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THE INFORMATION COMPANY
Customer Case Studies: E-Business Suite 11i and Grid
Enabling Real Application Clusters (RAC) with E-Business Suite 11i

Session ID: S625
Agenda

• Supported Versions for 10g Real Application Clusters (RAC) and 10g Automated Storage Management (ASM)

• Introduction to Customer Panel
Supported Versions

• 11.5.7 and higher supported on 9i Real Application Clusters (RAC)
• 11.5.9 and higher supported on 10g Real Application Clusters (RAC)
• For latest information please go to Certify on Metalink
• AppsRAP Strategic Program open for customers interested in deploying 11i with 10g Real Application Clusters (RAC) or 10g Automated Storage Management (ASM)
Customer Panel

- Cisco Systems
  - Shanti Iyer, IT Manager
  - Anitha Parimi, IT Architect
- Gartner Group
  - Jorge Rivas, Principal Member of IT Staff
  - Mohammad Shabbir, Principal Member of IT Staff
- Orbotech
  - Bar-Haim, CIO
Empowering the Internet Generation
Cisco 11i E-Business Suite on 9i RAC

• Shanthi Iyer (Manager IT)
• Anitha Parimi (11i Architect)
• Cisco Systems
Agenda

• Key drivers
• When we started..
• Where we are now..
• I2R and QTC RAC implementation
• RAC benefits
• Lessons learned
Building a Foundation for Cisco’s Future Success

- Drive industry best practices and capabilities
- Maintain Cisco Leadership Position
  - Breakaway differentiation
- Scalable, Simplified, and Integrated Business Capabilities
  - Cost Saving and productivity
- Common Technology and Business Process Platform
  - Enables System Level Capabilities

Establish architecture for a process environment
Optimization and integration of business processes
Business Drivers

• **Market Dynamics**
  - Growing recognition of the power of cross-functional collaboration
  - Greater demand for external collaboration with suppliers, distributors, partners and customers
  - Enhanced support in ERP systems for e-business models

• **Internal Drivers**
  - Oracle 10.7 applications and RDBMS 8i at end-of-life
  - Legacy custom applications and bolt-ons
  - Uptime requirements and SLA
  - TCO
When we started..2001

External DMZ

Ordering Tool

Change Order Tool

Service Quoting

Service Orders

Internal

Commerce Gateway

eCommerce Engine

XML, EDI

Collections

OE/AR

OE/AR (EMEA)

WW Mfg US Fin

Global Order Promising

June 2003

Product

Service

Custom 3rd Party

10.7

11i

May 2001

EMEA Fin

May 2003

ASIA/AI Fin

June 2002

Service Quoting

Renewal Manager

Service Contracts

Product Config

Calico Srv Config

CARE Call Center

Metrix Srv Logistics

When we started..2001

Renewal Manager

Collections

OE/AR

OE/AR (EMEA)

WW Mfg US Fin

Global Order Promising

June 2003

Product

Service

Custom 3rd Party

10.7

11i

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EMEA Fin

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ASIA/AI Fin

June 2002

Service Quoting

Renewal Manager

Service Contracts

Product Config

Calico Srv Config

CARE Call Center

Metrix Srv Logistics
Drivers for Real Application Clusters

- Reduce operating expenses
- Zero downtime for mission critical applications
- Architecture to scale systems horizontally
I2R – RAC Implementation
Dec 2003
I2R: Oracle9i RAC Architecture

PROD 1

Listener _PRD

PROD 2

Listener _blt

Cisco LD

APPs1

APPs2

APPs3

CM

Cluster

Mid range Servers

Failover

Gig E Interconnect

Bolt-on Users

Bolt on Apps Online Reporting

11i Users

Bolt-on Apps

Online Reporting
Cisco11i I2R: Profile

- DB Version: 9.2.0.5
- Size of DB: 4.6TB
- Workload distribution
- DB Servers: 2 node, 32 way high end servers with 64GB RAM
- App Servers: 3 nodes, 8 way mid range servers with 32GB RAM
- E-Business Suite: 11.5.8
- Biz function: Support and Service Logistics
- Conc Jobs per day: 300K
QTC – RAC Implementation
August 2005
QTC Technology Drivers

