

Business Grid Project Objectives & Key Technical Issues

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Thanks to all the teams in the **BUSINESS GRID COMPUTING PROJECT**

Business Grid Consortium

- ◆ Mission: Develop Business Grid middleware
 - Next generation business application infrastructure
 - Contribute to international standardization
- ◆ Three year project: 2003 - 2005
- ◆ Industry Members: Fujitsu, Hitachi, and NEC
- ◆ Collaborate with Grid Technology Research Center of AIST
- ◆ Jointly funded by the Ministry of Economy, Trade, and Industry (METI)
- ◆ Resultant components are to be available as “open-source”

Objectives

◆ Effective Use of IT Resources

- Automating / Reducing System Management
 - ◆ Realize autonomous configuration management and automatic operation management.
- Integrated management of a heterogeneous environment
- Better utilization of IT resources
 - ◆ Optimal resource allocation / Dynamic resource allocation
 - ◆ IT Resource location transparency

◆ Robust IT Environment for Business Continuity

- Improving reliability and safety of systems supporting critical social infrastructure by providing standardized ways to build robust systems (e.g. load balancing, disaster recovery etc) at a reasonable cost.



Value Creation

- by combining heterogeneous IT resources and services
- by allocating more funding for new business, rather than house keeping

Areas BizGrid is likely to be appreciated

IT systems where:

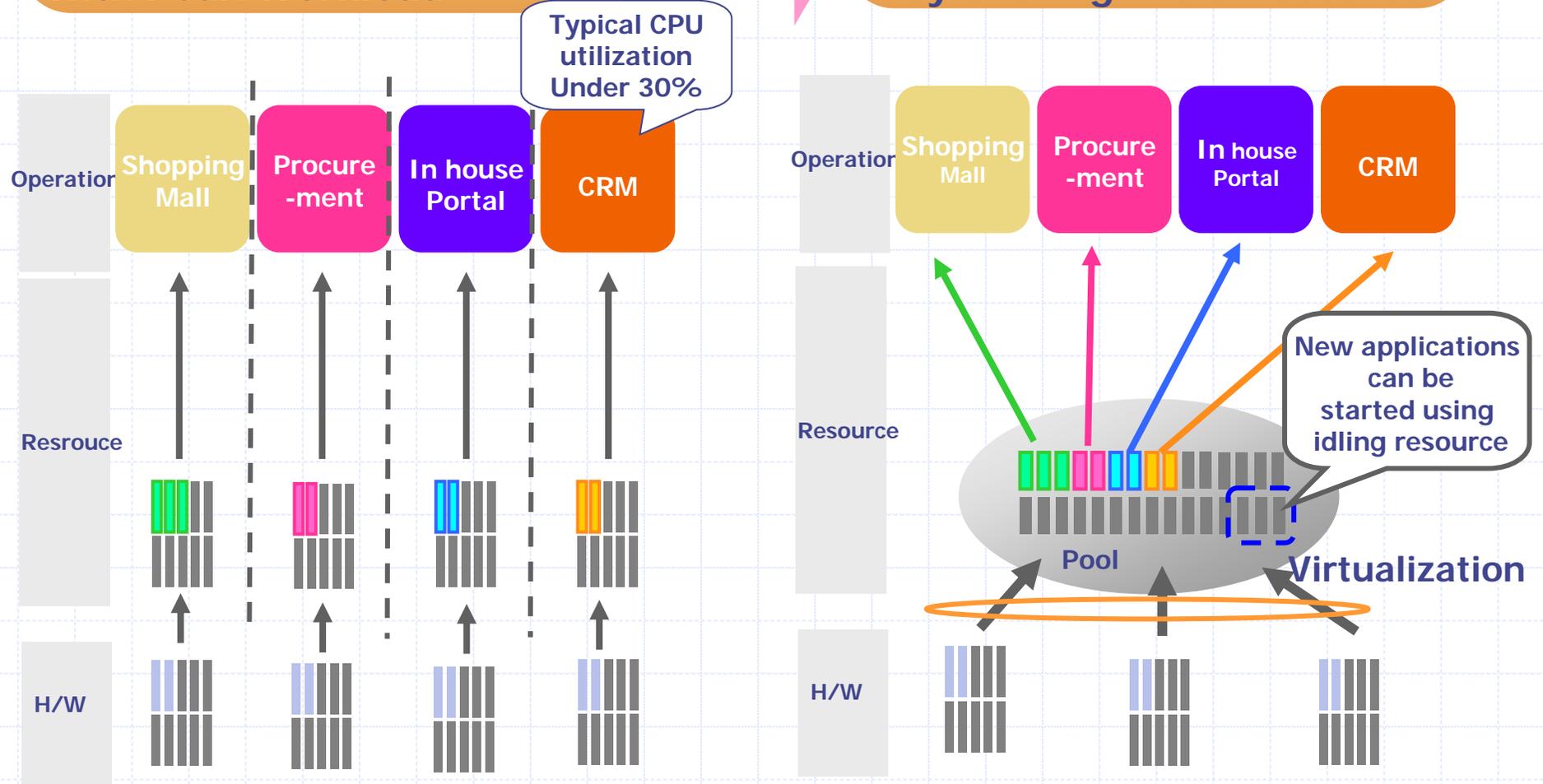
- ◆ business continuity needs to be sustained at a reasonable cost.
 - The functionalities such as shared back-up and remote disaster recovery will make the existing IT systems more resilient against failure without relying on the costly dedicated mechanisms.
- ◆ large workload deviation is expected
 - The internet systems such as Web shopping, e-trading and electric submission are prone to slow-down due to unexpected surge of requests. The scheduled / dynamic resource allocation functionality will alleviate the problem.
- ◆ a new business needs trial before the company makes full commitment
 - The shared, idling resources will make ideal room for a “small start” or “trial” of new business activities.
- ◆ the resources are to be shared among multiple organizations
 - IT utilization will be maximized by overlaying applications having different usage patterns. e.g. on-line transaction and batch account settlement
 - ASPs / IDCs

