Grid Based Application Service Provision

GRASP

Scope

The aim of the GRASP project has been to integrate network enabled Application Service Provision (ASP) with Grid computing and Web Services. To this end, GRASP has explored a new and advanced system infrastructure for application service provision based on Grid technologies. Solutions developed by the project have been evaluated using three application testbeds in the biomedical, e-learning, and financial sectors.

Innovation and Functionality

The GRASP project has made a breakthrough in application service provision from both the technological and business view points. It has done this by the provision of innovative, advanced services for the support of collaborative and Virtual Organisational business models. The main outcome of the project has been the development of the GRASP architecture and infrastructure based on Grid Middleware technologies. This infrastructure has been integrated with commodity technologies, such as Microsoft's .Net platform (e.g. GRASP designed an OGSA–compliant Grid Information Service using .NET).

Having built an ASP infrastructure using Grid technologies, GRASP has delivered high levels of scalability and reliability, innovative security solutions, accounting, a fine grained pricing model, definition of service level agreements, Quality-of-Service (QoS), and resource management.

GRASP has Grid-enabled two application testbeds, based on its architecture and infrastructure, in order to validate the effectiveness of the business models and defined methodologies for developing Grid-aware applications.

Positioning

The GRASP project has aimed to provide new business models for Grid environments. The two application testbeds developed by the project were used to verify and validate the project's results and to compare them with other ASP models based on more traditional technologies. The purpose has been to demonstrate value-added opportunities for ASPs, which may be derived from the use of Grid technologies, in the GRASP model.

Target Users and User Benefits

The application testbeds developed by GRASP fall into two domains: Intensive data analysis and the statistical study of hospital patient data; and e-Learning. The wider applicability of the results of the GRASP project, however, includes other sectors, such as the pharmaceutical, chemical, food and drink, tobacco, electronics and mechanical industries, for which pilot user-trials are planned.

As the ASP market keeps on growing, motivated by the thrust of companies who want to reduce the total cost of resource ownership, new and

Contract number
IST-2001-35464

Type of project
Cost-shared Research and Technological Development Action

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Maximum Community contribution to project
EUR 1 960 000

Project start date
1 April 2002

Duration
34 months

Information Society

European Commission

innovative solutions for the delivery of ASP are becoming more pertinent. This is particularly important for SMEs, for whom remote access to resources and applications will help to avoid large investments in running ERP systems.

Maturity and Availability of Tools

The GRASP infrastructure has been developed in two cycles. The first concluded with the delivery of a limited version to the application testbed developers for early prototyping. The second cycle is ongoing and will conclude with the delivery of the full infrastructure.

Compliance with Standards

The Open Grid Service Architecture (OGSA) is the reference model for the development of the GRASP infrastructure. The GRASP software is compliant with version 1.0 of the OGSI specification. In addition, the GRASP platform uses standard specifications from the Web Services sector, including: SOAP; UDDI; BPEL/BPEL4WS – as the business process definition language (with some extensions for the implementation of Grid Services); WS-Security; WS-Manageability; and WSLA. The GRASP project has also analysed the impact of migrating GRASP infrastructure from the OGSI specification to the WSRF specification, and has started that migration.

Interoperability

The GRASP platform has been based on Microsoft .NET core services, as the chosen hosting environment, and the OGSI.NET framework developed by the University of Virginia, which is an implementation of the OGSI specification. The GRASP security mechanism makes

use of the Microsoft implementation of WS-Security specifications and integration of the security functionalities provided by the OGSI.NET framework. Migration to WSRF implies also the adoption of the WSRF.NET framework, developed also by the University of Virginia.

The GRASP platform has also integrated other commercial components and commodity technologies, such as BizTalk for the orchestration of Grid Services, UDDI for the discovery of Grid Services, the WSE Microsoft implementation of WS standards, and MS Performance Counter for the monitoring of resources.

Value-Added Services and Next Generation Development

Following the end of the project, the GRASP platform will be adapted and extended by other Grid projects. In particular, the ELeGI project will further enhance the GRASP work with semantic capabilities for improved resource discovery and on-demand orchestration, together with services for creating and managing Virtual Learning Organisations.

The Akogrimo project will also make use of the results of the GRASP project to address new challenges associated with pervasive Next Generation Grids. Relevant aspects of the latter include resource sharing across multiple administrative domains, QoS, and flexible security mechanisms that can be adapted for use in pervasive computing environments. A selection of scientific and technological development results from GRASP will be adapted and further improvement by the TrustCoM project.

Project Partners

Organisation name and country

ATOS ORIGIN SAE (ATOS)	ES
CENTRO DI RICERCA IN MATEMATICA PURA ED APPLICATA (CRMPA)	IT
COUNCIL FOR THE CENTRAL LABORATORY OF THE RESEARCH COUNCILS (CCLRC)	UK
CS SYSTEMS D'INFORMATION (CSSI)	FR
LOGICDIS S.A. (LOGICDIS)	GR
MEDITECNOLOGIA, SAU (COMB)	ES
UNIVERSITAT POLITECNICA DE CATALUNYA (UPC)	ES
UNIVERSITAET STUTTGART (USTUTT/HLRS)	DE