# Workflows

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# Outline

- **Work done in 2006/2007**
- **EUFORIA:**
  - Short presentation
  - WP4 : Workflows

# Work done in 2006/2007

- **Comparison of workflows:**
  - Kepler (Kepler project)
  - Salome (Projet Salome)
- **Decision to try to use Scilab as a possible replacement of Matlab (waiting for version 5),**
- **First tests on grids using EGEE:**
  - Installation of Kepler on the GRIF IRFU UI,
  - Tests of submission, status query and output retrieving.

# EUFORIA

- **EU Fusion fOR Iter Application: project funded by the EU under the 7th Framework Programme (FP7),**
- **Goal: provide a comprehensive framework and infrastructure for core and edge transport and turbulence simulation, linking grid and High Performance Computing (HPC), to the fusion modeling community.**
- **Web site**

# EUFORIA: Objectives

- **Deployment of a grid service**
- **Deployment of an HPC infrastructure**
- **Development of a portal for general user access**
- **Adaptation of a standard ontology for edge?\core simulations**
- **Adaptation and optimization of fusion simulation tools and codes targeting**
  - Serial grid applications
  - Parallel grid applications
  - High Performance Computing
- **Development of a framework or code platform tool providing**
  - Dynamic workflow orchestration
  - High quality Visualization
  - Data mining capabilities
- **Middleware development needed for deployment of computational resources from framework tools**

# EUFORIA: Consortium

- Chalmers University of Technology (*Coordinator*) from Sweden
- Max Plank Institute for Plasma Physics (IPP) from Germany
- Centro Superior de Investigaciones Científicas (CSIC) from Spain
- Centro de Investigaciones Energéticas, Medio Ambientales y Tecnológicas (CIEMAT) from Spain
- Forschungszentrum Karlsruhe (FZK) from Germany
- Finnish IT Center for Science (CSC) from Finland
- Abo Akademi University (ABO) from Finland
- University of Edinburgh (UEDIN) from United Kingdom
- Barcelona Supercomputing Center (BSC) from Spain
- French Atomic Energy Commission (CEA) from France
- University Louis Pasteur - Strasbourg I (ULP) from France
- University of Ljubljana (UOL) from Slovenia
- Poznan Supercomputing and Networking Center PSNC from Poland
- Italian National Agency for New Technologies, Energy and the Environment (ENEA) from Italy

# EUFORIA: structure

- **Networking activities:**
  - NA1: Management
  - NA2: User Document and Training
  - NA3: Dissemination
- **Service activities/Infrastructure deployment and Operation:**
  - SA1: Grid Infrastructure
  - SA2: HPC infrastructure
  - SA3: User Support for HPC and Grid activities
- **Joint Research Activities:**
  - JRA1: Adaptation of codes and tools for Grid infrastructure
  - JRA2: Adaptation of codes and tools for HPC infrastructure
  - JRA3: Physics integration/Workflows orchestration tools
  - JRA4: Visualization

# EUFORIA: kick-off meeting 01/08

- Code Interfaces and Data Structures : Tools
- Fusion oriented research at INRIA and in the CALVI team
- JRA4 Overview and plans
- JRA3 and JRA4 discussion
- JRA3
- Overview of the Kepler platform
- JRA3 & JRA4 parallel session
- JRA3, SA1, SA2 & SA3 parallel session

# Future: Transparent execution & Interactivity

- The actual usage is not adapted to the simulation:
  - **JDL**
  - **batch (job-submit, test of the status…)**
  - **Data as files (=>GridFTP, SE, …)**
- Work waiting for data:messages:
  - **Basé sur interactiv GRID (glite, glogin, Crossbroker)**
  - **Int.eu.grid: http://www.interactive-grid.eu**

