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UK Research and Innovation

Translation and the Virtual Materials Marketplace

VIMMP
VIRTUAL MATERIALS MARKETPLACE

In collaboration with Pietro Asinari,
Luca Bergamasco, Welchy Leite Cavalcanti,
Gerhard Goldbeck, and Ignacio Pagonabarraga

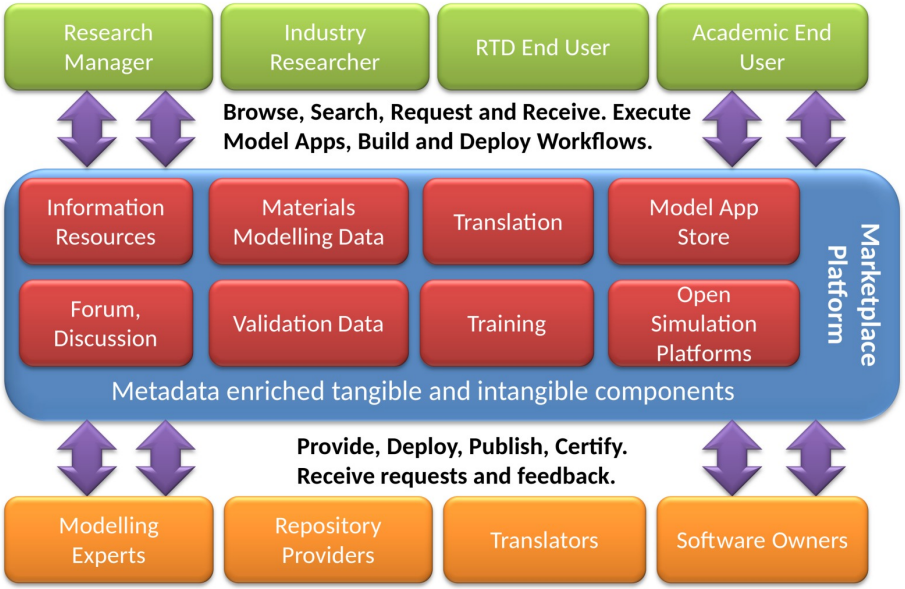
Eindhoven, DPI Office
4th December 2018

EMMC Workshop
Industrial Views and Needs for Translation

Science & Technology Facilities Council | UK Research and Innovation | Fraunhofer IFAM | Politecnico di Torino | Goldbeck Consulting | cecam Centre Européen de Calcul Atomique et Moléculaire | VIMMP Virtual Materials Marketplace

Virtual Materials Marketplace: VIMMP (Horizon 2020)

VIMMP Marketplace concept: To serve its participants and facilitate exchange, e.g., between materials **model providers**, industrial & academic client **end users**, and **translators**.



