



OntoCommons - Ontology-driven data documentation for Industry Commons

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OntoCommons “Ontology-driven data documentation for Industry Commons” has received funding from the European Union’s Horizon Programme call H2020 -NMBP-TO-IND-2020-singlestage, Grant Agreement number 958371

www.ontocommons.eu

Main project features

CONSORTIUM

- 19 Partners from 10 EU countries
- 15 RTDs and 4 companies

TIMELINE

- Project Start: November 1st, 2020
- Duration: 36 months



OntoCommons will

- involve different stakeholders
domain experts, ontologists, implementers, industrial stakeholders and end-users
- target different domains covered by H2020 NMBP Work Programme
including materials and manufacturing
- enable intra- and cross-domain interoperability
- harmonise data documentation
- delivere a number of demonstration cases
- ensure sustainability after the end of the project

OntoCommons Objectives

● — **OBJ 1 – Community Development**

- CSA project → cooperation establishment & engagement in providing input
- increasing the effectiveness of *OntoCommons* (Cooperation)
- two-way communication *OntoCommons* ↔ stakeholders (Engagement)

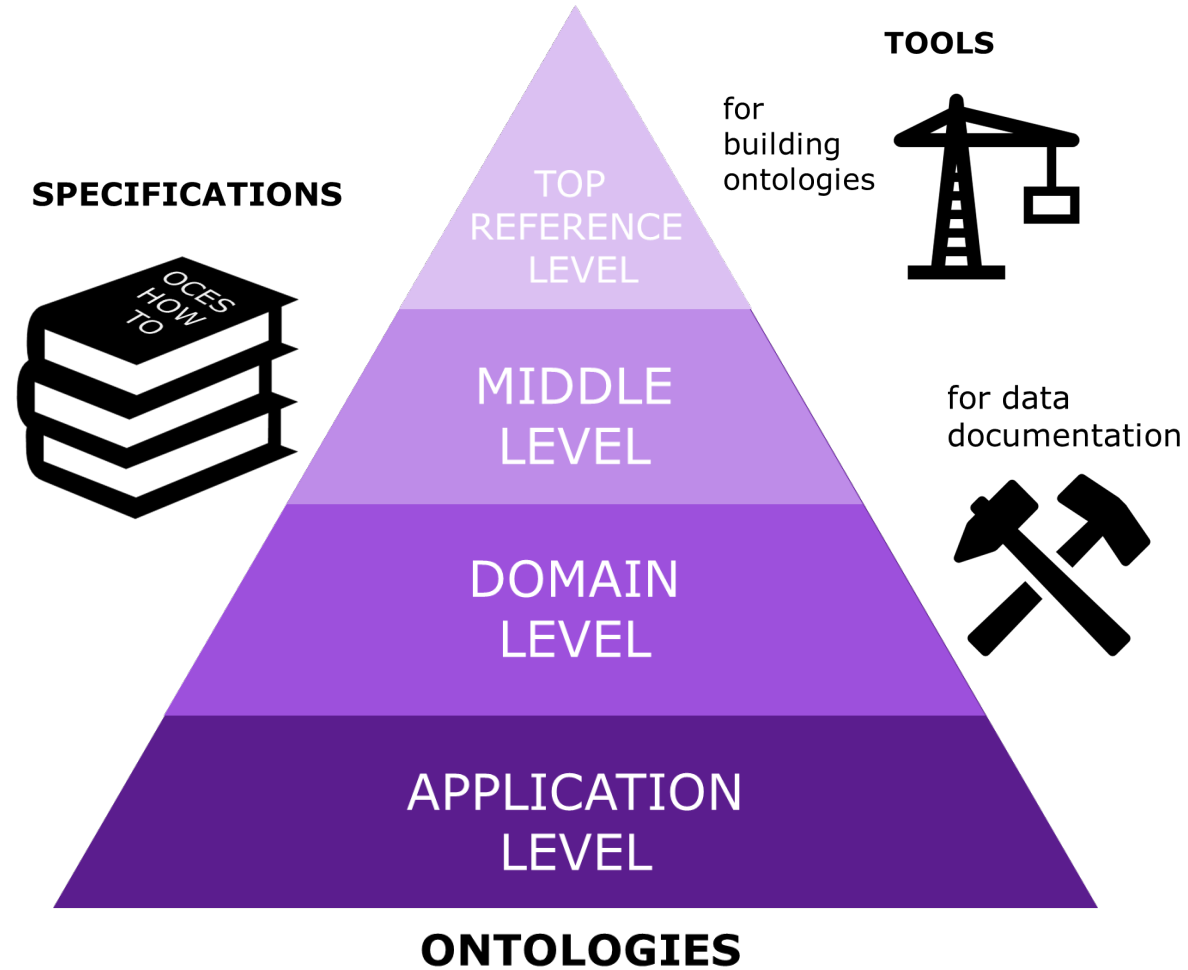
● — **OBJ 2 – Ontology Commons EcoSystem**

