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

https://www.Snap4City.org

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9 July 2019, 2° Training day of 3, Florence
https://www.snap4city.org/drupal/node/485

Paolo Nesi, paolo.nesi@unifi.it
https://www.Km4City.org
https://www.disit.org

Agenda of 9 July

- Recall on Architecture
- Dashboard Usage and Authoring
  - Dashboards Usage and Widgets
  - Unified Data and Services Inspection and Exploitation
- Dashboard Creation & Exercitation
  - Dashboard Creation, Exercitation
  - Dashboards Management
  - Dashboards on Web and Mobile Devices
- Data Type Management GDPR Compliant
- Snap4City and Km4City Projects
- Acknowledgments

Training piattaforma Snap4City. Dai Dati alla città Senziente, Smart City and IOT

- **25 Giugno**: *visione generale sulla piattaforma: dai dati alle Dashboard passando da IOT e Data Analytic, GDPR, Living Lab, Smart City API, smart city control room (SCCR).*

- **9 Luglio (aula 111, viale Morgagni plesso didattico Univ. Firenze, aula di informatica https://goo.gl/maps/Wh27PuwRd817G2TB7):**
  - ..

- **23 Luglio (aula 111, viale Morgagni plesso didattico Univ. Firenze, aula di informatica https://goo.gl/maps/Wh27PuwRd817G2TB7):**
  (Si consiglia di: non venire con il vostro portatile, l'aula è attrezzata con PC con risoluzione HD, avere già installato Toscana in a Snap su Android o iOS, da qualche giorno
  - Come aggiungere funzioni che non sono presenti ora in piattaforma, e.g.: gestione rifiuti, agricoltura, legno,
  - Intelligence delle Dashboard, Combinazione di sorgenti dati,
  - sviluppo di applicazioni IOT data driven con strumenti visuali (esercitazione)
  - Creazione di applicazioni smart, IOT Applications integrate con Dashboard (esercitazione)
  - Sviluppo di sensori IOT a basso costo
  - Sviluppo di soluzioni di Data Analytic tramite R Studio
  - Esempio di Web Scraping integrato
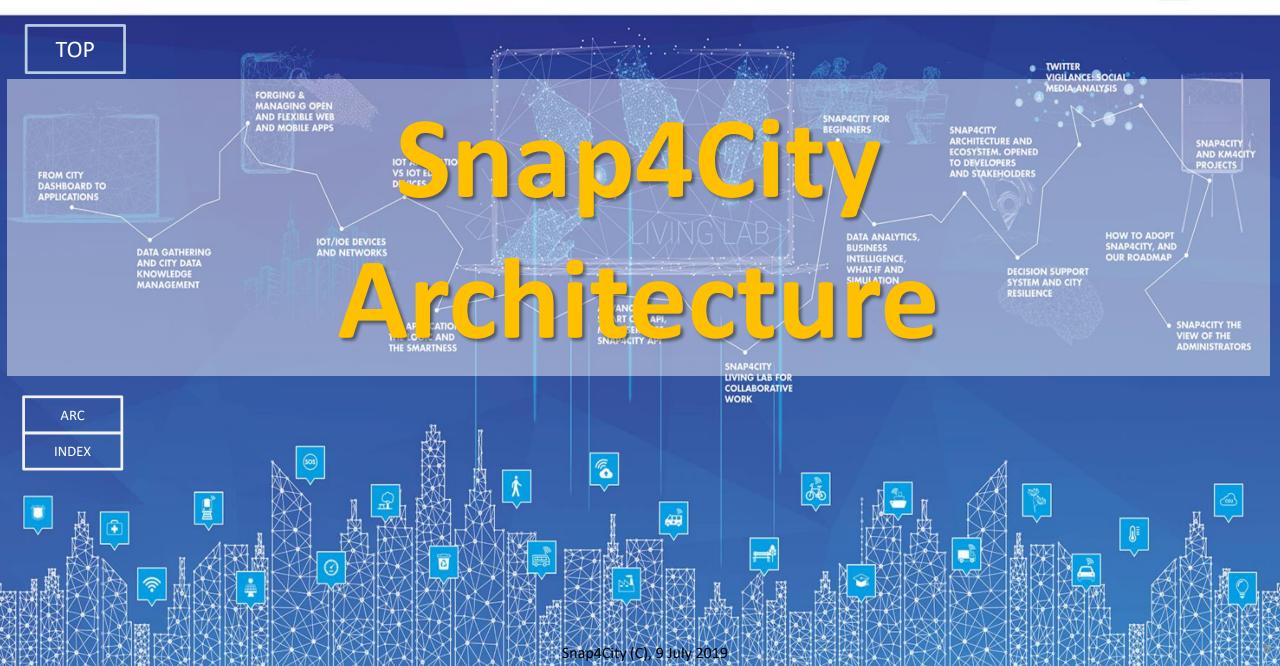 - La gestione della sicurezza in stack IOT

Altre Giornate a Agosto/Settembre

- 1) Snap4City the architecture and technical details
  - Smart City Data Storage: large tables, graphs, and Data Shadow
  - Data Ingestion processes in ETL or other means
  - IOT Applications and elastic management
  - IOT, end-2-end security from devices to Dashboards
  - User Managment
  - Auditing of activities
- 2) Data management
  - Data Search
  - Data Ingestion via Data Gate
  - Data Ingestion via ETL
  - Data Ingestion via IOT brokers, and NIFI
  - Data Modeling

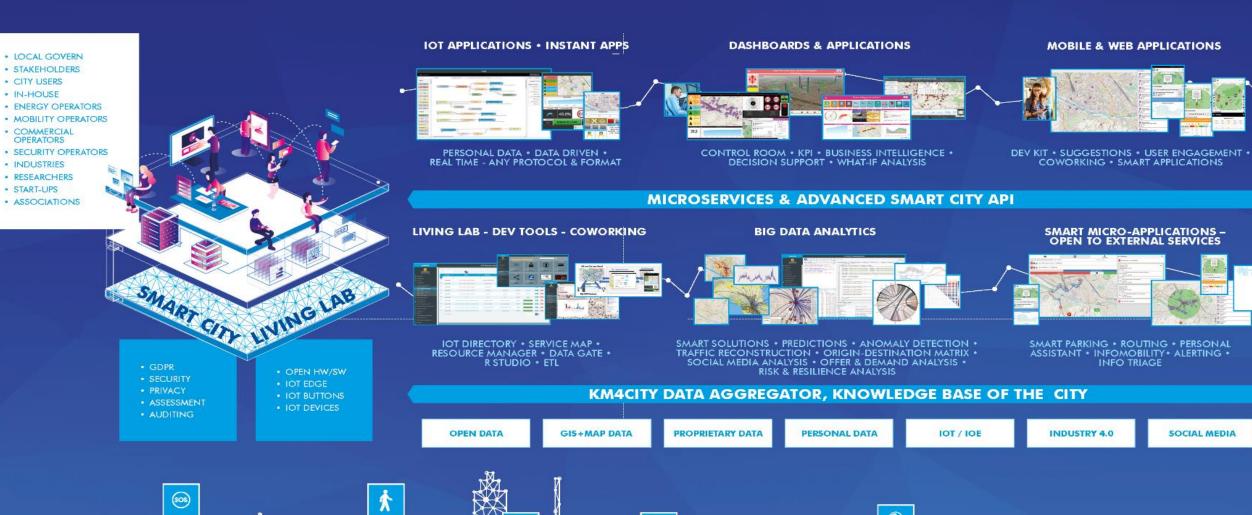# SCALABLE SMART ANALYTIC APPLICATION BUILDER FOR SENTIENT CITIES

TOP

Snap4City Architecture

ARC

INDEX

SNAP4CITY · KM4CITY

100% OPEN SOURCE URBAN PLATFORM: SMART CITY AND LIVING LAB

- LOCAL GOVERN
- STAKEHOLDERS
- CITY USERS
- IN-HOUSE
- ENERGY OPERATORS
- MOBILITY OPERATORS
- COMMERCIAL OPERATORS
- SECURITY OPERATORS
- INDUSTRIES
- RESEARCHERS
- START-UPS
- ASSOCIATIONS

SMART CITY LIVING LAB

- GDPR
- SECURITY
- PRIVACY
- ASSESSMENT
- AUDITING

- OPEN HW/SW
- IOT EDGE
- IOT BUTTONS
- IOT DEVICES

IOT APPLICATIONS · INSTANT APPS

PERSONAL DATA · DATA DRIVEN · REAL TIME - ANY PROTOCOL & FORMAT

DASHBOARDS & APPLICATIONS

CONTROL ROOM · KPI · BUSINESS INTELLIGENCE · DECISION SUPPORT · WHAT-IF ANALYSIS

MOBILE & WEB APPLICATIONS

DEV KIT · SUGGESTIONS · USER ENGAGEMENT · COWORKING · SMART APPLICATIONS

MICROSERVICES & ADVANCED SMART CITY API

LIVING LAB - DEV TOOLS - COWORKING

IOT DIRECTORY · SERVICE MAP · RESOURCE MANAGER · DATA GATE · R STUDIO · ETL

BIG DATA ANALYTICS

SMART SOLUTIONS · PREDICTIONS · ANOMALY DETECTION · TRAFFIC RECONSTRUCTION · ORIGIN-DESTINATION MATRIX · SOCIAL MEDIA ANALYSIS · OFFER & DEMAND ANALYSIS · RISK & RESILIENCE ANALYSIS

SMART MICRO-APPLICATIONS – OPEN TO EXTERNAL SERVICES

SMART PARKING · ROUTING · PERSONAL ASSISTANT · INFOMOBILITY · ALERTING · INFO TRIAGE

KM4CITY DATA AGGREGATOR, KNOWLEDGE BASE OF THE CITY

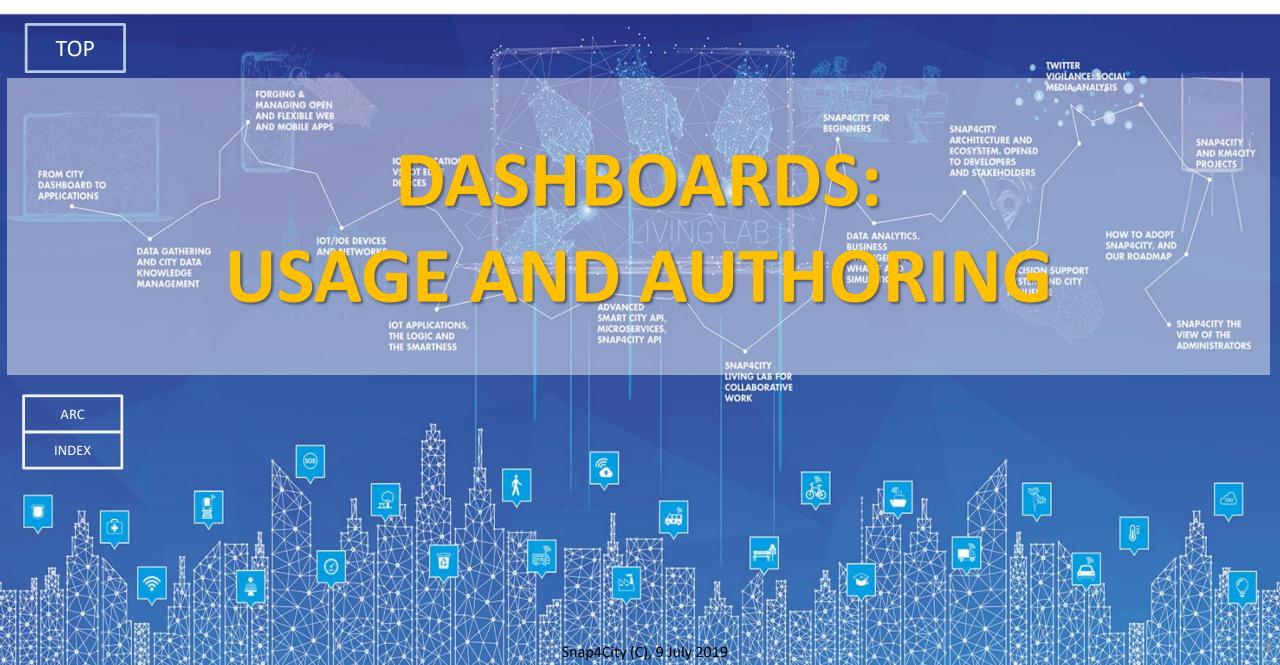| OPEN DATA | GIS+MAP DATA | PROPRIETARY DATA | PERSONAL DATA | IOT / IOE | INDUSTRY 4.0 | SOCIAL MEDIA |

What they state about us

- One Platform for all City data, and all the Stakeholders
  - One common environment for your Living Lab
  - $\rightarrow$ share costs among all Stakeholders, ... $\rightarrow$ sustainability
- User friendly interface, all in, easy to use!
  - What you can do in Snap4City in Hours/Days with other platform you take at least Weeks, "*X20 factor*"
- Open Source 100%, No Vendor Lock-in, etc.
  - Real Open Source Licence: Affero GPL, no custom private release.
- Any Standard, Any protocol, Any format, etc.

SCALABLE SMART ANALYTIC APPLICATION BUILDER FOR SENTIENT CITIES

TOP

DASHBOARDS: USAGE AND AUTHORING
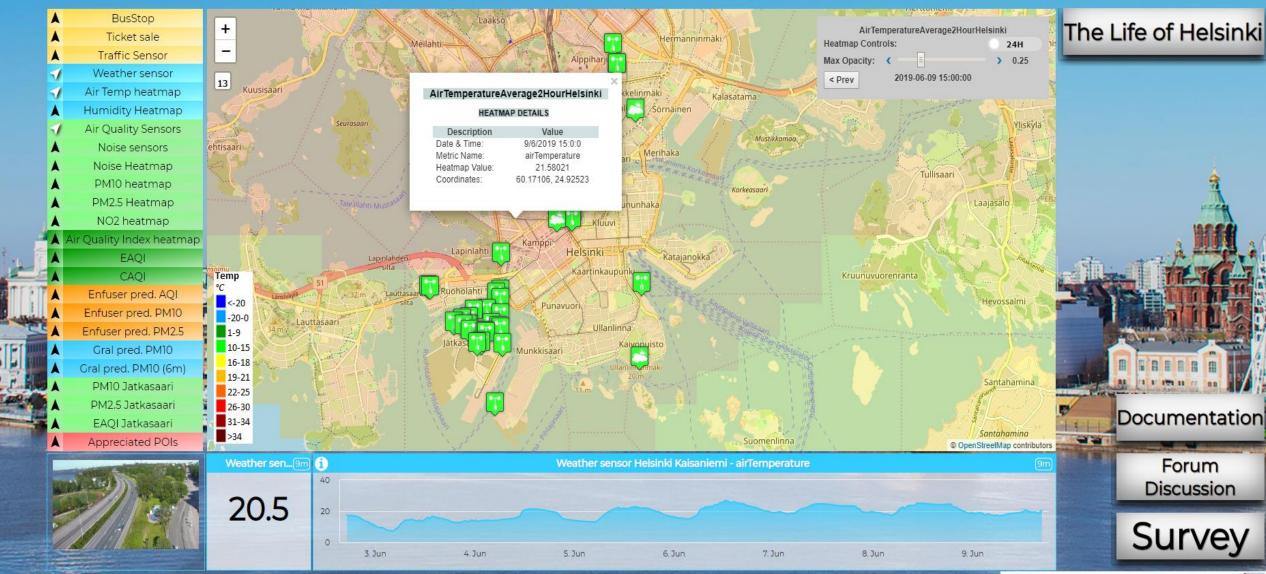
ARC

INDEX

Public Dashboards (see them on the Portal)

Dashboards Usage vs Widgets

ARC

INDEX

Helsinki City Overview (H5a)

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

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

AirTemperatureAverage2HourHelsinki

Heatmap Controls: 24H
Max Opacity: 0.25
< Prev   2019-06-09 15:00:00

AirTemperatureAverage2HourHelsinki

HEATMAP DETAILS

Description	Value
Date & Time:	9/6/2019 15:0:0
Metric Name:	airTemperature
Heatmap Value:	21.58021
Coordinates:	60.17106, 24.92523

Temp °C
<-20	
-20-0	
1-9	
10-15	
16-18	
19-21	
22-25	
26-30	
31-34	
>34	

The Life of Helsinki

Documentation

Forum Discussion

Survey

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Weather sen... (9m)

20.5

Weather sensor Helsinki Kaisaniemi - airTemperature (9m)

40 — 20 — 0

3. Jun   4. Jun   5. Jun   6. Jun   7. Jun   8. Jun   9. Jun

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

Helsinki City Overview (H5a)

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

Sun 9 Jun 17:07:25

Selector

The Life of Helsinki

Button

AirTemperatureAverage2HourHelsinki
Heatmap Controls: 24H
Max Opacity: ‹ › 0.25
< Prev 2019-06-09 15:00:00

AirTemperatureAverage2HourHelsinki

HEATMAP DETAILS

Description	Value
Date & Time:	9/6/2019 15:0:0
Metric Name:	airTemperature
Heatmap Value:	21.58021
Coordinates:	60.17106, 24.92523

Widget Map
(multi data map)

Temp
°C
<-20
-20-0
1-9
10-15
16-18
19-21
22-25
26-30
31-34
>34

External Content

Single Content

Time Trend

Documentation

Forum Discussion

Buttons

Survey

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

Dashboard Usage & Recipe

- https://www.snap4city.org/dashboardSmartCity/view/index.php?iddasboard=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**: Heatmaps, traffic, 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
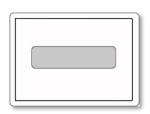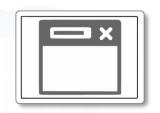
Other Widgets in the dashboard

- **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, Video Streams
  - Many many other tools see next exercise
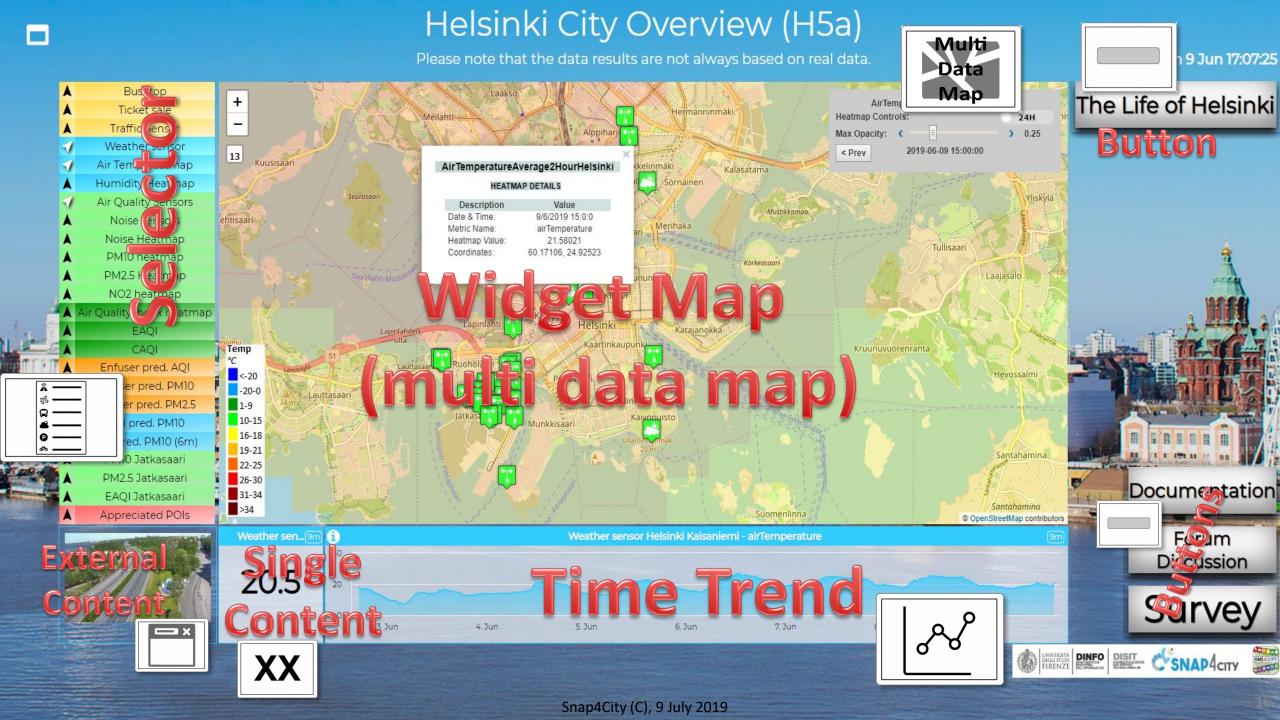
- **Single Content**
  - Single value: numeric, string, HTML, etc.

