



UNIVERSITÀ
DEGLI STUDI
FIRENZE

DINFO
DIPARTIMENTO DI
INGEGNERIA
DELL'INFORMAZIONE

DISIT
DISTRIBUTED SYSTEMS
AND INTERNET
TECHNOLOGIES LAB



Interoperability in the experience of the KM4City Solution

<http://www.disit.org/km4city>

www.Km4City.org

Nicola Mitolo, Nicola.mitolo@unifi.it



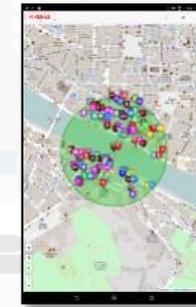
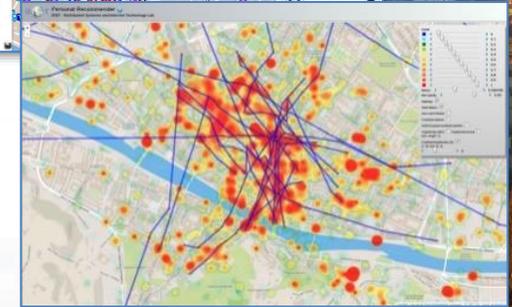
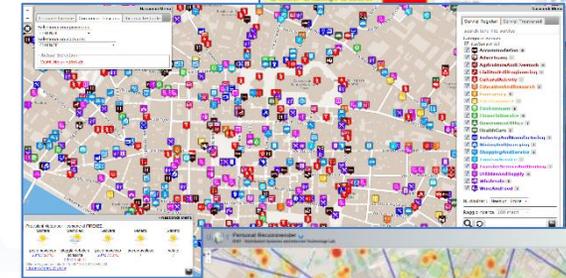
Tavolo Nazionale
Consultazione
EERA, JPI Smart City,
Bologna 26-06-2017





Sentient Urban Platform for Smart City

- Set up an ICT based Urban Platform integrated and unified data management among services, city operators and city users:
 - **Control Room, Real Time Monitoring**
 - decision support, assessing and monitoring risk and resilience
 - **Data analytics and business intelligence**
 - predictions, reasoning, city users behavior analysis, ...
 - **Reading the city: data, users behavior and needs, ...**
 - IOT, Open data sensors, private data, static and real time data.
 - **City Strategies: stimulate virtuous behavior of City Users**
 - participation, totem, twitter, Apps, etc.
 - **Transform Data into value**
 - Put in action smart city innovative solutions and services, development tools



Data & Model



<http://www.km4city.org/?infoDocs>

<http://www.km4city.org/?controlRoom>

<http://www.km4city.org/?devTools>

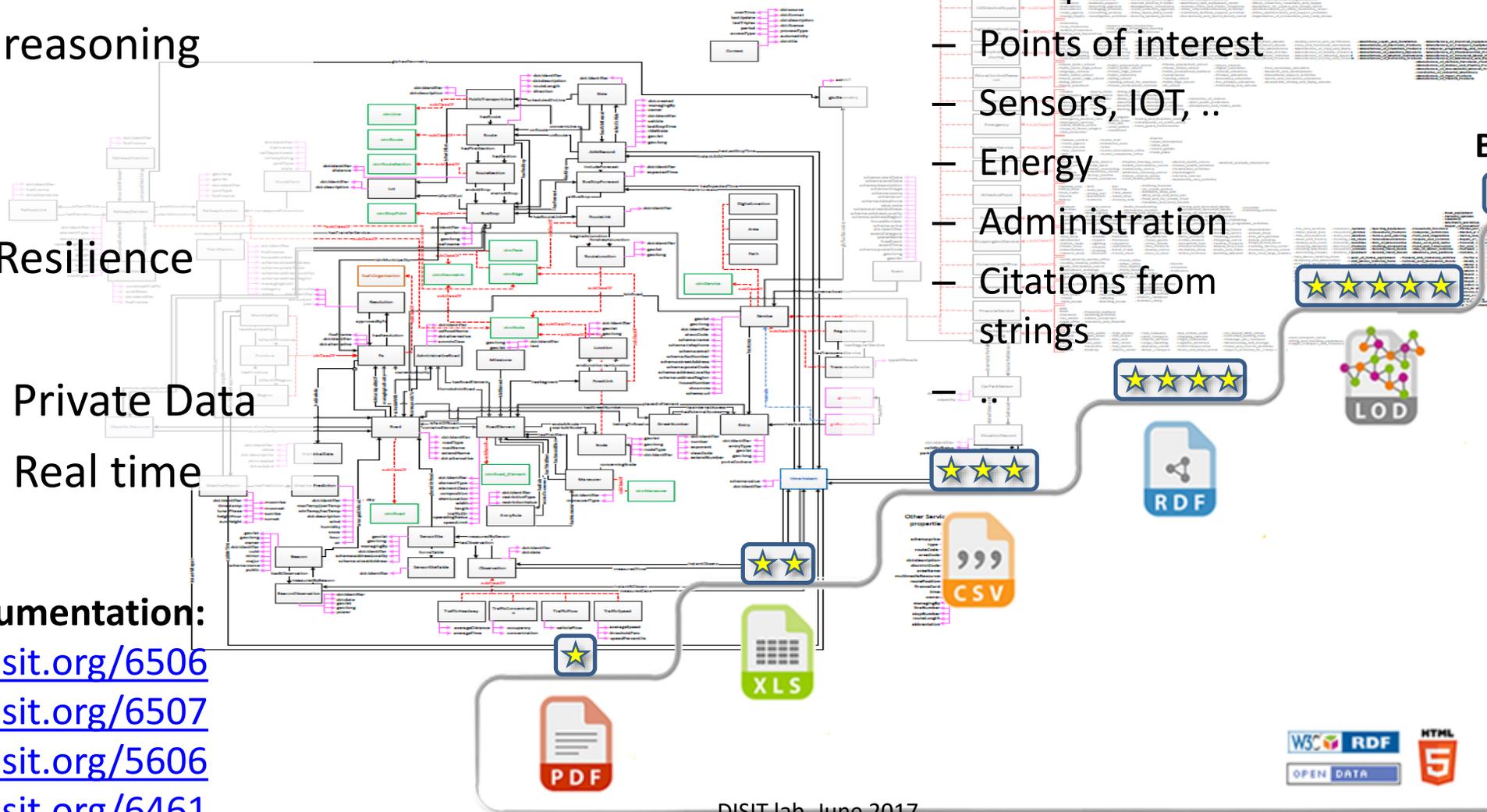
<http://www.km4city.org/?app>

Km4City: Knowledge Base



- Multiple DOMAINS
- Geospatial reasoning
- Temporal reasoning
- Metadata
- Statistics
- Risk and Resilience
- Licensing
- Open and Private Data
- Static and Real time

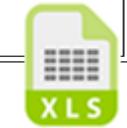
- Street-Guide
- Mobility and transport
- Points of interest
- Sensors, IOT, ..
- Energy
- Administration
- Citations from strings



Big Data Tools



LOD and reasoners



Ontology Documentation:

- <http://www.disit.org/6506>
- <http://www.disit.org/6507>
- <http://www.disit.org/5606>
- <http://www.disit.org/6461>

Transport systems
Mobility, parking



Public Services
Govern, events, ...



Sensors, IOT
Cameras, ..



Environment,
Water, energy



Shops, services,
operators



Social Media
WiFi, network

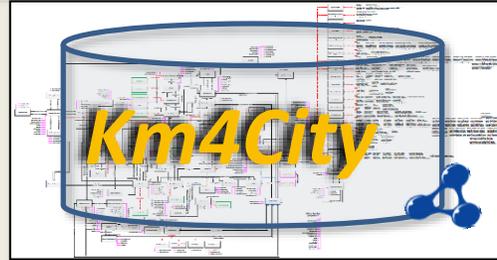


Static, Slow and Real Time data flows

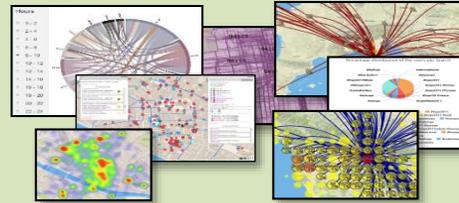
DISCES -- Distributed and parallel architecture on Cloud



Km4City Smart City Engine



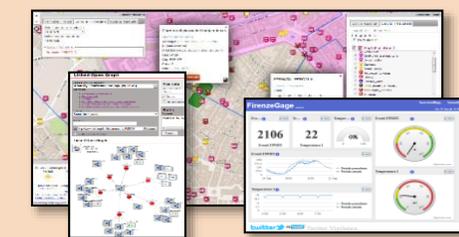
Big Data Analytics



Smartening Tools



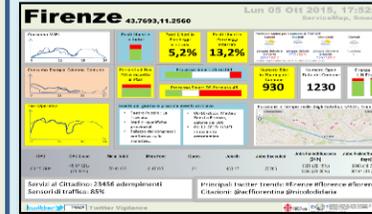
Development Tools



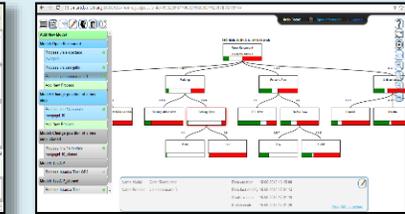
Km4City Smart City API

City Operators and Decision Makers

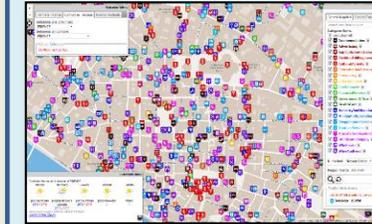
Dashboards



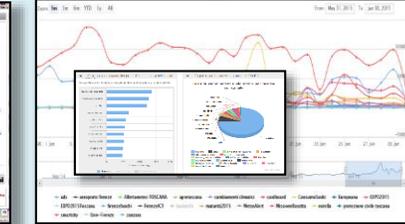
Smart Decision Support



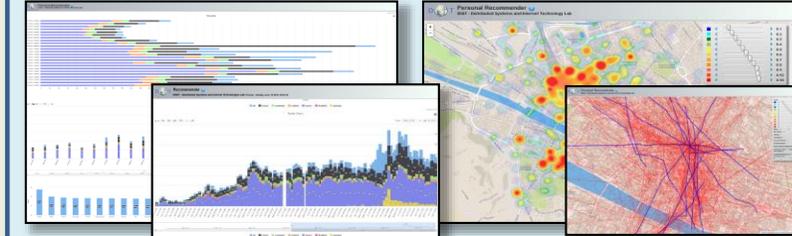
ServiceMap browser



Twitter Vigilance



Analyzers of City User Behavior



Tools for Final Users

Mobile e Web Apps





Interoperability

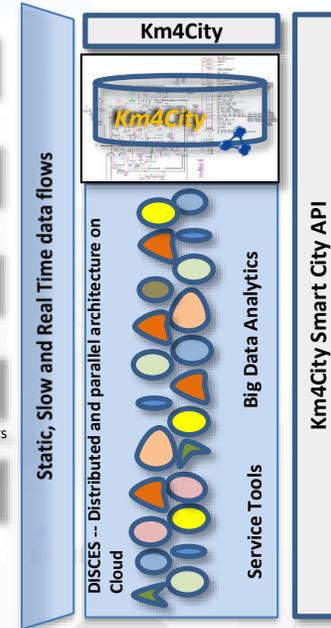
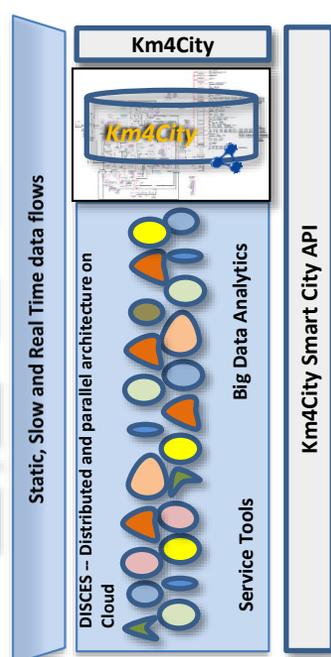
- At different levels:
 - Among cities/regions
 - Among data providers
 - Among Operators
- By Means of:
 - Smart City API → Apps
 - Km4City Smart City Ontology
 - Dashboards/data analytics