Effective Use of IT Resources

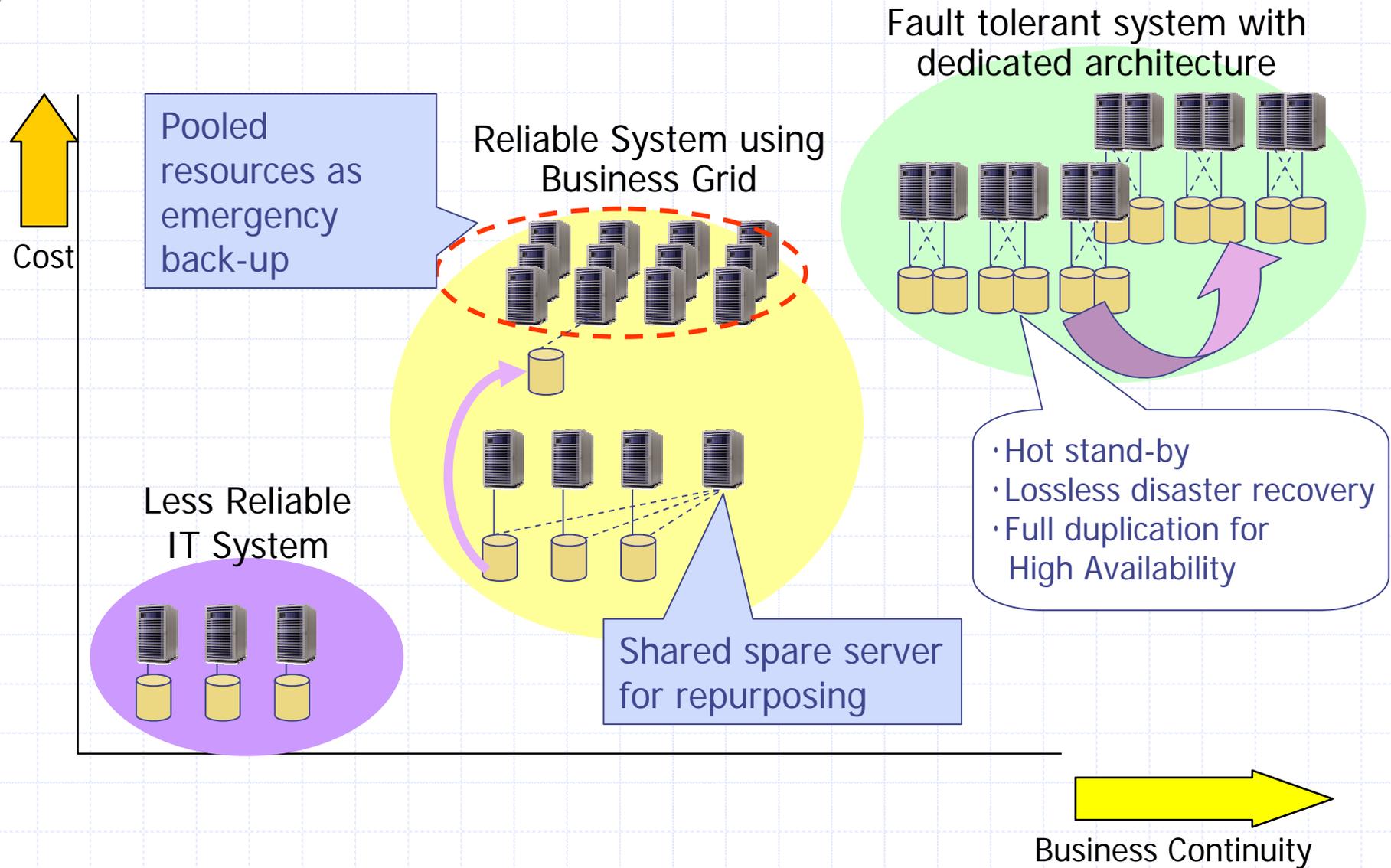
Resource Preparation to cope with Peak Workload



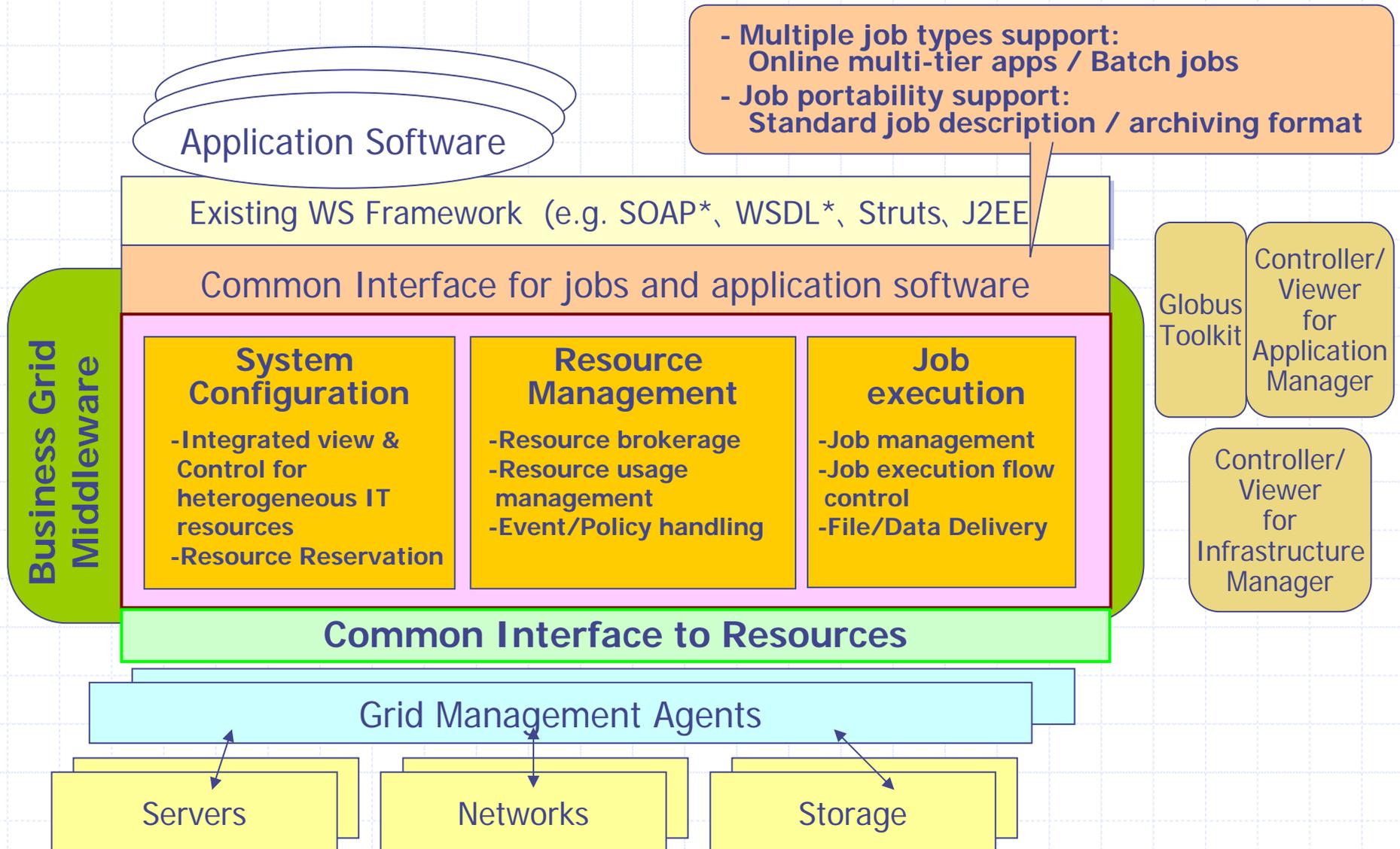
Cost Reduction by Sharing Extra Resources



