GridASP :
An ASP framework for Grid Utility Computing

Grid Technology Research Center (GTRC)
(National Institute of Advanced Industrial Science and Technology) AIST,
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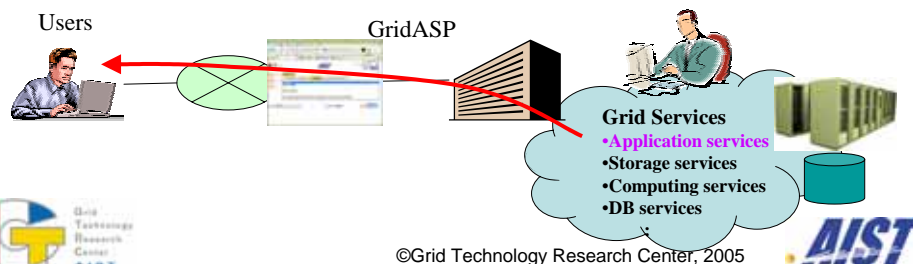National Institute of Advanced Industrial Science and Technology

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GridASP in Business Grid PJ

METI*: Ministry of Economy, Trade and Industry

- **Project "GridASP" is a part of Business Grid PJ in Japan (METI)**
  - Goal of the Business Grid Project: develop Grid middleware for application in businesses (2003 - 2005)
- **GridASP is a utility computing framework for technical computing in the enterprise**
  - Automobile: CAE, CFD simulation, crash analysis , ...
  - Semiconductor: circuit simulation, device simulation , ...
  - Pharmaceutical: drug screening, structural analysis , ...
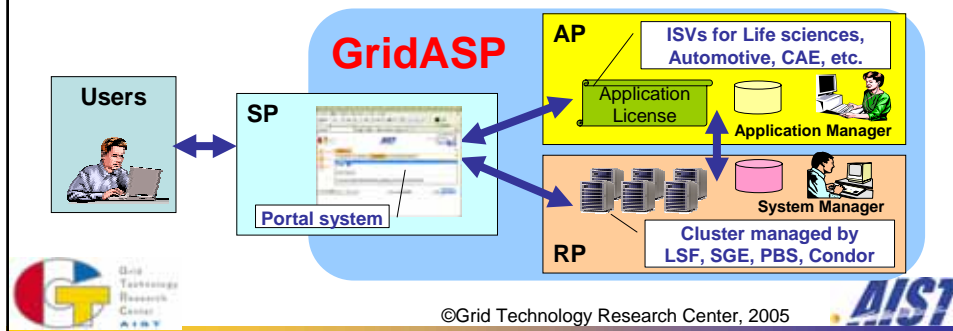 - Finance: Credit/Market Risk Analysis, ...

Users

GridASP

Grid Services
•**Application services**
•Storage services
•Computing services
•DB services

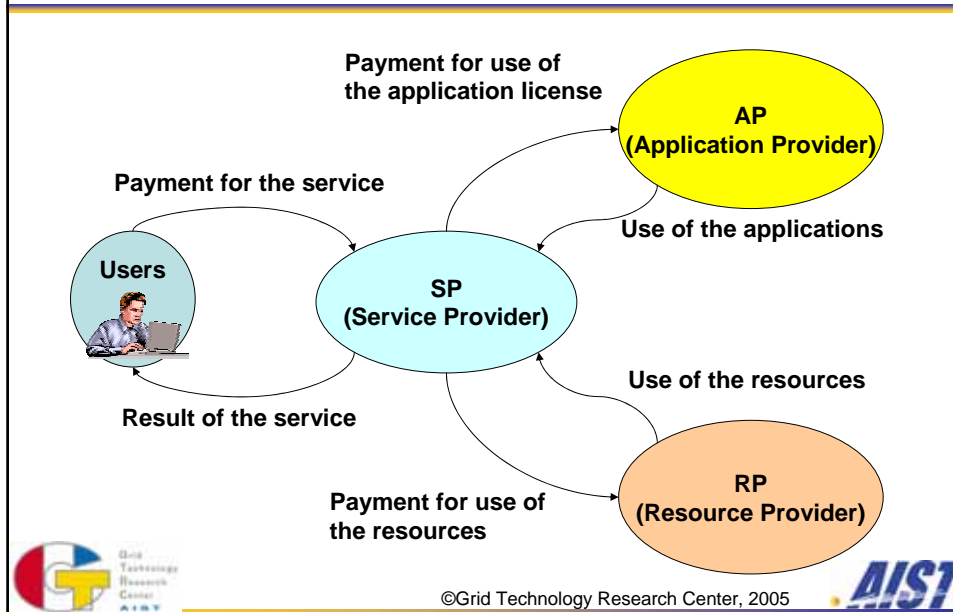©Grid Technology Research Center, 2005

Concept of GridASP

- **Three independent organizations federate as the ASP**
  - AP (Application Providers)
    - Application packages and license management
  - RP (Resource Providers)
    - Resource management and job execution
  - SP (Service Providers)
    - Web portal and mediation between users and RP

GridASP

Users

SP

Portal system

AP

ISVs for Life sciences, Automotive, CAE, etc.

