



UNIVERSITÀ
DEGLI STUDI
FIRENZE

DINFO
DIPARTIMENTO DI
INGEGNERIA
DELL'INFORMAZIONE

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

OPEN DATA DAY
NUOVE OPPORTUNITÀ PER CITTADINI, STUDENTI, AZIENDE

L'universita' come aggregatore di Open Data del Territorio: L'esperienza Fiorentina

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paolo.nesi@unifi.it



Domini di intervento

- **Mobilità:** inter-modalità, bigliettazione integrata, sostenibile, scambiatori, sfruttamento stazioni, etc.,
- **Servizi:** gov ..SUAP, edu, turismo, beni culturali, salute, etc.,
- **Energia:** risparmio energetico, riduzione amissioni, inquinamento, etc.,
- **Ambiente:** qualità dell'aria, fiumi, meteo, rifiuti, etc.,
- ... **commercio, industria,** etc.
- ... **Infrastrutture critiche.** → resilienza



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

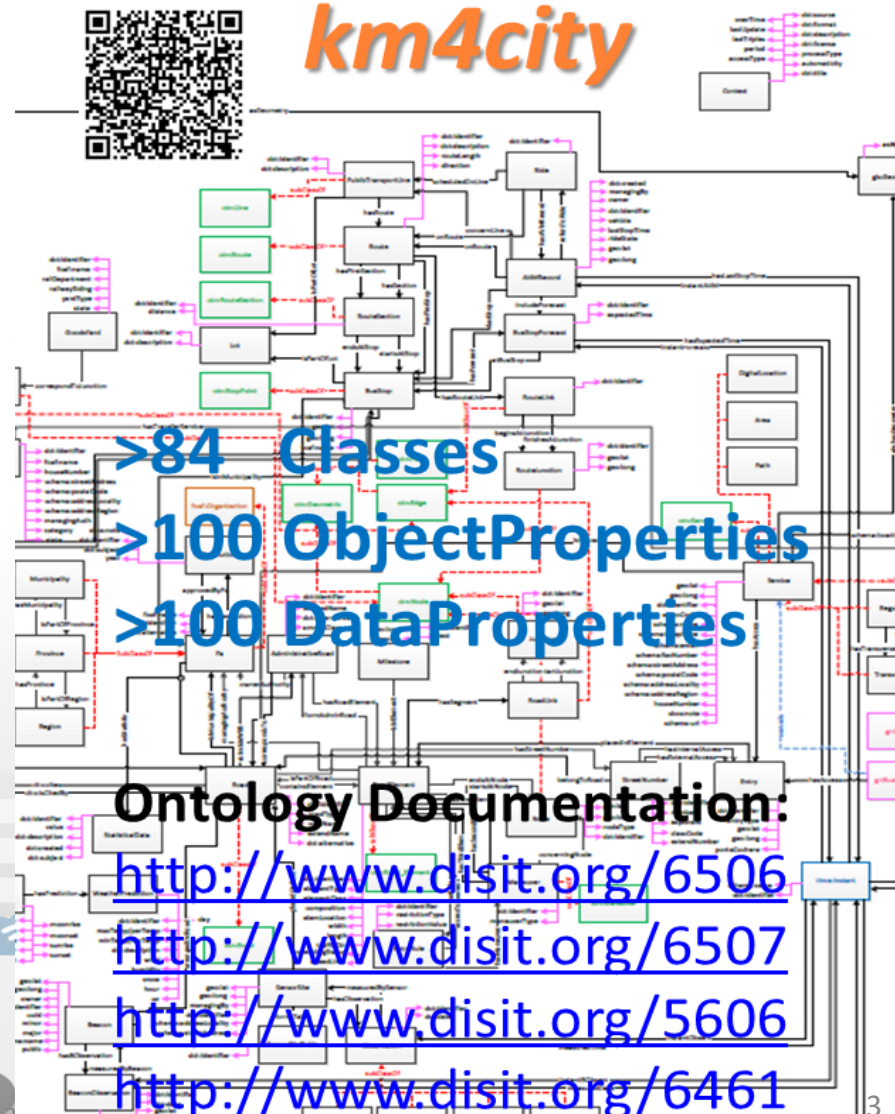
<http://servicemap.disit.org>

I Dati

- **Collezionamento dati** statici, quasi statici e real time, stream
 - **Dati open:** geo localizzati, servizi, statistiche, censimenti, etc.
 - **Dati privati degli operatori:** con licenze limitate per non permettere di fare profitto ad altri operatori sulla base dei loro dati
 - **Dati personali delle persone:** profili, comportamenti tramite APP, IOT, sensori, web, etc.
- **Integrazione dati per renderli semanticamente interoperabili**, ed operare deduzioni (time, space...)
 - I tradizionali **collettori di open data** danno visioni statistiche ma **non sono adatti a produrre servizi integrati**
 - **Integrazione con modelli semantici unificanti come Km4City**

Smart-city Ontology

km4city





- Nascondi Menu

Fermate Firenze | Comuni in Toscana | Ricerca Testuale

Selezione una provincia:
FIRENZE

Selezione un comune:
FIRENZE

Actual Selection
COMUNE di FIRENZE

Previsioni Meteo per il comune di FIRENZE:

Martedì	Mercoledì	Giovedì	Venerdì	Sabato
poco nuvoloso 23°C / 27°C	pioggia debole e schiarite 20°C / 30°C	poco nuvoloso 20°C / 33°C	poco nuvoloso	velato

Ultimo Aggiornamento: 2015-09-15T09:07:00+02:00
[LINKED OPEN GRAPH](#)

Road Graph (Tuscany region)

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

- 110,374 Services (20 cat, 512 cat.)
- 2,326 Bus stops & 86 bus lines
- 210 Parking areas
- 424 Traffic Sensors
- Info on: points, paths, areas, etc.

- Nascondi Menu

Servizi Regolari | Servizi Trasversali

Search text into service

Categorie Servizi

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

N. risultati: Nessun Limite

Raggio ricerca: 100 metri

Resultati della ricerca

più di 4000 risultati, attivato clustering

Services: 16858

<http://servicemap.disit.org>

Dynamic/real-time

- bus lines: 200 updates/day per line
- Parking status: 36 updates/day
- Traffic Sensors: 48 updates/day
- Weather: 2 updates/day for 285 areas
- Events: 60 new events/day
- Wi-Fi: 250,000 measures per day



Transport systems
 Mobility, parking



Public Services
 Govern, events,



Sensors, IOT
 Cameras, ..



