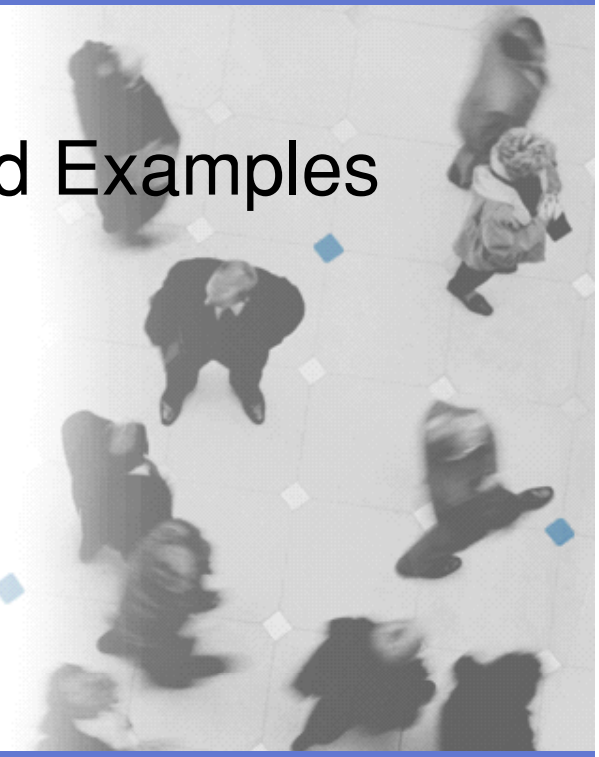

Grid Computing in Action - Real World Examples

Using Grid Technologies To Create Business Value

SESSION – S04

Andy Gangone
xSeries Technical Conference
August 2004

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Key ideas to walk away with

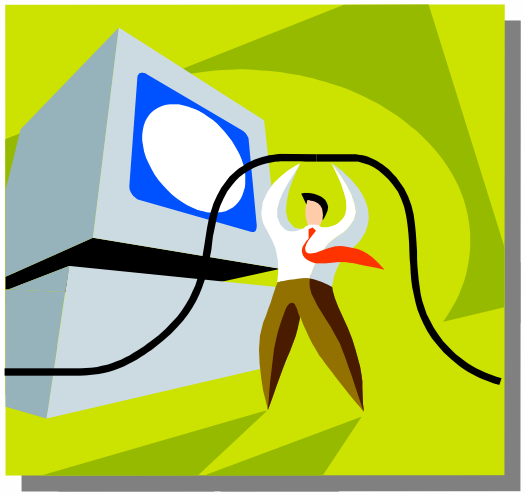
- **Grid computing is creating IT and Business value today!**
- **Early adopters are gaining competitive advantage!**
- **Grid computing roadmap is becoming more robust and clear!**
- **Customers are using IBM Grid Offerings to start small and grow!**
- **Grid is a logical first step in the on demand journey!**