- **Time Trend**
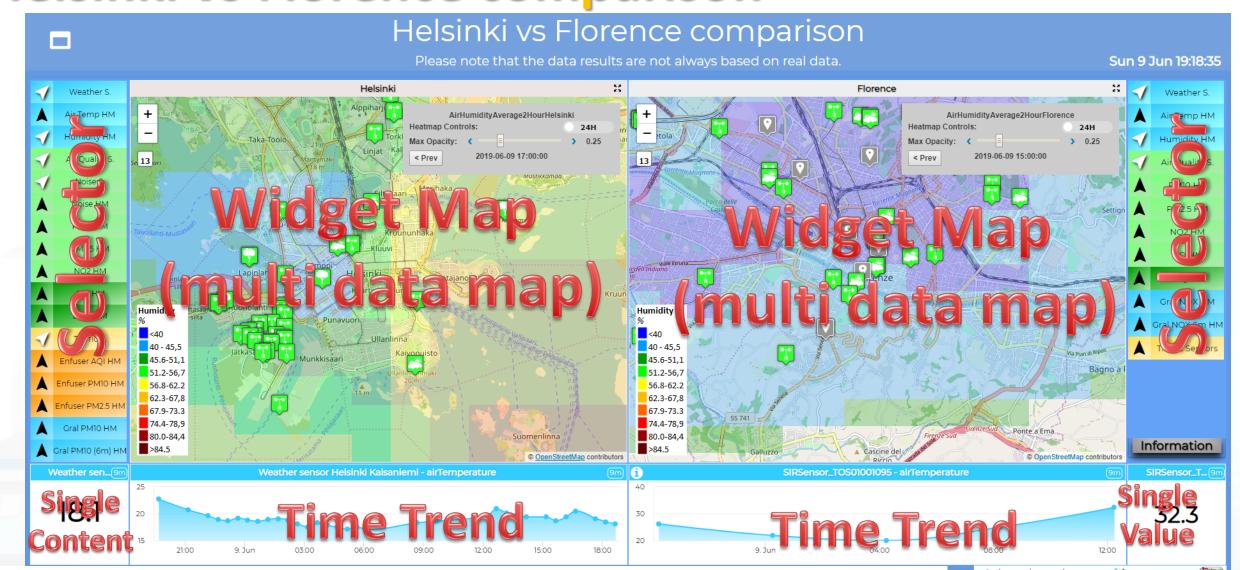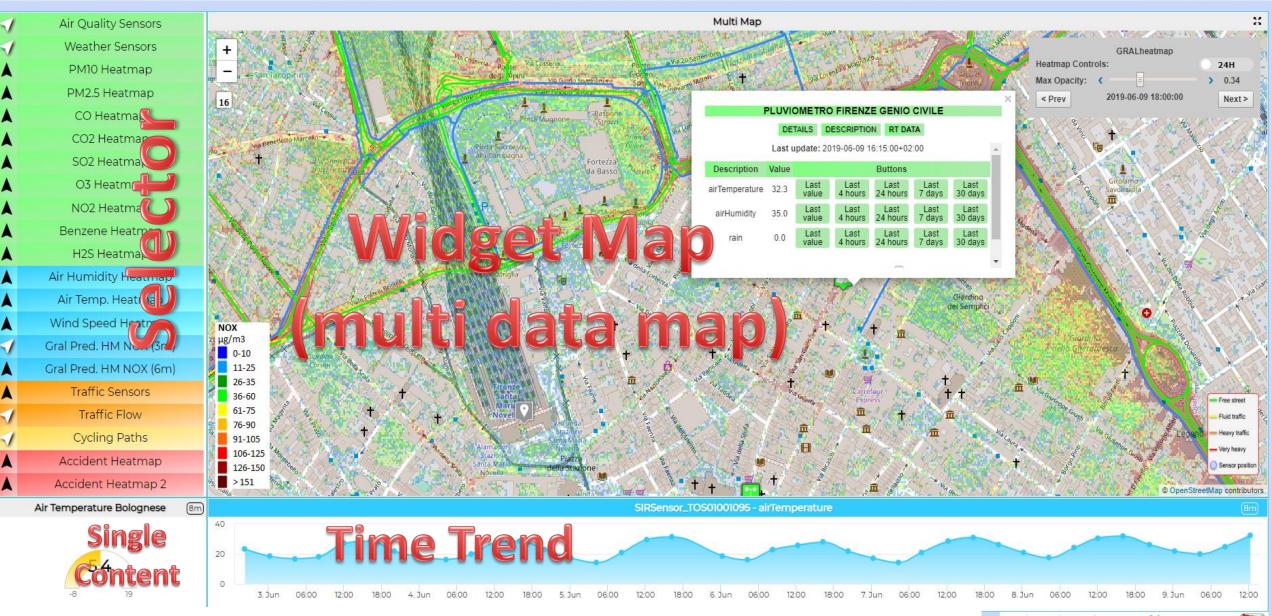 - Time Series: numeric values over time

Helsinki City Overview (H5a)

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

Multi Data Map

Mon 9 Jun 17:07:25

The Life of Helsinki

Button

Selector

Bus Stop
Ticket sale
Traffic sensor
Weather sensor
Air Temp Heatmap
Humidity Heatmap
Air Quality Sensors
Noise sensors
Noise Heatmap
PM10 heatmap
PM2.5 Heatmap
NO2 heatmap
Air Quality Index heatmap
EAQI
CAQI
Enfuser pred. AQI
...fuser pred. PM10
...fuser pred. PM2.5
...I pred. PM10
...red. PM10 (6m)
...0 Jatkasaari
PM2.5 Jatkasaari
EAQI Jatkasaari
Appreciated POIs

AirTemperatureAverage2HourHelsinki

HEATMAP DETAILS

Description	Value
Date & Time:	9/6/2019 15:0:0
Metric Name:	airTemperature
Heatmap Value:	21.58021
Coordinates:	60.17106, 24.92523

AirTemp
Heatmap Controls:
24H
Max Opacity: ◀ | ▶ 0.25
< Prev   2019-06-09 15:00:00

Widget Map (multi data map)

Temp
°C
<-20
-20-0
1-9
10-15
16-18
19-21
22-25
26-30
31-34
>34

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Documentation

Forum Discussion

Buttons

Survey

External Content

Weather sen... 9m ℹ

Single Content

20.5

XX

Weather sensor Helsinki Kaisaniemi - airTemperature   9m

Time Trend

3. Jun   4. Jun   5. Jun   6. Jun   7. Jun

UNIVERSITÀ DEGLI STUDI FIRENZE   DINFO   DISIT   Snap4City   KM4CITY

Helsinki vs Florence comparison

https://www.snap4city.org/dashboardSmartCity/view/index.php?iddasboard=MTc0MQ==

Firenze - Trafair - AirQuality Heatmaps

This dashboad contains data derived from actual sensors and predictive values under validation
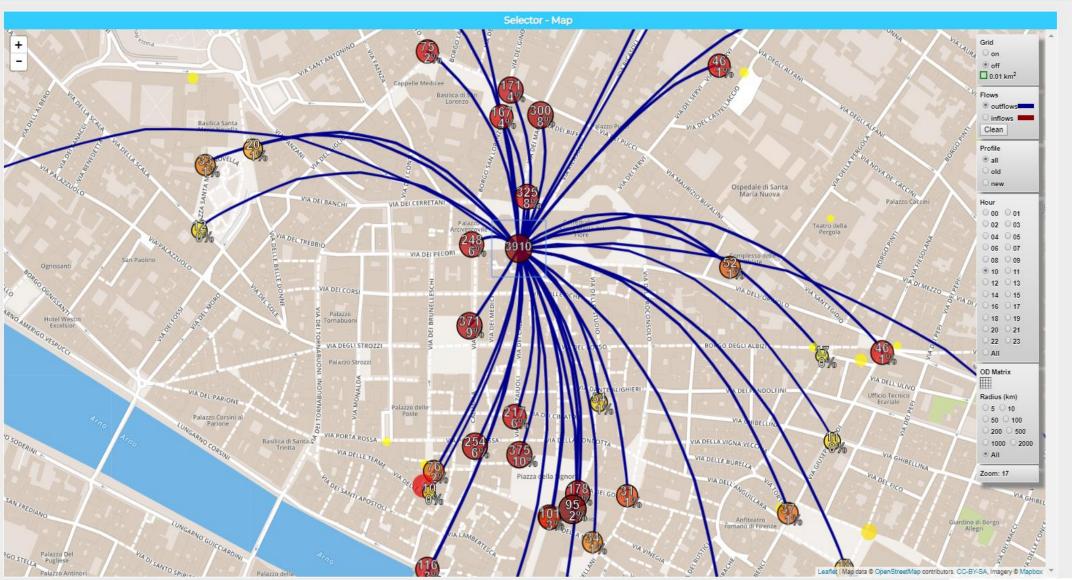
Sun 9 Jun 18:53:01

Selector

Air Quality Sensors
Weather Sensors
PM10 Heatmap
PM2.5 Heatmap
CO Heatmap
CO2 Heatmap
SO2 Heatmap
O3 Heatmap
NO2 Heatmap
Benzene Heatmap
H2S 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
Accident Heatmap 2

Multi Map

Widget Map (multi data map)

GRALheatmap

Heatmap Controls: 24H

Max Opacity: ‹ › 0.34

< Prev   2019-06-09 18:00:00   Next >

PLUVIOMETRO FIRENZE GENIO CIVILE

DETAILS   DESCRIPTION   RT DATA

Last update: 2019-06-09 16:15:00+02:00

Description	Value	Buttons				
airTemperature	32.3	Last value	Last 4 hours	Last 24 hours	Last 7 days	Last 30 days
airHumidity	35.0	Last value	Last 4 hours	Last 24 hours	Last 7 days	Last 30 days
rain	0.0	Last value	Last 4 hours	Last 24 hours	Last 7 days	Last 30 days

NOX
µg/m3
0-10
11-25
26-35
36-60
61-75
76-90
91-105
106-125
126-150
> 151

Free street
Fluid traffic
Heavy traffic
Very heavy
Sensor position

© OpenStreetMap contributors

Air Temperature Bolognese   8m

Single Content

SIRSensor_TOS01001095 - airTemperature   8m

Time Trend

40

20

0

3. Jun 06:00 12:00 18:00 4. Jun 06:00 12:00 18:00 5. Jun 06:00 12:00 18:00 6. Jun 06:00 12:00 18:00 7. Jun 06:00 12:00 18:00 8. Jun 06:00 12:00 18:00 9. Jun 06:00 12:00

https://www.snap4city.org/dashboardSmartCity/view/index.php?iddasboard=MTUzMg==

Life in Toscana: Dashboard

https://www.snap4city.org/dashboardSmartCity/view/index.php?iddasboard=MTc3NA==

Life in Toscana: Dashboard

https://www.snap4city.org/dashboardSmartCity/view/index.php?iddasboard=MTc3NA==

Life in Toscana: Dashboard

Dashboard Usage and Recipe

- https://www.snap4city.org/dashboardSmartCity/view/index.php?id dasboard=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.
  - **Snap4City pages**: Form discussion, help desk, user manual, …
  - **Snap4City Dashboards** for nested views, MultiDashboards views
    - Ultra ultra HD screens….
- **Selector WEB**
  - Anything that can be shown on External Content WG, one or more

External Services (registered)

Screenshot of the Snap4City "List of External Services" interface showing registered external services including:

- Firenze: Recency and Frequency from WiFi... (Government and Security)
- Firenze: Tracking rescue teams (Government and Security)
- Firenze: Trajectories from Mobile App (Government and Security)
- Flanders Environment Agency (Environment)
- Garda Lake Overview (a part) (Services POI and IOT)
- GDS test (Environment)
- Google Map (Services POI and IOT)
- Helsinki Map GIS, Kartta (GovernmentOffice)
- Helsinki Overview (a part) (Services POI and IOT)
- Indice della Qualita dell'aria in Italia, by UNI... (Environment)
- Interactive Maps Amsterdam (GovernmentOffice)
- Km4City User Statistics (Infrastructure)

Left navigation menu: 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, Notificator, Data Inspector, My Data, KPI, POI, IOT Applications, IOT Directory and Devices, Knowledge and Maps, Micro Applications, External Services, Data Set Manager: Data Gate, Resource Manager: Process Loader, Development Tools, Management, Settings, User Management and Auditing, Help and Contacts, Documentation and Articles, My Profile

MicroApplications

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

Thu 13 Jun 23:37:56

External Content

Selector web

Grid
- on
- off
- ☐ 0.3 km²

Flows
- outflows
- inflows
- Clean

Hour
- 00 01
- 02 03
- 04 05
- 06 07
- 08 09
- 10 11
- 12 13
- 14 15
- 16 17
- 18 19
- 20 21
- 22 23
- All

OD Matrix

Radius (km)
- 200 500
- 1000 2000
- All

Zoom: 13

26600 33%
21280 27%
5320 7%
5320 7%
5320 7%
5320 7%
79800 5320 7%
5320 7%

https://www.snap4city.org/dashboardSmartCity/view/index.php?iddasboard=MTgwNw==

Multi-Widget Map - Demo

Traffic Events (9m)

29/06/2019 14:32:32 5
MATERIALE IN CARREGGIATA SOSTANZA VISCIDA, INDIRIZZO: VIA DELLA TORRICELLA 5,

OIL ON ROAD
29/06/2019 14:22:53 1
INCIDENTI CON FERITI, INDIRIZZO: VIA FILIPPO CORRIDONI 32 R,

ACCIDENT(S)
29/06/2019 14:05:41 1
29-06-2019 13:27 TRAFFICO RALLENTATO TRA GINESTRA FIORENTINA E MONTELUPO FIORENTINO PER LAVORI. FONTE IMPRESA:

SLOW TRAFFIC
29/06/2019 13:27:19 5
29-06-2019 12:45 VEICOLO FERMO O AVARIA TRA EMPOLI E EMPOLI EST. FONTE C.O. POL.STRADALE: PATTUGLIA POLIZIA (COA)

BROKEN DOWN VEHICLE(S)
29/06/2019 12:45:01 5
29-06-2019 12:20 TRAFFICO RALLENTATO TRA

Operator Events (9m)

20/03/2019 10:35:19
PEOPLE 51 OPERATOR SNAP4CITY

15/03/2019 13:54:29
PEOPLE 51 OPERATOR SNAP4CITY

15/03/2019 13:50:04
PEOPLE 15 OPERATOR SNAP4CITY

16/02/2019 18:28:01

Multi Map

Parking Free Spaces - Park_Rt (9m)
65.1
23. Jun 24. Jun 25. Jun 26. Jun 27. Jun 28. Jun 29. Jun

Legend:
Free street
Fluid traffic
Heavy traffic
Very heavy
Sensor position

Florence Events (9m)
free
"DIVENTO VENTO"
€
"LA BOHÈME"
€
"DALLAPICCOLA DAYS"
free
CONCERTO DELL'ORCHESTRA DA CAMERA FIORENTINA
€
"L'IMPORTANZA DI CHIAMARSI ERNESTO"
"CINEAMOUR"

Selector
Bus Stops
Cycle Paths Geometry
Cycle Paths Pins
Traffic Flow Density
Meteo Stations
Air Temp Heatmap
Air Quality

https://www.snap4city.org/dashboardSmartCity/view/index.php?iddasboard=MTA2NA==

Multi-Widget Map - Demo

Sat 29 Jun 16:42:24

Widget Map (multi data map)

Time Trend

Selector

https://www.snap4city.org/dashboardSmartCity/view/index.php?iddasboard=MTA2NA==

Multi-Widget Map - Demo

Traffic Events

Mobile Operator Events

Entertainment Events

https://www.snap4city.org/dashboardSmartCity/view/index.php?iddasboard=MTA2NA==
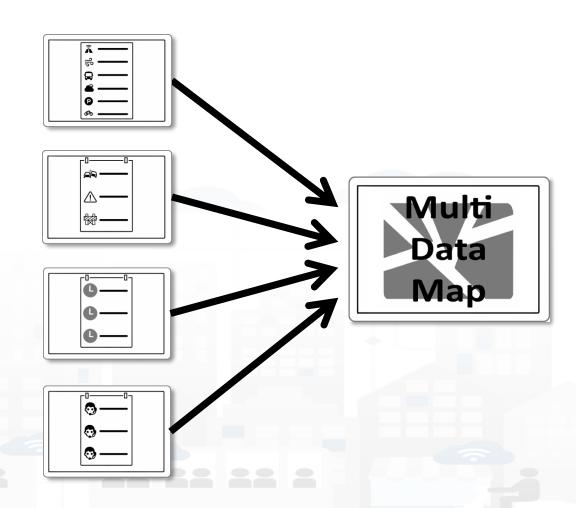
Dashboard Usage and recipe: Event map target

- ## Selector
  - **POI, Heatmap, traffic, etc.**

- ## Traffic Events:
  - From gestore (manager)

- ## Entertainment events:
  - From several sources

- ## Mobile Operator Events:
  - From operators with Mobile Apps

Parking Monitoring Firenze

Tue 21 May 15:23:09

https://www.snap4city.org/dashboardSmartCity/view/index.php?iddasboard=MTE3MA==

First aids overview - Tuscany

Service status of main first aid... Thu 25 M...

