planteamiento de la red de ontologías hércules (roh) – UTE RIAM-DEUSTO

A continuación se muestra la tabla actualizada indicando las decisiones realizadas relativas a la selección de entidades y su mapeo a entidades ya existentes en otras ontologías previas. Se indican descripciones en inglés para poder así anotar las entidades de la ontología diseñada. Adoptaremos el enfoque multilingüe de CERIF que dice “*Fields of this type may be repeated for different language expressions. Each value must have two additional attributes; cfLangCode which must be a language code eg. "en-gb"; cfTrans which indicates if the text has been translated: "o" it is the original languague, "m" it has been translated by a machine, "h" it has been translated by a human*.”. For example, *lang[de,h]*. Multilingüismo – castellano, inglés e idiomas oficiales en autonomías de España deben ser soportados. Para ello, se usarán propiedades como rdfs:label y rdfs:comment que definen etiquetas y descripciones en lenguaje natural de clases ontológicas. Por ejemplo:

:juan rdfs:label "Juan" .

:Professor rdfs:label "Professor"@en .

:position rdfs:label "Position"@en ;

rdfs:label "Posición"@es .

:juan :position "Professor"@en ;

:position "Catedrático"@es .

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| **Entidad** | **Ontologías externas reutilizadas** | **Licencia** | **Comentarios** |
| **Accreditation** | * Closely linked to cerif:Qualification (see [CERIF 1.5](https://www.eurocris.org/Uploads/Web%20pages/CERIF-1.5/cerif.html#cfQual) Reference), although it is more specific, it only refers to a label received by a researcher according to its academic, teaching, management performance. | Creative Commons Attribution License 4.0 | * An Accreditation models research and academic position accreditations. Qualification goes beyond Accreditation because it also refers to degrees and other qualifications a person may have. Accreditation has an important object property which is dateIssued which links Accreditation with vivo:DataTimeValue |
| **AcademicDegree** | * Somehow linked to cerif:Qualification (see [CERIF 1.5](https://www.eurocris.org/Uploads/Web%20pages/CERIF-1.5/cerif.html#cfQual) Reference). This entity does not exist in CERIF but does exist in VIVO. We have taken the one in VIVO as reference from where to extend. In VIVO a Person is related to an vivo:AwardedDegree associated to a vivo:AcademicDegree from a vivo:Organization as output of an vivo:EducationalProcess. In order to simplify the ROH ontology, the EducationProcess entity has not been imported. | Creative Commons Attribution License 4.0 | * An AcademicDegree describes the degrees offered by a University and obtained by different Researchers. |
| **DateTimeValue** | * Taken from vivo:DateTimeValue which through data property date/time associates with xsd:dateTime class. | Creative Commons Attribution License 4.0 | * Models a point in time, very similarly as in through fields cfStartDate and cfEndDate which are modelled as [ISO dateTime](https://en.wikipedia.org/wiki/ISO_8601) |
| **DateTimeInterval** | * Taken from vivo:DateTimeInterval which through vivo:start and vivo:end link with vivo:DateTimeValue class. Analogous to cfStartDate, cfEndDate fields | Creative Commons Attribution License 4.0 | * Models a time span, very similarly as in CERIF but more nicely encompasses the time interval as instance of class vivo:DateTimeInterval |
| **Role** | * Based on vivo:Role. CERIF also includes a similar entity named Classification Scheme. That way, they can classify Publication\_Types, Organization Types, Academic Titles, Person-Publication Roles, Person-Project Roles. In the case of VIVO, a Role taxonomy is defined including Employee roles, Researcher Roles and Leader Roles among may others. Given that ROH is an ontology the classification of classes is implicit in the class hierarchy itself. This is the reason why we have taken the Role class from VIVO. | Creative Commons Attribution License 4.0 | * VIVO already provides a neat classification of roles which will be mostly reused within ROH. |
