



# DOME 4.0

## Digital Open Marketplace Ecosystem 4.0

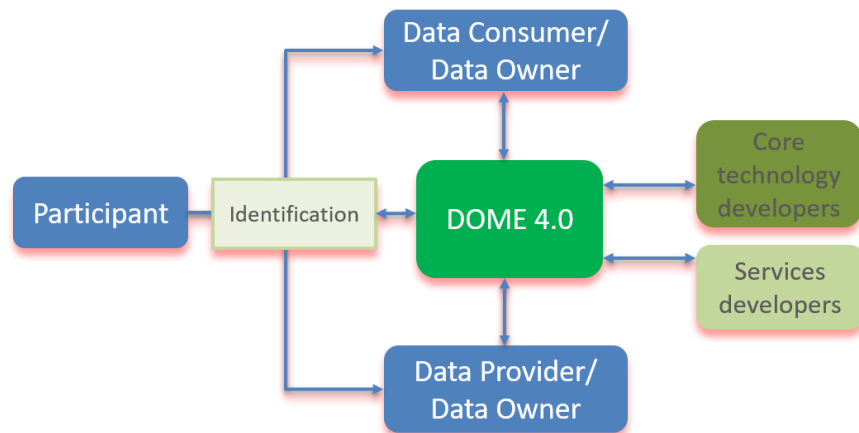
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CMCL Innovations  
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- Introduction to DOME 4.0
- Ecosystem approach and current status
- Cooperation between DOME 4.0 and OntoCommons
- Sharing experience from initial work in ontology development and interoperability

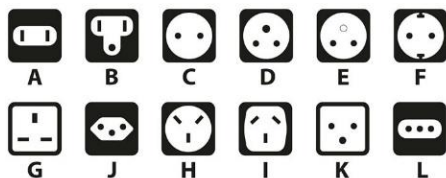
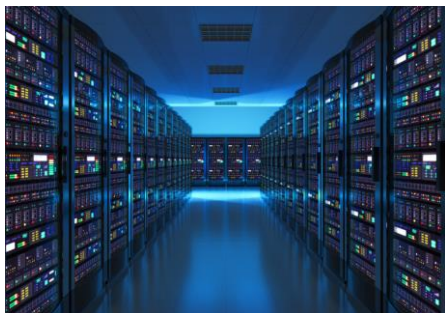




