Smart City and Open Data Projects and tools of DISIT Lab

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DISIT Lab

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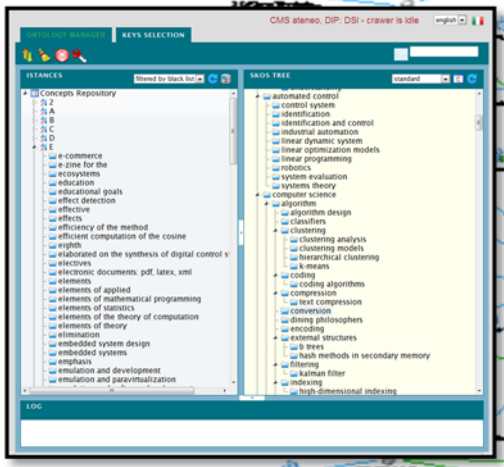
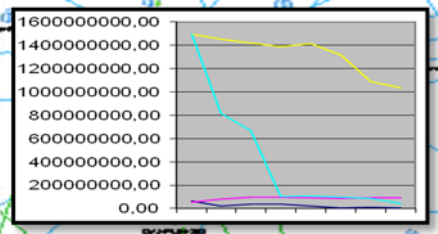
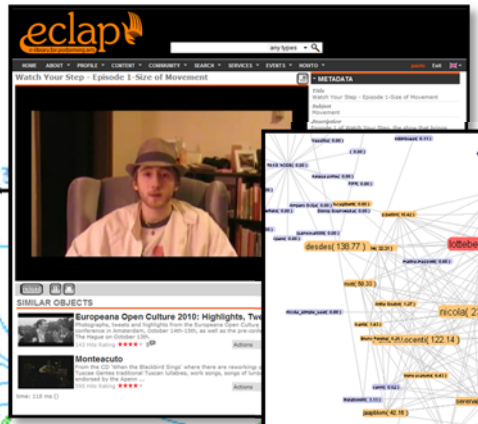
http://www.disit.dinfo.unifi.it

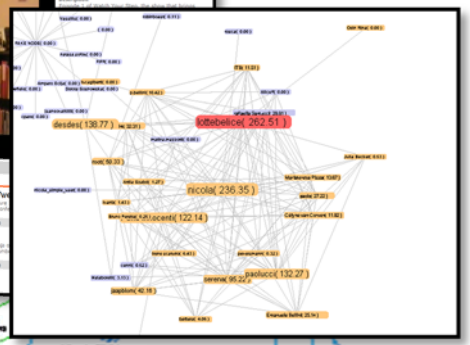
Knowledge Acceleration





Data Analytics, Big data

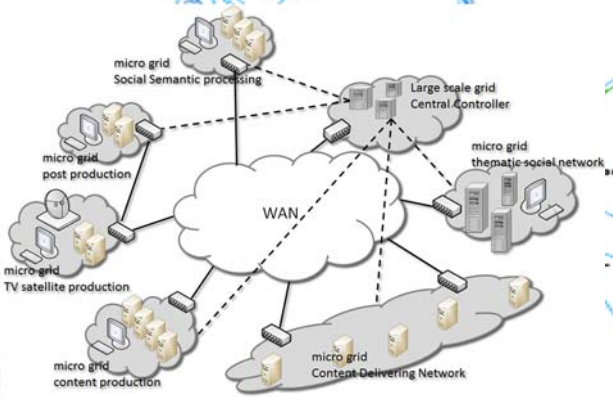




Social Media

Mobile Computing

Smart Cities



Cloud and Grid Computing

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

- Prof. Paolo Nesi, paolo.nesi@unifi.it
- More than 20 among postdocs, PhD students and fellows

Current research topics

- Social media, collaborative work, Mobile computing, OpenData, LOD
- SmartCity, BigData, data analytics
- Railway signaling, autonomous driving systems, formal methods
- Cloud Computing, grid computing, smart cloud
- Data Mining, Knowledge Acceleration, natural language processing

Main research results

- Knowledge Management and Natural Language Processing: OSIM, CoSkoSAM
- Content and Protection Management, grid computing: AXMEDIS AXCP
- Social Media, recommendations and tool: ECLAP.eu, MyStoryPlayer, Social Graph, IPR Wizard…
- Mobile Computing: Mobile Medicine, Mobile Emergency, etc.….
- Music Transcode, winner of MIREX for piano
- Awards: IEEE ICECCS, DMS, Italia degli Innovatori, etc.

Main sources of funding

- **European Commission**: ECLAP (social media, CH), AXMEDIS (DRM, protection, automation e grid computing), WEDELMUSIC, IMAESTRO, VARIAZIONI, IMUTUS, MUSICNETWORK, MOODS, MUPAAC, OFCOMP, etc. ……
- **Italian Ministry**: Smart Cities COLL@BORA (collaborative work, social media), FIRB e PRIN
- **Regional**: SACVAR (knowledge mining and reasoning), TRACE-IT (Railway signalling), RAISSS (Railway signalling), ICARO (cloud)
- **Fondations**: MatchMaking (NLP), OSIM (Knowledge Acceleration, NLP)

Main Smart City and OD Projects

- Linked Open Graph: http://log.disit.org
- Sii-Mobility http://www.sii-mobility.org
- SmartCityOntology Coll@bora
- SACVAR and OSIM