- Transport systems
Mobility, parking
- Public Services
Govern, events, ...
- Sensors, IOT
Cameras, ...
- Environment,
Water, energy
- Shops, services, operators
- Social Media
WiFi, network



- Transport systems
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Smart City Control Room



<http://www.km4city.org/?controlRoom>



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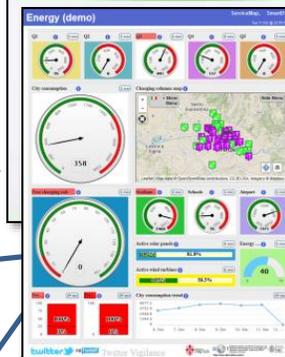
Horizon 2020
European Union Funding
for Research & Innovation



Transport
systems,
Mobility, Parking



Sensors, IOT
Cameras, ..



Public services,
Govern, Events



Environment,
Water, energy



Shops,
services,
operators

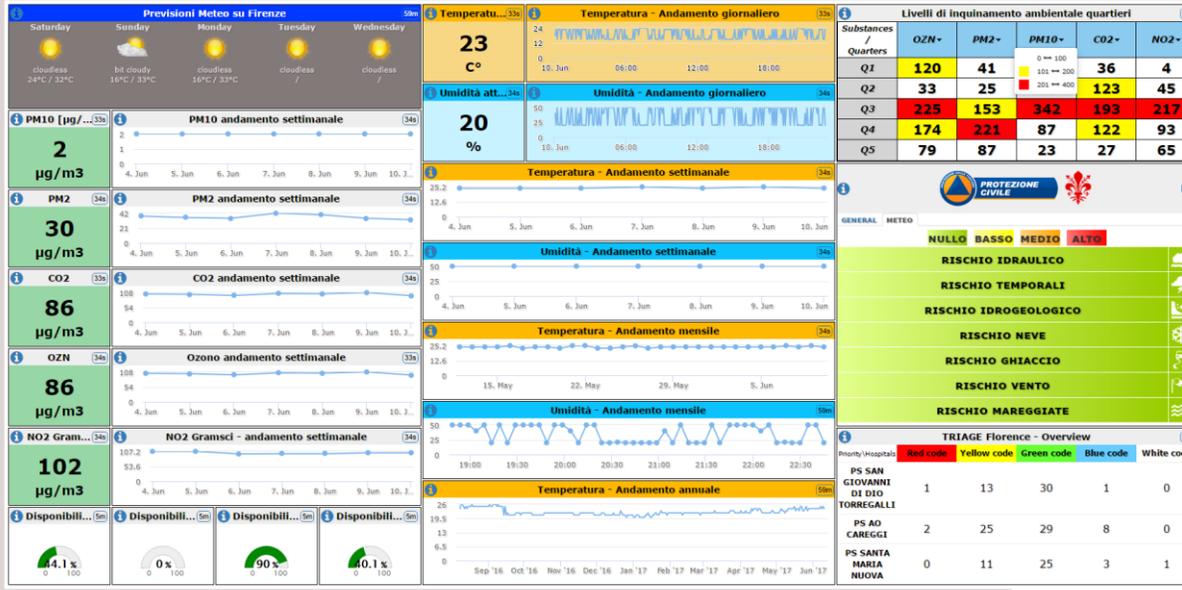


Social Media,
WiFi, Network

Dashboards

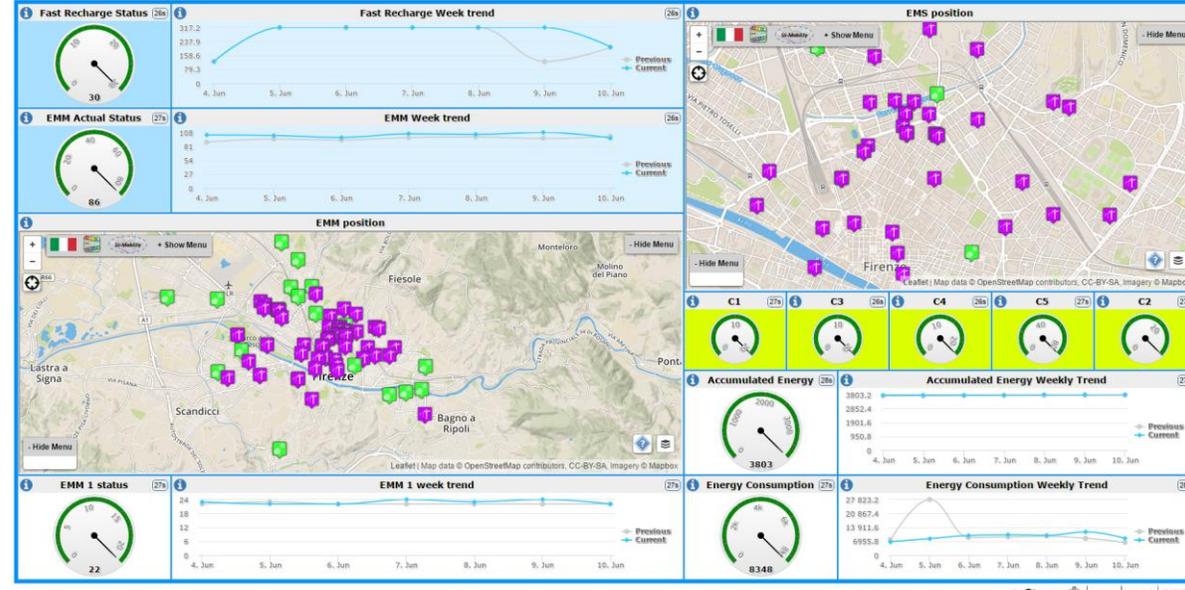
Firenze Ambiente e Salute HD

Dati ambientali su Firenze (demo)



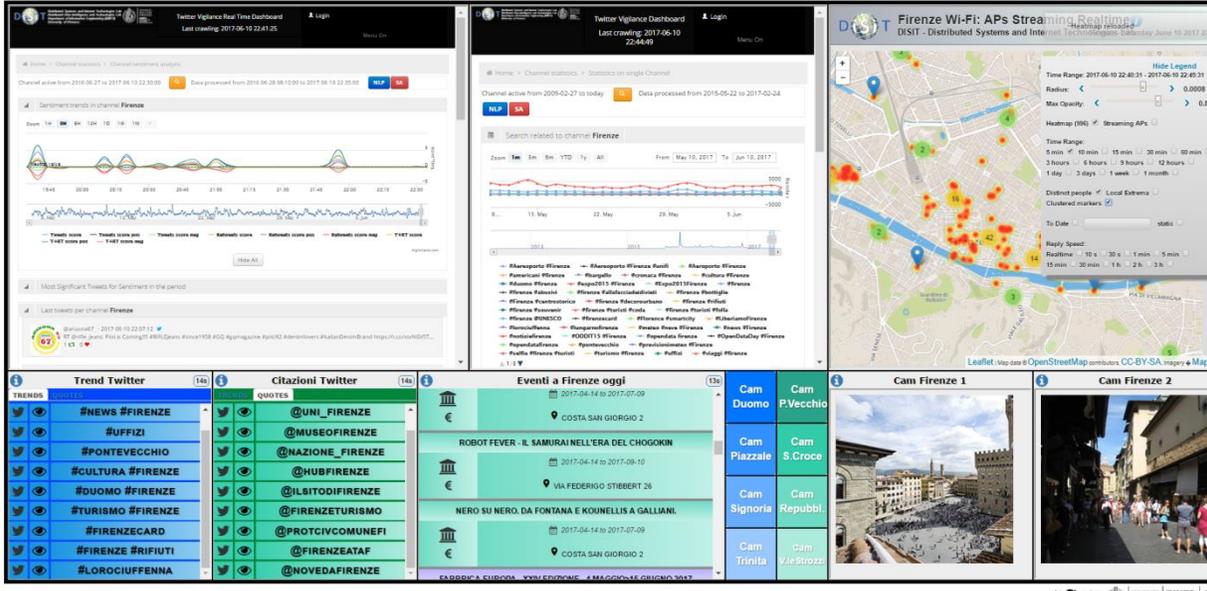
Firenze Energia e Colonnine HD

(demo, dati simulati)



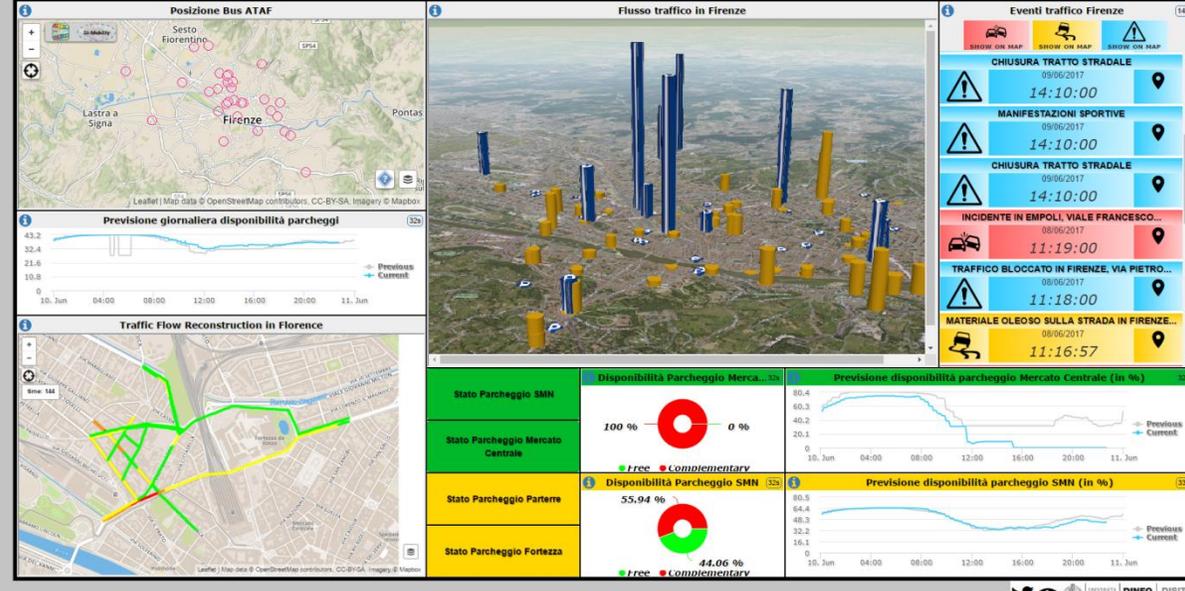
Firenze Sociale e Social Media (HD)

