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IBM Transformation: Major IT Consolidation Initiative

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IBM

IBM – Enterprise Computing Model

zExpo, September 18, 2007

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IBM Consolidation Announcement Highlights

- *IBM will consolidate thousands of servers onto approximately 30 System z mainframes*

- *We expect substantial savings in multiple dimensions: energy, software and system support costs*

- *Major proof point of IBM's 'Project Big Green' initiative*

- *The consolidated environment will use 80% less energy*

- *This transformation is enabled by the System z's sophisticated virtualization capability*

Think what we could do for you

IBM'S PROJECT BIG GREEN SPURS GLOBAL SHIFT TO LINUX ON MAINFRAME

Plan to shrink 3,900 computer servers to about 30 mainframes targets 80 percent energy reduction over five years

Optimized environment to increase business flexibility

ARMONK, NY, August 1, 2007 – In one of the most significant transformations of its worldwide data centers in a generation, IBM (NYSE: IBM) today announced that it will consolidate about 3,900 computer servers onto about 30 System z mainframes running the Linux operating system. The company anticipates that the new server environment will consume approximately 80 percent less energy than the current set up and expects significant savings over five years in energy, software and system support costs.

At the same time, the transformation will make IBM's IT infrastructure more flexible to evolving business needs. The initiative is part of Project Big Green, a broad commitment that IBM announced in May to sharply reduce data center energy consumption for IBM and its clients.

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Agenda

- IBM Transformation and "Big Green"

- Why IBM System z™ Now?

- IBM Global Account Infrastructure Challenge

- Approach - Consolidation to System z at IBM

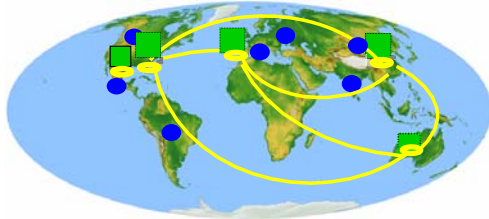- Implementation Challenges

- Critical Success Factors

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IBM's Transformation: An Ongoing Journey

IBM Strategic Delivery Model

IBM Metrics	1997	Today
CIOs	128	1
Host data centers	155	7
Web hosting centers	80	5
Network	31	1
Applications	15,000	4,700

TECHNOLOGY

- Global Resources
- Strategic IGA location
- Strategic Web location for IGA
- Ethernet and Power9 Networks
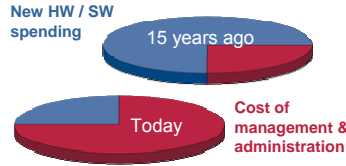
Tactical and operational efficiencies

- Consolidation of infrastructure
- Application consolidation/reduction
- Global resource deployment
- Enterprise end-to-end architecture optimization

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Project 'Big Green'

- **IBM to reallocate $1 billion each year:**
  - To accelerate "green" technologies and services
  - To offer a roadmap for clients to address the IT energy crisis while leveraging IBM hardware, software, services, research, and financing teams
  - To create a global "green" team of almost 1,000 energy efficiency specialists from across IBM
- **Re-affirming a long standing commitment at IBM:**
  - Energy conservation efforts from 1990 – 2005 have resulted in a 40% reduction in CO_2 emissions and a quarter billion dollars of energy savings
  - Annually invest $100M in infrastructure to support remanufacturing and recycling best practices
  - *Will double compute capacity by 2010 without increasing power consumption or carbon footprint saving 5 billion kilowatt hours per year*
- **What "green" solutions can mean for clients:**
  - For the typical 25,000 square foot data center that spends $2.6 million in power annually, energy costs can be cut in half
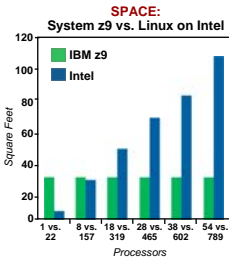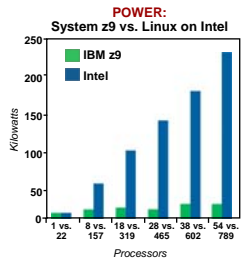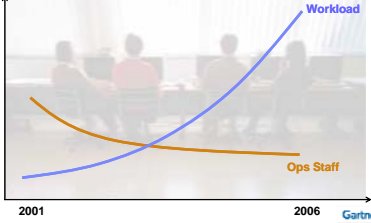 - Equals the reduction of emissions from taking 1,300 automobiles off of the road

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Why System z Now?

