REDEFINING HIGH PERFORMANCE COMPUTING ("HPC") PRODUCTIVITY
NEW HPC GENERAL TRENDS

• From Customers:
  – Power and Cooling are increasingly important
  – Virtualization:
    – Performance, performance, performance
    – Cheaper, cheaper, cheaper
    – Easier to deploy, manage, update, monitor
  – Storage and I/O becoming more important
  – Heterogeneous computing is coming

• From Industry:
  – More (efficient) cores
  – Power and Cooling
  – Faster interconnects
  – More storage
  – Heterogeneous computing is coming
NEW HPC PRODUCTIVITY VS. PERFORMANCE

What users want

• Flexibility  (Choice)
• Scalability  (Growth)
• Reliability  (Support)

What users want even more…

Simplicity
NEW HPC PRODUCTIVITY VS. PERFORMANCE

Simplicity

Selection

Get IT Faster

Deployment

Run IT Better

Implementation

Grow IT Smarter

Support
“We’re focused on scalable and flexible solutions that simplify high-performance computing by reducing cost and complexity.”

Michael Dell
2008
WHY DELL?

Redefining HPC Productivity
DELL BELIEVES THAT IT HAS POSITIVELY CHANGED THE HPC LANDSCAPE SINCE 2001
(DELL USES COTS+ TECHNOLOGY)

First Windows Cluster/ 康奈尔理论中心 2001 Top 500

Total Linux Solution Bundle: Hardware/Software and Services

Fastest CCS Cluster
top 500 fastest windows cluster on Dell, 2007

First NPACI** ROCKS Cluster
DELL HAS BEEN RECOGNIZED WITH NUMEROUS AWARDS

• 2007 Life Science Industry Award for Computer Hardware
• 2007 HPCWire Editors’ Choice Award for Best Price/Performance HPC Cluster Solution
• 2006 HPCWire Readers’ Choice Award for Best Price/Performance HPC Cluster Solution
• 2006 Life Science Industry Award for Best-in-Class Hardware Provider
• 2005 HPCWire Readers' and Editors’ Choice Awards for HPC Best Hardware/Price Performance Solution
• 2005 HPCWire Editors’ Choice Awards for Best Hardware/Price Performance Cluster Solution
DELL BELIEVES IT HAS BEEN LEADER IN CHANGING THE HPC LANDSCAPE SINCE 2001

TODAY...

DELL SHIPS OVER 64 NODES PER DAY
REVENUE MARKET SHARE OF LEADING VENDORS

- IBM: 35.4%
- HP: 31.1%
- Dell: 18.6%
- Other: 7.6%
- Sun: 4.0%
- SGI: 1.5%
- Cray: 1.4%
- NEC: 0.3%
- Dawning: 0.2%
- Bull: 0.1%

Source: IDC 2008
REVENUE MARKET SHARE OF SEGMENTS

- Technical Workgroup: 22.5%
- Supercomputer: 25.8%
- Technical Departmental: 36.3%
- Technical Divisional: 15.4%

Source: IDC 2008
MARKET SEGMENTATION

HPC Servers
$10B

Government

Industry/ Private Sector

Academic/ University

Source: IDC 2008
MARKET SEGMENTATION

HPC Servers
$10B

- Workgroup (under $50K) $2.7B
- Divisional ($250K - $500K) $1.4B
- Departmental ($50K - $250K) $3.3B
- Supercomputers (Over $500K) $2.6B

Source; IDC 2008
Dell’s HPC Value Proposition
Redefining HPC Productivity
HPC 项目的传统周期

1. 采购阶段
2. 实施阶段
3. 集成调试阶段
4. 运营阶段

Performance Optimization

HPC 项目的传统周期

购买系统时，选择有限的选项 - 选择私有或开源 - 与大多数供应商合作，尤其是在前端几乎没有合作。
DELL 360° VIEW OF HPC PRODUCTIVITY