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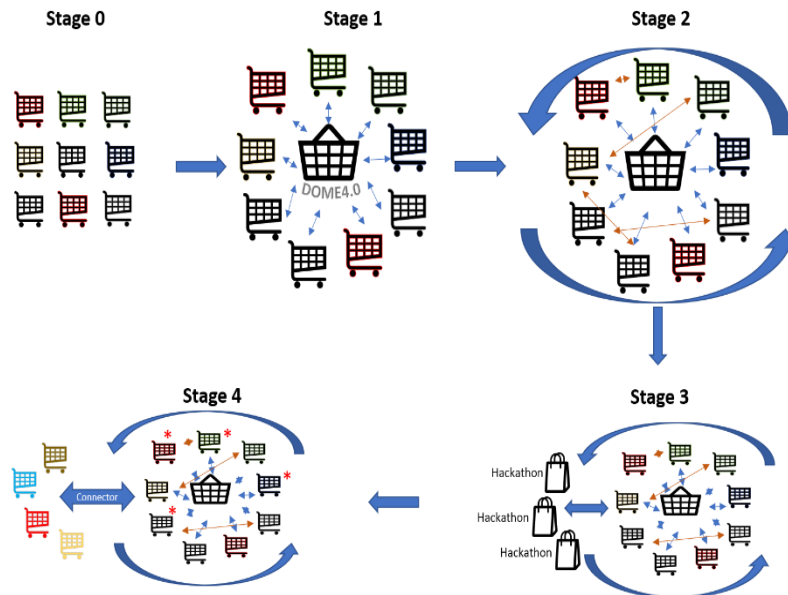
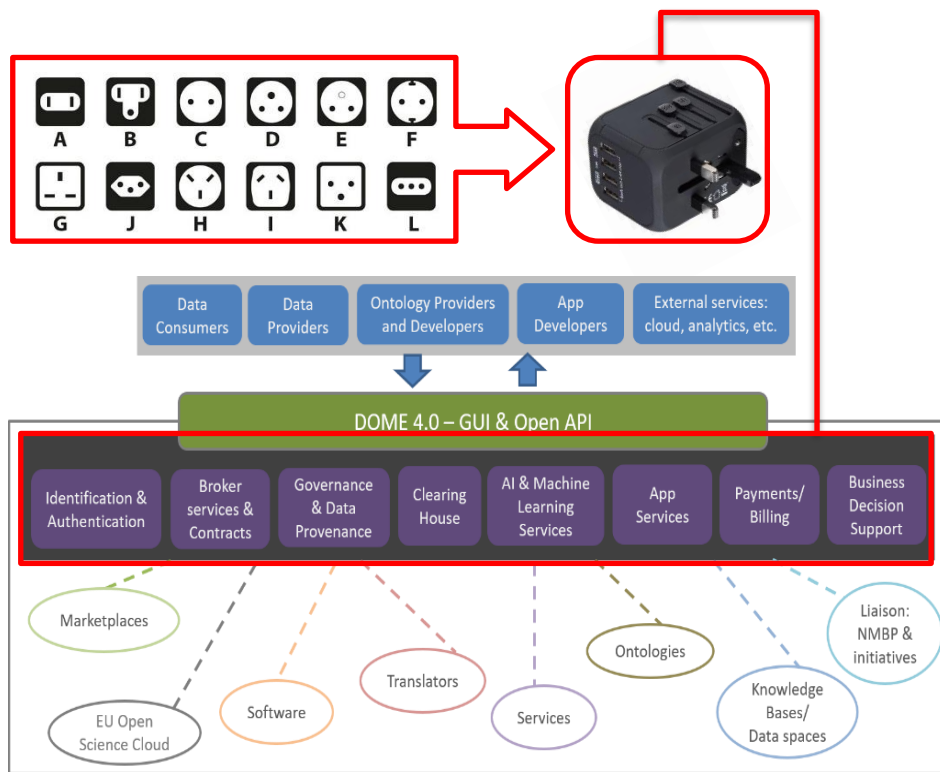
- An ecosystem for transactions between **data prosumers** and **data services** providers
- Materials, manufacturing (and beyond)
- **Connects** with other marketplaces, OSPs, OTEs, databases and knowledge bases
- **Semantically-enriched** core and industrial/B2B showcases
- Demonstrate **added value** via **9 B2B** showcases
- **FAIR** principles of data – Findable, Accessible, Interoperable, Reusable

A trusted digital ecosystem that is a first choice for businesses and organisations seeking to transact with data and data services

