

L'interopérabilité sémantique: données liées et web sémantique pour l'OV

Projets EOSC FAIR-IMPACT et OSTRAILS

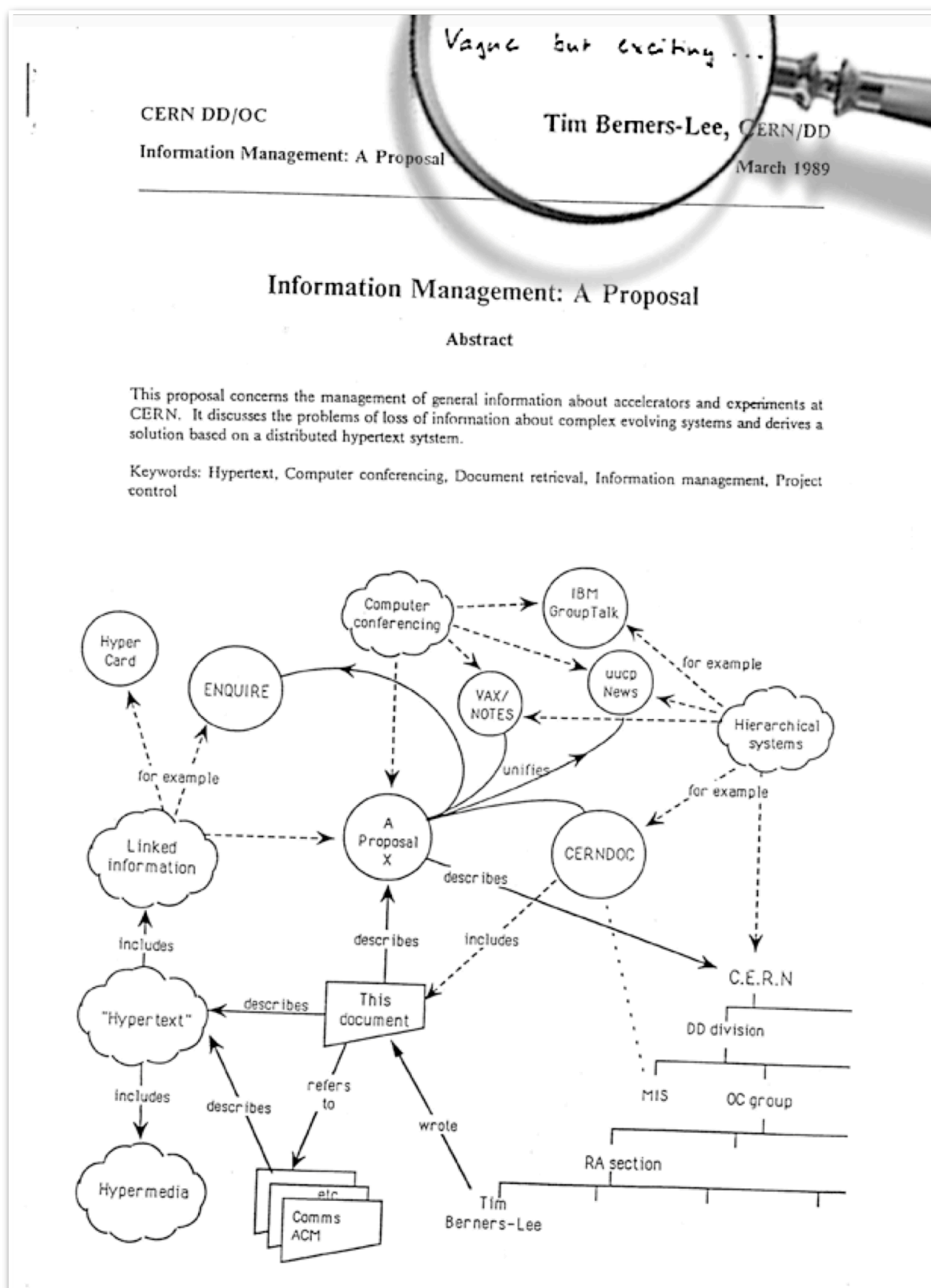
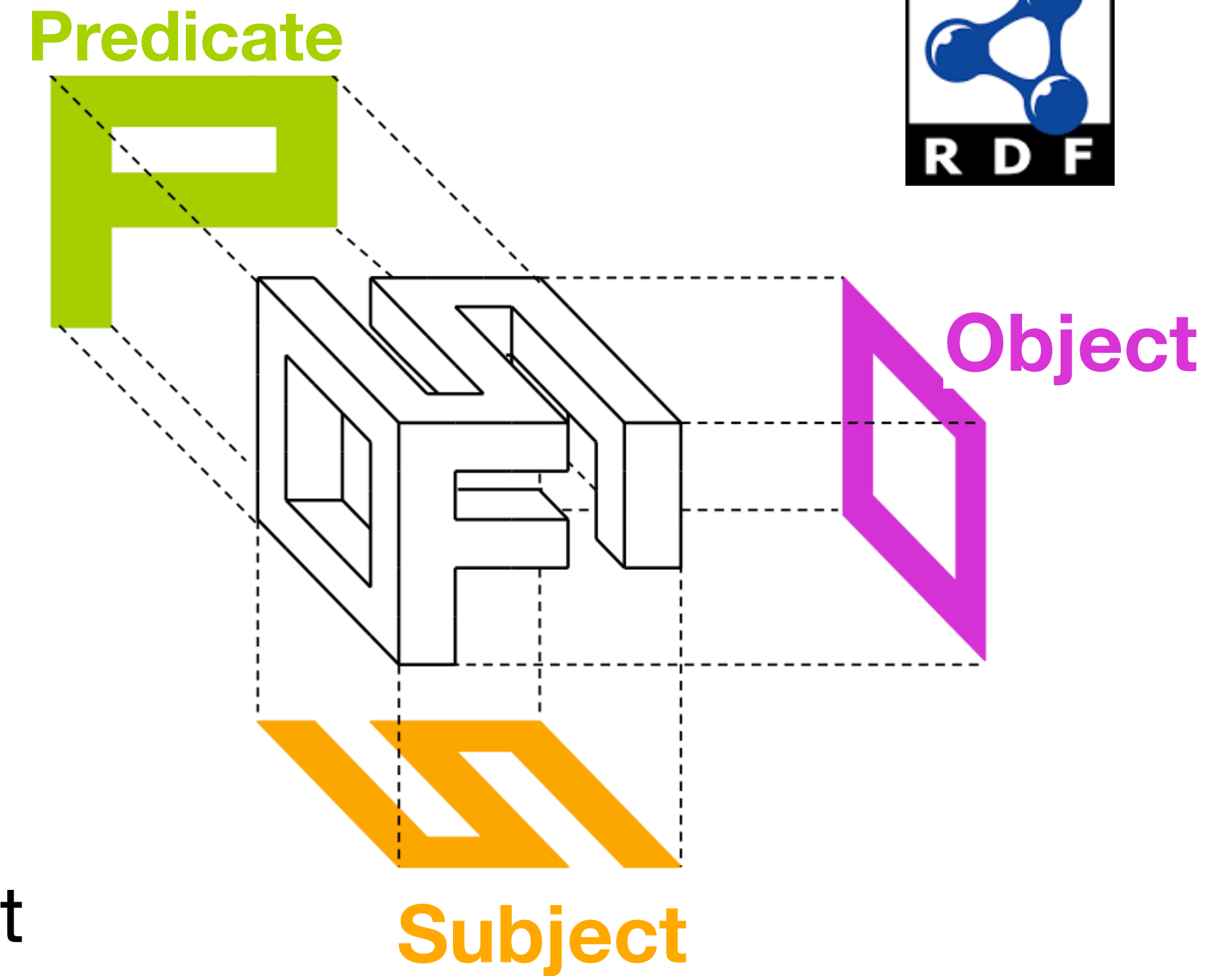
Données liées

