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DEGLI STUDI
FIRENZE

DINFO
DIPARTIMENTO DI
INGEGNERIA
DELL'INFORMAZIONE

DISIT
DISTRIBUTED SYSTEMS
AND INTERNET
TECHNOLOGIES LAB



MINISTERO DELL'ISTRUZIONE DELL'UNIVERSITÀ E DELLA RICERCA



Preparazione alle Smart City API

Paolo Nesi, paolo.nesi@unifi.it



<http://www.Km4City.org>

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



Transport systems
Mobility, parking



Public Services
Govern, events, ...



Sensors, IOT
Cameras, ...



Environment,
Water, energy



Shops, services,
operators



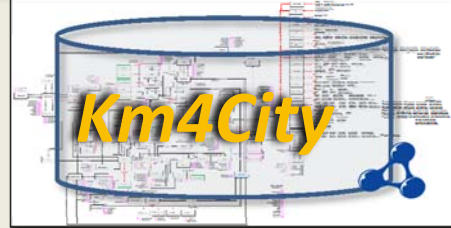
Social Media
WiFi, network



Static, Slow and Real Time data flows

Km4City Smart City Engine

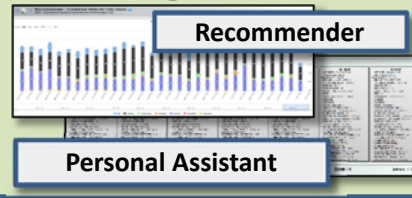
DISCES -- Distributed and parallel architecture on Cloud



Big Data Analytics



Smartening Tools



Development Tools



Km4City Smart City API

City Operators and Decision Makers

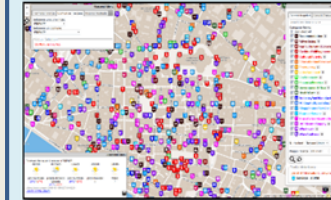
Dashboards



Smart Decision Support



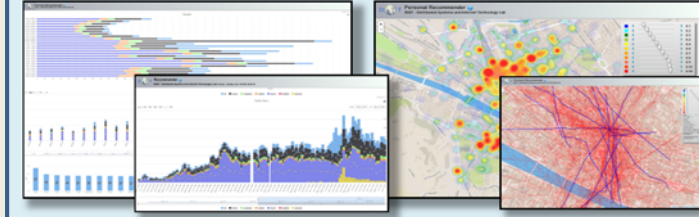
ServiceMap browser



Twitter Vigilance



Analyzers of City User Behavior

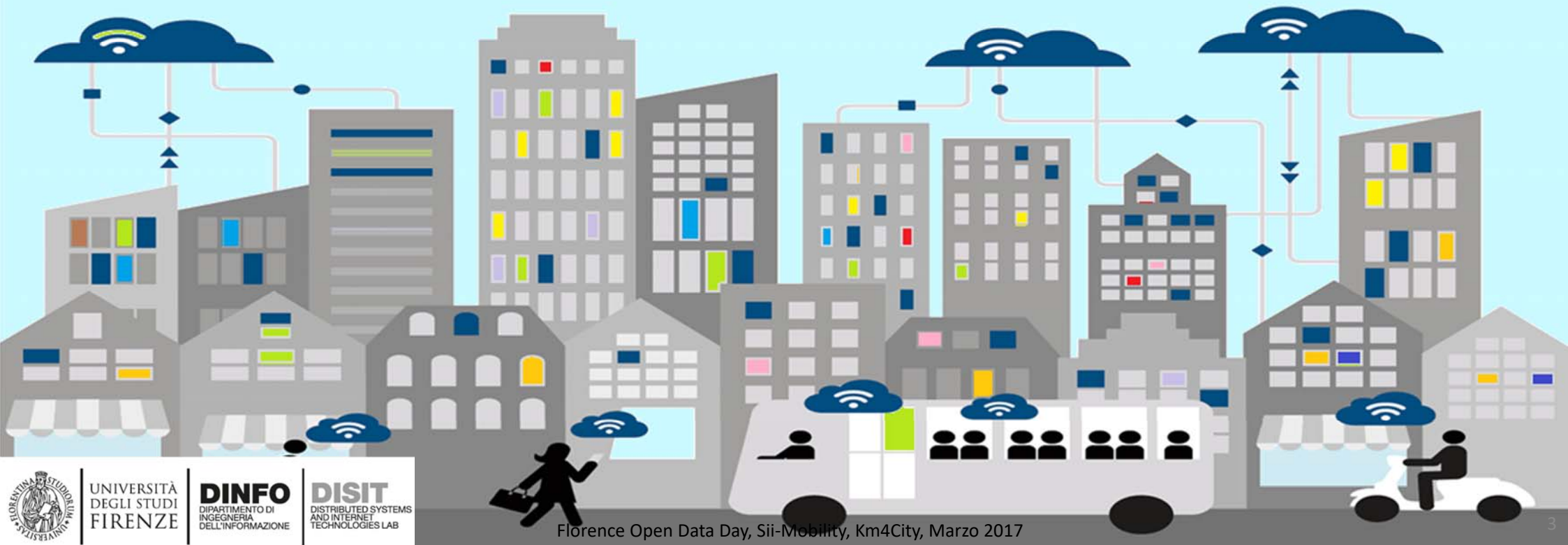


Tools for Final Users

Mobile e Web Apps



Data & Model



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Florence Open Data Day, Sii-Mobility, Km4City, Marzo 2017



