

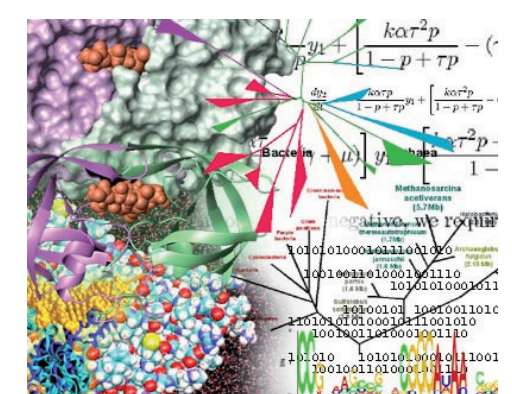


Multiscale **AP**PLICATIONS on European e-inf**RA**STRUCTURES

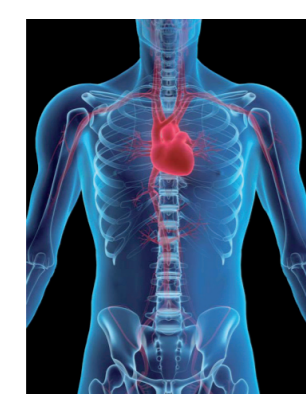


MAPPER develops strategies and will provide tools, software and services that permit loosely and tightly coupled multiscale computing in a user friendly and transparent way. This will be accomplished by deploying a computational science environment on and across European e-infrastructures. By taking advantage of existing software and services, and by collaborating with other projects, MAPPER will result in high quality components.

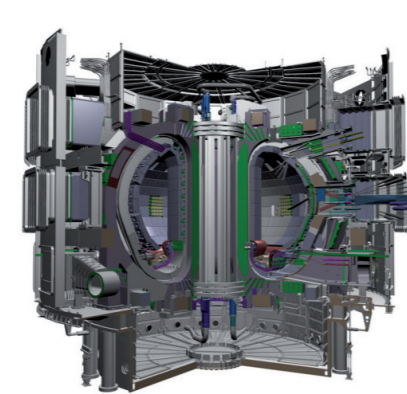
The project is driven by seven challenging exemplar applications from five user communities.



