

Amazing Free Tools for Oracle DBAs

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Pythian

24. hroug
godisnja konferencija

Matheus Boesing

Oracle Database 12c Maximum Availability Certified Expert (OCE)
Oracle Database 12c Performance Management and Tuning Certified Expert (OCE)
Oracle Database 12c Data Guard Administrator Certified Expert (OCE)
Oracle Database 12c RAC and Grid Infrastructure Administrator Certified Expert (OCE)
Oracle Database 12c Administrator Certified Professional (OCP)
Oracle Database SQL Certified Expert (OCE)
Oracle Enterprise Manager 12c Certified Implementation Specialist (OCS)
Oracle Database 11g Performance Tuning Certified Expert (OCE)
Oracle Real Application Clusters 11g Certified Implementation Specialist (OCS)
Oracle Database 11g Certified Implementation Specialist (OCS)
Oracle Database 11g Administrator Certified Professional (OCP)
Oracle Database 11g Administrator Certified Associate (OCA)
EXIN: Certified Integrator Secure Cloud Services
EXIN: Cloud Computing Foundation
ITIL® Foundation Certificate in IT Service Management
ISO/IEC 20000 – IT Service Management Foundation
ISO/IEC 27002 – Information Security Foundation
EXIN: Green IT Citizen
COBIT 4.1 Foundation for IT Services
Microsoft Technology Associate – SQL Server (MTA)



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Matheus Boesing



Matheus Boesing

Lead Database Consultant at Pythian |
Oracle ACE ♠



Oracle Database 12c Maximum Availability Architecture
Oracle Database 12c Performance Tuning
Oracle Database 12c Data Guard
Oracle Database 12c RAC and Oracle Grid Infrastructure
Oracle Database 12c Administration
Oracle Database SQL Certified Expert
Oracle Enterprise Manager 12c
Oracle Database 11g Performance Tuning
Oracle Real Application Clusters
Oracle Database 11g Certified Specialist
Oracle Database 11g Administration
Oracle Database 11g Administration
EXIN: Certified Integrator Specialist
EXIN: Cloud Computing Foundation
ITIL® Foundation Certificate
ISO/IEC 20000 – IT Service Management
ISO/IEC 27002 – Information Security Management
COBIT 4.1 Foundation for IT Governance
Microsoft Technology Associate



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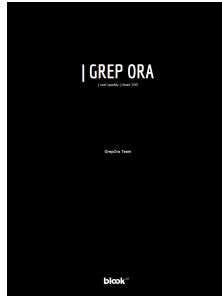
Certified Associate

Oracle Database 11g
Administrator



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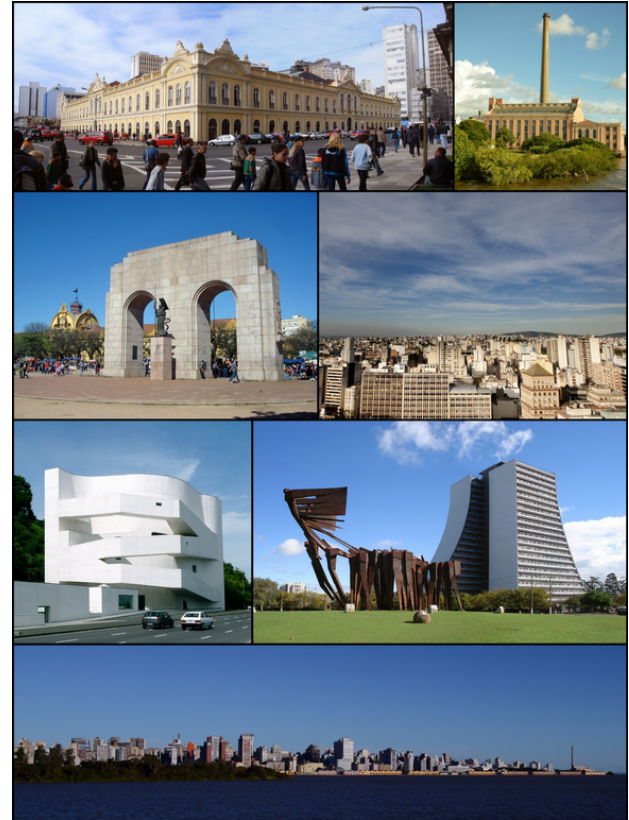


Matheus Boesing

DO YOU KNOW
HOW BIG BRAZIL IS?



Porto Alegre, Rio Grande do Sul (1,6M ha - 5th)



Pythian

love your data



EXPERIENCED

11,800

Systems currently managed by Pythian



GLOBAL

400

Pythian experts in 35 countries



EXPERTS

2

Millennia of experience gathered and shared over 19 years

AGENDA

- Scope delimitation...
- A brief classification
- Walk through and some examples
 - Lot's of things here, prepare yourself!
 - 90+ tools showed. 127 mentioned in total.
- Closure
- Q&A



Free Tools: Safe Harbour Statement

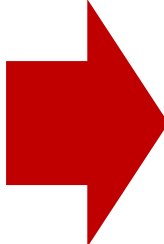


Free Tools: Context

- Software x Tool
 - Tool: Additional solution for specific end
- Also not considered:
 - No repository/versioning/infracodding software
 - No edit/note pads
 - No virtualization solutions
 - No regular monitoring software
 - No ssh tools
 - No protocols or languages (APEX, ORDS) itself
 - Not (only) Linux commands
- Pure Problem Solver Gold!



Oracle Tools: What for and Classification

- Tuning
 - Reactive (firefighter)
 - Proactive (PDCA)
 - Layer
 - SQL
 - Database
 - Operating System
 - Result
 - Action
 - Report
 - Output
 - Source
 - Built-in -> Free
 - MOS -> No Extra Cost (Support)
 - Community -> 😊
 - Some AWR/ASH -> If you have Diagnostic Pack
- 
- Trace File Gathering/Profiling
 - SQL Level Diag/Tuning
 - Database Level Diag/Reports
 - Database Monitoring
 - Server Monitoring/Diagnostics
 - Benchmarking
 - Online Troubleshooting

Oracle Tools: Tracing Oracle

- ENABLING TRACE: **-- All versions.**

- A Session:

```
SQL> ALTER SESSION SET sql_trace=TRUE;
SQL> EXEC DBMS_SESSION.set_sql_trace(sql_trace => TRUE);
SQL> ALTER SESSION SET EVENTS '10046 trace name context forever, level 8';
SQL> EXEC DBMS_SYSTEM.set_sql_trace_in_session(sid=>123, serial#=>1234, sql_trace=>TRUE);
SQL> EXEC DBMS_SYSTEM.set_ev(si=>123, se=>1234, ev=>10046, le=>8, nm=>");
```

- Since 8i (SQL*Plus)**

```
SQL> ORADEBUG [SETMYPID | SETOSPID 1234 | SETORAPID 123456];
SQL> ORADEBUG EVENT 10046 TRACE NAME CONTEXT FOREVER, LEVEL 12;
```

- All versions with DBMS_SUPPORT**

```
SQL> EXEC DBMS_SUPPORT.start_trace(waits=>TRUE, binds=>FALSE);
SQL> EXEC DBMS_SUPPORT.start_trace_in_session(sid=>123, serial=>1234, waits=>TRUE, binds=>FALSE);
```

- A SQL

- SQL Trace (10046)**

```
SQL> ALTER SYSTEM SET EVENTS 'sql_trace [sql:&&sql_id] bind=true, wait=true';
```

- SQL Trace (10053)**

```
SQL> ALTER SESSION SET EVENTS 'trace[rdbms.SQL_Optimizer.*][sql:sql_id]';
```



Oracle Tools: Tracing Oracle

- ENABLING TRACE:
 - Several Sessions?

```
trcsess [output=output_file_name][session=session_Id]  
[clientid=client_Id][service=service_name]  
[action=action_name][module=module_name][trace_files]
```

ORACLE[®]

- No DB-Install Required

What is TRCSCESS and How to use it ? (Doc ID 280543.1)

Oracle Tools: Tracing Oracle

- How do a trace look like?

```
[PROCESS ID = 12359]
*** 2002-04-02 09:48:28.376
PARSING IN CURSOR #1 len=17 dep=0 uid=27 oct=3 lid=27 tim=868373970961 hv=887450622 ad='22683fb4'
select * from cat
END OF STMT
PARSE #1:c=0,e=339,p=0,cr=0,cu=0,mis=0,r=0,dep=0,og=4,tim=868373970944
EXEC #1:c=0,e=221,p=0,cr=0,cu=0,mis=0,r=0,dep=0,og=4,tim=868373971411
FETCH #1:c=0,e=791,p=0,cr=7,cu=0,mis=0,r=1,dep=0,og=4,tim=868373972435
FETCH #1:c=0,e=1486,p=0,cr=20,cu=0,mis=0,r=6,dep=0,og=4,tim=868373986238
*** 2002-04-02 10:03:58.058
XCTEND rlbk=0, rd_only=1
STAT #1 id=1 cnt=7 pid=0 pos=1 obj=0 op='FILTER '
STAT #1 id=2 cnt=7 pid=1 pos=1 obj=18 op='TABLE ACCESS BY INDEX ROWID OBJ$ '
STAT #1 id=3 cnt=7 pid=2 pos=1 obj=37 op='INDEX RANGE SCAN I_OBJJ2 '
STAT #1 id=4 cnt=0 pid=1 pos=2 obj=4 op='TABLE ACCESS CLUSTER TAB$J2 '
STAT #1 id=5 cnt=6 pid=4 pos=1 obj=3 op='INDEX UNIQUE SCAN I_OBJ# '
[PROCESS ID=12995]
*** 2002-04-02 10:04:32.738
Archiving is disabled
Archiving is disabled
```

- How to read it?

Oracle Tools: Trace File Profiling

- TKPROF

```
tkprof filename1 filename2 [waits=yes|no] [sort=option] [print=n] [aggregate=yes|no]
[insert=filename3] [sys=yes|no] [table=schema.table] [explain=user/password] [width=n]
```

```
SELECT job_id,SUM(salary),COUNT(*) FROM employees GROUP BY job_id
HAVING SUM(salary)=(SELECT MAX(SUM(salary)) FROM EMPLOYEES GROUP BY
job_id)
```

call	count	cpu	elapsed	disk	query	current	rows
Parse	1	0.01	0.00	0	0	0	0
Execute	1	0.00	0.00	0	0	0	0
Fetch	2	0.00	0.04	0	14	0	1
total	4	0.01	0.04	0	14	0	1

```
Misses in library cache during parse: 1
Optimizer mode: ALL_ROWS
Parsing user id: 85
```

Rows	Row Source Operation
1	FILTER (cr=14 pr=0 pw=0 time=0 us)
19	HASH GROUP BY (cr=7 pr=0 pw=0 time=90 us cost=4 size=13 card=1)
107	TABLE ACCESS FULL EMPLOYEES (cr=7 pr=0 pw=0 time=318 us cost=3 size=1391 card=107)
1	SORT AGGREGATE (cr=7 pr=0 pw=0 time=0 us cost=4 size=13 card=1)
19	SORT GROUP BY (cr=7 pr=0 pw=0 time=72 us cost=4 size=13 card=1)
107	TABLE ACCESS FULL EMPLOYEES (cr=7 pr=0 pw=0 time=318 us cost=3 size=1391 card=107)

```
Elapsed times include waiting on following events:
```

Event waited on	Times Waited	Max. Wait	Total Waited
SQL*Net message to client	2	0.00	0.00
Disk file operations I/O	1	0.03	0.03
SQL*Net message from client	2	0.01	0.01
asynch descriptor resize	1	0.00	0.00

```
*****
```



Oracle Tools: Trace File Profiling

- Trace Analyzer
TRCANLZR (TRCA)

Call	Call Count	OS Buffer Gets (disk)	BG Consistent Read Mode (query)	BG Current Mode (current)	Rows Processed or Returned	Library Cache Misses	Times Waited Non-Idle	Times Waited Idle
Parse:	3	0	0	0	0	1	0	3
Execute:	3	0	0	0	0	1	0	0
Fetch:	189	39471	61923	3	2766	0	838	186
Total:	195	39471	61923	3	2766	2	838	189

SQL_TRACE/Event 10046
Trace File Analyzer - Tool for
Interpreting Raw SQL Traces
(Doc ID 224270.1)

Event Name	Wait Class	Non-Idle Wait Time	Times Waited Non-Idle	Idle Wait Time	Times Waited Idle	Average Wait Time	Max Wait Time	Blocks	Average Blocks
direct path read:	User I/O	0.484	645			0.000750	0.002190	39471	61.2
SQL*Net message from client:	Idle			0.051	189	0.000269	0.004059		
SQL*Net message to client:	Network	0.000	189			0.000001	0.000003		
asynch descriptor resize:	Other	0.000	4			0.000004	0.000005		
Total:		0.484	838	0.051	189				



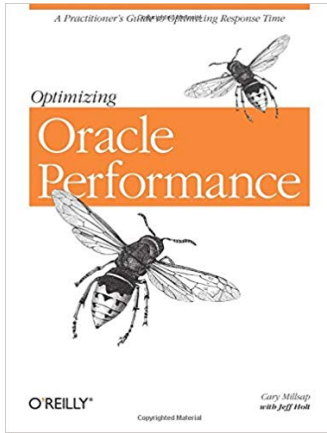
- DB-Install Required

ID	PID	Estim Card	Actual Rows	Row Source Operation	BG Consistent Read Mode (cr)	OS Buffer Gets (pr)	OS Write Calls (pw)	Time (secs)	Obj	Cost	Estim Size (bytes)
1:	0	151	2766	SORT ORDER BY	61923	39471	0	95.329	0	19528	14949
2:	1		2766	FILTER	61923	39471	0	95.321	0		
3:	2	151	3528	. HASH GROUP BY	61923	39471	0	95.315	0	19528	14949
4:	3	3518	10452	.. HASH JOIN	61923	39471	0	95.289	0	19526	348282
5:	4	3518	10452	... NESTED LOOPS	17793	0	0	3.925	0	688	284958
6:	5	3518	10452	.... HASH JOIN	7335	0	0	3.782	0	687	267368
7:	6	1199	3717	.....+ TABLE ACCESS FULL CUSTOMER	2352	0	0	0.022	107082	220	76736
8:	6	281573	845376	.....+ TABLE ACCESS FULL SALES_ORDER	4983	0	0	1.072	107090	465	3378876
9:	5	1	10452	..... INDEX UNIQUE SCAN CUSTOMER_PK	10458	0	0	0.058	107083	0	5
10:	4	302976	899994	.... VIEW	44130	39471	0	88.617	0	18836	5453568
11:	10	302976	899994	.... HASH GROUP BY	44130	39471	0	86.923	0	18836	7574400
12:	11	3416582	10350603	.....+ HASH JOIN	44130	39471	0	60.898	0	8648	85414550
13:	12	200000	600000	.....+ TABLE ACCESS FULL PART	4206	0	0	0.582	107087	392	2000000
14:	12	3450201	10350603+ TABLE ACCESS FULL ORDER_LINE	39924	39471	0	11.845	107094	3609	51753015

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Oracle Tools: Trace File Profiling

- Perl Profiler ([profiler-1.pl](#))
(Jeff Holt and Cary Millsap)



- No DB-Install Required

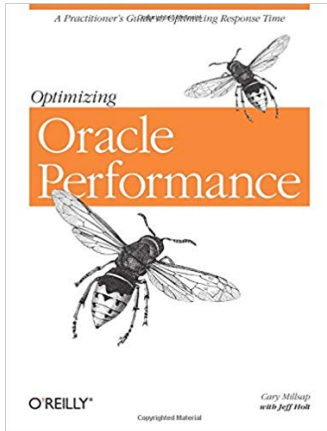
- Filter Data

```
# Copyright (c) 1999-2003 by Hotsos Enterprises, Ltd. All rights reserved.
# partial script shown
while (<>) {
  if (/^WAIT #(\d+):nam='([^\']*)' ela=\s*(\d+)/i) {
    $ela{$2} += $3;
    $sum_ela += $3;
  } elsif (/^$action #(\d+):c=(\d+),e=(\d+)/i) {
    $ela{"total CPU"} += $2;
  }
  $r += $3;
  if (!defined $cid) {
    $cid = $1;
  } else {
    die "can't mix data across cursor ids $cid and $1" if $1 != $cid;
  }
  $ela{"unaccounted-for"} = $r - ($ela{"total CPU"} + $sum_ela);
  printf "%9s %6s %-40s\n", "Duration", "Pct", "Oracle kernel event";
  printf "%8s- %5s- %-40s\n", "-"x8, "-"x5, "-"x40;
  printf "%8.2fs %5.1f%% %-40s\n", $ela{$_}/$ticsPerSec, $ela{$_}/$r*100, $_ for sort { $ela{$b} <=> $ela{$a} }
  keys $ela;

  printf "%8s- %5s- %-40s\n", "-"x8, "-"x5, "-"x40;
  printf "%8.2fs %5.1f%% %-40s\n", $r/$ticsPerSec, 100, "Total response time";
```

Oracle Tools: Trace File Profiling

- Perl Profiler ([profiler-1.pl](#))
(Jeff Holt and Cary Millsap)
 - Find cursor of interest...

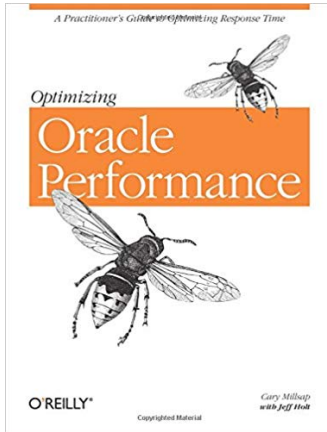


```
grep -A5 PARSING js122a1_ora_9447_10046-test.trc
```

```
...  
PARSING IN CURSOR #140393346266296 len=44 dep=0 uid=104 oct=3 lid=104  
tim=2887502430839 hv=3071810026 ad='62696560' sqlid='5kzhan6vjh6ga'  
select *  
from ora54_test  
where owner = 'SYS'  
END OF STMT  
PARSE  
#140393346266296:c=10000,e=56347,p=10,cr=119,cu=0,mis=1,r=0,dep=0,og=1,plh  
=933114381,tim=2887502430829  
...
```

Oracle Tools: Trace File Profiling

- Perl Profiler ([profiler-1.pl](#))
(Jeff Holt and Cary Millsap)



- Profile it:

```
grep -E \ 'FETCH #140393346266296|PARSING IN CURSOR  
#140393346266296.*5kzhan6vjh6ga|WAIT #140393346266296' js122a1_ora_9447_10046-  
test.trc \ | ./profiler-1.pl
```

Duration Pct Oracle kernel event

```
-----  
6.01s      91.5% SQL*Net message from client  
0.28s      4.3% unaccounted-for  
0.21s      3.2% db file scattered read  
0.03s      0.5% total CPU  
0.01s      0.2% KSV master wait  
0.01s      0.2% gc cr multi block request  
0.00s      0.0% library cache pin  
0.00s      0.0% row cache lock  
0.00s      0.0% db file sequential read  
0.00s      0.0% library cache lock  
0.00s      0.0% SQL*Net message to client  
0.00s      0.0% ASM file metadata operation  
0.00s      0.0% SQL*Net more data to client  
0.00s      0.0% Disk file operations I/O
```

```
-----  
6.57s      100.0% Total response time
```

Oracle Tools: Trace File Profiling

- Perl Profiler ([profiler-2.pl](#))
(Cary Millsap)
- Aggregates all events in file...
- Portable Perl script for traces.
- No DB-Install Required

```
# partial script shown - entire calculation portion
sub betweener($) {
    my ($nam) = @_;
    # Return true iff $nam is a between-call event.
    return 1 if $nam eq 'SQL*Net message from client';
    return 1 if $nam eq 'SQL*Net message to client';
    return 1 if $nam eq 'single-task message';
    return;
}

while (<>) {
    if (/^WAIT #(\d+); nam='([^\']*)' ela=\s*(\d+)/i) {
        $ela{$2} += $3;
        $n{$2}++;
        $sum_ela += $3;
        $sum_ela_between += $3 if betweener($2);
    }
    elsif (/^$action #(\d+):c=(\d+),e=(\d+),.*dep=0/i) {
        $sum_c_dep0 += $2;
        $sum_e_dep0 += $3;
        $n{"CPU service"}++;
    }
}

my $R = $sum_e_dep0 + $sum_ela_between;
$ela{"unaccounted-for"} = $R - ($sum_c_dep0 + $sum_ela);
$n{"unaccounted-for"} = 1;
$ela{"CPU service"} = $sum_c_dep0;
```

Oracle Tools: Trace File Profiling

- Perl Profiler ([profiler-2.pl](#))
(Cary Millsap)

```
# partial script shown - entire calculation portion
profiler-2.pl js122a1_ora_9447_10046-test.trc
```

- Aggregates all events in file...
- Portable Perl script for traces.
- No DB-Install Required

Response Time Component	Duration	Pct	# Calls	Dur/Call
SQL*Net message from client	6.01s	94.2%	424	0.014185s
db file scattered read	0.21s	3.3%	28	0.007625s
unaccounted-for	0.05s	0.7%	1	0.047083s
CPU service	0.04s	0.7%	427	0.000098s
db file sequential read	0.03s	0.5%	11	0.002902s
KSV master wait	0.01s	0.2%	2	0.007016s
gc cr multi block request	0.01s	0.2%	23	0.000538s
library cache pin	0.00s	0.0%	2	0.001457s
row cache lock	0.00s	0.0%	19	0.000145s
gc cr grant 2-way	0.00s	0.0%	3	0.000301s
library cache lock	0.00s	0.0%	2	0.000268s
SQL*Net message to client	0.00s	0.0%	424	0.000001s
ASM file metadata operation	0.00s	0.0%	1	0.000087s
SQL*Net more data to client	0.00s	0.0%	1	0.000086s
Disk file operations I/O	0.00s	0.0%	1	0.000002s
Total response time	6.38s	100.0%		

Oracle Tools: Trace File Profiling

- 10046_events.pl
(Clive Bostock)

```
./10046_events.pl -t ../tracefile-identifier/trace/js122a1_ora_9447_10046-test.trc
```

EVENT AGGREGATES

```
=====
```

Wait Event	Count	Elapsed (ms)	Avg Ela (ms)	%Total
SQL*Net message from client	424	6014	14	95.57
db file scattered read	28	213	7	3.39
db file sequential read	11	31	2	0.51
KSV master wait	2	14	7	0.22
gc cr multi block request	23	12	0	0.20
library cache pin	2	2	1	0.05
row cache lock	19	2	0	0.04
gc cr grant 2-way	3	0	0	0.01
library cache lock	2	0	0	0.01
SQL*Net message to client	424	0	0	0.01
ASM file metadata operation	1	0	0	0.00
SQL*Net more data to client	1	0	0	0.00
Disk file operations I/O	1	0	0	0.00
Total Elapsed:		6293		

- Portable Perl script
- No DB-Install Required

Oracle Tools: Trace File Profiling

- 10046_events.pl

(Clive Bostock)

EVENT AGGREGATE BREAKDOWN

=====

Object Id	: Wait Event	Count	Tot Ela (ms)	%Total	Avg Ela (ms)
95165	: SQL*Net message from client	423	6014	95.56	14
95165	: db file scattered read	28	213	3.39	7
18	: db file sequential read	1	15	0.24	15
95165	: KSV master wait	2	14	0.22	7
14	: db file sequential read	1	12	0.20	12
95165	: gc cr multi block request	23	12	0.20	0
8694	: library cache pin	2	2	0.05	1
8694	: row cache lock	19	2	0.04	0
3	: db file sequential read	1	1	0.02	1
95165	: db file sequential read	1	0	0.01	0
8694	: library cache lock	2	0	0.01	0
8694	: SQL*Net message from client	1	0	0.01	0
57	: gc cr grant 2-way	1	0	0.01	0
95165	: SQL*Net message to client	422	0	0.01	0
...					

Oracle Tools: Trace File Profiling

- 10046_events.pl

(Clive Bostock)

EVENT HISTOGRAM BREAKDOWN (Edited to fit the page)

=====

This section splits the event counts into elapsed time buckets so that we can see if there are any suspicious or anomalous response time / frequency patterns.

