



Km4City

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

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How to & Overview 2016





Agenda

- Km4City storia e roadmap
- Dati e Modello
- Development Tools
- App: Web e Mobile
- Mobile reasoning and Monitoring
- Monitoring via Wi-Fi
- Control Room
- Twitter Vigilance
- Progetti Connessi



Km4City Roadmap

2021

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> API
- <http://log.disit.org>
- <http://www.disit.org/fodd>
- <http://www.disit.org/tv> Twitter Vigilance
- <http://smartds.km4city.org>

- Weather
- Cultural Heritage
- Energy recharge pillar
- Wi-Fi

2014 - Events in the city

2015

Km4City 1.4

- Embed
- More API
- iBeacon

API

RESOLUTE
RESilience management guidelines and Operationalization appLied to Urban Transport Environment

Km4City 1.5

- SmartDS
- Km4City App

RESOLUTE H2020
2015-2018 - Started

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

Sii-Mobility SCN
2016-2018 - Started
Km4City 1.6.2

2016

REPLICATE H2020
2016-2021- Started

REPLICATE
Renaissance of Places with Innovative Citizenship And TEchnology

Suggestions on demand
User Behaviour Analysis
Trajectories and OD

12/2017

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

6/2017

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

Today

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

GHOST SIR
2016-2019 - Started

GHOST
Governing the smart city: a governance-oriented approach to smart urbanism



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



Transport systems
Mobility, parking



Public Services
Govern, events, ...



Sensors, IOT
Cameras, ...



Environment,
Water, energy



Shops, services,
operators



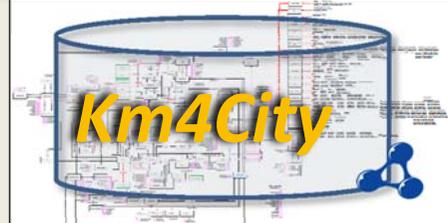
Social Media
WiFi, network



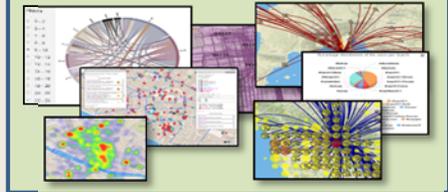
Static, Slow and Real Time data flows

Km4City Smart City Engine

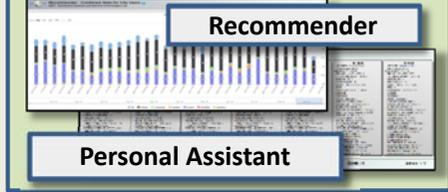
DISCES -- Distributed and parallel architecture on Cloud



Big Data Analytics



Smartening Tools



Development Tools



Km4City Smart City API

City Operators and Decision Makers

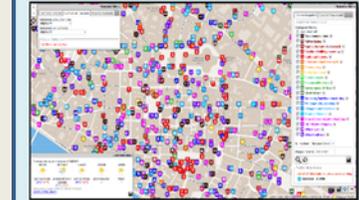
Dashboards



Smart Decision Support



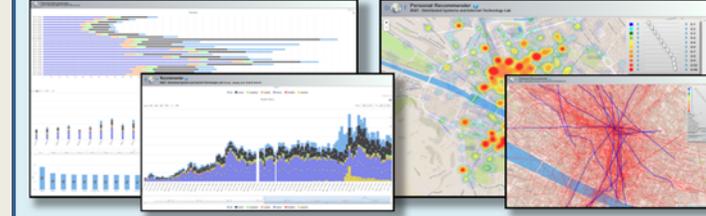
ServiceMap browser



Twitter Vigilance

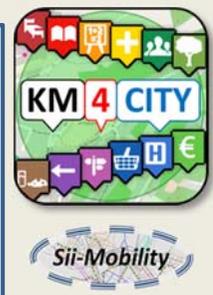
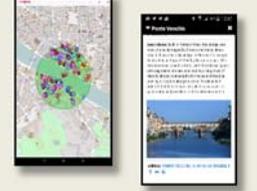


Analyzers of City User Behavior



Tools for Final Users

Mobile e Web Apps

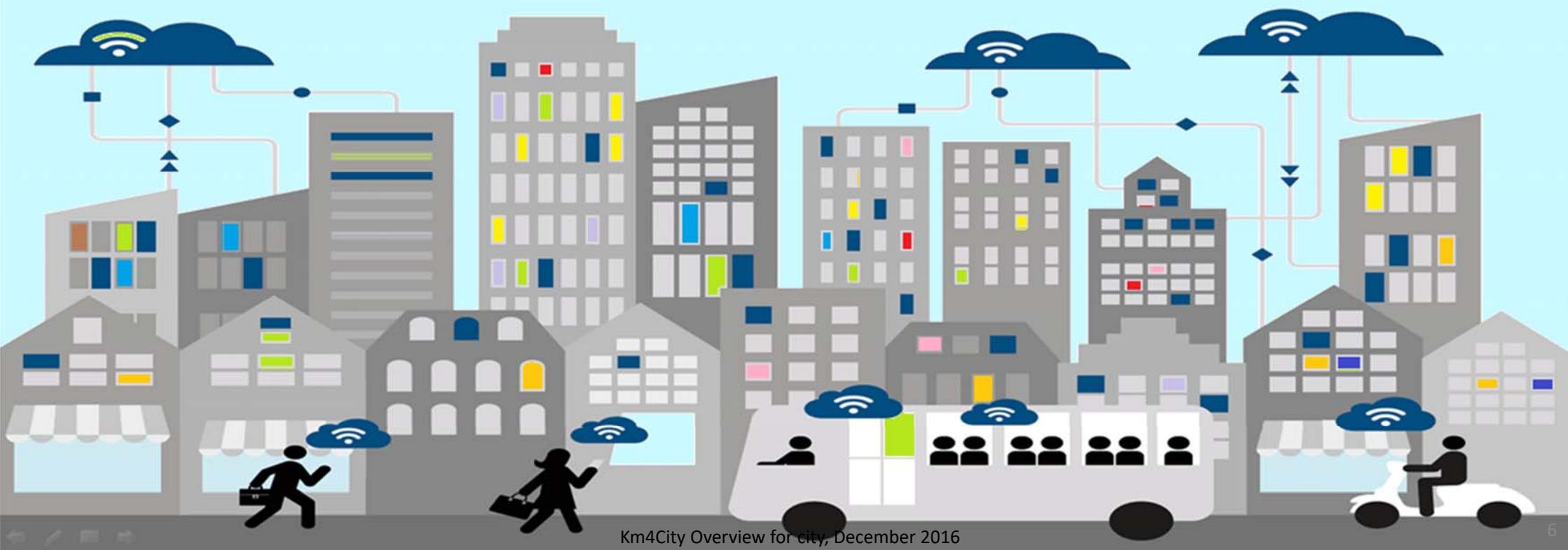


[Http://www.km4city.org](http://www.km4city.org)



www.Km4City.org

Dati e Modello



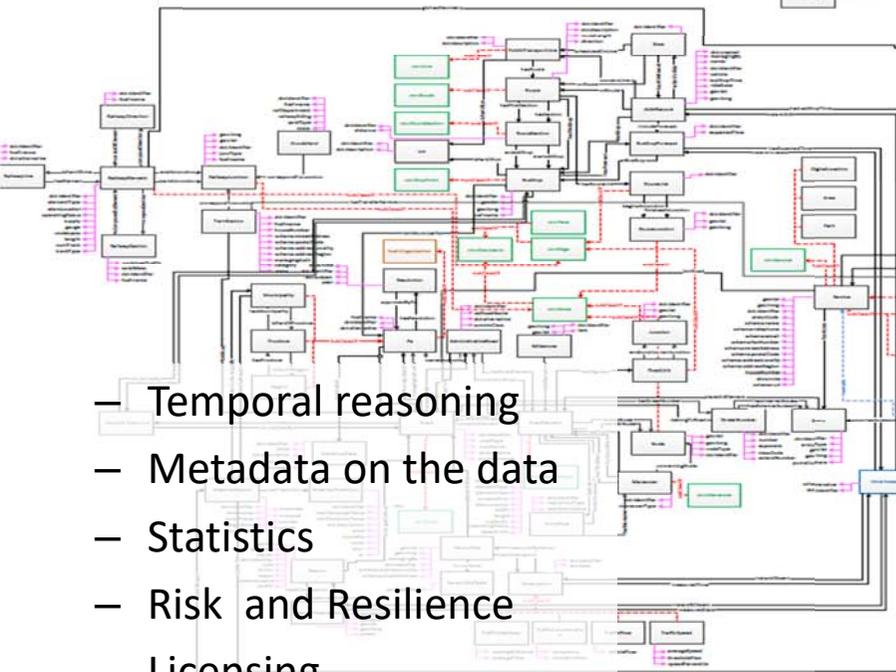


Km4City Ontology - RDF Store



Km4City is a new generation of Urban Platforms

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



- Temporal reasoning
- Metadata on the data
- Statistics
- Risk and Resilience
- Licensing
- Open and Private Data
- Static and Real time
- ..

Big Data Tools



LOD and reasoners



Present data Tuscany Region

Road Graph (Tuscany region)

- 132,923 Roads
- 389,711 Road Elements
- 318,160 Road Nodes
- 1,508,207 Street Numbers

- Services (20 cat, 512 cat.)
- 16 Pub. Transport Operators
- 21.280 Bus stops & 1081 bus lines
- 210 Parking areas
- 796 Traffic Sensors
- Info on: points, paths, areas, etc.

Dynamic/real-time

- bus lines: 144 updates X day X line
- **NEW:** Timeline PT: 1081 lines, 1-2 updates per day
- parking status: 76 updates X day X sensor
- traffic Sensors: 288 updates X day X sensor
- weather: 2 updates X day for 285 areas
- **NEW:** Triage status: updates per day, for H
- **NEW:** Fuel stations: 1 update per day, 1600 stations
- events: about 60 new events X day
- Wi-Fi: > 350.000 measures X day
- mobiles: > 50.000 measures X day
- more than 35.000 distinct users X day
- From 600.000 to 4.5 M Tweets X day
-+ many IOT are coming

<http://servicemap.km4city.org>

Km4City Overview for city December 2016

Servizi Regolari Servizi Trasversali

search text into service

Categorie Servizi

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

N. risultati: Nessun Limite

Raggio ricerca 100 metri

Risultati della ricerca

più di 4000 risultati, attivato clustering

Services 16858



Dati: statici, dinamici e modello

- **Presenti in Toscana**

- Grafo Strade → OSM, segnaletica
- POI: 500 categorie, 200 macro-categorie
- TPL: operatori + FFSS + tranvia + ferri, percorsi, paline ed orari
 - afat, ctt, cap, tiemme, amvbus, tft, vaibus, blubus, etruria mobilità, siena mobilità, cpt, trenitalia, gest, toremar.
- METEO, previsioni, Sensori traffico, parcheggi, **benzina, Triage ospedali**, etc...

Vedi slide precedente

- **In arrivo ----- vedi anche slide successiva**

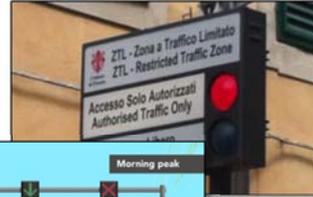
- ambiente, terremoti, rischio idrogeologico, PMV, etc..
- uff. postali, colonnine, livelli acqua, etc.
- Panchine, cassonetti, light, irrigatori, etc..



Internet of Things: Sensors and Actuators

- **Restricted Traffic Zone Gates**

- Passages, payment, alerts, Wi-Fi control, RFI control, etc.



- **Road Direction manager:**

- panel, red-light, etc.
- Status and action



- **Environmental Sensors:**

- Air quality, pollution, rain, allergens, snow, ...
- humidity, temperature, ...
- water level in rivers
- Status of underpass and bridges
- Seismic sensors



- **Public Light Pillars**

- Traffic flows, people flow,
- Wi-Fi, Tv-Camera, BT servers, on/off, percentage of light, ..



- **Waste Manager**

- Level, kind, status, on/off

- **Recharge station, column**

- Free slots, consumption, next time slot, ...



- **Risk maps data**

- Value of the buildings,
- hydrogeological risk map,
- earthquake risk map, ...
- people distribution and location
- Position of recover places,



- **Traffic Zone Gates**

- Passages, alerts,
- Wi-Fi control,
- RFID control,
- etc.



Modello Km4City vs Mobilità presenti In progress

- Grafo stade regionale, geometria
- Ciclabili, geometria
- Parcheggi, geometria e stato real time
- TPL + FFSS + Ferri: geometria
 - Orari, real time, ..
- Colonnine di ricarica
 - Posizione (stato in progress)
- Distributori di benzina
- Stato del triage, pronto soccorso
- Monitoraggio Flussi:
 - Persone:
 - Wifi → Firenze WiFi
 - Flussi via App
 - Modelli predittivi e di early warning
 - Traffico
- **Navigazione su APP:**
 - Routing di vario tipo
 - Connected drive: semafori, eventi, Mobile App
- **Kit Veicolare (navigazione e rilievi) per:**
 - Bike, Car/Bus, Evoluti
- Maggiore connessione con:
 - gestore del traffico di Firenze
 - Ordinanze
 - UST, ITS
 - TV Camere
 - Frequentazione TPL per fermata
 - modelli di adattamento in base ad eventi ed ordinanze
- Connessione con Tramvia, Ferrovie, ...
- Altri dati:
 - Segnaletica
 - etc.



Hide Menu

Florence Bus Tuscan Municipalities Text Search Events

Select a province:
PISA

Select a municipality:
PISA

Actual Selection
COMUNE di PISA

Query results organized by category

Total number of results: 1058

Category	Item number
Accommodation	529
CulturalActivity	71
EducationAndResearch	57
Emergency	9
Entertainment	25
FinancialService	18
GovernmentOffice	13
HealthCare	46
ShoppingAndRetail	54
TransferServiceAndRenting	9
UtilitiesAndSupply	41
WineAndFood	186

Show All

Regular Services Transversal Services

Services Categories

- De/Select All
- Accommodation
- Advertising
- AgricultureAndLivestock
- CivilAndEdiEngineering
- CulturalActivity
- EducationAndResearch
- Emergency
- Entertainment
- Environment
- FinancialService
- GovernmentOffice
- HealthCare
- IndustryAndManufacturing
- MiningAndQuarrying
- ShoppingAndRetail
- TourismService
- TransferServiceAndRenting
- UtilitiesAndSupply
- Wholesale
- WineAndFood

Filter:

search text into service

N. results: No Limit

Search Range: 100 mt

Search Area: select...

Search Results

Services 1058

Weather Forecast for Municipality of : PISA

Day	Weather	Temperature
Saturday	cloudless	4°C / 11°C
Sunday	cloudy	-2°C / 10°C
Monday	overcast	0°C / 10°C
Tuesday	light rain	/
Wednesday	bit cloudy	/

Latest Update: 2016-12-17T08:31:00+01:00
[LINKED OPEN GRAPH](#)

Esempio: Su area Pisa

Leaflet | Map data © OpenStreetMap contributors, CC-BY-SA, Imagery © Mapbox

Km4City Overview for city, December 2016



The screenshot displays the ServiceMap web application interface. The main map shows the city of Pisa, Italy, with numerous colorful icons representing different services. The interface includes a top navigation bar with menu items like 'File', 'Modifica', 'Visualizza', 'Cronologia', 'Segnalibri', 'Tile', 'Strumenti', and 'Aiuto'. The browser address bar shows the URL 'servicemap.disit.org/WebAppGrafo/mappa.jsp'. On the left, there are navigation controls and a search box. A sidebar on the right contains a 'Regular Services' and 'Transversal Services' menu with categories such as Accommodation, Advertising, AgricultureAndLivestock, CivilAndEdilEngineering, CulturalActivity, EducationAndResearch, Emergency, Entertainment, Environment, FinancialService, GovernmentOffice, HealthCare, IndustryAndManufacturing, MiningAndQuarrying, ShoppingAndService, TourismService, TransferServiceAndRenting, UtilitiesAndSupply, Wholesale, and WineAndFood. Below the menu is a search filter section with a search text input, a search range of 100 mt, and a search area dropdown. The search results show 'Services 1058'. At the bottom left, there is a weather forecast widget for the Municipality of Pisa, showing conditions for Saturday (cloudless, 4°C/11°C), Sunday (cloudy, -2°C/10°C), Monday (overcast, 6°C/10°C), Tuesday (light rain), and Wednesday (bit cloudy). The bottom of the screen shows the Windows taskbar with various application icons and the system tray displaying 'ENG 19:20'.

Su Pisa
solo
POI



File Modifica Visualizza Cronologia Segnalibri Tife Strumenti Aiuto

Km4City Development an... ServiceMap

servicemap.disit.org/WebAppGrafo/mapa.jsp

Hide Menu

Florence Bus Tuscan Municipalities Text Search Events

Select a province:
PISA

Select a municipality:
- Seleziona un Comune -

Actual Selection
Coord: 43.7086,10.4105
Address: VIALE DELLE PIAGGE, 0, PISA

Query results organized by category

Total number of results: 1849

Category	Item number
Accommodation	708
CulturalActivity	78
EducationAndResearch	51
Emergency	8
Entertainment	23
FinancialService	16
GovernmentOffice	12
HealthCare	44
ShoppingAndService	53
TourismService	9
TransferServiceAndRenting	670
WineAndFood	177

Show All

Regular Services Transversal Services

Services Categories

- De/Select All
- Accommodation +
- Advertising +
- AgricultureAndLivestock +
- CivilAndEdiEngineering +
- CulturalActivity +
- EducationAndResearch +
- Emergency +
- Entertainment +
- Environment +
- FinancialService +
- GovernmentOffice +
- HealthCare +
- IndustryAndManufacturing +
- MiningAndQuarrying +
- ShoppingAndService +
- TourismService +
- TransferServiceAndRenting +
- UtilitiesAndSupply +
- Wholesale +
- WineAndFood +

Filter:
search text into service

N. results: No Limit

Search Range 5 km

Search Area select...

Search Results

Services 1849 of 1855 available

Weather Forecast for Municipality of: FIRENZE

Day	Weather	Temperature
Saturday	cloudless	3°C / 11°C
Sunday	bit cloudy	4°C / 11°C
Monday	overcast	3°C / 11°C
Tuesday	light rain	/
Wednesday	bit cloudy	/

Latest Update: 2016-12-17T09:51:00+01:00
[LINKED_OPEN_GRAPH](#)

Leaflet | Map data © OpenStreetMap contributors, CC-BY-SA, Imagery © Mapbox

ENG 19:24

Su Pisa
con TPL e
sensori



Esempio: Su Pisa solo TPL e sensori

The screenshot shows the ServiceMap web application interface. The main map displays a network of public transport lines (TPL) and sensors (represented by red and blue icons) in the Pisa area. The interface includes a search bar at the top, a filter panel on the right, and data popups for specific lines and sensors.

Filter Panel (Right):

- Regular Services: De/Select All, Area, DigitalLocation, HappeningNow, Path, Fresh Place, Public Transport Line, Road Sensors, Bus Stops, Tram_stops, Train_station, Ferry_stop
- Transversal Services: (empty)
- Search Results: Services: 7 of 7 available, Bus Stops: 1456 of 1456 available, Road Sensors: 68 of 68 available
- Public Transport Lines Found: 568

LINKED OPEN GRAPH (Top Center):

Lines: E03 E03
 Display: 10 Bus per page

Time	Line	Direction
18:51:00 2016-12-17	E03	Piazzale Verdi
19:21:00 2016-12-17	E03	Piazzale Verdi
20:38:00 2016-12-17	E03	Piazzale Verdi
09:21:00 2016-12-18	E03	Piazzale Verdi
11:21:00 2016-12-18	E03	Piazzale Verdi

Showing page 1 of 1
 Real-time data currently not available

METRO74 (Bottom Center):

LINKED OPEN GRAPH
 Tipology: TransferServiceAndRenting - SensorSite
 Address: SGC FI-PI-LI - Navadchio - Pisa NE (IT13) - di FI
 Data from sensor: METRO74
 Latest Update: 2016-12-17T16:30:05+01:00

Avg Distance(m)	Avg Time (sec)	Occupancy (%)	Concentration (car/km)
N.A.	31.28727	N.A.	0.0

Vehicle Flow (car/h)	Avg Speed (Km/h)	Threshold Perc (%)	Speed Perc (%)
0.0	110.0	N.A.	N.A.



The screenshot displays the ServiceMap web application interface. The main map shows a network of bus routes in Florence, Italy, with various icons representing bus stops and sensors. The sidebar on the right contains a search and filter panel. The search results section shows the following data:

- Search Results: Services 7 of 7 available
- Bus Stops: 1456 of 1456 available
- Road Sensors: 68 of 68 available
- Bus Lines: 568 Public Transport Lines Found.

The results list includes the following TPL Lines:

- TPL Line: Direction: Castellina → Collesalveti P.Za Gramsci
- TPL Line: Direction: Collesalveti Centro → V. Cogorano D
- TPL Line: Direction: Collesalveti Centro → V. Cogorano D

Esempio: Su Pisa solo TPL e sensori



Traffic Flow Tools



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



File Modifica Visualizza Cronologia Segnalibri Tife Strumenti Aiuto

Km4City Back Office and ... ServiceMap3D

www.disit.org/service3d/

- Hide Menu

PISA PISA

Selection: COMUNE di PISA

Approximate address:

filter results by text

Services Categories

Regular Services: Transversal Services: **3D Data**

Car park

Road Sensors

Scale x2

Display next information manually:

How often to change displayed data? 10 seconds

How often to update informations? 2 minutes

N. results: 100

Search Range 500 mt

- Hide Menu

Car park: occupiedParkingLots Road sensor: occupancy

CESIUM bing Earthstar Geographics SIO © 2016 Microsoft Corporation © 2010 NAVTEQ © Harris Corp. Earthstar Geograph

ENG 18:33

Sensori traffico e parcheggi real time 3D Su Pisa



Distributori di benzina in Toscana, prezzi e servizi, giornaliero

The screenshot shows the ServiceMap web application interface. The main map displays numerous purple markers representing fuel stations across the Tuscany region. A detailed popup window for a station in Cortona provides the following information:

CORTONA-SS71 KM110 330 FR TERONTOLA
LINKED OPEN GRAPH
Topology: TransferServiceAndRenting - Fuel_station
Address: FZ.TERONTOLA SS., 71 KM.110.330
Cap: 52040
City: CORTONA
Prov.: AR

tipo	prezzo	servizio
Benzina	1.548 EUR	Self
GPL	0.599 EUR	Servito
Gasolio	1.396 EUR	Self
Hi-Q Diesel	1.648 EUR	Self
Hi-Q Perform+	1.796 EUR	Self

Latest Update: 2017-01-06 07:03:59

The right sidebar contains a list of service categories, with 'TransferServiceAndRenting' checked. The search results at the bottom indicate that 1674 of 1674 services are available.