Robust IT Environment for Business Continuity

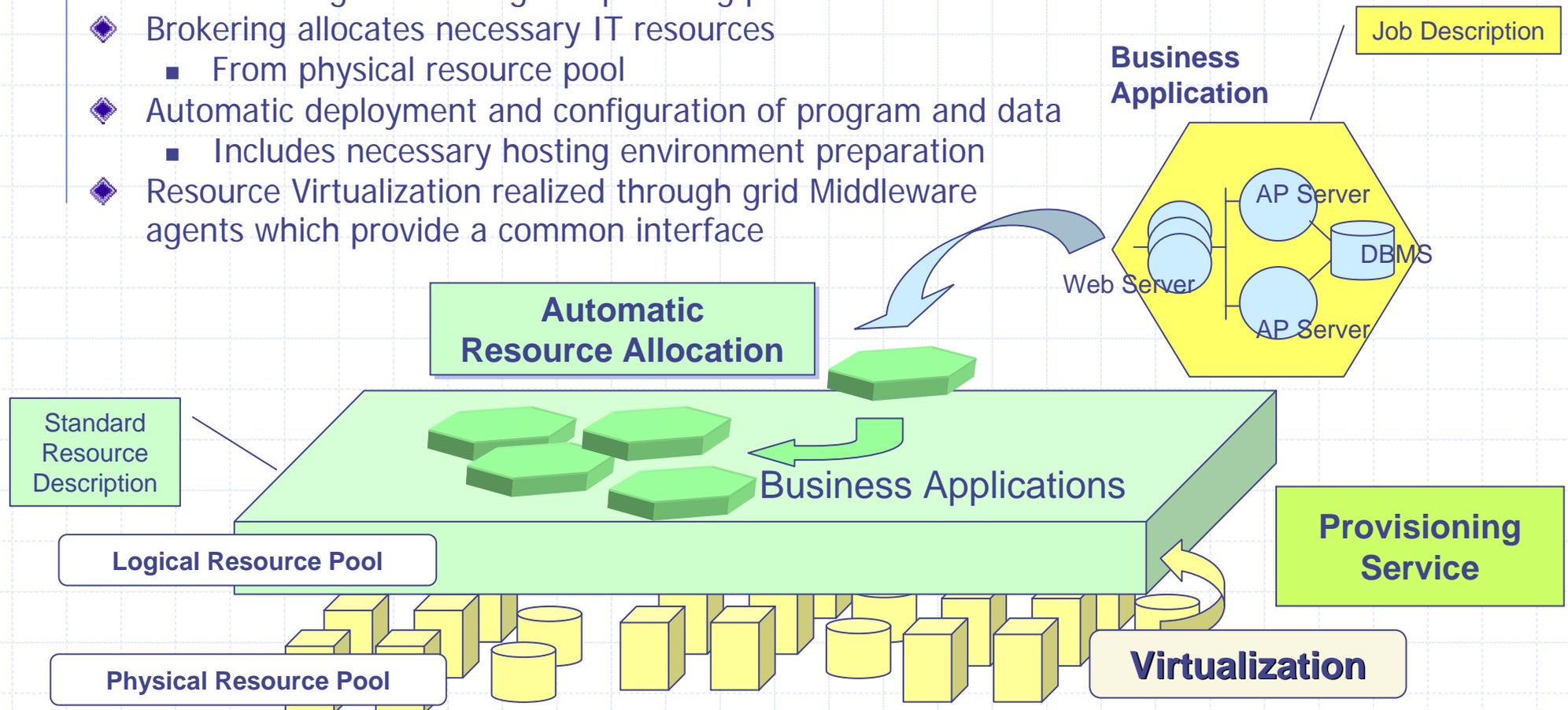


Business Grid Key Components



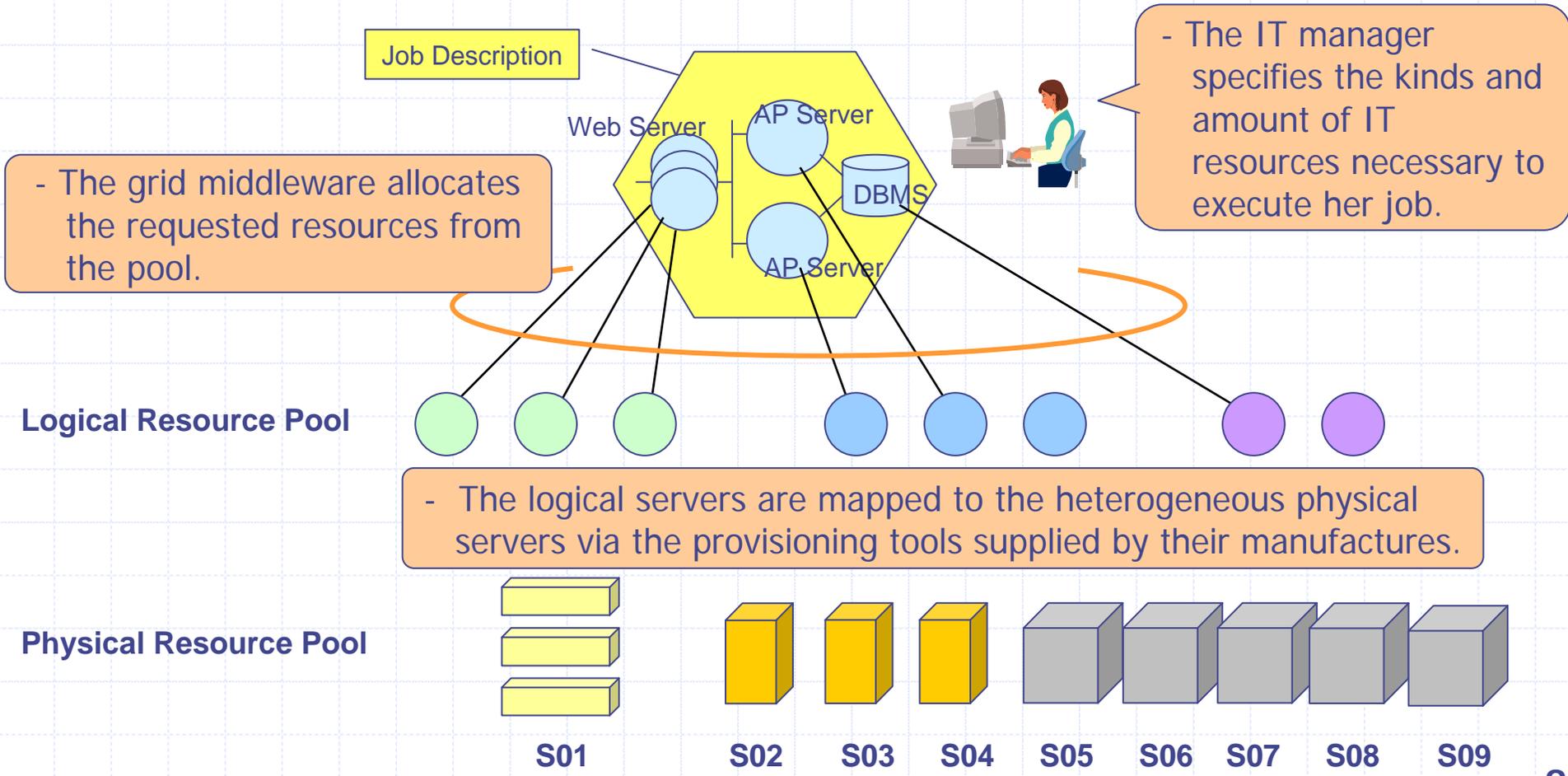
Big Picture - how it works -

- ◆ Job Submission
 - Standard job description and application contents service (using WS-Agreement protocol)
 - Including self-healing & -optimizing policies
- ◆ Brokering allocates necessary IT resources
 - From physical resource pool
