

EUROPEAN REGIONAL DEVELOPMENT FUND (ERDF)

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HERCULES PROJECT

A System for Universities with Research Data Semantically Enriched



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euroCRIS membership meeting
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Hercules 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**).

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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

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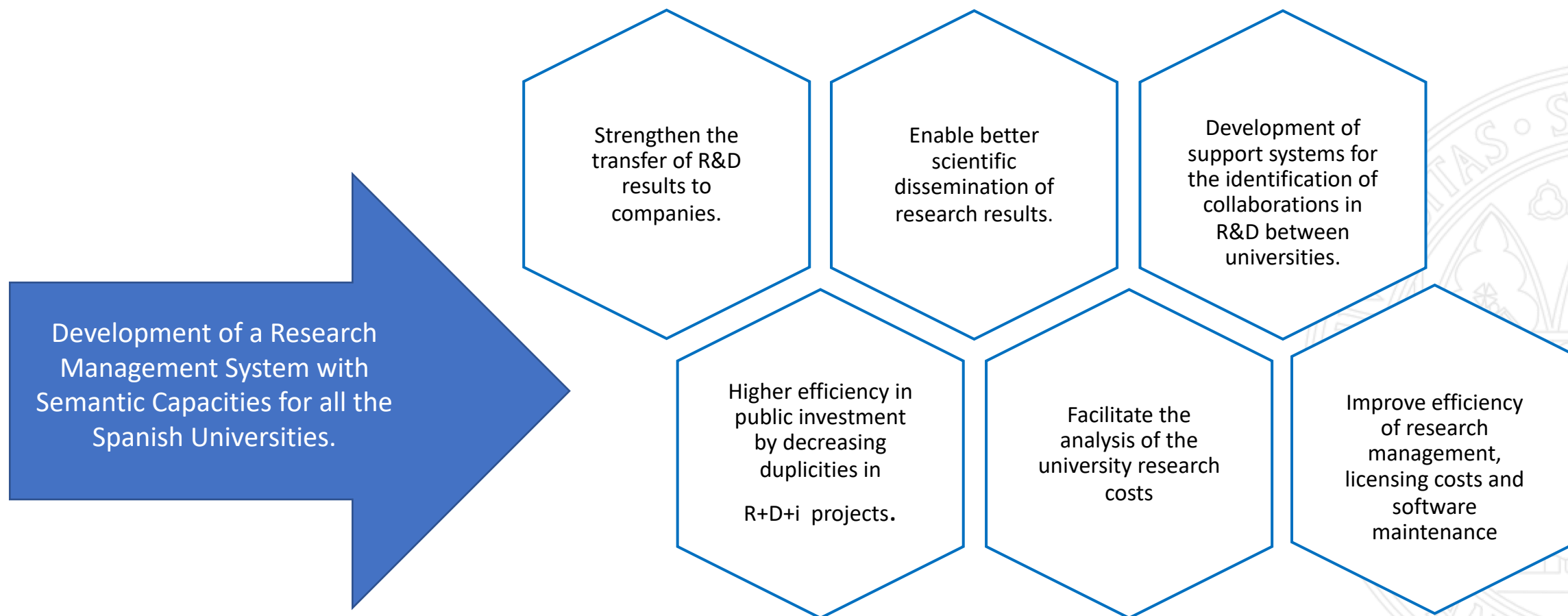
Participation of CRUE Universities in HERCULES



