

# G-ECLIPSE

## Scope

Since the invention of the World Wide Web in the beginning of the nineties, the creation and the adoption of new ideas based on this new media has never slowed and will continue in the future. But the complexity of the whole internet has increased with every cycle of innovation. In the age of WEB 2.0, everyone can be a consumer and, at the same time, a provider of information and content. The next-generation internet is not limited to information alone, but also provides computing and storage resources to everyone, which can be used to build enhanced service offerings. Some call these offerings The Grid or The Cloud. Today, people and organizations already share the potential of distributed IT infrastructures by creating collaborations on different levels, from private social networks of a few persons to managed distributed IT infrastructure of multinational enterprises. In order to successfully adopt those new ideas and to benefit from the new products in the history of the internet, end users, internet resource providers and developers require new tools that hide the increasing complexity. The g-Eclipse project develops such a general tooling framework for future Grid infrastructures.

## Advances

In recent years, Grid infrastructures have become the backbone of those fields in science and research that require the solution of complex computational problems. At the same time, the commercial application of Grid

work for IDEs and applications. g-Eclipse is an Eclipse Technology project supported by the Eclipse Foundation and freely available under the EPL Open Source license.

g-Eclipse provides a framework independent from the underlying Grid middleware. On top of this framework, it provides tools to customize Grid users' applications, to manage Grid resources and to support the development cycle of new Grid applications. On the Grid middleware layer, it provides adapters, i.e. Grid middleware-specific implementations, that support the gLite and the GRIA middleware. Furthermore, it includes an adapter to Amazon Web Services' S3 and EC2 components that bridges the gap between Grid and Cloud computing.

## Positioning in global context

### The One-Stop-Grid-Shop

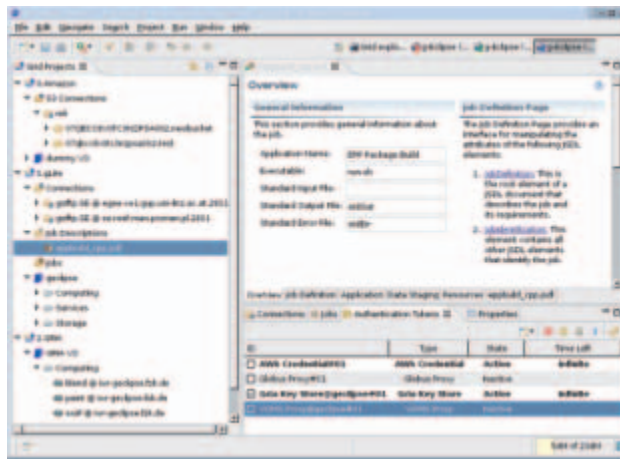
After downloading a pre-configured package and a few guided configurations steps, g-Eclipse is ready for use with existing academic Grid infrastructures such as EGEE or commercial offerings like Amazon's Cloud computing services. Even inexperienced users are able to setup a Grid project within five minutes in g-Eclipse, be it a project in academia or in a business domain. Thanks to its ability to support new middleware systems and to integrate other tools, g-Eclipse is becoming the "One-Stop-Grid-Shop" for new and emerging Grid infrastructures.

## Contribution to standardization and interoperability issues

### Glue the Grid together

The architecture of the g-Eclipse framework is designed for extensibility and interoperability. It is no longer possible to clearly distinguish between local computing resources and resources on the Grid or Cloud. As a simple example, g-Eclipse integrates the data access to different Grid infrastructures as if they were local. This makes it possible to edit and to work with distributed data sets in a transparent and straightforward way; it is also very easy to move data between different types of Grid infrastructures.

