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October 1–5, 2017
SAN FRANCISCO, CA

Be A Hero With Your DBA

Database Tuning for Admins, Architects and Developers

Graham Wood: Architect
Bob Carlin: Development Manager
Real-World Performance
October, 2017

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AWR Analysis for Admins, Developers and Architects

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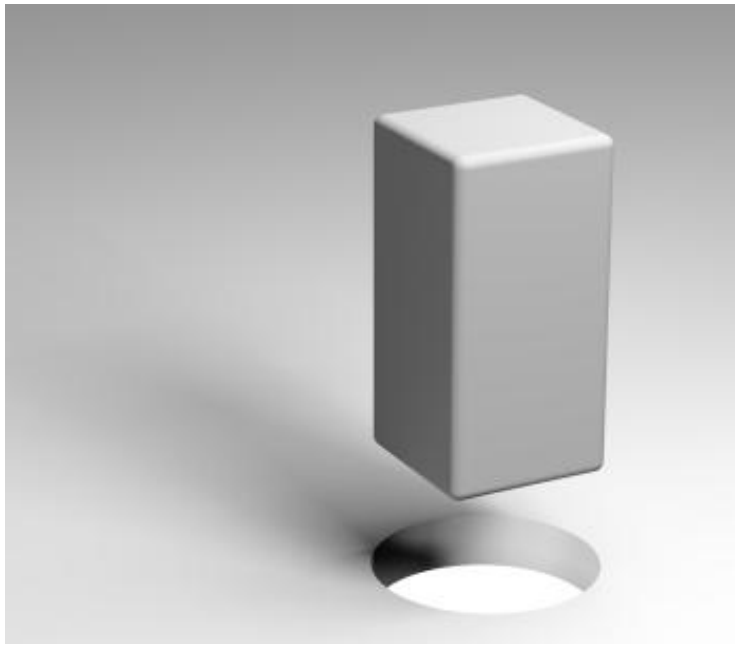
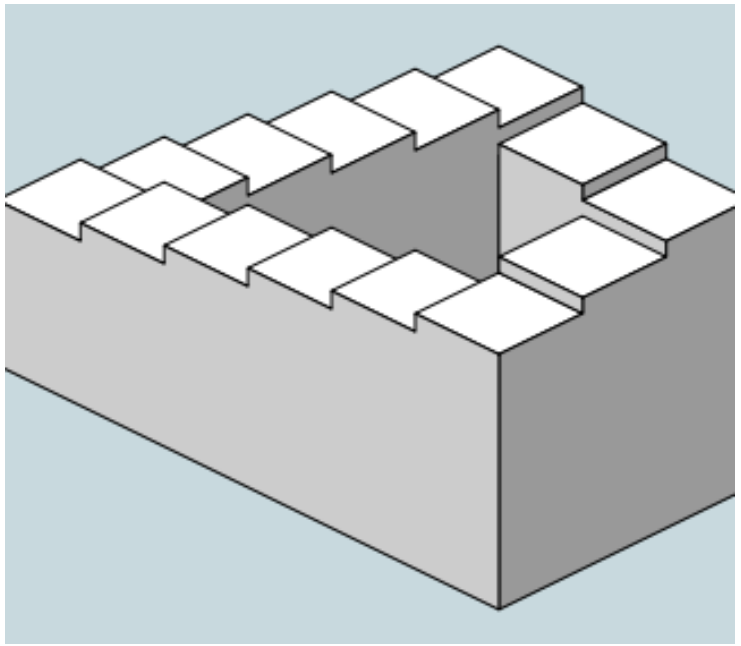
Real-World Performance Root Causes



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



The application architecture/code design is sub-optimal

There is a sub optimal algorithm in the database

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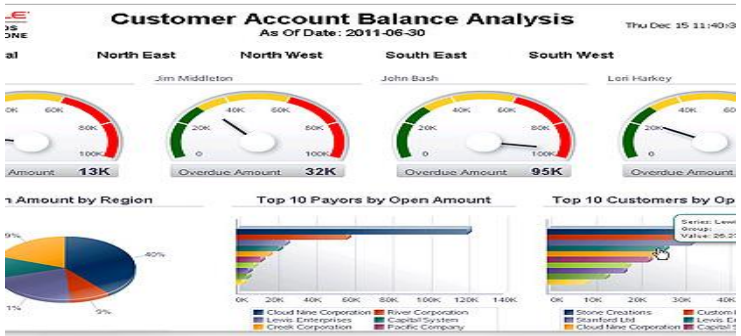
How Does Your Organization Do Performance ?

- Conventional
  - Focus is on “Good Enough” or “What the Business Needs”
  - Process Orientated/Part of Quality Assurance
  - Spends most of the time on Platform Tuning Issues
  - Only changes things within limited scope
  - Bottom up tuning approach
  - Looking for incremental gains
- Real-World
  - Focus on excellence and what the Hardware and Software can do
  - Innovate excellent performance and add intellectual property to your code
  - Everything is within scope
  - Holistic top down approach
  - Focus on orders of magnitude gains

1000X Project



Baseline:	4.3 Hours
Code Changes:	4.3 Hours
Correct Usage:	29 Secs
Bug Fixes:	12 Secs
Final:	12 Secs
Speed up:	**1355.57**

Baseline:	2.4 Days
Code Changes:	27 Mins
Correct Usage:	7.5 Mins
Bug Fixes:	4.5 Mins
Final:	4.5 Mins
Speed up:	**1002**

Baseline:	2.5 Hours
Code Changes:	2.5 Hours
Correct Usage:	4 Secs
Bug Fixes:	0.90 Secs
Final:	0.90 Secs
Speed up:	**1024**

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RWP @Demoground

- Moscone West SOA-161
- Discuss your performance challenges with RWP staff
- Bring your AWR/ADDM/ASH/SQL* Monitor for analysis by RWP

AWR Architecture Analysis

More than just wait events and top SQL

- Large amount of data in the AWR report
- Tells us about the way that the system has been architected and designed as well as about how it is performing
- Often see common mistakes from architecture and coding
- Hyperlinks in slides are links to Real-World Performance (RWP) video series
  - http://oracle.com/goto/oll/rwp

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AWR from OLTP System

Ready for Black Friday?

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AWR from Online system

- Testing system for Black Friday readiness
- Cannot generate full projected load on test system
- Do you see any problems with this system scaling up from this test?
- Will we survive Black Friday ?

AWR Header

WORKLOAD REPOSITORY report for

DB Name	DB Id	Instance	Inst num	Startup Time	Release	RAC
SHOPPING	1722515684	SHOPPING02	2	07-Oct-13 16:10	11.2.0.2.0	YES

Host Name	Platform	CPUs	Cores	Sockets	Memory (GB)
hlq11db.na.bigretail.com	Linux x86 64-bit	64	32	4	504.03

	Snap Id	Snap Time	Sessions	Cursors/Session
Begin Snap:	3037	15-Oct-13 02:45:11	3351	8.2
End Snap:	3044	15-Oct-13 04:30:00	4635	26.2
Elapsed:		104.82 (mins)		
DB Time:		27,641.09 (mins)		

Report Summary

Cache Sizes

	Begin	End		
Buffer Cache:	30,720M	30,720M	Std Block Size:	16K
Shared Pool Size:	16,384M	16,384M	Log Buffer:	14,772K

Load Profile

	Per Second	Per Transaction	Per Exec	Per Call
DB Time(s):	263.7	0.2	0.00	0.00
DB CPU(s):	39.0	0.0	0.00	0.00
Redo size:	9,829,605.5	7,222.2		
Logical reads:	802,177.1	589.4		

- 32 Cores available
- Over processed

  - Sessions is 100x cores
  - Session count growing
    - Session leak
    - Dynamic connection pools
- Cursors per session growing