- 9.2.0.6 with RAC (server side load balanced)
- Oracle E-Biz suite on Linux
- 10gAS Single-Sign-On
- NAS and shared APPL_TOP
- Cisco Content Switch Module
- Oracle E-Biz suite to 11.5.9
- Gig-E Cluster interconnect
Cisco 11i QTC Profile

- DB Version: 9.2.0.6
- Size of DB: 1.3TB
- Server side load balancing
- DB Servers: 2 node, 48 way high end servers with 48GB RAM
- App Servers: 8 X Linux DL380, 2 X 12
- E-Biz: 11.5.9
- Biz function: OM-AR
- Conc Jobs per day: 25k
RAC Node 1&2: Run Queue (Daily)
Server Side Load balancing - Distribution (Daily)
Benefits of Apps on RAC

“Deliver business value by leveraging RAC technology“

- Horizontal scalability and load balancing provides opportunities for consolidation

- 99.999 availability requirements for mission critical business applications

- Eliminate conventional reporting environments

- Reduce operating expenses such as storage and resource costs
Lessons Learned
Standard Change Flow & Environment Refresh

Bug Fixes / Small Projects
- No RAC Patch Verification

Large Upgrades
- RAC Performance

Change Flow
- No RAC Patch Verification
- No RAC DEV
- RAC STAGE
- RAC PROD
- RAC Performance

Quarterly refresh of DEV & STG
Adhoc refresh based on project schedule
Partnership and Collaboration

• **External**
  - Consulting engagement with Oracle “APPSRAP” team
  - Direct channel with core oracle RAC team
  - Oracle SSC engagement

• **Internal**
  - Offshore team engagement
  - Performance team
  - Data Migration team
  - RMO (Release Management Office)
End Game

It’s All About the Business

• Agile business structure that can quickly respond to new business opportunities
• Ease of doing business with us
• Optimized business processes that raise productivity
• Lower total system cost of ownership
Enabling RAC in E-Business Suite 11i
‘Customer Panel’

- Jorge Rivas
- Mohammad Shabbir
  - Principal Members of IT staff
- Publishing Company in NorthEast
Topics

• Business Requirements
  ➢ Background -- E-business Suite Implementation
  ➢ High Availability Needs

• Hardware Vendor Selection

• Technical Architecture

• Experiences
  ➢ Technical Issues Encountered
  ➢ Benefits Realized
  ➢ Lessons Learned

• Q & A
Introduction

• Real Application Clusters (9i / 10g RAC) is a powerful feature that can greatly enhance an application's scalability and availability. Also, RAC is the primary building block for enabling ‘Grid architecture’ – “Oracle’s quote”

• In this panel discussion, as one of the users of RAC technology, we will discuss configuring RAC in a 11i environment and our experiences with the technology ‘so far’
Business Requirements

- Legacy Processes [leading to high ‘Operational Costs’]
- Many SILO Systems [Complex Infra]
- Need for an ERP System to support:
  - Customers, Products, SOX compliance & Finance Business
- **Business Continuity:**
  - Need to support Global Business
  - Need for increased system availability, and system scalability [Self-Service demands]
Key Technical Objectives

• Implement …
  • Redundant fault tolerant architecture to protect against hardware failure
  • High Availability Database and Middleware Server solution
  • Architecture that will provide capacity on demand (temporary or permanent provision)
  • Architecture that provides future platform of choice
RAC Infrastructure Planning

