



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



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

## Dashboards and Visual Analytics

Nov. 2023, Course, Part 2

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

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

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



UNIVERSITÀ  
DEGLI STUDI  
FIRENZE

**DINFO**  
DIPARTIMENTO DI  
INGEGNERIA  
DELL'INFORMAZIONE

**DISIT**  
DISTRIBUTED SYSTEMS  
AND INTERNET  
TECHNOLOGIES LAB

Paolo Nesi, [paolo.nesi@unifi.it](mailto:paolo.nesi@unifi.it)  
<https://www.Km4City.org>  
<https://www.disit.org>



*Be smart in a SNAP!*



**SMARTCITY**  
EXPO WORLD CONGRESS

7-9 November 2023, Barcelona, Spain

Visit Snap4City in Hall 1

**Dashboards and Visual Analytics**

Nov. 2023, Course, Part 2

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

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

**LIVING LAB**

**SCALABLE SMART ANALYTIC APPLICATION BUILDER FOR SENTIENT CITIES**



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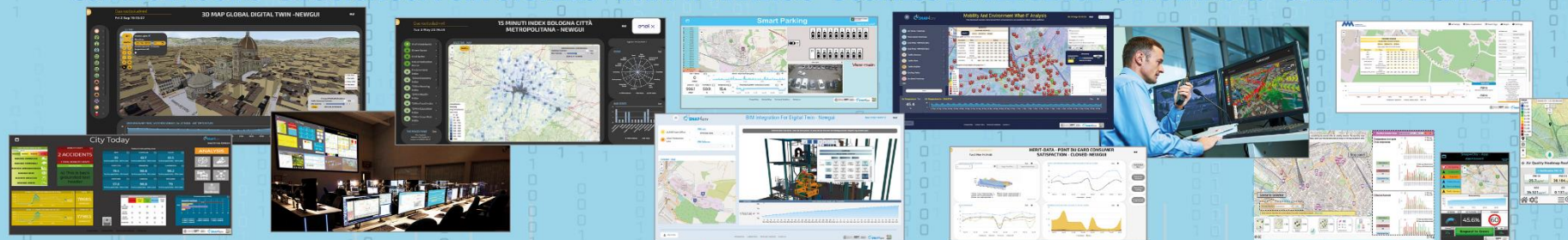


SNAP4CITY

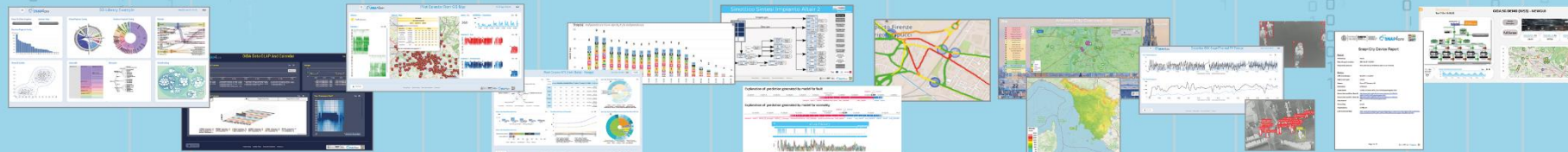


# Smart Solutions and Decision Support Systems

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  
EVENT DRIVEN

Native and External  
Smart Applications

Mobility & Transport

Light & Energy

Waste | Environment

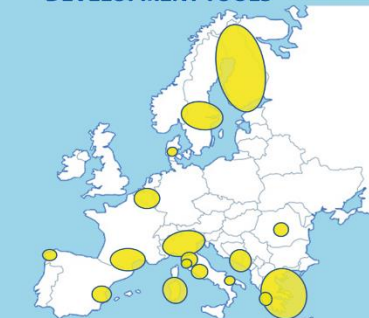
Building | Tourism

Asset Management

Security and Safety

Social Media

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/944>

*On Line Training Material (free of charge)*



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

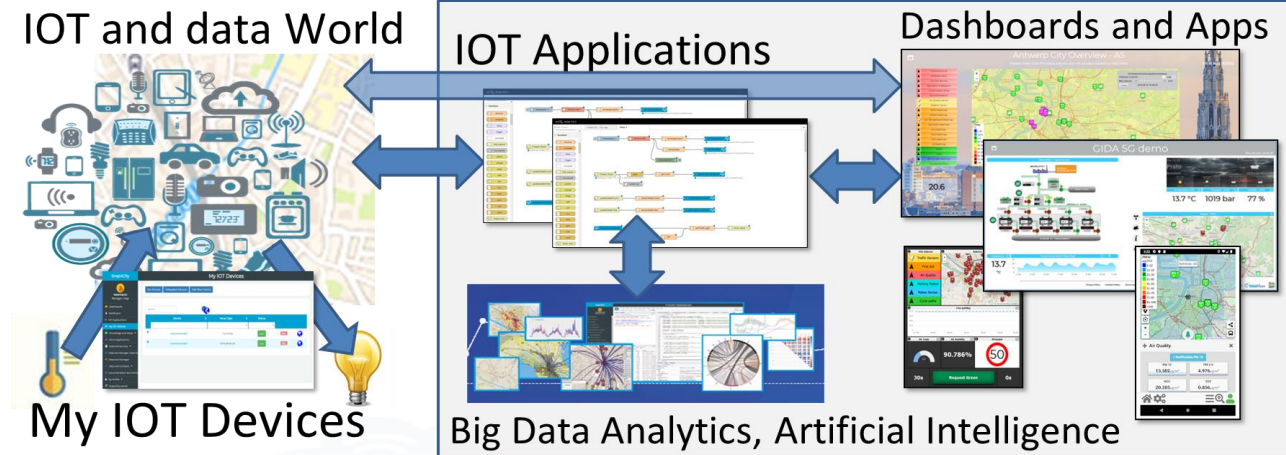


# Note on Training Material

- **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

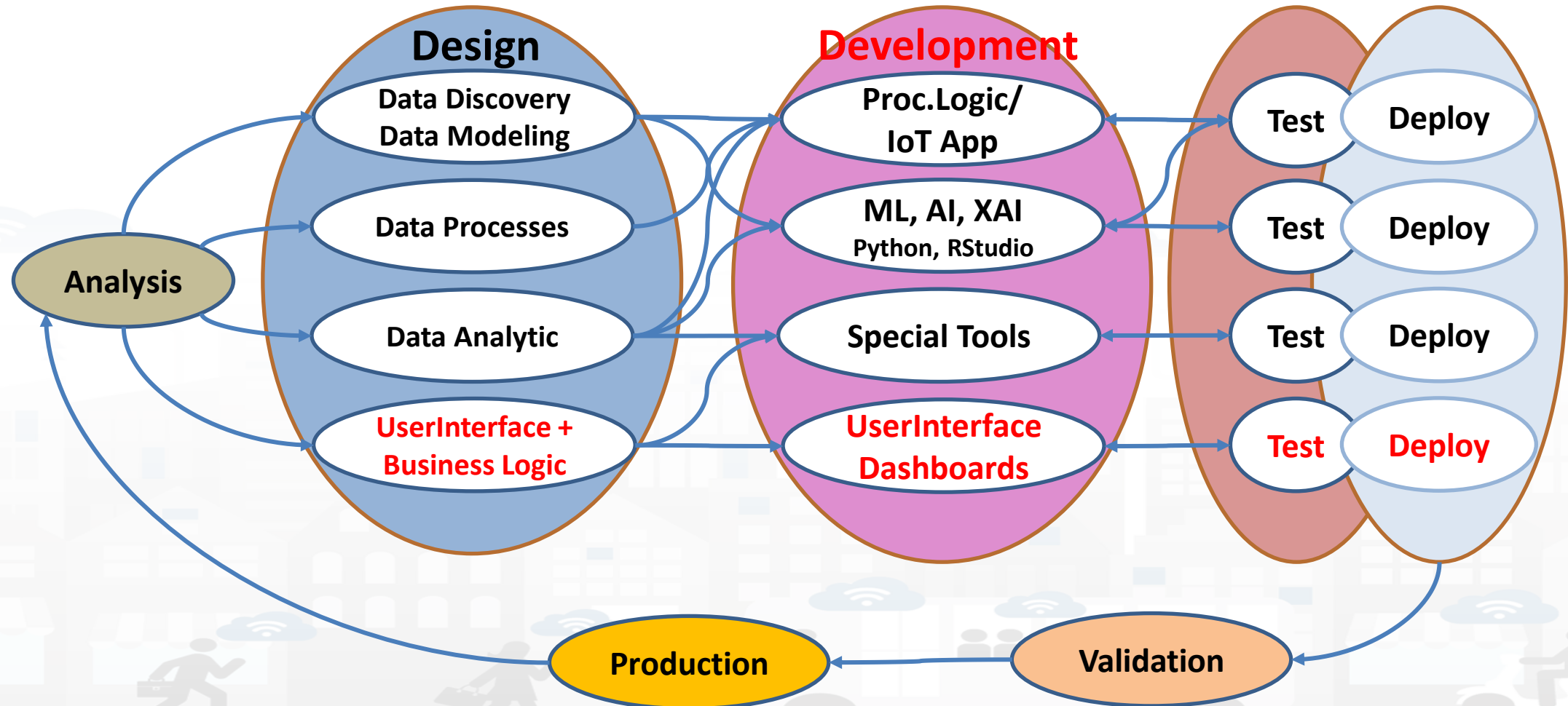
- Recall on Snap4City Architecture
- Snap4City Dashboards Purposes and Uses
  - Snap4City Dashboards vs Technical data monitoring dashboards
  - Snap4City Dashboards main concepts
- Main Data Kinds: data vs representations
- Snap4City DASHBOARDS: Main Concepts and simple Widgets
- Creating a Snap4City 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

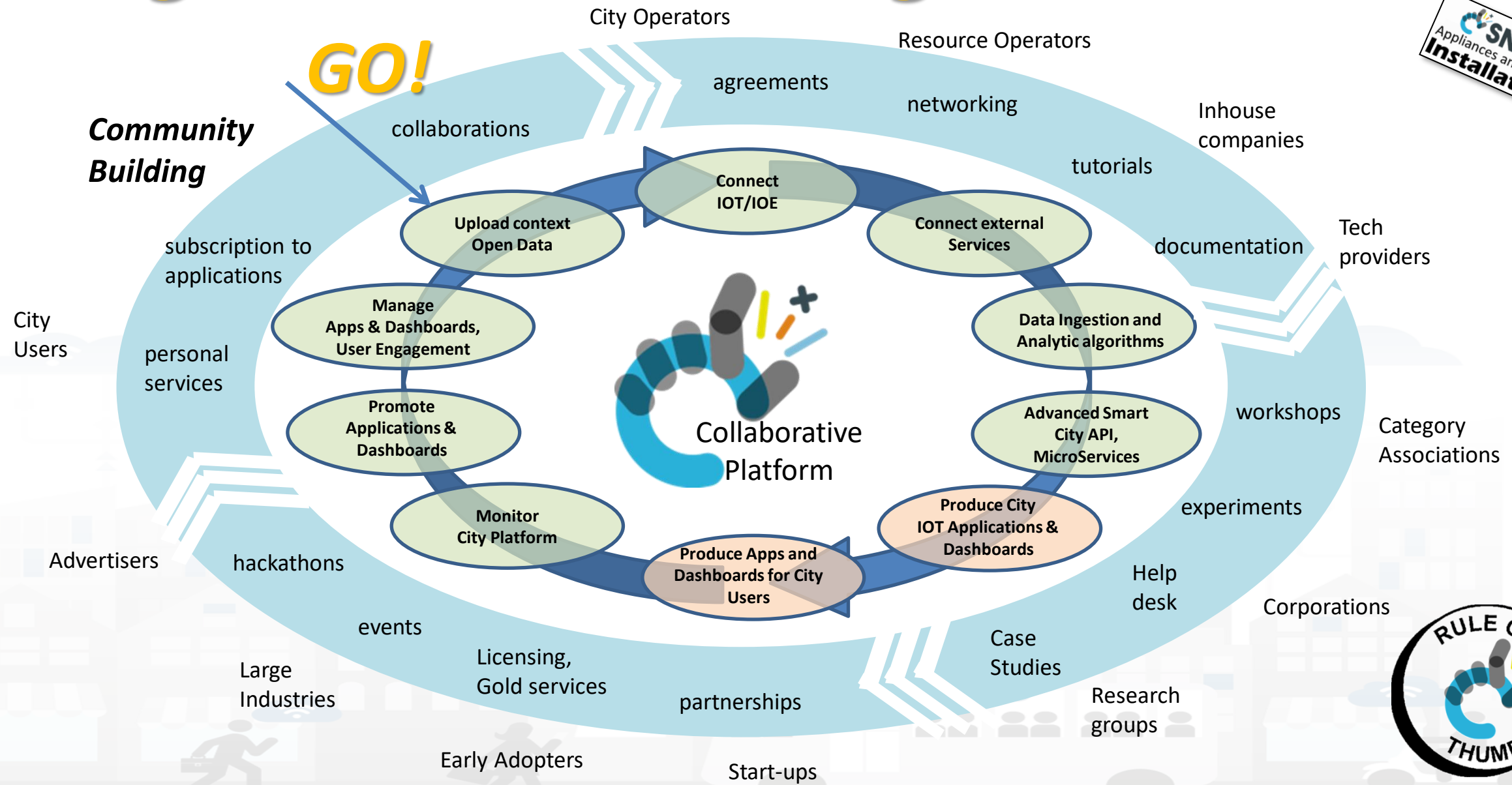
<https://www.snap4city.org/944>

# Development Life Cycle Smart Solutions





# Living Lab Accelerating



TOP

# Recall on Snap4City Architecture

FROM CITY DASHBOARD TO APPLICATIONS

DATA GATHERING AND CITY DATA KNOWLEDGE MANAGEMENT

FORGING & MANAGING OPEN AND FLEXIBLE WEB AND MOBILE APPS

IOT/IOE DEVICES AND NETWORKS

APPLICATIONS THE LOGIC AND THE SMARTNESS

IC APPLICATIONS VISIT EVIDENCES

ADVANCED SMART CITY API, AND SERVICES FOR SNAP4CITY API

SNAP4CITY LIVING LAB FOR COLLABORATIVE WORK

SNAP4CITY FOR BEGINNERS

DATA ANALYTICS, BUSINESS INTELLIGENCE, WHAT-IF AND SIMULATION

CITY ARCHITECTURE AND ECOSYSTEM TYPE TO DEVELOPERS AND STAKEHOLDERS

TWITTER VIGILANCE: SOCIAL MEDIA ANALYSIS

DECISION SUPPORT SYSTEM AND CITY RESILIENCE

HOW TO ADOPT SNAP4CITY, AND OUR ROADMAP

SNAP4CITY AND KM4CITY PROJECTS

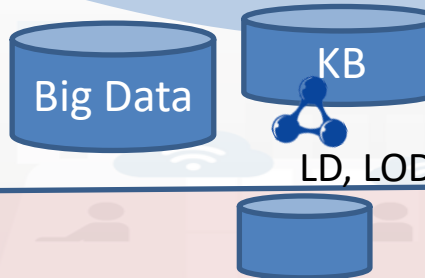
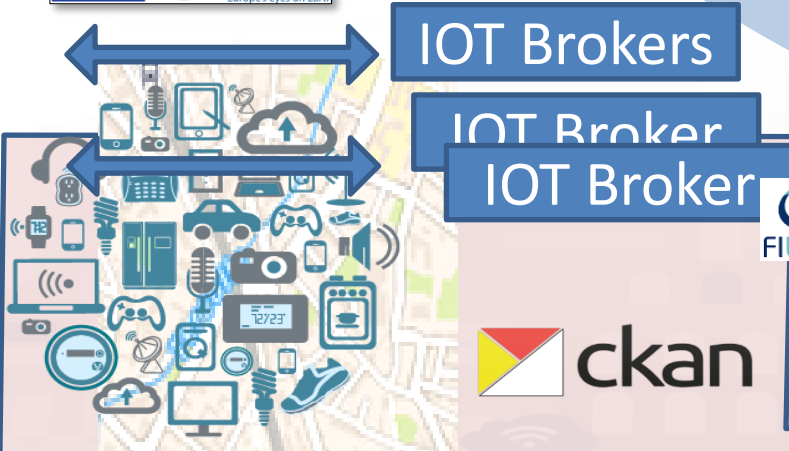
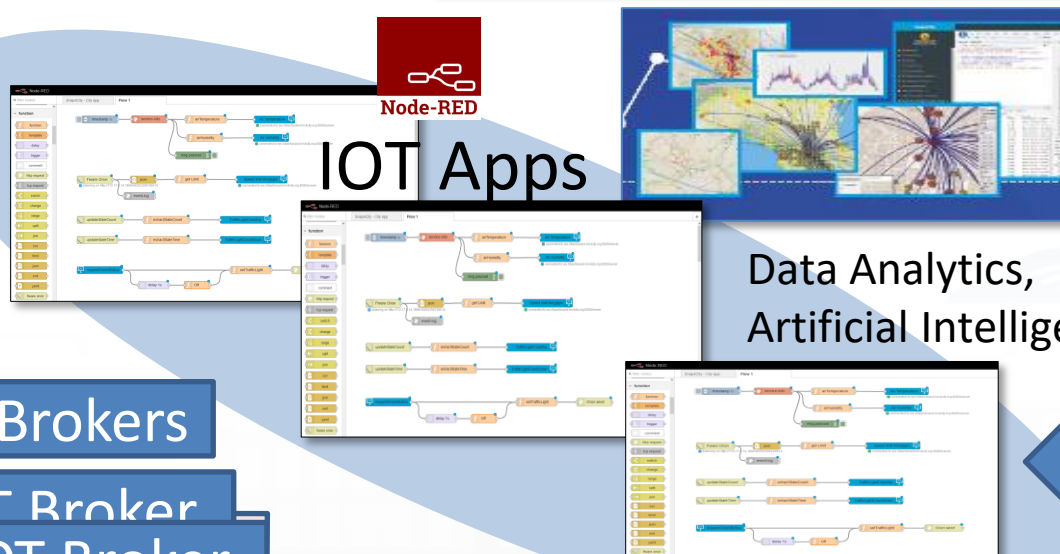
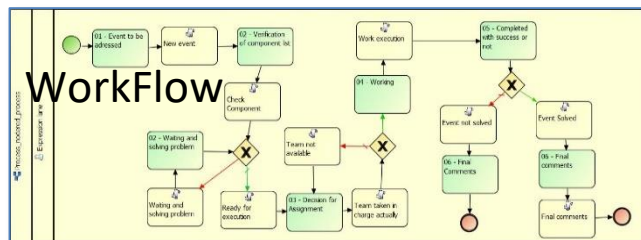
SNAP4CITY THE VIEW OF THE ADMINISTRATORS



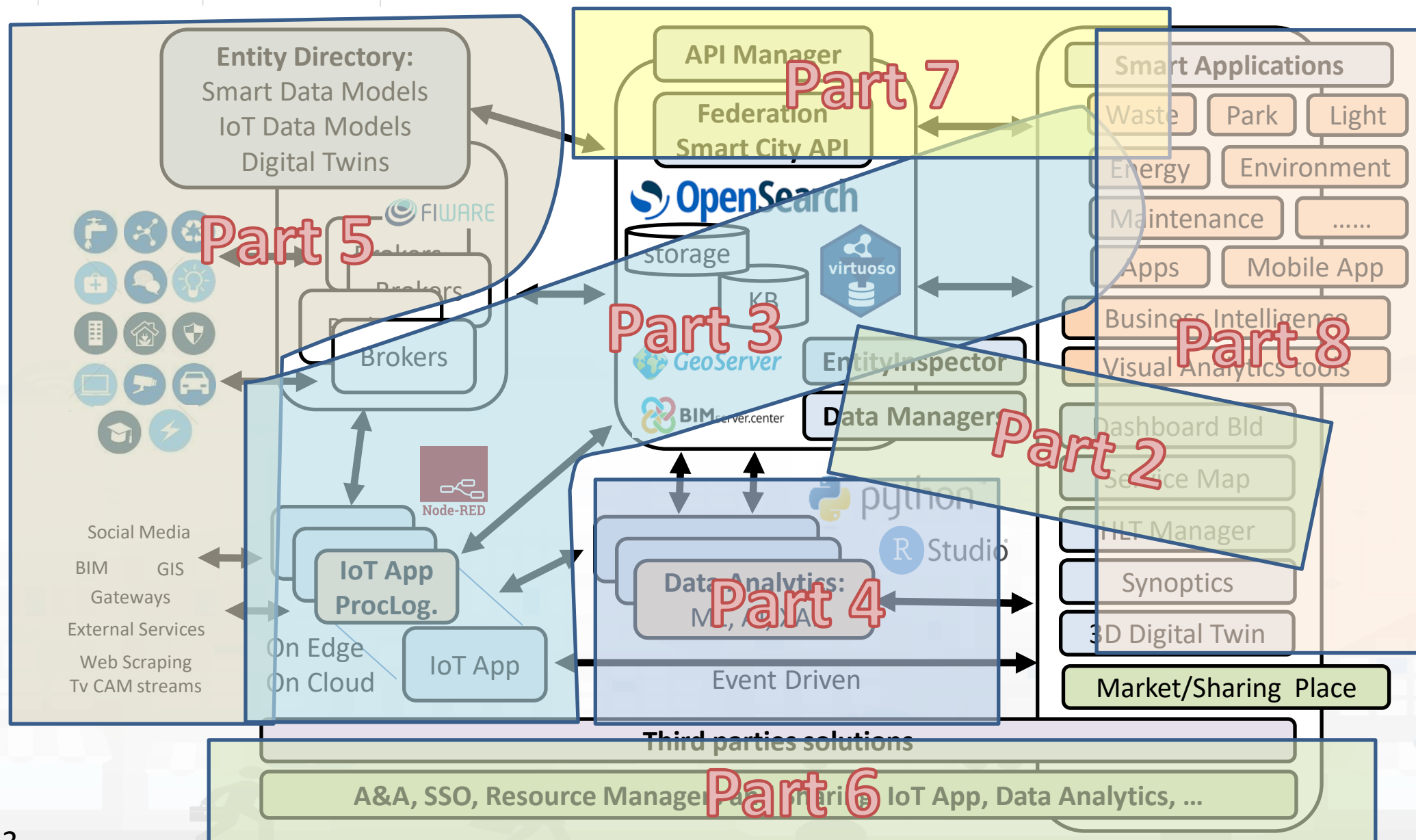
# Concept



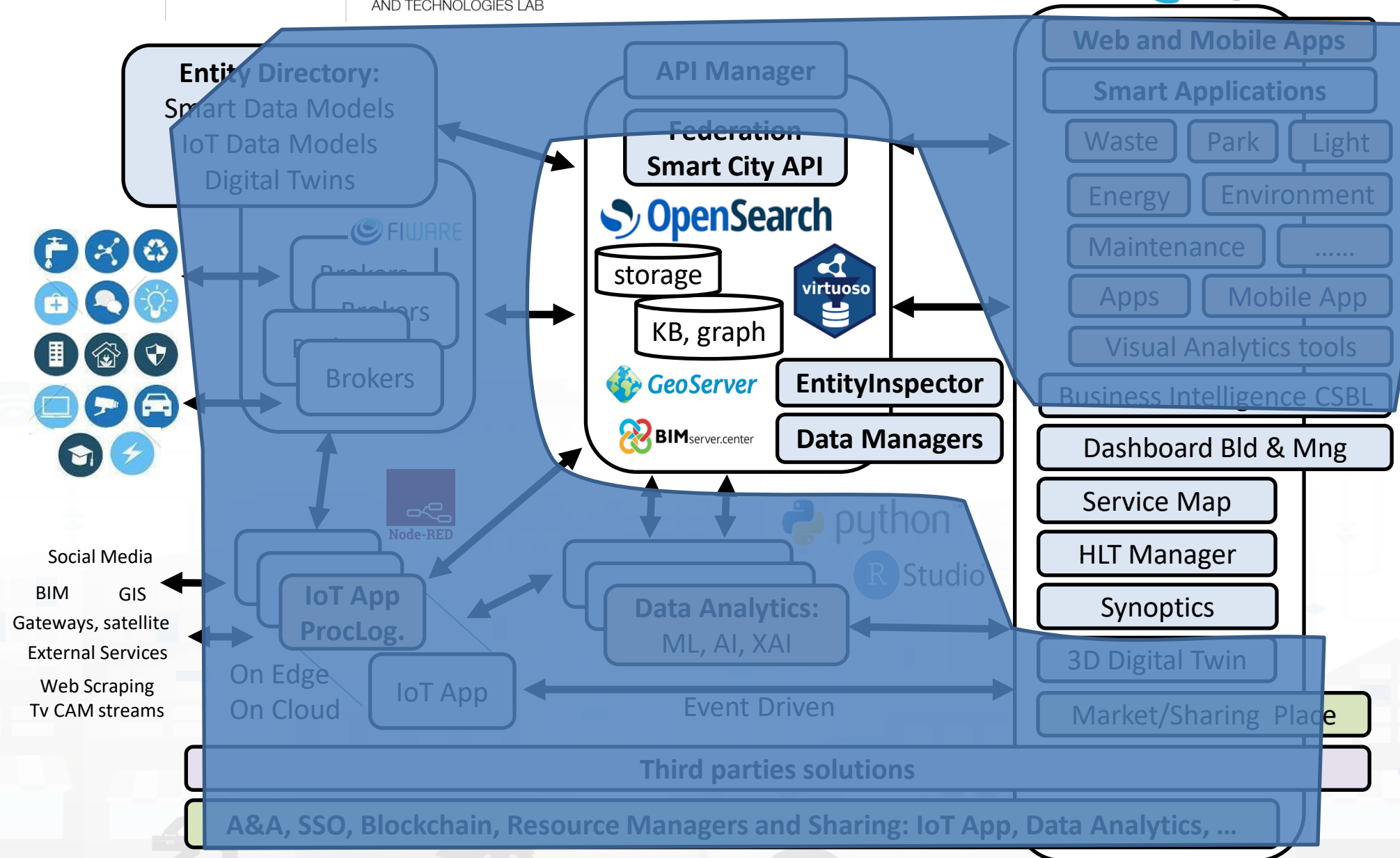
KPI, POI, MyKPI, ...  
API, External Services  
Web Scraping











TOP

# Snap4City Dashboards Purposes and Uses

FROM CITY  
DASHBOARD TO  
APPLICATIONS

DATA GATHERING  
AND CITY DATA  
KNOWLEDGE  
MANAGEMENT

FORGING &  
MANAGING OPEN  
AND FLEXIBLE WEB  
AND MOBILE APPS

IOT/IOE DEVICES  
AND NETWORKS

APPLICATIONS  
THE LOGIC AND  
THE SMARTNESS

ADVANCED  
CITY API  
MICROSERVICES,  
SNAP4CITY API

SNAP4CITY  
LIVING LAB FOR  
COLLABORATIVE  
WORK

SNAP4CITY FOR  
BEGINNERS

SNAP4CITY  
ARCHITECTURE AND  
SYSTEMS, REFER  
TO DEVELOPERS  
AND RESEARCHERS

DATA ANALYTICS,  
BUSINESS  
INTELLIGENCE  
WHAT-IF ANALYSIS  
SIMULATION

DECISION SUPPORT  
SYSTEMS AND CITY  
RESILIENCE

HOW TO ADOPT  
SNAP4CITY, AND  
OUR ROADMAP

SNAP4CITY  
AND KM4CITY  
PROJECTS

SNAP4CITY THE  
VIEW OF THE  
ADMINISTRATORS

TWITTER  
VIGILANCE: SOCIAL  
MEDIA ANALYSIS



# 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**Prepare

**A**bsorb

**R**ecover

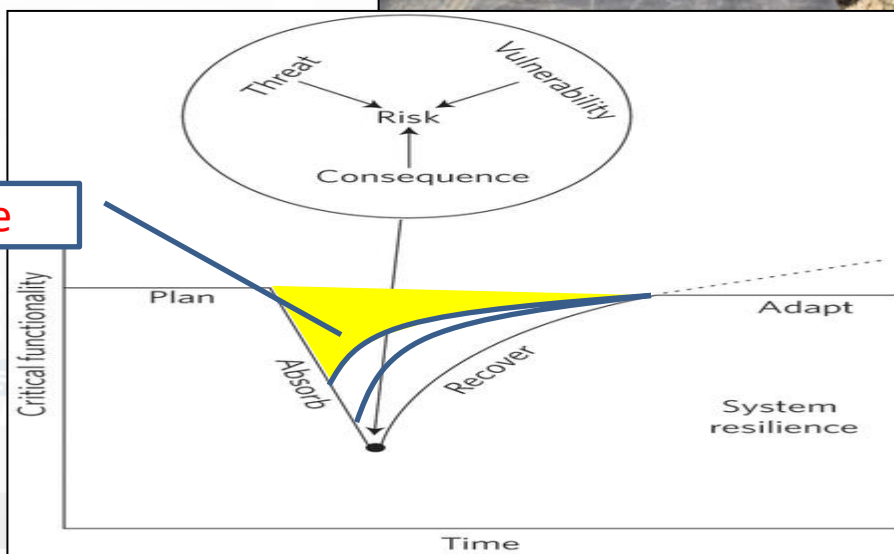
**A**dapt

## Impact:

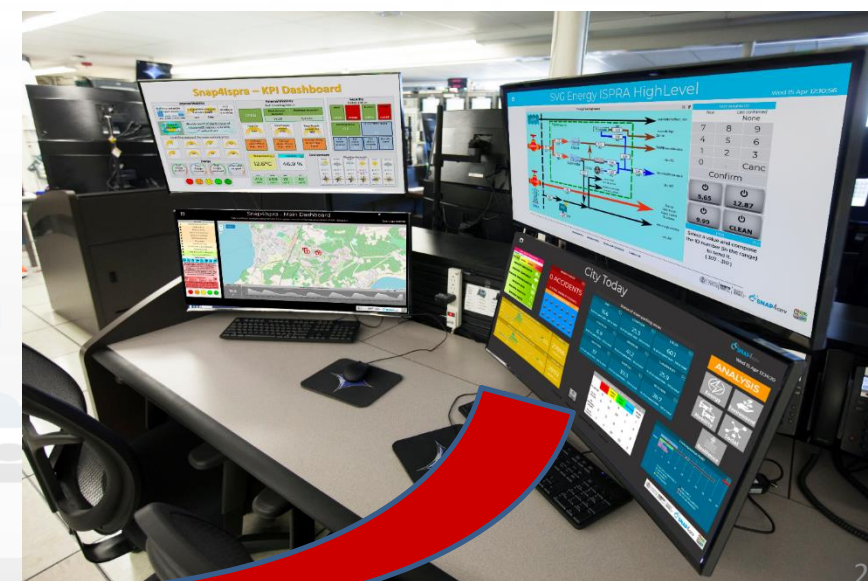
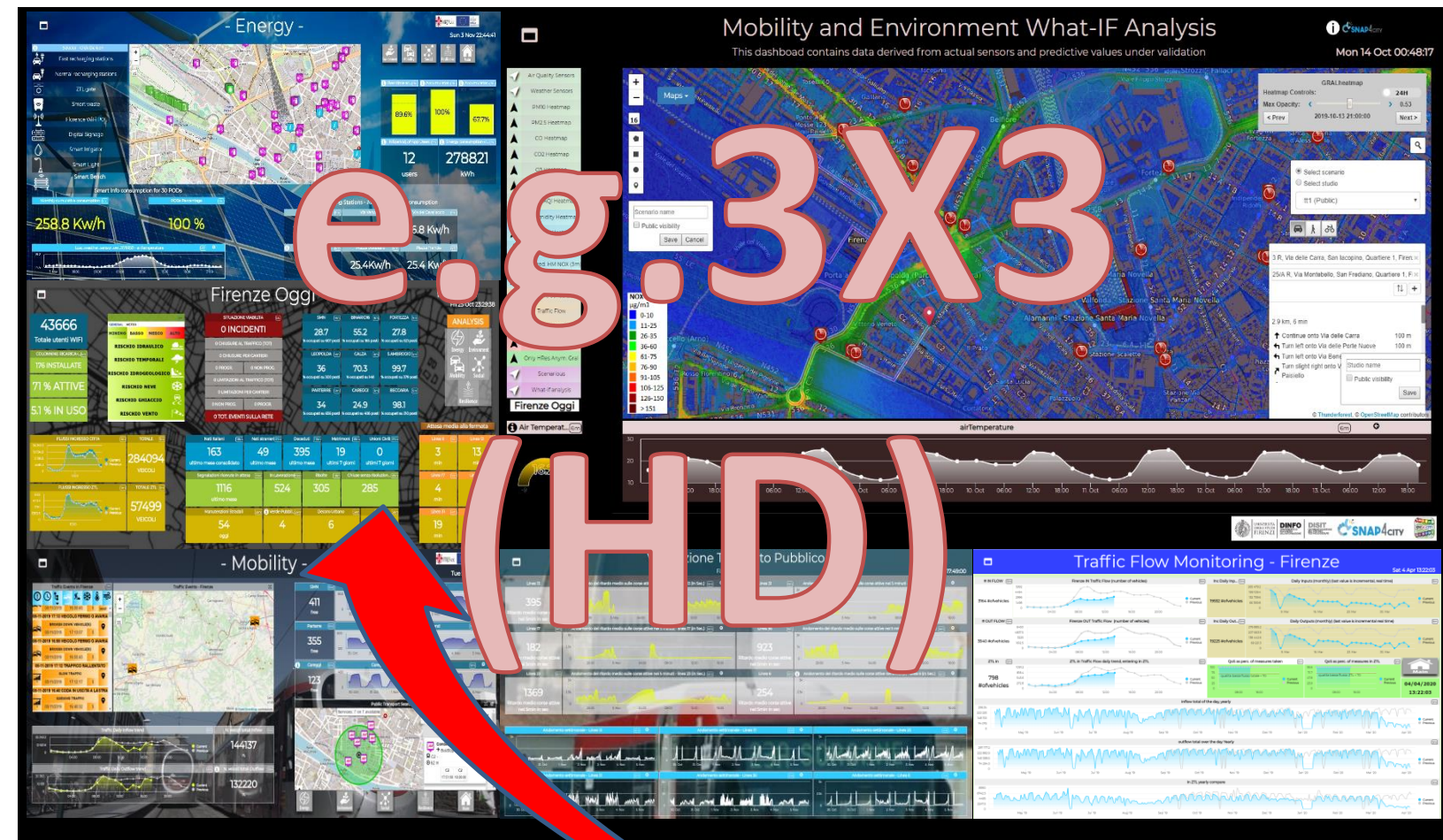
- Early warning, faster reaction
- Increased resilience

## Several metrics related to:

- Volume of retweets
- Sentiment analysis







From Console Operator to the  
Video Wall







## 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

SNAP4city

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
- ▲ Gral Pred. HM NOx (3m)
- ▲ Gral Pred. HM NOx (6m)
- ▲ Traffic Sensors
- ▲ Traffic Flow
- ▲ Cycling Paths
- ▲ Accident Heatmap
- ▲ Only HPEs Anym. Gral
- ▲ Scenarios
- ▲ What-if analysis

Firenze Oggi

Air Temperat... (1m)



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



# Citizens Engagement

Fri 6 Sep 16:58:10



Twitter Hashtags

#FIORENTINA
#FIRENZE
#UFFIZI
#PONTEVECCHIO
#ACCADEMIA
#BARGELLO
#AEROPORTO #FIRENZE
#AEROPORTO #FIRENZE

Twitter Chatrooms

@NAZIONE_FIRENZE
@DISCOVERTUSCANY
@UNI_FIRENZE
@NOVEDAFIRENZE
@PROTCIVCOMUNEFI
@BNCFIRENZE
@MUSEONOVECENTO
@FIRENZEDIGITALE
@PITTI_IMMAGINE

Civil Protection Alerts - Protezione Civile

NUOVO

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 - Torreggiali

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: NO<sub>2</sub>, PM<sub>10</sub>, PM<sub>2.5</sub> ([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



				WHO guidelines	
Pollutant	Averaging period	Objective and legal nature and concentration	Comments	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





## • 15 Minute City Index:

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



- 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



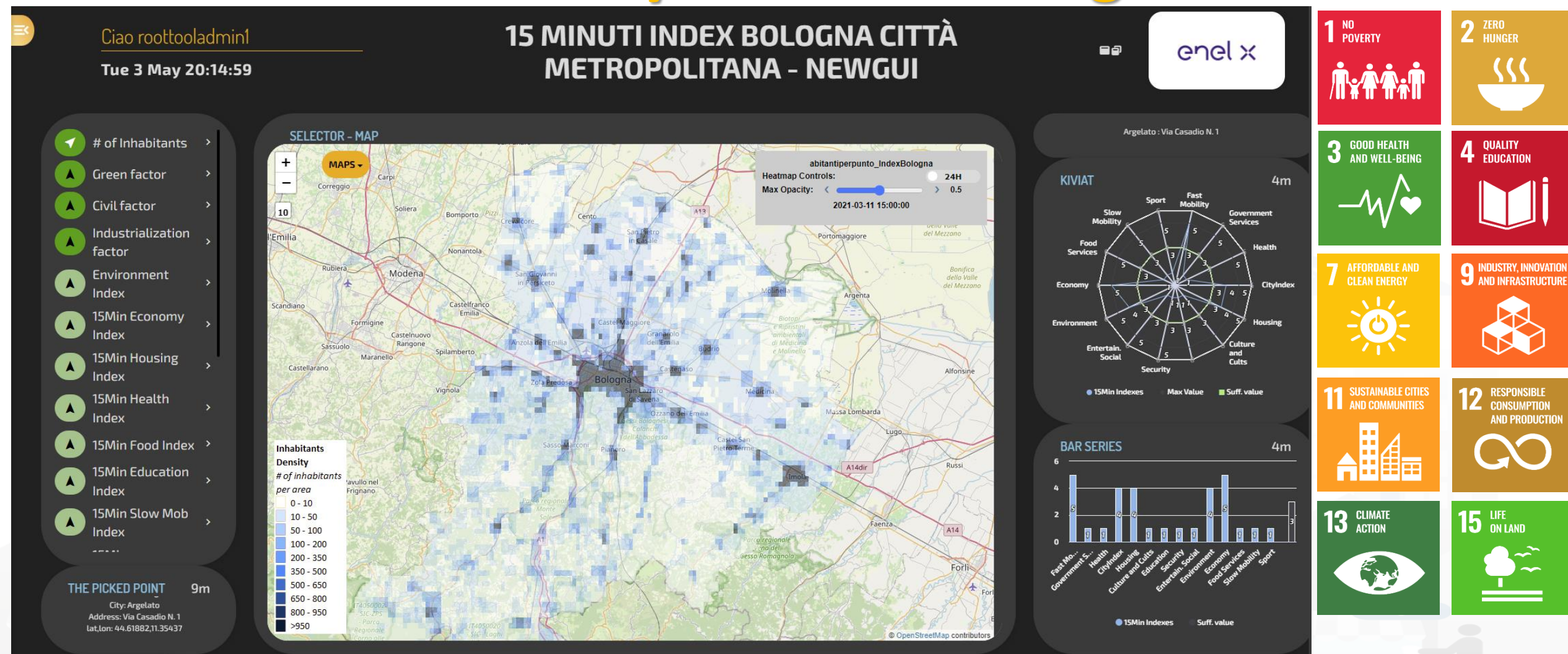
- Monitoring and Predicting: NO<sub>2</sub>, NO<sub>x</sub>, CO<sub>2</sub>, Traffic flow, pollutant, landslide, waste, etc
- Traffic flow reconstruction
- Demand vs Offer of Mobility analysis



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



# 15MinCityIndex on Bologna





# Decision Support Systems, What-if

## ○ Event planning, via what-if analysis

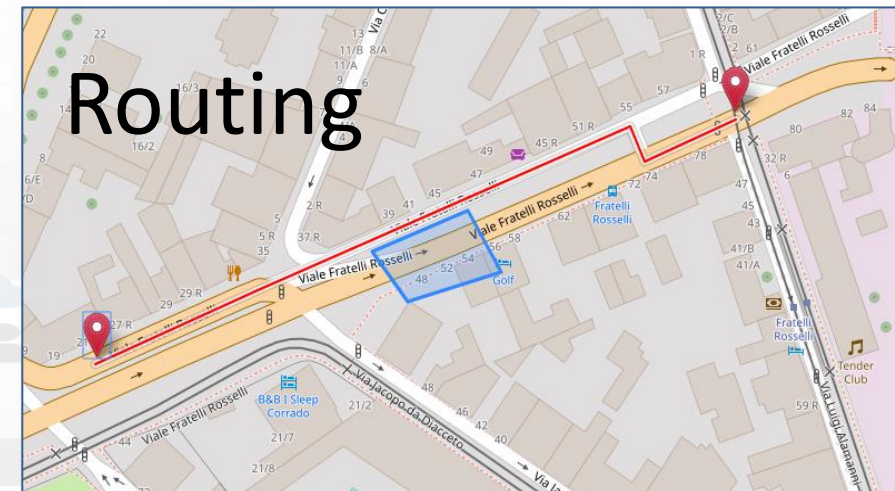
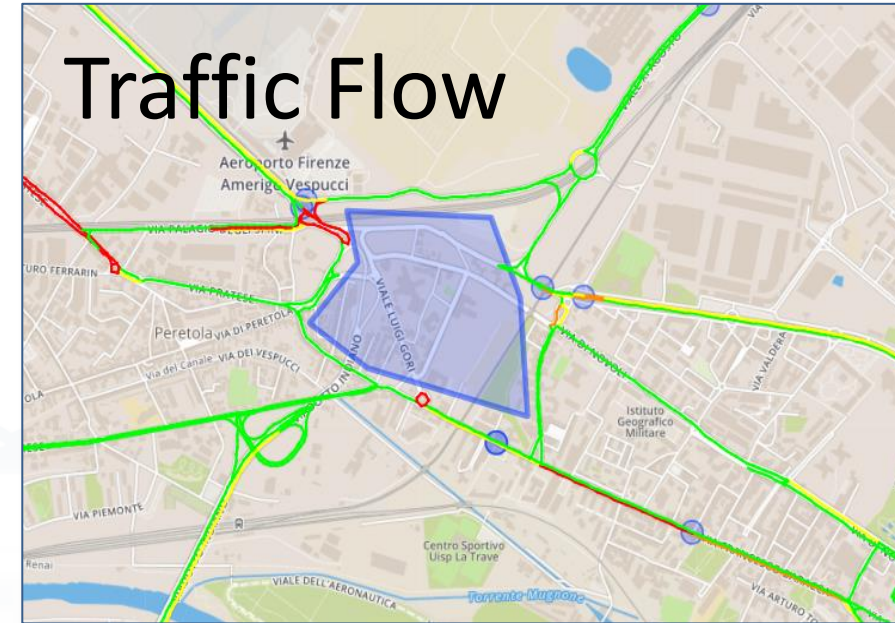
- Change in the graph structure of the city
- Impact on the flow of people and vehicles
- Adaptation: public transport, traffic, pedestrian management, etc.

## ○ 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

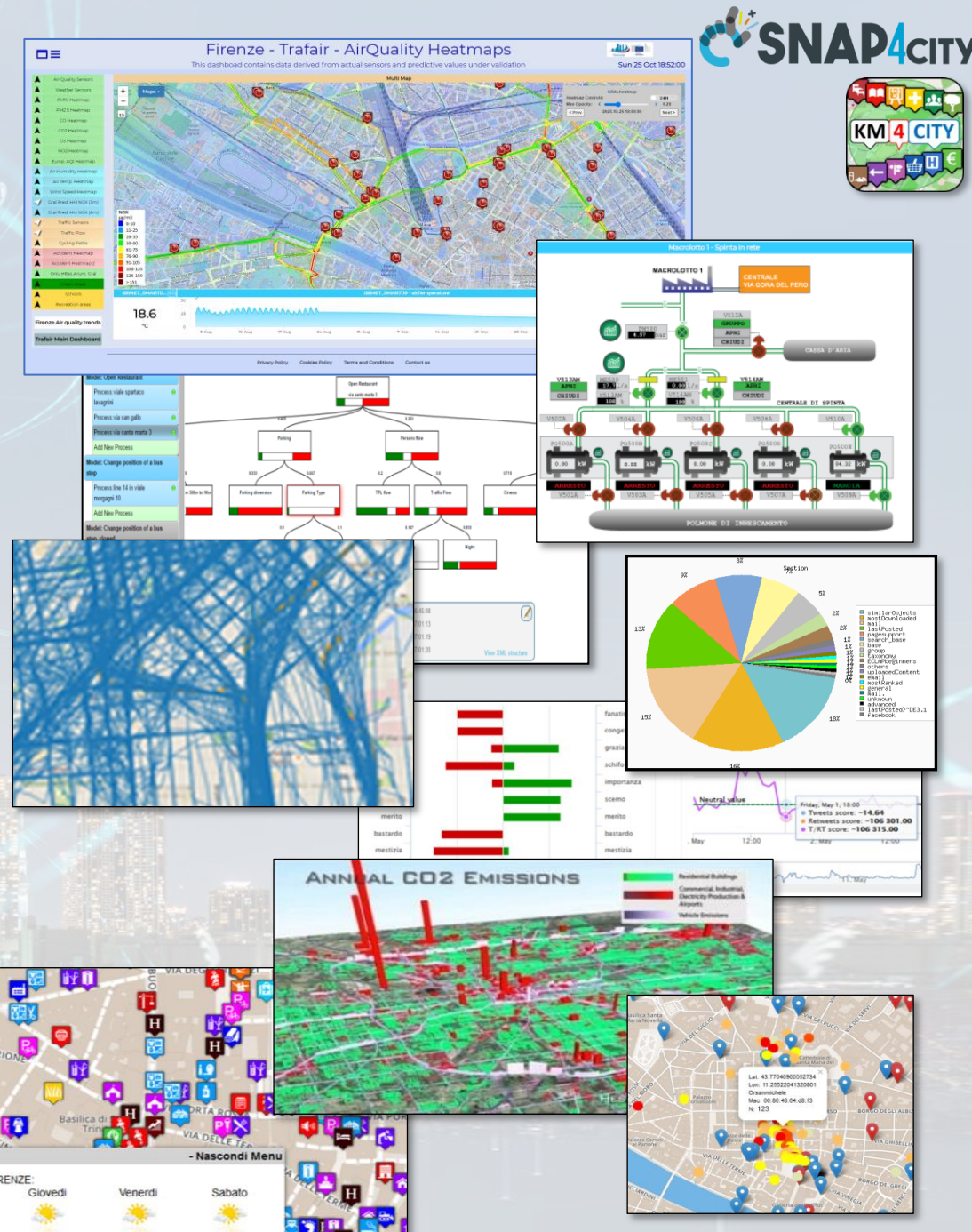
- More detail in the context integrated data
- Greater realism in deductions and representations
- Less fragmentation and non-uniformity in the views to support decisions





# Data Driven Decision Support

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

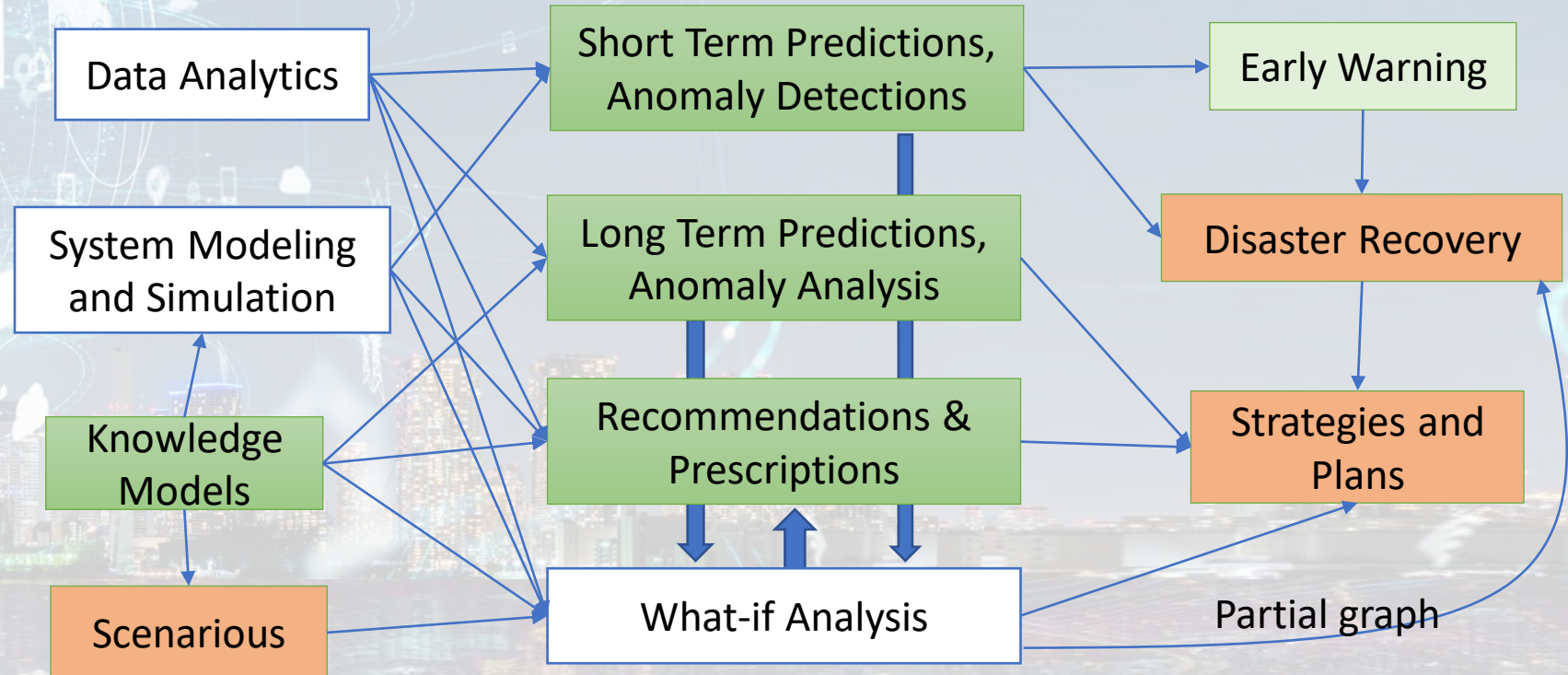
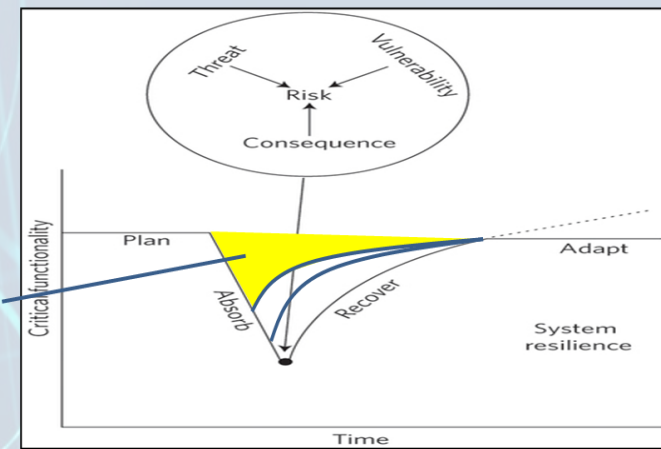




# Snap4City Analytics

- 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,...

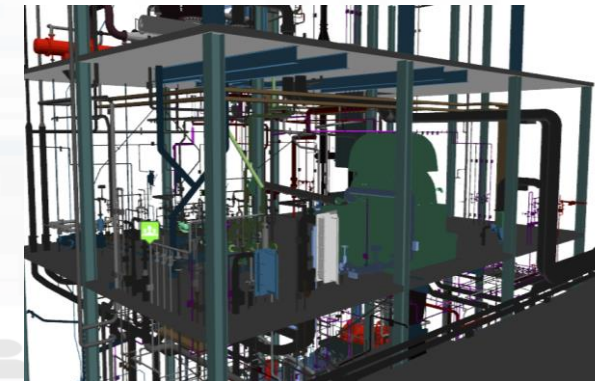
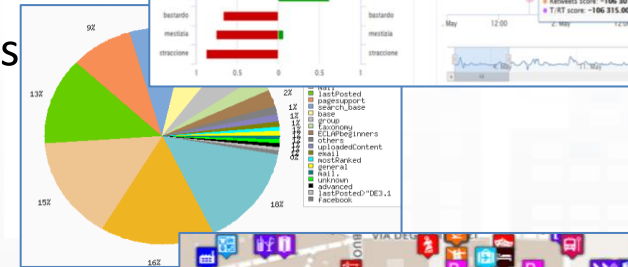
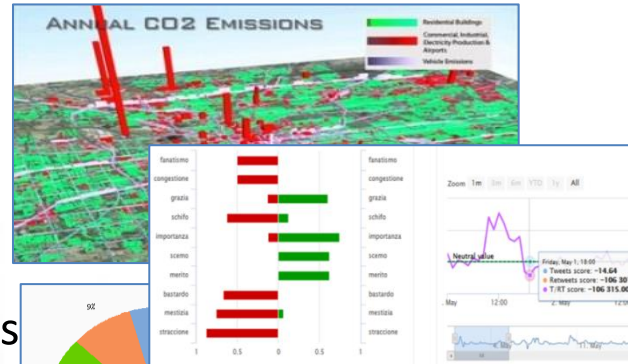
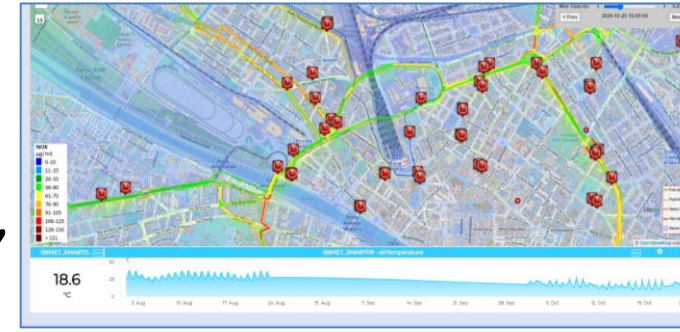


## • Digital Twin

- **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







Ciao

Fri 13 Oct 18:29:18

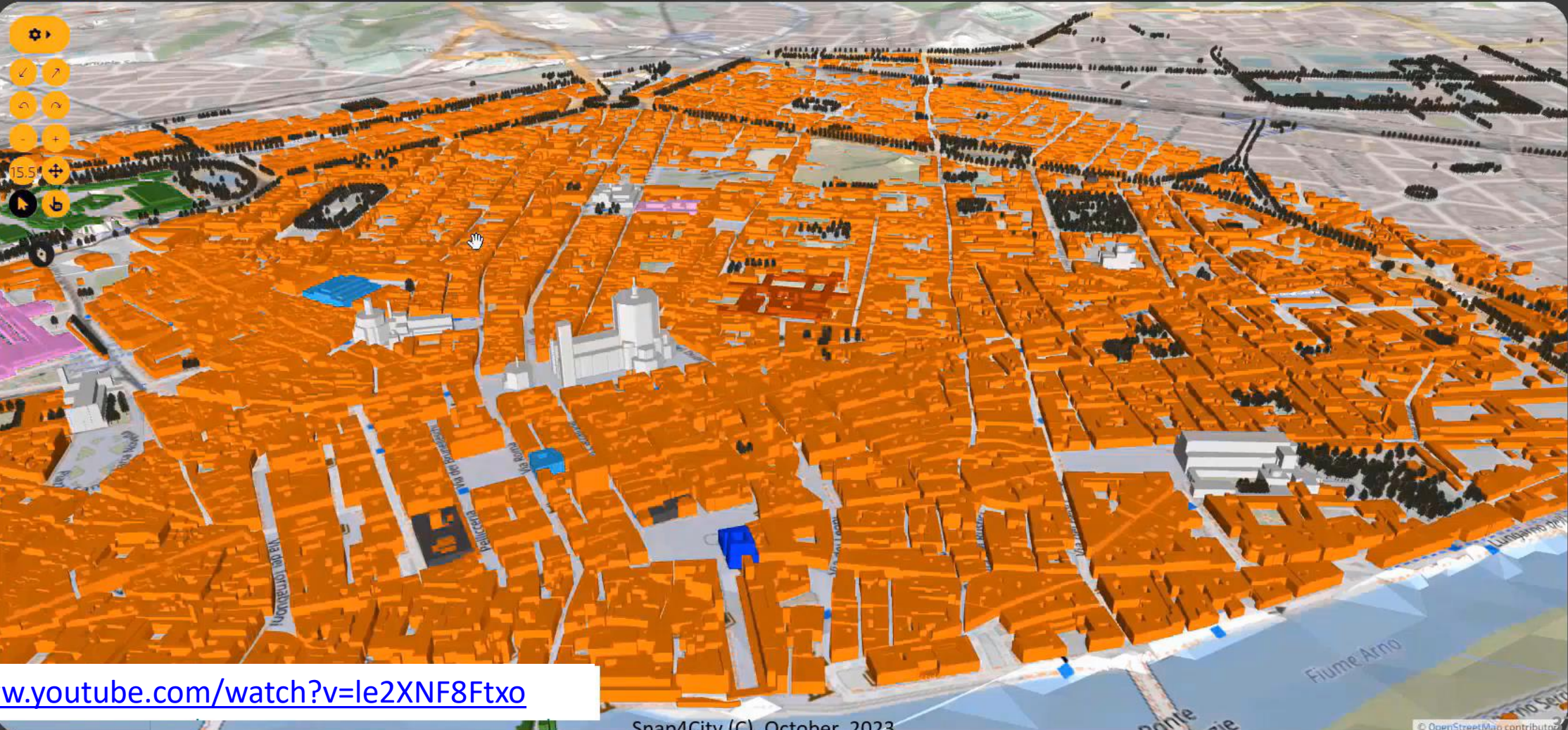
# FLORENCE SCDT



SELECT...

- ORAL HD
- NO 2
- 
- 
- 
- 
- 
- 
- WHAT-IF
- 
- 

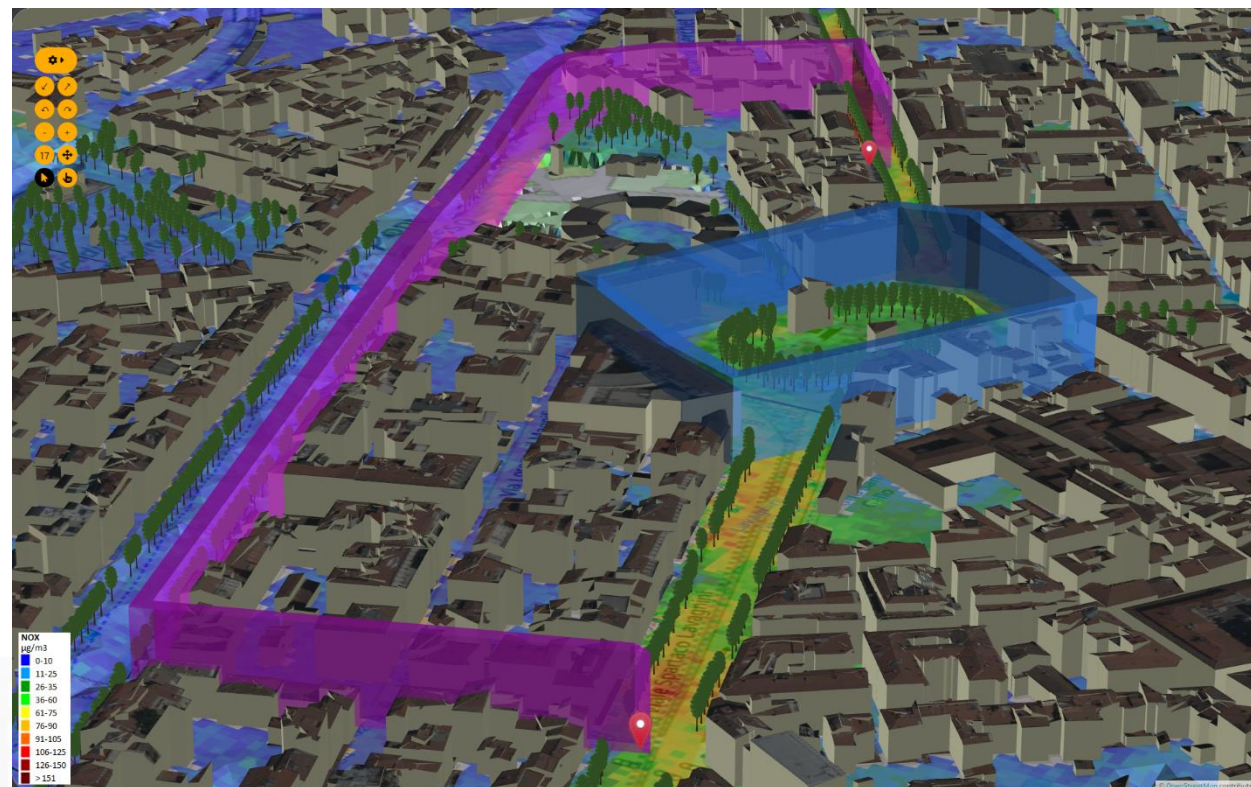
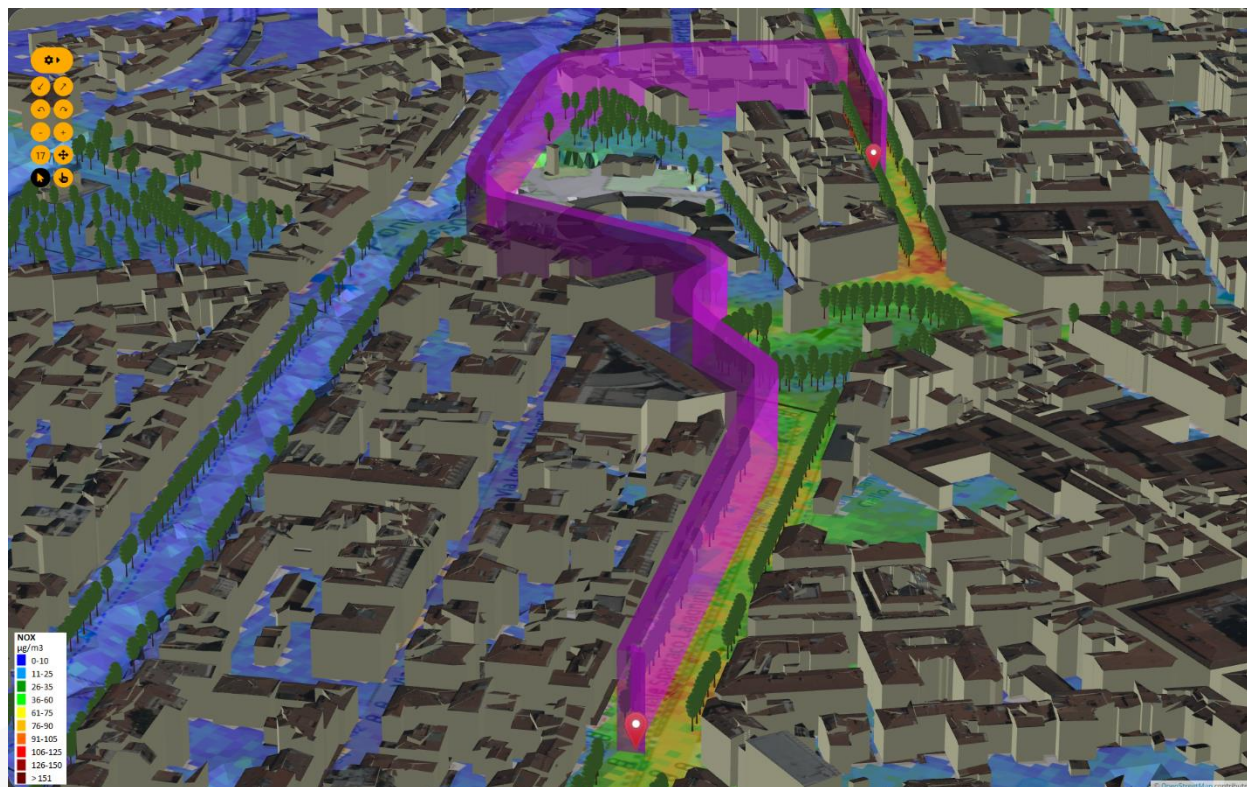
DOUBLE MAP



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

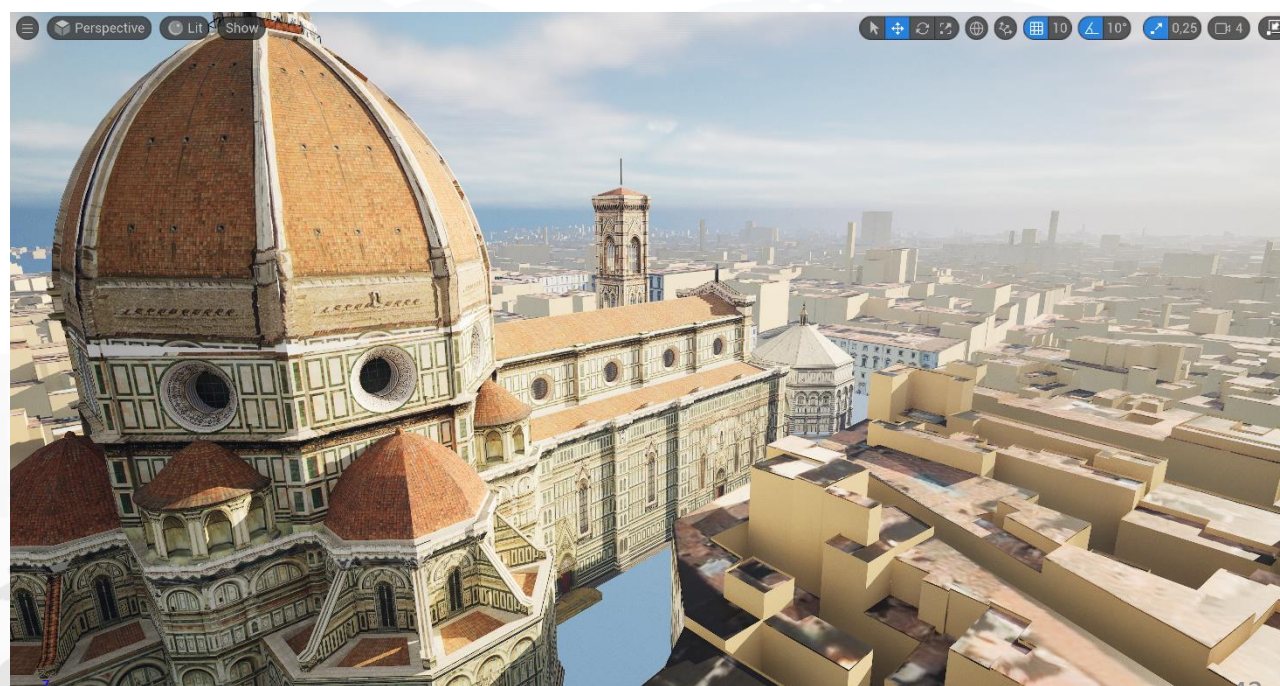
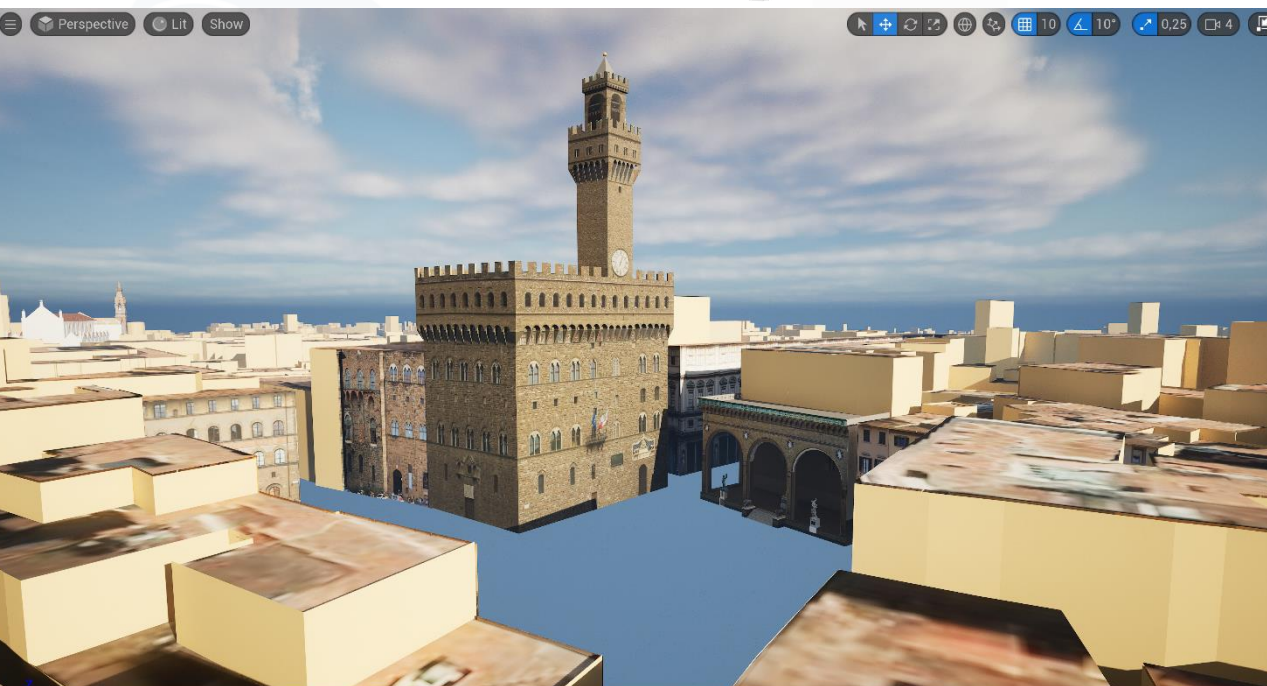


# Dyamic Routing in 3D space

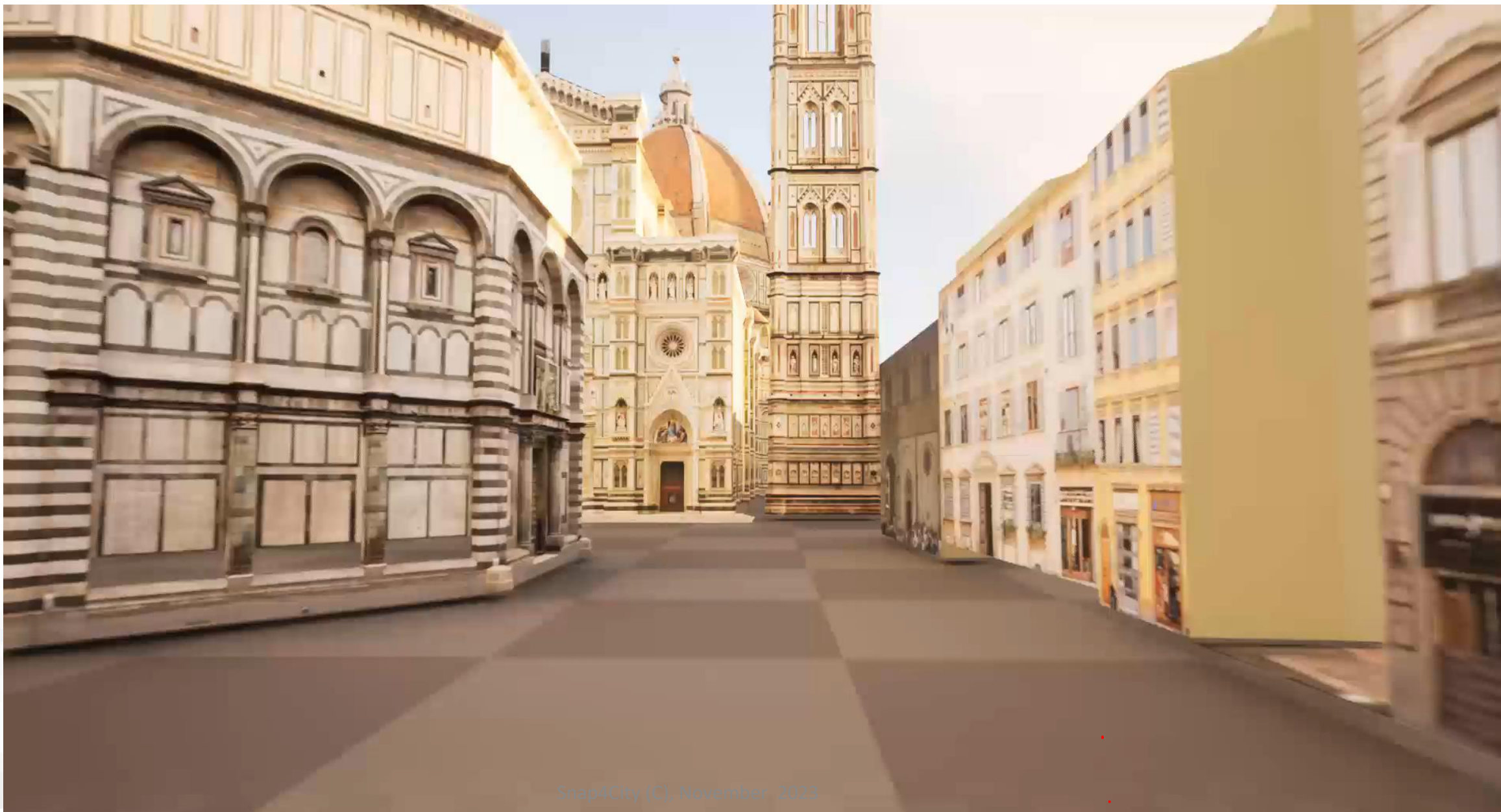




# OCULUS









# Snap4City Digital Twin Engine and data + 3D Google Data





The screenshot shows a Windows desktop environment. The taskbar at the top contains icons for Cestino, FreeComm..., Telegram, VMware Front Exp..., App, Maps, Google, Gmail, Snap4City, Snap4, Calendar, Translate, Google Scholar Cita..., DISIT, DISIT old, Facebook, DataCenter, Trello, Km4City major tools, Impostazioni, and YouTube. The desktop background is dark grey. On the left side, there is a vertical sidebar with icons for Acrobat Reader, QGIS 2.18, Adobe Acrobat 9 Pro, Wondershare EdrawMax, Arduino, Thunderbird, ArubaSign64, GRASS GIS 7.2.0, CMS, AVTECH\_Tr..., Advanced IP Scanner, Bit4id - PKI Manager, iSpring Convert..., Browser Opera, iSpring Free 6, Cam Viewer1, Mendeley Desktop, VMware Workstati..., Notepad++, DeskUpdate, and OBS Studio. The main window is titled 'Dashboard Management System' and displays the 'Florence Testing' interface. The interface has a dark blue header with the SNAP4CITY logo and the text 'Florence Testing' and 'Mon 18 Sep 17:40:57'. Below the header, there is a 'Selector' panel on the left with a list of icons and a 'Double Map' panel in the center showing an aerial view of Florence. A notification dialog box is open in the foreground, stating 'OBS è già in esecuzione' (OBS is already running) and providing instructions to close existing instances before trying again. The dialog box has two buttons: 'Avvia comunque' (Run anyway) and 'Annulla' (Cancel).











