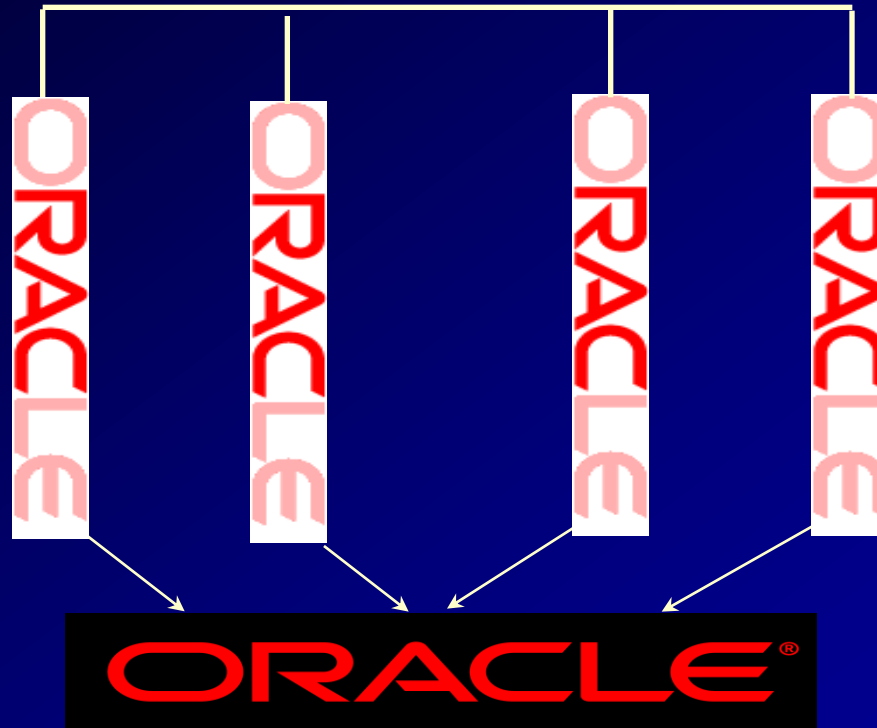


Tuning the Oracle Grid

New York 2009



Rich Niemiec, TUSC (www.tusc.com)

(Special Thanks: Caryl Lee Fisher, Paul Dorsey, Oracle Corporation Enterprise Manager Team, Jeff Gainer, Yvonne Formel)

(Thanks: Barb Dully, Angelo Pruscino, Prabhaker Gongloor, Anil Khilani, Jay Rossiter, John Kennedy, Julie Wong, Arsalan Farooq, Benoit Dageville, Jim Hawkins, Brad Brown & Joe Trezzo)



Audience Knowledge

- Oracle9i Experience ?
- Oracle9i RAC Experience?
- Oracle10g Experience?
- Oracle10g Grid Control Experience?
- Oracle 11g Experience?
- Goals
 - Overview of Tuning and Oracle 10g Grid
 - Focus on a few nice grid features of Oracle 10g
- Non-Goals
 - Learn ALL aspects of Tuning Oracle 10g
 - Learn how to install/manage RAC/Grid
 - 11g Grid





Overview



- The Basics, Oracle & Market Direction
- RAC, Grid Basics and Scaling it All
- Tuning the Interconnect & using Statspack/AWR
- Grid Control Basics, Multi-Node & Tuning
- Other quick Tips
- Availability thoughts
- Summary



Tip #1

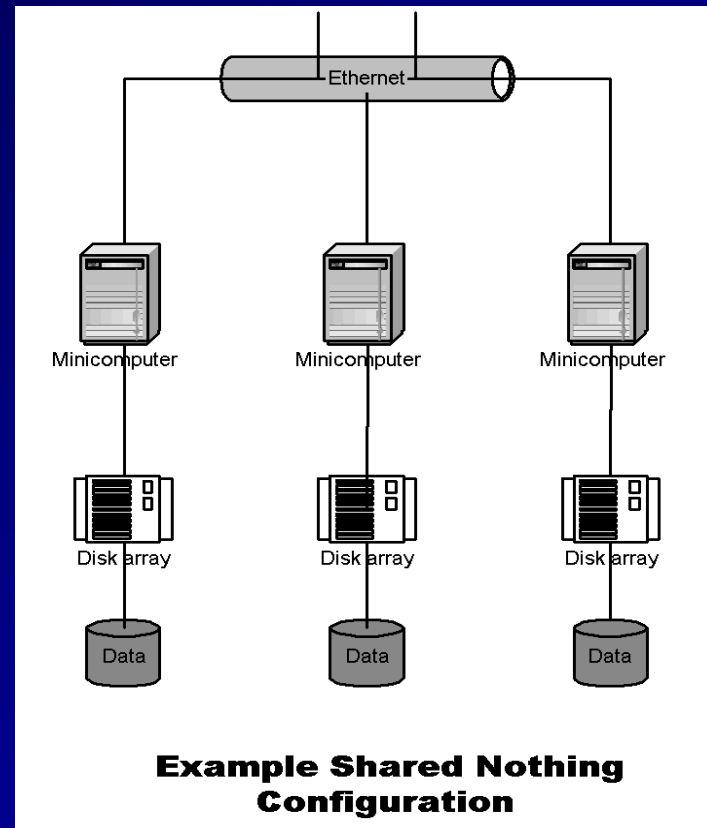
Know the Basics – OPS and early Clusters



Introduction to RAC

- IBM drove the Shared Nothing Architecture in its cluster solution.
- Others that use this*:
 - Teradata
 - Netezza
 - Google

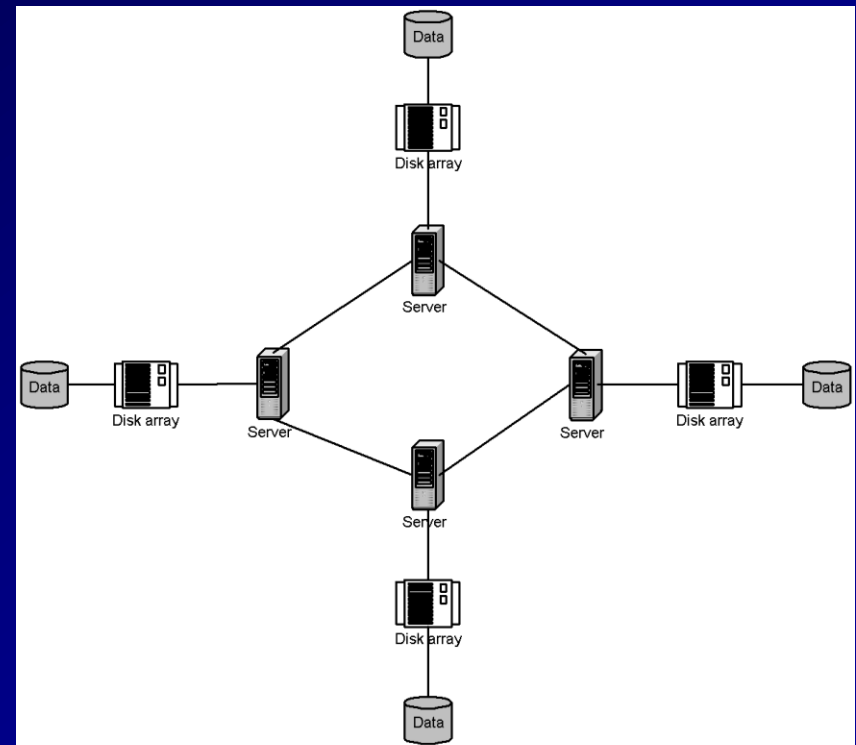
* *Wikipedia*





Introduction to RAC

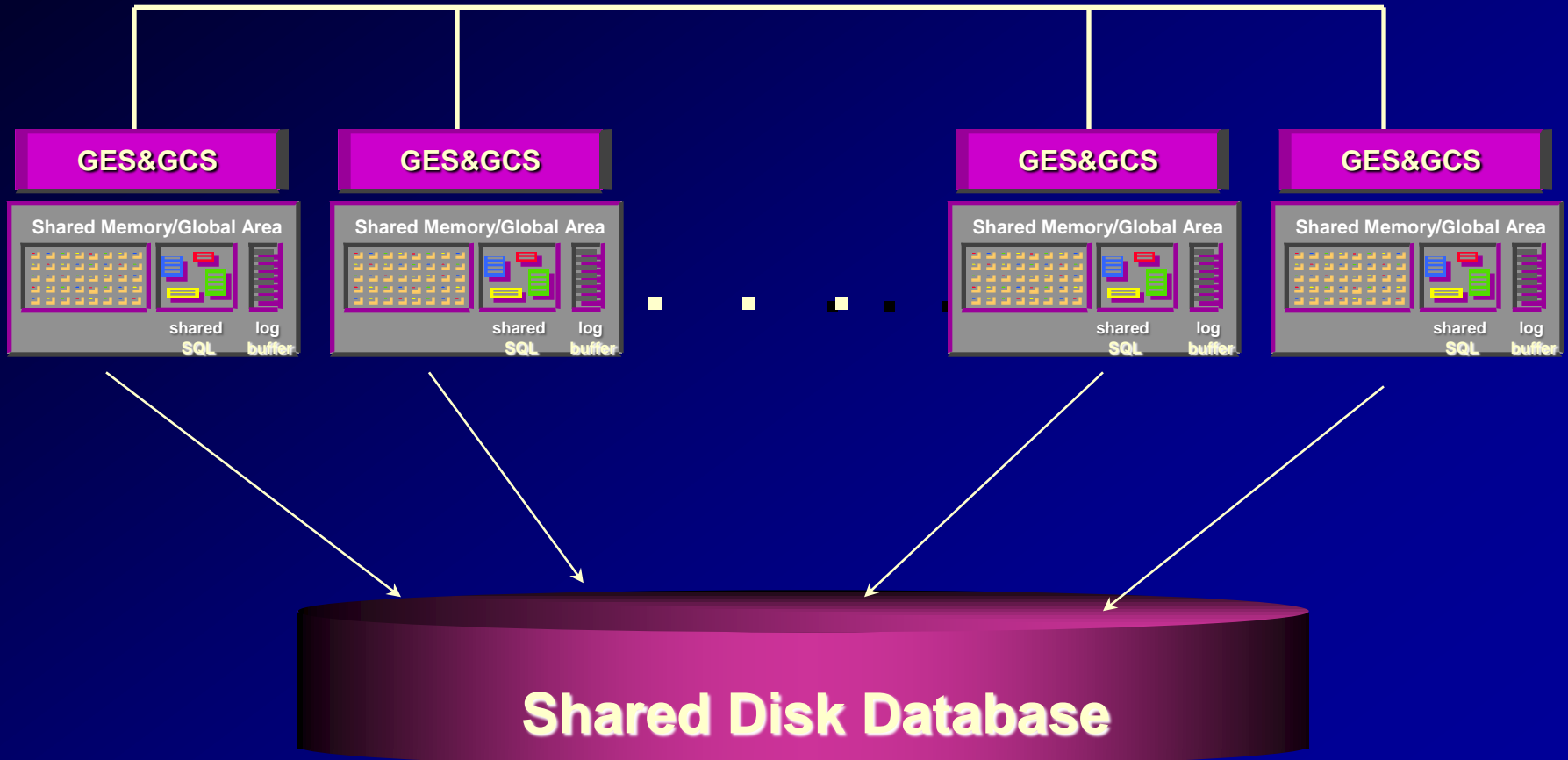
- Federated Databases (Microsoft based Architecture)
- Similar to shared-nothing



**MicroSoft Federated Architecture
(1)**



Introduction to RAC Shared Data Model





Tip #2

Know the Oracle

"I admire risk takers. I like leaders – people who do things before they become fashionable or popular. I find that kind of integrity inspirational."



LAWRENCE J. ELLISON | *Chairman & Chief Executive Officer, 2003*



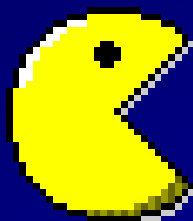
Oracle Firsts – *Innovation!*

- 1979 First commercial SQL relational database management system
- 1983 **First 32-bit** mode RDBMS
- 1984 First database with read consistency
- 1987 **First client-server** database
- 1994 First commercial and multilevel secure database evaluations
- 1995 **First 64-bit** mode RDBMS
- 1996 First to break the 30,000 TPC-C barrier
- 1997 **First Web** database
- 1998 First Database - Native **Java** Support; Breaks 100,000 TPC-C
- 1998 First Commercial RDBMS ported to **Linux**
- 2000 First database with **XML**
- 2001 First middle-tier database cache
- 2001 First RDBMS with **Real Application Clusters**
- 2004 First **True Grid Database**
- 2005 First **FREE Oracle Database** (10g Express Edition)
- 2006 First **Oracle Support for LINUX Offering**
- 2007 **Oracle 11g Released!**



Tip #3

Know the Market Direction – Consolidation!

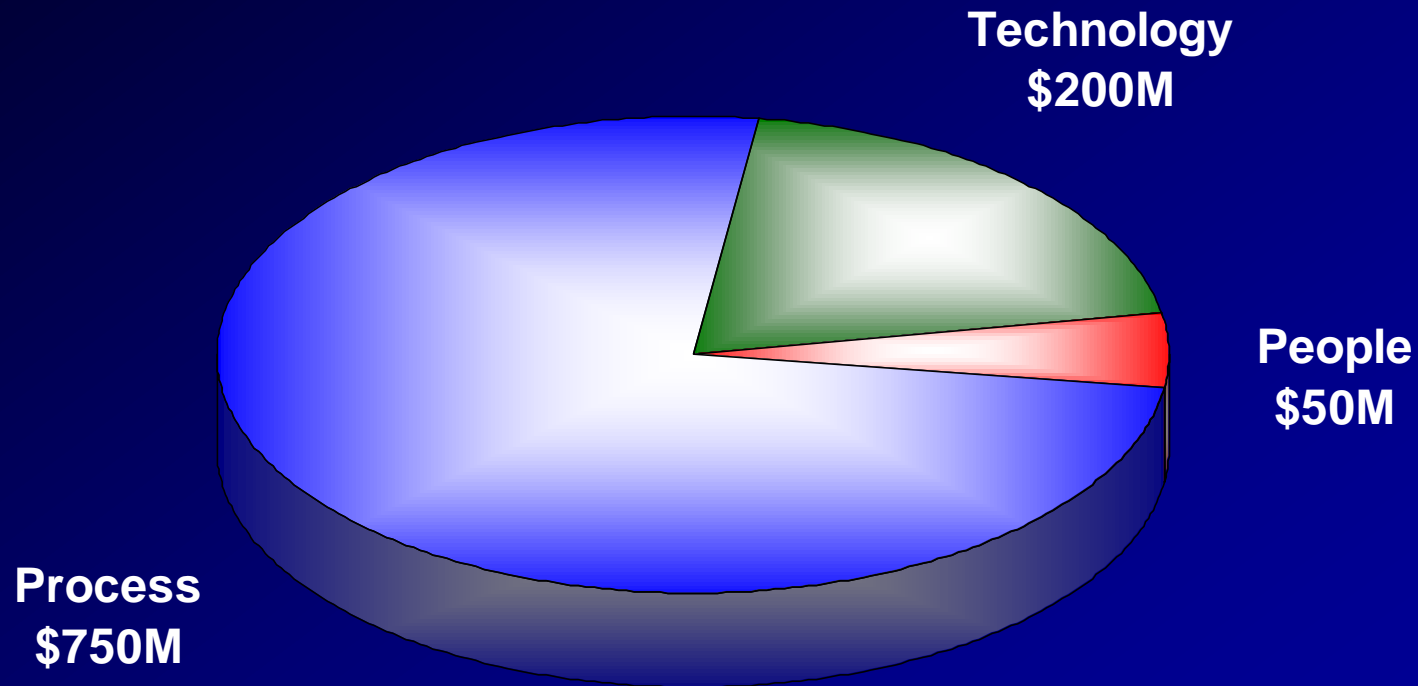


*“I think there is a world market for maybe 5
computers.”*

- Thomas Watson, IBM Chairman '43

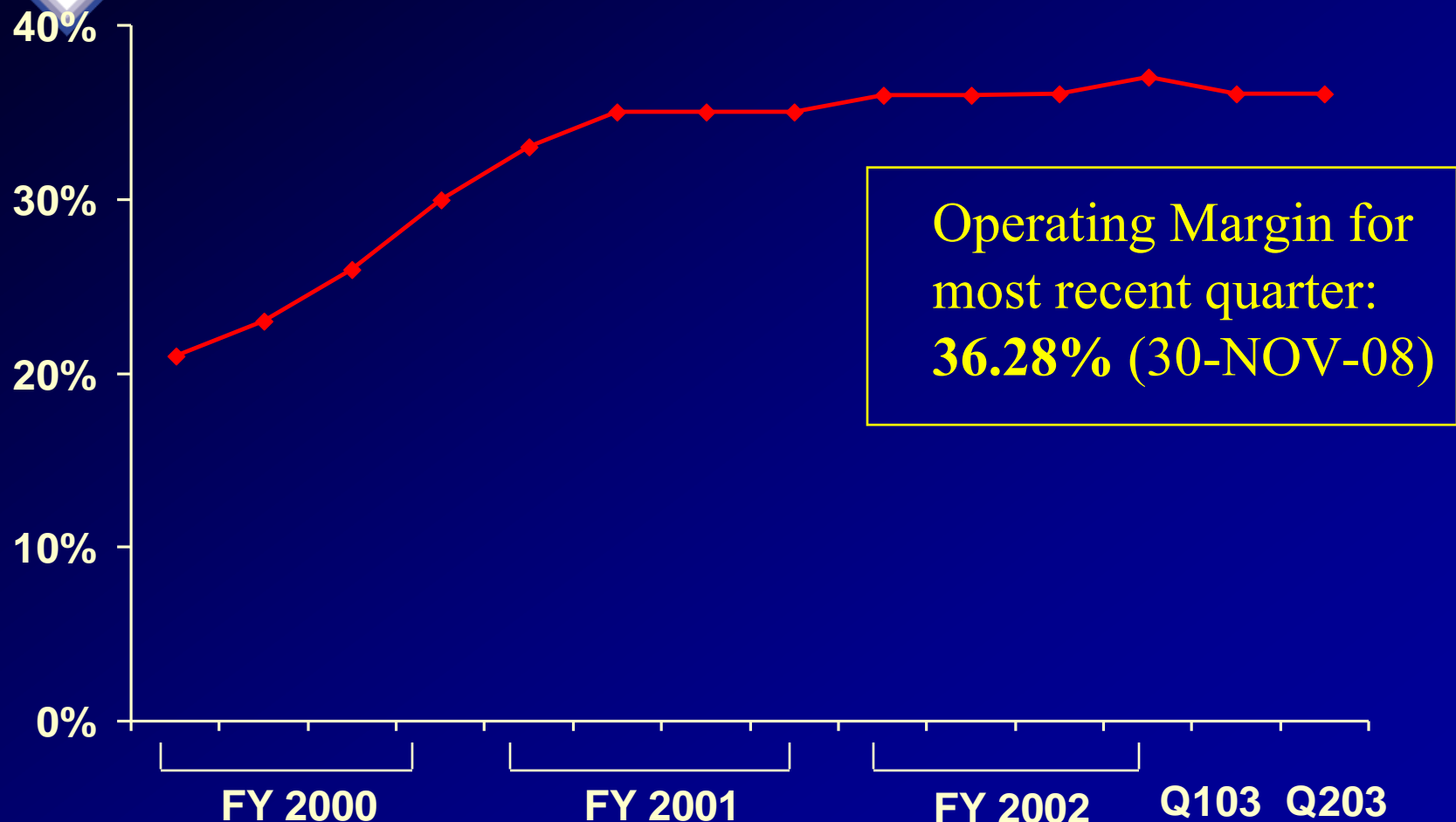


How Oracle saved \$1B: CONSOLIDATION! & Process



Operating Margin Improvement

Trailing 12 Month Operating Margin Trend

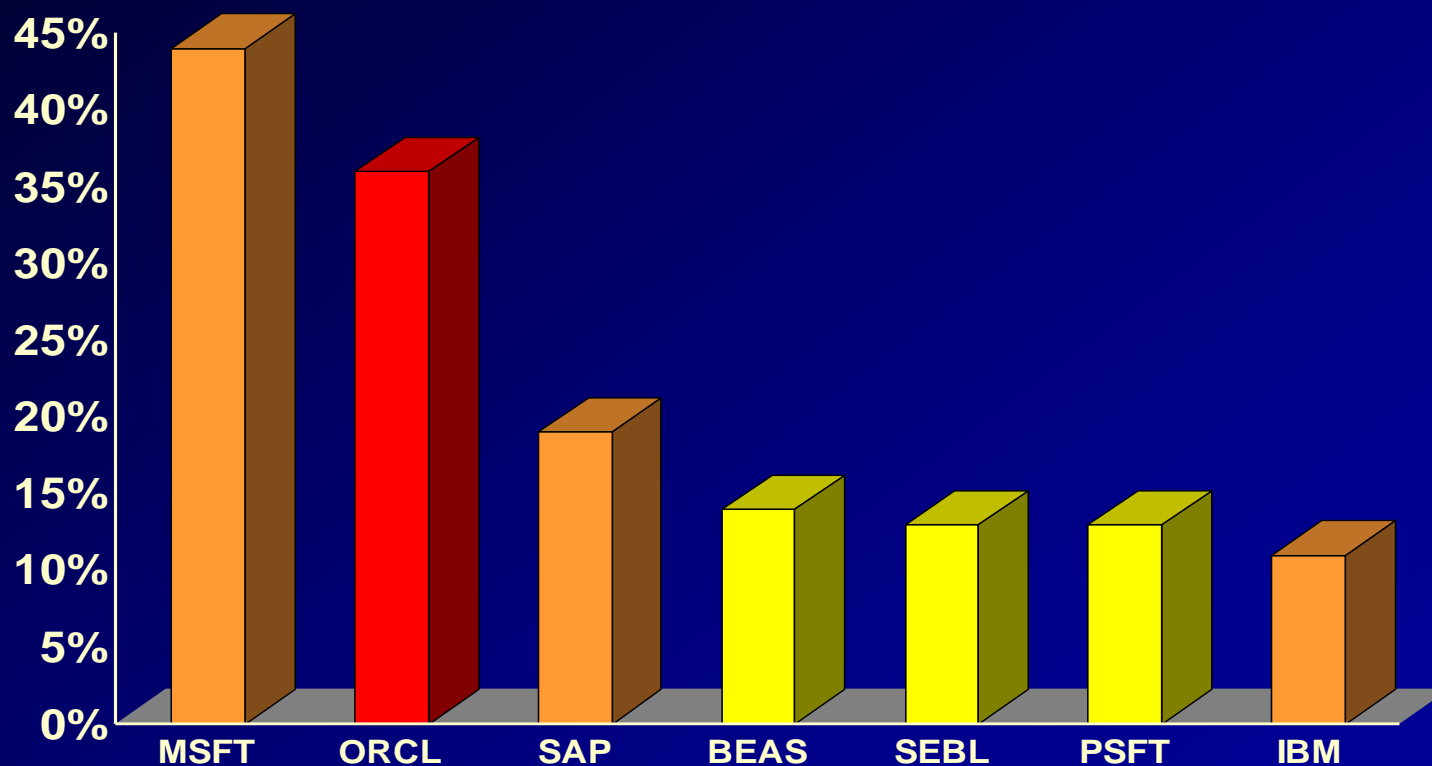


Note: Oracle Corporation - Ending November 2002



I saw this in a Jeff Henley Talk in 2003

Trailing 12 Months





PROJECT FUSION
Protect, Extend, Evolve
Your Applications Investment

Future Goal is to do this for Others:

Oracle and PeopleSoft – Better Together



ORACLE

Oracle Agrees to Buy Siebel

- Vaults Oracle to #1 in Customer Relationship Management
- Together Oracle and Siebel will be our customers' most valued partner

* Rule 425 Disclosure


SIEBEL
you > us

Not to be confused with... Fusion Middleware/**BI Acquisitions:**





Why Linux Helps RAC/Grid?