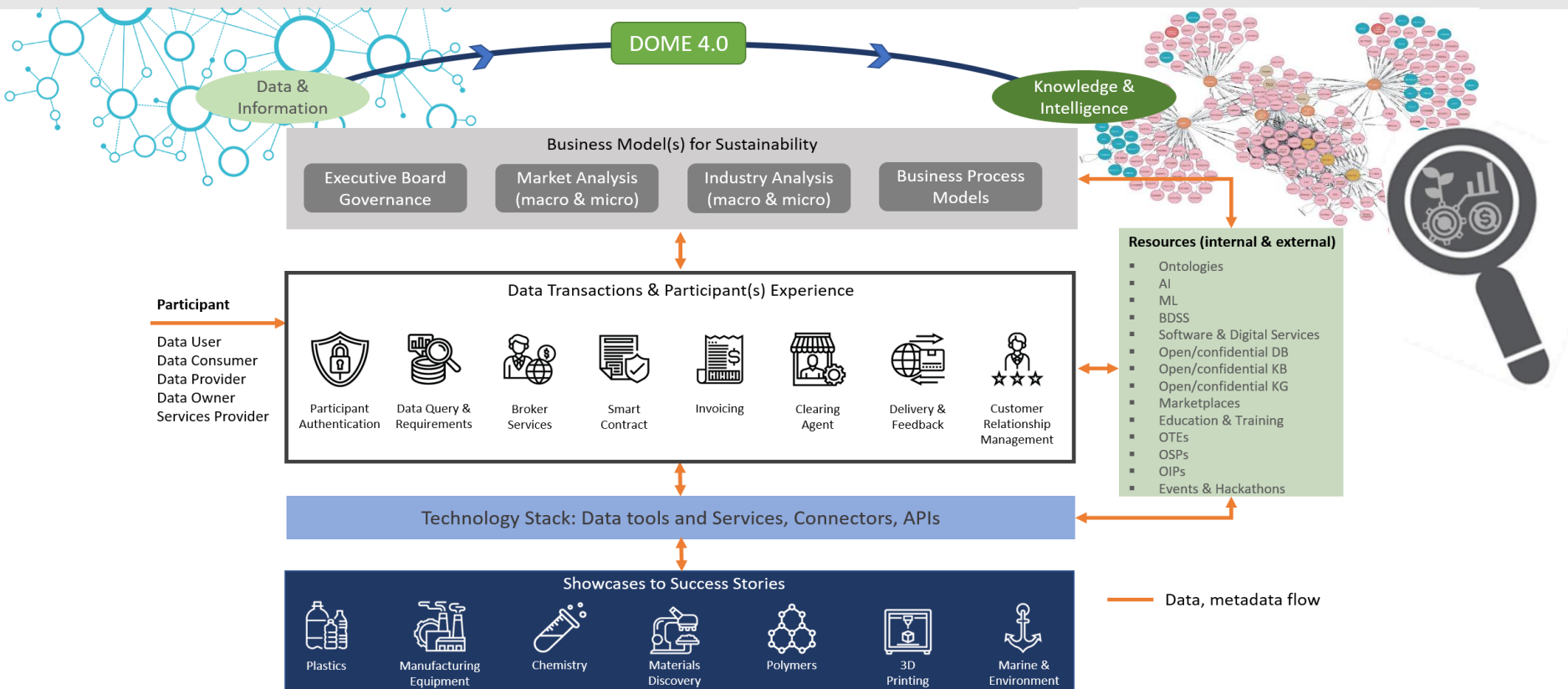


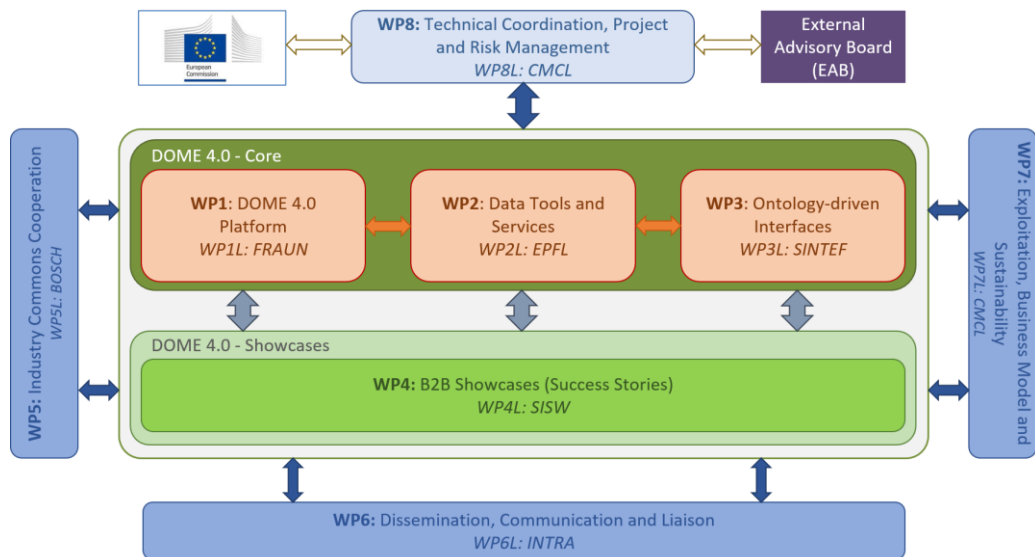
- **Data abundance:** sensors, Internet of Things/Senses/Services
- Data lakes, data warehouses: store vs. effort to make it actionable on-demand
- Multiple tools and **lack of interoperability**
- Marketplaces - requirements:
  - Access data from multiple sources and deliver it to the customer
  - Trusted, aggregated and ready-to-use data
  - Data provenance and IP/sovereignty
- Multiple marketplaces being developed
- Architecture, APIs and semantics developed on individual project level
- **Data and information silos exist**
- **Lack of a digital collaborative ecosystem** that connects with marketplaces, DBs, KBs and treats market participants as equal citizens

