UNIVERSITÀ DEGLI STUDI FIRENZE

DINFO
DIPARTIMENTO DI INGEGNERIA DELL'INFORMAZIONE

DISIT
DISTRIBUTED SYSTEMS AND INTERNET TECHNOLOGIES LAB

www.Km4City.org

Smart City vs Big Data Challenges

http://www.disit.org/km4city

Paolo Nesi, paolo.nesi@unifi.it

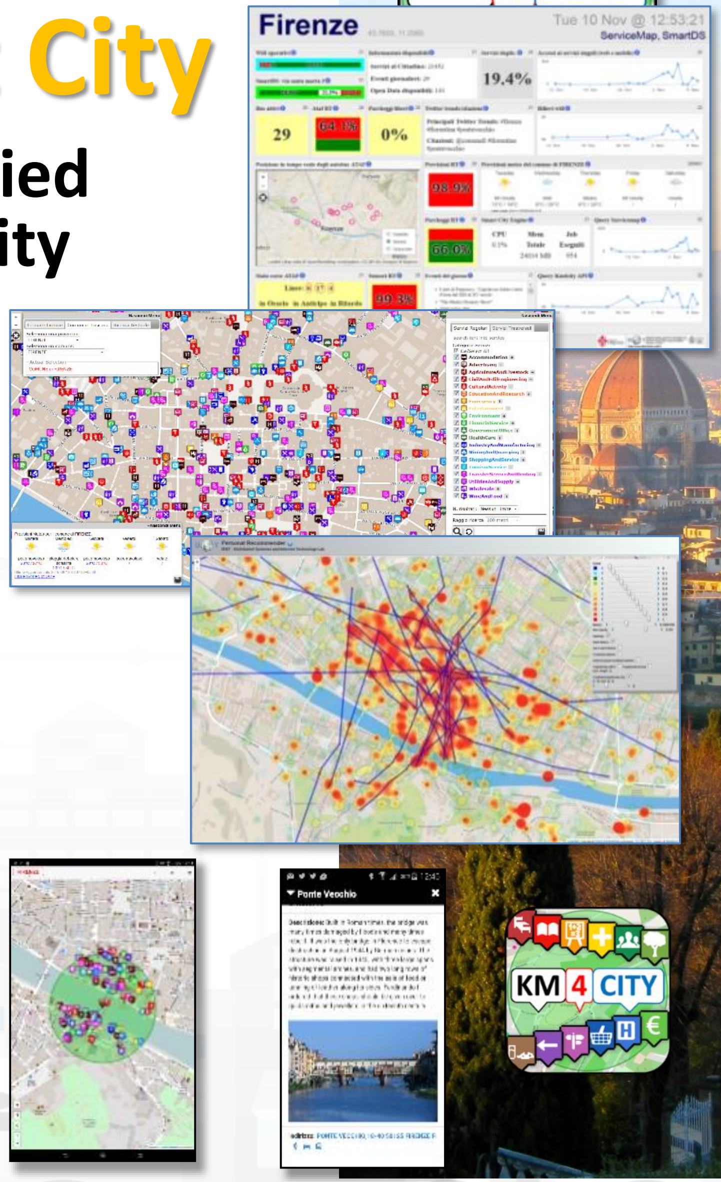
enbis European Network for Business and Industrial Statistics

ENBIS-17 in Naples

9 – 14 September 2017; Naples (Italy)

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**:
    - ***Reading the city: big data, users behavior and needs, …***
        - IOT, Open data sensors, private data, static and real time data.
    - ***Data analytics and business intelligence***
        - predictions, reasoning, city users behavior analysis, ….
    - ***City Strategies: stimulate virtuous behavior of City Users***
        - participation, totem, twitter, Apps, etc.
    - ***Control Room, Real Time Monitoring***
        - decision support, assessing and monitoring risk and resilience
    - ***Transform Data into value → Living lab***
        - Involve city stakeholders for collaborative service development
        - Put in action smart city innovative solutions and services, development tools



Transport systems
Mobility, parking

Public Services
Govern, events, …

Sensors, IOT
Cameras, ..

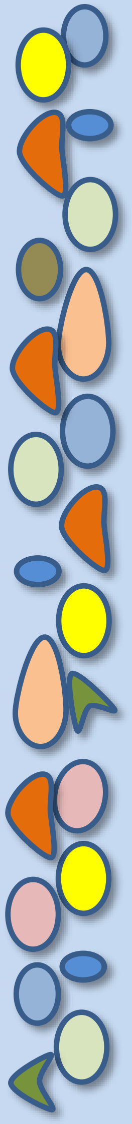
Environment,
Water, energy

Shops, services,
operators

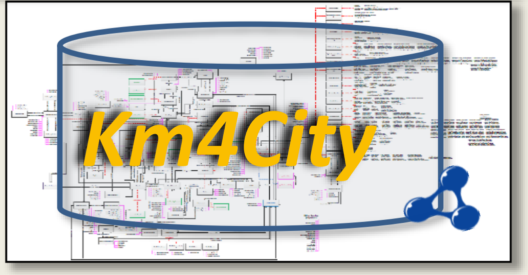
Social Media
WiFi, network

Static, Slow and Real Time data flows

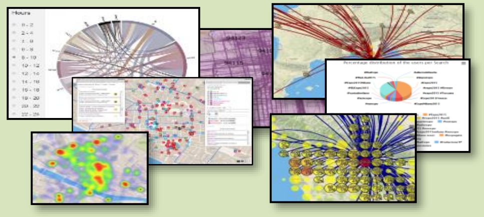
DISCES -- Distributed and parallel architecture on Cloud



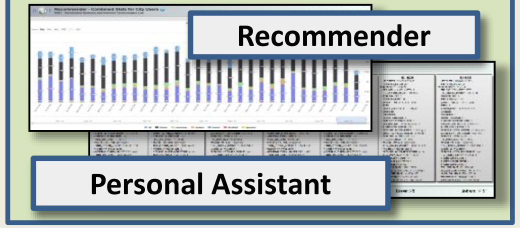
Km4City Smart City Engine



Big Data Analytics



Smartening Tools

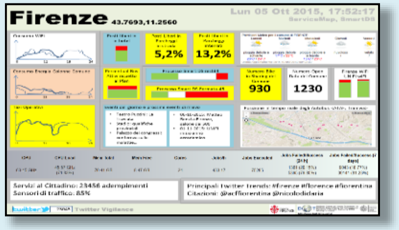


Development Tools

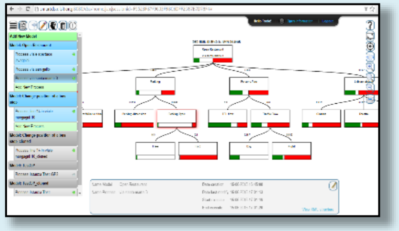
Km4City Smart City API

City Operators and Decision Makers

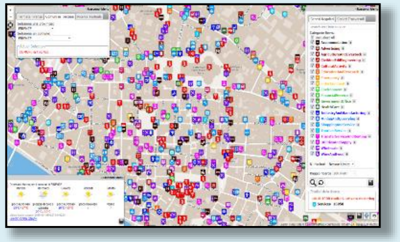
Dashboards



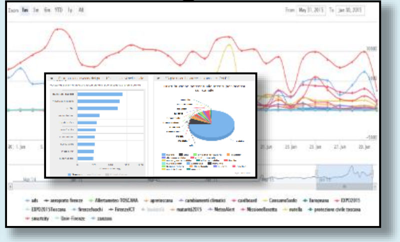
Smart Decision Support



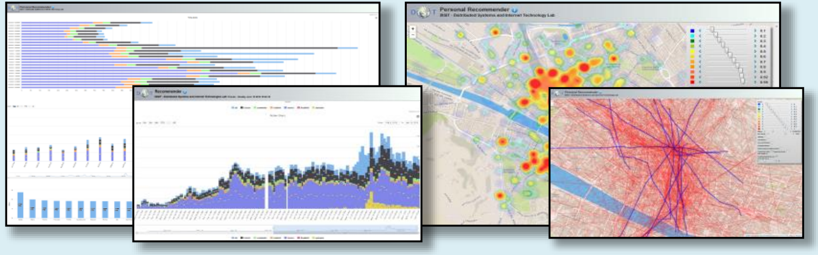
ServiceMap browser



Twitter Vigilance

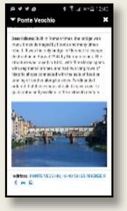


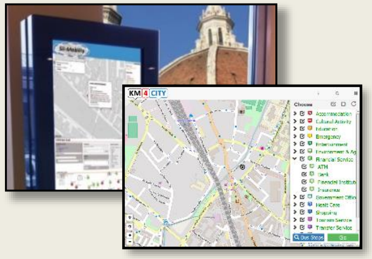
Analyzers of City User Behavior



Tools for Final Users

Mobile e Web Apps

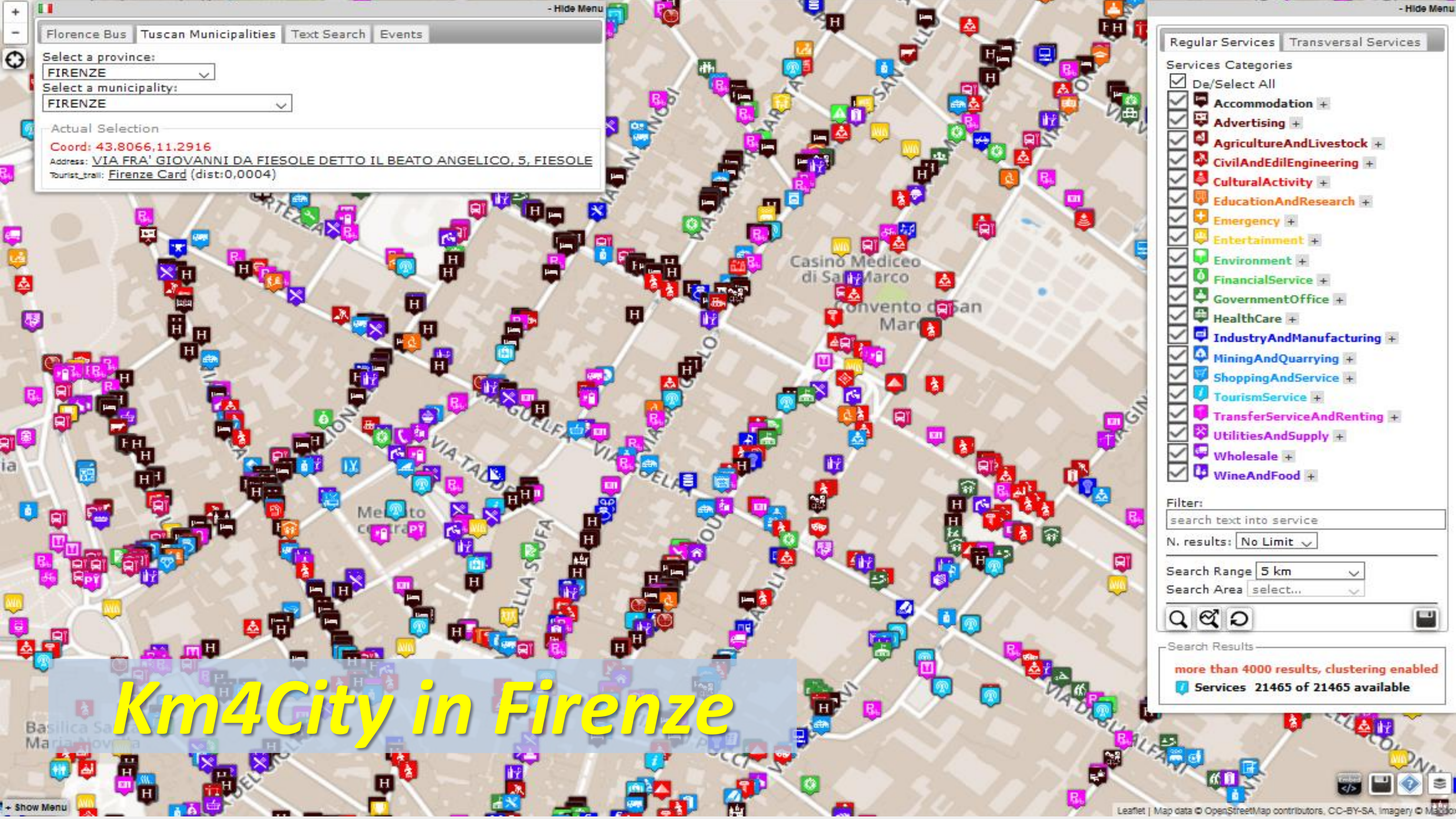




Http://www.km4city.org

for ENBIS 2017, Napoli, by DISIT Lab

Km4City in Firenze



Select a province: FIRENZE
Select a municipality: FIRENZE

Actual Selection
Coord: 43.8066,11.2916
Address: VIA FRA' GIOVANNI DA FIESOLE DETTO IL BEATO ANGELICO, 5, FIESOLE
Tourist_trail: Firenze Card (dist:0,0004)

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

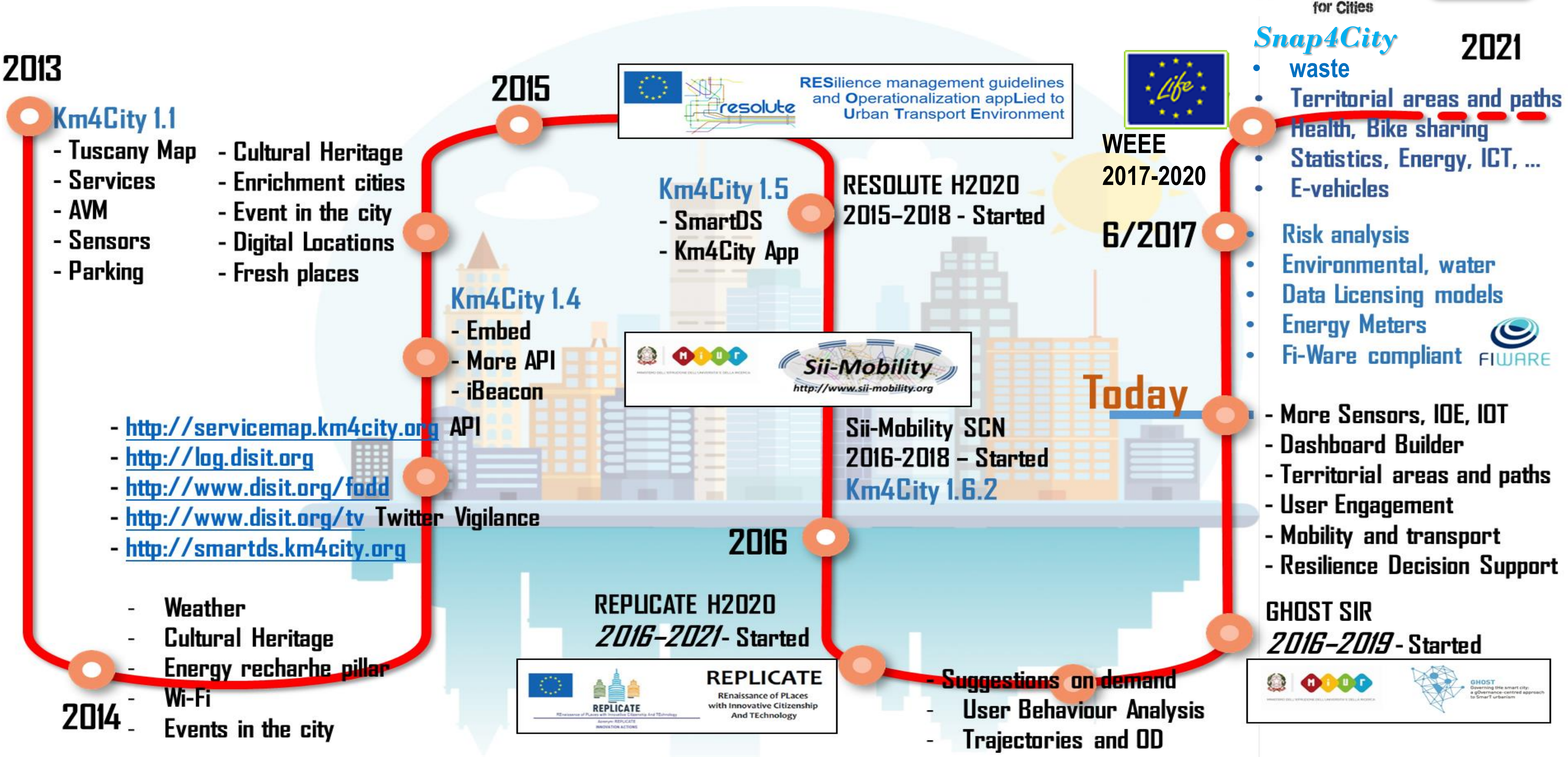
Data Problems

- Variety
  - Lack of semantic interoperability, several formats, different IDs, …
  - Several production sources and approaches, …
- Veracity
  - Non uniform, non dense, not arriving with the same time, not arriving with correct values (GPS, Time, accelerometers, etc.)
- Volume:
  - Static vs real, real time, …
- Velocity
  - Different real time rate, data driven cases
- Value
  - Data model vs target scenarious, …
  - IPR, privacy vs security, ..

Km4City Roadmap

SELECT for Cities

KM 4 CITY



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 recharhe pillar
- Wi-Fi
- Events in the city

2015

Km4City 1.4

- Embed
- More API
- iBeacon

RESilience management guidelines and Operationalization appLied to Urban Transport Environment

resolute

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

WEEE
2017-2020

6/2017

Today

Snap4City

2021

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

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

FIWARE

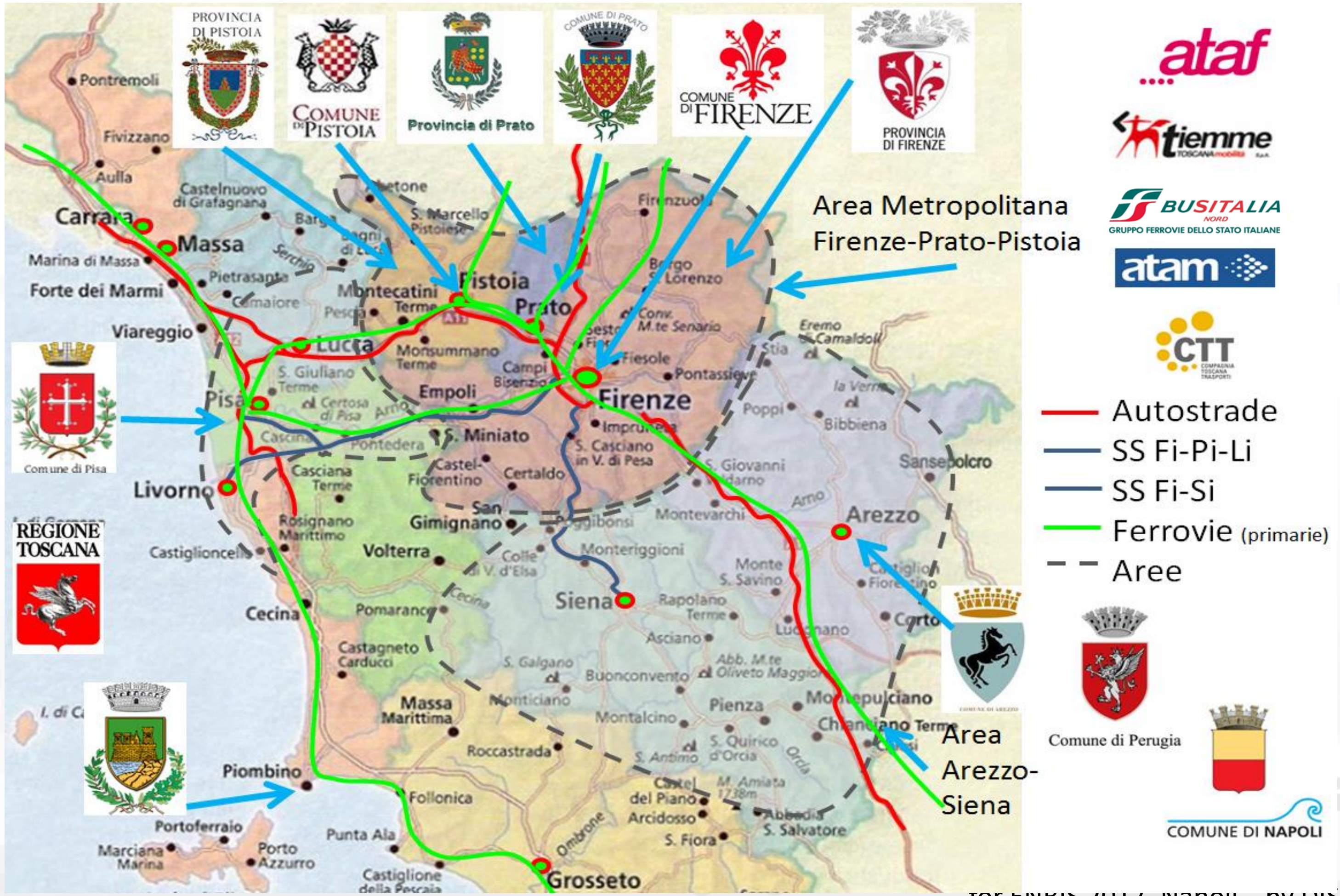
- More Sensors, IOE, IOT
- Dashboard Builder
- Territorial areas and paths
- User Engagement
- Mobility and transport
- Resilience Decision Support

GHOST SIR
2016-2019 - Started

Sii-Mobility

http://www.Sii-Mobility.org

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



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

Horizon 2020
European Union Funding
for Research & Innovation

http://www.resolute-eu.org

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

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

REPLICATE

Horizon 2020
European Union Funding
for Research & Innovation

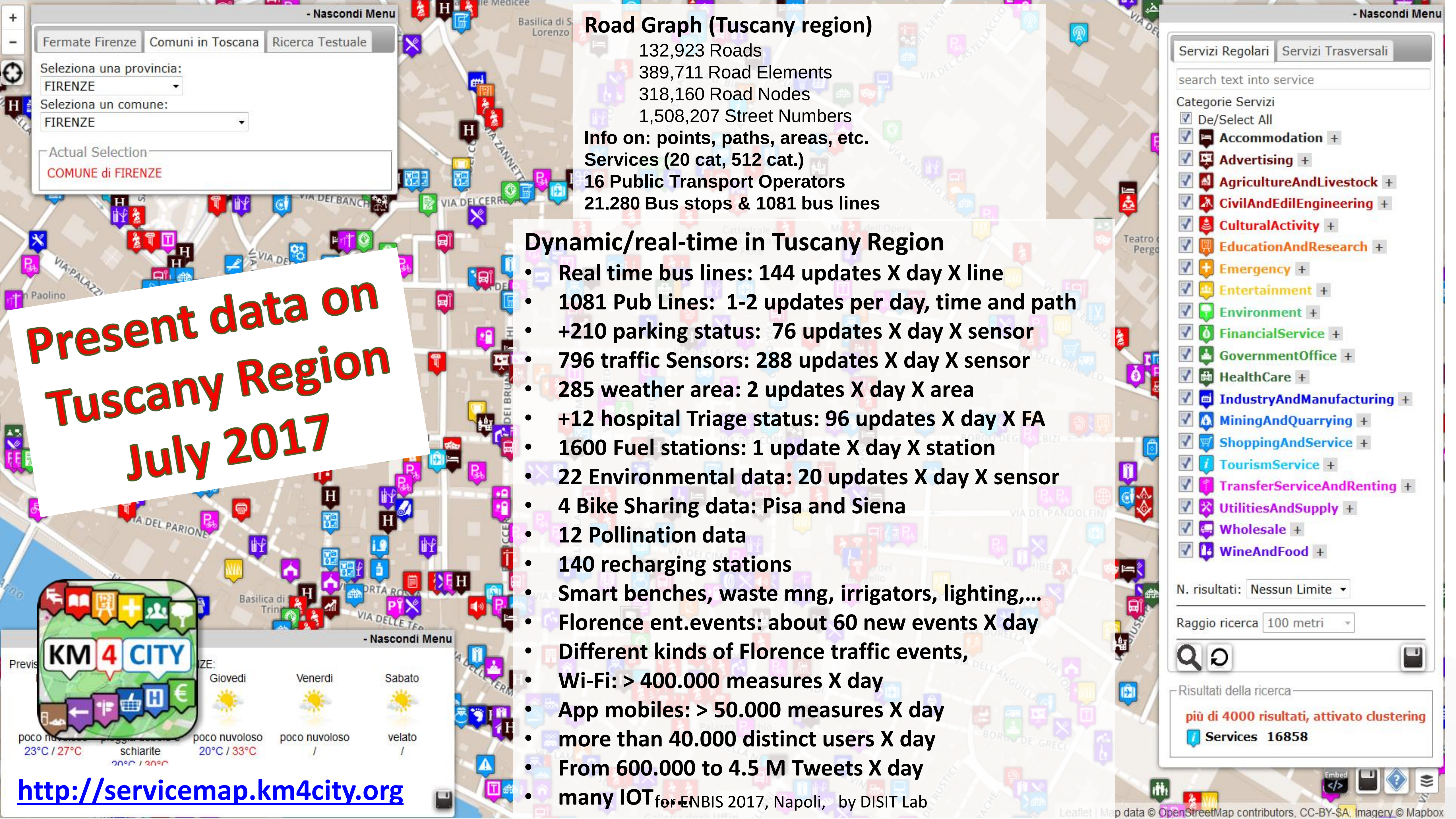
REnaissance of PLaces
with Innovative Citizenship
And TEchnology

http://replicate-project.eu/

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

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

Present data on Tuscany Region July 2017



Seleziona una provincia: FIRENZE

Seleziona un comune: FIRENZE

Actual Selection

COMUNE di FIRENZE

N. risultati: Nessun Limite

Raggio ricerca 100 metri

Risultati della ricerca

più di 4000 risultati, attivato clustering

Services 16858

Road Graph (Tuscany region)

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

Info on: points, paths, areas, etc.
Services (20 cat, 512 cat.)
16 Public Transport Operators
21.280 Bus stops & 1081 bus lines

