

Index

A

Active Session History

report

- activity over time, [10-10](#)
- load profile, [10-7](#)
- top events, [10-7](#)
- top files, [10-10](#)
- top Java, [10-9](#)
- top latches, [10-10](#)
- top objects, [10-10](#)
- top PL/SQL, [10-9](#)
- top sessions, [10-9](#)
- Top SQL, [10-8](#)
- using, [10-6](#)

reports, [10-2](#)

ADDM

- enabling in a PDB, [7-6](#)

allocation of memory, [12-1](#)

applications

- deploying, [2-19](#)
- design principles, [2-9](#)
- development trends, [2-16](#)
- implementing, [2-14](#)

Automatic Database Diagnostic Monitor

- actions and rationales of recommendations, [7-9](#)
- analysis results example, [7-9](#)
- and DB time, [7-3](#)
- example report, [7-9](#)
- findings, [7-9](#)
- results, [7-9](#)
- setups, [7-10](#)
- types of problems considered, [7-3](#)
- types of recommendations, [7-9](#)

automatic database diagnostic monitoring, [1-5](#)

automatic memory management, [12-4](#)

automatic segment-space management, [4-5](#), [11-20](#), [18-10](#)

Automatic shared memory management, [13-1](#)

automatic SQL tuning, [1-5](#)

automatic undo management, [4-3](#)

Automatic Workload Repository, [1-5](#)

- Active Data Guard support, [6-24](#)
- AWR data storage and retrieval in a
multitenant environment, [6-21](#)

Automatic Workload Repository (*continued*)

- categorization of AWR statistics in a
multitenant environment, [6-20](#)

compare periods report

- about, [9-1](#)
- advisory statistics, [9-13](#), [9-16](#)
- details, [9-9](#)
- dictionary cache statistics, [9-16](#)
- I/O statistics, [9-12](#)
- instance activity statistics, [9-12](#)
- latch statistics, [9-14](#)
- library cache statistics, [9-16](#)
- operating system statistics, [9-10](#)
- segment statistics, [9-14](#), [9-15](#)
- service statistics, [9-10](#)
- SQL statistics, [9-10](#)
- summary, [9-8](#)
- supplemental information, [9-17](#)
- time model statistics, [9-9](#)
- undo statistics, [9-14](#)
- using, [9-8](#)
- wait events, [9-10](#)
- wait statistics, [9-13](#)

configuring, [6-6](#)

default settings, [6-4](#)

factors affecting space usage, [6-4](#)

managing snapshots in ADG standby databases, [6-30](#)

minimizing space usage, [6-4](#)

modifying snapshot settings, [6-8](#)

multitenant environment support, [6-20](#)

overview, [6-2](#)

recommendations for retention period, [6-4](#)

reports, [6-35](#)

retention period, [6-4](#)

space usage, [6-4](#)

statistics collected, [6-2](#)

turning off automatic snapshot collection, [6-4](#)

unusual percentages in reports, [6-34](#)

Viewing AWR data in a multitenant environment, [6-23](#)

viewing remote snapshots for ADG standby databases, [6-33](#)

views for accessing data, [6-18](#)

Autonomous Data Warehouse

ADW, [13-3](#)

Autonomous Transaction Processing

ATP, [13-3](#)

awrrpt.sql

Automatic Workload Repository report, [6-35](#)

B

B-tree indexes, [2-11](#)baselines, [1-2](#), [6-3](#)performance, [6-1](#)benchmarking workloads, [2-17](#)big bang rollout strategy, [2-19](#)bitmap indexes, [2-11](#)block cleanout, [11-15](#)

block size

choosing, [18-9](#)optimal, [18-9](#)

bottlenecks

elimination, [1-3](#)fixing, [3-1](#)identifying, [3-1](#)memory, [12-1](#)resource, [11-38](#)buffer busy wait events, [11-20](#)actions, [11-20](#)

buffer cache

contention, [11-22](#), [11-23](#), [11-33](#)hit ratio, [14-4](#)

buffer pools

multiple, [14-7](#)

buffer waits

about, [9-13](#)business logic, [2-6](#), [2-14](#)

