

Advanced RAC Training - onsite

Note that this is just an outline. While I try to stick with the outline, I update the course materials frequently to reflect version changes, recently encountered major bugs etc.

Considerations for RAC

Why should you consider RAC?

Why should you not consider RAC?

Critical elements for successful conversion to RAC

- Application affinity
- Application workload issues
- Concurrency issues

Extended RAC - Introduction

Concepts

Basic concepts about RAC

Cache Fusion Introduction

SCN: Propagation and impact

Troubleshooting critical background processes

Roles of various background processes

Tuning background processes

Troubleshooting background processes using OS utilities

Clusterware

GI process introduction

Process startup

Resource, details, and dependencies etc

Log file analysis

ASM

Introduction to ASM

Disks, headers, disk groups, and files

Kfed to review disk headers

Pitfalls of ASM redundancy

ASM and multipathing

Asm files, db files, and aliases

Internals of ASM

SGA parameters

Asmcmd – examples, demos etc

Rebalancing issues – adding disks, removing disks, etc

ASM performance review

Cache Fusion internals

Resources, locks, and more

GC transfer examples such as single block reads, 2-way, and 3-way reads

Understanding cache fusion internals to effectively troubleshoot in RAC

Demos for GC transfer examples

Global Resource Directory

Learn about default block Mastering scheme and Dynamic Re-mastering concepts

Detect and troubleshoot DRM issues
How to avoid GRD freeze with effective DRM setup

GC performance analysis using performance counters

Introduction to GV\$ views
Troubleshooting GC performance using gv\$ views and performance statistics
Deep review about LMS internals using OS utilities
Review LMS effectiveness using performance counters
Understanding workload patters using performance counters
Use GV\$ views to understand RAC performance
How to identify SQL statements suffering and causing GC performance issues?

Troubleshooting GC performance using RAC wait events.

Learn about various RAC wait events such as gc cr grants, gc cr block 2-way, 3-way
, gc cr block busy, gc cr block congested, log file sync, gcs log flush sync, gc buffer busy etc
Troubleshooting performance issues using RAC wait events.
Probing ASH data to uncover hidden performance issues
How to review AWR report for RAC specific issues?

Object tuning and troubleshooting

Issues with Node affinity
General partitioning for RAC
Concurrency issues with heavy insert workload
Hash partitioned indexes
Hash partitioned tables
Freelists, freelist groups, and ASSM
Reverse key indexes
Sequences, cache, and order
Library cache lock, library cache issues in RAC due to heavy DDL

RAC Performance - Network

Engineering network to suite application workload
Performance, scalability issues with various network configuration
Performance analysis of Network Hardware
Jumbo packets versus Non-jumbo packet
Detecting lost packets.

Memory management in RAC

SGA configuration – Why SGA size matters in RAC?
Buffer cache management
Troubleshooting shared pool issues, RAC specific allocations
Shared pool durations and heapdump analysis

RAC – PQ and PX

Parallel query in RAC
Controlling parallelism: Intra-instance and Inter-instance parallelism
10g, 11g new features in parallel processing
Partitioning, PQ and RAC
Troubleshooting parallelism issues

How to improve PX performance using few basic techniques?

RAC performance: Locks and Latches GES layer

- Locks - global locks
- Troubleshooting locking contention in RAC
- Deadlocks, initialization parameter and troubleshooting deadlocks in RAC
- Latch contention specific to RAC
- Troubleshooting RAC specific latches.

RAC: Undo

- Undo block shipping
- Light works rule
- Commit cleanout issues
- LGWR performance
- Excessive CR copy creation
- Long running processes in active databases

Optimizer setup in RAC

- Execution plan management in RAC
- How to troubleshoot execution plan differences between instances?
- Optimizer parameter setup to match workload patterns
- Effective use of SQL profiles, and sql baselines to improve plan stability
- System statistics and how to setup in RAC?

Cluster freeze, instance freeze, and GRD freeze

- Review of systemstate dumps in RAC
- Hanganalyze and hanganalyze_global
- Effective use of gv\$wait_chains
- Troubleshooting and tuning instance reconfiguration

RAC Stress testing: Is your environment ready?

- Stress testing using scripts
 - Inducing High CPU usage
 - Inducing high Global cache Traffic
 - Inducing high redo generation
- Swingbench to the rescue

Administration practices

- Initialization parameter management
- Undo tablespace management
- Optimal temp tablespace setup
- Troubleshoot software issues.

RAC – Workload management

- Configuring connect time failover
- Run time failover
- Services and Service Failover
- Connection Load Balancing and LBA
- Resource Manager, Services and RAC

