Project no. FP6-034442

GridCOMP

Grid programming with COMPonents: an advanced component platform for an effective invisible grid

STREP Project

Advanced Grid Technologies, Systems and Services

D.DIS.01 – GridCOMP Website

Due date of deliverable: September 2006
Actual submission date: 30 March 2007

Start date of project: 1 June 2006   **Duration**: 30 months

Organisation name of lead contractor for this deliverable: GEIE ERCIM

Project co-funded by the European Commission within the Sixth Framework Programme (2002-2006)		
Dissemination Level		
P	Public	PU

Keyword List: Website, Flyer, General presentation
Responsible Partner: Patricia Ho-Hune, GEIE ERCIM
Author: Karen Marache, GEIE ERCIM

MODIFICATION CONTROL			
Version	Date	Status	Modifications made by
1	29-02-2007	Draft	Karen Marache
2	06-03-2007	Draft	Patricia Ho-Hune
3	08-03-2007	Draft	Marco Danelutto
4	23-03-2007	Final	Karen Marache

Deliverable manager
- Patricia Ho-Hune, ERCIM

List of Contributors
- Peter Kunz, ERCIM

List of Evaluators
- Marco Danelutto, UNIPI
- Rajkumar Buyya, UOM

Goal of this document

The goal of this document is to briefly present the structure and aim of the GridCOMP website: http://gridcomp.ercim.org. The website has been launched in July 2006.

It also presents the GridCOMP General Presentation and Flyer.
Both are available on the website, under the Dissemination Section.

Table of Content

1 GridCOMP Web Site

Status of GridCOMP Website

The general structure has been finalised and the content is being implemented.

Palette Website as a key support for communication

All tools and information will be accessible from the **GridCOMP Website**. The project website will be the key support for GridCOMP communication. It will provide the channels for communication both within the project and with external stakeholders. To this end it will provide a secure collaborative working area.

Homepage: http://gridcomp.ercim.org

The Homepage presents the most important information on the project for external readers. It describes the mission of GridCOMP project.

About GridCOMP: Objectives and Consortium

This page presents the main objectives and impact of the project.

This page also presents all Participants in the GridCOMP Project

GridCOMP meetings:

This page presents important events and meetings in which GridCOMP is involved

Conferences & seminars:

This page presents the most important events which GridCOMP will attend to or/and be organizing.

Deliverables:

This page makes all GridCOMP Deliverables accessible for download with a direct access to public documents and a secured access to restricted and confidential documents.

Contacts:


Lead contacts for the project

Dissemination

This page makes GridCOMP's logos available, and presents the GridCOMP flyer.

Links:
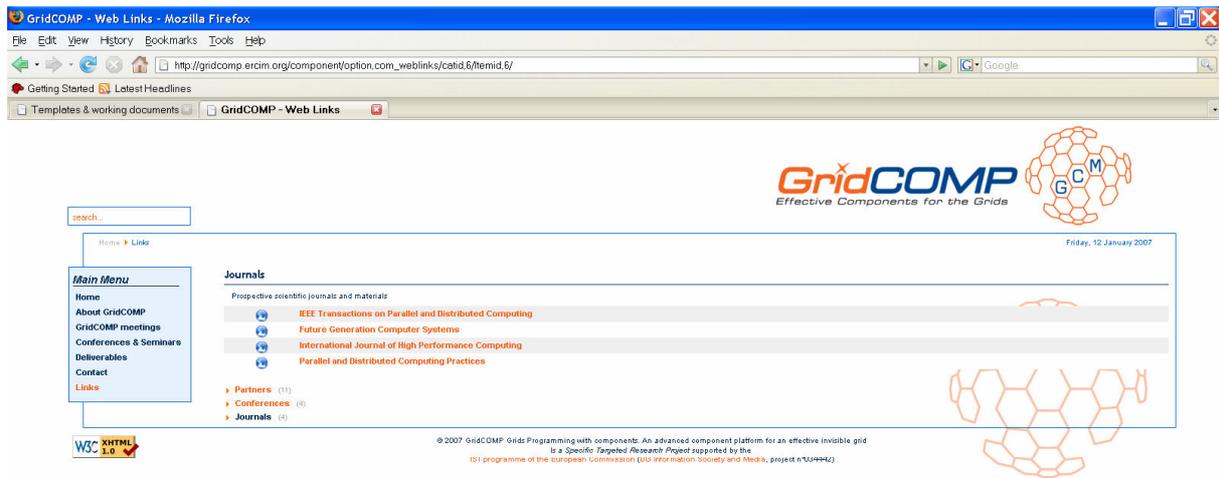
Links to other useful resources related to the project such as partners, conferences and journals.