(encore en phase d'apprentissage)



- déjà dans les racines du web

- Liens entre ressources dans un graphe orienté et étiqueté
- **Triplets** = objet / prédicat / sujet
- **Graphe** = ensemble triplets reliés entre eux
- RDF (Resource Description Framework) = standard W3C
- Plusieurs sérialisation (RDF/XML, Turtle, JSON-LD...)
- SPARQL est un langage de requête sur graphe RDF



FAIR-IMPACT

<https://fair-impact.eu/>



FAIR-IMPACT
Expanding FAIR solutions across EOSC

- Focus sur les **artefacts sémantiques** pour améliorer l'interopérabilité sémantique de l'EOSC.
- Fédération de Catalogues d'Artefacts Sémantiques (Semantics Artefact Catalogs – SAC) avec des instances OntoPortal
<https://ontoportal.org/>
- Beaucoup de communautés impliquées:
 - Biologie/Médecine
 - Agriculture/nourriture
 - Environnement
 - Industrie
 - Sciences de la Terre
 - **Astronomie** (hélioplaneto+astro)
 - Chimie

The screenshot shows the OntoPortal Appliance interface. At the top, there is a teal navigation bar with the OntoPortal logo and menu items: Ontologies, Search, Annotator, Recommender, Mappings, Login, and Support. Below the navigation bar, the main content area is titled "Welcome to OntoPortal Appliance, your ontology repository for your ontologies".

The interface is divided into several sections:

- Search for a class:** A search box with the placeholder text "Enter a class, e.g. Melanoma" and a search icon. Below the search box is a link for "Advanced Search".
- Find an ontology:** A search box with the placeholder text "Start typing ontology name, then choose from list" and a search icon. Below the search box is a button labeled "Browse Ontologies".
- Ontology Visits (April 2023):** A line graph showing visits over time. The x-axis is labeled from 0 to 2.5. A "More" link is visible at the bottom left of the graph.
- OntoPortal Appliance Statistics:** A table showing the following data:

Category	Count
Ontologies	2
Classes	100
Properties	36,286
Mappings	2

At the bottom of the page, there is a footer with the text: "OntoPortal Appliance 3.1.1 | Powered by BioPortal | Projects".

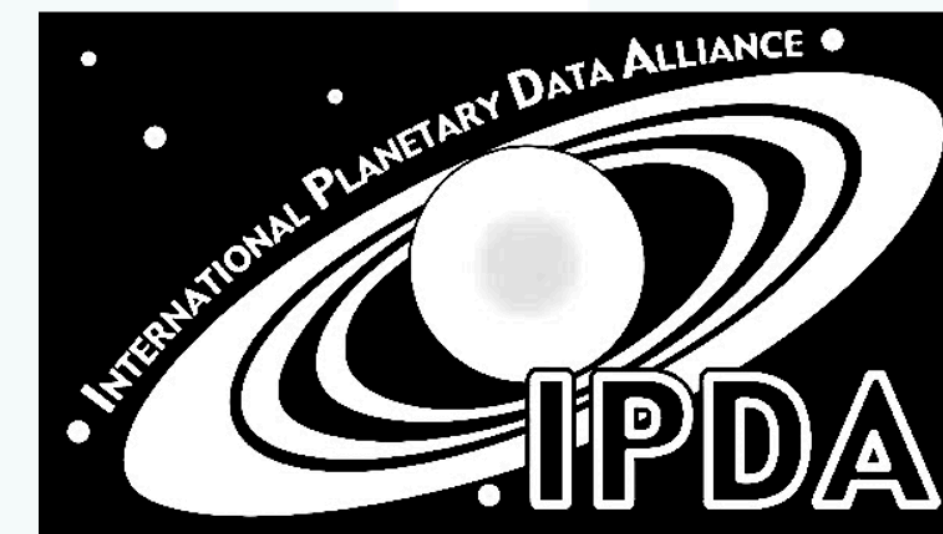
L'astronomie dans FAIR-IMPACT

une nouvelle communauté

- Présentation de systèmes sémantiques de l'IVOA/IHDEA/IPDA.
=> *comparer comment on fait => idées pour améliorer*
=> *aussi comparer IVOA, IHDEA & IPDA*
- Présentation de la gouvernance autour de nos artefacts sémantiques
=> *on est totalement bottom-up, et ce n'est pas si commun !*
- Travail sur les mappings pour relier les communautés:
=> *travaux précédents (RDA metadata crosswalk WG)*
(voir https://doi.org/10.1162/dint_a_00186)
- Préparation d'un portail prototype pour nos vocabulaires

