OraPub is about Oracle performance.

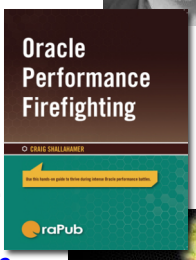
- OraPub is all about Oracle performance management; monitoring, firefighting, quantitative and predictive analysis.
- Web site started in 1995 and the company was founded in 1998 by Craig Shallahamer.
- OraPub has always been about disseminating Oracle database centric technical information.
- Consulting, training, books, papers, and products are now being offered.
- We have been on-site in 23 countries and our resources have been received in probably every country where there are DBAs.

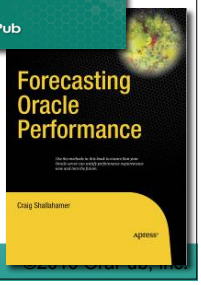
Resources

- Free Tools
- Free Papers
- Books
- Products
- Consulting
- Training

Short resume.

- Studies economics, mathematics, and computer science at university in California, US.
- Started working with Oracle technology in 1989 as a Forms 2.3 developer on Oracle version 5.
- Soon after started performance firefighting...daily!
- Co-found both Oracle's Core Technology and System Performance Groups.
- Left Oracle to start OraPub, Inc. in 1998.
- Authored 24 technical papers and worked in 24 countries.
- Authors and teaches his classes ***Oracle Performance Firefighting***, ***Adv Oracle Performance Analysis***, and ***Oracle Forecasting & Predictive Analysis***.
- Authored the books, *Forecasting Oracle Performance*, and his new book, ***Oracle Performance Firefighting***.

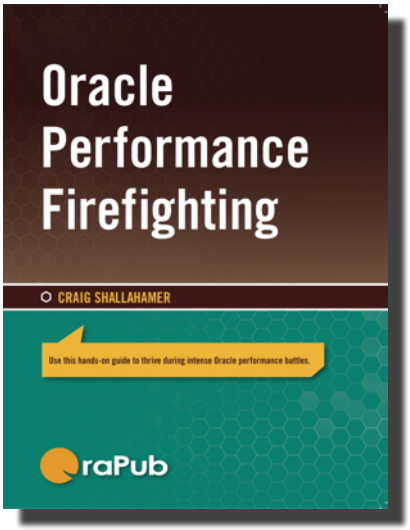




raPub

If you want my firefighting book…

- Retail $49.95
- Amazon $69.95
- OraPub normal $39.95
- "FLORIDA" disc. $29.96
- Cash in hand $30.00



raPub

A day in the life of an Oracle server process

OraPub

Hurry up and wait .

```
SQL> l
  1  select event doings,
  2         time_waited/100 time_s
  3  from   v$session_event
  4  where  sid = &sid
  5    and  time_waited > 0
  6  union
  7  select 'burning CPU' doings,
  8          value/1000000 time_s
  9  from    v$sess_time_model
 10  where   sid=&sid
 11*   and   stat_name = 'DB CPU'
SQL> /

Doings                             TIME_S
------------------------------ ---------
SQL*Net message from client       633.550
burning CPU                         0.088
db file scattered read              0.010

3 rows selected.
```

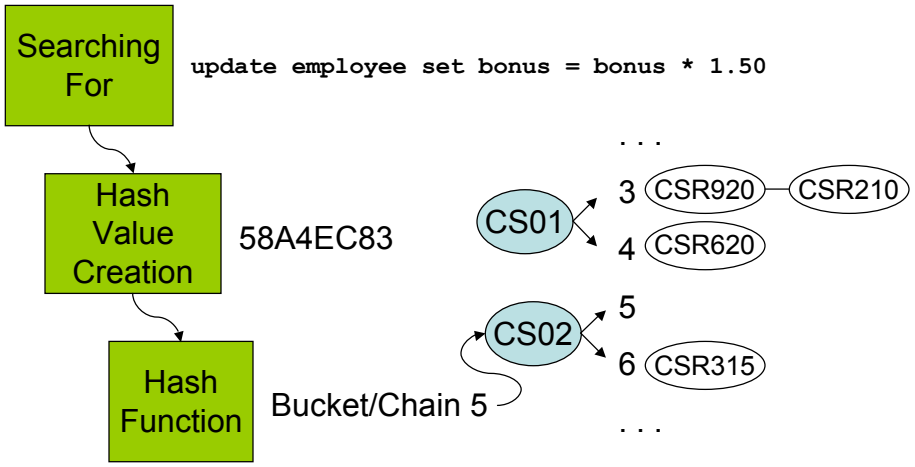
OraPub

Being probed is not pleasant!