Dynamic/real-time in Tuscany Region

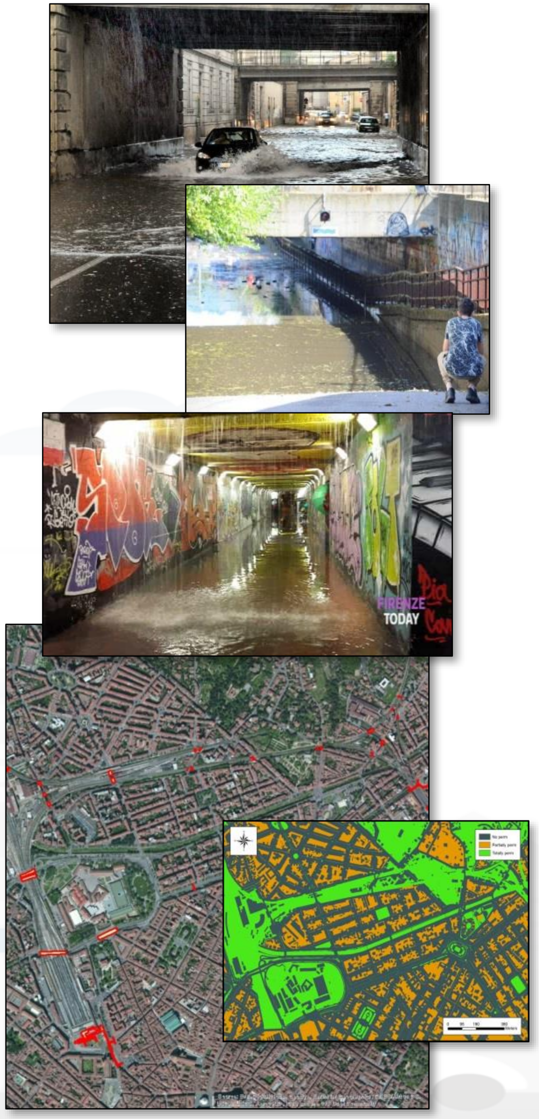
- Real time bus lines: 144 updates X day X line
- 1081 Pub Lines: 1-2 updates per day, time and path
- +210 parking status: 76 updates X day X sensor
- 796 traffic Sensors: 288 updates X day X sensor
- 285 weather area: 2 updates X day X area
- +12 hospital Triage status: 96 updates X day X FA
- 1600 Fuel stations: 1 update X day X station
- 22 Environmental data: 20 updates X day X sensor
- 4 Bike Sharing data: Pisa and Siena
- 12 Pollination data
- 140 recharging stations
- Smart benches, waste mng, irrigators, lighting,…
- Florence ent.events: about 60 new events X day
- Different kinds of Florence traffic events,
- Wi-Fi: > 400.000 measures X day
- App mobiles: > 50.000 measures X day
- more than 40.000 distinct users X day
- From 600.000 to 4.5 M Tweets X day
- many IOT…

http://servicemap.km4city.org

Other Sensors and Actuators, IOT

- 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, temperature,
  - humidity,…
- Public Light Pillar
  - Traffic flows, environment,
  - 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, …

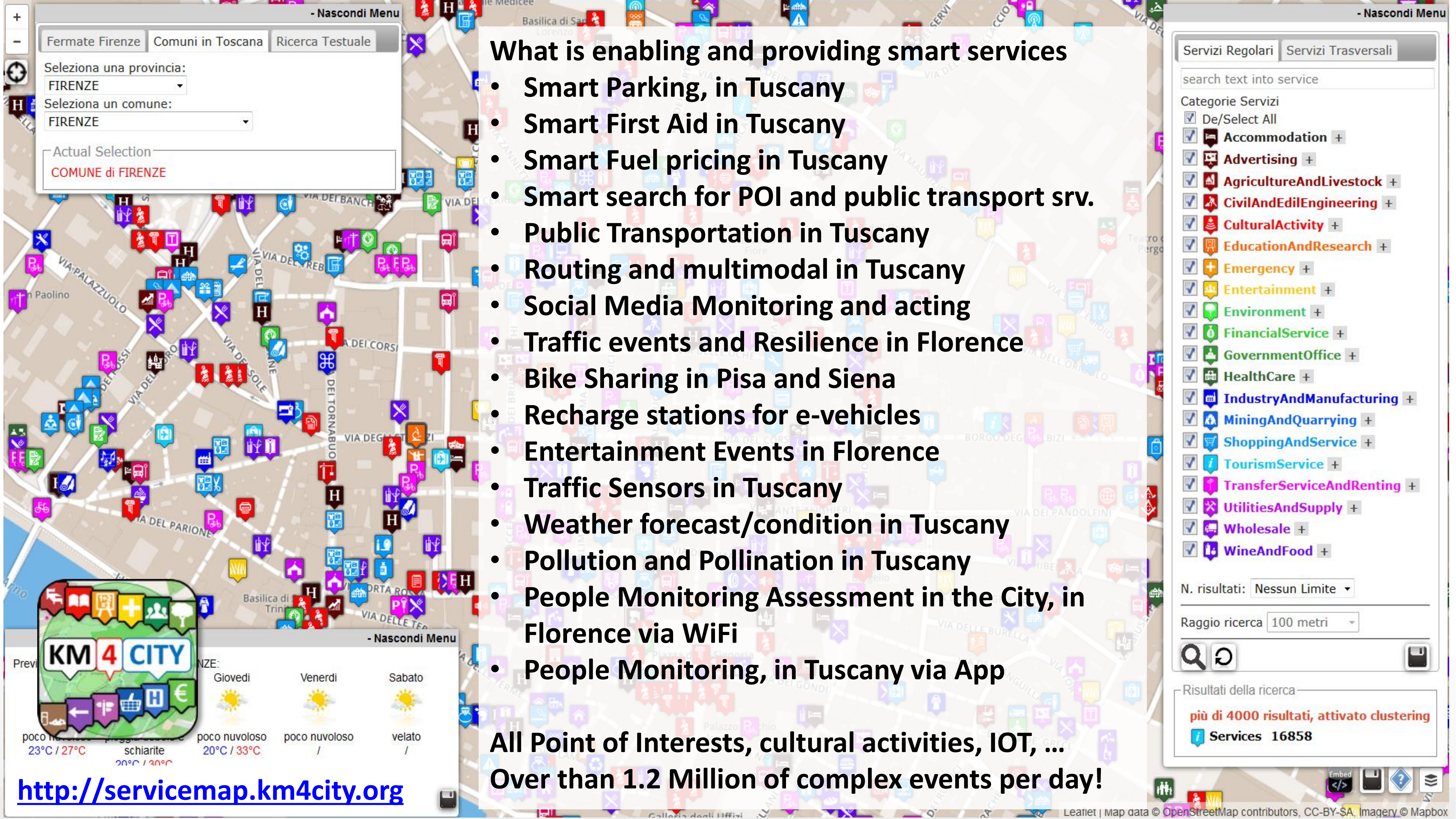
- **Environmental Sensors**:
  - Air, temperature, humidity,
  - water level in rivers
  - Status of underpass and bridges
- **Risk assessment**
  - Value of the buildings,
  - hydrogeological risk map,
  - earthquake risk map, …
  - people distribution and location
  - Position of recover places,
- **Traffic Zone Gates**
  - Passages, alerts,
  - etc.



What is enabling and providing smart services

- Smart Parking, in Tuscany
- Smart First Aid in Tuscany
- Smart Fuel pricing in Tuscany
- Smart search for POI and public transport srv.
- Public Transportation in Tuscany
- Routing and multimodal in Tuscany
- Social Media Monitoring and acting
- Traffic events and Resilience in Florence
- Bike Sharing in Pisa and Siena
- Recharge stations for e-vehicles
- Entertainment Events in Florence
- Traffic Sensors in Tuscany
- Weather forecast/condition in Tuscany
- Pollution and Pollination in Tuscany
- People Monitoring Assessment in the City, in Florence via WiFi
- People Monitoring, in Tuscany via App

All Point of Interests, cultural activities, IOT, …
Over than 1.2 Million of complex events per day!



Seleziona una provincia: FIRENZE
Seleziona un comune: FIRENZE
Actual Selection
COMUNE di FIRENZE

☑ 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

poco nuvoloso 23°C / 27°C
schiarite 20°C / 30°C
poco nuvoloso 20°C / 33°C
poco nuvoloso /
velato /

http://servicemap.km4city.org

Data & Model

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

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

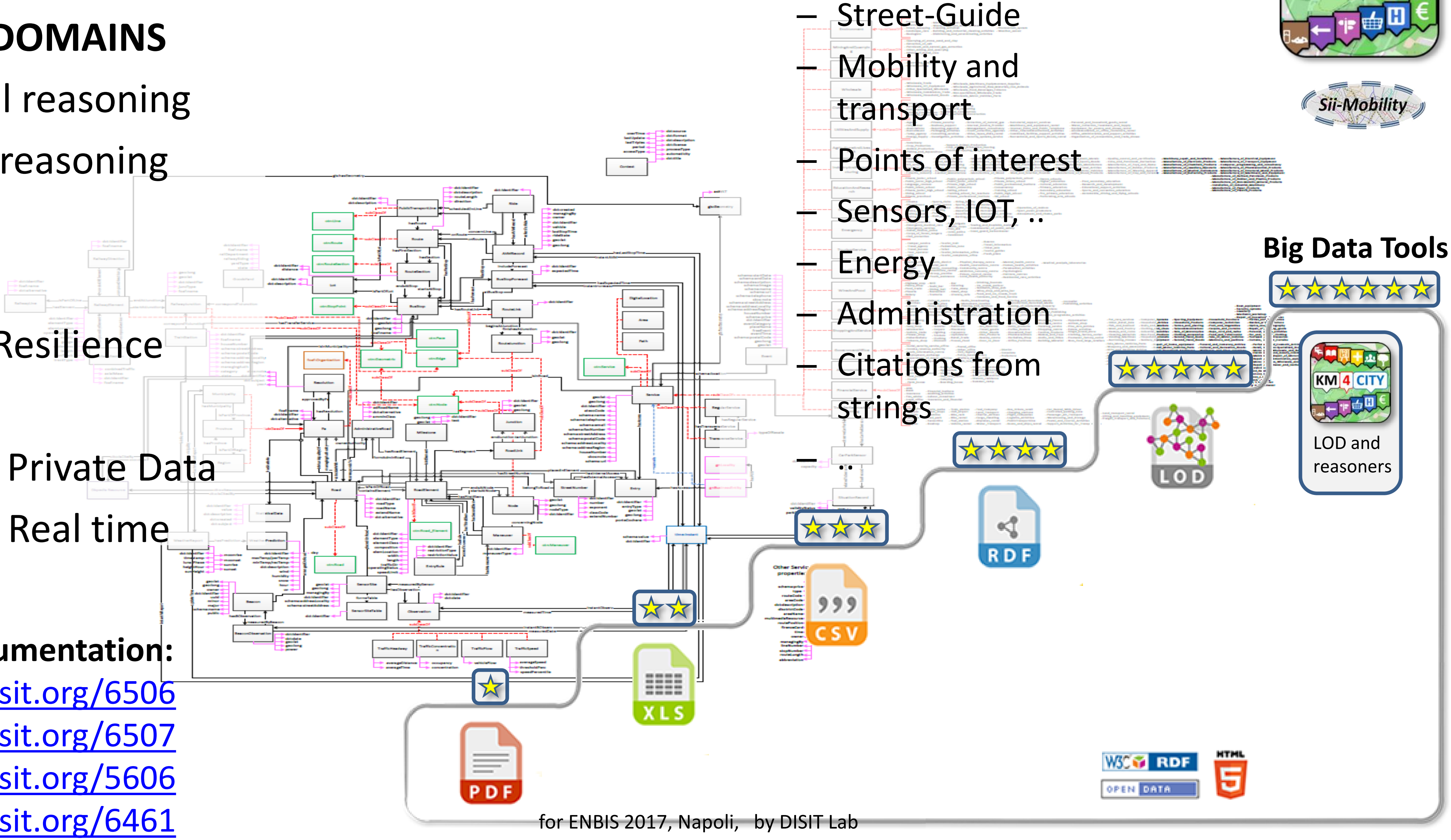
http://www.km4city.org/?devTools

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

Km4City: Knowledge Base

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

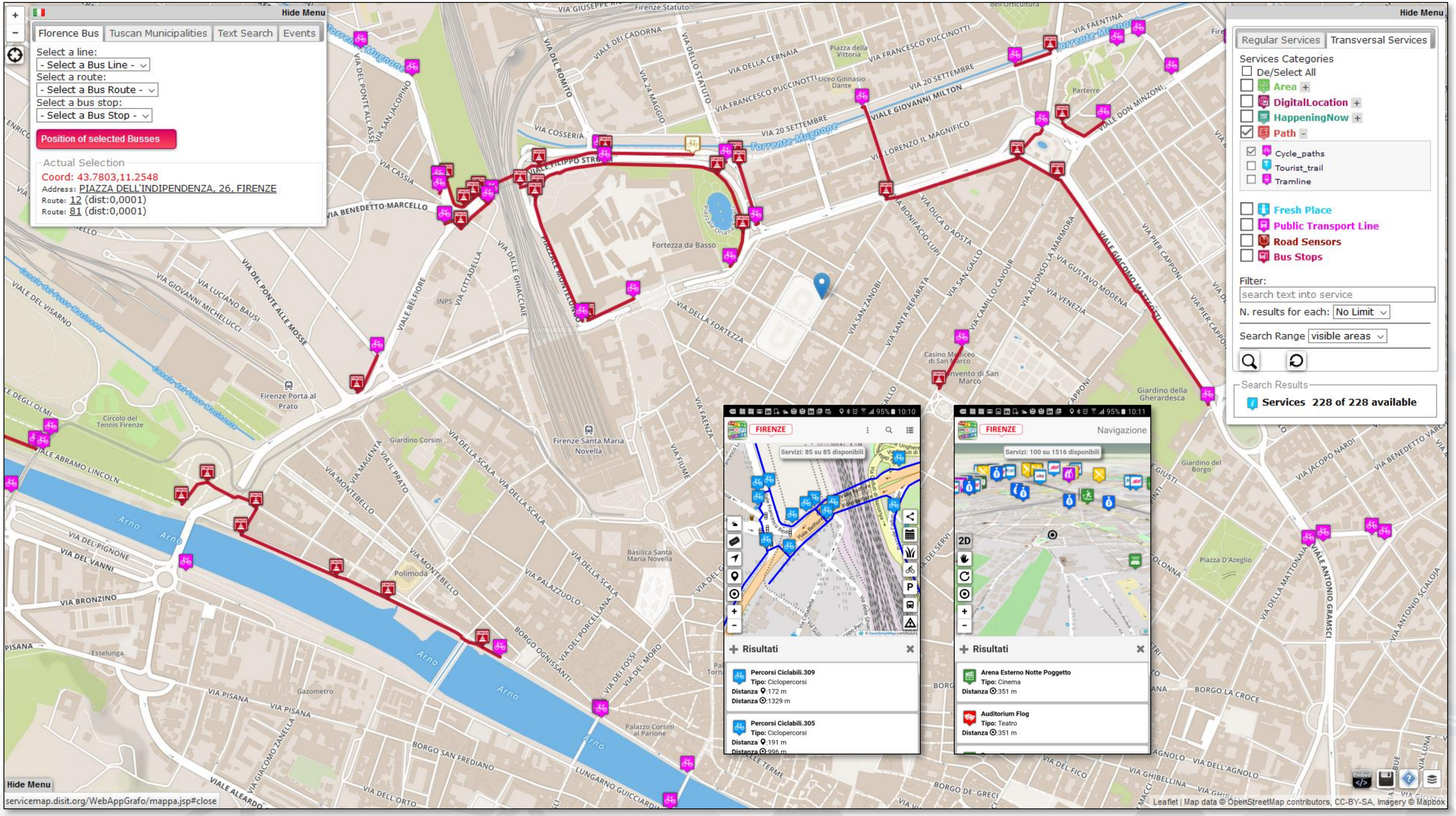
- Street-Guide
- Mobility and transport
- Points of interest
- Sensors, IOT, ..
- Energy
- Administration
- Citations from strings
- ..



Ontology Documentation:

http://www.disit.org/6506
http://www.disit.org/6507
http://www.disit.org/5606
http://www.disit.org/6461

Cycling Paths



Hide Menu

Florence Bus | Tuscan Municipalities | Text Search | Events

Select a line: - Select a Bus Line -
Select a route: - Select a Bus Route -
Select a bus stop: - Select a Bus Stop -

Position of selected Busses

Actual Selection
Coord: 43.7803,11.2548
Address: PIAZZA DELL'INDIPENDENZA, 26, FIRENZE
Route: 12 (dist:0,0001)
Route: 81 (dist:0,0001)

Hide Menu

Regular Services | Transversal Services

Services Categories
☐ De/Select All
☐ Area +
☐ DigitalLocation +
☐ HappeningNow +
☑ Path -
☑ Cycle_paths
☐ Tourist_trail
☐ Tramline
☐ Fresh Place
☐ Public Transport Line
☐ Road Sensors
☐ Bus Stops

Filter: search text into service
N. results for each: No Limit
Search Range: visible areas

Search Results
Services 228 of 228 available

FIRENZE
Servizi: 85 su 85 disponibili

Risultati

Percorsi Ciclabili.309
Tipo: Ciclopercorsi
Distanza :172 m
Distanza :1329 m

Percorsi Ciclabili.305
Tipo: Ciclopercorsi
Distanza :191 m
Distanza :996 m

FIRENZE Navigazione
Servizi: 100 su 1516 disponibili

Risultati

Arena Esterno Notte Poggetto
Tipo: Cinema
Distanza :351 m

Auditorium Flog
Tipo: Teatro
Distanza :351 m

Hide Menu
servicemap.disit.org/WebAppGrafo/mappa.jsp#close

UNIVERSITÀ
DEGLI STUDI
FIRENZE

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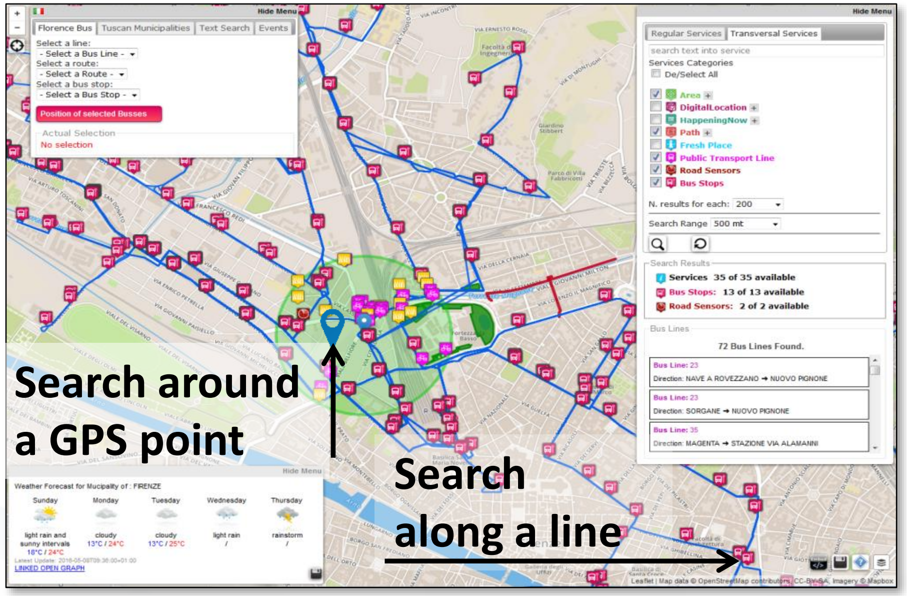
DISTRIBUTED SYSTEMS
AND INTERNET
TECHNOLOGIES LAB
http://www.disit.org

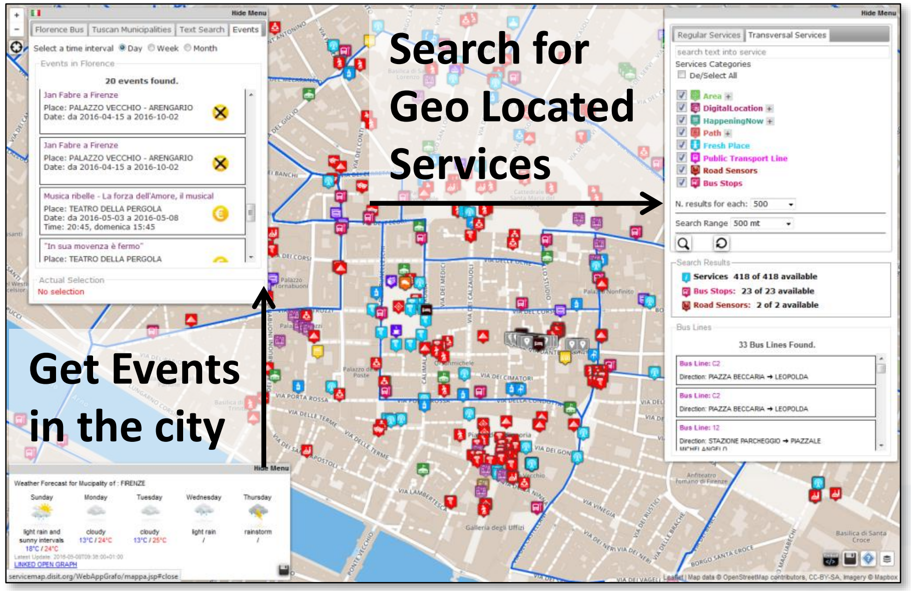
ServiceMap

KM4CITY

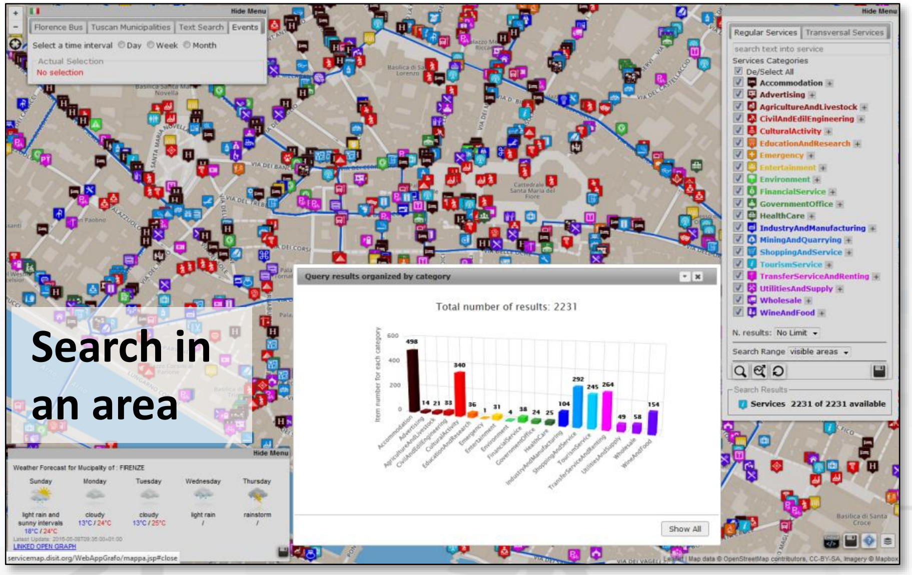
Sii-Mobility


Search around a GPS point

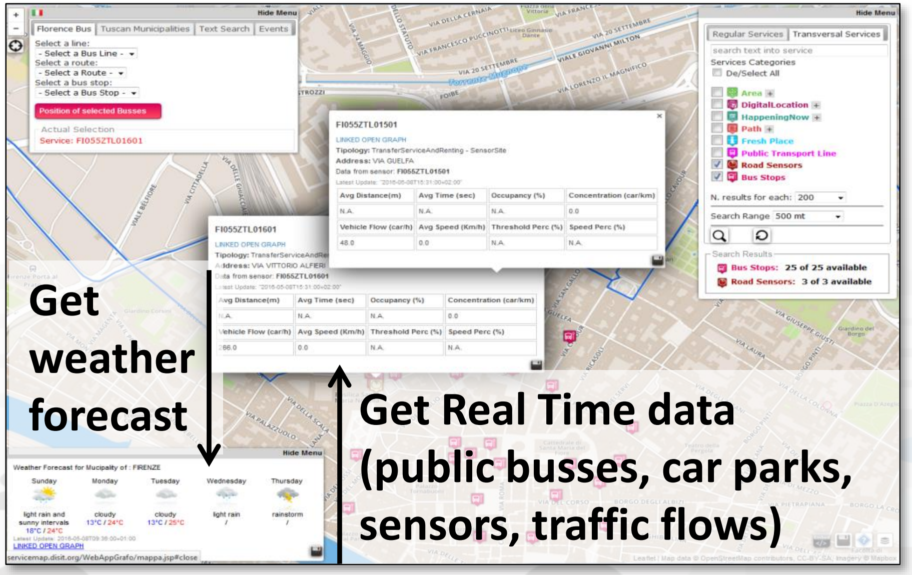
Search along a line


Search for Geo Located Services

Get Events in the city

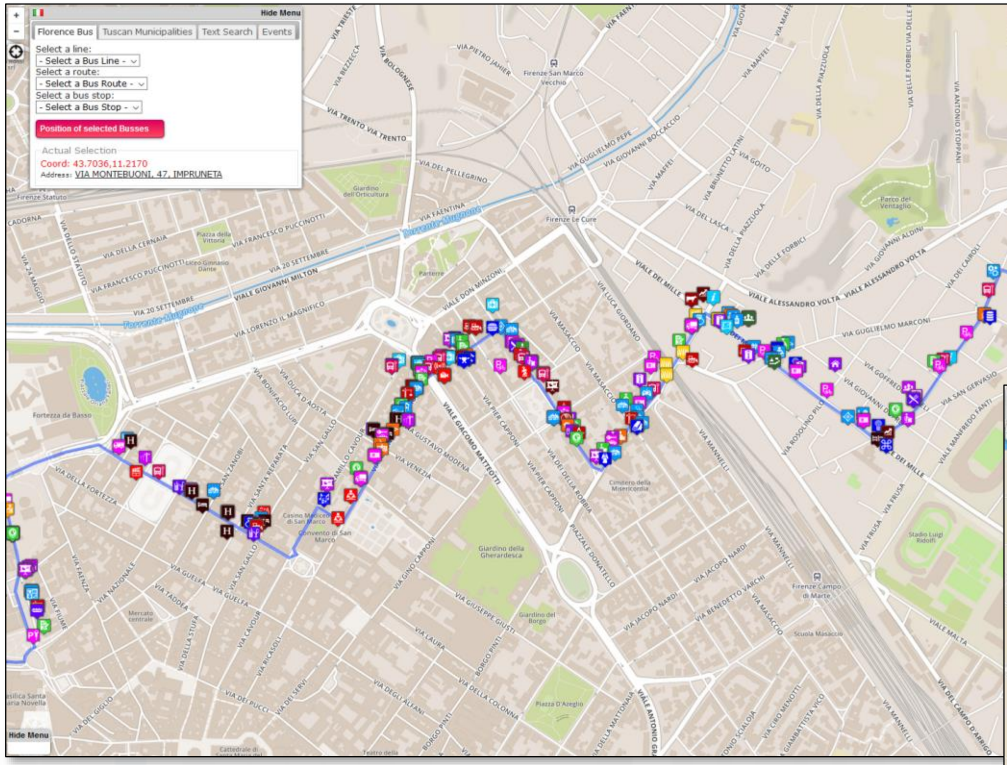

Search in an area

Query results organized by category
Total number of results: 2231


Get weather forecast

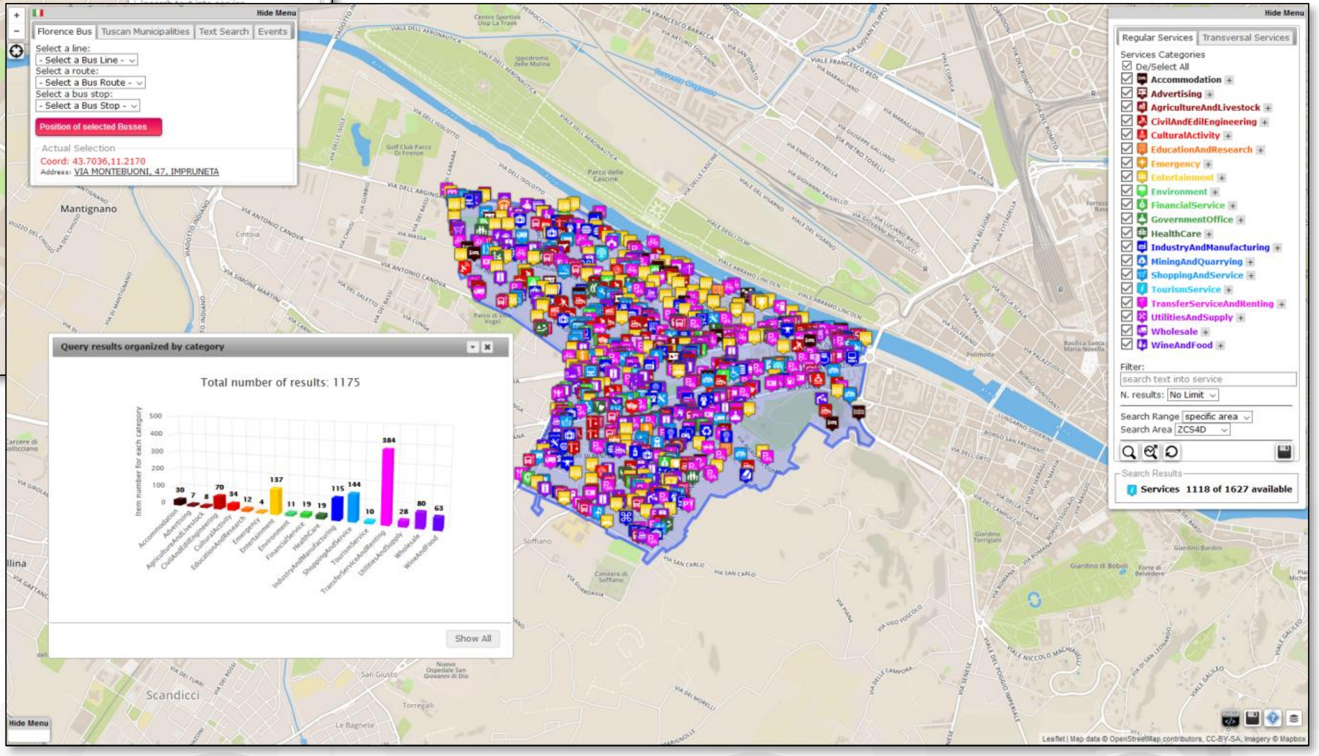
Get Real Time data (public busses, car parks, sensors, traffic flows)