(dati non completi)



Firenze Mobilità e Trasporti HD

(demo, dati non completi)



ESB

Alarms

- TEST - ALLUVIONE MUGNONE MAJOR 07/06/2017 12:45:54
- ALLUVIONE ARNO COVERCIANO CRITICAL 15/06/2017 15:47:31
- ALLUVIONE ARNO VIA PETRIOLO MAJOR 07/06/2017 15:48:11
- TEST - SCONTRI ALLO STADIO CRITICAL 15/06/2017 09:50:04

Traffic events

- SEVERE ACCIDENT SERIOUS ACCIDENT(S) 21/06/2017 11:24:10
- ROAD WORKS ROADWORKS 21/06/2017 11:24:10
- ORD 2017-001302 - SP NA*17 A?ALTO VALDARNO?71ST... 13/06/2017 00:00:00
- INTERVENTO URGENTE PUBBLICACQUA CLOSED AHEAD 20/06/2017 10:00:00

Evacuation plans

- PLAN N.1497263867 IN_PROGRESS 12/06/2017 - 11:37:47 PATHS: 3
- PLAN N.2000000000 PROPOSED 18/06/2017 - 09:42:06 PATHS: 2
- PLAN N.1497604404 PROPOSED 18/06/2017 - 11:08:47 PATHS: 1

Tram position

- TRAM1 21/06/2017 11:32:27
- TRAM2 21/06/2017 11:32:31

Network Analysis

- FM0495 (NORMALIZED) NODE BETWEENNESS 1.0000
- FM0496 (NORMALIZED) NODE BETWEENNESS 0.8091 ON MAP
- FM0500 (NORMALIZED) NODE BETWEENNESS 0.7878
- FM2276 (NORMALIZED) NODE BETWEENNESS 0.7858
- FM0497 (NORMALIZED) NODE BETWEENNESS 0.7825
- FM0701

Environment

PROTEZIONE CIVILE

GENERAL METEO

RISCHIO IDRAULICO: NULLO BASSO MEDIO ALTO

RISCHIO TEMPORALI

RISCHIO IDROGEOLOGICO

RISCHIO NEVE

RISCHIO GHIACCIO

RISCHIO VENTO

RISCHIO MAREGGIATE

Anemomet... 22 C°

221

Temperatu... 24 C°

Umidità 20 %

Pluv. Flore... 24 mm

Pluviometer Florence City - last 24h

Hydromete... 20 m.s.z.l.

Hydrometer Arno Nave di Rosano - Last 24h

Hydromete... 24 m.s.z.l.

Hydrometer Arno Florence Uffici - Last 24h

Hydromete... 24 m.s.z.l.

Hydrometer Mugnone Ponte alle Mosse - Last 24h

Mobility

Bus Lines Status

STATO: LINEE MONITORATE DATE: 2016-08-04 23:59:03

ULTIMO AGGIORNAMENTO: 2016-08-04 23:59:03

Underpass Viale Maritti Aperto

Underpass Viale Talenti closed

Underpass Fortezza Aperto

Parterre Pa... 76.2%

SMN 65.7%

Fortezza Fi... 37.2%

Mercato Ce... 65.4%

20 num.

33 num.

Florence main first aids status

Priority	Red code	Yellow code	Green code	Blue code	White code
PS SANTA MARIA NUOVA	1	7	14	1	0
PS SAN GIOVANNI DE' DIO TORREGALLI	2	10	24	2	0
PS AD CAREGGI	10	27	31	10	2
PS SANTA MARIA ANNUNZIATA	2	9	22	4	0

Parking availability (%) 28:2

Resources

Planned events

- 1966 - 2016 - LA BELLEZZA SALVATA - PROROGATA FINO AL 2016-12-01 to 2017-07-02 VIA CAMILLO CAVALLO 3
- 2017-02-15 to 2017-06-23 NE SPORILLI LE BIBLIOTECHE DELL'UNIVERSITÀ DI FIRENZE IN
- 2017-02-15 to 2017-09-29 BIBLIOTECHE DELL'UNIVERSITÀ DI FIRENZE IN MOSTRA - PROROGATA

Ambulance... 20 num.

Ambulance... 33 num.

Voluntiers

Twitter Quotes

- #FIRENZE
- #NEWS #FIRENZE
- #FIRENZE #FIUTI
- #UFFIZI
- #PONTEVECCHIO
- #BARGELLO
- #AEROPORTO #FIRENZE
- #DUOMO #FIRENZE
- #VIAGGI #FIRENZE
- #CRONACA #FIRENZE

Twitter Quotes

- @MUSEOFIRENZE
- @COMUNEFIRENZE
- @NAZIONE_FIRENZE
- @PROTCIVCOMUNEFIRENZE
- @UNI_FIRENZE
- @HUBFIRENZE
- @NOVEDAFIRENZE
- @ILSIDOFIRENZE
- @FIRENZETURISMO
- @BIBLIO_COMUNEFIRENZE

TV-RT Firenze

Twitter Vigilance Real Time Dashboard

Last crawling: 2017-06-21 12:44:30

Channel active from 2016-06-27 to 2017-06-21 12:35:00

Data processed from 2016-06-28 08:10:00 to 2017-06-21 12:35:00

Sentiment trends in channel Firenze

Zoom 1H 2H 6H 12H 1D 1W 1M 1Y

Most Significant Tweets for Sentiment in the channel

Last tweets per channel Firenze

@GiorgiaLodi - 2017-06-21 12:13:45 RT @emanuelegeri: Primo giorno d'Estate: pubblicato aggiornamento luoghi freschi https://t.co/sKzZoeGhw su #opendatafirenze @comunefi

TV Firenze

Twitter Vigilance Dashboard

Last crawling: 2017-06-21 12:44:49

Channel active from 2009-02-27 to today

Data processed from 2015-05-22 to 2017-02-24

Search related to channel Firenze

Zoom 1m 3m 6m YTD 1y All

From May 21, 2017 To Jun 21, 2017

Most Significant Tweets for Sentiment in the channel

Last tweets per channel Firenze

Daily number of tweets/retweets for channel: Firenze

ESB events

Map showing tram routes and event locations in Florence.

Firenze Wi-Fi - Access Points Clusters Coverage Map

DISIT - Distributed Systems and Internet Technologies Lab

Firenze - Wednesday June 21 2017 12:49:12

Heatmap showing Wi-Fi access point clusters in Florence.

Firenze Wi-Fi - APs Streaming Realtime

DISIT - Distributed Systems and Internet Technologies Lab

Firenze - Wednesday June 21 2017 12:49:12

Realtime map showing Wi-Fi access points in Florence.

Smart City Dashboard



Horizon 2020
European Union Funding
for Research & Innovation

Firenze

43 1903, 11/2000

Smart City Engine: 42.4% (CPU: 3.2%, RAM: 58.7, DAILY JOBS: 4863)

Smart City Overview: 24 (55.4%)

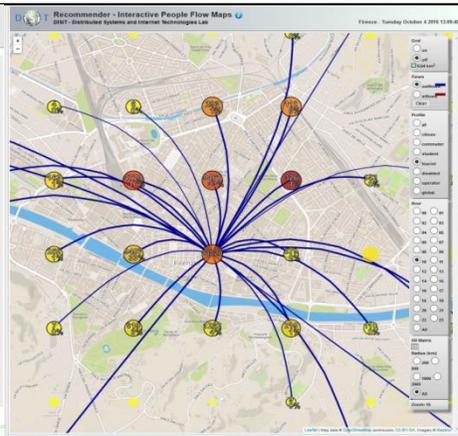
Real-time position ATAP bus: 2, 12, 33

Twitter Vigilance: 18.6%

Smart City Engine: 26%

Smart City Overview: 24 (55.4%)

Smart City Overview: 24 (55.4%)



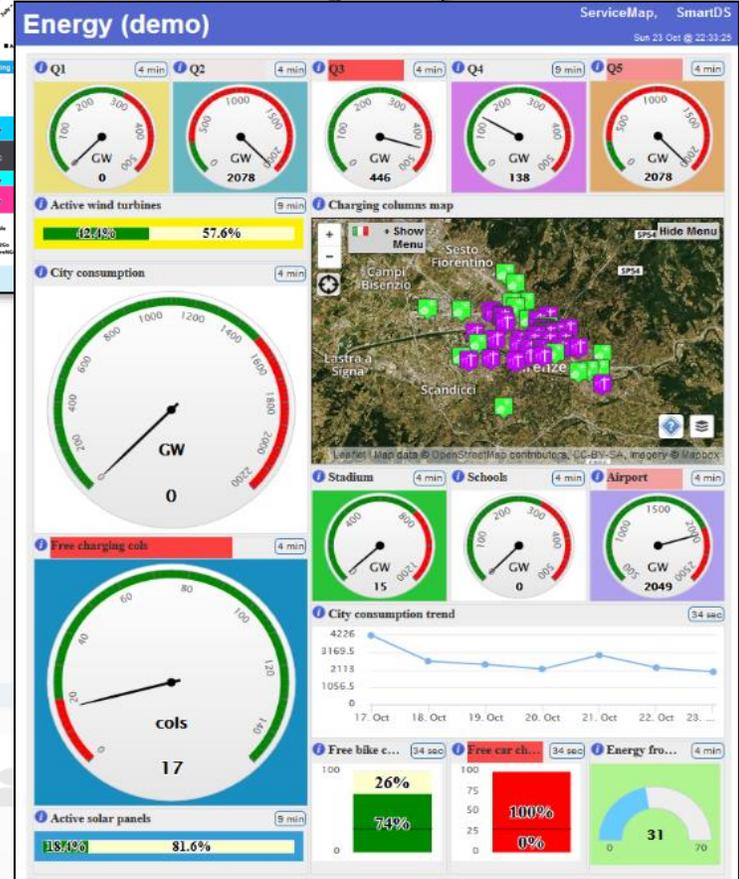
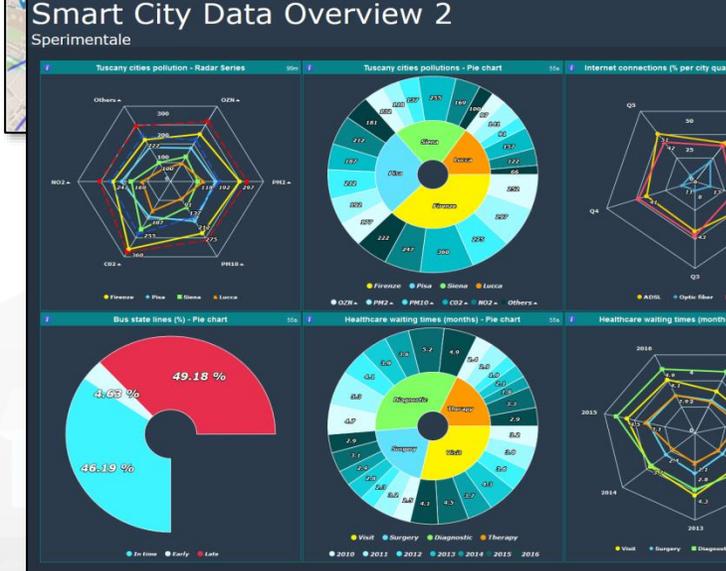
Florence data overview