Environment,
 Water, energy



Shops, services,
 operators

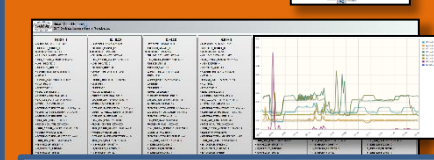
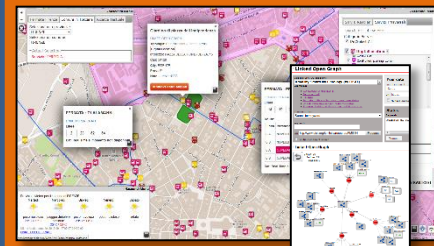
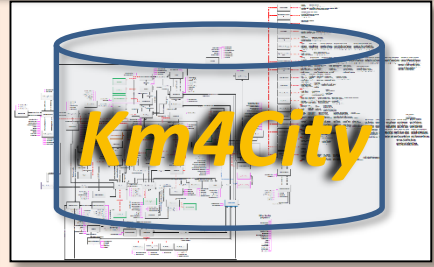
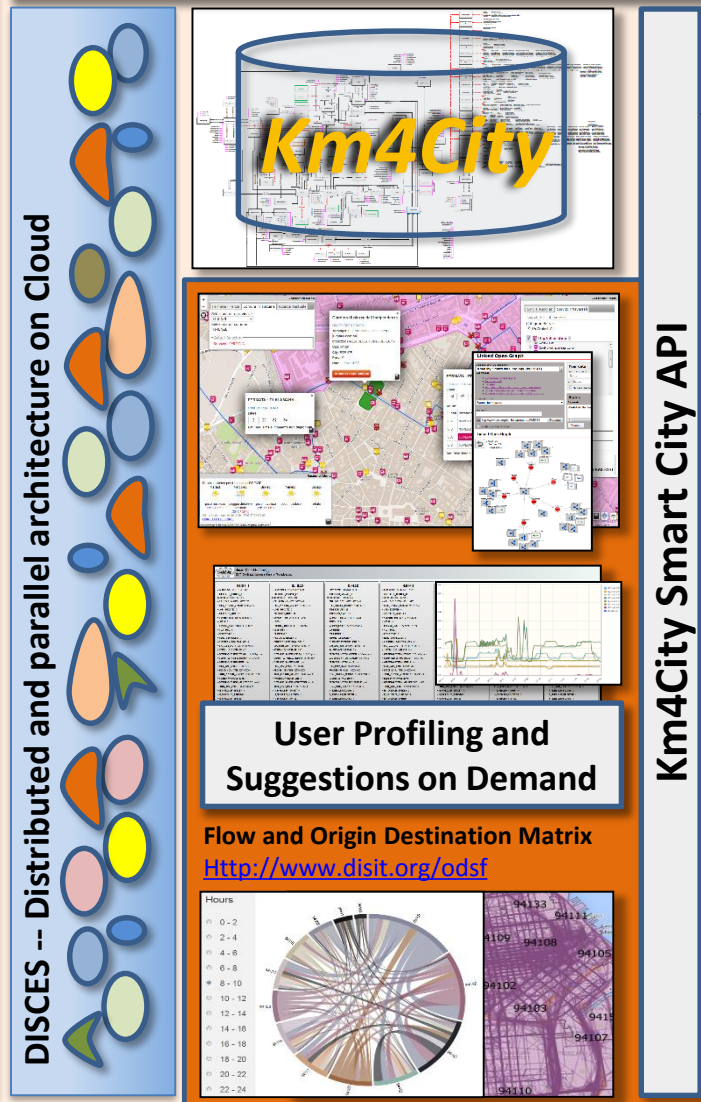


Social Media
 WiFi, network



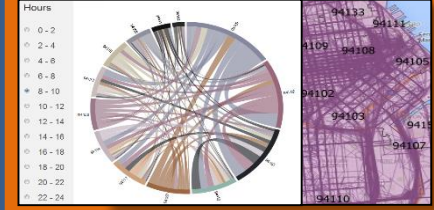
Static, Slow and Real Time data flows

Km4City Smart City Engine



User Profiling and
 Suggestions on Demand

Flow and Origin Destination Matrix
<http://www.disit.org/odsf>



Km4City Tools for Developers

Tools for Operators

Smart City Dashboard
<http://www.disit.org/dash>

Smart Decision Support
<http://Smartds.disit.org>

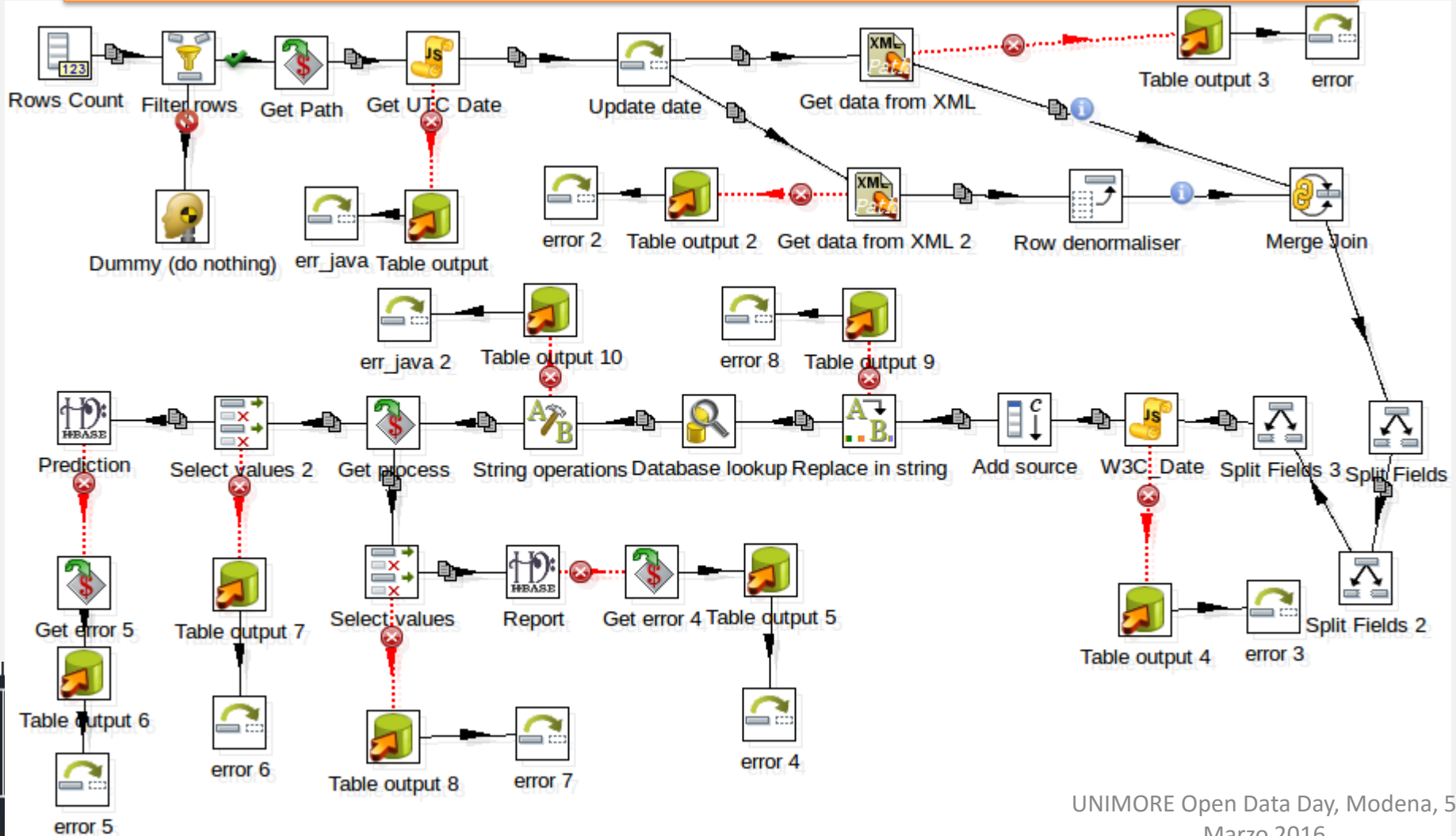
Service map browser
<http://servicemap.disit.org>

Twitter Vigilance
<http://www.disit.org/tv>

Tools for Final Users

Mobile e Web Apps
<http://www.km4city.org>

Example of Ingestion process



Linked Open Graph

<http://log.disit.org>

A bus stop info....

