

Grid Computing



**Grid Computing**  
**IBMグリッド・コンピューティングがもたらす  
ITとビジネスの価値**

AI Bunshaft  
VP, WW Business Development & Sales  
IBM Grid Computing



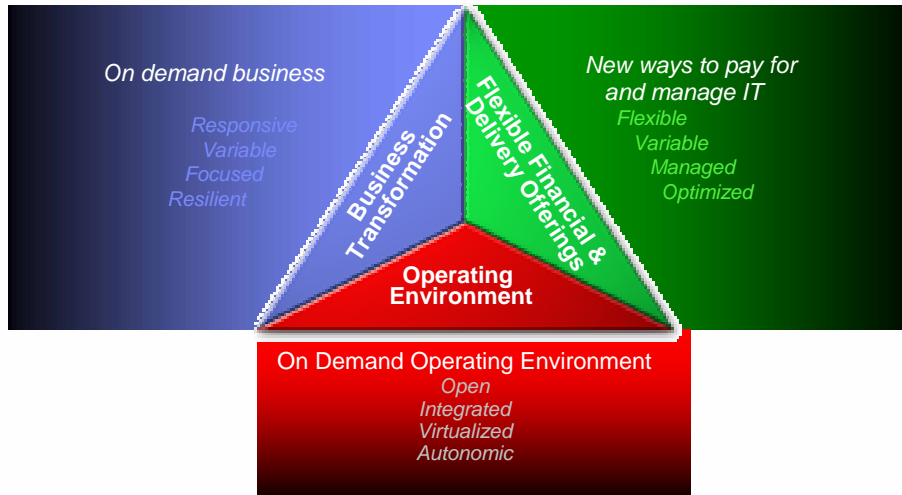
Grid Computing



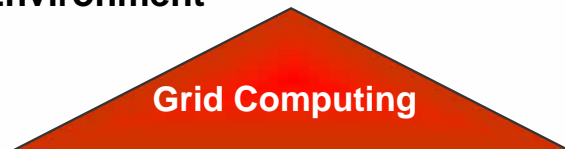
**Key Messages**

- **Grid Computing is an integral part of IBM's On Demand Strategy!**
- **Grid computing is delivering real business value today!**
- **Grid Computing is about virtualizing resources!**
- **Grid is about business value and business transformation!**
- **The Grid ecosystem is being built on open standards!**
- **Customers are using IBM Grid Offerings to start small and grow!**

