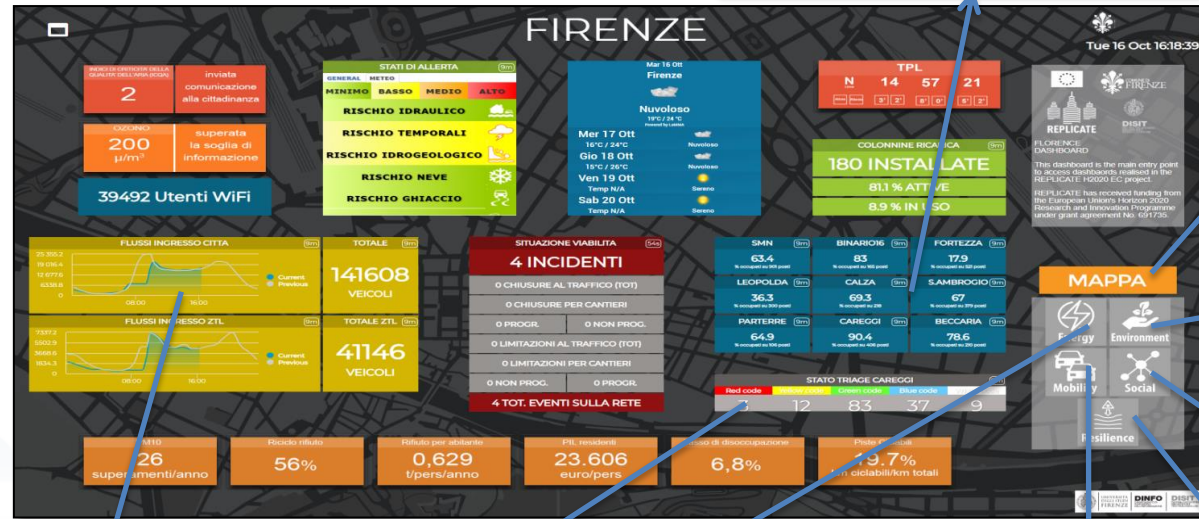
Most of the widgets are connected to an URL to jump to other views/dashboards



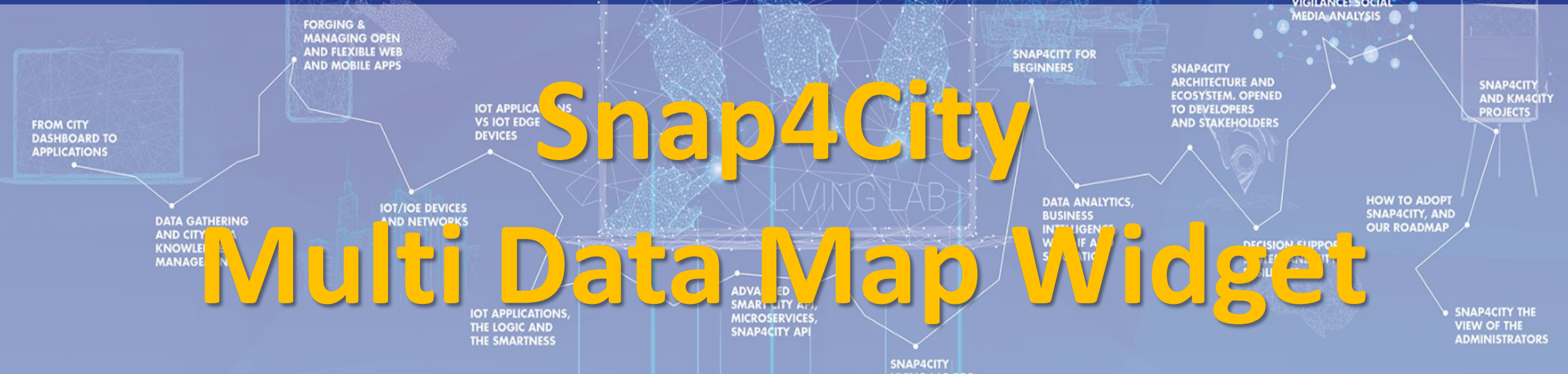
UNIVERSITÀ  
DEGLI STUDI  
FIRENZE

**DINFO**  
DIPARTIMENTO DI  
INGEGNERIA  
DELL'INFORMAZIONE

**DISIT**  
DISTRIBUTED SYSTEMS AND  
INTERNET TECHNOLOGIES LAB  
DISTRIBUTED DATA INTELLIGENCE  
AND TECHNOLOGIES LAB



TOP



# Snap4City

# Multi Data Map Widget





# Unique Dashboard builder Multiple Styles

**Multi Data Map**

**AIR QUALITY MONITORING STATION 42R804 - ANTWERPEN (RING)**

VALUE NAME: ANTWERP\_AIR\_QUALITY\_BETR804

DETAILS DESCRIPTION RT DATA

Last update: 2019-11-03 09:00:00+01:00

Description	Value	Buttons				
airQualityPM10	8	Last value	Last 4 hours	Last 24 hours	Last 7 days	Last 30 days
airQualityNO2	21	Last value	Last 4 hours	Last 24 hours	Last 7 days	Last 30 days
airQualitySO2	null	Last value	Last 4 hours	Last 24 hours	Last 7 days	Last 30 days
airQualityPM2_5	3	Last value	Last 4 hours	Last 24 hours	Last 7 days	Last 30 days

10.2

03/11/2019 10:52:16

<https://www.snap4city.org/dashboardSmartCity/view/index.php?iddashboard=MjM1MA==>

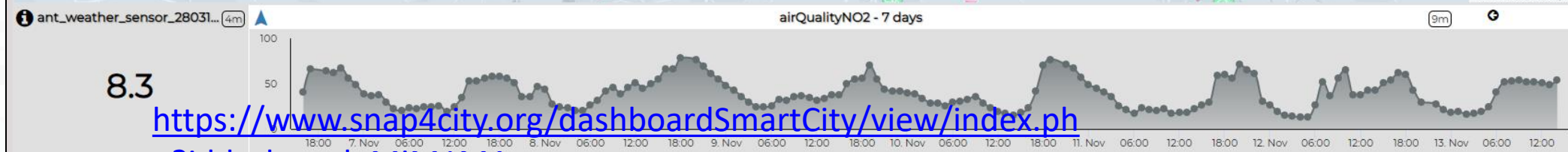
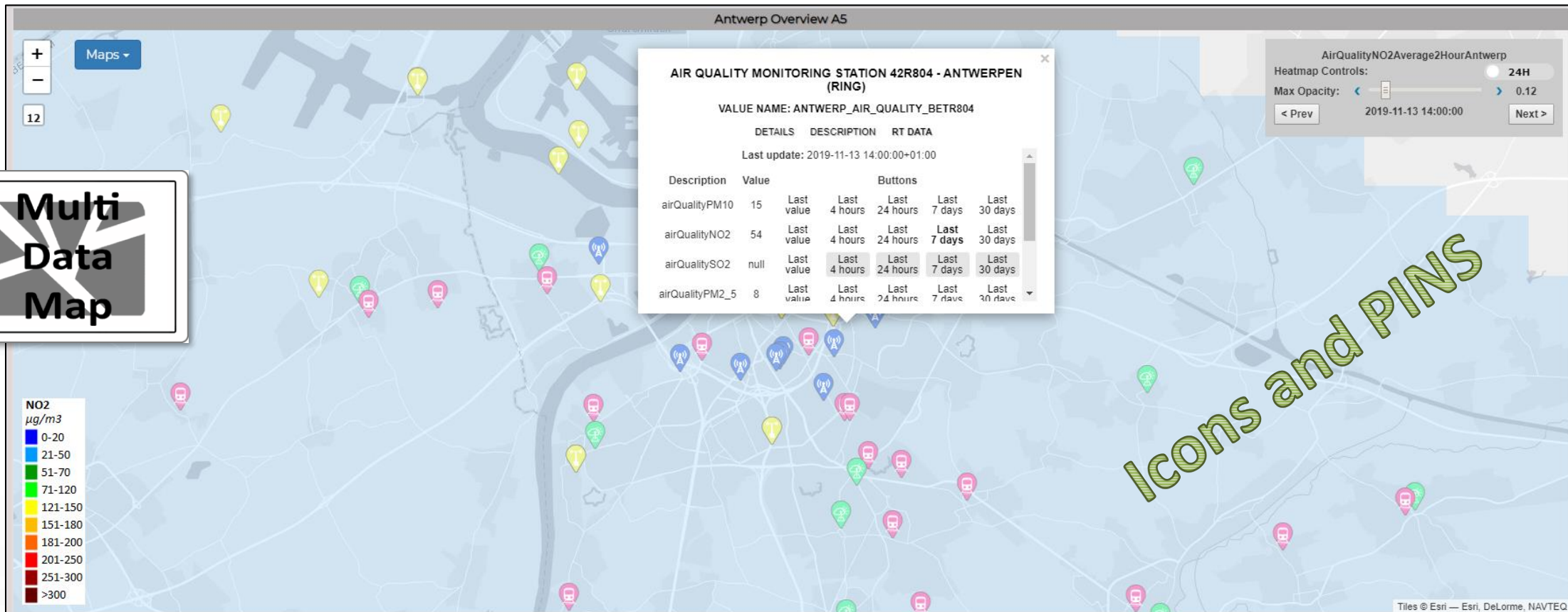
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XX



# Menu Icon and PINs as Icons

Multi  
Data  
Map



<https://www.snap4city.org/dashboardSmartCity/view/index.php?iddashboard=MjM1MA==>

# Technical Selector: TECH MultiDataMap

## Antwerp Selector Tech

Fri 1 Nov 14:17:43

**Selector Tech**

- Heatmap
  - AirQualitySO2Average2HourAntwerp
  - AirQualityO3Average2HourAntwerp
  - AirQualityNO2Average2HourAntwerp
  - CAQI1hourAverageAntwerp
  - AirQualityPM2\_5Average2HourAntwerp
  - AirQualityPM10Average2HourAntwerp
  - EAQI1hourAverageAntwerp
  - BikeFeelingAntwerp
  - AirTemperatureAverage2HourAntwerp
  - AirHumidityAverage2HourAntwerp
- MyPOI
  - Stripmuur Nero
  - Charif
  - Mile bvba
  - An Sibhin
  - Avini
  - BAZAR BIZAR by YOUR
  - My POI WAC&R
  - bike sharing
  - The School of Life Antwerpen
  - Vers Zuid
  - The Fish Market Cafe
  - Copyright
- Sensor
  - ant\_weather\_sensor\_2786229
  - ant\_weather\_sensor\_2786694
  - ant\_weather\_sensor\_2802031
  - ant\_weather\_sensor\_2803138
  - AirQualityObserved:VMM:42R801

**Selector - Map**

AirQualityPM2\_5Average2HourAntwerp  
Heatmap Controls: 24H  
Max Opacity: 0.25  
2019-10-25 11:00:00

PM2.5  $\mu\text{g}/\text{m}^3$

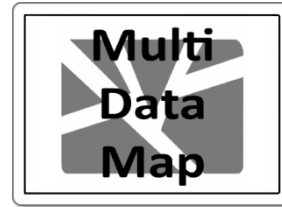
- 0-5
- 6-10
- 11-15
- 16-25
- 26-35
- 36-40
- 41-50
- 51-60
- 61-70
- >70

**TECH**

<https://www.snap4city.org/dashboardSmartCity/view/index.php?idashboard=MjMxOA==>

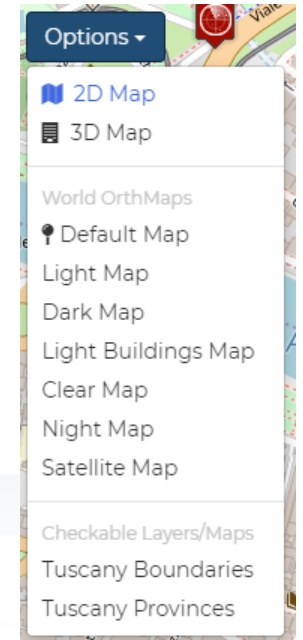
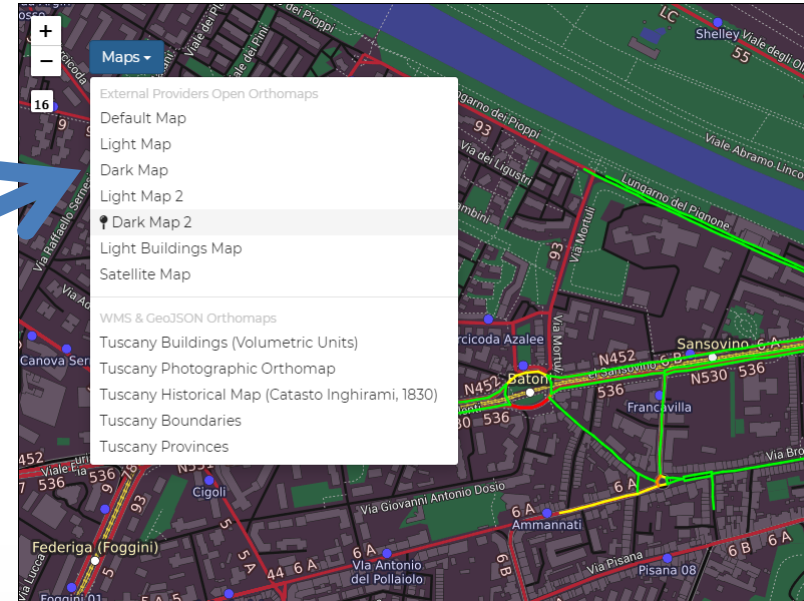
# Multi Data Map: many kinds of data

- **Orthomaps:** plain maps and overlapped layers
- A range of **Pins Kinds** for marking Services, IOT Devices, etc.
- **Services:**
  - POI, MyPOI, IOT Devices, Sensors, Actuators, IOT Device Moving, etc.
  - Cycling paths
  - Areas shapes: gardens, etc...
  - GIS data
- **Heatmaps:** different types
- **Traffic Flows:** different kinds
- **OD matrices**
- **Special data:**
  - **What-If** analysis: routing, public routing, traffic flow
  - **Routing: private, public, pedestrian, public means**
  - **Scenarios** definition
- **3D** buildings on special version of MMD
- ....

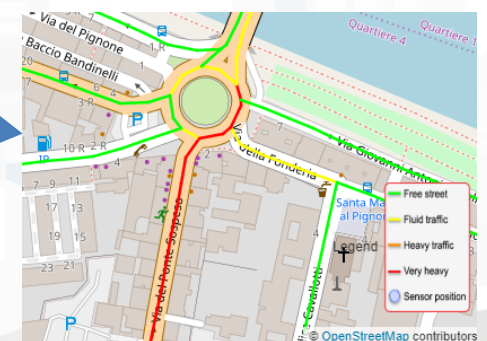


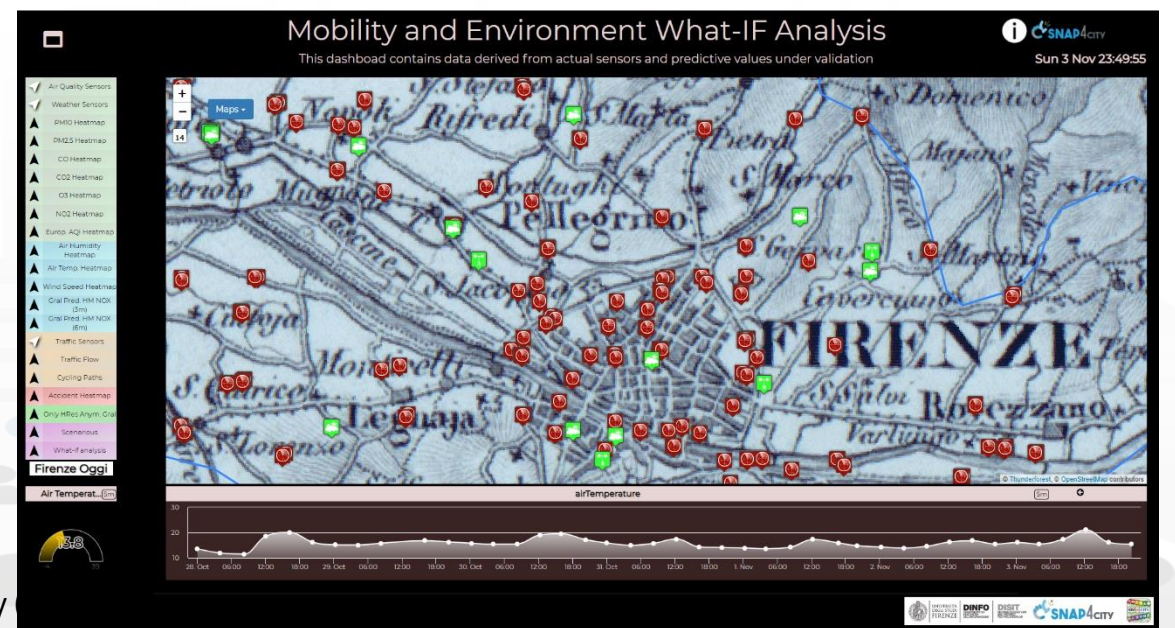
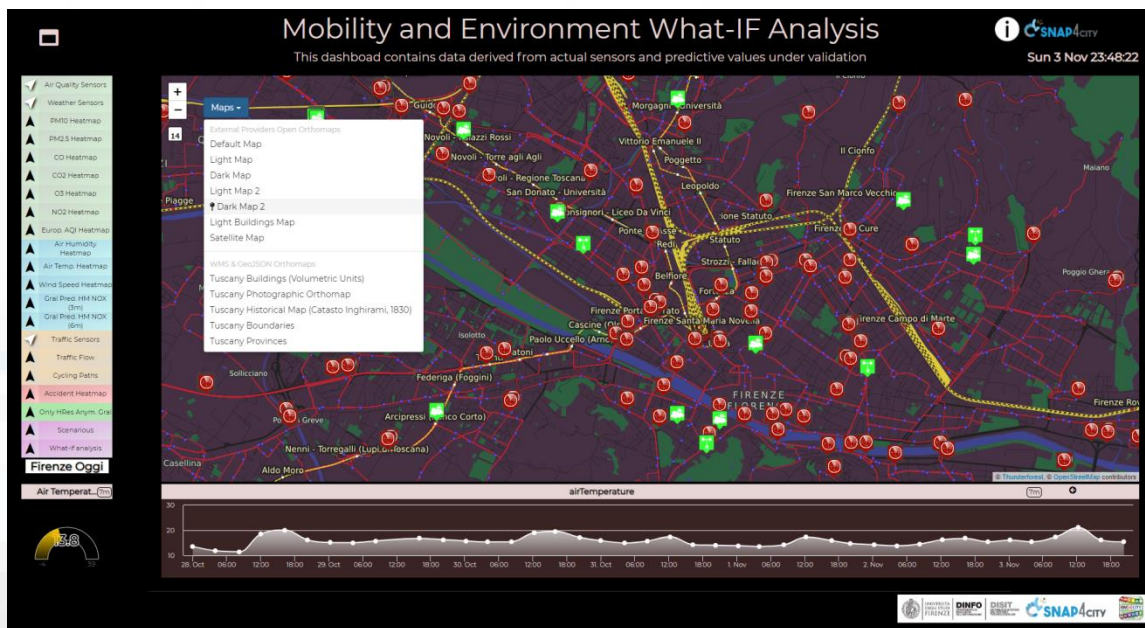
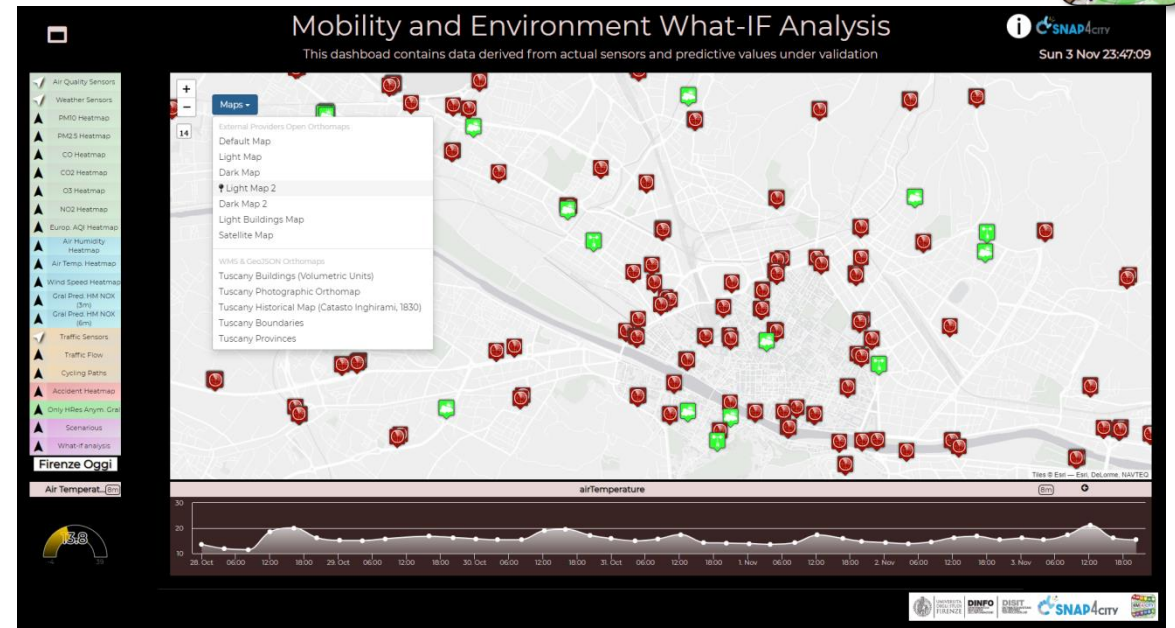
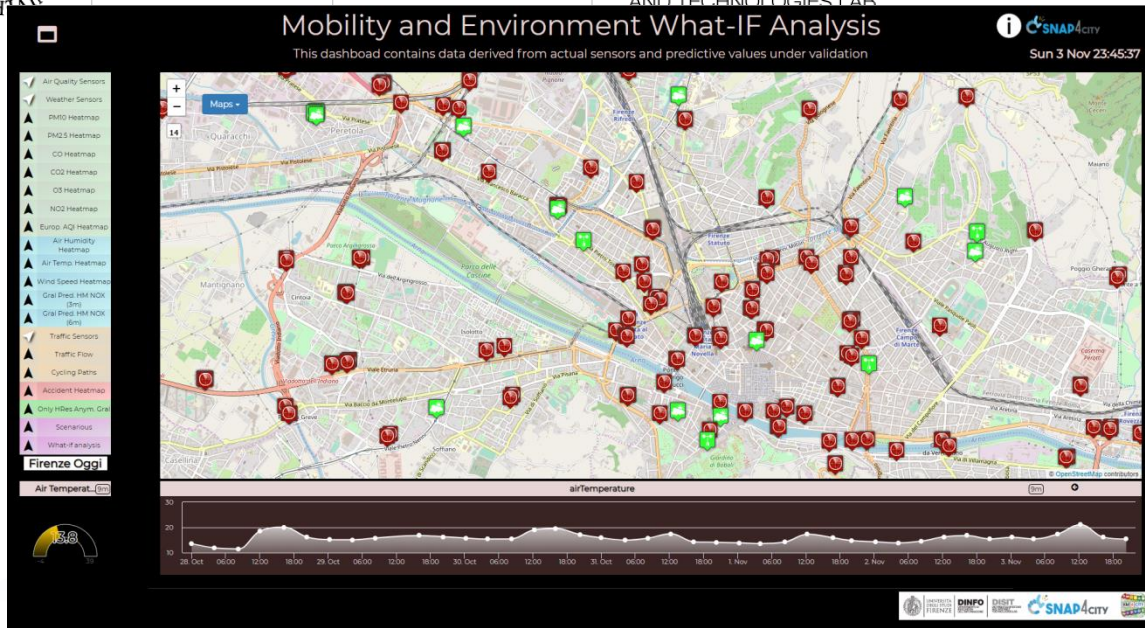
# Multi Data Map Widget

- The most powerful Data Map rendering tool, it supports:
  - KB Sensor data:** POI, sensors, actuators, etc. (see in the following), moving devices
  - WFS data** (see in the following)
  - WMS background maps**
    - Ask to a **RootAdmin** for activating this feature on your MultiDataMap widgets once created the dashboard
    - Maps can come from GIS servers, and WMS
  - WMS Heatmaps GeoTIFF**
  - WMS Traffic Flow GeoTIFF**
  - GTFS data from Public Transport**
  - Special tools**
    - Scenario (see in the following)
    - What-IF (see in the following)



<https://www.snap4city.org/dashboardSmartCity/view/index.php?iddashboard=MjE5MA==#>





# Orthomaps as graphic layers

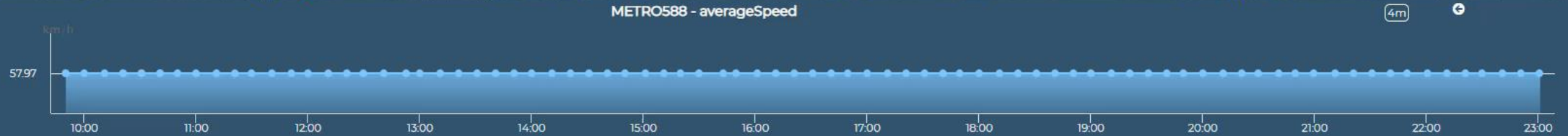
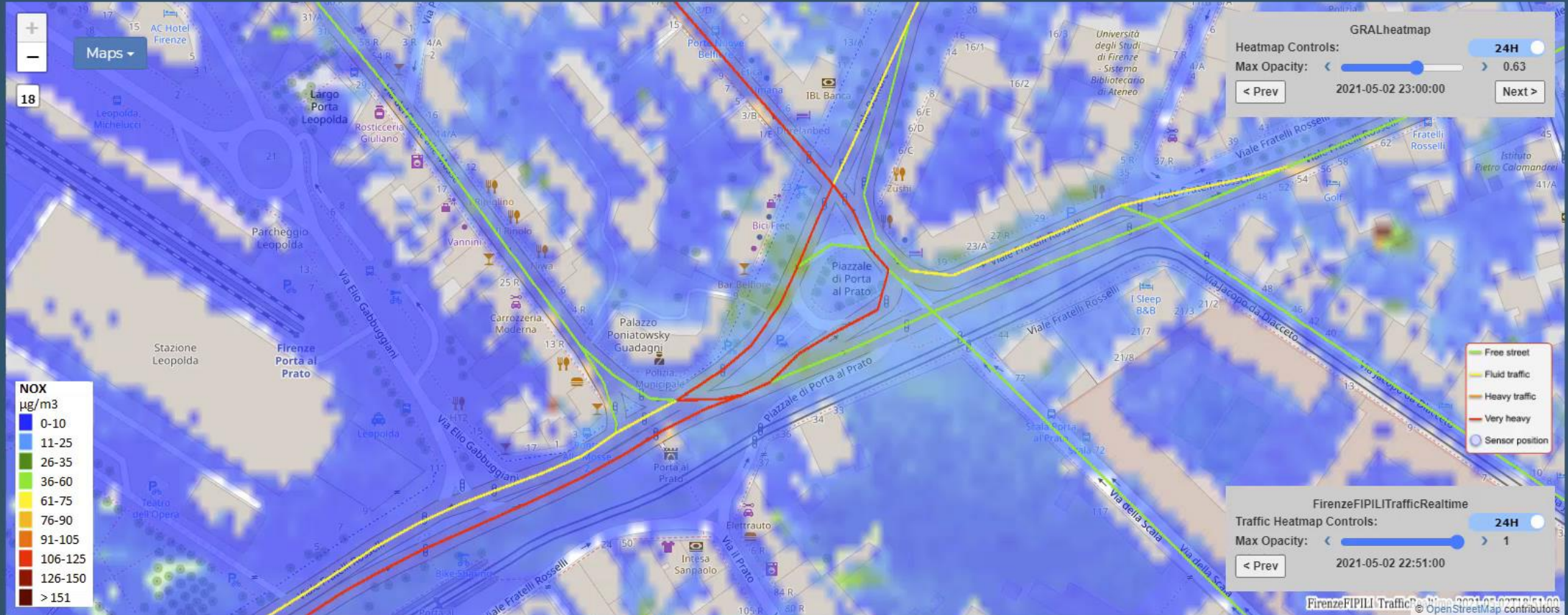
- **Orthomaps can be:**
  - Directly exploited from public service via WMS protocol, from some GIS services as GeoServer
  - Loaded into the Snap4City GeoServer
  - Layered if they can be overlapped each other, such as map with gov border above.
- The Dashboard owner can
  - Select the Orthomaps to be used shown as default in the dashboard
- Each organization has its own set of Orthomaps

<https://www.snap4city.org/dashboardSmartCity/view/index.php?iddashboard=MjE5MA==>

# Traffic Flow Manager on multiple cities

Sun 2 May 23:16:31

- Traffic Sensors
- Weather\_sensor
- AirTemperatureAverage2HourFlorence
- PM2.5 Heatmap
- GRAL Heatmap
- Gral HRES
- Accident Heatmap
- Traffic Flow
- TFM FIRENZE Real Time
- TFM FIPILI Real Time
- TFM Pisa Real Time
- TFM Livorno Real Time
- TFM Modena Real Time
- TFM Santiago Real Time
- prova hres fipili 2k
- prova hres fipili 4k
- prova hres fipili 8k
- Scenario
- What-if



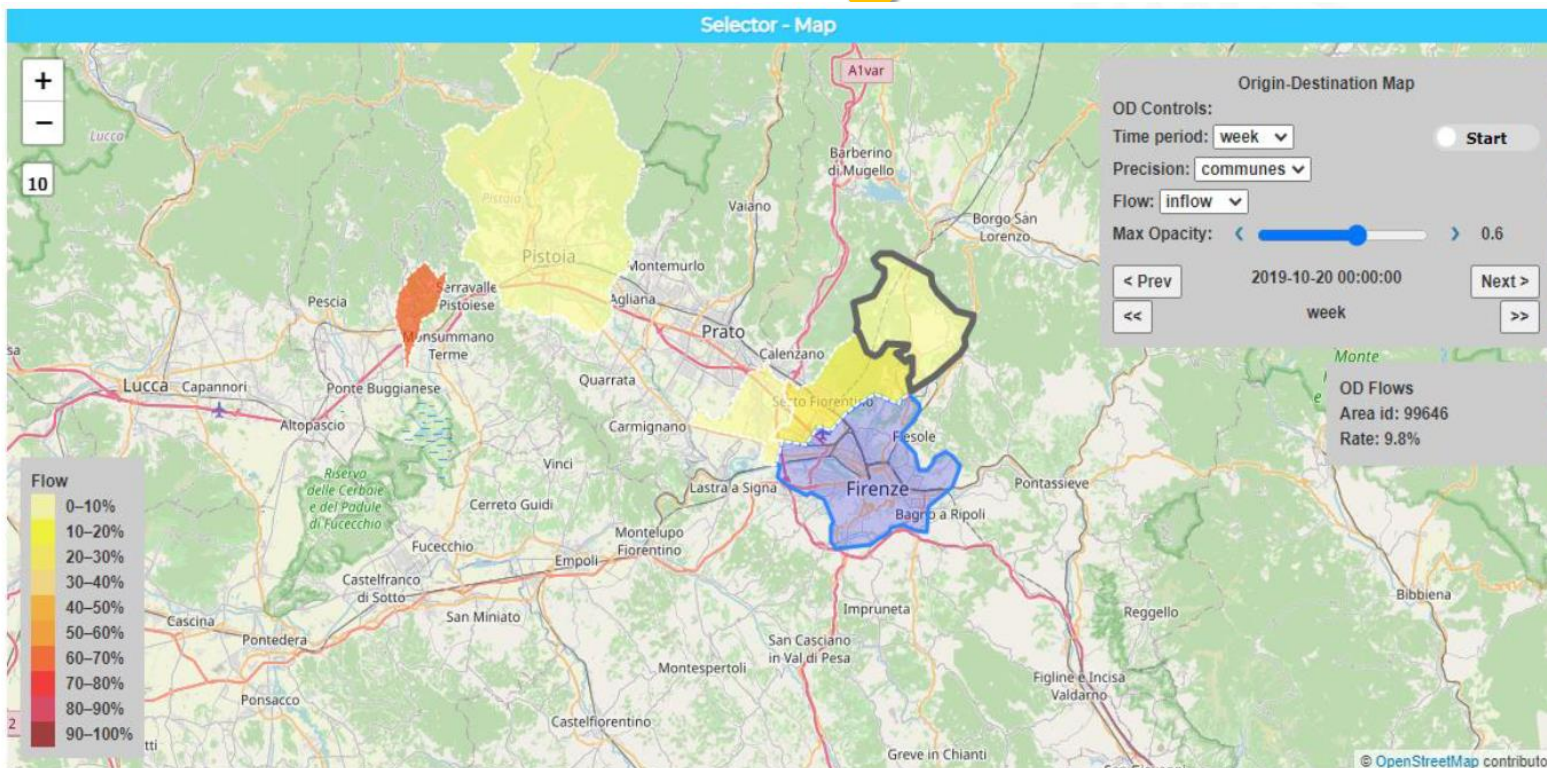
Privacy Policy Cookies Policy Terms and Conditions Contact us



<https://www.snap4city.org/dashboardSmartCity/view/index.php?iddashboard=MzEyNg==>



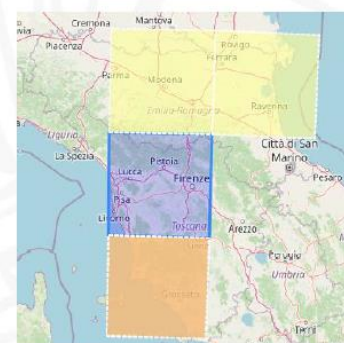
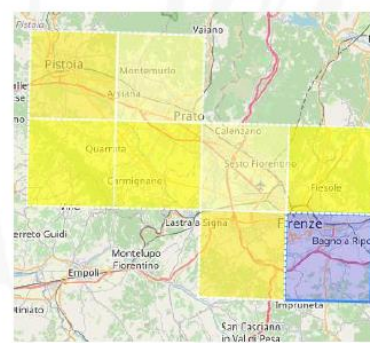
# Different Origin Destination Matrices



- Get specific value
- Time window
- Opacity
- Animation
- Inflow/outflow
- Sequence of OD matrices: next/prev

## shapes

- Shapes: city, region, territories, etc.
  - GADM <https://gadm.org/>, and ACE
- Squared MGRS:
  - 1m, 10m, 100m, 1Km, 10Km, 100Km