A table based overview over city main data

Wed 18 Jan @ 19:19:10

Air Quality Index					Weather stations					Citizens satisfaction index							
Substances	OZ ₃	PM _{2.5}	PM ₁₀	CO ₂	NO ₂	Area / Station	Wind speed (km/h)	Direction	Temperature (°C)	Humidity (%)	Rain today (mm)	Pressure (mbar)	Citizen / Service	Quality (%)	Cost (%)	Availability time (%)	Emergency handling (%)
Q1	120	41	165	36	4	Sesto Fiorentino	50	N	12	0	0	922	Water	92	67	95	42
Q2	33	25	66	123	45	Livorno	65	NE	17	0	0	876	Public transportation	36	29	27	31
Q3	225	153	342	193	217	Grosseto	78	E	4	22	0	1022	Public safety	77	64	58	62
Q4	174	221	87	122	93	Vare	42	S	6	0	34	895	Roads management	28	42	27	25
Q5	79	87	23	27	65	Fallonia	102	N	7.2	23	0	913	Healthcare	72	61	23	56
						Giugio	97	O	3	19	0	957	Welfare	43	54	38	36

Categories / Vehicle	Total arrivals	Overnights	Day triggers	Fields Categories	Free	Paid	Winter	Spring	Summer	Autumn
Airplane	56	36	20	Classical music, opera, ballet	7	23	6	10	4	10
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



First aids overview - Tuscany



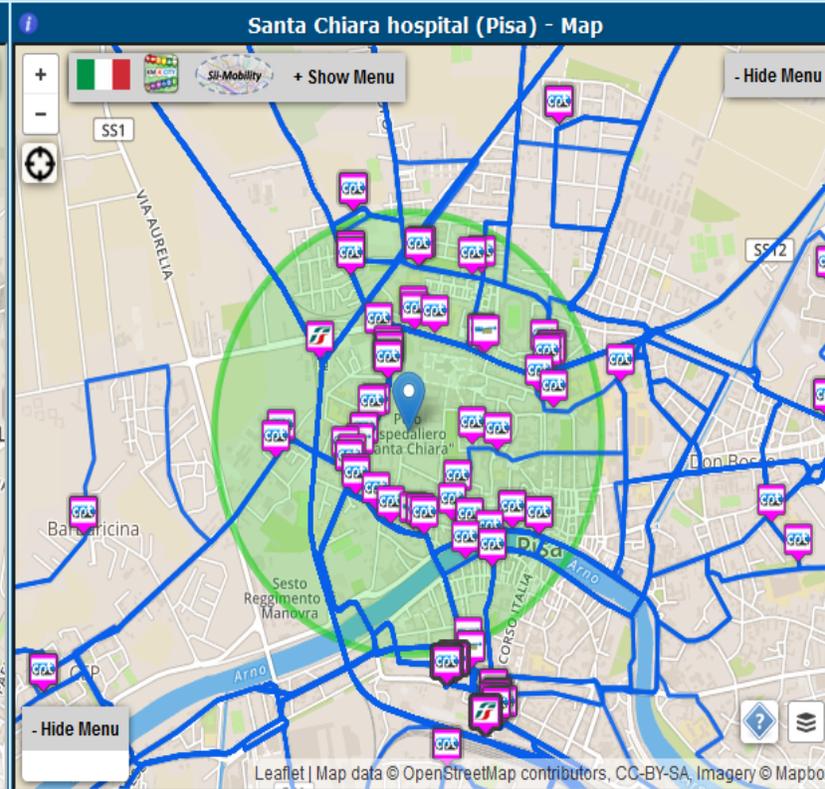
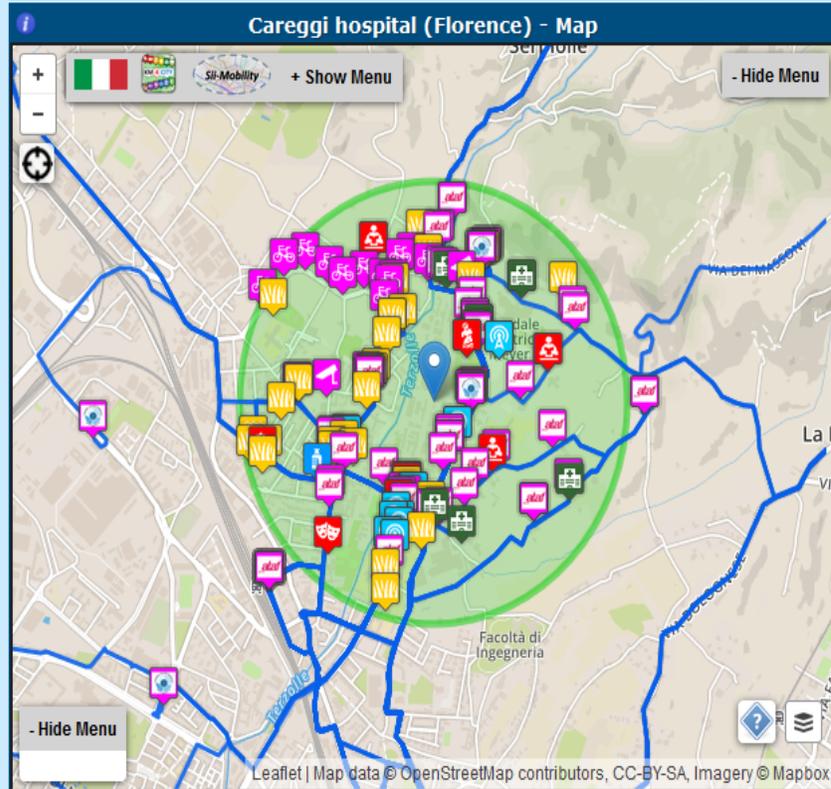
Service status of main first aids

Thu 25 May @ 11:00:34

Careggi hospital (Florence) - Details 9m					
Priority\Status	Red code	Yellow code	Green code	Blue code	White code
Addressed	1	4	3	0	0
Waiting	0	2	9	2	0
In visit	1	9	18	3	0
In observation	4	19	2	0	0
Totals	6	34	32	5	0

Santa Chiara hospital (Pisa) - Details 9m					
Priority\Status	Red code	Yellow code	Green code	Blue code	White code
Waiting	0	1	7	9	3
In visit	0	7	1	1	6
Totals	0	8	8	10	9

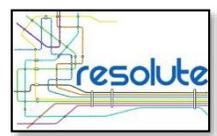
Other hospitals - Summary 9m					
Priority\Hospitals	Red code	Yellow code	Green code	Blue code	White code
PS SAN GIOVANNI DI DIO TORREGALLI	1	16	20	1	0
PS SANTA MARIA NUOVA	1	14	12	3	0
PS AO CAREGGI	6	34	32	5	0
PS SANTA MARIA ANNUNZIATA	1	8	11	1	0
PS BORGO SAN LORENZO	0				0
PS OSPEDALI RIUNITI	3				1
PS CASENTINO					
PS SANTA CROCE					
PI PO CORTONA					
PS CIVILE PIOMBINO					
PS LA MISERICORDIA					



Stato Priorità	1	2	3	4	5
Con Destinazione	0	4	2	0	0
In Attesa	0	0	1	1	0
In Visita	1	5	4	3	0
Oss. Temporanea	1	17	7	1	0
Totale	2	26	14	5	0



Using city Forecast

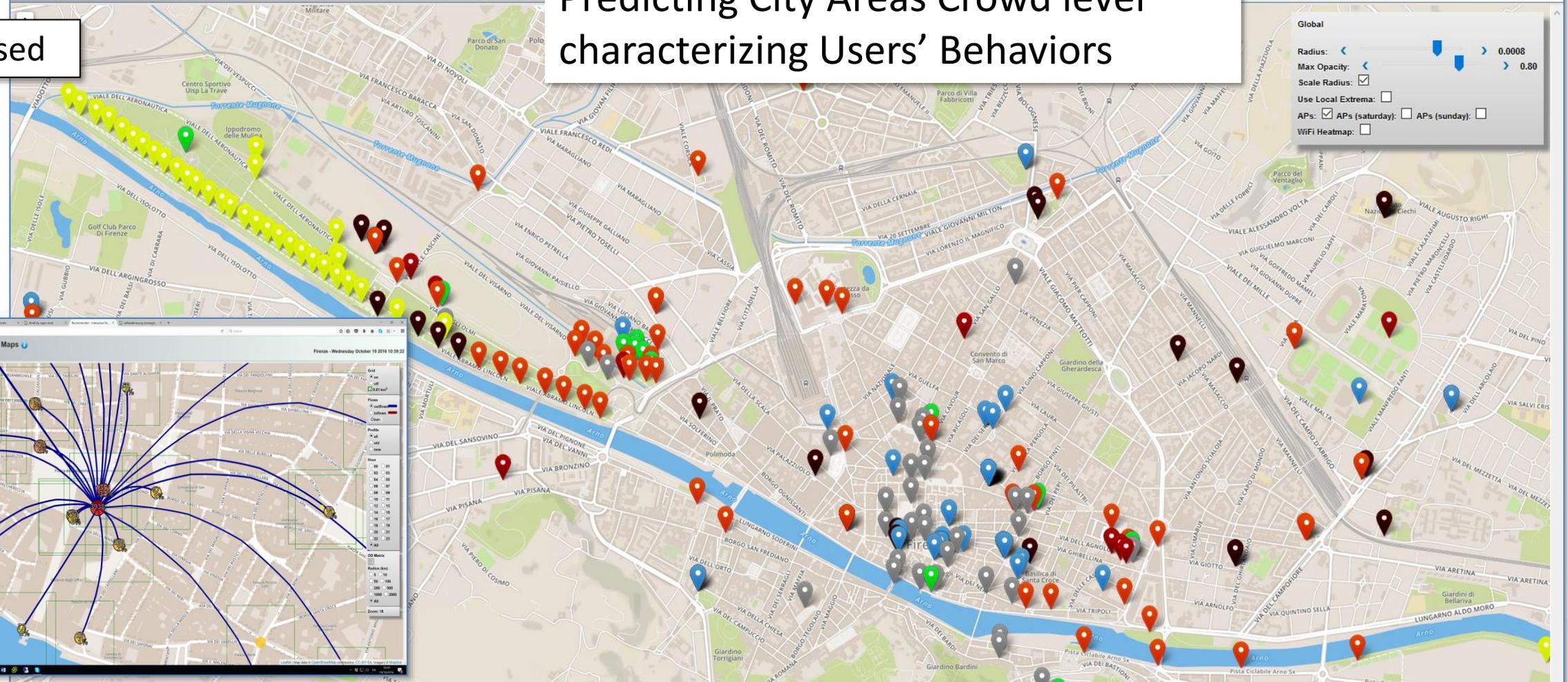


DISIT Firenze Wi-Fi: Access Points Clusters Coverage Map
DISIT - Distributed Systems and Internet Technologies Lab

Wi-Fi based

Predicting City Areas Crowd level characterizing Users' Behaviors

Firenze - Saturday November 12 2016 19:16:33



Global

Radius:

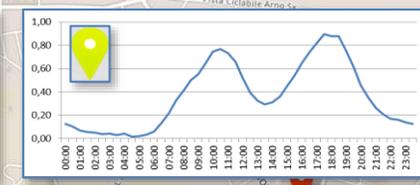
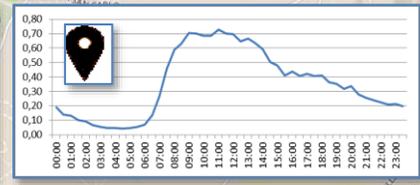
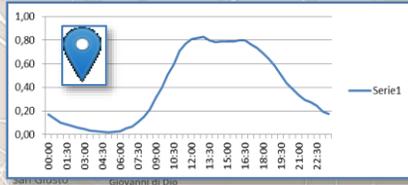
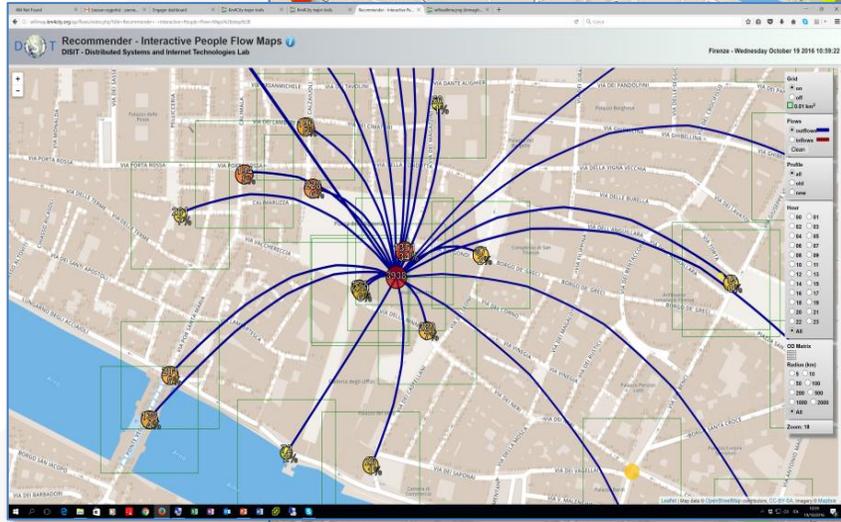
Max Opacity:

Scale Radius:

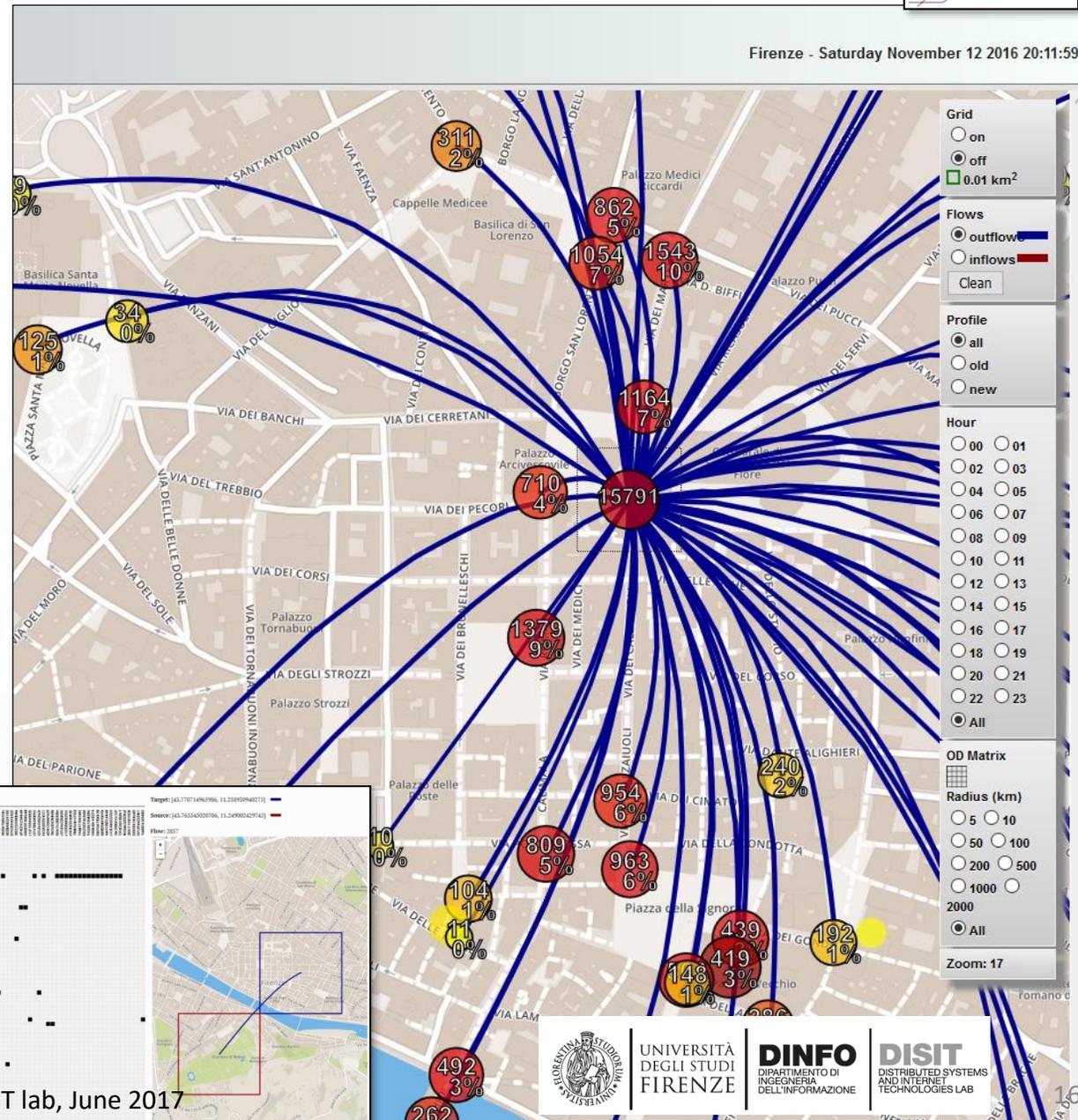
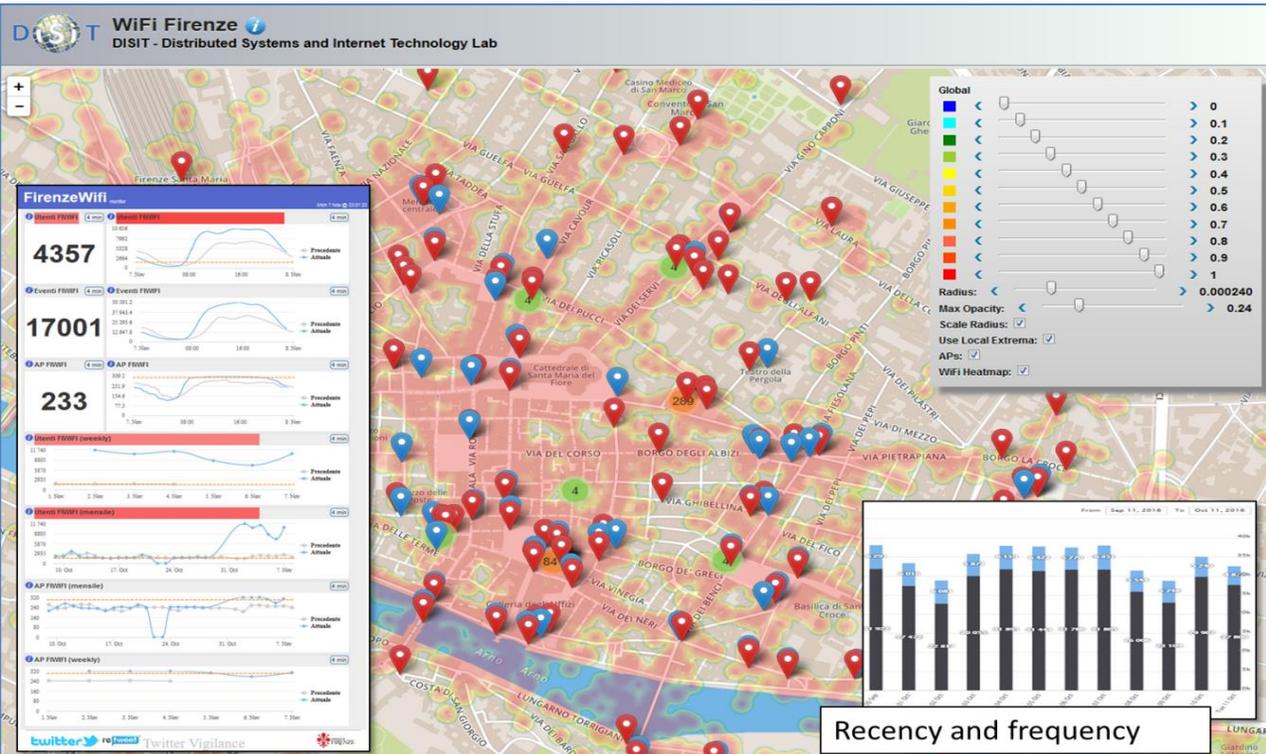
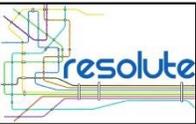
Use Local Extrema:

APs: APs (saturday) APs (sunday)

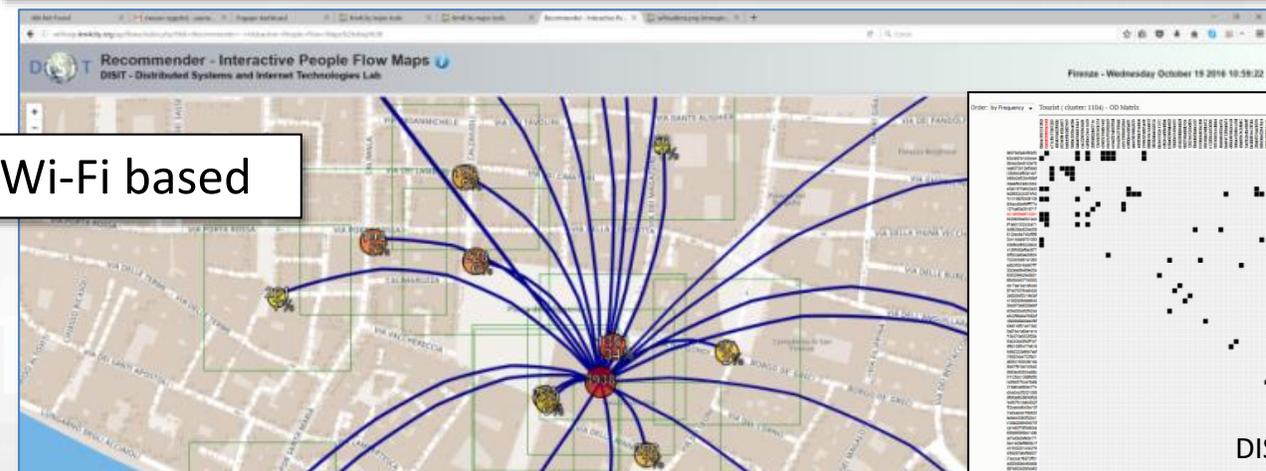
WiFi Heatmap:



Origin Destination Matrix Estimation

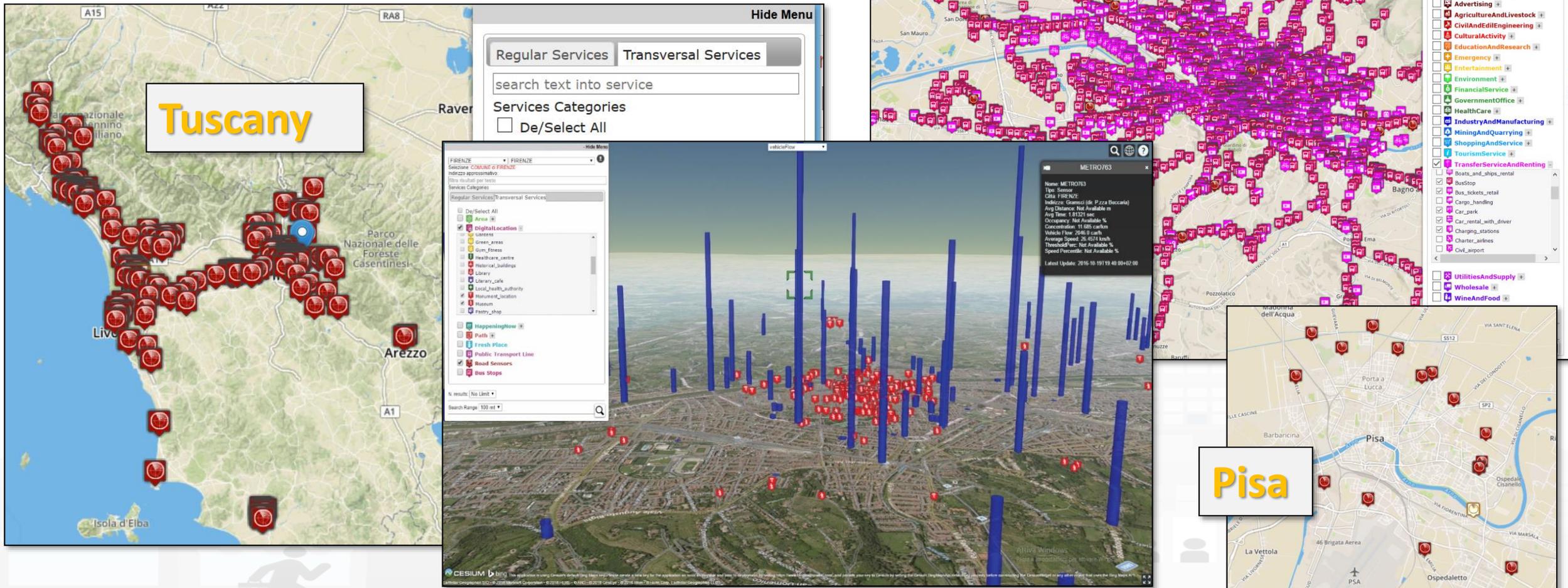


Wi-Fi based

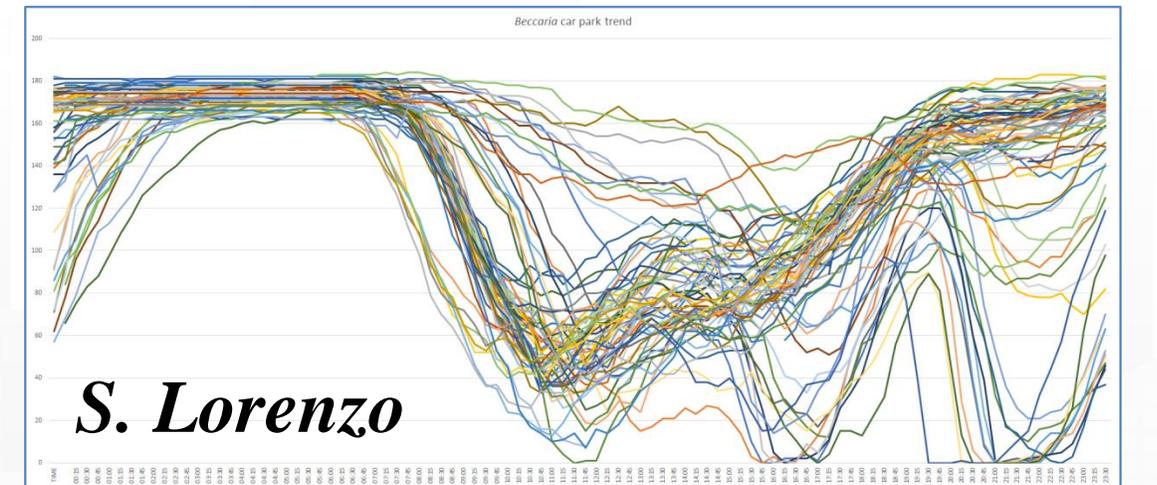
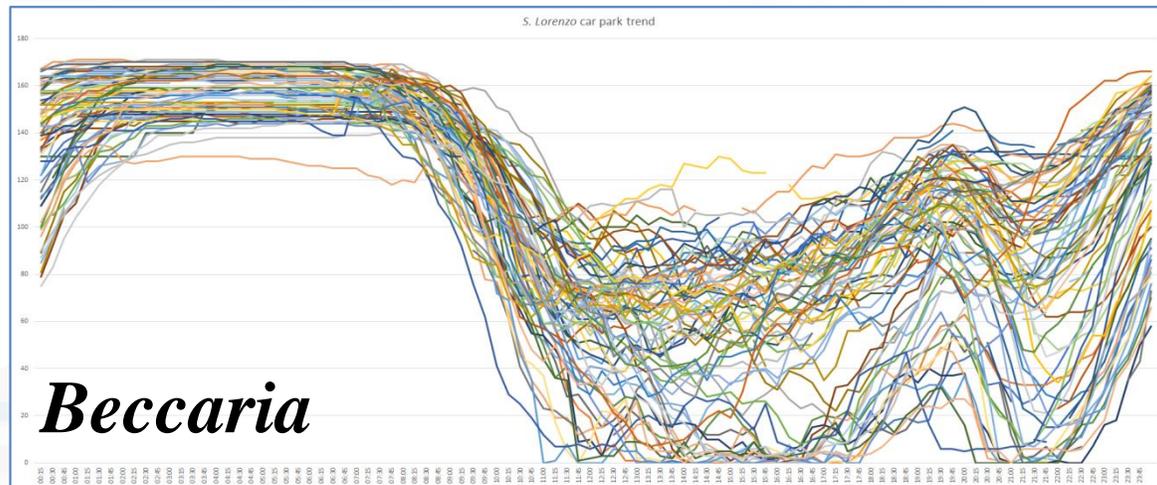
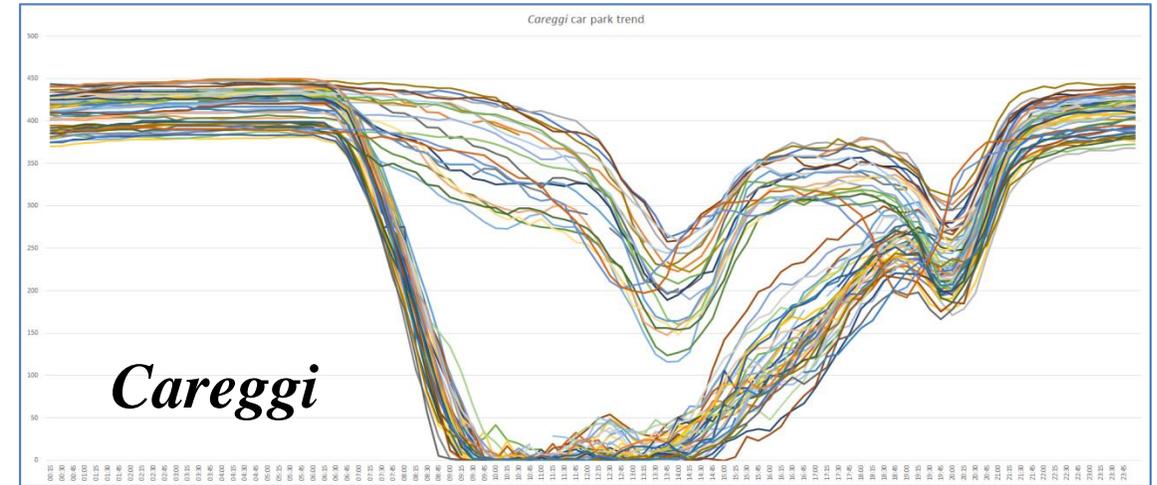
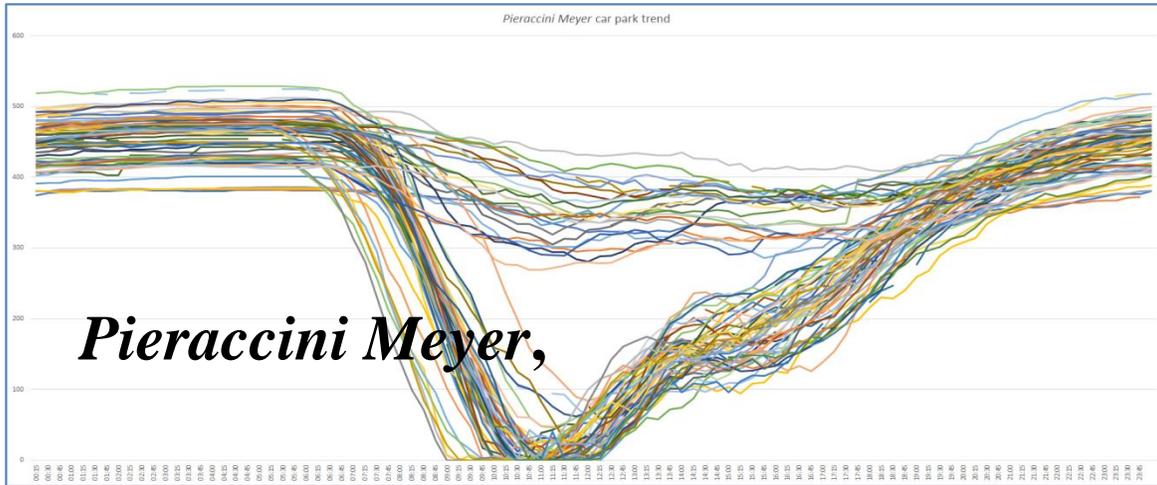


Traffic Flow Forecast

- Spire and Virtual Spires (cameras), Bluetooth, ..
- Specifically located: along, around, ..