- ◆ Automatic deployment and configuration of program and data
 - Includes necessary hosting environment preparation
- ◆ Resource Virtualization realized through grid Middleware agents which provide a common interface



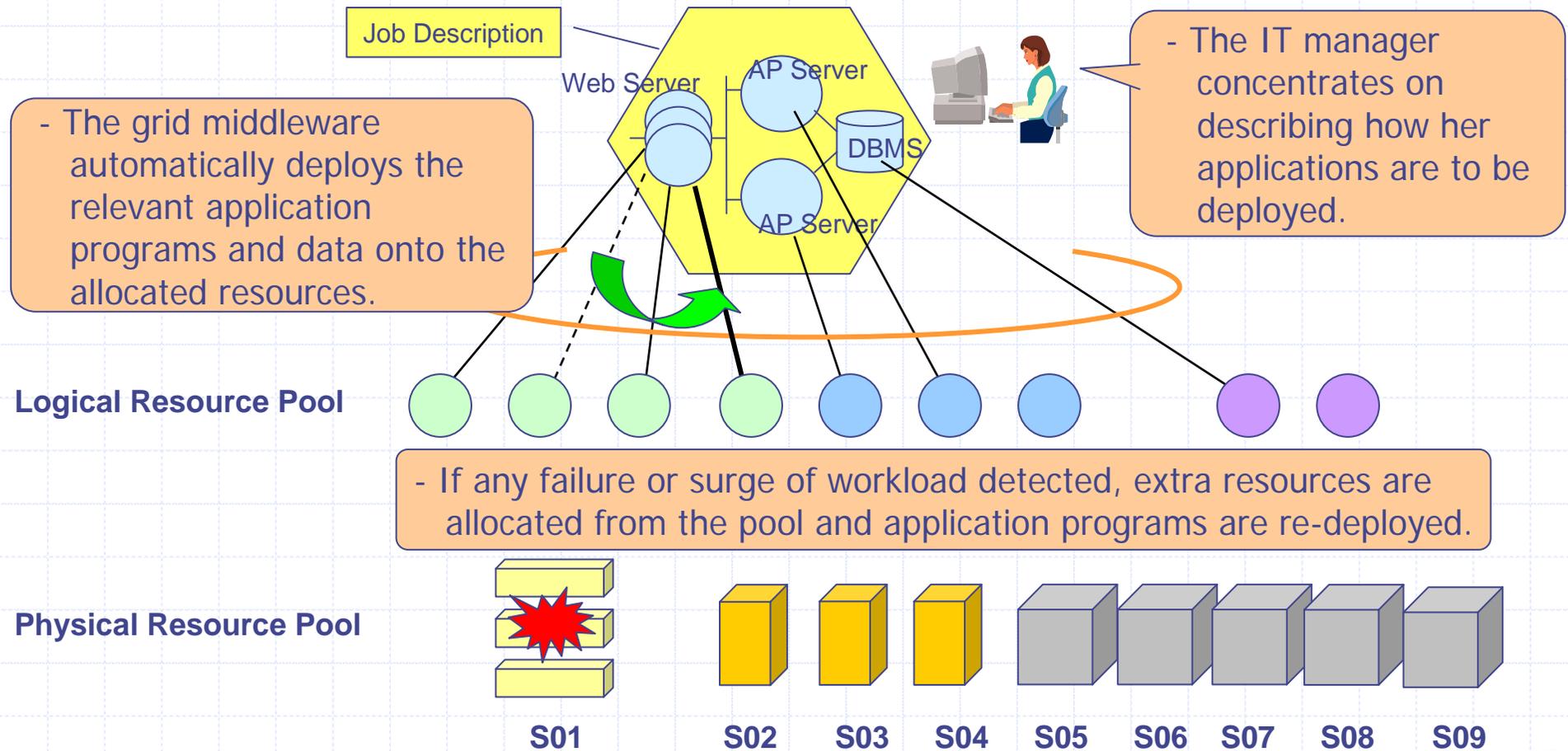
Optimum Resource Allocation

- The grid middleware finds and allocates the optimum amount and kinds of resources from the virtualized pool, enabling increased resource utilization with minimum human intervention.



