HERCULES PROJECT
A System for Universities with Research Data Semantically Enriched

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euroCRIS membership meeting
Münster, November 2019
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Hércules is an initiative promoted by the Conference of Rectors of Spanish Universities (CRUE) and led by the University of Murcia. It has a total budget of Five million four hundred and sixty two thousand six hundred euros (5.462.600 €). The European Regional Development Fund (ERDF) is financing 80%, therefore the ERDF makes a contribution of Four million three hundred seventy thousand eighty euros (4.370.080 €). This contribution is made through the Ministry of Economy, Industry and Competitiveness (currently the Ministry of Science, Innovation and Universities) as Intermediate Body of the Smart Growth Operational Programme (POCint), which now is known as the Plurirregional Operational Programme of Spain (POPE).
Background

- 84 Universities having different Research Management Systems
- Each university has its own procedures and the systems are based on different data models and schemata
- Poor standardisation
- Transfer of research results to the society is done in a disaggregated way
- Inefficiencies in knowledge management and dissemination
- Additional costs to use combined research information
- Difficulties to access European Funds
- Data representation is done with different granularity

Needs

- Integration of normalized CV
- Transparency
- Collaborations between universities and research groups
- Unify the criteria used to extract the information
- Open Access of research results to the society
- Availability of combined information from different universities/sources
- Improvement of the technological transfer and collaboration University-Company
Participation of CRUE Universities in HERCULES
Objectives

- Strengthen the transfer of R&D results to companies.
- Enable better scientific dissemination of research results.
- Development of support systems for the identification of collaborations in R&D between universities.
- Higher efficiency in public investment by decreasing duplicities in R+D+i projects.
- Facilitate the analysis of the university research costs.
- Improve efficiency of research management, licensing costs and software maintenance.

Development of a Research Management System with Semantic Capacities for all the Spanish Universities.
Products

RMS
Development of an Innovative Prototype of a Research Management System

DEAM
Enrichment of Research Data from Internet sources.
Development of Semantic Analysis Methods.

OISA
- Development of an Ontological Infrastructure.
- Development of a Semantic Architecture
Intellectual Property Rights

GPLv3
General Public Licence
It is free to facilitate the deployment in all universities
HÉRCULES Final Picture

Hércules Semantic Layer

Universities using Hércules RMS – Full integration.

Strongly connected universities

Univesities using their own RMS.
They made the RMS accessible

Softly connected universities

Universities align with HÉRCULES

Other Universities

Univesities using their own RMS.
RMS not accessible.
Pre-Commercial Procurement PCP

2,478,199,86 €

Public Procurement of Innovative Solutions PPI

1,362,744,00 €
Covenant signing (NOV17)  
Covenant Execution (AUG18)  

2017 2018 2019 2020 2021 2022

TODAY (20/11/2019)

End of covenant (AUG 22)

Prelliminary Market Consultation

OISA
RMS
DEAM

Project plan
Ontological Infrastructure and Semantic Architecture (OISA)

The products included in this public tender are:

- **Ontological Infrastructure**: creation of an Ontology Network that can be used to describe the data of the research domain with fidelity and high granularity.

- **Semantic Data Architecture**: developing an efficient platform to store, manage and publish distributed research data. It is based on the Ontological Infrastructure, with the ability to synchronize instances installed in different universities.
Ontological Infrastructure

The Hercules Project will create a “Hercules Ontologies Network” with the following elements and connections:

- Internal Ontologies. They will be created to represent areas of Knowledge that are not covered neither by external ontologies or conversions of external vocabularies and standards.
- External Ontologies
- Conversions of external vocabularies and standards to Ontologies

✓ It will be implemented a method to convert to OWL that is able to manage changes in the source.
✓ It is required to be aligned with the FAIR principles.
Semantic Architecture

The objective is to create a platform, called – RMS Backend, that manages the research domain data in a distributed way, given that each University is expected to have an RMS Backend that synchronizes with the others.

The main components are:

- RMS Backend
- FrontEnd
Semantic Architecture: RMS Backend

**Backend itself.**
This section is in charge of storing, synchronizing, and managing the data. It comprises the following elements:

a. Storage: Triple Store.
b. Factory of URIs.
c. Data Manager and a Data Manager Web Interface.
d. Data Generation: Conversion to RDF, validation, discovery and publication.

**Frontend**
This part is responsible for publishing RDF data for external clients. It consists of the following elements:

a. SPARQL endpoint (for humans and machines).
b. Linked Data Server (for Humans).
c. Web Documentation (for Humans).
Innovative Prototype of a Research Management System

- Its main objective is to create an innovate prototype of the Research Management System (RMS)
- Development of a pilot of the innovative RMS prototype developed at the University of Murcia

Including the corresponding data migrations and integrations with other existing information systems, both internal to the University and external.
Scope of the Service

The development of an innovative prototype of the Research Management System for UNIVERSITIES

- Communication with Semantic Architecture projects.
- Implementation of a pilot at the University of Murcia
- Documentation and training

Acquisition of equipment or infrastructure is not included in the scope.
Functional Modules to be Developed

- University research web portal
- Data Analytics and Intelligence
- Patent and company management
- Management of scholarships and grants
- Catalogue of the scientific-technical offer
- Management of research projects
- Advanced user support services applying Artificial Intelligence and natural programming language

RMS

Management of the researcher
Management of research groups
Management of scientific production
Management of areas of specialization of the researcher
Ethics management
Customer Relationship
Data Enrichment and Analysis Methods

- Intended to enrich, use and exploit the data produced by the AISO project.

- It has two components for:
  - Facilitating the enrichment of the data with information from Internet available sources, and therefore, used on a common basis by researchers. Researches will actively participate validating and updating their information.
  - Exploiting the information available with Analysis Methods, and in the end, will facilitate the creation of networks by establishing connections between experts and researchers.
Products

OISA
- Development of an **Ontological Infrastructure** for the description of the information of the Spanish University System.
- Development of a **Semantic Architecture** for the management of the data of the Spanish University System.

DEAM
- Enrichment of Research Data from Internet sources.
- Development of Semantic Analysis Methods.

**RMS**
Development of an Innovative Prototype of a **Research Management System** which is connected to the Semantic Systems and the research data network created in the scope of the Project.

**OISA**

**DEAM**

**RMS**

**OISA**

**DEAM**

**RMS**
Thank you for your attention

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