

Parthenos Entities: Research Infrastructure Model DRAFT

V3.1

FORTH-ICS

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Document History

Version/date	Date	Changes/approval	Author/Approved by
V 1.0	25/5/2016	Initial version	George, Martin
V 1.1	25/5/2016	Minor Editing	George
V 1.2	2/6/2016	Relation pe27 add	George
V 1.3	7/6/2016	Physical Curation and Hosting Classes removed, changed property names to 'pp' format from 'pe', added class curated thing	George
V 1.4	7/6/2016	Minor Editing	George
V 1.5	10/6/2016	Alignment with discussions from WP5/6 Joint Meeting in Crete	George
V1.6	11/7/2016	Corrections to document based on feedback from CNR. Corrections and feedback on model from Athina. Check of IsA relations on classes and properties. Fixed where necessary. Added names to all relations and classes in relation description tables. Added shortcut links to all relations for easier use of doc. Added more referred classes and relations from CIDOC CRM and CRMdig. Made extended names for repeated relation names like 'has part' in order to conform with Gcube. Added class and relation hierarchy table for ease of navigation of doc + better	George, Leonardo Candela, Athina

		overview of model.	
V1.7	18/8/2016	Added three new properties to the model pp39 is metadata for and pp40 created successor of, pp41 is index of. These three properties are added in order to allow tracking and management of changes in metadata.	Doerr, Bruseker
V1.8	30/8/2016	Added new property pp42 'has declarative time'	Bruseker
V1.8.1	3/2/2017	Correction to document, indicating declaration of PE20 Volatile Digital Object as subclass of PE32 Curated Thing; Part of general alignment to RDFS 1.8.1 after corrections from WP6 team	Bruseker;Frosini
V1.9	13/2/2017	Introduction of new classes: PE33 E-Access Brokering Service PE34 Team PE35 Project PE36 Competency Type PE37 Protocol Type PE38 Schema And new relations: PP43 supported project activity (was project activity supported by) PP45 was competence (had competence of) PP46 brokered access to (had access brokered by) PP47 had protocol type (was protocol type of) PP48 used protocol parameter (was protocol parameter of) Updated: PE25 RI Consortium PP25 is maintained by (label) PE25 RI Consortium, now	Bruseker

		subclass of E34 Team, not E40 Legal Body PE26 RI Project now subclass of PE35 Project and not E7 Activity (directly)	
V1.10	10/3/2017	Harmonization with RDFS, updating all relation classes declared in PE to present tense format to reflect 'current state of knowledge' position.	Theodoridou; Bruseker
V1.11	14/3/2017	Changed PP45 has competence (is competence of) to PP45 has competency (is competency of)	Theodoridou; Bruseker
V2.0	12/4/2017	Removed draft classes judged unnecessary for PE model (related to provenance, to be expressed elsewhere)	Bruseker
V3.0	14/4/2018	Introduced classes PE39 through PE44 and relations PP51 through PP60. This adds some convenient shortcut and type properties, the ability to model awards and funding and the ability to indicate audience and geographic scope of an activity.	Bruseker
V3.1	30/8/2018	General editing and introduction of examples for classes and relations with references. Addition of CERIF appendix. Corrections: PP53 had awarder (was awarded by): the inverse "was awarded by" will change to "was awarder of" PP54 had awardee (was awarded to): the inverse "was awarded to" will	Kritsotaki; Bruseker

		change to "was awardee of" PP40 created successor of should be a subproperty of "P94 has created" (and not a subproperty of P16)	
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Parthenos Entities: Research Infrastructure Model DRAFT

The Parthenos Entities (PE) propose an ontological model and RDF schema to encode data of use in supporting the activities and aims of research infrastructures to pool and connect services, software, datasets and to enable users of such services to reach the actors and understand the knowledge generation processes which generated the offered datasets. Research infrastructures integrate highly heterogeneous resources for an often equally heterogeneous public. A central component of the activity of and RI in a digital environment involves building a data model that will support intuitive and accurate recall of information produced within the domain supported. It is the implicit or explicit belief of communities that organize into RIs that the integration of data from different members of the community offers not only the possibility of more efficient research and knowledge sharing but also the asking and answering of new questions by the crossing of data by sections of the community that normally would not consider their data in relation. Within this frame, PE proposes an ontological model that tries to capture the general basic entities deployed in building RI registries which is offered both as an intellectual tool for the checking and generation of such models and also as a means to create a common expression by which data could be shared across research communities, thus creating an RI of RIs. Such an effort is a logical extension of the belief inherent to individual research communities but broadened to an interdisciplinary scale.

PE is modelled as an extension of CIDOC CRM, the ISO standard ontology for cultural heritage data, and CRMdig, an extension of the latter which models provenance information in digitization processes. In this way, the modelling of a minimal metadata set for use in a registry as proposed above can be complimented by full modelling of detailed datasets in order to provide a rich web of data that can be accessed from the starting point of an RI registry. CIDOC CRM with its open extension policy and support of analytic data generated by empirical sciences with regards to the human past provides a suitably general ontology to allow for the integration of data across a wide spread of humanities and scientific disciplines.

PE is being developed in the context of the Parthenos Project, a European funded project.

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Hierarchies

Class Hierarchy

#	IsA Hierarchy	Orig.	Reg?
E7	Activity	CRM	N
PE35	Project	PE	Y
PE26	RI Project	PE	Y
PE27	Service Action [Draft]	PE	Y
PE1	Service	PE	Y
PE2	Hosting Service	PE	Y
PE5	Digital Hosting Service	PE	Y
PE6	Software Hosting Service	PE	Y
PE13	Software Computing E-Service	PE	Y
PE16	Curated Software E-Service	PE	Y
PE14	Software Delivery E-Service	PE	Y
PE16	Curated Software E-Service	PE	Y
PE7	Data Hosting Service	PE	Y
PE15	Data E-Service	PE	Y
PE17	Curated Data E-Service	PE	Y
PE3	Curating Service	PE	Y
PE10	Digital Curating Service	PE	Y
PE11	Software Curating Service	PE	Y
PE16	Curated Software E-Service	PE	Y
PE12	Data Curating Service	PE	Y
PE17	Curated Data E-Service	PE	Y
PE8	E-Service	PE	Y
PE33	E-Access Brokering Service	PE	
PE13	Software Computing E-Service	PE	Y
PE16	Curated Software E-Service	PE	Y
PE14	Software Delivery E-Service	PE	Y
PE16	Curated Software E-Service	PE	Y
PE15	Data E-Service	PE	Y
PE17	Curated Data E-Service	PE	Y
E65	Creation	CRM	N
E77	Permanent Item	CRM	N
E39	Actor	CRM	Y
E74	Group		
E40	Legal Body	CRM	Y
PE34	Team		
PE25	RI Consortium	PE	Y
E70	Thing	CRM	Y
PE32	Curated Thing	PE	Y
E78	Curated Holding	CRM	Y
PE20	Volatile Digital Object	PE	Y
E71	Man Made Thing	CRM	N
E24	Physical Man Made Thing	CRM	N
E78	Curated Holding	CRM	Y
E28	Conceptual Object	CRM	N
E55	Type		
PE36	Competency Type		
PE37	Protocol Type		
E89	Propositional Object	CRM	N
E73	Information Object	CRM	N
E29	Design or Procedure	CRM	N

PE28	Curation Plan	PE	Y
D1	Digital Object	dig	Y
PE19	Persistent Digital Object	PE	Y
PE21	Persistent Software	PE	Y
PE22	Persistent Dataset	PE	Y
PE20	Volatile Digital Object	PE	Y
PE23	Volatile Software	PE	Y
PE24	Volatile Dataset	PE	Y
PE18	Dataset	PE	Y
PE22	Persistent Dataset	PE	Y
PE24	Volatile Dataset	PE	Y
D14	Software	dig	Y
PE21	Persistent Software	PE	Y
PE38	Schema		
PE23	Volatile Software	PE	Y

Relations Hierarchy

#	Hierarchy	Domain	Range	Origin
P1	is identified by	E1 CRM Entity	E41 Appellation	CRM
PP28	has designated access point (is designated access point of)	PE8 E-Service	PE29 Access Point	PE
PP50	Accessible at (provides access to)	D1 Digital Object	PE29 Access Point	
P9	consists of (forms part of)	E4 Period	E4 Period	CRM
PP1	currently offers (currently offered by)	PE26 RI Project	PE1 Service	PE
PP43	supports project activity (is project activity supported by)	PE35 Project	E7 Activity	
PP38	Executes (is executed by)	PE1 Service	PE27 Service Action	PE
P14	carried out by (performed)	E7 Activity	E39 Actor	CRM
PP2	Provided by (provides)	PE1 Service	E39 Actor	PE
PP3	Requested by (requests)	PE27 Service Action	E39 Actor	PE
P15	was influenced by (influenced)	E7 Activity	E1 CRM Entity	CRM
PP44	has maintaining team (is maintaining team of)	PE35 Project	PE34 Team	
PP25	has maintaining RI (is maintaining RI of)	PE26 RI Project	PE25 RI Consortium	PE
P16	used specific object (was used for)	E7 Activity	E70 Thing	CRM
PP4	hosts object (is object hosted by)	PE2 Hosting Service	E70 Thing	PE
PP6	hosts digital object (is digital object hosted by)	PE5 Digital Hosting Service	D1 Digital Object	PE
PP7	hosts software object (is software object hosted by)	PE6 Software Hosting Service	D14 Software	PE
PP8	hosts dataset (is dataset hosted by)	PE7 Data Hosting Service	PE18 Dataset	PE
PP14	runs on request (is run by)	PE13 Software Computing E-Service	D14 Software	PE
PP15	delivers on request (is delivered by)	PE14 Software Delivery E-Service	D14 Software	PE
PP29	uses access protocol (is access protocol used by)	PE8 E-Service	D14 Software	PE
PP48	uses protocol parameter (is protocol parameter of)	PE8 E-Service	PE38 Schema	
PP49	provides access point (is access point provided by)	PE8 E-Service	E29 Access Point	
PP40	created successor of (is deprecated by)	E65 Creation	PE22 Persistent Dataset	PE
P21	had general purpose (was purpose of)	E7 Activity	E55 Type	
PP45	has competency (is competency of)	PE1 Service	PE36 Competency Type	
PP32	curates (is curated by)	PE3 Curating Service	PE32 Curated Thing	PE
PP11	curates volatile digital object (is volatile digital object curated by)	PE10 Digital Curating Service	PE20 Volatile Digital Object	PE
PP12	curates volatile software (is volatile software curated by)	PE11 Software Curating Service	PE23 Volatile Software	PE

PP13	curates volatile dataset (is volatile dataset curated by)	PE12 Data Curating Service	PE24 Volatile Dataset	PE
P147	curated (was curated by)	E87 Curation Activity	E78 Curated Holding	CRM
P33	used specific technique (was used by)	E7 Activity	E29 Design or Procedure	CRM
PP31	uses curation plan (is curation plan used by)	PE3 Curating Service	PE28 Curation Plan	PE
P106	is composed of (forms part of)	E90 Symbolic Object	E90 Symbolic Object	CRM
PP16	has persistent digital object part (is persistent digital object part of)	PE19 Persistent Digital Object	PE19 Persistent Digital Object	PE
PP19	has persistent software part (is persistent software part of)	PE21 Persistent Software	PE21 Persistent Software	PE
PP20	has persistent dataset part (is persistent dataset part of)	PE22 Persistent Dataset	PE22 Persistent Dataset	PE
PP18	has digital object part (is digital object part of)	PE20 Volatile Digital Object	D1 Digital Object	PE
PP21	has software part (is software part of)	PE23 Volatile Software	D14 Software	PE
PP23	has dataset part (is dataset part of)	PE24 Volatile Dataset	PE18 Dataset	PE
P125	Used object of type (was type of object used in)	E7 Activity	E55 Type	
PP47	has protocol type (is protocol type of)	PE8 E-Service	PE37 Protocol Type	
P129	is about (is subject of)	E89 Propositional Object	E1 CRM Entity	CRM
PP39	is metadata for (has metadata)	PE22 Persistent Dataset	D1 Digital Object	PE
P130	shows features of (features also found on)	E70 Thing	E70 Thing	CRM
PP17	has snapshot (is snapshot of)	PE20 Volatile Digital Object	PE19 Persistent Digital Object	PE
PP22	has release (is release of)	PE23 Volatile Software	PE21 Persistent Software	PE
PP24	has dataset snapshot (is dataset snapshot of)	PE24 Volatile Dataset	PE22 Persistent Dataset	PE
PP46	brokers access to (access brokered by)	PE33 E-Access Brokering Service	PE8 E-Service	

Classes

PE1 Service

Class Label	PE1 Service
Subclass of	E7 Activity
Superclass of	PE2 Hosting Service PE3 Curating Service PE8 E-Service
Scope Note	This class comprises declared offers by some instance of E39 Actor of their willingness and ability to execute an activity or series of activities at the request of another instance of E39 Actor for the specific benefit of the latter. The identity of a service therefore depends on the individual instance of E39 actor making the offer, the type of activity(ies) offered and/or the type of product resultant from such an activity(ies). An instance of a PE1 Service begins to exist with the declaration of the ability and willingness of an instance of E39 actor to perform the particular set of activities for the benefit of another actor. The instance of PE1 Service ends when either the declared willingness or ability permanently ends. n.b.: this means that the ability may temporarily be interrupted, such as when an actor is on vacation or where the machine on which the service relies is being repaired, without meaning that the service as such has ended. A service need not continually be running in order for it be considered to be continuous, for example a service may be defined to fall within certain working hours. The instance of PE1 Service includes all auxiliary abilities of the same actor to execute the respective activities, but not services provided by third parties in the course of the service provisioning.
Examples	The local car repair shop's car repair services. The Cendari Archival Directory (PE17) (CENDARI Archival Directory, n.d.) The ICCD RA Thesaurus for archaeological objects (PE17) (ICCU, 2015)

New Direct Properties:

Label	Domain	Range	Scope Note
PP2 provided by	PE1	E39	Indicates the intention and willingness of an actor to carry out some service
PP42 has declarative time	PE1	xsd:Date	Relates an instance of PE1 Service to a time span during which the service provider declares the service is, will be, has been in effect.
PP45 has competency	PE1	PE36	Relates an instance of PE1 Service to

PP51 has availability	PE1	PE39	an instance of E36 Competency Type which it is competent to perform. Relates an instance of PE2 Service to an instance of PE39 Availability Type.
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PE2 Hosting Service

Class Label	PE2 Hosting Service
Subclass of	PE1 Service
Superclass of	PE 5 Digital Hosting Service
Scope Note	This class comprises declared offers by some instance of E39Actorto hold, protect and provide access to one or more objects in a generic sense, either physical or conceptual, at the request of an instance of E39 Actor, where the latter may be the initial party or a second party. An instance of PE2 Hosting Service begins from the moment of agreement between the contracting parties that the host will carry out these holding and protection activities in order to provide access, upon request, to some instance or instances of E70 Thing for the sake of the client. The hosting services continue so long as the hosting actor retains the ability to provide access to the object(s) to the client. The instance of hosting service ends when the host is either no longer willing or able to provide access to the objects that they undertook to hold and protect for the client.
Examples	Amazon cloud hosting of a user's files [PE5] Hosting Service of the collection of United States Holocaust Memorial Museum for(Collections Search - United States Holocaust Memorial Museum,n.d.) B2share service (PE5) of the EOSC-hub service catalogue (EOSC-hub Service Catalogue, n.d.)) The Knossos Stratigraphical Museum Collections Holdings Service (BSA MAO, n.d.)