# Proposed DOME 4.0 solution



# Approach





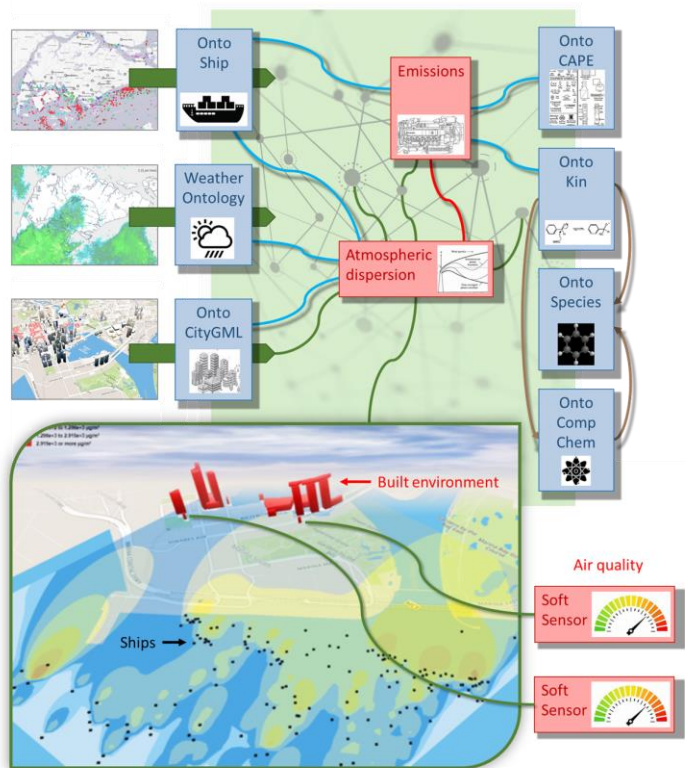
- Current status: M5
  - Technical Architecture
  - Business Architecture
  - Showcases → use cases and user requirement specifications
- Cooperation with OntoCommons
  - Monthly meetings running
  - 3 outcomes envisaged for 2021 – first of which is this meeting



# B2B showcases

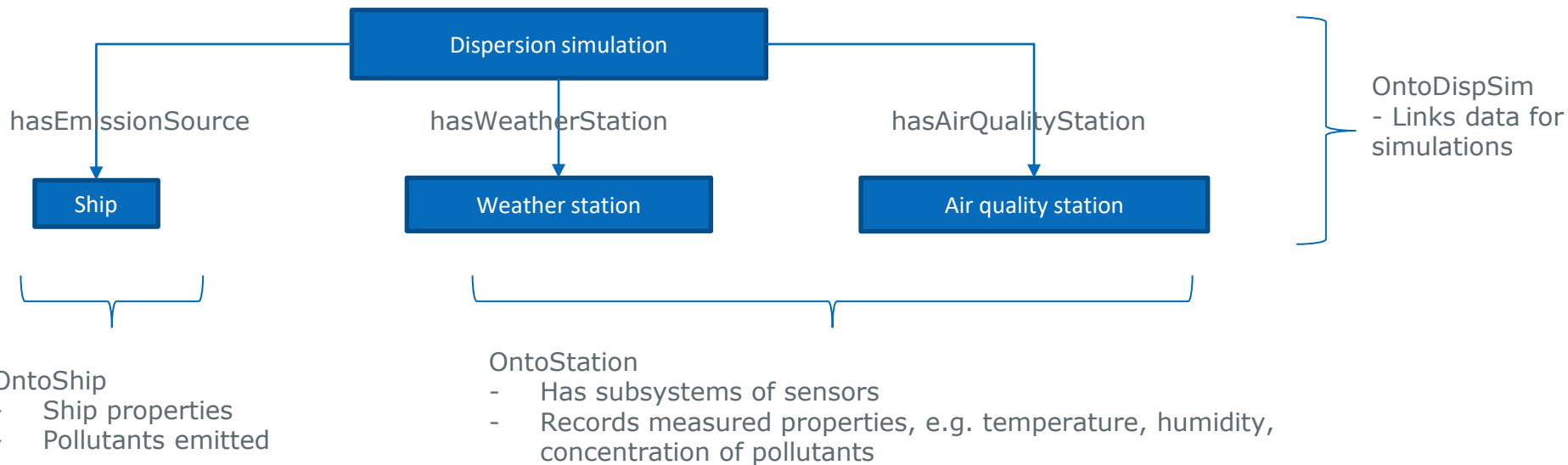
NO.	B2B SHOWCASES	DATA SOURCES	INDUSTRIAL SECTORS
1	Chemistry Knowledge Graph (KG) – marine, air quality	Ontokin KB: species, thermodynamics, chemical kinetics, sensors and geo-location data	MARINE, ENVIRONMENTAL, NANOPARTICLES
2	Light weight construction – fibre reinforced plastics	Laboratory experiments, multiscale models	PLASTICS
3	Polymeric additives for coatings: anti-corrosion	Thermodynamic, Laboratory Regulatory, Modelling	POLYMERS
4	Structural adhesives: Fatigue behaviour	Experimental data, MatWeb: Materials property data	ADHESIVES
5	Production equipment tools and service catalogues (metals, plastics, high-tech)	Semantic data repositories of MARKET4.0	MANUFACTURING
6	Turnkey services & custom workflows integrating simulations and data	Materials Cloud (Open Science, FAIR data principles)	MATERIALS
7	Formulated consumer products	gPROMS (PSE), molecular simulation (UKRI), Cheméo (Céondo), and REFPROP (NIST)	CHEMICAL PROCESSES AND MATERIALS
8	Semantic Analytics of Manufacturing Assets	Bosch I4.0 Knowledge Graph, manufacturing production data	SMART MANUFACTURING
9	Virtual development of composite materials	Experimental data, material data sheets	COMPOSITE MATERIALS