C

chained rows, [11-16](#)

classes

wait events, [5-3](#), [11-7](#)client/server applications, [19-10](#)Cloud Control, [1-4](#)

column order

indexes, [2-12](#)

components

hardware, [2-5](#)software, [2-6](#)conceptual modeling, [3-3](#)

consistency

read, [11-15](#)consistent gets from cache statistic, [14-4](#)

contention

library cache latch, [11-32](#)memory, [11-1](#), [12-1](#)shared pool, [11-32](#)tuning, [11-1](#)wait events, [11-32](#)context switches, [19-10](#)CONTROL_FILES initialization parameter, [4-1](#)CPUs, [2-5](#)statistics, [11-3](#)utilization, [19-8](#)

CREATE INDEX statement

PARALLEL clause, [4-8](#)

CURSOR_SHARING initialization parameter,

[15-5](#)

CURSOR_SPACE_FOR_TIME initialization

parameter, [15-15](#)

cursors

accessing, [15-6](#)sharing, [15-6](#)

D

data

and transactions, [2-7](#)cache, [19-1](#)gathering, [5-1](#)modeling, [2-10](#)queries, [2-8](#)searches, [2-8](#)

database caching modes

configuring, [14-14](#)default database caching mode, [14-14](#)determining which mode to use, [14-15](#)

force full database caching mode

about, [14-15](#)verifying, [14-16](#)database monitoring, [1-5](#)diagnostic, [7-1](#)

database performance

comparing, [9-1](#)degradation over time, [9-1](#)Database Resource Manager, [11-3](#), [19-4](#), [19-11](#)

database tuning

performance degradation over time, [9-1](#)transient performance problems, [10-1](#)

databases

diagnosing and monitoring, [7-1](#)size, [2-9](#)statistics, [5-1](#)db block gets from cache statistic, [14-4](#)db file scattered read wait events, [11-21](#), [11-22](#)actions, [11-22](#), [11-24](#)db file sequential read wait events, [11-21](#), [11-23](#)actions, [11-24](#)

DB time

metric, [7-2](#)statistic, [5-1](#)DB_BLOCK_SIZE initialization parameter, [18-4](#)DB_DOMAIN initialization parameter, [4-1](#)DB_NAME initialization parameter, [4-1](#)DBA_OBJECTS view, [14-10](#)

DBMS_ADVISOR package
 setting DBIO_EXPECTED, [7-11](#)
 setups for ADDM, [7-10](#), [7-11](#)
 DBMS_SHARED_POOL package
 managing the shared pool, [15-20](#)
 debugging designs, [2-18](#)
 deploying applications, [2-19](#)
 design principles, [2-9](#)
 designs
 debugging, [2-18](#)
 testing, [2-18](#)
 validating, [2-18](#)
 development environments, [2-14](#)
 diagnostic monitoring, [1-5](#), [7-1](#)
 dictionary cache, [9-16](#)
 direct path
 read events, [11-24](#)
 read events actions, [11-24](#)
 read events causes, [11-25](#)
 wait events, [11-26](#)
 write events actions, [11-26](#)
 write events causes, [11-26](#)
 disks
 monitoring operating system file activity, [11-4](#)

E

emergencies
 performance, [3-5](#)
 Emergency Performance Method, [3-6](#)
 End to End Application Tracing
 action and module names, [2-15](#)
 enqueue
 about, [9-14](#)
 enqueue wait events, [11-26](#)
 actions, [11-26](#)
 statistics, [11-10](#)
 estimating workloads, [2-17](#)
 benchmarking, [2-17](#)
 extrapolating, [2-17](#)
 extrapolating workloads, [2-17](#)