- Performance via Grid
- Availability via Grid
- Stability via Grid
- Security via Oracle
- Cost Savings via Smaller Servers (Grid)

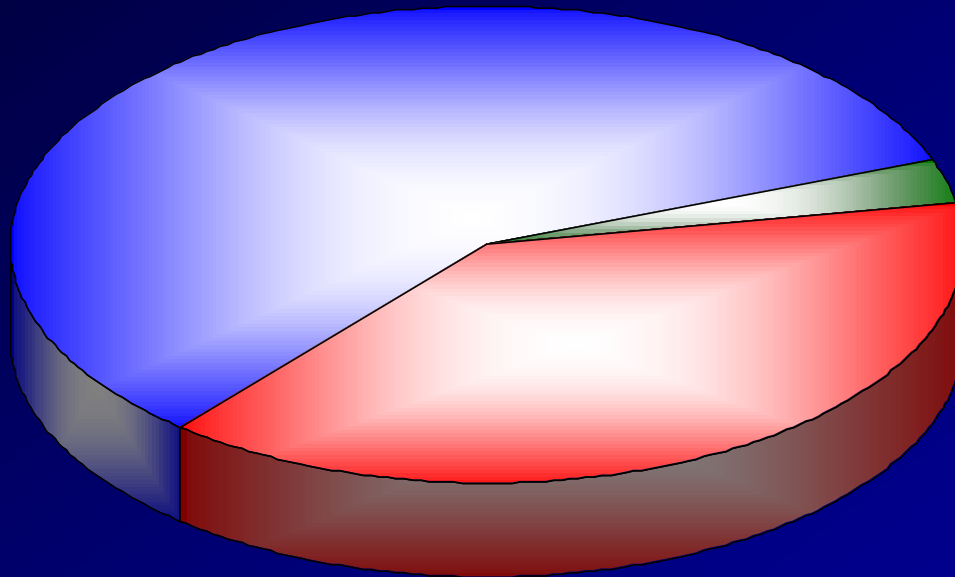
- Larry says so:
 - Companies start building, supporting and creating once Larry charts a bend in the road.



Commercial Linux Database Market 2002



IBM (58%)

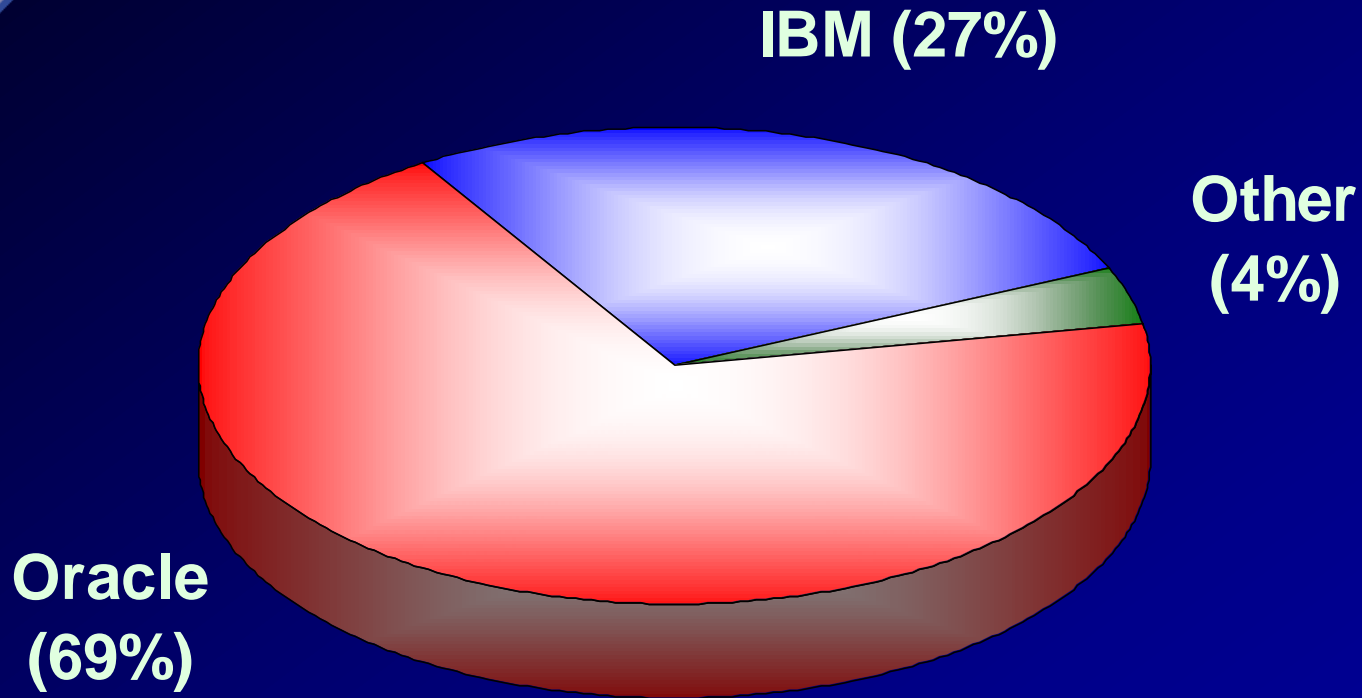


**Other
(3%)**

**Oracle
(39%)**

Source: Gartner, May 2005

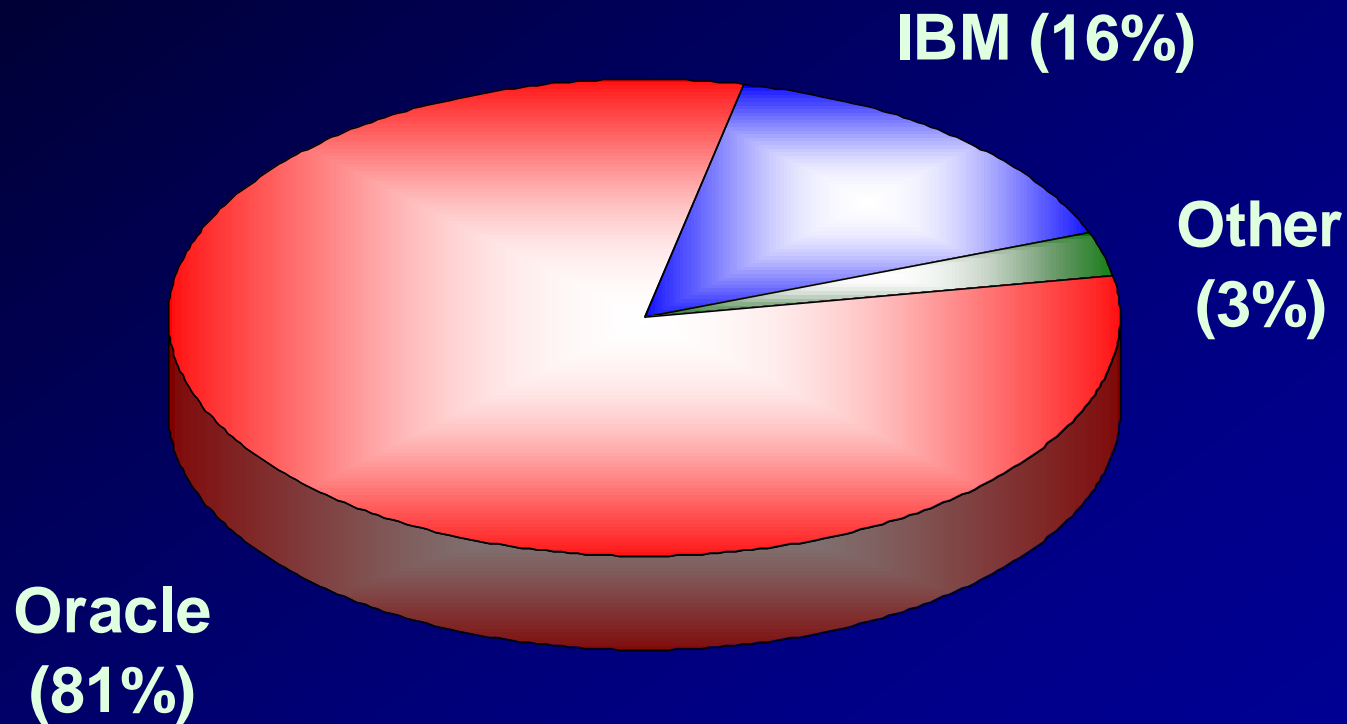
Commercial Linux Database Market 2003



Source: Gartner, May 2005



Commercial Linux Database Market 2004

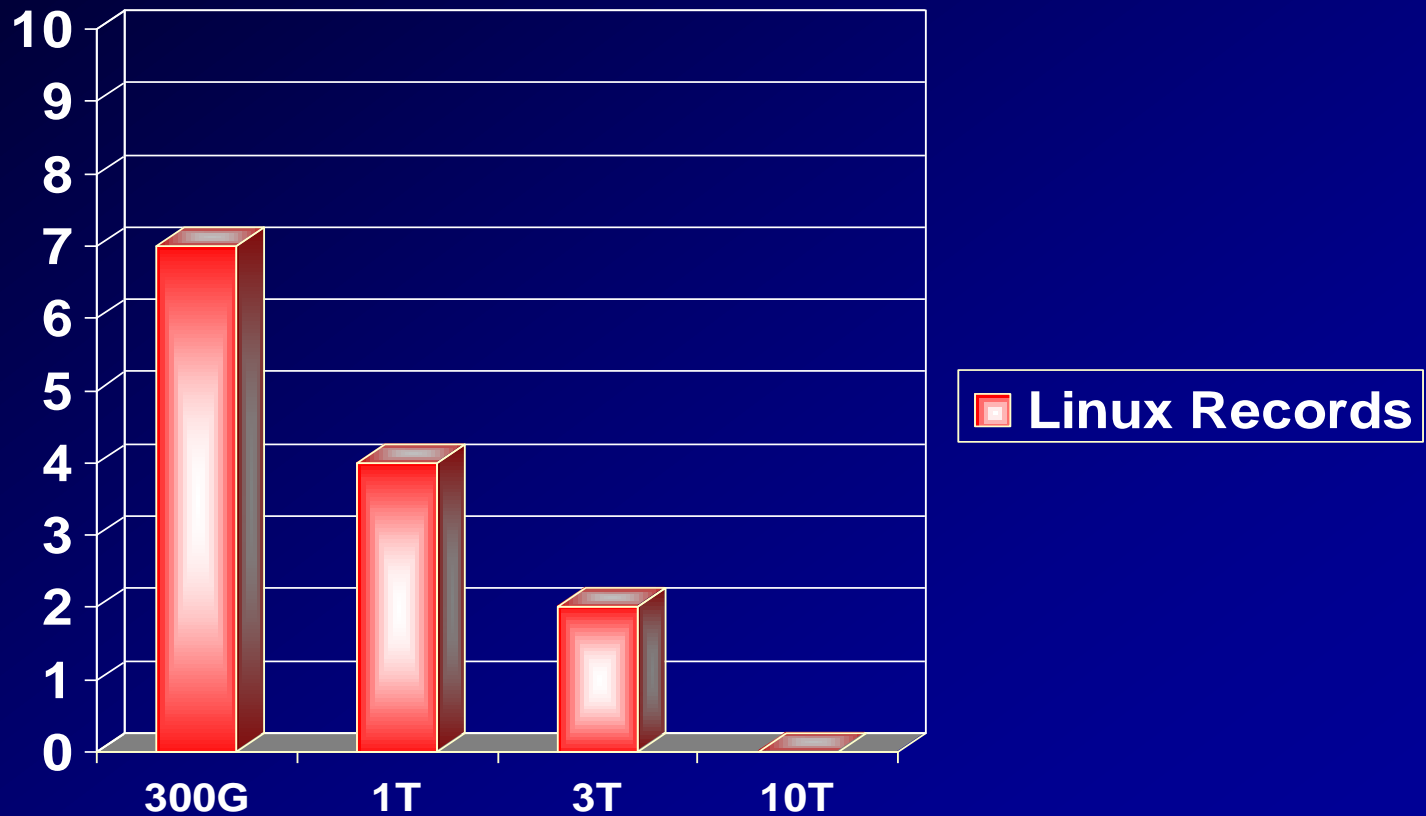


Source: Gartner, May 2005

**** Oracle had 82.6% in 2006 (Gartner, June 2007)**



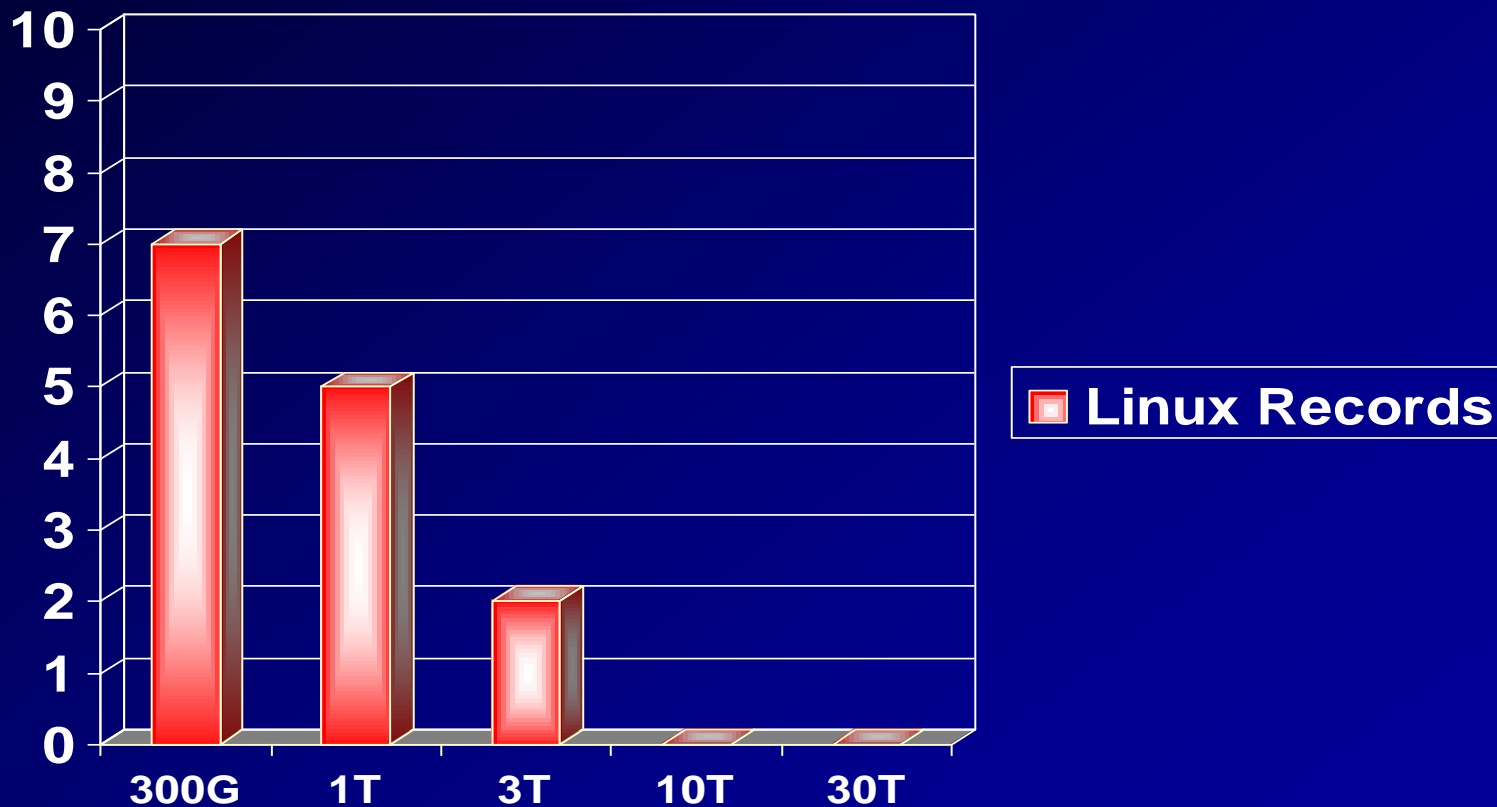
Records in Top 10 – TPC-H



Source: www.tpc.org (As of November 1, 2006)



Records in Top 10 – TPC-H



Source: www.tpc.org (As of April 16, 2008)

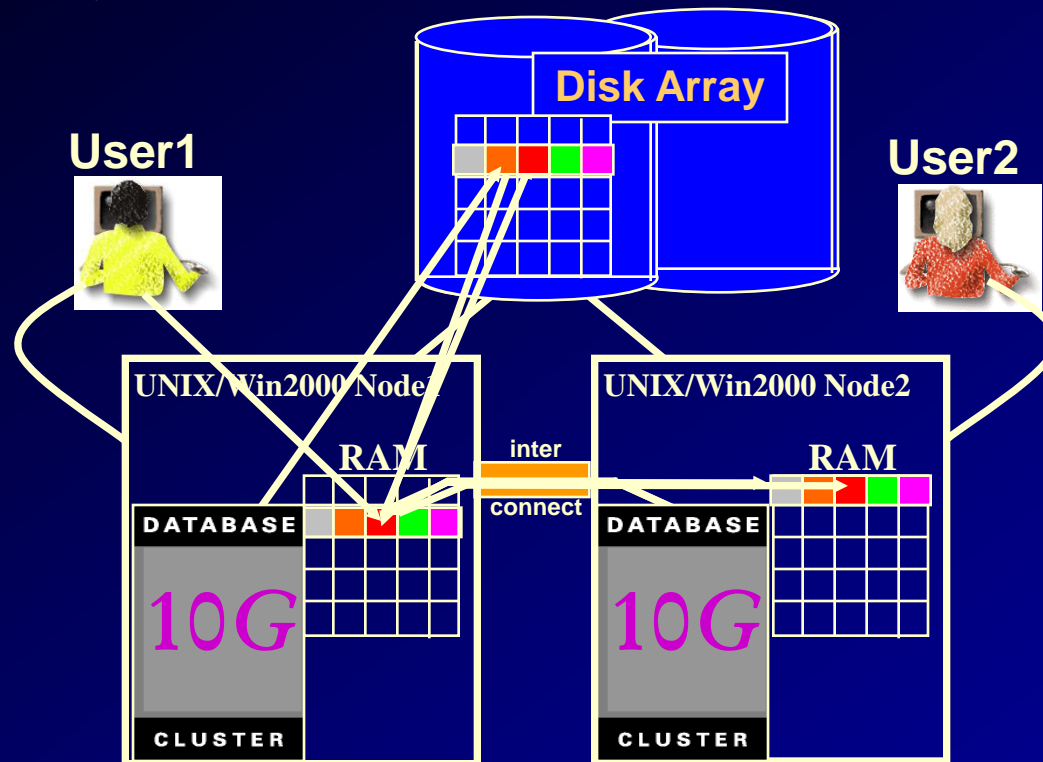


Tip #4: Grid Basics – Start with RAC

“Forrester estimates that there are more than 1,200 customers who are currently using RAC in production, and this is likely to double in the next 12-18 months...”

- Forrester, Oracle RAC Gains Momentum - 9/15/05

Real Applications Clusters - Cache Fusion



1. User1 queries data
2. User2 queries same data - via interconnect with no disc I/O
3. User1 updates a row of data and commits
4. User2 wants to update same block of data – 10g keeps data concurrency via interconnect



Tip #5: Grid Basics – Scaling it

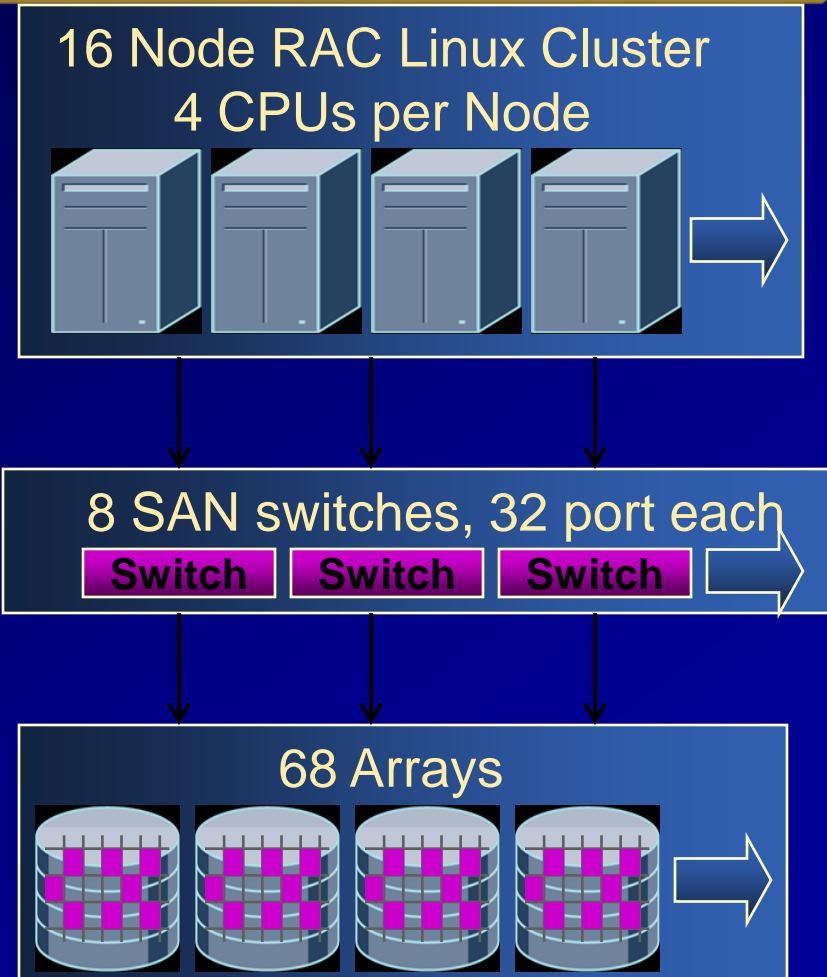
“The best thing about the Grid is that it is unstoppable.”

