Karlsruhe Institute of Technology

Simulation and Data Life Cycle Labs at SCC

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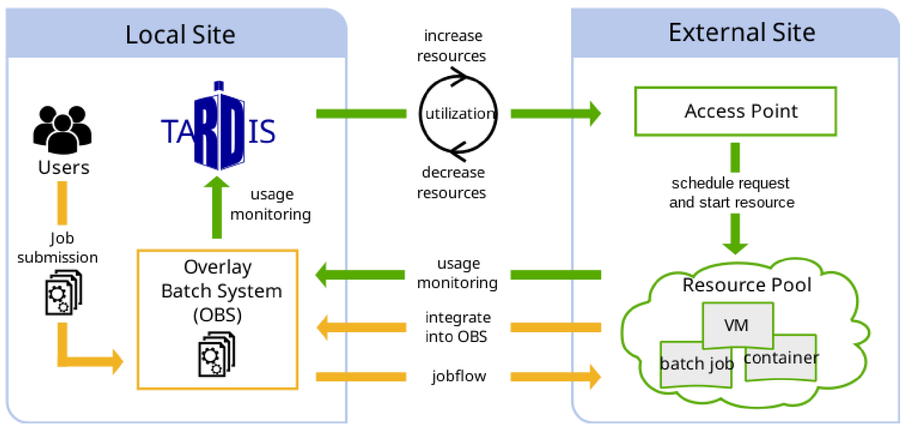
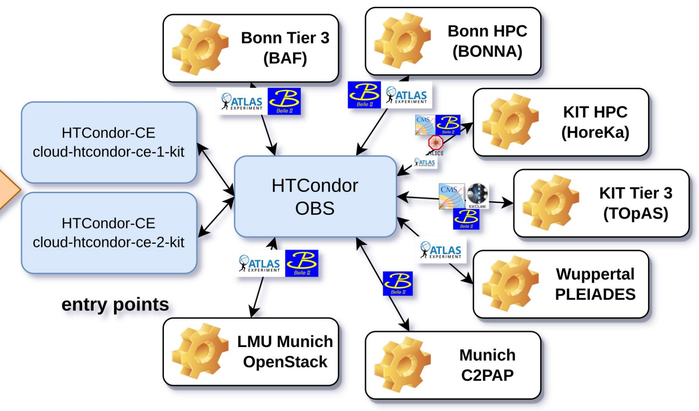
SDL Particle and Astroparticle Physics



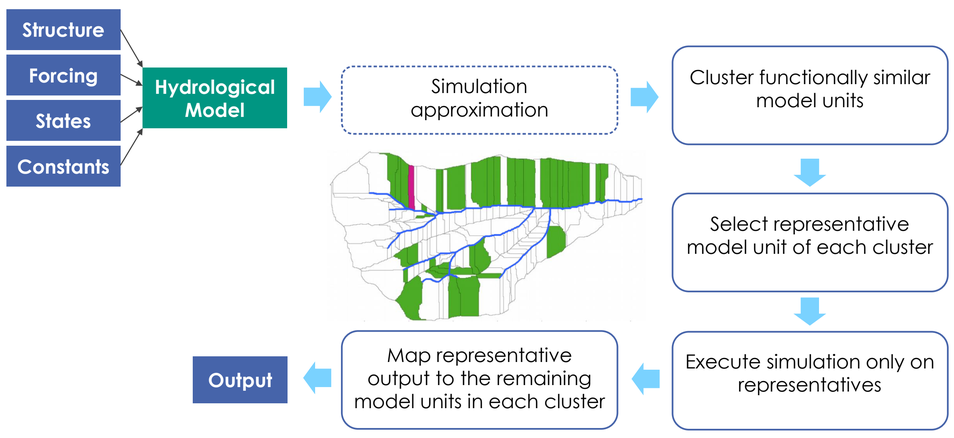
The **COBalD/TARDIS** software suite developed in a joint effort lead by the SDL PAP enables the transparent access of users to remote compute resources such as HPC systems.