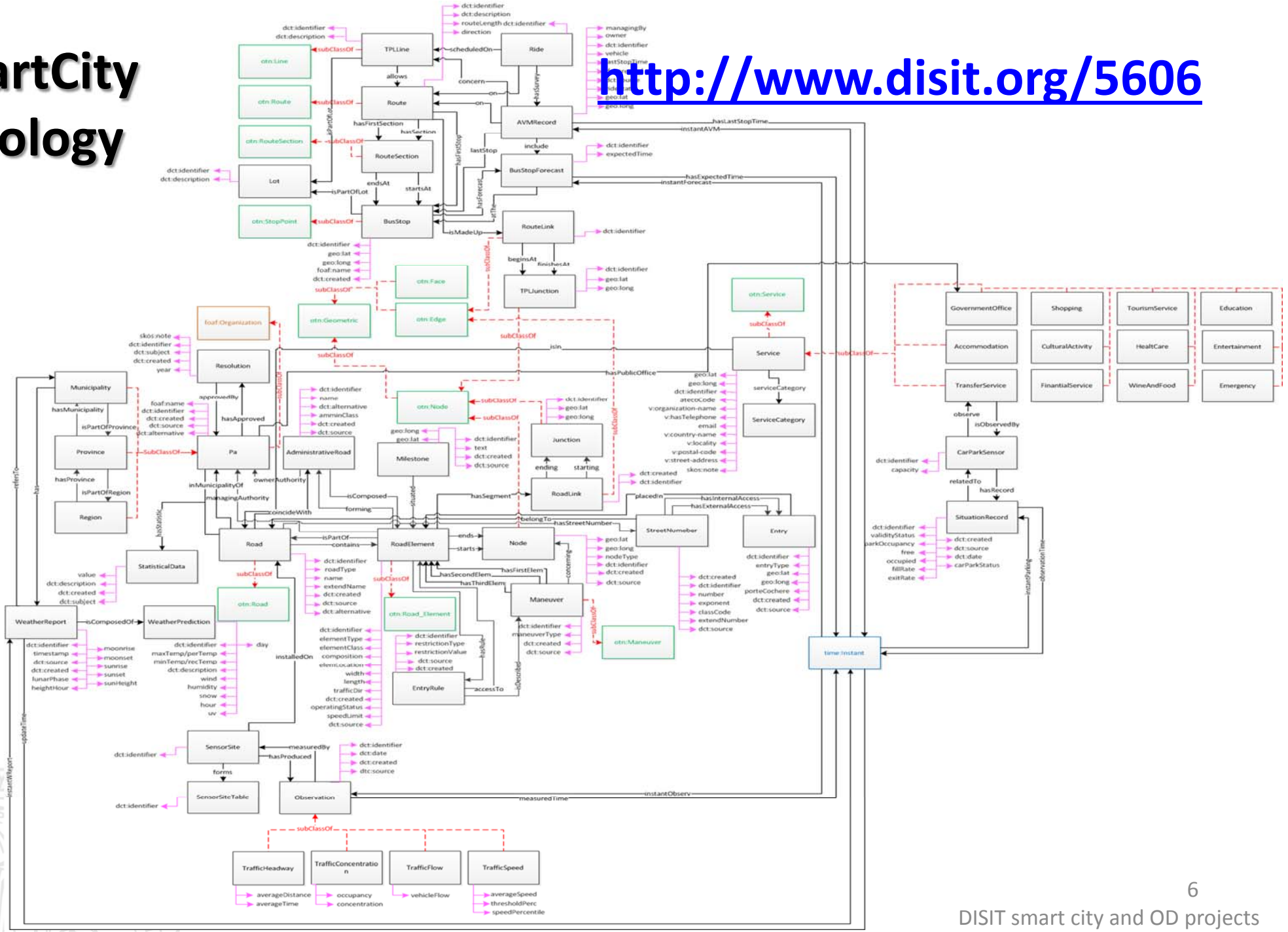
- see them it via http://log.disit.org
- see http://www.disit.org