The Economist
June 2001₂₃



Amazon.com Data Warehouse

- 25 TB database
 - 15 TB row data
- 9iR2 using one Oracle Cluster File System per storage array
- Services 50,000 complex queries per week
 - 2 to 3 gigabyte (byte, not bit) per second table scan throughput
- Listed in top ten (6th) largest Warehouses in 2005 Winter Survey and only RAC system.
 - In 2003, Amazon was #5 with 13T.
 - Yahoo was #1 in 2005 with 100T of data (triple the #1 of 2003) and they had 385 trillion rows on Oracle!
 - Teradata had 4 of the Top 10 databases in the 2003 survey, yet has zero in the 2005 survey





Issues

- Too many filesystems
 - 68 arrays (2 luns ea.) results in 136 filesystems.
 - To get an even I/O across arrays needed a datafile for every tablespace on each filesystem.
 - Takes over 30 minutes to mount all the filesystems on a host reboot
- Too many datafiles
 - This resulted in thousands of datafiles that caused major management and performance issues
- Not performing to design
 - At first they used no async IO on OCFS 1.0 limited the throughput of cluster to 3 Gbytes of IO per second. Once we got to OCFS 1.0.14 and async I/O the throughput almost doubled to 5 Gbytes per second



Write Caches = Redo Performance

- Write cache
 - A fast array with write caching can do 0.5 ms average writes vs 6 ms for a non cached write
 - Write speed causes issues when writing redo slowing commit.
- Some items that can affect your write times
 - Internal array mirroring
 - They used faster Controllers & mirrored them (doubled IOPS)
- ASM
 - ASM allowed them to use BIGFILE tablespaces which cut datafiles < 100
 - No slow reboots due to mounting



Tip #6

Tune the Interconnect



Normal database Tuning and Monitoring

- Prior to tuning RAC specific operations, each instance should be tuned separately.
 - APPLICATION Tuning (Fix the SQL fixes everything)
 - DATABASE Tuning (Bad setup = Bad performance)
 - OS Tuning (Bad setup = Bad performance)

THEN - You can begin tuning RAC



Tuning the RAC Cluster Interconnect

High GCS Time Per Request

- Problem Indicators:
 - High Transfer Time
 - One node showing excessive transfer time
- Use OS commands to verify cluster interconnects are functioning correctly.
- Contention for blocks: Modify the object to reduce the chances for application contention.
 - Reduce the number of rows per block
 - Adjust the block size to a smaller block size
 - Modify INITRANS and FREELISTS



Tip #7

Use Statspack & AWR to Tune RAC



Statspack/AWR – Check Regularly

1. Top 5 wait events
2. Load Profile
3. Instance Efficiency Hit Ratios
4. Wait Events / **Wait Event Histograms**
5. Latch Waits
6. Top SQL
7. Instance Activity / **Time Model Stats / O/S Stats**
8. File I/O / **File Read Histogram / Undo Stats**
9. Memory Allocation
10. Undo



Tuning the RAC Cluster Interconnect

Using STATSPACK Reports

- The STATSPACK report show statistics ONLY for the node or instance on which it was run.
- Run `statspack.snap` procedure and `spreport.sql` script on each node you want to monitor to compare to other instances.
- In 10g you can still use statspack or you can also use the **new AWR Report**.



Tuning the RAC Cluster Interconnect Using STATSPACK Reports

- Top 5 Timed Events

CPU time (processing time) should be the predominant event

Exceeds CPU time, therefore needs investigation.

