National Grid NG SINGAPORE

ALiCE Java-based Grid System

Project Introduction

Objectives
To provide a portable middleware to facilitate the development and deployment of applications on a Grid.

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Period of Project
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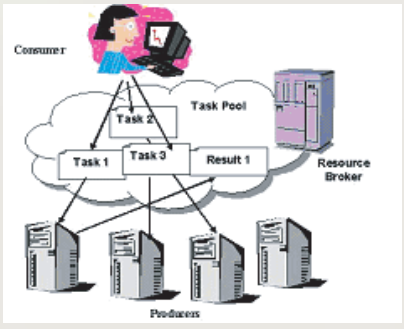
Abstract
ALiCE (Adaptive and scaLable internet-based Computing Engine) is a lightweight grid-computing middleware for aggregating computational resources. An object-based programming template library facilitates rapid development of Grid applications.

Project Details

Description
ALiCE is a portable software technology for developing and deploying general-purpose Grid applications and systems. It virtualises computer resources into one computing environment through a platform-independent consumer-producer resource-sharing model, and harnesses idle resources for computation to increase the usable power of existing systems on the network.



ALiCE Consumer-Producer Model

Computer applications are submitted by a consumer for execution on idle producer computers through a resource broker residing on another computer. The resource broker regulates consumer's resource demand and producer idle cycles, and dispatches tasks from its task pool for execution at the producers. A novel application-driven task-scheduling algorithm allows a consumer to select the performance level for each computer application to be executed.

ALiCE comprises the following main components:
a. A programming model consisting of class libraries and a set of design patterns to support both sequential and parallel Grid applications'
b. A user interface to support the submission of task by consumers;
c. A generic computing engine at each producer accepts Grid tasks for execution; and
d. A resource broker that manages and hides the complexities of distributed computing.

The main benefits of ALiCE are:
a. reduce business cost by maximising the utilisation of existing computing resources;
b. access to scalable computational capabilities.
ALiCE provides additional power without the need for additional costly investment;
c. remote access to expensive computational resources, equipment, and hard to distribute, large and proprietary data sets.

Applications developed include computational genomics, satellite image processing, and grid-enabled Matlab.

Reference
Y.M. Teo and X.B. Wang, ALiCE: A Scalable Runtime Infrastructure for High Performance Grid Computing, Procs of IFIP International Conference on Network and Parallel Computing, LNCS 3222, pp. 101-109, Springer Verlag, Wuhan, China, October 2004.