# Local Digital Twin vs BIM





TOP

# Snap4City Dashboards vs Technical data monitoring dashboards

FROM CITY  
DASHBOARD TO  
APPLICATIONS

FORGING &  
MANAGING OPEN  
AND FLEXIBLE WEB  
AND MOBILE APPS

IOT APPLICATIONS  
VS IOT  
DEVICES

SNAP4CITY FOR  
BEGINNERS

SNAP4CITY  
ARCHITECTURE AND  
ECOSYSTEM. OPENED  
TO DEVELOPERS  
AND STAKEHOLDERS

TWITTER  
VIGILANCE: SOCIAL  
MEDIA ANALYSIS

SNAP4CITY  
AND KM4CITY  
PROJECTS

DATA GATHERING  
AND CITY DATA  
KNOWLEDGE  
MANAGEMENT

IOT/IOE DEVICES  
AND NETWORKS

DATA ANALYTICS,  
BUSINESS  
INTELLIGENCE,  
WHOLE AND  
SIMULATION

HOW TO ADOPT  
SNAP4CITY, AND  
OUR ROADMAP

SNAP4CITY THE  
VIEW OF THE  
ADMINISTRATORS

IOT APPLICATIONS,  
THE LOGIC AND  
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ADVANCED  
SMART CITY API,  
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SNAP4CITY API

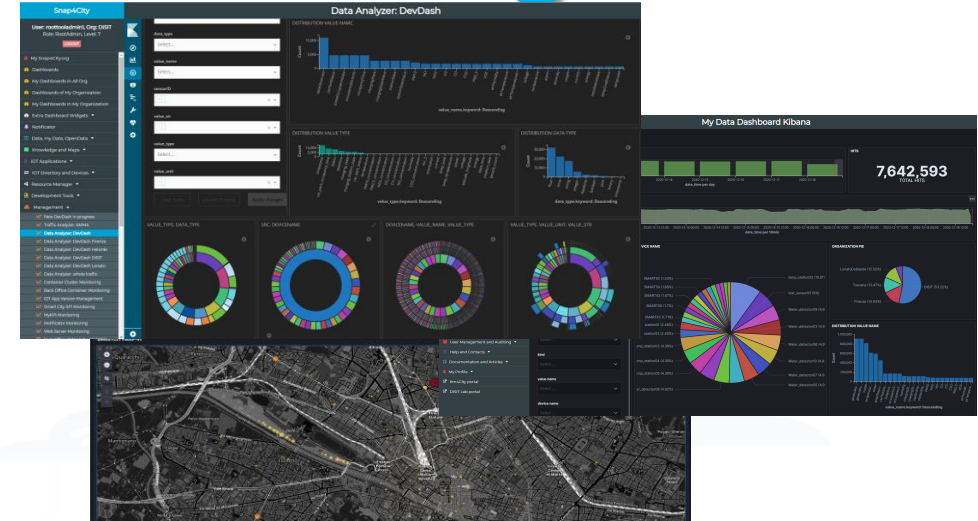
SNAP4CITY  
LIVING LAB FOR  
COLLABORATIVE  
WORK



# 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



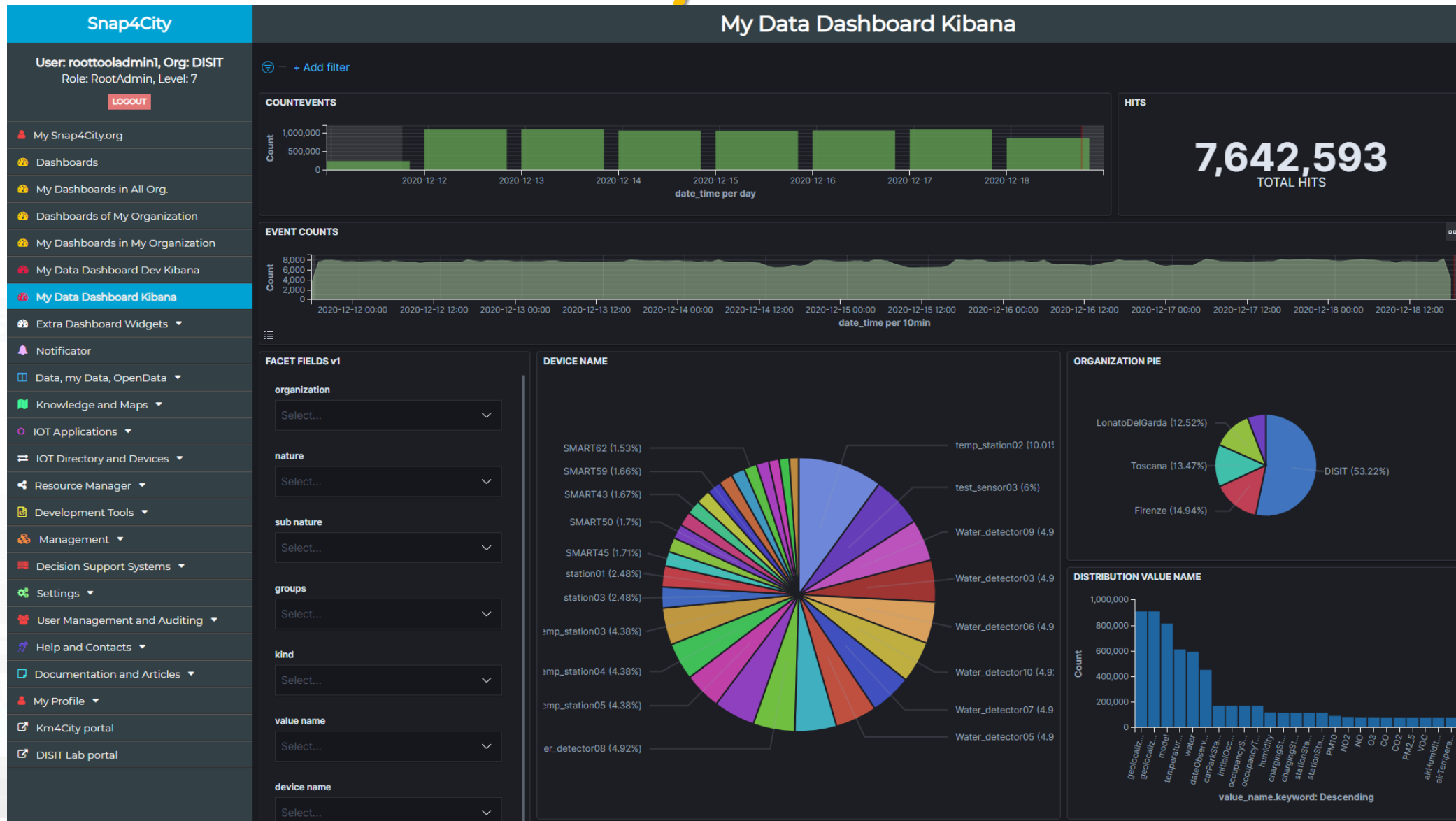


# My Dev Dash (DevDash)

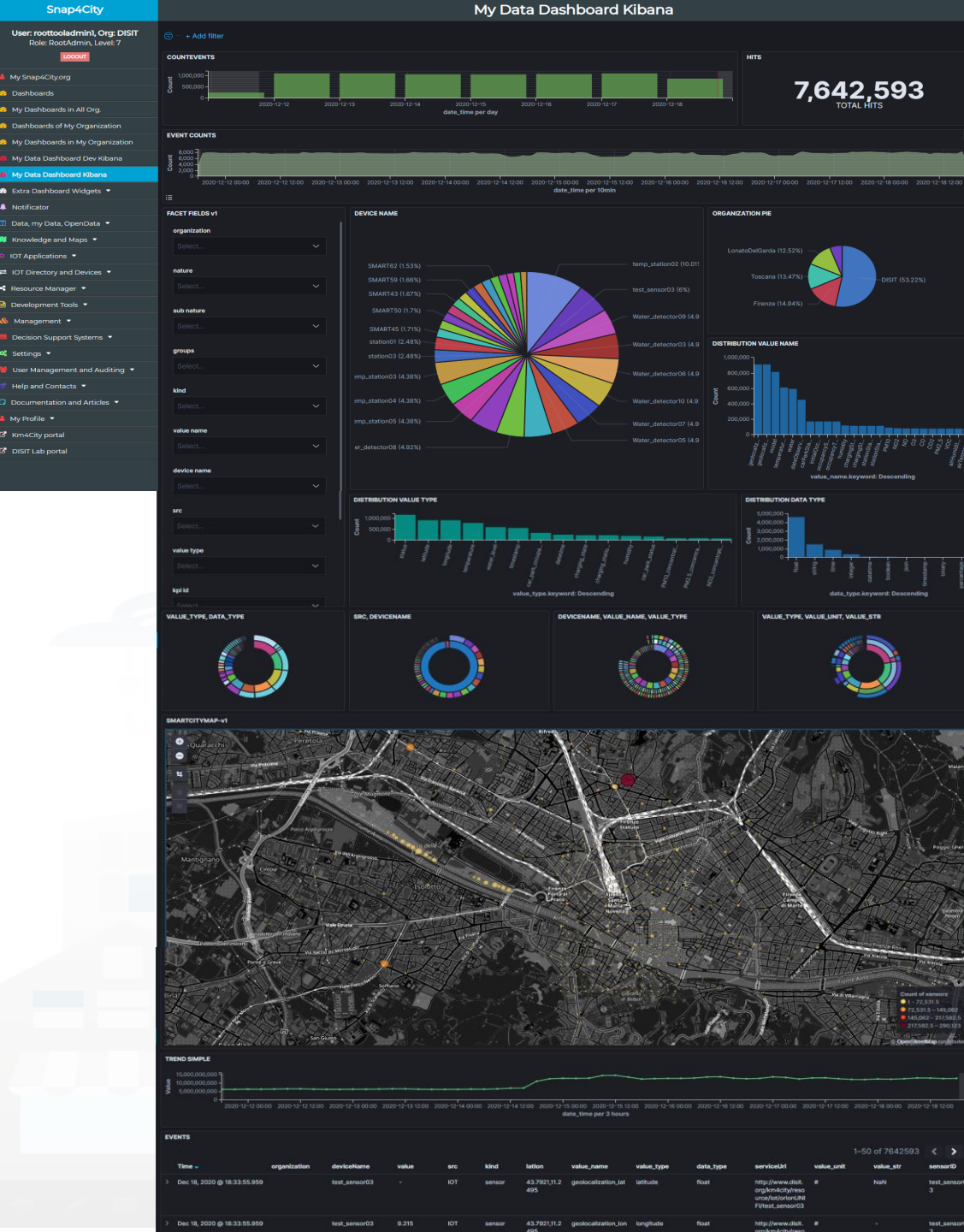
- For accessing and browsing data on Open Search (Elastic Search) storage and other sources supported
  - Family of Grafana, Kibana, Banana
- **No Support for real time event driven** widgets/panels, actuators and synoptics, no sophisticated maps, etc.
- **Not suitable for control room**, decision makers, 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







# 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.



Control Room





# 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

FROM CITY  
DASHBOARD TO  
APPLICATIONS

DATA GATHERING  
AND CITY DATA  
KNOWLEDGE  
MANAGEMENT

FORGING &  
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## 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

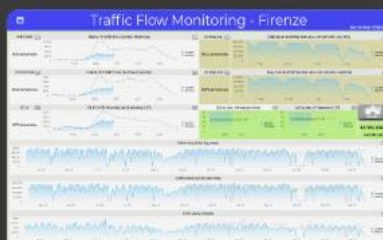
Filter by dashboard



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

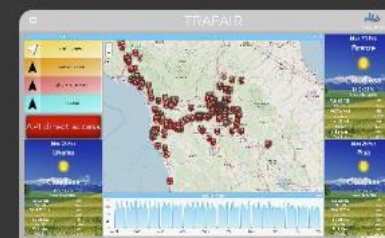
Public (DISIT)



Trends transparencies - newgui

Passive

Public (DISIT)



Tuscany TRAFAIR Data Dashboard

Passive

Public (DISIT)



Tuscany weather dashboard 1

Passive

Public (DISIT)





# Snap4City Dashboards main concepts



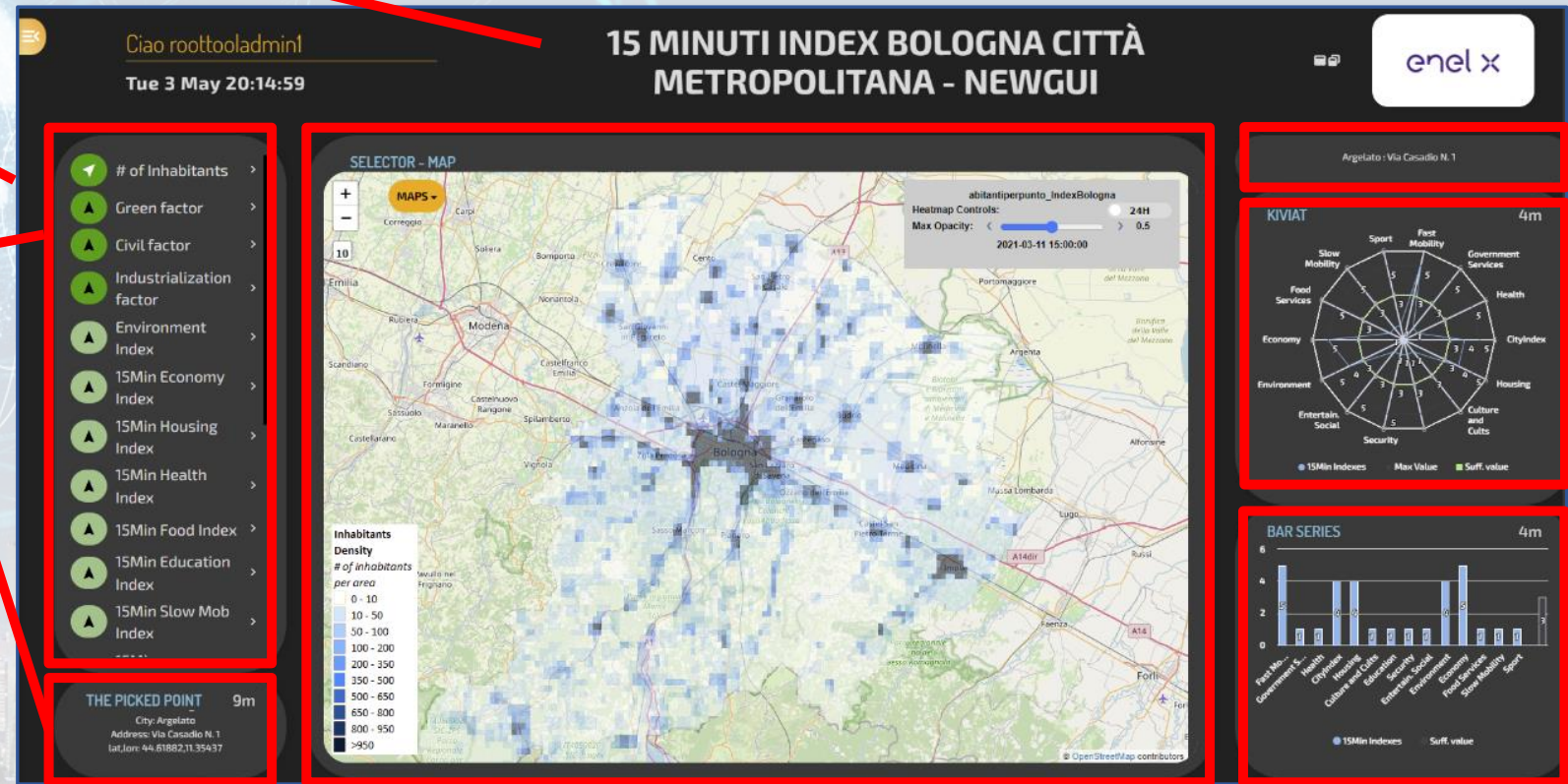
Header

Dashboard

Interactive Widgets

## Server Communication

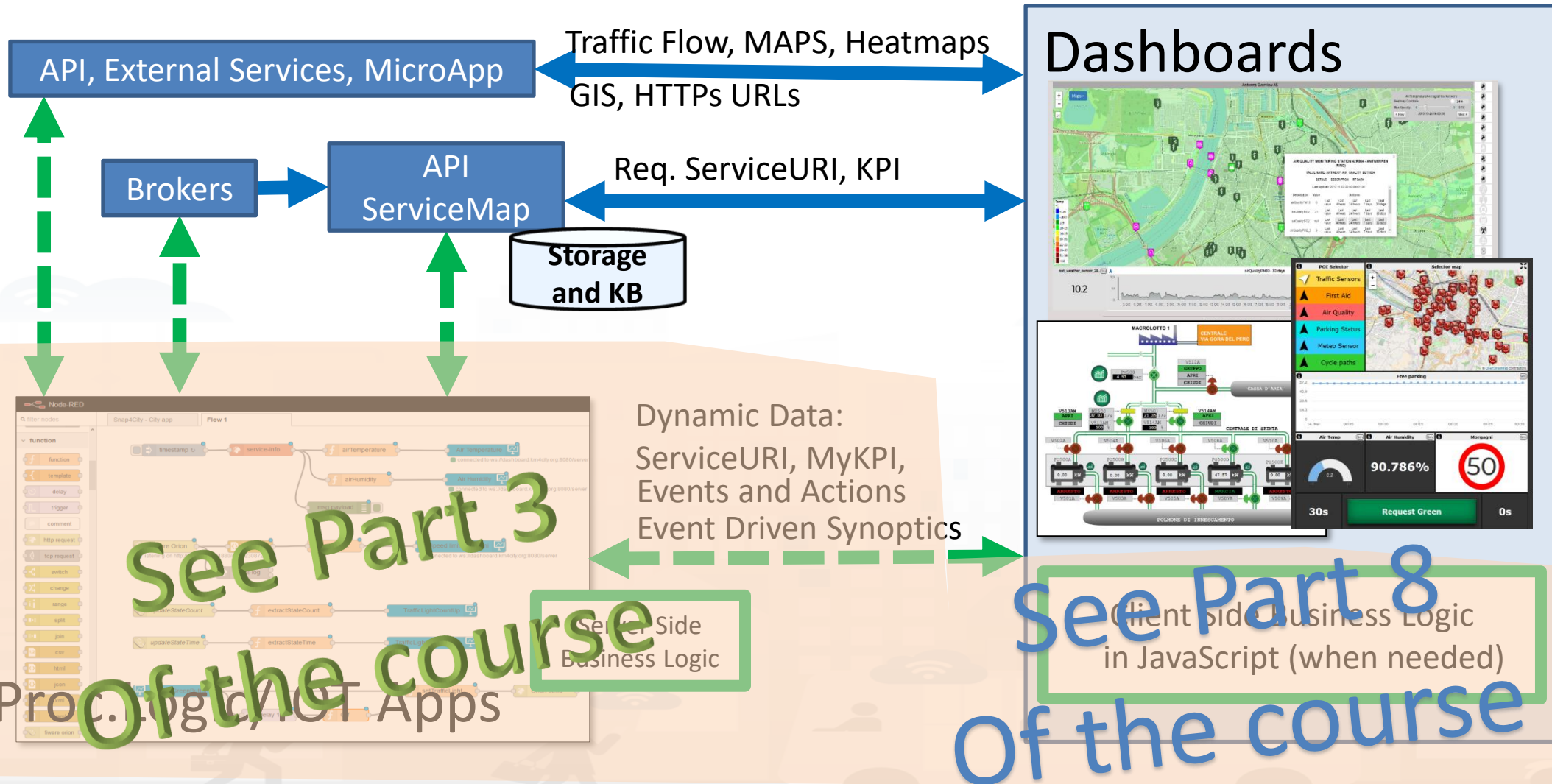
- Real Time data requests/send
- Event Driven
- Server Side Business Logic
  - See Part 3 of the course



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



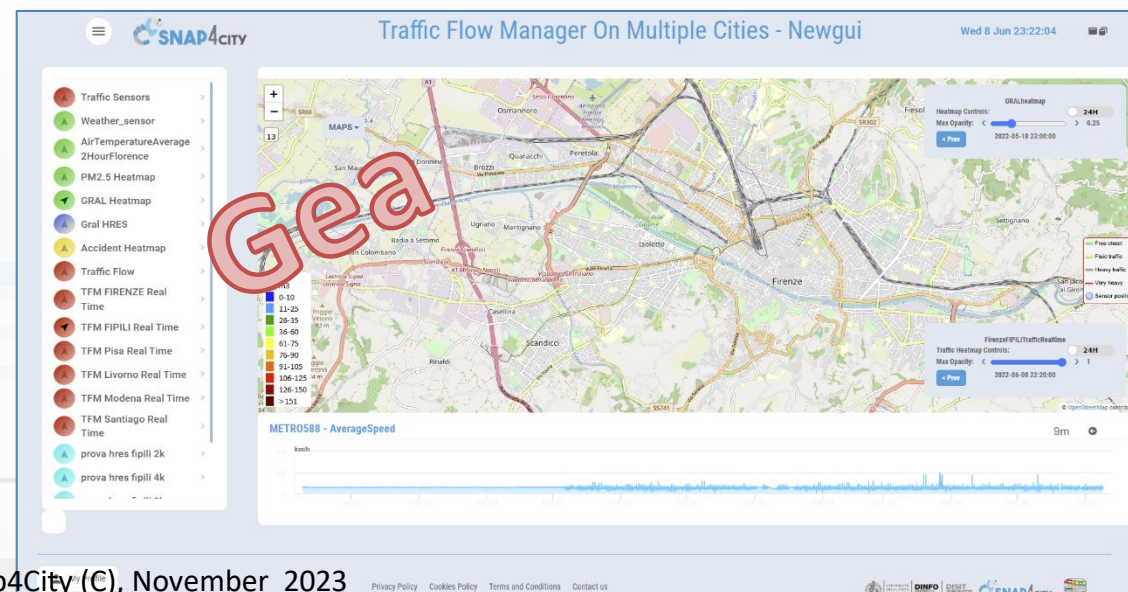
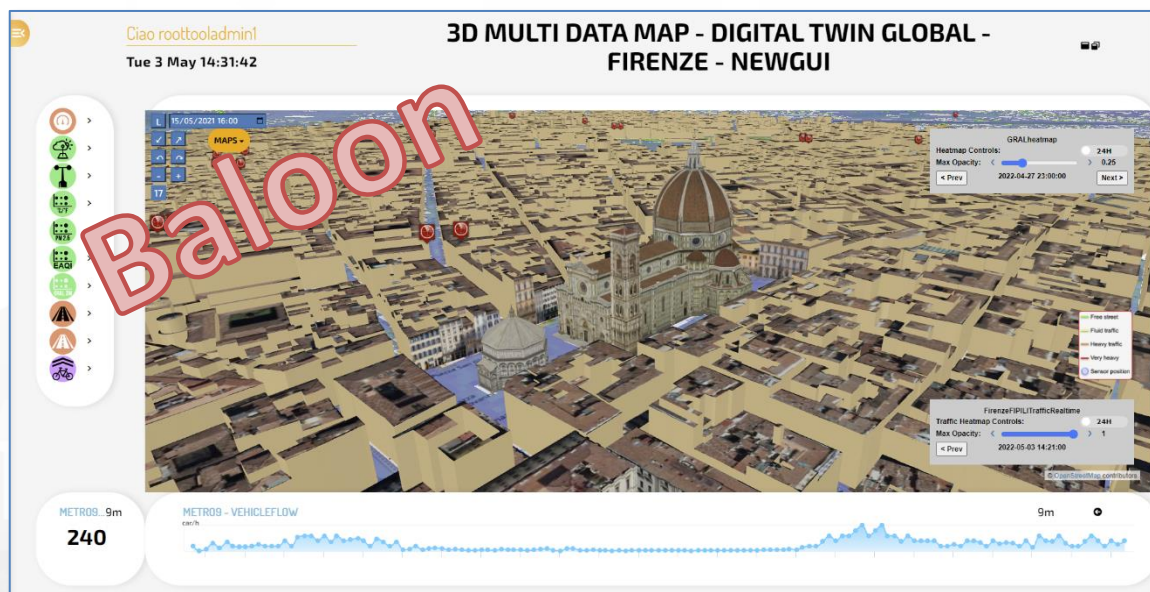
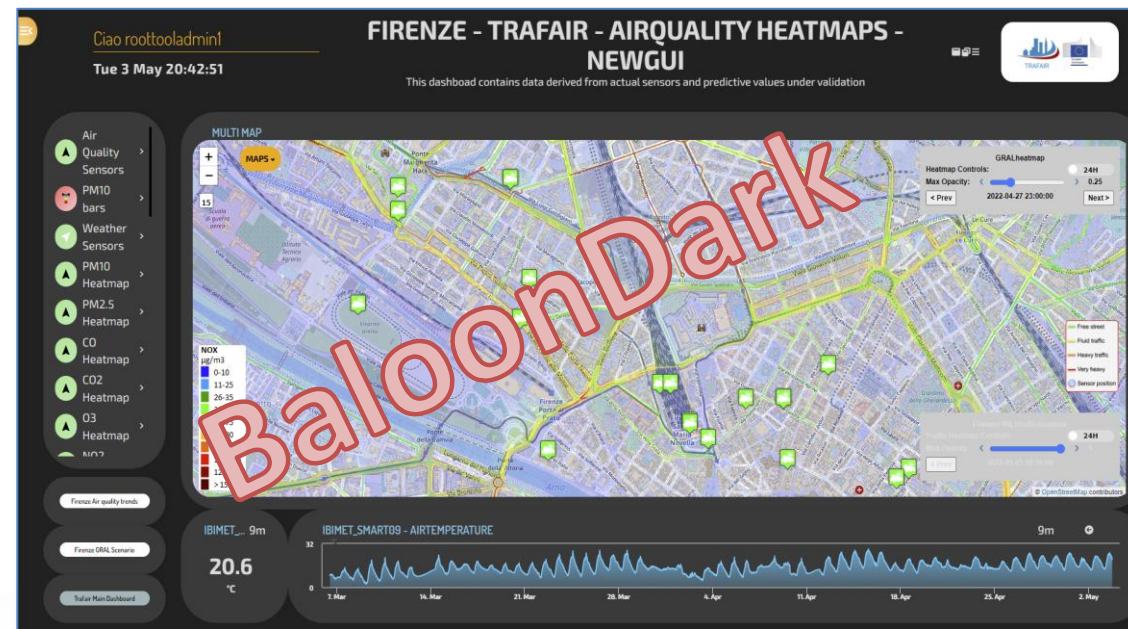
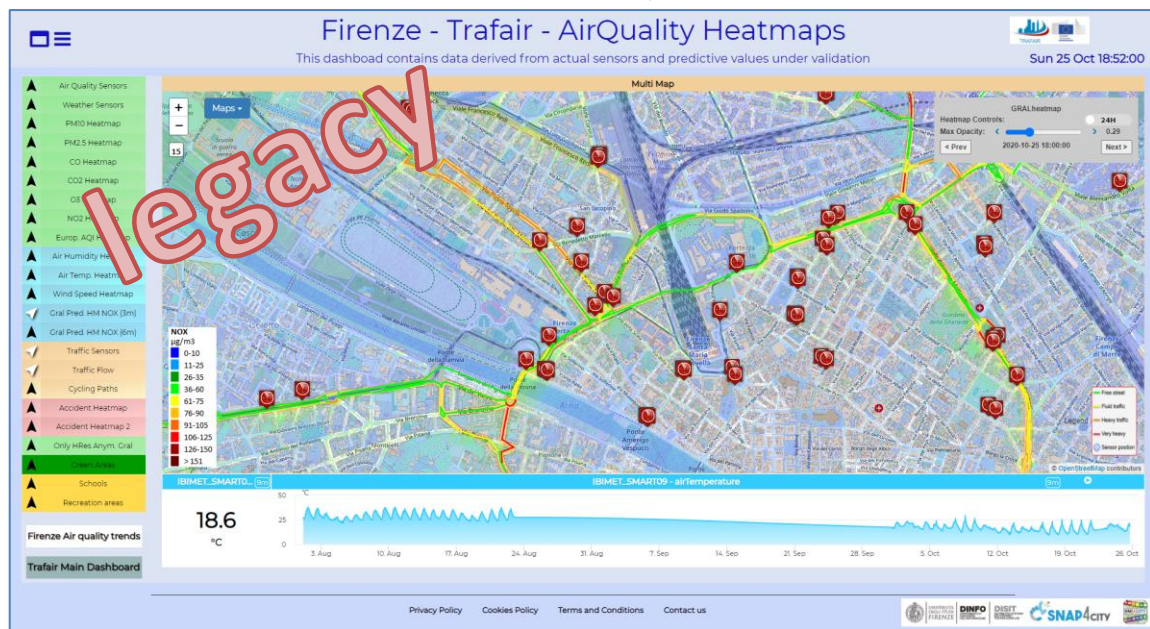
# How the Dashboards exchange data



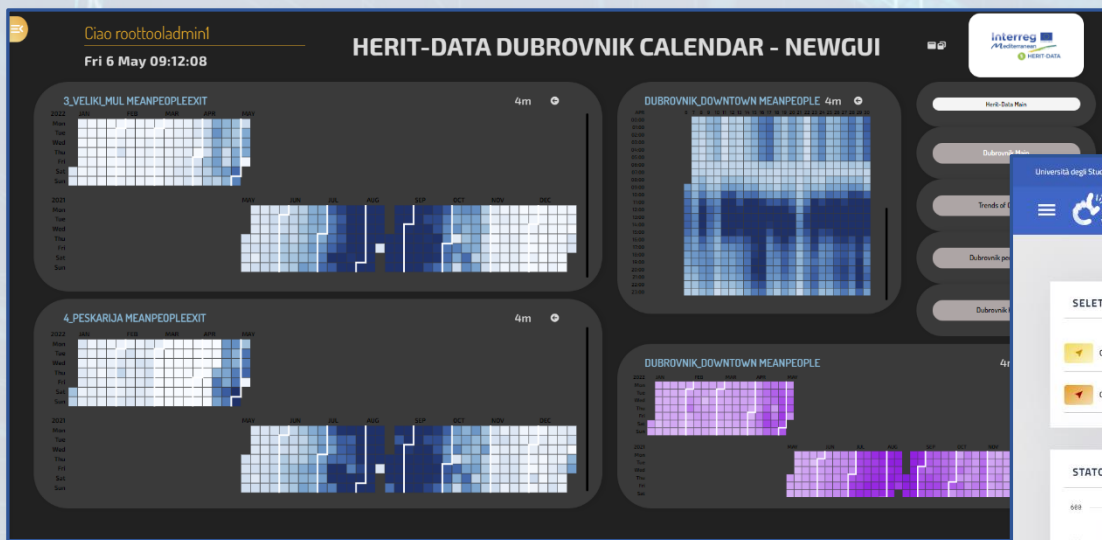




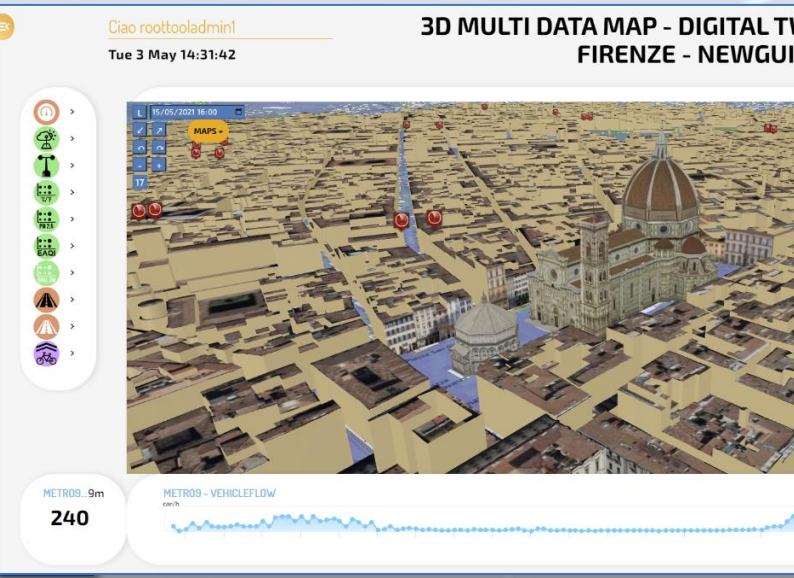
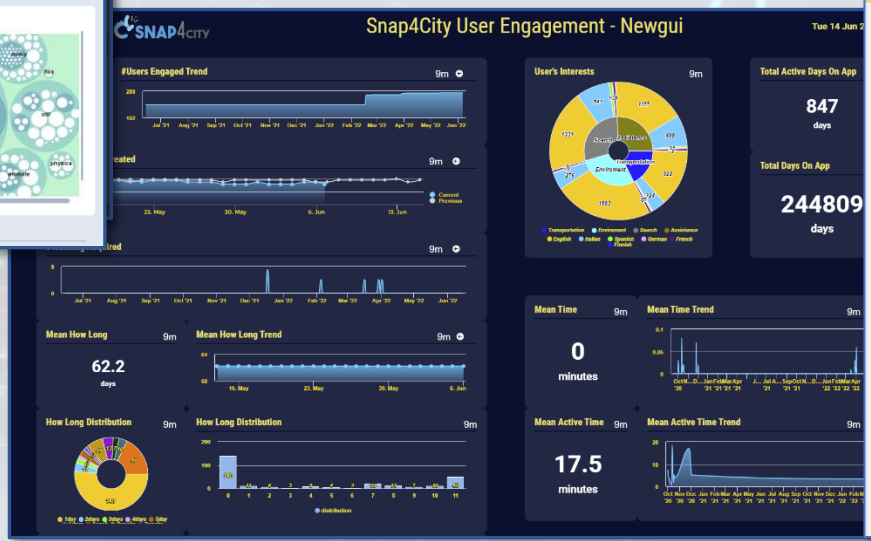
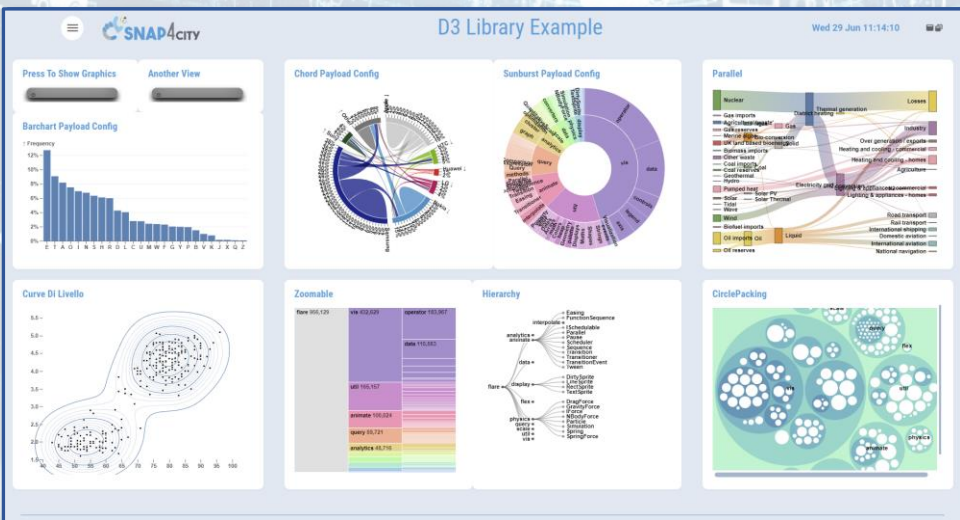
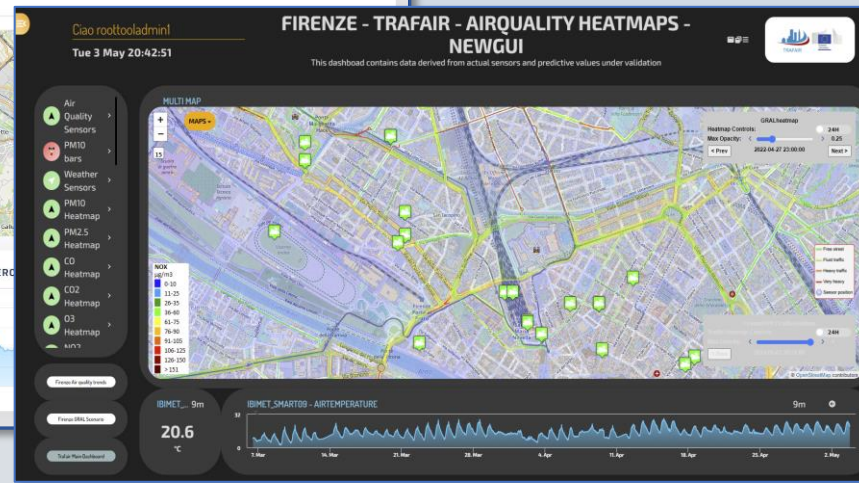
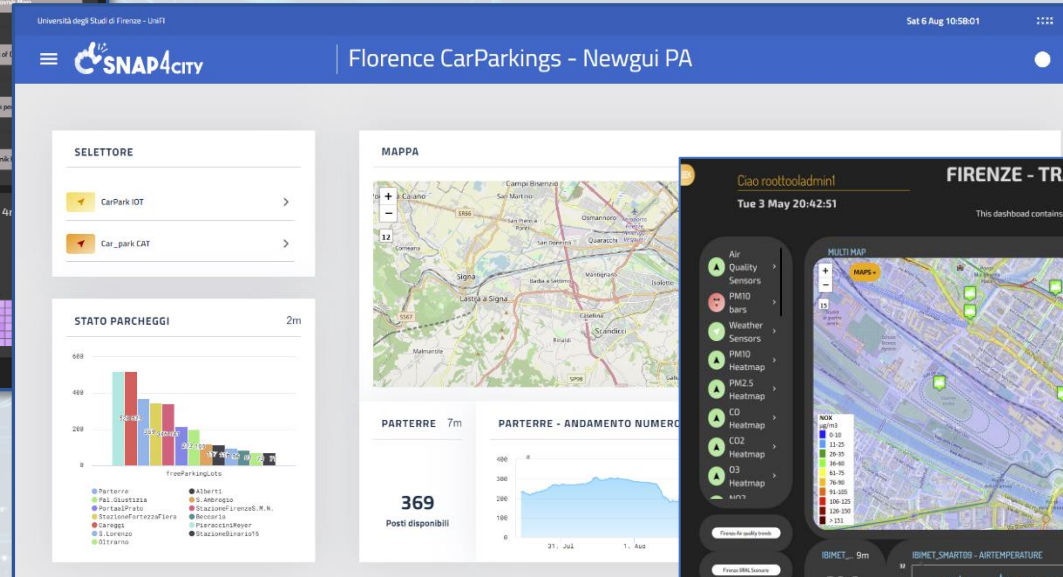








# Different Themes



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

**Fast Charging Station**

Normal recharging stations

Smart Light

Digital Signage

ZTL gates

Smart waste

Florence WiFi

Smart Irrigator

Smart Bench

Smart Info consumption for 30 PODs

Monthly cumulative consump... (9m)

PODs Percentage (9m)

258.8 Kw/h

tusc\_weather\_sensor\_ow\_3176959 - airTemperature

**Fast Recharging Stations - Average Weekly consumption**

Viale Guldoni (9m)

Piazza Donatello (9m)

Via del Cavallaccio (9m)

Piazza Giorgini (9m)

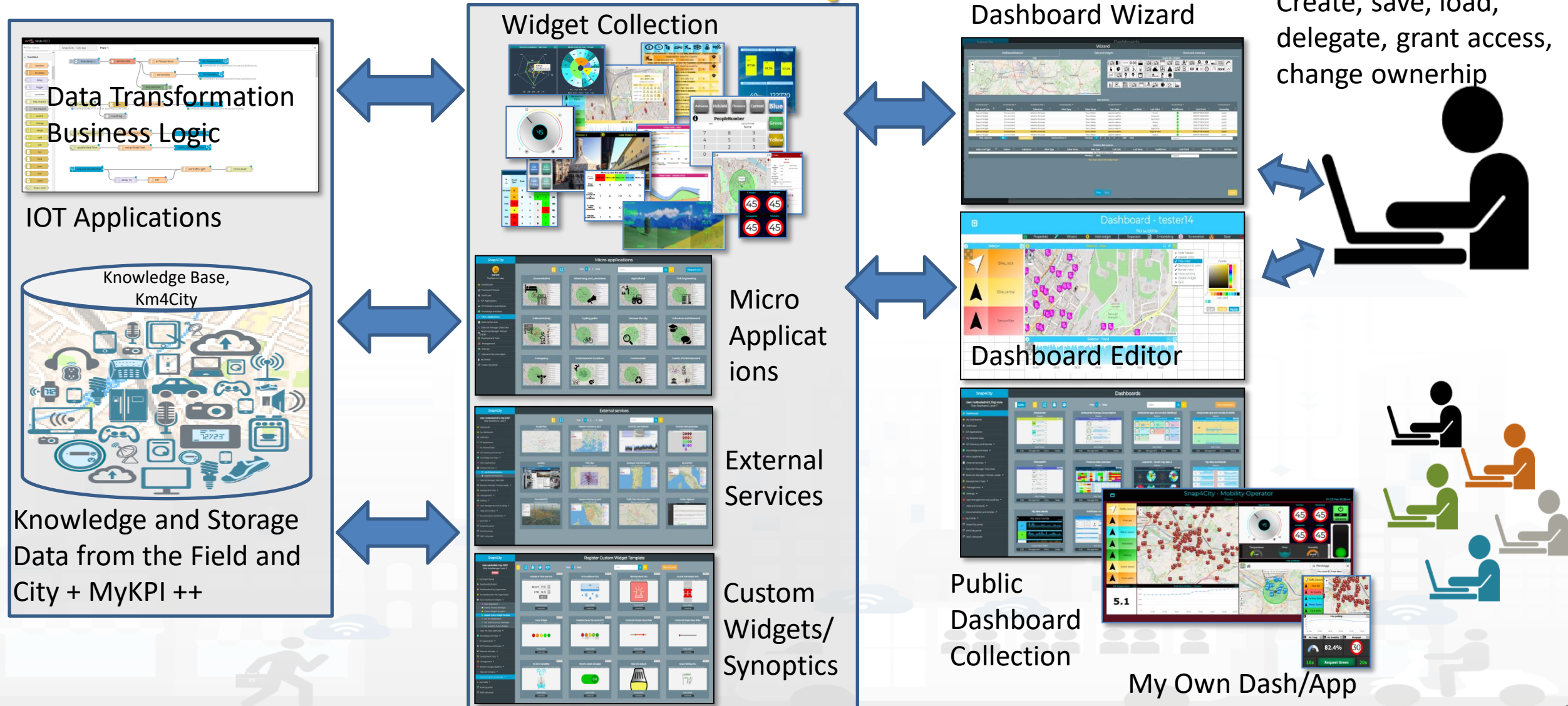
Via Venosta (9m)

Piazza Francia (9m)

Tue 20 Jun 18:34:4



# Dashboard Builder: Development





TOP

## A fast Toor

FROM CITY  
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# HOW ARE YOU GOING TO BUILD THE FUTURE?

Snap4City: a framework for rapid implementation of Decision Support Systems and Smart Applications.



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

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



Installations

What People say

Mobile Apps

IOT Devices

IOT Applications

Data Analytics

Dashboards

Living Lab

Smart City API



Training on Tools and Platform

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





TOP

# Main Data Kinds:

# data vs representations

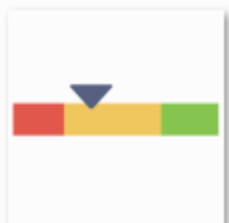


# From Data to Visualization





# Visual Representations



Slider with multiple steps for KPI



sparklines



kpi



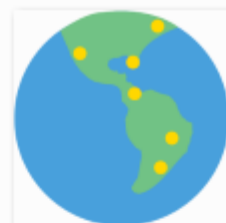
histogram



heatmap



flow-maps



geo-maps



donut-chart



Data-grid



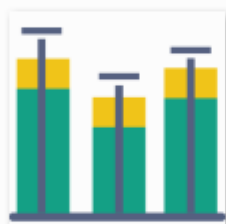
chord



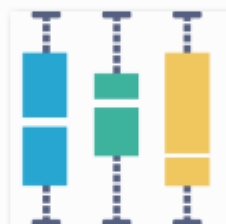
Cone



Bubble-matrix chart



Bullet



Box-plot



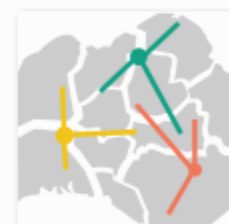
stacked-area



Stacked-line chart



Stacked-combination Chart



spider-maps



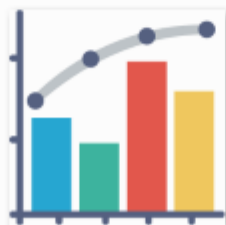
Sequence-Sunburst



Pivot



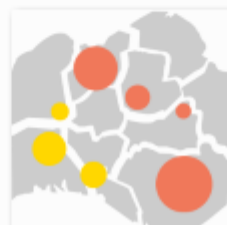
pie-chart-1



Pareto-chart



radar



Bubble-maps



waterfall

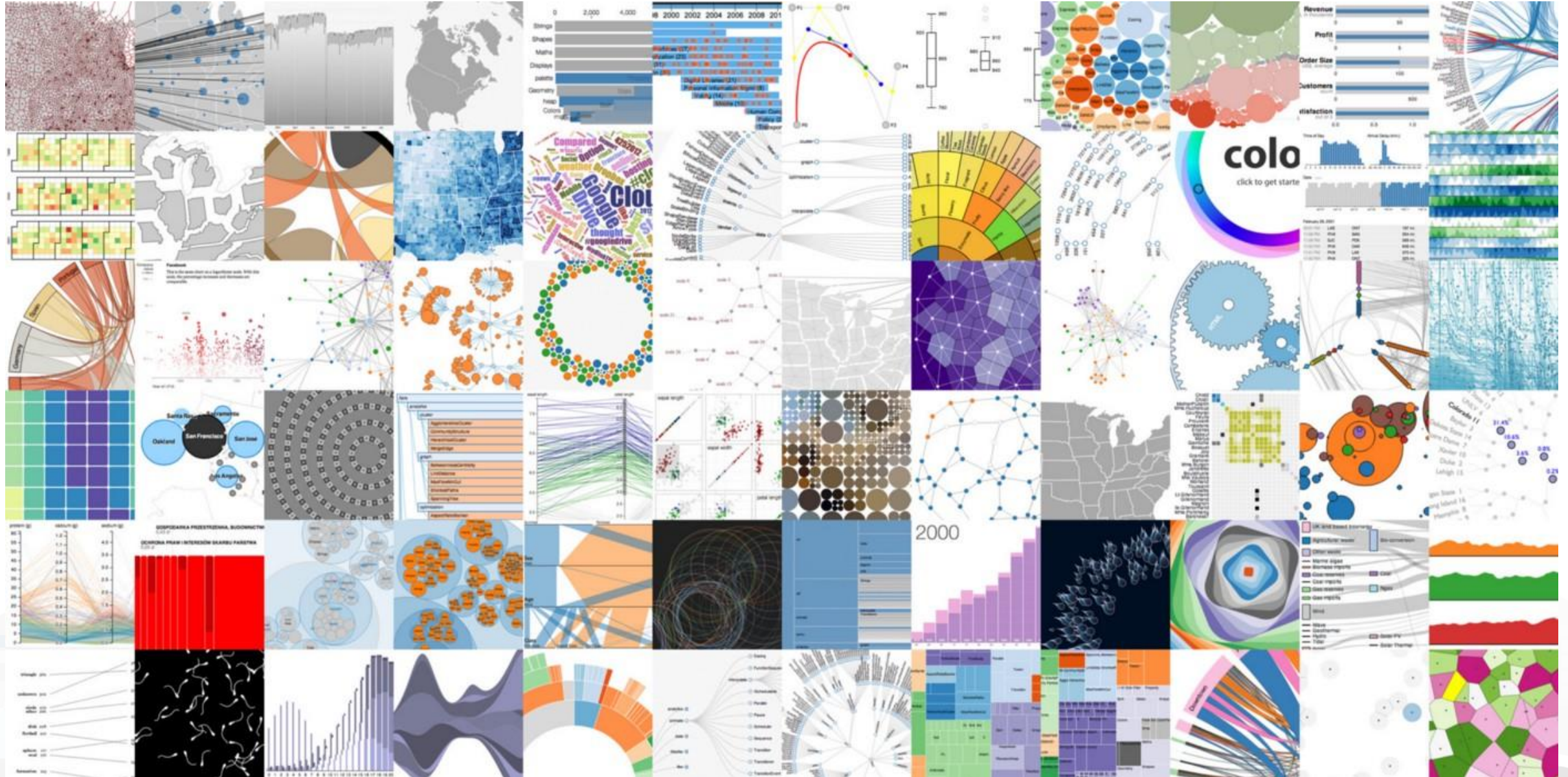


Sunburst



Sankey





# 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

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IOT Device

# What About IoT Devices, Time Series



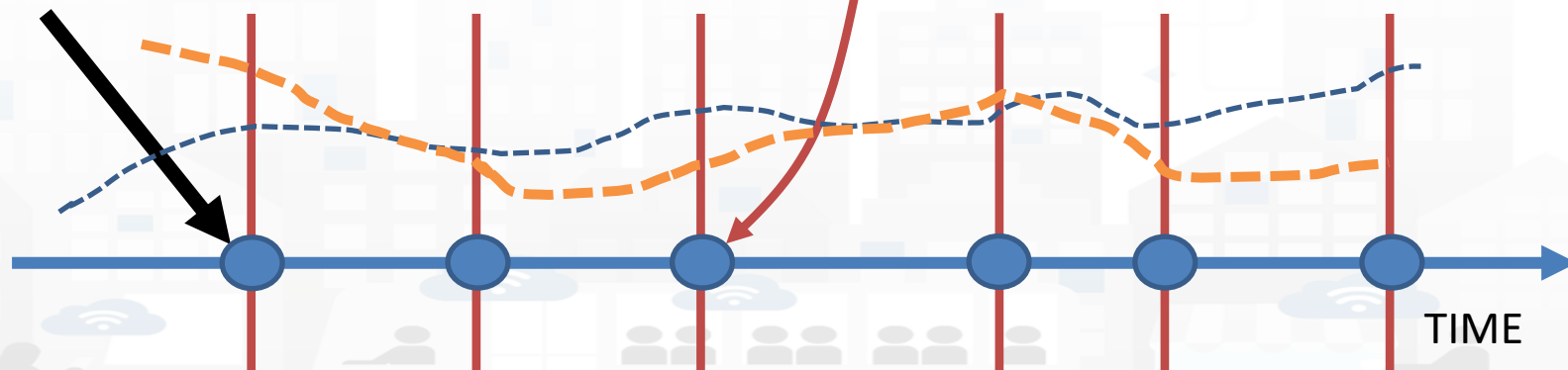
IOT Device

Sends a  
message

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

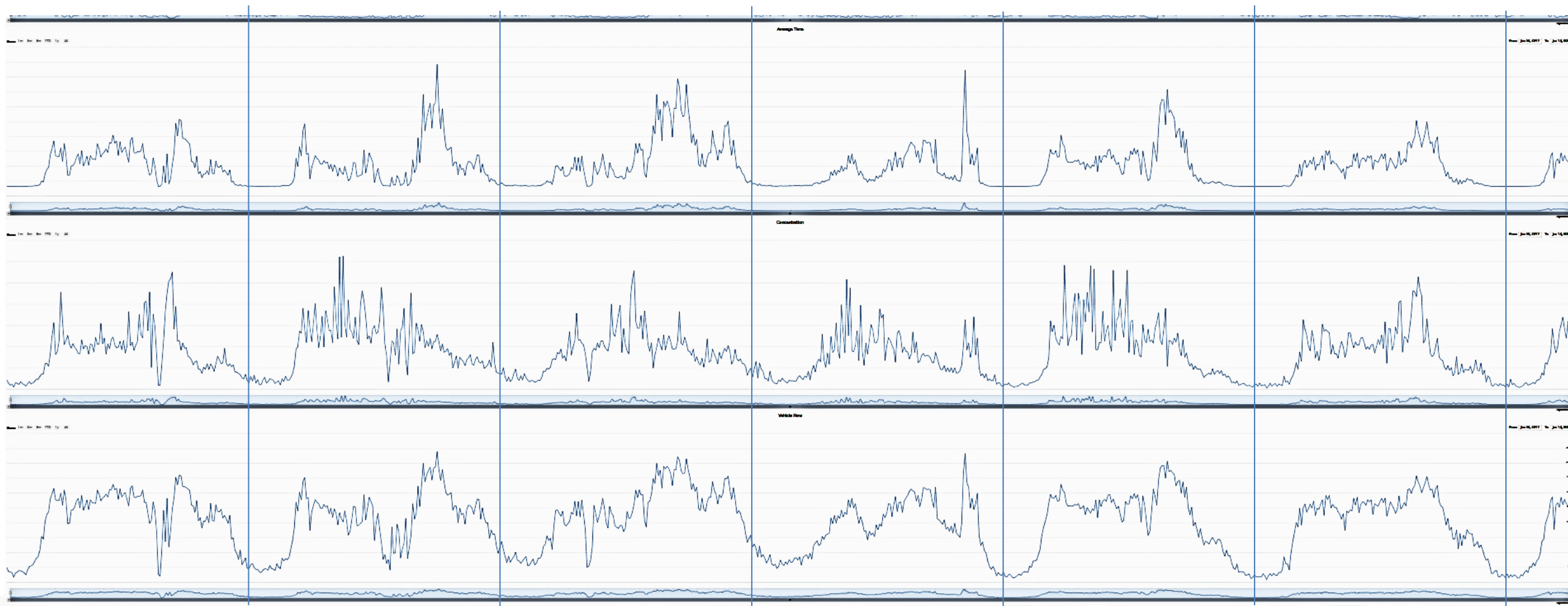
- A set of data coming from an IoT Device with multiple sensor become a time series of values for devices.
  - For example: taking a new measure every 10 minutes (**Red Lines**)
  - Non regular rates can be valid data as well.
- Each new measure in Snap4City is conventionally time located in «**dateObserved**»,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

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





# Traffic Flow data



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

TOP

## Maps data

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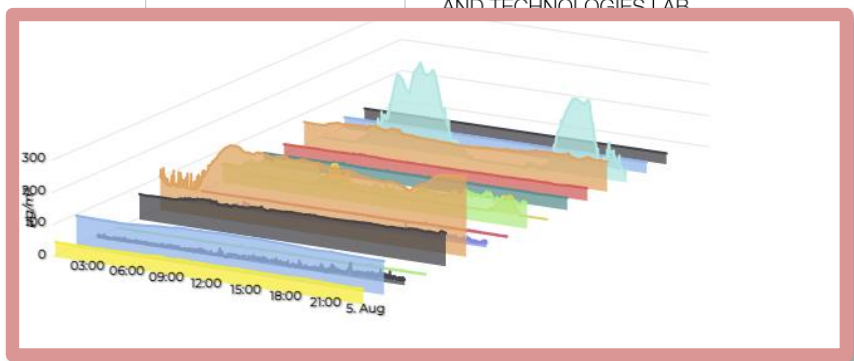
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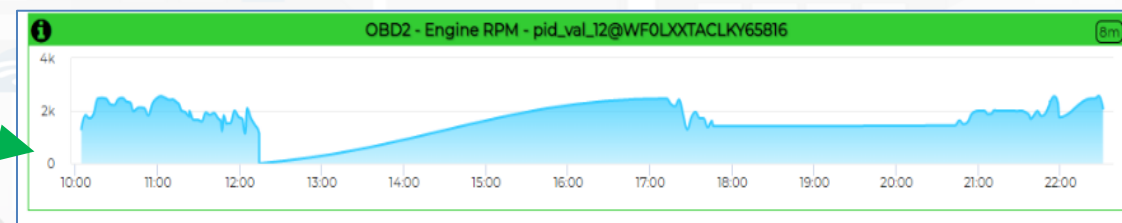
Longitude

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
- Svalbard 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 Busses**

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	101.56052

Latest Update: 2021-01-16T12:...

Regular Services | Transversal Services

De/Select All

- ☒ Accommodation +
- ☒ Advertising +
- ☒ AgricultureAndLivestock +
- ☒ CivilAndEdilEngineering +
- ☒ CulturalActivity +
- ☒ EducationAndResearch +
- ☒ Emergency -
- ☒ Carabinieri
- ☒ Civil\_protection
- ☒ Coast\_guard
- ☒ 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

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

Latest Update: 2021-01-16T07:57:00+01:00  
<http://www.disit.org/km4city/resource/Firenze1610780220000>

Entity/Device

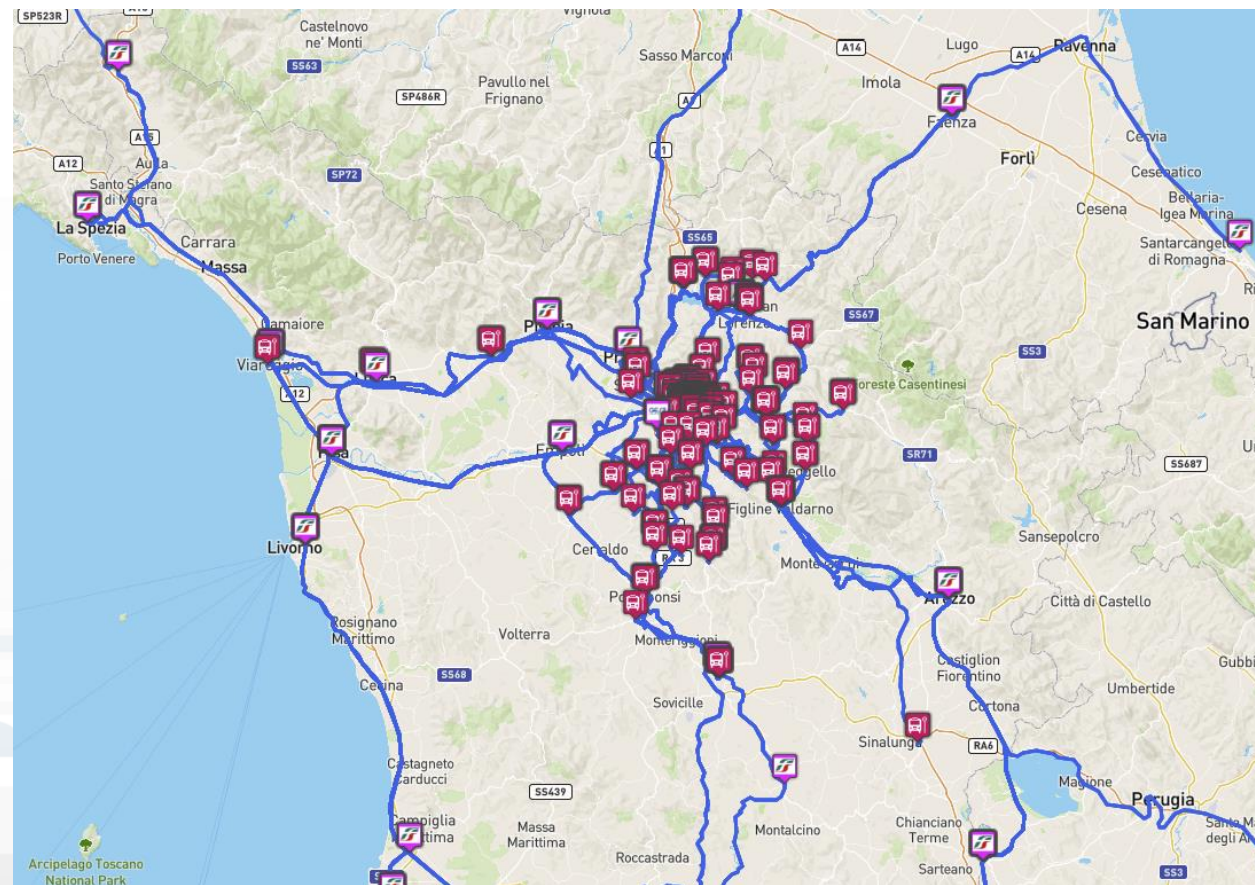
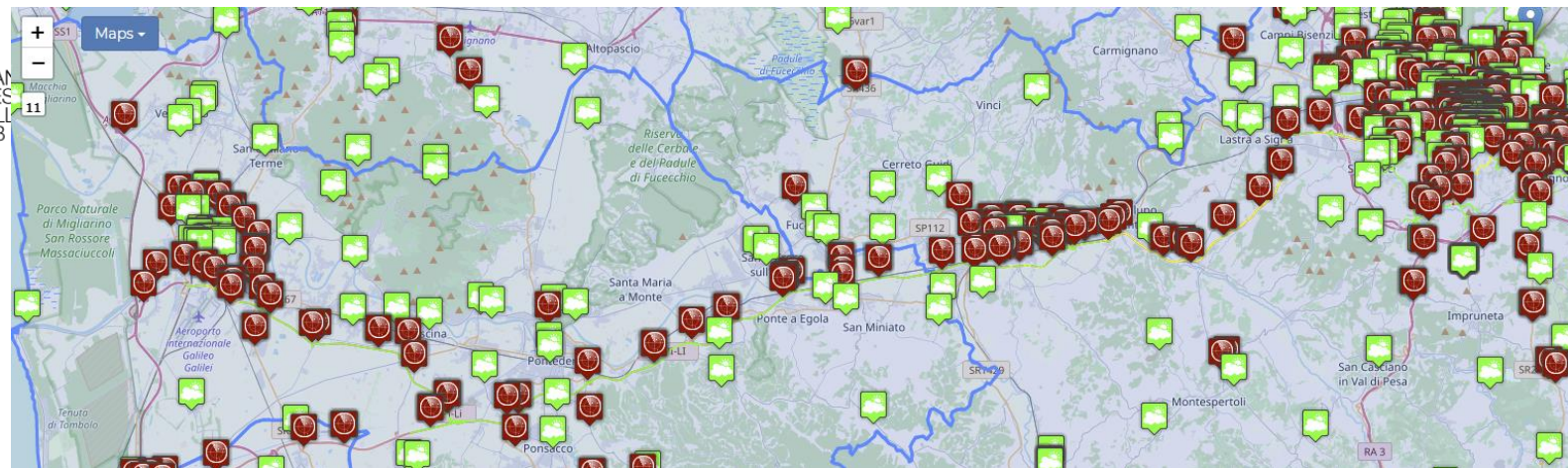
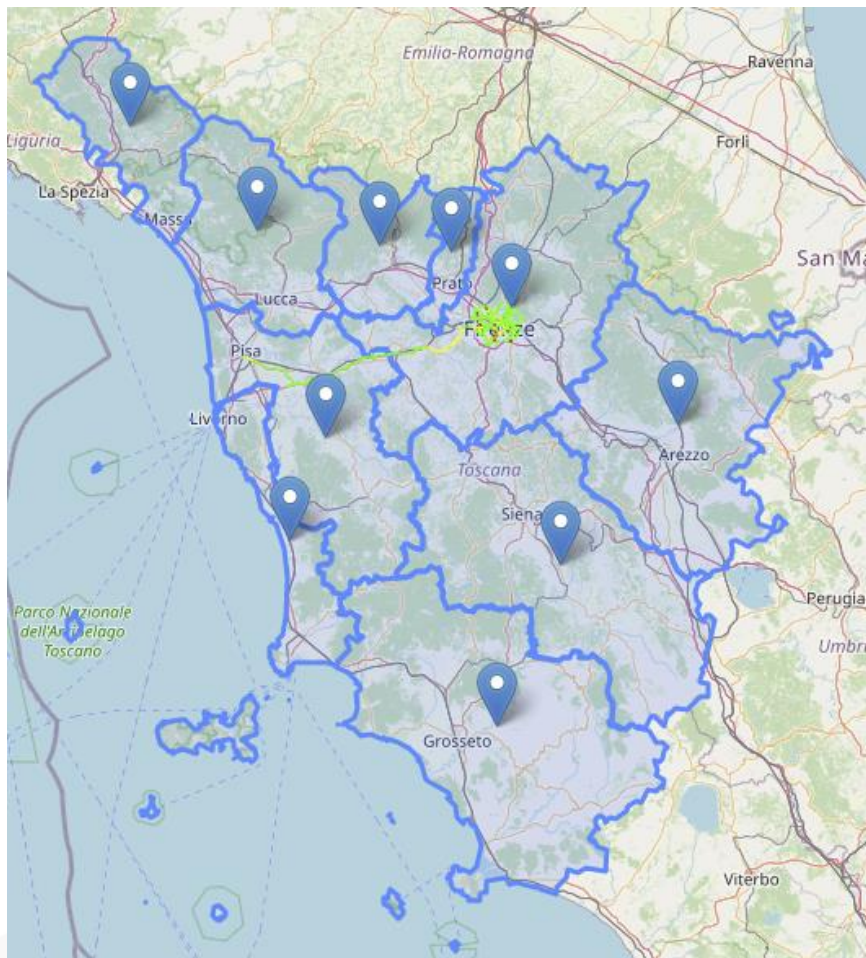
Structural information

POI

Entity/Device

Map: Struct. Information

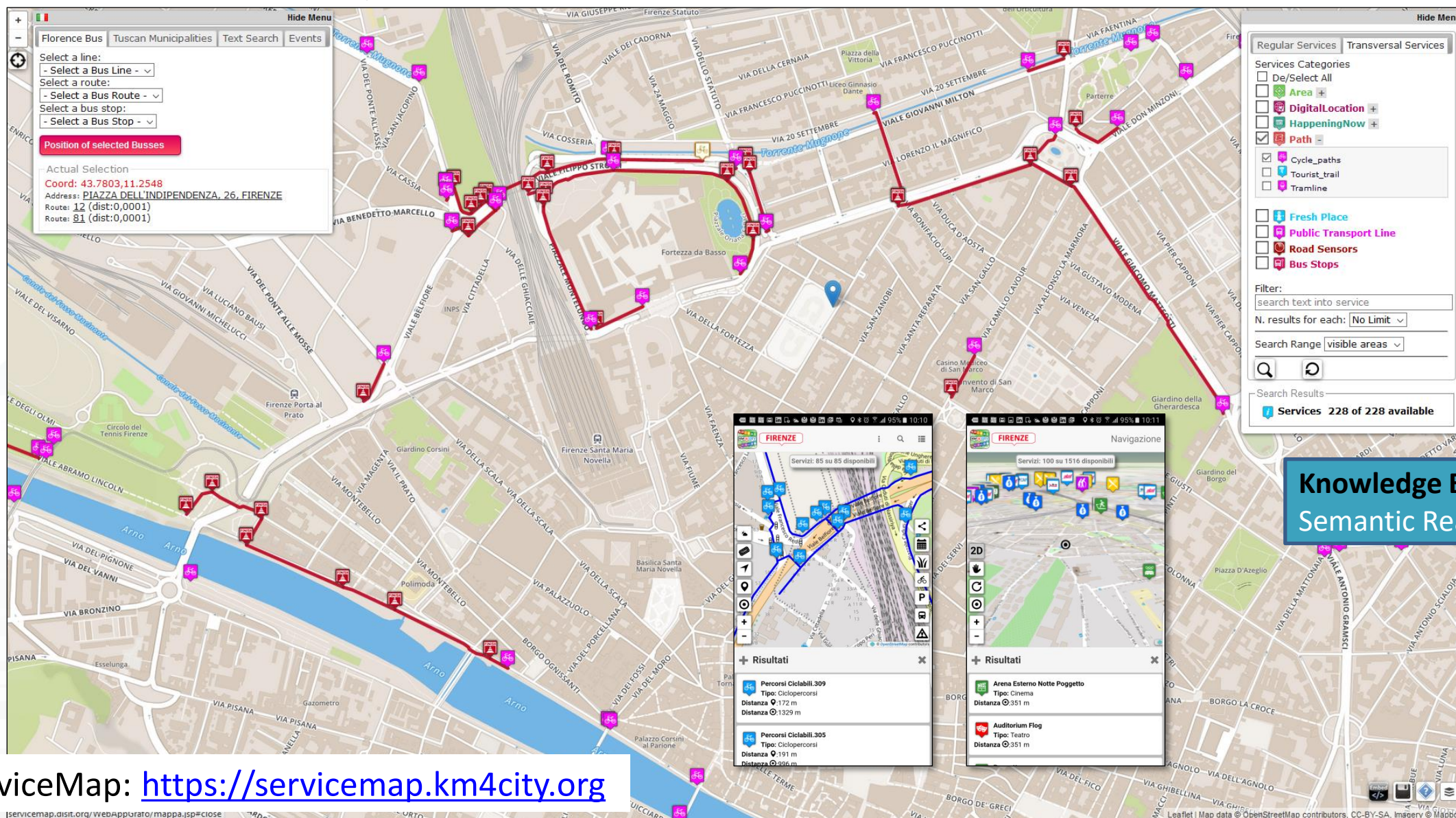




# Admin Models & limitations



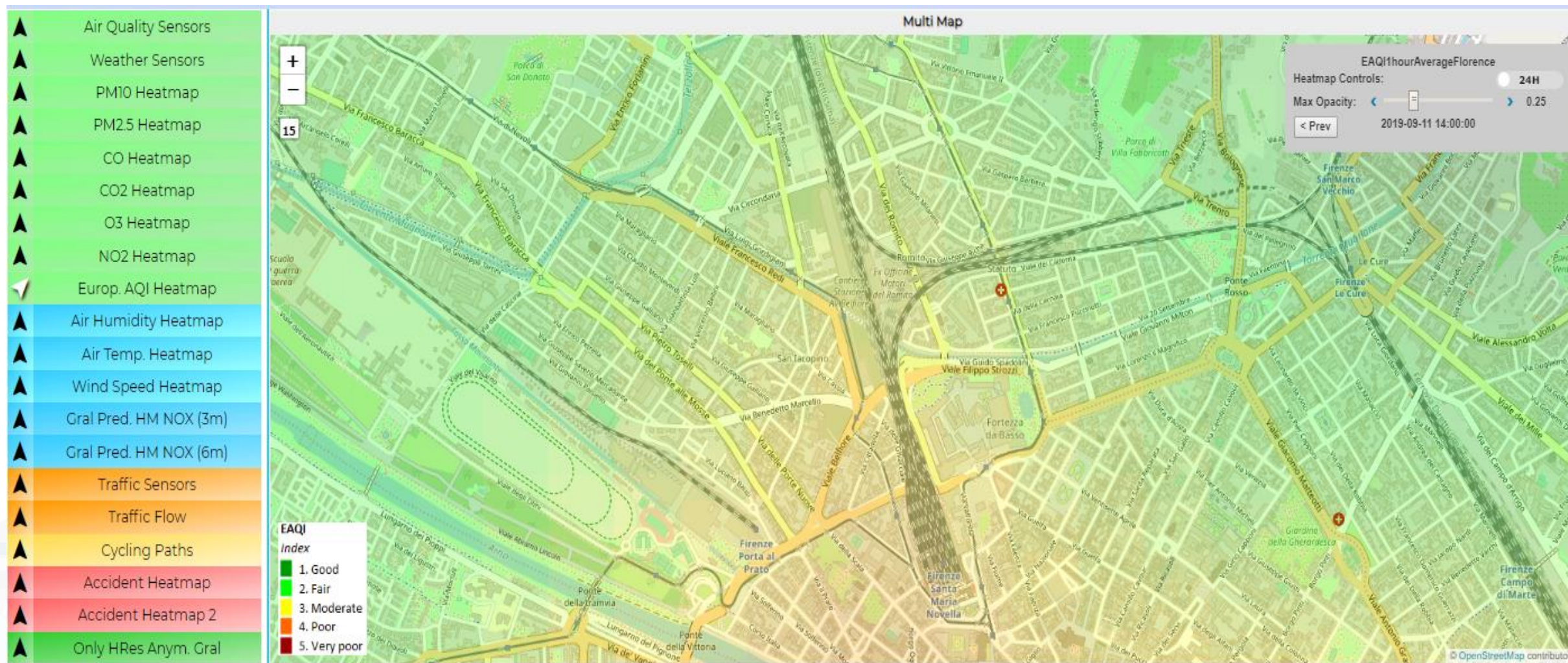
# Cycling Paths



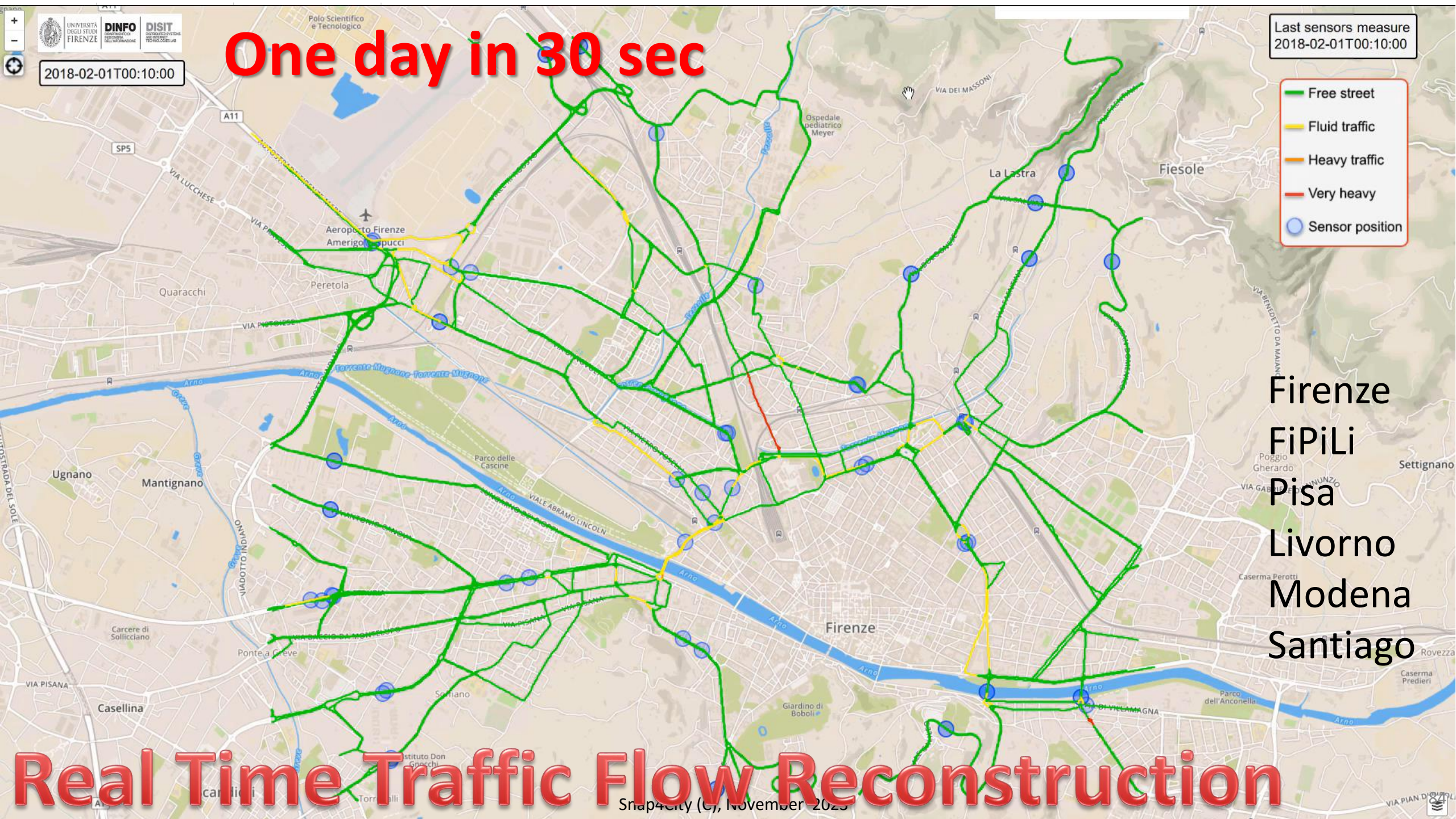
ServiceMap: <https://servicemap.km4city.org>



