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DINFO
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INGEGNERIA
DELL'INFORMAZIONE

DISIT
DISTRIBUTED SYSTEMS
AND INTERNET
TECHNOLOGIES LAB

Km4City



Open, Flexible, Scalable City Platform

<http://www.km4city.org>

Paolo Nesi, paolo.nesi@unifi.it

smart city expo
WORLD CONGRESS

15-17 NOVEMBER 2016
BARCELONA


Fira Barcelona





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Open, Flexible, Scalable City Platform

- **Open**

- Open Source, Open to any kind of customization
- Open to any data source

- **Flexible**

- Addressing multiple domains: mobility, environment, weather, energy, e-vehicles, waste, risk analysis, govern, culture, tourism,ù
- Ingesting data via any protocol and approach

- **Scalable**

- Sustainable and affordable for both small and large scale cities
- providing support for decision support performing data analytics in real time



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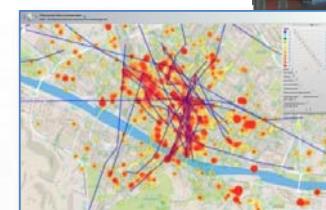
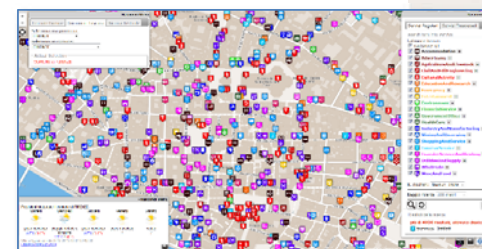


Stand: F680



Km4City: Integrated Urban Platform

- **Aggregate & integrate data**
 - Multiple protocols from urban operators,
 - open data, IOT, sensors, internet of everything, cloud, mobile devices, Wi-Fi, social media, ...
- **Data Exploitation performing**
 - predictions, reasoning, business intelligence, ..
 - users behavior analysis, decision support system, ..
 - Control Room, Real Time Monitoring tools,
- **Produce value from data enabling to**
 - Stimulate virtuous behavior, influence City Users!
 - Put in action CITY Strategies