Triage, pronto soccorso in Toscana, stato in tempo reale

The screenshot shows the ServiceMap application interface. On the left, there is a menu with options like 'Florence Bus', 'Tuscan Municipalities', 'Text Search', and 'Events'. Below the menu, there are dropdown menus for selecting an agency, line, route, and bus stop. A red button labeled 'Position of selected Busses' is visible. The main map area displays a topographic map of Tuscany with orange location markers. A detailed information window for 'PRONTO SOCCORSO AZIENDA OSPEDALIERA PISANA' is open, showing contact information and a status table. On the right side, there is a 'Regular Services' panel with a list of service categories and a search filter.

PRONTO SOCCORSO AZIENDA OSPEDALIERA PISANA
LINKED OPEN GRAPH
Typology: Emergency - First_aid
Phone: 050992300
Fax: 050992300
Address: VIA BONANNÒ PISANO
DBpedia: "Vino_Pisano"
DBpedia: "Pisanelo"
DBpedia: "Giovanni_Pisano"
DBpedia: "Giovanni_Pisano_(calciatore)"
DBpedia: "Andrea_Pisano"
DBpedia: "Andrea_Pisano_(pallanuotista)"
DBpedia: "Nicola_Pisano"
Cap: 56100
City: PISA
Prov: PI
Note: general information: SNC

stato	rosso	giallo	verde	blu	bianco
In Attesa	0	2	8	5	2
In Vista	1	7	6	1	5

Latest Update: 2017/01/05 18:30:08.000

PRONTO SOCCORSO OSPEDALE DI BORGO SAN LORENZO
LINKED OPEN GRAPH
Typology: Emergency - First_aid
Phone: 0552496253
Fax: 0552496253
Address: VIALE DELLA RESISTENZA, 52
Cap: 50032
City: BORGO SAN LORENZO
Prov: FI

stato	rosso	giallo	verde	blu	bianco
Con Destinazione	0	1	1	0	0
In Attesa	0	0	0	0	0
In Vista	0	0	1	0	0
Oss. Temporanea	0	0	4	0	0
Totale	0	1	6	0	0

Latest Update: 2017-01-12T02:30:00-00:00

Regular Services
Services Categories
 De/Select All
 Accommodation
 Advertising
 AgricultureAndLivestock
 CivilAndEdilEngineering
 CulturalActivity
 EducationAndResearch
 Emergency
 Commissariat_of_public_safety
 Corps_of_forest_rangers
 Emergency_medical_care
 Emergency_services
 Fire_brigade
 First_aid
 Italian_finance_police
 Local_police
 Towing_and_roadside_assistance
 Entertainment
 Environment
 FinancialService
 GovernmentOffice
 HealthCare
 IndustryAndManufacturing
 MiningAndQuarrying
 ShoppingAndService
 TourismService
 TransferServiceAndRenting
 UtilitiesAndSupply
 Wholesale
 WineAndFood

Filter:
search text into service
N. results: No Limit
Search Range: visible area
Search Area: select...

Search Results
Services 43 of 43 available



Parcheggi in Firenze e Toscana, stato in tempo reale

The screenshot shows the ServiceMap website interface. The main map displays Florence, Italy, with numerous purple 'PY' icons representing parking spots. A sidebar on the left contains a search menu with options like 'Florence Bus', 'Tuscan Municipalities', and 'Text Search'. A 'Position of selected Busses' box shows 'Actual Selection: Service: Parcheggio S. Lorenzo'. A 'Parking Open' popup provides real-time data for Parcheggio Beccaria:

Total Capacity	Free Spaces	Occupied Spaces
210	66	144

The right sidebar lists various service categories, including Accommodation, Advertising, AgricultureAndLivestock, CivilAndEdilEngineering, CulturalActivity, EducationAndResearch, Emergency, Entertainment, Environment, FinancialService, GovernmentOffice, HealthCare, IndustryAndManufacturing, MiningAndQuarrying, ShoppingAndService, TourismService, and TransferServiceAndRenting. A search filter is set to 'visible area', showing 71 results.



www.Km4City.org

Development Tools



Transport systems
Mobility, parking



Public Services
Govern, events, ...



Sensors, IOT
Cameras, ...



Environment,
Water, energy



Shops, services,
operators



Social Media
WiFi, network

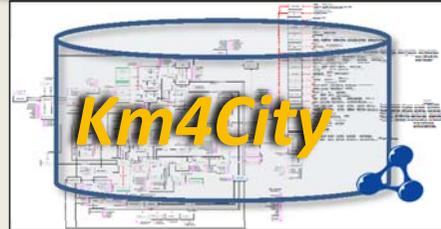


Static, Slow and Real Time data flows

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



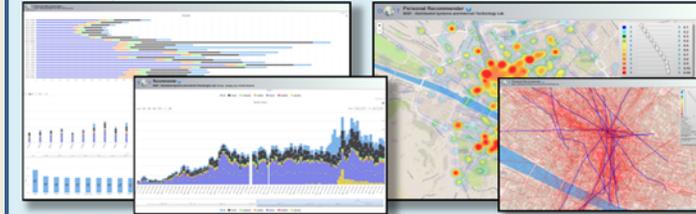
ServiceMap browser



Twitter Vigilance



Analyzers of City User Behavior



Tools for Final Users

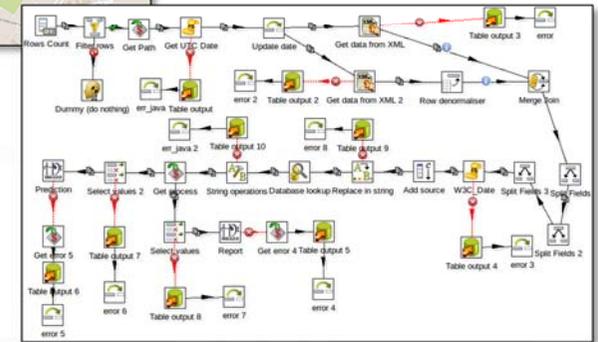
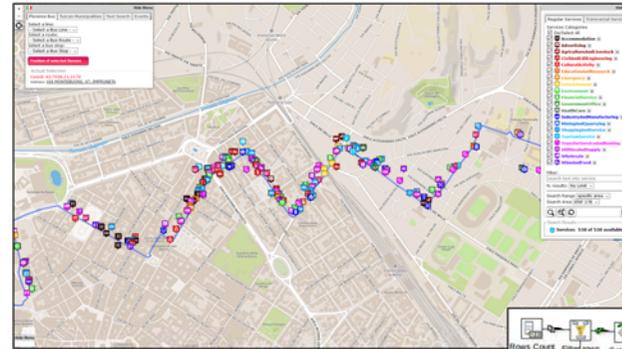
Mobile e Web Apps





Development Tools

- **Smart City API:**
 - Varie tipologie di API
- **Generatore “ServiceMap”,**
<http://servicemap.km4city.org>
 - Chiamate per App
 - Embedding in pagine web
- **Caricare nuovi dati: manuale e automatico**
 - POI, IOT, etc.
 - Caricamento di Shape e percorsi
- **Dashboard builder**
 - Produzione di dashboard per control room
 - Embedding di viste specifiche da altri analytics: wifi, 3D, flow, recommend, engager, etc.





Smart City API

- **Home Page:** <http://www.km4city.org>
- **Smart City API doc:** <http://www.disit.org/6596>
 - <http://www.km4city.org/km4citydoc.html>
 - <http://www.disit.org/km4city/>
- **Generatore di chiamate** → <http://Servicemap.km4city.org>
- **Training on API, 24 Gennaio 2017:** <http://www.disit.org/6977>
- **Hackathon 7-8 Aprile 2017:** <http://www.sii-mobility.org/index.php/eventi/hackathon-sii-mobility>
- **Le funzioni primarie delle Smart City API, divise in due aree:**
 - quelle per le App final user. Per esempio «Toscana dove cosa...»
 - quelle per operatori: wifi, flussi, control room, etc.



Smart City API

- Diversi livelli: Linked Open Data,
 - SPARQL query, Query ID, REST API
- Search: full Text, near GPS, along Line, into a polyline
 - Multidomain POIs
- Parking status
- TPL data
- Recommendation on demand
- Engagement on demand
- Weather forecast
- Events
- Twitter data related to tuned channels
- User Participation: POI rank, comment, foto
- Social Icons
- Routing (in progress)
- Authentication (social in progress)
- Reporting user behavior
- Getting profiled menu
- Etc...



ServiceMap Development Tool



Search around a GPS point

Search along a line

Regular Services | Transversal Services

Search text into service

Services Categories

Actual Selection

N. results for each: 200

Search Results

Services: 35 of 35 available

Bus Stops: 13 of 13 available

Road Sensors: 2 of 2 available

Bus Lines: 72 Bus Lines Found

Bus Line 22
Destino: SASSA A ROZZAZZANO - NUOVO PENONE

Bus Line 23
Destino: SORGARE - NUOVO PENONE

Bus Line 33
Destino: MAGENTA - STAZIONE VIA ALABANZI

Weather Forecast for Municipality of FIRENZE

Sunday | Monday | Tuesday | Wednesday | Thursday

light rain and heavy showers | cloudy | cloudy | light rain | rainstorm

18°C / 14°C | 17°C / 24°C | 17°C / 20°C | 17°C / 20°C | 18°C / 25°C

Search for Geo Located Services

Get Events in the city

Regular Services | Transversal Services

Search text into service

Services Categories

Actual Selection

N. results for each: 500

Search Results

Services: 418 of 418 available

Bus Stops: 23 of 23 available

Road Sensors: 2 of 2 available

Bus Lines: 33 Bus Lines Found

Bus Line 12
Destino: PIAZZA BECCARIA - PIAZZA BECCARIA

Bus Line 12
Destino: PIAZZA BECCARIA - PIAZZA BECCARIA

Bus Line 12
Destino: STAZIONE MARCHIOLETTI - STAZIONE MARCHIOLETTI

Weather Forecast for Municipality of FIRENZE

Sunday | Monday | Tuesday | Wednesday | Thursday

light rain and heavy showers | cloudy | cloudy | light rain | rainstorm

18°C / 14°C | 17°C / 24°C | 17°C / 20°C | 17°C / 20°C | 18°C / 25°C

Query results organized by categories

Total number of results: 1175

Services: 1118 of 1175 available

Search in an area

Regular Services | Transversal Services

Search text into service

Services Categories

Actual Selection

N. results: No Limit

Search Range: visible area

Search Results

Services: 2231 of 2231 available

Query results organized by category

Total number of results: 2231

Services: 2231 of 2231 available

Weather Forecast for Municipality of FIRENZE

Sunday | Monday | Tuesday | Wednesday | Thursday

light rain and heavy showers | cloudy | cloudy | light rain | rainstorm

18°C / 14°C | 17°C / 24°C | 17°C / 20°C | 17°C / 20°C | 18°C / 25°C

Get weather forecast

Get Real Time data (public busses, car par sensors, traffic flows)

Regular Services | Transversal Services

Search text into service

Services Categories

Actual Selection

N. results for each: 254

Search Results

Services: 254 of 254 available

Query results organized by category

Total number of results: 2231

Services: 2231 of 2231 available

Weather Forecast for Municipality of FIRENZE

Sunday | Monday | Tuesday | Wednesday | Thursday

light rain and heavy showers | cloudy | cloudy | light rain | rainstorm

18°C / 14°C | 17°C / 24°C | 17°C / 20°C | 17°C / 20°C | 18°C / 25°C

Service: F955ZTL01501

LANZO OLEO DEGRAS

Technology: TransferService/Anemometry - SensorSite

Address: VIA GUGLIELMO

Data from sensor: F955ZTL01501

Last update: 2016-12-08T11:21:00+01:00

Occupancy (%)	Avg Time (sec)	Occupancy (%)	Concentration (part/m3)
N.A.	N.A.	N.A.	N.A.
N.A.	N.A.	N.A.	N.A.
N.A.	N.A.	N.A.	N.A.

Vehicle Flow (part/h) | Avg Speed (km/h) | Threshold Part (%) | Speed Part (%)

18.0 | 0.0 | N.A. | N.A.

18.0 | 0.0 | N.A. | N.A.

18.0 | 0.0 | N.A. | N.A.



ServiceMap Development Tool



Search around a GPS point

Search along a line

Regular Services Transversal Services

Search Results: 35 of 35 available
Bus Stops: 13 of 13 available
Road Sensors: 2 of 2 available

72 Bus Lines Found

Search results organized by category

Total number of results: 2231

Category	Count
Accommodation	18
Advertising	11
AgricultureAndLivestock	11
CivilAndEngineering	11
CulturalActivity	11
EducationAndResearch	11
Emergency	11
Environment	11
FinancialService	11
GovernancePublic	11
HealthCare	11
IndustryAndManufacturing	11
InformationAndCommunication	11
ShoppingAndService	11
TransportAndInfrastructure	11
Wholesale	11
WelfareAndSocial	11

Services: 2231 of 2231 available

Smart City API call generation

Web App HTML5

Mobile Apps

Giardino Di Boboli

Tipo: Digital Location

Descrizione: The Prince s Way ends in the Giardino di Boboli, near the Grotta del Buontalenti, that is a very masterpiece of the Mannerist architecture and sculpture

Descrizione: Il Percorso del Principe termina nel Giardino di Boboli, nei pressi della Grotta del Buontalenti, vero e proprio capolavoro dell'architettura e della scultura manierista

DISPONIBILE SU

Scarica da

Scarica da

Embed into Web pages

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

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

KM4CITY SERVICE MAP EMBEDDED



Caricare nuovi dati

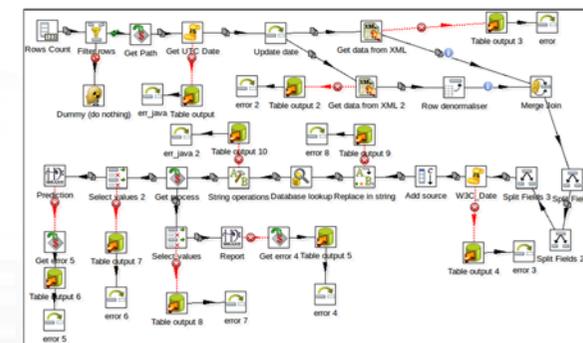
- **Dati Statici e Sporadici, caricamento:**

- Manuale a partire da:
 - tabelle in CSV; forme: SHP, WKT
- Automatico da tutti i formati:
 - SHP, CSV, KLM, XML, JSON, db, xls, txt, triple, etc.

- **Dati dinamici, caricamento automatico:**

- Programmato con scheduler DISCES
- Processi in ETL o Java o C o Python
- Tipicamente: Ingestion (ETL), quality improvement (ETL), mapping (KARMA)

- **Procedure «open source»** accessibili come esempi e come sistema di sviluppo **si veda tutorial** del Luglio 2016: <http://www.disit.org/6690>





Transport systems
Mobility, parking



Public Services
Govern, events, ...



Sensors, IOT
Cameras, ..



Environment,
Water, energy



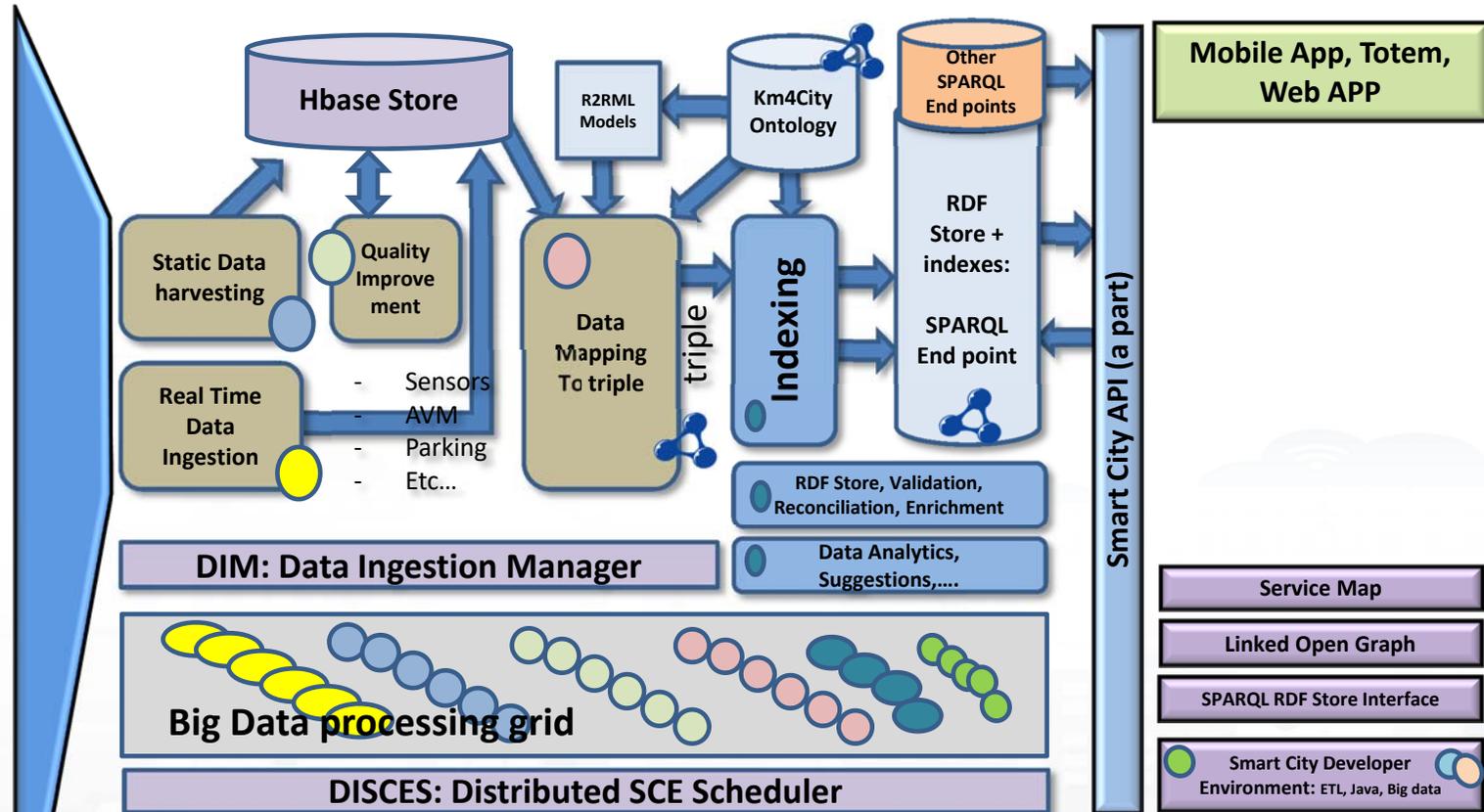
Shops, services,
operators



Social Media
WiFi, network



Data Ingestion and Mining





Dashboard Builder



Dashboard Builder

Operations
Metrics
Widgets
Users

Dashboards Overview

Name	Title	Creation Date	Status
ES	Dashboard Guide	2014-07-27 11:33:51	OK
A-01	Price based model	2014-09-12 12:57:03	OK

Sources Management

DataSources Overview

ID	URL
Km4CityApp	jdbc:mysql://redborg:3306
Km4CityG2C	jdbc:mysql://192.168.0.20:3306
Km4CityG2C	http://192.168.0.206:8080/WebAppGrabs/parq
Km4CityRecommender	jdbc:mysql://192.168.0.50:3306
Km4CityServiceMap	jdbc:mysql://192.168.0.72:3306
Km4CitySustainability	jdbc:mysql://192.168.0.72:3306
giris	jdbc:mysql://redborg:3306
SmartES	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: Add

Metric Description: Description: Description of Data
Default Metric: Sensor_R1
Data Source: Performance VCA
Data Area: Status
Data Source: Performance Response per 10 Minutes at - Trason
Default Unit: 10 Sec
Status: Active

Context:

Type Widget: Max 1 Metric

Selected Metric:

Link:

Widget Parameters

Title: Background: Color:

Time Interval: Refresh: Unit:

Rows number: Columns number:

Buttons: Add, Close, Create

BarContent - 2x4 (9 min)

14.2% 85.8%

Buttons: Button 2x1, Button 2x2, Button 4x2, Button 4x4

4x2 (9 min): 56%, 44%

5x2 (59 sec): 28%, 72%

6x2 (59 sec): 24%, 76%

PARK (59 sec): SUCCESS 2016-11-09 23:09:25

Modifica Widget

id Widget:

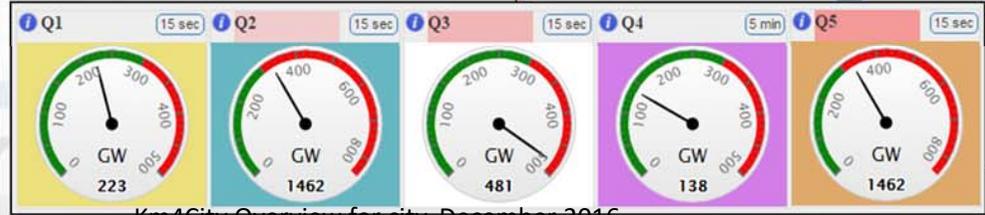
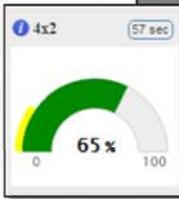
Type:

Min. Columns number: Max. Columns number:

Min. Rows number: Max. Rows number:

n. metrics: Color:

Buttons: Close, Modify



4x3 (4 min), 4x6 (59 sec), 5x5 (59 sec), 5x8 (59 sec), 4x2 (48 sec)