F

FAILED_AUTO_TASKS_REPORT Function, [7-14](#)
 fast ingest, [13-9](#), [13-12](#)
 fast lookup, [13-18](#)
 disabling for a table, [13-21](#)
 FAST_START_MTTR_TARGET
 and tuning instance recovery, [11-43](#)
 Fast-Start checkpointing architecture, [11-41](#)
 Fast-Start Fault Recovery, [11-39](#), [11-41](#)
 free buffer wait events, [11-29](#)
 free lists, [11-21](#)
 function-based indexes, [2-11](#)

H

hard parsing, [2-13](#)
 hardware
 components, [2-5](#)
 limitations of components, [2-4](#)
 sizing of components, [2-4](#)
 HOLD_CURSOR clause, [15-7](#)
 hours of service, [2-9](#)

I

I/O
 and SQL statements, [11-23](#)
 contention, [11-4](#), [11-7](#), [11-22](#), [11-36](#)
 excessive I/O waits, [11-22](#)
 monitoring, [11-4](#)
 objects causing I/O waits, [11-23](#)
 idle wait events, [11-31](#)
 SQL*Net message from client, [11-38](#)
 indexes
 adding columns, [2-11](#)
 appending columns, [2-11](#)
 B-tree, [2-11](#)
 bitmap, [2-11](#)
 column order, [2-12](#)
 costs, [2-12](#)
 creating, [4-8](#)
 design, [2-10](#)
 function-based, [2-11](#)
 partitioned, [2-11](#)
 placement on disk, [18-5](#)
 reducing I/O, [2-12](#)
 reverse key, [2-11](#)
 selectivity, [2-12](#)
 sequences in, [2-12](#)
 serializing in, [2-12](#)
 initialization parameters
 CONTROL_FILES, [4-1](#)
 DB_DOMAIN, [4-1](#)
 DB_NAME, [4-1](#)
 OPEN_CURSORS, [4-1](#)
 STREAMS_POOL_SIZE, [13-4](#)
 instance activity
 comparing, [9-12](#)
 instance caging, [19-8](#)
 instance configuration
 initialization files, [4-1](#)
 performance considerations, [4-1](#)
 instance recovery
 Fast-Start Fault Recovery, [11-41](#)
 performance tuning, [11-39](#)
 Internet scalability, [2-3](#)

L

`LARGE_POOL_SIZE` initialization parameter, [15-26](#)

latch contention

- library cache latches, [11-12](#)
- shared pool latches, [11-12](#)

latch free wait events

- actions, [11-32](#)

latch wait events, [11-32](#)

latches, [10-10](#)

- tuning, [1-2](#), [11-32](#)

library cache, [9-16](#)

- latch contention, [11-32](#)
- latch wait events, [11-32](#)
- lock, [11-36](#)
- pin, [11-36](#)

linear scalability, [2-4](#)

locks and lock holders

- finding, [11-26](#)

log buffer

- space wait events, [11-36](#)

log file

- parallel write wait events, [11-36](#)
- switch wait events, [11-36](#)
- sync wait events, [11-37](#)

log writer processes

- tuning, [18-6](#)

LRU

- aging policy, [14-7](#)
- latch contention, [11-35](#)

M

max session memory statistic, [15-25](#)

`MAXOPENCURSORS` clause, [15-7](#)

`MEMOPTIMIZE FOR WRITE` clause, [13-14](#)

memoptimize pool, [13-18](#)

`MEMOPTIMIZE_POOL_SIZE` initialization parameter, [13-18](#)

`MEMOPTIMIZE_WRITE` hint, [13-15](#)

Memoptimized Rowstore

- about, [13-9](#)
- fast ingest

 - about, [13-9](#)
 - disabling, [13-15](#)
 - enabling, [13-14](#)
 - prerequisites, [13-12](#)
 - using, [13-15](#)

- fast lookup

 - about, [13-17](#)
 - enabling for a table, [13-20](#)
 - prerequisites, [13-18](#)

- memoptimize pool, [13-18](#)

memory

- hardware component, [2-5](#)

memory (*continued*)