SmartCityOntology http://www.disit.org/5606

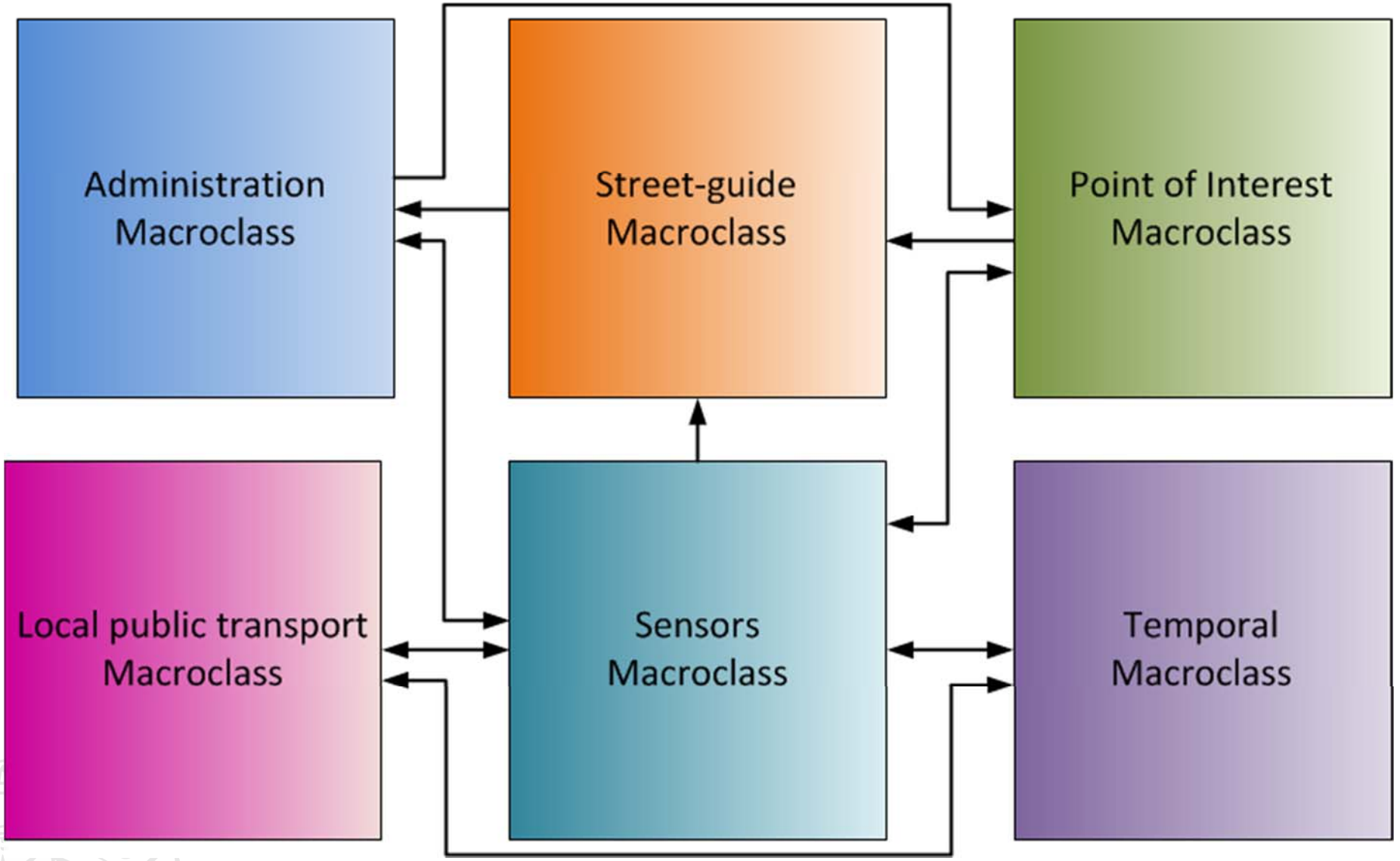
- **Title:** SmartCity Ontology for Service Inference
- **Duration**: 12 months
- **Objectives**: create an ontology that allows to combine all the data provided by the city of Florence and the Tuscan region:
  - 509 OpenData (Municipality of Florence)
  - 119 OpenData (Tuscany Region)
  - Timetable TPL
  - Street Graph
  - Punti di interesse
  - Real Time Data from traffic sensors
  - Real Time Data from parking sensors
  - Real Time Data from AVM systems
  - Weather Forrecast (consortium Lamma)
- **Link**: http://log.disit.org, http://www.disit.org/5606
- E..g florence: http://log.disit.org/service/index.php?uri=http://www.disit.dinfo.unifi.it/SiiMobility/048017&sparql=http://192.168.0.205:8080/openrdf-sesame/repositories/siimobilityultimate