CPU Load, RAM, Daily jobs

35.2 GB, 212 JOBS

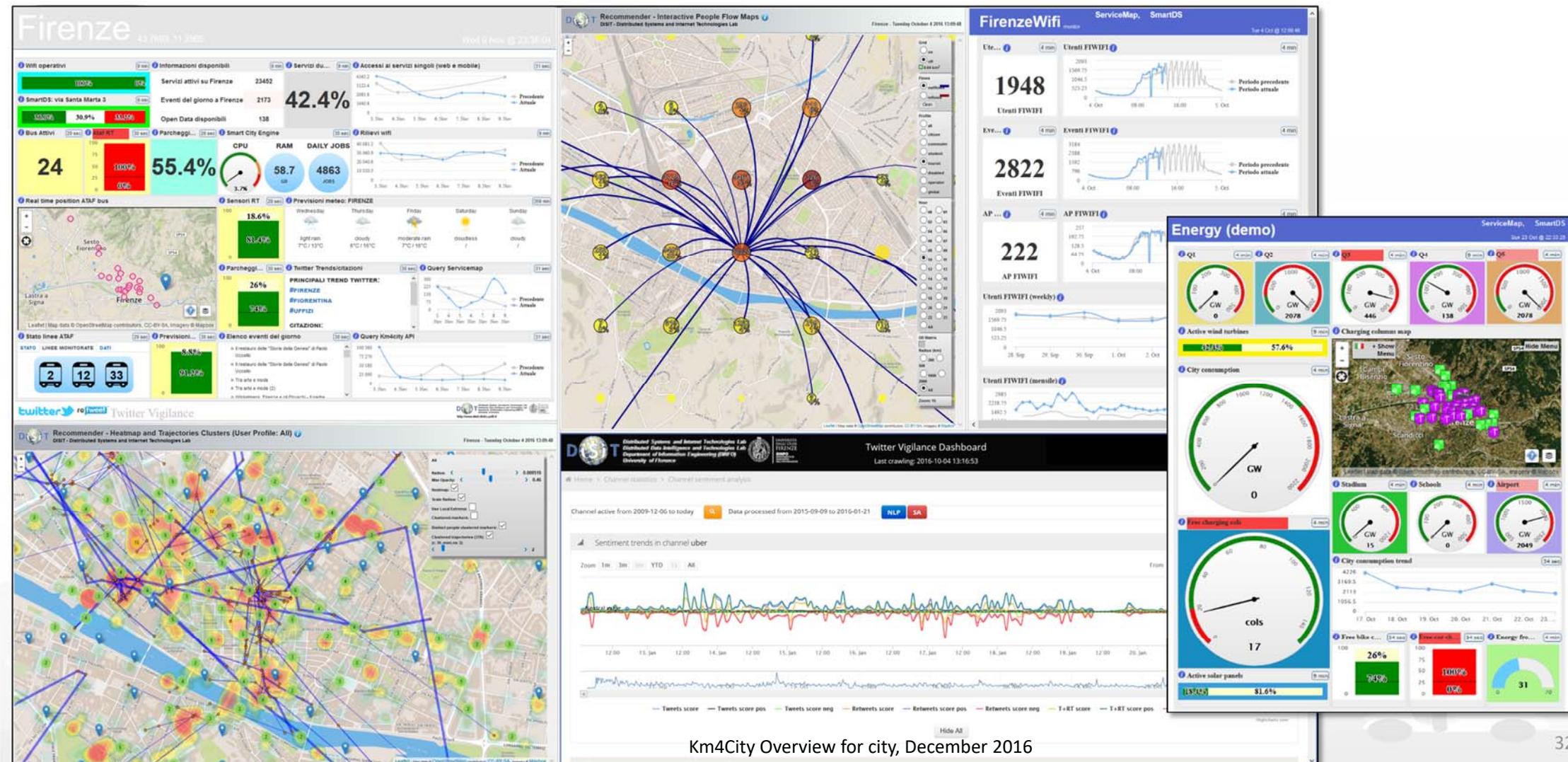
35.0%, 65.0%

Km4City Overview for city, December 2016

Smart City Dashboard

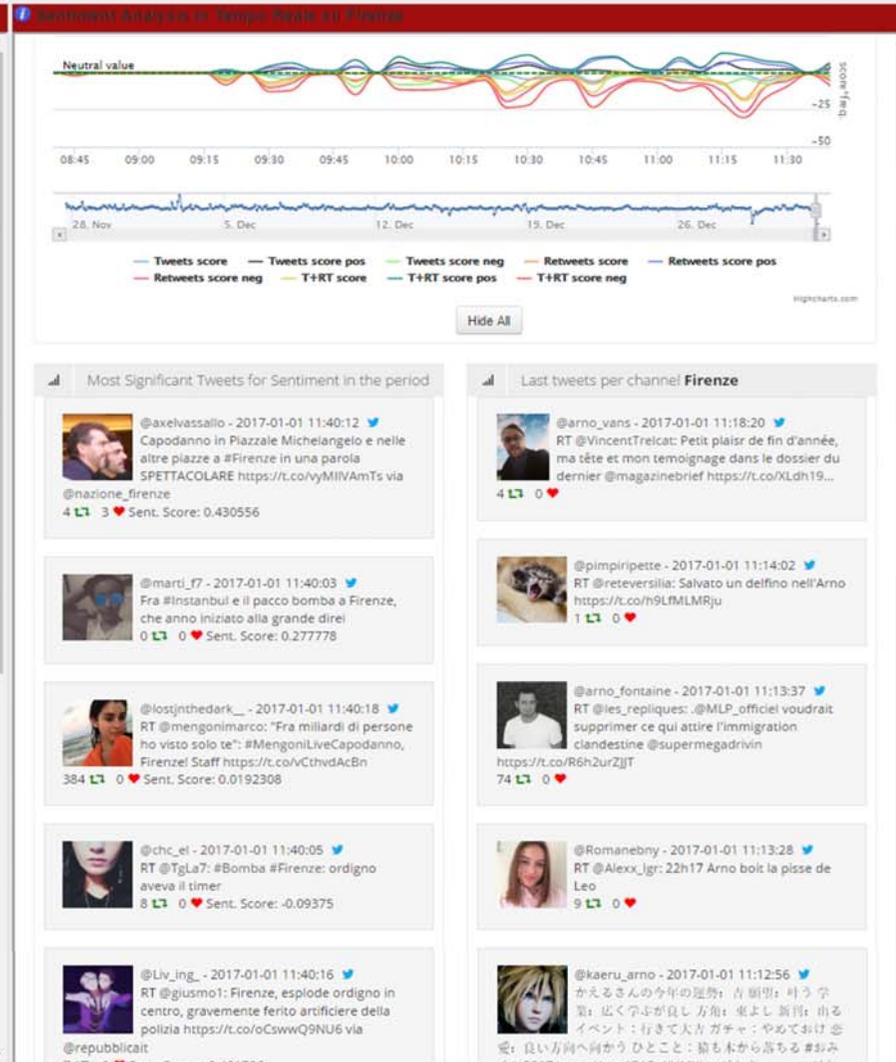
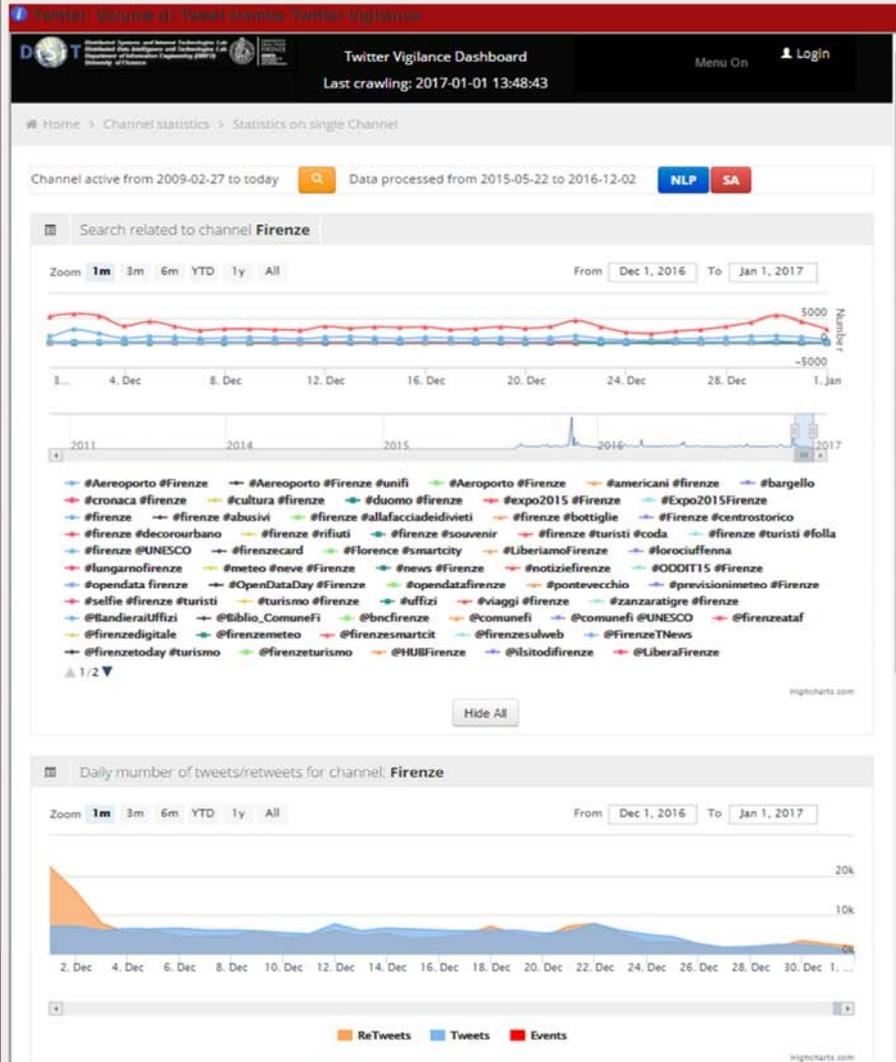


Horizon 2020
European Union Funding
for Research & Innovation



Km4City Overview for city, December 2016

Twitter Vigilance su Firenze (sperimentale)



Twitter Channels

TRENDS QUOTES

@COMUNEFI
@NAZIONE_FIRENZE
@UNI_FIRENZE
@PROTCIVCOMUNEFI
@NOVEDAFIRENZE
@MUSEOFIRENZE

Twitter Hashtag Trends

TRENDS QUOTES

#FIRENZE
#UFFIZI
#NEWS #FIRENZE
#DUOMO #FIRENZE
#PONTEVECCHIO
#BARGELLO
#CULTURA #FIRENZE
#CRONACA #FIRENZE

We suggest to use Chrome browser for better experience

Sentient City Control Room

www.Km4City.org



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FIRENZE

DINFO
DIPARTIMENTO DI
INGEGNERIA
DELL'INFORMAZIONE

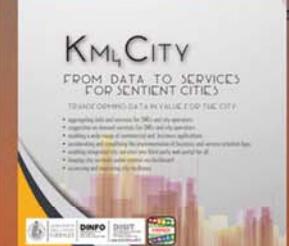
DISIT
DISTRIBUTED SYSTEMS
AND INTERNET
TECHNOLOGIES LAB



GET IT ON
Google play

Download on the
App Store

Download from
Windows Phone Store



Home Sentient City Control Room City Users' Tools Back Office and Dev Tools Info and Docs

Real Time Monitoring Tools for Control Room Dashboards

Real Time Control Room Dashboard ⓘ	Monitoring City Users by Wi-Fi (*) ⓘ	Monitoring City Users Behaviour via Mobile App (*) ⓘ	Monitoring Real Time Data on 3D: traffic and parking (*) ⓘ	Monitoring Parking Areas Status in Florence (*) ⓘ	Monitoring Traffic Sensors in Tuscany Region (*) ⓘ	Getting moods and alerts via Twitter Sentiment Analysis (*) ⓘ	Early Warning and Prediction Tools ⓘ	Smart Decision Support System, SmartDS (*) ⓘ
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Smart City Control Room, Dashboard, Real Time Data

The dashboard displays a variety of real-time data visualizations including:

- Percentage indicators (e.g., 42.4%, 44.7%)
- Counters for different categories (e.g., 120, 21, 20, 27, 41)
- Line graphs showing trends over time
- Maps with data points
- Summary cards for specific metrics (e.g., 1790, 4392, 16915, 225, 1, 76, 40)
- Status indicators for SmartCity Processes

Big Data Analytics Tools, Business Intelligence, Decision Support Tools

City Resilience Decision Support System, ResilienceDS (*) ⓘ	City Risk & Vulnerability Analysis Tool ⓘ	Assessing and Analysing Wi-Fi Coverage (*) ⓘ	Origin Destination Matrix by Wi-Fi data (*) ⓘ	City Users Recency and Frequency by Wi-Fi data (*) ⓘ	City Users Origin Destination Matrix via Mobile App (*) ⓘ	Heatmaps and Trajectories of City Users Tourists (*) ⓘ	Analysing City Users' Behavior (*) ⓘ	Social Media Twitter Vigilance (*) ⓘ	Twitter Data Analysis Tool (*) ⓘ
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Back Office and Development Tools

Home Sentient City Control Room City Users' Tools Back Office and Dev Tools Info and Docs

Development Tools for Mobile App and Web App (the ServiceMap Tool), generating Smart City API calls exploiting unified aggregated data and reasoners:

 Service Map (visual query development tool) (*) ⓘ	 POI density in Florence Downtown (*) ⓘ	 Events in Florence (*) ⓘ	 Services & POI in Tuscany (*) ⓘ	 Services & POI in Florence (*) ⓘ	 Services & POI in Pisa (*) ⓘ	 Bus Lines and timelines in Tuscany ⓘ	 Green Areas in Florence (*) ⓘ	 Cycling Path in Florence (*) ⓘ	 Search on Area analysis (*) ⓘ	 Search along line analysis (*) ⓘ
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Dashboard development tools

Dashboard Builder for developing alive control room dashboards (*) ⓘ

Smart City API, Linked Open Data, RDF Store tools, 5 Stars Data

 Web page: Km4City Smart City API documentation	 Km4City Ontology, SVG File	 ZIP File: Download Km4City Ontology, multiple formats	 Linked Open Graph LOD (*) ⓘ	 SPARQL & Data Licenses (*) ⓘ	 Smart City Main Data, IOT, Sensors in Tuscany
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Data Warehouse and Back Office Data Aggregation Tools

 Smart City General Architecture	 Programming User Engagements	 Web Page: Data Ingestion Manager, DIM data broker tool	 Web Page: DISCES, Smart City Engine, Big Data Process manager	 Web Page: RDF store Indexer, RIM, and versioning manager
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www.km4city.org/img/srvpisa.png

Km4City Overview for city, December 2016



Info and Documentation

Home Sentient City Control Room City Users' Tools Back Office and Dev Tools Info and Docs

Km4City Information, Documentation, Tutorial, Training

Km4City
FROM DATA TO SERVICES FOR SENTIENT CITIES
TO ANALYZE AND VISUALIZE DATA IN FAVOR OF THE CITY

- supporting urban and services for SMEs and city operators
- supporting a wide range of commercial and business applications
- providing integrated and secure services that can be used for all
- providing the services and tools needed to build a smart city
- providing the services and tools needed to build a smart city

Km4City Flyer PDF

Km4City
The Urban Platform for Sentient Cities

Km4City Video 2016

FIRENZE
FIRENZE, Where, What

Km4City Mobile App Video

Km4City
Smart City Ecosystem
<http://www.disit.org/km4city>
Paolo Nesi, paolo.nesi@unifi.it

Km4City Slides

Web Page: Projects exploiting & contributing to Km4City

smart city expo
WORLD CONGRESS
15-17 NOVEMBER 2016
GRAN VIA VENUE

Web Page: DISIT Lab, Km4City at Smart City Expo World Conference 2016

Roadmap of development

Web Page: Km4City Information & Documentation page

Web Page: DISIT Lab (who we are)

Km4City
SMART CITIES AND BIG DATA
<http://www.disit.org/km4city>

Km4City Video 2015

Web Page: Km4City related Articles

Web Page: GitHub Link Open Source Code

Smart City API

Web Page: Smart City API

FAQ

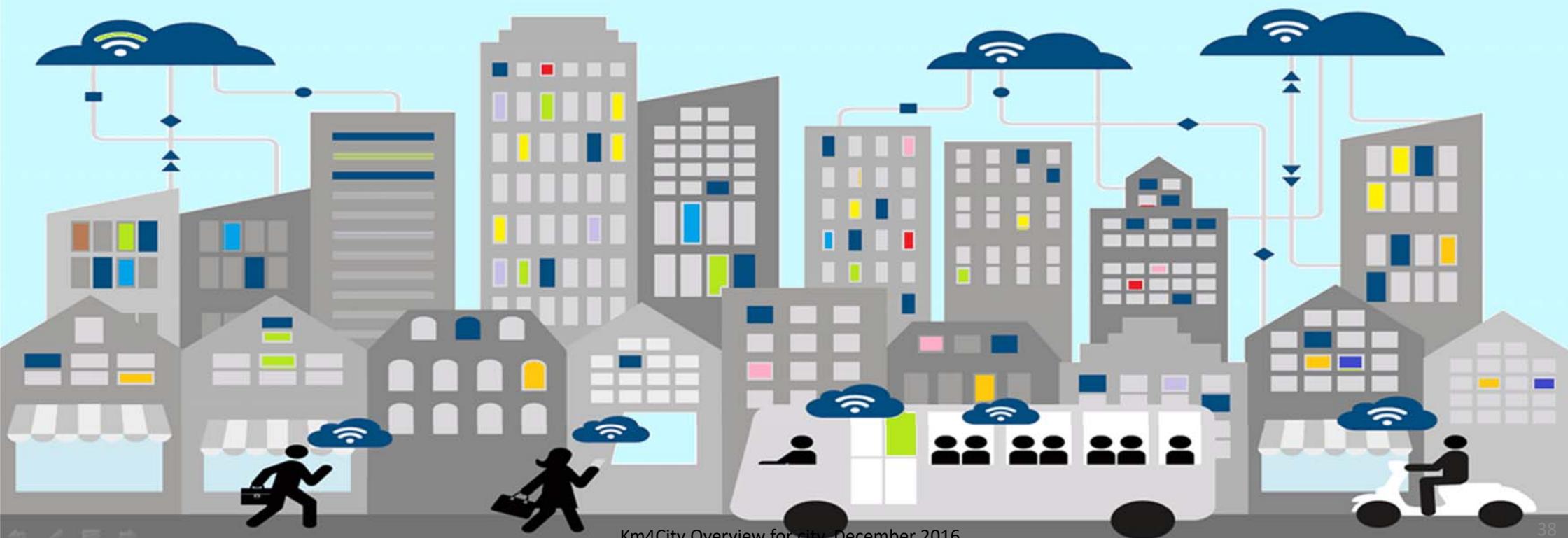
Web Page: Frequently Asked Questions





www.Km4City.org

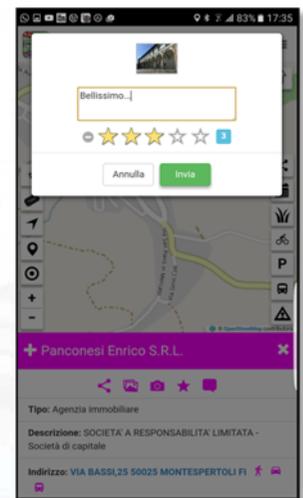
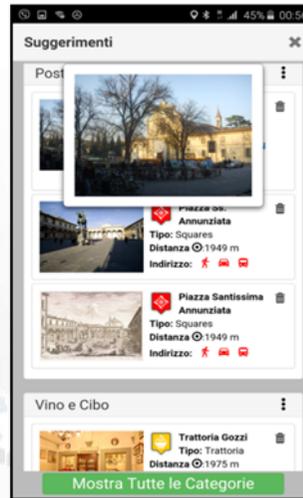
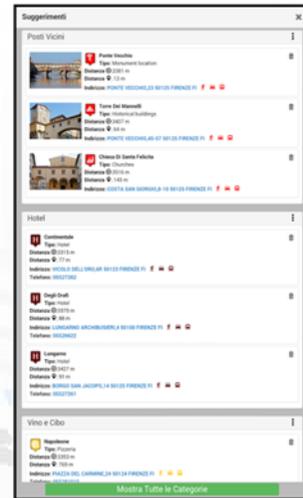
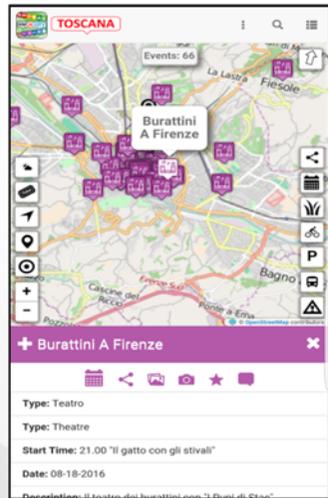
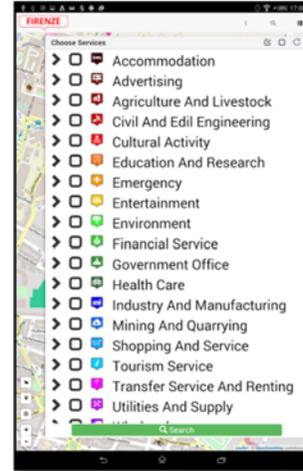
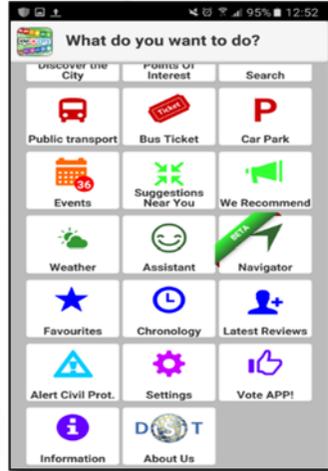
App: Web e Mobile





Km4City APP, caratteristiche 1/3

- **5 lingue:** IT, EN, SP, DE, FR
- **Profili di city users:** Cittadino, pendolare, studente, turista, etc..
- **Menu profilato per POI**
 - City user diversi e adattivo
- **Menu primario personalizzabile**
- Ricerca testuale
- Ricerca per tipo di POI
 - vicino a te, vicino ad un punto
- Ricerche dirette
 - Vicino a me, Eventi in città', Aree Verdi
 - Mezzi di trasporto, Ciclabili, Parcheggi
 - Etc.
- POI
 - Preferiti, Social icon
 - Ranking/stelline, Commenti, immagini





Km4City APP, caratteristiche 2/3

• Mobilita'

