Oracle Grid on DELL Enterprise

Dell International Inc., Korea

창진일 차장

컨설팅 사업부
정진일 차장
Agenda

• Dell | Oracle Partnership
• Value Proposition
• Performance
• One Source
• Q&A
“수 많은 작은 서버들을 적절한 관리 하에 마치 하나의 거대한 컴퓨터를 사용하는 것처럼 해주는 컴퓨팅 개념”
Oracle 10g - 주요 특징

- Application Server Grid
- Database Grid
- Storage Grid
- 관리의 용이성 (Self Managing DB)
- 그리드를 통한 데이터 프로비저닝
- 자동화된 그리드 제어
- 그리드 상에서의 애플리케이션 개발
1997. Dell | Oracle Partnership Formed

- Fastest growing tier-1 hardware vendor in the Oracle database market
- #1 Oracle Reseller in 2003
- Up to 250,000 transactions per hour* within Dell IT on mission critical system
- Oracle Global IT operations using >2,000 Dell|Linux servers
- Using Dell servers in the Austin Data Center for Outsourcing
- Develops Linux-based software on Dell servers

* Dell's Sales ODS database is processing over 250,000 transactions per hour in peak hours. It is also responding to 100,000+ queries/requests per hour at the same time. (as of April 2003)
Oracle은 Dell Power Edge Server를 사용하여 Red-Hat Linux상에서 Core Product를 개발합니다.

IDOL 프로그램은 Intel, Dell, Oracle, Red Hat Linux를 통한 Unix Migration Solution입니다.
Joint Messaging to the Customer

**Buy Oracle Standard Edition One Direct From Dell.**

One Stop Shopping...Easy on Dell!

Now you can order Oracle Standard Edition One direct from Dell. With Oracle Standard Edition One running on Dell hardware, you get the reliability you need at a lower price. Easy as Dell.

To order call 1-800-BUY-DELL or visit www.dell.com/oracle

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**Oracle Database 10g $149 Per User**

One CD
17 minute install
Easy to use

Oracle Standard Edition One
$149 per user or $5995 per processor
First class database...economy price

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Oracle.com/standardedition
or call 1-800-525-6173

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“We can take four inexpensive Dell machines and group them together and run them faster than a Unix machine at a tiny fraction of the cost. And it’s much more reliable, because if one of the Dell computers fails, three are left to keep the system running.”

- Larry Ellison, Chairman and CEO, Oracle Corporation

Oracle Chief Executive Larry Ellison said his company had "no more important partner than Dell" when it comes to expanding the reach of its technology and lowering customers costs.

- Rex Crum, CBSMarketWatch.com
### Oracle & Dell Joint Development

- **All Oracle applications run on Dell servers**
- **Two operating systems**
  - Microsoft® Windows®
  - Red Hat® Linux® Advanced Server
- **Best Practices Program**
  - White papers
  - Installation guides, tools
  - Benchmarks
  - Joint Support Services

<table>
<thead>
<tr>
<th>ORACLE Product</th>
<th>Windows</th>
<th>Linux</th>
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<tbody>
<tr>
<td>Database</td>
<td>Y</td>
<td>Y</td>
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<tr>
<td>RAC (parallel cluster)</td>
<td>Y</td>
<td>Y</td>
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<tr>
<td>Application Server</td>
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<td>Y</td>
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<tr>
<td>E-Business Suite</td>
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<td>Collaboration Suite</td>
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<td>Small Business Suite</td>
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<td>Developer tools</td>
<td>Y</td>
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</table>
Real Business Benefits

Reduce Cost:
• Pre-defined and pre-tested technology combination helps minimize Downtime and Grid infrastructure through Deployment & Management simplification, reducing costs.

Improve Quality of Service:
• End-to-end testing, validation, and documentation provide reliable Service Level, enabling faster response times for Business-driven IT.

Reduce Risk:
• Proven solutions and cooperative engineering reduce Downtime, providing timely maintenance and processes.

Manage Growth:
• Dell|Oracle solution is designed for scalability and concentrated management, enabling low-cost H/W and user growth.

