

ORACLE®



Using RAC to scale your Application and Database

A Real-World Use Case for Developers & Architects

Oracle Real-World Performance Team
Oracle Product Development

ORACLE

ORACLE
REAL-WORLD PERFORMANCE

Agenda

- 1 About the Real World Performance Team
- 2 Quick RAC Review
- 3 Use Case and Live Demo
- 4 Recap

Agenda

- 1 About the Real World Performance Team
- 2 Quick RAC Review
- 3 Use Case and Live Demo
- 4 Recap

What is Real-World Performance ?

Bridging the Divide from Today's Performance to What is Possible

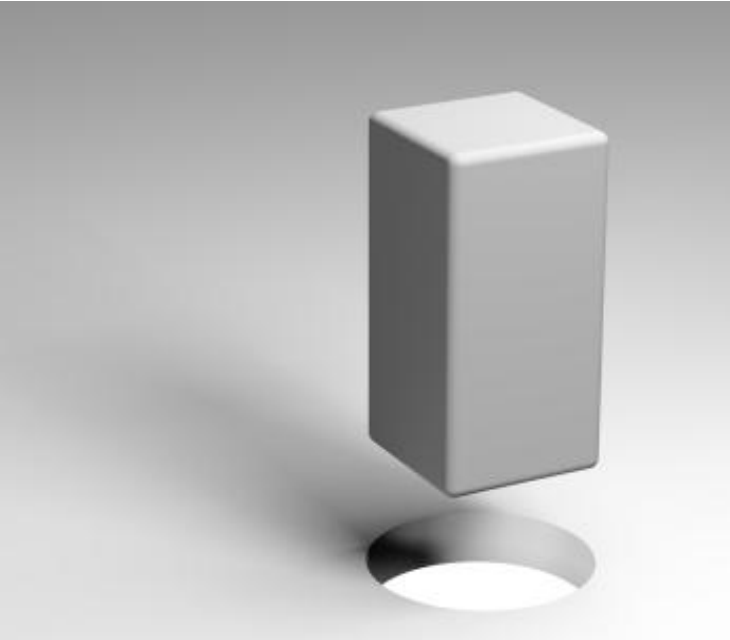


Real-World Performance

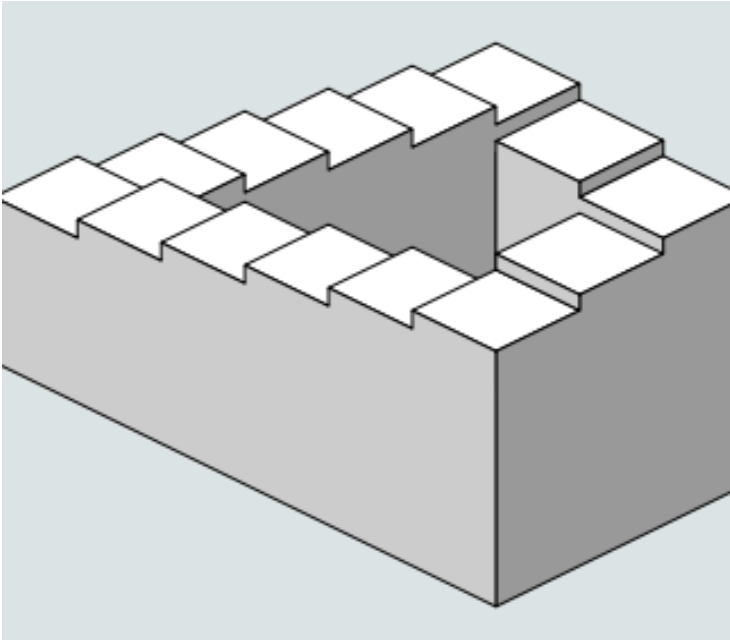
Who We Are

- Part of the Database Development Organization
- Global Team located in USA, Europe, Asia
- 300+ combined years of Oracle database experience
- Innovate to achieve exceptional Database Performance
- Our methods:
 - Use the product as it was designed to be used
 - Numerical and logical debugging techniques
 - Educate others about the best performance methods and techniques
 - Avoid and eliminate “tuning” by hacking/guessing/luck