## Three key initiatives to IBM's On Demand Strategy

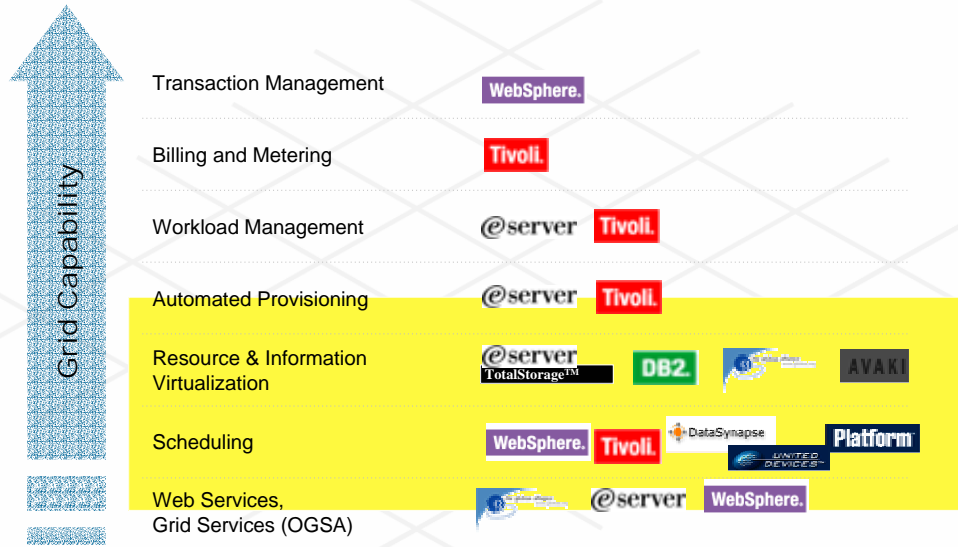


## Grid is a great first step to building an On Demand Operating Environment



On Demand Operating Environment Characteristics	Grid Alignment
Integrated	<ul style="list-style-type: none"> <li>The OGSA (Open Grid Services Architecture) Grid standard brings together other open standards such as XML (eXtensible Markup Language), WSDL (Web Services Description Language), UDDI (Universal Description, Discovery and Integration) and SOAP (Simple Object Access Protocol)—all important to Web services.</li> </ul>
Open	<ul style="list-style-type: none"> <li>Grids are built on open standards (e.g. OGSA) and support multi-vendor operating environments.</li> </ul>
Virtualized	<ul style="list-style-type: none"> <li>With Grid Computing, customers can virtualize entire data centers, sharing and managing distributed computing resources as if these resources were a single, unified computing instance.</li> </ul>
Autonomic	<ul style="list-style-type: none"> <li>Grid software and hardware contain autonomic elements (e.g. DB2, eServer, etc.)</li> </ul>

## Grid Adoption Today



## Grid Computing Motivation

### Business Drivers

- Accelerate Speed to Market
- Increase Operating Efficiency
- Enhance Customer Relationships
- Improve Cross-Enterprise Collaboration
- Quickly Respond to Variable Demands



### IT Drivers

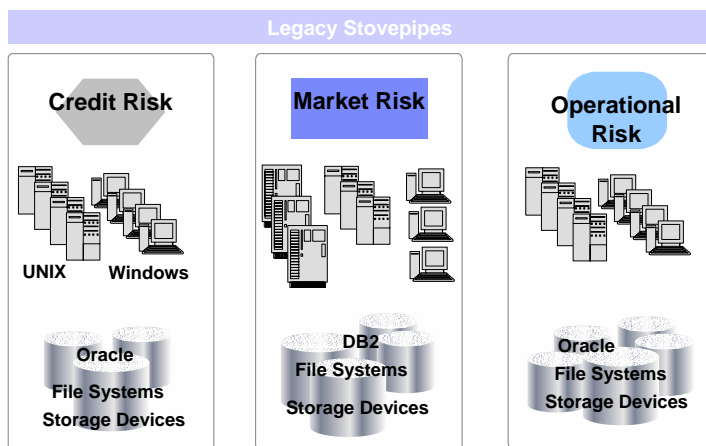
- Accelerate Applications
- Enable Data Access, Integration and Collaboration
- Integrate Stovepiped, Heterogeneous Resources
- Improve Asset Utilization
- Strengthen Redundancy and Resiliency
- Quickly Respond to Variable Demands