Object Id	: Wait Event	<1ms	<2ms	<4ms	<8ms	<512ms	>=1024ms
95165	: SQL*Net message from client	0	1	0	0	0	0
95165	: db file scattered read	31	0	0	1	0	0
18	: db file sequential read	0	0	0	0	0	0
95165	: KSV master wait	1	0	0	0	0	0
14	: db file sequential read	0	0	0	0	0	0
95165	: gc cr multi block request	45	0	0	0	0	0
8694	: library cache pin	2	0	1	0	0	0
8694	: row cache lock	37	0	0	0	0	0
3	: db file sequential read	0	1	0	0	0	0
95165	: db file sequential read	1	0	0	0	0	0
8694	: library cache lock	3	0	0	0	0	0
8694	: SQL*Net message from client	1	0	0	0	0	0
57	: gc cr grant 2-way	1	0	0	0	0	0
95165	: SQL*Net message to client	843	0	0	0	0	0
57	: db file sequential read	1	0	0	0	0	0
31	: db file sequential read	1	0	0	0	0	0
70	: db file sequential read	1	0	0	0	0	0
...							

Oracle Tools: Trace File Profiling

- oracle_trace_parsing

(Kyle Hailey)

- No DB-Install Required

`./parsetrc.pl mytrace.trc`

- summary of activity
- histogram of latency
- SQL execution plan

```
-----  
Summary of Activity in trace file  
-----  
event                                count total secs    avg ms  
1) ELAPSED                            921  
2) CPU                                485  
3) db file sequential read            76259    201    2.644  
4) db file scattered read             7196     20    2.849  
5) SQL*Net message from client        22        0   12.123  
6) asynch descriptor resize          186982     0    0.001  
-----  
Histogram of latencies for:           db file sequential read  
-----  
0  64u  .1m  .2m  .5m  1m  2m  4m  8m  16m  33m  65m  .1s  .1s+  
0 29239 6676 972 8044 735 1177 5377 17642 6062 286 13 36  
-----  
Histogram of latencies by I/O size in # of blocks for:  
db file scattered read  
direct path read  
direct path read temp  
-----  
db file scattered read  
0  64u  .1m  .2m  .5m  1m  2m  4m  8m  16m  33m  65m  .1s  .1s+  
32 0    0    0    0    0    0 5106 702 661 660 50  
2  0    2    3    0    0    0  0    0    0    4    0  
-----
```

Oracle Tools: Trace File Profiling

- `oracle_trace_parsing`

(Kyle Hailey)

- No DB-Install Required

`./parsetrc.pl mytrace.trc`

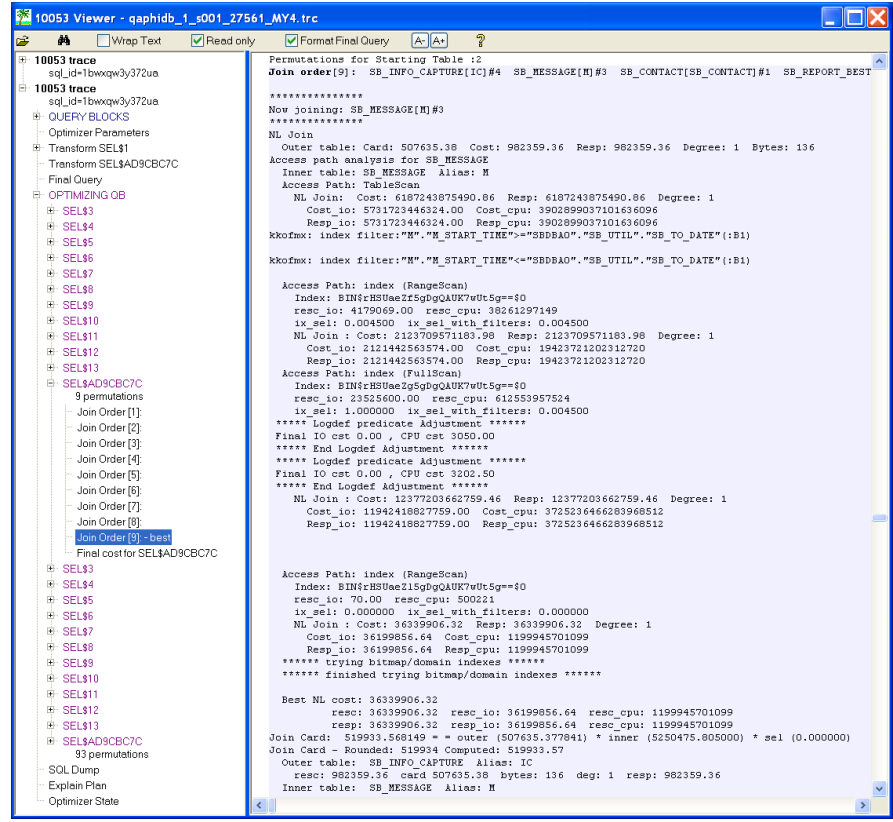
- summary of activity
- histogram of latency
- SQL execution plan

```
-----  
Breakdown by SQL Statement  
-----  
  
UPDATE TOTO.TRANSACTIONS T1 SET  
  T1.YIELD_YTM = (SELECT NVL(T1.YIELD_YTM,NVL(T2."Reported_Yield",T1.YIELD_YTM))  
-----  
          events for query  
-----  
event                                count total secs    avg ms  
-----  
db file sequential read                3349         18      5.493  
db file scattered read                   1           0     11.417  
Disk file operations I/O                 1           0      0.083  
-----  
          execution plan for query  
-----  
      'UPDATE TOTO (cr=5171 pr=3378 pw=0 time=18564002 us)'  
      'FILTER (cr=5171 pr=3378 pw=0 time=18563998 us)'  
      'NESTED LOOPS (cr=5171 pr=3378 pw=0 time=18563995 us)'  
      'NESTED LOOPS (cr=1931 pr=370 pw=0 time=78074 us cost=1264  
      'SORT UNIQUE (cr=30 pr=30 pw=0 time=30635 us cost=17  
      'TABLE ACCESS FULL VATRADE_SUPPORT (cr=30 pr=30 pw=0 time=22918  
      'INDEX RANGE SCAN TRADE_ID_SOURCE_IDX (cr=1901 pr=340 pw=0  
      'TABLE ACCESS BY INDEX ROWID LOT_TRANSACTIONS (cr=3240 pr=3008 pw=0  
      'TABLE ACCESS FULL VATRADE_SUPPORT (cr=0 pr=0 pw=0 time=0 us cost=17  
-----
```


Oracle Tools: Trace File Profiling

- 10053 TreeViewer
(Hans-Peter Sloot, Robert van der Erde)

- No DB-Install Required



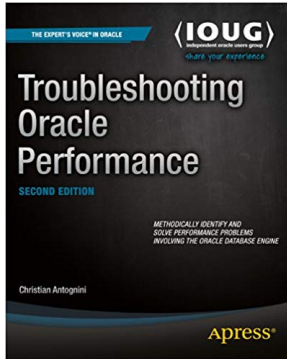
Oracle Tools: Trace File Profiling

- Trivadis Extended Tracefile Analysis Tool

TVD\$XTAT

(Christian Antognini)

- Version 4 Beta 11 (March 2017)
- Reports are very detailed
- No DB-Install Required



```
./tvdxtat.sh -r 12 -t text.xml -i js122a1_ora_9447_10046-test.trc -o tvdstat-report.txt
```

Execution Plans		Session ID	11.123						
		Service Name	SYSSUSERS						
		Module Name	JDBC Thin Client						
		Parsing User	0						
		Hash Value	289500602						
		SQL ID	5206f148n2vdu						
		Text	select * from BILL						
Optimizer Mode	ALL_ROWS	Hash Value	213776285						
Rows	Operation								
20,000	TABLE ACCESS FULL BILL (cr=2069 pr=0 pw=0 time=143848 us cost=17 size=420000 card=20000)								
Database Call Statistics with Recursive Statements									
Call	Count	Misses	CPU [s]	Elapsed [s]	PIO [b]	LIO [b]	Consistent [b]	Current [b]	Rows
Parse	1	1	0.005	0.005	0	24	24	0	0
Execute	1	0	0.000	0.000	0	0	0	0	0
Fetch	2,001	0	0.143	0.127	0	2,069	2,069	0	20,000
Total	2,003	1	0.148	0.131	0	2,093	2,093	0	20,000
Average (per row)	0	0	0.000	0.000	0	0	0	0	1
Database Call Statistics without Recursive Statements									
Call	Count	Misses	CPU [s]	Elapsed [s]	PIO [b]	LIO [b]	Consistent [b]	Current [b]	Rows
Parse	1	1	-0.026	0.000	0	-42	-42	0	0
Execute	1	0	0.000	0.000	0	0	0	0	0
Fetch	2,001	0	0.143	0.127	0	2,069	2,069	0	20,000
Total	2,003	1	0.117	0.102	0	2,027	2,027	0	20,000
Average (per row)	0	0	0.000	0.000	0	0	0	0	1
Resource Usage Profile overall current									
Component	Total Duration [s]	%	Number of Events	Duration per Event [s]					
SQL*Net message from client	1.271	83.638	2,001	0.001					
CPU	0.117	7.700	n/a	n/a					
recursive statements	0.116	7.631	n/a	n/a					
SQL*Net message to client	0.016	1.031	2,001	0.000					
Total	1.519	100.000							

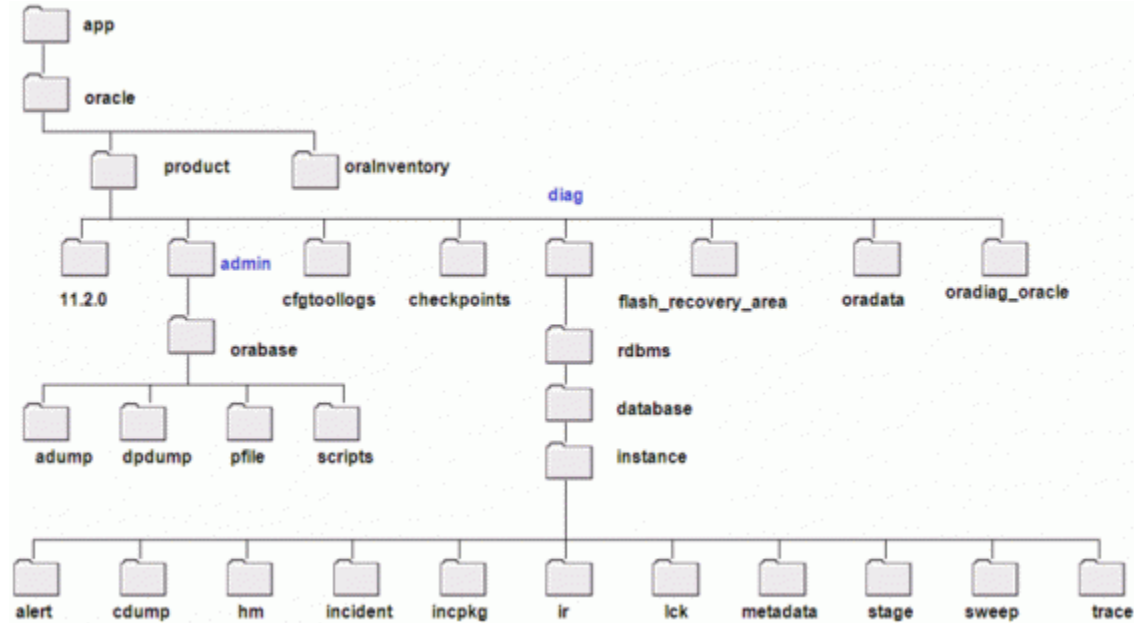
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Oracle Tools: Managing Traces

- ADRCI



Oracle Tools: Managing Traces

- ADRCI

```
adrci> show control
ADR Home = /u01/app/oracle/diag/rdbms/mydb/mydb:
*****
ADRID                SHORTP_POLICY        LONGP_POLICY
-----
1067873839           720                  8760
```

```
adrci> purge
```

```
adrci> purge -age 10080 --(7days, minutes)
```



Oracle Tools: Managing Traces

- ADRCI

```
adrci> show problem

ADR Home = /u01/app/oracle/diag/rdbms/orcl/orcl:
*****
PROBLEM_ID          PROBLEM_KEY                                LAST_INCIDENT    LASTINC_TIME
-----
1                   ORA 3137 [3120]                            71593            2013-08-09 10:16:43.714000 +01:00
2                   ORA 7445 [kghalo()]                        72697            2013-10-09 10:05:17.154000 +01:00
2 rows fetched
```



```
adrci> show incident

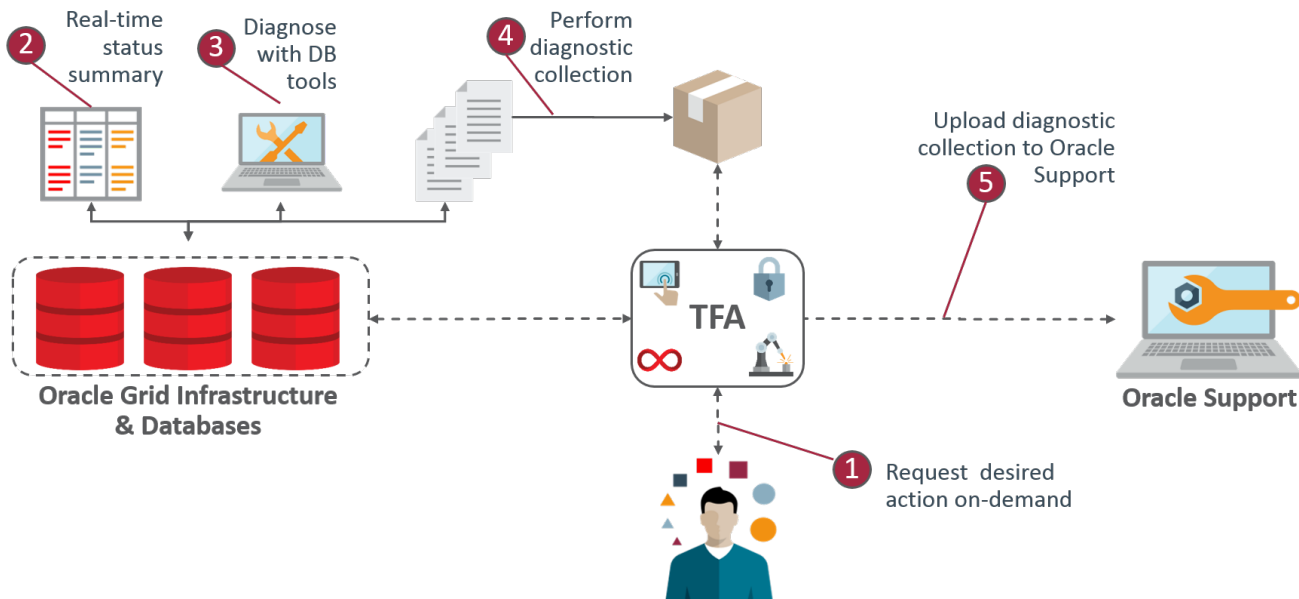
ADR Home = /u01/app/oracle/diag/rdbms/orcl/orcl:
*****
INCIDENT_ID        PROBLEM_KEY                                CREATE_TIME
-----
71593              ORA 3137 [3120]                            2013-08-09 10:16:43.714000 +01:00
72697              ORA 7445 [kghalo()]                        2013-10-09 10:05:17.154000 +01:00
2 rows fetched
```

```
adrci> ips create package problem 2 correlate all
Created package 1 based on problem id 2, correlation level all
```


Oracle Tools: Managing Traces

- TFA
(Trace File Analyzer)

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Oracle Tools: Managing Traces

- TFA
(Trace File Analyzer)

View System & Cluster Summary

Use the summary command for a quick real-time view of all key database components.

It shows any potential problems with important elements such as:

- Database
- Clusterware
- ASM
- Patch
- Listener
- Network
- OS

```
tfactl summary
```

Investigate Logs

1. Analyze logs for recent errors `tfactl analyze -last 2d`

2. Search logs for specific errors `tfactl analyze -search "ORA-00600" -last 14d`

3. Analyze further using any [included tools](#) for example:

```
tfactl
tfactl > database MyDB
MyDB tfactl > oratop
```



Oracle Tools: Managing Traces

- TFA
(Trace File Analyzer)

Perform a diagnostic collection

Use a one command SRDC to collect exactly what you or Oracle Support need to diagnose a specific type of problem.

```
tfactl diagcollect -srdc <srdc_type>
```

Then log an SR with the resulting zip file.

See the documentation for a [full list of all the different SRDCs available](#).

For more information about SRDCs run `tfactl diagcollect -srdc -help`

If there is not yet an SRDC about the type of problem you are collecting for then run a default diagnostic collection.

This will trim and collect all key diagnostics for the past 12 hours.

```
tfactl diagcollect
```

To collect for a specific date use:

```
tfactl diagcollect -for "yyyy-mm-dd"
```

To collect between a date and optional time range use:

```
tfactl diagcollect -from "yyyy-mm-dd hh:mm:ss" -to "yyyy-mm-dd hh:mm:ss"
```



Oracle Tools: Managing Traces

- TFA
(Trace File Analyzer)



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specific type of problem.
ult diagnostic collection.
mm : ss"

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Oracle Tools: SQL Level Diag/Tuning



Oracle Tools: SQL Level Diag/Tuning

- SQLTXPLAIN - SQLT

(Carlos Sierra)

All About the SQLT Diagnostic Tool (Doc ID 215187.1)

Execution Plans

List ordered by phv and source.

#	Plan Hash Value	SQLT Plan Hash Value ¹	SQLT Plan Hash Value ²	Src	Source	Plan Info	Plan Stability	Is Bind Sensitive	Optimize
1	142578110	33788	55604	MEM	GV\$SQL_PLAN	cardinality_feedback yes		Y	ALL_ROW
2	142578110	33788	33788	AWR	DBA_HIST_SQL_PLAN	cardinality_feedback yes			ALL_ROW
3	657302870	92811	23794	MEM	GV\$SQL_PLAN	cardinality_feedback yes		Y	ALL_ROW
4	657302870	92811	92811	AWR	DBA_HIST_SQL_PLAN	cardinality_feedback yes			ALL_ROW
5	657302870	92811	38096	XPL	PLAN_TABLE				ALL_ROW
6	1637264670	24162	55145	MEM	GV\$SQL_PLAN			Y	ALL_ROW
7	2816325939 [W]	25354	56337	MEM	GV\$SQL_PLAN	cardinality_feedback yes		Y	ALL_ROW
8	2816325939 [W]	25354	25354	AWR	DBA_HIST_SQL_PLAN				ALL_ROW
9	3267771367 [B]	65842	11910	MEM	GV\$SQL_PLAN	cardinality_feedback yes		Y	ALL_ROW
10	3267771367 [B]	65842	65842	AWR	DBA_HIST_SQL_PLAN	cardinality_feedback yes			ALL_ROW
11	3935795003	93006	39074	MEM	GV\$SQL_PLAN	cardinality_feedback yes		Y	ALL_ROW
12	3935795003	93006	93006	AWR	DBA_HIST_SQL_PLAN	cardinality_feedback yes			ALL_ROW

(1) SQLT PHV considers id, parent_id, operation, options, index_columns and object_name. SQLT PHV2 includes also access and filter predicates.

(2) Display of child plans is restricted up to 100 per phv as per tool parameter "r_rows_table_s".

[Go to Plan Performance Statistics](#)

[Go to Plans Summary](#)

[Go to Top](#)

- DB-Install Required

```
SQL> @sqltextract.sql dkz7v96ym42c6 SQLTXPLAIN
```

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Oracle Tools: SQL Level Diag/Tuning

- SQL Tuning Health Check
SQLHC
(Carlos Sierra)

SQL Tuning Health Check Script (SQLHC) [Doc ID 1366133.1]

1366133.1 SQLHC 11.4.3.7 Report:

sqlhc_V1122_host01_11.2.0.2.0

155923.html

Tables Summary

#	Table Name	Owner	Num Rows	Table Sample Size	Indexes	Avg Index Sample Size	Table Columns	Columns with Histogram	Avg Column Sample Size
1	CUSTOMER	QTUNE	10751	10751	4	10751	5	2	6405
2	ORDER_LINE	QTUNE	239152	4933	4	178042	8	0	2932
3	PART	QTUNE			2		6	0	
4	SALES_ORDER	QTUNE	33895	33895	3	33895	5	1	28204

Base Statistics Summary. This could be compared with output from another system to check for differences.

- No DB-Install Required

SQL> @sqlhc.sql T djkbvyr8vkc64h

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Observations

#	Type	Name	Observation	More
1	CBO PARAMETER	DB_FILE_MULTIBLOCK_READ_COUNT	CBO initialization parameter "db_file_multiblock_read_count" with a value of 8.	Review the correctness of this non-default value "8". Unset this parameter unless there is a strong reason for keeping its current value. Default value is "98" as per V\$SYS_OPTIMIZER_ENV.
2	CBO PARAMETER	DB_FILE_MULTIBLOCK_READ_COUNT	Value of 8 overriding its default value of 98.	The default value of this parameter is a value that corresponds to the maximum I/O size that can be performed efficiently. This value is platform-dependent and is 1MB for most platforms. Because the parameter is expressed in blocks, it will be set to a value that is equal to the maximum I/O size that can be performed efficiently divided by the standard block size.
3	CBO PARAMETER	HASH_AREA_SIZE	Value of 1048576.	Review the correctness of this non-default value "1048576". Unset this parameter unless there is a strong reason for keeping its current value. Default value is "131072" as per V\$SYS_OPTIMIZER_ENV.

Suggestions for potential improvements

Various categories of observation are provided including Statistics and Parameter categories among others

The SQL that generated the output is at the end of the report

Oracle Tools: SQL Level Diag/Tuning

- PL/SQL Profiler

Script to produce HTML report with top consumers out of PL/SQL Profiler DBMS_PROFILER data (Doc ID 243755.1)

```
SQL> EXEC DBMS_PROFILER.START_PROFILER('optional comment');
SQL> EXEC DBMS_PROFILER.STOP_PROFILER;
SQL> @profiler.sql
```

243755.1 PROFILER 11.4.4.7 Report: profiler_V1123_host01_11.2.0.3.0_20120702_090120.html

```
RUNID      : 3
Owner      : QTUNE
Date       : 2012-05-10/13:40:02
Comment    : SOLT XECUTE input/sample/script2
Total Time: 242.520000000 (seconds)
RDBMS     : 11.2.0.3.0
Platform  : LINUX
```

- DB-Install Required

- Top 10 Lines as per Total Time
- Top 10 Profiled PL/SQL Libraries
- All Profiled PL/SQL Libraries

Top 10 Lines as per Total Time

Top	Lib #	Type	Owner	Name	Line #	Times Line Exec	Total Time (seconds)	Min Time (seconds)	Max Time (seconds)	Line Text
1	67	PACKAGE BODY	SQLTXPLAIN	SQLTSD	5720	2	11.239085744	5.499081311	5.740004433	
2	67	PACKAGE BODY	SQLTXPLAIN	SQLTSD	3017	1	6.387841694	6.387841694	6.387841694	write_log('final_list_of_tables');
3	67	PACKAGE BODY	SQLTXPLAIN	SQLTSD	2351	1	2.727243421	2.727243421	2.727243421	BEGIN
4	67	PACKAGE BODY	SQLTXPLAIN	SQLTSD	3539	1	1.425019977	1.425019977	1.425019977	BEGIN
5	34	PACKAGE BODY	SQLTXPLAIN	SQLTSR	701	116	1.403814230	0.001992976	0.249819015	
6	24	PACKAGE BODY	SQLTXPLAIN	SQLTSA	160	1254	1.224672370	0.000633992	0.007474910	INSERT INTO sqlt\$log VALUES log_rec;
7	142	PACKAGE BODY	SQLTXPLAIN	TRCAST	3933	334	0.949135662	0.002651968	0.013020844	INSERT INTO trca\$row_source_plan VALUES rsp_rec;
8	67	PACKAGE BODY	SQLTXPLAIN	SQLTSD	1983	1	0.919979010	0.919979010	0.919979010	BEGIN
9	67	PACKAGE BODY	SQLTXPLAIN	SQLTSD	3997	13	0.850471840	0.004154950	0.770357797	BEGIN
10	139	PACKAGE BODY	SQLTXPLAIN	TRCASP	1009	57116	0.810692315	0.000000999	0.001928976	PROCEDURE parse_line (
TOTAL							27.937956263			

#1 Top Consumer

Displays 10 lines before and after #1 top consumer.

