



business

Project eLiza



IBM and the Grid

***Opening Workshop DAS-2
Vrije Universiteit
Amsterdam***

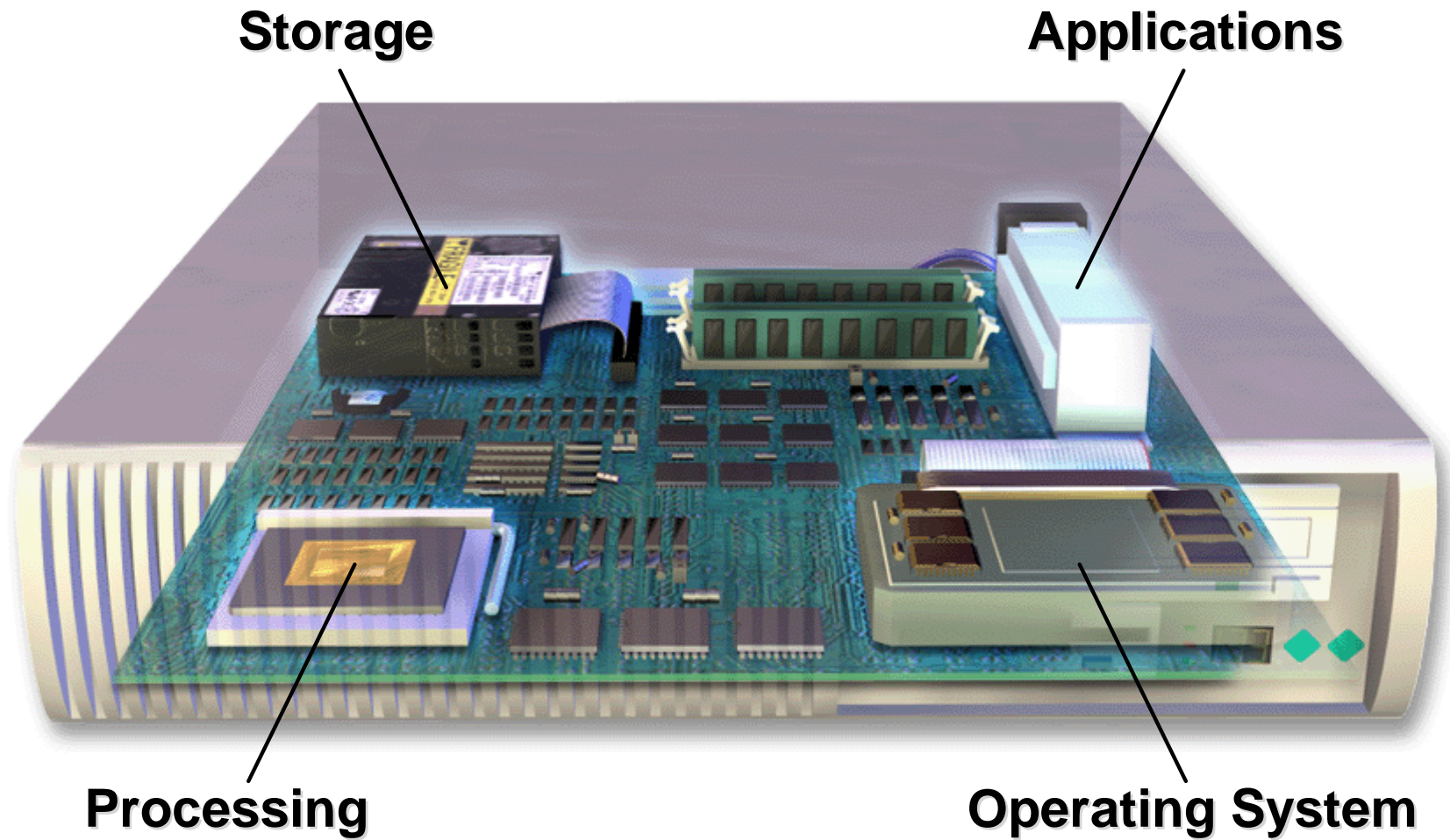
**Dr Daron Green
Grid Technologies EMEA**

6 June 2002

IBM

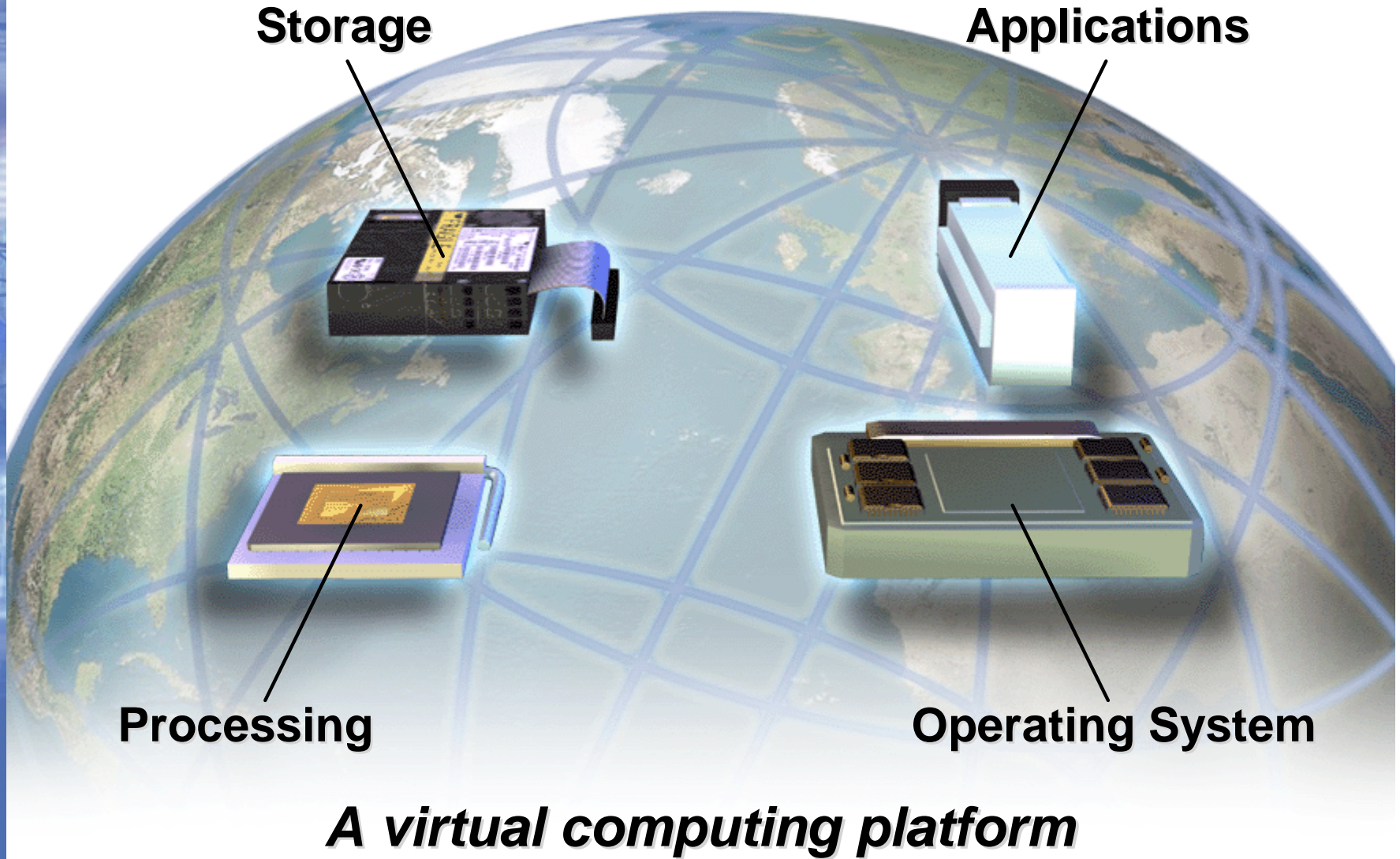
The Grid computing concept

Grid as a computing platform



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Grid as a computing platform

