www.gridwisetech.com

Building a National Grid

GridwiseTech. Independent expert on scalable computing

gridwise tech

What is Grid?

For industry today, competitive edge comes from the power, speed and flexibility of their information processing. In finance, engineering, oil & gas, education and research, telecommunications and pharmaceuticals, data centers of 10,000 processors are not uncommon. But recently it has become clear that this is not enough, and the world's leading corporations and governments have turned to Grids.

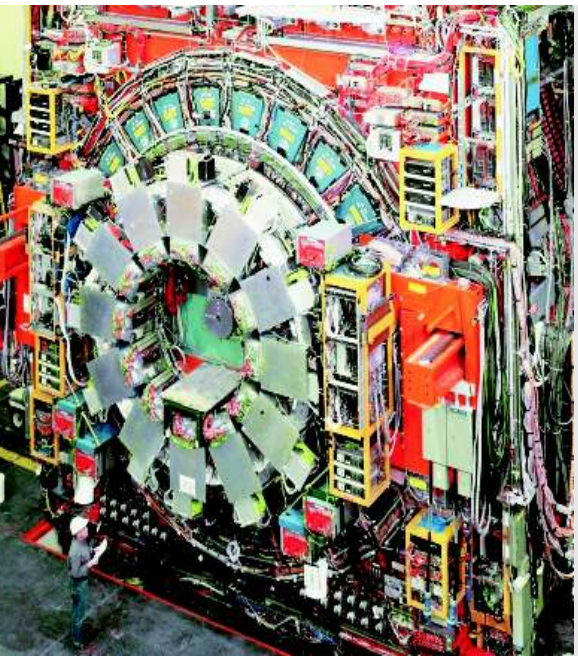
A grid is a large infrastructure for sharing thousands of computers. Grids can connect and harness the power of servers from many data centers in multiple locations. Together, providing a "cloud" of services, they are equivalent to a large virtual machine more powerful than the world's fastest supercomputers. Thanks to their ability to work across distributed environments, their flexibility, and scalability, Grids can solve problems of science and industry, applying capabilities far in excess of any single data center, challenges which simply would not be possible to tackle using traditional methods and resources.

Why do countries invest in national grids?

The world's most advanced economies increasingly recognize that demand for computing power can be addressed most effectively as a coordinated national effort. Tech-savvy nations have built grids to advance science, research and industry. Their research and development institutions in the public and private sectors have access to a wide range of advanced applications, data and processing not available to their competitors. Grids generate substantial direct and indirect return on investment to the nation and industry.

By controlling a region's main hub of IT resources, a grid operator can allocate all his computers to assist a critical industry at an instant's notice, leveraging its chances to compete worldwide. At other times, a grid can help overcome national emergencies such as a defense effort or a natural disaster.

Major Grids are in operation in Europe (EGEE), USA (TeraGrid, NEESGrid), UK (e-Science), Japan, and recently in Asian countries such as Malaysia.



EGEE: the world's largest distributed infrastructure funded by the European Union.

This project now spans over 130 institutions in 32 countries. The EGEE LCG Grid, worth hundreds of millions of Euros, manages over 41,000 CPUs, 15 petabytes of storage, and maintains on average 30,000 concurrent computational jobs a day, sometimes up to 98,000 jobs a day. Initially targeted at high-energy physics, the Grid processes applications from all sectors including the search for therapies for malaria and AIDS, or powering massive engineering simulations.

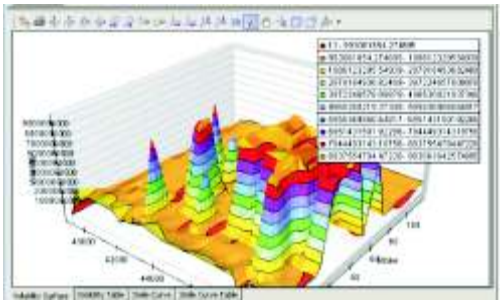
Processing vast data sets from the Large Hadron Collider (LHC), in CERN's underground chamber, needs the enormous computing power of the EGEE Grid.

