

## Purpose and status of the European Virtual Marketplace Ontology (EVMPO)

The ontology work of the VIMMP and MARKETPLACE consortia concerns

- the **European Virtual Marketplace Ontology (EVMPO)**,
- **marketplace-level ontologies** (e.g., “training”, “validation”, ...),
- **subdomain-specific ontologies** (e.g., “particle-based dynamics”, “continuum”, ...).

It is our aim to be not only transparent and open in all aspects, but also to become maximally interoperable, ideally by using the same ontologies, jointly agreed on by both consortia. This work is based on the European Materials Modelling Ontology (EMMO) as an upper ontology.

Semantic connections will be made as follows:

- Fundamental paradigmatic categories from EVMPO are connected to the EMMO;
- marketplace-level ontologies elaborate the EVMPO categories at greater detail;
- subdomain-specific ontologies connect to OSMO, a marketplace-level ontology.

## Structure of the European Virtual Marketplace Ontology

EVMPO provides a structure for the marketplace-level ontologies by formulating **fundamental paradigmatic categories** which correspond to irreducible terms that are constitutive to the virtual-marketplace paradigm. Consistency with EVMPO, and by implication with EMMO, is a requirement for components of the European Virtual Marketplace Framework.

Terms which are not so closely related to the virtual marketplace paradigm itself, but will presumably occur somewhere in our semantic web (elements from the periodic table, academic qualification of experts, etc.), are **non-paradigmatic**. For this purpose, the EVMPO introduces **one fundamental non-paradigmatic category: “annotation”**.

The purpose of this structure is that both marketplaces can agree on

- **paradigmatic entities**,
- **annotations** which are either directly or indirectly related to paradigmatic entities,

while any marketplace retains the option to extend its own semantic base as required. At any time, any work beyond the agreed joint semantic basis remains possible for any side. To remain compatible with the joint European Virtual Marketplace Framework, however, all such additional works need to avoid logical contradictions with the EVMPO and the EMMO.

## List and definition of the fundamental categories

Paradigmatic categories:

- (1) **assessment**, i.e., *proposition on accuracy, performance, or trust in something/someone*
- (2) **calendar\_event**; by definition, *evmpo:calendar\_event* is equivalent to *ical:Vevent* from the W3C iCalendar ontology with Time Zones as Datatypes (also known as ICALTZD)
- (3) **communication**, i.e., *message or action that is communicated by a stakeholder*
- (4) **information\_content\_entity**; by definition, *evmpo:information\_content\_entity* is equivalent to *iao:information\_content\_entity* from the Information Artifact Ontology
- (5) **infrastructure**, i.e., *virtual-marketplace infrastructure including DB, hardware, software*

- (6) **material**; by definition, *evmpo:material* is equivalent to *emmo:material*
- (7) **model**; by definition, *evmpo:model* is equivalent to *emmo:model*
- (8) **process**; i.e., temporal evolution of one or multiple entities<sup>1</sup>
- (9) **product**, i.e., any good or service, marketed off-site or on the virtual marketplace<sup>2</sup>
- (10) **property**; by definition, *evmpo:property* is equivalent to *emmo:property*
- (11) **role**; by definition, *evmpo:role* is equivalent to *emmo:role*<sup>3</sup>
- (12) **simulation**, i.e., simulation workflow (including a single simulation as special case)

Non-paradigmatic category:

- (a) **annotation**, i.e., non-paradigmatic aspect associated with an entity covered by EVMPO

Subclass relation graph of the paradigmatic branches



1 The subclass “**physical\_process**” is stated to be a subclass of *emmo:process*.

2 The subclass “**tradeable\_object**” specifically refers to a service offered on a virtual marketplace.

3 The subclass “**stakeholder**” refers to an individual/institution/group that acts on a virtual marketplace.