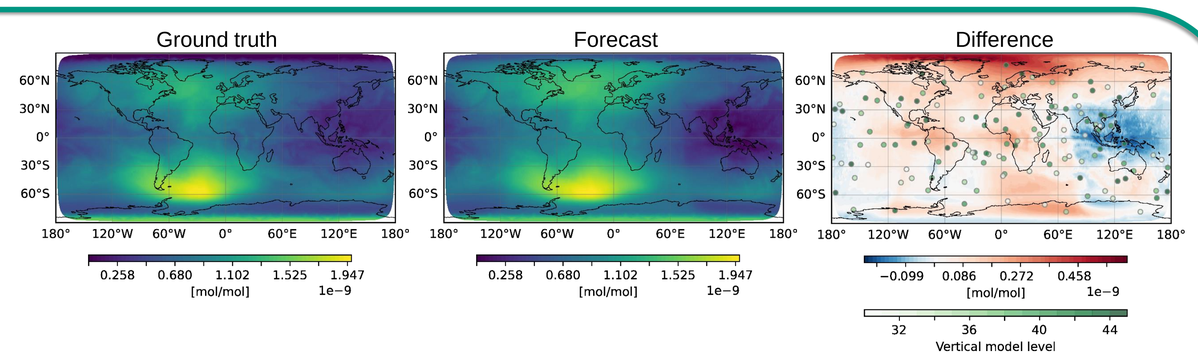


HoreKa is the major compute resource provider to the German overlay batch system (OBS) for HTC jobs of scientists from particle and astroparticle physics. The OBS is operated by **GridKa and SDL PAP** using COBalD/TARDIS.

SDL Earth System Science

Effective and computationally efficient approximation of environmental simulations using machine learning methods that yields outputs acceptable for domain scientist





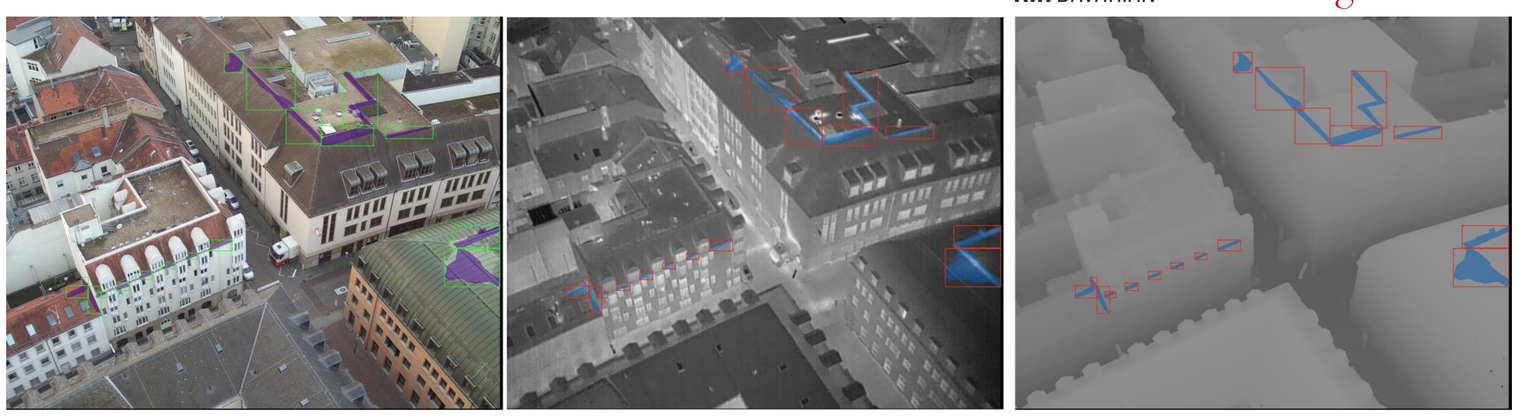
- Using similarities to approximate complex simulations through machine learning
- Tuning the uncertainty of the approximated model by adjusting the number of clusters while considering the corresponding computation time
- Replacing compute-intensive simulations with neural networks models
- Execution of environmental simulations using less computing resources

DOI: 10.5445/IR/1000169007

SDL Engineering for Energy and Mobility

- UN estimates ~50% of building energy used for thermal conditioning
- **Thermal bridges** areas with high **thermal conductivity** → lost energy
- **70 GB RGBTH multi-spectral drone data** collected, published as open data
- Automatic detection: **data-parallel SWIN-T** transformer
- Measurement of **energy for AI**

AIR BAVARIAN Carnegie Mellon



RGB

https://github.com/Helmholtz-AI-Energy/TBBRDet
https://zenodo.org/records/7022736