Linked Open Graph

Select a SPARQL endpoint:

Km4City SmartCity Ontology (by DISIT)

- dbpedia live
- British Museum
- FactForge live
- LinkedGeoData
- Europeana
- Cultura Italia
- Comune di Firenze
- Senato, Italiano
- Camera dei deputati, Italiano
- Getty Vocabularies
- Open Link SW
- IEEE Video Stanford representation
- Km4City SmartCity Ontology (by DISIT)**
- ICARO Smart Cloud Ontology (by DISIT)
- MyStory Player (by DISIT)
- OSIM UNIFI Competences (by DISIT)
- ECLAP Performing Arts Network (by DISIT)
- lodlaundromat.org
- geo.linkeddata.es

Linked Open Graph

Select a SPARQL endpoint:

Km4City SmartCity Ontology (by DISIT)

Examples:

- VIA GIACOMO MATTEOTTI
- Bagno a ripoli
- Florence
- Fermata di Piazza San Marco, real time status
- Empoli traffic flow sensor, real time status
- Florence, Parking at the station, real time status

Choose a class:

Search for keyword

keyword:

uri: <http://www.disit.org/km4city/resource/FM0084> Request

Multiple endpoint search

Your data

sparql endpoint: (c...)

uri: http://...

Multiple endpo...

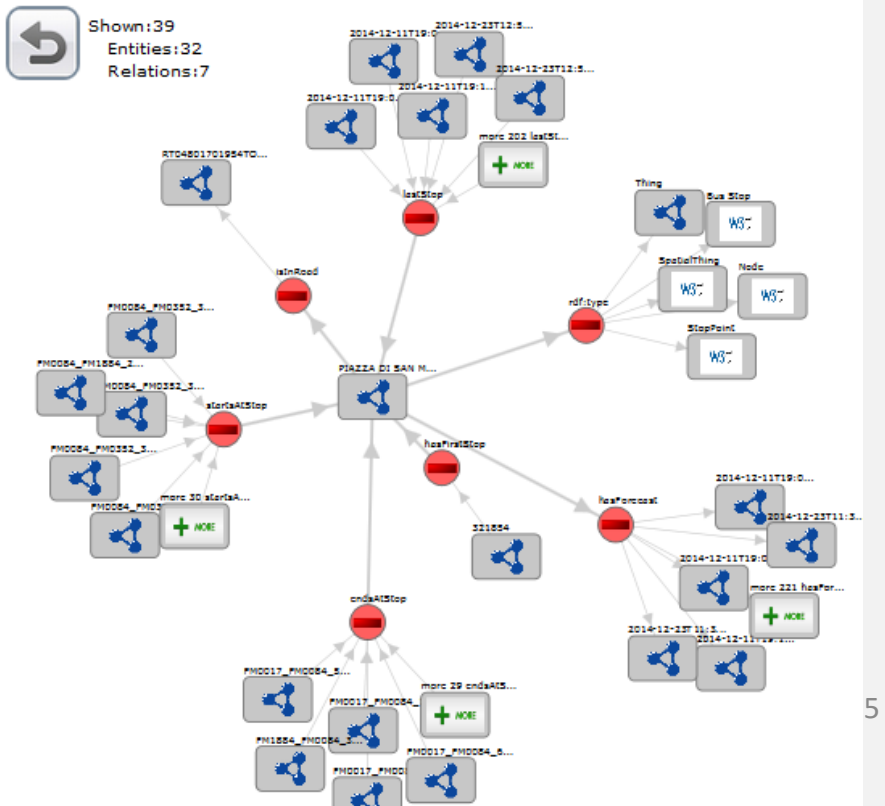
Status

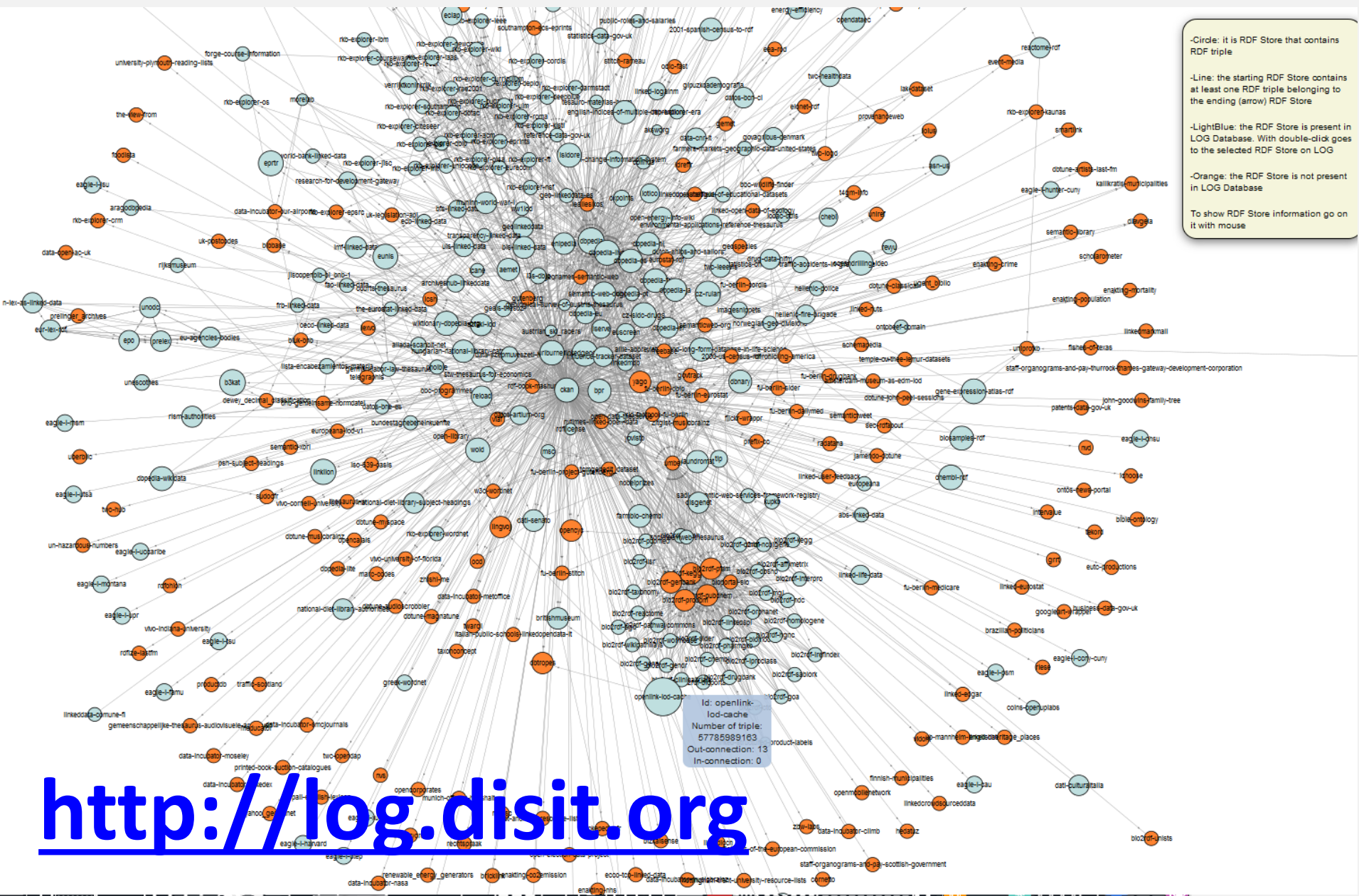
Requests:

Fermata di Pi...

Remove

Linked Open Graph





-Circle: 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

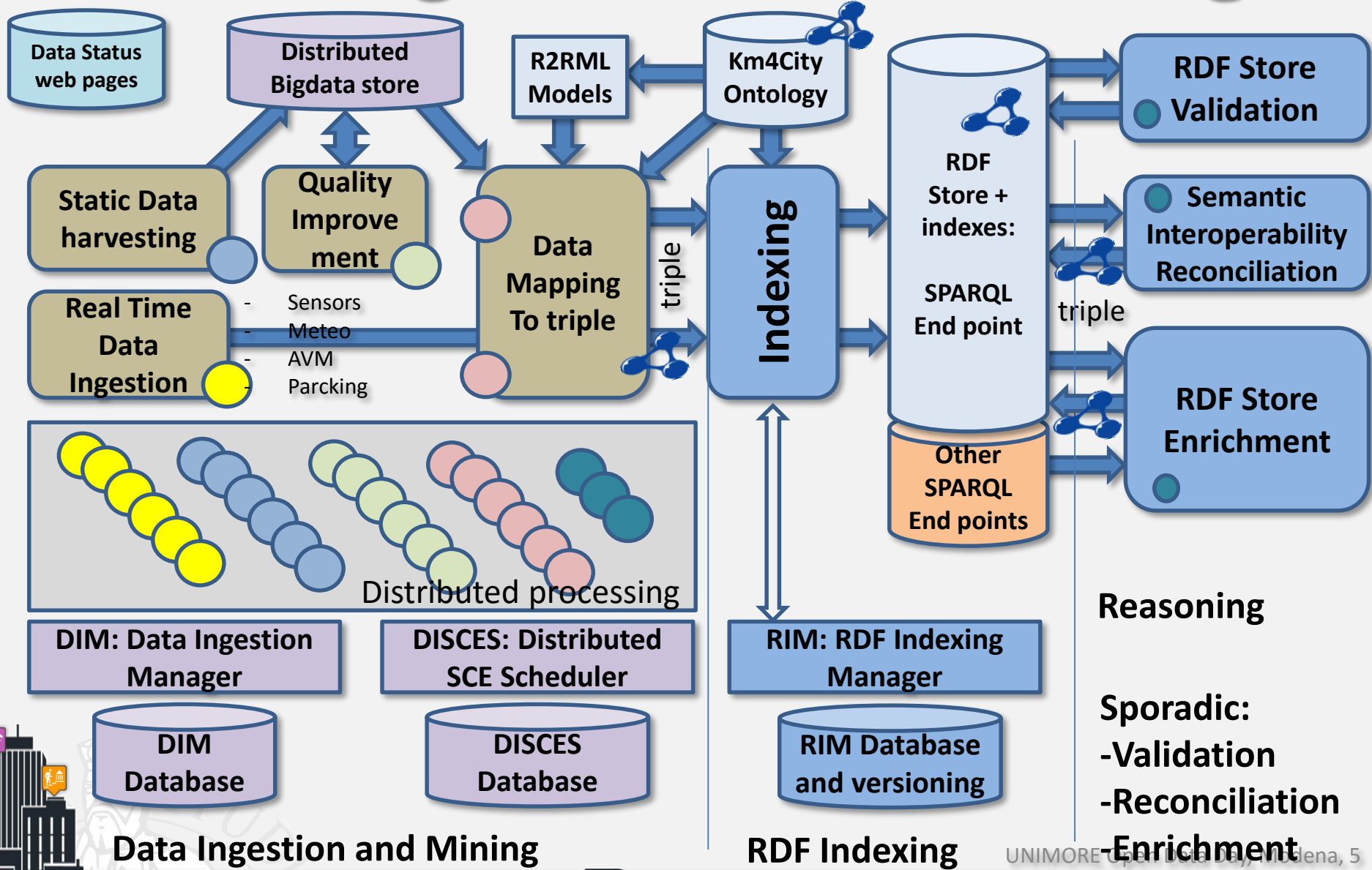
-LightBlue: the RDF Store is present in LOG Database. With double-click goes to the selected RDF Store on LOG