New Direct Properties:

Label	Domain	Range	Scope Note
PP4 hosts object	PE2	E70	Indicates the generic relation of provision of some hosting service of an object of any kind.

PE3 Curating Service

Class Label	PE3 Curating Service
Subclass of	PE1 Service
Superclass of	PE10 Digital Curating Service
Scope Note	This class comprises declared offers by some instance of E39 Actor of their willingness and ability to engage in a series of selection and organization activities on a collection of objects according to a specified plan. The identity of the curation service is tied to the collection of which it is the curator. A curation service comes into existence for the curation of some determinate collection taken as a whole, and is further determined in its identity by provider of the service and the plan which is adopted in order to carry out the curation. It is, in particular, the nature of the object of curation to be a collection in the sense of a plurality of objects from which parts can be added or removed without the overall identity of that collection being changed. An instance of PE3 Curating Service begins when the curator initiates the selection and organization of a collection of objects under the declared curation plan. The curating service may take over the curation of an existing collection or begin the curation of a new collection. So as long as the curator maintains these selecting and organizing activities of these objects according to the declared plan, the curation activity is considered on-going, regardless of any particular activities or lack thereof at any one time. Should the actor no longer be willing to engage in these activities or the objects be unavailable in a permanent manner, then the instance of PE3 Curating Service is to be considered ended. While curated objects may need to be hosted, this service may or may not be undertaken by the same actor. Therefore hosting can be documented separately and attributed to the appropriate third party actor.
Examples	Curation of the Collection of Ancient Greek Art by Nikolas Papadimitriou at the Museum of Cycladic Art (Cycladic Art Museum of Cycladic Art, n.d.) Curation Service for: Base de données terminologique polytechnique et plurilingue VERBA - G-AU Terminologie générale" (PE10) (ELRA - ELRA- : Base de donn\u00e9es terminologique polytechnique et plurilingue VERBA - G-AU Terminologie ,n.d.) Art & Architecture Thesaurus (Getty Research Institute, n.d.) MET Curation of Modern Collection ((Metadata Encoding and

New Direct Properties:

Label	Domain	Range	Scope Note
PP31 uses curation plan	PE3	PE28	Links an instance of PE3 Curation Service with the plan that organizes this activity.
PP32 curates	PE3	PE32	Links an instance of PE3 Curation Service with the object or objects for which it provides curation services.

PE5 Digital Hosting Service

Class Label	PE5 Digital Hosting Service
Subclass of	PE2 Hosting Service
Superclass of	PE6 Software Hosting Service PE7 Data Hosting Service
Scope Note	This class comprises declared offers by some instance of E39Actor to hold, protect and provide access to one or more digital objects at the request of an instance of E39 Actor. The identity of digital hosting is determined by the type of object that the host undertakes to keep and provide access to. The hosting is digital in the sense that the object being held and protected is of a digital nature. Digital hosting does not entail the running of machines and software. An instance of PE5Digital Hosting Service begins from the moment of agreement between the contracting parties that the host will carry out these holding and protection activities in order to provide access, upon request, to some instance or instances of D1Digital Object for the sake of the client. Digital hosting services continue so long as the hosting actor retains the ability to provide access to the hosted object(s) to the client. The instance of hosting service ends when the host is either no longer willing or able to provide access to the object or collection of objects that they undertook to hold and protect for the client.
Examples	Google Art hosting of the digital images of the collections of Mathaf: the Arab Museum of Modern Art (PE7) (Collections Qatar Museums, n.d.) Hosting Service for Signs of Ireland Corpus datasets (Gratta, et al. 2014), (IIT - CNR - Istituto di Informatica e Telematica, n.d.)

Hosting Service for Weighted Lexicon of Event Nouns (Gratta, et al. 2014),
(IIT - CNR - Istituto di Informatica e Telematica, n.d.)

New Direct Properties

Label	Domain	Range	Scope Note
PP6 hosts object	digital	PE5 D1	Indicates the relation of provision of a hosting service of a digital object of any kind.

PE6 Software Hosting Service

Class Label	PE6 Software Hosting Service
Subclass of	PE5 Digital Hosting Service
Superclass of	PE13 Software Computing E-Service PE14 Software Delivery E-Service
Scope Note	This class comprises declared offers by some instance of E39Actor to hold and protect one or more software objects at the request of an instance of E39 Actor. The identity of software hosting is determined by the type of object that the host undertakes to keep and provide access to. The hosting is an instance of PE6 Software Hosting Service, just in case the object or objects which are held and protected are software. Software hosting does not entail the running of machines and software. An instance of PE6 Software Hosting Service begins from the moment of agreement between the contracting parties that the host will carry out these holding and protection activities in order to provide access, upon request, to some instance or instances of D14 Software for the sake of the client. Digital hosting services continue so long as the hosting actor retains the ability to provide access to the hosted object(s) to the client. The instance of hosting service ends when the host is either no longer willing or able to provide access to the object or collection of objects that they undertook to hold and protect for the client.
Examples	Hosting of the “Historical Software Collection” by archive.org Hosting of X3ML by github (delving/x3ml, n.d.)

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New Direct Properties

Label	Domain	Range	Scope Note
PP7 hosts software object	PE6	D14	Indicates the relation of provision of some hosting service of a software object.

PE7 Data Hosting Service

Class Label	PE7 Data Hosting Service
Subclass of	PE5 Digital Hosting Service
Superclass of	PE15 Data E-Service
Scope Note	This class comprises declared offers by some instance of E39Actor to hold and protect one or more datasets at the request of an instance of E39 Actor. The identity of data hosting is determined by the type of object that the host undertakes to keep and provide access to. The hosting is an instance of PE7 Data Hosting Service, just in case the object or objects which are held and protected are dataset. Data hosting does not entail the running of machines and software. An instance of PE7 Data Hosting Service begins from the moment of agreement between the contracting parties that the host will carry out these holding and protection activities in order to provide access, upon request, to some instance or instances of PE18 Dataset for the sake of the client. Digital hosting services continue so long as the hosting actor retains the ability to provide access to the hosted object(s) to the client. The instance of hosting service ends when the host is either no longer willing or able to provide access to the object or collection of objects that they undertook to hold and protect for the client.
Examples	Archaeological Data Service's Hosting of project data for the "Church Wilne Deserted Medieval Settlement, Derbyshire" Ariadne Project's Landscape Services Cloud Hosting for Archaeological 3D

Models (Ariadne, n.d.)

New Direct Properties

Label	Domain	Range	Scope Note
PP8 hosts dataset	PE7	PE18	Indicates the relation of provision of some hosting service of a dataset object.

PE8 E-Service

Class Label	PE8 E-Service
Subclass of	PE1 Service
Superclass of	PE13 Software Computing E-Service PE14 Software Delivery E-Service PE15 Data E-Service PE33 E-Access Brokering Service
Scope Note	This class comprises declared offers to provide computing facilities by some instance of an E39 Actor who provisions a hardware/software setup that is able to respond to the use requests of some E39 Actor through automated receipt, manipulation and sending of data. The identity of an instance of PE8 E-Service depends on the particular communication software it runs, the actor maintaining the service active, and the logical communication address for issuing requests to it. An instance of PE8 E-Service comes into existence on the declaration of its offer and the making available of the service through some access point. It ceases to exist just in case the instance of E39 Actor is no longer willing or able to maintain the e-service when, for example an organization ceases to operation entirely, cancels the particular service, or is no longer able to support the software/hardware entailed.
Examples	IBM quantum computing service to quantum computing researchers (QuantumComputing-IBMQ-US,n.d.)

New Direct Properties

Label	Domain	Range	Scope Note
PP28 has designated access point	PE8	PE29	Links an instance of a PE8 E-Service to the web address at which the e-service can be accessed.

PP29 uses access protocol	PE8	D14	Links an instance of PE8 E-Service with the instance of D14 software which encodes the access protocol by which the e-service is to be accessed.
PP47 has protocol type	PE8	PE37	Relates an instance of PE8 E-Service to instances of PE37 Protocol Type that classify the protocols used to access the service.
PP48 uses protocol parameter	PE8	PE38	Relates an instance of PE8 E-Service to instances of PE35 Schema that this service requires in order to run.
PP49 provides access point	PE8	PE29	Relates an instance of PE8 E-Service to an instance of PE29 Access Point which the service provides for an instance of D1 Digital Object.

PE10 Digital Curating Service

Class Label	PE10 Digital Curating Service
Subclass of	PE3 Curating Service
Superclass of	PE11 Software Curating Service PE12 Data Curating Service
Scope Note	This class comprises declared offers by some instance of E39 Actor of their willingness and ability to engage in a series of selection and organization activities on an instance of PE20 Volatile Digital Object according to a specified plan. The identity of the instance of PE10 Digital Curation Service is tied to the instance of PE20 Volatile Digital Object of which it is the curation. Instances of PE20 Volatile Digital Object are by their nature composites of different data sources. The curation activity on the volatile digital object in executing its plan for the volatile digital object - some functional goal - ensures the unity of the one volatile digital object and provides it an identity. Thus again, as with physical curation of a collection, it is normal for parts to be added or removed from the volatile digital object without its overall identity changing. It is precisely having this one object of the digital curation service that in turn allows the identification of the service itself, alongside knowledge of the curator and the plan. An instance of PE10 Digital Curating Service begins when the curator initiates the selection and organization of a volatile digital object under the declared curation plan. The curating service may take over the curation of an existing volatile digital object or begin the curation of an entirely new volatile digital object. As long as the curator maintains the will and ability to carry out these selecting and organizing activities according to the declared plan, the curation activity is considered on-going, regardless of any particular activities or lack thereof at any one time. Should the actor

	no longer be willing to engage in these activities or the volatile digital object be unavailable in a permanent manner, then the instance of PE10 Digital Curating Service is to be considered ended. While curated objects may need to be hosted, this service may or may not be undertaken by the same actor. Therefore hosting can be documented separately and attributed to the appropriate third party actor.
Examples	Natural History Museum of London Curation Team Management of Natural History Collection's Collection Management System DB (Natural History Museum, 2014)

New Direct Properties

Label	Domain	Range	Scope Note
PP11 curates volatile digital object	PE10	PE20	This property associates an instance of digital curating service with the digital object of which it is the curation activity.

PE11 Software Curating Service

Class Label	PE11 Software Curating Service
Subclass of	PE10 Digital Curating Service
Superclass of	PE16 Curated Software E-Service
Scope Note	This class comprises declared offers by some instance of E39 Actor of their willingness and ability to engage in a series of selection and organization activities on an instance of PE23 Volatile Software according to a specified plan. The identity of the instance of PE11 Software Curation Service is tied to the instance of PE23 Volatile Software of which it is the curation. Instances of PE23 Volatile Software are by their nature composites of different data sources. The curation activity on the volatile software in executing its plan for the volatile software - some functional goal - ensures its unity and provides it an identity. Thus again, as with physical curation of a collection, it is normal for parts to be added or removed from the volatile software object without its overall identity changing. It is precisely having this one object of the software curation service that, in turn, allows the identification of the service itself, alongside knowledge of the curator and the plan. An instance of PE11Software Curating Service begins when the curator initiates the selection and organization of a volatile software object under the declared curation plan. The curating service may take over the curation of an existing volatile software object or begin the curation of an

entirely new volatile software object. As long as the curator maintains the will and ability to carry out these selecting and organizing activities according to the declared plan, the curation activity is considered on-going, regardless of any particular activities or lack thereof at any one time. Should the actor no longer be willing to engage in these activities or the volatile digital object be unavailable in a permanent manner, then the instance of PE11Software Curating Service is to be considered ended.

While curated objects may need to be hosted, this service may or may not be undertaken by the same actor. Therefore hosting can be documented separately and attributed to the appropriate third party actor.

Examples Forth's development and curation of the X3ML Toolkit Suite(ICS - X3ML Toolkit, n.d.)

Microsoft's Development of Microsoft Word

New Direct Properties

Label	Domain	Range	Scope Note
PP12 curates volatile software	PE11	PE23	This property associates an instance of software curating service with the software of which it is the curation activity.

PE12 Data Curating Service

Class Label	PE12 Data Curating Service
Subclass of	PE10 Digital Curating Service
Superclass of	PE17 Curated Data E-Service
Scope Note	This class comprises declared offers by some instance of E39 Actor of their willingness and ability to engage in a series of selection and organization activities on an instance of PE24 Volatile Dataset according to a specified plan. The identity of the instance of PE12 Data Curating Service is tied to the instance of PE24 Volatile Dataset of which it is the curation. Instances of PE24 Volatile Dataset are by their nature composites of different data sources. The curation activity on the volatile dataset in executing its plan for the volatile software - some functional goal - ensures its unity and provides it an identity. Thus again, as with physical curation of a collection, it is normal for parts to be added or removed from the volatile software object without its overall identity changing. It is precisely having this one object of the software curation service that, in turn, allows the identification of the service itself, alongside knowledge of the curator and

the plan.

An instance of Data Curating Service begins when the curator initiates the selection and organization of a volatile dataset under the declared curation plan. The curating service may take over the curation of an existing volatile dataset or begin the curation of an entirely new volatile dataset. As long as the curator maintains the will and ability to carry out these selecting and organizing activities according to the declared plan, the curation activity is considered on-going, regardless of any particular activities or lack thereof at any one time. Should the actor no longer be willing to engage in these activities or the volatile digital object be unavailable in a permanent manner, then the instance of Data Curating Service is to be considered ended.

While curated objects may need to be hosted, this service may or may not be undertaken by the same actor. Therefore hosting can be documented separately and attributed to the appropriate third party actor.

Examples

Curating Service for Consortium 3D dataset (NAKALA par Humanum,n.d.)

Curating Service for Projet Karnak - Index global des inscriptions des temples de Karnak (Projet Karnak | Labex ARCHIMEDE , Indexation des Textes ,n.d.)

Prime Minister of Canada's Office Curation of PMO Twitter Data Feed of PMO (Prime Minister of Canada - Premier ministre du Canada, n.d.)

New Direct Properties

Label	Domain	Range	Scope Note
PP13 curates volatile dataset	PE12	PE24	This property associates an instance of data curating service with the volatile dataset of which it is the curation activity.

PE13 Software Computing E-Service

Class Label	PE13 Software Computing E-Service
Subclass of	PE6 Software Hosting Service PE8 E-Service

Superclass of	PE16 Curated Software E-Service
Scope Note	This class comprises instances of offers that are made up of both instances of PE6 Software Hosting and PE8 E-Service while additionally offering the ability and willingness to run a certain software for the requesting instance of E39 Actor. That is to say, the service provider takes on duties of hosting software, running the equipment to provide it, and delivering computing power to run it on request. The identity of this service is likewise composite depending on those factors relevant to instances of PE6 Software Hosting Service and PE8 E-Service, while additionally requiring that we have a clear identity of the software. The software release that the service runs may change without affecting the identity of the overall service, but to retain its identity this change would need to be documented in the access protocol, and to be archived in a log file. If an E39 Actor provides software computing e-services that run more than one software release at the same time, each of these should be documented as a separate instance of PE13 Software Computing E-Service. The processing software is not regarded as part of the service, but as being used by the service. An instance of PE13 Software Computing E-Service comes into existence on the declaration of its offer and the making available of the service along with the software it offers to run through some access point. It ceases to exist just in case the instance of E39 Actor is no longer willing or able to maintain the service when, for example if an organization ceases operation entirely, or the particular service is abandoned, if the software provisioned is permanently unavailable, or the host is no longer able to support the software/hardware entailed in providing the computing service.
Examples	The provisioning of Google Doc Service to clients by Google The Landscape Services - 3D Terrain Service (Landscape Services, n.d.) ARIADNE Visual Media Service provided by Ariadne Cosortium (Ariadne, n.d.) WeNMR suite for Structural Biology (EOSC-hub Service Catalogue, n.d.))