| **Person** (Persona) /  **Researcher**  (Investigador) /  **Lecturer** (Profesor) | * Based on FOAF (Friend of a Friend): <http://xmlns.com/foaf/spec/>, following pattern used in VIVO. Still, it considers all attributes and links defined in CERIF through entity cfPers. roh:Person incorporates the following data properties declared as attributes in cfPers, namely: Person Identifier, Birthdate, Gender, Uniform Resource Identifier, Research Interest, Keywords. Some important relationships from CERIF that have also been adopted are: Curriculum Vitae, Event, Indicator. See [Person ref](https://www.eurocris.org/Uploads/Web%20pages/CERIF-1.5/cerif.html#cfPers) for more details. | Creative Commons Attribution License 1.0 | * In ROH, there is a foaf:Person entity who inherits from foaf:Agent. However, the main entity that users of ROH will deal with is Researcher. Such entity inherits from foaf:Person. It adds to this widely used entity object properties for TAX ID, ORCID and also several object properties specific to the research domain like “takes” a Role in an Organization, or “participates in”  ResearchObject, can “have different roles” in Projects, may “hasImpactMetric” which is a new type of class also defined in ROH. |
| **Organization**  (Organización) | * Based on FOAF (Friend of a Friend): <http://xmlns.com/foaf/spec/>, it takes into account the object properties (attributes, i.e. acronym, headcount, turnover, uniform resource identifier) and data properties (links) defined by Organization Unit in CERIF. In CERIF, there are relationships with Classification, Equipment, ElectronicAddress, Event, Expertise and Skill, Facility, Funding, Organisation Unit, Prize Award, Result Patent, Result Product, Result Publication, Service, Person, Project, Post Address, Dublin Core, Medium, Measurement, Indicator | Creative Commons Attribution License 1.0 | * It is a child of foaf:Agent and is the parent of roh:Funder. An Organization is a foaf:Organization which carries out several Projects. Some organization can emit Acreditations (e.g. ANECA or CENAI in Spain) or award degrees and “has knowledge areas”. An Organization may receive several FundingAmount, corresponding to a Funding, obtainted through a FundingProgram providing by a Funder. As a foaf:Agent an Organization may be involved in several Actitity, has ResearchLine, is associated to KnowledgeArea and bound to a GeographicalScope, it may also have a time span. |
| **Project**(Proyecto) | * Brand new entity but uses properties that were used in SWRC and are defined in CERIF. It takes from CERIF the following object properties: acronym, URI, title, abstract, keywords. It is linked with  Classification, Equipment, Event, Facility, Funding, Organisation Unit, Person, Prize Award, Result Patent, Project, Result Product, Result Publication, Service, Medium, Measurement, Indicator | Creative Commons Attribution License 4.0 | * A Project is a new entity in ROH – *a project in business and science is typically defined as a collaborative enterprise, frequently involving research or design, that is carefully planned to achieve a particular aim*. Its configuration is inspired by the swrc:project and takes into account cerif:Project’s data properties. It encompasss all those properties and adds some new ones, e.g. projectStatus or projectType. It links this Entity with Organization, Person, ResearchResult and Funding |
| **Funder** (Fuente de financiación) | * Brand new entity specifically created for ROH, highly based on swrcfe:Funder, entity within ontology previously published by Deusto, i.e. SWRC-FE (SWRC Funding Extension): <https://morelab.deusto.es/ontologies/swrcfe>. Not reused since SWRC is no longer available and the indicated extension depended on SWRC. There is an entity called Funding in CERIF which is related. vivo:Grant and vivo:Contract have a data property called total award amount. vivo:FundingOrganization is equivalent to the roh:Funder. | Creative Commons Attribution License 4.0 | * A Funder inherits from foaf:Organization, it funds several Projects, “funds” several Fundings |
| **FundingProgram**  (Programa de financiación) | * Brand new specifically created for ROH, highly based on swrcfe:FundingProgram, entity within ontology previously published by Deusto, i.e. SWRC-FE (SWRC Funding Extension): <https://morelab.deusto.es/ontologies/swrcfe>. Not reused since SWRC is no longer available. There is not such entity neither in CERIF nor in VIVO. | Creative Commons Attribution License 4.0 | * A FundingProgram providers several Fundings, belongs to a Funder, the funding provided is divided into several FundingAmounts. Each organization taking part in a Project has a Funding, which is divided into several FundingAmounts |