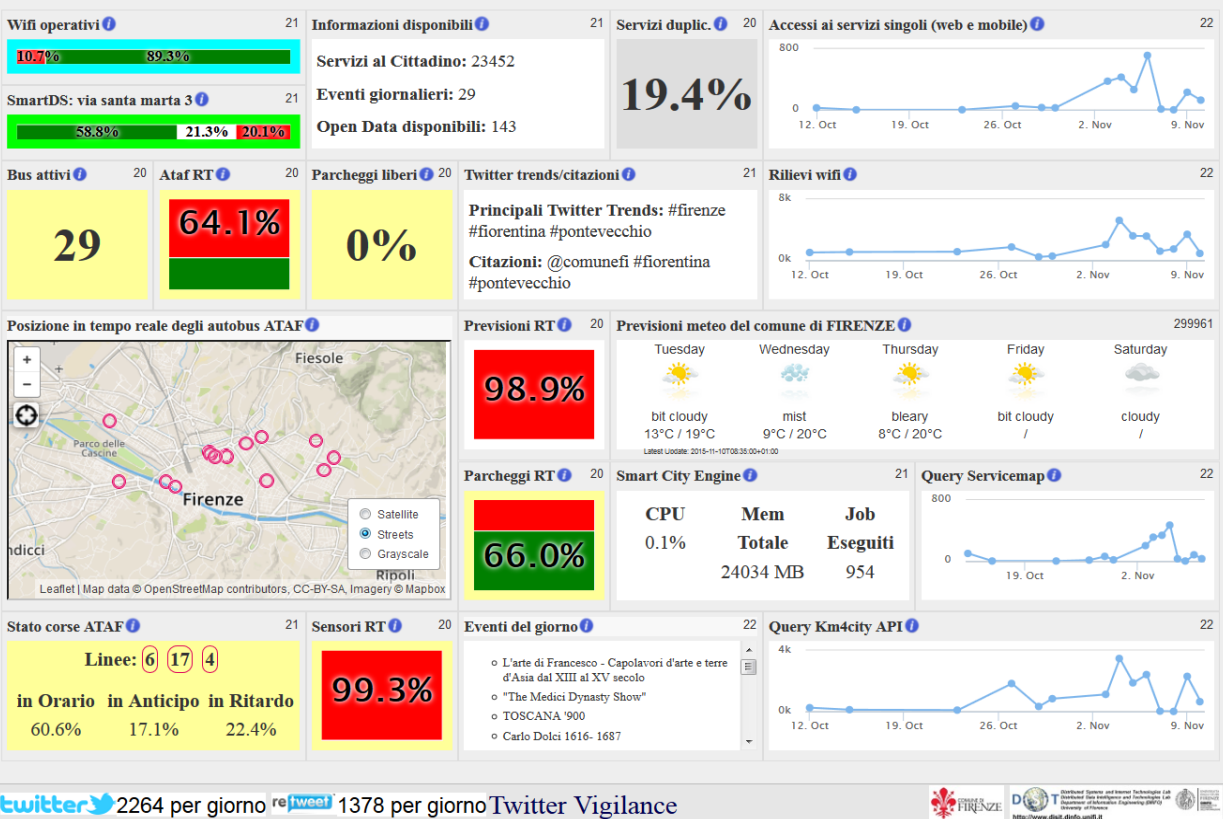
-Orange: the RDF Store is not present in LOG Database

To show RDF Store information go on it with mouse

<http://log.disit.org>

Data Ingestion and Mining





ICT e infrastrutture di comunicazione sono una chiave per tenere sotto controllo e gestire le infrastrutture ma ... non è sufficiente per migliorare la resilienza delle città:

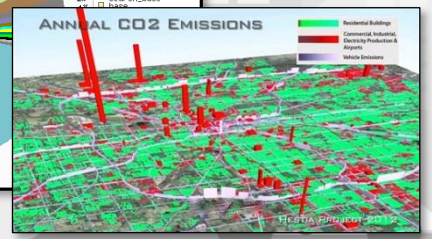
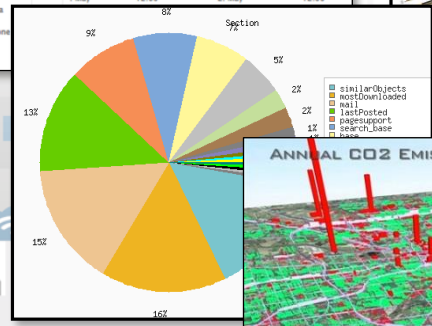
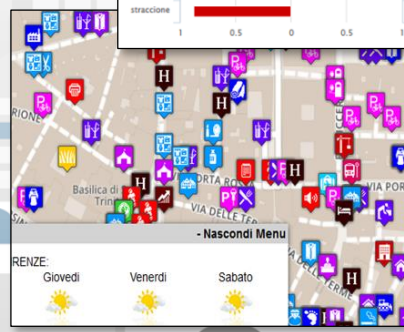
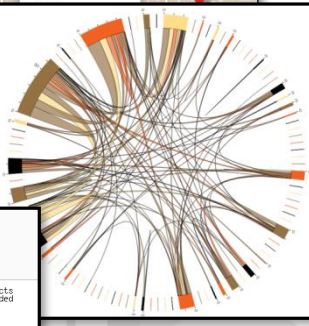
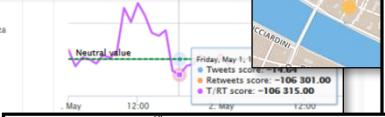
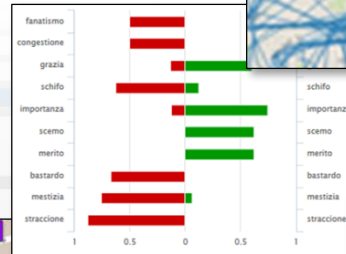
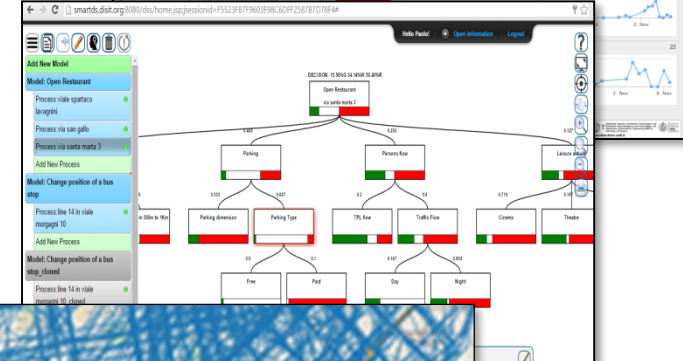
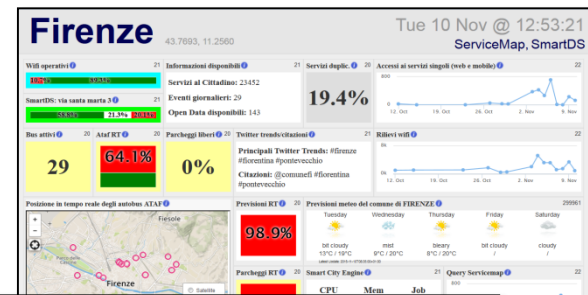
Control Room delle Città Metropolitane devono:

- **arrivare a supervisionare domini multipli** e le interdipendenze fra mobilità, energia, comunicazione, servizi, flussi traffico, flussi pedonali, turismo, etc.
- **Migliorare la loro Resilienza**, capacità di reazione ed assorbimento.

