

# UniGridS – Uniform Interface to Grid Services

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UniGridS is an EU 6th Framework Programme funded project. The partners involved in UniGridS are:

- Forschungszentrum Juelich GmbH, Germany.
- Consorzio Interuniversitario per il Calcolo Automatico dell'Italia Nord Orientale (CINECA), Italy.
- Fujitsu Laboratories of Europe, UK.
- University of Warsaw, Poland.
- Intel GmbH, Germany.
- The University of Manchester, UK.
- T-Systems SfR, Germany.

The UniGridS project is funded to develop a Grid Service infrastructure compliant with the Open Grid Services Architecture (OGSA). It is based on the UNICORE Grid software initially developed in the UNICORE and UNICORE Plus projects and extended in the EU funded EUROGRID and GRIP projects. These demonstrated the development of an effective Grid, the use of applications in a Grid environment and the interoperability between the Globus Toolkit version 2 and UNICORE.

The guiding principle of the project is both to adopt and to influence standards in key project areas. Additional generic software components for visualization and steering of simulations, remote device monitoring and control will be developed to broaden the applicability of Grid computing to new scientific and technological areas. Access to distributed data and databases will be integrated from previous European Grid projects. A framework for quality of service and service level agreements will be designed to meet the requirements of industrial and business communities. Dynamic Virtual Organisations will be supported by enhancing the UNICORE security infrastructure to allow different usage models such as delegation and collective authentication. UniGridS will develop translation mechanisms, such as resource ontologies, to interoperate with other OGSA compliant systems.

At the same time, UniGridS will target Grid economics by developing a SLA framework and cross-Grid brokering services. The project developments will be proven in

scientific and industrial domains, namely biomolecular and computational biology, and geophysical depth imaging by oil companies. The UniGridS project will cooperate with other European projects, particularly Integrated Projects in FP6. It will make its results available to them on a timely basis and solicit their requirements to influence the software development process.

## UNICORE

UNICORE (Uniform Interface to Computing Resources) offers a ready-to-run Grid system including client and server software. UNICORE makes distributed computing and data resources available in a seamless and secure way through intranets and Internet. UNICORE has been designed and implemented as a total solution for end-users who need to execute their applications on a variety of systems in different organizations and access distributed data. Consequently, UNICORE is a viable production quality Grid middleware with the following unique features that go well beyond any toolkit approach:

- Applications can be used unchanged on different architectures; this is especially important for commercial codes for which source is not available in general.
- Advanced graphical interfaces can be easily integrated for any application.
- Complex workflows involving different systems and different organizations can be easily constructed. The user no longer needs to manage data transfers or start successor jobs manually; this is all done by UNICORE.
- UNICORE's strong end-to-end security ensures authentication of users and accountability of resource consumption.
- UNICORE respects the administrative autonomy of participating organisations.
- UNICORE can utilize resources managed by Globus Toolkit version 2 and 3.

The objective of UniGridS is to retain these outstanding characteristics of UNICORE and enhance them so

