Grid Computing

Grid Computing in the Enterprise

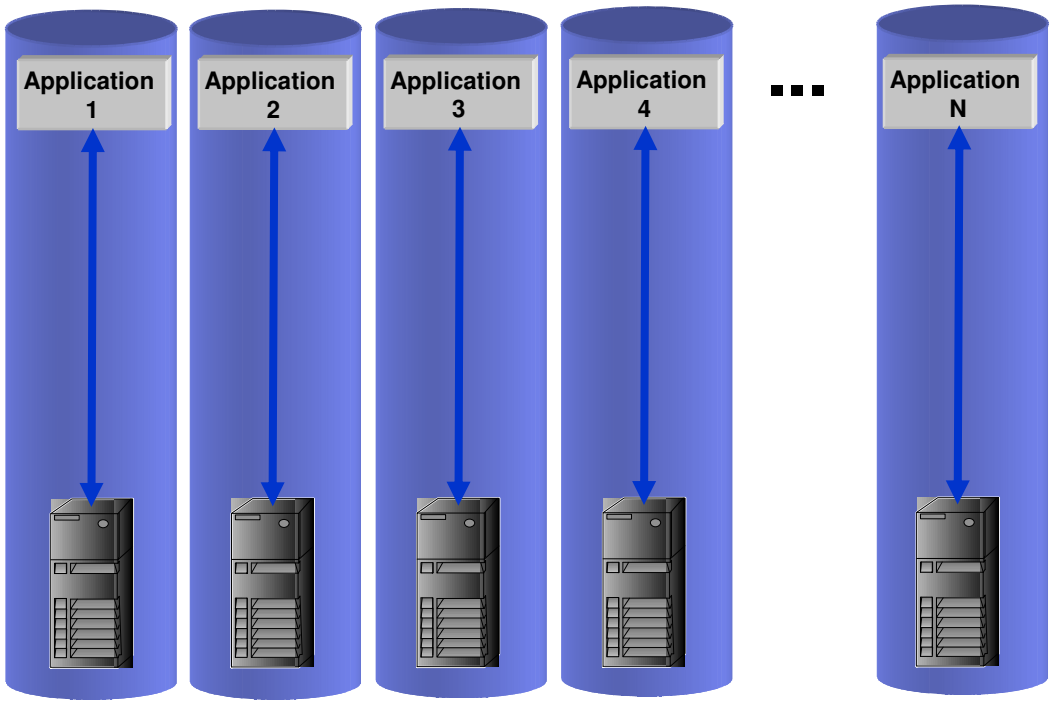
Creating I/T and Business Value

EGEE4, 25 October 2005: Industry Forum Panel
Pisa, Italy

Ellen Stokes, stokese@us.ibm.com
Senior Technical Staff Member
Austin, Texas

Grid Computing: Enabling an On Demand Infrastructure

Before Grid

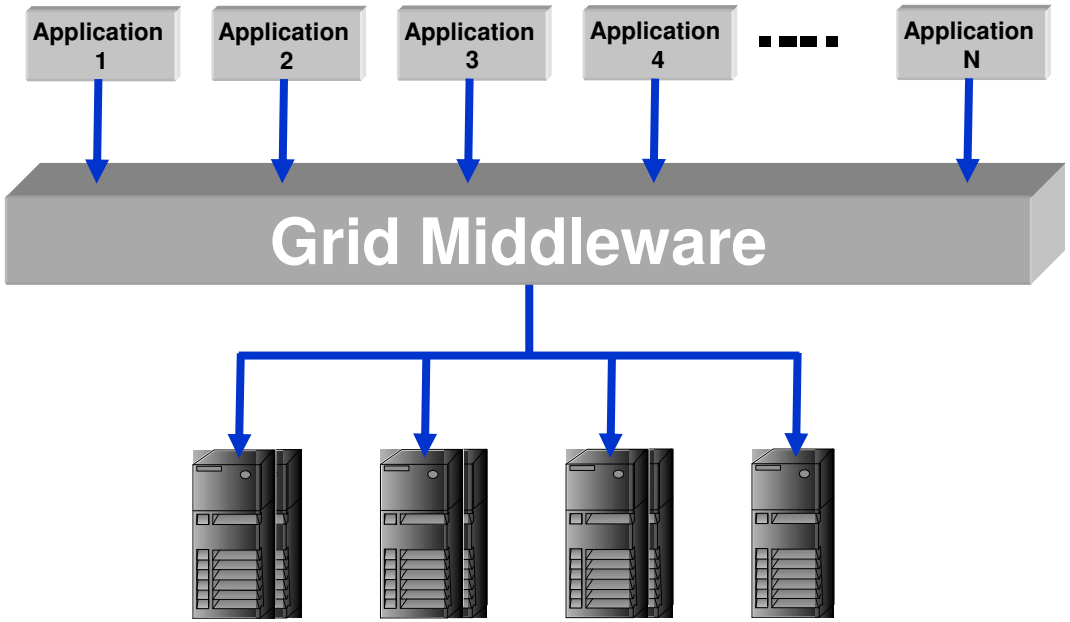


"Siloed" architecture:

- Higher costs (capital + operational) through limited pooling of IT assets across silos
- Challenging cross organization collaboration
- Limited responsiveness due to more manual scheduling and provisioning

Grid Computing: Enabling an On Demand Infrastructure

After Grid



"Virtualized" infrastructure:

- Creates a **virtual application operating, storage & collaboration environment**
- Virtualizes application services execution
- Dynamically fulfills requests over a virtual pool of system resources
- Offers an adaptive, self-managed operating environment that offers high availability

Grid Motivations

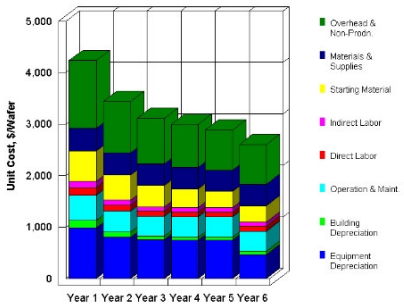
Accelerate

- Faster, more accurate decision making

Collaborate

Productivity and Collaboration

- Access to distributed data, information insight



Optimize

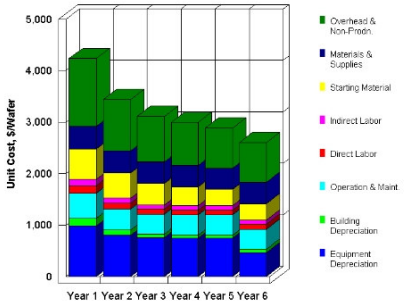
IT Optimization

- Improve efficiency and cost structure

Grid Motivations

Accelerate

Collaborate



Optimize

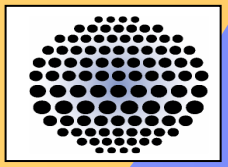
Grid Focus Areas

