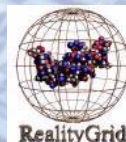


The RealityGrid Portal

RealityGrid

<http://www.realitygrid.org/>



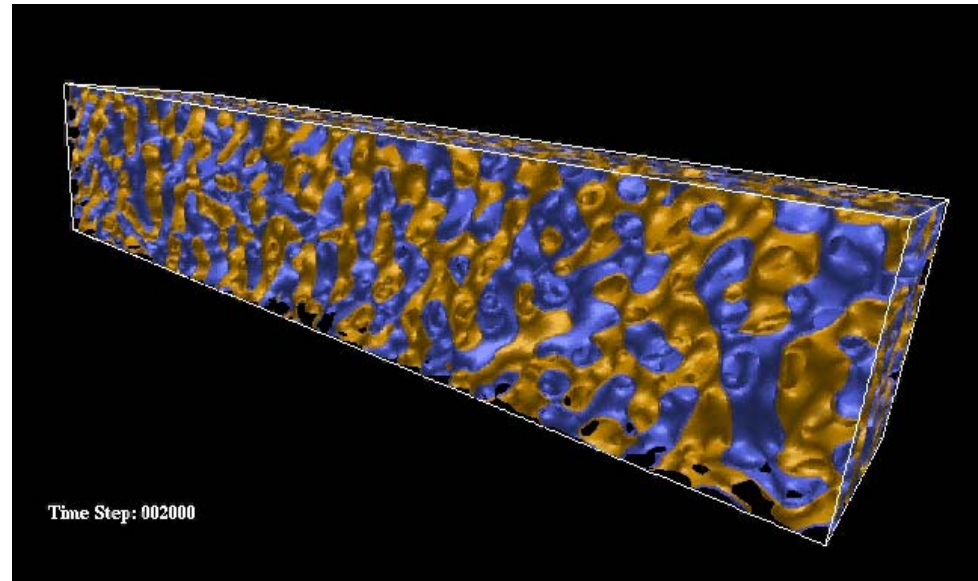
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- A little background on the RealityGrid project.
- The RealityGrid Portal – a lightweight client from which to control complex, remote simulations.
- Function and make-up of the RealityGrid Portal.
- A demo – the RealityGrid Portal in action!



What is RealityGrid?

- An EPSRC project to design and implement a **Grid-enabled environment for computational steering**.
- Primary motivation is condensed matter physics:
 - multi-component fluids;
 - colloidal particles;
 - surfactants;
 - large biological molecules,modelled using: Lattice Boltzmann, molecular dynamics, and coupled models.

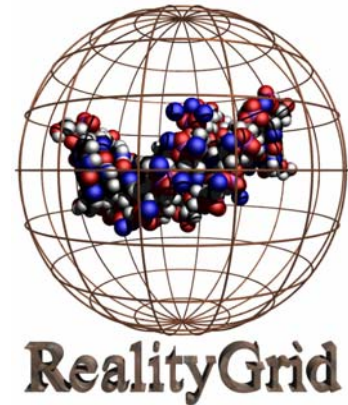


Simulation of a binary fluid under shear.

RealityGrid members are Edinburgh, Loughborough, Manchester, Oxford, and UCL.

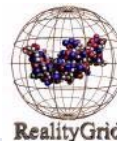


- RG target simulation typically takes days to complete, running on HPC systems such as NGS or HPCx.
- Computational steering allows scientist to interact with live simulation as it runs, to:
 - monitor progress;
 - control parameters.
- RealityGrid provides a steering library and API:



<http://www.realitygrid.org/middleware.html>

based on **OGSI::Lite** / **WSRF::Lite** Grid middleware.

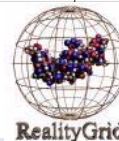


- A gateway to the RealityGrid Steerer that brings control of a remote simulation to the scientist.
- Developed as a **portlet application** ...
- ... minimal requirements on the client – a standard web browser such as Internet Explorer or Firefox.