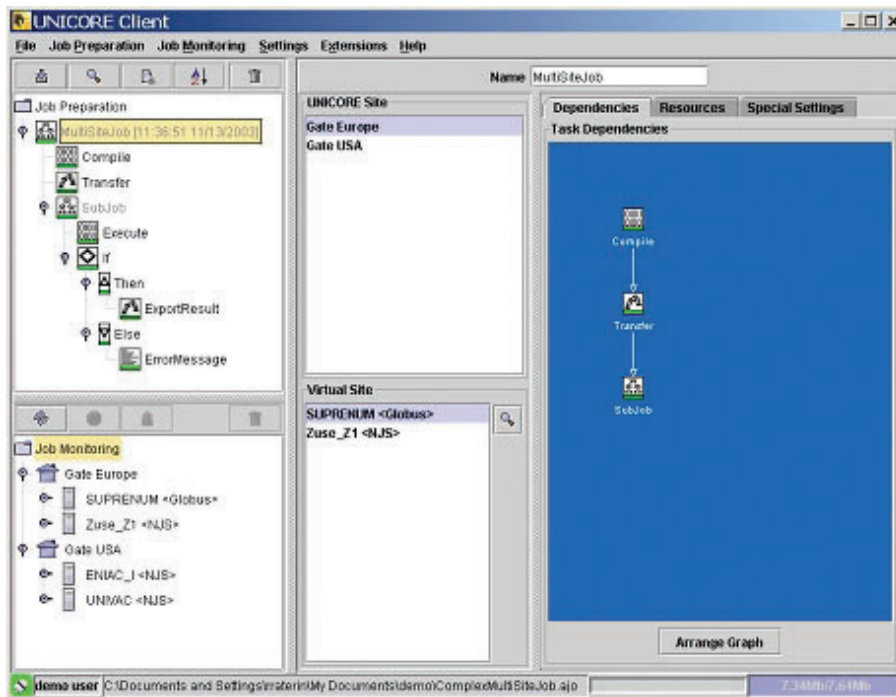


Figure 1: The UNICORE client.

that individual components can interoperate with other web or Grid services. Examples are: enlisting a different OGSA compliant resource broker or invoking a Web Service directly from the client without the full stack of UNICORE software. As a result, UNICORE/GS (Grid Services) will be more than ‘just another OGSA compliant Grid middleware’. It will bring immediate value to the end-user and also to providers of services.

### Interoperability

UniGridS plans to achieve interoperability with other Grid infrastructures by providing a set of atomic Grid

services based on current standards like WSRF, OGSA and JSDL. We have defined five atomic services to create, destroy and manage different WS-Resources representing target systems, jobs and storage. With this layer of well-defined service interfaces it will be possible to develop applications and clients on top of all Grid infrastructures that support these interfaces. To adopt the atomic service layer, other infrastructures may decide to directly implement the interfaces or write small translation components that connect the interfaces to already existing services. See Figure 2.

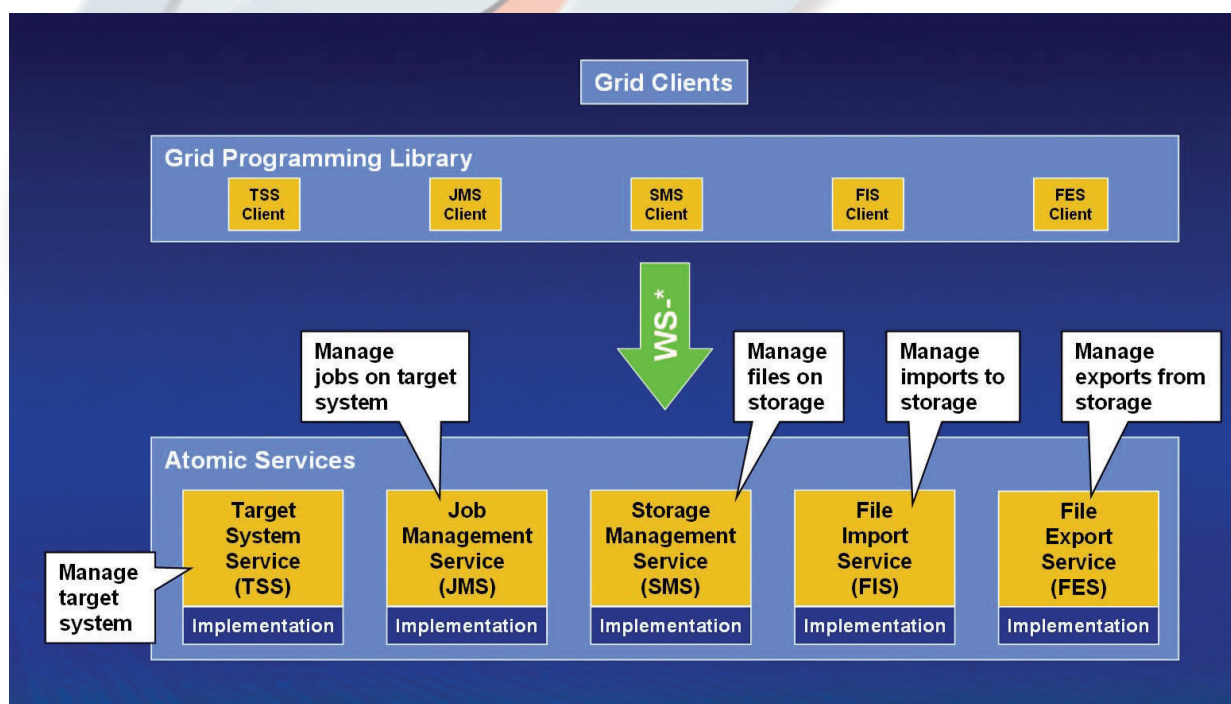


Figure 2: Atomic Services in UniGridS.

