Grid Middleware & Testbed for the K*Grid

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MoreDream Overview

• Our main goal
  • is to develop a grid middleware which makes possible to organize a grid environment easily on demand

• Our research issues
  • Resource management: GRASP
  • Grid information: GAIS
  • Grid-enabled MPICH: MPICH-GX

• Our middleware implementation
  • conforms to OGSI specification
GRASP Overview

• Grid Resource Allocation Services Package (GRASP)
  • A package of Grid services which are related to resource allocation process in Grid
  • A tool for users to submit jobs easily to Grid environment

• Main Features
  • Resource brokering
  • Co-allocation (cross-site MPI-based job execution)
  • Fault tolerant job execution system
  • OGSI-compliant (based on OGSI implementation of GT3)
  • Collective and resource layer services
GAIS Overview

• Grid Advanced Information System (GAIS)
  • Package of Grid services which are related to provide mechanisms for discovery and monitoring, and hence for planning and adapting application behavior
  • Indexes Service Data carrying state information from multiple grid service instances
  • Manages the lifecycle of VO

• Main features
  • Universal VO management
  • Categorization of Grid Services
  • Classification of Service Data
  • Rich information provider
MPICH-GX Overview

- **MPICH-GX**
  - Enable a MPI Job to Execute through Grid Middleware such as Globus Toolkit 3 by File based initialization

- **MPICH-GF**
  - Fault tolerant MPICH by Checkpoint mechanism
  - Integration with GRASP

- **MPICH-GP**
  - MPI Job Support in Private IP Environment

- **MPICH-GS**
  - Security MPI messaging based on PKI
Status of K*Grid Testbed

- Consists of 13 resource providers
  - 7 Supercomputers + 9 High performance clusters
- Includes heterogeneous computing architectures
  - Linux, AIX, HP-UX, IRIX
- Installs Globus Toolkit v2.4 and other S/Ws
- Supports application scientists to adapt the Grid environment
- Provides production CA service based on APGrid PMA (Policy Management Authority)
- Collaborates other international Grid communities
  - PRAGMA, iHPC, GridLab, iVDGL and TeraGrid
Other Research Issues

• Development of Grid Accounting System
  • Prof. Seong Jong Chung (Chonbuk National Univ.)

• Research on Grid Task Scheduling Methods
  • Prof. Sunggu Lee (Pohang Univ. of Science and Technology)

• Development of Grid based Fault-tolerant System
  • Prof. Heon Y. Yeom (Seoul National Univ.)

• Development of Network-based Heterogeneous Storage Data Management System for Computing Grid Environment
  • Prof. Jaechun No (Sejong Univ.)

• Other Network Related Research Projects
Thank You