Root Causes of Suboptimal Database Performance



The database is not being used as it was designed to be Used



The application architecture/code design is Suboptimal

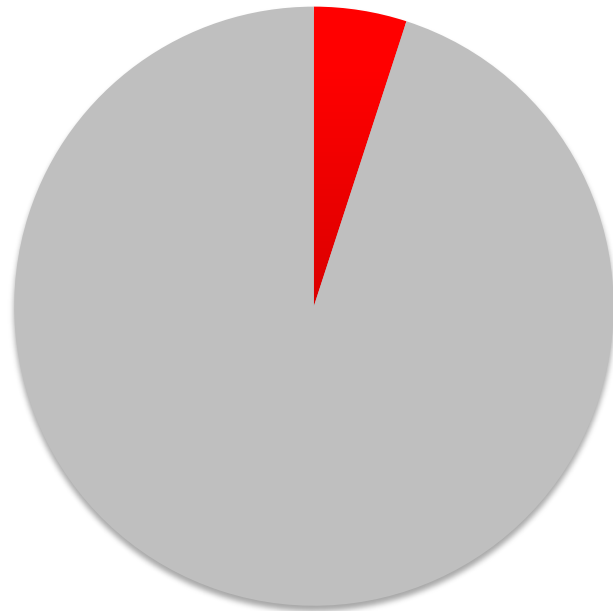


There is a suboptimal algorithm in the database

The Real World Performance Perception Problem

Where database users look for performance improvements

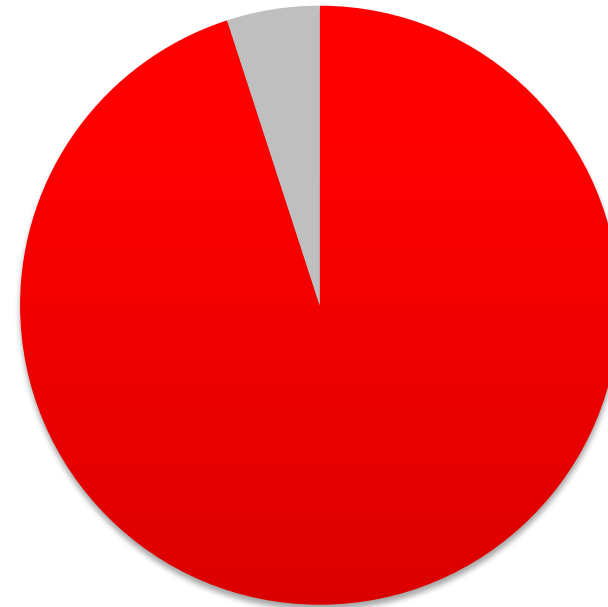
Perception



- Application Algorithms and Correct Product Usage
- Database Platform

The best place to look for performance Improvements

Reality



- Application Algorithms and Correct Product Usage
- Database Platform

Recent Results 1000X Projects



Baseline: ~ 4.3 Hours

Code Changes: 4.3 Hours

Correct Usage: 29 secs

Bug Fixes: 11.5 secs

Final: 11.5 secs

Speed up: **1346x**



Baseline: ~ 2.4 Days

Code Changes: 27 Mins

Correct Usage: 7.5 Mins

Bug Fixes: 3 Mins 27 Secs

Final: 3 Mins 27 Secs

Speed up: **1002x**



Baseline: 4.06 hours

Code Changes: 3.65 Secs

Correct Usage: 3.65 Secs

Bug Fixes: 3.65 Secs

Final: 3.65 Secs

Speed up: **4007x**



<IOUG>

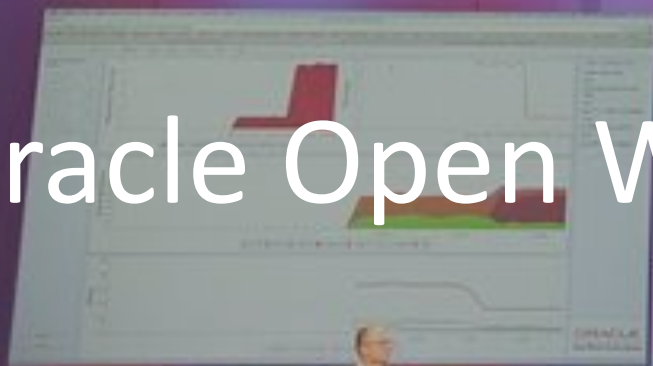
Real-World Performance Education Programs

ORACLE®

ORACLE®
REAL-WORLD PERFORMANCE

10/7/2015 Copyright © 2014, Oracle and/or its affiliates. All rights reserved. |

Oracle Open World



Real-World Performance

Oracle Open World 2014 Sessions

What the Real-World Performance Team Learns from Your Automatic Workload Repository Report

