IBM Systems and Technology Group

UNICORE as a Front End for IBM Infrastructure Solution

1st UNICORE Summit, 11.10.05 France Nice

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Agenda

- **Grid Building Blocks Concept with UNICORE**
- **IBM Grid and Grow**
- **IBM Virtualization Engine**

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- **IBM Grid and Grow**
- **IBM Virtualization Engine**

Zürcher Kantonalbank

Business Analytics

Challenge:

- To strengthen the quantitative credit risk management, Zürcher Kantonalbank developed new models and algorithms for portfolio credit risk.
- To model the tight interaction between the obligors at a fine grained level with a new approach (awarded with the STOXX 2004 Gold Award “A Simple Model of Credit Contagion”)
- Improve the performance for a factor 1000 compared to the prototype in Matlab

Solution:

- Custom C++ implementation based on open source under Debian/Linux
- IBM eServer 1350 Cluster with Intel based x336 server
- Proof of Concept and HPC optimization services in the Grid Design Center in Montpellier.

Zürcher Kantonalbank

Technology Benefit

- *Solution is capable to run a complete credit risk portfolio simulation with 250k samples within 24h.*
- *Distributed computing application capable to scale over 1k of CPU’s.*
- *Highly portable application implementation based on MPI 2 message passing standard*
- *Solution is very cost efficient.*
- *Consequent usage of open source ensures leading edge technology.*
- *Highly motivated development team interacting with the open source community.*

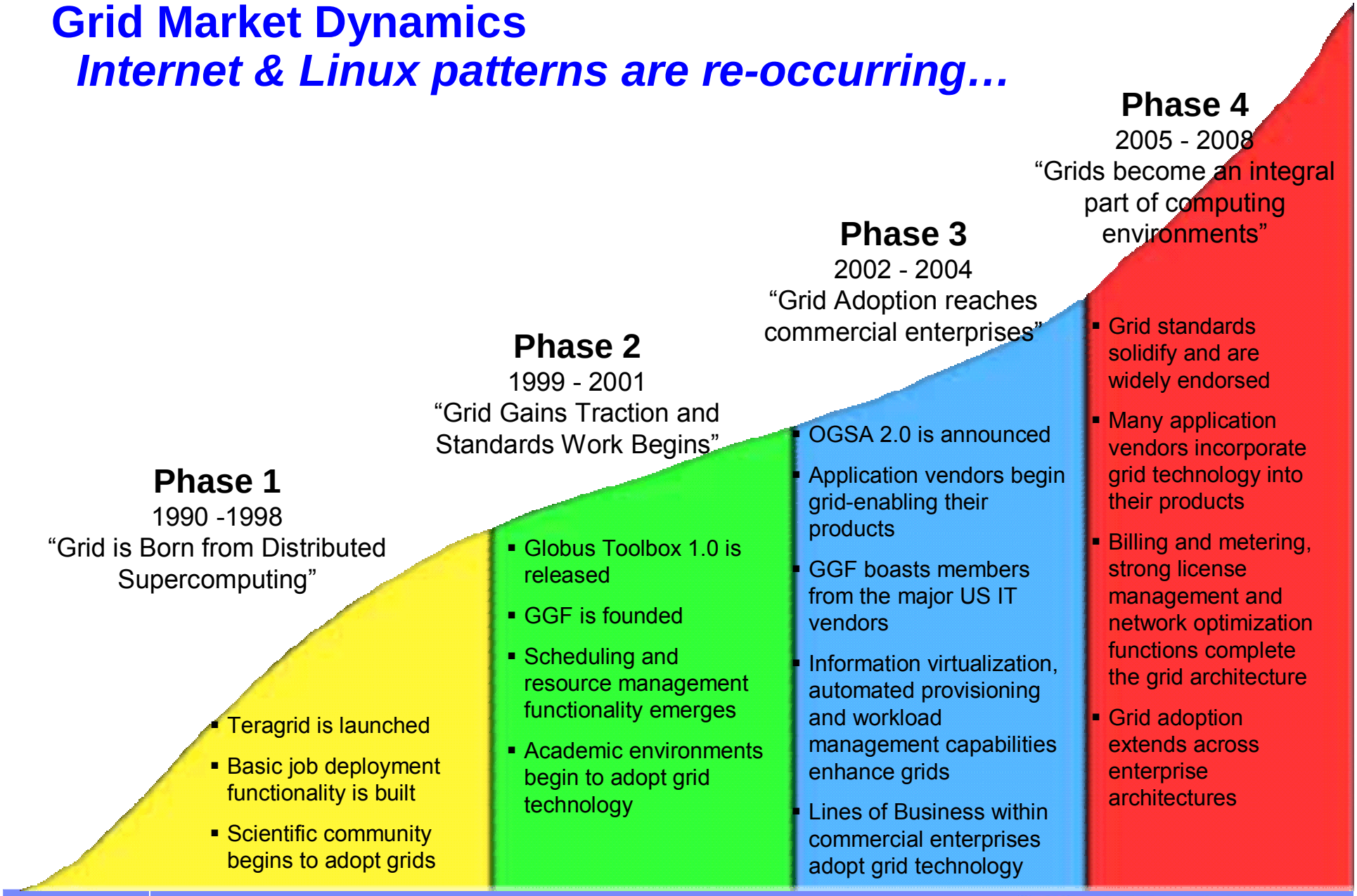
Business Benefit

- *More precise credit risk measurement and management*
- *Evaluating unpredictable scenarios with stress testing simulations.*
- *Solution is successfully productive since 30. June 2005*