- EcoSystem Requirements and Specifications
- Top Level Ontologies (TLO) made of a mutual sets of alignments
- Middle Level Ontologies (MLO) to allow smooth connections between TLOs, lower level ontologies and commonly needed entities
- Domain Level Ontologies (DLO) needed by demonstrators
- Tools

● — **OBJ 3 – Demonstrators**

- effectiveness of *OntoCommons* proved by demonstration cases (OCES)
- ready to use ontologies, tools and data samples (dissemination purposes)
- relying on existing or external resources

Ontology Commons EcoSystem



—The OES will consist of:

- a **hierarchy of networked ontologies** of different levels of generality (from top-level to application level) for which multiple forms of interoperability will be provided.
- a **set of tools and methodologies** covering the full range of *OntoCommons* activities, from ontology development (e.g. editors) to reasoning (e.g. reasons) and database integration.
- a **set of specifications** for ontologies that will provide full compatibility between tools and ontologies.

—The OCES will adopt a **pluralist** approach for the ontological representation of a domain of interest

ONTO COMMONS TOOLS & SOLUTIONS

OntoCommons Ontology EcoSystem (OCES)



-  A hierarchy of ontologies
-  Toolkits
-  Specifications
-  OntoCommons Top Reference Ontology (TRO)
-  Top Level Ontology (TLO)
-  Domain Level Ontology (DLO)
-  Application Level Ontology (ALO)
-  Blueprinting reference implementation Toolkit
-  OntoCommons Ontology Repository
-  Ontology ecosystem knowledge graph

METHODOLOGICAL FRAMEWORK & ECOSYSTEM

- Methodological framework for ontology development and documentation
- Ontology ecosystem structure and reference implementation

REPORTS

- Data Management Plan
- Communities interested in domain-specific semantics
- Domains ontology requirements and specifications
- Feedback loops of cross domain ontologies interoperability
- The finalized Review of Domain Interoperability (RoDI)
- Dissemination, communication & stakeholder's engagement strategy & plan
- Exploitation & Sustainability
- Landscape of ontology development methodologies and platforms
- OntoCommons Standardisation Impact Report



EVENTS

- 2 DOMAIN ONTOLOGIES
- 2 HORIZONTAL WORKSHOPS
- 8 FOCUSED WORKSHOPS
- 2 EXPERT GROUP MEETINGS
- 3 EXTERNAL ADVISORY BOARD
- 6 SUPPORT WEBINARS

COMMUNITY

AN AUTHORITATIVE
& ACTIVE EXTERNAL
ADVISORY BOARD (EAB)