# Weighted Bubbles

## Roma Demo1 (mappe e dati real time)

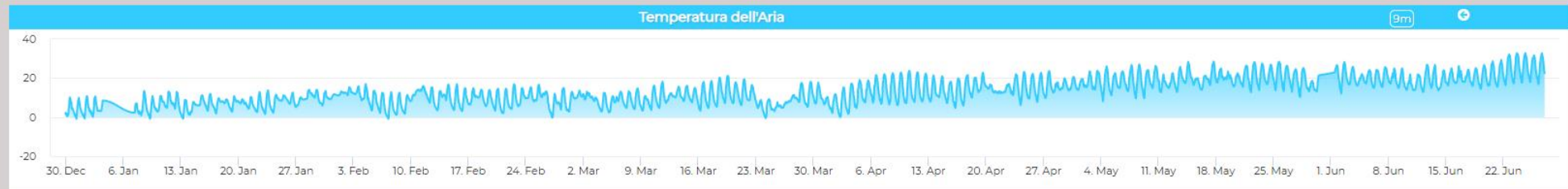
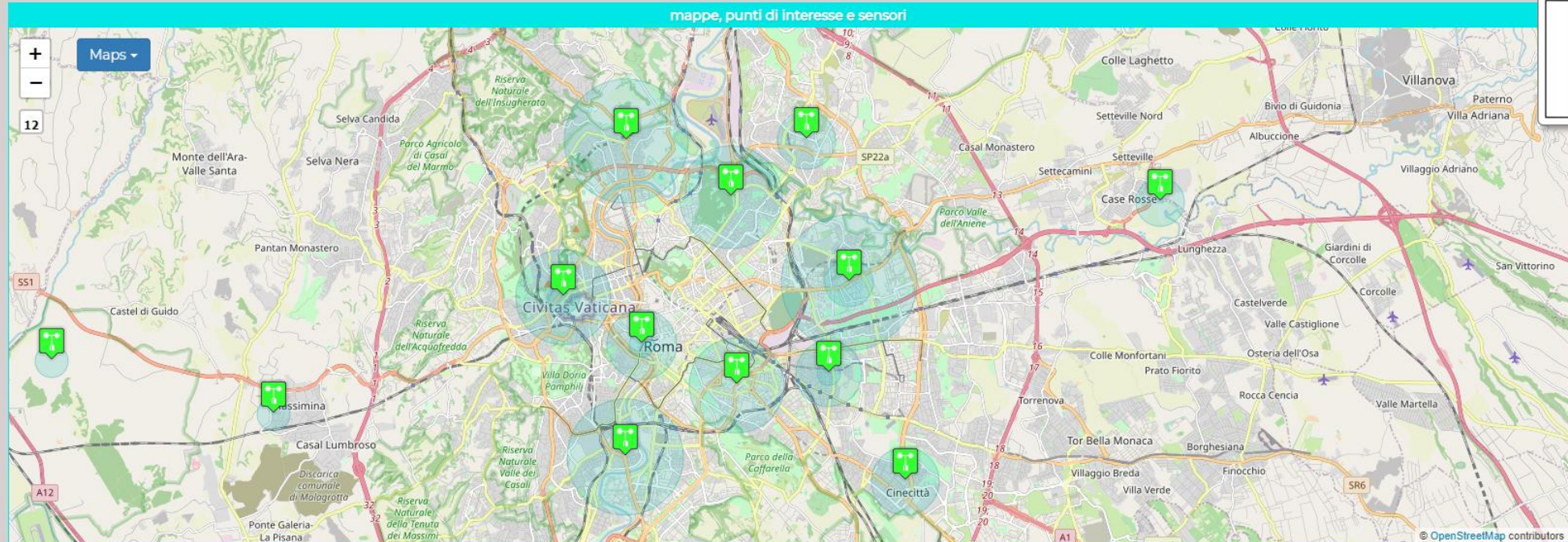
Sat 27 Jun 00:16:48



- ▲ Edifici Storici
- ▲ Musei
- ▲ Mobilità e Fermate
- ▲ Sensori Qualità Aria
- ▲ O3 Heatmap
- ▲ NO2 Heatmap
- ▲ NO2 Bubbles
- ▲ COVID-19

Trasporti

Qualità  
dell'Aria



# Custom Dynamic Pins



## Custom Pins on Map - test GP

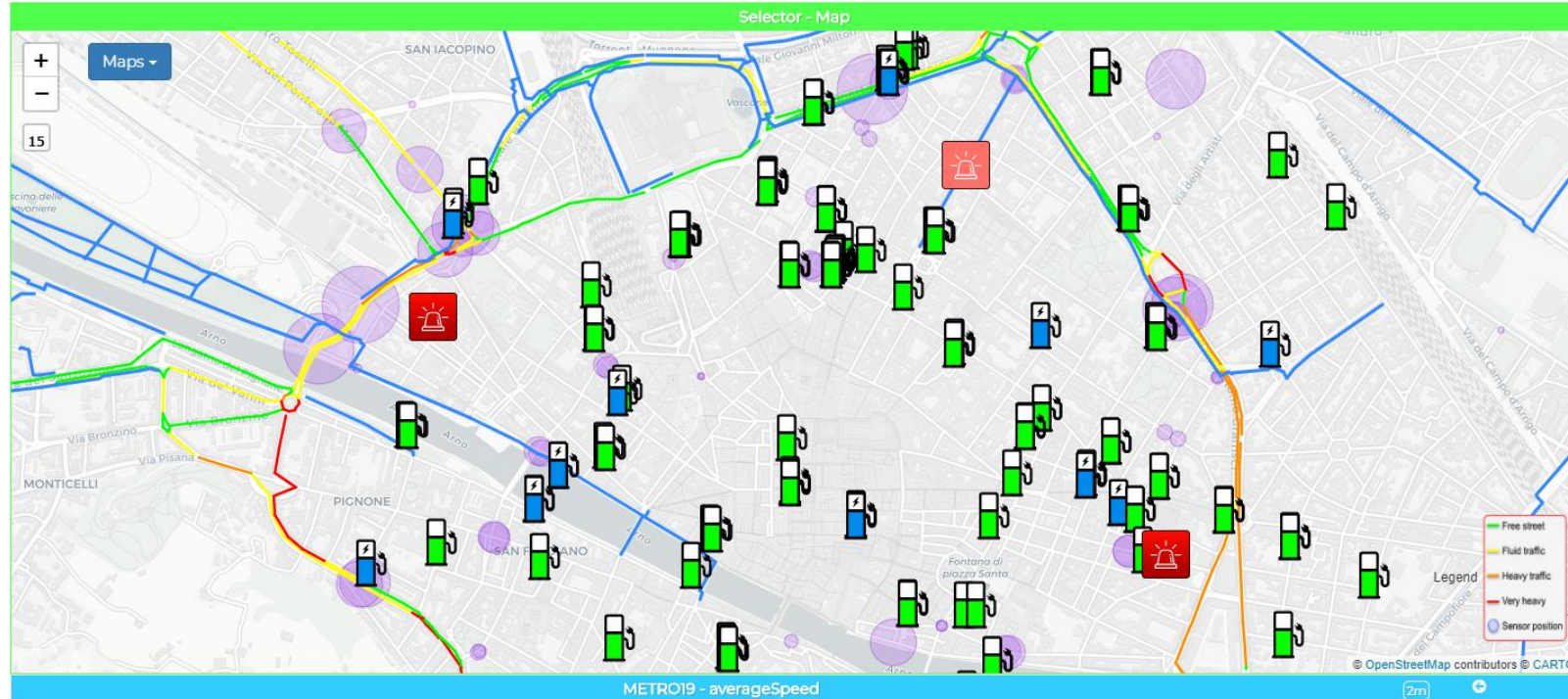
Sat 31 Oct 11:35:41



Selector



METRO19 - avera... (2m)



<https://www.snap4city.org/dashboardSmartCity/view/index.php?iddashboard=Mjk5MA==>

# Pins on Multi Data Maps (1)

## Normal Over



- **Classic:** (default)
  - Text menu or Icon Menu
    - Custom color of the Menu only
  - Fixed on the basis of Nature and Subnature

## Normal Over Icon Menu



- **Icon:** (accessible as **Icon Mode** of selector)
  - Also usable with **Text Mode** of the menu
  - Selectable from a large set
  - Coherent with Icon on Menu
  - Custom Color

# Pins on Multi Data Maps (2)



Bubble Pins

- **Bubble:**

- Text Menu or Icon Menu
- Custom Color
- Size depending on ServiceURI Attribute, IOT Device ValueName

- **Custom:** (accessible from Alternate View Mode)

- Can be created by AreaManagers as **Custom Widgets** <https://www.snap4city.org/663>
- Selectable from a set
- Coherent with Menu, also usable with text menu
- Variable/Dynamic colors/animations associated with ServiceURI Attribute, IOT Dev ValueName



Pins and Menu icons





### 3D Map



Traffic

FirenzeTrafficRealtime

Traffic Controls: 24H

Max Opacity:

< Prev 2023-05-22 08:01:00

- Free street
- Fluid traffic
- Heavy traffic
- Very heavy
- Sensor position

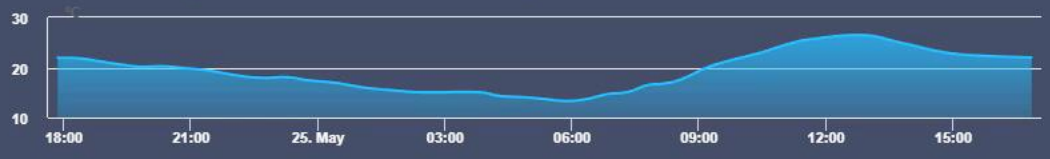
### Air Quality FI-BASSI - NO2

6m



### Weather\_sensor\_Open Weather 3176959 - Air Temperature

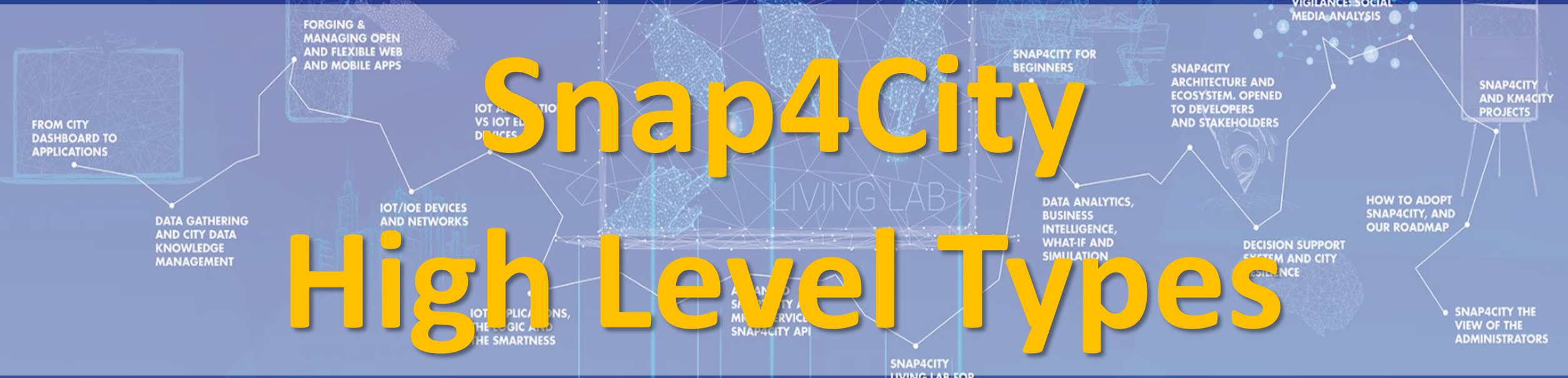
6m



TOP

# Snap4City

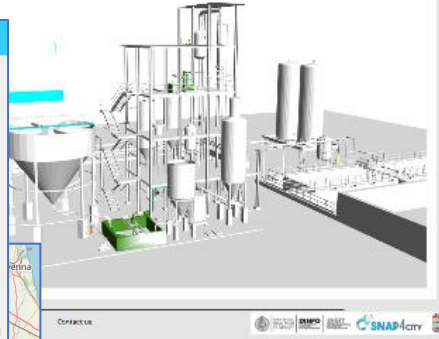
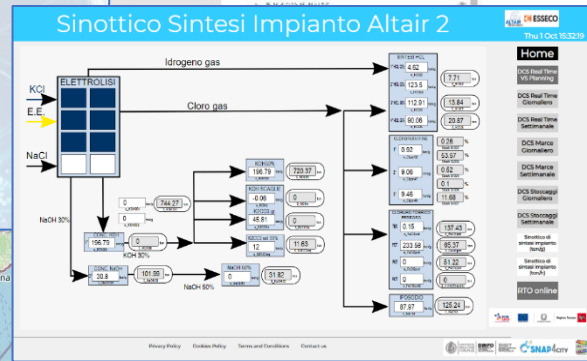
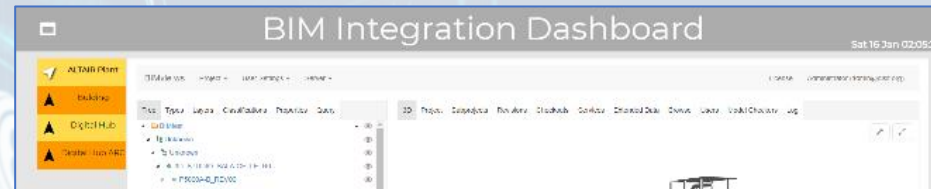
# High Level Types



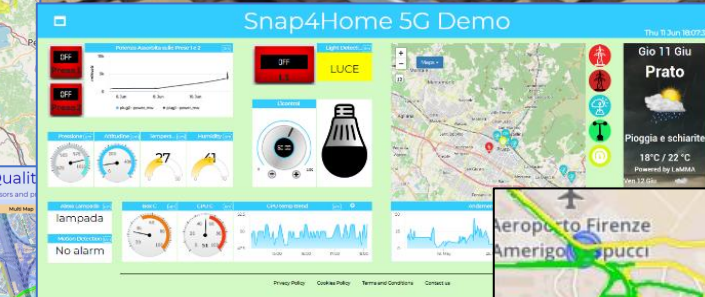
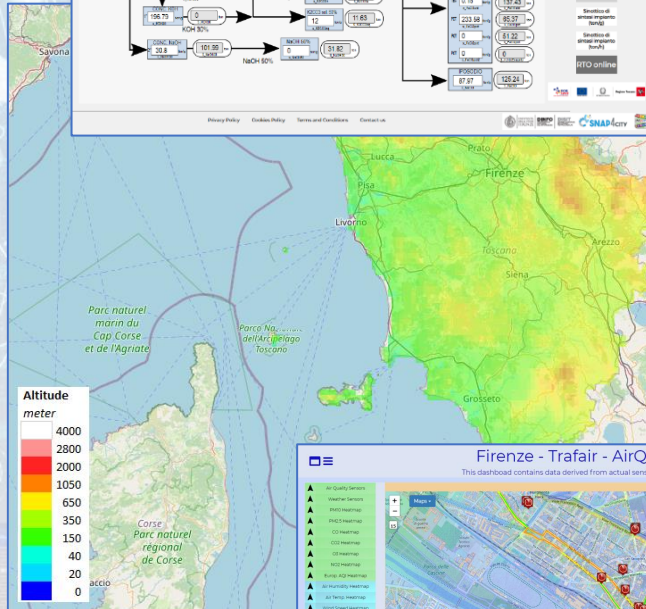
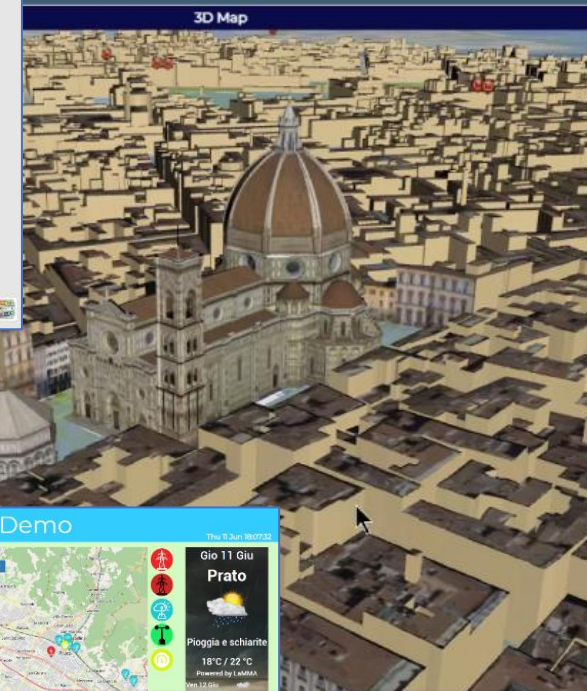
# High Level Types

Snap4City (C), September 2023

- 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, ..
- decision scenarios, ....
- etc.



**SNAP4CITY**  
- Digital Twin Global - Fire  
demonstrator



UNIVERSITÀ  
DEGLI STUDI  
FIRENZE

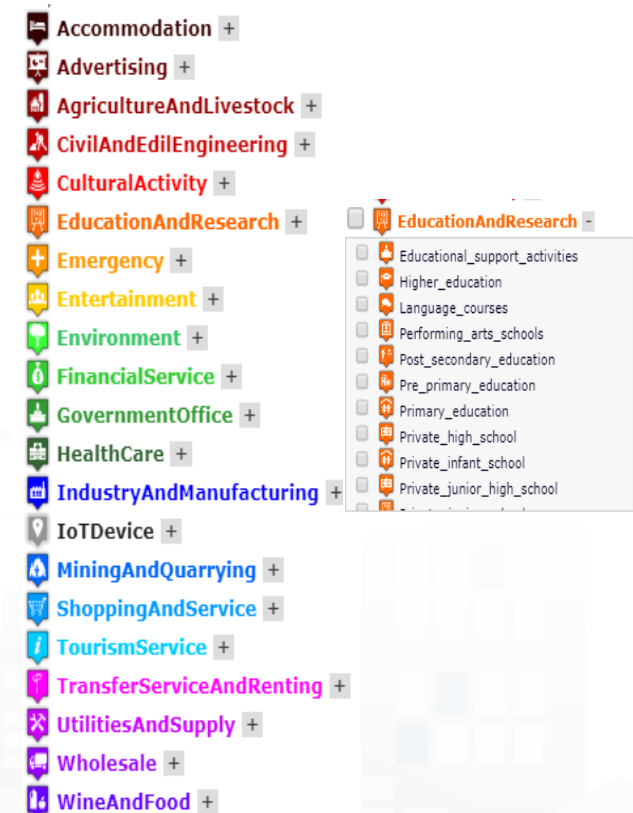
**DINFO**  
DIPARTIMENTO DI  
INGEGNERIA  
DELL'INFORMAZIONE

**DISIT**  
DISTRIBUTED SYSTEMS  
AND INTERNET  
TECHNOLOGIES LAB



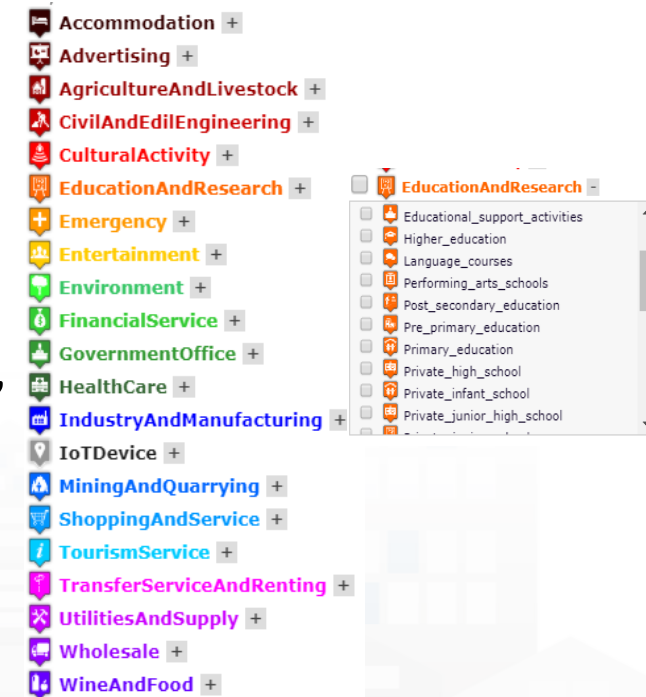
# HLT: Unified Classification for Data and Services

- **Data Models:** all devices/entities sprunt from that model
  - Entity Model, IoT Device Model, Mobile Device Model, Data Table Model
- **Devices:** are instances of some model or sprunt from processes
  - Entity Device, IoT Device, Mobile Device, Data Table Device, Sensor Device
- **Variables, Sensor/sensor-actuator, :**
  - Entity Variable, IoT Device Variable, Mobile Device Variable, Data Table Variable, Sensor, Sensor-Actuator
  - **Dashboard-IOT App:** messages from GUI to Business Logic on IoT App
- **MyKPI:** dynamic GPS, info, single variable, Time Series, (**Classification**)
  - **KPI:** former KPI model
  - **MyPersonaData/MyData:** safes in which specific personal data are saved.
- **POI:** static GPS, info about a location, (**Classification**),
  - **MyPOI:** personal POI that can be leveraged to standard POI by administrator
- **Heatmaps:** matrices on some area, Time Series, (**Classification**)
- **Traffic Flow:** road segments with flow density, Time Series, (**Classification**)
- **OD Matrices:** origin destination matrices, Time Series, (**Classification**)
- **Complex events:** emergency, alarm, entertainment, CAP, ... special widgets



# HLT: Unified Classification for Data and Services

- **External Service:** third party visualization tools, iFRAMED...
  - Also TV CAMs are rendered here, and substantially all the other Services
- **Synoptics:** graphic representations with animation connected to variables and/or MyKPI and/or IoTApp, etc.
- **BIM representations:** Digital Twin Local, ...
- **Micro Applications:** Snap4City, Km4City micro applications, iFRAMED
- **Special Widget:** a set of special visualization tool with their dedicated data type
- **WFS:** a specific tool for WFS GIS rendering, please note almost the same kind of data type can be visualized as Data above described



# Data Inspector: HLT classification

**Snap4City**

User: roottooladmin1, Org: DISIT  
Role: RootAdmin, Level: 7

LOGOUT

- My Snap4City.org
- Tour Again
- ダッシュボード
- Dashboards (Public)
- My Dashboards in All Org.
- Dashboards of My Organization
- My Dashboards in My Organization
- My Data Dashboard Dev Kibana
- My Data Dashboard Kibana
- Extra Dashboard Widgets
- Notificator
- Data, my Data, OpenData
- Data Inspector
- MyKPI, MyData, MyPOI
- My Groups of Entities
- View/Set MyPOI on Tuscany
- Data Table Loader (Excel)
- POI Loader (Excel)
- Harvest Satellite Copernicus Data
- HeatMap Manager
- ColorMap Manager
- TrafficFlow Manager
- OD Manager
- BIM Server old
- BIM Server New
- BIM Srv New: Add
- BIM Srv new: View

## Data Inspector

**Single data widgets**

**Multi data widgets**

**Map Controls:**

FilterMap GPSUser GPSOrg

Now displaying in Standard Mode  
Switch to the Synoptic Mode to select MyKPIs and sensors that you need for your synoptics.

Switch now to the Synoptic Mode

**Data sources**

High-Level Type	Nature	Subnature	Device/Model	Broker	Value Name	Value Type	Data Type	Value Unit	Last Date	Last Value	Healthiness	Last
Sensor	Mobility and Transport	SensorSite	METRO11		concentration	vehicle_concentration	float	car/km	2021-10-30 17:21:00	0.2	<span style="color: green;">●</span>	2021-10
Sensor	Mobility and Transport	SensorSite	METRO11		averageSpeed	average_vehicle_speed	float	km/h	2021-10-30 17:21:00	60.0	<span style="color: green;">●</span>	2021-10
Sensor	Mobility and Transport	SensorSite	METRO11		vehicleFlow	vehicle_flow	float	car/h	2021-10-30 17:21:00	12.0	<span style="color: green;">●</span>	2021-10
Sensor	TransferServiceAndRenting	SensorSite	METRO1		thresholdPerc	vehicle_threshold_perc	float	%	2021-10-30 17:21:00	Not Available	<span style="color: green;">●</span>	2021-10
Sensor	TransferServiceAndRenting	SensorSite	METRO1		speedPercentile	vehicle_speed_percentile	float	%	2021-10-30 17:21:00	Not Available	<span style="color: green;">●</span>	2021-10
Sensor	TransferServiceAndRenting	SensorSite	METRO1		occupancy	vehicle_occupancy	float	%	2021-10-30 17:21:00	Not Available	<span style="color: green;">●</span>	2021-10
Sensor	TransferServiceAndRenting	SensorSite	METRO1		avgDistance	average_vehicle_distance	float	m	2021-10-30 17:21:00	Not Available	<span style="color: green;">●</span>	2021-10
Sensor	TransferServiceAndRenting	SensorSite	METRO10		thresholdPerc	vehicle_threshold_perc	float	%	2021-10-30 17:21:00	Not Available	<span style="color: green;">●</span>	2021-10

**concentration - 30 days**

15.9

# HLT: Unified Classification for Data and Services

IoT Device Variable, Sensor Device	All selected (15)	All selected (48)	All selected (27)		All selected (1499)	All selected (159)	All selected (15)	All selected (63)	Last Date	Last Value	All selected (2)		All selected (2)
High-Level Type	Nature	Subnature	Device/Model	Broker	Value Name	Value Type	Data Type	Value Unit			Healthiness	Last Check	Ownership
IoT Device Variable	IoTDevice	IoTSensor	devicetest1	orionUNIFI	temperature	temperature	float	°C			●	2021-10-15 10:01:02	private (My Own)
IoT Device Variable	IoTDevice	IoTSensor	devicetest1	orionUNIFI	humidity	humidity	float	#			●	2021-10-15 10:01:02	private (My Own)
IoT Device Variable	IoTDevice	IoTSensor	MyThermometer_001	orionUNIFI	temperature	temperature	float	°C			●	2021-10-15 10:01:01	private
IoT Device Variable	IoTDevice	IoTSensor	MyThermometer_001	orionUNIFI	humidity	humidity	float	#			●	2021-10-15 10:01:01	private
IoT Device Variable	IoTDevice	IoTSensor	adminTest1	orionUNIFI	temperature	temperature	string	°C	2018-05-31 19:16:05		●	2021-10-15 10:01:00	private (My Own)
IoT Device Variable	IoTDevice	IoTSensor	adminTest1	orionUNIFI	humidity	humidity	string	%	2018-05-31 19:16:05		●	2021-10-15 10:01:00	private (My Own)
IoT Device Variable	IoTDevice	IoTSensor	newmarcodev1	orionUNIFI	temperature	temperature	float	°C			●	2021-10-15 10:00:59	private
IoT Device Variable	IoTDevice	IoTSensor	newmarcodev1	orionUNIFI	humidity	humidity	float	%			●	2021-10-15 10:00:59	private

**High Level Types**

**Nature**

**Semantic  
Classific.**

**SubNature**

**Dev/Model name**

**Technical  
Source**

**Broker name**

**Value Name**

**Variables, names**

**Value Type**

**Data Type**

**Value Unit**

**Last Date/Time**

**Real  
Time**

**Last Value**

**Healthiness**

**Status**

**Last Check**

**Ownership  
Organization**

**For  
Admin**

# Snap4City Dashboards main concepts

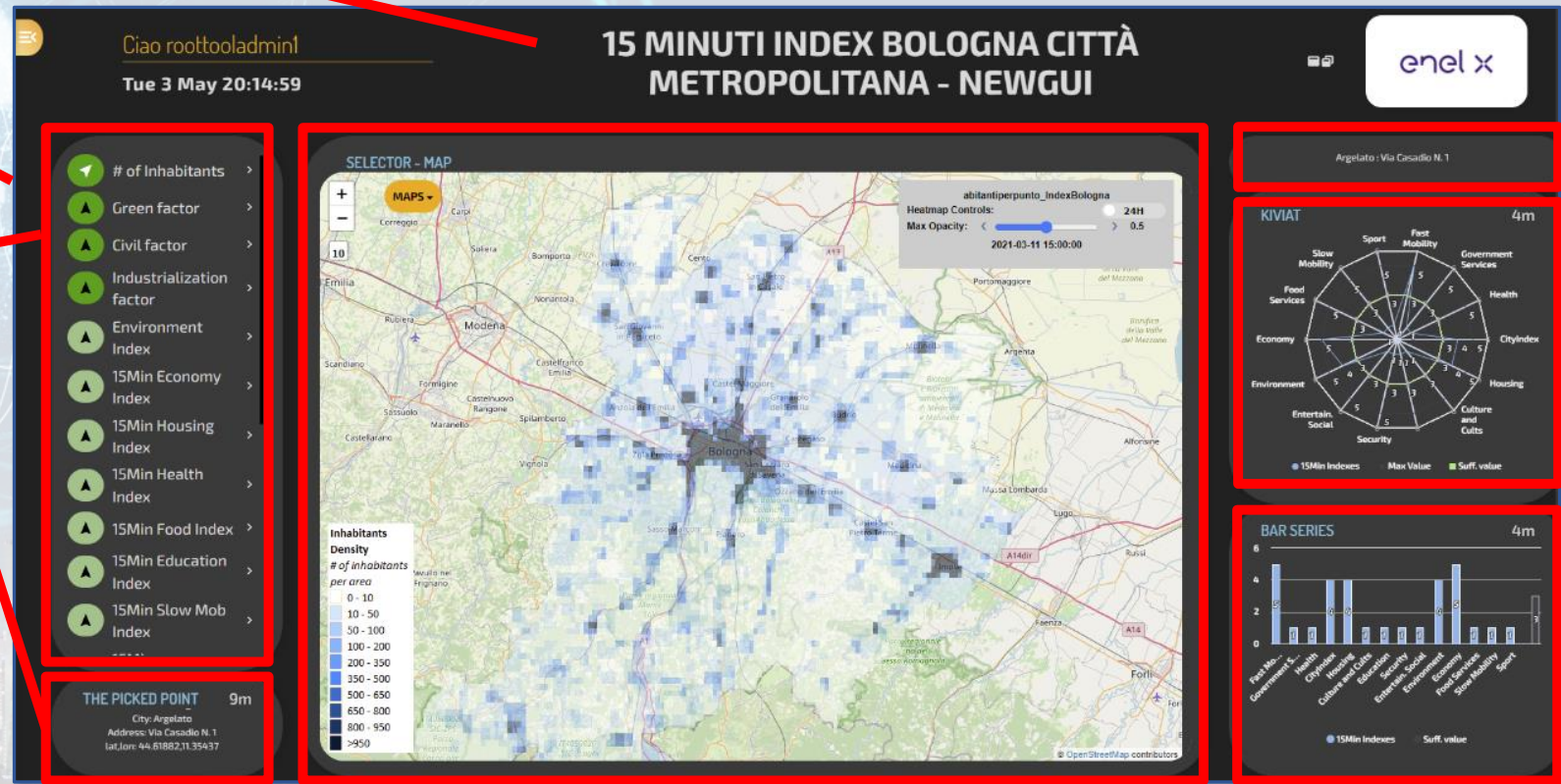
Header

Dashboard

Interactive Widgets

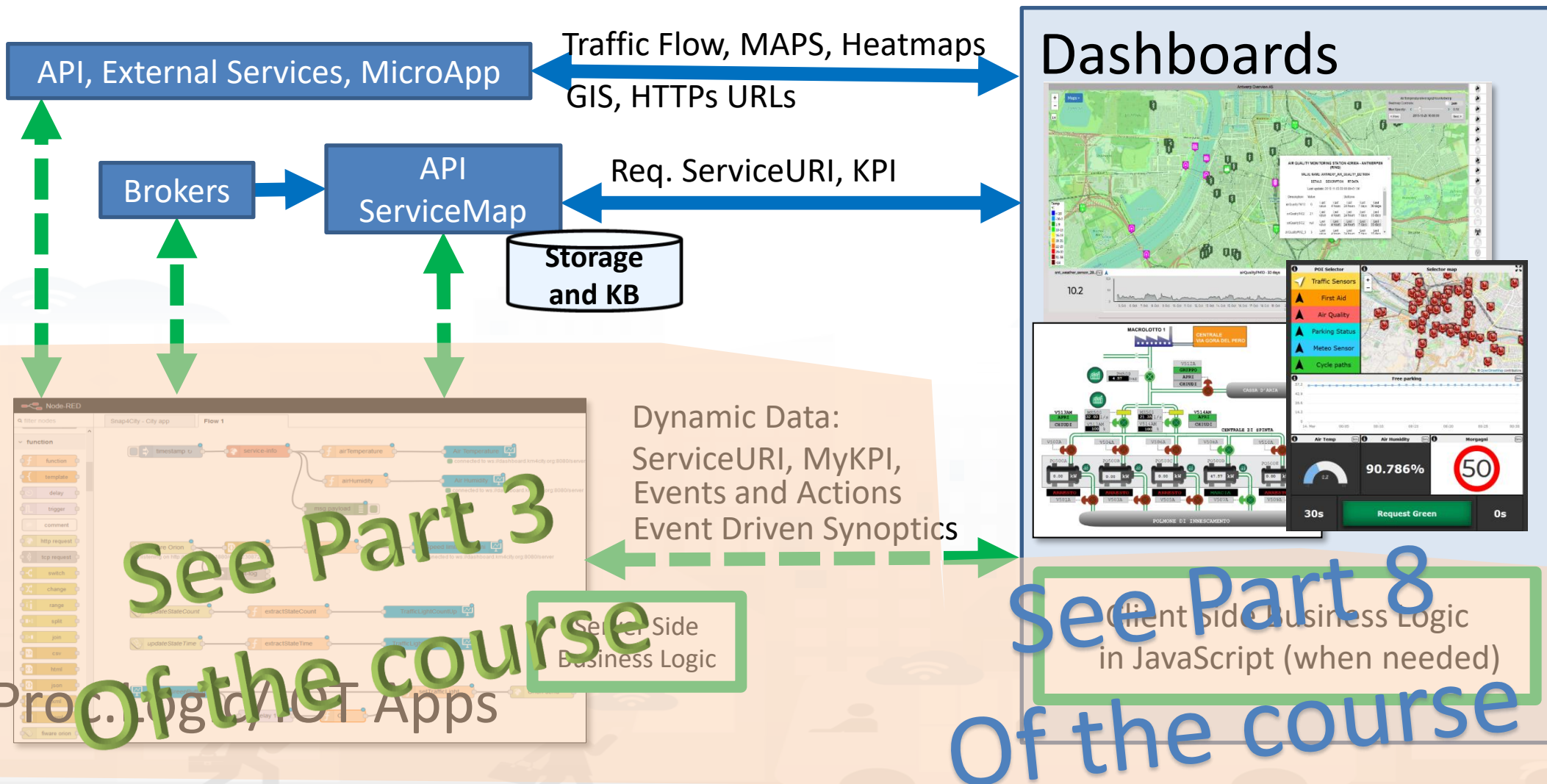
## Server Communication

- Real Time data requests/send
- Event Driven
- Server Side Business Logic
  - See Part 3 of the course