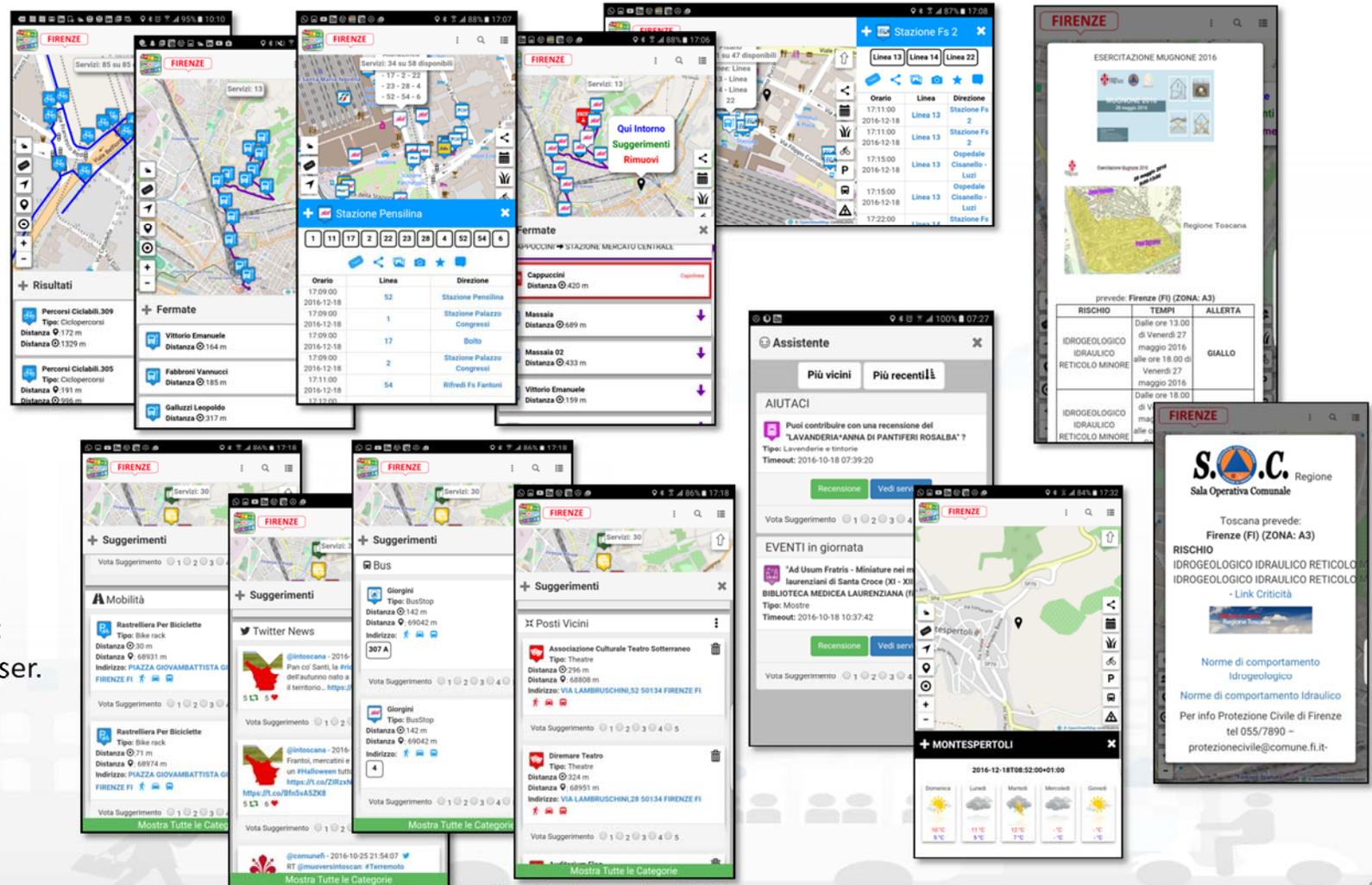
- Percorsi e fermate, orari
- parcheggi
- Biglietti ubani
- Ciclabili
- Predizione parcheggi

• Assistente personale

- Info
- Engagement
- Aiuto
- Protezione civile

• Suggestion:

- Personalizzate ed adattive: bannate e tipate per city user.
- POI, Twitter, Eventi,
- New Meteo,
- New protezione civile

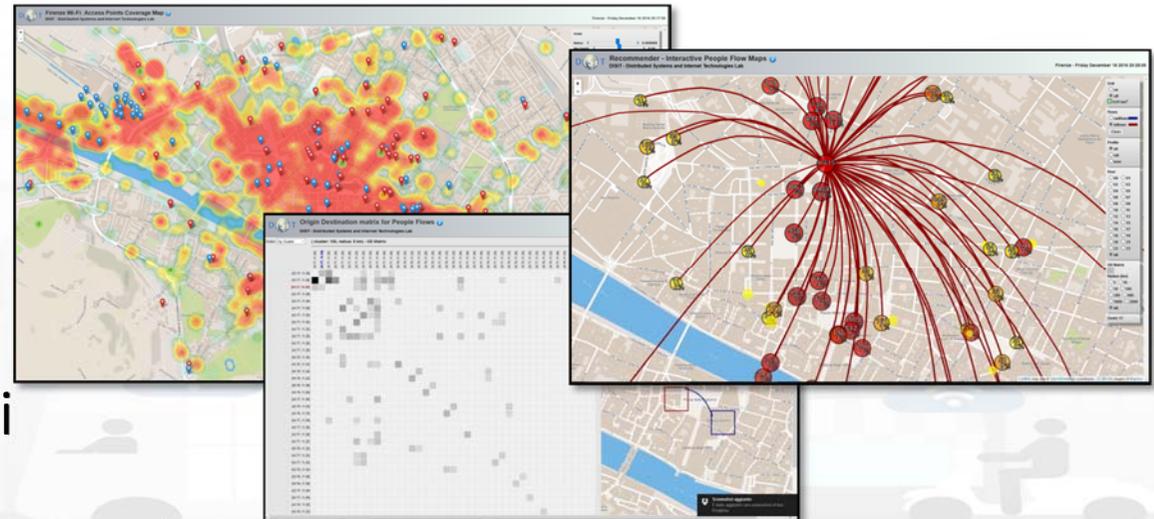
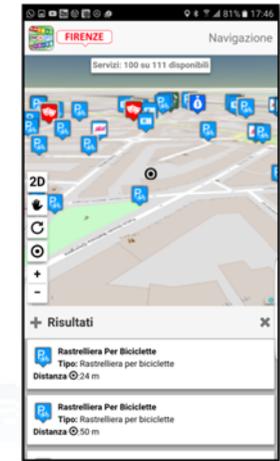
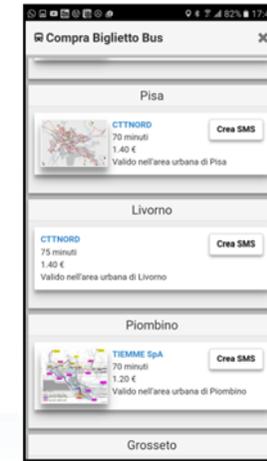


Km4City Overview for city, December 2016



Km4City APP, caratteristiche 3/3

- Navigazione 3D (BETA)
- Pagamento per TPL a tempo
- App come strumento di rilevazione
 - stato Wifi: rilevazione e misurazioni della potenza WiFi in città'
 - Rilevazione iBeacon
 - comportamento utente
 - Flussi Persone via APP, GPS:
 - OD matrix
 - Flussi fuori in Toscana e fuori



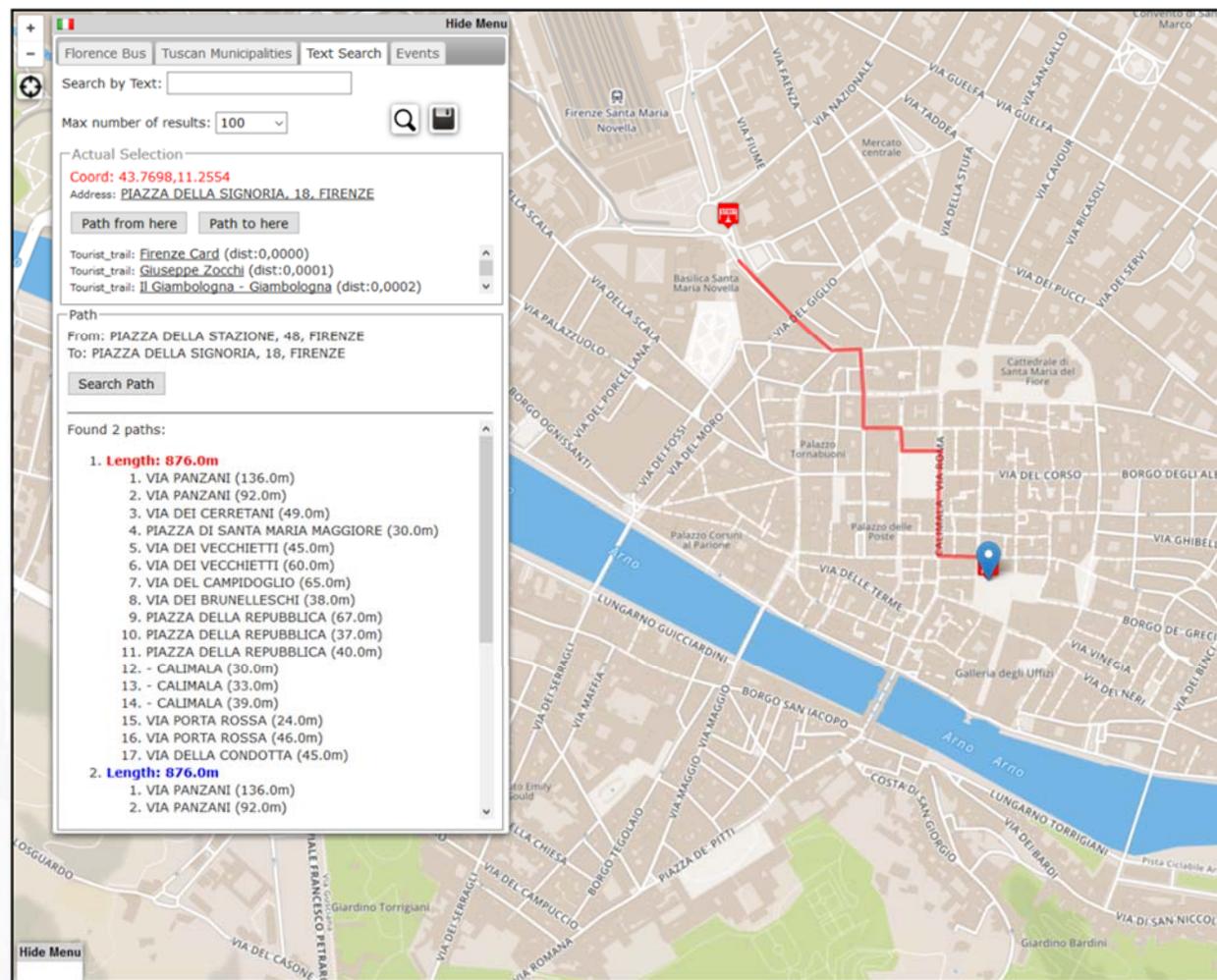
Km4City Overview for city, December 2016



Km4City App: caratteristiche (in progress)



- **Ricerca percorso DA-A:**
 - pedonale
 - TPL, pedonale
 - Bike private
 - Car Privata, Multimodale
 - Multipoint, per delivering
- **Registrazione su APP:**
 - Mutuata tramite social
 - Tramite email
- **Metodi di pagamento integrato**
 - TPL + parcheggi
 - Autostrada
 - ZTL
-

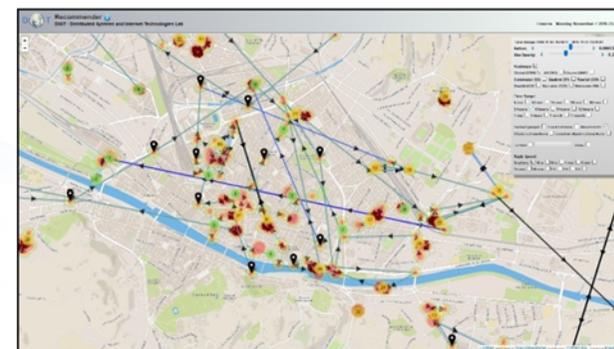
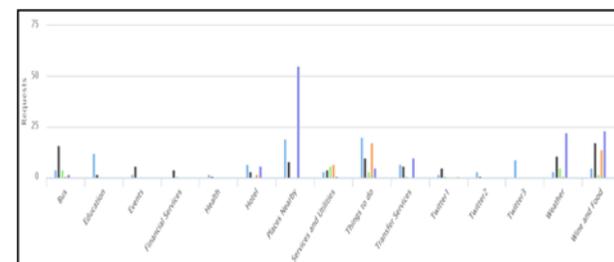


Km4City Overview for city, December 2016



Reasoning on App Data and for App

- **Suggerimenti on demand:**
 - Prossimita' e in relazione al comportamento
- **Analisi del comportamento utente**
 - produzione engagement on demand
 - Ricostruzione del comportamento in mobilita'
- **Produzione di Engagement on demand**
- **Routing;**
 - Pedestrian, TPL, Bike private
 - etc.



Rule name	Type	#event	#viewed	#viewed on #event	Description
daily_event_de	ENGAGEMENT	1 (0%)	0 (0%)	0%	Suggest (in german) an event currently on in Florence
daily_event_en	ENGAGEMENT	1720 (2.12%)	70 (7.1%)	4.07%	Suggest (in english) an event currently on in Florence
- commuter		5 (0.29%)	0 (0%)	0 (0%)	
- student		14 (0.81%)	0 (0%)	0 (0%)	
- tourist		1462 (85%)	25 (35.71%)	25 (1.71%)	
- citizen		113 (6.57%)	39 (55.71%)	39 (34.51%)	
- operator		0 (0%)	0 (0%)	0 (0%)	
- disabled		0 (0%)	0 (0%)	0 (0%)	
- all		119 (6.92%)	6 (5.57%)	6 (5.04%)	
daily_event_es	ENGAGEMENT	6 (0.01%)	4 (0.41%)	66.67%	Suggest (in spanish) an event currently on in Florence
daily_event_fr	ENGAGEMENT	6 (0.01%)	0 (0%)	0%	Suggest (in french) an event currently on in Florence
daily_event_it	ENGAGEMENT	549 (6.73%)	296 (30.02%)	5.42%	Suggest (in italian) an event currently on in Florence
parking_en	ASSISTANCE	141 (0.17%)	128 (12.98%)	90.78%	Alert (in english) if the user parked in a residential parking zone
parking_es	ASSISTANCE	3 (0%)	3 (0.3%)	100%	Alert (in spanish) if the user parked in a residential parking zone
parking_it	ASSISTANCE	187 (0.23%)	1 (0.1%)	0.53%	Alert (in italian) if the user parked in a residential parking zone
short_a_phot_de	ENGAGEMENT	68 (0.88%)	1 (0.1%)	1.47%	Ask (in german) a contribution for a nearby point-of-interest

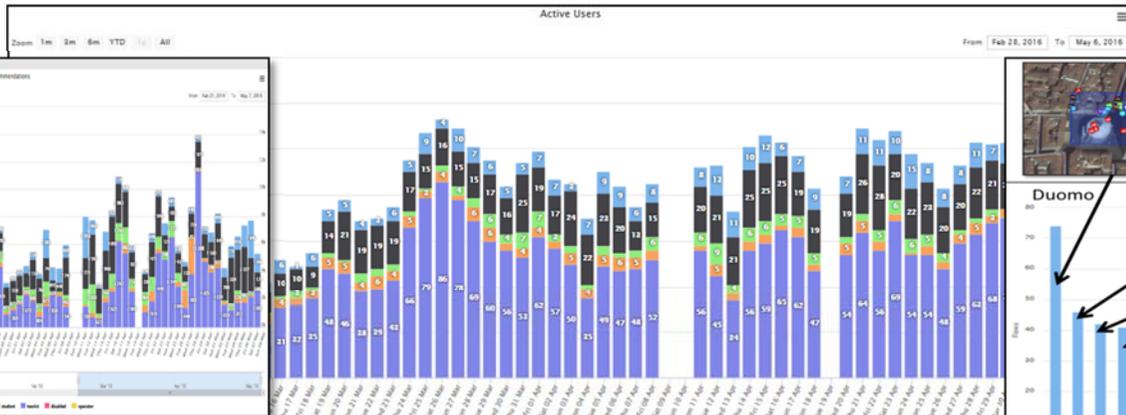


User Behavior Analysis

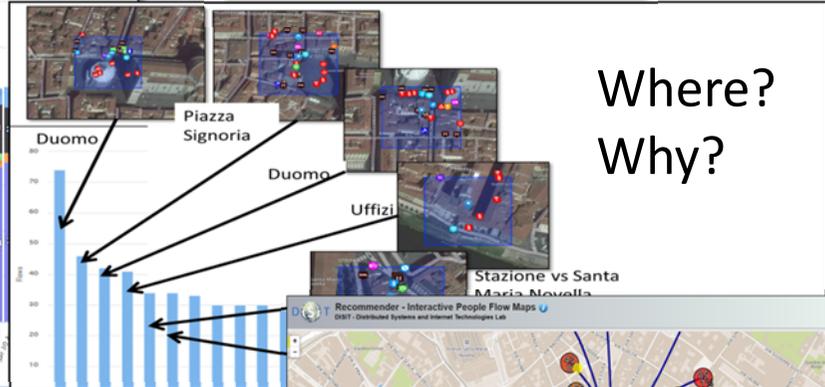


Integrated Analysis

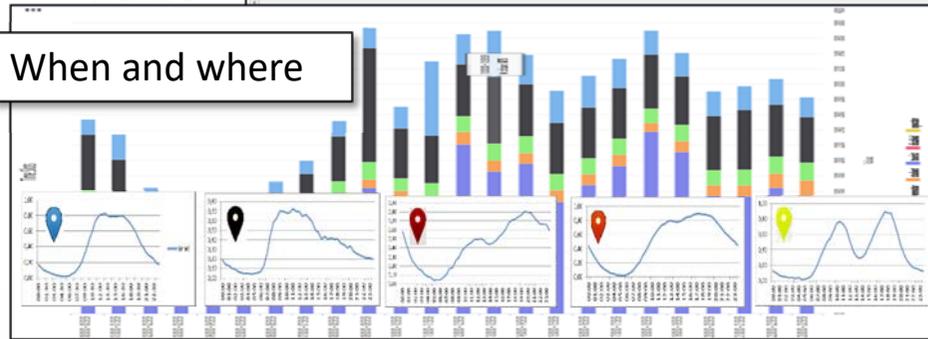
Who



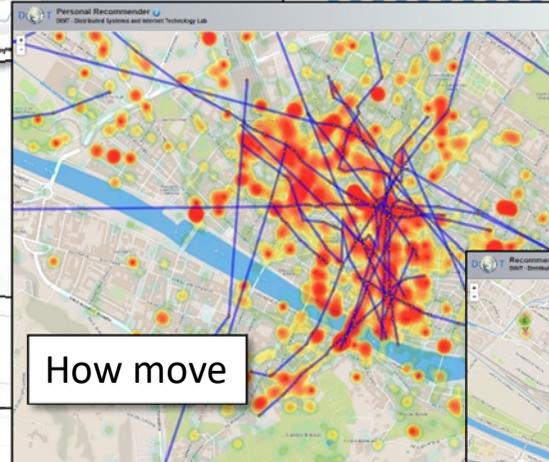
Where?
Why?