computational biology



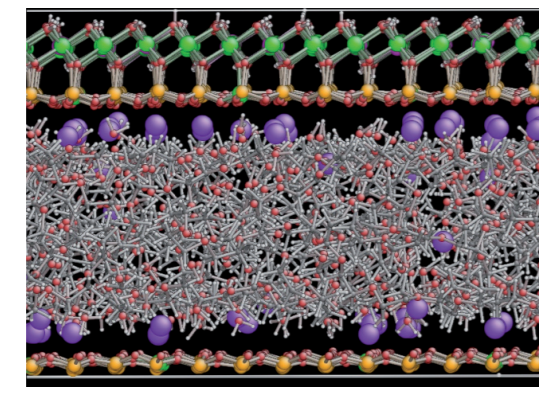
virtual physiological human



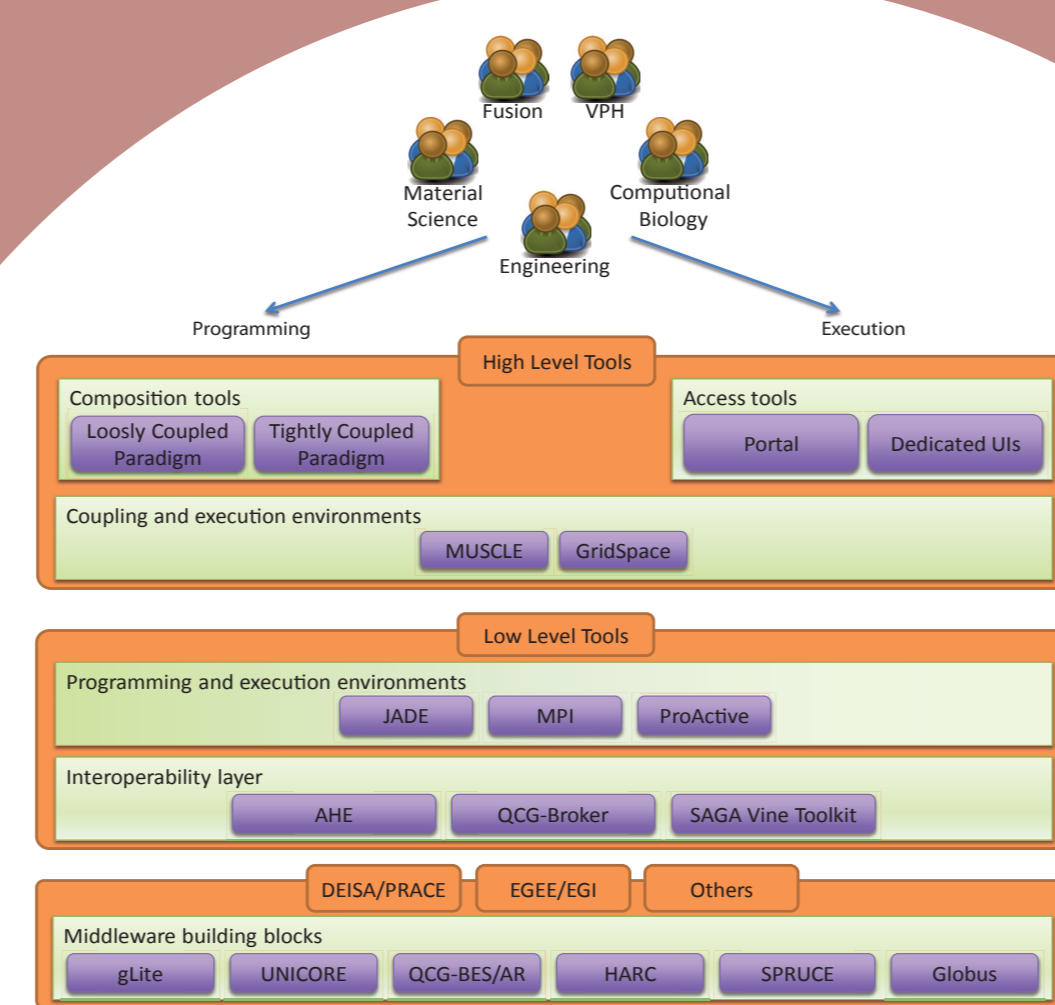
fusion



hydrology



nano material science



Our solutions will enable distributed multiscale computing for any multiscale models fitting into our paradigm and MAPPER opens up to other user communities.

Multidisciplinary and multiscale models, require extreme scale computing capabilities. We will work together closely with European resource providers and also have significant trans-Atlantic Grid and HPC experience.