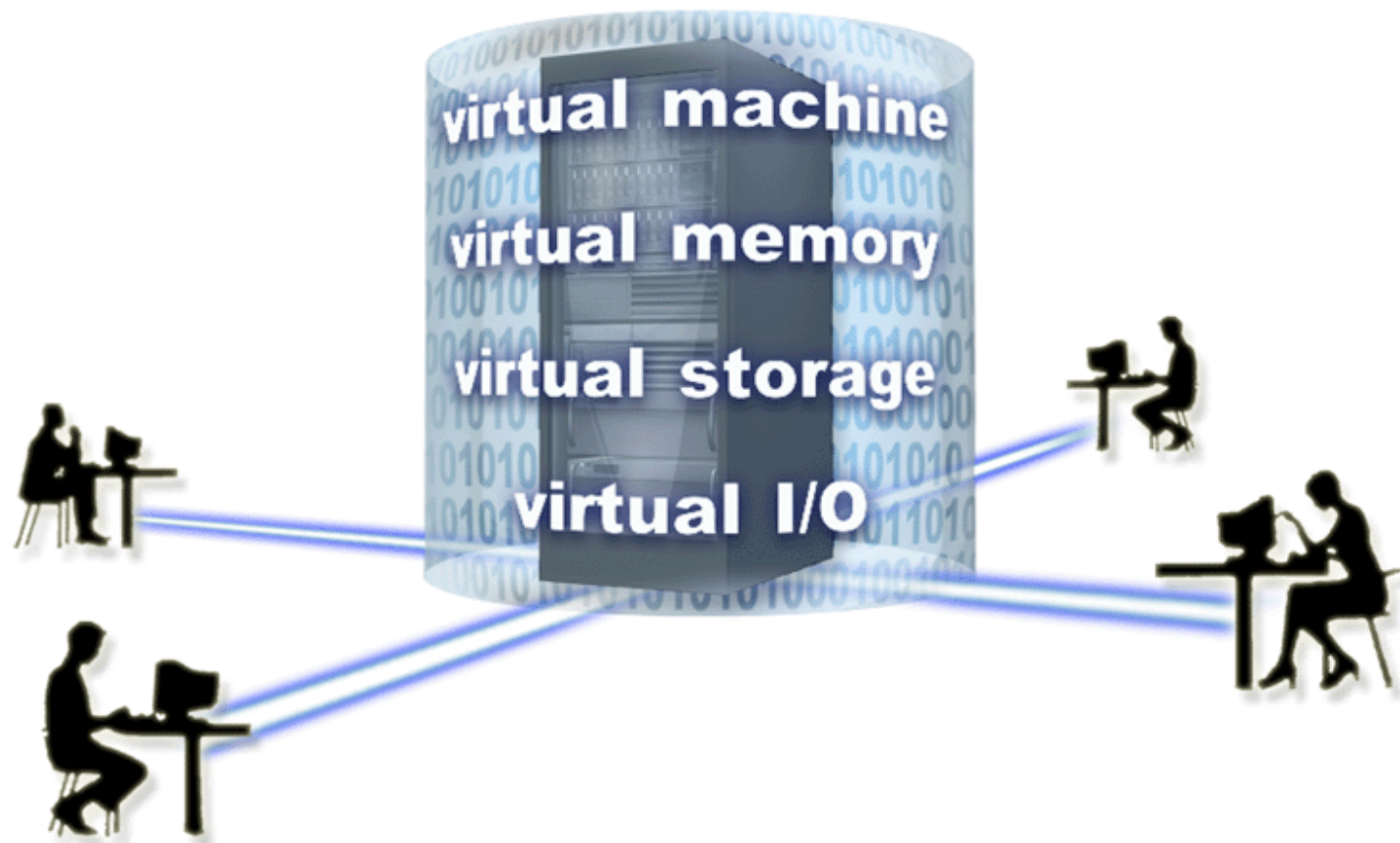


Users access computers

Memory
Storage
I/O



Virtualisation: flexible system resources



Grid virtualisation: Users access services





Why is this happening now?

Why now?

Timeliness

- **Maturation of requirements, projects and concepts from S &TC communities**
 - ▶ *The Grid blueprint for a new computing infrastructure, 1999*
 - ▶ *Anatomy of the Grid, 2001*

- **Maturation of web service approach**
 - ▶ **Other distributed computing technologies are proprietary or 'brittle' ('87 Sun's Open Network Computing, '89 OSF's DCE, '89 Object Management Group's CORBA, '96 Microsoft's DCOM)**
 - ▶ **Microsoft began XML-based distributed computing 1997 (RPC on HTTP) - conflicted with DCOM community**
 - ▶ **SOAP 0.9 appeared Sept 1999 and then SOAP v1.2 July 2001**

- **Political interest**

Why OGSA?

Because...

- **Vendor neutral approach**
- **Core technology developed in open source...**
- **...building on agreed standards**
- **Service-oriented architecture benefitting from recognised web-service formulation**
 - ▶ **Find, Publish, Bind**
- **Flexible platform-independent technologies:**
 - ▶ **XML, SOAP, WSDL, UDDI, WSFL, WSEL**