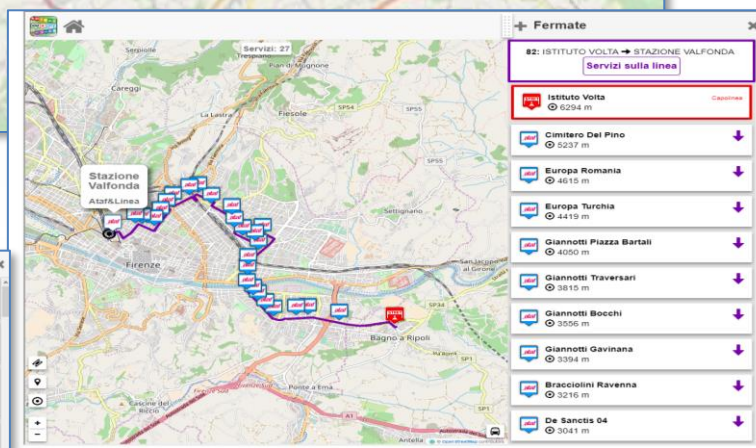
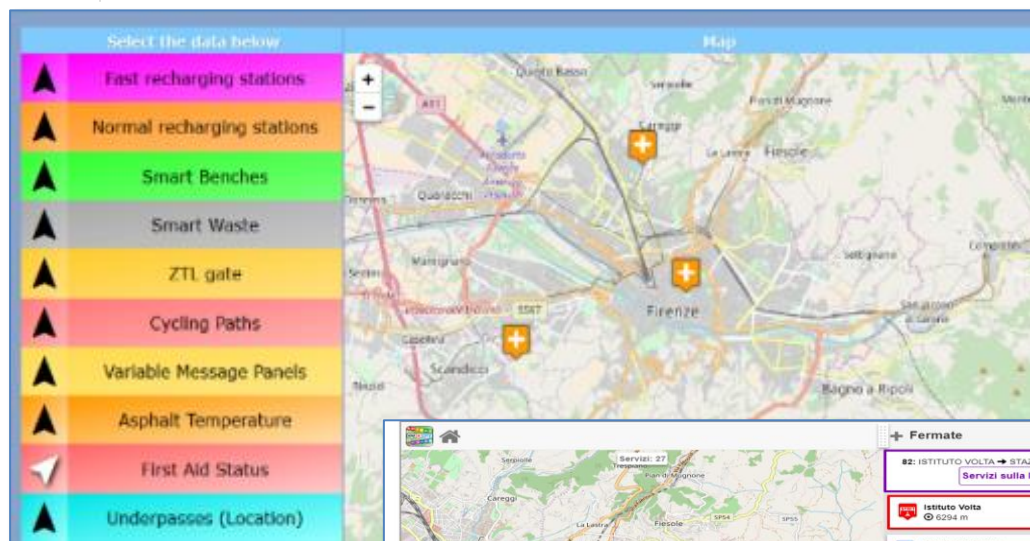


Inter Widget Communication:  
Client Side Business Logic  
See part 8 of the Course

# How the Dashboards exchange data



# HLT: POI



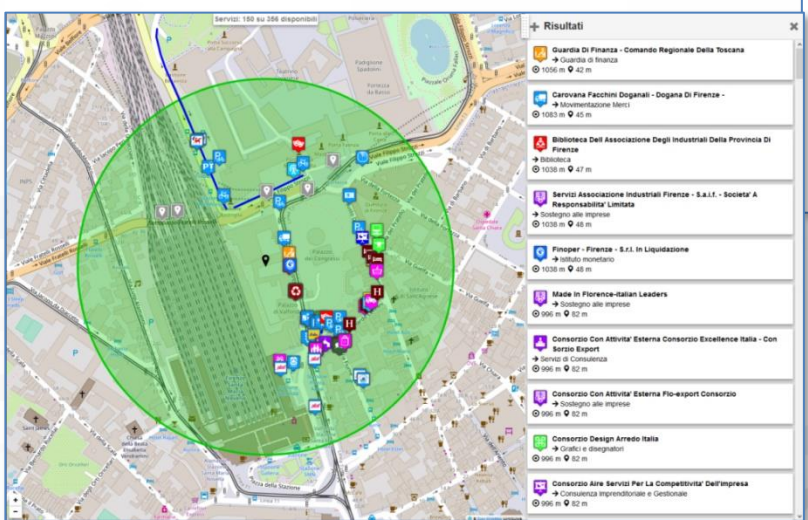
## Categories

- Accommodation +
- Advertising +
- AgricultureAndLivestock +
- CivilAndEdilEngineering +
- CulturalActivity +
- EducationAndResearch +
- Emergency +
- Entertainment +
- Environment +
- FinancialService +
- GovernmentOffice +
- HealthCare +
- IndustryAndManufacturing
- IoTDevice +
- MiningAndQuarrying +
- ShoppingAndService +
- TourismService +
- TransferServiceAndRenting +
- UtilitiesAndSupply +
- Wholesale +
- WineAndFood +

- EducationAndResearch -
  - Educational\_support\_activities
  - Higher\_education
  - Language\_courses
  - Performing\_arts\_schools
  - Post\_secondary\_education
  - Pre\_primary\_education
  - Primary\_education
  - Private\_high\_school
  - Private\_infant\_school
  - Private\_junior\_high\_school

High Level Types

## Single POI

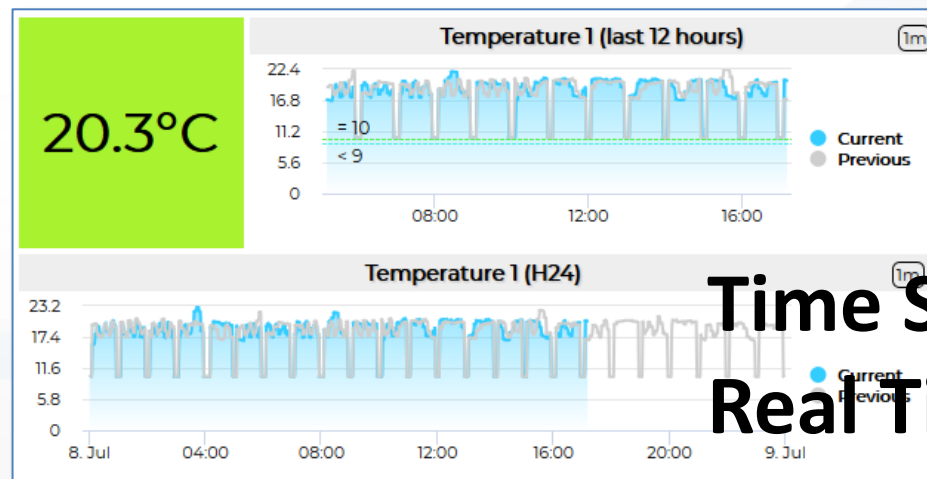
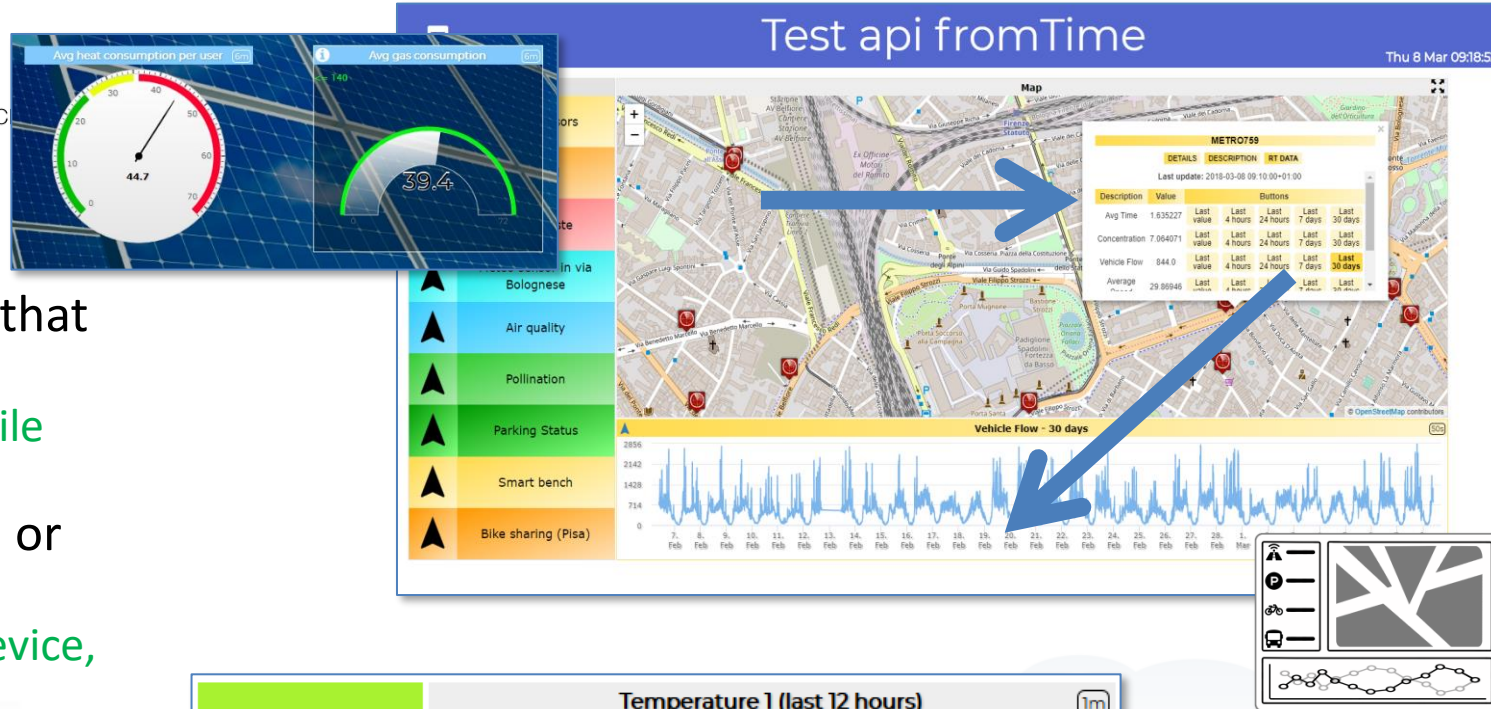


**POI:** static GPS, info about a location, (Classification),  
**MyPOI:** personal POI that can be leveraged to standard POI by administrator

# HLT: Entities

## High Level Types

- **Data Models:** all devices sprunt from that model
  - Entity Model, IoT Device Model, Mobile Device Model, Data Table Model
- **Devices:** are instances of some model or sprunt from processes
  - Entity Instance, IoT Device, Mobile Device, Data Table Device, Sensor Device
- **Variables, Sensor/sensor-actuator, :**
  - Entity Variable, IoT Device Variable, Mobile Device Variable, Data Table Variable, Sensor, Sensor-Actuator
  - **Dashboard-IOT App:** messages from GUI to Business Logic on IoT App
- **MyKPI:** dynamic GPS, info, single variable, Time Series, (Classification)
  - **KPI:** former KPI model
  - **MyPersonaData/MyData:** safes in which specific personal data are saved.



**Time Series**  
**Real Time**  
**Event Driven**  
**Historical Data**



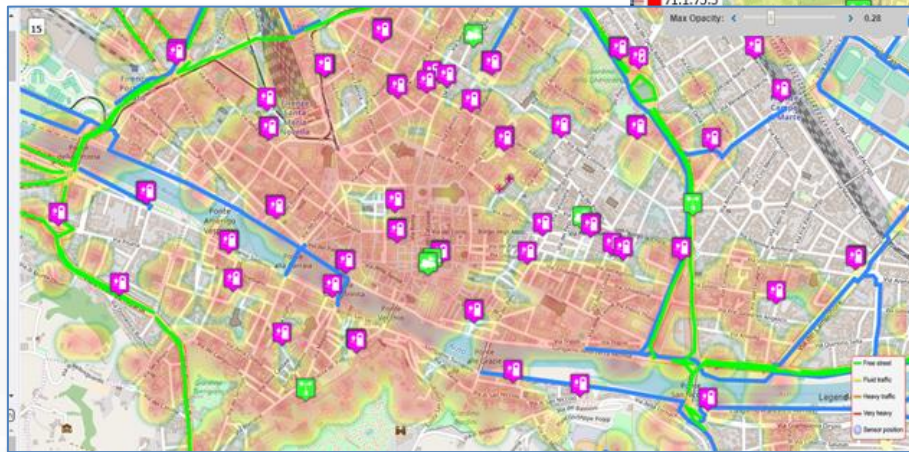
Type: calibrated

# HLT: Heatmaps

ColorMaps For  
Calibrated

**EAQI**  
*Index*

Green	1. Good
Light Green	2. Fair
Yellow	3. Moderate
Orange	4. Poor
Red	5. Very poor



**Safety on bike density**

Red	Very bad
Orange	Bad
Yellow	Not so good
Light Green	Neutral
Green	Good
Dark Green	Very good
Black	Excellent



**Noise LAEQ dBA**

Blue	<44.3
Light Blue	44.4-48.8
Green	48.9-53.3
Light Green	53.5-57.7
Yellow	57.8-62.1
Orange	62.2-66.6
Red-Orange	66.7-71
Red	71.1-75.5
Dark Red	75.6-79.9
Black	>79.9

Type: Gaussian

High Level Types

# Heatmaps (flexible Data Analytics)

- Main:
  - Heatmaps are Time series
- A) Gaussian Heatmaps
- B) Calibrated heatmaps
  - From Km x Km to 4x4 mt
  - PM10, PM2.5, SO2, NO2, Noise, NO, O3, Enfuser, **GRAL**,.... Copernicus
  - Any programmed ColorMap
  - Animations
  - Piking values in any place, values on their position.
  - On Web and Mobile App



**Multi Data Map**

**Multi Data Map**

HEATMAP DETAILS	
Description	Value
Date & Time	5/5/2019 13:0:0
Metric Name	LAeq
Heatmap Value	63.73804
Coordinates	60.17764, 24.93536

**Multi Data Map**

# HeatMap Manager: managing, colormaps

- Historical data, time series
- Huge amount of data and points per heatmap
- Data coming from: sensors, IOT App, Copernicus Satellite, ...
- Multiple formats
- High speed computing
- WMS (GIS) compliant
- Animations
- Color maps: from few (5) to dense color scale (1000)
- Picking any place
- Smart City API to get them
- MicroServices for IOT Applications

The screenshot displays the Snap4City HeatMap Manager interface. On the left is a navigation sidebar with user information (User: rootooladmin1, Org: Other, Role: RootAdmin, Level: 7) and a list of dashboards. The main area shows a table of heatmaps with columns for Map name, Color Map, Owner, Organization, Minimum date, Maximum date, and Instances. A 'PM10 µg/m3' legend is overlaid on the right, showing a color scale from blue (0-10) to maroon (>100). Below this, there are three more legends: 'EAQI Index' (1. Good to 5. Very poor), 'Safety on bike density' (Very bad to Excellent), and 'Noise LAEQ dBA' (<44.3 to >79.9). At the bottom, a table for 'Edit Color Map: airHumidity' shows columns for Minimum Limit, Maximum Limit, and Rgb, with rows for values from 40 to 84.4.

Minimum Limit	Maximum Limit	Rgb	Color
	40	rgb(0,0,255)	blue
40	45.5	rgb(0,153,255)	cyan
45.5	51.1	rgb(0,153,0)	green
51.1	56.7	rgb(0,255,0)	yellowgre
56.7	62.2	rgb(255,255,0)	yellow
62.2	67.8	rgb(255,187,0)	gold
67.8	73.3	rgb(255,102,0)	orange
73.3	78.9	rgb(255,0,0)	red
78.9	84.4	rgb(153,0,0)	darkred
84.4		rgb(84,0,0)	maroon



# HLT: Special Tools

High Level Types

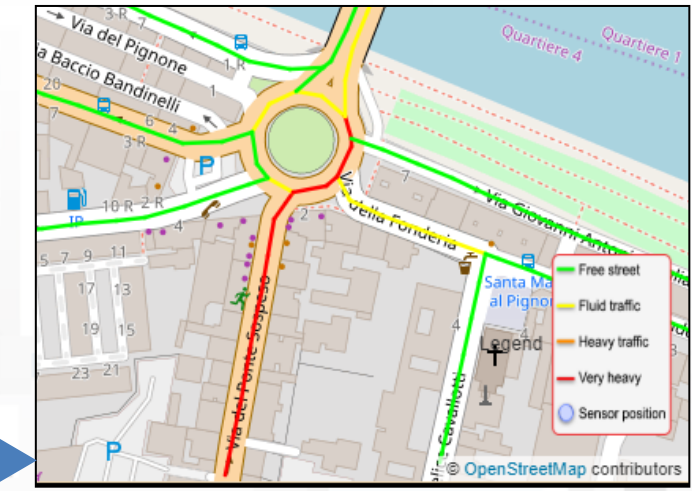
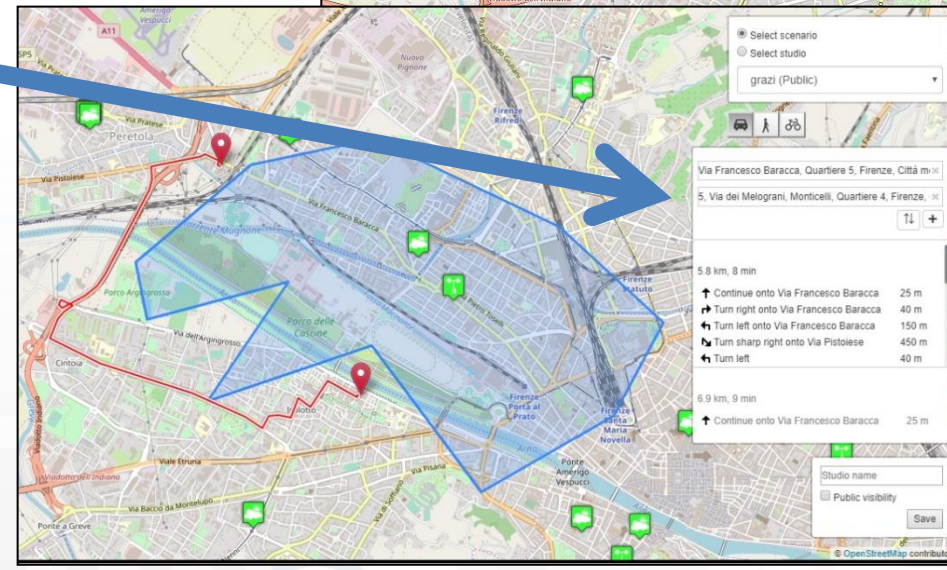
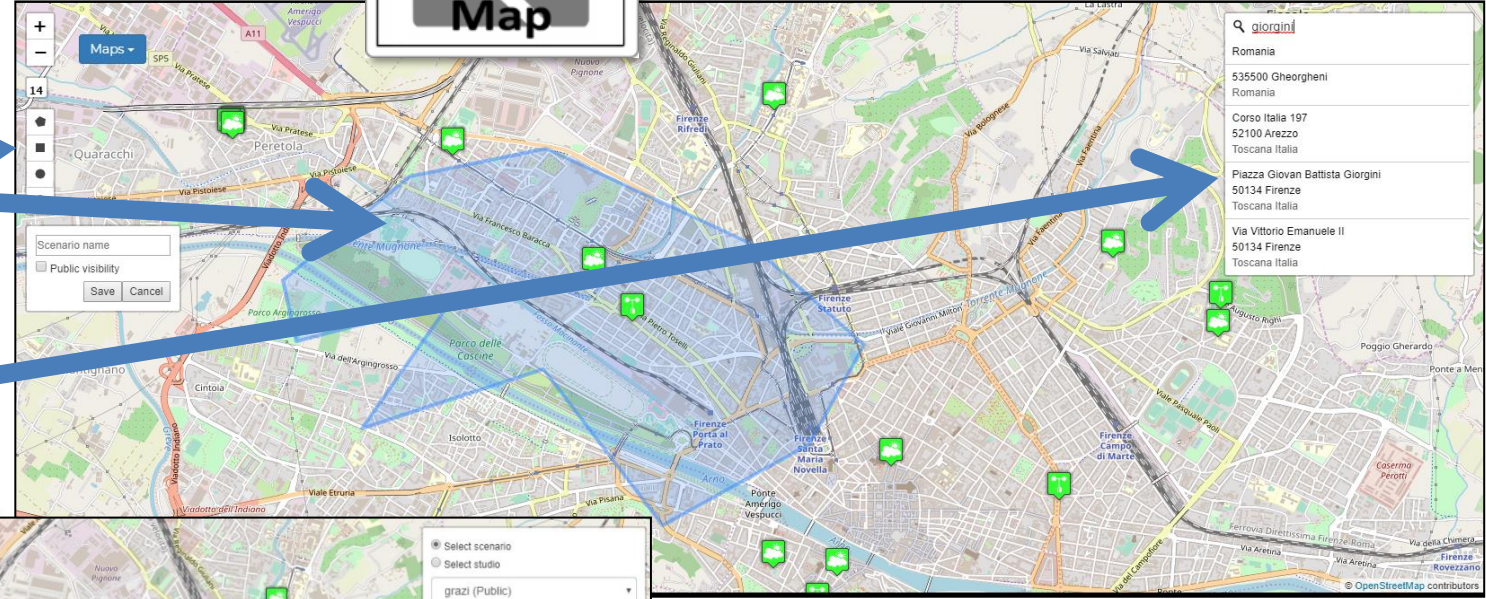
## • Scenarios

- Full text search of roads and geolocations.
- Multiple areas, days
- Global map of OSM

## • What-IF

- Conditional routing
- Dynamic routing
- Multiple paths

## • Traffic Flows



# Video Streams from TV Cameras

## Settings for RootAdmin Only



# TV Cameras

- **Two main modalities**

- **Image frames**, periodically updated

- Format: JPG
- Protocols: http/https (with and without authentication)
- Via **IPCAM Service**

- **Video Stream**

- Formats: MP4, H264,
- Protocol: RTSP, ONVIF (with and without authentication)
- Via **TVCam Manager**

– *based on Kurento, TURN, WebRTC*

**Snap4City** TVCam Manager

User: roottooladmini, Org: DISIT  
Role: RootAdmin, Level: 7

+ Add new Cam

Show 5

Name	Description	Subnature	Latitude	Longitude	VideoSource
bunny	test_bunny_video	Private_security	43.784617826689605	11.212212777641378	rtsp://wowz
ServiceURI http://www.disit.org/km4city/resource/iot/orionUNIFI/DISIT/bunny					
Organization DISIT					
Contextbroker orionUNIFI					
Model TVCamStream					
Controls <a href="#">VIEW</a> <a href="#">EDIT</a> <a href="#">DELEGATE</a> <a href="#">DELETE</a>					
disit_Lab	cam_in_the_DISIT_lab	Private_security	43.79842935147719	11.253071083176406	rtsp://192.16
ServiceURI http://www.disit.org/km4city/resource/iot/orionUNIFI/DISIT/disit_Lab					
Organization DISIT					
Contextbroker orionUNIFI					
Model TVCamStream					
Controls <a href="#">VIEW</a> <a href="#">EDIT</a> <a href="#">DELEGATE</a> <a href="#">DELETE</a>					

# TVCam Manager



# Video Device Model: TVCamStream

Variable		example
dateObserved	Timestamp	
name	ID camera	bunny
description	Text	test_bunny_video
videoSource	Call	<a href="rtsp://wowzaec2demo.streamlock.net/vod/mp4:BigBuckBunny_115k.mp4">rtsp://wowzaec2demo.streamlock.net/vod/mp4:BigBuckBunny_115k.mp4</a>
.... custom		It is possible to create other models extending this kind of model

## In addition you have:

- Model: TVCamStream
  - ContextBroker: selected in the model
- ServiceURI (automatically assigned)
- Nature and Subnature: .....
- GPS Lat, Long: you can decide at the instance

## Optional:

- Username: .....
- Password: .....



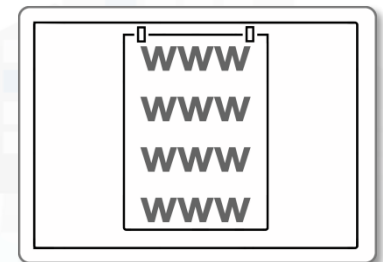
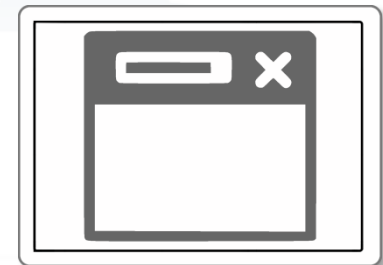
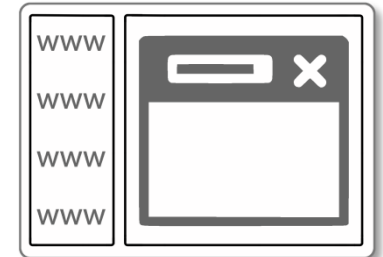
TOP

# *External Services (integration of) your or third-party web pages*



# Dashboard Usage and Recipes

- <https://www.snap4city.org/dashboardSmartCity/view/index.php?idashboard=MTc3NA==>
- **External Content Widget (optional zoom feature):**
  - **External Services:** Web Pages, web sites, web tools (registered or not)
    - **Tools:** Twitter Vigilance, Origin Destination Matrices, WiFi Tool, ...
    - **GIS & MAPs:** ServiceMap, ArcGIS, ServiceMap3D, GoogleMap, etc. etc.
    - **TV CAM** Proxy adapted, VideoCam Streams, ...
  - **MicroApplications**
    - More than 300 micro applications based on Snap4City and Km4City Tech.
  - **Synoptics and Custom widgets**
  - **Snap4City pages:** Form discussion, help desk, user manual, ...
  - **Snap4City Dashboards** for nested views, MultiDashboards views
    - Ultra HD screens, UHD or even wider....
- **Selector WEB**
  - Anything that can be shown on External Content WG, one or more



# External Services (registered)

**Snap4City**

User: rootooladmin1, Org: DISIT  
Role: RootAdmin, Level: 7

**LOGOUT**

- My Snap4City.org
- Dashboards
- My Dashboards in All Org.
- Dashboards of My Organization
- My Dashboards in My Organization
- Notificator
- Data Inspector
- My Data, KPI, POI
- IOT Applications
- IOT Directory and Devices
- Knowledge and Maps
- Micro Applications
- External Services
- Data Set Manager: Data Gate
- Resource Manager: Process Loader
- Development Tools
- Management
- Settings
- User Management and Auditing
- Help and Contacts
- Documentation and Articles
- My Profile

## List of External Services

↓ A Z

↓ Z A

Prev 1 2 **3** 4 5 ... 13 Next

Filter

New Tab

**Firenze: Recency and Frequency from WiFi...**  
Government and Security

New Tab

**Firenze: Tracking rescue teams**  
Government and Security

New Tab

**Firenze: Trajectories from Mobile App**  
Government and Security

New Tab

**Flanders Environment Agency**  
Environment

New Tab

**Garda Lake Overview (a part)**  
Services POI and IOT

New Tab

**GDS test**  
Environment

New Tab

**Google Map**  
Services POI and IOT

New Tab

**Helsinki Map GIS, Kartta**  
GovernmentOffice

New Tab

**Helsinki Overview (a part)**  
Services POI and IOT

New Tab

**Indice della Qualita dell'aria in Italia, by UNI...**  
Environment

New Tab

**Interactive Maps Amsterdam**  
GovernmentOffice

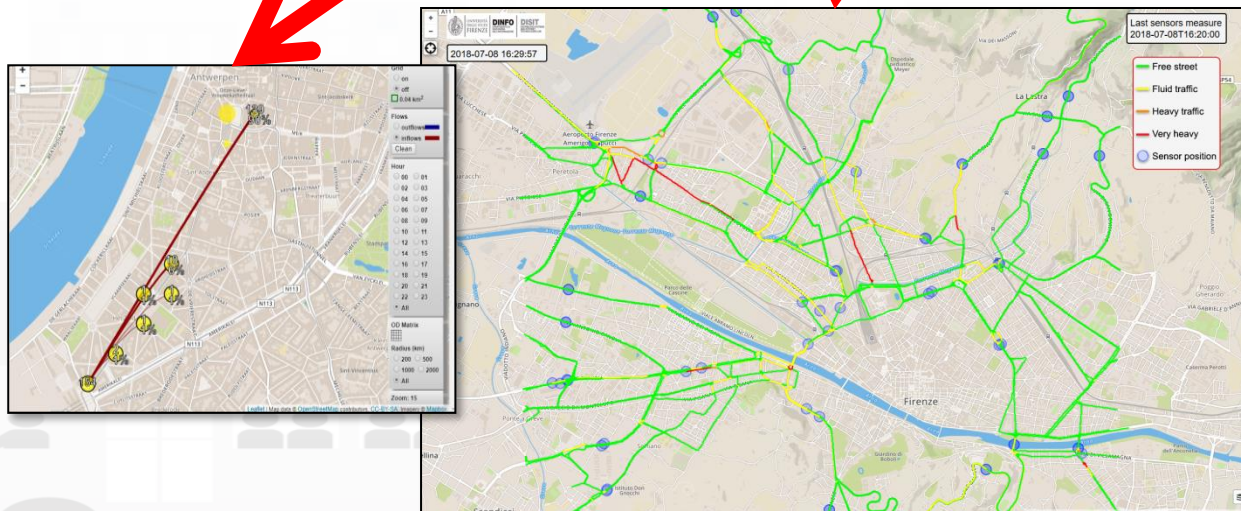
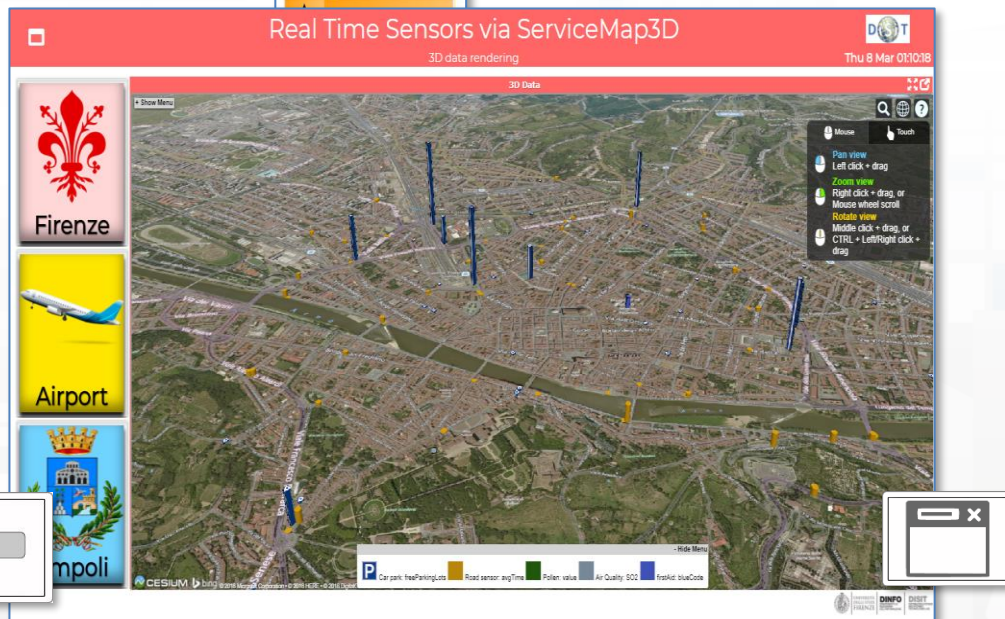
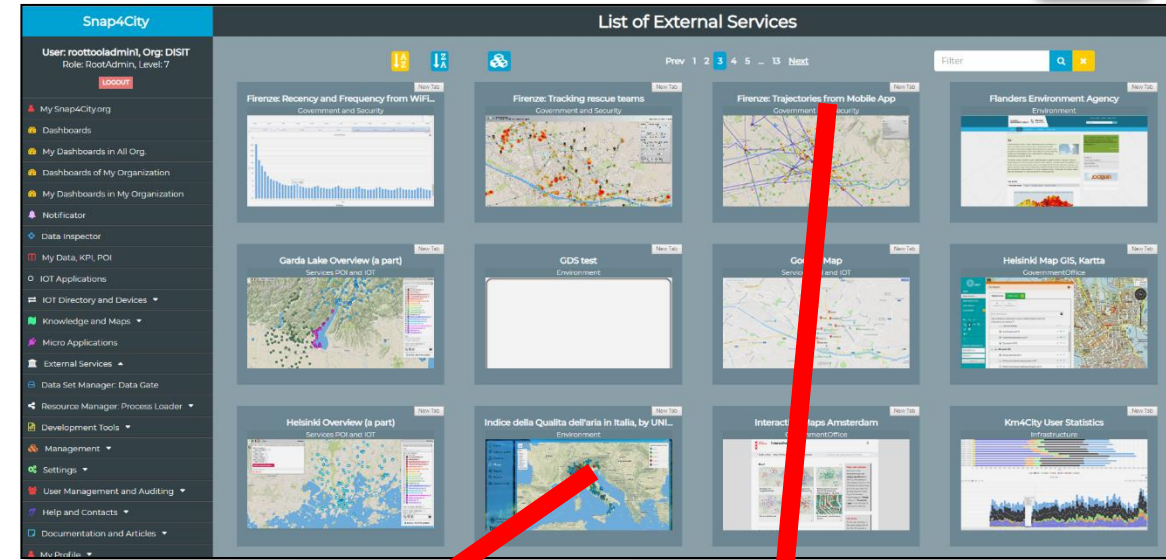
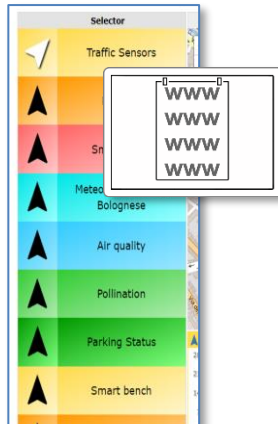
New Tab