2 GridCOMP General Presentation

This is a general presentation, giving the profile, the overview and the name of the partners of the project. A brief description of the workpackages is done.
The presentation will be updated while the project goes on.

GridCOMP Project Profile

- **STREP - Specific Targeted Research Project**
- Project Identifier: FP6-034442
- European Commission: Advanced grid technologies, systems and services
- Start Date: 1 June 2006
- End Date: 30 November 2008
- Project co-ordinator: ERCIM
- Scientific coordinator: INRIA
- Total cost: 2 974 230 €
- European Commission funding: 1 750 000 €
- Consortium: 11 partners, 3 outside Europe
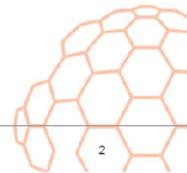
GridCOMP   Grid programming with components: an advanced COMPonent platform for an effective invisible grid   2

Partnership: 11 members

GridCOMP   Grid programming with components: an advanced COMPonent platform for an effective invisible grid   3

Project Overview

○ **Objectives**:

GRID PROGRAMMING WITH COMPONENTS:
**an ADVANCED COMPONENT PLATFORM**
for an EFFECTIVE INVISIBLE GRID
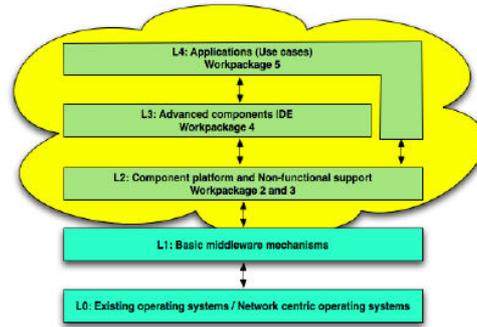
○ **Summary**:

- ○ The Grid Component Model (GCM, NoE CoreGrid) takes OW2 Fractal comp. model as a starting point, with OW2 ProActive Grid middleware

- ○ Interoperability with other standards: EGEE gLite, UNICORE, NorduGrid, Globus, Web Services, etc.,

- ○ Coordination with the NESSI initiative: involvement of OW2, IBM, ATOS

Grid programming with components: an advanced *COM*Ponent platform for an effective invisible grid

Work Packages: Approach & Structure
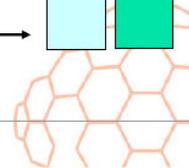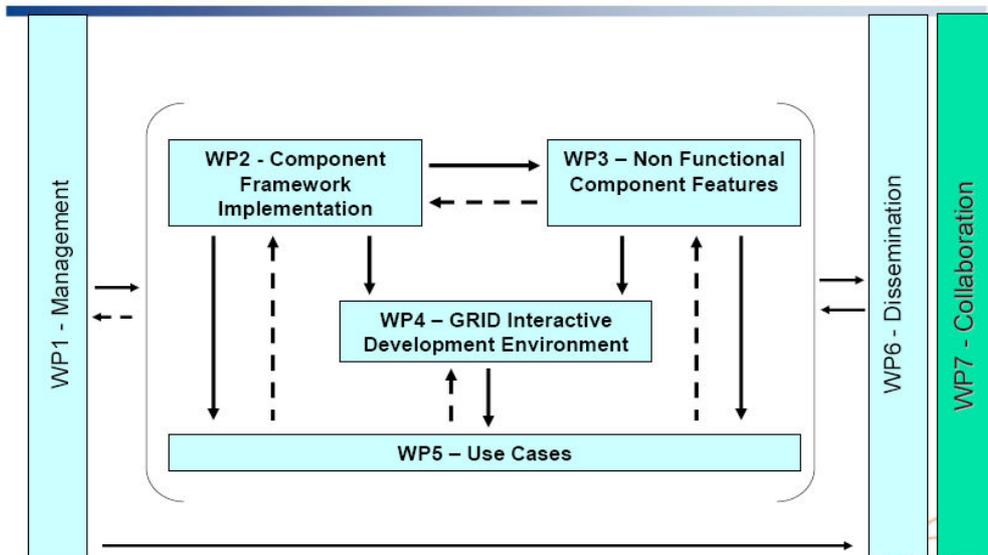
WP2: Component Framework Implementation

○ GCM: Grid Component Model

GridCOMP takes:

- ○ GCM as a first specification
- ○ GCM being defined in the NoE CoreGRID (42 institutions)

- ○ ProActive as a starting point, and Open Source reference implementation.

