Grids, Business, and the Evolution of Corporate IT

Martin Antony Walker BSc DIC PhD
Segment Manager, Scientific Research and Grids, HP EMEA

IDC Top 10 Enterprise Computing Predictions

- Enterprise grids of SMP servers and scale out clusters will begin to show up in new wave data centers
- Virtualization, provisioning, and automation will drive much of the IT transformation
- Scale-out deployments will move workloads to multiple tiers of computers operating in a grid of servers

Report #201216 2006

Two major trends in information technology today

Virtualisation

Abstract resources from their physical realizations, and present them to clients as services

SOA OGSA

Standardisation

Base virtualization solutions on open standards

XML, SOAP, WSDL

Standards to describe the client-service-resource relationship

“state”

Service Oriented Architecture (SOA)

- An SOA defines how two IT entities interact to enable one to perform a unit of work (a service) for the other; interactions are defined using a description language (e.g. web services via XML, SOAP, WSDL)
- Interactions occur without user intervention, and can be composed (one service can invoke others)
- Services can have associated policies (e.g. a SLA), and they and their policies can be monitored (HP OpenView SOA Manager)
- Monitoring can trigger events, e.g. reprovisioning of resources (HP OpenView Change and Configuration Management solutions)

Convergence/Divergence

- Two stacks of web service specifications have been developed to handle the issue of state
  - WSDM/WSRF (OASIS)
  - WS-Management (W3C and DMTF)
- The major IT industry players have now agreed on the basic underlying web service specification stack (WS-Man), and have begun the process of integration and standardization

Important Questions

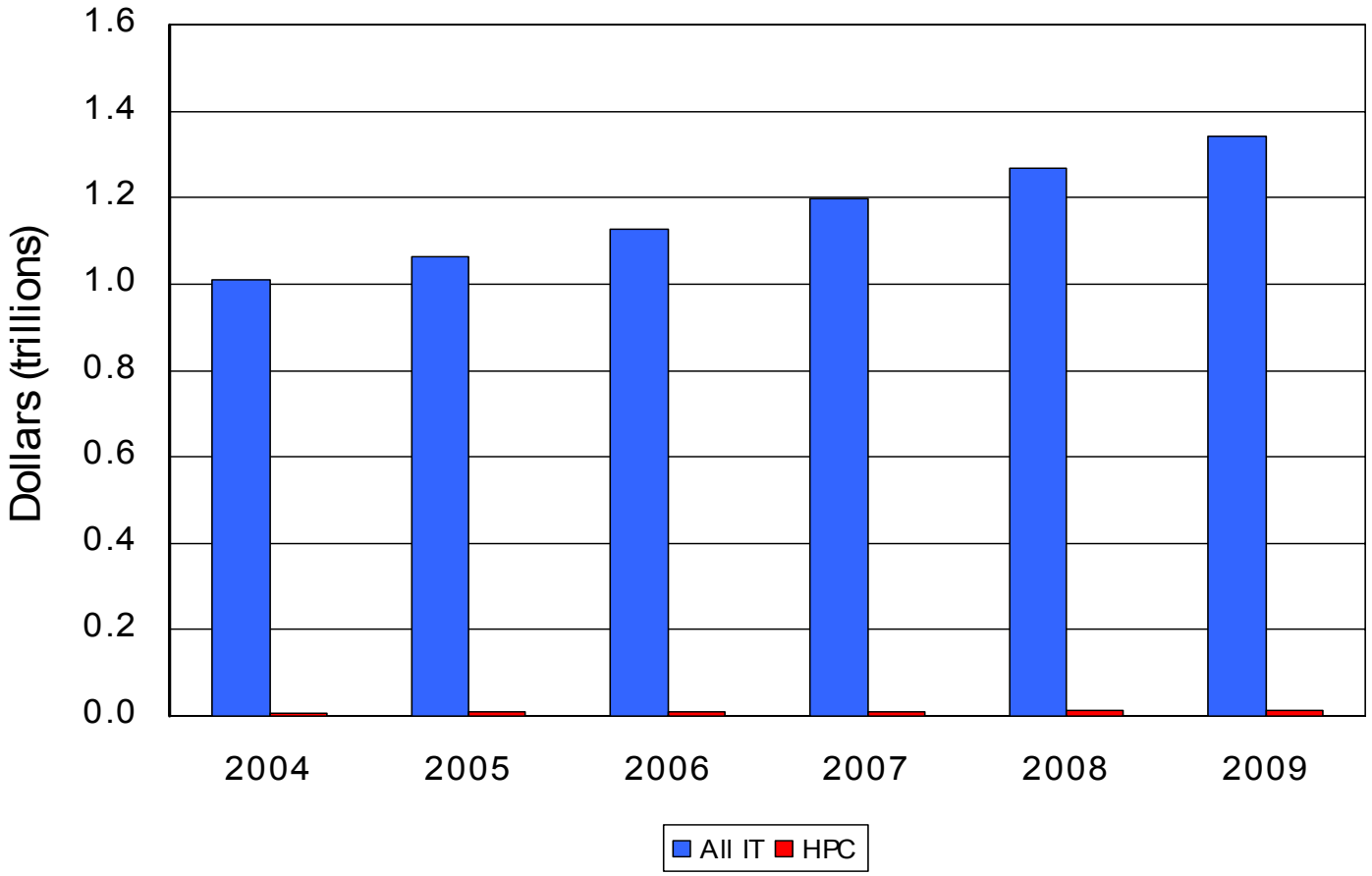
- What (business) problems can be solved by grid?
- How do grids relate to SOA, utility computing models, event-driven services, messaging, and database and networking systems?
- How do legacy assets interact with new technologies?

