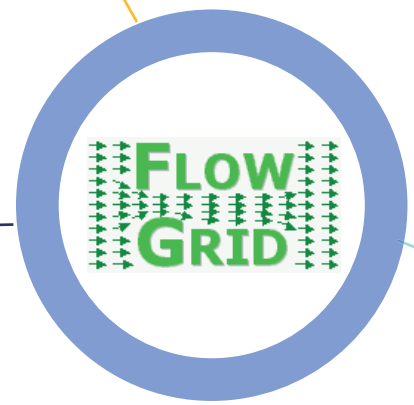


Towards a European CFD Virtual Organisation

FLOWGRID



Scope

The objective of the FlowGrid project has been to solve Computational Fluid Dynamics (CFD) application problems by using Grid enabled computing resources and by setting up virtual organisations for sharing software, computing resources.

More specifically, the goals of the FlowGrid project have been:

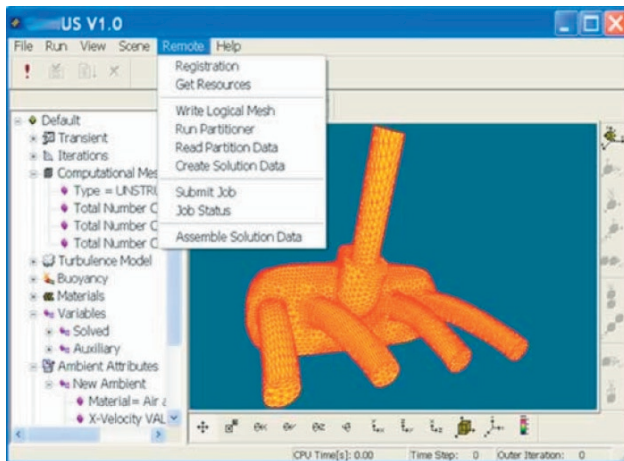
- To enhance and implement a novel client software for accessing CFD solutions on the Grid;
- To develop scalable and generic Middleware to support the deployment of CFD solvers on the Grid;
- To assess the performance of parallel versions of these CFD solvers by running real industrial applications on distributed parallel computers;
- To validate computational results with experimental results.

Innovation and Functionality

FlowGrid is an example of a Grid computing environment aiming to revolutionise the way distributed CFD simulations are set up, executed and monitored on distributed computing resources.

A FlowGrid toolkit and Middleware for the collaborative execution of Grid-enabled CFD applications and visualisation tools has also been developed.

The “FlowServe” Middleware has been designed and implemented to provide the necessary architecture for enabling a user-friendly client and a portal to set up and run CFD problems in a Grid environment.



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Contract number
IST-2001-38433

Type of project
Cost-shared Research and Technological Development Action

Project coordinator
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Project website
<http://www.unizar.es/FlowGrid/>

Maximum Community contribution to project
EUR 1 100 000

Project start date
1 September 2002

Duration
28 months

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Positioning

The project has developed generic and innovative Grid solutions by using, and extending, the Globus toolkit, which is the most advanced and widely used Grid infrastructure toolkit.

CFD solutions on the Grid can be efficiently deployed by using, extending and building components that work with the CFD solvers themselves, through the FlowGrid toolkit, and connecting to basic Grid infrastructure software and hardware underneath.

Target Users and User Benefits

Although there have been many advances in Grid technologies, industrial users with a real need for Grid resources, have not as yet been able to benefit from them due to the lack of real Grid-enabled applications. One application area that demands significant computing resources is CFD. The FlowGrid project has addressed this issue and significantly advanced the state-of-the-art by developing the key components that are necessary in order to set up and run CFD applications on the Grid.

The target users of the FlowGrid technologies are the engineers, who need to work on the designs of large CFD models and to run compute-intensive optimisation simulations without the need to invest in expensive hardware, and vendors who need to provide CFD services through the Grid.

Maturity and Availability of Tools

The FlowServe Middleware, which provides access through a novel client software or a portal to Grid enabled solvers for CFD applications has been developed by the project.

Project Partners

Organisation name and country

CERTH/CPERI	GR
FLUID MECHANICS GROUP, UNIVERSITY OF ZARAGOZA, SPAIN	ES
HSVA	DE
SKODA VYZKUM S.R.O	CZ
SYMBAN	UK
ZIB	DE

Compliance with Standards

The FlowServe Middleware has been made OGSA-compliant by incorporating Web Service Resource Framework (WSRF) compatible interfaces.

Interoperability

The FlowServe Middleware uses the Globus Toolkit version 2.4.3, by accessing the native Globus Toolkit 2 interfaces via the Globus Java library. FlowServe itself provides its services via WebService, which are described by WSDL interfaces and can therefore be easily integrated with other services.

Value-Added Services and Next Generation Development

After the project end, the FlowGrid model and software will be commercialised. There are a number of foreseen business and industrial prerequisites for doing this, including:

- For industrial users to increase productivity by accessing Grid resources, which were not previously accessible to them, and performing routine design and optimisation simulations without the need to invest in expensive hardware.
- For industrial users to access powerful CFD applications over the Internet and to dynamically control those applications from a user-friendly client interface.
- For CFD vendors to expand their business by providing services through the Grid.