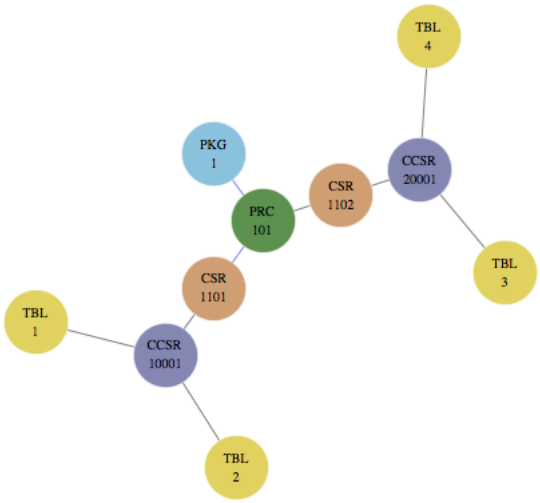
```
[oracle@fourcore SEOUC]$ ps -eaf|grep 3635
oracle    3635  3634  0 16:35 ?        00:00:00 oracleprod18
oracle    9314  9268  0 16:51 pts/1    00:00:00 grep 3635

[oracle@fourcore SEOUC]$ strace -p 3635
Process 3635 attached - interrupt to quit
read(9,
```


Client expectations are so unbelievably high!

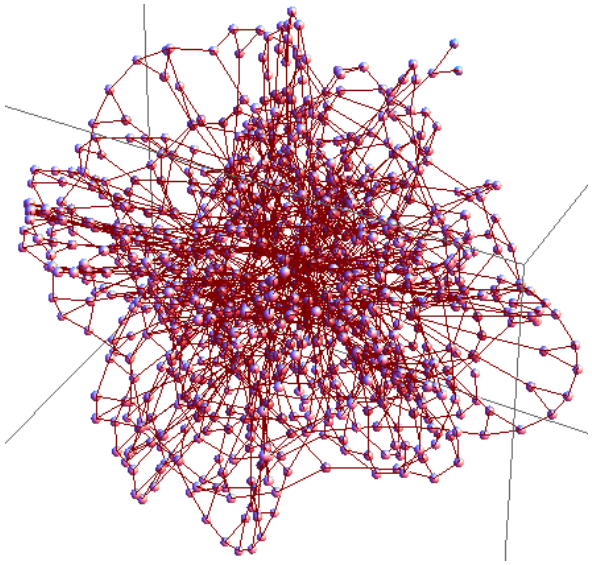
I'm very environmentally conscious.



If only life was so simple…



But it's not that simple!



I've got to "ask permission."

```
Function Get_Mutex(mutex_name,type,mode)
{
  If type eq 'nowait'
    If Fast_Get(mutex_name)
      return TRUE
    Else
      return FALSE
    End-If
  Else
    If Fast_Get(mutex_name)
    Then
      return TRUE
    Else
      While ( TRUE )
        If Spin_Get(mutex_name)
        Then
          return TRUE
        Else
          Register_Event("cursor: *")
          Mutex_Wait(try++)
        End-If
      End-While
    End-If
  End-If
}

Function Mutex_Wait(try)
{
  options defined by kernel developers
    - CPU yield, blocking wait, sleep
}
```

```
Function Fast_Get(mutex_name)
{
  If mutex.holder := sid occurs
  Then
    Case mode:
      'X': If mutex.ref_count = 0
           Then
             return TRUE
           Else
             mutex.holder = clear
             return FALSE
           End-If
      'S': mutex.ref_count++
           mutex.holder = clear
           return TRUE
    End-Case
  Else
    return FALSE
  End-If
}

Function Spin_Get(mutex_name)
{
  for i = 1 to 255
    If Fast_Get(mutex_name)
    Then
      return TRUE
    End-If
  End-For
  return FALSE
}
```