Km4City Ontology - RDF Store

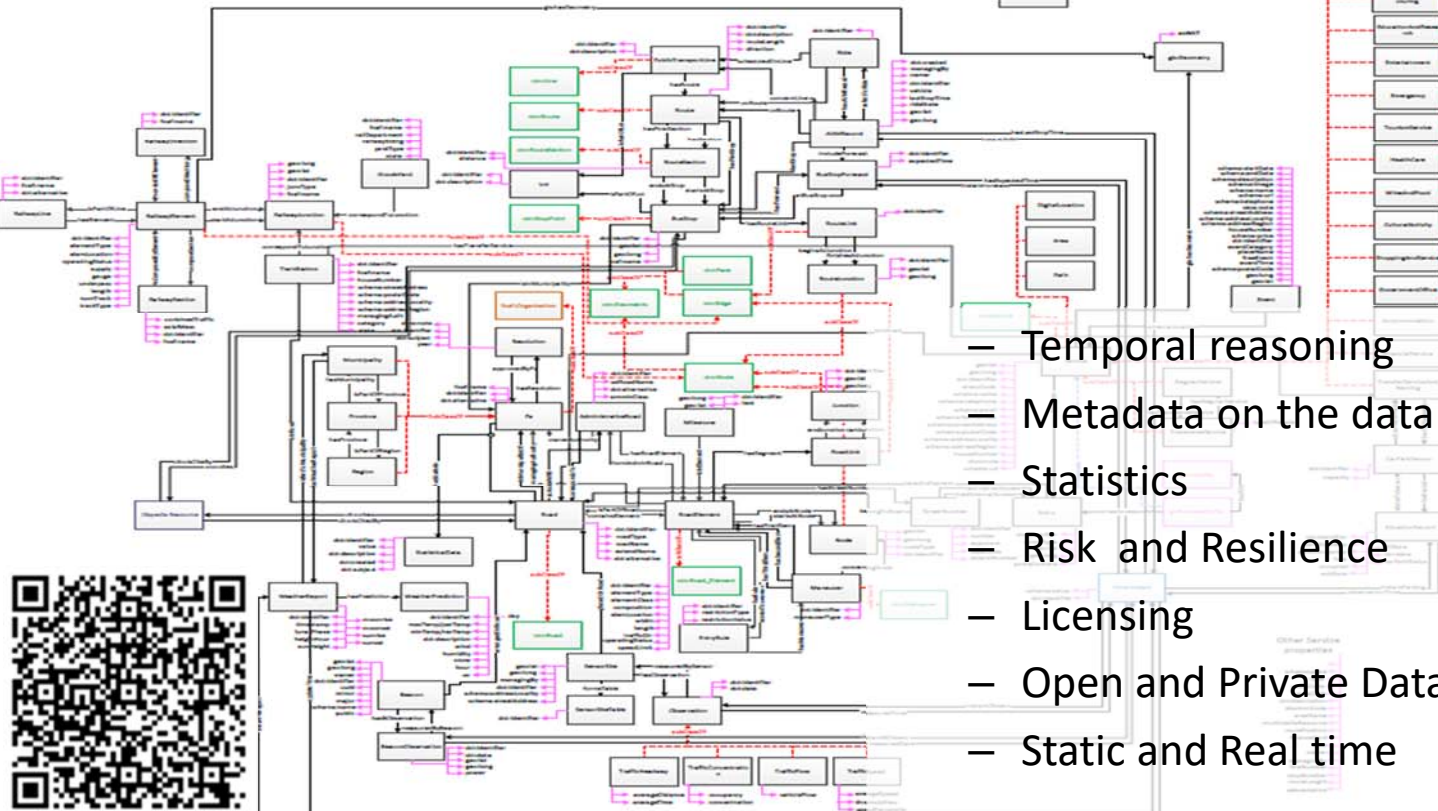


- >84 Classes
- >100 ObjectProperties
- >100 DataProperties

- different aspects:
 - 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

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





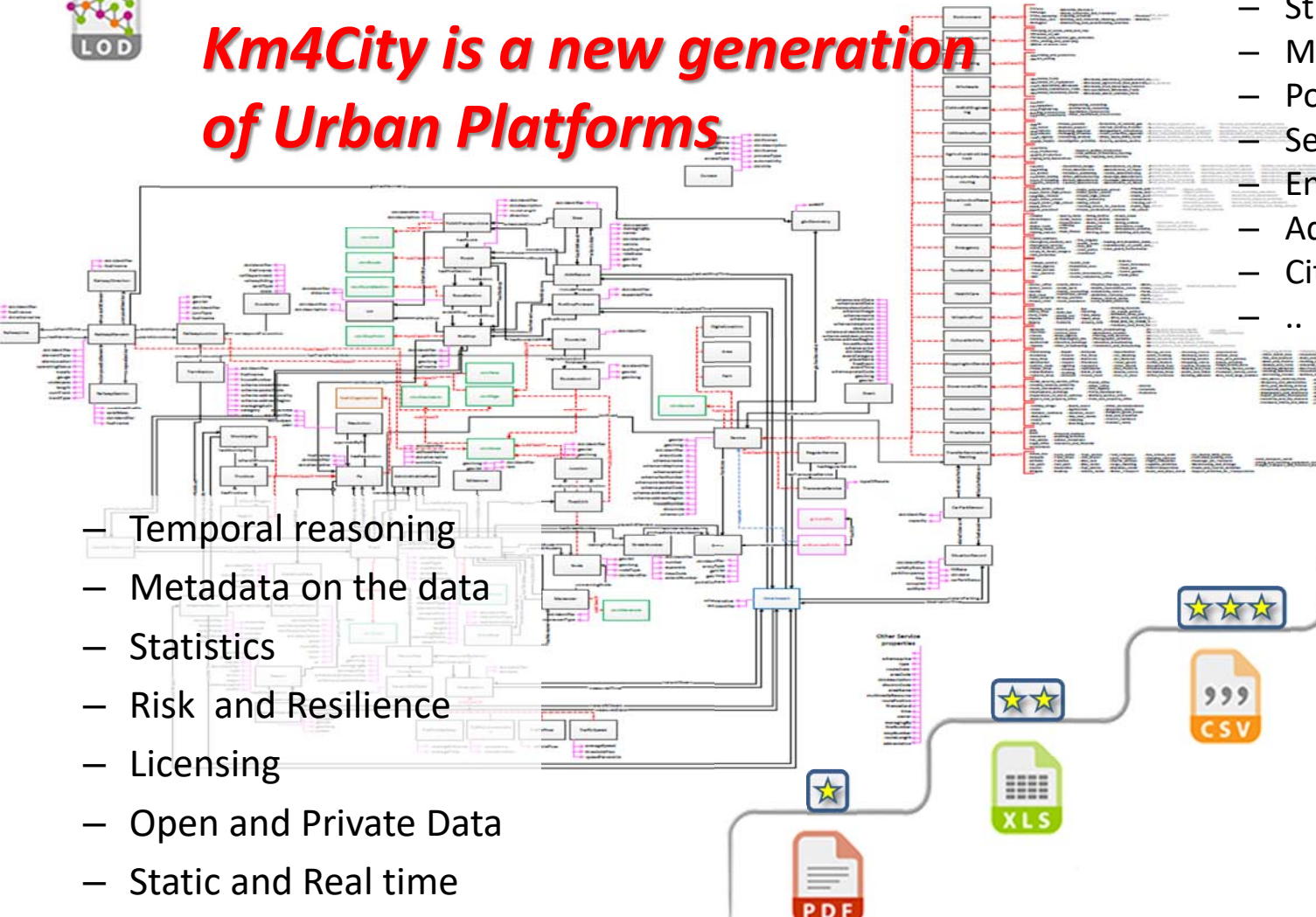
Km4City Ontology - RDF Store



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



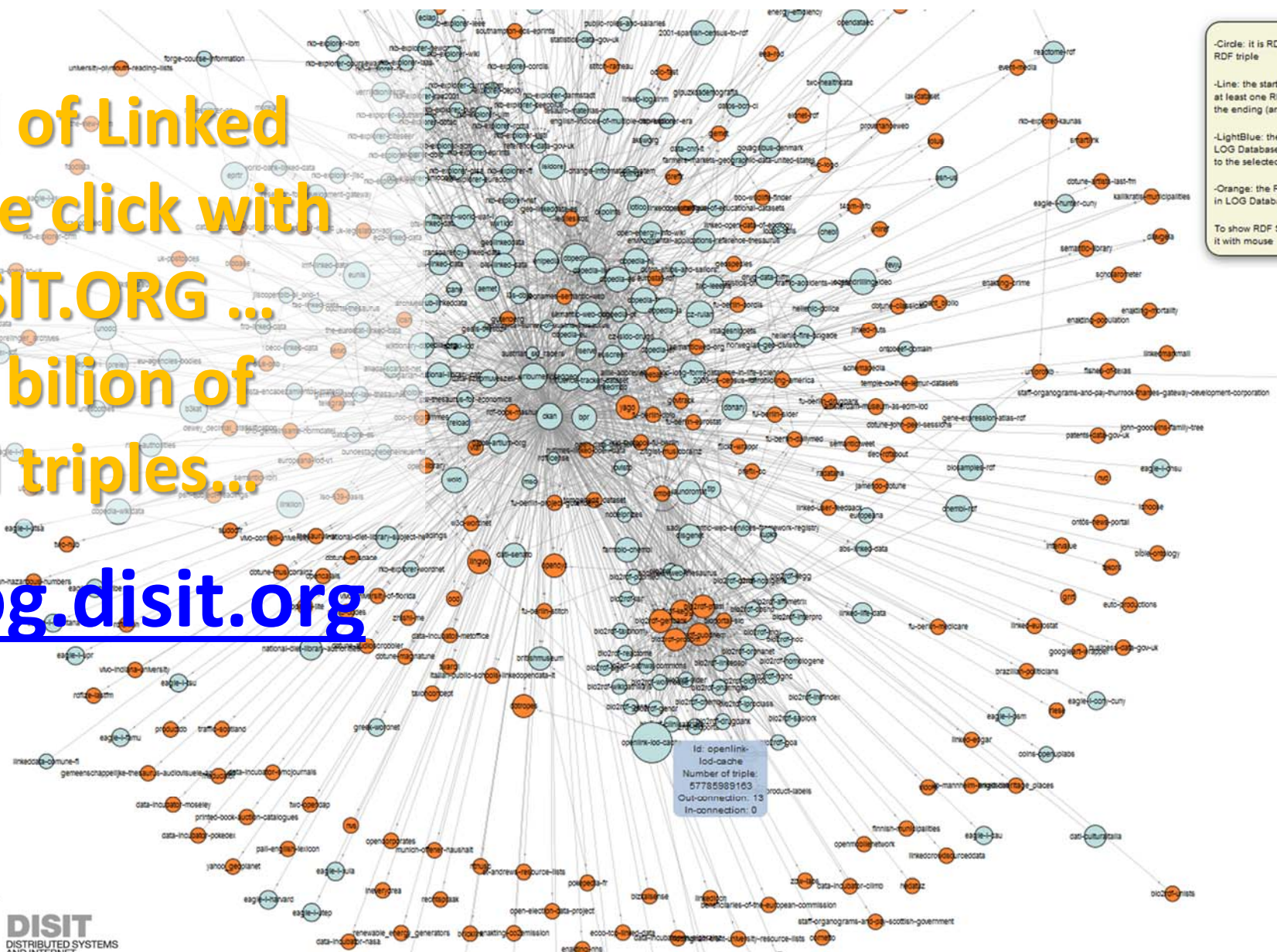
LOD and reasoners





The World of Linked Data in one click with LOG of DISIT.ORG ... billion and billion of connected triples...

<http://log.disit.org>



-Circle: it is RDF Store that contains RDF triple
 -Line: the starting RDF Store contains at least one RDF triple belonging to the ending (arrow) RDF Store
 -LightBlue: the RDF Store is present in LOG Database. With double-click goes to the selected RDF Store on LOG
 -Orange: the RDF Store is not present in LOG Database
 To show RDF Store information go on it with mouse



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**Dati presenti
per la
Toscana**

<http://servicemap.disit.org>

Grfo strade regionale (Toscana)

132,923 strade
389,711 elementi stradali
318,160 nodi stradali
1,508,207 numeri civici

Servizi in 20 cat, 512 sottocat.
16 Operatori di trasporto pubblico
21.280 Fermate bus e 1081 linee
210 Parking areas
796 Traffic Sensors
Info on: points, paths, areas, etc.