Marketplace Momentum

Grid Computing Motivation

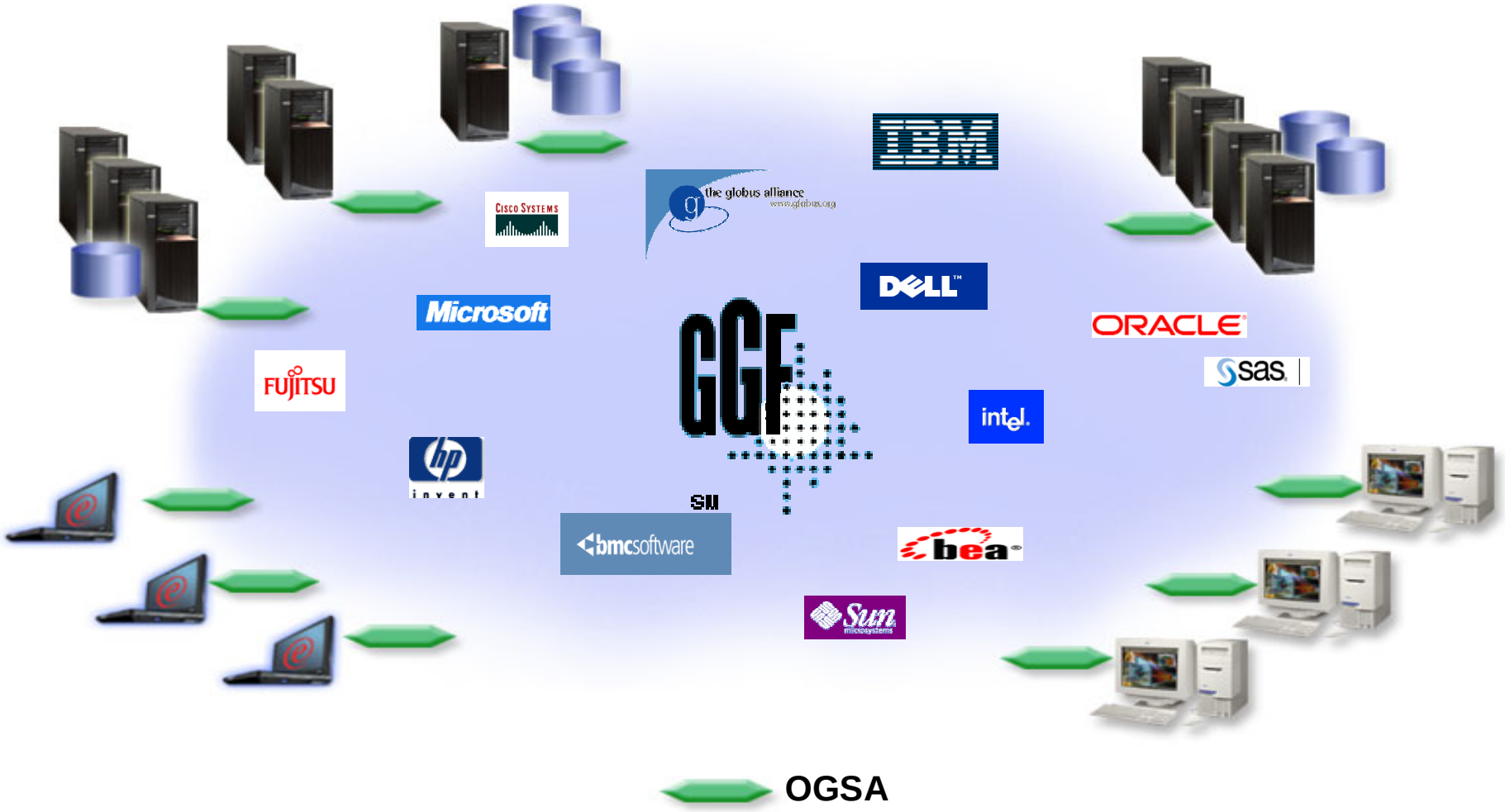
IT Pain Points

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



The Global Grid Forum: Open Grid Services Architecture (OGSA)

The TCP/IP of Grid Computing



Grid Computing Motivation

Business Pain Points

- **Improve Operating Efficiency/ROI**
- **Reduce Capital Expenses**
- **Accelerate Business Processes**
- **Enhance Employee Productivity**
- **Quickly Adapt to Changing Requirements**

What would it mean if your business could…

- Analyze the value of an investment portfolio in minutes, rather than hours?
- Significantly accelerate the drug discovery process?
- Cut the design time of products in half, while reducing the instances of defects?
- Efficiently expand and contract capacity to meet cyclical demand?
- Unite research teams around the world to take advantage of the most up-to-date learnings?

Grid Focus Areas & Value Propositions

Business Analytics Grid	Engineering & Design Grid	Research & Development Grid	Government Development Grid	Enterprise Optimization Grid
Enable faster and more comprehensive business planning and analysis through the sharing of data and computing power	Share data and computing power, for computing intensive engineering and scientific applications, to accelerate product design	Accelerate and enhance the R&D process by enabling the sharing data and computing power seamlessly for research intensive applications	Create large-scale IT infrastructures to drive economic development and/or enable new government services	Optimize computing and data assets to improve utilization, efficiency and business continuity
				
• Better Decision Making • Time to Solution • Reduced Costs	• Improved Product Design • Time to Solution • Reduced Costs	• Improved Collaboration • Time to Solution • Reduced Costs	• Better Decision Making • Improve Collaboration • Stimulate Economic Development	Improved: •Resiliency •Productivity Reduced: •Costs •Complexity