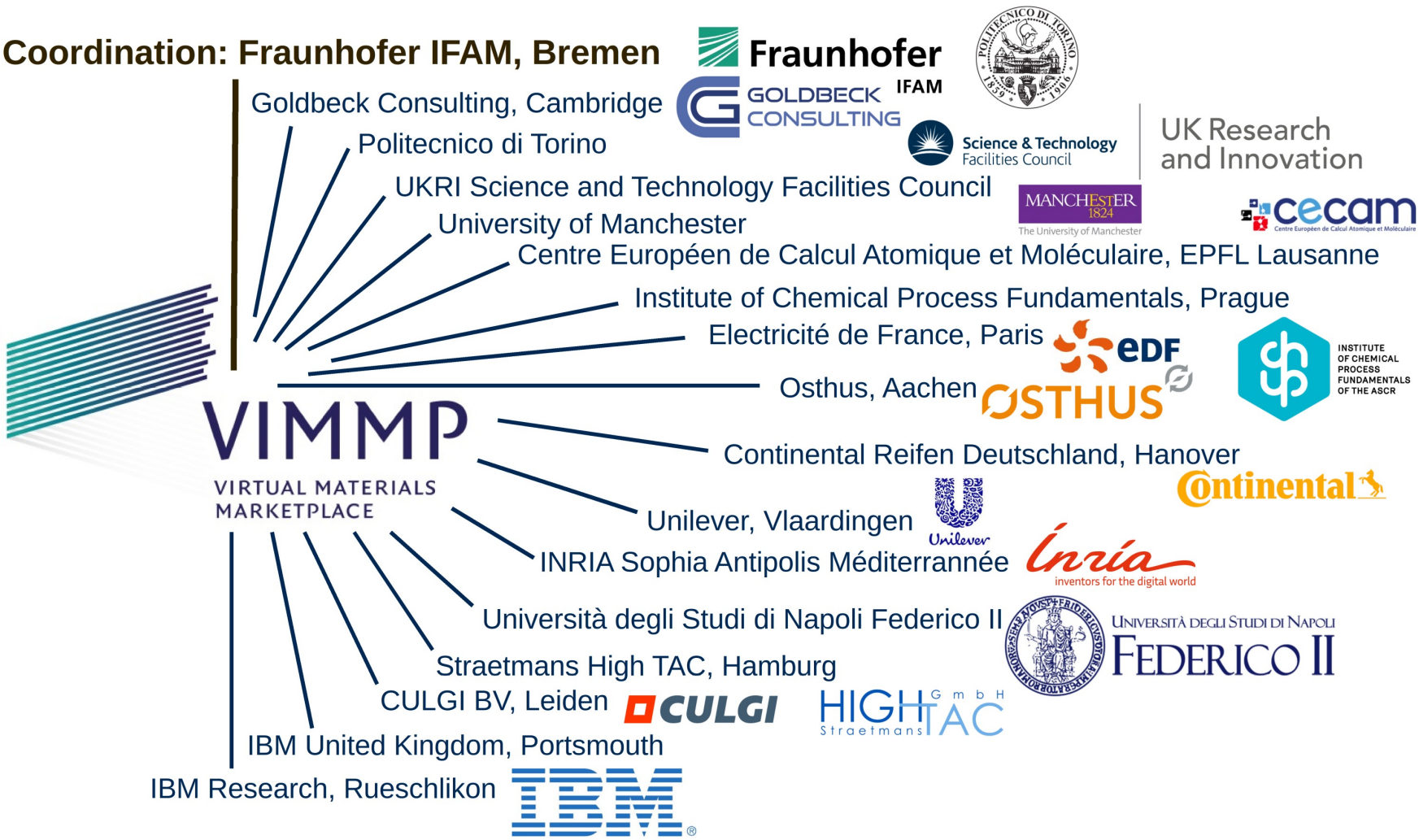
EMMC

Coordination:

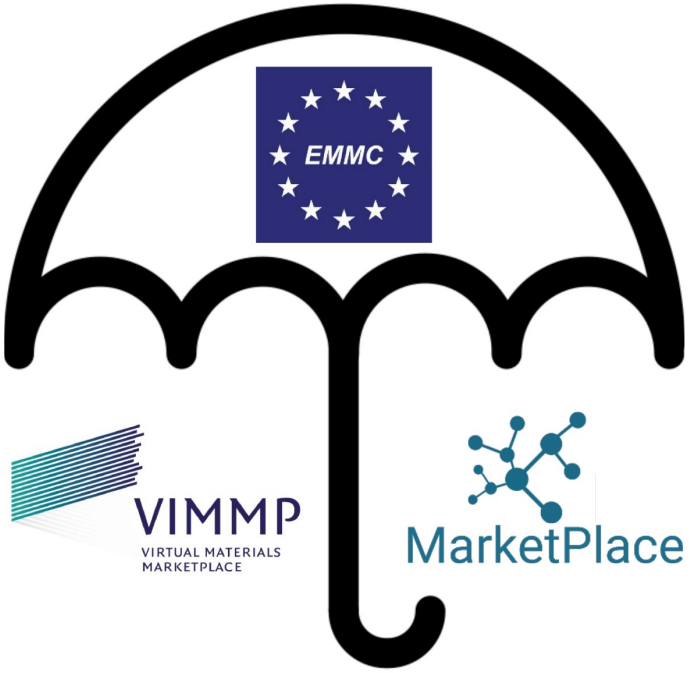
Fraunhofer IFAM

The **VIMMP Marketplace** will provide end-user interfaces to information resources, discussion forums, databases and repositories, translation and training services, validated models and modelling software, and the ability to utilise open simulation platforms to build and deploy workflows via cloud-based computing resources.

Virtual Materials Marketplace: VIMMP (Horizon 2020)



European Virtual Marketplace Framework



VIMMP will provide a genuine **two-sided virtual marketplace** comprising service providers and service consumers, serving all stakeholders from materials development, and supporting market deployment of new materials.