2,000 ENGAGED COMMUNITY
MEMBERS FROM ALL STAKEHOLDER
GROUPS & GLOBAL COVERAGE

PRESENCE AT **>30** 3RD PARTY EVENTS



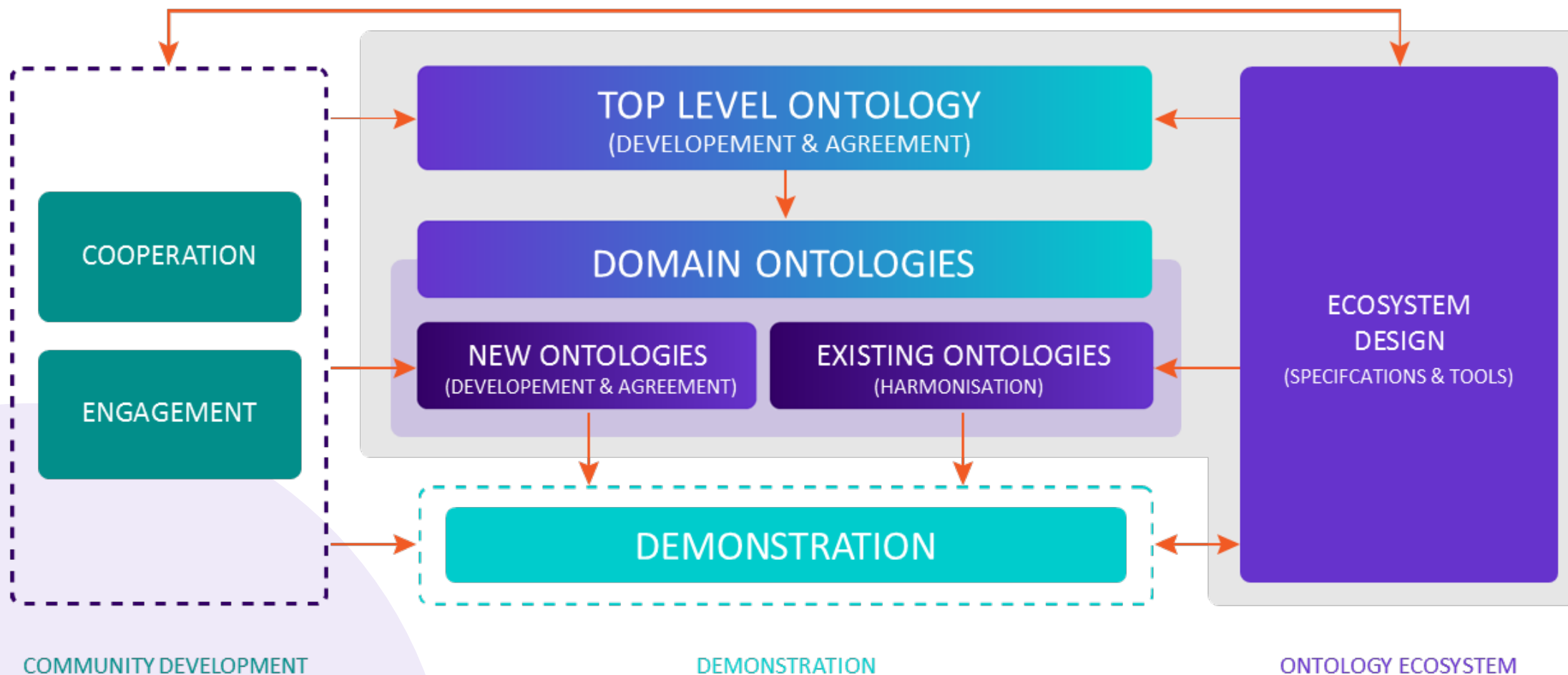
DEMONSTRATORS

Use of Ontologies

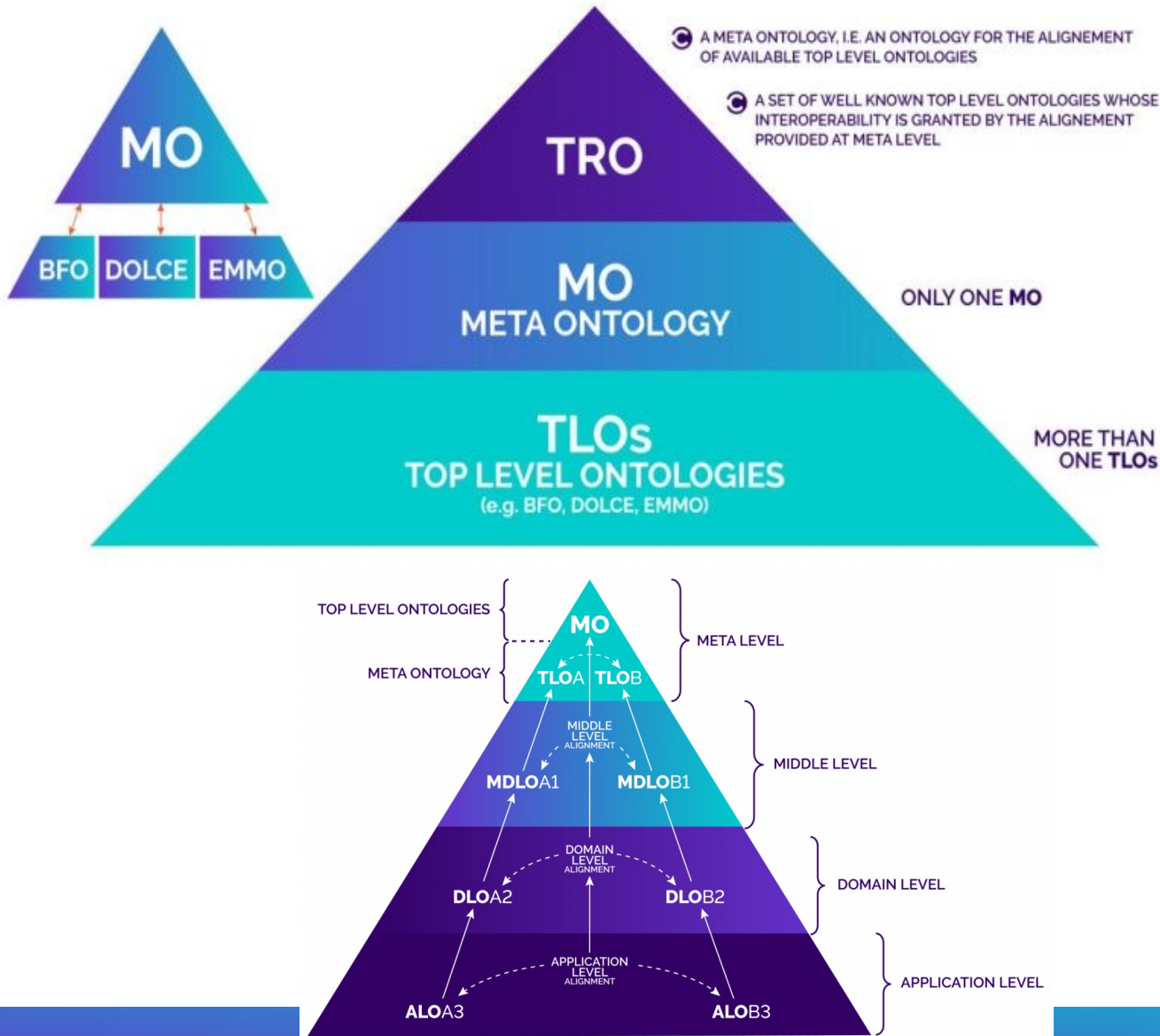


- Airbus, Materials
- Bosch, Manufacturing of Microchips
- Aibel, Material, automated reasoning
- Teckniker, material, search and decision
- BASF, Material
- OAS, PSS on logistic and manufacturing, decision making
- IFAM, Material, quality management
- Manufacturing or chemical industry
- Holonix, Product life cycle management, manufacturing
- IRES, Nanosafety, manufacturing, decision making
- Adige SpA, Manufacturing, remote maintenance process