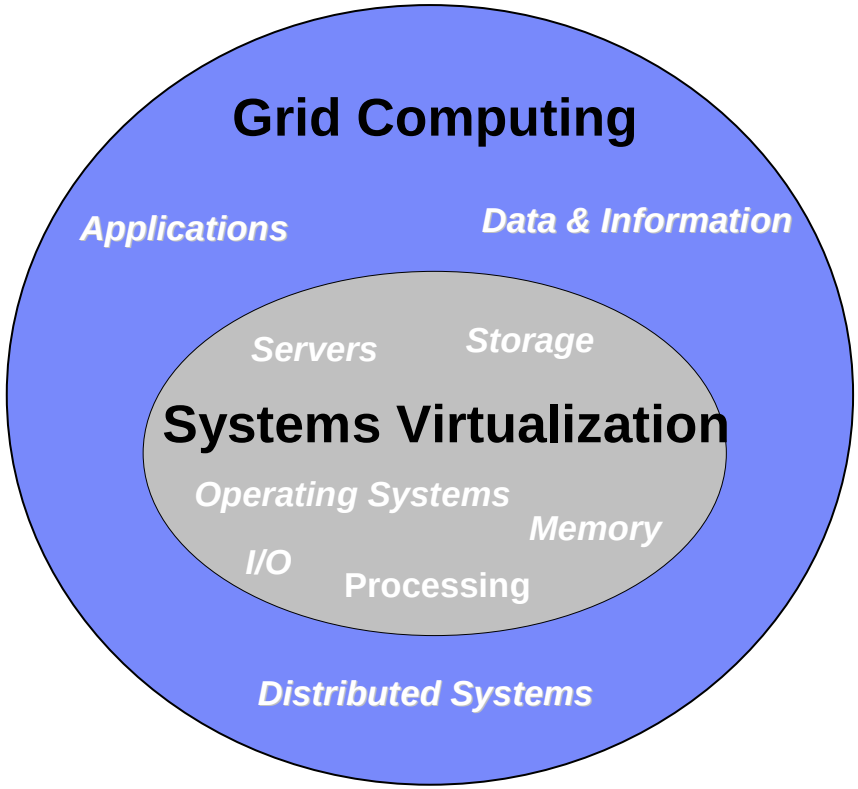
“With our new credit risk application we can calculate total profit and loss of large credit portfolios incorporating full transaction details and based on a sophisticated credit dependency model with macro- and microeconomic factors. From our first single CPU prototype under Matlab we achieved a performance factor increase of 4000 with our new Grid HPC cluster “BigFish 100”.” said Dr. Daniel Egloff, manager financial computing Zürcher Kantonalbank, Switzerland.

Grid Market Dynamics

Internet & Linux patterns are re-occurring…



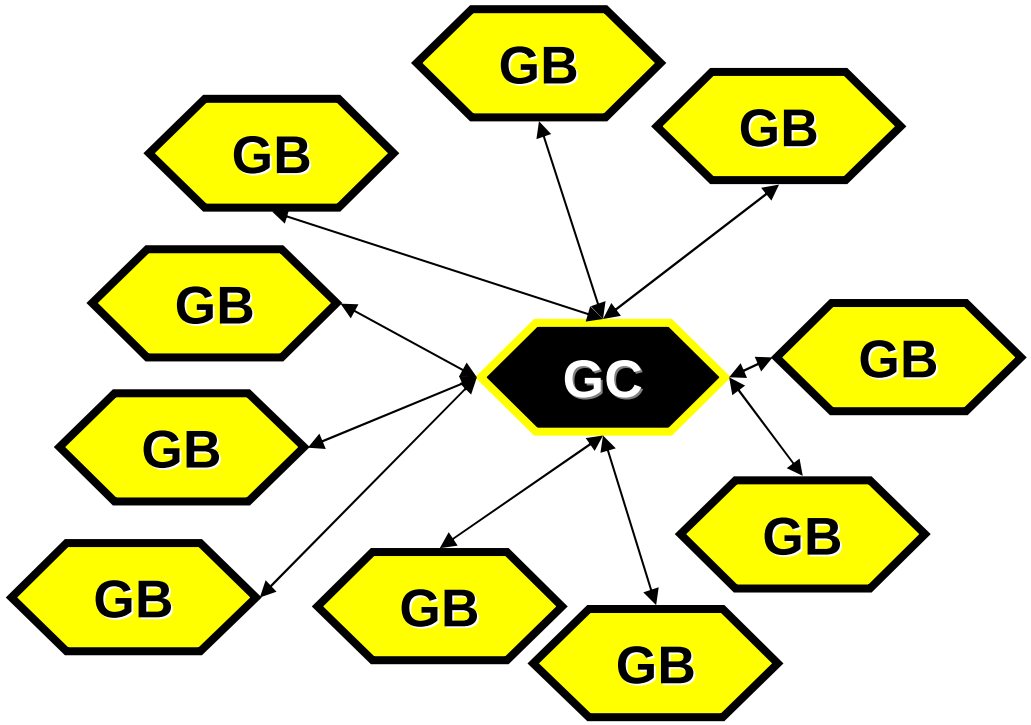
Virtualization **Technologies are Key to building an On Demand IT Infrastructure**