Accelerate Time to Value:
• Pre-tested and proven highest performance solutions speed up guest's Deployment Time.
• **Dell is an authorized reseller of Oracle products**
  - Database 9i and 10g
  - Application Server 9i and 10g
  - Real Application Clusters (RAC) 9i and 10g
  - Collaboration Suite
  - Standard Edition One – database for small business

• **Oracle Product Support**

• **Comprehensive Professional Services**
  - Sizing, Installation, Deployment, Tuning
The Momentum and Value of Standards

The datacenter is moving to standards

Dell drives standards in the industry…

Desksops - 98% standardized: Dell #1 worldwide\(^1\)
Workstations - 87% standardized: Dell #1 worldwide\(^2\)
x86 Servers - 90% standardized\(^3\): Dell #1 US, China (PRC)\(^1\)
Disk Storage - standardizing: Dell #4 Worldwide\(^4\)

Sources: \(^1\)IDC Worldwide Quarterly PC Tracker, Nov 15, 2004  \(^2\)IDC Worldwide Workstation QView Q3 2004  \(^3\)IDC Worldwide Quarterly Server Tracker, Q3 2004  \(^4\)IDC Worldwide Quarterly Disk Storage Systems Tracker Q3 2004. Standardization is defined as open, non-proprietary architecture
Customers Are Voting With Their $$$
x86 vs. RISC

x86 architecture share continued to grow and reached 91% of overall server units.

Source: IDC reports
Enterprise Total Solution provider

**Direct Attached Storage (DAS)**
- PowerEdge 6850 Servers w/ Dell | EMC Storage Enclosure & DLT Drive/Autoloader

**Network Attached Storage (NAS)**
- PowerVault 745N
- Dell | EMC NS500G NAS on SAN

**Storage Area Network (SAN)**
- PowerEdge 6850 Servers
- Dell | EMC FC Switch
- Dell | EMC Storage Enclosure
- PowerVault 136T DLT Library

**LAN**
Enterprise Total Solution provider

• Client (Desktop, Notebook, Workstation, Monitor, Print, etc)
• Server (Tower, Rack, 1way, 2way, 4way & Blade)
• Storage (DAS, NAS, SAN)
• Switch (Gigabit, Managed, Unmanaged)
• SAN solutions (FC Switch, HBA)
• Tape solutions (Tape Drive, Tape Autoloader, Tape library)
• OS (MS, Red Hat, Suse)
• Application (Altiris, MS SMS, VMware)
• DB application
• Back-up S/W
• DPS (Dell Professional Service), 3rd party service
## Processor Roadmap

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<th>Q4 CY05</th>
<th>Q1 CY06</th>
<th>Q2 CY06</th>
<th>Q3 CY06</th>
<th>Q4 CY06</th>
<th>Q1 CY07</th>
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<tbody>
<tr>
<td><strong>4S</strong></td>
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<td><strong>2S</strong> (Triathlon)</td>
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<td><strong>SC1435, PE1900 and Blades</strong></td>
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<td><strong>Mid/Low Voltage 2S</strong></td>
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<td><strong>PE and Blades</strong></td>
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<td><strong>2S (SC1430)</strong></td>
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<td><strong>1S (SC and PE)</strong></td>
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<tr>
<td><strong>4S</strong></td>
<td><strong>Blades</strong></td>
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<tr>
<td><em><em>Low Voltage</em> 2S</em>*</td>
<td><strong>(Rack and Blades)</strong></td>
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<td><strong>2S (SC and PE)</strong></td>
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<td><strong>1S (SC and PE)</strong></td>
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</table>

- **Single Core**
- **Dual Core**

**EOL**

- **New processor introduction**
- **New platform/chipset**

### Processor Details

- **PD 900 sequence (Smithfield) / 7230**
- **Conroe Family / Mukilteo-2**
- **MV Dempsey 3.2Ghz 1066 FSB**
- **Dual core (LV Woodcrest)**
- **Dual core (Woodcrest) / 5000V (Blackford-VS)**
- **PD 800 sequence (Smithfield) / 7230**
- **Dual core (Woodcrest) / 5000X (Greencreek)**