Free slots Parking forecast



Smart City API



<http://www.disit.org/7044>



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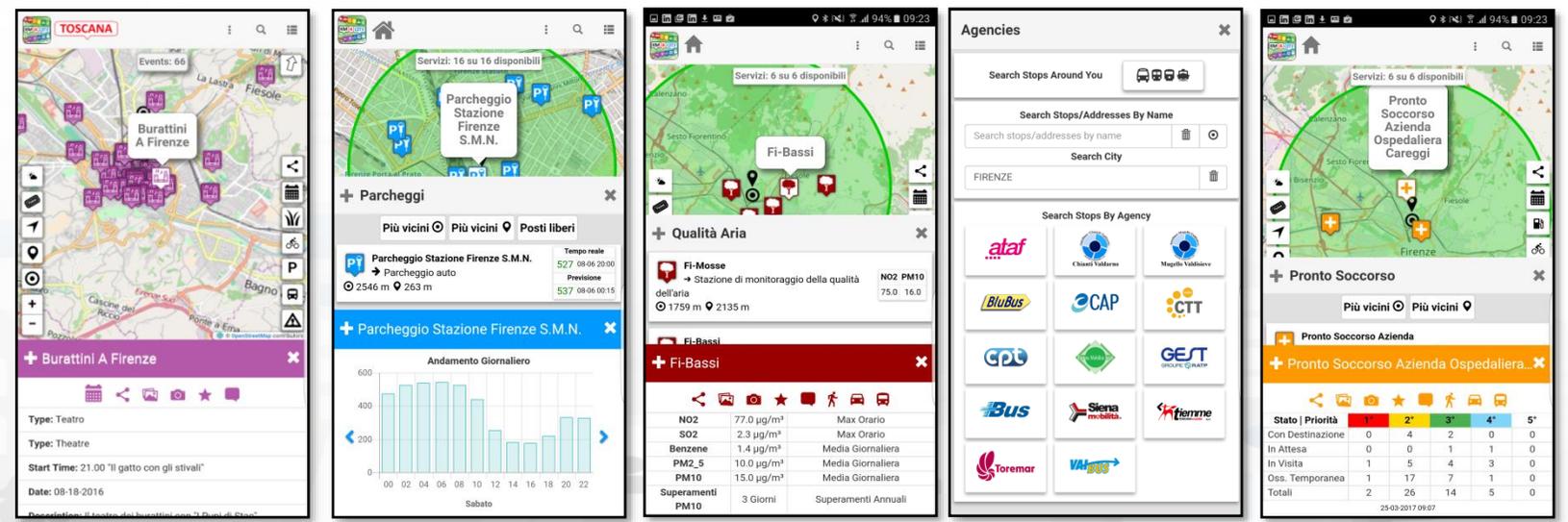
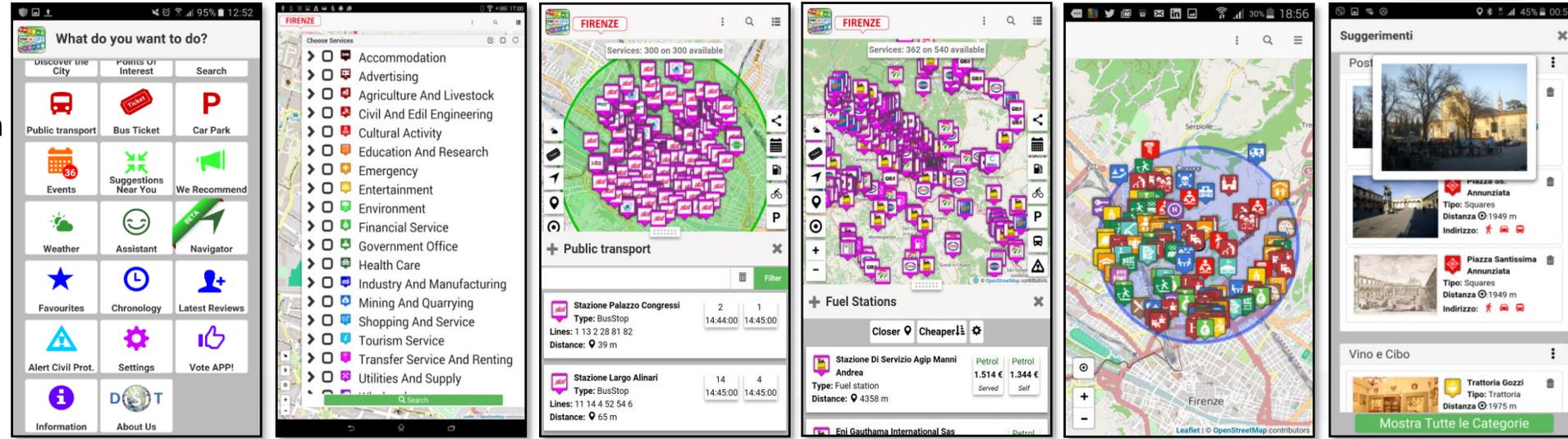
Scenari vs SmartCity API

- Empowering the city users
- Access to event information
- Supporting City Users in using Public Mobility
- Supporting City Users in using Private Mobility
- New Experience to access at Cultural and Touristic info
- New way to access at health services
- Access at Environmental information
- Profiled Suggestions to City Users
- Personal Assistant

Km4City APP



- Smart Parking, in Tuscany
- Smart First Aid in Tuscany
- Smart Public Transportation in Tuscany
- Smart Fuel pricing in Tuscany
- Bike Sharing in Pisa
- Weather condition in Tuscany
- Pollution and Pollination in Tuscany
- Traffic Sensors in Tuscany
- Smart Routing in Tuscany
- Smart Transportation in Florence
 - Events, traffic, ...
- Entertainment Events in Florence



Development Tools

<http://www.km4city.org/?controlRoom>

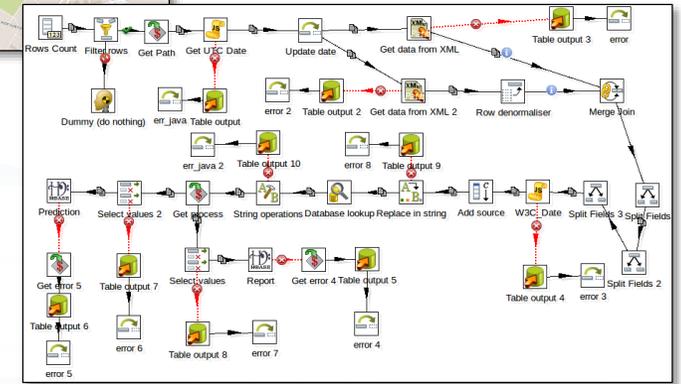
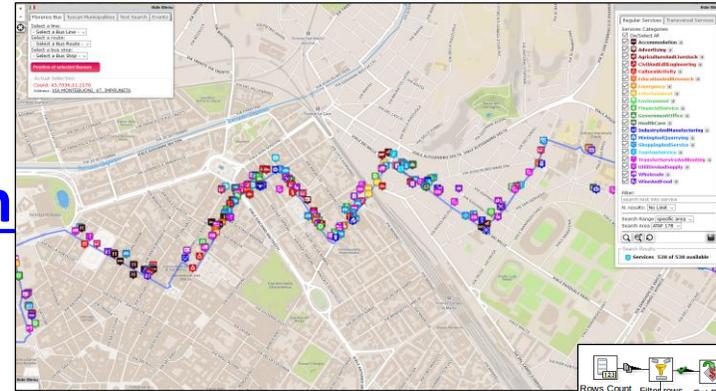
<http://www.km4city.org/?devTools>

<http://www.km4city.org/?infoDocs>

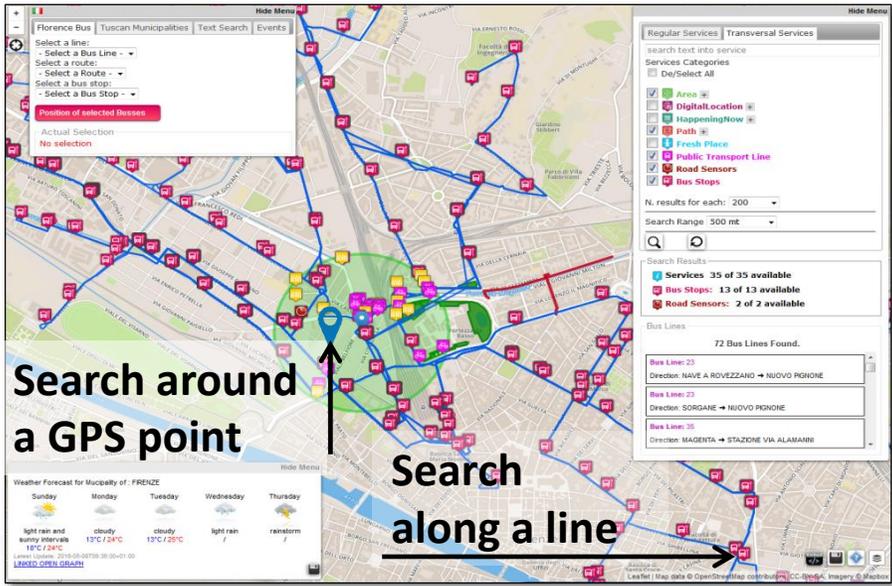
<http://www.km4city.org/?app>



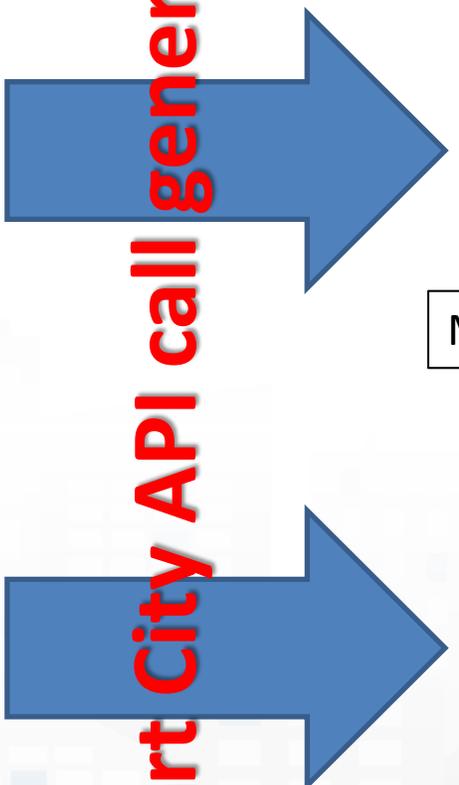
- **Smart City API:**
 - Several kind of APIs
- **Generator “ServiceMap”, <http://servicemap.com>**
 - Call per web and mobile App
 - Embedding in web pages
 - *Collaborative work*
- **Load new data: manual and automatic**
 - POI, IOT, etc.
 - Load of Shape & Paths
 - *Collaborative work*
- **Dashboard builder**
 - Production of dashboard per control room
 - Embedding view of any other analytics of Km4City or of third party: wifi, 3D, flow, recommend, engager, etc.
 - *Collaborative work*



ServiceMap Dev Tool



Smart City API call generation



Web App HTML5

Mobile Apps

Embed into Web pages

<http://www.disit.org/6873>



Dashboard Builder

<http://www.disit.org/6935>



Dashboard Builder

Admin Logout

Operations
Metrics
Widgets
Users

Dashboards Overview

My Dashboard

Name	Title	Creation Date	Status
12	Dashboard Galia	2016-07-27 11:35:15	

A - 01

Copia 59

Copia Duplicazione Dashboard

CopiaAdminDash

CopiaDashAttuale

dashboard creata

DASHBOARD DUPLICATA 41

DashobarAdmin

Menu_dash

nuova Copia

nuova Copia01

Nuova Dashboard

NUOVA DASHBOARD 40

Sources Management

Operations
Dashboard Builder
metrics
widgets

DataSources Overview

ID	URI
Km4CityApp	jdbc:mysql://fedislog:3306
Km4Cityquartz	jdbc:mysql://192.168.0.20:3306
Km4CityRDF	http://192.168.0.208:8080/WebApp/Grafico?spanl
Km4CityRecommender	jdbc:mysql://192.168.0.55:3306
Km4CityServiceMap	jdbc:mysql://192.168.0.72:3306
Km4CitySillmobility	jdbc:mysql://192.168.0.72:3306
prova	jdbc:mysql://fedislog:3306
SmarrDS	jdbc:mysql://192.168.0.25:3306
TwitterTv	jdbc:mysql://192.168.0.50:3306

Add new Widget

Click the Add button to add one or more metrics to the widget

Metric: Sensors_RT

Metric Description: Description: Percentage of Edge Sensors Active
Metric: CPUUsage: Percentuale+424
Data Area: Mobilita
Data Source: Osservatorio Regionale per la Mobilita ed i Trasporti
Refresh rate: 60 sec
Status: Active

Context: [Dropdown]

Type Widget: widgetPieChart (max 1 metrics)

Selected Metrics: Sensors_RT

Link: www.km4city.wf_operative.it

Information: Percentage of road sensors (underground only) working or not compared to those declared in the day. The portion of the graph in red refers to the percentage of non-functioning, the green part refers to the active ones.