Grid and Virtualization…

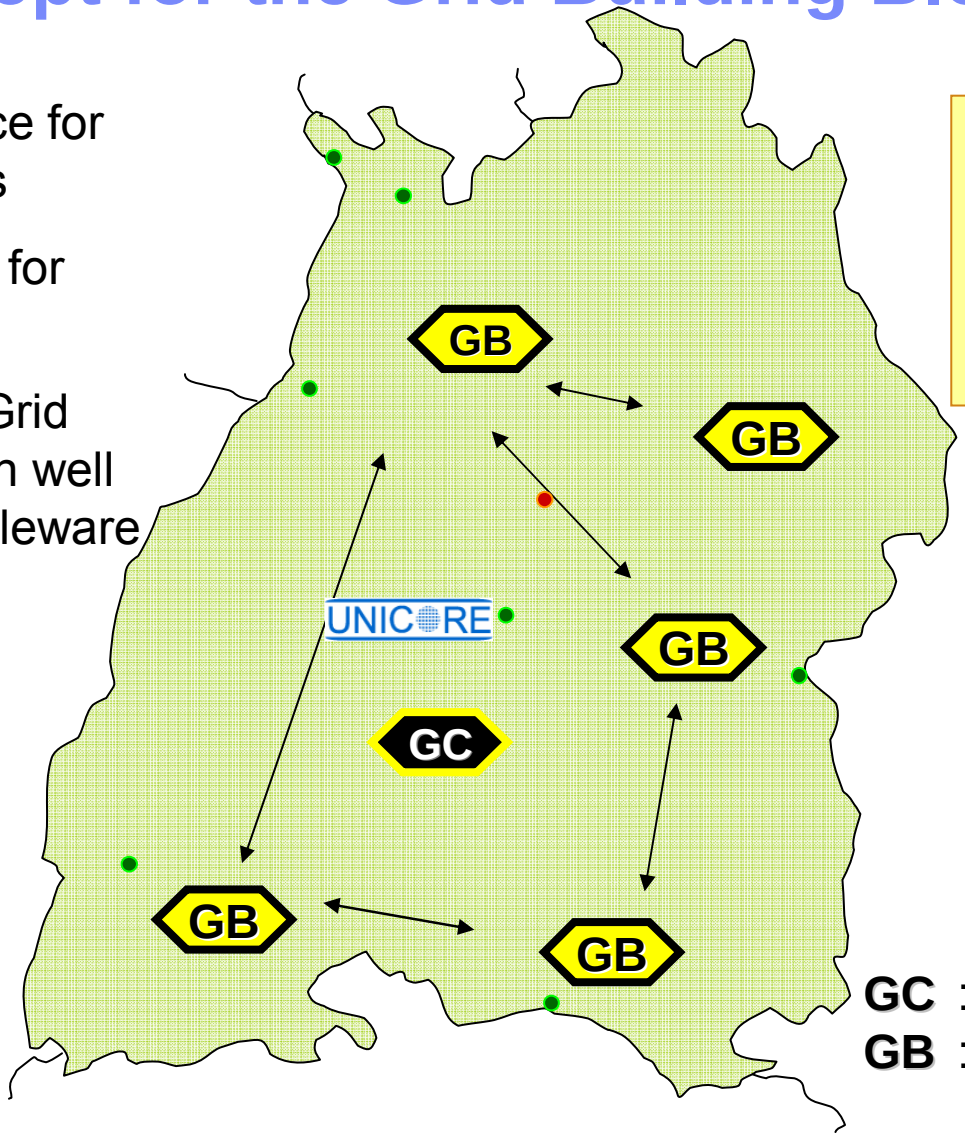
- **work together to reduce operational and systems management costs while maintaining needed capacity.**
- **reduce the complexity of adding to the existing I/T infrastructure**
- **gather data and information across the organization to promote collaboration**
- **deliver on SLA response times during spikes in production and test scenarios.**
- **help create a heterogeneous I/T infrastructure that is more responsive to the organization's needs**

Grid Building Blocks



Base Concept for the Grid Building Blocks

- Compute resource for research projects
- Reusable assets for local authorities
- Coordination of Grid infrastructure with well established middleware
- Integration of UNICORE



Example implementations of a Grid Center with multiple Grid Building Blocks

GC := Grid Center
GB := Grid Building Blocks

Grid Building Block Concept

Grid Center (GC)

ID Certificate Management	Management of Certificates and Authentication	e1350 Cluster Server
Master Grid Server	Gateway Function with SLA Oriented Load Balancing	e1350 Cluster Server
Master Grid Data Source	Distributed File System	e1350 Cluster Server and Storage
Master Grid Software Stack Repository	Linux NOS with Grid Management Software	e1350 Cluster Server and Storage

Grid Building Blocks (GB)

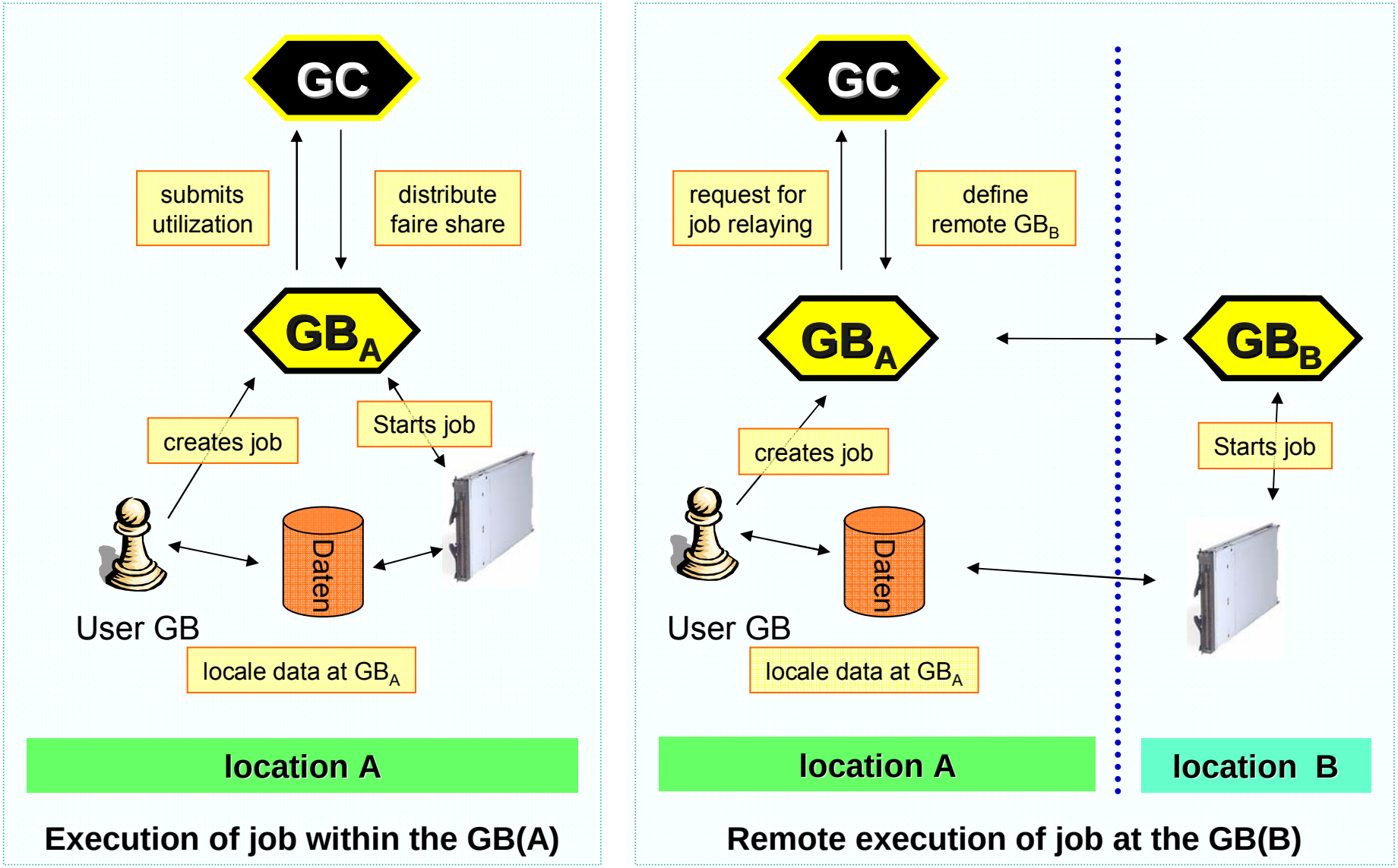
ID Certificate Client	Request and redistribution of Certificates	e1350 Cluster Server
Local Grid Server	Execution of Service Request by using Faire-Shares	e1350 Cluster Server
Local Grid Data Source	Distributed File System	e1350 Cluster Server and Storage
Local Grid Software Stack Repository	Linux NOS with Grid Management Components	e1350 Cluster Server and Storage