Hewitt Associates LLC

Business Analytics

Challenge

- **Create Grid Computing environment to:**
- **Contain expenses for CalcEngine valuations**
- **Maintain or improve availability, response time & scalability**
- **Insure personal-data security**
- **Capitalize on existing application code**
- **Cooperate with z/OS Sysplex CICS Calling Environment**
- **Enable smooth and orderly migration to change**

Solution

- **IBM eServer™ zSeries® server**
- **IBM eServer BladeCenter™ servers**
- **Linux Red Hat v8.0**
- **Business Partner: DataSynapse GridServer**

Hewitt a global HR outsourcing and consulting firm

Benefits:

- Efficiently uses of the combined processing power of their heterogeneous environment
- Experienced an immediate 10% faster response time with the first application deployment
- Open architecture enables Hewitt to easily deploy additional applications
- Increased processing speed reduced cost per transaction
- Reduced operational costs improves competitiveness in their industry segment

Bowne Technology Enterprises LLC

Enterprise Optimization

Challenge:

Leverage Grid Computing to enhance their core application:

- Cyclical peaks in demand for compute power
- The need for the prioritization of key customer projects
- Improve IT infrastructure utilization and reduce TCO

Solution:

- IBM Business Consulting Services; Application Innovation Services and Integrated Technology Services (ITS)
- IBM Grid Value at Work
- DataSynapse
- Globus Toolkit 3.0

BOWNE

Business Benefits

- Enhanced customer service capabilities while adhering to SEC regulations
- Increased revenues resulting from the ability to process increased job volumes
- Dynamic prioritization of customer jobs to better meet customer expectations

Technology Benefits

- Reduced statement application run time by 50% resulting in a 100% improvement in throughput
- Decreased operational cost by leveraging and optimizing existing servers and applications to process a greater workload

RBC Insurance

Business Analytics

Challenge

Dramatically improve compute services to Valuation Actuaries.

Solution

- **IBM ^ ™ xSeries® servers**
- **IBM Global Services**
- **Platform Computing Inc. Software and Services**

Technology Benefits:

- **Reduced application processing time**
- **Increased ability to run multiple valuation scenarios to reduce risk**

Business Benefits:

- **75% reduction of time spent on manual job scheduling**
- **97% reduction in application processing time**

"IBM and Platform Grid enabled our valuation application and supporting infrastructure for immediate results. With the integrated solution, we have been able to reduce a 2.5 hour job to 10 minutes, and an 18 hour job to 32 minutes. We are now looking to move to a production environment. By virtualizing applications and infrastructure, we anticipate being able to deliver higher quality services to our clients faster than ever before, which will significantly impact our competitive edge"
Keith Medley, Head of Insurance Technology, RBC Insurance

NLI Research (Nippon Life Insurance)

Business Analytics

Challenge

Improve the performance of Financial Risk Management Application (developed by NLI) for business needs including new regulations (Basel II and audits) and competitive process.

Solution

- **By adopting the Grid Job Scheduler, performance is improved with minimum investment.**
- **IBM Tokyo Research Laboratory joined a customer project in applying Grid technology for this application.**
- **Key middleware for security and data integrity to be developed through this joint research.**

RESEARCH
ニッセイ基礎研究所

Technology Benefits:

- **Reduced processing time for financial risk calculation from around 10 hours to about 49 minutes – an approximate 12-fold increase in speed.**
- **Automated job-scheduling**

Business Benefits:

- **Can run more complex scenarios to reduce risk exposure**

"Grid technology enables us to realize faster risk management calculations for complex financial derivatives. In addition, we expect that we will be able to analyze factors from a variety of angles and explore new financial businesses that take risk into consideration."

-- Shuji Tanaka, Executive Research Fellow at the NLI Research Institute

Wachovia

Business Analytics

Challenge

- **Create an infrastructure that can support significant increases in trading volume.**
- **Reduce the time to results of risk reports in fixed income and capital markets and**

Solutions

- **IBM eServer™ xSeries® Blade servers**
- **Linux**
- **DataSynapse GridServer**

"We haven't scratched the surface yet for how we envisage using Grid Computing to meet our ongoing product development and trading activity"
--Andy Cook, Head Exotics Trader, Wachovia

WACHOVIA

Business Benefits:
- **P&L Risk report turnaround improved…from as much as 15 hours to minutes on a real-time intraday basis**
- **Solution enables 4x more volume and 25x more modeling simulations**
- **Platform supports the trading of more complex financial products**

