

# How To Use An AWR/Statspack Report To Tune Oracle Systems

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COLLABORATE19  
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**WORKLOAD REPOSITORY report for**

DB Name	DB Id	Instance	Inst num	Startup Time	Release	RAC
PROD30	147730122	prod30		1 26-Aug-15 12:08	11.2.0.1.0	NO

Host Name	Platform	CPUs	Cores	Sockets	Memory (GB)
sixcore	Linux x86 64-bit	6	6	1	23.54

	Snap Id	Snap Time	Sessions	Cursors/Session
Begin Snap:	10445	01-Sep-15 09:47:58	26	1.7
End Snap:	10446	01-Sep-15 11:00:00	31	1.4
Elapsed:		72.04 (mins)		
DB Time:		248.29 (mins)		


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**Report Summary**

**Cache Sizes**

	Begin	End	
Buffer Cache:	0M	0M	Std Block Size: 8K
Shared Pool Size:	480M	480M	Log Buffer: 7,700K

**Load Profile**

	Per Second	Per Transaction	Per Exec	Per Call
DB Time(s):	3.5	9.9	0.58	0.71
DB CPU(s):	1.9	5.5	0.32	0.40
Redo size:	8,220,653.3	23,611,491.6		
Logical reads:	208,143.7	597,833.5		

**Oh Man!**

**What now?**

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## Step-By-Step

### How To Use An AWR/Statspack Report...

- To known when to use and NOT use an AWR report
- Understanding Oracle's time model
- Properly setting up a time-based analysis framework
- How to actually do the analysis
- Learn by watching someone doing the analysis


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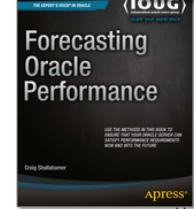
How To Use AWR/SP

# About Me...

- Long time Oracle DBA
- Specialize in Oracle Database performance and performance engineering
- Performance researcher
- Blogger: A Wider View About Oracle Performance Tuning
- Author: Oracle Performance Firefighting and Forecasting Oracle Performance.
- Conference speaker
- Teacher and mentor
- Oracle ACE Director
- IOUG DBA Track Manager

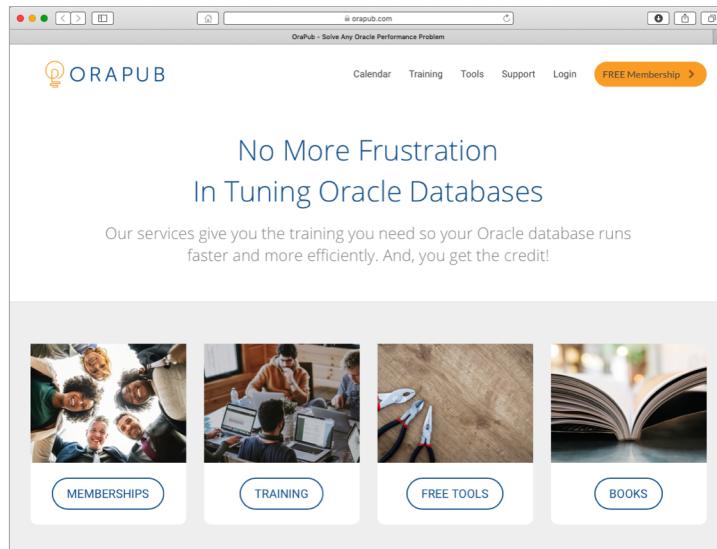
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The screenshot shows the OraPub website with a banner reading "No More Frustration In Tuning Oracle Databases". Below the banner, a subtext says "Our services give you the training you need so your Oracle database runs faster and more efficiently. And, you get the credit!" There are four image thumbnails: "MEMBERSHIPS" (people smiling), "TRAINING" (people at a desk), "FREE TOOLS" (tools on a table), and "BOOKS" (an open book). The right side of the page has a sidebar with the text: "OraPub works with Oracle DBAs empowering them to beat bots, AI, machine learning and autonomous anything."

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How To Use AWR/SP

# Step-By-Step How To Use An AWR/Statspack Report...



- To know when to use and NOT use an AWR report
- Understanding Oracle's time model
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Know  
when to use  
and  
when NOT to use  
an AWR report



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How To Use AWR/SP

Top 10 Foreground Events by Total Wait Time					
Event	Waits	Total Wait Time (sec)	Wait Avg(ms)	% DB time	Wait Class
DB CPU		18.3K		25.0	
db file sequential read	595,835	18K	30	24.7	User I/O
log file sync	26,296	13.9K	530	19.1	Commit
SQL*Net message from dblink	3,230	7780.4	2409	10.7	Network
TCP Socket (KGAS)	122,399	7631.2	62	10.5	Network
Disk file operations I/O	76,981	3641.5	47	5.0	User I/O
direct path read	167,212	2316.2	14	3.2	User I/O
read by other session	26,883	1112.4	41	1.5	User I/O
buffer busy waits	3,499	711	203	1.0	Concurrency
direct path write temp	4,389	593.1	135	.8	User I/O

**By design,  
an AWR report focuses on  
an Oracle instance or cluster.**

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**AWR report says  
CPU and physical  
read IO is the heart  
of the issue.**

**Users say  
performance is  
slow every Friday  
afternoon.**

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AWR report says  
physical read IO is  
the heart of the issue.

A few users said  
their screen  
randomly locked  
for a minute.



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There is no session level detail in an AWR report.

By design,  
an AWR report focuses on  
an Oracle instance or cluster.