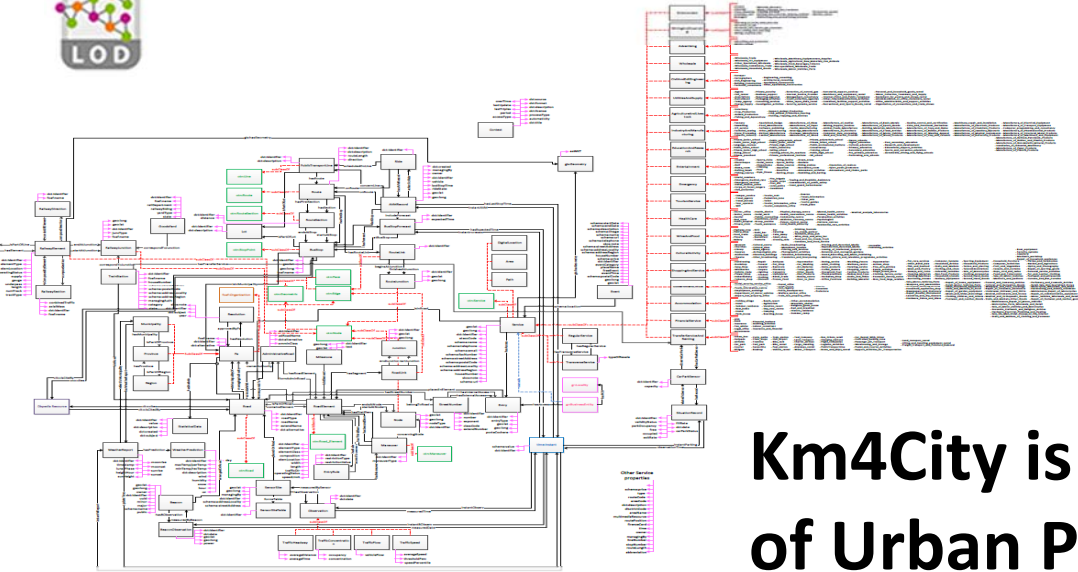




Km4City Ontology - RDF Store



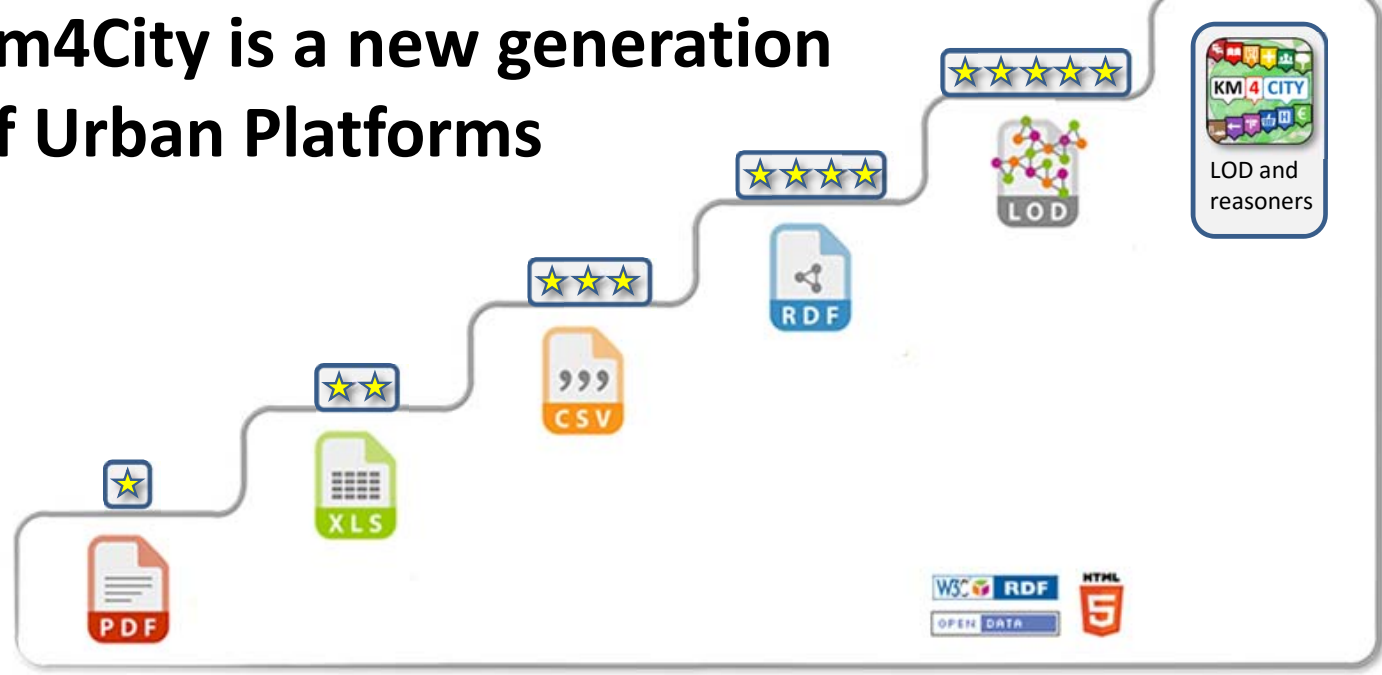
- Street-Guide
- Mobility and transport
- Points of interest
- Sensors, IOT, ..
- Energy
- Administration
- Citations from strings
- ..