# EAQI Heatmap and sequence







2018-02-01T00:10:00

One day in 30 sec

Last sensors measure  
2018-02-01T00:10:00

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

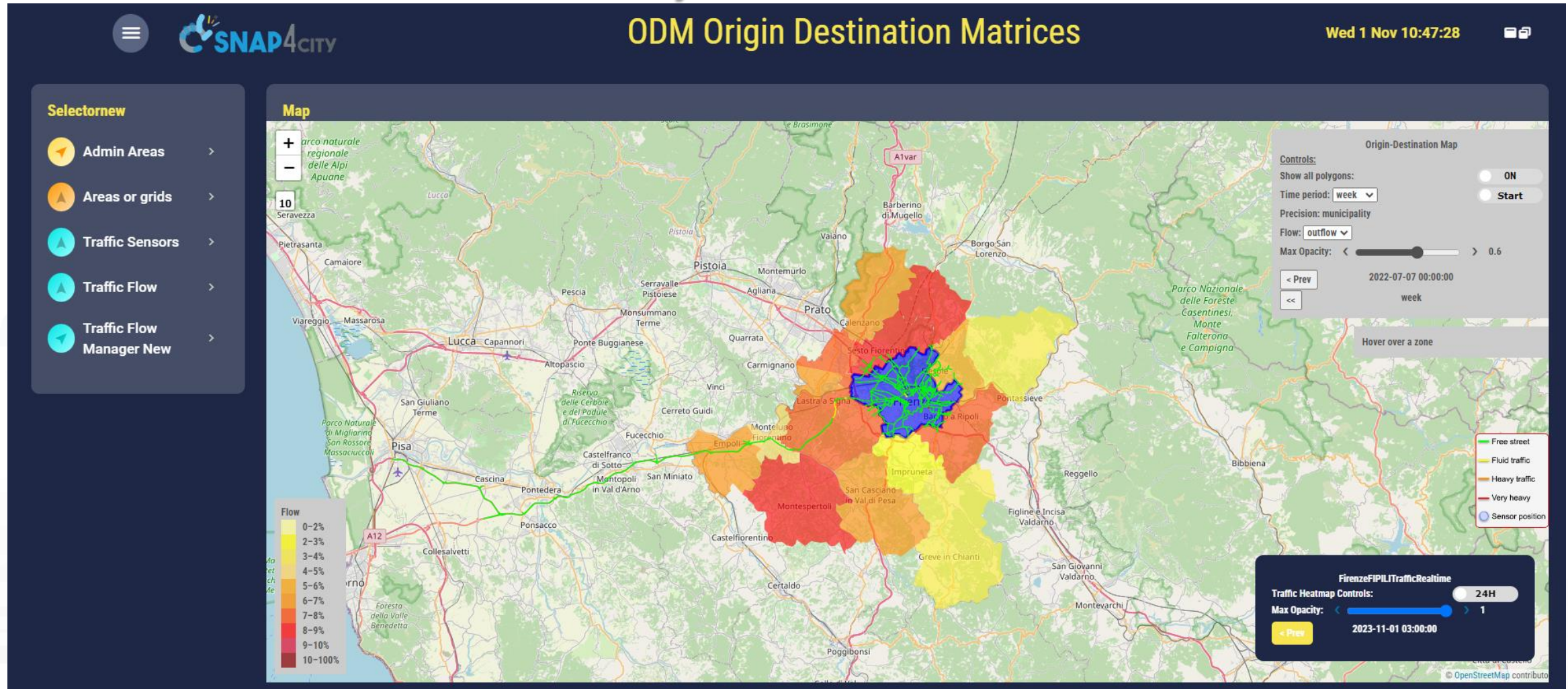
Firenze  
FiPiLi  
Pisa  
Livorno  
Modena  
Santiago

Real Time Traffic Flow Reconstruction



# ODM, Traffic Flow

## ODM Origin Destination Matrices



<https://www.snap4city.org/dashboardSmartCity/view/Gea-Night.php?iddasboard=Mzk3Nw==>

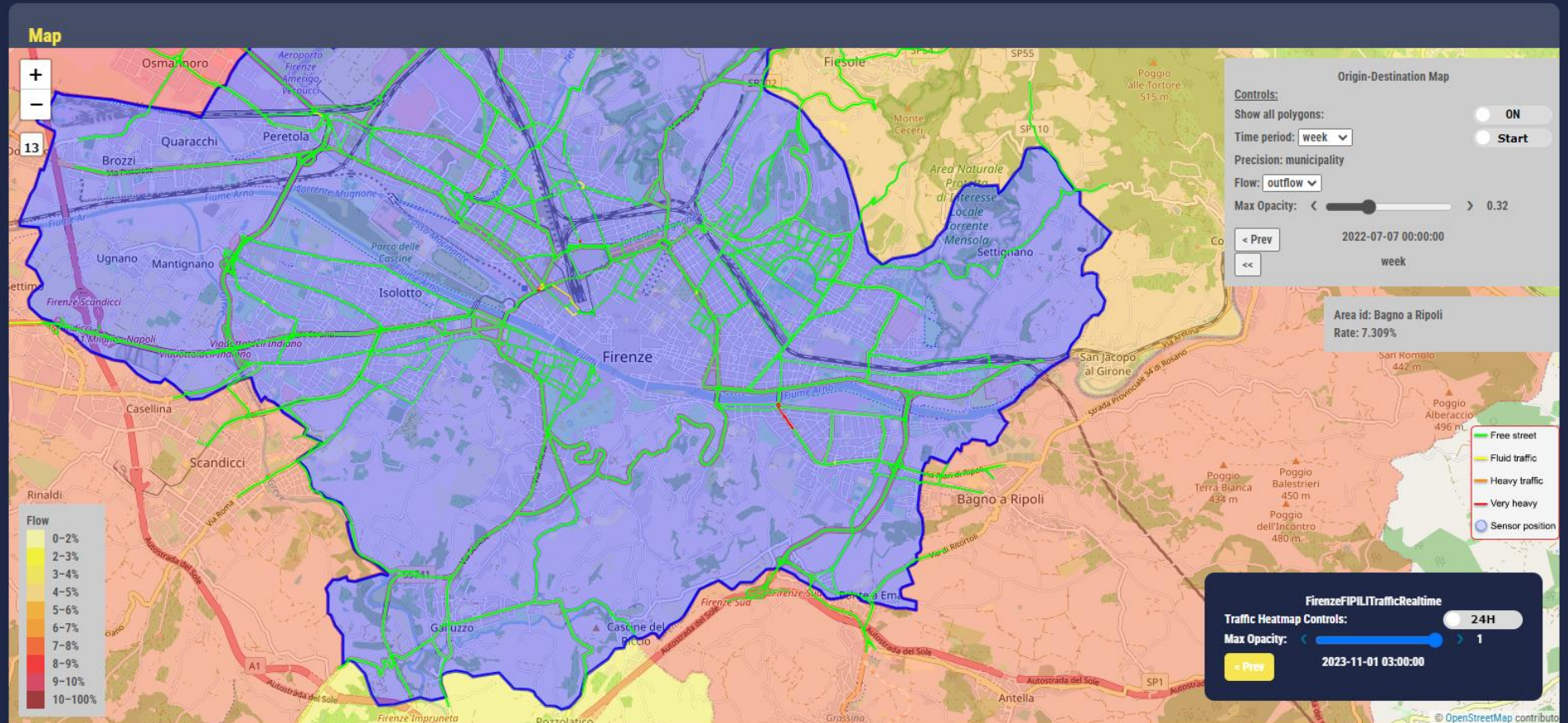


## ODM Origin Destination Matrices

Wed 1 Nov 10:50:01

### Select or new

- Admin Areas >
- Areas or grids >
- Traffic Sensors >
- Traffic Flow >
- Traffic Flow Manager New >

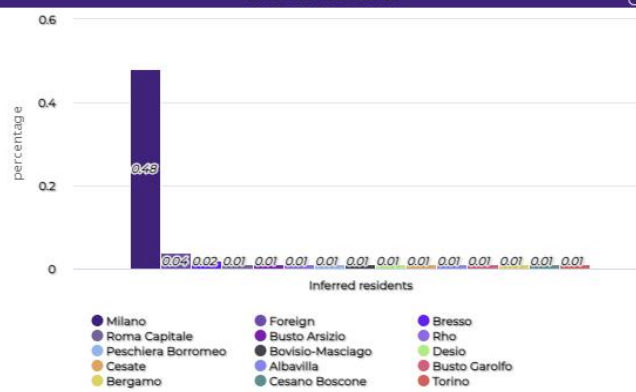
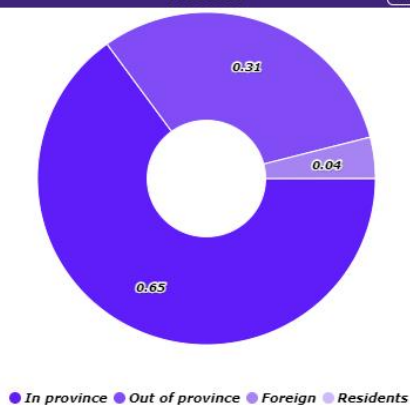
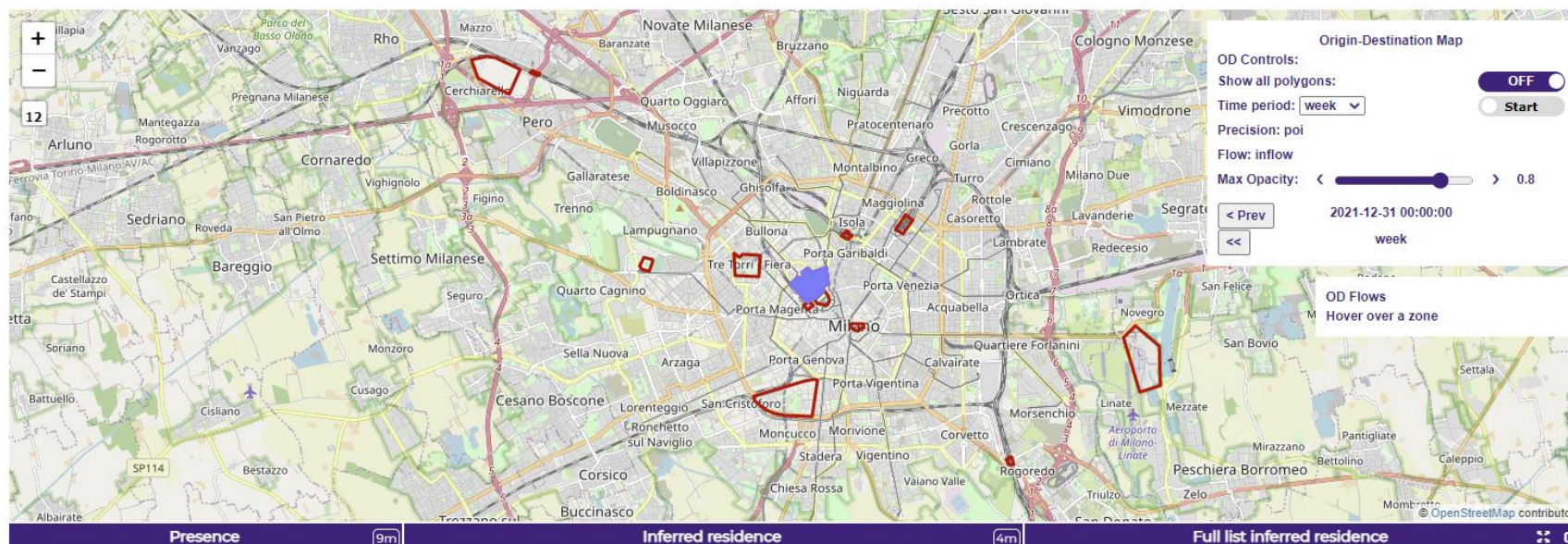


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# ODM Visual Analytic on Milan Area

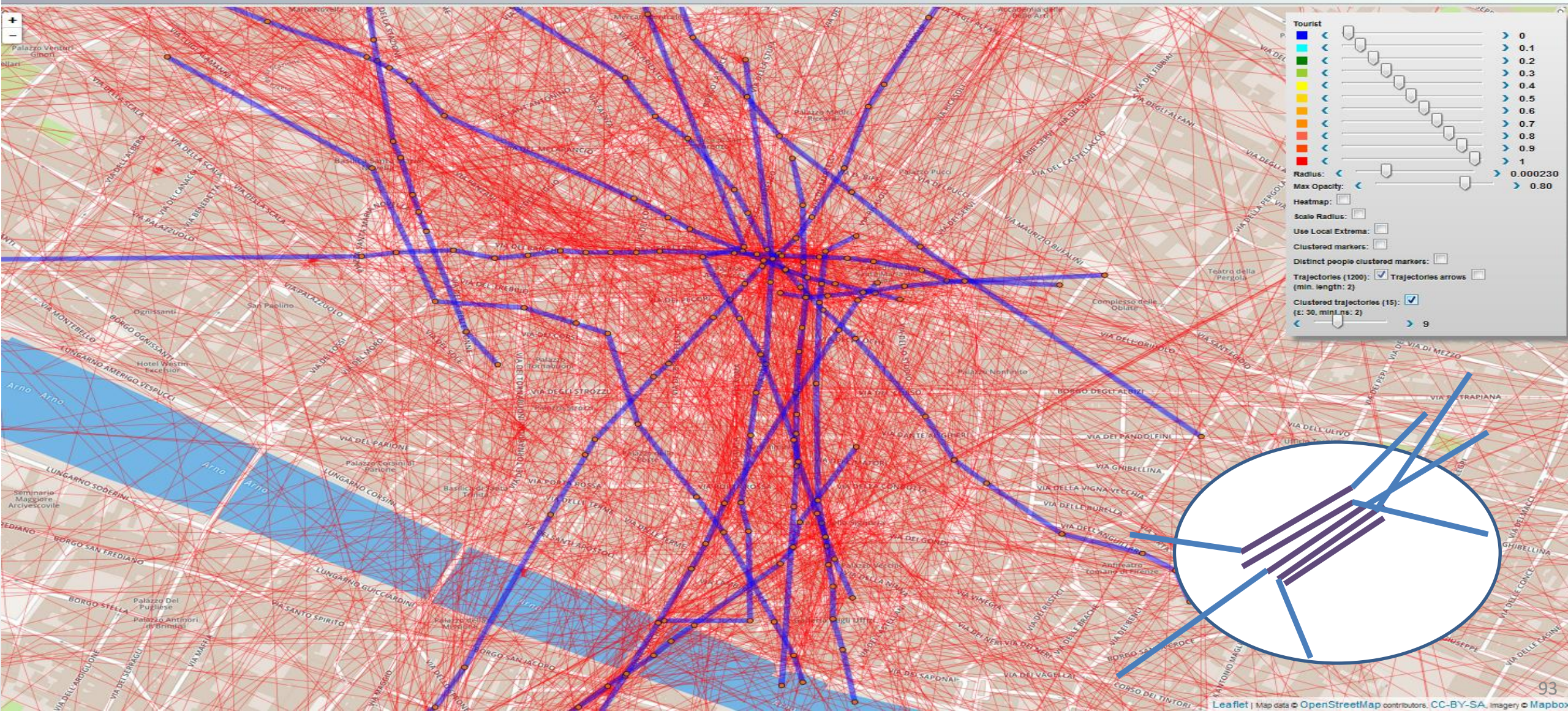


## Parco Sempione

<input type="radio"/> Region	<input type="radio"/> Province	<input checked="" type="radio"/> Municipality	<input type="radio"/> 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

FROM CITY  
DASHBOARD TO  
APPLICATIONS

DATA GATHERING  
AND CITY DATA  
KNOWLEDGE  
MANAGEMENT

FORGING &  
MANAGING OPEN  
AND FLEXIBLE WEB  
AND MOBILE APPS

IOT/IOE DEVICES  
AND NETWORKS

IOT APPLICATIONS  
V. IOT LOGIC

IOT APPLICATIONS,  
THE LOGIC AND  
THE SMARTNESS

ADVANCED  
SMART CITY API,  
MICROSERVICES,  
SNAP4CITY API

SNAP4CITY  
LIVING LAB FOR  
COLLABORATIVE  
WORK

SNAP4CITY FOR  
BEGINNERS

DATA ANALYTICS,  
BUSINESS  
INTELLIGENCE,  
WHAT-IF AND  
SIMULATION

SNAP4CITY  
ARCHITECTURE AND  
ECOSYSTEM. OPENED  
TO DEVELOPERS  
AND STAKEHOLDERS

TWITTER  
VIGILANCE: SOCIAL  
MEDIA ANALYSIS

DECISION SUPPORT  
SYSTEM AND CITY  
RESILIENCE

HOW TO ADOPT  
SNAP4CITY, AND  
OUR ROADMAP

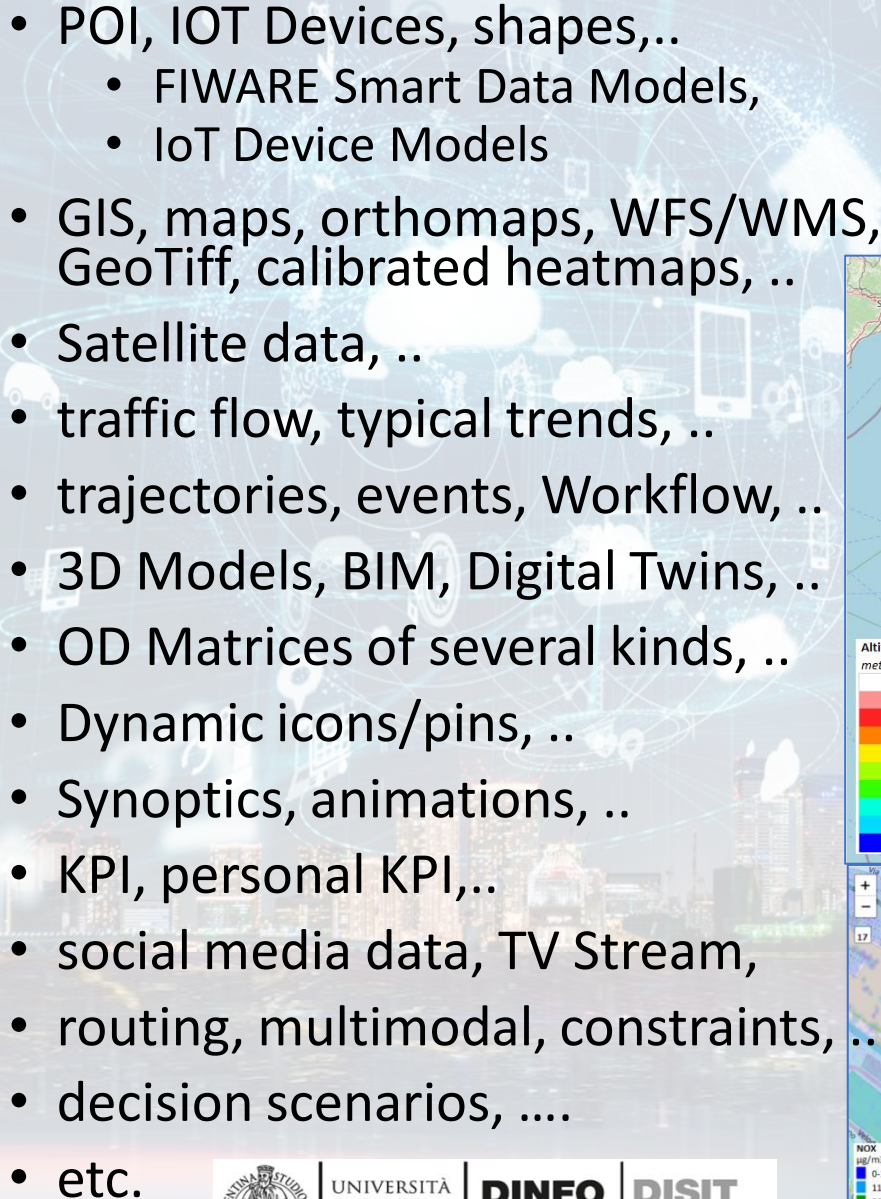
SNAP4CITY  
AND KM4CITY  
PROJECTS

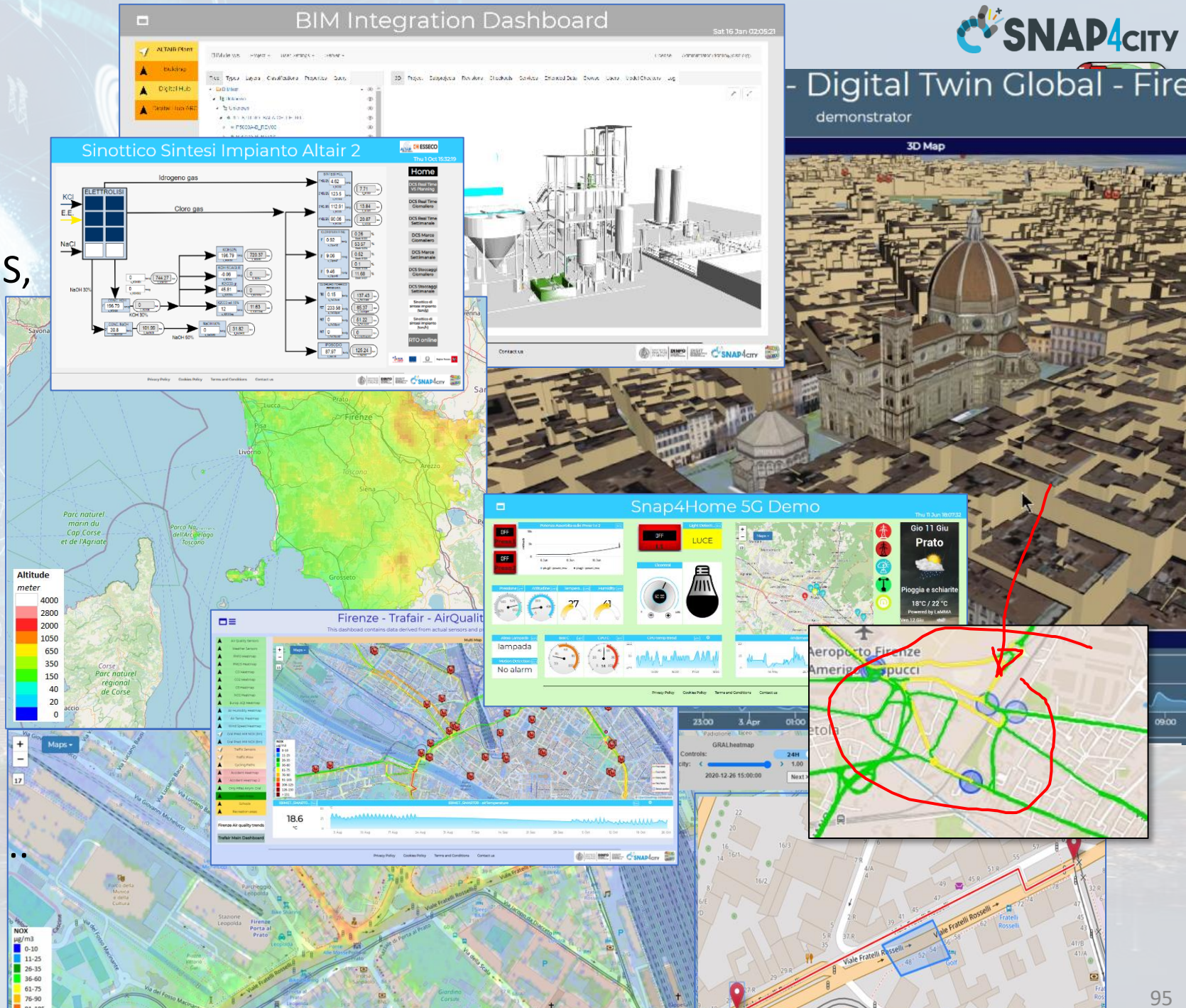
SNAP4CITY THE  
VIEW OF THE  
ADMINISTRATORS



# High Level Types

Snap4City (C), November 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.





TOP

# Snap4City DASHBOARDS: Main Concepts and simple Widgets

FROM CITY  
DASHBOARD TO  
APPLICATIONS

DATA GATHERING  
AND CITY DATA  
ANALYTICS

FORGING &  
MANAGING OPEN  
AND FLEXIBLE WEB  
AND MOBILE APPS

IOT/IOE DEVICES  
AND NETWORKS

IOT APPLICATIONS,  
THE LOGIC AND  
THE SMARTNESS

ADVANCED  
SMART CITY API,  
MICROSERVICES,  
SNAP4CITY API

SNAP4CITY  
LIVING LAB FOR  
COLLABORATIVE  
WORK

SNAP4CITY FOR  
BEGINNERS

DATA ANALYTICS,  
BUSINESS  
INTELLIGENCE,  
STATISTICS  
SIMULATIONS

SNAP4CITY  
ARCHITECTURE AND  
ECOSYSTEM, OPENED  
TO PARTNERS  
AND STUDENTERS

TWITTER  
VIGILANCE: SOCIAL  
MEDIA ANALYSIS

HOW TO ADOPT  
SNAP4CITY, AND  
OUR ROADMAP

SNAP4CITY  
AND KM4CITY  
PROJECTS

SNAP4CITY THE  
VIEW OF THE  
ADMINISTRATORS

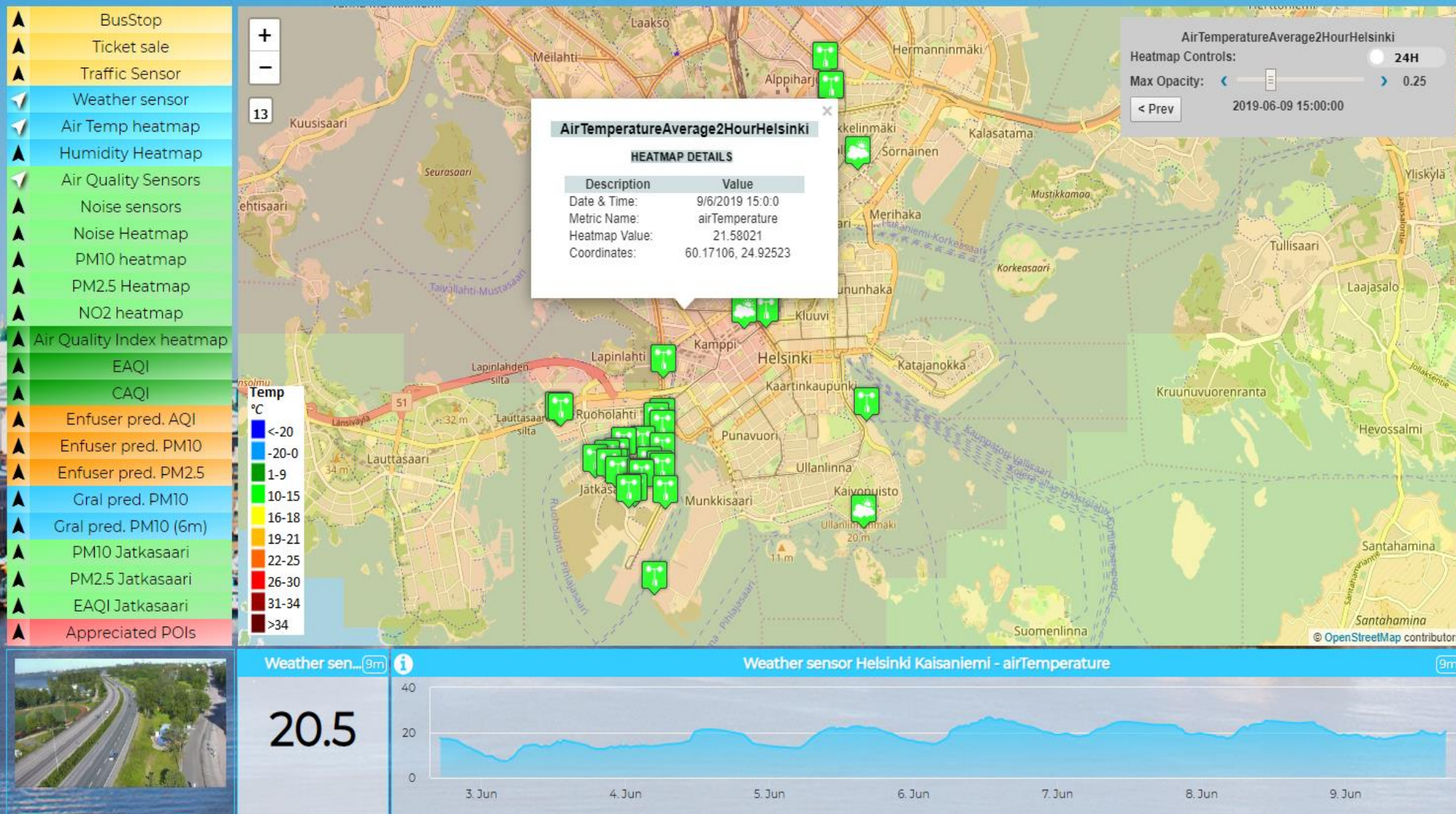




# Helsinki City Overview (H5a)

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

Sun 9 Jun 17:07:25



The Life of Helsinki

Documentation

Forum  
Discussion

Survey

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



UNIVERSITÀ  
DEGLI STUDI  
FIRENZE

DINFO  
DIPARTIMENTO  
DELL'INFORMAZIONE

DISIT  
DIPARTIMENTO  
DELL'INFORMAZIONE

SNAP4CITY





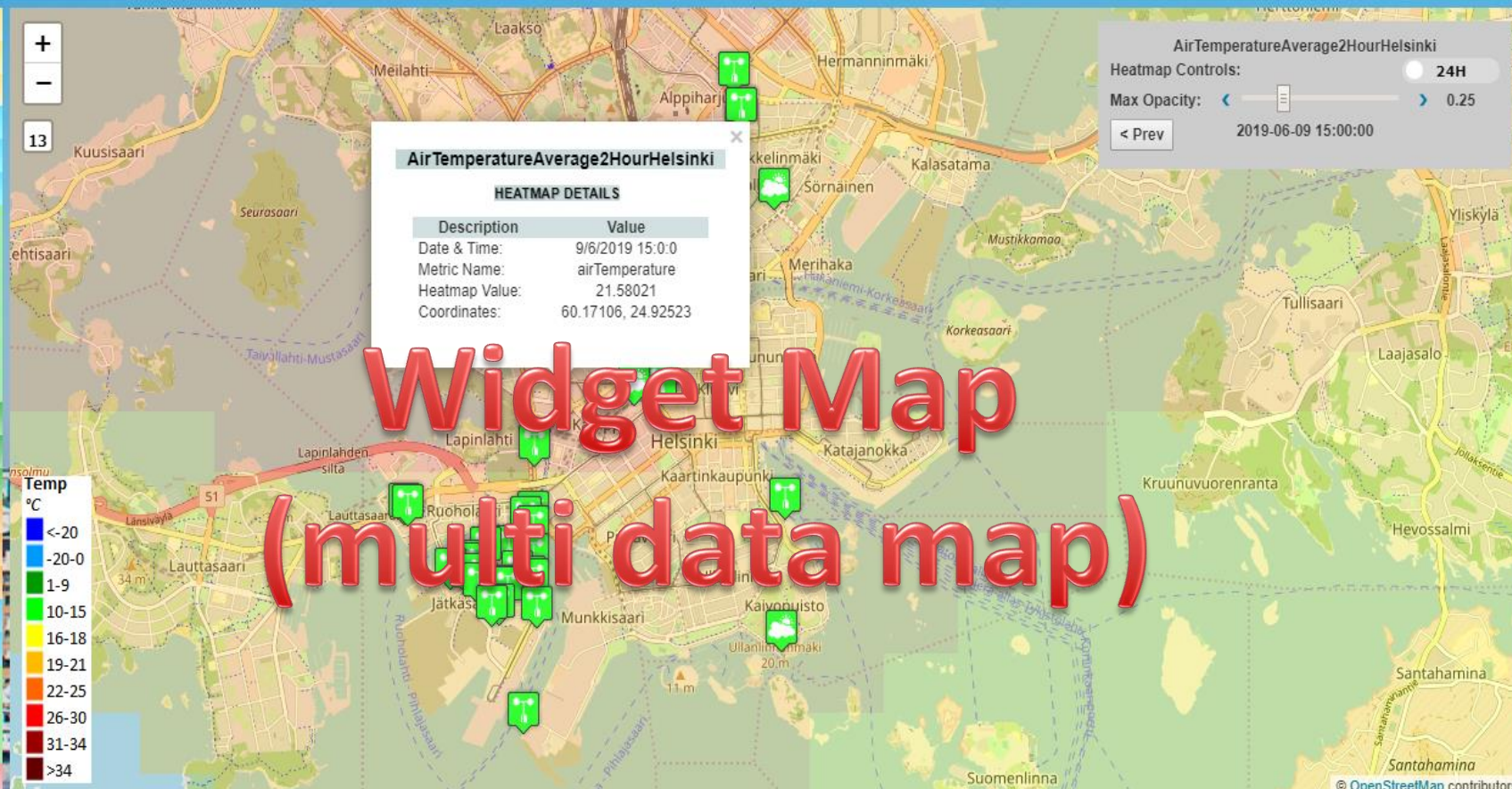


# Helsinki City Overview (H5a)

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
- ▲ 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



Widget Map  
(multi data map)

External  
Content



Single  
Content



Time Trend

The Life of Helsinki

Button

Documentation

Forum  
Discussion

Survey

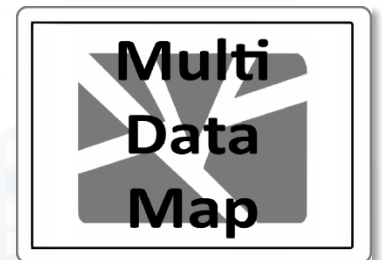
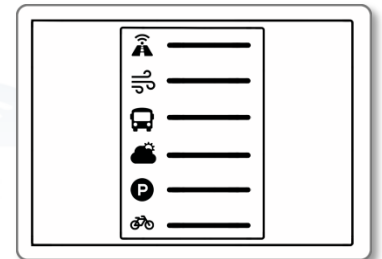
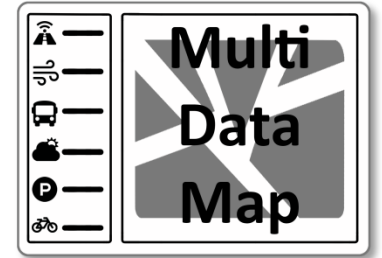
<https://www.snap4city.org/dashboardSmartCity/view/index.php?iddasboard=MTQwNg==>





# Dashboard Usage & Recipe

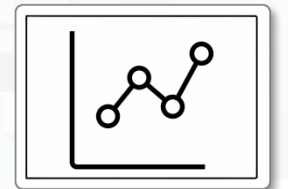
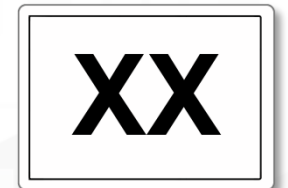
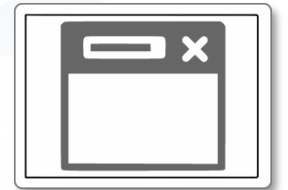
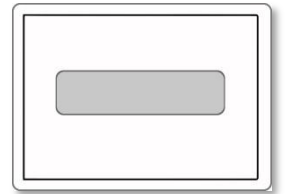
- <https://www.snap4city.org/dashboardSmartCity/view/index.php?iddashboard=MTQwNg==>
- **Selector Widget:** (of different kinds) present “Information”, according to the HighLevelType (**HLT**), as overlapped layers on Target
  - **Additive:** PIN (POI, sensors, etc.), Cycling Paths, shapes, ...
  - **Mutual 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.

Multi  
Data  
Map

The Life of Helsinki

Button

Widget Map  
(multi data map)

Documentation

Forum  
Discussion

Survey

External  
Content

Single  
Content

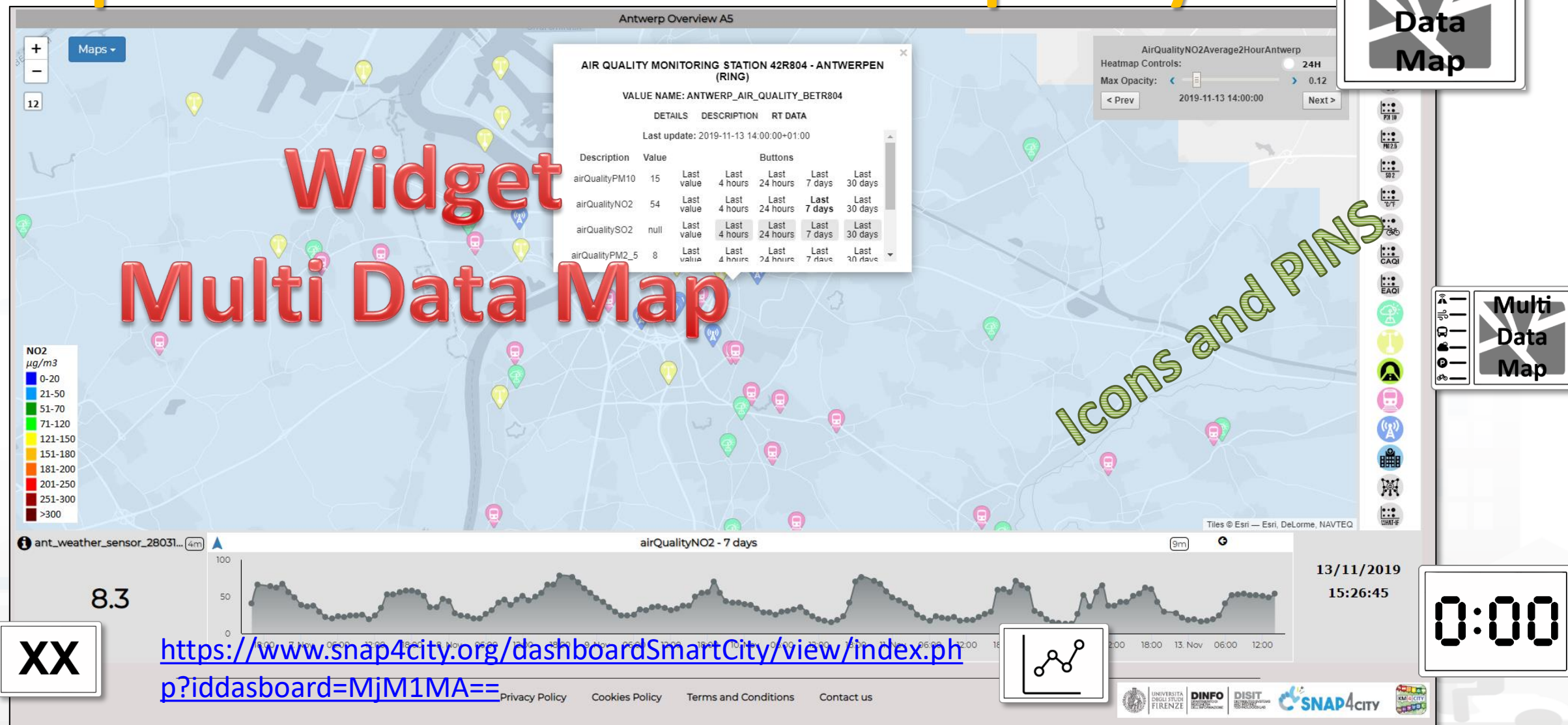
Time Trend

XX





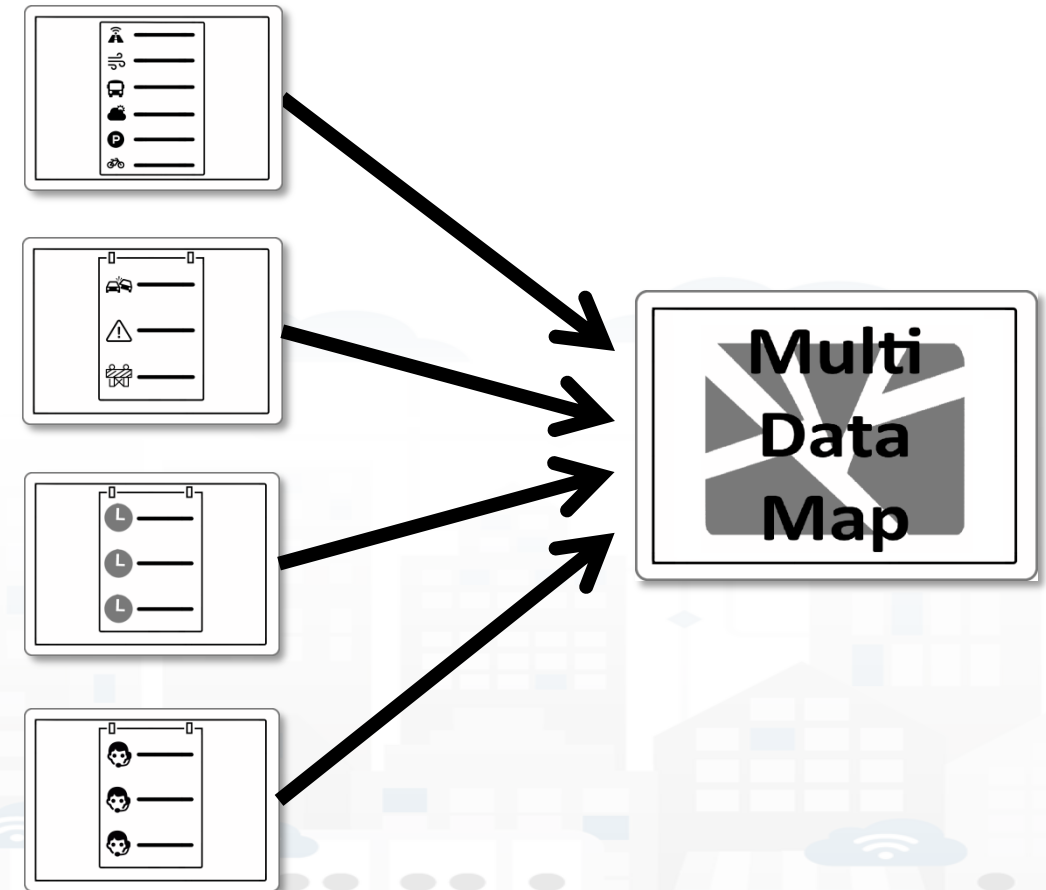
# Unique Dashboard builder Multiple Styles





# Dashboard Usage and recipe: Event map target

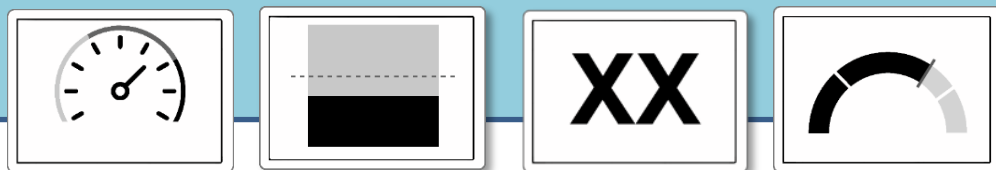
- **Selector to Show on Map a**
  - category of Map positioned elements
  - Single Entity
  - Heatmap among many
  - Traffic flow
  - Origin Destination Map
- **Events which are also PIN on map**





TOP

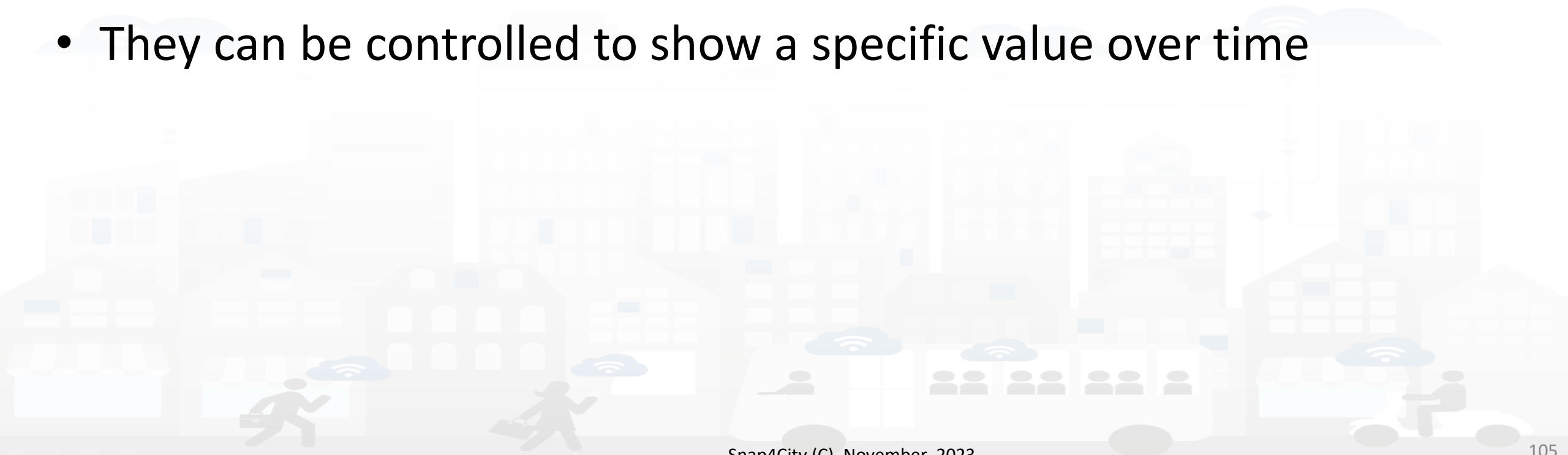
# *Main Single Values Widgets*





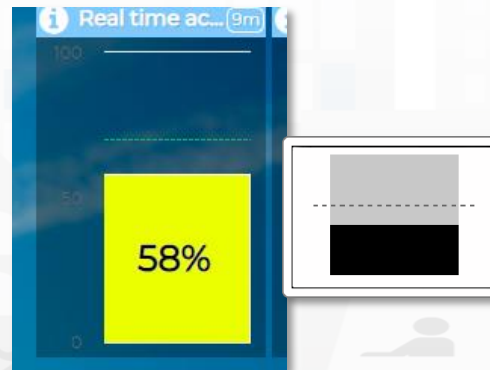
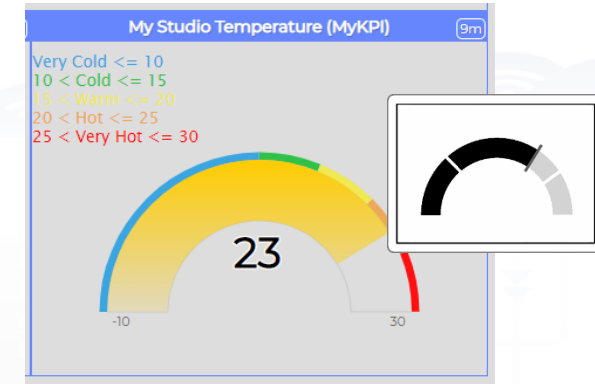
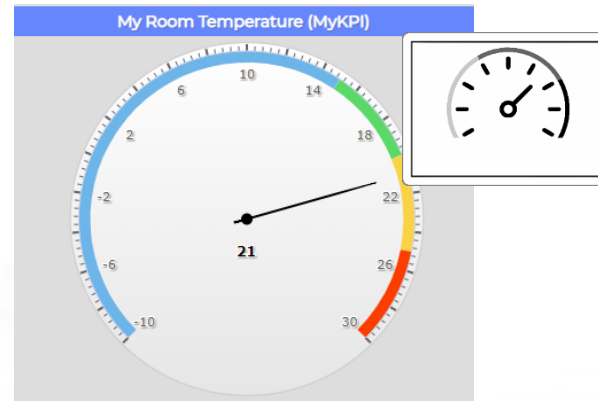
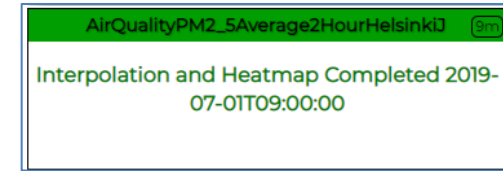
# Single Value Widgets

- 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 Content
- Speedometer
- Gauge
- Single Bar



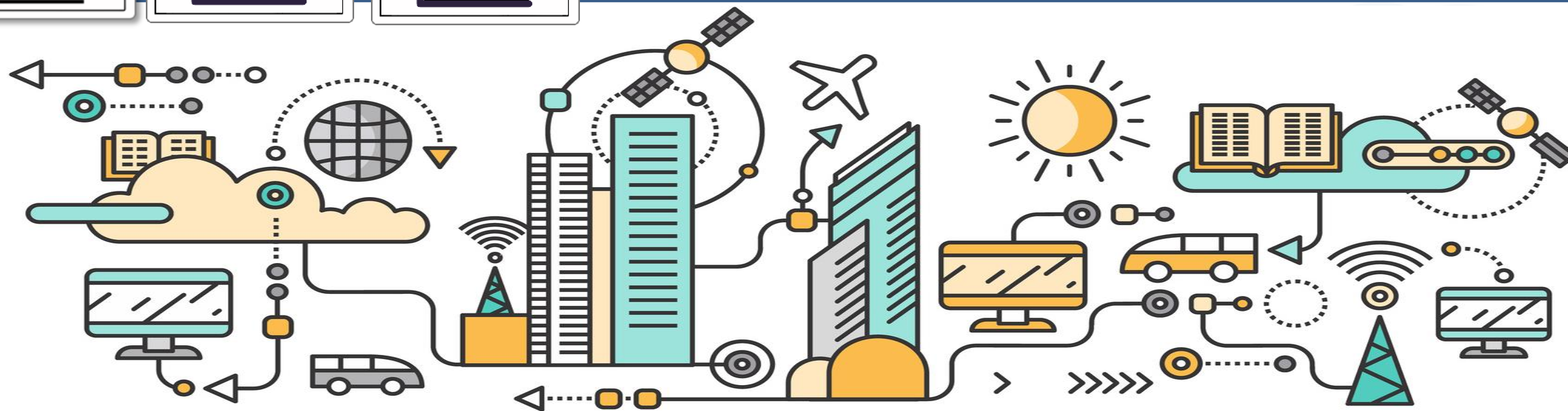
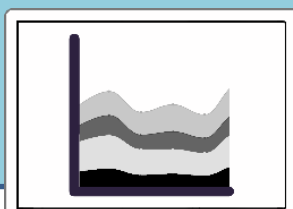
*Most of the multi xxxx widgets  
can show also single values*



TOP

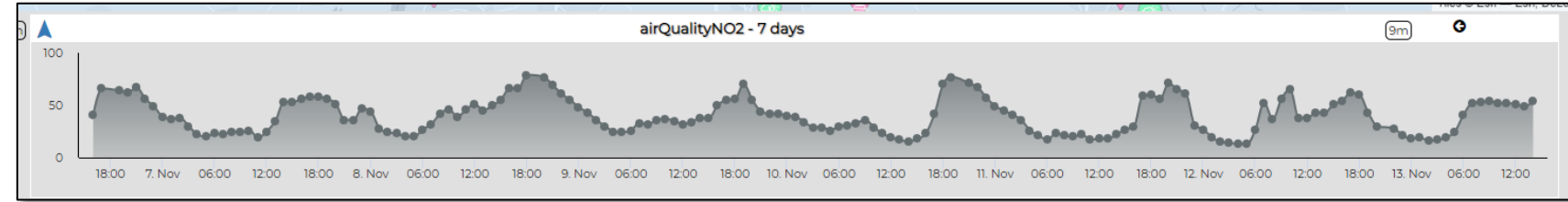
# *Time Series, Multi Series*

## *Widgets*



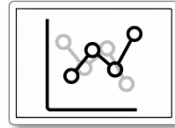


## • Time Trend

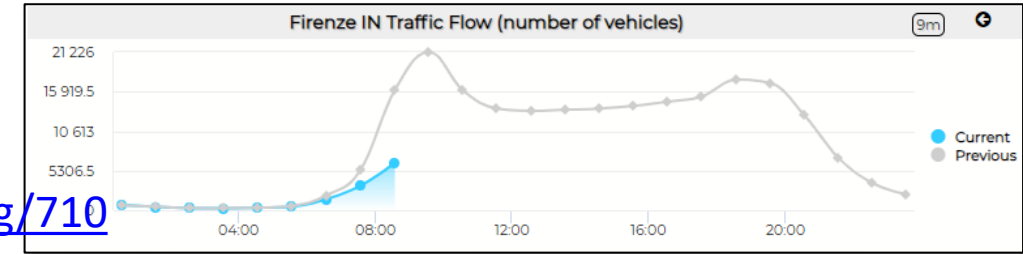


## • Time Trend Compare

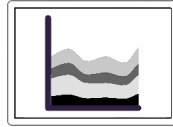
- Comparing trends of the same time series



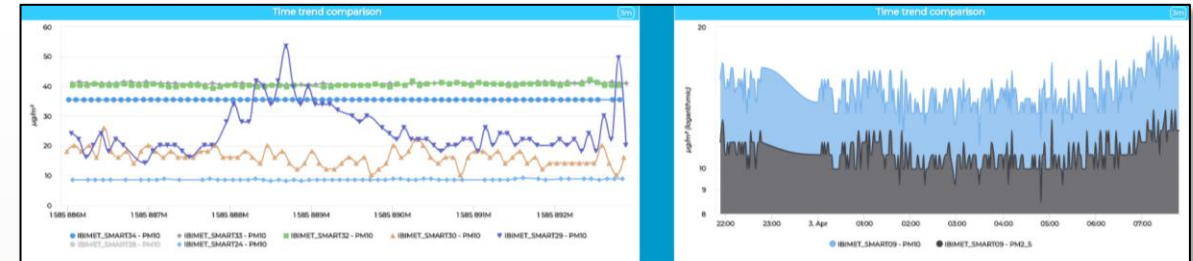
<https://www.snap4city.org/710>



## • Multi Series



- Showing multiple trends of multiple time series with same unit



## • Typical Time Trend



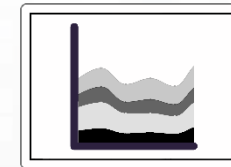
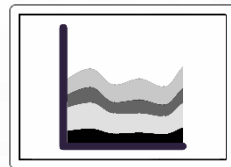
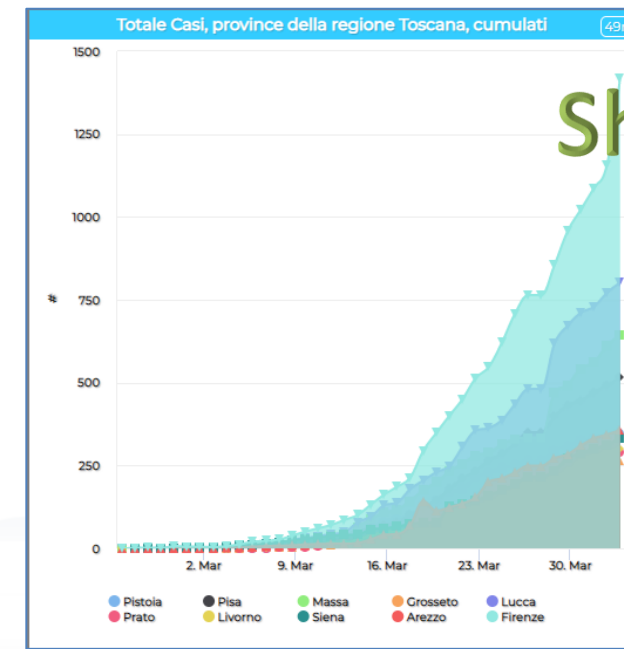
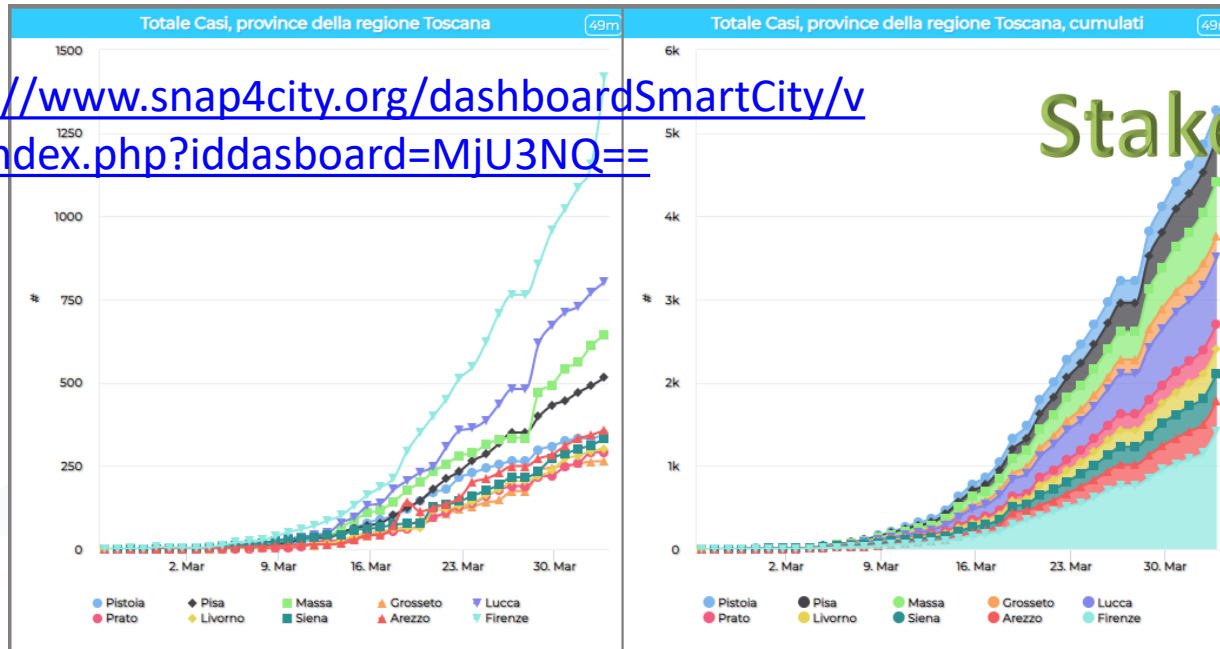
- Showing the typical trend of a time serie: multiple modalities

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





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



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





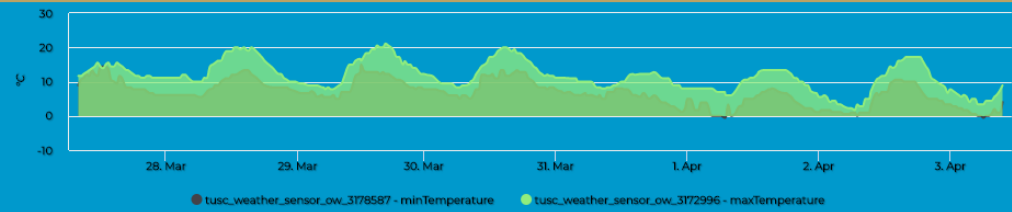
# Time Series Test - Cloned

Fri 3 Apr 09:54:08

• METRO55 - averageSpeed • METRO738 - averageSpeed • METRO707 - averageSpeed

Time trend comparison Filled Areas - Multiple Temperature Metrics

3m

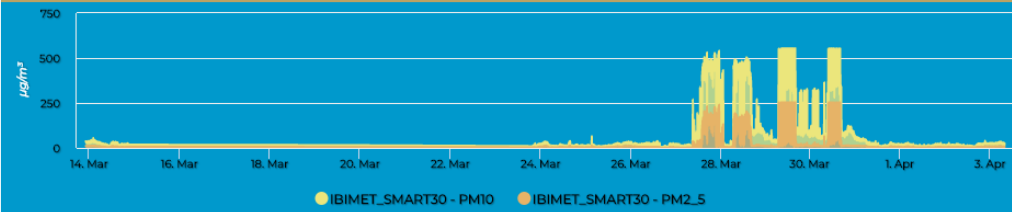


tusc\_weather\_sensor\_ow\_3178587 - minTemperature tusc\_weather\_sensor\_ow\_3172996 - maxTemperature

• Weather sensor Zwijndrecht - airTemperature • IBIMET\_SMART06 - airTemperature

Time trend comparison - Stacked Filled Areas (ONLY ON EQUALLY SAMPLED DATA SERIES I)

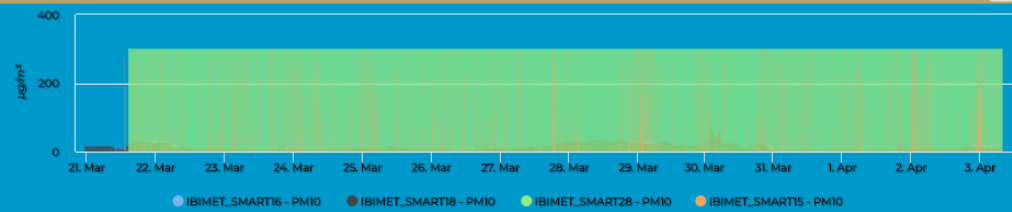
3m



IBIMET\_SMART30 - PM10 IBIMET\_SMART30 - PM2.5

Time trend comparison

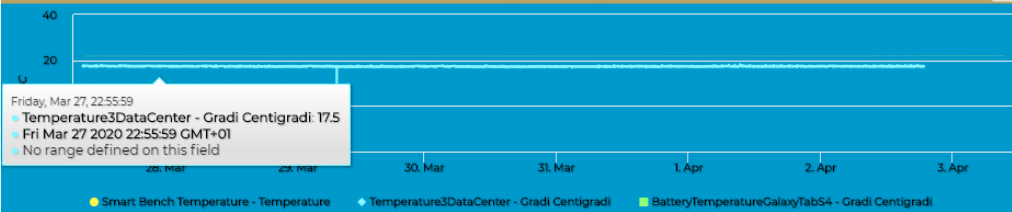
3m



IBIMET\_SMART16 - PM10 IBIMET\_SMART18 - PM10 IBIMET\_SMART28 - PM10 IBIMET\_SMART15 - PM10

Time trend comparison - MyKPI

3m

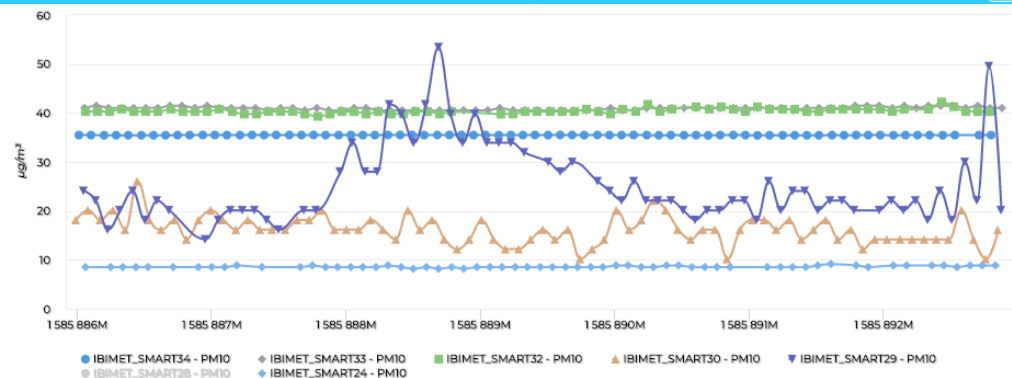


Friday, Mar 27, 22:55:59  
Temperature3DataCenter - Gradi Centigradi: 17.5  
Fri Mar 27 2020 22:55:59 GMT+01  
No range defined on this field

Smart Bench Temperature - Temperature Temperature3DataCenter - Gradi Centigradi Battery/TemperatureGalaxy/TabS4 - Gradi Centigradi

Time trend comparison

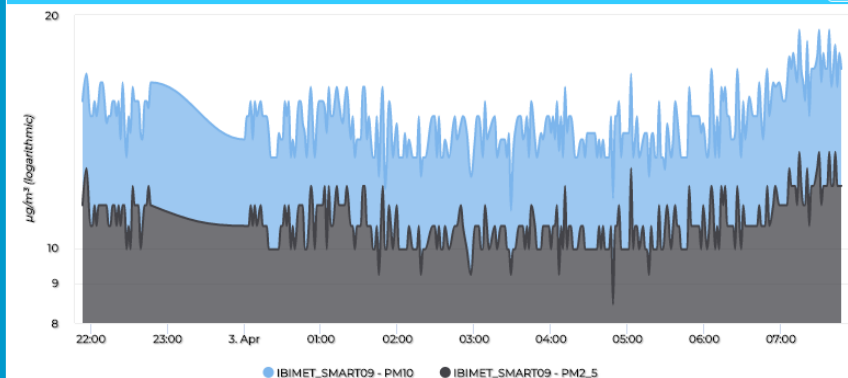
3m



IBIMET\_SMART34 - PM10 IBIMET\_SMART33 - PM10 IBIMET\_SMART32 - PM10 IBIMET\_SMART30 - PM10 IBIMET\_SMART29 - PM10  
IBIMET\_SMART28 - PM10 IBIMET\_SMART24 - PM10

Time trend comparison

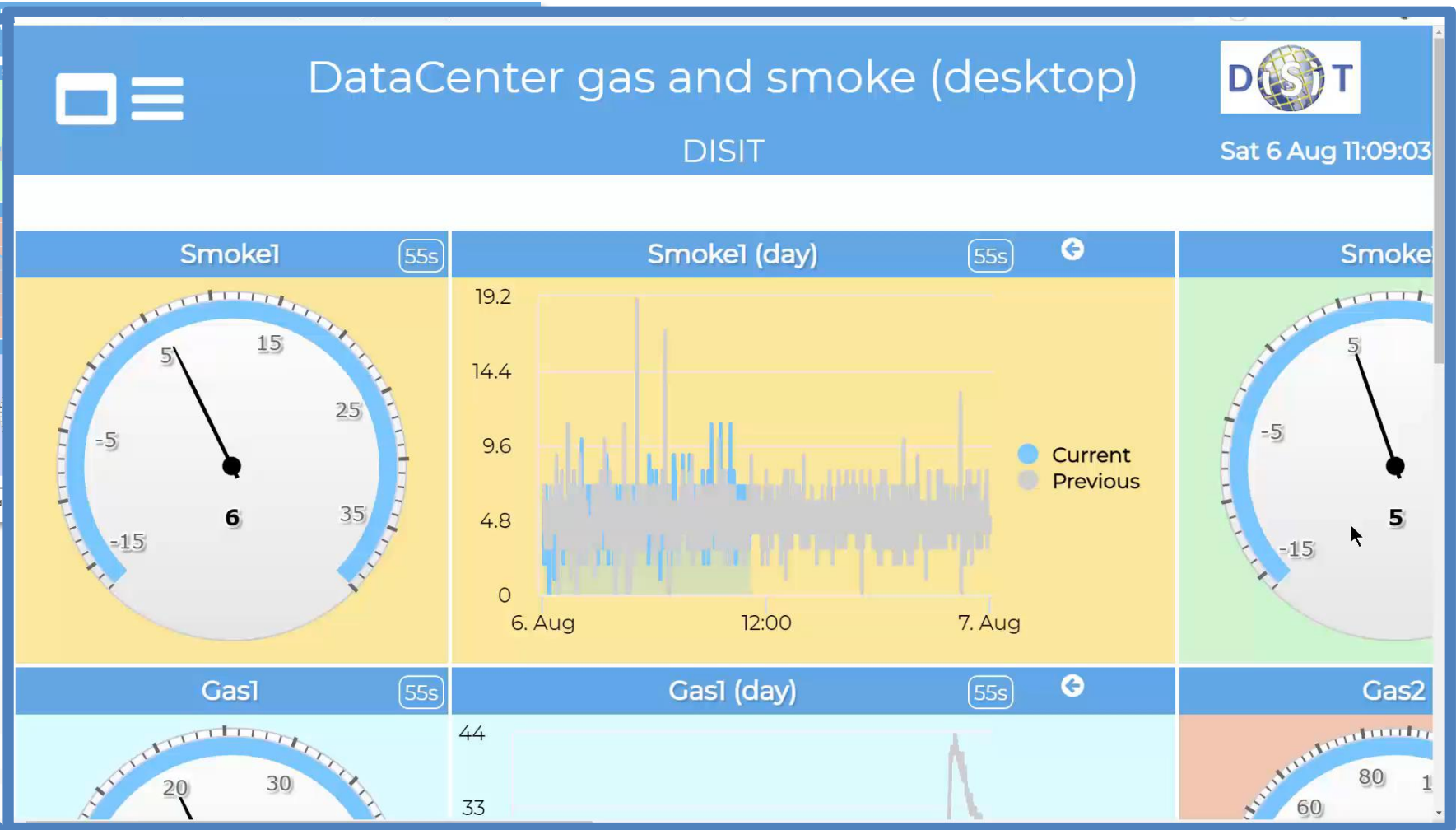
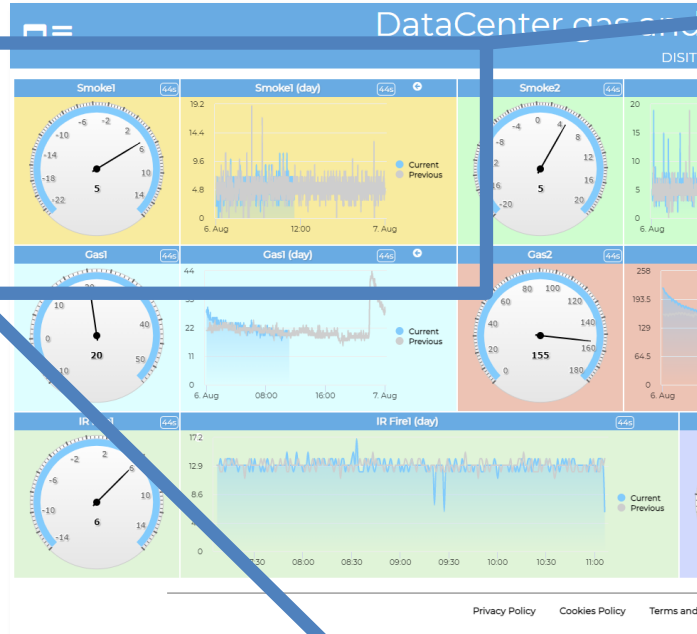
3m



IBIMET\_SMART09 - PM10 IBIMET\_SMART09 - PM2.5



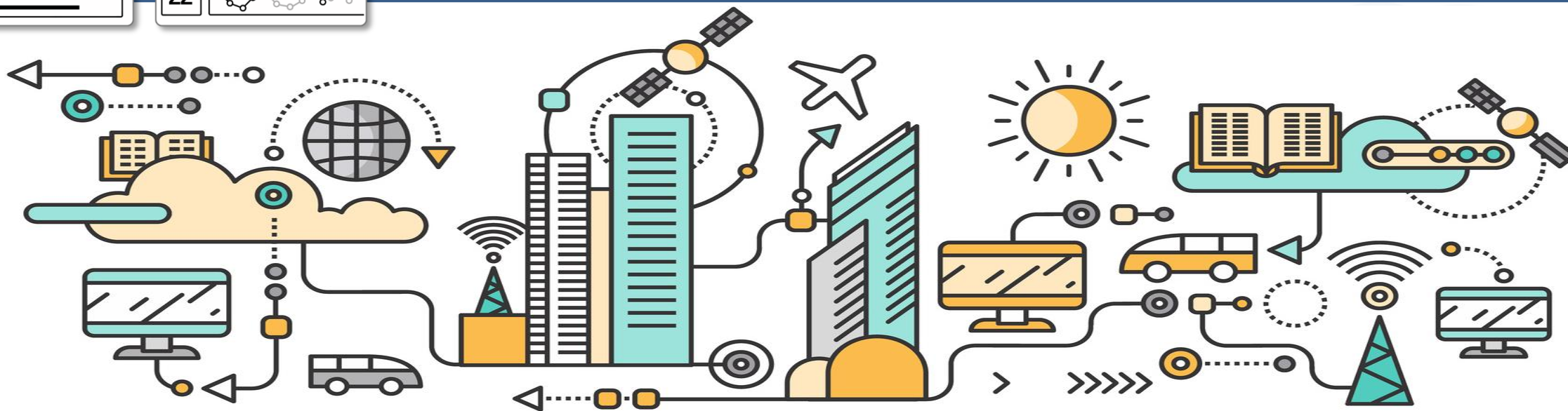
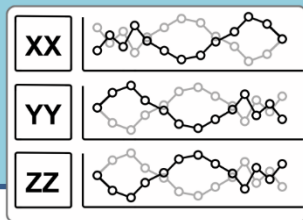
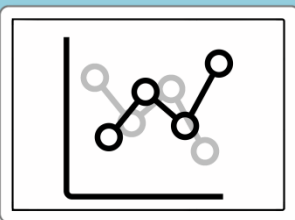
# Drill Down over time