Real-World Performance of Star and Snowflake Schemas, Part 1: The Theory

Real-World Performance of Star and Snowflake Schemas, Part 2: The Reality

www.oracle.com/goto/oll/rwp

ORACLE Learning Library

Home Products Search My Library

nobody Help Login

Real-World Performance Learning Library

Welcome

ORACLE
REAL-WORLD PERFORMANCE

Learn to Apply Real-World Performance Tuning Techniques

The Real-World Performance (RWP) Group is part of the Oracle Database Development organization. Engineers in the RWP group focus on extracting the maximum performance from the Oracle Database and hardware in the real-world. We do this by identifying inefficiencies in current systems and applying modern database design and tuning techniques.

We created this learning library for you so that you can learn the best practices, and methodologies to apply to your Oracle Databases.

What Does Real-World Performance Mean?

0:00 / 3:55

Videos

- Real-World Performance Education
- Introduction to Real-World Performance
- RWP #1: Cursors and Connections
- RWP #2: Bad Performance with Logons
- RWP #3: Connection Pools and Hard Parse
- RWP #4: Bind Variables and Soft Parse
- RWP #5: Shared Cursors and One Parse
- RWP #6: Leaking Cursors
- RWP #7: Set Based Processing

Real World Performance Challenge

Click to show us how you've increased your Oracle Database performance

Hardware and Software, Engineered to Work Together

[Set Screen Reader Mode On](#)
Release 3.0

[About Oracle](#) | [Contact Us](#) | [Terms of Use](#) | [Your Privacy Rights](#) |

Built using Oracle Application Express 4.2

Online Education

Real-World Performance

Online Video Series

- Real-World Performance Engineers discussing and demonstrating performance issues, root causes and when to apply the correct techniques
 - The Optimizer
 - Core DB Performance
 - Extreme OLTP
 - Extreme DW
- <http://www.oracle.com/goto/oll/rwp>



Real-World Performance Training

Real-World Performance Classroom Training

Classroom Training

- 4 Day Class of Intensive Performance Training
 - Topics: The Optimizer, Core DB Performance, Extreme OLTP and DW
 - Classroom, Demos, Hands On, Test and Quizzes
 - Training given by Real-World Performance Engineers
 - Designed for Architects, Developers and DBAs
 - 4 months training in 4 days
- Contact RWP or your local Oracle team to apply