<http://www.mapper-project.eu/>



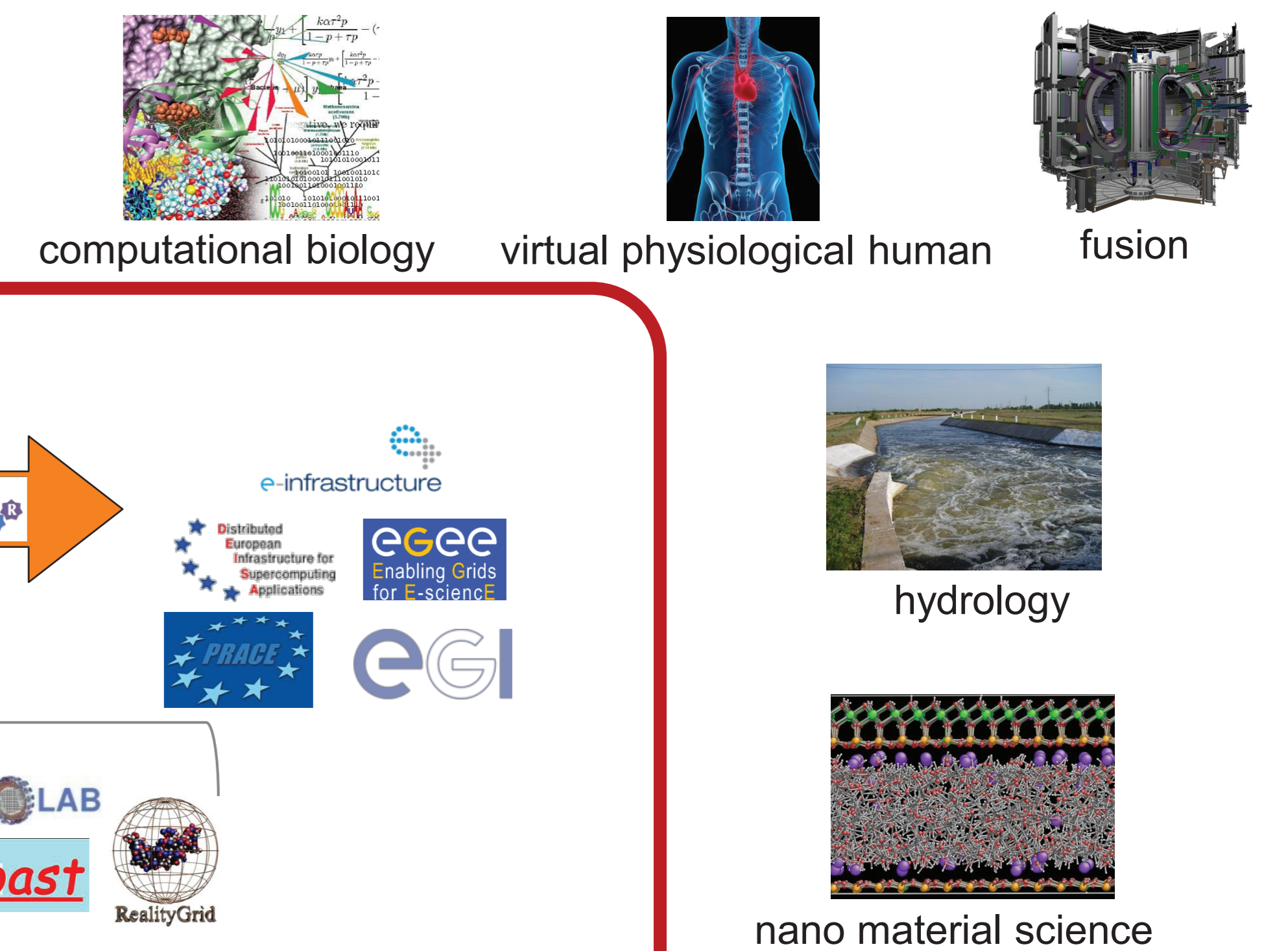
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Multiscale **AP**PLICATIONS on European e-inf**RA**STRUCTURES

Motivation

Scientists are often faced with modelling **multiscale, multi discipline** systems
 Simulating such models in three dimensions requires large scale computing capabilities
 Existing modelling frameworks and middleware for distributed simulations do often not suffice

Applications



Ambition

Develop computational strategies, software and services for distributed multiscale simulations across disciplines exploiting existing and evolving European e-infrastructure
 Deploy a computational science infrastructure
 Deliver high quality components aiming at large-scale, heterogeneous, high performance multi-disciplinary multiscale computing
 Advance state-of-the-art in high performance computing on e-infrastructures
 enable distributed execution of multiscale models across e-infrastructures