Lib #	Type	Owner	Name	Line #	Times Line Exec	Total Time (seconds)	Min Time (seconds)	Max Time (seconds)	Line Text
67	PACKAGE BODY	SQLTXPLAIN	SQLTSD	5710	2	0.000022999	0.000010999	0.000011999	*
67	PACKAGE BODY	SQLTXPLAIN	SQLTSD	5711					*-----*
67	PACKAGE BODY	SQLTXPLAIN	SQLTSD	5712					PROCEDURE collect_wri\$_optstat_aux_hist (



Oracle Tools: SQL Level Diag/Tuning

- Craig Shallahamer Tools
 - Firefighting Diagnostic Toolkit
 - OraPub System Monitor (OSM) Toolkit
 - BloodHound Toolkit
 - Full Time Tool
 - ...
- No DB-Install Required

```
$ fulltime.sh 124545 15 1
PID: 12545 SID: 168 SERIAL: 9 USERNAME: SYSTEM at 18-Oct-2013 06:40:13
CURRENT SQL: SELECT COUNT(*) FROM DBA_OBJECTS WHERE 1=0
total time: 14.468 secs, CPU: 13.239 secs (91.51%), wait: 1.229 secs (8.49%)
Time Component
-----
cpu : [?] sum of funcs consuming less than 2% of CPU time      10.938  75.60
cpu : [.] __intel_new_memset                                   1.252   8.66
wait: cursor: pin S                                           1.229   8.49
cpu : [.] opixec                                             0.436   3.01
cpu : [.] audsel                                             0.367   2.53
cpu : [.] kxsxsi                                             0.270   1.87
Samples remaining: 0
Gathering next 15 second sample...

$ fulltime.sh 32873 45
PID: 32873 SID: 9 SERIAL: 13 USERNAME: OE2 at 18-Oct-2013 12:13:49
CURRENT SQL: SELECT COUNT(*) FROM ( SELECT SUM(OBJECT_ID) FROM ORDERS UNION SELECT
total time: 44.438 secs, CPU: 41.611 secs (93.64%), wait: 2.827 secs (6.36%)
Time Component
-----
cpu : [.] kcbgtr                                             29.714  66.87
cpu : [.] kdstf000010100001km                               3.716   8.36
cpu : [.] lnxsum                                             3.541   7.97
cpu : [?] sum of funcs consuming less than 2% of CPU time    2.393   5.38
cpu : [.] kaf4reasrpk0km                                    2.180   4.91
wait: PL/SQL lock timer                                     2.100   4.73
wait: latch: cache buffers chains                          0.727   1.64
```

Oracle Tools: SQL x Database Level

SQL Tuning



Database Performance



Oracle Tools: SQL x Database Level

SQL Tuning



Database Performance



Oracle Tools: Database Level Diag/Reports

- Oracle Tools and Scripts
 - ORAchk

ORAchk - Health Checks for the Oracle Stack (Doc ID 1268927.2)

System Health Score is 79 out of 100 ([detail](#))

`./orachk`

Summary

OS/Kernel Version	LINUX X86-64 OELRHHEL 7 3.8.13-118.4.1.el7uek.x86_64
DB Home - Version - Names	/u01/app/oracle/product/12102 - 12.1.0.2.0 - SANDPRD
Database Server	oralinux7
orachk Version	12.1.0.2.6_20160207
Collection	orachk_oralinux7_SANDPRD_052316_022627.zip
Duration	53 mins, 1 seconds
Executed by	oracle
Arguments	-a
Collection Date	23-May-2016 02:26:56

Note! This version of orachk is considered valid for 15 days from today or until a new version is available

Table of Contents

- [Database Server](#)
- [Patch Recommendation](#)
- [Maximum Availability Architecture \(MAA\) Scorecard](#)
- [Findings needing further review](#)
- [Platinum Certification](#)

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Oracle Tools: Database Level Diag/Reports

- Oracle Tools and Scripts

- ORAchk
- EXAchk

RACchk

- HAchk

./exachk -a

Oracle Exadata Database Machine exachk or HealthCheck (Doc ID 1070954.1)

Oracle Exadata Assessment Report

System Health Score is 87 out of 100 ([detail](#))

Cluster Summary

Cluster Name	2-cluster
OS Version	LINUX.X86_64.OELRHEL.5.2.6.32-400.1.1.el5uek
CRS Home - Version	/u01/app/11.2.0.3/grid - 11.2.0.3.0
DB Home - Version - Names	/u01/app/orclpdb/product/11.2.0.3/dbhome_1 - 11.2.0.3.0 - g
Exadata Version	11.2.3.2.0
Number of nodes	14
Database Servers	4
Storage Servers	7
IB Switches	3
exachk Version	2.2.0_20121109
Collection	exachk_SAMPLE_011113_134037.zip
Collection Date	11-Jan-2013 13:44:28

NOTE : exachk is only one part of the MAA Best Practices recommendation methodology. My Oracle Support "Oracle Exadata Best Practices (Doc ID757552.1)" should be contains additional operational and diagnostic guidance that is not programmed within exachk.

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Oracle Tools: Database Level Diag/Reports

- Oracle Tools and Scripts
 - ORAchk
 - EXAchk
 - Statspack

SQL>@?/rdbms/admin/**spreport**.sql

- DB-Install Required

```
STATSPACK report for

Database      DB Id      Instance      Inst Num  Startup Time  Release      RAC
-----
1302450501 MATT                1 12-Jan-16 07:06 11.2.0.4.0 NO

Host Name      Platform      CPUs Cores Sockets  Memory (G)
-----
ip-10-3-1-202  Linux x86 64-bit      1   0     0      1.0

Snapshot      Snap Id     Snap Time      Sessions Curs/Sess Comment
-----
Begin Snap:      1 13-Jan-16 21:56:35      32      1.5
End Snap:        3 13-Jan-16 21:58:35      30      1.5
Elapsed:         2.00 (mins) Av Act Sess:      0.1
DB time:         0.12 (mins)  DB CPU:          0.02 (mins)

Cache Sizes      Begin      End
-----
Buffer Cache:    212M      208M  Std Block Size:      8K
Shared Pool:     116M      120M  Log Buffer:          3,056K

Load Profile      Per Second  Per Transaction  Per Exec  Per Call
-----
DB time(s):      0.1         2.3              0.00      0.07
DB CPU(s):       0.0         0.5              0.00      0.01
Redo size:       17,129.3    685,172.0
Logical reads:   89.5        3,580.7
Block changes:  32.6        1,302.7
Physical reads:  2.2         89.7
Physical writes: 3.4         136.7
User calls:      0.8         32.3
Parses:          5.0         198.7
Hard parses:     1.5         60.0
W/A MB processed: 0.5         18.4
Logons:          0.0         1.3
Executes:        17.3        692.3
Rollbacks:       0.0         0.0
Transactions:    0.0
```

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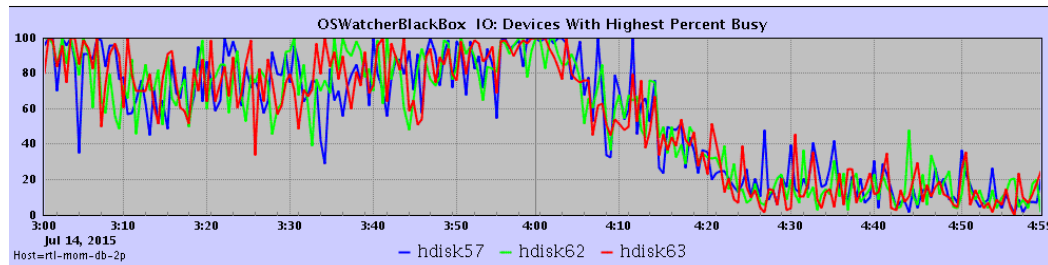
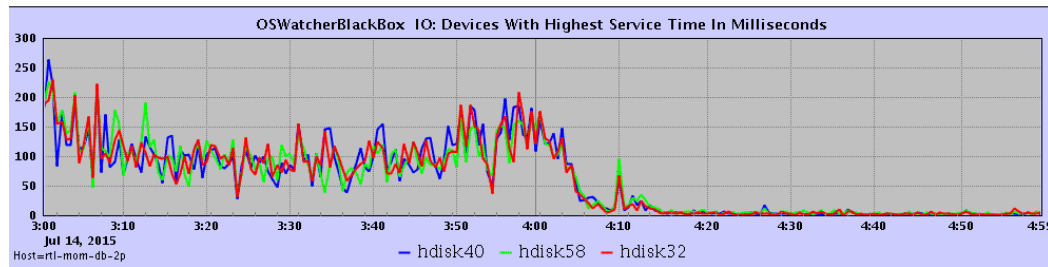
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Oracle Tools: Database Level Diag/Reports

- Oracle Tools and Scripts
 - ORAchk
 - EXAchk
 - Statspack
 - TFA – OS Watcher



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Oracle Tools: Database Level Diag/Reports

- Oracle Tools and Scripts
 - ORAchk
 - EXAchk
 - Statspack
 - TFA – OS Watcher
 - TFA - Procdwatcher

```
#####
Procwatcher Debugging for Process 20008 ora_fg_grac41
#####
SQL: Wait Chains Report for Process 20008 ora_fg_grac41
SQL> SQL> -e V WAITCHAINS (top 100 rows) Snapshot Taken At: Sat Apr 26 11:53:43 CEST 2014
PROC 20008 : Current Process: 20008 SID: 33 SER#: 25 INST grac41 INST #: 1
PROC 20008 : Blocking Process: <none> from Instance Number of waiters: 1
PROC 20008 : Final Blocking Process: <none> from Instance Program:
PROC 20008 : Wait Event: SQL*Net message from client P1: 1413697536 P2: 1 P3: 0
PROC 20008 : Seconds in Wait: 867 Seconds Since Last Wait:
PROC 20008 : Wait Chain: 1: 'SQL*Net message from client'<=>'enq: TX - row lock contention'
PROC 20008 : Blocking Wait Chain: <none>
#####
SQL: Lock Report for Process 20008 ora_fg_grac41
SQL> SQL> -e V LOCK Snapshot Taken At: Sat Apr 26 11:53:51 CEST 2014
PROC PROC TY ID1 ID2 LMODE REQUEST BLOCK
-----
PROC 20008 INST grac41 TX 655386 19323 6 0 1
--> process 20008 holds a lock in exclusiv mode
#####
SQL: Current SQL Report for Process 20008 ora_fg_grac41
SQL> SQL> Snapshot Taken At: Sat Apr 26 11:54:04 CEST 2014
PROC 20008 - select * from emp where empno=7934 for update
at Apr 26 11:54:07 CEST 2014
F S UID PID PPIID C PRI NI ADDR SZ WCHAN STIME TTY TIME CMD
0 S oracle 20008 1 0 80 0 - 394868 sk_wai 11:38 ? 00:00:00 oraclegrac41 (LOCAL=NO)

SQL*Plus: Release 11.2.0.4.0 Production on Sat Apr 26 11:54:13 2014
Copyright (c) 1982, 2013, Oracle. All rights reserved.
Enter user-name: SQL> Oracle pid: 48, Unix process pid: 20008, image: oracle@grac41.example.com
Sat Apr 26 11:54:13 CEST 2014

ksedsts()+465<-ksdxfstk()+32<-ksdxcdb()+1927<-sspuser()+112<-__sighandler()<-read()+14<-nttfrpd()+343<-nsbasic_brc()+376
<-nsbrevc()+69<-nioqrc()+495<-opikndf2()+978<-opitsk()+831<-opiino()+969<-opiodr()+917<-opidrv()+570<-sou2o()+103
<-opimai_real()+133<-ssthrrmain()+265<-main()+201<-__libc_start_main()+253
Sat Apr 26 11:54:13 CEST 2014

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<-opimai_real()+133<-ssthrrmain()+265<-main()+201<-__libc_start_main()+253
Statement processed.
--> Application is not progressing - Server process is waiting for Input from client
```

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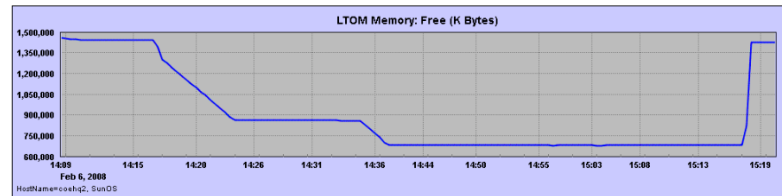
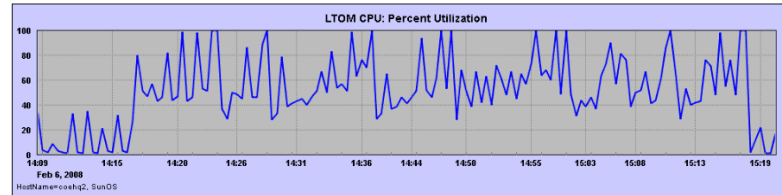
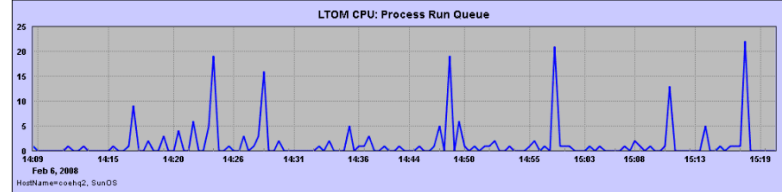
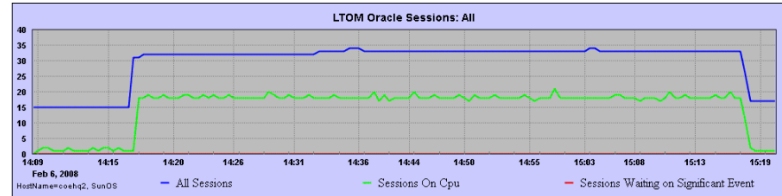
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Oracle Tools: Database Level Diag/Reports

- Oracle Tools and Scripts
 - ORAchk
 - EXAchk
 - Statspack
 - TFA – OS Watcher
 - TFA – Procwatcher
 - Lite Onboard Transaction Monitor (LTOM)

- Installation Required



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Oracle Tools: Database Level Diag/Reports

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- Installation Required

RDA 4.24 Main Index

Executed on rac2

- Overview
- Operating System Setup
- User Profile
- Performance
- Network
- Oracle Installation
- RDBMS
 - RDBMS Log/Trace Files
- External Data Collection

Oracle Remote Diagnostic Agent (RDA)

Written by: Oracle Global Customer Support
Version: 4.24
Report created on: 07-Sep-2011 11:45:41 UTC

- System Settings
- Oracle Product Settings
- Customer Information
- Data Collection Overview
- SQL Request Overview
- Operating System Command Execution Overview

System Settings

Machine and version	Linux rac2 2.6.18-194.el5 #1 SMP Tue Mar 16 21:52:43 EDT 2010 i686
Fully qualified host name	rac2
Platform	32-bit Red Hat Linux
O/S Version	2.6.18
Virtualization technology detected?	VMware
Logged in as	oracle
Last run as	uid=500(oracle) gid=500(oinstall) groups=500(oinstall),501(dba)
Executed as Oracle home owner?	Yes
RDA home directory	/u01/rda
RDA work directory	/u01/rda
Output file prefix	daveRDA
Output file directory	/u01/rda/output
Setup profile	Default
Perform network pings?	No
Is Transparent/Procedural Gateway information requested?	No

[Back to top](#)

Oracle Product Settings

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Oracle Tools: Database Level Diag/Reports

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- TFA – Procwatcher
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- Remote Diagnostics Agent (RDA)
- HANGFG: Hang File Generator

./hangfg.sh <ARG1>

- Hanganalyze
- Systemstate Dump

```
*****
HANG ANALYSIS:
*****
Open chains found:
>> This process (below) is running
Chain 1 : :

>> Below is a wait chain. Sid 16 waits for Sid 17
Chain 2 : :

--
Other chains found:
Chain 3 : :

Extra information that will be dumped at higher levels:
>> This just shows which nodes would be dumped at each level
[level 4] : 2 node dumps -- [LEAF] [LEAF_NW] [IGN_DMP]
[level 5] : 2 node dumps -- [NLEAF]
[level 10] : 10 node dumps -- [IGN]

State of nodes
>> All nodes are listed below. The "state" column shows the st
>> that the session is in
([nodenum]/sid/sess_orno/session/state/start/finish/[adplist]
>> The first nodes are IGN (ignore)
[0]/1/1/0x826f94c0/IGN/1/2//none
[1]/2/1/0x826f9d2c/IGN/3/4//none
[2]/3/1/0x826fa598/IGN/5/6//none
[3]/4/1/0x826fae04/IGN/7/8//none
[4]/5/1/0x826fb670/IGN/9/10//none
[5]/6/1/0x826fb6dc/IGN/11/12//none
[6]/7/1049/0x826tc748/IGN/13/14//none
[7]/8/1049/0x826tcfb4/IGN/15/16//none
[8]/9/1049/0x826tfd820/IGN/17/18//none
[9]/10/1049/0x826fa08c/IGN/19/20//none
>> below are LEAF nodes in various states
[12]/13/158/0x826ff9d0/LEAF_NW/21/22//none
[15]/16/416/0x82701314/NLEAF/23/26/[16]/none
[16]/17/941/0x82701b80/LEAF/24/25/[15]
[17]/18/344/0x827023ec/NLEAF/27/28/[16]/none
>> You are told which processes are being dumped
>> They will dump errorstacks to their own trace files
Dumping System_State and Fixed_SGA in process with ospid 1866
Dumping Process information for process with ospid 18656
Dumping Process information for process with ospid 18658
...
*****
PROCESS DUMP FROM HANG ANALYZER:
*****

*** 2016-06-15 16:59:00.180
Processing Oradebug command 'dump systemstate 266'
*****
SYSTEM STATE (level=10, with short stacks)
-----
System global information:
processes: base 0xbb5b6850, size 1000, cleanup 0xbb63b780
allocation: free sessions 0x8ba6fb48, free calls (nil)
control alloc errors: 0 (process), 0 (session), 0 (call)
PMON latch cleanup depth: 0
seconds since PMON's last scan for dead processes: 39
system statistics:
0 OS CPU Qt wait time
727657760 Requests to/from client
7106305 logons cumulative
274 logons current
231675649 opened cursors cumulative
1737 opened cursors current
43388218 user commits
1682106 user rollbacks
835078962 user calls
752889391 recursive calls
12720247 recursive cpu usage
150 pinned cursors current
15100586388 session logical reads
0 session logical reads in local numa group
0 session logical reads in remote numa group
[...]
PROCESS 1:
-----
SO: 0xbb63a6d0, type: 2, owner: (nil), flag: INIT/-/-/0x0 if: 0x3 c:
proc=0xbb63a6d0, name=process, file=ksu.h LINE:12616, pg=0
(process) oracle pid:1, ser:0, calls cur/top: (nil)/(nil)
Flags : (0x20) PSEUDO
Flags2: (0x0), Flags3: (0x10)
intr error: 0, call error: 0, sess error: 0, txn error 0
intr queue: empty
ksudlp FALSE at location: 0
(post info) last post received: 0 0 0
last post received-location: No post
last process to post me: none
last post sent: 0 0 0
last post sent-location: No post
last process posted by me: none
(latch info) wait_event=0 bits=0
O/S info: user: , term: , ospid: (DEAD)
OSD pid info: Unix process pid: 0, image: PSEUDO
```



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HANGFG User Guide (Doc ID 362094.1)

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Oracle Tools: Database Level Diag/Reports

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 - Remote Diagnostics Agent (RDA)
 - HANGFG: Hang File Generator
 - ASHDUMP

```
ASHDUMPSECONDS
=====
Processing Oradebug command 'dump ashdumpseconds 30'
ASH dump
<>
*****
SCRIPT TO IMPORT
*****
-----
Step 1: Create destination table
-----
CREATE TABLE ashdump AS
SELECT * FROM SYS.WRH$_ACTIVE_SESSION_HISTORY WHERE rownum < 0
-----
Step 2: Create the SQL*Loader control file as below
-----
load data
infile * "str '\n###\n'"
append
into table ashdump
fields terminated by ',' optionally enclosed by '"'
(
SNAP_ID CONSTANT 0      ,
DBID                    ,
INSTANCE_NUMBER        ,
SAMPLE_ID              ,
SAMPLE_TIME TIMESTAMP ENCLOSED BY '"' AND '"' TO_TIMESTAMP(:SAMPLE_TIME
SESSION_ID             ,
SESSION_SERIAL#        ,
SESSION_TYPE           ,
USER_ID                ,
SQL_ID                 ,
SQL_CHILD_NUMBER
```



Oracle Tools: Database Level Diag/Reports

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 - Remote Diagnostics Agent (RDA)
 - HANGFG: Hang File Generator
 - ASHDUMP
 - STACKX: Stack Trace Extract
 - (Roger Snowden)

Debuggers recognized and discovered by *stackx* are (in order of preference):

- gdb
- mdb (Solaris only)
- adb
- dbx
- sdb

```
$ stackx core.1234 > stacktrace.txt
```

or

```
$ stackx /usr/bin/adb core.1234 > stacktrace.txt
```

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Oracle Tools: Database/OS Level

- Oracle Tools and Scripts
 - Database Security Assessment Tool (DBSAT)



Assessment Date & Time							
Date of Data Collection	Date of Report	Reporter Version					
Wed May 18 2016 16:20:00	Fri May 20 2016 10:43:21	1.0 (May 2016) - 1c0a					

Database Identity				
Name	Platform	Database Role	Log Mode	Created
DB	Linux x86 64-bit	PRIMARY	NOARCHIVELOG	Wed Feb 03 2016 09:40:00

Summary							
Section	Pass	Evaluate	Opportunity	Some Risk	Significant Risk	Severe Risk	Total Findings
Basic Information	0	0	0	0	0	1	1
User Accounts	4	0	0	3	3	1	11
Privileges and Roles	5	11	0	1	0	0	17
Authorization Control	0	0	2	0	0	0	2
Data Encryption	0	1	1	0	0	0	2
Fine-Grained Access Control	0	0	5	0	0	0	5
Auditing	2	4	2	0	3	0	11
Database Configuration	5	4	0	3	0	0	12
Network Configuration	1	0	0	1	3	0	5
Operating System	3	1	0	0	1	0	5
Total	20	21	10	8	10	2	71

Oracle Tools: Database/OS Level

- Oracle Tools and Scripts
 - Database Security Assessment Tool (DBSAT)

Assessment Date & Time							
Date of Data Collection	Date of Report	Reporter Version					
Wed May 18 2016 16:20:00	Fri May 20 2016 10:43:21	1.0 (May 2016) - 1c0a					