**Note:**
- SC1435, SC1430 and PE1900 will launch with Woodcrest only (no Dempsey)
- For PE only
PowerEdge 9th Generation
For Better Control of Your Business

Continuing the success of Dell’s 8th Generation of PowerEdge Servers

성능
- Intel® Xeon® Dual-Core
- Fully Buffered DIMMs
- PCI-Express I/O
- Serial-Attached-SCSI
- TCP/IP Offload Engine

신뢰성
정밀한 설계 및 제조,
테스트 과정에 충실한 Dell

관리기능
- 강화된 공통기능
- Dell OpenManage™
- DRAC 5
- IPMI 2.0
- Program 가능한 LCD

완벽한 솔루션
완벽한 기업용 제품을 위한
테스트 및 입증자료 제공
PowerEdge 9th Generation
For Better Control of Your Business

Consistent rack ID; Metal bezels; LCD visible; focus on fit/finish/refinement

Berlin
PE1950

London
PE2950

Montreal
PE2900
PowerEdge 9th Generation
For Better Control of Your Business

PowerEdge 9th Generation

Supported on the 2P rack servers

Berlin 3.5
Berlin 2.5
London 3.5
London 3.5 w/4 backplane
London 3.5 w/6 backplane
London 2.5
## PowerEdge 9th Generation vs 8th Generation

<table>
<thead>
<tr>
<th>Feature</th>
<th>8th Generation</th>
<th>9th Generation</th>
</tr>
</thead>
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<tr>
<td><strong>Storage</strong></td>
<td></td>
<td></td>
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<tr>
<td>U320 SCSI (split backplane)</td>
<td>3.5&quot; Hot-plug SATA (3.5&quot; max)</td>
<td></td>
</tr>
<tr>
<td>3.5&quot; HDs (some models)</td>
<td>2.5&quot; (1U/2U blade)</td>
<td></td>
</tr>
<tr>
<td>SATA</td>
<td>4 Port SAS Std.; ROMB required for &gt;4 HDs</td>
<td></td>
</tr>
<tr>
<td>Dual channel SCSI</td>
<td>ROMB on daughter card</td>
<td></td>
</tr>
<tr>
<td>ROMB on riser</td>
<td>TBU w/ add-in controller; ROMB int. only</td>
<td></td>
</tr>
<tr>
<td>Internal SCSI for TBU; ext SCSI on 2U/5U</td>
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<tr>
<td><strong>Memory</strong></td>
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<tr>
<td>DDR II</td>
<td>Fully Buffered DIMMs (FBD)</td>
<td></td>
</tr>
<tr>
<td>6 DIMMs – high capacity</td>
<td>8 DIMMs on 9G (12 on PE2900); high capacity DIMMs</td>
<td></td>
</tr>
<tr>
<td>Single Core Processors</td>
<td>Dual Core Processors</td>
<td></td>
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<tr>
<td><strong>I/O Connectivity</strong></td>
<td></td>
<td></td>
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<tr>
<td>Intel Gb NICs</td>
<td>Broadcom Gb NICs w/ optional TOE</td>
<td></td>
</tr>
<tr>
<td>PS/2, parallel port (some models)</td>
<td>No PS/2 – USB only; No parallel port</td>
<td></td>
</tr>
<tr>
<td>5v PCI (some models)</td>
<td>Only PCI-X and PCIe</td>
<td></td>
</tr>
<tr>
<td>DRAC (for 8th gen)</td>
<td>DRAC is supported; redundant port is optional; supports more connections</td>
<td></td>
</tr>
</tbody>
</table>

### PowerEdge 9th Generation

- **Fully Buffered DIMMs (FBD)**
- **Dual channel SCSI**
- **3.5" HDs**
- **SAS (split backplane N/A)**
- **PS/2, parallel port (some models)**
- **5v PCI (some models)**
- **DRAC**

### PowerEdge 8th Generation

- **U320 SCSI (split backplane)**
- **3.5" HDs**
- **SATA**
- **PS/2, parallel port (some models)**
- **5v PCI (some models)**
- **DRAC**

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**ORACLE**
Standard Edition One: The Solution For SMB