- PGA statistics, [9-13](#)
- statistics, [9-16](#)

memory allocation

- importance, [12-1](#)
- tuning, [13-7](#)

memory management

- automatic shared, [12-4](#)

metrics, [6-1](#)

migrated rows, [11-16](#)

mirroring

- redo logs, [18-7](#)

modeling

- conceptual, [3-3](#)
- data, [2-10](#)
- workloads, [2-18](#)

monitoring

- diagnostic, [1-5](#)

multiple buffer pools, [14-7](#)

N

`NAMESPACE` column

- `V$LIBRARYCACHE` view, [15-10](#)

network

- hardware component, [2-5](#)
- speed, [2-8](#)

network communication wait events, [11-38](#)

- db file scattered read wait events, [11-21](#)
- db file sequential read wait events, [11-21](#), [11-23](#)

- SQL*Net message from Dblink, [11-39](#)
- SQL*Net more data to client, [11-38](#)

O

object-orientation, [2-16](#)

`OPEN_CURSORS` initialization parameter, [4-1](#)

operating system

- data cache, [19-1](#)
- monitoring disk I/O, [11-4](#)

optimization

- described, [1-4](#)

optimizer,

- introduction, [1-4](#)
- query, [1-4](#)

Oracle CPU statistics, [11-3](#)

Oracle Enterprise Manager Cloud Control, [1-4](#)

- advisors, [1-5](#)
- Performance page, [1-5](#)

Oracle Forms

- control of parsing and private SQL areas, [15-8](#)

Oracle Managed Files, [18-8](#)

Oracle Orion

- calibration tool parameters, [18-16](#)

Oracle Orion (*continued*)
 command-line options, [18-16](#)
 Oracle performance improvement method, [3-1](#)
 steps, [3-2](#)

P

page table, [19-9](#)
 paging, [19-10](#)
 reducing, [13-6](#)
 PARALLEL clause
 CREATE INDEX statement, [4-8](#)
 parameter
 RESULT_CACHE_MAX_TEMP_RESULT,
 [16-10](#)
 RESULT_CACHE_MAX_TEMP_SIZE, [16-10](#)
 RESULT_CACHE_MODE, [16-9](#)
 parameters
 initialization, [9-17](#)
 parsing
 hard, [2-13](#)
 Oracle Forms, [15-8](#)
 Oracle precompilers, [15-7](#)
 reducing unnecessary calls, [15-6](#)
 soft, [2-13](#)
 partitioned indexes, [2-11](#)
 per-session PGA memory limit
 PGA, [17-19](#)
 performance
 emergencies, [3-5](#)
 improvement method, [3-1](#)
 improvement method steps, [3-2](#)
 mainframe, [19-6](#)
 monitoring memory on Windows, [19-9](#)
 tools for diagnosing and tuning, [1-4](#)
 tools for performance tuning, [1-4](#)
 UNIX-based systems, [19-6](#)
 Windows, [19-6](#)
 Performance Hub active reports
 about, [6-41](#)
 generating, [6-41](#), [6-43](#)
 performance problems
 transient, [10-1](#)
 performance tuning
 Fast-Start Fault Recovery, [11-39](#)
 instance recovery, [11-39](#)
 FAST_START_MTTR_TARGET, [11-41](#)
 setting FAST_START_MTTR_TARGET,
 [11-43](#)
 using V\$INSTANCE_RECOVERY, [11-42](#)
 PGA_AGGREGATE_TARGET initialization
 parameter, [4-1](#)
 physical reads from cache statistic, [14-4](#)
 proactive monitoring, [1-3](#)
 processes
 scheduling, [19-10](#)

Program Global Area
 PGA, [13-3](#)
 program global area (PGA)
 direct path read, [11-24](#)
 direct path write, [11-26](#)
 shared servers, [15-24](#)
 programming languages, [2-14](#)