Dynamic/real-time

- Linee TPI: 11+ (p.d.f.) X giorno
- Orari PT: 1081 linee, 1-2 updates per giorno
- Stato parcheggi: 76 update X giorno X parcheggio
- Sensorio traffico: 288 update X giorno X sensore
- Meteo: 2 updates X giorno for 285 aree
- Triage status: svariati update x gio. per ospedale
- Costi carburanti: 1 update x giorno, x 1600 stations
- Eventi a Fi: circa 60 eventi X giorno
- Wi-Fi: > 350.000 misure X giorno
- APP: > 50.000 misure X giorno
- > 35.000 utenti distinti X giorno
- Da 600.000 a 4.5 M Tweet X giorno
-+ many IOT are coming



- Nascondi Menu

Previsi

Giorno	Previsione
Giovedì	poco nuvoloso 23°C / 27°C schiarite 09:00 / 19:00
Venerdì	poco nuvoloso 20°C / 33°C
Sabato	velato

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

<http://servicemap.km4city.org>

Florence Open Data Day, Sii-Mobility, Km4City, Marzo 2017



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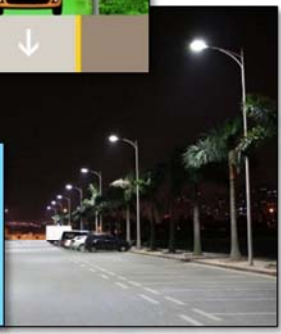
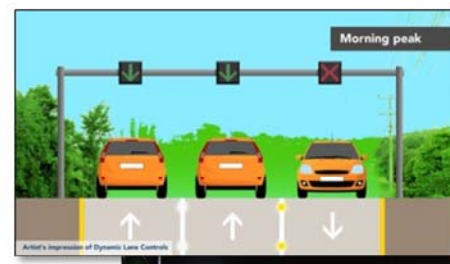
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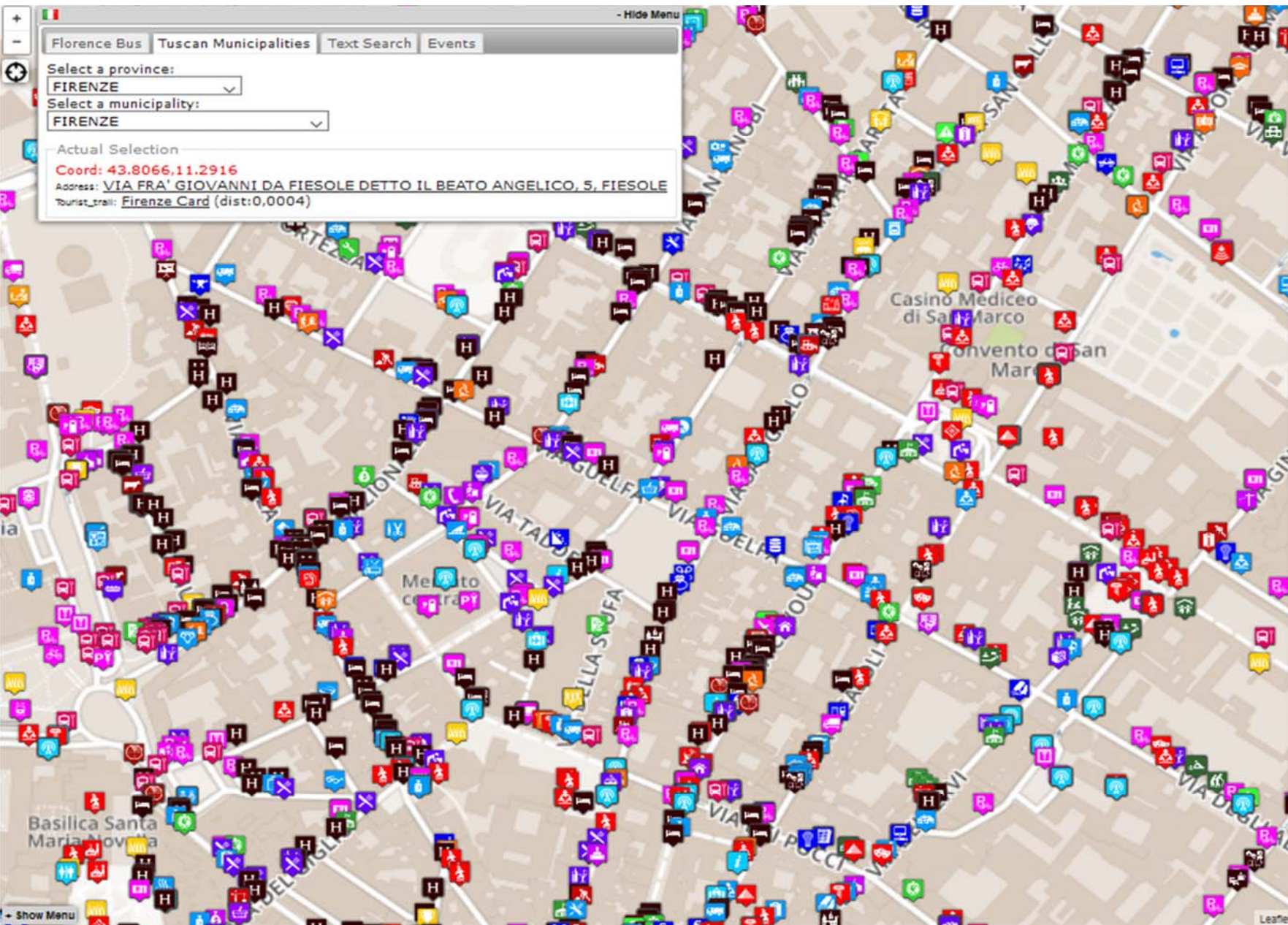
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Si stanno aggiungendo molti altri dati

- ZTL
- Sensori ambientali
- Illuminazione
- Panchine
- Cassonetti
- Colonnine di ricarica
- Parcheggi disabili
- Livelli acqua nei sottopassi
- Etc.





Regular Services Transversal Services

Services Categories

- De/Select All
- Accommodation +
- Advertising +
- AgricultureAndLivestock +
- CivilAndEdilEngineering +
- 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