New HW / SW spending

15 years ago

Today

Cost of management & administration

Source: Tony Picardi, IDC
Economist.com: Make it simple. October 28th, 2004
From The Economist print edition

System z9 Managing Growth and Complexity

Workload

Ops Staff

2001   2006   Gartner

Worldwide Server Market:
Cost of Management Ramps Dramatically

Worldwide IT Spending on Servers, Power and Cooling, and Management/Administration

Spending (US$B)   Installed Base (M Units)

Power and Cooling Costs x8
Server Mgt and Admin Costs x4
New Server Spending

1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010

Many Servers, Much Capacity, Low Utilization = $140B unutilized server assets

Source: IDC, 2006

POWER:
System z9 vs. Linux on Intel

IBM z9
Intel

Kilowatts

1 vs. 22 | 8 vs. 157 | 18 vs. 319 | 28 vs. 465 | 38 vs. 602 | 54 vs. 789

Processors

SPACE:
System z9 vs. Linux on Intel

IBM z9
Intel

Square Feet

1 vs. 22 | 8 vs. 157 | 18 vs. 319 | 28 vs. 465 | 38 vs. 602 | 54 vs. 789

Processors

The Linux on Intel servers selected in this example are functionally eligible servers considered for consolidation to a System z running at low utilization such that the composite utilization is approximately 5%. The utilization rate assumed for System z EC is 90%. This is for illustration only actual power and space reductions, if any, will vary according to the actual servers selected for consolidation.

IBM Global Account
Significant organic growth in the System z platform and System p virtualization over last several years

z Platform Growth – IBM account

400
350
300
250
200
150
100
50
0

1Q04 2Q04 3Q04 4Q04 1Q05 2Q05 3Q05 4Q05 1Q06 2Q06 3Q06 4Q06 1Q07 2Q07

MIPS (in K's)
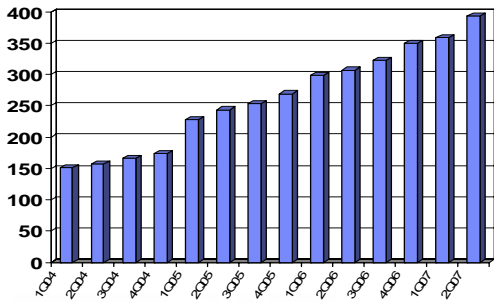
- MIPS grew by 160% between 2004 and 2007 on 76 machines worldwide
- Linux® on System z installed MIPS have increased over 300% in the last year
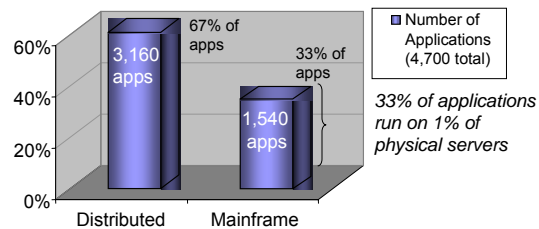- 1,540 of IBM's 4,700 applications are hosted by System z

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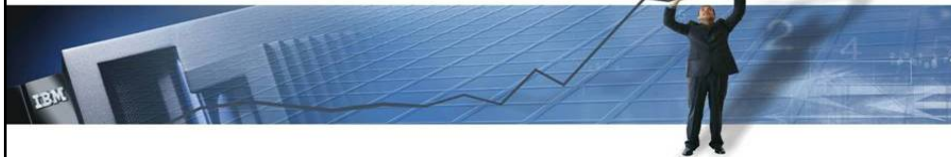
Continued server growth brought growing physical space challenges

Infrastructure Challenges

- Floor space challenges in key facilities
- Underutilized assets maintaining outdated Web infrastructure
- Additional physical space needed for future SO growth
- Continued infrastructure cost pressure

Distributed server consolidation is the next step in cost savings after the massive consolidation of IGS Data Centers

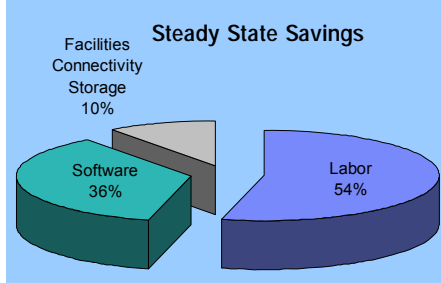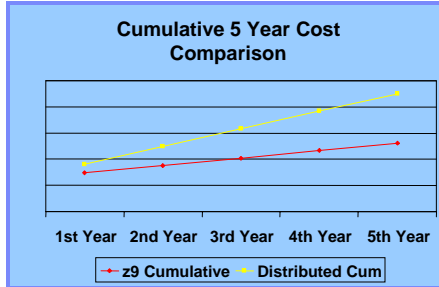**Application Distribution between Mainframe and Distributed Servers**