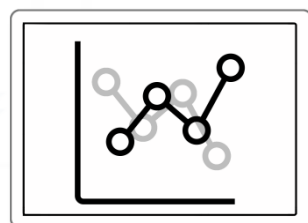
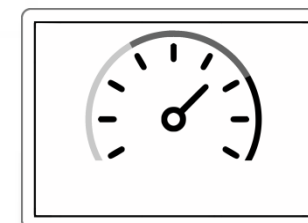
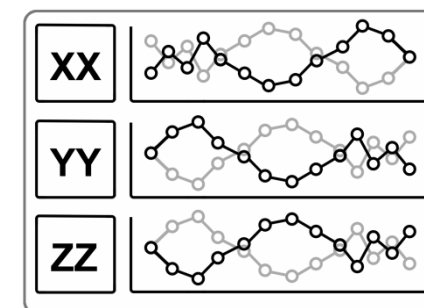
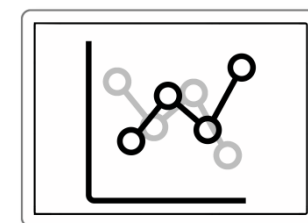
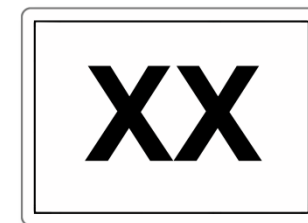
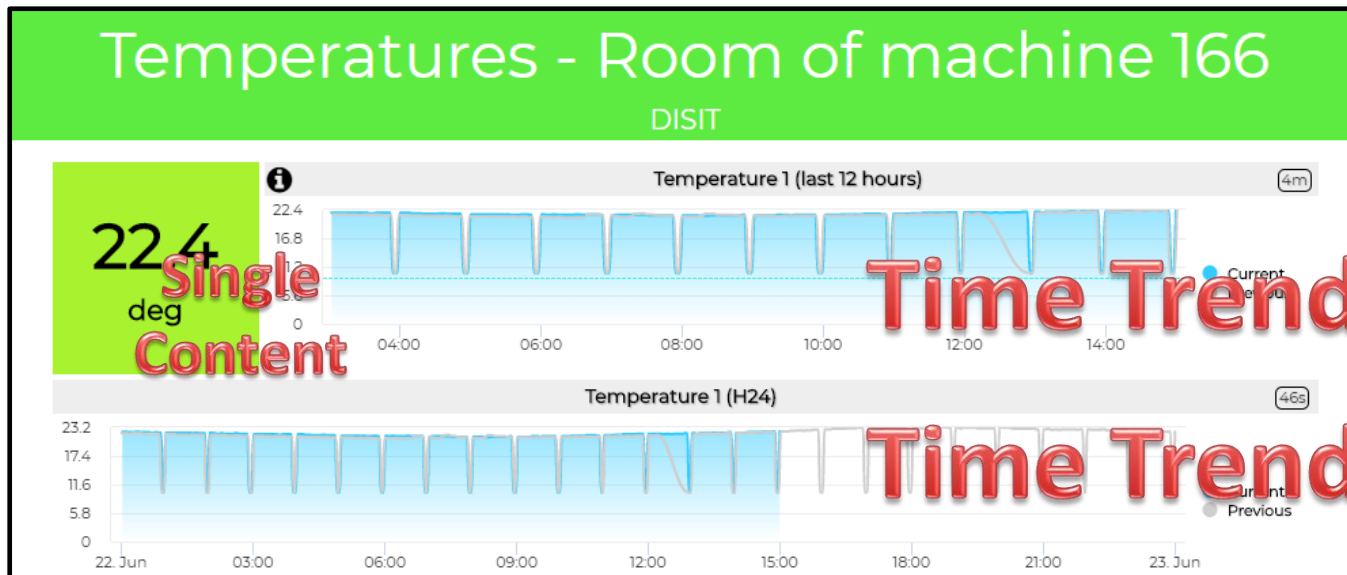
TOP

# *Time Trend Compare Widgets for Time Series*



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





They manage  
HLT: Sensor

**Time Trend Compare**

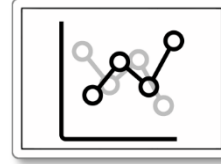
**Time Trend Compare**

**SpeedoMeter**

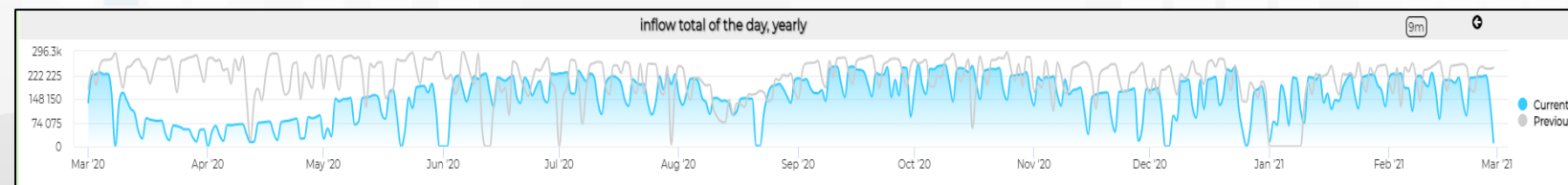
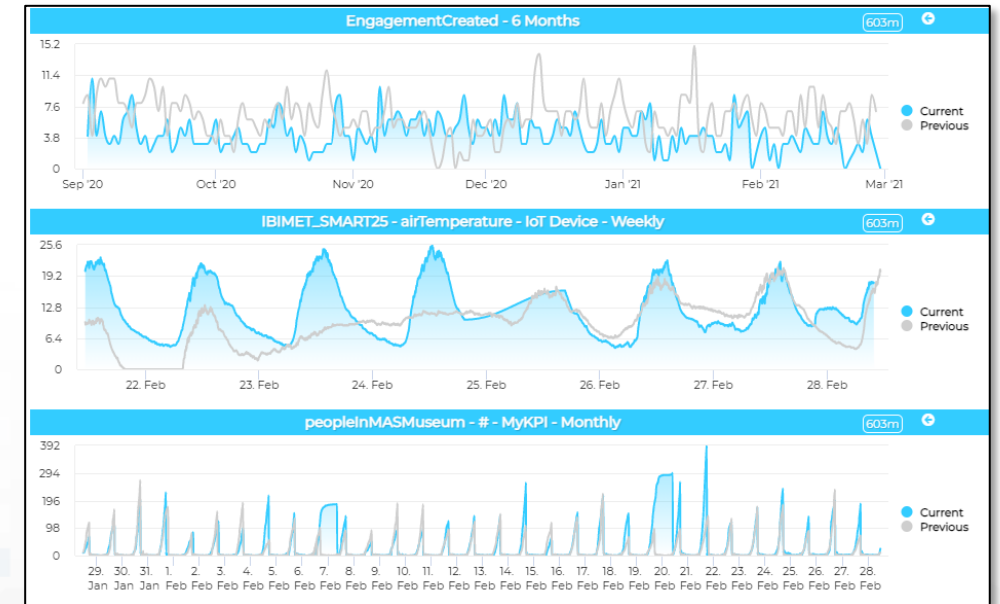
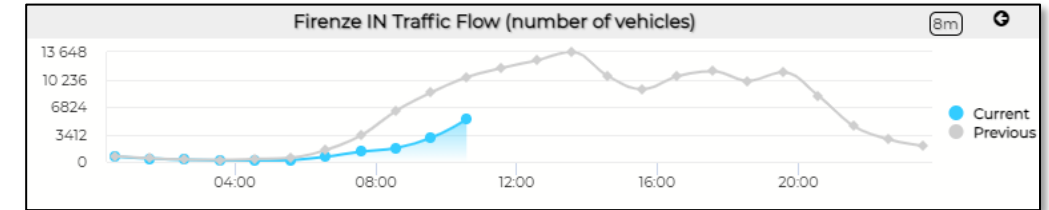


# Time Trend Compare

## A tool for visual Analytics, Comparing



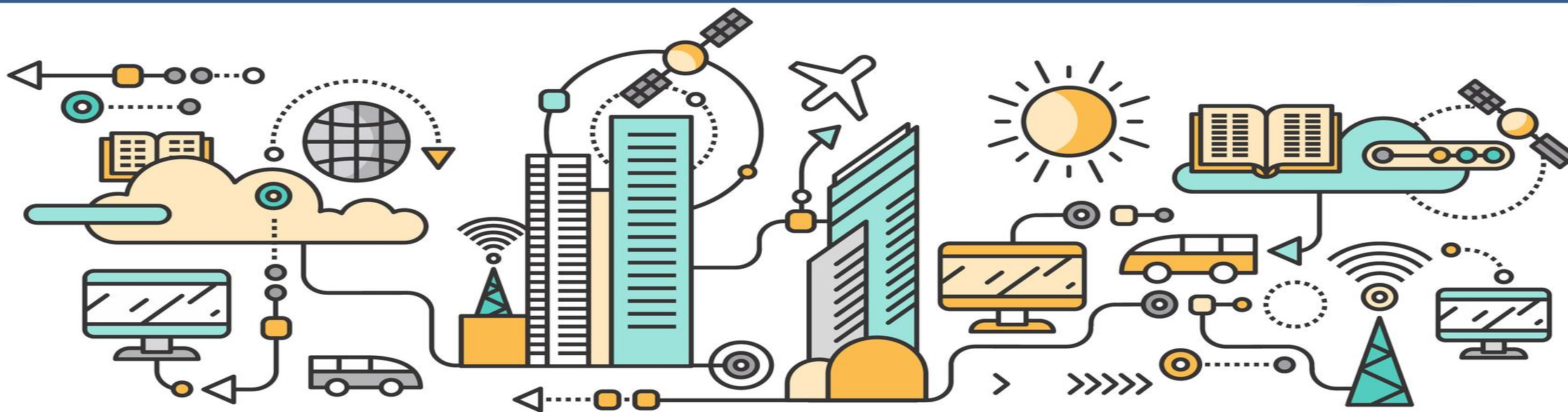
- **4 hours** wrt those before, or same hours of previous day
- **12 hours** wrt those before, or same hours of previous day
- **Day** wrt day before, or same day of previous week or month
- **Week** wrt to previous week, or
  - week starting on Monday
- **Month** wrt to previous month, or
  - previous 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*



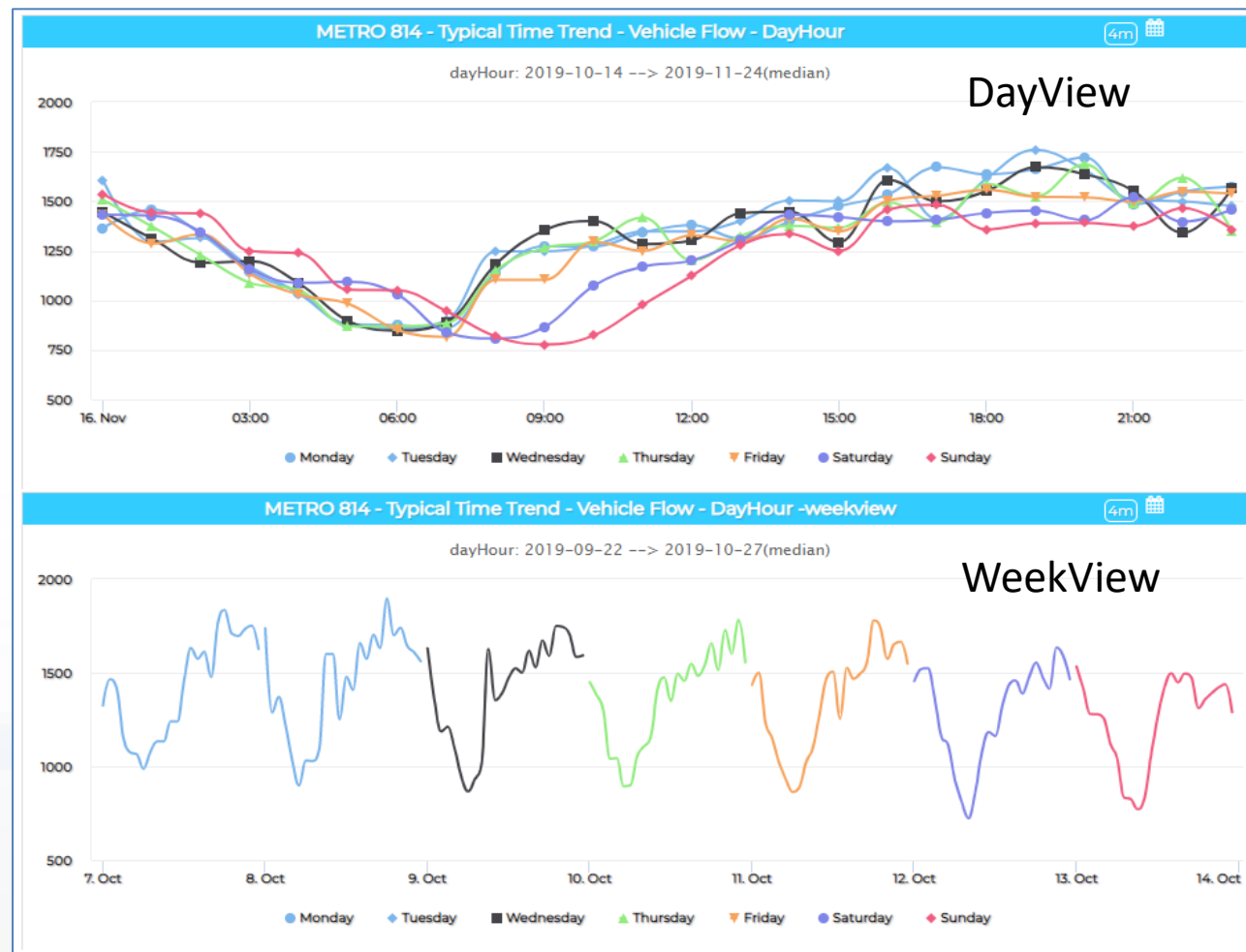
<https://www.snap4city.org/705>



# 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.

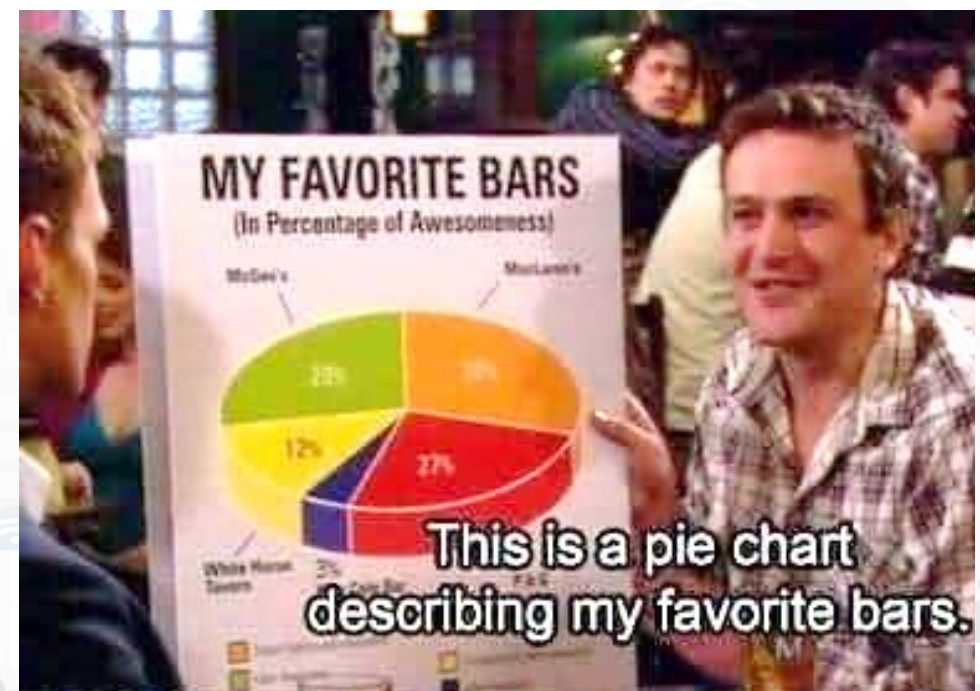
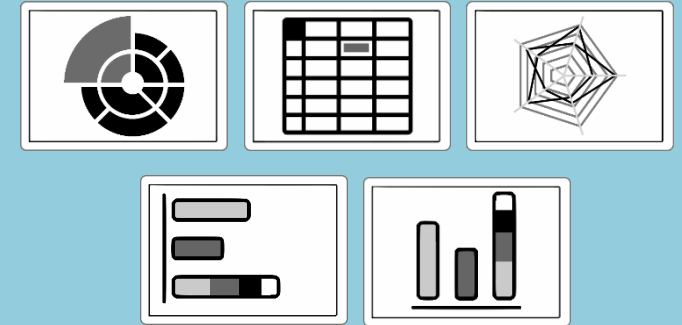


<https://www.snap4city.org/dashboardSmartCity/view/index.php?iddasboard=MzA4NA==>

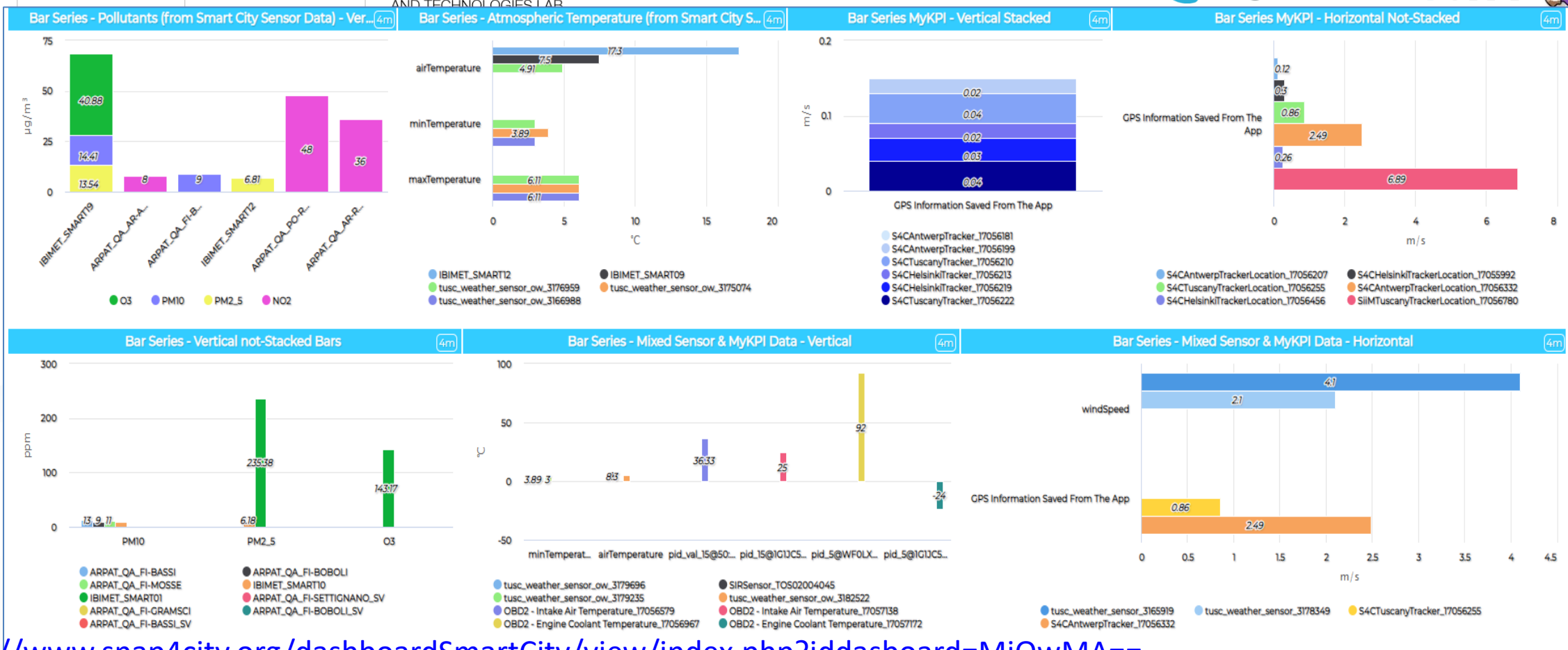


TOP

# *Bars, Pies, Donut, Spiders, Tables Widgets*

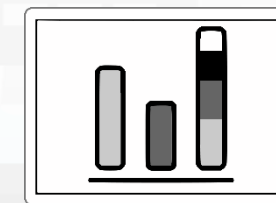
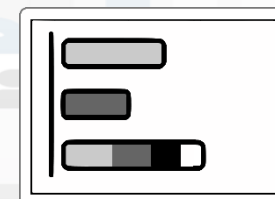






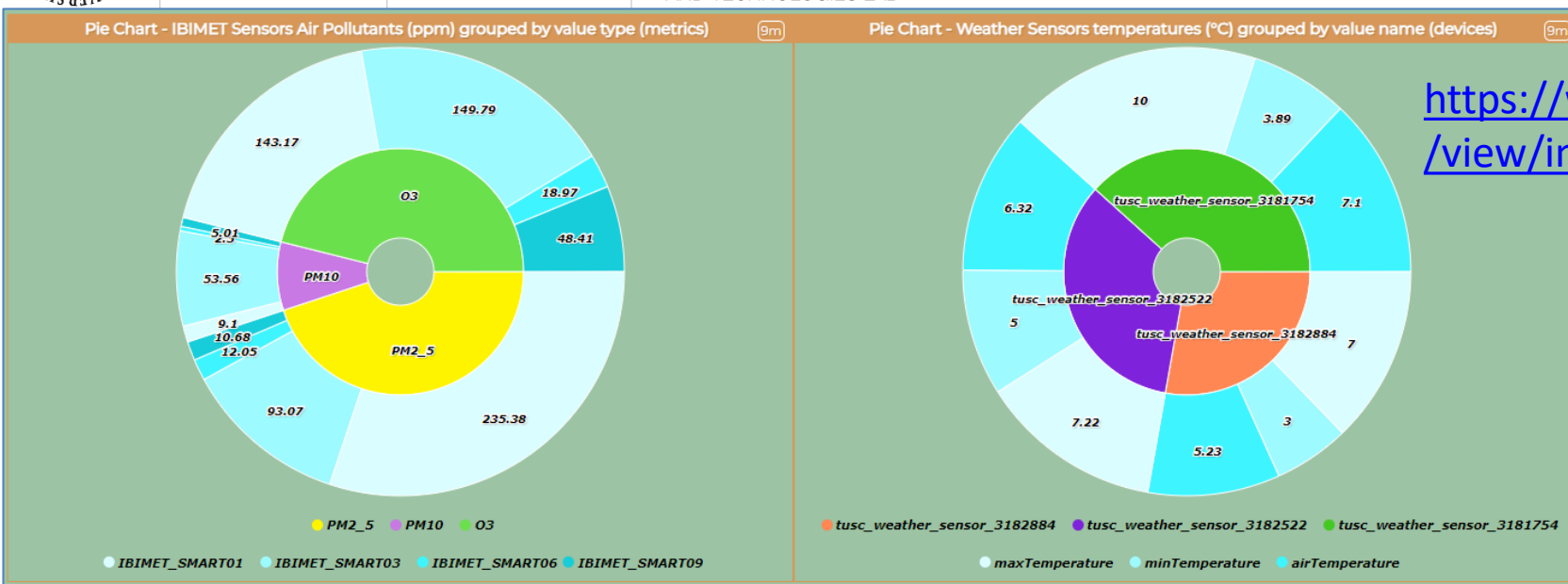
<https://www.snap4city.org/dashboardSmartCity/view/index.php?iddasboard=MjQwMA==>

- **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

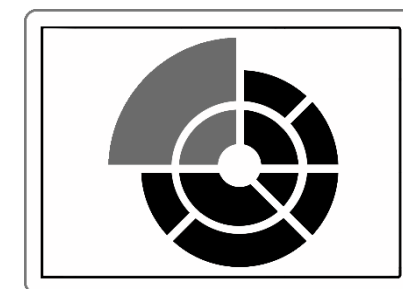




# Pie & Donut

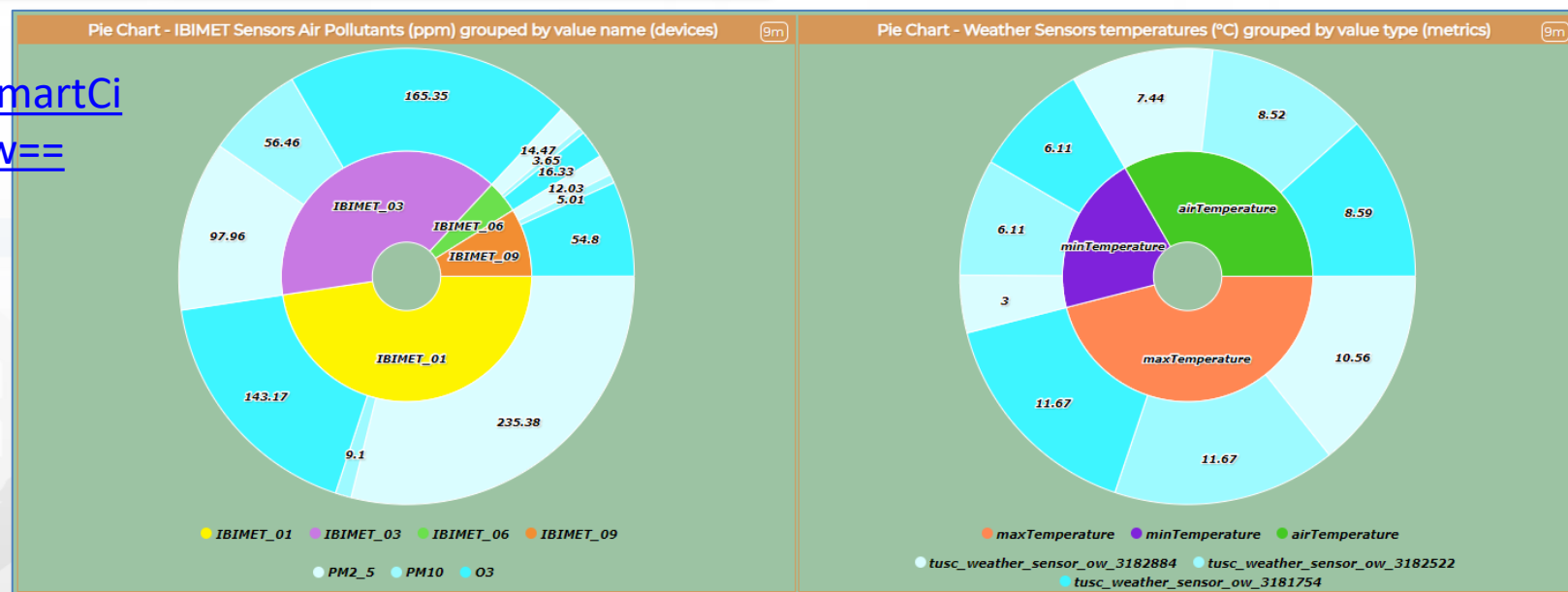


<https://www.snap4city.org/dashboardSmartCity/view/index.php?iddasboard=MjUxNw==>



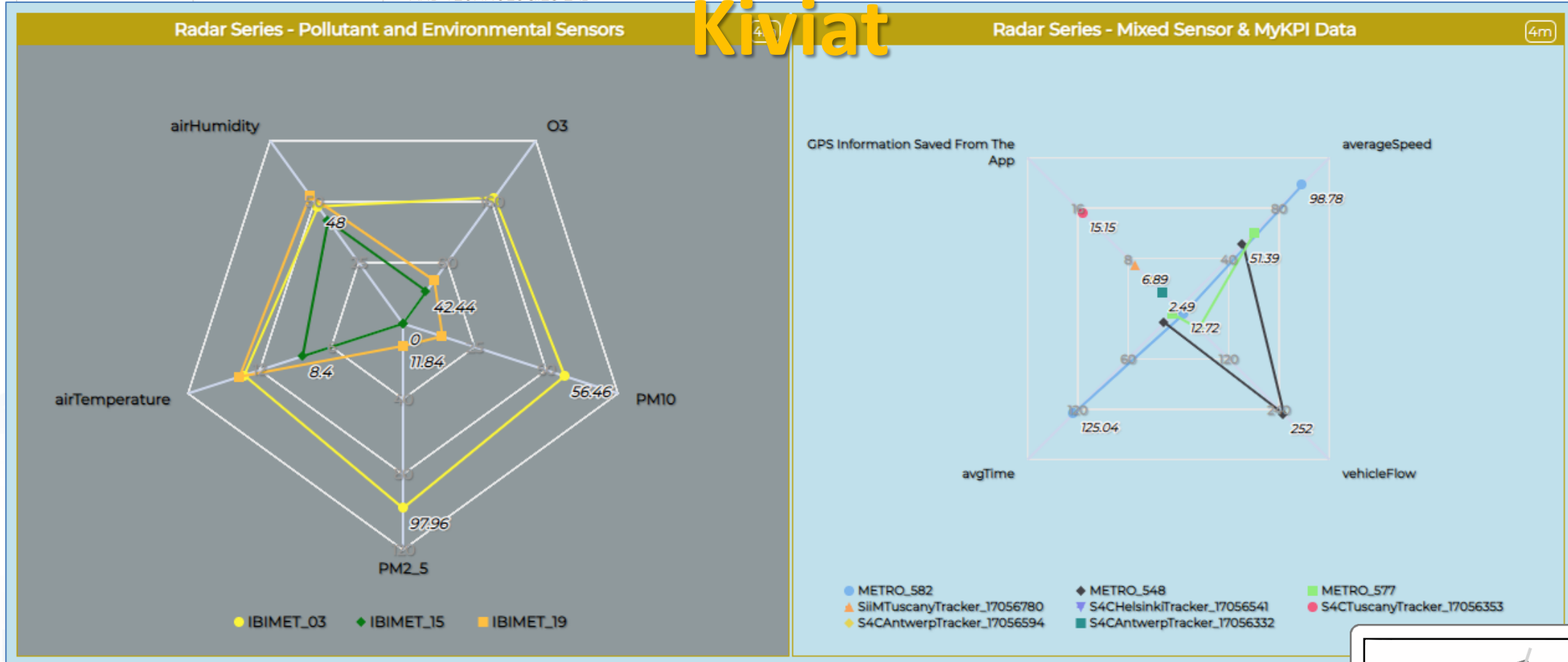
<https://www.snap4city.org/dashboardSmartCity/view/index.php?iddasboard=MjUyNw==>

- Single level Pie and two levels as Donut
- Grouped Value Type, Value Unit



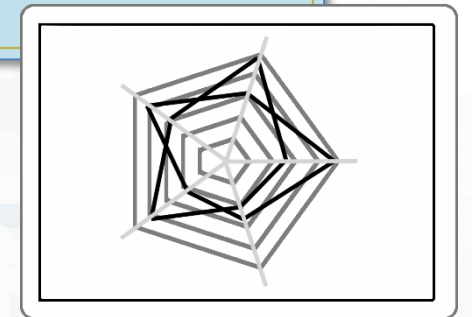


# Radar, SpiderNet Kiviat



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

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





# Florence data overview

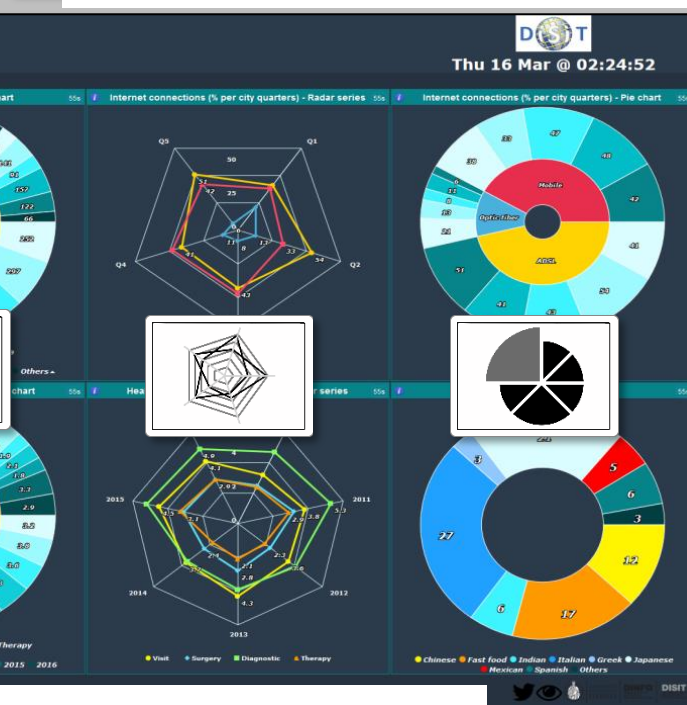
A table based overview over city main data

Wed 18 Jan @ 19:19:10

Air Quality Index						Weather stations							Citizens satisfaction index				
Substances / Quarters	OZ <sup>+</sup>	PM <sup>2+</sup>	PM <sup>10+</sup>	CO <sup>2+</sup>	NO <sup>2+</sup>	Date / Station	Wind speed (km/h) <sup>+</sup>	Direction	Temperature (°C) <sup>+</sup>	Humidity (%) <sup>+</sup>	Rain today (mm) <sup>+</sup>	Pressure (mbar)	Criteria / Services	Quality (%) <sup>+</sup>	Cost (%) <sup>+</sup>	Availability time (%) <sup>+</sup>	Emergency handling (%) <sup>+</sup>
Q1	120	41	165	36	4	Sesto Fiorentino	50	N	12	19	0	922	Water	92	67	95	42
						Livorno	65	NE	17	0	0	876	Public transportation	36	29	27	31
Q2	33	25	66	123	45	Grosseto	78	E	4	22	0	1022	Public safety	77	64	58	62
Q3	225	153	342	193	217		Vade	42	S	6	0	34	895	Roads management	28	42	27
Q4	174	221	87	122	93	Follonica	102	N	7.2	23	0	913	Healthcare	72	64	23	23
Q5	79	87	23	27	65	Cigliù	97	O	3	19	0	957	Welfare	43	51	38	38
													Public administration	58	16	18	18

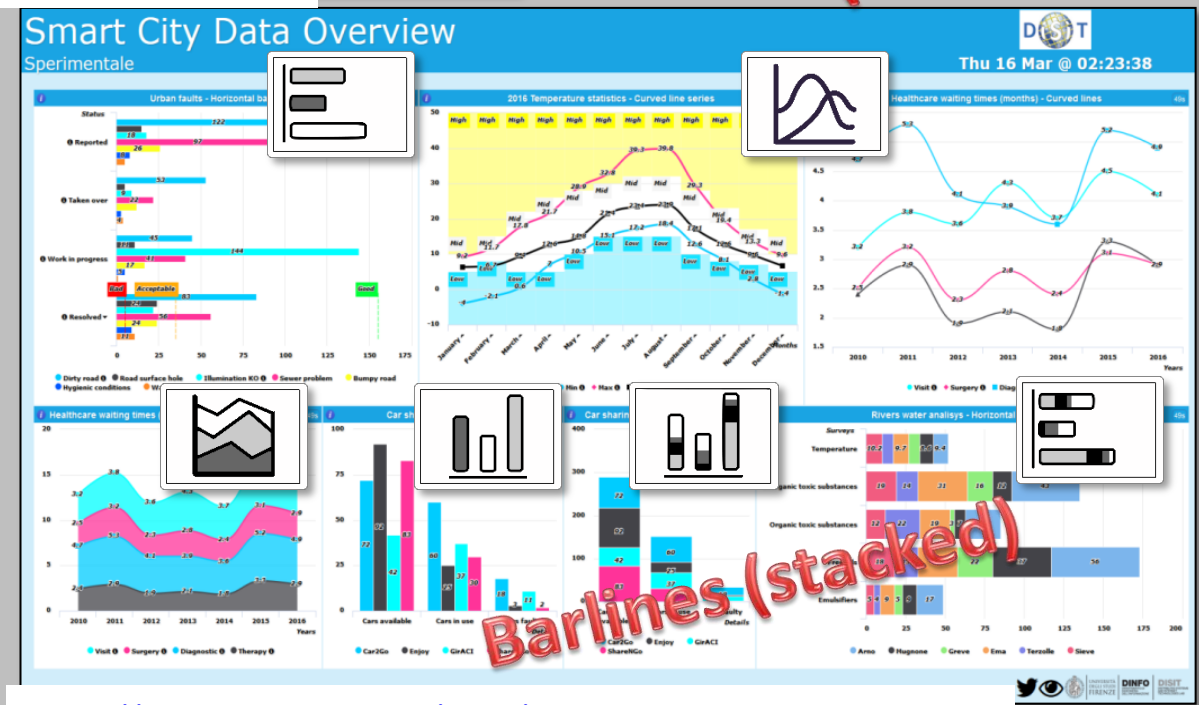
Tourists flow				Florence events 2017 overview						
Categories Vehicle	Total arrivals	Overnights	Day trippers	Fields / Categories	Free	Paid	Winter	Spring	Summer	Autumn
Airplane	56	36	20	Classical music, opera, ballet	7	23	6	10	4	1
Train	122	81	41	Exhibitions	4	16	3	7	6	4
Car	215	133	82	Guided tours	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
				Contemporary music	30	42	8	25	30	9
Total	550	360	190	Sport	20	192	55	104	27	26

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



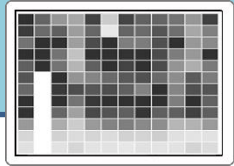
<https://main.snap4city.org/view/index.php?iddashboard=MTAw>

Snap4City (C), No



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

# *Calendar Widgets for Time Series*

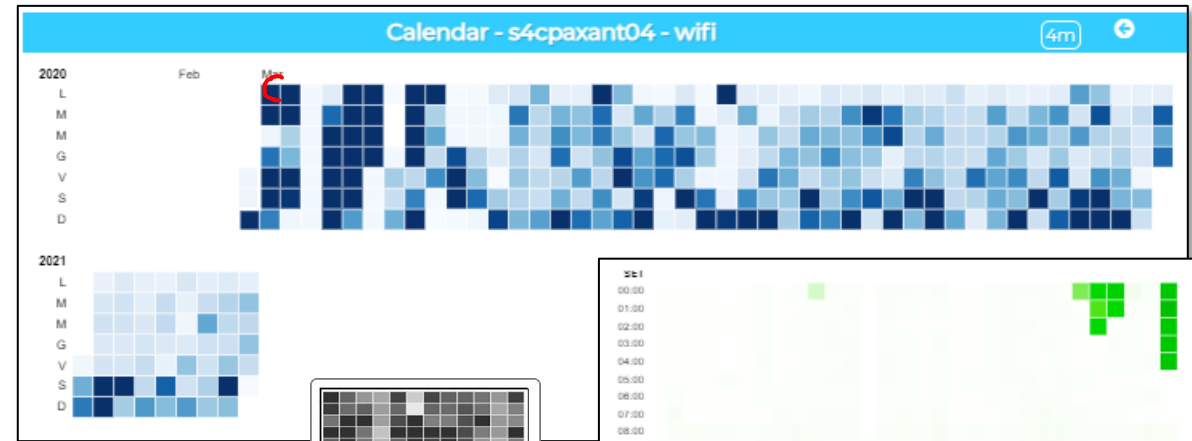




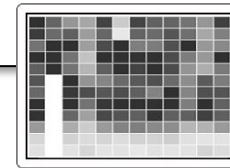
<https://www.snap4city.org/706>

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

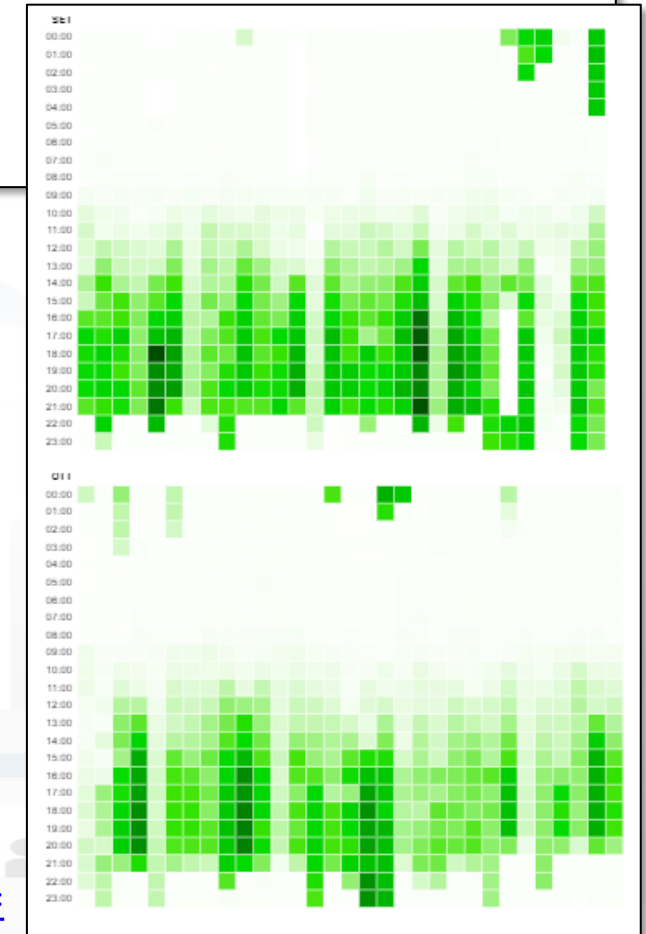
- **Year**
  - 1 Year, 12 months, by weeks, per days
  - Time Range: 1D, 7D, 1M, 6M, 1Y
- **Month**
  - 30 days, 24 hours
  - Time Range: 1D, 7D, 1M, 6M, 1Y
- **You can scroll in history**
- **They manage HLT: Sensor, MyKPI and work receiving Dynamic data from IOT App**



Year, 1Y



Month, 6M



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



Ciao roottooladmin!

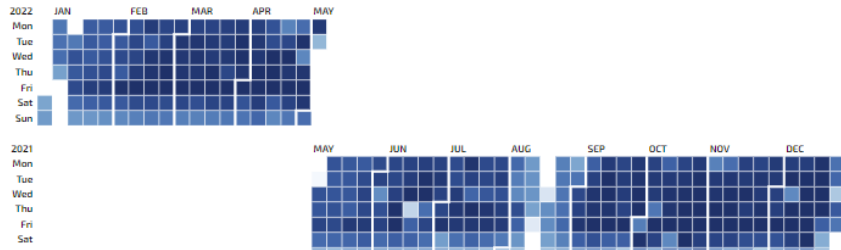
Tue 3 May 13:59:05

## HERIT-DATA - ACTIVITIES CALENDAR - NEWGUI



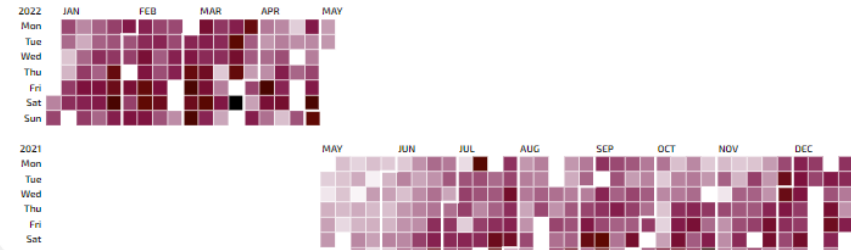
METRO763 VEHICLEFLOW VOLUME

4m



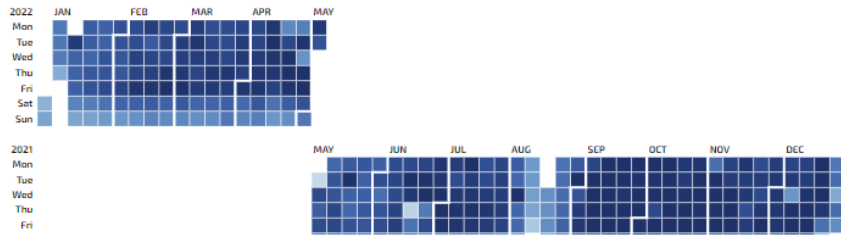
ARPAT\_QA\_FI-GRAMSCI\_SV NO2 VOLUME

4m



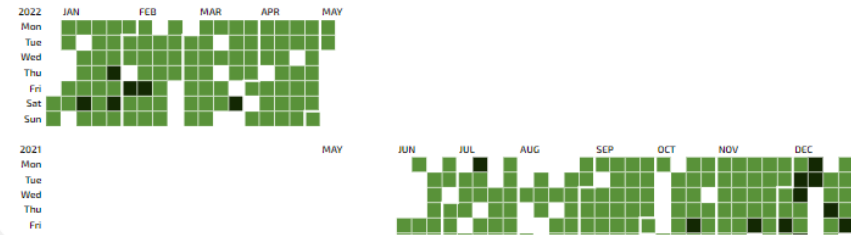
METRO762 VEHICLEFLOW (DAY MEAN)

4m



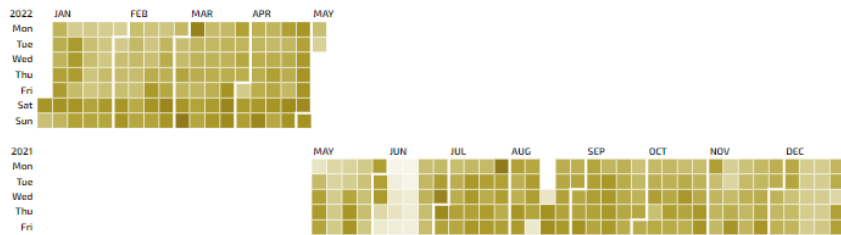
ARPAT\_QA\_FI-GRAMSCI\_SV CO VOLUME

4m



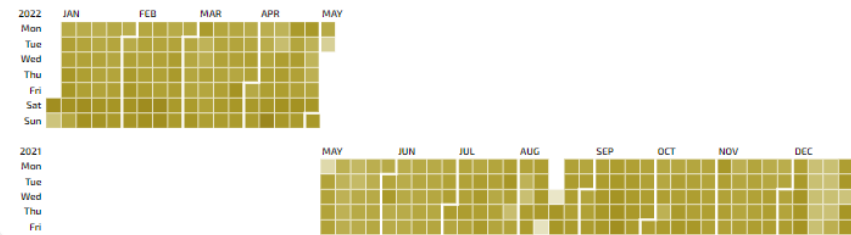
CARPARKSTAZIONEBINARIO16 BUSY SLOTS2 VOLUME

4m



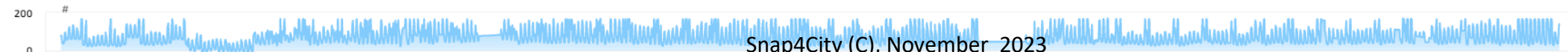
CARPARKSTAZIONEFIRENZES.M.N. BUSY SLOTS VOLUME

4m



CARPARKSTAZIONEBINARIO16 - OCCUPIED PARKING LOTS

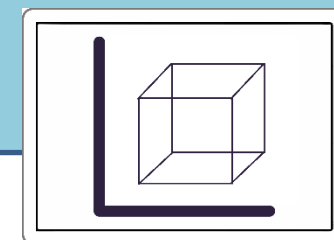
9m



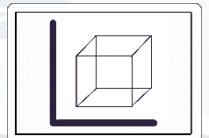
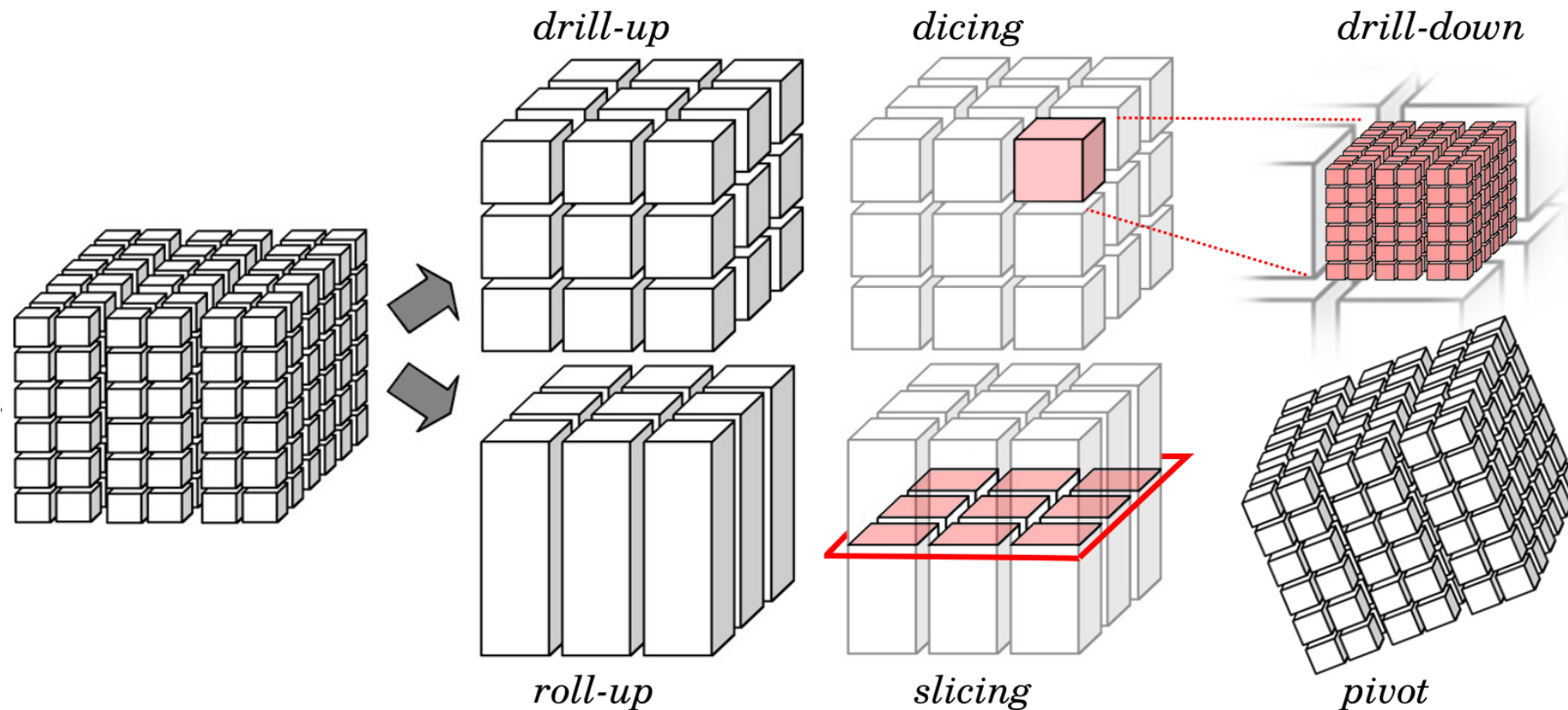


TOP

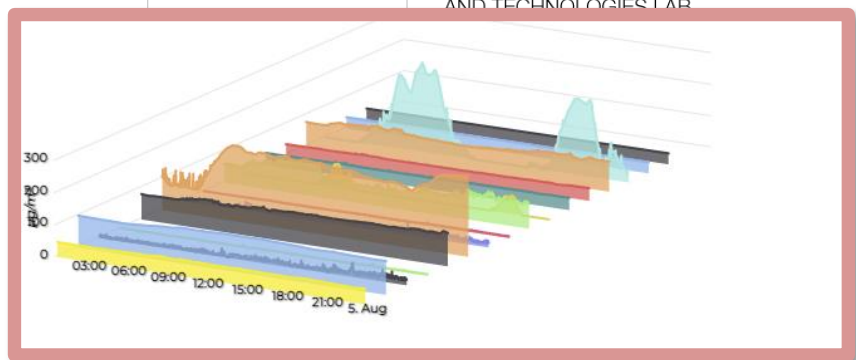
# *OLAP Data Cubes Widgets*



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







## Longitude

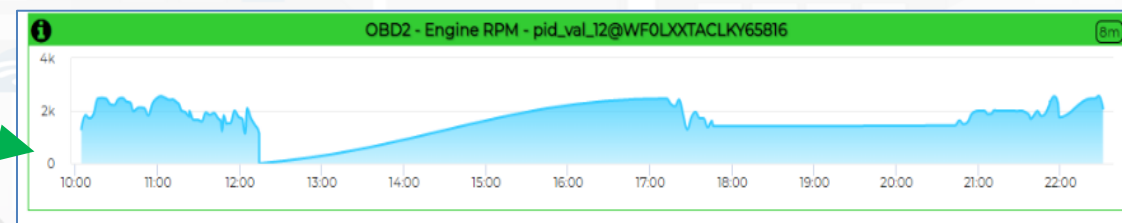
Latitude

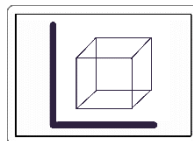


## Values

Sensors of Devices,  
KPI, etc.

time





# Data Cube 3D Olap

Fri 6 Aug 00:34:27

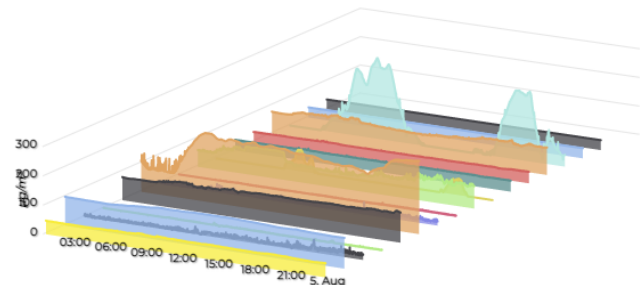
IBIMET Air Quality Sensors

4m

µg/m³

Toggle Time Slice

Toggle Stream Graph



● IBIMET30 - NO2\_concentration - µg/m³  
 ● IBIMET30 - PM2.5\_concentration - µg/m³  
 ● IBIMET31 - PM10\_concentration - µg/m³  
 ● IBIMET31 - NO2\_concentration - µg/m³  
 ● IBIMET33 - PM10\_concentration - µg/m³  
 ● IBIMET33 - NO2\_concentration - µg/m³  
 ● IBIMET34 - NO2\_concentration - µg/m³  
 ● IBIMET34 - PM2.5\_concentration - µg/m³  
 ● IBIMET30 - O3\_concentration - µg/m³  
 ● IBIMET31 - O3\_concentration - µg/m³  
 ● IBIMET33 - O3\_concentration - µg/m³  
 ● IBIMET34 - O3\_concentration - µg/m³

Highcharts.com

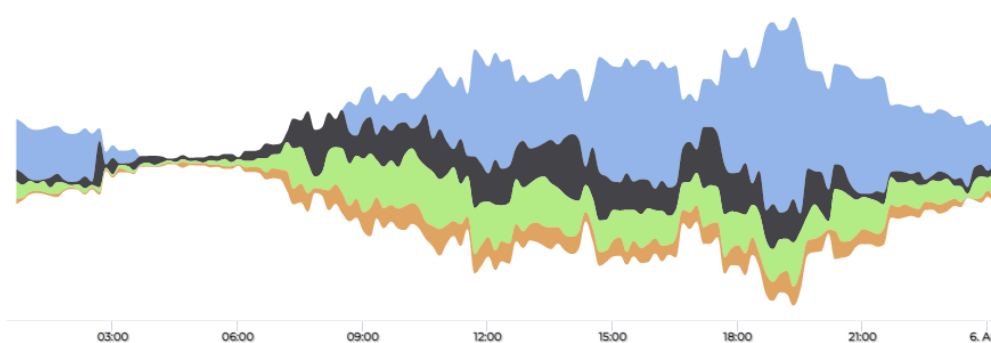
METRO Traffic Sensors

4m

car/h

Toggle Time Slice

Toggle Stream Graph



● METRO1 - vehicle\_flow - car/h  
 ● METRO3 - vehicle\_flow - car/h  
 ● METRO16 - vehicle\_flow - car/h  
 ● METRO25 - vehicle\_flow - car/h

Highcharts.com

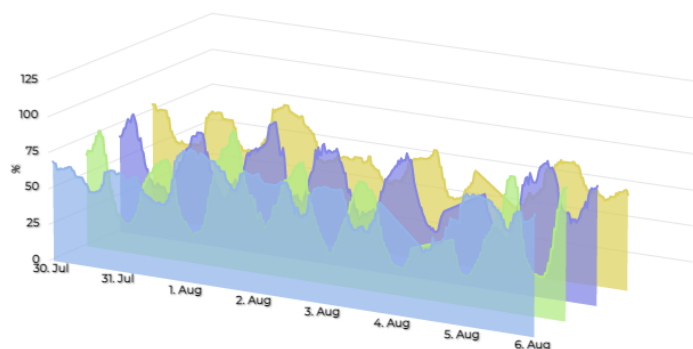
Weather Sensors

4m

%

Toggle Time Slice

Toggle Stream Graph



● 318125 - air\_humidity - humidity - %  
 ● 318125 - air\_humidity - humidity - %  
 ● 318125 - air\_humidity - humidity - %  
 ● 318125 - air\_humidity - humidity - %

Highcharts.com

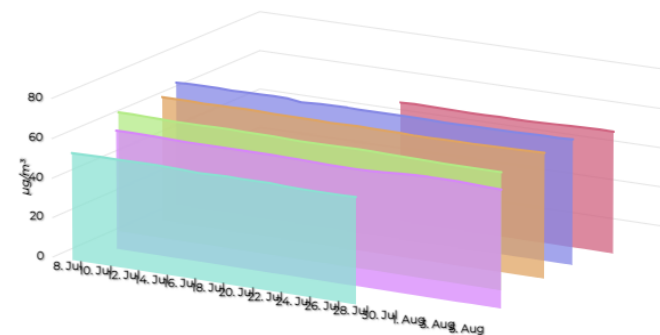
NO2 Predictions MyKPI

4m

µg/m³

Toggle Time Slice

Toggle Stream Graph



● NO2 prediction + 30 - NO2 - NO2\_concentration - µg/m³  
 ● NO2 prediction + 90 - NO2 - NO2\_concentration - µg/m³  
 ● NO2 prediction + 150 - NO2 - NO2\_concentration - µg/m³  
 ● NO2 prediction + 60 - NO2 - NO2\_concentration - µg/m³  
 ● NO2 prediction + 120 - NO2 - NO2\_concentration - µg/m³  
 ● NO2 prediction + 180 - NO2 - NO2\_concentration - µg/m³

Highcharts.com

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



TOP

# Creating a Snap4City Dashboard

FROM CITY DASHBOARD TO APPLICATIONS

DATA GATHERING AND CITY DATA KNOWLEDGE MANAGEMENT

FORGING & MANAGING OPEN AND FLEXIBLE WEB AND MOBILE APPS

IOT/IOE DEVICES AND NETWORKS

IOT APPLICATIONS VS IOT EDGE DEVICES

IOT APPLICATIONS, THE LOGIC AND THE SMARTNESS

ADVANCE SMART CITY APPS, MICROSERVICES, SNAP4CITY API

SNAP4CITY LIVING LAB FOR COLLABORATIVE WORK

SNAP4CITY FOR BEGINNERS

DATA ANALYTICS, BUSINESS INTELLIGENCE, WHAT-IF AND

SNAP4CITY ARCHITECTURE AND ECOSYSTEM. OPENED TO DEVELOPERS AND STAKEHOLDERS

TWITTER VIGILANCE: SOCIAL MEDIA ANALYSIS

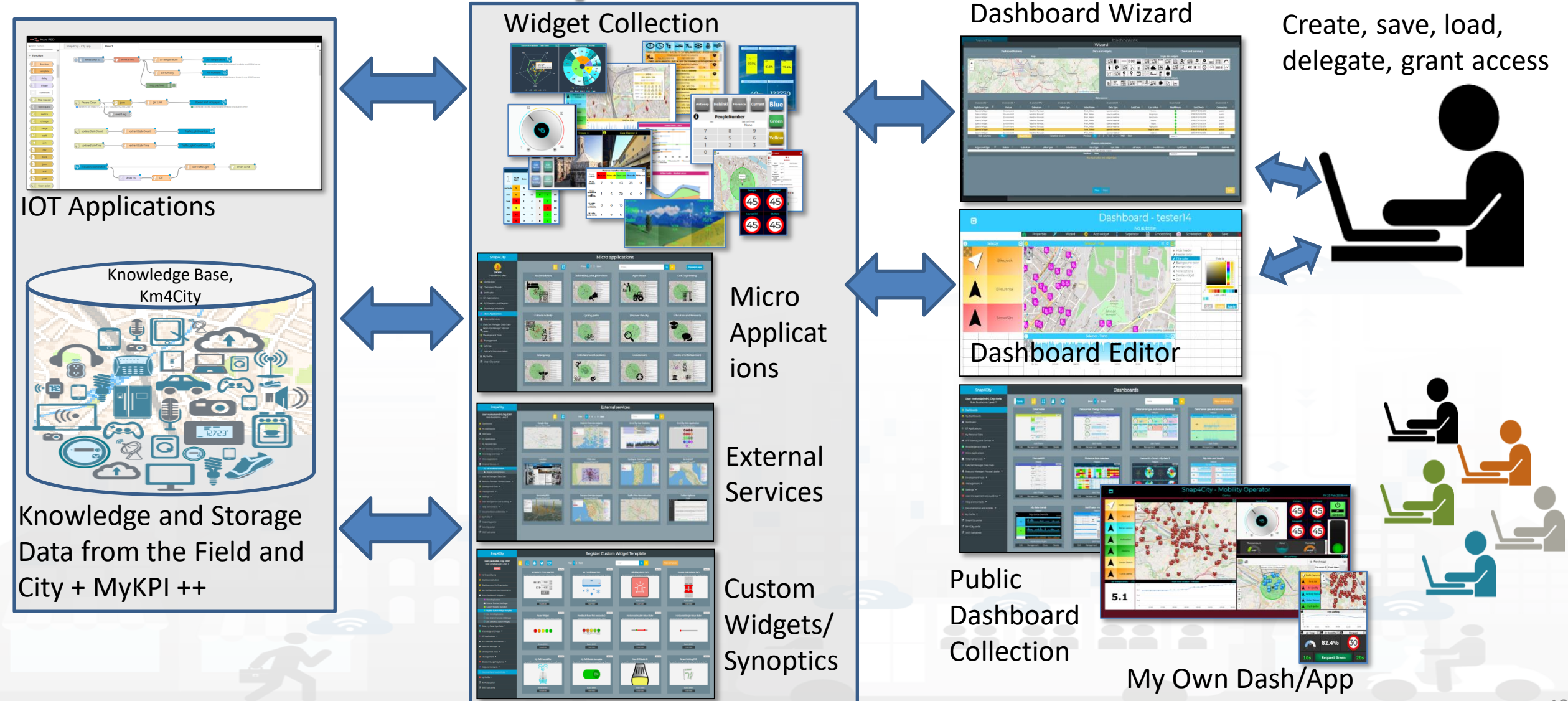
HOW TO ADOPT SNAP4CITY, AND OUR ROADMAP

SNAP4CITY AND KM4CITY PROJECTS

SNAP4CITY THE VIEW OF THE ADMINISTRATORS



# Dashboard Development





# New Dash ?

## My Dashboards in My Organization

User: paolo.disit, Org: DISIT  
Role: AreaManager, Level: 3  
[LOGOUT](#)

[Switch to Legacy Layout](#)

[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](#)

Prev 1 2 3 Next

My own

[NEW DASHBOARD](#)

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

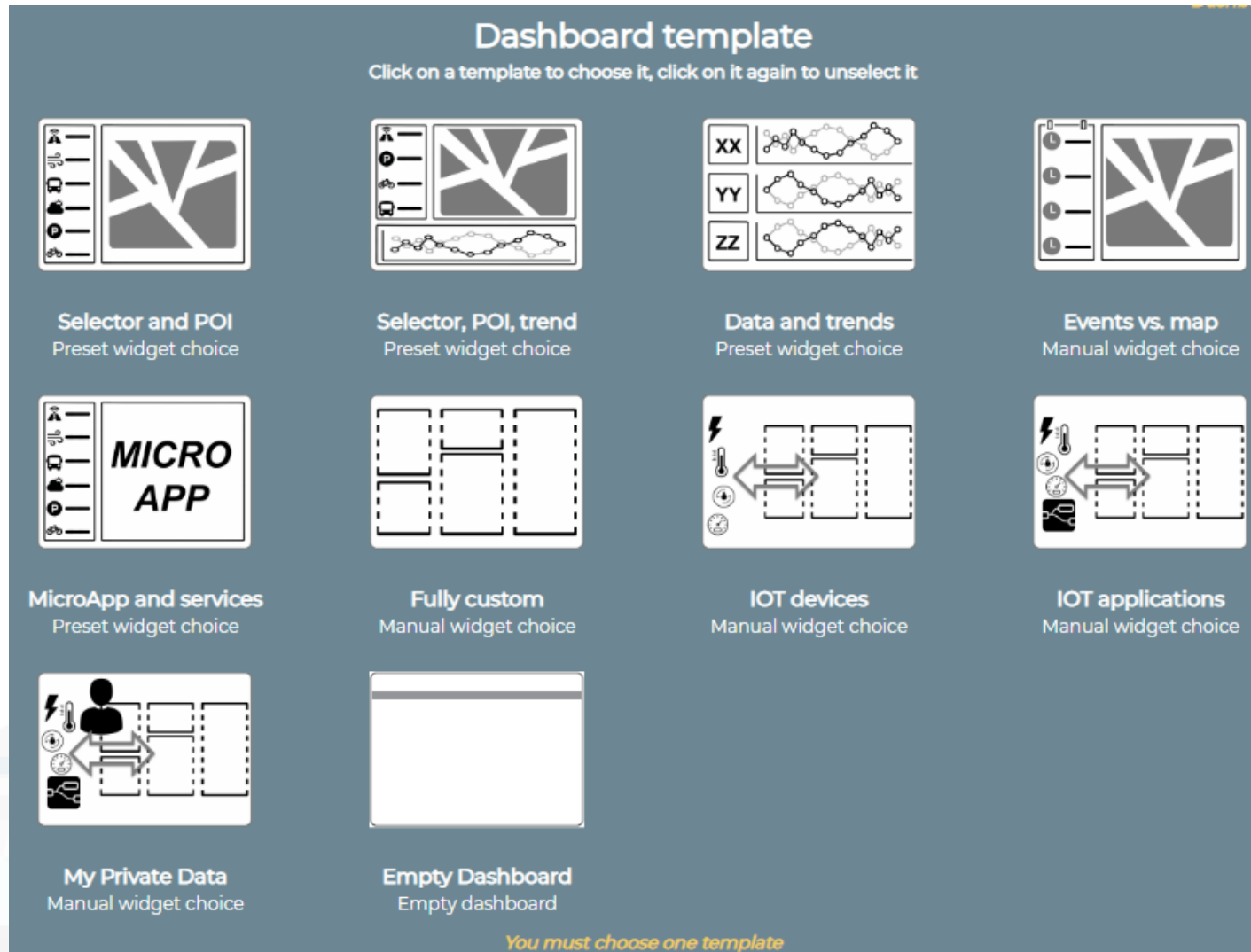
Passive

My own: Public (DISIT)

[Privacy Policy](#) [Cookies Policy](#)

**UNIVERSITÀ DEGLI STUDI FIRENZE** **DINFO** **DISIT**

# From Templates to Wizard and Dashboards



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



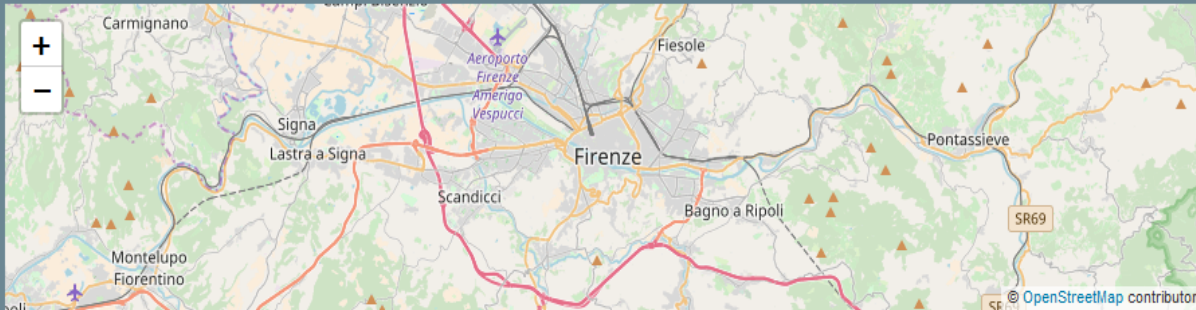
## Wizard

## Dashboard features

## Data and widgets



## Map



## Single data widgets



## Multi data widgets



## Data sources

All selected (10) ▾	All selected (55) ▾	All selected (776) ▾	All selected (315) ▾	All selected (47) ▾	All selected (2) ▾				
High-Level Type	Nature	Subnature	Value Type	Value Name	Data Type	Last Date	Healthiness	Last Check	Ownership
Special Widget	Environment	Weather Forecast	Previ_Meteo	special weather	Vergemoli	2018-07-08 16:00:18	●	2018-07-08 16:00:18	public
Special Widget	Environment	Weather Forecast	Previ_Meteo	special weather	Vergemoli	2018-07-08 16:00:18	●	2018-07-08 16:00:18	public
Special Widget	Environment	Weather Forecast	Previ_Meteo	special weather	Vergemoli	2018-07-08 16:00:18	●	2018-07-08 16:00:18	public
Special Widget	Environment	Weather Forecast	Previ_Meteo	special weather	Vergemoli	2018-07-08 16:00:18	●	2018-07-08 16:00:18	public
Special Widget	Environment	Weather Forecast	Previ_Meteo	special weather	Vergemoli	2018-07-08 16:00:18	●	2018-07-08 16:00:18	public
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Special Widget	Environment	Weather Forecast	Previ_Meteo	special weather	Vergemoli	2018-07-08 16:00:18	●	2018-07-08 16:00:18	public
Special Widget	Environment	Weather Forecast	Previ_Meteo	special weather	Vergemoli	2018-07-08 16:00:18	●	2018-07-08 16:00:18	public
Special Widget	Environment	Weather Forecast	Previ_Meteo	special weather	Vergemoli	2018-07-08 16:00:18	●	2018-07-08 16:00:18	public
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Special Widget	Environment	Weather Forecast	Previ_Meteo	special weather	Vergemoli	2018-07-08 16:00:18	●	2018-07-08 16:00:18	public
Special Widget	Environment	Weather Forecast	Previ_Meteo	special weather	Vergemoli	2018-07-08 16:00:18	●	2018-07-08 16:00:18	public
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Special Widget	Environment	Weather Forecast	Previ_Meteo	special weather	Vergemoli	2018-07-08 16:00:18	●	2018-07-08 16:00:18	public
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Special Widget	Environment	Weather Forecast	Previ_Meteo	special weather	Vergemoli	2018-07-08 16:00:18	●	2018-07-08 16:00:18	public
Special Widget	Environment	Weather Forecast	Previ_Meteo	special weather	Vergemoli	2018-07-08 16:00:18	●	2018-07-08 16:00:18	public
Special Widget	Environment	Weather Forecast	Previ_Meteo	special weather	Vergemoli	2018-07-08 16:00:18	●	2018-07-08 16:00:18	public
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Special Widget	Environment	Weather Forecast	Previ_Meteo	special weather	Vergemoli	2018-07-08 16:00:18	●	2018-07-08 16:00:18	public
Special Widget	Environment	Weather Forecast	Previ_Meteo	special weather	Vergemoli	2018-07-08 16:00:18	●	2018-07-08 16:00:18	public
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Special Widget	Environment	Weather Forecast	Previ_Meteo	special weather	Vergemoli	2018-07-08 16:00:18	●	2018-07-08 16:00:18	public
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Special Widget	Environment	Weather Forecast	Previ_Meteo	special weather	Vergemoli	2018-07-08 16:00:18	●	2018-07-08 16:00:18	public
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Special Widget	Environment	Weather Forecast	Previ_Meteo	special weather	Vergemoli	2018-07-08 16:00:18			

- 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



# Widgets' Icons

## Single data

Single data widgets



## Multi data

Multi data widgets



Map Controls:



## Map Controls

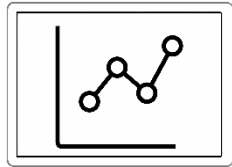


# Widget selection

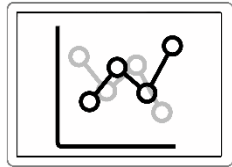
Single data widgets

Multi data widgets

# Selection of Main Widgets icons



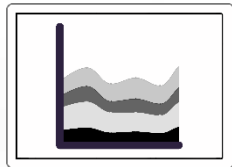
Time Trend



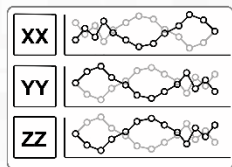
Time Trend  
Compare



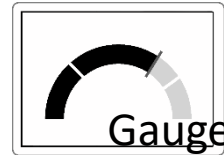
MultiSeries



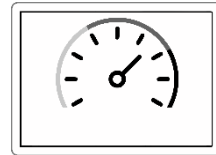
MultiSeries  
(stacked)



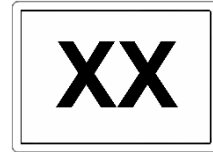
Multi  
TimeTrend



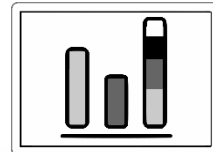
Gauge



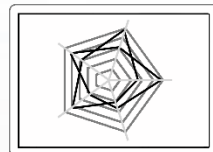
Speedometer



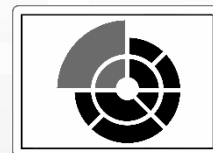
Single  
Content



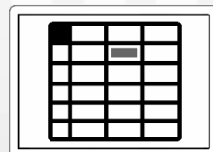
Barseries



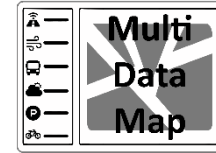
Spider /  
Kiviat



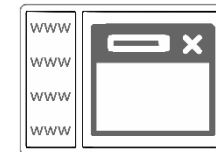
Pie / Donut



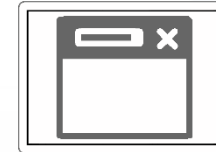
Table



Selector +  
Multi Data  
Map



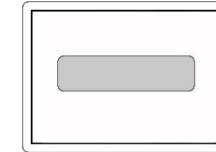
Selector +  
External  
Service



External  
Service



Clock



Button



SNAP4City Dashboards Wizard

Dashboard features | Data and widgets | Check and summary

Map

Select

Select

Select

Wizard

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	Prev_Meteo	special weather	Vernio			2018-07-08 16:00:18	public
Special Widget	Environment	Weather Forecast	Prev_Meteo	special weather	Vergemoli			2018-07-08 16:00:18	public
Special Widget	Environment	Weather Forecast	Prev_Meteo	special weather	Vecchiano			2018-07-08 16:00:18	public
Special Widget	Environment	Weather Forecast	Prev_Meteo	special weather	Valiano			2018-07-08 16:00:18	public
Special Widget	Environment	Weather Forecast	Prev_Meteo	special weather	Vaglia			2018-07-08 16:00:18	public
Special Widget	Environment	Weather Forecast	Prev_Meteo	special weather	Vagli sotto			2018-07-08 16:00:18	public
Special Widget	Environment	Weather Forecast	Prev_Meteo	special weather	Vagli di sotto			2018-07-08 16:00:18	public
Special Widget	Environment	Weather Forecast	Prev_Meteo	special weather	Uzzano			2018-07-08 16:00:18	public