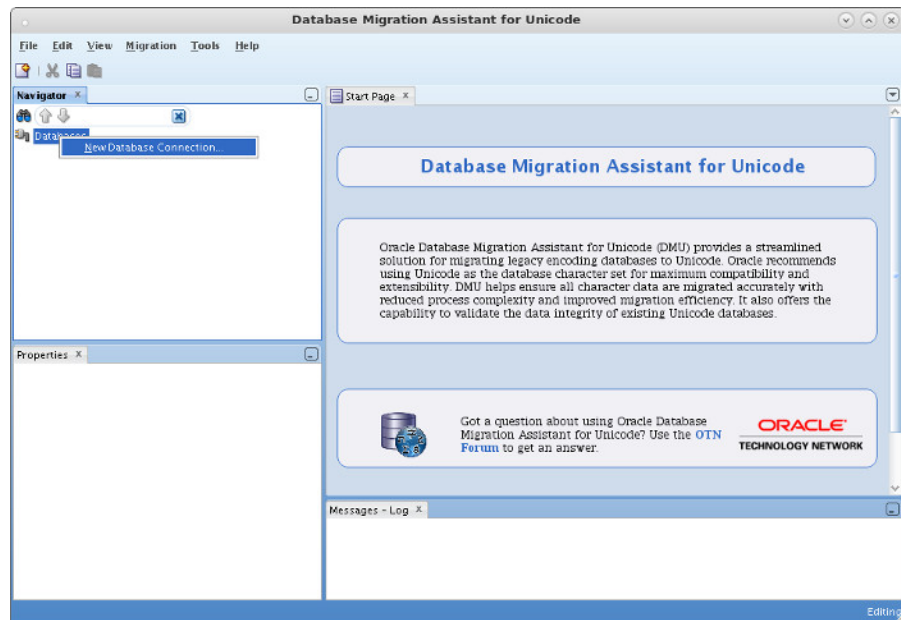
USER.DEFPWD							
Status Severe Risk							
Summary Found 13 unlocked user accounts with default password.							
Details Users with default password: ADAMS, BLAKE, CLARK, CTXSYS, HR, IX, JONES, OE, PM, SCOTT, SH, SYSTEM, XDB							
Remarks Default account passwords for predefined Oracle accounts are well known. Open accounts with default passwords provide a trivial means of entry for attackers, but well-known passwords should be changed for locked accounts as well.							
						Risk	Total Findings
Authorization Control	0	0	2	0	0	0	2
Data Encryption	0	1	1	0	0	0	2
Fine-Grained Access Control	0	0	5	0	0	0	5
Auditing	2	4	2	0	3	0	11
Database Configuration	5	4	0	3	0	0	12
Network Configuration	1	0	0	1	3	0	5
Operating System	3	1	0	0	1	0	5
Total	20	21	10	8	10	2	71



Oracle Tools: Database/OS Level

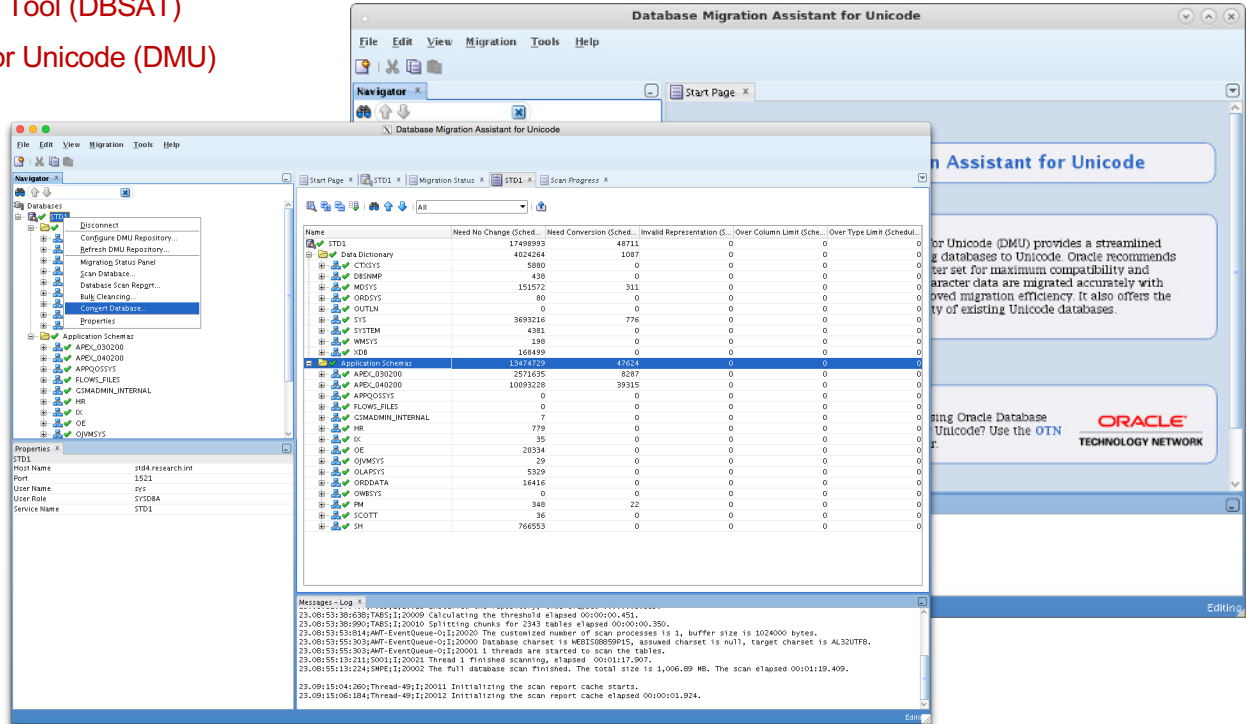
- Oracle Tools and Scripts
 - Database Security Assessment Tool (DBSAT)
 - Database Migration Assistant for Unicode (DMU)

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Oracle Tools: Database/OS Level

- Oracle Tools and Scripts
 - Database Security Assessment Tool (DBSAT)
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Oracle Tools: Database/OS Level

- Oracle Tools and Scripts
 - Database Security Assessment Tool (DBSAT)
 - Database Migration Assistant for Unicode (DMU)
 - DBVERIFY (DBV)

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```
DBVERIFY: Release 10.2.0.4.0 - Production on Sun Mar 30 19:58:17 2014
Copyright (c) 1982, 2007, Oracle. All rights reserved.

DBVERIFY - Verification starting : FILE = +DATA/purasdb/datafile/cbnlindx.260.842111535
Block Checking: DBA = 97018652, Block Type = KTB-managed data block
**** actual rows locked by itl 4 = 1 != # in trans. header = 0
**** actual rows locked by itl 19 = 1 != # in trans. header = 0
---- end index block validation
Page 549660 failed with check code 6401

DBVERIFY - Verification complete

Total Pages Examined      : 4194302
Total Pages Processed (Data) : 172
Total Pages Failing (Data) : 0
Total Pages Processed (Index): 4187043
Total Pages Failing (Index): 1
Total Pages Processed (Other): 7051
Total Pages Processed (Seg) : 0
Total Pages Failing (Seg) : 0
Total Pages Empty         : 36
Total Pages Marked Corrupt : 0
Total Pages Influx        : 0
Highest block SCN         : 0 (0.0)
```

Oracle Tools: Database/OS Level

- Oracle Tools and Scripts
 - Database Security Assessment Tool (DBSAT)
 - Database Migration Assistant for Unicode (DMU)
 - DBVERIFY (DBV)
 - Cluster Health Check Monitor (CHM)



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Oracle Tools: Database/OS Level

- Oracle Tools and Scripts
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 - Database Migration Assistant for Unicode (DMU)
 - DBVERIFY (DBV)
 - Cluster Health Check Monitor (CHM)
 - Oracle Patch Planner (OPLAN)

```
$ cd /u01/app/oracle/patch
$ $ORACLE_HOME/OPatch/oplan/oplan generateApplySteps 19954978

Processing request...

Review the log messages captured in the following file: /u01/app/grid/cfgtoollogs/oplan/2015-02-16-20-01-02/log

Success!

Follow the instructions outlined in the following Installation Instructions document and patch your system:

Apply Instructions (HTML)      : /u01/app/grid/cfgtoollogs/oplan/2015-02-16-20-01-02/ApplyInstructions.html
Apply Instructions (TEXT)     : /u01/app/grid/cfgtoollogs/oplan/2015-02-16-20-01-02/ApplyInstructions.txt
```

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Oracle Tools: Database/OS Level

- Oracle Tools and Scripts
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 - Database Migration Assistant for Unicode (DMU)
 - DBVERIFY (DBV)
 - Cluster Health Check Monitor (CHM)
 - Oracle Patch Planner (OPLAN)



Select A Patch Application Option

1. **Out-of-Place Patching: Apply Patch to a Cloned Oracle Home and Switch** In this option, each existing Oracle Home will be cloned before patching. The patch will then be applied to the clones. All database resources will be stopped on all existing Oracle Homes, then started from the patched Oracle Home clones, in sequence. This option is time-consuming but ensures minimal loss of data as patches are not applied directly to existing instances.

a. **Oracle Recommended - Clone Existing Oracle Homes, Patch and Switch to Each Clone in Rolling Mode:**

- **Advantages:** No downtime while patching; offers best diagnosability of issues during patching; quick recovery from failures since patch is not applied to in-use Oracle Homes.
- **Disadvantages:** Most time-consuming option with greatest number of steps.
- Total number of steps required: **89**
 - During the **full** availability of services: **66**
 - During the **partial** availability of services: **23**

[Click here for detailed Oracle Recommended - Clone Existing Oracle Homes, Patch and Switch to Each Clone in Rolling Mode steps.](#)

If issues are encountered during Out-of-Place patching, you can safely revert back to the original Oracle Home using the Switchback method. [Click here for detailed Switchback to Old Home During Out of Place Patching steps.](#)

2. **In-Place Patching: Apply Patch to Existing Oracle Homes** In this option, the patch will be applied directly to the specified Oracle Homes. This is the least time-consuming option outlined below.

a. **Rolling Mode: Apply Patch to Each Node In A Cluster Sequentially** Resources running on each node in the cluster will be stopped, patched and then restarted, one at a time, this approach ensures that multi-instance databases remain available during the patching process, but it will take longer to complete.

i. **Apply Patch In-Place using OPatch Auto Command in Rolling Mode:**

- **Advantages:** No downtime while patching; fewer patching steps.
- **Disadvantages:** May be time consuming; less-than-optimal diagnosability of issues during patching; slower recovery from failures.
- Total number of steps required: **37**
 - During the **full** availability of services: **31**
 - During the **partial** availability of services: **6**

[Click here for detailed Apply Patch In-Place using OPatch Auto Command in Rolling Mode steps.](#)

ii. **Apply Patch In-Place using OPatch Command in Rolling Mode:**

- **Advantages:** No downtime while patching; offers best diagnosability of issues during patching.
- **Disadvantages:** May be time consuming; greater number of steps; slower recovery from failures.
- Total number of steps required: **51**
 - During the **full** availability of services: **29**
 - During the **partial** availability of services: **22**

AutoUpgrade Tool

<https://docs.oracle.com/en/database/oracle/oracle-database/19/upgrd/about-oracle-database-autoupgrade.html>

<https://mikedietchde.com/2018/09/27/oow2018-the-new-autoupgrade-for-the-oracle-database/>

AutoUpgrade Tool (Doc ID 2485457.1)

Target versions supported

AutoUpgrade Tool can be used on upgrading to below Oracle Database releases:

- Oracle Database 19c (19.3 and newer)
- Oracle Database 18c (18.5 and newer)
- Oracle Database 12c Release 2 (12.2 + DBJAN2019RU and newer)

For supported source Oracle Databases releases to be upgraded to above target releases, refer to Database Server Upgrade/Downgrade Compatibility Matrix (Doc ID 551141.1)

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Oracle Tools: Database Level Diag/Reports

- eDB360

(Carlos Sierra)

```
SQL> @edb360.sql T
```

- No DB-Install Required

- SQLdb360

(Carlos Sierra & Mauro Pagano)

June 11th, 2018

Operating System (OS) Statistics History

- CPU Time Percent for Cluster (1485) [html](#) [text](#) [csv](#) [chart](#)
- CPU Time Percent for Instance 1 (1494) [html](#) [text](#) [csv](#) [chart](#)
- CPU Time Percent for Instance 2 (1486) [html](#) [text](#) [csv](#) [chart](#)
- CPU Load for Cluster (1485) [html](#) [text](#) [csv](#) [chart](#)
- Virtual Memory (VM) Pages for Cluster (1485) [html](#) [text](#) [csv](#) [chart](#)
- CPU Idle Time Percent per Instance (1485) [html](#) [text](#) [csv](#) [chart](#)
- CPU Busy Time Percent per Instance (1485) [html](#) [text](#) [csv](#) [chart](#)
- CPU User Time Percent per Instance (1485) [html](#) [text](#) [csv](#) [chart](#)
- CPU Nice Time Percent per Instance (1485) [html](#) [text](#) [csv](#) [chart](#)
- CPU Sys Time Percent per Instance (1485) [html](#) [text](#) [csv](#) [chart](#)
- OS CPU Wait Time Percent per Instance (1485) [html](#) [text](#) [csv](#) [chart](#)
- Resource Manager (RM) CPU Wait Time Percent per Instance (1485) [html](#) [text](#) [csv](#) [chart](#)
- CPU IO Wait Time Percent per Instance (1485) [html](#) [text](#) [csv](#) [chart](#)
- CPU Load per Instance (1485) [html](#) [text](#) [csv](#) [chart](#)
- Virtual Memory (VM) Pages IN per Instance (1485) [html](#) [text](#) [csv](#) [chart](#)
- Virtual Memory (VM) Pages OUT per Instance (1485) [html](#) [text](#) [csv](#) [chart](#)

System Time Model

- System Time Model (STM) per Cluster (1485) [html](#) [text](#) [csv](#) [chart](#)
- System Time Model (STM) for Instance 1 (1434) [html](#) [text](#) [csv](#) [chart](#)
- System Time Model (STM) for Instance 2 (1465) [html](#) [text](#) [csv](#) [chart](#)

System Time Model Components

- STM: background elapsed time per Instance (1485) [html](#) [text](#) [csv](#) [chart](#)
- STM: background cpu time per Instance (1485) [html](#) [text](#) [csv](#) [chart](#)
- STM: RMAN cpu time (backup/restore) per Instance (1485) [html](#) [text](#) [csv](#) [chart](#)
- STM: DB time per Instance (1485) [html](#) [text](#) [csv](#) [chart](#)
- STM: DB CPU per Instance (1485) [html](#) [text](#) [csv](#) [chart](#)
- STM: connection manager time per Instance (1485) [html](#) [text](#) [csv](#) [chart](#)
- STM: sequence load elapsed time per Instance (1485) [html](#) [text](#) [csv](#) [chart](#)
- STM: sql execute elapsed time per Instance (1485) [html](#) [text](#) [csv](#) [chart](#)
- STM: parse time elapsed per Instance (1485) [html](#) [text](#) [csv](#) [chart](#)
- STM: hard parse elapsed time per Instance (1485) [html](#) [text](#) [csv](#) [chart](#)
- STM: PL/SQL execution elapsed time per Instance (1485) [html](#) [text](#) [csv](#) [chart](#)
- STM: Inbound PL/SQL rpc elapsed time per Instance (1485) [html](#) [text](#) [csv](#) [chart](#)
- STM: PL/SQL compilation elapsed time per Instance (1485) [html](#) [text](#) [csv](#) [chart](#)
- STM: Java execution elapsed time per Instance (1485) [html](#) [text](#) [csv](#) [chart](#)
- STM: repeated bind elapsed time per Instance (1485) [html](#) [text](#) [csv](#) [chart](#)

I/O Waits

- User plus System I/O Waits Counts per Instance (1485) [html](#) [text](#) [csv](#) [chart](#)
- User plus System I/O Waits - Histogram for Cluster (1485) [html](#) [text](#) [csv](#) [chart](#)

I/O Waits Histogram for Top Wait Events

- User I/O "call smart table scan" Waits - Histogram for Cluster (149) [html](#) [text](#) [csv](#) [chart](#)
- User I/O "call single block physical read" Waits - Histogram for Cluster (1485) [html](#) [text](#) [csv](#) [chart](#)
- User I/O "direct path read" Waits - Histogram for Cluster (79) [html](#) [text](#) [csv](#) [chart](#)
- User I/O "direct path read temp" Waits - Histogram for Cluster (79) [html](#) [text](#) [csv](#) [chart](#)
- System I/O "db file parallel write" Waits - Histogram for Cluster (1485) [html](#) [text](#) [csv](#) [chart](#)
- System I/O "log file parallel write" Waits - Histogram for Cluster (1485) [html](#) [text](#) [csv](#) [chart](#)
- User I/O "direct path write" Waits - Histogram for Cluster (29) [html](#) [text](#) [csv](#) [chart](#)
- System I/O "db file async I/O submit" Waits - Histogram for Cluster (1485) [html](#) [text](#) [csv](#) [chart](#)
- System I/O "control file sequential read" Waits - Histogram for Cluster (1485) [html](#) [text](#) [csv](#) [chart](#)
- User I/O "Disk file Mirror Read" Waits - Histogram for Cluster (1485) [html](#) [text](#) [csv](#) [chart](#)
- User I/O "read by other session" Waits - Histogram for Cluster (30) [html](#) [text](#) [csv](#) [chart](#)

Active Session History (ASH) - Top Timed Events

- ASH Top Timed Events for Cluster past 1 hour (16) [html](#) [text](#) [csv](#) [chart](#)
- ASH Top Timed Events for Instance 1 past 1 hour (16) [html](#) [text](#) [csv](#) [chart](#)
- ASH Top Timed Events for Instance 2 past 1 hour (16) [html](#) [text](#) [csv](#) [chart](#)
- ASH Top Timed Events for Cluster past 4 hours (14) [html](#) [text](#) [csv](#) [chart](#)
- ASH Top Timed Events for Instance 1 past 4 hours (13) [html](#) [text](#) [csv](#) [chart](#)
- ASH Top Timed Events for Instance 2 past 4 hours (7) [html](#) [text](#) [csv](#) [chart](#)
- ASH Top Timed Events for Cluster past 1 day (16) [html](#) [text](#) [csv](#) [chart](#)
- ASH Top Timed Events for Instance 1 past 1 day (16) [html](#) [text](#) [csv](#) [chart](#)
- ASH Top Timed Events for Instance 2 past 1 day (16) [html](#) [text](#) [csv](#) [chart](#)
- ASH Top Timed Events for Cluster past 7 days (16) [html](#) [text](#) [csv](#) [chart](#)
- ASH Top Timed Events for Instance 1 past 7 days (16) [html](#) [text](#) [csv](#) [chart](#)
- ASH Top Timed Events for Instance 2 past 7 days (16) [html](#) [text](#) [csv](#) [chart](#)
- ASH Top Timed Events for Cluster past 31 days (16) [html](#) [text](#) [csv](#) [chart](#)
- ASH Top Timed Events for Instance 1 past 31 days (16) [html](#) [text](#) [csv](#) [chart](#)
- ASH Top Timed Events for Instance 2 past 31 days (16) [html](#) [text](#) [csv](#) [chart](#)

Active Session History (ASH) - Top SQL

- ASH Top SQL for Cluster past 1 hour (16) [html](#) [text](#) [csv](#) [chart](#)
- ASH Top SQL for Instance 1 past 1 hour (16) [html](#) [text](#) [csv](#) [chart](#)
- ASH Top SQL for Instance 2 past 1 hour (16) [html](#) [text](#) [csv](#) [chart](#)
- ASH Top SQL for Cluster past 4 hours (16) [html](#) [text](#) [csv](#) [chart](#)
- ASH Top SQL for Instance 1 past 4 hours (16) [html](#) [text](#) [csv](#) [chart](#)
- ASH Top SQL for Instance 2 past 4 hours (13) [html](#) [text](#) [csv](#) [chart](#)
- ASH Top SQL for Cluster past 1 day (16) [html](#) [text](#) [csv](#) [chart](#)
- ASH Top SQL for Instance 1 past 1 day (16) [html](#) [text](#) [csv](#) [chart](#)
- ASH Top SQL for Instance 2 past 1 day (16) [html](#) [text](#) [csv](#) [chart](#)
- ASH Top SQL for Cluster past 7 days (16) [html](#) [text](#) [csv](#) [chart](#)
- ASH Top SQL for Instance 1 past 7 days (16) [html](#) [text](#) [csv](#) [chart](#)
- ASH Top SQL for Instance 2 past 7 days (16) [html](#) [text](#) [csv](#) [chart](#)
- ASH Top SQL for Cluster past 31 days (16) [html](#) [text](#) [csv](#) [chart](#)
- ASH Top SQL for Instance 1 past 31 days (16) [html](#) [text](#) [csv](#) [chart](#)
- ASH Top SQL for Instance 2 past 31 days (16) [html](#) [text](#) [csv](#) [chart](#)

Active Session History (ASH) - Top Modules and Actions

- ASH Top Modules and Actions for Cluster past 4 hours (6) [html](#) [text](#) [csv](#) [chart](#)
- ASH Top Modules and Actions for Instance 1 past 4 hours (9) [html](#) [text](#) [csv](#) [chart](#)
- ASH Top Modules and Actions for Instance 2 past 4 hours (9) [html](#) [text](#) [csv](#) [chart](#)
- ASH Top Modules and Actions for Cluster past 1 day (12) [html](#) [text](#) [csv](#) [chart](#)
- ASH Top Modules and Actions for Instance 1 past 1 day (16) [html](#) [text](#) [csv](#) [chart](#)
- ASH Top Modules and Actions for Instance 2 past 1 day (16) [html](#) [text](#) [csv](#) [chart](#)
- ASH Top Modules and Actions for Cluster past 7 days (16) [html](#) [text](#) [csv](#) [chart](#)
- ASH Top Modules and Actions for Instance 1 past 7 days (16) [html](#) [text](#) [csv](#) [chart](#)
- ASH Top Modules and Actions for Instance 2 past 7 days (16) [html](#) [text](#) [csv](#) [chart](#)

Active Session History (ASH) - Top Users

- ASH Top Users for Cluster past 4 hours (3) [html](#) [text](#) [csv](#) [chart](#)
- ASH Top Users for Instance 1 past 4 hours (3) [html](#) [text](#) [csv](#) [chart](#)
- ASH Top Users for Instance 2 past 4 hours (3) [html](#) [text](#) [csv](#) [chart](#)
- ASH Top Users for Cluster past 1 day (3) [html](#) [text](#) [csv](#) [chart](#)
- ASH Top Users for Instance 1 past 1 day (3) [html](#) [text](#) [csv](#) [chart](#)
- ASH Top Users for Instance 2 past 1 day (3) [html](#) [text](#) [csv](#) [chart](#)
- ASH Top Users for Cluster past 7 days (16) [html](#) [text](#) [csv](#) [chart](#)
- ASH Top Users for Instance 1 past 7 days (16) [html](#) [text](#) [csv](#) [chart](#)
- ASH Top Users for Instance 2 past 7 days (16) [html](#) [text](#) [csv](#) [chart](#)

Active Session History (ASH)

- AAS per Wait Class for Cluster (1487) [html](#) [text](#) [csv](#) [chart](#)
- AAS per Wait Class for Instance 1 (1494) [html](#) [text](#) [csv](#) [chart](#)
- AAS per Wait Class for Instance 2 (1487) [html](#) [text](#) [csv](#) [chart](#)
- AAS Total per Instance (1487) [html](#) [text](#) [csv](#) [chart](#)
- AAS On CPU per Instance (1472) [html](#) [text](#) [csv](#) [chart](#)

Active Session History (ASH) on Wait Class

- AAS Waiting on Administrative per Instance (0) [html](#) [text](#) [csv](#) [chart](#)
- AAS Waiting on Application per Instance (16) [html](#) [text](#) [csv](#) [chart](#)
- AAS Waiting on Cluster per Instance (62) [html](#) [text](#) [csv](#) [chart](#)
- AAS Waiting on Commit per Instance (16) [html](#) [text](#) [csv](#) [chart](#)
- AAS Waiting on Concurrency per Instance (211) [html](#) [text](#) [csv](#) [chart](#)
- AAS Waiting on Configuration per Instance (10) [html](#) [text](#) [csv](#) [chart](#)
- AAS Waiting on Idle per Instance (50) [html](#) [text](#) [csv](#) [chart](#)
- AAS Waiting on Network per Instance (4) [html](#) [text](#) [csv](#) [chart](#)
- AAS Waiting on Other per Instance (1002) [html](#) [text](#) [csv](#) [chart](#)
- AAS Waiting on Queuing per Instance (6) [html](#) [text](#) [csv](#) [chart](#)
- AAS Waiting on Scheduler per Instance (15) [html](#) [text](#) [csv](#) [chart](#)
- AAS Waiting on System IO per Instance (865) [html](#) [text](#) [csv](#) [chart](#)
- AAS Waiting on User IO per Instance (866) [html](#) [text](#) [csv](#) [chart](#)

Active Session History (ASH) on Top Wait Events

- AAS Waiting on Application "eng; TM - contention" per Instance (7) [html](#) [text](#) [csv](#) [chart](#)
- AAS Waiting on User IO "call smart table scan" per Instance (79) [html](#) [text](#) [csv](#) [chart](#)
- AAS Waiting on User IO "call single block physical read" per Instance (116) [html](#) [text](#) [csv](#) [chart](#)
- AAS Waiting on User IO "direct path read" per Instance (24) [html](#) [text](#) [csv](#) [chart](#)
- AAS Waiting on Other "reliable message" per Instance (171) [html](#) [text](#) [csv](#) [chart](#)
- AAS Waiting on User IO "direct path read temp" per Instance (29) [html](#) [text](#) [csv](#) [chart](#)
- AAS Waiting on System IO "db file parallel write" per Instance (125) [html](#) [text](#) [csv](#) [chart](#)
- AAS Waiting on Scheduler "resmgr:qo queued" per Instance (14) [html](#) [text](#) [csv](#) [chart](#)
- AAS Waiting on User IO "direct path write" per Instance (16) [html](#) [text](#) [csv](#) [chart](#)
- AAS Waiting on Other "Streams AQ: qmn coordinator waiting for slave to start" per Instance (77)
- AAS Waiting on Concurrency "eng; HV - contention" per Instance (4) [html](#) [text](#) [csv](#) [chart](#)
- AAS Waiting on User IO "Disk file Mirror Read" per Instance (49) [html](#) [text](#) [csv](#) [chart](#)

SQL Sample

- 5wxzdw4w2ncy planx(text) sqlmon(zip) sqlash(zip)
- 5ym3bkr4ubk planx(text) sqlmon(zip) sqlash(zip)
- 0bz4hql0mpas planx(text) sqlmon(zip) sqlash(zip) sql(zip)
- 0ru337af7gbw planx(text) sqlmon(zip) sqlash(zip) sql(zip)
- 48kzjnm3583 planx(text) sqlmon(zip) sqlash(zip)
- 0hrz4q4j0ubk planx(text) sqlmon(zip) sqlash(zip)
- d1yz7zu4p1a planx(text) sqlmon(zip) sqlash(zip)
- 5pkr10wnaqpr planx(text) sqlmon(zip) sqlash(zip)
- fyfn30shkix planx(text) sqlmon(zip)
- 8dq0vrmjng7 planx(text) sqlmon(zip)
- 0u2d440897 planx(text) sqlmon(zip)
- 0y4qg46c1q4 planx(text) sqlmon(zip)
- 0tsc477qdk7 planx(text)
- gszh055g04y4 planx(text)
- 03sn309j0v6 planx(text)
- 3h0ap3r08r7 planx(text)

@matheusdba

Pythian
love your data

boeing@pythian.com

Oracle Tools: Database Security

- ORACHECKSUM

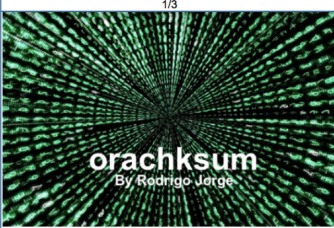
<https://www.dbarj.com.br/en/orachksm-oracle-database-integrity-checker/>

- No DB-Install Required

@matheusdba

orachksm v1811: Oracle Database Integrity Checker for DB 12.1.0.2.0.

Database:orcl License:N. This report covers the time interval between 2018-11-25 and 2018-12-27. Days:31. Timestamp:2018-12-26/11:17:08.

1/3	2/3	3/3
 <p>1a. Objects Integrity Checker</p> <ol style="list-style-type: none">1. SOURCE Checksum Results pie csv html (0)2. VIEW Checksum Results pie csv html (0)3. Objects with Difference html (0) <p>1b. Permissions Checker</p> <ol style="list-style-type: none">4. Table Privs - Extra pie csv html (7)5. Table Privs - Missing pie csv html (0)6. Table Privs (Non-Internals) - Extra pie csv html (0)7. Table Privs (Non-Internals) - Missing pie csv html (0)8. Column Privs - Extra pie csv html (0)9. Column Privs - Missing pie csv html (0)10. System Privs - Extra pie csv html (0)11. System Privs - Missing pie csv html (0)12. Role Privs - Extra pie csv html (0)13. Role Privs - Missing pie csv html (0)14. Role Privs (Non-Internals) - Extra pie csv html (0)15. Role Privs (Non-Internals) - Missing pie csv html (0) <p>1c. RK Checker</p> <ol style="list-style-type: none">16. Synonyms - Extra pie csv html (0)17. Synonyms - Missing pie csv html (37082)18. Java Policy - Extra pie csv html (0)19. Java Policy - Missing pie csv html (0)20. Tablespace Quotas - Extra pie csv html (1)21. Tablespace Quotas - Missing pie csv html (0)22. VPD Policies - Extra pie csv html (0)23. VPD Policies - Missing pie csv html (0)24. Triggers - Extra pie csv html (0)25. Triggers - Missing pie csv html (0) <p>1d. File Checker (Linux only)</p> <ol style="list-style-type: none">26. Files: /rdbms/* Checksum Results pie csv html (0)27. Files: /jdk/* Checksum Results pie csv html (0)28. Files: /javavm/* Checksum Results pie csv html (0)	<p>2a. Scheduler Checker</p> <ol style="list-style-type: none">29. Legacy Jobs - Extra pie csv html (0)30. Legacy Jobs - Missing pie csv html (0)31. Scheduler Jobs - Extra pie csv html (0)32. Scheduler Jobs - Missing pie csv html (1)33. Scheduler Programs - Extra pie csv html (0)34. Scheduler Programs - Missing pie csv html (0) <p>2b. Audit Checker</p> <ol style="list-style-type: none">35. Object Audit Options - Extra pie csv html (0)36. Object Audit Options - Missing pie csv html (0)37. Statement Audit Options - Extra pie csv html (0)38. Statement Audit Options - Missing pie csv html (0)39. Privileges Audit Options - Extra pie csv html (0)40. Privileges Audit Options - Missing pie csv html (0)41. Audit Policies - Extra pie csv html (0)42. Audit Policies - Missing pie csv html (0)43. Audit Policy Columns - Extra pie csv html (0)44. Audit Policy Columns - Missing pie csv html (0)45. Audit Unified Policies - Extra pie csv html (0)46. Audit Unified Policies - Missing pie csv html (0)	<p>3a. Miscellaneous</p> <ol style="list-style-type: none">47. File: 00002_orachksm_orcl_log.txt text (147)48. File: 00003_orachksm_orcl_time_log.txt text (137)49. File: 00004_orachksm_orcl_zip_log.txt text (1517)50. File: 00005_orachksm_orcl_tkprof_sort.txt text (54047)

Oracle Tools: Database Security

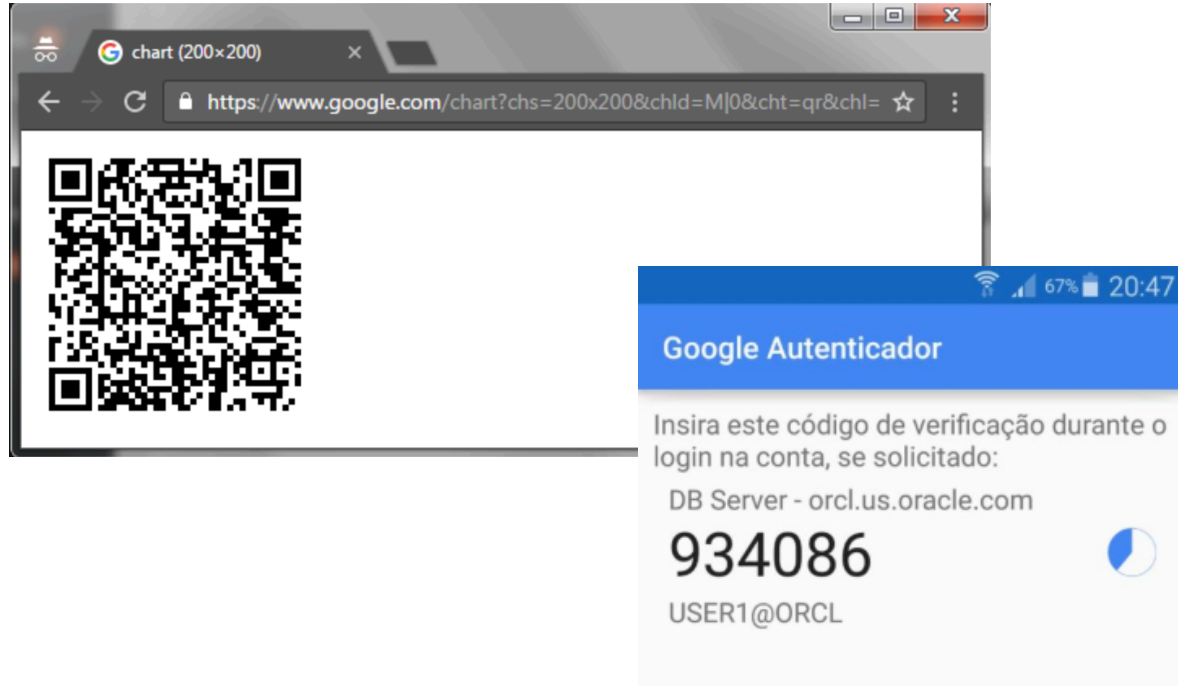
- ORATOTP (2FA) - Oracle Time-based One-time Password