The screenshot shows the RealityGrid Portal interface in a Mozilla Firefox browser window. The browser address bar shows the URL: <http://port.epcc.ed.ac.uk:8080/gridsphere/gridsphere?cid=65&JavaScrip>. The page title is "GridSphere Portal" and the main heading is "gridsphere portal framework". The page is divided into several sections:

- Welcome:** Administration, **realitygrid**
- ResourceDiscovery**, **ParameterSteering**, **HistoryPlot**
- Parameter Steering** (Active Portlet):
 - Application Control:** Remote application status: RUNNING. Buttons: Pause Application, Stop Application.
 - Parameter Steering Table:**
- Buttons:** Get Next Timestep, Apply changes, Resync with application
- Footer:** <http://www.realitygrid.org/> (Version 1.0, August 2005)

Parameter name	Current value	New value
Actual temperature	1.4883135491735588E-5	
Application	Fluctuating lattice Boltzmann	
CPU_TIME_PER_STEP	9.14	
Chk_Frequency	0	<input type="text" value="0"/>
Fluid viscosity	0.025	<input type="text" value="0.025"/>
Ghost mode	0	<input type="text" value="0"/>
Ghost temperature	7.878794565994188E-6	
IO_Frequency	0	<input type="text" value="0"/>
Input temperature	0.0050	<input type="text" value="0.0050"/>
Mean rho^2	1.4635090733583457E-5	
Mean v_x^2	4.953939428675223E-6	
Mean v_y^2	4.956117953760481E-6	
Mean v_z^2	4.973078109300071E-6	
SEQUENCE_NUM	31	
STEERING_INTERVAL	1	<input type="text" value="1"/>
THUMBNAIL	Binary data containing 4096 bytes	<input type="button" value="Visualise"/>
THUMBNAIL_HEIGHT	64	<input type="text" value="64"/>
THUMBNAIL_MAX	1.0	<input type="text" value="1.0"/>
THUMBNAIL_MIN	-1.0	<input type="text" value="-1.0"/>
THUMBNAIL_WIDTH	64	<input type="text" value="64"/>
TIMESTAMP	No value	
Target temperature	2.5E-5	



Three types of functionality

Resource discovery:

- facilitate discovery of/connection to a remote simulation (see Fig.).

Control:

- Pause, resume, or stop the remote simulation;
- Monitor and adjust key parameter values on running simulation.

...

GridSphere Portal - Mozilla Firefox

http://bort.epcc.ed.ac.uk:8080/gridsphere/gridsphere?cid=63

GridSphere Portal Framework
open-source / portlet jsr168 compliant

Welcome, Root User

Resource Discovery

Query Service Group Registry

Enter the GSH for the Service Group Registry:

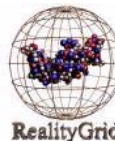
Creator Name	Creator Group	Start Time	Application	Task Description	Hostname	N. processors	
maem2	SVE Group	2005-06-29T14:31:51Z	lbomd	test			Connect
george beckett	NeSC	2005-08-10T10:59:59Z	Ludwig	Demo RGP to Andy.	emerald.epcced.ac.uk 1		Connect
maem2	SVE Group	2005-08-08T14:14:46Z	lbomd	test			Connect
mabdr2	SVE Group	2005-04-29T07:39:44Z	tb2-mpi	2x1_TiAdatom_Sr			Connect
madb3	SVE Group	2005-08-09T07:35:57Z	lbomd	Mg347-10keV-MgInO			Connect
mabdr2	SVE Group	2005-08-08T08:52:14Z	tb2-mpi	2x1_TiAdatom_TI			Connect
maxm	SVE Group	2005-06-15T16:02:02Z	lbomd	Fe nanoindentation			Connect
maxm	SVE Group	2005-06-15T16:04:42Z	lbomd	Fe nanoindentation			Connect