**Km4City User Statistics**  
Infrastructure

37

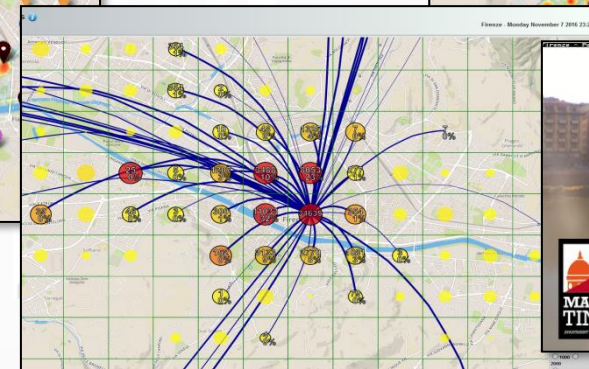
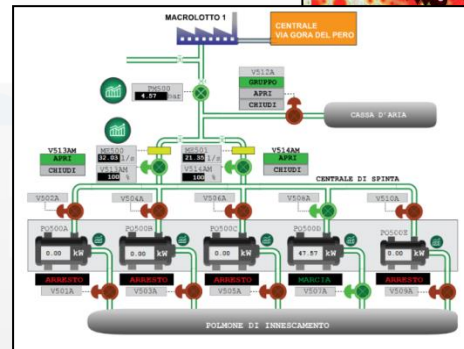
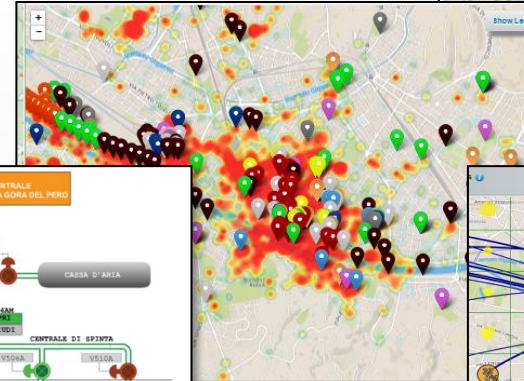
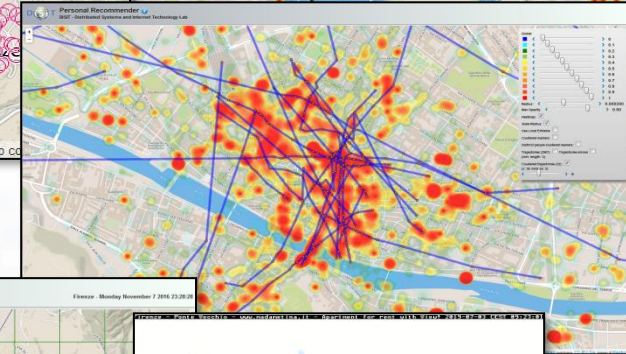
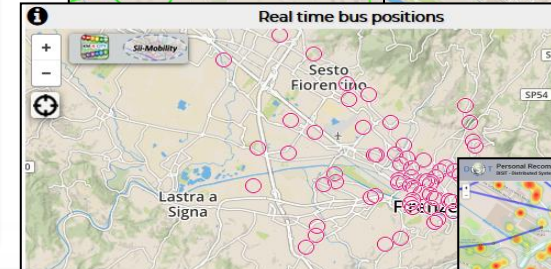
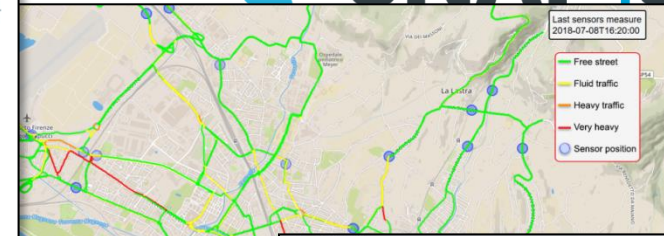
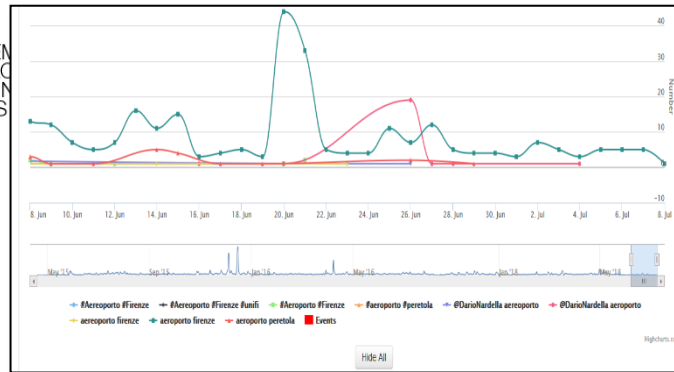
# HLT: External Services

High Level Types



# External Services

- **Twitter Vigilance:**
  - Daily and real time
  - Volume and sentiment analysis
- Services on Maps, GIS, ArcGIS
- Real time sensors on 3D
- Web HTML5 Applications
- Origin Destination Matrix
- Real Time fleets
- Routing, Multimodal tools
- **IPCAM** connector
- **Synoptics**
- **Third party tools!**
- .....
- **Other tools also internal**
  - Traffic Flow Reconstruction
  - User behaviour monitoring
  - Tracking tools
  - Heatmaps tools
  - Trajectories tools



# HTML5 MicroApplications



**Events**

- Made In New York. Keith Haring, Paolo Ruggiani & Co. La Vera Origine Della Street Art. 26-10-2017 | 04-02-2018 | 252 m
- Leonardo Bruni. L'umanesimo A Firenze - Prerogate Al 2002/2018 | 13-10-2017 | 23-03-2018 | 261 m
- Il Reliquario Di Montalto | 24-09-2017 | 30-01-2018 | 299 m
- Da Brooklyn Al Bargello: Giovanni Della Robbia, La Lunetta Antonini E Stefano Ariani | 10-11-2017 | 08-04-2018 | 299 m
- Tessuto E Ricchezza A Firenze Nel Trecento. Lana, Seta, Pittura | 05-12-2017 | 18-03-2018 | 434 m
- Il Cinquecento A Firenze. Tra Michelangelo, Pontormo E Giambologna. | 11-08-2017 | 21-01-2018 | 435 m

**Routing**

VIA DEI BRUNI, 27 FIRENZE

PIAZZA CESARE BECCARIA, 19 FIRENZE

Azzera Calcola

Percorso

Stazione: 0218  
L'Azze: 20  
Santo Spirito: 10:30:00

**Air Quality**

Qualità Aria Heatmap

PM 10	12.857 µg/m³	PM 2.5	6.191 µg/m³
NO2	11.667 µg/m³	Health AIQI	1.06
L'Aeq (Noise)	57.917 dBA	European AQI	1
AQI Enluser Pred.	1	PM 10 Enluser Pred.	10.2 µg/m³
PM 2.5 Enluser Pred.	5.3 µg/m³	PM 10 GRAL Pred.	0.895 µg/m³

**Pollution**

Quantità Polline

Pollen Firenze

Stazione monitoraggio @ 2407 m

Qui Intorno

Alternaria	0.3
Altre Oleacee	0.0
Betulle	0.0
Cornacee	7.0
Cupressacee/Taxacee	2.0
Fraxino	0.3
Graminacee	0.0
Nesofite	7.0
Oleacee	0.3
Ontano	0.0
Pinacee	0.0
Ulmacee	0.0
Urticacee	0.0

**Hospital First Aid**

Pronto Soccorso Ospedale Santa Maria Nuova

Qui Intorno

Stato   Priorità	2	3	6	0	0
Con Destinazione	2	3	6	0	0
In Altosa	0	0	4	2	0
In Vista	0	2	0	1	0
Ora Temporanea	0	3	6	0	0
Totale	2	8	16	3	0

Public Transportation

**POIs**

Fi-boboli

Stazione di monitoraggio della qualità dell'aria

PM10	25.0 µg/m³	Media Giornaliera
Superamenti	1 Giorni	Superamenti Annuali
PM10	1 µg/m³	
Icqa	1 µg/m³	
Icqa Annual	4 µg/m³	
PM10	5 µg/m³	
Icqa Combined	5 µg/m³	
Counter		
Icqa Measured	2018-01-08T00:00:00+01:00	
Time		

**Public Transportation**

Totem Stazione Firenze

Fermate

- ISTITUTO VOLTA → STAZIONE VALFONDA
- ISTITUTO VOLTA @ 5234 m
- Cimitero Del Pino @ 5237 m
- Europa Romania @ 4615 m
- Europa Turchia @ 4419 m
- Giannotti Piazza Bartali @ 4050 m
- Giannotti Traversari @ 3815 m
- Giannotti Bocchi @ 3005 m
- Giannotti Ravin @ 3394 m
- Giannotti Ravin @ 3116 m
- De Sanctis 04 @ 3041 m

See many others on web



# COFFEE BREAK

TOP

# *Synoptic, Custom Widgets and PINS Creation*



- Extra Dashboard Widgets ▾
- Micro Applications
- External Services, WebPages
- Custom Widgets / Synoptics
- My Data Selection for Synoptics
- Custom Widget Templates: list and...
- Doc: MicroApplications
- Doc: External Services, WebPages
- Doc: Synoptics, Custom Widgets







# Demo UC5 GIDA



## GIDA 5G demo

Wed 16 Oct 23:01:00

Details Absorption

Full Screen

Mer 16 Ott Powered by LaMMA

### Prato

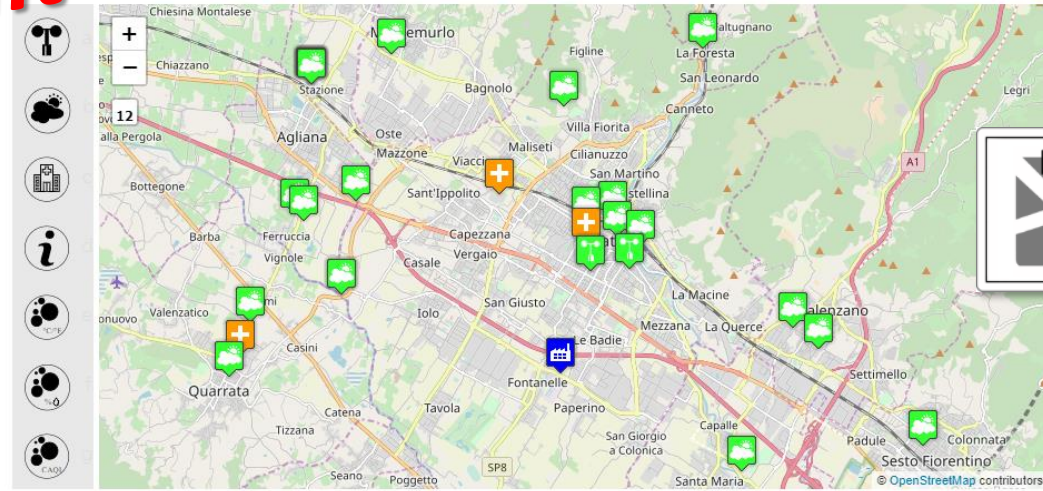
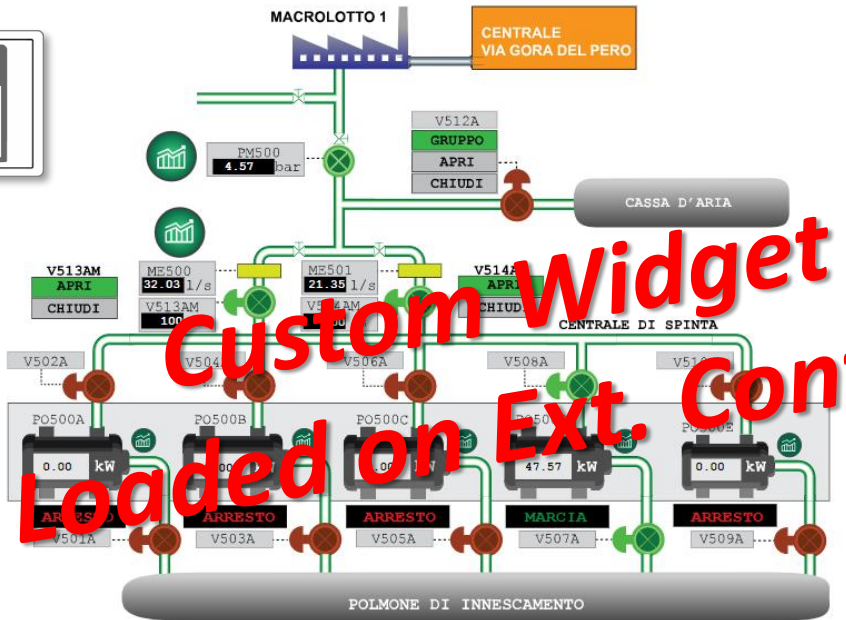
Nuvoloso 16°C / 21°C

Gio 17 Ott 12°C / 21°C Nuvoloso	Ven 18 Ott 11°C / 22°C Nuvoloso	Sab 19 Ott Temp N/A Coperto	Dom 20 Ott Temp N/A Pioggia moderata o forte
---------------------------------------	---------------------------------------	-----------------------------------	--

tusc\_weather\_sensor\_o... 8m | Pressione - GIDA 8m | Umidità - GIDA 8m

13.4°C 1020 bar 87 % XX

Custom Widget Loaded on Ext. Content



Multi Data Map

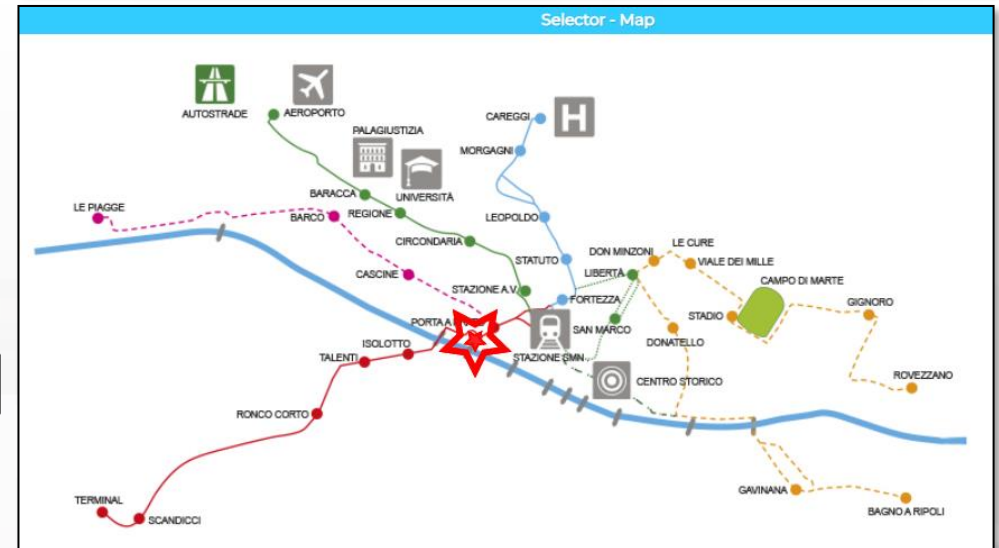
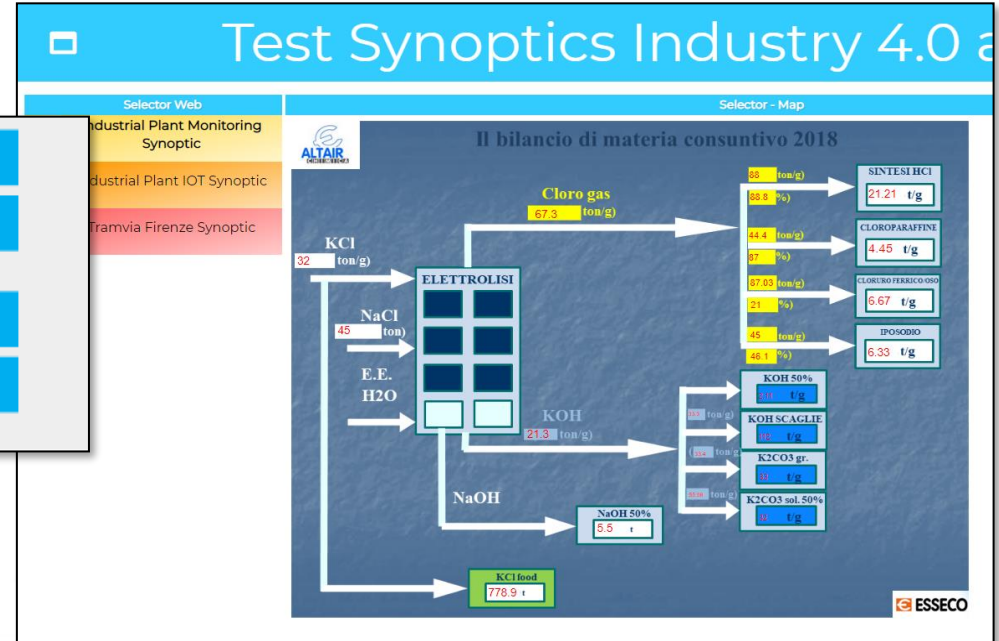
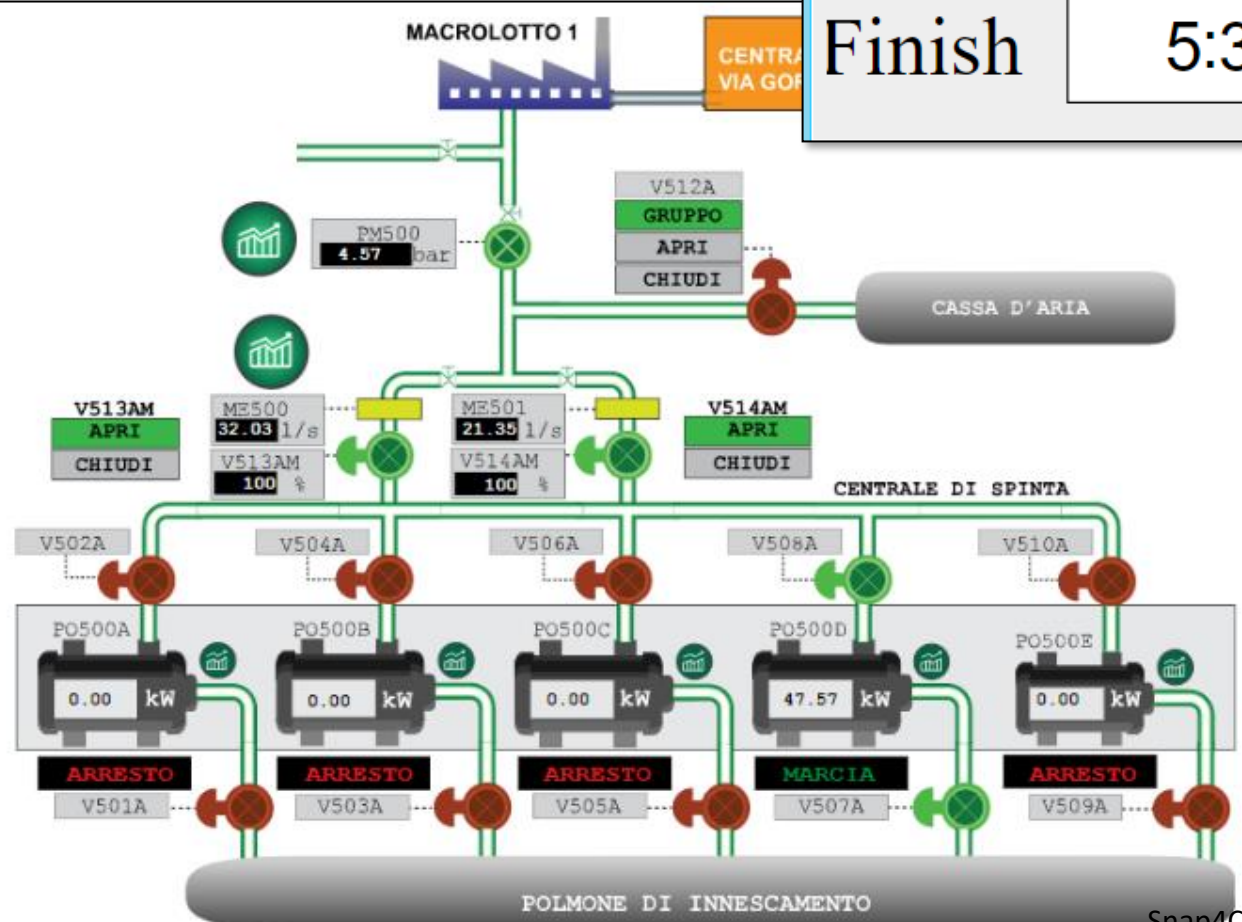
XX 13.6 °C



## Custom Dashboards and Widgets (interactive, Animations, etc.)

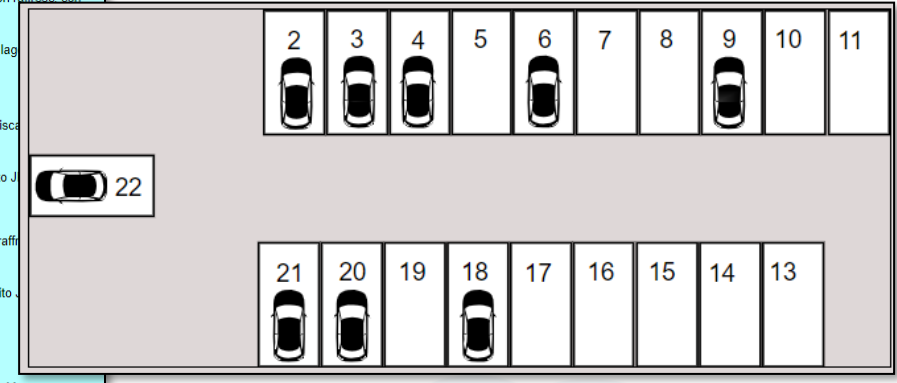
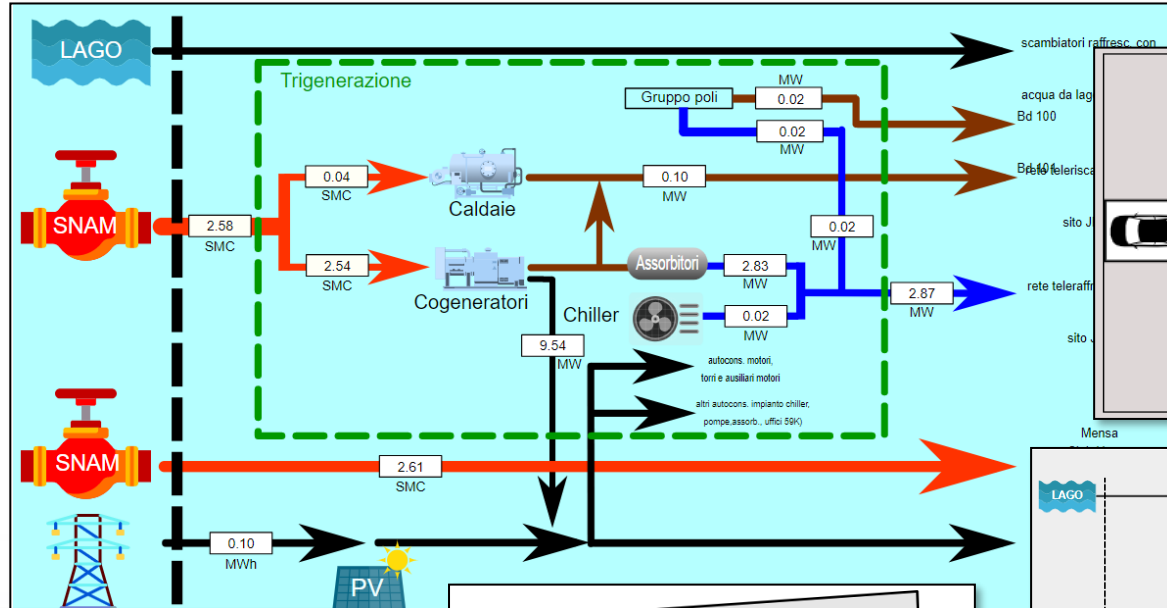
- SVG for graphic design
- MyKPI for collecting data

Begin	3:00	+ -
Finish	5:30	+ -

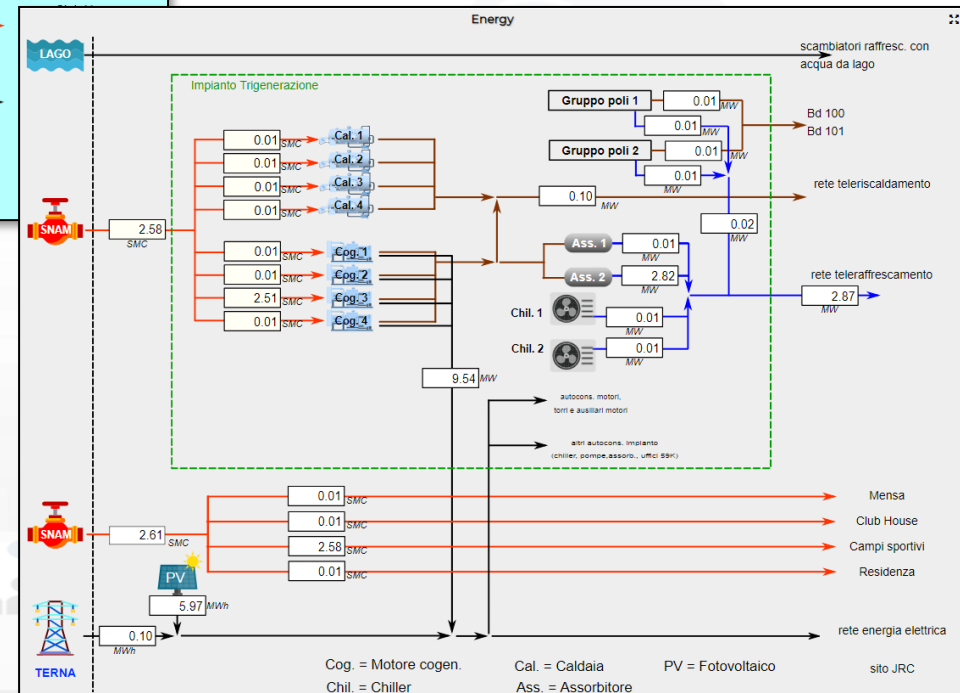
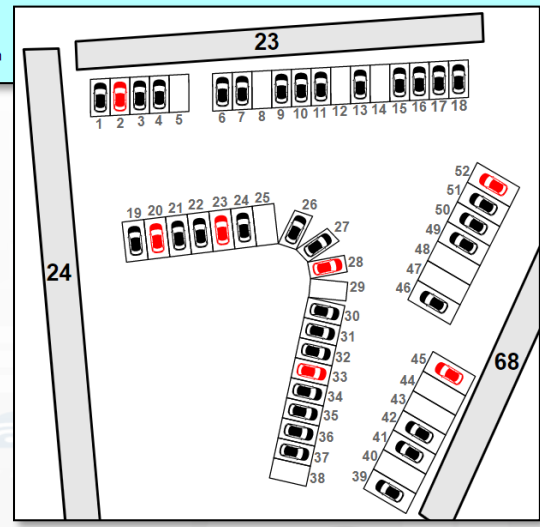


# Special Custom Widgets

- Smart parking
- Smart Energy
- Smart Light
- Smart ....
- Energy View
- Custom Controls



-2 -1 0 1 2  
  
 Total clicks 6 Mean rate value 0.00

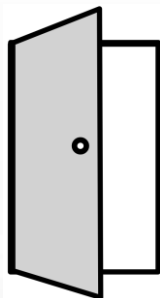
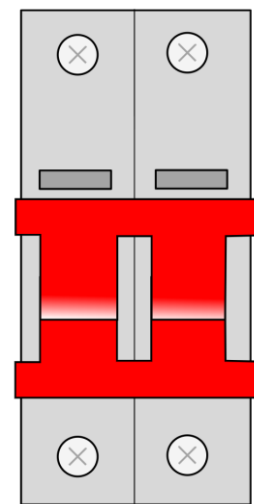


Begin 17:00 + -   
 Finish 4:00 + -

# Other examples

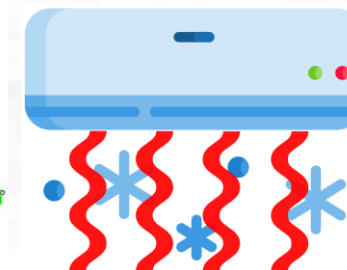
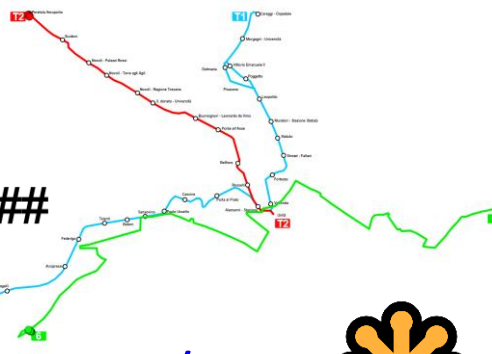
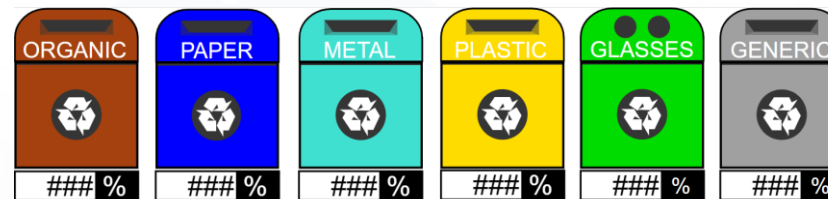
## Virtual Actuators (sensor-actuator)

- From: Dashboard
- To: IOT App, MyKPI, other Synoptics



## Virtual Sensors

- From: MyKPI, Sensors, IOT App, other Synoptics
- To: Dashboards



<https://www.snap4city.org/663>



# Smart Lonato del Garda

Sat 9 Nov 17:20:59

- Slot 1
- Slot 2
- Slot 3
- Slot 4
- Slot 5
- Slot 6
- Slot 7
- Slot 8
- Slot 9
- Slot 10
- Slot 11
- Slot 12
- Slot 13
- Slot 14
- Slot 15
- Slot 16
- Slot 17
- Slot 18
- Slot 19
- Slot 20
- Slot 21
- Slot 22

Selector - Map

**TEST1\_AIRSENSEUR\_RVB01**

VALUE NAME: TEST1\_AIRSENSEUR\_RVB01

	DETAILS	DESCRIPTION	RT DATA				
dateObserved	11/9/2019, 4:18:33 PM	Last value	Last 4 hours	Last 24 hours	Last 7 days	Last 30 day	
humidity	66.347755	Last value	Last 4 hours	Last 24 hours	Last 7 days	Last 30 day	
pressure	987.0833	Last value	Last 4 hours	Last 24 hours	Last 7 days	Last 30 day	
temperature	14.078355	Last value	Last 4 hours	Last 24 hours	Last 7 days	Last 30 day	

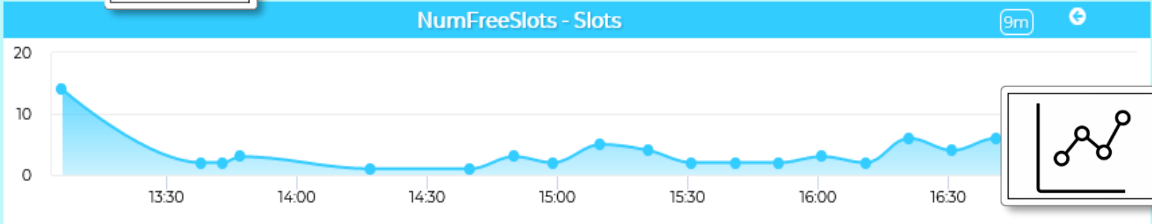
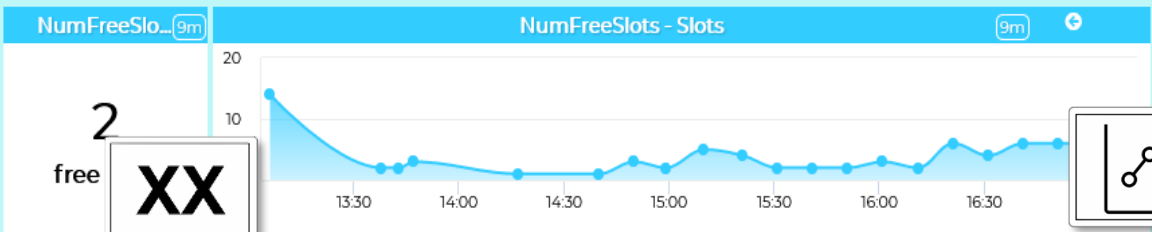
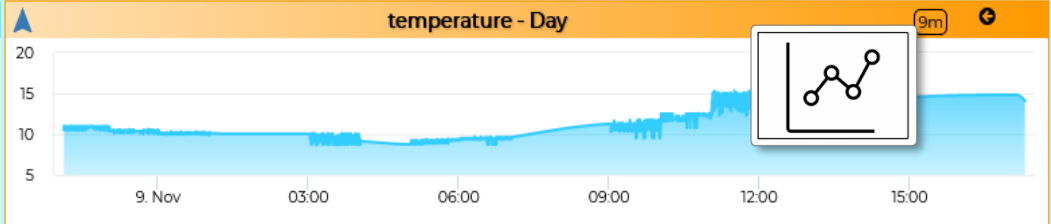


22

Environment other

SmartParkingLonato\_1... 9m

XX



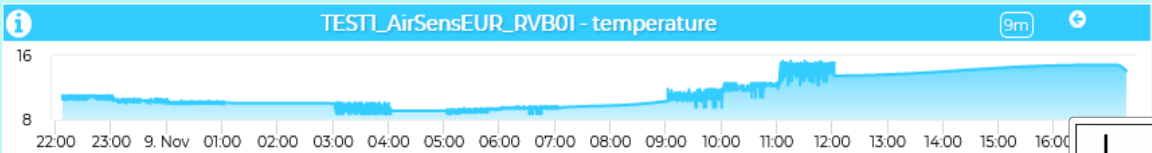
pressure 987.1 mm

humidity % 66.3

temperature 14.1 C

Slot ID 14 slot ID

Max Present Duration 19 ore e 11 minuti



Privacy Policy Terms and Conditions Contact us

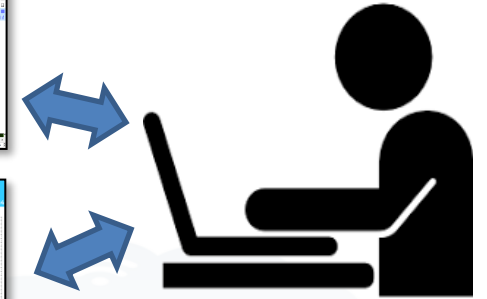


# Custom Widget / Synoptic / PIN Development

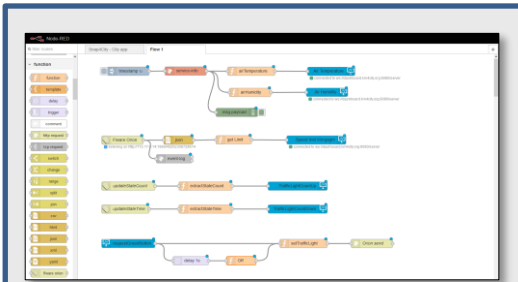
Inkscape editor on your computer



Create, save a Custom Widget in SVG



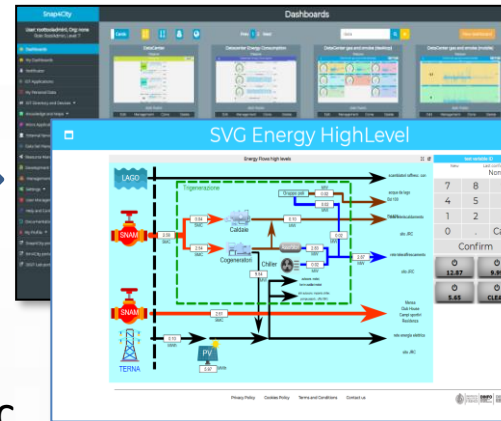
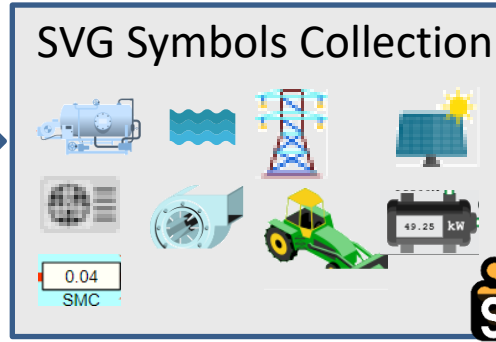
Create, save, load, delegate, grant access