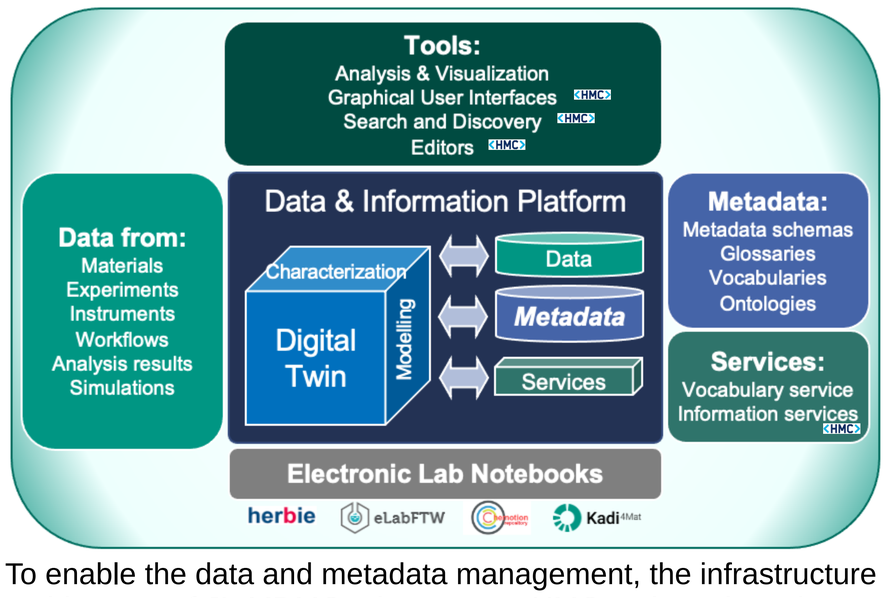
Thermal

Deep learning approaches to building rooftop thermal bridge detection from aerial images
DOI: 10.1016/j.autcon.2022.104690

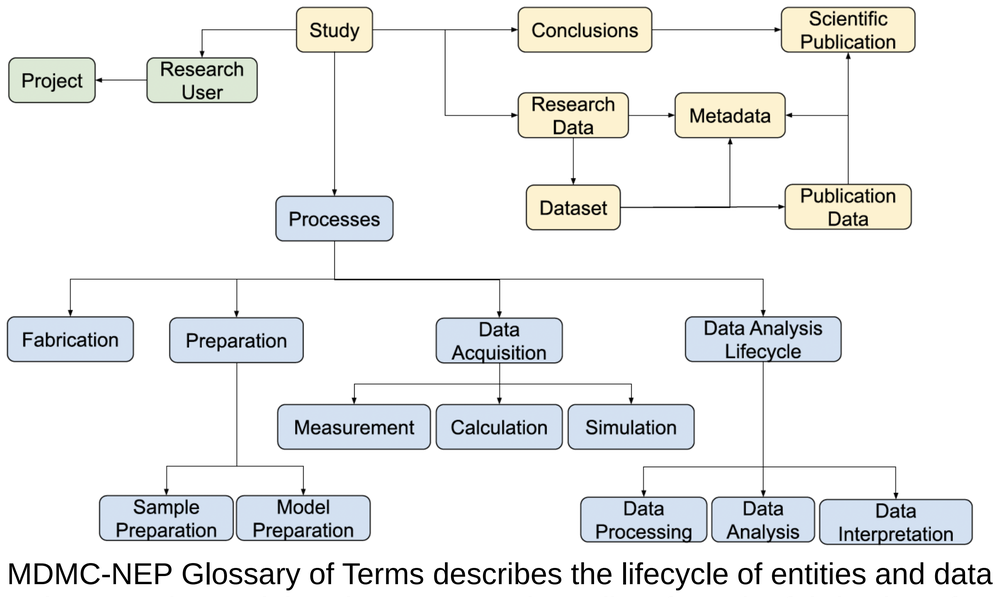
Height

Thermal Bridges on Building Rooftops
DOI: 10.1038/s41597-023-02140-z

SDL Materials Science



To enable the data and metadata management, the infrastructure architecture of JL-MDMC adopts many HMC tools and services as key building blocks, which are also used in other projects related to materials science.



The MDMC-NEP Glossary of Terms describes the lifecycle of entities and data collected in nanoscience and materials science research studies, from the fabrication of a material to the scientific publication, and then archived for further data discovery and data sharing.

DOI: 10.5281/zenodo.10663833