New Direct Properties

Label	Domain	Range	Scope Note
PP14 runs on	PE13	D14	This property associates an instance of software computing e-service with the software that it runs when requested.

PE14 Software Delivery E-Service

Class Label	PE14 Software Delivery E-Service
Subclass of	PE6 Software Hosting Service PE8 E-Service
Superclass of	PE16 Curated Software E-Service
Scope Note	This class comprises instances of offers that are made up of both instances of PE6 Software Hosting and PE8 E-Service while additionally offering the ability and willingness to deliver a particular piece of software to the requesting instance of E39 Actor. That is to say, the service provider takes on duties of hosting software, running the equipment to provide it, and delivering software on demand to a client. The identity of this service is likewise composite depending on those factors relevant to instances of PE6 Software Hosting Service and PE8 E-Service, while additionally requiring that we have a clear identity of the software to be delivered. The software release that the service delivers may change without affecting the identity of the overall service, but to retain its identity this change would need to be documented in the access protocol, and to be archived in a log file. If an E39 Actor provides e-services that deliver more than one software release at the same time, each of these should be documented as a separate instance of PE13 Software Computing E-Service. The processing software is not regarded as part of the service, but as being used by the service. An instance of PE14 Software Delivery E-Service comes into existence on the declaration of its offer and the making available of the service along with the software it offers to deliver through some access point. It ceases to exist just in case the instance of E39 Actor is no longer willing or able to maintain the service when, for example if an organization ceases operation entirely, or the particular service is abandoned, if the software provisioned is permanently unavailable, or the host is no longer able to support the software/hardware entailed in providing the computing service.

Examples	The offer of Github to a client to store his/her software and deliver it to other users
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New Direct Properties

Label	Domain	Range	Scope Note
PP15 delivers on request	PE14	D14	This property associates an instance of software delivery e-service with the software that it delivers when requested.

PE15 Data E-Service

Class Label	PE15 Data E-Service
Subclass of	PE7 Data Hosting Service PE8 E-Service
Superclass of	PE17 Curated Data E-Service
Scope Note	This class comprises instances of offers that are made up of both instances of PE7 Data Hosting and PE8 E-Service while additionally offering the ability and willingness to offer electronic access to one or more datasets to the requesting instance of E39 Actor. That is to say, the service provider takes on duties of both hosting dataset(s) while running the equipment to provide access to the same. The identity of this service is a composite of those factors relevant to instances of PE7Data Hosting Service and PE8 E-Service. An instance of PE15Data E-Service comes into existence on the declaration of its offer and the making available of the service along with the dataset it aims to provide access to through some access point. It ceases to exist just in case the instance of E39 Actor is no longer willing or able to maintain the service when, for example if an organization ceases operation entirely, or the particular dataset is permanently unavailable, or the host is no longer able to support the software/hardware entailed in providing the computing service.
Examples	Offer of the British School at Athens of e-access to the digitized collection of the Byzantine Research Fund Metashare (Home - META-SHARE, n.d.) "Cendari Sparql Endpoint" (a data service through a SPARQL access point)._(TRAME, n.d.)

The MET On-line Catalogue Modern and Contemporary Art | The Metropolitan Museum of Art, n.d.))

PE16 Curated Software E-Service

Class Label	PE16 Curated Software E-Service
Subclass of	PE11 Software Curating Service PE14 Software Delivery E-Service PE13 Software Computing E-Service
Superclass of	-
Scope Note	This class comprises instances of offers that are made up of both instances of PE11 Software Curating Service and PE14S/W Delivery E-Service or PE13 Software Computing E-Service. Here then we speak of an offer both to curate some software(s), host it and running the equipment enabling its delivery to or running for clients. The identity of an instance of PE16Curated Software E-Service depends thus on the actor providing the service, the software hosted and curated, as well as the particular processing software its E-service component runs, as well as the logical communication address for issuing requests to it. The software release the service delivers or runs may change without affecting the identity of the overall service, but to retain its identity this change would need to be documented in the access protocol, and to be archived in a log file. An instance of PE16 Curated Software E-Service comes into existence on the declaration of its offer and the making available of the service along with the software it curates and delivers/runs through some access point. It ceases to exist just in case the instance of E39 Actor is no longer willing or able to maintain the service when, for example if an organization ceases operation entirely, or the particular service is abandoned, if the software to be hosted and curated is lost, or the host/curator is no longer able to support the software/hardware entailed in providing the delivery service.
Examples	“Collection Space” collection management software (CollectionSpace collections management software for museums and more, n.d.) EGI Cloud Container Service (EGI Cloud Container Compute, n.d.) EOSC-hub service catalogue (EOSC-hub Service Catalogue, n.d.))

PE17 Curated Data E-Service

Class Label	PE17 Curated Data E-Service
Subclass of	PE12 Data Curating Service PE15 Data E-Service
Superclass of	-
Scope Note	This class comprises instances of offers that are made up of both instances of PE12 Data Curating Service and PE15 Data E-Service. Here then we speak of an offer to curate some volatile dataset, host it and run the equipment necessary in order for clients to be able to access it electronically on demand. The identity of an instance of PE17 Curated Data E-Service depends thus on the actor providing the service, the dataset hosted and curated, the particular processing software its E-service component runs, as well as the logical communication address for issuing requests to it. An instance of PE17 Curated Data E-Service comes into existence on the declaration of its offer and the making available of the service along with the data it curates and provides access to through some access point. It ceases to exist just in case the instance of E39 Actor is no longer willing or able to maintain the service when, for example if an organization ceases operation entirely, or the particular service is abandoned, if the dataset to be hosted and curated is lost, or the host/curator is no longer able to support the software/hardware entailed in providing the delivery service.
Examples	Spotify custom crafted playlist for spotify user The Component Registry for the re-use and sharing of CLARIN metadata components and profiles (CLARIN Component Registry, n.d.)] EHRI Portal (EHRI - Welcome to the European Holocaust Research Infrastructure online portal, n.d.)] DYAS Organizations and Collections Registries (DYAS Registries, n.d.))

PE18 Dataset

Class Label	PE18 Dataset
Subclass of	D1 Digital Object

Superclass of	PE22 Persistent Dataset PE24 Volatile Dataset
Scope Note	This class comprises identifiable immaterial items that can be represented as sets of bit sequences and whose content contains propositions about the objective world. The identity of an instance of PE18 is determined by its content in bit level encoding alongside its provenance. Any instance of a dataset may be composed of many distinct parts of other identifiable datasets. An aggregate of instances of PE18 dataset is treated as one instance and its parts can be documented as having a part of relation (p106). Datasets in practice are either volatile or persistent.
Examples	Clarin Virtual Language Observatory Dataset (PE24) Overview CLARIN centres CLARIN ERIC, n.d.) The collections database of the Qatar Museum Authority(Collections Qatar Museums, n.d.) A 3D model of the Asinou Church in Cyprus (Themistocleous et al., 2015)

PE19 Persistent Digital Object

Class Label	PE19 Persistent Digital Object
Subclass of	D1 Digital Object
Superclass of	PE21 Persistent Software PE22 Persistent Dataset
Scope Note	This class comprises instances of D1 digital object which are the result of a distinct creation moment in which the whole of the content of the digital object as a propositional set was established and encoded at a bit level, whether this creation moment is known or not. Persistent digital objects are thus identified by their content, bit level encoding and the moment of production as a whole unit of information. An instance of persistent digital object continues to exist so long as one copy of it remains on one carrier which has been maintained without change to its internal content, thus propagating the original condition of the instance.

Examples	Version 5.2 of Microsoft DOS Backup file of the shared drive at FORTH Submitted copy of deliverable 5.1 in word format
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New Direct Properties

Label	Domain	Range	Scope Note
PP16 has persistent digital object part	PE19	PE19	This property associates an instance of PE19 Persistent Digital Object with a structural part of that instance which is, in turn, also an instance of PE19 Persistent Object. An instance of PE19 Persistent Digital Object can only have parts which are themselves also instances of PE19. This is in juxtaposition to PE20 Volatile Digital Object which may have parts which are themselves either instances of P20 Volatile Digital Object or P19 Persistent Digital Object.

PE20 Volatile Digital Object

Class Label	PE20 Volatile Digital Object
Subclass of	PE32 Curated Thing D1 Digital Object
Superclass of	PE23 Volatile Software PE24 Volatile Dataset
Scope Note	This class comprises instances of digital objects whose content is subject to continuous change without notice or necessary archiving of intermediate state but which can be considered as one with regards to its provenance in some curation plan that determines its information, goal and subject coverage. At any one point, an instance of PE20 Volatile Digital Object can be identified by an official snapshot of the actual data stream, an instance of PE19 Persistent Digital Object, taken by the responsible curating authority which has as ancestors any previous snapshots taken of the data stream. The curator assigns a persistent identifier to the official snapshot and is the only individual who can identify the true representative snapshot. Reference to the content of an instance of PE20 Volatile Digital Object is

	down by way of the official snapshot.
Examples	The catalogue of iTunes Store music offerings The Archive of Archaeological Data Service UK Archaeology Data Service: Archives, n.d.) WordNet (Gratta, et al. 2014), (IIT - CNR - Istituto di Informatica e Telematica, n.d.) TwitterBuonaScuola Corpus (Gratta, et al. 2014), (IIT - CNR - Istituto di Informatica e Telematica, n.d.)

New Direct Properties

Label	Domain	Range	Scope Note
PP17 has snapshot	PE20	PE19	This property associates an instance of PE20 Volatile Digital Object with an instances of PE19 Persistent Object which at any one point stands as an official version of the overall data stream.
PP18 has digital object part	PE20	D1	This property associates an instance of PE20 Volatile Digital Object with a structural part of that instance. This structural part may be another instance of D1 Digital object, be it also a PE20 Volatile Digital Object or in fact be an instance of PE19 Persistent Object.

PE21 Persistent Software

Class Label	PE21 Persistent Software
Subclass of	D14 Software PE19 Persistent Digital Object
Superclass of	
Scope Note	This class compromises instances of digital objects that that can be executed on a computer to perform specific operations. In particular, an instance of PE21 Persistent software is the necessary information to process datasets algorithmically and to transform or integrate datasets in a collaborative infrastructure. The identity of a software depends on its content on the bit-level of encoding. The validity of the results produced by the software's application depends categorically on its algorithmic correctness. A software release is defined as an instance of software. The software release begins to exist with its

	provision by the actor who is responsible for producing it. We also include in this category all data structures and formal ontologies that are used to configure the behavior of the software at an infrastructure component level.
Examples	Sketchup Pro 2017 (3D modeling for everyone, n.d.) Themas version 1.1 (ICS - THEMAS - Thesaurus Management System, n.d.)

New Direct Properties

Label	Domain	Range	Scope Note
PP19 has persistent software part	P21	P21	This property associates an instance of PE21 Persistent Software with a structural part of that instance which is, in turn, also an instance of PE21 Persistent Software.

PE22 Persistent Dataset

Class Label	PE22 Persistent Dataset
Subclass of	PE18 Dataset PE19 Persistent Digital Object
Superclasses of	
Scope Note	This class compromises datasets that contain collections of data, records or information kept as a persistent unit of information in the knowledge generation process from primary records up to any level of aggregation or integration. The identity of a dataset is given by its content on the bit-level of encoding and its provenance. Since large datasets have a very small chance to be “reinvented” with another meaning, it is often practical to base the identity of a dataset on the content only, and apply a respective disambiguation of provenance only in case of obviously accidental identity. Different versions of a dataset are regarded as different datasets. Their relation should be defined by metadata describing the derivation process, rather than by version numbers. In general, a dataset may be integrated from different sources of provenance, such as a corpus of inscriptions compiled from different publication or a snapshot of a complete digital library. The integrated dataset may preserve the units of information of the source from which it has taken components. The content of

	knowledge organization systems, such as gazetteers, author lists, thesauri and formal ontologies of terms at a particular point in time, fall under datasets.
Examples	Records of the Excavations at 198 High Street, Exeter (Exeter archive site 55) (http://archaeologydataservice.ac.uk/archives/view/exeter_parent_2015/site_list.cfm) Documentation for use of METS (Metadata Encoding and Transmission Standard (METS) Official Web Site Library of Congress, n.d.) ARIADNE Record for Houten VleuGel-ACH en VleuGel-RSS (Verhelst, E.M.P. and Boer, E. De, 2007)

New Direct Properties

Label	Domain	Range	Scope Note
PP20 has persistent dataset part	PE22	PE22	This property associates an instance of PE22 Persistent Dataset with a structural part of that instance which is, in turn, also an instance of PE22 Persistent Dataset.
PP39 is metadata for	PE22	D1	Relates an instance of PE22 Persistent Dataset to some other instance of D1 Digital Object for which it plays the role of metadata. This relation establishes that the function of the information contained in the domain instance of PE22 is to describe the information contained in the range instance of D1.

PE23 Volatile Software

Class Label	PE23 Volatile Software
Subclass of	D14 Software PE20 Volatile Digital Object
Superclass of	
Scope Note	This class comprise software that is in the process of active development volatile software class is comprised of instances of the working copy of some software in development. The software in development is the necessary information to perform specific operations. The identity of an instance of PE23 Volatile Software depends on the unity provided it by the instance of PE11 Software Curating Service responsible for it, that provides it its unity of purpose. The PE11 Software

	Curating Service is responsible for the creation of instances of PE21 Persistent Software which are the official release of this development stream and the ability to find and run its instructions at some time.
Examples	Source code of development of Sketchup Source code of development of X3ML

New Direct Properties

Label	Domain	Range	Scope Note
PP21 has software part	PE23	D14	This property associates an instance of PE23 Volatile Software with a structural part of that instance. This structural part will be an instance of D14 Software and can be either of its subclasses, PE21 Persistent Software of PE23 Volatile Software.
PP22 has release	PE23	PE21	This property associates an instance of PE23 Volatile Software with an instances of PE21 Persistent Software which at any one point stands as an official version of that software development stream.

PE24 Volatile Dataset

Class Label	PE24 Volatile Dataset
Subclass of	PE18 Dataset PE20 Volatile Digital Object
Superclass of	
Scope Note	This class comprises datasets that are changed without notice or archiving of intermediate states but maintained by an instance of PE12 Data Curating Service. The identity of a volatile dataset is enabled by the unity given to it by curation programme that operates on it, that bequeaths the volatile dataset common information goal and subject coverage. In order for an instance of PE24 Volatile Dataset to be referenceable it is necessary for the official curator to take snapshots, creating instances of PE22 Persistent Data Set which can be assigned and official identifier and referenced. Volatile datasets are typically whole databases or mash-ups with active data feeds.