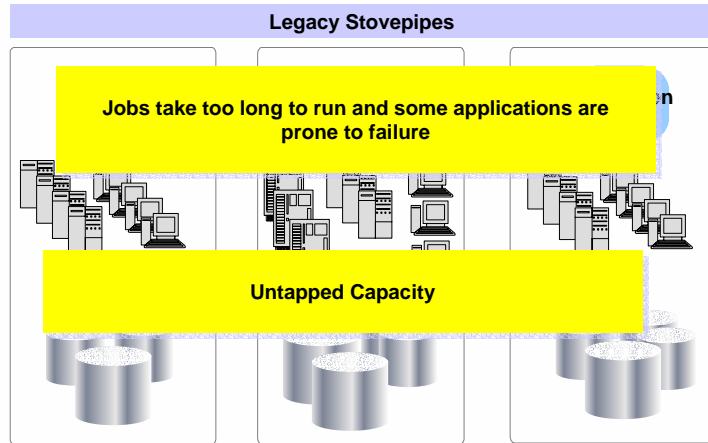
### Grid Computing Marketplace Momentum



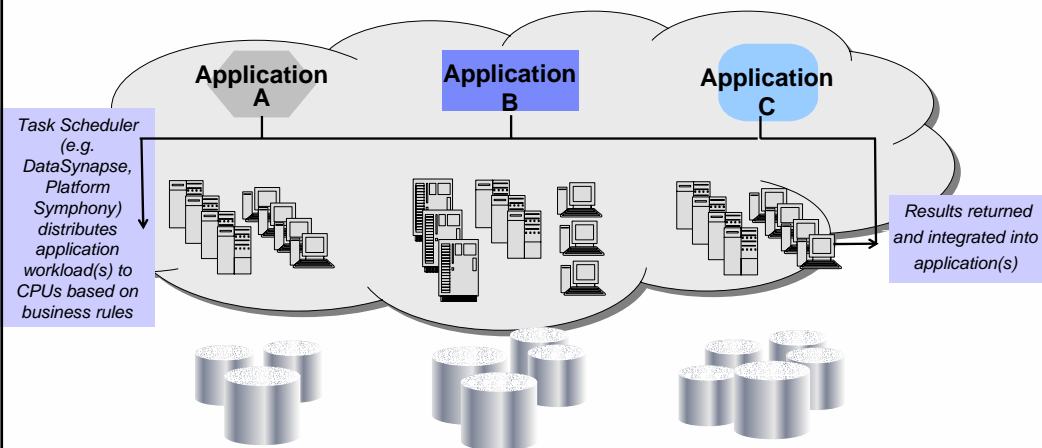
### Current Heterogeneous, Fragmented View of Analytic Infrastructure CPU and Information Resources



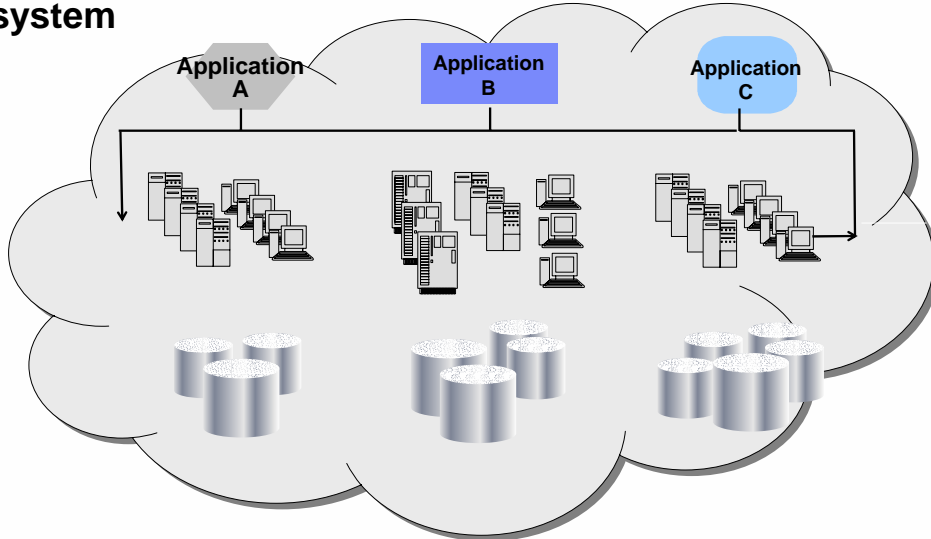
## Application Performance Issues, untapped CPU and information resources



## Clients can start by virtualizing application(s) CPU resources by introducing a layer of Grid middleware, creating shared CPU and centralized scheduling for applications



They can then virtualize information resources to create a single view of information for applications by introducing a layer of Grid middleware or parallel file system



Unlocking idle capacity and unleashing it on the business

Before: 10 Hours  
After: 15 Minutes

Before: 30 Seconds  
After: 500 Milliseconds

Before: 45 Minutes  
After: 2 Minutes

- Efficient
- Resilient
- Scalable
- Open

# Grid Computing...The Ultimate Objective








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

*"OGSA.... the TCP/IP of Grid Computing"*



## IBM 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
				
<ul style="list-style-type: none"> <li>• Better Decision Making</li> <li>• Time to Solution</li> <li>• Reduced Costs</li> </ul>	<ul style="list-style-type: none"> <li>• Improved Product Design</li> <li>• Time to Solution</li> <li>• Reduced Costs</li> </ul>	<ul style="list-style-type: none"> <li>• Improved Collaboration</li> <li>• Time to Solution</li> <li>• Reduced Costs</li> </ul>	<ul style="list-style-type: none"> <li>• Better Decision Making</li> <li>• Improve Collaboration</li> <li>• Stimulate Economic Development</li> </ul>	<ul style="list-style-type: none"> <li>Improved:               <ul style="list-style-type: none"> <li>• Resiliency</li> <li>• Productivity</li> </ul> </li> <li>Reduced:               <ul style="list-style-type: none"> <li>• Costs</li> <li>• Complexity</li> </ul> </li> </ul>

## Services Capabilities

*Address customer pain points*

Based on experiences with over 100 Grid Computing engagements, clients have three core sets of needs when it comes to services:

### Innovation:

- Algorithms, processor optimization, SW development, MPI, etc.