VIMMP participates in the creation of an single open and interoperable **European Virtual Marketplace Framework** on the basis of jointly agreed and managed semantic assets.

Translation environment on the VIMMP Marketplace

Development goals for the translation environment:

- Matchmaking between end users and model providers
- Translation services following the EMMC Translators Guide
- Registered translators will reach out to a wider audience and facilitate contacts to potential stakeholders who are not registered on the VIMMP Marketplace
- Integration of translation with training, provision of training services to translators (e.g., by academics) and by translators (e.g., to industrial engineers)

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Training resources for future translators and courses offered by translators will be integrated into the CECAM programme and publicized accordingly.

Modelling and simulation standardization

Time line of EMMC-governed standardization efforts

RoMM VI → **MODA** → **CWA 17284** → **Ontologies**

Semi-formalized terminology or vocabulary

Graph language & formalized terminology

CEN European standard

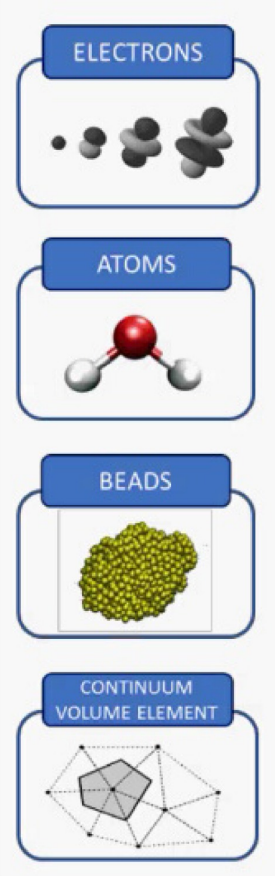
EMMO and EVMPO

(Ontology development is work in progress at present.)

EMMC

(1) User Case
(2) Model
(3) Solver
(4) Processing

MODA
(graph language)



electronic

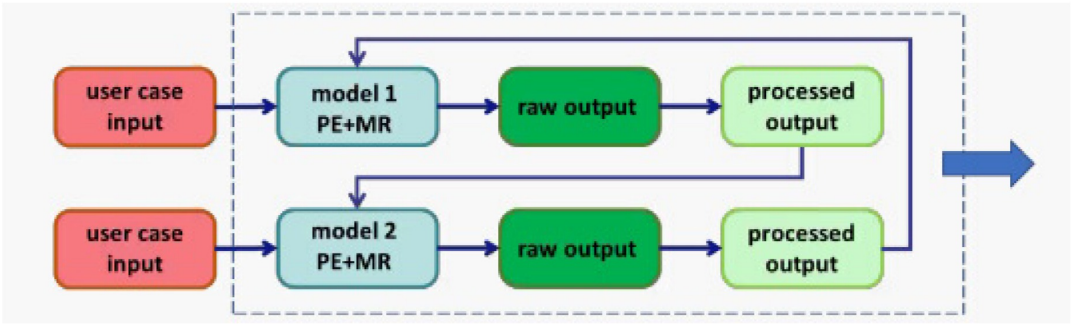
atomistic

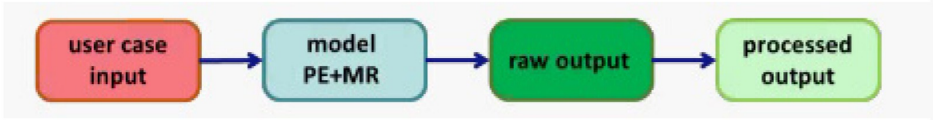
mesoscopic

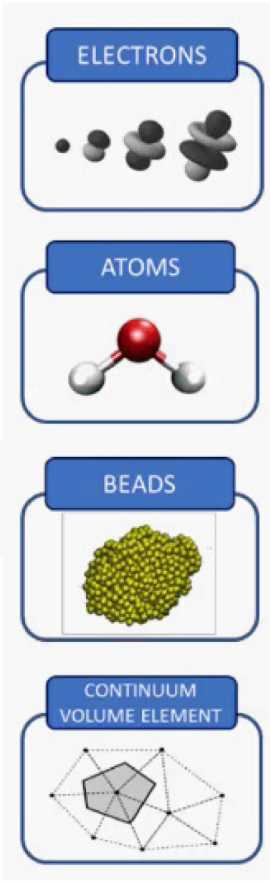
continuum

Modelling and simulation standardization

MODA – Modelling Workflow Graph Language (CEN standard by CWA 17284)