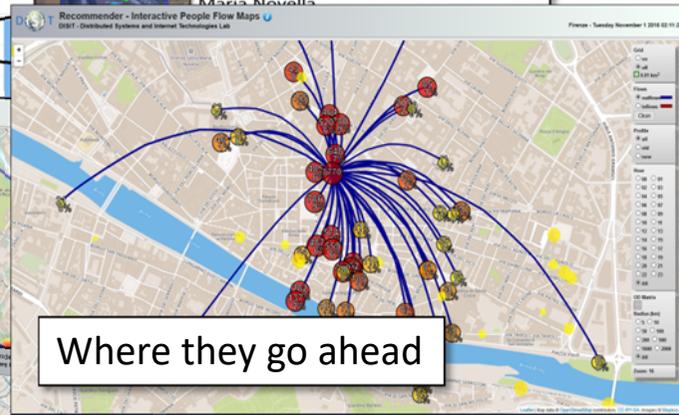
When and where



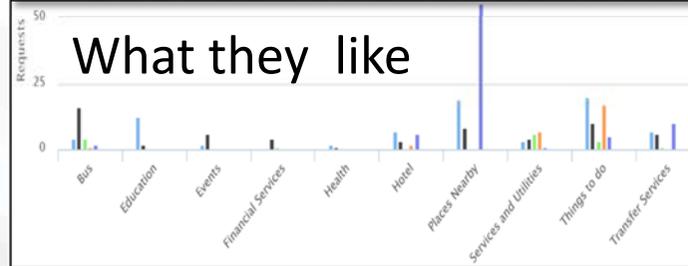
How move



Where they go ahead



What they like



How much they stay



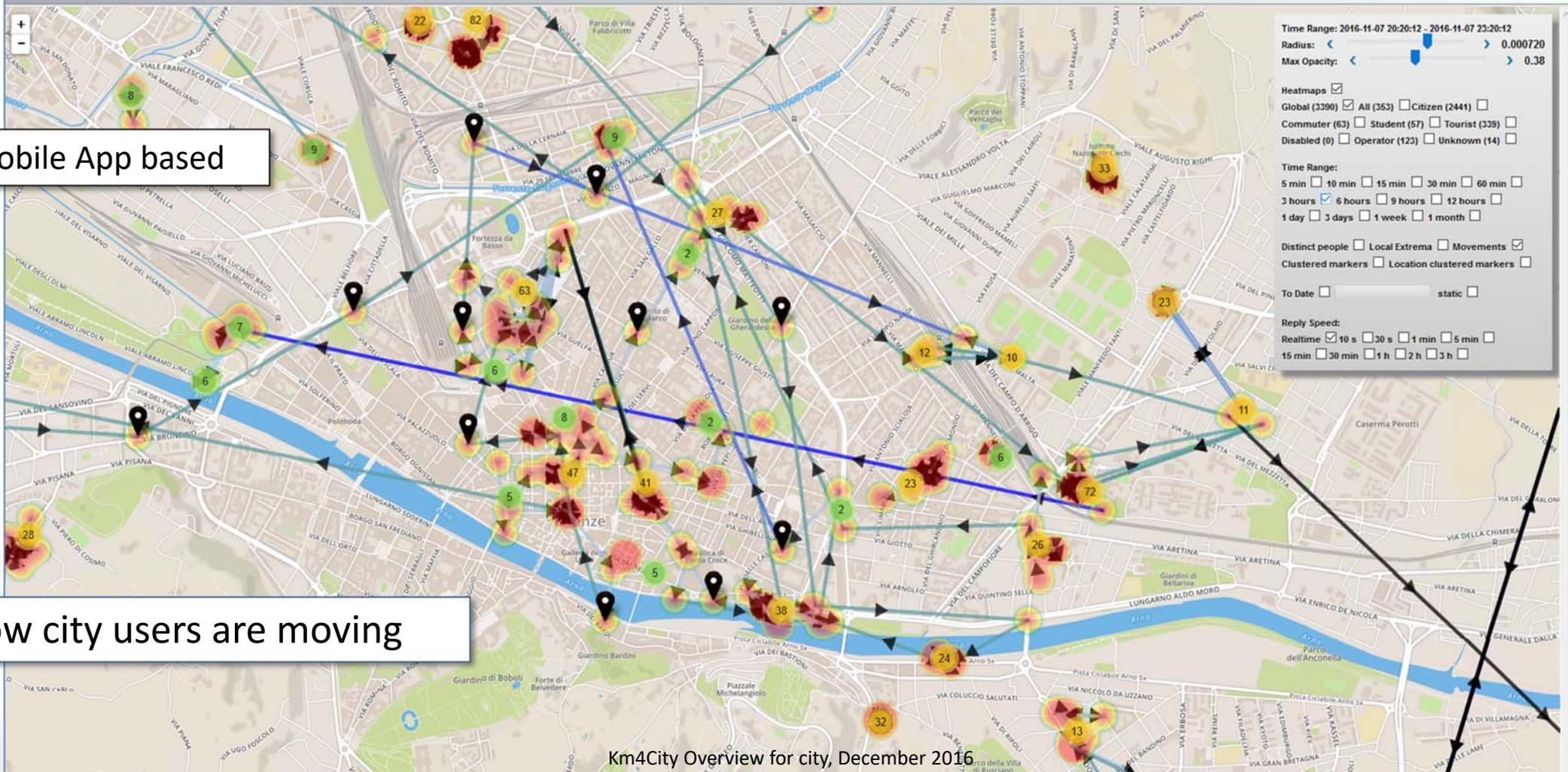


Anonymous User Behaviour Analysis



DISIT Recommender
DISIT - Distributed Systems and Internet Technologies Lab

Firenze - Monday November 7 2016 23:20:15



Mobile App based

How city users are moving

Km4City Overview for city, December 2016

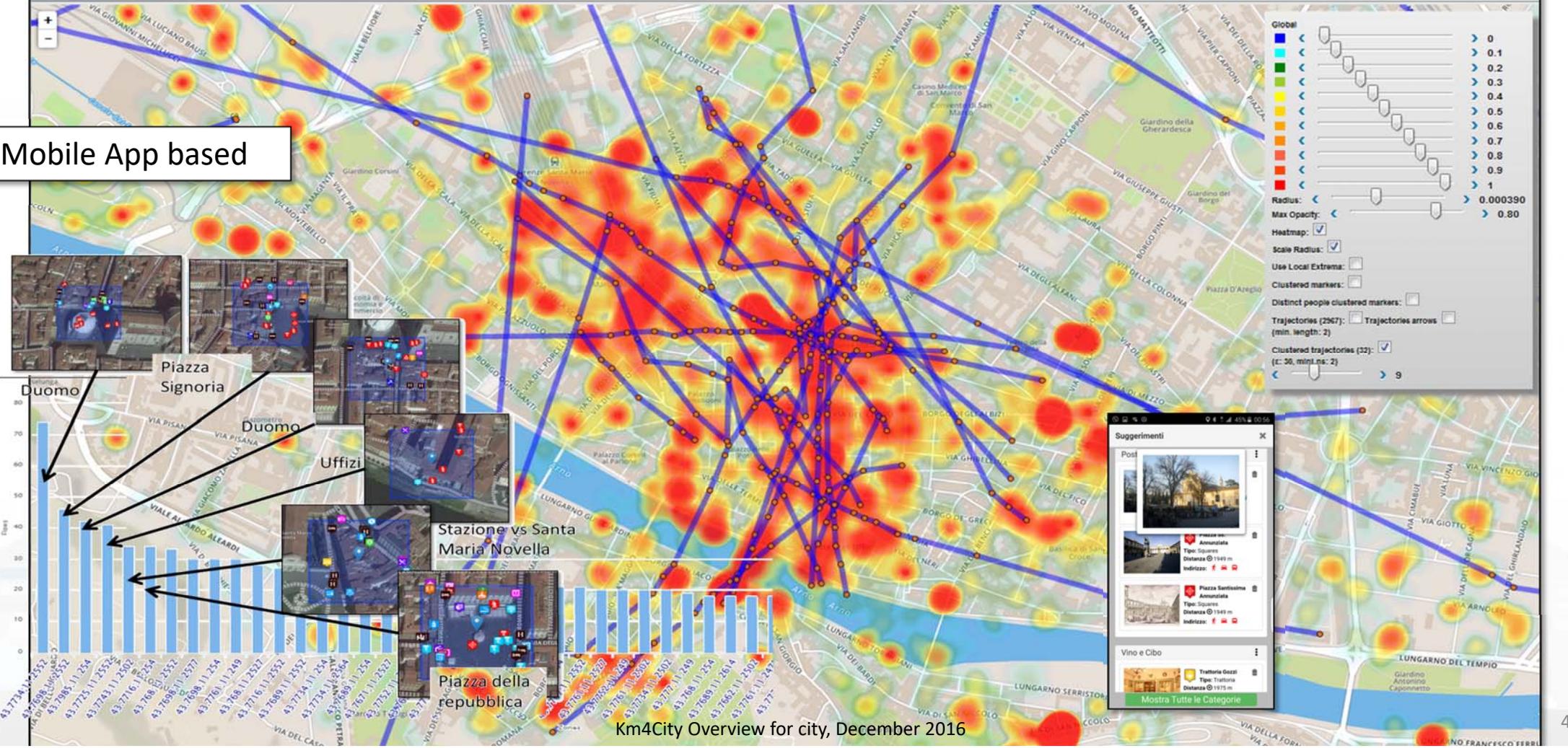


User Behavior Analyzer



DISIT Personal Recommender
DISIT - Distributed Systems and Internet Technology Lab

Mobile App based



Km4City Overview for city, December 2016



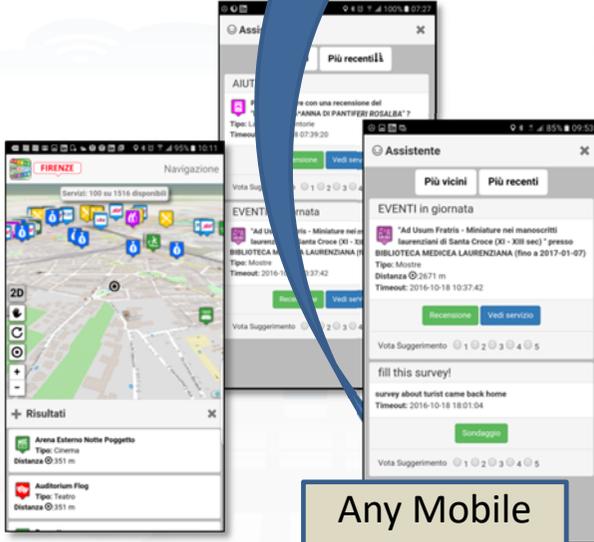
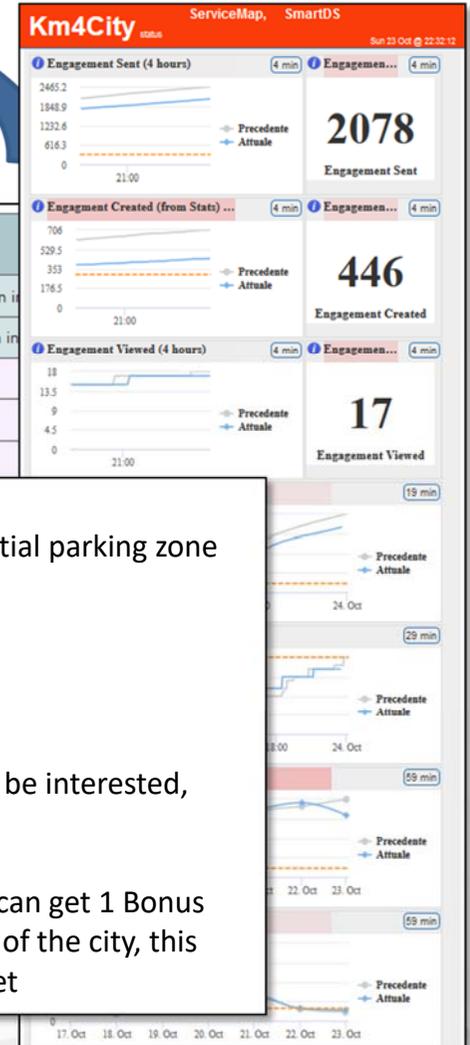
User influencing, engaging, monitoring & Follow Up



City & City Operators Strategy Editor



Rule name	Type	#sent	#viewed	#viewed on #sent	Description
daily_event_de	ENGAGEMENT	1 (0%)	0 (0%)	0%	Suggest (in german) an event currently on in
daily_event_en	ENGAGEMENT	1720 (2.12%)	70 (7.1%)	4.07%	Suggest (in english) an event currently on in
- commuter		5 (0.29%)	0 (0%)	0 (0%)	
- student		14 (0.81%)	0 (0%)	0 (0%)	
- tourist		1462 (85%)	25 (35.71%)	25 (1.71%)	
- citizen		113 (6.57%)			
- operator		0 (0%)			
- disabled		0 (0%)			
- all		119 (6.92%)			
daily_event_es	ENGAGEMENT	6 (0.01%)			
daily_event_fr	ENGAGEMENT	6 (0.01%)			
daily_event_it	ENGAGEMENT	5459 (6.73%)			
parking_en	ASSISTANCE	141 (0.17%)			
parking_es	ASSISTANCE	3 (0%)			
parking_it	ASSISTANCE	187 (0.23%)			
shoot_a_photo_de	ENGAGEMENT	68 (0.08%)			



Any Mobile and Web App

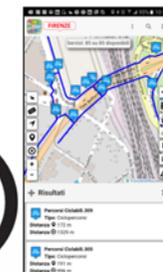
- Inform**
You have parked out of your residential parking zone
The Road cleaning is this night
The waste in S.Andreas Road is full
- Engage**
Provide a comment, a score, etc..
- Stimulate / recommend**
Events in the city, services your may be interested, etc..
- Provide Bonus**
Since you have parked here you we can get 1 Bonus
We suggest you to leave the car out of the city, this bonus can be used to buy a bus ticket



Engagement & Assistant Rules



- **Detecting** city users' habits about mobility
 - Private cars → **stimulating Bus Usage & Bikes**
 - Private cars parking → usage of **peripheral parking-lot + bus**
 - Leave the car and take the bus twice → by using **bonus, tickets..**
 - → different solutions for moving...
- **Assisting by notifying** when one is
 - parking out of the residential parking zone
 - parking in a zone subjected to cleaning in the next two days
 - entering in the restricted traffic zone
- **Suggesting** you about
 - Events, **Civil Protection Alerts**,
 - **Closer free parking** ...
- **Administering** questionnaires
 - Getting assessment about services, city experience
 -
- **Requesting** ranking, photo and/or comments





www.Km4City.org

Monitoring via Wi-Fi

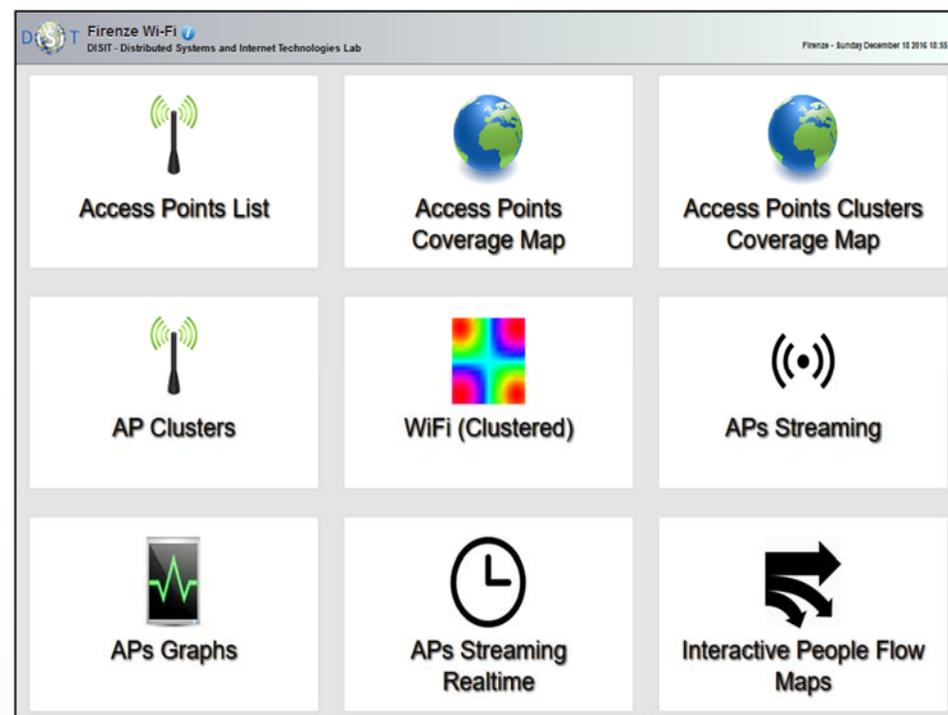




Monitoraggio tramite Wi-Fi

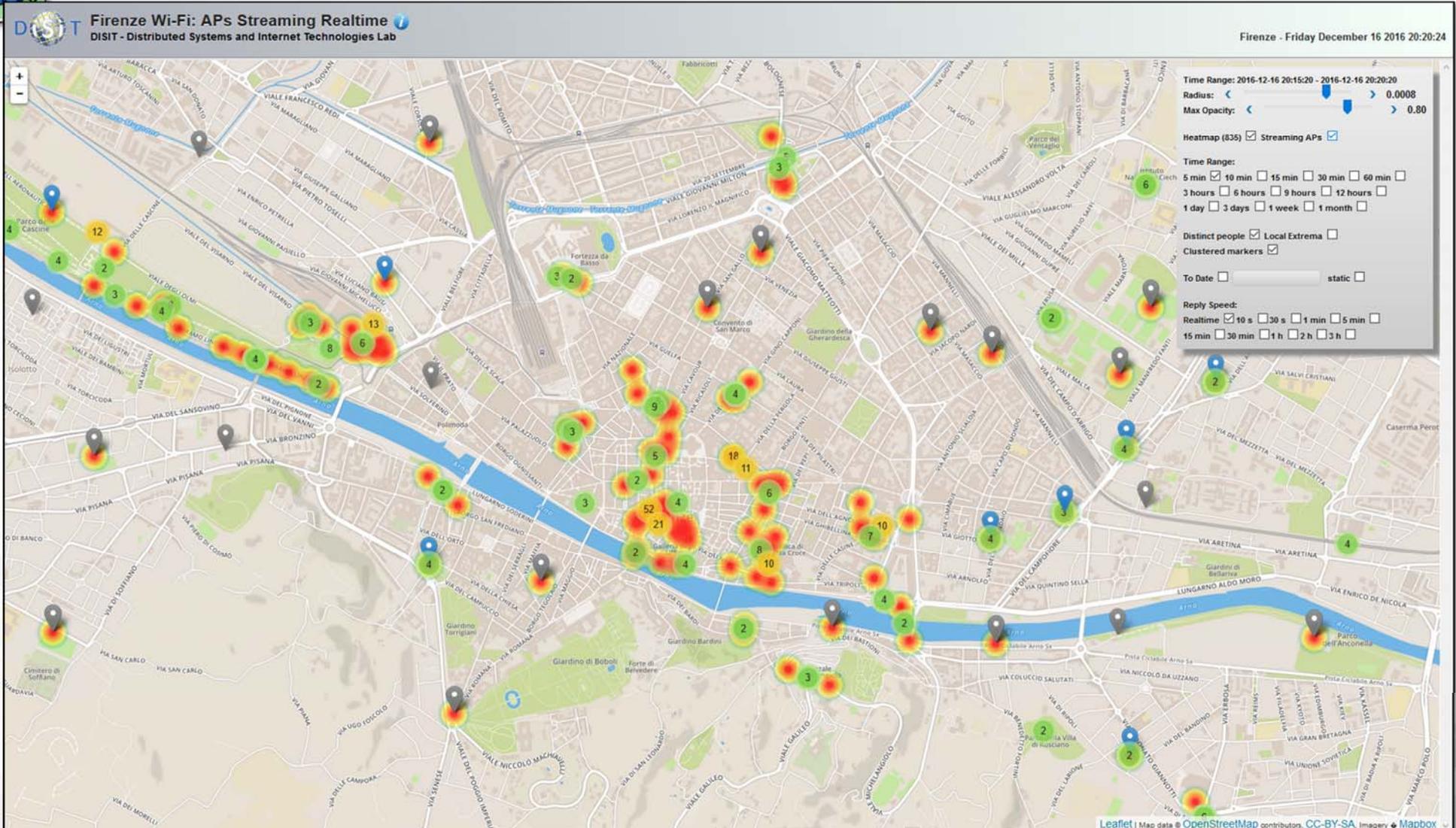


- **Instrumentazione della rete Wi-Fi**
 - 1500 AP → 345 instrumentati
 - Stream da AP al DISIT Lab
 - Real time monitoring → dashboard
- **Data Analytics**
 - heatmap
 - Analisi del comportamento utente
 - Clustering del comportamento
 - Modelli predittivi
 - Identificazione di condizioni critiche





