

# UNiCS: The open data platform for Research and Innovation

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At some point in life mathematical logic turned me into a computer scientist. Nowadays I'm a researcher at the SIRIS Lab, working in the areas of:

- knowledge representation & reasoning,
- modal and description logics,
- conceptual modelling, and
- ontology-based data management.

I studied Philosophy in Milano and did my master's thesis on modal logic-based representations of first order quantification. In year 2006, I finished my PhD dissertation @UNIMIB proposing a knowledge-based system for chemical compound formulations. I have been a postdoc for a while, then I moved to the KRDB Research Centre @FUB. I joined the SIRIS Lab in Barcelona in 2014.

international and interdisciplinary, with seven different nationalities and PhDs in different fields, from archeology to astrophysics, philosophy and computer science.



## Regional Governments



“I want to understand how the regional S3-related initiatives fit within the general R&I panorama and other funded projects. I want to analyse the collaboration networks which exist already within a given thematic area, and understand which kinds of actors are mostly involved.”

## HE&R Institutions



“I’m interested in enhancing the attractiveness of my higher education organisation and I want to get a better understanding of the student mobility patterns and their evolution over time. Is there anyone else similar to us on this respect?”

## R&I Funding Bodies



“Research and innovation ecosystems are fast changing and fast growing. I need to define our research and innovation priorities, but also inform the shaping our future investments and then monitor and learn to eventually reshape our existing policies.”

We combine **domain expertise**,  
**data analytics** and **co-design thinking**.

We stimulate **collective intelligence** for exploring scenarios, designing solutions and launching transformations.





Regione Toscana



Barcelona Institute of  
Science and Technology



UNIVERSITY  
OF CENTRAL ASIA



## The academic structures of Boston, London and Paris: a comparison

Report issued to the CNRS

CLIENT  
Centre National de la Recherche Scientifique  
(CNRS)

DATE  
March 2016

SIRIS  
ANALYTICAL REPORTS

MEMBERSHIP OF THE INSTITUTIONS

## Finançament de la recerca en biomedicina a Espanya

Informe elaborat per la Fundació "La Caixa"

CLIENT  
Fundació "La Caixa"

DATE  
May 2015

SIRIS  
ANALYTICAL REPORTS

MEMBERSHIP OF THE INSTITUTIONS

## Uso eficiente e complementare dei fondi destinati alla Ricerca, all'Innovazione e all'Alta Formazione nel contesto della programmazione dei fondi strutturali 2014-2020 in Calabria

Proposta Coesive

CLIENT  
Università della Calabria

DATE  
April 2015

SIRIS  
ANALYTICAL REPORTS

MEMBERSHIP OF THE INSTITUTIONS

## Characterisation of preliminary priority areas for smart specialisation in Moldova

Final report for the Ministry of the  
Economy for programming the  
European Structural Funds

CLIENT  
EUROPEAN COMMISSION - JOINT MOODSIC 4.0104

DATE  
February  
2015

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## CHALLENGES

Increasing Accountability  
and Responsibility

Clarifying Strategy and  
Improving Decision-Making

Analysing and  
Benchmarking Performance

Detecting Emerging Trends

Access Quality  
on-the-point Data

Data-driven and  
participatory  
policy-making  
and monitoring

SIRIO  
ACADEMIC

## TRANSFORMATIONAL TRENDS

Open Data

Semantic Technology

Data Analytics  
and Visualization

Participatory Culture

Customised Approach



We develop **data-driven tools** to support **decision-making and monitoring**, by transforming raw data into visual and interactive experiences.

Our tools are based on cutting-edge technologies, integrating semantic and data mining solutions, **custom designed for specific strategic questions**.



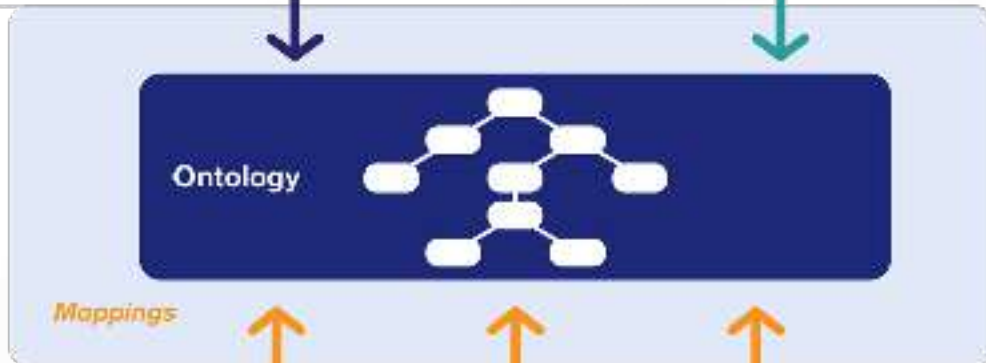
## The applications

- Dashboards, data visualisations, access points and tools.