Along a Line



Select a line: - Select a Bus Line -
Select a route: - Select a Bus Route -
Select a bus stop: - Select a Bus Stop -

Actual Selection
Coord: 43.7036,11.2170
Address: VIA MONTEBUONI, 47, IMPRUNETA



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

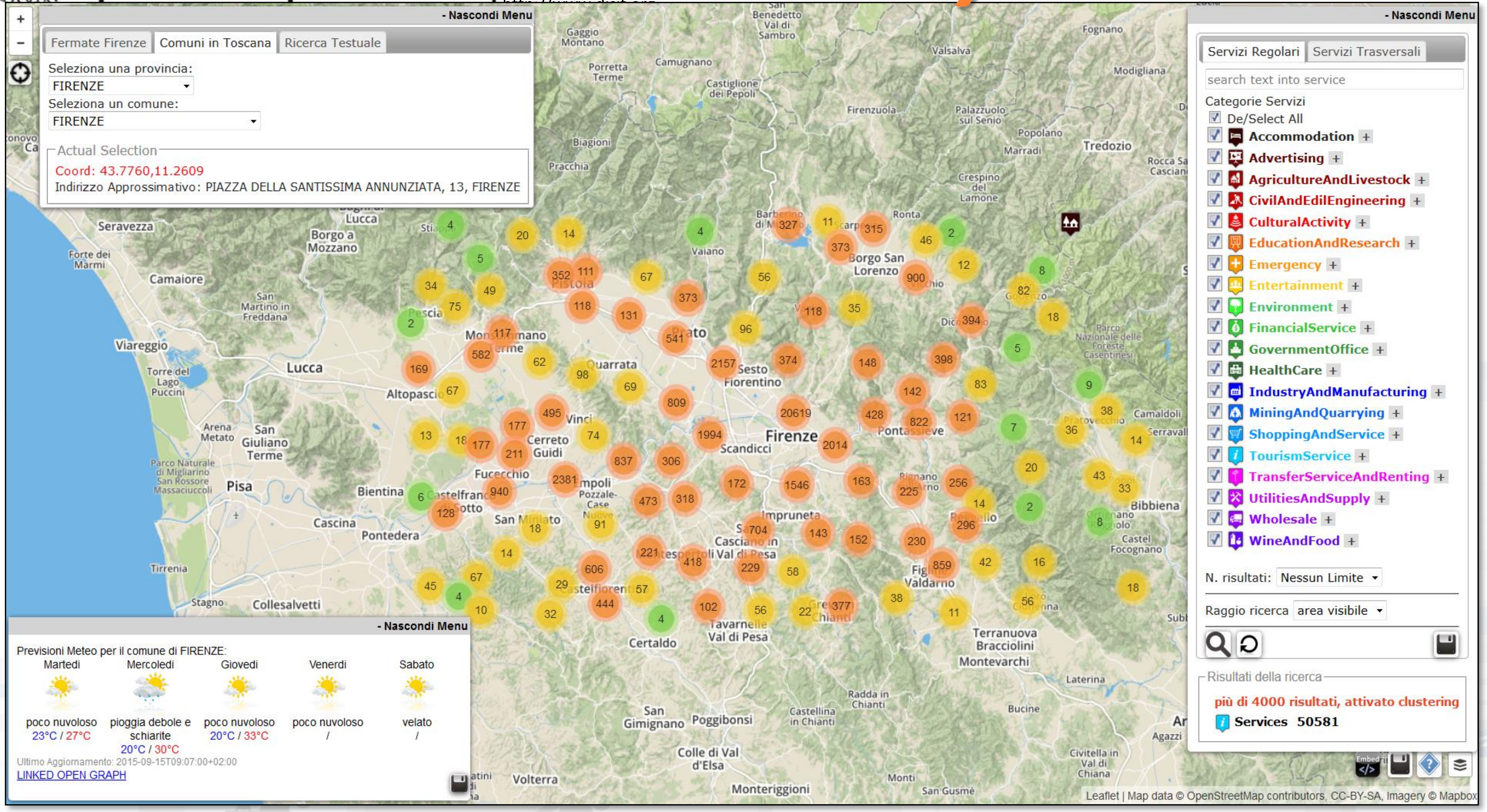
Filter: search text into service
N. results: No Limit
Search Range: specific area
Search Area: ZCS4D

Search Results
Services 1118 of 1627 available

Into an Area

for ENBIS 2017, Napoli, by DISIT Lab

Km4City in Toscana



Seleziona una provincia: FIRENZE

Seleziona un comune: FIRENZE

Actual Selection

Coord: 43.7760,11.2609

Indirizzo Approssimativo: PIAZZA DELLA SANTISSIMA ANNUNZIATA, 13, FIRENZE

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: area visibile

Risultati della ricerca

più di 4000 risultati, attivato clustering

Services 50581

Previsioni Meteo per il comune di FIRENZE:

Martedi	Mercoledi	Giovedi	Venerdi	Sabato
poco nuvoloso	pioggia debole e schiarite	poco nuvoloso	poco nuvoloso	velato
23°C / 27°C	20°C / 30°C	20°C / 33°C	/	/

Ultimo Aggiornamento: 2015-09-15T09:07:00+02:00

LINKED OPEN GRAPH

- ***Search all services in the area***

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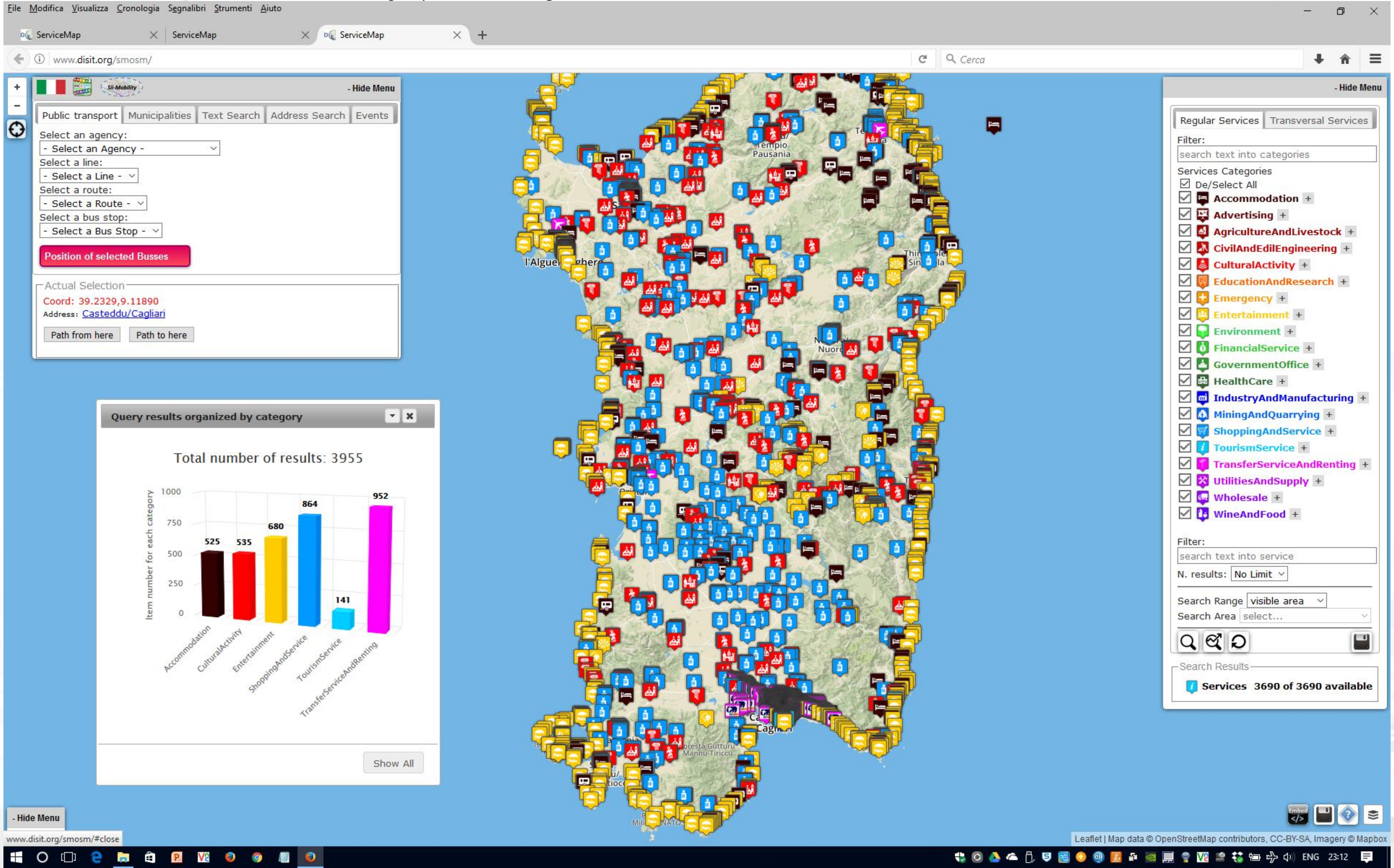
DISIT DISTRIBUTED SYSTEMS AND INTERNET TECHNOLOGIES LAB

http://www.disit.org

Km4City in Sardegna



Select an agency:
- Select an Agency -
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
Coord: 39.2329,9.11890
Address: Casteddu/Cagliari

Path from here
Path to here

Query results organized by category

Total number of results: 3955

Category	Item number for each category
Accommodation	525
CulturalActivity	535
Entertainment	680
ShoppingAndService	864
TourismService	141
TransferServiceAndRenting	952

Show All

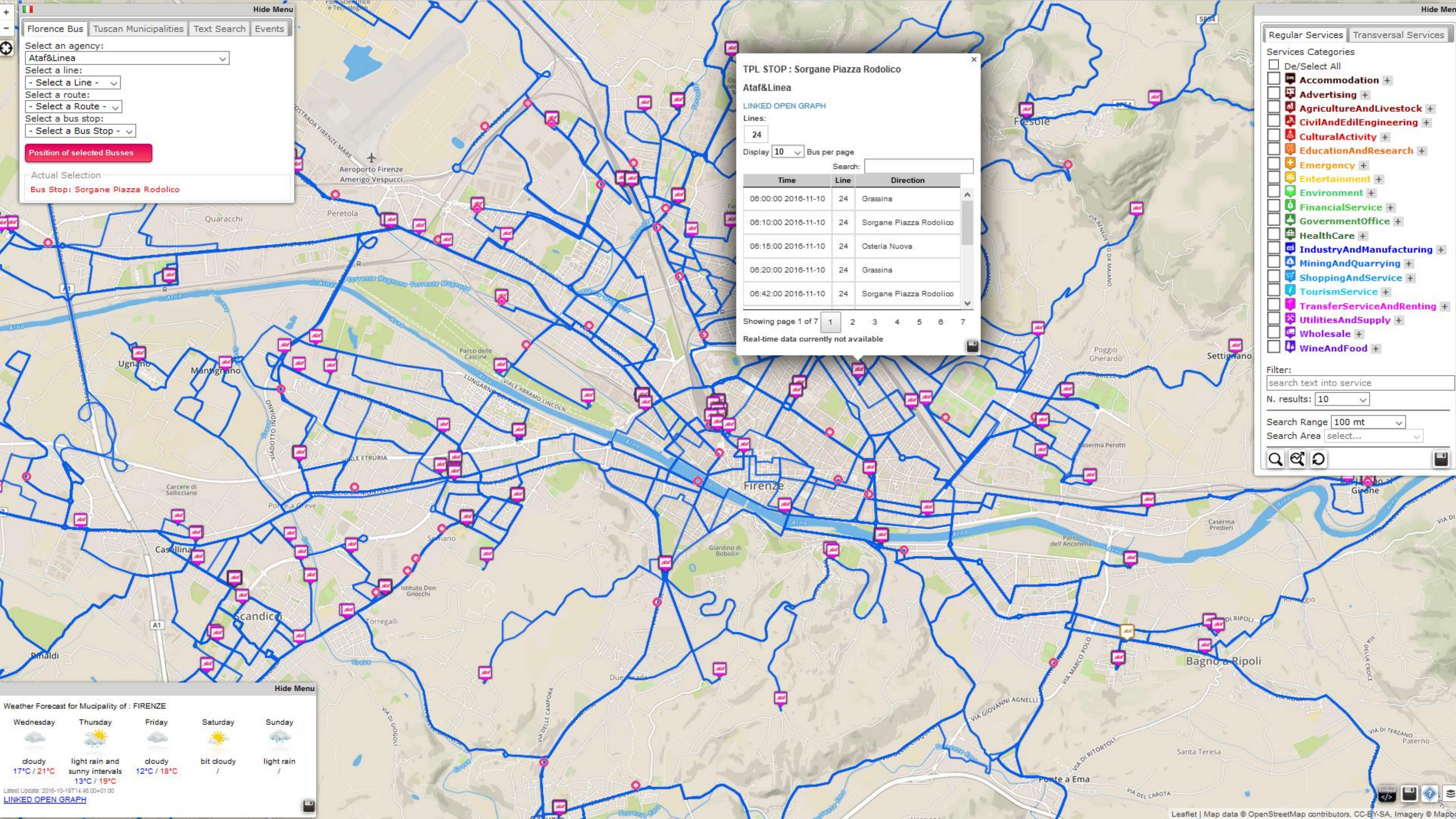
Filter:
search text into categories
Services Categories
- ☑ De/Select All
- ☑ Accommodation +
- ☑ Advertising +
- ☑ AgricultureAndLivestock +
- ☑ CivilAndEdilEngineering +
- ☑ CulturalActivity +
- ☑ EducationAndResearch +
- ☑ Emergency +
- ☑ Entertainment +
- ☑ Environment +
- ☑ FinancialService +
- ☑ GovernmentOffice +
- ☑ HealthCare +
- ☑ IndustryAndManufacturing +
- ☑ MiningAndQuarrying +
- ☑ ShoppingAndService +
- ☑ TourismService +
- ☑ TransferServiceAndRenting +
- ☑ UtilitiesAndSupply +
- ☑ Wholesale +
- ☑ WineAndFood +

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

Search Results
Services 3690 of 3690 available

- Hide Menu

Sii-Mobility



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 -

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 1 2 3 4 5 6 7

Real-time data currently not available

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...

Weather Forecast for Mucipality of : FIRENZE

Wednesday	Thursday	Friday	Saturday	Sunday
cloudy	light rain and sunny intervals	cloudy	bit cloudy	light rain
17°C / 21°C	13°C / 19°C	12°C / 18°C	/	/

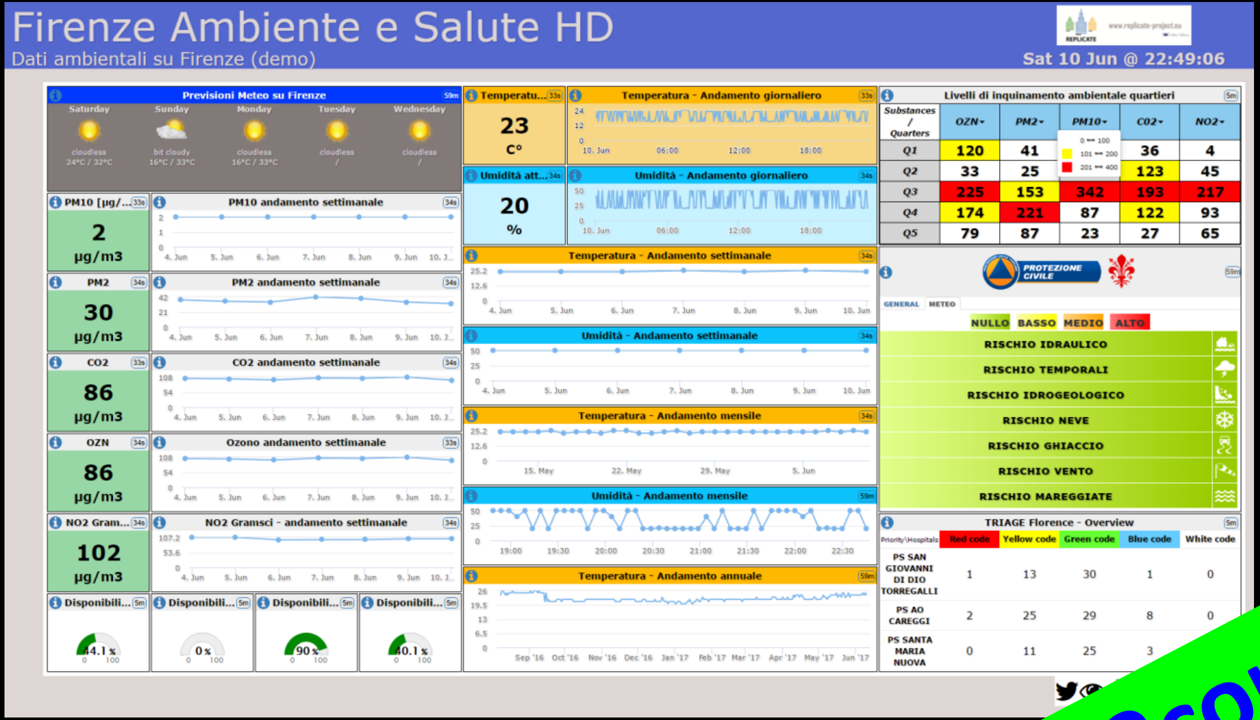
Latest Update: 2016-10-19T14:46:00+01:00

LINKED OPEN GRAPH

Smart City Control Room

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

SmartCity Processes


Firenze Ambiente e Salute HD
Dati ambientali su Firenze (demo)
Sat 10 Jun @ 22:49:06
Previsioni Meteo su Firenze
Saturday
Sunday
Monday
Tuesday
Wednesday
Temperatura - Andamento giornaliero
Umidità - Andamento giornaliero
PM10 andamento settimanale
PM2 andamento settimanale
CO2 andamento settimanale
Ozono andamento settimanale
NO2 Gramsci - andamento settimanale
Temperatura - Andamento settimanale
Umidità - Andamento settimanale
Temperatura - Andamento mensile
Umidità - Andamento mensile
Temperatura - Andamento annuale
PROTEZIONE CIVILE
GENERAL
METEO
NULLO
BASSO
MEDIO
ALTO
RISCHIO IDRAULICO
RISCHIO TEMPORALI
RISCHIO IDROGEOLOGICO
RISCHIO NEVE
RISCHIO GHIACCIO
RISCHIO VENTO
RISCHIO MAREGGIATE
Disponibili...

Temperatura: 23 C°

Umidità att...: 20 %

PM10 [µg/...: 2 µg/m3

PM2: 30 µg/m3

CO2: 86 µg/m3

OZN: 86 µg/m3

NO2 Gram...: 102 µg/m3

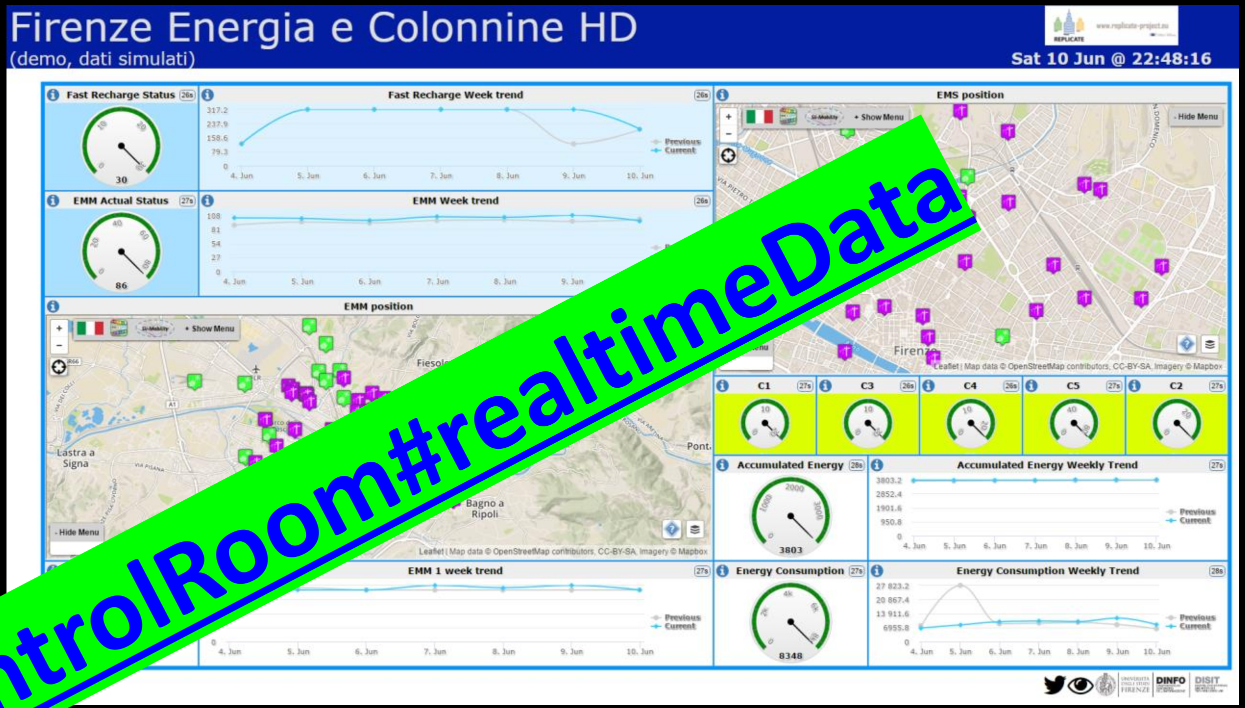
Livelli di inquinamento ambientale quartieri

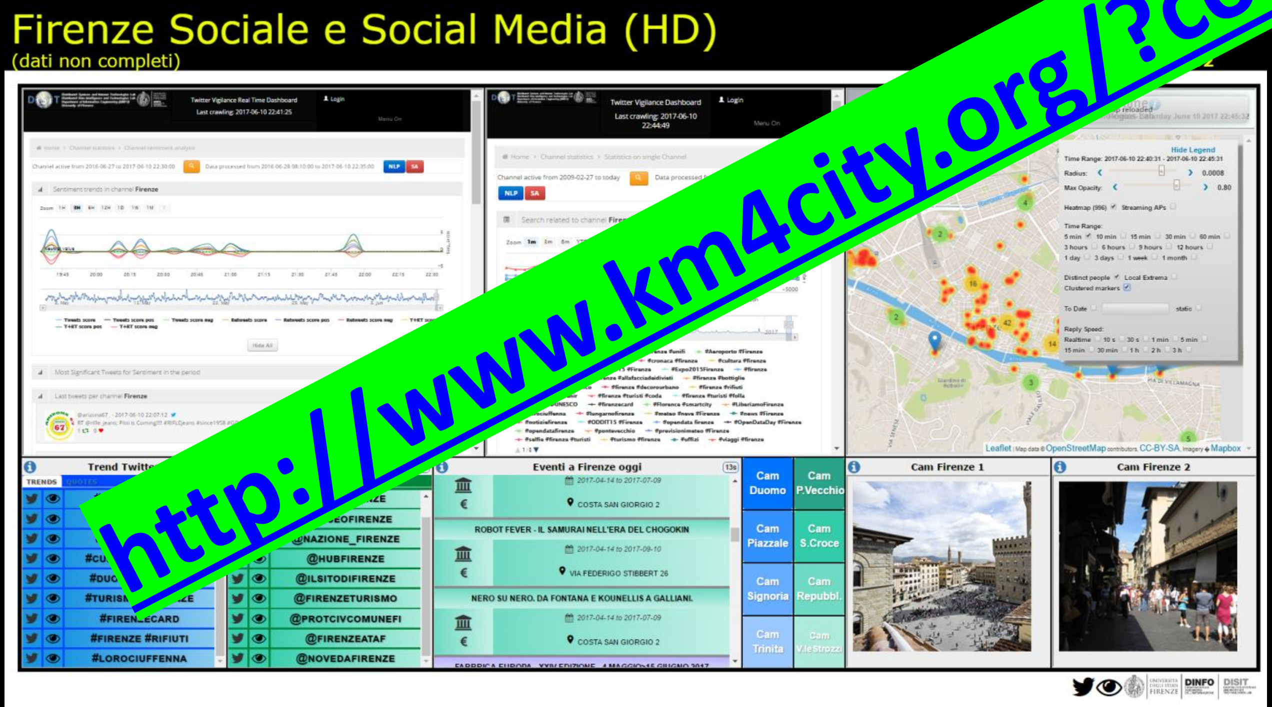
Substances / Quarters	OZN	PM2	PM10	CO2	NO2
Q1	120	41		36	4
Q2	33	25		123	45
Q3	225	153	342	193	217
Q4	174	221	87	122	93
Q5	79	87	23	27	65

