SQL Trace в Oracle

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Не искать ключи под фонарём

Oracle Diagnostic Events (не те, что Wait Events)

- $ORACLE_HOME/rdbms/mesg/oraus.msg

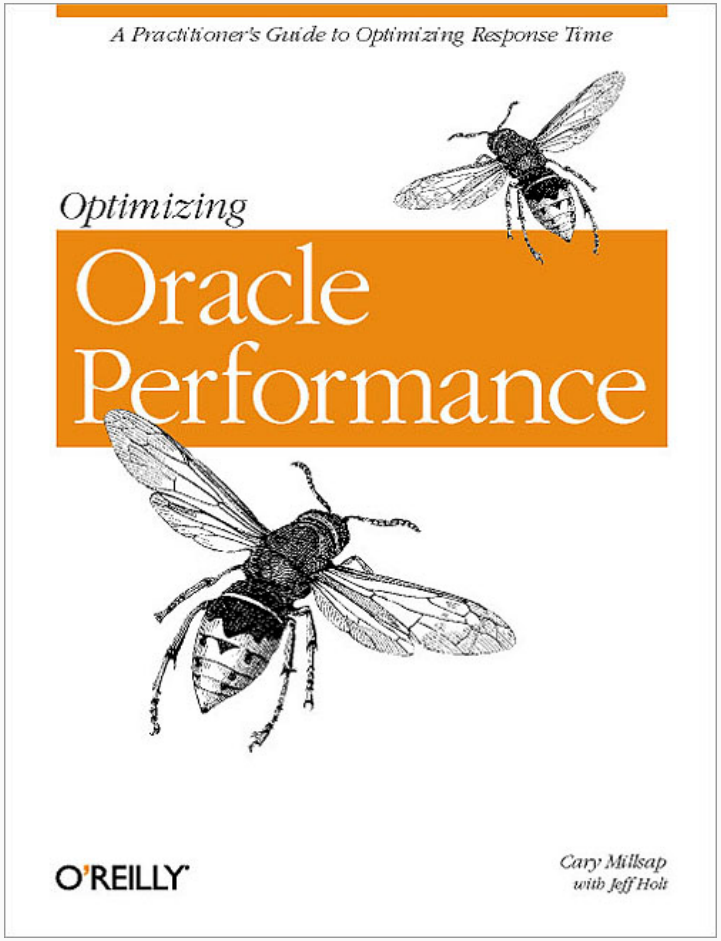
```
/ Pseudo-error debugging events:
/   Error codes 10000 .. 10999 are reserved for debug event codes
/   that are not really errors.
[...]
10046, 00000, "enable SQL statement timing"
```

- EVENT: 10046 ”enable SQL statement tracing (including binds/waits)” (Doc ID 21154.1)

В начале была книга

Optimizing Oracle Performance: A Practitioner's Guide to Optimizing Response Time
by Cary Millsap and Jeff Holt

O'Reilly Media, 2003



Enable trace

- **по-старинке**

```
alter session set events '10046 trace name context forever, level 8'
```

- **в своей сессии**

```
exec dbms_session.session_trace_enable(waits, binds, plan_stat)
```

- **в другой сессии**

```
exec dbms_monitor.session_trace_enable(sid, serial#, waits, binds, plan_stat)
-- select * from dba_enabled_traces;
```

- **по service_name/module/action**

```
exec dbms_monitor.serv_mod_act_trace_enable( -
    service_name, module_name, action_name, waits, binds, instance_name, plan_stat)
```

- **точечно**

```
alter system set events 'sql_trace[sql: sql_id=9tz4qu4rj9rdp|grwydz59pu6mc] -
    wait=true, binds=false, plan_stat=adaptive'

alter system set events 'sql_trace{process: pname=smon|p0000} wait=true'

alter system set events 'sql_trace[sql: sql_id=9tz4qu4rj9rdp]{process:12345}'
```

Disable trace

```
alter session set events '10046 trace name context off'

exec dbms_monitor.session_trace_disable(sid, serial#)

alter system set events 'sql_trace[sql: sql_id=9tz4qu4rj9rdp|grwydz59pu6mc] off'
```

Как сделать трассировку еще проще

- dbms_application_info.set_action(action_name)
- dbms_application_info.set_module(module_name, action_name)
- dbms_session.set_identifier(client_id)

Dude, Where's My Trace?

```
select value from v$diag_info where name = 'Default Trace File';


select tracefile from v$process where addr=(
    select paddr from v$session where sid=sys_context('userenv','sid')
);


alter system set "_trace_files_public"=true scope=spfile; -- on dev machine


select translate(payload, 'x'||chr(10), 'x') payload
from v$diag_trace_file_contents
where adr_home || '/trace/' || trace_filename = (
    select tracefile
    from v$process
    where addr = (
        select paddr from v$session where sid = sys_context('userenv','sid')
    )
)
order by line_number;
```

И какой уровень трассировки выставлять?

- Обычно 8-ой (waits=true)
- 12-й (binds=true) и +16-й (plan_stat='all_executions') уровни изредка могут и тормозить

И насколько всё тормозит от трассировки?