Service-Oriented Architecture

Major IT suppliers already committed

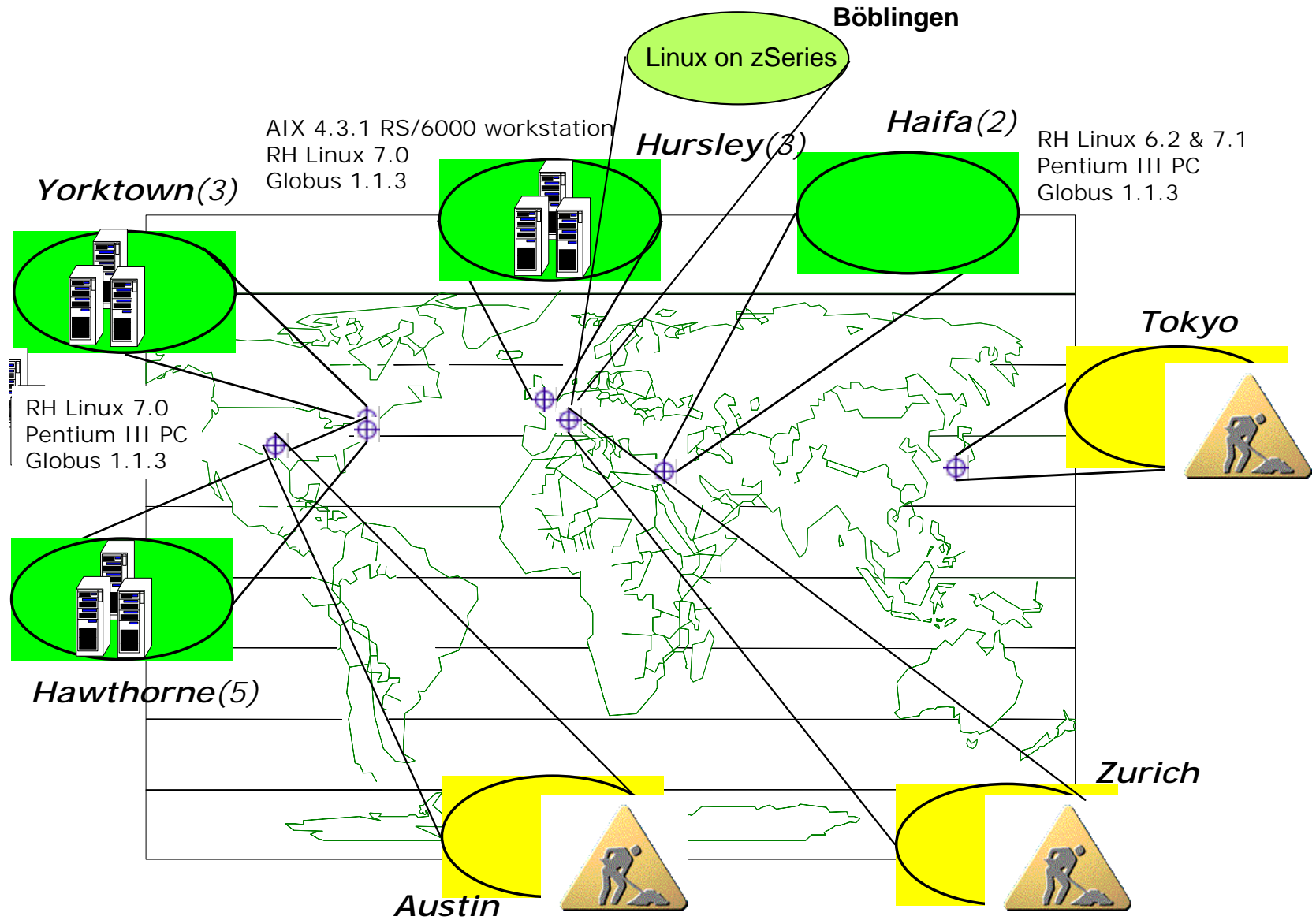
- **IBM - e-Business: SOAP, WSDL, UDDI plus many major products. Common themes with e-Liza.**
- **Microsoft - .Net: is Broader than just web services, includes C#.**
- **Sun - SunOne: an *Open Net Environment*. Based on XML, SOAP, WSDL, UDDI. Augmented by ebXML.**
- **Oracle - Oracle9i Web Services Broker: using SOAP, UDDI, WSDL**
 - ▶ **Database technology as service registry and value-added service (eg security)**



IBM and Grid

IBM Research

Internal Grid 'sand pit'



National Digital Mammographic Archive

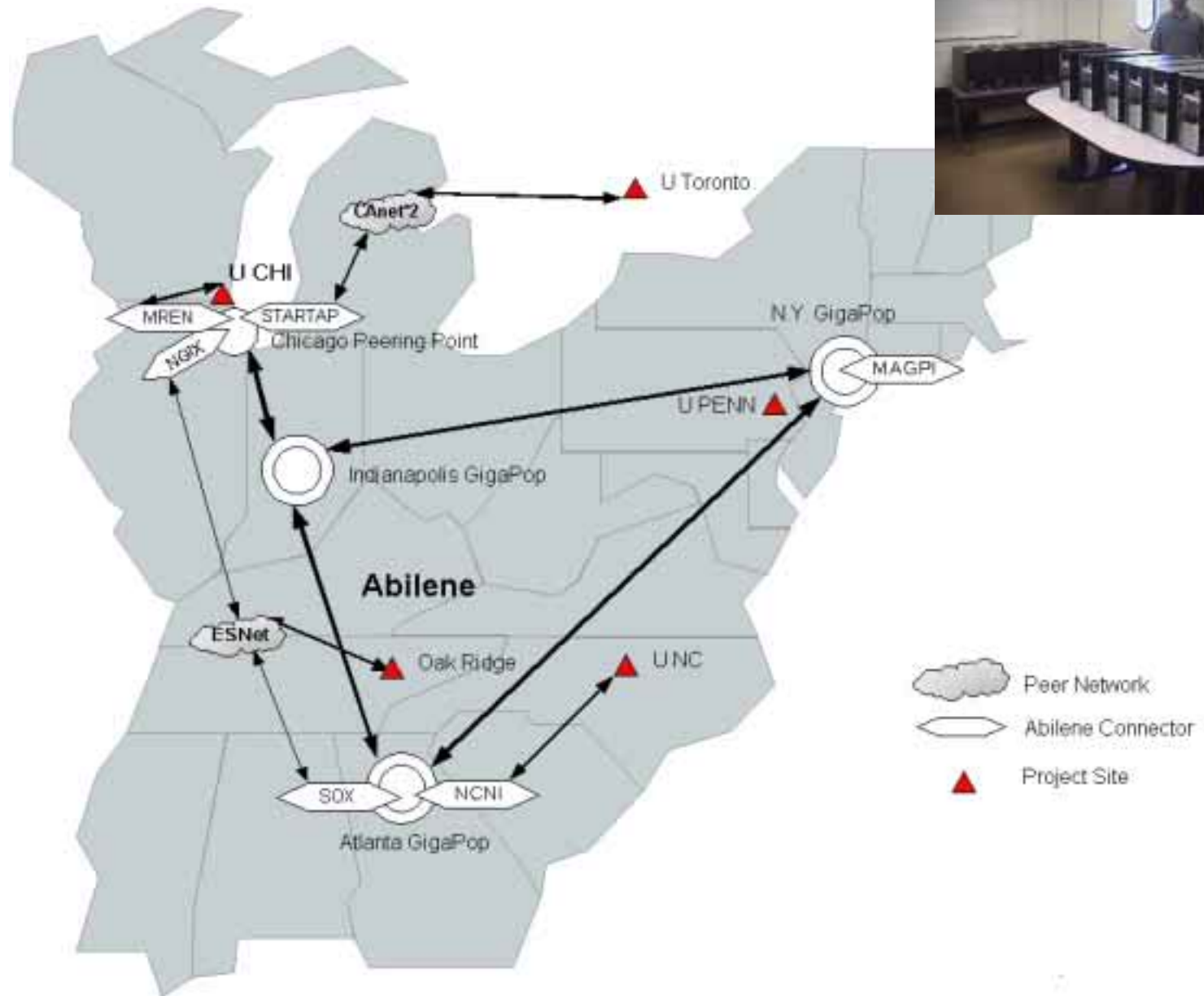
University of Pennsylvania

- **NDMA project addresses**
 - ▶ Archive, Storage and retrieval for use by clinicians
 - ▶ Training and Teaching for Radiology Departments
 - ▶ Computer Assisted Diagnostics as a service

- **Recent FDA approval recognised advantages of digital devices will encourage digital radiology conversion**
 - ▶ 2000 Hospitals x 7 TB per yr x 2 = 28 PB per yr