User

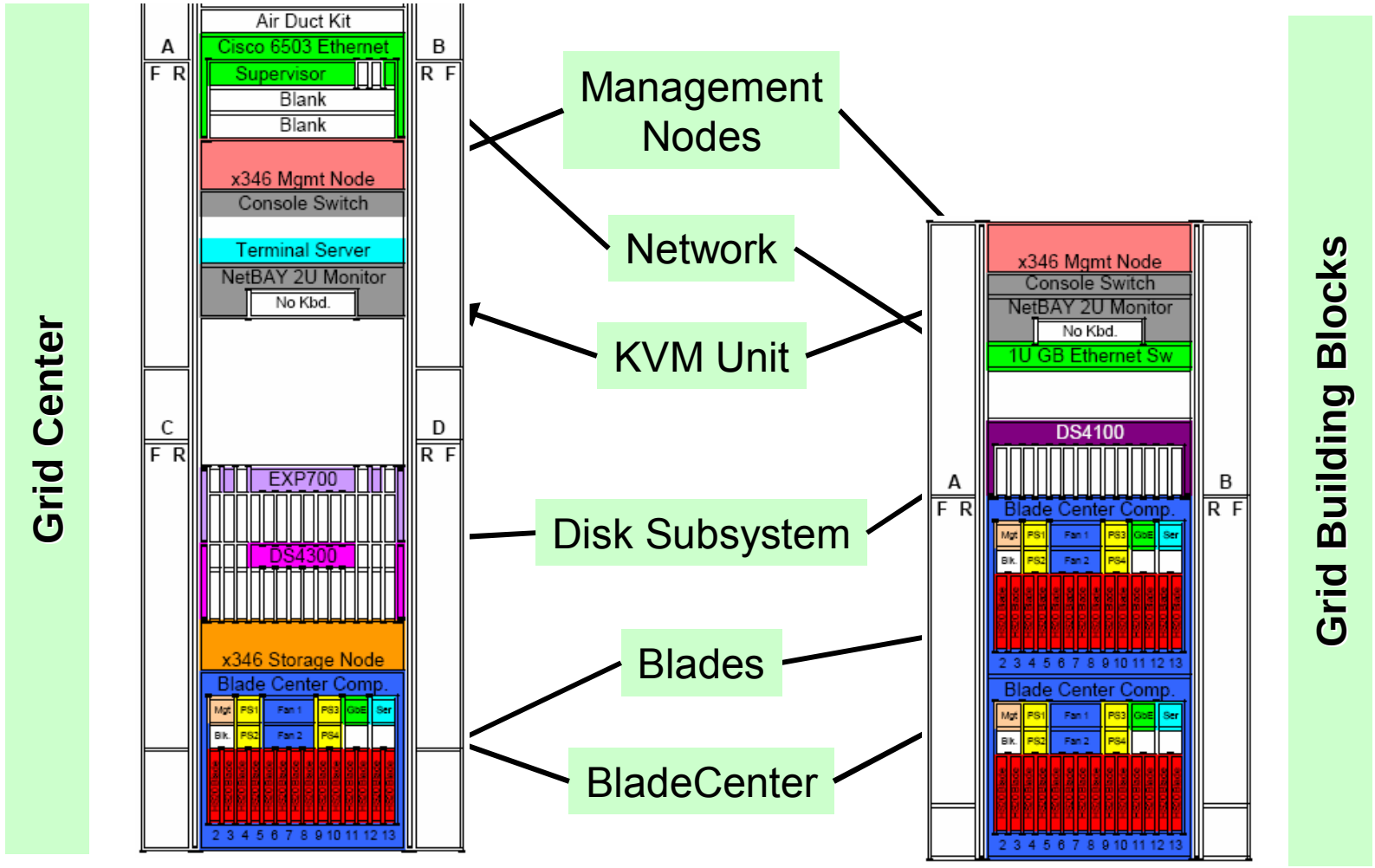
Possible Projects with Grid Building Blocks

