GRIDCOMP

Scope

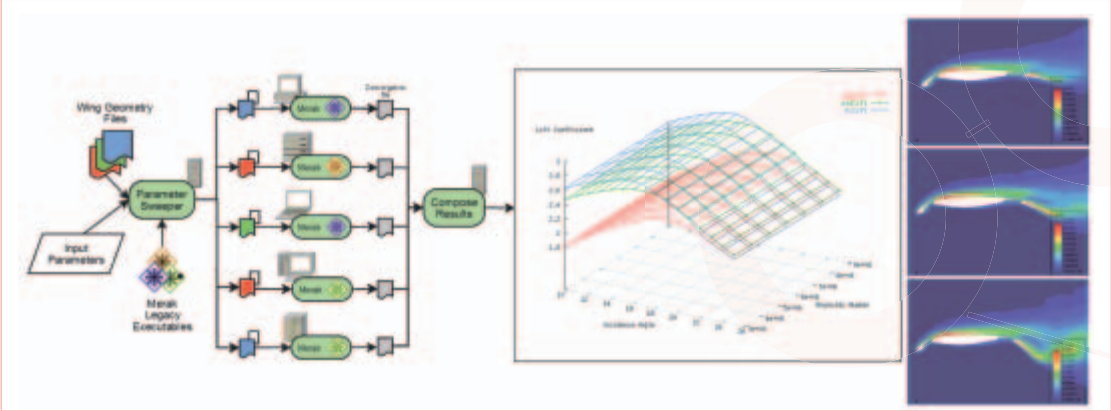
Software composition for Grid computing and Service Oriented Architecture is becoming a top challenge for industry as the speed of computer is no longer increasing (end of Moore Law), and just for the sake of electricity consumption there is a strong need to reduce and globalize IT infrastructure.

Gridcomp project defines and implement a **Grid Component Model (GCM)** for the IT sector, and provide an Open Source reference implementation in the **ProActive Parallel Suite** library. Standard grid components will make it possible to seamlessly compose applications and services deployed on large scale infrastructures, e.g. several thousand machines all over the world. Moreover, autonomic aspects provide the capability to scale up or down the components at execution.

GCM/ProActive seamlessly integrates and contributes to Service Oriented Architecture (SOA), making it possible to dynamically deploy components as services on the right set of machines, and to take into account application **Service Level Agreements** in order to enforce contracted **Quality of Services**.

Positioning in global context

Component based programming models for distributed architectures and grids have been investigated in the last years in different contexts including Common Component Architecture and Corba Component Model. Gridcomp adopts the GCM model, designed within Coregrid (NoE) and contributes to both design and development of a reference implementation of GCM. GCM builds on top of previous experiences achieved in the aforementioned projects and clearly places Coregrid and Gridcomp at the top edge in component based programming model design for grids. GCM defines a grid application development methodology that can be easily migrated in the context of software services and SOA, exploiting recent advances in such framework, such as Service Component Architecture (SCA). Preliminary results achieved within Gridcomp and Coregrid migrating advanced features of GCM, such as component autonomic management, in the SCA/Service context clearly make Gridcomp results competitive and effective in the overall European grid/distributed software arena.



Computation of aerodynamic wing performance using GCM components

Advances

Here are the major project breakthroughs:

- Components that compose and scale
- Interoperability of Deployment on various Grids
- The capacity to dynamically adapt scale at execution
- Reducing the IT infrastructure cost by sharing resources amongst applications
- Effective Service Oriented Architecture with dynamic management of services

Contribution to standardization and interoperability issues

Within the ETSI standardization body (European Telecommunications Standards Institute), Technical Committee on GRID, Gridcomp is defining the two following standards:

- ETSI GCM Interoperability Deployment, TS 102 650-1
- ETSI GCM Application Description, No TS 102 650-2

Target users / sectors in business and society

Overall, both industry and scientists that need to accelerate their applications to control dynamically the amount of resources they use can benefits from the project results. Potential users may be:

- Software and Application Developers, Systems Integrators.
- Service and Utility Providers.
- End-users in: Pharma and bio, Engineering, Oil and Gas, Large Web applications, Telco, Electronic. Design, Manufacturing, Government.

Overall benefits for business and society

The availability of high level component based programming models raising the level of abstraction presented to the user and hiding the distributed architecture programming and most of the peculiarities involved in grid, consistently reduces the cost of software development, both in terms of design and debugging and tuning. The open source, efficient and scalable implementation of the Grid Component Model provided by Gridcomp provides programmers the tools that can be exploited to incrementally design large software packages and services on top of several distinct grid middleware systems, reusing existing and already tuned components. GCM also seamlessly implement autonomic management of performance tuning in structured parallel applications. Results achieved within the project show that applications can be developed and tuned using GCM in less than half the time required to write the same applications with traditional grid middleware programming tools at the same tuning level. In terms of business and society this means that more and more effective applications will be available or that less manpower will be required to develop new applications.

Examples of use

Gridcomp Solutions: facing security, management, business intelligence challenges and achieving reduced development time, component reuse, and scalability.

Gridcomp in Biometrics, recognizing humans based on traits.

The scenario of identifying one person based solely on biometric information faces high response-time and high-cost issues. Distributing the identification effort among low-cost hardware resources, the Gridcomp identification system can work on a large population in real-time.

Gridcomp in Accounting, predicting invoice delays.

Estimate how much a customer will delay the payment of an invoice is very valuable for companies; however the time and resource cost associated in enterprise-grade database systems may be too high. A Gridcomp-based application can leverage cheaper database systems and distribute the statistical computation, performing the estimation more frequently, and thus delivering a business advantage.

Gridcomp in Business Intelligence, delivering intelligent data.

Business intelligence often involves data mining and ETL (Extract Transform Load): relevant information from enormous files is analyzed, extracted, transformed and loaded into data warehouses in order to support decision making processes. Gridcomp has enhanced these data-mining and ETL processes and has delivered a faster response-time capability for different departments in a Telco-company scenario.

Gridcomp in Aerospace, design simulation at its best.

Simulation applications can be wrapped inside grid components and be used as the building blocks for more complex or performing ones. Gridcomp has demonstrated that the aerodynamic performance of different wing configurations can be simulated fast and accurate without developing new and expensive simulation processes by using pre-existing, already amortized software and Gridcomp components.

Achievements

Both can be used and are used by industrials**:**

- **The GCM Specification and ETSI Standards for interoperability:** http://etsi.org
- **The ProActive/GCM Open Source Middleware Implementation:** http://proactive.inria.fr

GridCOMP

title
GRID programming with Components: an advanced component platform for an effective invisible grid

contract number
034442

type of project
Specific Targeted Research Project

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project website and partner list
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duration
30