Welcome to the Second DOME 4.0 Newsletter!

DOME 4.0

We are pleased to announce the publication of the second issue of the DOME 4.0 newsletter. If you are interested in industrial data and digital marketplaces, you are at the right place!

DOME 4.0 is a 4-year Research and Innovation Action (RIA) from 2020 to 2024 funded under Horizon 2020 focusing on developing a comprehensive industrial data ecosystem aligned with the Open Science and Open Innovation objectives to enable sharing of business-to-business (B2B) data for the purpose of value generation and creation of new or enhanced products, processes, and services.

DOME 4.0 will be open to all providers and users of data, and aims to facilitate maximum knowledge extraction with the help of ontology-driven semantic data interoperability and modern data processing technologies adopted from the fields of Machine Learning (ML) and Artificial Intelligence (AI). These features are crucial to scale and advance the proposed ecosystem to any sector of the economy. Given the significant contribution of the materials and manufacturing sectors to the European economy, DOME 4.0 focuses on data-driven knowledge generation within these key sectors.

DOME 4.0 Newsletter N°2

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STAY TUNED

Stay updated on all our latest news, developments, research and general information regarding the DOME 4.0 project.

Stay tuned @ **www.dome40.eu**!

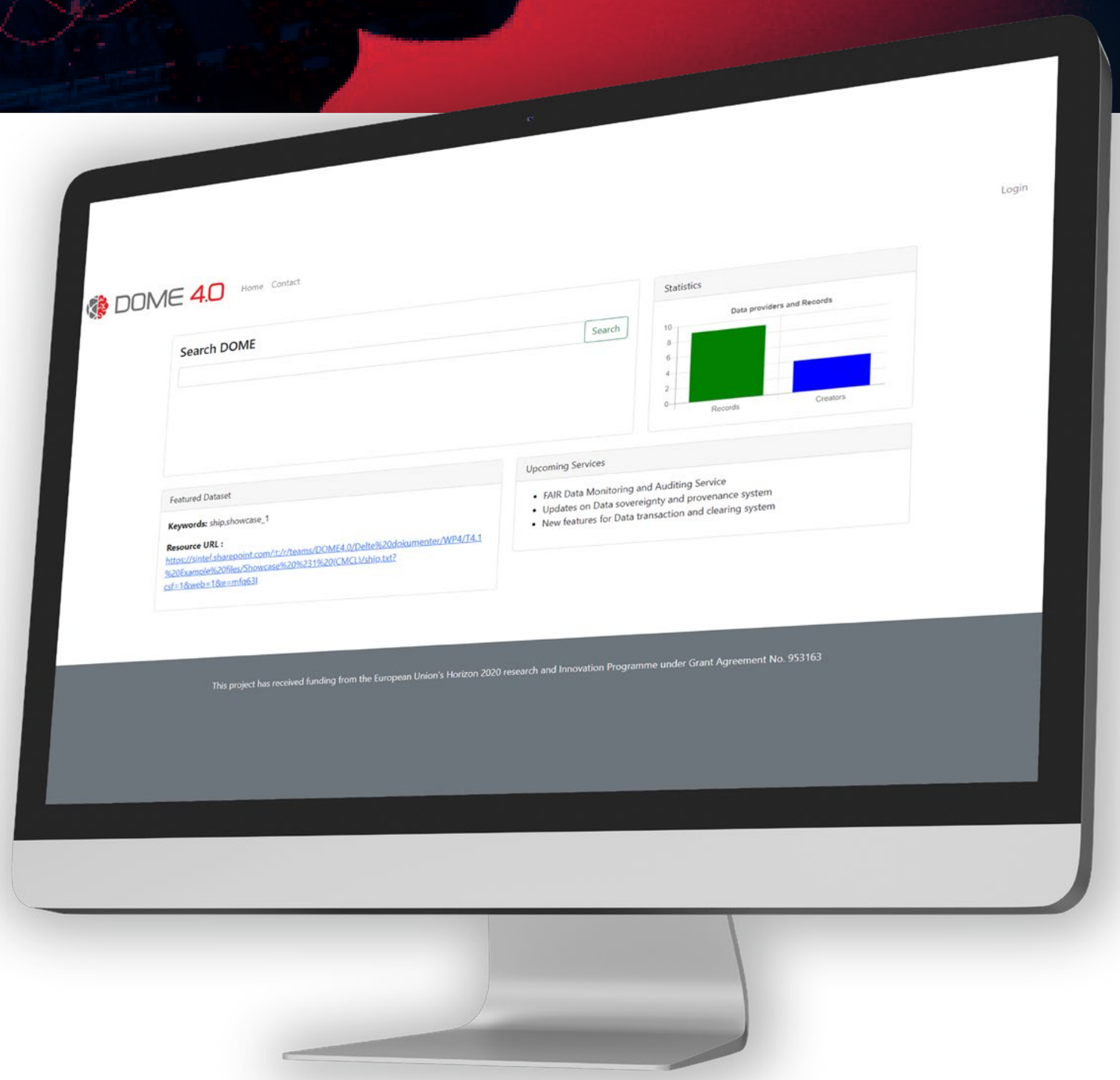
PROJECT INFORMATION

Digital Open Marketplace Ecosystem (DOME) 4.0
Grant Agreement ID: **953163**
Start Date: **December 1st, 2020**
End Date: **November 30th, 2024**
Coordinator: **COMPUTATIONAL MODELLING CAMBRIDGE LIMITED (CMCL)**

@DOME40_H2020 @DOME40

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 953163.

Platform



The platform of DOME 4.0 will focus on three main threads.

- The first is the translation of the business cases requirements into technical features (architecture requirements) that need to be implemented.
- The second is the definition of the User stories based on the business case studies considering the need to address data sharing within the industry commons landscape.
- The third thread is providing both the digital collaborative framework for the development, testing and deployment of the DOME 4.0 data portal.

Recent activities focused on the implementation of the front and backend components of the portal, the integration, and the collating of all services. A series of proof of principle (PoP) minimal viable products (MVPs) have been developed and demonstrated in internal meetings. The architecture document is being drafted by summarizing all the design decisions and will be published soon on GitHub.

Find more info for the project at ***https://dome40.eu/***

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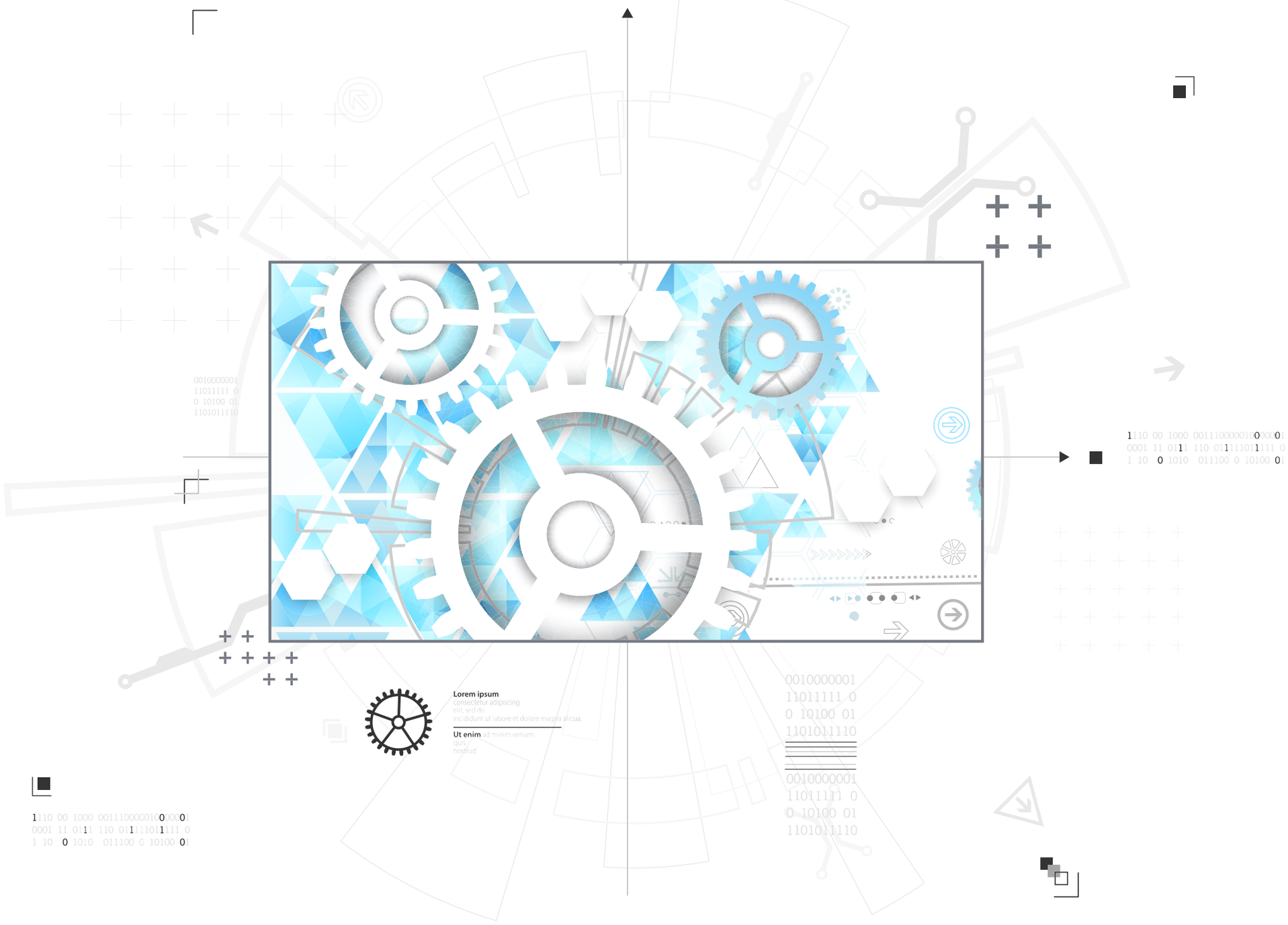
Ontology-Driven Interfaces