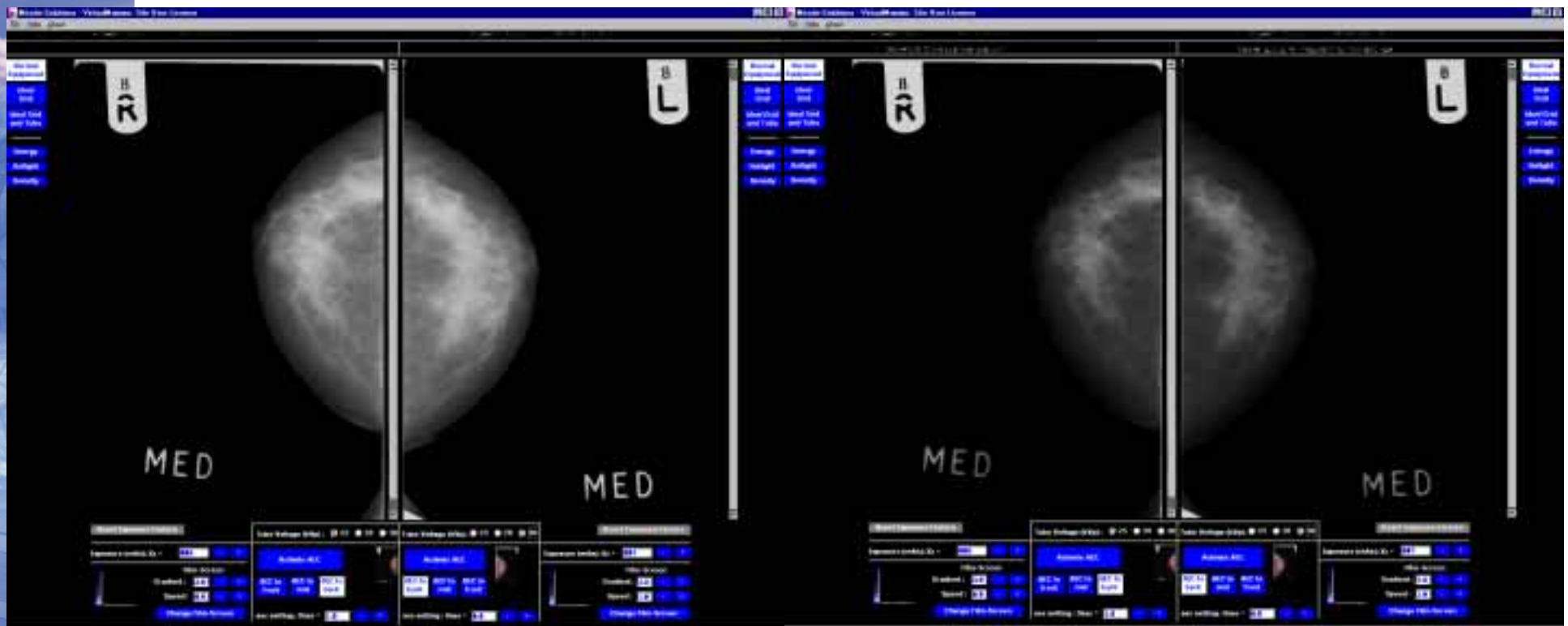
- **Pilot Problem scale in NDMA**
 - ▶ $4 \times 7 \times 2 = 56$ Terabytes / year
 - ▶ IBM contributing technology/skills: DB2, GPFS, GLOBUS

National Digital Mammographic Archive



eDiamond - (NDMA in UK)

Data abstraction removing artefacts due to system specifics/settings



Status: Proposal submitted

Tony Blair's speech on British Science

May 2002

The emerging field of e-science should transform this kind of work....

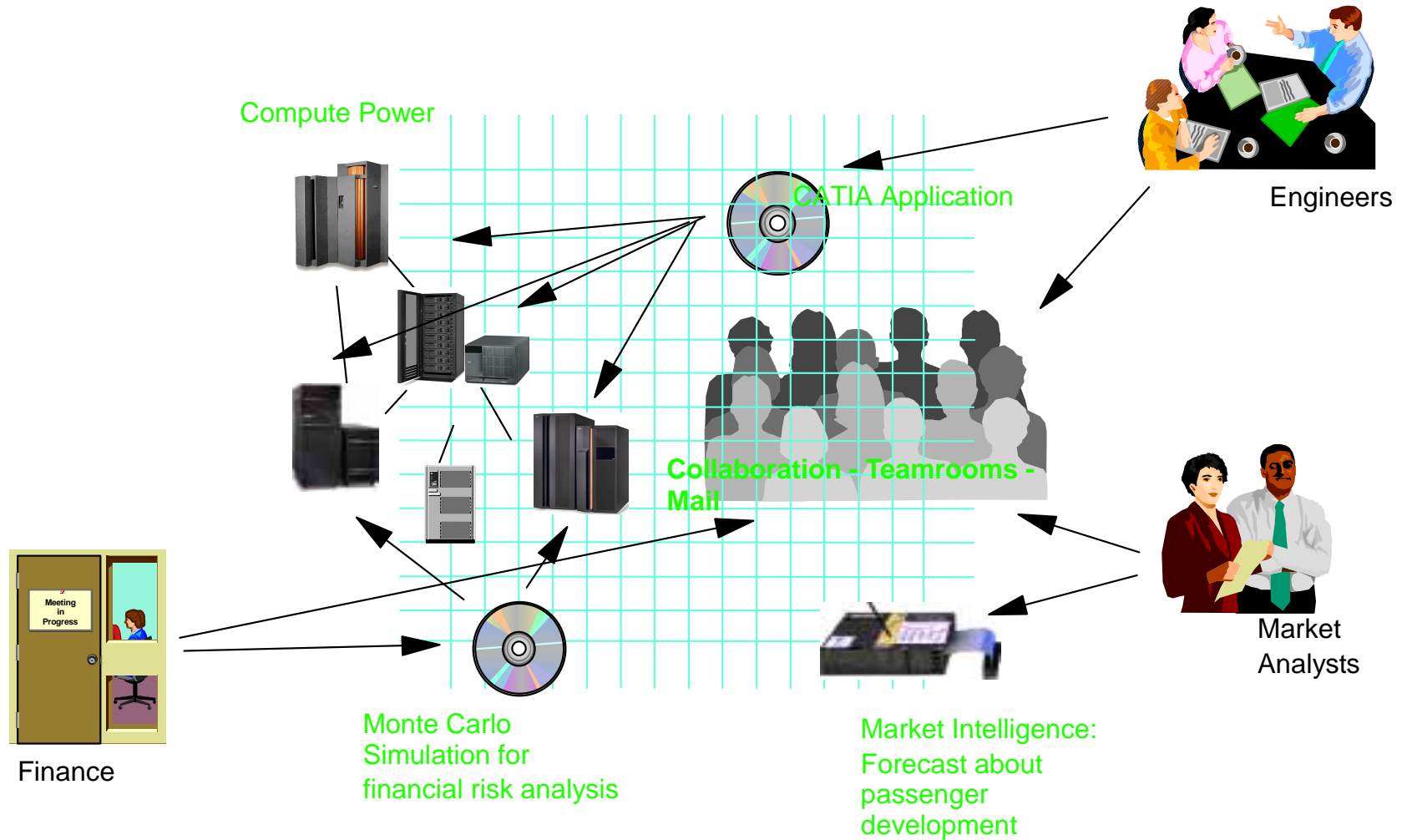
.....One of the pilot **e-science projects is to develop a digital mammographic archive, together with an intelligent medical decision support system for breast cancer diagnosis and treatment.** An individual hospital will not have supercomputing facilities, but through the grid it could buy the time it needs. So the surgeon in the operating room will be able to pull up a high-resolution mammogram to identify exactly where the tumour can be found.