服务支持 & 扩展

计划 & 沟通

运行 & 性能实现

采购 & 部署
DELL 360° VIEW OF HPC PRODUCTIVITY
PLANNING FOR ENVIRONMENTAL EFFICIENCY

Readiness Assessment: to support power, heat and weight requirements of your HPC solution

<table>
<thead>
<tr>
<th>HVAC / Cooling Analysis</th>
<th>Power Analysis</th>
<th>Remediation Report</th>
</tr>
</thead>
<tbody>
<tr>
<td>Document HVAC systems</td>
<td>Document power systems and equipment</td>
<td>Summary of current state</td>
</tr>
<tr>
<td>Measure and analyze existing data center environment</td>
<td>Measure and analyze existing power delivery to the target deployment area</td>
<td>Recommendation for environment changes</td>
</tr>
<tr>
<td>Determine row arrangement for hot aisle/cold aisle suitability</td>
<td>UPS type, location, size/VA voltage, existing load</td>
<td>Identify anomalies in data center that impair optimal performance</td>
</tr>
<tr>
<td>Recommendations for chilled air based on requirements</td>
<td></td>
<td>Go/No go assessment for technology deployment</td>
</tr>
</tbody>
</table>

Diagram of HVAC and cooling systems showing intake, discharge, perforated tiles, raised floor, and supply air plenum.
DELL 360° VIEW OF HPC PRODUCTIVITY
DELL SIMPLIFIES DEPLOYMENT
Integrated, Validated and Pre-configured Bundles

8 – 256 node bundles

HPC Design and Test Lab
State of the Art Engineering Lab
Collaborative Partner Design & Testing
Standardized Test Beds & Methodology
Technical Papers & Best Practices

Collaborative Development
Advancing Dell & Partner Technology
Leader in Corporate wide initiatives;
Multipack, PS Assessment, POC
DELL 360° VIEW OF HPC PRODUCTIVITY
DELL 360° VIEW OF HPC PRODUCTIVITY
DELL 360° VIEW OF HPC PRODUCTIVITY
DELL HPC VALUE PROPOSITION

Flexibility & Choice
Plug-n-Perform
Productivity Ready
Comprehensive Implementation & Support Services
Unparalleled Value

SIMPPLICITY DELIVERED!
INDUSTRY STANDARD BUILDING BLOCKS AND LEADING HPC PARTNERSHIPS = CHOICE

Industry-standard Building Blocks
+
Leading Partnerships

Comprehensive Solution

Integrated, Validated & Pre-configured Bundles
+
Comprehensive Services

Simplified Design, Deployment & Support

ARCHITECTED FOR 360° PRODUCTIVITY
INDUSTRY STANDARD BUILDING BLOCKS AND LEADING HPC PARTNERSHIPS = CHOICE

Cluster Management: Platform Clustercorp

Interconnect Fabrics:
- Gigabit Ethernet
- Infiniband & Myrinet

Operating Systems:
- Red Hat® Enterprise Linux®
- Microsoft® Windows™

Storage:
- Dell PowerVault™
- Dell/EMC and DataDirect Networks®

Systems:
- Dell PowerEdge™ Servers:
- AMD
- Intel

2007 Best Hardware Price/Performance Solution
FOUR YEARS IN A ROW
CHOICE OF PLATFORMS

**Systems:** Dell PowerEdge Servers

**Storage:** Dell PowerVault, Dell / EMC & DataDirect Networks Storage

CHOICE OF OPERATING SYSTEMS

Red Hat Enterprise Linux

Microsoft Windows
CHOICE OF COMPREHENSIVE SOFTWARE Development & Cluster File/Management Tools

DELL HPC

Middleware & Development Tools
Operating System
Interconnect Hardware & Protocol
Platform Hardware & Management

Cluster Management
Why Dell?

Redefining HPC Productivity
SEC Core Competencies:

1.
2.
3.
4.
5.
6.
7.
8.
9.
REDEFINING HPC PRODUCTIVITY
THANKS!