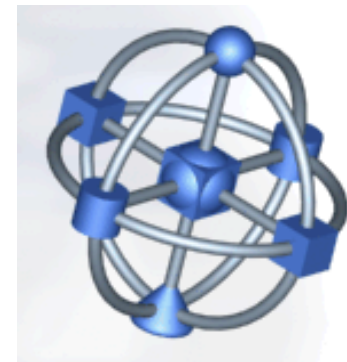




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# Grid Computing at IBM

## Creating Value for IT and Business





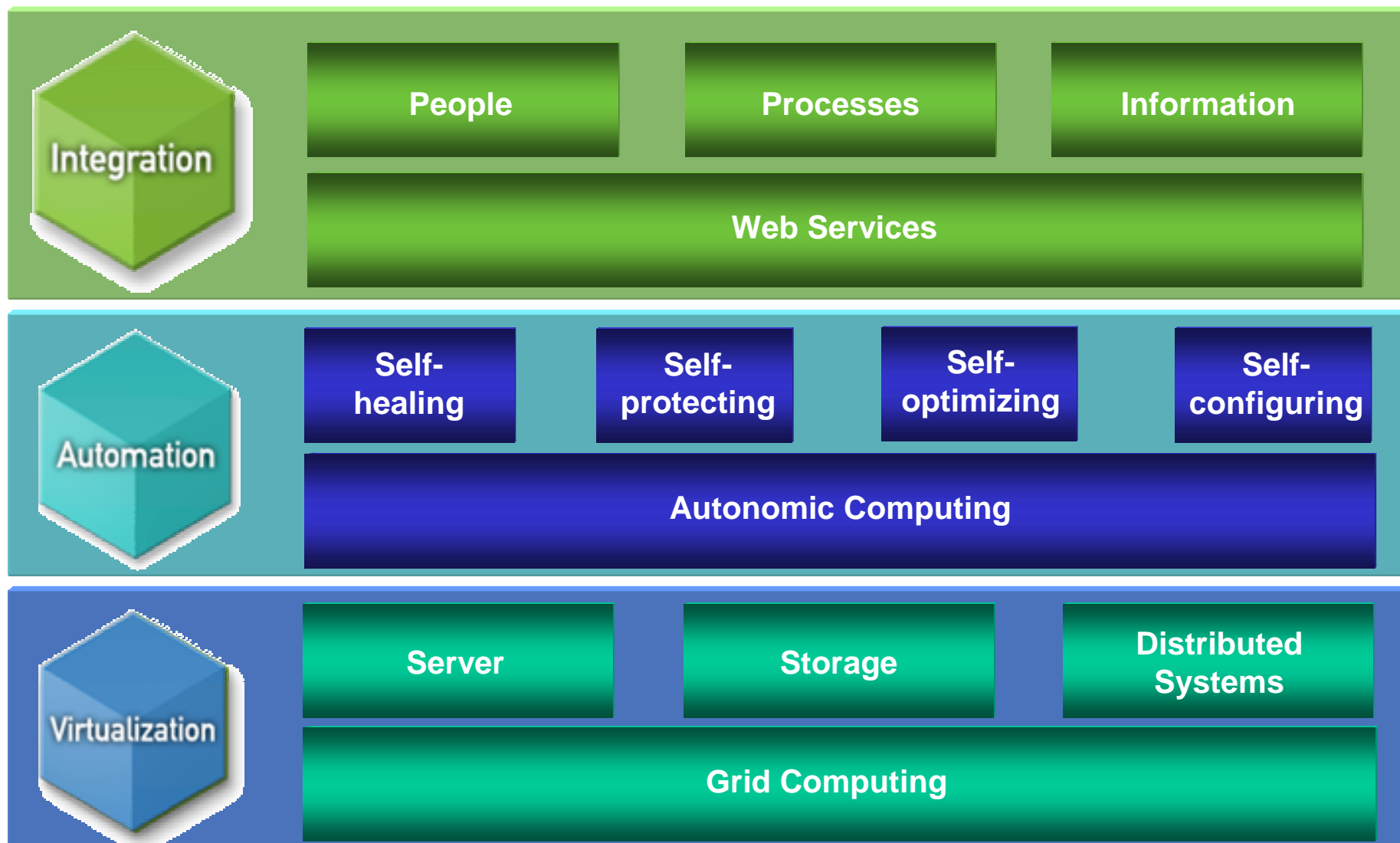
## e-business on demand: the destination

# e-business on demand

An enterprise whose **business processes - integrated end-to-end** across the company and with key partners, suppliers and customers - can **respond with speed** to any **customer demand, market opportunity** or **external threat**.