The ecosystem information model will be able to semantically link the different pieces of the ecosystem together. The first use of the information model is in the broker that will get the first beta release ready for the first project hackathon. The semantic broker will be able to perform semantic searches to identify a data source and data service candidates for the end user.

Data connectors are enablers of semantic data exchange on the DOME 4.0 platform. A connector is a small computer program that hides away the complexity of the connection to an external platform. Each connector will have the same API, making it easy for the DOME 4.0 platform to communicate with any DOME 4.0 connector. The connector will include semantic information about the data source, or service.

This will be registered at the broker such that we are able to do semantic searches across all registered connectors. So far, have been made three prototype connectors (to chemeo.com, optimade.org, and market40.eu). In the future, we will make a reference connector such that it will be easy for others to make connectors, and thereby connect their platform to the DOME 4.0 ecosystem. Inviting externals to create their own connectors will consist one of the topics for future hackathons.



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Technical Tools and Services

Developing the technical tools and services that will form the project's platform, DOME 4.0 will utilize a tool to automatically assess the 'FAIRness' of a particular data set, a system to track the sovereignty and provenance of data as well as to store contracts between data providers and consumers, and services that enable splitting, aggregation and analysis of data served by DOME 4.0, including via sophisticated simulation and modeling workflows. We are particularly excited about our implementation of a zero-trust method for making contracts between data providers and consumers. This is based on blockchain technology and allows users of the DOME 4.0 platform to instantly buy and gain access to diverse data sets, which are ontologically enriched by the DOME 4.0 platform. Furthermore, it gives us the flexibility to deploy the DOME 4.0 ecosystem across multiple 'nodes', allowing it to be truly decentralized and opening the door to the writing of custom digital contracts based on the needs of data providers.

One example of the power of DOME 4.0 is that of bringing together OPTIMADE and AiiDALab. OPTIMADE is a standard for exchanging atomistic data (i.e. materials or molecules), while AiiDALab is an in-browser tool for running sophisticated quantum-mechanical simulations without the need for expert domain knowledge. DOME 4.0 can query a number of OPTIMADE compliant data sources, and hand-off the desired atomistic structure to AiiDALab for downstream processing.