Km4City is a new generation of Urban Platforms

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

Big Data Tools



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
- parking status: 76 updates X day X sensor
- traffic Sensors: 288 updates X day X sensor
- weather: 2 updates X day for 285 areas
- 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

- Nascondi Menu

Fermate Firenze Comuni in Toscana Ricerca Testuale

Seleziona una provincia:
FIRENZE

Seleziona un comune:
FIRENZE

- Actual Selection
COMUNE di FIRENZE

- Nascondi Menu

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

KM4 CITY

Previs

Giovedì Venerdì Sabato

poco nuvoloso 23°C / 27°C schiarite

poco nuvoloso 20°C / 33°C

velato

<http://servicemap.km4city.org>



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ServiceMap



Search around a GPS point

Search along a line

Actual Selection: No selection

Services: 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

Services: 2231 of 2231 available

Smart City API call generation

Web App HTML5

Mobile Apps

Embed into Web pages

DISPONIBILE SU Google play

Scarica da App Store

Scarica da Windows Store

KM4CITY SERVICE MAP EMBEDDED

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

Km4City Smart City Ecosystem, November 2016

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



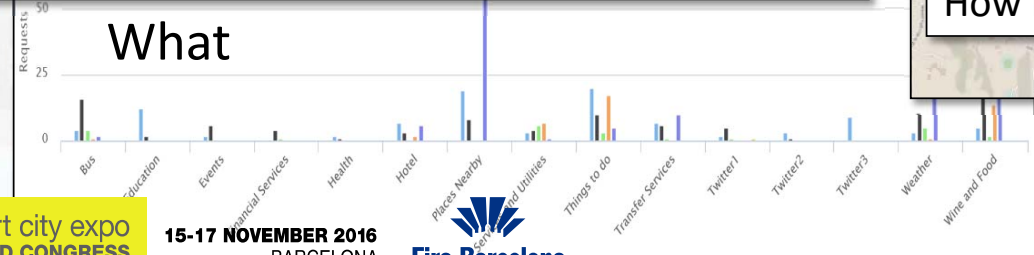
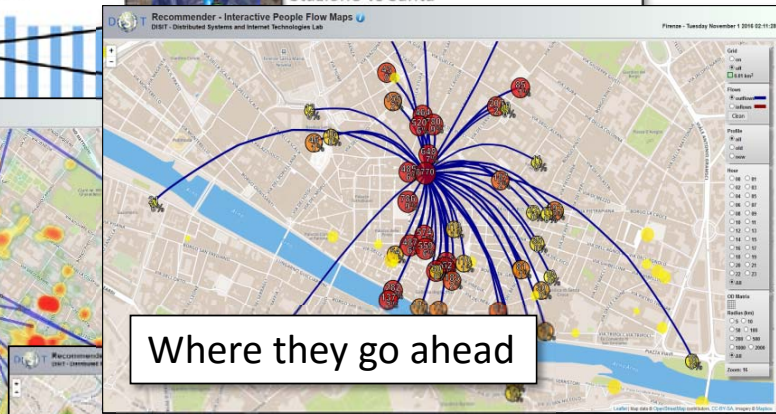
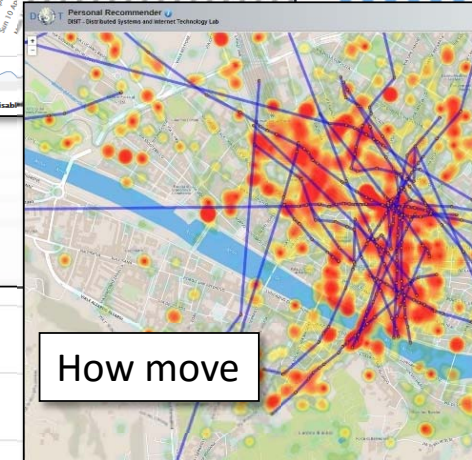
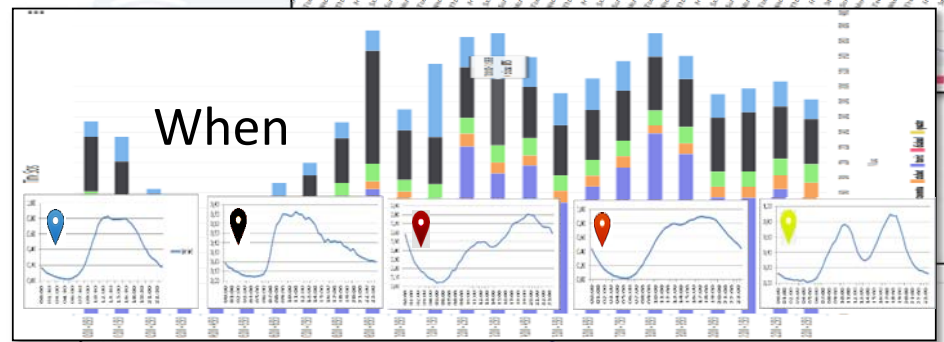
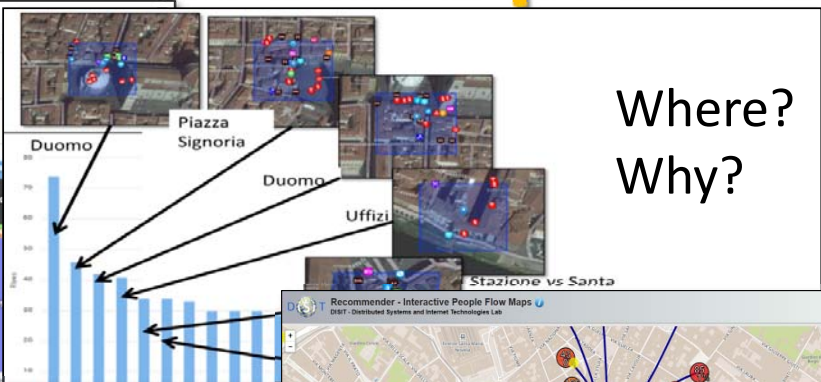
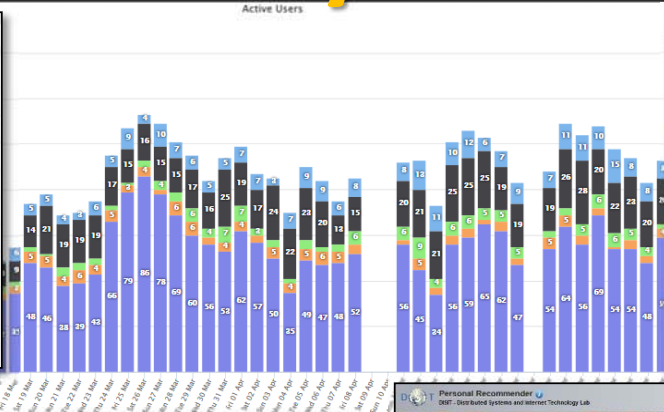
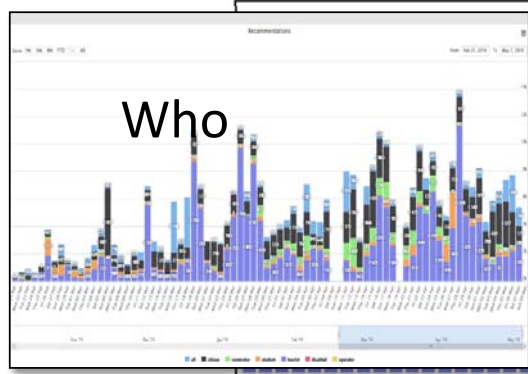
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User Behavior Analyzer for Collective profiling



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Km4City Smart City Ecosystem, November 2016