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EMMC

(1) User Case
(2) Model
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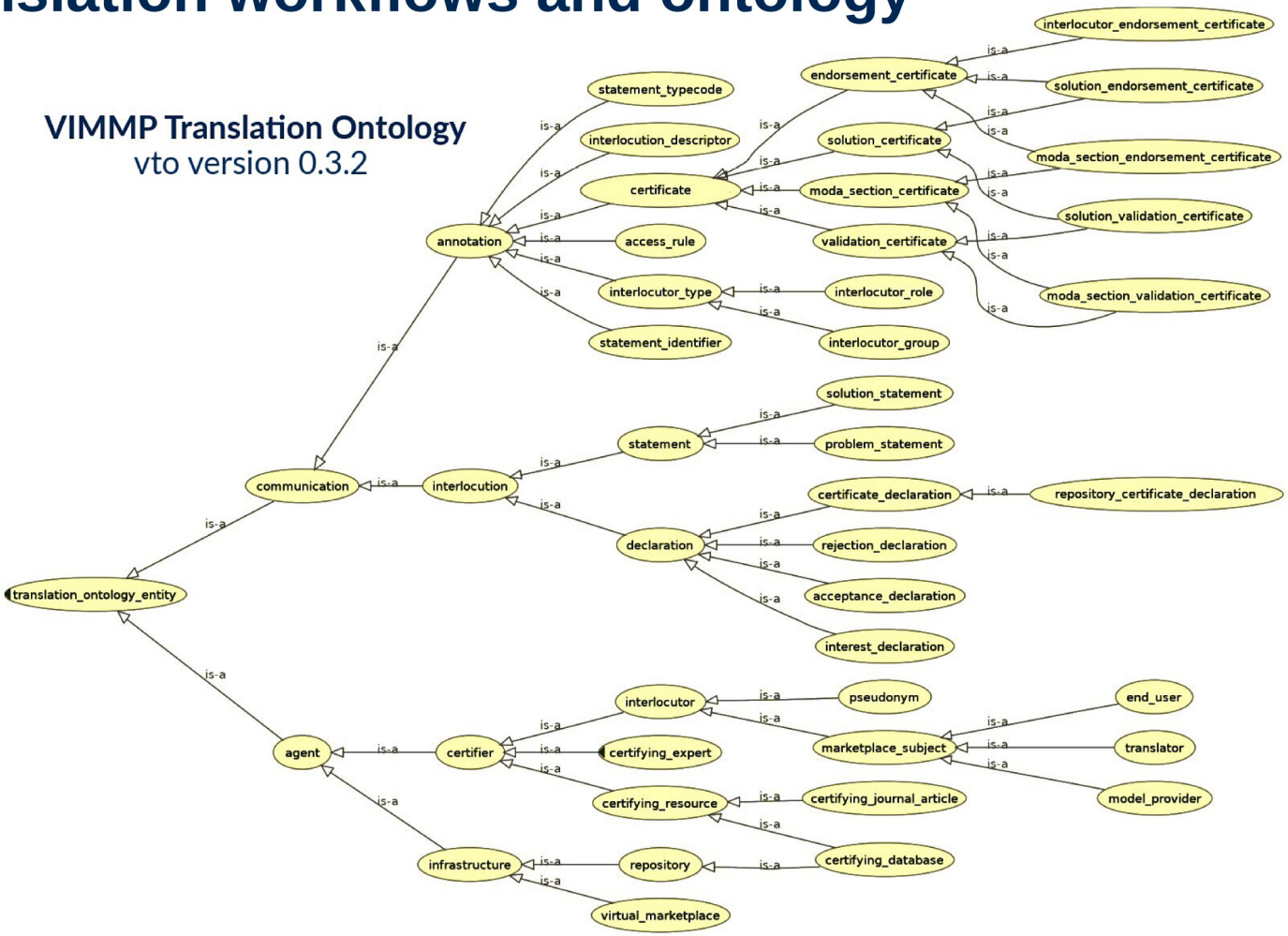
cen

EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Translation workflows and ontology



Disclaimer: Displayed ontology sketches represent an early stage of development.