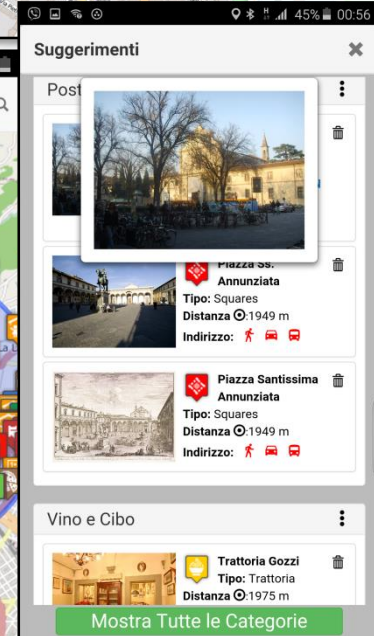
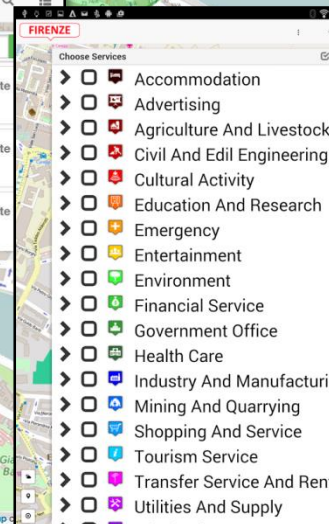
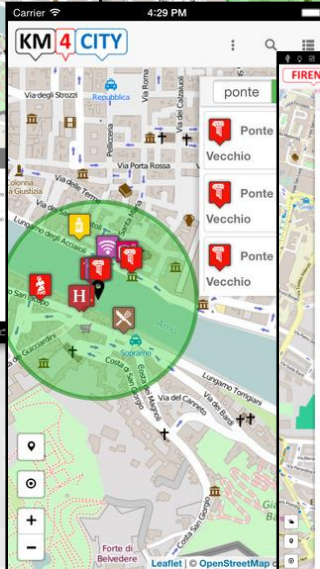
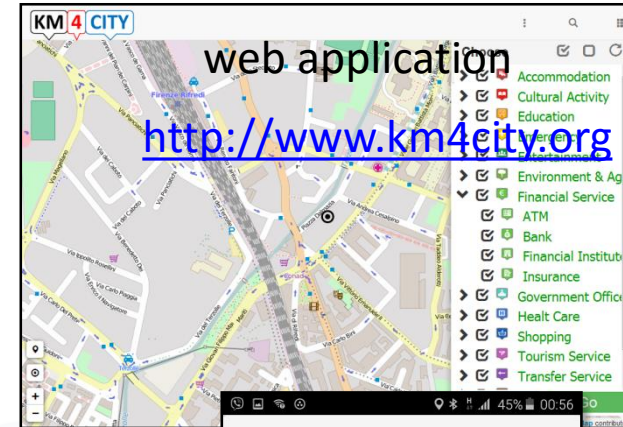
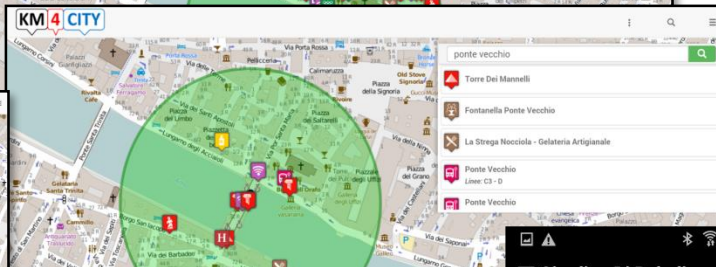


Decisioni supportate dai dati periodiche ed in tempo reale

- **Condivisione e Integrazione Dati multidominio: *semantica e bigdata***
- **Dati → Smart City Engine → Control Room**
- **analisi: monitoraggio, flussi e comportamenti, sondaggi, mining, correlazioni, cause – effetti, etc.**
 - Per il miglioramento di servizi correnti
 - Per reagire ad eventi, incremento della resilienza,
 - Per la creazione servizi innovativi
 - ...

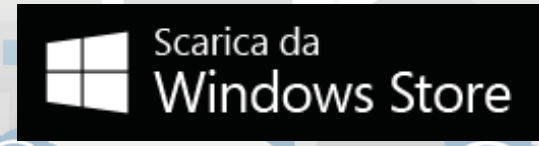
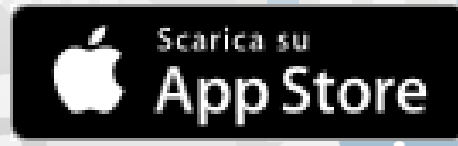