Technology Benefits:
- **Improved resiliency of application and jobs**
- **Improved utilization of supporting HW assets**
- **Reduces cost of ownership of infrastructure**

Business Analytics

Royal Dutch Shell

Challenge

Improve accuracy and speed of summarization and scientific modeling applications

Solution

- **IBM ^ TM**
- **Linux**
- **Globus Toolkit**

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**

"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.**

European Aeronautic Defense and Space Company

Engineering & Design

Challenge

EADS wanted to build an “on demand computing” model for the simulation tools used by their engineers to shorten analysis completion time and provide a single image of computer resources.

Solution

Shorten the product design cycle with a Grid Computing platform based on:

- **IBM ^ ™**
- **Linux**
- **Globus Toolkit**
- **GridXpert technology**

Technology Benefits:

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

Business Benefits:

- **Cut analysis and simulation time, while improving the quality of the output**
- **Improve the productivity of the Design Office**

IBM

Engineering & Design

Challenge

- Microprocessor Design
- Benchmarking & Testing
- Server Design

Solution

- IBM ^ TM
- 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

Research & Development

IN2P3

Institut National de Physique Nucleaire et de Physique des Particules

Challenge

The research institute needs to enhance the scalability, reliability and resilience of the existing grid environment to meet the large-scale, high-performance computing needs of new and existing users, as well as prepare for expansion to other grid environments throughout Europe.

Solution

- **IBM eServer™ pSeries® UNIX-based servers**
- **IBM eServer™ xSeries® Linux clusters**
- **Globus Tool Kit V3.0**
- **Storage capacity of up to thirty terabytes**

Benefits:

- **Improved performance increases the number of compute intensive research projects.**
- **Enhanced environment increases the ability of the organization to contribute in key Life Sciences research.**
- **State-of-the-art, production-ready Grid allows European technological community to efficiently collaborate**

"We are extremely pleased about our collaboration with IBM. IBM's technical expertise will allow us to rapidly achieve our goal to build a production ready Grid to support our key research initiatives"

-- Guy Wormser Deputy Director - IN2P3

Research & Development

CINECA

Challenge

Improve research capabilities at high-performance computing (HPC) competence center for major public and private research institutions

Solution

- **IBM eServer™ pSeries™ 690 servers running IBM AIX® 5**
- **IBM 7133 Serial Disk System**
- **IBM Global Services—Integrated Technology Services**

"CINECA has established a long-term partnership with IBM in most of the business areas in which HPC is becoming crucial. IBM has the capability and competency to be a big player in this arena." — *Sanzio Bassini, HPC Team Leader, CINECA*

CINECA

Technology Benefits:

- **Gained performance, availability and flexibility in an IBM 1600 Cluster Architecture**
- **Achieved over three teraflops of processing power during peak performance times**

Business Benefits:

- **Top 500 list for HPC facilities**
- **Ranks among the top 30 installations of its kind in the world**
- **One of EMEA's leading HPC providers**

AIST (National Institute of Advanced Industrial Science & Technology)