OntoCommons Project Structure




Ontologies harmonisation

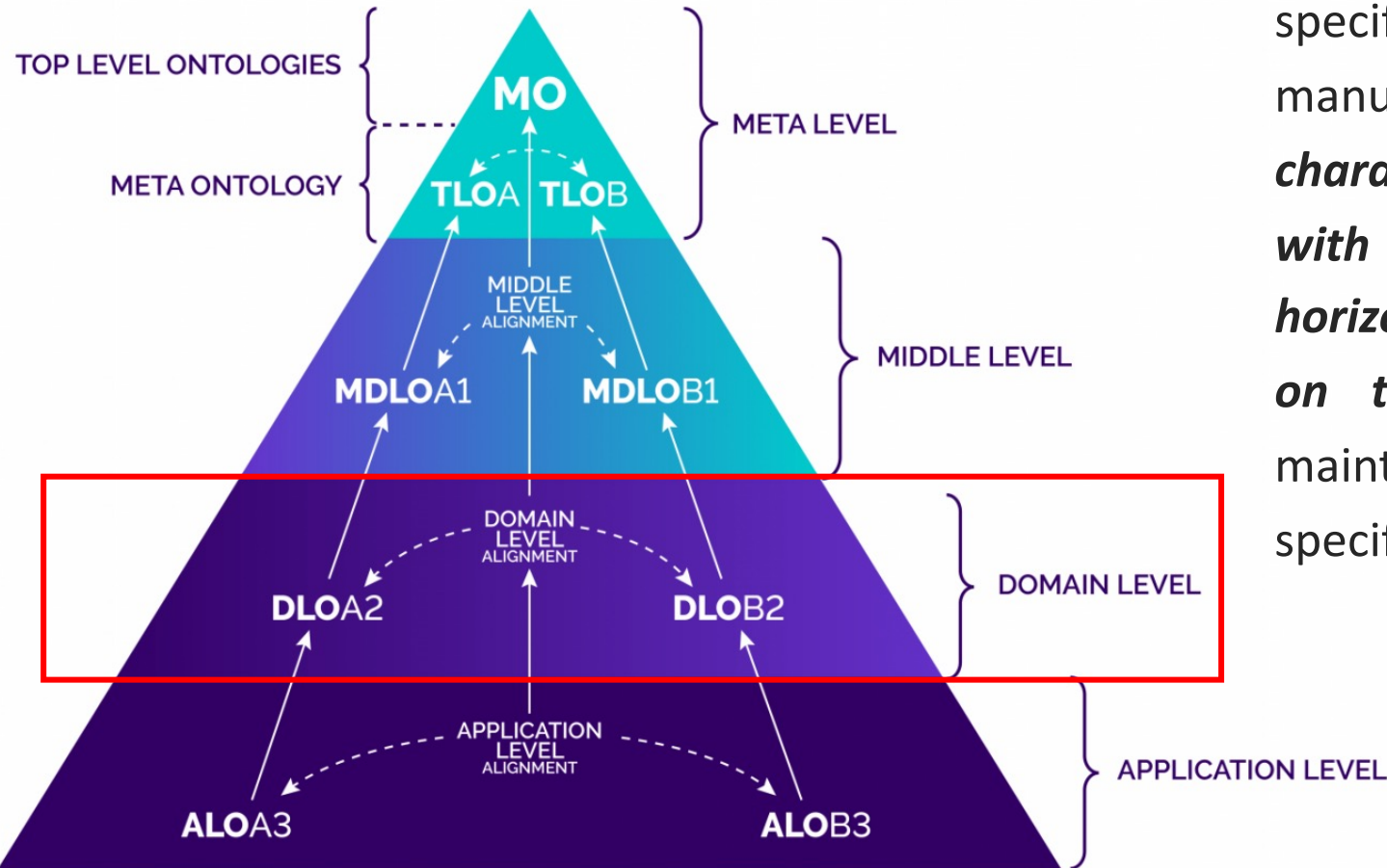


OntoCommons will not only provide data documentation harmonisation through an ontology but will also provide harmonisation between ontologies, through the TRO through a multilevel alignment:

- **Syntactic** alignment (OWL, FOL, etc.) for all the ontologies that will be part of the OES.
- **Terminological** alignment enabling a minimum taxonomical interoperability between ontologies, i.e. the possibility to build hybrid taxonomies (i.e. is a based graphs) by pasting a sub-branch of one ontology under another ontology.
- **Semantic** alignment will be targeted primarily by OntoCommons only within TLO branches, whenever different existing MLO/DLO/ALO, belonging to the same TLO and covering the same domain of interest, provides data that need to be made interoperable.
- **Formatting** alignment including e.g. labelling of classes, the definition of terms and the annotations.