Examples	Ancient World Online Blogspot curated by Charles Jones (http://ancientworldonline.blogspot.com/) The Cendari Dataset (CENDARI Archival Directory, n.d.) CoCoON Dataset (COLlections de COrpus Oraux Num, n.d.)
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New Direct Properties

Label	Domain	Range	Scope Note
PP23 has dataset part	PE24	PE18	Indicates the datasets, volatile or persistent, that form part of the volatile dataset
PP24 has dataset snapshot	PE24	PE22	Indicates the representative snapshot of the volatile dataset created at some point to stand as an identifier for the whole volatile dataset
PP41 is index of	PE24	D1	Relates an instance of PE24 to an instance of D1 Digital object in the capacity of being an index for the latter.

PE25 RI Consortium

Class Label	PE25 RI Consortium
Subclass of	PE34 Team
Superclass of	
Scope Note	This class comprises special groups of actors who come together for the purpose of supporting a research infrastructure project. An RI Consortium can be composed of all other types of actors including other RI Consortiums. An RI Consortium is identified by its commonality of purpose and not by its membership at any one time. The group comes into existence with the agreement to maintain some collective project. So long as the group continues to support the common RI project and is non-empty the consortium continues to exist.
Examples	Parthenos Consortium (Consortium - PARTHENOS Project, n.d.) } n.d.)

Ariadne Consortium (Ariadne, n.d.)
Clarín Consortium/ Clarín-EU (Portal CLARIN Centre voor Nederland en Vlaanderen, n.d.)
Huma-num Consortium (Huma-Num, 2015)
Cendari Consortium (Cendari, n.d.)

PE26 RI Project

Class Label	PE26 RI Project
Subclass of	PE35 Project
Superclass of	
Scope Note	This class comprises instances of collaborative enterprise undertaken over a period of time by an instance of PE25 RI Consortium with the intention of supporting research activities by providing a number of services to instances of E39 Actor. The project's existence depends on the continued maintenance by some consortium. It ends when there is no consortium left to maintain it.
Examples	Parthenos Project (Home - PARTHENOS Project, n.d.) Ariadne Project (Ariadne, n.d.) Clarín Project (Portal CLARIN Centre voor Nederland en Vlaanderen, n.d.) Meta-Net Project (MetaNet: An Overview MetaNet, n.d.) FLaReNet project (FLARENET Institute for Computational Linguistics "A. Zampolli", n.d.)

New Direct Properties

Label	Domain	Range	Scope Note
PP1 currently offers	PE26	PE1	Allows research infrastructure project to be linked to the services it presently offers.
PP25 has maintaining RI	PE26	PE25	This property indicates the relation that exists between an instance of PE25 RI Consortium and some instance of PE26 RI Project, where the instance of PE25 is the responsible group of actors who maintain and support the instance of PE26.

PE28 Curation Plan

Class Label	PE28 Curation Plan
Subclass of	E29 Design or Procedure
Superclass of	
Scope Note	This class comprises instances of plans that guide curation projects and which provide the information necessary to understand the intention and overall aim of an actor in carrying out some instances of PE3 Curating Service.
Examples	The Curation plan for the collection of the archaeological museum of Paros(DYAS Registries, n.d.) The Standardization Survival Kit: TEI specification (SSK/TEI_SSK_ODD.xml at master \ ParthenosWP4/SSK \GitHub, n.d.)

PE29 Access Point

Class Label	PE29 Access Point
Subclass of	E51 Contact Point
Superclass of	
Scope Note	This class comprises instances of web addresses and network addresses by which e-services can be accessed.
Examples	http://git-trame.fefonlus.it/sparql for Cendari Sparql Endpoint https://portal.ehri-project.eu/

PE32 Curated Thing

Class Label	PE32 Curated Thing
Subclass of	E70 Thing
Superclass of	E78 Curated Holding PE20 Volatile Digital Object
Scope Note	This class comprises aggregations of instances of either E18 Physical Thing or of PE20 Volatile Digital Object that are assembled and maintained by one or more instances of E39 Actor over time for a specific purpose and audience, and according to a particular collection development plan. Items may be added or removed from an instance of P32 Curated Thing in

	pursuit of this plan. The instance of PE32 Curated Thing gets identity not through a physical togetherness of things, nor through a concatenation of information objects, but rather through the deliberate management of the curated thing according to a plan.
Examples	The collections of engraved prints and matrices, drawings and photographs along a chronological period from the 15th century to the present of the Central Institute for Graphics (Istituto Centrale per la Grafica , n.d.)

PE33 E-Access Brokering Service

Class Label	PE33 E-Access Brokering Service
Subclass of	PE8 E-Service
Superclass of	-
Scope Note	This class comprises declared offers by some instance of E39 Actor of their willingness and ability to provide electronic access brokering services for another instance of E39 Actor. E-Access brokering services offer mediation between the user of this instance of PE33 and some instance of PE8 E-Service, providing the means for the user to access the specified service. The actual E-Access brokering service function as an automatic process, and is indicated by the link to an instance of PE8 E-Service which is the service to which it gives access. An instance of a PE33 Access Brokering Service begins to exist with the declaration of the ability and willingness of an instance of E39 actor to broker access to some instance of PE8 E-Service. The instance of PE33 Access Brokering Service ends when either the declared willingness or ability to effectuate the mediation between the user and the target service permanently ends.
Examples	

New Direct Properties

Label	Domain	Range	Scope Note
PP46 brokers access to	PE33	PE8	Relates an instance of PE33 E-Access Brokering Service to instances an instance of PE8 E-Service which is a service to which it brokers access.

PE34 Team

Class Label	PE34 Team
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Subclass of	E74 Group
Superclass of	PE25 RI Consortium
Scope Note	This class comprises groups of actors who come together for some defined project. The identity of the team is given by the collective will to achieve and support some project/aim. Membership in the group is determined by official association to the team for the purpose of contributing to the achievement of its aim. Membership need not be mediated by institutional association. An instance of PE34 Team is identified by its commonality of purpose and not by its membership at any one time. A PE34 Team instance comes into existence with the agreement to maintain its collective project. So long as the will to maintain the project is upheld by a minimal membership of the team (1), the team can be said to exist, although any or all of its members may change over time.
Examples	IIT-CNR (IIT - CNR - Istituto di Informatica e Telematica, n.d.) The Sismel team ((User, n.d.)

PE35 Project

Class Label	PE35 Project
Subclass of	E7 Activity
Superclass of	PE26 RI Project
Scope Note	This class comprises instances of collaborative enterprise undertaken over a period of time by an instance of PE35 Team with the intention of effectuating some defined programme entailing the support of a number of instances of E7 Activity. An instance of PE35 Project comes into being with the formation of an instance of PE34 Team whose aim it is to carry out and maintain the project. The project continues to exist so long as the team both exists and continues to exercise its agency towards the maintenance of this project. A project ends either when it has reached its declared end point, attained its goal or the team constituted to support it is dissolved with no successor specified.
Examples	The project named "Reference Corpus of contemporary written Dutch" (Oostdijk, N., Reynaert, M., Hoste, V., Schuurman, I. (2013) The Construction of a 500 Million Word Reference Corpus of Contemporary Written Dutch in: Essential Speech and Language Technology for Dutch: Results by the STEVIN-programme (eds. P. Spyns, J. Odijk), Springer Verlag.)

Huma-Num project (Huma-Num, 2015)

New Direct Properties

Label	Domain	Range	Scope Note
PP43 supports project activity	PE35	E7	Relates an instance of PE35 Project to an instance of E7 Activity which it supports as part of its overall program.
P44 has maintaining team	PE35	PE34	Relates an instance of PE35 Project to an instance of E34 Team which is the supporting agency that facilitates it.

PE36 Competency Type

Class Label	PE36 Competency Type
Subclass of	E55 Type
Superclass of	
Scope Note	This class comprises concepts that are used to classify the processes or actions that a service is supposed to be capable of carrying out.
Examples	Computational Linguistics Machine Translation

PE37 Protocol Type

Class Label	PE37 Protocol Type
Subclass of	E55 Type
Superclass of	
Scope Note	This class comprises concepts that are used to classify the protocols that are used to access an instance of PE8 E-Service.
Examples	OAI-PMH (Open Archives Initiative Protocol for Metadata Harvesting, n.d.) DCAP (DCAP, Data Link Switching Client Access Protocol, n.d.)

PE38 Schema

Class Label	PE38 Schema
Subclass of	D14 Software
Superclass of	
Scope Note	This class is used to document instances of data structures, including formal ontologies that are used to configure the behavior of software.
Examples	The Pico XML schema (Profilo Applicativo PICO, n.d.) The OLAC format (OLAC 2001)) CIDOC-CRM RDF (CIDOC 6.2 , 2018) (Versions of the CIDOC-CRM CIDOC CRM, n.d.)

PE39 Availability Type

Class Label	PE39 Availability Type
Subclass of	E55 Type
Superclass of	
Scope Note	This class comprises concepts that are used to indicate the availability of a service in terms of kinds of time interval.
Examples	24 hours, Sporadic, On-Request

PE40 Programing Language

Class Label	PE40 Programing Language
Subclass of	E55 Type
Superclass of	
Scope Note	This class comprises instances of programming languages used for the

	creation of software.
Examples	Java
	Telos

PE41 Award Activity

Class Label	PE41 Award Activity
Subclass of	E7 Activity
Superclass of	PE42 Funding Activity
Scope Note	Awarding is a type of intentional event. We further restrict its intention to the type that is planned and involves an awarder, awardee, some award and perhaps a motivating reason. We are here at the level of the 'gift'.
Examples	The Awarding of the Best Paper to "ACTA: A general purpose Finite State Machine (FSM) description language for smart game design" at the 11th International Conference on Interfaces and Human Computer Interaction 2017 , (ICS, n.d.)

New Direct Properties

Label	Domain	Range	Scope Note
PP53 had awarder	PE41	E39	Links the instance of award activity to the agent responsible for bestowing the award.
PP54 had awardee	PE41	E39	Links the instance of award activity to the agent bestowed the award.
PP55 awarded	PE41	E70	Links the instance of award activity to the object be it physical or conceptual that was awarded.
PP56 awarded for	PE41	E1	Links the instance of award activity to the entity that was the reason for the granting of the award.

PE42 Funding Activity

Class Label	PE42 Funding Activity
Subclass of	PE41 Award Activity

Superclass of	
Scope Note	Funding is a type of intentional event. We further restrict its intention to the type that is planned and involves a funder, fundee, some monetary amount and perhaps a motivating reason. We are here at the level of exchange. This kind of activity can be seen as a specialization of award activity, that restricts the circuit of reward.
Examples	
The funding of Parthenos under Call H2020-INFRA-SUPP-2014/2015 (http://www.parthenos-project.eu/)	

New Direct Properties

Label	Domain	Range	Scope Note
PP57 provided funding amount	PE42	E97	Links the instance of funding activity to the monetary amount awarded.

PE43 Encoding Type

Class Label	PE43 Encoding Type
Subclass of	E55 Type
Superclass of	
Scope Note	This class comprises concepts that are used to classify kinds of encoding used in the creation of digital objects.
Examples	XML (Extensible Markup Language (XML) 1.0 (Fifth Edition), n.d.)
	RDF (Swick, 1997)

PE44 Audience Type

Class Label	PE44 Audience Type
Subclass of	E55 Type
Superclass of	
Scope Note	This class comprises concepts that are used to classify kinds of audience.
Examples	
Cultural Heritage	

Humanities

Conservation Specialists

Relations

PP1 currently offers (currently offered by)

Relation Label	PP1 currently offers (is currently offered by)
Subrelation of	P9 consists of (forms part of)
Superrelation of	-
Domain	PE26 RI Project
Range	PE1 Service
Scope	Allows research infrastructure project to be linked to the services it presently offers
Examples	The Ariadne Project (PE26) <i>currently offers</i> the Ariadne catalogue (PE17) (Ariadne, n.d) Clarín-EU Project (PE26) <i>currently offers</i> Virtual Language Observatory Service (PE17)(CLARIN VLO, n.d.)

PP2 provided by (provides)

Relation Label	PP2 provided by (provides)
Subrelation of	P14 carried out by (performed)
Superrelation of	-
Domain	PE1 Service
Range	E39 Actor
Scope	Indicates the intention and willingness of an actor to carry out some service
Examples	The Component Registry (PE17) <i>is provided by</i> Clarín-EU Consortium (PE25) (CLARIN Component Registry, n.d.) The ICCD RA Thesaurus for archaeological objects (PE17) <i>is provided by</i> Ariadne Consortium (PE25) (Ariadne, n.d)

PP4 hosts object (is object hosted by)

Relation Label	PP4 hosts object (is object hosted by)
Subrelation of	P16 used specific object (was used for)

Superrelation of	PP6 hosts digital object (is digital object hosted by)
Domain	PE2 Hosting Service
Range	E70 Thing
Scope	Indicates the generic relation of provision of some hosting service of an object of any kind.
Examples	"Hosting Service of United States Holocaust Memorial Museum" (PE2) <i>hosts object</i> "Romana Primus photograph collection" (E78) (Collections Search - United States Holocaust Memorial Museum, n.d.) Hosting Service for: the Collection of the Archaeological Museum of Paros (PE2) <i>hosts object</i> the Collection of the Archaeological Museum of Paros(E78) (DYAS Registries, n.d.)

PP6 hosts digital object (is digital object hosted by)

Relation Label	PP6 hosts digital object (is digital object hosted by)
Subrelation of	PP4 hosts object (is object hosted by)
Superrelation of	PP7 hosts software object (is software object hosted by) PP8 hosts dataset (is dataset hosted by)
Domain	PE5 Digital Hosting Service
Range	D1 Digital Object
Scope	Indicates the relation of provision of a hosting service of a digital object of any kind.
Examples	Hosting Service for LitRec (PE5) <i>hosts digital object</i> LitRec (PE20) (Gratta, et al. 2014), (IIT - CNR - Istituto di Informatica e Telematica, n.d.) "Hosting Service for The Munich Versatile and Fast Open-Source Audio Feature Extractor (openSMILE)" (PE5) <i>hosts digital object</i> "The Munich Versatile and Fast Open-Source Audio Feature Extractor (openSMILE)" (PE20) (Gratta, et al. 2014), (IIT - CNR - Istituto di Informatica e Telematica, n.d.)

PP7 hosts software object (is software object hosted by)

Relation Label	PP7 hosts software object (is software object hosted by)
Subrelation of	PP6 hosts digital object (is digital object hosted by)

Superrelation of	-
Domain	PE6 Software Hosting Service
Range	D14 Software
Scope	Indicates the relation of provision of some hosting service of a software object.
Examples	FORTH/ Hosting (PE6) <i>hosts software object</i> Themas (PE23) (ICS - THEMAS - Thesaurus Management System, n.d.)

PP8 hosts dataset (is dataset hosted by)

Relation Label	PP8 hosts dataset (is dataset hosted by)
Subrelation of	PP6 hosts digital object (is digital object hosted by)
Superrelation of	-
Domain	PE7 Data Hosting Service
Range	PE18 Dataset
Scope	Indicates the relation of provision of some hosting service of a dataset object.
Examples	The Cendari Archival Directory(PE17) <i>hosts dataset</i> BISLAM (Bibliotheca Scriptorum Latinorum Medii Recentiorisque Aevi) (PE24) (CENDARI Archival Directory, n.d.) CulturalItalia Portal (PE17) <i>hosts dataset</i> CulturalItalia Portal Dataset (PE24) (OAI 2.0 Request Results, n.d.)