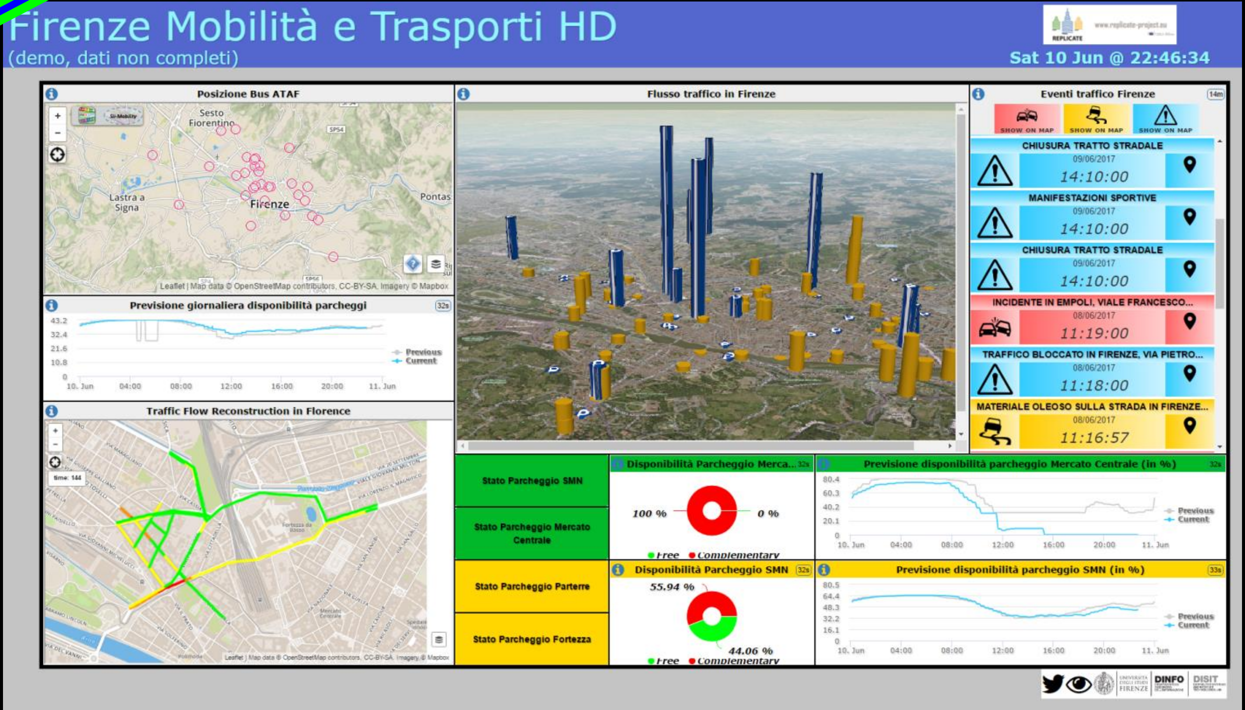
0 ↔ 100
101 ↔ 200
201 ↔ 400

TRIAGE Florence - Overview

Priority\Hospitals	Red code	Yellow code	Green code	Blue code	White code
PS SAN GIOVANNI DI DIO TORREGALLI	1	13	30	1	0
PS AO CAREGGI	2	25	29	8	0
PS SANTA MARIA NUOVA	0	11	25	3	





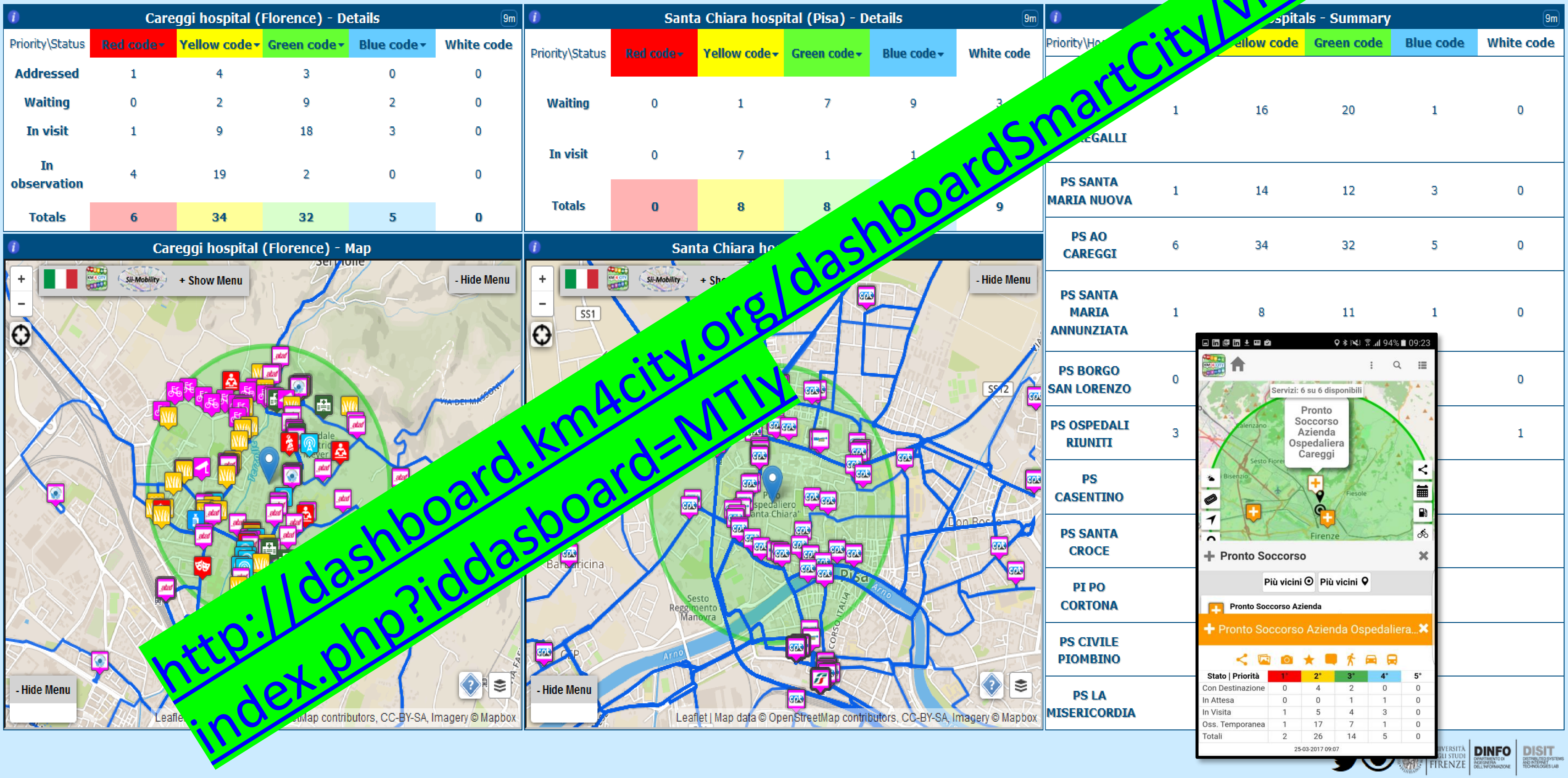

Firenze Mobilità e Trasporti HD
(demo, dati non completi)
Sat 10 Jun @ 22:46:34
Posizione Bus ATAF
Flusso traffico in Firenze
Eventi traffico Firenze
Previsione giornaliera disponibilità parcheggi
Traffic Flow Reconstruction in Florence
Stato Parcheggio SMN
Stato Parcheggio Mercato Centrale
Stato Parcheggio Parterre
Stato Parcheggio Fortezza
Disponibilità Parcheggio Merca...
Disponibilità Parcheggio SMN
Previsione disponibilità parcheggio Mercato Centrale (in %)
Previsione disponibilità parcheggio SMN (in %)
CHIUSURA TRATTO STRADALE
MANIFESTAZIONI SPORTIVE
INCIDENTE IN EMPOLI, VIALE FRANCESCO...
TRAFFICO BLOCCATO IN FIRENZE, VIA PIETRO...
MATERIALE OLEOSO SULLA STRADA IN FIRENZE...
14:10:00
11:19:00
11:18:00
11:16:57
100 %
0 %
55.94 %
44.06 %
Free
Complementary

http://www.km4city.org/?controlRoom#realtimeData

First aids overview - Tuscany

Service status of main first aids

ay @ 11:00:34



Careggi hospital (Florence) - Details 9m

Priority\Status	Red code	Yellow code	Green code	Blue code	White code
Addressed	1	4	3	0	0
Waiting	0	2	9	2	0
In visit	1	9	18	3	0
In observation	4	19	2	0	0
Totals	6	34	32	5	0

Santa Chiara hospital (Pisa) - Details 9m

Priority\Status	Red code	Yellow code	Green code	Blue code	White code
Waiting	0	1	7	9	3
In visit	0	7	1	1	[illegible]
Totals	0	8	8	[illegible]	9

spitals - Summary 9m

Priority\Ho	[illegible]	ellow code	Green code	Blue code	White code
EGALLI	1	16	20	1	0
PS SANTA MARIA NUOVA	1	14	12	3	0
PS AO CAREGGI	6	34	32	5	0
PS SANTA MARIA ANNUNZIATA	1	8	11	1	0
PS BORGO SAN LORENZO	0	[illegible]	[illegible]	[illegible]	0
PS OSPEDALI RIUNITI	3	[illegible]	[illegible]	[illegible]	1
PS CASENTINO					
PS SANTA CROCE					
PI PO CORTONA					
PS CIVILE PIOMBINO					
PS LA MISERICORDIA					

Careggi hospital (Florence) - Map

Santa Chiara ho

94% 09:23

Servizi: 6 su 6 disponibili

Pronto Soccorso Azienda Ospedaliera Careggi

Pronto Soccorso

Più vicini ⊙ Più vicini

Pronto Soccorso Azienda

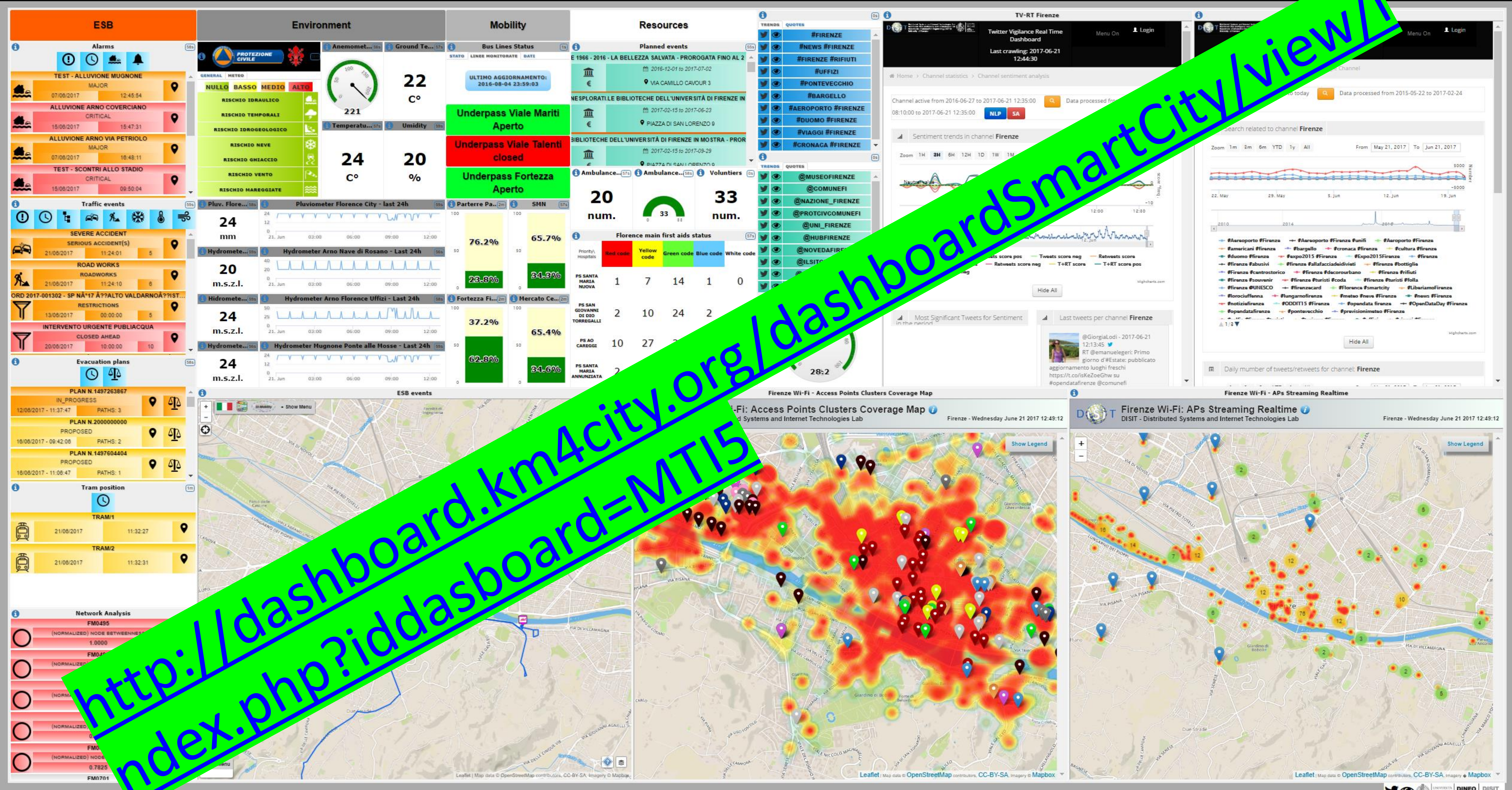
Pronto Soccorso Azienda Ospedaliera...

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

25-03-2017 09:07

http://dashboard.km4city.org/dashboardSmartCity/view/index.php?iddasboard=MTIy

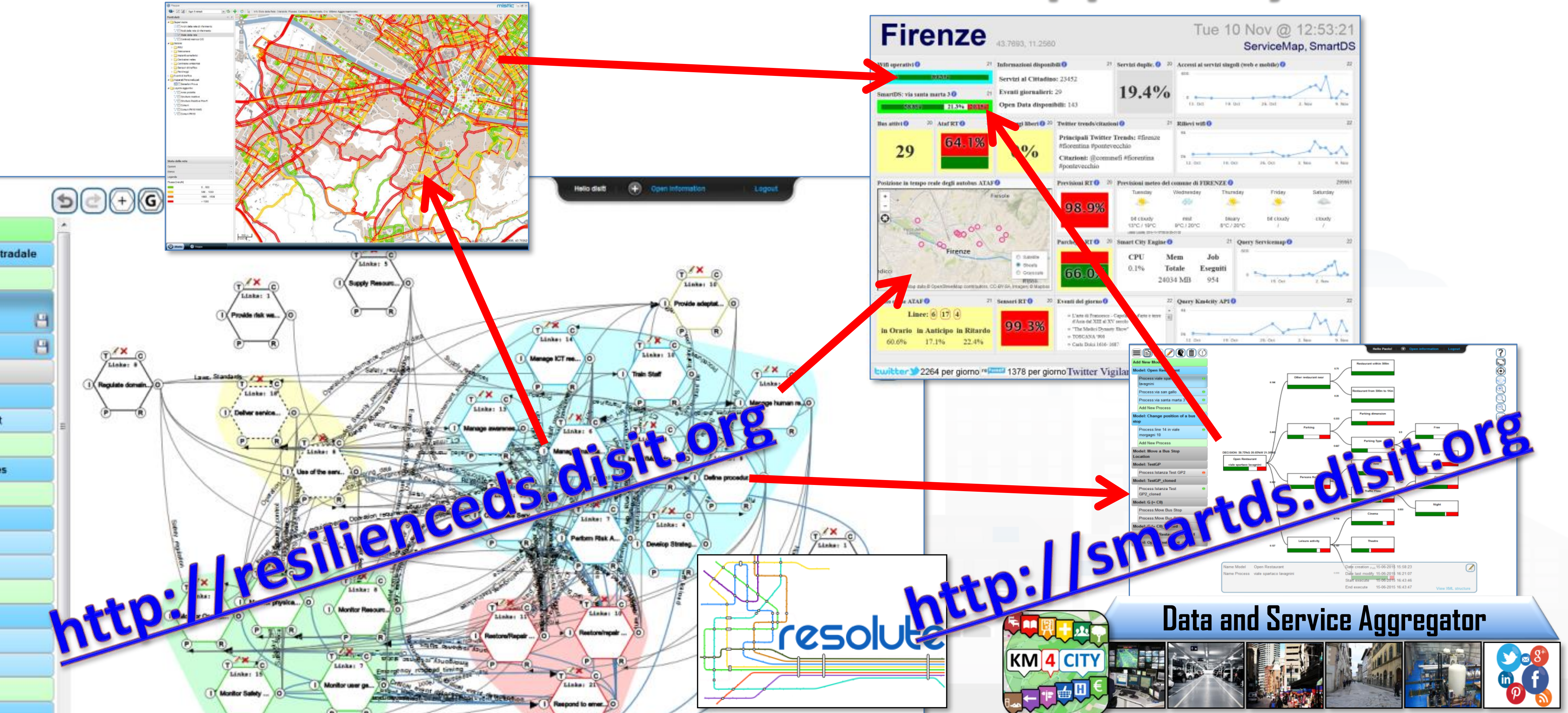
RESOLUTE Dashboard 4XHD v5


ESB
Environment
Mobility
Resources
Alarms
Traffic events
Evacuation plans
Tram position
Network Analysis
Bus Lines Status
Planned events
Florence main first aids status
TV-RT Firenze
ESB events
Firenze Wi-Fi - Access Points Clusters Coverage Map
Firenze Wi-Fi - APs Streaming Realtime
Underpass Viale Mariti Aperto
Underpass Viale Talenti closed
Underpass Fortezza Aperto

http://dashboard.km4city.org/dashboardSmartCity/view/index.php?iddasboard=MTI5

Assessing / Controlling city resilience

Risk Assessment vs Decision Support Systems



Firenze 43.7693, 11.2560

Tue 10 Nov @ 12:53:21

ServiceMap, SmartDS

Servizi al Cittadino: 23452

Eventi giornalieri: 29

Open Data disponibili: 143

Principali Twitter Trends: #firenze #fiorentina #pontevecchio

Citazioni: @commefi #fiorentina #pontevecchio

CPU 0.1%

Mem Totale 24034 MB

Job Eseguiti 954

Linee: 6 17 4

in Orario 60.6% in Anticipo 17.1% in Ritardo 22.4%

twitter 2264 per giorno retweet 1378 per giorno Twitter Vigilance

http://resilienceds.disit.org

http://smartds.disit.org

Data and Service Aggregator

Monitoring City Usage

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

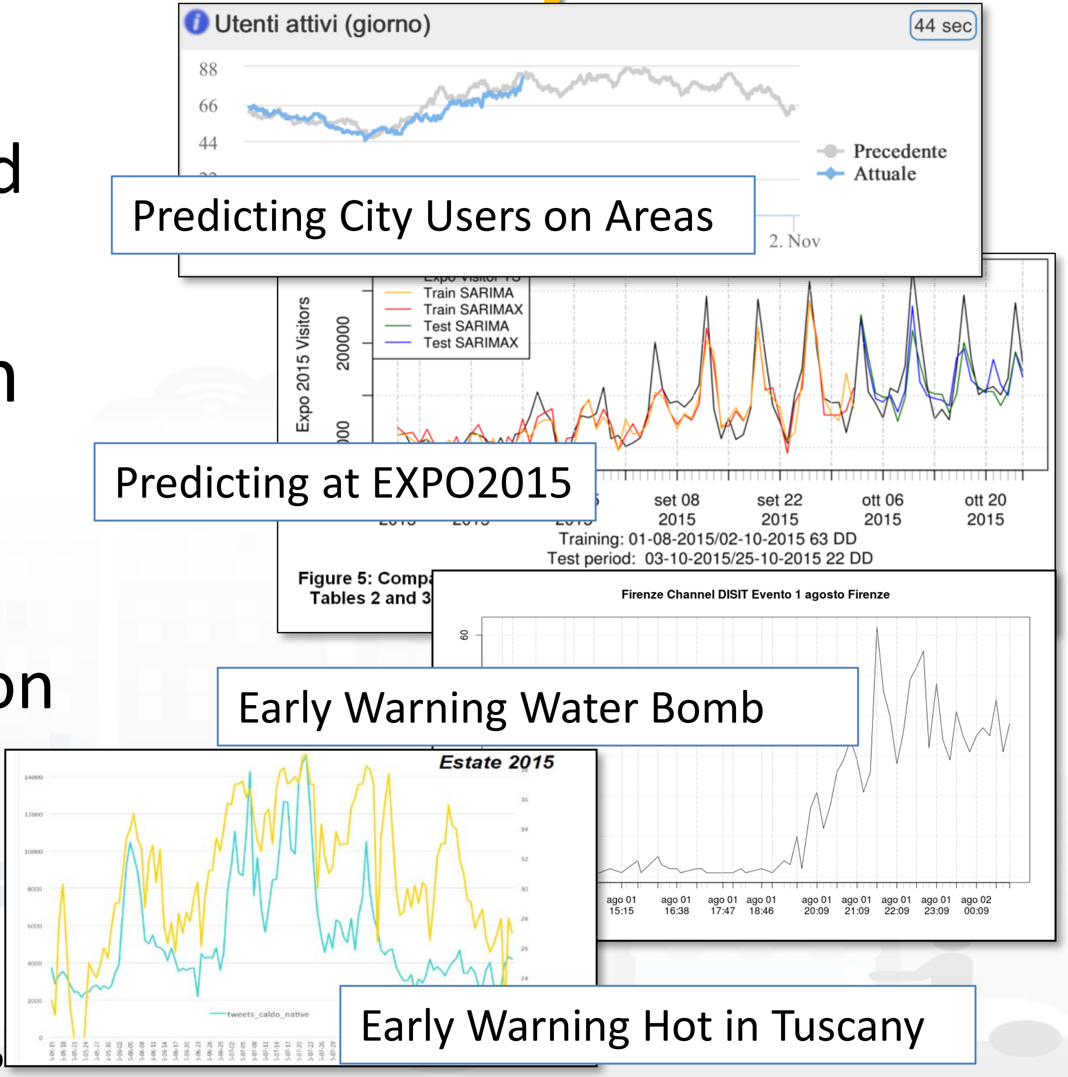
http://www.km4city.org/?devTools

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

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

Predicting Models for Admin. & City Users

- Aiming at improving
  - quality of service, distributing workload
  - early warning
- Short (15 min, 30 Min) and mid Term Predictions (1 week)
- Data Analytics: ML, NLP/SA, Clust…
  - Traffic Flows → multiflow reconstruction
  - Parking Status → free slots
  - People Flows (WiFi, Twitter)
    → crowd , #number of people



Predicting City Users on Areas

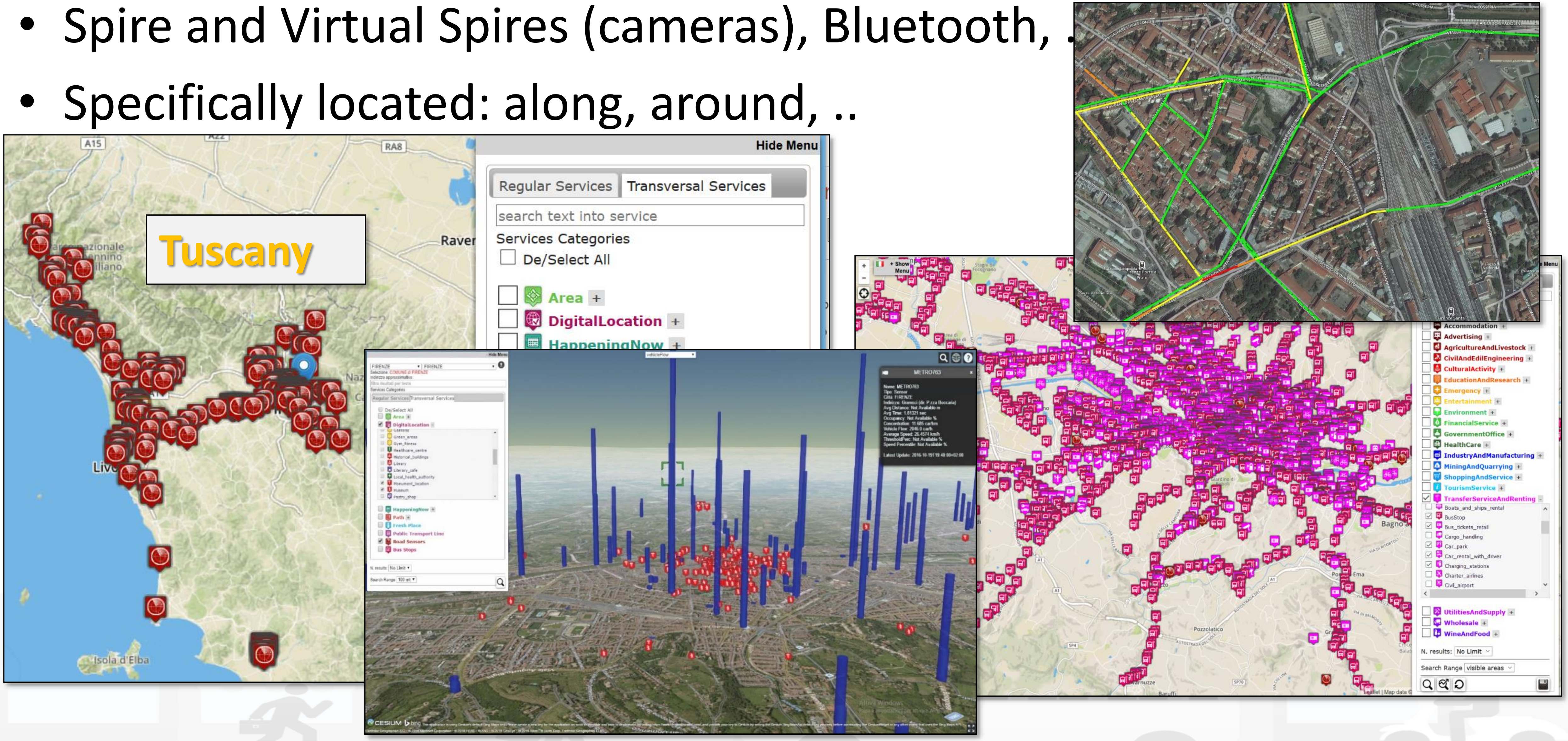
Predicting at EXPO2015

Early Warning Water Bomb

Early Warning Hot in Tuscany

Traffic Flow Tools

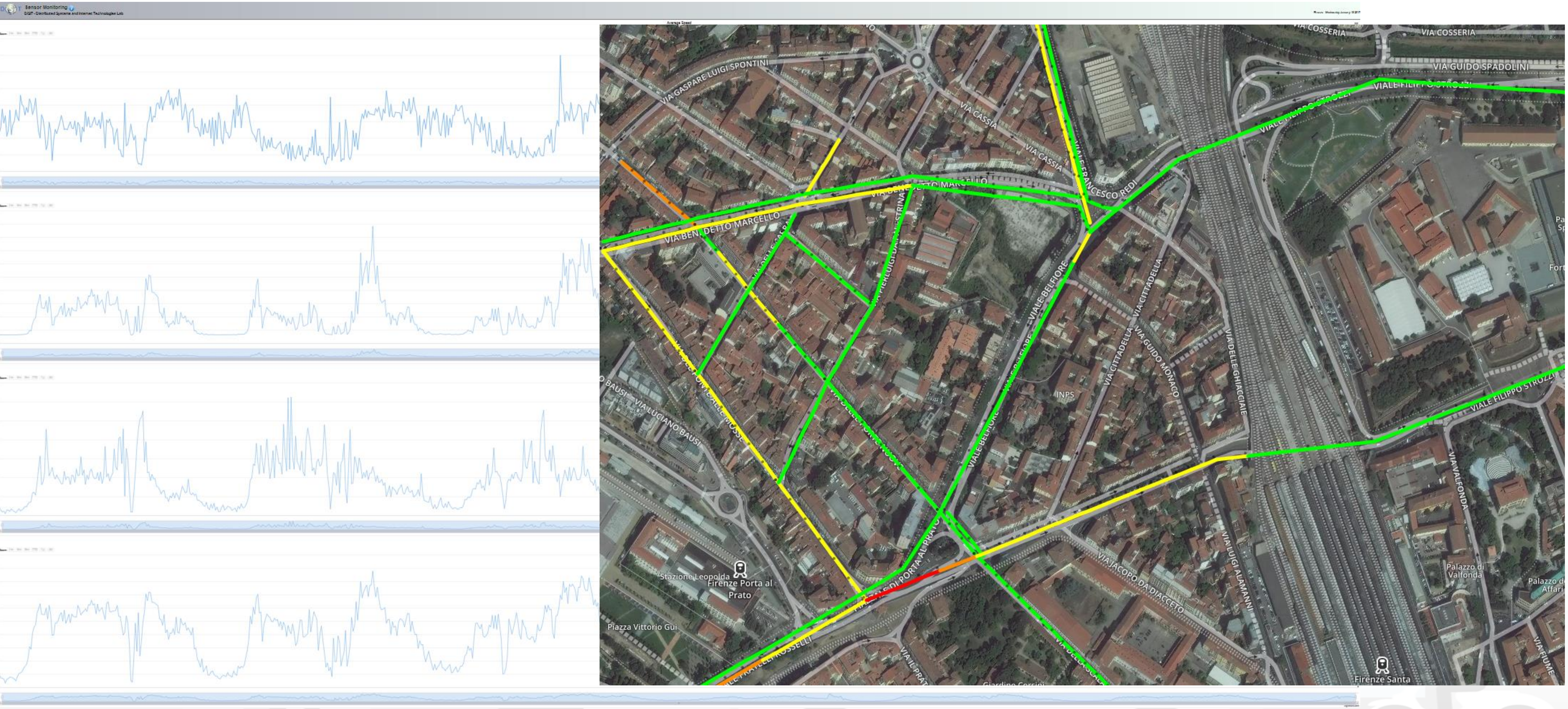
- Spire and Virtual Spires (cameras), Bluetooth, .
- Specifically located: along, around, ..



