Interoperability of Virtual Organizations on a Complex Semantic Grid
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www.inteliGrid.com & www.ve-forum.org/Grid_SIG/
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InteliGrid Newsletter

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Editorial

It has now been nearly 18 months since the InteliGrid project set forth on its objective of providing solutions for the interoperability of virtual organisations on a complex semantic grid. We'll update you on some of our tools in the next newsletter.

In this newsletter, we would like to reproduce an interview that our coordinator, Prof. Žiga Turk recently gave on "Grid Semantics for Virtual Collaboration".

In addition to InteliGrid, 11 other projects received EU funding for doing research on Grid technology. We have featured them as well so you can explore what else is on the Grid with InteliGrid.

Do continue to visit our website to catch up on news, some of our results, and events of interest.

A.S. Kazi, dissemination manager

Grid Semantics for Virtual Collaboration-An Interview

"We hope that we can augment Grid technology to provide a stable and secure collaboration platform on one hand, and a platform into which players can plug in and get out rather quickly on the other," says Professor Žiga Turk, coordinator of the InteliGrid and researcher at the University of Ljubljana in Slovenia. "In addition to that, the Grid should be providing ICT resources on demand to support the irregular requirements over the design and production cycle."

Ultimately, this will mean consortiums can quickly form one off 'virtual organisations' (VOs), acting like a single company across the Grid infrastructure. For this to be effective, however, computers must 'know' what data 'means'.

"Since the 16th century, when architects started more regularly to use documentation to share designs, the meaning has been implicit. A line on paper is a line and it can stand for anything," says Prof Turk.

He adds that computerised drafting did not change much in that respect. Humans understand what lines stand for and can make intelligent decisions about them.

The Need for Understanding

"But computers don't [understand]. For computers to assist more intelligently in the design process, the design must be composed of higher-level objects, such as walls, windows and so on. Applications and services can assist humans more intelligently if working with these meaningful objects," says Prof Turk.

Similarly, the IT infrastructure for a virtual organisation is quite complex and to manage it the infrastructure itself must know what it consists of, what services are there, and what resources are available to be used.

"Not just how much processing speed or disk space a machine on the Grid can offer, but what services are there that can help with, for example, designing walls. So we need to bridge the semantics of the IT infrastructure and the semantics of the [industry] domain," says Prof Turk.

In semantic computing computers can deal with meaningful objects. It is a huge topic in Web computing right now. Dr Tim Berners-Lee, one of the founding fathers of the Web, is currently devoting the majority of his creative energies into making The Semantic Web a reality.

If he succeeds it will have a profound impact on society, perhaps more than the creation of the Internet itself. Information will no longer be tied simply to words that appear on the page. **InteliGrid** is making bold steps in semantic computing for VOs in complex industries. Its concern is not so much words but models of engineering products.

The project has made a lot of progress so far, one year into its three-year cycle. "We have a very clear idea what the architecture of the system would look like and started with the development of some key components. The engineering Grid is set up, one can log into the portal, and there are some essential administration and engineering services already plugged in," says Prof Turk.

Conceptualising Knowledge

Currently the project is focused on the selection of appropriate ontologies of the IT environment. Ontologies are a crucial element of the Semantic Grid; they are the foundation stones upon which meaning is built. Ontologies are an agreed upon selection of related concepts that denote real world objects within a computer system or a database. A kind of furniture of the world into which real world concepts can be orderly organised.

"The ontology services are the key component of **InteliGrid** because it is there where humans, but more importantly, applications and services get the metadata about the IT environment and the domain that can be intelligently reasoned about in a machine," says Prof Turk.

Ultimately, **InteliGrid** plans to deliver a demonstration of their system in 2007, when the project ends. It could be huge but there are quite a few uncertainties.

"The impact, we hope, will be quite wide. We are accumulating the knowledge, building the infrastructure

and the toolkits that will allow for a broad transition of the industry towards semantic, model-based, ontology-committed collaboration," says Prof Turk. "Of course, a lot also depends on the general directions in which the ICT infrastructures will be moving. But we hope **InteliGrid** will provide a strong case for the Grids being the mainstream collaboration paradigm."

Grid computing was originally intended for this type of intense collaboration, but most applications of Grid technology centre on computationally-intensive computing, using the CPUs of a bunch of computers linked together to crunch through vast problems like tracking weather or the stock market, or analysing the petabytes of data created by particle accelerators.

More immediately, the **InteliGrid** could have a huge impact on the way engineers work. "Some studies show that engineers and designers spend over 70 per cent of their time in non-value adding activities - like finding information, converting or re-keying data. What they like to do and what they are best at is creative designing. Projects like **InteliGrid** will allow them to spend more time at what they are best at," says Prof Turk.

Prof Turk also believes **InteliGrid** will make airplanes, buildings and bridges safer and more efficient. And this will ultimately not only benefit the engineers and the architects but the entire population, he says.

"After all, improvements in the built environment provide better living and working conditions for all - with multiple indirect benefits for the competitiveness and social standard," says Prof Turk.

On THE Grid with InteliGrid

Grids for Complex Problem Solving was chosen as one of the *Strategic Objectives* of the IST programme. As a concrete result, in the summer of 2004, a total of twelve projects (**InteliGrid** included) were awarded 52 M€ of research funding in an attempt to do breakthrough research and provide a critical mass of expertise and resources necessary to trigger change.

Together with **InteliGrid**, they are on the Grid. Do visit their websites for more information.

For more information on EU-funded RTD activities in the area of “Grid-based systems for Complex Problem Solving”, visit: http://www.cordis.lu/ist/grids/

Akogrimo: Access to Knowledge through the Grid in a mobile World (http://www.mobilegrids.org/)

CoreGRID: European Research Network on Foundations, Software Infrastructures and Applications for large scale distributed, Grid and Peer-to-Peer Technologies (http://www.coregrid.net/)

DataMiningGrid: Data Mining Tools and Services for Grid Computing Environments (http://www.datamininggrid.org/)

Grid@Asia: Advanced Grid Research Workshops through European and Asian Co-operation (http://www.gridatasia.net/)

GridCoord: ERA Pilot on a co-ordinated Europe-wide initiative in Grid Research (http://www.gridcoord.org/)

HPC4U: Highly Predictable Cluster for Internet-Grids (http://hpc4u.cetic.be/)

K-WF Grid: Knowledge-based Workflow System for Grid Applications (http://www.kwfgrid.net/)

NextGRID: The Next Generation Grid (http://www.nextgrid.org/)

OntoGrid: Paving the way for knowledgeable Grid services and systems (http://www.ontogrid.net/)

Provenance: Enabling and Supporting Provenance in Grids for Complex Problems (http://www.gridprovenance.org/)

SIMDAT: Data Grids for Process and Product Development using Numerical Simulation and Knowledge Discovery (http://www.simdat.org/)

UniGridS: Uniform Interface to Grid Services (http://www.unigrids.org/)