Top 5 Timed Events

~~~~~

Event

Waits

Time (s)

% Elap  
Time

-----  
global cache cr request

820

154

72.50

CPU time

54

25.34

global cache null to x

478

1

.52

control file sequential read

600

1

.52

control file parallel write

141

1

.28

- 
- Transfer times are excessive from other instances in this cluster to this instance.
  - Could be due to network problems or buffer cache sizing issues.



# Tuning the RAC Cluster Interconnect Using AWR Reports (FYI Only)

## Global Cache Load Profile

|                                | Per Second | Per Transaction |
|--------------------------------|------------|-----------------|
| Global Cache blocks received:  | 0.38       | 0.05            |
| Global Cache blocks served:    | 0.26       | 0.04            |
| GCS/GES messages received:     | 766.83     | 106.40          |
| GCS/GES messages sent:         | 1,278.25   | 177.36          |
| DBWR Fusion writes:            | 0.01       | 0.00            |
| Estd Interconnect traffic (KB) | 404.57     |                 |

## Global Cache Efficiency Percentages (Target local+remote 100%)

|                                 |        |
|---------------------------------|--------|
| Buffer access - local cache %:  | 100.00 |
| Buffer access - remote cache %: | 0.00   |
| Buffer access - disk %:         | 0.00   |

## Global Cache and Enqueue Services - Workload Characteristics

|                                                   |     |
|---------------------------------------------------|-----|
| Avg global enqueue get time (ms):                 | 1.9 |
| Avg global cache cr block receive time (ms):      | 1.8 |
| Avg global cache current block receive time (ms): | 1.9 |
| Avg global cache cr block build time (ms):        | 0.0 |
| Avg global cache cr block send time (ms):         | 0.2 |
| Global cache log flushes for cr blocks served %:  | 0.0 |
| Avg global cache cr block flush time (ms):        |     |
| Avg global cache current block pin time (ms):     | 0.1 |



Done



Internet



# Tuning the RAC Cluster Interconnect Using AWR Reports (FYI Only)

## SQL ordered by Cluster Wait Time

| Cluster Wait Time (s) | CWT % of Elapsed Time | Elapsed Time(s) | CPU Time (s) | Executions | SQL Id | SQL Module | SQL Text |
|-----------------------|-----------------------|-----------------|--------------|------------|--------|------------|----------|
| 75.00                 | 0.38                  | 19,515.02       | 7,568.17     | 1,680      |        |            |          |
| 0.85                  | 3.63                  | 23.36           | 7.56         | 1          |        |            |          |
| 0.15                  | 13.69                 | 1.09            | 0.76         | 1          |        |            |          |
| 0.09                  | 31.73                 | 0.27            | 0.08         | 46         |        |            |          |
| 0.06                  | 12.31                 | 0.46            | 0.30         | 1          |        |            |          |
| 0.03                  | 0.20                  | 14.19           | 6.18         | 1,688      |        |            |          |
| 0.03                  | 0.26                  | 10.71           | 2.71         | 1,688      |        |            |          |
| 0.03                  | 83.42                 | 0.03            | 0.00         | 1          |        |            |          |
| 0.02                  | 36.30                 | 0.07            | 0.06         | 4          |        |            |          |
| 0.02                  | 43.85                 | 0.06            | 0.01         | 1          |        |            |          |
| 0.02                  | 1.77                  | 1.12            | 0.54         | 10         |        |            |          |
| 0.02                  | 10.23                 | 0.15            | 0.13         | 1          |        |            |          |
| 0.02                  | 3.76                  | 0.40            | 0.02         | 1          |        |            |          |
| 0.01                  | 12.17                 | 0.11            | 0.09         | 1          |        |            |          |
| 0.01                  | 33.26                 | 0.03            | 0.02         | 1          |        |            |          |
| 0.01                  | 8.39                  | 0.09            | 0.09         | 177        |        |            |          |
| 0.01                  | 11.26                 | 0.02            | 0.00         | 1          |        |            |          |

Done

Internet



# Tuning the RAC Cluster Interconnect Using STATSPACK Reports

- Guidelines for interconnect statistics:
  - All times should be  $< 15\text{ms}$
- High values could indicate possible network or memory problems
- Could also be caused by application locking issues
- May need to review the enqueue section of STATSPACK or AWR report for further analysis.

# AWR – High Insert: ITL Issues



## Segments by ITL Waits

- % of Capture shows % of ITL waits for each top segment compared
- with total ITL waits for all segments captured by the Snapshot

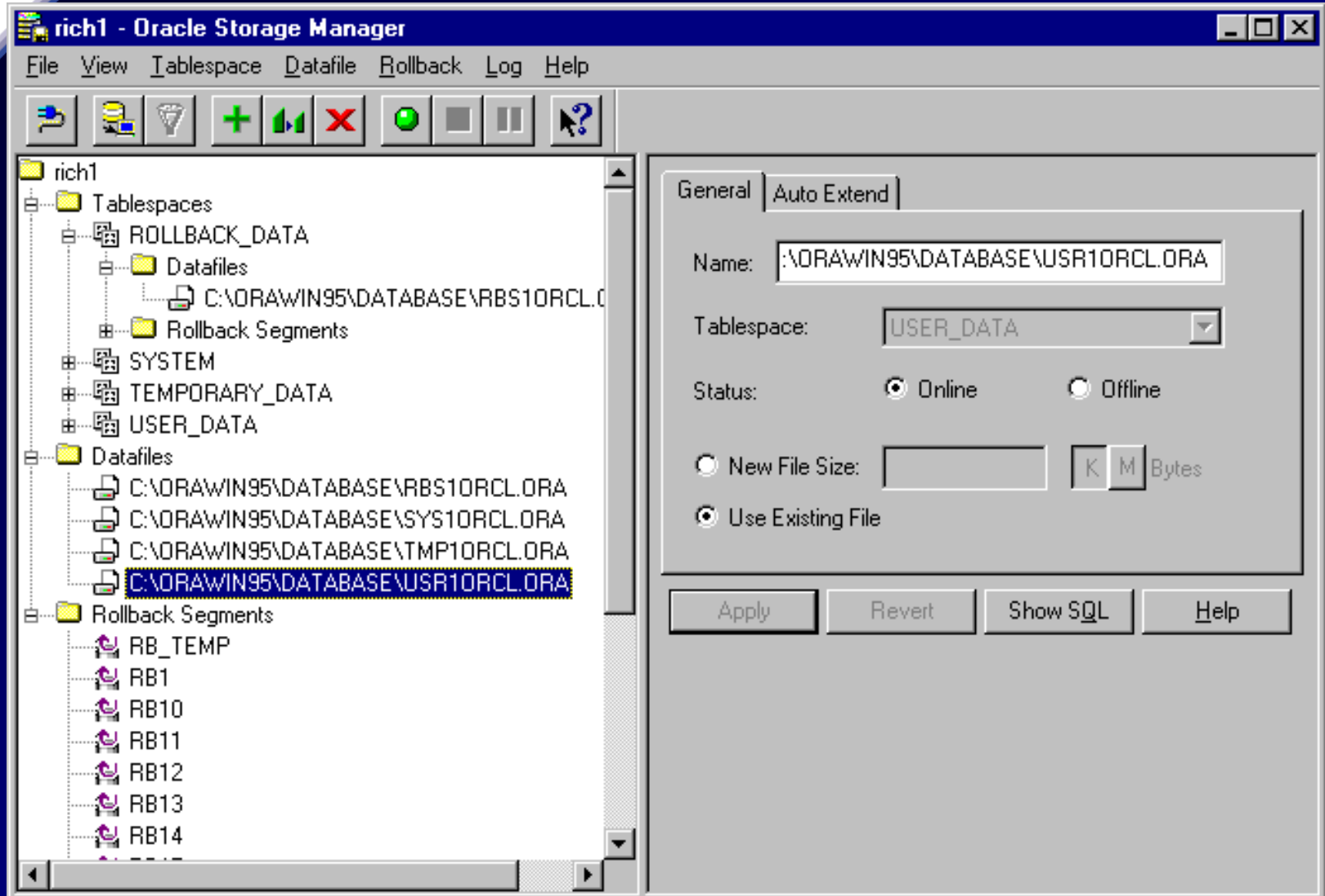
| Owner | Tablespace Name | Object Name | Subobject Name | Obj. Type       | ITL Waits | % of Capture |
|-------|-----------------|-------------|----------------|-----------------|-----------|--------------|
|       |                 |             |                | INDEX PARTITION | 126       | 32.06        |
|       |                 |             |                | INDEX PARTITION | 112       | 28.50        |
|       |                 |             |                | INDEX PARTITION | 66        | 16.79        |
|       |                 |             |                | INDEX PARTITION | 65        | 16.54        |
|       |                 |             |                | INDEX PARTITION | 12        | 3.05         |



# Tip #8

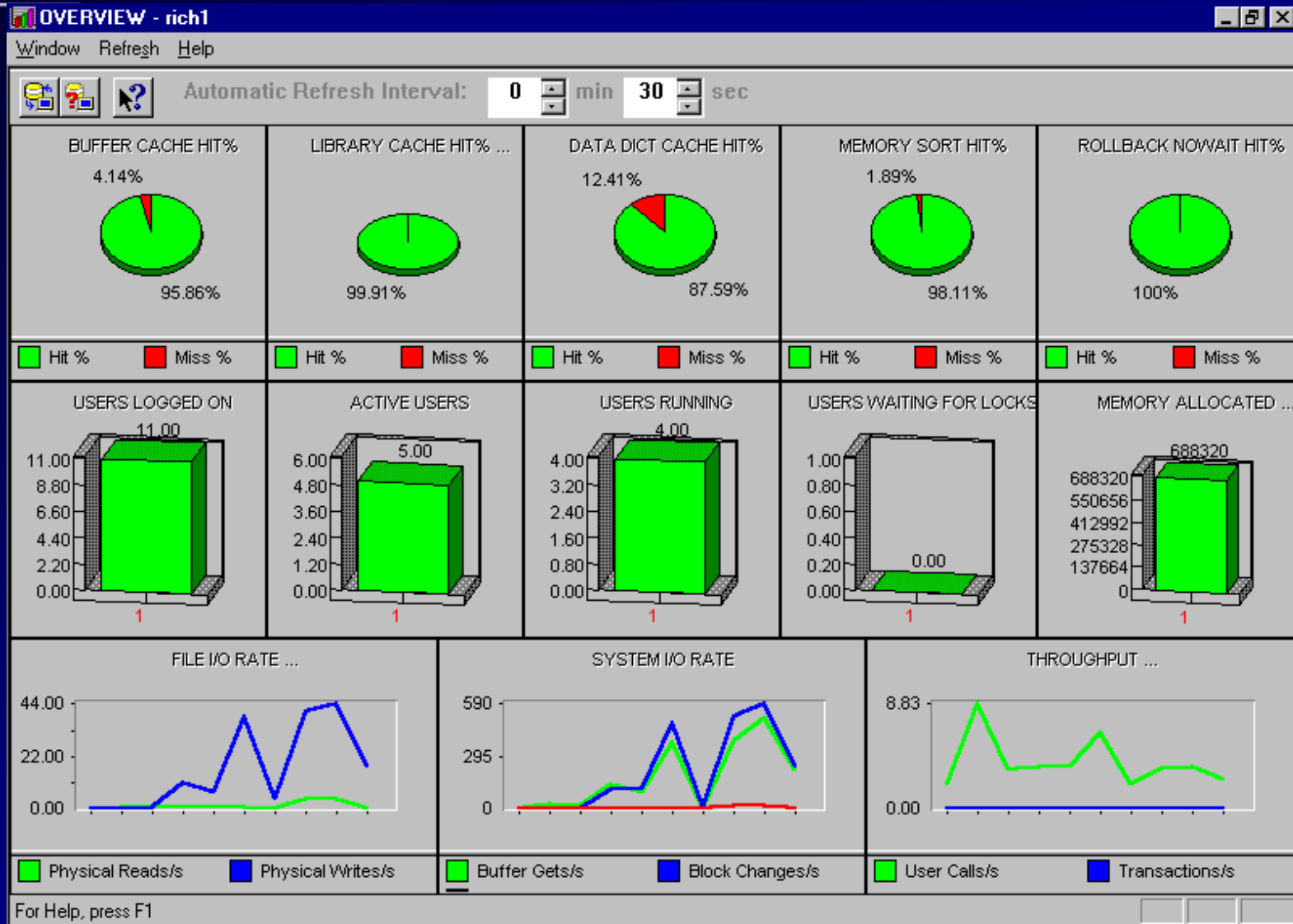
## Use Grid Control

# Enterprise Manager: Back in Time!





# Performance Manager : Back in Time!







# Grid Control 10gR2: Monitor All Targets

Monitor  
Targets...  
are they  
up?

Target  
Alerts

Oracle Enterprise Manager (GCDemo) - Oracle Enterprise Manager Console Homepage - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address http://tdsgcm01.oracleleads.com/em/console/home

ORACLE Enterprise Manager 10g  
Grid Control

Home Targets Deployments Alerts Policies Jobs Reports

Page Refreshed Apr 13, 2006 2:23:09 PM CDT

View All Targets

Overview

Total Monitored Targets **201**

All Targets Status

Down(6)  
Unknown(4)  
Up(169)

All Targets Alerts

Critical **47**  
Warning **47**  
Errors **42**

All Targets Policy Violations

Critical **209**  
Warning **80**  
Informational **10**

All Targets Jobs

Problem Executions (last 7 days) **1**  
Suspended Executions (last 7 days) **0**

Target Search

Search All

Security Policy Violations

Critical **197**  
Warning **79**  
Informational **3**  
New in Last 24 Hours **5**

Critical Patch Advisories for Oracle Homes

Patch Advisories **1**

Patch Advisory information may be stale.  
Oracle MetaLink refresh job has not run successfully in 72 hours.

Affected Oracle Homes **7**

Job [RefreshFromMetalink](#)

Deployments Summary

View Database Installations

| Database Installations         | Targets | Installations | Interim Patches Applied |
|--------------------------------|---------|---------------|-------------------------|
| Oracle Database 10g 10.1.0.3.0 | 1       | 1             | Yes                     |
| Oracle Database 10g 10.1.0.4.0 | 1       | 2             | Yes                     |
| Oracle Database 10g 10.1.0.4.2 | 1       | 1             | No                      |
| Oracle Database 10g 10.2.0.1.0 | 3       | 3             | No                      |
| Oracle9i 9.2.0.6.0             | 0       | 1             | No                      |

Resource Center

[Documentation](#)  
[Release Notes](#)  
[Support](#)  
[Oracle Technology Network](#)



# Grid Control 10gR2: See the Specific Hosts

Click on  
Targets  
Tab...

See the  
Specific  
HOSTS

Oracle Enterprise Manager (GCDEMO) - Hosts - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Home Search Favorites

http://tdscrm01.oracleads.com/em/console/targets

ORACLE Enterprise Manager 10g  
Grid Control

Home Targets Deployments Alerts Policies Jobs Reports

Hosts | Databases | Application Servers | Web Applications | Services | Systems | Groups | All Targets | Collaboration Suites | NetApp Filers

Hosts

Page Refreshed Apr 13, 2006 2:27:15 PM CDT

Search  Go Advanced Search

Remove Configure Add

| Select                | Name                      | Status | Alerts | Policy Violations | Compliance Score (%) | CPU Util % | Mem Util % | CPU IO Wait % | Transfers/s | Swap Util % | CPU Load (5min) | Location |
|-----------------------|---------------------------|--------|--------|-------------------|----------------------|------------|------------|---------------|-------------|-------------|-----------------|----------|
| <input type="radio"/> | stdemo06.oracle.com       |        | 0 1    | 44 2 0            | 60                   | 100        | 82.56      | 79.08         |             | 22.2        | .48             |          |
| <input type="radio"/> | stdemo07.oracle.com       |        | 1 1    | 33 2 0            | 60                   | 100        | 54.55      | 84.91         |             | 38.45       | .35             |          |
| <input type="radio"/> | stdsbeacon.idc.oracle.com |        | 0 2    | 13 3 0            | 70                   | 11.42      | 79.32      | 0             |             | .08         | .07             |          |
| <input type="radio"/> | stdsbeacon.uk.oracle.com  |        | 0 1    | 5 1 0             | 76                   | 63.81      | 82.16      | .04           |             | 0           | .9              |          |
| <input type="radio"/> | tdsgcbea01.oracleads.com  |        | 0 0    | 5 1 0             | 76                   | 4.3        | 46.59      | 1.48          |             | 0           | .03             |          |
| <input type="radio"/> | tdsgcm01.oracleads.com    |        | 0 0    | 6 1 0             | 57                   | 10.01      | 74.55      | 1.95          |             | 0           | .15             |          |
| <input type="radio"/> | tdsgcrep01.oracleads.com  |        | 0 2    | 6 1 0             | 57                   | 100        | 98.02      | 2.12          |             | 8.07        | 4.82            |          |
| <input type="radio"/> | tdsgcweb01.oracleads.com  |        | 0 0    | 5 1 0             | 76                   | 5.18       | 70.84      | 2.18          |             | 0           | .35             |          |
| <input type="radio"/> | tdsgcwin02.oracleads.com  |        | 0 0    | 5 1 0             | 80                   | 5.33       | 62.7       |               | 0           | 1.48        |                 |          |
| <input type="radio"/> | tdsocs80.oracleads.com    |        | 1 0    | 5 1 0             | 76                   | 12.82      | 96.37      | .47           |             | 1.69        | 1               |          |
| <input type="radio"/> | tdspet01.oracleads.com    |        | 1 0    | 6 1 0             | 57                   | 12.82      | 97.21      | 1.84          |             | .6          | .21             |          |

Remove Configure Add

TIP For an explanation of the icons and symbols used in this page, see the [Icon Key](#).

Related Links

[Customize Table Columns](#) [Execute Host Command](#)

Home | Targets | Deployments | Alerts | Policies | Jobs | Reports | Setup | Preferences | Help | Logout

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[About Oracle Enterprise Manager](#)



# Grid Control 10gR2: See the Specific Databases

Still on  
Targets  
Tab...

See a  
Specific  
Database

Cluster  
Database

Oracle Enterprise Manager (GCDEMO) - Databases - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address: http://tdsgcm01.oracleads.com/em/console/targets?ctxType=Databases

ORACLE Enterprise Manager 10g  
Grid Control

Home Targets Deployments Alerts Policies Jobs Reports

Hosts Databases Application Servers Web Applications Services Systems Groups All Targets Collaboration Suites NetApp Filers

### Databases

Page Refreshed Apr 13, 2006 2:27:52 PM CDT

Targets Not Configured 1

Search  (Go) [Advanced Search](#)

| Select Name               | Type                            | Status | Alerts | Policy Violations | Compliance Score (%) | Sessions: CPU | Sessions: I/O | Sessions: Other | Instance CPU (%) | Library cache pin (%) | Data Dictionary Hit (%) | Free buffer waits (%) |
|---------------------------|---------------------------------|--------|--------|-------------------|----------------------|---------------|---------------|-----------------|------------------|-----------------------|-------------------------|-----------------------|
| emrep.oracleads.com       | Database Instance               |        |        | 11 11 4           | 91                   |               |               |                 |                  |                       |                         |                       |
| ora10g.oracle.com         | Database Instance               |        | 0 2    | 6 4 2             | 88                   | .01           | 0             | 0               | .5               |                       | 92                      | ✓                     |
| ora10gR2.oracleads.com    | Database Instance               |        | 0 3    | 11 17 2           | 91                   | 0             | 0             | 0               | .28              |                       | 100                     | ✓                     |
| prod                      | Cluster Database<br>(1 of 2 up) |        | 1 5    | 6 0 0             | 93                   | n/a           | n/a           | n/a             | n/a              | n/a                   | ✓                       | n/a                   |
| tdsocs80.oracleads.com_DB | Database Instance               |        | 0 8    | 10 18 2           | 92                   | .05           | 0             | .03             | 1.25             |                       | 100                     | ✓                     |

☒ TIP For an explanation of the icons and symbols used in this page, see the [Icon Key](#).

**Related Links**

[Customize Table Columns](#) [Dictionary Baselines](#) [Dictionary Comparisons](#)  
[Execute SQL](#) [Recovery Catalogs](#)

Home Targets Deployments Alerts Policies Jobs Reports Setup Preferences Help Logout

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[About Oracle Enterprise Manager](#)





# Grid Control 10gR2: View the Topology

One node  
is  
UP

One node  
is  
DOWN

Oracle Enterprise Manager (GCDEMO) - Cluster Database: prod - Microsoft Internet Explorer

Address: http://tdsgcm01.oracleads.com/em/console/rac/racSiteMap?type=rac\_database&target=prod&pageNum=5

Hosts | Databases | Application Servers | Web Applications | Services | Systems | Groups | **All Targets** | Collaboration Suites | NetApp Filers

Cluster: stdemo06\_cluster

**Cluster Database: prod**

Latest Data Collected From Target **Apr 13, 2006 2:28:44 PM CDT** (Refresh)

Home | Performance | Administration | Maintenance | **Topology**

Cluster Database topology presents the host view of a cluster database. Database instances, ASM instances, listeners, and interfaces information is available. You can optionally view configuration information. These views can also be used to launch various administration and configuration functions.

☒ Show Only Hosts With Instances ☐ Show Configuration Details View Data: **Manually**

**Overview**

**Selection Details**

Name: **prod\_prod1**  
Type: **Database Instance**  
Host: **stdemo06.oracle.com**  
Critical Alerts: **0**  
Warning Alerts: **3**  
Status: **Up**

**Summary**

Status: **Up**  
Up: **2** (↓1 ↑1)  
Instances: **Cluster: stdemo06\_cluster**

**Legend**

Home | Performance | Administration | Maintenance | **Topology**

**Instances**

| Name       | Status | Alerts | Policy Violations | Compliance Score (%) | ADDM Findings | ASM                       | Sessions: CPU | Sessions: I/O | Sessions: Other | Instance CPU (%) | Library cache pin (%) | Data Dictionary Hit (%) | Free buffer waits (%) |
|------------|--------|--------|-------------------|----------------------|---------------|---------------------------|---------------|---------------|-----------------|------------------|-----------------------|-------------------------|-----------------------|
| prod_prod1 | (U)    | 0 3    | 0 0 0             | 100                  | 0             | +ASM1_stdemo06.oracle.com | 0             | 0             | 0               | .05              |                       |                         |                       |



# Grid Control 10gR2: Look at all Systems

Monitor  
Systems  
and their  
members

Oracle Enterprise Manager (GCDEMO) - Systems - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Home Search Favorites

Address http://tdsgcm01.oracleads.com/em/console/targets?ctxType=Systems

ORACLE Enterprise Manager 10g  
Grid Control

Home Targets Deployments Alerts Policies Jobs Reports

Hosts | Databases | Application Servers | Web Applications | Services | **Systems** | Groups | All Targets | Collaboration Suites | NetApp Filers

**Systems**

Page Refreshed Apr 13, 2006 2:31:07 PM CDT

Search [ ] Go Advanced Search

Remove Configure Add

| Select                           | Name                                                | Type                        | Alerts | Policy Violations | Members                                                                 |
|----------------------------------|-----------------------------------------------------|-----------------------------|--------|-------------------|-------------------------------------------------------------------------|
| <input checked="" type="radio"/> | <a href="#">Calendar System 1</a>                   | Calendar System             | 0 0    | 8 2 0             | Host<br>Calendar Server<br>Redundancy Group<br><a href="#">more..</a>   |
| <input type="radio"/>            | <a href="#">Collaboration Suite Search System 1</a> | Ultrasearch System          | 0 0    | 5 1 0             | OC4J<br>OCS Search Client<br>Redundancy Group<br><a href="#">more..</a> |
| <input type="radio"/>            | <a href="#">Discussions System 1</a>                | Discussions System          | 0 0    | 8 2 0             | Host<br>OC4J<br><a href="#">more..</a>                                  |
| <input type="radio"/>            | <a href="#">EM Website System</a>                   | System                      | 1 0    | 22 12 4           | OC4J<br>Host<br><a href="#">more..</a>                                  |
| <input type="radio"/>            | <a href="#">Identity Management System 1</a>        | Identity Management System  | 0 0    | 7 1 0             | OC4J<br>Single Sign-On<br>Redundancy Group<br><a href="#">more..</a>    |