Nome: METRO763
Tipo: Sensor
Città: FIRENZE
Indirizzo: Gramsci (dir. P.zza Beccaria)
Avg Distance: Not Available m
Avg Time: 1.81321 sec
Occupancy: Not Available %
Concentration: 11.685 car/km
Vehicle Flow: 2046.0 car/h
Average Speed: 26.4574 km/h
ThresholdPerc: Not Available %
Speed Percentile: Not Available %

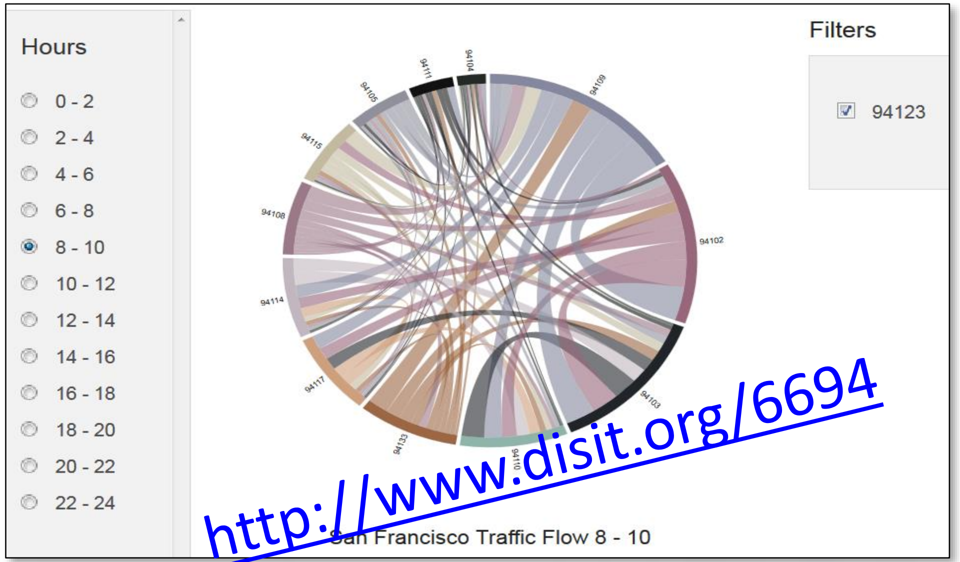
Latest Update: 2016-10-19T19:40:00+02:00

Traffic Flow data



Traffic and People Flow Assessment

- **Origin Destination Matrix**
  - – Specific Sensors, vehicle Kits, mobile App, Wi-Fi Access Points, etc.
- **Assess people and traffic flows to**
  - – improve services
  - – predict critical conditions on Crit. Infra.
  - – take real time decisions and sending messages in push to population
  - – Increase city resilience
  - – optimize traffic flow
  - – take decision of routing

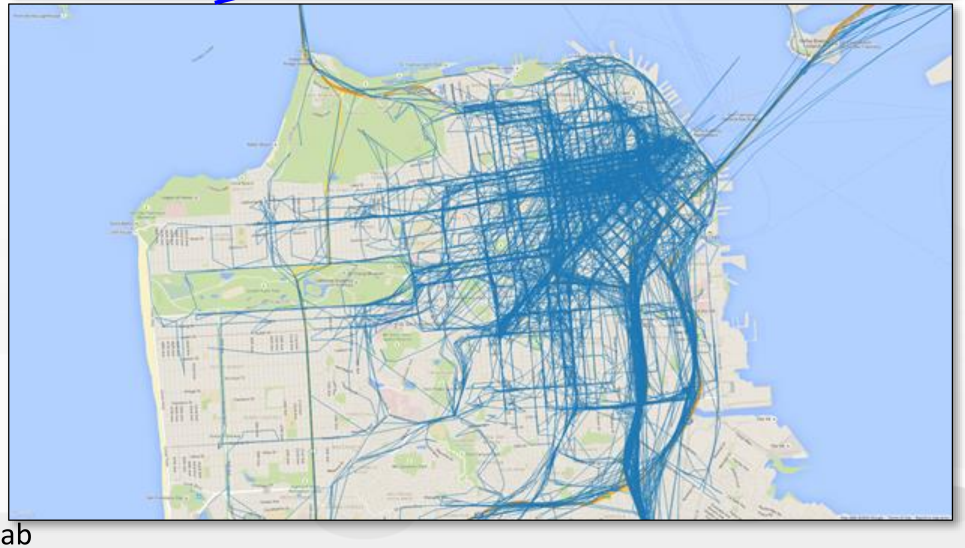


Hours
○ 0 - 2
○ 2 - 4
○ 4 - 6
○ 6 - 8
● 8 - 10
○ 10 - 12
○ 12 - 14
○ 14 - 16
○ 16 - 18
○ 18 - 20
○ 20 - 22
○ 22 - 24

Filters
☑ 94123

San Francisco Traffic Flow 8 - 10

http://www.disit.org/6694

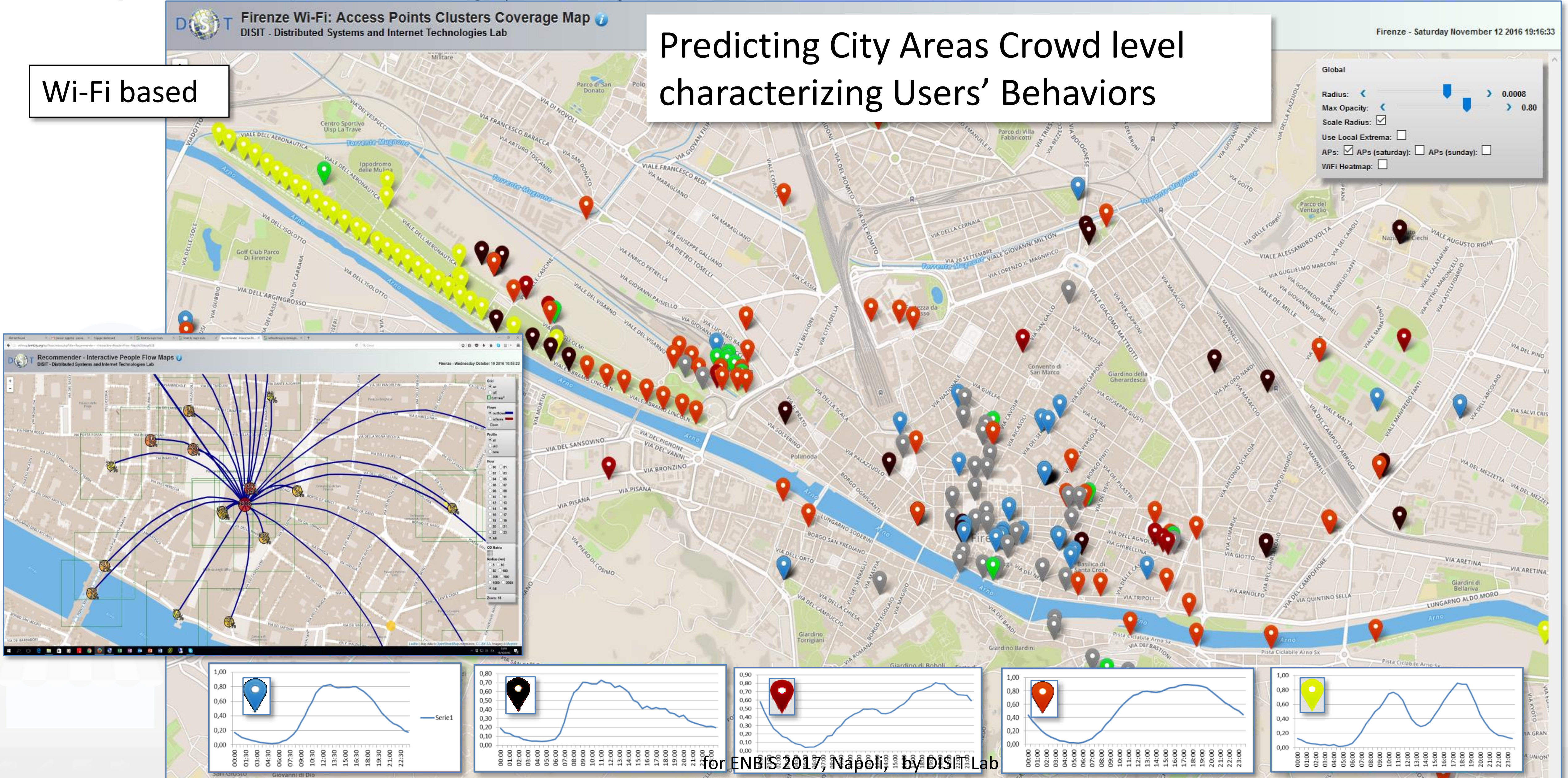


http://www.disit.org

Characterizing City Areas

Wi-Fi based

Predicting City Areas Crowd level characterizing Users' Behaviors



Firenze Wi-Fi: Access Points Clusters Coverage Map

DISIT - Distributed Systems and Internet Technologies Lab

Firenze - Saturday November 12 2016 19:16:33

Global

Radius: 0.0008

Max Opacity: 0.80

Scale Radius: ☑

Use Local Extrema: ☐

APs: ☑ APs (saturday): ☐ APs (sunday): ☐

WiFi Heatmap: ☐

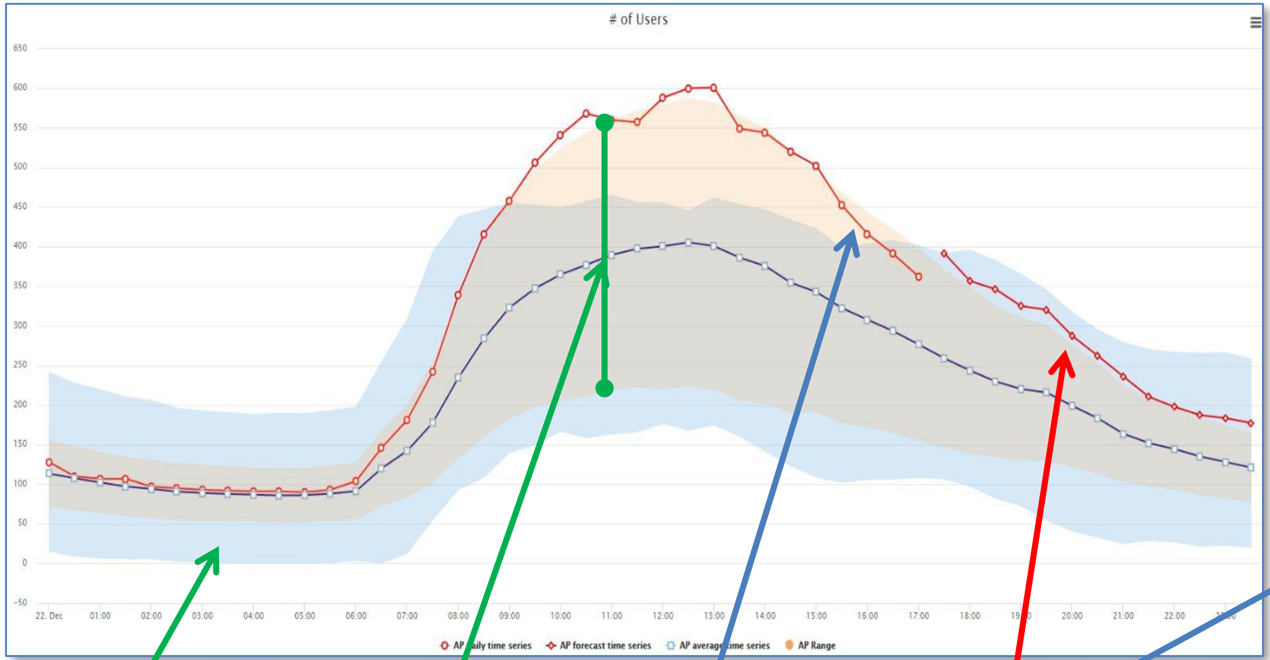
Recommender - Interactive People Flow Maps

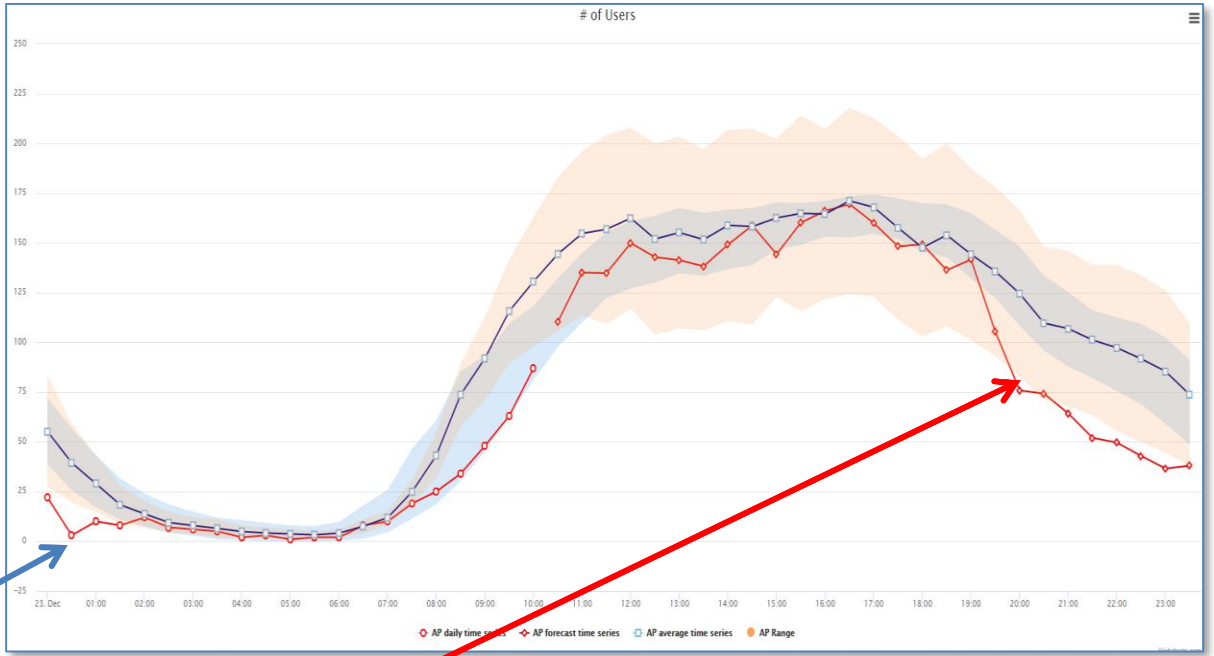
DISIT - Distributed Systems and Internet Technologies Lab

Firenze - Wednesday October 19 2016 10:59:22

Prediction and identification of anomalies

Guessing number of users of Wi-Fi Access Points





Cluster confidence

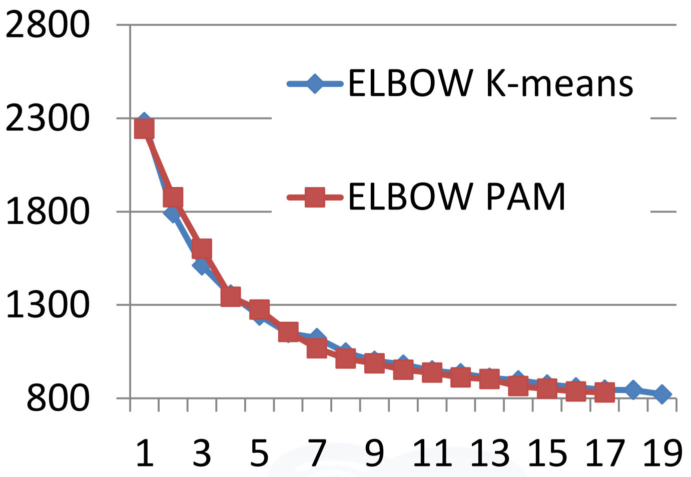
AP average and confidence

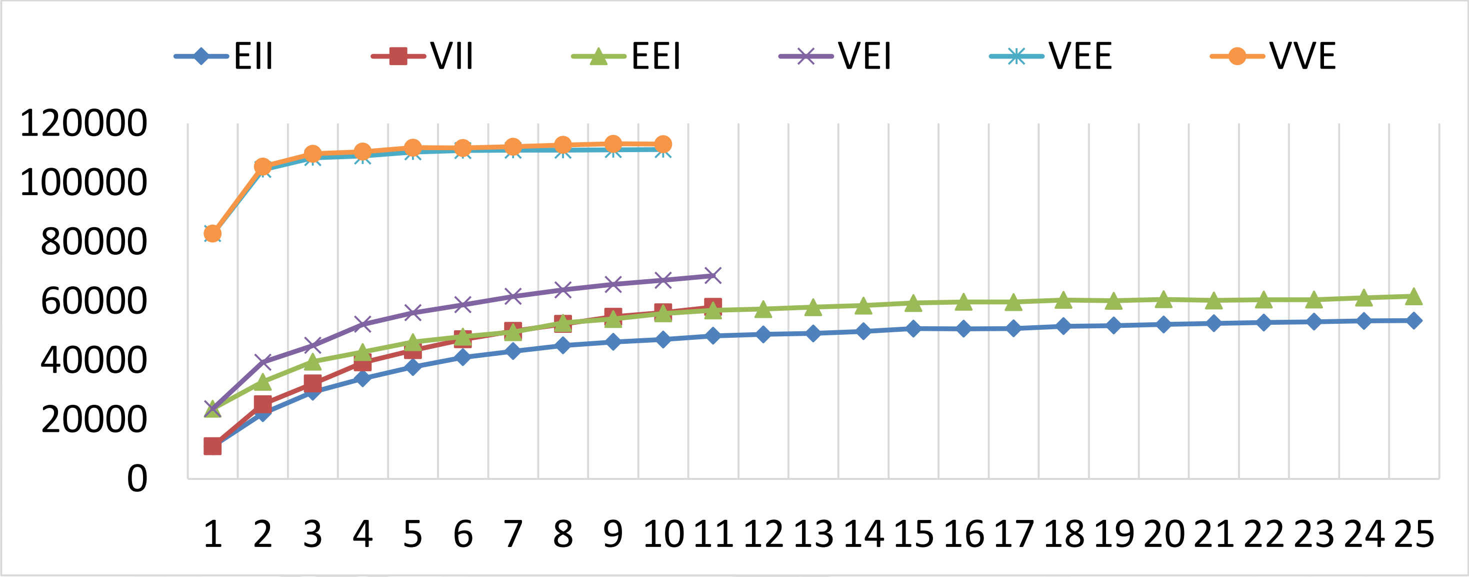
Actual AP trend for today

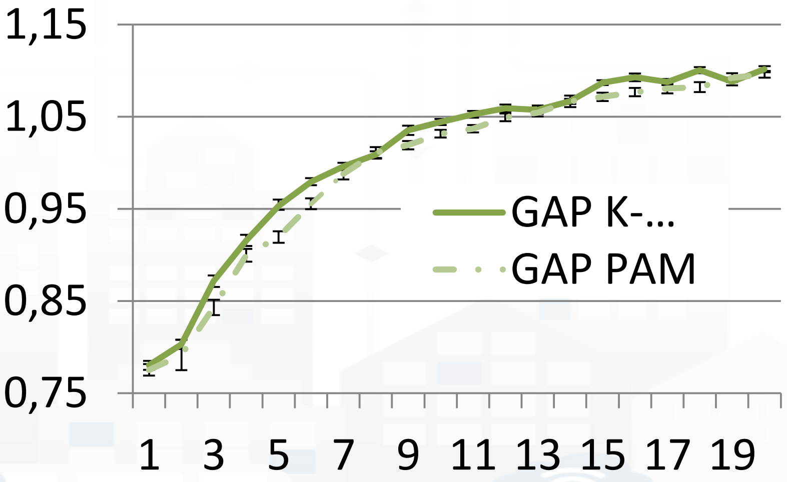
AP prediction for the next time slot in the day on the basis of past weeks

Clustering of City Usage of Wi-Fi

- Approaches: K-Means, K-Medoids (PAM), …..
- Assessment Methods: ELBOW, GAP
- Identification of the most suitable K







UNIVERSITÀ DEGLI STUDI FIRENZE

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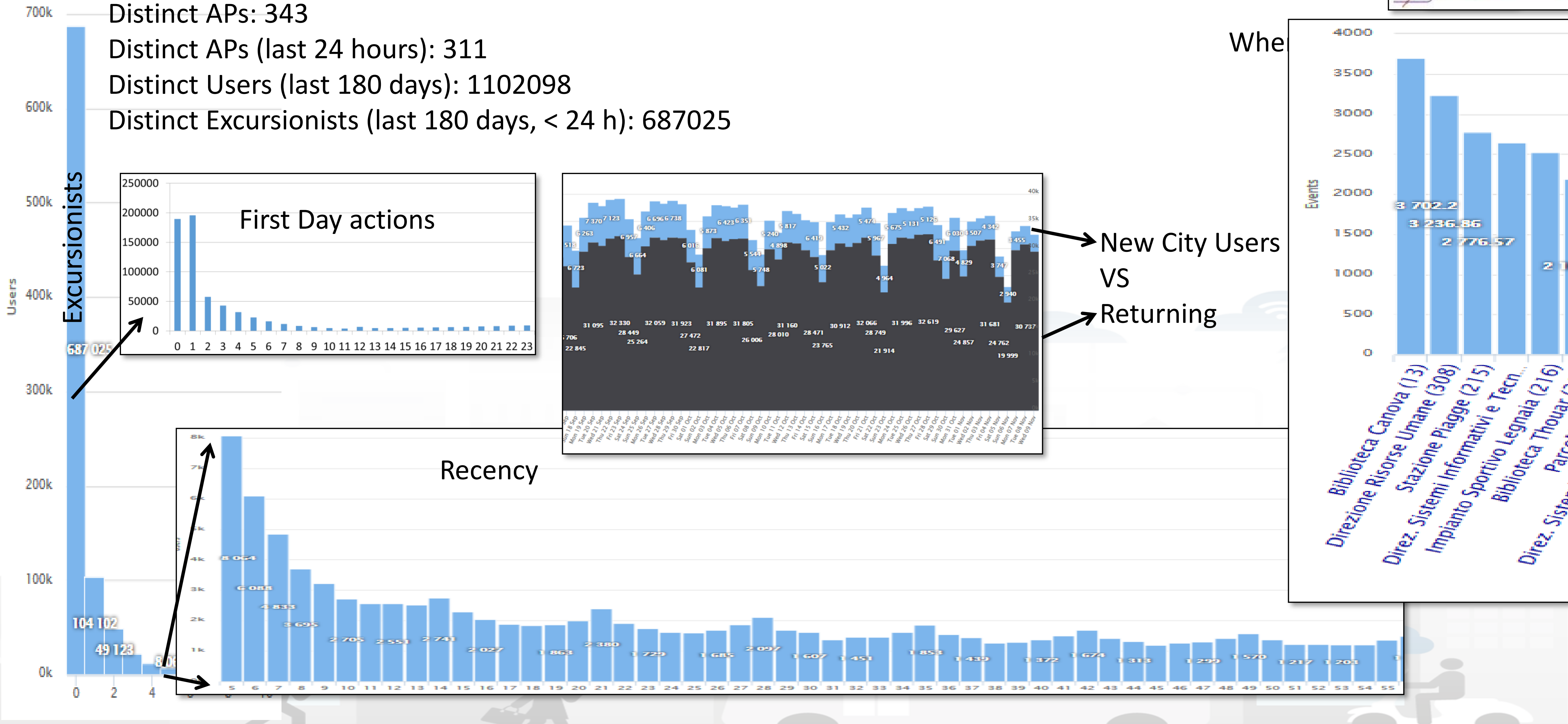
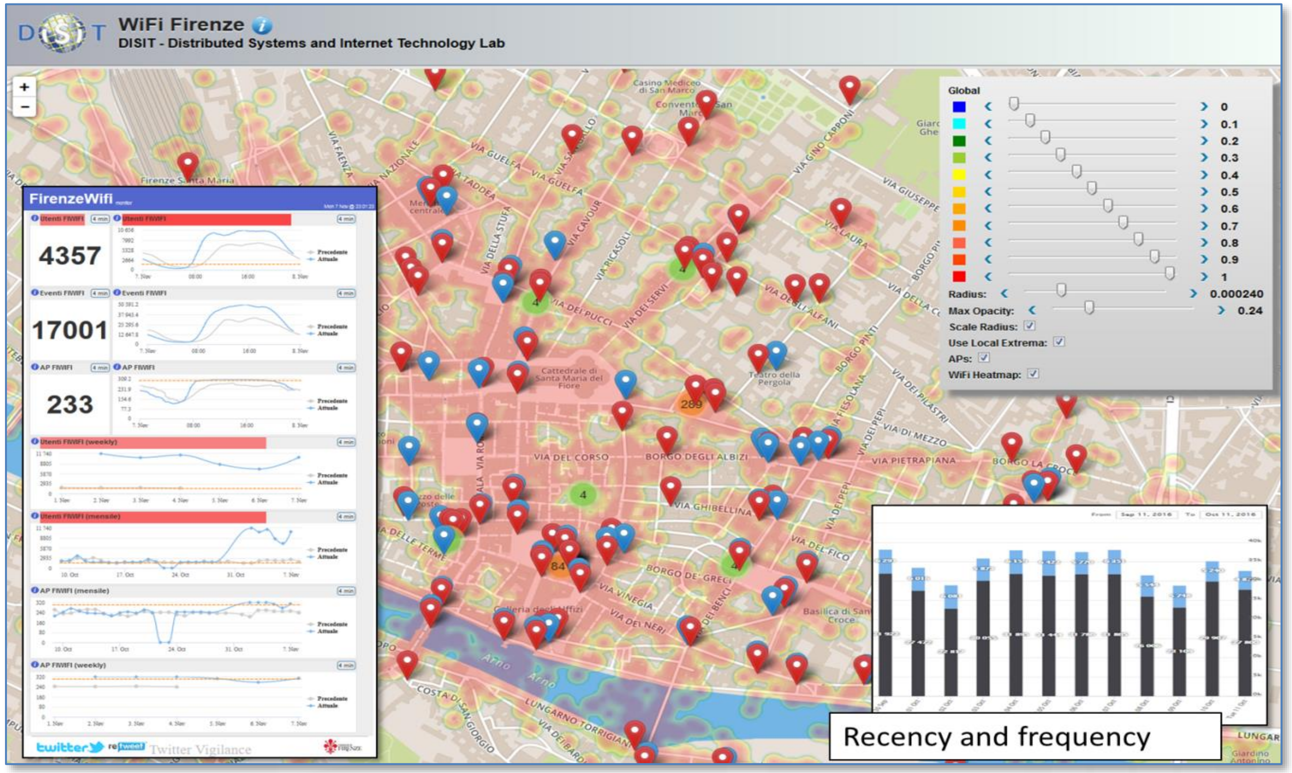
DISIT DISTRIBUTED SYSTEMS AND INTERNET TECHNOLOGIES LAB
http://www.disit.org