IOT Applications

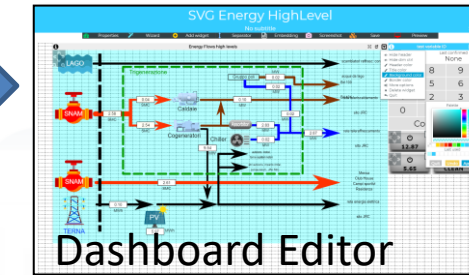


Knowledge and Storage Data from the Field and City



Public Dashboard Collection

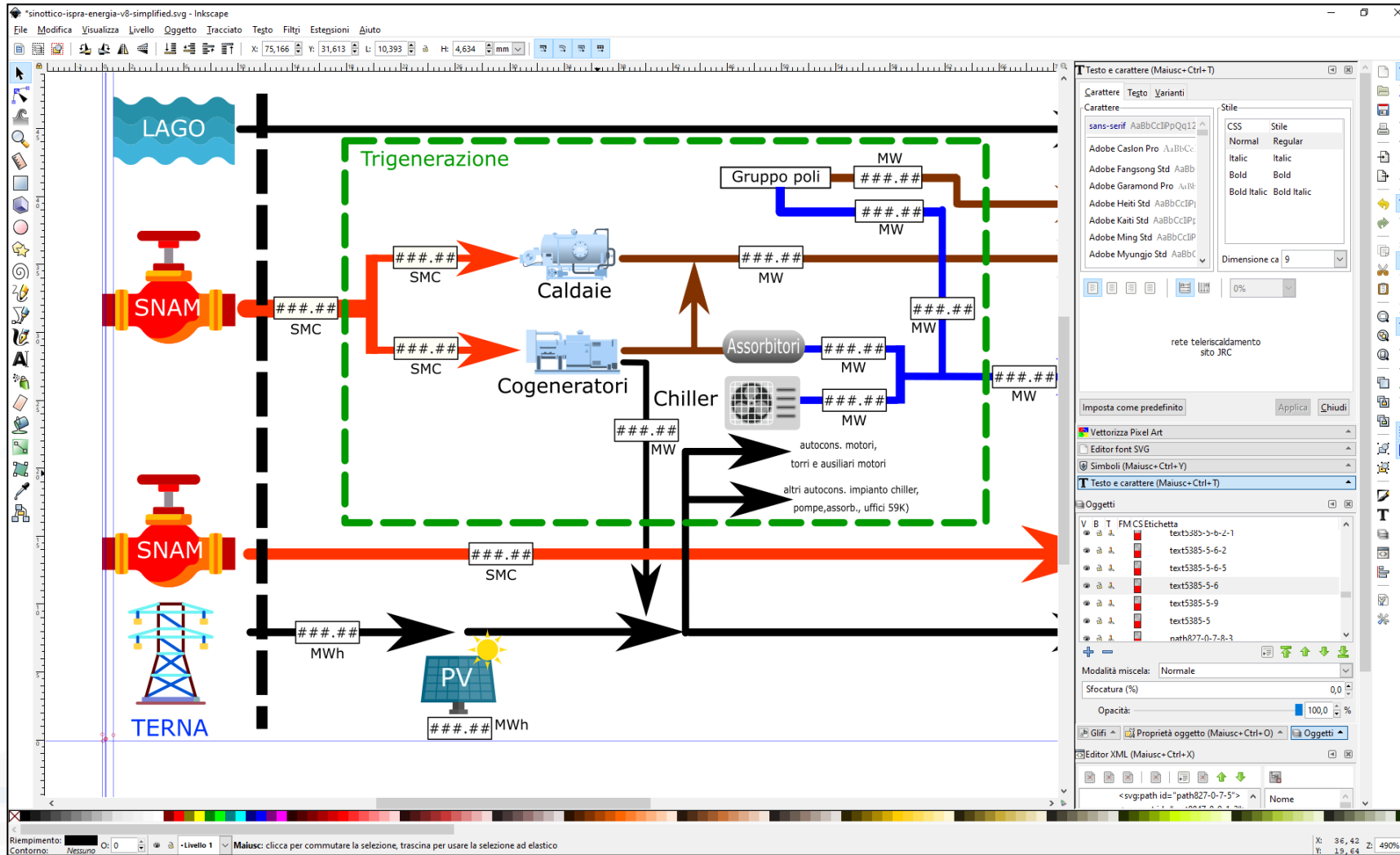
My Own Dash/App



Dashboard Editor

1. Create and Load a Custom SVG
2. Select/Reuse an SVG
3. Make and Instance of Synoptic by Associate Variables with MyKPI
4. Create on Dashboard a Widget based on Synoptic HLT such as Ext. Srv.:

- <https://www.snap4city.org/synoptic/v2/synoptic.html?id=xxxx>



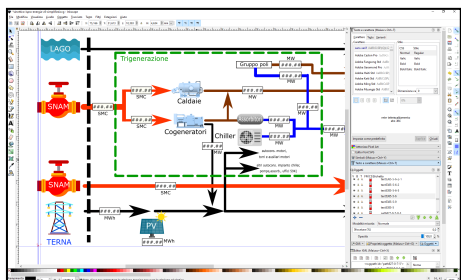
How to  
create a  
custom  
Widget



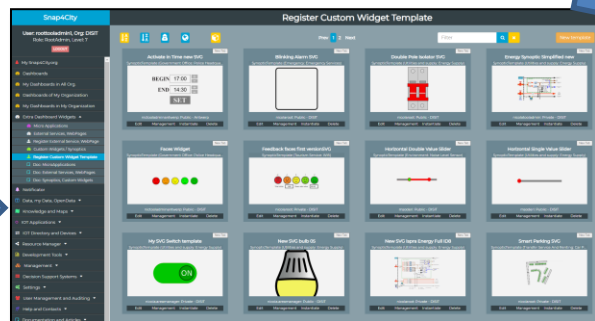
- User manual on: <https://www.snap4city.org/595>

**CW with a single READ Variable are  
automatically usable as PINS**

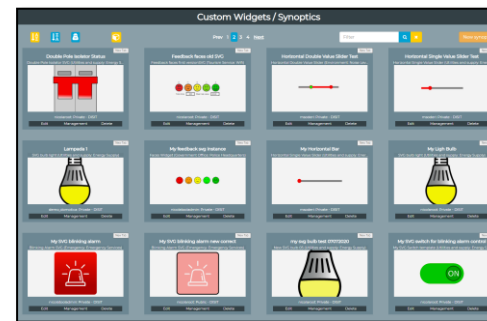
**Create, save a Custom  
Widget in SVG**



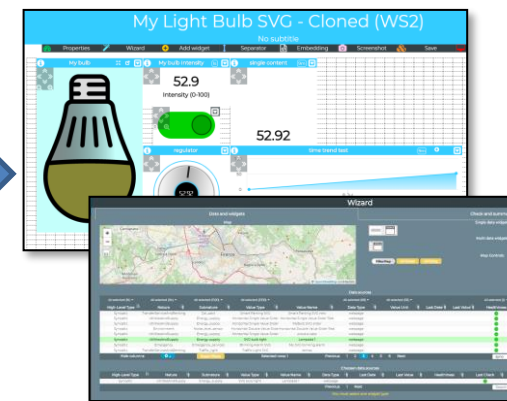
**Upload as  
Custom Widget Template**



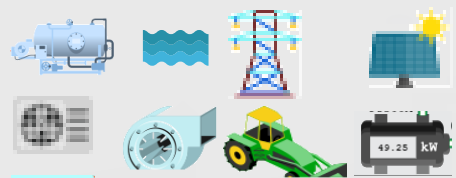
**List of Custom  
Widgets / Synoptics**



**Dashboard Editing/wizard**

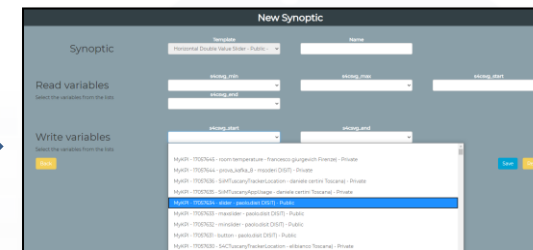
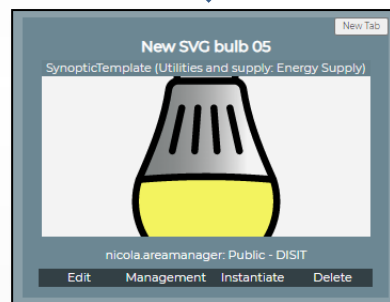


**SVG Symbols Collection**

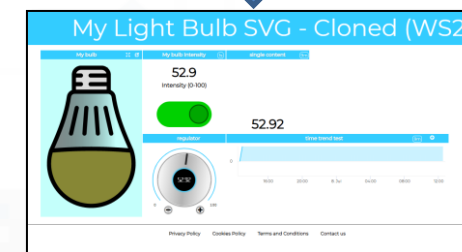


**From any open library**

**select**

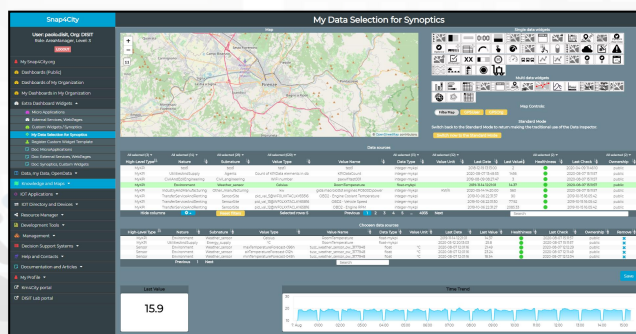


**Instantiate as  
Custom Widgets /  
Synoptics  
Connect with  
WebSockets**



**Final Dashboard**

**Select MyKPI and  
Sensor Data for  
Synoptics cases**



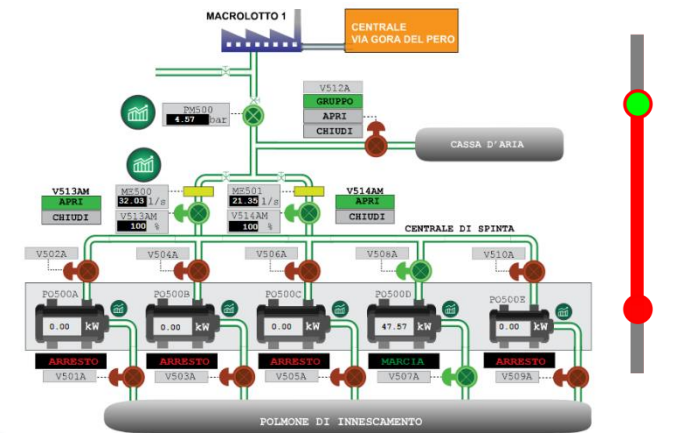
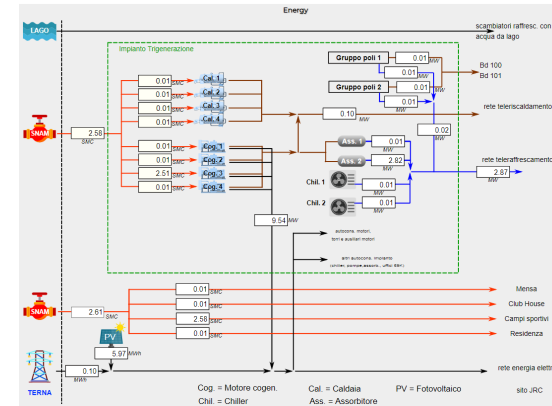
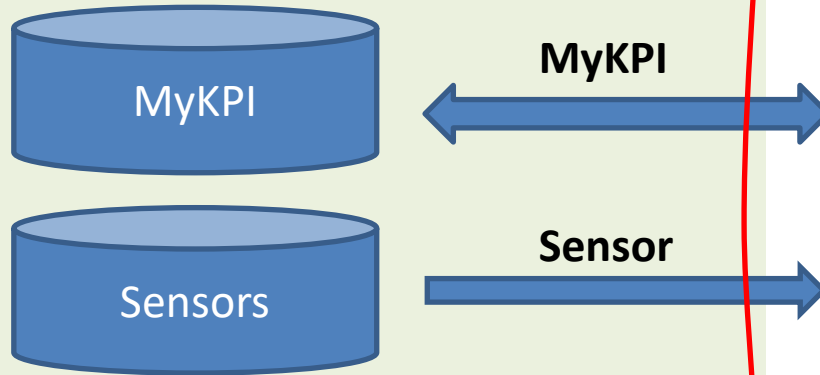


# Help on Custom Widgets

Custom Widget name and image	Explanation	Variable(s)	Accepted values
<b>Activate in Time new SVG</b> 	Set the begin and the end hours by using the small + and - buttons. Click SET to send the defined hours to the server.	<b>s4csvg_begin</b> (read and write variable) Default value: <b>##:##</b> <b>s4csvg_finish</b> (read and write variable) Default value: <b>##:##</b>	starting hour in the form <u>HH:mm</u> to be set by clicking the + and - button ending hour in the form <u>HH:mm</u> to be set by clicking the + and - button
<b>Air Conditioner SVG</b> 	Change the image according to the value received.	<b>s4csvg_airconditioner_status</b> (read variable) Default value: undefined state, the SVG shows the overlapped cold and hot images.	0 = OFF, 1 = cold, 2 = hot
<b>Blinking Alarm SVG</b> 	The image blink or stop to blink according to the value received.  Example: <a href="https://www.snap4city.org/dashboardSmartCity/view/index.php?iddashboard=Mjc4NQ==">https://www.snap4city.org/dashboardSmartCity/view/index.php?iddashboard=Mjc4NQ==</a>	<b>s4csvg_blinking_alarm</b> (read variable) Default value: 1, blinking	0 = OFF (fixed image), 1 = blinking
<b>Double Pole Isolator SVG</b> 	By clicking the SVG, the status of the switch changes accordingly and the corresponding value is sent to the server.  Example: <a href="https://main.snap4city.org/view/index.php?iddashboard=Mjk4Ng==">https://main.snap4city.org/view/index.php?iddashboard=Mjk4Ng==</a>	<b>s4csvg_isolator_onoff</b> (read and write variable) Default value: undefined state, the SVG shows the overlapped position up and position down images.	0 = OFF (position down), 1 = ON (position up)
<b>Faces Widget</b> 	By clicking a coloured face the corresponding value is sent to the server.  Examples: <a href="https://www.snap4city.org/dash">https://www.snap4city.org/dash</a>	<b>s4csvg_userFeedback</b> : value sent to the server by clicking the corresponding face (write variable).	-2 = very bad, -1 = bad, 0 = so-and-so, 1 = quite-good, 2=good

	<a href="https://www.snap4city.org/dashboardSmartCity/view/index.php?iddashboard=MjuONA==">boardSmartCity/view/index.php?iddashboard=MjuONA==</a>	Default value: no value sent. The SVG shows the five	
--	---	--	--

# From-To Custom Widgets / Synoptics to Storage in WS



**Course Part 3**

Shared Variables

Constant Values

**Web Socket Secure**

# Select the Sensors and MyKPI to be used on Synoptics

**Snap4City**

User: paolo.disit, Org: DISIT  
Role: AreaManager, Level: 3

[LOGOUT](#)

- [My Snap4City.org](#)
- [Dashboards \(Public\)](#)
- [Dashboards of My Organization](#)
- [My Dashboards in My Organization](#)
- [Extra Dashboard Widgets](#)
- [Micro Applications](#)
- [External Services, WebPages](#)
- [Custom Widgets / Synoptics](#)
- [My Data Selection for Synoptics](#)
- [Register Custom Widget Template](#)
- [Doc: MicroApplications](#)
- [Doc: External Services, WebPages](#)
- [Doc: Synoptics, Custom Widgets](#)
- [Data, my Data, OpenData](#)
- [Knowledge and Maps](#)
- [IOT Applications](#)
- [IOT Directory and Devices](#)
- [Resource Manager](#)
- [Development Tools](#)
- [Management](#)
- [Decision Support Systems](#)
- [Help and Contacts](#)
- [Documentation and Articles](#)
- [My Profile](#)
- [Km4City portal](#)
- [DISIT Lab portal](#)

### My Data Selection for Synoptics

**Single data widgets**

**Multi data widgets**

**Map Controls:**

[FilterMap](#) [GPSUser](#) [GPSOrg](#)

Standard Mode

Switch back to the Standard Mode to return making the traditional use

[Switch now to the Standard Mode](#)

Data sources

High-Level Type	Nature	Subnature	Value Type	Value Name	Data Type	Value Unit	Last Date	Last Value	Healthiness	Last Check	Ownership
MyKPI	test1	test1	test1	test1	integer-mykpi		2018-12-19 13:13:00	2	●	2020-04-09 11:46:10	public
MyKPI	UtilitiesAndSupply	Agents	Count of KPIData elements in db	KPIDataCount	integer-mykpi		2020-08-07 13:48:53	1456	●	2020-08-07 15:11:57	public
MyKPI	CivilAndEdilEngineering	Civil_engineering	WiFi number	paxwifitest001	integer-mykpi		2019-08-09 08:27:47	3	●	2020-08-07 15:11:57	public
MyKPI	Environment	Weather_sensor	Celsius	RoomTemperature	float-mykpi		2019-11-14 12:21:01	14.37	●	2020-08-07 15:11:57	public
MyKPI	IndustryAndManufacturing	Other_manufacturing	kwh	gida.macrolottol engines.POS00D.power	integer-mykpi	KW/h	2020-05-14 14:20:00	560	●	2020-08-07 15:11:57	public
MyKPI	TransferServiceAndRenting	SensorSite	pid_val_5@WF0LXXTACKLY65816	OBDD2 - Engine Coolant Temperature	integer-mykpi		2019-10-06 22:31:37	90	●	2019-10-15 16:05:42	public
MyKPI	TransferServiceAndRenting	SensorSite	pid_val_13@WF0LXXTACKLY65816	OBDD2 - Vehicle Speed	integer-mykpi		2019-10-06 22:31:30	77.92	●	2019-10-15 16:05:42	public
MyKPI	TransferServiceAndRenting	SensorSite	pid_val_12@WF0LXXTACKLY65816	OBDD2 - Engine RPM	integer-mykpi		2019-10-06 22:31:27	2085.33	●	2019-10-15 16:05:42	public

Chosen data sources

High-Level Type	Nature	Subnature	Value Type	Value Name	Data Type	Value Unit	Last Date	Last Value	Healthiness	Last Check	Ownership	Remove
MyKPI	Environment	Weather_sensor	Celsius	RoomTemperature	float-mykpi		2019-11-14 12:21:01	14.37	●	2020-08-07 15:11:57	public	✕
MyKPI	UtilitiesAndSupply	Energy_supply	°C	RoomTemperature	float-mykpi		2020-05-12 20:13:03	25.8	●	2020-08-07 15:11:57	public	✕
Sensor	Environment	Weather_sensor	maxTemperatureForecast-096h	tusc_weather_sensor_ow_3177948	float	°C	2020-08-07 12:01:16	21.49	●	2020-08-07 12:12:29	public	✕
Sensor	Environment	Weather_sensor	airTemperatureForecast-012h	tusc_weather_sensor_ow_3177948	float	°C	2020-08-07 12:01:16	23.24	●	2020-08-07 12:11:49	public	✕
Sensor	Environment	Weather_sensor	minTemperatureForecast-045h	tusc_weather_sensor_ow_3177948	float	°C	2020-08-07 12:01:16	18.54	●	2020-08-07 12:12:34	public	✕

Last Value

15.9

Time Trend

Click

See listed and save them

Save

# Custom Widgets Templates

**Snap4City**

User: roottooladmin1, Org: DISIT  
Role: RootAdmin, Level: 7

[LOGOUT](#)

- My Snap4City.org
- Dashboards
- My Dashboards in All Org.
- Dashboards of My Organization
- My Dashboards in My Organization
- Extra Dashboard Widgets
- Micro Applications
- External Services, WebPages
- Register External Service, WebPage
- Custom Widgets / Synoptics
- Register Custom Widget Template**
- Doc: MicroApplications
- Doc: External Services, WebPages
- Doc: Synoptics, Custom Widgets
- Notificator
- Data, my Data, OpenData
- Knowledge and Maps
- IOT Applications
- IOT Directory and Devices
- Resource Manager
- Development Tools
- Management
- Decision Support Systems

## Register Custom Widget Template

Prev 1 2 3 Next

Filter

[New template](#)

**Activate in Time new SVG** (New Tab)  
SynopticTemplate (Government Office: Police Headqua...  
  
nictooladminantwerp: Public - Antwerp  
[Edit](#) [Management](#) [Instantiate](#) [Delete](#)

**Air Conditioner SVG** (New Tab)  
SynopticTemplate (Utilities and supply: Energy Supply)  
  
nicola.areamanager: Public - DISIT  
[Edit](#) [Management](#) [Instantiate](#) [Delete](#)

**Blinking Alarm SVG** (New Tab)  
SynopticTemplate (Emergency: Emergency Services)  
  
nicolaroot: Public - DISIT  
[Edit](#) [Management](#) [Instantiate](#) [Delete](#)

**debug fan** (New Tab)  
SynopticTemplate (Entertainment: Forest)  
  
msoderi: Private - DISIT  
[Edit](#) [Management](#) [Instantiate](#) [Delete](#)

**Double Pole Isolator SVG** (New Tab)  
SynopticTemplate (Utilities and supply: Energy Supply)  
  
nicolaroot: Public - DISIT  
[Edit](#) [Management](#) [Instantiate](#) [Delete](#)

**Energy Synoptic Simplified new** (New Tab)  
SynopticTemplate (Utilities and supply: Energy Supply)  
  
nicolatoooladmin: Private - DISIT  
[Edit](#) [Management](#) [Instantiate](#) [Delete](#)

**Feedback faces first versionSVG** (New Tab)  
SynopticTemplate (Tourism Service: Wifi)  
  
nicolaroot: Public - DISIT  
[Edit](#) [Management](#) [Instantiate](#) [Delete](#)

**Horizontal Double Value Slider** (New Tab)  
SynopticTemplate (Environment: Noise Level Sensor)  
  
[Edit](#) [Management](#) [Instantiate](#) [Delete](#)

**Horizontal Single Value Slider** (New Tab)  
SynopticTemplate (Utilities and supply: Energy Supply)  
  
[Edit](#) [Management](#) [Instantiate](#) [Delete](#)

**My SVG Humidifier** (New Tab)  
SynopticTemplate (Utilities and supply: Energy Supply)  
  
[Edit](#) [Management](#) [Instantiate](#) [Delete](#)

**My SVG Switch template** (New Tab)  
SynopticTemplate (Utilities and supply: Energy Supply)  
  
[Edit](#) [Management](#) [Instantiate](#) [Delete](#)

**Instantiate**

Snap4City (C), September 2023

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# Instantiating a Custom Widget Synoptic

BEGIN 17:00 + -

END 14:30 + -

SET

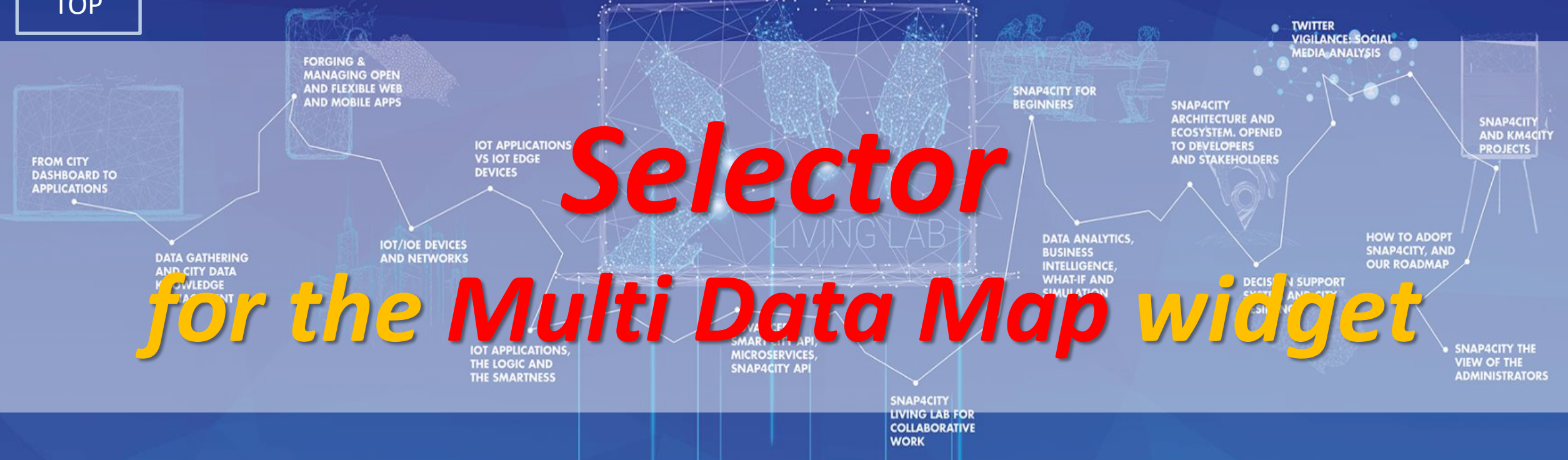
- MyKPI - 17055863 - My Room Temperature 4 - gp.helsinki.test (Helsinki) - Private
- MyKPI - 17055853 - my studio temperature - GP - - gpantaleo (DISIT) - Private
- MyKPI - 17055848 - test2 - angelo.difino (DISIT) - Private
- MyKPI - 17055845 - ClientiGiornalieri - roottooladmin1 (DISIT) - Private
- Shared - shared\_fan\_maxDur
- Sensor - Water\_detector10 water - undefined (DISI) - Public
- Shared - shared\_case4-bulb
- Shared - shared\_fan\_minDur
- Shared - shared\_prova\_blink
- Shared - shared\_fan\_velocity
- Sensor - Water\_detector09 water - undefined (DISI) - Public
- Sensor - Water\_detector04 water - undefined (DISI) - Public
- Sensor - Water\_detector02 water - undefined (DISI) - Public
- Sensor - Water\_detector01 water - undefined (DISI) - Public
- Sensor - Water\_detector03 water - undefined (DISI) - Public
- Sensor - Water\_detector05 water - undefined (DISI) - Public
- Sensor - Water\_detector07 water - undefined (DISI) - Public
- Sensor - Water\_detector06 water - undefined (DISI) - Public
- Sensor - Water\_detector08 water - undefined (DISI) - Public
- New shared variable...

- `[]`
  - leave it empty to connect later directly from/to IOT APP
- **MyKPI**
  - Read/write data, your KPI, and real time values
- **Sensors**
  - Your data collected as sensors only rendering data
- **New Shared Variables**
  - ..... Only for Case 3: Synoptic vs Synoptic Communications
  - No protection of data value

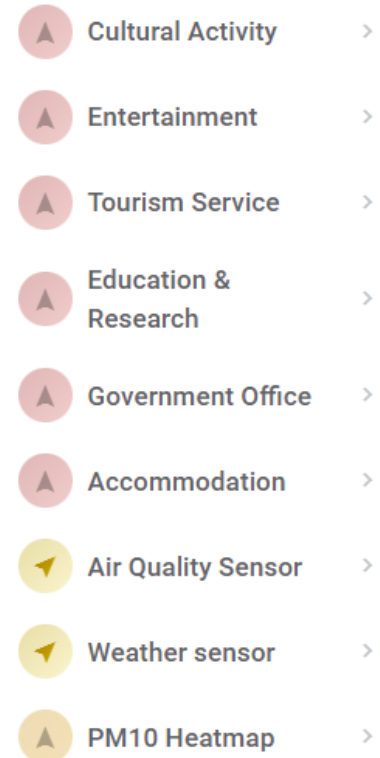
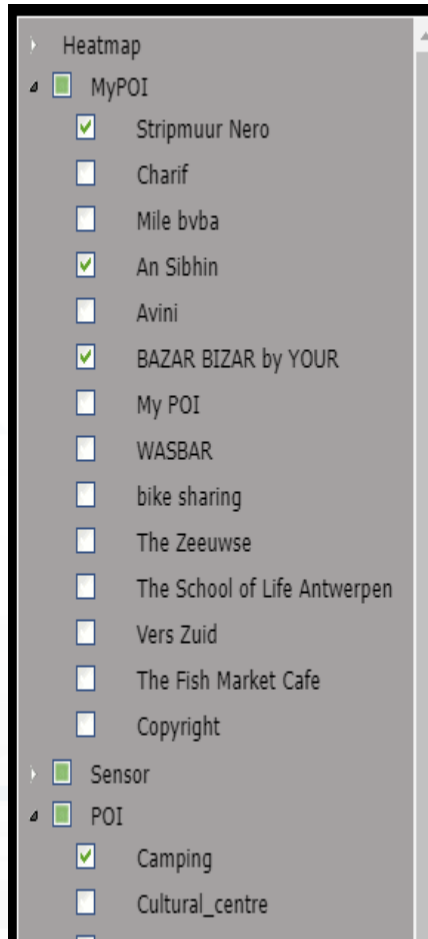
TOP

# Selector

# for the Multi Data Map widget



# The Selector for Multi Data Maps



- **Different styles**
  - Icon and Text menu
  - Custom Menu Icon
  - Icon Menu buttons
  - Etc.
- **Features**
  - Removable header
  - Colours custom
  - Transparencies
  - Mixed modalities
- **Note:**
  - Manus can be realized also with a set of Buttons

*The Selector is the Map Controller*

# Custom Dynamic Pins

EDITING

Properties

Selector

- Hide header
- Hide dim ctrl
- Header color
- Title color
- Background color
- Border color
- More options**
- Delete widget
- Quit

Custom Pins on Map - test GP

Sat 31 Oct 11:35:41

Multi Data Map

METRO19 - averageSpeed

0.1 Km/h

Privacy Policy Cookies Policy Terms and Conditions Contact us

<https://www.snap4city.org/dashboardSmartCity/view/index.php?iddashboard=Mjk5MA==>



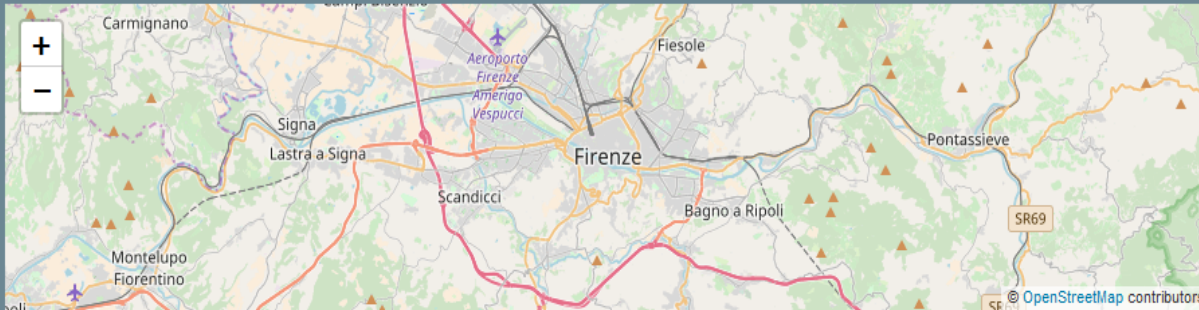
## Wizard



## Dashboard features

## Data and widgets

## Map



## Single data widgets



## Multi data widgets



## Data sources

High-Level Type	Nature	Subnature	Value Type	Value Name	Data Type	Last Date	Healthiness	Last Check	Ownership
Special Widget	Environment	Weather Forecast	Previ_Meteo	Previ_Meteo	special weather			2018-07-08 16:00:18	public
Special Widget	Environment	Weather Forecast	Previ_Meteo	Previ_Meteo	special weather			2018-07-08 16:00:18	public
Special Widget	Environment	Weather Forecast	Previ_Meteo	Previ_Meteo	special weather			2018-07-08 16:00:18	public
Special Widget	Environment	Weather Forecast	Previ_Meteo	Previ_Meteo	special weather			2018-07-08 16:00:18	public
Special Widget	Environment	Weather Forecast	Previ_Meteo	Previ_Meteo	special weather			2018-07-08 16:00:18	public
Special Widget	Environment	Weather Forecast	Previ_Meteo	Previ_Meteo	special weather			2018-07-08 16:00:18	public
Special Widget	Environment	Weather Forecast	Previ_Meteo	Previ_Meteo	special weather			2018-07-08 16:00:18	public
Special Widget	Environment	Weather Forecast	Previ_Meteo	Previ_Meteo	special weather			2018-07-08 16:00:18	public
Special Widget	Environment	Weather Forecast	Previ_Meteo	Previ_Meteo	special weather			2018-07-08 16:00:18	public

• Select the area of your interest: panning and zooming

• Select the

- graphic aspect of your interest, or
- High Level Type of your interest, or

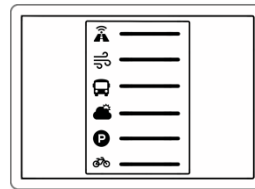
- Make a search if you have a precise idea or
- Act on filters: nature, subnature, type, name, value, date, health, owner, ...
- Combine them as you like

• Select the lines of your interest

• Then click on Next and get the Dashboard by wizard



Close



# Dashboard Usage and recipe: Event map target

- **Selector to Show on Map a**
  - category of Map positioned elements
    - [https://servicemap.disit.org/WebAppGrafo/api/v1/?selection=43.08694333811321;8.791809082031252;44.93758500391093;14.065246582031252&categories=Traffic\\_sensor&maxResults=0&maxDists=0.1&text=&model=&value\\_type=&format=json](https://servicemap.disit.org/WebAppGrafo/api/v1/?selection=43.08694333811321;8.791809082031252;44.93758500391093;14.065246582031252&categories=Traffic_sensor&maxResults=0&maxDists=0.1&text=&model=&value_type=&format=json)
    - <https://servicemap.disit.org/WebAppGrafo/api/v1/?queryId=e5f39066cd68ffe259ed8877bcee222b&format=json>
  - Entity by Model
    - <https://www.disit.org/superservicemap/api/v1?selection=59.36535064975547;13.457822799682619;59.39031474260852;13.566999435424806&model=SmartLightCapelon&format=json>
  - Single Entity
    - [https://servicemap.disit.org/WebAppGrafo/api/v1/?serviceUri=http://www.disit.org/km4city/resource/iot/orionFirenze2/Firenze/SHT20lab\\_new&format=json&fromTime=3-day](https://servicemap.disit.org/WebAppGrafo/api/v1/?serviceUri=http://www.disit.org/km4city/resource/iot/orionFirenze2/Firenze/SHT20lab_new&format=json&fromTime=3-day)
  - Heatmap among many
    - [https://wmserver.snap4city.org/geoserver/Snap4City/wms?service=WMS&layers=Florence\\_PM10](https://wmserver.snap4city.org/geoserver/Snap4City/wms?service=WMS&layers=Florence_PM10)
  - Traffic flow
    - <https://wmserver.snap4city.org/geoserver/Snap4City/wms?service=WMS&layers=FirenzeFIPILITrafficRealtime&trafficflowmanager=true>
    - <https://firenzetraffic.km4city.org/trafficRTDetails/roads/read.php>
  - Origin Destination Map
    - [https://odmm.snap4city.org/api/get?precision=communes&from\\_date=&organization=Toscana&inflow=True&longitude=11.255751&latitude=43.769710&od\\_id=mobile\\_Toscana\\_1000&perc=True](https://odmm.snap4city.org/api/get?precision=communes&from_date=&organization=Toscana&inflow=True&longitude=11.255751&latitude=43.769710&od_id=mobile_Toscana_1000&perc=True)
- **Events which are also PIN on map**
- **Il Service URI as the unique identifier of the Entity**
  - <http://www.disit.org/km4city/resource/iot/orionUNIFI/DISIT/METRO632>

# MoreOptions (below part)

Map widgets

Selector Ma

Active rows font color

rgba(0,0,0,1)



Icon/Text Mode

Icon Only



Map Pin Icon

Pin Icon



Default	Symbol mode	Symbol choice	Symbol preview	Symbol color	Description	Query	Color1	Color2	Data widgets	Default View Mode	Map Icon color	Alternate View Mode	Variable Name	Order	
<input checked="" type="checkbox"/>	Auto				Traffic Bubl...	https://se...	rgba(1!	rgba(1!	Nothing se			Bub	vehicleFl	1	<input checked="" type="checkbox"/>
<input type="checkbox"/>	Auto				Psvgb_X-val3	https://se...	rgba(1!	rgba(1!	METRO19	Pir		Cus	val3	2	<input checked="" type="checkbox"/>
<input type="checkbox"/>	Auto				Psvgb_X-val1	https://se...	rgba(2!	rgba(2!	METRO19	Pir		Cus	val1	3	<input checked="" type="checkbox"/>
<input type="checkbox"/>	Auto			rgba(1	Psvgb_X-val4	https://se...	rgba(2!	rgba(2!	METRO19	Pir		Cus	val4	4	<input checked="" type="checkbox"/>
<input type="checkbox"/>	Auto			rgba(2!	recharging st...	https://se...	rgba(2!	rgba(2!	METRO19		Symbol (	Cus	stationSt	5	<input checked="" type="checkbox"/>
<input type="checkbox"/>	Auto				PM2_5 Heatmap	https://wm...	rgba(8:	rgba(8:	Nothing se					Empty	<input checked="" type="checkbox"/>
<input type="checkbox"/>	Auto				Traffic Flow	https://fi...	rgba(2!	rgba(2!	Nothing se					Empty	<input checked="" type="checkbox"/>
<input type="checkbox"/>	Auto				Cycling Paths	https://se...	rgba(2!	rgba(2!	Nothing se					Empty	<input checked="" type="checkbox"/>
<input type="checkbox"/>	Auto				Scenario	/scenario/	rgba(0,	rgba(1!	Nothing se					Empty	<input checked="" type="checkbox"/>
<input type="checkbox"/>	Auto				What-IF	/whatif/	rgba(5:	rgba(1!	Nothing se					Empty	<input checked="" type="checkbox"/>

You may need to save and reopen the MoreOptions more than once to pass on different kinds of configurations



# More Options of the Selector

- Setting:
  - Heatmaps
  - Bubbles
  - Icons
  - Custom
  - Traffic flow
  - Cycling path
  - What-if
  - Etc. etc.

