Bringing Neuroscience to High-Performance Computing

The role of the Jülich Supercomputing Centre in the Human Brain Project
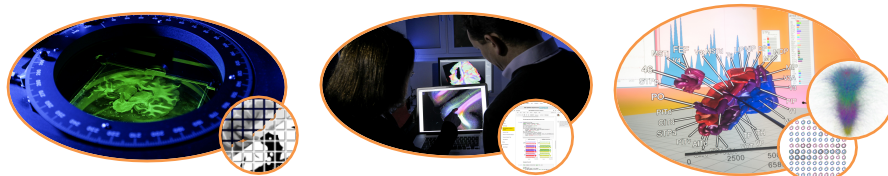
4 October 2018   Anna Lührs

Bringing Neuroscience to HPC

HBP scientists & neuroscience community

Neuroinformatics, Simulation, Neurorobotics

Platform services & middleware

Running large-scale, data intensive, interactive brain simulations

Managing large amounts of data used and produced in the HBP

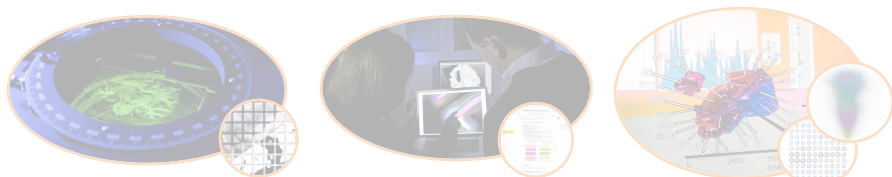Managing complex workflows comprising concurrent simulation, data analysis & visualization workloads

High Performance Analytics & Computing (HPAC) Platform

FENIX
RESEARCH INFRASTRUCTURE

JSC has key roles in HPAC and Fenix

HBP scientists & neuroscience community

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Platform services & middleware

High Performance Analytics & Computing (HPAC) Platform

- JSC is the German site among the five supercomputing centers in HPAC and Fenix
- Thomas Lippert leads the HBP's HPAC Platform Subproject together with Colin McMurtrie (CSCS) and Hans Ekkehard Plesser (NMBU & INM-6)
- Dirk Pleiter is the Technical Coordinator of the ICEI project building the Fenix Infrastructure
- Management and coordination of HPAC and Fenix
- Architecture specification for HPAC and Fenix
- Use case management & requirements analysis for HPAC and Fenix

HPAC Platform integration & operation

HBP scientists & neuroscience community

Neuroinformatics, Simulation, Neurorobotics

Platform services & middleware

High Performance Analytics & Computing (HPAC) Platform

Integration & Operation

- Integration of HPC systems and storage in HPAC and Fenix
- Pilot systems JULIA and JURON, design based on HBP requirements
- HPAC middleware
- Security
- Central HPAC LDAP server
- User support
  - Contribution to HPAC level 1 support (helpdesk)
  - Advanced support and co-developments by SimLab

HPAC Platform research & development

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Platform services & middleware

Research & Development in HPAC
- Development of data federation and data-intensive computing technology
  - Data location and transfer services
  - Data handling for interactive analysis and visualisation
- Enhancements and operation of the UNICORE middleware
- Co-development of complex (multi-site) workflows with users
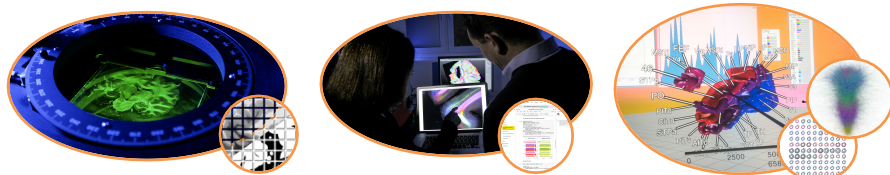
Development needs for Fenix
- JSC leads envisaged ICEI R&D procurements of
  - Fenix User and Resource Management Service
  - Data mover - data transfer between archival and active data repositories
- ➢ Talk by Thomas Schulthess on Fenix

Application software development

HBP scientists & neuroscience community

Neuroinformatics, Simulation, Neurorobotics

Platform services & middleware

Simulator and tools development

➢ Talk by Abigail Morrison about contributions of SimLab Neuroscience

JSC contributors to HBP

Sander Apweiler

Anne Carstensen

Rajalekshmi Deepu

Sandra Diaz

Jochen Eppler

Steffen Graber

Björn Hagemeier

Andreas Herten

Carsten Karbach

Wouter Klijn

Dorian Krause

Anne Küsters

Charl Linssen

Thomas Lippert

Anna Lührs

Daniel Mallmann

Abigail Morrison

Andreas Müller

Ralph Niederberger

Lena Oden

Boris Orth

Alexander Peyser

Meredith Peyser

Dirk Pleiter

Bernd Schuller

Bastian Tweddell

... and many more

Bringing neuroscience to HPC