На -10% и менее процентов

SQL запрос с высоты птичьего полета

Стадия запроса	Trace Level
PARSE	1
BINDS	4
EXEC	1
WAIT	8
FETCH	1
STAT	1, 16, 32, 64
CLOSE	1

Что в трейс-файле?

- **Разбивка запроса на стадии PARSE / EXEC / FETCH / BINDS / WAIT / STAT**

- **Информация о CPU Time, Elapsed Time, Timestamp**

```
PARSE #1:c=311,e=311,p=0,cr=0,cu=0,mis=1,r=0,dep=1,og=4,plh=0,tim=745332470
```

- **Информация об иерархии запросов**

```
PARSE #1:c=311,e=311,p=0,cr=0,cu=0,mis=1,r=0,dep=1,og=4,plh=0,tim=745332470
```

- **Информация о dba_objects.object_id**

```
WAIT #1: nam='db file scattered read' ela= 9426 file#=3 block#=23883 blocks=5 obj#=21722 ...
```

Что делать с trace-файлом?

- tkprof

  ```
  tkprof sort=prsela,exeela,fchela file.trc file.out
  ```

- Method R Software

  ```
  https://method-r.com/software/
  ```

- tvd$xtat

  ```
  https://antognini.ch
  ```

- orasrp

  ```
  http://oracledba.ru/orasrp
  ```

Что можно извлечь из трейса? Flat Profile

```
Session Flat Profile
================================================

                                                                  ---------------- Time Per Call --------------
Event Name                                 % Time        Seconds      Calls             Avg             Min             Max
-----------------------------------------  --------  -------------  ---------  --------------  --------------  --------------
db file sequential read                      47.4%        1.0842s      1,959         0.0006s         0.0003s         0.0105s
unaccounted-for time                         21.9%        0.5005s
FETCH calls [CPU]                            17.3%        0.3961s      2,347         0.0002s         0.0000s         0.3812s
PARSE calls [CPU]                            10.8%        0.2464s         13         0.0190s         0.0000s         0.2360s
PGA memory operation                          1.1%        0.0250s        326         0.0001s         0.0000s         0.0198s
EXEC calls [CPU]                              0.9%        0.0211s         59         0.0004s         0.0000s         0.0098s
Disk file operations I/O                      0.6%        0.0136s          3         0.0045s         0.0000s         0.0135s
SQL*Net message from client [idle]            0.1%        0.0014s          2         0.0007s         0.0004s         0.0010s
asynch descriptor resize                      0.0%        0.0000s          1         0.0000s         0.0000s         0.0000s
SQL*Net message to client                     0.0%        0.0000s          2         0.0000s         0.0000s         0.0000s
-----------------------------------------  --------  -------------  ---------  --------------  --------------  --------------
Total                                       100.0%        2.2883s
```

Что можно извлечь из трейса? Call Graph

```
Session Call Graph
================================================
                                          Self    Cumulative
        SQL Hash Value  Branch %   Total %       Seconds       Seconds      Calls  Similar      Command Type
----------------------  --------  --------  ------------  ------------  ---------  -------  ----------------
2466234169                94.6%    100.0%       2.1518s       2.2745s          3        0            SELECT
  3433193208               1.8%      1.8%       0.0404s       0.0404s          4        0            SELECT
  1411673910               1.1%      1.1%       0.0251s       0.0251s      2,283        0            SELECT
  3461447171               0.2%      1.0%       0.0045s       0.0218s          3        0            SELECT
    4126578894             0.8%      0.8%       0.0174s       0.0174s         40        0            SELECT
  2195068792               0.9%      0.9%       0.0208s       0.0208s          3        0            SELECT
  2045374727               0.1%      0.5%       0.0019s       0.0111s          7        0            SELECT
    1641257687             0.4%      0.4%       0.0090s       0.0090s          2        0            SELECT
    4126578894             0.0%      0.0%       0.0003s       0.0003s          2        0            SELECT
  4126578894               0.1%      0.1%       0.0017s       0.0017s         27        0            SELECT
  3849548163               0.0%      0.0%       0.0006s       0.0006s         22        0            SELECT
  1641257687               0.0%      0.0%       0.0004s       0.0004s          5        0            SELECT
  3901160166               0.0%      0.0%       0.0004s       0.0004s          7        0            SELECT
  2880999359               0.0%      0.0%       0.0003s       0.0003s          9        0            SELECT
- - - - - - - - - - -   - - - -   - - - -   - - - - - -   - - - - - -   - - - - -  - - - -  - - - - - - - -
2217940283              100.0%      0.0%       0.0004s       0.0004s          2        0     ALTER SESSION
----------------------  --------  --------  ------------  ------------  ---------  -------  ----------------
```

Что можно извлечь из трейса? Event Histograms

```
db file sequential read
------------------------
        value  ------------- Distribution ------------- count
    0.000128s |                                         0
    0.000256s |@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@ 1,300
    0.000512s |@@@@@@@@@@@@@                            546
    0.001024s |@                                        95
    0.002048s |                                         9
    0.004096s |                                         3
    0.008192s |                                         6
    0.016384s |                                         0
```

Минусы SQL Trace

- Бесполезен для сессий в прошлом

Плюсы SQL Trace

- Непосредственное понимание того, что происходит в сессии
- Не нужна никакая дополнительная лицензия
- Возможность ”reverse engineering”

Вопросы?