Semantic artefacts in astronomy & astrophysics

- **Several communities** (with different semantic ecosystems):
 - **IVOA** (International Virtual Observatory Alliance)
<http://ivoa.net>
 ⇒ **interoperability driven** (schemas, protocols, vocabularies)
 NB: vocabularies = controlled lists for schemas
 - **IPDA** (International Planetary Data Alliance)
<https://ipda.jpl.nasa.gov>
 ⇒ **archive and reuse driven** (information model based on OAIS)
 Description of observational products in an archive (for future reuse)
 - **IHDEA** (International Heliophysics Data Environment Alliance)
<https://ihdea.net>
 ⇒ **catalogue of products** (registry)
 ⇒ **access and reuse driven** (data/metadata formats, protocols, tools)
 Community tools and protocols



Ontology / semantic artefact cataloguing prior work (2)

- **Vocabulary broker prototype developed by German team**
(in the frame of the ESPAS FP7 EC project)
See here: <http://wdcosf.fh-potsdam.de> (started in 2016, last update in 2019)
- Several vocabularies have been processed:
 - Unified Astronomy Thesaurus: **UAT**
 - Space Physics Archive Search and Extract: **SPASE**,
 - Near Earth Space Data Infrastructure for e-Science: **ESPAS**
 - Global Change Master Directory: **GCMD**
 - GEneral Multilingual Environmental Thesaurus: **GEMET**
- Nice prototype, but seems not maintained (no contact with team, yet)

magnetic field >

OSF Search

The search found 62 results in 0.303 seconds.

Search results

Magnetic Field

Description: The DC magnetic field strength and direction
inScheme: ESPAS Observed Property,
closeMatch: Magnetic Field,

Magnetic Field

Description: Pertaining to the magnetic field generated by the Earth, consisting of both the dipole and non-dipole components.
relatedMatch: Field,
inScheme: GCMD Solid Earth,
closeMatch: Magnetic Field,

Magnetic Fields/Magnetic Currents

Description: An Electromagnetic field (EM field) is the region of space near electric currents, magnets, broadcasting antennas etc., regions in which electric and magnetic forces may act, for example on charged particles.
inScheme: GCMD Sun-Earth Interactions,

Magnetic Field

Description: A region of space near a magnetized body where magnetic forces can be detected (as measured by methods such as Zeeman splitting, etc.).
inScheme: SPASE Wave Quantity, SPASE Measurement Type,

Magnetic fields

Description: not available
inScheme: The Unified Astronomy Thesaurus,

Magnetic Field

Prototype Ontoport

<http://voparis-ontoport-dev.obspm.fr/>

- But: rassembler les vocabulaires de l'astronomie, l'héliophysique, des sciences planétaires... dans un portail
- Sources:
 - IVOA: <http://ivoa.net/rdf>
 - UAT (Unified Astronomy Thesaurus)
 - SPASE (Space Physics Archive Search and Extract)
 - PDS4 Information model
 - VAMDC; OGC; etc.



The screenshot shows the Ontoport web interface. At the top, there is a navigation bar with the Ontoport logo and links for Ontologies, Search, Annotator, Recommender, and Mappings. The main heading is "Browse" with a sub-heading "Browse the library of ontologies". A search bar is present, and the current view shows 19 results sorted by "Classes count". The list of ontologies includes:

- PDS4 Information Model (Full dump) (PDS4-IM-FULL)**: 1,038 classes, uploaded 11/9/23.
- PDS4 Information Model Classes (PDS4-IM-1L00)**: 221 classes, uploaded 11/9/23.
- draft CfHA (CFHA)**: 336 instances, 41 classes, uploaded 10/26/23.
- IVOA Content types of VO resources (CONTENT_TYPE)**: 22 classes, uploaded 7/24/23.
- IVOA Reference Frames (REFFRAME)**: 21 classes, uploaded 7/24/23.
- IVOA Messengers (MESSENGERS)**: 10 classes, uploaded 7/24/23.
- IVOA Time Scales (TIMESCALE)**: 9 classes, uploaded 7/24/23.
- IVOA Reference Positions (REFPOSITION)**: 6 classes, uploaded 7/24/23.
- IVOA Content levels for VO resources (CONTENT_LEVEL)**: 3 classes, uploaded 7/24/23.
- Unified Astronomy Thesaurus (UAT)**: 2,373 concepts.