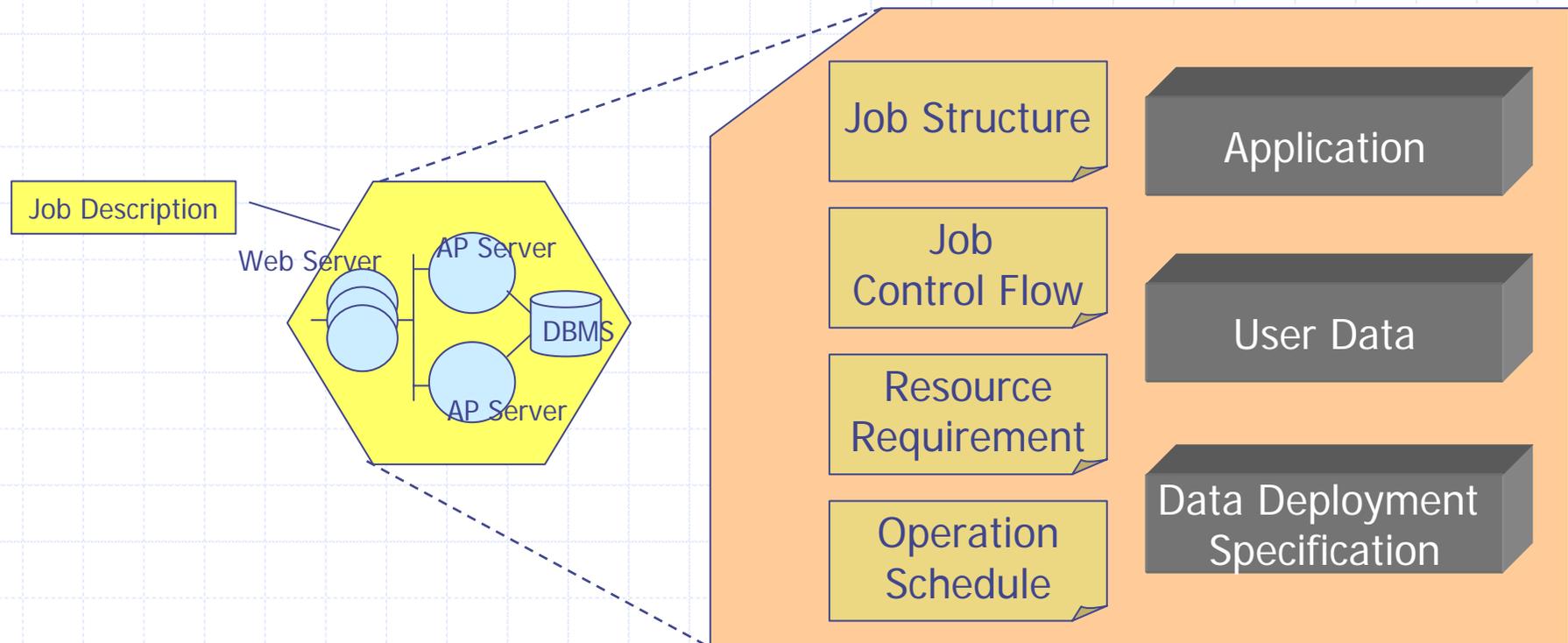
Dynamic Deployment of Business Application

- Based upon the job description, the relevant application programs and data are automatically deployed onto the allocated resources in a consistent manner.