Hover mouse over information icon to view GSH

Connect to steerer

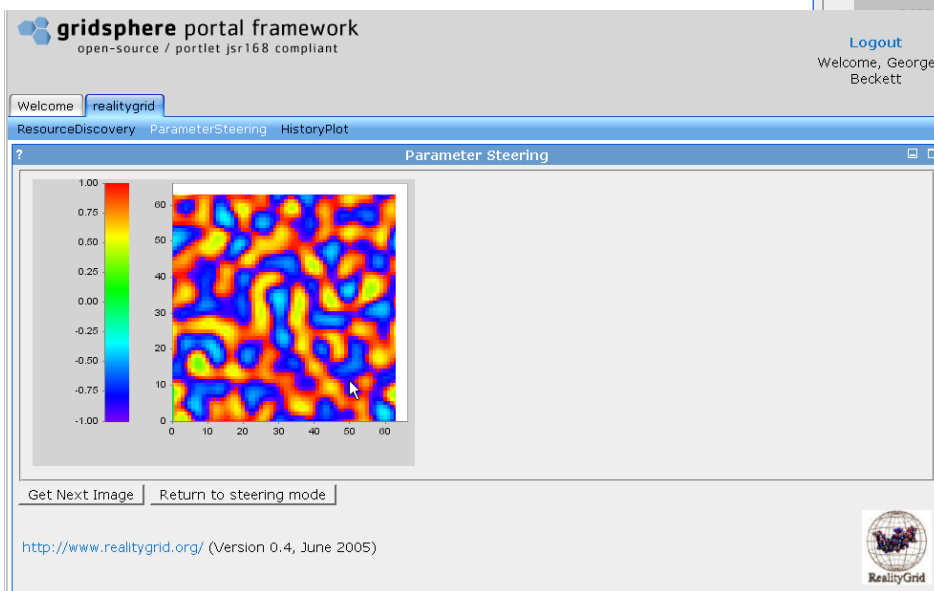
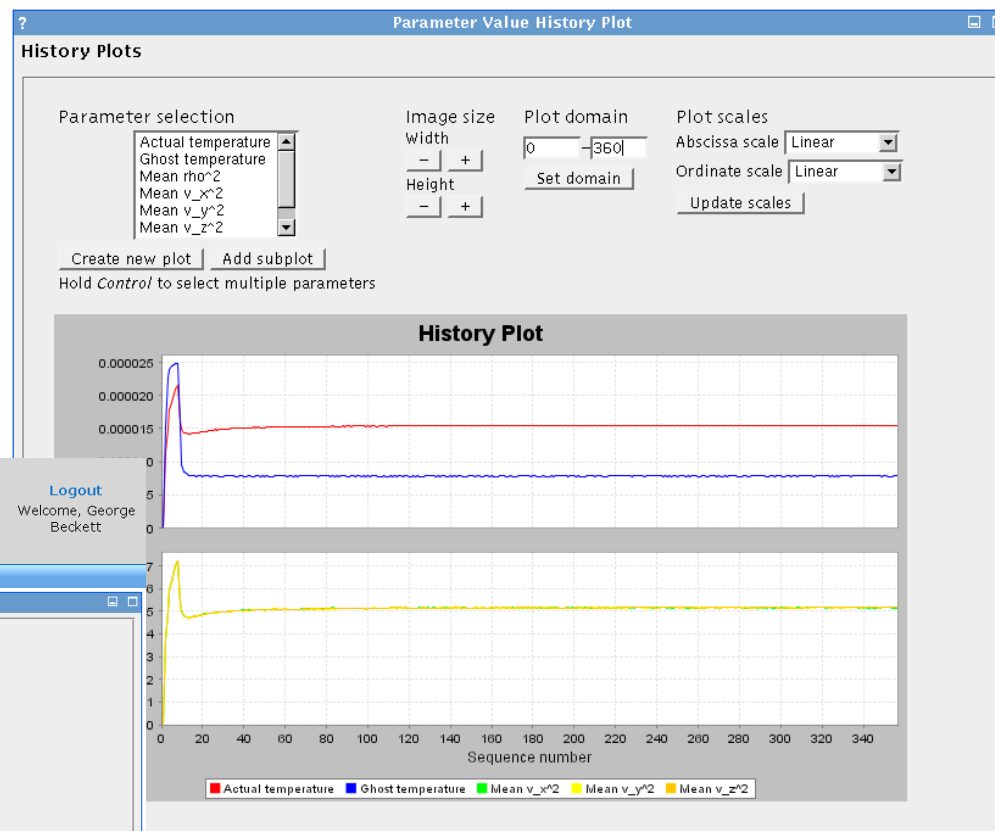
Enter the GSH for the Steering Grid Service: [Establish connection](#)

<http://www.realitygrid.org/> (Version 1.0, August 2005)

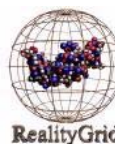


Analysis:

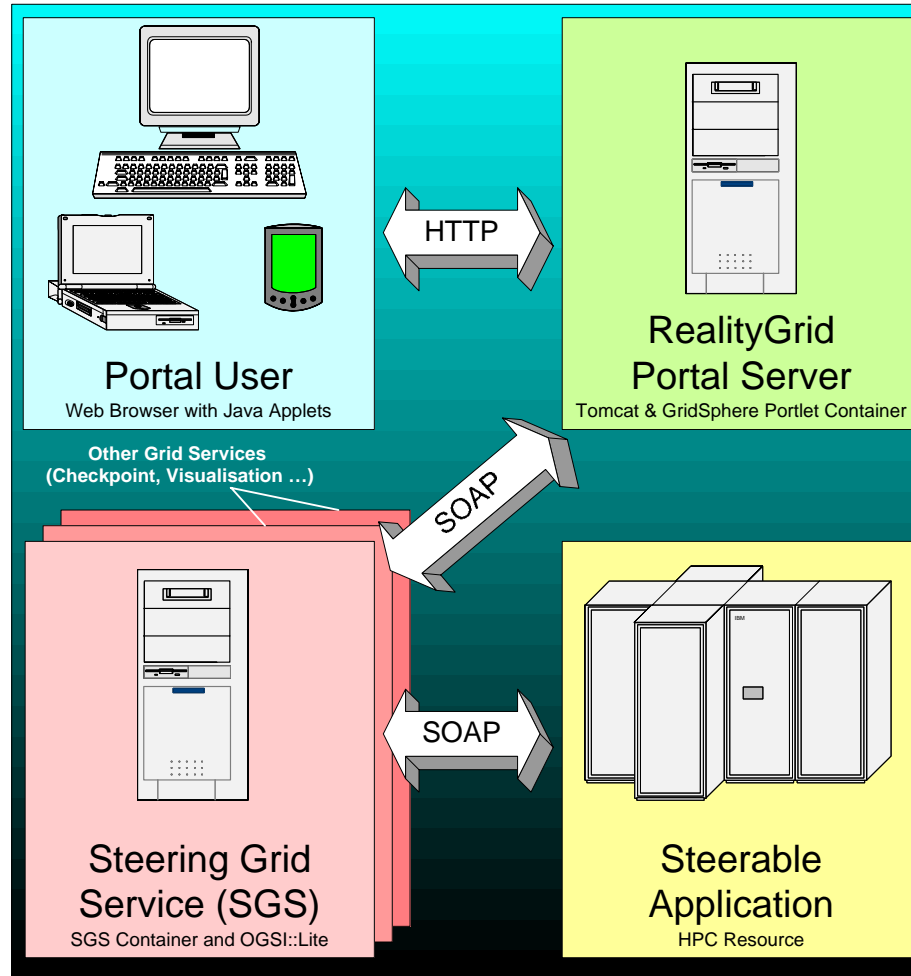
Functionality to plot/analyse the history of one or more monitored parameters



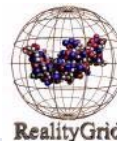
Thumbnail image visualisation



How does it work?