Q

queries
 data, [2-8](#)
 query optimizer, [1-4](#)
 See also optimizer

R

rdbms ipc reply wait events, [11-38](#)
 read consistency, [11-15](#)
 read wait events
 direct path, [11-24](#)
 scattered, [11-22](#)
 redo logs, [4-4](#)
 buffer size, [11-36](#)
 mirroring, [18-7](#)
 placement on disk, [18-6](#)
 sizing, [4-4](#)
 reducing
 contention with dispatchers, [4-10](#)
 paging and swapping, [13-6](#)
 REEXECUTE_FAILED_AUTO_TASKS
 Procedure, [7-15](#)
 RELEASE_CURSOR clause, [15-7](#)
 Remote Management Framework (RMF), [6-26](#)
 resources
 allocation, [2-6](#), [2-14](#)
 bottlenecks, [11-38](#)
 wait events, [11-23](#)
 response time, [2-8](#)
 reverse key indexes, [2-11](#)
 RMF, [6-26](#)
 rollout strategies
 big bang approach, [2-19](#)
 trickle approach, [2-19](#)

S

scalability, [2-2](#)
 factors preventing, [2-4](#)
 Internet, [2-3](#)
 linear, [2-4](#)
 scattered read wait events, [11-22](#)
 actions, [11-22](#)
 segment-level statistics, [11-10](#)
 selectivity
 ordering columns in an index, [2-12](#)

- sequential read wait events
 - actions, [11-24](#)
 - service hours, [2-9](#)
 - session memory statistic, [15-25](#)
 - SGA_TARGET initialization parameter
 - automatic memory management, [13-1](#)
 - shared pool contention, [11-32](#)
 - shared server
 - performance issues, [4-9](#)
 - reducing contention, [4-9](#)
 - tuning, [4-9](#)
 - tuning memory, [15-24](#)
 - SHARED_POOL_SIZE initialization parameter, [15-15](#)
 - SHOW SGA statement, [13-7](#)
 - sizing redo logs, [4-4](#)
 - snapshots
 - about, [6-2](#)
 - soft parsing, [2-13](#)
 - software
 - components, [2-6](#)
 - sort areas
 - tuning, [17-1](#)
 - SQL statements
 - waiting for I/O, [11-23](#)
 - SQL Tuning Advisor, [1-5](#)
 - SQL*Net
 - message from client idle events, [11-38](#)
 - message from dblink wait events, [11-39](#)
 - more data to client wait events, [11-38](#)
 - statistics
 - baselines, [6-1](#)
 - consistent gets from cache, [14-4](#)
 - databases, [5-1](#)
 - db block gets from cache, [14-4](#)
 - dictionary cache, [9-16](#)
 - gathering, [5-1](#)
 - I/O, [9-12](#)
 - instance activity, [9-12](#)
 - latch, [9-14](#)
 - library cache, [9-16](#)
 - max session memory, [15-25](#)
 - memory, [9-16](#)
 - operating system
 - comparing, [9-10](#)
 - PGA memory, [9-13](#)
 - physical reads from cache, [14-4](#)
 - segment, [9-14](#), [9-15](#)
 - segment-level, [11-10](#)
 - service, [9-10](#)
 - session memory, [15-25](#)
 - shared server processes, [4-11](#)
 - SQL, [9-10](#)
 - time model, [5-1](#), [9-9](#)
 - undo, [9-14](#)
 - waits, [9-13](#)
 - STREAMS_POOL_SIZE initialization parameter, [13-4](#)
 - striping
 - manual, [18-5](#)
 - swapping, [19-9](#), [19-10](#)
 - reducing, [13-6](#)
 - switching processes, [19-10](#)
 - system architecture, [2-5](#)
 - configuration, [2-7](#)
 - hardware components, [2-5](#)
 - CPUs, [2-5](#)
 - I/O subsystems, [2-5](#)
 - memory, [2-5](#)
 - networks, [2-5](#)
 - software components, [2-6](#)
 - business logic, [2-6](#)
 - data and transactions, [2-7](#)
 - resources for managing user requests, [2-6](#)
 - user interface, [2-6](#)
 - System Global Area tuning, [13-7](#)
- ## T
-
- tables
 - creating, [4-6](#)
 - design, [2-10](#)
 - placement on disk, [18-5](#)
 - setting storage options, [4-6](#)
 - tablespaces, [4-4](#)
 - creating, [4-4](#), [4-5](#)
 - temporary, [4-4](#), [4-5](#)
 - temporary tablespaces, [4-4](#)
 - creating, [4-5](#)
 - testing designs, [2-18](#)
 - thrashing, [19-10](#)
 - time model statistics, [5-1](#)
 - comparing, [9-9](#)
 - Top Java
 - Active Session History report, [10-9](#)
 - top PL/SQL
 - Active Session History report, [10-9](#)
 - Top Sessions
 - Active Session History report, [10-9](#)
 - Top SQL
 - Active Session History report, [10-8](#)
 - transactions and data, [2-7](#)
 - trickle rollout strategy, [2-19](#)
 - tuning
 - and bottleneck elimination, [1-3](#)
 - and proactive monitoring, [1-3](#)
 - latches, [1-2](#), [11-32](#)
 - resource contention, [11-1](#)
 - shared server, [4-9](#)
 - sorts, [17-1](#)
 - System Global Area (SGA), [13-7](#)

