

# 'MATERIALS MODELLING MARKETPLACE TO ENABLE INDUSTRIAL INNOVATION THROUGH INTEROPERABLE MULTISCALE SIMULATIONS'



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*This work has received funding from the European Union's Horizon 2020 Next generation system integration tangible and intangible materials model components to support innovation in industry NMBP-25-2017*



# What do we tackle?

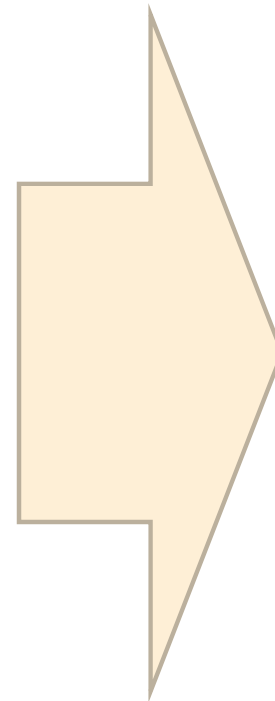
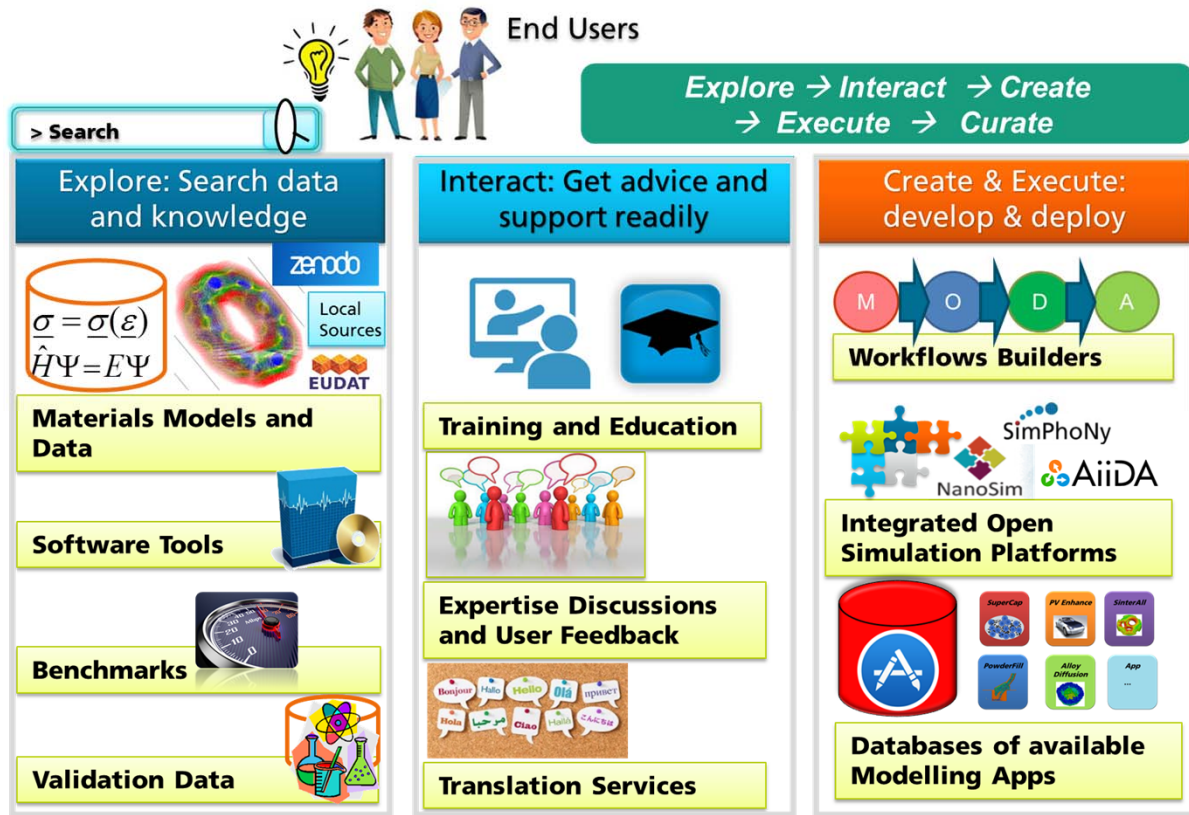
## The limited interaction, sharing and large overheads problem