This is an important example of how DOME 4.0 can bring together existing data sources and services in a way that adds significant value to both.

Additionally, we are focusing on getting the platform up and running as we work towards implementing more and more showcases. COVID-19 has certainly made this work a lot less fun, but in the coming months we will be holding our first hackathon, this will be for internal developers only but as time goes on, we plan hackathons with external parties wishing to connect their data or service with the DOME 4.0 platform.

Keep an eye out for this exciting opportunity!

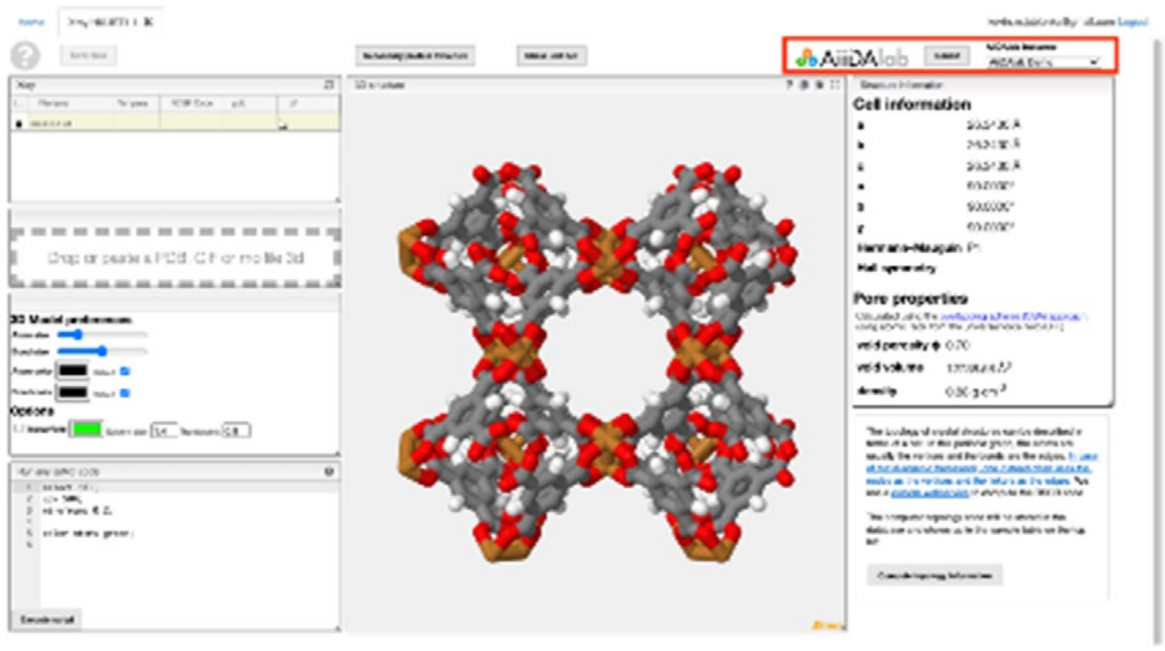

Image courtesy of "Jablonka KM, Zasso M, Patiny L, Marzari N, Pizzi G, Smit B, et al. Connecting lab experiments with computer experiments: Making "routine" simulations routine.", CC BY 4.0'
https://chemrxiv.org/engage/chemrxiv/article-details/610975b8393cc9d4bb50d355

Learn more at ***https://dome40.eu/***

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Showcases

The nine B2B showcases form the exploitation basis for the project's main asset, the DOME 4.0 platform.

The different B2B showcases represent a wide collection of typical industrial and scientific decision-making processes and the automation through the DOME 4.0 platform will create added value in terms of increased efficiency.

The increased efficiency will come from two main aspects:

1. By sharing and connecting data – data consumers with the data providers

2. By automated workflows allowing efficient data analysis and processing (e.g. by AI)

The following list is a summary of the different B2B showcases:

A scientific marine case with a focus on air quality predictions that supports port-authorities.

- There are four cases related to engineering the structural behavior of polymers, polymer composites and adhesives. These cases serve users not just as a catalogue of materials to select from while considering a pre-defined performance criteria, but also serve as workflows enhanced with material and sample-design. This enhancement will allow predicting and optimizing the material and sample characteristics depending on andoptimizing the material and sample characteristics depending on additives/fiber content, sample geometry etc.