```
SQL> set serveroutput on
SQL> set lines 1000
SQL> exec twofactor.setup;
https://www.google.com/chart?chs=200x200&chld=Ml0&cht=qr&chl=%6F%74%70%61%75%74%68%3A%2F%2F%74%6F%74%70%2F%55%53%45%5
PL/SQL procedure successfully completed.

SQL>
```

Oracle Tools: Database Security

- ORATOTP (2FA)



Oracle Tools: Database Security

- ORATOTP (2FA)

<https://www.dbarj.com.br/oratotp-oracle-time-based-one-time-password/>

```
SQL> conn User1/User1
Connected.
SQL> exec enable_role('APPOBJACCESS');
BEGIN enable_role('APPOBJACCESS'); END;
*
ERROR at line 1:
ORA-20000: User not authenticated in 2Factor.
ORA-06512: at "TOTP.ENABLE_ROLE", line 14
ORA-06512: at line 1

SQL> exec twofactor.authenticate(388648);

PL/SQL procedure successfully completed.

SQL> exec enable_role('APPOBJACCESS');

PL/SQL procedure successfully completed.

SQL> exec twofactor.remember(471508);

PL/SQL procedure successfully completed.

SQL> conn User1/User1
Connected.
SQL> exec enable_role('APPOBJACCESS');

PL/SQL procedure successfully completed.

SQL>
```

Oracle Tools: Database Monitoring



Oracle Tools: Database Monitoring

- Mother Of All Tuning Scripts

MOATS

(Tanel Pöder, Adrian Billington)

SQL>select * from table(moats.top);

- DB-Install Required

```
SQL> select * from table(moats.top);
```

```
MOATS: The Mother Of All Tuning Scripts v1.0 by Tanel Poder & Adrian Billington  
http://www.e2sn.com & http://www.oracle-developer.net
```

```
+ INSTANCE SUMMARY -----+  
| Instance: SOL112          | Execs/s:   29.6 | sParse/s:   9.7 | LIOs/s:   4390.1 | Read MB/s:   1.2 |  
| Cur Time: 01-Mar 09:38:44 | Calls/s:   20.5 | hParse/s:   4.9 | PhyRD/s:   11.0 | Write MB/s:   0.3 |  
| History: 0h 1m 17s       | Commits/s:  0.4 | cHits/s:   25.8 | PhyWR/s:   3.7 | Redo MB/s:   0.0 |  
+-----+  
+ TOP SQL_ID (child#) -----+ TOP SESSIONS -----+ + TOP WAITS -----+ WAIT CLASS --+  
| 100% | 3jbwa65aqmkvm (0) | 30,28,154,142,14 | | 80% | direct path write temp | User I/O |  
| 40% | (0) | | | 20% | log file parallel write | System I/O |  
| 20% | 13sp89mx21tab (0) | 32 | | 20% | db file sequential read | User I/O |  
| 20% | cq8hzxwd7mk8d (0) | 143 | | 20% | control file parallel write| System I/O |  
| | | | | 20% | direct path read | User I/O |  
+-----+ +-----+  
+ TOP SQL_ID -- PLAN_HASH --- SQL TEXT -----+  
3jbwa65aqmkvm 2645209246 SELECT O.ORDER_ID, LINE_ITEM_ID, PRODUCT_ID, UNIT_PRICE, QUANTITY, ORDER_MODE, O  
RDER_STATUS, ORDER_TOTAL, SALES_REP_ID, PROMOTION_ID, C.CUSTOMER_ID, CUST_FIRST_  
  
13sp89mx21tab 644658511 SELECT MOATS_ASH_OT( SYSTIMESTAMP, SADDR, SID, SERIAL#, AUDSID, PADDR, USER#, US  
ERNAME, COMMAND, OWNERID, TADDR, LOCKWAIT, STATUS, SERVER, SCHEMA#, SCHEMANAME,  
  
cq8hzxwd7mk8d 415205717 SELECT VALUE FROM NLS_DATABASE_PARAMETERS WHERE PARAMETER = 'NLS_NCHAR_CHARACTER  
SET'
```


Oracle Tools: Database Monitoring

- **SNAPPER**

(Tanel Pöder)

```
SQL> @snapper ash,stats,gather=s,sinclud=redo_size 5 1 "select sid from v$session"
-- Session Snapper v3.01 by Tanel Poder ( http://www.tanelpoder.com )
-----
      SID, USERNAME , TYPE, STATISTIC , DELTA, HDELTA/SEC,
-----
      20, SYS      , STAT, redo size      , 13376076, 2.68M,
      31, SYS      , STAT, redo size      , 18232, 3.65k,
      143, SYS     , STAT, redo size      , 26796, 5.36k,
-- End of snap 1, end=2010-03-01 11:52:47, seconds=5
-----
-- Sampled Session Activity Profile --
-- Act% | Wait Event | Wait Class | SQL_ID |
-----
69% | log file parallel write | System I/O |
50% | ON CPU | ON CPU | crwqs334cz65x
27% | log buffer space | Configuration | crwqs334cz65x
12% | log buffer space | Configuration | f6f6wxb0st0yp
8% | ON CPU | ON CPU |
8% | db file sequential read | User I/O | gvt8zulkltsff
```

- No DB-Install Required

time of a single session!

Oracle Tools: Database Monitoring

- SNAPPER

(Tanel Pöder)

```
SQL> @snapper stats,gather=s,sinclude=physical%bytes 5 1 "select sid from v$session"
-- Session Snapper v3.01 by Tanel Poder ( http://www.tanelpoder.com )
```

- No DB-Install Required

SID	USERNAME	TYPE	STATISTIC	DELTA	HDELTA/SEC
6	(CKPT)	STAT	physical read total bytes	16384	3.28k
6	(CKPT)	STAT	physical write total bytes	32768	6.55k
6	(CKPT)	STAT	cell physical IO interconnect bytes	49152	9.83k
20	SYS	STAT	physical read total bytes	29360128	5.87M
20	SYS	STAT	cell physical IO interconnect bytes	29360128	5.87M
20	SYS	STAT	physical read bytes	29360128	5.87M
139	SOE	STAT	physical read total bytes	1835008	367k
139	SOE	STAT	cell physical IO interconnect bytes	1835008	367k
139	SOE	STAT	physical read bytes	1835008	367k

-- End of snap 1, end=2010-03-01 12:00:35, seconds=5

time of a single session!

Oracle Tools: Database Monitoring

- EXASNAPPER

(Tanel Pöder)

```
SQL> EXEC :e:= exasnap.end_snap;

PL/SQL procedure successfully completed.

SQL> SELECT * FROM TABLE(exasnap.display_snap(:b, :e));
```

NAME

-- Exadata Snapper v0.7 BETA by Tanel Pöder @ Enkitec - The Exadata Experts (<http://www.enkitec.com>)

DB_LAYER_IO	DB_PHYSIO_BYTES	|#####|	2216 MB	96 MB/sec
DB_LAYER_IO	DB_PHYSRD_BYTES	|#####|	2216 MB	96 MB/sec
DB_LAYER_IO	DB_PHYSWR_BYTES	|	0 MB	0 MB/sec
AVOID_DISK_IO	PHYRD_FLASH_RD_BYTES	|#####|	325 MB	14 MB/sec
AVOID_DISK_IO	PHYRD_STORIDX_SAVED_BYTES	|#####|	1886 MB	81 MB/sec
REAL_DISK_IO	SPIN_DISK_IO_BYTES	|	5 MB	0 MB/sec
REAL_DISK_IO	SPIN_DISK_RD_BYTES	|	5 MB	0 MB/sec
REAL_DISK_IO	SPIN_DISK_WR_BYTES	|	0 MB	0 MB/sec
REDUCE_INTERCONNECT	PRED_OFFLOADABLE_BYTES	|#####|	2216 MB	96 MB/sec
REDUCE_INTERCONNECT	TOTAL_IC_BYTES	|	2 MB	0 MB/sec
REDUCE_INTERCONNECT	SMART_SCAN_RET_BYTES	|	2 MB	0 MB/sec
REDUCE_INTERCONNECT	NON_SMART_SCAN_BYTES	|	0 MB	0 MB/sec
CELL_PROC_DEPTH	CELL_PROC_DATA_BYTES	|#####|	330 MB	14 MB/sec
CELL_PROC_DEPTH	CELL_PROC_INDEX_BYTES	|	0 MB	0 MB/sec
CLIENT_COMMUNICATION	NET_TO_CLIENT_BYTES	|	0 MB	0 MB/sec
CLIENT_COMMUNICATION	NET_FROM_CLIENT_BYTES	|	0 MB	0 MB/sec

- DB-Install Required

Oracle Tools: Database Monitoring

- MOATS 2.0

(Sidney Chen)

```
SQL> SELECT /*+ no_monitor */*
FROM TABLE(moats.top(2));
```

- DB-Install Required

```
+ Database: DEMO | Activity Statistics Per Second | Interval: 5s | Screen Window = 40 * 175 | Ash Height = 13 | SQL Height = 8 | Arraysize should be 80 |-----+
| Inst|CPU| |dl|el|usr%|--sys%| Logons| Execl| Calls| Commts| sParse| hParse| cchits| LIOs(O)| PhyRD| PhyWR| READ MB|Write MB| Redo MB|OffloadKB| ExSI MB|ExFOHts|
| 1| 95.5| 3.7| .81| 21| 71| 121| 01| 81| 01| 41| 01| 17951| 11| 981| 01| 01| .01| 01| 17941|
| 21| 96.0| 3.3| .71| 21| 31| 91| 01| 21| 01| 01| 01| 17181| 11| 941| 01| 01| .01| 01| 17181|
| 31| 95.4| 3.9| .71| 21| 21| 91| 01| 21| 01| 01| 01| 16951| 11| 931| 01| 01| .01| 01| 16961|
| 41| 95.6| 3.8| .51| 21| 31| 91| 01| 21| 01| 01| 01| 17401| 11| 951| 01| 01| .01| 01| 17411|
| 51| 93.4| 5.8| .81| 21| 71| 101| 01| 41| 01| 41| 01| 17031| 21| 931| 01| 01| .01| 01| 17001|
| 61| 96.2| 3.3| .51| 21| 51| 91| 01| 21| 01| 21| 01| 17381| 11| 951| 01| 01| .01| 01| 17361|
| 71| 94.9| 4.4| .71| 21| 61| 91| 01| 21| 01| 41| 01| 17221| 11| 941| 01| 01| .01| 01| 17221|
| 81| 95.2| 4.2| .61| 21| 91| 101| 01| 71| 01| 51| 01| 17031| 11| 931| 01| 01| .01| 01| 17041|
+-----+
Total : 15; 42; 79; 1; 29; 0; 21; 0; 13814; 9; 754; 0; 0; ; 0; 13811;
+-----+
+ AAS| TOP| Instance| Top Events-----+ WAIT CLASS ->
| 5.0| 24%| inst(1)| enq: TX - row lock contenti | Application | 24 | CPU: IO: Others:
| 1.6| 8%| inst(6)| ON CPU | ON CPU | 20 |
| 1.6| 8%| inst(3)| ON CPU | ON CPU | 19 |
| 1.4| 7%| inst(2)| ON CPU | ON CPU | 17 |
| 1.4| 7%| inst(8)| ON CPU | ON CPU | 15 |
| 1.4| 7%| inst(7)| ON CPU | ON CPU | 14 |
| 1.4| 7%| inst(5)| ON CPU | ON CPU | 12 |
| 1.2| 6%| inst(1)| ON CPU | ON CPU | 10 |
| 1.0| 5%| inst(4)| direct path read temp | User I/O | 8 |
| 1.0| 5%| inst(4)| ON CPU | ON CPU | 7 |
| 0.8| 4%| inst(1)| direct path read temp | User I/O | 5 |
| 0.6| 3%| inst(2)| direct path read temp | User I/O | 3 |
| 0.6| 3%| inst(8)| direct path read temp | User I/O | 2 |
| 0 |
+-----+
^ 01:28:46 01:32:21 ^ 01:35:56 ^
+ AAS| TOP| SQL_ID -----+ 1st TOP Event(O) -----+ 2nd TOP Event(O) -----+ Inst_Cnt + TOP SESSIONS (sid@inst_id) -----+
| 16.0| 76%| 0zwb09f6ad0s | ON CPU (69%) | direct path read temp (31%) | 8 | 60003,72802,10408,13785,14104,16701,56701,59707 |
| 5.0| 24%| 2ww0rm04f5q2w | enq: TX - row lock contentio (100%) | | 1 | 80001,24001,132301,86301,36801 |
+-----+
+ TOP SQL_ID -----+ PLAN_HASH_VALUE + SQL TEXT -----+
| 0zwb09f6ad0s | 1547908977 | select /*+ parallel(16) */ count(*) from t |
| 2ww0rm04f5q2w | 2927627013 | update t1 set object_name = upper(object_name) |
+-----+
```

Oracle Tools: Database Monitoring

- **Sqlplus Dashboard For RAC**
(Jagjeet Singh)

```

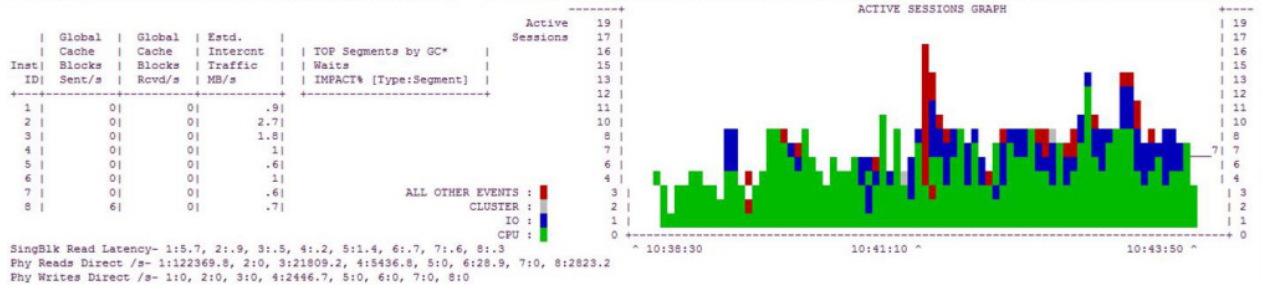
+Inst-----+CPUIDL%+IO%+USR%+SYS%+Tprse/s--+Hprse/s--+PhyWIO/s--+PhyRMB/s--+PhyRIO/s--+PhyRMB/s--+SessLIO/s--+Exec/s--+RedoMB/s+Commit/s--+ExSMB/s--+ExSMB/s--+ExFCRn/s+
|CDRECD011 | 64.3 | 0 | 31.4 | 4.1 | 3 | 0 | 32 | 0 | 394 | 48 | 36621 | 33 | 0 | 0 | 0 | 0 | 0 | 31 |
|CDRECD012 | 91 | 0 | 6.8 | 2.1 | 1982 | 0 | 1890 | 3 | 8 | 0 | 28270 | 5517 | 1 | 1007 | 0 | 0 | 0 | 51 |
|CDRECD013 | 91.5 | 0 | 6.3 | 2 | 2 | 0 | 32 | 0 | 4 | 0 | 12 | 3 | 0 | 0 | 0 | 0 | 0 | 41 |
|CDRECD014 | 78.6 | 0 | 19.9 | 1.3 | 13 | 0 | 54 | 0 | 169 | 25 | 67560 | 41 | 0 | 8 | 0 | 0 | 0 | 68 |
|CDRECD015 | 77.6 | 0 | 19.7 | 2.5 | 2 | 0 | 29 | 0 | 2 | 0 | 11 | 2 | 0 | 0 | 0 | 0 | 2 |
|CDRECD016 | 76.7 | 0 | 21.1 | 2 | 2 | 0 | 42 | 0 | 4 | 0 | 11 | 2 | 0 | 0 | 0 | 0 | 4 |
|CDRECD017 | 49.3 | 0 | 46.7 | 3.8 | 3 | 0 | 33 | 0 | 3 | 0 | 14544 | 12 | 0 | 0 | 0 | 0 | 0 | 3 |
|CDRECD018 | 85.2 | 0 | 12.3 | 2.4 | 2 | 0 | 29 | 0 | 2 | 0 | 24 | 3 | 0 | 0 | 0 | 0 | 2 |
-----
TOTAL : 2009, 0, 2141, 3, 586, 73, 147053, 5613, 1, 1018, 0, 0, 91,
    