Real-World Performance Training

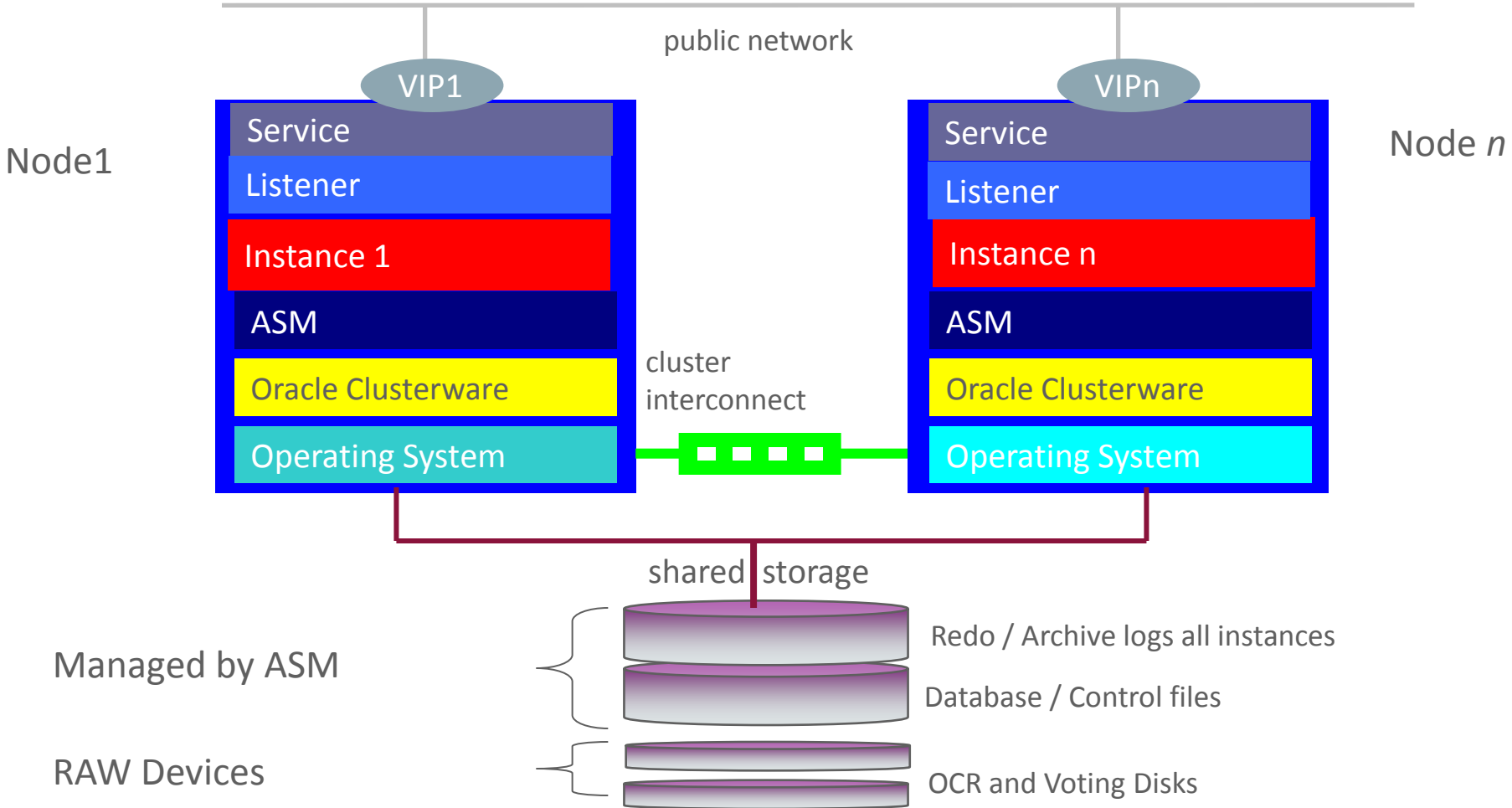
What you will learn

- Understand how the optimizer works and how it is influenced
- Learn the fundamentals of core database performance
 - Database Computer Science
 - Application Algorithms
 - When to apply the correct tools and techniques
- Extreme OLTP
 - Connection Management, Contention and Tools
- Extreme Data Warehousing
 - Working with large data sets
 - DW Techniques: Set based processing, Exadata, Database In-Memory, Parallel

