

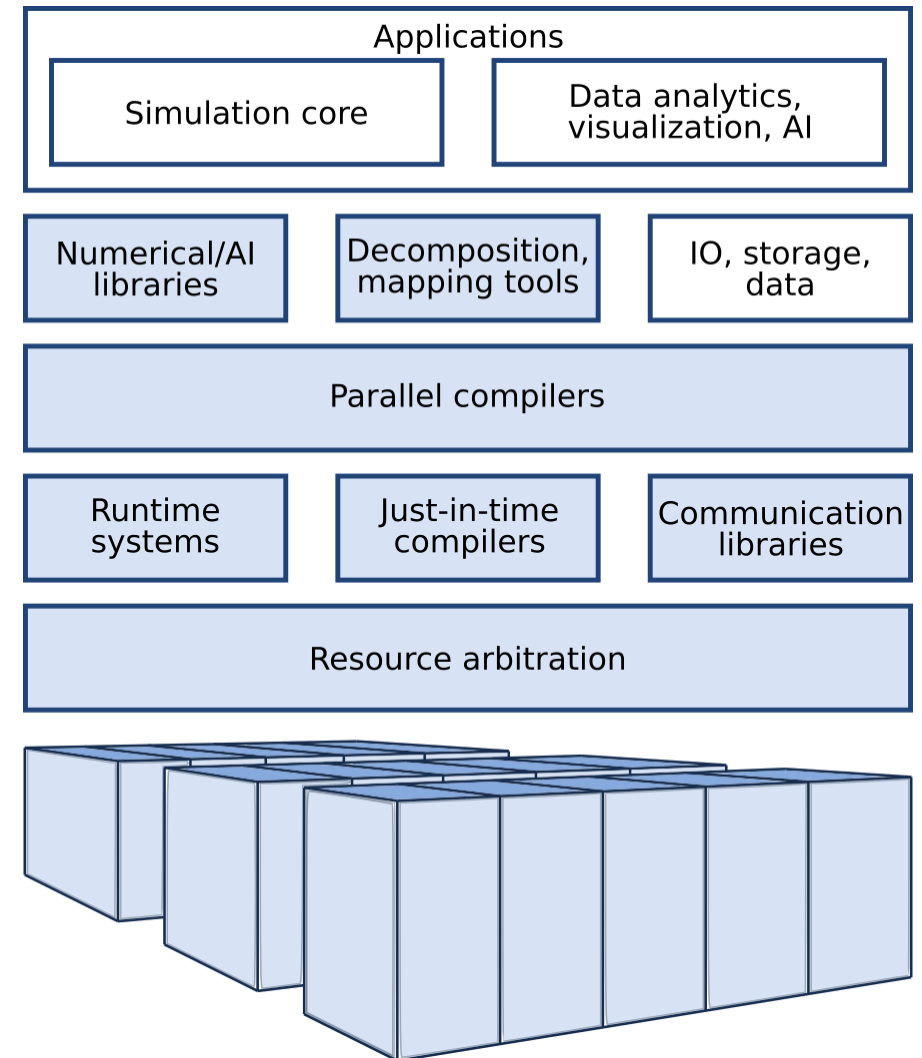
NumPEX: Exa-Soft (PC2)