| **Funding** (Financiación) | * Brand new entity created for ROH. It has taken into account the way cerif:funding was defined but it is more elaborated in this case. It adopts the following attributes from cfFund:  Funding Identifier, cfStartDate, cfEndDate, Acronym, Amount, Currency , Uniform Resource Identifier, Name, Description, Keywords. Taking into account the entities CERIF relates with, it links with analogous entities: Equipment, Event, Facility, Classification, Funding, Organisation Unit, Person, Project, Result Product, Result Publication, Result Patent, Service, Medium, Indicator, Measurement, Federate | Creative Commons Attribution License 4.0 | * A Funding is the funding associated to a Project whose funding is associated to a FundingProgram, which in turn is associated to a Funder. A Funding consists of several FundingAmounts, associated to the different entities that participate in a project and to the annuities in which they do it. Funding gathers information about the total funding received for a Project. |
| **FundingAmount**  (Ingresos por proyecto) | * Brand new entity created for ROH. It has taken into account the way cerif:money associated to cerif:funding is modelled. In CERIF’s ERD there is an attribute called cfAmount within cfFund (Funding). It is more elaborated in this case of ROH, since it allows for different amounts scattered across several years and several organizations receiving the funds. | Creative Commons Attribution License 4.0 | * A FundingAmount is linked to a Funding that finances a Project. Each FundingAmount is associated to an Organization participating in the Project and to a specific annuity. |
| **ProjectExpense**  **(**Gastos de proyecto) | * Brand new entity created for ROH. It has taken into account the way direct costs data property associated to Contract. It is more elaborated in this case in ROH, since it timestamps each expense with a vivo:DateTimeValue through property expenseDate and has attributes expenseConcept, expenseType and expenseAmount | Creative Commons Attribution License 4.0 | * A ProjectExpense is carried out by a Researcher (by default the principal researcher) in charge of a Project, which indirectly links it to Funding, understood as a set of FundingAmounts. The types of expenses considered are: Personnel Expenses, Subcontracting, Travel, Equipment, Research Infrastructure and Other Goods and Services. It is important that the imputation of hours to projects may imply the inclusion of parts of hours. Some expenses according to University Financial Management should be linked to Suppliers, a special type of Organization |
| **ResearchObject** | * ResearchObject is a brand new entity created in ROH that integrates entities created in BIBO (http://purl.org/ontology/bibo/) ontology. For example, bibo:Collection, bibo:Periodical, bibo:Journal, bibo:Article, bibo:Book, bibo:Chapter, bibo:Patent, bibo:Thesis, bibo:Webpage. Besides, this entity is closely linked with the following entities in CERIF: cfResPat (Result Patent), cfResProd (Result Product), cfResPubl (Result Publication), cfSrv (Service). Need to extend entity to verify that attributes and links considered in CERIF are all included. | Attribution 1.0 Generic (CC BY 1.0) | * A ResearchObject is generated by one to several Persons as result of their participation in a Project. An elaborated taxonomy of ResearchObject is provided, covering all types of publications, Patents and Webpages. Need to discuss whether other additional types should be covered. It is related with Person (property isAuthoredBy), i.e. Researcher which is a subclass, through Participation, which describes how is that person participation. It is also related to Project (property isResultOf) |