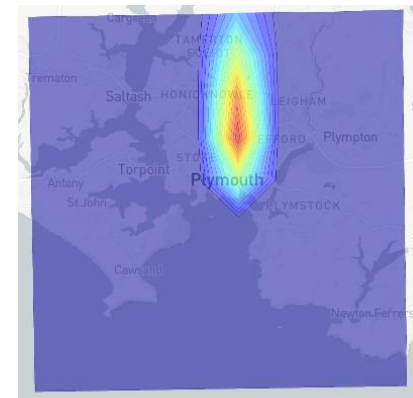
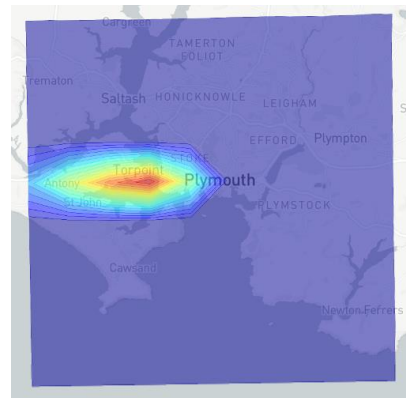
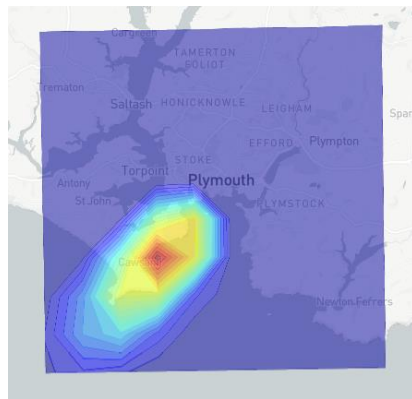
- **Knowledge Graph: Cross-domain interoperability**
- Air Quality (AQ) virtual sensor
  - Augment physical sensors at port/harbour cities
  - Emissions source apportionment
- Utilise real-time weather and ship location data from external DBs
- Account for city architectural data
- 3 x commercial and open source software
- Support decision making in local authorities and industry – air quality and resource optimization

# Ontology to link different domains



# Testing and preliminary results

- Different wind conditions can affect how pollutants disperse in an area
- This example has a ship emitting emissions in the middle of the simulation domain



**Wind  
Direction (from):**      **North east**

**East**

**South**

- DOME 4.0 digital marketplace ecosystem
- 9 B2B showcases to demonstrate cross-domain semantic interoperability
- Standardisation actions in collaboration with *OntoCommons*, EMMC, and EAB
- Cooperation with OntoCommons – ontologies, best practices, demonstrators
- Developers and managers of marketplaces, knowledge bases, etc. - connect with us!

## Project name: DOME 4.0 Digital Open Marketplace Ecosystem 4.0

Call DT-NMBP-40-2020:  
Creating an open marketplace for industrial data (RIA)

The European Union Horizon 2020  
Grant Agreement no. 953163





# DOME 4.0



@DOME40\_H2020



DOME40

[www.dome40.eu](http://www.dome40.eu)



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# THANK YOU

Any questions?