Km4CityMobile App: all stores

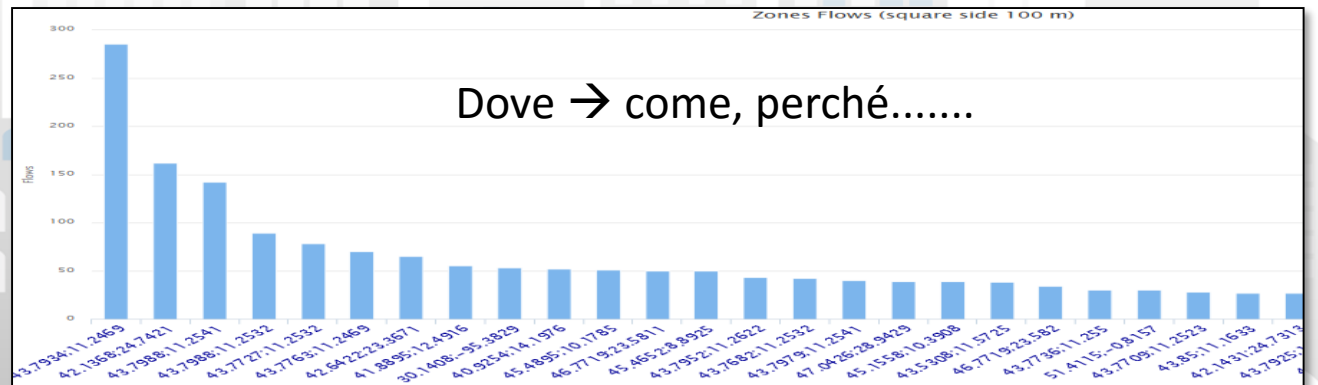
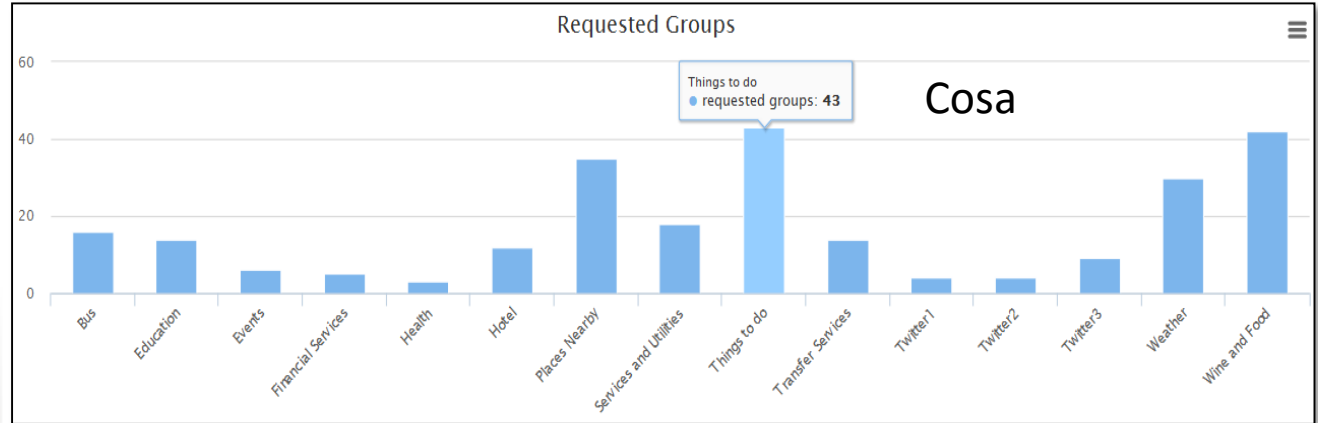
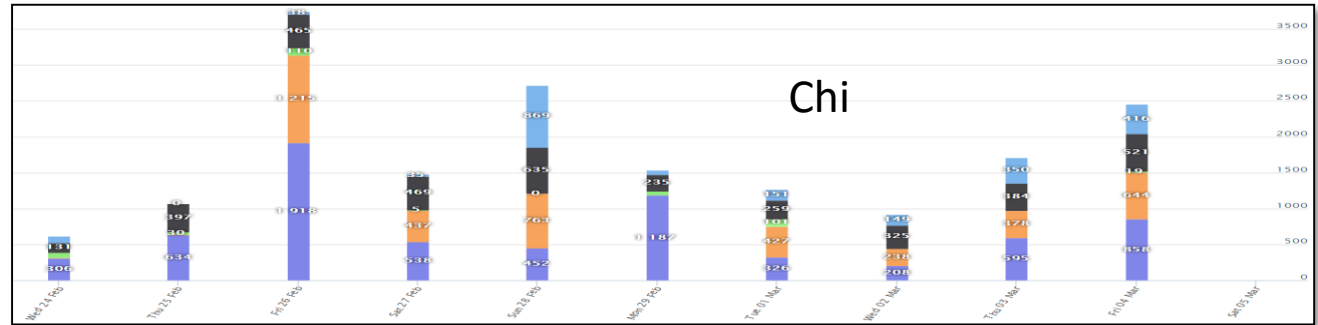
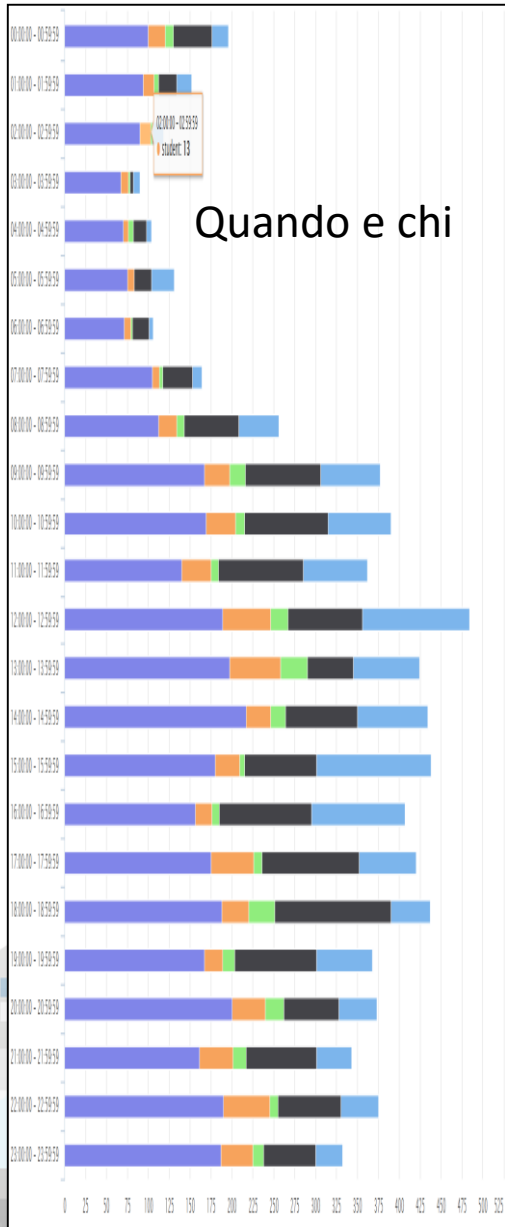




Firenze dove, cosa.. Km4City



Recommender



- *Sperimentazione e validazione in Toscana*
- *Integrazione con gli operatori esistenti*
- *DISIT lab, Università di Firenze, è il coordinatore*

■ <http://www.Sii-Mobility.org>



- -
 -
 -
 -
 -
 -
- Autostrade
— SS Fi-Pi-Li
— SS Fi-Si
— Ferrovie (primarie)
- - Aree

ECM; Swarco Mizar; Inveni 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

Progetto: Smart City Nazionale



Commenti dei cittadini,
Social Media



AVM trasporto
Pubblico

Merci



Sensori su
trasporto Privato

Sensori,
sistema monitoraggio



Sensori
Parcheggi



Monitoraggio
traffico, autostrade



Rete
Ferroviaria

Parametri
ambientali

Servizi ed
enti



Ordinanze: eventi,
lavori pubblici, ..

Emergenze,
polizia, 118



UTC



Infomobility



Varchi
Telematici, ZTL



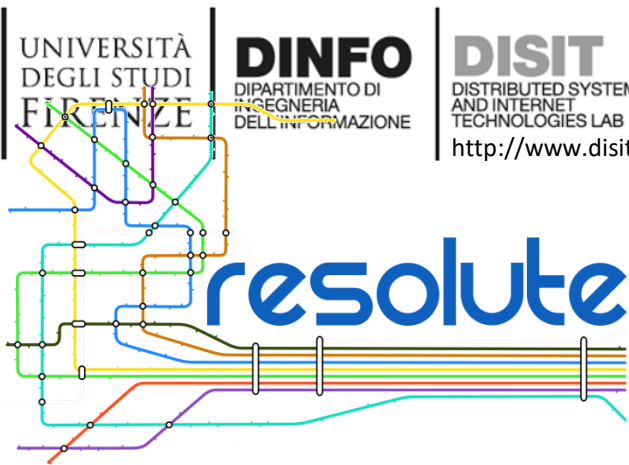


MINISTERO DELL'ISTRUZIONE, DELL'UNIVERSITÀ E DELLA RICERCA

Obiettivi Generali (sintesi)



- **ridurre i costi sociali della mobilità per le persone**
 - consentendo **minori disagi, maggiore efficienza,**
 - **maggiore sensibilità verso le necessità del cittadino,**
 - minori emissioni, migliori condizioni ambientali;
 - percorsi info-formativi in modo che il **cittadino cambi le abitudini non virtuose;**
 - **ridurre i costi di trasporto ed i tempi di percorrenza per gli utenti, per i gestori e le amministrazioni, tramite soluzioni di ottimizzazione.**
- **semplificare l'uso dei sistemi di mobilità**
 - **sensori innovativi per AVM e mezzi privati sul territorio**
 - **Sistemi integrati di pagamento e di identificazione**
 - **soluzioni di guida/percorso connesso (connect drive, smart drive o walk)**
 - **Integrazione di dati provenienti da gestori e sorgenti di tipo diverso**
 - **Gestione avanzata di mezzi**
 - **misurazione di flussi**
 - **realizzazione di sensori, attuatori**
- **Sperimentazione su comuni e province della Toscana**
- **Contribuire al miglioramento degli standard nazionali ed internazionali**