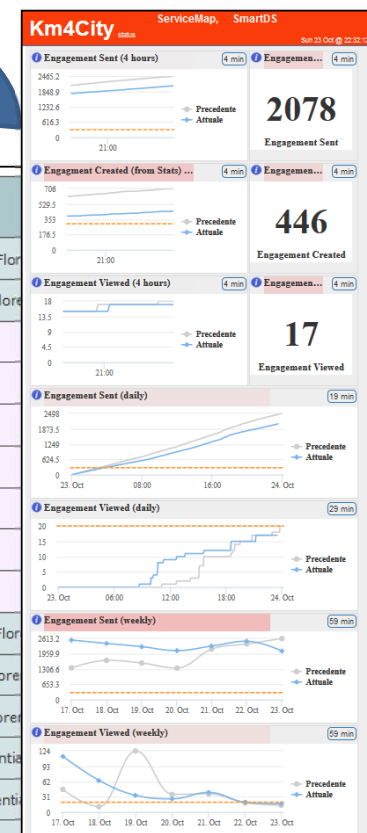
User influencing, engaging, monitoring & Follow Up



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 Flore
daily_event_en	ENGAGEMENT	1720 (2.12%)	70 (7.1%)	4.07%	Suggest (in english) an event currently on in Flore
- 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 (8.57%)	6 (5.04%)	
daily_event_es	ENGAGEMENT	6 (0.01%)	4 (0.41%)	66.67%	Suggest (in spanish) an event currently on in Flore
daily_event_fr	ENGAGEMENT	6 (0.01%)	0 (0%)	0%	Suggest (in french) an event currently on in Flore
daily_event_it	ENGAGEMENT				Suggest (in italian) an event currently on in Flore
parking_en	ASSISTENTE				Suggest (in english) if the user parked in a residential
parking_es	ASSISTENTE				Suggest (in spanish) if the user parked in a residential
parking_it	ASSISTENTE				Suggest (in italian) if the user parked in a residential
shoot_a_photo_de	ENGAGEMENT				Suggest (in german) a contribution for a nearby point-of-interest



