Development of Grid Environment for Interactive Applications

CROSSGRID

Scope

Whilst existing solutions only enabled Grid applications to be run in a batch mode, with CrossGrid it is possible to monitor the progress of application execution, change its parameters and receive output on the fly. Thus, CrossGrid supports the concept of interactive Grid computing.

CrossGrid applications target the following groups of users:

- medical doctors, who can obtain new tools to help form correct diagnoses and guide them during operations through simulation and visualisation of surgical procedures;
- flood crisis teams, which can predict the risk of a flood on the basis of historical records and actual hydrological and meteorological data;
- physicists, who can optimize the analysis of massive volumes of data distributed across countries and continents;
- industries, which can be advised on the best timing for critical operations involving the risk of air pollution.

Innovation and Functionality

The most innovative feature of the CrossGrid project is the enabling of interactive applications for Grids. CrossGrid has also built on the work of other projects, such as the DataGrid project. Specifically, CrossGrid boasts three key products:

- the Migrating Desktop: a user-friendly method of accessing Grid resources from any Web-enabled computer from anywhere on the Internet, with customized environments for individual users serviced by the CrossGrid Roaming Access Server;
- the Grid scheduler: supporting permanent job queue supporting multiple users, sequential and parallel jobs expressed in the Job Description Language. Job priorities and job preemption mechanisms allow simultaneous management of batch and interactive jobs;
- the OCM-G/GPM tools: for monitoring the performance of the Grid infrastructure in support of the scheduling algorithms.

Positioning

CrossGrid provides added value on all levels of Grid development. As a basis of its development, CrossGrid relies on solutions provided by the Globus and DataGrid projects. CrossGrid solutions are in turn used by other, subsequent EC Grid projects, such as EGEE and K-WfGrid. In addition, CrossGrid takes an active part in worldwide Grid standardization and research bodies.

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Contract number
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Type of project
Cost-shared Research and Technological Development Action

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Project website
http://www.eu-crossgrid.org

Maximum Community contribution to project
EUR 4 841 582

Project start date
1 March 2002

Duration
38 months

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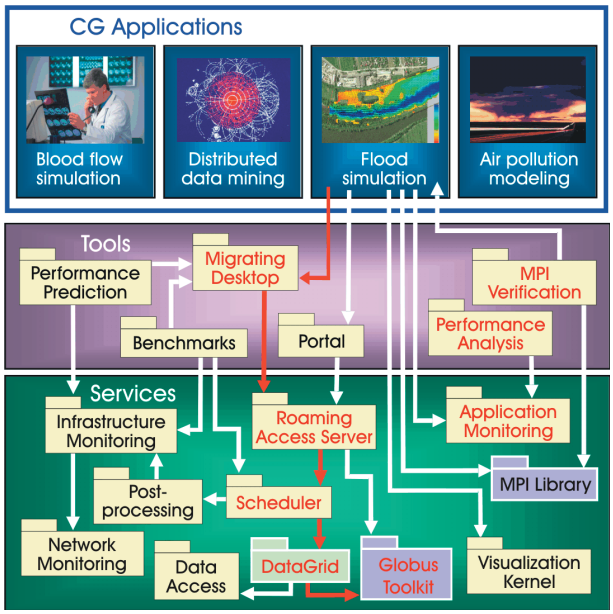

Target Users and User Benefits

CrossGrid users fall into two groups:

- application scientists (i.e. people from the application domain, not inherently involved in Grid development as such).
- Grid developers (i.e. computer scientists engaged in Grid research).

Maturity and Availability of Tools

CrossGrid software has been available since March 2004. This software is available under an open source license that is based on the DataGrid project's General Public License. Also available is a CrossGrid tutorial for potential users.

Compliance with Standards

Where applicable, use of developing GGF specifications has been made. Furthermore, the CrossGrid testbed is fully compliant and up to date with the recent LCG specification. The CrossGrid software uses standard Web Services technologies to allow easy access to Grids.