Application License

Application Manager

System Manager

RP

Cluster managed by LSF, SGE, PBS, Condor

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GridASP model

Payment for use of the application license

Payment for the service

Users

SP (Service Provider)

Result of the service

AP (Application Provider)

Use of the applications

Use of the resources

RP (Resource Provider)

Payment for use of the resources

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Benefit of each players

- 🌐 **General**
  - ▶ Easy to start the business
- 🌐 **SP**
  - ▶ Collection of useful services for the customers
  - ▶ Broker business for applications and resources
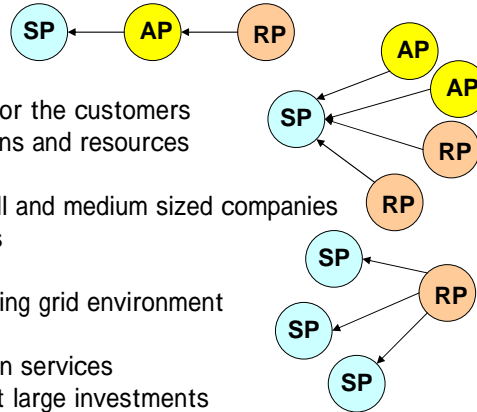- 🌐 **AP**
  - ▶ New approach to service small and medium sized companies
  - ▶ Testbed for novel applications
- 🌐 **RP**
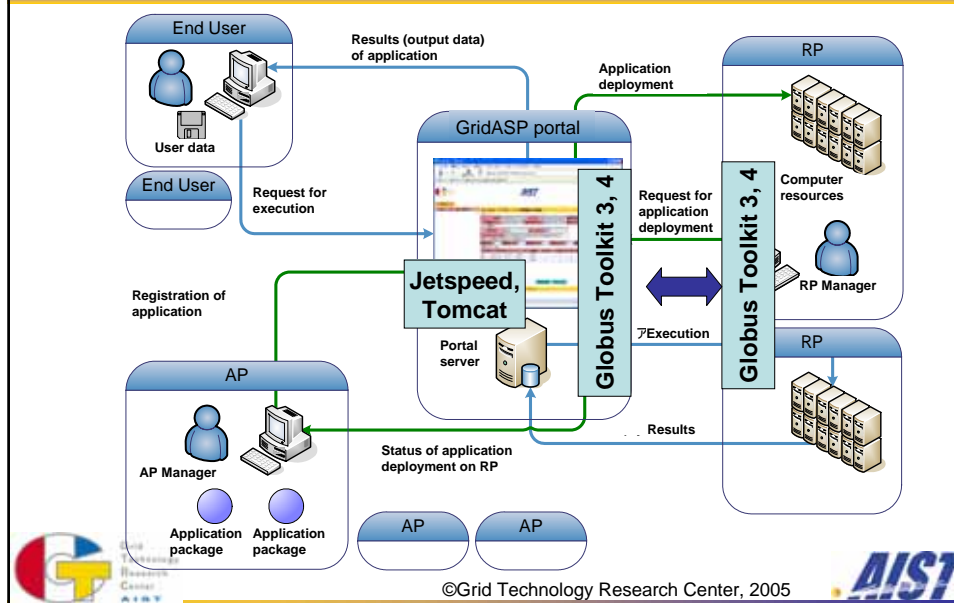 - ▶ Reduced operating cost by using grid environment
- 🌐 **Users**
  - ▶ Payment per use of application services
  - ▶ Starting up a business without large investments
  - ▶ Implement very large computations in a cost efficient way

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Portal system as a center of the GridASP