### Transformation:

- New business and IT models,
- Business process redesign

### Integration:

- Web services, service oriented architectures, charge-back models, governance, etc.
- Architecture, implementation and management

# Charles Schwab

Business Analytics

- Reduced the processing time on an existing wealth management application, from more than four minutes to fifteen seconds
- Will allow Charles Schwab to potentially increase customer satisfaction by responding to inquiries at a faster pace
- Planning to explore leveraging Grid computing into other key business areas



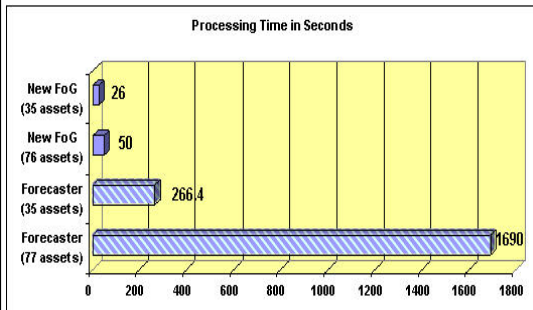
*"We believe that Grid computing ... has the potential to greatly improve our quality of service and be a truly disruptive technology."*

Oren Leiman, Managing Director, Charles Schwab

## Charles Schwab - Performance benchmark results

Old Application on Sun Environment

New Application on IBM Grid



Forecaster Solaris Run	Dec. 10 <sup>th</sup> New FoG Run	% Reduction in Response Time vs. Forecaster Solaris*
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76/77 asset portfolio (Very Complex)		
1690 sec.	50 sec.	97%
35 asset portfolio (Complex)		
266.4 sec.**	26 sec.	90%

The Solaris Performance Run for a single user job, 76/77 asset portfolio, is showing a whopping 97% cut in processing time—over 27 minutes saved

## Charles Schwab



[www.ibm.com/grid](http://www.ibm.com/grid)

## 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.

### 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

## China Grid

Research & Development

### Challenge:

Build a Grid infrastructure linking 12 universities across China, with a focus on:

- Life Science
- e-learning
- Mass Information Processing (Digital Olympic)
- Data Grid
- Fluid Dynamics

Cover 12 universities across China, expanding to 100 universities. 6 Tflops and over 60TB storage capacity

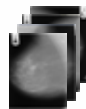
### Solution:

- IBM Integrated Technology Services
- IBM Research
- IBM eServer
- IBM Total Storage



## UK eDiamond

Research & Development



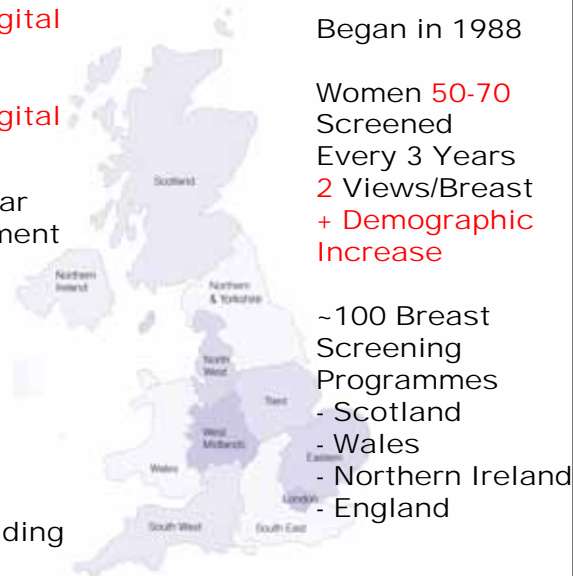
Digital

Digital

2,000,000 - Screened every Year  
 120,000 - Recalled for Assessment  
 10,000 - Cancers  
 1,250 - Lives Saved



230 - Radiologists (Double Reading)  
 50% - Workload Increase



## LSU Eye Center

Research & Development

### Challenge

- The LSU Eye Center has worked to develop IT solutions to enable the retinal screening of diabetics throughout the state.
- Effort has focused on providing access for those patients with limited opportunities for appropriate health services.
- Grid solution will allow clinics around the state to transfer digital retinal images to specialists at the LSU Eye Center.