PP11 curates volatile digital object (is volatile digital object curated by)

Relation Label	PP11 curates volatile digital object (is volatile digital object curated by)
Subrelation of	PP32 curates (is curated by)
Superrelation of	PP12 curates volatile software (is volatile software curated by) PP13 curates volatile dataset (is volatile dataset curated by)
Domain	PE10 Digital Curating Service
Range	PE20 Volatile Digital Object
Scope	This property associates an instance of digital curating service with the

	digital object of which it is the curation activity.
Examples	Dataset Curation Service for Bibliothèque numérique de l'INHA (PE17) <i>curates volatile digital object</i> Bibliothèque numérique de l'INHA (PE24) (Accueil , n.d.)/) "Dataset Curation Service for Syria. Archéologie, Art et histoire"(PE17) <i>curates volatile digital object</i> "Syria. Archéologie, Art et histoire" (PE24) (Search the Collection, n.d.)

PP12 curates volatile software (is volatile software curated by)

Relation Label	PP12 curates volatile software (is volatile software curated by)
Subrelation of	PP11 curates volatile digital object (is volatile digital object curated by)
Superrelation of	-
Domain	PE11 Software Curating Service
Range	PE23 Volatile Software
Scope	This property associates an instance of software curating service with the software of which it is the curation activity.
Examples	FORTH/ DARIAH-GR/ΔYΑΣ Software Development (PE11) <i>curates volatile software</i> THEMAS Thesauri Software (PE23) (ICS - THEMAS - Thesaurus Management System, n.d.)

PP13 curates volatile dataset (is volatile dataset curated by)

Relation Label	PP13 curates volatile dataset (is volatile dataset curated by)
Subrelation of	PP11 curates volatile digital object (is volatile digital object curated by)
Superrelation of	-
Domain	PE12 Data Curating Service
Range	PE24 Volatile Dataset
Scope	This property associates an instance of data curating service with the volatile dataset of which it is the curation activity.
Examples	The Cendari Archival Directory(PE17) <i>curates volatile dataset</i> the Cendari Dataset (PE24) (CENDARI Archival Directory, n.d.)

"DYAS Organizations and Collections Registries"(PE17) *curates volatile dataset* "Dyas Catalogue Dataset"(PE24) (DYAS Registries, n.d.)

PP14 runs on request (is run by)

Relation Label	PP14 runs on request (is run by)
Subrelation of	P16 used specific object (was used for)
Superrelation of	-
Domain	PE13 Software Computing E-Service
Range	D14 Software
Scope	This property associates an instance of software computing e-service with the software that it runs when requested
Examples	Landscape Services (PE13) <i>runs on request</i> 3D Terrain Service Software (PE21) (3D Terrain Service, n.d.)

PP15 delivers on request (is delivered by)

Relation Label	PP15 delivers on request (is delivered by)
Subrelation of	P16 used specific object (was used for)
Superrelation of	-
Domain	PE14 Software Delivery E-Service
Range	D14 Software
Scope	This property associates an instance of software delivery e-service with the software that it delivers when requested.
Examples	Themas Forth Hosting Service (PE14) <i>delivers on request</i> Themis (PE23) (ICS - THEMAS - Thesaurus Management System, n.d.)

PP16 has persistent digital object part (is persistent digital object part of)

Relation Label	PP16 has persistent digital object part (is persistent digital object part of)
Subrelation of	P106 is composed of (forms part of)
Superrelation of	PP19 has persistent software part (is persistent software part of) PP20 has persistent dataset part (is persistent dataset part of)
Domain	PE19 Persistent Digital Object
Range	PE19 Persistent Digital Object
Scope	This property associates an instance of PE19 Persistent Digital Object with

	a structural part of that instance which is, in turn, also an instance of PE19 Persistent Object. An instance of PE19 Persistent Digital Object can only have parts which are themselves also instances of PE19. This is in juxtaposition to PE20 Volatile Digital Object which may have parts which are themselves either instances of P20 Volatile Digital Object or P19 Persistent Digital Object.
Examples	

PP17 has snapshot (is snapshot of)

Relation Label	PP17 has snapshot (is snapshot of)
Subrelation of	P130 shows features of (features are also found on)
Superrelation of	PP22 has release (is release of) PP24 has dataset snapshot (is dataset snapshot of)
Domain	PE20 Volatile Digital Object
Range	P19 Persistent Digital Object
Scope	This property associates an instance of PE20 Volatile Digital Object with an instances of PE19 Persistent Object which at any one point stands as an official version of the overall data stream.
Examples	1.0 Parthenos.doc (PE19) <i>is snapshot of</i> Parthenos deliverable doc (PE20), before its 1 st release.

PP18 has digital object part (is digital object part of)

Relation Label	PP18 has digital object part (is digital object part of)
Subrelation of	P106 is composed of (forms part of)
Superrelation of	PP21 has software part (is software part of) PP23 has dataset part (is dataset part of)
Domain	PE20 Volatile Digital Object
Range	D1 Digital Object
Scope	This property associates an instance of PE20 Volatile Digital Object with a structural part of that instance. This structural part may be another instance of D1 Digital object, be it also a PE20 Volatile Digital Object or in fact be an instance of PE19 Persistent Object.
Examples	

PP19 has persistent software part (is persistent software part of)

Relation Label	PP19 has persistent software part (is persistent software part of)
Subrelation of	PP16 has persistent digital object part (is persistent digital object part of)
Superrelation of	-
Domain	PE21 Persistent Software
Range	PE21 Persistent Software
Scope	This property associates an instance of PE21 Persistent Software with a structural part of that instance which is, in turn, also an instance of PE21 Persistent Software.
Examples	X3ML version 1.1 (PE21) <i>has persistent software part</i> X3ML Engine 1.1 (PE21) (ICS -X3ML Toolkit, n.d.)

PP20 has persistent dataset part (is persistent dataset part of)

Relation Label	PP20 has persistent dataset part (is persistent dataset part of)
Subrelation of	PP16 has persistent digital object part (is persistent digital object part of)
Superrelation of	-
Domain	PE22 Persistent Dataset
Range	PE22 Persistent Dataset
Scope	This property associates an instance of PE22 Persistent Dataset with a structural part of that instance which is, in turn, also an instance of PE22 Persistent Dataset.
Examples	I Revues Collection DB (PE22) <i>has persistent d/s part</i> I revue MD for Alma DB (PE22) (http://revues.inist.fr/)

PP21 has software part (is software part of)

Relation Label	PP21 has software part (is software part of)
Subrelation of	PP18 has digital object part (is digital object part of)
Superrelation of	-
Domain	PE23 Volatile Software
Range	D14 Software

Scope	This property associates an instance of PE23 Volatile Software with a structural part of that instance. This structural part will be an instance of D14 Software and can be either of its subclasses, PE21 Persistent Software of PE23 Volatile Software.
Examples	X3ML (PE23) <i>has software part</i> 3M Editor (D14) (ICS -X3ML Toolkit, n.d.) (Marketakis, Y, 2017))

PP22 has release (is release of)

Relation Label	PP22 has release (is release of)
Subrelation of	PP17 has snapshot (is snapshot of)
Superrelation of	-
Domain	PE23 Volatile Software
Range	PE21 Persistent Software
Scope	This property associates an instance of PE23 Volatile Software with an instances of PE21 Persistent Software which at any one point stands as an official version of that software development stream.
Examples	Themas (PE23) <i>has release</i> Themas Version 1.1. (PE21) (ICS - THEMAS - Thesaurus Management System, n.d.)

PP23 has dataset part (is dataset part of)

Relation Label	PP23 has dataset part (is dataset part of)
Subrelation of	PP18 has digital object part (is digital object part of)
Superrelation of	-
Domain	PE24 Volatile Dataset
Range	PE18 Dataset
Scope	This property associates an instance of PE24 Volatile Dataset with a structural part of that instance. This structural part will be an instance of PE18 Dataset and can be either of its subclasses, PE22 Persistent Dataset of PE24 Persistent Dataset.
Examples	Metashare Dataset (PE24) <i>has dataset part</i> "Metadata Record for: Base de données terminologique polytechnique et plurilingue VERBA - G-AU Terminologie générale"(PE22) (Home - META-SHARE, n.d.) INHA (PE24) <i>has dataset part</i> Bibliothèque numérique de l'INHA (PE24) (Accueil , n.d.)

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PP24 has dataset snapshot (is dataset snapshot of)

Relation Label	PP24 has dataset snapshot (is dataset snapshot of)
Subrelation of	PP17 has snapshot (is snapshot of)
Superrelation of	-
Domain	PE24 Volatile Dataset
Range	PE22 Persistent Dataset
Scope	This property associates an instance of PE24Volatile Dataset with an instance of PE22 Persistent Dataset which at any one point stands as an official version of that dataset.
Examples	“VERBA Polytechnic and Plurilingual Terminological Database - G-AU General Terminology”(PE24) <i>has dataset snapshot</i> "Base de données terminologique polytechnique et plurilingue VERBA - G-AU Terminologie générale Ver 1.0" (PE22) (Home - META-SHARE, n.d.)

PP25 has maintaining RI (is maintaining RI of)

Relation Label	PP25 has maintaining RI (is maintaining RI of)
Subrelation of	PP44 has maintaining team (is maintaining team of)
Superrelation of	-
Domain	PE26 RI Project
Range	PE25 RI Consortium
Scope	This property indicates the relation that exists between an instance of PE25 RI Consortium and some instance of PE26 RI Project, where the instance of PE25 is the responsible group of actors who maintain and support the instance of PE26.
Examples	Clarin Project (PE26) <i>has maintaining RI</i> Clarin ERIC (PE25) (Overview CLARIN centres CLARIN ERIC, n.d.) CulturaItalia Project (PE26) <i>has maintaining RI</i> Cultura Italia (PE25) (Cultura Italia, un patrimonio da esplorare, n.d.)

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PP28 has designated access point (is designated access point of)

Relation Label	PP28 has designated access point (is designated access point of)
Subrelation of	P1 is identified by (identifies)
Superrelation of	-
Domain	PE8 E-Service
Range	PE29 Access Point
Scope	Links an instance of a PE8 E-Service to the web address at which the e-service can be accessed.
Examples	The Component Registry (PE17) <i>has designated access point:</i> https://www.clarin.eu/componentregistry (PE29) (CLARIN Component Registry, n.d.) The ICCD RA Thesaurus for archaeological objects (PE17) <i>has designated access point:</i> http://vast-lab.org/thesaurus/ra/vocab (PE29) (ICCU, 2015)

PP29 uses access protocol (is access protocol used by)

Relation Label	PP29 uses access protocol (is access protocol used by)
Subrelation of	P16 used specific object (was used for)
Superrelation of	-
Domain	PE8 E-Service
Range	D14 Software
Scope	Links an instance of PE8 E-Service with the instance of D14 software which encodes the access protocol by which the e-service is to be accessed.
Examples	Advanced I-EHR service (PE8) <i>uses access protocol</i> the Wireless Access Protocol (WAP) (D14) (Katehakis et al., 2001)

PP31 uses curation plan (is curation plan used by)

Relation Label	PP31 uses curation plan (is curation plan used by)
Subrelation of	P33 used specific technique (was used by)
Superrelation of	-
Domain	PE3 Curating Service
Range	PE28 Curation Plan
Scope	Links an instance of PE3 Curation Service with the plan that organizes this activity
Examples	"DYAS Organizations and Collections Registries" (PE17) <i>uses curation plan</i> "provided by DCU" (PE28). (DYAS Registries, n.d.)

PP32 curates (is curated by)

Relation Label	PP32 curates (is curated by)
Subrelation of	
Superrelation of	P147 curated (was curated by) PP11 curates volatile digital object (is volatile D/O curated by)
Domain	PE3 Curating Service
Range	PE32 Curated Thing
Scope	Links an instance of PE3 Curation Service with the object or objects for which it provides curation services.
Examples	"Curation Service for: Base de données terminologique polytechnique et plurilingue VERBA - G-AU Terminologie générale"(PE3) <i>curates</i> "VERBA Polytechnic and Plurilingual Terminological Database - G-AU General Terminology"(PE24) (Home - META-SHARE, n.d.)

PP39 is metadata for (has metadata)

Relation Label	PP39 is metadata for (has metadata)
Subrelation of	P129 is about (is subject of)
Superrelation of	-

Domain	PE22 Persistent Dataset
Range	D1 Digital Object
Scope	Relates an instance of PE22 Persistent Dataset to some other instance of D1 Digital Object for which it plays the role of metadata. This relation establishes that the function of the information contained in the domain instance of PE22 is to described the information contained in the range instance of D1.
Examples	"Metadata Record for: Base de données terminologique polytechnique et plurilingue VERBA - G-AU Terminologie générale"(PE22) <i>is metadata for</i> "VERBA Polytechnic and Plurilingual Terminological Database - G-AU General Terminology"(PE24) (Home - META-SHARE, n.d.) "ARIADNE Record for Houten VleuGel-ACH en VleuGel-RSS" (PE22) <i>is metadata for</i> "Houten VleuGel-ACH en VleuGel-RSS"(PE24) (Verhelst, E.M.P. and Boer, E. De , 2007, (Welcome - Ariadne portal, n.d.)

PP40 created successor of (is deprecated by)

Relation Label	PP40 created successor of (is deprecated by)
Subrelation of	P94 has created (was created by)
Superrelation of	-
Domain	E65 Creation
Range	PE22 Persistent Dataset
Scope	Relates an instance of E65 Creation to an instance of E22 Persistent Dataset that is acting as a metadata set. The latter E22 Persistent Dataset is referred to in the act of creation, specifically as the object of some correction. It is thus deprecated in the act of creation of some new instance of E22 Persistent Dataset. The new instance can be considered the successor of this deprecated dataset. The most recent successor, all things being equal, represents the present state of knowledge.
Examples	

PP41 is index of (is indexed by)

Relation Label	PP41 is index of (is indexed by)
Subrelation of	
Superrelation of	-
Domain	PE24 Volatile Dataset
Range	D1 Digital Object
Scope	Relates an instance of PE24 to an instance of D1 Digital object in the capacity of being an index for the latter.
Examples	LRE Map Dataset (PE24) <i>is index of</i> Wordnet (PE20) (Gratta, et al. 2014), (IIT - CNR - Istituto di Informatica e Telematica, n.d.) LRE Map Dataset (PE24) <i>is index of</i> LitRec (PE20) (Gratta, et al. 2014), (IIT - CNR - Istituto di Informatica e Telematica, n.d.)

PP42 has declarative time

Relation Label	PP42 has declarative time
Subrelation of	
Superrelation of	-
Domain	PE1 Service
Range	E61 Time Primitive (xsd:Date in the rdf encoding)
Scope	Relates an instance of PE1 Service to a time span during which the service provider declares the service is, will be, has been in effect.
Examples	The Landscape Services - 3D Terrain Service(PE13) <i>has declarative time</i> 2016 (E61) (Landscape Services, n.d.) "DYAS Organizations and Collections Registries"(PE17) <i>has declarative time</i> 2014 - 2020 (E61) (DYAS Registries, n.d.)

