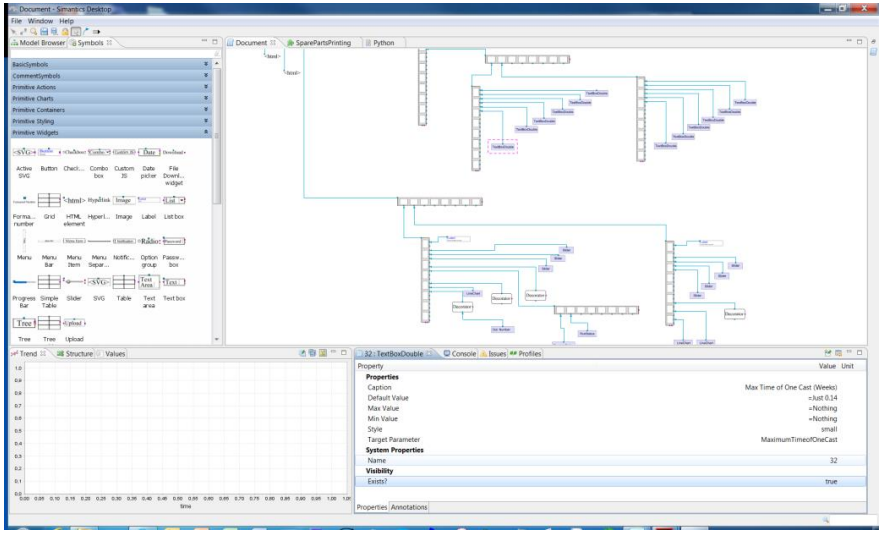
Notes on virtual upscaling chains



Annual e-workshop

Virtual Upscaling

2017-12-20

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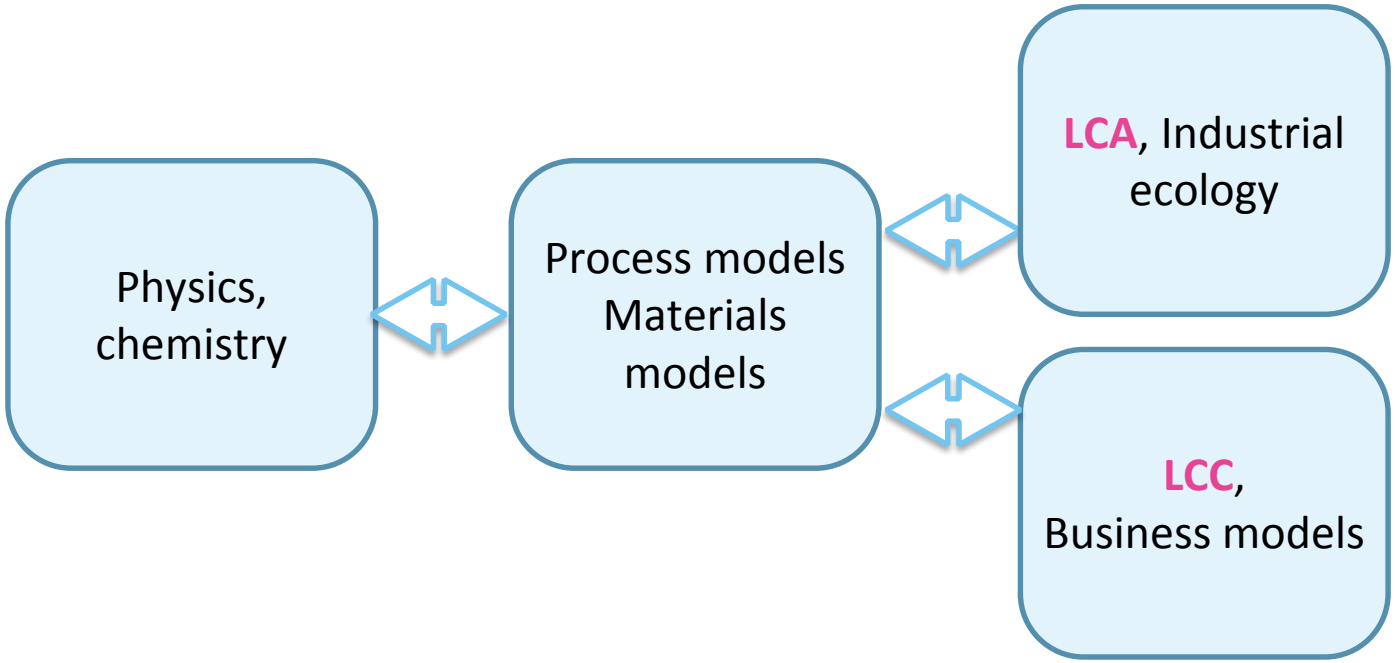
Model-based Virtual Upscaling



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Upscaling chains covered in the project so far

- There are several modeling chains (level couplings) which we have covered so far in the various WPs

- CFD – Thermodynamics/Process simulation software (Fluent – HSC-Sim)
- Direct coupling (HSC-Sim integrated into MF, Fluent communication channel exists)

- Process simulation models – Life Cycle Analysis models (HSC-Sim - SULCA)
- Both models integrated into MF

- Thermo-mechanical model coupling (Finite elem. – Finite diff.)
- Direct coupling

- Structural models – CFD (Digimat, Moldflow-Ansys)
- Direct coupling

- Thermokinetic model – System dynamic model (inhouse codes, freeware)
- Both models interated into MF (http://modellingfactory.simupedia.com/amdh/)

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General points of future directions

- Semantic integration platform: rapid integrations possible, **deeper integration** levels than just data integration possible
- **Various modeling paradigms and languages** can be used together
- Allow users to user their favorite tools in data production and analysis
- Not everything should be integrated: concentrate on **model/paradigm 'families'**
- Interface with HPC, do not compete with specialized solutions (e.g. support work flow management, batch jobs etc, data formats etc.)
- Support **surrogate model construction** (fast to simulate, automatable). In other words, computationally heavy models are transformed into more easily compatible fast models, which are suitable for web apps, optimization (iterative usage)

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Demo: Modelling Factory

- https://modellingfactory.org/

- Interested in trying it out yourself? Check out instructions at
- https://modellingfactory.org/instructions

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