SmartCity Ontology

http://www.disit.org/5606

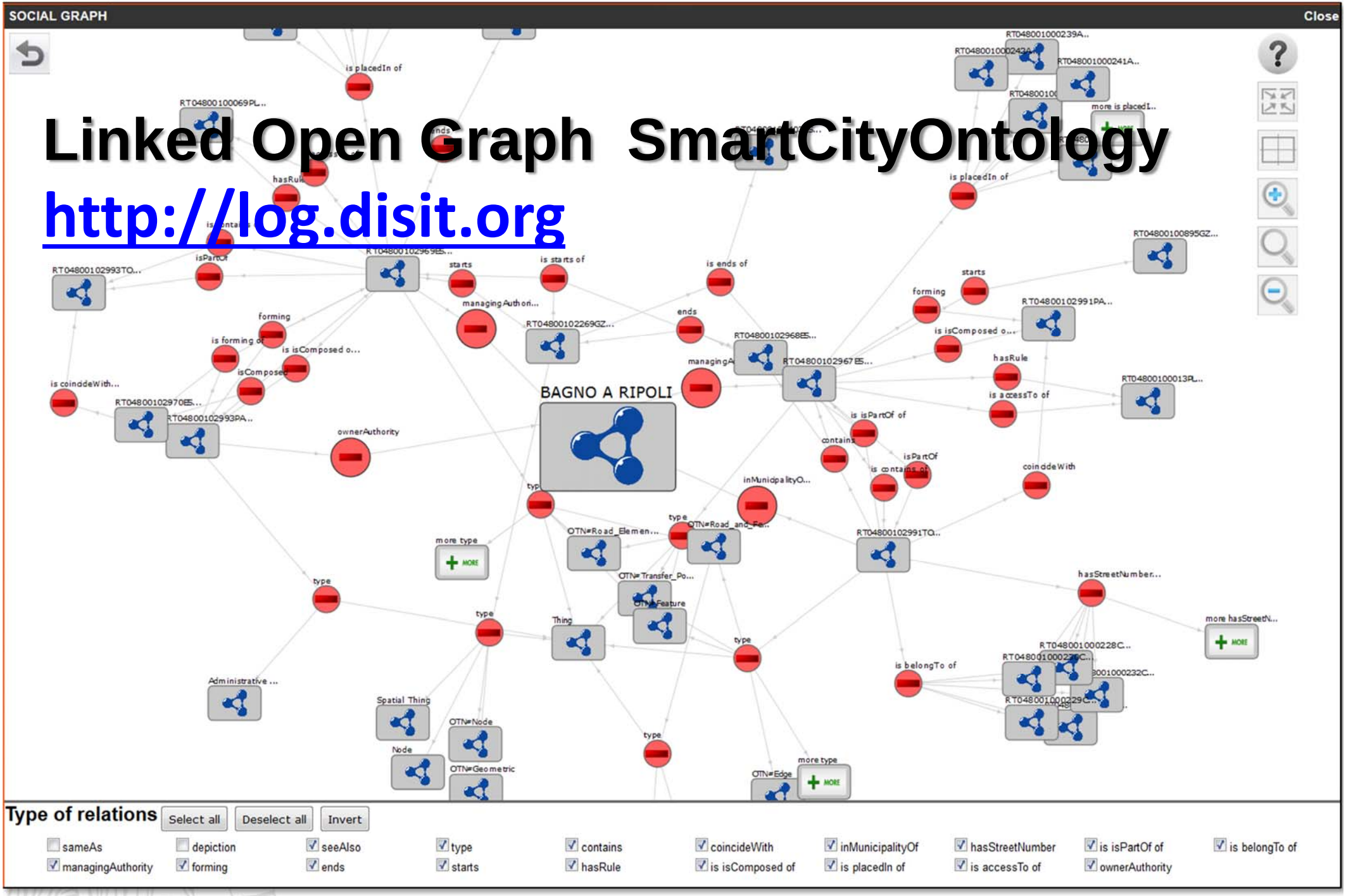


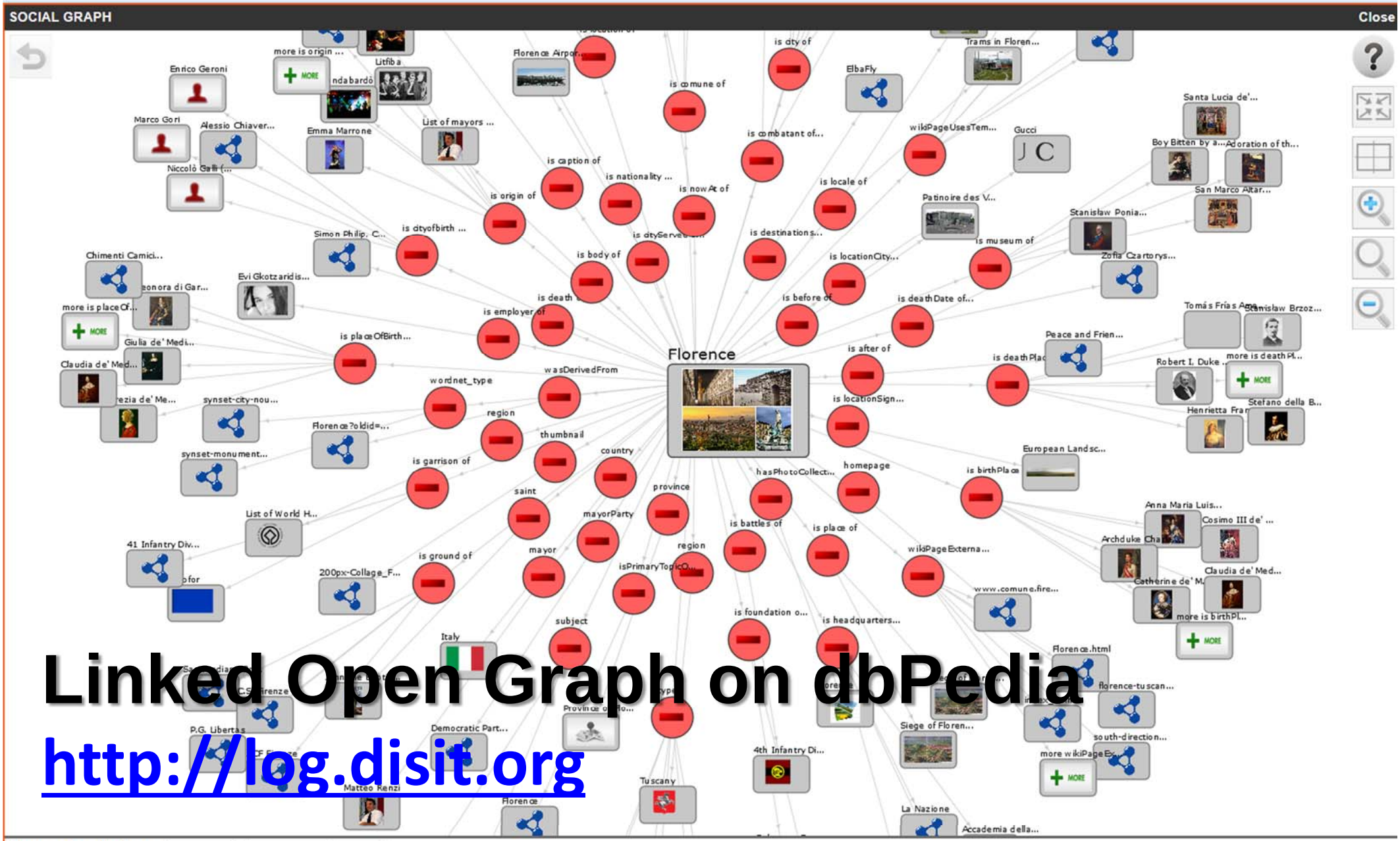
SmartCityOntology … major macroclasses



Linked Open Graph

- **Title**: Linked Open Graph: Social and Linked Open Data Navigation
- **Duration**: 24 months, derived from EC project ECLAP
- **Objectives**:
  - Design and develop tools for graphical navigation on Open Data and Linked Open Data
- **Link**:
  - LOG LOD http://log.disit.org
  - Also used in www.ECLAP.eu Social Graph: http://www.eclap.eu/116088
- **Examples for: dbPedia, Europeana, British Museum, LinkedGeo Data, Cultura Italia, Sii-Mobility, ICARO Cloud, MyStoryPlayer, OSIM Knowledge Modeling and reasoning**