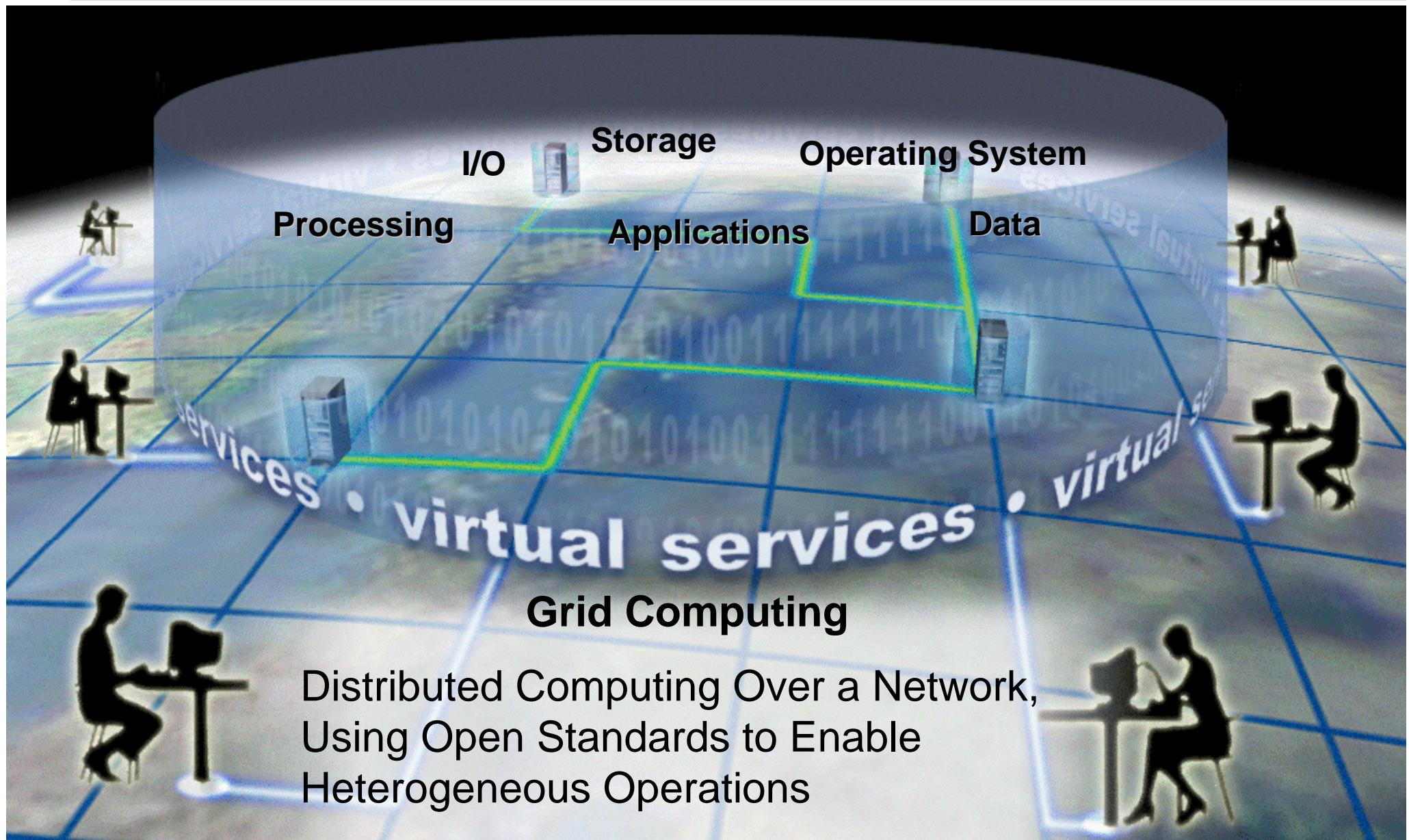


# On Demand Operating Environment





## Grid Computing Defined

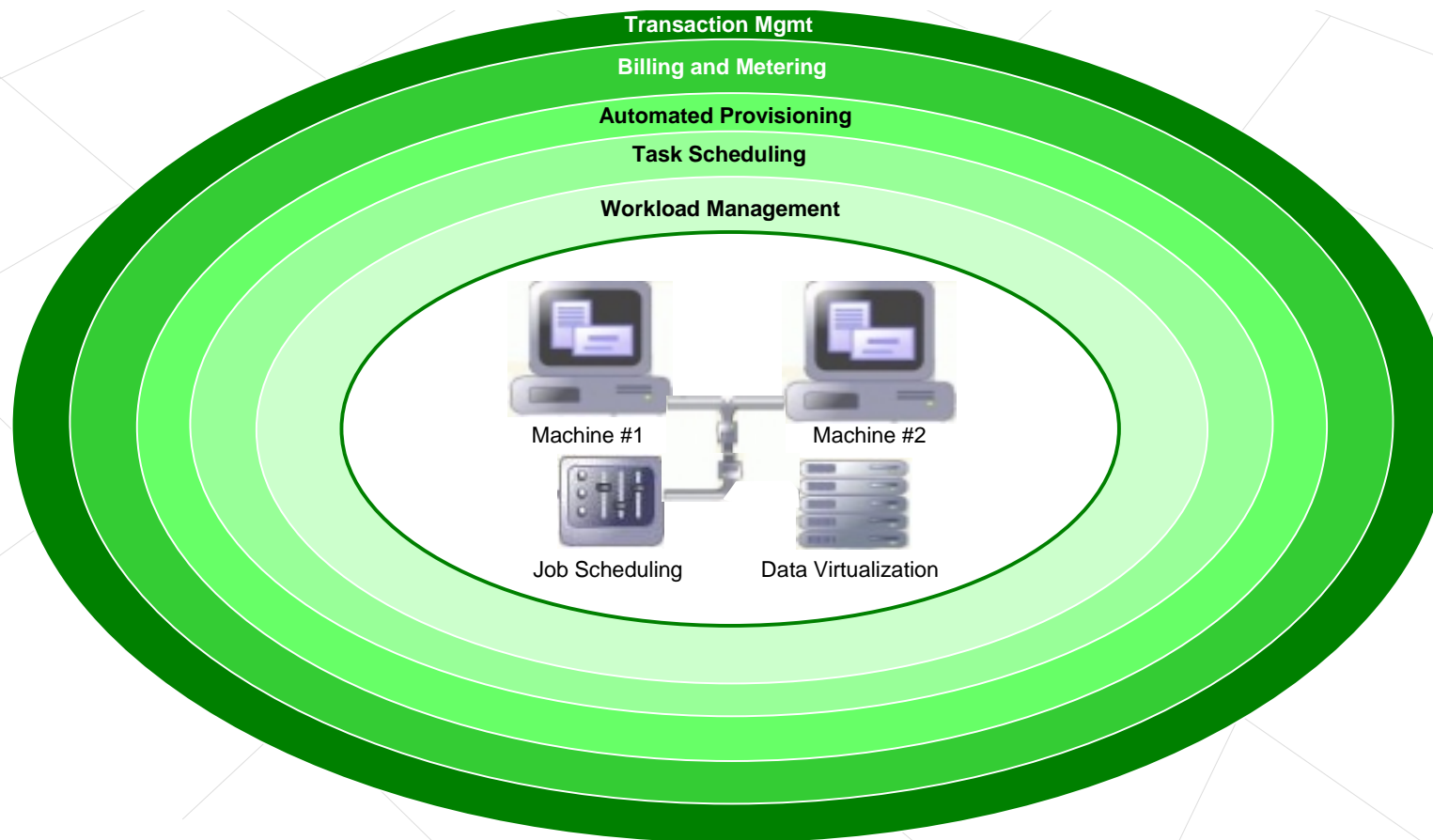




## Grid Adoption Steps -- "Setting The Bar"

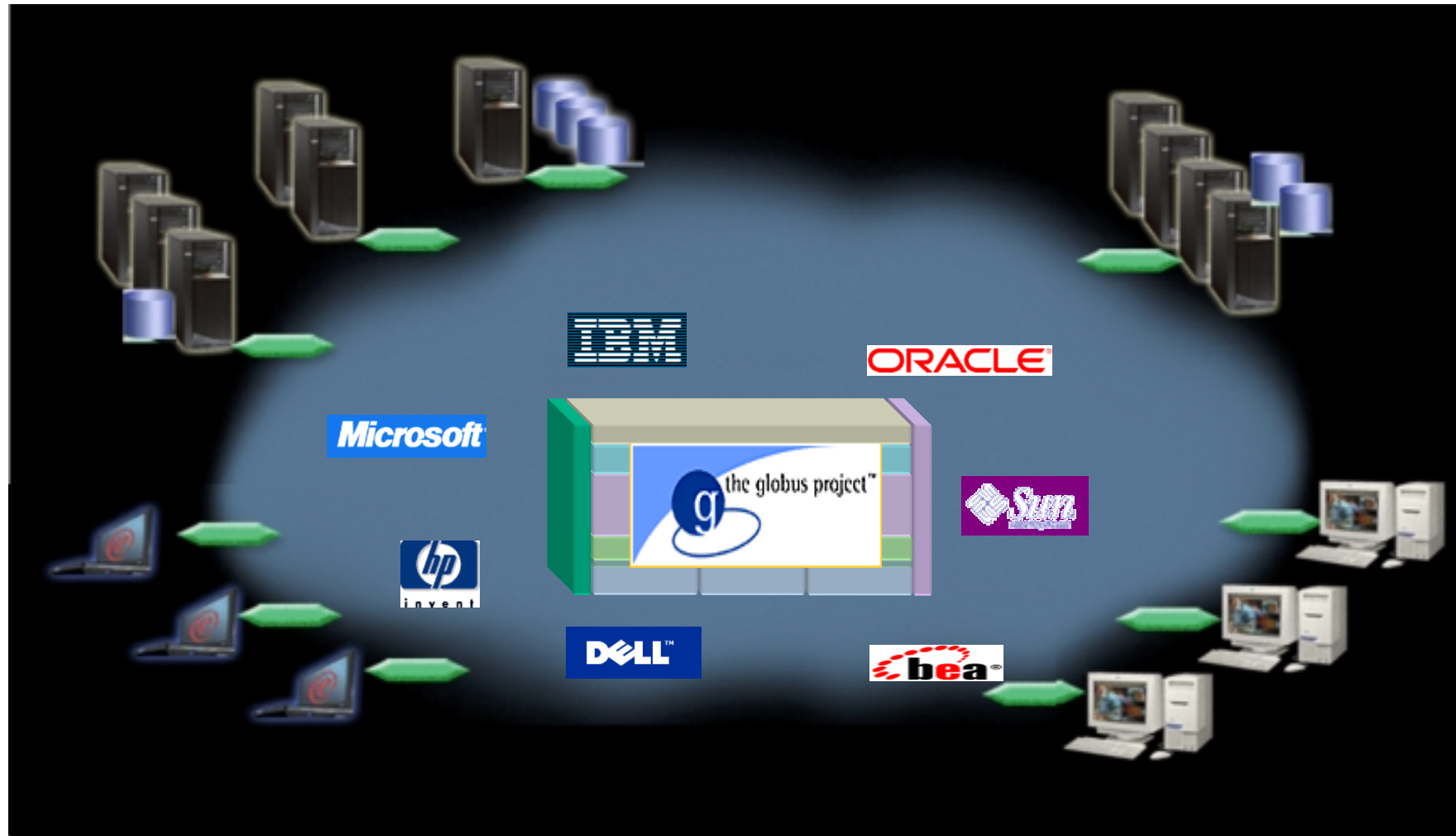
### ***Transaction Management:***

- Manage the execution of e-business transactions across distributed resources
- Enable dynamic allocation of resources for transactional and parallel application models