```

```

+IMPACT%+TOP WAIT EVENTS+WAIT CLASS+IMPACT%+TOP SQLs (child)+PLAN#+OFFLOAD#+PLAN-CONTRL+TOP SESSIONS+INST:SID+
| 92.9% | ON CPU | ON CPU | 86.2% | c0s22jqujx0w(0) | 129261686 | 0% | 1:885, 7:1269 | |
| 4.3% | cell smart table scan | User I/O | 2.4% | 6pthw9rkmszgp(0) | 200838561 | -105345 | 4:2398 |
| 2.4% | direct path read temp | User I/O | 2.4% | 5rm5y4c66r46a(0) | 205555148 | 0% | SProfile | 4:1769 |
| .5% | enq: KO - fast object checkpoint | Application | 2.4% | 6pnsau2sfq02(0) | 153384643 | 30% | 1:2906 |
| 2.4% | axpfnhr755fp8(0) | 154394268 | 94% | 1:2524 |
    
```

SQL>select * from table(jss.top(40,5));

- **DB-Install Required**

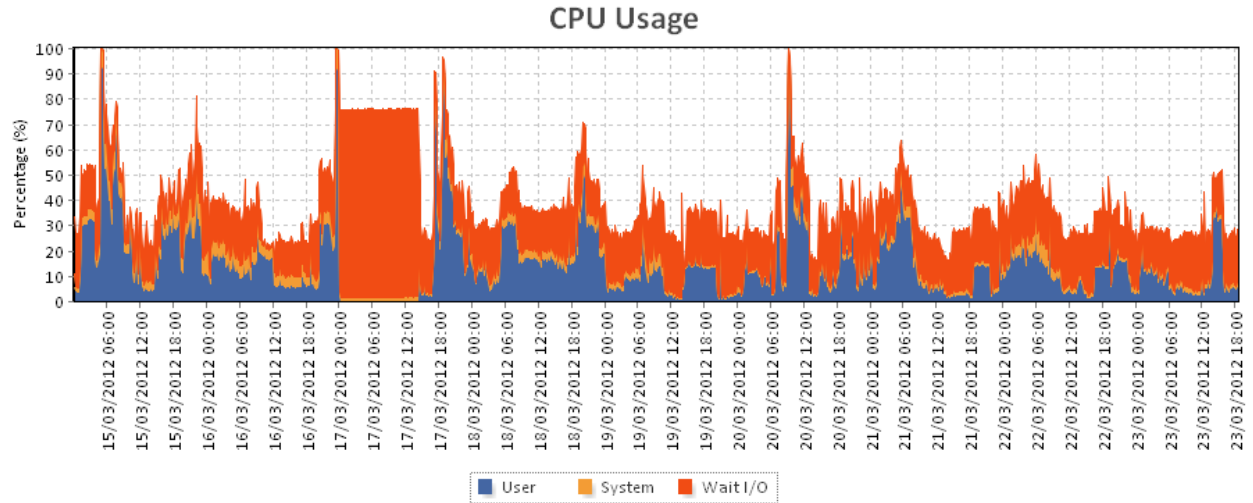


```

+----+SqlID+-----+SqlText+-----+LongstDur+InstCnt+--+Cnt+--+CPU+--+CONC+--+CLUS+--+IO+--+PhyReadMb+
| 5rm5y4c66r46a | SELECT MIN(TO_CHAR(TO_DATE(S2_QVAL, 'YYYY-MM-DD"THH24:MI:SS'), DECODE(LENGTH(S2_QV | 1 | 1 | 0 | 0 | 0 | 0 | | |
| c0s22jqujx0w | SELECT JANUS_PROCESS_SEQ_NO FROM JANUS_PROCESS_QUEUE J, THREAD_STUDIES TS WHERE J.S | 2 | 2 | 0 | 0 | 0 | 0 |
| axpfnhr755fp8 | SELECT ROWID FROM JANUS_PROCESS_QUEUE WHERE PROCESS_STATUS_BIT = '0000000000000000 | 00:03:36 | 1 | 1 | 8.9 | 0 | 0 | 66.1 | 1419 |
| 6pnsau2sfq02 | select rowid from SUPPQUAL_TBL where STUDY_STAGE_BIT = '00000000000000000000000000 | 00:00:20 | 1 | 1 | 8.9 | 0 | 0 | 67 | 771 |
| 6pthw9rkmszgp | SELECT /*+ use_hash(S IT) */ DISTINCT SUPP_ROWID, SUPP_BIT STUDY_STAGE_BIT FROM (SE | 00:04:22 | 1 | 1 | 46.8 | 0 | 0 | 52.7 | 4262 |
    
```

Oracle Tools: Database Monitoring

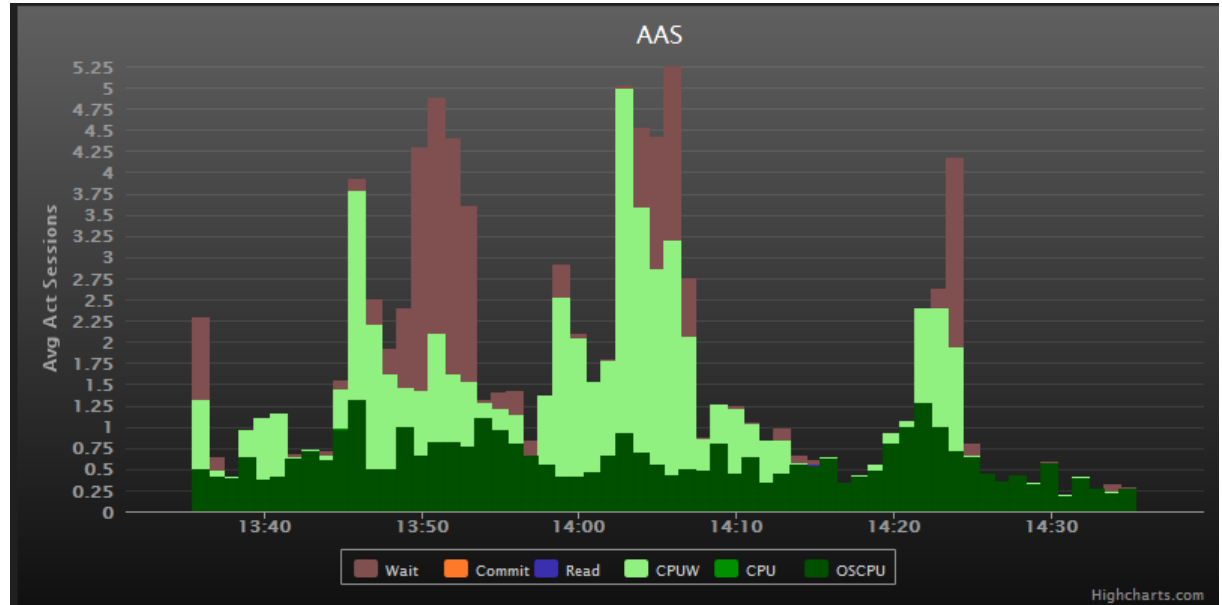
- Mandela
- Windows Client
- No DB-Install Required



Oracle Tools: Database Monitoring

- **AAS Viewer / WEB-ASH / W-ASH**
(Kyle Hailey)

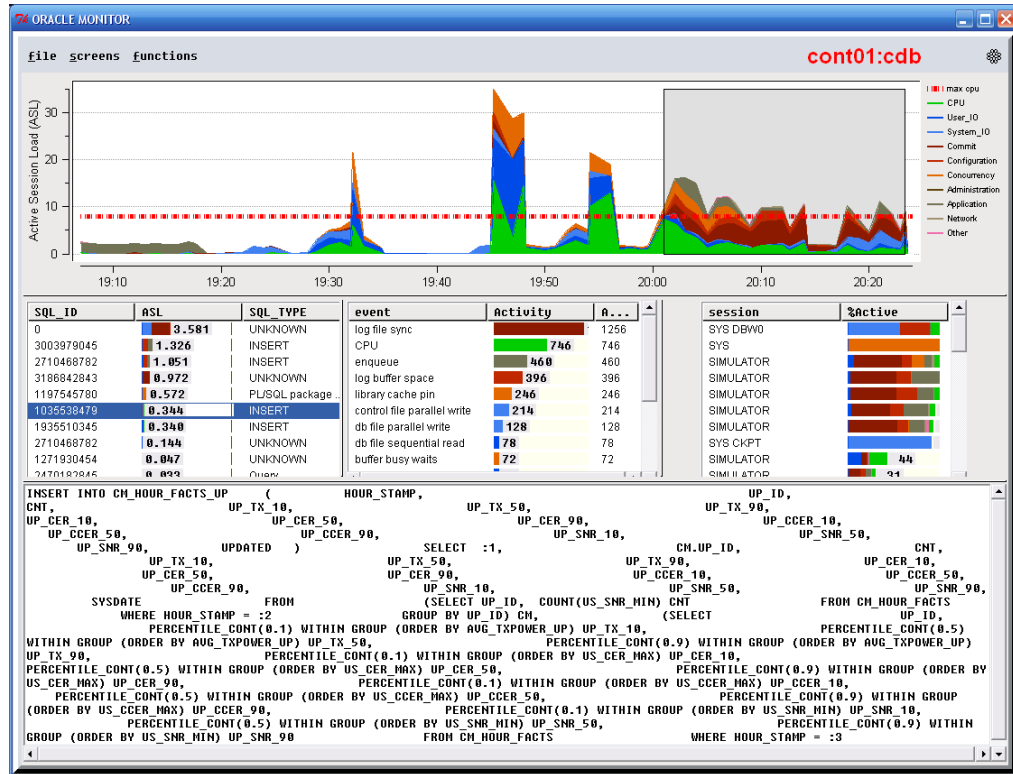
- Current data from DB (ASH):
- OS CPU
- Oracle CPU
- CPU Wait



Oracle Tools: Database Monitoring

- ASHMON (Tom Kyte)

- ASH
- S-ASH



Oracle Tools: Database Monitoring

- Simulated ASH

SASH (S-ASH)

(Kyle Hailey, Marcin Przepiorwski)

```
SQL> ! cat topcpu.sql
set lines 180 pages 180
set numw 12

select * from (
  select to_char(stime,'yyyymmdd') dia
        ,OLD_HASH_VALUE /* ,sql_id */
        ,sum(EXECS) "#exe"
        ,sum(BUF_GETS) "#gets"
        ,sum(cpu_time) cpu
        ,sum(ELAPS_TIME) elap
        ,round(sum(cpu_time)/greatest(sum(EXECS),1)/1000000,2) cpu_xeje
        ,round(sum(ELAPS_TIME)/greatest(sum(EXECS),1)/1000000,2) ELAP_XEJE
        ,round(sum(BUF_GETS)/greatest(sum(EXECS),1),2) GETS_XEJE
        ,row_number() over (partition by to_char(stime,'yyyymmdd') order by sum(cpu_time) desc) cpu_rank
  from (select ssnapid, stime, sql_id, OLD_HASH_VALUE, TEXT_SUBSET
        case when EXECUTIONS < nvl(lag(EXECUTIONS) over (partition by sql_id order by sq.snap_id),0) then EXECUTIONS
            else EXECUTIONS - lag(EXECUTIONS) over (partition by sql_id order by sq.snap_id) END EXECS,
        case when DISK_READS < nvl(lag(DISK_READS) over (partition by sql_id order by sq.snap_id),0) then DISK_READS
            else DISK_READS - lag(DISK_READS) over (partition by sql_id order by sq.snap_id) END DISK_RDS,
        case when BUFFER_GETS < nvl(lag(BUFFER_GETS) over (partition by sql_id order by sq.snap_id),0) then BUFFER_GETS
            else BUFFER_GETS - lag(BUFFER_GETS) over (partition by sql_id order by sq.snap_id) END BUF_GETS,
        case when ROWS_PROCESSED < nvl(lag(ROWS_PROCESSED) over (partition by sql_id order by sq.snap_id),0) then ROWS_PROCESSED
            else ROWS_PROCESSED - lag(ROWS_PROCESSED) over (partition by sql_id order by sq.snap_id) END ROWSP,
        case when CPU_TIME < nvl(lag(CPU_TIME) over (partition by sql_id order by sq.snap_id),0) then CPU_TIME
            else CPU_TIME - lag(CPU_TIME) over (partition by sql_id order by sq.snap_id) END CPU_TIME,
        case when ELAPSED_TIME < nvl(lag(ELAPSED_TIME) over (partition by sql_id order by sq.snap_id),0) then ELAPSED_TIME
            else ELAPSED_TIME - lag(ELAPSED_TIME) over (partition by sql_id order by sq.snap_id) END ELAPS_TIME
        from STATSSQL_SUMMARY sq,
        (SELECT iv.start_snap_id as ssnapid, iv.end_snap_id as esnapid, iv.start_snap_time as stime, iv.end_snap_time as etime
        FROM (SELECT lag(dbid) over (order by dbid, instance_number, snap_id) AS start_dbid, dbid AS end_dbid,
              lag(snap_id) over (order by dbid, instance_number, snap_id) AS start_snap_id, AS end_snap_id,
              lag(instance_number) over (order by dbid, instance_number, snap_id) AS start_inst_nr, instance_number AS end_inst_nr,
              lag(snap_time) over (order by dbid, instance_number, snap_id) AS start_snap_time, snap_time AS end_snap_time,
              lag(startup_time) over (order by dbid, instance_number, snap_id) AS start_startup_time, startup_time AS end_startup_time
        FROM perfstat.stats$snapsbot
        where snap_time between to_date('04/12/2017 00:00','dd/mm/yyyy hh24:mi')
                              and to_date('04/12/2017 23:31','dd/mm/yyyy hh24:mi')
        ) iv
        WHERE iv.start_snap_id IS NOT NULL
        AND iv.start_dbid=iv.end_dbid
        AND iv.start_inst_nr=iv.end_inst_nr
        AND iv.start_startup_time=iv.end_startup_time) i
        where i.esnapid = sq.SNAP_ID
        )
  where EXECS is not null
  group by to_char(stime,'yyyymmdd'), OLD_HASH_VALUE
  order by sum(cpu_time) desc
)
where rownum < 10
order by dia, cpu;
```


Oracle Tools: Database Monitoring

- Simulated ASH
- SASH (S-ASH)

(Kyle Hailey, Marcin Przepiorwski)

```
SQL> ! cat topcpu.sql
set lines 180 pages 180
set numw 12

select * from (
  select to_char(stime,'yyyymmdd') dia
        ,OLD_HASH VALUE /* ,sql_id */
        ,sum(EXECs) "#exe"
        ,sum(BUF_GETS) "#gets"
        ,sum(cpu_time) cpu
        ,sum(ELAPS_TIME) elap
        ,round(sum(cpu_time)/greatest(sum(EXECs),1)/1000000,2) cpu_xeje
        ,round(sum(ELAPS_TIME)/greatest(sum(EXECs),1)/1000000,2) ELAP_XEJE
        ,round(sum(BUF_GETS)/greatest(sum(EXECs),1),2) GETS_XEJE
  from ash
  where sql_id = 'fb3f3wv111jja'
  group by dia
)
```

```
SQL> sta topcpu1 fb3f3wv111jja
execution stats for a particular SQL over the last 30 days
old 42:          and sql_id='&1'
new 42:          and sql_id='fb3f3wv111jja'
```

DIA	#exe	#gets	CPU	ELAP	CPU_XEJE	ELAP_XEJE	GETS_XEJE
20171109	2011831	11218510919	62369255000	63175197750	.03	.03	5576.27
20171114	2029966	10694907888	60567317000	61336237358	.03	.03	5268.52
20171115	1840535	9849209157	55549764000	56187889393	.03	.03	5351.28
20171118	2755267	6354156536	76181329000	77239116115	.03	.03	2306.19
20171120	2824217	9819744053	76690055000	7776287136	.03	.03	3476.98
20171129	2981041	14553068394	83347125000	84441484048	.03	.03	4881.87
20171201	2193389	17396098730	111876188000	133704393622	.05	.06	7931.15
20171204	2195612	19715908899	162824310000	306643690676	.07	.14	8979.69
20171205	4835847	23091836907	315720533000	521154772097	.07	.11	4775.14

```
9 rows selected.

)
)
where rownum < 10
order by dia, cpu;
```

Oracle Tools: **Server** Level Diag/Monitor



Oracle Tools: Server Level Diag/Monitor

- ORATOP

oratom - Utility for Near Real-time Monitoring of Databases, RAC and Single Instance (Doc ID 1500864.1)

./oratom

- Installed with TFA



```
Oracle 11g - Primary 16:06:06 up: 24d, 1 ins, 565 sn, 17 us, 94G mt, 0% fra, 6 er, 24.3% db
ID %CPU LOAD %DCU AAS ASC ASI ASW ASP AST UST MBPS IOPS IORL LOGR PHYR PHYW %FR PGA TEMP UTPS UCPS SSRT DCTR DWTR %DBT
1 33 44 4 15.5 1 12 3 0 15 564 161 8.6k 3m 382k 3.2k 5.9k 6 2.0G 2.1G 8 1.9k 4m 18 81 100
```

EVENT (RT)		TOTAL WAITS	TIME(s)	AVG MS	PCT	WAIT CLASS
DB CPU			54411		3	
db file parallel write		3.685E+09	2070273	0	92	System I/O
db file sequential read		26694286	73722	0	3	User I/O
ARCH wait on SENDREQ		7287162	54411	0	2	Network
log file sequential read		6456731	46700	0	2	System I/O

ID	SID	SPID	USERNAME	PROGRAM	SRV	SERVICE	PGA	SQLID/BLOCKER	OPN	E/T	STA	STE	WAIT CLASS	EVENT/*LATCH	W/T
1	3010	39301			DED		2.4M	1dkhwzqrxbb23	INS	0	ACT	WAI	Network	SQL*Net more data fro	27m
1	1487	20280			DED		36M	5zdqzrvfjsjkn0	DEL	595s	ACT	CPU	User I/O	cpu runqueue	13m
1	3423	52908			DED		1.4M	51699srz2pzb2	INS	0	ACT	I/O	User I/O	db file sequential re	12m
1	474	4770	B/G	ARC1	DED	SYSSBAC	42M			24d	ACT	WAI	System I/O	log file sequential r	9m
1	902	52874			DED		38M	galv3uwjc7c1y	SEL	0	ACT	I/O	User I/O	db file sequential re	9m
1	3543	22640			DED		2.5M	51699srz2pzb2	INS	1.0s	ACT	I/O	User I/O	db file sequential re	8m
1	3486	22638			DED		11M	7hk85dm6jwvn	SEL	0	ACT	I/O	User I/O	db file parallel read	8m
1	1723	22626			DED		92M	569xyqzg2faf2	DEL	0.5h	ACT	I/O	User I/O	db file sequential re	7m
1	2080	12955			DED		2.1M	1576pk39p3qy7	INS	1.0s	ACT	WAI	Network	SQL*Net more data fro	7m
1	2425	6484			DED		106M	gyyan2hp26a0f	DEL	0.5h	ACT	I/O	User I/O	db file sequential re	4m
1	1364	23863			DED		13M	a7xq2vz67w15p	DEL	8.0s	ACT	I/O	User I/O	db file sequential re	3m
1	1075	31823			DED		2.1M	51699srz2pzb2	INS	1.0s	ACT	I/O	User I/O	db file sequential re	3m
1	1004	3479	R/G		DED	SYSSBAC	11M			24d	ACT	WAI	System I/O	db file parallel writ	1m
1	651	75116			DED		2.3M	05gvkfjsjzdln	SEL	1.5h	ACT	I/O	User I/O	db file sequential re	1m
1	650	3467	B/G	DBW1	DED	SYSSBAC	11M			24d	ACT	WAI	System I/O	db file parallel writ	1m
1	2601	58473	B/G	DW00	DED	SYSSBAC	1.9G	84uk3fcvtjmdm	INS	0.7h	ACT	CPU	User I/O	cpu runqueue	1m
1	1782	22435			DED		2.4M	3bbmq08z4t8	INS	0	ACT	CPU	User I/O	cpu runqueue	615u
1	3482	37030			DED		10M	61m3r5v466y8t	DEL	259s	ACT	I/O	User I/O	db file sequential re	587u
1	591	3465	B/G	DBW0	DED	SYSSBAC	11M			24d	ACT	WAI	System I/O	db file parallel writ	461u
1	2319	59702			DED		4.7M	gt4u0zgalbr3p	DEL	49s	ACT	I/O	User I/O	db file sequential re	111u
1	3086	92045	B/G	NSA2	DED	SYSSBAC	30M			1.1d	ACT	CPU	Network	LNS wait on SENDREQ	88u
1	827	3473	B/G	DBW4	DED	SYSSBAC	12M			24d	ACT	WAI	System I/O	db file parallel writ	87u
1	2598	72012	B/G	ARC0	DED	SYSSBAC	53M			9.1d	ACT	CPU	Network	ARCH wait on SENDREQ	74u
1	2011	88604	B/G	ARC3	DED	SYSSBAC	51M			16d	ACT	CPU	Network	ARCH wait on SENDREQ	63u
1	768	3471	B/G	DBW3	DED	SYSSBAC	12M			24d	ACT	WAI	System I/O	db file parallel writ	60u
1	195	74970	B/G	ARC2	DED	SYSSBAC	53M			16d	ACT	CPU	Network	ARCH wait on SENDREQ	45u
1	886	3475	B/G	DBW5	DED	SYSSBAC	11M			24d	ACT	WAI	System I/O	db file parallel writ	40u
1	945	3477	B/G	DBW6	DED	SYSSBAC	11M			24d	ACT	WAI	System I/O	db file parallel writ	19u
1	1478	5998	SYS	AS05	DED	SYSSUSE	492M			24d	ACT	CPU	Concurrnc	cpu runqueue	7u
1	1300	5960	SYS	AS02	DED	SYSSUSE	500M	9uy589cxu6adm	SEL	24d	ACT	CPU	Concurrnc	cpu runqueue	7u
1	709	3469	B/G	DBW2	DED	SYSSBAC	11M			24d	ACT	WAI	System I/O	db file async I/O sub	0

Oracle Tools: Server Level Diag/Monitor

- ATOP
 - NETATOP

ATOP - robin		2012/10/25		13:08:11		y-----		10s elapsed							
PRC	sys	1.16s	user	1.40s	#proc	330	#tslpi	450	#tslpu	0	#zombie	0	#exit	0	
CPU	sys	10%	user	12%	irq	0%	idle	376%	wait	2%	curf	1.20GHz	curscal	49%	
CPL	avg1	0.03	avg5	0.07	avg15	0.02	csw	66844	intr	49036			numcpu	4	
MEM	tot	3.5G	free	767.6M	cache	1.8G	buff	329.2M	slab	368.1M	shmem	50.0M	shrss	6.9M	
SWP	tot	4.0G	free	2.9G							vmcom	2.2G	vmlim	5.8G	
DSK		sda	busy	2%	read	0	write	27	MBr/s	0.00	MBw/s	0.67	avio	7.85 ms	
NET	transport	tcpi	30862	tcpo	21031	udpi	1	udpo	0	tcpao	0	tcpo	0	tcppo	0
NET	network	ipi	30865	ipo	21031	ipfrw	0	deliv	30863	icmpi	0	icmpo	0	icmpo	0
NET	p5p1	28%	pcki	30862	pcko	21029	si	28 Mbps	so	5571 Kbps	erri	0	erro	0	

PID	TID	TCPRCV	TCPRASZ	TCPSND	TCPSASZ	UDPRCV	UDPRASZ	UDPSND	UDPSASZ	BANDWI	BANDWO	NET	CMD	1/3
24858	-	20163	1438	10328	71	0	0	0	0	23 Mbps	588 Kbps	70%	ssh	
24970	-	10703	582	10703	582	0	0	0	0	4983 Kbps	4983 Kbps	30%	attract	
24857	-	0	0	0	0	0	0	0	0	0 Kbps	0 Kbps	0%	scp	
3011	-	0	0	0	0	0	0	0	0	0 Kbps	0 Kbps	0%	Xorg	
2213	-	0	0	0	0	0	0	0	0	0 Kbps	0 Kbps	0%	cgrulesengd	
24755	-	0	0	0	0	0	0	0	0	0 Kbps	0 Kbps	0%	atop	
3550	-	0	0	0	0	0	0	0	0	0 Kbps	0 Kbps	0%	multiload-appl	
3550	3550	0	0	0	0	0	0	0	0	0 Kbps	0 Kbps	0%	multiload-appl	
18308	-	0	0	0	0	0	0	0	0	0 Kbps	0 Kbps	0%	gnome-terminal	
18308	18308	0	0	0	0	0	0	0	0	0 Kbps	0 Kbps	0%	gnome-terminal	
3554	-	0	0	0	0	0	0	0	0	0 Kbps	0 Kbps	0%	clock-applet	
3554	3554	0	0	0	0	0	0	0	0	0 Kbps	0 Kbps	0%	clock-applet	
24925	-	0	0	0	0	0	0	0	0	0 Kbps	0 Kbps	0%	gnome-power-ma	
2184	-	0	0	0	0	0	0	0	0	0 Kbps	0 Kbps	0%	irqbalance	
4	-	0	0	0	0	0	0	0	0	0 Kbps	0 Kbps	0%	ksoftirqd/0	

<https://www.atoptool.nl/>

Oracle Tools: Server Level Diag/Monitor

- Perfmon
(Yong)

- top + wait events