Where possible, g-Eclipse provides support for emerging standards in the Grid domain, for example the description of computational services is facilitated by an editor for the Job Submission Description Language (JSDL) standard from the Open Grid Forum (OGF). The combination of a solid internal architecture for interoperability, support for standards and the reliable Eclipse Platform enables the g-Eclipse framework to close the gap between different Grid infrastructures – it is time for the user to glue.



technologies has led to new categories of offerings (e.g. cloud computing) and are likely to play an important role in the "software as a service" landscape of the future. However, the complexity of Grid infrastructures is often discouraging for new and inexperienced users and impedes the use of Grid technologies in new application domains. To overcome this, the g-Eclipse project is building an integrated workbench framework to access the power of existing Grid infrastructures. This framework is based on the Eclipse Platform, which was originally known as a Java Integrated Development Environment (IDE), but since then has proven itself as a general-purpose frame-

## Target users / sectors in business and society

### The 'Swiss Army Knife for Grid computing'

g-Eclipse is more than just a tool – it is a veritable toolbox for Grid computing within the Eclipse community. Its architecture enables the integration of new sophisticated tools – such as the Visualization ToolKit (VTK) to show the results of complex scientific calculations in an interactive way. With the collection of current and future tools, g-Eclipse has the potential to be the “Swiss Army Knife for Grid Computing” – just use the right tool to solve your academic or business objective.

- Grid application users will benefit from an intuitive and simple interface to the Grid and to local resources. Their access to the Grid will be via standardized, yet customizable user-friendly interfaces.
- Grid resource providers can reduce the cost of operation as the complexity of the Grid is minimized with the use of supporting tools.
- Grid application developers will be empowered to speed up the development cycle of new Grid applications.

## Overall benefits for business and society

### Building the “Engineering Desktop” with g-Eclipse

For complex computational simulations, a highly specialized engineer working in an SME may be using remote resources offered by specialized providers. With g-Eclipse, s/he will be able to access these infrastructure resources in a simple way, comparable to the exceedingly easy access to the Internet with the first web browsers in the early nineties. With the g-Eclipse framework, s/he will be able to design his/her “Engineering Desktop” and intuitively obtain support in carrying out his/her daily work. S/he will be able to manage his/her data locally and remotely including visualizing the results of the simulation. S/he will define his/her simulation processes with the help of dedicated wizards and editors and then start them from the same environment with “just one-click”. In the future, further semantic tools are expected which will help the engineer to find other resource providers and domain experts to collaborate with, based on service level agreements. If there is a need for very specialized tools to be built into g-Eclipse, s/he can integrate them him/herself or contact the g-Eclipse experts to get it done.

## Examples of use

### What makes g-Eclipse different

The g-Eclipse framework is a technology project at the Eclipse Foundation and benefits from the Eclipse community and its brand. By being part of one of the largest Open Source communities, g-Eclipse profits from the open development process of that community and from the requirement to develop an open ecosystem for Grid computing instead of just creating another tool for Grid computing. The ecosystem approach has achieved its seal of approval with the availability of various implementations for different Grid middleware infrastructures and for Cloud computing. The g-Eclipse project qualifies the current partners as leading experts in tools for Grid computing within the Eclipse community.

In the future world of Grid and Cloud computing, together with the Software-as-a-Service approach, g-Eclipse has the potential to become an integrated part of everyone's computing environment.

## Achievements

The g-Eclipse framework is Open Source and is available for download from the project webpage ([www.geclipse.eu](http://www.geclipse.eu)) and from the Eclipse Foundation ([www.eclipse.org/geclipse](http://www.eclipse.org/geclipse)). It offers the following features:

- Support for Grid application users, Grid resource providers and Grid application developers.
- Provision of the g-Eclipse Grid model to enable Grid projects in the Eclipse platform.
- Support for the gLite and the GRIA middleware based on the g-Eclipse Grid model.
- Support for Amazon Web Services' S3 and EC2 based on the g-Eclipse Grid model.
- Support for the JSDL editor based on the OGF standard.



### title

An integrated, grid enabled workbench tool for grid application users, grid developers and grid operators based on the eclipse platform

### contract number

034327

### type of project

Specific Targeted Research Project

### contact point

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### project website and partner list

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

### EC contribution

1 960 000 €

### start date

01/07/2006

### duration

30