Careggi hospital (Florence) - ... 9m

Priority\Status	Red code	Yellow code	Green code	...de	...0
Addressed	1	4	3	0	0
Waiting	0	2	9	2	0
In visit	1	9	...	3	0
In observation	4	19	2	0	0
Totals	6	34	32	5	0

Santa Chiara hospital (Pisa) - D...

Priority\Status	Red code	Yellow code	Green code		
Waiting	0	1	7	9	3
In visit				1	6
Totals	0	8	8	10	9

Other hospitals - Sum... 9m

Priority\Hospitals	Red code	Yellow code	Green c...		...code
PS SAN GIOVANNI DI DIO TORREGALLI	1	16	20	1	0
PS SANTA MARIA NUOVA	1		3	0	
PS AO CAREGGI	6	34	32	5	0
PS SANTA MARIA ANNUNZIATA	1	8	11	1	0
...RGO ...RENZO	0	3	3	4	0
PS OSPEDALI RIUNITI	3	8	18	1	1
PS CASENTINO	No data available for this hospital				
PS SANTA CROCE	No data available for this hospital				
PI PO CORTONA	No data available for this hospital				
PS CIVILE PIOMBINO	No data available for this hospital				

First AID

First AID

First AID Multi

Careggi hospital (Florence) - Map

+ Show Menu — Hide Menu

SM

External Content ServiceMap

Santa Chiara hospital (Pisa) - Map

+ Show Menu — Hide Menu

SM

External Content ServiceMap

No data available for this hospital

https://main.snap4city.org/view/index.php?iddasboard=MTIy

Firenze Social and Social Media new
Demo cams

Sun 11 Mar 16:24:55

Twitter Vigilance Real Time Firenze
Twitter Vigilance Real Time Dashboard
Last crawling: 2018-03-11 16:23:14
Login — Menu On

External Content TwitterVigilanceRT

Twitter Vigilance Firenze
Twitter Vigilance Dashboard
Last crawling: 2018-03-11 16:21:07
Login — Menu On

External Content TwitterVigilance

Traffic flow map
Last sensors measure 2018-03-11T16:10:00
2018-03-11 16:24:55
Free street, Heavy traffic, Very heavy, sensor position

External Content Traffic Flow

Trend Twitter
Twitter Trend

Citations Twitter
Twitter quotes

Events in Florence today
Events

Buttons

Cam Firenze 1 / Cam Firenze 2
External Content CAMStream

https://dashboard.km4city.org/view/index.php?iddasboard=MjY3

34

Match Widget vs Icon

https://main.snap4city.org/view/index.php?iddasboard=OTQw

Table

Kiviat and Pies

Curved Lines (stacked)

Barlines (stacked)

https://main.snap4city.org/view/index.php?iddasboard=Nzc=

https://main.snap4city.org/view/index.php?iddasboard=MTAw
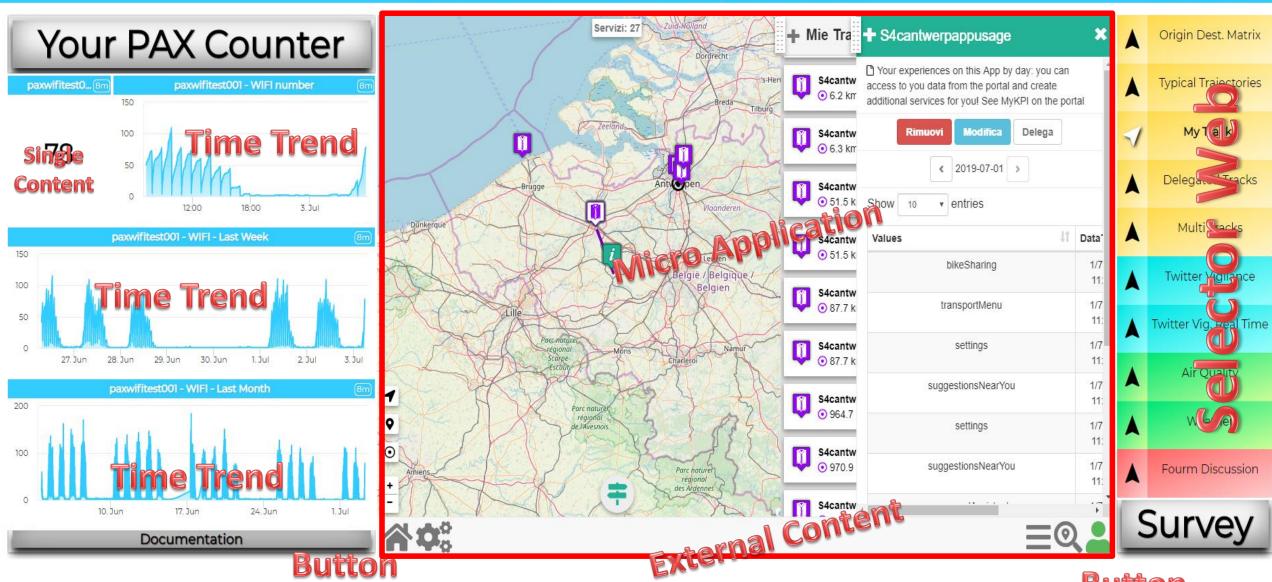
https://main.snap4city.org/view/index.php?iddasboard=ODM=

Snap4City (C),

36

Monitoring My PAXCounter and Tracks (example)

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

Wed 3 Jul 09:18:07

Your PAX Counter

Single Content

Time Trend

Time Trend

Time Trend

Micro Application

External Content

Selector Web

Origin Dest. Matrix

Typical Trajectories

My Tracks

Delegated Tracks

Multi Tracks

Twitter Vigilance

Twitter Vig. Real Time

Air Quality

Weather

Fourm Discussion

Survey

Button

Button

https://www.snap4city.org/dashboardSmartCity/view/index.php?iddasboard=MTc0NQ==

Monitoring My PAXCounter and Tracks (example)

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

Your PAX Counter

Single Content

Time Trend

Time Trend

Time Trend

Tracker

Dashboard

External Content

Button

Selector web

Origin Dest. Matrix

Typical Trajectories

My Tracks

Delegated Tracks

Multi Tracks

Twitter Vigilance

Twitter Vig. Real Time

Air Quality

Weather

Fourm Discussion

Survey Button

Documentation

https://www.snap4city.org/dashboardSmartCity/view/index.php?iddasboard=MTc0NQ==

Bus Tracking
(planned or real time)

3D view of POIs,
Real time Sensor values

Original Bus Position Map Widget

Firenze

Airport

Empoli

Real Time ... 3D

Sat 1 Dec 16:57:33

Car park: freeParkingLots   Road sensor: avgTime   Pollen: value   Air Quality: SO2   firstAid: blueCode

https://main.snap4city.org/view/index.php?iddasboard=MTY2

https://www.snap4city.org/dashboardSmartCity/view/index.php?iddasboard=MTUxMQ==

A set of connected dashboards
Many different tools.
Fully interactive for touch screens

Energy   Environment   Mobility   Social   Resilience

https://www.snap4city.org/dashboardSmartCity/view/index.php?iddasboard=OTM5

FIRENZE

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

2 | inviata comunicazione alla cittadinanza

OZONO
200 µ/m³ | 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 Linee	14	57	21
Attive Ritardo	3' 2'	8' 0'	5' 2'

COLONNINE RICARICA (9m)
180 INSTALLATE
81.1 % ATTIVE
8.9 % IN USO

REPLICATE — DISIT

FLORENCE DASHBOARD

This dashboard is the main entry point to access dashbaords realised in the REPLICATE H2020 EC project.
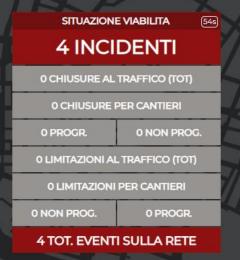
REPLICATE has received funding from the European Union's Horizon 2020 Research and Innovation Programme under grant agreement No. 691735.

FLUSSI INGRESSO CITTA (9m)

25 355.2 / 19 016.4 / 12 677.6 / 6338.8 / 0
08:00 — 16:00
Current / Previous

TOTALE (9m)
141608 VEICOLI

FLUSSI INGRESSO ZTL (9m)

7337.2 / 5502.9 / 3668.6 / 1834.3 / 0
08:00 — 16:00
Current / Previous

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)	BINARIO16 (9m)	FORTEZZA (9m)
63.4 % occupati su 901 posti	83 % occupati su 165 posti	17.9 % occupati su 521 posti
LEOPOLDA (9m)	CALZA (9m)	S.AMBROGIO (9m)
36.3 % occupati su 300 posti	69.3 % occupati su 218	67 % occupati su 379 posti
PARTERRE (9m)	CAREGGI (9m)	BECCARIA (9m)
64.9 % occupati su 106 posti	90.4 % occupati su 406 posti	78.6 % occupati su 210 posti

MAPPA

Energy | Environment | Mobility | Social | Resilience

STATO TRIAGE CAREGGI (9m)

Red code	Yellow code	Green code	Blue code	White code
3	12	83	37	9

PM10	Riciclo rifiuto	Rifiuto per abitante	PIL residenti	Tasso di disoccupazione	Piste Ciclabili
26 superamenti/anno	56%	0,629 t/pers/anno	23.606 euro/pers	6,8%	19.7% km ciclabili/km totali

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

FIRENZE

Tue 16 Oct 16:18:39

Single Content 2

Single Content

Civil Protection SOC

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

inviata comunicazione alla cittadinanza

GENERAL | METEO

MINIMO BASSO MEDIO ALTO

RISCHIO IDRAULICO

RISCHIO TEMPORALI

RISCHIO IDROGEOLOGICO

RISCHIO NEVE

RISCHIO GHIACCIO

Single Content
OZONO
200 µg/m³

Single Content
supera la soglia di informazione

Single Content
39492 Utenti WiFi

Meteo
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

External Content
TPL
N 14 57 21
Linea
Attesa Ritardo 3' 2' 8' 0' 5' 2'

COLONNINE RICARICA 9m
3 SingleContent
INSTALLATE
81.1 % ATTIVE
8.9 % IN USO

External Content
FLORENCE DASHBOARD
This 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
FLUSSI INGRESSO CITTA 9m
25 355.2 19 016.4 12 677.6 Current

Single Content
TOTALE 9m
141...

Time Trend Compare
FLUSSI INGRESSO ZTL 9m
7337.2 5502.9 1834.1 Previous

Single Content
TOTALE ZTL 9m
41...

10 Single Content
SITUAZIONE VIABILITA 54s
4 INCIDENTI
0 CHIUSURE AL TRAFFICO (TOT)
0 ... PER CANTIERI
0 PROGR.
LIMITAZIONI AL TRAFFICO (TOT)
0 NON PROG. 0 PROGR.
4 TOT. EVENTI SULLA RETE

9 Single Content
SMN 9m 63.4 % occupati su 901 posti
BINARIO16 9m 83 % occupati su 165 posti
FORTEZZA 9m 17.9 % occupati su 521 posti
LEOPOLDA 36.3 % occupati su 300 posti
69.3 % occupati su 218
AMBROGIO 9m 67 % occupati su 379 posti
PARTERRE 9m 64.9 % occupati su 106 posti
% occupati su 406 posti
BECCARIA 9m 78.6 % occupati su 210 posti

First AID
STATO TRIAGE CAREGGI 9m
Red code Yellow code Green code Blue code White code
3 3 9

MAPPA
6 Buttons
Energy Environment Mobility Social Resilience

6 Buttons
PM... 26 superamenti/anno
...o 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

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

Snap4City (C), 9 July 2019

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Unified Data and Services Inspection and Exploitation

ARC

INDEX

Data Inspector

Data Inspector (open on your left side menu)

- **Cross Filtering on the basis of**:
  - MAP: pan and zoom → lock , center on GPS coordinates of the user
  - Data Source Classification:
    - faceted filtering
    - full text search
  - Click on data source to see it on map, and see the graphics representation, just to learn how widgeting it.

- **Selecting a Data Source on Map**: on its Pin you can see:
  - Real time data
  - Time trend: 4 hours, 12 hours, 1 day, 1 week, 30 days.
  - Full status and description (only for Administrators)
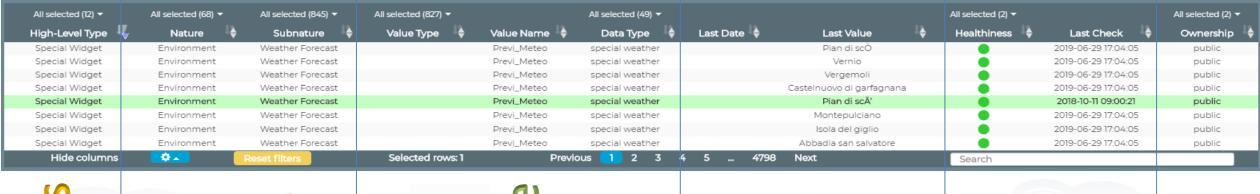
Unified Data and Services Model/Classification

High-Level Type	Nature	Subnature	Value Type	Value Name	Data Type	Last Date	Last Value	Healthiness	Last Check	Ownership
All selected (12) ▼	All selected (68) ▼	All selected (845) ▼	All selected (827) ▼		All selected (49) ▼			All selected (2) ▼		All selected (2) ▼
Special Widget	Environment	Weather Forecast		Previ_Meteo	special weather		Pian di scÒ	●	2019-06-29 17:04:05	public
Special Widget	Environment	Weather Forecast		Previ_Meteo	special weather		Vernio	●	2019-06-29 17:04:05	public
Special Widget	Environment	Weather Forecast		Previ_Meteo	special weather		Vergemoli	●	2019-06-29 17:04:05	public
Special Widget	Environment	Weather Forecast		Previ_Meteo	special weather		Castelnuovo di garfagnana	●	2019-06-29 17:04:05	public
Special Widget	Environment	Weather Forecast		Previ_Meteo	special weather		Pian di scÅ'	●	2018-10-11 09:00:21	public
Special Widget	Environment	Weather Forecast		Previ_Meteo	special weather		Montepulciano	●	2019-06-29 17:04:05	public
Special Widget	Environment	Weather Forecast		Previ_Meteo	special weather		Isola del giglio	●	2019-06-29 17:04:05	public
Special Widget	Environment	Weather Forecast		Previ_Meteo	special weather		Abbadia san salvatore	●	2019-06-29 17:04:05	public

Hide columns   ⚙▲   Reset filters   Selected rows: 1   Previous   1   2   3   4   5   ...   4798   Next   Search

High Level Types | **Nature** **SubNature** — *Semantic* | **Value Type** **Value Name** **Data Type** — *Technical* | **Last Date/Time** **Last Value** — *RealTime* | **Healthiness** **Last Check** — *Status* | **Ownership**

HLT: Complex events

High Level Types

- **Complex Event**
- Dashboard-IOT App
- External Service
- Heatmap
- KPI (Key Performance Indicator)
- MicroApplication
- My Personal Data
- MyKPI
- MyPOI
- POI (Point of Interest)
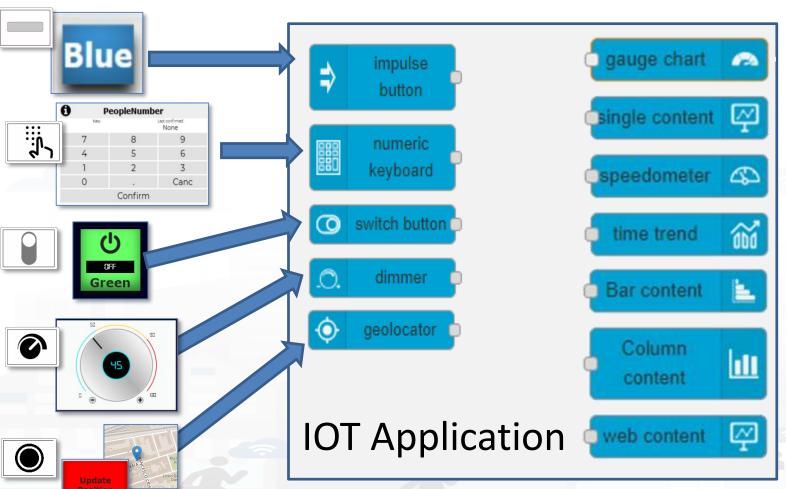- Sensor
- Sensor Actuator
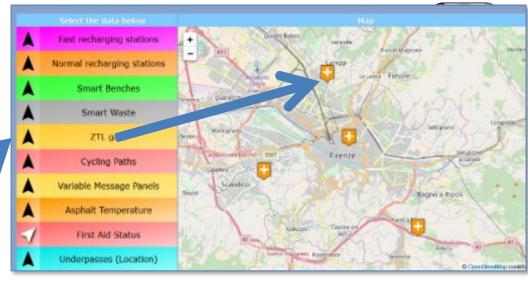- Special Widget
- Wfs (GIS)