Prototype Ontoport

Statut actuel: 36 ontologies importées

- **Vocabulaires importés avec succès:**

- IVOA Reference Frames
- IVOA Messenger
- IVOA Time Scales
- IVOA Reference Positions
- IVOA Content levels for VO resources
- IVOA Content types of VO resources
- IVOA Unified Astronomy Thesaurus
- Unified Astronomy Thesaurus (UAT)
- PDS4 Information Model Classes

- **Erreur d'importation:**

- IVOA Relationship types in the VO
- IVOA Roles of dates
- IVOA DALI Examples
- IVOA Semantics
- IVOA Datalink core

Ontoport Appliance Statistics	
Ontologies	36
Classes	2,713
Properties	36,286
Mappings	828

IVOA Messengers

Last uploaded: July 24, 2023

Download Home User

Summary Classes Properties Notes Mappings Widgets

Jump to:

Neutrino

- Photon
 - Gamma Ray
 - Infrared
 - Millimeter
 - Optical
 - Radio
- Ultraviolet
 - Extreme UV
- X-Ray

Details Visualization Notes (0) Class Mappings ()

Preferred Name	Neutrino
Definitions	This term comprises all generations of neutrinos (electron, μ , τ), and particles as well as antiparticles.
ID	http://www.ivoa.net/rdf/messenger#Neutrino
comment	This term comprises all generations of neutrinos (electron, μ , τ), and particles as well as antiparticles.
label	Neutrino
prefLabel	Neutrino
subClassOf	http://www.w3.org/2002/07/owl#Thing

Des vocabulaires plus FAIR ?

Un évaluateur du FAIR pour les ontologies : FOOPS!

- https://foops.linkeddata.es/FAIR_validator.html#
(à essayer avec <http://www.ivoa.net/rdf/timescale>)
- **Objectif:** améliorer la qualité et l'interopérabilité
- par exemple:
 - versions explicites (avec des liens vers les versions précédentes)
 - URI persistants (DOI, w3id, handle...)
 - versionIRI (URL complète avec la version)
 - préciser le préfixe à utiliser pour le « namespace »
 - citation (comment citer le vocabulaire)
 - ajouter des métadonnées
 - doi, publisher, logo, status, source, issued
 - previous version, backwards compatibility, modified
 - provenance pour chaque terme (author, creation date)
 - provenance pour le vocabulaire (issued, publisher)

Prochaines étapes

Nouveaux vocabulaires & Mappings entre les vocabulaires

- Artefacts sémantiques:
 - besoin de transcrire le modèle SPASE (XML Schema document) en RDF
 - nouveaux vocabulaires à venir, e.g., ObsFacility
 - extension de vocabulaires, e.g., RefFrame
 - que faire avec les UCDs dans ce contexte ?
 - peut-on (veut-on) ressortir une partie de PDL ?
- Les mappings entre communautés sont facilités avec OntoPortal