Metric and widget choice

Widget category: Data viewer

Metric: Selector

Widget name: w\_Selector\_2190\_widgetSelectc

Widget type: widgetSel max 1 metrics

Context: [empty]

Widget link: none

Metric description: Name: Selector. Description: Selector query list.

Generic widget properties

Title: Selector

Background color: rgba(255,255,255,1)

Content font size: 16

Content font color: rgba(0,0,0,1)

Header color: rgba(238,238,238,1)

Header text color: rgba(0,0,0,1)

Period: [dropdown]

Refresh rate (s): [input]

Height: 48

Width: 6

U/M: [input]

U/M position: [dropdown]

Show header: No

Font type (autosuggestion): Auto

Specific widget properties

Map widgets: Multi Map

Default	Symbol mode	Symbol choice	Symbol preview	Description	Query	Color1	Color2	Data widgets	Display	Buttons	Bubble Metric	Order	
Yes	Auto	▲	▲	Air Quality S...	https://se...	rgba(2...)	rgba(2...)	Air Tempe...	Pins	▼	▼	-2	✗
Yes	Auto	▲	▲	PM10 Heatmap	https://wm...	rgba(2...)	rgba(2...)	Nothing si...	▼	▼	▼	-1	✗
No	Auto	▲	▲	PM2.5 Heatmap	https://wm...	rgba(2...)	rgba(2...)	Nothing si...	▼	▼	▼	2	✗
No	Auto	▲	▲	CO Heatmap	https://wm...	rgba(2...)	rgba(2...)	Nothing si...	▼	▼	▼	3	✗
No	Auto	▲	▲	CO2 Heatmap	https://wm...	rgba(2...)	rgba(2...)	Nothing si...	▼	▼	▼	3	✗
No	Auto	▲	▲	O3 Heatmap	https://wm...	rgba(2...)	rgba(2...)	Nothing si...	▼	▼	▼	4	✗
No	Auto	▲	▲	NO2 Heatmap	https://wm...	rgba(2...)	rgba(2...)	Nothing si...	▼	▼	▼	5	✗
No	Auto	▲	▲	Europ. AQI He...	https://wm...	rgba(2...)	rgba(2...)	Nothing si...	▼	▼	▼	7	✗
No	Auto	▲	▲	Air Quality S...	https://se...	rgba(2...)	rgba(2...)	Nothing si...	▼	▼	▼	8	✗
No	Auto	▲	▲	Air Quality S...	https://se...	rgba(1...)	rgba(2...)	Nothing si...	▼	▼	▼	9	✗
No	Auto	▲	▲	Wind Speed He...	https://wm...	rgba(1...)	rgba(2...)	Nothing si...	▼	▼	▼	10	✗
No	Auto	▲	▲	Gral Pred. HM...	https://wm...	rgba(1...)	rgba(2...)	Nothing si...	▼	▼	▼	11	✗
No	Auto	▲	▲	Gral Pred. HM...	https://wm...	rgba(1...)	rgba(2...)	Nothing si...	▼	▼	▼	12	✗
Yes	Auto	▲	▲	Traffic Sensors	https://se...	rgba(2...)	rgba(2...)	Air Tempe...	Pins	▼	▼	15	✗
No	Auto	▲	▲	Traffic Bubble	https://se...	rgba(2...)	rgba(2...)	Nothing si...	▼	▼	▼	16	✗
No	Auto	▲	▲	Traffic Bubble	https://se...	rgba(2...)	rgba(2...)	Nothing si...	▼	▼	▼	17	✗
No	Auto	▲	▲	Cycling Paths	https://se...	rgba(2...)	rgba(2...)	Nothing si...	Geometr	▼	▼	20	✗
No	Auto	▲	▲	Accident Heatmap	https://he...	rgba(2...)	rgba(2...)	Nothing si...	▼	▼	▼	21	✗
No	Auto	▲	▲	Only HRes Any...	https://wm...	rgba(1...)	rgba(1...)	Nothing si...	▼	▼	▼	Empty	✗
No	Auto	▲	▲	Scenariuos	/scenario/	rgba(2...)	rgba(2...)	Nothing si...	▼	▼	▼	Empty	✗

The More Option data and table are automatically created / initialized by Wizard

It can be adjusted for:  
-- adding more selections  
-- tuning the services  
-- exploiting nicer views

# The Selector is the Map Controller

More Options

Specific widget properties

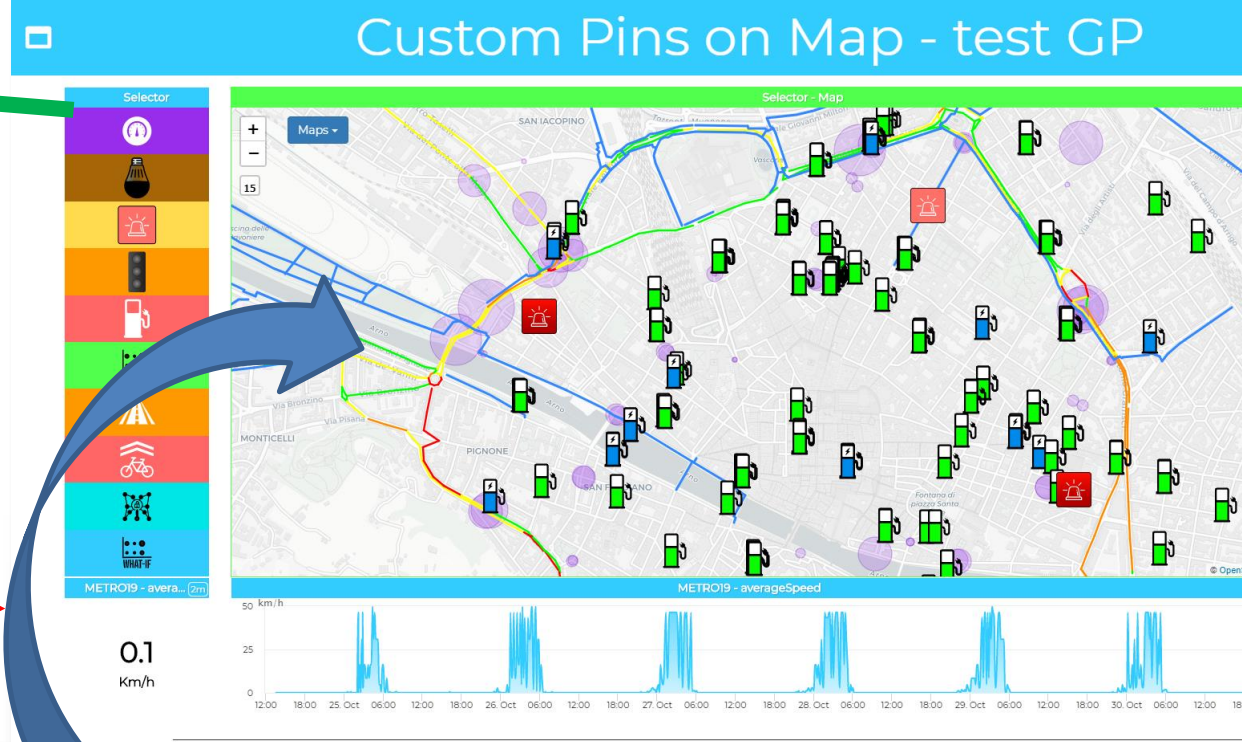
Widget: Selector - Map

Active rows font color: rgba(0,0,0,1)

Default	Symbol mode	Symbol choice	Symbol preview	Symbol color	Description	Query
Yes	Auto				Traffic Bubbl...	https://se...
No	Auto				Psvgb_X-val3	https://se...
No	Auto				Psvgb_X-val1	https://se...
No	Auto			rgba(	Psvgb_X-val4	https://se...
No	Auto			rgba(	recharging st...	https://se...
No	Auto				PM2_5 Heatmap	https://wm...
No	Auto				Traffic Flow	https://fi...
No	Auto				Cycling Paths	https://se...
No	Auto				Scenario	/scenario/
No	Auto				What-IF	/whatif/

More Options Edit

- Query ID
- REST CALL
- Command
- Heatmap



**Knowledge base**  
Semantic reasoners

**Indexing and aggregating**  
Elastic search

**Search and Query,**  
Smart City API  
Facet, semantic search

• *The Query is produced by Wizard but can be manually changed*

# How to Get the «Query» used in More Options (1)

- Query ID
  - only Read and Read/Write of the query
- REST CALL of the Smart City APIs
  - JSON
  - HTML (do not use into MoreOptions)

*Request to get an email To With Query/calls !! To get the same data*

snap4city@gmail.com  
a me

Thanks a lot for using Service Map by DISIT at <http://servicemap.disit.org>

Your query "Service FI-MOSSE" has been saved.

Description: No description provided.

You can access to the query results on Service Map by clicking on these links:

Link for read only result in format json : <https://servicemap.disit.org/WebAppGrafo/api/v1/?queryId=c33d6672968a1d5db83f27cf00c06198&format=json>

Link for read only result in html : <https://servicemap.disit.org/WebAppGrafo/api/v1/?queryId=c33d6672968a1d5db83f27cf00c06198&format=html>

Link for overwrite this query on Service Map : <https://servicemap.disit.org/WebAppGrafo/api/?queryId=f75d163130b1c8a9c7927c7b89>

Link to obtain results in format json : [https://servicemap.disit.org/WebAppGrafo/api/v1/?serviceUri=http://www.disit.org/km4city/resource/ARPAT\\_QA\\_FI-MOSSE\\_SV&format=json](https://servicemap.disit.org/WebAppGrafo/api/v1/?serviceUri=http://www.disit.org/km4city/resource/ARPAT_QA_FI-MOSSE_SV&format=json)

Link to obtain results in format html : [https://servicemap.disit.org/WebAppGrafo/api/v1/?serviceUri=http://www.disit.org/km4city/resource/ARPAT\\_QA\\_FI-MOSSE\\_SV&format=html](https://servicemap.disit.org/WebAppGrafo/api/v1/?serviceUri=http://www.disit.org/km4city/resource/ARPAT_QA_FI-MOSSE_SV&format=html)

or copy paste it on your browser.

You can share the link with your friends.

Best regards  
ServiceMap.disit.org team  
You can contact us at [info@disit.org](mailto:info@disit.org) or visit our web page at <http://www.disit.org>

# The example of email from ServiceMap

snap4city@gmail.com

a me ▾

Thanks a lot for using Service Map by DISIT at <http://servicemap.disit.org>

Your query "Service FI-MOSSE" has been saved.

Description: No description provided.

You can access to the query results on Service Map by clicking on these links:

Link for read only result in format json: <https://servicemap.disit.org/WebAppGrafo/api/v1/?queryId=c33d6672968a1d5db83f27cf00c0e919&format=json>

Link for read only result in html: <https://servicemap.disit.org/WebAppGrafo/api/v1/?queryId=c33d6672968a1d5db83f27cf00c0e919&format=html>

Link for overwrite this query on Service Map: <https://servicemap.disit.org/WebAppGrafo/api/?queryId=f75d163130b1c8af9c7927cc7b857d70>

Link to obtain results in format json : [https://servicemap.disit.org/WebAppGrafo/api/v1/?serviceUri=http://www.disit.org/km4city/resource/ARPAT\\_QA\\_FI-MOSSE\\_SV&format=json](https://servicemap.disit.org/WebAppGrafo/api/v1/?serviceUri=http://www.disit.org/km4city/resource/ARPAT_QA_FI-MOSSE_SV&format=json)

Link to obtain results in format html : [https://servicemap.disit.org/WebAppGrafo/api/v1/?serviceUri=http://www.disit.org/km4city/resource/ARPAT\\_QA\\_FI-MOSSE\\_SV&format=html](https://servicemap.disit.org/WebAppGrafo/api/v1/?serviceUri=http://www.disit.org/km4city/resource/ARPAT_QA_FI-MOSSE_SV&format=html)

or copy paste it on your browser.

You can share the link with your friends.

Best regards

[ServiceMap.disit.org](http://ServiceMap.disit.org) team

You can contact us at [info@disit.org](mailto:info@disit.org) or visit our web page at <http://www.disit.org>

# The Selector is the Map Controller

## Custom Pins on Map - test GP

No subtitle

Sat 31 O

Properties Wizard Add widget Separator Embedding Screenshot Save Preview

MoreOptions

Pin Icon: Pin Icon

Data widgets	Default View Mode	Map Icon color	Alternate View Mode
Nothing selected			Bub
METRO19	Pir		Cus
METRO19	Pir		Cus
METRO19	Pir		Cus
METRO19		Symbol	Cus
Nothing selected			
Nothing selected			
Nothing selected			
Nothing selected			
Nothing selected			
Nothing selected			

• Targeting the data to be shows on other data Widgets

Selector

Selector - Map

PSVG3B						
VALUE NAME: PSVG3B						
	DETAILS	DESCRIPTION	RT DATA			
str1	eccolo	Last value	Last 4 hours	Last 24 hours	Last 7 days	
val1	0	Last value	Last 4 hours	Last 24 hours	Last 7 days	
val2	2	Last value	Last 4 hours	Last 24 hours	Last 7 days	
val3	34	Last value	Last 4 hours	Last 24 hours	Last 7 days	
val4	4	Last value	Last 4 hours	Last 24 hours	Last 7 days	

METRO19 - av...[9m]

0.1 Km/h

val3 - 4 Hours



TOP

# Setting More Options for the Multi Series widget



# Setting Multiseries More Options

- Stacked/non stacked, shaded
- Linear / Log
- Typical time trend
- ServiceURI:

<http://www.disit.org/km4city/resource/iot/orionUNIFI/DISIT/METRO1>

- Query:

<https://servicemap.disit.org/WebAppGrafo/api/v1/?serviceUri=http://www.disit.org/km4city/resource/iot/orionUNIFI/DISIT/METRO1&fromTime=7-day&valueName=vehicleFlow&aggregation=60-minute>

- Query ID, MyKPI ID etc.

Modify widget

**Metric and widget choice**

Widget category: Data viewer

Metric: AggregationSeries

Widget name: w\_AggregationSeries\_3380\_wid

Widget type: widgetCur max: 1 metrics

Context:

Widget link: none

Metric description:

**Generic widget properties**

Title: Time trend

Background color: rgba(0,0,0,1)

Content font size: 10

Content font color: rgba(0,0,0,1)

Header color: rgba(0,0,0,1)

Header text color: rgba(0,0,0,1)

Period: Week

Refresh rate (s): 300

Height: 30

Width: 72

U/M:

U/M position:

Show header: Yes

Font type (autosuggestion): Auto

**Specific widget properties**

Line width: 2

X-Axis format:

Y-Axis type:

Y-Axis Min:

Y-Axis Max:

X-Axis labels font size: 10

X-Axis labels font color: rgba(0,0,0,1)

Y-Axis labels font size: 10

Y-Axis labels font color: rgba(0,0,0,1)

X-Axis Label:

Y-Axis Label:

Secondary Y-Axis:

Data labels font size: 10

Data labels font color: rgba(0,0,0,1)

Legend font size: 10

Legend font color: rgba(0,0,0,1)

Chart type: Simple lines

Data labels: Value only

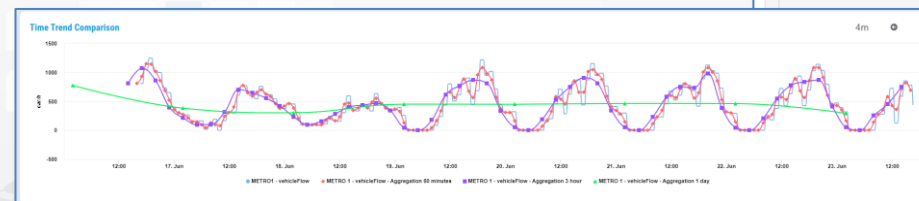
Typical time trend:

Trend type:

Reference date: gg/mm/yyyy

Typical Trend Type Date:

Labels	Query, Query ID or URI (Empty for Dynamic Data from IOT-Apps)	Value Type (Mandatory only for MyKPI & Sensor)	Color	
METRO1 - vehicleFlow	<a href="http://www.disit.org/km4city/resource/iot/orionUNIFI/DISIT/METRO1">http://www.disit.org/km4city/resource/iot/orionUNIFI/DISIT/METRO1</a>	vehicleFlow	rgba(124,181,221,1)	+
	<a href="https://servicemap.disit.org/WebAppGrafo/api/v1/?serviceUri=http://www.disit.org/km4city/resource/iot/orionUNIFI/DISIT/METRO1&amp;fromTime=7-day&amp;valueName=vehicleFlow&amp;aggregation=60-minute">https://servicemap.disit.org/WebAppGrafo/api/v1/?serviceUri=http://www.disit.org/km4city/resource/iot/orionUNIFI/DISIT/METRO1&amp;fromTime=7-day&amp;valueName=vehicleFlow&amp;aggregation=60-minute</a>	vehicleFlow	rgba(255,102,102,1)	✗
	<a href="https://servicemap.disit.org/WebAppGrafo/api/v1/?serviceUri=http://www.disit.org/km4city/resource/iot/orionUNIFI/DISIT/METRO1&amp;fromTime=7-day&amp;valueName=vehicleFlow&amp;aggregation=60-minute">https://servicemap.disit.org/WebAppGrafo/api/v1/?serviceUri=http://www.disit.org/km4city/resource/iot/orionUNIFI/DISIT/METRO1&amp;fromTime=7-day&amp;valueName=vehicleFlow&amp;aggregation=60-minute</a>	vehicleFlow	rgba(150,79,251,1)	✗
	<a href="https://servicemap.disit.org/WebAppGrafo/api/v1/?serviceUri=http://www.disit.org/km4city/resource/iot/orionUNIFI/DISIT/METRO1&amp;fromTime=7-day&amp;valueName=vehicleFlow&amp;aggregation=60-minute">https://servicemap.disit.org/WebAppGrafo/api/v1/?serviceUri=http://www.disit.org/km4city/resource/iot/orionUNIFI/DISIT/METRO1&amp;fromTime=7-day&amp;valueName=vehicleFlow&amp;aggregation=60-minute</a>	vehicleFlow	rgba(0,244,76,1)	✗



TOP

# Data Inspector vs Data Processes Details

*(some features are only accessible to \*Admin roles)*



# Advanced Features of the Data Inspector

- Some features accessible only for the Owner and \*Admin, such as:
  - Specific information on the basis of the High Level Type
  - Values connected to the data (structure of the single data)
  - Details regarding the ingestion process
  - Eventual image representing the City Entity, for example the sensor
  - Ownership (licensing) details regarding the data owner
- So that you can access on all of them in the Snap4City version if you install on premise.
- A part of these features can be activated for the Organization Managers, namely: «ToolAdmin» roles.



**Snap4City**

User: roottooladmin, Org: DISIT  
Role: RootAdmin, Level: 7

[LOGOUT](#)

- My Snap4City.org
- Dashboards
- My Dashboards in All Org.
- Dashboards of My Organization
- My Dashboards in My Organization
- Notificator
- Data Inspector**
- My Data, KPI, POI
- IOT Applications
- IOT Directory and Devices
- Knowledge and Maps
- Micro Applications
- External Services
- Data Set Manager: Data Gate
- Resource Manager: Process Loader
- Development Tools
- Management
- Settings
- User Management and Auditing
- Help and Contacts
- Documentation and Articles

## Data Inspector

Map

Single data widgets

Multi data widgets

Map Controls:

[FilterMap](#) [GPSUser](#) [GPSOrg](#)

Data sources

Sensor	All selected (7)
High-Level Type	Nature
Sensor	Environment
Sensor	Environment
Sensor	Environment
Sensor	Environment
Sensor	Environment
Sensor	Environment
Sensor	Environment

Last Value: **14.9**

### Data sources Details

Device	Values	Healthiness	Process	Image	Licensing	User
GPS Coordinates:	42.642033, 18.1122					
High-Level Type:	Sensor					
Nature:	From IOT Device to KB					
Subnature:	IoTSensor					
Value Name:	DubrovnikorionDubrovnik-UNIFI:camera_Dubrovnik_1_Ploce					
Device ServiceURI or Data ID:	http://www.disit.org/km4city/resource/iot/orionDubrovnik-UNIFI/Dubrovnik/camera_Du					
Sensor ServiceURI or Data ID:	http://www.disit.org/km4city/resource/iot/orionDubrovnik-UNIFI/Dubrovnik/camera_Du					
Datasource:	IoT					
Ownership:	private					
Organizations:	Dubrovnik					

[Link to Service Map](#) [Link to IoT Device](#)

Healthiness	Last Check	Ownership
●	2019-08-13 07:18:30	public
●	2019-08-13 07:18:30	public
●	2019-08-13 07:18:30	public
●	2019-08-13 07:18:30	public
●	2019-08-13 07:18:30	public
●	2019-08-13 07:17:27	public
●	2019-08-13 07:17:27	public



• Click with the mouse on it

**HLT: Sensor**

## Knowledge Base view

Knowledge Base popup window showing details for a specific location.

**Snap4City**

User: roottooladmin, Org: DISIT  
Role: RootAdmin, Level: 7

[LOGOUT](#)

**IOT Devices**

IOT Device	IOT Broker	Device Type	Model	Ownership	Status	Soft	Delete	Location
AccessPoint1_FerniaSuperstore	orionLonatoDeCarda-UNIFI	AccessPointSensor	AccessPointLonato	DELEGATED	active	EDIT	DELETE	📍
AccessPoint2_ITIS	orionLonatoDeCarda-UNIFI	AccessPointSensor	AccessPointLonato	DELEGATED	active	EDIT	DELETE	📍
AccessPoint3_Palaspont	orionLonatoDeCarda-UNIFI	AccessPointSensor	AccessPointLonato	DELEGATED	active	EDIT	DELETE	📍
adminDev1	orionUNIFI	Ambiental		MYOWNPRIVATE	active	EDIT	DELETE	📍
AdminDevice001	orionUNIFI	Ambiental		MYOWNPRIVATE	active	EDIT	DELETE	📍
AdminDevice002	orionUNIFI	Ambiental		MYOWNPRIVATE	active	EDIT	DELETE	📍
AdminDevice004	orionUNIFI	Ambiental		MYOWNPRIVATE	active	EDIT	DELETE	📍
AdminDevice005	orionUNIFI	Ambiental		MYOWNPRIVATE	active	EDIT	DELETE	📍
AdminTest005	orionUNIFI	Ambiental		MYOWNPRIVATE	active	EDIT	DELETE	📍

Showing 1 to 10 of 370 entries

- Specific values of selected
- Information of the values of the other sensors on the same device
- View Trends, marking problems, healthiness by point according to a Fuzzy model
- Marking problems for future machine learning processes (separate tool)

Data sources Details

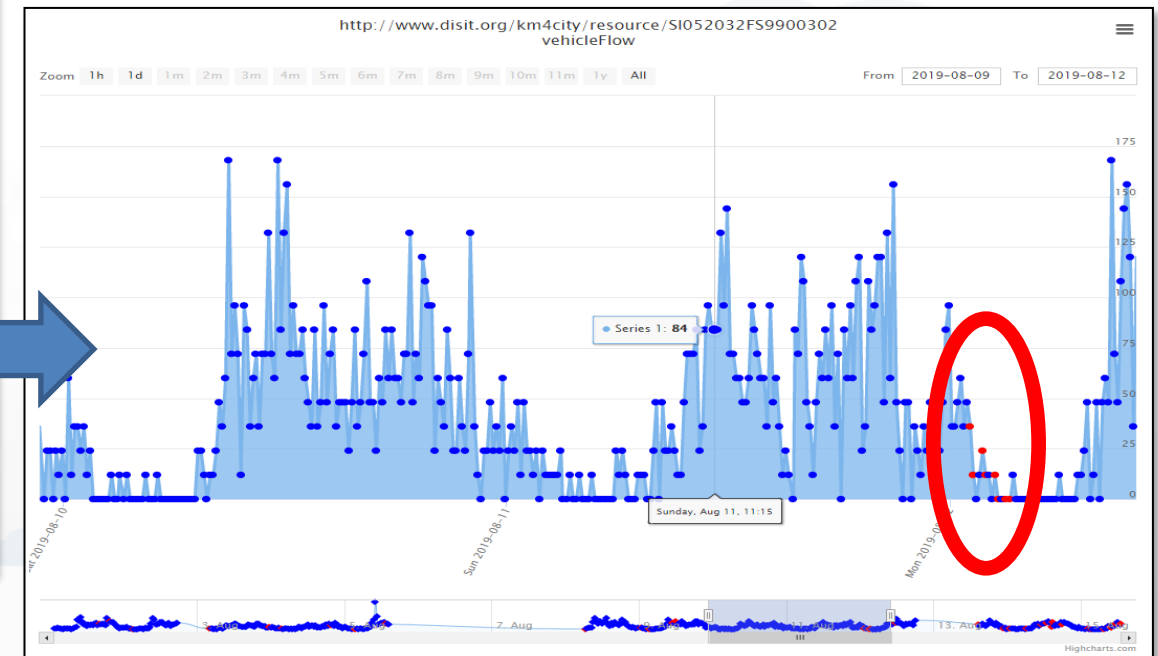
Device Values Healthiness Process Image Licensing User

Last Date: 2020-07-21 19:00:00

Last Value:

Value Type	Healthy	Delay (s)	Reason	Healthiness Criteria	Refresh Rate (s)	Data type	Unit	Value	Time Trend
dateObserved	●	61890	undefined	undefined	300	time	timestamp	2020-07-21T17:00:00.000Z	VIEW
deceduti	●	61890	undefined	undefined	300	integer	#	16797	VIEW
dimessi_guariti	●	61890	undefined	undefined	300	integer	#	71775	VIEW
isolamento_domiciliare	●	61890	undefined	undefined	300	integer	#	6838	VIEW
nuovi_attualmente_positivi	●	61890	undefined	undefined	300	integer	#	-131	VIEW
ricoverati_con_sintomi	●	61890	undefined	undefined	300	integer	#	151	VIEW
stato	●	61890	undefined	undefined	300	string	#	ITA	VIEW
tamponi	●	61890	undefined	undefined	300	integer	#	1212468	VIEW
terapia_intensiva	●	61890	undefined	undefined	300	integer	#	21	VIEW
totale_attualmente_positivi	●	61890	undefined	undefined	300	integer	#	7010	VIEW
totale_casi	●	61890	undefined	undefined	300	integer	#	95582	VIEW
totale_ospedalizzati	●	61890	undefined	undefined	300	integer	#	172	VIEW
codice_regione	●	61890	missing value	undefined	300	integer	status		VIEW
denominazione_regione	●	61890	missing value	undefined	300	string	status		VIEW

Cancel



# HLT: Sensor

# Healthiness

Data sources Details

Device	Values	Healthiness	Process	Image	Licensing	User
Value Type:	meanPeople					
Healthiness Criteria:						
Delay:	813417					
Data Type:	float					
Period:	900					
Last Update:	2020-07-10T13:06:34.734+02:00					
Healthiness Criteria 1:	●	(2020-07-19 23:03:31) false				
Healthiness Criteria 2:	●	(2020-07-19 23:03:31) false				

Cancel

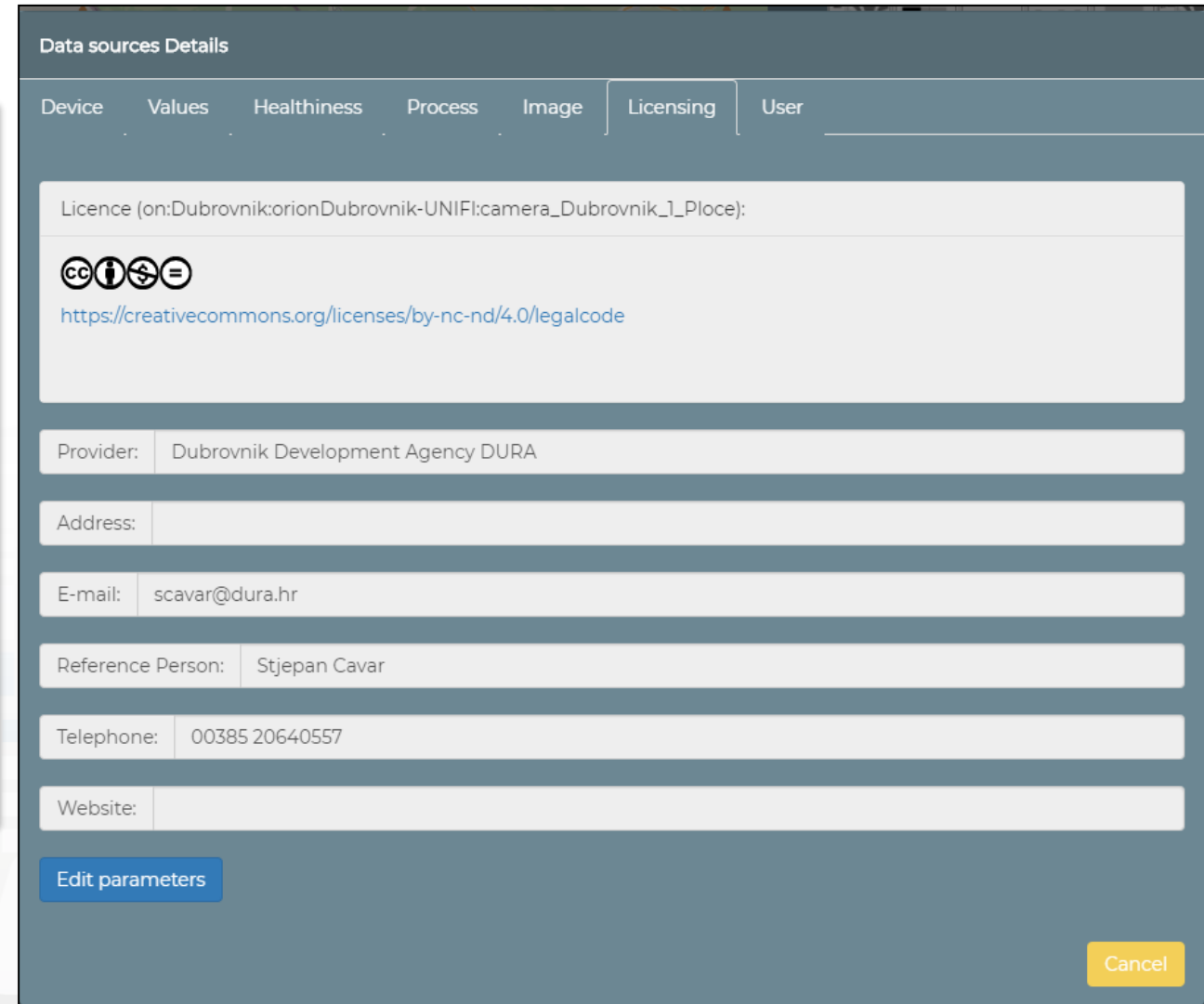
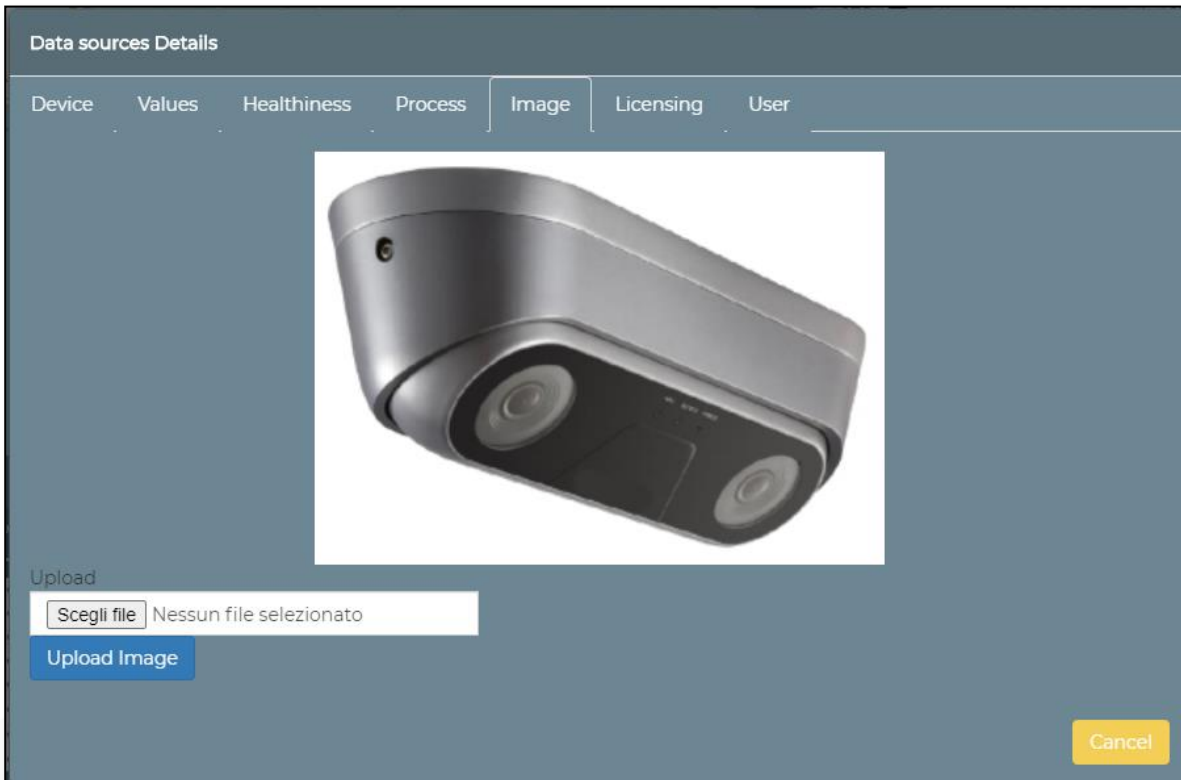
- Two different criteria
  - **H1**: at least an event in the last 24 hours
  - **H2**: machine learning for most of Sensors devices