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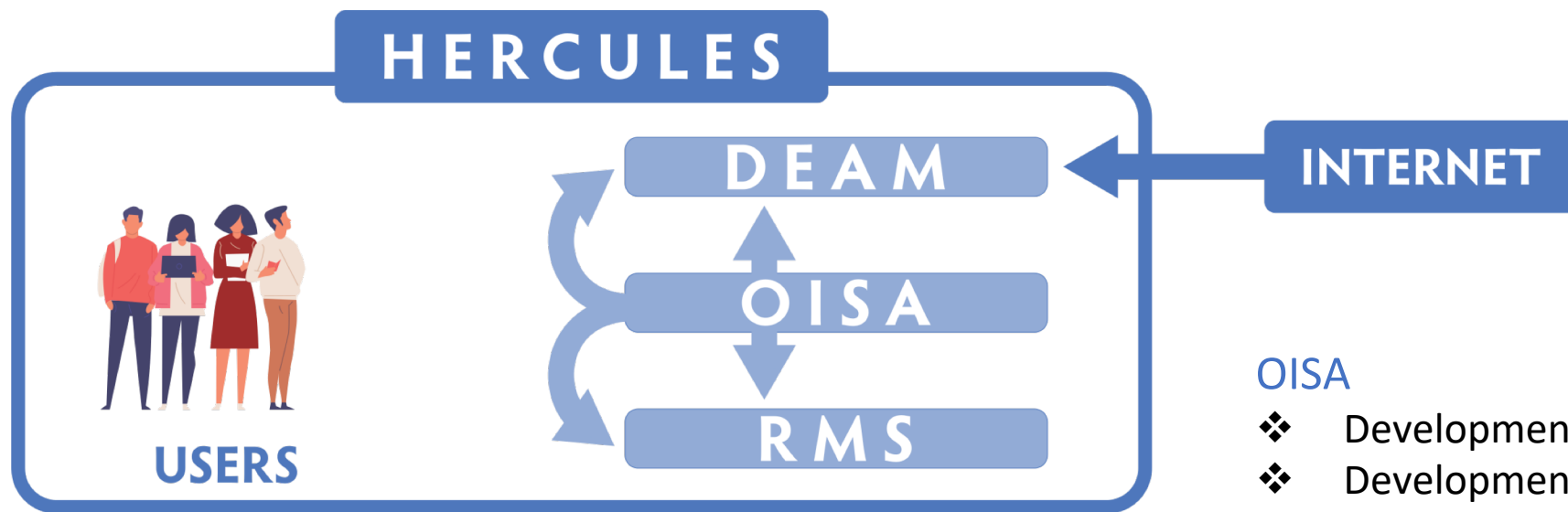
Objectives



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Products



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OISA

- ❖ Development of an **Ontological Infrastructure**.
- ❖ Development of a **Semantic Architecture**

DEAM

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

RMS

Development of an Innovative Prototype of a **Research Management System**

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Intellectual Property Rights

GPLv3

General Public Licence

It is free to facilitate the deployment in all universities

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HÉRCULES Final Picture

Hércules Semantic Layer

HÉRCULES RMS

- ▶ Universities using Hércules RMS – Full integration.

Universities align with HÉRCULES

Strongly connected universities

- ▶ Universities using their own RMS.
- ▶ They made the RMS accesible

Softy connected universities

- ▶ Universities using their own RMS.
- ▶ RMS not accesible.

Other Universities

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Pre-Commercial Procurement PCP