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



Origin Destination Matrix Estimation



WiFi Firenze
DISIT - Distributed Systems and Internet Technology Lab

FirenzeWifi

Utenti FIWIFI: 4357

Eventi FIWIFI: 17001

AP FIWIFI: 233

Global

Radius: 0.000240

Max Opacity: 0.24

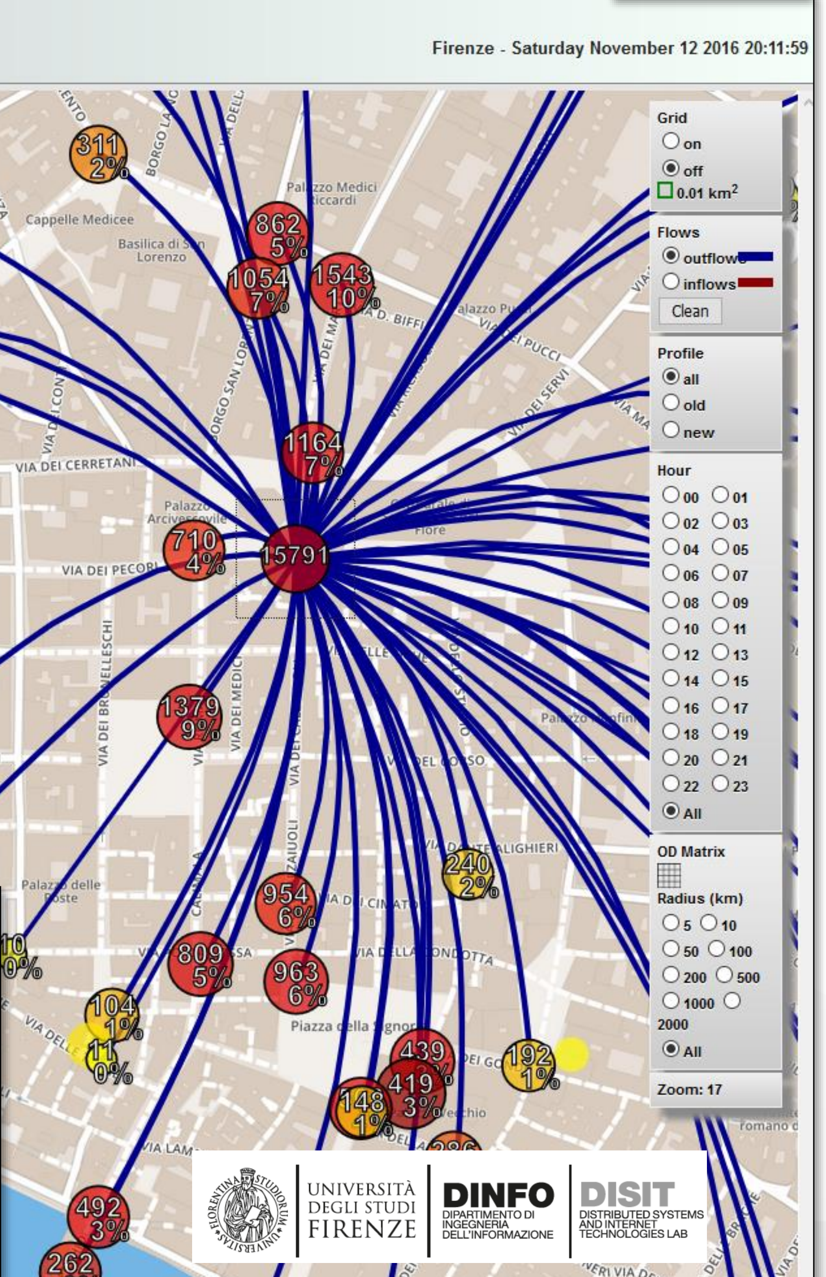
Scale Radius: ☑

Use Local Extrema: ☑

APs: ☑

WiFi Heatmap: ☑

Recency and frequency



Firenze - Saturday November 12 2016 20:11:59

Grid
○ on
● off
☐ 0.01 km²

Flows
● outflows
○ inflows
Clean

Profile
● all
○ old
○ new

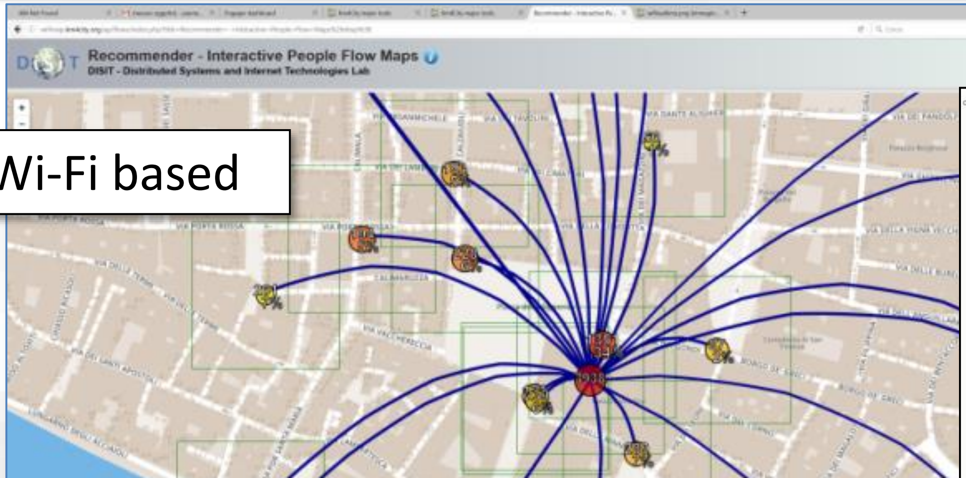
Hour
○ 00 ○ 01
○ 02 ○ 03
○ 04 ○ 05
○ 06 ○ 07
○ 08 ○ 09
○ 10 ○ 11
○ 12 ○ 13
○ 14 ○ 15
○ 16 ○ 17
○ 18 ○ 19
○ 20 ○ 21
○ 22 ○ 23
● All

OD Matrix

Radius (km)
○ 5 ○ 10
○ 50 ○ 100
○ 200 ○ 500
○ 1000 ○ 2000
● All

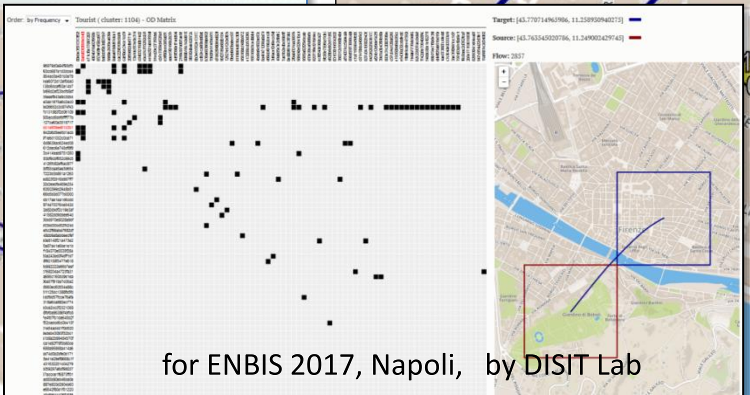
Zoom: 17

Wi-Fi based



Recommender - Interactive People Flow Maps
DISIT - Distributed Systems and Internet Technologies Lab

Firenze - Wednesday October 19 2016 10:59:22

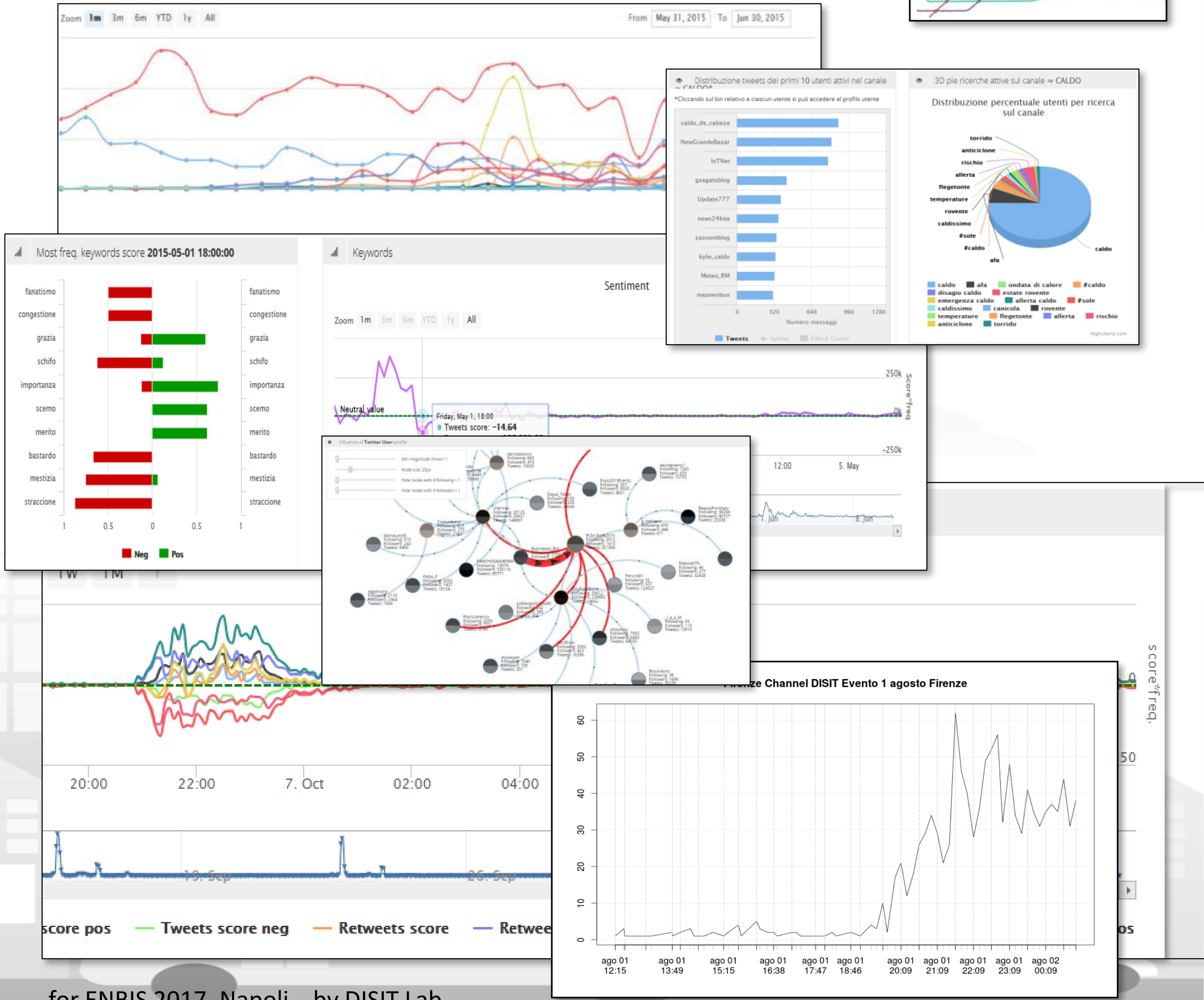


Order: by Frequency

Tourist (cluster: 1104) - OD Matrix

Twitter Vigilance

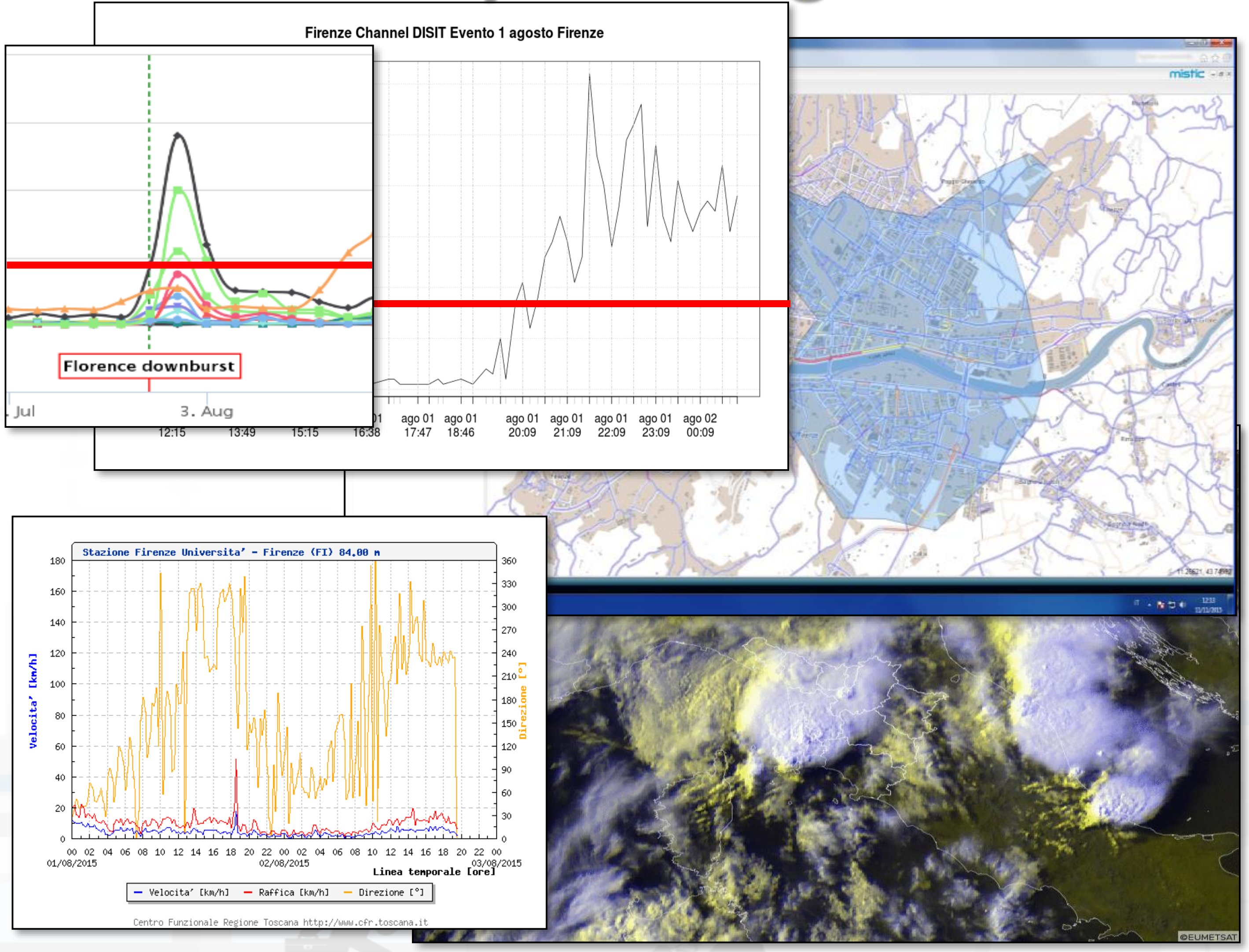
- http://www.disit.org/tv
- http://www.disit.org/rttv
- Citizens as sensors to
  - Assess sentiment on services, events, …
  - Response of consumers wrt…
  - Early detection of critical conditions
  - Information channel
  - Opinion leaders
  - Communities
  - Formation
  - Predicting volume of visitors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


Zoom 1m 3m 6m YTD 1y All
From May 31, 2015 To Jun 30, 2015
Most freq. keywords score 2015-05-01 18:00:00
fanatismo
congestione
grazia
schifo
importanza
scemo
merito
bastardo
mestizia
straccione
Neg
Pos
Keywords
Sentiment
Neutral value
Friday, May 1, 18:00
Tweets score: -14.64
Distribuzione tweets dei primi 10 utenti attivi nel canale CALDO
3D pie ricerche attive sul canale = CALDO
Distribuzione percentuale utenti per ricerca sul canale
Influence of Twitter User profile
Firenze Channel DISIT Evento 1 agosto Firenze
20:00
22:00
7. Oct
02:00
04:00
score pos
Tweets score neg
Retweets score
Retwee

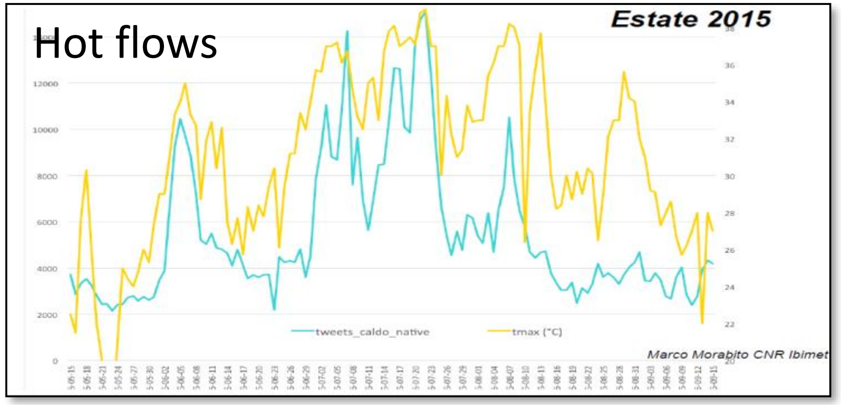
Twitter Vigilance

Twitter Vigilance

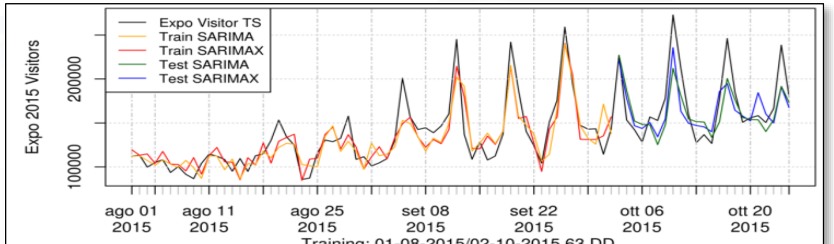
Early Warning



Predictive models



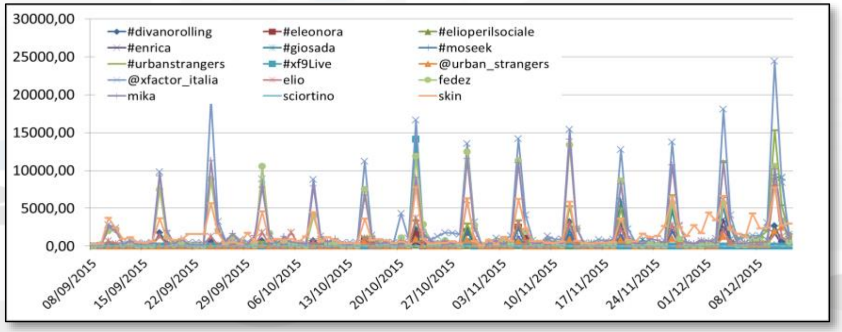
Attendance at long lasting events: EXPO2015



Training: 01-08-2015/02-10-2015 63 DD
Test period: 03-10-2015/25-10-2015 22 DD

Figure 5: Comparison among the selected predictive models discussed and presented in Tables 2 and 3 with respect to the real number of visitors. Both training and validation periods are reported.

Attendance at recurrent events: TV, footbal



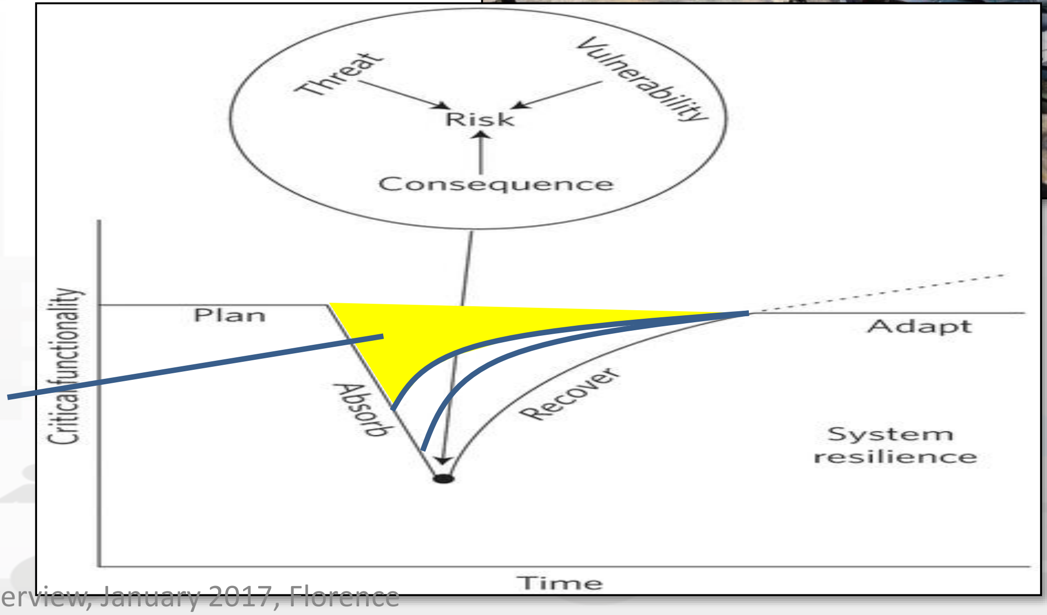
for ENBIS 2017, Napoli, by DISIT Lab

Early warning, detection

- **Issue:**
  - Detection of critical condition
  - Not easily detected with other means
- **Impact:**
  - Early warning, faster reaction
  - Increased resilience
- **Several metrics related to**
  - Volume of retweets
  - Sentiment analysis

City Resilience

Prepare
Absorb
Recover
Adapt

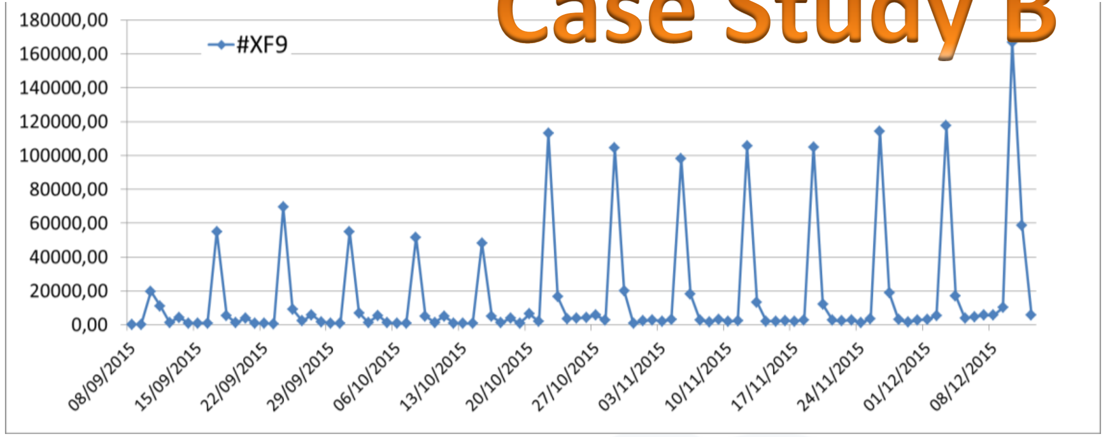


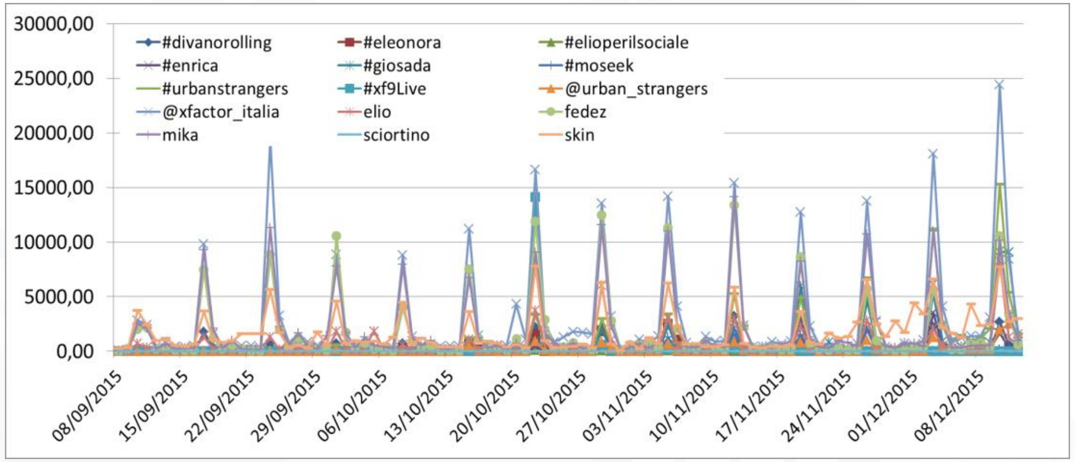
damage

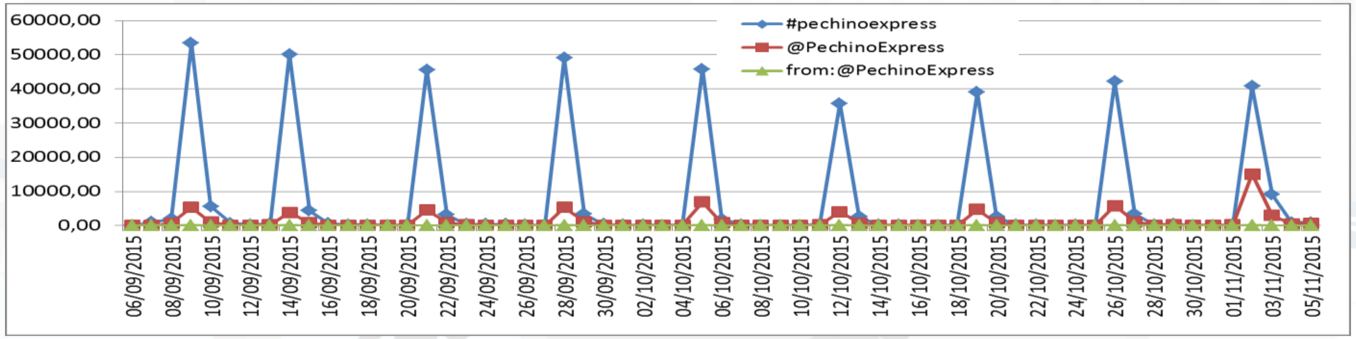
Predicting Audience: X-Factor, PechinoExpress…