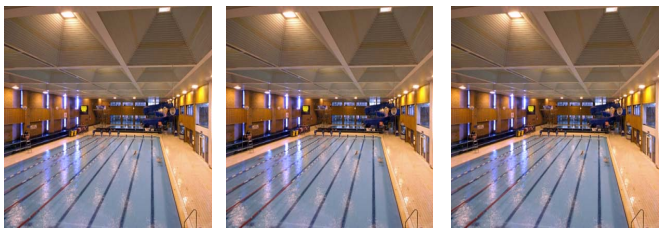
Burn and wait

```
SQL> l
  1  select event doings,
  2         time_waited/100 time_s
  3  from   v$session_event
  4  where  sid = &sid and  time_waited > 0
  5  union
  6  select 'burning CPU' doings,
  7          value/1000000 time_s
  8  from    v$sess_time_model
  9  where   sid=&sid and stat_name = 'DB CPU'
 10* order by time_s desc
SQL> /

Doings                              TIME_S
------------------------------ ---------
SQL*Net message from client       763.252
burning CPU                       130.955
library cache: mutex X              7.230
latch: shared pool                  1.660
db file sequential read             0.070
db file scattered read              0.010

6 rows selected.
```


Cursor is not found! …hard parse

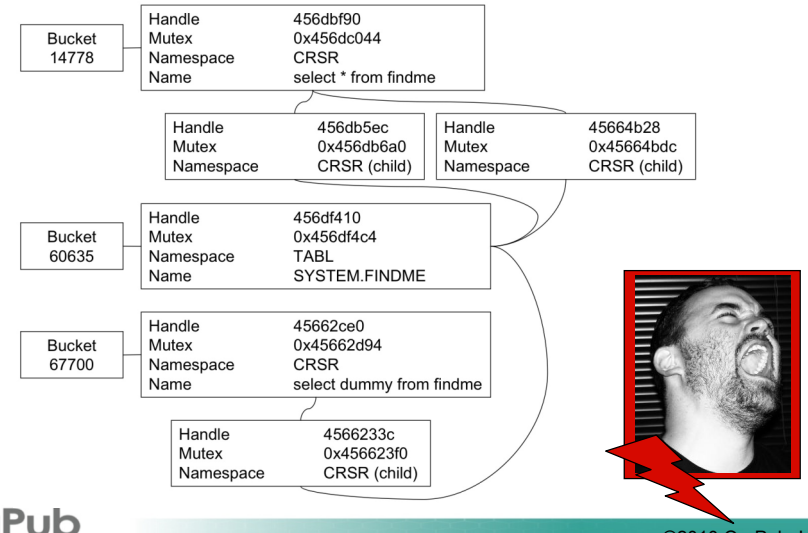
First, I've got to get some memory.