more than 4000 results, clustering enabled

Services 21465 of 21465 available

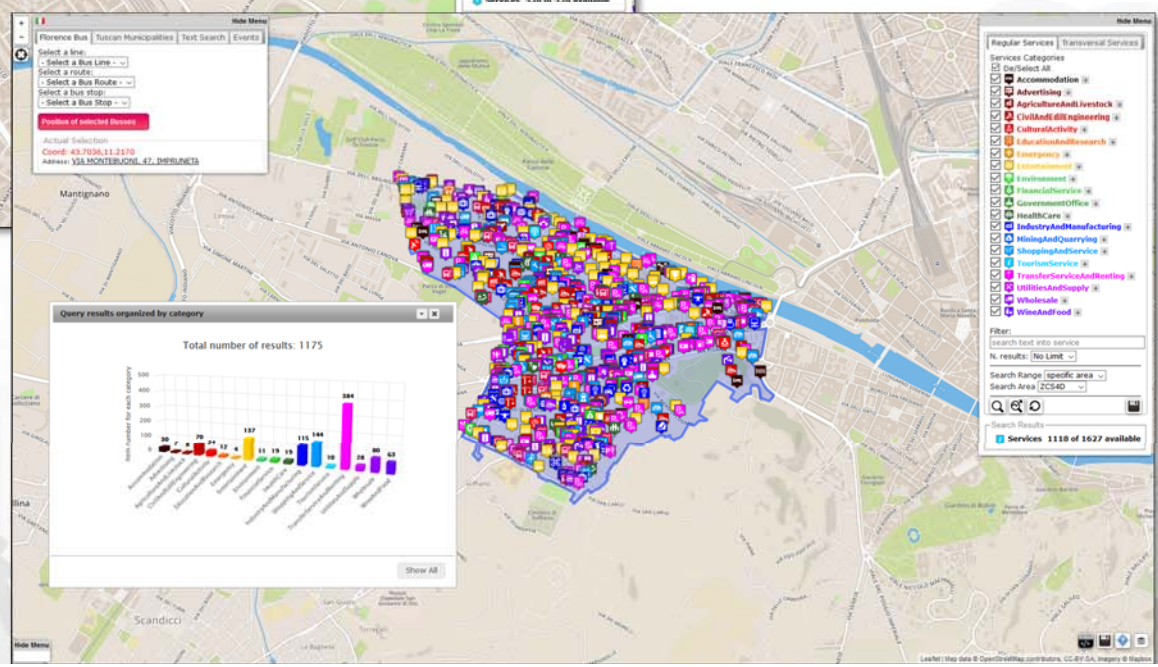
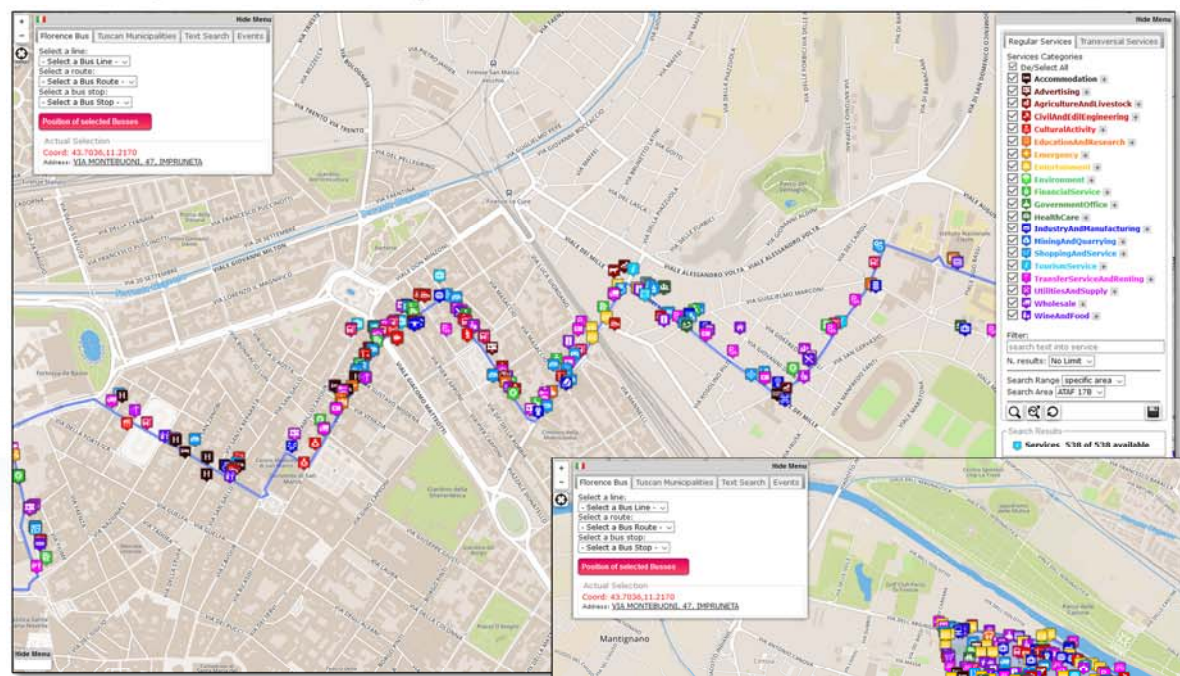


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Along a Line



Into an Area



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Km4City Firenze and beyond



The screenshot shows the Km4City application interface. At the top, there are navigation tabs: "Fermate Firenze", "Comuni in Toscana", and "Ricerca Testuale". Below these, there are dropdown menus for "Seleziona una provincia:" (set to FIRENZE) and "Seleziona un comune:" (set to FIRENZE). The "Actual Selection" box shows coordinates "Coord: 43.7760,11.2609" and an approximate address "Indirizzo Approssimativo: PIAZZA DELLA SANTISSIMA ANNUNZIATA, 13, FIRENZE".

The main map displays numerous colored circular markers (red, orange, yellow, green) representing different services across the Florence region. A sidebar on the right lists various service categories under "Servizi Regolari" and "Servizi Trasversali", including Accommodation, Advertising, AgricultureAndLivestock, CivilAndEdilEngineering, CulturalActivity, EducationAndResearch, Emergency, Entertainment, Environment, FinancialService, GovernmentOffice, HealthCare, IndustryAndManufacturing, MiningAndQuarrying, ShoppingAndService, TourismService, TransferServiceAndRenting, UtilitiesAndSupply, Wholesale, and WineAndFood. The sidebar also shows "N. risultati: Nessun Limite" and "Raggio ricerca: area visibile".

At the bottom left, there is a weather forecast for Florence:

Previsioni Meteo per il comune di FIRENZE:	Martedì	Mercoledì	Giovedì	Venerdì	Sabato
	poco nuvoloso	pioggia debole e schiarite	poco nuvoloso	poco nuvoloso	velato
	23°C / 27°C	20°C / 33°C	20°C / 33°C	/	/

 The last update is "Ultimo Aggiornamento: 2015-09-15T09:07:00+02:00" with a "LINKED_OPEN_GRAPH" button.

- Search all services in the area



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Km4City in Firenze



The screenshot displays the Km4City web application interface. It features a central map of Florence with various data overlays. On the left, there is a search and filter menu with options for 'Fermate Firenze', 'Comuni in Toscana', and 'Ricerca Testuale'. Below this, there are dropdown menus for selecting a province (FIRENZE) and a commune (FIRENZE). A 'Actual Selection' box shows 'Servizio: PERGOLA'. In the center, there are two information popups: one for 'Giardino di piazza dell'Indipendenza' and another for 'FERMATA : T1 ALAMANNI'. On the right, there is a 'Servizi Regolari' and 'Servizi Trasversali' menu with a search bar and a list of service categories. Below this, there is a 'Route' section showing bus lines and directions. At the bottom left, there is a weather forecast section for the commune of FIRENZE. The map itself shows various bus stops, green areas, and other urban features. The interface is clean and modern, with a focus on providing real-time data and search capabilities for users.

• **Areas, Bus lines, bike lanes, tram, RTZ, etc.**

Florence Open Data Day, Sii-Mobility, Km4City, Marzo 2017



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Pisa
only
POI

File Modifica Visualizza Cronologia Segnalibri Tile Strumenti Aiuto

Km4City Development an... ServiceMap

servicemap.disit.org/WebAppGrafo/mappa.jsp

Cerca

Hide Menu

Florence Bus Tuscan Municipalities Text Search Events

Select a province:
PISA

Select a municipality:
PISA

Actual Selection:
Service: Osteria Il Fantasma dell'Opera

Regular Services Transversal Services

Services Categories

- De/Select All
- Accommodation +
- Advertising +
- AgricultureAndLivestock +
- CivilAndEdilEngineering +
- 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 100 mt

Search Area select...

Search Results:
Services 1058

Hide Menu

Weather Forecast for Municipality of : PISA

Saturday	Sunday	Monday	Tuesday	Wednesday
cloudless 4°C / 11°C	cloudy -2°C / 10°C	overcast 6°C / 10°C	light rain /	bit cloudy /

Latest Update: 2016-12-17T08:51:00+01:00
[LINKED_OPEN_GRAPH](#)

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

ENG 19:20



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File Modifica Visualizza Cronologia Segnalibri Tife Strumenti Aiuto

Km4City Development an... x ServiceMap x +

servicemap.disit.org/WebAppGrafo/mappa.jsp

Cerca

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

Pisa TPL & sensors

Hide Menu

Florence Bus Tuscan Municipalities Text Search Events

Select an agency:
Ataf&Linea

Select a line:
- Select a Line -

Select a route:
- Select a Route -

Select a bus stop:
- Select a Bus Stop -

Position of selected Busses

Actual Selection
Bus Stop: Sorgane Piazza Rodolico

TPL STOP: Sorgane Piazza Rodolico

Ataf&Linea

LINKED OPEN GRAPH

Lines:
24

Display 10 Bus per page

Search:

Time	Line	Direction
06:00:00 2016-11-10	24	Grassina
06:10:00 2016-11-10	24	Sorgane Piazza Rodolico
06:15:00 2016-11-10	24	Osteria Nuova
06:20:00 2016-11-10	24	Grassina
06:42:00 2016-11-10	24	Sorgane Piazza Rodolico

Showing page 1 of 7

Real-time data currently not available

Hide Menu

Regular Services Transversal Services

Services Categories

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

Filter:
search text into service

N. results: 10

Search Range 100 mt

Search Area select...