Hide columns

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						

Previous Next

You must select one widget type

Prev Next



# Dashboard Wizard

Università degli Studi di Firenze - UniFI

SNAP4city Florence CarParkings - Newgui PA

Sat 6 Aug 10:58:01

SELETTORE

- CarPark IOT
- Car\_park CAT

STATO PARCHEGGI 2m

MAPPA

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

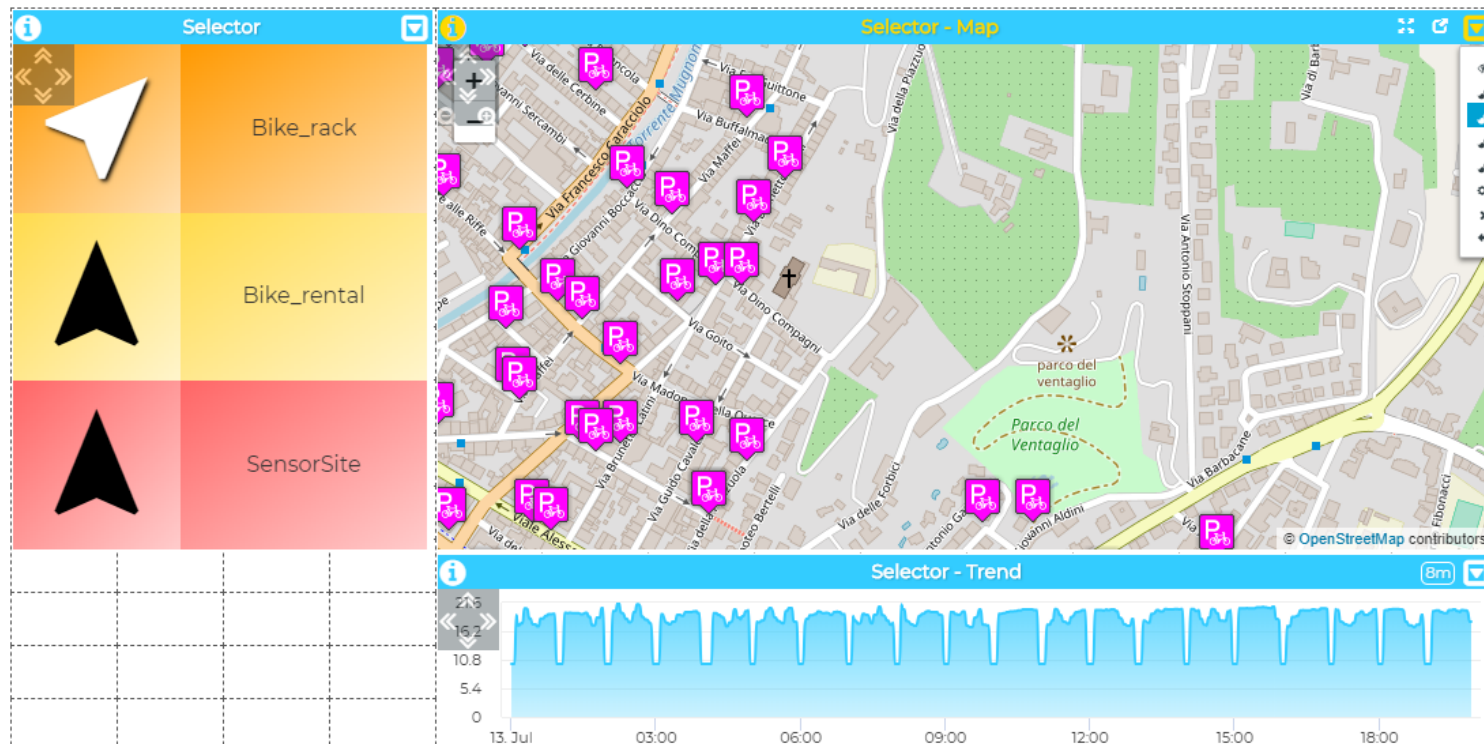
Wizard

Dashboard - tester14

No subtitle

Fri 13 Jul 19:57:32

Properties Wizard Add widget Separator Embedding Screenshot Save Preview



CONTEXTUAL  
MENU to  
edit features

Use Wizard to add more widgets

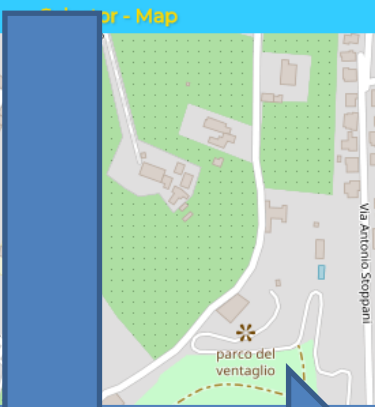
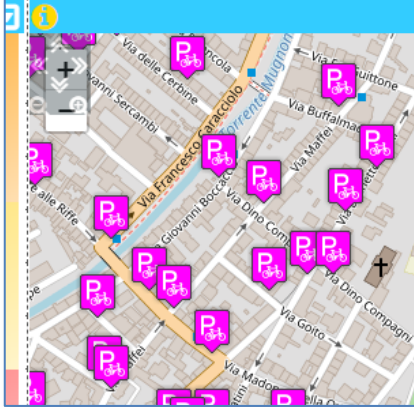


# Manual Addition of Widgets

Dashboard - tester14

No subtitle

Properties Wizard **+** Add widget Separator Embedding Screenshot Save Preview



### Add new widget to dashboard

Metric and widget choice

Widget category

▼

Actuator

Data viewer

Specific widget properties

### Generic widget properties

Title

Content font size

Header color

Background color

Content font color

Header text color

### Metric and widget choice

Widget category

Metrics category

Metric

Metric description

Widget type

Widget link

Data viewer

Shared metrics

Bolognese\_Pressione

Description: Pressione atmosferica via Bolognese. Metric Typology: Float.

widgetGaugeChart

widgetTimeTrendCompare

widgetSingleContent

widgetSpeedometer

widgetTimeTrend

widgetCarrierPosition

# 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](#)



Username: nicola.mitolo

Search

### Training on Tools and Platform

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

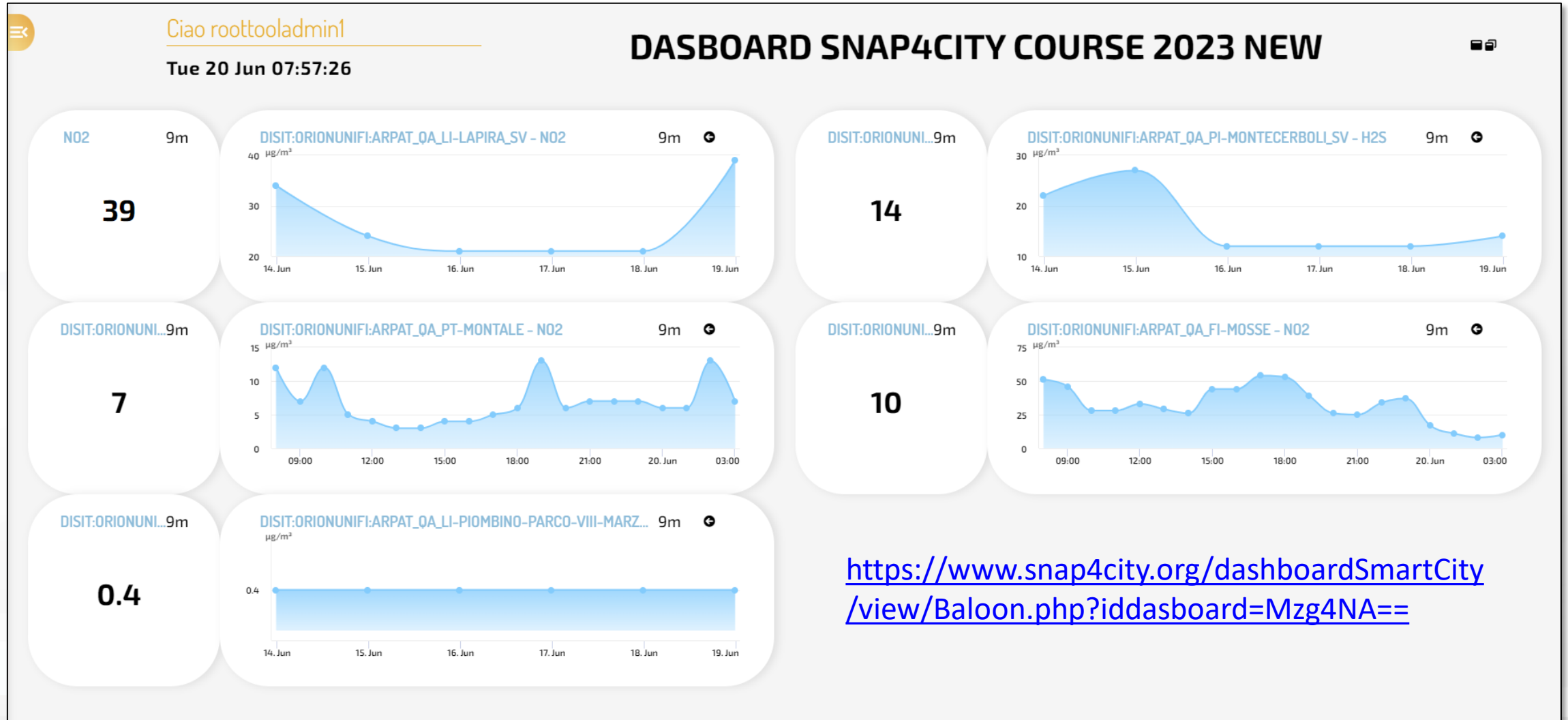


## Organization Groups

DISIT

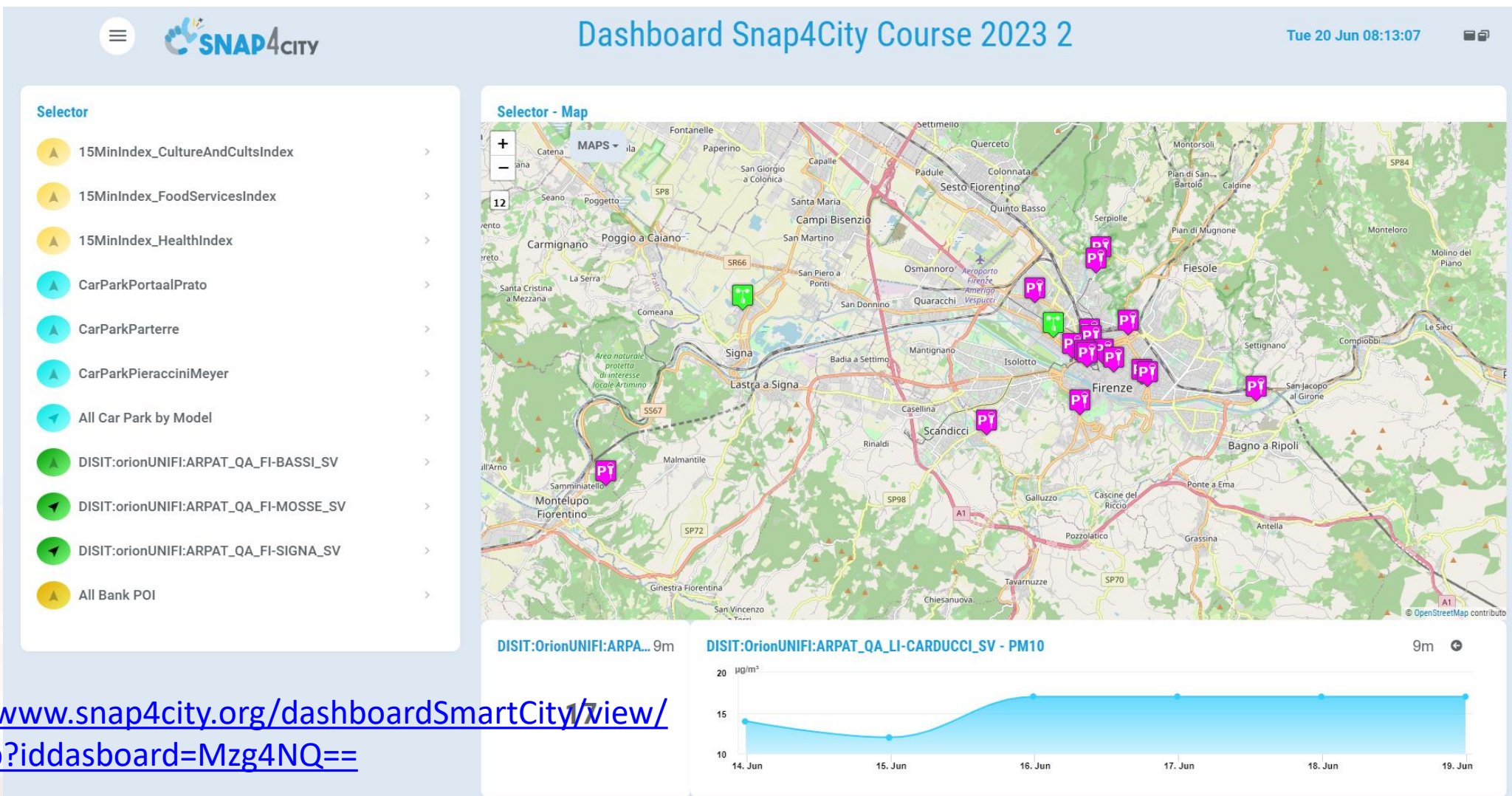
- TECHNICAL OVERVIEW: <https://www.snap4city.org/download/video/Snap4City-PlatformOverview.pdf>
- Development Life Cycle: <https://www.snap4city.org/download/video/Snap4Tech-Development-Life-Cycle.pdf>
- Client-Side Business Logic Widget Manual: <https://www.snap4city.org/download/video/Snap4Client-Side-Business-Logic-WidgetManual.pdf>

# First Example





# Second Example with some improvement



<https://www.snap4city.org/dashboardSmartCity1/view/Gea.php?iddasboard=Mzg4NQ==>

Dashboard title

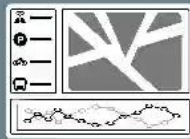
Dashboard title can't be empty

Dashboard template

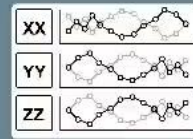
Click on a template to choose it, click on it again to unselect it



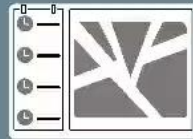
**Selector and map**  
Preset widget choice



**Selector, map, trend**  
Preset widget choice



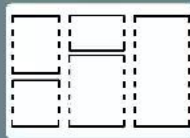
**Data and trends**  
Preset widget choice



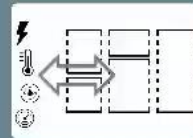
**Events vs. map**  
Manual widget choice



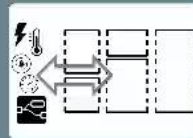
**MicroApp and Services**  
Preset widget choice



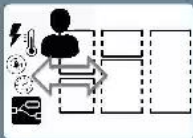
**Fully custom**  
Manual widget choice



**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



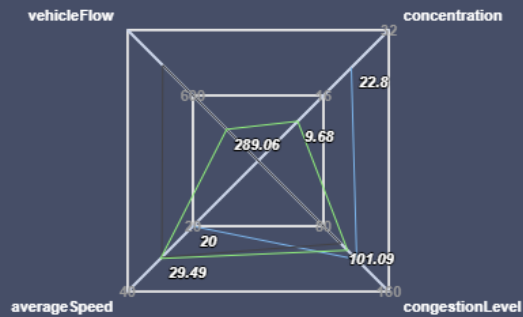
# Example Case 3

## Course 2023 Case 3

Tue 20 Jun 08:45:52

### Radar Series

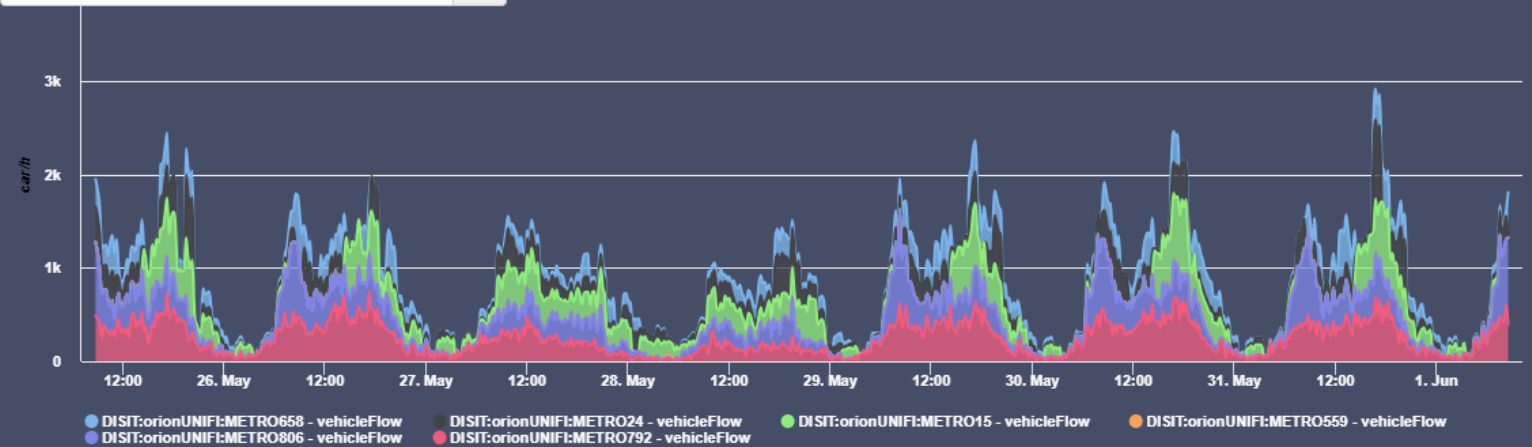
05/09/2023 8:43



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

### Time Trend Comparison

06/01/2023 8:44 AM



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TOP

# *Combining Widgets: Nesting & Linking Dashboards*





# Mixt per Roma

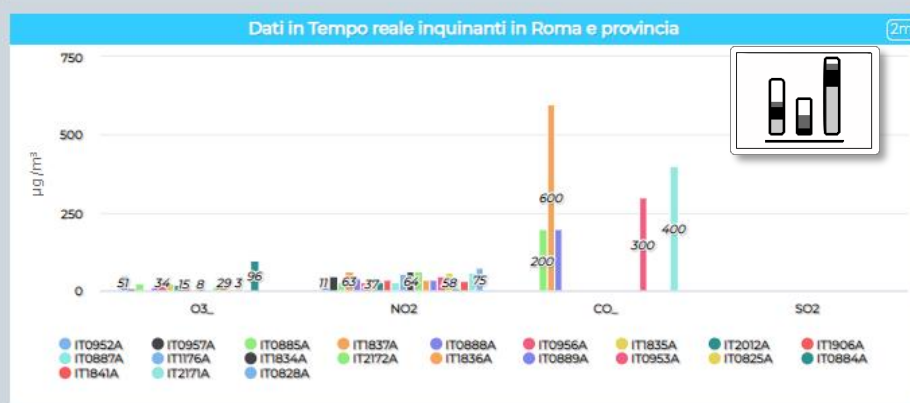
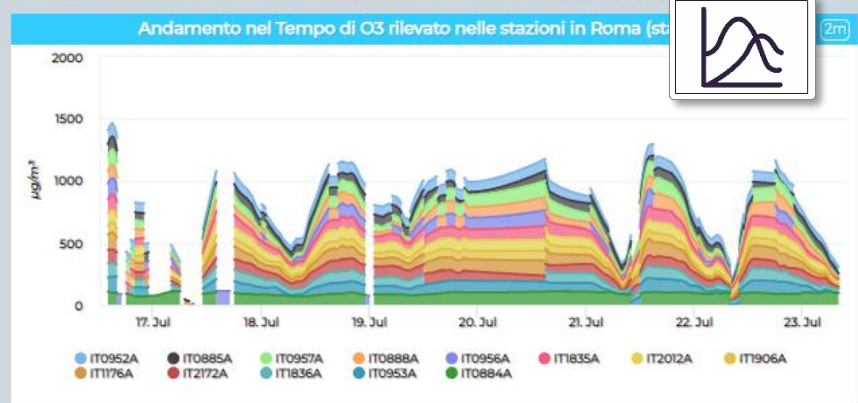
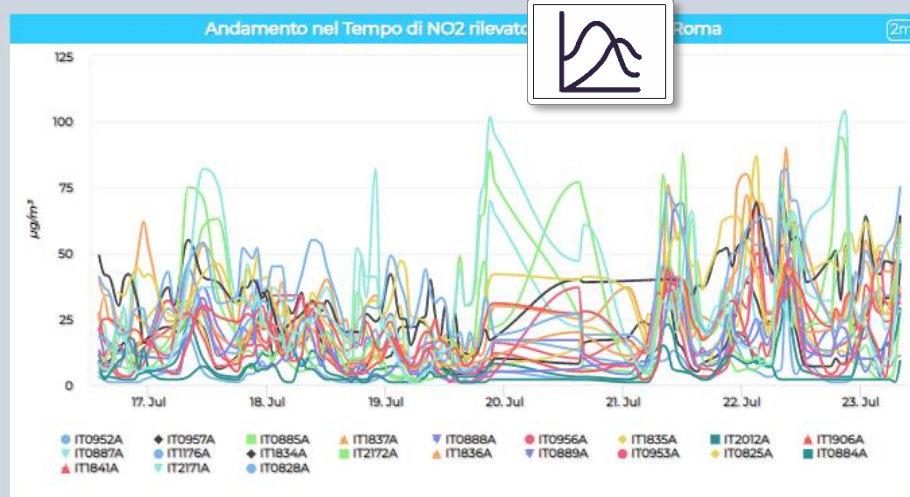
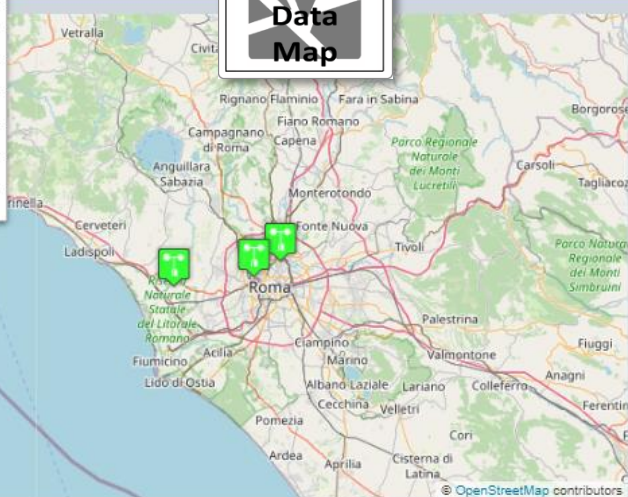
## Roma Demo3 (Qualità dell'Aria)

Thu 23 Jul 13:35:09

**MENU**

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

**Multi  
Data  
Map**



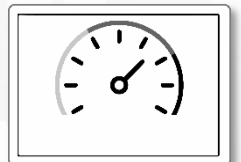
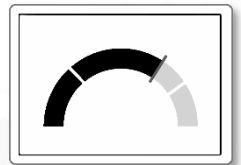
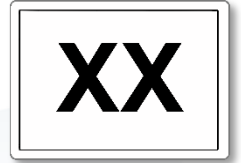
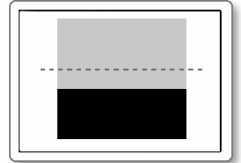
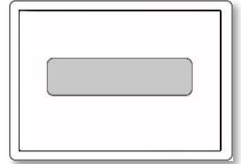
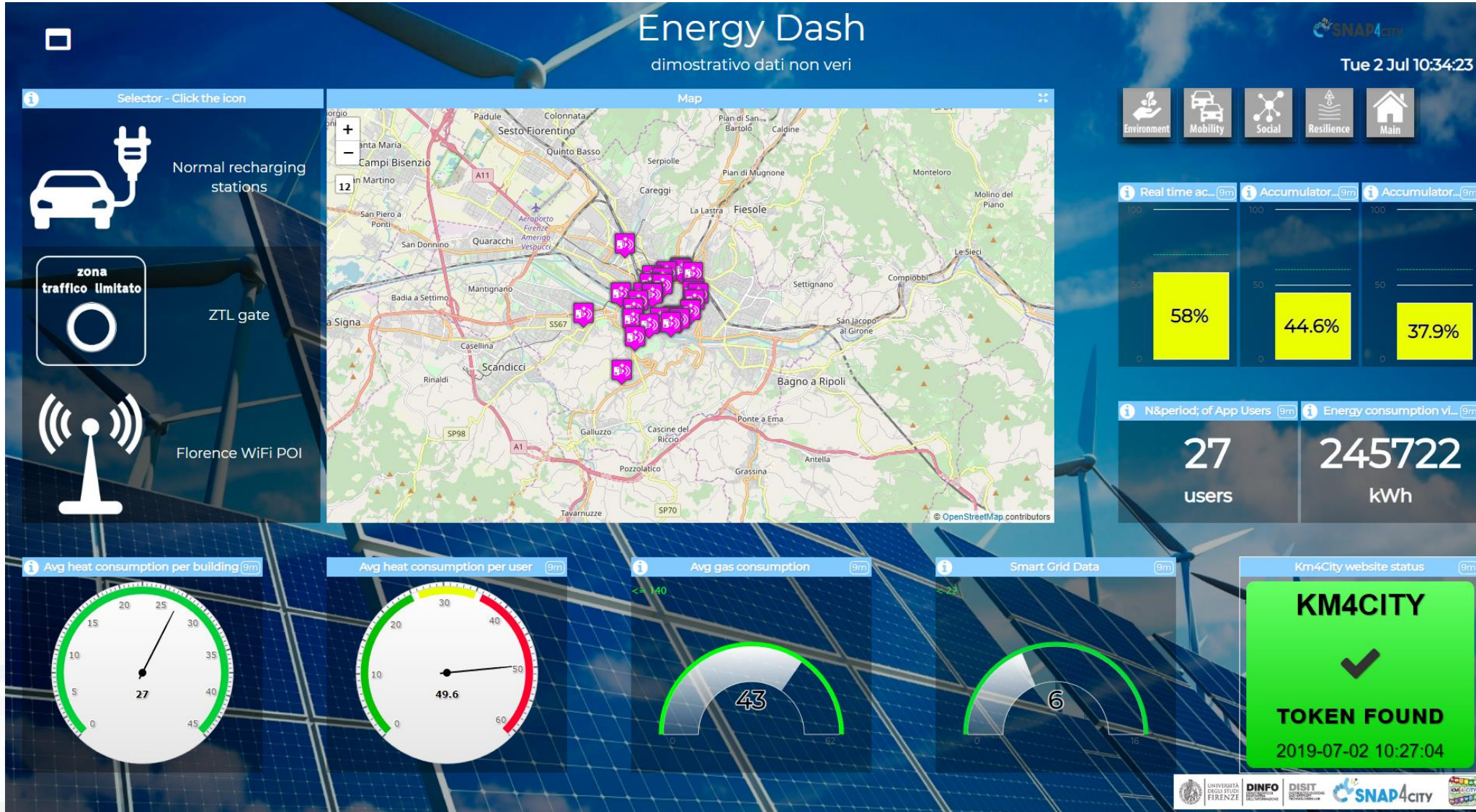
Valori Inquinanti in tempo reale, mappe

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

paxwifitest0... (8m) paxwifitest001 - WIFI number (8m)

78  
Single  
Content

Time Trend

paxwifitest001 - WIFI - Last Week (8m)

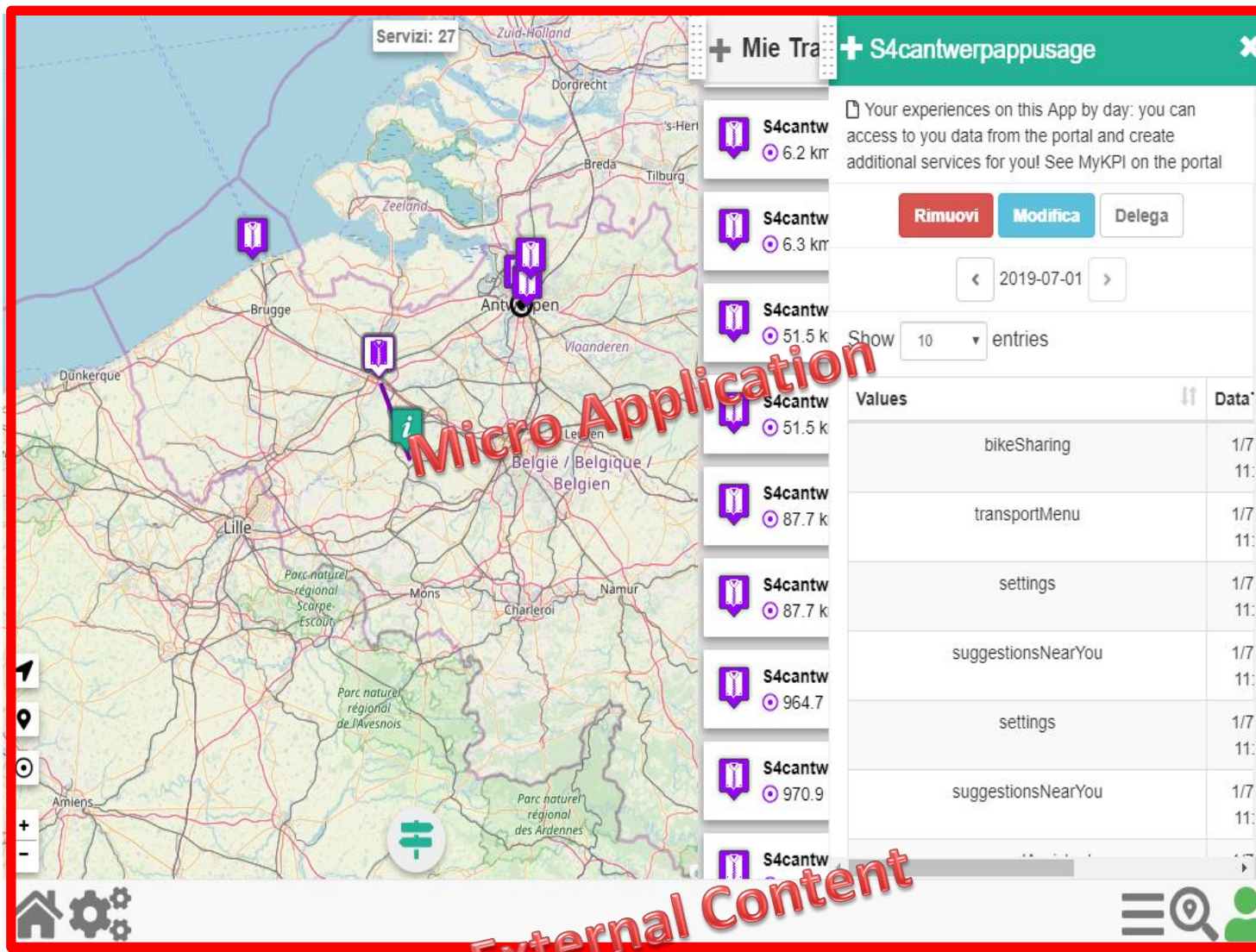
Time Trend

paxwifitest001 - WIFI - Last Month (8m)

Time Trend

Documentation

Button



Micro Application

External Content

Origin Dest. Matrix

Typical Trajectories

My Talk

Delegated Tracks

Multi Tracks

Twitter Vigilance

Twitter Vig. Real Time

Air Quality

Weather

Forum Discussion

Survey

Button







# FIRENZE

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

2

inviata comunicazione alla cittadinanza

OZONO

200  $\mu\text{m}^3$

superata la soglia di informazione

39492 Utenti WiFi

STATI DI ALLERTA 9m

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

Sereno

Sab 20 Ott

Temp N/A

Sereno

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.

FLUSSI INGRESSO CITTA 9m

25.355.2

19.016.4

12.677.6

6338.8

0

08:00

16:00

Current

Previous

FLUSSI INGRESSO ZTL 9m

7337.2

5502.9

3668.6

1834.3

0

08:00

16:00

Current

Previous

TOTALE 9m

141608

VEICOLI

TOTALE ZTL 9m

41146

VEICOLI

SITUAZIONE VIABILITA 54s

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 9m

63.4

% occupati su 901 posti

BINARIO16 9m

83

% occupati su 165 posti

FORTEZZA 9m

17.9

% occupati su 521 posti

LEOPOLDA 9m

36.3

% occupati su 300 posti

CALZA 9m

69.3

% occupati su 218

S.AMBROGIO 9m

67

% occupati su 379 posti

PARTERRE 9m

64.9

% occupati su 106 posti

CAREGGI 9m

90.4

% occupati su 406 posti

BECCARIA 9m

78.6

% occupati su 210 posti

STATO TRIAGE CAREGGI 9m

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












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

Snap4City (C), November 2023



156



# FIRENZE



Tue 16 Oct 16:18:39

Single Content  
Single Content

2

inviata  
comunicazione  
alla cittadinanza

Single Content  
Single Content

200  
µm³

super  
la soglia di  
informazione

Single Content  
39492 Utenti WiFi

Civil Protection

STATION ALLERIA

GENERAL METEO

MINIMO BASO SOC ALTO

RISCHIO IDRAULICO

RISCHIO TEMPORALI

RISCHIO IDROGEOLOGICO

RISCHIO NEVE

IO GHIACCIO



Mar 16 Ott  
Firenze  
Meteo

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  
Seren

Sab 20 Ott  
Temp N/A  
Seren

External Content

TPL

N	14	57	21
Linea			
Attes	3'	2'	8'
Partenza	0'	5'	2'

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.

Time Trend Compare



Time Trend Compare



Single Content  
14130

TOTALE

Single Content  
41166

TOTALE ZTL

SITUAZIONE VIABILITA

4 INCIDENTI

0 CHIUSURE AL TRAFFICO (TOT)

0 CHIUSURE PER CANTIERI

0 PROGR.

0 PROGR.

0 NON PROG.

0 PROGR.

4 TOT. EVENTI SULLA RETE

10 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	A Z 69.3 % occupati su 218	AMBROGIO 67 % occupati su 379 posti
PARTERR 64.9 % occupati su 106 posti	PARTERR 30. % occupati su 406 posti	BECCARIA 78.6 % occupati su 210 posti

9 Single Content

STATO TRIAGE CAREGGI

Red code	Yellow code	Green code	Blue code	White code
3	2	3	1	9

First Aid

MAPPA

Energy

Environment

Mobility

Social

Resilience

6 Buttons

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

6 Buttons

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

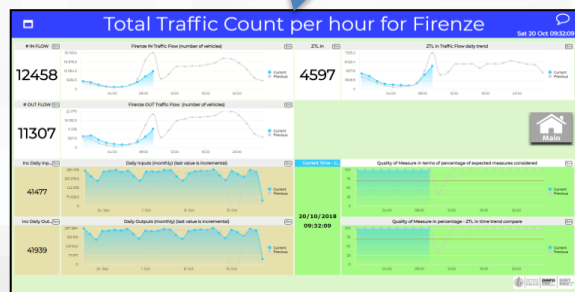
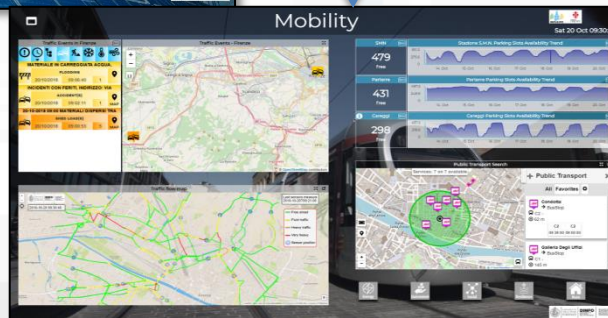
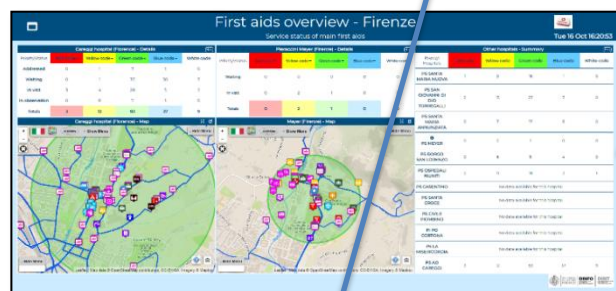
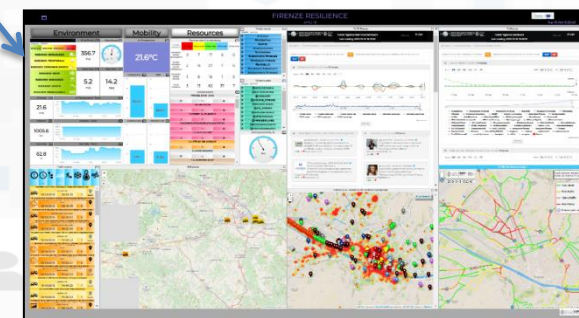
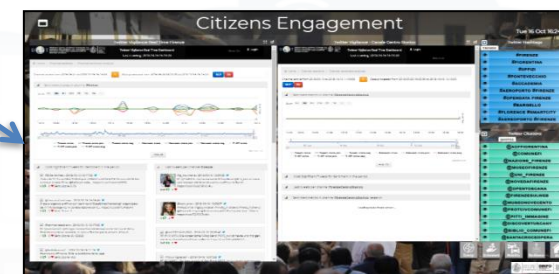
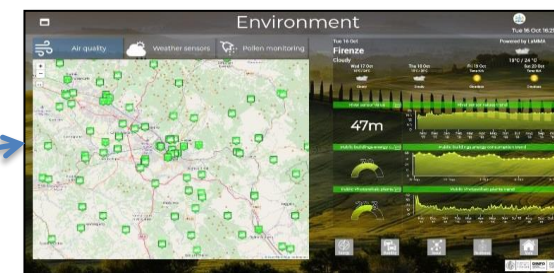
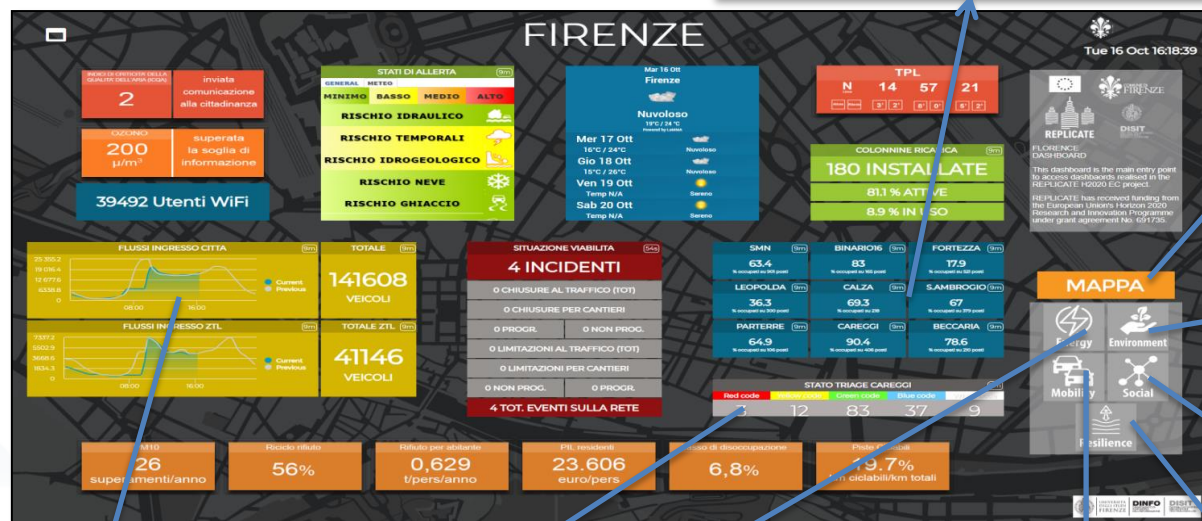




UNIVERSITÀ  
DEGLI STUDI  
FIRENZE

**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

FROM CITY  
DASHBOARD TO  
APPLICATIONS

FORGING &  
MANAGING OPEN  
AND FLEXIBLE WEB  
AND MOBILE APPS

IOT APPLICATIONS  
VS IOT EDGE  
DEVICES

DATA GATHERING  
AND CITY  
KNOWLEDGE  
MANAGEMENT

IOT/IOE DEVICES  
AND NETWORKS

IOT APPLICATIONS,  
THE LOGIC AND  
THE SMARTNESS

ADVANCED  
SMART CITY APPS,  
MICROSERVICES,  
SNAP4CITY API

SNAP4CITY  
LIVING LAB FOR  
COLLABORATIVE  
WORK

SNAP4CITY FOR  
BEGINNERS

SNAP4CITY  
ARCHITECTURE AND  
ECOSYSTEM. OPENED  
TO DEVELOPERS  
AND STAKEHOLDERS

TWITTER  
VIGILANCE: SOCIAL  
MEDIA ANALYSIS

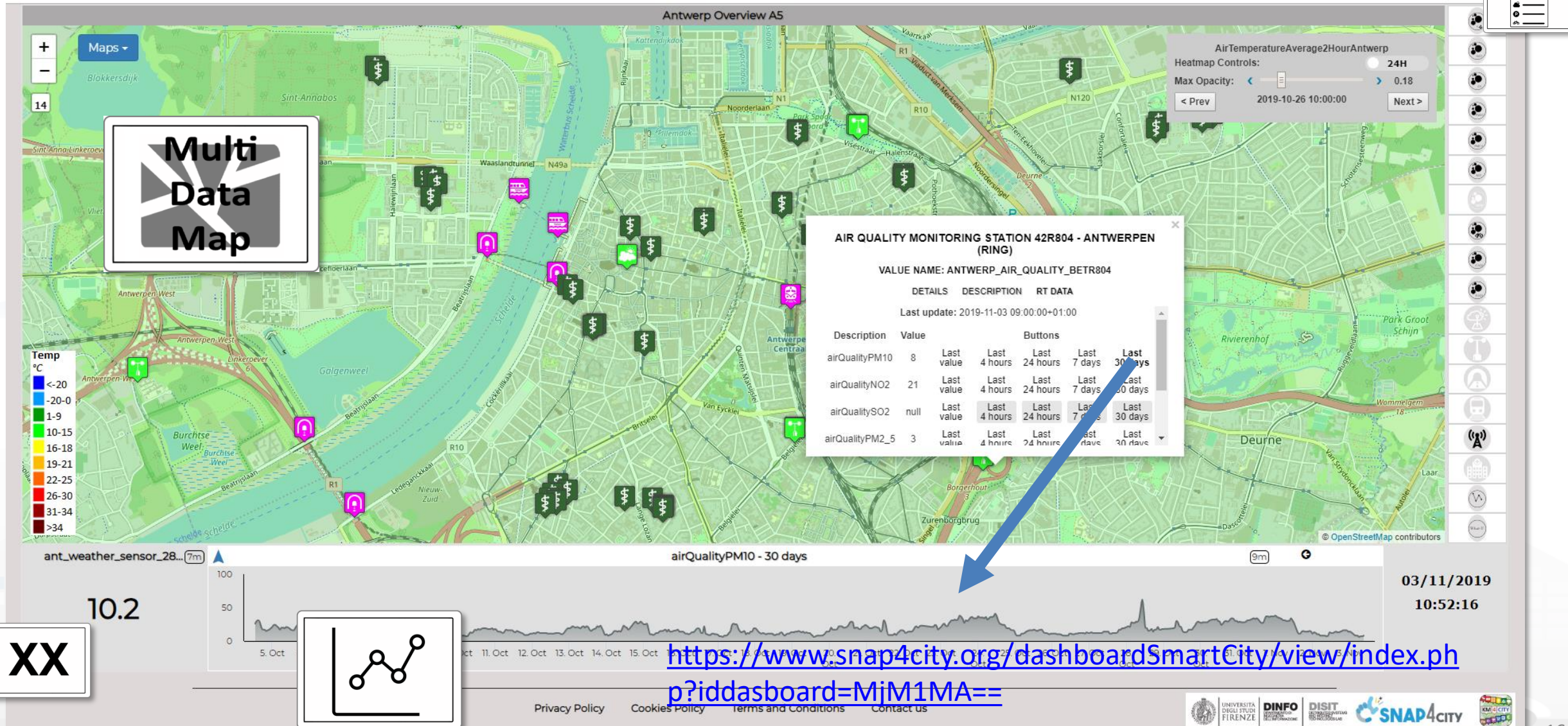
SNAP4CITY  
AND KM4CITY  
PROJECTS

HOW TO ADOPT  
SNAP4CITY, AND  
OUR ROADMAP

SNAP4CITY THE  
VIEW OF THE  
ADMINISTRATORS

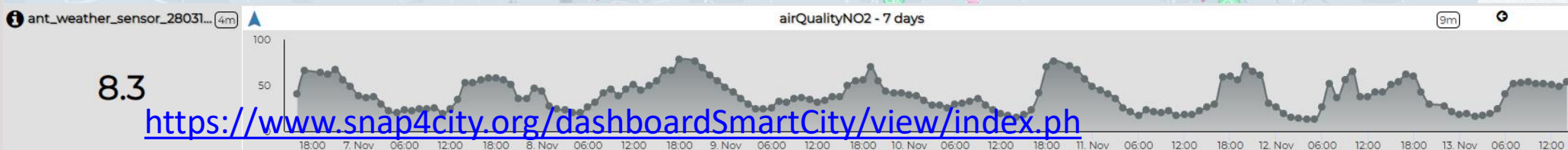
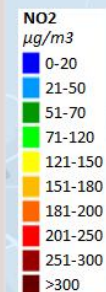
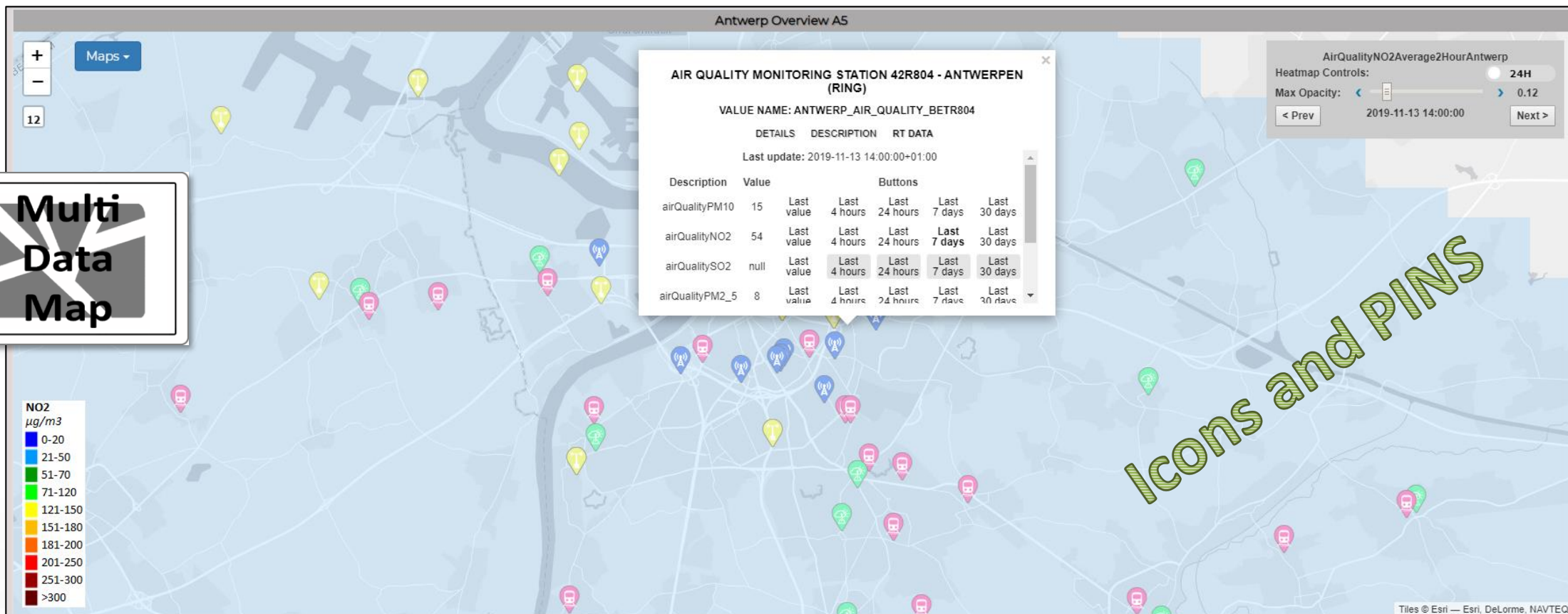
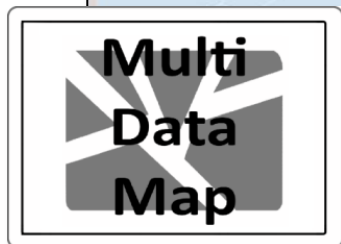


# Unique Dashboard builder Multiple Styles





# Menu Icon and PINs as Icons



8.3

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



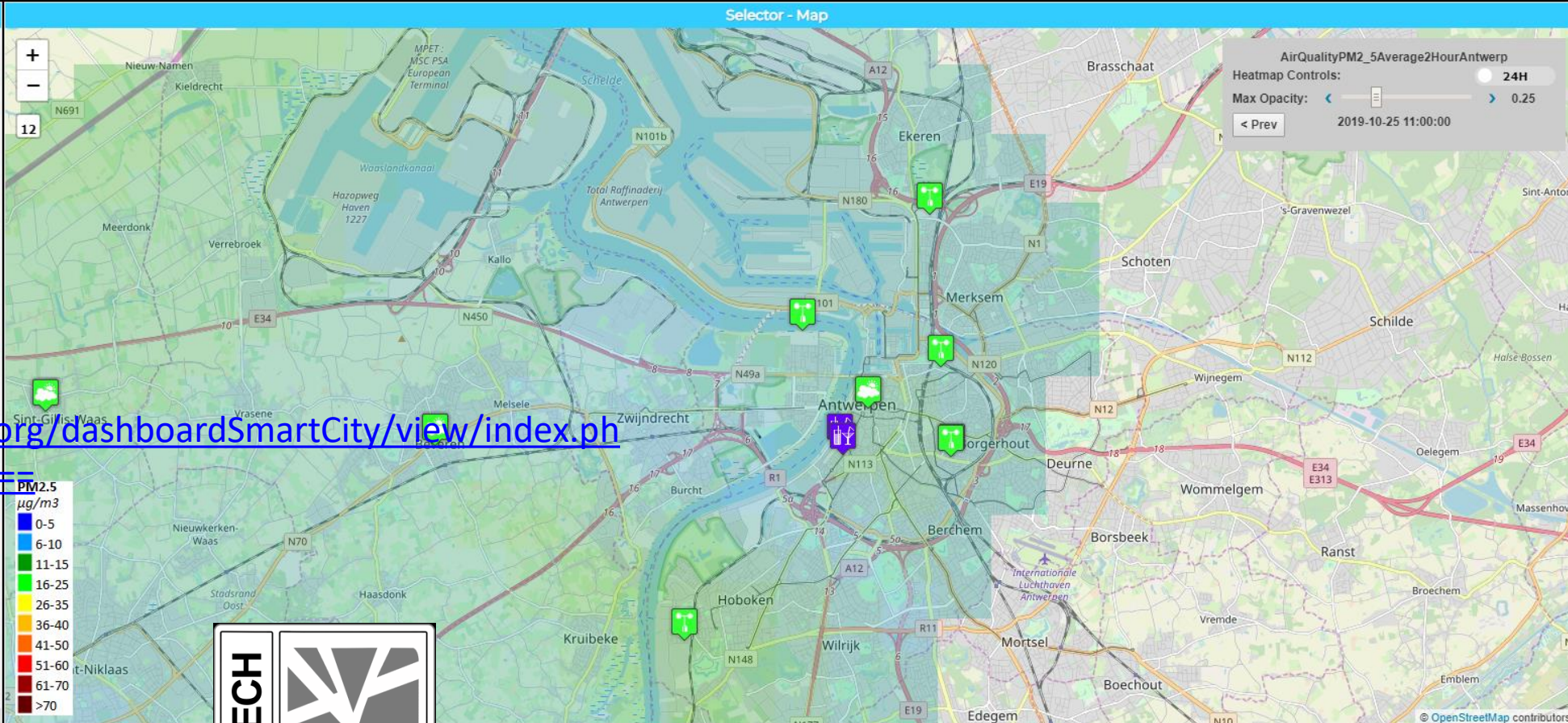
# Technical Selector: TECH MultiDataMap

## 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
  - ☐ WACB
  - ☐ 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



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



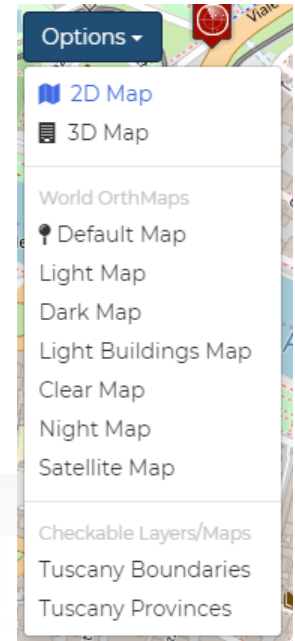
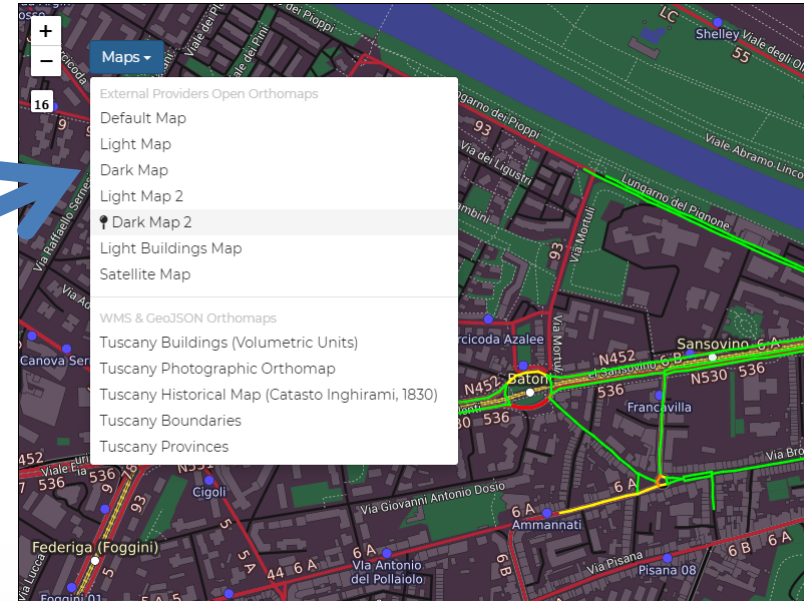
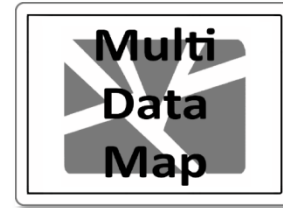


# Multi Data Map: many kinds of data

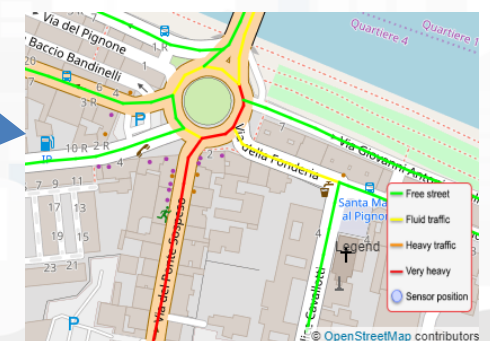
- **Orthomaps:** plain maps and overlapped layers
- A range of **Pins Kinds** for marking Services, IOT Devices, etc.
- **Services:**
  - POI, MyPOI, IOT Devices, Sensors, Actuators, IOT Device Moving, etc.
  - Cycling paths
  - Areas shapes: gardens, etc...
  - GIS data
- **Heatmaps:** different types
- **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

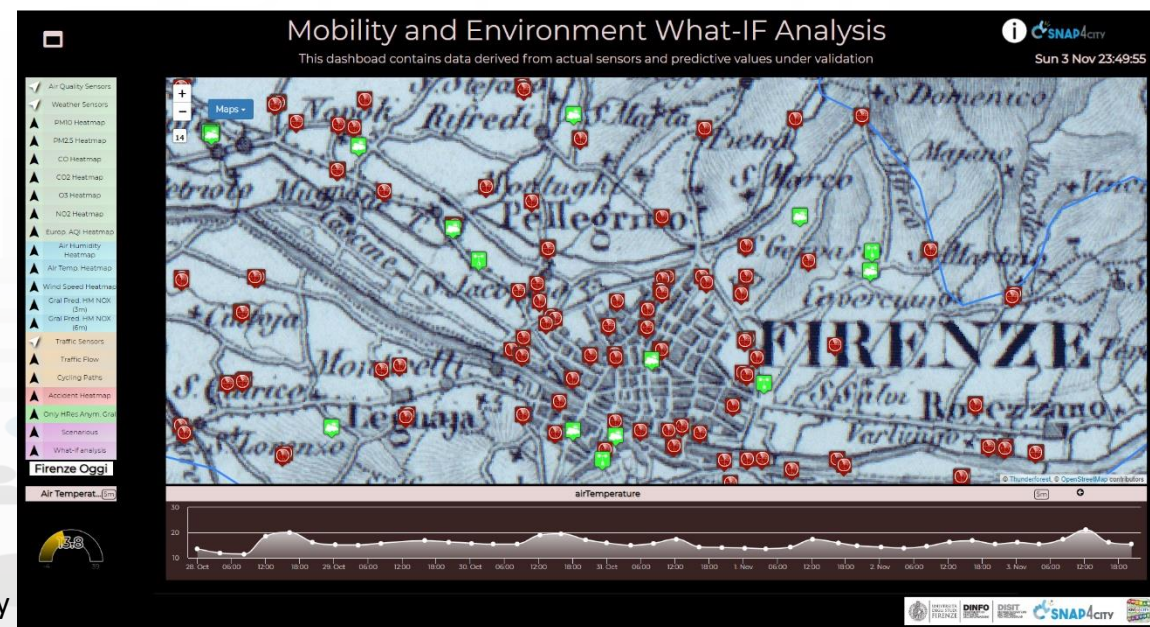
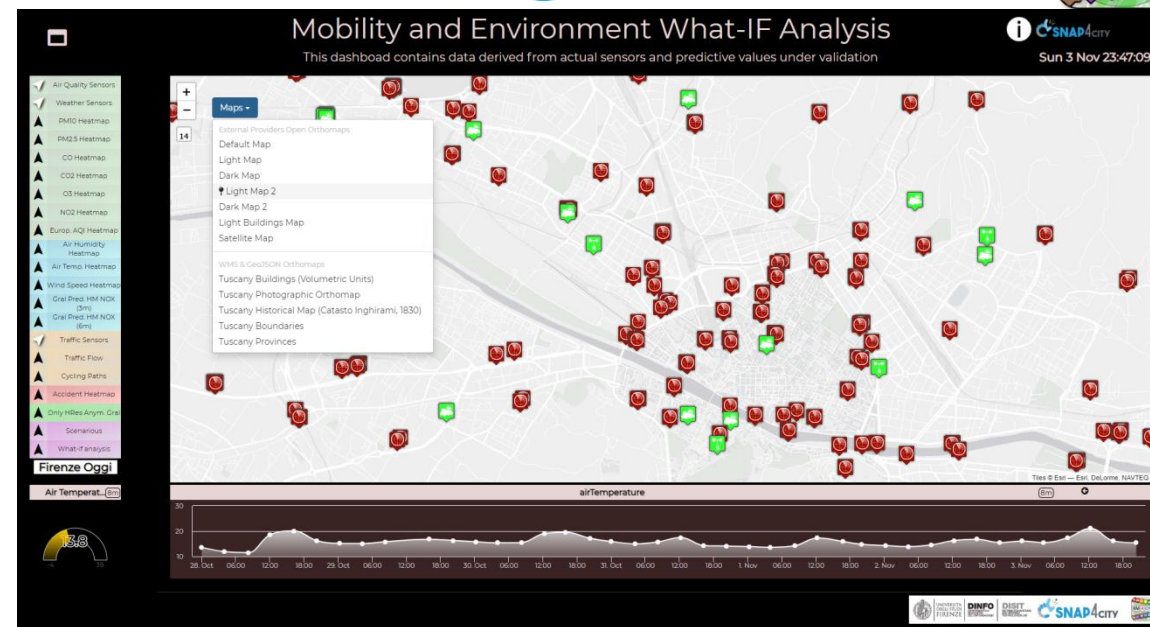
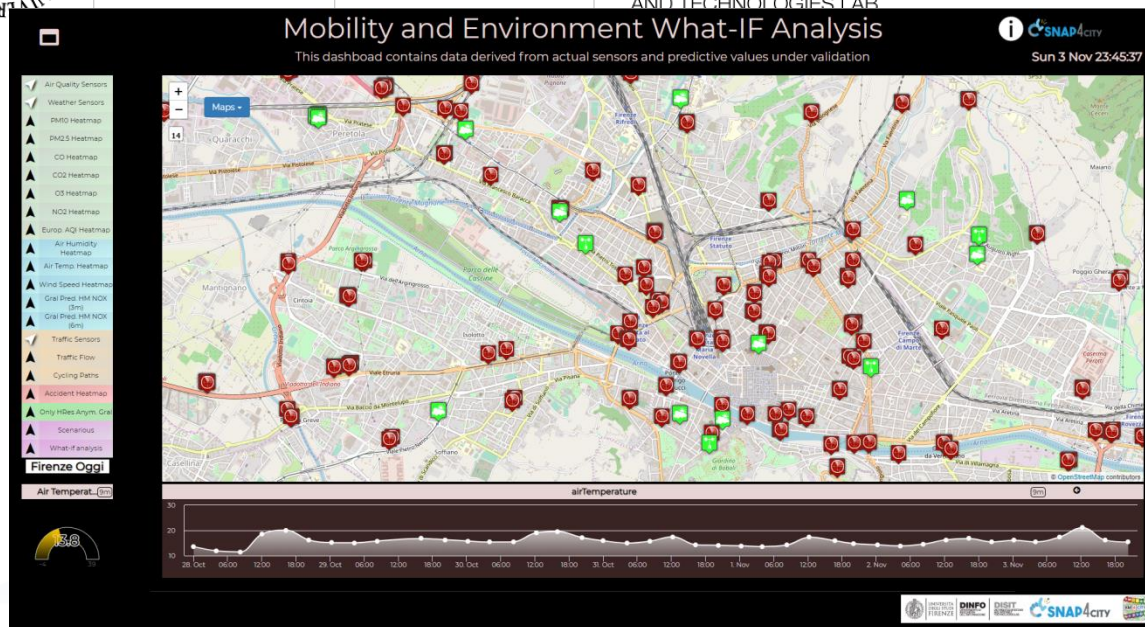
- The most powerful Data Map rendering tool, it supports:
  - KB Sensor data:** POI, sensors, actuators, etc. (see in the following), moving devices
  - WFS data** (see in the following)
  - WMS background maps**
    - Ask to a **RootAdmin** for activating this feature on your MultiDataMap widgets once 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==>

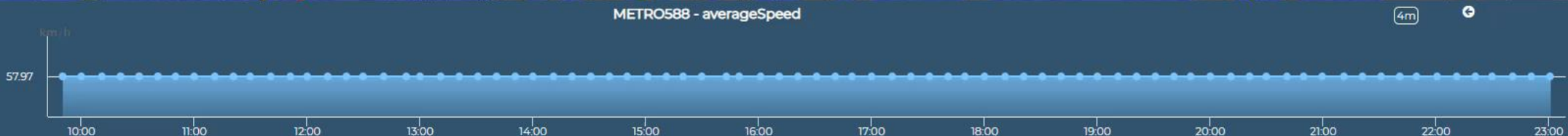
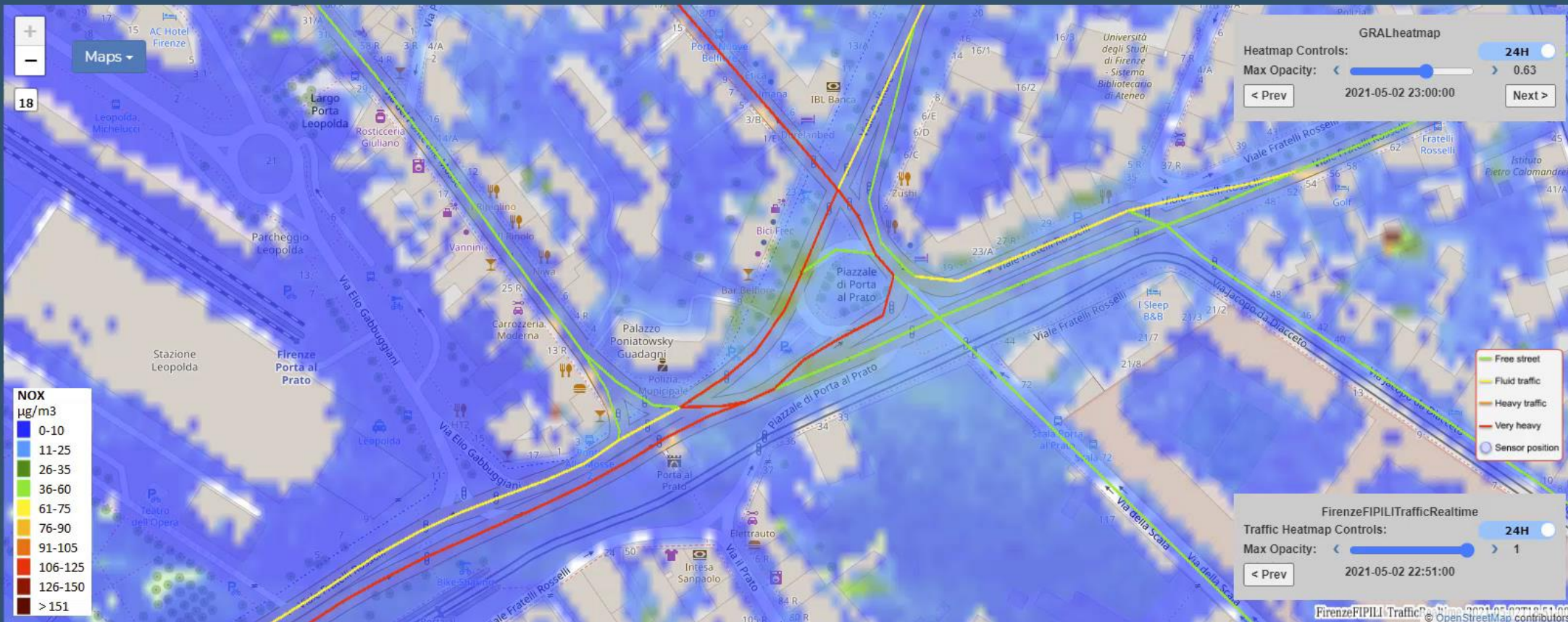




# Traffic Flow Manager on multiple cities

Sun 2 May 23:16:31

- Traffic Sensors
- Weather\_sensor
- AirTemperatureAverage2HourFirenze
- 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



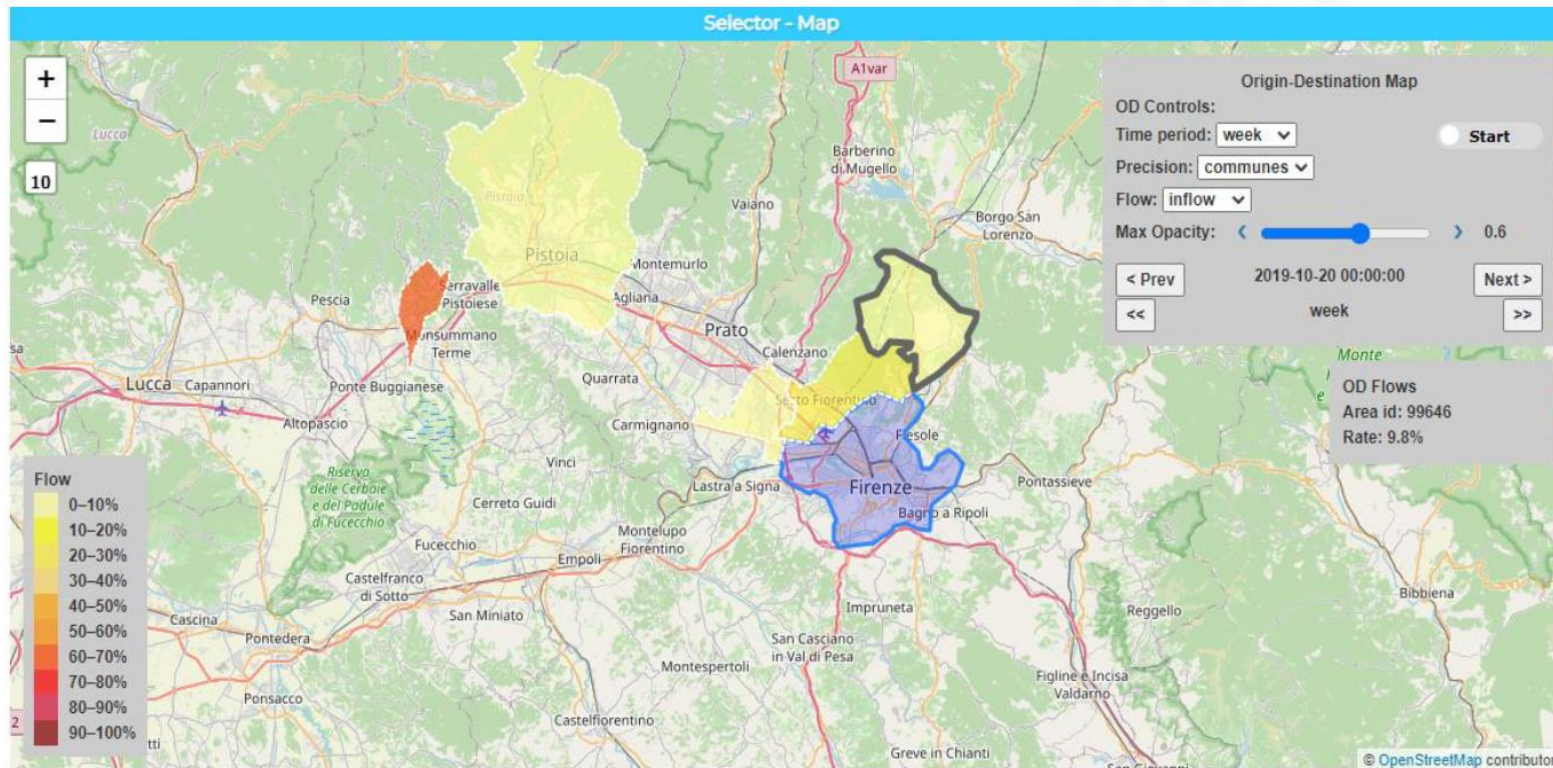
Privacy Policy Cookies Policy Terms and Conditions Contact us



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



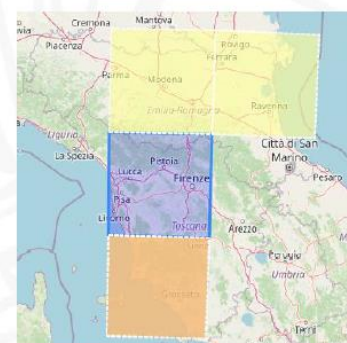
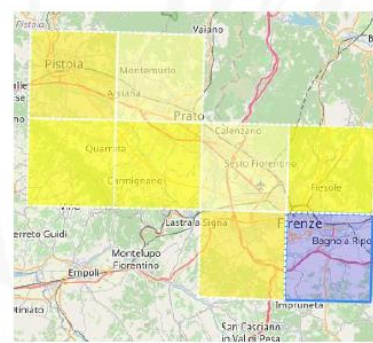
# Different Origin Destination Matrices



- 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)

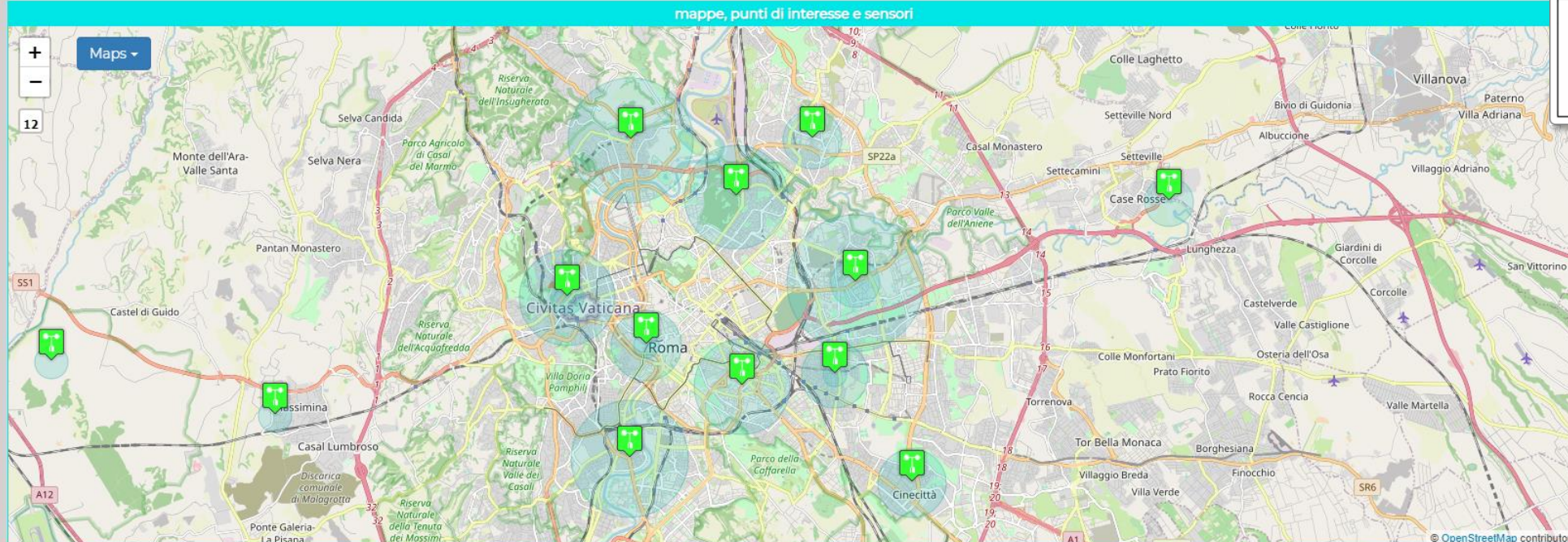
Sat 27 Jun 00:16:48



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

Trasporti

Qualità  
dell'Aria



Multi  
Data  
Map

Temperatura (9m)

22.5  
°C

Temperatura dell'Aria (9m)

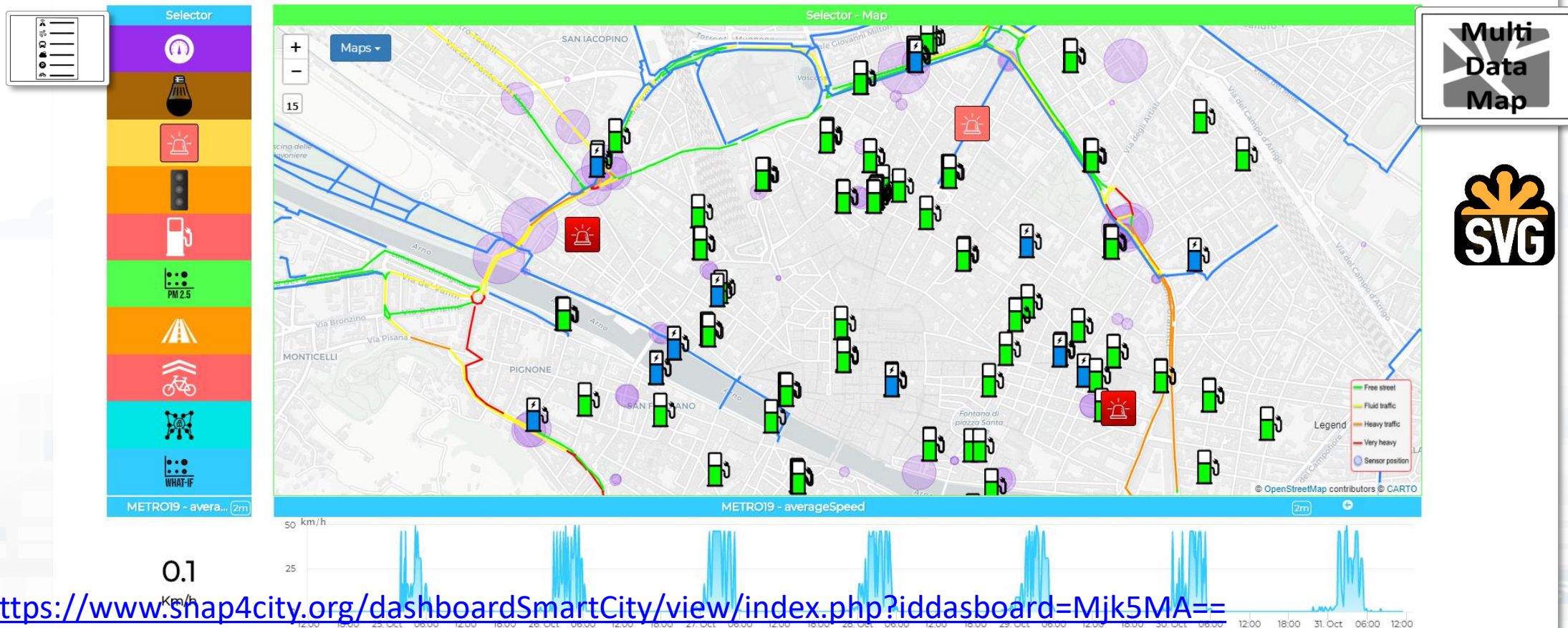




# Custom Dynamic Pins

## Custom Pins on Map - test GP

Sat 31 Oct 11:35:41



<https://www.snap4city.org/dashboardSmartCity/view/index.php?iddasboard=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:**
  - 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