| <input type="radio"/>            | <a href="#">Mail System 1</a>                       | Mail System                 | 0 0    | 18 20 2           | Host<br>OC4J<br><a href="#">more..</a>                                  |
| <input type="radio"/>            | <a href="#">MedRecServer System</a>                 | System                      | 0 0    | 2 0 0             | BEA WebLogic<br>Server Domain<br>BEA WebLogic<br>Managed Server         |
| <input type="radio"/>            | <a href="#">Mobile Collaboration System 1</a>       | Mobile Collaboration System | 0 0    | 9 2 0             | OC4J<br>Mobile Collaboration<br><a href="#">more..</a>                  |
| <input type="radio"/>            | <a href="#">OCS System 1</a>                        | OCS System                  | 0 0    | 20 20 2           | OC4J<br>Host<br><a href="#">more..</a>                                  |



# Grid Control 10gR2: Click on a Specific System

Click on  
the  
PetStore  
System

Check  
all  
changes  
made  
and  
Alerts

Oracle Enterprise Manager (GCDEMO) - System: Petstore | System - Microsoft Internet Explorer

Address: http://tdsgcm01.oracleads.com/em/console/target/groups/view/home?type=generic\_system&target=Petstore%201%20System&ctx.Type=Systems

ORACLE Enterprise Manager 10g  
Grid Control

Home Targets Deployments Alerts Policies Jobs Reports

Hosts | Databases | Application Servers | Web Applications | Services | **Systems** | Groups | All Targets | Collaboration Suites | NetApp Filers

**System: Petstore | System**

Page Refreshed Apr 13, 2006 2:31:36 PM CDT (Refresh) (Launch Dashboard)

Home Charts Administration Components Topology

**Status** (Status History)

100% Uat6

**Alerts** (Alert History)

| Severity | Current | Last 24 hours |
|----------|---------|---------------|
| ✖        | 5       | 0             |
| ⚠        | 0       | 0             |
| Total    | 5       | 0             |

**Policy Violations**

| Severity | Current | Last 24 Hours |     | Distinct Rules Violated |
|----------|---------|---------------|-----|-------------------------|
|          |         | Cleared       | New |                         |
| ✖        | 10      | 0             | 0   | 6                       |
| ⚠        | 1       | 0             | 0   | 1                       |
| i        | 0       | 0             | 0   | 0                       |
| Total    | 11      | 0             | 0   | 7                       |

Policy Trend Overview

**Security Policy Violations**

| Severity | Current | Last 24 Hours |     | Distinct Rules Violated |
|----------|---------|---------------|-----|-------------------------|
|          |         | Cleared       | New |                         |
| ✖        | 9       | 0             | 0   | 5                       |
| ⚠        | 1       | 0             | 0   | 1                       |
| i        | 0       | 0             | 0   | 0                       |
| Total    | 10      | 0             | 0   | 6                       |

Security At a Glance

Critical Patch Advisories for Oracle Homes

**Services**

| Name     | Type            | Status | Performance Alerts | Usage Alerts | Policy Violations |
|----------|-----------------|--------|--------------------|--------------|-------------------|
| Petstore | Web Application | ⓘ      | 0 0                | 3 0          | 0 0 0             |

**Configuration Changes**  
Configuration changes detected for the last 7 days

| Category                    | Changes |
|-----------------------------|---------|
| ▼ All Target Types          | 0       |
| ▶ Host                      | 0       |
| ▶ OC4J                      | 0       |
| ▶ Oracle Application Server | 0       |
| ▶ Oracle HTTP Server        | 0       |
| ▶ Web Cache                 | 0       |

Home Charts Administration Components Topology

**Related Links**

Access Edit System Reports  
Target Properties





# Grid Control 10gR2: Specific System – Chart Tab

Click on  
Charts to  
see  
further  
details

Launch  
Dashboard  
(See next  
slide)

The screenshot shows the Oracle Enterprise Manager 10gR2 interface for a system named 'Petstore'. The browser window title is 'Oracle Enterprise Manager (GCDEMO) - System: Petstore | System - Microsoft Internet Explorer'. The address bar shows the URL: [http://tdsgcm01.oracleleads.com/em/console/target/groups/view/charts?type=generic\\_system&target=Petstore%20%20system&event=Refresh&ctxType=Systems](http://tdsgcm01.oracleleads.com/em/console/target/groups/view/charts?type=generic_system&target=Petstore%20%20system&event=Refresh&ctxType=Systems). The page has a navigation bar with tabs: Home, Targets, Deployments, Alerts, Policies, Jobs, Reports. Below this is a sub-navigation bar with links: Hosts, Databases, Application Servers, Web Applications, Services, Systems (highlighted), Groups, All Targets, Collaboration Suites, NetApp Filers. The main content area is titled 'System: Petstore | System' and includes a 'Page Refreshed Apr 13, 2006 2:32:21 PM CDT' status. There are buttons for 'Refresh' and 'Launch Dashboard'. The 'Charts' tab is selected, showing two charts: 'CPU Utilization (%): Host: Highest Average' and 'Total Disk I/O Per Second: Host: Highest Average'. Both charts show data for 'tdspet01.oracleleads.com' over a period from April 12, 2006, to April 13, 2006. The CPU chart shows a peak around 12 AM on April 13. The disk I/O chart shows a sharp spike at the same time. Below the charts are 'Related Links' for Access, Edit System, Reports, and Target Properties. The footer contains copyright information and a link to 'About Oracle Enterprise Manager'.



# Grid Control 10gR2: Specific System – Dashboard

Dashboard  
for the  
PetStore  
system &  
Targets

X5 Petstore I System - System Monitoring Dashboard - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Reload Home Search Favorites

Address [http://tdsgcm01.oracleads.com/em/console/target/system/systemDashboard?type=generic\\_system&target=Petstore%20I%20System&ctxType=Systems](http://tdsgcm01.oracleads.com/em/console/target/system/systemDashboard?type=generic_system&target=Petstore%20I%20System&ctxType=Systems)

ORACLE Enterprise Manager 10g  
Grid Control

System: Petstore I System Page Refreshed Apr 13, 2006 2:33:10 PM CDT Refresh

| Target                                                | Type                      | Status | Alerts | Policy Violations | CPU Utilization (%) | Total Disk I/O Per Second | Total Disk I/O Per Second | Total Disk I/O Per Second | Memory Utilization (%) |
|-------------------------------------------------------|---------------------------|--------|--------|-------------------|---------------------|---------------------------|---------------------------|---------------------------|------------------------|
| <a href="#">ias10g.tdspet01.oracleads.com</a>         | Oracle Application Server | Up     | 4      | 0                 | 4                   | 0                         | -                         | -                         | -                      |
| <a href="#">ias10g.tdspet01.oracleads.com HTTP...</a> | Oracle HTTP Server        | Up     | 2      | 0                 | 2                   | 0                         | -                         | -                         | -                      |
| <a href="#">tdspet01.oracleads.com</a>                | Host                      | Up     | 1      | 0                 | 6                   | 1                         | 0                         | 0                         | 0                      |
| <a href="#">ias10g.tdspet01.oracleads.com Web ...</a> | Web Cache                 | Up     | 0      | 0                 | 1                   | 0                         | 0                         | 0                         | 0                      |
| <a href="#">ias10g.tdspet01.oracleads.com home</a>    | OC4J                      | Up     | 0      | 0                 | 1                   | 0                         | 0                         | 0                         | 0                      |

Alerts 0 5 0

| Severity | Target                                                    | Date                     | Message                                                                                      | Latest Comment |
|----------|-----------------------------------------------------------|--------------------------|----------------------------------------------------------------------------------------------|----------------|
| Warning  | <a href="#">ias10g.tdspet01.oracleads.com</a>             | Jan 18, 2006 11:58:32 AM | Memory Utilization is 95.24%                                                                 |                |
| Warning  | <a href="#">ias10g.tdspet01.oracleads.com</a>             | Mar 15, 2006 8:10:11 AM  | Memory Utilization of HTTP Server is 103.11%                                                 |                |
| Warning  | <a href="#">ias10g.tdspet01.oracleads.com HTTP Server</a> | Mar 15, 2006 8:12:04 AM  | Memory Utilization is 100%                                                                   |                |
| Warning  | <a href="#">ias10g.tdspet01.oracleads.com HTTP Server</a> | Mar 27, 2006 4:51:43 AM  | The number of active requests is 146                                                         |                |
| Warning  | <a href="#">tdspet01.oracleads.com</a>                    | Apr 12, 2006 9:32:48 AM  | Filesystem /app has 4% available space, fallen below warning (20) or critical (5) threshold. |                |

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Legend

Alerts





# Grid Control 10gR2: Specific Groups

Now  
move to  
Groups

Many  
more  
Changes

Oracle Enterprise Manager (GCDEMO) - Group: Production Databases - Microsoft Internet Explorer

Address: http://tdsgcm01.oracleads.com/em/console/target/groups/view/home?type=composite&target=Production%20Databases&ctxType=Groups

ORACLE Enterprise Manager 10g  
Grid Control

Home | Targets | Deployments | Alerts | Policies | Jobs | Reports

Hosts | Databases | Application Servers | Web Applications | Services | Systems | **Groups** | All Targets | Collaboration Suites | NetApp Filers


**Group: Production Databases**

Page Refreshed Apr 13, 2006 2:35:08 PM CDT (Refresh) (Launch Dashboard)

Home | Charts | Administration | Members

**Status**

Status History



Configuration Changes

Configuration changes detected for the last 7 days

| Category            | Changes |
|---------------------|---------|
| ▼ All Target Types  | 26      |
| ▶ Cluster Database  | 6       |
| ▶ Database Instance | 20      |

**Alerts**

Alert History

| Severity | Current | Last 24 hours |
|----------|---------|---------------|
| ✖        | 0       | 0             |
| ⚠        | 8       | 0             |
| Total    | 8       | 0             |

**Policy Violations**

| Severity | Current | Last 24 Hours |     | Distinct Rules Violated |
|----------|---------|---------------|-----|-------------------------|
|          |         | Cleared       | New |                         |
| ✖        | 23      | 0             | 0   | 16                      |
| ⚠        | 21      | 0             | 0   | 9                       |
| i        | 4       | 0             | 0   | 4                       |
| Total    | 48      | 0             | 0   | 29                      |

[Policy Trend Overview](#)

**Security Policy Violations**

| Severity | Current | Last 24 Hours |     | Distinct Rules Violated |
|----------|---------|---------------|-----|-------------------------|
|          |         | Cleared       | New |                         |
| ✖        | 20      | 0             | 0   | 13                      |
| ⚠        | 21      | 0             | 0   | 9                       |
| i        | 1       | 0             | 0   | 1                       |
| Total    | 42      | 0             | 0   | 23                      |

[Security At a Glance](#)

**Critical Patch Advisories for Oracle Homes**

Current 1

⚠ Patch Advisory information may be stale.  
Oracle MetaLink refresh job has not run successfully in 72 hours.

Affected Oracle Homes 4

Job [RefreshFromMetalink](#)



# Grid Control 10gR2: All Targets – Specific DB

Monitor  
DB and  
all core  
Info.

Click on  
Policy  
Trends  
(See next  
slide)

Oracle Enterprise Manager (GCDEMO) - Database Instance: ora10gR2.oracleads.com - Microsoft Internet Explorer

Address: http://tdsgcm01.oracleads.com/em/console/database/instance/sitemap?event=doLoad&target=ora10gR2.oracleads.com&type=oracle\_database&pageNum=1

ORACLE Enterprise Manager 10g  
Grid Control

Home Targets Deployments Alerts Policies Jobs Reports

Hosts | Databases | Application Servers | Web Applications | Services | Systems | Groups | All Targets | Collaboration Suites | NetApp Filers

Logged in As DBSNMP

Database Instance: ora10gR2.oracleads.com

Home Performance Administration Maintenance

Latest Data Collected From Target Apr 13, 2006 3:30:14 PM CDT Refresh View Data Automatically (60 sec)

### General

Status Up  
Up Since Mar 27, 2006 1:51:55 AM CST  
Instance Name ora10gR2  
Version 10.2.0.1.0  
Host tdspe01.oracleads.com  
Listener LISTENER\_tdspe01.oracleads.com

Shutdown Black Out

View All Properties

### Host CPU

Load 0.35 Paging 0.00

### Active Sessions

Maximum CPU 1

### SQL Response Time

SQL Response Time (%) 111.04

### Diagnostic Summary

ADDM Findings 0  
Alert Log Apr 4, 2006 7:46:33 AM

### Space Summary

|                                 |       |
|---------------------------------|-------|
| Database Size (GB)              | 2,061 |
| Problem Tablespace              | 0     |
| Segment Advisor Recommendations | 0     |
| Space Violations                | 0     |
| Dump Area Used (%)              | 96    |

### High Availability

|                                |          |
|--------------------------------|----------|
| Instance Recovery Time (sec)   | 20       |
| Last Backup                    | n/a      |
| Usable Flash Recovery Area (%) | 100      |
| Flashback Logging              | Disabled |

### Alerts

Category All Go Critical 0 Warning 3

| Severity | Category  | Name               | Message                              | Alert Triggered         |
|----------|-----------|--------------------|--------------------------------------|-------------------------|
| Warning  | Dump Area | Dump Area Used (%) | 96% of background dump area is used. | Apr 12, 2006 9:25:40 AM |
| Warning  | Dump Area | Dump Area Used (%) | 96% of core dump area is used.       | Apr 12, 2006 9:25:40 AM |
| Warning  | Dump Area | Dump Area Used (%) | 96% of user dump area is used.       | Apr 12, 2006 9:25:40 AM |

### Related Alerts

### Policy Violations

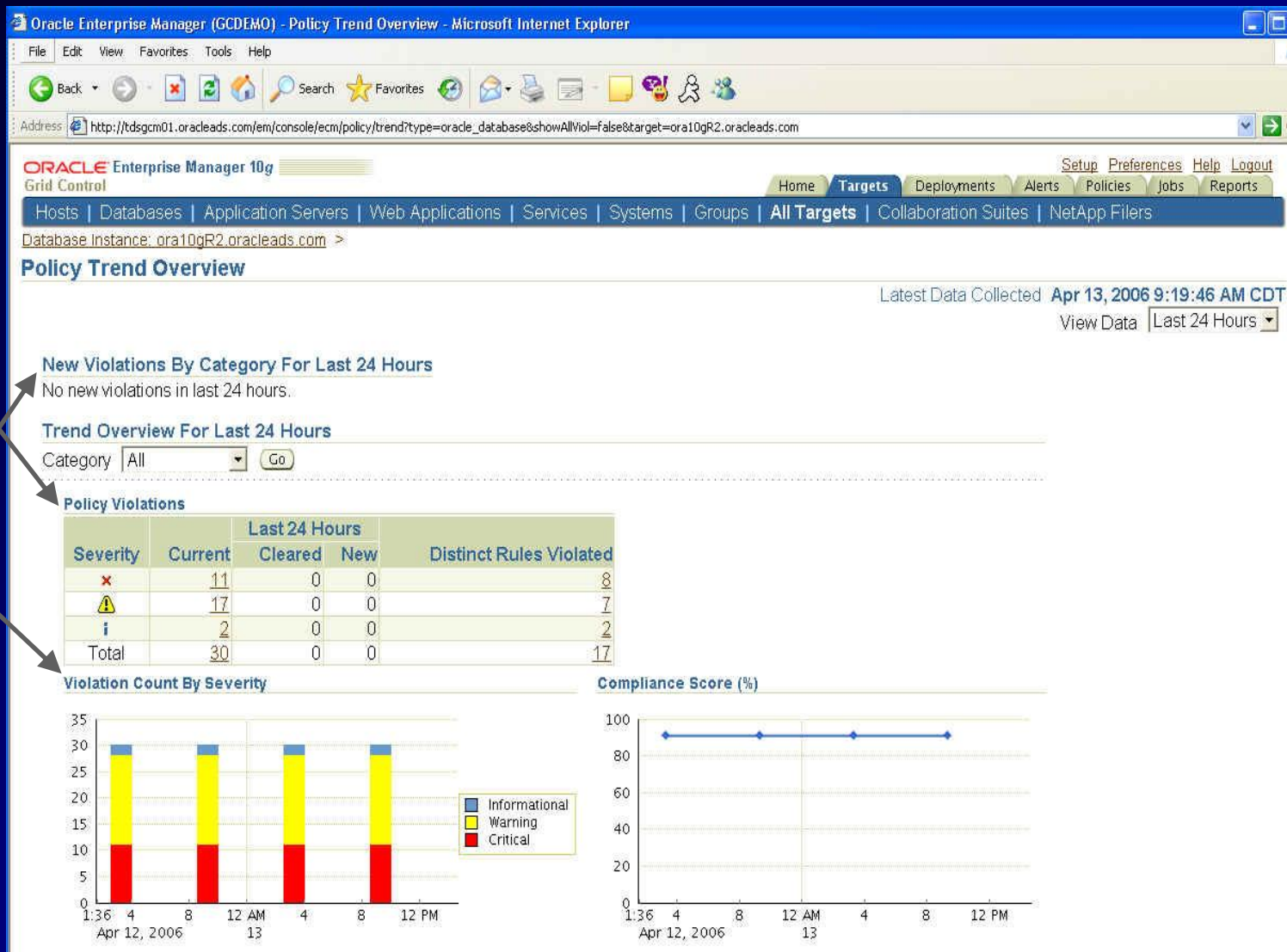
Current 11 17 2 Distinct Rules Violated 8 7 2 Compliance Score (%) 91

Policy Trend Overview



# Grid Control 10gR2: Specific DB – Policy Trends

Policy  
Trend  
Overview  
shows  
Violations  
and  
Severity







# Grid Control 10gR2: Policies – All Violations

Click on  
Policies  
Tab &  
Search  
Violations

Specific  
Violation

Oracle Enterprise Manager (GCEMO) - Policy Violations - Microsoft Internet Explorer

Address: http://tdsgcm01.oracleads.com/em/console/ecm/policy/policyViolations?event=doSearch&viol\_timeperiod=7

ORACLE Enterprise Manager 10g  
Grid Control

Home Targets Deployments Alerts Policies Jobs Reports

Violations | Associations | Library | Security At a Glance | Errors

### Policy Violations

The following table displays a rollup of policy violations. For detail information click on the violation count link. Page Refreshed Apr 13, 2006 2:38:43 PM CDT

Simple Search

Target Type: All Most Recent Violation within 7 Days  
Target Name:   
Category: All  
Severity: All  
[Go](#) [Advanced Search](#)

| Severity | Violation Count | Policy Rule                                | Target                            | Type     | Most Recent Violation        | Category      | Compliance Score (%) | Non-Compliant Since             |
|----------|-----------------|--------------------------------------------|-----------------------------------|----------|------------------------------|---------------|----------------------|---------------------------------|
| ✗        | 1               | Critical Patch Advisories for Oracle Homes | tdsgcrep01.oracleads.com          | Host     | Apr 13, 2006 6:31:16 AM CDT  | Configuration |                      | 26 Apr 13, 2006 6:31:16 AM CDT  |
| ✗        | 1               | Listener Logfile Permission                | LISTENER_tdsgcrep01.oracleads.com | Listener | Apr 13, 2006 5:55:06 AM CDT  | Security      |                      | 26 Apr 13, 2006 5:55:06 AM CDT  |
| ✗        | 1               | Listener Trace Directory Permission        | LISTENER_tdsgcrep01.oracleads.com | Listener | Apr 13, 2006 5:55:06 AM CDT  | Security      |                      | 26 Apr 13, 2006 5:55:06 AM CDT  |
| ⚠        | 1               | Listener Password                          | LISTENER_tdsgcrep01.oracleads.com | Listener | Apr 13, 2006 5:55:06 AM CDT  | Security      |                      | 76 Apr 13, 2006 5:55:06 AM CDT  |
| ⚠        | 1               | Use of Hostname in Listener.ora            | LISTENER_tdsgcrep01.oracleads.com | Listener | Apr 13, 2006 5:55:05 AM CDT  | Security      |                      | 76 Apr 13, 2006 5:55:05 AM CDT  |
| ⚠        | 1               | Listener Default Name                      | LISTENER_tdsgcrep01.oracleads.com | Listener | Apr 13, 2006 5:55:05 AM CDT  | Security      |                      | 76 Apr 13, 2006 5:55:05 AM CDT  |
| ✗        | 2               | Critical Patch Advisories for Oracle Homes | stdemo07.oracle.com               | Host     | Apr 10, 2006 12:09:56 PM PDT | Configuration |                      | 26 Apr 10, 2006 12:09:56 PM PDT |
| ✗        | 2               | Critical Patch Advisories for Oracle Homes | stdemo06.oracle.com               | Host     | Apr 10, 2006 6:29:54 AM PDT  | Configuration |                      | 26 Apr 10, 2006 6:29:54 AM PDT  |
| ✗        | 42              | Open Ports                                 | stdemo06.oracle.com               | Host     | Apr 10, 2006 6:28:50 AM PDT  | Security      |                      | 36 Dec 7, 2005 12:43:05 AM PST  |

Home Targets Deployments Alerts Policies Jobs Reports Setup Preferences Help Logout



# Grid Control 10gR2: Deployments

Check  
Deployments  
and Patches

Check all  
Installations  
& Summary  
of Patches

Oracle Enterprise Manager (GCDEMO) - Deployments - Microsoft Internet Explorer

Address: http://tdsgcm01.oracleads.com/em/console/functions

ORACLE Enterprise Manager 10g

Home Targets **Deployments** Alerts Policies Jobs Reports

General | Provisioning

### Deployments

#### Critical Patch Advisories for Oracle Homes

Patch Advisories 1

⚠ Patch Advisory information may be stale.  
Oracle MetaLink refresh job has not run successfully in 72 hours.