*Some functionalities are limited to certain roles*





## Image of the Devices and Licensing



*Some functionalities are limited to certain roles*

# HLT: External Service

Data sources Details

Device	Values	Image	Ownership
GPS Coordinates:	51.222744, 4.405380		
High-Level Type:	External Service		
Nature:	Environment		
Subnature:	Antwerpen (park Spoor Noord) Air Pollution		
Value Name:	ExternalContent		
Datasource:	Special Process		
Ownership:	public		
Organizations:	['DISIT', 'Antwerp', 'Other']		

[Link to External Service](#)

Data sources Details

Device	Values	Image	Ownership
Value Type:			
Data Type:	webpage		
Last Date:			
Last Value:	Antwerp		

Value Type	Healthy	Delay (s)	Reason	Health

Data sources Details

Device	Values	Image	Ownership

Data sources Details

Device	Values	Healthiness	Process	Image	Licensing	User
User Creator:	angelo.difino.dubrovnik					
Status:						
E-mail creator:						

[Cancel](#)

The fields shown may be present or not depending on the HLT and on the information received

# HLT: From Dashboard to IOT APP

- Click with the mouse on it

**Data Inspector**

User: rootooladmin1, Org: DISIT  
Role: RootAdmin, Level: 7

**Data sources Details**

Device	Values	Healthiness	Image	Licensing	User
GPS Coordinates:					
High-Level Type:	Dashboard-IOT App				
Nature:	From Dashboard to IOT App				
Subnature:	Mobile PAXCounter 01 in Antwerp				
Value Name:	nr8a0bv				
Device ServiceURI or Data ID:					
Sensor ServiceURI or Data ID:					
Datasource:	From Dashboard to IOT App				
Ownership:	private (My Own)				
Organizations:	Other				

Healthiness | Last Check | Ownership

●	2020-07-22 19:21:41	private
●	2020-07-22 19:21:41	private
●	2020-06-19 22:48:27	private (My Own)
●	2019-03-04 23:20:42	private
●	2020-07-06 10:34:39	private (My Own)
●	2020-07-06 10:34:39	private
●	2020-07-22 19:21:41	private
●	2019-03-04 23:20:42	private

Link to lot App  
List of Dashboard

Link to dashboard "Mobile PAXCounter 01 in Antwerp"  
Link to dashboard "PaxMobAnt05"  
Link to dashboard "Mobile PAXCounter 03 in Antwerp"

**Mobile PAXCounter 01 in Antwerp**

No data available

Begin: 19:00, Finish: 19:00, Activate

CUMULATIVE MODE: OFF, Device in Cumulative Mode: OFF

**Data Inspector**

User: roottooladmin1, Org: DISIT  
Role: RootAdmin, Level: 7

My Snap4City.org

My Dashboards

My Dashboards in All Org.

My Dashboards of My Organization

My Dashboards in My Organization

Extra Dashboard Widgets

Notificator

Data, my Data, OpenData

**Data Inspector**

My Data, KPI, POI

My Groups of Entities

Data Set Manager: Data Gate

DataGate Harvester

Add Data Sources into the Platform

High Level Types

Supported Protocols, HowTo add

Interoperability & Standards

Knowledge and Maps

IOT Applications

IOT Directory and Devices

Resource Manager

Development Tools

Management

Decision Support Systems

Map

Single data widgets

Data widgets

Controls:

Optic Mode

and sensors that you need for your synoptics.

**Data sources Details**

Device	Values	Healthiness	Image	Licensing	User
GPS Coordinates:	60.215797, 24.812305				
High-Level Type:	MyKPI				
Nature:	UtilitiesAndSupply				
Subnature:	Agents				
Value Name:	S4CAntwerpAppUsage				
Device ServiceURI or Data ID:	17056644				
Sensor ServiceURI or Data ID:	17056644/App Usage Information Saved From The App				
Datasource:					
Ownership:	private				
Organizations:	Antwerp				

Healthiness: true

Last Click: 2020-08-10 13:09:02

Ownership: private

2020-08-10 13:09:02 private

2020-08-10 13:09:02 private

15.9

Link to MyKPI

List of lotApp

- Click with the mouse on it

No.	Value	Latitude	Longitude	Data Time	Insert Time	Control
142950	ok	52.29346	4.422791	20/08/2019 19:04:34	20/08/2019 19:04:39	OK
142950	ok	52.29383	4.422754	20/08/2019 19:04:37	20/08/2019 19:04:38	OK

Showing 1 to 3 of 3 MyKPI value

Page Number

List of lotApp

Link to lotApp nrqolob

Node-RED

Flow 3 | Flow 1 | **Flow 2** | Flow 4

input

- inject
- catch
- status
- link
- mgt
- http
- websocket
- stop
- vtip
- amp
- amp2
- stomp

output

- debug

Flow 2

Name: Flow 2

ID: "54396f1a-66e43"

Status: Enabled

Information

timestamp t

random

Save on Room 1

msg payload

random

Save on Room 2

msg payload

Some functionalities are limited to certain roles

TOP

# Dashboard Management

FORGING & MANAGING OPEN AND FLEXIBLE WEB AND MOBILE APPS

FROM CITY DASHBOARD TO APPLICATIONS

IOT APPLICATIONS VS IOT EDGE DEVICES

SNAP4CITY FOR BEGINNERS

SNAP4CITY ARCHITECTURE AND ECOSYSTEM. OPENED TO DEVELOPERS AND STAKEHOLDERS

TWITTER VIGILANCE SOCIAL MEDIA ANALYSIS

SNAP4CITY AND KM4CITY PROJECTS

DATA CENTERIN AND CITY DATA KNOWLEDGE MANAGEMENT

DATA ANALYSIS BUSINESS INTELLIGENCE SIMULATION

HOW TO ADOPT SNAP4CITY, AND ROADMAP




DECISION SUPPORT SYSTEM AND CITY RESILIENCE

SNAP4CITY THE VIEW OF THE ADMINISTRATORS

IOT APPLICATIONS, THE LOGIC AND THE SMARTNESS

ADVANCED SMART CITY API, MICROSERVICES, SNAP4CITY API

SNAP4CITY LIVING LAB FOR COLLABORATIVE WORK

-  Dashboards (Public)
-  Dashboards of My Organization
-  My Dashboards in My Organization



TOP

# *Dashboards List, Manage, Share, Delegate, Clone, ...*





# Dashboard List and Editor

Snap4City
Dashboards

User: rootooladmin1, Org: none  
Role: RootAdmin, Level: 7

- Dashboards**
- My Dashboards
- Notifier
- IOT Applications
- My Personal Data
- IOT Directory and Devices
- Knowledge and Maps
- Micro Applications
- External Services
- Data Set Manager: Data Gate
- Resource Manager: Process Loader
- Development Tools
- Management
- Settings
- User Management and Auditing
- Help and Contacts
- Documentation and Articles
- My Profile
- Snap4City portal
- Km4City portal
- DISIT Lab portal

Cards
↓ A Z
↓ Z A
🔍
🔄

Prev
1
2
Next

🔍
✕

New dashboard

**DataCenter**  
Passive

disit: Public

Edit Management Clone Delete

**Datacenter Energy Consumption**  
Passive

disit: Public

Edit Management Clone Delete

**DataCenter gas and smoke (desktop)**  
Passive

disit: Public

Edit Management Clone Delete

**DataCenter gas and smoke (mobile)**  
Passive

disit: Public

Edit Management Clone Delete

**FirenzeWiFi**  
Passive

disit: Private

Edit Management Clone Delete

**Florence data overview**  
Passive

disit: Public

Edit Management Clone Delete

**Leonardo - Smart city data 2**  
Passive

Leonardo: Public

Edit Management Clone Delete

**My data and trends**  
Passive

nicola.mitolo: Public

Edit Management Clone Delete

**My data trends**  
Passive

nicola.mitolo: Public

Edit Management Clone Delete

**Notifier monitoring**  
Passive

disit: Public

Edit Management Clone Delete

**Pisa Real Time Data**  
Passive

mitolo: Public

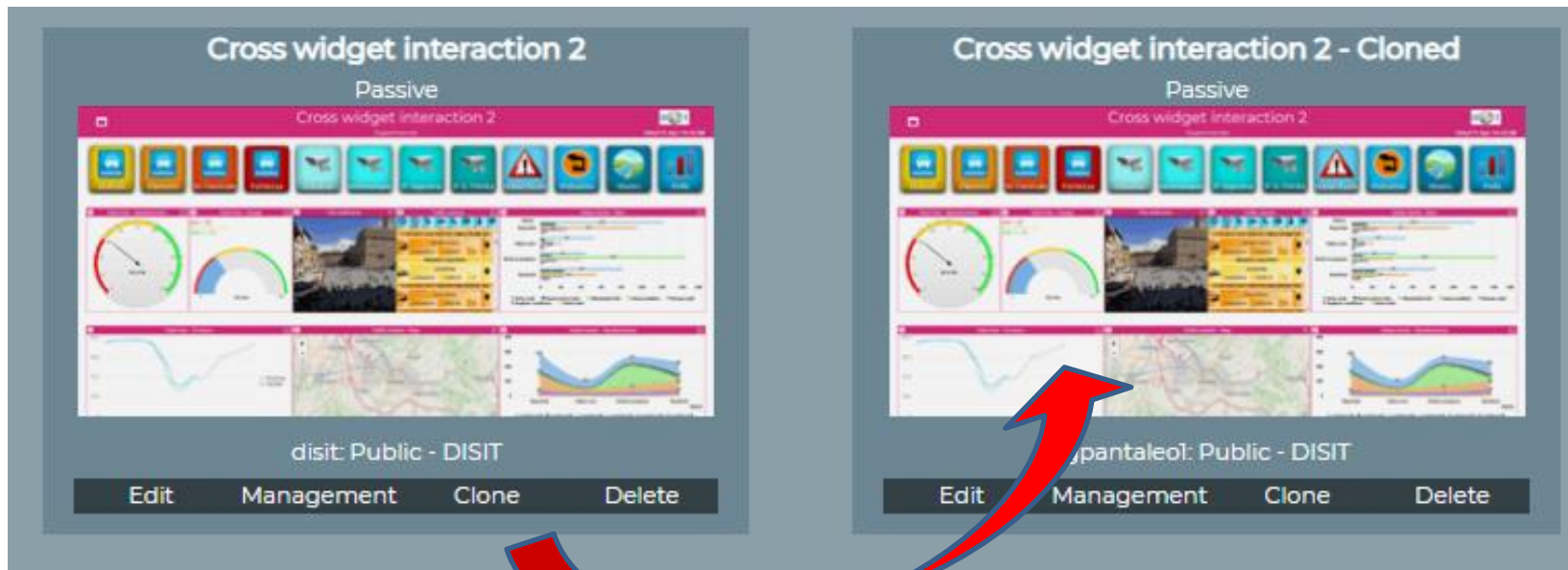
Edit Management Clone Delete

**Real Time Sensors via ServiceMap3D**  
Passive

disit: Public

Edit Management Clone Delete

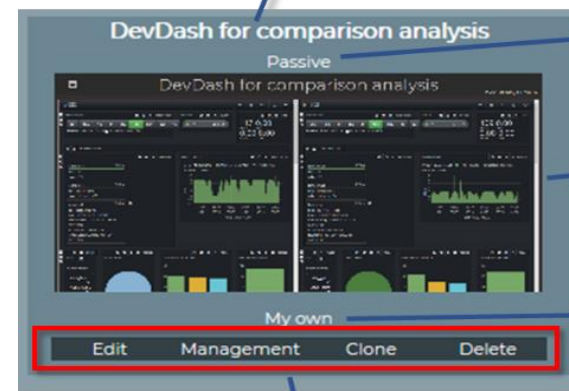
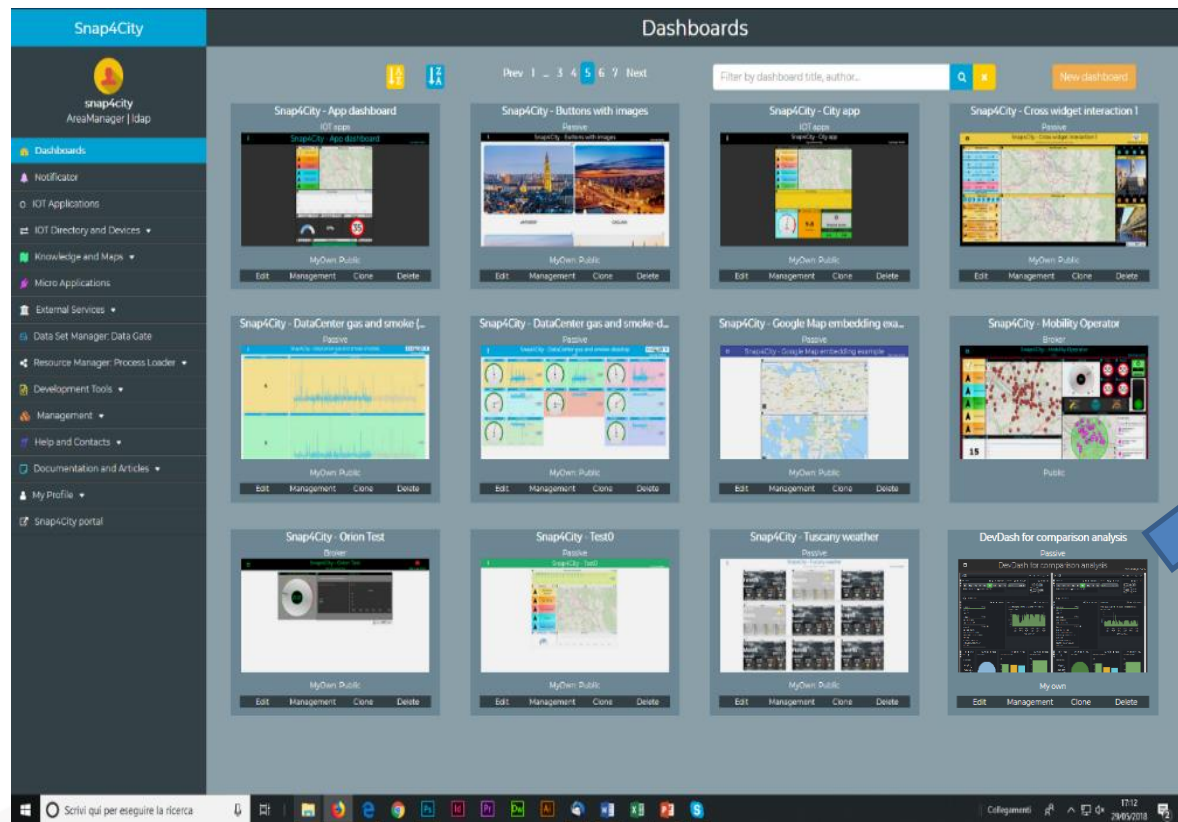
# Clone Dashboard



- Cloned: Same dash with title having «- Cloned» at the end
  - You can: Clone, change name, pass to your colleague, edit, etc.
- Be careful that exploited resources are not cloned



# Dashboard Listing and Features



Dashboard Title

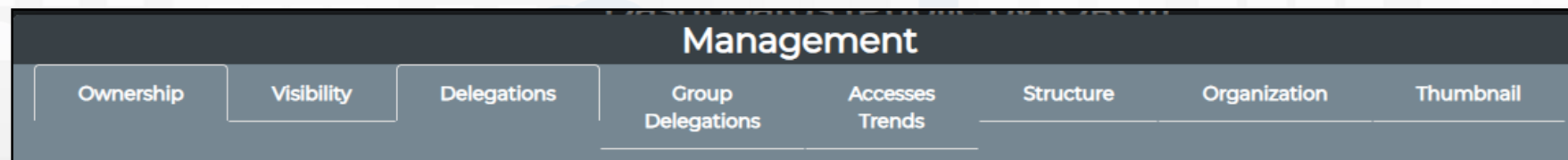
Dashboard Type

Dashboard Preview  
(click to open the dashboard in view)

Ownership

Additional actions  
(only for the dashboard owner)

- Edit (open Dashboard Builder)
- Management
- Clone (clone the Dashboard)
- Delete (delete the Dashboard)



# Dashboard Management

- **Change Ownership**

- Towards any user
- Knowing the nickname

- **Visibility**

- **Public or Private**
- please note that data has to be published as well to make them accessible

The screenshot shows the 'Management' interface for an 'Air Quality Sensor in Jätkäsaari - Helsinki'. The 'Ownership' tab is active. On the left, there is a map of Helsinki with several green sensor icons. On the right, the 'Change ownership' section contains a text input field labeled 'New owner username' and a blue 'Confirm' button. A yellow warning message below the input field reads 'New owner username can't be empty'. A yellow 'Close' button is located in the bottom right corner.

The screenshot shows the 'Management' interface for the same 'Air Quality Sensor in Jätkäsaari - Helsinki'. The 'Visibility' tab is active. On the left, the same map of Helsinki is shown. On the right, the 'Change visibility' section features a dropdown menu currently set to 'Public' and a blue 'Confirm' button. A yellow 'Close' button is visible in the bottom right corner.

# Dashboard Management

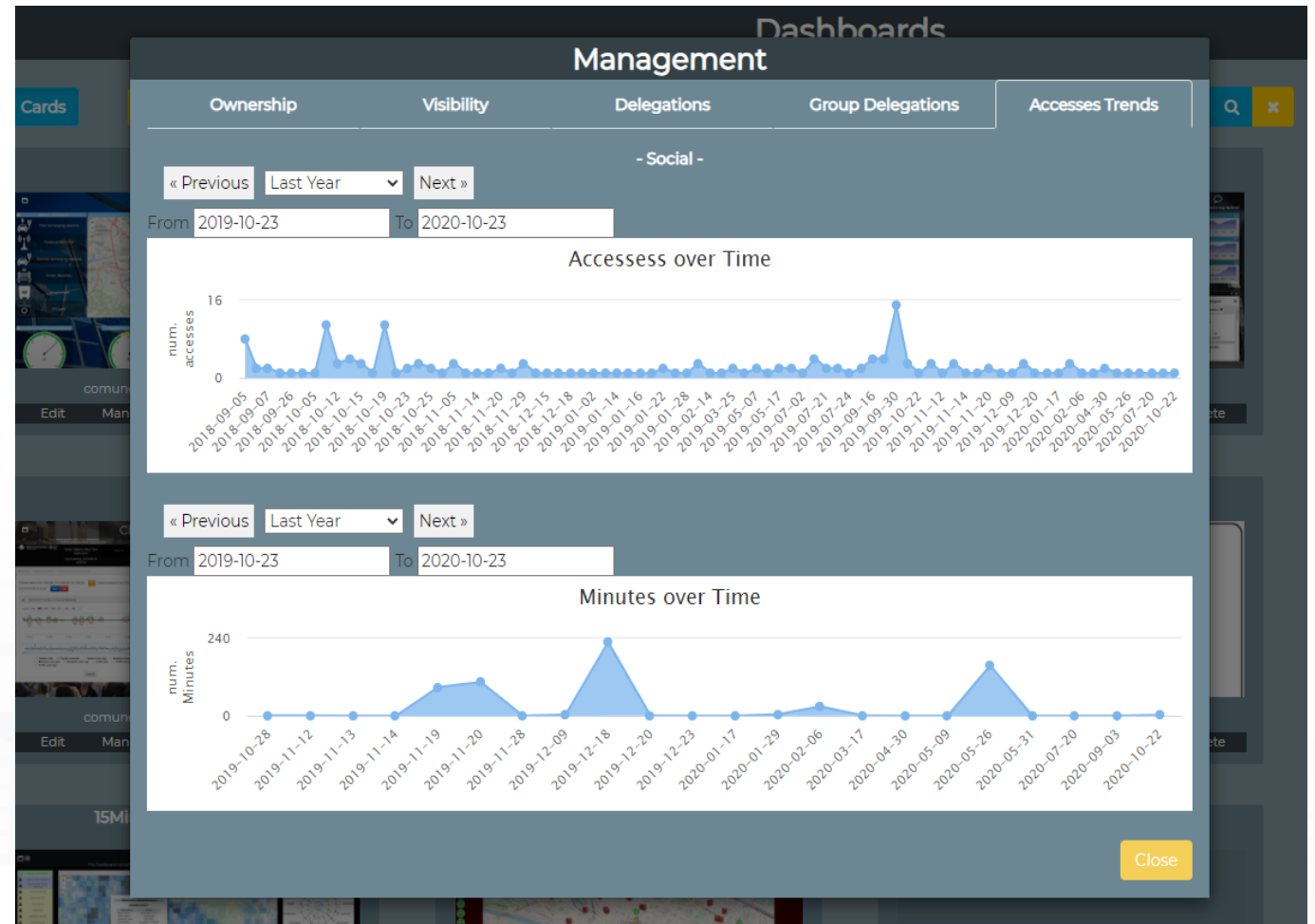
- **Delegation access to other users**
  - See next example
- **Delegation Access to other Groups [Higher roles cross Organization]**
  - See next example

The screenshot shows the 'Management' interface for a sensor. The 'Delegations' tab is active. On the left, there is a preview of the sensor's dashboard titled 'My Sensor 373773207E330118 - Helsinki - H3'. On the right, there is a form to 'Add new delegation' with a text input for 'Delegated username' and a 'Confirm' button. A message below the input says 'Delegated username can't be empty'. Below the form, there is a table for 'Current user delegations' with one entry: 'barc2019' with a 'Remove' button (marked with a red X). A 'Close' button is in the bottom right corner.

The screenshot shows the 'Management' interface for group delegations. The 'Group Delegations' tab is active. On the left, there is a preview of a comparison dashboard titled 'Helsinki vs Antwerp comparison'. On the right, there is a form to 'Add new group delegation' with two dropdown menus: 'Helsinki' and 'Citizens', and a 'Confirm' button. Below the form, there is a table for 'Current group delegations' with one entry: 'Helsinki - All Groups' with a 'Remove' button (marked with a red X).

# Monitoring Dashboard Usage

- **Key Performance Indicators**
  - Number of Accesses
  - Minutes of exposition
- **Time Periods:**
  - Day by Day
  - Week by Week
  - Month by Month
  - 6 months by 6 months
  - Year by Year



TOP

# *The Organization and its Dashboard menu*



# Dashboard Menu a Short Cut for other.....

- **Each Organization** on Snap4City may define its own Menu on Dashboards
  - The Menu can be activated or not in each single Dashboard of the ORG
- **Definition includes** a list of Items and Subitems, each of which with
  - colors & icons
  - Links to web pages/dashboards to be activated and modality
  - User Roles at which it has to be proposed
  - Etc.

## [TC 1.23 - Dashboard Menu management per Organization](https://www.snap4city.org/dashboardSmartCity/view/index.php?iddashboard=MjE5MA==)

<https://www.snap4city.org/dashboardSmartCity/view/index.php?iddashboard=MjE5MA==>

The screenshot displays the 'Mobility' dashboard interface. A menu overlay is visible on the left side, listing various items and subitems. The 'Environment' subitem is currently selected and highlighted in blue. Below the menu, a list of items is shown with up arrow icons, including 'Air Temp. Heatmap', 'Wind Speed Heatmap', 'Gral Pred. HM NOX (3m)', 'Gral Pred. HM NOX (6m)', 'Traffic Sensors', 'Traffic Flow', 'Cycling Paths', 'Accident Heatmap', and 'Only HRes Anym. Gral'. The background features a map of an urban area with several red circular markers indicating specific locations or data points. The map includes labels for streets like 'Via Pratese', 'Via Pistoiese', and 'Viadotto Indiano', and areas like 'Quaracchi', 'Peretola', 'Mantignano', and 'Cintoia'. The top right corner of the dashboard shows the title 'Mobility' and the subtitle 'This dashboard'.

# Mixt per Roma

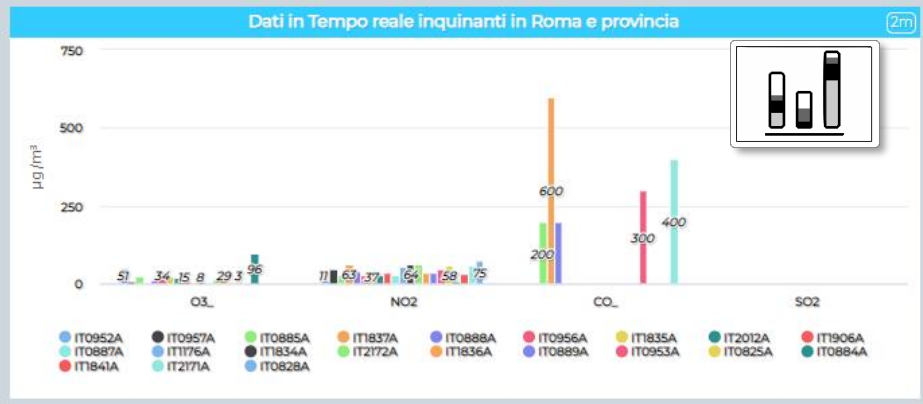
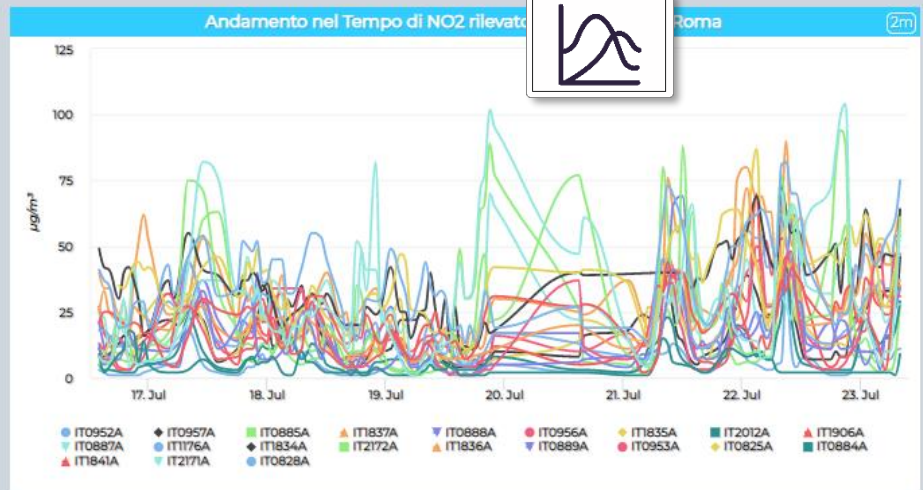
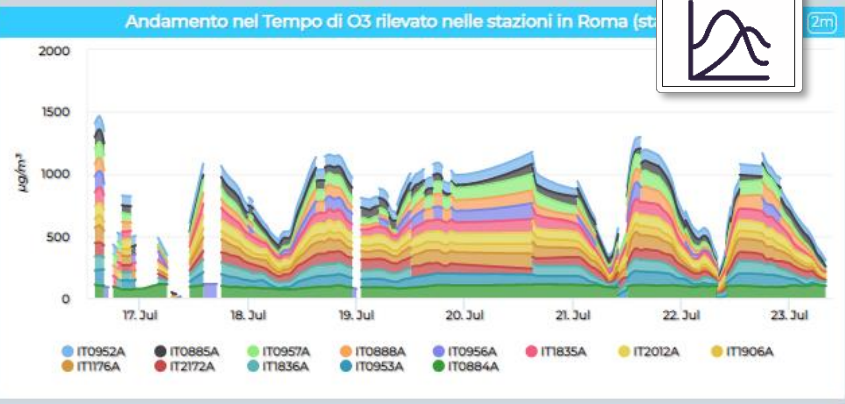
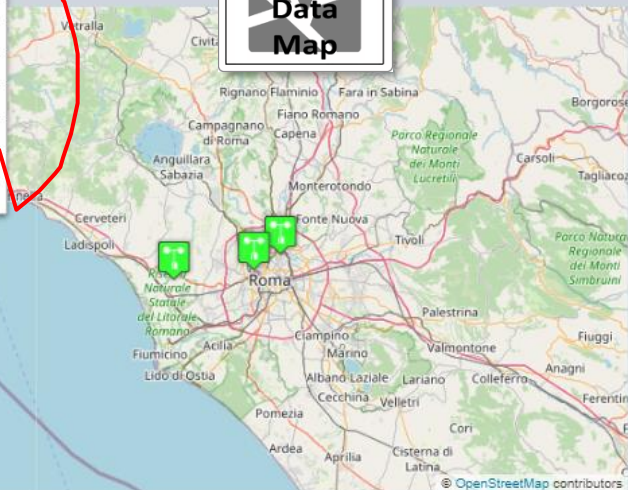
## Roma Demo3 (Qualità dell'Aria)

Thu 23 Jul 13:35:09

**MENU**

- Home
- Maps
- Mobility and Transport
- Environment
- Social
- Some Services
- Infrastructure
- Quit

**Multi Data Map**



Valori Inquinanti in tempo reale, mappe 2m

value type / value name	O3_	NO2_	CO_	SO2_
IT0952A	51	11		
IT0957A	7	46		
IT0828A				
IT2171A				
IT0952A				
IT0885A	25	29	200	
IT1837A		63	600	
IT0888A	11	37	200	
IT0956A	34	29		
IT1835A	24	37		
IT2012A	20	29		
IT1906A	15	34		
IT0887A		28		
IT1176A	8	54		
IT1834A		64		
IT2172A	15	61		
IT1836A	29	35		
IT0953A	3	47	300	1.3
IT0889A		34		
IT0825A		58		
IT0884A	96	9		
IT1841A		31		
IT2171A		57	400	
IT0828A		75		

Home Trasporti

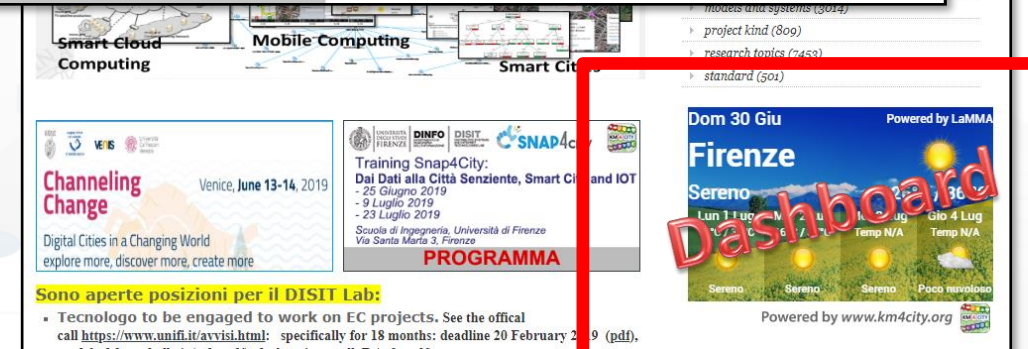
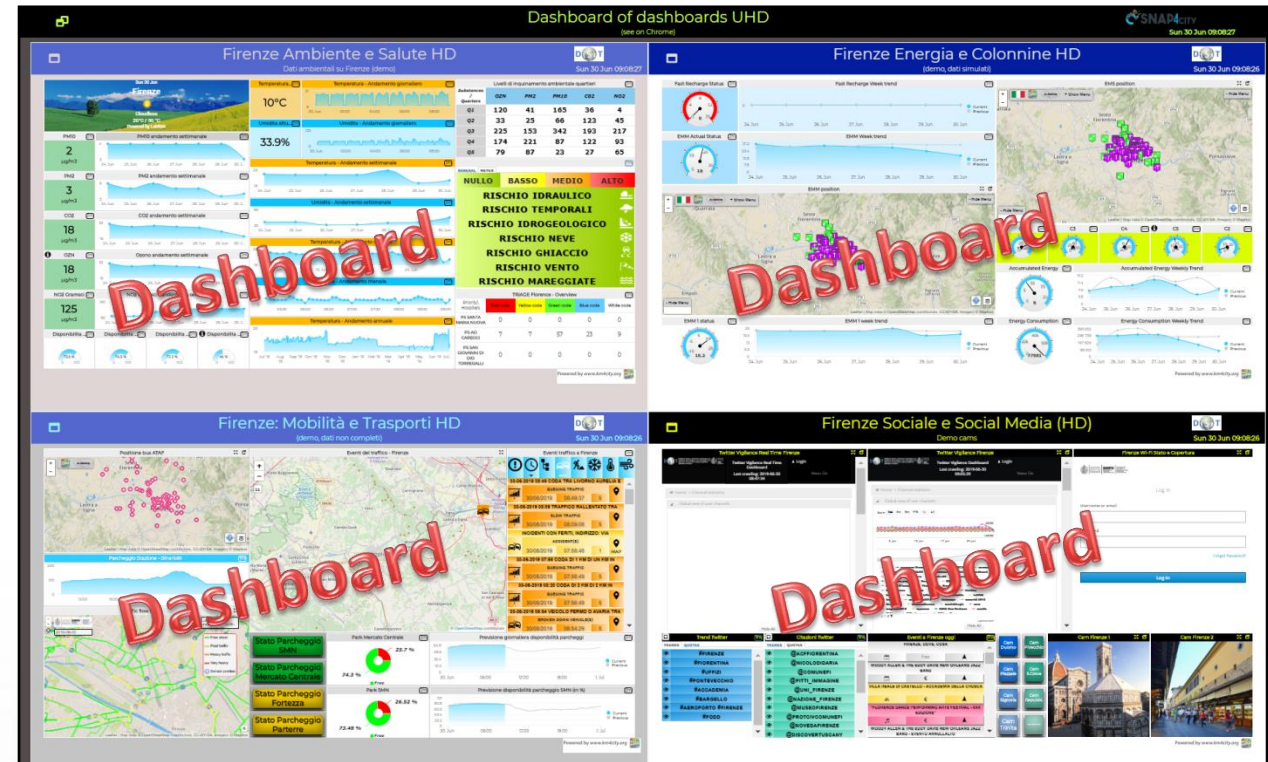
# *Dashboard Embedding into third party Web Sites/pages*