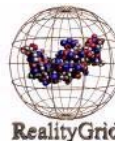
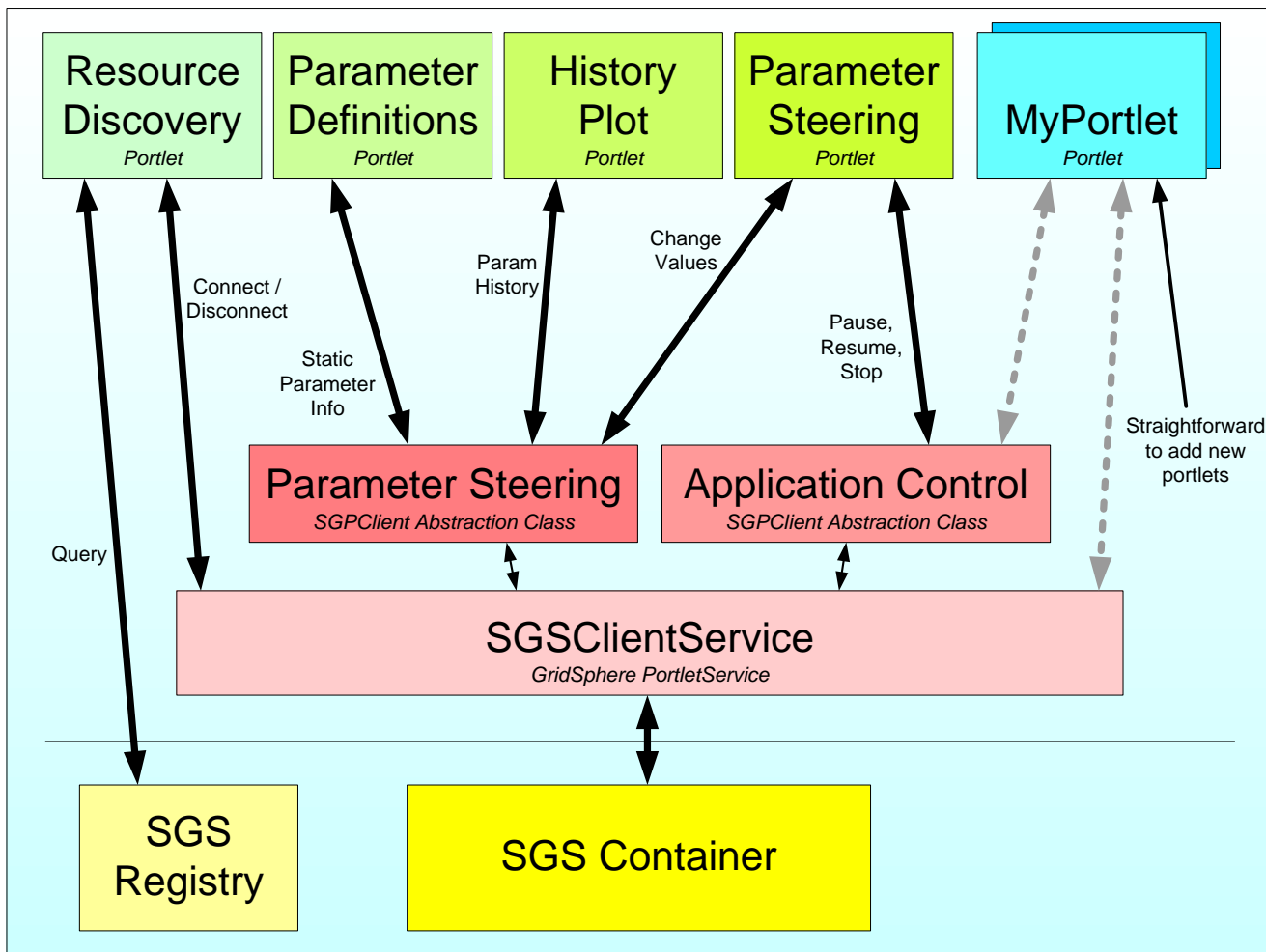


- Access to remote applications through a lightweight web client:
 - simple, user-friendly gateway to complex services;
 - requiring no specialised software or localised configuration at client system.
- Ability to control and customise user environment:
 - aggregating content from multiple data and compute resources;
 - filtering data to provide manageable and meaningful information;
 - allowing each scientist to customise their presentation.
- Access to resources from a range of clients:
 - desktop PC, internet cafe, PDA,

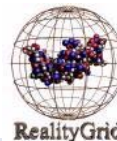


- For maximum portability and longevity, RGP designed to comply with JSR 168 Portlet Specification.
- Application is built using GridSphere (development / hosting):
 - enables rapid development / deployment of portlet applications;
 - has rich functionality set and supports JSR 168
 - available open-source and free <http://www.gridisphere.org/>;
 - includes core portlets offering base functionality:
 - single sign-on and authorisation;
 - common tools for working with Grid applications;
 - user-customisable environment;
 - Support for JSPs, Visual Beans, provides GridSphere (UI) tag library.





- Migrate to latest WSRF-compliant version of RealityGrid Steering Service;
- Checkpoint control – allowing user to take snapshot of application, and rewind / fast-forward between checkpoints;
- Utilise additional GridSphere functionalities e.g. authentication, security, etc ...
- Now for the demo – also be running on the EPSRC stand.





Kevin Stratford



Paul Graham



George Beckett



Matthew Egbert



Jean-Christophe Desplat