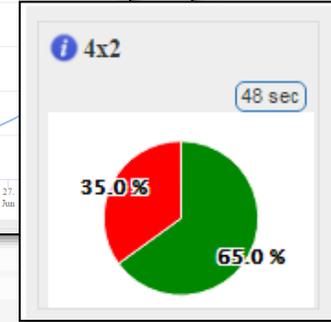
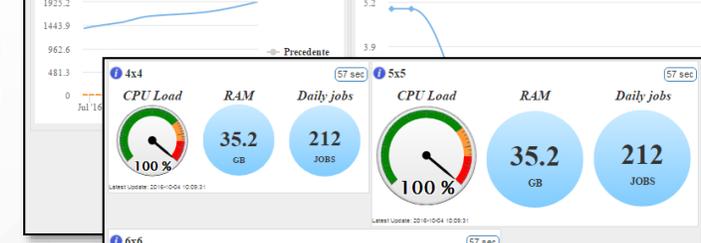
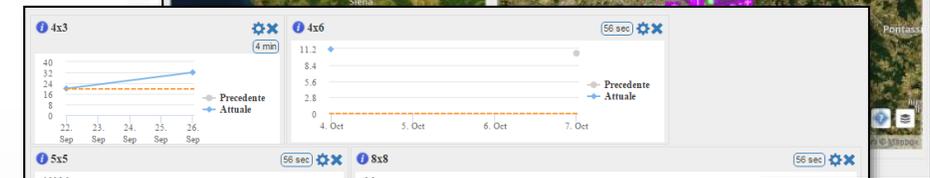
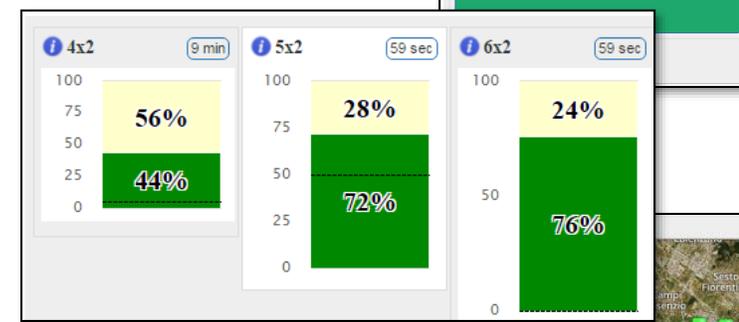
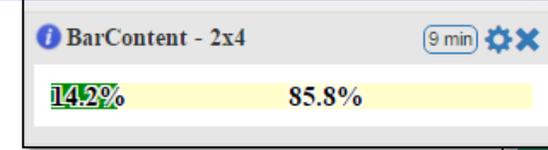
Widget Parameters

Title: Sensors RT Background color: amrr

Time Interval: No Refresh rate (sec): 60

Rows number: 2 Columns number: 3

Buttons: Reset, Close, Create



Modifica Widget

Id Widget: widgetBarContent

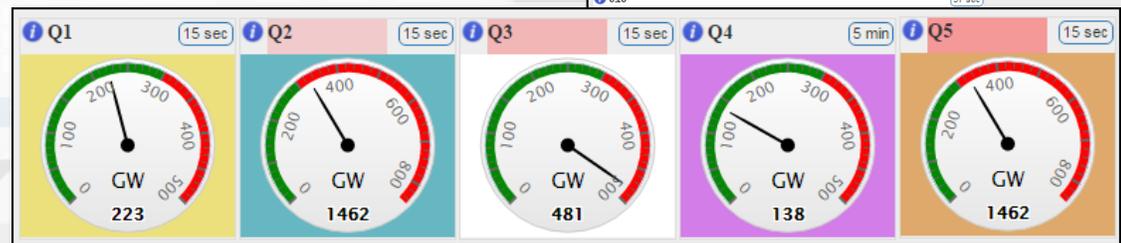
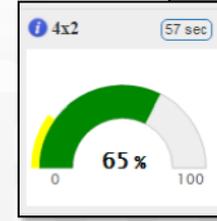
Type: Percentuale

Min. Columns number: 1 Max. Columns number: 2

Min. Rows number: 2 Max. Rows number: 3

n. metrics: 1 Color: 1

Buttons: Close, Modify



Projects Using and Contributing to Km4City





Km4City Roadmap



2021

- waste
- Territorial areas and paths
- Health, Bike sharing
- Statistics, Energy, ICT, ...
- E-vehicles



WEEE
2017-2020

6/2017

- Risk analysis
- Environmental, water
- Data Licensing models
- Energy Meters
- Fi-Ware compliant

Today

- More Sensors, IOE, IOT
- Dashboard Builder
- Territorial areas and paths
- User Engagement
- Mobility and transport
- Resilience Decision Support

GHOST SIR
2016-2019 - Started



RESilience management guidelines
and Operationalization appLied to
Urban Transport Environment

RESOLUTE H2020
2015-2018 - Started

Km4City 1.5
- SmartDS
- Km4City App



Sii-Mobility SCN
2016-2018 - Started
Km4City 1.6.2

2015

Km4City 1.4
- Embed
- More API
- iBeacon

API
Twitter Vigilance

2016

REPLICATE H2020
2016-2021- Started



REPLICATE
Renaissance of Places with Innovative Citizenship
And Technology

- Suggestions on demand
- User Behaviour Analysis
- Trajectories and OD

2013

Km4City 1.1

- Tuscany Map
- Services
- AVM
- Sensors
- Parking
- Cultural Heritage
- Enrichment cities
- Event in the city
- Digital Locations
- Fresh places

- <http://servicemap.km4city.org>
- <http://log.disit.org>
- <http://www.disit.org/fodd>
- <http://www.disit.org/tv>
- <http://smartds.km4city.org>

- Weather
- Cultural Heritage
- Energy recharge pillar
- Wi-Fi
- Events in the city

2014



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FIRENZE

DINFO
DIPARTIMENTO DI
INGEGNERIA
DELL'INFORMAZIONE

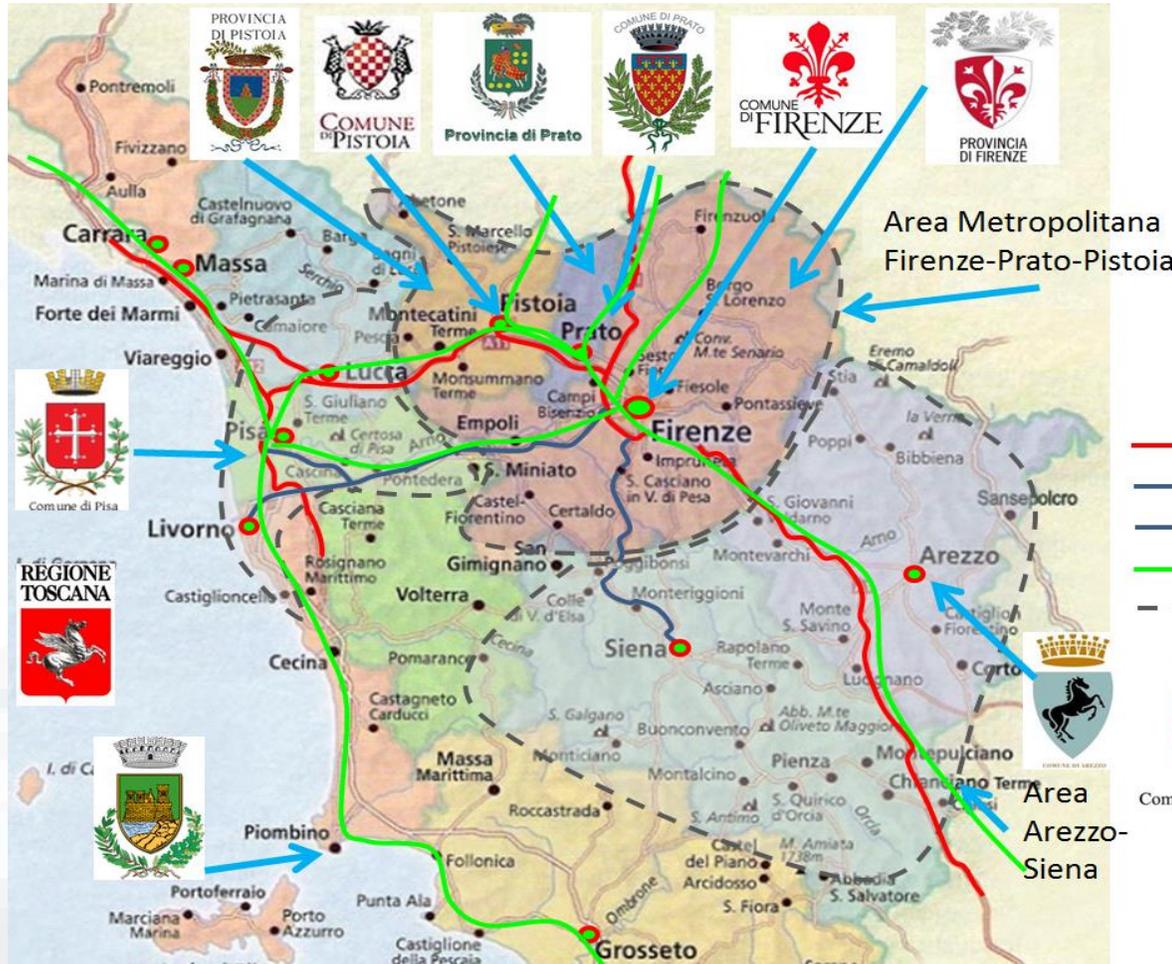
DISIT
DISTRIBUTED SYSTEMS
AND INTERNET
TECHNOLOGIES LAB
<http://www.disit.org>

Sii-Mobility

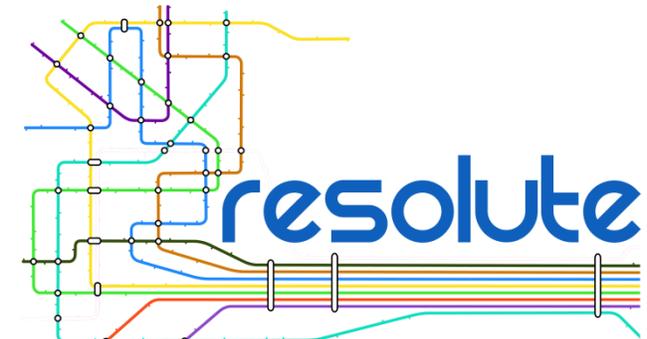
<http://www.Sii-Mobility.org>



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



*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*



<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
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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



UNIV
DEGLI
FIR



Horizon 2020
European Union Funding
for Research & Innovation

REnaissance of PLaces
with Innovative Citizenship
And TEchnology

<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

- ❑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

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- **Km4City** is an open technology exploited by those projects and line of research of DISIT Lab. Some of the innovative solutions and research issues developed into the above mentioned projects are also compliant and contributing to the Km4City approach and thus are contributing to the open Km4City model of DISIT lab.