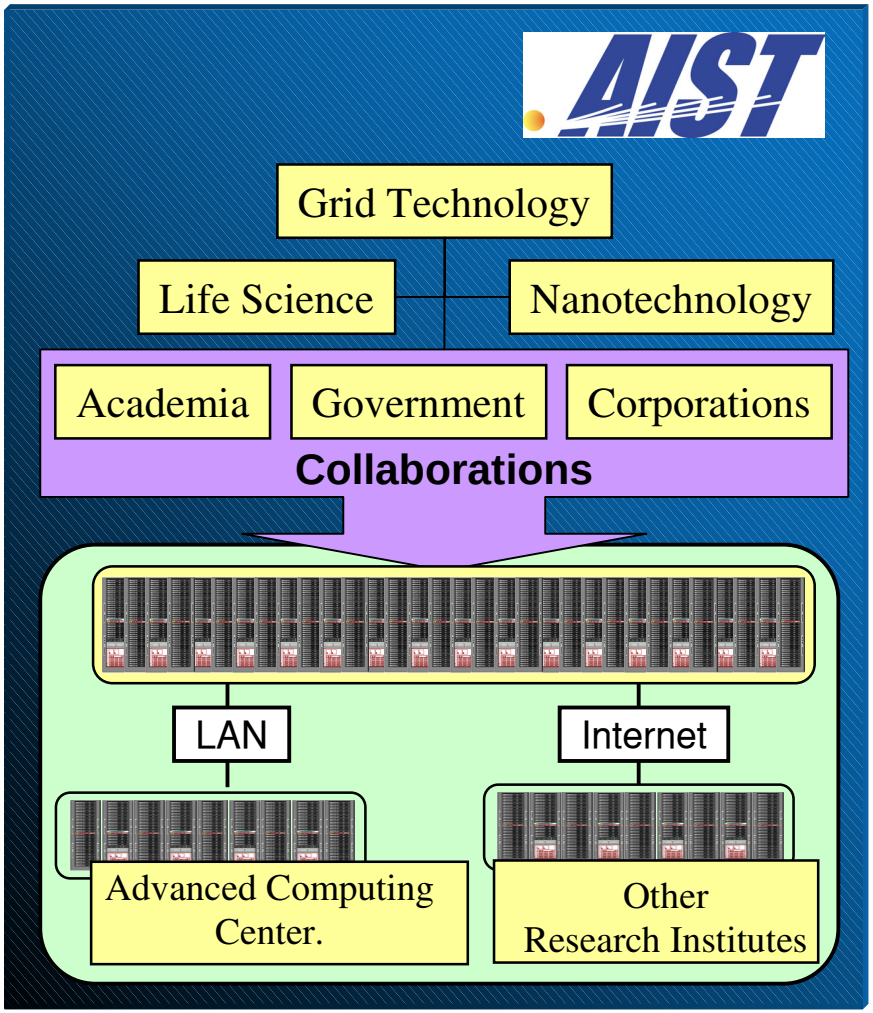
Research & Development

Challenge

AIST, Japan's largest national research organization needed to provide an on-demand computing infrastructure which dynamically adapts to support various research requirements of its collaborators focusing in areas of grids, life science, and nanotechnology.

Solution

- **Linux Cluster**
  - **2116 CPU AMD Opteron Cluster**
  - **520 CPU Intel Madison Cluster**
- **Globus Toolkit 3.0 (OGSA)**



World's most powerful Linux-based supercomputer

- More than 11 trillion calculations per second
- More powerful than the current third most powerful supercomputer in the world

Research & Development

University of Florida

Challenge

U.S.-based research university's Advanced Computing and Information Systems (ACIS) lab sought to respond to the needs of scientists, in multiple geographic locations, for a high-performance, secure and reliable infrastructure for grid computing research

Solution

Create a virtual, secure grid computing environment for collaboration based on:

- **IBM ^ ™ zSeries® server**
- **Linux and z/VM™**
- **IBM virtualization software**
- **IBM TotalStorage® Enterprise Storage Server®**
- **IBM ^ ™ xSeries® server in an 8-node cluster**

Business Benefits:

- **Enables scientific and design collaboration, using ACIS-developed software (In-VIGO), In Virtual Grid Organizations**

Technology Benefits:

- **Virtualization allows multiple researchers, each with separate and distinct applications, to use a single mainframe solution**

Kansai Electric Power Co.