Hardware Vendor Selection Criteria …

• Proven PA-RISC [Uncompromising Choice!]
• Scalability / Integration [Future Oracle Apps needs]
• Lowest risk and fastest to deploy
  • In-house PA-RISC Expertise
• PA-RISC [Eligible to migrate to Itanium in future]
Architecture - Details

11i10 DB Infrastructure

- 9iRAC on the database tier for scalability and high availability
- Two node cluster - HP PA-RISC servers
- HP SAN System for DB Storage
- HP ServiceGuard to enable clustering
Architecture – Details … Continues

11i.10 MW Infrastructure (WEB/FORMS Tier)

- Hardware load balanced & deployed on HP PA-RISC
- SAN storage for the middle-tier servers
- All middle-tier servers configured and deployed with identical software stacks
- Each server have local SAN mounts, which contain the application XXXX_TOP directory structures
Architecture – Details … Continues

11i.10 MW Infrastructure (CM/Admin Tier)

- Hardware deployed on HP PA-RISC
- SAN storage for the middle-tier servers
- All middle-tier servers configured and deployed with identical software stacks
- Each server have local SAN mounts, which contain the application XXXX_TOP directory structures
RAC Tech Stack - Details

• **Hardware:**
  • HP PA-RISC two node database cluster
  • HyperFabric High-speed Interconnect
  • I/O [SAN – 2GBit FC Connectivity, Raw Devices]

• **Software:**
  • Oracle9i (9.2.0.6)
  • Oracle UDP/IP [Cluster Interconnect IPC]
  • HP ServiceGuard 11.16 [extensions for RAC]
  • TDPO/RMAN [for online backups]
  • GRID Control [alerts setup]
Experiences

• Technical Issues Encountered
  • Stability issues, using HMP with HyperFabric
• Support Challenges
  • Cloning Complexity
• Benefits Realized
  • Fault Tolerance ‘so far’
• Lessons Learned
  • Get expertise help early in the infra design phase
E-Business Suite on Linux/9i RAC Migration

• Jacob Bar-Haim
  • CIO & Corporate VP for IT

• Orbottech Ltd.
The Markets We Serve

New Technologies

AOI

Direct Imaging
Plotting
CAM

Orbotech is a world leader in providing yield-enhancing solutions to the electronics industry.

New markets for core technologies

New Markets

Bare PCBs
Flat-Panel Displays
Assembled PCBs
Our Strength

- Technical expertise
  - The industry’s top scientists
  - Multidisciplinary know-how
  - Major investment in R & D

- Core Technologies
  - Numerous Patents & Patents Applications

- Global Infrastructure
  - 1500 Employees in over 30 countries

- Comprehensive Customer Support
- Financial Strength
Revenues & Distribution

($ Millions)

2003 2004 H1 2004 H1 2005
228.4 315.2 144.7 189.8

Services

Sales

Europe 8%
North America 10%
Japan 9%
Pacific Rim 73%

Display 47%
CAR 3%
PCB Assembly 8%
PCB Bareboard 42%
Global Infrastructure

1500 Employees in over 30 countries
WISE : Orbotech’s Oracle Apps.
Implementation

- **Customers:**
  - 400 employees in headquarter
  - 200 employees in the subsidiaries

- **WISE Team:**
  - 1 Manager
  - 2 DBA
  - 4 System analysts and 6 Programmers
  - 2 Support engineers

- **Modules:**
  - Logistics (INV, PUR, SCP, OM, WIP, QA)
  - HR (Training, Recruitment)
  - Finance (AP, AR, GL)

- **Interfaces:**
  - Service (OpenUPTIME)
  - ECO, Archive
  - HR Benefits
  - Travel Expenses

- **Reporting Tools:**
  - Discoverer
  - Cognos tools (EIS)
WISE History

- **WISE I** (Logistics modules, Order entry, GL)
  - “One Instance for All”
  - Configuration: 10.7 on windows platform and Oracle 7.x Database
  - Implementation: 1997 – 1999
  - Going live: Apr-1999