Case Study B

- Trend of TW and RTW for X-Factor 9
  - Several searches
- Similar model for other Social Intensive TV shows
  - See below Pechino Express







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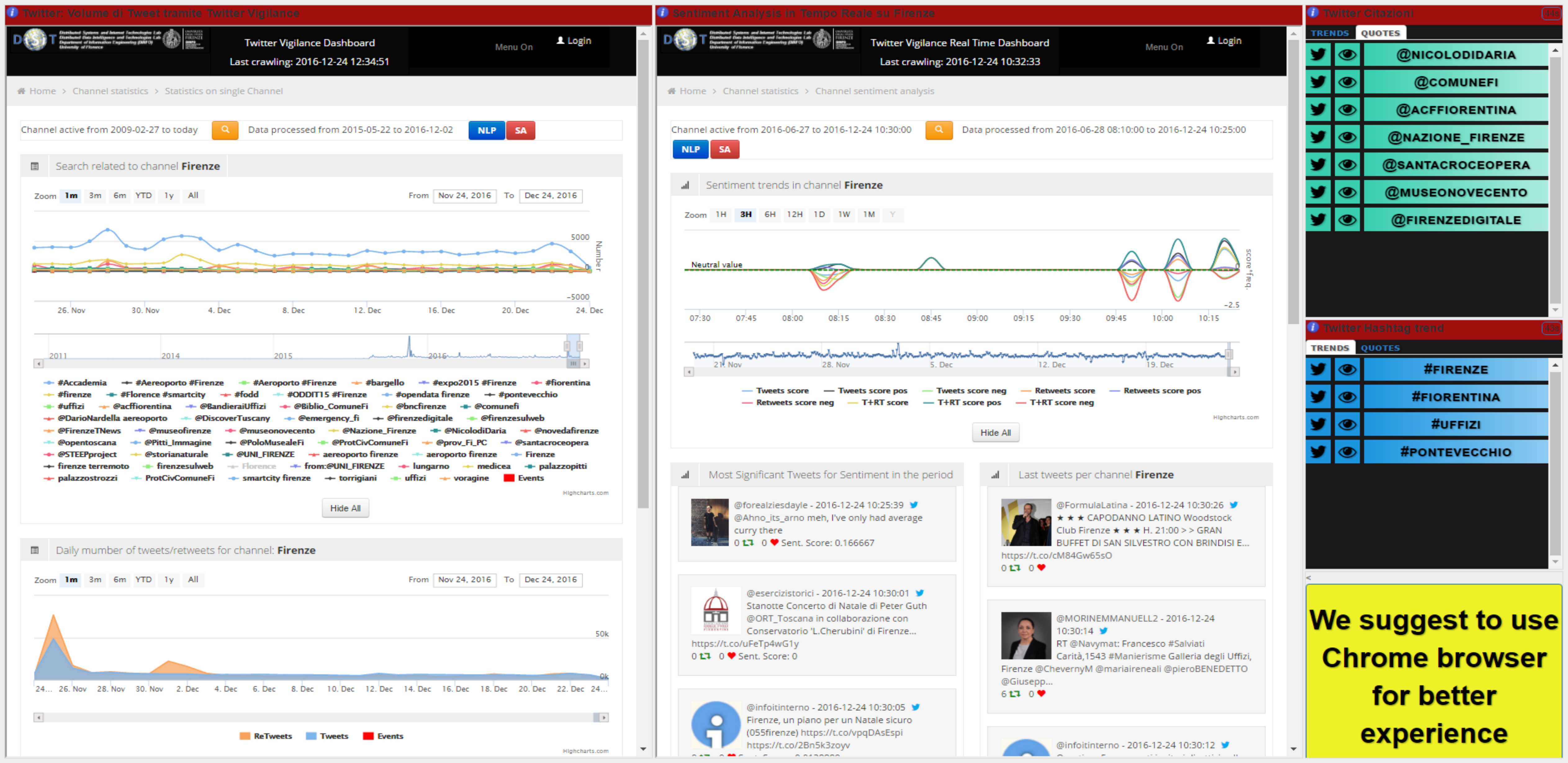
DINFO DIPARTIMENTO DI INGEGNERIA DELL'INFORMAZIONE
DISIT DISTRIBUTED SYSTEMS AND INTERNET TECHNOLOGIES LAB

Twitter Vigilance su Firenze
(sperimentale)

Sat 24 Dec @ 10:37:57



Twitter: Volume di Tweet tramite Twitter Vigilance

Twitter Vigilance Dashboard
Last crawling: 2016-12-24 12:34:51

Home > Channel statistics > Statistics on single Channel

Channel active from 2009-02-27 to today

Data processed from 2015-05-22 to 2016-12-02

Search related to channel **Firenze**

Daily mumber of tweets/retweets for channel: **Firenze**

Zoom 1m 3m 6m YTD 1y All
From Nov 24, 2016 To Dec 24, 2016
50k
0k
24... 26. Nov 28. Nov 30. Nov 2. Dec 4. Dec 6. Dec 8. Dec 10. Dec 12. Dec 14. Dec 16. Dec 18. Dec 20. Dec 22. Dec 24...
ReTweets
Tweets
Events
Highcharts.com

Sentiment Analysis in Tempo Reale su Firenze

Twitter Vigilance Real Time Dashboard
Last crawling: 2016-12-24 10:32:33

Home > Channel statistics > Channel sentiment analysis

Channel active from 2016-06-27 to 2016-12-24 10:30:00

Data processed from 2016-06-28 08:10:00 to 2016-12-24 10:25:00

Sentiment trends in channel **Firenze**

Most Significant Tweets for Sentiment in the period

@forealziesdayle - 2016-12-24 10:25:39
@Ahno_its_arno meh, I've only had average curry there
0 0 Sent. Score: 0.166667

@esercizistorici - 2016-12-24 10:30:01
Stanotte Concerto di Natale di Peter Guth @ORT_Toscana in collaborazione con Conservatorio 'L.Cherubini' di Firenze... https://t.co/uFeTp4wG1y
0 0 Sent. Score: 0

@infoitinterno - 2016-12-24 10:30:05
Firenze, un piano per un Natale sicuro (055firenze) https://t.co/vpqDAsEspi https://t.co/2Bn5k3zoyv

Last tweets per channel **Firenze**

@FormulaLatina - 2016-12-24 10:30:26
★ ★ ★ CAPODANNO LATINO Woodstock Club Firenze ★ ★ ★ H. 21:00 > > GRAN BUFFET DI SAN SILVESTRO CON BRINDISI E... https://t.co/cM84Gw65sO
0 0

@MORINEMMANUELL2 - 2016-12-24 10:30:14
RT @Navymat: Francesco #Salviati Carità,1543 #Manierisme Galleria degli Uffizi, Firenze @ChevernyM @mariaireneali @pieroBENEDETTO @Giusepp...
6 0

@infoitinterno - 2016-12-24 10:30:12

Twitter Citazioni

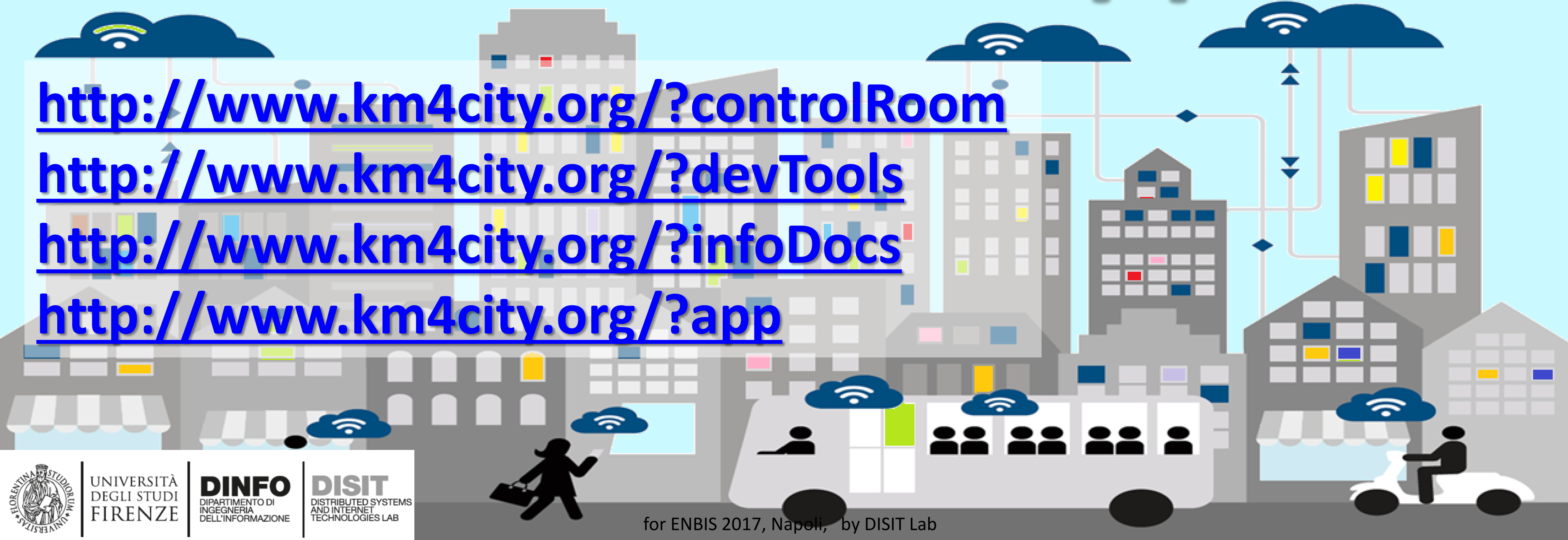
@NICOLODIDARIA
@COMUNEFI
@ACFFIORENTINA
@NAZIONE_FIRENZE
@SANTACROCEOPERA
@MUSEONOVECENTO
@FIRENZEDIGITALE

Twitter Hashtag trend

#FIRENZE
#FIORENTINA
#UFFIZI
#PONTEVECCHIO

We suggest to use Chrome browser for better experience

Engaging Users via Mobile App



http://www.km4city.org/?controlRoom
http://www.km4city.org/?devTools
http://www.km4city.org/?infoDocs
http://www.km4city.org/?app

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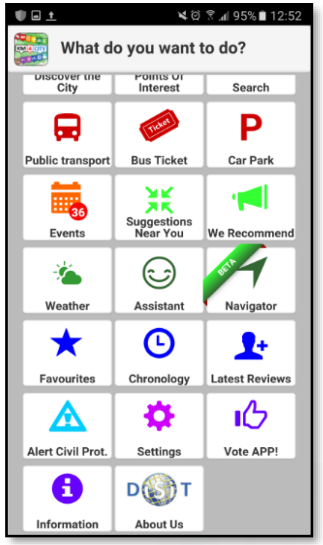
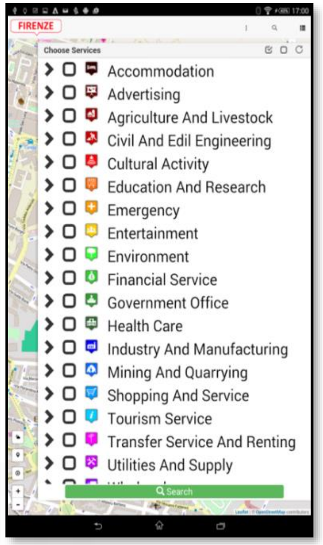
DISIT DISTRIBUTED SYSTEMS AND INTERNET TECHNOLOGIES LAB

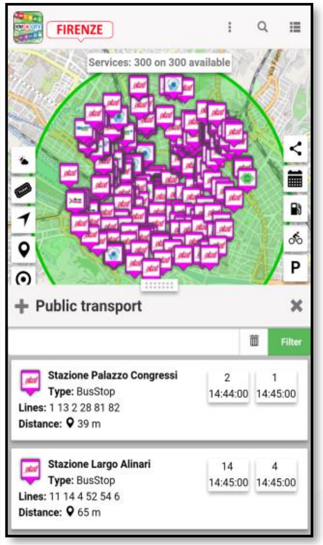
Km4City APP

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


What do you want to do?

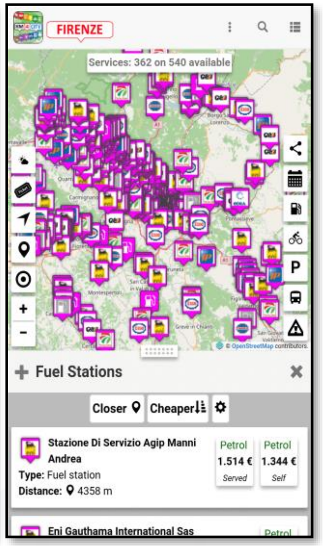

Choose Services

- ☐ Accommodation
- ☐ Advertising
- ☐ Agriculture And Livestock
- ☐ Civil And Edil Engineering
- ☐ Cultural Activity
- ☐ Education And Research
- ☐ Emergency
- ☐ Entertainment
- ☐ Environment
- ☐ Financial Service
- ☐ Government Office
- ☐ Health Care
- ☐ Industry And Manufacturing
- ☐ Mining And Quarrying
- ☐ Shopping And Service
- ☐ Tourism Service
- ☐ Transfer Service And Renting
- ☐ Utilities And Supply



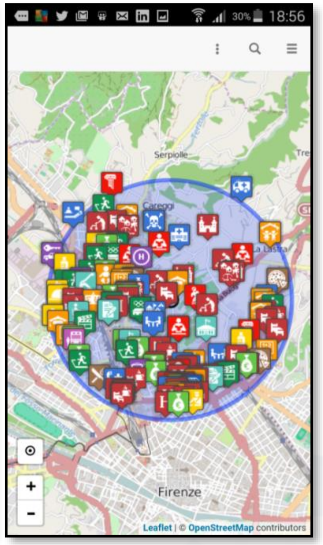
Stazione Palazzo Congressi
Type: BusStop
Lines: 1 13 2 28 81 82
Distance: 39 m
2 14:44:00 · 1 14:45:00

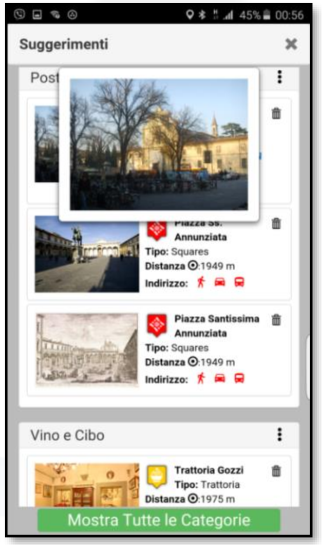
Stazione Largo Alinari
Type: BusStop
Lines: 11 14 4 52 54 6
Distance: 65 m
14 14:45:00 · 4 14:45:00



Stazione Di Servizio Agip Manni Andrea
Type: Fuel station
Distance: 4358 m
Petrol 1.514 € Served · Petrol 1.344 € Self

Eni Gauthama International Sas




Suggerimenti

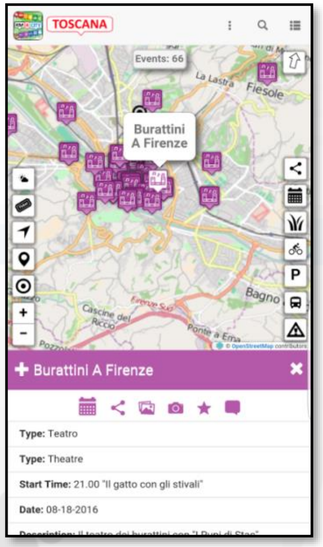
Post

Piazza SS. Annunziata
Tipo: Squares
Distanza: 1949 m
Indirizzo:

Piazza Santissima Annunziata
Tipo: Squares
Distanza: 1949 m
Indirizzo:

Vino e Cibo

Trattoria Gozzi
Tipo: Trattoria
Distanza: 1975 m



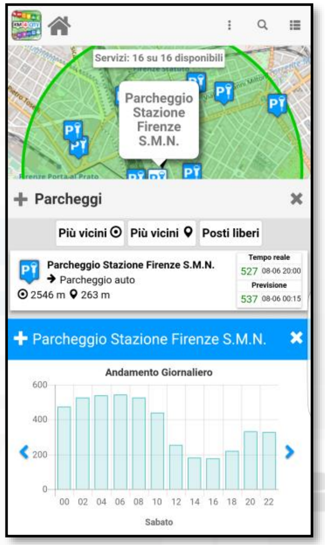
Burattini A Firenze

Type: Teatro

Type: Theatre

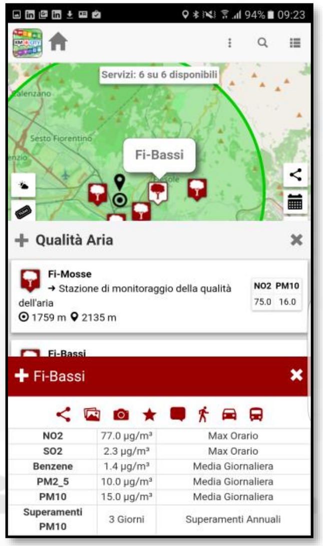
Start Time: 21.00 "Il gatto con gli stivali"

Date: 08-18-2016


Servizi: 16 su 16 disponibili
Parcheggio Stazione Firenze S.M.N.
Parcheggi
Più vicini
Più vicini
Posti liberi

Parcheggio Stazione Firenze S.M.N.
→ Parcheggio auto
2546 m · 263 m
Tempo reale 527 08-06 20:00
Previsione 537 08-06 00:15

Parcheggio Stazione Firenze S.M.N.



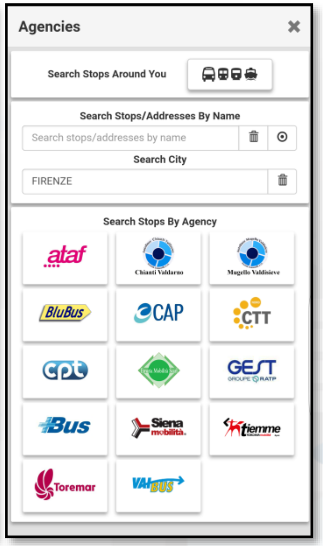
Fi-Mosse
→ Stazione di monitoraggio della qualità dell'aria
1759 m · 2135 m

NO2	PM10
75.0	16.0

Fi-Bassi

Fi-Bassi

NO2	77.0 µg/m³	Max Orario
SO2	2.3 µg/m³	Max Orario
Benzene	1.4 µg/m³	Media Giornaliera
PM2_5	10.0 µg/m³	Media Giornaliera
PM10	15.0 µg/m³	Media Giornaliera
Superamenti PM10	3 Giorni	Superamenti Annuali


Agencies

Search Stops Around You

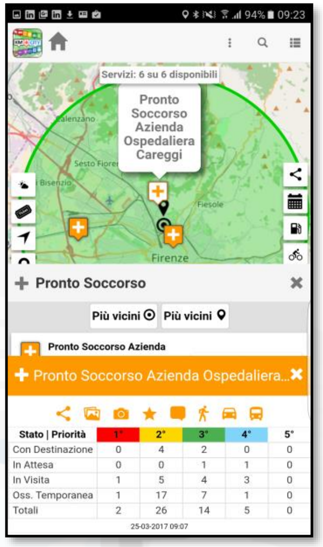
Search Stops/Addresses By Name

Search stops/addresses by name

Search City

FIRENZE

Search Stops By Agency


Servizi: 6 su 6 disponibili
Pronto Soccorso Azienda Ospedaliera Careggi
Fiesole
Firenze

Pronto Soccorso

Più vicini ⦿ · Più vicini

Pronto Soccorso Azienda

Pronto Soccorso Azienda Ospedaliera…

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

25-03-2017 09:07

Available on the App Store

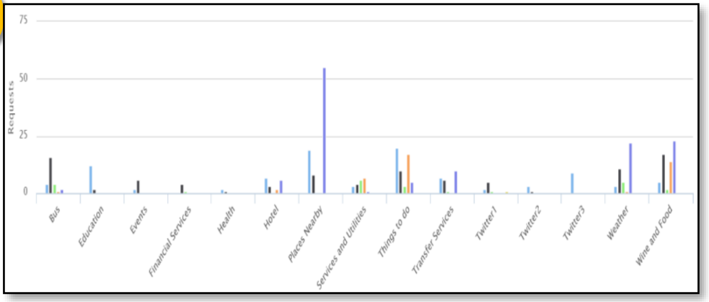
ANDROID APP ON Google play

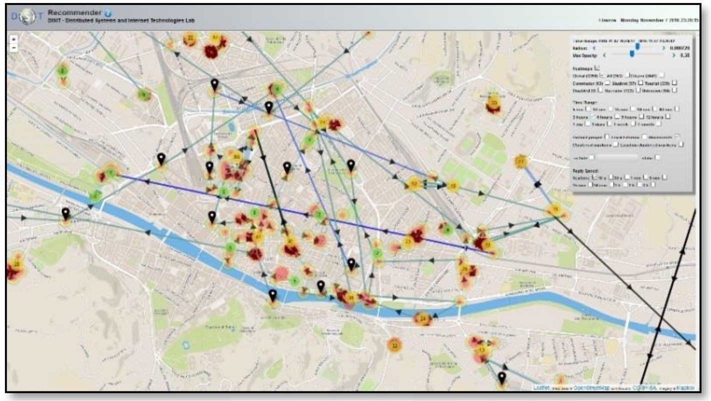
Download from Windows Phone Store

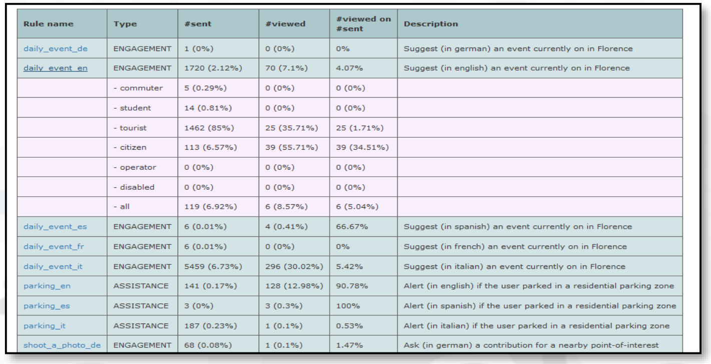
for ENBIS 2017, Napoli, by DISIT Lab

Reasoning on App Data and for App

- **Suggestions….**
  - **ML, clustering..**
- **Engagements….**
  - **Rules systems, ML, city strategies**
- **User behavior analysis**
  - *Reconstruction of user behavior on the move*
    and in the city in general
  - *Pedestrian, TPL, Bike, private, etc.*

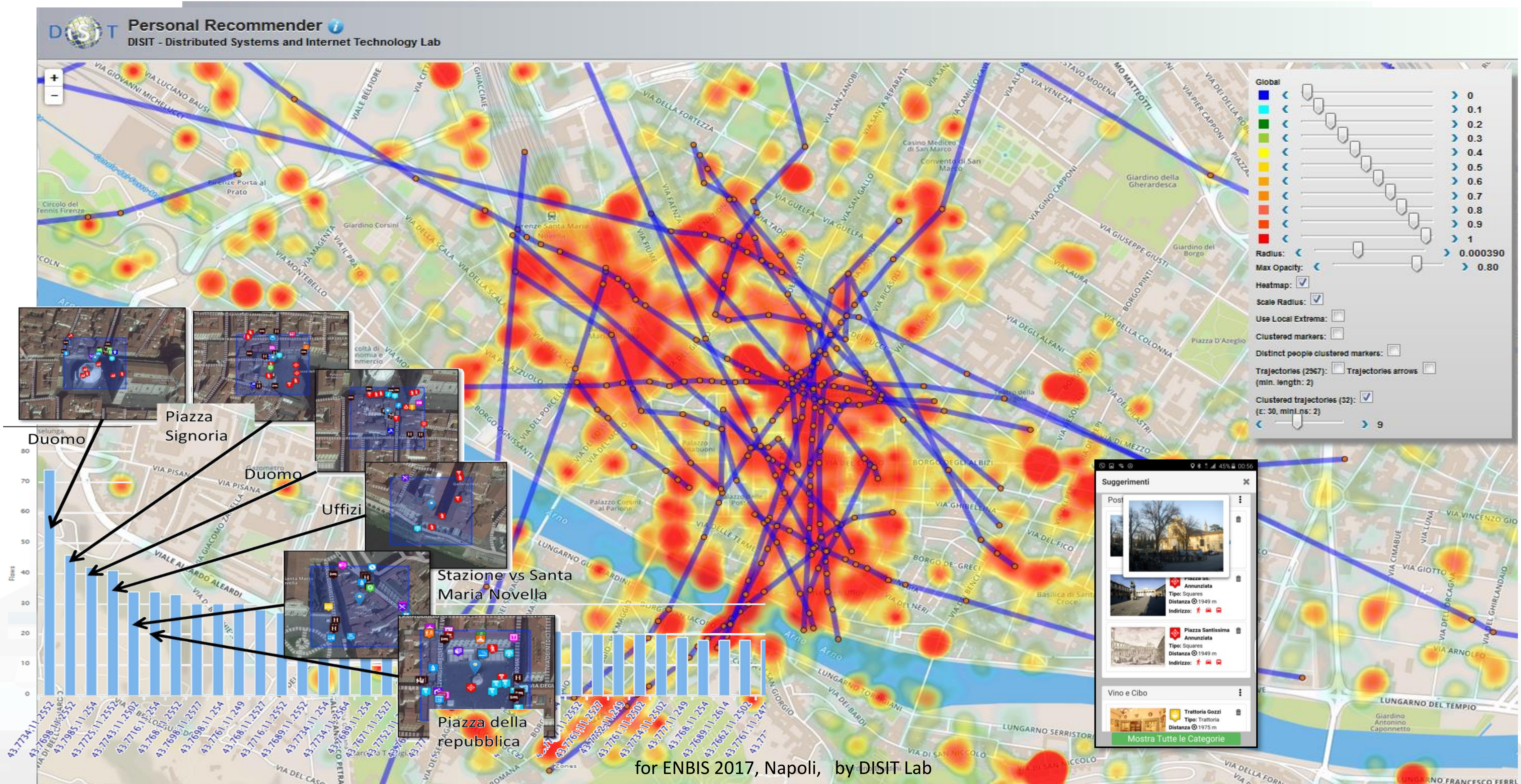






Rule name	Type	#sent	#viewed	#viewed on #sent	Description
daily_event_de	ENGAGEMENT	1 (0%)	0 (0%)	0%	Suggest (in german) an event currently on in Florence
daily_event_en	ENGAGEMENT	1720 (2.12%)	70 (7.1%)	4.07%	Suggest (in english) an event currently on in Florence
	- commuter	5 (0.29%)	0 (0%)	0 (0%)	
	- 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 (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 Florence
daily_event_fr	ENGAGEMENT	6 (0.01%)	0 (0%)	0%	Suggest (in french) an event currently on in Florence
daily_event_it	ENGAGEMENT	5459 (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
shoot_a_photo_de	ENGAGEMENT	68 (0.08%)	1 (0.1%)	1.47%	Ask (in german) a contribution for a nearby point-of-interest