Affected Oracle Homes 7  
Job [RefreshFromMetalink](#)

#### Deployments Summary

View

| Database Installations         | Targets | Installations | Interim Patches Applied |
|--------------------------------|---------|---------------|-------------------------|
| Oracle Database 10g 10.1.0.3.0 | 1       | 1             | Yes                     |
| Oracle Database 10g 10.1.0.4.0 | 1       | 2             | Yes                     |
| Oracle Database 10g 10.1.0.4.2 | 1       | 1             | No                      |
| Oracle Database 10g 10.2.0.1.0 | 3       | 3             | No                      |
| Oracle9i 9.2.0.6.0             | 0       | 1             | No                      |

#### Configuration

[Search](#)  
[Compare Configuration](#)  
[Compare to Multiple Configurations\(Job\)](#)  
[View Saved Configurations](#)

#### Patching

[Patch Oracle Software](#)  
[View Patch Cache](#)  
[Patch Linux Hosts](#)

#### Cloning

[Clone Database](#)

#### Overview

Enterprise Manager maintains detailed information about hosts and their operating systems, as well as software installations. The Deployments Summary table provides a high level view of this information, as well as allowing you to explore the details by selecting the individual components. This information is also available on the Configuration page for a host. Using the Deployments tools, you can:

- Perform searches on the detailed information.
- Compare the detailed information of hosts and databases.
- Search Oracle MetaLink for patches, and subsequently manage their deployment.
- Clone a database or Oracle home to an alternative location.
- Manage the configuration collection process.

#### Agent Installation

[Install Agent](#)  
[Agent Installation Status](#)

#### Configuration History

[Import Configuration](#)  
[Host Configuration Collection Problems](#)  
[Refresh Host Configuration](#)  
[Configuration History](#)

#### Clone Oracle Home



Tip #9

Use Grid Control for Multi-Node Systems



# 10g RAC Enhancements

- GRID Control
  - Allows for RAC instance startup, shutdown
  - Allows for RAC instance creation
  - Allows for resource reallocation based on SLAs
  - Allows for automatic provisioning when used with RAC, ASM and Linux





# Monitor Clusters

Monitor  
4-Node  
IOUG  
Cluster

Check  
Alerts &  
Policy  
Issues

ORACLE Enterprise Manager 10g  
Grid Control

Home Targets Deployments Alerts Policies Jobs Reports

Hosts | Databases | Application Servers | Web Applications | Services | Systems | Groups | All Targets

Cluster: IOUG Latest Data Collected From Target Apr 13, 2006 2:08:03 PM EDT Refresh

Home Performance Targets Interconnects Topology

**General**

Status Up (Black Out)

Hosts 4 (↑4)

Availability (%) 100.0 (Last 24 hours)

Cluster Name IOUG

Oracle Clusterware Status Up (↑4)

Clusterware Version 10.2.0.2.0

Clusterware Home /u01/app/oracle/product/Crs

**Configuration**

View Hardware

| Hardware                   | Hosts |
|----------------------------|-------|
| x86_64 AuthenticAMD x86_64 | 1     |
| x86_64 GenuineIntel x86_64 | 3     |

**Diagnostic Summary**

Interconnect Findings 0

**Cluster Databases**

| Name  | Status | Alerts | Policy Violations | Compliance Score (%) | Version    |
|-------|--------|--------|-------------------|----------------------|------------|
| iooug | ⊕      | 0 14   | 23 40             | 90                   | 10.2.0.2.0 |

**Alerts**

Category All Critical 0 Warnings 0

| Severity     | Target Name | Target Type | Category | Name | Message | Alert Triggered |
|--------------|-------------|-------------|----------|------|---------|-----------------|
| (No Alerts!) |             |             |          |      |         |                 |

**Security**

Last Security Evaluation Apr 13, 2006 12:32:30 PM EDT Compliance Score (%) 67 Enterprise Security At a Glance

**Job Activity**

Create Job OS Command Co

Job executions scheduled to start no more than 7 days ago

| Status    | Submitted to the Cluster | Submitted to any member |
|-----------|--------------------------|-------------------------|
| Scheduled | 0                        | 0                       |
| Running   | 0                        | 0                       |
| Suspended | 0                        | 0                       |
| Problem   | 0                        | 0                       |





# Monitor Clusters: Interconnect

Check the  
Inter-  
connects

All  
Nodes  
listed

ORACLE Enterprise Manager 10g  
Grid Control

Home Targets Deployments Alerts Policies Jobs Reports

Hosts | Databases | Application Servers | Web Applications | Services | Systems | Groups | All Targets

Cluster: IOUG

Latest Data Collected From Target Apr 13, 2006 2:16:38 PM EDT Refresh

Home Performance Targets **Interconnects** Topology

The interconnect configuration and internode communication will influence the performance of cluster databases. The tables below show network interfaces on all hosts and network interfaces currently in use by cluster databases. It is important that cluster databases are configured to use a private interconnect for message and block transfers.

View Data Manually

Private Interconnect Transfer Rate (MB/Sec) 0.0788\*  
Transfer rate on the private network in the last 5 minutes.

### Interfaces by Hosts

View Private

Expand All Collapse All

| Name                | Type      | Subnet      | Interface Type | Total I/O Rate (MB/Sec) (Last 5 Minutes) | Total Error Rate (%) (Last 5 Minutes) |
|---------------------|-----------|-------------|----------------|------------------------------------------|---------------------------------------|
| IOUG                | Cluster   |             |                |                                          |                                       |
| atln1.us.oracle.com | Host      |             |                |                                          |                                       |
| eth1                | Interface | 192.168.1.0 | Private        | .051*                                    | 0*                                    |
| atln2.us.oracle.com | Host      |             |                |                                          |                                       |
| eth1                | Interface | 192.168.1.0 | Private        | .018*                                    | 0*                                    |
| atln3.us.oracle.com | Host      |             |                |                                          |                                       |
| eth1                | Interface | 192.168.1.0 | Private        | .026*                                    | 0*                                    |
| atln7.us.oracle.com | Host      |             |                |                                          |                                       |
| eth1                | Interface | 192.168.1.0 | Private        | .056*                                    | 0*                                    |

### Interfaces in Use by Cluster Databases

Expand All Collapse All

| Name  | Target Type       | Interface Name | Host Name           | IP Address  | Interface Type | Source                    | Transfer Rate (MB/Sec) (Last 5 Minutes) |
|-------|-------------------|----------------|---------------------|-------------|----------------|---------------------------|-----------------------------------------|
| ioug  | Cluster Database  |                |                     |             |                |                           |                                         |
| ioug1 | Database Instance | eth1           | atln1.us.oracle.com | 192.168.1.1 | Private        | Oracle Cluster Repository | .012*                                   |
| ioug2 | Database Instance | eth1           | atln2.us.oracle.com | 192.168.1.2 | Private        | Oracle Cluster Repository | .0035*                                  |
| ioug3 | Database Instance | eth1           | atln3.us.oracle.com | 192.168.1.3 | Private        | Oracle Cluster Repository | .011*                                   |
| ioug6 | Database Instance | eth1           | atln7.us.oracle.com | 192.168.1.7 | Private        | Oracle Cluster Repository | .025*                                   |

TIP The Transfer Rate is the estimated traffic contributed by the instance assuming uniform block size in the database.

TIP \* indicates the data that is more than 10 minutes old.



# Monitor Clusters: Topology

View the  
Cluster  
Topology

Look at  
the 4  
Listeners

ORACLE Enterprise Manager 10g  
Grid Control

Home Targets Deployments Alerts Policies Jobs Reports

Hosts | Databases | Application Servers | Web Applications | Services | Systems | Groups | All Targets

Cluster: IOUG

Latest Data Collected From Target Apr 13, 2006 2:16:38 PM EDT Refresh

Home Performance Targets Interconnects **Topology**

Overview

Selection Details

Name: ioug

Cluster Database

Up Instances: 4/4

Critical Alerts: 0

Warning Alerts: 16

Status: Up

Summary

Status Up

Hosts 4 (4)

Oracle Clusterware Up

Status 4

Legend

Home Performance Targets Interconnects Topology

Hosts

| Name                   | Status | Oracle Clusterware Status | Alerts | Policy Violations | Compliance Score (%) | CPU Util % | Mem Util % | Total IO/sec |
|------------------------|--------|---------------------------|--------|-------------------|----------------------|------------|------------|--------------|
| atlmidi1.us.oracle.com | Up     | Up                        | 0      | 5                 | 76                   |            |            | 30.63        |
| atlmidi2.us.oracle.com | Up     | Up                        | 0      | 5                 | 76                   |            |            | 26.33        |
| atlmidi3.us.oracle.com | Up     | Up                        | 0      | 5                 | 76                   |            |            | 25.27        |
| atlmidi4.us.oracle.com | Up     | Up                        | 0      | 5                 | 76                   |            |            | 24.9         |

Cluster ASM

Interconne...

ioug

LISTENER A...

LISTENER A...

LISTENER A...

LISTENER A...



# Monitor Clusters: Databases

Go to the  
Database  
Screen for  
the  
Cluster

Check  
CPU,  
Sessions  
& Alerts

ORACLE Enterprise Manager 10g  
Grid Control

Home Targets Deployments Alerts Policies Jobs Reports

Hosts | **Databases** | Application Servers | Web Applications | Services | Systems | Groups | All Targets

Cluster ioug >

Cluster Database: ioug

Home Performance Administration Maintenance Topology

Latest Data Collected From Target Apr 13, 2006 2:16:45 PM EDT Refresh View Data Automatically (60 sec)

**General**

Status Up  
Instances 4 (↑ 4)  
Availability (%) 100 (Last 24 hours)  
Cluster ioug  
Time Zone PDT  
Database Name ioug  
Version 10.2.0.2.0  
Oracle Home /u01/app/oracle/product/10g

Shutdown Black Out

**Host CPU**

Load 1.16

**Active Sessions**

Maximum CPU 14

**Diagnostic Summary**

Interconnect Findings

**Space Summary**

Database Size (GB) Unavailable  
Problem Tablespace 0  
Segment Advisor Recommendations Details  
Space Violations 0

**High Availability**

Last Backup n/a  
Flashback Logging n/a

**Alerts**

Category All Critical 1 Warnings 8

| Severity | Target Name | Target Type       | Category                | Name                                                            | Message                                                       | Alert Triggered          |
|----------|-------------|-------------------|-------------------------|-----------------------------------------------------------------|---------------------------------------------------------------|--------------------------|
| Critical | ioug_ioug6  | Database Instance | Global Cache Statistics | Global Cache Average Current Block Request Time (centi-seconds) | Metrics "Global Cache Average Current Get Time" is at 2.71429 | Apr 13, 2006 2:19:41 PM  |
| Warning  | ioug_ioug3  | Database Instance | Global Cache Statistics | Global Cache Blocks Lost                                        | Metrics "Global Cache Blocks Lost" is at 2                    | Apr 12, 2006 3:46:24 PM  |
| Warning  | ioug_ioug3  | Database Instance | User Audit              | Audited User                                                    | User SYS logged on from atimdi3.                              | Apr 10, 2006 6:23:44 PM  |
| Warning  | ioug_ioug6  | Database Instance | User Audit              | Audited User                                                    | User SYS logged on from atimdi7.                              | Apr 12, 2006 12:31:45 PM |
| Warning  | ioug_ioug1  | Database          | Global Cache            | Global Cache Blocks Lost                                        | Metrics "Global Cache Blocks Lost" is at 3                    | Apr 12, 2006             |

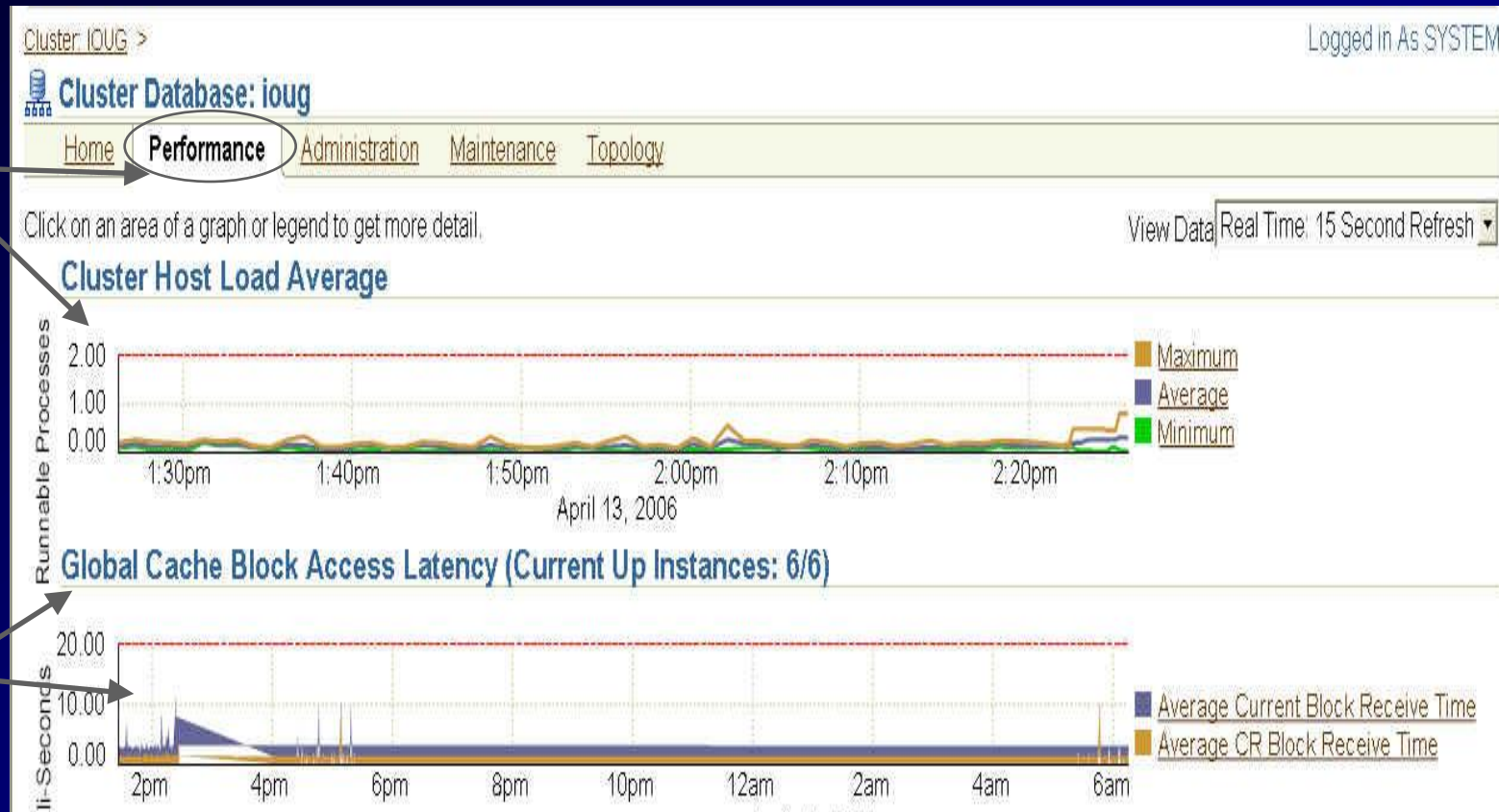




# Monitor Clusters: Global Block Transfers

Check  
Performance

Check the  
Transfer  
of Blocks





# Tip #10

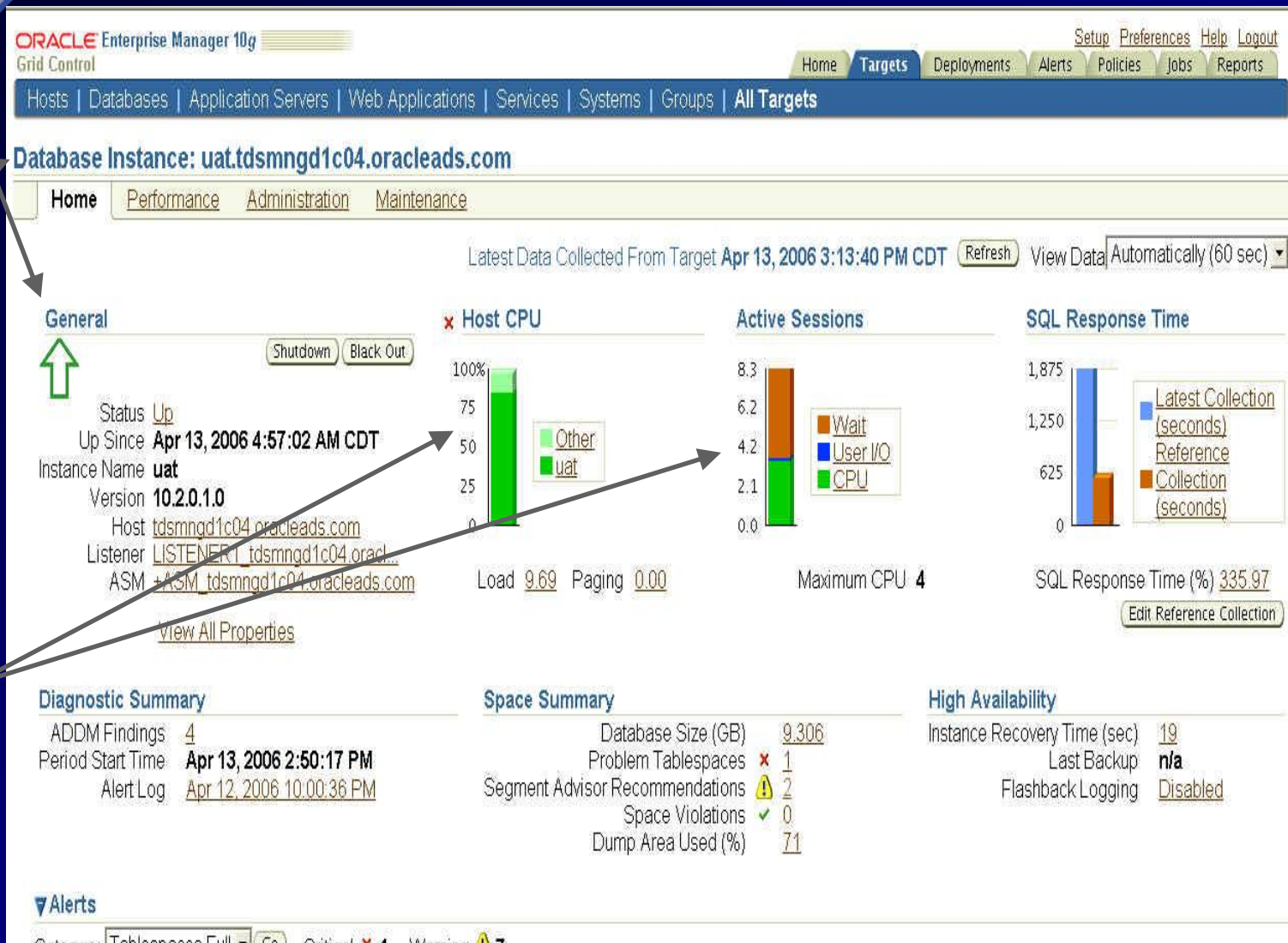
## Use Grid Control for Tuning Systems



# Tune Specific Database

Monitor  
Specific  
Database

CPU  
Issues  
and User  
Waits!





# Tune Specific Database (long page continued...)

## Performance Analysis – CPU Issue

**Alerts**

Category **Tablespaces Full** [Go](#) Critical **1** Warning **7**

| Severity | Category         | Name                      | Message                              | Alert Triggered         |
|----------|------------------|---------------------------|--------------------------------------|-------------------------|
| <b>×</b> | Tablespaces Full | Tablespace Space Used (%) | Tablespace USERS3 is 96 percent full | Apr 13, 2006 5:04:28 AM |

**Related Alerts**

**Performance Analysis**

Period Start Time **Apr 13, 2006 2:50:17 PM** Period Duration (minutes) **10.02**

| Impact (%) | Finding                                                                                                                                              | Recommendations                                                |
|------------|------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|
| 100        | Host CPU was a bottleneck and the instance was consuming 88% of the host CPU. All wait times will be inflated by wait for CPU.                       | 1 Application Analysis<br>2 SQL Tuning<br>1 Host Configuration |
| 74.8       | SQL statements consuming significant database time were found.                                                                                       | 3 SQL Tuning                                                   |
| 21.6       | SQL statements were not shared due to the usage of literals. This resulted in additional hard parses which were consuming significant database time. | 1 Application Analysis                                         |
| 21.5       | SQL statements were found waiting for row lock waits.                                                                                                | 1 Application Analysis                                         |

**Policy Violations**

Current **11 10 4** Distinct Rules Violated **8 5 4** [Compliance Score \(%\) 92](#) [Policy Trend Overview](#)

**Security**

Last Security Evaluation **Apr 13, 2006 4:59:42 AM CDT** Compliance Score (%) **90** [Enterprise Security At a Glance](#)

**Job Activity**

Jobs scheduled to start no more than 7 days ago:

Scheduled Executions **0** Running Executions **0** Suspended Executions **0** Problem Executions **0**

**Home** [Performance](#) [Administration](#) [Maintenance](#)

**Related Links**

|                                          |                                            |                                               |
|------------------------------------------|--------------------------------------------|-----------------------------------------------|
| <a href="#">Access</a>                   | <a href="#">Advisor Central</a>            | <a href="#">Alert History</a>                 |
| <a href="#">Alert Log Content</a>        | <a href="#">All Metrics</a>                | <a href="#">Blackouts</a>                     |
| <a href="#">Deployments</a>              | <a href="#">Execute SQL</a>                | <a href="#">iSQL*Plus</a>                     |
| <a href="#">Jobs</a>                     | <a href="#">Metric and Policy Settings</a> | <a href="#">Metric Baselines</a>              |
| <a href="#">Metric Collection Errors</a> | <a href="#">Monitoring Configuration</a>   | <a href="#">Monitor in Memory Access Mode</a> |
| <a href="#">Reports</a>                  | <a href="#">Rules Manager</a>              | <a href="#">SQL History</a>                   |
| <a href="#">Target Properties</a>        | <a href="#">Usage Based Metrics</a>        |                                               |

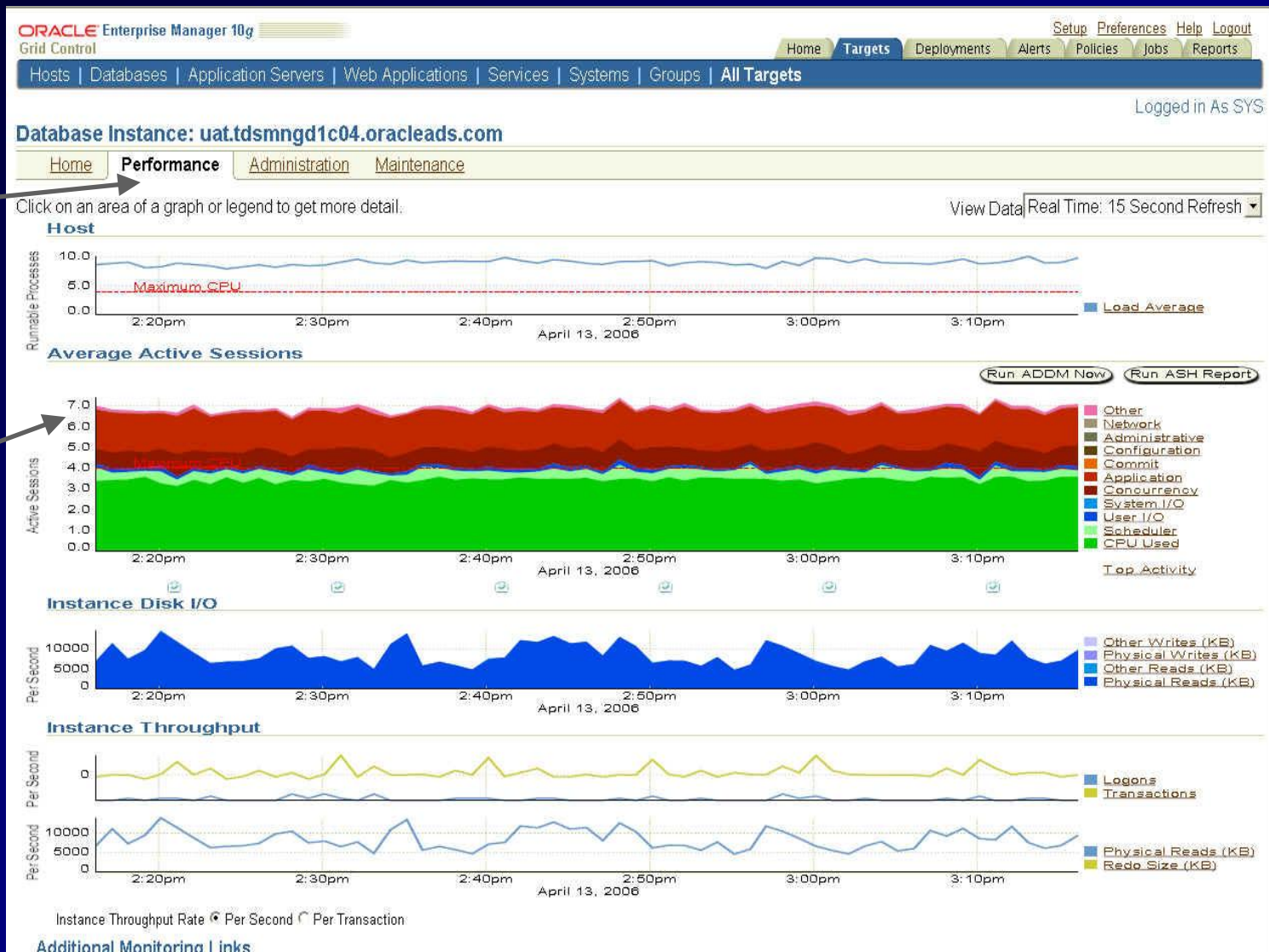




# Tune Specific Database: Click on Performance

Click on  
Perf. Tab

CPU &  
Application  
Issues



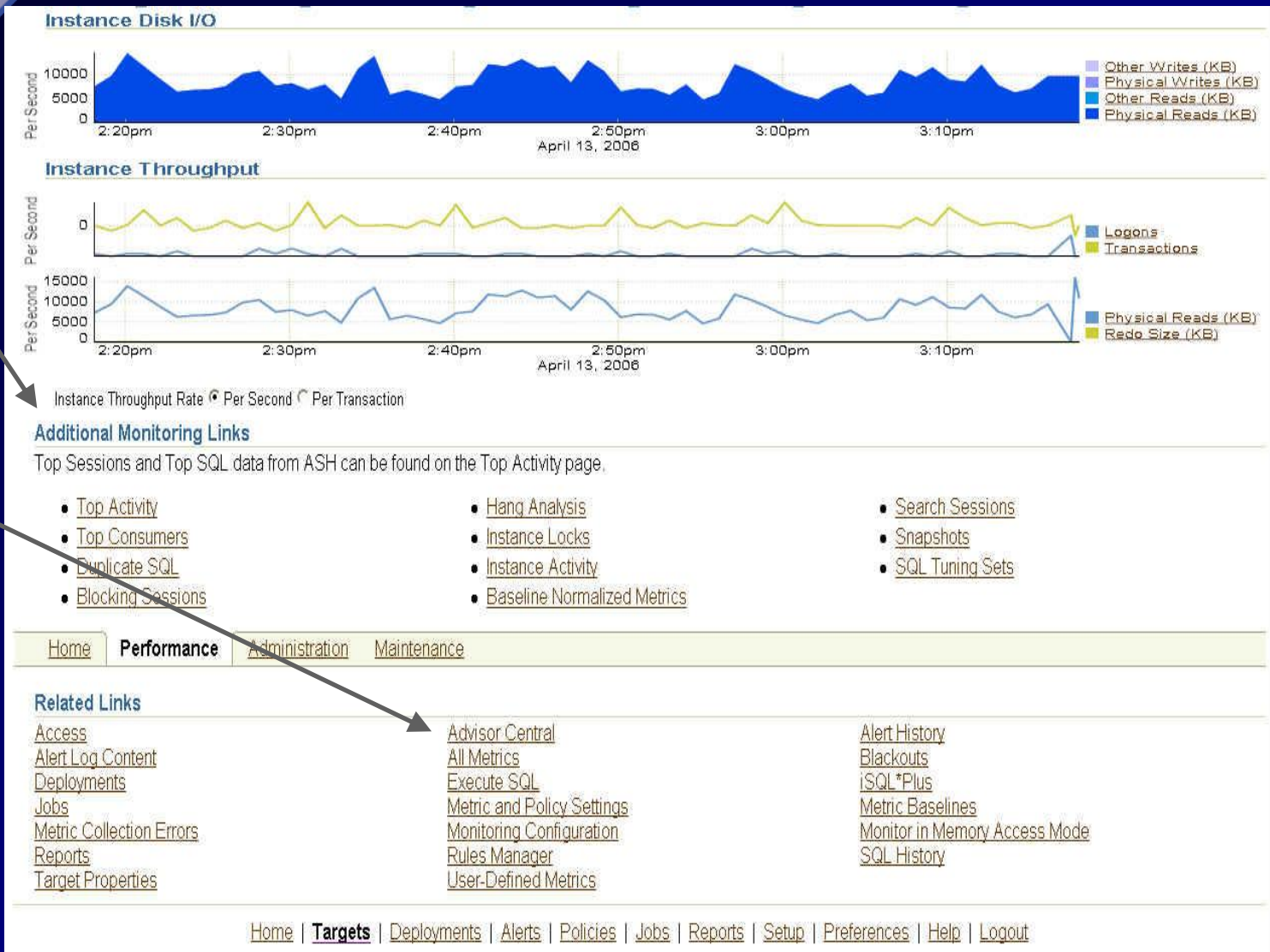




# Tune Specific Database: Click on Performance (cont.)

Links to  
Top SQL

Advisor  
Central  
& Other  
Quick  
Links

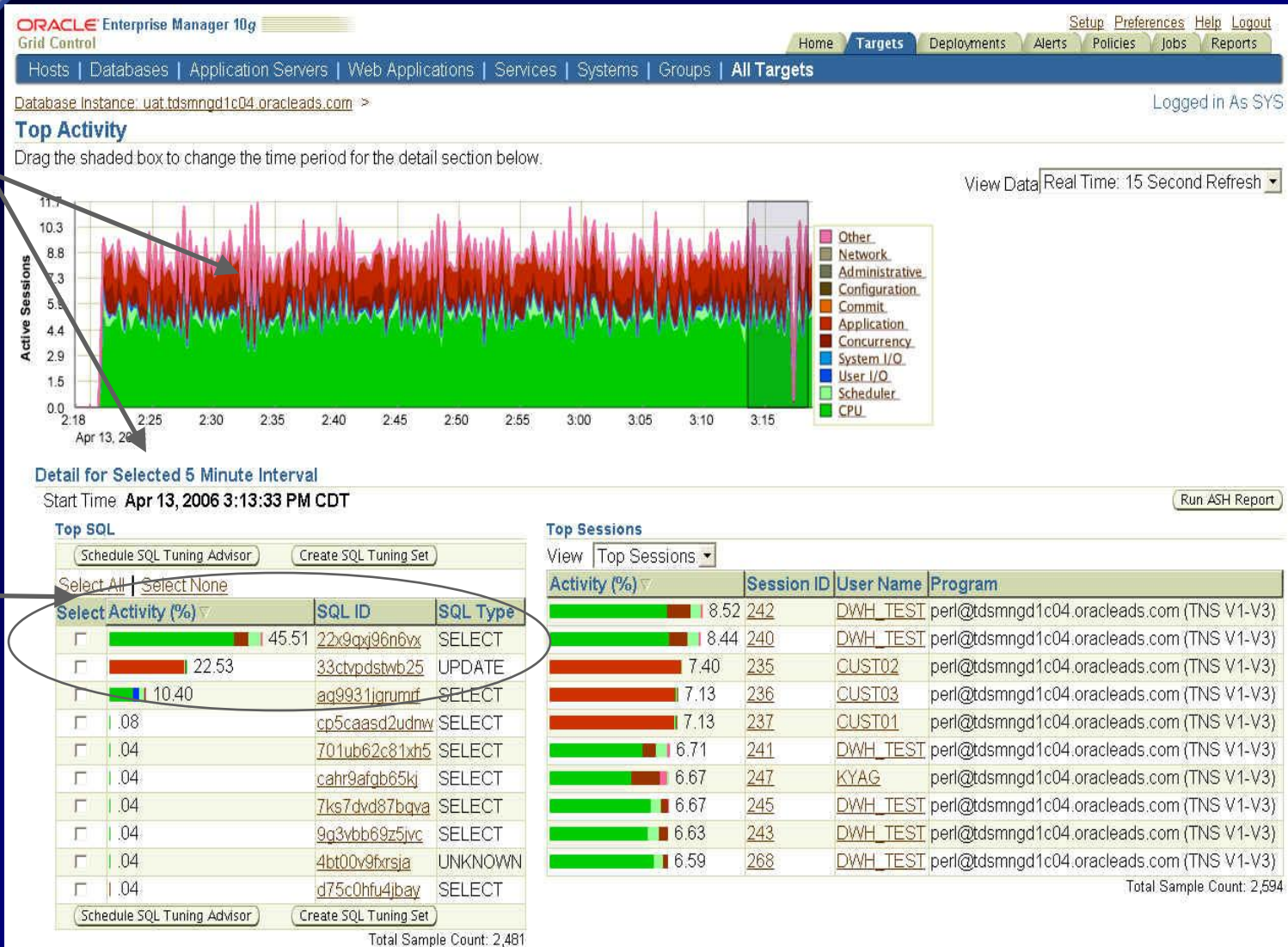




# Tune Specific Database: Click on Top Activity

Drill into  
the Top  
Resource  
Hogs.

Worst  
SQL to  
Tune!





# Tune Specific Database: Go To Advisor Central (ADDM)

Pick a  
problem  
time.

Analyze  
Problem;  
Click  
Here  
(next  
slide)

ORACLE Enterprise Manager 10g  
Grid Control

Home Targets Deployments Alerts Policies Jobs Reports

Hosts | Databases | Application Servers | Web Applications | Services | Systems | Groups | All Targets

Database Instance: uat.tds.mngd1c04.oracleads.com > Advisor Central >

Logged in As SYS

### Automatic Database Diagnostic Monitor (ADDM)

Page Refreshed Apr 13, 2006 3:20:08 PM CDT [Refresh](#)

#### Database Activity

The icon selected below the graph identifies the ADDM analysis period. Click on a different icon to select a different analysis period.

[Run ADDM](#)

[Zoom](#)

[TIP](#) For an explanation of the icons and symbols used in this page, see the [Icon Key](#)

#### Performance Analysis

Task Name: [ADDM:2598625219\\_1\\_10396](#) (End Time: Apr 13, 2006 3:00:18 PM) Time Range: **Apr 13, 2006 2:45:00 PM to Apr 13, 2006 3:15:00 PM**

[View Snapshots](#) [View Report](#)

Database Time (minutes) **86.1** Period Start Time **Apr 13, 2006 2:50:17 PM CDT** Period Duration (minutes) **10**

Task Owner **SYS** Average Active Sessions **8.6**

| Impact (%) | Finding                                                                                                                                              | Recommendations                                                |
|------------|------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|
| 100        | Host CPU was a bottleneck and the instance was consuming 88% of the host CPU. All wait times will be inflated by wait for CPU.                       | 1 Application Analysis<br>2 SQL Tuning<br>1 Host Configuration |