SOCIAL GRAPH
Close
Linked Open Graph SmartCityOntology
http://log.disit.org
BAGNO A RIPOLI
is placedIn of
isPartOf
starts
is starts of
is ends of
ends
forming
is forming of
is isComposed o...
isComposed
is coincideWith...
ownerAuthority
managingAuthori...
is isPartOf of
contains
isPartOf
is contains of
coincideWith
inMunicipalityO...
hasRule
is accessTo of
more type
type
Thing
Administrative ...
Spatial Thing
Node
OTN=Node
OTN=Geometric
OTN=Edge
OTN=Transfer_Po...
OTN=Feature
hasStreetNumber...
more hasStreetN...
is belongTo of
Type of relations
Select all
Deselect all
Invert
sameAs
depiction
seeAlso
type
contains
coincideWith
inMunicipalityOf
hasStreetNumber
is isPartOf of
is belongTo of
managingAuthority
forming
ends
starts
hasRule
is isComposed of
is placedIn of
is accessTo of
ownerAuthority



Linked Open Graph on dbPedia

http://log.disit.org

Linked Open Graph for LOD

A browsing tool to explore LOD sparql services via their entry point. To explore RDF elements and view which contents or users are linked with that.
With just one click (or tap) over a node you can see appear the navigation panel that allows you to:

- Explore/Reduce a node of the graph.
- Focus the visualization over a node.
- Open a specified content and view it's info.
- Direct accessing to the info associated with an entity, attributes and their values.
- Filtering relationships, inverting the filtering.
- Save your linked open graph with your preferences and navigations and get their access via email, that you can share with your colleagues for reading and further browsing and change.

A list of check buttons, one for each relation kind, to turn on/off the visualization of relations from the LOG.

LOG tool is free of use for no profit organizations. You can embed the LOG tool in your web pages.

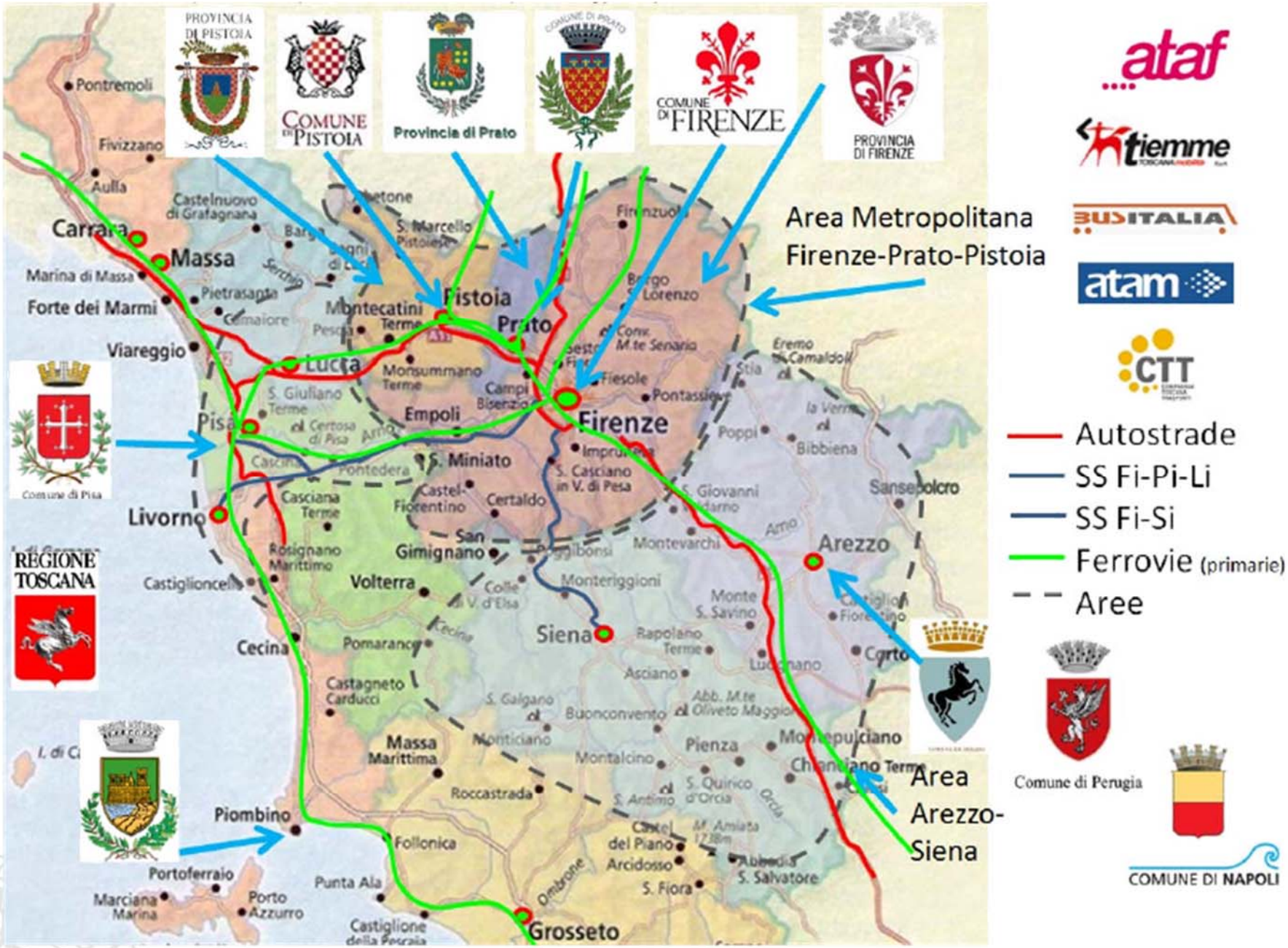
Sii-Mobility

- **Title**: Support of Integrated Interoperability for Services to Citizens and Public Administration
- **Duration**: 36 months
- **Cost**: 22 Meuro
- **Objectives**:
  1. Reduction of social costs of mobility;
  2. Simplify the use of mobility systems;
  3. Developing working solutions and application, with testing methods;
  4. Contribute to standardization organs, and establishing relationships with other smart cities' management systems.