Domain ontologies work package overview

-  A **Domain Level Ontology (DLO)** can be seen as a specialized module of a MLO, targeting a specific domain of applications (e.g. additive manufacturing, composite materials). *A DLO is characterized by an increased level of detail with respect to an MLO, a more pronounced horizontal extension and a strong dependency on the domain of application*, while still maintaining some neutrality with respect to the specific problem addressed.




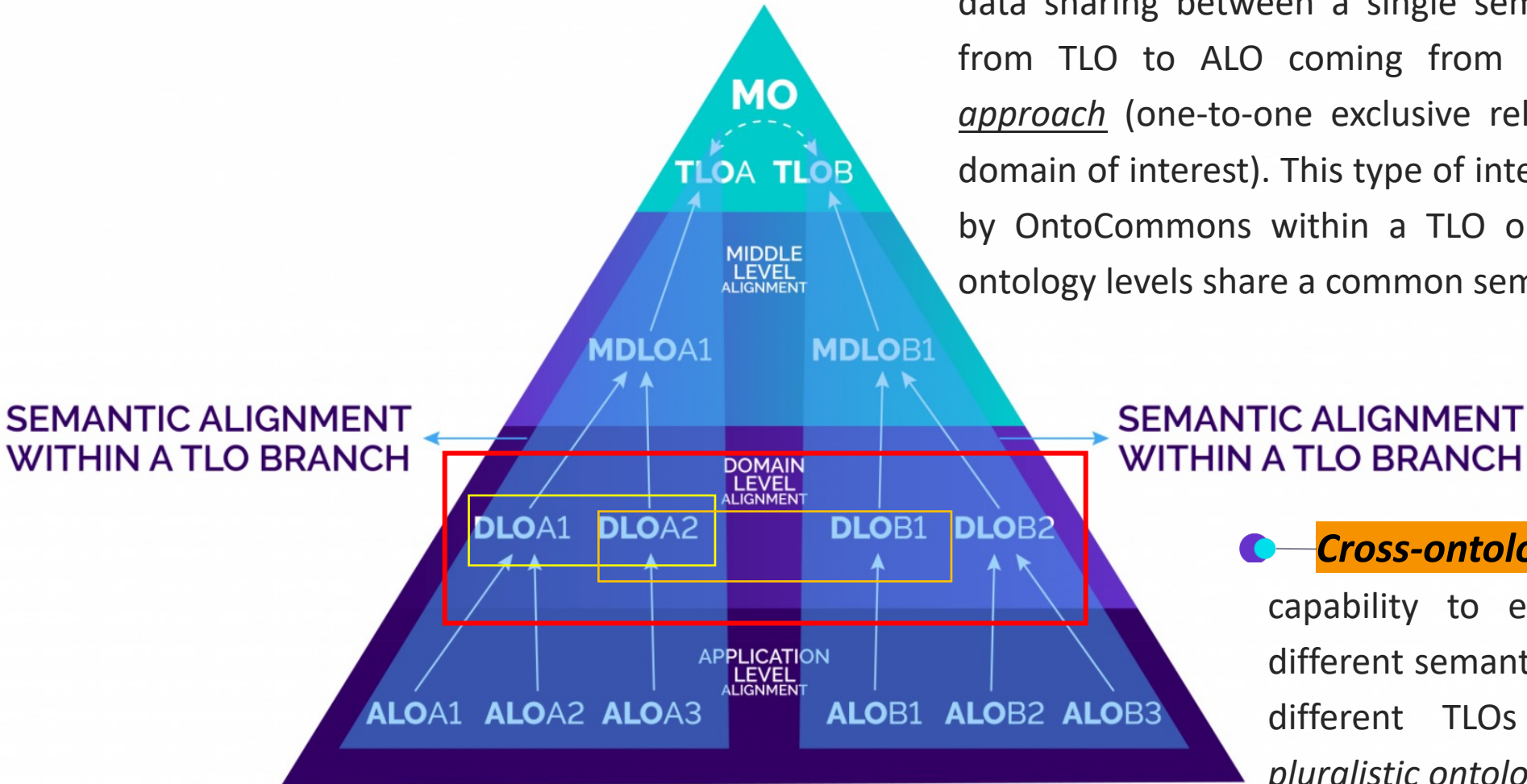
The core objective is to :