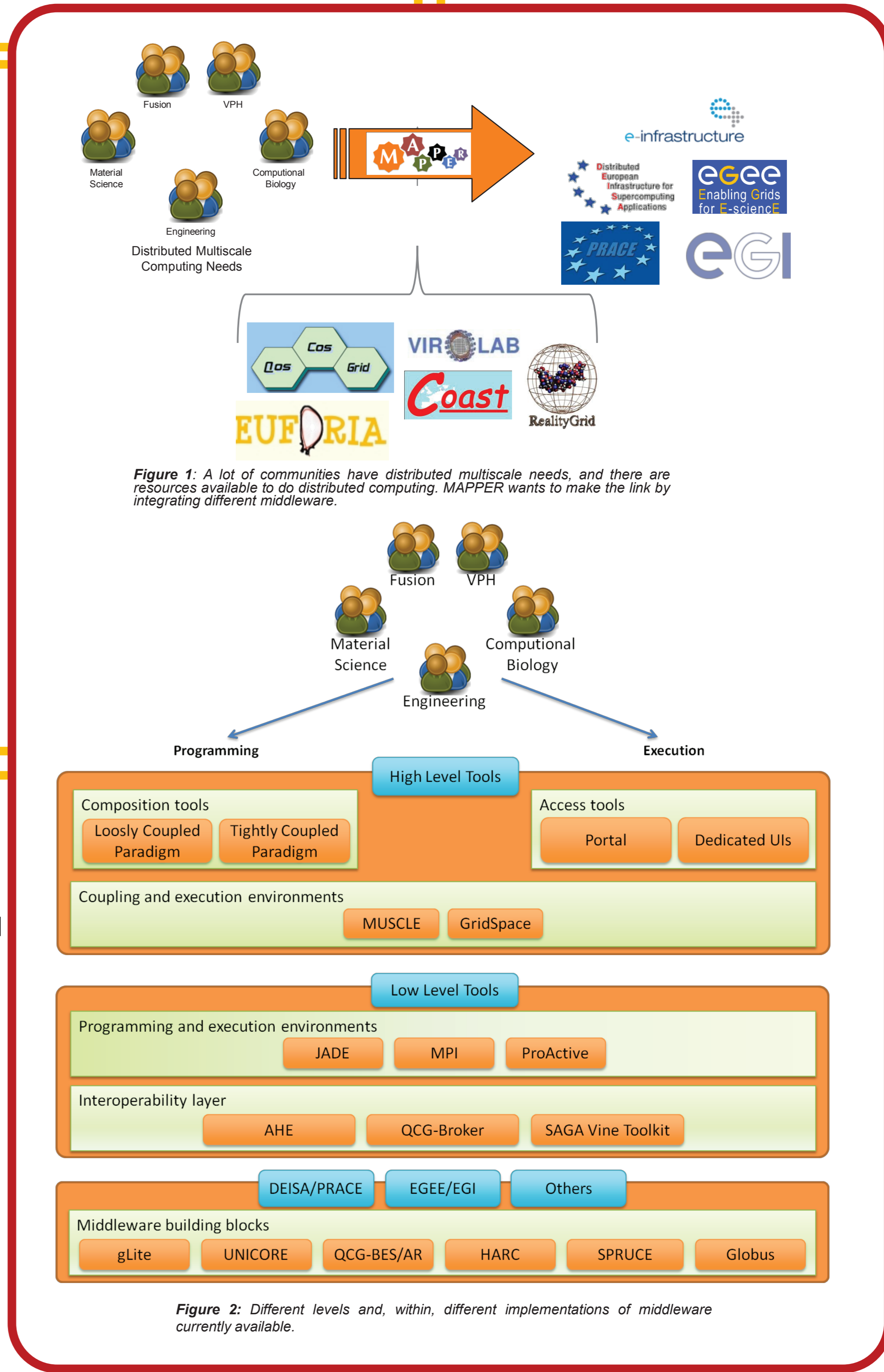


Figure 1: A lot of communities have distributed multiscale needs, and there are resources available to do distributed computing. MAPPER wants to make the link by integrating different middlewares.

Services

Interoperability services:
 can be accessed by users and applications
 form an abstraction layer to grid resources and middleware
 are responsible for providing access to resources and for synchronizing and distributing applications.
 For example: multiscale simulations can be controlled by a broker developed in the QosCosGrid project

Many middleware services do not yet interoperate. where appropriate, this should change

the fast track

will start working on application deployment **as early as possible**
 manually adapts, integrates and deploys a minimal set of infrastructure components to enable multiscale applications

the deep track

will work on higher level services and full integration
 realises the full and integrated MAPPER infrastructure, enabling the coupling of multiscale components

Internationally

MAPPER partners have significant experience with the **trans-Atlantic grid** and HPC
 Collaborate with the US **TeraGrid** to integrate infrastructures across the globe.