PP43 supports project activity (is project activity supported by)

Relation Label	PP43 supported project activity (is project activity supported by)
Subrelation of	P9 consists of (forms part of)
Superrelation of	-
Domain	PE35 Project
Range	E7 Activity
Scope	Relates an instance of PE35 Project to an instance of E7 Activity which it supports as part of its overall program.
Examples	"Reference Corpus of contemporary written Dutch" project (PE35) <i>supports project activity</i> the Creation Event of corpus hedendaags

nederlands (E65) (Oostdijk et al., 2013)

Parthenos Project (PE35) *supports project activity* the Foresight studies (E7) (Home - PARTHENOS Project, n.d.)

PP44 has maintaining team (is maintaining team of)

Relation Label	PP44 has maintaining team (is maintaining team of)
Subrelation of	P17 was motivated by (motivated)
Superrelation of	PP26 has maintaining RI (is maintaining RI of)
Domain	PE35 Project
Range	PE34 Team
Scope	Relates an instance of PE35 Project to an instance of E34 Team which is the supporting agency that facilitates it.
Examples	Ariadne Project (PE35) <i>has maintaining team</i> Ariadne Consortium (PE25) (Welcome - Ariadne portal, n.d.) DARIAH-GR/ΔΥΑΣ (PE26) <i>has maintaining team</i> Dariah-GR Consortium (PE25) (DARIAH.it, n.d.)

PP45 has competency (is competency of)

Relation Label	PP45 has competency (is competency of)
Subrelation of	P21 had general purpose (was purpose of)
Superrelation of	-
Domain	PE1 Service
Range	PE36 Competency Type
Scope	Relates an instance of PE1 Service to an instance of E36 Competency Type which it is competent to perform.
Examples	Metashare (PE15) <i>has competency</i> Computational Linguistics (PE36) (Home - META-SHARE, n.d.) The Cendari Archival Directory (PE17) <i>has competency the</i>

Medieval Archival Material (PE36) (CENDARI Archival Directory, n.d.)

PP46 brokers access to (access brokered by)

Relation Label	PP46 brokers access to (has access brokered by)
Subrelation of	
Superrelation of	-
Domain	PE33 E-Access Brokering Service
Range	PE8 E-Service
Scope	Relates an instance of PE33 E-Access Brokering Service to instances an instance of PE8 E-Service which is a service to which it brokers access.
Examples	

PP47 has protocol type (is protocol type of)

Relation Label	PP47 has protocol type (is protocol type of)
Subrelation of	P125 used object of type (was type of object used in)
Superrelation of	-
Domain	PE8 E-Service
Range	PE37 Protocol Type
Scope	Relates an instance of PE8 E-Service to instances of PE37 Protocol Type that classify the protocols used to access the service.
Examples	The ICCD RA Thesaurus for archaeological objects (PE17) <i>has protocol type</i> API (PE37) (http://vast-lab.org/thesaurus/ra/vocab/) ICCU, 2015) DYAS Organizations and Collections Registries (PE17) <i>has protocol type</i> DCAP (PE37) (DYAS Registries, n.d.)

PP48 uses protocol parameter (is protocol parameter of)

Relation Label	PP48 uses protocol parameter (is protocol parameter of)
Subrelation of	P16 used specific object (was used for)
Superrelation of	-
Domain	PE8 E-Service
Range	PE38 Schema
Scope	Relates an instance of PE8 E-Service to instances of PE35 Schema that this service requires in order to run.
Examples	ALMA (Archivum Latinitatis Medii Aevi) (PE17) <i>uses protocol parameter</i> n/a (http://irevues.inist.fr/)

PP49 provides access point (is access point provided by)

Relation Label	PP49 provides access point (is access point provided by)
Subrelation of	
Superrelation of	-
Domain	PE8 E-Service
Range	PE29 Access Point
Scope	Relates an instance of PE8 E-Service to an instance of PE29 Access Point which the service provides for an instance of D1 Digital Object.
Examples	"Data Hosting Service for: Houten VleuGel-ACH en VleuGel-RSS" (PE15) <i>provides access point</i> http://dx.doi.org/10.17026/dans-xhv-8afk (PE29) (Welcome - Ariadne portal, n.d.) Online Hosting for corpus hedendaags nederlands (PE15) <i>provides access point</i> http://hdl.handle.net/10032/dcd794bbc034670be87f0700bb287bfb (PE29) (Corpus Hedendaags Nederlands search, n.d.)

PP50 accessible at (provides access to)

Relation Label	PP50 accessible at (provides access to)
Subrelation of	
Superrelation of	-
Domain	D1 Digital Object
Range	PE29 Access Point
Scope	Relates an instance of D1 Digital Object to an instance of PE29 Access Point which has been provided to it by some PE8 E-Service.
Examples	"Best practices for Oral History Interviews"(PE22) <i>is accessible at</i> http://www.oralhistory.org/about/principles-and-practices (PE29) (Principles and Best Practices Oral History Association, n.d.) "Corpus hedendaags nederlands"(PE24) <i>is accessible at</i> http://hdl.handle.net/10032/dcd794bbc034670be87f0700bb287bfb (PE29) (Corpus Hedendaags Nederlands search, n.d.)

PP51 has availability (is availability of)

Relation Label	PP51 has availability (is availability of)
Subrelation of	P2 has type (is type of)
Superrelation of	-
Domain	PE1 Service
Range	PE39 Availability Type
Scope	Relates an instance of PE2 Service to an instance of PE39 Availability Type.
Examples	ARIADNE Visual Media Service (PE13) <i>has availability</i> 24/7 (PE39) (Ariadne , n.d.)

PP52 is programmed with (is used to programme)

Relation Label	PP52 is programmed with (is used to programme)
Subrelation of	
Superrelation of	-

Domain	D14 Software
Range	PE40 Programming Language
Scope	Relates an instance of D14 Software to an instance of PE40 Programming Language with which it was programmed. This property is a shortcut for the fully developed path: D14 L11i->D7->P32->E55.
Examples	THEMAS (PE23) <i>is programmed with</i> TELOS representation language (PE40) (THEMAS - Thesaurus Management System, n.d.)

PP53 had awarder (was awarder of)

Relation Label	PP53 had awarder (was awarded by)
Subrelation of	P14 carried out by
Superrelation of	
Domain	PE41 Award Activity
Range	E39 Actor
Scope	Links the instance of award activity to the agent responsible for bestowing the award.
Examples	Best Paper Awarding at the 11th International Conference on Interfaces and Human Computer Interaction 2017 (PE41) had awarder IADIS (E39) <i>was awarded by</i> (ICS, n.d.)

PP54 had awardee (was awardee of)

Relation Label	PP54 had awardee (was awarded to)
Subrelation of	P14 carried out by
Superrelation of	
Domain	PE41 Award Activity
Range	E39 Actor
Scope	Links the instance of award activity to the agent bestowed the award.
Examples	Best Paper Awarding at the 11th International Conference on Interfaces and Human Computer Interaction 2017(PE41) has awardee Zidianakis, E., Antona, M., & Stephanidis, C.,(E74) (ICS, n.d.)

PP55 awarded (was thing awarded by)

Relation Label	PP55 awarded (was thing awarded by)
Subrelation of	P16 used specific object
Superrelation of	
Domain	PE41 Award Activity
Range	E70 Thing
Scope	Links the instance of award activity to the object be it physical or conceptual that was awarded.
Examples	Best Paper Awarding at the 11th International Conference on Interfaces and Human Computer Interaction 2017(PE41) <i>awarded</i> IADIS Best Paper Award 2017 (E73) (ICS, n.d)

PP56 awarded for (was award of)

Relation Label	PP56 awarded for (was award of)
Subrelation of	P17 was motivated by
Superrelation of	
Domain	PE41 Award Activity
Range	E1 CRM Entity
Scope	Links the instance of award activity to the entity that was the reason for the granting of the award.
Examples	Best Paper Awarding at the 11th International Conference on Interfaces and Human Computer Interaction 2017(PE41) <i>awarded</i> for the paper entitled “ACTA: A general purpose Finite State Machine (FSM) description language for smart game design” (E31 Document) (ICS, n.d)

PP57 provided funding amount (was funding provided by)

Relation Label	PP57 provided funding amount (was funding provided by)
Subrelation of	
Superrelation of	
Domain	PE42 Funding Activity
Range	E97 Monetary Amount
Scope	Links the instance of funding activity to the monetary amount awarded.

	<i>PP57 provided funding amount (was funding provided by) is a shortcut of the more fully developed path from 'PE42 Funding Activity' through 'PP55 awarded', 'E70 Thing', 'P43 has dimension', to 'E97 Monetary Amount'</i>
Examples	The funding of Parthenos under Call H2020-INFRA-SUPP-2014/2015 (PE42) <i>provided funding amount</i> 12 million euros (E97) (EHRI - Welcome to the European Holocaust Research Infrastructure online portal, n.d.)

PP58 is encoded with (is encoding of)

Relation Label	PP58 is encoded with (is encoding of)
Subrelation of	P2 has type
Superrelation of	
Domain	D1 Digital Object
Range	PE43 Encoding Type
Scope	Links an instance of digital object to the type of encoding that was used in its production and can now be used in determining how to access it. This is a shortcut of the long path 11i->D7->p33->E29->p2->E55
Examples	LRE Map Dataset (PE24) <i>is encoded with</i> RDF (PE43) (Gratta, et al. 2014), (IIT - CNR - Istituto di Informatica e Telematica, n.d.) MuseiD-Italia Dataset (PE24) <i>is encoded with</i> XML (PE43) (Cultura Italia, un patrimonio da esplorare, n.d.)

PP59 had intended audience (was intended audience of)

Relation Label	PP59 had intended audience (was intended audience of)
Subrelation of	P21 had general purpose
Superrelation of	
Domain	E7 Activity
Range	PE44 Audience Type

Scope	Links an instance of E7 Activity to the audience type that it was intended to be directed at.
Examples	Greek military protection of airspace (E7) had intended audience domestic voters (E55).

PP60 had intended geographic scope (was intended geographic scope of)

Relation Label	PP60 had intended geographic scope (was intended geographic scope of)
Subrelation of	
Superrelation of	
Domain	E7 Activity
Range	E53 Place
Scope	Links an instance of E7 Activity to the geographic range over which it was intended to have effect by the actor.
Examples	Greek military protection of airspace (E7) had intended geographic scope the official territory of Greece according to Lausanne Treaty (E53).

Referred Classes

D1 Digital Object

Class Label	D1 Digital Object
Subclass of	E73 Information Object
Superclass of	PE19 Persistent Digital Object PE20 Volatile Digital Object D14 Software PE18 Dataset
Scope Note	This class comprises identifiable immaterial items that can be represented as sets of bit sequences, such as data sets, e-texts, images, audio or video items, software, etc., and are documented as single units. Any aggregation of instances of D1 Digital Object into a whole treated as single unit is also regarded as an instance of D1 Digital Object. This means that for instance, the content of a DVD, an XML file on it, and an element of this file, are regarded as distinct instances of D1 Digital Object, mutually related by the P106 is composed of (forms part of) property. A D1 Digital Object does not depend on a specific physical carrier, and it can exist on one or more carriers simultaneously.
Examples	
External Ontology Origin	CRMdig 3.2.1

Properties

Label	Domain	Range	Scope Note
PP50 accessible at	D1	PE29	Relates an instance of D1 Digital Object to an instance of PE29 Access Point which has been provided to it by some PE8 E-Service.
PP58 is encoded with	D1	PE43	Links an instance of digital object to the type of encoding that was used in its production and can now be used in determining how to access it. This is a shortcut of the long path 11i->D7->p33->E29->p2->E55

D14 Software

Class Label	D14 Software
Subclass of	D1 Digital Object
Superclass of	PE21 Persistent Software PE23 Volatile Software PE38 Schema
Scope Note	This class comprises software codes, computer programs, procedures and functions that are used to operate a system of digital objects.
Examples	
External Ontology Origin	CRMdig 3.2.1

Properties

Label	Domain	Range	Scope Note
PP52 is programmed with	D14	PE40	Relates an instance of D14 Software to an instance of PE40 Programming Language with which it was programmed. This property is a shortcut for the fully developed path: D14 L11i->D7->P32->E55.

E7 Activity

Class Label	E7 Activity
Subclass of	E5 Event
Superclass of	PE1 Service PE35 Project PE27 Service Action PE41 Award Activity
Scope Note	This class comprises actions intentionally carried out by instances of E39 Actor that result in changes of state in the cultural, social, or physical systems documented. This notion includes complex, composite and long-lasting actions such as the building of a settlement or a war, as well as simple, short-lived actions such as the opening of a door.
Examples	
External Ontology Origin	CIDOC CRM 6.2.1

Properties

Label	Domain	Range	Scope Note
PP59 had intended audience	E7	PE44	Links an instance of E7 Activity to the audience type that it was intended to be directed at.
PP60 had intended geographic scope	E7	E53	Links an instance of E7 Activity to the geographic range over which it was intended to have effect by the actor.

E29 Design or Procedure

Class Label	E29 Design or Procedure
Subclass of	E73 Information Object
Superclass of	PE28 Curation Plan
Scope Note	This class comprises documented plans for the execution of actions in order to achieve a result of a specific quality, form or contents. In particular it comprises plans for deliberate human activities that may result in the modification or production of instances of E24 Physical Thing. Instances of E29 Design or Procedure can be structured in parts and sequences or depend on others. This is modelled using <i>P69 has association with</i> (is associated with).. Designs or procedures can be seen as one of the following: 1. A schema for the activities it describes 2. A schema of the products that result from their application. 3. An independent intellectual product that may have never been applied, such as Leonardo da Vinci's famous plans for flying machines. Because designs or procedures may never be applied or only partially executed, the CRM models a loose relationship between the plan and the respective product
Examples	
External Ontology Origin	CIDOC CRM 6.2.1

E39 Actor

Class Label	E39 Actor
Subclass of	E77 Persistent Item
Superclass of	E21 Person E74 Group

Scope Note	This class comprises people, either individually or in groups, who have the potential to perform intentional actions of kinds for which someone may be held responsible. The CRM does not attempt to model the inadvertent actions of such actors. Individual people should be documented as instances of E21 Person, whereas groups should be documented as instances of either E74 Group or its subclass E40 Legal Body.
Examples	
External Ontology Origin	CIDOC CRM 6.2.1

E40 Legal Body

Class Label	E40 Legal Body
Subclass of	E74 Group
Superclass of	PE25 RI Consortium
Scope Note	This class comprises institutions or groups of people that have obtained a legal recognition as a group and can act collectively as agents. This means that they can perform actions, own property, create or destroy things and can be held collectively responsible for their actions like individual people. The term 'personne morale' is often used for this in French.
Examples	
External Ontology Origin	CIDOC CRM 6.2.1

E51 Contact Point

Class Label	E51 Contact Point
Subclass of	E41 Appellation
Superclass of	E45 Address PE29 Access Point
Scope Note	This class comprises identifiers employed, or understood, by communication services to direct communications to an instance of E39 Actor. These include E-mail addresses, telephone numbers, post office boxes, Fax numbers, URLs etc. Most postal addresses can be considered both as instances of E44 Place Appellation and E51 Contact Point. In such cases the subclass E45 Address should be used. URLs are addresses used by machines to access another machine through an http request. Since the accessed machine acts on behalf of the E39 Actor providing the machine, URLs are considered as instances of E51 Contact Point to that E39 Actor.
Examples	
External Ontology Origin	CIDOC CRM 6.2.1

E55 Type

Class Label	E55 Type
Subclass of	E28 Conceptual Object
Superclass of	E56 Language E57 Material E58 Measurement Unit PE36 Competency Type PE37 Protocol Type PE39 Availability Type PE40 Programing Language PE43 Encoding Type PE44 Audience Type
Scope Note	This class comprises concepts denoted by terms from thesauri and controlled vocabularies used to characterize and classify instances of CRM classes. Instances of E55 Type represent concepts in contrast to instances of E41 Appellation which are used to name instances of CRM classes. E55 Type is the CRM's interface to domain specific ontologies and thesauri. These can be represented in the CRM as subclasses of E55 Type, forming hierarchies of terms, i.e. instances of E55 Type linked via P127 has broader term (has narrower term). Such hierarchies may be extended with additional properties
Examples	
External Ontology Origin	CIDOC CRM 6.2.1

E65 Creation

Class Label	E65 Creation
Subclass of	E7 Activity
Superclass of	
Scope Note	This class comprises events that result in the creation of conceptual items or immaterial products, such as legends, poems, texts, music, images, movies, laws, types etc.
Examples	
External Ontology Origin	CIDOC CRM 6.2.1

Properties

Label	Domain	Range	Scope Note
PP40 created successor of	E65	PE22	Indicates the relation between the act of creation and a metadata set that is corrected in the act of creation.