# Open Grid Services Architecture (OGSA)

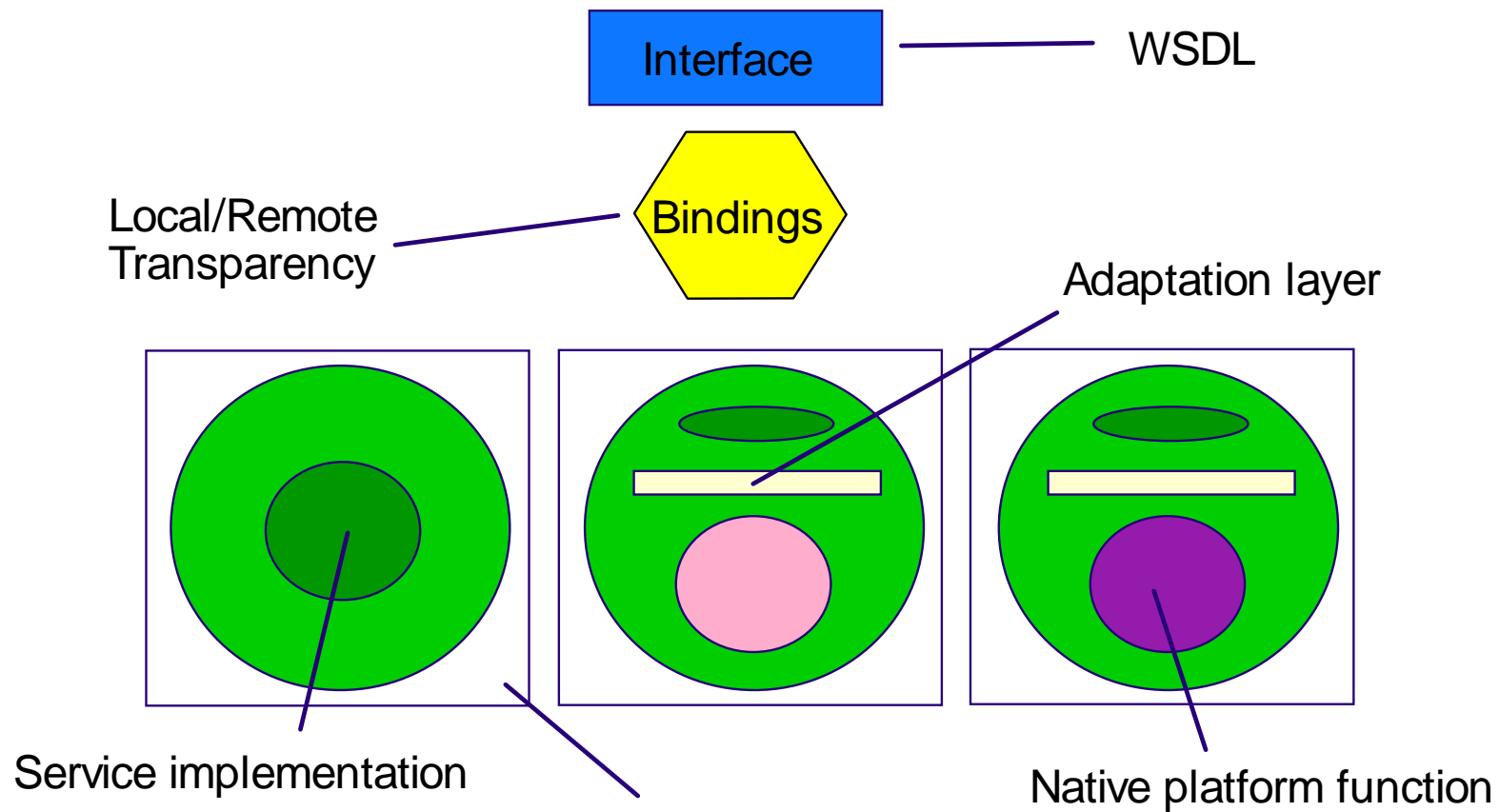


OGSA



# Service Model

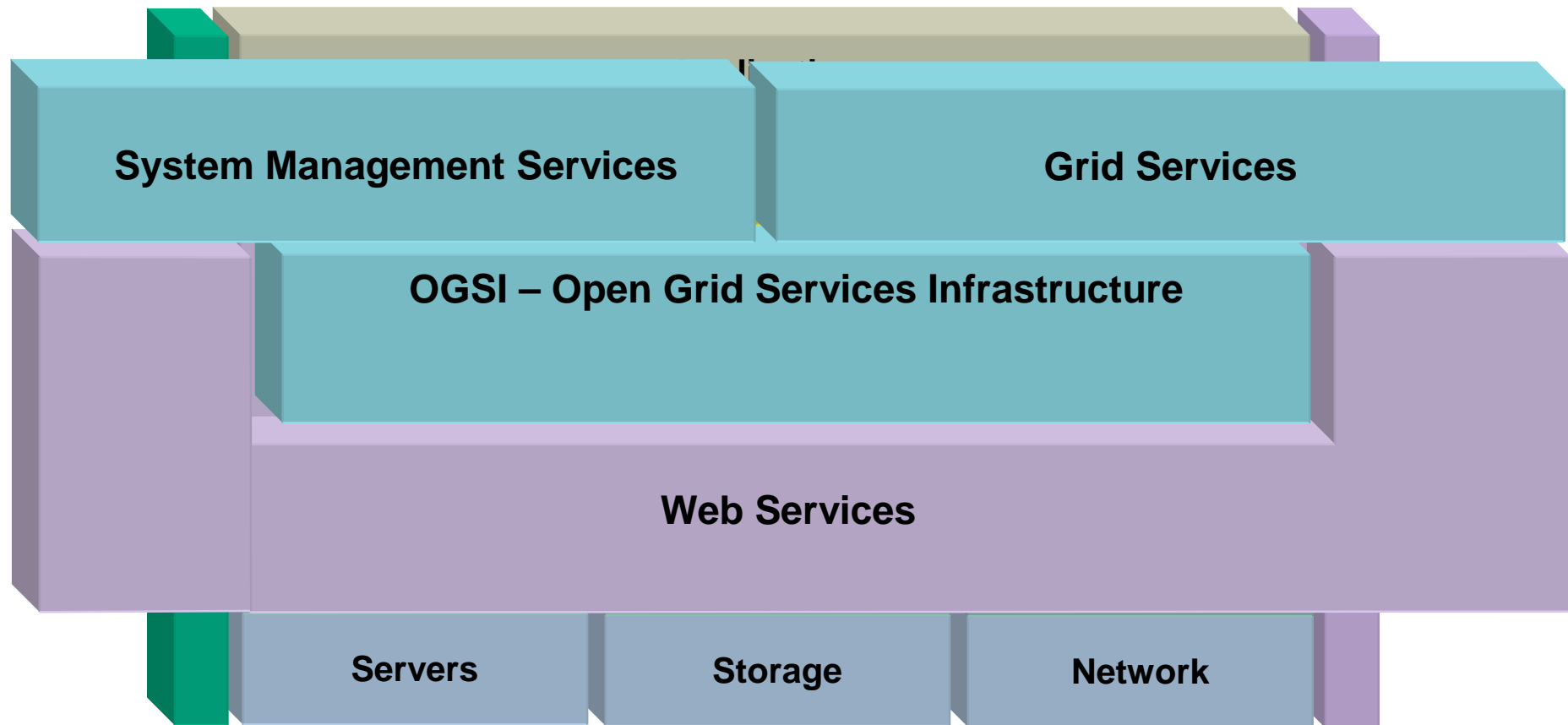
## Separate interface from access and implementation