The Sii-Mobility platform will be capable to provide support for SME and Public Administrations. Sii-Mobility consists in a federated/integrated interoperable solution aimed at enabling a wide range of specific applications for private services to citizen and commercial services to SME.

- **Link**: http://www.disit.dinfo.unifi.it/siimobility.html

Commenti dei cittadini, Social Media
Merci
AVM trasporto Pubblico
Sensori su trasporto Privato
Sensori, sistema monitoraggio
Sensori Parcheggi
UTC
Sii-Mobility
Infomobility
Monitoraggio traffico, autostrade
Varchi Telematici, ZTL
Emergenze, polizia, 118
Rete Ferroviaria
Parametri ambientali
Servizi ed enti
Ordinanze: eventi, lavori pubblici, ..


PROVINCIA DI PISTOIA
COMUNE DI PISTOIA
Provincia di Prato
COMUNE DI PRATO
COMUNE DI FIRENZE
PROVINCIA DI FIRENZE
ataf
tiemme
BUSITALIA
atam
CTT
Area Metropolitana
Firenze-Prato-Pistoia
Autostrade
SS Fi-Pi-Li
SS Fi-Si
Ferrovie (primarie)
Aree
Area
Arezzo-
Siena
Comune di Perugia
COMUNE DI NAPOLI
REGIONE TOSCANA
Comune di Pisa
Pontremoli
Fivizzano
Aulla
Carrara
Massa
Marina di Massa
Forte dei Marmi
Viareggio
Lucca
Pistoia
Prato
Montecatini Terme
Pisa
Livorno
Empoli
Firenze
Arezzo
Sansepolcro
Siena
Volterra
San Gimignano
Cecina
Piombino
Portoferraio
Marciana Marina
Porto Azzurro
Punta Ala
Follonica
Massa Marittima
Grosseto
Castiglione della Pescaia
Castagneto Carducci
Rosignano Marittimo
Cascina Terme
Pontedera
Castelfiorentino
Certaldo
S. Miniato
Montepulciano
Chianciano Terme
Montalcino
Pienza
Abbadia S. Salvatore
Arcidosso
Roccastrada
Monticiano
Buonconvento
Rapolano Terme
Asciano
Monteriggioni
Montevarchi
Bibbiena
Poppi
Pontassieve
Fiesole
Impruneta
Campi Bisenzio
Monsummano Terme
Pietrasanta
Castelnuovo di Garfagnana
Barga
S. Marcello Pistoiese
Borgo S. Lorenzo
Firenzuola
Eremo di Camaldoli
Monte S. Savino
Cortona
Lucignano
Abbadia di Oliveto Maggiore
S. Quirico d'Orcia
Ombrone
Arno
Serchio
Cecina

