

Programming and Execution of Multiscale Applications

Katarzyna Rycerz¹, Eryk Ciepiela², Tomasz Gubała^{2,3}, Daniel Harężlak², Grzegorz Dyk², Jan Meizner², and Marian Bubak^{1,2,3}

¹AGH University of Science and Technology, Department of Computer Science, Krakow, Poland

²AGH University of Science and Technology, ACC CYFRONET AGH, Krakow, Poland

³Informatics Institute, University of Amsterdam, The Netherlands



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Goal

- The environment for composing multiscale applications
 - built from single scale models implemented as scientific software components
 - distributed in various European e-infrastructures
- Applications structure described in the Multiscale Modelling Language (MML)
 - single scale sub-modules
 - scaleless mappers
 - the coupling topology describing their connections

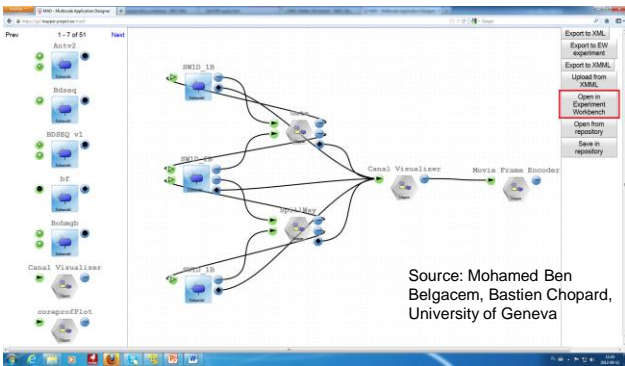
Tools

- MAPPER Memory** is a **semantic-aware persistence store** to record metadata about model and scales
- Multiscale Application Designer** is a user-friendly **visual composition tool** transforming high level MML description into executable GridSpace experiment
- GridSpace Experiment Workbench** supports **execution** and **result management** of generated experiments on infrastructures via interoperability layers
- Provenance Tracking System** supports storing and providing detailed **information about experiments execution and results**

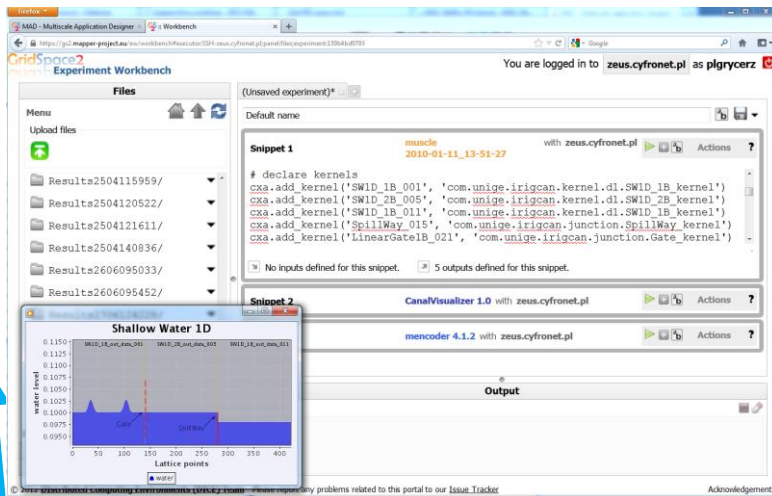
2. Compose Application in MAD <https://gs2.mapper-project.eu/mad>

3. Execute experiment in GridSpace EW <https://gs2.mapper-project.eu/ew>

4. View results



Source: Mohamed Ben Belgacem, Bastien Chopard, University of Geneva

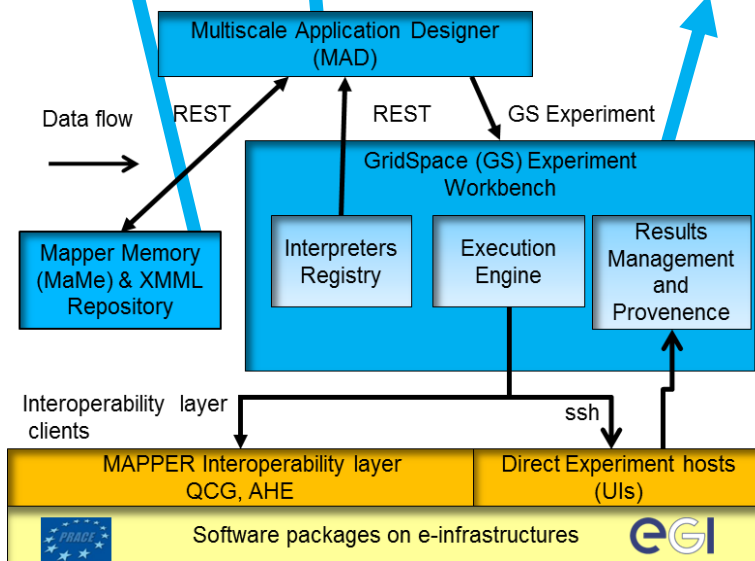


1. Register modules in MaMe, store information about MML-based applications structure <http://gs2.mapper-project.eu/mame>

Used in simulation of

- blood flow
- irrigation canals
- clay-polymer nanocomposites,
- fusion
- gene-regulatory networks.

20 single-scale models and 25 mappers are already registered in the MaMe



Conclusions

- Convenient composition of multiscale application variants
- Support for reusability of simulation models
- Easy usage of different resources in a single experiment
- Support for sharing infrastructure independent experiments
- Easy usage through Web interface
- Support for interactive execution

References

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Acknowledgements

This research was partially supported by the EU ICT MAPPER project (grant 261507). The authors thank A.G. Hoekstra, J. Borgdorff, C. Bona Casas, E. Lorenz, M. Ben Belgacem, and B. Chopard.