Research and Development	Accelerate and enhance the R&D process by enabling the sharing data and computing power seamlessly for research intensive applications	Life Sciences Education Industrial	
Engineering and Design	Share data and computing power, for computing intensive engineering and scientific applications, to accelerate product design	Industrial	
Business Analytics	Enable faster and more comprehensive business planning and analysis through the sharing of data and computing power	Financial Industrial Life Sciences	
Government Development	Create large-scale IT infrastructures to drive economic development and/or enable new government services	Gov't	
Enterprise Optimization	Optimize computing and data assets to improve utilization, efficiency and business continuity	Financial Industrial Gov't Education Life Sciences	

Grid and Virtualization

IBM is focused on solutions that help clients realize value from the full spectrum of grid computing solutions

Virtualize Outside the Enterprise

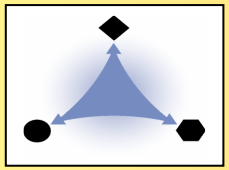


Suppliers, partners, customers and external resources

Virtualize the Enterprise

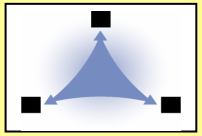
Enterprise wide Grids, Information Insight, and Global Fabrics

Virtualize Unlike Resources

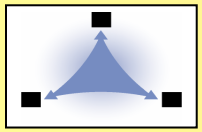


Heterogeneous systems, storage, and networks; Application-based Grids

Virtualize Like Resources



Single System (Partitioning)



Cluster

Simple (2-4)

Sophisticated (4+)

Homogenous systems, storage, and networks

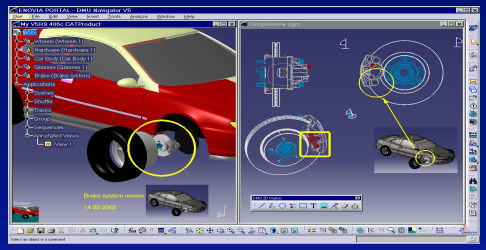
Homogenous
Single Organization
Tightly Coupled