- A huge amount of knowledge and data from simulations and experiments is produced and stored by many stakeholders
  - across the same company operations and different labs/institutes
  - many common problems with similar solutions but lack of exchange of information
    - limited collaboration
    - hard to find expertise
  - data (results, information) is hardly curated
    - calculations or experiments are often repeated without a reason
    - it takes a long time and much effort to find **knowledge**
    - Creativity is based on what exists already!
- Numerous models and related software tools each requiring
  - different expertise
  - knowledge acquisition
  - deployment, operation and regular maintenance





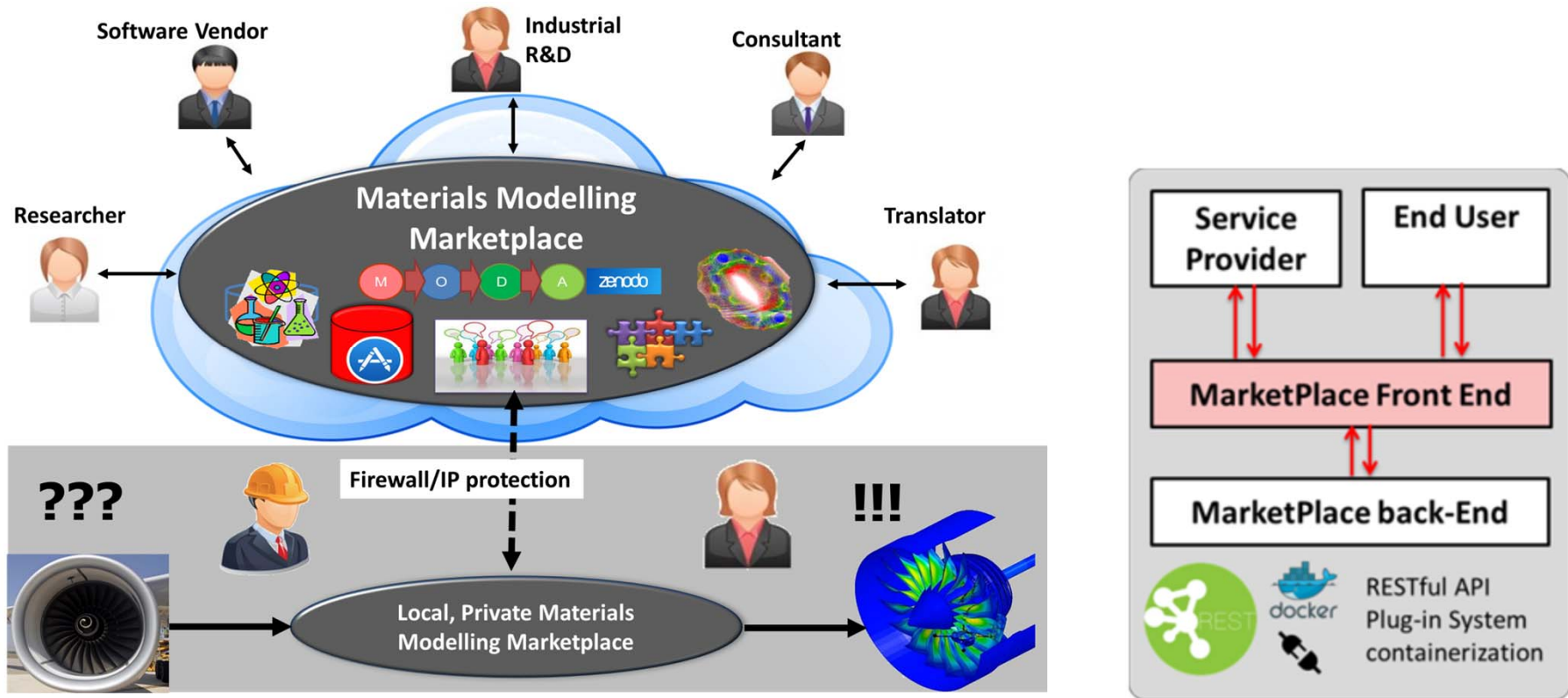
# MarketPlace: A One-Stop-Shop



Materials  
Modelling Market-  
places are true  
**innovation hubs**

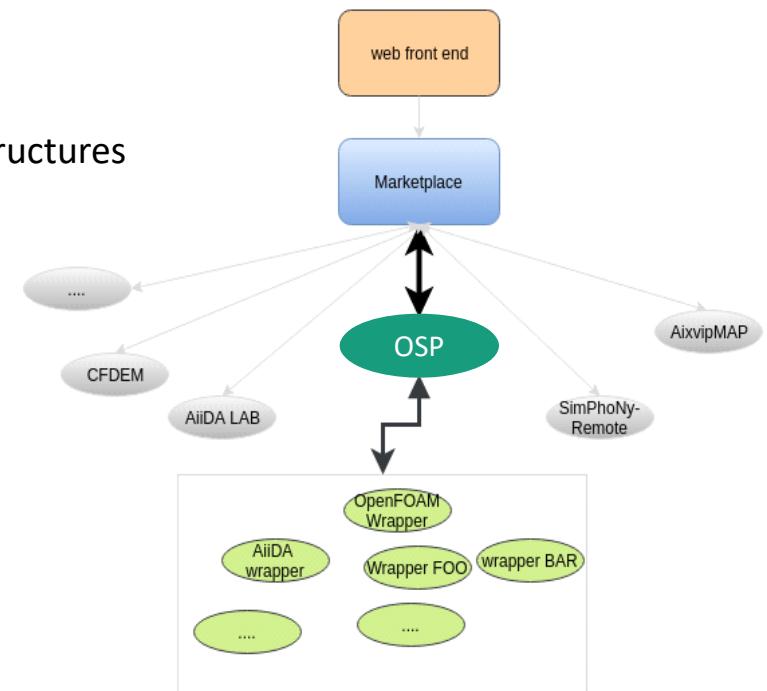
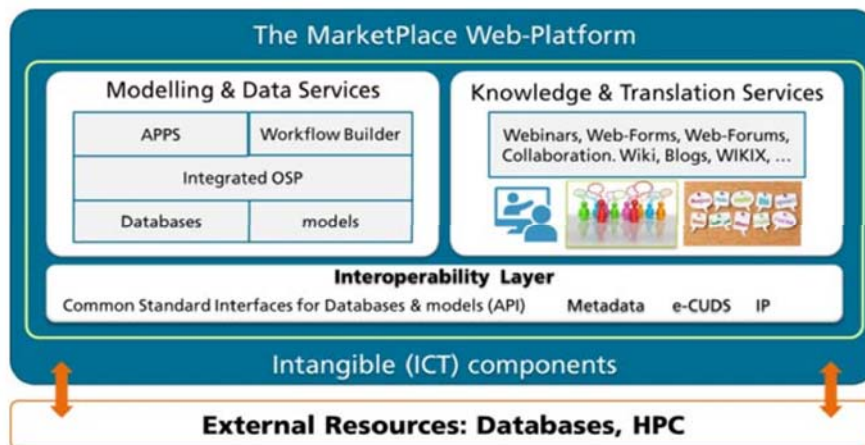
# Concept – Microservices – Public and Private Deployments