- ○ Open Source OW2 ProActive implements a preliminary version of GCM
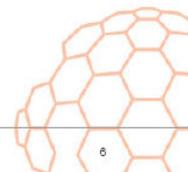
GCM Technical Structure

1. Component Specification as an XML schema or DTD

2. Run-Time API defined in several languages : C, Java

3. Packaging described as an XML schema

4. Information for Deployment

   (Virtual Nodes, … Variables, File Transfer, …)

ProActive

○ *ProActive* is a Java **GRID** middleware library (with Open Source code under **LGPL** license) for **parallel**, **distributed** and **multi-threaded** computing.
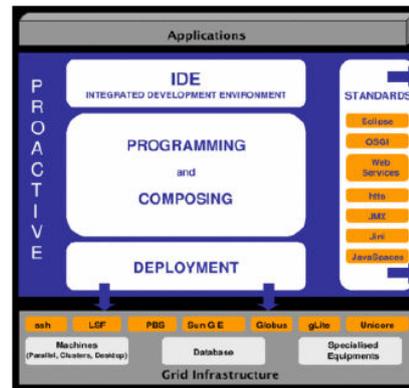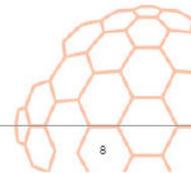
Status of GCM in ProActive

○ **Partial implementation:**
  - ○ ADL schema, API, Multicast, Gathercast, …
  - ○ Component GUI (prototype)

○ **Distributed components** for various applications:
  - ○ Numerical, Legacy, …

○ **On-going experiments**:
  - ○ up to 300+ CPUs
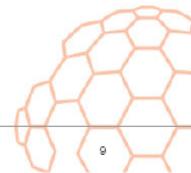
A Vision: GCM as EU's GSM

○ Once upon a time:
  ○ GSM: Global System for Mobile communication

○ Process:
  ○ "critical decisions […] the GSM initiative became a success in Europe […]
  ○ Initially the strategy and technical specifications were agreed for Europe and […] incorporating all non-European requirements […] worldwide to participate "

From: Gsm & Umts: The Creation of Global Mobile Communications

Standardization of GSM was crucial for EU advances in Mobile Telephony (Science and Business)
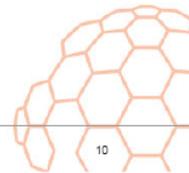
A Vision: GCM as EU's GSM

GRID faces the same challenge:
  ○ Build Flexibility
  ○ Openness
  ○ Interoperability

Objectives:

Build a Word-Wide standard for Science and Business GRIDs: GCM
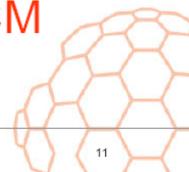
Objectives

Objectives	How Achievement will be measured
A EU Component Framework	Adoption
Non Functional Features: Invisible Grid	Efficiency
GRID IDE	Usability
Industrial Use-Case Validations	Client Demand

GridCOMP   Grid programming with components: an advanced COMPonent platform for an effective invisible grid   12

Research Challenges

○ **A generic GCM, still efficient**

○ **Effective composition:**

　○ Semantics, Deployment, Portability

○ **Non-Functional Aspects:**

　○ Security, Load-Balancing, Fault-tolerance, …

GridCOMP   Grid programming with components: an advanced COMPonent platform for an effective invisible grid

Key technology advancements

○ Programming the Grid with reusable, composable, components
  ○ vs. ad hoc solutions

○ Deployment on various architectures
  ○ Super Computer Center, Clusters, data-center, desktop Grids, …

○ Interoperability with related Grid software

○ Integration into Service Oriented Architecture (SOA)

GridCOMP   Grid programming with components: an advanced COMPonent platform for an effective invisible grid

WP3 - Non Functional Component Features (1)

○ Definition of a "framework" for autonomic management of distributed components
  ○ Design of the manager structure
  ○ Definition of proper implementation mechanisms
  ○ Characterisation of properties handled through autonomic managers

○ Preliminary experiments on notable (parallel) component compositions
  ○ Autonomic management of simple performance contracts
 ○ Assessment of the autonomic framework features

GridCOMP   Grid programming with components: an advanced COMPonent platform for an effective invisible grid   15
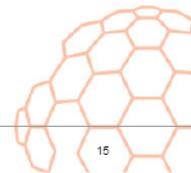
WP3 - Non Functional Component Features (2)

- Layered design of non functional component features
  - Identify proper support mechanisms to handle dynamic adaptation of components
  - Define local strategies to achieve contractually specified QoS goals
    - Based on mechanisms, predefined for well-known paradigms
    - Exhibiting local functional correctness
    - Enforcing the reestablishment of broken QoS contract to validity range
  - Define orchestration strategies preserving local to global effect
    - Local strategies are functional to a global goal
    - Application adaptation extent is keep as local as possible
- Interaction with use case providers to assess/improve non functional framework
  - Framework is validated on use cases or parts of them
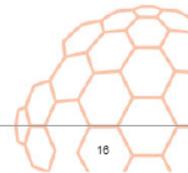
WP4 - Grid IDE for Programmers and Composers