1. Integration of industries to work with Grid Building Blocks
2. Measurement system for grid infrastructure
3. Reliable and secure transaction in the grid
4. Content management over the grid
5. Grid library: Management of electronic content (Migration of local government archives to grid systems)
6. Support Grid Infrastructure
7. Analyze Toolbox (Pattern Matching for instance in LS and identity control)
9. e-learning library as network of institutes to offer multimedia content to a broader community
10. e-learning toolbox for content creation (Rendering, compilation, real-time content)
11. Federated grids, well defined connectors (based on Web Services (WS-RF), service oriented architecture)
12. Start grid on Grid Building Blocks for non expert first time grid users
13. Interface Grid Building Blocks with classical non-grid resources like mobile phones, GPS, environmental measurement systems

Example: Task Execution with Grid Building Blocks



Hardware Design of Grids Building Blocks



Software Design Grid Building Block

GC - Grid Center	
Function	**Product Name**
Management of certificate authority	IBM Identity Manager
UNICORE gateway	UNICORE
Globus Toolkit	IBM Grid Toolbox/UNIVA
Distributed file system	IBM General Parallel File System (GPFS)
Cluster management software	IBM Cluster Systems Management (CSM)
Load balancing Fair-Share	IBM LoadLeveler

GB - Grid Building Block	
Funktion	**Name des Produkts**
UNICORE gateway	UNICORE
Globus Toolkit	IBM Grid Toolbox/UNIVA
Distributed file system	IBM General Parallel File System (GPFS)
Cluster Management Software	IBM Cluster Systems Management (CSM)
Load balancing Fair-Share	IBM LoadLeveler

GU - Grid User	
Funktion	**Name des Produkts**
UNICORE Client	UNICORE Java based

Systeme basieren auf Linux als Betriebssystem

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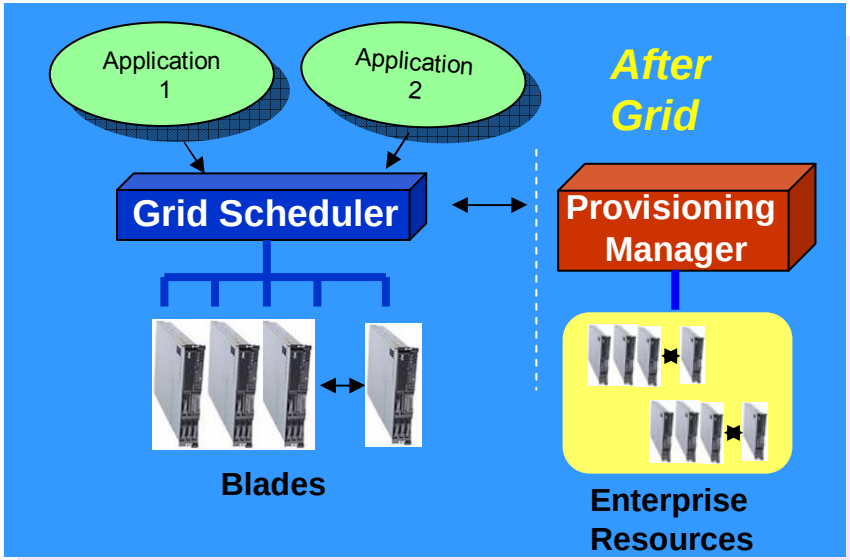
- IBM Virtualization Engine

New IBM® Grid and Grow™ Offering

Offering Objectives

- *A simple, affordable introduction to grid technology*
- *Easy to deploy, open solution that demonstrates business improvements and growth*
- *Provides an 'on-ramp' to On Demand infrastructure*
- *Positions for future growth including more robust Grid technology and industry solutions*



Target Markets

- *Departments in large industry accounts needing to accelerate business results*
  - *Financial Services, Industrial, Public Sector*
- *Mid Market*
- *Existing enterprise accounts needing additional capacity*

Offering Package

- *Grid Scheduler*
- *BladeCenter and Blades*
- *Operating system*
- *Services*
- *Advanced optional components*

IBM® Grid and Grow™ Components

Base Offering

Grid Scheduler	*Choice dependent on industry & workload* • *Platform LSF* • *Altair PBS Pro* • *DataSynapse GridServer* •*IBM Loadleveler*
Blade Server	*BladeCenter chassis & servers* •*7 blades (7 slots for growth)* *Intel HS20, Power JS20 or AMD LS20 each with 2 CPUs and 2 GB memory* • *Gigabit Ethernet* • *Redundant power supply* • *Management console and cables* • *IBM Director*
Operating System	*SW licenses for Linux, Windows or AIX*
Services	• *Hardware, operating system and scheduling software installation* • *Application assessment* • *Client Training*

Optional Components

Provisioning Manager	Tivoli Provisioning manager (TPM)
Services	TPM Installation and Implementation assistance
High Speed Interconnect	Maximize I/O and inter blade communication plus dynamic I/P addressing

Starting at

$49,000 USD

List Price

IGS Services for IBM® Grid and Grow™ Offering:

	No-charge tools	Base Offering	Optional Services
Grid Value at Work Lite	X		
Tools to help identify where to get started (coming soon)	X		
Hardware & Software ordering, including Grid scheduler		X	
Hardware - site readiness, hardware install, network connect, troubleshoot, resolve any issues		X	
OS install and configuration, VLAN configuration		X	
Grid Scheduler installation and configuration		X	
Client application assessment		X	
Performance testing and documentations		X	
Client skills transfer		X	
Grid Innovation Workshop			X
Full Grid Value at Work Workshop			X
Supportline services for Linux			X
Hardware Maintenance			X
Grid Scheduler Maintenance			X
Tivoli Provisioning Manager / Tivoli Orchestration Services			X

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Innovation Inhibitors

"Every time we add new applications interfaces, we added degree of **complexity**"

"There is a huge operational and reputational **risk**"

"How can you provide **reliability** if one of the 100 goes down?"