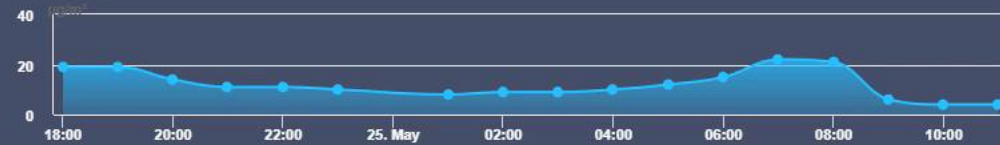


## 3D Map



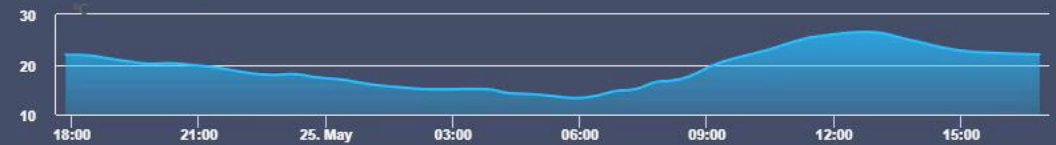
## Air Quality FI-BASSI - NO2

6m



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

6m





TOP

# Snap4City

## High Level Types

FROM CITY  
DASHBOARD TO  
APPLICATIONS

DATA GATHERING  
AND CITY DATA  
KNOWLEDGE  
MANAGEMENT

FORGING &  
MANAGING OPEN  
AND FLEXIBLE WEB  
AND MOBILE APPS

IOT/IOE DEVICES  
AND NETWORKS

IOT APPLICATIONS  
VS IOT DEVICES

IOT APPLICATIONS,  
THE LOGIC AND  
THE SMARTNESS

ADVANCED  
SNAP4CITY API  
MINI SERVICE  
SNAP4CITY API

SNAP4CITY  
LIVING LAB FOR  
COLLABORATIVE  
WORK

SNAP4CITY FOR  
BEGINNERS

DATA ANALYTICS,  
BUSINESS  
INTELLIGENCE,  
WHAT-IF AND  
SIMULATION

SNAP4CITY  
ARCHITECTURE AND  
ECOSYSTEM. OPENED  
TO DEVELOPERS  
AND STAKEHOLDERS

TWITTER  
VIGILANCE: SOCIAL  
MEDIA ANALYSIS

DECISION SUPPORT  
SYSTEM AND CITY  
RESILIENCE

HOW TO ADOPT  
SNAP4CITY, AND  
OUR ROADMAP

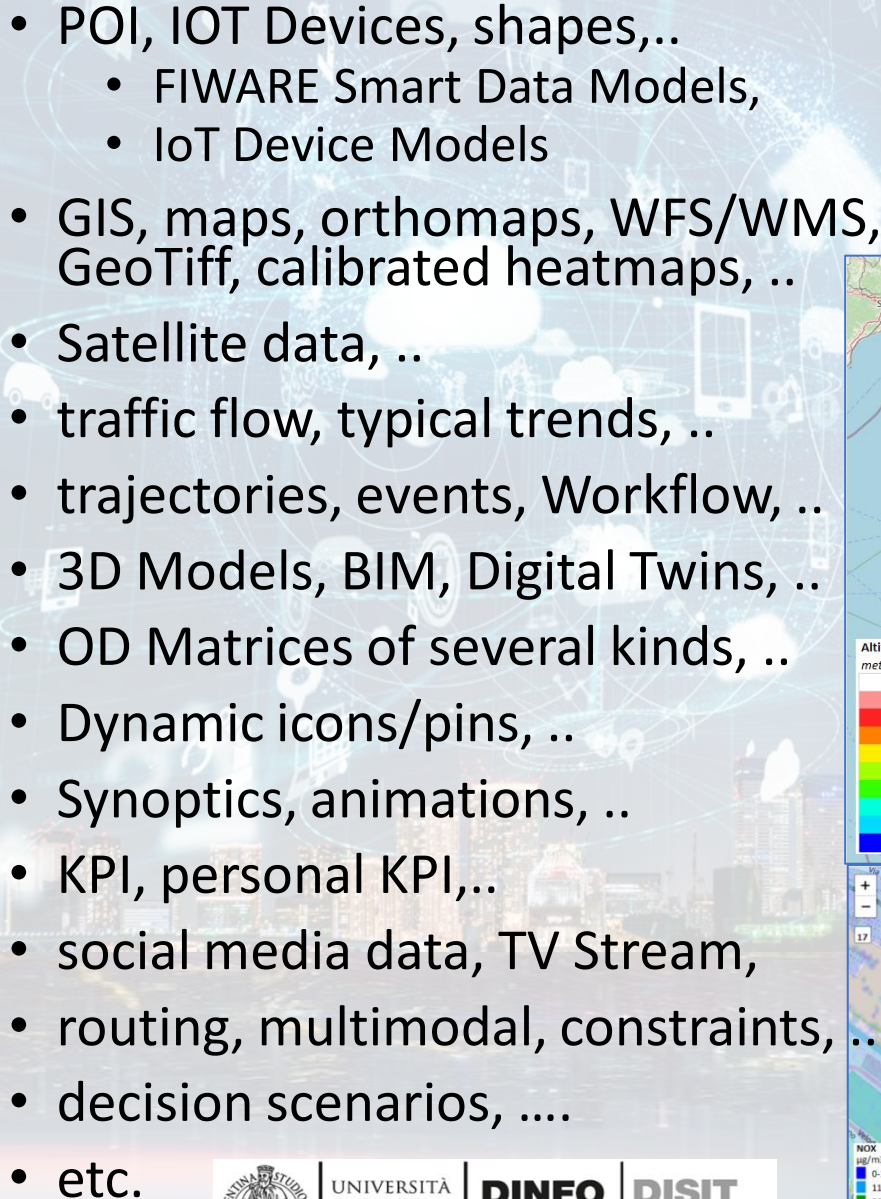
SNAP4CITY  
AND KM4CITY  
PROJECTS

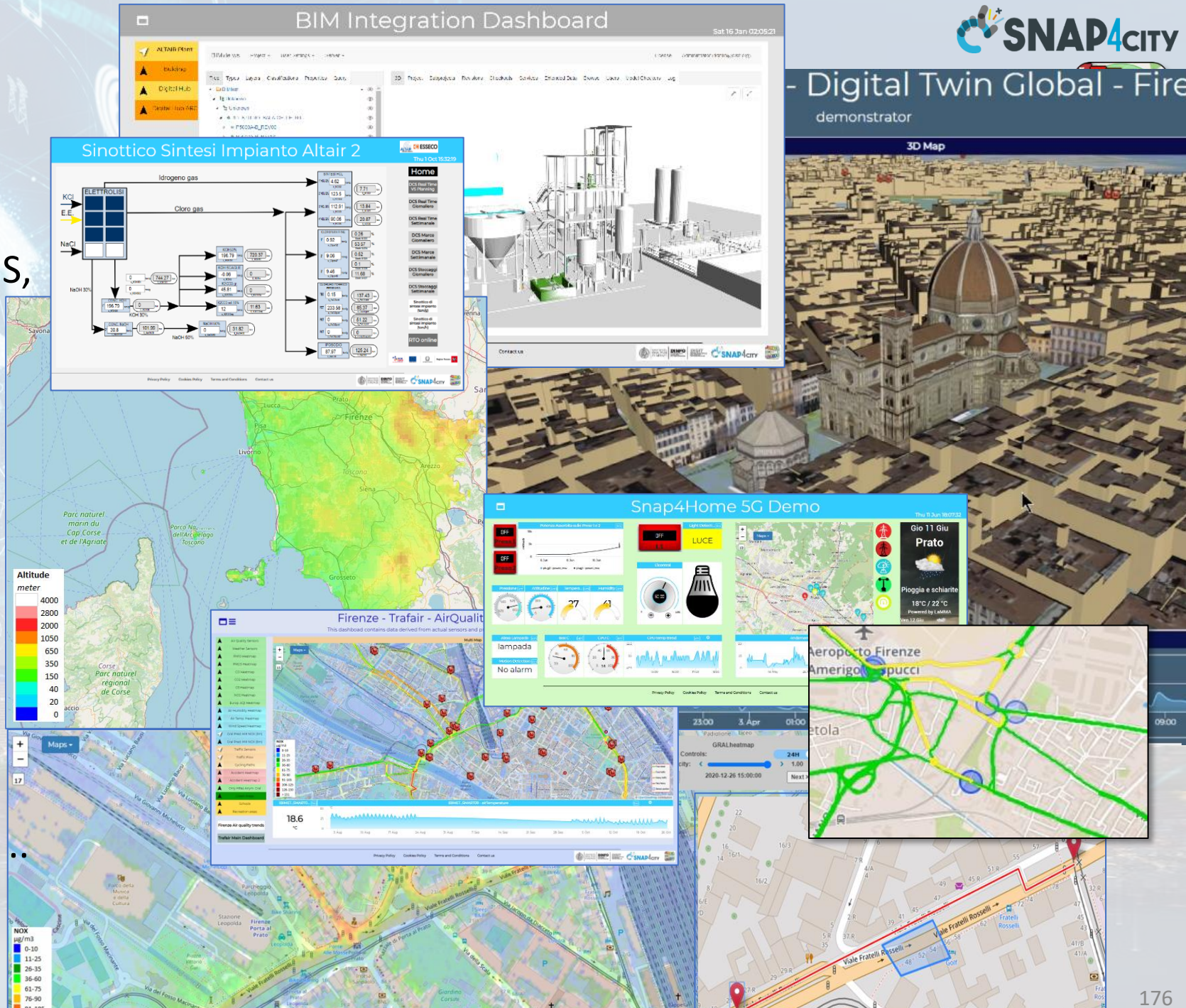
SNAP4CITY THE  
VIEW OF THE  
ADMINISTRATORS



# High Level Types

Snap4City (C), November 2023

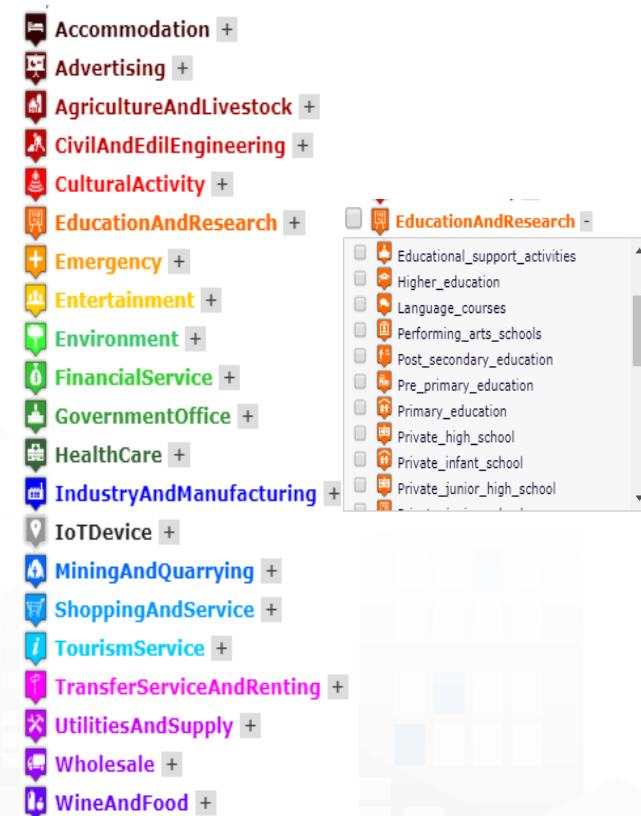
- 
- POI, IOT Devices, shapes,..
    - FIWARE Smart Data Models,
    - IoT Device Models
  - GIS, maps, orthomaps, WFS/WMS, GeoTiff, calibrated heatmaps, ..
  - Satellite data, ..
  - traffic flow, typical trends, ..
  - trajectories, events, Workflow, ..
  - 3D Models, BIM, Digital Twins, ..
  - OD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





# 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**

Map

**METRO1**

VALUE NAME: METRO1

DESCRIPTION DESCRIPTION RT DATA

Last update: 2021-10-30 18:41:00+02:00

Description	Value	Buttons				
avgTime	20.23125	Last value	Last 4 hours	Last 24 hours	Last 7 days	Last 30 days
concentration	9.95571	Last value	Last 4 hours	Last 24 hours	Last 7 days	Last 30 days
vehicleFlow	575.7519	Last value	Last 4 hours	Last 24 hours	Last 7 days	Last 30 days

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		2021-10
Sensor	Mobility and Transport	SensorSite	METRO11		averageSpeed	average_vehicle_speed	float	km/h	2021-10-30 17:21:00	60.0		2021-10
Sensor	Mobility and Transport	SensorSite	METRO11		vehicleFlow	vehicle_flow	float	car/h	2021-10-30 17:21:00	12.0		2021-10
Sensor	TransferServiceAndRenting	SensorSite	METRO1		thresholdPerc	vehicle_threshold_perc	float	%	2021-10-30 17:21:00	Not Available		2021-10
Sensor	TransferServiceAndRenting	SensorSite	METRO1		speedPercentile	vehicle_speed_percentile	float	%	2021-10-30 17:21:00	Not Available		2021-10
Sensor	TransferServiceAndRenting	SensorSite	METRO1		occupancy	vehicle_occupancy	float	%	2021-10-30 17:21:00	Not Available		2021-10
Sensor	TransferServiceAndRenting	SensorSite	METRO1		avgDistance	average_vehicle_distance	float	m	2021-10-30 17:21:00	Not Available		2021-10
Sensor	TransferServiceAndRenting	SensorSite	METRO10		thresholdPerc	vehicle_threshold_perc	float	%	2021-10-30 17:21:00	Not Available		2021-10

Hide columns Reset filters Selected rows: 1 Previous 1 ... 7 8 9 ... 1590 Next sensorsite

15.9

concentration - 30 days



# 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)			All selected (2)	All selected (2)	
High-Level Type	Nature	Subnature	Device/Model	Broker	Value Name	Value Type	Data Type	Value Unit	Last Date	Last Value	Healthiness	Last Check	Ownership
IoT Device Variable	IoTDevice	IoTSensor	devicetest1	orionUNIFI	temperature	temperature	float	°C	2018-05-31 19:16:05		●	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			●	2021-10-15 10:01:00	private (My Own)
IoT Device Variable	IoTDevice	IoTSensor	adminTest1	orionUNIFI	humidity	humidity	string	%			●	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
4													
Hide columns	⚙️	Reset filters	Selected rows: 1		Previous 1 2 3 4 5 ... 2466 Next				Search				

High Level Types

Nature

SubNature

**Semantic  
Classific.**

Dev/Model name

Broker name

**Technical  
Source**

Value Name

Value Type

Data Type

Value Unit

**Variables, names**

Last Date/Time

Last Value

**Real  
Time**

Healthiness

Last Check

**Status**

Ownership  
Organization

**For  
Admin**

# Snap4City Dashboards main concepts

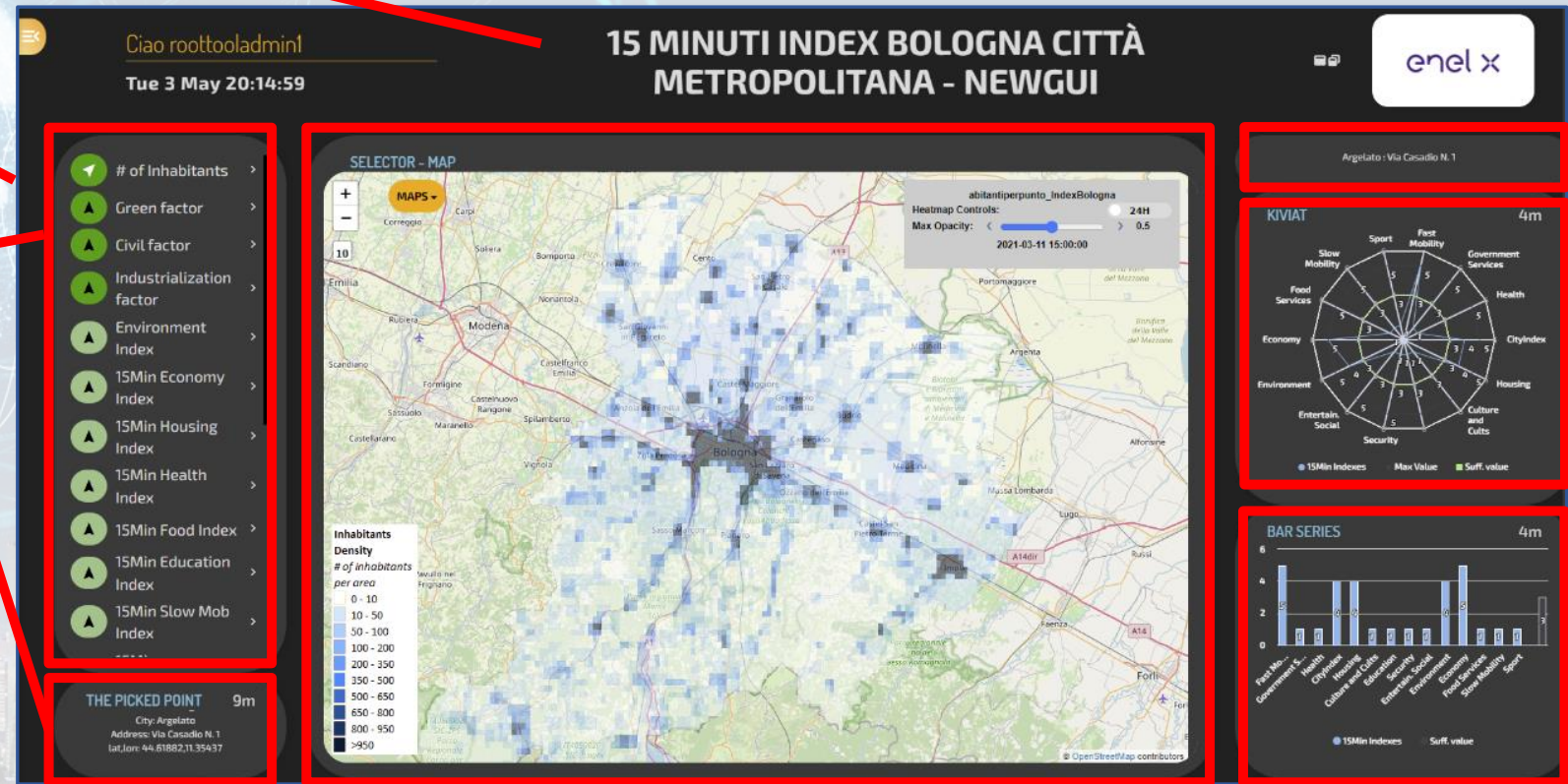
Header

Dashboard

Interactive Widgets

Server Communication

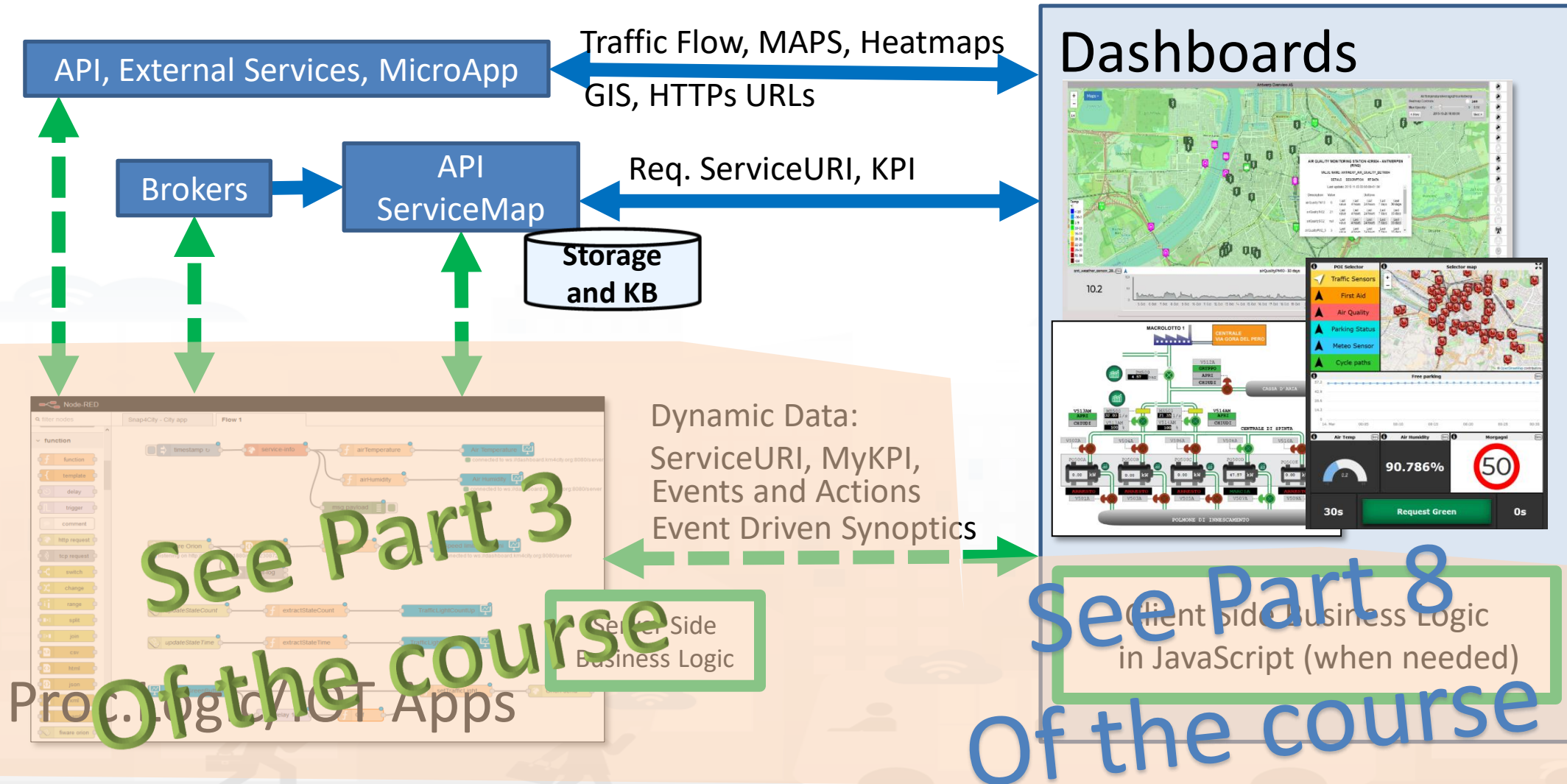
- Real Time data requests/send
- Event Driven
- Server Side Business Logic
  - See Part 3 of the course



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



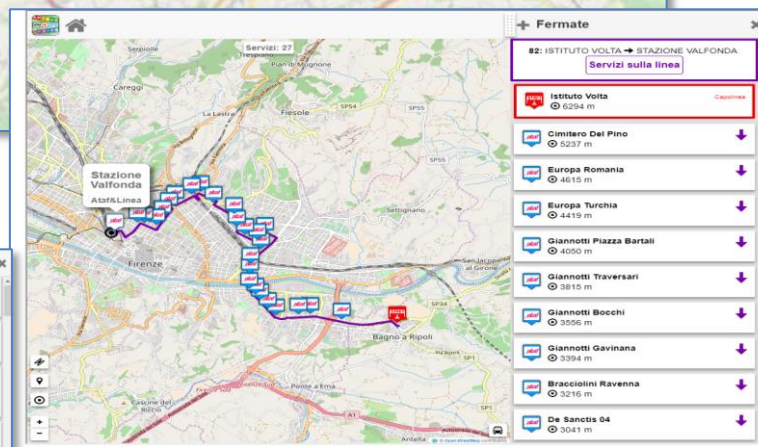
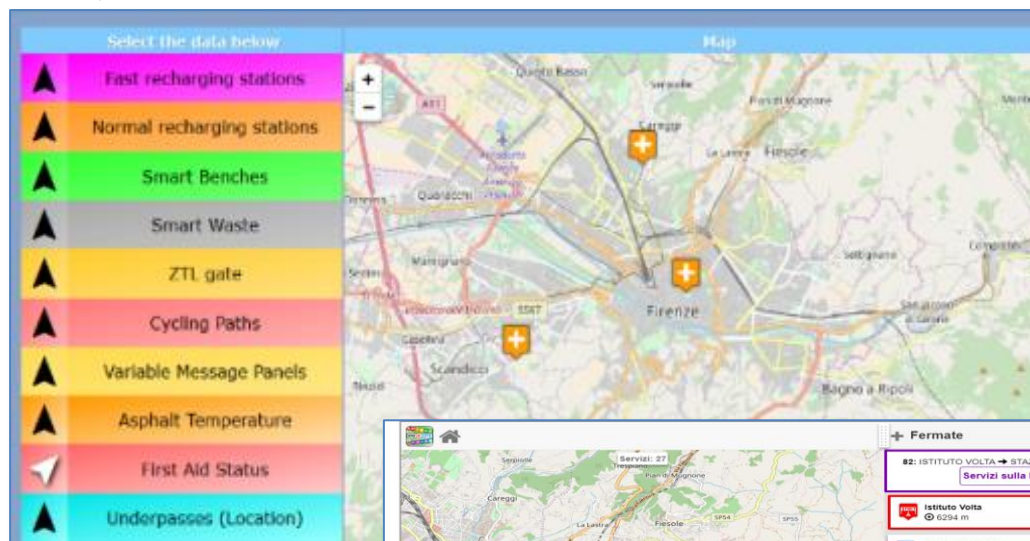
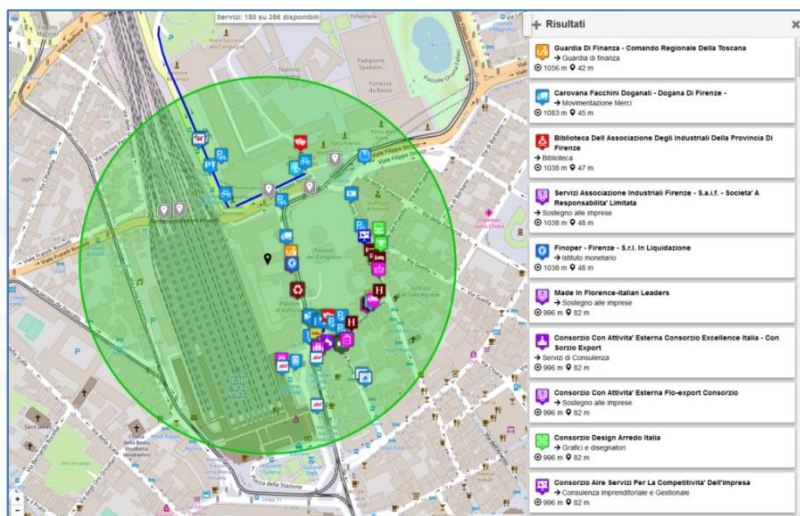
# How the Dashboards exchange data



# HLT: POI

## High Level Types

### Single POI



### Categories

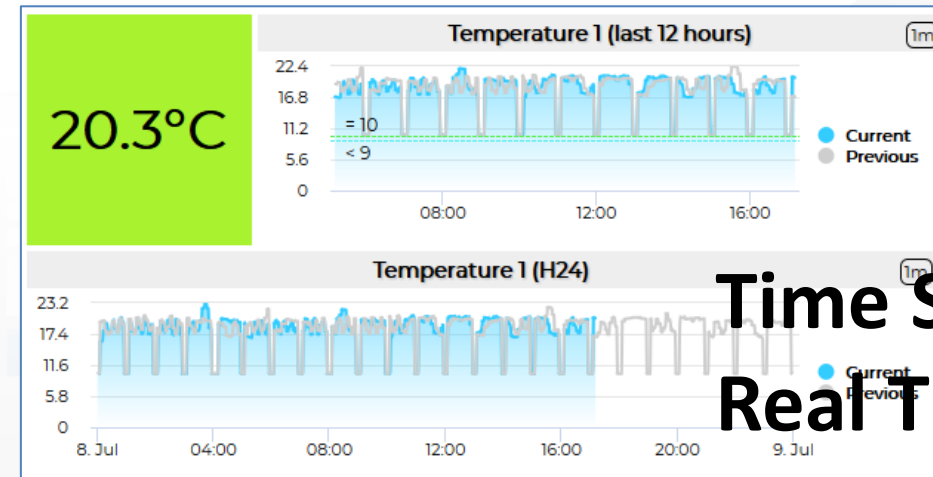
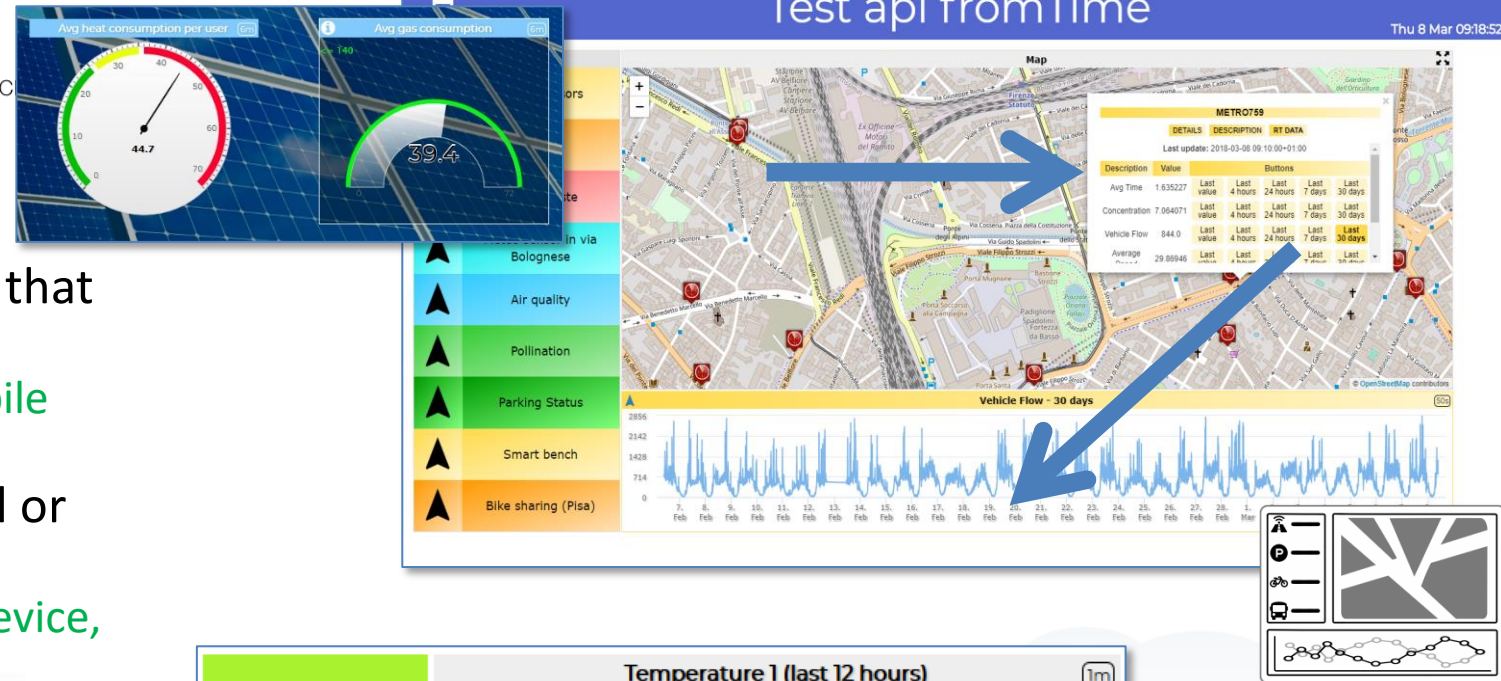
- Accommodation +
- Advertising +
- AgricultureAndLivestock +
- CivilAndEdilEngineering +
- CulturalActivity +
- EducationAndResearch +
- Emergency +
- Entertainment +
- Environment +
- FinancialService +
- GovernmentOffice +
- HealthCare +
- IndustryAndManufacturing +
- IoTDevice +
- MiningAndQuarrying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

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



# HLT: Entities

- **Data Models:** all devices sprunt from that model
  - Entity Model, IoT Device Model, Mobile Device Model, Data Table Model
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  - Entity Instance, IoT Device, Mobile Device, Data Table Device, Sensor Device
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  - Entity Variable, IoT Device Variable, Mobile Device Variable, Data Table Variable, Sensor, Sensor-Actuator
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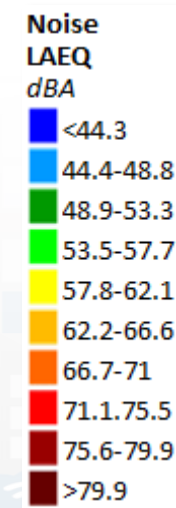
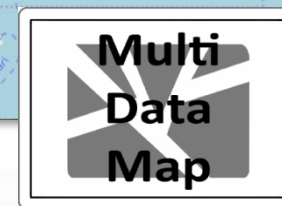
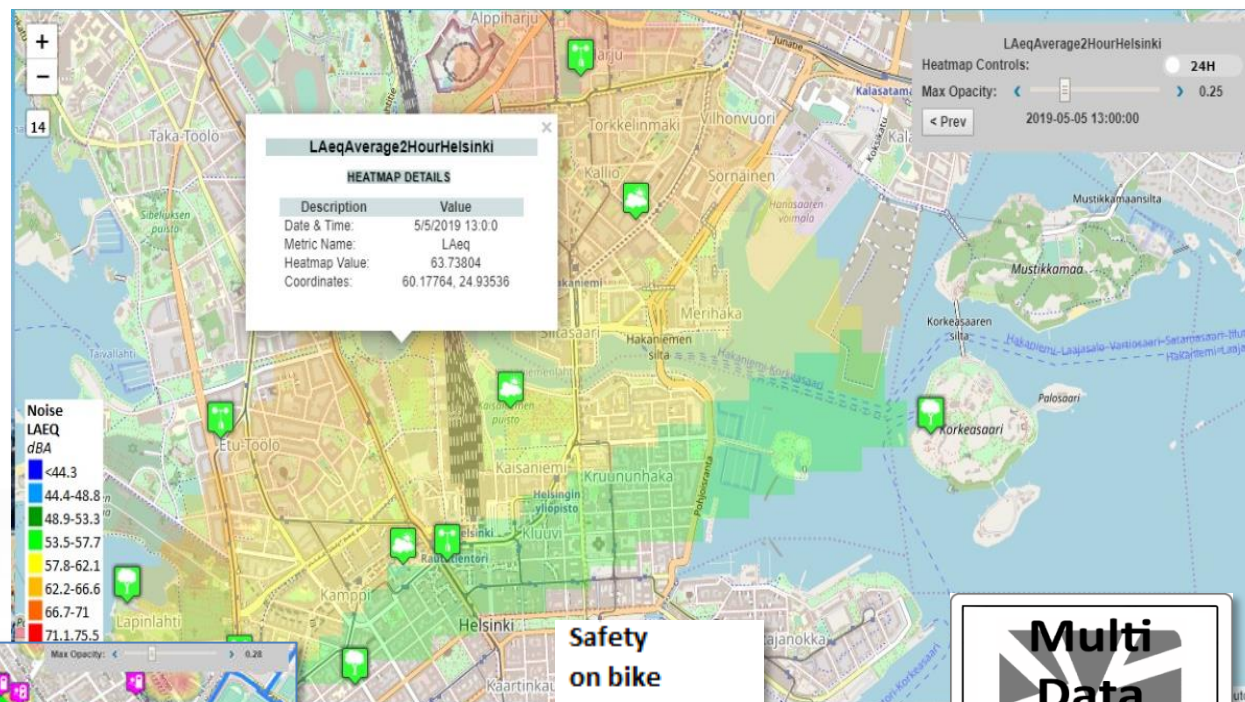


**Time Series**  
**Real Time**  
**Event Driven**  
**Historical Data**

Type: calibrated

# HLT: Heatmaps

ColorMaps For  
Calibrated

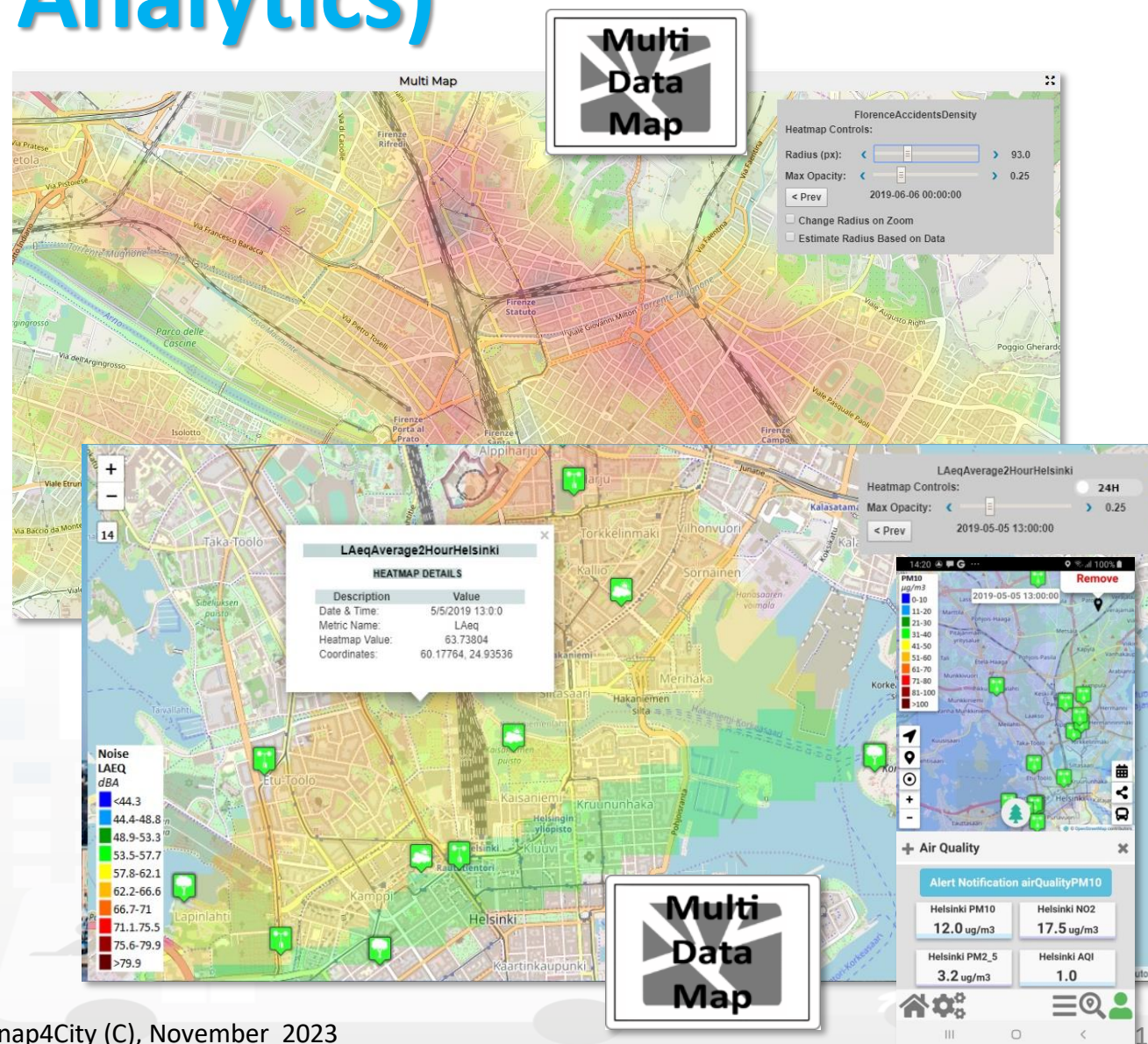


Type: Gaussian



# Heatmaps (flexible Data Analytics)

- Main:
  - Heatmaps are Time series
- A) Gaussian Heatmaps
- B) Calibrated heatmaps
  - From KmxKm 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



# 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

**Snap4City**

User: roottooladmin, Org: Other  
Role: RootAdmin, Level: 7  
[Logout](#)

**HeatMap Manager**

Map name	Color Map	Owner	Organization	Minimum date	Maximum date	Instances	
WindSpeedAverage2HourFlorence	<a href="#">VIEW</a> <a href="#">EDIT</a>	windSpeed	roottooladmin	DISIT	2019-02-21 15:36:25	2019-05-05 13:00:00	832
safetyOnBikeDensity	<a href="#">VIEW</a> <a href="#">EDIT</a>	safetyOnBikeDensity	roottooladmin		2018-10-16 00:00:00	2018-10-16 00:00:00	1
PM2_5Average2HourFlorence	<a href="#">VIEW</a> <a href="#">EDIT</a>	PM2_5	roottooladmin	DISIT	2019-03-11 00:00:00	2019-03-11 00:00:00	1
PM2_5Average24HourFlorence	<a href="#">VIEW</a> <a href="#">EDIT</a>	PM2_5	roottooladmin	DISIT	2019-03-10 23:00:00	2019-03-13 09:59:35	4
PM10Average24HourFlorence	<a href="#">VIEW</a> <a href="#">EDIT</a>	pm10	roottooladmin	DISIT	2019-02-19	2019-03-13	5

Edit Color Map: airHumidity

Minimum Limit	Maximum Limit	Rgb
	40	rgb(0,0,255)
40	45.5	rgb(0,153,255)
45.5	51.1	rgb(0,153,0)
51.1	56.7	rgb(0,255,0)
56.7	62.2	rgb(255,255,0)
62.2	67.8	rgb(255,187,0)
67.8	73.3	rgb(255,102,0)
73.3	78.9	rgb(255,0,0)
78.9	84.4	rgb(153,0,0)
84.4		rgb(84,0,0)

**PM10  $\mu\text{g}/\text{m}^3$**

- 0-10
- 11-20
- 21-30
- 31-40
- 41-50
- 51-60
- 61-70
- 71-80
- 81-100
- >100

**EAQI Index**

- 1. Good
- 2. Fair
- 3. Moderate
- 4. Poor
- 5. Very poor

**EnfuserAQI Index**

- 1. Good
- 2. Satisfactory
- 3. Fair
- 4. Poor
- 5. Very poor

**Safety on bike density**

- Very bad
- Bad
- Not so good
- Neutral
- Good
- Very good
- Excellent

**Noise LAEQ dBA**

- <44.3
- 44.4-48.8
- 48.9-53.3
- 53.5-57.7
- 57.8-62.1
- 62.2-66.6
- 66.7-71
- 71.1-75.5
- 75.6-79.9
- >79.9





# HLT: Special Tools

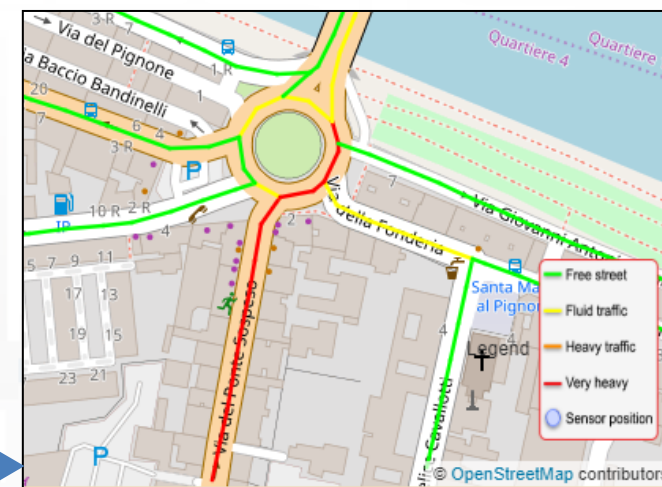
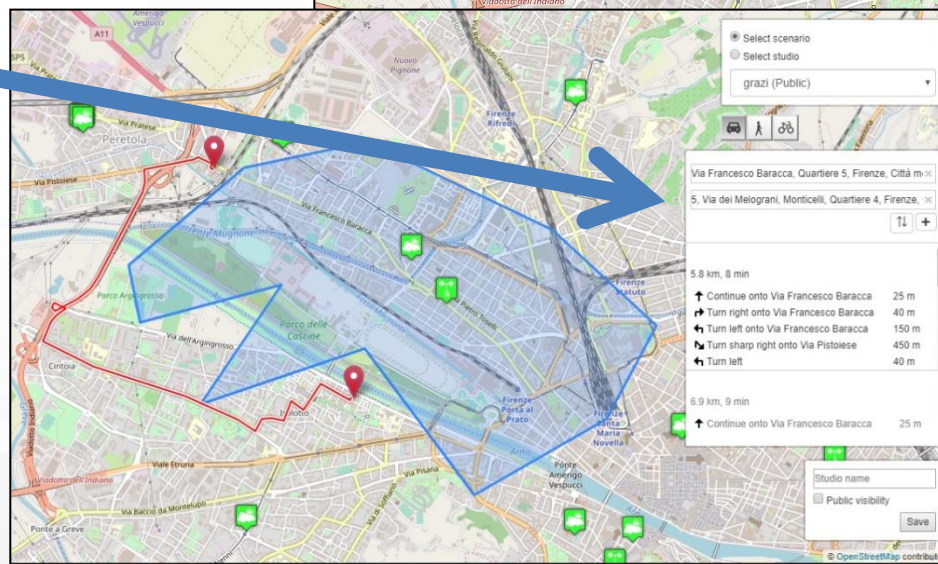
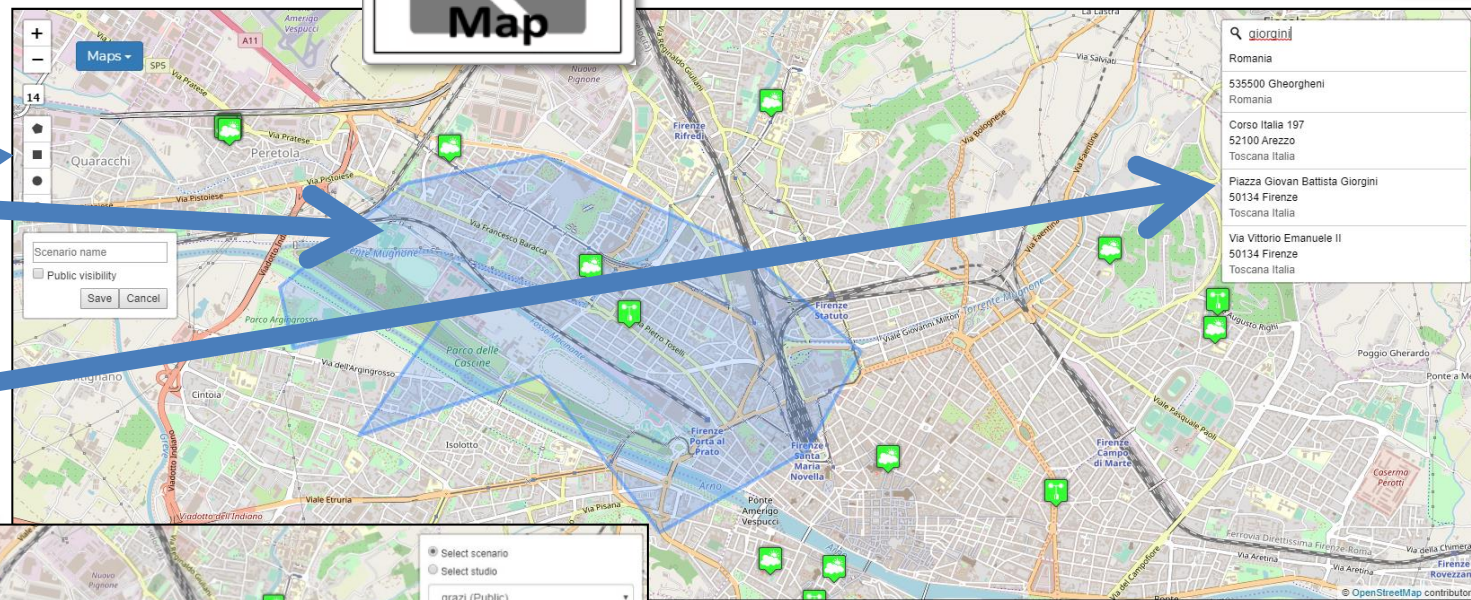
## • Scenarious

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

## • What-IF

- Conditional routing
- Dynamic routing
- Multiple paths

## • Traffic Flows



TOP

# 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**

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

LOGOUT

- 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
  - TVCam Manager**
  - OD Manager
  - BIM Manager
  - BIM Server old

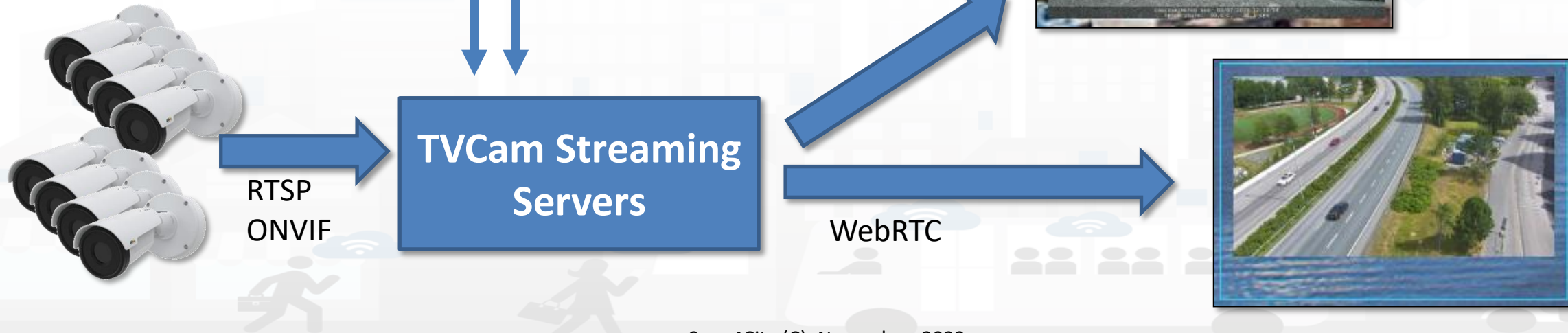
**TVCam Manager**

+ Add new Cam

Show 5

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

# 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:

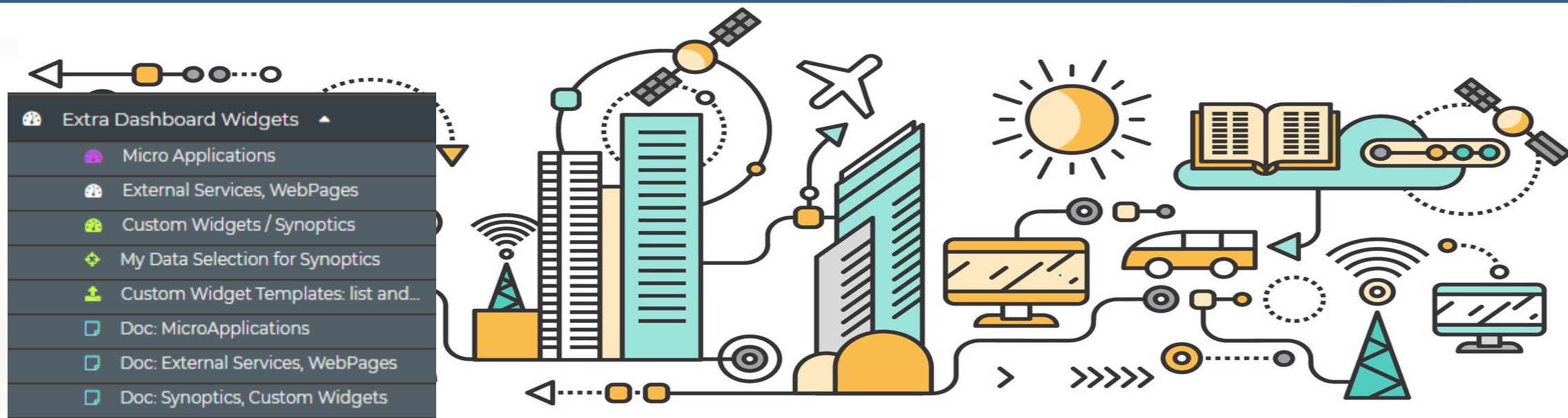
- Model: TVCamStream
  - ContextBroker: selected in the model
- ServiceURI (automatically assigned)
- Nature and Subnature: .....
- GPS Lat, Long: you can decide at the instance

## Optional:

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

TOP

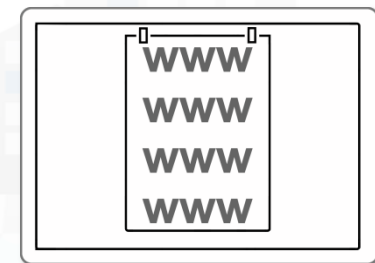
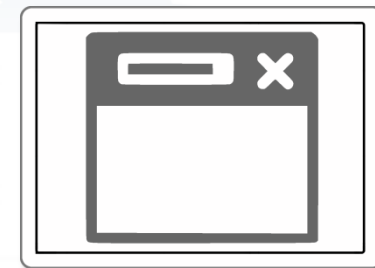
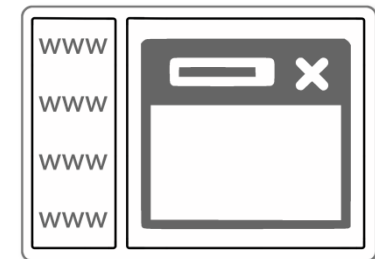
# *External Services (integration of) your or third-party web pages*





# 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



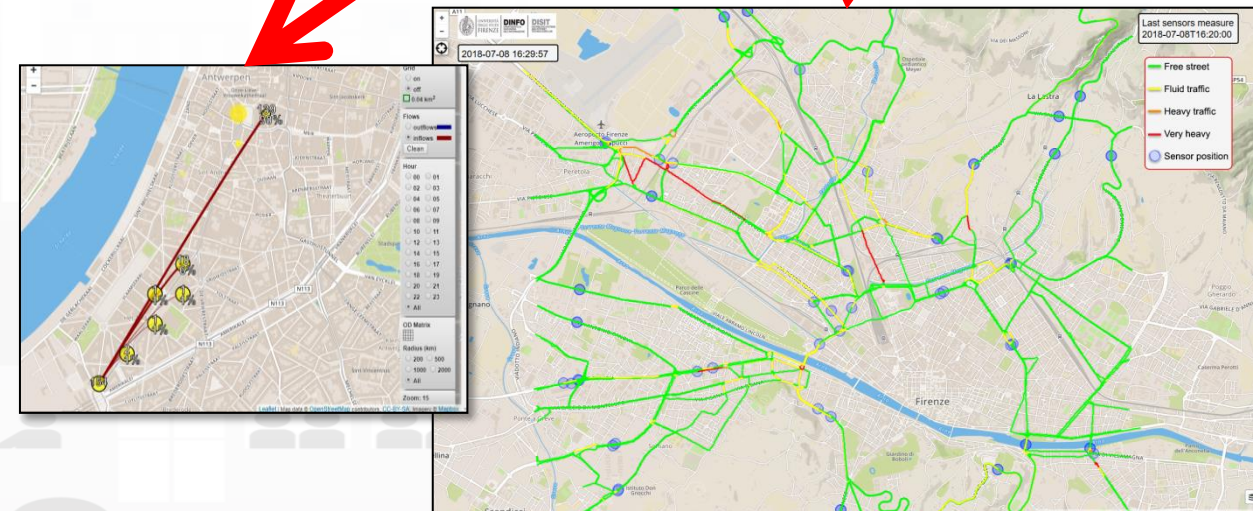
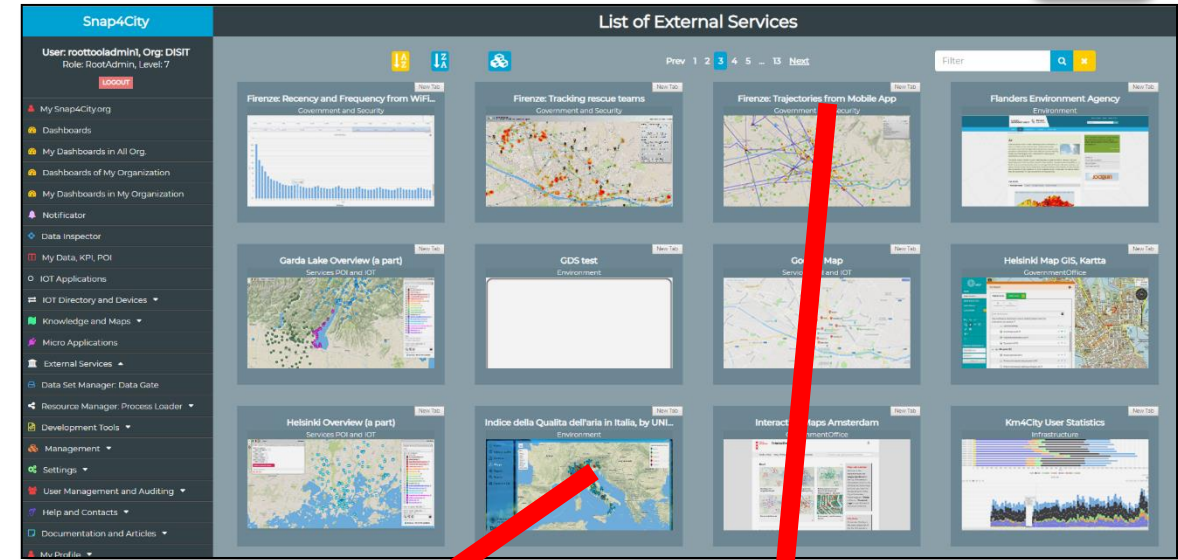
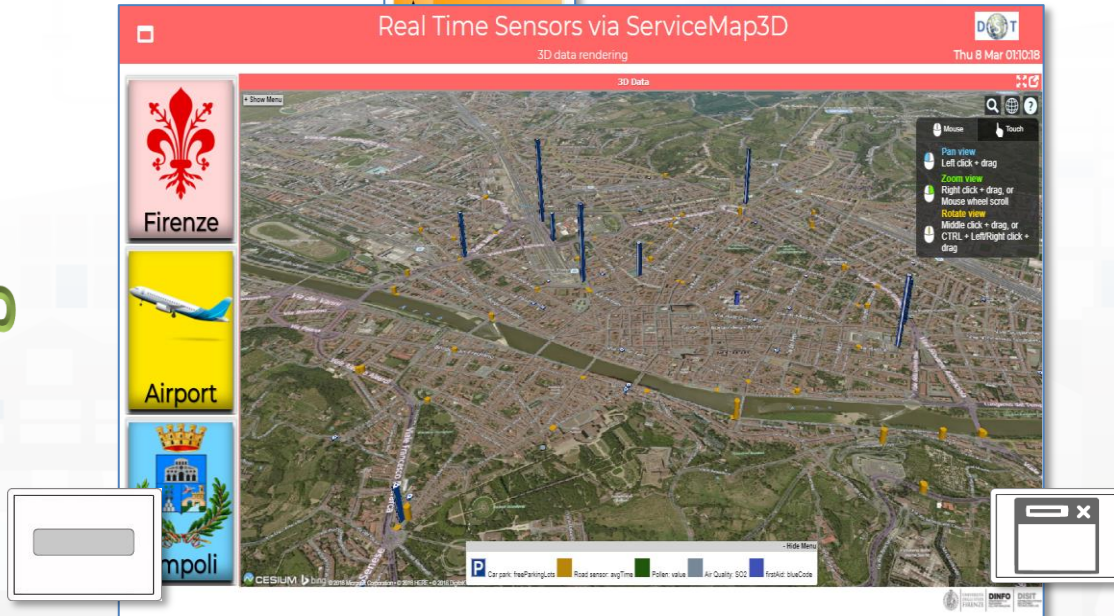
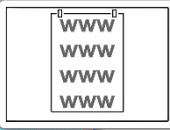
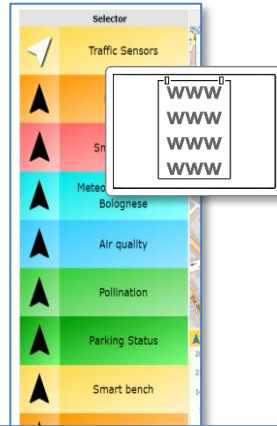
## List of External Services

97



# HLT: External Services

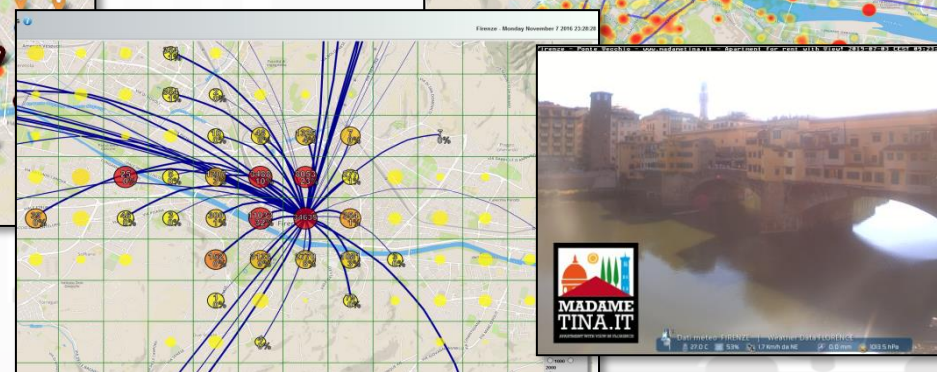
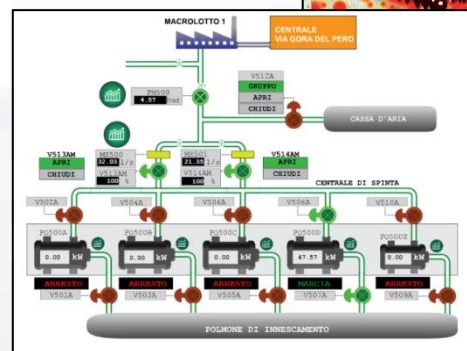
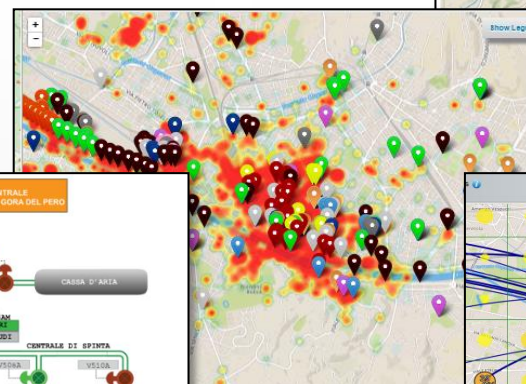
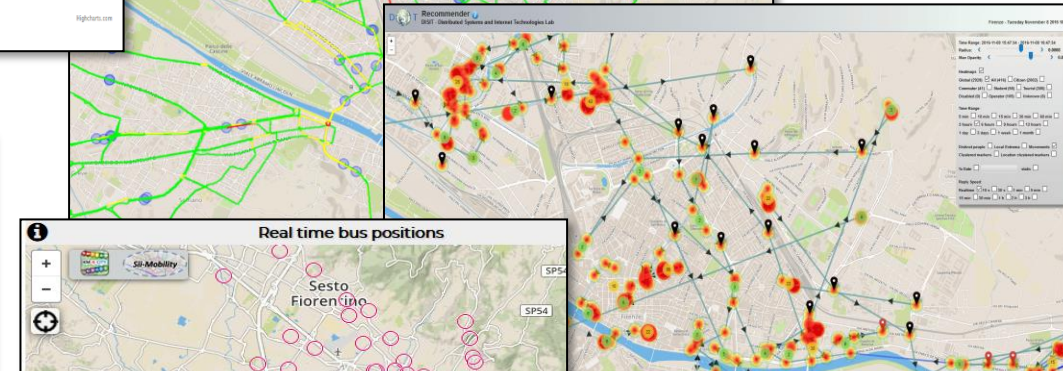
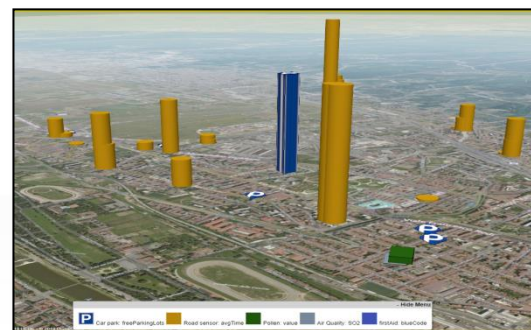
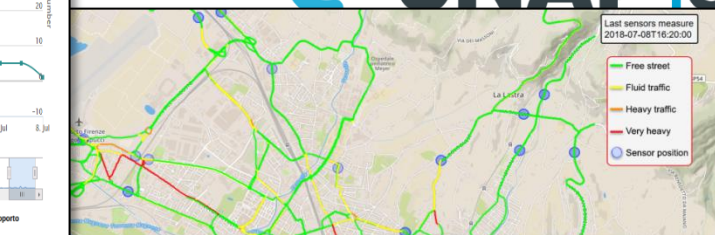
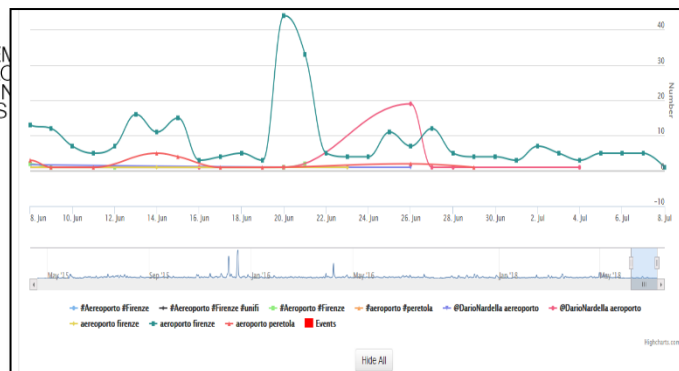
High Level Types





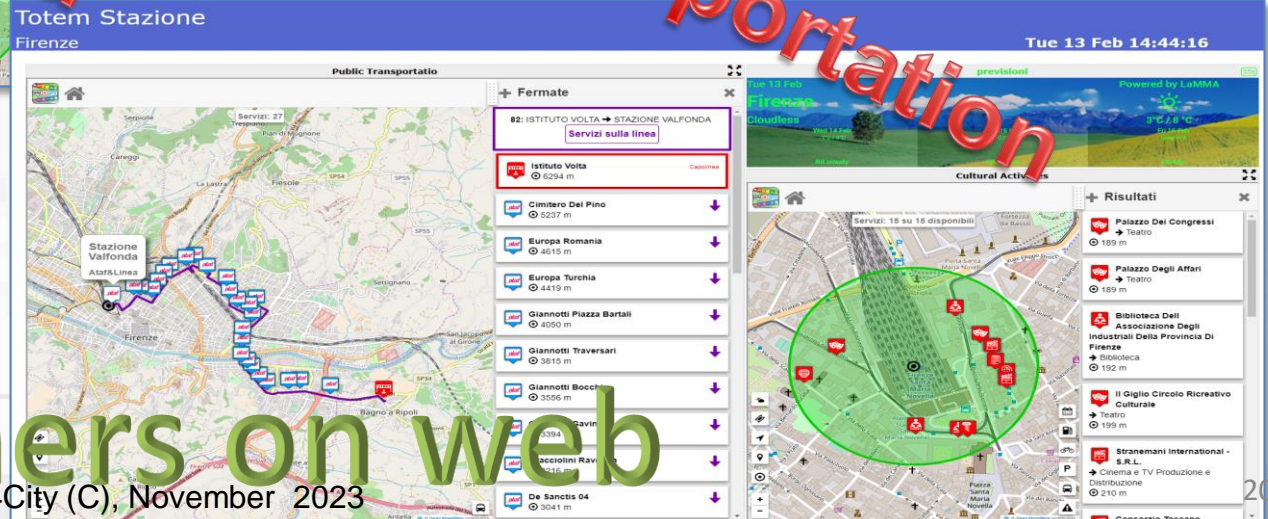
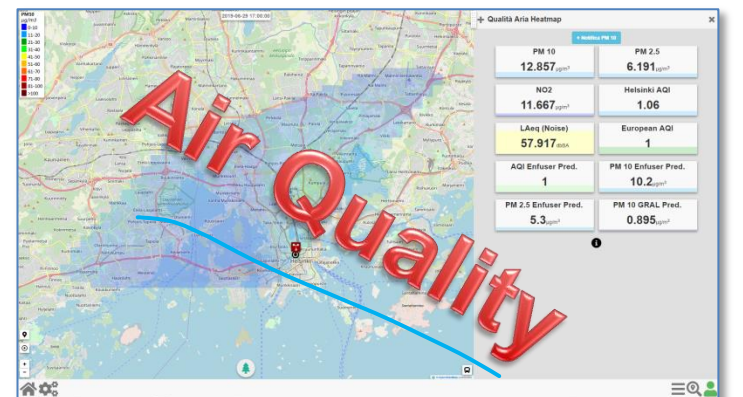
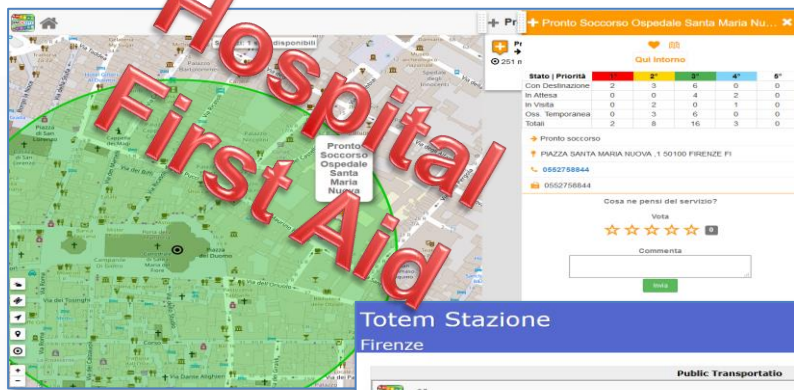
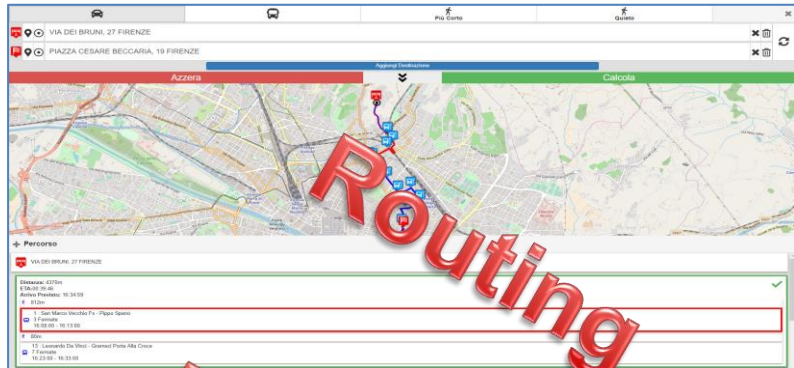
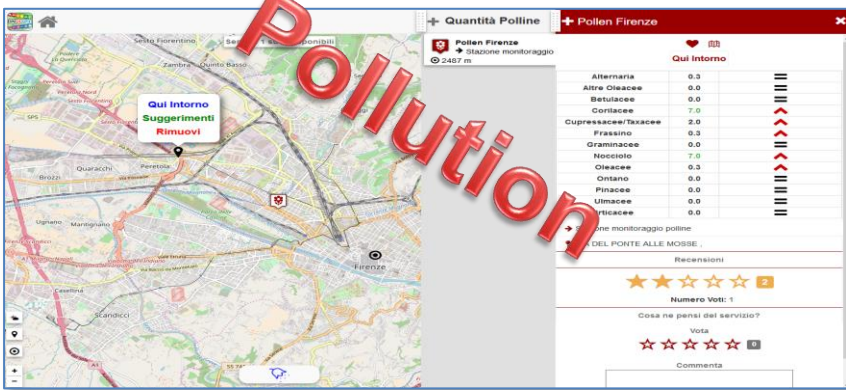
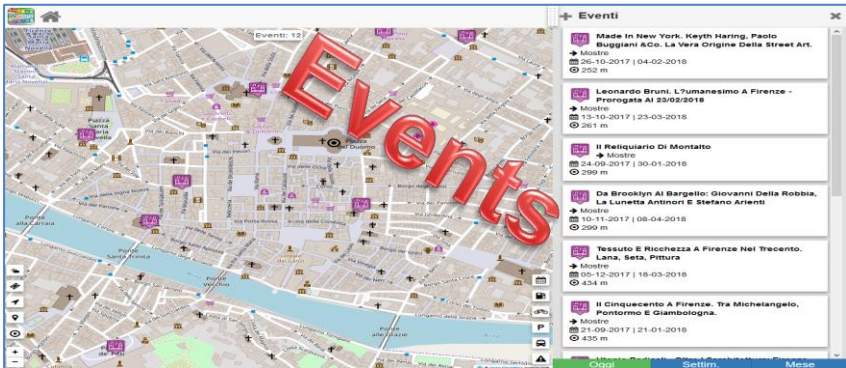
# External Services