| 74.8       | SQL statements consuming significant database time were found.                                                                                       | 3 SQL Tuning                                                   |
| 21.6       | SQL statements were not shared due to the usage of literals. This resulted in additional hard parses which were consuming significant database time. | 1 Application Analysis                                         |
| 21.5       | SQL statements were found waiting for row lock waits.                                                                                                | 1 Application Analysis                                         |

[Informational Findings](#)





# Tune Specific Database: Run ADDM

Main  
Finding

Details  
and Top  
SQL

Parsing  
Issue

ORACLE Enterprise Manager 10g  
Grid Control

Home Targets Deployments Alerts Policies Jobs Reports

Database Instance: uat.tdsmingd1c04.oracleleads.com > Advisor Central > Automatic Database Diagnostic Monitor (ADDM) > Logged in As SYS

### Performance Finding Details

|                         |      |                   |                             |                           |     |
|-------------------------|------|-------------------|-----------------------------|---------------------------|-----|
| Database Time (minutes) | 86.1 | Period Start Time | Apr 13, 2006 2:50:17 PM CDT | Period Duration (minutes) | 10  |
| Task Owner              | SYS  | Task Name         | ADDM:2598625219_1_10396     | Average Active Sessions   | 8.6 |

Finding: Host CPU was a bottleneck and the instance was consuming 88% of the host CPU. All wait times will be inflated by wait for CPU.

Impact (minutes): 86.1  
Impact (%): 100

### Recommendations

[Schedule SQL Tuning Advisor](#)

[Select All](#) | [Select None](#) | [Show All Details](#) | [Hide All Details](#)

| Select Details                | Category                                                                                                                                                                              | Benefit (%) |
|-------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| <input type="checkbox"/> Hide | Host Configuration                                                                                                                                                                    | 100         |
| Action                        | Consider adding more CPUs to the host or adding instances serving the database on other hosts.                                                                                        |             |
| Action                        | Session CPU consumption was throttled by the Oracle Resource Manager. Consider revising the resource plan that was active during the analysis period.                                 |             |
| <input type="checkbox"/> Hide | SQL Tuning                                                                                                                                                                            | 43.7        |
| Action                        | Investigate the SQL statement with SQL_ID "22x9qxj96n6vx" for possible performance improvements.                                                                                      |             |
| Action                        | Run SQL Tuning Advisor on the SQL statement with SQL_ID "22x9qxj96n6vx". <a href="#">Run Advisor Now</a>                                                                              |             |
| Rationale                     | SQL statement with SQL_ID "22x9qxj96n6vx" was executed 167 times and had an average elapsed time of 13 seconds.                                                                       |             |
| Rationale                     | Waiting for event "latch: cache buffers chains" in wait class "Concurrency" accounted for 10% of the database time spent in processing the SQL statement with SQL_ID "22x9qxj96n6vx". |             |
| Rationale                     | Waiting for event "resmgr:cpu quantum" in wait class "Scheduler" accounted for 8% of the database time spent in processing the SQL statement with SQL_ID "22x9qxj96n6vx".             |             |
| Rationale                     | Waiting for event "latch free" in wait class "Other" accounted for 1% of the database time spent in processing the SQL statement with SQL_ID "22x9qxj96n6vx".                         |             |
| Rationale                     | Average CPU used per execution was 7 seconds.                                                                                                                                         |             |
| <input type="checkbox"/> Hide | Application Analysis                                                                                                                                                                  | 14.2        |
| Action                        | Parsing SQL statements were consuming significant CPU. Please refer to other findings in this task about parsing for further details.                                                 |             |
| <input type="checkbox"/> Show | SQL Tuning                                                                                                                                                                            | 9.6         |



# Tune Specific Database: Advisor: SQL Tuning Set

Run SQL  
Tuning  
Set

Results  
for worst  
queries

ORACLE Enterprise Manager 10g  
Grid Control

Home **Targets** Deployments Alerts Policies Jobs Reports

Hosts | Databases | Application Servers | Web Applications | Services | Systems | Groups | All Targets

Database Instance: uat.tds.mngd1c04.oracleads.com > Advisor Central > **SQL Tuning Results:SQL\_TUNING\_1144959719826**

Page Refreshed Apr 13, 2006 3:23:52 PM Refresh

Status **COMPLETED**  
Started **Apr 13, 2006 3:22:07 PM**  
Completed **Apr 13, 2006 3:23:45 PM**

Tuning Set Owner **SYS**  
Tuning Set Name **TUNING\_SET\_1144959719140**  
Time Limit (seconds) **1800**  
Running Time (seconds) **98**

**Recommendations**  
View Recommendations

| Select SQL Text                                                                    | Parsing Schema | SQL ID       | Statistics | SQL Profile | Index | Restructure SQL | Miscellaneous Error |
|------------------------------------------------------------------------------------|----------------|--------------|------------|-------------|-------|-----------------|---------------------|
| SELECT /* DSS_Q54 */ 'B'    t1.ch_featurevalue_09_id<br>ch_featurevalue_09_id, ... | DWH_TEST       | 22x9qx96n6vx |            | ✓           |       |                 | ✓                   |
| SELECT /* Restructure Query */ distinct t1.project_type_id ...                     | DWH_TEST       | aq9931grumrf | ✓          |             |       | ✓               |                     |

Home | **Targets** | Deployments | Alerts | Policies | Jobs | Reports | Setup | Preferences | Help | Logout

# Tune Specific Database: View Recommendations – Query1



ORACLE Enterprise Manager 10g  
Grid Control

Setup Preferences Help Logout  
Home Targets Deployments Alerts Policies Jobs Reports

Hosts | Databases | Application Servers | Web Applications | Services | Systems | Groups | All Targets

Database Instance: uat.tdsrnmngd1c04.oracleads.com > Advisor Central > SQL Tuning Results: SQL\_TUNING\_1144959719826 > Logged in As SYS

## Recommendations for SQL ID:22x9qxj96n6vx

Only one recommendation should be implemented.

**SQL Text**  
SELECT /\* DSS\_Q54 \*/ 'B' || tt1.ch\_featurevalue\_09\_id.ch\_featurevalue\_09\_id, 'G' || tt1.ch\_featurevalue\_02\_elgr\_id.ch\_featurevalue\_02\_id, ...

**Select Recommendation**  
Original Explain Plan (Annotated)

Implement

| Select Type                                  | Findings                                                                   | Recommendations                                 | Rationale | Benefit New Explain (%) Plan | Compare Explain Plans |
|----------------------------------------------|----------------------------------------------------------------------------|-------------------------------------------------|-----------|------------------------------|-----------------------|
| <input checked="" type="radio"/> SQL Profile | A potentially better execution plan was found for this statement.          | Consider accepting the recommended SQL profile. |           | 99.08                        |                       |
| <input type="radio"/> Miscellaneous          | The optimizer could not merge the view at line ID 4 of the execution plan. |                                                 |           |                              |                       |

Home Targets Deployments Alerts Policies Jobs Reports Setup Preferences Help Logout

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[About Oracle Enterprise Manager](#)

Problem  
Query

Use the  
Profile:  
to Help  
99%!

Compare  
Xplan





# Tune Specific Database: Compare Explain Plans

New  
Xplan

Old  
Xplan

ORACLE Enterprise Manager 10g  
Grid Control

Home Targets Deployments Alerts Policies Jobs Reports

Hosts | Databases | Application Servers | Web Applications | Services | Systems | Groups | All Targets

Database Instance: uat.tdsrmdg1c04.oracleads.com > Advisor Central > SQL Tuning Results: SQL\_TUNING\_1144959719826 >  
Recommendations for SQL ID: 22x9qxj96n6vx >

Logged in As SY

### Compare Explain Plans

#### New Explain Plan With SQL Profile

[Expand All](#) | [Collapse All](#)

| Operation                   | Line ID | Object                 |
|-----------------------------|---------|------------------------|
| SELECT STATEMENT            | 0       |                        |
| HASH GROUP BY               | 1       |                        |
| VIEW                        | 2       |                        |
| HASH GROUP BY               | 3       |                        |
| VIEW                        | 4       |                        |
| WINDOW NOSORT               | 5       |                        |
| SORT GROUP BY               | 6       |                        |
| HASH JOIN                   | 7       |                        |
| INLIST ITERATOR             | 8       |                        |
| TABLE ACCESS BY INDEX ROWID | 9       | DWH_TEST.LU_ELEMENTGE  |
| INDEX RANGE SCAN            | 10      | DWH_TEST.LU_ELEMENTGE  |
| HASH JOIN                   | 11      |                        |
| TABLE ACCESS BY INDEX ROWID | 12      | DWH_TEST.LU_ELEMENTGE  |
| INDEX RANGE SCAN            | 13      | DWH_TEST.LU_ELEMENTGE  |
| HASH JOIN                   | 14      |                        |
| TABLE ACCESS BY INDEX ROWID | 15      | DWH_TEST.LU_ELEMENTGE  |
| INDEX RANGE SCAN            | 16      | DWH_TEST.LU_ELEMENTGE  |
| HASH JOIN                   | 17      |                        |
| TABLE ACCESS FULL           | 18      | DWH_TEST.LU_PERIOD_293 |
| HASH JOIN                   | 19      |                        |
| TABLE ACCESS FULL           | 20      | DWH_TEST.LU_OUTLET_293 |

#### Original Explain Plan (Annotated)

Indicates an adjustment from the original plan by the SQL Tuning Advisor  
The following is the original explain plan for the SQL statement being tuned.

[Expand All](#) | [Collapse All](#)

| Operation                   | Line ID | Object             |
|-----------------------------|---------|--------------------|
| SELECT STATEMENT            | 0       |                    |
| HASH GROUP BY               | 1       |                    |
| VIEW                        | 2       |                    |
| HASH GROUP BY               | 3       |                    |
| VIEW                        | 4       |                    |
| WINDOW NOSORT               | 5       |                    |
| SORT GROUP BY               | 6       |                    |
| TABLE ACCESS BY INDEX ROWID | 7       | DWH_TEST.FACT_PD_C |
| NESTED LOOPS                | 8       |                    |
| MERGE JOIN CARTESIAN        | 9       |                    |
| HASH JOIN                   | 10      |                    |
| MERGE JOIN CARTESIAN        | 11      |                    |
| TABLE ACCESS BY INDEX ROWID | 12      | DWH_TEST.LU_ELEMEN |
| NESTED LOOPS                | 13      |                    |
| NESTED LOOPS                | 14      |                    |
| TABLE ACCESS BY INDEX ROWID | 15      | DWH_TEST.LU_ELEMEN |
| INDEX RANGE SCAN            | 16      | DWH_TEST.LU_ELEMEN |

# Tune Specific Database: View Recommendations – Query2



ORACLE Enterprise Manager 10g  
Grid Control

Home Targets Deployments Alerts Policies Jobs Reports

Hosts | Databases | Application Servers | Web Applications | Services | Systems | Groups | All Targets

Database Instance: uattdsmngd1c04.oracleads.com > Advisor Central > SQL Tuning Results:SQL\_TUNING\_1144959719826 >

Logged in As SYS

## Recommendations for SQL ID:aq9931jgrumrf

Only one recommendation should be implemented.

**SQL Text**  
SELECT /\* Restructure Query \*/ distinct t1.project\_type\_id FROM lu\_item\_293 t2, f...

**Select Recommendation**  
Original Explain Plan (Annotated)

Implement

| Select Type     | Findings                                                                                                                                                                                                                                                                                               | Recommendations                                                             | Rationale                                                                                                                                                                   | New Benefit (%) | Explain Plan | Compare Explain Plans |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|--------------|-----------------------|
| Statistics      | Index "DWH_TEST"."PROJECT_TYPE_IDX_A" was not analyzed.                                                                                                                                                                                                                                                | Consider collecting optimizer statistics for this index.                    | The optimizer requires up-to-date statistics for the index in order to select a good execution plan.                                                                        |                 |              |                       |
| Restructure SQL | The predicate TO_NUMBER("T1"."PROJECT_TYPE_ID")=1 used at line ID 9 of the execution plan contains an implicit data type conversion on indexed column "PROJECT_TYPE_ID". This implicit data type conversion prevents the optimizer from selecting indices on table "DWH_TEST"."FACT_PD_OUT_ITM_293_A". | Rewrite the predicate into an equivalent form to take advantage of indices. | The optimizer is unable to use an index if the predicate is an inequality condition or if there is an expression or an implicit data type conversion on the indexed column. |                 |              |                       |

Home Targets Deployments Alerts Policies Jobs Reports Setup Preferences Help Logout

Second  
worst  
SQL to  
Tune

Fix by  
collecting  
statistics  
Or  
Rewrite  
SQL





# Tune Specific Database: ADDM Finding/Fix - Parse Issue

Problem:  
Not using  
bind  
variables

Fix for  
entire  
database  
or SQL

ORACLE Enterprise Manager 10g  
Grid Control

Home Targets Deployments Alerts Policies Jobs Reports

Hosts | Databases | Application Servers | Web Applications | Services | Systems | Groups | All Targets

Database Instance: uat.tdsrmdg1c04.oracleleads.com > Advisor Central > Automatic Database Diagnostic Monitor (ADDM) > Logged in As SYS

### Performance Finding Details

|                         |      |                   |                             |                           |     |
|-------------------------|------|-------------------|-----------------------------|---------------------------|-----|
| Database Time (minutes) | 86.1 | Period Start Time | Apr 13, 2006 2:50:17 PM CDT | Period Duration (minutes) | 10  |
| Task Owner              | SYS  | Task Name         | ADDM:2598625219_1_10396     | Average Active Sessions   | 8.6 |

Finding: SQL statements were not shared due to the usage of literals. This resulted in additional hard parses which were consuming significant database time.

Impact (minutes): 18.6  
Impact (%): 21.6

### Recommendations

Show All Details | Hide All Details

| Details | Category             | Benefit (%) |
|---------|----------------------|-------------|
| Hide    | Application Analysis | 21.6        |

Action: Alternatively, you may set the parameter "cursor\_sharing" to "force". [Implement](#)

Action: Investigate application logic for possible use of bind variables instead of literals.

Rationale: At least 1056 SQL statements with PLAN\_HASH\_VALUE 3191477378 were found to be using literals. Look in V\$SQL for examples of such SQL statements.

### Findings Path

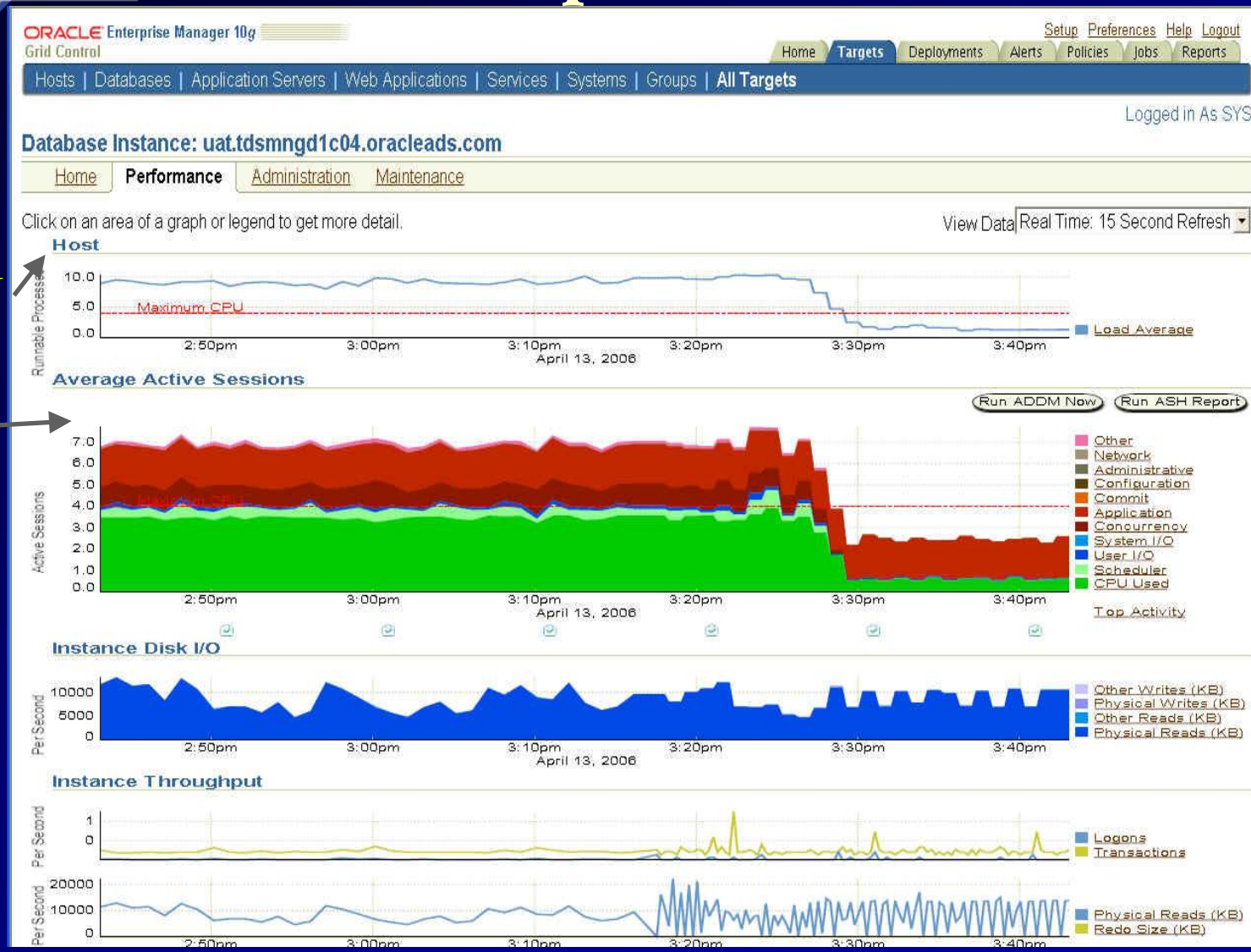
Expand All | Collapse All

| Findings                                                                                                                                             | Impact (%) | Additional Information                 |
|------------------------------------------------------------------------------------------------------------------------------------------------------|------------|----------------------------------------|
| SQL statements were not shared due to the usage of literals. This resulted in additional hard parses which were consuming significant database time. | 21.6       |                                        |
| Hard parsing of SQL statements was consuming significant database time.                                                                              | 21.8       |                                        |
| Contention for latches related to the shared pool was consuming significant database time.                                                           | 6.2        | <a href="#">Additional Information</a> |
| Wait class "Concurrency" was consuming significant database time.                                                                                    | 10.8       |                                        |



# Tune Specific Database: Problem Fixed - Nice Improvement

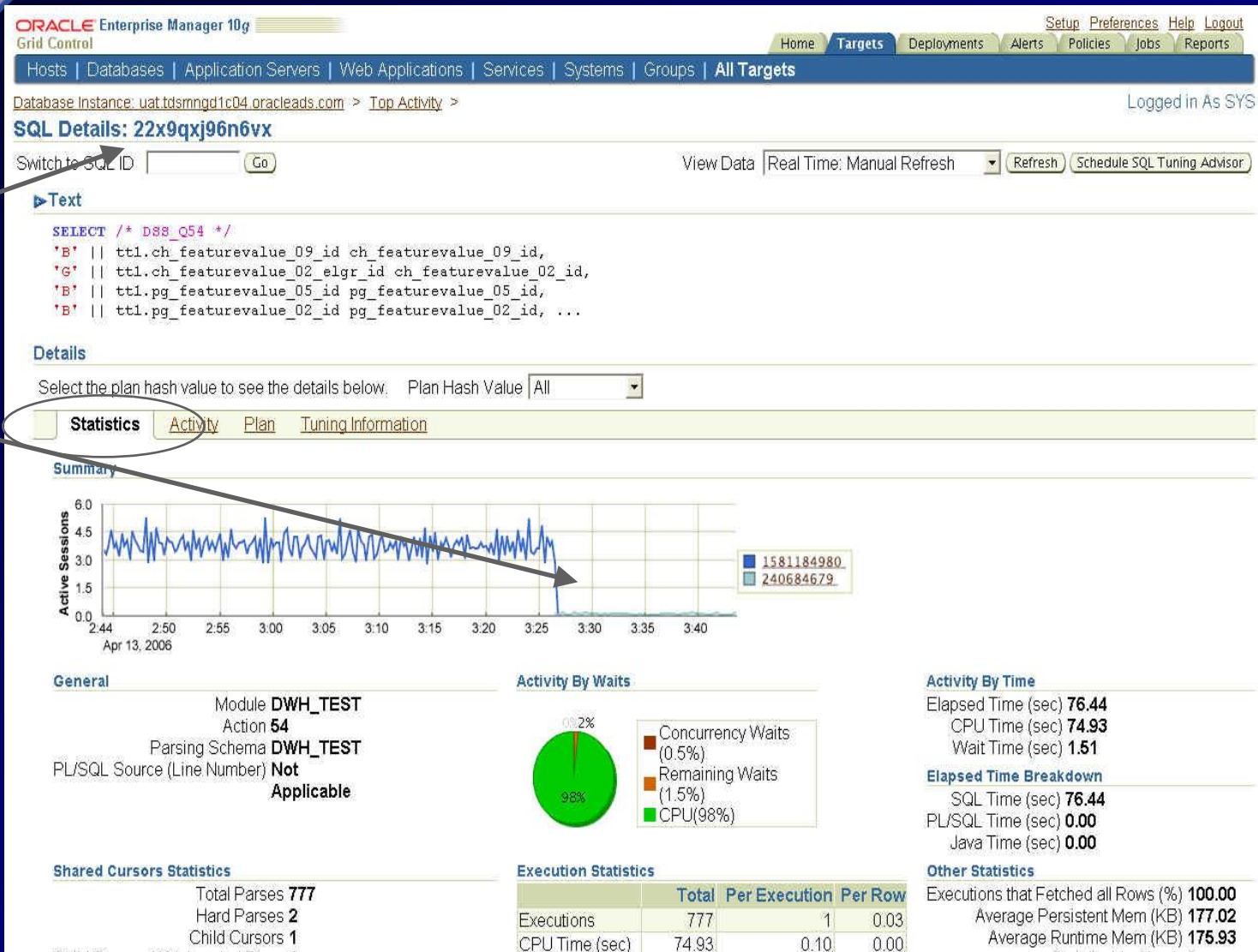
Quick  
Impact on  
Host CPU  
and on  
Users





# Tune Specific Query: Problem Fixed - Query Improvement

Worst  
Query 1:  
Shows  
Huge  
Benefit







# Tune Specific Query: View Plan - Query Improvement

Worst  
Query2:  
Example  
Plan Tree

SQL Details: aq9931jgrumrf

Switch to SQL ID  Go View Data Real Time: Manual Refresh Refresh Schedule SQL Tuning Advisor

Text