  - Cursor leakage

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Load Profile

Load Profile

	Per Second	Per Transaction	Per Exec	Per Call
DB Time(s):	263.7	0.2	0.00	0.00
DB CPU(s):	39.0	0.0	0.00	0.00
Redo size:	9,829,605.5	7,222.2		
Logical reads:	802,177.1	589.4		
Block changes:	44,854.5	33.0		
Physical reads:	10,749.2	7.9		
Physical writes:	2,085.7	1.5		
User calls:	104,774.4	77.0		
Parses:	39,775.4	29.2		
Hard parses:	0.1	0.0		
W/A MB processed:	96.0	0.1		
Logons:	10.5	0.0		
Executes:	59,560.7	43.8		
Rollbacks:	878.3	0.7		
Transactions:	1,361.0			

- ~260 sessions active on average
- ~40 on CPU
  - Only have 32 cores
  - System CPU limited
- 10 logons per second
  - In a stable system?
    - Session leaks
    - Dynamic connection pools
- 40% of user txns are rollbacks
  - Coding for failure

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Init.ora

init.ora Parameters

Parameter Name	Begin value	End value (if different)
_bloom_filter_enabled	FALSE	
_disable_image_check	TRUE	
_fix_control	6239971:off	
_kghdsidx_count	1	
_kgl_debug	hash='69cd9f156d9ccd9b245ebaccce65c558' debug=33554432	
_kgl_hot_object_copies	16	
_memory_imm_mode_without_autosga	FALSE	
_shared_pool_reserved_min_alloc	6000	
aq_tm_processes	4	
audit_file_dest	/u01/app/oracle/admin/SHOPPING02/adump	
audit_sys_operations	TRUE	
audit_trail	DB	
cluster_database	TRUE	
cluster_database_instances	2	
compatible	11.2.0.2.0	
control_file_record_keep_time	35	
control_files	+SHOPPING_DATA01/SHOPPING/controlfile/current.762.823865529, +SHOPPING_RECO01/SHOPPING/controlfile/current.375.823865531	
core_dump_dest	/u01/app/oracle/admin/SHOPPING02/cdump	
cursor_sharing	FORCE	
db_block_size	16384	
db_cache_size	32212254720	
db_create_file_dest	+SHOPPING_DATA01	
db_domain	world	
db_file_multiblock_read_count	32	
db_files	4096	
db_name	SHOPPING	
db_recovery_file_dest	+SHOPPING_RECO01	

- Underscore parameters
- Db_block_size=16384
- Cursor_sharing=FORCE
- Db_file_multiblock_read_count=32

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Init.ora

db_file_multiblock_read_count	32
db_files	4096
db_name	SHOPPING
db_recovery_file_dest	+SHOPPING_RECO01
db_recovery_file_dest_size	64424509440
db_recycle_cache_size	4429185024
db_writer_processes	12
diagnostic_dest	/u01/app/oracle
disk_asynch_io	TRUE
fal_client	SHOPPING
fal_server	op99eodb01_linux
fast_start_mttr_target	3600
instance_name	SHOPPING02
instance_number	2
java_pool_size	134217728
job_queue_processes	20
large_pool_size	2147483648
local_listener	SHOPPING02_local
log_archive_config	dg_config=(SHOPPING, op99eodb)
log_archive_dest_1	location=+SHOPPING_RECO01
log_archive_dest_2	
log_archive_dest_state_2	DEFER
log_archive_max_processes	10
log_archive_min_succeed_dest	1
log_buffer	3407872
nls_date_format	DD-MON-RR
open_cursors	2000
open_links	255
optimizer_capture_sql_plan_baselines	TRUE
optimizer_dynamic_sampling	1
optimizer_index_cost_adj	50
optimizer_mode	ALL_ROWS
optimizer_secure_view_merging	FALSE

- Db_writer_processes=12
  - On a system that supports asynchIO?
- Open_cursors=2000
  - Per session limit
  - Implies cursor leaking

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Init.ora

open_cursors	2000
open_links	255
optimizer_capture_sql_plan_baselines	TRUE
optimizer_dynamic_sampling	1
optimizer_index_cost_adj	50
optimizer_mode	ALL_ROWS
optimizer_secure_view_merging	FALSE
os_authent_prefix	
parallel_adaptive_multi_user	FALSE
parallel_max_servers	180
parallel_min_servers	8
pga_aggregate_target	16106127360
processes	5500
recovery_parallelism	90
remote_listener	qlocdb17:50000
remote_login_passwordfile	EXCLUSIVE
resource_manager_plan	
sec_case_sensitive_logon	FALSE
service_names	SHOPPINGsvc, SHOPPING02svc
session_cached_cursors	200
session_max_open_files	20
sessions	8320
sga_max_size	56505663488
shared_pool_reserved_size	262144000
shared_pool_size	17179869184
spfile	+SHOPPING_DATA01/SHOPPING/spfile
sql_trace	FALSE
star_transformation_enabled	false
streams_pool_size	134217728
thread	2
timed_statistics	TRUE
trace_enabled	TRUE
undo_management	AUTO
undo_retention	18000
undo_tablespace	undo02
workarea_size_policy	AUTO

- Optimizer_index_cost_adj=50
  - Classic hack parameter
- Processes=5500
- Sessions=8320

Top events

Where is the time going?

Top 5 Timed Foreground Events

Event	Waits	Time(s)	Avg wait (ms)	% DB time	Wait Class
library cache: mutex X	51,206,131	377,179	7	22.74	Concurrency
enq: TX - row lock contention	259,719	298,891	1151	18.02	Application
db file sequential read	40,457,009	282,531	7	17.04	User I/O
latch: row cache objects	141,091	247,016	1751	14.89	Concurrency
DB CPU		245,536		14.81	

- Concurrency waits > 35% of time
  - Library cache: mutex X
  - Latch:row cache objects
    - Typical of high CPU load
    - A symptom, not the problem
- Row lock contention 18% of time
- IO with 7ms avg read time
- CPU only 15% of DB Time
- Log file sync?

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Top SQL

Where is the time going?

SQL ordered by Elapsed Time

- Resources reported for PL/SQL code includes the resources used by all SQL statements called by the code.
- % Total DB Time is the Elapsed Time of the SQL statement divided into the Total Database Time multiplied by 100
- %Total - Elapsed Time as a percentage of Total DB time
- %CPU - CPU Time as a percentage of Elapsed Time
- %IO - User I/O Time as a percentage of Elapsed Time
- Captured SQL account for 43.8% of Total DB Time (s): 1,658,465
- Captured PL/SQL account for 13.9% of Total DB Time (s): 1,658,465

Elapsed Time (s)	Executions	Elapsed Time per Exec (s)	%Total	%CPU	%IO	SQL Id	SQL Module	SQL Text
204,008.97	1,967,640	0.10	12.30	0.59	2.83	ccfrfn4vuhtt0	ScheduleReturn	SELECT /*SHOP*/ YFS_ORDER_HE...
116,892.49	26,600,256	0.00	7.05	6.12	0.00	4xrbd7rw15at7	INT&CAP_AgentServer	BEGIN DBMS_APPLICATION_INFO.SE...
110,919.39	28,684,565	0.00	6.69	6.30	0.00	bmx990q2tsqjb	JDBC Thin Client	BEGIN DBMS_APPLICATION_INFO.SE...
79,569.63	13,172,207	0.01	4.80	8.40	0.00	8pvr9fks6m1r9	ADJUSTEOMSINV	SELECT /*SHOP*/ TO_CHAR(sysd...
57,474.41	108,429	0.53	3.47	0.17	0.05	1f72kz03ydy4x	Sourcing	SELECT /*SHOP*/ YFS_ORDER_HE...
20,853.07	53,990	0.39	1.26	0.17	0.00	f110q31ahqbb5	CONFIRMFPSHIPMENT	SELECT /*SHOP*/ YFS_ORDER_HE...
19,865.13	1,580,843	0.01	1.20	6.48	0.00	2tq3dknsjum6d	JDBC Thin Client	SELECT :"SYS_B_0" FROM DUAL...
19,820.14	93,037	0.21	1.20	0.16	0.01	4htst3fakwa0m	CONSOLIDATE_ADDNL_INV	SELECT /*SHOP*/ YFS_INVENTOR...
19,064.37	19	1,003.39	1.15	4.03	97.93	d7ufw6t6n4qrn	JDBC Thin Client	SELECT /*SHOP*/ count(:"SYS_...
16,954.77	2,418,713	0.01	1.02	8.52	91.24	fqq27u174x4t1	RETEK_ORDER_CREATE	SELECT /*SHOP*/ YFS_ORDER_LI...