| **Publication**  **(**Publicación) | * There is a set of objects related to publications that are defined as subclasses of bibo:Collection (Periodical, Journal, Magazine) and bibo:Document (Article, ConferencePaper, EditorialArticle, Book, Proceedings, ConferencePaper, Chapter, Thesis) which describe ResearchResult associated to a publication. All these concepts are based on BIBO ontology. CERIF defines cfResPubl (Result Publication). It contains the following fields: Result Publication Identifier, Result Publication Date, Number, Volume, Edition, Series, Issue, Start Page, End Page, Total Pages, International Standard Book Number, International Standard Serial Number, Uniform Resource Identifier, Title, Abstract, Keywords, Bibliographic Note, Name Abbreviation, Subtitle, Version Info. It is related with the following entities: Event, Organisation Unit, Person, Project, Result Publication, Classification, Funding, Dublin Core, Facility, Equipment, Result Product, Result Patent, Citation, Metrics, Medium, Service, Measurement, Indicator. CERIF also defines cfResPat (Result Patent). In this case the attributes that it includes are slightly different, being: Result Patent Identifier Identifier (max 128 chars) * 0-1 cfCountryCode Country Code string * 0-1 cfRegistrDate Registration Date ISO Date (nb. not dateTime!) * 0-1 cfApprovDate Approval Date ISO Date (nb. not dateTime!) * 0-1 cfPatentNum Patent Number string * 0-1 cfURI Uniform Resource Identifier string * 0-N cfTitle Title Multi-lingual text field * 0-N cfAbstr Abstract Multi-lingual text field * 0-N cfKeyw Keywords Multi-lingual text field * 0-N cfVersInfo Version Info | Attribution 1.0 Generic (CC BY 1.0) | * ResearchResult objects related to publication concept are based on types defined by BIBO ontology. Currently, the following set of publication-related entities are supported: bibo: bibo:Collection (Periodical, Journal, Magazine) and bibo:Document (Article, ConferencePaper, EditorialArticle, Book, Proceedings, ConferencePaper, Chapter, Thesis) |
| **Activity**  (Actividades académicas) | * Based on cerif:Event entity. It encompasses all the cerif:Event’s data properties (type (free or pay), TimeInterval and GeographicalScope). However, given that time and location are modelled differently in ROH, it is a new entity, namely roh:Activity | Creative Commons Attribution License 4.0 | * An Activity is participated by Persons, each activity is usually linked to a Project and causes a ProjectExpense. The activityType data property defines categories: CONFERENCE, PLACEMENT, THESIS, VIVA. More to to be defined. |
| **Placement**(Estancia) | * It is modelled within Activity. No new entity has been created so far. Should the placement need to gather extra metada such as director of placement and others then we should create a subclass. | Creative Commons Attribution License 4.0 | * A Placement is an Activity which may have some extra data, apart from the standard properties of an Activity i.e. time range, location scope and type. |
| **Infrastructure**  (infraestructura) | * Not modeled yet. Modelado por cerif:InfrastructureEntity, refiriendo a conceptos dependientes como cerif:Equipment o cerif:Facility | ID  Nombre  Descripción  Tipo  Lugar | * Una Infrastructure pertenece a una Organization y en ocasiones está financiada por un Funding. |
| **GeographicalScope**  (ámbito geográfico) | * Based on Geonames ontology <http://www.geonames.org/ontology>, since we want to leverage the instance data of Geonames regarding administrative relations among locations, e.g. Murcia in Región de Murcai, in Spain, in Europe. We have to decide whether to align it or not with <https://schema.org/Place> | Attribution 3.0 Generic (CC BY 3.0) | * An Organization (and its subclasses, e.g. Funder), an Activity and a Project are bound to a geographical scope. All the entities of ROH which have to be defined within a geographical scope have the hasGeographicalScope object property. |
| **Concept** (Concepto) | * Base on skos:Concept (<https://www.w3.org/TR/skos-reference/>). It has three subclasses, namely KnowledgeArea, ResearchLine and Tab | Creative Commons Attribution License 4.0 | * Using SKOS, concepts can be identified using URIs, labeled with lexical strings in one or more natural languages, assigned notations (lexical codes), documented with various types of note, linked to other concepts and organized into informal hierarchies and association networks, aggregated into concept schemes, grouped into labeled and/or ordered collections, and mapped to concepts in other schemes. |