“현재 비지니스의 요구”

“가까운 미래의 데이터센터”

- **Oracle 가격**: $745 for a 5 user license
- **Oracle 패키지 구입**: including server, software and support (storage sold separately)
  - 최소의 투입비용
  - Starting at $2,863
  - Scalable to large clusters


Source: [www.dell.com/database](http://www.dell.com/database) as of 03/07/05
Scalable Enterprise starts with Grid Oracle 10g Database and RAC

Entry Level Business Continuance: 높은 용이성

Easy as Dell: Installation CD, 배치 서비스, 원스탑 쇼핑 또는 One P.O.

투자보호: Leverage common industry building blocks through out

Scalable IT: Pay as you grow...

ORACLE
Dell | Oracle Grid-Computing

- 그리드
- 클러스트된
- 클러스트된
- 클러스트된
- 기업 관리자
- 어플리케이션 서버
- 데이터베이스 서버
Grid On-Demand Performance:
동적 자원 할당

Availibility on demand

Scale as you grow
- 작업량 감지기가 능력을 늘릴 필요성을 탐지해 낸다
- 새로운 서버 노드가 클러스트로 된다

프로덕션 서버 폴

ORACLE
기업 관리자

ORACLE
클러스트된 어플리케이션 서버

ORACLE
클러스트된 데이터베이스 서버
그리드의 높은 이용편의성
최종 유저는 Server Failure를 볼 수 없다.

Availibility on demand
다운시간 없다
- 최종 유저에겐 투과성이 있다 (failing은 남아있는 노드로 넘긴다)
- 새로운 서버가 클러스트로 된다.
Grid 동적 자원 재구성: 
작업량 균형을 위한 재할당

Availibility on demand

작업량의 균형
● 작업량 모니터가 클러스터 이용도의 불균형을 탐지해 낸다
● 이용도가 떨어지는 클러스터에서 서버를 제거하고 높은 작업량을 갖는 클러스터를 추가한다

프로덕션 서버 풀

어플리케이션 이용도

작업량 모니터가 클러스터 이용도의 불균형을 탐지해 낸다
이용도가 떨어지는 클러스터에서 서버를 제거하고 높은 작업량을 갖는 클러스터를 추가한다
표준화의 가치

시간이 지남에 따라 독점 시스템과 플랫폼이 환경에서 감소 되었기 때문에 새 프로젝트와 이점의 개발에 초점을 맞추는 당시 IT 조직의 능력이 5배 이상증가 되었습니다. 또한 공유가 가능한 하드웨어 비용을 지불하는 것을 감안하여도 수입 대비 운영 비용이 수년간 감소했습니다. D비은 비용효과 면에서 유리한 회사이며 Dell IT도 동일하게 높은 표준을 유지하고 있습니다. 표준 기반 기술을 활용함으로써 당시는 비즈니스의 속도를 따라갈 수 있으며 비즈니스의 새로운 경쟁력을 지속적으로 창출하여 타사와의 경쟁을 넘칠 수 있습니다.

표준 기반 플랫폼을 지향해야한 것이 Dell IT의 성공열쇠였지만 단지 운영비용을 절감한 것만은 아니었습니다. 당시에 있어서 또 다른 중요한 이점은 IT 인력을 이전보다 환영하는 효율적인 방법으로 활용할 수 있는 능력을 갖추었다는 것입니다.

당시 IT 전문가들은 이제 복잡한 레거시 시스템을 유지하는 데 시간을 소비하기 보다는 비즈니스 파트너에게 새로운 도입을 전달하는데 주력할 수 있습니다. 이는 Dell의 경쟁력을 유지하는데도 도움이 됩니다.
Dell Runs Mission-Critical Order System on Oracle 10g

Moved from 52 CPU’s in 2 RISC servers to six Dell PowerEdge 4-ways

12개월 ROI 평가 = $1.749 million 비용절감 효과

- 시스템의 전체 퍼포먼스 5배 향상
- 리얼타임 fault tolerance로 비즈니스 연속성 구현
- 자동화된 관리로 인해 사람이 할 수 있는 실수를 크게 감소시킨다
- 미래의 요구사항을 충족하기 위해서 기술은 그 영역을 확장해 나갈 것이다.