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

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	HUMANIS T	FR
SWARCO Mizar	SWMIZ	IT
Associação para o Desenvolvimento da Investigação no Instituto Superior de Gestão	ADI-ISG	PT
<i>Consorzio Milano Ricerche</i>	CMR	IT

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



Horizon 2020
European Union Funding
for Research & Innovation

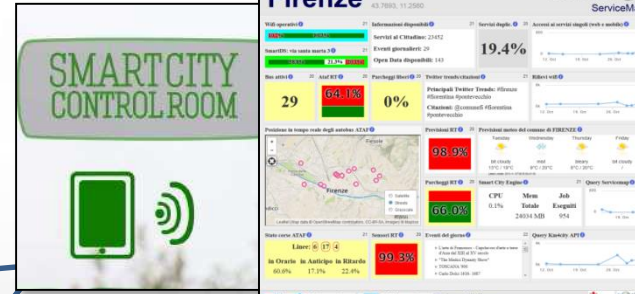
**REnaissance of PLaces
with Innovative Citizenship
And Technology**



- **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, DIF**
- **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 SYSTEMS, LTD ESOTERIX UNITED KINGDOM**
- **32 NEC LABORATORIES EUROPE, LTD NEC UNITED KINGDOM**
- **33 COMMONWHEELS CAR CLUB CIC CO-WHEELS UNITED KINGDOM**
- **34 UNIVERSITY OF THE WEST OF ENGLAND UWE UNITED KINGDOM**
- **35 ESADE BUSINESS SCHOOL ESADE SPAIN**
- **36 SISTELEC SOLUCIONES DE TELECOMUNICACION, S.L. SISTELEC SPAIN**

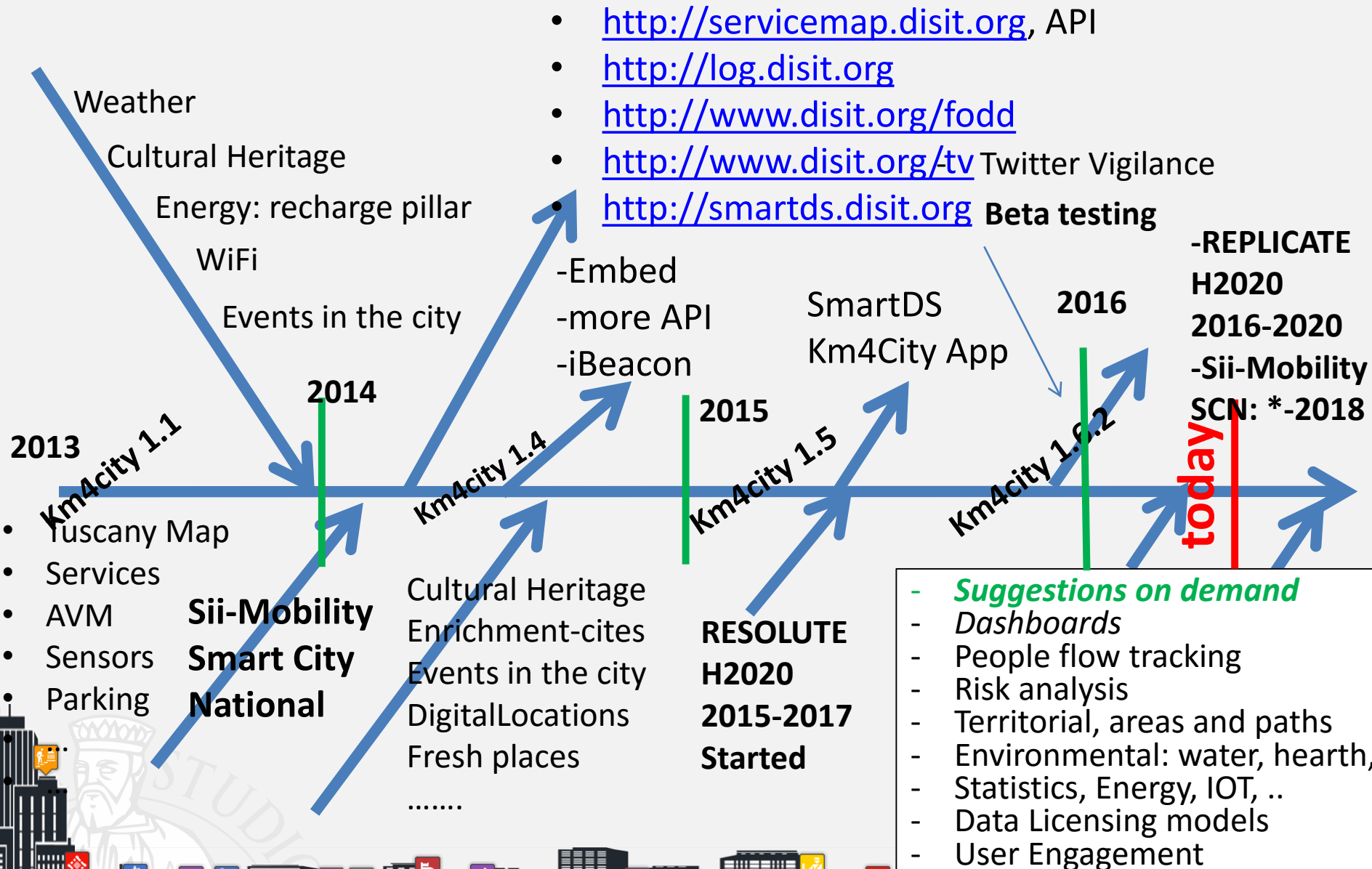
REPLICATE a Firenze: Energia, ICT e Mobilità



Km4City EcoSystem

- **Final Users Tools:** <http://www.disit.org/km4city>
 - Km4City mobile applications
 - Km4City web application: <http://www.km4city.org>
- **Public Administrator Tools:**
 - Smart City Dashboards, <http://dashboard.km4city.org>
 - ServiceMap Server, <http://servicemap.disit.org>
 - Smart decision support system, <http://smartds.disit.org>
 - Twitter Vigilance, <http://www.disit.org/tv>
 - Traffic and People Flow Assessment <http://www.disit.org/6694>
- **Developers Tools:** <http://www.disit.org/km4city>
 - ServiceMap Server, plus API, <http://servicemap.disit.org>
 - Ontology Documentation <http://www.disit.org/km4city>
 - LOG LOD browser <http://log.disit.org>
 - Open Source Mobile Application, FODD <http://www.disit.org/6595>
- **Back Office tools for Public Administrations**
 - Data Ingestion Manager, DIM, <http://www.disit.org/6732>
 - Distributed Smart City Engine Scheduler, DISCES <http://www.disit.org/6515>
 - RDF Indexer Manager, RIM, <http://www.disit.org/6708>
 - RDF store enricher with dbPedia
- **Adopted on projects and real scenarios**

Km4city roadmap





Ne volete sapere di più ?

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

DISIT Lab

Dipartimento di Ingegneria dell'Informazione

Università degli Studi di Firenze

Via S. Marta 3, 50139, Firenze, Italia

<http://servicemap.disit.org>

<http://log.disit.org>

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