- **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



See many others on web



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





## GIDA 5G demo

Wed 16 Oct 23:01:00

Details Absorption

Full Screen

Mer 16 Ott  
**Prato**  
Nuvoloso  
16°C / 21 °C  
Powered by LaMMA

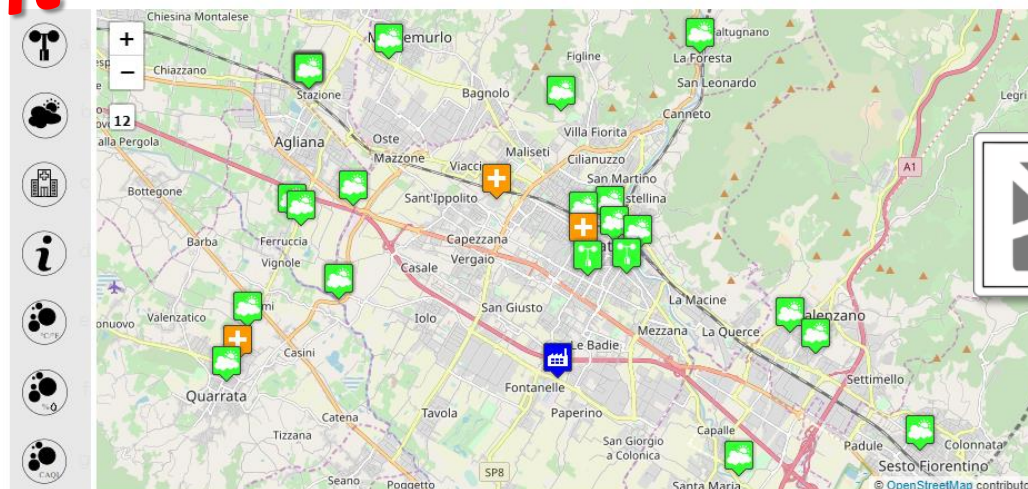
Gio 17 Ott 12°C / 21°C Nuvoloso	Ven 18 Ott 11°C / 22°C Nuvoloso	Sab 19 Ott Temp N/A Coperto	Dom 20 Ott Temp N/A Pioggia moderata o forte
---------------------------------------	---------------------------------------	-----------------------------------	--

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

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

- SVG for graphic design
- MyKPI for collecting data

Begin

3:00

+

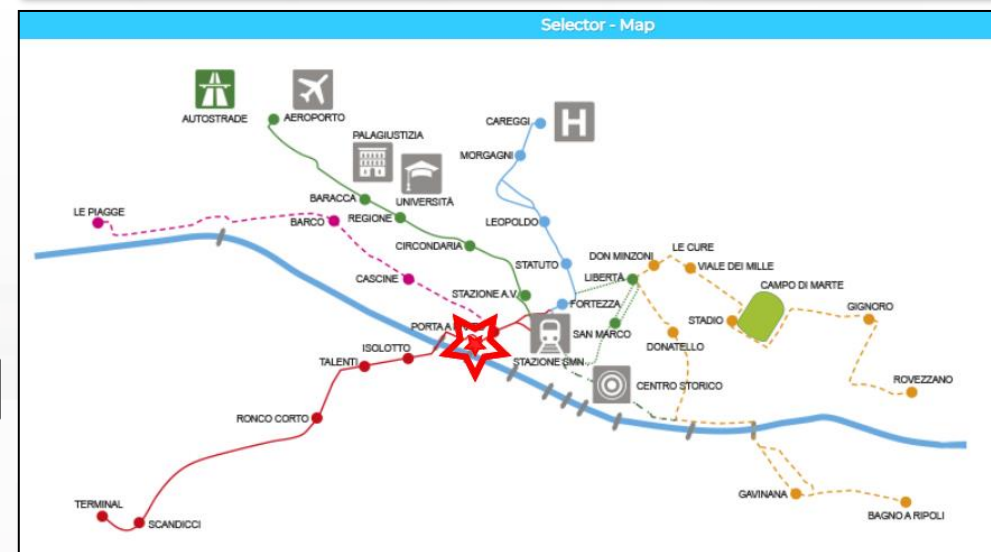
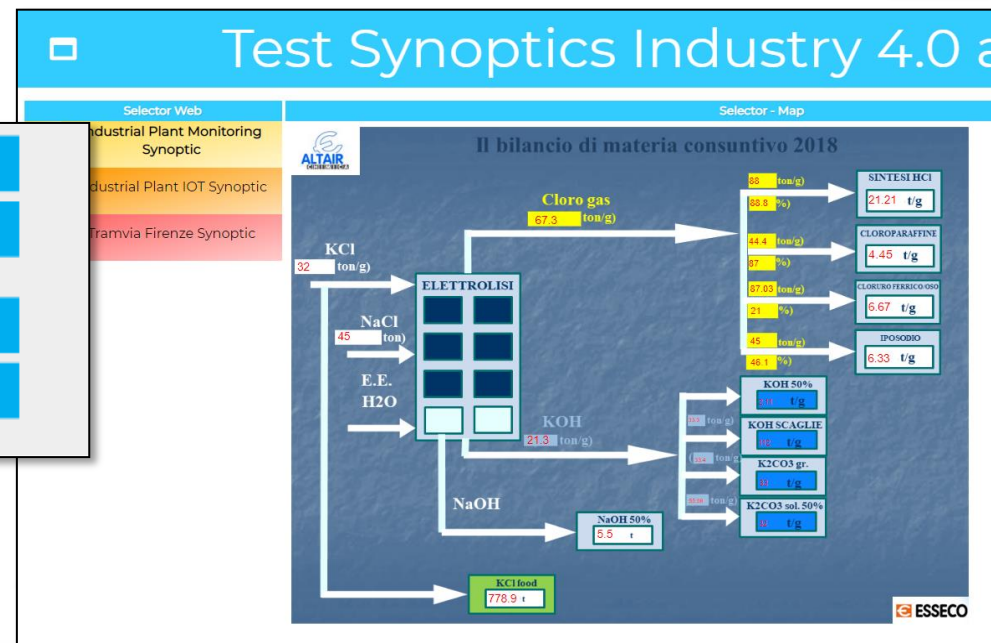
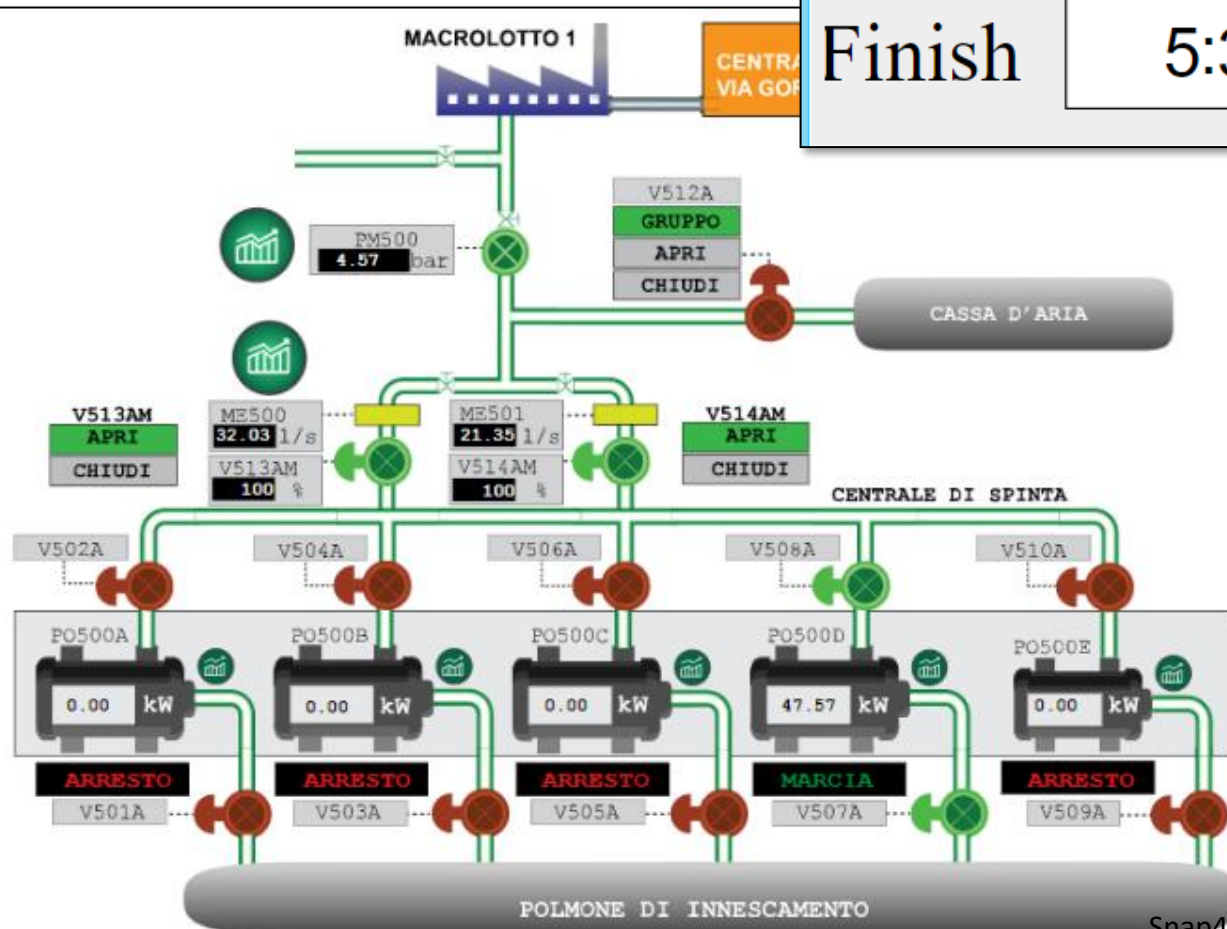
-

Finish

5:30

+

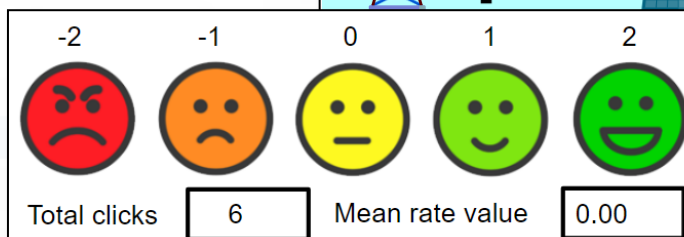
-





# Special Custom Widgets

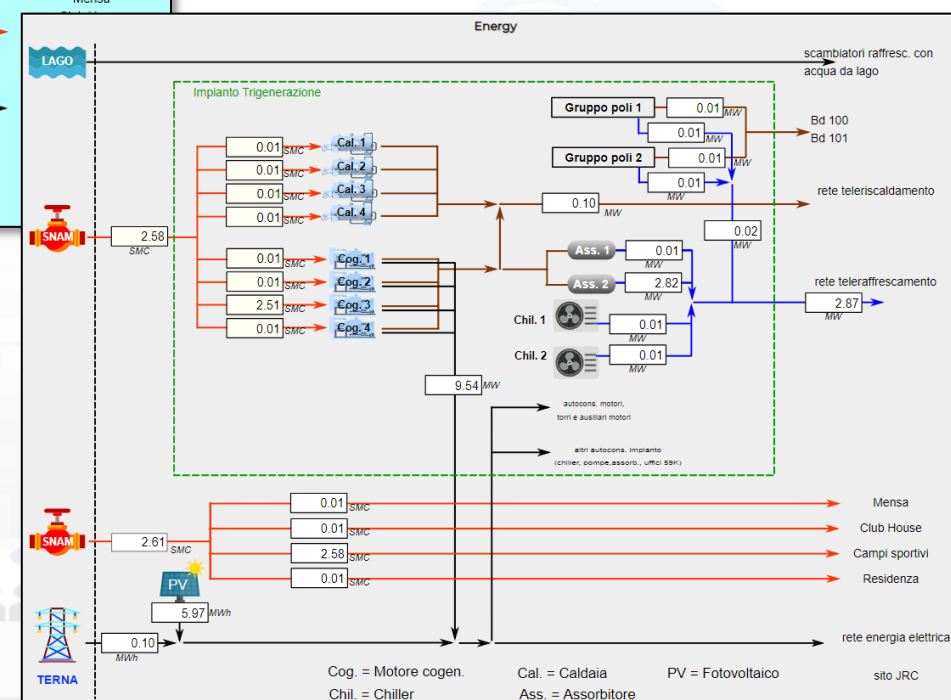
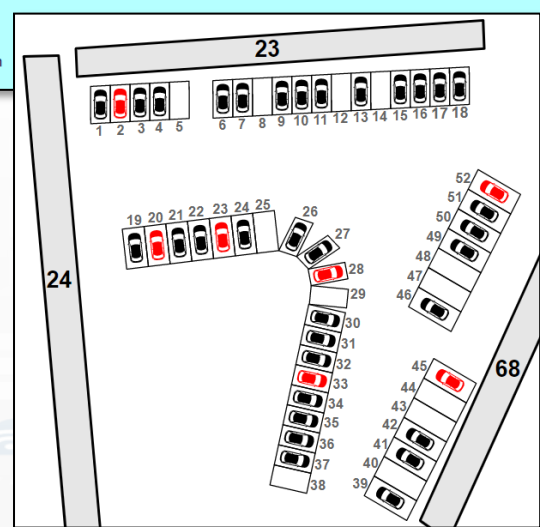
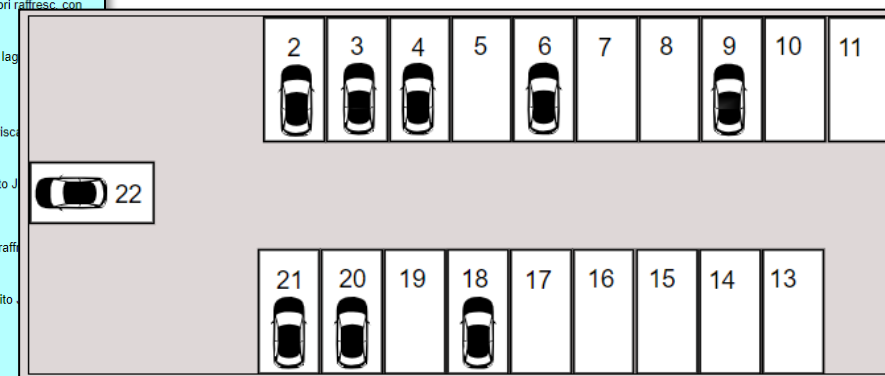
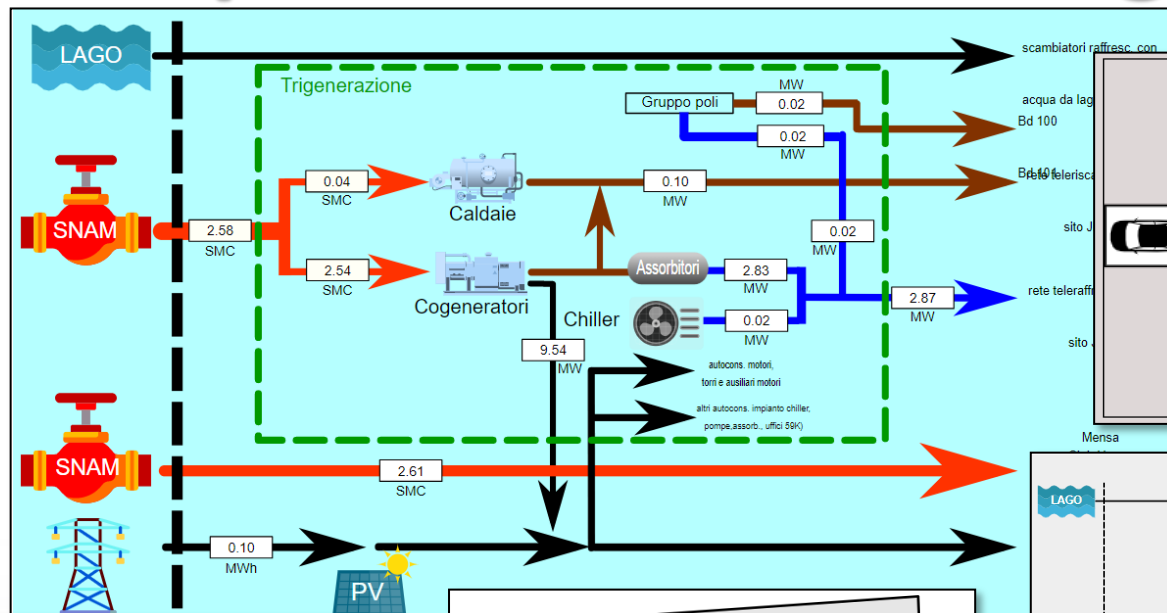
- Smart parking
- Smart Energy
- Smart Light
- Smart ....
- Energy View
- Custom Controls



Begin 17:00

Finish 4:00

Below the time inputs are two rows of smiley faces for selection.



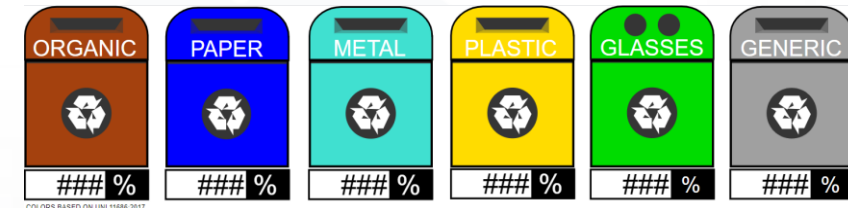
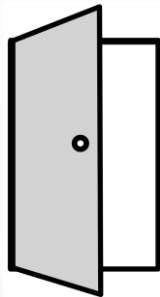
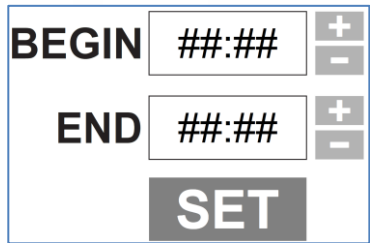
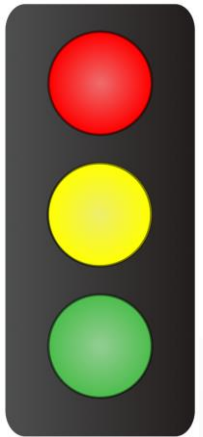
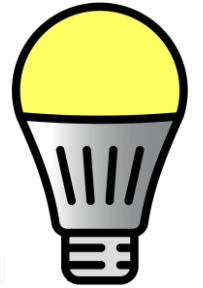
## • Virtual Actuators (sensor-actuator)

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

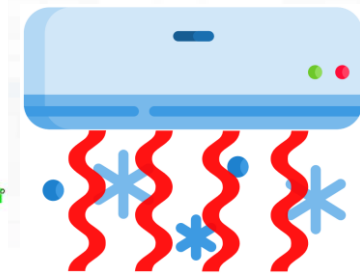


## • Virtual Sensors

- 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

Environment  
other

Selector - Map

**TEST1\_AIRSENSEUR\_RVB01**

VALUE NAME: TEST1\_AIRSENSEUR\_RVB01

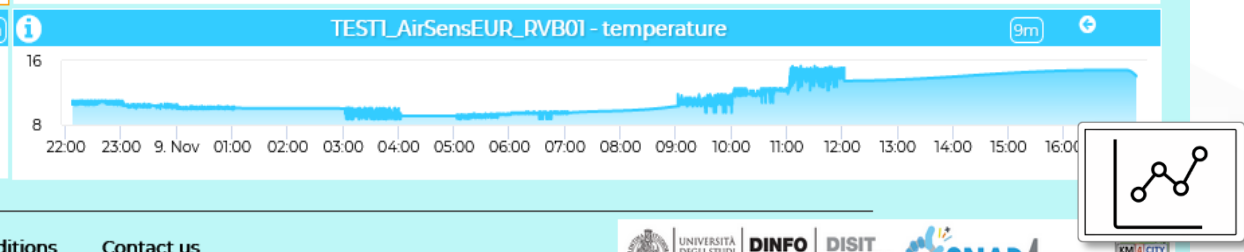
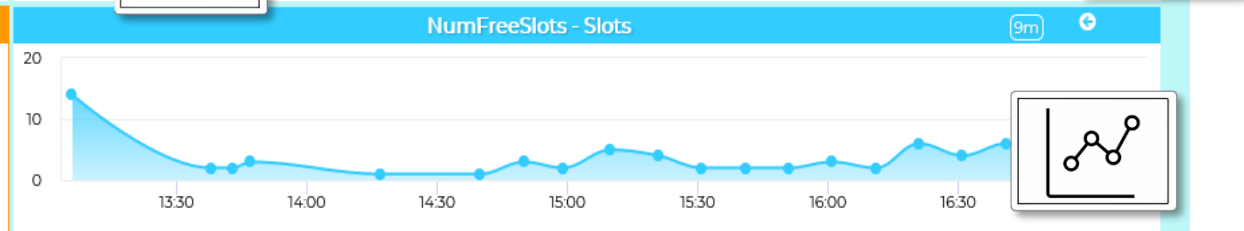
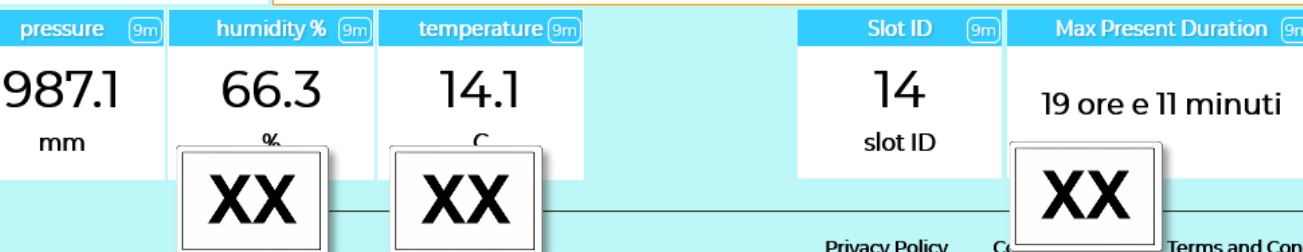
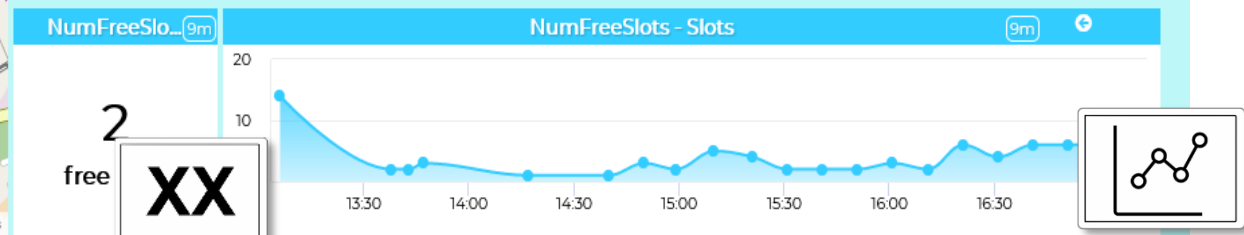
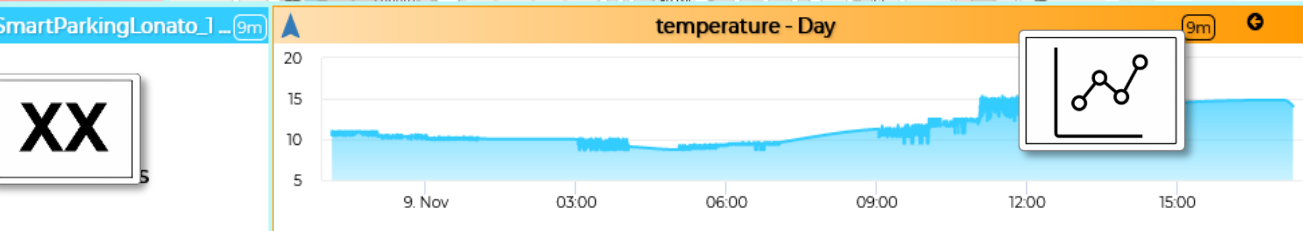
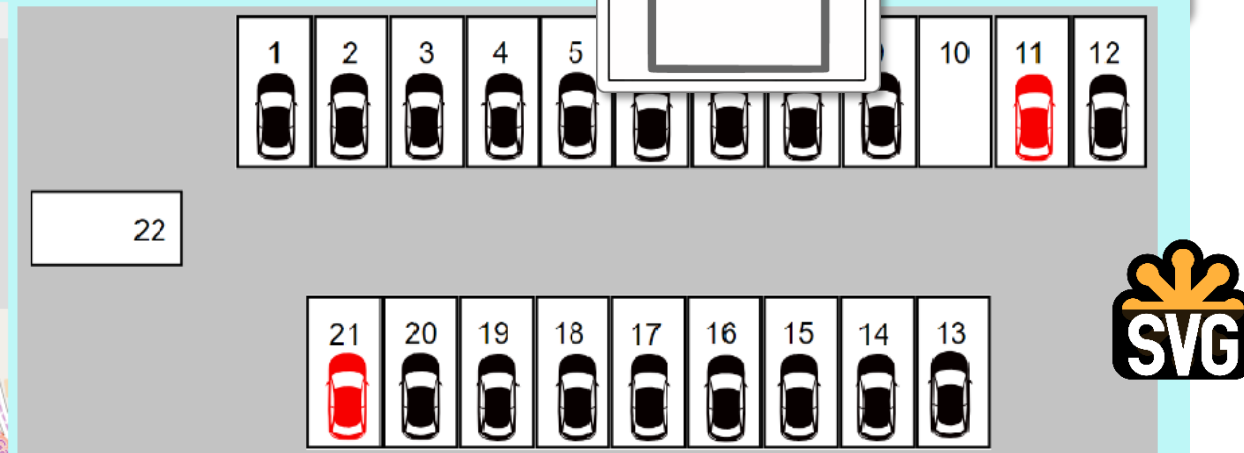
DETAILS DESCRIPTION RT DATA

dateObserved	11/09/2019 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

Multi Data Map

Lonato del Garda

OpenStreetMap contributors



Privacy Policy

Contact us

Terms and Conditions

Contact us

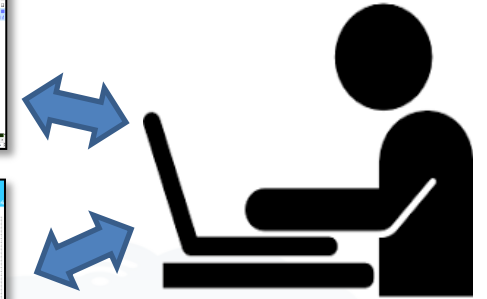


# Custom Widget / Synoptic / PIN Development

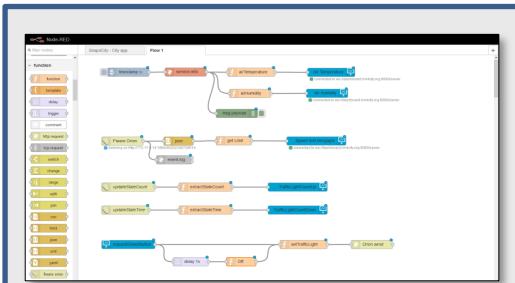
Inkscape editor on your computer



Create, save a Custom Widget in SVG



Create, save, load, delegate, grant access

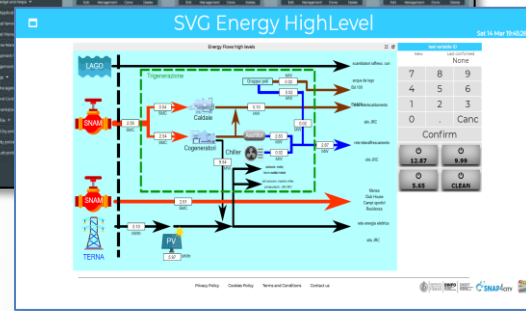
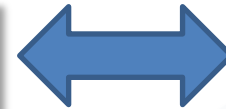
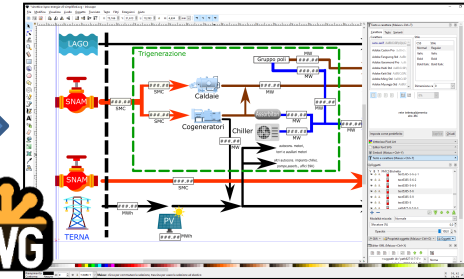


IOT Applications



Knowledge and Storage Data from the Field and City

SVG Symbols Collection



Public Dashboard Collection

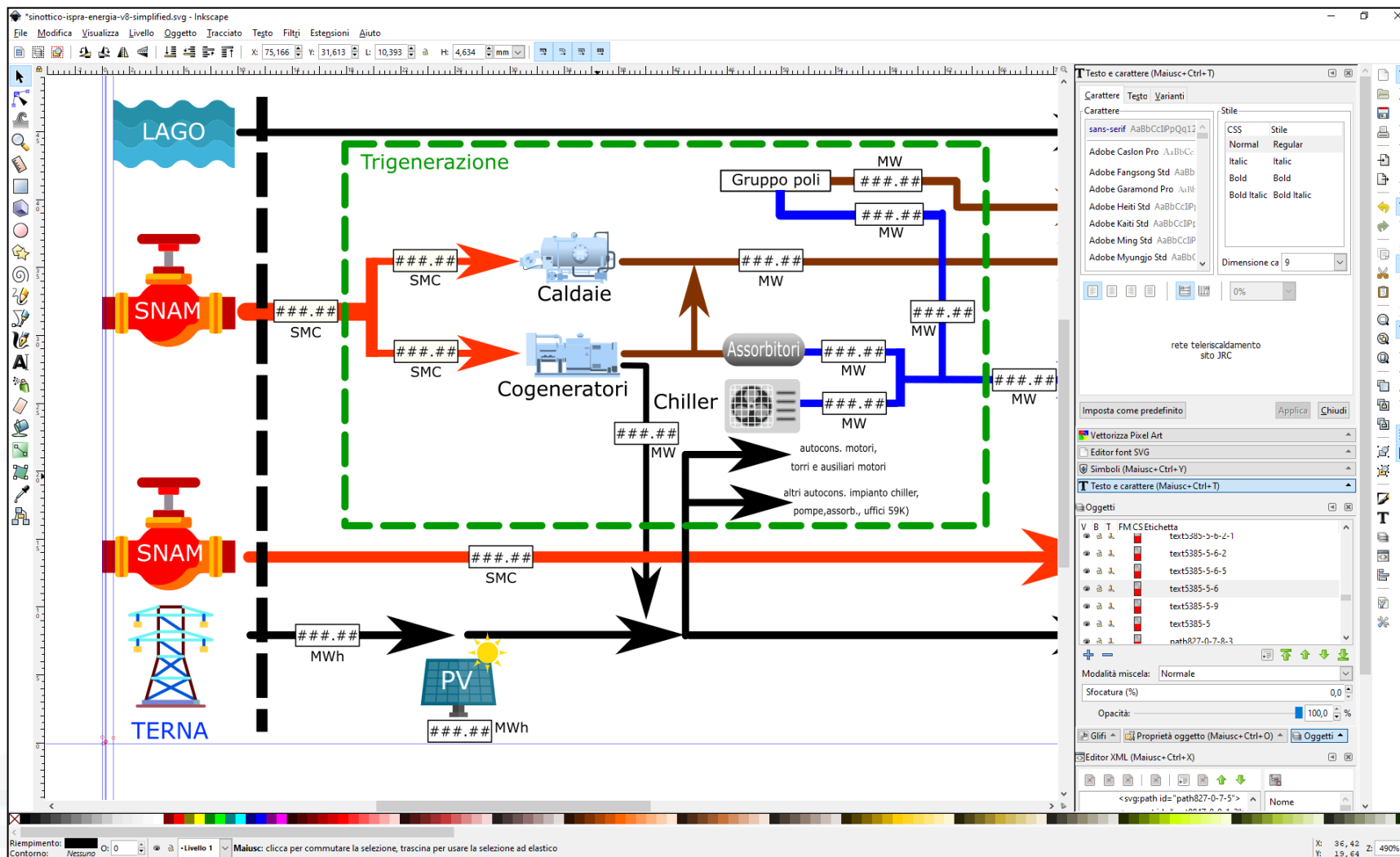
My Own Dash/App



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>





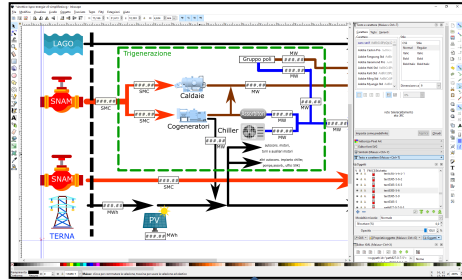
# How to create a custom Widget



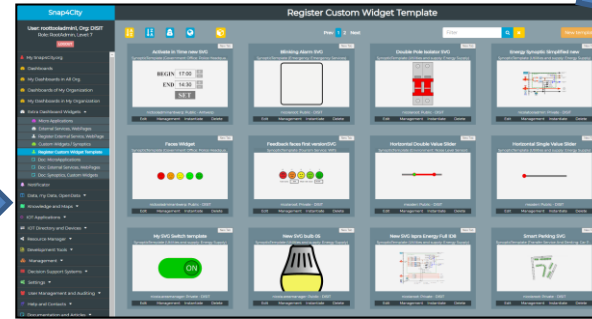
- User manual on: <https://www.snap4city.org/595>

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

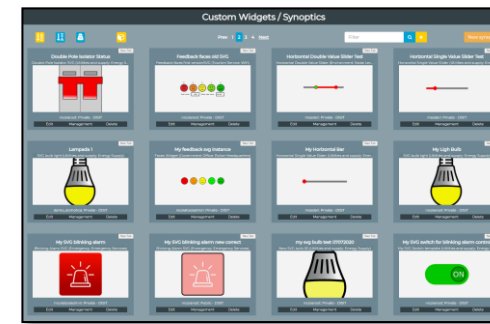
**Create, save a Custom  
Widget in SVG**



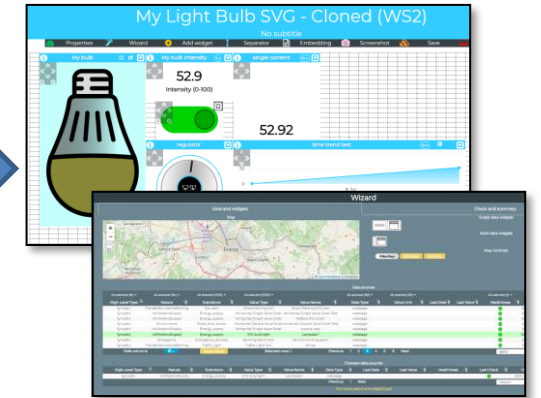
**Upload as  
Custom Widget Template**



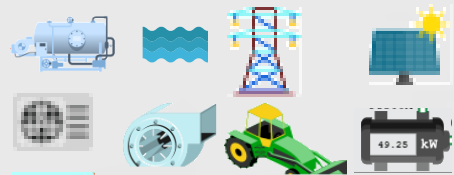
**List of Custom  
Widgets / Synoptics**



**Dashboard Editing/wizard**

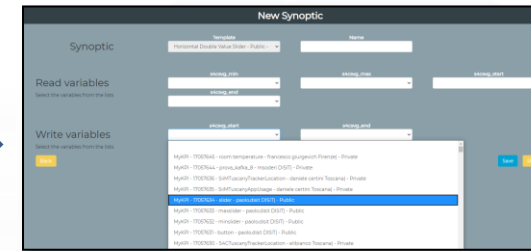
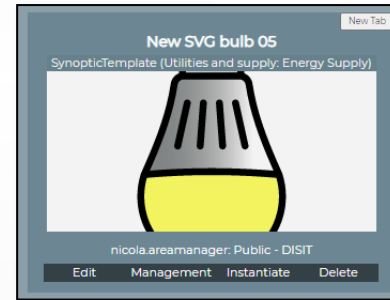


**SVG Symbols Collection**



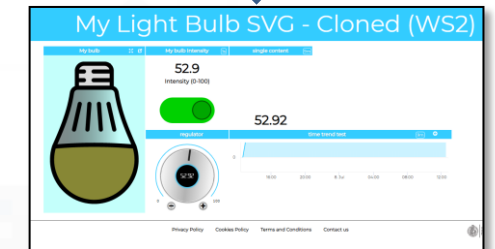
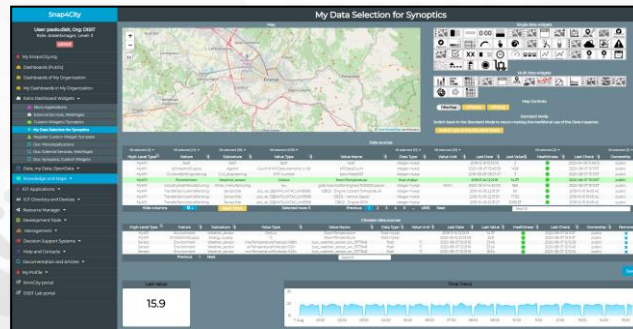
**From any open library**

**select**



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


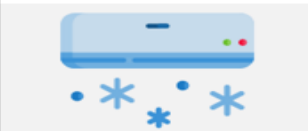

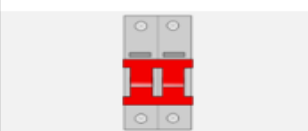

**Select MyKPI and  
Sensor Data for  
Synoptics cases**



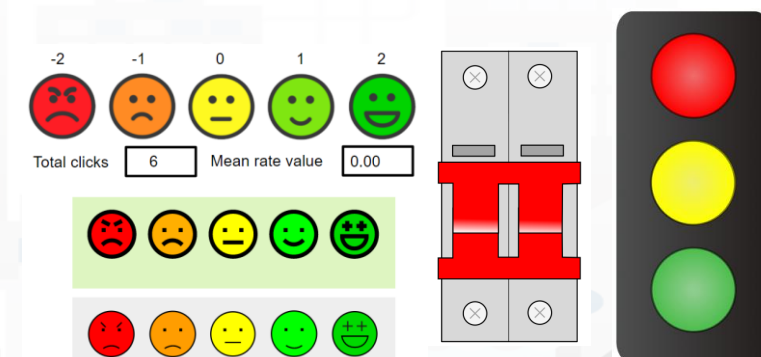
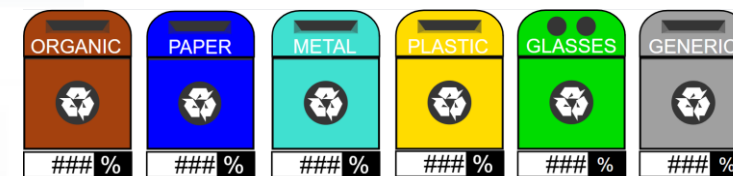
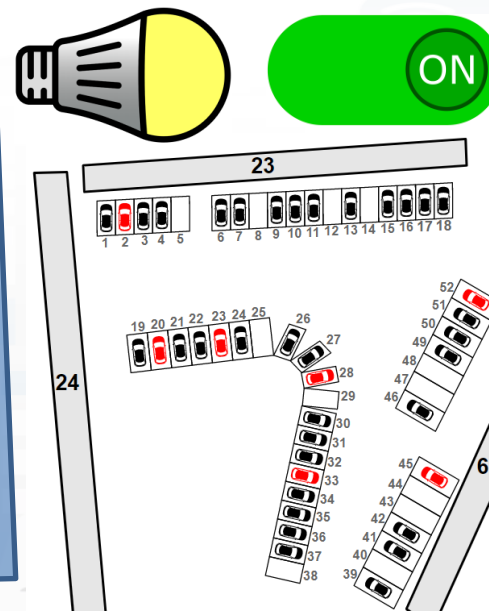
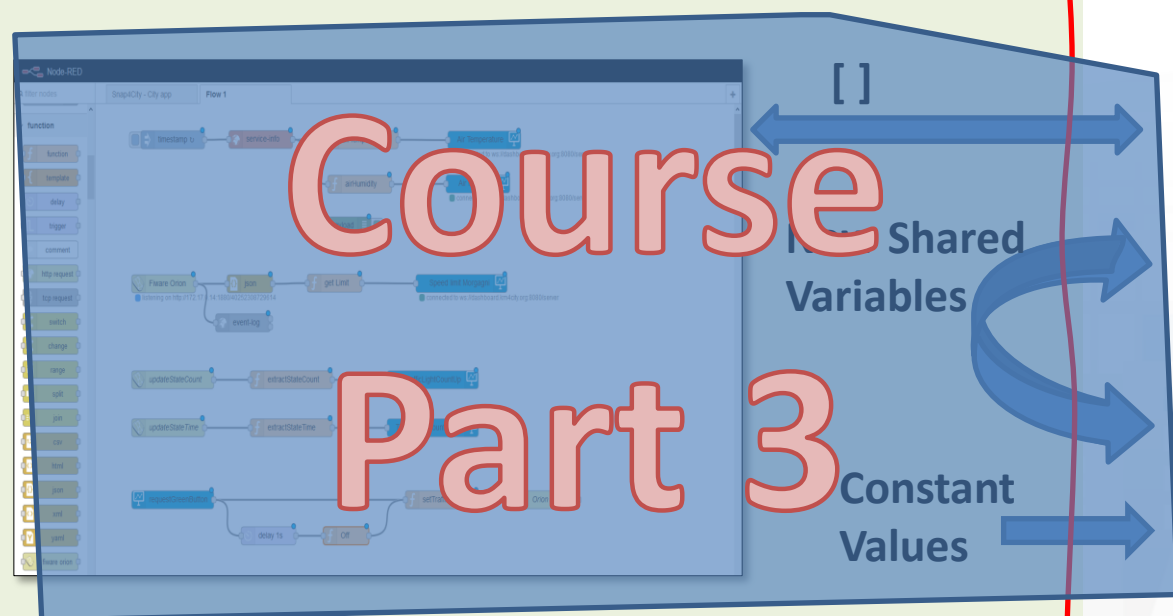
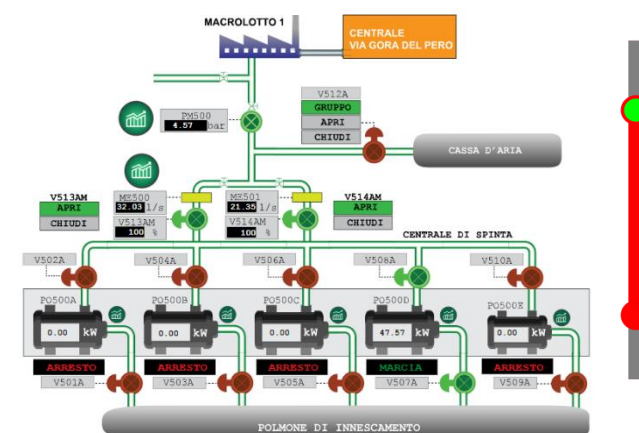
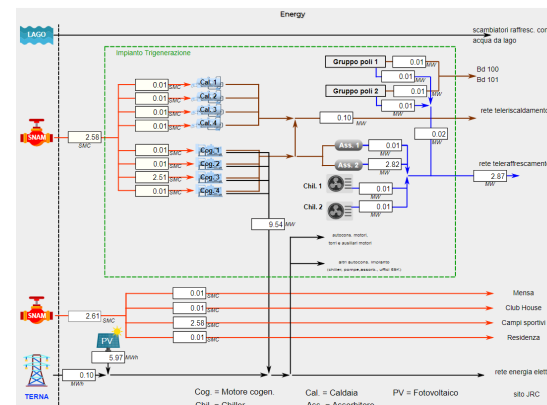
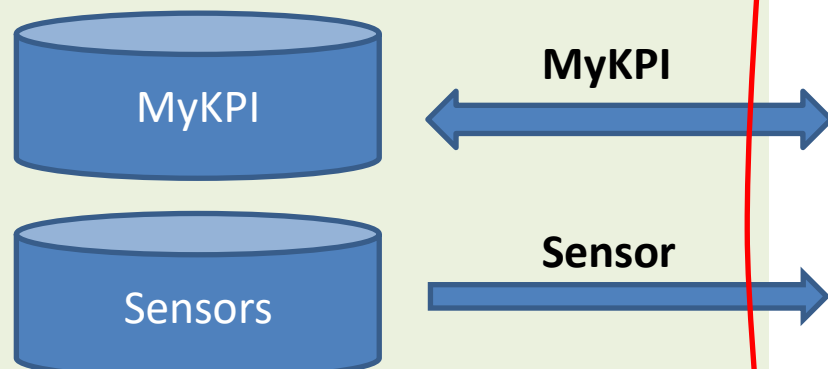
**Final Dashboard**



# 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: <code>##:##</code> <b>s4csvg_finish</b> (read and write variable) Default value: <code>##:##</code>	starting hour in the form <code>HH:mm</code> to be set by clicking the + and - button ending hour in the form <code>HH:mm</code> 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/dashboardSmartCity/view/index.php?iddashboard=MjuONA==">https://www.snap4city.org/dashboardSmartCity/view/index.php?iddashboard=MjuONA==</a>	<b>s4csvg_userFeedback</b> : value sent to the server by clicking the corresponding face (write variable). Default value: no value sent. The SVG shows the five	-2 = very bad, -1 = bad, 0 = so-and-so, 1 = quite-good, 2=good

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



**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

Map

Single data widgets

Multi data widgets

Map Controls:

FilterMap GPSUser GPSOrg

Standard Mode

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

Switch now to the Standard Mode

**Data sources**

All selected (3)	All selected (14)	All selected (28)	All selected (629)	All selected (13)	All selected (32)	All selected (2)	All selected (2)				
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 13:00	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.macroloft1engines.P0500D.power	integer-mykpi	KW/h	2020-05-14 14:20:00	560		2020-08-07 15:11:57	public
MyKPI	TransferServiceAndRenting	SensorSite	pid_val_13@WF0LXXTACKLY65816	OBD2 - 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	OBD2 - 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	OBD2 - Engine RPM	integer-mykpi		2019-10-06 22:31:27	2085.33		2019-10-15 16:05:42	public

Hide columns Reset filters Selected rows: 5 Previous 1 2 3 4 5 ... 4935 Next

**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	X
MyKPI	UtilitiesAndSupply	Energy_supply	°C	RoomTemperature	float-mykpi		2020-05-12 20:13:03	25.8		2020-08-07 15:11:57	public	X
Sensor	Environment	Weather_sensor	maxTemperatureForecast-09h	tusc_weather_sensor_ow_3177948	float	°C	2020-08-07 12:01:16	21.49		2020-08-07 12:12:29	public	X
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	X
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	X

Previous 1 Next

**Last Value**

15.9

**Time Trend**

Click

See listed and save them

Save

## 216



# Instantiating a Custom Widget Synoptic

**Snap4City**

User: roottooladmin1, Org: DISIT  
Role: RootAdmin, Level: 7  
[Logout](#)

[Snap4City.org](#)

[Dashboards](#)

[Dashboards in All Org.](#)

[Dashboards of My Organization](#)

[Dashboards in My Organization](#)

[Dashboard Widgets](#)

[Notificator](#)

**New Synoptic**

Template: [Activate in Time new SVG - Public - Antw](#)

Name:

Read variables:

Write variables:

[Back](#) [Save](#) [Reset](#)

- **[ ]**
  - 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

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...

TOP

# *Selector*

# *for the Multi Data Map widget*

FROM CITY  
DASHBOARD TO  
APPLICATIONS

FORGING &  
MANAGING OPEN  
AND FLEXIBLE WEB  
AND MOBILE APPS

IOT APPLICATIONS  
VS IOT EDGE  
DEVICES

DATA GATHERING  
AND CITY DATA  
KNOWLEDGE  
MANAGEMENT

IOT/IOE DEVICES  
AND NETWORKS

IOT APPLICATIONS,  
THE LOGIC AND  
THE SMARTNESS

VALUES  
SMART CITY API,  
MICROSERVICES,  
SNAP4CITY API

SNAP4CITY  
LIVING LAB FOR  
COLLABORATIVE  
WORK

SNAP4CITY FOR  
BEGINNERS

SNAP4CITY  
ARCHITECTURE AND  
ECOSYSTEM. OPENED  
TO DEVELOPERS  
AND STAKEHOLDERS

TWITTER  
VIGILANCE: SOCIAL  
MEDIA ANALYSIS

SNAP4CITY  
AND KM4CITY  
PROJECTS

HOW TO ADOPT  
SNAP4CITY, AND  
OUR ROADMAP

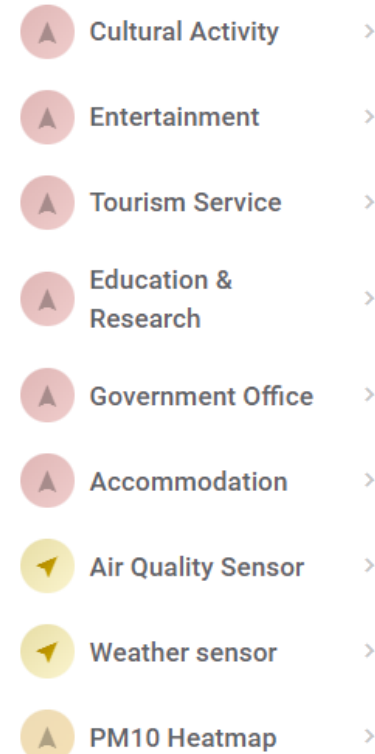
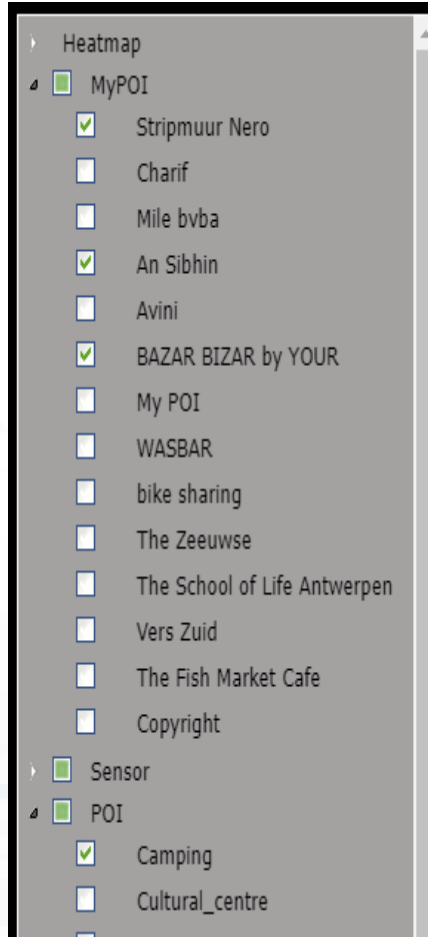
SNAP4CITY THE  
VIEW OF THE  
ADMINISTRATORS

DATA ANALYTICS,  
BUSINESS  
INTELLIGENCE,  
WHAT-IF AND  
SIMULATION

DECISION SUPPORT  
SHORT AND CITY  
PLANNING



# 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

The 'Selector' panel on the left contains a list of icons for different data types: a purple icon with a brain, a brown icon with a lightbulb, a yellow icon with a bell, an orange icon with a speaker, a red icon with a gas pump, a green icon with 'PM 2.5', and an orange icon with a road sign. A context menu is open over the yellow bell icon, showing options: 'Hide header', 'Hide dim ctrl', 'Header color', 'Title color', 'Background color', 'Border color', 'More options' (circled in red), 'Delete widget', and 'Quit'.

The main dashboard area shows a map titled 'Custom Pins on Map - test GP' with a date/time stamp 'Sat 31 Oct 11:35:41'. The map displays various custom pins, including gas pumps and bells, overlaid on a street map. A legend on the right indicates 'Free street', 'Fluid traffic', 'Heavy traffic', 'Very heavy', and 'Sensor position'. Below the map is a graph titled 'METRO19 - averageSpeed' showing speed in km/h over time. The graph has a y-axis from 0 to 50 km/h and an x-axis showing dates from 25 Oct to 31 Oct. The graph shows several peaks in speed. At the bottom of the dashboard, there are links for 'Privacy Policy', 'Cookies Policy', 'Terms and Conditions', and 'Contact us', along with logos for the participating institutions.

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



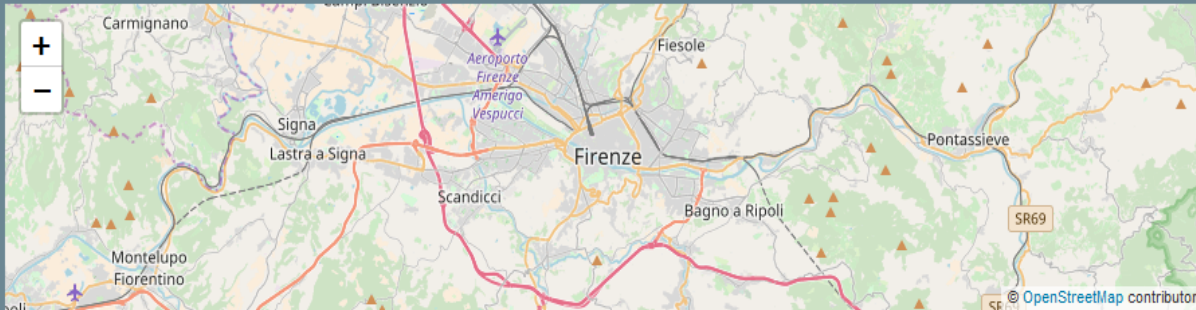
## Wizard

## Dashboard features

## Data and widgets



## Map



## Single data widgets



## Multi data widgets



## Data sources

All selected (10) ▾	All selected (55) ▾	All selected (776) ▾	All selected (315) ▾	All selected (47) ▾	All selected (2) ▾			
High-Level Type	Nature	Subnature	Value Type	Value Name	Data Type	Last Date	Last Check	Ownership
Special Widget	Environment	Weather Forecast	Previ_Meteo	special weather	Vergemoli	2018-07-08 16:00:18	public	
Special Widget	Environment	Weather Forecast	Previ_Meteo	special weather	Vergemoli	2018-07-08 16:00:18	public	
Special Widget	Environment	Weather Forecast	Previ_Meteo	special weather	Vergemoli	2018-07-08 16:00:18	public	
Special Widget	Environment	Weather Forecast	Previ_Meteo	special weather	Vergemoli	2018-07-08 16:00:18	public	
Special Widget	Environment	Weather Forecast	Previ_Meteo	special weather	Vergemoli	2018-07-08 16:00:18	public	
Special Widget	Environment	Weather Forecast	Previ_Meteo	special weather	Vergemoli	2018-07-08 16:00:18	public	
Special Widget	Environment	Weather Forecast	Previ_Meteo	special weather	Vergemoli	2018-07-08 16:00:18	public	
Special Widget	Environment	Weather Forecast	Previ_Meteo	special weather	Vergemoli	2018-07-08 16:00:18	public	
Special Widget	Environment	Weather Forecast	Previ_Meteo	special weather	Vergemoli	2018-07-08 16:00:18	public	
Special Widget	Environment	Weather Forecast	Previ_Meteo	special weather	Vergemoli	2018-07-08 16:00:18	public	
Special Widget	Environment	Weather Forecast	Previ_Meteo	special weather	Vergemoli	2018-07-08 16:00:18	public	
Special Widget	Environment	Weather Forecast	Previ_Meteo	special weather	Vergemoli	2018-07-08 16:00:18	public	
Special Widget	Environment	Weather Forecast	Previ_Meteo	special weather	Vergemoli	2018-07-08 16:00:18	public	
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Special Widget	Environment	Weather Forecast	Previ_Meteo	special weather	Vergemoli	2018-07-08 16:00:18	public	
Special Widget	Environment	Weather Forecast	Previ_Meteo	special weather	Vergemoli	2018-07-08 16:00:18	public	
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Special Widget	Environment	Weather Forecast	Previ_Meteo	special weather	Vergemoli	2018-07-08 16:00:18	public	
Special Widget	Environment	Weather Forecast	Previ_Meteo	special weather	Vergemoli	2018-07-08 16:00:18	public	
Special Widget	Environment	Weather Forecast	Previ_Meteo	special weather	Vergemoli	2018-07-08 16:00:18	public	
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Special Widget	Environment	Weather Forecast	Previ_Meteo	special weather	Vergemoli	2018-07-08 16:00:18	public	
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Special Widget	Environment	Weather Forecast	Previ_Meteo	special weather	Vergemoli	2018-07-08 16:00:18	public	
Special Widget	Environment	Weather Forecast	Previ_Meteo	special weather	Vergemoli	2018-07-08 16:00:18	public	
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Special Widget	Environment	Weather Forecast	Previ_Meteo	special weather	Vergemoli	2018-07-08 16:00:18	public	
Special Widget	Environment	Weather Forecast	Previ_Meteo	special weather	Vergemoli	2018-07-08 16:00:18	public	
Special Widget	Environment	Weather Forecast	Previ_Meteo	special weather	Vergemoli	2018-07-08 16:00:18	public	
Special Widget	Environment	Weather Forecast	Previ_Meteo	special weather	Vergemoli	2018-07-08 16:00:18	public	
Special Widget	Environment	Weather Forecast	Previ_Meteo	special weather	Vergemoli	2018-07-08 16:00:18	public	
Special Widget	Environment	Weather Forecast	Previ_Meteo	special weather	Vergemoli	2018-07-08 16:00:18	public	
Special Widget	Environment	Weather Forecast	Previ_Meteo	special weather	Vergemoli	2018-07-08 16:00:18	public	
Special Widget	Environment	Weather Forecast	Previ_Meteo	special weather	Vergemoli	2018-07-08 16:00:18	public	
Special Widget	Environment	Weather Forecast	Previ_Meteo	special weather	Vergemoli	2018-07-08 16:00:18	public	
Special Widget	Environment	Weather Forecast	Previ_Meteo	special weather	Vergemoli	2018-07-08 16:00:18	public	
Special Widget	Environment	Weather Forecast	Previ_Meteo	special weather	Vergemoli	2018-07-08 16:00:18	public	
Special Widget	Environment	Weather Forecast	Previ_Meteo	special weather	Vergemoli	2018-07-08 16:00:18	public	
Special Widget	Environment	Weather Forecast	Previ_Meteo	special weather	Vergemoli	2018-07-08 16:00:18	public	
Special Widget	Environment	Weather Forecast	Previ_Meteo	special weather	Vergemoli	2018-07-08 16:00:18	public	
Special Widget	Environment	Weather Forecast	Previ_Meteo	special weather	Vergemoli	2018-07-08 16:00:18	public	
Special Widget	Environment	Weather Forecast	Previ_Meteo	special weather	Vergemoli	2018-07-08 16:00:18	public	
Special Widget	Environment	Weather Forecast	Previ_Meteo	special weather	Vergemoli	2018-07-08 16:00:18	public	
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Special Widget	Environment	Weather Forecast	Previ_Meteo	special weather	Vergemoli	2018-07-08 16:00:18	public	
Special Widget	Environment	Weather Forecast	Previ_Meteo	special weather	Vergemoli	2018-07-08 16:00:18	public	
Special Widget	Environment	Weather Forecast	Previ_Meteo	special weather	Vergem			

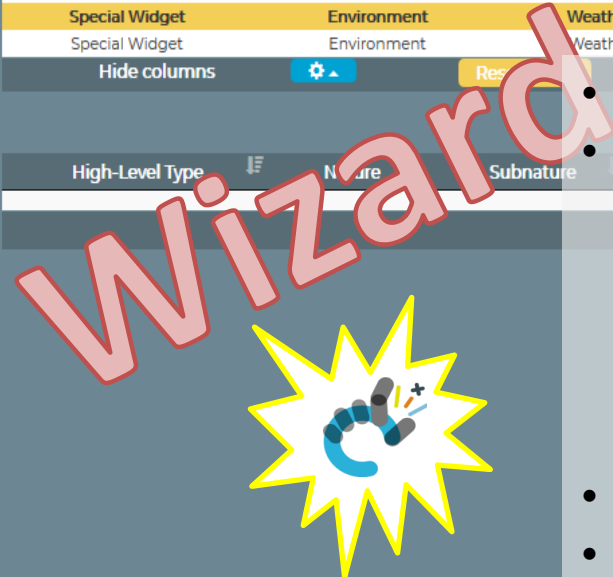
- Select the area of your interest: panning and zooming

- Select the

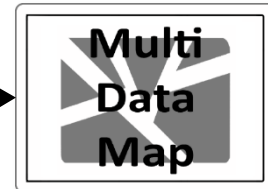
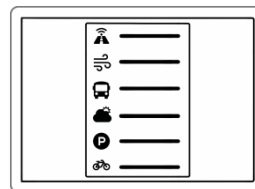
- graphic aspect of your interest, or
- High Level Type of your interest, or
- Make a search if you have a precise idea or
- Act on filters: nature, subnature, type, name, value, date, health, owner, ...
- Combine them as you like

- 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=Firenze\\_PM10](https://wmserver.snap4city.org/geoserver/Snap4City/wms?service=WMS&layers=Firenze_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 Map

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 Bubble	https://se...	rgba(1, 1, 1, 1)	rgba(1, 1, 1, 1)	Nothing set			Bub	vehicleFl	1	✖
<input type="checkbox"/>	Auto				Psvgb_X-val3	https://se...	rgba(1, 1, 1, 1)	rgba(1, 1, 1, 1)	METRO19	Pir		Cus	val3	2	✖
<input type="checkbox"/>	Auto				Psvgb_X-val1	https://se...	rgba(2, 1, 1, 1)	rgba(2, 1, 1, 1)	METRO19	Pir		Cus	val1	3	✖
<input type="checkbox"/>	Auto			rgba(1, 1, 1, 1)	Psvgb_X-val4	https://se...	rgba(2, 1, 1, 1)	rgba(2, 1, 1, 1)	METRO19	Pir		Cus	val4	4	✖
<input type="checkbox"/>	Auto			rgba(1, 1, 1, 1)	recharging station	https://se...	rgba(2, 1, 1, 1)	rgba(2, 1, 1, 1)	METRO19		Symbol (	Cus	stationSt	5	✖
<input type="checkbox"/>	Auto				PM2_5 Heatmap	https://wm...	rgba(8, 1, 1, 1)	rgba(8, 1, 1, 1)	Nothing set					Empty	✖
<input type="checkbox"/>	Auto				Traffic Flow	https://fi...	rgba(2, 1, 1, 1)	rgba(2, 1, 1, 1)	Nothing set					Empty	✖
<input type="checkbox"/>	Auto				Cycling Paths	https://se...	rgba(2, 1, 1, 1)	rgba(2, 1, 1, 1)	Nothing set					Empty	✖
<input type="checkbox"/>	Auto				Scenario	/scenario/	rgba(0, 1, 1, 1)	rgba(1, 1, 1, 1)	Nothing set					Empty	✖
<input type="checkbox"/>	Auto				What-IF	/whatif/	rgba(5, 1, 1, 1)	rgba(1, 1, 1, 1)	Nothing set					Empty	✖

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



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DEGLI STUDI  
FIRENZE

**DINFO**  
DIPARTIMENTO DI  
INGEGNERIA  
DELL'INFORMAZIONE

D  
DIST  
INTER  
DIST  
AND

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\_wigetSelect

Widget type: widgetSel max 1 metrics

Context:

Widget link: none

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

Generic widget properties

Title: Selector

Content font size: 16

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

Period:

Height: 48

U/M:

Show header: No

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

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

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

Refresh rate (s):

Width: 6

U/M position:

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	Bubble	Bubble Metric	Order	
Yes	Auto			Air Quality S...	https://se...	rgba(238,238,238,1)	rgba(238,238,238,1)	Air Temp...	Pins			-2	×
Yes	Auto			...	...	...	...	...	...			-1	×
No	Auto			PM10 Heatmap	https://wm...	rgba(238,238,238,1)	rgba(238,238,238,1)	Nothing si				2	×
No	Auto			PM2.5 Heatmap	https://wm...	rgba(238,238,238,1)	rgba(238,238,238,1)	Nothing si				2	×
No	Auto			CO Heatmap	https://wm...	rgba(238,238,238,1)	rgba(238,238,238,1)	Nothing si				3	×
No	Auto			CO2 Heatmap	https://wm...	rgba(238,238,238,1)	rgba(238,238,238,1)	Nothing si				3	×
No	Auto			O3 Heatmap	https://wm...	rgba(238,238,238,1)	rgba(238,238,238,1)	Nothing si				4	×
No	Auto			NO2 Heatmap	https://wm...	rgba(238,238,238,1)	rgba(238,238,238,1)	Nothing si				5	×
No	Auto			Europ. AQI He...	https://wm...	rgba(238,238,238,1)	rgba(238,238,238,1)	Nothing si				7	×
No	Auto			...	...	...	...	Nothing si				8	×
No	Auto			...	...	...	...	Nothing si				9	×
No	Auto			Wind Speed He...	https://wm...	rgba(238,238,238,1)	rgba(238,238,238,1)	Nothing si				10	×
No	Auto			...	...	...	...	Nothing si				11	×
No	Auto			Grat. Pred. HM...	https://wm...	rgba(238,238,238,1)	rgba(238,238,238,1)	Nothing si				12	×
Yes	Auto			Traffic Sensors	https://se...	rgba(238,238,238,1)	rgba(238,238,238,1)	Air Tempe	Pins			15	×
No	Auto			...	...	...	...	Nothing si				16	×
No	Auto			Traffic Bubble	https://se...	rgba(238,238,238,1)	rgba(238,238,238,1)	Nothing si		V	vehiclef	17	×
No	Auto			Cycling Paths	https://se...	rgba(238,238,238,1)	rgba(238,238,238,1)	Nothing si	Geometr			20	×
No	Auto			Accident Heatmap	https://he...	rgba(238,238,238,1)	rgba(238,238,238,1)	Nothing si				21	×
No	Auto			Only HRes Any...	https://wm...	rgba(238,238,238,1)	rgba(238,238,238,1)	Nothing si				Empty	×
No	Auto			Scenariious	/scenario/	rgba(238,238,238,1)	rgba(238,238,238,1)	Nothing si				Empty	×



# The Selector is the Map Controller

More Options

Specific widget properties

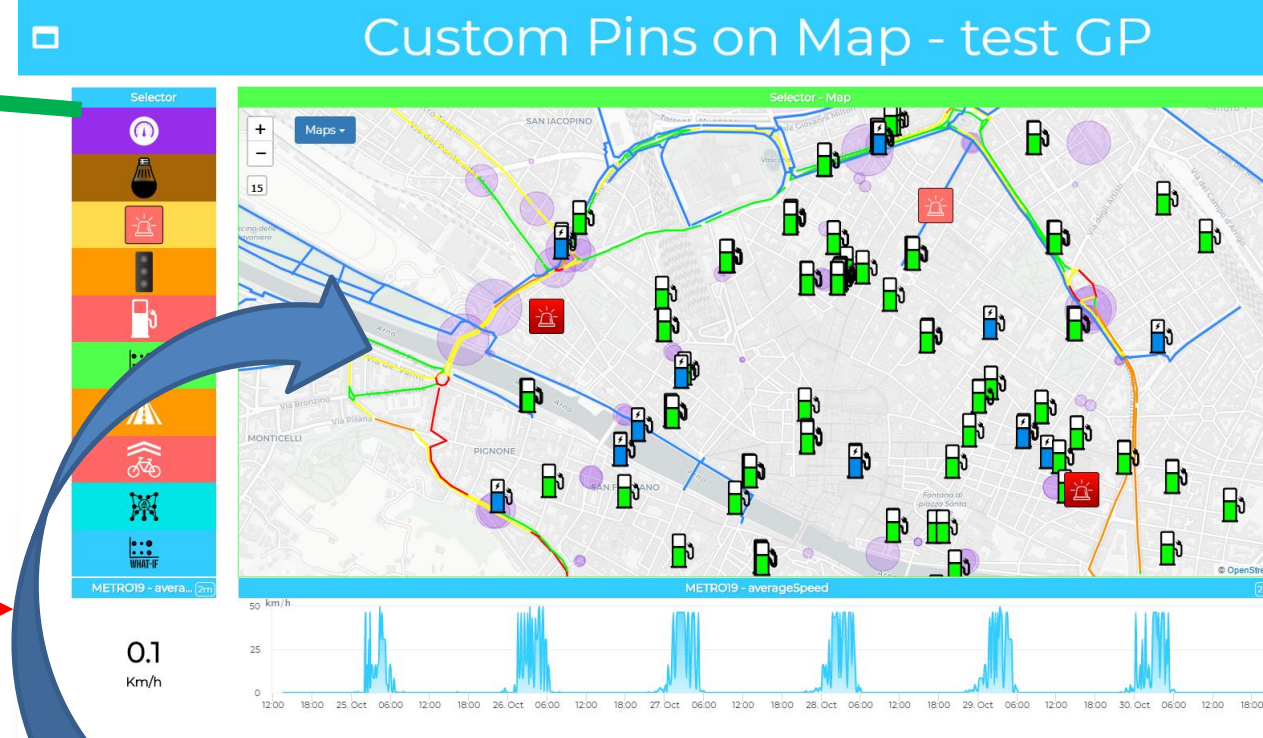
Widget: Selector - Map

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

Default	Symbol mode	Symbol choice	Symbol preview	Symbol color	Description	Query
Yes	Auto				Traffic Bubble	https://se...
No	Auto				Psvgb_X-val3	https://se...
No	Auto				Psvgb_X-val1	https://se...
No	Auto			rgba(0,0,0,1)	Psvgb_X-val4	https://se...
No	Auto			rgba(0,0,0,1)	recharging station	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)

**Service Map (Toscana)**

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

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 Busses

Actual Selection  
Service: FI-MOSSE

**FI-MOSSE**

Service: http://  
Name: ARPAT\_QA  
Nature: Environment  
Subnature: Air Quality  
City: FIRENZE  
Prov: FIRENZE  
Note: Dato Valido

Save your information for services.

You can save this service on ServiceMap.  
Please insert a valid e-mail, and you will receive a link that could allow you to access at the results and share it with your friends.

Insert your e-mail:  
email@domain.ext

Insert a title:  
Service FI-MOSSE

Insert a description:  
Insert a description

Send

Property/Value	Value
PM10	annualPM10ExceedCount
PM2.5	PM2_5
Benzene	Benzene
CO	CO
H2S	H2S
NO2	NO2
SO2	SO2
O3	O3
hourO3max	hourO3max
dailyO3ExceedCount	dailyO3ExceedCount
airQualityNOxGrat_6m	49.3323 @2020-11-02T22:00:00+01:00
airQualityNOxGrat_3m	65.9572 @2020-11-02T22:00:00+01:00

Latest Update: 2020-10-31T18:00:00+01:00

**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=c33d6672968a1d5db83f2c00c0f098&format=json>

Link for read only result in html: <https://servicemap.disit.org/WebAppGrafo/api/v1/?queryId=c33d6672968a1d5db83f2c00c0f098&format=html>

Link for overwrite this query on Service Map: <https://servicemap.disit.org/WebAppGrafo/api/v1/?queryId=f75d163130b1c6a9c792cc7b89&format=html>

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.