- Provides an integrated programming and composing GUI.
- Offers facilities to bind both normal code and legacy code into primitive components.
- Enables assembly of Grid applications.
- Provides tools for the deployment of a given Grid component configuration or application.
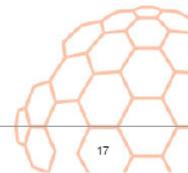
WP4 - Grid IDE for Data-centre operators

- Provides a mechanism for installing, monitoring and mapping necessary component code to available resources.
- Offers a steering tool for installing, removing, and re-installing new versions of component code.
- Provides a tool for the monitoring of resources.
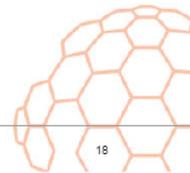
WP5 - Use cases (1)

- Telecom - Extended Data Record Processor
  - Collects, cleans, unifies and process data from several sources
  - Grid technology will provide reduced processing time, redundancy, fault-tolerance, lower cost and higher scalability

- Aerospace - Wing Design Application
  - Legacy application that computes the aerodynamic wing performance for a given configuration
  - This application will be wrapped into a component and distributed for parallel execution
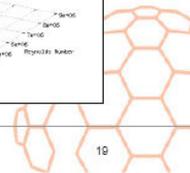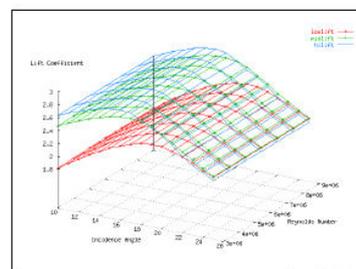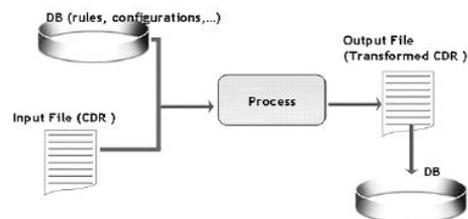
WP5 - Use cases (2)

- Biometric Identification System
  - Identify people solely on their biometric information (1:N match)
  - Use fingerprint biometrics (AFIS)
  - Consider multiple fingers to work reliably on large user population
  - Use distributed matching to achieve real-time performance
  - Based on business process (workflow) engine for adaptability
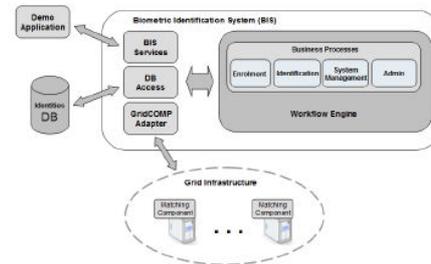
- Management application
  - Client/server application, with heavy processes (computing or data access intensive) written in PL/SQL procedures
  - Speed-up by parallelizing a sequential process into several sub processes
  - Speed-up by splitting data into subsets

GridCOMP   Grid programming with components: an advanced COMPonent platform for an effective invisible grid   20
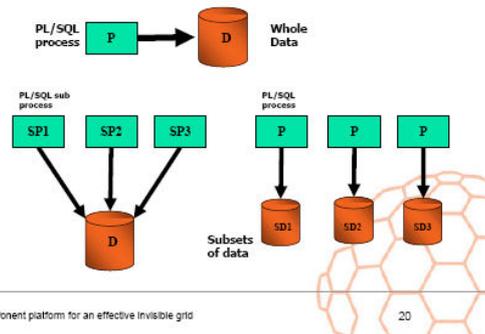
Expected Results & Impact

Anticipated Results & Impacts	Milestone (date)
Running and operational prototype of the component framework	M6 – M24
Management of Non-Functional Aspects	M14 – M24
A GCM Grid environment (IDE)	M18 – M24
Use of the GCM in the 4 industrial use cases	M30

GridCOMP   Grid programming with components: an advanced COMPonent platform for an effective invisible grid

Standardization *(contribution to & use of)*

○ **Approach:**

　○ Ensure interoperability with existing Grid software

　○ EGEE gLite, Unicore, WS, Globus, LSF, …

　○ Other business standards (PKI X509, OSGi, …)

○ **Standardisation Goals:**

　○ A well defined, standardized, EU GCM, … GGF

　○ Tested Grid Interop (Grid PlugTests, ETSI)