"We have to speed the **evolution** of our company"

Source: IBM Board of Advisors

Why IT optimization is important & necessary?

Fuel growth by managing costs:

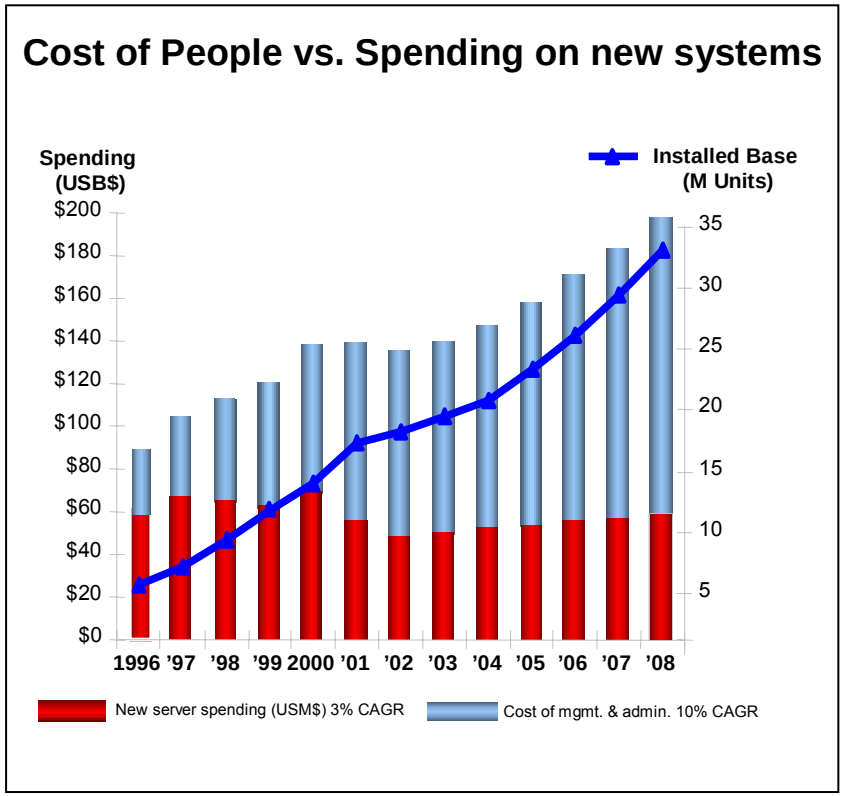
- 80% of CEO's view growth as a key focus area
- Operational costs far exceed the budgets for new hardware, they are growing at approximately 2 ½ times the compound annual growth rate*

Complexity is growing:

- Existing computing capacity is highly underutilized
- Gartner predicts that enterprises that don't leverage virtualization technologies will spend as much as 25 percent more for their x86 servers

Business Flexibility:

- Agility has been made a high priority across the organization . . .[however] only 13 percent of the CEOs rate their organization's ability to respond to changing business conditions as very responsive **



Optimize IT assets now to fuel growth, improve ROI, increase staff productivity and improve quality of service.

**IDC, 2004 **CEO Study of 456 WW CEOs IBM Corporation, 2-04; Graphic: IDC Directions 4-7-04 Customer Adoption of On-Demand Enterprises.*

Flexible & Manageable

Big Things
Look Like Little Things

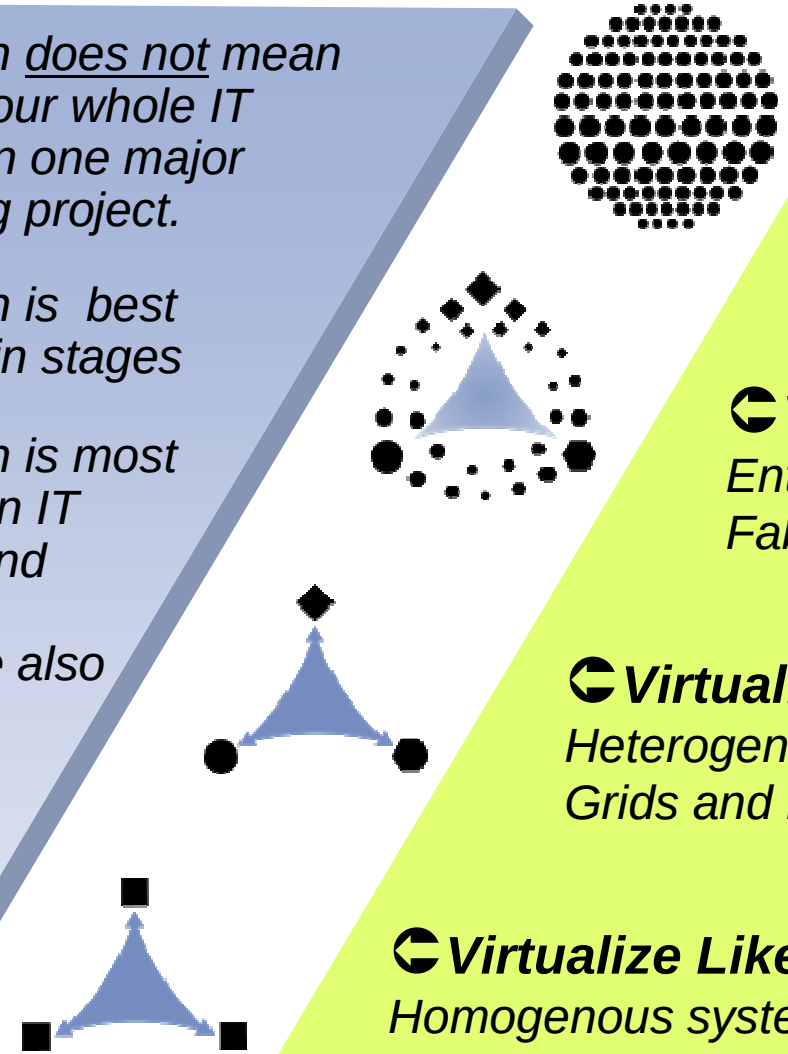
Little Things
Look Like Big Things

Virtualization Solutions: Stages of Deployment

—Virtualization does not mean you change your whole IT environment in one major re-engineering project.