Traffic Events

Operator

Entertainment Events

Multi Data Map

HLT: External Services

High Level Types

- **Complex Event**
- Dashboard-IOT App
- **External Service**
- Heatmap
- KPI (Key Performance Indicator)
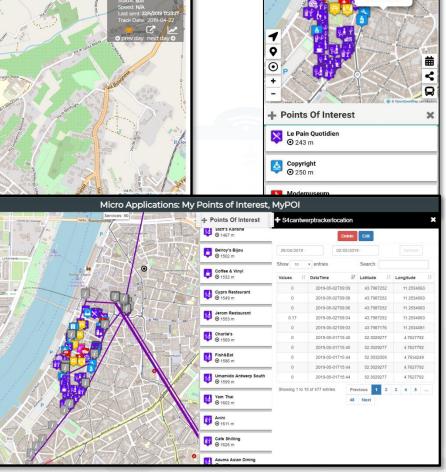- MicroApplication
- My Personal Data
- MyKPI
- MyPOI
- POI (Point of Interest)
- Sensor
- Sensor Actuator
- Special Widget
- Wfs (GIS)

External Services

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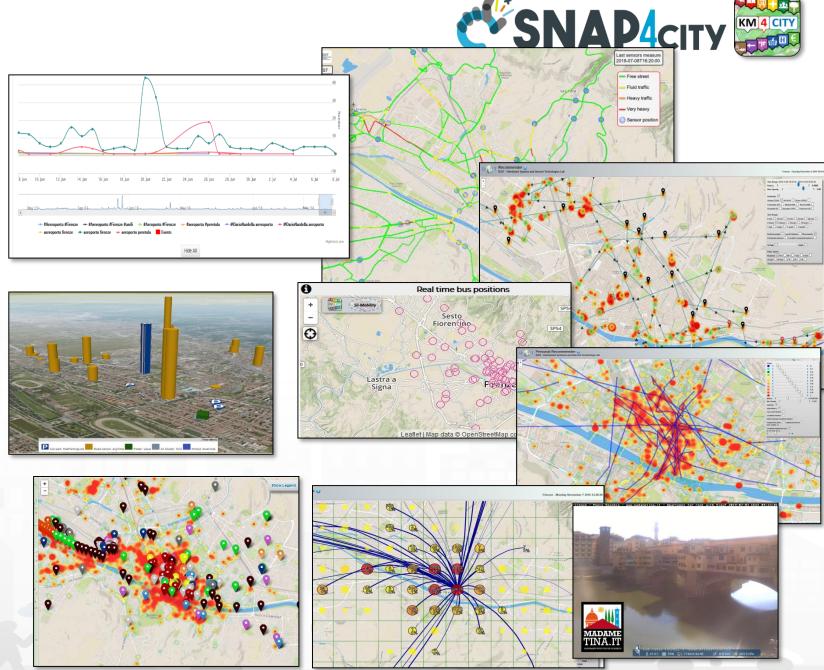
- Twitter Vigilance:
  – Daily and real time
  – Volume and sentiment analysis
- Services on Maps, GIS, ArcGIS
- Real time sensors on 3D
- Web HTML5 Applications
- Origin Destination Matrix
- Real Time fleets
- Routing, Multimodal tools
- IPCAM connector
- **Third party tools!**
- …..
- **Other tools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

IPCAM Service

- Examples:
  - https://main.snap4city.org/cam/ipCam.php?IP=www.meteofirenzehoteldavid.com/webcam/pontevecchio.jpg
  - https://main.snap4city.org/cam/ipCam.php?IP=www.meteofirenzehoteldavid.com/webcam/Firenze-HotelDavid.jpg
  - https://main.snap4city.org/cam/ipCam.php?IP=192.168.0.240/tmpfs/auto.jpg
  - https://main.snap4city.org/cam/ipCam.php?IP=www.cagliarimeteo.it/images/webcam/1/Cam1.jpg
  - ...
  - To access with credentials you need to add setting on an IP Cam Table
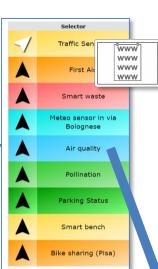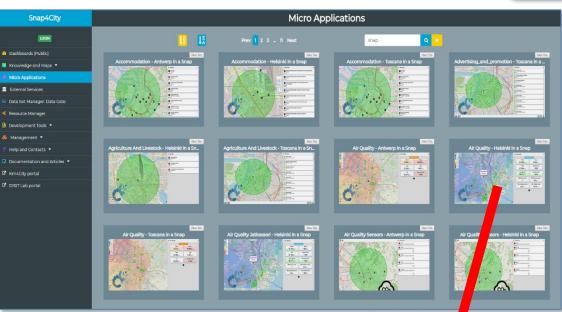
HLT: MicroApplications
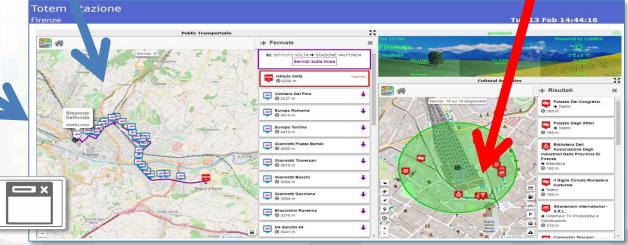
High Level Types

- **Complex Event**
- Dashboard-IOT App
- **External Service**
- Heatmap
- KPI (Key Performance Indicator)
- MicroApplication
- My Personal Data
- MyKPI
- MyPOI
- POI (Point of Interest)
- Sensor
- Sensor Actuator
- Special Widget
- WFS (GIS)

HTML5 MicroApplications

Events

Routing

Air Quality

Pollution

Hospital First Aid

Public Transportation

POIs

HLT: Special Widgets

High Level Types

- **Complex Event**
- Dashboard-IOT App
- **External Service**
- Heatmap
- KPI (Key Performance Indicator)
- **MicroApplication**
- My Personal Data
- MyKPI
- MyPOI
- POI (Point of Interest)
- Sensor
- Sensor Actuator
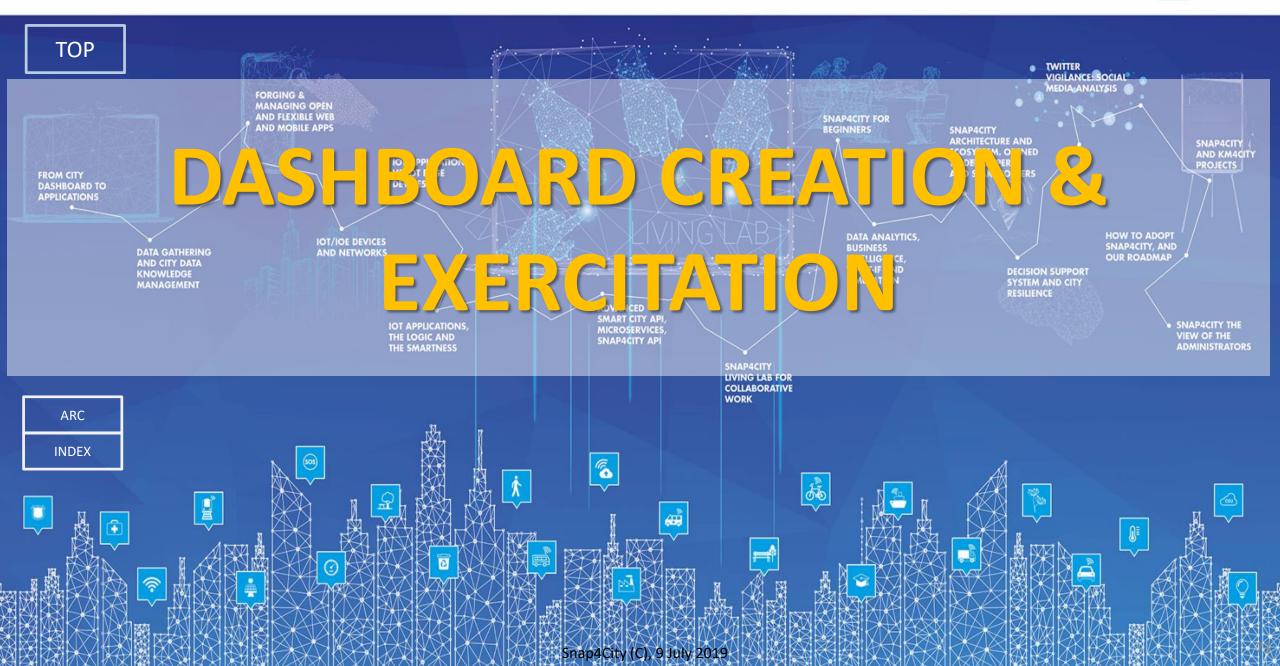- **Special Widget**
- Wfs (GIS)

HLT: POI

High Level Types

- **Complex Event**
- Dashboard-IOT App
- **External Service**
- Heatmap
- KPI (Key Performance Indicator)
- **MicroApplication**
- My Personal Data
- MyKPI
- MyPOI
- POI (Point of Interest)
- Sensor
- Sensor Actuator
- **Special Widget**
- Wfs (GIS)

Categories

Single POI

HLT: Heatmaps

High Level Types

- **Complex Event**
- Dashboard-IOT App
- **External Service**
- Heatmap
- KPI (Key Performance Indicator)
- **MicroApplication**
- My Personal Data
- MyKPI
- MyPOI
- **POI (Point of Interest)**
- Sensor
- Sensor Actuator
- **Special Widget**
- Wfs (GIS)

Heatmaps (flexible Data Analytics)

- **Main:**
- **—Heatmaps are Time series**
- **A) Gaussian Heatmaps**
- **B) Calibrated heatmaps**
  - From 200x200 to 4x4 mt
  - PM10, PM2.5, SO2, NO2, Noise, NO, O3, Enfuser, **GRAL**,....
  - Any programmed Color map
  - Animations
  - Piking values in any place, values on their position.
  - On Web and Mobile App
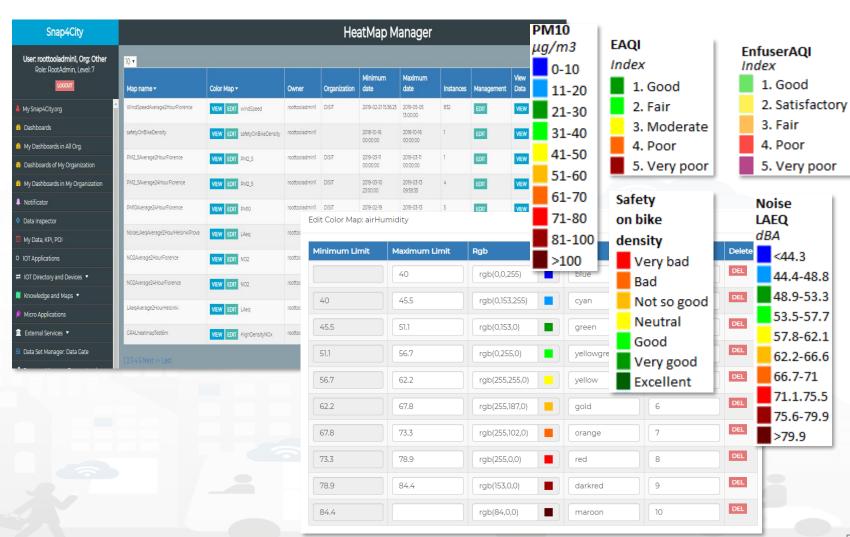
HeatMap Manager: managing, colormaps

- Historical data, time series
- Huge amount of data and points per heatmap
- 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

HLT: KPI (key Performance Indicator)
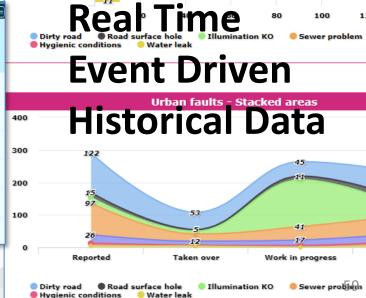
High Level Types

- **Complex Event**
- Dashboard-IOT App
- **External Service**
- **Heatmap**
- **KPI** (Key Performance Indicator)
- **MicroApplication**
- My Personal Data
- MyKPI
- MyPOI
- **POI** (Point of Interest)
- Sensor
- Sensor Actuator
- **Special Widget**
- Wfs (GIS)

Real Time

Event Driven

Historical Data

HLT: Sensors

High Level Types

- **Complex Event**
- Dashboard-IOT App
- **External Service**
- **Heatmap**
- **KPI** (Key Performance Indicator)
- **MicroApplication**
- My Personal Data
- MyKPI
- MyPOI
- **POI** (Point of Interest)
- **Sensor**
- **(Sensor Actuator)**
- **Special Widget**
- Wfs (GIS)

Real Time
Event Driven
Historical Data

HLT: Sensors

Nature
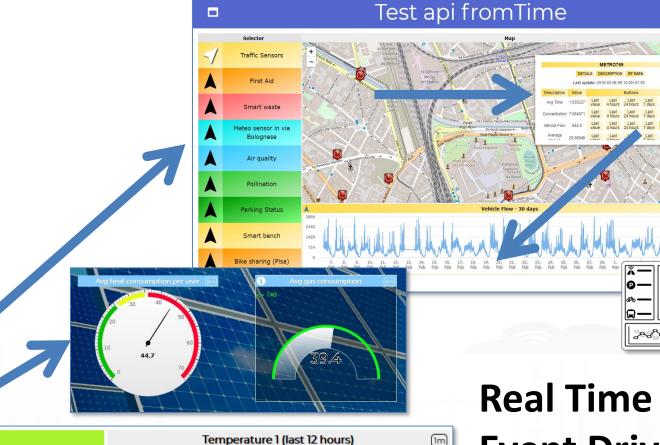
- Sensors can arrive in platform as follows (see **Nature**)
  - *ETL processes* in PULL
    - **As Periodic processes**
  - **From IOT Devices to KB** (knowledge base). Registered via IOT Directory, arriving via IOT Broker and saved into the Data Shadow,
    - **IOT data driven process** in PUSH
  - **From Dashboard to IOT Devices** (echo) is a virtual sensor **Sensor Actuators (HLT)**,
    - **IOT data driven process** in PUSH

IOT Data Driven

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

SubNature

EducationAndResearch –
- Educational_support_activities
- Higher_education
- Language_courses
- Performing_arts_schools
- Post_secondary_education
- Pre_primary_education
- Primary_education
- Private_high_school
- Private_infant_school
- Private_junior_high_school

IOT Data Driven

Actuator

Sensor Actuator
From Dashboard to IOT Device

Green
OFF

From IOT Device to KB

Sensors

Snap4City IOT Brokers

Managing Public and Private IOT/IOE Devices

Snap4city Platform Data Shadow

Sensors

Real Time + Historical

Sensors

Dashboards also provide rendering for sensor values

Lavagnini   Statuto
45   45

Towards any IOT Device and/or Dashboard

From Dashboard to IOT Devices

- **Widgets:**
  - Impulse Button
  - Button
  - Switch
  - Dimer/Knowb
  - KeyPad
  - geolocator
- **Registered** on some IOT brokers with NGSI mutual authentication
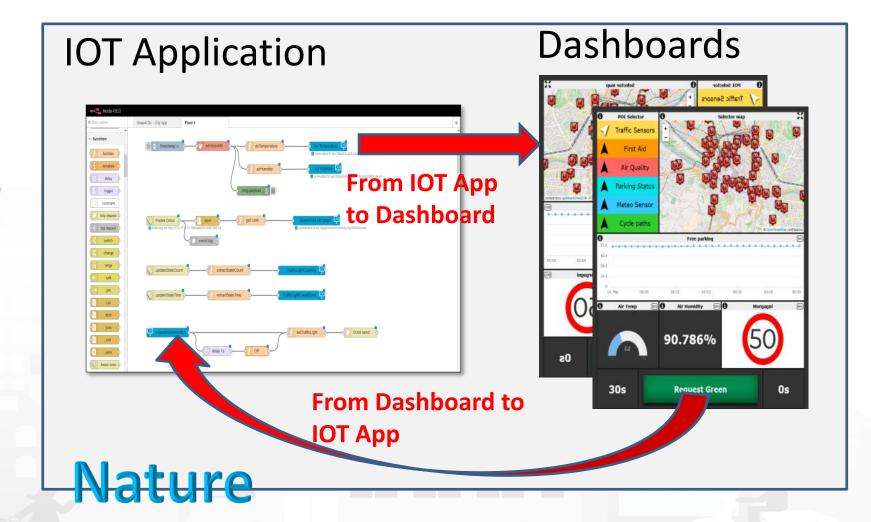
Acting on your systems

HLT: Sensors-Actuators

High Level Types

- **Complex Event**
- **Dashboard-IOT App**
- **External Service**
- **Heatmap**
- **KPI** (Key Performance Indicator)
- **MicroApplication**
- My Personal Data
- MyKPI
- MyPOI
- **POI** (Point of Interest)
- **Sensor**
- **Sensor Actuator**
- **Special Widget**
- Wfs (GIS)

IOT Application

Dashboards

From IOT App to Dashboard

From Dashboard to IOT App

Nature

Dashboard-IOT App

Nature

From Dashboard to IOT App

From IOT App to Dashboard

IOT Application

| impulse button |
| numeric keyboard |
| switch button |
| dimmer |
| geolocator |

| gauge chart |
| single content |
| speedometer |
| time trend |
| Bar content |
| Column content |
| web content |

Single Content Widget (flexibility)

From Dashboard Editor and IOT Applications, accepts in input:

- Numbers
- String
- HTML code

XX

single content

Helsinki:orio... (9m)

7.4

µg/m3

20.3°C

11440 Utenti WiFi

AirQualityPM2_5Average2HourHelsinkiJ (9m)

Interpolation and Heatmap Completed 2019-07-01T09:00:00

SO2Average24HourFlorence (8m)

No Availabe Data for airQualitySO2 : All ServiceUris are empty 2019-06-26T07:00:00

246 TOT. EVENTI SULLA RETE

COLONNINE RICARICA· (8m)

176 INSTALLATE

Messages (9m)

Position Updated, press Show My Position

SMN (8m)	BINARIO16 (8m)
39.5	73.9
% occupati su 901 posti	% occupati su 165 posti
LEOPOLDA (8m)	CALZA (8m)
27.7	44.6
% occupati su 300 posti	% occupati su 218

HLT: MyKPI, ...