## Support Internal private and external public service



# Architecture Design

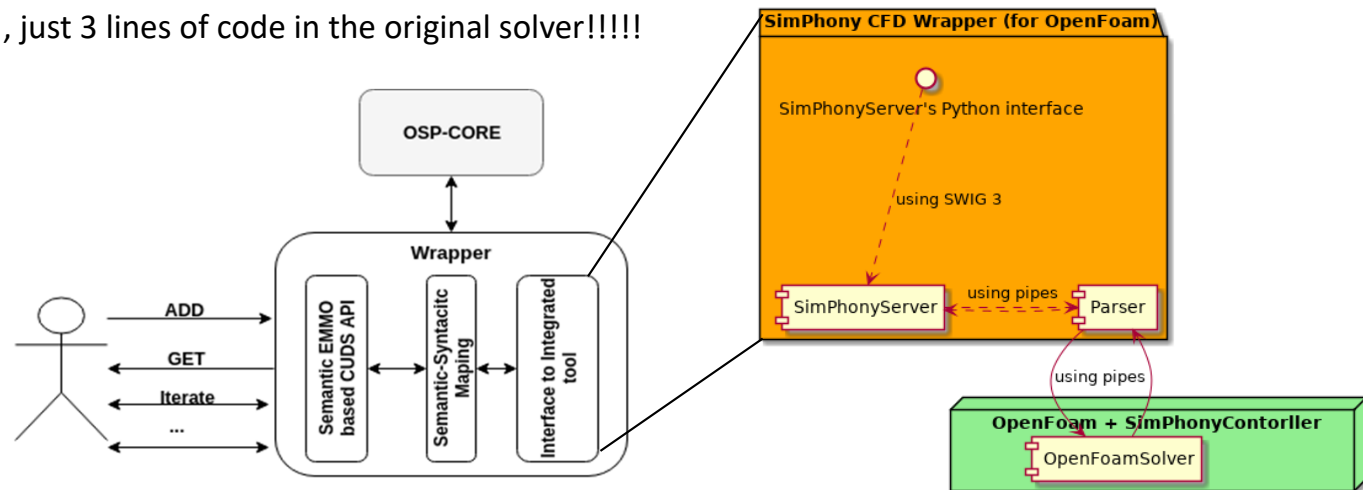
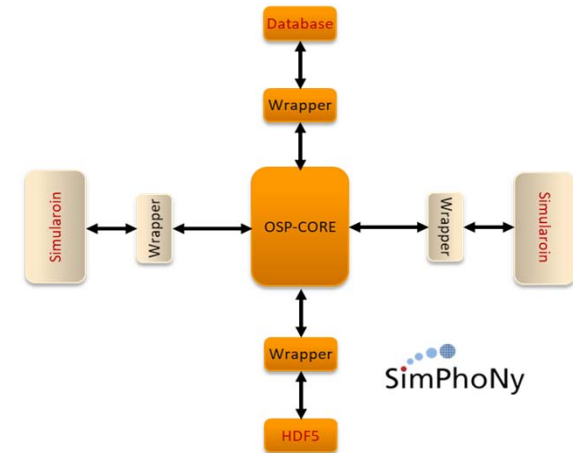
- Marketplace Endorses European Materials & Modelling Ontology EMMO for **interoperability**
- Can include other ontology as well!!!