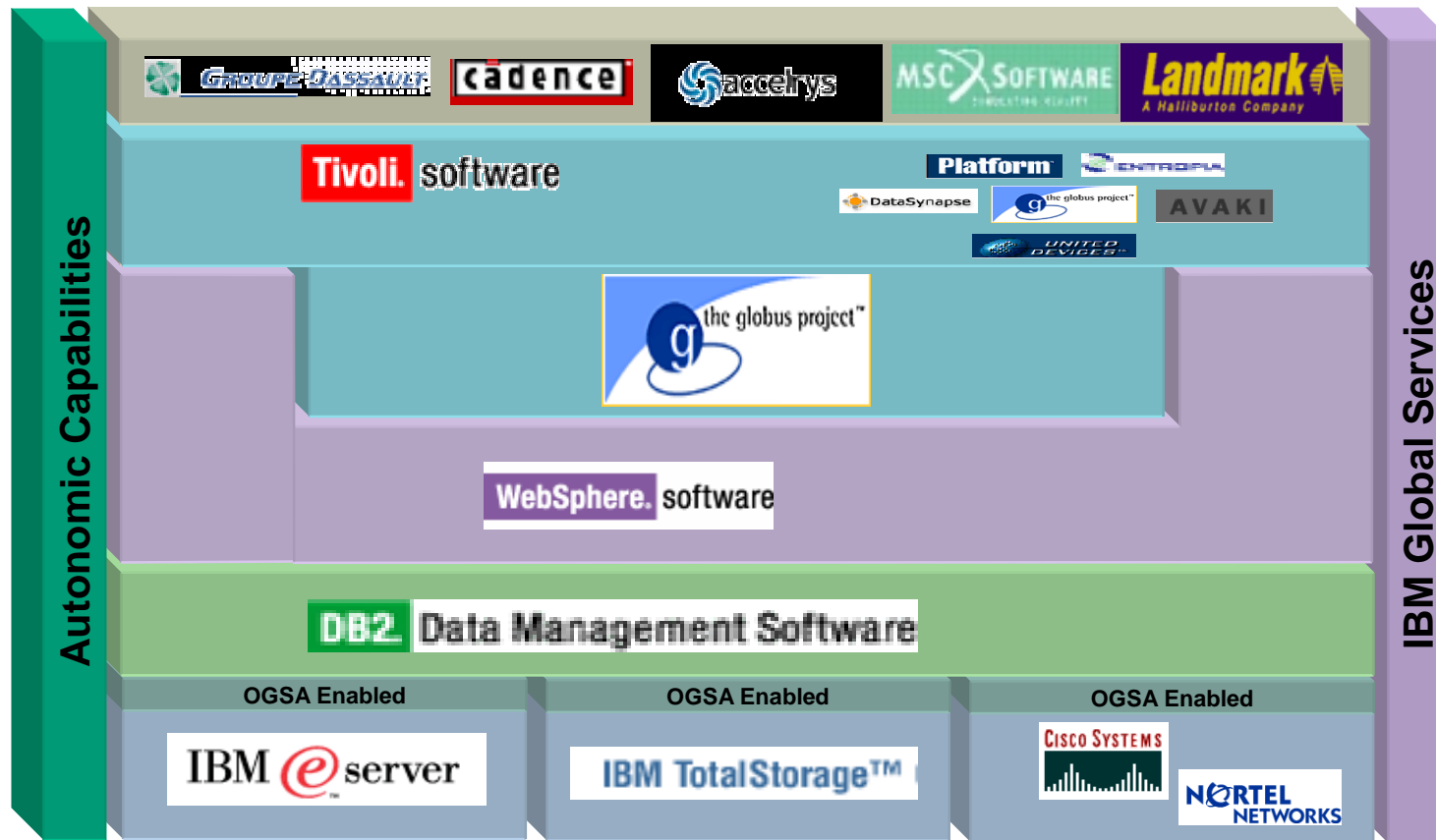
# Architecture Framework

## ***OGSA Structure***





# Architecture Framework





# Grid Computing Enables IT and Business Value

## IT Needs

- Improve Asset Optimization
- Integrate Heterogeneous Resources
- Enable Data Access, Integration and Collaboration
- Strengthen Redundancy and Resiliency
- Quickly Respond to Variable Demands



## Business Needs

- Improve Operating Efficiency/ROI
- Reduce Capital Expenses
- Accelerate Business Processes
- Enhance Enterprise Collaboration
- Quickly Adapt to Changing Requirements



# Grid Focus Areas

	Research & Development Grid	Engineering & Design Grid	Business Analytics Grid	Enterprise Optimization Grid	Government Development Grid
Description	Accelerate and enhance the R&D process by enabling the sharing data and computing power seamlessly for research intensive applications	Share data and computing power, for computing intensive engineering and scientific applications, to accelerate product design	Enable faster and more comprehensive business planning and analysis through the sharing of data and computing power	Optimize computing and data assets to improve utilization, efficiency and business continuity	Create large-scale IT infrastructures to drive economic development and/or enable new government services
Priority Sectors	Public, Industrial	Industrial	Financial Services, Public, Industrial	Financial Services, Public, Industrial	Public
Primary Buyers	<ul style="list-style-type: none"> <li>• Primary: LOB decision makers</li> <li>• Secondary: IT as an enabler</li> </ul>			<ul style="list-style-type: none"> <li>• Primary: IT decision makers</li> <li>• Secondary: LOB influencers</li> </ul>	

Productivity = 

 = Efficiency

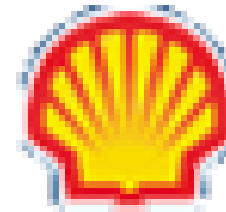
# Marketplace Momentum

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**SONY**



*charles* SCHWAB



**WACHOVIA**



# Aventis

## Challenge

- **Distributed, diverse data sources across continents**
- **Limited ability to consolidate, construct and analyze data sets**

## Solution

- **Linux**
- **IBM @server**
- **IBM Discovery Link**



### *Technology Benefits:*

- Using IBM DiscoveryLink to bring together data sources in one coherent view

### *Business Benefits:*

- Significant increase in researcher productivity due to improve collaboration
- Better data quality and currency



# Royal Dutch/Shell

## Business Analytics

### Challenge

- **Improve accuracy and speed of summarization and scientific modeling applications**

### Solution

- **IBM @server**
- **Linux**
- **Globus Toolkit**

***"Grid computing is important to Shell because it offers the potential to create a truly unlimited resource, with a uniform interface to a variety of services. This is a significant opportunity for Shell to engage its independent companies in closer cooperation."*** J.N. Buur, Principal Research Physicist, Shell International Exploration and Production B.V.



### **Technology Benefits:**

- More robust, scalable IT infrastructure that adjusts as volumes fluctuate
- Open standards permit easy integration of existing software

### **Business Benefits:**

- Cut processing time of seismic data, while improving the quality of the output
- Focus employees on key scientific, not IT problems



# Charles Schwab

## Challenge

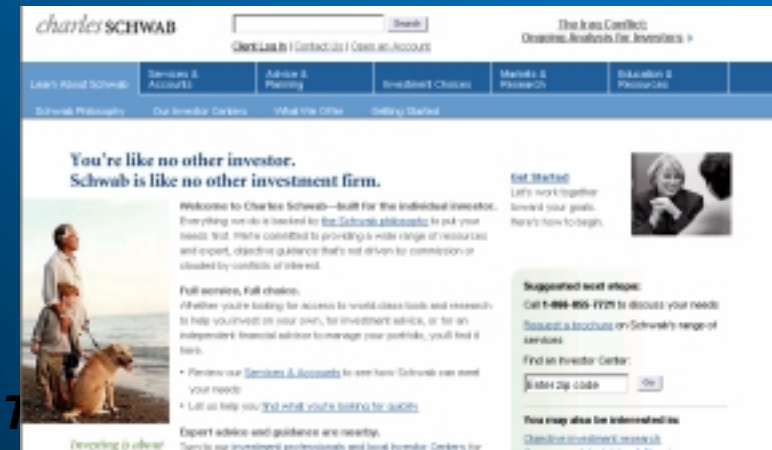
- Reduce the processing time on an existing wealth management application to improve customer service.