User Behavior Analyzer



Personal Recommender
DISIT - Distributed Systems and Internet Technology Lab

Global
- 🟦 0
- 🟦 0.1
- 🟩 0.2
- 🟩 0.3
- 🟨 0.4
- 🟨 0.5
- 🟧 0.6
- 🟧 0.7
- 🟥 0.8
- 🟥 0.9
- 🟥 1

Radius: 0.000390
Max Opacity: 0.80
Heatmap: ☑
Scale Radius: ☑
Use Local Extrema: ☐
Clustered markers: ☐
Distinct people clustered markers: ☐
Trajectories (2967): ☐ Trajectories arrows ☐
(min. length: 2)
Clustered trajectories (32): ☑
(ε: 30, minLns: 2)
9

Suggerimenti

Post

Piazza SS. Annunziata
Tipo: Squares
Distanza ⊙:1949 m
Indirizzo:

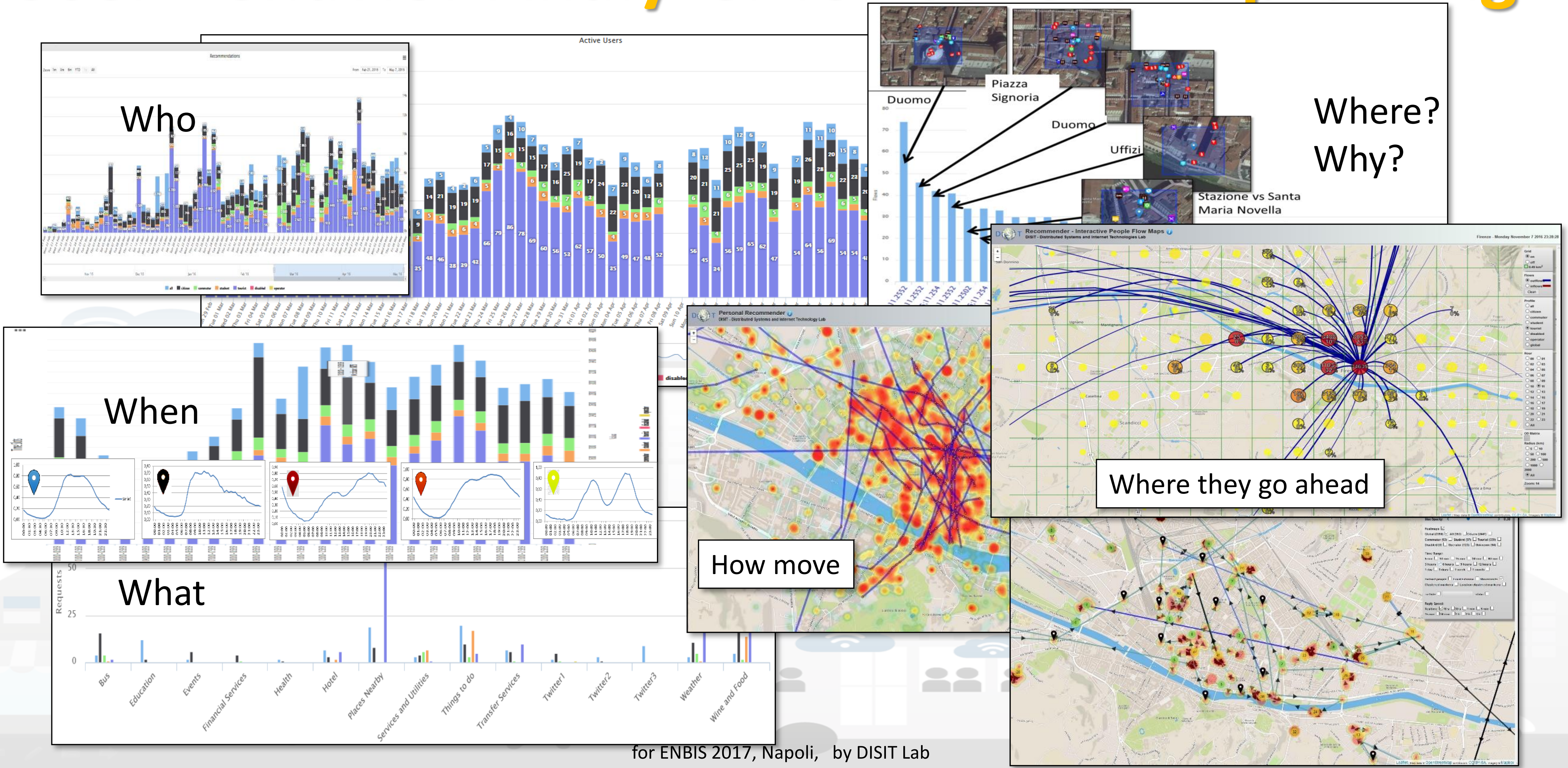
Piazza Santissima Annunziata
Tipo: Squares
Distanza ⊙:1949 m
Indirizzo:

Vino e Cibo

Trattoria Gozzi
Tipo: Trattoria
Distanza ⊙:1975 m

Mostra Tutte le Categorie

User Behavior Analyzer for Collective profiling



Who

When

What

Where?
Why?

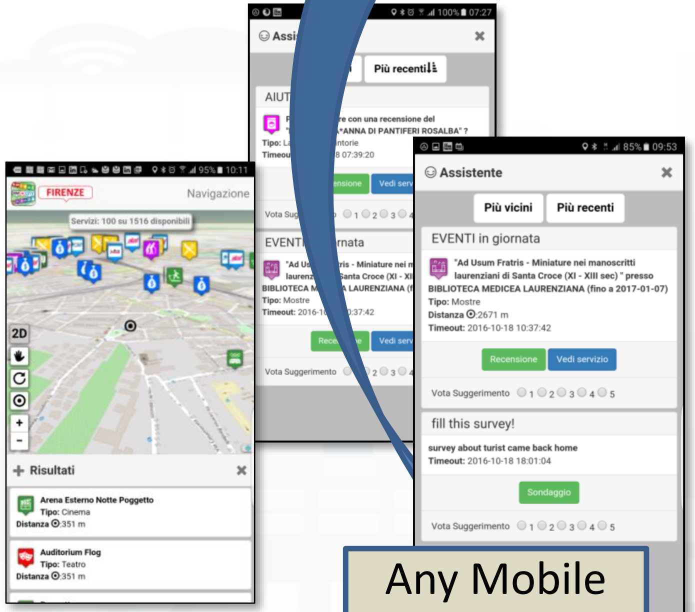
How move

Where they go ahead

User influencing, engaging, monitoring & Follow Up

City & City Operators

Strategy Editor



Arena Esterno Notte Poggetto
Tipo: Cinema
Distanza ⦿:351 m

Auditorium Flog
Tipo: Teatro
Distanza ⦿:351 m

Assistente

Più vicini | Più recenti

EVENTI in giornata

"Ad Usum Fratris - Miniature nei manoscritti laurenziani di Santa Croce (XI - XIII sec) " presso BIBLIOTECA MEDICEA LAURENZIANA (fino a 2017-01-07)
Tipo: Mostre
Distanza ⦿:2671 m
Timeout: 2016-10-18 10:37:42

Recensione | Vedi servizio

Vota Suggerimento ○ 1 ○ 2 ○ 3 ○ 4 ○ 5

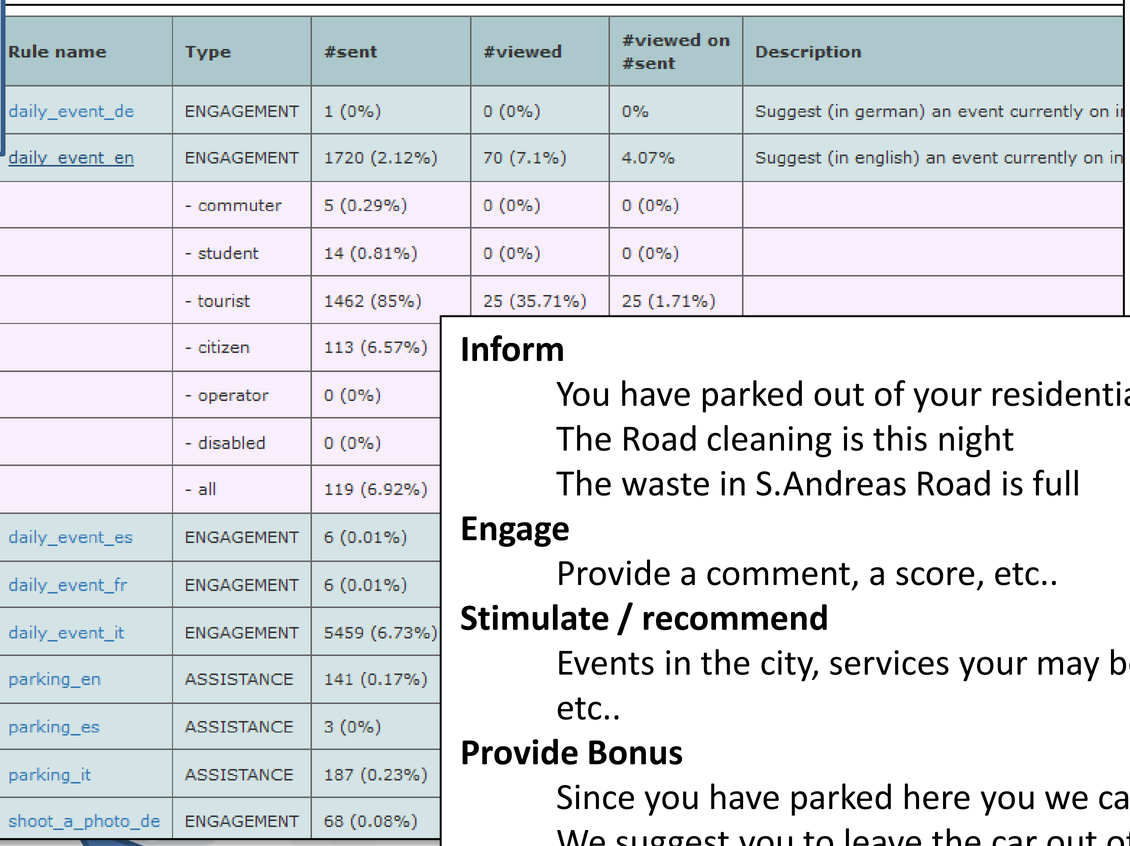
fill this survey!

survey about turist came back home
Timeout: 2016-10-18 18:01:04

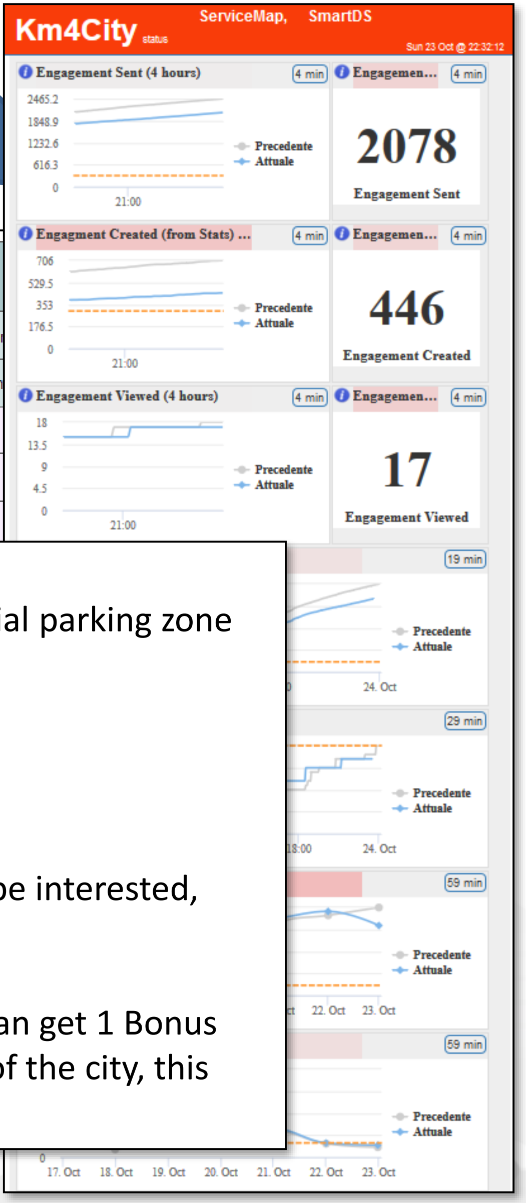
Sondaggio

Vota Suggerimento ○ 1 ○ 2 ○ 3 ○ 4 ○ 5

Any Mobile and Web App



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 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%)			



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

Development Tools

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

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

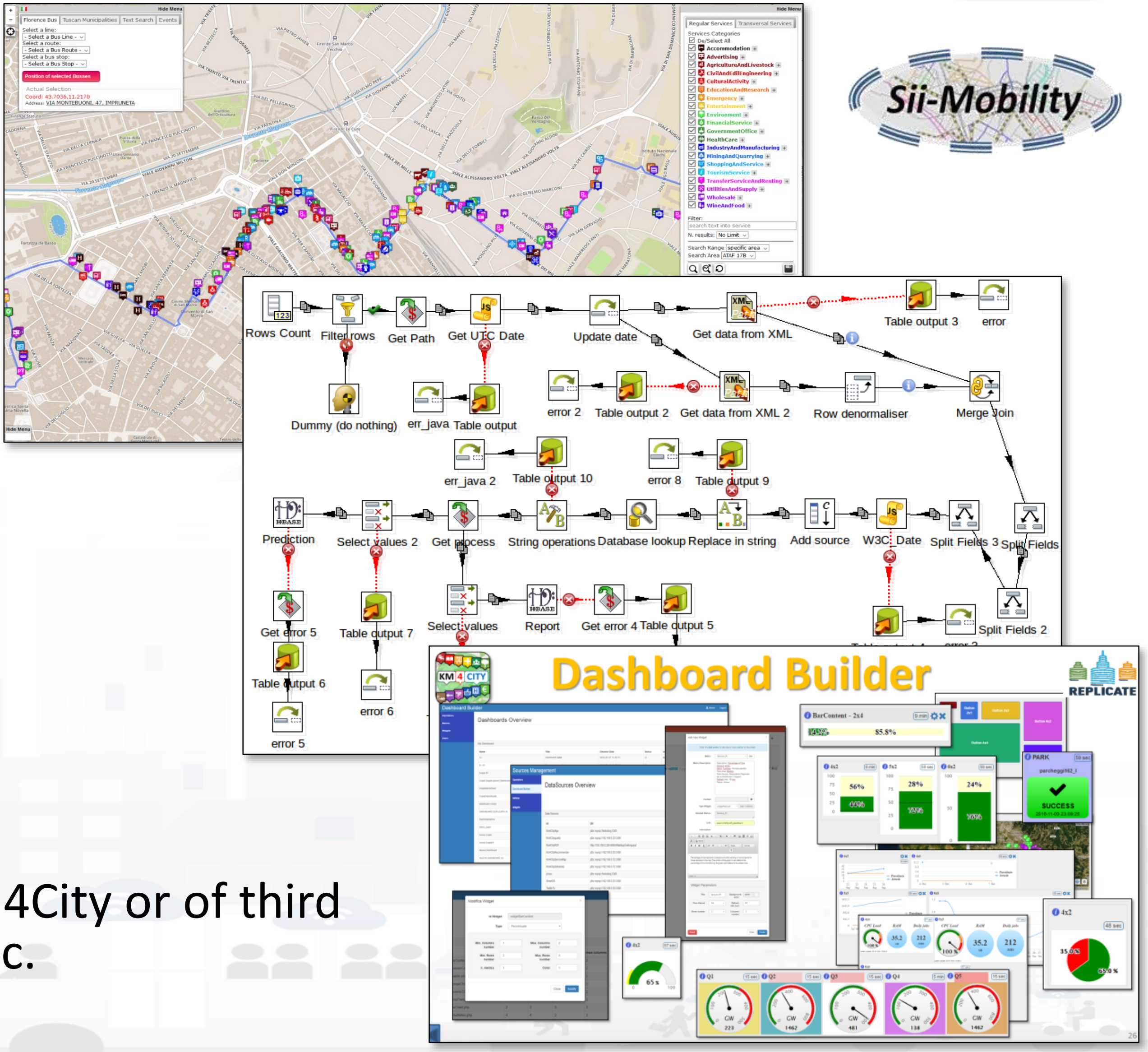
http://www.km4city.org/?infoDocs

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

http://www.disit.org/7044

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
  - ***Collaborative work***
- **Load new data: manual and automatic**
  - POI, IOT, etc.
  - Load of Shape & Paths
  - ***Collaborative work***
- **Dashboard builder**
  - Production of dashboard per control room
  - Embedding view of any other analytics of Km4City or of third party: wifi, 3D, flow, recommend, engager, etc.
  - ***Collaborative work***



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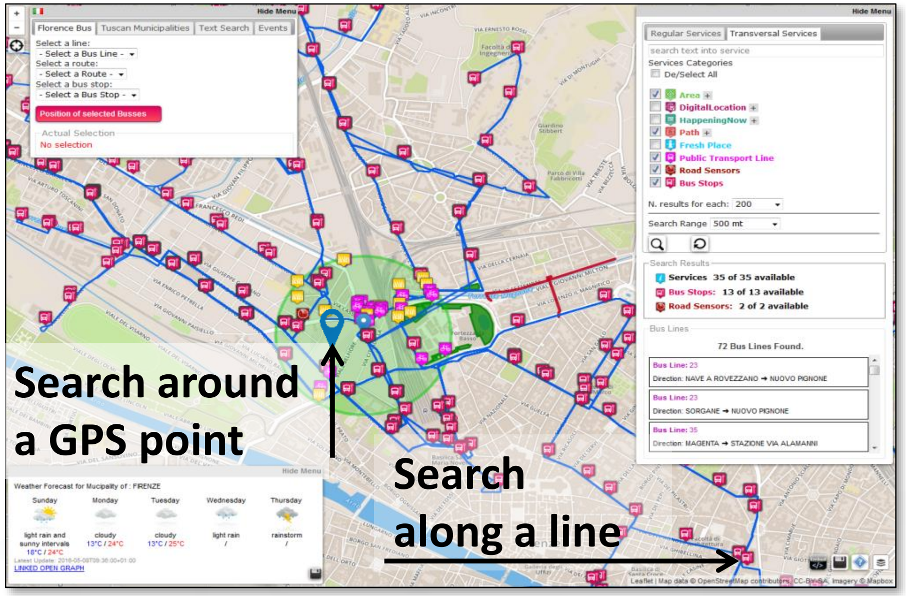
DISIT DISTRIBUTED SYSTEMS AND INTERNET TECHNOLOGIES LAB

http://www.disit.org

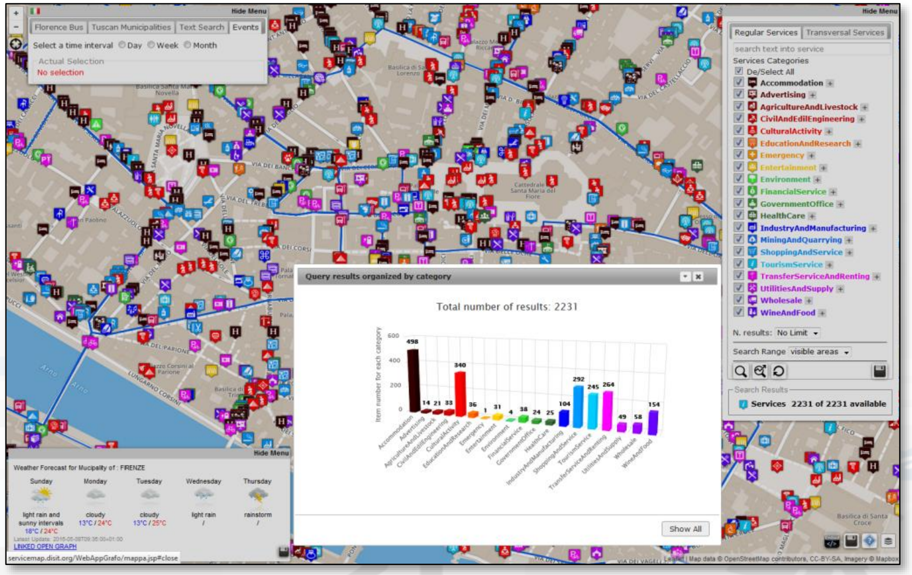
Sii-Mobility

ServiceMap Dev Tool

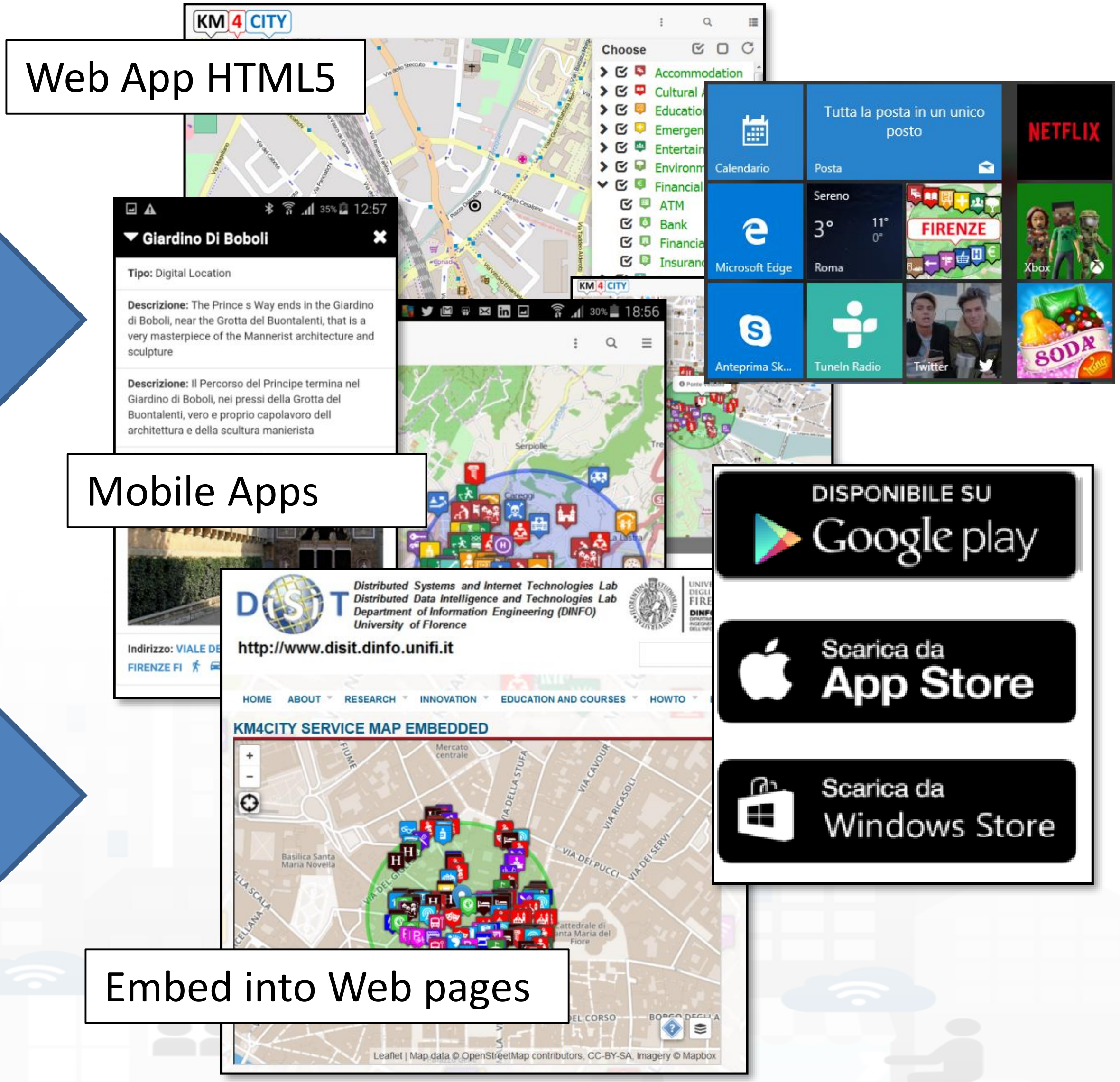


Search around a GPS point

Search along a line



Smart City API call generation



Web App HTML5

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

Indirizzo: VIALE DE
FIRENZE FI

Mobile Apps

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

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KM4CITY SERVICE MAP EMBEDDED

Embed into Web pages

DISPONIBILE SU Google play

Scarica da App Store

Scarica da Windows Store

http://www.disit.org/6873

for ENBIS 2017, Napoli, by DISIT Lab

Providing Services to City Users

- Cities aims at **providing new Smart Services** to city users:
  - operators, final users, etc.
- In most cases via **Web and Mobile Apps** which **exploit data**:
  - Structural data, open data, real time data, etc., private data from companies
  - **to be aggregated and transformed** in services (providing: prediction, information, early warning, relations)
  - **at reasonable cost** for: developers, operators, and SME to realize new Apps and services.
- *If cost is not affordable*, *Services and Apps are not developed*, in most cases the Apps are also provided for free, so that high costs are not sustainable → Public Private Partnership

Ref: http://www.disit.org/5487

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Open Source

- **Km4City, Sii-Mobility, RESOLUTE, REPLICATE: smart city big data open source tools. Km4City is a knowledge base and a research line of DISIT lab mainly developed before the start of Sii-Mobility, RESOLUTE, REPLICATE projects. While it has been mainly improved by them. Those projects are complementary each other and almost all of them use and contribute the Km4City research line. ServiceMap smart city knowledge base tool**: smart city service tool (mainly developed for Sii-Mobility project) for accessing to km4city knowledge base, for service browsing and query, for **Smart City API** for mobile and for mobile development tool, http://www.disit.org/km4city
- **Km4City ontology model and files** are accessible from http://www.disit.org/km4city improved with the support of projects as Sii-mobility, REPLICATE and RESOLUTE
- **SCE, Smart City/Cloud Engine front end interface,** SCE is part of DISCES a Distributed SCE Scheduler Tools (SCE: Smart City/Cloud Engine), a DISIT tool for smart environments. It is currently in use in Km4City tools, and in ICARO Cloud project and service, see CLOUD page. Developed for ICARO, and then improved for Sii-Mobility, and used in many other projects
- **SCE, Smart City/Cloud Engine backend,** SCE is part of DISCES a Distributed SCE Scheduler Tools (SCE: Smart City/Cloud Engine), a DISIT tool for smart environments. It is currently in use in Km4City tools, and in ICARO Cloud project and service, see CLOUD page. Developed for ICARO, and then improved for Sii-Mobility, and used in many other projects
- **DIM-RIM**: Data Ingestion Manager and RDF Indexing Manager, WEB page on DISIT lab with user manuals, DIM and RIM area used in Km4City and tools, Sii-Mobility smart city national SCN project, RESOLUTE H2020
- **Dashboard Builder and executo**r: a tool for creating dashboard for smart city. See Km4City example of dashboard as reported in http://www.km4city.org/controlroomtools.html for the documentation see http://www.disit.org/6935 which is manual with examples regarding widgets. Developed for REPLICATE Project, and used in others as Sii-Mobility, RESOLUTE.
- **Sii-Mobility Dev Kit Mobile AppKm4city**: Open Source version of the Sii-Mobility mobile and web app, open modular (the full version is operative and accessible on all stores as "Firenze dove cosa", or " Toscana dove cosa", you can install from http://www.km4city.org/app). Developed for Sii-Mobility, adopted for the training and development meeting of the 24 January 2017, and as a basis for the Hackathon of 7-8 April 2017 in Florence.

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- Thanks to the MIUR for co-fouding 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.