Real Time Monitoring of Wi-Fi network

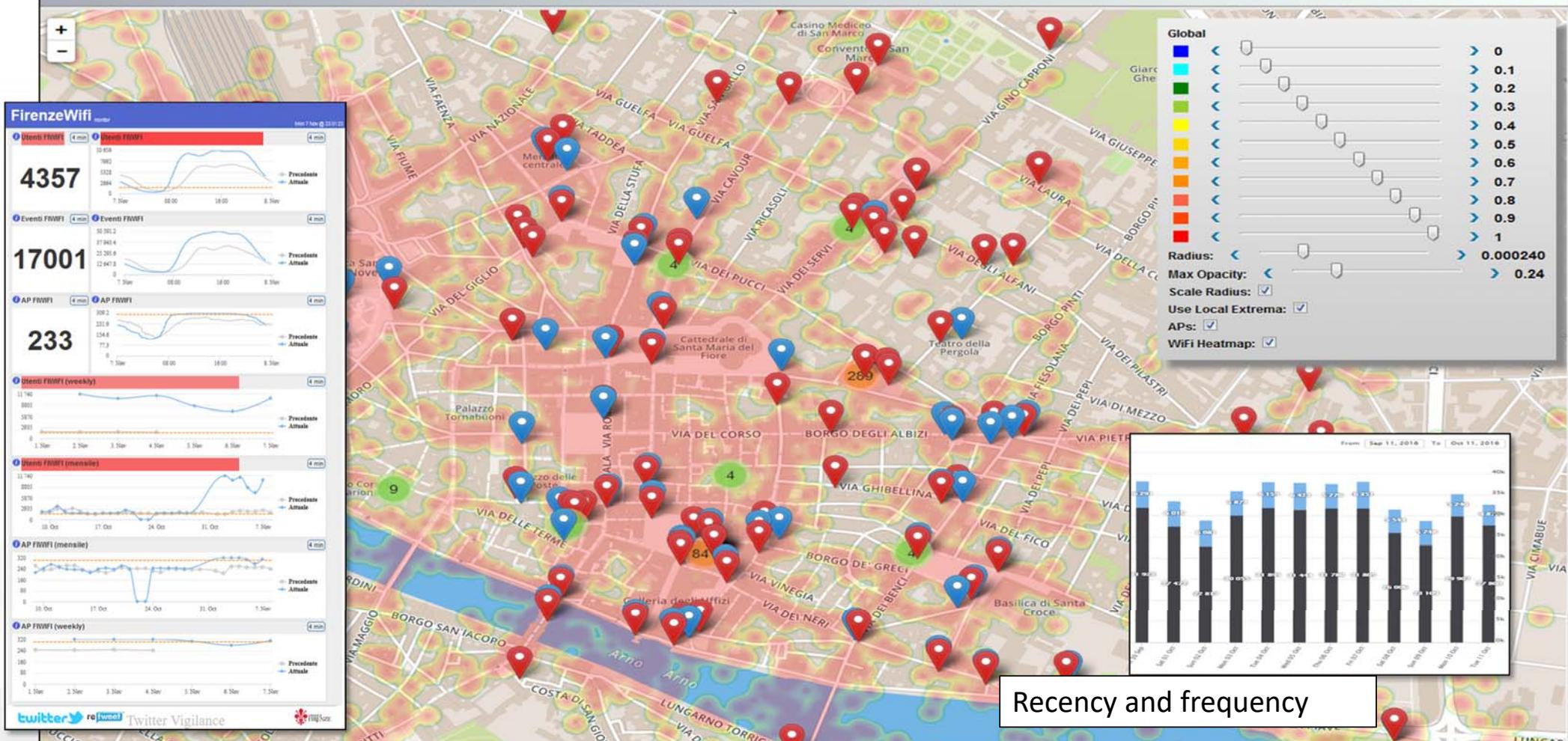




Wi-Fi Monitor tool



DISIT WiFi Firenze
DISIT - Distributed Systems and Internet Technology Lab



Recency and frequency



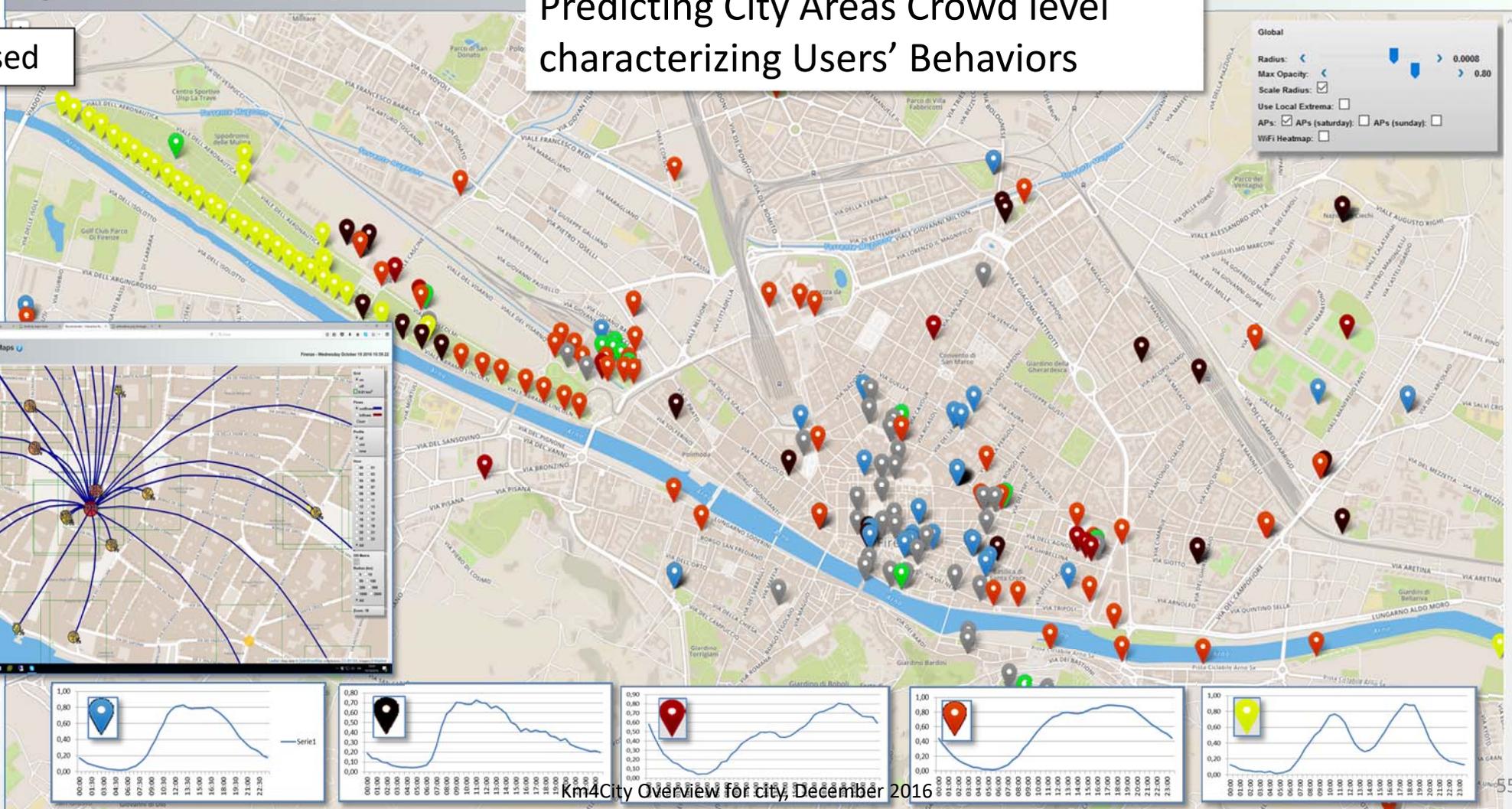
Characterizing City Areas



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

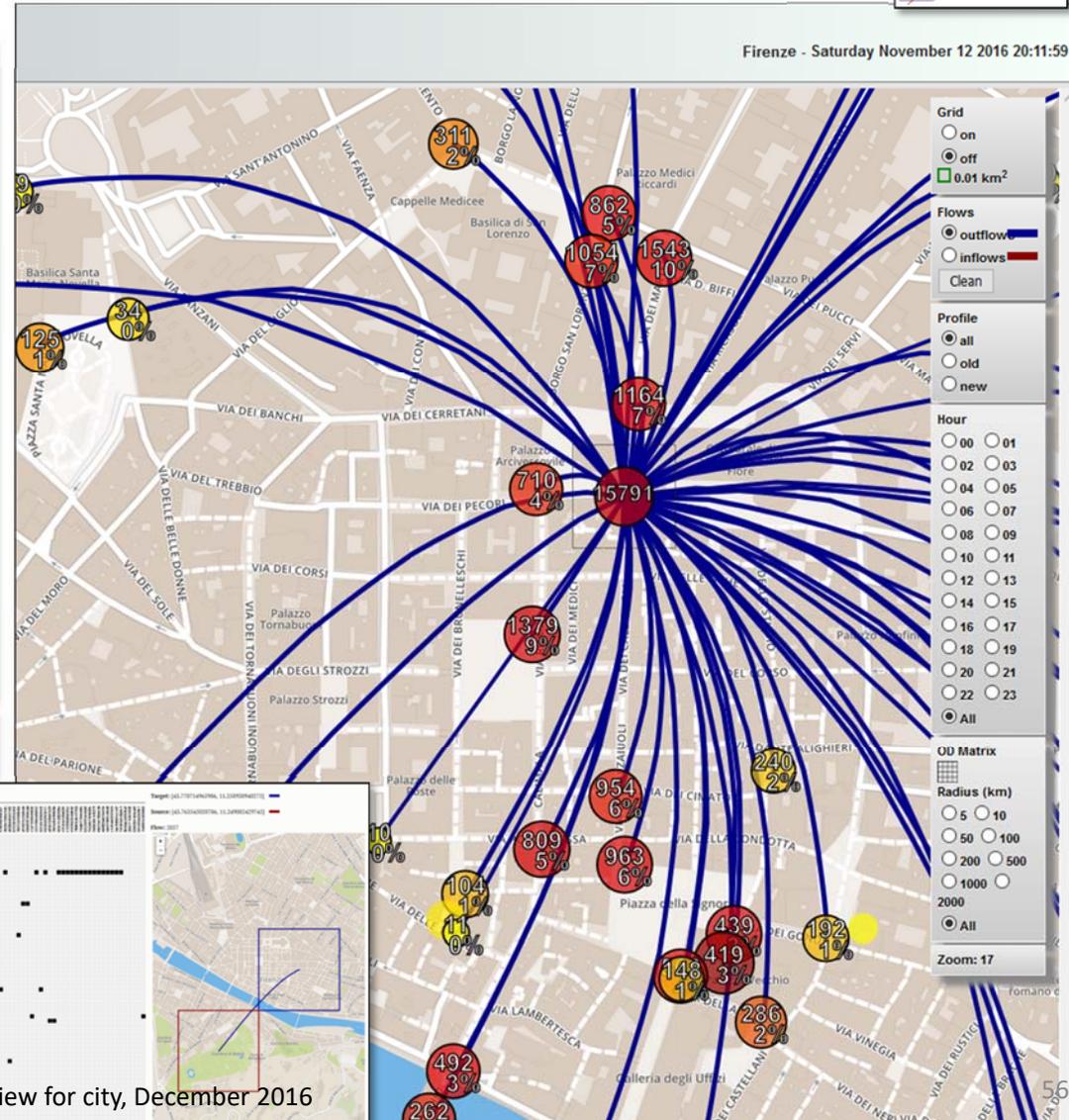
Predicting City Areas Crowd level
characterizing Users' Behaviors

Wi-Fi based

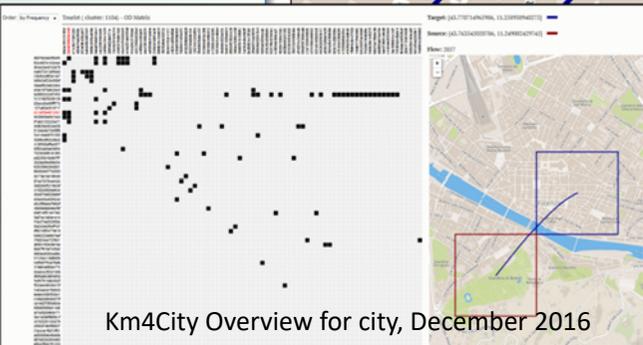
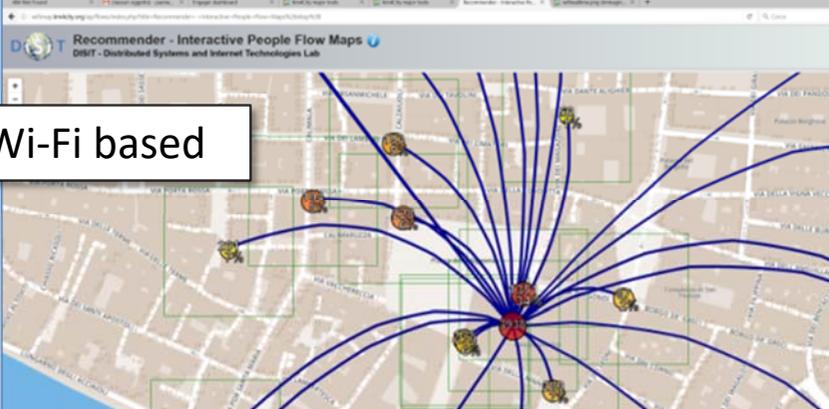




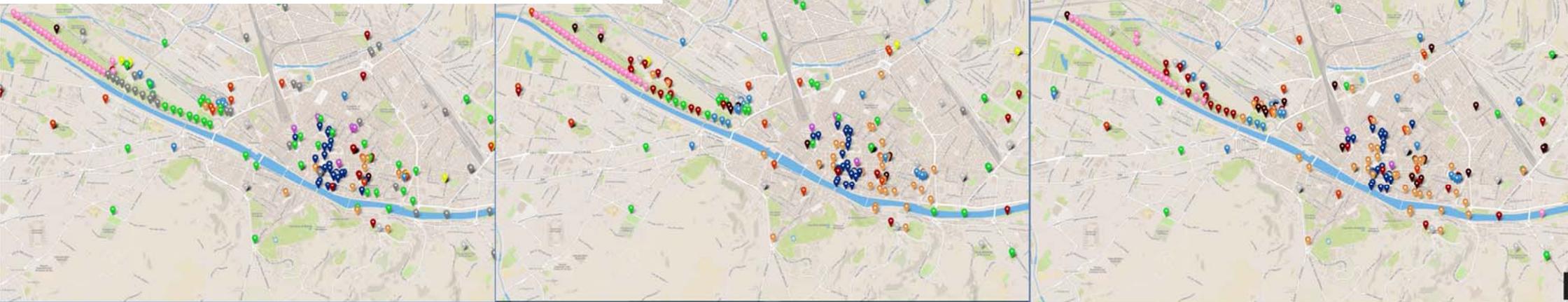
Origin Destination Matrix Estimation



Wi-Fi based



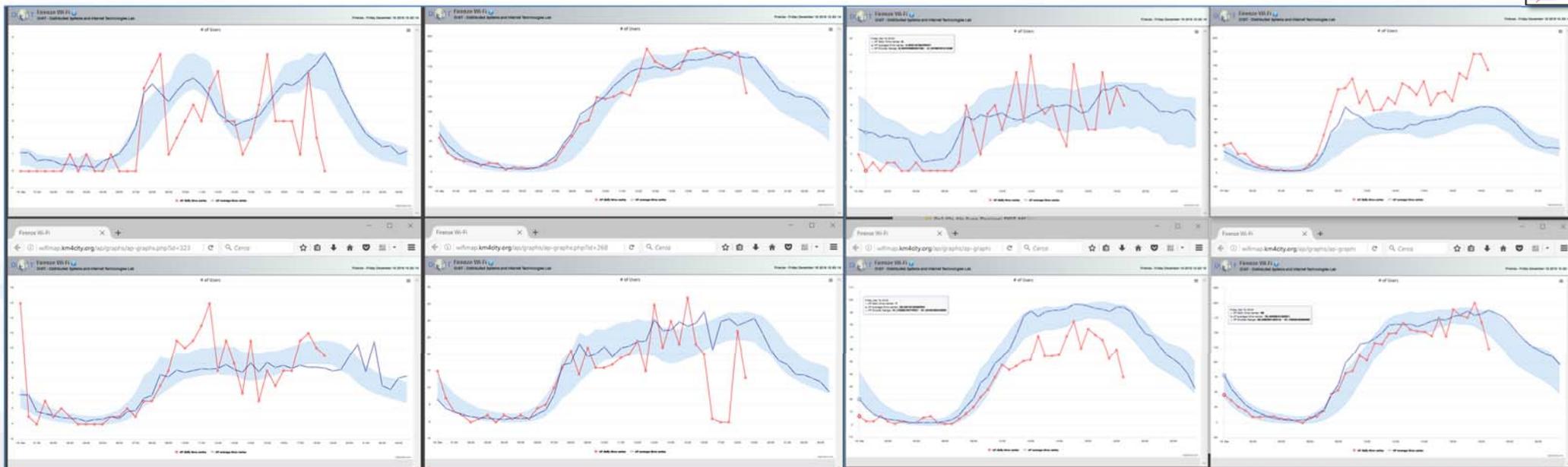
Clustering e Modelli Predittivi



Lunedì-Venerdì

Sabato

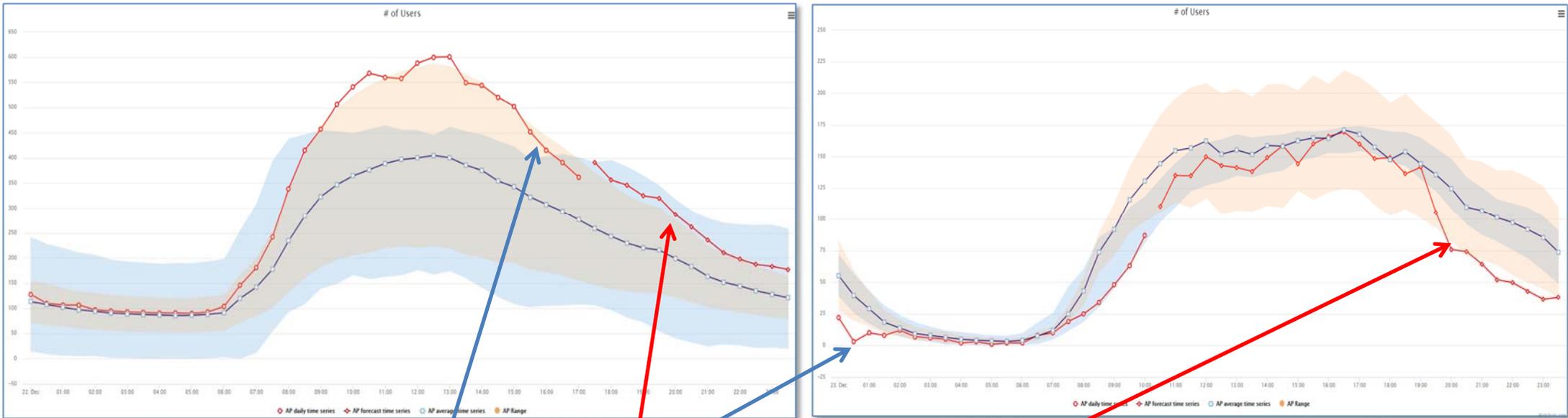
Domenica





Predizione e identificazione anomalie

Guessing number of users of Wi-Fi Access Points



Cluster trend and confidence

AP trend and confidence

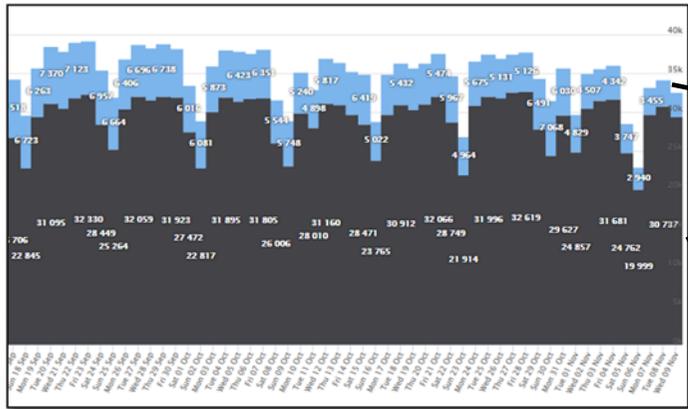
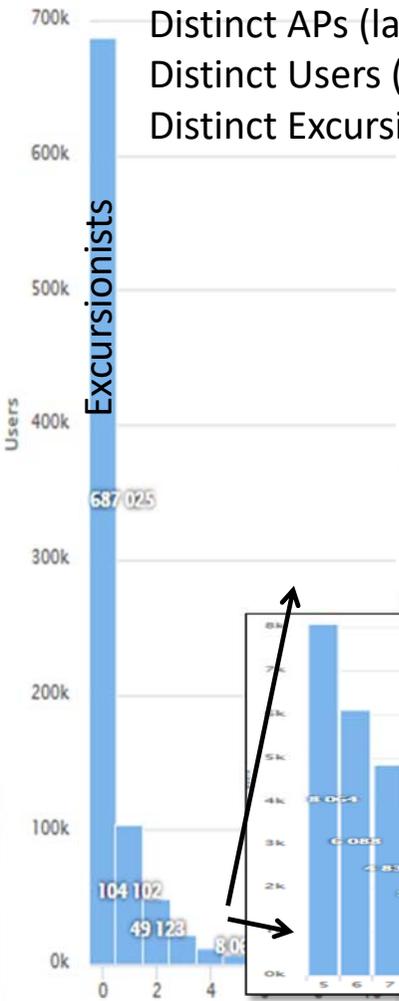
Actual AP trend for today

AP prediction for the next time slot in the day on the basis of past weeks

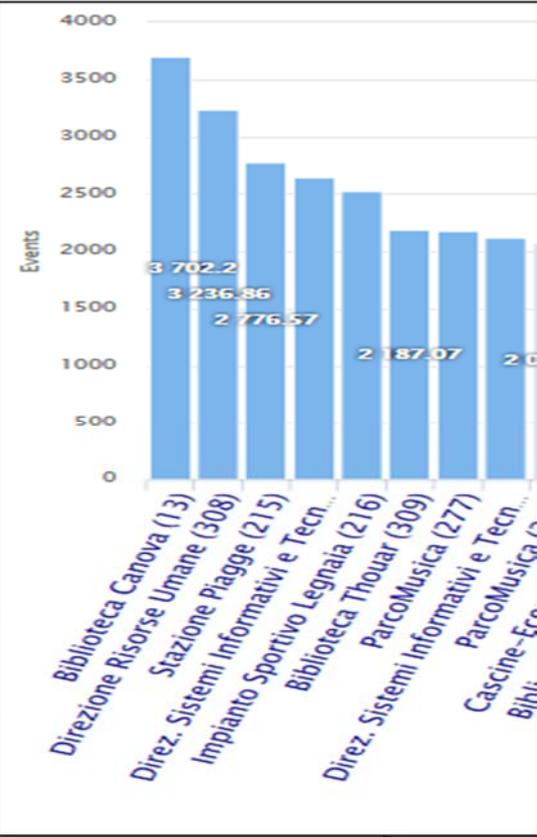
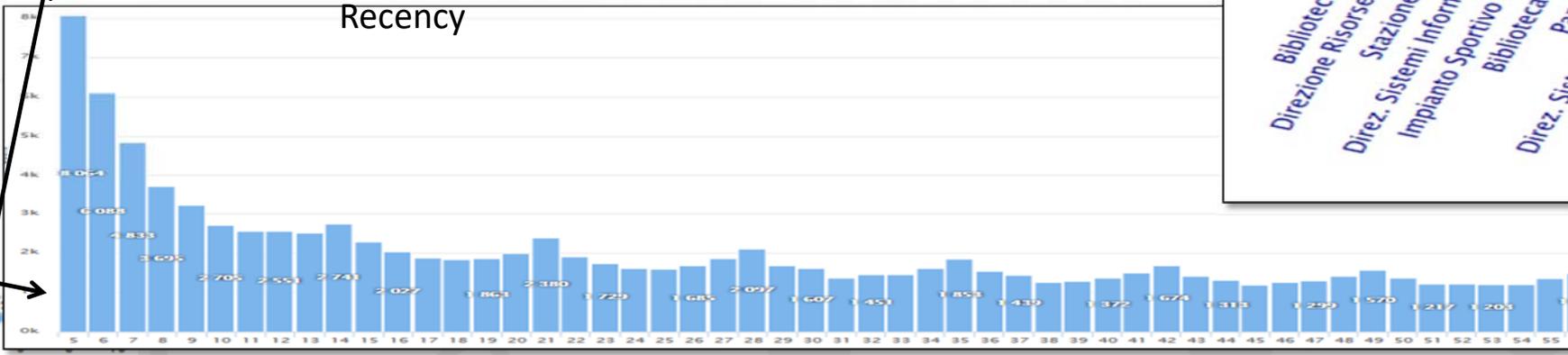


User Behavior Analysis

Distinct APs: 343
 Distinct APs (last 24 hours): 311
 Distinct Users (last 180 days): 1102098
 Distinct Excursionists (last 180 days, < 24 h): 687025



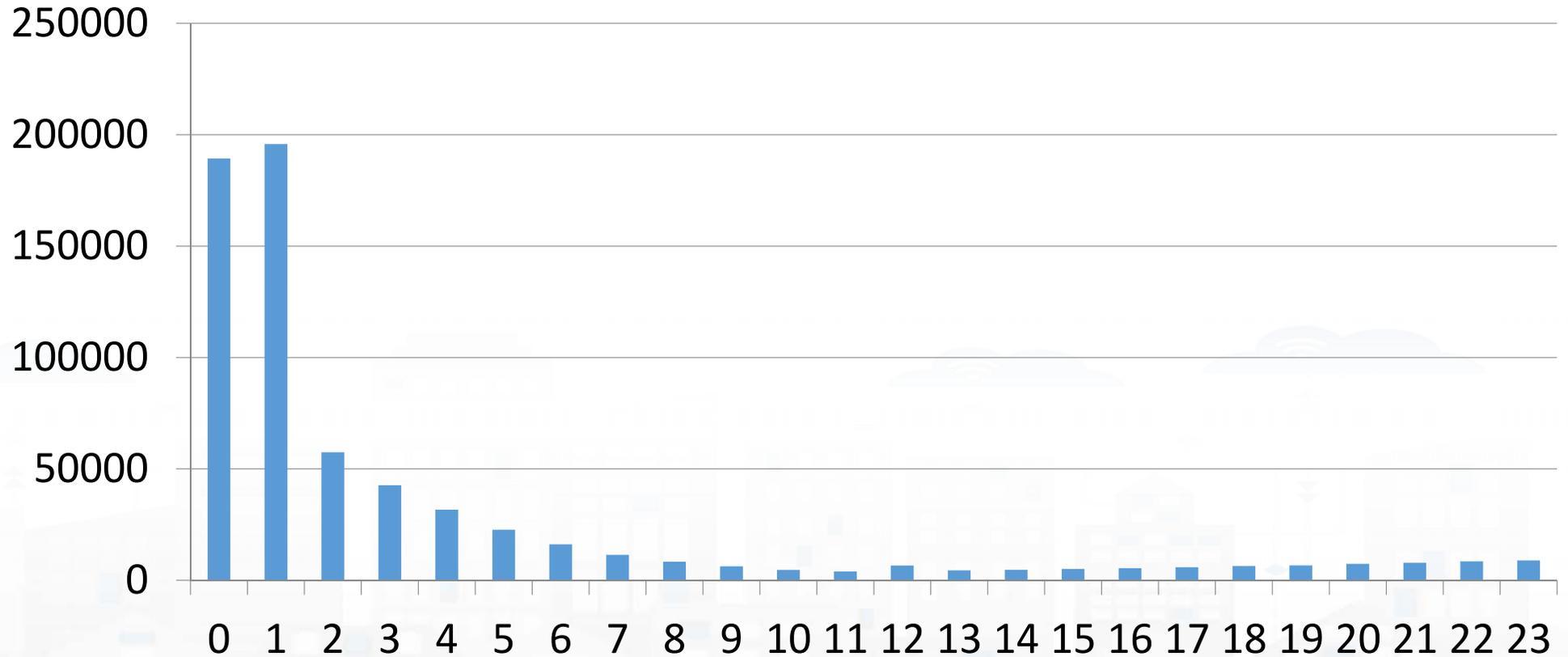
→ New City Users
 VS
 → Returning



Km4City Overview for city, December 2016



Distribution in the first 24 hours



4 means: permanence for more than 3 hours and less than 4 hours



www.Km4City.org

Control Room



Sentient City Control Room

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FIRENZE

DINFO
DIPARTIMENTO DI
INGEGNERIA
DELL'INFORMAZIONE

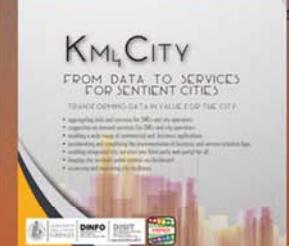
DISIT
DISTRIBUTED SYSTEMS
AND INTERNET
TECHNOLOGIES LAB



GET IT ON
Google play

Download on the
App Store

Download from
Windows Phone Store



Home Sentient City Control Room City Users' Tools Back Office and Dev Tools Info and Docs

Real Time Monitoring Tools for Control Room Dashboards

Real Time Control Room Dashboard ⓘ	Monitoring City Users by Wi-Fi (*) ⓘ	Monitoring City Users Behaviour via Mobile App (*) ⓘ	Monitoring Real Time Data on 3D: traffic and parking (*) ⓘ	Monitoring Parking Areas Status in Florence (*) ⓘ	Monitoring Traffic Sensors in Tuscany Region (*) ⓘ	Getting moods and alerts via Twitter Sentiment Analysis (*) ⓘ	Early Warning and Prediction Tools ⓘ	Smart Decision Support System, SmartDS (*) ⓘ
------------------------------------	--------------------------------------	--	--	---	--	---	--------------------------------------	--