High Performance Computing software and tools



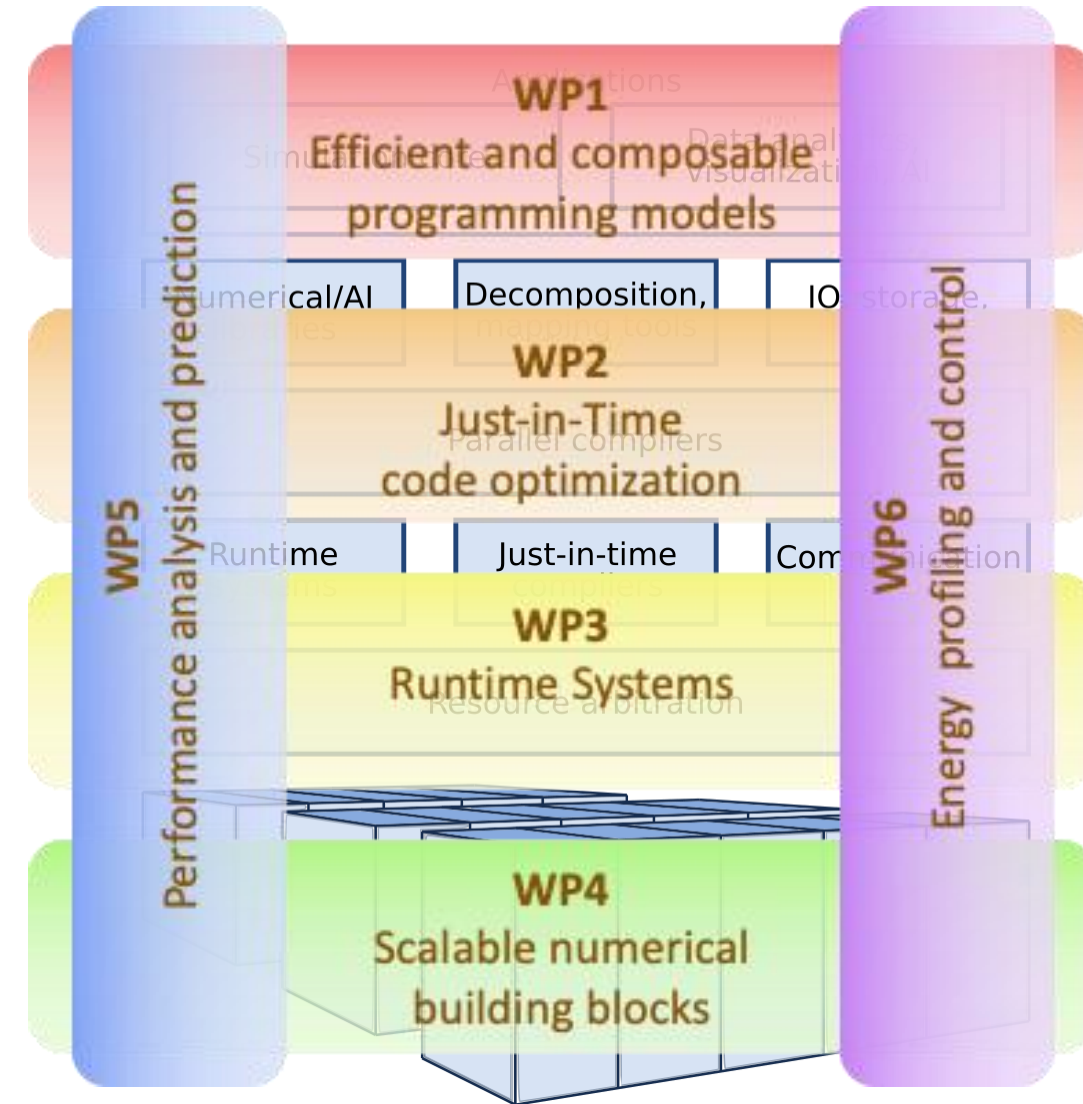
Exa-Soft

- Challenges:
 - Harness the power of highly accelerated, large scale architectures
 - Support portable functionality and performance across different architectures
 - Provide better separation of concerns between algorithms and implementations
- Objectives:
 - Develop programming models, runtime systems and compilers to achieve high productivity and portable performance on large-scale heterogeneous systems
 - Develop new performance and energy profiling and optimization approaches and tools
 - Produce a new generation of scalable, portable and composable numerical libraries



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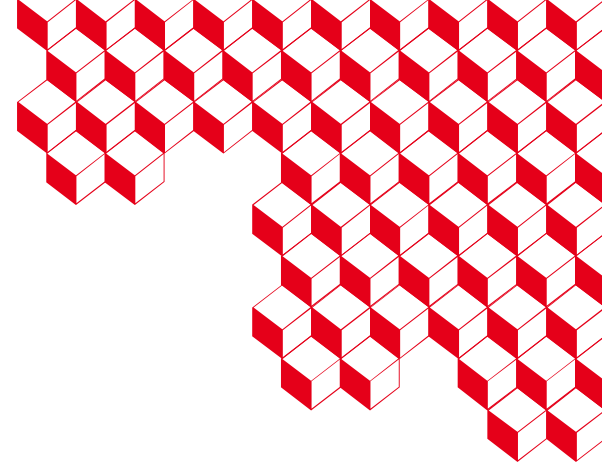
Exa-Soft: High-level approaches for parallel software (WP1)

- Challenges:
 - Porting code to new machines
 - Machine heterogeneity
 - Debugging of complex software stack
 - Development time / code reuse
 - Separation of concerns between domain experts and HPC experts
- Objectives:
 - Abstract the application (code and data) from the machines
 - Improve code composability
- Expected key outcomes:
 - C++ complexity disambiguation for advanced optimizing and parallelizing code transformations
 - Tools for parallel heterogeneous scientific application at scale
 - Foundation of an HPC composition model
 - High level data description and partitioning for reusable parallel building blocks

Exa-Soft WP1 / CExA interface



- Exa-Soft will try to answer the following questions:
 - C++ complexity disambiguation for advanced optimizing and parallelizing code transformations
 - Tools for parallel heterogeneous scientific application at scale
 - Foundation of an HPC Composition Model
 - High level data description and partitioning for reusable parallel building blocks
- Use cases :
 - Application sharing with CExA
 - Application outside CEA in the case of Exa-Soft
- Human resources:
 - 4 PhDs shared with other WPs
 - 2 post-doc (2 years)
 - Engineer 36 months



Thank you

CEA,DAM,DIF

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