## Solution

- IBM@server
- Linux
- Globus Toolkit
- IBM Infrastructure Technology Services
- IBM Research

***“We believe that Grid computing ... has the potential to greatly improve our quality of service and be a truly disruptive technology.”***

Oren Leiman, Managing Director, Charles Schwab



### **Technology Benefits:**

- Reduced processing time from four minutes to fifteen seconds...
- Leverages existing infrastructure...
- Grid enabling many more applications

### **Business Benefits:**

- Increase customer satisfaction by responding to inquiries in real time...
- Enabling Schwab to move from a low cost transactional broker to an advice based wealth manager



# RBC Insurance

## Challenge

- Reduce the time it takes for an insurance policy valuation application to run

## Solution

- IBM @server
- IBM Infrastructure Technology Services
- Platform Computing (ISV)



**RBC**  
**Royal Bank**

### *Technology Benefits:*

- Reduced processing time from eighteen hours to thirty-four minutes
- Automated job-scheduling
- Expanding implementation

### *Business Benefits:*

- Can run more complex scenarios to reduce risk exposure
- Actuaries can spend less time scheduling application



# IBM

## Engineering & Design

### Challenge

- **Microprocessor Design**
- **Benchmarking & Testing**
- **Server Design**

### Solution

- **IBM @server**
- **Globus Toolkit**
- **IBM Global Services**



#### *Microprocessor Design Grid*

- Chip simulation driving 80% resource utilization
- Lower error rates in microprocessor designs
- Reduced development cycle, improved ROI and design engineer productivity

#### *Benchmarking/Testing Grid*

- Allows for larger scaling tests at lower costs by pooling all the servers across multiple sites

#### *Z Series Design Grid*

- Production environment is adjusted to average workload, lowering fixed cost
- Increased computing power for HW simulations
- 40% increase in productivity of hardware engineers



## Kansai Electric Power Co,

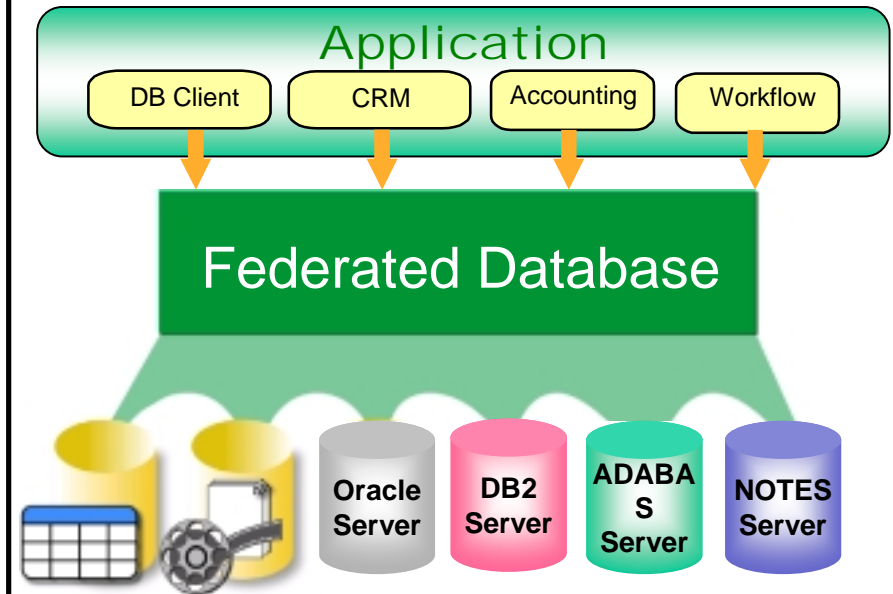
### Enterprise Optimization

#### Challenge

- **Japan's second largest electric utility company has various information in a heterogeneous, distributed database environment**
- **Integrate information beyond departments and affiliated companies to enable information sharing**

#### Solution

- **Create virtual database federated from heterogeneous database environment**
- **IBM DB2 Data Federation Technology**
- **Wrapper to access other RDBs including legacy database**



#### *Technology Benefits:*

- Virtualize various data sources across the enterprise
- Enable information sharing using existing systems including legacy data base
- Enable to develop new businesses more rapidly at a minimum cost



# Butterfly.net

## Enterprise Optimization

### Challenge

- **Scalable, resilient infrastructure for running massive multiplayer games**

### Solution

- **IBM @server**
- **Globus Toolkit**
- **IBM WebSphere Application Server**
- **DB2 Universal Database**
- **IBM e-business Hosting Services**



### *Technology Benefits:*

- Improved end-user experience supporting over one million simultaneous sessions

### *Business Benefits:*

- Developers avoid huge upfront costs
- Announced with Sony Computer Entertainment
- The Butterfly Grid for PlayStation2 unveiled at Games Developers' Conference in San Jose March 2nd



# TIGER

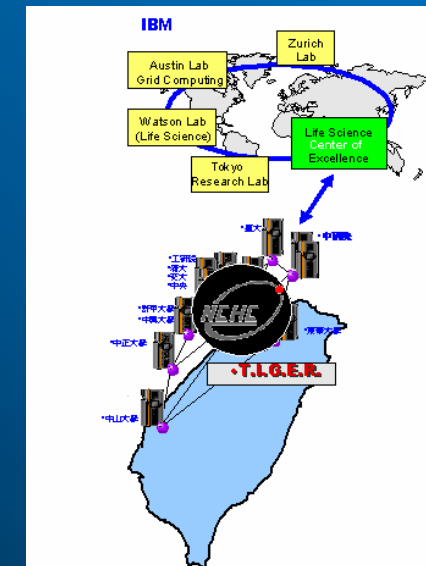
## Government Development

### Challenge

- The Taiwanese government is building a grid between their leading academic and research institutions for research and collaboration in the areas of nanotechnology and life sciences

### Solution

- IBM and NCHC building National Grid Test Bed
- IBM is assisting in the planning and implementation of the grid infrastructure.



### *Technology Benefits*

- Integrate in-country academic and research computing resources
- Test implementations and investigations into billing and provisioning systems will take place