- Top statement

```
SELECT /*SHOP*/ YFS_ORDER_HEADER.*
FROM YFS_ORDER_HEADER
WHERE (ORDER_HEADER_KEY = :1 )
FOR UPDATE
```

  - 12% of load
  - 2 million executions
  - Average execution 0.1 sec

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Top SQL

Segments by Row Lock Waits

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

Owner	Tablespace Name	Object Name	Subobject Name	Obj. Type	Row Lock Waits	% of Capture
SHOP	SHOPDATA	YFS_ORDER_HEADER		TABLE	250,888	38.42
SHOP	SHOPDATA	YFS_INVENTORY_ITEM		TABLE	83,732	12.82
SHOP	SHOPINDEX2	YFS_ORDER_HEADER_I9		INDEX	63,183	9.68
SHOP	SHOPINDEX1	YFS_STATISTICS_DETAIL_PK		INDEX	30,675	4.70
SHOP	SHOPINDEX1	YFS_ORDER_RELEASE_STATUS_PK		INDEX	25,905	3.97

- Top statement

```
SELECT /*SHOP*/ YFS_ORDER_HEADER.*
FROM YFS_ORDER_HEADER
WHERE (ORDER_HEADER_KEY = :1 )
FOR UPDATE
```

  - 40% of Row Lock Waits are on that object

Top SQL

SQL ordered by Elapsed Time

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20,853.07	53,990	0.39	1.26	0.17	0.00	f110g31ahqbb5	CONFIRMFPSHIPMENT	SELECT /*SHOP*/ YFS_ORDER_HE...
19,865.13	1,580,843	0.01	1.20	6.48	0.00	2tg3dknsjum6d	JDBC Thin Client	SELECT :"SYS_B_0" FROM DUAL...
19,820.14	93,037	0.21	1.20	0.16	0.01	4htst3fakwa0m	CONSOLIDATE_ADDNL_INV	SELECT /*SHOP*/ YFS_INVENTOR...
19,064.37	19	1,003.39	1.15	4.03	97.93	d7ufw6t6n4qrn	JDBC Thin Client	SELECT /*SHOP*/ count(:"SYS_...
16,954.77	2,418,713	0.01	1.02	8.52	91.24	fqq27u174x4t1	RETEK_ORDER_CREATE	SELECT /*SHOP*/ YFS_ORDER_LI...

- Next two statements
  - Call of DBMS_APPLICATION_INFO
    - Application instrumentation
  - 14% of load
  - 26M executions each
  - Instrumentation is a good thing BUT
    - Not needed since Oracle 10g
    - Use parameters to OCI or Java instead