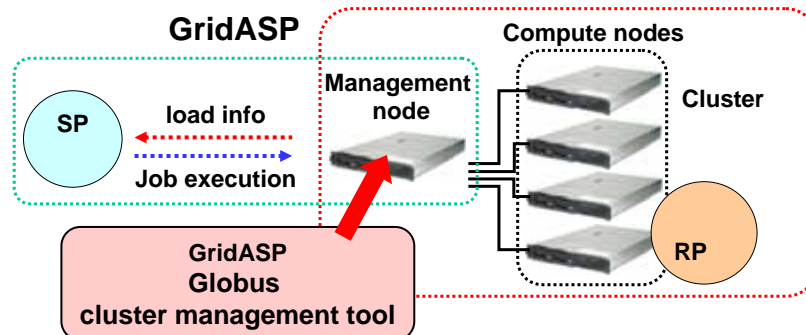©Grid Technology Research Center, 2005

Computer Resources at RP

- Clusters are managed using the following cluster software
  - PBS, LSF, SGE, Condor
- GridASP software is installed on the management node
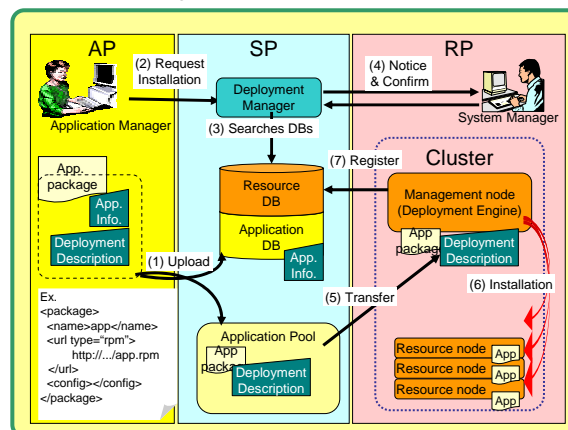- Compute nodes of the cluster are managed by the cluster software

GridASP
Compute nodes

Management node

SP
load info
Job execution

Cluster

RP

GridASP
Globus
cluster management tool

Globus and GridASP are installed on the management node.

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Centralized Application/Resource Management

- APs prepares application packages and "manuals"
  - Application information: functions, input parameter
  - Deployment description: installation script and application packages
- RPs download the packages and deploy them to the clusters

AP
SP
RP

(2) Request Installation
(4) Notice & Confirm

Application Manager
Deployment Manager
System Manager

(3) Searches DBs

App. package
App. Info.
Deployment Description

(7) Register
Cluster

Resource DB

Application DB
App. Info.

Management node (Deployment Engine)
App package
Deployment Description

(1) Upload
(5) Transfer
(6) Installation

Ex.
<package>
 <name>app</name>
 <url type="rpm">
  http://.../app.rpm
 </url>
</package>

Application Pool
App package
Deployment Description

Resource node   App
Resource node   App
Resource node   App

Masking of user activities and data

- **Nobody knows both "who" and "what" about user jobs**
  - Anonymous ID for RPs
  - Data encryption via SPs

	Real World		Anonymous World	GSI (Globus)
	Users	SP	RP	

(1)Authentication

(2) Proxy certificate with anonymous ID

Ex. Smith

Real ID

Anonymous ID

Ex. user12

(3) Encryption (4) Transfer (5) Decryption

Data

Ex. Structures of candidate molecules

secret key **Shared key cryptosystem** secret key

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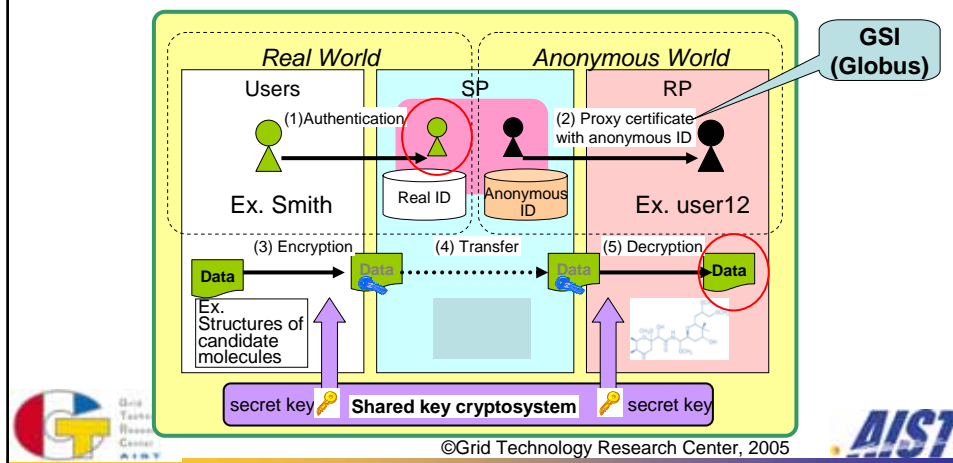
Status of the GridASP project

- **The first version of GridASP framework has been completed**
- **Proof-of-concept experiment is planned**
- **Join our experiment**
  - Telecom
  - Application vendor
  - Data center
  - Portal

Users (Bio-, pharma.)	SP (Grid Portal)	AP (application vendors)	RP AIST super clusters

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