2.478.199,86 €

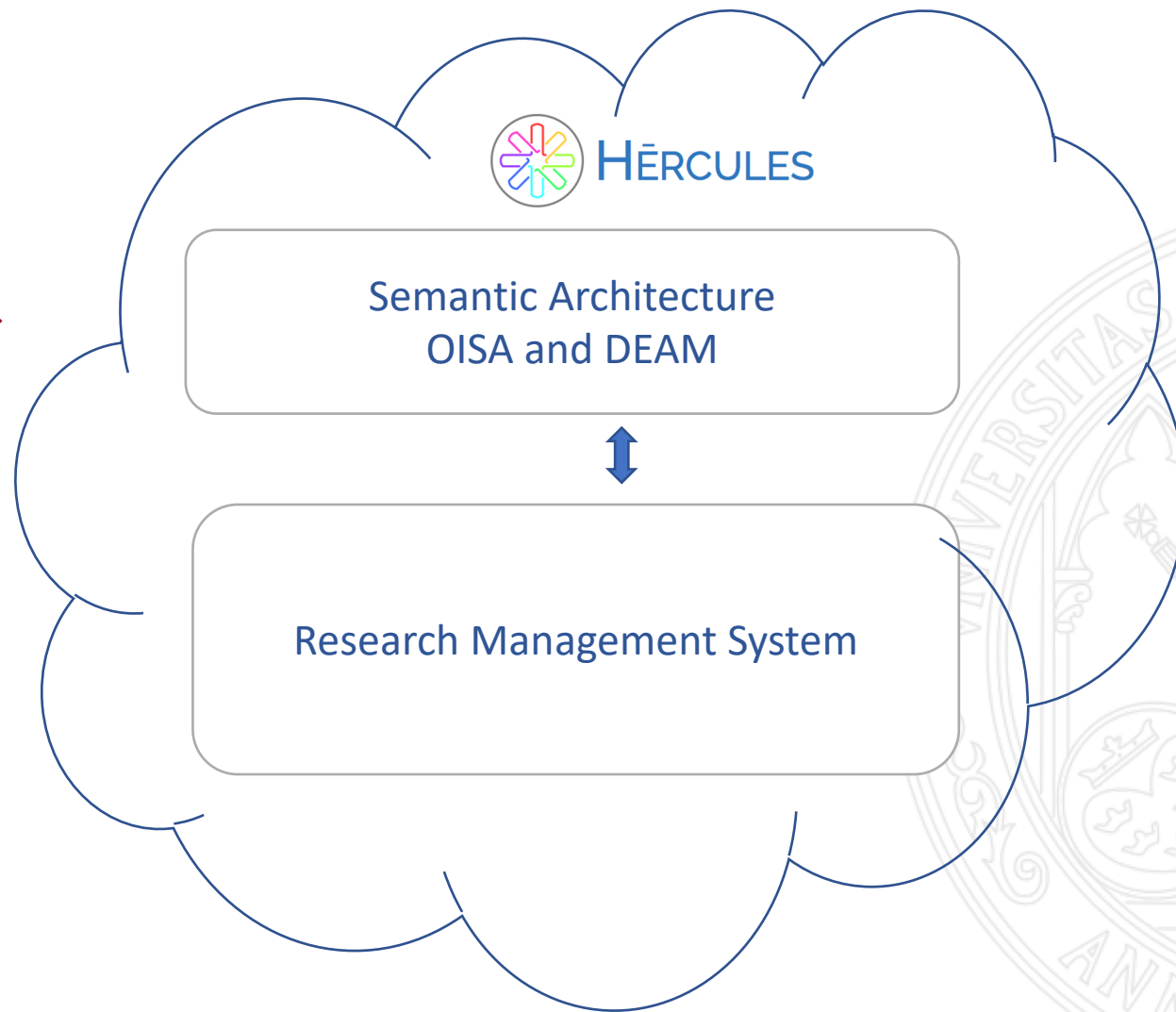
Public Procurement of Innovative Solutions PPI

1.362.744,00 €

R&D&i

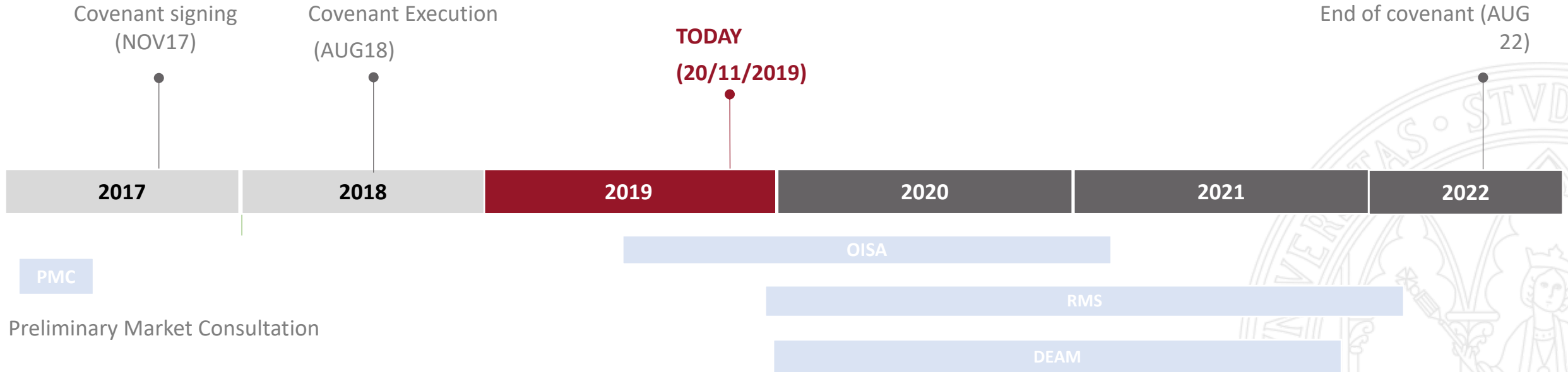


Innovation



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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