```
#!/bin/bash
#perfmon.sh: Oracle session and OS process correlated performance monitoring script.
#Example assumes a 4 node RAC where hosts are named like host[1-4] and this script runs on host4.

export ORACLE_SID=ORCL
export ORACLE_HOME=/u01/app/oracle/product/11.2.0/db
export PATH=$ORACLE_HOME/bin:/usr/bin:/bin
TIMEOUT=10 #this many seconds allowed to connect to another host of RAC
cd /home/oracle/scripts/perfmon

#LCDTRH=300 #line count delta threshold; crude logic to detect massive waits
#RECIPIENT=12345678@example.com #pager through email
#LCBF=$(wc -l perfmon.log | awk '{print $1}') #line count before run

date +%Y%m%d%H%M%S" >> perfmon.log

for i in 1 2 3; do
echo -e "\nhost${i}\n" >> perfmon.log
ssh host${i} "LINES=15 COLUMNS=132 CPULOOP=1 top -cbn1 | sed 's/ *$//'" >> perfmon.log &
#On RHEL7 or for top 3.3, change the above line to:
#ssh host${i} "LINES=15 COLUMNS=132 top -wcbn2 | grep -A14 '^top -' | tail -15" >> perfmon.log &
p=$!
(sleep $TIMEOUT; kill -1 $p) &
k=$!
wait $p
exit=$?
#Normal exits are 0..127, signals are 128+signo
case $exit in
129) echo '(timed out)' >&2;;
*) kill $k;; # Kill the killer.
)
osac
done
echo -e "\nhost4\n" >> perfmon.log #This script runs locally on host4.
LINES=15 COLUMNS=132 CPULOOP=1 top -cbn1 | sed 's/ *$//'" >> perfmon.log
#On RHEL7 or for top 3.3, change the above line to:
#LINES=15 COLUMNS=132 top -wcbn2 | grep -A14 '^top -' | tail -15 >> perfmon.log

#Feel free to exclude other unwanted events in the query
sqlplus -S / as sysdba <<EOF >> perfmon.log
set pagesize 1000 linesize 200 feedback 0
col i for 9
col sid for 9999
col evnt for a30
col usr for a15
col mach for a20
col prog for a20
col spid for a5
select a.inst_id i,sid,substr(a.username,1,15) usr,substr(machine,1,20) mach,substr(a.program,1,20) prog,sql_id,prev_sql_id,substr(event,1,30) evnt,p1,p2,p3,spid,pga_alloc_mem pga
from gv\$session a,gv\$process b where a.paddr=b.addr and a.inst_id=b.inst_id and event!='PX Deq: reop credit' and wait_class='Idle' order by 1,3;
exit
EOF

#LCAF=$(wc -l perfmon.log | awk '{print $1}') #line count after run
#((( LCAF - LCBF ) > LCDTRH )) && mail -s "Possible massive waits on $ORACLE_SID" $RECIPIENT < /dev/null
```

Oracle Tools: Server Level Diag/Monitor

- Perfmon

(Yong)

• top + wait e

```
#!/bin/bash
#perfmon.sh: Oracle session and OS process correlated performance monitoring script.
#Example assumes a 4 node RAC where hosts are named like host[1-4] and this script runs on host4.

20080327124601
...
host2

top - 12:46:04 up 131 days, 11:49, 1 user, load average: 1.17, 1.13, 1.25
Tasks: 312 total, 4 running, 308 sleeping, 0 stopped, 0 zombie
Cpu(s): 13.7% us, 3.9% sy, 0.0% ni, 73.5% id, 8.5% wa, 0.1% hi, 0.3% si
Mem: 8293488k total, 7828272k used, 465216k free, 332448k buffers
Swap: 8388576k total, 2264096k used, 6124480k free, 3918592k cached

  PID USER      PR  NI  VIRT  RES  SHR  S %CPU  %MEM    TIME+  COMMAND
 28543 oracle    22   0 5233m 141m 129m R   83  1.7   0:00.54 oracletest (LOCAL=NO)
 8272  oracle    15   0 5449m 2.3g 2.1g D   22 29.6 943:24.05 ora_p299_test
10098 oracle    16   0 5231m 2.2g 2.2g D   7 27.9 28:15.04 oracletest (LOCAL=NO)
28548 root      16   0 4976 2912 2320 S   3  0.0   0:00.01 /bin/sh /etc/init.d/init.cssd fatal
 4760 oracle    15   0 5228m 108m 99m S   3  1.3   0:00.89 oracletest (LOCAL=NO)
 8302 oracle    15   0 5231m 102m 91m S   2  1.3   0:01.75 oracletest (DESCRIPTION=(LOCAL=YES)(ADDRESS=(PROTOCOL=beq)))
 8451 oracle    15   0 5231m 227m 216m S   1  2.8   0:07.85 oracletest (LOCAL=NO)

  I  SID  USR          MACH                PROG                SQL_ID          PREV_SQL_ID  EVNT                P1          P2          P3  SPID          PGA
-----
  2  755  CB           EXAMPLE\APPSERVER01 wwwpx.exe         9sslvsmq53ucs  fqwpnzvugsgs6  gc cr request      173         10806         1  28543         8188249
  2  626  ABC_USER    EXAMPLE\APPSERVER2  abc.exe          8jt2wr0d0r7tg  cq7an5qmrblbq  gc cr request      44          128581        1  10098         5132225
  2  554  SYS         host1.example.com   oracle@host2.exa... db file scattered read      3           333341        16  8272         217796545
  3  816  LOGISTICS_USER ECP\CSNETTRANS     wwwpx.exe         2aj1gub45fjs5  f4gkzswdd78gk  db file sequential read    53           6110         1  29580         6025561

...

sqlplus -s / as sysdba >>> @perfmon.log
set pagesize 1000 linesize 200 feedback 0
col i for 9
col sid for 9999
col evnt for a30
col usr for a15
col mach for a20
col prog for a20
col spid for a5
select a.inst_id i,sid,substr(a.username,1,15) usr,substr(machine,1,20) mach,substr(a.program,1,20) prog,sql_id,prev_sql_id,substr(event,1,30) evnt,p1,p2,p3,spid,pga_alloc_mem pga
from gv$session a,gv$process b where a.paddr=b.addr and a.inst_id=b.inst_id and event!='PX Deq: reap credit' and wait_class='Idle' order by 1,3;
exit
EOF

#LCAF=$(wc -l perfmon.log | awk '{print $1}') #line count after run
#((( LCAF - LCBF ) > LCDTHR )) && mail -s "Possible massive waits on $ORACLE_SID" $RECIPIENT < /dev/null
```

Oracle Tools: Server Level Diag/Monitor

- AMON

(Andrej Simon)

```
Host: oel154db1 Instance: b01 User: SYS Delay: 10 sec
Page: 1/2 Order by SPID($), SID(#), user name($)
Sessions: 30 (22 active). Log. Rds: 100007. Ph. Rds: 0. Ph. Wrts: 0
DB time(s): 18.17. DB CPU(s): 7.43. Backgr. elapsed time(s): 0.19.
```

SID, Ser#	SPID	User	S	Program	CPU (sec.)	Logical Reads	Physical Reads
139,18	3281	ANDREJ	I	topcpu@oel154db1.vbox..V1-V3)	1.00	30322	0
138,1934	3287	ANDREJ	I	topcpu@oel154db1.vbox..V1-V3)	1.20	19449	0
137,4823	3284	ANDREJ	I	topcpu@oel154db1.vbox..V1-V3)	0.72	19141	0
133,4963	3293	ANDREJ	I	topcpu@oel154db1.vbox..V1-V3)	1.42	19098	0
134,6540	3296	ANDREJ	I	topcpu@oel154db1.vbox..V1-V3)	1.24	15909	0
135,10070	3290	ANDREJ	I	topcpu@oel154db1.vbox..V1-V3)	0.92	12648	0
156,5	3022	SYS	A	amon@oel154db1.vbox.d..V1-V3)	0.08	75	0
146,3	3018		A	oracle@oel154db1.vbox..(CJQ0)	0.02	46	0
136,9	3216	ANDREJ	I	sqlplus@oel154db1.vbo..V1-V3)	0.00	0	0
140,3053	3185	ANDREJ	I	sqlplus@oel154db1.vbo..V1-V3)	0.00	0	0
142,3	3026		A	oracle@oel154db1.vbox..(q001)	0.00	0	0
143,7	3271		A	oracle@oel154db1.vbox..(W000)	0.00	0	0
144,3	3024		A	oracle@oel154db1.vbox..(q000)	0.00	0	0
149,1	3002		A	oracle@oel154db1.vbox..(SMCO)	0.00	0	0
151,1	2998		A	oracle@oel154db1.vbox..(FBDA)	0.00	0	0

* S - Session status (&-active, I-inactive, K-killed).

Oracle Tools: Server Level Diag/Monitor

- AMON

(Andrej Simon)

```
Host: oel154db1 Instance: b01 User: SYS Delay: 10 sec
Page: 1/2 Filter Status Active/All Sessions(i), Type User/All Sessions(6)
Page: Sessions: 30 (22 active). Log. Rds: 109613. Ph. Rds: 0. Ph. Wrts: 0
Sess: DB time(s): 15.69. DB CPU(s): 8.79. Backgr. elapsed time(s): 0.21.
DB t:
```

SID, Ser#	SPID	User	S	Program	CPU (sec.)	Redo Size	Physical Writes
134,6540	3296	ANDREJ	I	topcpu@oel154db1.vbox..V1-V3)	1.00	248.4KB	0
139,139,	135,10070	3290	ANDREJ	I topcpu@oel154db1.vbox..V1-V3)	0.97	248.3KB	0
138,138,.	133,4963	3293	ANDREJ	I topcpu@oel154db1.vbox..V1-V3)	0.97	248.2KB	0
137,137,.	137,4823	3284	ANDREJ	I topcpu@oel154db1.vbox..V1-V3)	0.87	248.2KB	0
133,133,.	139,18	3281	ANDREJ	I topcpu@oel154db1.vbox..V1-V3)	0.79	212.6KB	0
134,134,.	138,1934	3287	ANDREJ	I topcpu@oel154db1.vbox..V1-V3)	1.01	208.3KB	0
135,135,.	156,5	3022	SYS	A amon@oel154db1.vbox.d..V1-V3)	0.10	0	0
156,156,.	146,3	3018		A oracle@oel154db1.vbox..(CJQ0)	0.02	0	0
146,146,.	136,9	3216	ANDREJ	I sqlplus@oel154db1.vbo..V1-V3)	0.00	0	0
136,136,.	140,3053	3185	ANDREJ	I sqlplus@oel154db1.vbo..V1-V3)	0.00	0	0
140,140,.	142,3	3026		A oracle@oel154db1.vbox..(q001)	0.00	0	0
142,142,.	143,7	3271		A oracle@oel154db1.vbox..(W000)	0.00	0	0
143,143,.	144,3	3024		A oracle@oel154db1.vbox..(q000)	0.00	0	0
144,144,.	149,1	3002		A oracle@oel154db1.vbox..(SMCO)	0.00	0	0
149,149,.	151,1	2998		A oracle@oel154db1.vbox..(FBDA)	0.00	0	0
151,151,.							

* S - Session status (A-active, I-inactive, K-killed).

Oracle Tools: Server Level Diag/Monitor

- AMON

(Andrej Simon)

```
Host: oel54db1 Instance: b01 User: SYS Delay: 10 sec
Page: 1/2 Filter Status Active/All Sessions(1), Type User/All Sessions(6)
Host: oel54db2 Instance: +ASM User: SYS Delay: 10 sec
Page: 1/1 Order by av. read time(3), av. write time(4), reads/sec(5)
I/O statistics for ASM clients.
Inst. DG Disk Bytes/s Bytes/s Av.Read Av.Wrt. Reads Writes Err
          Read Written Time (ms) Time (ms) Per sec Per sec
a01 1 1 20.8KB 12.8KB 0.0 0.0 1.3 0.8 0
b01 4 7 8.0KB 6.4KB 0.0 0.0 0.5 0.4 0
a01 1 0 6.4KB 17.0KB 0.0 0.0 0.4 2.0 0
b01 4 1 4.8KB 0 0.0 0.0 0.3 0.0 0
a01 2 0 1.6KB 29.8KB 0.0 35.7 0.1 2.8 0
b01 4 3 819.20 0 0.0 0.0 0.1 0.0 0
b01 4 0 0 6.4KB 0.0 0.0 0.0 0.4 0
b01 4 5 0 6.4KB 0.0 0.0 0.0 0.4 0
b01 3 0 0 6.4KB 0.0 0.0 0.0 0.4 0

* ms - milliseconds, Err - failed I/O requests since startup

* S - Session status (A-active, I-inactive, K-killed).
```

physical
writes

Oracle Tools: Server Level Diag/Monitor

- AMON

(Andrej Simon)

```
Host: oel54db1 Instance: b01 User: SYS Delay: 10 sec
Host: oel54db2 Instance: +ASM User: SYS Delay: 10 sec
Page: 1/1 Order by bytes/sec read(1), bytes/sec written(2)
ASM disks statistics.
Disk DG Bytes/s Bytes/s Av.Read Av.Wrt. Reads Writes Err
Name Read Written Time (ms) Time (ms) Per sec Per sec
DISK02 1 29.6KB 33.9KB 0.0 0.0 2.7 3.6 0
DISK01 1 15.2KB 1.2KB 0.0 0.0 1.7 0.3 0
DISK03 2 0 35.0KB 0.0 0.0 0.0 3.9 0
a01
b01
a01
b01
a01
b01
b01
b01
b01
b01
* ms
* S - Session status (A-active, I-inactive, K-killed).
```

Oracle Tools: Server Level Diag/Monitor

- **Nigel's Monitor - Nmon**
(Nigel Griffiths)

```
nmon-16a [H for help] Hostname=vm26 Refresh= 2secs 08:53.14
-----
          For help type H or ...
          nmon -? - hint
          nmon -h - full details

          To stop nmon type q to Quit

          -----

          DISTRIB_DESCRIPTION="Ubuntu 15.04"
          PowerVM POWER8 (architected), altivec supported CHRP IBM,8284-22A
          PowerVM Entitlement=1.00 VirtualCPUs=2 LogicalCPUs=16
          PowerVM SMT=8 Capped=0
          Processor Clock=3425.000000MHz Little Endian

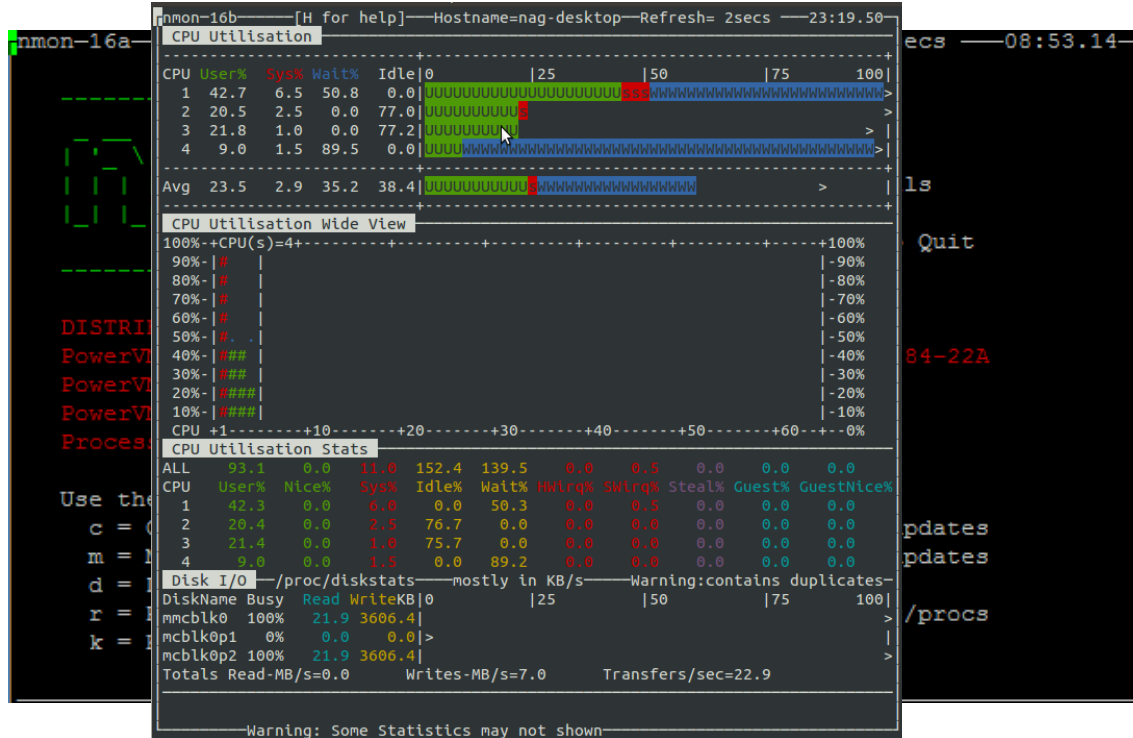
          Use these keys to toggle statistics on/off:
          c = CPU          l = CPU Long-term      - = Faster screen updates
          m = Memory       V = Virtual memory     + = Slower screen updates
          d = Disks        n = Network           j = File Systems
          r = Resource     N = NFS                . = only busy disks/procs
          k = Kernel       t = Top-processes     h = more options
                               q = Quit
```

- IBM AIX, ported to Linux

Oracle Tools: Server Level Diag/Monitor

- Nigel's Monitor - Nmon
(Nigel Griffiths)

- IBM AIX, ported to Linux



Oracle Tools: Server Level Diag/Monitor

- dstat

(Dag Wieers)

- Python
- Output CSV
- Many Plugins

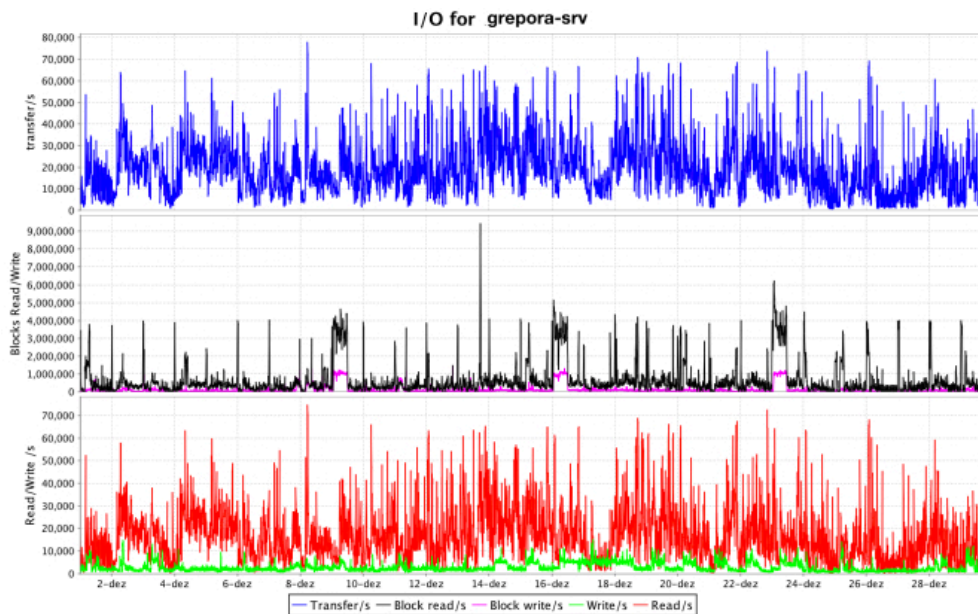
```
[root@vmsserver62 ~]# dstat -n -m -y -t -p -d -c -l
net/total- ----memory-usage-----system-- ----time----- --procs--- -dsk/total- ----total-cpu-usage---- ---load-avg---
recv  send| used  buff  cach  free| int  csw | date/time | run blk new| read  writ|usr  sys  idl  wai  hiq  siq| 1m  5m 15m
  0    0 |1267M 166M 371M 206M| 398  532 |15-11 16:01:55|  0  0  0| 305B  11k|  0  0 100  0  0  0|  0  0  0
120B 1038B|1267M 166M 371M 206M| 975  475 |15-11 16:01:56|  1  0  0|  0  0 |  0  0 100  0  0  0|  0  0  0
 60B  442B|1267M 166M 371M 206M| 986  433 |15-11 16:01:57|  1  0  0|  0  0 |  0  0 100  0  0  0|  0  0  0
 60B  442B|1267M 166M 371M 206M| 974  425 |15-11 16:01:58|  1  0  0|  0  0 |  0  0 100  0  0  0|  0  0  0
 60B  548B|1267M 166M 371M 206M| 988  445 |15-11 16:01:59|  0  0  0|  0  0 |  0  0 100  0  0  0|  0  0  0
 60B  532B|1267M 166M 371M 206M| 973  430 |15-11 16:02:00|  0  1  0|  0  0 |  0  0  99  1  0  0|  0  0  0
180B  548B|1267M 166M 371M 206M| 991  445 |15-11 16:02:01|  0  0  0|  0  0 |  0  0 100  0  0  0|  0  0  0
390B  621B|1267M 166M 371M 206M| 978  542 |15-11 16:02:02|  0  0  6|  0  0 |  0  0  99  1  0  0|  0  0  0
 60B  548B|1267M 166M 371M 206M| 990  447 |15-11 16:02:03|  0  0  0|  0  0 |  0  0 100  0  0  0|  0  0  0
120B  532B|1267M 166M 371M 206M| 978  420 |15-11 16:02:04|  0  0  0|  0  0 |  0  0 100  0  0  0|  0  0  0
 60B  532B|1267M 166M 371M 206M| 988  447 |15-11 16:02:05|  0  0  0|  0  0 |  0  0 100  0  0  0|  0  0  0
 60B  532B|1267M 166M 371M 206M| 972  435 |15-11 16:02:06|  0  0  0|  0  0 |  0  0 100  0  0  0|  0  0  0
 60B  532B|1267M 166M 371M 206M| 995  459 |15-11 16:02:07|  0  0  0|  0  0 |  0  0 100  0  0  0|  0  0  0
```

www.itlsa.com

Oracle Tools: Server Level Diag/Monitor

- kSar

- A. Collect from current server.
- B. Extract from other server using direct SSH connection.
- C. Use a Generated SAR File.
- D. Run Java tool from Client Server.



<https://grepora.com/2018/01/17/ksar-generating-graphs-from-sar-reports/>

Oracle Tools: **Benchmarking**



Oracle Tools: I/O Benchmarking

- dd

```
$ time sh -c "dd if=/dev/zero of=dd-test-file bs=8k count=1000000 && sync"
1000000+0 records in
1000000+0 records out

real    0m18.42s
user    0m0.70s
sys     0m16.77s
$ ls -l ddfile
-rw-r--r--  1 oracle   oinstall   8192000000 Nov  2 16:11 dd-test-file
```


Oracle Tools: I/O Benchmarking

- Oracle IO Numbers (ORION)

```
# $ORACLE_HOME/bin/orion -run normal -testname ob-test
ORION: ORacle IO Numbers -- Version 12.1.0.2.0
ob-test_20140828_1804
Calibration will take approximately 190 minutes.
Using a large value for -cache_size may take longer.