SP #1 SP #2 SP #3

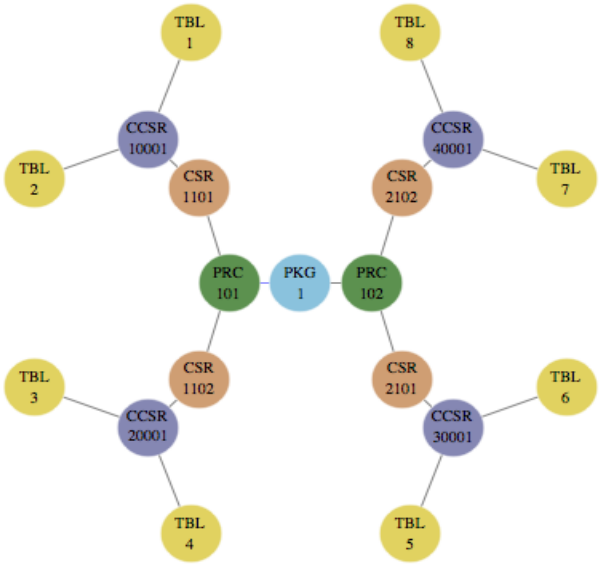


Cursor is not found! …hard parse

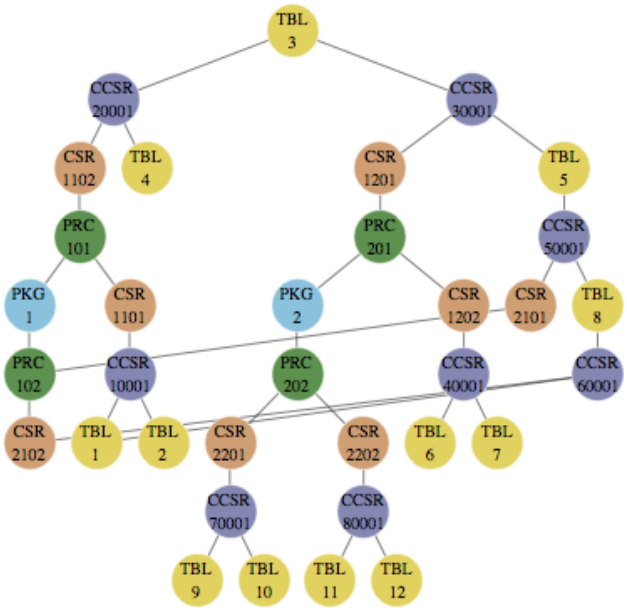
Second, I've got to establish establish relationships.



The cascade effect is real.



Especially when sharing occurs.



Time to run the SQL!

First, pin the cursor.

Second, find out where the block is.

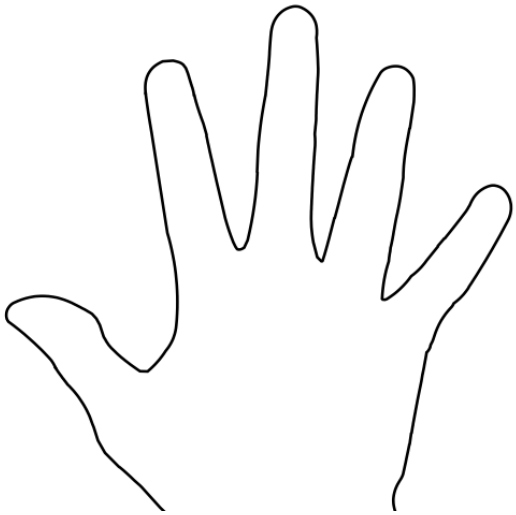
Third, get the block and pin it.

Fourth, change the row/block.

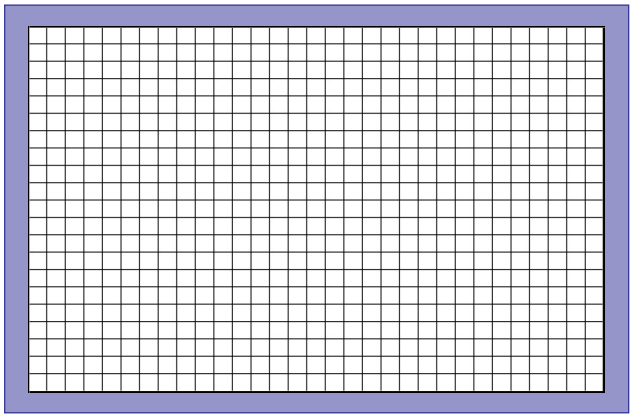
Fifth, generate some redo, undo, redo.

Sixth, let my client know I'm done.

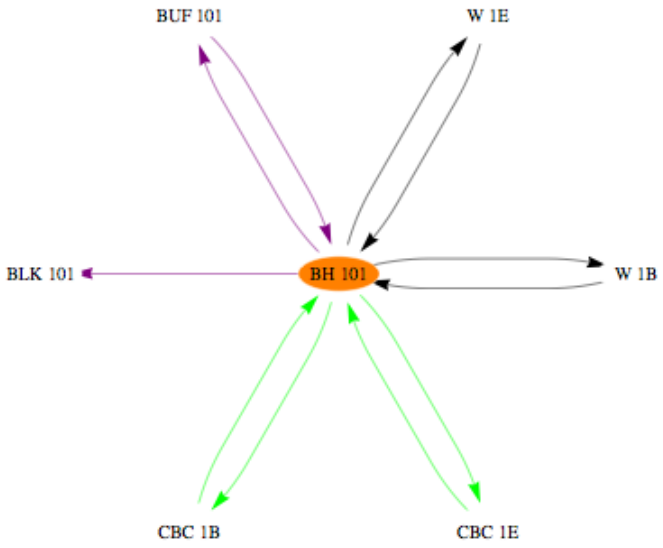
Pin the cursor.