Smart City Control Room, Dashboard, Real Time Data

The dashboard displays a variety of real-time data visualizations including:

- Percentage indicators (e.g., 42.4%, 44.7%)
- Line graphs showing trends over time
- Maps with data points
- Summary cards with key figures (e.g., 1790, 4392, 16915, 225, 10, 41)
- SmartCity Processes status grid

Big Data Analytics Tools, Business Intelligence, Decision Support Tools

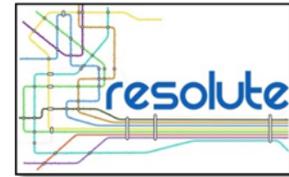
City Resilience Decision Support System, ResilienceDS (*) ⓘ	City Risk & Vulnerability Analysis Tool ⓘ	Assessing and Analysing Wi-Fi Coverage (*) ⓘ	Origin Destination Matrix by Wi-Fi data (*) ⓘ	City Users Recency and Frequency by Wi-Fi data (*) ⓘ	City Users Origin Destination Matrix via Mobile App (*) ⓘ	Heatmaps and Trajectories of City Users Tourists (*) ⓘ	Analysing City Users' Behavior (*) ⓘ	Social Media Twitter Vigilance (*) ⓘ	Twitter Data Analysis Tool (*) ⓘ
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Control Room e Supporto alla decisioni

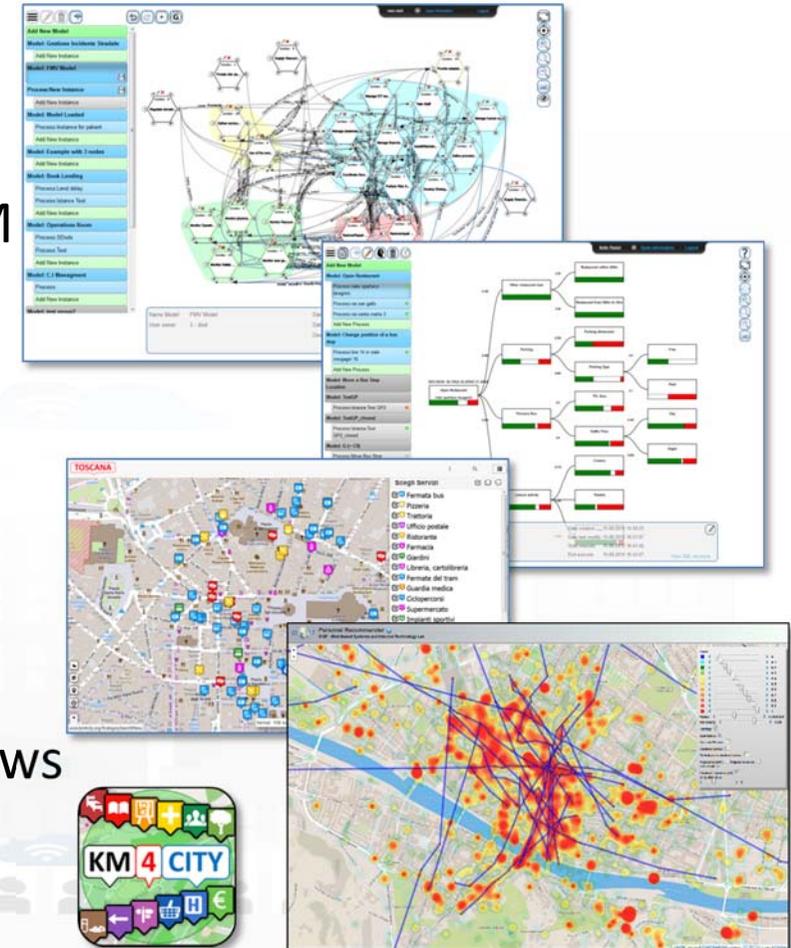
- **Dashboard Builder**
 - Visto in precedenza
- **Resilience DS, basato su FRAM**
 - Valutazione della resilienza: Linea Guida Europea per la Resilienza
- **Smart DS, basato su System Thinking**
 - Modelli Baesiani per il supporto alle decisioni
- **Twitter Vigilance**
 - Canali personalizzati: statistiche, NLP, SA, scarico dati
 - Canali real time personalizzati



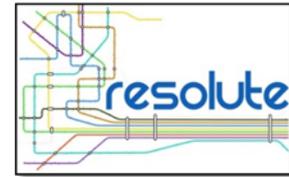
Main Approach



- Three main layers
- Complex System modeling: function, processes, resources, time, events, etc..
 - Functional Resonance Analysis Method, FRAM
 - Resilience Analysis Grid, RAG
- Decision Support System, DSS
 - System Thinking, Goal Models
 - Risk analysis
 - UTS/ITS decision supports
- Data, big data access and exploitation
 - Data Analytics, Internet of Things, sensors, flows
 - People flow and behavior
 - Social Media



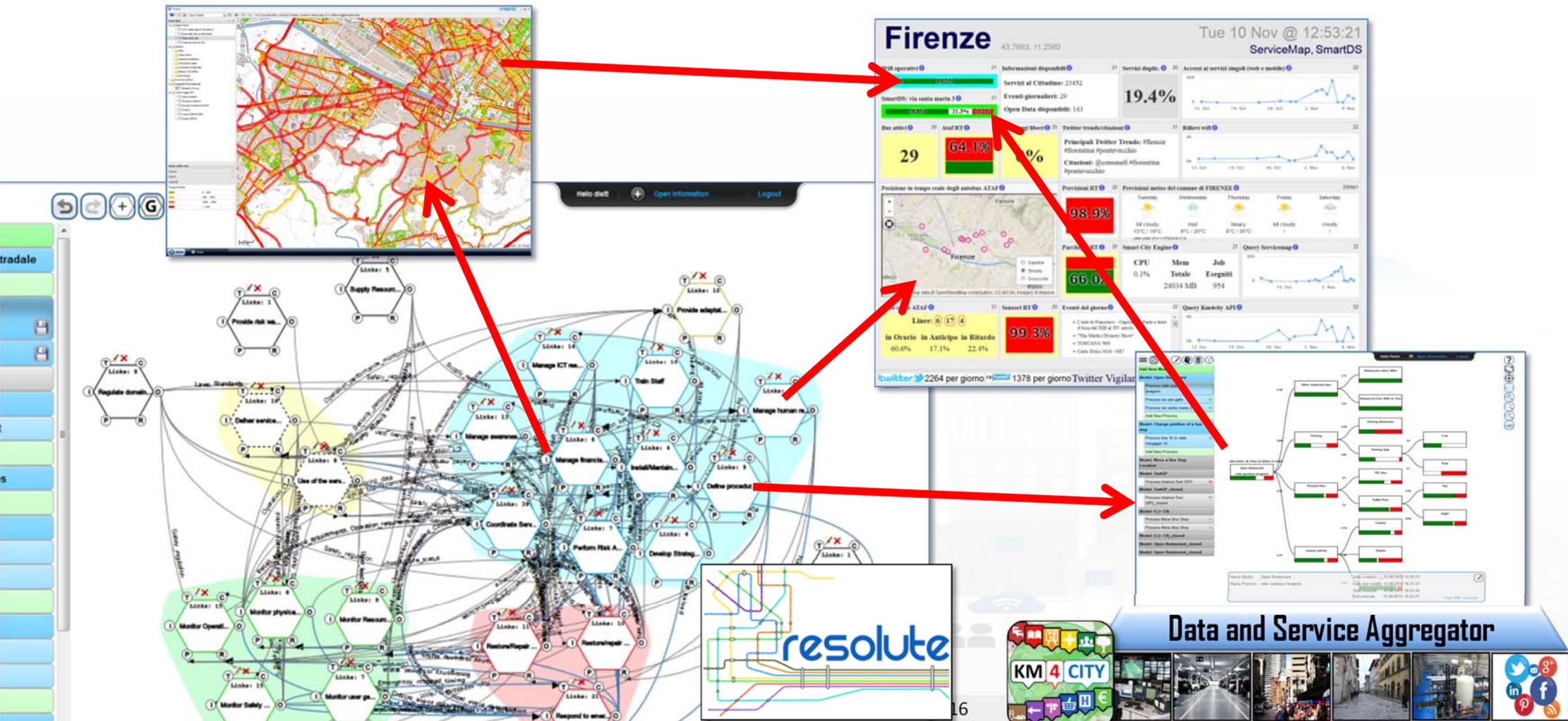
Problems and issues



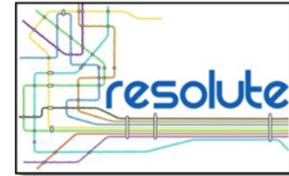
- Cities include **critical infrastructures** strongly related / depended each other:
 - Transport, energy, communication, cyber, health...
- **Risks** for Critical Infrastructures may be due to natural and/or man made events.
- **Urban Transport System**, is one of the most challenging since UTS is the via by which many problems may propagate but also the path used by solutions and the recovery actions.



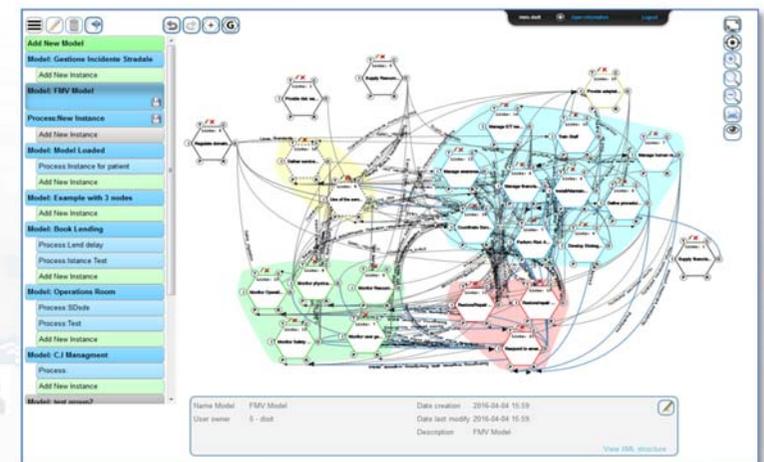
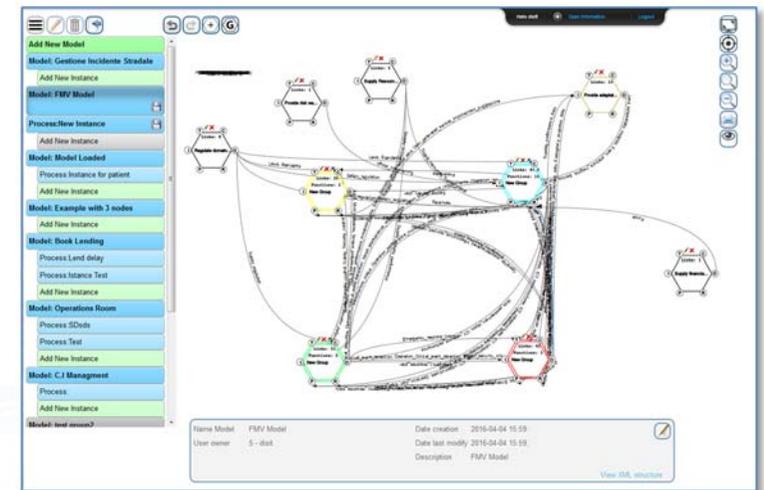
Assessing / Controlling city resilience

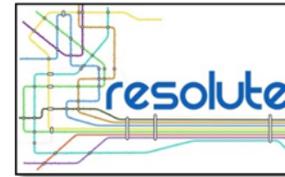


ResilienceDS tool



- **FRAM Model**
 - Macro FRAM processes
 - Metrics for Process complexity assessment
 - Operational Semantic for executing FRAM model
 - Connection with SmartDS
 - Connection with BigData open to multiple sources of data and workgroup results, Km4City
- **Collaborative work**
- **Open for all**
- **Validated on ERMG**
- **Web Tool**





Risk Assessment

Decision Support Systems

Flood sensors observations:

From	Date	mm/h
<input checked="" type="checkbox"/> Firenze Genio Civile	2016-04-11T15:59:00	12
<input checked="" type="checkbox"/> Firenze Penetola	2016-04-11T15:59:00	20.5
<input checked="" type="checkbox"/> Firenze Universta	2016-04-11T15:59:00	10.5

Service Details:

NAME: villa maria teresa hospital...
ADDRESS: VIA DELLA CERNAIA, FIRENZE, FIRENZE
SERVICE TYPE: http://www.dist.org/km4city/schemataPublic_Jstptal
SERVICE CLASS: http://www.dist.org/km4city/schemataHealth-Care
SERVICE: http://www.dist.org/km4city/resources/7ab1bc4584357b727dd57f6081d2db
VALUE: 100
WKT DESCRIPTION POINT: (11.2561 43.7668)

Traffic observations:

From	Date	km/h	car/km	car/h
VIA DELLA MATTONAIA	2016-10-10 18:01:08	58	15	2438
LANGARNO AMERIGO VESPUCCI	2016-10-10 18:01:08	18	65	1842
VIA CARMELO CAVOUR	2016-10-10 18:01:08	61	12	2009
VIA VALFOCCA	2016-10-10 18:01:08	27	53	2207
VIA VITTORIO ALFIERI	2016-10-10 18:01:08	23	38	2798
VIA SENESE	2016-10-10 18:01:08	27	54	3218
VIA GUELFA	2016-10-10 18:01:08	68	3	420
VIA DELLA SCALIA	2016-10-10 18:01:08	60	13	2157
PIAZZA DI SAN FELICE	2016-10-10 18:01:08	62	10	1887
BORGIO SAN FREDIANO	2016-10-10 18:01:08	57	17	2000
VIA VITTORIO ALFIERI	2016-10-10 18:01:08	10	78	186
VIA DEL CAMPLOCCO	2016-10-10 18:01:08	60	13	2157
VIA DEI BENI	2016-10-10 18:01:08	22	59	2679
PIAZZALE DI PORTA ROMANA	2016-10-10 18:01:08	54	8	1361

Model: Open Restaurant

- Process viale spartaco lavagnini
- Process via san gallo
- Process via santa marta 3

Model: Change position of a bus stop

- Process line 14 in viale morgagni 10

Model: Move a Bus Stop Location

- Model: TestGP
- Process Istanza Test GP2
- Model: TestGP_cloned
- Process Istanza Test GP2_cloned
- Model: G (= C8)
- Process Move Bus Stop
- Process Move Bus Stop
- Model: G (= C8)_cloned
- Model: Open Restaurant_cloned
- Model: Open Restaurant_cloned

Decision Tree:

- Open Restaurant (viale spartaco lavagnini)
 - Other restaurant near lavagnini
 - Restaurant within 500m
 - Restaurant from 500m to 100m
 - Parking
 - Parking dimension
 - Parking type
 - Free
 - Paid
 - Pedestrian flow
 - TPL flow
 - traffic flow
 - Day
 - Night
 - Leisure activity
 - Cinema
 - Theatre

Assessing Risk

- hydraulic
- Seismic



Creating and activating Decision Support models

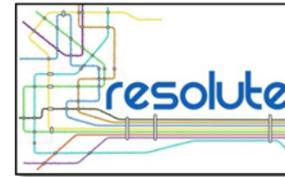


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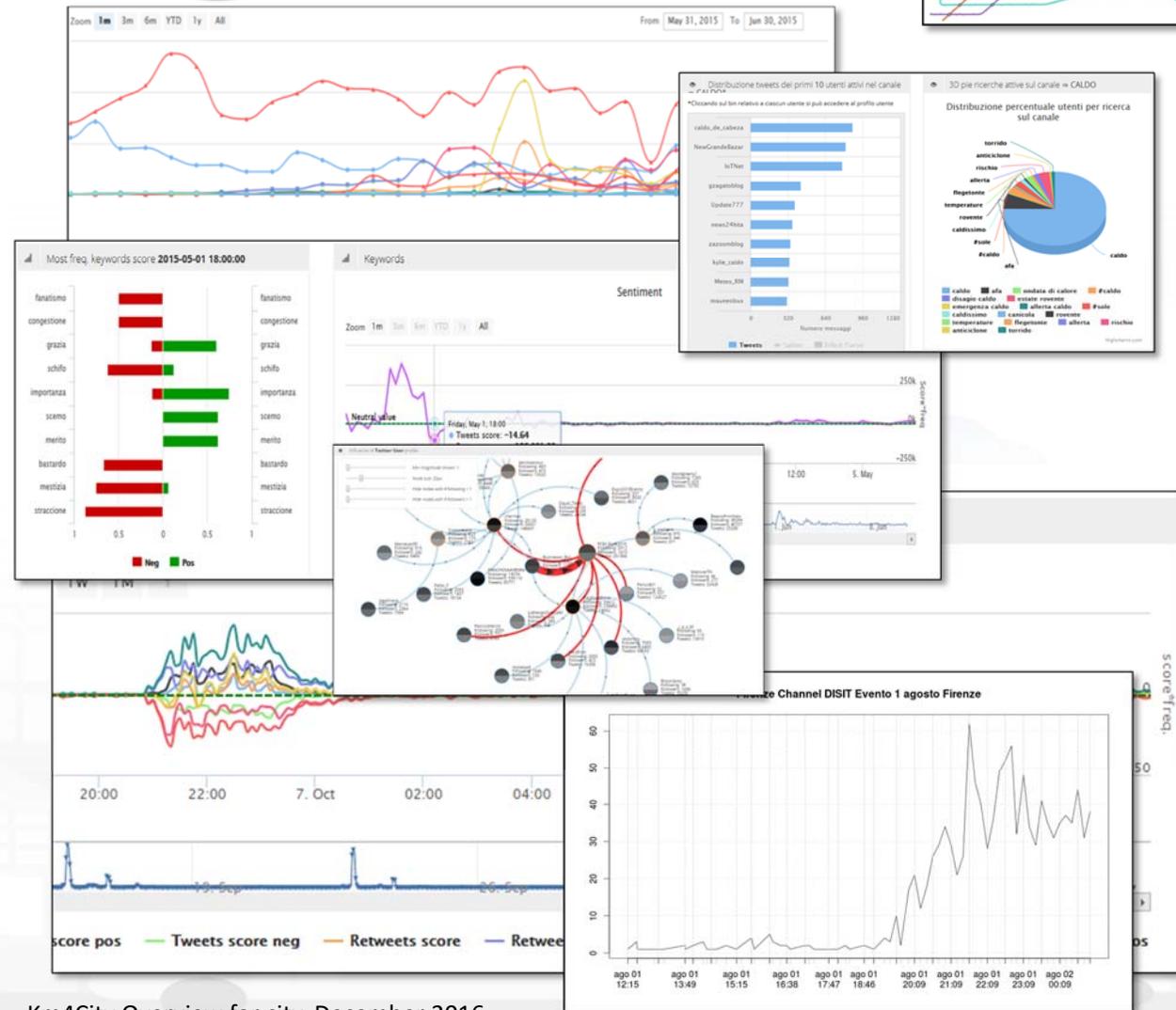
Twitter Vigilance



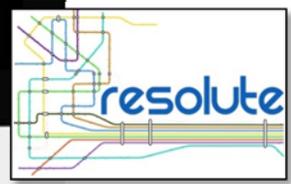
Twitter Vigilance



- <http://www.disit.org/tv>
- <http://www.disit.org/rttv>
- Citizens as sensors to
 - Assess sentiment on services, events, ...
 - Response of consumers wrt...
 - Early detection of critical conditions
 - Information channel
 - Opinion leaders
 - Communities
 - Formation
 - Predicting volume of visitors for tuning the services



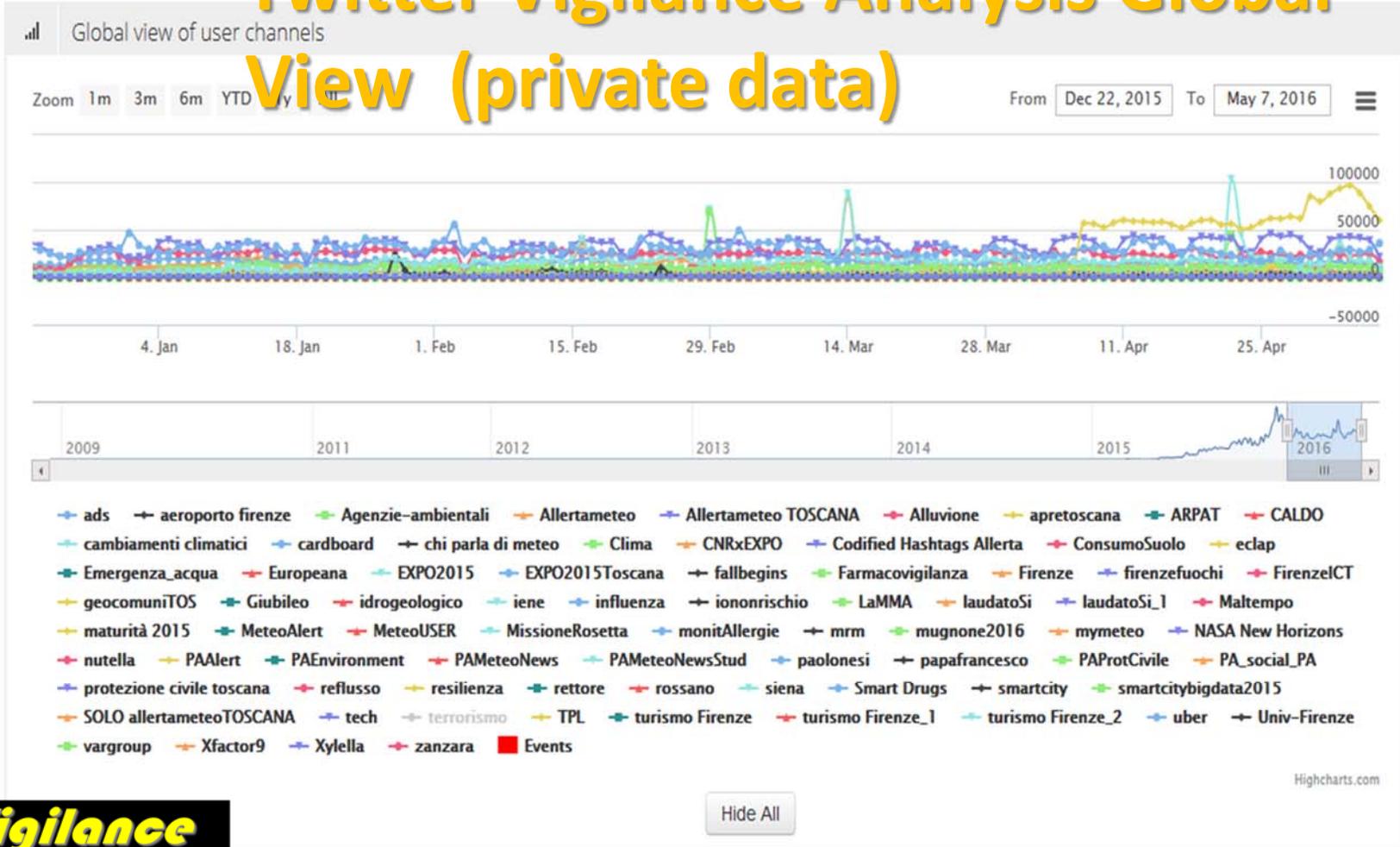
Twitter Vigilance



- Search parameters
- Crawler Statistics
- Config Twitter API
- Data analysis 3
- Channel Statistics**
- Search statistics
- Retweet Statistics
- Twitter Users statistics
- Sentiment analysis 1
- LOGS 9
- Processes
- INFO