—Virtualization is best implemented in stages

—Virtualization is most effective when IT governance and management processes are also updated



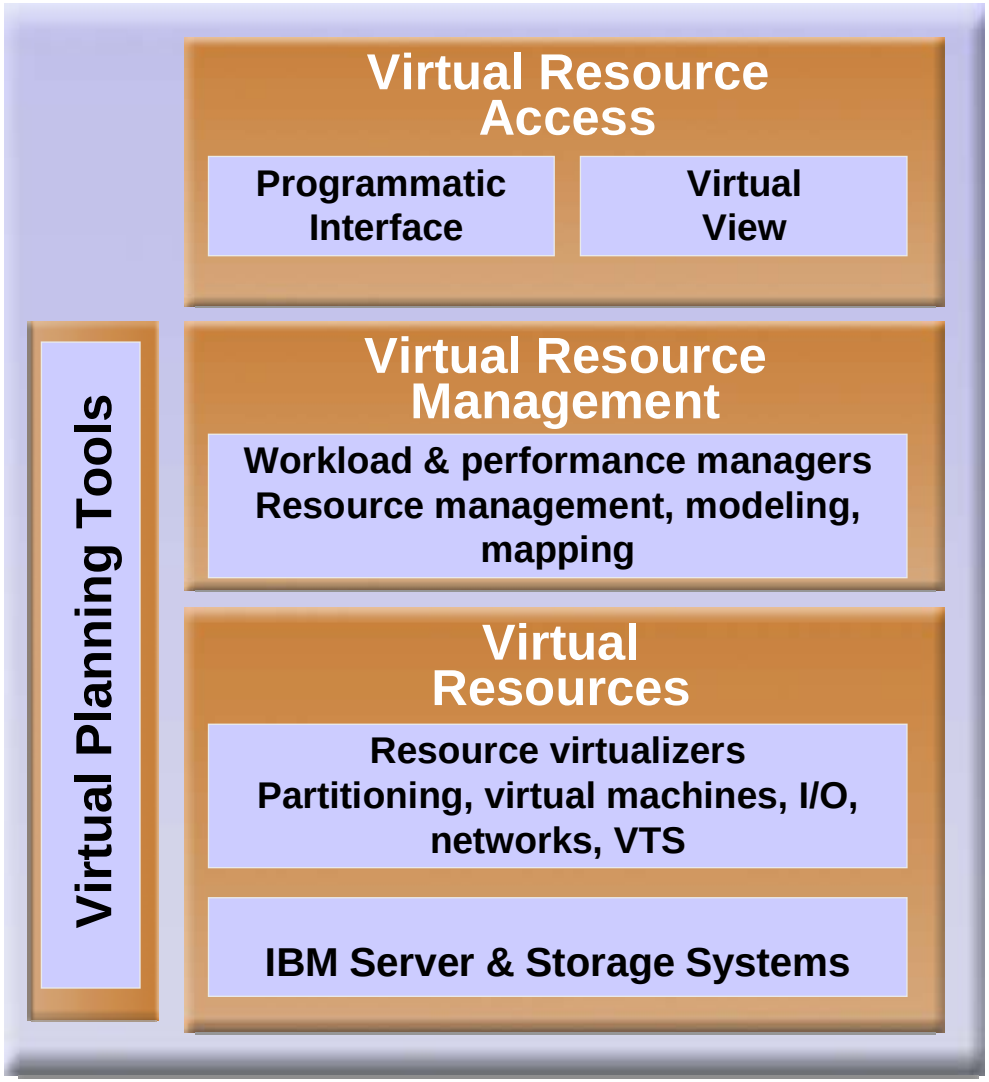
Virtualize Outside The Enterprise:
Suppliers, partners and customers

Virtualize The Enterprise:
Enterprise wide Grids and Global Fabrics

Virtualize Unlike Resources:
Heterogeneous systems, application based Grids and networks