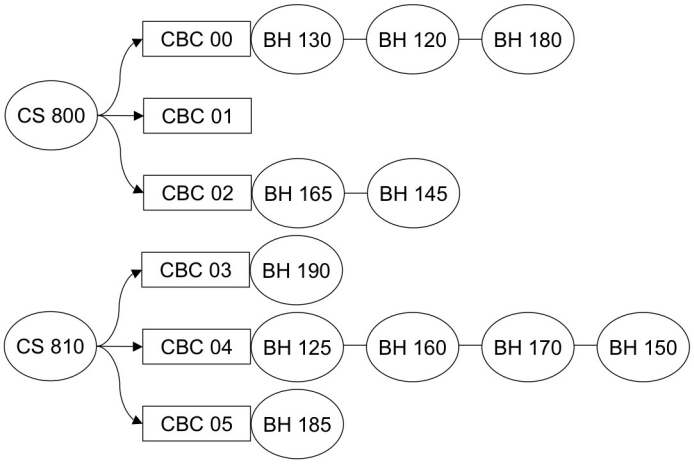
Find out where the block is.



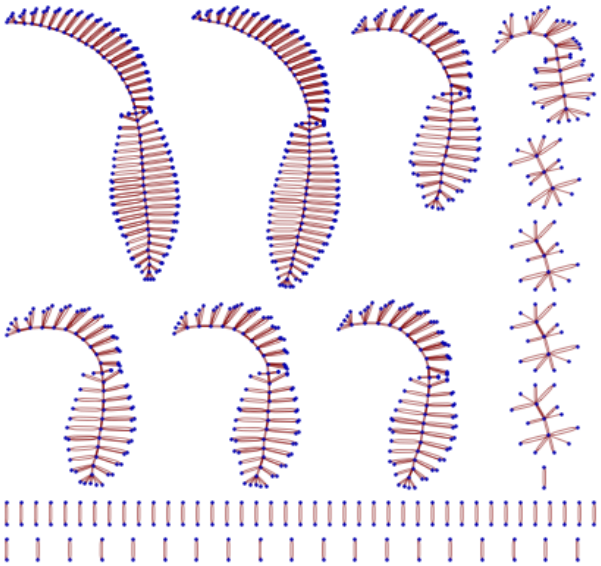
Buffer header close-up



A man's got to have a good map!



Just a glimpse of the complexity.