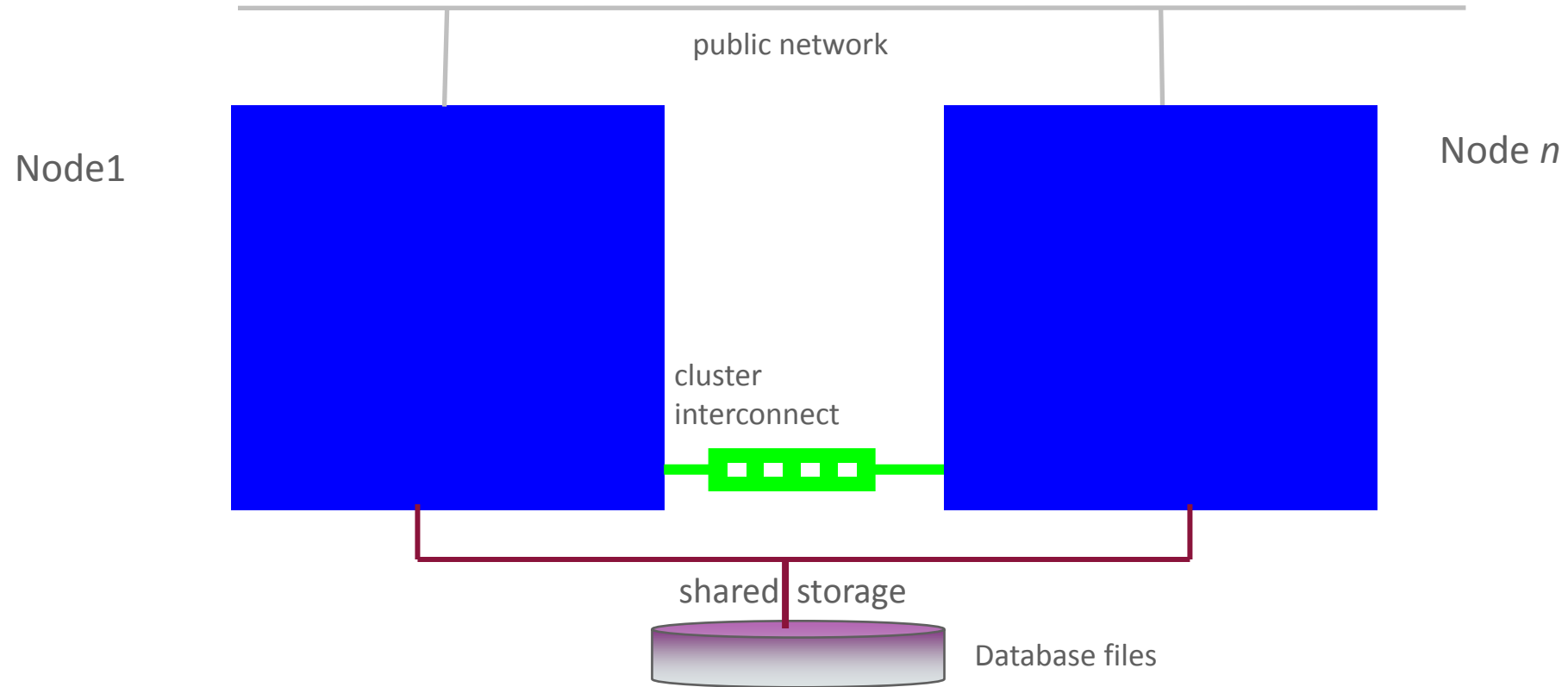
Agenda

- 1 About the Real World Performance Team
- 2 Quick RAC Review
- 3 Use Case and Live Demo
- 4 Recap

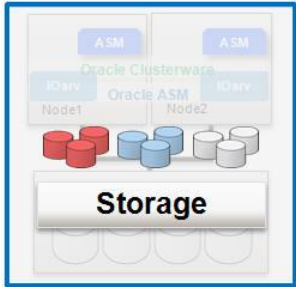
Oracle RAC Architecture



Oracle RAC Architecture



This is what Oracle RAC addresses



Storage Management

- Oracle ASM
- Oracle ACFS



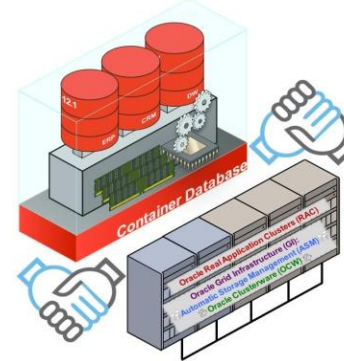
Quality of Service

- Quality of Service Management (QoS)
- Application Continuity



High Availability and Scalability

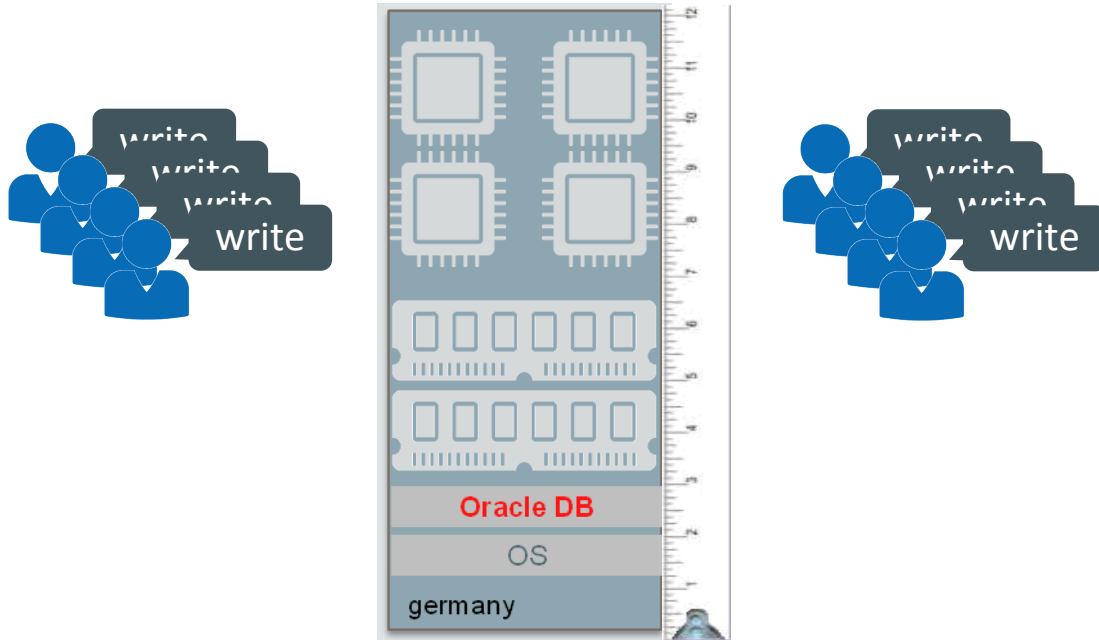
- Oracle Clusterware
- Oracle RAC & RAC One Node