A perspective

HPC is often the leading-edge technology indicator for the commercial enterprise

- Unix
- NFS
- Web
- Computer graphics
- Pipelining
- Threads
- Parallelism
- ccNUMA
- Grid (?)

HPC versus overall IT world-wide

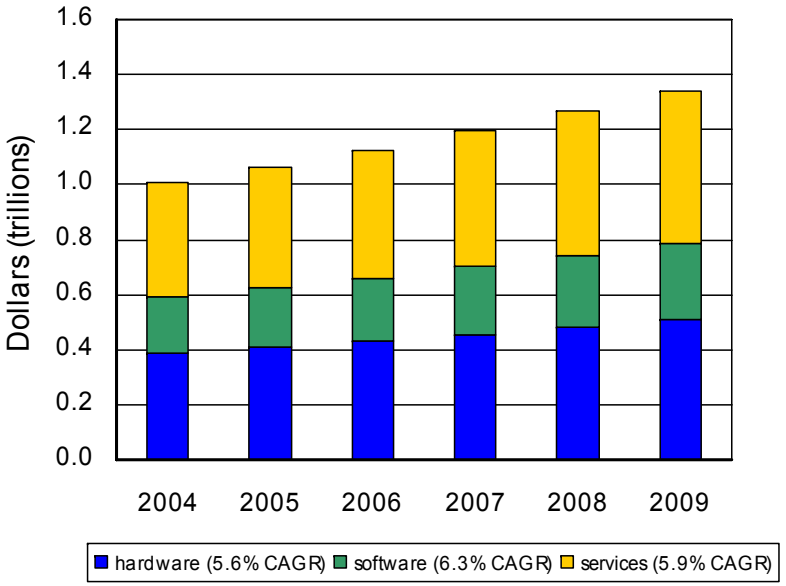


Data from IDC Aug 2005

invent

WW IT spending breakdown

- Consumer spending is ~10% of the total
- Hardware and services are comparable in spending
- Software is ~50% of hardware or services
- Even if grid could only address one portion, it is a much larger addressable market than HPC alone
- Even under scrutiny overall IT dominates HPC



Data from IDC Aug 2005

Conclusion:

- If grid is relevant to the commercial enterprise then it represents a much larger market than HPC
- People involved in grid R&D should not ignore the requirements of enterprise IT
- However, to be clear, the commercial enterprise is more challenging than HPC

Enterprise IT pain-points

IT executives will invariably list at least some of these as their principal issues

- Increasing data-center complexity
- Increasing management/administration spending
  - Think of this as the staff/asset ratio
- Low resource utilization
- “Brittle” nature of IT resources
- Inability to share resources
- Lack of alignment and sync with the business
- Heterogeneity
- Application provisioning and life cycle management

Transformation via “grid"

Today	Future
Labor intensive IT administration	Automated administrative tasks
Islands (silos) of technologies (OS/architecture dependent)	Modular re-deployable hardware and applications
Dedicated server and/or application stacks	Reconfiguration and scaling without physical rewiring
Static production deployment	Model-based deployment/flexing
Multi-O/S, multi-architecture data center environments	Run IT as a shared service utility
Cost/complexity improved primarily via IT consolidation	Resource utilization dynamically allocated

Conclusion:

- The grid solution space is congruent to the enterprise problem space
- Caution needed here since it is a journey to make it true in practice
  - We are on the way but there is a long way still to go

Inhibitors to grid

- Top issues preventing Grid adoption:
  - Security
  - Social engineering
- To avoid confusion…
  - These are not the only issues, there are (many) others

Security

- In a Grid environment we have different classes of users possibly sharing resources and meta-data
  - Family
  - Friends
  - Strangers
  - Enemies (i.e., Coke and Pepsi)
- If security isn't assured and trusted, sharing and automation are hampered

Social engineering

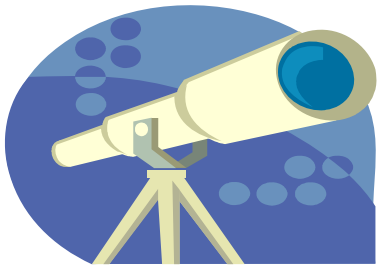
- Moving to Grid forces IT management to embrace a new operational model
  - Loss of direct ownership (aka “server hugging”)
  - Reliance on others
  - Feels risky
    - Nobody gets fired maintaining the status quo
  - Different way to “do IT”
    - Grid actually, initially, adds complexity
  - Organizational politics
  - Managing expectations
  - As a change it is just uncomfortable for people
- Don’t underestimate how hard this issue is

Five key conclusions

1. Convergence is happening
2. Pay attention to requirements of commercial enterprise
3. The principal enterprise IT issues are known
4. Grid addresses the enterprise IT issues
5. Challenges are security and social engineering

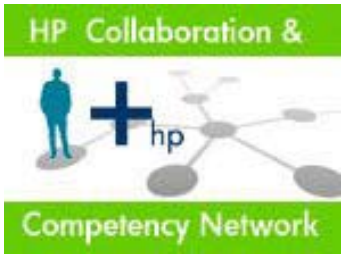

invent

HP's Grid strategy in brief



- Grid-enable HP products
- Simplify grid deployment, execution and management
- Drive standardization
- Deliver consulting services to customers
- Partner with solution providers
- Partner with public and government-funded deployments and grid R&D efforts

HP collaborations with the grid community



HP Labs: Inventing the future of Grid

HP Labs researchers are exploring solutions to Grid technology challenges

- Examples:
  - Framework for describing, deploying and managing complex, distributed services (www.smartfrog.org)
  - Market-based allocation mechanisms, e.g. Tycoon
  - Resource management tools to match supply to demand
  - Secure virtualization of servers, storage, and networks
  - GridLite: "Grid“ (e.g. Globus) on devices such as HP iPAQ
  - Scalable, adaptive monitoring and measurement