Hashing to find BH

Searching For

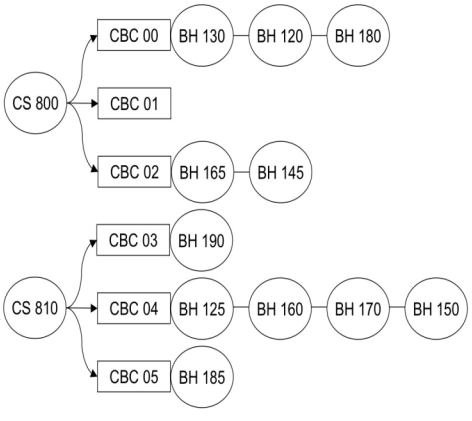
```
File      28
Block 43653
```

Hash Value Creation

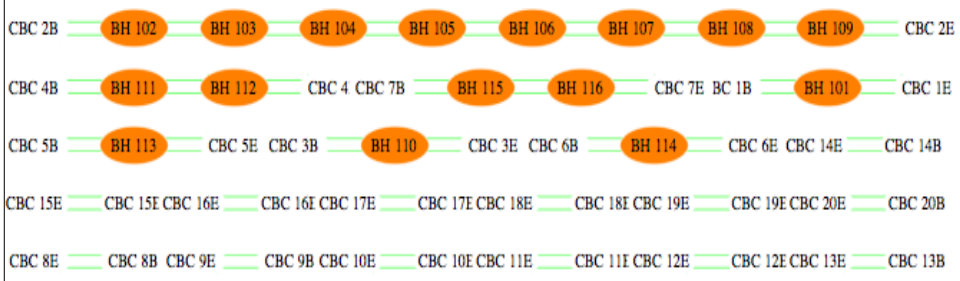
B56468D33

Hash Function

Bucket 04



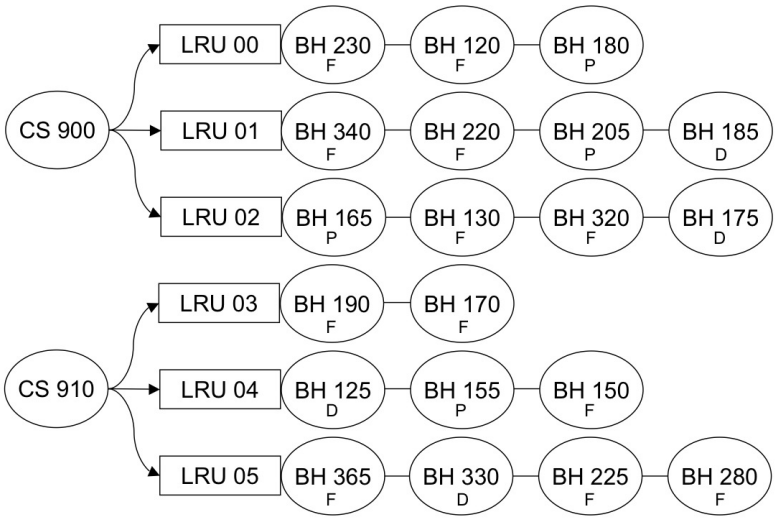
Popular or long chains are problematic.



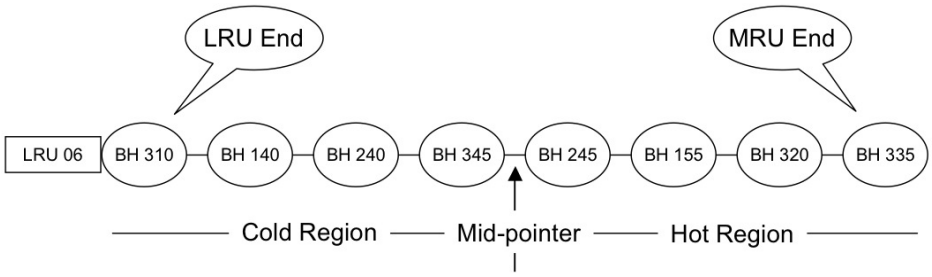
CBC latch contention

```
SQL> l
  1  select event doings,
  2         time_waited/100 time_s
  3  from   v$session_event
  4  where  sid = &sid and  time_waited > 0
  5  union
  6  select 'burning CPU' doings,
  7          value/1000000 time_s
  8  from    v$sess_time_model
  9  where   sid=&sid and stat_name = 'DB CPU'
 10* order by time_s desc
SQL> /

Doings                              TIME_S
------------------------------ ---------
SQL*Net message from client       962.228
burning CPU                       341.065
latch: cache buffers chains         9.230
db file scattered read              0.570
db file sequential read             0.321
read by other session               0.312

6 rows selected.
```

Find a free buffer part 1



Find a free buffer part 2



Get the block from “disk”

```
[oracle@fourcore ~]$ strace -rp 15621
Process 15621 attached - interrupt to quit
. . .
0.000041 gettimeofday({1266354967, 147052}, NULL) = 0
0.000044 pread64(10,"\6\242\0\0a. . .1\0\3\246~\1"..., 8192, 766255104) = 8192
0.022104 gettimeofday({1266354967, 147200}, NULL) = 0
. . .
```


I’m not a selfish person!

```
SQL> l
  1  select event doings,
  2         time_waited/100 time_s
  3  from   v$session_event
  4  where  sid = &sid and  time_waited > 0
  5  union
  6  select 'burning CPU' doings,
  7          value/1000000 time_s
  8  from    v$sess_time_model
  9  where   sid=&sid and stat_name = 'DB CPU'
 10* order by time_s desc
SQL> /

Doings                           TIME_S
------------------------------ ---------
SQL*Net message from client     1231.286
burning CPU                      413.591
direct path read                 392.073
read by other session             69.612
db file sequential read            8.721
latch: cache buffers chains        7.230

6 rows selected.
```

