

## PROJECT INTRODUCTION

### Objectives

To design an integrated set of tools and models to represent Grid resources, to ease discovery and matching of resources, and to provide a standard Web Services interface for integration.

### Project Investigator / Manager

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### Period of Project

01 Dec 2004 – 30 Nov 2006

### Website

<http://cemnet.ntu.edu.sg>

### Abstract

Grid computing environment opens a new distributed computing era that allows users "easy" access to Grid resources. Currently its flat resource definition has no precise model definition and semantics, which increases the integration difficulty and limits the degree of automation. Semantic Web technology and CIM domain knowledge are exploited in this project to achieve better Grid resource management.

## PROJECT DETAILS

### Description

Quartermaster is an integrated set of tools and technologies to ease the setup of a utility computing farm for enterprise IT environments. Quartermaster supports the entire lifecycle of computing tasks - including the design, deployment, operation, and decommissioning of each task. All tools within Quartermaster are integrated using models based on CIM, an industry standard meta-model to support interoperability between management systems and the technologies they manage.

To support interoperability among management solutions, DCML, a model for data center management is introduced. It provides the ability to describe three broad types of information required in an automated data center environment. By utilizing the CIM as domain knowledge, and DCML as the Semantic Web syntax, our objective is to provide a Web Service enabled resource management system for the Grid by leveraging on:

- Translation of User Requirements

There is a gap between the application level requirement and Grid's resource level requirement. Users are interested in application level requirements like transaction rates. Grid understands lower level resource level requirements such as available disk space and memory. This gap can be resolved by a sizing tool which we implement as part of a design-matching module, and it involves study on constraint

- Formal Representation of Grid Resources  
DCML is proposed as a model for data center's resource definition. As Quartermaster uses CIM model and MOF to describe resources in its environment, we implement an adaptor to convert Quartermaster CIM/MOF to DCML. The converted models are stored in a local repository.

- Discovery and Match of Grid Resources  
To check whether the target Grid provides the user required resource, we implement a matchmaking module between DCML contexts. This is the core of the runtime matchmaking module. Then we apply the DCML context in the WS-Agreement to perform the resource discovery and simple negotiation.

### Collaborating Organizations:

- Institute of High Performance Computing
- HP Laboratories (Palo Alto)