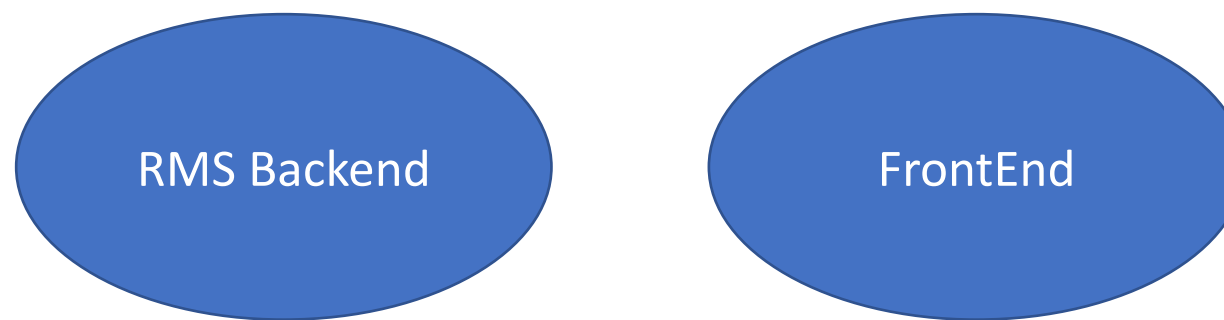
The Hercules Project will create a “Hercules Ontologies Network” with the following elements and connections:

- 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:



Semantic Architecture: RMS Backend

Internal administration interface, where the data of the Research domain will be uploaded



Web Platform with 2 interfaces:



Public interface (Frontend) so that external clients can exploit the information stored

Backend itself.

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

- Storage: Triple Store.
- Factory of URIs.
- Data Manager and a Data Manager Web Interface.
- 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:

- SPARQL endpoint (for humans and machines).
- Linked Data Server (for Humans).
- Web Documentation (for Humans).

Innovative Prototype of a Research Management System

- Its main objective is to create a 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.

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Scope of the Service

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



Acquisition of equipment or infrastructure is not included in the scope.

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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

Management of the researcher

Management of research groups

Management of scientific production

Management of areas of specialization of the researcher

Ethics management

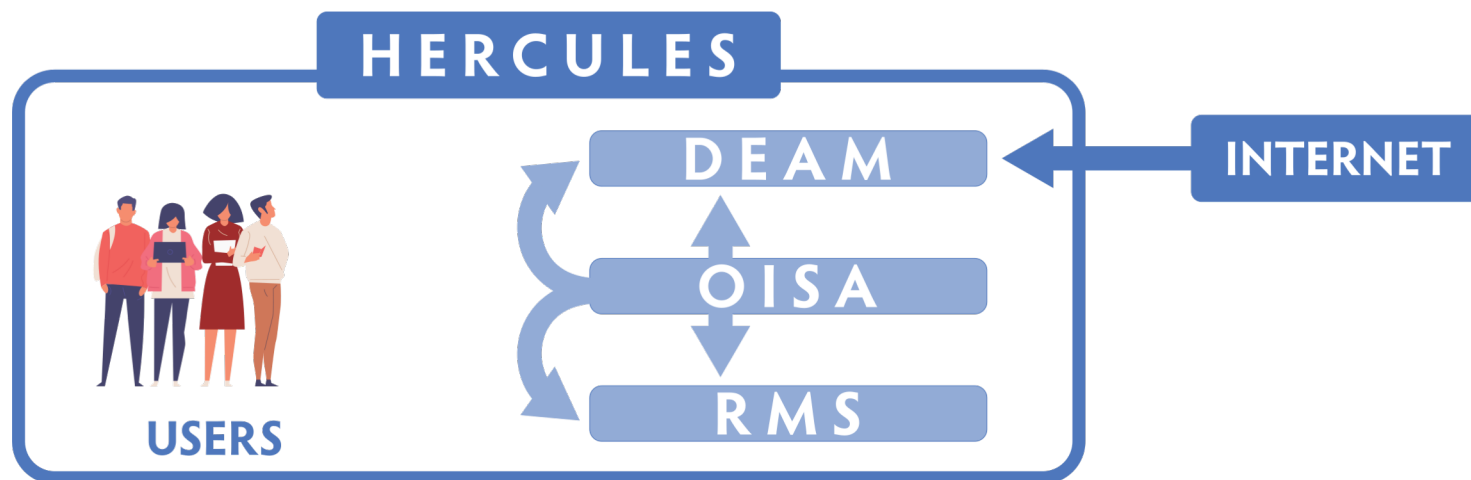
Customer Relationship

RMS

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



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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.

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HERCULES WEBSITE

<http://hercules.um.es>

Thank you for your attention

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