U

undo management, automatic mode, [4-3](#)
 Unified Memory, [13-1](#)
 UNIX system performance, [19-6](#)
 user global area (UGA)
 shared servers, [4-9](#), [15-24](#)
 user interface, [2-6](#)
 users
 interaction method, [2-8](#)
 interfaces, [2-14](#)
 location, [2-8](#)
 network speed, [2-8](#)
 number of, [2-8](#)
 requests, [2-14](#)
 response time, [2-8](#)

V

V\$ACTIVE_SESSION_HISTORY view, [11-8](#)
 V\$BUFFER_POOL_STATISTICS view, [14-9](#)
 V\$DB_CACHE_ADVICE view, [14-2](#)
 V\$EVENT_HISTOGRAM view, [11-9](#)
 V\$FILE_HISTOGRAM view, [11-9](#)
 V\$JAVA_LIBRARY_CACHE_MEMORY view,
 [15-13](#)
 V\$JAVA_POOL_ADVICE view, [15-13](#)
 V\$LIBRARY_CACHE_MEMORY view, [15-12](#)
 V\$LIBRARYCACHE view
 NAMESPACE column, [15-10](#)
 V\$QUEUE view, [4-11](#)
 V\$ROWCACHE view
 performance statistics, [15-13](#)
 V\$SESSION view, [11-8](#), [11-10](#)
 V\$SESSION_EVENT view, [11-8](#)
 V\$SESSION_WAIT view, [11-8](#)
 V\$SESSION_WAIT_CLASS view, [11-9](#)

V\$SESSION_WAIT_HISTORY view, [11-9](#)
 V\$SESSTAT view, [15-25](#)
 V\$SHARED_POOL_ADVICE view, [15-12](#)
 V\$SHARED_POOL_RESERVED view, [15-22](#)
 V\$SYSSTAT view
 redo buffer allocation, [14-13](#)
 using, [14-4](#)
 V\$SYSTEM_EVENT view, [11-9](#)
 V\$SYSTEM_WAIT_CLASS view, [11-9](#)
 V\$TEMP_HISTOGRAM view, [11-9](#)
 V\$WAITSTAT view, [11-10](#)
 validating designs, [2-18](#)
 views, [2-13](#)
 vmstat UNIX command, [19-9](#)

W

wait events, [5-3](#)
 buffer busy waits, [11-20](#)
 classes, [5-3](#), [11-7](#)
 comparing, [9-10](#)
 direct path, [11-26](#)
 enqueue, [11-26](#)
 free buffer waits, [11-29](#)
 idle wait events, [11-31](#)
 latch, [11-32](#)
 library cache latch, [11-32](#)
 log buffer space, [11-36](#)
 log file parallel write, [11-36](#)
 log file switch, [11-36](#)
 log file sync, [11-37](#)
 network communication wait events, [11-38](#)
 rdbms ipc reply, [11-38](#)
 resource wait events, [11-23](#)
 Windows performance, [19-6](#)
 workloads, [2-17](#), [2-18](#)