Coll@bora

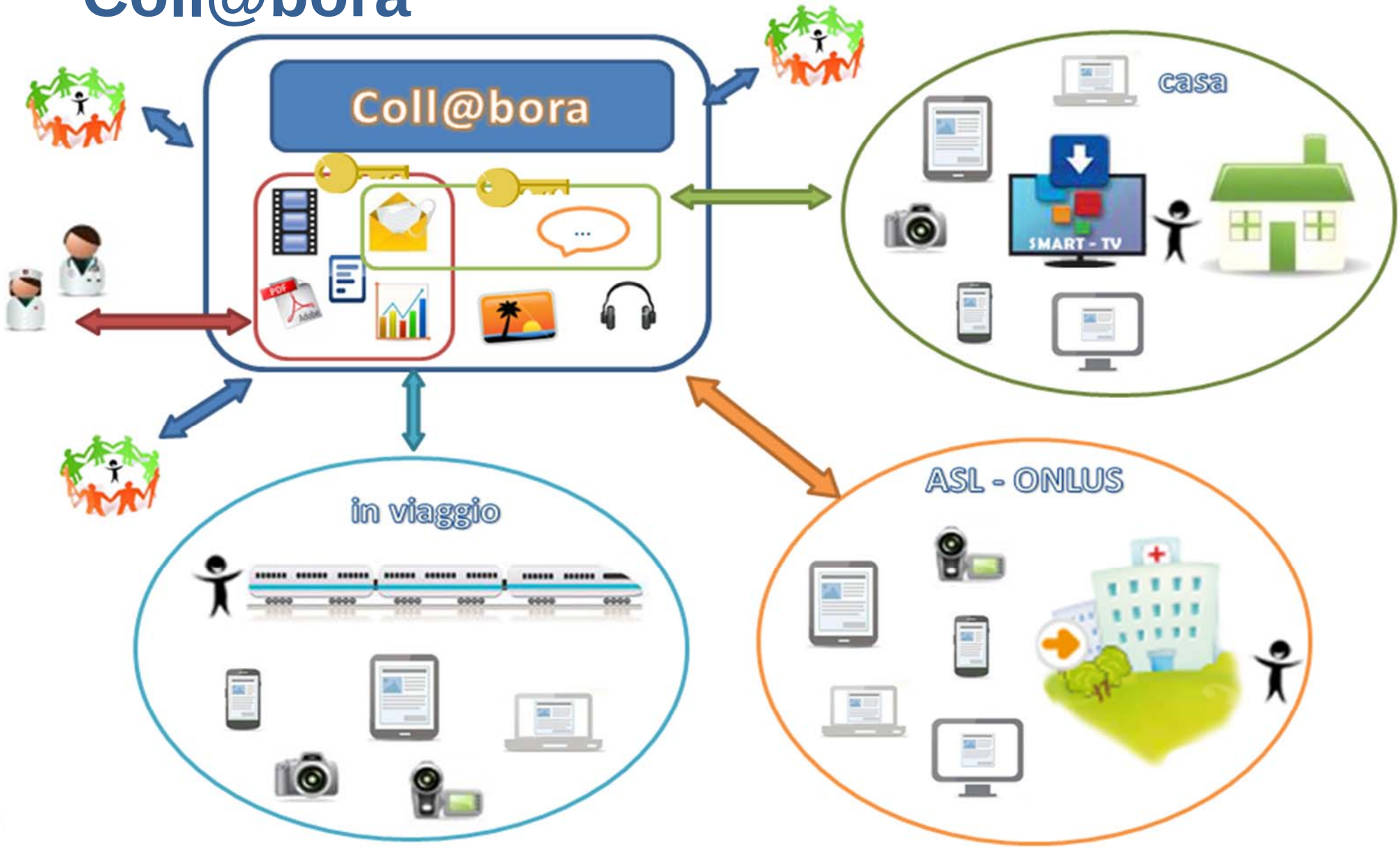
- **Title**: Collaborative Support for Parents and Operators of Disabled
- **Duration**: 24 months
- **Cost**: 1 Meuro
- **Objectives**: providing strong advantages for
  1. Relatives interested in facilitating relations with the management team;
  2. Associations in order to offer a better service to the families and people with disabilities by providing a collaborative support to the involved teams, but also to manage the wealth of knowledge, to support the training of the staff, etc.

  Coll@bora provides a secure collaboration tool for the teams and for the association to support the families and the disabled people.
- **Link**: http://www.disit.dinfo.unifi.it/collabora.html

Coll@bora

- **Objective 1:** Study and development of a platform for collaboration and management for team (consisting of parents, family members, physicians, physician assistants, volunteers, etc..) for disable support in privacy
- **Objective 2:** Study and development of web applications, and mobile smartTv to support the activities of assistance and service
- **Objective 3:** validation of the solution