Exploring the commercial adoption of Grid

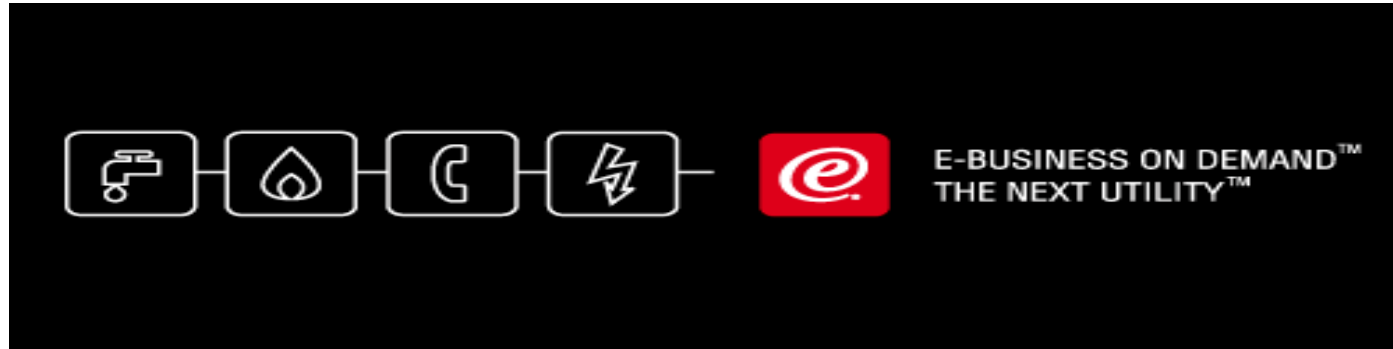
Virtual Organizations

Example: A consortium works on a recommendation for the development of a new intercontinental aircraft.



e-Utilities: how Grids will be used

Analogy to Water, Electricity, Telephone



Standards and easy, dynamic access

Secure and always available

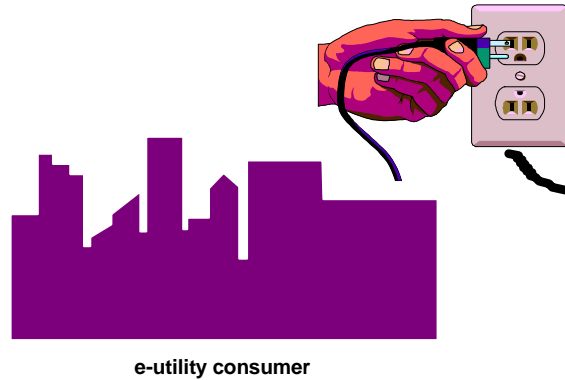


Pay what you consume

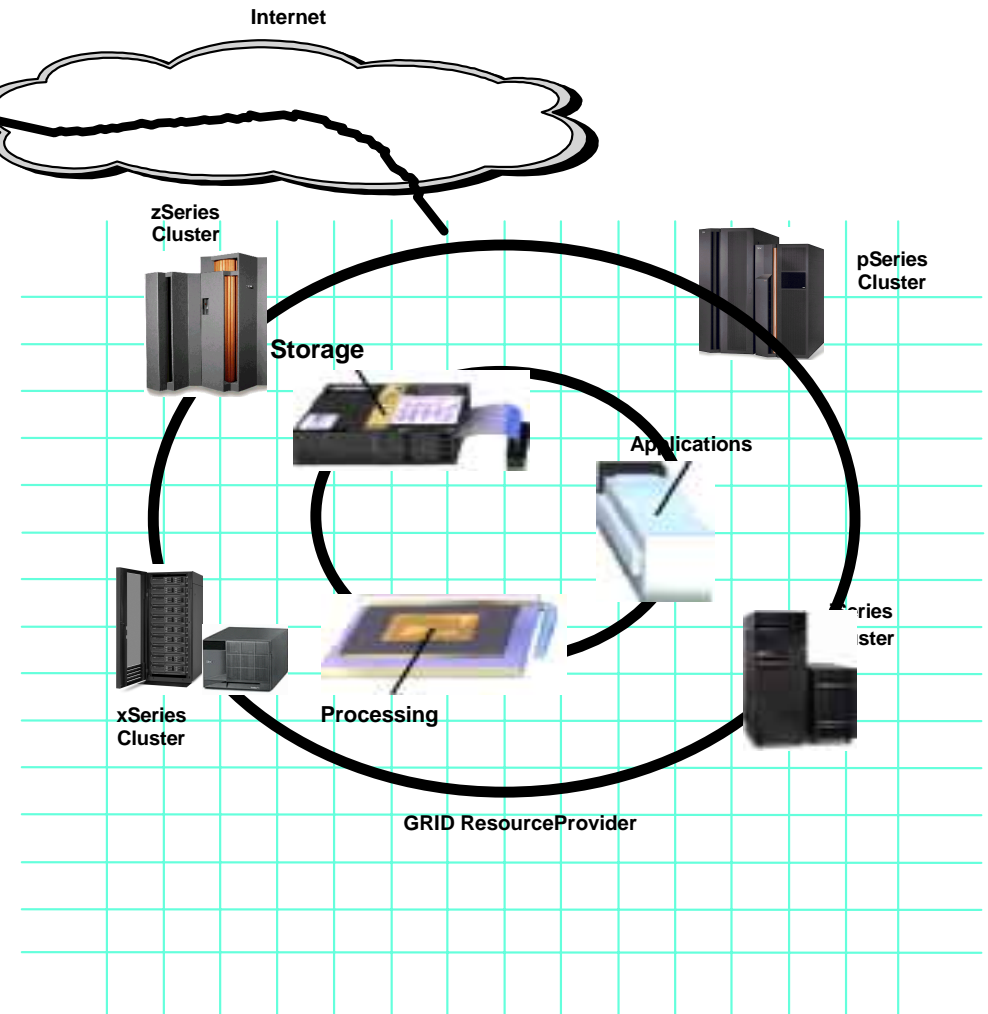
\$ / kwh



The e-utility model



***...IT Resources
from the power
(IT) outlet***



IBM and Grid

- **Aligned with Grid open-source initiative**
 - **Open Grid Services Architecture**
- **Grid Innovation Centre, Montpellier, France**
 - **Environment for piloting Grid solutions**
 - **Equipment and people**
 - **'Open' technologies: GLOBUS, Condor**
 - **ISV technologies: Platform, Entropia, Avaki, United Devices, NICE**
- **Grid fits as part of existing IBM missions**
 - **Project e-Liza: Autonomic computing**