- **WISE II** (HR, OM, 3rd party warehouses)
  - Configuration: 11i (11.5.4), Web based
  - Going live: Feb-2002
  - Implementing Multi-Org
WISE History

• WISE III (Finance, Improved OM)
  • Implementation: 2005
  • Going live Phase I: August-2005: Israel & Pacific
  • Going live Phase II: May-2006: USA, Europe & Japan

• WISE IV - 2006
  • Version 11.5.10 on Linux platform and Oracle 10G Database
  • PLM, Spare Parts Managements, Collaborative Planning, Contracts Management, e-Business management (DBI), OAM(?)
Migration Goals

- Implement Orbotech’s Redundancy Policy on the ERP System
- Solve Infrastructure Scalability Barriers
- Use mainstream architecture
- Support Orbotech world wide operation
Orbotech’s Redundancy Policy

• Use Redundant infrastructure, including 9iRAC Database, multiple Application servers, and Load balancer
• Use Robust Central Storage
• Create a DRP site for emergency situations
Initial Architecture Barriers

- Single Database server was close to its maximum load capacity, causing performance issues
- Oracle on Windows platform got to its maximum memory level, unable to support more than ~500 concurrent sessions (about 150 oracle applications users)
- Using non mainstream Infrastructure, reflected on Oracle’s ability to support
Chosen Architecture for Oracle Apps. 11.5.8

- 2 x HP DL580 Intel based 4cpu servers Running Suse Linux O/S and Oracle 9.2.05 Database
- HP EVA Storage with fully redundant configuration
- 4 x HP DL380 Intel based 2cpu Linux servers for the application tier; one for concurrent manager processes and 3 for users sessions support
- Alteon Load balancer in front of the 3 application servers
Project Highlights

Phase I

- Move Database from Windows platform to Linux
- U/G Database from Ver. 8.1.7 to 9.2.05 and implement RAC
- Move Concurrent Manager to a dedicated application server
- Application tier is left on Windows platform
- Project team included: Orbotech’s DBA and System team, Oracle’s 9iRAC expert, Oracle’s Applications Expert, HP Linux and storage experts.
Project Highlights

Phase II
- Move Application tier to Linux using Oracle migration process
- Move Environment processes to Linux (printing, mail, fax, etc …)
- Extensive testing due to platform change

Phase III
- U/G Application tier from 11.5.8 to 11.5.10
- Database U/G to 10G
## General Project Time Table

<table>
<thead>
<tr>
<th>Stage</th>
<th>Description</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Phase I</strong></td>
<td>Planning, Sizing &amp; Pilot</td>
<td>2 Months (done)</td>
</tr>
<tr>
<td></td>
<td>Purchasing, Installing, Stress test &amp; Migration</td>
<td>1 Month (done)</td>
</tr>
<tr>
<td></td>
<td>Database Migration to Linux and 9i RAC.</td>
<td></td>
</tr>
<tr>
<td><strong>Phase II</strong></td>
<td>Pilot &amp; Excessive application testing.</td>
<td>2 Months (Planned for Q4/2005)</td>
</tr>
<tr>
<td></td>
<td>Installing &amp; Migration</td>
<td>1 Month (Planned for Q4/2005)</td>
</tr>
<tr>
<td></td>
<td>Application Tier Migration to Linux.</td>
<td></td>
</tr>
<tr>
<td><strong>Phase III</strong></td>
<td>Migration to Apps. Ver. 11.5.10 &amp; DB Ver. 10G</td>
<td>H1/2006</td>
</tr>
<tr>
<td></td>
<td>System Upgrade</td>
<td></td>
</tr>
</tbody>
</table>
The System is more stable

Performance is better and consistent

All known bottlenecks removed (more users can connect simultaneously).

Parallel concurrent processing (necessary when RAC is used) is not working reliably on Windows platform, forcing the Migration of the application tier to Linux also (Phase II)
Thank You!