- One case is dealing with formulated consumer products with a focus on the chemical formulation and related properties such as rheology, interfacial behavior etc.

- One case deals with the semantic analytics of manufacturing assets by collecting data from sensors deployed in production assets and reporting various characteristics.

- The case dealing with the link to the MARKET4.0 (MARKET4.0 – MARKET4.0 EU (market40.eu)) platform allows the interchanges in terms of industrial machines and services catalogues.

- The case dealing with the link to Materials Cloud (Materials Cloud) platform allows the interchanges in terms of resources in computational materials science.

During the first 18M of the project, the different B2B showcases have completed the requirement definition in terms of data-exchanges with the DOME 4.0 platform and currently the ongoing work is focused on the execution of these cases as offline scenarios which also includes the identification of case-specific user-scenarios.

Learn more about our showcases at ***https://dome40.eu/dome-40-showcases***

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News

4th GA Meeting of The DOME 4.0 Project

The 4th GA Meeting of DOME 4.0 was held in a hybrid mode on 31/5 – 1/6 2022 in Cambridge, UK. This was the first time after 18 months from the beginning of the project that most of the partners could meet face-to-face.

Read more

DOME 4.0: A Solution Between Marketplaces

DOME 4.0 proposes a whole different approach to deal with market fragmentation and siloing of data within domains.

Read more

How DOME 4.0 Manages To Make Data FAIR

The DOME 4.0 challenge is to make data FAIR through an effective common information system that allows business-to-business data sharing and enables new or improved products, processes, and services.

Read more

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News

What Makes DOME 4.0 Unique?

DOME 4.0 is unique in two ways. First and foremost, it opens a wider market, and engages more stakeholders.

Read more

DOME 4.0 Overview

DOME 4.0 is a Horizon 2020-funded 4-year Research and Innovation Action (RIA) from 2020 to 2024 with focus on establishing a comprehensive industrial data ecosystem aligned with the Open Science and Open Innovation objectives to enable the sharing of business-to-business (B2B) data for the purpose of value generation and the production of new or enhanced products, processes, and services.

Read more

3rd GA Meeting of The DOME 4.0 Project

Over 1 - 2 December 2021 was held virtually the 3rd GA Meeting of DOME 4.0! During the meeting, the consortium discussed the progress towards the targets over the last 12 months.

Read more

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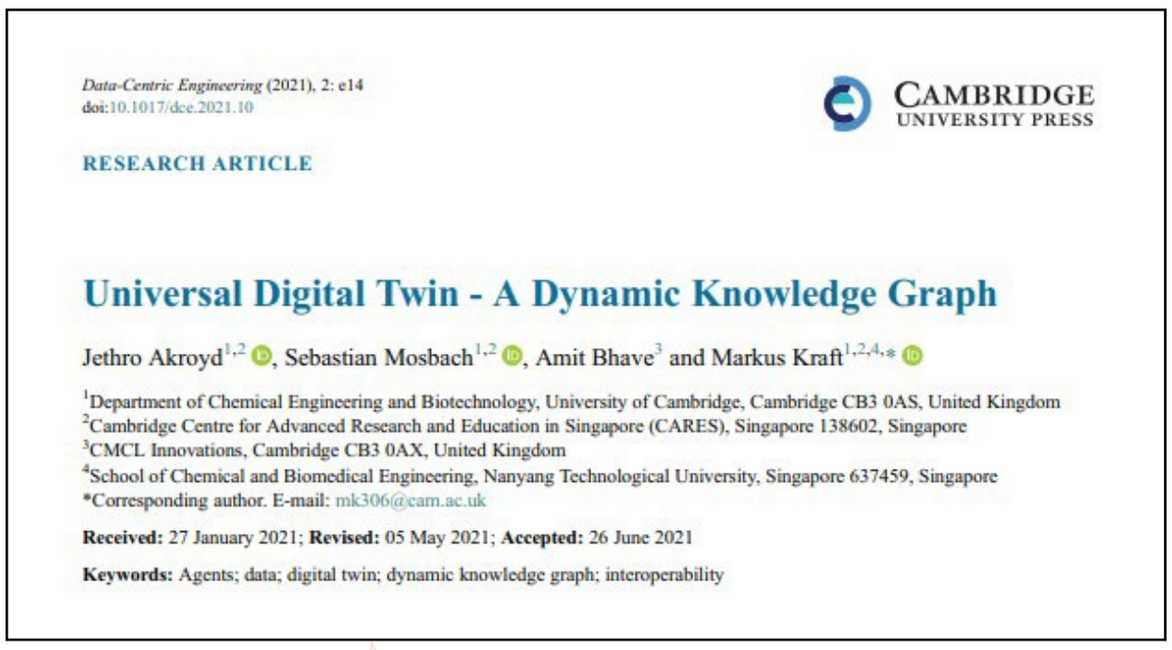
News