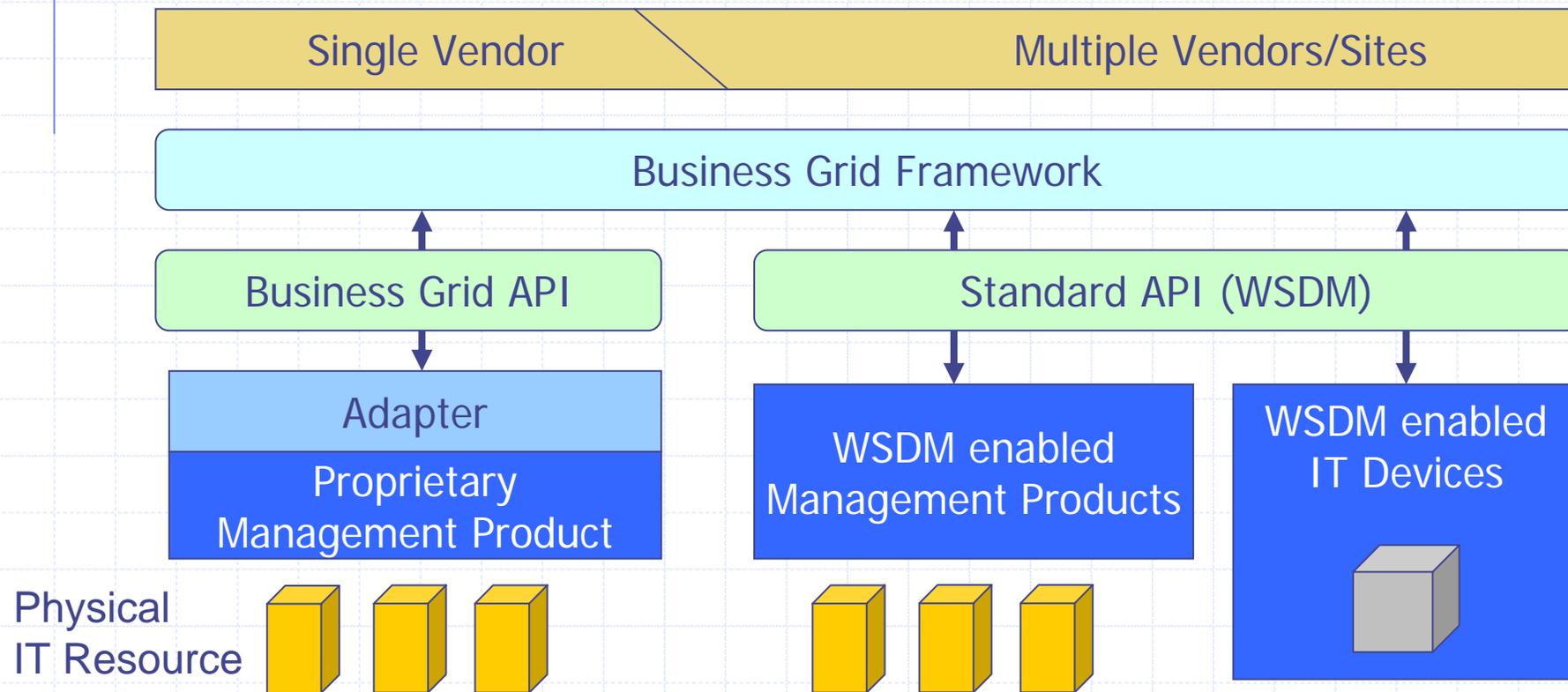
Job Description

- ◆ The job description in BizGrid not only archives the relevant execution modules, but also maintains all necessary information in one package, in order to manage the entire lifecycle of the operation.
- ◆ The description contains the specification of job structure (e.g. 3-tire Web App). It enables mapping between the job and virtualized resources, automatic deployment of execution modules and autonomic control of the resource allocation.



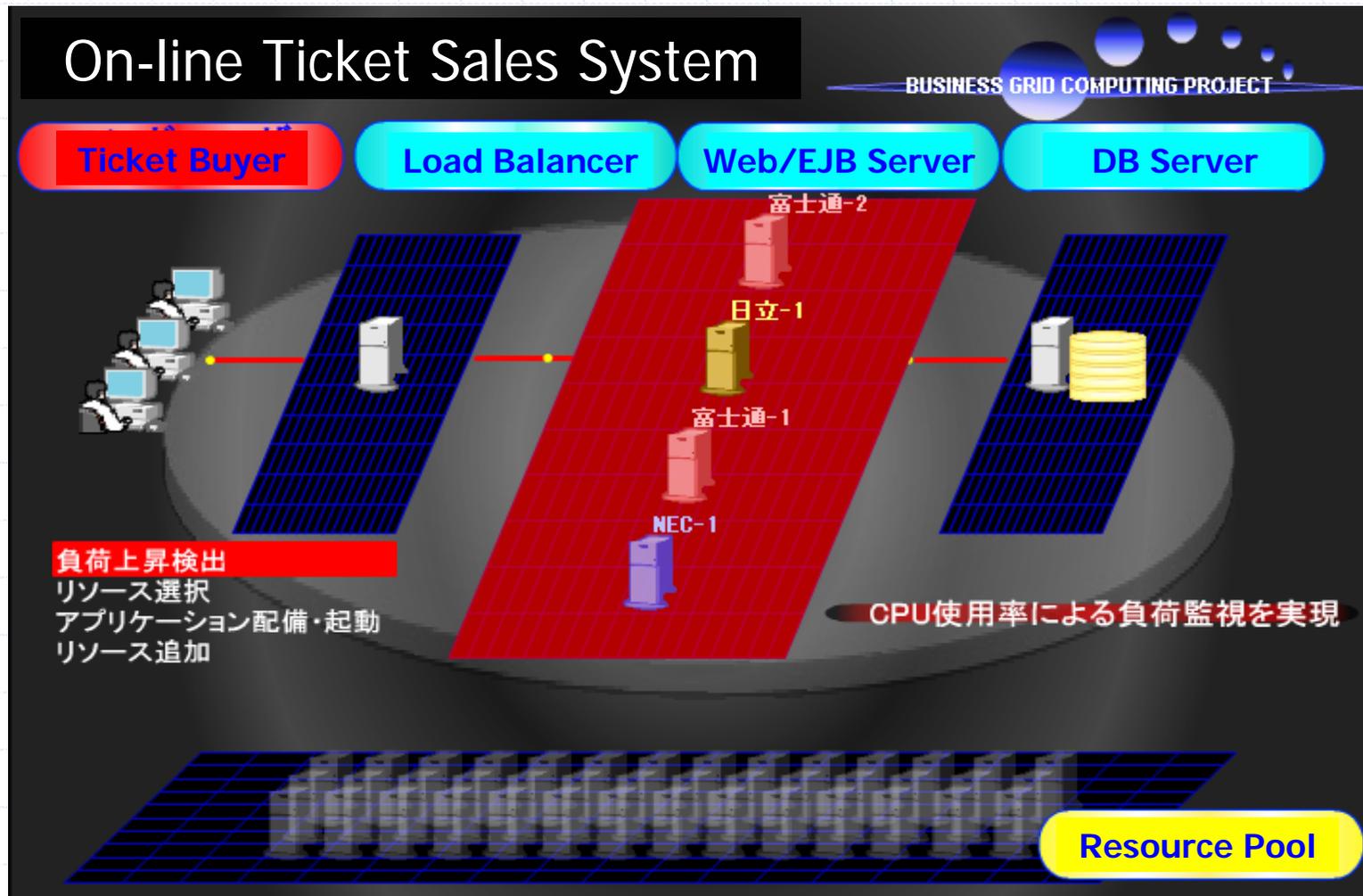
Resource Virtualization

- ◆ Currently, BizGrid adopts its own API to describe and control IT devices.
- ◆ Efforts are being made to adopt the standardized API (e.g. WSDM) so that WSDM enabled management products and IT devices can also be managed by the business grid framework in a seamless way.