E70 Thing

Class Label	E70 Thing
Subclass of	E77 Persistent Item
Superclass of	PE32 Curated Thing
Scope Note	This general class comprises discrete, identifiable, instances of E77 Persistent Item that are documented as single units, that either consist of matter or depend on being carried by matter and are characterized by relative stability. They may be intellectual products or physical things. They may for instance have a solid physical form, an electronic encoding, or they may be a logical concept or structure.
Examples	
External Ontology Origin	CIDOC CRM 6.2.1

E71 Man Made Thing

Class Label	E71 Man Made Thing
Subclass of	E70 Thing
Superclass of	E24 Physical Man-Made Thing E28 Conceptual Object
Scope Note	This class comprises discrete, identifiable man-made items that are documented as single units. These items are either intellectual products or man-made physical things, and are characterized by relative stability. They may for instance have a solid physical form, an electronic encoding, or they may be logical concepts or structures
Examples	
External Ontology Origin	CIDOC CRM 6.2.2

E74 Group

Class Label	E74 Group
Subclass of	E39 Actor
Superclass of	E40 Legal Body PE34 Team
Scope Note	This class comprises any gatherings or organizations of E39 Actors that act collectively or in a similar way due to any form of unifying relationship. In the

wider sense this class also comprises official positions which used to be regarded in certain contexts as one actor, independent of the current holder of the office, such as the president of a country. In such cases, it may happen that the Group never had more than one member. A joint pseudonym (i.e., a name that seems indicative of an individual but that is actually used as a persona by two or more people) is a particular case of E74 Group. A gathering of people becomes an E74 Group when it exhibits organizational characteristics usually typified by a set of ideas or beliefs held in common, or actions performed together. These might be communication, creating some common artifact, a common purpose such as study, worship, business, sports, etc. Nationality can be modelled as membership in an E74 Group (cf. HumanML markup). Married couples and other concepts of family are regarded as particular examples of E74 Group.	
Examples	
External Ontology Origin	CIDOC CRM 6.2.2

E77 Persistent Item

Class Label	E77 Persistent Item
Subclass of	E1 CRM Entity
Superclass of	E39 Actor E70 Thing
Scope Note	This class comprises items that have a persistent identity, sometimes known as “endurants” in philosophy. They can be repeatedly recognized within the duration of their existence by identity criteria rather than by continuity or observation. Persistent Items can be either physical entities, such as people, animals or things, or conceptual entities such as ideas, concepts, products of the imagination or common names. The criteria that determine the identity of an item are often difficult to establish -; the decision depends largely on the judgement of the observer. For example, a building is regarded as no longer existing if it is dismantled and the materials reused in a different configuration. On the other hand, human beings go through radical and profound changes during their life-span, affecting both material composition and form, yet preserve their identity by other criteria. Similarly, inanimate objects may be subject to exchange of parts and matter. The class E77 Persistent Item does not take any position about the nature of the applicable identity criteria and if actual knowledge about identity of an instance of this class exists. There may be cases, where the identity of an E77 Persistent Item is not decidable by a certain state of knowledge. The main classes of objects that fall outside the scope the E77 Persistent

	Item class are temporal objects such as periods, events and acts, and descriptive properties.
Examples	
External	CIDOC CRM 6.2.2
Ontology Origin	

E78 Curated Holding

Class Label	E78 Curated Holding
Subclass of	E24 Physical Man Made Thing PE32 Curated Thing
Superclass of	
Scope Note	This class comprises aggregations of instances of E18 Physical Thing that are assembled and maintained (“curated” and “preserved,” in museological terminology) by one or more instances of E39 Actor over time for a specific purpose and audience, and according to a particular collection development plan. Typical instances of curated holdings are museum collections, archives, library holdings and digital libraries. A digital library is regarded as an instance of E18 Physical Thing because it requires keeping physical carriers of the electronic content. Items may be added or removed from an E78 Curated Holding in pursuit of this plan. This class should not be confused with the E39 Actor maintaining the E78 Curated Holding often referred to with the name of the E78 Curated Holding (e.g. “The Wallace Collection decided...”). Collective objects in the general sense, like a tomb full of gifts, a folder with stamps or a set of chessmen, should be documented as instances of E19 Physical Object, and not as instances of E78 Curated Holding. This is because they form wholes either because they are physically bound together or because they are kept together for their functionality.
Examples	
External	CIDOC CRM 6.2.2
Ontology Origin	

E97 Monetary Amount

Class Label	E97 Monetary Amount
Subclass of	E54 Dimension
Superclass of	
Scope Note	This class comprises quantities of monetary possessions or obligations in terms of their nominal value with respect to a particular currency. These quantities may be abstract accounting units, the nominal value of a heap of

	coins or bank notes at the time of validity of the respective currency, the nominal value of a bill of exchange or other documents expressing monetary claims or obligations.
Examples	Christies' hammer price for "Vase with Fifteen Sunflowers" (E97) has currency British Pounds (E98)
External Ontology Origin	CIDOC CRM 6.2.2

Referred Relations

P1 is identified by (identifies)

Relation Label	P1 is identified by (identifies)
Subrelation of	-
Superrelation of	PP28 has designated access point (is designated access point of)
Domain	E1 CRM Entity
Range	E41 Appellation
Scope	This property describes the naming or identification of any real world item by a name or any other identifier. This property is intended for identifiers in general use, which form part of the world the model intends to describe, and not merely for internal database identifiers which are specific to a technical system, unless these latter also have a more general use outside the technical context. This property includes in particular identification by mathematical expressions such as coordinate systems used for the identification of instances of E53 Place. The property does not reveal anything about when, where and by whom this identifier was used. A more detailed representation can be made using the fully developed (i.e. indirect) path through E15 Identifier Assignment.
Examples	
External Ontology Origin	CIDOC CRM 6.2.1

P2 has type (is type of)

Relation Label	P2 has type (is type of)
Subrelation of	-
Superrelation of	PP51 has availability (is availability of) PP58 is encoded with (is encoding of)
Domain	E1 CRM Entity
Range	E55 Type
Scope	This property allows sub typing of CRM entities - a form of specialisation – through the use of a terminological hierarchy, or thesaurus. The CRM is intended to focus on the high-level entities and relationships needed to describe data structures. Consequently, it does not specialise entities any further than is required for this immediate purpose. However, entities in the isA hierarchy of the CRM may be specialised into any number of sub entities, which can be defined in the E55 Type hierarchy. E51 Contact Point, for

	example, may be specialised into “e-mail address”, “telephone number”, “post office box”, “URL” etc. none of which figures explicitly in the CRM hierarchy. Sub typing obviously requires consistency between the meaning of the terms assigned and the more general intent of the CRM entity in question.
Examples	
External Ontology Origin	CIDOC CRM 6.2.1

P9 consists of (forms part of)

Relation Label	P9 consists of (forms part of)
Subrelation of	-
Superrelation of	PP1 currently offers (currently offered by) PP43 supports project activity (is project activity supported by)
Domain	E4 Period
Range	E4 Period
Scope	This property associates an instance of E4 Period with another instance of E4 Period that is defined by a subset of the phenomena that define the former. Therefore the space time volume of the latter must fall within the space time volume of the former. This property is transitive.
Examples	
External Ontology Origin	CIDOC CRM 6.2.1

P14 carried out by (performed)

Relation Label	P14 carried out by (performed)
Subrelation of	-
Superrelation of	PP2 provided by (provides) PP3 requested by (requests) PP53 had awardee (was awarded by) PP54 had awardee (was awarded to)
Domain	E7 Activity
Range	E39 Actor
Scope	This property describes the active participation of an E39 Actor in an E7 Activity. It implies causal or legal responsibility. The P14.1 in the role of property of the property allows the nature of an Actor's participation to be specified.

Examples	
External Ontology Origin	CIDOC CRM 6.2.1

P15 was influenced by (influenced)

Relation Label	P15 was influenced by (influenced)
Subrelation of	-
Superrelation of	PP25 has maintaining RI (is maintaining RI of)
Domain	E7 Activity
Range	E1 CRM Activity
Scope	This is a high level property, which captures the relationship between an E7 Activity and anything that may have had some bearing upon it. The property has more specific sub properties.
Examples	
External Ontology Origin	CIDOC CRM 6.2.1

P16 used specific object (was used for)

Relation Label	P16 used specific object (was used for)
Subrelation of	-
Superrelation of	PP4 hosts object (is object hosted by) PP14 runs on request (is run by) PP15 delivers on request (is delivered by) PP29 uses access protocol (is access protocol used by) PP48 uses protocol parameter (is protocol parameter of) P55 awarded (was thing awarded by)
Domain	E7 Activity
Range	E70 Thing
Scope	This property describes the use of material or immaterial things in a way essential to the performance or the outcome of an E7 Activity. This property typically applies to tools, instruments, moulds, raw materials and items embedded in a product. It implies that the presence of the object in question was a necessary condition for the action. For example, the activity of writing this text required the use of a computer. An immaterial thing can be used if at least one of its carriers is present. For example, the software tools on a computer. Another example is the use of a particular name by a particular group of people over some span to identify a thing, such as a settlement. In this case, the physical carriers of this name are at

	least the people understanding its use.
Examples	
External Ontology Origin	CIDOC CRM 6.2.1

P17 was motivated by (motivated)

Relation Label	P17 was motivated by (motivated)
Subrelation of	-
Superrelation of	PP44 has maintaining team PP56 awarded for (was award of)
Domain	E7 Activity
Range	E1 CRM Entity
Scope	This property describes an item or items that are regarded as a reason for carrying out the E7 Activity. For example, the discovery of a large hoard of treasure may call for a celebration, an order from headquarters can start a military manoeuvre.
Examples	
External Ontology Origin	CIDOC CRM 6.2.1

P21 had general purpose (was purpose of)

Relation Label	P21 had general purpose (was purpose of)
Subrelation of	-
Superrelation of	PP45 has competency
Domain	E7 Activity
Range	E55 Type
Scope	This property describes an intentional relationship between an E7 Activity and some general goal or purpose. This may involve activities intended as preparation for some type of activity or event. <i>P21 had general purpose (was purpose of)</i> differs from <i>P20 had specific purpose (was purpose of)</i> in that no occurrence of an event is implied as the purpose.
Examples	
External Ontology Origin	CIDOC CRM 6.2.1

P33 used specific technique (was used by)

Relation Label	P33 used specific technique (was used by)
Subrelation of	-
Superrelation of	PP31 uses curation plan (is curation plan used by)
Domain	E7 Activity
Range	E29 Design or Procedure
Scope	This property identifies a specific instance of E29 Design or Procedure in order to carry out an instance of E7 Activity or parts of it. The property differs from P32 used general technique (was technique of) in that P33 refers to an instance of E29 Design or Procedure, which is a concrete information object in its own right rather than simply being a term or a method known by tradition. Typical examples would include intervention plans for conservation or the construction plans of a building.
Examples	
External Ontology Origin	CIDOC CRM 6.2.1

P106 is composed of (forms part of)

Relation Label	P106 is composed of (forms part of)
Subrelation of	-
Superrelation of	PP16 has persistent digital object part (is persistent digital object part of) PP18 has digital object part (is digital object part of)
Domain	E90 Symbolic Object
Range	E90 Symbolic Object
Scope	This property associates an instance of E90 Symbolic Object with a part of it that is by itself an instance of E90 Symbolic Object, such as fragments of texts or clippings from an image. This property is transitive
Examples	
External Ontology Origin	CIDOC CRM 6.2.1

P125 used object of type (was type of object used in)

Relation Label	P125 used object of type (was type of object used in)
Subrelation of	
Superrelation of	PP47 has protocol type (is protocol type of)
Domain	E7 Activity
Range	E55 Type
Scope	This property defines the kind of objects used in an E7 Activity, when the specific instance is either unknown or not of interest, such as use of "a hammer.
Examples	
External Ontology Origin	CIDOC CRM 6.2.1

P129 is about (is subject of)

Relation Label	P129 is about (is subject of)
Subrelation of	-
Superrelation of	PP39 is metadata for (has metadata)
Domain	E89 Propositional Object
Range	E1 CRM Entity
Scope	This property documents that an E89 Propositional Object has as subject an instance of E1 CRM Entity. This differs from P67 refers to (is referred to by), which refers to an E1 CRM Entity, in that it describes the primary subject or subjects of an E89 Propositional Object.
Examples	
External Ontology Origin	CIDOC CRM 6.2.1

P130 shows features of (features are also found on)

Relation Label	P130 shows features of (features are also found on)
Subrelation of	-
Superrelation of	PP17 has snapshot (is snapshot of)
Domain	E70 Thing
Range	E70 Thing
Scope	This property generalises the notions of "copy of" and "similar to" into a directed relationship, where the domain expresses the

derivative, if such a direction can be established. Otherwise, the relationship is symmetric. If the reason for similarity is a sort of derivation process, i.e., that the creator has used or had in mind the form of a particular thing during the creation or production, this process should be explicitly modelled. Moreover it expresses similarity in cases that can be stated between two objects only, without historical knowledge about its reasons.	
Examples	
External Ontology Origin	CIDOC CRM 6.2.1

P147 curated (was curated by)

Relation Label	P147 curated (was curated by)
Subrelation of	PP32 curates (is curated by)
Superrelation of	-
Domain	E87 Curation Activity
Range	E78 Curated Holding
Scope	This property associates an instance of E87 Curation Activity with the instance of E78 Collection or collections with that is subject of that curation activity following some implicit or explicit curation plan.
Examples	
External Ontology Origin	CIDOC CRM 6.2.3

Compatibility with CERIF model

CERIF¹—the **C**ommon **E**uropean **R**esearch **I**nformation **F**ormat (<https://www.eurocris.org/cerif/main-features-cerif>) – is a conceptual model describing the Research domain. In this direction, CERIF is a well suited common reference model since it models datasets, software, services, projects and actors as well as, most importantly the contextual relations that exist between them. This conceptual model provides the means to represent resources in an accurate and manageable way. Moreover, the Semantic Layer in CERIF provides a classification system and allows for the efficient and meaningful management of controlled vocabularies by the communities.