Update the row

```
SQL> alter system dump datafile 1 block 75847;

System altered.
SQL>!cat prod5_ora_21741.trc
...
Block header dump:  0x00412847
 Object id on Block? Y
 seg/obj: 0xff6b  csc: 0x00.50fcb6  itc: 3  flg: O  typ: 1 - DATA
     fsl: 0  fnx: 0x412848 ver: 0x01

 Itl           Xid                  Uba         Flag  Lck        Scn/Fsc
0x01   0x0003.00d.00000318  0x00c3e3d0.0593.0c  ----    1  fsc 0x0000.00000000
0x02   0x0008.01b.00000340  0x00c41bce.0481.24  ----    1  fsc 0x0000.00000000
0x03   0x0001.000.00000320  0x00c45fa0.0599.0b  ----    1  fsc 0x0000.00000000
. . .
```


Let's not forget about redo, undo, redo.

```
SQL> l
  1  select event doings,
  2         time_waited/100 time_s
  3  from   v$session_event
  4  where  sid = &sid and  time_waited > 0
  5  union
  6  select 'burning CPU' doings,
  7          value/1000000 time_s
  8  from    v$sess_time_model
  9  where   sid=&sid and stat_name = 'DB CPU'
 10* order by time_s desc
SQL> /

Doings                           TIME_S
------------------------------ ---------
SQL*Net message from client     1231.286
burning CPU                      490.890
log buffer space                 196.219
log file parallel write           71.483
db file parallel write            42.309
direct path write                 19.756

6 rows selected.
```

Let my client know I'm done!

```
SQL> l
  1  select event doings,
  2         time_waited/100 time_s
  3  from   v$session_event
  4  where  sid = &sid and  time_waited > 0
  5  union
  6  select 'burning CPU' doings,
  7          value/1000000 time_s
  8  from    v$sess_time_model
  9  where   sid=&sid and stat_name = 'DB CPU'
 10* order by time_s desc
SQL> /

Doings                              TIME_S
------------------------------ ---------
SQL*Net message from client     1432.589
burning CPU                      499.691
log buffer space                 196.219
log file parallel write           71.483
db file parallel write            42.309
direct path write                 19.756
SQL*Net message to client          0.086

7 rows selected.
```


And life is boring once again!

```
SQL> l
  1  select event doings,
  2         time_waited/100 time_s
  3  from   v$session_event
  4  where  sid = &sid and  time_waited > 0
  5  union
  6  select 'burning CPU' doings,
  7          value/1000000 time_s
  8  from    v$sess_time_model
  9  where   sid=&sid and stat_name = 'DB CPU'
 10* order by time_s desc
SQL> /

Doings                              TIME_S
------------------------------ ---------
SQL*Net message from client     2576.002
burning CPU                      521.621
log buffer space                 196.219
log file parallel write           71.483
db file parallel write            42.309
direct path write                 19.756
SQL*Net message to client          0.086

7 rows selected.
```

A day in the life of an Oracle server process

OraPub

Want to dig deeper?

- **Training** from OraPub
  - Oracle Performance Firefighting (I)
  - Adv Oracle Performance Analysis (II)
  - Oracle Forecasting & Predictive Analysis
  - OraPub 1-Day 2010 Perf Seminar
- **Books**
  - Oracle Performance Firefighting (C. Shallahamer)
  - Forecasting Oracle Performance (C. Shallahamer)
- **Products**
  - **OraPub Stress Identifier** now available.
- **Papers/Tools** at www.orapub.com
  - Scientifically Evaluating Alternative Performance Solutions
  - Introduction To Oracle Performance Optimization
  - **Exploring Oracle's [Buffer Cache, Library Cache]**
- **Craig's Blog** at blogspot.com

Irvine, CA November

Philly, PA October!!

Tomorrow!!

OraPub

A day in the life of an Oracle server process