IBM and Grid

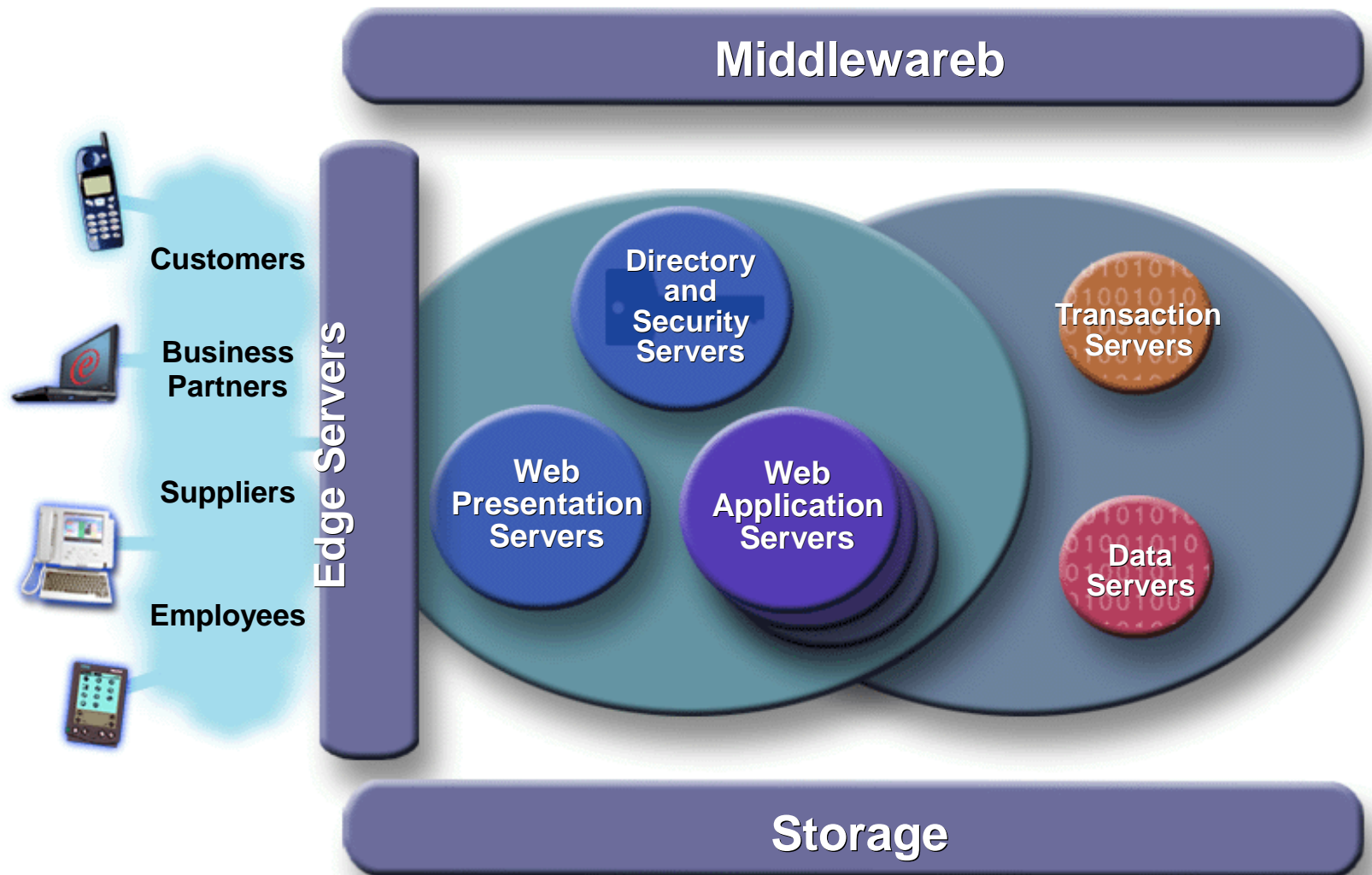
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Remember the
business context...

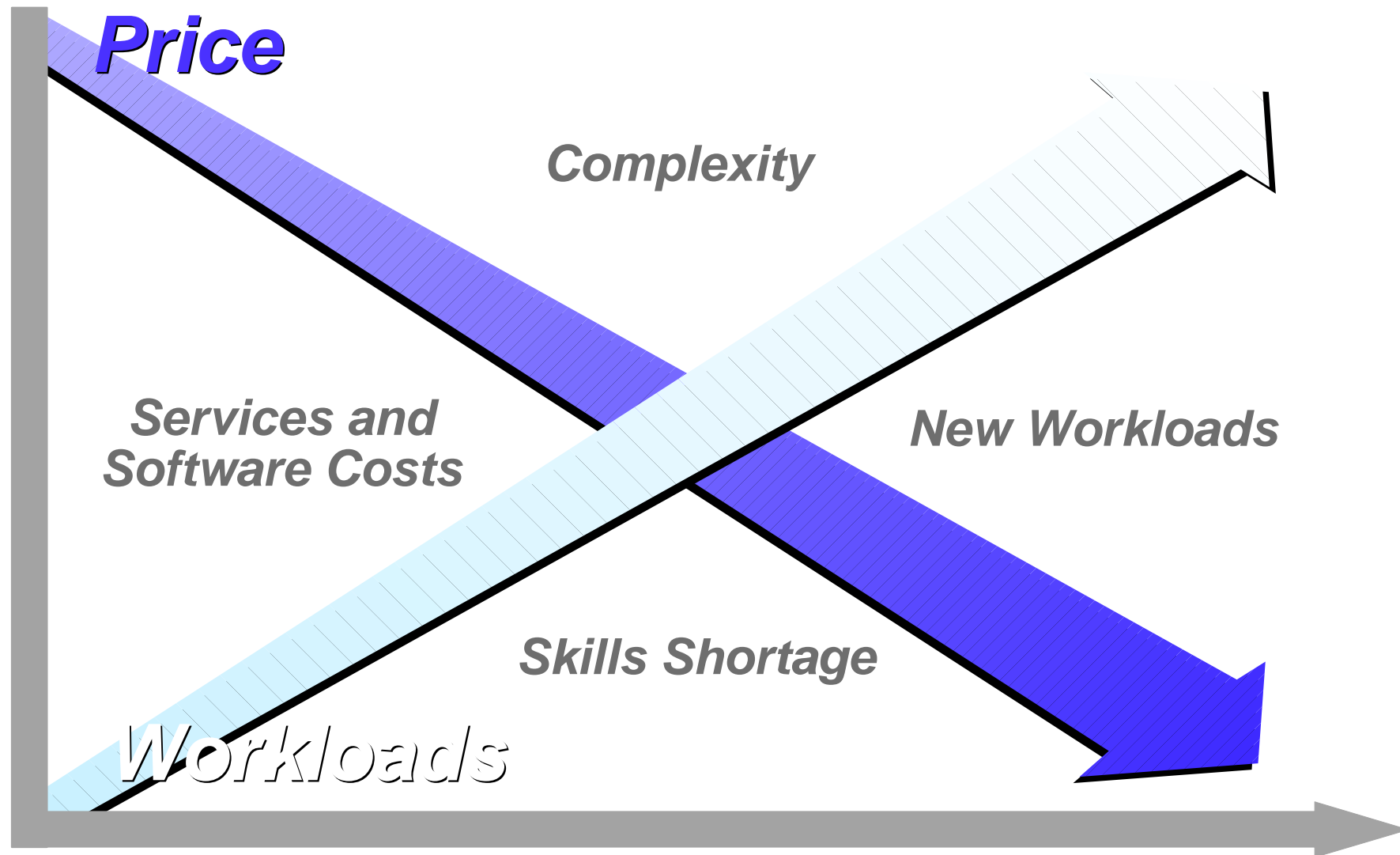
How will Grids be managed?

