

ORACLE®

SQL Tuning Experts Panel

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Hardware and Software
Engineered to Work Together

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OPEN
WORLD

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What Makes SQL Go Bad?

STATISTICS

Optimizer
Statistics Issues

- Stale/Missing statistics
- Incomplete statistics
- Improper optimizer configuration
- Upgraded Database: new optimizer
- Changing statistics
- Rapidly changing data

RESOURCES

Resource &
Contention
Issues

- Hardware resource crunch
- Contention (row lock contention, block update contention)
- Data fragmentation

APPLICATIONS

Application
Issues

- Missing access structures
- Poorly written SQL statements

CURSOR SHARING

Cursor Sharing
Issues

- Bind-sensitive SQL with bind peeking
- Literal usage

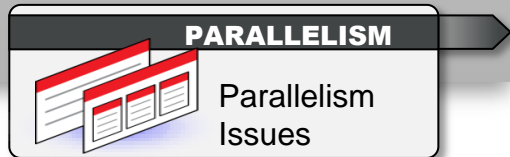
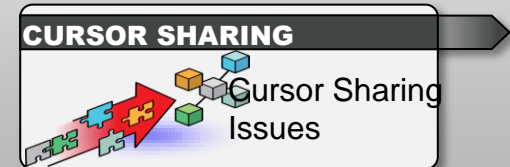
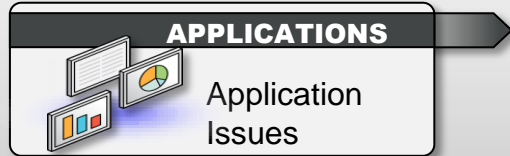
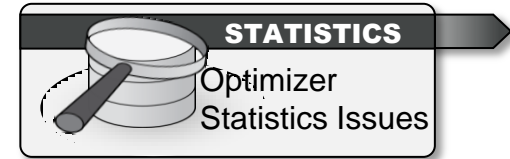
PARALLELISM

Parallelism
Issues

- Not parallelized (no scaling to large data)
- Improperly parallelized (partially parallelized, skews)

Agenda

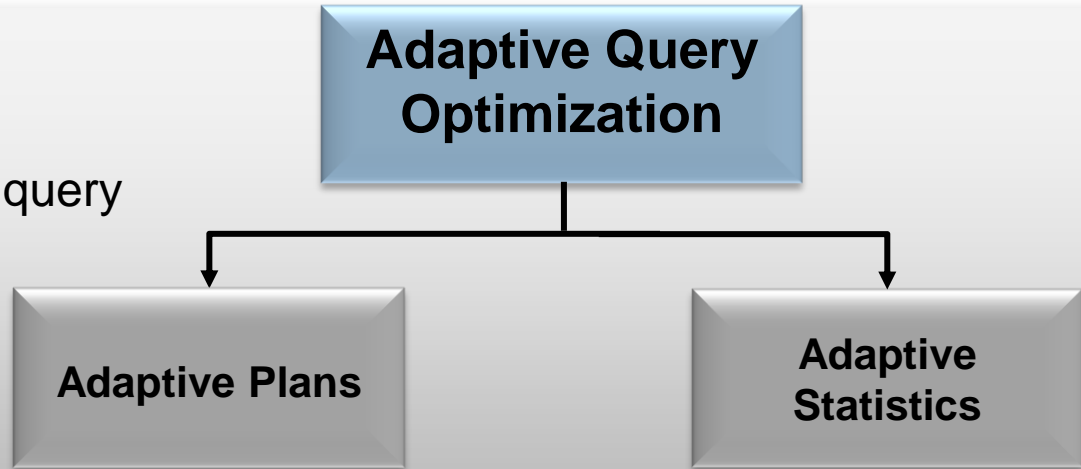
- Detecting and diagnosing problem SQL
- Resolving and tuning problem SQL
- SQL tuning in engineered systems
- SQL tuning in Oracle Database 12c



Adaptive Query Optimization



- Adaptive Plans
 - Run-time adjustments to query plan
- Adaptive Statistics
 - Discovery of additional information leads to better statistics



Automatic Performance Diagnostics



The ADDM Family:

A Continuous Evolution in Database Performance Management

ADDM

Compare
Period ADDM

Real-Time
ADDM

Enhanced
Real-Time ADDM

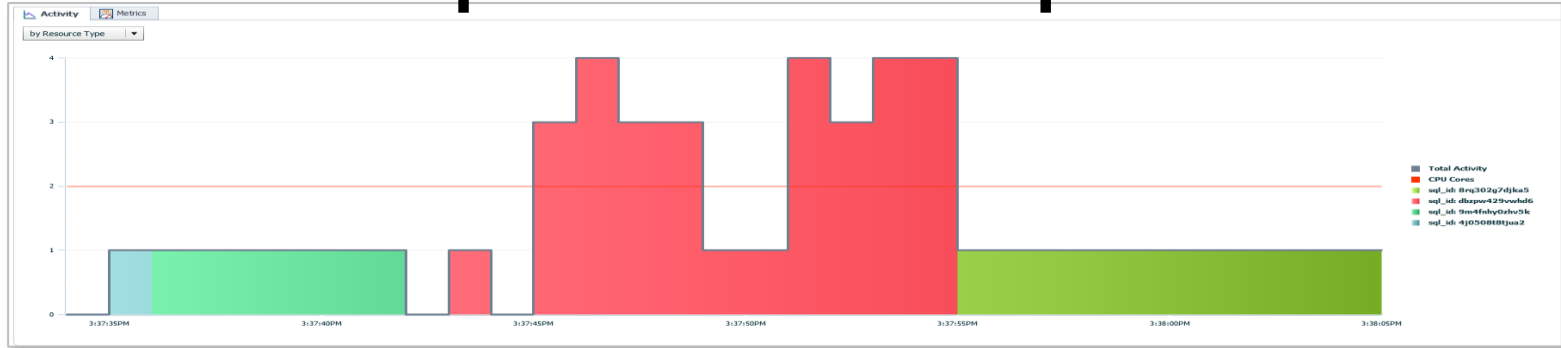
- Diagnose persistent performance issues
- Uses AWR snapshots
- Automatically runs every hour