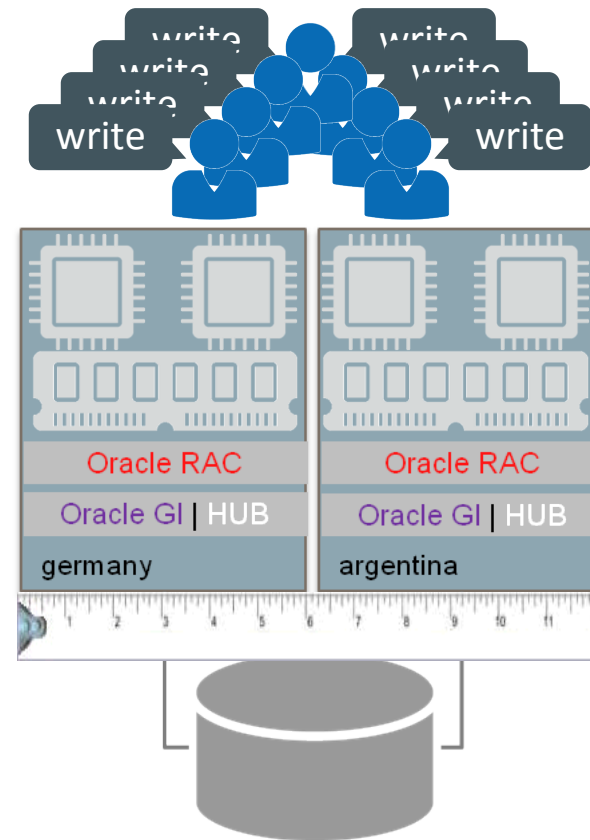
Consolidation

- Oracle RAC with Oracle Multitenant

Scaling Principles



- Does the application scale on a single (SMP) system?



- If it does, it is likely to scale horizontally.

Scalability is measured considering the whole system.

Latency - Some Important Numbers

Best Block Access Speeds

Block Location	Access Time
L2 CPU cache	~ 1 nano sec (10^{-9})
Virtual Memory	~ 1 micro sec (10^{-6})
NUMA Far Memory	~ 10 micro sec (10^{-6})
Flash Memory (PCI)	~ 0.01 milli sec (10^{-3})
Flash Memory (Networked)	~ 0.1 milli sec (10^{-3})
Disk I/O	~ 1-10 milli sec (10^{-3})

Agenda

- 1 About the Real World Performance Team
- 2 Quick RAC Review
- 3 Use Case and Live Demo
- 4 Recap

Use Case - Extreme OLTP Workload

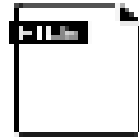


- Small transactions
- Processing small numbers of rows
- Fast (single-digit millisecond) response times
- Large numbers of users
- It's all about efficiency
 - Get-in-get-out
 - Be nice to others

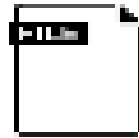
Database / Middleware Interaction Scenario

- Devices ship files
- Files read and processed by multiple application servers

Files



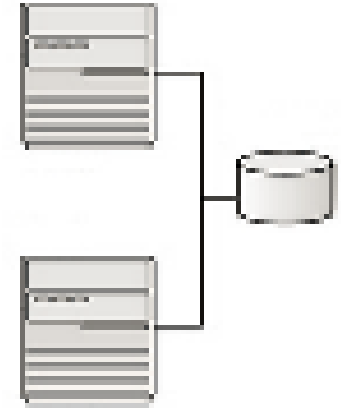
...



App Server(s)



DB node(s)



End of preview ...

- This will be an interactive session, where the presenter and the audience will work together in diagnosing the root cause of the performance degradation
- Thus, to not spoil the interactive experience and participation in this challenge, the preview ends here
- The complete set of slides will be available on-line after the session

Hardware and Software Engineered to Work Together

ORACLE®