- OSP Core** (Ontology (Based on EMMO) → Common Universal Data Structures (CUDS)) → **Interoperability between tools in MarketPlace**



# Services available soon on MarketPlace

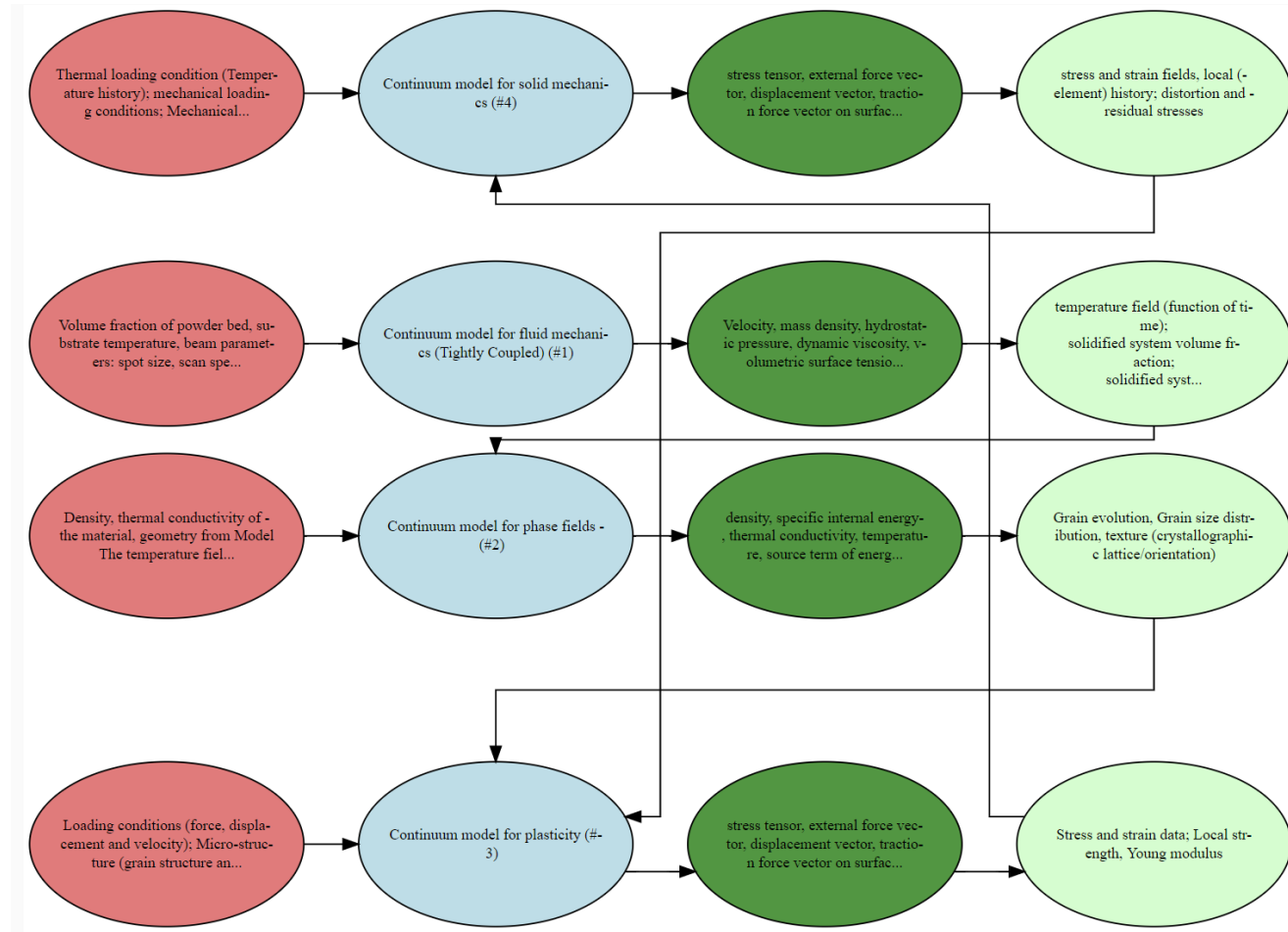
## OpenFoam for Fluid Dynamics Simulations