Home > Channel statistics

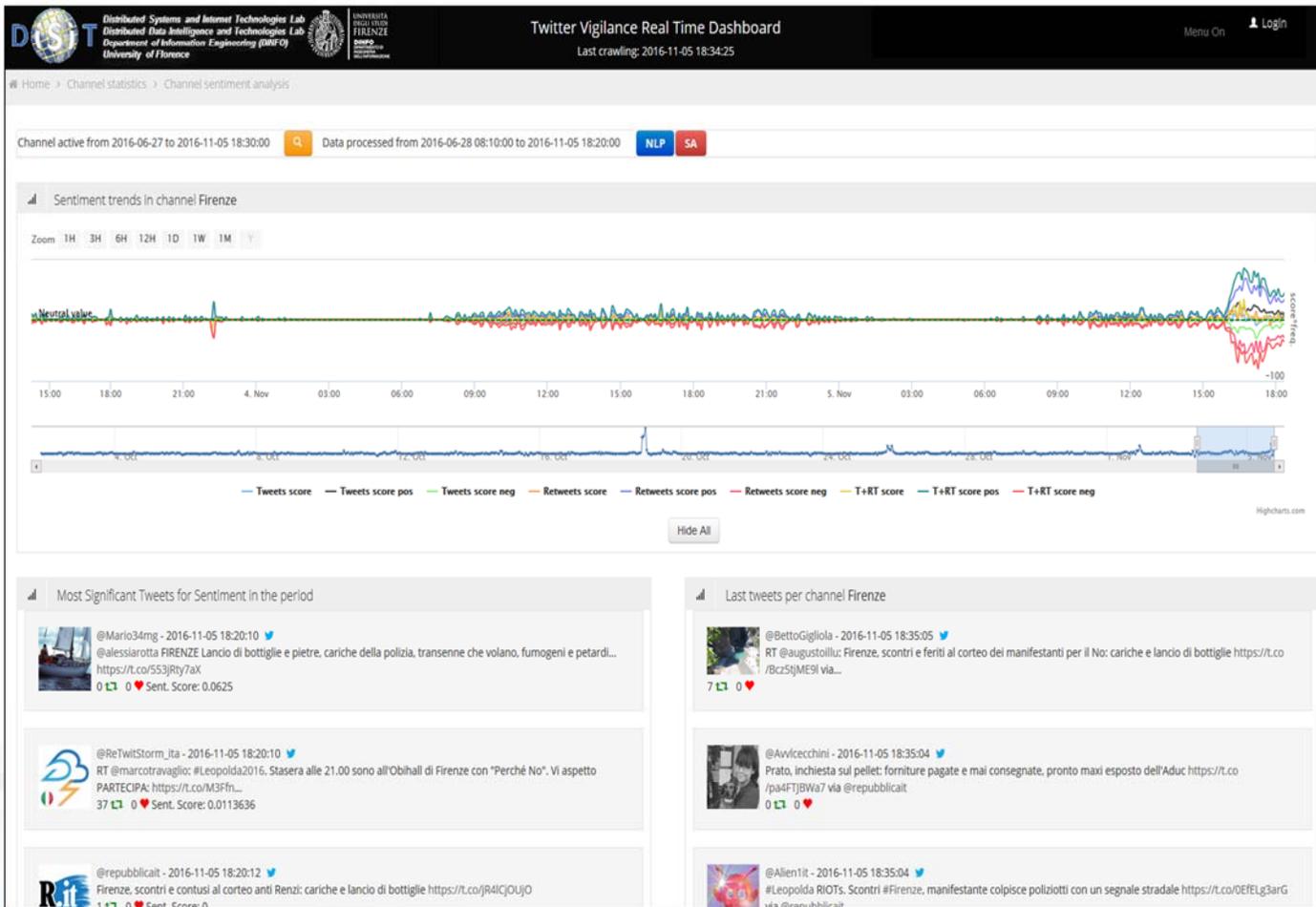
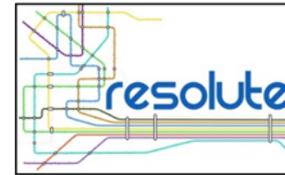
Twitter Vigilance Analysis Global View (private data)



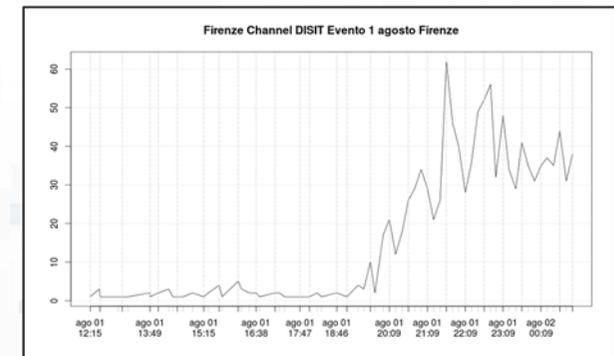
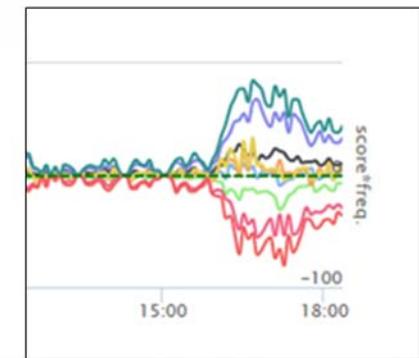
Twitter Vigilance



Time Twitter Vigilance, Early Warning

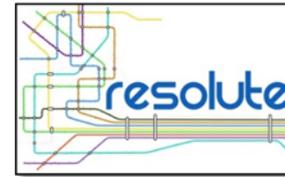


Sentiment Analysis

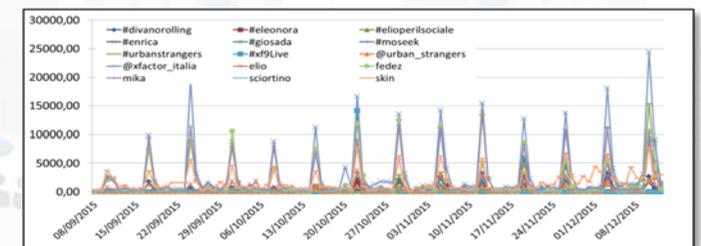
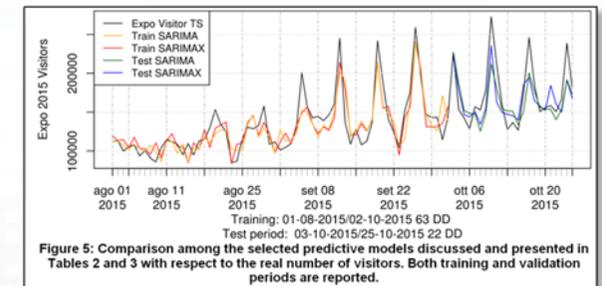
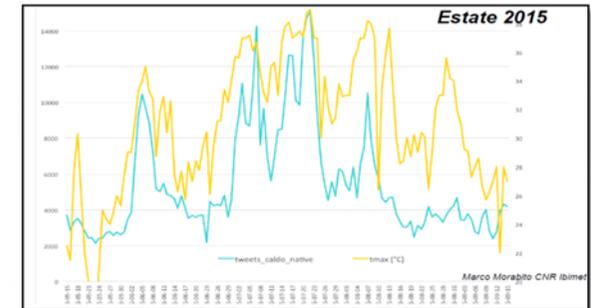


Twitter Vigilance

Prediction/Assessment

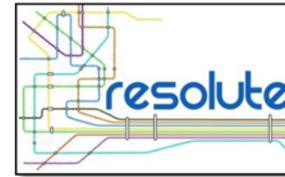


- Football game results as related to the volume of Tweets
- Number of votes on political elections, via sentiment analysis, SA
- Size and inception of contagious diseases
- marketability of consumer goods
- public health seasonal flu
- box-office revenues for movies
- places to be visited, most visited
- number of people in locations like airports
- audience of TV programmes, political TV shows
- weather forecast information
- Appreciation of services

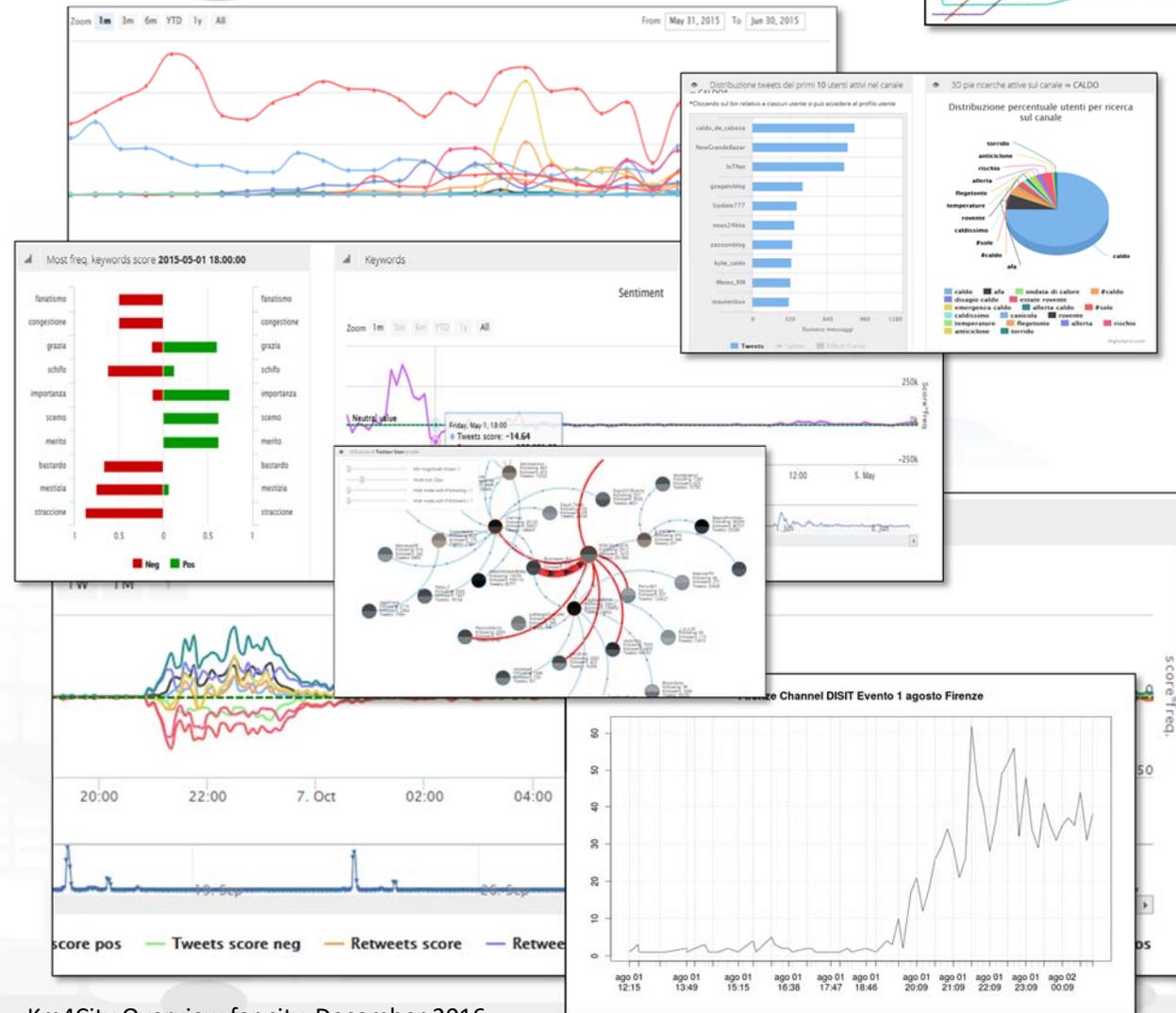


Twitter Vigilance

Twitter Vigilance



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 - Opinion leaders
 - Communities
 - Formation
 - Predicting volume of visitors for tuning the services



Twitter Vigilance



www.Km4City.org

Progetti





Lista progetti: using/contributing

- <http://www.disit.org/6890>
- **Sii-Mobility Smart City Nazionale**
 - <http://www.sii-mobility.org>
- **RESOLUTE H2020**
 - <http://www.resolute-eu.org>
- **REPLICATE H2020**
 - <http://replicate-project.eu/>
- **GHOST MIUR**
 - <http://sites.unica.it/ghost>
- **Regionale JOIN**
- **Altri...**



RESilience management guidelines
and Operationalization appLied to
Urban Transport Environment



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Sii-Mobility



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

■ <http://www.Sii-Mobility.org>



- ataf
- tiemme
- BUSITALIA
- atam
- CTT
- Highways
- SS Fi-Pi-Li
- SS Fi-Si
- Railways (main)
- - Areas

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



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.
- **Testing on municipalities and provinces of Tuscany**
- **Contribute to the improvement of national and international standards**
- **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

Principali Delibere su Sii-Mobility



PA	Tipo di atto
Provincia di Prato	Delibera di Giunta n.267 del 30.10.2012
Comune di Prato	Delibera di Giunta n.474 del 30.10.2012
Provincia di Firenze	Delibera di Giunta n.147 del 06.11.2012
Comune di Firenze	Delibera di Giunta n.403 del 06.11.2012
Provincia di Pistoia	Delibera di Giunta n.156 del 08.11.2012
Comune di Pistoia	Delibera di Giunta n.321 del 08.11.2012
Comune di Pisa	Delibera di Giunta n.203 del 06.11.2012
Comune di Arezzo	Delibera di Giunta n.498 del 07.11.2012
Regione Toscana	Delibera di Giunta n.249 del 15.04.2013



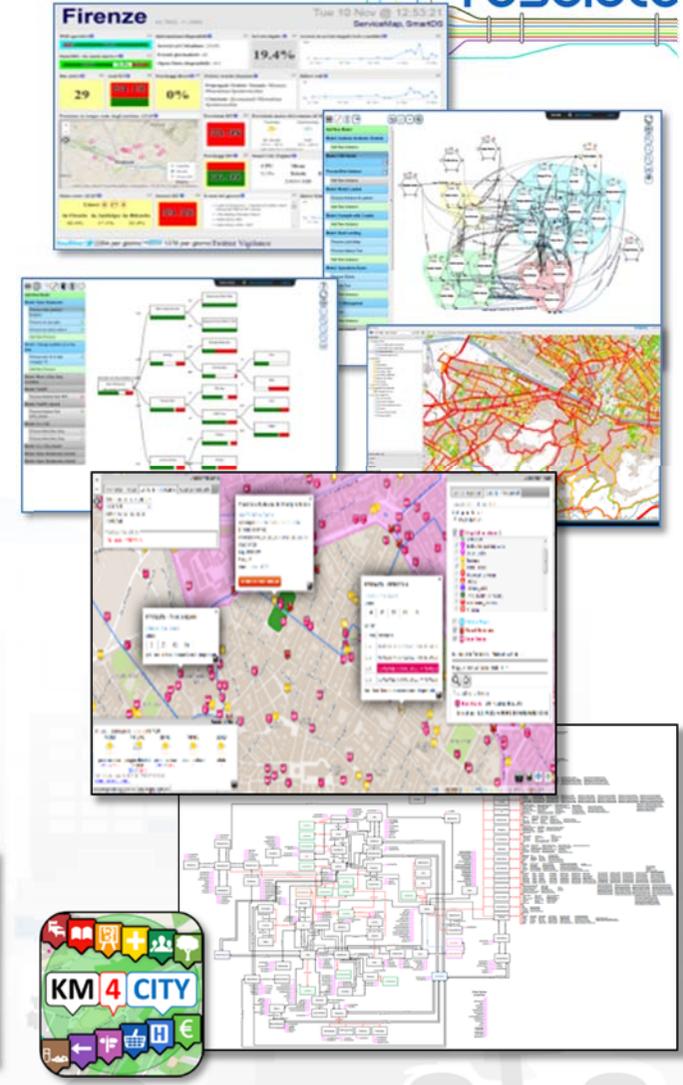
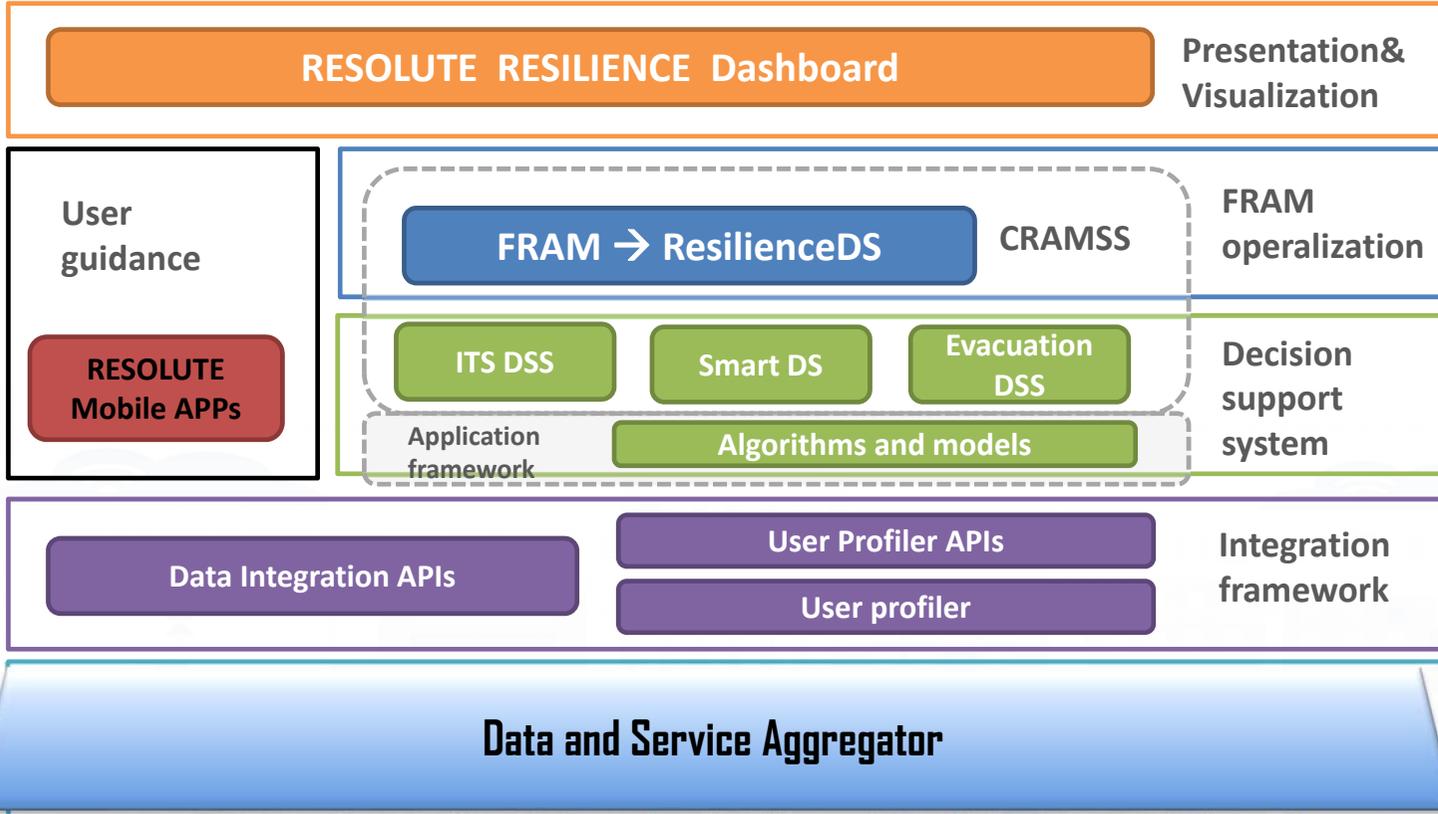
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<http://www.resolute-eu.org>

- 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
<i>Consorzio Milano Ricerche</i>	CMR	IT

RESOLUTE Architecture





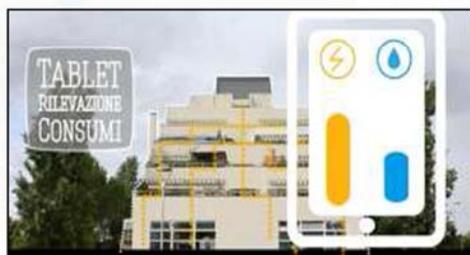
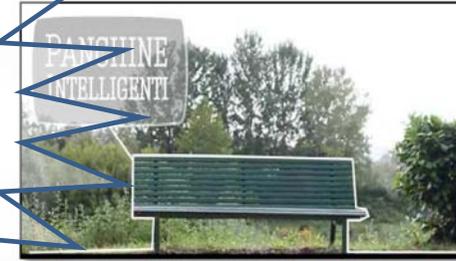
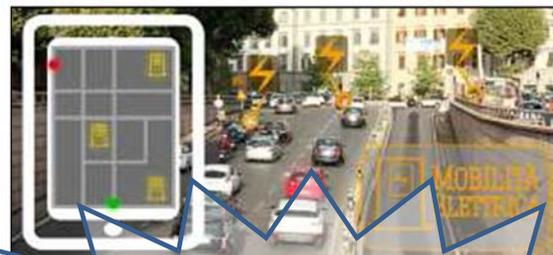
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- demonstrate Smart City technologies in energy, transport and ICT in districts in:
 - **San Sebastian (S), Florence (I) and Bristol (UK),**
 - follower cities of Essen, Nilufer and Lausanne
- Cities are the customer: considering local specificities
- 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 EUSKAL TEL, S.A. EUSKAL TEL 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

REPLICATE in Firenze: Energy, ICT & Mobility





Governing the smart city: a governance-centered approach to Smart urbanism – GHOST



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>

Acknowledgement

- Thanks to the European Commission for founding. All slides reporting logo of **RESOLUTE H2020** are representing tools and research founded by European Commission for the RESOLUTE project. **RESOLUTE** has received funding from the European Research Council (ERC) under the European Union's Horizon 2020 research and innovation programme (grant agreement n° 653460).
- Thanks to the European Commission for founding. All slides reporting logo of **REPLICATE H2020** are representing tools and research founded by European Commission for the REPLICATE project. **REPLICATE** has received funding from the European Research Council (ERC) under the European Union's Horizon 2020 research and innovation programme (grant agreement n° 691735).
- Thanks to the MIUR for co-founding and to the University of Florence and companies involved. All slides reporting logo of **Sii-Mobility** are representing tools and research founded by MIUR for the Sii-Mobility SCN MIUR project.
- **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.



END