Planning

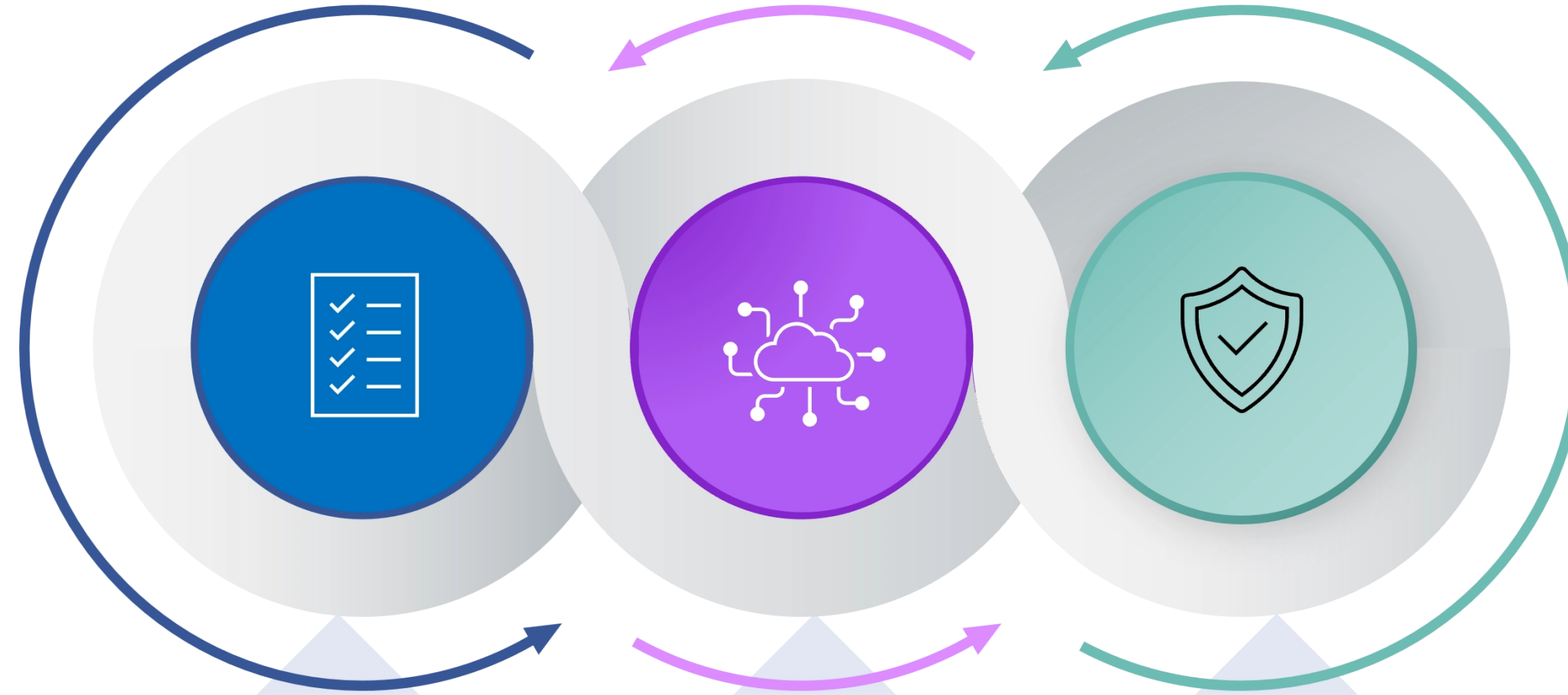
Machine Actionable DMPs

Tracking

Scientific Knowledge Graphs

Assessing

FAIR Metrics & tools



Layer 0 – Interoperability

MA-DMP TEMPLATES

- Schema for data, software, etc.
- Vocabularies
- PIDs, Versioning

SKGS FORMATS

- Metadata Schema
- Provenance
- Vocabularies
- Quality & coverage

FAIR METRICS & TESTS

- Minimum Metrics
- Domain Specific metrics

APIS & FLOWS: Publishing | Exchanging data with SKGs-DMPs-FAIR tools | Notification protocols

Plan-Track-Assess interoperability Reference Architecture ①

FAIR Assessment Models ②

Layer 1 – Federation

Scilake
FAIRCORE4EOSC
Core Components Supporting a FAIR EOSC

Enhanced Platforms ④

FAIR Tests/toolkits ⑤

Layer 2 – Assessment

DMP Evaluation Service ⑥ | SGK Research Product Quality toolbox ⑦ | Foops! | Metadata Validator | FAIR Aware | fair metrics