Coll@bora



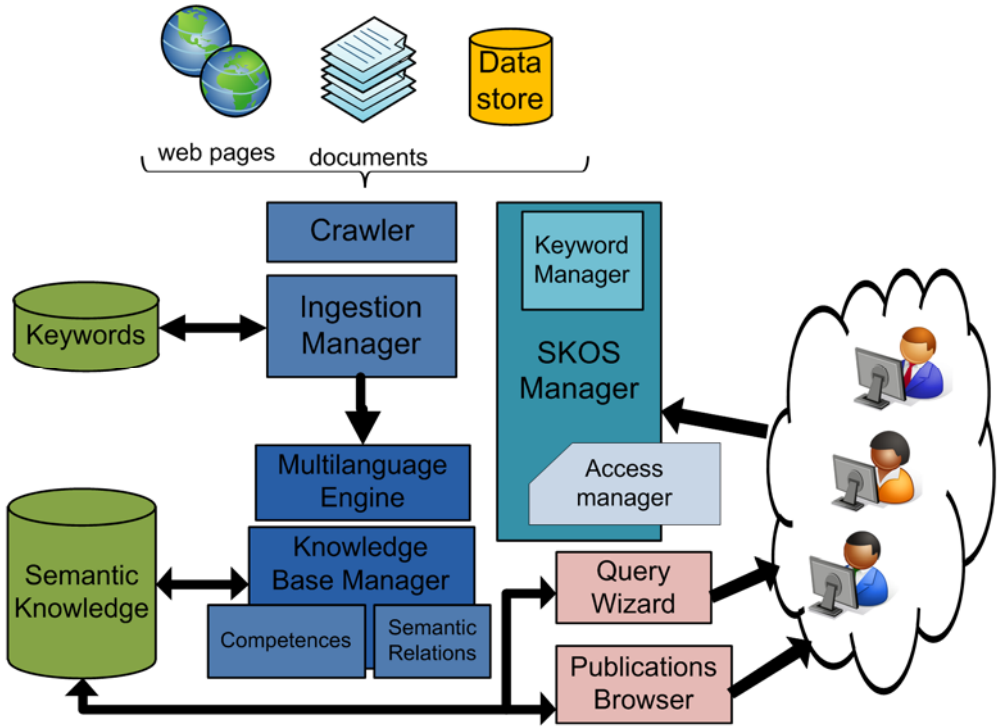
SACVAR/OSIM: Open Mind Innovative Space

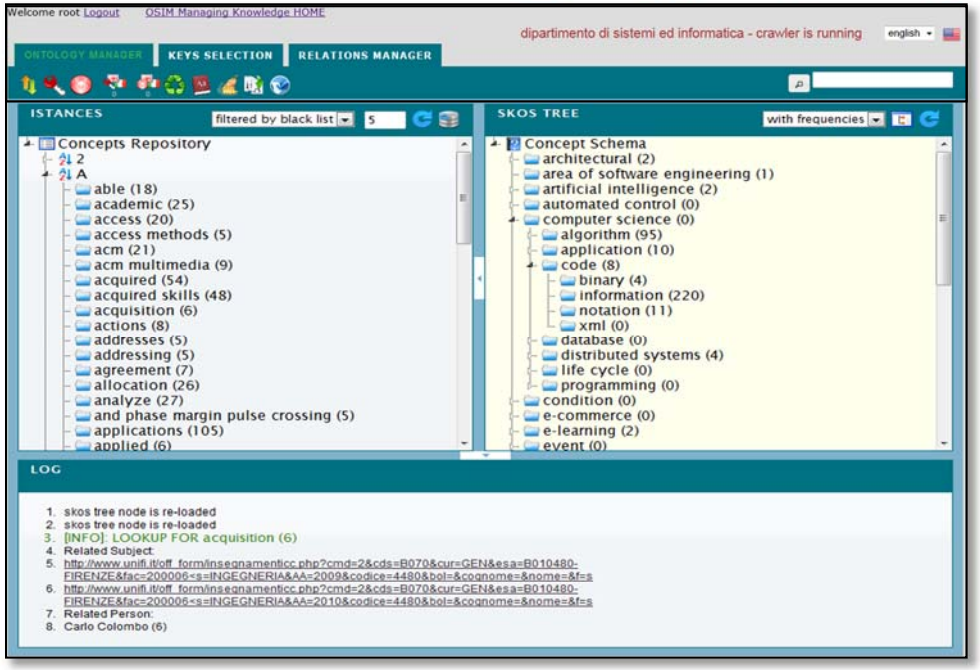
- **Title**: Open Mind Innovative Space, and SACVAR
- **Duration**: 36 months, 12 as OSIM e 24 as SACVAR
- **Objectives**:
  1. Knowledge mining construction from people competence
  2. Semantic search engine on mined knowledge
  3. Web pages and Blog mining and analysis in Natural Language
  4. Match making and affective computing analysis

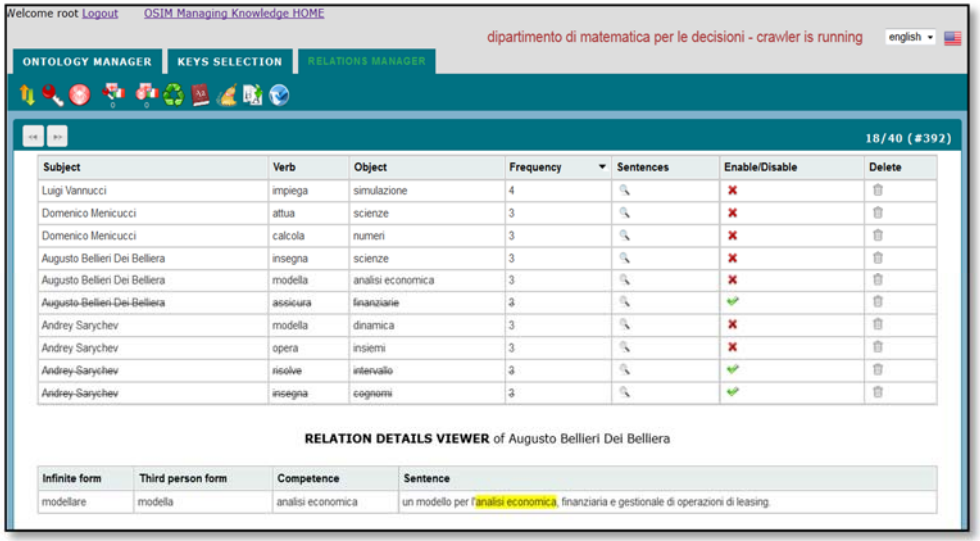
– We are using these tools for social media analysis, to analyze citizens appreciation and comments on Smart City services.

- **Link**: http://openmind.disit.org
  - http://www.disit.dinfo.unifi.it/osim.html
  - http://www.disit.dinfo.unifi.it/sacvar.html

OSIM Architecture and tools







Data Analytics and Data Reasoning

- DISIT personnel is capable to integrate and define algorithms grounded on: statistical analysis, data mining, learning and knowledge reasoning.
- The typical goals are for: data reconciliation, data quality assessment and correction, data connection and inference, deduction, prediction, pattern detection, critical condition detection, discovering un expected correlations.

Florence: ICT and Transportation

- **good experience**, since it is a smart city in sense that provides a large number of open data related to transport, mobility, geolocation, citizens' services, energy, pollution, parking, etc.
  - **Open data** address classical static information and also real time information related to traffic, energy, parking, sensors, etc.
  - **on the basis** of them a number of smart services are provided.
- Florence has a number of working infrastructures

Potential challenges and interests

- Florence is also a trial for the above mentioned projects and much more

- **Potential advances are:**
  - New and advanced Services for SME and PA
    - created by providing integrated data and support for executing data analytics algorithms for energy-ict-transportation
  - Increasing efficiency in exploiting resources, reducing pollution, and thus to create better living condition, and new jobs

DISIT Potential challenges and interests

DISIT is interested in participating in the next calls of the European Commission and in particular for:

- Working on open data and linked open data for smart city, smart cloud, smart manufacturing, smart museum, etc.
  - Creating semantic models and reasoning engines
  - Creating data mining and natural language processing tools as SACVAR/OSIM
- Working on defining big data solutions and infrastructures
- Working on data analytics algorithms computing:
  - Predictions and trends,
  - unexpected correlations,
  - data inconsistencies and incompleteness,
  - etc.