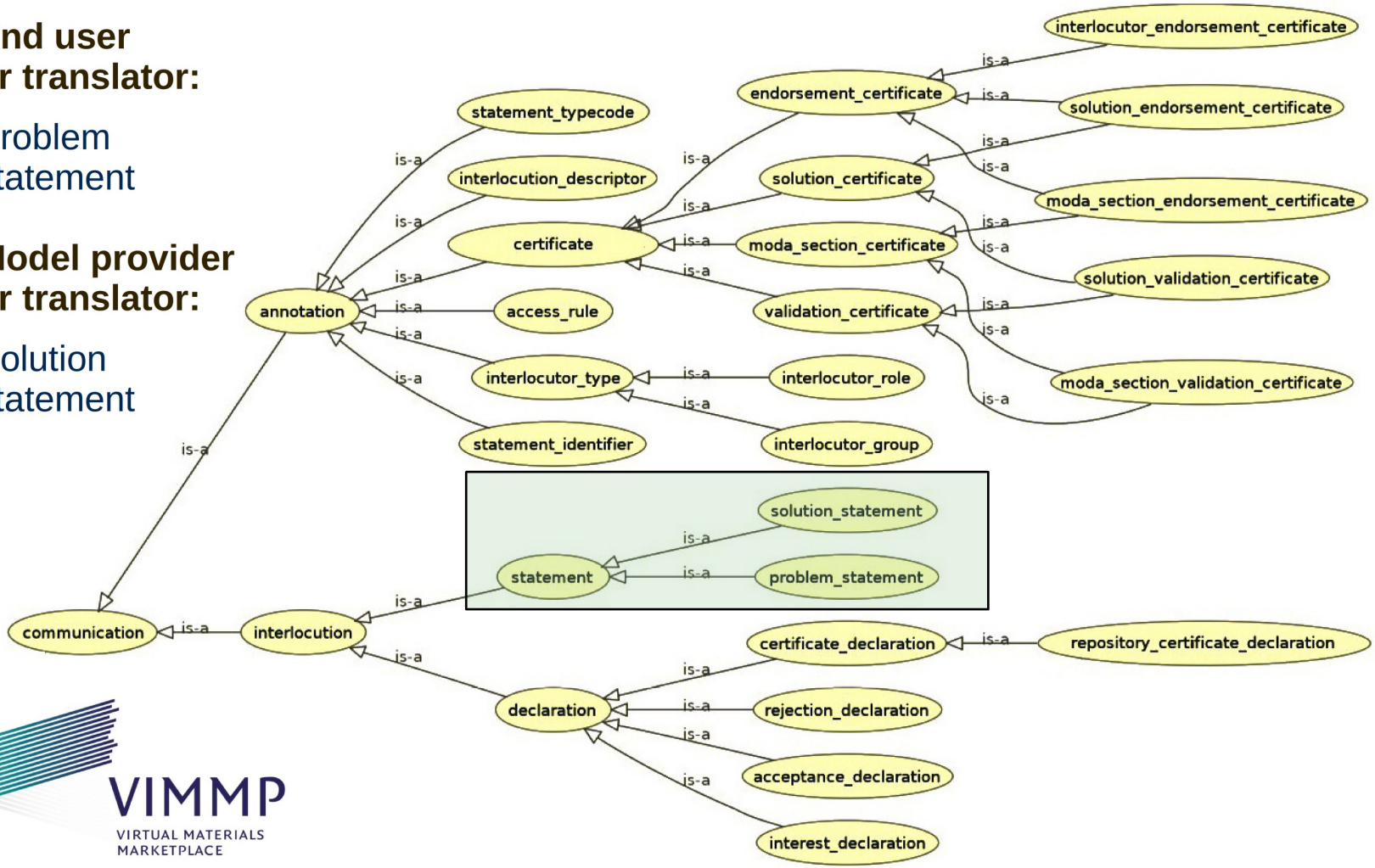
Translation workflows and ontology

End user or translator:

Problem statement

Model provider or translator:

Solution statement



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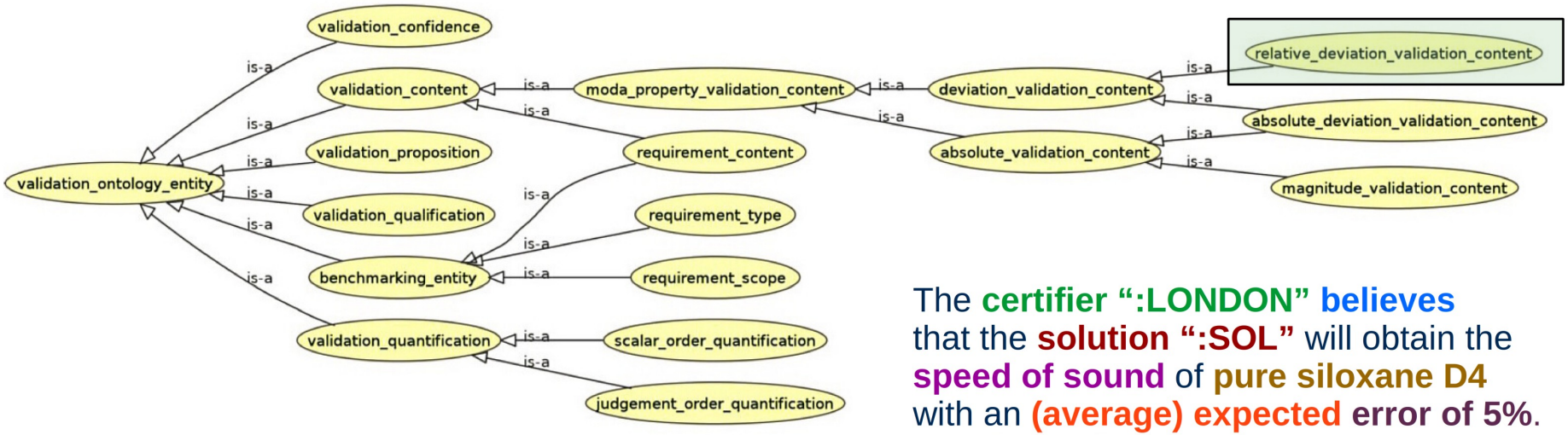
Validation, trust, and model assessment



The **certifier ":LONDON"** **believes** that the **solution ":SOL"** will obtain the **speed of sound** of **pure siloxane D4** with an **(average) expected error of 5%**.

```
:SOL_ACCURACY a :solution_validation_certificate;
  :has_certifier :LONDON;
  :refers_to_solution :SOL;
  :states :SOL_ACCURACY_PROP.

:SOL_ACCURACY_PROP a :validation_proposition;
  :has_confidence :STATEMENT_OF_BELIEF;
  :has_qualification :EXPECTATION;
  :has_content :SOL_ACCURACY_CONT.

:SOL_ACCURACY_CONT a :relative_deviation_validation_content;
  :asserts_magnitude 0.05;
  :refers_to_material :D4_PURE;
  :refers_to_property :SPEED_OF_SOUND.
```

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Educating future translators

Lecturers: E. Chiavazzo, L. Bergamasco, D. Marchisio, and G. Raos

Digitalizing, democratizing and empowering materials development via artificial intelligence

1) LEARN: tools & current vision of the ***European Commission*** for industrial innovation

2) PROPOSE: listen to EU industries and propose your ideas for innovative solutions

3) ANALYZE (I): assess technological feasibility & artificial intelligence integration for your ideas

4) ANALYZE (II): assess the investment costs vs economic value and returns of your project

5) CONVINCE: disseminate your ideas using social media, EMMC website, final workshop

Industrial partners

Academic partners

Educating future translators: 2018/19 programme at ASP

Lecturers: E. Chiavazzo, L. Bergamasco, D. Marchisio, and G. Raos

ALTA SCUOLA POLITECNICA

POLITECNICO DI MILANO | POLITECNICO DI TORINO

“iMAT” Programme

Technical training – methodological overview (RoMM), interoperability, workflows (MODA)

Economical training – IP protection, impact of modelling, value engineering, BDSS

Additional concepts – EMMC, related infrastructure, conventions, and projects

The participating students in 2018/19 cover the desired broad spectrum of backgrounds, including Chemical Engineering, Mechanical Engineering, Integrated Product Design, Civil/Structural Engineering, Physics of Complex Systems, and Mathematical Engineering

Significant collaboration and contributions acknowledged:

Bremen	–	Welchy Leite Cavalcanti
Cambridge	–	Gerhard Goldbeck
Daresbury	–	Silvia Chiacchiera, Michael Seaton, Ilian Todorov
Lausanne	–	Ignacio Pagonabarraga
Torino	–	Pietro Asinari, Luca Bergamasco

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