Data Center Transformation

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Technology for better business outcomes
Agenda

• Pressures and predictions on the data center
• Data Center Transformation: definition, benefits and scope
• Data Center Vision
• HP’s Data Center Transformation Services
• Client example & HP’s own Data Center Transformation
• Getting started with HP
Pressures on the data center

**Business**
- Compliance
- Security
- Growth
- Globalization
- Environmental
- Innovation

**IT Infrastructure**
- IT complexity
- Under utilized assets
- Integration needs
- Security and continuity
- Serve extended enterprise

**Facilities**
- Floor space
- Excessive heat
- Location
- Aging facilities
- Regulations
- Mergers and acquisitions

**Operations**
- 24x7 expectation
- Management complexity
- Lack of skilled resources
- Globalization
- Seasonal spikes
- Sourcing decisions

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IT’s energy woes: some scary numbers

The total power demand by servers WW in 2005 was equivalent to about fourteen 1000 MW power plants. (Jonathan G. Koomey, Ph.D. Staff Scientist, Lawrence Berkeley National Laboratory and Consulting Professor, Stanford University, February 15, 2007)

Servers in the United States and their attendant cooling systems consumed 45 billion kilowatt-hours of energy in 2005. That’s more than Mississippi and 19 other states (“U.S. servers slurp more power than Mississippi”, Cnet News, February 14, 2007)

A typical 10,000-square-foot data center consumes enough juice to turn on more than 8,000 60-watt light bulbs . . . companies that own them could end up paying millions of dollars this year just to keep their computers turned on. And it’s getting more expensive. (CIO Magazine, April 15, 2006)
Data Center Institute predictions about Data Centers (2006)

- By 2010, more than half of all data centers will have to relocate to new facilities or outsource some applications

- By 2015, pool of qualified and senior technical management will shrink by 45%

- Over the next 5 years power failures and limits on power availability will halt data center operations at more than 90% of all companies

- Within the next 5 years, 1 out of every 4 data centers will experience a business disruption serious enough to affect the entire company’s ability to continue business-as-usual
CIOs and data center managers are asking tougher questions

<table>
<thead>
<tr>
<th>CIO</th>
<th>Enable competitive advantage</th>
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<tbody>
<tr>
<td></td>
<td>How can my data center meet the demand for business innovation and time-to-market?</td>
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<td>What is the right number, location and sourcing model?</td>
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<td>What are the true costs of IT assets and services at my data centers?</td>
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</table>

| Data center manager                                                 | Improve data center operational efficiency                        |
|                                                                     | What assets do I have or where are my assets are located?         |
|                                                                     | How do I handle resource shortages and skill gaps?               |
|                                                                     | How can I implement best practices around processes, operations and vendor management? |

| Data center facilities manager                                      | Transform facilities                                            |
|                                                                     | How can I modernize the facility?                               |
|                                                                     | How do I solve power, cooling, cabling and floor space issues?  |
|                                                                     | How can I minimize human errors and facility risks?            |
In the new era of Business Technology, yesterday’s data center will **not** do
What is data center transformation?

**Transformation** = looking at new approaches to improve the data center “doing things differently”

Activities that support transformation:
- standardization + simplification + consolidation + modularization + integration + innovation + optimization of data center facilities, IT infrastructure, and data center management & operations across people, process and technology
Transforming the data center yields significant business benefits

<table>
<thead>
<tr>
<th>Reduce Cost</th>
<th>Mitigate Risk</th>
<th>Accelerate Growth</th>
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<tbody>
<tr>
<td>• Up to 30% savings from data center consolidation &amp; virtualization</td>
<td></td>
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<tr>
<td>• Up to 40% energy savings</td>
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<td>• Up to 25% real estate, location savings</td>
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<tr>
<td>• Reduce management costs through automation</td>
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<tr>
<td>• Centralize and standardize IT and data center processes</td>
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<td></td>
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<tr>
<td>• Establish compliance with industry best practices</td>
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<td></td>
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<tr>
<td>• Minimize business disruptions with energy-smart, mission critical facilities</td>
<td></td>
<td></td>
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<tr>
<td>• Increase data center capacity</td>
<td></td>
<td></td>
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<tr>
<td>• Provide global reach to data centers</td>
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<td></td>
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<tr>
<td>• Support new business initiatives faster</td>
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</table>

Reduce costs and increase control through industry-leading end-to-end data center solutions from HP
What is in scope for data center transformation?