High Level Types

- **Complex Event**
- **Dashboard-IOT App**
- **External Service**
- **Heatmap**
- **KPI** (Key Performance Indicator)
- **MicroApplication**
- **My Personal Data**
- **MyKPI**
- **MyPOI**
- **POI** (Point of Interest)
- **Sensor**
- **Sensor Actuator**
- **Special Widget**
- Wfs (GIS)

Real Time
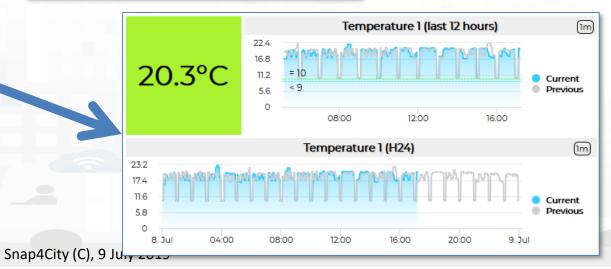
Event Driven

Historical Data

MyKPI as Trajectories

My Personal Tracker

High Level Types

- **Complex Event**
- **Dashboard-IOT App**
- **External Service**
- **Heatmap**
- **KPI** (Key Performance Indicator)
- **MicroApplication**
- **My Personal Data**
- **MyKPI**
- **MyPOI**
- **POI** (Point of Interest)
- **Sensor**
- **Sensor Actuator**
- **Special Widget**
- Wfs (GIS)
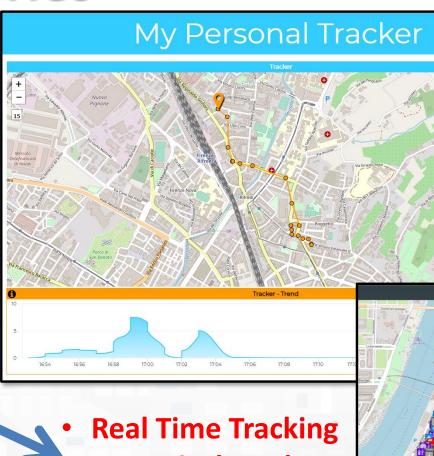
- **Real Time Tracking**
- **Hystorical Tracks**
- **MicroApplications**
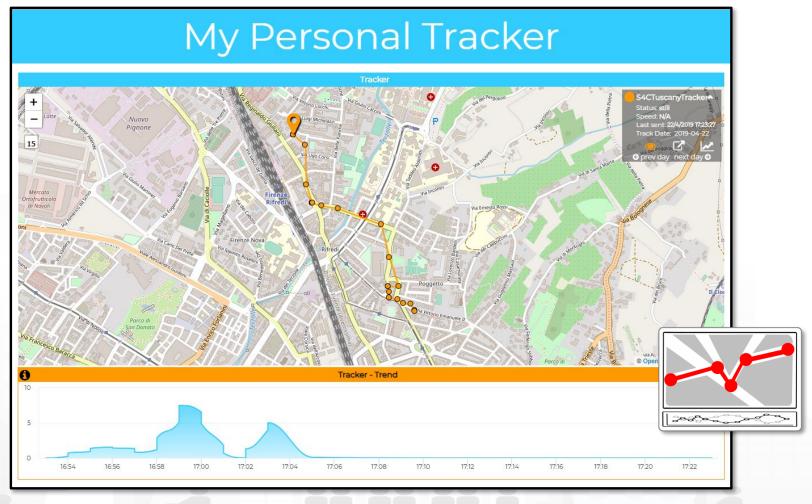
MyKPI: Tracking of Devices and Mobiles

- Real Time Trajectories for
  – Mobile Phone
  – Moving IOT Devices
  – OBU, Vehicular Kits
  – Multiple tracks
  – Day by day
- Micro Application

PAX Counter

OBU
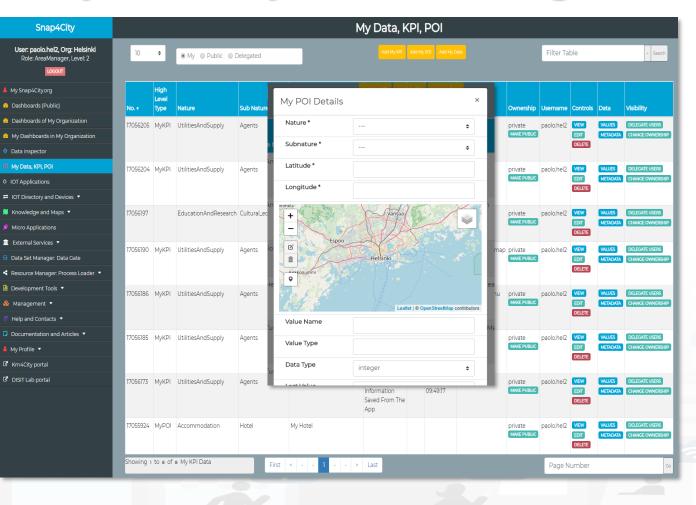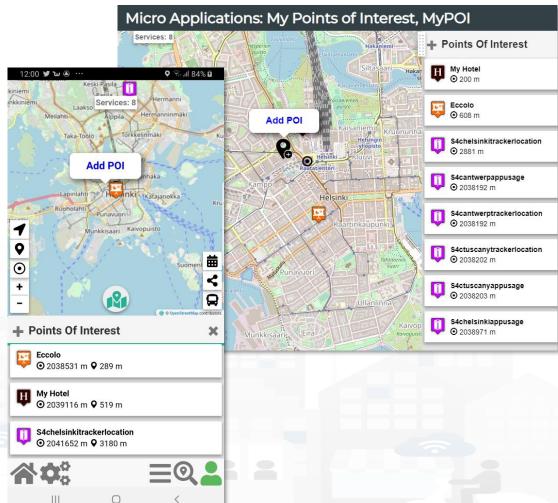
MyKPI, MyPOI: Management as GDPR
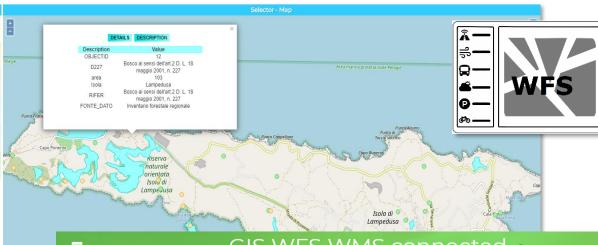
HLT: WFS (GIS)

High Level Types

- **Complex Event**
- **Dashboard-IOT App**
- **External Service**
- **Heatmap**
- **KPI** (Key Performance Indicator)
- **MicroApplication**
- **My Personal Data**
- **MyKPI**
- **MyPOI**
- **POI** (Point of Interest)
- **Sensor**
- **Sensor Actuator**
- **Special Widget**
- **WFS (GIS)**

-Points
-Shapes, paths
-Heatmaps
-.....

Snap4City WFS
WMS Tools
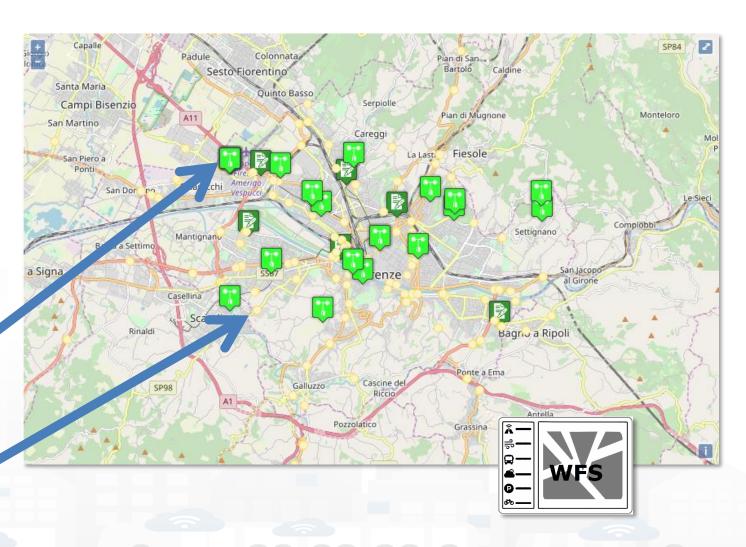
HLT: WFS (GIS)

High Level Types

- Complex Event
- Dashboard-IOT App
- External Service
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- KPI (Key Performance Indicator)
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- My Personal Data
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- Wfs (GIS)

DASHBOARD CREATION & EXERCITATION

TOP

ARC

INDEX

Dashboards Creation

ARC

INDEX

Dashboard with intelligence App

Dashboards with IOT Applications for enforcing data driven smart and intelligence into them

Dashboard-IOT App

IOT and City data World

IOT Applications

Dashboards

My IOT Devices

Applications

Dashboard Development

Widget Collection

Dashboard Wizard

Create, save, load, delegate, grant access

IOT Applications

MicroApplications

Dashboard Editor

Knowledge Base, Km4City
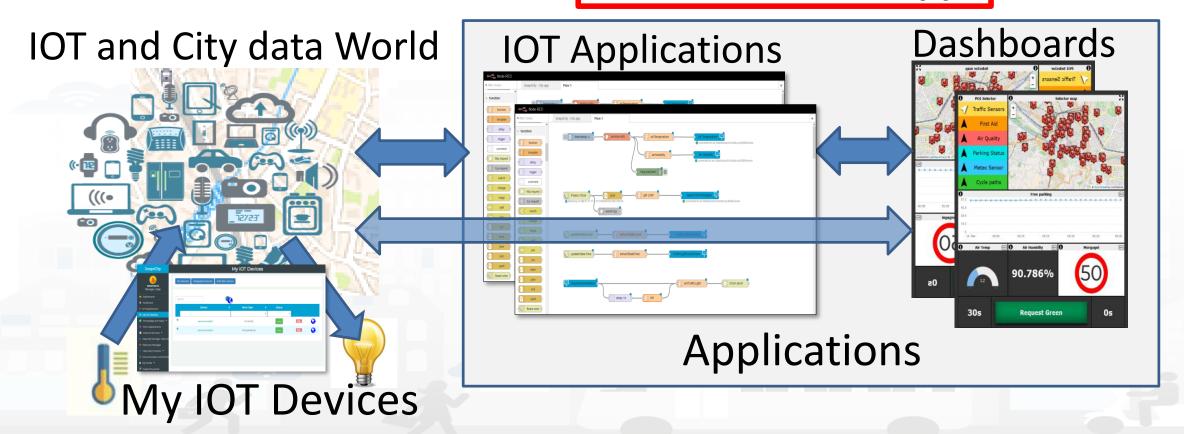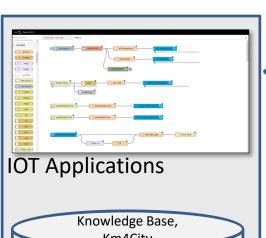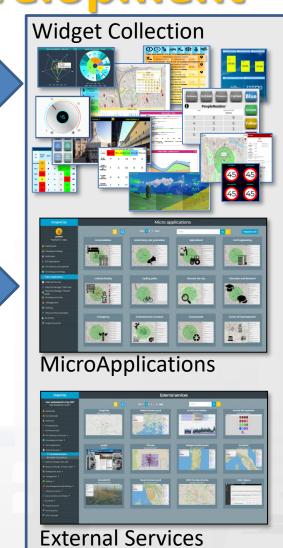
Knowledge and Storage Data from the Field and City

External Services

Public Dashboard Collection

My Own Dash/App

Dashboard List and Editor

From Templates to Wizard and Dashboards

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

Selector and POI
Preset widget choice

Selector, POI, 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
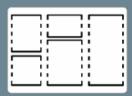
You must choose one template

- to create a new Dashboard

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

Wizard

Dashboard features	Data and widgets	Check and summary

Map

Single data widgets

Multi data widgets

Data sources

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

Hide columns   ⚙▲   Res...   Selected rows: 0   Previous 1 2 3 4 5 ... 1081 Next   Search

Choosen data sources

High-Level Type	Nature	Subnature	Value Type	Value Name	Data Type	Last Date	Last Value	Healthiness	Last Check	Ownership	Remove

Previous Next   Search

- 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 a 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

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ICONS of Widgets

Single data

Multi data

Dashboard Wizard

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

Snap4City (C), 9 July 2019

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

Generic widget properties

Title		Background color	rgba(2
Content font size		Content font color	rgba(0
Header color	rgba(2	Header text color	rgba(0

Metric and widget choice

Widget category [Data viewer ▼]
Metrics category [Shared metrics ▼]
Metric [Bolognese_Pressione ▼]
Metric description: Description: Pressione atmosferica via Bolognese. Metric Typology: Float.

Widget type [widgetGaugeChart ▼]
- widgetGaugeChart
- widgetTimeTrendCompare
- widgetSingleContent
- widgetSpeedometer
- widgetTimeTrend
- widgetCarrierPosition

Widget link

Specific widget properties

Cancel   Confirm

Snap4City (C), 9 July 2019

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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

- See the following tutorials
  - **HOW TO: create a Dashboard** in Snap4City
  - **HOW TO: add data sources to the Snap4City Platform**
  - **US1.   Using City Dashboards**
  - **US2.   Using and Creating Snap4City Applications with Dashboards**
  - **US4.   Creating City Dashboards and related Event Monitoring and Actions**

Dashboards Creation Exercitation

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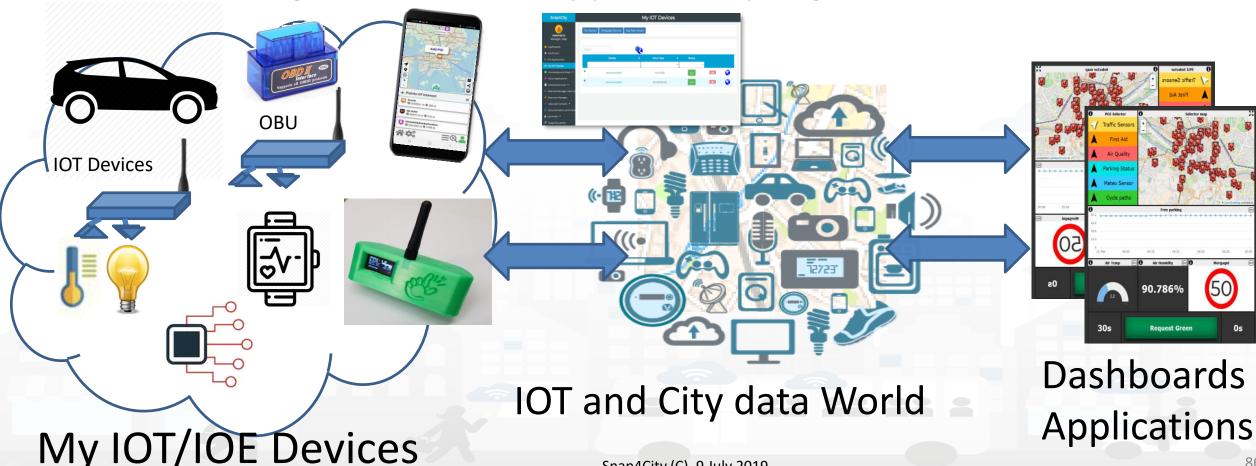
To Start we are going to use Direct Dashboards

Dashboards accessing data available on Platform, including your own data coming from Mobile App, already registered!!!