### *Business Benefits*

- Stimulate research in Life Sciences and Nanotechnology

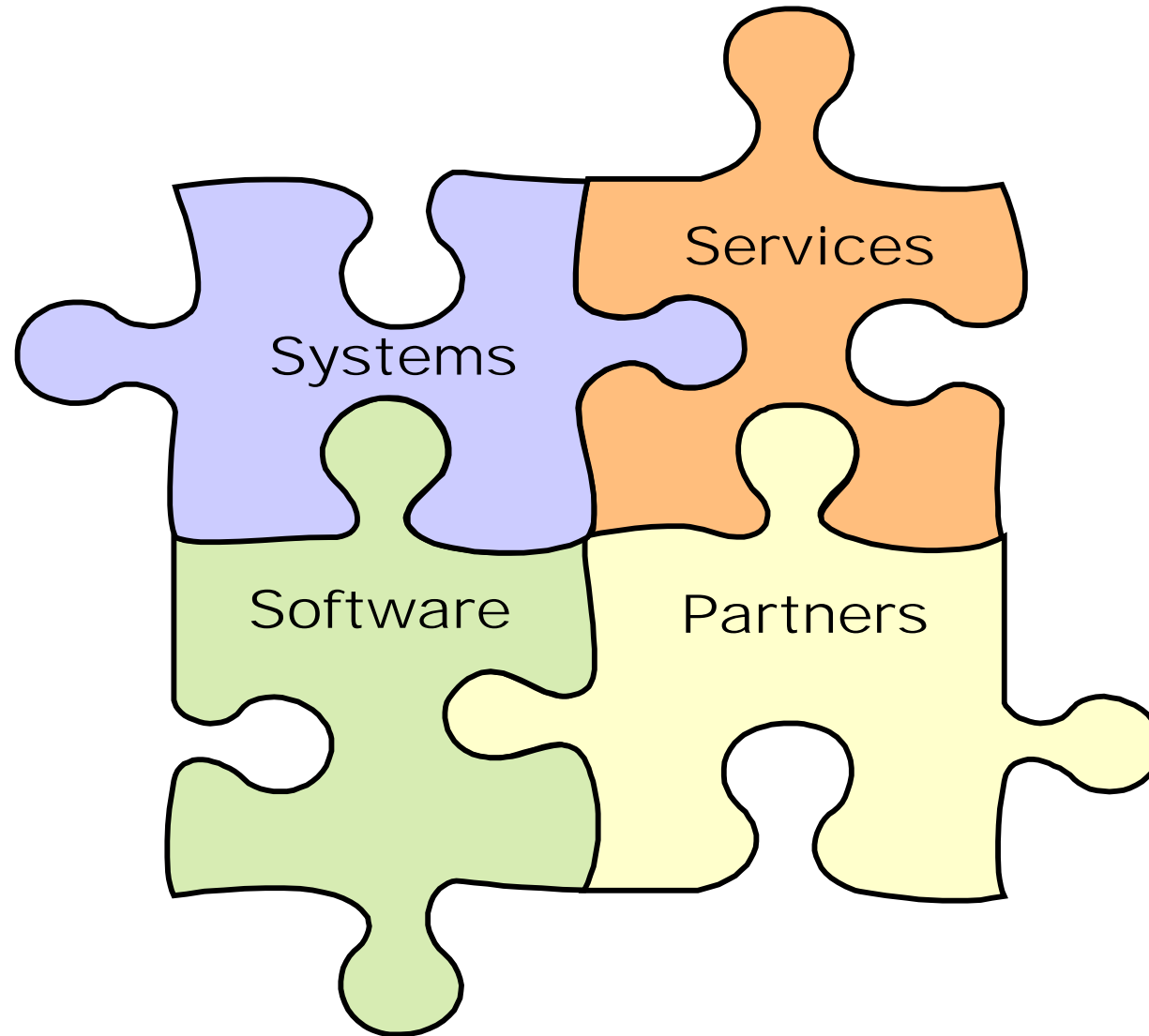
# Grid Offerings

Research & Development	Engineering & Design	Business Analytics	Enterprise Optimization	Government Development
<ul style="list-style-type: none"> <li>•Life Sciences: IBM Grid Offering for Information Accessibility</li> <li>•<b>Higher Education: IBM Grid Offering for University Research Collaboration</b></li> <li>•<b>Agricultural Chemical: IBM Grid Offering for Information Access</b></li> <li>•Grid Innovation Workshop/Modules</li> </ul>	<ul style="list-style-type: none"> <li>▪Aerospace: IBM Grid Offering for Engineering Design</li> <li>▪Aerospace: IBM Grid Offering for Design Collaboration</li> <li>▪Automotive: IBM Grid Offering for Design Collaboration</li> <li>▪Automotive: IBM Grid Offering for Engineering Design</li> <li>▪<b>Electronics: IBM Grid Offering for Engineering Design</b></li> <li>▪<b>Electronics: IBM Grid Offering for Design Collaboration</b></li> <li>•Grid Innovation Workshop/Modules</li> </ul>	<ul style="list-style-type: none"> <li>▪Financial Services: IBM Grid Offering for Analytics Acceleration</li> <li>•Life Sciences: IBM Grid Offering for Analytics Acceleration</li> <li>•<b>Petroleum: IBM Grid Offering for Geophysical Analysis: Upstream Petroleum</b></li> <li>•<b>Agricultural Chemical: IBM Grid Offering for Analytics Acceleration</b></li> <li>•Grid Innovation Workshop/Modules</li> </ul>	<ul style="list-style-type: none"> <li>▪Financial: IBM Grid Offering for IT Optimization</li> <li>▪<b>Petroleum: IBM Grid Offering for IT Optimization</b></li> <li>•Grid Innovation Workshop/Modules</li> </ul>	<ul style="list-style-type: none"> <li>▪Government: IBM Grid Offering for Information Access</li> <li>•Grid Innovation Workshop/Modules</li> </ul>