Today's e-business Infrastructure



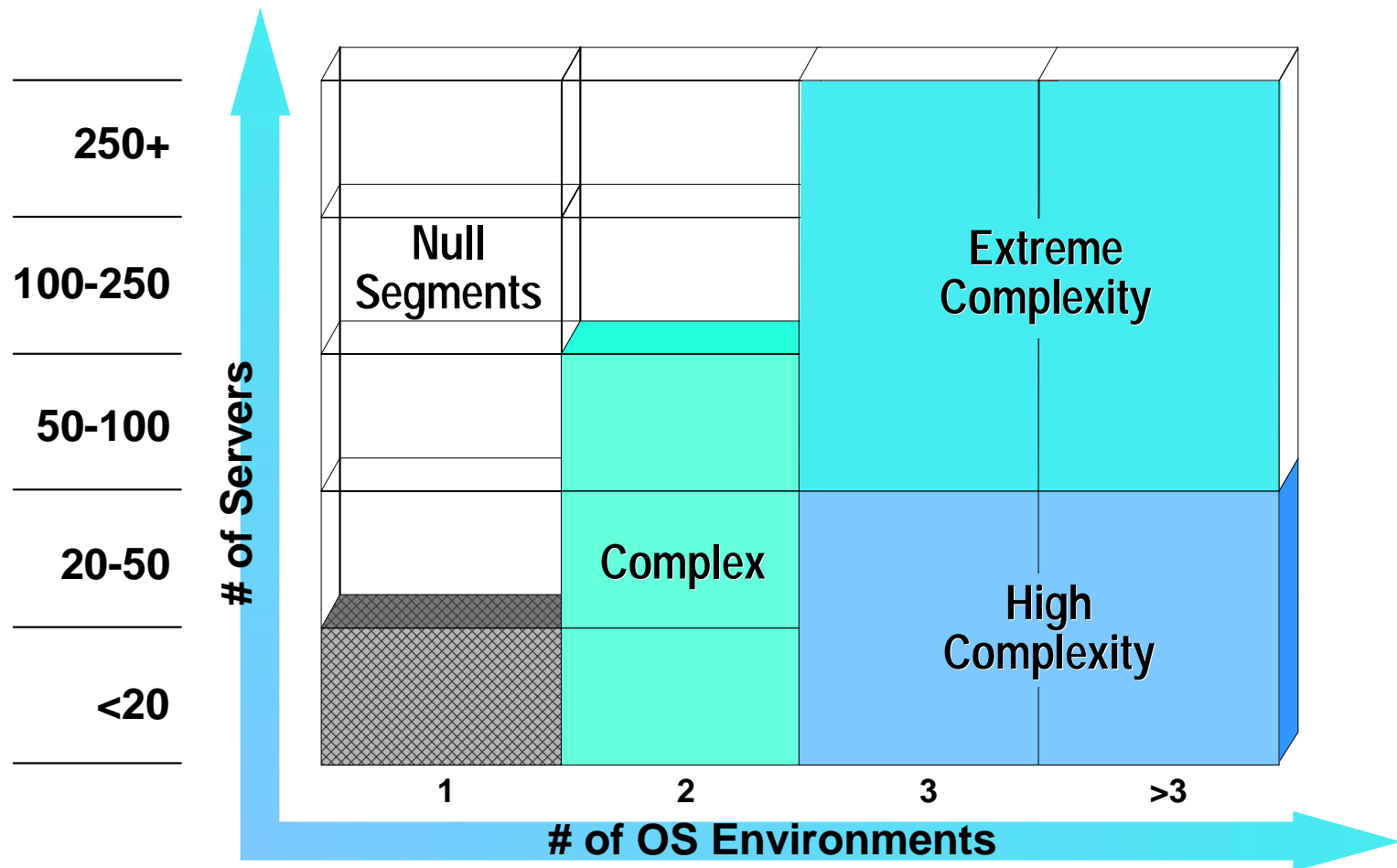
The e-business IT Infrastructure Challenge

Managing today's diverse e-business infrastructure is an increasing challenge: self-managing systems are required



A Market View of Complexity

- Market need for Project eLiza is quantifiable
- Significant portion of Server market is in High/Extreme Complexity segments
- Heterogeneous server environments are a reality