## The data integration platform

- Semantic integration via a common ontology that reflects domain expert knowledge and is mapped to the different sources.



## The data infrastructure

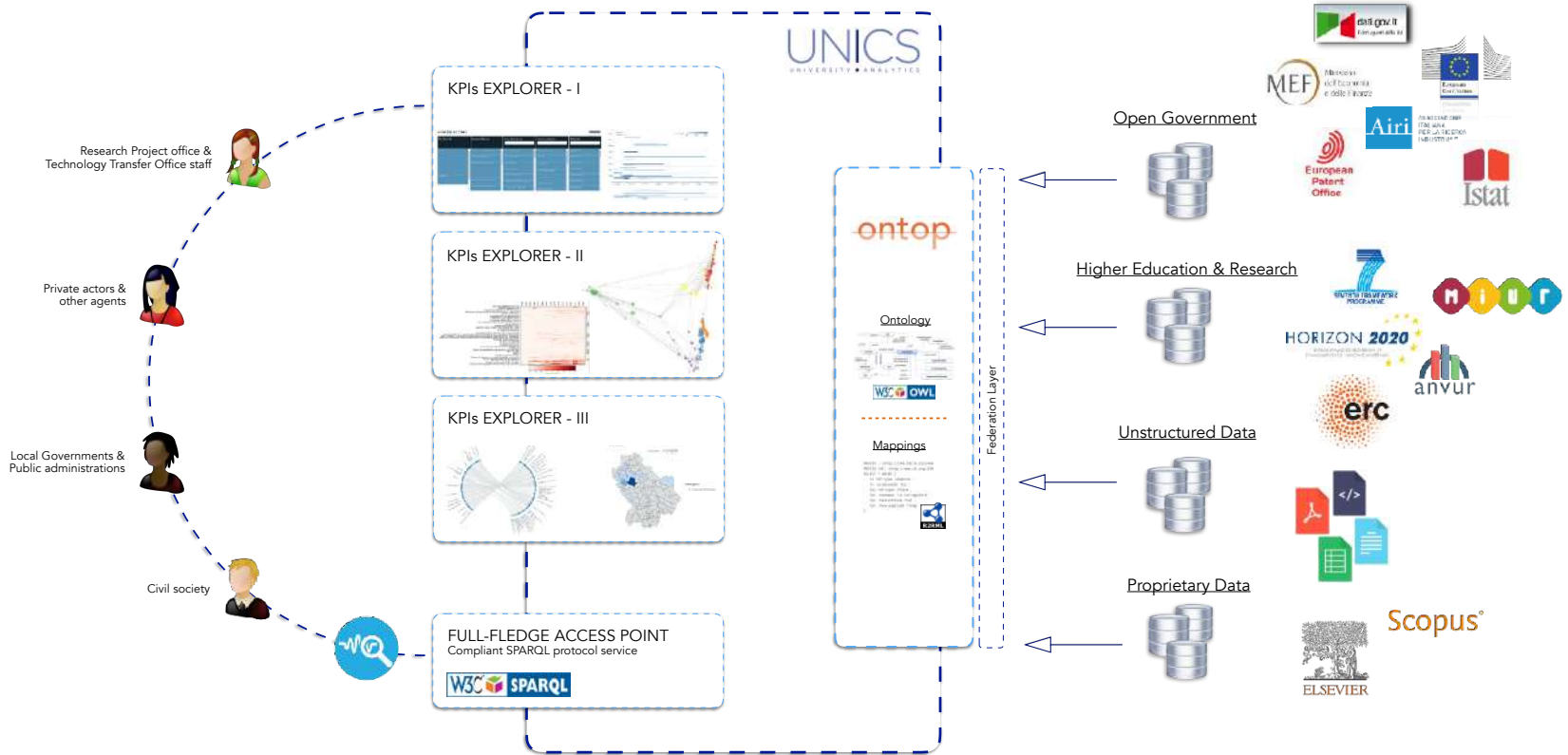
- Distributed sources from diverse providers and varying formats.



Our **solutions** provide end-users with:

- a running technology for accessing data in a way that is conceptually sound with the **experts domain knowledge**.
- a **semantically-transparent platform**, ready to acquire and be complemented with new data from different sources.
- a theoretically grounded mechanism to **homogenise information** originally stored in different formats and according to different conceptualisations.





END-USERS

KPIs INTERACTIVE VISUALISATION TOOLS, QUERY SYSTEMS, ...