Impact of a regional grid

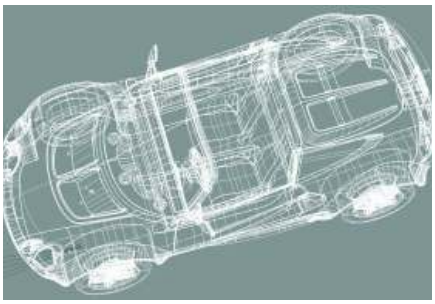
- National: Provides resources to use in national emergencies. Leverages technical culture. Provides technology hub to boost high-tech industry, start-ups and job creation.
- Research and Education: Provides tools and virtual laboratories for future generations of engineers, to experiment in all sectors of science, develop creativity and fuel the passion to learn.
- Medicine and Life Sciences: infrastructure to tackle challenges in epidemiology, pharmacy, and clinical centers nation-wide.
- Industry: support local business in engineering, oil & gas, finance, with access to compute power their international competition cannot easily afford.

data center

medical visualization

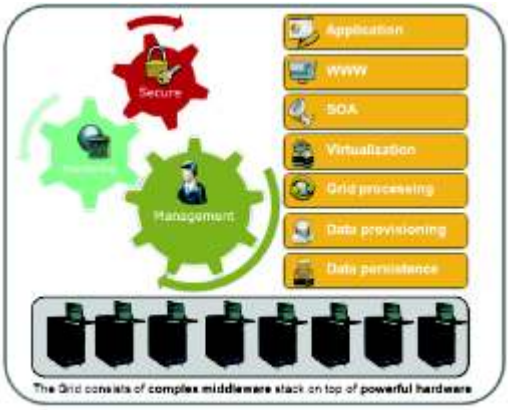


financial application



engineering visualization

How does it work?



Grids integrate geographically distributed resources (CPUs, storage, network, and licenses) into a virtual, shared pool. Users and applications access that pool with ease; a priority user has all the hardware of the organization available to him within a fraction of a second. Grid consists of a multi-layer stack of scalable middleware, orchestrated to work together (see diagram) and interconnected by standard, interoperable protocols. The integration of complex multi-vendor stacks is a specialty of GridwiseTech.

Planning for building the Grid

A national or regional Grid project can vary substantially in scope and time. In general, there is a three-year roll-out period, followed by many years of operation. Grid projects should start with a strategic study, when our multinational team of grid experts develop a strategic roadmap with the project's stakeholders, followed by a detailed planning phase. Proof-of-concept installations are followed by pilot system integration, followed by production system delivery. Awareness and community building and knowledge transfer are key activities which run throughout the project. The project must also address the long-term sustainability of the resource.

Complete project planning and roll-out of a regional Grid infrastructure are core elements of GridwiseTech's offerings.

GridwiseTech experience

GridwiseTech is well established within the industrial and scientific scalable Grid processing community. In its early days, GridwiseTech contributed substantially to the fundamental research which underpins the development of the Grid paradigm, including US flagship projects, Globus and NEESGrid, as well as Europe's largest Grid installation, EGEE. Today we are recognized as world-leading experts, working directly with other authorities in the field. Our position as thought leader as well as our vendor independence is useful with innovatory projects, and we are used to working directly with authorities, technical leads and field experts. We have successfully helped the world's largest corporations achieve internal scalable processing. Our commercial customer base includes Ricoh, BP, Turner Broadcasting System and Philips. Our area of operations reaches from Japan to Malaysia to Europe and USA.

We have contributed to the following national and continental programmes:

- NEESGrid – world's first production partner grid set up among twelve universities and research centers in the USA in 2003. GridwiseTech assisted in integration of middleware for distributed earthquake simulations.
- Enabling Grids for E-Science in Europe (EGEE) – world's most distributed grid installation. GridwiseTech is EGEE's Business Associate providing the community with commercial perspective, and integrating the infrastructure with commercial users.
- Open Grid Forum (OGF) is the world's premier standard body ensuring cooperation between business and industry. GridwiseTech held mentoring role at OGF; our Grid Primer tutorial opened the OGF conferences in 2005 and 2006.
- The Globus Project from Argonne National Laboratory and University of Southern California produced cornerstone software for the world's earliest grid installations since 1996. GridwiseTech participated in the development and quality assurance of Globus Toolkit, today the base of most academic grids.
- Further projects with GridwiseTech team involvement: Malaysia's KnowledgeGRID, Germany's D-Grid, and the UK's e-Science Programme.

Our experts:

We engage an international body of senior experts to execute grid projects. The following team has supported us with the most recent activities.

Dr Wolfgang Gentzsch
Grid visionary, strategist and advisor to USA and German governments

Alison McDonald
Director of Digital Archiving Consultancy, advising UK government and EU on e-infrastructure strategy

Glenn Wright
Built world's largest supercomputers, including the Univ. of Texas 320-T Flop Ranger

Giuseppe Ugolotti
As head of NICE with 40 year IT career, provided grid visualization to numerous corporations

Prof. Bill Spencer
Managed $50M NEESGrid, world's first production grid at U. of Illinois

Paweł Płaszczak
As CEO of GridwiseTech, built grids in USA, Europe and Japan and Malaysia

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