- OpenFoam Interactive (OFI)
  - Supports OpenFOAM (any version)
  - Supports All Solvers and Models (PE + MR)
- Wrapper accesses the entire data and models in the tool including solvers with minimal changes
  - E.g., for OpenFOAM, just 3 lines of code in the original solver!!!!



# Initial Applications

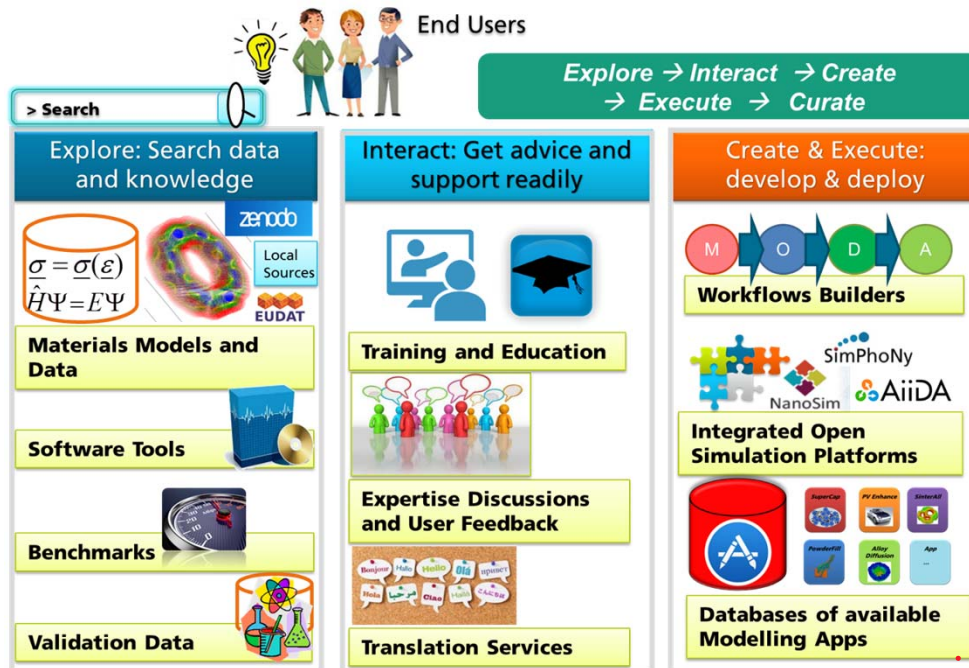
- Four cases pre-fixed
  - additive manufacturing
  - Screen printing
  - ceramic injection moulding
  - nano-based catalysis systems
- Two are open-cases
  - materials for photovoltaic cell printing.
  - 3D printing of Metals
- Two additional community use cases are invited in year 4





# To sum up

Marketplace is being developed as we speak...