# Grid Offering Components

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# Grid Offerings

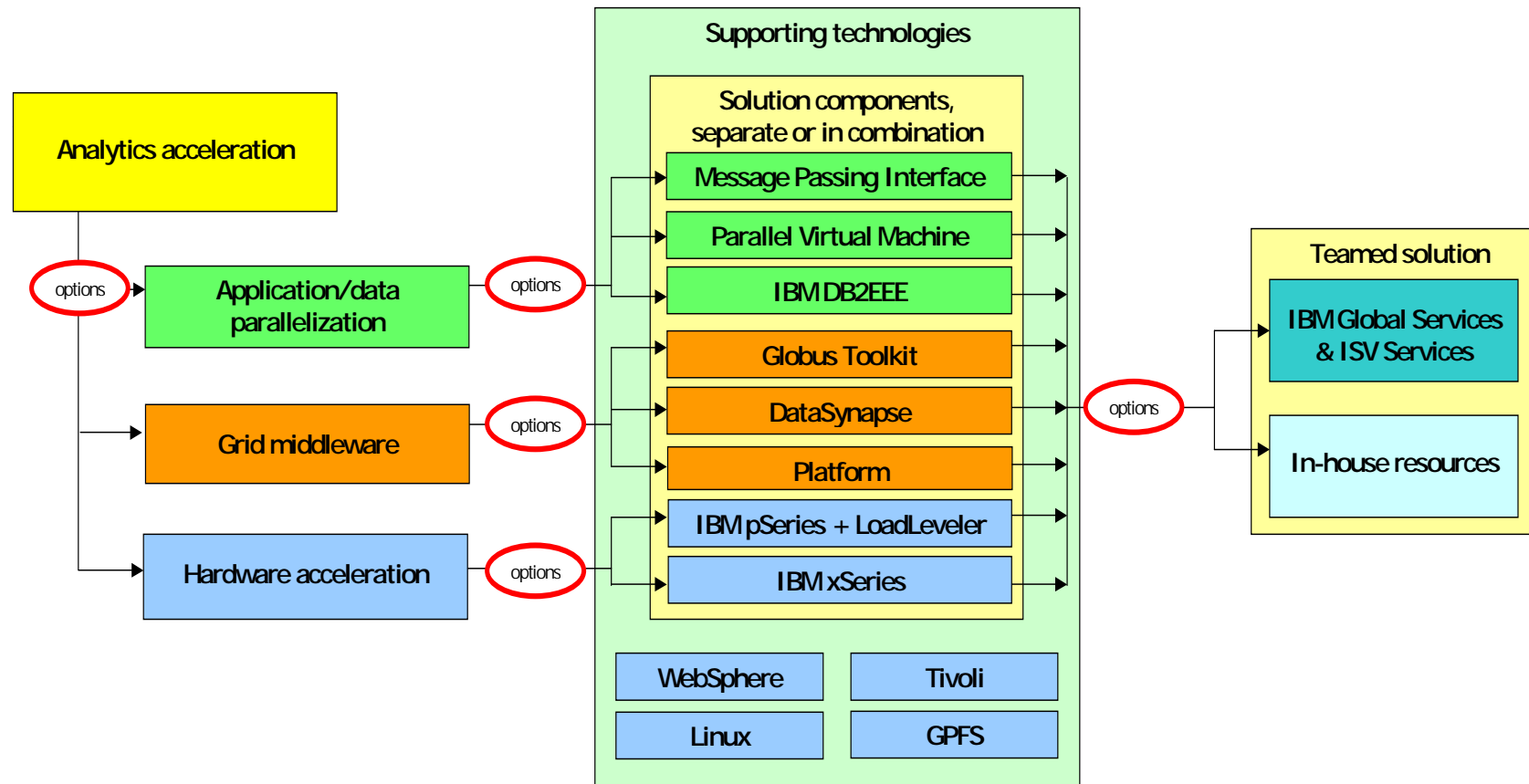
Research & Development	Engineering & Design	Business Analytics	Enterprise Optimization	Government Development
<ul style="list-style-type: none"> <li>•Life Sciences: IBM Grid Offering for Information Accessibility</li> <li>•Higher Education: IBM Grid Offering for University Research Collaboration</li> <li>•Agricultural Chemical: IBM Grid Offering for Information Access</li> <li>•Grid Innovation Workshop/Modules</li> </ul>	<ul style="list-style-type: none"> <li>▪Aerospace: IBM Grid Offering for Engineering Design</li> <li>▪Aerospace: IBM Grid Offering for Design Collaboration</li> <li>▪Automotive: IBM Grid Offering for Design Collaboration</li> <li>▪Automotive: IBM Grid Offering for Engineering Design</li> <li>▪Electronics: IBM Grid Offering for Engineering Design</li> <li>▪Electronics: IBM Grid Offering for Design Collaboration</li> <li>•Grid Innovation Workshop/Modules</li> </ul>	<ul style="list-style-type: none"> <li>▪<b>Financial Services: IBM Grid Offering for Analytics Acceleration</b></li> <li>•Life Sciences: IBM Grid Offering for Analytics Acceleration</li> <li>•Petroleum: IBM Grid Offering for Geophysical Analysis: Upstream Petroleum</li> <li>•Agricultural Chemical: IBM Grid Offering for Analytics Acceleration</li> <li>•Grid Innovation Workshop/Modules</li> </ul>	<ul style="list-style-type: none"> <li>▪Financial: IBM Grid Offering for IT Optimization</li> <li>▪Petroleum: IBM Grid Offering for IT Optimization</li> <li>•Grid Innovation Workshop/Modules</li> </ul>	<ul style="list-style-type: none"> <li>▪Government: IBM Grid Offering for Information Access</li> <li>•Grid Innovation Workshop/Modules</li> </ul>

# Business Analytics: Financial Markets

## IBM Grid Offering for Analytics Acceleration

Enhances competitiveness and agility in the financial trading market by:

- Reducing statistical margin of error, faster trade decisions and increased number of scenarios and parameter space
- Providing affordable, effective IT for a sophisticated trade portfolio and tolerance for IT asset failure





# Getting Started

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- **IBM can tailor one of the Grid offerings available today to meet your specific needs**
- **Take one of IBM's classes on Grid Computing and the Globus Toolkit**
- **IBM's Grid Innovation Workshops can help you identify appropriate solution areas and develop and prioritize a list of Grid pilot implementations**
- **With the IBM Grid ROI Tool you can quantify the value of Grid to your organization**
- **WW Design Centers where you can architect and validate complex Grid solutions**
- **Grid Pilots where you can utilize established technologies to solve similar problems to those that you are attempting to address**



## IBM Commitment & Focus

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### Commitment

- **Open standards**
- **R&D and investments in grid and related technologies**
- **Industry-leading partners**
- **Multiplatform experience and expertise**
- **Worldwide grid strategy, design, implementation and integration services**

### Focus

- **Industry-specific offerings**
- **Product development roadmaps**
- **Building an ecosystem**
- **Building grids for commercial and public organizations**
- **Integrated solutions: HW, SW, Services and Partners**



## Web Resources

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- **IBM Grid Computing: [www.ibm.com/grid](http://www.ibm.com/grid)**
- **IBM Alphaworks: [www.ibm.com/alphaworks](http://www.ibm.com/alphaworks)**
  - **IBM Grid Toolbox:**
    - Globus Toolkit 2.2.4 for IBM pSeries (AIX 5.1 and 5.2), iSeries and zSeries (SLES8), xSeries (RedHat Linux 7.3)
    - Better documentation, customization scripts, and LoadLeveler enablement
  - **Grid Application Framework for Java (GAF4J)**
    - Lightweight framework that enables the development of Java applications that can distribute execution threads as tasks over grid resources
  - **Emerging Technologies Toolkit**
    - Architectural overview of web services, grid and autonomic technologies (SOAP engine – Apache AXIS, XML parser, UDDI client API, GT3 alpha 2, ReGS) - requires Java SDK 1.3.1 or 1.4 on Windows or Linux
  - **Business Workload Manager Demo (BWLM Toolkit soon)**
    - Browser-based demo of autonomic management of transactional workload



## Web Resources (continued)

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- **IBM Developerworks:** [www-106.ibm.com/developerworks/grid](http://www-106.ibm.com/developerworks/grid)
  - **Globus Toolkit 3.0 and OGSI Architecture**
    - Overview of the Globus GT3 software architecture and simple Grid Service illustration with WSDL
  - **A developer's overview of OGSI**
    - Examples to explain core concepts of OGSI
  - **Introduction to GT3 Alpha 3**
    - Tutorial for programmers and system administrators for GT3 installation and deployment onto WAS V.5.0
  - **Grid Toolbox tutorial**
  - **Grid computing explained**
    - Irving Wladawsky-Berger explains Grid Computing