OBU

IOT Devices

My IOT/IOE Devices

IOT and City data World

Dashboards Applications

In this exercitation we are going to use the main Dashboard Templates

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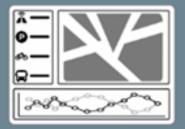
Click on a template to choose it, click on it again to unselect it

Selector and POI
Preset widget choice

Selector, POI, trend
Preset widget choice

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Events vs. map
Manual widget choice

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Manual widget choice

IOT devices
Manual widget choice

IOT applications
Manual widget choice
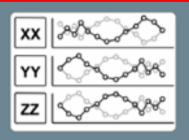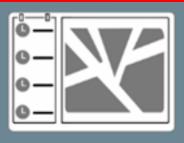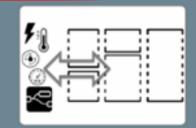
Empty Dashboard
Empty dashboard

Exercitation on dashboard building

1. Create a Dashboard for the visualization of sensors values: actual and their trend

2. Create a Dashboard for the visualization of geolocated services (POI, Sensors, heatmap, etc.) and their selection on Map, with eventual target to see the time trend

3. Create a Dashboard for the visualization of MyKPI regarding my trajectories and eventually those of other users.

1) Create a Dashboard for the visualization of sensors values: actual and their trend

- The sensors to be selected should
  - Be located downtown in Florence around a POINT of YOUR interest: home, work, study, etc.
  - Report data regarding: environment, traffic, parking, pollution, etc.
- **We suggest to:**
  - Understand how to work with data by using the Data Inspector
  - Create a new Dashboard by Wizard
  - Customize look and fill of the Dashboard and widgets
- Time: 20 minutes
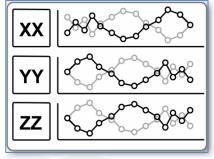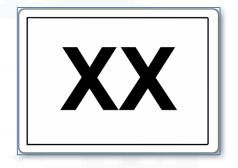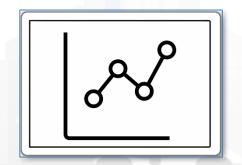
Single data widgets

Multi data widgets

Identify your Widgets

1) Create a Dashboard for the visualization of sensors values: actual and their trend

- The sensors to be selected should
  - Be located downtown in Florence around a POINT of YOUR interest: home, work, study, etc.
  - Report data regarding: environment, traffic, parking, pollution, etc.
- **We suggest to:**
  - Understand how to work with data by using the Data Inspector
  - Create a new Dashboard by Wizard
  - Customize look and fill of the Dashboard and widgets
- Time: 10-20 minutes
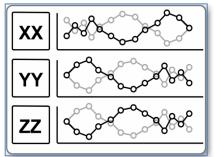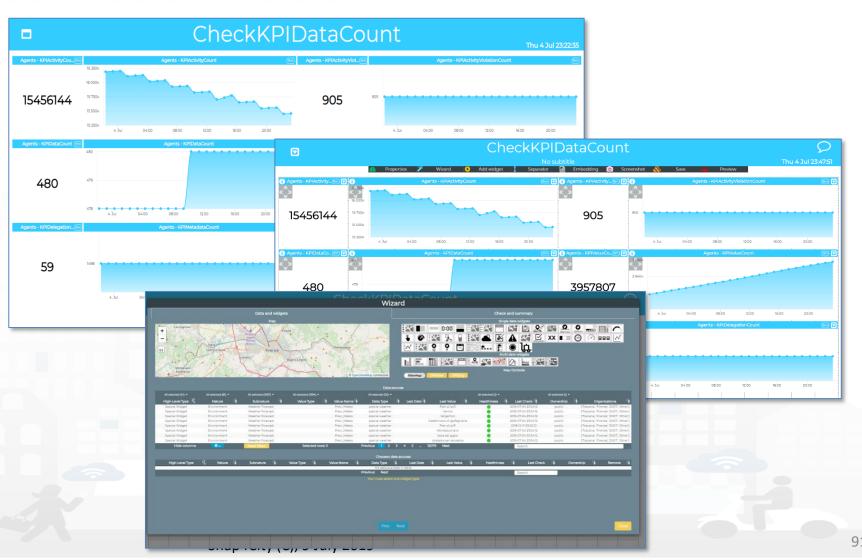
Result could be similar to

- You can add more Widgets by:
  - Wizard
  - Editor manually
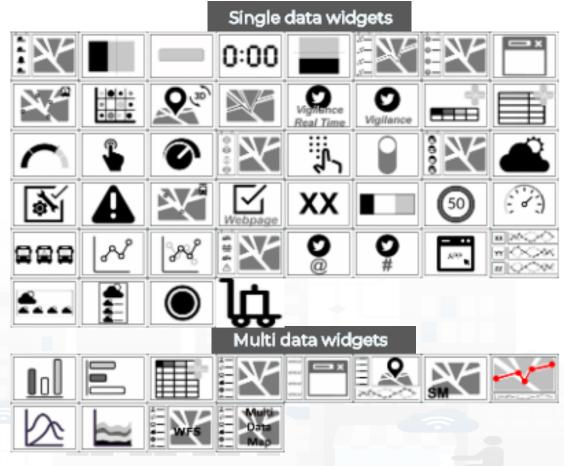
2) Create a Dashboard for the visualization of geolocated services (POI, Sensors, heatmap, etc.) and their selection on Map, with eventual target to see the time trend

- **The HLT to be selected** should
  - Be located downtown in Florence
  - Could be of different kind **of** nature. At least 5 of them
  - Data regarding: environment, traffic, parking, pollution, etc.
- **We suggest to:**
  - Start creating the New Dashboard by Wizard
  - Customize look and fill of the Dashboard and widgets
- Time: 10-20 minutes
- There are different modalities to get similar results

Single data widgets

Multi data widgets

Identify your Widgets

2) Create a Dashboard for the visualization of geolocated services (POI, Sensors, heatmap, etc.) and their selection on Map, with eventual target to see the time trend
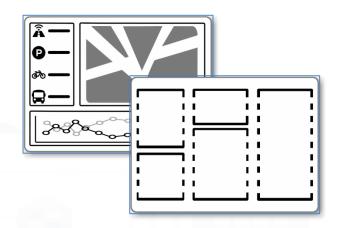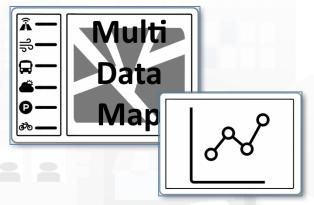
- The HLT to be selected should
  - Be located downtown in Florence
  - Could be of different kind HLType, and nature. At least 5 of them
  - Data regarding: environment, traffic, parking, pollution, etc.
- **We suggest to:**
  - Start creating the New Dashboard by Wizard
  - Customize look and fill of the Dashboard and widgets
- Time: 10-20 minutes
- There are different modalities to get similar results
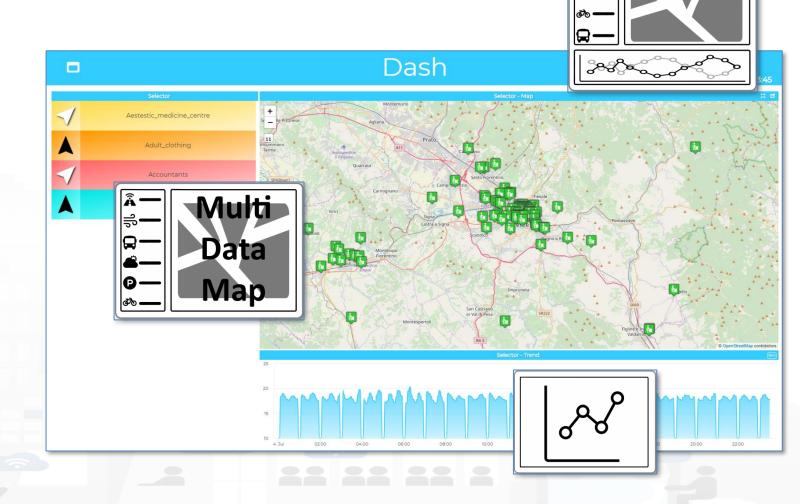
Result could be similar to

- Not all combinations provide the same effective result
- You can
  - customize the resulting dash
  - add other widgets by wizard
  - see how a Selector is built
  - .....

3) Create a Dashboard for the visualization of MyKPI regarding my trajectories and [eventually those of other users]

- **We suggest to:**
  - Open Dashboard Wizard
  - Search for your trajectory on mobile looking for MyKPI
  - Create a Dashboard exploiting the Widget Tracker
  - Customize look and fill of the Dashboard and widgets, change color of the header, etc.

- Time: 10-15 minutes

Single data widgets

Multi data widgets

Identify your Widgets

3) Create a Dashboard for the visualization of MyKPI regarding my trajectories and [eventually those of other users]
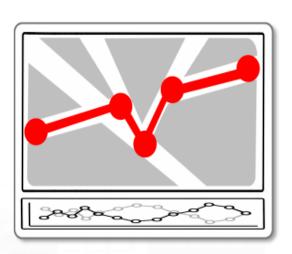
- **We suggest to:**
  - Open Dashboard Wizard
  - Search for your trajectory on mobile looking for MyKPI
  - Create a Dashboard exploiting the Widget Tracker
  - Customize look and fill of the Dashboard and widgets, change color of the header, etc.
- Time: 10-15 minutes

Result could be similar to

Dashboards Management

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List of Dashboard you created?
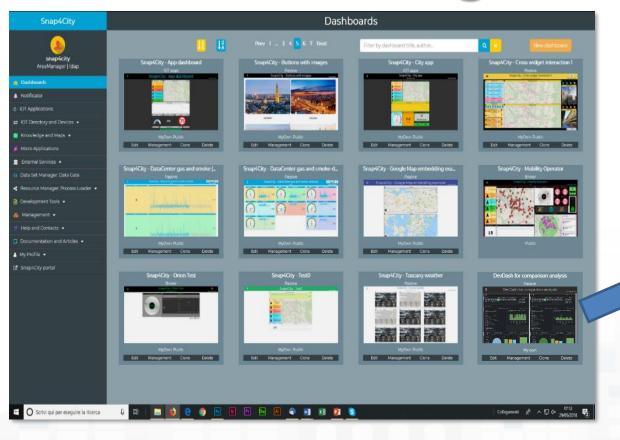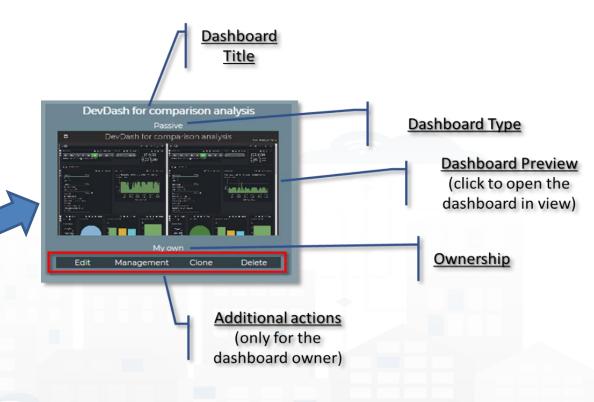
Dashboard Management
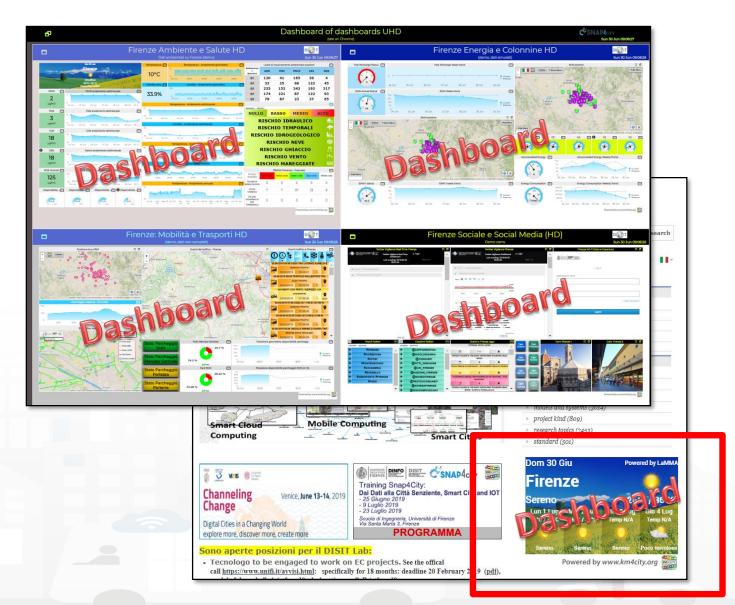
Additional Features

- Embedding Dashboards into a Dashboard

- Embedding a Dashboard into a Third Party Web Page

Dashboards' Intelligence on Web and Mobile Devices
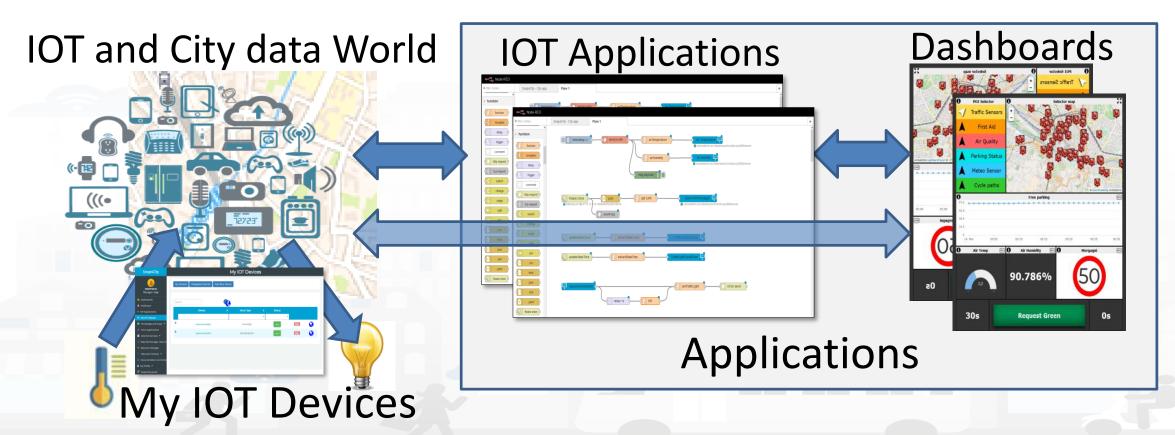
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Dashboard with intelligence App

Dashboards with IOT Applications for enforcing data driven smart and intelligence into them

Dashboard-IOT App

IOT and City data World

IOT Applications

Dashboards

My IOT Devices

Applications

City Dashboard + IOT App
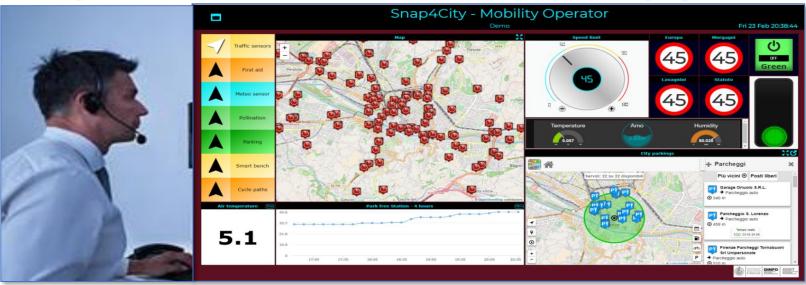
Control Room Operator

Would like to:

- **Monitor** traffic flow, Environment, Car parking, Cycling, First aid, temp., …
- **Act and monitor** Dynamic Plates
- **Act and monitor** red lights

Driver, Policeman

Would like to:

- **Monitor** traffic, Parking, env., speed limit, …
- **Act and monitor** red lights
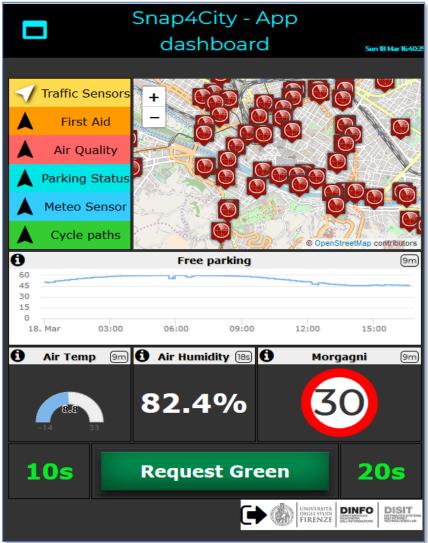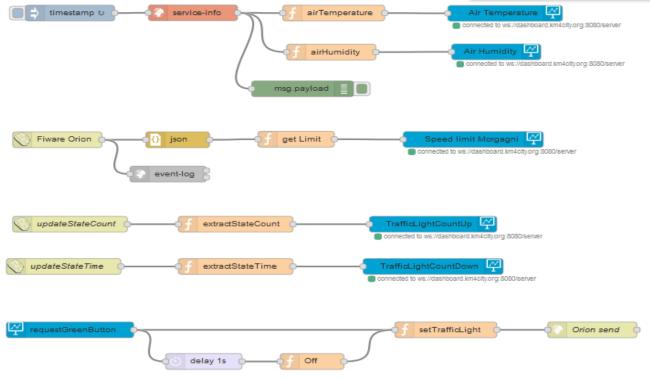
IOT Application with City Dashboard Simple development
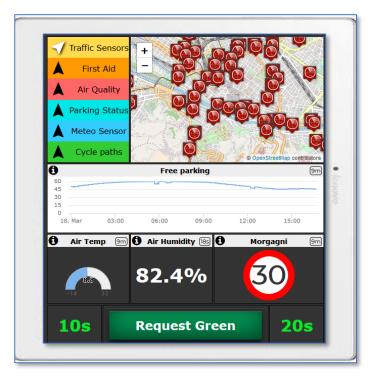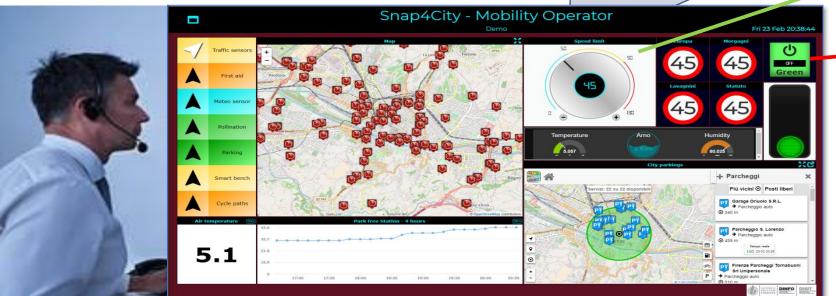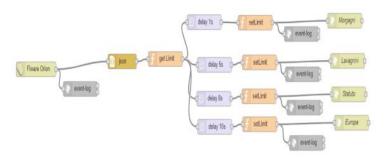
- Virtual Sensors and Virtual Actuators
- From Dashboard to IOT App and viceversa
- From Dashboard to IOT Brokers/Devices and viceversa

IOT Applications vs Dashboards

- **IOT Applications**, realized by using Snap4City Node-RED and integrated with Snap4City Nodes/MicroServices block, can be behind dashboards to get data from them with Virtual Sensors and Actuators.
  - Dashboards may be connected to multiple IOT Applications and IOT devices
  - IOT Applications may be connected with multiple Dashboards and IOT devices
- **A network of Dashboards, IOT Apps and IOT Devices** and data is easily realized exchanging data via secure connections.
- **Training Cases**:
  - **US2.   Using and Creating Snap4City Applications with Dashboards**
  - **US9.   Creating Snap4City IOT Applications, different formats, protocols, brokers, communications**