Other SQL

98sp81sbwt4vc	select /* SHOP */ :"SYS_B_0" as ENTITY, sum(quantity) QUANTITY, DEMAND_TYPE, B.shipnode_key from yfs_inventory_demand B where B.inventory_item_key = (select inventory_item_key from yfs_inventory_item A where A.item_id = :1 and A.product_class = :2 and A.UOM = :3 and A.organization_code = :4) and B.demand_ship_date >= :5 and B.demand_ship_date <= :6 and B.shipnode_key in (:7 , :8 , :9 , :10 , :11 , :12 , :13 , :14 , :15 , :16 , :17 , :18 , :19 , :20 , :21 , :22 , :23 , :24 , :25 , :26 , :27 , :28 , :29 , :30 , :31 , :32 , :33 , :34 , :35 , :36 , :37 , :38 , :39 , :40 , :41 , :42 , :43 , :44 , :45 , :46 , :47 , :48 , :49 , :50 , :51 , :52 , :53 , :54 , :55 , :56 , :57 , :58 , :59 , :60 , :61 , :62 , :63 , :64 , :65 , :66 , :67 , :68 , :69 , :70 , :71 , :72 , :73 , :74 , :75 , :76 , :77 , :78 , :79 , :80 , :81 , :82 , :83 , :84 , :85 , :86 , :87 , :88 , :89 , :90 , :91 , :92 , :93 , :94 , :95 , :96 , :97 , :98 , :99 , :100 , :101 , :102 , :103 , :104 , :105 , :106 , :107 , :108 , :109 , :110 , :111 , :112 , :113 , :114 , :115 , :116 , :117 , :118 , :119 , :120 , :121 , :122 , :123 , :124 , :125 , :126 , :127 , :128 , :129 , :130 , :131 , :132 , :133 , :134 , :135 , :136 , :137 , :138 , :139 , :140 , :141 , :142 , :143 , :144 , :145 , :146 , :147 , :148 , :149 , :150 , :151 , :152 , :153 , :154 , :155 , :1 56 , :157 , :158 , :159 , :160 , :161 , :162 , :163 , :164 , :165 , :166 , :167 , :168 , :169 , :170 , :171 , :172 , :173 , :174 , :175 , :176 , :177 , :178 , :179 , :180 , :181 , :182 , :183 , :184 , :185 , :186 , :187 , :188 , :189 , :190 , :191 , :192 , :193 , :194 , :195 , :196 , :197 , :198 , :199 , :200 , :201 , :202 , :203 , :204 , :205 , :206 , :207 , :208 , :209 , :210 , :211 , :212 , :213 , :214 , :215 , :216 , :217 , :218 , :219 , :220 , :221 , :222 , :223 , :224 , :225 , :226 , :227 , :228 , :229 , :230 , :231 , :232 , :233 , :234 , :235 , :236 , :237 , :238 , :239 , :240 , :241 , :242 , :243 , :244 , :245 , :246 , :247 , :248 , :249 , :250 , :251 , :252 , :253 , :254 , :255 , :256 , :257 , :258 , :259 , :260 , :261 , :262 , :263 , :264 , :265 , :266 , :267 , :268 , :269 , :270 , :271 , :272 , :273 , :274 , :275 , :276 , :277 , :278 , :279 , :280 , :281 , :282 , :283 , :284 , :285 , :286 , :287 , :288 , :289 , :290 , :291 , :292 , :293 , :294 , :295 , :296 , :297 , :298 , :299 , :300 , :301 , :302 , :303 , :304 , :305 , :306 , :307 , :308 , :309 , :310 , :311 , :312 , :313 , :314 , :315 , :316 , :317 , :318 , :319 , :320 , :321 , :322 , :323 , :324 , :325 , :326 , :327 , :328 , :329 , :330 , :331 , :332 , :333 , :334 , :335 , :336 , :337 , :338 , :339 , :340 , :341 , :342 , :343 , :344 , :345 , :346 , :347 , :348 , :349 , :350 , :351 , :352 , :353 , :354 , :355 , :356 , :357 , :358 , :359 , :360 , :361 , :362 , :363 , :364 , :365 , :366 , :367 , :368 , :369 , :370 , :371 , :372 , :373 , :374 , :375 , :376 , :377 , :378 , :379 , :380 , :381 , :382 , :383 , :384 , :385 , :386 , :387 , :388 , :389 , :390 , :391 , :392 , :393 , :394 , :395 , :396 , :397 , :398 , :399 , :400 , :401 , :402 , :403 , :404 , :405 , :406 , :407 , :408 , :409 , :410 , :411 , :412 , :413 , :414 , :415 , :416 , :417 , :418 , :419 , :420 , :421 , :422 , :423 , :424 , :425 , :426 , :427 , :428 , :429 , :430 , :431 , :432 , :433 , :434 , :435 , :436 , :437 , :438 , :439 , :440 , :441 , :442 , :443 , :444 , :445 , :446 , :447 , :448 , :449 , :450 , :451 , :452 , :453 , :454 , :455 , :456 , :457 , :458 , :459 , :460 , :461 , :462 , :463 , :464 , :465 , :466 , :467 , :468 , :469 , :470 , :471 , :472 , :473 , :474 , :475 , :476 , :477 , :478 , :479 , :480 , :481 , :482 , :483 , :484 , :485 , :486 , :487 , :488 , :489 , :490 , :491 , :492 , :493 , :494 , :495 , :496 , :497 , :498 , :499 , :500 , :501 , :502 , :503 , :504 , :505 , :506 , :507 , :508 , :509 , :510 , :511 , :512 , :513 , :514 , :515 , :516 , :517 , :518 , :519 , :520 , :521 , :522 , :523 , :524 , :525 , :526 , :527 , :528 , :529 , :530 , :5 31 , :532 , :533 , :534 , :535 , :536 , :537 , :538 , :539 , :540 , :541 , :542 , :543 , :544 , :545 , :546 , :547 , :548 , :549 , :550 , :551 , :552 , :553 , :554 , :555 , :556 , :557 , :558 , :559 , :560 , :561 , :562 , :563 , :564 , :565 , :566 , :567 , :568 , :569 , :570 , :571 , :572 , :573 , :574 , :575 , :576 , :577 , :578 , :579 , :580 , :581 , :582 , :583 , :584 , :585 , :586 , :587 , :588 , :589 , :590 , :591 , :592 , :593 , :594 , :595 , :596 , :597 , :598 , :599 , :600 , :601 , :602 , :603 , :604 , :605 , :606 , :607 , :608 , :609 , :610 , :611 , :612 , :613 , :614 , :615 , :616 , :617 , :618 , :619 , :620 , :621 , :622 , :623 , :624 , :625 , :626 , :627 , :628 , :629 , :630 , :631 , :632 , :633 , :634 , :635 , :636 , :637 , :638 , :639 , :640 , :641 , :642 , :643 , :644 , :645 , :646 , :647 , :648 , :649 , :650 , :651 , :652 , :653 , :654 , :655 , :656 , :657 , :658 , :659 , :660 , :661 , :662 , :663 , :664 , :665 , :666 , :667 , :668 , :669 , :670 , :671 , :672 , :673 , :674 , :675 , :676 , :677 , :678 , :679 , :680 , :681 , :682 , :683 , :684 , :685 , :686 , :687 , :688 , :689 , :690 , :691 , :692 , :693 , :694 , :695 , :696 , :697 , :698 , :699 , :700 , :701 , :702 , :703 , :704 , :705 , :706 , :707 , :708 , :709 , :710 , :711 , :712 , :713 , :714 , :715 , :716 , :717 , :718 , :719 , :720 , :721 , :722 , :723 , :724 , :725 , :726 , :727 , :728 , :729 , :730 , :731 , :732 , :733 , :734 , :735 , :736 , :737 , :738 , :739 , :740 , :741 , :742 , :743 , :744 , :745 , :746 , :747 , :748 , :749 , :750 , :751 , :752 , :753 , :754 , :755 , :756 , :757 , :758 , :759 , :760 , :761 , :762 , :763 , :764 , :765 , :766 , :767 , :768 , :769 , :770 , :771 , :772 , :773 , :774 , :775 , :776 , :777 , :778 , :779 , :780 , :781 , :782 , :783 , :784 , :785 , :786 , :787 , :788 , :789 , :790 , :791 , :792 , :793 , :794 , :795 , :796 , :797 , :798 , :799 , :800 , :801 , :802 , :803 , :804 , :805 , :806 , :807 , :808 , :809 , :810 , :811 , :812 , :813 , :814 , :815 , :816 , :817 , :818 , :819 , :820 , :821 , :822 , :823 , :824 , :825 , :826 , :827 , :828 , :829 , :830 , :831 , :832 , :833 , :834 , :835 , :836 , :837 , :838 , :839 , :840 , :841 , :842 , :843 , :844 , :845 , :846 , :847 , :848 , :849 , :850 , :851 , :852 , :853 , :854 , :855 , :856 , :857 , :858 , :859 , :860 , :861 , :862 , :863 , :864 , :865 , :866 , :867 , :868 , :869 , :870 , :871 , :872 , :873 , :874 , :875 , :876 , :877 , :878 , :879 , :880 , :881 , :882 , :883 , :884 , :885 , :886 , :887 , :888 , :889 , :890 , :891 , :892 , :893 , :894 , :895 , :896 , :897 , :898 , :899 , :900 , :901 , :902 , :903 , :904 , :905 , :9 06 , :907 , :908 , :909 , :910 , :911 , :912 , :913 , :914 , :915 , :916 , :917 , :918 , :919 , :920 , :921 , :922 , :923 , :924 , :925 , :926 , :927 , :928 , :929 , :930 , :931 , :932 , :933 , :934 , :935 , :936 , :937 , :938 , :939 , :940 , :941 , :942 , :943 , :944 , :945 , :946 , :947 , :948 , :949 , :950 , :951 , :952 , :953 , :954 , :955 , :956 , :957 , :958 , :959 , :960 , :961 , :962 , :963 , :964 , :965 , :966 , :967 , :968 , :969 , :970 , :971 , :972 , :973 , :974 , :975 , :976 , :977 , :978 , :979 , :980 , :981 , :982 , :983 , :984 , :985 , :986 , :987 , :988 , :989 , :990 , :991 , :992 , :993 , :994 , :995 , :996 , :997 , :998 , :999 , :1000 , :1001 , :1002 , :1003 , :1004 , :1005 , :1006)group by B.demand_type, B.shipnode_key union select /* SHOP */ :"SYS_B_1" as ENTITY, sum(quantity) QUANTITY, DEMAND_TYPE, B.shipnode_key from yfs_inventory_demand_addnl B where B.inventory_item_key = (select inventory_item_key from yfs_inventory_item A where A.item_id = :1007 and A.product_class = :1008 and A.UOM = :1009 and A.organization_code = :1010) and B.demand_ship_date >= :1011 and B.demand_ship_date <= :1012 and B.shipnode_key in (:1013 , :1014 , :1015 , :1016 , :1017 , :1018 , :1019 , :1020 , :1021 , :1022 , :1023 , :1024 , :1025 , :1026 , :1027 , :1028 , :1029 , :1030 , :1031 , :1032 , :1033 , :1034 , :1035 , :1036 , :1 037 , :1038 , :1039 , :1040 , :1041 , :1042 , :1043 , :1044 , :1045 , :1046 , :1047 , :1048 , :1049 , :1050 , :1051 , :1052 , :1053 , :1054 , :1055 , :1056 , :1057 , :1058 , :1059 , :1060 , :1061 , :1062 , :1063 , :1064 , :1065 , :1066 , :1067 , :1068 , :1069 , :1070 , :1071 , :1072 , :1073 , :1074 , :1075 , :1076 , :1077 , :1078 , :1079 , :1080 , :1081 , :1082 , :1083 , :1084 , :1085 , :1086 , :1087 , :1088 , :1089 , :1090 , :1091 , :1092 , :1093 , :1094 , :1095 , :1096 , :1097 , :1098 , :1099 , :1100 , :1101 , :1102 , :1103 , :1104 , :1105 , :1106 , :1107 , :1108 , :1109 , :1110 , :1111 , :1112 , :1113 , :1114 , :1115 , :1116 , :1117 , :1118 , :1119 , :1120 , :1121 , :1122 , :1123 , :1124 , :1125 , :1126 , :1127 , :1128 , :1129 , :1130 , :1131 , :1132 , :1133 , :1134 , :1135 , :1136 , :1137 , :1138 , :1139 , :1140 , :1141 , :1142 , :1143 , :1144 , :1145 , :1146 , :1147 , :1148 , :1149 , :1150 , :1151 , :1152 , :1153 , :1154 , :1155 , :1156 , :1157 , :1158 , :1159 , :1160 , :1161 , :1162 , :1163 , :1164 , :1165 , :1166 , :1167 , :1168 , :1169 , :1170 , :1171 , :1172 , :1173 , :1174 , :1175 , :1176 , :1177 , :1178 , :1179 , :1180 , :1181 , :1182 , :1183 , :1184 , :1185 , :1186 , :1187 , :1188 , :1189 , :1190 , :1191 , :1192 , :1193 , :1194 , :1195 , :1196 , :1197 , :1198 , :1199 , :1200 , :1201 , :1202 , :1203 , :1204 , :1205 , :1206 , :1207 , :1208 , :1209 , :1210 , :1211 , :1212 , :1213 , :1214 , :1215 , :1216 , :1217 , :1218 , :1219 , :1220 , :1221 , :1222 , :1223 , :1224 , :1225 , :1226 , :1227 , :1228 , :1229 , :1230 , :1231 , :1232 , :1233 , :1234 , :1235 , :1236 , :1237 , :1238 , :1239 , :1240 , :1241 , :1242 , :1243 , :1244 , :1245 , :1246 , :1247 , :1248 , :1249 , :1250 , :1251 , :1252 , :1253 , :1254 , :1255 , :1256 , :1257 , :1258 , :1259 , :1260 , :1261 , :1262 , :1263 , :1264 , :1265 , :1266 , :1267 , :1268 , :1269 , :1270 , :1271 , :1272 , :1273 , :1274 , :1275 , :1276 , :1277 , :1278 , :1279 , :1280 , :1281 , :1282 , :1283 , :1284 , :1285 , :1286 , :1287 , :1288 , :1289 , :1290 , :1291 , :1292 , :1293 , :1294 , :1295 , :1296 , :1297 , :1298 , :1299 , :1300 , :1301 , :1302 , :1303 , :1304 , :1305 , :1306 , :1307 , :1308 , :1309 , :1310 , :1311 , :1312 , :1313 , :1314 , :1315 , :1316 , :1317 , :1318 , :1319 , :1320 , :1321 , :1322 , :1323 , :1324 , :1325 , :1326 , :1327 , :1328 , :1329 , :1330 , :1331 , :1332 , :1333 , :1334 , :1335 , :1336 , :1337 , :1338 , :1339 , :1340 , :1341 , :1342 , :1343 , :1344 , :1345 , :1346 , :1347 , :1348 , :1349 , :1350 , :1351 , :1352 , :1353 , :1354 , :1355 , :1356 , :1357 , :1358 , :1359 , :1360 , :1361 , :1362 , :1363 , :1364 , :1365 , :1366 , :1367 , :1368 , :1369 , :1370 , :1371 , :1372 , :1373 , :1374 , :1375 , :1376 , :1377 , :1378 , :1379 , :1380 , :1381 , :1382 , :1383 , :1384 , :1385 , :1386 , :1387 , :1388 , :1389 , :1390 , :1391 , :1392 , :1393 , :1394 , :1395 , :1396 , :1397 , :1398 , :1399 , :1400 , :1401 , :1402 , :1403 , :1404 , :1405 , :1406 , :1407 , :1408 , :1409 , :1410 , :1411 , :1412 , :1413 , :1414 , :1415 , :1416 , :1417 , :1418 , :1419 , :1420 , :1421 , :1422 , :1423 , :1424 , :1425 , :1426 , :1427 , :1428 , :1429 , :1430 , :1431 , :1432 , :1433 , :1434 , :1435 , :1436 , :1437 , :1438 , :1439 , :1440 , :1441 , :1442 , :1443 , :1444 , :1445 , :1446 , :1447 , :1448 , :1449 , :1450 , :1451 , :1452 , :1453 , :1454 , :1455 , :1456 , :1457 , :1458 , :1459 , :1460 , :1461 , :1462 , :1463 , :1464 , :1465 , :1466 , :1467 , :1468 , :1469 , :1470 , :1471 , :1472 , :1473 , :1474 , :1475 , :1476 , :1477 , :1478 , :1479 , :1480 , :1481 , :1482 , :1483 , :1484 , :1485 , :1486 , :1487 , :1488 , :1489 , :1490 , :1491 , :1492 , :1493 , :1494 , :1495 , :1496 , :1497 , :1498 , :1499 , :1500 , :1501 , :1502 , :1503 , :1504 , :1505 , :1506 , :1507 , :1508 , :1509 , :1510 , :1511 , :1512 , :1513 , :1514 , :1515 , :1516 , :1517 , :1518 , :1519 , :1520 , :1521 , :1522 , :1523 , :1524 , :1525 , :1526 , :1527 , :1528 , :1529 , :1530 , :1531 , :1532 , :1533 , :1534 , :1535 , :1536 , :1 537 , :1538 , :1539 , :1540 , :1541 , :1542 , :1543 , :1544 , :1545 , :1546 , :1547 , :1548 , :1549 , :1550 , :1551 , :1552 , :1553 , :1554 , :1555 , :1556 , :1557 , :1558 , :1559 , :1560 , :1561 , :1562 , :1563 , :1564 , :1565 , :1566 , :1567 , :1568 , :1569 , :1570 , :1571 , :1572 , :1573 , :1574 , :1575 , :1576 , :1577 , :1578 , :1579 , :1580 , :1581 , :1582 , :1583 , :1584 , :1585 , :1586 , :1587 , :1588 , :1589 , :1590 , :1591 , :1592 , :1593 , :1594 , :1595 , :1596 , :1597 , :1598 , :1599 , :1600 , :1601 , :1602 , :1603 , :1604 , :1605 , :1606 , :1607 , :1608 , :1609 , :1610 , :1611 , :1612 , :1613 , :1614 , :1615 , :1616 , :1617 , :1618 , :1619 , :1620 , :1621 , :1622 , :1623 , :1624 , :1625 , :1626 , :1627 , :1628 , :1629 , :1630 , :1631 , :1632 , :1633 , :1634 , :1635 , :1636 , :1637 , :1638 , :1639 , :1640 , :1641 , :1642 , :1643 , :1644 , :1645 , :1646 , :1647 , :1648 , :1649 , :1650 , :1651 , :1652 , :1653 , :1654 , :1655 , :1656 , :1657 , :1658 , :1659 , :1660 , :1661 , :1662 , :1663 , :1664 , :1665 , :1666 , :1667 , :1668 , :1669 , :1670 , :1671 , :1672 , :1673 , :1674 , :1675 , :1676 , :1677 , :1678 , :1679 , :1680 , :1681 , :1682 , :1683 , :1684 , :1685 , :1686 , :1687 , :1688 , :1689 , :1690 , :1691 , :1692 , :1693 , :1694 , :1695 , :1696 , :1697 , :1698 , :1699 , :1700 , :1701 , :1702 , :1703 , :1704 , :1705 , :1706 , :1707 , :1708 , :1709 , :1710 , :1711 , :1712 , :1713 , :1714 , :1715 , :1716 , :1717 , :1718 , :1719 , :1720 , :1721 , :1722 , :1723 , :1724 , :1725 , :1726 , :1727 , :1728 , :1729 , :1730 , :1731 , :1732 , :1733 , :1734 , :1735 , :1736 , :1737 , :1738 , :1739 , :1740 , :1741 , :1742 , :1743 , :1744 , :1745 , :1746 , :1747 , :1748 , :1749 , :1750 , :1751 , :1752 , :1753 , :1754 , :1755 , :1756 , :1757 , :1758 , :1759 , :1760 , :1761 , :1762 , :1763 , :1764 , :1765 , :1766 , :1767 , :1768 , :1769 , :1770 , :1771 , :1772 , :1773 , :1774 , :1775 , :1776 , :1777 , :1778 , :1779 , :1780 , :1781 , :1782 , :1783 , :1784 , :1785 , :1786 , :1787 , :1788 , :1789 , :1790 , :1791 , :1792 , :1793 , :1794 , :1795 , :1796 , :1797 , :1798 , :1799 , :1800 , :1801 , :1802 , :1803 , :1804 , :1805 , :1806 , :1807 , :1808 , :1809 , :1810 , :1811 , :1812 , :1813 , :1814 , :1815 , :1816 , :1817 , :1818 , :1819 , :1820 , :1821 , :1822 , :1823 , :1824 , :1825 , :1826 , :1827 , :1828 , :1829 , :1830 , :1831 , :1832 , :1833 , :1834 , :1835 , :1836 , :1837 , :1838 , :1839 , :1840 , :1841 , :1842 , :1843 , :1844 , :1845 , :1846 , :1847 , :1848 , :1849 , :1850 , :1851 , :1852 , :1853 , :1854 , :1855 , :1856 , :1857 , :1858 , :1859 , :1860 , :1861 , :1862 , :1863 , :1864 , :1865 , :1866 , :1867 , :1868 , :1869 , :1870 , :1871 , :1872 , :1873 , :1874 , :1875 , :1876 , :1877 , :1878 , :1879 , :1880 , :1881 , :1882 , :1883 , :1884 , :1885 , :1886 , :1887 , :1888 , :1889 , :1890 , :1891 , :1892 , :1893 , :1894 , :1895 , :1896 , :1897 , :1898 , :1899 , :1900 , :1901 , :1902 , :1903 , :1904 , :1905 , :1906 , :1907 , :1908 , :1909 , :1910 , :1911 , :1912 , :1913 , :1914 , :1915 , :1916 , :1917 , :1918 , :1919 , :1920 , :1921 , :1922 , :1923 , :1924 , :1925 , :1926 , :1927 , :1928 , :1929 , :1930 , :1931 , :1932 , :1933 , :1934 , :1935 , :1936 , :1937 , :1938 , :1939 , :1940 , :1941 , :1942 , :1943 , :1944 , :1945 , :1946 , :1947 , :1948 , :1949 , :1950 , :1951 , :1952 , :1953 , :1954 , :1955 , :1956 , :1957 , :1958 , :1959 , :1960 , :1961 , :1962 , :1963 , :1964 , :1965 , :1966 , :1967 , :1968 , :1969 , :1970 , :1971 , :1972 , :1973 , :1974 , :1975 , :1976 , :1977 , :1978 , :1979 , :1980 , :1981 , :1982 , :1983 , :1984 , :1985 , :1986 , :1987 , :1988 , :1989 , :1990 , :1991 , :1992 , :1993 , :1994 , :1995 , :1996 , :1997 , :1998 , :1999 , :2000 , :2001 , :2002 , :2003 , :2004 , :2005 , :2006 , :2007 , :2008 , :2009 , :2010 , :2011 , :2012)group by B.demand_type, B.shipnode_key