Facilities
- Strategy, build and design
- Consolidation and relocation
- Cabling and racking
- Power and cooling
- Site modernization
- Business continuity

IT Infrastructure
- Service oriented
- Networks
- Unified Communications
- Server, storage consolidation
- Virtualization
- Application and database

Management & Operations
- Facilities operations management
- Server, storage, network operations
- Infrastructure management
- Automation

Service Management, Culture and Staff, Security and Continuity
The data center for today and tomorrow
Building the data center of the future

Traditional Data Center
Monolithic Computing

Today’s Data Center
Silo’d, Dedicated Infrastructure

Centralized, Rigid Practices

Next Generation Data Center
Shared, Automated, Virtual, Delivered as a Service

Integrated, modular apps (SOA)

Business Integration

Technology Integration

Shared, virtualized server pool

Shared storage

Server/Storage

App

App1 App2 App3

Server Server Server

Shared storage
Data Center Vision

HP Data Center Transformation

Decrease Cost
Mitigate Risk
Accelerate Business Growth

Business outcomes

Energy and Space Efficient
Always On
Global and Virtual
Service Oriented and Automated

Adaptive Infrastructure enabling the next generation data centers
Energy and space efficient data centers

- Evaluate your strategy: modernize, build new or outsource
- Design for energy efficiency
- Reduce space and power through virtualization, blades, effective racking and shared services
- Implement energy efficiency criteria for sourcing
- Manage IT energy usage
- Recycle, reuse, refurbish

Environmentally friendly, better utilized and power efficient
‘Always On’ Data Centers

- Build availability architecture into DC architecture rather than by application
- Deliver a standard portfolio of tiered availability services
- Start with business impact and risk analysis
- Employ e-vaulting
- Use more logical security
- Use dynamic and automated resource reallocation
- Reduce number of accesses to the white space

Rock-solid availability and recovery for mission critical business
Global and Virtual Data Centers

- Consider the optimal data center number and locations
- Classify data centers and define a master plan
- Ruthlessly standardize and consolidate
- Plan for global proactive and mission critical support
- Virtualize the infrastructure
- Optimize the network globally, converge voice and data
Service oriented and automated Data Centers

- Deliver the data center as a service to the business
- Create a data center service catalog
- Adopt a service oriented architecture
- Remote, "lights-out" management
- Selectively outsource
- Implement service management best practices such as ITIL V3
- Drive up automation
- Optimize charge back models

Delivered as a service and automated with end-to-end service management
Software tools for data center transformation

1. **Service mapping**
   Current state analysis of infrastructure and services

2. **Asset management**
   Current and future state analysis of contracts, licenses and other IT assets

3. **Data center automation**
   Automated rollout and implementation of infrastructure and applications

4. **Consolidated event and performance management**
   Unified view of event and performance information

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**DATA CENTER TRANSFORMATION**

- Data center automation
- Data center consolidation
- Compliance and security
- Application consolidation
- Management software consolidation
HP’s Data Center Transformation Services
HP’s Data Center Transformation Portfolio

Transform with Options

Data Center Services

- Operations-based services to improve your existing data centers and infrastructure

Data Center Consolidation Services

- Strategy, design and implementation services to achieve the objectives of the next generation data center

Adaptive Infrastructure as a Service

- IT as a Service and flexible sourcing alternatives for the next generation data center

Energy & Space Efficient – Always On – Global & Virtual – Service Oriented & Automated
# HP’s Data Center Transformation Services

<table>
<thead>
<tr>
<th>Energy &amp; Space Efficiency</th>
<th>Always On</th>
<th>Global &amp; Virtual</th>
<th>Service Oriented &amp; Automated</th>
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</thead>
<tbody>
<tr>
<td>• Data Center Strategy</td>
<td>• Business Continuity &amp; Recovery</td>
<td>• IT Consolidation &amp; Migration</td>
<td></td>
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<tr>
<td>• DC Assessment &amp; Thermal zoning</td>
<td>• Security</td>
<td>• Virtualization (server/Storage &amp; Network)</td>
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<tr>
<td>• Data Center Implementation</td>
<td>• Mission Critical Services &amp; Support</td>
<td>• Dynamic Provisioning</td>
<td></td>
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<tr>
<td>• Power and Cooling Solutions</td>
<td>• Operational Service Management</td>
<td>• Relocation</td>
<td></td>
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<td></td>
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<td>• Deployment</td>
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Strategy > Design > Deployment & Transition > Operation > Continual Improvement
HP IT Transformation Story

The data center for today **and** tomorrow

- Energy and Space Efficient
- Always On
- Global and Virtual
- Service Oriented and Automated
HP Data Center Transformation