Virtualize Like Resources:
Homogenous systems, storage and networks

IBM Virtualization Engine™ is all-encompassing



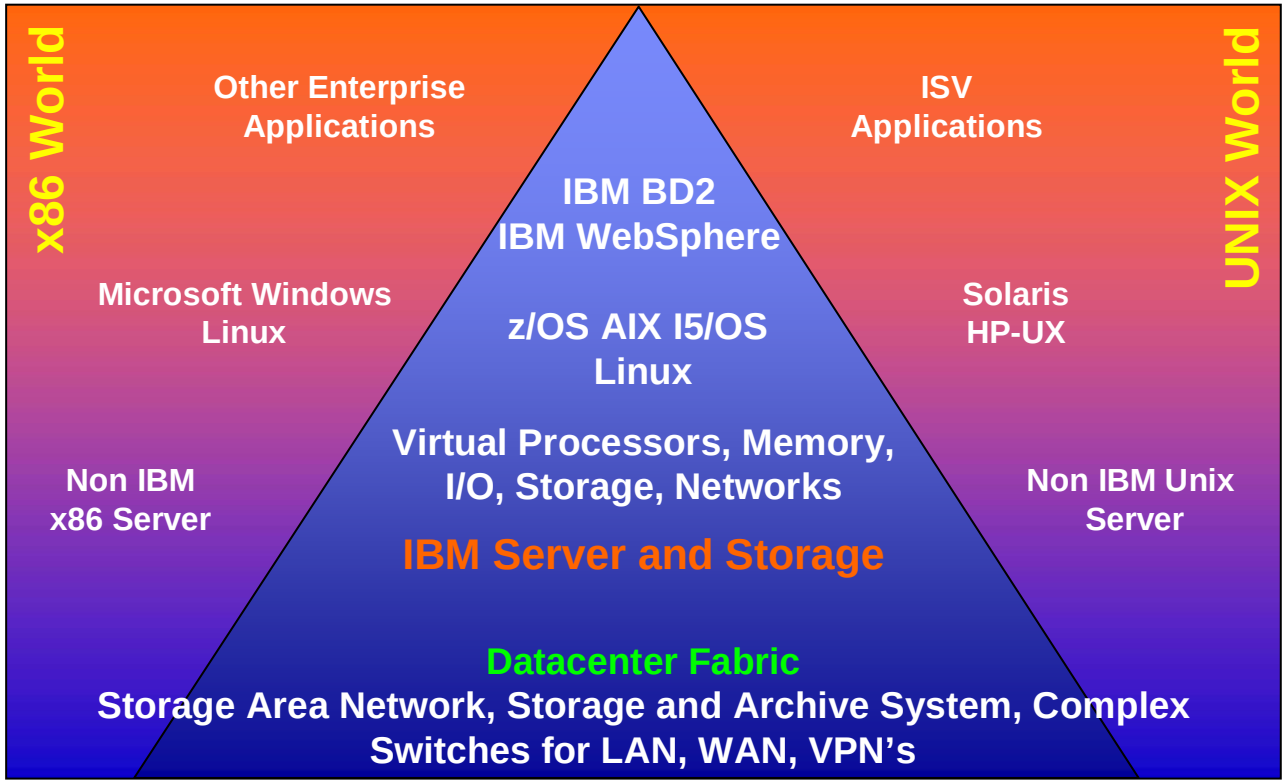
Virtualized view

Virtualized management

Virtualized resources

IBM Virtualization Engine

IBM Virtualization Engine™ and the real world



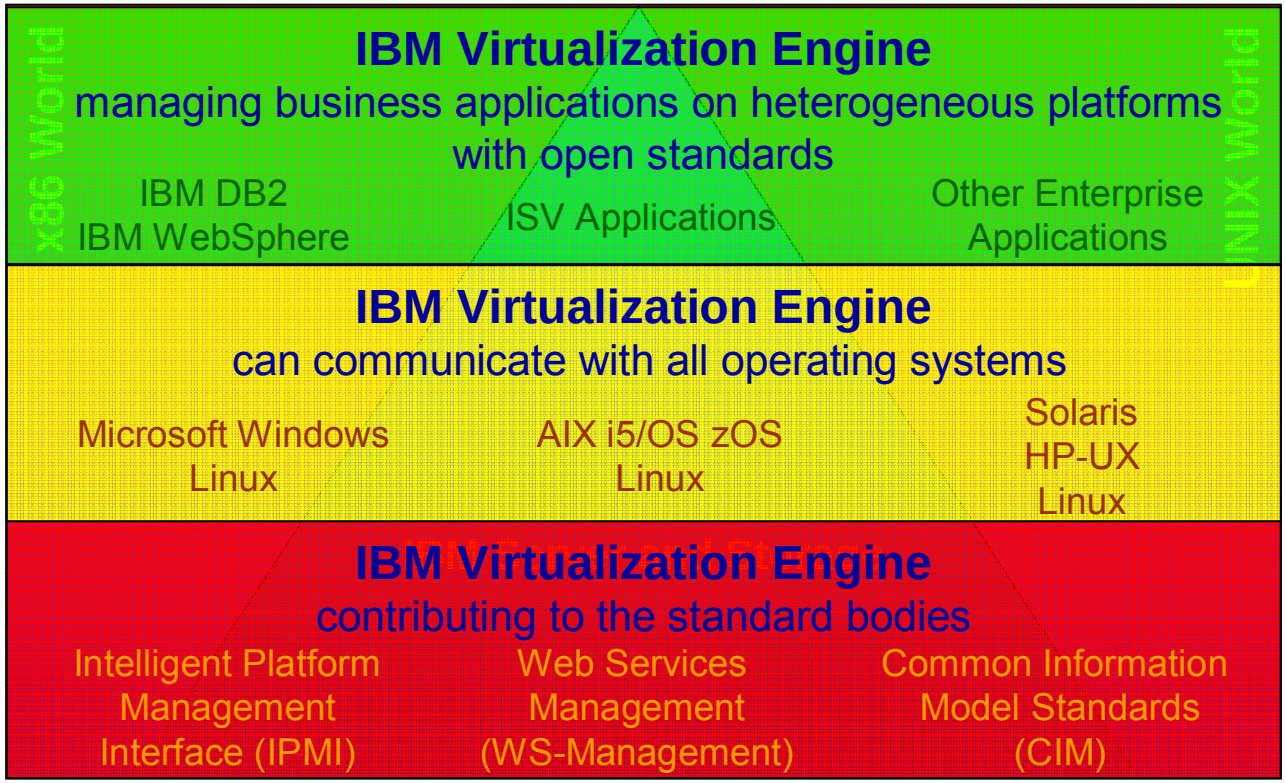
Manage your application service level

Manage your heterogeneous servers

Manage your datacenter fabric

IBM Virtualization Engine

IBM Virtualization Engine™ and the real world



Manage your application service level

Manage your heterogeneous servers

Manage your datacenter fabric

- ✓ ***IBM Virtualization Engine is designed to work with all management systems which will support open standards.***
- ✓ ***IBM cooperates in the standards bodies like DTMF, GGF and Oasis to help our customer harmonizing their management platforms.***

IBM Virtualization Engine

Wrap Up

- **UNICORE is a stable well accepted grid software**
- **Grid and Grow is using stable, mature technology**
- **Grid is leading on the workload user space level Virtualization will complement on systems level to enable a real on demand operating environment.**
- **IBM is interested in cooperating with the UNICORE Forum contributing to the UNICORE project by leveraging Grid and Grow announcements.**