## Industrial Application

UniGridS is bringing an industrial application (a seismic signal analysis code) to the “Grid” by using the UNICORE/GS programming environment. This kind of geophysical application is very challenging today because it requires hundreds of processing units for many days in order to produce subsoil images of sufficient quality to be of use to geophysicists. The task will be done using a few steps, with the minimal amount of “re-engineering” of the original application code.

The aim of this work is manifold, but mainly:

- it will demonstrate the effectiveness of the UNICORE/GS middleware currently under development;
- it will leverage the UNICORE programming environment approach to the Grid applications by exploring the offered features and weakness;
- it will allow users of this kind of application to exploit many computational resources, even from more than one institution, in order to tackle complex problems in a more effective way.

## Functionality

The application is being implemented by two UNICORE “plug-ins”. The first plug-in will provide the interface for the application parameters (Figure 3) and for the pre-processing phase, with the second one being used (Figure 4) for the “solve” phase. This latter phase will be split among many computing resources and the user will be able to manage the parameter settings for the application in one place and for all the available computing platforms.

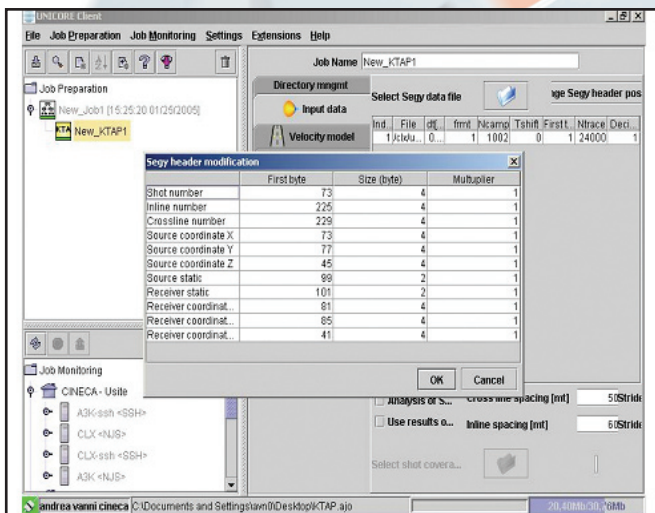


Figure 3: Interface for the application parameters.

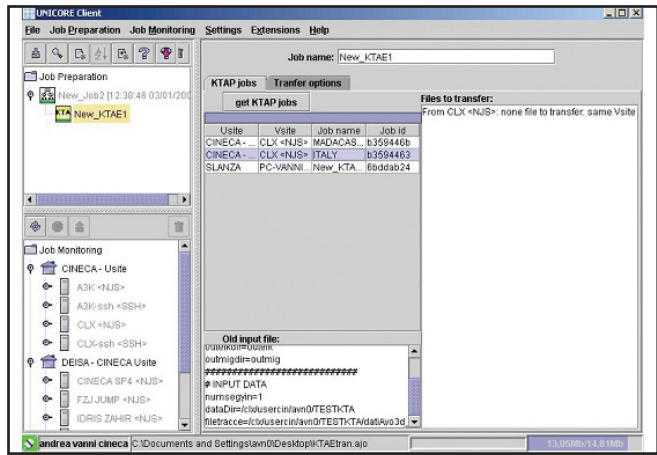


Figure 4: Submission of a “second phase” job.

Figure 4 shows a screenshot of a session for the submission of a “second phase” job (namely New\_KTAE1) that follows the execution of the “first phase” jobs listed on the central panel of the UNICORE client. The “second phase” job will inherit some parameter settings and results from the already executed pre-processing phase, but the user could decide to execute them in a totally new facility among those listed in the bottom left panel of the UNICORE Client. During the next steps of the project these applications will be integrated with economic brokering for the execution of the “solve” phase and a better management of the data transfers.

## Further Details

More information on the UniGridS project can be found on the UniGridS website [www.unigrids.org](http://www.unigrids.org) and the GRIP website [www.grid-interopability.org](http://www.grid-interopability.org).

The UNICORE software can be downloaded from the sourceforge website:

<http://unicore.sourceforge.net/>.

For any questions, please contact the UniGridS dissemination coordinator:

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