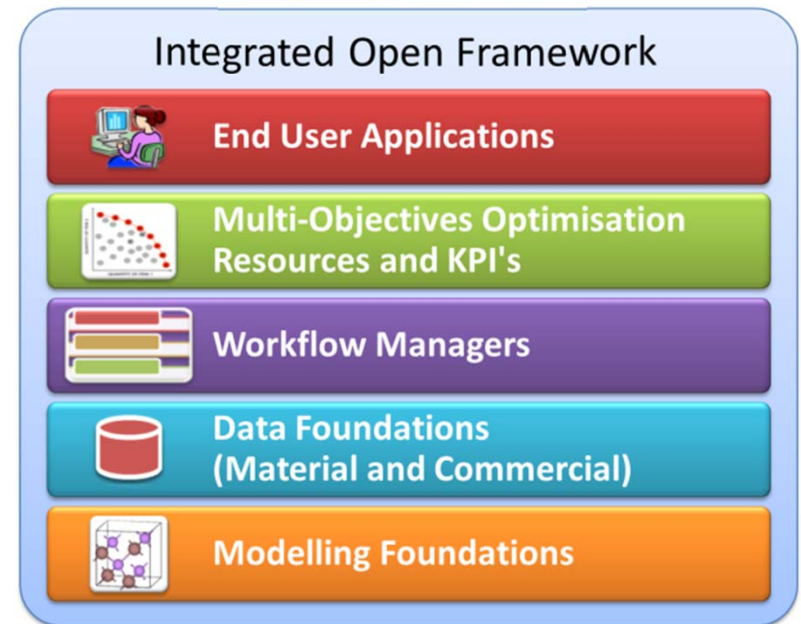
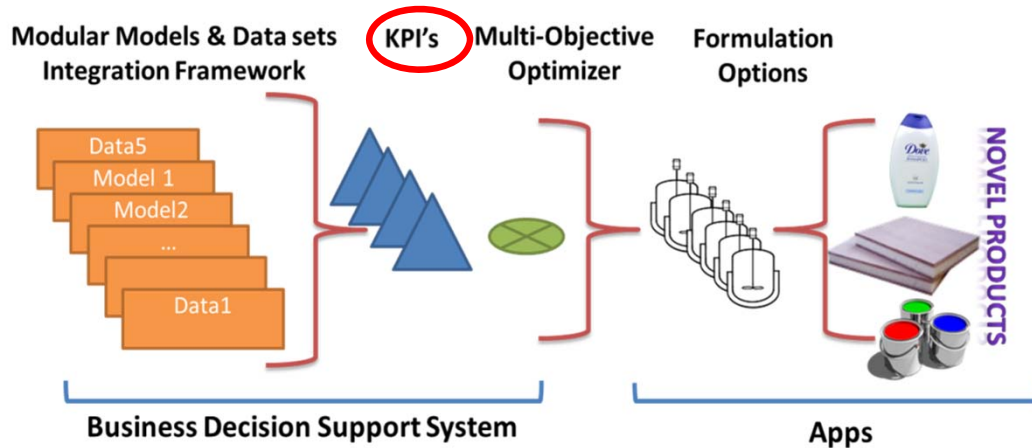


What we aim for is to provide Barebones  
MarketPlace platform:  
It is open to all!

Coming soon...watch out for the first release at <https://the-marketplace-project.eu>

# FORMULATIONS AND COMPUTATIONAL ENGINEERING - FORCE

## Materials Modelling as vehicle to better KPIs



The Demonstrators:

- Personal care liquids:
  - Design consumer segmented personal care fluids
- Rigid PU foams:
  - Low K-value PU insulation
- Fast curing inks:
  - PU process optimization & ink formulation design

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 MarketPlace



## Thank You for your attention!!!

### Acknowledgements:



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