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OLTP Summary

Not looking good for Black Friday

- System is CPU bound at test load levels
- System seems to be leaking both cursors and sessions (and maybe locks)
- System is running far too many processes
- High overhead application instrumentation

AWR from Batch System

Do we need new hardware?

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AWR from batch system

- Night time batch workload approaching time limit
- Solutions being proposed:
  - Bigger better hardware, Exadata?
  - Increased application parallelism?

AWR Header

WORKLOAD REPOSITORY report for

DB Name	DB Id	Instance	Inst num	Startup Time	Release	RAC
PRODSYSA	3435569172	PRODSYSA1	1	21-Jun-14 20:06	11.2.0.2.0	YES

Host Name	Platform	CPUs	Cores	Sockets	Memory (GB)
BANKPRDDB1	AIX-Based Systems (64-bit)	176	44		446.00

	Snap Id	Snap Time	Sessions	Cursors/Session
Begin Snap:	60492	25-Jun-14 00:00:20	1314	8.9
End Snap:	60493	25-Jun-14 00:30:02	1131	10.0
Elapsed:		29.70 (mins)		
DB Time:		1,660.23 (mins)		

Report Summary

Cache Sizes

	Begin	End		
Buffer Cache:	135,168M	135,168M	Std Block Size:	8K
Shared Pool Size:	26,624M	26,624M	Log Buffer:	714,024K

- 44 Cores available
- Over processed

  - Sessions is 30x cores

Load Profile

Load Profile

	Per Second	Per Transaction	Per Exec	Per Call
DB Time(s):	55.9	2.5	0.00	0.11
DB CPU(s):	10.5	0.5	0.00	0.02
Redo size:	27,687,471.1	1,248,941.2		
Logical reads:	409,367.5	18,466.0		
Block changes:	89,742.8	4,048.2		
Physical reads:	8,004.2	361.1		
Physical writes:	12,861.8	580.2		
User calls:	491.6	22.2		
Parses:	2,241.0	101.1		
Hard parses:	0.6	0.0		
W/A MB processed:	13.5	0.6		
Logons:	5.6	0.3		
Executes:	46,341.7	2,090.4		
Rollbacks:	3.4	0.2		
Transactions:	22.2			

- ~55 sessions active on average
- ~10 on CPU
  - Only 25% of CPU resource used
  - Scope for significantly more throughput
- ~5 logons per second

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Init.ora

init.ora Parameters

Parameter Name	Begin value	End value (if different)
_disable_fast_validate	TRUE	
_gc_policy_minimum	100000000	
_high_priority_processes	VKTM|LMS*|LGWR	
_highthreshold_undoretention	10000	
_ktb_debug_flags	8	
_newsort_enabled	FALSE	
_optimizer_cost_based_transformation	OFF	
_optimizer_join_elimination_enabled	TRUE	
_shared_io_pool_size	0	
aq_tm_processes	1	
archive_lag_target	900	
audit_file_dest	/oracle11R2/app/admin/PRODSYSA/adump	
audit_sys_operations	TRUE	
audit_trail	DB	
blank_trimming	TRUE	
cell_offload_processing	FALSE	
cluster_database	TRUE	
compatible	11.2.0.2.0	
control_files	+DATADG/prodsysa/controlfile/current.260.740933965_bkp, +FLASHDG/prodsysa/controlfile/current.256.740933965_bkp	