- collect community input and formulate guidance and agreements concerning the harmonisation of domain ontologies
- improve **intra-and cross-domain interoperability**.

The present efforts will build upon existing and newly developed domain ontologies in the range of domains including **materials modelling, characterisation, and manufacturing** as needed by demonstrators.

Intra and Cross-ontology interoperability

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Intra-ontology interoperability: The capability to enable data sharing between a single semantic representation of data from TLO to ALO coming from a monistic ontology/domain approach (one-to-one exclusive relation between ontology and domain of interest). This type of interoperability will be addressed by OntoCommons within a TLO ontology branch whose lower ontology levels share a common semantic framework.



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Cross-ontology interoperability the capability to enable data sharing between different semantic representations of data from different TLOs branches coming from a pluralistic ontology/domain approach.

Domain ontologies work package Detailed objectives

| | |
|----|--|
| O1 | Encourage exchange and intra-industry collaboration on ontologies (on pre competitive basis), to achieve a base common domain ontology on top of which innovation can happen |
| O2 | Collect and formalize requirements from the stakeholder community by domain in terms of ontology development and exploitation; on this basis, identify gaps (with respect to pre-existing ontologies) and encourage and facilitate development efforts from the community aiming at closing these gaps |
| O3 | Review the available domain ontologies and build a conceptual framework to make them findable and accessible |
| O4 | Help to harmonize and develop domain ontologies to improve their interoperability and reusability |
| O5 | Support the sustainability of domain ontology development through a Review of Domain Interoperability (RoDI) |



❖ **Main Objective:** Draw a map of the semantic landscape in the context of materials and manufacturing.

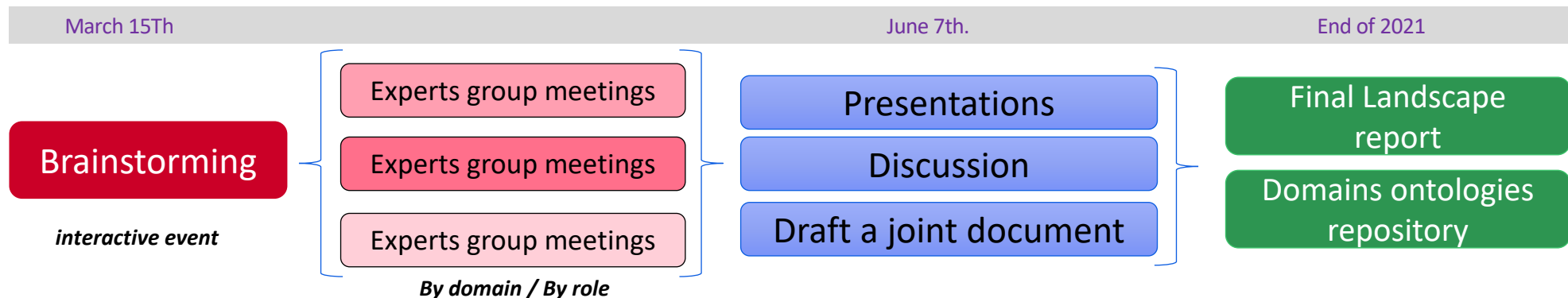
❖ **Inputs:**

- Short and long Surveys
- Workshop attendees' answers and opinions

❖ **Outcomes:**

- Populating a registry of semantic assets created within the project
- writing a report document that critically captures the status of the field to advance it.

❖ **Process and Timeline**





Thanks

Questions?

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Contact

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