Source: Oracle sponsored ROI Study: Dell Moves European Sales Operations to Oracle Enterprise Grid on Dell Systems Published by Mainstay Partners, Dec 2004
Dell Consolidates on Oracle 10g Linux for GEDIS

ROI SERIES

ROI HIGHLIGHTS

- ROI of 173% over five years
- Internal rate of return of 77% over five years
- Achieve payback on investment in 12 months
- Net savings of $4.6 million over five years
- Achieved higher availability and scalability

EXECUTIVE SUMMARY

Texas-based information technology provider Dell Inc. operates one of the highest-volume internet commerce sites in the world. By 2004, however, the company was experiencing the first signs of age in its Europe-based offline order-management system, affecting system availability and, potentially, line manufacturing. In addition, Dell’s growing volume of customers was pushing the limits of the EMEA system, which at the time had a maximum capacity of 6,000 concurrent users.

To avoid any serious disruption and build a foundation that could scale with the business at lower cost, Dell decided to standardize on Oracle 10g grid technology.
The Proof is in The Performance

Dell 2-processor PowerEdge 2850/Windows vs. UNIX 4-processor server

Speed

- UNIX
- Dell

- 77% faster

Price

- UNIX
- Dell

- 49% less

Source: Based on testing by Dell in Nov. 2004 comparing similarly configured 4-P UNIX server with 1.28 GHz processors and 2-P PowerEdge 2850 server with 3.4 GHz processors. Dell expects server testing performance to vary with processor speed. Server prices obtained from companies’ respective websites as of 11/29/04.
The Scalable Enterprise
주요벤더사는?
  • Sun, HP, IBM

고객이 선택하는 이유는?
  - Mission critical, Fault-tolerant systems

어떤 고객들인가?
  - 4개의 CPU 이상의 프로세싱 파워를 요구하는 고객들
Comparing Unix with Linux

- Unix
  - 대규모 확장성
  - 입증된 가용성
  - 질적인 지원
  - 진보된 솔루션

- Linux
  - 제한된 확장성
  - 제한된 가용성
  - 제한된 지원
  - 진보되지 않은 솔루션

So why would a customer migrate?
Can You Name These Servers?
Scale-Up Computing

• What is the largest number of CPUs in a scale-up Unix server from HP, IBM or Sun?
  – typically 64 cores. With dual-core technology that effectively means 128 CPUs now in most cases

• What is their value proposition?
  – Availability, scalability, reliability and flexibility

• How do they achieve scalability?
  – Through internal expansion that allow many CPUs to share access to a common memory pool and that allow the machine to run a single operating system

• How do they achieve high availability?
  – Through internal redundancy
Can You Name These Servers?
• What is the largest number of CPUs in a scale-up Intel server from Dell?
  - 4 CPUs. Dell doesn’t sell servers with more than 4 CPUs. That means a single Dell server cannot be an “enterprise solution” because it simply isn’t scalable enough.

• What is Dell’s key value proposition?
  - Low-cost, industry-standard, modular computing elements that deliver a flexible, affordable, standard-based approach to enterprise computing.

• How does Dell achieve scalability?
  – Through external expansion that allow many servers to cooperate together in a grid to support large workloads

• How does Dell achieve high availability?
  - Through external redundancy.
Computing on Demand Scaling Out

Large Dedicated Server

- Expensive costly components
- High incremental costs
- Single point of failure
- Enterprise service at high cost

Oracle Grid

- Low cost modular components
- Low incremental costs
- No single point of failure
- Enterprise service at low cost
Our Path to Grid

- Standardize
  - Cost effective Dell servers
  - Intel Xeon & Itanium 2 processors
  - Tiered EMC Networked Storage

- Consolidate onto
  - Oracle 10g Databases with Real Application Clusters and Automatic Storage Management
  - EMC Networked Storage

- Automate
  - Operation & management
• Lower cost industry standard technology now exists to meet or exceed the QoS, manageability, flexibility and performance previously offered only by expensive SMP solutions