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CAMBRIDGE UNIVERSITY PRESS

RESEARCH ARTICLE

Universal Digital Twin - A Dynamic Knowledge Graph

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Keywords: Agents; data; digital twin; dynamic knowledge graph; interoperability

Universal Digital Twin - A Dynamic Knowledge Graph

The paper entitled “Universal Digital Twin - A Dynamic Knowledge Graph” produced by DOME 4.0 is now published.

Read more

2nd GA Meeting of the DOME 4.0

Due to the COVID-19 pandemic, the 2nd GA Meeting of DOME 4.0 was held online!

Read more

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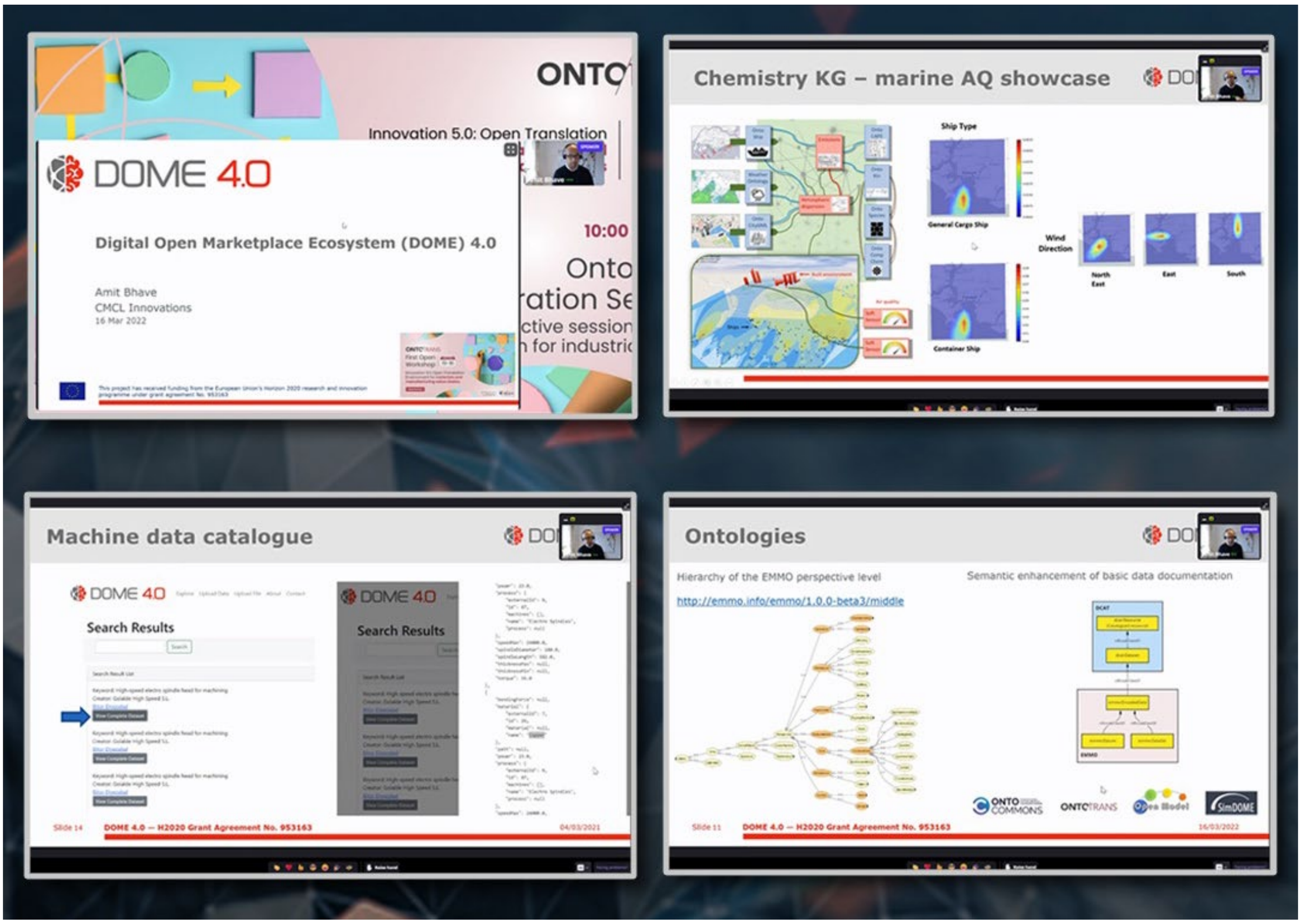
Events