Enterprise Optimization

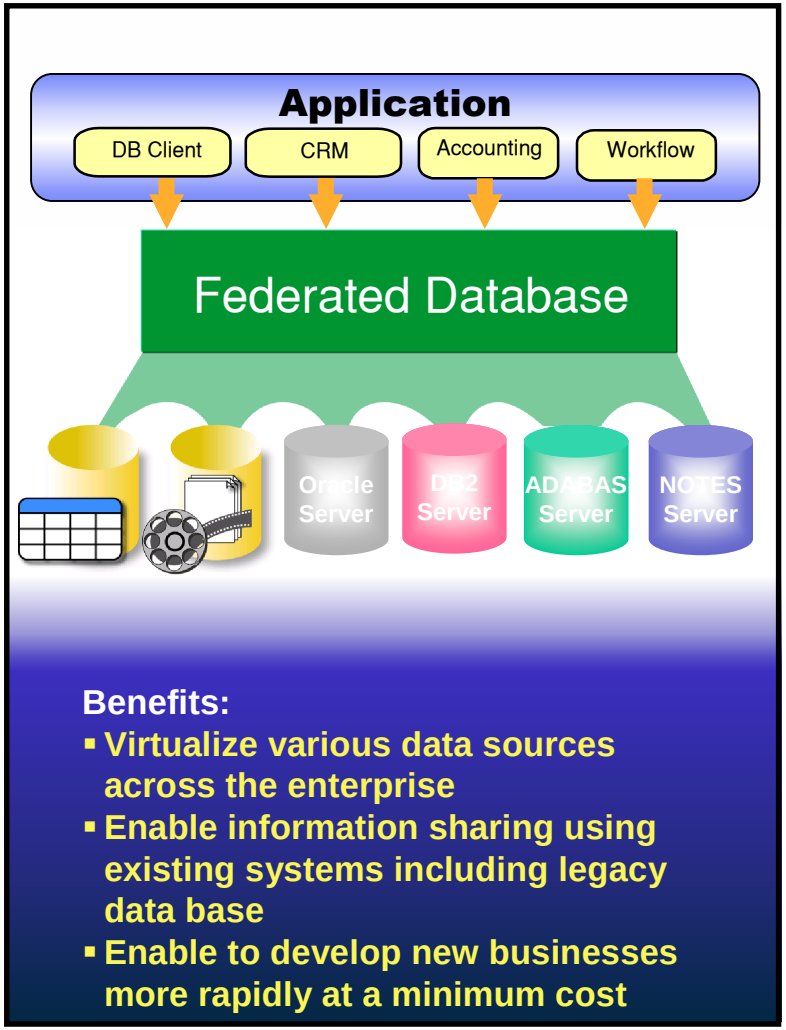
Challenge

Japan's second largest electric utility company has various information on heterogeneous data base environment distributed across multiple departments. KEPCO wanted to integrate information beyond departments and affiliated companies to enable information sharing.

Solution

Create virtual data base federated from heterogeneous data base environment
Data Grid technology enables to federate various data source distributed across multiple departments.

- **IBM DB2 Data Federation Technology**
- **Wrapper to access other RDBs including legacy data base**



Enterprise Optimization

Marist College

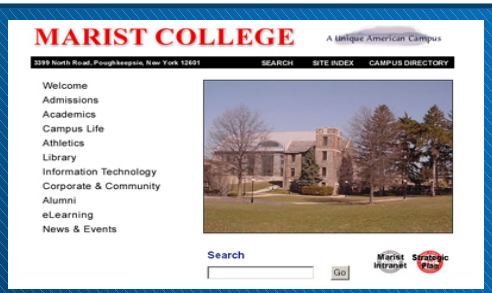
Challenge

Medium-sized U.S. college needed a more stable, resilient and powerful platform for internal IT operations and computer science student labs, to respond to demands for classes in Linux and grid computing

Solution

Increase and improve educational IT resources.
Consolidate servers onto a mainframe partitioned into hundreds of virtual machines to enable the creation of a grid environment for instructional purposes, based on:

- **IBM eServer™ zSeries® server**
- **Red Hat Linux**
- **Z/VM V4.3**
- **Globus Grid Computing toolkit**



Technology Benefits:

- **Quick and easy to add new virtual servers when needed**
- **More stable, robust and secure environment**

Business Benefits:

- **Stronger Linux skills and greater satisfaction for students**
- **Lower cost due to server consolidation, lower license fees, less maintenance**

Ngee Ann Polytechnic

Enterprise Optimization

Challenge

Resolve the computing capacity and project processing issues in the school's seven technology, research and development labs.

Solution

Create a scalable grid infrastructure that maximized the compute power of the lab's twenty five PC's. The solution, designed by IBM Global Services, Integrated Technology Services included:

- **Linux operating system**
- **Globus Toolkit**
- **Platform LSF**
- **Installation services performed by IBM independent software vendor Avaki**

Benefits:

- **Maximized the utilization of existing computing power while minimizing IT investment**
- **Reduces project run time improving research lab project capacity and student and faculty**
- **Enhances Polytechnic's image as a leading-edge provider of technology research and development**

What to Look for in a Grid Solution provider

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
- Implementing grids for commercial and public organizations
- Integrated solutions: Software, Services, Hardware and Partners