- In-depth performance comparison across two periods
- Uses AWR data
- Manually triggered

- Hung or extremely slow databases
- Uses a normal and diagnostic mode connection
- Manually triggered

- Proactively detect & diagnose performance spikes
- Uses in-memory data
- Automatically runs every 3 seconds

Monitor Complex Database Operations



- **Oracle Database 11g: Support for simple DB operations**
 - SQL statements (e.g., SQL for DSS, batch/report SQL, runaway SQL)
 - PL/SQL procedures/functions
- **Oracle Database 12c: NEW support for composite operations**
 - Session(s) activity between 2 points of time defined by application code / DBA
 - For example; SQL*Plus script, batch job, or ETL processing
 - At most one DBOP per DB session
 - Visibility of top SQL statements, system and session performance metrics without the overhead of SQL trace

Automatic Report Persistence to Disk



MMON slave samples every minute

Identifies top 5 based on elapsed time

Report data compressed and written to disk

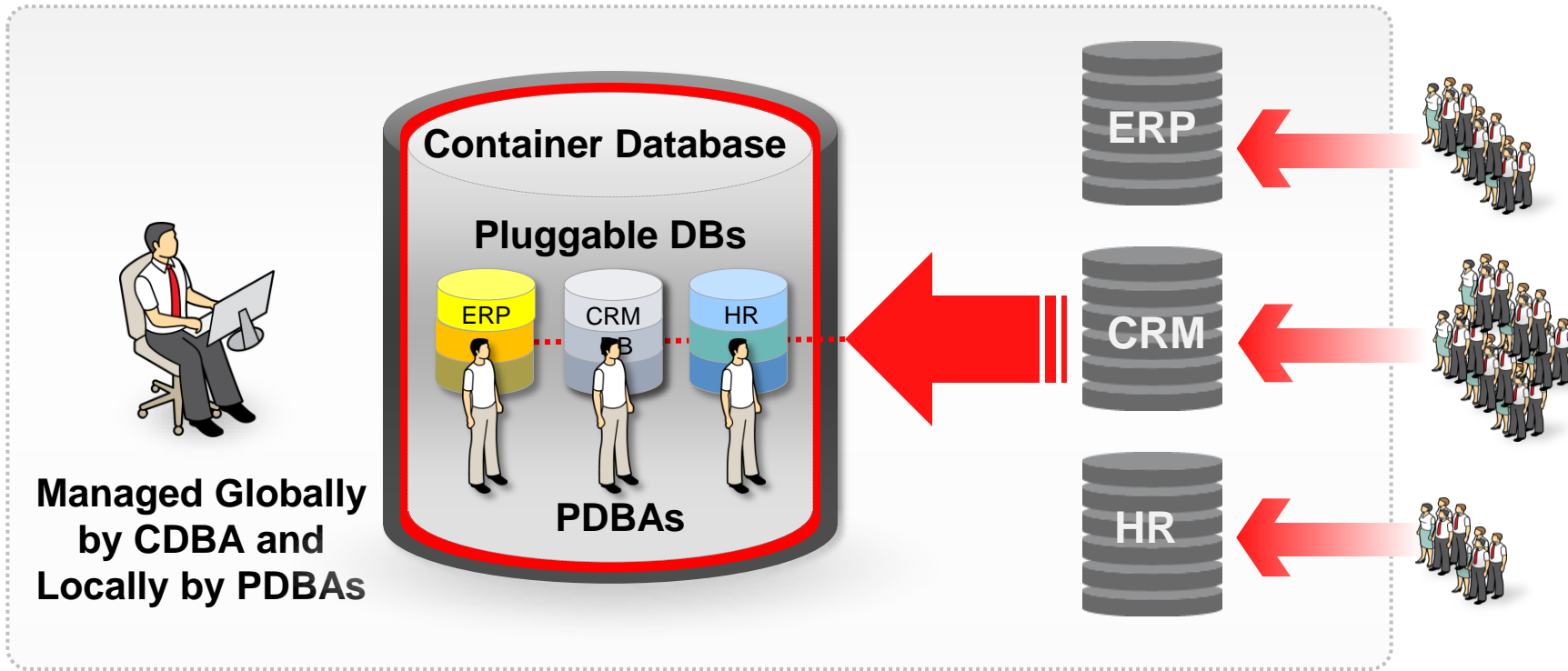
Short duration reports that are not written eventually age out from the queue

- Save Real-Time SQL Monitoring, DBOP and Real-time-ADDM reports automatically into the AWR
- Top 5 reports in each sample gets written to disk
- View persisted reports using SQL Monitoring in EM Cloud Control or EM Express
- SQL Monitoring data no longer lost
- Provides the ability to go back in time and find issues in SQL execution
- Data purged based on AWR retention policy



Pluggable Databases

Role of CDBA vs. PDBA in tuning pluggable databases



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