• Project MegaGrid Objectives:
  – How do you design and deploy?
  – How do you monitor, analyze and tune for performance?
  – How do you scale?
  – How do you manage?
Our Methodology

• **Identify a real world enterprise workload**
  – Cramer Systems, British Telecom workload
  – Cramer’s Voice / Data service provisioning software
  – Web-based application – CPU and I/O intensive

• **Establish a baseline on SMP servers**
  – 550,000 transactions / hour

• **Jointly design and build an enterprise grid infrastructure**
  – Clustered database, servers, networked storage

• **Measure performance, scalability, and management while progressively scaling the infrastructure**
  – Scale up to terabytes of data

• **Document best practices and quantify the advantages**
Project MegaGrid Results

Performance (Cramer 4 Benchmark)

<table>
<thead>
<tr>
<th>Transactions per Hour</th>
<th>Sun Cluster</th>
<th>Dell Cluster 550K</th>
<th>Dell Cluster 580K</th>
<th>Dell Cluster 1.07M</th>
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</thead>
<tbody>
<tr>
<td>E 15K</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PE 1750</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PE 7250</td>
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</tbody>
</table>

Value

<table>
<thead>
<tr>
<th>Price</th>
<th>Sun Cluster</th>
<th>Dell Cluster 1.07M</th>
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</thead>
<tbody>
<tr>
<td>E 15K</td>
<td>$2.6M</td>
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<tr>
<td>PE 1750</td>
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</table>

Server list pricing was obtained from dell.com and sun.com as of December 3, 2004, and includes server hardware costs only.
Project MegaGrid - Phase II Plans

- **Enterprise Application Consolidation** - Expand Applications workload to include Cramer, Oracle Application Server and Oracle Applications

- **Continued Scalability of The Grid** - Continue to scale environment, adding additional nodes and storage to the Oracle 10g database cluster

- **Business Continuance** - Expand testing to focus on best practices for performing upgrade and patch management in large-scale clusters without disruption and protection against component failure in the Grid

- **Backup to Disk** – Test online backup to disk solutions leveraging ATA storage

- **Workload management** – Capture the procedures for provisioning resources to react to changes in workload demand – includes migration of data / storage from one system to another

- **Document Additional Best Practices** - Publish Best Practices for deployment, upgrade and management of business applications in large-scale clusters
How to Learn More

• Websites
  – www.dell.com/megagrid
  – www.emc.com/megagrid
  – www.oracle.com/megagrid

• Content
  – Joint Best Practices and whitepapers
  – Frequently Asked Questions
  – News and Upcoming Events
Perception of Complexity

Traditional Approach

- Tech Support
- Pro Services
- Oracle Licenses
- 9i AS/DB/RAC
- Implementation
- Hardware

Oracle

Partners

Hardware Vendors
The Single-Source Enterprise

<table>
<thead>
<tr>
<th>Traditional</th>
<th>Dell</th>
<th>Oracle</th>
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<tbody>
<tr>
<td>Tech Support</td>
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<td>DELL</td>
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<tr>
<td>Implementation</td>
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<td>Customer</td>
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<td>Prof. Services</td>
<td>Partner</td>
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<td>10g AS/DB/RAC</td>
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<td>DELL</td>
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<td>DELL</td>
</tr>
<tr>
<td>HW</td>
<td>HW Vendor</td>
<td>DELL</td>
</tr>
</tbody>
</table>
Oracle Sizing Support & Services

ACCURACY

Initial Sizing
- SC or TSR
- Engage sizing tools and whitepapers
- Utilize ET/FEM
- Utilize ETA (ISIS)
- SWAG or Estimate

Consultative Sizing
- Engage ETA (ISIS)
- Engage DPS
- Potential Site Survey
- Potential SOW
- More Accurate

Real Sizing and/or POC
- Engage DPS/ISIS
- Utilize POC Center
- Onsite POC's
- Recreate Customer Environment
- Provide Baseline
- SOW
- Extremely Accurate

Deployment

COST
Q U E S T I O N S
A N S W E R S
Q U E S T I O N S
A N S W E R S