The project proposes a minimal set of metadata that should be collected with regards to the entities referred to in the Parthenos Entities model for the provisioning of the Parthenos Registry. A mapping between the PARTHENOS Entites and CERIF is presented below.

The Parthenos Entities and their correspondence to CERIF entities is displayed in the following table:

Research Infrastructure: on-going project to support the connection of services, resources and expertise between actors in a domain.	Project: 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. Projects can be further defined as temporary rather than permanent social systems that are constituted by teams within or across organizations to accomplish particular tasks under time constraints. cerif:OrgUnit cerif:Proj cerif:Proj cerif:Proj_Class can be used to classify the project.
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¹ . CERIF is a EU Recommendation to Member States.

that is kept as a persistent unit of information in the knowledge generation process. PE18_Dataset PE19_Persistent_Digital_Object PE20_Volatile_Digital_Object PE22_Persistent_Dataset PE24_Volatile_Dataset	that a CERIF product is considered a result in general, achieved through some effort - and not at all is it a commercial or physical product only. It was intended to also represent i.e. software or 'research data'. cerif:ResProd cerif:ResProd_Class can be used to assign specialized interpretations to objects and datasets.
Software: is an artefact that can be executed on a computer to perform specific operations. PE21_Persistent_Software PE23_Volatile_Software PE38_Schema	Product: The entity product in CERIF has often caused confusion, it was maybe not stressed enough, that a CERIF product is considered a result in general, achieved through some effort - and not at all is it a commercial or physical product only. It was intended to also represent i.e. software or 'research data'. cf:ResProd cerif:ResProd_Class can be used to classify software.
Actor: entities such as institutions, teams or individual people that participate in the research infrastructure as partner providing data and/or services	Person: A person (plural: persons or people; from Latin: persona, meaning "mask") is a being, such as a human, that has certain capacities or attributes constituting personhood, the precise definition of which is the subject of much controversy. Definition Source: http://en.wikipedia.org/wiki/Person Organization: An organization is a social group which distributes tasks for a collective goal. The word itself is derived from the Greek word organon, itself derived from the better-known word ergon - as we know `organ` - and it means a compartment for a particular job. Definition Source: http://en.wikipedia.org/wiki/Organization

E39_Actor PE34_Team PE25_RI_Consortium	cerif:Person cerif:OrgUnit
Curation: plans that guide curation projects and which provide the information necessary to understand the intention and overall aim of an actor in carrying out some curating services. PE28_Curation_Plan	Result Publication: Collection of information records that, in combination, represent a full and up-to-date history of research or scholarly published outputs resulting from, or related to, the person's research activities. Definition Source: http://dictionary.casrai.org/research-personnel-profile/1.1.0/contributions/outputs/publications cerif:ResPubl
Physical things: objects that are assembled and maintained by an Actor over time for a specific purpose and audience, and according to a particular collection development plan.	Facility: A facility is a space or equipment necessary for conducting research. Equipment: An equipment is an instrumentality needed for an undertaking or to perform a service. Definition Source: http://wordnetweb.princeton.edu/perl/webwn?s=equipment

PE32_Curated_Thing	cerif:Facil cerif:Equip
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REFERENCES

- 3D modeling for everyone. SketchUp. n.d URL <https://www.sketchup.com/home>
- 3D Terrain Service . n.d. URL <http://landscape.ariadne-infrastructure.eu/vpb-service.php> (accessed 8.2.18).
- 3M ,URL n.d. <http://139.91.183.3/3M/Privacy?action=conditions&lang=en> (accessed 8.2.18).
- Accueil , n.d. URL <http://bibliotheque-numerique.inha.fr/> (accessed 8.28.18).
- Archaeology Data Service: Archives URL <http://archaeologydataservice.ac.uk/archive/> (accessed 8.2.18).
- Ariadne - Ariadne n.d URL <http://www.ariadne-infrastructure.eu/> (accessed 8.2.18).
- Ariadne URL <http://visual.ariadne-infrastructure.eu/> (accessed 8.2.18b).
- Art & Architecture Thesaurus (Getty Research Institute). n.d URL <http://www.getty.edu/research/tools/vocabularies/aat/> (accessed 8.2.18).
- AWOL - The Ancient World Online, n.d URL <http://ancientworldonline.blogspot.com/> (accessed 8.2.18).
- B2SAFE - EOSC-hub Service Catalogue , n.d URL <https://www.eosc-hub.eu/catalogue/B2SAFE> (accessed 8.2.18).
- BSA MAO , n.d ,URL <http://mao.bsa.ac.uk/index.php?page=knossos> (accessed 8.2.18).
- CENDARI Archival Directory. n.d.URL <https://archives.cendari.dariah.eu/> (accessed 8.2.18).
- Cendari. URL <http://www.cendari.eu/> (accessed 8.2.18).
- CIDOC 6.2 , 2018 April, http://www.cidoc-crm.org/sites/default/files/cidoc_crm_v6.2-

2018April.rdfs

CLARIN, n.d, Component Registry URL
https://catalog.clarin.eu/ds/ComponentRegistry/?_k=opwbgl (accessed 8.2.18).

CLARIN ERIC n.d | URL <https://www.clarin.eu/> (accessed 8.2.18).

CLARIN VLO, n.d. URL
https://vlo.clarin.eu/?_k=opwbgl (accessed 8.28.18).

Collections | Qatar Museums , n.d URL <http://www.qm.org.qa/en/collections> (accessed 8.2.18).

Collections de CORPUS Oraux Numériques ,n.d URL <https://cococon.huma-num.fr/exist/crdo/> (accessed 8.2.18).

Collections Search - United States Holocaust Memorial Museum, n.d URL
<https://collections.ushmm.org/search/> (accessed 8.2.18).

CollectionSpace | collections management software for museums and more, n.d. URL
<http://www.collectionspace.org/> (accessed 8.27.18).

Consortium - PARTHENOS Project , n.d. URL <http://www.parthenos-project.eu/consortium> (accessed 8.28.18).

Corpus Hedendaags Nederlands search , n.d ,URL <http://chn.inl.nl/>

Cultura Italia, un patrimonio da esplorare , n.d ,URL
http://www.culturaitalia.it/opencms/museid/index_museid.jsp?language=it&tematica=header&selected=0 (accessed 8.2.18).

Cycladic Art | Museum of Cycladic Art. n.d , URL <https://cycladic.gr/en/page/kikladiki-techni> (accessed 8.2.18).

DARIAH.it , n.d ,URL <http://it.dariah.eu/sito/> (accessed 8.2.18).

DCAP, Data Link Switching Client Access Protocol. n.d. URL
<http://www.networksorcery.com/enp/protocol/dcap.htm> (accessed 8.2.18).

delving/x3ml GitHub. URL <https://github.com/delving/x3ml>

DYAS Registries, n.d URL <http://registries.dyas-net.gr/en> (accessed 8.2.18).

EGI | Cloud Container Compute,

EHRI - Welcome to the European Holocaust Research Infrastructure online portal. n.d URL
<https://portal.ehri-project.eu/> (accessed 8.2.18).

ELRA - ELRA-T0177 : Base de données terminologique polytechnique et plurilingue VERBA - G-AU Terminologie générale . n.d URL http://catalogue-old.elra.info/product_info.php?products_id=252&language=fr (accessed 8.2.18).

EOSC-hub Service Catalogue . n.d URL <https://www.eosc-hub.eu/catalogue> (accessed 8.2.18b).

Exeter City Council, Cotswold Archaeology, 2015. Exeter Archaeology Archive Project.
<https://doi.org/10.5284/1035173>

Extensible Markup Language (XML) 1.0 (Fifth Edition) , n.d. URL <https://www.w3.org/TR/xml/> (accessed 8.28.18).

FLARENET | Institute for Computational Linguistics «A. Zampolli» . n.d .URL
<http://www.ilc.cnr.it/en/content/flarenet> (accessed 8.2.18).

FORTH – ICS, n.d URL <https://www.ics.forth.gr/mobile/download.html> (accessed 8.2.18).

Home - META-SHARE. n.d URL <http://www.meta-share.org/> (accessed 8.2.18).

Home - PARTHENOS Project , n.d .URL <http://www.parthenos-project.eu/> (accessed 8.2.18).

Huma-Num, 2015. Huma-Num : l'infrastructure des humanités numériques URL
<https://www.huma-num.fr/>

ICCU, 2015. Thesaurus RA - Strumenti terminologici Scheda RA Reperti Archeologici URL <http://vast-lab.org/thesaurus/ra/vocab/>

ICS , n.d. URL https://www.ics.forth.gr/hci/index_main.php?l=&c=669 (accessed 8.28.18).

ICS - THEMAS - Thesaurus Management System. n.d. URL https://www.ics.forth.gr/isl/index_main.php?l=e&c=243 (accessed 8.2.18).

ICS - X3ML Toolkit, n.d. URL https://www.ics.forth.gr/isl/index_main.php?l=e&c=721 (accessed 8.27.18)

IIT - CNR - Istituto di Informatica e Telematica. n.d. URL <https://www.iit.cnr.it/> (accessed 8.2.18).

Gratta, R.D., Pardelli, G., & Goggi, S. 2014. The LRE Map disclosed. *LREC*.

Instituut voor de Nederlandse Taal, n.d. . Instituut voor de Nederlandse Taal. URL <https://ivdnt.org/>

ISIDORE - Access to digital data of Humanities and Social Sciences. n.d URL <https://www.rechercheisidore.fr/api> (accessed 8.2.18).

Istituto Centrale per la Grafica. n.d URL <http://www.grafica.beniculturali.it/> (accessed 8.2.18).

Katehakis, D.G., Sfakianakis, S., Tsiknakis, M., Orphanoudakis, S.C., 2001. An infrastructure for Integrated Electronic Health Record services: the role of XML (Extensible Markup Language). *J. Med. Internet Res.* 3, E7. <https://doi.org/10.2196/jmir.3.1.e7>

Landscape Services n.d URL <http://landscape.ariadne-infrastructure.eu/> (accessed 8.2.18).

Marketakis, Y, 2017. X3ML mapping framework for information integration in cultural heritage and beyond. Springer-Verlag Berlin, Heidelber, *International Journal on Digital Libraries* 18, 301–319.

Metadata Encoding and Transmission Standard (METS) Official Web Site | Library of Congress n.d URL <http://www.loc.gov/standards/mets/> (accessed 8.2.18).

MetaNet: An Overview | MetaNet. n.d URL <https://metanet.icsi.berkeley.edu/metanet/node/5> (accessed 8.2.18).

Modern and Contemporary Art | The Metropolitan Museum of Art, n.d URL <https://www.metmuseum.org/about-the-met/curatorial-departments/modern-and-contemporary-art> (accessed 8.2.18).

NAKALA par Huma-Num, n.d, URL <https://www.nakala.fr/> (accessed 8.2.18).

Natural History Museum, 2014. Collection specimens. <https://doi.org/10.5519/0002965>

OAI 2.0 Request Results. n.d .URL <http://www.culturaitalia.it/oaiProviderCI/OAIHandler> (accessed 8.2.18).

OLAC 2001, URL <http://www.language-archives.org/OLAC/0.4/olac.xsd> (accessed 8.2.18a).

Oostdijk, N., Reynaert, M., Hoste, V., Schuurman, I., 2013. The Construction of a 500-Million-Word Reference Corpus of Contemporary Written Dutch, in: Spyns, P., Odijk, J. (Eds.), *Essential Speech and Language Technology for Dutch*. Springer Berlin Heidelberg, Berlin, Heidelberg, pp. 219–247. https://doi.org/10.1007/978-3-642-30910-6_13

Open Archives Initiative Protocol for Metadata Harvesting. n.d. URL <https://www.openarchives.org/pmh/> (accessed 8.2.18).

Overview CLARIN centres | CLARIN ERIC. n.d URL <https://www.clarin.eu/content/overview-clarin-centres> (accessed 8.2.18).

petrad, 2015. Innovating the Heritage Research Sector - PARTHENOS Begins Its Work. URL <https://ehri-project.eu/innovating-heritage-research-sector-parthenos-begins-its-work>

Portal | CLARIN Centre voor Nederland en Vlaanderen . n.d .URL <https://portal.clarin.inl.nl/> (accessed 8.2.18).

Prime Minister of Canada - Premier ministre du Canada. . Prime Minister of Canada - Premier ministre du Canada. n.d URL <http://pm.gc.ca>

Principles and Best Practices | Oral History Association. n.d. URL <http://www.oralhistory.org/about/principles-and-practices/> (accessed 8.2.18).

Profilo Applicativo PICO. n.d URL <http://www.culturaitalia.it/opencms/export/sites/culturaitalia/attachments/documenti/picoap/picoap1.0.xml> (accessed 8.2.18).

Projet Karnak | Labex ARCHIMEDE – ANR-11-LABX-0032-01, SITH - Système d'Indexation des Textes Hiéroglyphiques , n.d. URL <http://sith.huma-num.fr/karnak> (accessed 8.27.18).

Quantum Computing - IBM Q - US , n.d, URL <https://www.research.ibm.com/ibm-q/> (accessed 8.2.18).

Search the Collection. The Metropolitan Museum of Art, i.e. The Met Museum. n.d URL <https://www.metmuseum.org/art/collection/search>

SSK/TEI_SSK_ODD.xml at master · ParthenosWP4/SSK · GitHub. n.d URL https://github.com/ParthenosWP4/SSK/blob/master/spec/TEI_SSK_ODD.xml (accessed 8.2.18).

Swick, R.1997. *Resource Description Framework (RDF)*". W3C. Archived from [the original](#) on February 14, 1998. Retrieved 2015-11-24.

Themistocleous, K., Ioannides, M., Agapiou, A., Hadjimitsis, D.G., 2015. The methodology of documenting cultural heritage sites using photogrammetry, UAV, and 3D printing techniques: the case study of Asinou Church in Cyprus, in: Hadjimitsis, D.G., Themistocleous, K., Michaelides, S., Papadavid, G. (Eds.), . p. 953510. <https://doi.org/10.1117/12.2195626>

TRAME. n.d URL <http://git-trame.fefonlus.it/> (accessed 8.2.18a).

User, S., n.d. Società Internazionale per lo Studio del Medioevo Latino , URL <http://www.sismelfirenze.it/index.php?lang=en>

Verhelst, E.M.P. (ACVU-HBS), Boer, E. De (ACVU-HBS), 2007. Houten VleuGel-ACH en VleuGel-RSS. <https://doi.org/10.17026/dans-xhv-8afk>

Versions of the CIDOC-CRM | CIDOC CRM , n.d URL <http://www.cidoc-crm.org/versions-of-the-cidoc-crm> (accessed 8.2.18).VIAF. n.d URL <https://viaf.org/> (accessed 8.2.18).

Welcome - Ariadne portal , n.d URL <http://portal.ariadne-infrastructure.eu/> (accessed 8.2.18).

n.d URL <http://www.resourcebook.eu/lremap/owl/instances/> (accessed 8.2.18c).