### Solution

- Pilot was jointly designed and delivered with support from grants from Pfizer and LBRIN, an NIH BRIN grant, and IBM Global Services.
- It was deployed on an IBM [eServer logo]<sup>®</sup> pSeries<sup>®</sup> leveraging existing infrastructure, and incorporates IBM DB2<sup>®</sup> and WebSphere<sup>®</sup> software.

### Expected Eye Center IT outcomes:

- Improved patient vision and less blindness as a result of simplifying and providing more opportunities for screening to a much wider patient base, reducing patient travel and cost.
- IT will add to the ability to store and retrieve retinal images, leading to better clinical databases and trials. The grid will enable development of new automatic feature detection algorithms.

### Expected outcomes for diabetic patients:

- Increased vision care for those with previously limited access; less blindness from diabetes.

## Kansai Electric Power Co.

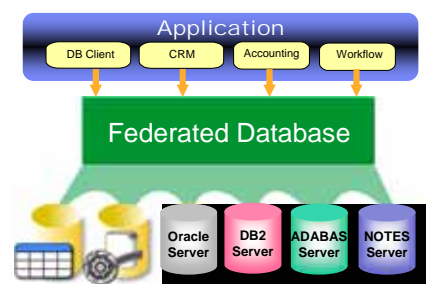
Enterprise Optimization

### 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

- IBM Business Consulting Services
- IBM Integrated Technology Services
- IBM DB2 Data Federation 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

## 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 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 Nanotech

## MAGNA STEYR

### Engineering and Design

#### 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 running Platform Computing as Grid Middleware provider w/ Dassault Systemes CATIA & ENOVIA DMU applications providing clash detection analysis

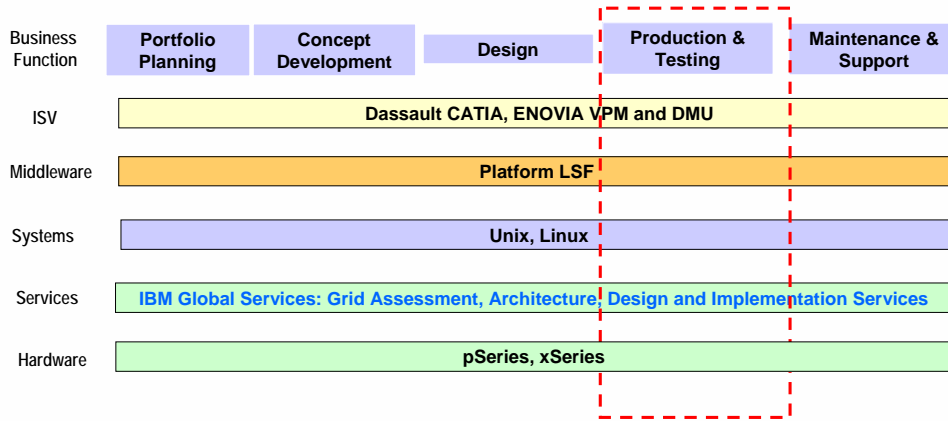


#### Benefits:

- Significant performance improvement (72 – 4 hrs)
- 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.