Inform
Engage
Stimulate / recommend
Provide Bonus
motivatinmg

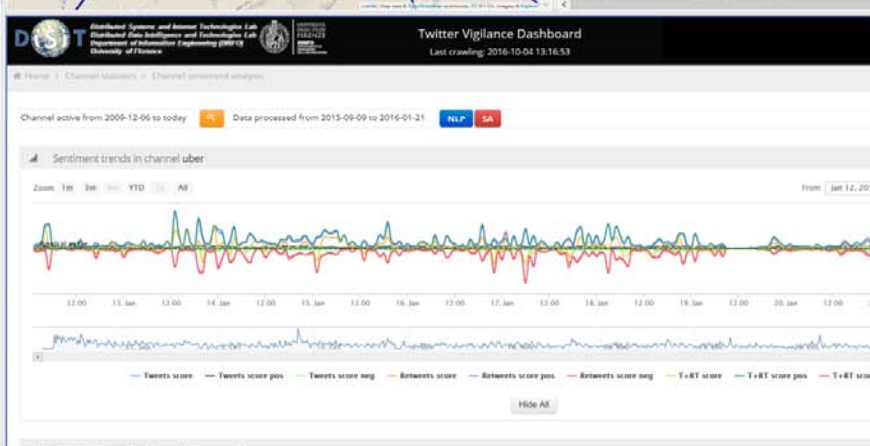
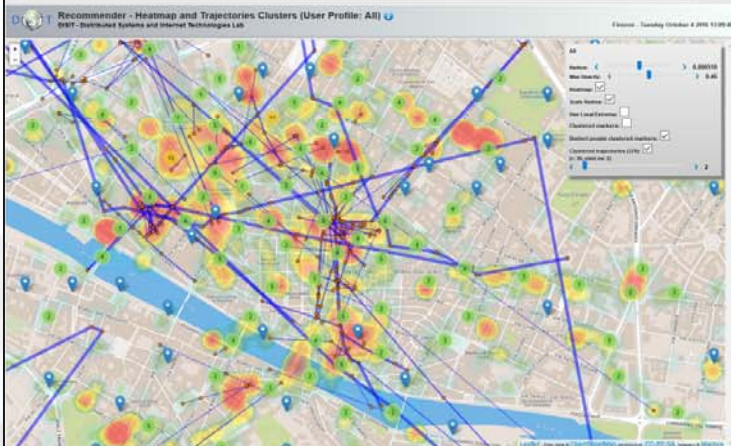
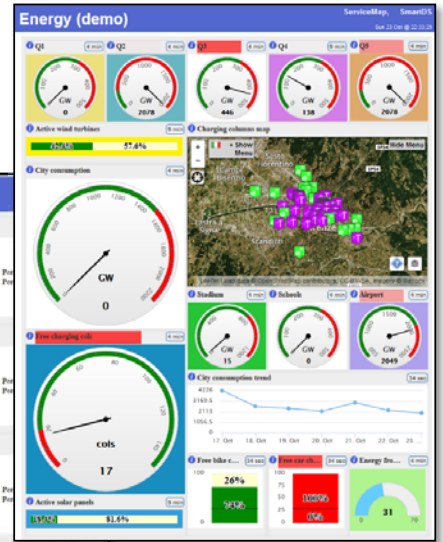
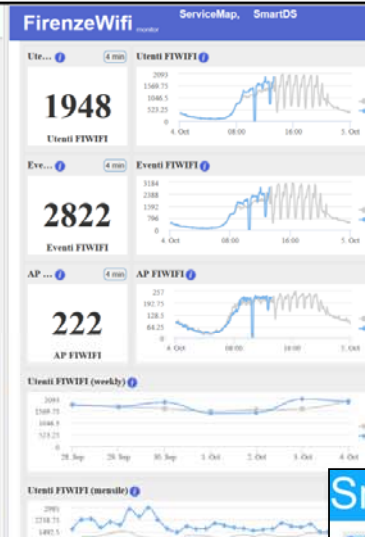
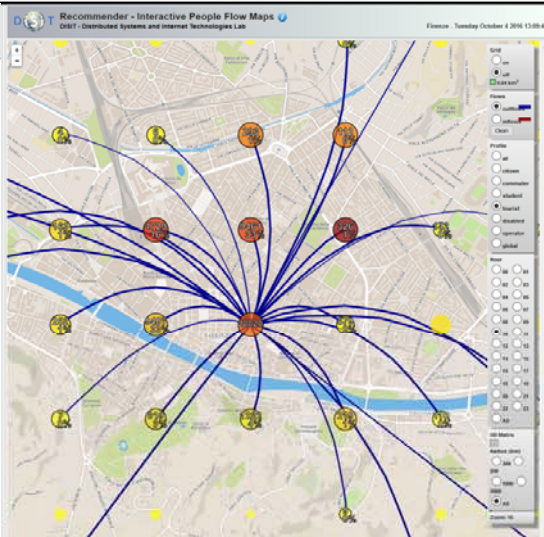
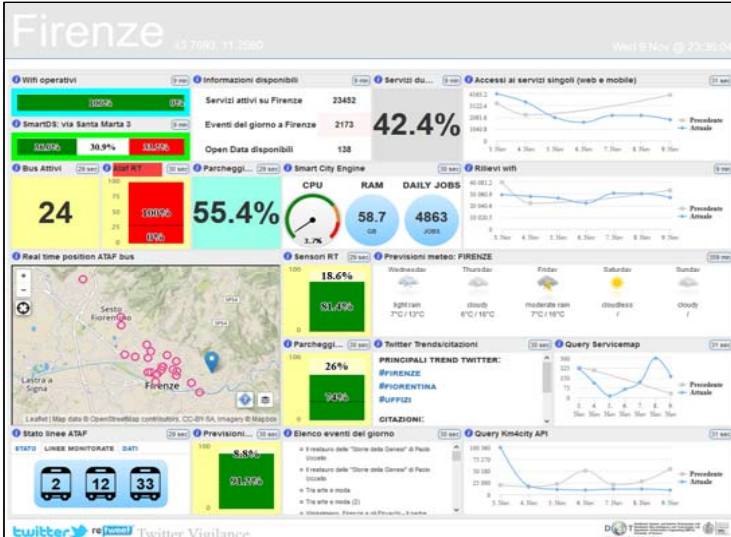
Any Mobile and Web App