| **ResearchLine** (Área de investigación) | * It contains a free entry lexical string, which is usually bound to an Organization. | Creative Commons Attribution License 4.0 | * There is no standard for ResearchLine. RIS3 which are regional research lines could also fit here. |
| **KnowledgeArea** (Área conocimiento) | * Modeled as UNESCO codes thesaurus created by University of Murcia (<http://skos.um.es/unescothes/>) | Creative Commons Attribution License 4.0 | * ROH will be populated with instance data of UNESCO skos concepts. A Person, Activity, Project and Organization can be qualified by a KnowledgeArea |
| **Tag** (concepto / tema) | * It contains a free entry lexical string, which may be bound to any searchable entity in ROH | Creative Commons Attribution License 4.0 | * Entity to facilitate search and classification |
| **Contract** (contrato) | * Not tackled yet * Modelado según ontología PPROC (<http://contsem.unizar.es/def/sector-publico/pproc.html>) | ID  Document | * Un Contract es un documento legal que recoge las condiciones y obligaciones de un Researcher o las condiciones y obligaciones de un proyecto y las diferentes organizaciones que intervienen en él |
| **SocialNetwork**  **(**Redes sociales) | * Part of foaf:Agent. Not tackled yet * Modelado con FOAF SocialWeb categoría de propiedades | ID  Descripción | * Un SocialNetwork describe la vinculación de un investigador, organización o projecto a diferentes redes sociales |
| **CV** (Curriculum Vitae) | * Not completed yet. Created new entity Acreditation to be able to retrieve data related to labels and certificates from researchers. * No existe una ontología pero sí un formato para el CV en formato cvn-xml: <https://cvn.fecyt.es/editor/index.html?locale=eng#INDEX> | * Datos personales:   + Situación profesional   + Formación académica   + Indicadores generales de calidad * Resumen libre de CV: * Méritos más relevantes:   + Publicacio-nes   + Proyectos   Contratos | * Un CV es generado principalmente como resultado de agregar varias entiedades, realizar búsquedas en el grafo y extraer de manera programática los diferentes elementos de un CV, con el apoyo de lenguajes de consulta como SPARQL y restricciones como SHACL. |
| **ResearchIndicator** (Indicador de investigación) | * A definir como entidad nueva basado en: * cerif:Metrics * VIVO ontologías: <https://wiki.duraspace.org/display/VIVODOC110x/VIVO+Ontology+Domain+Definition> * BiDO (<http://www.sparontologies.net/ontologies/bido>) * Extensiones a SWRC, ESWRC desarrolladas para DKH | * ID * Nombre * Descripción * Value | * Un ResearchIndicator en muchos casos puede ser generado como resultado de realizar búsquedas en el grafo y agregar de manera programática resultados agrupados acorde con diferentes categorías, periodos temporales, etc. De nuevo, estas entidades serán instanciadas programáticamente con el apoyo de lenguajes de consulta como SPARQL y restricciones como SHACL |
| **ResearchReport** (Memoria de investigación) | * A definir como nuevo concepto dentro de la red de ontologías Hércules hercules:ResearchReport | * ID * Título * Descripción * Periodo * Documento PDF | * Un ResearchReport es generado principalmente por la agregación de varias entidades * Un ResearchReport es un informe correspondiente a una Organization y sus sub-organizaciones para un periodo que recogerá una descripción de los Researchers, sus ResearchResults, sus Projects clasificados por sus KnowledgeAreas y ResearchLines. |
| **Subject** (Asignatura) | * Ontología basada en trabajo previo en DKH, llamada unisubject , que reutiliza y extiende la ontología Alocom. * Pending development | ID  Nombre  Descripción  Programa  Guía de estudiante   * Contenidos | * Un Subject es una asignatura impartida por un Lecturer para una organización Organization en un Degree. Contiene un programa (program:SubjectProgram), una guía de estudiante (educmat:Guide) y unos contenidos (educmat:EducationalMaterial)  que podrían considerarse como entidades adicionales del modelo. |
| **AcademicDegree**(Titulación) | * Ontología basada en trabajo previo en DKH, llamada unidegree, que reutiliza DC, ORG para algunas propiedades y realiza extensiones propias. * Pending development | Creative Commons Attribution License 4.0 | * Un Degree pertenece a una Organization que ofrece varios grados que contienen varias Subjects las cuales pueden ser impartidas por uno o varios Lecturers. |