Maximum Large MBPS=1672.01 @ Small=0 and Large=2

Maximum Small IOPS=16262 @ Small=13 and Large=1
Small Read Latency: avg=796 us, min=111 us, max=4927 us, std dev=254 us @ Small=13 and Large=1

Minimum Small Latency=148 usecs @ Small=1 and Large=0
Small Read Latency: avg=148 us, min=0 us, max=82630 us, std dev=209 us @ Small=1 and Large=0
Small Read / Write Latency Histogram @ Small=1 and Large=0
```

Latency:		# of IOs (read)	# of IOs (write)
0 - 1	us:	18	0
2 - 4	us:	0	0
4 - 8	us:	0	0
8 - 16	us:	3	0
16 - 32	us:	4	0
32 - 64	us:	5	0
64 - 128	us:	64513	0
128 - 256	us:	325674	0
256 - 512	us:	5750	0



Oracle Tools: I/O Benchmarking

- Silly Little Oracle Benchmark

SLOB

(Kevin Closson)

- Physical I/O Testing
- Sustained Throughput Test
 - iostat, vmstat, mpstat
 - AWR Snap Before and After Test

```
$
$ cat slob.conf

UPDATE_PCT=20
RUN_TIME=120
WORK_LOOP=0
SCALE=10000
WORK_UNIT=256
REDO_STRESS=HEAVY
LOAD_PARALLEL_DEGREE=8
SHARED_DATA_MODULUS=8

# Settings for SQL*Net connectivity:
#ADMIN_SQLNET_SERVICE=slob
#SQLNET_SERVICE_BASE=slob
#SQLNET_SERVICE_MAX=2
#SYSDBA_PASSWD="change_on_install"

export UPDATE_PCT RUN_TIME WORK_LOOP SCALE WORK_UNIT LOAD_PARALLEL_DEGREE REDO_STRESS SHARED_DATA_MODULUS

$ sh ./setup.sh IOPS 16

NOTIFY: Load Parameters (slob.conf):

LOAD_PARALLEL_DEGREE == 8
SCALE == 10000
ADMIN_SQLNET_SERVICE == ""
CONNECT_STRING == "/ as sysdba"
NON_ADMIN_CONNECT_STRING ==

NOTIFY: Testing connectivity to the instance to validate slob.conf settings.
NOTIFY: ./setup.sh: Successful test connection: "sqlplus -l / as sysdba"

NOTIFY: Creating and loading seed table.

Table created.

PL/SQL procedure successfully completed.

NOTIFY: Seed table loading procedure has exited.
NOTIFY: Setting up user 1 2 3 4 5 6 7 8
NOTIFY: Waiting for background processes - Mon Aug 4 20:15:17 EDT 2014
NOTIFY: Setting up user 9 10 11 12 13 14 15 16
NOTIFY: Waiting for background processes - Mon Aug 4 20:15:21 EDT 2014

Table dropped.

NOTIFY: ./setup.sh: Loading procedure complete (12 seconds). Please check ./cr_tab_and_load.out for any errors

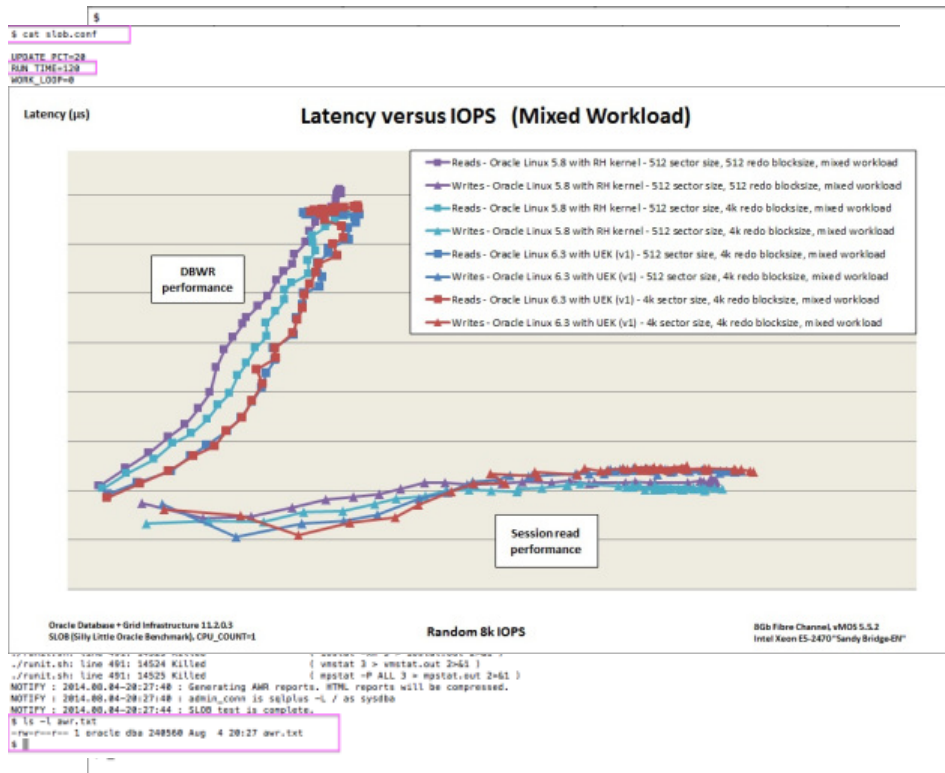
$
```

Oracle Tools: I/O Benchmarking

- Silly Little Oracle Benchmark
SLOB

(Kevin Closson)

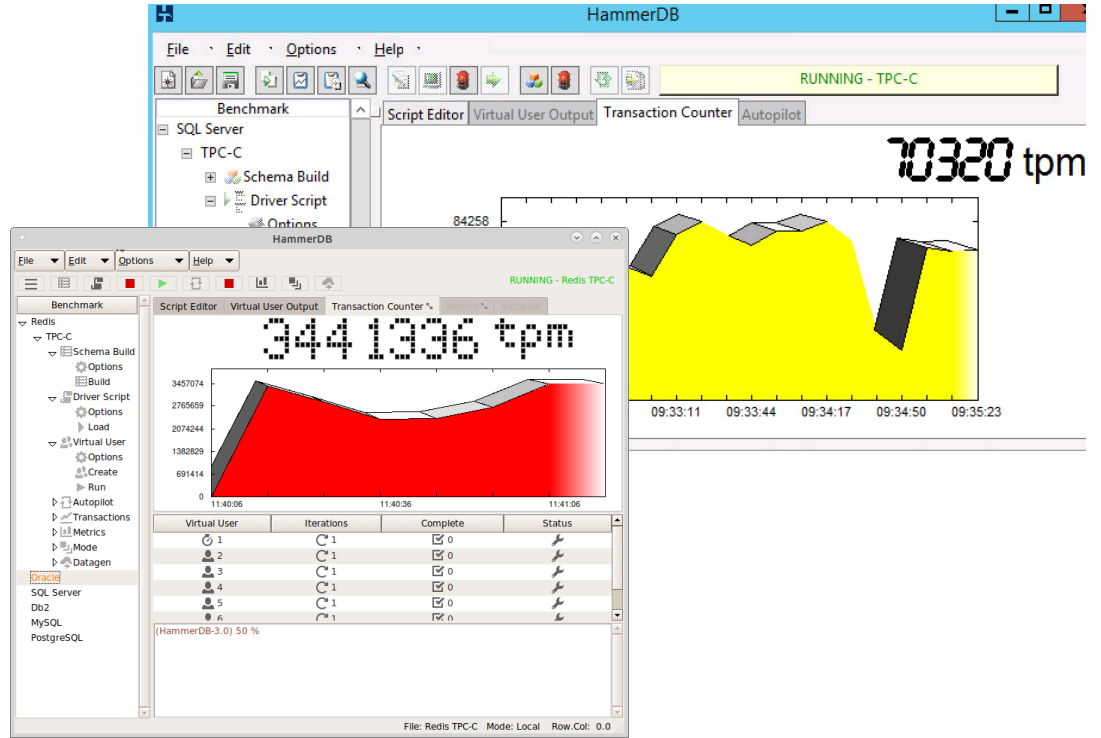
- Physical I/O Testing
- Sustained Throughput Test
 - iostat, vmstat, mpstat
 - AWR Snap Before and After Test



Oracle Tools: Database Benchmarking

- HammerDB (HammerORA)

- Supports many Databases
- GUI

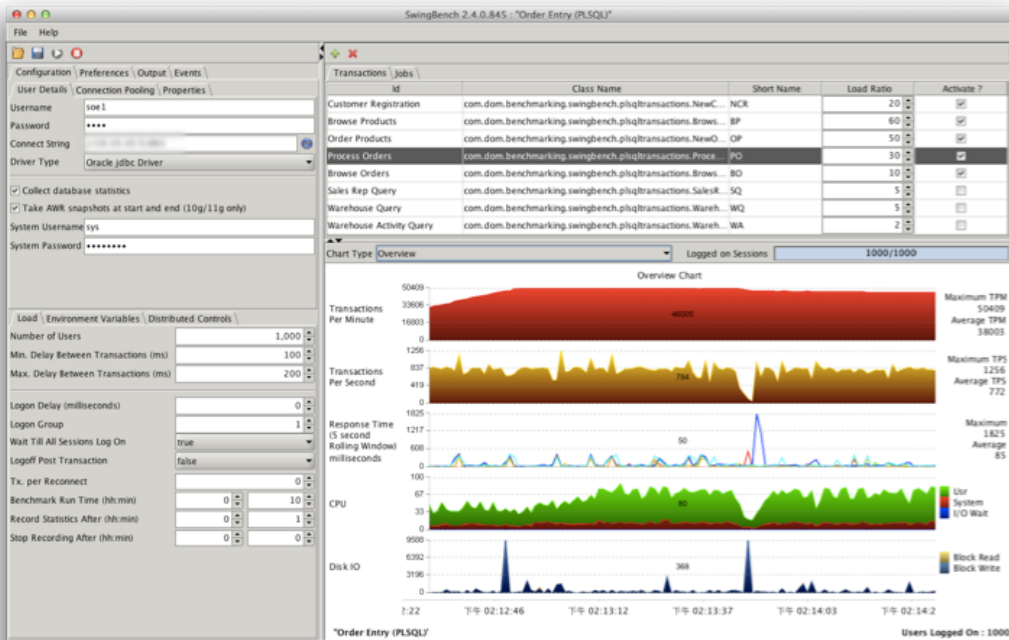


Oracle Tools: Database Benchmarking

- **Swingbench**

(Dominic Giles)

- Transaction types and sizes
- Number of users
- Think time (min and max)
- CLI and GUI

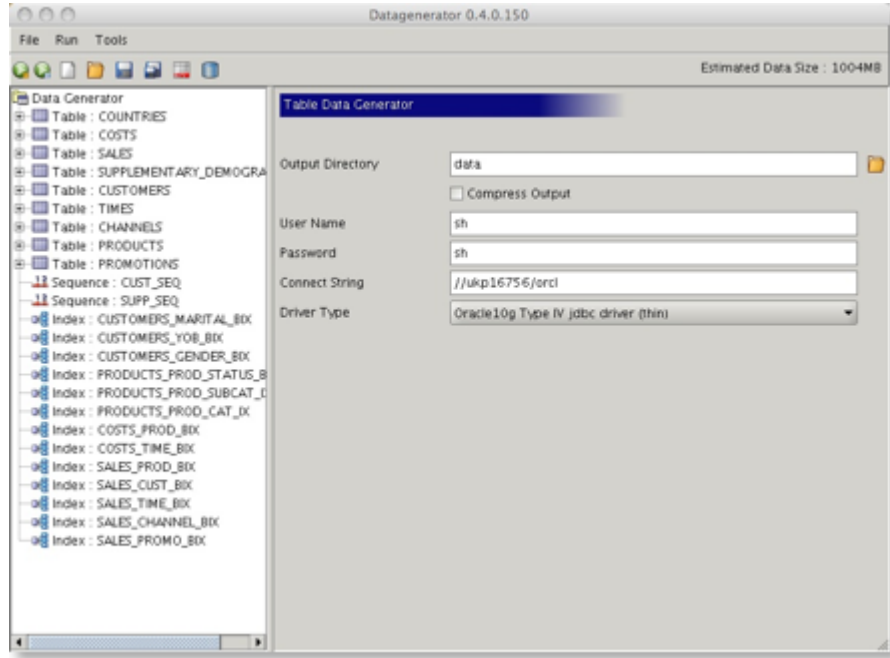


Oracle Tools: Benchmarking – DataGen

- **Data Generator**

(Dominic Giles)

- Populate tables, sequences, etc.
- Semi random data



Oracle Tools: Network Benchmarking

- `oratctest`

Measuring Network Capacity using oratctest (Doc ID 2064368.1)

```
% java -jar oratctest.jar test.server.address.com -port=5555 -duration=10s -interval=2s
```

The test will display output similar to the following :

```
Message payload      = 1 Mbyte
Payload content type = RANDOM
Delay between messages = NO
Number of connections = 1
Socket send buffer   = (system default)
Transport mode       = SYNC
Disk write           = NO
Statistics interval  = 2 seconds
Test duration        = 10 seconds
Test frequency       = NO
Network Timeout      = NO
(1 Mbyte = 1024x1024 bytes)
```

```
(07:43:06) The server is ready.
                Throughput
(07:43:08)      107.747 Mbytes/s
(07:43:10)      107.900 Mbytes/s
(07:43:12)      107.826 Mbytes/s
(07:43:14)      107.861 Mbytes/s
(07:43:16)      107.914 Mbytes/s
(07:43:16) Test finished.
                Socket send buffer = 526476 bytes
                Avg. throughput = 107.819 Mbytes/s
```

- Assess Data Guard Transport

ORACLE®

Oracle Tools: **Online Troubleshooting**



Oracle Tools: Online Troubleshooting

- MOS
 - **ORA-600/ORA-7445/ORA-700 Error Look-up Tool (Doc ID 153788.1)**

★ **ORA-600/ORA-7445/ORA-700 Error Look-up Tool (Doc ID 153788.1)**

NEW: For ORA-7445 errors, if you have the related trace file, consider trying the MOS ORA-7445-Troubleshooting Tool [CLICK HERE](#)

For ORA-600 errors, if you have the related trace file, consider trying the MOS ORA-600-Troubleshooting Tool [CLICK HERE](#)

ORA-600/ORA-7445/ORA-700 Error Look-up Tool

This tool provides a look-up capability for generic ORA-600, ORA-7445 and ORA-700 error codes. You can do a look-up based on the error code's first argument, the entire error message, or by parsing the related stack trace.

Look-up By Error or Error Code's First Argument

Select the appropriate error code and enter its First argument. Alternatively, enter the entire error message in the First Argument field. Then select "Look-up Error".

Error Code ORA-600 ORA-7445 ORA-700

Error Code First Argument

Oracle RDBMS Version

Or

Search by Stack Trace

[Help on using this feature. \(Which call stacks are supported?\)](#)

Show Search Criteria

Help and Documentation

- [General help on using this Error Look-up Tool](#)
- Refer to [Document 1092832.1](#) for additional ORA-600 related information.
- Refer to [Document 1092855.1](#) for additional ORA-7445 related information.
- Refer to [Document 737878.1](#) for additional ORA-700 related information.
- Refer to [Document 1300014.1](#) to view an Advisor Webcast where Support experts demonstrate the tool and discuss best practices.

ORACLE®

Oracle Tools: Online Troubleshooting

- MOS
 - [ORA-600/ORA-7445/ORA-700 Error Look-up Tool \(Doc ID 153788.1\)](#)
 - [Guided Resolution tools for ORA-600](#)

☆ [Troubleshooting Assistant: Oracle Database Error ORA-600 \[17285\] \(Interactive Guide to Resolving Your Error\) \(Doc ID 1612876.2\)](#)

ORACLE®

Selection(s)

Please review the alert log. Were there any additional errors occurring with the ORA-600 [17285] error?

- No, there are no other error messages or the other errors occurred AFTER the ORA-600 [17285] error
- I encountered ORA-1031 OR ORA-600[KGANTC_1] errors with the ORA-600[17285] error
- The other errors occurred immediately BEFORE the ORA-600 [17285]

Additional Clarification

Please select an option above to begin clarifying the issue you are experiencing.

What error(s) are you experiencing?

Check all relevant errors for the issue you've identified

Oracle Tools: Online Troubleshooting

- MOS
 - [ORA-600/ORA-7445/ORA-700 Error Look-up Tool \(Doc ID 153788.1\)](#)
 - [Guided Resolution tools for ORA-600](#) (☆ [ORA-4030 Troubleshooting Tool \(Doc ID 1521926.1\)](#))
 - [ORA-4030 Troubleshooting Tool](#)

ORA-4030 Troubleshooting Tool

[Hide All](#) [Show All](#)

The ORA-4030 Troubleshooting tool will provide recommendations to resolve ORA-4030 errors by analyzing uploaded files. When a known solution is available, the tool will display the symptoms and causes which are suggestions for resolving the issue. If a known solution is not available, a list of helpful documents are provided as well as a list of recommended tools to use for monitoring memory usage.

Benefits of using the ORA-4030 Troubleshooting tool:

- Analyzes uploaded files to provide recommendations when a known solution is available
- When a known solution is unavailable, points to helpful documents and memory monitoring tools
- Troubleshooting report can be saved for later use
- Diagnostic Guide is available
- Create SR option available which will automatically populate many of the SR fields

Accessing the ORA-4030 Troubleshooting Tool

Click [here](#) to access the Troubleshooting Tool (Standalone Version).

- **Note:** The Troubleshooting Tool can also be accessed during SR creation when the error "ORA-4030" is entered in the "Error Codes" field. This is referred to as the "Create SR Version" below.
- **Note:** Some tool features are only available with the Standalone Version and are designated as "Standalone Version Only" below.

Using the Troubleshooting Tool

- + [Troubleshoot a New Issue](#) (Standalone Version Only)
- + [Troubleshoot a New Issue](#) (Create SR Version Only)
- + [Review a Troubleshooting Report](#) (Standalone Version Only)
- + [Upload new files and re-run a troubleshooting report](#) (Standalone Version Only)
- + [Review a Diagnostic Guide](#) (Standalone Version Only)

File Upload Options


In order to troubleshoot a new issue involving the ORA-4030, you will need to upload the requested files.

The following combinations of files can be uploaded:

- TFA output with errors
- RDA file AND alert log AND Incident dump file or Trace file
- RDA file AND an Incident Packaging Service (IPS) package with error



Oracle Tools: Online Troubleshooting

- MOS
 - [ORA-600/ORA-7445/ORA-700 Error Look-up Tool \(Doc ID 153788.1\)](#)
 - [Guided Resolution tools for ORA-600](#)  [ORA-4031 Troubleshooting Tool \(Doc ID 1521925.1\)](#)
 - [ORA-4030 Troubleshooting Tool](#)
 - [ORA-4031 Troubleshooting Tool](#)
 - ...



ORA-4031 Troubleshooting Tool

[Hide All](#) [Show All](#)

The ORA-4031 Troubleshooting tool will provide recommendations to resolve ORA-4031 errors by analyzing uploaded files. When a known solution is available, the tool will display the symptoms and causes i suggestions for resolving the issue.

Benefits of using the ORA-4031 Troubleshooting tool:

- Analyzes uploaded files to provide recommendations when a known solution is available
- Troubleshooting report can be saved for later use
- Diagnostic Guide is available
- Create SR option available which will automatically populate many of the SR fields

Accessing the ORA-4031 Troubleshooting Tool

Click [here](#) to access the Troubleshooting Tool (Standalone Version).

- **Note:** The Troubleshooting Tool can also be accessed during SR creation when the error "ORA-4031" is entered in the "Error Codes" field. This is referred to as the "Create SR Version" below.
- **Note:** Some tool features are only available with the Standalone Version and are designated as "Standalone Version Only" below.

Using the Troubleshooting Tool

- + [Troubleshoot a New Issue](#) (Standalone Version Only)
- + [Troubleshoot a New Issue](#) (Create SR Version Only)
- + [Review a Troubleshooting Report](#) (Standalone Version Only)
- + [Upload new files and re-run a troubleshooting report](#) (Standalone Version Only)
- + [Review a Diagnostic Guide](#) (Standalone Version Only)

File Upload Options

In order to troubleshoot a new ORA-4031 issue you will need to upload the requested files. The following combinations of files can be uploaded:

- TFA output with errors
- An alert log AND Trace file from the instance with the error
- Incident Packaging Service (IPS) package with error
- AWR report (Optional)

Oracle Tools: Honor Mentions

- Scripts / DB Tools
 - PL/SQL Unwrapper (Philipp Salvisberg)
 - Oracle Migration360
 - asm_metrics.pl csv_asm_metrics.pl (Bertrand Drouvot)
 - load-monitors (Jared Still)
 - Mumbai (Marcus Mönning)
 - Database Block Visualizer / Rico2 (Kamil Stawiarski)
 - Average Active Session in SQL*plus with refresh (Marcin Przepiorowski)
 - asqlmon, ashtop (Tanel Pöder)
 - Jmeter, iometer/blktrace
 - cloudwatch
- Linux Commands/Tools (DBAs should know/use besides *top* and *df*...)
 - screen
 - rlwrap
 - strace (truss)



Oracle Tools: Things I “forgot”...

- Software (*mostly payed*)
 - Foglight for Oracle (Quest/Dell)
 - Lab128
 - Ignite (Confio Software)
 - WISE (Workload Interface Statistical Engine)
 - MindArray IPM (MindArray Systems)
 - Orachrome (SETRA Conseil Company)
 - dbTrends for Oracle STATSPACK (Spviewer Software)
 - DB Optimizer (Idera)
 - SQLab
 - RichMon 4 Oracle
 - Quick SQL
 - Live SQL
 - Aqua Data Studio
 - Virtual Box
 - Method R Workbench
 - ...
- SSH
 - Putty
 - mRemoteNG
 - ...
- Monitoring
 - Zabbix/Orabbix
 - OpMon
 - AWS Cloud Watch
 - Dynatrace
 - Myora
 - Spotlight
 - DBWatcher
 - ...
- Data Visualizer
 - Grafana
 - Perfsheet.js
 - ...
- Notes
 - UltraEdit
 - Notepad++
 - Sublime Text
 - Komodo Edit
 - Textpad
 - Gqueues
 - ...
- Infra-Codding/Repositories
 - Jenkins
 - Bitbucket
 - Lighty
 - Git
 - Ansible
 - ...

Oracle Tools: Conclusion



Oracle Tools: Conclusion

- Built-In, MOS, Community.
- Several Oracle supported tools for a bunch of things.
- Tons of tools for all sorts of things on Community.
- Don't re-invent the wheel... You may find barely everything free.
- **Know the main available tools and what they solve.**
- Don't try to use everything.
 - Know well 3 to 5.



LecID: 401

THANK YOU



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