Strategy enforced



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Smart City Dashboard



Km4City Smart City Ecosystem, November 2016



Transport systems
Mobility, parking



Public Services
Govern, events, ...



Sensors, IOT
Cameras, ...



Environment,
Water, energy



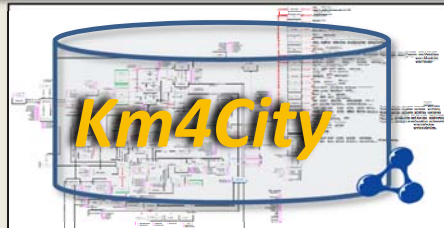
Shops, services,
operators



Social Media
WiFi, network



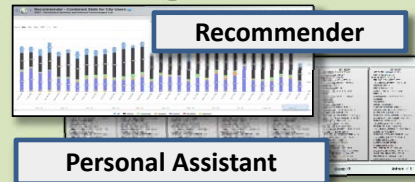
Km4City Smart City Engine



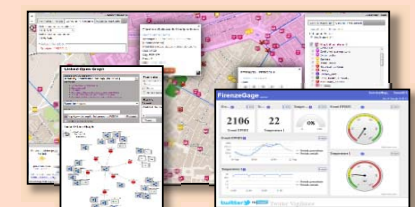
Big Data Analytics



Smartening Tools



Development Tools



Static, Slow and Real Time data flows

DISCES -- Distributed and parallel architecture on Cloud

Km4City Smart City API

City Operators and Decision Makers

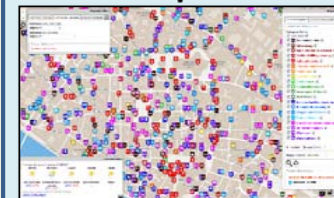
Dashboards



Smart Decision



ServiceMap browser



Twitter Vigilance

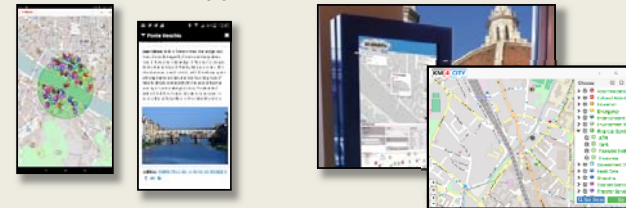


Analyzers of City User Behavior



Tools for Final Users

Mobile e Web Apps





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- **Open**

- Open to any kind of customization → Open Source, license free
- Open to any data source → Km4City DataWarehouse

- **Flexible**

- multiple domains data and processes → Km4City Ontology and Tools
- Ingesting data via any protocol and approach → Km4City DataWarehouse

- **Scalable**

- Sustainable and affordable → Flexible and compoundable tools
- providing support for decision support performing data analytics in real time
→ Km4City Scalable Back office for Big Data Analytics

www.Km4City.org



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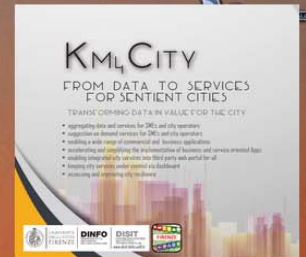
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GET IT ON
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Download on the
App Store

Download from
Windows Phone Store



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



City Users' Tools for Mobile Devices and Web

FIRENZE, Where, What

Km4City Mobile App Video

Suggestions and recommendations (*)

Engagements

Web and Totem Km4City Apps (*)

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