## Clash Analysis Offering

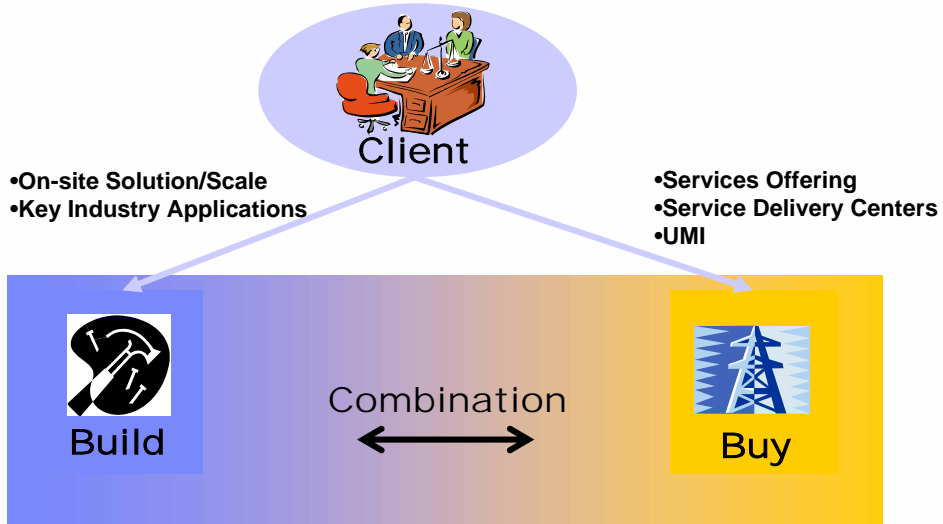


“... the new IBM Grid Offering for Design Collaboration shows that grid can also be an agent of change that fundamentally alters the way work is performed, with the end result being more effective design processes, shorter development cycles, and substantial savings in creating and delivering new products.”  
*Sageza, April 2, 2004*

## IBM Grid Industry Solutions

Business Analytics	Engineering & Design	Research & Development	Government Development	Enterprise Optimization
<ul style="list-style-type: none"> <li>•Retail Banking: IBM Grid Offering For Customer Insight</li> <li>•Financial Markets &amp; Banking: IBM Grid Offering for Risk Management and Compliance</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> </ul>	<ul style="list-style-type: none"> <li>•IBM Grid Offering for Clash Analysis:                             <ul style="list-style-type: none"> <li>▪ Automotive</li> <li>▪ Aerospace</li> </ul> </li> <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> </ul>	<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> </ul>	<ul style="list-style-type: none"> <li>•Government: IBM Grid Offering for Information Access</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> </ul>

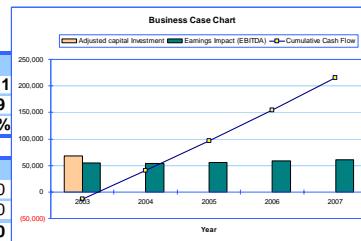
## Delivering Grid Computing Value Today



## IBM Grid Value at Work

**Business Case Measures:**

Accounting Income Based:		Cash Flow Based:	
Pre-tax ROC	166%	Payback Period	1
After-tax ROC	116%	NPV	152,009
Economic Value Added	37,028	IRR	400%



Income Statement Impact:	2003	2004	2005	2006	2007
Capital Investment	68,360	0	0	0	0
Avoided capital expense	0	0	0	0	0
<b>Adjusted capital investment</b>	<b>68,360</b>	<b>0</b>	<b>0</b>		
Revenue gain	0	0	0	0	0
Business cost savings	42,000	44,100	46,305	48,620	51,051
IT operating cost savings	12,788	9,788	9,788	9,788	9,788
<b>Earnings Impact (EBITDA)</b>	<b>54,788</b>	<b>53,888</b>	<b>56,093</b>	<b>58,408</b>	<b>60,839</b>
Depreciation	13,672	13,672	13,672	13,672	13,672
<b>Earnings Impact (EBIT)</b>	<b>41,116</b>	<b>40,216</b>	<b>42,421</b>	<b>44,736</b>	<b>47,167</b>
<b>Cash Flow Impact:</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>
Free Cash Flow to Firm	(13,572)	53,888	56,093	58,408	60,839
Cumulative Cash Flow	(13,572)	40,315	96,408	154,815	215,654

## IBM Commitment & Focus

### Commitment

- Open standards
- R&D and investments in grid and related technologies
- Industry-leading partners
- Multiplatform experience and expertise
- Worldwide services practice for Grid Computing

### Focus

- Industry-specific offerings
- Product development roadmaps
- Building an ecosystem
- Implementing grids for over 100 commercial and public organizations
- Integrated solutions: Services, Software, Hardware and Partners

## Getting Started

- **IBM can tailor and implement one of the industry offerings to meet clients specific needs**
- **IBM has skilled, local teams of professionals and partners to help your firm best exploit Grid technologies**
- **Start the on demand journey today...**
  - Dedicated Grid teams around the world
  - Grid Design Centers in US, EMEA and AP


[www.ibm.com/grid](http://www.ibm.com/grid)

## ご聴講ありがとうございました

お問い合わせは、[grid@jp.ibm.com](mailto:grid@jp.ibm.com)までお願い致します

IBMグリッド・コンピューティング  
に関する情報は、下記URLをご覧ください。

**[ibm.com/grid/jp/](http://ibm.com/grid/jp/)**

 **business on demand™**