Dashboard Chatroom and Notifications

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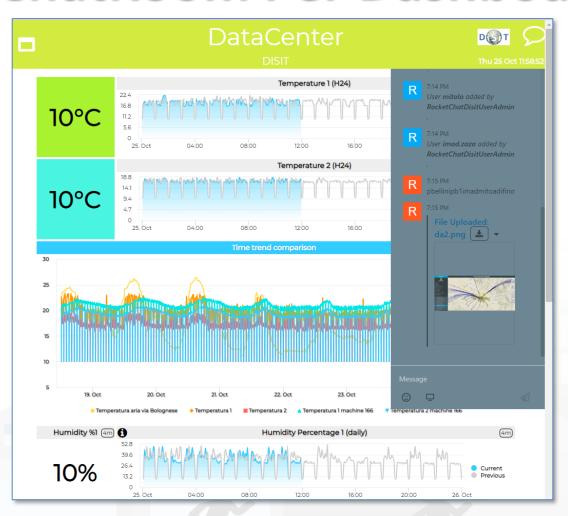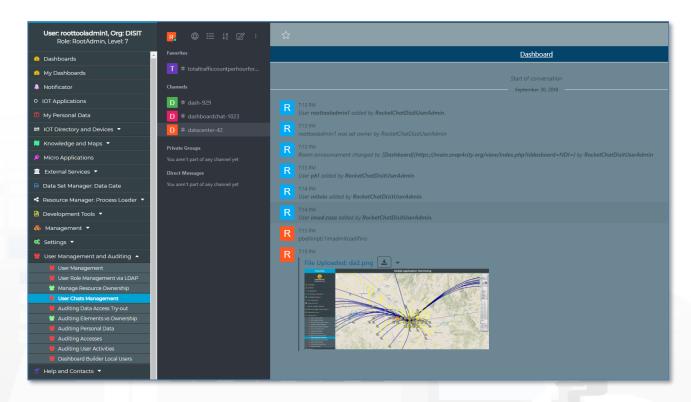
ChatRoom Per Dashboard

Chat Management

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.
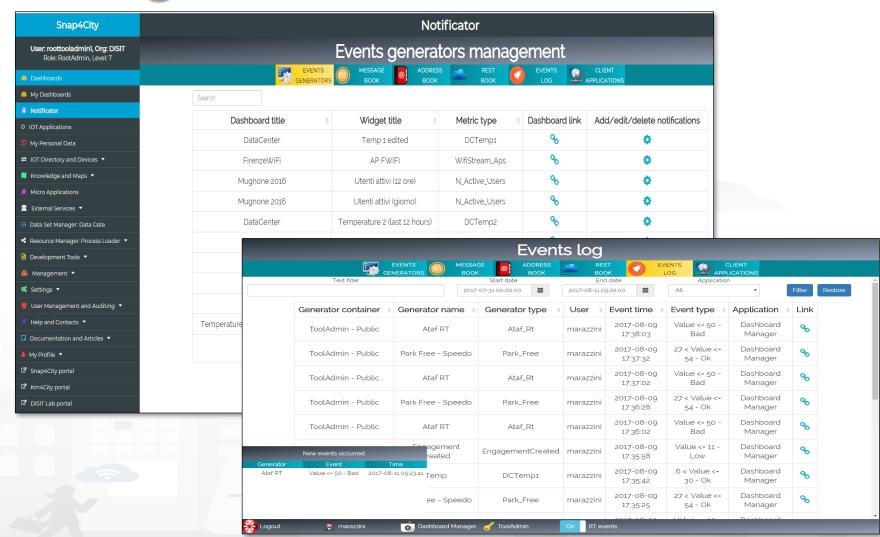
Smart City Monitoring: Notificator

- Notifications may arrive via Facebook, Telegram, SMS, email, etc., by exploiting IOT App behind the dashboard

- Integration with workflow management system for ticketing

Dashboards

- **Suitable** as: City Dashboard, App interface, and Control Room Dashboards, Situation Room Dashboard, Operator Dashboard

- **Created** visually compounding graphic Widgets
  - Each widget has 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

- See the following tutorials
  - **HOW TO: create a Dashboard** in Snap4City
  - **US1.   Using City Dashboards**
  - **US2.   Using and Creating Snap4City Applications with Dashboards**
  - **US4.   Creating City Dashboards and related Event Monitoring and Actions**

TOP

Data Type Management
GDPR Compliant

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GDPR: General Data Protection Regulation

Users may decide to:

– provide access to who, for do what, until when consented

– accept terms of use by **signed** consent **for** data management **service**

From each service, the user is capable to:

– **See** what we collect in terms of Data Type: traces, logs, paths, profiles, accesses, IOT devices, sensors, maps, etc.

– **Download**, **delete**, **inspect** Data

– **Auditing** and **Revoke access** or **grant** access right to each **single Data**

– **Delete all Data in single shot** or singularly (**forget all about me**)

- Correctness
- Transparency
- Security
- Integrity
- Privacy
- Auditing
- …

GDPR: General Data Protection Regulation

If personal data are **published by the owner:**

– the data are **released anonymously,**

$\rightarrow$ also in this case they can be **revoked at any time**:

Snap4City is also compliant to GDPR **Technical Constraints** as it:

– **Performs Secure connections** in any private data exchange

– **Encrypts** data store for all private data

– **Decouples** data and personal IDs

– **Audits** private data usage

Encrypted
Data Storage

GDPR Compliant

My Personal Data Types

My Profile ▲
- **My Personal Data Types**
- My Personal Statistics and Bounds

| View | Edit | Track | Access control | Convert |

This page allows you to access at your Data Types, which are your personal data that we c
most cases, a specific tool and view is provided to manage them.

- **My profile data and Blogs**
  - to manage your user profile data (name, email,): view, edit, delete
- **My Personal Statistics and Bounds: daily   or Monthly**
  - to access at your statistics about the data access and volume of resources use
    that may depend on the Organization at which one belong and on the role in
- **My Personal Data, My KPI and My POI**
  - to manage your personal MyKPI, MyPOI and trajectories, if any: view, edit, dele
- **My Personal Engagement**
  - to manage your personal engagements recevied on the Mobile Apps, auditing
- **My IOT Devices**
  - to manage your IOT Devices in which it is possible to: edit, delete, make public
- **My IOT Applications**
  - to manage your IOT Applications in which it is possible to: delete, restart, char
- **My Dashboards**
  - to manage your Dashboards in which it is possible to: edit, delete, change ow
- **My IOT sensor data service URI (for programmers)**
  - to manage the Delegations to access at the ServiceURI of the knowledge bas
- **My IOT sensor data service GraphID (for programmers)**
  - to manage the Delegations to access at the a Graph (data set) of the knowled
- **My personal data by IOT App (partially deprecated)**
  - to manage your MyPersonal Data, if any: view, edit, delete, delegation in acces
- **My Annotation data**
  - to manage the Delegation to access at the Annotations: delegation in access,
- **Auditing Access to My Data**
  - to audit the accesses to MyData

Manage Profile and MyPersonalData

For each Data Type:

- Start as private → making them public (anonymous) and revoke
- The Owner is the only one that can: (1) modify values; (2) change the ownership
- Define/revoke Delegation to Access
- Delete/forget per Data Type and "me all"!
- Auditing

Details for Main Data Kinds

- **My Personal Data, My KPI and My POI**
  - to manage your personal MyKPI, MyPOI and trajectories, if any: view, edit, delete, delegation in access, revoke delegation, make public, change ownership

- **My Personal Engagement**
  - to manage your personal engagements received on the Mobile Apps, auditing, if any: view, delete

- **My IOT Devices**
  - to manage your IOT Devices in which it is possible to: edit, delete, make public, delegate in access, revoke delegation, change ownership

- **My IOT Applications**
  - to manage your IOT Applications in which it is possible to: delete, restart, change ownership.

- **My Dashboards**
  - to manage your Dashboards in which it is possible to: edit, delete, change ownership, delegate in access, revoke delegation, see list of delegations, make public.

Smart Bench

airQualityCO2 8m

483
µg/m3

Temperature 8m

27.1
°C

Humidity 8m

44.2
%

light 8m

0

Pressure 8m

1005
hPa

totalSittings 8m

0

sittings 8m

0

totalTransits 8m

0

transits 8m

0
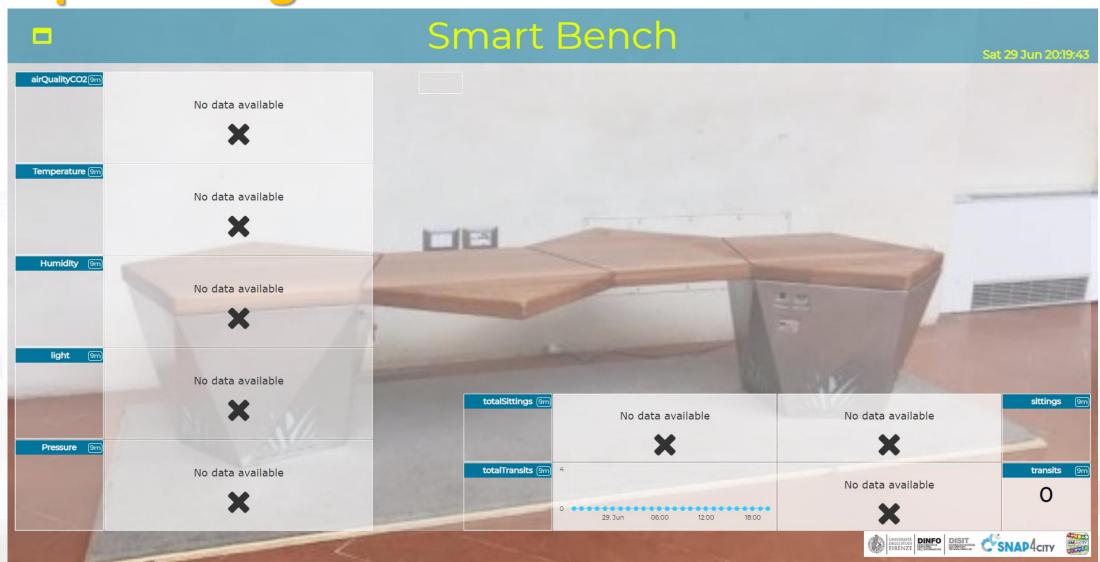
Example: Delegated Dashboard but not all data
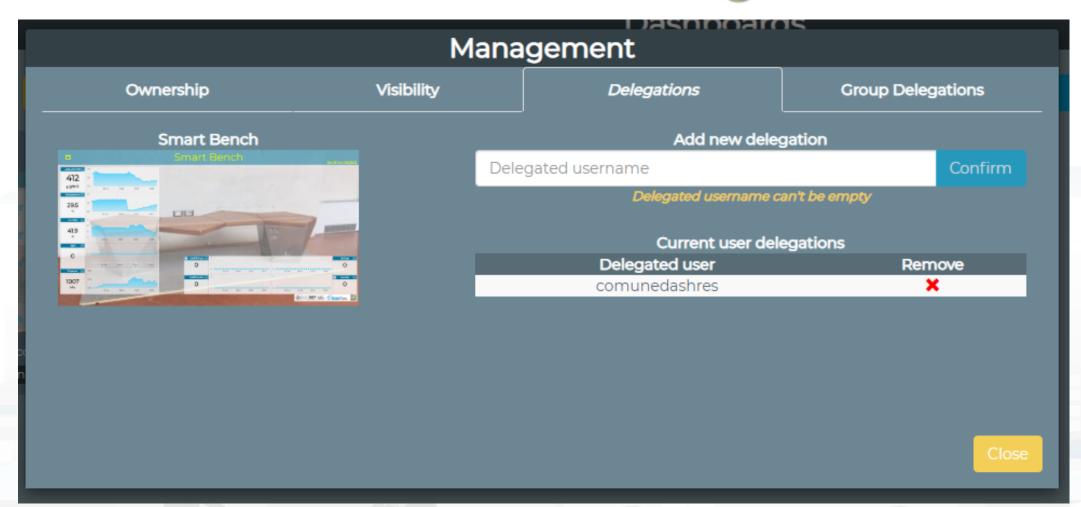
Dashboard Delegation

Personal Data Management, GDPR compliant: POI, Data, KPI

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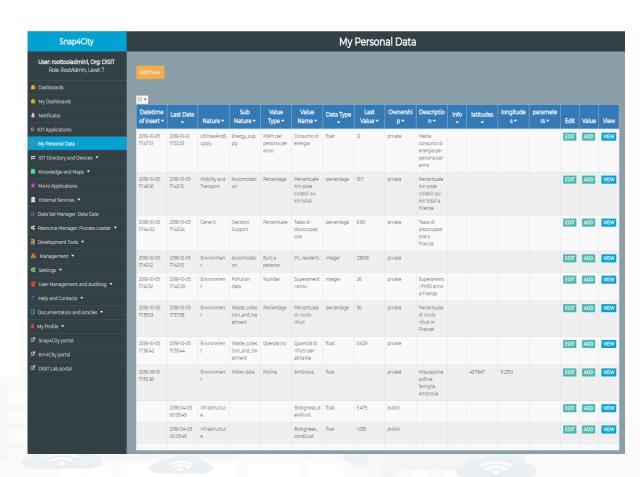
Managing Personal: KPI, Data, POIs

Which can be:

– **Acquired from any source:** SQL, SPARQL, API, etc., ODBC, JDBC, etc.

– **Computed** by means of IOT App, Data Analytics, ETL

– **Stored/retrieved** into personal safe or general storage

– **Edited** from tool, or from IOT App

– **Added** Manually or Automatically

– **Shown via Dashboard**

Smart Bench Data Delegation

My Data, KPI, POI

No. ↑	High Level Type	Nature	Sub Nature	Value Name	Value Type	Data Type	Last Date	Last Value	Ownership	Username	Controls	Data	Visibility
17056232	MyKPI	Entertainment	Smart_bench	Smart Bench Transits	transits	integer	6/29/2019, 7:59:52 PM	0	private	disit_comunefi	VIEW EDIT DELETE	VALUES METADATA	DELEGATE USERS CHANGE OWNERSHIP
17056231	MyKPI	Entertainment	Smart_bench	Smart Bench Light	light	float	6/29/2019, 7:59:53 PM	0	private	disit_comunefi	VIEW EDIT DELETE	VALUES METADATA	DELEGATE USERS CHANGE OWNERSHIP
17056230	MyKPI	Entertainment	Smart_bench	Smart Bench CO2	airQualityCO2	float	6/29/2019, 7:59:53 PM	412	private	disit_comunefi	VIEW EDIT DELETE	VALUES METADATA	DELEGATE USERS CHANGE OWNERSHIP
17056229	MyKPI	Entertainment	Smart_bench	Smart Bench Total Sittings	totalSittings	integer	6/29/2019, 7:59:53 PM	0	private	disit_comunefi	VIEW EDIT DELETE	VALUES METADATA	DELEGATE USERS CHANGE OWNERSHIP
17056228	MyKPI	Entertainment	Smart_bench	Smart Bench Sittings	sittings	integer	6/29/2019, 7:59:53 PM	0	private	disit_comunefi	VIEW EDIT DELETE	VALUES METADATA	DELEGATE USERS CHANGE OWNERSHIP
17056227	MyKPI	Entertainment	Smart_bench	Smart Bench Total Transits	totalTransits	integer	6/29/2019, 7:59:52 PM	0	private	disit_comunefi	VIEW EDIT DELETE	VALUES METADATA	DELEGATE USERS CHANGE OWNERSHIP
17056226	MyKPI	Entertainment	Smart_bench	Smart Bench Pressure	Pressure	float	6/29... 7:59...						
17056225	MyKPI	Entertainment	Smart_bench	Smart Bench Humidity	Humidity	float	6/29... 7:59...						
17056224	MyKPI	Entertainment	Smart_bench	Smart Bench Temperature	Temperature	float	6/29... 7:59...						

Showing 1 to 9 of 9 My KPI Data

First < - - - 1 - - - > Last

My Data, KPI, POI

Return to My KPI Data List

Values of KPIData: No. 1705... ame Smart Bench Light

KPI Delegation Details ✕

Username Delegated * [   ]

Close SAVE

10 ⬍   Add New My KPI Delegation

No. ↑	Username Delegated	Insert Time	Controls
		No data available in table	

Showing 1 to 0 of 0 My KPI Delegation

First < - - - 1 - - - > Last   Page Number [   ] Go

Management of MyKPI, MyPOI, ...

Recalling Exercize number 3

Accessing Multiple Trajectories

You can revoke at any instant

Training piattaforma Snap4City. Dai Dati alla città Senziente, Smart City and IOT

- **25 Giugno**: *visione generale sulla piattaforma: dai dati alle Dashboard passando da IOT e Data Analytic, GDPR, Living Lab, Smart City API, smart city control room (SCCR).*

- **9 Luglio (aula 111, viale Morgagni plesso didattico Univ. Firenze, aula di informatica https://goo.gl/maps/Wh27PuwRd817G2TB7):**
  - ..