ONTOLOGY-BASED DATA INTEGRATION LAYER

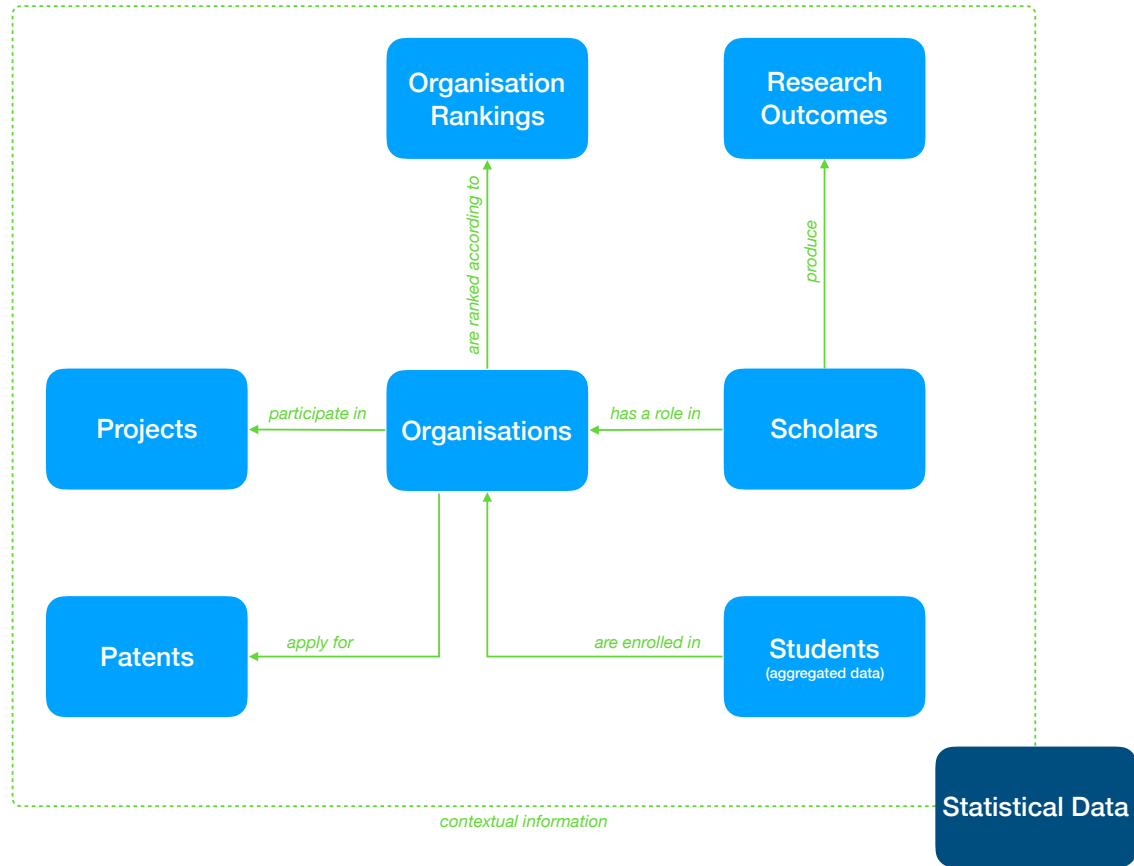
DATASOURCES



UNiCS ANALYTICS



1711 owl:ObjectProperty  
 1174 owl:DatatypeProperty  
 3096 owl:Class





```

mappingId N_project_class
target    (:Project (p_id) as :Project ; :idNumber (:a_id)) .
source    select
          p.id as p_id,
          from
          unids.project p

mappingId N_project_scre
target    (:Project (p_id) summary (:p_scre)) .
source    select
          p.id as p_id,
          p.summary as p_scre
          from
          unids.project p

mappingId N_project_tit
target    (:Project (p_id) displayName (:n_tit)) .
source    select
          p.id as p_id,
          p.title as p_tit
          from
          unids.project p

mappingId N_project_call
target    (:Project (p_id) recCall (:ec_call)) .
source    select
          p.id as p_id,
          p.ec_call as ec_call
          from
          unids.project p

mappingId N_project_fundsch
target    (:Project (p_id) recFundingScheme (:ECFundingScheme (ec_fun_schere)) .
source    select
          p.id as p_id,
          p.ec_fun_schere as ec_fun_schere
          from
          unids.project p
          where
          p.ec_fun_schere is not null

mappingId N_funding_schere
target    (:ECFundingScheme (fs_eode) as :EC FundingScheme ; :shortName (fs_eode)) .
source    select
          fs.eode as fs_eode
          from
          unids.funding_schere fs

```



**Regional Observatory  
for Research and Innovation**



**Innovation Ecosystem in  
Moldavia**



**Smart Specialisation (S3)  
Monitoring Tool**



**Research Information System  
@PSL**



**Open Contracting  
Open Basento**



**UNiCS  
The Open Platform for HERI**





Virtual integration over multiple dataset formats (triple store, RDB, no-SQL, for instance)  
Statistical/Multidimensional data (is the 'RDF Data Cube' the right solution?)  
Access control management, distributed ontologies and mappings  
Semi-automatic generation and testing of mappings

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Data access and interoperability (SPARQL 1.1, OWL-DL... they are out there!)  
Data quality & overall system resilience  
Subject Classification Systems and context sensitive data exploration

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Proper ontologies specification: costs and benefits  
Ontology understanding and use by non-technical users

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Education and training





# Questions?