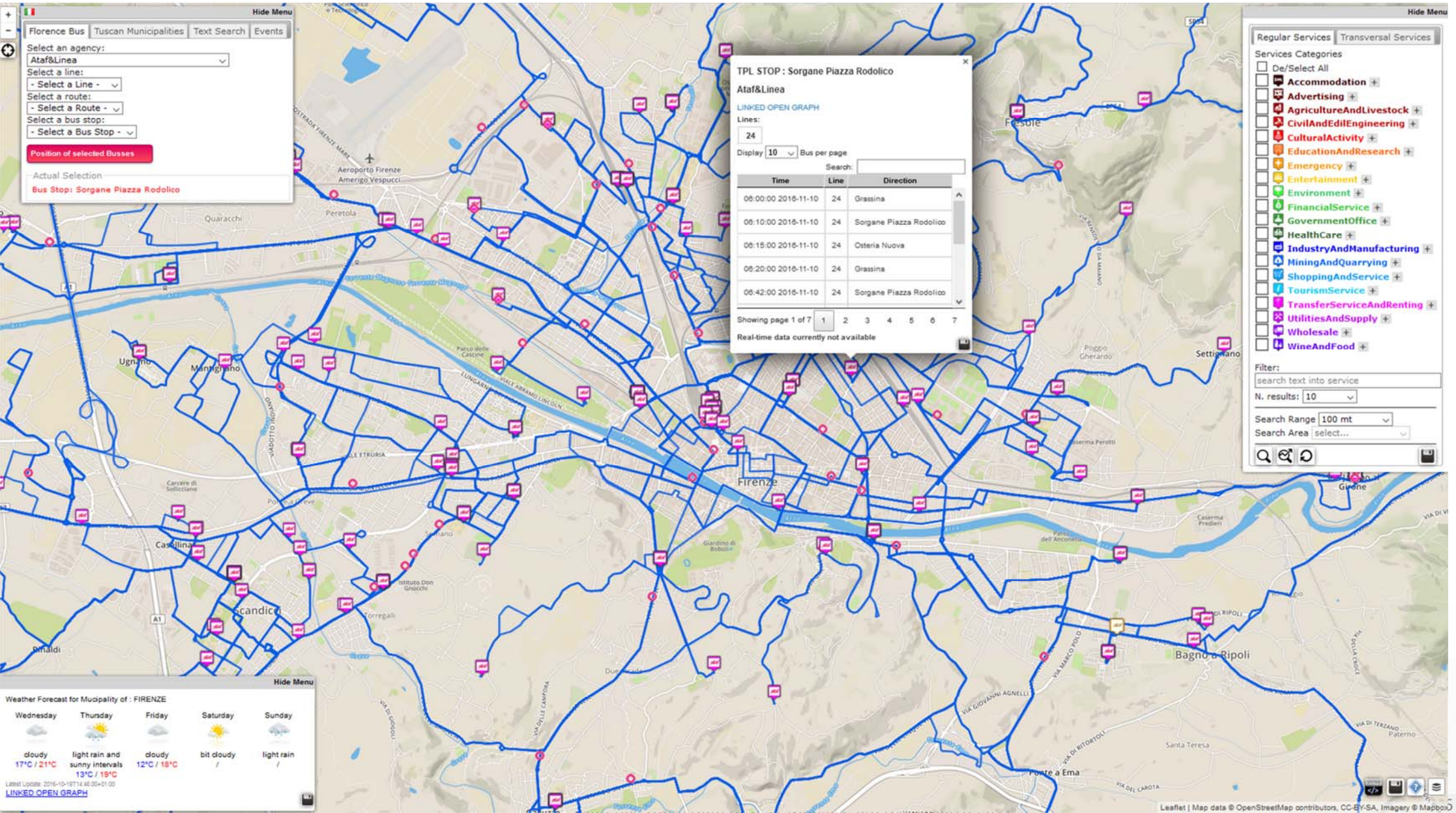
Hide Menu

Weather Forecast for Municipality of : FIRENZE

Wednesday	Thursday	Friday	Saturday	Sunday
17°C / 21°C	light rain and sunny intervals 13°C / 18°C	12°C / 18°C		

Latest Update: 2016-10-19T14:46:00+01:00

[LINKED OPEN GRAPH](#)



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





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Km4City Roadmap



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>

2014

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

2015

Km4City 1.4

- Embed
- More API
- iBeacon

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

GHOST SIR
2016-2019 - Started

GHOST SIR
Governing the smart city
with a platform oriented approach
to Smart Urbanism

2021

Development Tools



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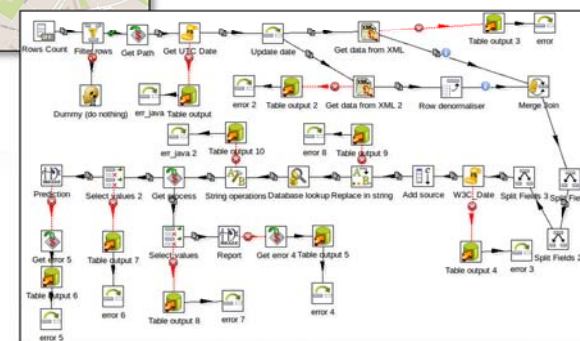
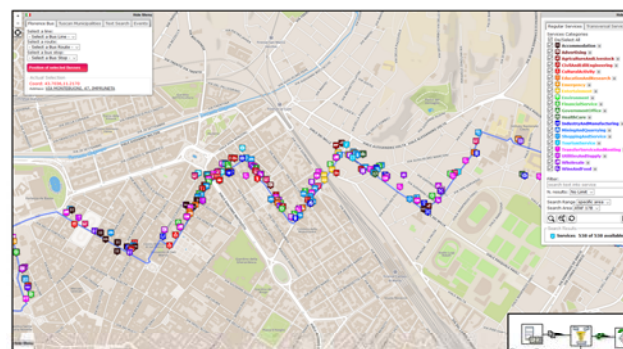
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Florence Open Data Day, Sii-Mobility, Km4City, Marzo 2017

Development Tools



- **Smart City API:**
 - Several kind of APIs
- **Generator “ServiceMap”,**
<http://servicemap.km4city.org>
 - Call per web and mobile App
 - Embedding in web pages
- **Load new data: manual and automatic**
 - POI, IOT, etc.
 - Load of Shape & Paths
- **Dashboard builder**
 - Production of dashboard per control room
 - Embedding view of any other analytics of Km4City or of third party: wifi, 3D, flow, recommend, engager, etc.





Smart City API



- <http://www.disit.org/6597>
 - REST API: serviceURI or Selection or GPS
 - REST API: Query ID
 - Receive an email
 - Get a JSON, HTML, ...
 - Call SPARQL
- EMBED facility in third party web pages
- Developers may use the ServiceMap tool to:
 - compose geographical and textual queries
 - THEN request an e-mail containing the calls (same results in JSON and/or in HTML)

The screenshot shows the ServiceMap tool interface. On the left, there are two windows displaying bus stop information. The top window is for 'FERMATA : STATUTO 04' and the bottom window is for 'FERMATA : STAZIONE PENSILINA'. Both windows show a 'LINKED OPEN GRAPH' button, a list of lines, and 'Prossimi transiti' (Next arrivals) information.

On the right, there are two 'Save your information for services.' windows. The top one is for saving a service, and the bottom one is for saving a query. Both windows prompt the user to insert an e-mail, a title, and a description, and include a 'Send' button.

Orario	Linea	Stato	Ride
13:01:40	4	In orario	5084813
13:05:04	17	Ritardo	4933186
13:07:24	6	In orario	4829621
13:09:02	17	In orario	4848688
13:12:02	6	Anticipo	4867907
13:12:20	6	In orario	4829654



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ServiceMap Development Tool



Search around a GPS point

Search along a line

Regular Services: 35 of 35 available
 Bus Stops: 13 of 13 available
 Road Sensors: 2 of 2 available
 72 Bus Lines Found

Search for Geo Located Services

Get Events in the city

20 events found.
 San Fabro a Firenze
 Place: PALAZZO VECCHIO - ARENGARDO
 Date: da 2018-04-15 a 2018-10-02

418 of 418
 Bus Stops: 23 of 23
 Road Sensors: 2 of 2

Total number of results: 1175

Search in an area

Query results organized by category

Total number of results: 2231

Services: 2231 of 2231 available

Get weather forecast

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

Service: FROSZTL01501
 Type: TransferService
 Address: Via Giotto, 1
 Last Update: 2018-03-29 11:00:00

Weather Forecast for Municipality of FIRENZE
 Sunday: 17°C / 24°C
 Monday: 17°C / 24°C
 Tuesday: 17°C / 24°C
 Wednesday: 17°C / 24°C
 Thursday: 17°C / 24°C