Six global data centers

- Consolidating 85 data centers into 6 global ones:
  - Modular data center design (“pay as you grow”)
  - Thermal mapping, virtualization, technology refresh and densification
  - Network transformation
- 3 Geographical zones in U.S. chosen for:
  - Proximity to fiber optic backbones/multiple power grids
  - Optimal location for disasters
- Within each zone:
  - 2 sites within 10-25 mile radius of each other
  - Each site Tier III
  - Each site designed for 3 levels of availability and continuity service
Global Data Center Transformation: Status Update

- Completed building three next generation global data centers
- Migration and consolidation of infra/apps to the new sites on track
- Completely exited 17 major DCs and many small ones

<table>
<thead>
<tr>
<th>Less</th>
<th>More</th>
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<tbody>
<tr>
<td>30% fewer servers, ~60% less annual energy use</td>
<td>80% more processing power</td>
</tr>
<tr>
<td>decreased storage cost</td>
<td>double the storage (replicated)</td>
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<tr>
<td>50% lower networking cost</td>
<td>triple the bandwidth</td>
</tr>
<tr>
<td>60% retirement of legacy apps</td>
<td>global applications</td>
</tr>
<tr>
<td>fewer sites, 10% less floor space</td>
<td>faster application rollout with availability and continuity integrated with data center</td>
</tr>
<tr>
<td>less HP IT cost</td>
<td>more capability</td>
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</table>

- Global applications
- Faster application rollout with availability and continuity integrated with data center
- More capability
DCT success: Power & Cooling Innovation
Leading scientific research institute in Singapore

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<tr>
<th>Challenge</th>
<th>Solution</th>
<th>Business Outcome</th>
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<tr>
<td>• Needed assurance of a recognised leader with proven end-to-end solution (clear winner was HP’s power &amp; cooling expertise)</td>
<td>Overall solution will comprise of an integrated solution:</td>
<td>• Positions research institute as iconic showcase in the region as NGDC technologies works in sync to provide state-of-the-art Test-Bed facility</td>
</tr>
<tr>
<td>• 24 x 7 highly available &amp; scalable</td>
<td>• Site Preparation for HPC Data Centers</td>
<td>• Allows institute to focus on bleeding edge research</td>
</tr>
<tr>
<td>• Secured</td>
<td>• HPC Data Centers and NOC build</td>
<td>• Optimised cost effective solution</td>
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<tr>
<td>• Manageable and robust data centre build that provides state-of-the-art features</td>
<td>• Building automation system</td>
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<tr>
<td>• Short delivery time</td>
<td>• Security Access and CCTV System</td>
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<td></td>
<td>• Fire protection system</td>
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<td></td>
<td>• Network Core Infrastructure Deployment and Link Provisioning</td>
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<tr>
<td></td>
<td>• Data Center Environmental Monitoring and Management</td>
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<tr>
<td></td>
<td>• HP Dynamic Smart Cooling</td>
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<tr>
<td></td>
<td>• Deployment and Integration of Infrastructure Management Systems (Dash Board etc)</td>
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<td></td>
<td>• Relocation of existing IT equipment</td>
<td></td>
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<td></td>
<td>• Hi-Speed Network Connection</td>
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<tr>
<td></td>
<td>• Program Management</td>
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Why hp?
Why HP for Data Center Transformation

<table>
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<tr>
<th>Program/Project Management</th>
<th>Over 3500 PMP certified project managers with 10-15 years of experience managing over 3000 active projects</th>
</tr>
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<tr>
<td>Hardware</td>
<td>#1 Hardware platform for Unix, Linux, Windows, x86 based and Blade Servers *</td>
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<tr>
<td>Software</td>
<td>#1 Management Software for Distributed Systems, Network Change &amp; Configuration Management **</td>
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<tr>
<td></td>
<td>DC Automation from Opsware</td>
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<td>Facilities</td>
<td>Top-ranked data center facilities services; EYP MCF</td>
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<td>Service Management</td>
<td>Over 6,000+ ITIL professionals; contributing ITIL authors</td>
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<tr>
<td>Energy Efficiency</td>
<td>1000+ patents in power &amp; cooling</td>
</tr>
<tr>
<td>Business Continuity</td>
<td>60+ recovery centers and high-availability labs</td>
</tr>
<tr>
<td>Global Delivery</td>
<td>14 global delivery centers; 65,000+ professionals in over 170 countries</td>
</tr>
<tr>
<td>Outsourcing</td>
<td>Highest Gartner rating (strong positive) in 2006-07</td>
</tr>
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Sources:  
*IDC Q2 2007 Worldwide Hardware Data  
**IDC FY06 Annual Services and Software Data
Thank You!

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• Global and Virtual
• Service Oriented and Automated

The data center for today and tomorrow.