Heterogeneous
Multiple Organizations
Loosely Coupled

Engineering and Design
Automotive

MAGNA STEYR

- Challenge
  - Too much time required to effectively run clash tests between complex sub-assemblies which impacts quality of the end product and getting the product to market on time.
  - Too much administrative time required from design engineers
- Solution
  - Grid enabled clash environment. IBM developed code and services using Platform Computing LSF w/ Dassault Systemes CATIA & ENOVIA DMU applications providing clash detection analysis.



Benefits:

- Significant performance improvement (72 – 4hrs)
- Risk and Error Reduction
- Cost Reduction
  - Increased accuracy of data improves quality and reduces late changes)

Improved Time to Market

- Faster evaluation of design alternatives
- More accurate and timely product development

"Grid technology from IBM and Platform Computing reduced the time required for our clash testing from 72 – 4 hours and contributed significantly to enhancing our design quality," said Dr. Heinz Mayer, MAGNA STEYR.

IBM Boeblingen Laboratory

Grid computing accelerates product development

WHY BECOME AN ON DEMAND BUSINESS:

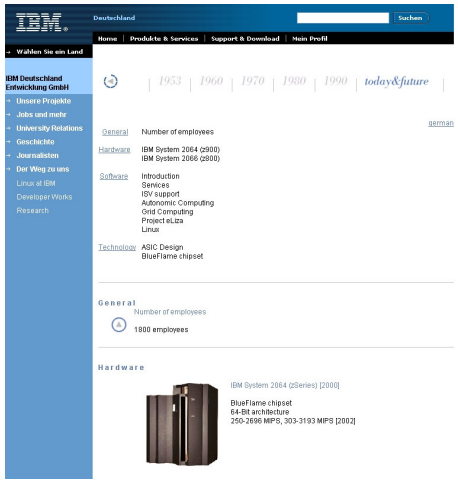
Product developers at the Boeblingen Lab were running out of computing power for high-demand applications such as server design simulations. They couldn't consolidate workloads or combine unused processor cycles. This threatened IBM's product development leadership, limited its speed to market and its ability to respond to customer and Business Partner needs. The Lab needed a way to maximize computing resources by consolidating them into a virtual environment.

SOLUTION:

The Lab joined under-utilized resources to create a virtual, resilient and open computing environment so developers can access high-performance computing capability locally, whenever they want it. Now, over 400 computers have been linked into one virtual system, which provides increased power for high-demand applications and increased responsiveness to market demands. The grid is powered by IBM eServer® xSeries® and a zSeries® running Linux to create a virtual server with open, resilient software platforms from IBM and Globus Alliance.

BENEFITS:

- 100% payback in one year due to savings and accelerated revenues
- 8,000 simulations can be run per day, far more than before
- Product simulations run faster, and products go to market in less time, with fewer flaws, better bottom-line results and more responsiveness to customers' needs.



http://www-5.ibm.com/de/entwicklung/history/menues_en/menue_heuzu.html

IPK (Institute of Plant Genetics and Crop Plant Research)

Research & Development

Challenge:

- The genome of barley is more than twice as large as the genome of a human. Sequencing the entire barley genome would be extremely expensive and time consuming.
- IPK needed large amounts of computational power to analyze short strands of barley DNA known as Expressed Sequence Tags (ESTs) from which it processes and performs intelligent data recycling by comparing the genome of rice to these ESTs

Solution:

- IBM eServer™ xSeries® e325 dual Opteron servers with SUSE Linux
- Maui, Torque (Open Source products) and Grid services support from the IBM On Demand design center in Montpellier

Benefits:

- **Before the Grid, it would have taken 200 days to make one single comparison of the 400,000 barley ESTs with the rice genome**
- **Using the Grid solution, IPK can complete a one-time comparison in just 30 hours and a previously unfeasible project can now be completed in just a few weeks**

The leading Institute of Plant Genetics and Crop Plant Research (IPK) has chosen IBM for its research Grid solution which is designed to support over 50 bioinformatics applications with a new data distribution mechanism enabling genetics research that was previously impossible."

-- Dr Ivo Grosse, Head of the Plant Data Warehouse working group in Gatersleben, Germany

Thank You!

www.ibm.com/grid