CoARA

Case studies - Requirements & Adoption

National | Thematic

Integrated Training Competence Centre ⑧

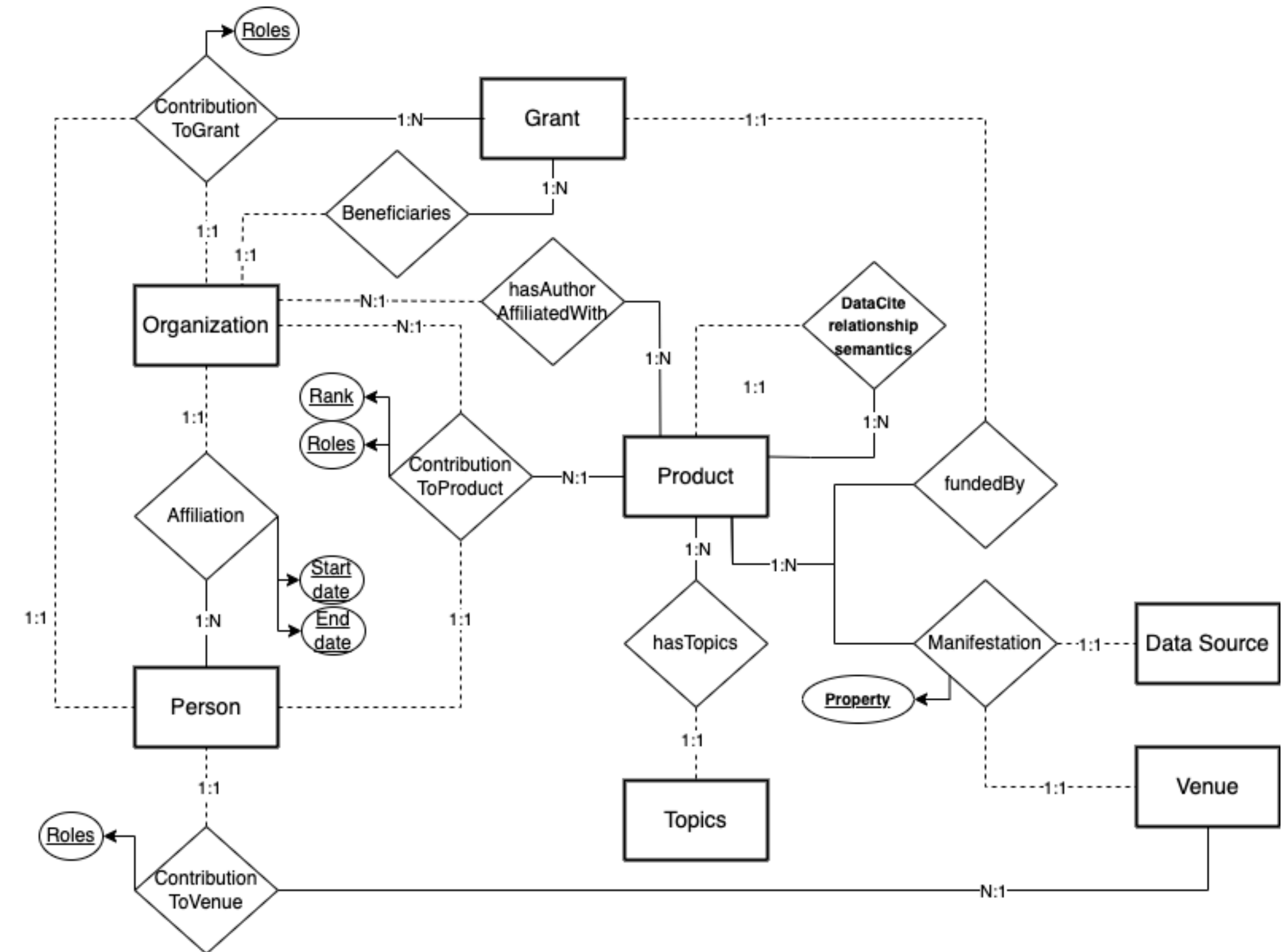
Guidance Toolkit ⑨

EOSC-A Task Forces
Interoperability Framework
RDA RESEARCH DATA ALLIANCE
EOSC Core
EOSC Exchange
OSTrails Commons
EOSC Hubs
• National
• RIs

Graphe de Connaissance Scientifique

RDA SKG-Interoperability Framework

- Graphe = Base de données constituée d'entités (nœuds) et de relations (liens)
- RDA SKG-IF working group => interroger les SKG et les sources de métadonnées
- Modèle simple de liens entre « products » et autres composantes (persons, grants, topics, data...)



SKG-IF core entities and relevant relations

Prochaines étapes

Graphes de Connaissance & Représentation de quantités

- Projet **OSTrails** (<https://ostrails.eu/>), focus sur trois étapes de la chaîne de production de la données:
 - plans de gestion de données
 - graphes de connaissance scientifique
 - vérification FAIR des objets/interfaces
- OSTrails: Pilote thématique « ESCAPE » avec deux prototypes:
 - Prototype MASER: PGD + FAIR + graphe de connaissance
 - => graphe rassemblant IVOA Registry + Datacite DOI metadata, EPNcore tables
 - => *Voir ma présentation au Hackathon*
 - Prototype CTA: ajout de la provenance dans le graphe de connaissance
- Explorer l'utilisation du framework RDA **I-Adopt** (<https://i-adopt.github.io>) pour décrire les mesures et les quantités