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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

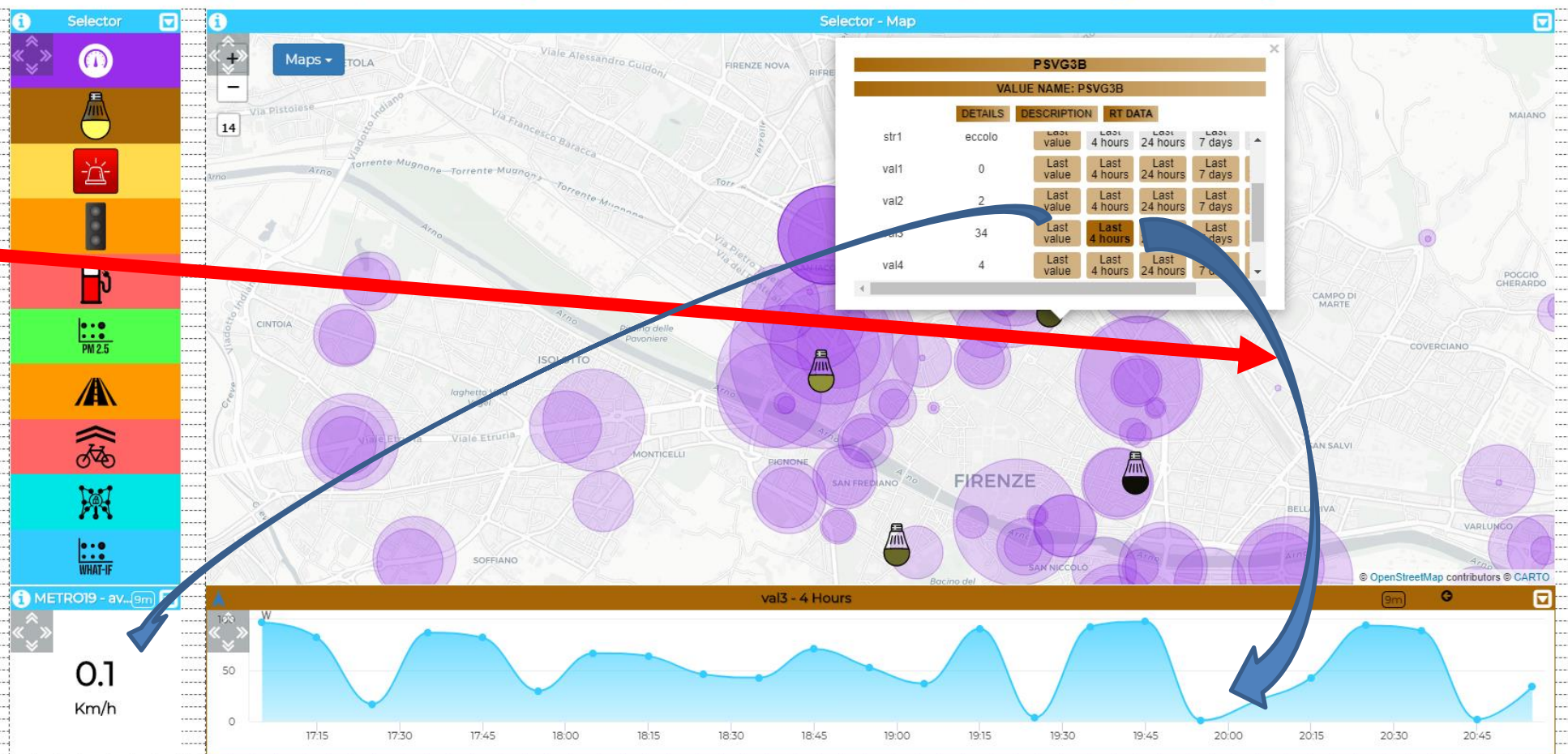
MoreOptions

## Custom Pins on Map - test GP

No subtitle

Sat 31 C

Properties Wizard Add widget Separator Embedding Screenshot Save Preview



- Targeting the data to be shows on other data Widgets



TOP

## *Setting More Options for the Multi Series widget*

FROM CITY  
DASHBOARD TO  
APPLICATIONS

DATA GATHERING  
AND CITY DATA  
KNOWLEDGE  
MANAGEMENT

FORGING &  
MANAGING OPEN  
AND FLEXIBLE WEB  
AND MOBILE APPS

IOT APPLICATIONS  
AND CONNECTED  
DEVICES

IOT/IOE DEVICES  
AND NETWORKS

IOT APPLICATIONS,  
THE LOGIC AND  
THE SMARTNESS

ADVANCED  
SMART CITY APP,  
MICROSERVICES,  
SNAP4CITY API

SNAP4CITY  
LIVING LAB FOR  
COLLABORATIVE  
WORK

SNAP4CITY FOR  
BEGINNERS

DATA ANALYTICS,  
BUSINESS  
INTELLIGENCE,  
WHAT-IF AND  
SIMULATION

SNAP4CITY  
ARCHITECTURE AND  
ECOSYSTEM. OPENED  
TO DEVELOPERS  
AND BUILDERS

TWITTER  
VIGILANCE: SOCIAL  
MEDIA ANALYSIS

HOW TO ADOPT  
SNAP4CITY, AND  
OUR ROADMAP

SNAP4CITY  
AND KM4CITY  
PROJECTS

SNAP4CITY THE  
VIEW OF THE  
ADMINISTRATORS

# 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

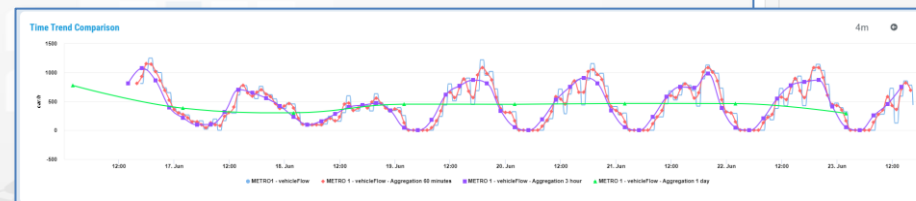
Typical time trend:

Trend type:

Reference date: gg/mm/aaaa

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	http://www.disit.org/km4city/resource/iot/ori...	vehicleFlow	rgba(124,181,21)	✗
	https://servicemap.disit.org/WebAppGrafo/api/...	vehicleFlow	rgba(255,102,1)	✗
	https://servicemap.disit.org/WebAppGrafo/api/...	vehicleFlow	rgba(150,79,25)	✗
	https://servicemap.disit.org/WebAppGrafo/api/...	vehicleFlow	rgba(0,244,76,1)	✗





[TOP](#)

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

Snap4City (C), November 2023

# 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

Hide columns

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:	IoT Sensor					
Value Name:	Dubrovnik:orionDubrovnik-UNIFI:camera_Dubrovnik_1_Place					
Device ServiceURI or Data ID:	http://www.disit.org/km4city/resource/iot/orionDubrovnik-UNIFI/Dubrovnik/camera_Dul					
Sensor ServiceURI or Data ID:	http://www.disit.org/km4city/resource/iot/orionDubrovnik-UNIFI/Dubrovnik/camera_Dul					
Datasource:	IoT					
Ownership:	private					
Organizations:	Dubrovnik					

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

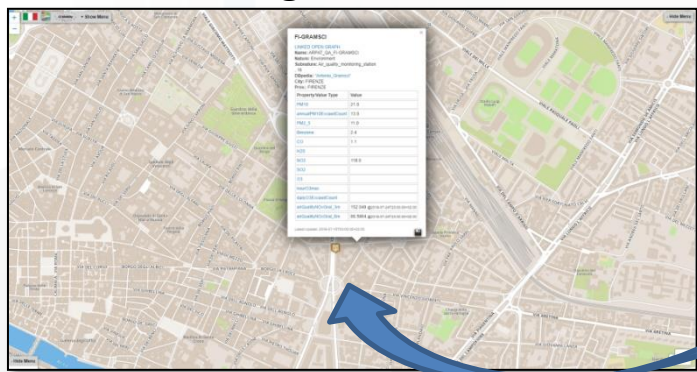
# Snap4City



- Click with the mouse on it

## HLT: Sensor

### Knowledge Base view



### Snap4City

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

[LOGOUT](#)

- My Snap4City.org
- Dashboards
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### IOT Devices

Show: 10 entries

IOT Device	IOT Broker	Device Type	Model	Ownership	Status	Soft	Delete	Location
AccessPoint1_FamiasSuperstore	orionLoratoDeCarda-UNIFI	AccessPointSensor	AccessPointLorato	DELEGATED	active	EDIT	DELETE	
AccessPoint2_TT65	orionLoratoDeCarda-UNIFI	AccessPointSensor	AccessPointLorato	DELEGATED	active	EDIT	DELETE	
AccessPoint3_Paleoport	orionLoratoDeCarda-UNIFI	AccessPointSensor	AccessPointLorato	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	
AdminDevice006	orionUNIFI	Ambiental		MYOWNPRIVATE	active	EDIT	DELETE	
AdminDevice007	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

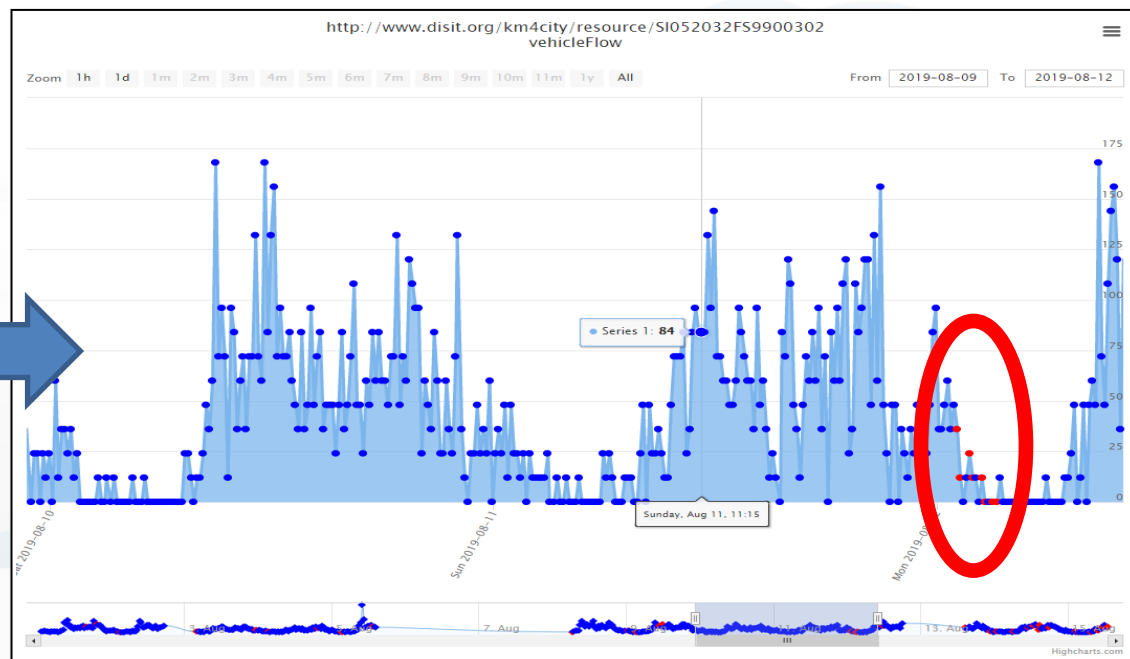
Device Values Healthiness Process Image Licensing User

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:	<span style="color: red;">●</span>	(2020-07-19 23:03:31) false				
Healthiness Criteria 2:	<span style="color: red;">●</span>	(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*

# Details regarding the IOT Ingestion process

- For IOT Device data
- IOT Broker details

**Data sources Details**

Device	Values	Healthiness	Process	Image	Licensing	User
Knowledge Base IP:	192.168.0.206					
IoT Broker:	orionFinland					
IoT Device:	373773207E330105					
Device Set name:						
<a href="#">Link to Knowledge Base</a>		<a href="#">Link to IoT Broker</a>				

[Cancel](#)

```
{
  "service": {
    "type": "FeatureCollection",
    "features": [
      {
        "type": "Feature",
        "geometry": {
          "type": "Point",
          "coordinates": [ 24.822805, 40.215797 ]
        },
        "properties": {
          "name": "orionFinland",
          "description": "orionFinland",
          "type": "orionFinland",
          "owner": "orionFinland",
          "owner_email": "orionFinland@disit.unifi.it",
          "owner_phone": "055 27596111",
          "owner_website": "http://www.disit.unifi.it",
          "owner_address": "Via dei Vespri 1, 50139 Firenze, Italy",
          "owner_city": "Firenze",
          "owner_state": "Firenze",
          "owner_country": "Italy",
          "owner_zip": "50139",
          "owner_latitude": "41.89191",
          "owner_longitude": "11.25595",
          "owner_timezone": "Europe/Rome",
          "owner_currency": "EUR",
          "owner_language": "it",
          "owner_units": "SI",
          "owner_symbols": "€",
          "owner_characters": "UTF-8",
          "owner_encodings": "UTF-8",
          "owner_decimals": "2",
          "owner_digits": "0-9",
          "owner_whitespace": " ",
          "owner_punctuation": ".,-:;'",
          "owner_alphabetic": "A-Za-z",
          "owner_numeric": "0-9",
          "owner_special": ".,-:;'",
          "owner_control": " ",
          "owner_separator": ".,-:;'",
          "owner_whitespace": " ",
          "owner_punctuation": ".,-:;'",
          "owner_alphabetic": "A-Za-z",
          "owner_numeric": "0-9",
          "owner_special": ".,-:;'",
          "owner_control": " ",
          "owner_separator": ".,-:;'",
          "owner_whitespace": " ",
          "owner_punctuation": ".,-:;'",
          "owner_alphabetic": "A-Za-z",
          "owner_numeric": "0-9",
          "owner_special": ".,-:;'",
          "owner_control": " ",
          "owner_separator": ".,-:;'"
        }
      }
    ]
  }
}
```

**SNAP4CITY**

User: root@snap4city.org, Org: DISIT, Role: RootAdmin, Level: 7

**IOT Brokers**

IOT Broker	Access Link	Access Port	Protocol	Ownership	Organization	Owner	Created	Edit	Delete
Antwerp	https://antwerp.belgipolis.be/antwerp/1/entities		ngsi	DELEGATED	Antwerp	iotdirectory.antwerp	2019-03-13 14:57:17	<a href="#">EDIT</a>	<a href="#">DELETE</a>
Antwerp2	https://antwerp-belgipolis.be/antwerp/1/entities		ngsi	DELEGATED	Antwerp	iotdirectory.antwerp	2019-01-01 00:00:00	<a href="#">EDIT</a>	<a href="#">DELETE</a>
CB-test-multi	192.168.1.47	8444	ngsi	DELEGATED	DISIT	angelodifino	2020-05-20 15:42:39	<a href="#">EDIT</a>	<a href="#">DELETE</a>
iotobf-smartbed	192.168.1.47	8443	ngsi	DELEGATED	SmartBed	angelodifino	2019-11-29 15:31:51	<a href="#">EDIT</a>	<a href="#">DELETE</a>
mqttUNIFI	192.168.1.10	1883	mqtt	DELEGATED	DISIT	iotdirectory.dist	2018-02-07 15:14:39	<a href="#">EDIT</a>	<a href="#">DELETE</a>
mqttUNIMI	159.149.129.184	1884	mqtt	DELEGATED	DISIT	iotdirectory.dist	2018-04-30 16:49:05	<a href="#">EDIT</a>	<a href="#">DELETE</a>
orionAntwerp-UNIFI	broker3.snap4city.org	8080	ngsi	PUBLIC	Antwerp	iotdirectory.antwerp	2019-06-03 14:25:16	<a href="#">EDIT</a>	<a href="#">DELETE</a>
orionDubrovnik-UNIFI	192.168.1.47	8446	ngsi	DELEGATED	Dubrovnik	iotdirectory.dubrovnik	2020-07-09 11:06:49	<a href="#">EDIT</a>	<a href="#">DELETE</a>
orionFinland	https://hgsi.fi/h/1		ngsi	PUBLIC	Helsinki	iotdirectory.helsinki	2018-11-21 16:05:24	<a href="#">EDIT</a>	<a href="#">DELETE</a>
orionFirenze-UNIFI	192.168.1.17	8443	ngsi	PRIVATE	Firenze	iotdirectory.firenze	2019-10-28 10:01:53	<a href="#">EDIT</a>	<a href="#">DELETE</a>

Showing 1 to 10 of 20 entries

Previous [1](#) [2](#) Next


Some functionalities are limited to certain roles



# Image of the Devices and Licensing

**Data sources Details**

Device Values Healthiness Process **Image** Licensing User




Upload  
Scegli file Nessun file selezionato  
Upload Image

Cancel

**Data sources Details**

Device Values Healthiness Process Image **Licensing** User

Licence (on: Dubrovnik: orionDubrovnik-UNIFI: camera\_Dubrovnik\_1\_Ploce):



<https://creativecommons.org/licenses/by-nc-nd/4.0/legalcode>

Provider: Dubrovnik Development Agency DURA

Address:

E-mail: scavar@dura.hr

Reference Person: Stjepan Cavar

Telephone: 00385 20640557

Website:

Edit parameters

Cancel

*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

**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

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

**Data Inspector**

Map

Single data widgets

Data widgets

Controls:

**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				

Link to IoT 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

Privacy Policy

Cookie Policy

Terms and Conditions

Contact Us

**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
- 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

**Data Inspector**

Map

Single data widgets

Data widgets

Controls:

Optic Mode

and sensors that you need for your synoptics.

Healthiness

Last Click

Ownership

15.9

Link to MyKPI

List of lotApp

- Click with the mouse on it

ID	Value	Latitude	Longitude	Data Time	Insert Time	Controls
422750	pin	42.2750	10.2750	20/08/2019 10:00:00	20/08/2019 10:00:00	edit delete
422751	pin	42.2751	10.2751	20/08/2019 10:00:00	20/08/2019 10:00:00	edit delete

List of lotApp

Link to lotApp nrqolob

**Node-RED**

Flow 3 Flow 1 Flow 2 Flow 4

input

- inject
- catch
- status
- link
- msgIn
- http
- websocket
- tcp
- udp
- amqp
- amqp2
- stomp

output

- debug

Flow 2

Name: Flow 2

ID: 154396f1a-66a33

Status: Enabled

Information

```

graph LR
    inject --> timestamp
    timestamp --> random1[random]
    random1 --> save1[Save on Room 1]
    save1 --> msg1[msg payload]
    random1 --> random2[random]
    random2 --> save2[Save on Room 2]
    save2 --> msg2[msg payload]
  
```



TOP

# Dashboard Management

FROM CITY  
DASHBOARD TO  
APPLICATIONS

FORGING &  
MANAGING OPEN  
AND FLEXIBLE WEB  
AND MOBILE APPS

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 COVERING  
AND CITY DATA  
KNOWLEDGE  
MANAGEMENT

IOT DEVICES  
AND NETWORKS

DATA ANALYSIS  
BUSINESS  
INTELLIGENCE  
SIMULATION

HOW TO ADOPT  
SNAP4CITY, AND  
GO 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, ...*

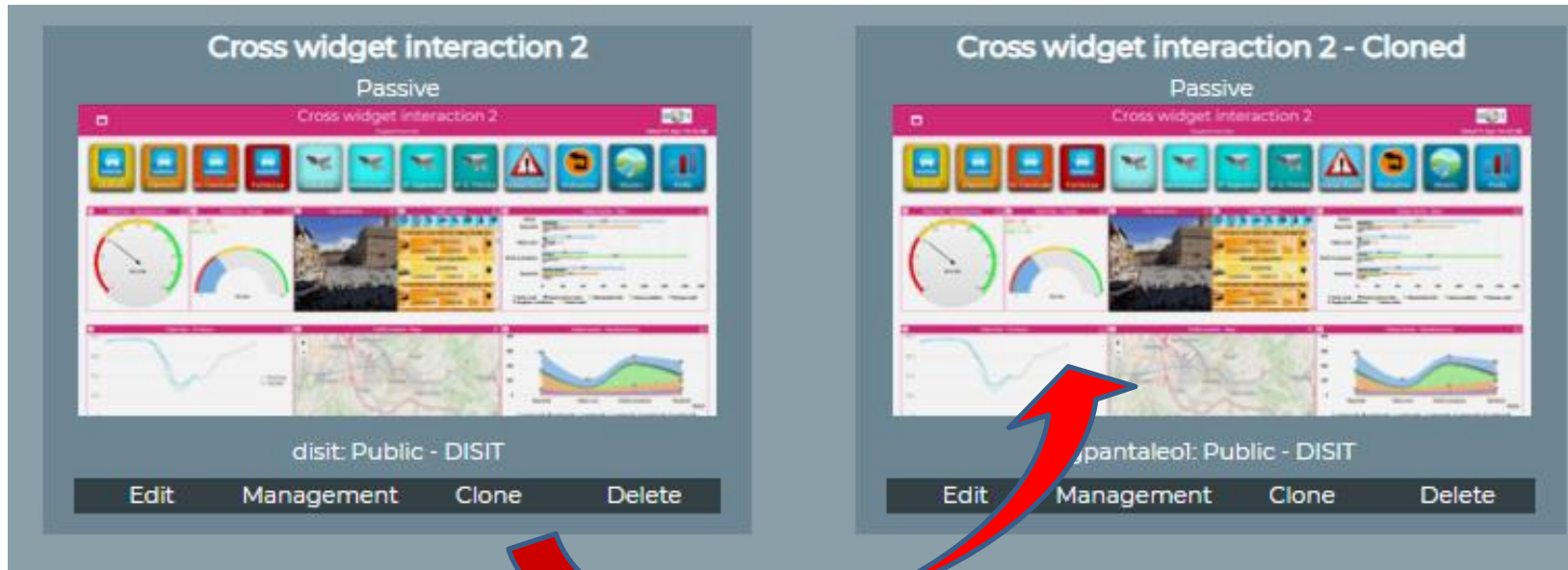




## Dashboards

243

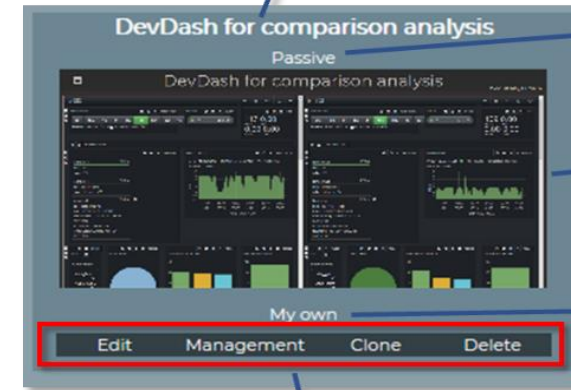
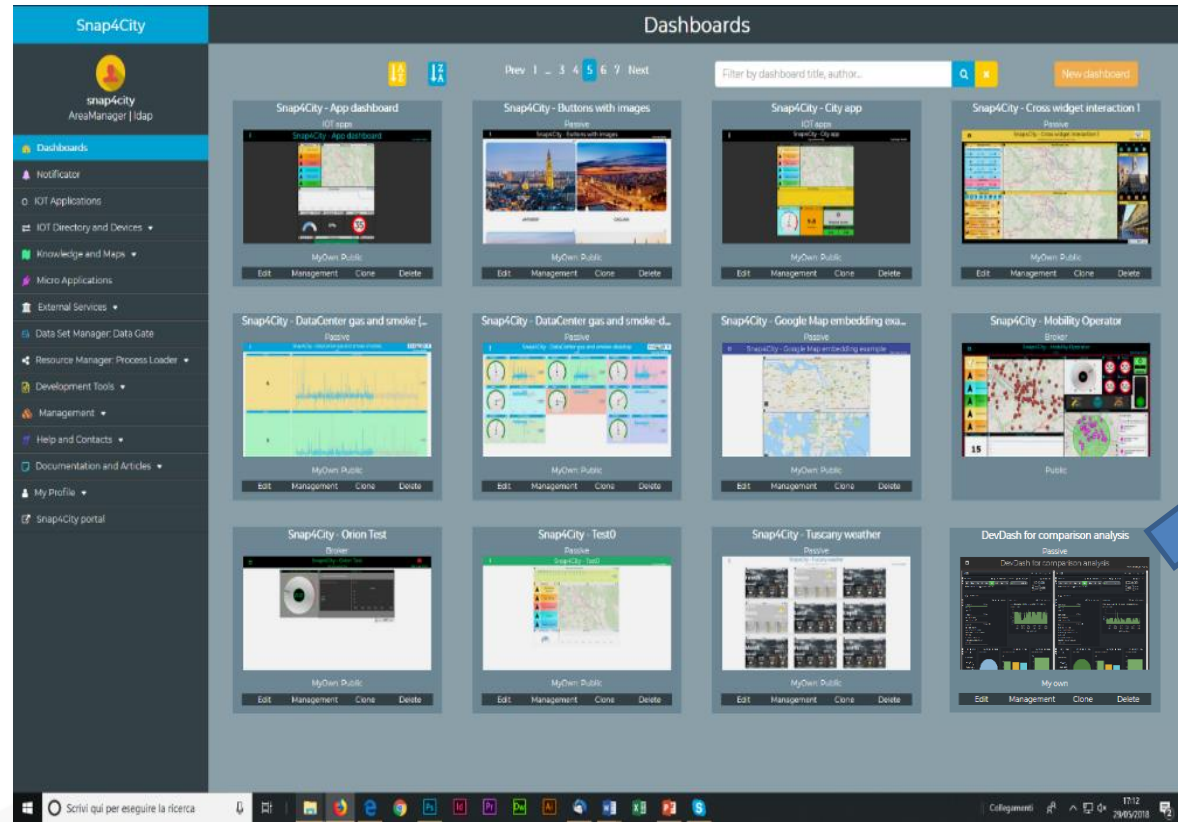
# Clone Dashboard



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



# Dashboard Listing and Features



Dashboard Title

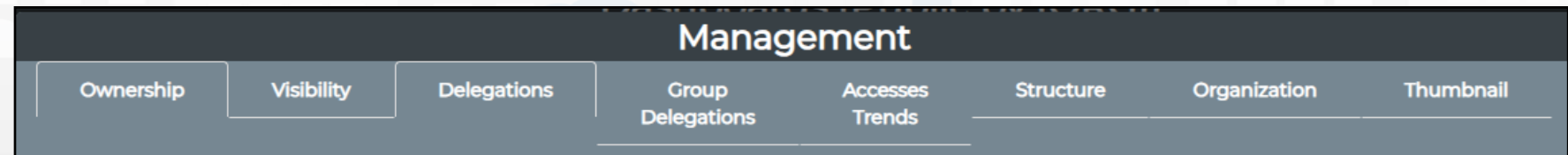
Dashboard Type

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)



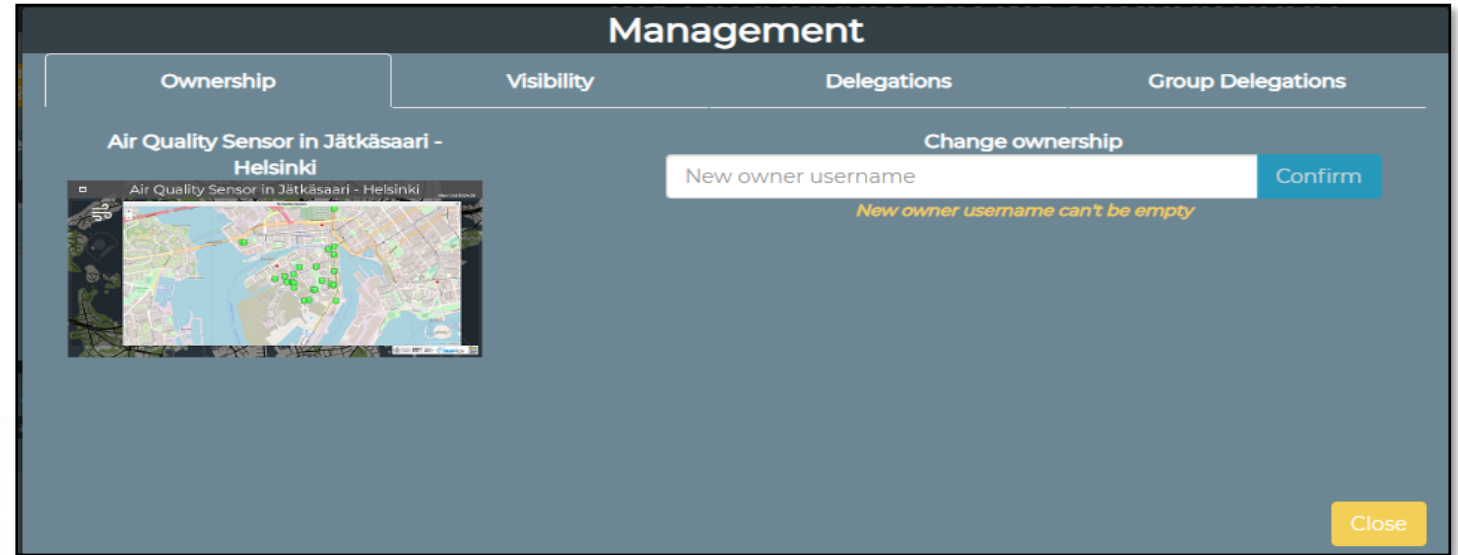
# Dashboard Management

- **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





# Dashboard Management

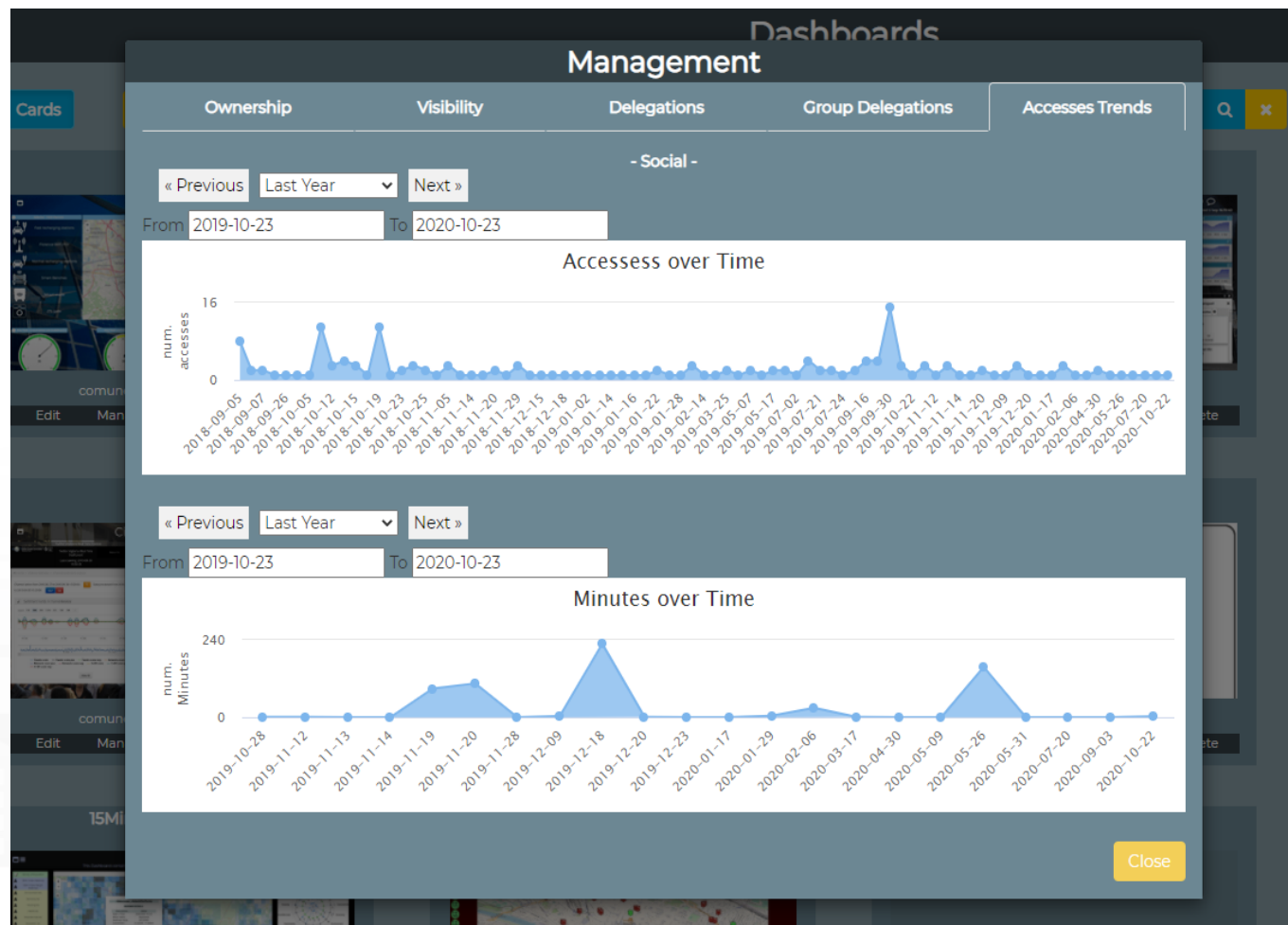
- **Delegation access to other users**
  - See next example
- **Delegation Access to other Groups [Higher roles cross Organization]**
  - See next example

The screenshot shows the 'Management' tab with sub-tabs: Ownership, Visibility, Delegations, Group Delegations, Accesses Trends, Structure, Organization, and Thumbnail. The 'Delegations' sub-tab is active, displaying a preview of a sensor dashboard for 'My Sensor 373773207E330118 - Helsinki - H3'. To the right, there is a form to 'Add new delegation' with a 'Delegated username' field and a 'Confirm' button. Below this, a table titled 'Current user delegations' shows a single entry: 'barc2019' with a 'Remove' button (marked with a red X). A 'Close' button is at the bottom right.

The screenshot shows the 'Management' tab with sub-tabs: Ownership, Visibility, Delegations, and Group Delegations. The 'Group Delegations' sub-tab is active, displaying a preview of a map comparison titled 'Helsinki vs Antwerp comparison'. To the right, there is a form to 'Add new group delegation' with dropdown menus for 'Helsinki' and 'Citizens', and a 'Confirm' button. Below this, a table titled 'Current group delegations' shows a single 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*

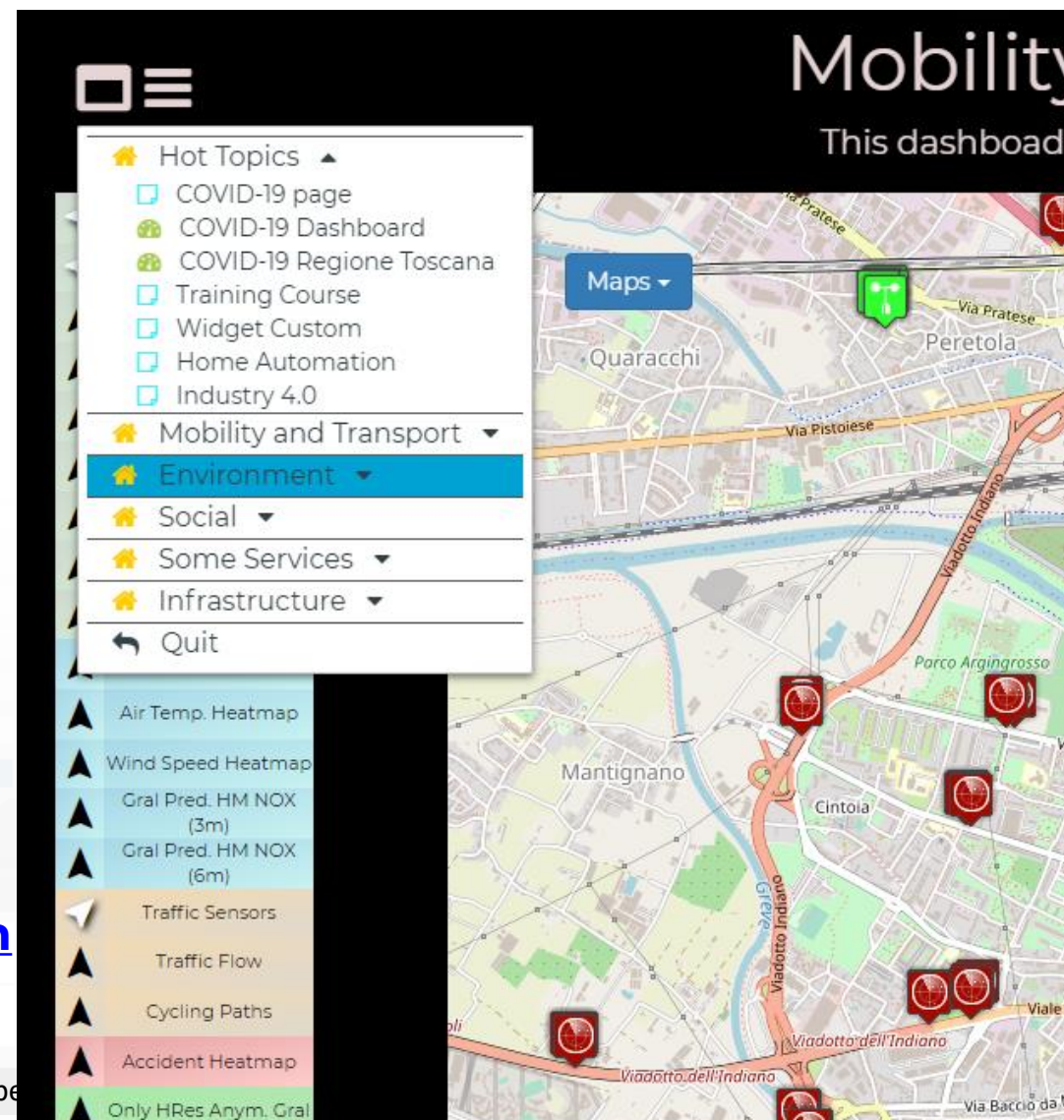


# Dashboard Menu a Short Cut for other.....

- **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?iddasboard=MjE5MA==>

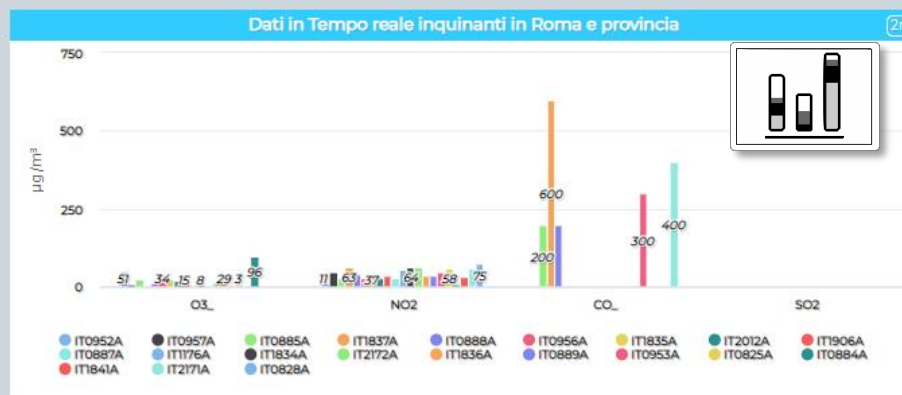
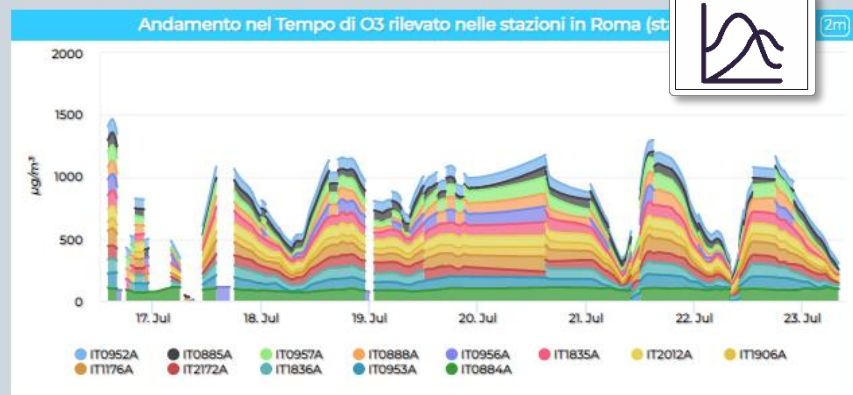
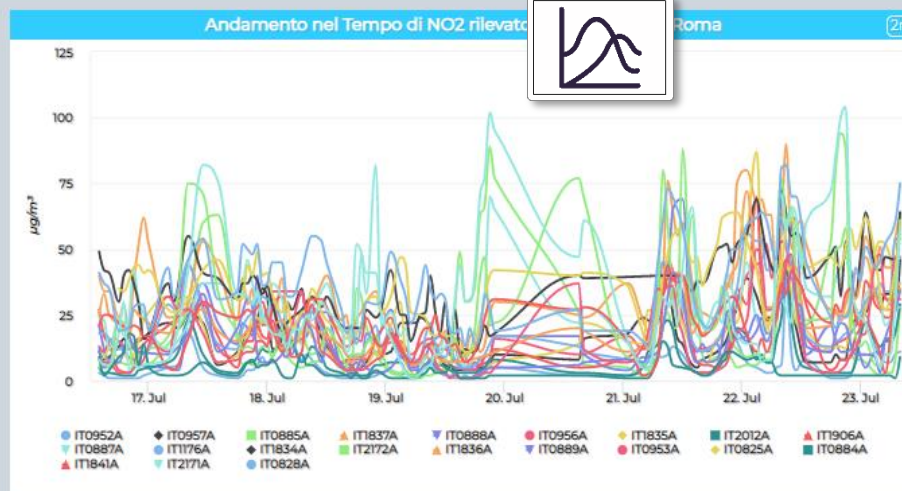
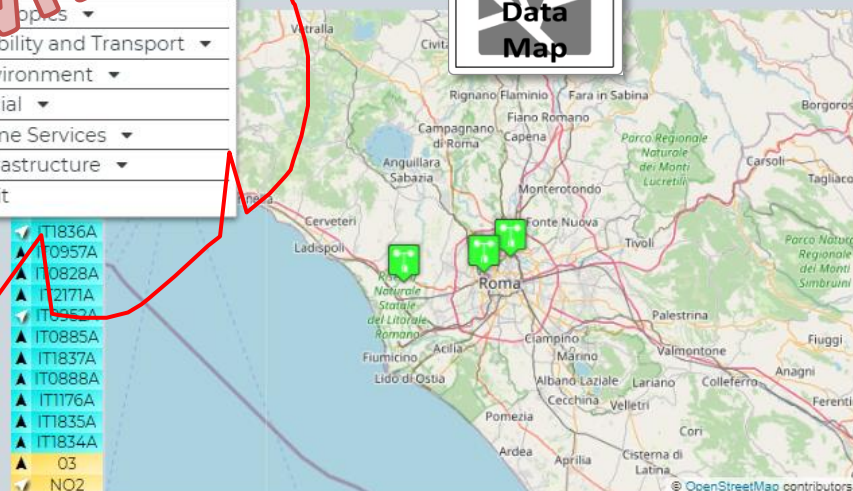
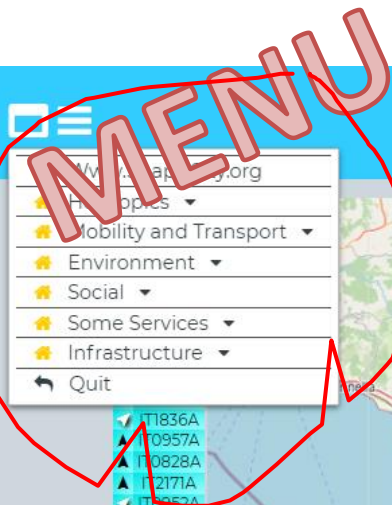




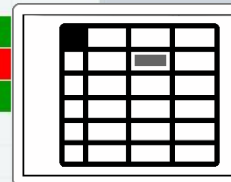
# Mixt per Roma

## Roma Demo3 (Qualità dell'Aria)

Thu 23 Jul 13:35:09



value type / value name	O3_	NO2_	CO_	SO2_
IT0952A	51	11		
IT0957A	7	46		
IT0828A				
IT2171A				
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

TOP

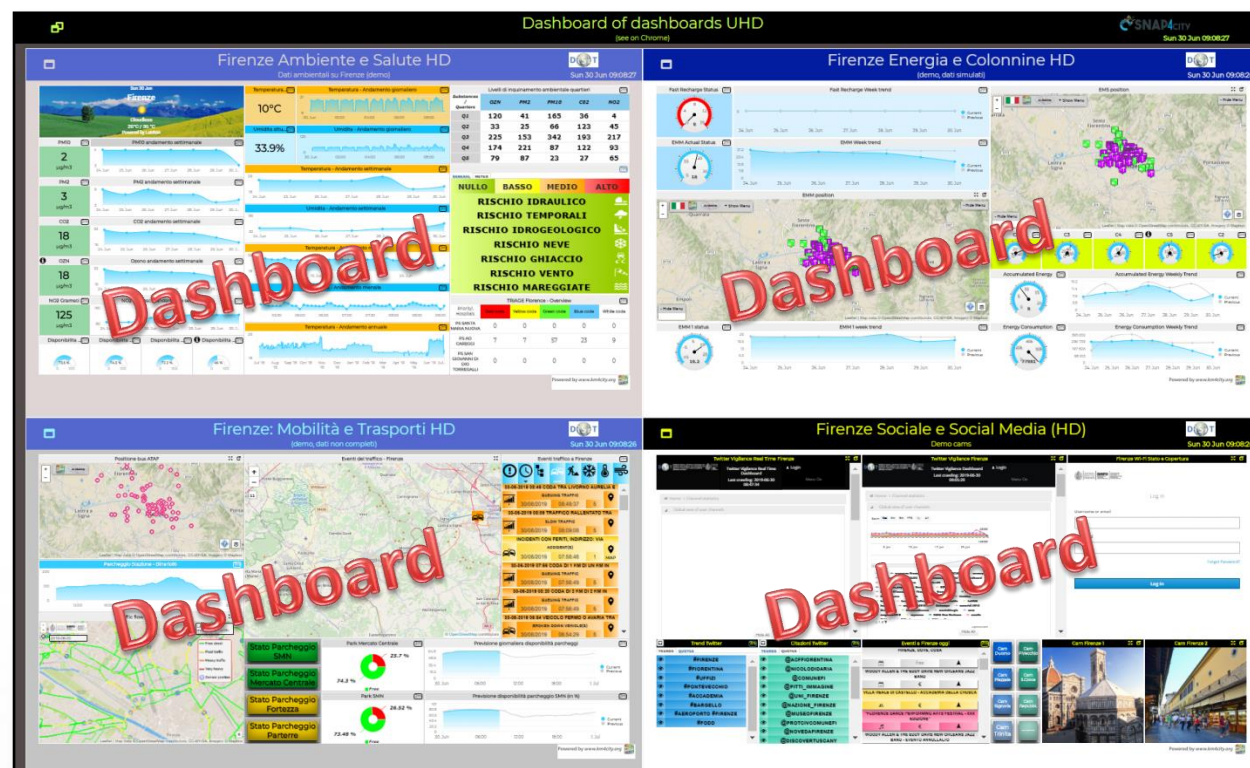
# *Dashboard Embedding into third party Web Sites/pages*





# 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**



Smart Cloud Computing

Mobile Computing

Smart City

Channelling Change

Venice, June 13-14, 2019

Digital Cities in a Changing World

explore more, discover more, create more

Training Snap4City:

Dai Dati alla Città Senziente, Smart City and IOT

- 25 Giugno 2019

- 9 Luglio 2019

- 23 Luglio 2019

Scuola di Ingegneria, Università di Firenze

Via Santa Maria 3, Firenze

**PROGRAMMA**

Sono aperte posizioni per il DISIT Lab:

- Tecnologo to be engaged to work on EC projects. See the official call <https://www.unifi.it/arvisi.html>: specifically for 18 months: deadline 20 February 2019 (pdf).

Dom 30 Giu

Firenze

Sereno

Lun 1 Lug

Sereno

M 2 Lug

Sereno

M 3 Lug

Sereno

M 4 Lug

Sereno

M 5 Lug

Poco nuvoloso

Powered by LaMMA

Powered by www.km4city.org

## Exmample 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 hiddend
  - 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

Roma Demo1 (mappe e dati real time)

Properties Wizard Add widget Separator Embedding Screenshot Save Preview

Embed this dashboard

Iframe markup generation

Automatic

Embed mode

800 600

Iframe width (px) Iframe height (px)

```
<iframe width="800" height="600"
src="https://www.snap4city.org/dashboardSmartCity/view/index.php?
iddashboard=MjcyNQ==&embedPolicy=auto">
</iframe>
```

Code to embed this dashboard

Save in txt file Save in html file

Embedding authorized pages

Authorized pages Empty

Update list

Iframe preview

Edifici Storici

Musei

Mobilità e Fermate

Sensori Qualità Aria

O3 Heatmap

NO2 Heatmap

NO2 Bubbles

COVID-19

Trasporti

Qualità dell'Aria

NO2 µg/m3

0-20

21-50

51-70

71-120

121-150

151-180

181-200

201-250

251-300

Dashboard properties

Measures Header Background

Responsive

No

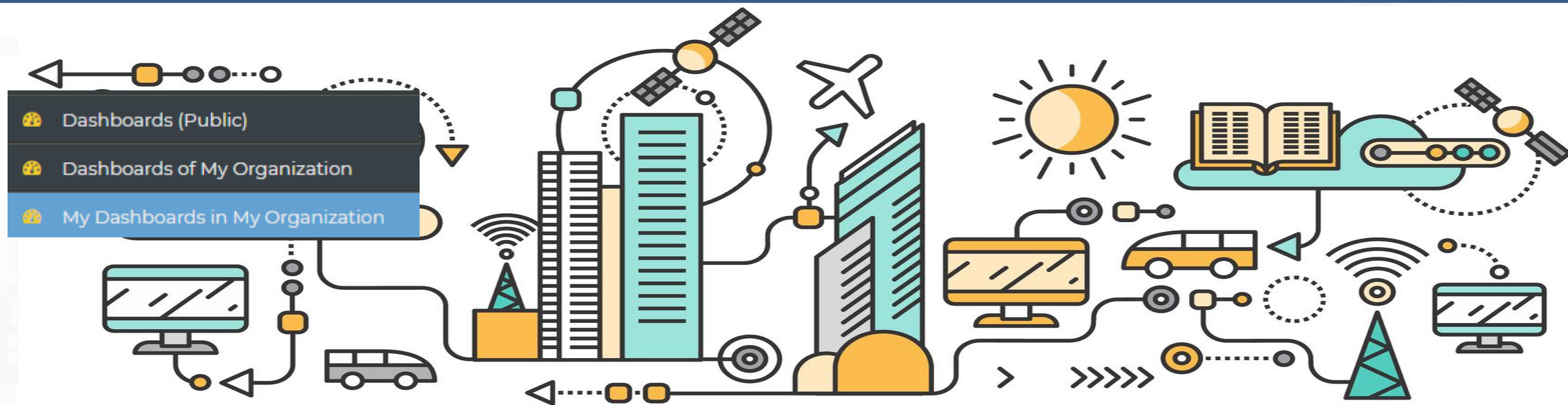
72

Dashboard width (cells)

Cancel Confirm

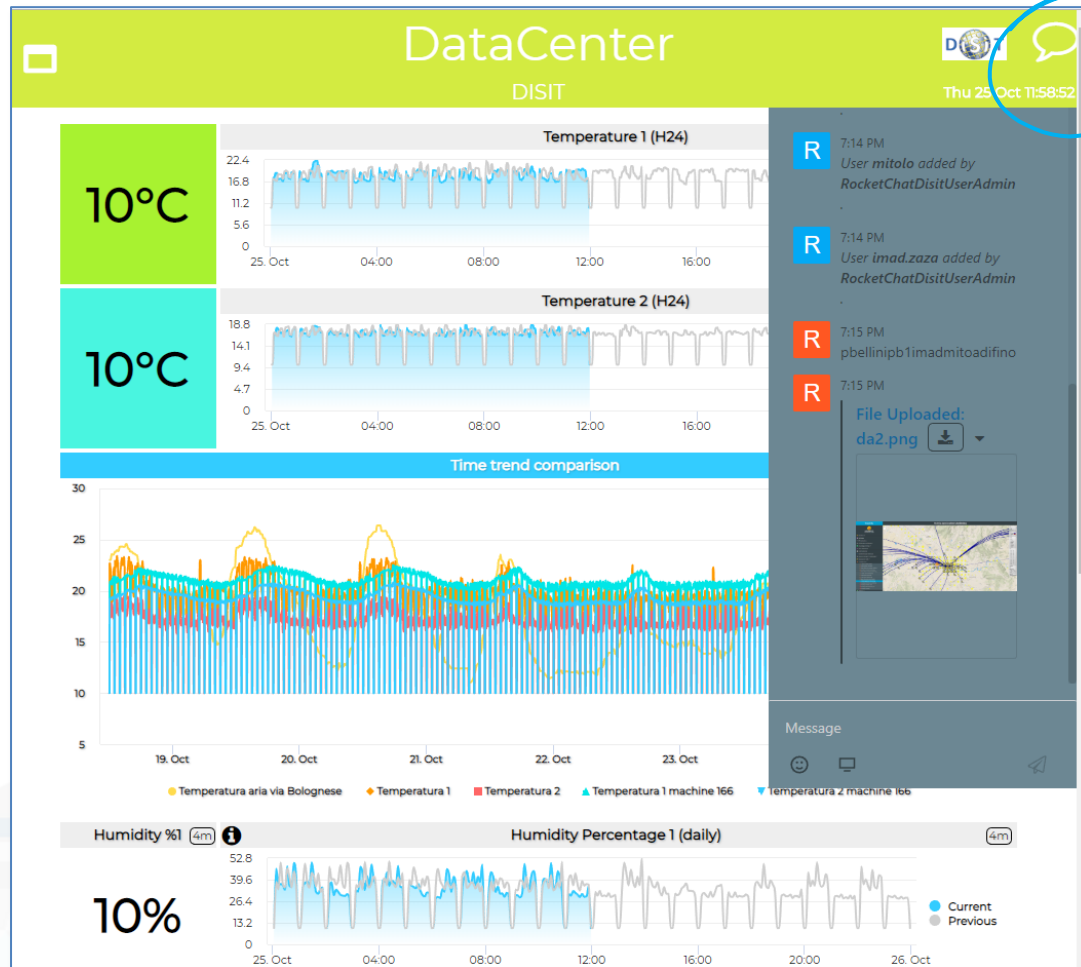
TOP

# *Private Dashboard ChatRoom*





# Private ChatRoom per Dashboard



## Chat Management

The screenshot displays the 'Chat Management' interface. The left sidebar contains a navigation menu with options like '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', and 'Help and Contacts'. The main area shows a chat window for the 'datacenter-42' channel, with messages from 'roottooladmin1' and 'pbellinipb1madmitoafino', and a file upload of 'da2.png'. The chat window also shows a list of favorites and channels.

# 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

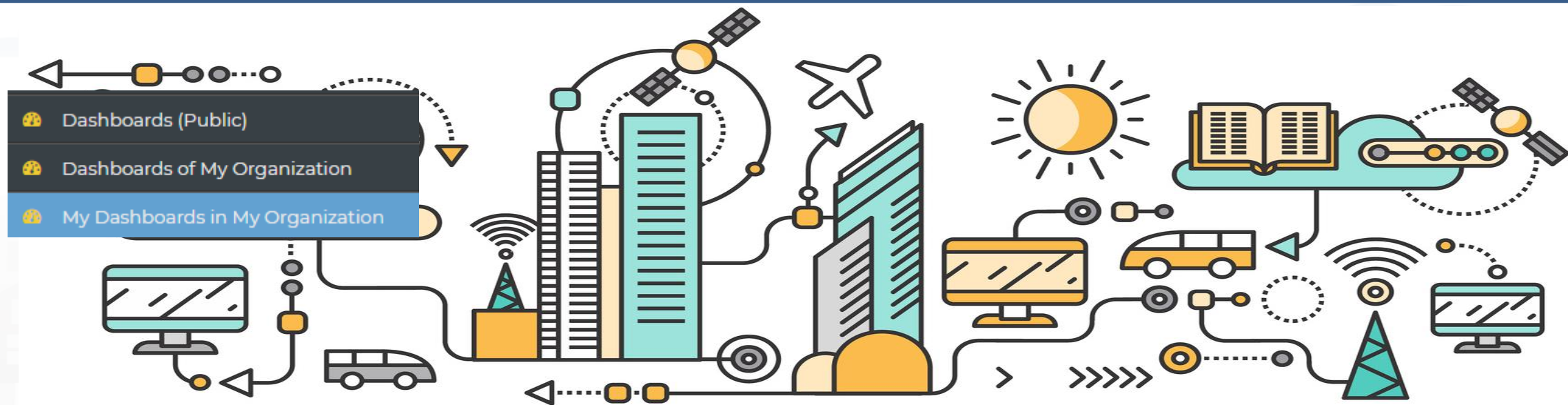


# Dashboard Chat Rooms

- 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

TOP

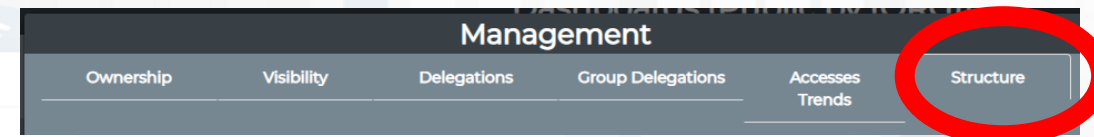
# *Dashboard Structure*





# 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**

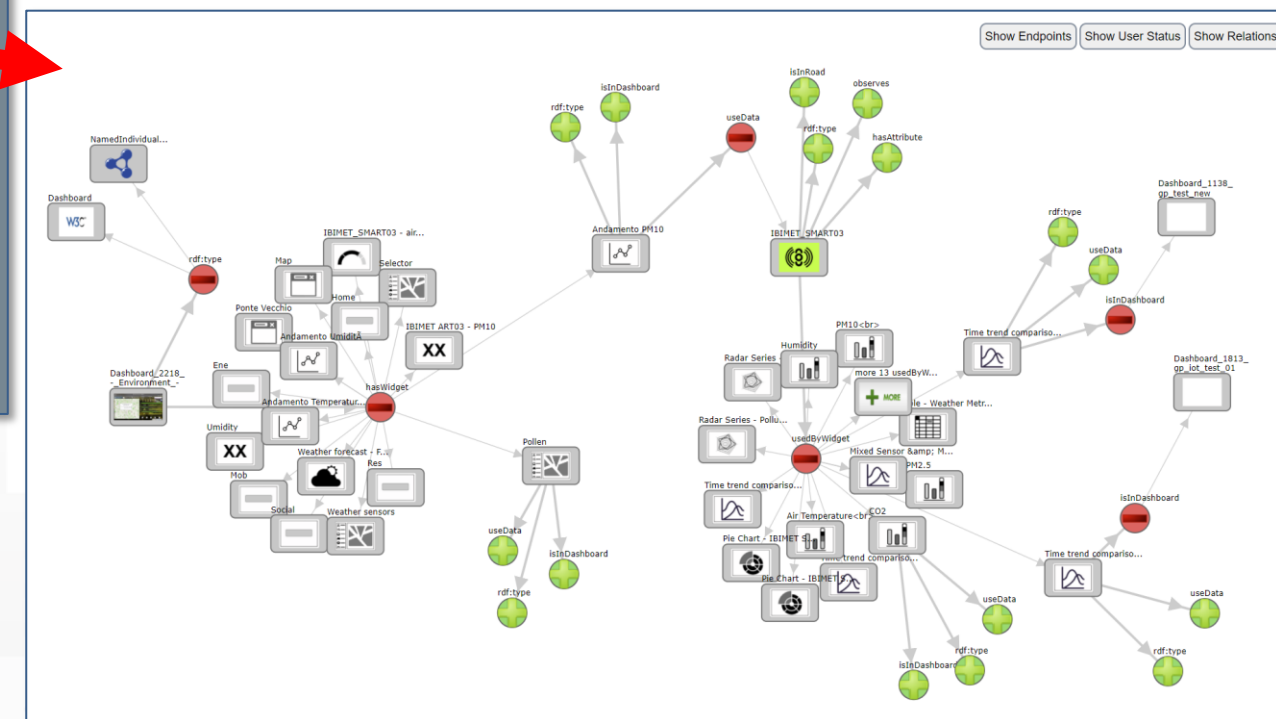
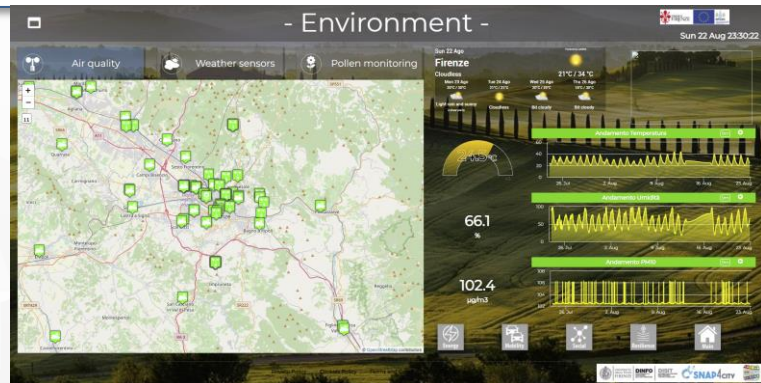
Ownership Visibility Delegations Group Delegations Accesses Trends **Structure**

[Link to Graph](#)

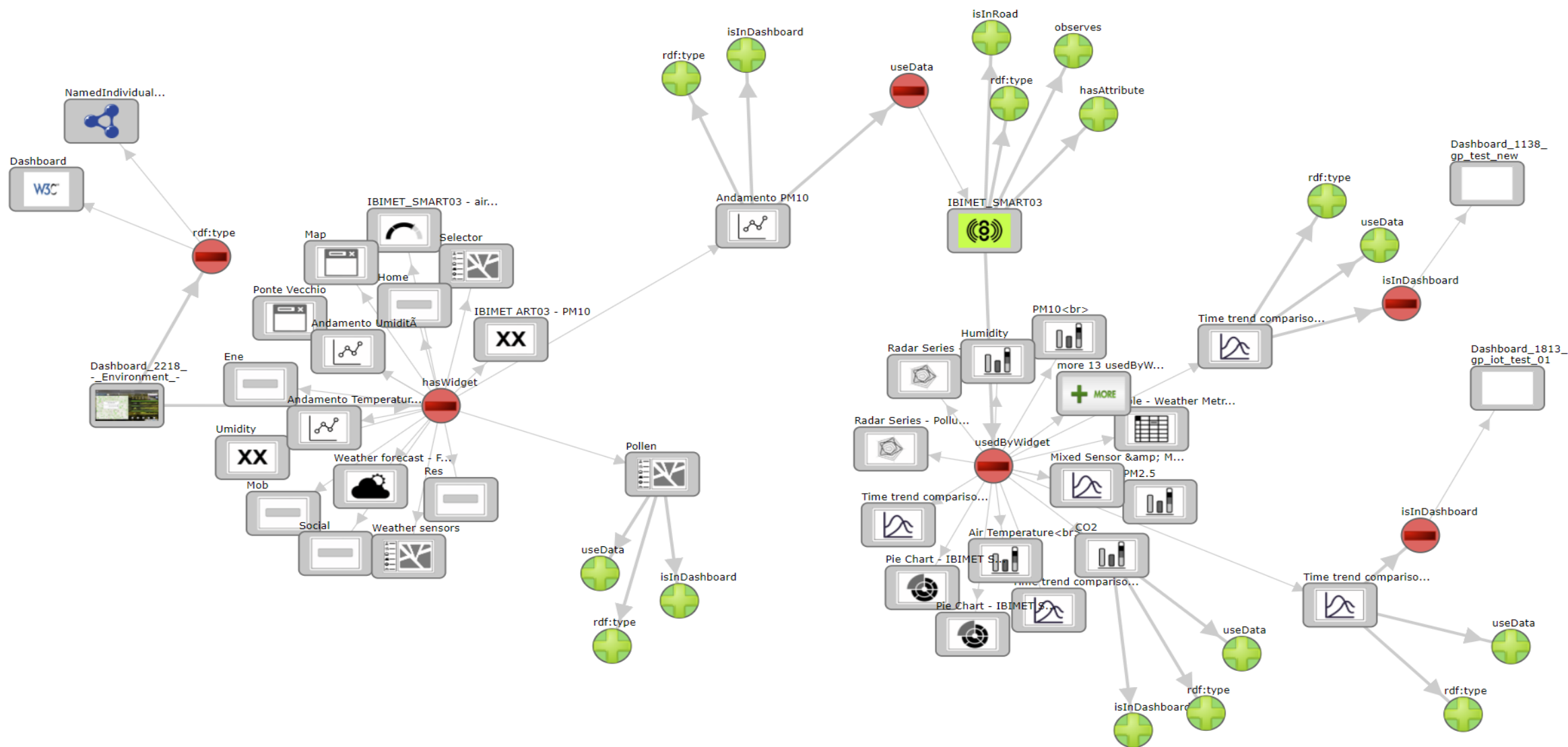
Dashboard Hierarchy

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*

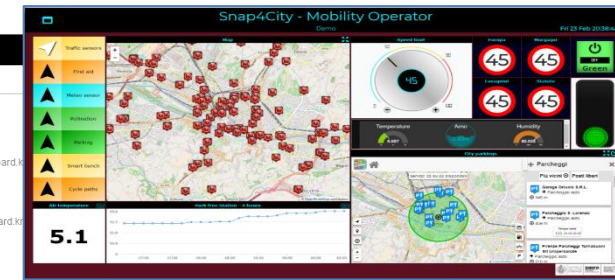
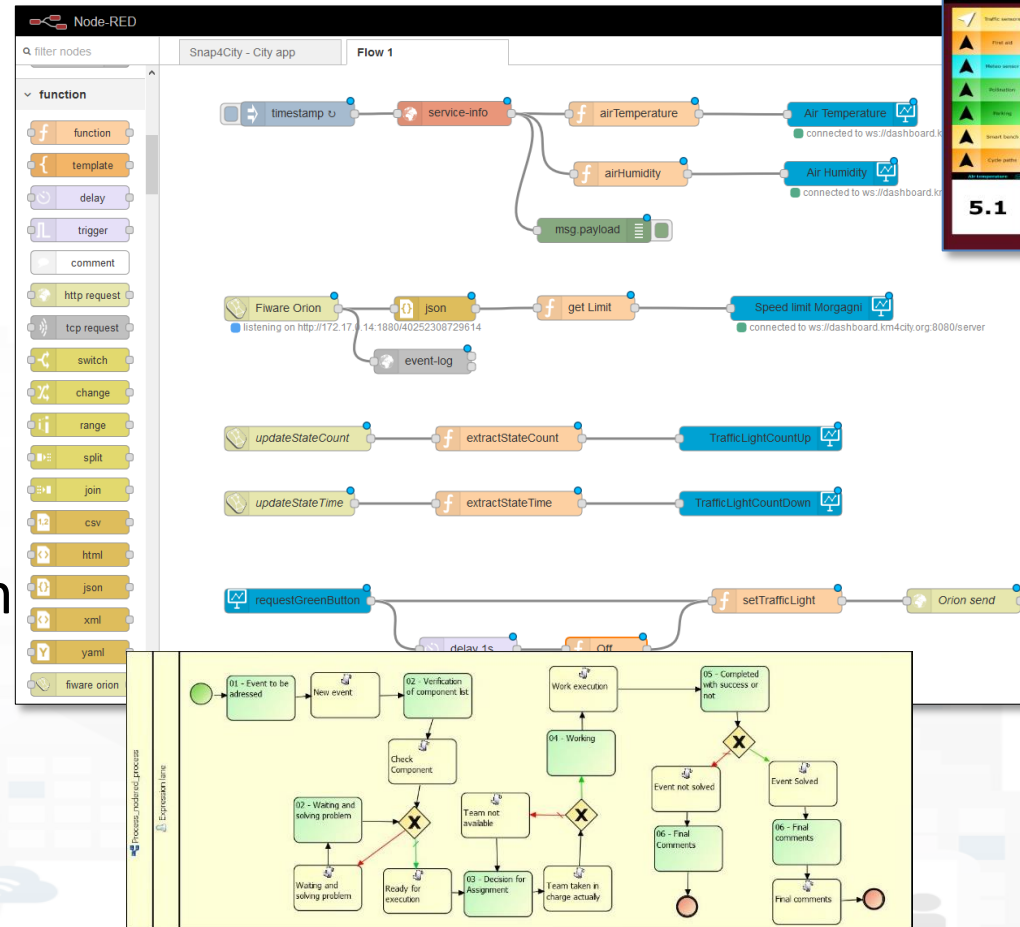




# Smart City Monitoring: notifications, alerting

## 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

FROM CITY DASHBOARD TO APPLICATIONS

DATA GATHERING AND CITY DATA KNOWLEDGE MANAGEMENT

FORGING & MANAGING OPEN AND FLEXIBLE WEB AND MOBILE APPS

IOT APPLICATIONS VS IOT EDGE DEVICES

IoT/Edge devices and network

IOT APPLICATIONS, THE LOGIC AND

ADVANCED SMART CITY API, MICROSERVICES, SNAP4CITY API

SNAP4CITY FOR BEGINNERS

SNAP4CITY ARCHITECTURE AND ECOSYSTEM, OPENED TO DEVELOPERS AND STAKEHOLDERS

















TWITTER VIGILANCE: SOCIAL MEDIA ANALYSIS

SNAP4CITY AND KM4CITY PROJECTS

HOW TO ADOPT SNAP4CITY, AND OUR ROADMAP

DECISION SUPPORT SYSTEM AND CITY RESILIENCE

SNAP4CITY THE VIEW OF THE ADMINISTRATORS

	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/944>

On Line Training Material (free of charge)



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

# 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>



# HOW ARE YOU GOING TO BUILD THE FUTURE?

Snap4City: a framework for rapid implementation of Decision Support Systems and Smart Applications.



[Home](#) / [Snap4City: Smart aNalytic APp builder for sentient Cities and IOT](#)

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

You can't delete this newsletter because it has not been sent to all its subscribers.

Username: [paolo.disit](#)

### Search



### Organization Groups

DISIT  
[Developer](#)  
[Operative](#)

Updates on

- 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\\_SNAP4SOLUTION.pdf](https://www.snap4city.org/download/video/DBL_SNAP4SOLUTION.pdf)



# 2023 booklets



- Smart City



[https://www.snap4city.org/download/video/DPL\\_SNAP4CITY.pdf](https://www.snap4city.org/download/video/DPL_SNAP4CITY.pdf)

- Industry



[https://www.snap4city.org/download/video/DPL\\_SNAP4INDUSTRY.pdf](https://www.snap4city.org/download/video/DPL_SNAP4INDUSTRY.pdf)

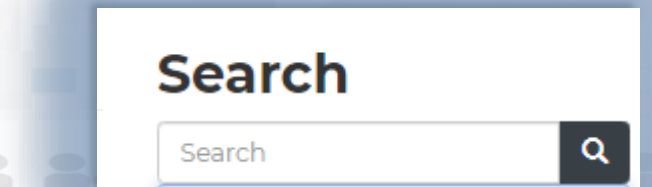
- Artificial Intelligence



[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>





# 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-u4vandg>

**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->

[Wdf](https://www.snap4city.org/download/video/ClientSideBusinessLogic-)



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**SNAP4Tech**

## 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-u4vanda>

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



# Overview



- <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)





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# Acknowledgements

FROM CITY  
DASHBOARD TO  
APPLICATIONS

DATA GATHERING  
AND CITY DATA  
KNOWLEDGE  
MANAGEMENT

FORGING &  
MANAGING OPEN  
AND FLEXIBLE WEB  
AND MOBILE APPS

IOT APPLICATIONS  
VS IOT EDGE  
DEVICES

IOT APPLICATIONS,  
THE LOGIC AND  
THE SMARTNESS

ADVANCED  
SMART CITY API,  
MICROSERVICES,  
SNAP4CITY API

SNAP4CITY  
LIVING LAB FOR  
COLLABORATIVE  
WORK

SNAP4CITY FOR  
BEGINNERS

AT BUSINESS  
INTELLIGENCE,  
WHAT-IF AND  
SIMULATION

SNAP4CITY  
ARCHITECTURE AND  
ECOSYSTEM. OPENED  
TO DEVELOPERS  
AND STAKEHOLDERS

TWITTER  
VIGILANCE: SOCIAL  
MEDIA ANALYSIS

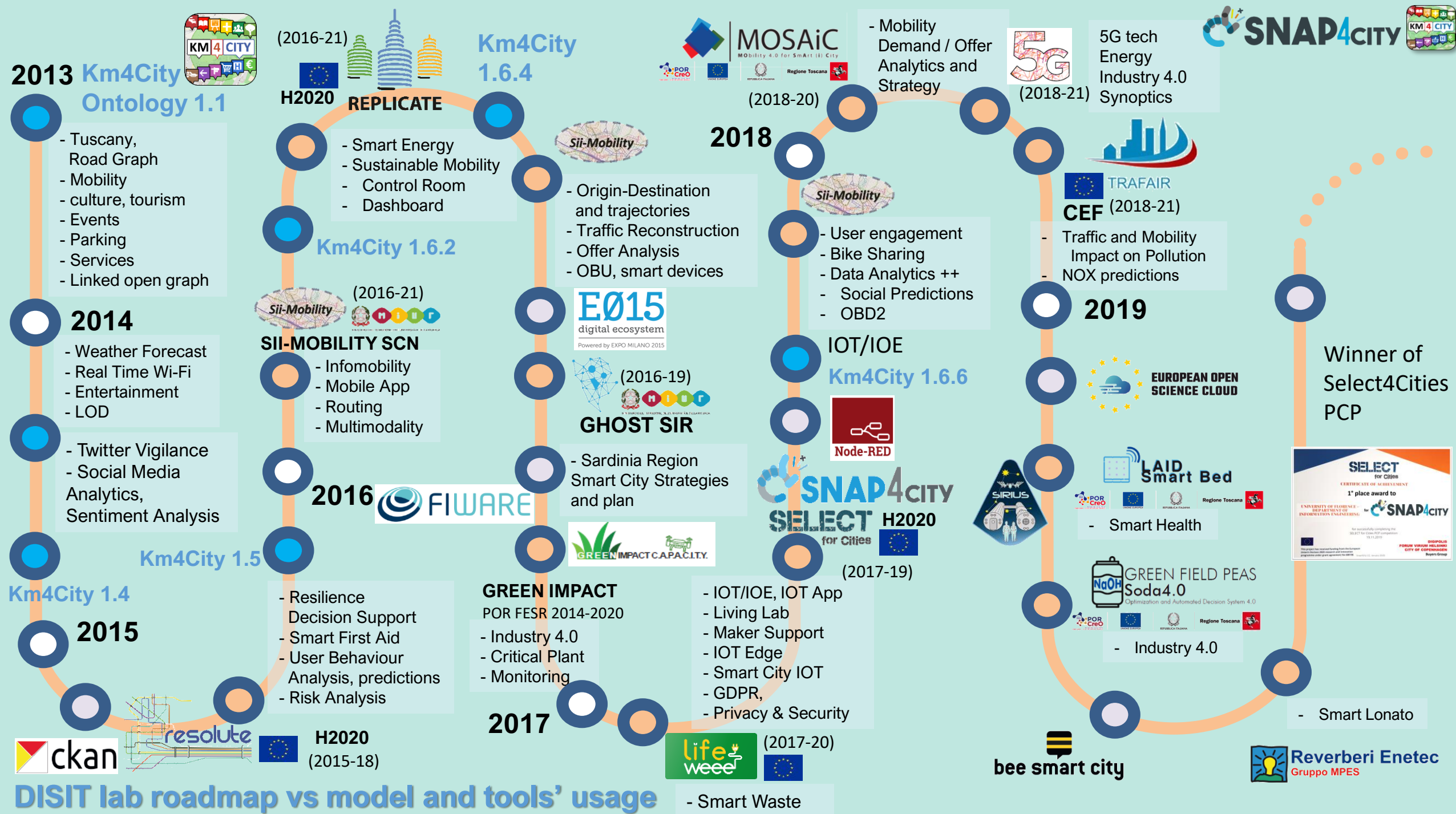
DECISION SUPPORT  
SYSTEM AND CITY  
RESILIENCE

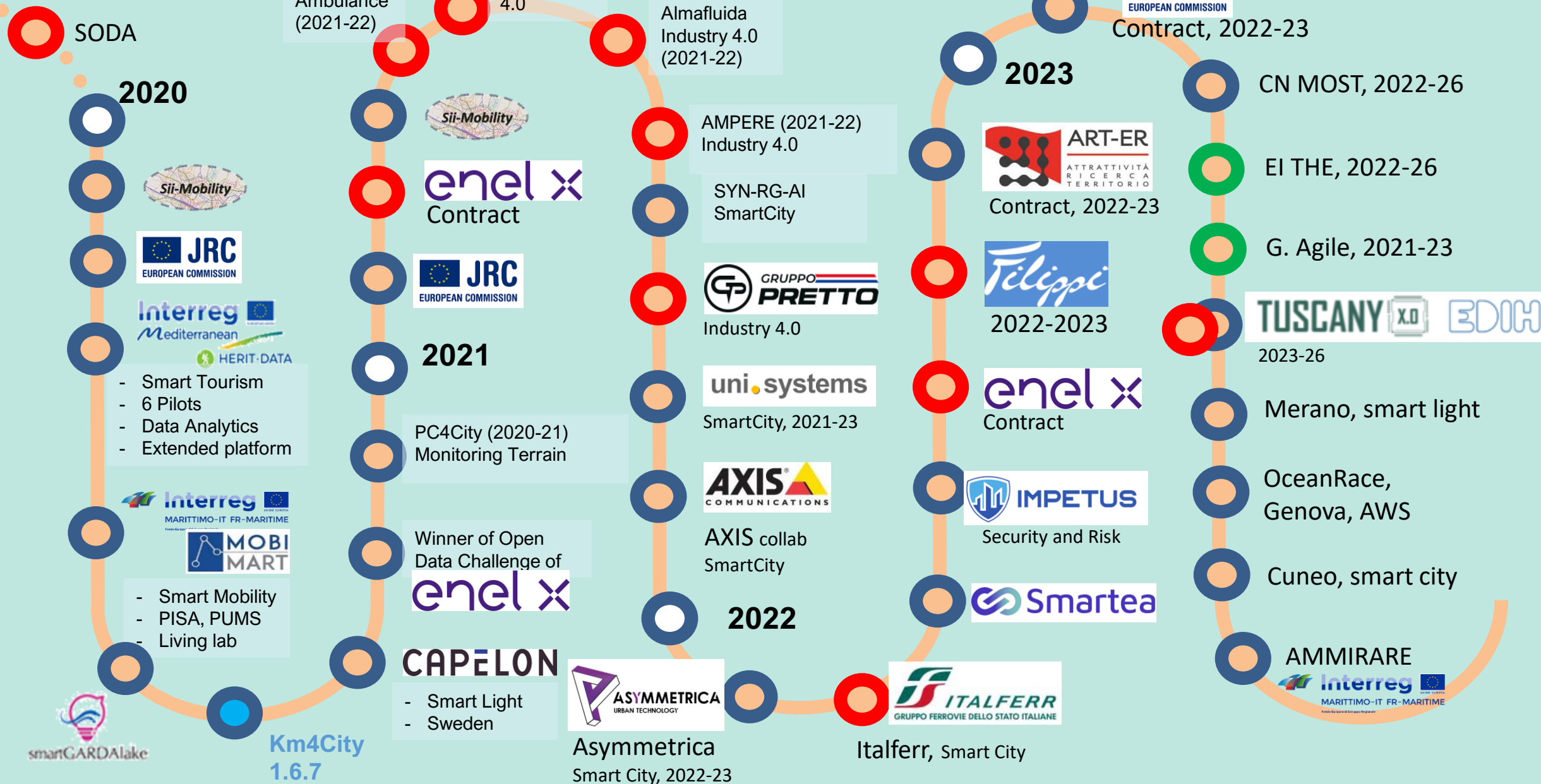
HOW TO ADOPT  
SNAP4CITY, AND  
OUR ROADMAP

SNAP4CITY  
AND KM4CITY  
PROJECTS

SNAP4CITY THE  
VIEW OF THE  
ADMINISTRATORS









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*Be smart in a SNAP!*



**SMARTCITY**  
EXPO WORLD CONGRESS

7-9 November 2023, Barcelona, Spain

Visit Snap4City in Hall 1

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