```
SELECT /* Restructure Query */
distinct t1.project_type_id
FROM lu_item_293 t2,
fact_pd_out_itm_293_a t1
WHERE t1.item_id = t2.item_id
AND t1.productgroup_id = t2.productgroup_id
AND t1.project_type_id = 1
```

Details

Select the plan hash value to see the details below. Plan Hash Value 2452208151

Statistics Activity **Plan** Tuning Information

Data Source Cursor Cache Capture Time Apr 13, 2006 3:45:28 PM Parsing Schema DWH\_TEST Optimizer Mode ALL\_ROWS

View Graph Table

Overview

Selection Details

Nothing Selected



# Tune Specific Query: Problem Fixed – Query Advice Tracked

Query1:  
Check the  
Tuning  
Info.

ORACLE Enterprise Manager 10g  
Grid Control

Home Targets Deployments Alerts Policies Jobs Reports

Hosts | Databases | Application Servers | Web Applications | Services | Systems | Groups | All Targets

Database Instance: uat.tds.mngd1c04.oracleads.com > Top Activity > Logged in As SYS

SQL Details: 22x9qxj96n6vx

Switch to SQL ID:  Go View Data Real Time: Manual Refresh Refresh Schedule SQL Tuning Advisor

Text

```
SELECT /* D88_Q54 */
'B' || tt1.ch_featurevalue_09_id ch_featurevalue_09_id,
'G' || tt1.ch_featurevalue_02_elgr_id ch_featurevalue_02_id,
'B' || tt1.pg_featurevalue_05_id pg_featurevalue_05_id,
'B' || tt1.pg_featurevalue_02_id pg_featurevalue_02_id, ...
```

Details

Select the plan hash value to see the details below. Plan Hash Value 240684679

Statistics Activity Plan **Tuning Information**

SQL Profiles and Outlines

A SQL Profile contains additional statistics of this SQL statement for the query optimizer to generate a better execution plan. An outline contains hints for this SQL statement for the query optimizer to generate a better execution plan.

Change Category Delete Disable/Enable

| Select Name                    | Type        | Category | Status  | Created                 |
|--------------------------------|-------------|----------|---------|-------------------------|
| • SYS_SQLPROF_0142a53bbeb44000 | SQL Profile | DEFAULT  | ENABLED | Apr 13, 2006 3:26:30 PM |

SQL Tuning History

The following SQL tuning tasks provide the recommendations to tune this SQL statement.

| Advisor Task Name        | Advisor Task Owner | Task Completion         |
|--------------------------|--------------------|-------------------------|
| SQL_TUNING_1144959719826 | SYS                | Apr 13, 2006 3:23:45 PM |

Statistics Activity Plan **Tuning Information**

Schedule SQL Tuning Advisor





# Tip #11

## Where does ASM Fit?



# Grid Control – 10gR2; A Look at ASM

Oracle Enterprise Manager (SYSMAN) - Disk Group: DATA - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Home Search Favorites Refresh Print View Source Links

Address http://atm1d18.us.oracle.com:7777/em/console/database/osm/diskGroup?type=osm\_instance&target=%2BA5M1\_atm1d1.us.oracle.com&oname=DATA&event=edit&ctxType= Go

ORACLE Enterprise Manager 10g Grid Control

Home Targets Deployments Alerts Policies Jobs Reports

All Targets Hosts Databases Application Servers Web Applications Services Systems Groups

Host atm1d1.us.oracle.com > Automatic Storage Management +ASM1 atm1d1.us.oracle.com > Logged in As SYS

Disk Group: DATA

Home Performance Templates Files

**General**

Name DATA  
State MOUNTED  
Redundancy EXTERN  
Total Size (GB) 55.88  
Pending Operations 0

**Disk Group Usage (GB)**

0% 8% 92%

Free(51.18)  
Internal(0.26)  
IOUG(4.43)

**Disk Group Usage History**

2.30  
2.25  
2.20  
2.15  
2.10  
2.05

1:00 3 6 9 11

Apr 23, 2006

IOUG

**Member Disks**

View By Disk Go Add

Check Resize Remove

Select All Select None

| Select Disk                    | Failure Group | Path       | Read/Write Errors | State  | Size (GB) | Used (GB) | Used (%) |
|--------------------------------|---------------|------------|-------------------|--------|-----------|-----------|----------|
| <input type="checkbox"/> DISK1 | DISK1         | ORCL:DISK1 | 0                 | NORMAL | 18.63     | 1.59      | 8.55     |
| <input type="checkbox"/> DISK2 | DISK2         | ORCL:DISK2 | 0                 | NORMAL | 18.63     | 1.56      | 8.35     |
| <input type="checkbox"/> DISK3 | DISK3         | ORCL:DISK3 | 0                 | NORMAL | 18.63     | 1.55      | 8.30     |

**TIP** Check Operation verifies the internal consistency of Disk Group metadata. If any errors are found, a summary error message is displayed, and the details of the detected errors are reported in the alert log.

Home Performance Templates Files

Internet

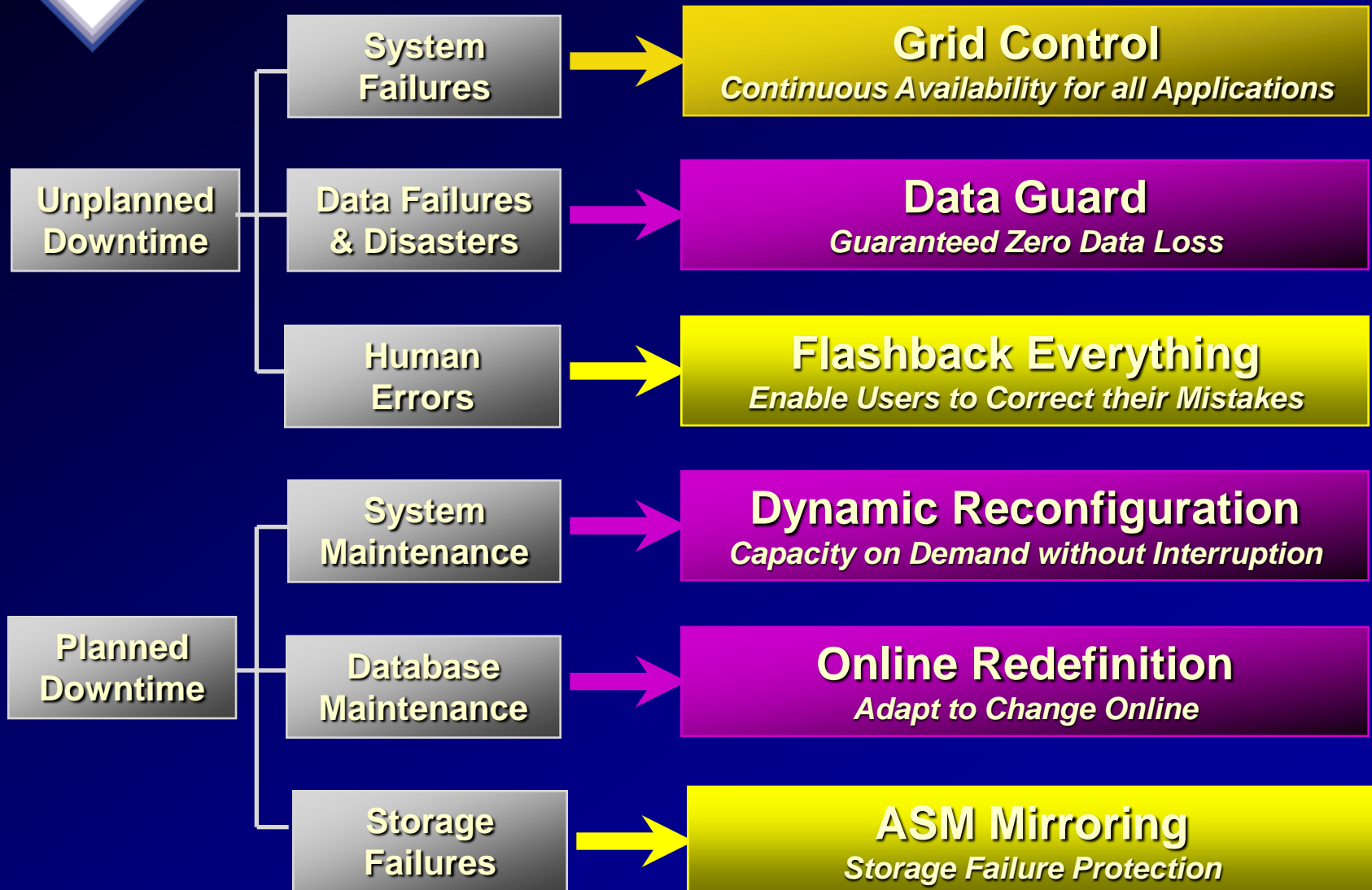


Tip #12

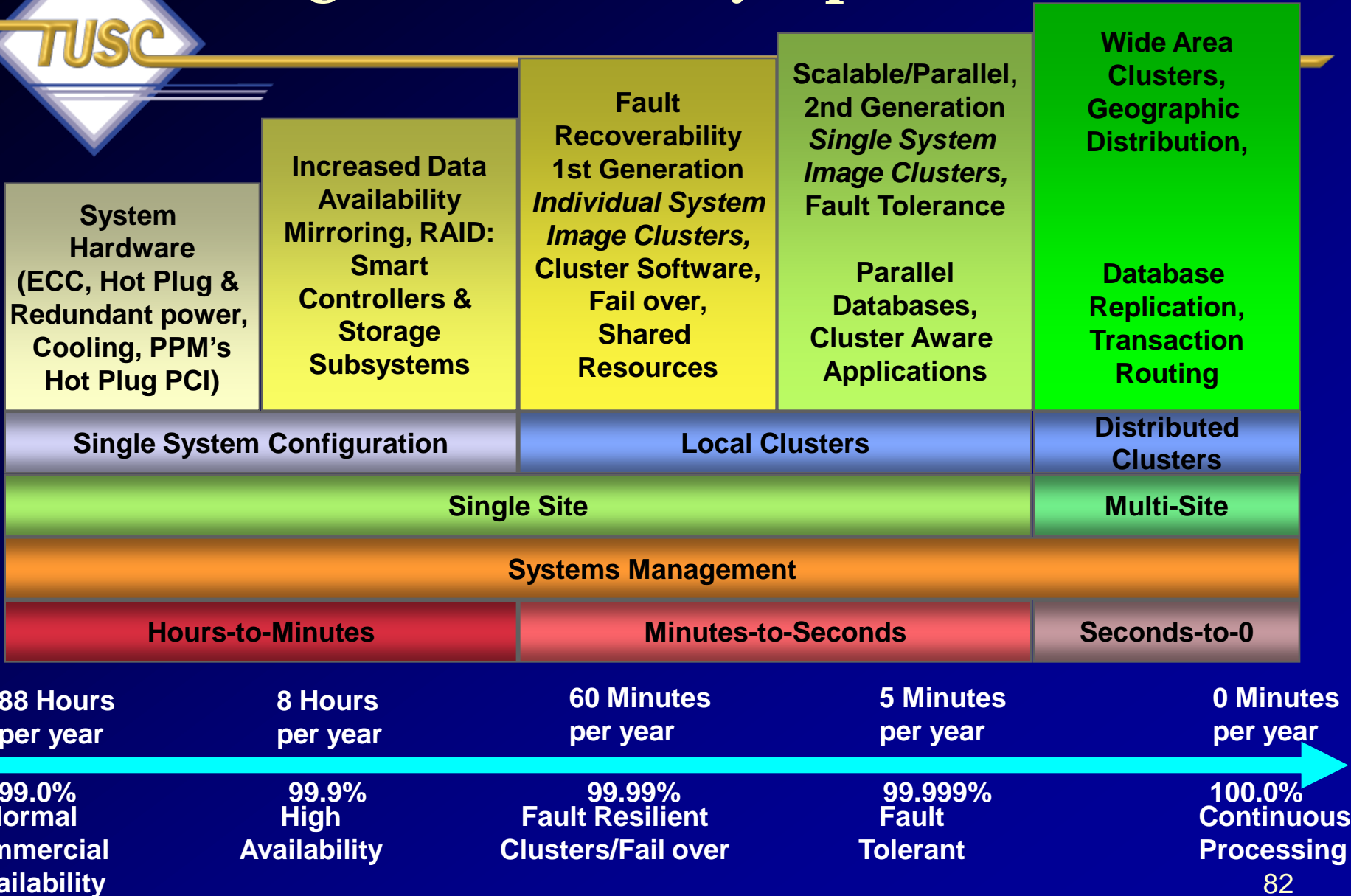
Use all parts of Oracle for High Availability  
Grids



# Oracle10g Database - ensures business information is always available



# High Availability Spectrum







# Grid Control – 10gR2; Host Availability & Quick Looks!

Oracle Enterprise Manager (SYSMAN) - Availability (Status History): atlmd1.us.oracle.com - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Home Search Favorites Print Mail Web

Address http://atlmd18.us.oracle.com:7777/em/console/monitoring/availOverview?target=atlmd1.us.oracle.com&type=host&pageType=byDay&ctxType=Hosts?event=doLoad Go Links

ORACLE Enterprise Manager 10g Grid Control

Home Targets Deployments Alerts Policies Jobs Reports

All Targets | Hosts | Databases | Application Servers | Web Applications | Services | Systems | Groups

Host: atlmd1.us.oracle.com >

Availability (Status History): atlmd1.us.oracle.com

Page Refreshed Apr 23, 2006 10:59:52 AM EDT  
View Data Last 24 hours

### General

Current Status **Up**  
Up Since **Apr 23, 2006 1:22:37 AM**  
Availability (%) **72.36**  
Blackout Time (minutes) **0**  
Agent Down Time (minutes) **398**  
Status Pending Time (minutes) **0**  
Availability (%) = Uptime/(Uptime + Agent Downtime)

### Overall Availability

72.36%

Apr 22, 2006 10:58:39 AM Apr 23, 2006 10:58:39 AM

Target states with duration less than 1.5 minutes will not appear on the timeline chart above.

### Downtime History for Last 24 Hours

View Downtime History

| Start Time              | End Time                | Duration (minutes) | Outage Type |
|-------------------------|-------------------------|--------------------|-------------|
| Apr 23, 2006 1:00:28 AM | Apr 23, 2006 1:00:31 AM | 1                  | Agent Down  |
| Apr 21, 2006 7:51:45 AM | Apr 22, 2006 5:36:28 PM | 2024               | Agent Down  |



# The Future: 8 Exabytes

## Look what fits in one 10g Database!



2K – A typewritten page

5M – The complete works of Shakespeare

10M – One minute of high fidelity sound

2T – Information generated on YouTube in one day

10T – 530,000,000 miles of bookshelves at the Library of Congress

20P – All hard-disk drives in 1995 (or your database in 2010)

700P – Data of 700,000 companies with Revenues less than \$200M

1E – Combined Fortune 1000 company databases (average 1P each)

1E – Next 9000 world company databases (average 100T each)

8E – Capacity of ONE Oracle10g Database (CURRENT)

12E to 16E – Info generated before 1999 (memory resident in 64-bit)

16E – Addressable memory with 64-bit (CURRENT)

161E – New information in 2006 (mostly images not stored in DB)

1Z – 1000E (Zettabyte - Grains of sand on beaches -125 Oracle DBs)

100TY - 100T-Yottabytes – Addressable memory 128-bit (FUTURE)<sup>84</sup>



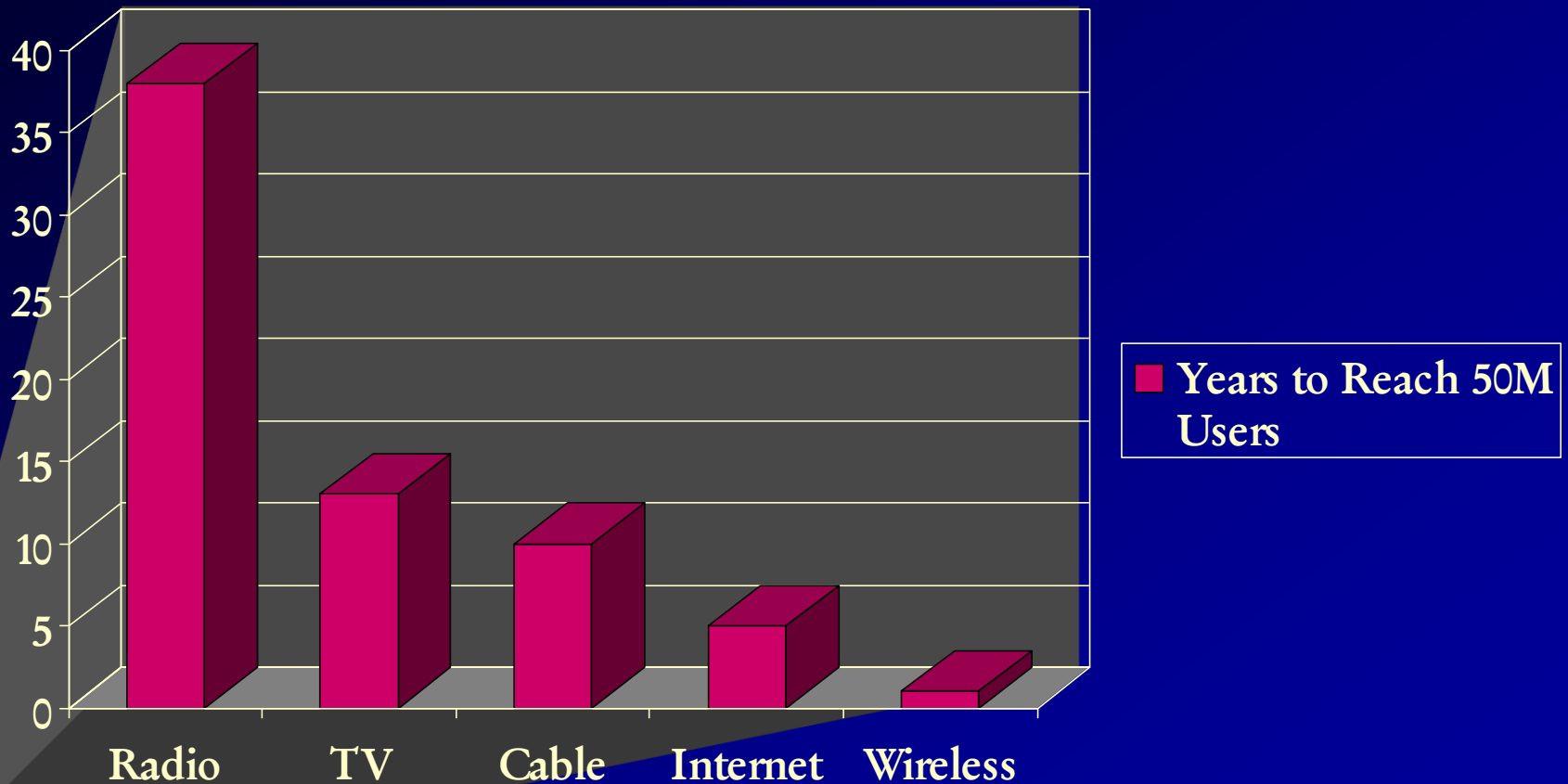
# 8 Exabytes:

## Look what fits in one 10g Database!

- All databases of the largest 1,000,000 companies in the world (3E).
- or*
- All Information generated in the world in 1999 (2E)
- or*
- All Information generated in the world in 2003 (5E)
- or*
- All Email generated in the world in 2006 (6E)
- or*
- 1 Mount Everest filled with Documents (approx.)



# Compelling Technology Statistics!





# Friedman's 6 Dimensions of Understanding Globalization\*

- Politics (Merging)
- Culture (Still disparate)
- Technology (Merging/Merged)
- Finance (Merging/Merged)
- National security (Disparate)
- Ecology (Merging)



\* Sited from Mark Hasson, PSU, *Global Pricing and International Marketing*.



# Impact Tuning with Oracle



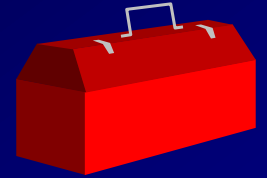
99.8% Less Data Accessed / 96.8% Time Reduction

| <u>Option</u>             | <u>Before</u>     | <u>After</u>    |
|---------------------------|-------------------|-----------------|
| Partitions                | 120 sec - 310M    | 0.43 sec - 200k |
| Partitions / Tuned        | 120 sec - 310M    | 0.01 sec - 8k   |
| Parallel Query (20 Proc.) | 230 sec           | 18 sec          |
| Function-Based Index      | 1206 sec - 3G     | 7 sec - 8k      |
| Materialized View         | 28 sec            | 3 sec           |
| Cursor_Sharing            | 240 sec           | 0.01 sec        |
| Truncate                  | 510 sec / 8G      | 0.40 sec / 32k  |
| Driving Table             | 900 sec           | 1 second        |
| SGA Sizing                | 30 sec            | 0.01 sec        |
| 750,000 Query Mix         | 5.1 T / 540 hours | 9 G / 23 hours  |

**NOW Oracle will do all of this for you!!!**



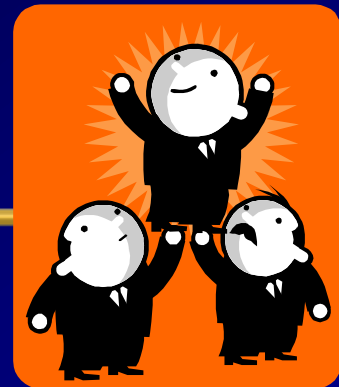
# V\$ Views over the years



| <u>Version</u>  | <u>V\$ Views</u>  | <u>X\$ Tables</u> |
|-----------------|-------------------|-------------------|
| 6               | 23                | ? (35)            |
| 7               | 72                | 126               |
| 8.0             | 132               | 200               |
| 8.1             | 185               | 271               |
| 9.0             | 227               | 352               |
| 9.2             | 259               | 394               |
| 10.1.0.2        | 340 (+31%)        | 543 (+38%)        |
| 10.2.0.1        | 396               | 613               |
| <b>11.1.0.6</b> | <b>484 (+22%)</b> | <b>798 (+30%)</b> |



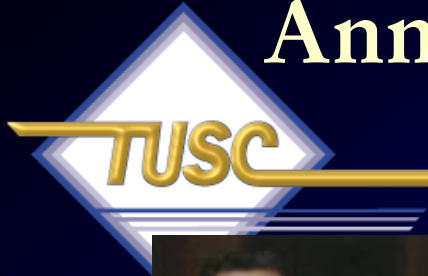
# Summary



- The Basics, Oracle & Market Direction
- RAC, Grid Basics and Scaling it All
- Tuning the Interconnect & using Statspack/AWR
- Grid Control Basics, Multi-Node & Tuning
- Other quick Tips
- Availability thoughts
- Summary

**Thanks for Coming!**

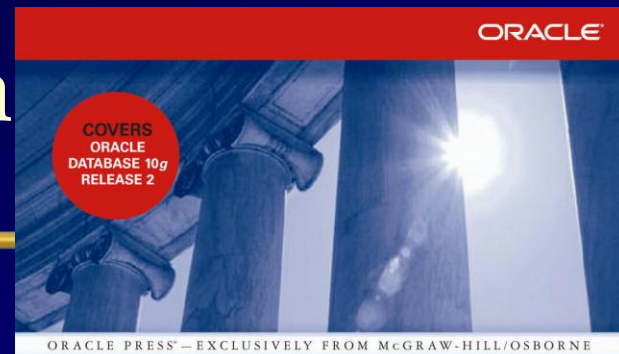
# Oracle Corporation – 30<sup>th</sup> Anniversary





# For More Information

- [www.tusc.com](http://www.tusc.com)
- *Oracle9i Performance Tuning Tips & Techniques; Richard J. Niemiec; Oracle Press (May 2003)*
- *Oracle 10g Tuning (Early 2007)*



## ORACLE DATABASE 10g Performance Tuning *Tips & Techniques*

Maximize System Performance with Proven Solutions from the Experts at TUSC

**RICHARD J. NIEMIEC**  
CEO of TUSC and Oracle Certified Master



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**Oracle Press**  
ONLY FROM OSBORNE

## ORACLE9i Performance Tuning *Tips & Techniques*

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Maximize System Performance and Improve Response Time

**RICHARD J. NIEMIEC**  
Chief Executive Officer of TUSC and Oracle Certified Master

AND THE EXPERTS AT TUSC:

**BRADLEY D. BROWN**  
Chairman and Chief Architect of TUSC

**JOSEPH C. TREZZO**  
President and Chief Operating Officer of TUSC

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*“If you are going through hell, keep going” - Churchill*





Get good Information:  
Your Team extends to Rolta TUSC!

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*“The strength of the team is each individual member...the strength of each member is the team.”*

*--Phil Jackson*



# Rolta TUSC Services

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  - Full-Life Cycle Development Projects
  - Enterprise Architecture
  - Database Services
- Oracle Application Solutions
  - Oracle Applications & EPM Implementations/Upgrades
  - Oracle Applications & Hyperion Tuning
- Managed Services
  - 24x7x365 Remote Monitoring & Management
  - Functional & Technical Support
- Training & Mentoring
- Oracle Authorized Reseller



# References

- *Oracle9i Performance Tuning Tips & Techniques*, Rich Niemiec
- *The Self-managing Database: Automatic Performance Diagnosis*; Karl Dias & Mark Ramacher, Oracle Corporation
- *EM Grid Control 10g*; [otn.oracle.com](http://otn.oracle.com), Oracle Corporation
- *Oracle Enterprise Manager 10g: Making the Grid a Reality*; Jay Rossiter, Oracle Corporation
- *The Self-Managing Database: Guided Application and SQL Tuning*; Benoit Dageville, Oracle Corporation
- *The New Enterprise Manager: End to End Performance*



# References

- *Oracle Database 10g Performance Overview*; Hervé Lejeune, Oracle Corporation
- *Oracle 10g*; Penny Avril, Oracle Corporation
- *Forrester Reports, Inc., TechStrategy Research*, April 2002, Organic IT
- *Internals of Real Application Cluster*, Madhu Tumma, Credit Suisse First Boston
- *Oracle9i RAC; Real Application Clusters Configuration and Internals*, Mike Ault & Madhu Tumma
- *Oracle Tuning Presentation*, Oracle Corporation



# References

- [www.roltatusc.com](http://www.roltatusc.com), [www.tusc.com](http://www.tusc.com), [www.oracle.com](http://www.oracle.com), [www.ixora.com](http://www.ixora.com), [www.laoug.org](http://www.laoug.org), [www.ioug.org](http://www.ioug.org), [technet.oracle.com](http://technet.oracle.com), [www.informationweek.com](http://www.informationweek.com), [www.bizjournals.com](http://www.bizjournals.com)
- *Oracle PL/SQL Tips and Techniques*, Joseph P. Trezzo; Oracle Press
- *Oracle9i Web Development*, Bradley D. Brown; Oracle Press
- *Using Oracle RAC and ASM to enable scaling on Linux with low cost storage*, Grant McAlister, Amazon, 2005
- Special thanks to Steve Adams, Mike Ault, Brad Brown, Don Burleson, Kevin Gilpin, Herve Lejeune, Kirk McCornum, Erik Detmer, Randy Swanson, and Joe Trezzo





# References

- Oracle 10g documentation
- Oracle 9i RAC class & instructor's comments
- Oracle 9i Concepts manual
- <http://geocities.com/pulliamrick/>
- *Tips for Tuning Oracle9i RAC on Linux*, Kurt Engeleiter, Van Okamura, Oracle
- *Leveraging Oracle9i RAC on Intel-based servers to build an "Adaptive Architecture"*, Stephen White, Cap Gemini Ernst & Young, Dr Don Mowbray, Oracle, Werner Schueler, Intel
- Oracle 10gR2 New Features & Strategies; Jim Hawkins<sub>98</sub>  
The 10gR2 New Features & Strategies; Jim Hawkins<sub>98</sub>



# References

- *Running YOUR Applications on Real Application Clusters (RAC); RAC Deployment Best Practices*, Kirk McGowan, Oracle Corporation
- *The Present, The Future but not Science Fiction; Real Application Clusters Development*, Angelo Pruscino, Oracle
- *Creating Business Prosperity in a Challenging Environment*, Jeff Henley
- Oracle Real Application Clusters, Murali Vallath.
- Oracle 10g Real Application Clusters Installation For Intel Linux x86, John Smiley, TUSC (Available on OTN)
- Build Your Own Oracle RAC 10g Cluster on Linux and FireWire, *by Jeffrey Hunter* (Available on OTN)
- **Oracle Database 10g - The World's First Self-Managing, Grid-Ready Database Arrives** Kelli Wiseth, Oracle



# References

- *Real Application Clusters, Real Customers Real Results*, Erik Peterson, Technical Manager, RAC, Oracle Corp.
- *Deploying a Highly Manageable Oracle9i Real Applications Database*, Bill Kehoe, Oracle
- *Getting the most out of your database*, Andy Mendelsohn, SVP Server Technologies, Oracle Corporation
- *Oracle9iAS Clusters: Solutions for Scalability and Availability*, Chet Fryjoff, Product Manager, Oracle Corporation
- *Oracle RAC and Linux in the real enterprise*, Mark



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[www.tusc.com](http://www.tusc.com)





# TUSC Corporate Profile

- “The Oracle Experts” since 1988
  - Oracle Partner of the Year, 2002, 2004, 2007 & 2008
  - Editors Choice – Consultant of the Year 2002 & 2004
  - Authorship, User Groups and Various Awards
  - One of the first 6 Oracle Masters in the World
  - Certified Advantage Partner

**ORACLE** CERTIFIED ADVANTAGE  
PARTNER







# Rich's Overview (rich@tusc.com)



- President of TUSC – A Rolta Company:
  - Inc. 500 Company (Fastest Growing 500 Private Companies)
  - 10 Offices in the United States (U.S.); Based in Chicago
  - Oracle Advantage Partner in Tech & Applications
- Author (3 Oracle Best Sellers):
  - Oracle Performing Tips & Techniques (Covers Oracle7 & 8i)
  - Oracle9i Performance Tips & Techniques
  - Oracle Database 10g Performance Tips & Techniques
- Former President of the International Oracle Users Group
- Current President of the Midwest Oracle Users Group
- Chicago Entrepreneur Hall of Fame - 1998
- Entrepreneur of the Year & National Hall of Fame - 2001
- IOUG Top Speaker in 1991, 1994, 1997, 2001, 2006, 2007
- MOUG Top Speaker Twelve Times
- National Trio Achiever award - 2006
- Oracle Certified Master & Oracle Ace Director
- Purdue Outstanding Electrical & Computer and Engineer - 2007