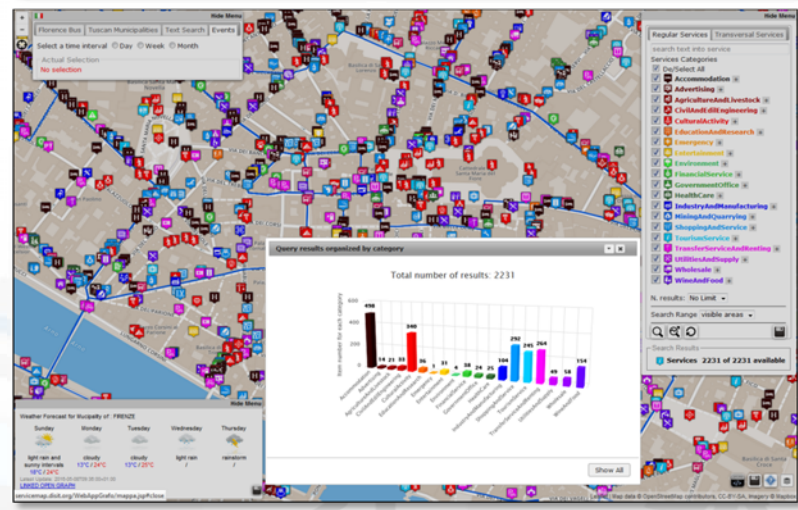
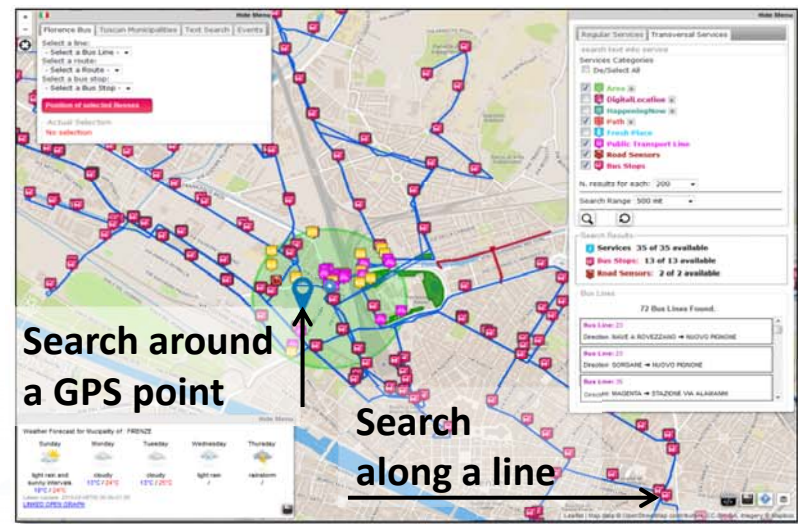
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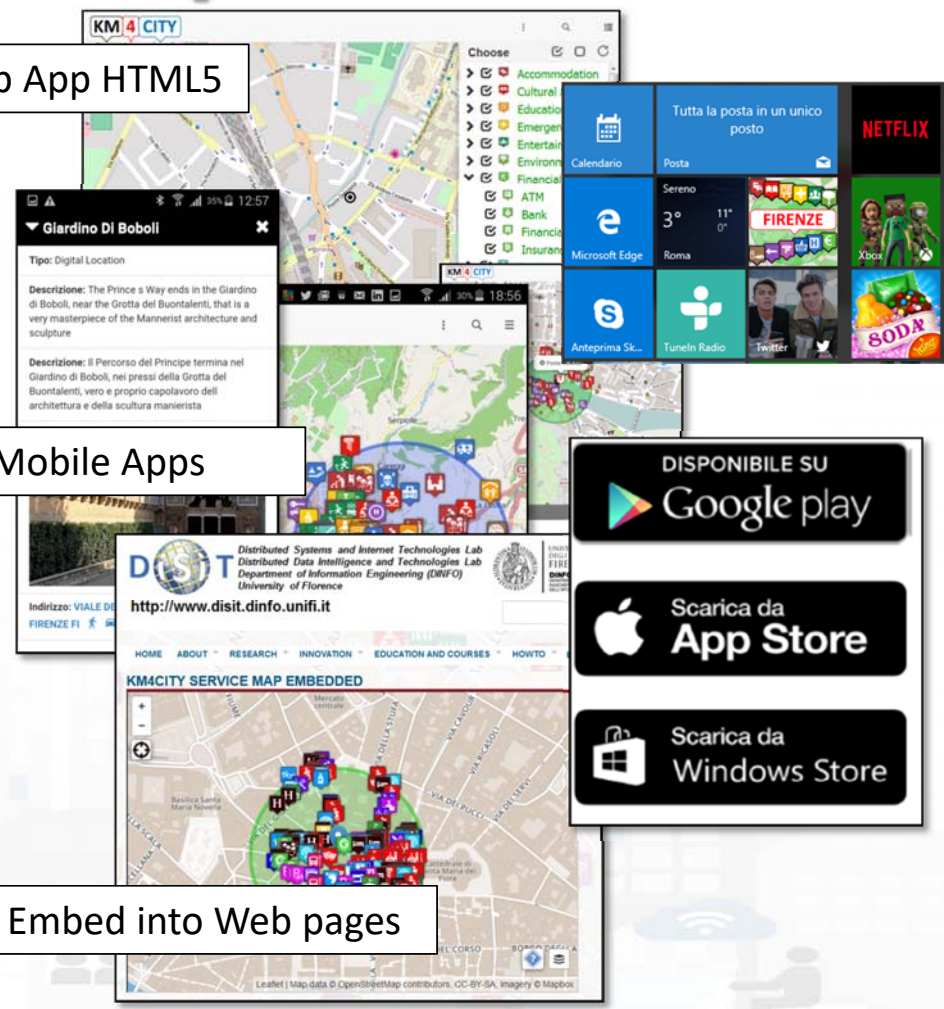
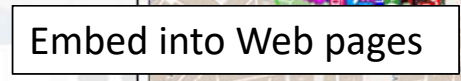
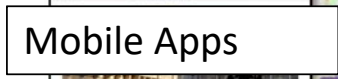
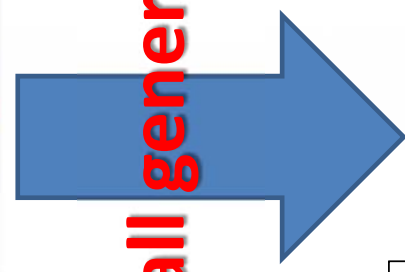
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TECHNOLOGIES LAB
<http://www.disit.org>



ServiceMap Dev Tool



Smart City API call generation





Linked Open Graph

log.disit.org/service/?graph=df5b4f67f01b7d96071475d62068e0fe

Linked Open Graph

SiiMobility (by DISIT)

Examples:

- VIA_GIACOMO_MATTEOTTI
- Bagno_a_ripoli
- Florence

Choose a class:

Search for keyword

keyword:

uri: Request

Your data

sparql endpoint: (optional)

uri: Request

Status

Requests:

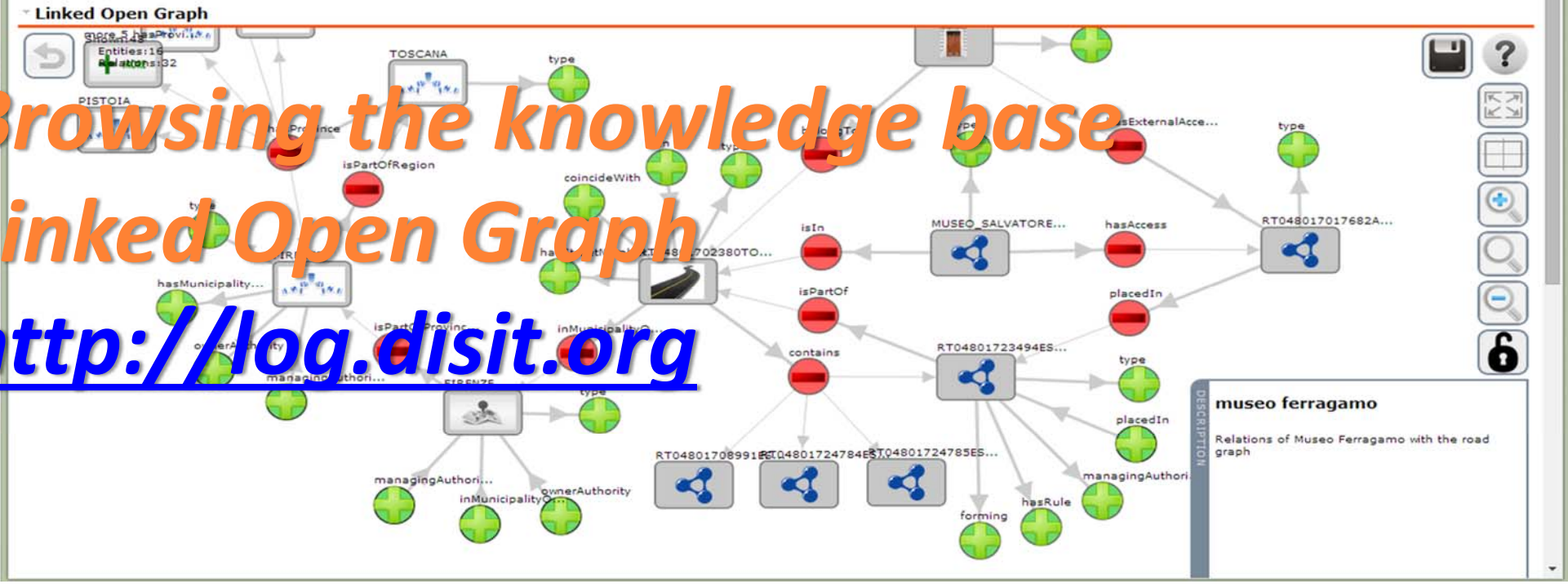
Remove Clear

Type of relations

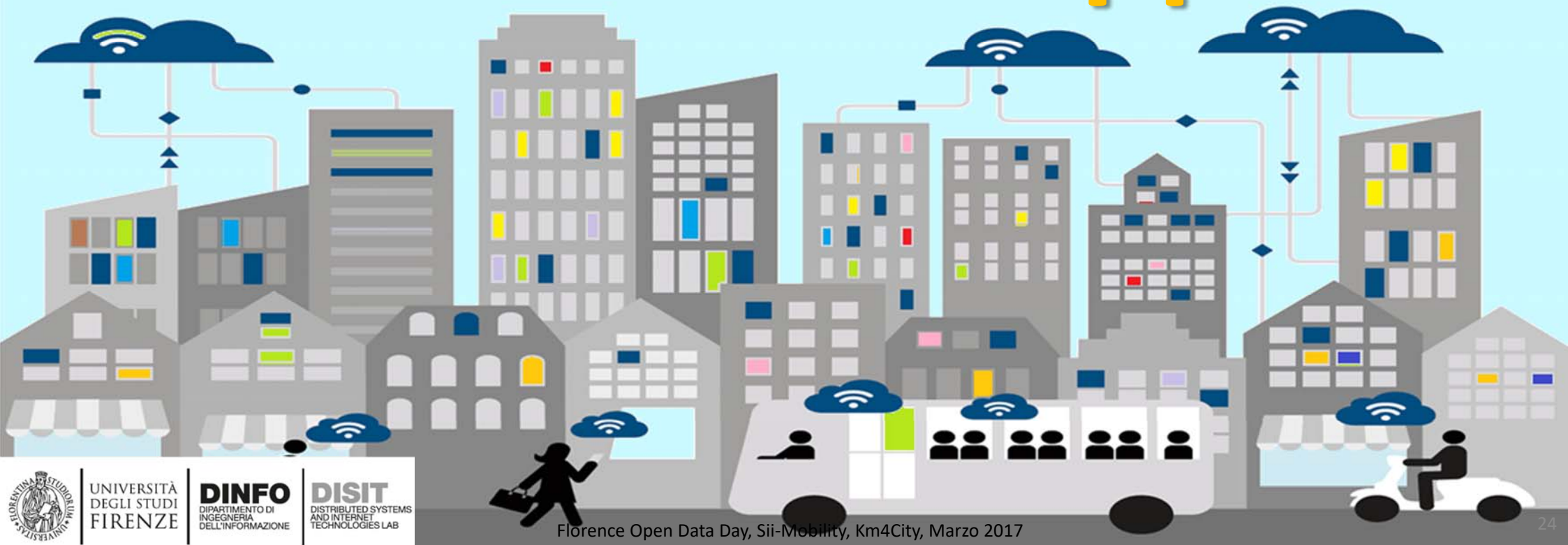
Select all Deselect all Invert Hide all inverse

<input checked="" type="checkbox"/> belongTo	<input checked="" type="checkbox"/> coincideWith
<input checked="" type="checkbox"/> contains	<input checked="" type="checkbox"/> depiction
<input type="checkbox"/> ends	<input checked="" type="checkbox"/> forming
<input type="checkbox"/> has	<input checked="" type="checkbox"/> hasAccess
<input checked="" type="checkbox"/> hasExternalAccess	<input checked="" type="checkbox"/> hasMunicipality
<input checked="" type="checkbox"/> hasProvince	<input checked="" type="checkbox"/> hasRule
<input checked="" type="checkbox"/> hasStreetNumber	<input checked="" type="checkbox"/> inMunicipalityOf
<input checked="" type="checkbox"/> isIn	<input checked="" type="checkbox"/> isPartOf
<input checked="" type="checkbox"/> isPartOfProvince	<input checked="" type="checkbox"/> isPartOfRegion
<input checked="" type="checkbox"/> managingAuthority	<input checked="" type="checkbox"/> ownerAuthority
<input checked="" type="checkbox"/> placedIn	<input type="checkbox"/> sameAs
<input checked="" type="checkbox"/> seeAlso	<input type="checkbox"/> starts

Browsing the knowledge base
Linked Open Graph
<http://log.disit.org>



Engaging Users via Mobile App



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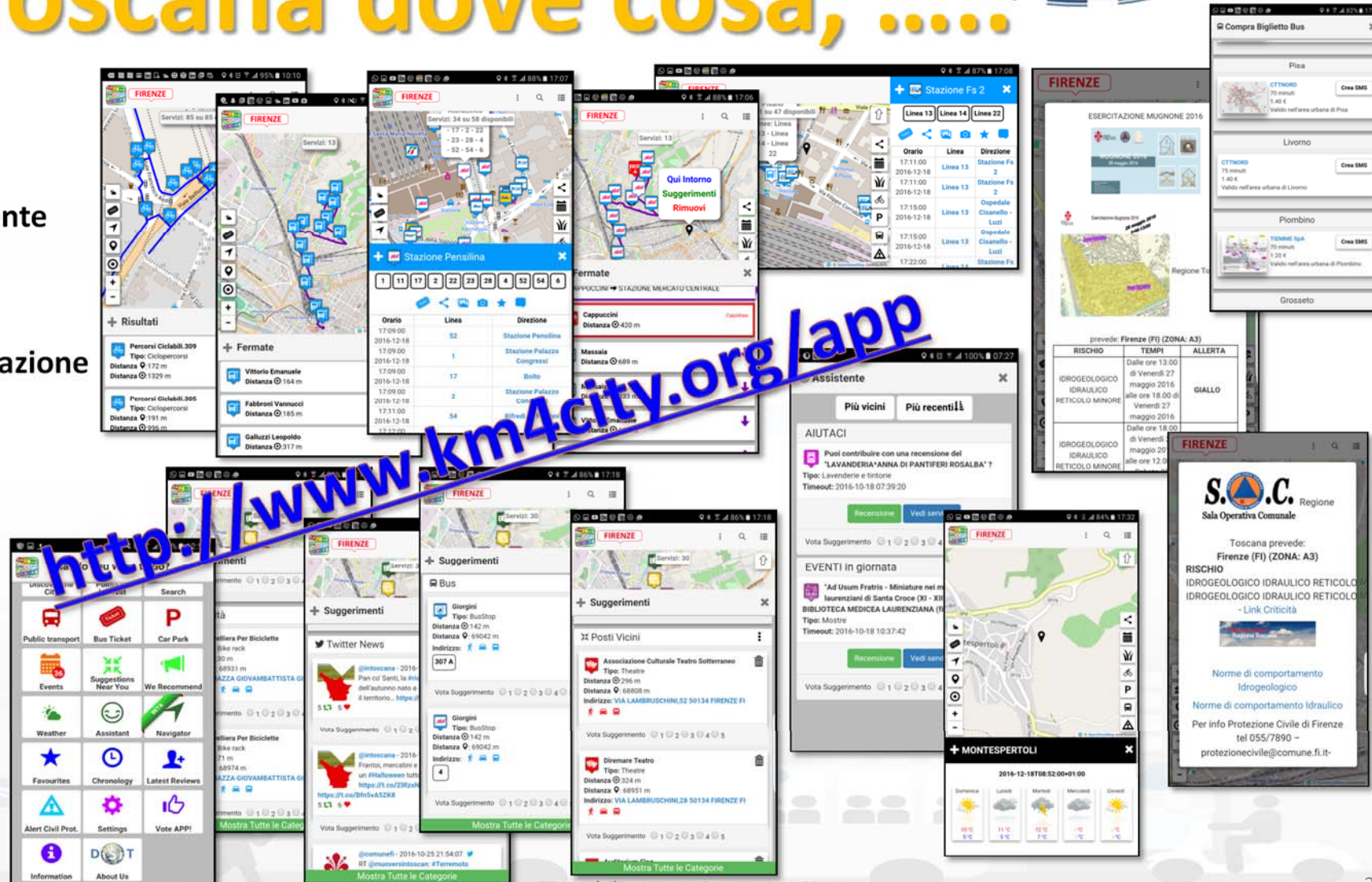
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Florence Open Data Day, Sii-Mobility, Km4City, Marzo 2017