# Additional Properties from Edit Dashboard

- **Embedding Dashboards into**
  - a Dashboard
  - third Party Web Page
- **Header or not**
- **Footer or not**
- **Responsive or not**
- **Size: any**
- **Background Image: any**
- **Add / change Screenshot (Thumbnails)**
- **Menu on left upper corner or not**



## Example of Dashboard without header

- To embed a dashboard without the header you can use the command
  - <https://www.snap4city.org/dashboardSmartCity/view/index.php?iddashboard=MzMxNw==&embedPolicy=auto>
  - embedPolicy can be: auto | manual
- Then:
  - header will be hidden
  - footer will be reduced to the logo only, centered in the view

## Dashboard Embedding

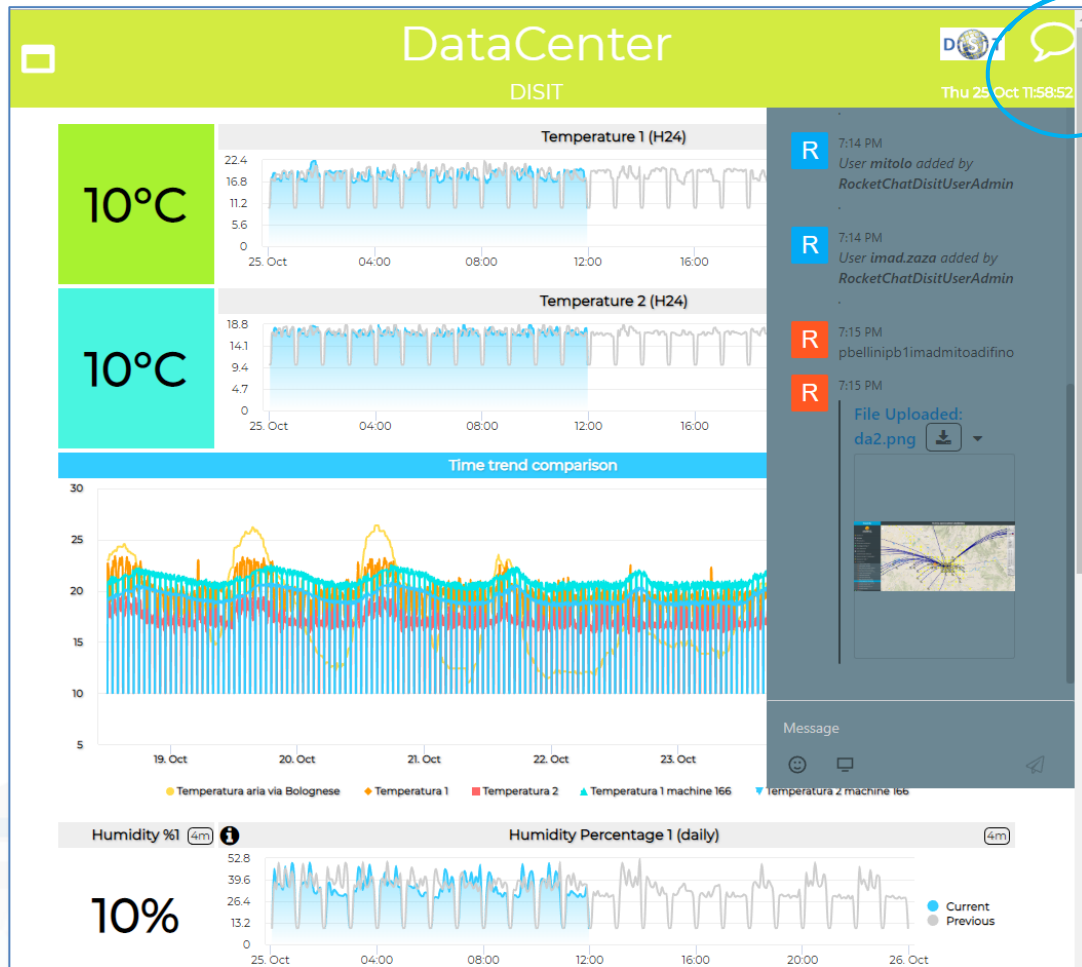
- go in Dashboard Edit
  - Get code for embedding
  - Providing domain on which you embed
  - See Iframe preview
- **Dashboard properties**
  - we suggest set Responsive
  - deciding on header On Off
  - Adjust size of Iframe and dashboard for tuning

TOP

# Private Dashboard ChatRoom



# Private ChatRoom per Dashboard



## Chat Management

The screenshot shows a chat management interface. On the left, there is a sidebar menu with various options, including "User Chats Management" which is highlighted. The main area displays a list of channels and private groups. The chat history shows messages from users and system notifications, including a file upload of "da2.png".

# Chat Rooms

- **Activated** by the Dashboard creator which can invite a number of users of the platform to
  - Exchange Comments and Pictures
  - access on web and mobile
  - provoke notifications
- Accessible only under authentication
- The administrator can access to the log for review and log of the discussions.
- Chat Room capability is available as an additional appliance

# Dashboard Chat Rooms

- Each Dashboard may have only **one separate ChatRoom**
- The Dashboard Owner can
  - Activate the Chat Room on Dashboard header in Edit
  - Add users of the platform to the chat room
- The **Chat Room**
  - Allows to Exchange Comments and Pictures
  - Can be Accessed on web and mobile
  - May Provoke notifications on the header of the Dashboard
  - Is accessible only under authentication
- The Administrators can access to the Log for review of the discussions

# Dashboard Structure

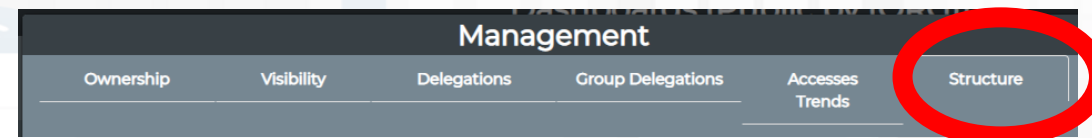




# Dashboard Structure

- **For each Dashboard** (Name, ID, ORG, Users, etc..) you can have
  - W number of widgets
    - For each Widget
      - Name,
      - A data (1 ...N)
  - I number of IoT Applications
    - ....
- **Thus:**
  - Different Dashboards may share the same data
  - Different Widgets in different Dashboards may share the same data...
  - Critical courses,..... More relevant data....

- **Access from Dashboard Management**



# Dashboard Management: Graph of Smart Application

**Management**

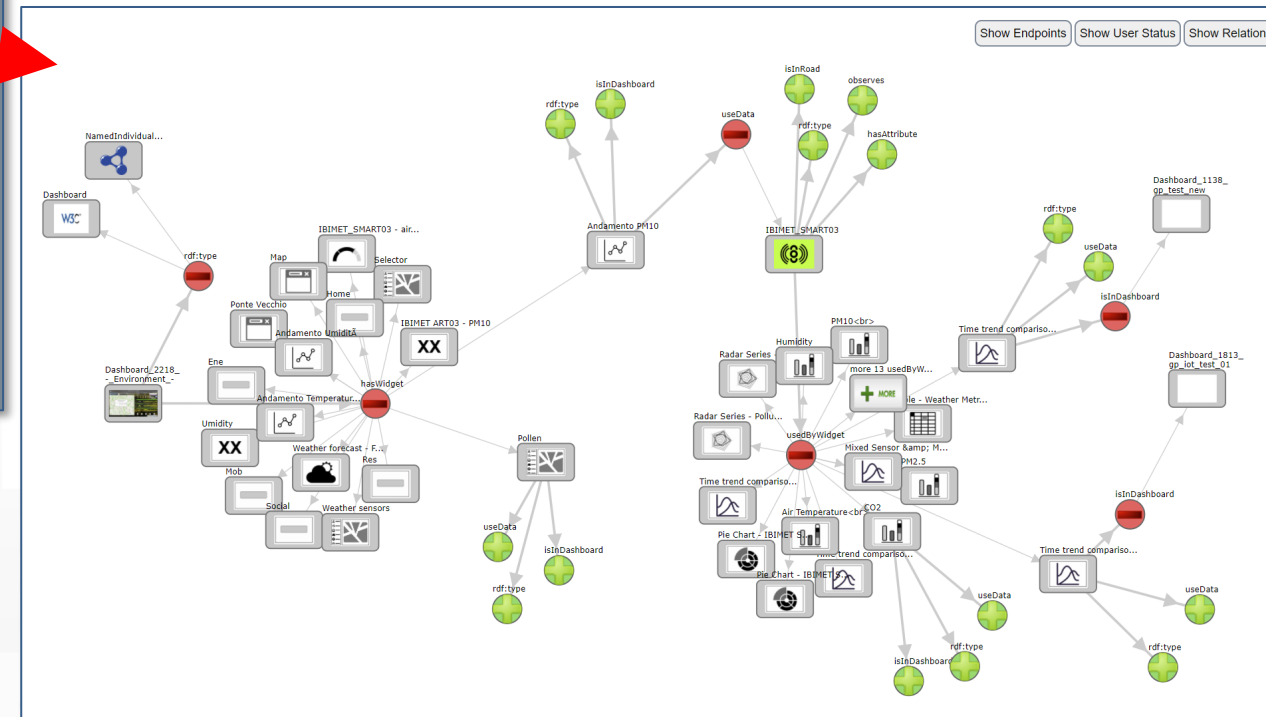
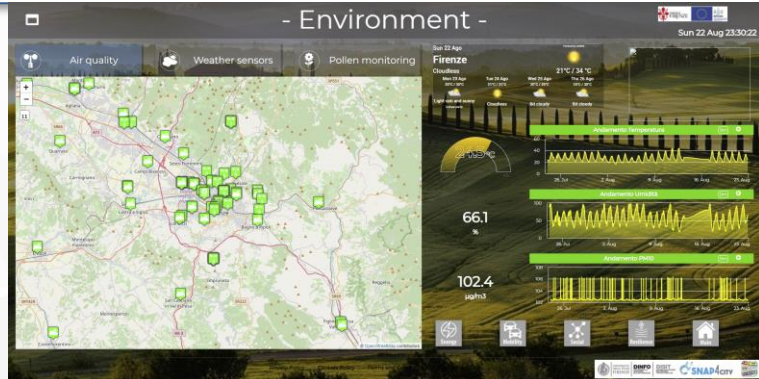
Ownership    Visibility    Delegations    Group Delegations    Accesses Trends    **Structure**

[Link to Graph](#)

Dashboard Hierarchy

Dashboard: - Environment -

- **Widget:** Ene - (*widgetButton*)
- **Use Data:**
  - **wfs:**
  - **Query:** <https://main.snap4city.org/view/index.php?iddasboard=MjMwNQ==>
  - [Link to Data Inspector \(root\)](#)
  - [Link to Graph log](#)
- **Widget:** Mob - (*widgetButton*)
- **Use Data:**
  - **wfs:**
  - **Query:** <https://www.snap4city.org/dashboardSmartCity/view/index.php?iddasbo...>
  - [Link to Data Inspector \(root\)](#)
  - [Link to Graph log](#)





TOP

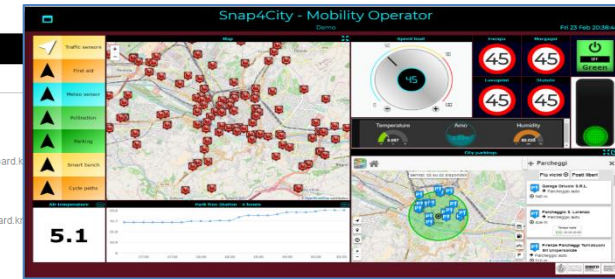
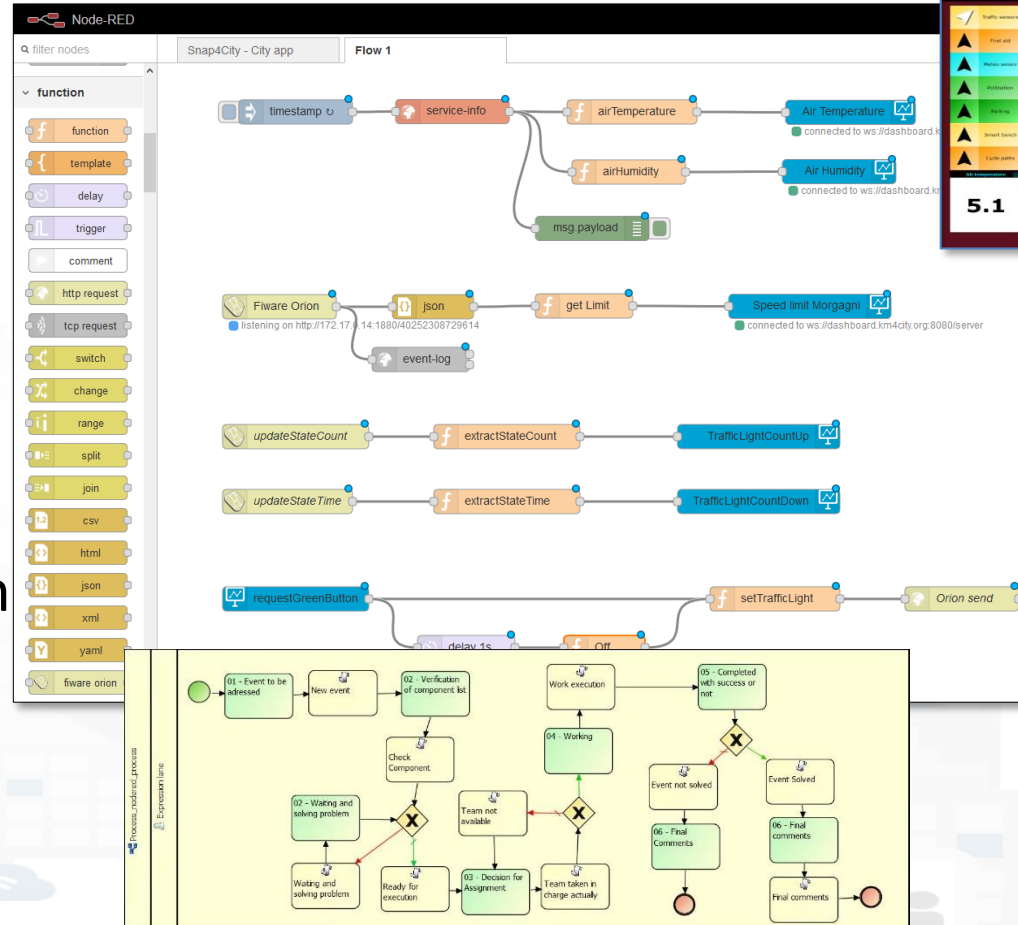
# *Notifications from Dashboard and from any Data Condition*



# Smart City Monitoring: notifications, alerting

## Notification with IOT App may

- Fire on any kind of condition exploiting on IOT App logic
- produce messages/events on
  - **Facebook, Telegram,**
  - **SMS, MMS, IOT Devices, ..**
  - **email, LOGS, FTP, ..**
  - **dashboards, mobiles, ...**
  - **Workflow/incident management system for ticketing**
  - **video wall management,**
  - **Video Management System Milestone**
  - etc. etc.





# Training Material



	1st part	2nd part	3rd part	4th part	5th part	6th part	7th part	8th
what	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
PDF 2022								
Interactive (2022) with video and animations								

<https://www.snap4city.org/577>



*On Line Training Material (free of charge)*

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

	1st part	2nd part	3rd part	4th part	5th part	6th part	7th part	8th
What	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
PDF 2022								
Interactive (2022) with video and animations								

Video1								
Video2								
Video3								
Video4				none		none	none	none

# Note on Training Material

- **Course 2023:** <https://www.snap4city.org/944>
  - Introductionary course to Snap4City technology
- **Course** <https://www.snap4city.org/577>
  - Full training course with much more details on mechanisms and a wider set of cases/solutions of the Snap4City Technology
- **Documentation** includes a deeper round of details
  - Snap4City Platform Overview:
    - <https://www.snap4city.org/drupal/sites/default/files/files/Snap4City-PlatformOverview.pdf>
  - Development Life Cycle:
    - <https://www.snap4city.org/download/video/Snap4Tech-Development-Life-Cycle.pdf>
  - Client Side Business Logic:
    - <https://www.snap4city.org/download/video/ClientSideBusinessLogic-WidgetManual.pdf>
- **On line cases and documentation:**
  - <https://www.snap4city.org/108>
  - <https://www.snap4city.org/78>
  - <https://www.snap4city.org/426>



Dashboards (Public)

My Snap4City.org

Tour Again

www.snap4solutions.org

Dashboards of My Organization

My Dashboards in My Organization

My Data Dashboard Dev Kibana

Extra Dashboard Widgets

Data Management, HLT

Knowledge and Maps

Processing Logics / IOT App

Entity Directory and Devices

Resource Manager

Development Tools

Management

Decision Support Systems

Deploy and Installation

Help and Contacts

Documentation and Articles



Home / Snap4City: Smart aNalytic APp builder for sentient Cities and IOT

# Snap4City: Smart aNalytic APp builder for sentient Cities and IOT

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## Search

Search input field with dropdown menu showing '-Any-'

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Flyer | Data Analytics Artificial Intelligence | Innovations | Interoperability | Installations

What People say | Mobile Apps | IOT Devices | IOT Applications | Data Analytics | Dashboards | Living Lab | Smart City API | Ontology | Work with Us

Articles | SNAP4CITY on EUROPEAN OPEN SCIENCE CLOUD MARKETPLACE | SNAP4CITY HACKATHON | INDUSTRY 4.0 | Snap4Industry | Snap4Home



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## Organization Groups

- DISIT
  - Developer
  - Operativo

- TECHNICAL OVERVIEW: <https://www.snap4city.org/download/video/Snap4City-PlatformOverview.pdf>
- Development Life Cycle: <https://www.snap4city.org/download/video/Snap4Tech-Development-Life-Cycle.pdf>
- Client-Side Business Logic Widget Manual: <https://www.snap4city.org/download/video/ClientSideBusinessLogic-WidgetManual.pdf>
- Booklet Data Analytics, Snap4Solutions: [https://www.snap4city.org/download/video/DBL\\_SNAP4SOLU.pdf](https://www.snap4city.org/download/video/DBL_SNAP4SOLU.pdf)

# 2022 booklets



- Snap4City



[https://www.snap4city.org/download/video/DPL\\_SNAP4CITY\\_2022-v02.pdf](https://www.snap4city.org/download/video/DPL_SNAP4CITY_2022-v02.pdf)

- Snap4Industry



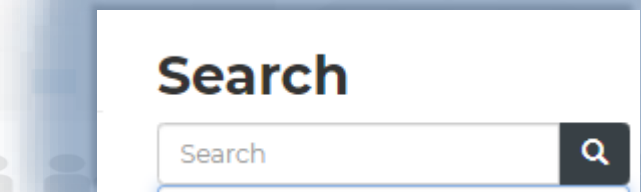
[https://www.snap4city.org/download/video/DPL\\_SNAP4INDUSTRY\\_2022-v03.pdf](https://www.snap4city.org/download/video/DPL_SNAP4INDUSTRY_2022-v03.pdf)

- Solutions
- Data Analytics



[https://www.snap4city.org/download/video/DPL\\_SNAP4SOLU.pdf](https://www.snap4city.org/download/video/DPL_SNAP4SOLU.pdf)

- **Free Registration on Snap4City.org**
  - Please select DISIT ORG to be sure to access at the examples
  - Most of the cities / tenant are private and they do not left much visible
- **What you get** is probably the 10% of what is on the platform 😊
- **Training:** <https://www.snap4city.org/577>
- **Scenarious:** <https://www.snap4city.org/4>
- **Publications:** <https://www.snap4city.org/426>
- **WEB pages:** <https://www.snap4city.org/78>
- ***SEARCH on the right side***



# Tech Overview

- <https://www.snap4city.org/drupal/sites/default/files/files/Snap4City-PlatformOverview.pdf>



### Technical Overview

From: DINFO dept of University of Florence, with its  
DISIT Lab, <https://www.disit.org> with its Snap4City solution

Snap4City:

- Web page: <https://www.snap4city.org>
- <https://twitter.com/snap4city>
- <https://www.facebook.com/snap4city>

Contact Person: Paolo Nesi, [Paolo.nesi@unifi.it](mailto:Paolo.nesi@unifi.it)

- o Phone: +39-335-5668674
- o LinkedIn: <https://www.linkedin.com/in/paolo-nesi-849ba51/>
- o Twitter: <https://twitter.com/paolonesi>
- o FaceBook: <https://www.facebook.com/paolo.nesi2>

# Development

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



## Development Life-Cycle

<https://www.snap4city.org/download/video/Snap4Tech-Development-Life-Cycle-v1-1.pdf>

### From Snap4City:

- We suggest you to read the **TECHNICAL OVERVIEW**:
  - <https://www.snap4city.org/download/video/Snap4City-PlatformOverview.pdf>
- <https://www.snap4city.org>
- <https://www.snap4solutions.org>
- <https://www.snap4industry.org>
- <https://twitter.com/snap4city>
- <https://www.facebook.com/snap4city>
- <https://www.youtube.com/channel/UC3tAO09EbNba8f2-u4vandq>

**Coordinator:** Paolo Nesi, [Paolo.nesi@unifi.it](mailto:Paolo.nesi@unifi.it)

DISIT Lab, <https://www.disit.org>  
DINFO dept of University of Florence,  
Via S. Marta 3, 50139, Firenze, Italy  
Phone: +39-335-5668674

# Client Side Business Logic

<https://www.snap4city.org/download/video/ClientSideBusinessLogic-WidgetManual.pdf>

## Client-Side Business Logic Widget Manual

### From Snap4City:

- We suggest you read <https://www.snap4city.org/download/video/Snap4Tech-Development-Life-Cycle.pdf>
- We suggest you read the TECHNICAL OVERVIEW:
  - <https://www.snap4city.org/download/video/Snap4City-PlatformOverview.pdf>
- slides go to <https://www.snap4city.org/577>
- <https://www.snap4city.org>
- <https://www.snap4solutions.org>
- <https://www.snap4industry.org>
- <https://twitter.com/snap4city>
- <https://www.facebook.com/snap4city>
- <https://www.youtube.com/channel/UC3tAQ09EbNba8f2-u4vandu>

Coordinator: Paolo Nesi, [Paolo.nesi@unifi.it](mailto:Paolo.nesi@unifi.it)  
DISIT Lab, <https://www.disit.org>  
DINFO dept of University of Florence,  
Via S. Marta 3, 50139, Firenze, Italy  
Phone: +39-335-5668674





SMART CITIES AND SMART INDUSTRY

**Snap4City:**  
**FIWARE** powered smart app  
builder for sentient cities

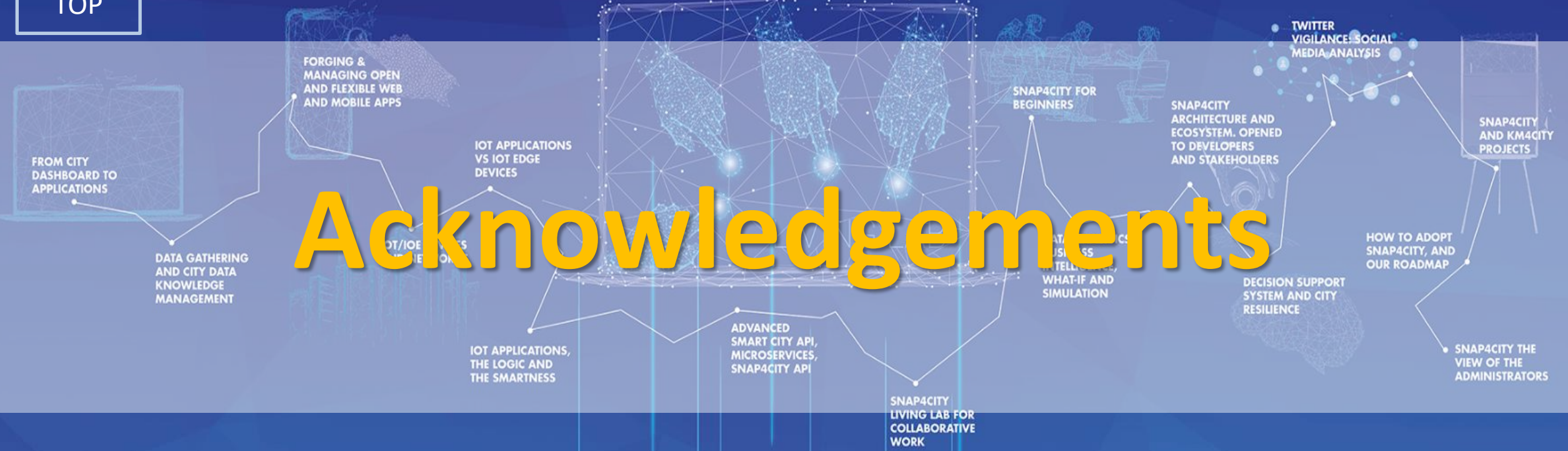
With the contribution of



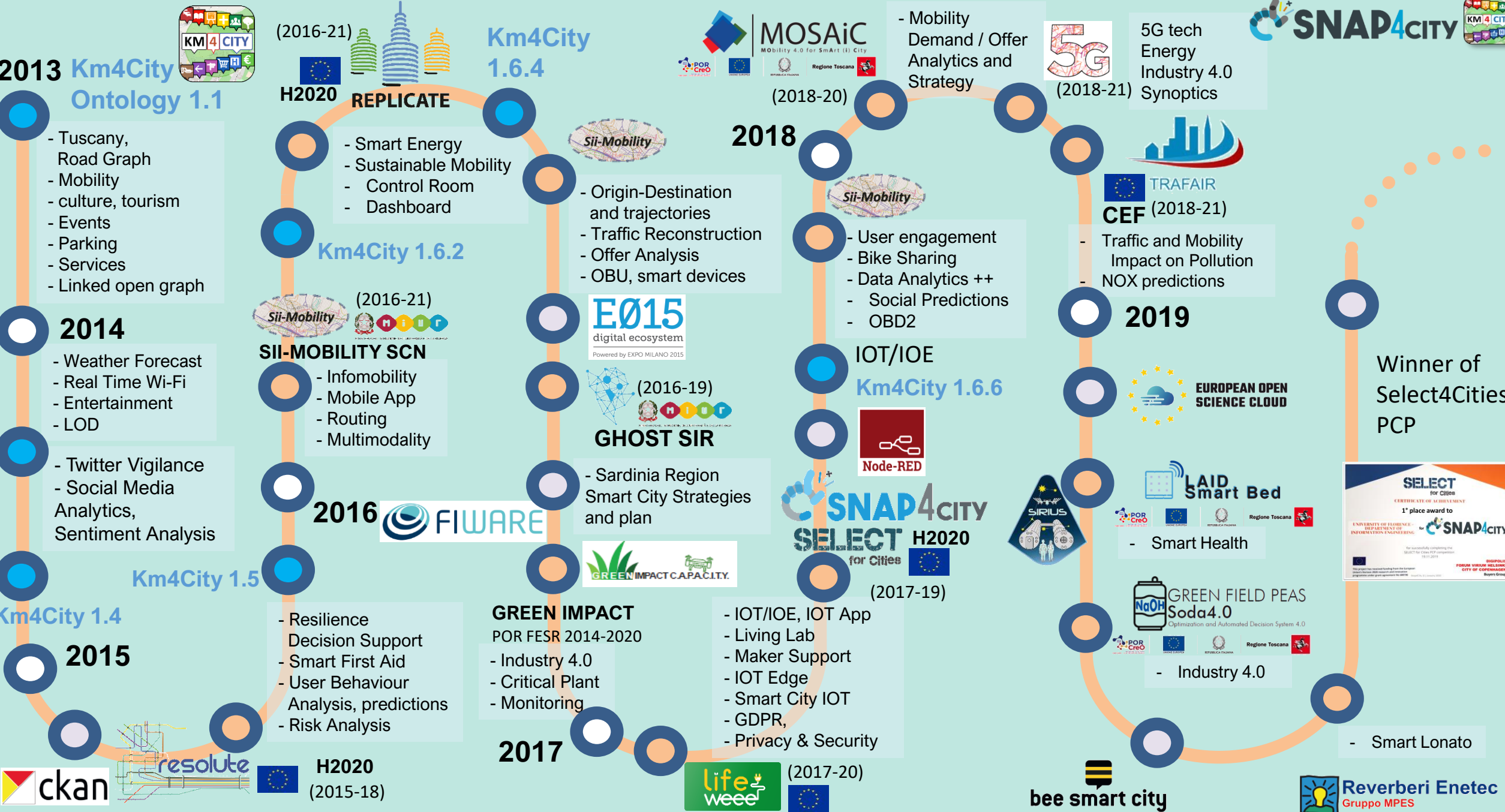
- <https://fiware-foundation.medium.com/snap4city-fiware-powered-smart-app-builder-for-sentient-cities-acfe24df49d5>
- [https://www.snap4city.org/download/sites/default/files/files/FF\\_ImpactStories\\_Snap4City.pdf](https://www.snap4city.org/download/sites/default/files/files/FF_ImpactStories_Snap4City.pdf)

TOP

# Acknowledgements







**2013 Km4City Ontology 1.1**

- Tuscany, Road Graph
- Mobility
- culture, tourism
- Events
- Parking
- Services
- Linked open graph

**2014**

- Weather Forecast
- Real Time Wi-Fi
- Entertainment
- LOD

- Twitter Vigilance
- Social Media Analytics, Sentiment Analysis

**Km4City 1.4**

**2015**

- Resilience Decision Support
- Smart First Aid
- User Behaviour Analysis, predictions
- Risk Analysis



**(2016-21) H2020 REPLICATE**

- Smart Energy
- Sustainable Mobility
- Control Room
- Dashboard

**Km4City 1.6.2**

- (2016-21) SII-MOBILITY SCN**
- Infomobility
  - Mobile App
  - Routing
  - Multimodality

**2016 FIWARE**

- GREEN IMPACT**  
POR FESR 2014-2020
- Industry 4.0
  - Critical Plant
  - Monitoring



**Km4City 1.6.4**

- (2018-20) MOSAIC**  
Mobility 4.0 for Smart (II) City
- Origin-Destination and trajectories
  - Traffic Reconstruction
  - Offer Analysis
  - OBU, smart devices

- (2016-19) GHOST SIR**
- Sardinia Region Smart City Strategies and plan

**2017**

- IOT/IOE, IOT App
- Living Lab
- Maker Support
- IOT Edge
- Smart City IOT
- GDPR, Privacy & Security



**2018**

- Mobility Demand / Offer Analytics and Strategy
- User engagement
- Bike Sharing
- Data Analytics ++
- Social Predictions
- OBD2

**IOT/IOE Km4City 1.6.6**



**2019**

- Smart Health
- Industry 4.0



**SNAP4CITY**

- Traffic and Mobility Impact on Pollution
- NOX predictions

**2019**



- Smart Lonato



**DISIT lab roadmap vs model and tools' usage**



SODA

Smart Ambulance (2021-22)

Enterprise (2021-22)  
Industry 4.0

Almafluida Industry 4.0 (2021-22)

**JRC**  
EUROPEAN COMMISSION  
Contract, 2022-23

2020

**JRC**  
EUROPEAN COMMISSION

**enel x**  
Contract

AMPERE (2021-22)  
Industry 4.0

**ART-ER**  
ATTRATTIVITÀ  
R I C E R C A  
T E R R I T O R I O  
Contract, 2022-23

CN MOST, 2022-26

EI THE, 2022-26

G. Agile, 2021-23

**Interreg** Mediterranean  
HERIT-DATA

2021

PC4City (2020-21)  
Monitoring Terrain

SYN-RG-AI  
SmartCity

**GRUPPO PRETTO**  
Industry 4.0

**Filippi**  
2022-2023

**TUSCANY X.D** EDIH  
2023-26

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

**Interreg** MARITTIMO-IT FR-MARITIME  
**MOBI MART**

Winner of Open Data Challenge of  
**enel x**

**uni.systems**  
SmartCity, 2021-23

**enel x**  
Contract

Merano, smart light

OceanRace, Genova, AWS

Cuneo, Smart City

- Smart Mobility
- PISA, PUMS
- Living lab

**AXIS COMMUNICATIONS**

AXIS collab  
SmartCity

**IMPETUS**  
Security and Risk

2022

**CAPÉLON**  
- Smart Light  
- Sweden

**ASYMMETRICA**  
URBAN TECHNOLOGY  
Asymmetrica  
Smart City, 2022-23

**Smartea**

**ITALFERR**  
GRUPPO FERROVIE DELLO STATO ITALIANE  
Italferr, Smart City



**Km4City 1.6.7**

TOP



*Be smart in a SNAP!*



**SMARTCITY**

EXPO WORLD CONGRESS

7-9 November 2023, Barcelona, Spain

Visit Snap4City in Hall 1

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Fax.: +39-055-2758570



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