



THE WHITE ROSE GRID e-Science Centre of Excellence

gViz – Visualization Middleware for e-Science



Visualization is a key component of e-Science, allowing insight to be gained into the large datasets generated either by simulation – such as in computational fluid dynamics – or by measurement – such as in medical imaging. The **gViz project** aims to provide today's e-Scientist with visualization software that works within modern Grid environments.

A major part of gViz is the **Grid-enabling** of a widely used visualization system, **IRIS**

Explorer from NAG. This is a Modular Visualization Environment, in which a user builds an application by connecting modules in a dataflow network. Our extension allows this network to span a set of Grid resources, so that user interface modules execute on the scientist's desktop, but computationally intensive modules are launched securely on remote servers using Globus middleware (see Figure 1). Moreover a number of scientists at different locations can join in a **collaborative visualisation** session.

Computational steering is proving an extremely useful way of working: visualization runs in tandem with simulation, and the scientist can amend the controlling parameters of the simulation as it executes. The **gViz Computational Steering Library** allows scientists to link their simulation code with a visualization system of choice. The Library can operate in a **Web Services** context, with the opportunity to register simulation details with the Web Service

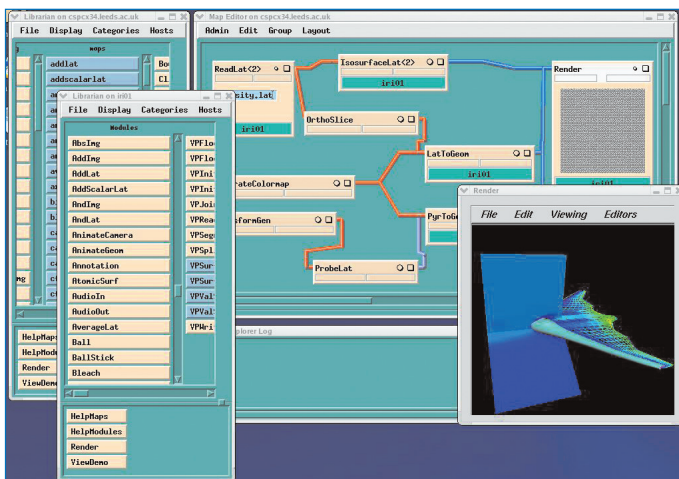
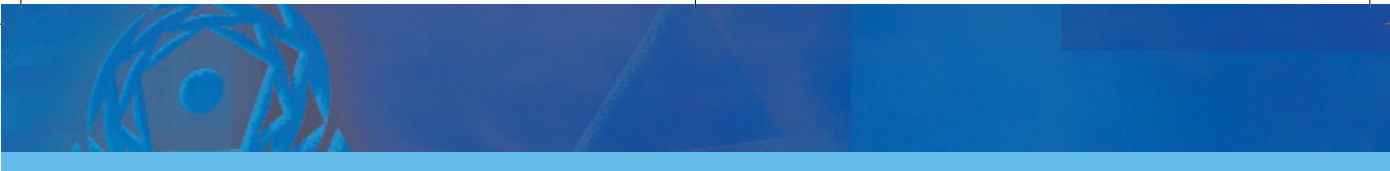


Figure 1: **Grid-enabled Distributed IRIS Explorer**
Modules with green bar are running on a remote resource, under control of Globus middleware; other modules such as Render execute on desktop.





and at any later time user interface components retrieve this information, so that the visualization system can connect to the simulation and steer its progress (see Figure 2).

Other aspects of gViz include study of the use of **XML languages for visualization**; the **Grid-enabling of the visualization system pV3**; and the development of novel **geometry compression** – important for any distributed application.

Partners in the project are: Universities of Leeds, Oxford and Oxford Brookes; CLRC Rutherford Appleton Laboratory, NAG, IBM UK and Streamline Computing.

Further Information

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The project's web pages are at:
<http://www.visualization.leeds.ac.uk/gViz>

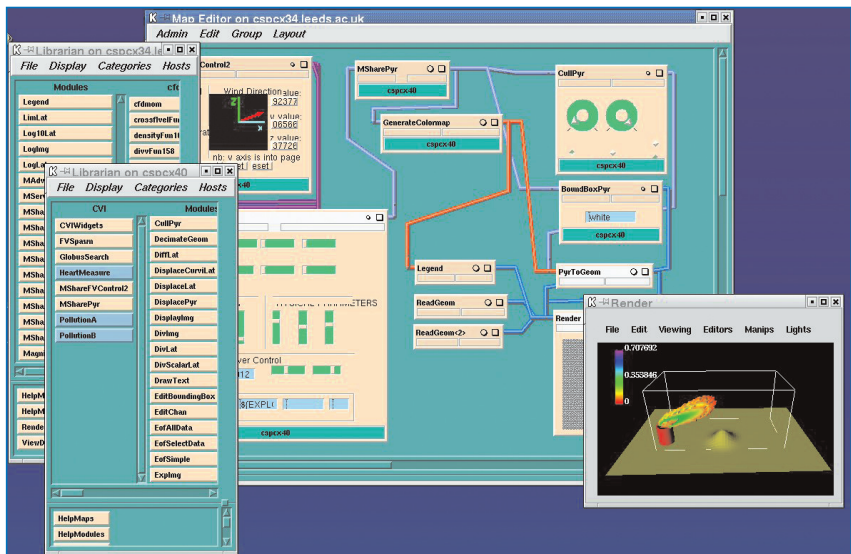


Figure 2: Computational Steering
 This shows IRIS Explorer being used for computational steering of a simulation of the dispersion of a pollutant – the wind direction is ‘steered’ by the e-scientist and the resulting effect is immediately visualised. The application also makes use of Grid-enabled features of IRIS Explorer.