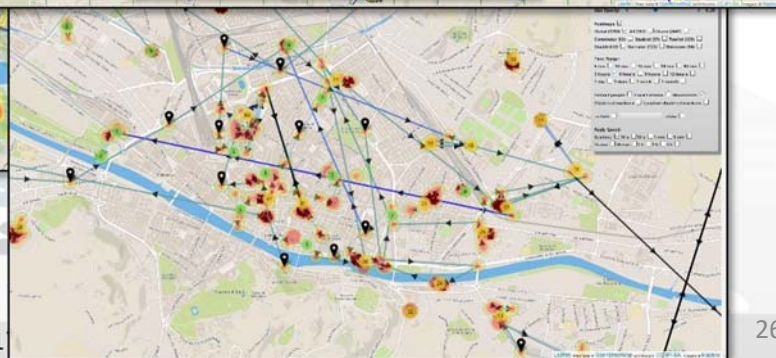
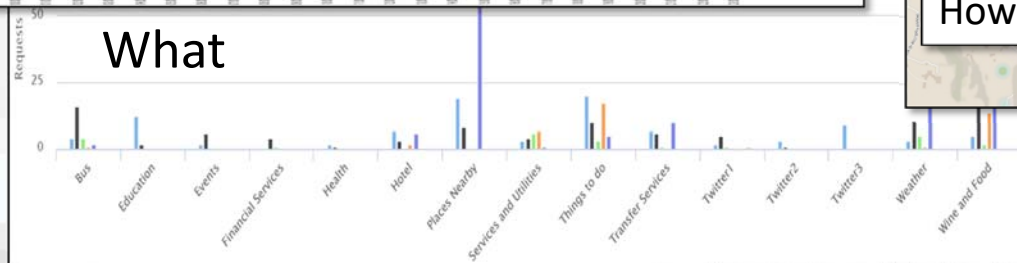
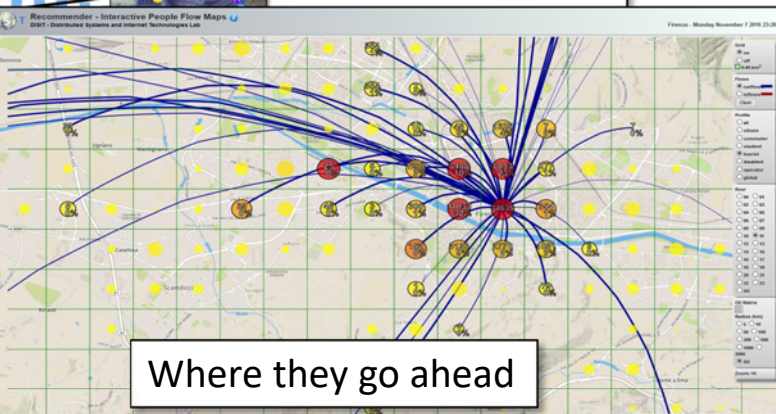
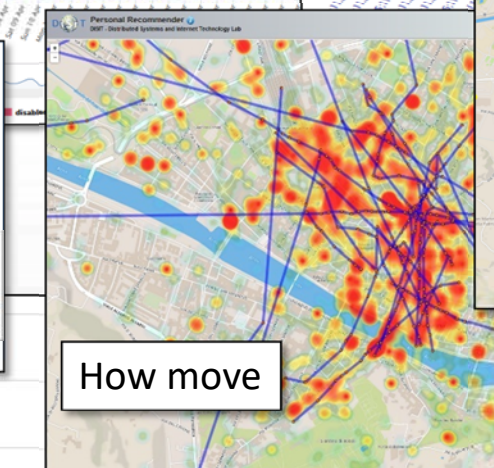
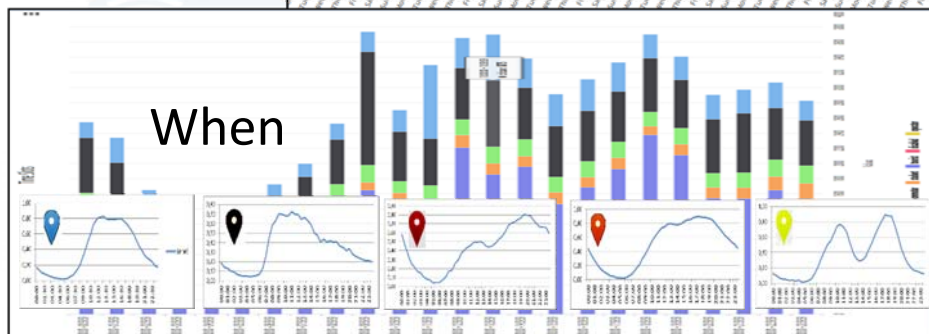
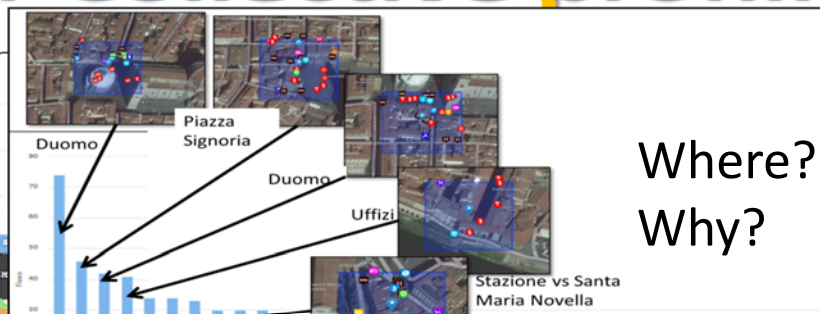
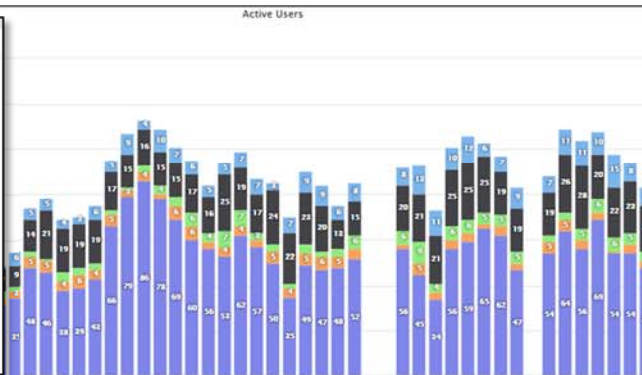
Toscana dove cosa,

- Tutta la Toscana
- Personalizzabile
- Profilata per tipo di utente
- Trasporto pubblico
- Traffico, percorsi, navigazione
- Parcheggi liberi
- Costi benzina
- Suggerimenti
- Assistenza
- Protezione civile
- Meteo
- Biglietti bus
- Punti di Interesse
- Contributi degli utenti



Florence Open Data Day, Sii-Mobility, Km4City, Marzo 2017

User Behavior Analyzer for Collective profiling

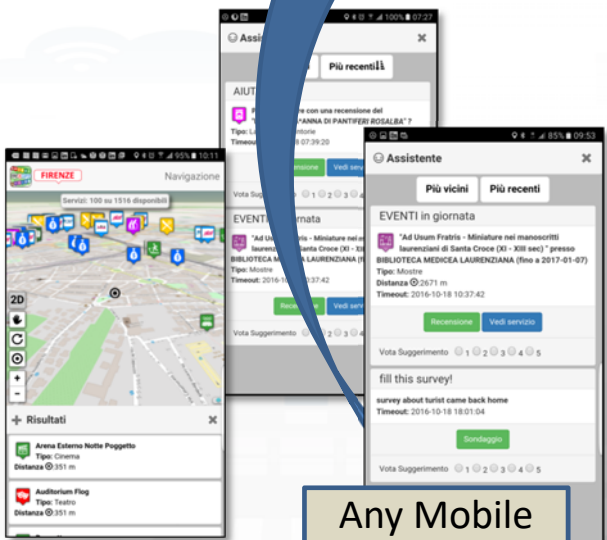
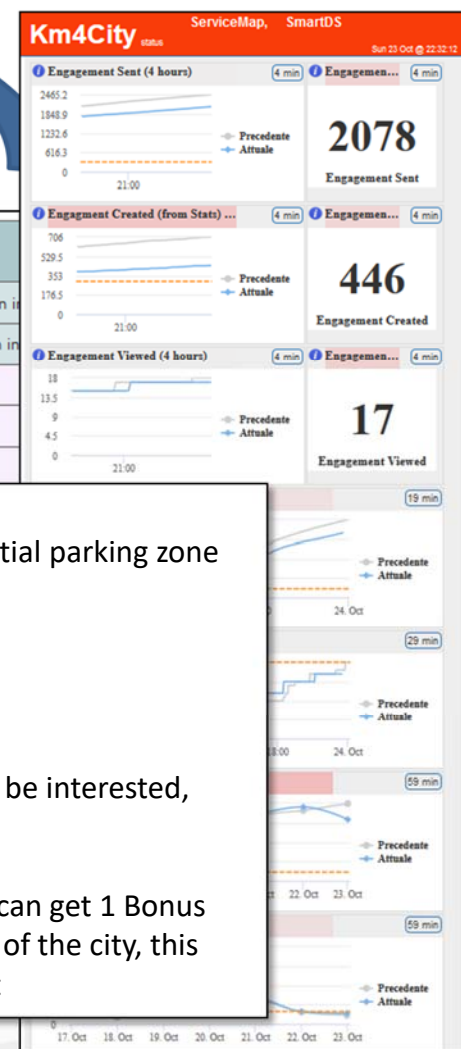


User influencing, engaging, monitoring & Follow Up

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 i
daily_event_en	ENGAGEMENT	1720 (2.12%)	70 (7.1%)	4.07%	Suggest (in english) an event currently on i
- 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 by a bus ticket

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.





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