# Know when to use and when NOT to use an AWR report

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# Understanding Oracle's time model

# It's all about time

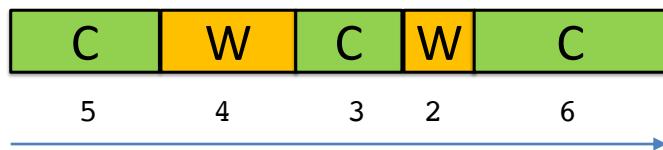


because that's what  
users care about

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## Oracle Time. What is it?

Database Time = CPU Time + Non Idle Wait Time



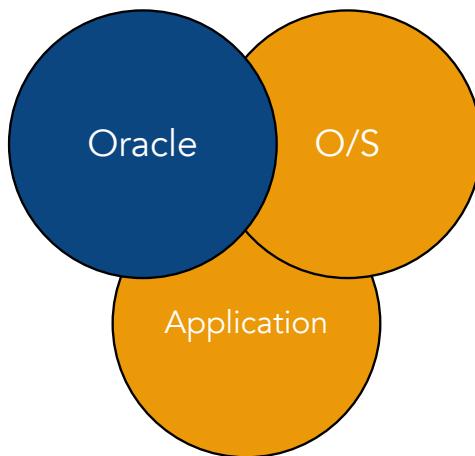
T I M E		W O R K	
CPU	= 14		
Non-Idle Wait	= 6	300K LIOs	
-----			
Elapsed = DB time	= 20		
Idle Wait	= 0		
Experience	= 20		Single Serial Session

# Understanding Oracle's time model

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# Properly setting up a time-based analysis framework

## OraPub 3-Circle Analysis



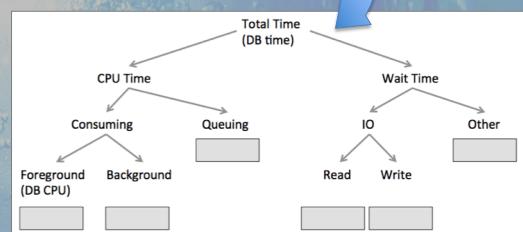
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## How to do an OTBA?

### Top 5 Timed Foreground Events

Event	Waits	Time(s)	Avg wait (ms)	% DB time	Wait Class
DB CPU		5,966		24.84	
latch: cache buffers chains	343,432	5,529	16	23.02	Concurrency
cursor: pin S	9,719	119	12	0.49	Concurrency
db file sequential read	1,312	6	5	0.03	User I/O
wait list latch free	302	4	12	0.02	Other

1. Get data
2. Classify Oracle time
3. Identify big piles of time
4. Develop big-time reducing solutions ...



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# How to actually do the analysis

**How to do an OTBA?**

**Top 5 Timed Foreground Events**

Event	Waits	Time(s)	Avg wait (ms)	% DB time	Wait Class
DB CPU		5,966		24.84	
latch: cache buffers chains	343,432	5,529	16	23.02	Concurrency
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db file sequential read	1,312	6	5	0.03	User I/O
wait list latch free	302	4	12	0.02	Other

**CPU** **5990**

**FG** 5966  
**BG** 24

**Non Idle Wait Time** 5529

**IO** 0  
**R** 0  
**W** 0

**Other** 5529  
**latch: CBC** 5529

1. Get data  
2. Classify Oracle time  
3. Identify big piles of time.  
4. Develop big-time reducing solutions ...

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**Solution Development**

- Usually our core objective is to reduce the time.
- At a deeper level, we are also interested in increasing throughput.
- In this analysis:
  - The two big piles of time (opportunities) are CPU and also non-idle wait time which is dominated by cache buffer chain wait time.
  - We need to do a deeper analysis focusing on the cache buffer chain wait time.
  - The result may provide very specific Oracle focused parameter changes and specific SQL statement(s) that can be tuned.
  - If there is a CPU bottleneck, which is very likely, a short term solution is to increase the host CPU capacity.

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# Learn by watching someone doing the analysis

ORAPUB

AWR-OTBA-Template-v1a

Oracle Time Based Analysis Template

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**Solution Notes**

1	A	B	C	D	E	F	G
2	CPU						
3	Foreground (DB CPU)		18,251				
4	Background		160				
5	WAIT				47311	Big Pile of time	
6	IO			31900			
7	R		18000				
8	db file seq		18000	30ms		SQL: look for top READ	
9	NA		0			increase caching	
10	W		13900				
11	log file sync		13900	530ms		SQL: look for high EXEC DML	
12	NA		0			looping commits, commit write	
13	OTHER			15411			
14	SQL*Net msg dblink		7780			understand application	
15	TCP Socket (DGAS)		7631			understand application	
16							
17							
18							
19							
20							
21							

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Learn by watching  
someone  
doing the analysis

This is powerful!  
Because you have a proven  
**method and process** that  
directly relates to the **user  
experience**. Plus it just  
**makes sense**... to anyone!

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But...  
This is just the beginning.  
There is so much more to  
mastering AWR analysis.

## Questions you may have...

- Why didn't you just focus on the top "elapsed time" SQL?
- I thought the TCP wait events were "idle wait events." So, why did you include them?
- How slow is "to slow" for IO wait times?
- Why don't you use other IO wait event average wait times?
- Why not simply focus on DB time percentage?
- What do I do when the DB time math isn't right?
- What is the difference between db time, wall time, elapsed time and db cpu?
- How does parallel query fit into all of this?
- What do we do if there is a CPU bottleneck, but there is more wait time than CPU time?
- Is it OK to use "average" wait times? Is there something better?
- What is the best snapshot interval? Is there a "best?"
- ...

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AWR/Statspack webinars.

# Thank You!



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