67% of apps — 3,160 apps (Distributed)

33% of apps — 1,540 apps (Mainframe)

Number of Applications (4,700 total)

33% of applications run on 1% of physical servers

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The IBM Global Account team identified 3,900 OS images for potential consolidation on System z

Approach

1. **Enlisted Linda Sanford, Sr VP, Enterprise On Demand Transformation & Information Technology, as Executive Champion at enterprise level**

2. **Included scope of 8,600 images eligible for migration to find 3900 'fit for purpose' and with TCO savings**

3. **Used commercial TCO model and resources to estimate savings**

4. **Holistic approach taken, integrating z consolidation with:**
   - **System p™ virtualization for appropriate work**
   - **Application portfolio reduction**
   - **Asset optimization**

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IBM Distributed Consolidation to System z
Linda Sanford, Executive Champion

- **Performed TCO and consolidation assessment on IBM portfolio**
  - ► Cross-IBM effort: System z, SW Migration Services, TCO Academy, Migration Factory
  - ► Analysis considers today's environment vs. "to be" environment; savings is net after hardware and migration investments

Cumulative 5 Year Cost Comparison

1st Year 2nd Year 3rd Year 4th Year 5th Year

◆ z9 Cumulative   ■ Distributed Cum

Steady State Savings

Facilities
Connectivity
Storage
10%

Software
36%

Labor
54%

- **Identified substantial savings opportunity**
  - ► Annual Energy Usage reduced by 80%
  - ► Total floor space reduced by 85%

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The IBM Global Account team identified 3,900 OS images for potential consolidation on System z

Workloads selected:

- **Transactional based workloads**

- **Workload that runs on multi-platforms for ease of migration**

- **Middleware**
  - Lotus Domino
  - WebSphere applications
  - DB/2 database
  - SAP DB/2 applications

- **Initial workloads include**
  - IBM's intranet
  - Employee Charitable Contribution Campaign
  - IBM forecasting/finance apps

Initial Priority for consolidation to Linux on System z

DB2

Lotus

WebSphere

SAP

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The IBM Consolidation to System z has been divided into phases to enable early evaluation of progress

IBM Consolidation Project at a Glance

- **Phase 1** is 125 servers (25 apps)
- **Phase 2** an additional 625 servers (125 apps)
- **Phase 3** is 2250 servers in 2008, 900 in 2009

- **Phase 1 and 2 provide 2007 results:**
  - migration process
  - billing change progress
  - evaluation of ROI and metrics

- **Total Investment split between:**
  - Migration / project management
  - Operations deployment and support
  - Business owner / developer testing

September 2007 Status:
> **44 servers migrated, next 500 in Migration, 8600 assessment completes in November**

IBM's Innovation Application

ThinkPlace

Hearts & Hands Together

Employee Charitable Contribution Campaign

IBM's Intranet

This is a cornerstone initiative in the IBM quality of service imperative

- **Leverages maturity of System z stack products for robust high availability**

- **Reduces complexity and increases stability**

- **Centralizes service level process management**

- **Potential for faster provisioning speed (months → days)**

- **Provides dynamic allocation of compute power**

  - ► Capacity on demand; increase/reduce compute power

- **Provides world class security**

Security

Economics

Energy Efficiency

Challenges in IBM's consolidation effort

- **Shared decision-making with business units**
  - ► **Need to balance Business unit initiatives with enterprise view**
- **Budget owners don't always see full cost**
- **People resources for evaluation and implementation are constrained**
- **Requires up-front investment – pay back over time**
- **Mindset of developers, application owners and architects (direct control, perceived lower cost)**
- **Selection process and project approach multi-dimensional and multi-disciplined**

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Critical Success Factors

- **Sponsor needs to have an enterprise view**
  - ► Complete TCO identifies full benefit to the corporation (broader than IT or TCA views)
  - ► Sponsor assists in managing execution of corporate level plan (versus application by application
- **Strategic investment will be required for migration**
  - ► Funding – linking to other business area/infrastructure projects helps leverage $$
  - ► Training and System z resource deployment
- **Clear goals, dedicated team, inclusive leadership is needed to execute the migration**
  - ► Define the strategy for a holistic solution
  - ► Manage with an integrated, collaborative approach to help people overcome preconceived mindsets
- **Leveraging talent and capability across all of IBM driving rapid results**
  - ► Integrating talent from Hardware division, Software unit and Services while sharing information between the IBM Global Account, strategic outsourcing and commercial accounts demonstrated the value intrinsic in the IBM Corporation

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System p	
System z	

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Notes:

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