Source: IBM Market Research, 2001

Self-optimizing

Self-configuring

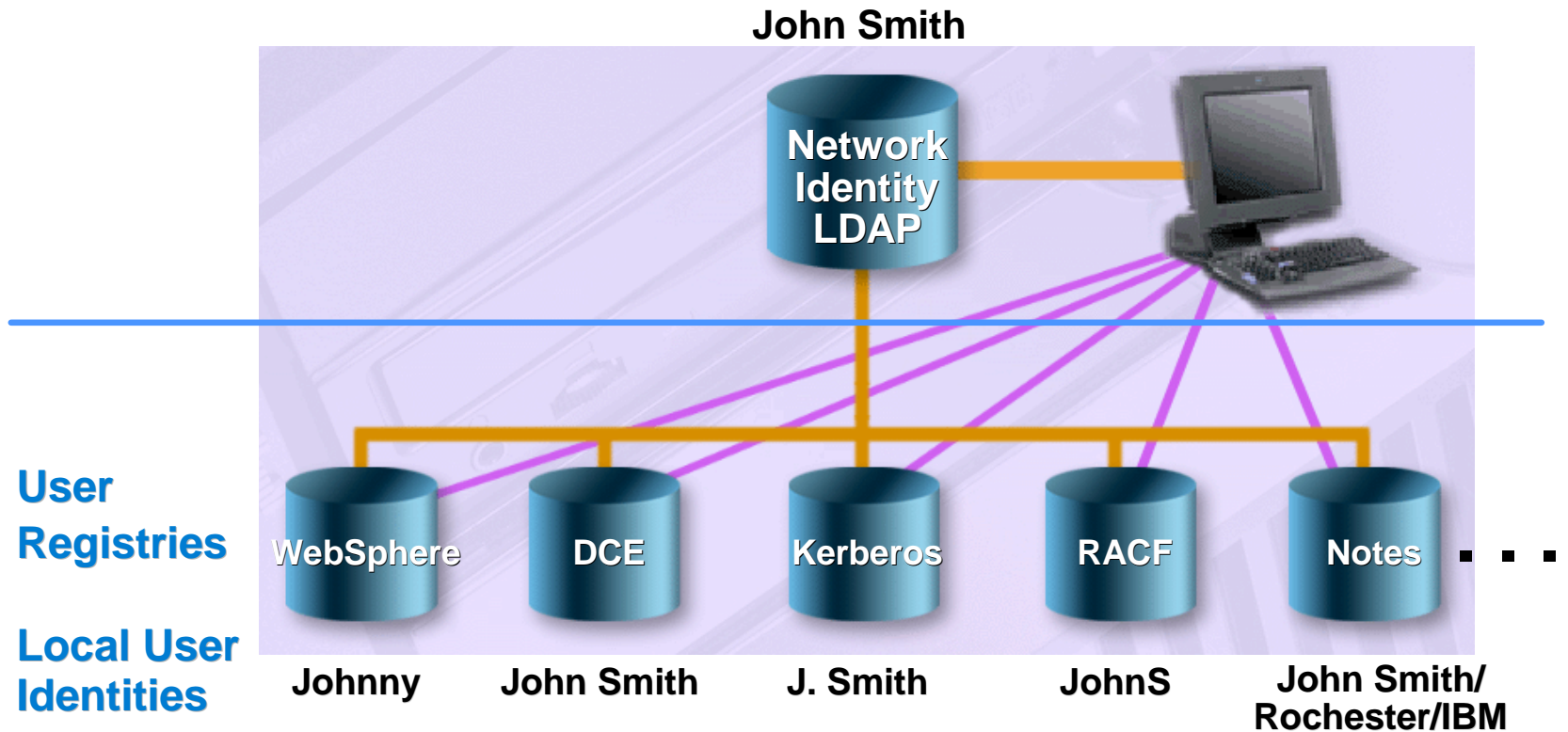


Self-protecting



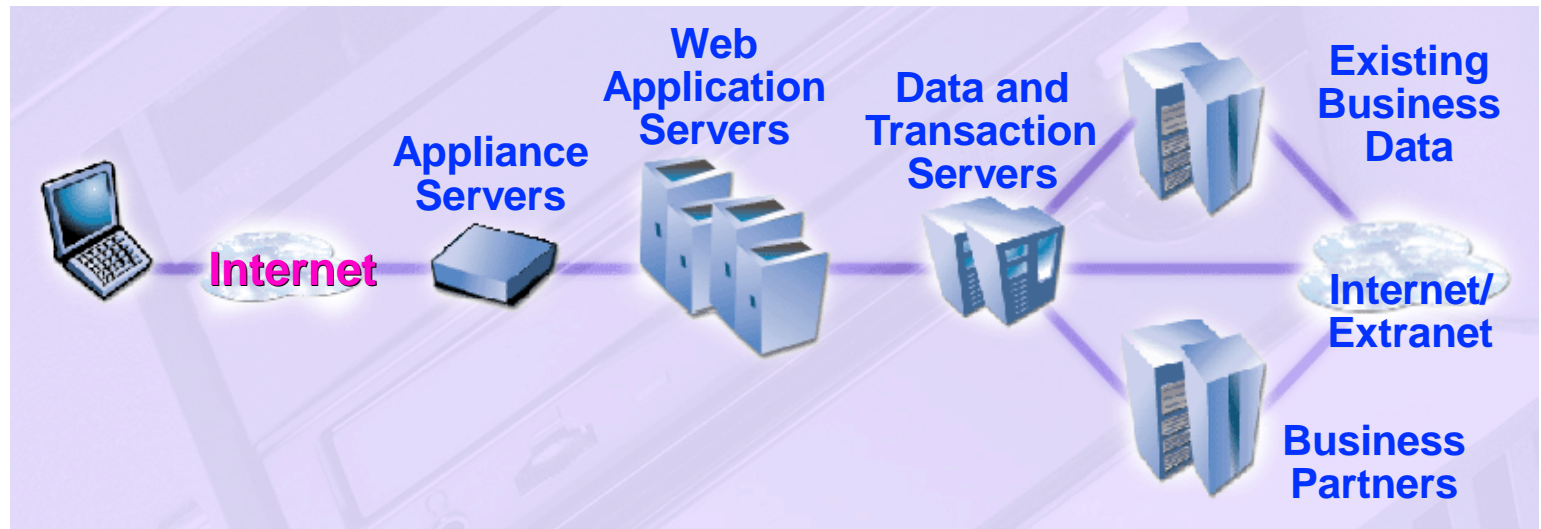
Self-healing

Secure Grids - eSecurity



- Enterprise Identity Mapping
- Single Point of Management Service
- Authenticated Identity Translation

Reliable Response Times - eWLM



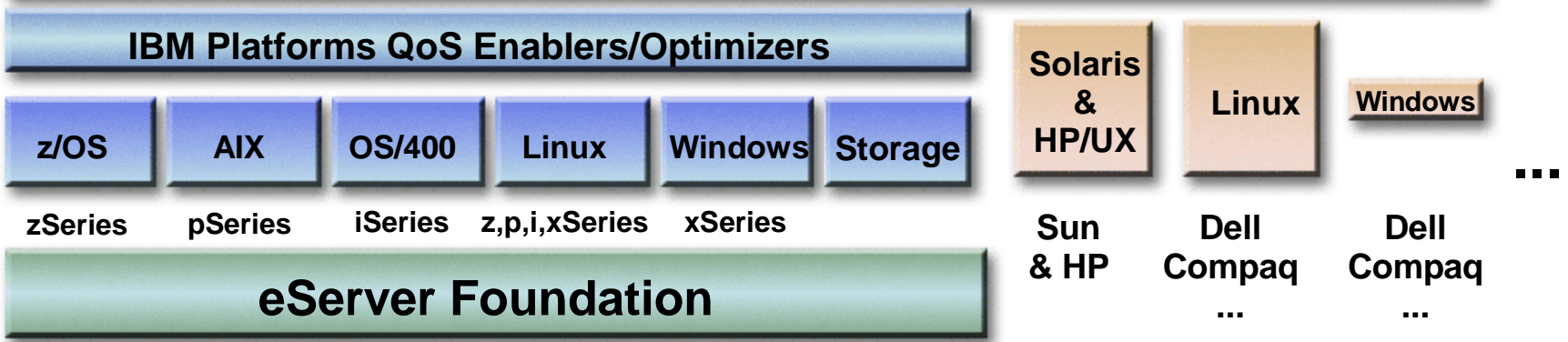
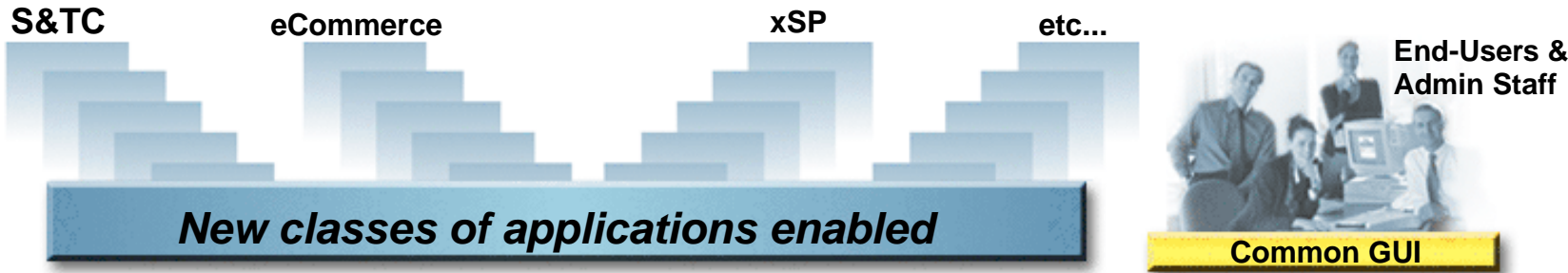
Self-tuning, End-to-End Performance Management:

- ▶ **Dynamic, allocation of server resources**
- ▶ **Workload balancing & routing**
- ▶ **Cross platform reporting**
- ▶ **Policy based for various classes of users & applications**



Architecture Framework

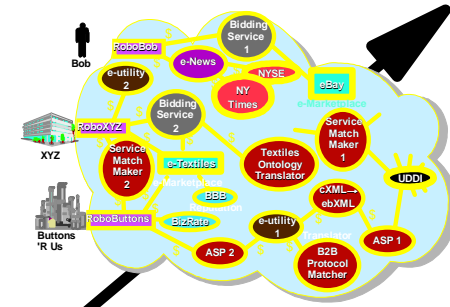
<http://www.globus.org/research/papers/ogsa.pdf>



Grid Computing Evolution

Virtual Organizations with dynamic Access to unlimited resources

Multiple & interoperable Grids



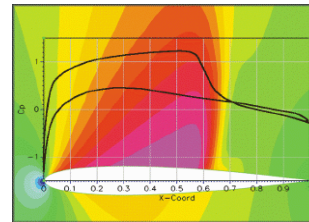
Shared Grids between trusted partners to share compute resources and business apps

Commercial Grids

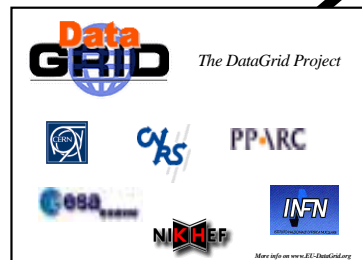


Technical applications in the commercial space

Technical Grids



Scientific Grids



Common use of resources within the scientific community for compute intensive workload

Altruistic Grids



CPU Scavenging

The internet ~~(r)~~evolution



**Resource
sharing:
Grid-based IT**

Information
sharing:
***World Wide Web
HTTP, HTML***

Communications
and data sharing:
***e-mail, ftp, telnet
TCP/IP***

Networking:
loosely coupled

e-business



Thank you