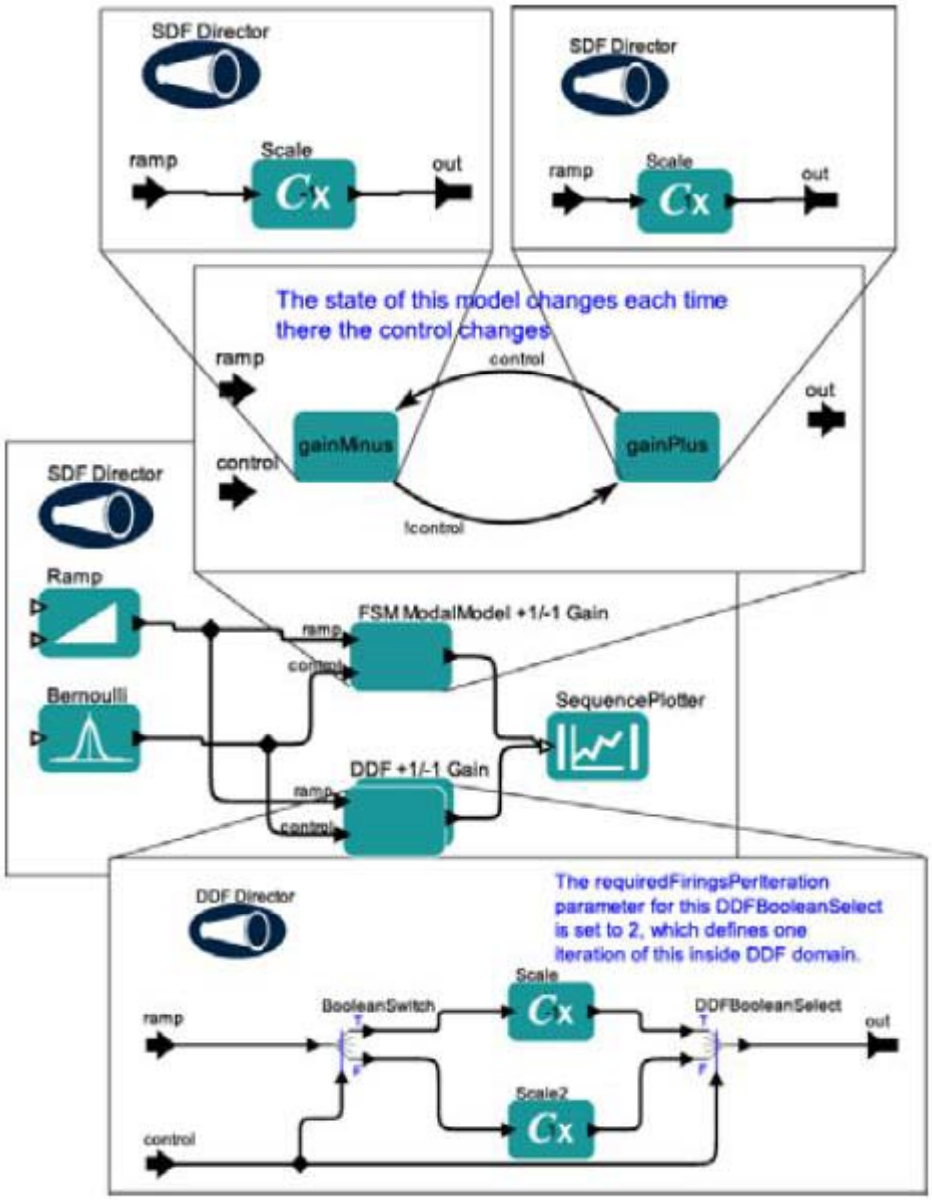
# Task: Codes orchestration

- **What?**
  - Investigate distributed Kepler as a tool for split workflow: part of the workflow will run on the gateway, on EGEE and on HPC (work with San Diego developers)
  - Investigate Gridway to launch Kepler
  - Develop a tool to convert the MOML (description file of Kepler) to Gridway
  - Done by CEA
  - Mid 09

# Model of computations: directors

- Data driven:
  - Dataflow oriented model
  - Modules are triggered by the data arrival
  - SDF (synchronous data flow) sequential execution
  - DDF (Parallel data flow) // execution
- Message driven:
  - Message oriented model (network of processes)
  - Communication by passing messages through FIFO
  - PN (process networks) // execution
- Time driven
  - Time-oriented models
  - DE (discrete event)
    - One global time
    - Events can be posted at some specific time
  - CT (Continuous Time)
    - Use to solve differential equations (integrator with feedback).
    - Implemented solvers:
      - Forward & backward Euler
      - 2(3)-order Runge-Kutta
      - Trapezoidal rule
- Finite State Machine … many others directors

# Mixing directors



# Questions

- I am not sure to be able to answer your questions but I can relay them to Bernard Guillerminet.