Interoperability

The CrossGrid services and tools are built upon the Globus Toolkit for access to computational resources and storage. Web Services technologies are used for implementation of various Grid components. This should enable interoperability with Grid tools and middleware being developed by other EU Grid projects, as well as porting CrossGrid software to future Grid systems.

Value-Added Services and Next Generation Development

Many CrossGrid software tools and components will be supported beyond the end of the project by CrossGrid partners. This further support and development work will fall within the scope of other European and national Grid projects such as the EGEE, K-WfGrid and CoreGRID projects. In addition, the CrossGrid Migrating Desktop software will be included in the GridSuite software product, developed by PSNC - one of the leading partners of the GridLab project.

Project Partners

Organisation name and country	
ACADEMIC COMPUTER CENTRE CYFRONET AGH, KRAKOW (CYFRONET)	PL
ALGOSYSTEMS S.A., APPLIED RESEARCH DEPT., ATHENS (ALGO)	GR
THE ANDRZEJ SOLTAN INSTITUTE FOR NUCLEAR STUDIES, LABORATORY FOR HIGH ENERGY PHYSICS, WARSAW (INS)	PL
ARISTOTLE UNIVERSITY OF THESSALONIKI, DIVISION OF NUCLEAR AND PARTICLE PHYSICS, DEPT. OF PHYSICS (A.U.TH.)	GR
COMPUTING CENTRE OF UNIVERSITY OF STUTTGART (HLRS)	DE
CONSEJO SUPERIOR DE INVESTIGACIONES CIENTIFICAS, SANTANDER, VALENCIA (CSIC)	ES
DATAMAT S.P.A (DATAMAT)	IT
DEPT. OF COMPUTER SCIENCE, TRINITY COLLEGE DUBLIN (TCD)	IE
FORSCHUNGSZENTRUM KARLSRUHE GMBH, CENTRAL INFORMATION AND COMMUNICATION TECHNOLOGIES DEPT. (FZK)	DE
THE HENRYK NIEWODNICZANSKI INSTITUTE OF NUCLEAR PHYSICS, HIGH ENERGY PHYSICS DEPT., CRACOW (INP)	PL
INSTITUTE OF INFORMATICS, SLOVAK ACADEMY OF SCIENCE, DEPT. OF PARALLEL AND DISTRIBUTED PROCESSING (II SAS)	SK
INSTITUTE OF TECHNICAL INFORMATICS UND TELEMATICS, JOHANNES KEPLER UNIVERSITY OF LINZ, DEPT. FOR GRAPHICS AND PARALLEL PROCESSING (UNIV. LINZ)	AT
INTERDISCIPLINARY CENTRE FOR MATHEMATICAL AND COMPUTATIONAL MODELLING, UNIVERSITY OF WARSAW (ICM)	PL
LABORATORIO DE INSTRUMENTACAO E FISICA EXPERIMENTAL DE PARTICULAS LIP COMPUTER CENTRE, LISBON (LIP)	PT
NATIONAL CENTRE FOR SCIENTIFIC RESEARCH 'DEMOKRITOS', INSTITUTE OF NUCLEAR PHYSICS, ATHENS (DEMO)	GR
POZNAN SUPERCOMPUTING AND NETWORKING CENTRE AFFILIATED TO THE INSTITUTE OF BIOORGANIC CHEMISTRY OF PAN (PSNC)	PL
TECHNICAL UNIVERSITY OF MUNICH, RESEARCH UNIT FOR COMPUTER ORGANISATION/PARALLEL COMPUTER ARCHITECTURE, DEPARTMENT OF INFORMATICS (TUM)	DE
UNIVERSITY OF AMSTERDAM, FACULTY OF SCIENCE (UVA)	NL
UNIVERSITAT AUTONOMA DE BARCELONA (UAB)	ES
UNIVERSITY OF CYPRUS, DEPT. OF COMPUTER SCIENCE (UCY)	CY
UNIVERSIDADE DE SANTIAGO DE COMPOSTELA (U.S.C.)	ES

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