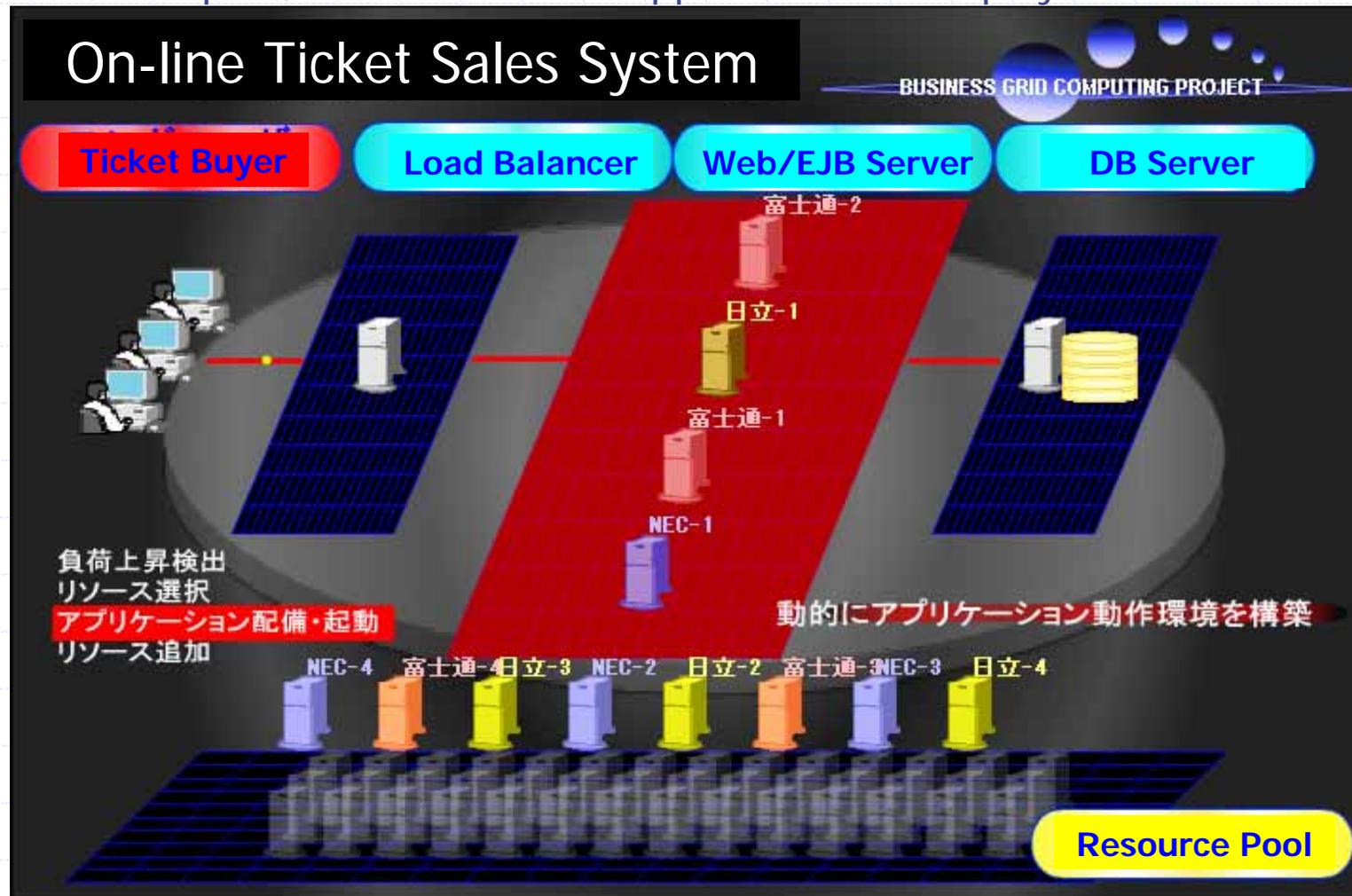
Demonstration Screen Dump (1)

Resource (CPU) usage is continuously monitored by the grid middleware.



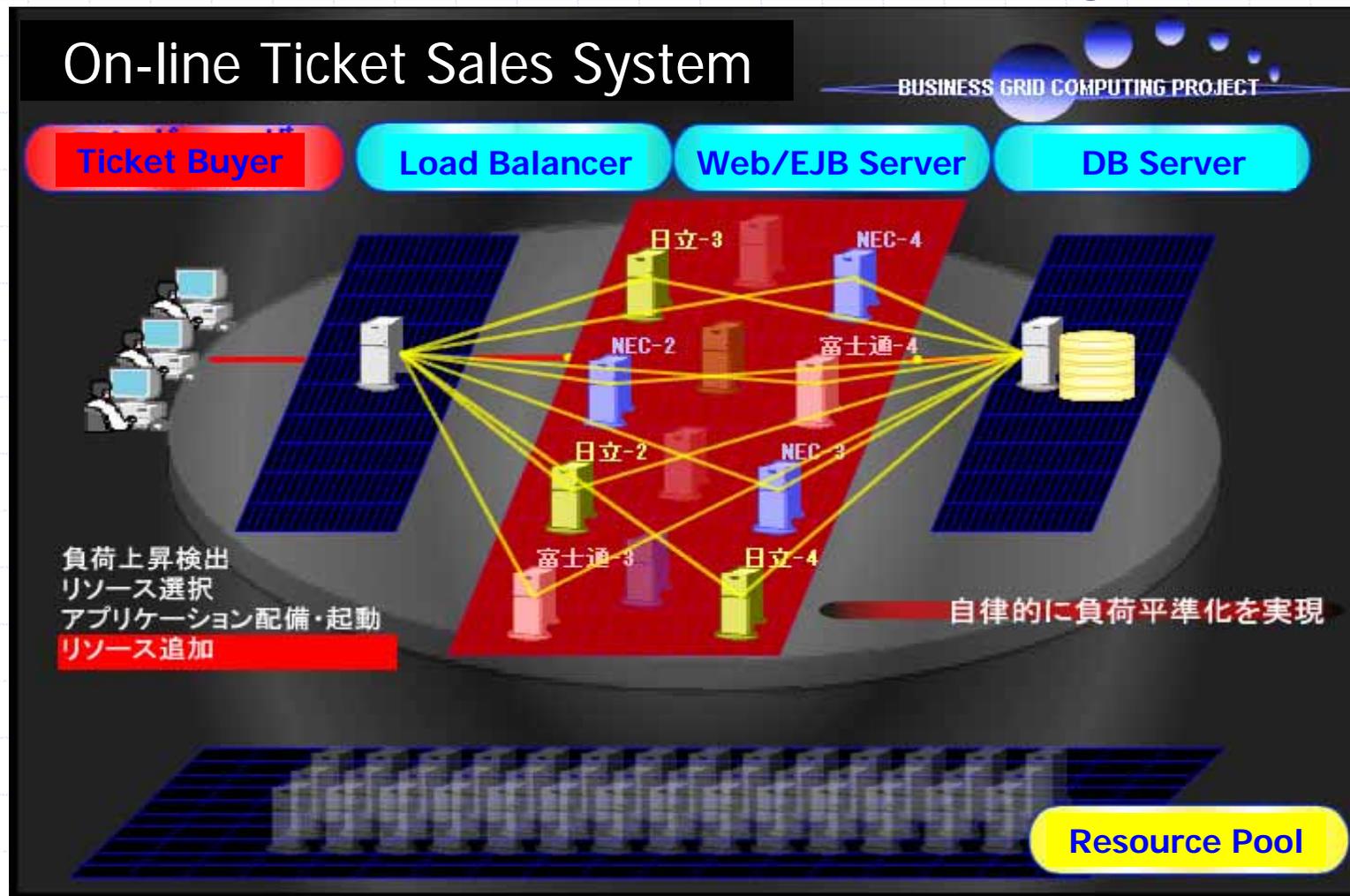
Demonstration Screen Dump (2)