- **23 Luglio (aula 111, viale Morgagni plesso didattico Univ. Firenze, aula di informatica https://goo.gl/maps/Wh27PuwRd817G2TB7):**
  (Si consiglia di: non venire con il vostro portatile, l'aula è attrezzata con PC con risoluzione HD, avere già installato Toscana in a Snap su Android o iOS, da qualche giorno
  - Come aggiungere funzioni che non sono presenti ora in piattaforma, e.g.: gestione rifiuti, agricoltura, legno,
  - Intelligence delle Dashboard, Combinazione di sorgenti dati,
  - sviluppo di applicazioni IOT data driven con strumenti visuali (esercitazione)
  - Creazione di applicazioni smart, IOT Applications integrate con Dashboard (esercitazione)
  - Sviluppo di sensori IOT a basso costo
  - Sviluppo di soluzioni di Data Analytic tramite R Studio
  - Esempio di Web Scraping integrato
  - La gestione della sicurezza in stack IOT

Altre Giornate a Agosto/Settembre

- 1) Snap4City the architecture and technical details
  - Smart City Data Storage: large tables, graphs, and Data Shadow
  - Data Ingestion processes in ETL or other means
  - IOT Applications and elastic management
  - IOT, end-2-end security from devices to Dashboards
  - User Managment
  - Auditing of activities
- 2) Data management
  - Data Search
  - Data Ingestion via Data Gate
  - Data Ingestion via ETL
  - Data Ingestion via IOT brokers, and NIFI
  - Data Modeling

TOP

SNAP4CITY AND KM4CITY PROJECTS

ARC

INDEX

2013 Km4City
Ontology 1.1
- Tuscany Road Graph
- Mobility
- culture, tourism
- Events
- Parking
- Services
- Linked open graph

resolute (2015-18) H2020
- Resilience Decision Support
- Smart First Aid
- User Behaviour Analysis, predictions
- Risk Analysis

2015

Km4City 1.5

2016

lifeweee (2017-20)
- Smart Waste

2017

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

SNAP4CITY
SELECT for Cities H2020 (2017-19)
- IOT/IOE, IOT App
- Living Lab
- Maker Support
- IOT Edge
- Smart City IOT
- GDPR
- Privacy & Security

...2021

2019

TRAFAIR CEF
(2018-21)
- Traffic and Mobility Impact on Pollution

Km4City 1.4

- Twitter Vigilance
- Social Media Analytics, Sentiment Analysis

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

Sii-Mobility (2016-19)
SII-MOBILITY SCN
- Infomobility
- Mobile App
- Routing
- Multimodality

Km4City 1.6.2

- Origin-Destination and trajectories
- Traffic Reconstruction
- Offer Analysis
- OBU, smart devices

Km4City 1.6.4

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

Sii-Mobility
- User engagement
- Bike Sharing
- Data Analytics ++
- Social Predictions

Km4City 1.6.6
IOT/IOE

MOSAiC
Mobility 4.0 for SmArt (i) City (2018-20)
- Mobility Demand / Offer Analytics and Strategy

- Smart Energy
- Sustainable Mobility
- Control Room Dashboard

(2016-21) H2020 REPLICATE

2014

2018

5G (2018-21)
5G tech Energy Industry 4.0

DISIT lab roadmap vs model and tools' usage

Snap4City (C), 9 July 2019

131

Main running projects

- Snap4City → The platform!
- Sii-Mobility → DISIT (mobility and transport)
- REPLICATE → DISIT (ICT, Energy, IOT)
- RESOLUTE → DISIT (Resilience, ICT, Big Data)
- GHOST → UNICA, UNIFI (strategies, smart city)
- TRAFAIR → UNIMORE, DISIT (environ. & transport)
- MOSAIC → DISIT (mobility and transport)
- WEEE Life → DISIT (waste, environment)
- Smart Garda Lake → Castelnuovo del Garda
- 5G → DISIT (Industry 4.0 vs SmartCity)
- Green Impact → DISIT (Industry 4.0, Chemical)
- PISA Agreement → data aggregation

Projects

SELECT for Cities

Sii-Mobility

REPLICATE

resolute

GHOST

TRAFAIR

5G

MOSAiC

life weee

smartGARDAlake

Green Impact

Sii-Mobility
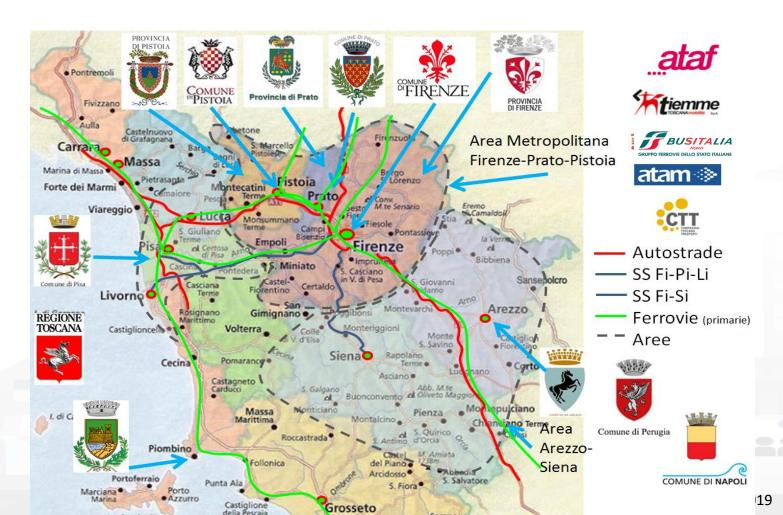
🔗 **http://www.Sii-Mobility.org**

- *Experimentations and validation in Tuscany*
- *Integration with present central station and subsystems*
- *DISIT lab, Università di Firenze, is the tech-scientific coordinator*

Area Metropolitana Firenze-Prato-Pistoia

- Autostrade
- SS Fi-Pi-Li
- SS Fi-Si
- Ferrovie (primarie)
- Aree

Area Arezzo-Siena

ECM; Swarco Mizar; Inventi In20; Geoin; QuestIT; Softec; T.I.M.E.; LiberoLogico; MIDRA (autostrade, motorola); ATAF; Tiemme; CTT Nord; BUSITALIA; A.T.A.M.; Effective Knowledge; eWings; Argos Engineering; Elfi; Calamai & Agresti; Project; Negentis

Sii-Mobility

Commenti dei cittadini, Social Media

Merci

Sensori su trasporto Privato

Sensori Parcheggi

Monitoraggio traffico, autostrade

Rete Ferroviaria

Parametri ambientali

Servizi ed enti

AVM trasporto Pubblico

Sensori, sistema monitoraggio

UTC

Infomobility

Varchi Telematici, ZTL
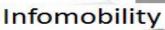
Emergenze, polizia, 118

Ordinanze: eventi, lavori pubblici, ...

General Objectives

- Reduce the social costs of mobility
  - minor inconvenience,
  - greater efficiency,
  - greater sensitivity to the needs of the citizen,
  - lower emissions,
  - better environmental conditions;
  - info-training programs to help city user in getting virtuous habits;
  - reduce transportation costs and travel times for users, for operators and administrations,
  - optimization solutions.

- **simplify the use of mobility systems**
  - innovative sensors for AVM and private transport on the territory
  - integrated systems for payment and identification
  - driving / offline routing solutions
  - connect the drive, smart drive or walk
  - Integration of data from operators and different type sources
  - advanced management of resources measurement of flows realization of sensors, actuators

- **Testing on municipalities and provinces of Tuscany**

- **Contribute to the improvement of national and international standards**

REPLICATE
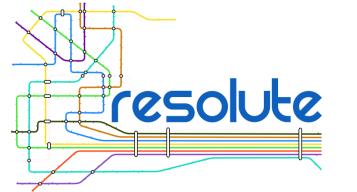
REnaissance of PLaces
with Innovative Citizenship
And TEchnology

Replicate project

http://replicate-project.eu/

- Demonstrate Smart City technologies in energy, transport and ICT in districts in:
  - San Sebastian, Florence and Bristol,
  - follower cities of Essen, Nilufer and Lausanne
- Cities are the customer: considering local specificities
- Solutions must be replicable, interoperable and scalable:
  - Integrated Infrastructure: deployment of ICT architecture, from internet of things to applications
  - Low energy districts
  - Urban mobility: sustainable and smart urban services

KM4CITY

Snap4City (C), 9 July 2019

- 1 (coordinator) FOMENTO DE SAN SEBASTIAN FSS SPAIN
- 2 AYUNTAMIENTO DE SAN SEBASTIAN SAN SEBASTIAN SPAIN
- 3 COMUNE DI FLORENCE FLORENCE ITALY
- 4 BRISTOL COUNCIL BRISTOL UNITED KINGDOM
- 5 STADT ESSEN ESSEN GERMANY
- 6 NILUFER BELEDIYESI NILUFER TURKEY
- 7 VILLE DE LAUSANNE LAUSANNE SWITZERLAND
- 8 IKUSI ANGEL IGLESIAS, S.A. IKUSI SPAIN
- 9 ENDESA ENERGÍA, S.A. ENDESA SPAIN
- 10 EUROHELP CONSULTING, S.L. EUROHELP SPAIN
- 11 ILUMINACION INTELIGENTE LUIX, S.L. LUIX SPAIN
- 12 FUNDACION TECNALIA RESEARCH & INNOVATION TECNALIA SPAIN
- 13 EUSKALTEL, S.A. EUSKALTEL SPAIN
- 14 COMPAÑÍA DEL TRANVÍA DE SAN SEBASTIÁN DBUS SPAIN
- 15 CONSIGLIO NAZIONALE DELLE RICERCHE CNR ITALY
- 16 ENEL DISTRIBUZIONE, SPA ENEL ITALY
- 17 MATHEMA, SRL MATHEMA ITALY
- 18 SPES CONSULTING SPES ITALY
- 19 TELECOM ITALIA, SPA TELECOM ITALY
- 20 UNIVERSITA DEGLI STUDI DI FLORENCE UNIFI ITALY: DINFO.DISIT Lab and DIEF
- 21 THALES ITALIA, SPA THALES ITALY
- 22 ZABALA INNOVATION CONSULTING ZABALA SPAIN
- 23 TECHNOMAR TECHNOMAR GERMANY
- 24 UNIVERSITY OF BRISTOL UOB UNITED KINGDOM
- 25 UNIVERSITY OF OXFORD UOXF UNITED KINGDOM
- 26 BRISTOL IS OPEN, LTD BIO UNITED KINGDOM
- 27 ZEETTA NETWORKS ZEETTA UNITED KINGDOM
- 28 KNOWLE WEST MEDIA CENTRE, LGB KWMC UNITED KINGDOM
- 29 TOSHIBA RESEARCH EUROPE, LTD TREL UNITED KINGDOM
- 30 ROUTE MONKEY, LTD ROUTE MONKEY UNITED KINGDOM
- 31 ESOTERIX SYSTMES, LTD ESOTERIX UNITED KINGDOM
- 32 NEC LABORATORIES EUROPE, LTD NEC UNITED KINGDOM
- 33 COMMONWHEELS CAR CLUB CIC CO-WHEELS UNITED KINGDOM
- 34 UNIVERSITY OF THE WEST OF ENGLAND UWE UNITED KINGDOM
- 35 ESADE BUSINESS SCHOOL ESADE SPAIN
- 36 SISTELEC SOLUCIONES DE TELECOMUNICACION, S.L. SISTELEC SPAIN

http://www.resolute-eu.org

- **Develop European Resilience Management Guidelines (ERMG)**
  - Develop a conceptual framework for creating/ maintaining Urban Transport Systems
- **Enhance resilience** through improved support of human decision making processes, particularly by training professionals and civil users on the ERMG and the RESOLUTE system
- **Operationalize and validate the ERMG** by implementing the RESOLUTE Collaborative Resilience Assessment and Management Support Systems (CRAMSS) for Urban Transport Systems addressing Road and Urban Rail Infrastructures
  - Pilots in **Florence and Athens**
- Adoption of the ERMG at EU and Associated Countries level

University of Florence: DISIT lab DINFO (Proj coordinator), DISIA and DST	UNIFI	IT
THALES	THALES	IT
ATTIKOMetro	ATTIKO	GR
Comune di Firenze	CDF	IT
Centre for Research and Technology Hellas	CERTH	GR
Fraunhofer-Gesellschaft zur Förderung der angewandten Forschung e.V.	FHG	DE
HUMANIST	HUMANIST	FR
SWARCO Mizar	SWMIZ	IT
Associação para o Desenvolvimento da Investigação no Instituto Superior de Gestão	ADI-ISG	PT
Consorzio Milano Ricerche	CMR	IT

GHOST: Governing tHe smart city: a gOvernance-centred approach to SmarT urbanism

General Objectives

- Offer a **comprehensive framework** for measuring and reassessing urban smart development and related rankings
- **Critical assessment** of Smart City ranking index existence
- Definition of an **enabling technology** supporting the action plans for strengthening multi-level place-based governance, applied in the tourism context
- Definition of **strategies for good smart governance**, with the purpose of providing recommendations to start or implement an institutional and development process leading towards smart city governance.

Partners:

University of Cagliari (Coordinator) DICAAR and DMI

University of Florence SAGAS and DISIT

University of Turin ESOMAS

University of Sassari DADU

Under the patronage of the Municipality of Cagliari

Duration: 23/09/2015 - 23/09/2018

http://sites.unica.it/ghost

COMUNE DI CAGLIARI

Understanding Traffic Flows to Improve Air quality

- **Objective:**
  - to develop a service that **combines traffic data on air quality**, weather conditions, and traffic flows in order to allow citizens and municipalities to estimate the level of pollution resulting from varying traffic flow conditions.

- **Where:**
  - **Zaragoza, Florence, Modena, Livorno, Santiago de Compostela, and Pisa**

- Università degli studi di Modena e Reggio Emilia (UNIMORE) -- Italy
- **Università degli Studi di Firenze – DISIT DINFO -- Italy**
- Universidade de Santiago de Compostela (USC) - Spain
- Comune di Modena (CMO) - Italy
- Regione Toscana (TR) - Italy
- Concello de Santiago de Compostela (CSC) - Spain
- Fundación Pública Gallega Centro Tecnológico de Supercomputación de Galicia (Fundacion CESGA) - Spain
- Universidad de Zaragoza (UNIZAR) - Spain
- Lepida S.p.A. (LP) - Italy
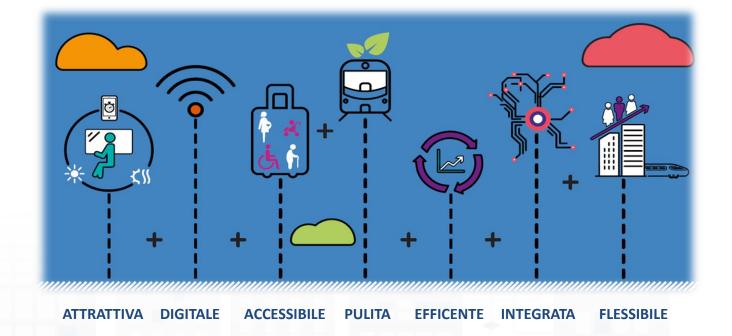
MObility 4.0 for SmArt (i) City

Tools for Mobility operators

- Demand Analysis
- Prediction on Parking
- Connected Drive
- Offer Analysis
- Simulation of Mobility
- Etc.

Where: in Tuscany

ATTRATTIVA   DIGITALE   ACCESSIBILE   PULITA   EFFICENTE   INTEGRATA   FLESSIBILE

WEEE: Waste from Electrical and Electronic Equipment

- **maximize the collection of WEEE** in Tuscany through a new governance model based on the involvement of SMEs and awareness raising activities towards citizens and its **replication in Andalucía**.

- Actions:
  - Improve the regional governance
  - Support municipalities in capacity building of public officials and improving services to citizens.
  - Develop a system of **services and incentives for SMEs**
  - Develop IT tools for companies and citizens: a **software** and **guidelines** for the simplification of administrative and bureaucratic activities and an **App** to easily locate collection sites.
  - Develop an awareness raising **information campaign** to increase public attention on the topic.
  - Test the **replicability and transferability** of project results through the implementation of actions in the Region of Andalucía.

http://www.regione.toscana.it/-/life-weee
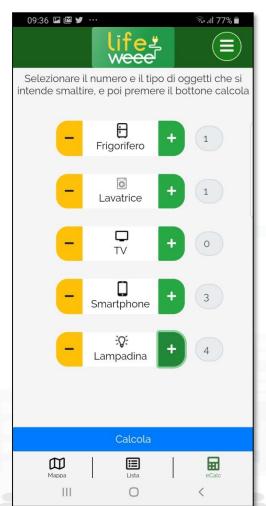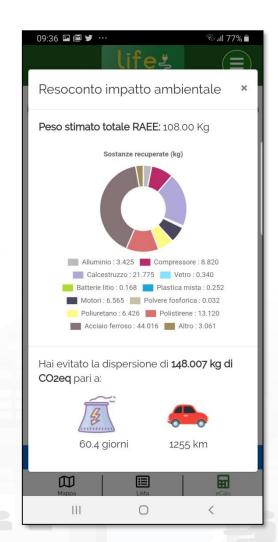
Example of Mobile App on Stores

smartGARDAlake
www.smartgardalake.it

1 INTELLIGENT PUBLIC LIGHTING

SMART NETWORK

SENSORS

INFRASTRUCTURE

2 OPEN DATA, IoT, SOCIAL

SNAP4CITY

3 APP E SERVIZI ON DEMAND SMART CITY & SMART TOURISM

4 CONTROL ROOM FOR SMART GOVERNCANCE

Experimenting 5G

Fields:
- Internet of Things: Industry IOT, Smart City
- Mobility and transport
- Safety & Security: video analysis
- Culture and Tourism, Education, Health

Where in Italy:
- Prato and L'Aquila

Partners:

SENSORI E IOT - PRATO
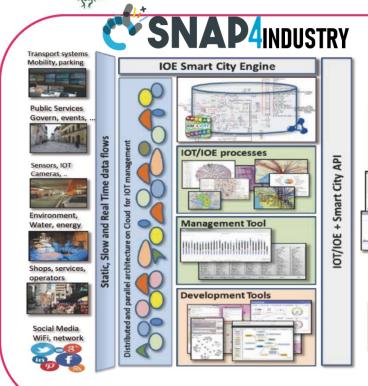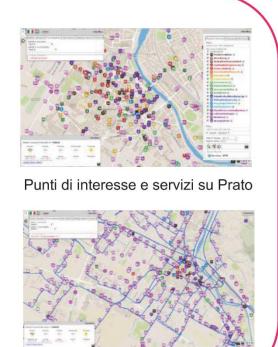
Piattaforma IoT/IoE abilitata dal 5G per applicazioni di:

- Smart City management (in ottica Smart City)

- monitoraggio utenze in modo smart

- industrial automation (in ottica Industria 4.0)

Punti di interesse e servizi su Prato

Use Case LEADER

Partner coinvolti

Aziende/Enti Coinvolti

Green Impact Capacity (GIC)

- Improve productivity of chemical plant

- Keep GREEN the environmental impact

- Exploiting innovative technologies

- Diversify the production

- Monitoring environmental conditions

Coll@bora

Supporto Collaborativo Protetto per Genitori e Operatori di Disabili

Tema primario: **Tecnologie Welfare e Inclusione**

Tema Secondario: **Salute**

Nicola Mitolo, DISIT Lab, UNIFI

Evaristo Ricci, Associazione Modi di Dire

Distributed Systems and Internet Technology Lab
Distributed Data Intelligence and Technology Lab
Department of Information Engineering (DINFO)
University of Florence

http://www.disit.dinfo.unifi.it

Collabora Mobile (DEMO)

Coll@bora
Mobile Manager

Coll@bora
Mobile App

Acknowledgements

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Acknowledgements

Be smart in a SNAP!

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Università degli Studi di Firenze - School of Engineering

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