- Underscore parameters
- Cell_offload_processing=FALSE

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Init.ora

db_name	PRODSYSA	
db_recovery_file_dest	+FCPRDFLASHDG	
db_recovery_file_dest_size	1610612736000	
db_writer_processes	4	
deferred_segment_creation	FALSE	
diagnostic_dest	/oracle11R2/app/oracle	
dispatchers		
event	28401 TRACE NAME CONTEXT FOREVER, LEVEL 1	
fal_client	PRODSYSA	
fal_server	FCODG2, FCODG3, ODG1FC, FCODG4, DRODGFC, FCODG2, FCODG3, ODG1FC, FCODG4, DRODGFC	
fast_start_mttr_target	30	
fast_start_parallel_rollback	LOW	
instance_number	1	
java_pool_size	3758096384	
job_queue_processes	10	
large_pool_size	3758096384	
listener_networks		
local_listener	(DESCRIPTION_LIST=(DESCRIPTION=(ADDRESS_LIST=(ADDRESS = (PROTOCOL = TCP)(HOST = 10.10.31.238)(PORT = 1541)))))	
log_archive_config	DG_CONFIG=(PRODSYSA, PRODG2, PRODG3, ODG1FC, NDODG, DRODGC)	
log_archive_dest_1	LOCATION=+PRDARCHDG VALID_FOR=(ALL_LOGFILES, ALL_ROLES) DB_UNIQUE_NAME=PRODSYSA	
log_archive_dest_2	service=PRODG2 LGWR ASYNC NET_TIMEOUT=10 valid_for=(ONLINE_LOGFILES, PRIMARY_ROLE) db_unique_name=FCODG2	
log_archive_dest_3	service=PRODG3 LGWR ASYNC NET_TIMEOUT=10 valid_for=(ONLINE_LOGFILES, PRIMARY_ROLE) db_unique_name=FCODG3	
log_archive_dest_4	service=ODG1FC LGWR ASYNC NET_TIMEOUT=10 MAX_CONNECTIONS=5 valid_for=(ONLINE_LOGFILES, PRIMARY_ROLE) db_unique_name=ODG1FC	
log_archive_dest_5	service=NDCODG LGWR ASYNC NET_TIMEOUT=10 NOAFFIRM MAX_CONNECTIONS=5 valid_for=(ONLINE_LOGFILES, PRIMARY_ROLE) db_unique_name=NDCFCODG	
log_archive_dest_6	service=DRODGFC LGWR ASYNC NET_TIMEOUT=10 NOAFFIRM MAX_CONNECTIONS=3 valid_for=(ONLINE_LOGFILES, PRIMARY_ROLE) db_unique_name=DRODGFC	
log_archive_dest_state_2	ENABLE	
log_archive_dest_state_3	ENABLE	
log_archive_dest_state_4	ENABLE	
log_archive_dest_state_5	ENABLE	
log_archive_dest_state_6	ENABLE	
log_archive_max_processes	20	
log_archive_trace	0	
log_file_name_convert	+DATADG, +FCODG1_DATADG, +FCPRDFLASHDG, +FCODG1_FLASHDG	
max_dump_file_size	UNLIMITED	
open_cursors	5000	
open_links	20	
optimizer_dynamic_sampling	0	

- Unused pools configured
  - Java pool and large pool 3.5GB each
- Open_cursors=5000
  - Per session limit
  - Implies cursor leaking

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Top events

Where is the time going?

Top 5 Timed Foreground Events

Event	Waits	Time(s)	Avg wait (ms)	% DB time	Wait Class
enq: TX - row lock contention	5,005	23,165	4628	23.25	Application
db file sequential read	9,540,362	19,908	2	19.98	User I/O
DB CPU		18,784		18.86	
library cache: mutex X	7,562,202	5,530	1	5.55	Concurrency
library cache lock	441	1,723	3908	1.73	Concurrency

- Row lock contention
  - > 4.5sec average wait time
  - In batch?
  - Often application parallelism
  - Load balancing vs affinity

- 9.5m IOs with 2ms avg read time
- CPU only 18% of DB Time
  - CPU usage underreported on AIX7 when processor multithreading enabled

Top SQL

Where is the time going?

SQL ordered by Elapsed Time

- Resources reported for PL/SQL code includes the resources used by all SQL statements called by the code.
- % Total DB Time is the Elapsed Time of the SQL statement divided into the Total Database Time multiplied by 100
- %Total - Elapsed Time as a percentage of Total DB time
- %CPU - CPU Time as a percentage of Elapsed Time
- %IO - User I/O Time as a percentage of Elapsed Time
- Captured SQL account for 70.5% of Total DB Time (s): 99,614
- Captured PL/SQL account for 89.8% of Total DB Time (s): 99,614

Elapsed Time (s)	Executions	Elapsed Time per Exec (s)	%Total	%CPU	%IO	SQL Id	SQL Module	SQL Text
44,940.15	128	351.09	45.11	21.61	27.51	fsmdxx6nrvayq		BEGIN :1 := ap_ch_txn_shell_en...
22,374.99	1,975	11.33	22.46	0.01	0.00	9vnpsx6fkv8ka	JDBC Thin Client	UPDATE CH_ACCT_MAST SET BAL_AV...
20,214.28	363	55.69	20.29	0.04	0.01	ckbtkuhjmskzf	JDBC Thin Client	BEGIN :1 := ap_ol_lib_crd_xfer_...
14,557.10	0		14.61	24.81	35.86	04kt8u64udphu		BEGIN :1 := ap_ch_eod_shell_en...
6,690.92	1,204,240	0.01	6.72	31.22	64.77	3jtmwq1mq4nux	ch_txn_shell_30	INSERT INTO CH_ARREARS_TABLE (...
4,595.10	2,358,185	0.00	4.61	32.40	66.25	4hcjtuw00c3s8	ch_txn_shell_126	SELECT A.CTR_UPDAT_SRLNO FROM ...
4,010.36	40,407	0.10	4.03	8.28	79.97	4yfbqnmxsrmgj	ch_eod_shell_47	SELECT COD_ACCT_NO, REF_BILLNO...
3,836.90	1,240,835	0.00	3.85	25.95	81.28	0yk1fp1aa269a	ch_txn_shell_126	SELECT NVL(MAX(REF_BILLNO_SRL)...
3,829.60	3,191,090	0.00	3.84	22.20	12.99	3hcj60qr7vyzq	ch_txn_shell_126	INSERT INTO CH_TMP_RCH101_1(DA...
3,615.56	64	56.49	3.63	18.88	15.96	f9b6w24834qa9		BEGIN :1 := ap_rd_txn_shell_en...
2,677.12	64	41.83	2.69	16.14	6.37	0f28897rjywq7	rd_txn_shell_6	SELECT COD_CC_BRN, XF_ST_CAP_I...
2,194.01	1,588	1.38	2.20	0.27	0.11	a6662tqx9fkq1	JDBC Thin Client	BEGIN :1 := ap_ol_lib_funds_xfe...
2,102.14	757,487	0.00	2.11	2.46	0.05	0ha15jrvstujw	ch_eod_shell_11	INSERT INTO CH_NPL_APPR_AMT_HI...
1,884.29	1,570,034	0.00	1.89	4.25	0.02	af7f92f13rmy4	JDBC Thin Client	INSERT INTO CH_ACTIONS_DUE (CO...
1,630.62	3,166,866	0.00	1.64	28.23	40.87	aqc1r5m322zxj	ch_txn_shell_126	INSERT INTO CH_ACCT_LEDG (DAT...
1,628.60	1,958,848	0.00	1.63	41.83	69.90	19k3ydhdzrkaz	ch_txn_shell_65	SELECT COD_APPR_SEQ_NPL FROM V...
1,413.58	3,184,429	0.00	1.42	30.49	1.27	149c92kpkfqq1	ch_txn_shell_126	UPDATE --+ index(s IN_XF_ST_CA...
1,335.94	1,574,690	0.00	1.34	4.81	0.10	dx5knq8qu560t	JDBC Thin Client	UPDATE CH_ACTIONS_DUE SET COD_...
1,318.03	2,355,958	0.00	1.32	28.28	62.65	54ud0a8tuwwbc	JDBC Thin Client	SELECT * FROM CH_ACCT_ATTRIBUT...
1,009.61	492	2.05	1.01	1.13	0.37	6ujjasvasuxkw	JDBC Thin Client	BEGIN :1 := ap_ol_neft_process...

- PL/SQL calls with 64 and 128 execs
  - Application parallel threads?