When the resource shortage is detected, appropriate chunk of resource is chosen from the pool, and the relevant applications are deployed.



Demonstration Screen Dump (3)

The extra servers are thrown into the environment, the network connection is established and the workload is balanced until the target service level is met.



Relevant Standardization Bodies

◆ GGF

- OGSA-WG (architecture, roadmap, WG factory)
- CMM-WG (resource management)
- JSDL-WG (job portability)
- CDDL-WG (configuration, deployment, lifecycle management)

◆ OASIS

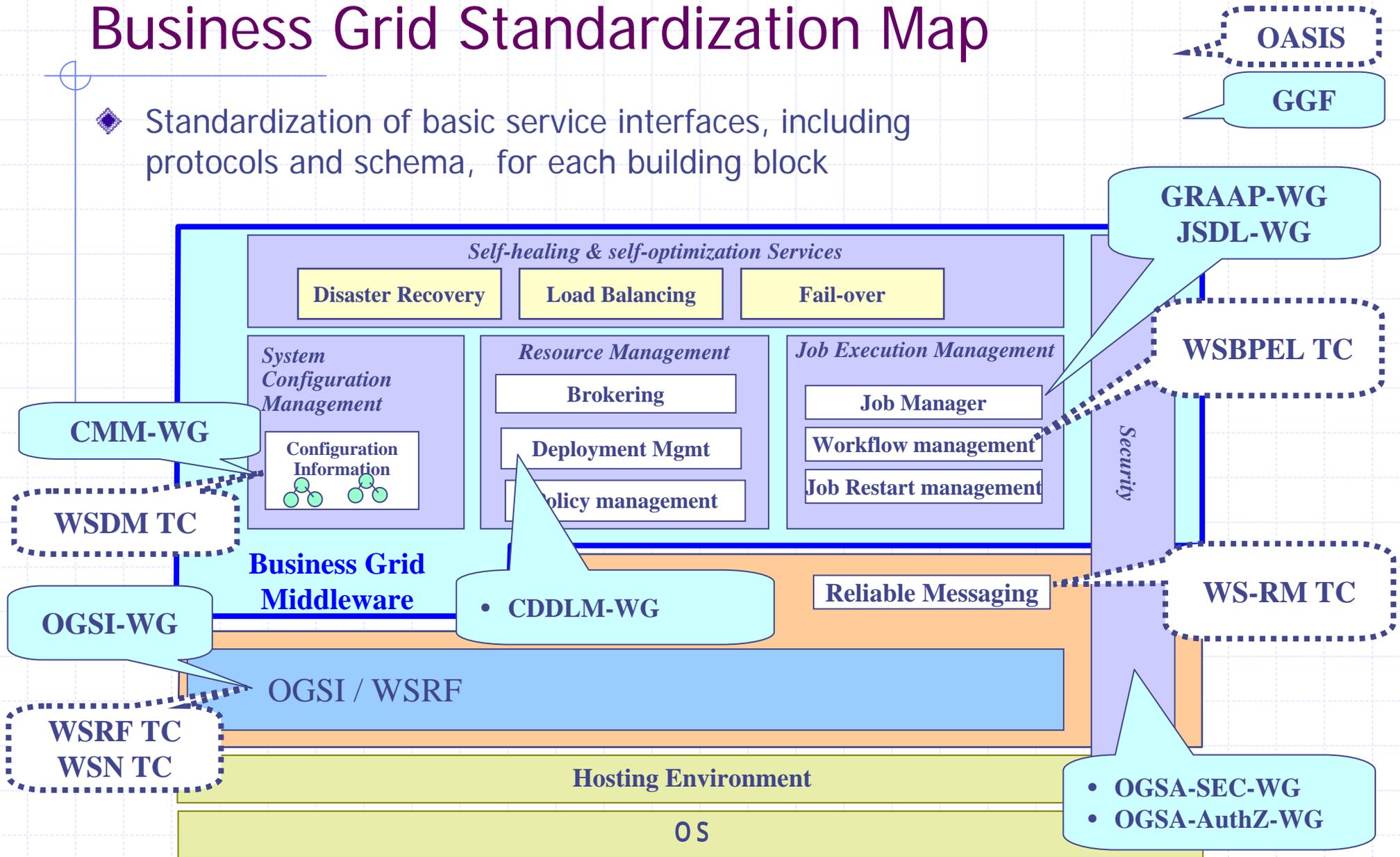
- WSDM TC
- WSRM TC
- WSBPEL TC
- WSRF TC, WSN TC

◆ DMTF

- Server Management WG
- Utility Computing WG

Business Grid Standardization Map

- Standardization of basic service interfaces, including protocols and schema, for each building block



Project Status / Things to do

- ◆ FY 2003 was the first year of the three-year project.
- ◆ Initial version of the business grid middleware has been developed and basic features are tried out.
- ◆ Features developed so far include:
 - Monitoring and registering underlying IT resources (both hardware and software)
 - Submitting and controlling e-Business applications
 - Allocating IT resources required by the application
 - Deploying and configuring e-Business application
 - Primitive functions for enabling policy based self-managing functionality
- ◆ Features to be developed this year will include:
 - Controlling multiple data centers i.e. Local/global two layered grid
 - Autonomic and more dynamic control of the resources
 - Adoption of emerging standards from GGF, OASIS, DMTF and other standardization bodies