DOME 4.0 at European and International events – the highlights



DOME 4.0 – Collaborative Spirit With EC-Supported Marketplaces, Materials And Manufacturing Projects

DOME 4.0 project was invited to present at the first open workshop organized by OntoTrans, an H2020 project which focuses on developing an industrial translation environment for materials and manufacturing.

Read more

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Events

Global Workshop: Ontology Commons Addressing Challenges of The Industry 5.0 Transition

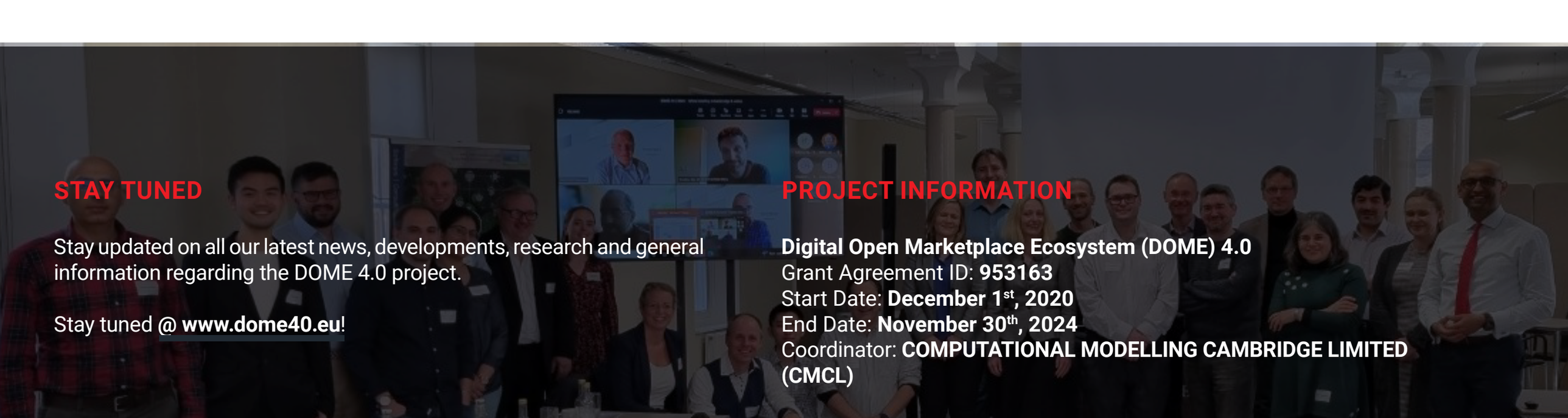
DOME 4.0 was presented at the Global Workshop: Ontology Commons addressing challenges of the industry 5.0 transition.

Read more

Digital Around The World 2021 - 24 Hours Connecting Over The World

CMCL Innovations represented the DOME 4.0 project at the Digital Around the World 2021 event, which was held online as a non-stop, 24-hour, around of the world event over 20-21 October 2021.

Read more



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