　○ Adoption by industry

○ **Standards that will be used:**

　○ gLite, Unicore, WS, X509

Grid programming with components: an advanced COMPonent platform for an effective invisible grid

---

Technical progress planned for the next six months (1/2)

○ **ProActive/GCM** Implementation

　○ Collective interface improvements (multicast)

　○ Interface the ProActive **Scheduler** with component

　○ Reorganization of the ProActive descriptor deployement file : more component

　○ Improve separation between ProActive features and ProActive/GCM

○ **Grid IDE** early prototype

　○ ADL files viewer, checker, editor

Grid programming with components: an advanced COMPonent platform for an effective invisible grid

23
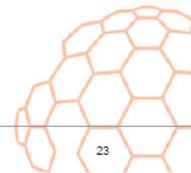
Technical progress planned for the next six months (2/2)

○ **Non Functional Component Features**

    ○ Definition of a "framework" for autonomic management of distributed components
- Prevent conflicts with the monitoring/steering Grid IDE functionality

    ○ Preliminary experiments on notable (parallel) component compositions
- Autonomic management of simple performance contracts
- Assessment of the autonomic framework features

    ○ Interaction with use case providers to assess/improve non functional framework

GridCOMP   *Grid* programming with components: an advanced *COM*Ponent platform for an effective invisible grid   24
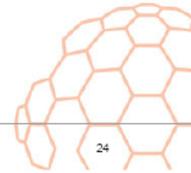
3 GridCOMP Flyer

The GridCOMP Flyer is a short (2-pages) presentation of the project, which can be used all over the world during meetings, workshops and events, about Grids.
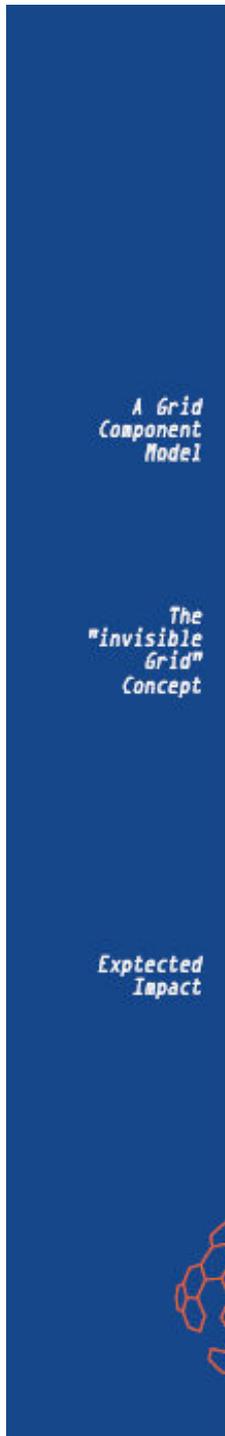
GridCOMP
Effective Components for the Grids

Cooperation

Coordination with the Networked European Software&Service Initiative (NESSI) is a strong priority, with the involvement of OW2, Atos Origin and IBM.

GridCOMP addresses both scientific computing and Grid-based business applications. The project can reach a world-wide audience thanks to the involvement of partners from Australia, China and South America.

Partnership

ERCIM
ERCIM EEIG
European Research Consortium
for Informatics and Mathematics, France

INRIA
INRIA - Institut National de Recherche
en Informatique et en Automatique, France

Computer Science Department
University of Pisa, Italy

IBM IBM Zurich Research Laboratory, Switzerland

University of Westminster
Harrow School of Computer Science
University of Westminster, London, UK

Atos Origin ATOS Origin, SEA, Spain

Department of Computer Science and
Technology, Tsinghua University, China

Institute of Information Science and
Technologies of the Italian National Research
Council (ISTI CNR), Pisa Italy

Department of Computer Science
and Software Engineering, University
of Melbourne, Australia

Grid Systems, SA, Mallorca, Spain

Computer Science Department,
University of Chile

Facts

Duration:	From 1 June 2006 to 30 November 2008
Budget	€2.974,230
EC Funding	€1.760,000
Funded by	IST Programme
Instrument	Specific Targeted Research Project
EC Project No.	FP6-034442

Contact

Administrative coordinator:
Patricia Ho-Hune, ERCIM EEIG
E-mail: patricia.ho-hune@ercim.org

Scientific coordinator:
Denis Caromel, INRIA
E-mail: denis.caromel@inria.fr

Web site: http://gridcomp.ercim.org/

GridCOMP is a "Specific Targeted Research Project"
supported by the IST programme of the European Union
(the Information Society and Media- project n° FP6-034442)

Information Society
Technologies