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Top SQL

SQL ordered by Executions

- %CPU - CPU Time as a percentage of Elapsed Time
- %IO - User I/O Time as a percentage of Elapsed Time
- Total Executions: 82,568,863
- Captured SQL account for 49.0% of Total

Executions	Rows Processed	Rows per Exec	Elapsed Time (s)	%CPU	%IO	SQL Id	SQL Module	SQL Text
3,207,702	0	0.00	831.30	17.11	0.00	1j294b5b3xb36	ch_txn_shell_126	SELECT DISTINCT(B.COD_SC), B.C...
3,191,090	3,178,360	1.00	3,829.60	22.20	12.99	3hcj60qr7vyzg	ch_txn_shell_126	INSERT INTO CH_TMP_RCH101_1(DA...
3,184,429	3,169,983	1.00	1,413.58	30.49	1.27	149c92kpkfgq1	ch_txn_shell_126	UPDATE --+ index(s IN_XF_ST_CA...
3,166,866	3,159,919	1.00	1,630.62	28.23	40.87	agc1r5m322zxj	ch_txn_shell_126	INSERT INTO CH_ACCT_LEDG (DAT...
2,358,185	2,355,944	1.00	4,595.10	32.40	66.25	4hcjtuw00c3s8	ch_txn_shell_126	SELECT A.CTR_UPDAT_SRLNO FROM ...
2,357,347	2,353,047	1.00	706.50	22.35	52.37	34qt4a31fysh7	JDBC Thin Client	SELECT * FROM CH_ACCT_MAST_AUX...
2,356,295	2,353,643	1.00	555.45	56.17	0.00	a4pq820z4d6uk	ch_txn_shell_26	UPDATE CH_ACCT_ATTRIBUTES SET ...
2,355,958	2,354,808	1.00	1,318.03	28.28	62.65	54ud0a8tuwwbc	JDBC Thin Client	SELECT * FROM CH_ACCT_ATTRIBUT...
2,351,739	2,350,203	1.00	344.80	30.12	0.00	62v1su88b1qwa	ch_txn_shell_30	UPDATE CH_ACCT_MAST_AUX SET AM...
1,958,848	1,957,277	1.00	1,628.60	41.83	69.90	19k3ydhdzrkaz	ch_txn_shell_65	SELECT COD_APPR_SEQ_NPL FROM V...
1,598,396	1,596,526	1.00	848.89	22.19	49.56	ggmnd6zwk50mt	ch_txn_shell_108	UPDATE AC_ACCT_PLAN_CRITERIA S...
1,595,116	1,591,020	1.00	822.96	19.72	1.33	44zpw5t6c9hdu	ch_txn_shell_26	UPDATE CH_ACCT_MAST SET BAL_LA...
1,593,661	4	0.00	246.60	26.18	0.00	2jfqzrxhrm93b		select /*+ rule */ c.name, u.n...
1,593,599	1,580,310	0.99	202.51	25.52	0.00	2skwhauh2cwky		select o.name, u.name from obj...
1,574,690	4,672	0.00	1,335.94	4.81	0.10	dx5knq8qu560t	JDBC Thin Client	UPDATE CH_ACTIONS_DUE SET COD_...
1,570,034	1,565,985	1.00	1,884.29	4.25	0.02	af7f92f13rmy4	JDBC Thin Client	INSERT INTO CH_ACTIONS_DUE (CO...
1,240,835	1,240,820	1.00	3,836.90	25.95	81.28	0yk1fp1aa269a	ch_txn_shell_126	SELECT NVL(MAX(REF_BILLNO_SRL)...
1,204,240	1,858,280	1.54	6,690.92	31.22	64.77	3jtmwq1mq4nux	ch_txn_shell_30	INSERT INTO CH_ARREARS_TABLE (...

- Top statement by executions
  - 3.2 M executions
  - 0 rows returned
- Large number of frequently executed statements
  - All process a single row per execute
  - Row by row batch processing

Top SQL

Segments by Row Lock Waits

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

Owner	Tablespace Name	Object Name	Subobject Name	Obj. Type	Row Lock Waits	% of Capture
FLEXPROD_HOST	CH_ACCT_MAST	CH_ACCT_MAST	SYS_P5657	TABLE PARTITION	4,352	71.17
FLEXPROD_HOST	FLEXPROD_HOST	PM_NEFT_TXN_LOG		TABLE	626	10.24
FLEXPROD_HOST	CH_ARREARS_TABLE	IN_CH_ARREARS_TABLE_1	SYS_P6347	INDEX PARTITION	238	3.89
FLEXPROD_HOST	FLEXPROD_HOST	IN_PM_NEFT_TXN_LOG_5		INDEX	227	3.71
FLEXPROD_HOST	FLEXPROD_HOST	IN_PM_NEFT_TXN_LOG_3		INDEX	216	3.53

- Top statement

```
UPDATE CH_ACCT_MAST
SET BAL_AVAILABLE = BAL_AVAILABLE + :B2 ,
  CTR_UPDAT_SRLNO = CTR_UPDAT_SRLNO + 1
WHERE COD_ACCT_NO = :B1
```

- 22% of DB Time
  - Not spending time on CPU or disk IO
- Object accounts for > 70% of RLWs
  - Object is partitioned
  - Attempting to reduce contention?

AWR Batch Summary

- Plenty of resources on current hardware platform
- Contention caused by sub-optimal application parallelism
- Row by row processing of millions of rows giving away orders of magnitude in performance vs set based processing

Conclusions

- AWR is more than just Top Events and Top SQL
- AWR is not just for DBAs
- AWR can help identify Resource, Architecture and Coding problems

Where to go for more information

Don’t Miss!

What	ID	Topic
General Session	GEN7353	SPARC Systems Update – Advancing the Software in Silicon Revolution
Demo	2217	SPARC Software in Silicon Turbocharges Your Database Queries
Demo	2203	Protect your Java, Database and Enterprise applications in a Fully Encrypted Datacenter
Session	CON6945	Implement End-to-End Encrypted Cloud Infrastructure Today
Session	CON6314	Java Middleware Deployments Done Right on an Oracle Infrastructure
Session	CON4925	Best Practices for Deploying DBaaS and MWaaS on a Private Cloud
Session	CON6374	How to Design Clouds with Performance, Security, and Deployment Automation
Session	CON6316	The Keys to Driving the Best Cloud Performance
Session	CON6235	Deep Dive on Oracle's Latest Software in Silicon Breakthroughs and Beyond
Session	CON6234	Transformational Machine Learning Use Cases You Can Deploy Now
Mini-Theater	THT8140	Modern Data Security Technology that Does Not Compromise Application Performance

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RWP Sessions @ OOW17 Oct 4th Rm 3012

When	ID	Topic
11am	CON6560	Optimizing Table Scans in Today's Cloud Platforms
12pm	CON6561	Migrating On-Premises Applications to the Cloud: Examining the Connection Strategy
1pm	CON6629	Real-World Challenges with Cloud Migrations and Proof-of-Concept Projects
2pm	CON6660	Applying Oracle Database 12*c* and Real-World Performance Techniques to SAP

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Real-World Performance Classroom Training
Quotes

"Fantastic – such a good course. Why can't all training be like this?"

"The demos schooled me"

"Content matches the real world—totally different than courses offered by Oracle University"

"Your understanding of Oracle real life problems, familiarity with computer science basics and procedures, teaching excellence, and interpersonal skills all contributed to a successful training"—Venkat Dulla, Qualcomm

"Anyone out there claiming that he/she is an Oracle DBA must attend RWP classes. We are highly experienced team of DBAs and we thought we've seen it all until this class ! Real problems that we are dealing day-to-day, like connection storms, was turned into training scenarios and explained so clearly with cause and solutions along with a diagnostic methodology…it was also an eye-opener for OLTP DBAs that I/O is no longer a bottleneck with exadata and it is time to start using set operations to achieve order of magnitude performance gains" –Metin Ylimaz, Turkcell


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