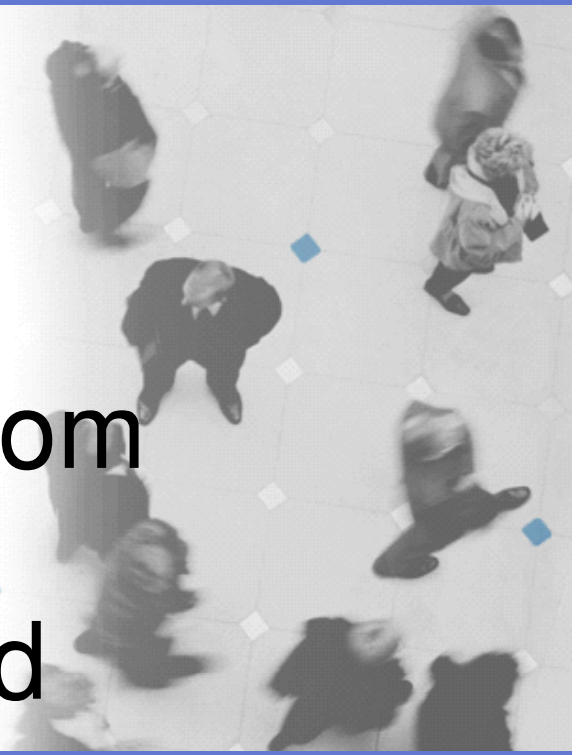
19 Grid Offerings in 10 Industries

Research & Development	Engineering & Design	Business Analytics	Enterprise Optimization	Government Development
•Life Sciences: IBM Grid Offering for Information Accessibility •Higher Education: IBM Grid Offering for University Research Collaboration •Agricultural Chemical: IBM Grid Offering for Information Access •Grid Innovation Workshop/Modules	▪Aerospace: IBM Grid Offering for Engineering Design ▪Aerospace: IBM Grid Offering for Design Collaboration ▪Automotive: IBM Grid Offering for Design Collaboration ▪Automotive: IBM Grid Offering for Engineering Design ▪Electronics: IBM Grid Offering for Engineering Design ▪Electronics: IBM Grid Offering for Design Collaboration •Grid Innovation Workshop/Modules	▪Financial Services: IBM Grid Offering for Analytics Acceleration ▪Financial Services: Grid Offering for Analytics Acceleration: Risk and Compliance ▪Financial Services: Grid Offering for Analytics Acceleration: Customer Insight •Life Sciences: IBM Grid Offering for Analytics Acceleration •Petroleum: IBM Grid Offering for Geophysical Analysis: Upstream Petroleum •Agricultural Chemical: IBM Grid Offering for Analytics Acceleration •Grid Innovation Workshop/Modules	▪Financial: IBM Grid Offering for IT Optimization ▪Petroleum: IBM Grid Offering for IT Optimization •Grid Innovation Workshop/Modules	▪Government: IBM Grid Offering for Information Access •Grid Innovation Workshop/ Modules

Grid Ecosystem

Business Analytics	Engineering & Design	Research & Development	Government Development	Enterprise Optimization
• SunGard • FairIsaac • SAS • Algorithmics • Moody's KMV • Globus • DataSynapse • Platform Computing • Gridsystems • Cornerstone Systems • Morse • Anix • Cisco	• Cadence • MSC Software • Dassault • ESI • Engineous • Synopsis • Globus • Platform Computing • Avaki • GridXpert • Gridsystems • PCPC Inc • Kobelco Systems • Science + Computing • Cisco • CIS Sud-Quest	• Accelrys • Dassault • Landmark Graphics • Japan Research Institute • Globus • Unicore • Avaki • Platform Computing • United Devices • GridXpert • Gridsystems • NTT-DATA • Moasys Corp. • Northgate • TBC • C.a.r.u.s Info. Tech. • Anterio Consult & Research • SCC • Cisco	• Globus • Platform Computing • United Devices • Avaki • Cornerstone Systems • Esteem Systems • Italtech • CIS Sud-Quest • Cisco	• Mercury Interactive • Rational • Globus • Platform Computing • United Devices • DataSynapse • GridXpert • Gridsystems • Force 10 • MSI • Beacon Information Technology • Malaysia Debt Ventures • CC Compunet • Comparex Informationsysteme GmbH • Bechtle Logistik und Service GmbH • Cisco

Application ISV
Grid ISV
Business Partner



THANK YOU !!

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