Oracle Performance Tuning

Overview of performance tuning strategies

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What is tuning?

- Group of activities used to optimize and homogenize the performance of a database
- Maximize use of system resources to perform work as efficiently and rapidly as possible
- Goals
  - Minimizing response time
  - Increasing throughput
  - Increasing load capabilities
  - Decreasing recovery time

Who tunes?

- Application Designers
- Application Developers
- Database Administrators
- System Administrators
- System Architects

Methodology

- Ratios
  - Buffer Cache in high 90's for OLTP
  - Dictionary Cache

- Wait Interface
  - db file sequential read
  - db file scattered read
  - buffer busy wait

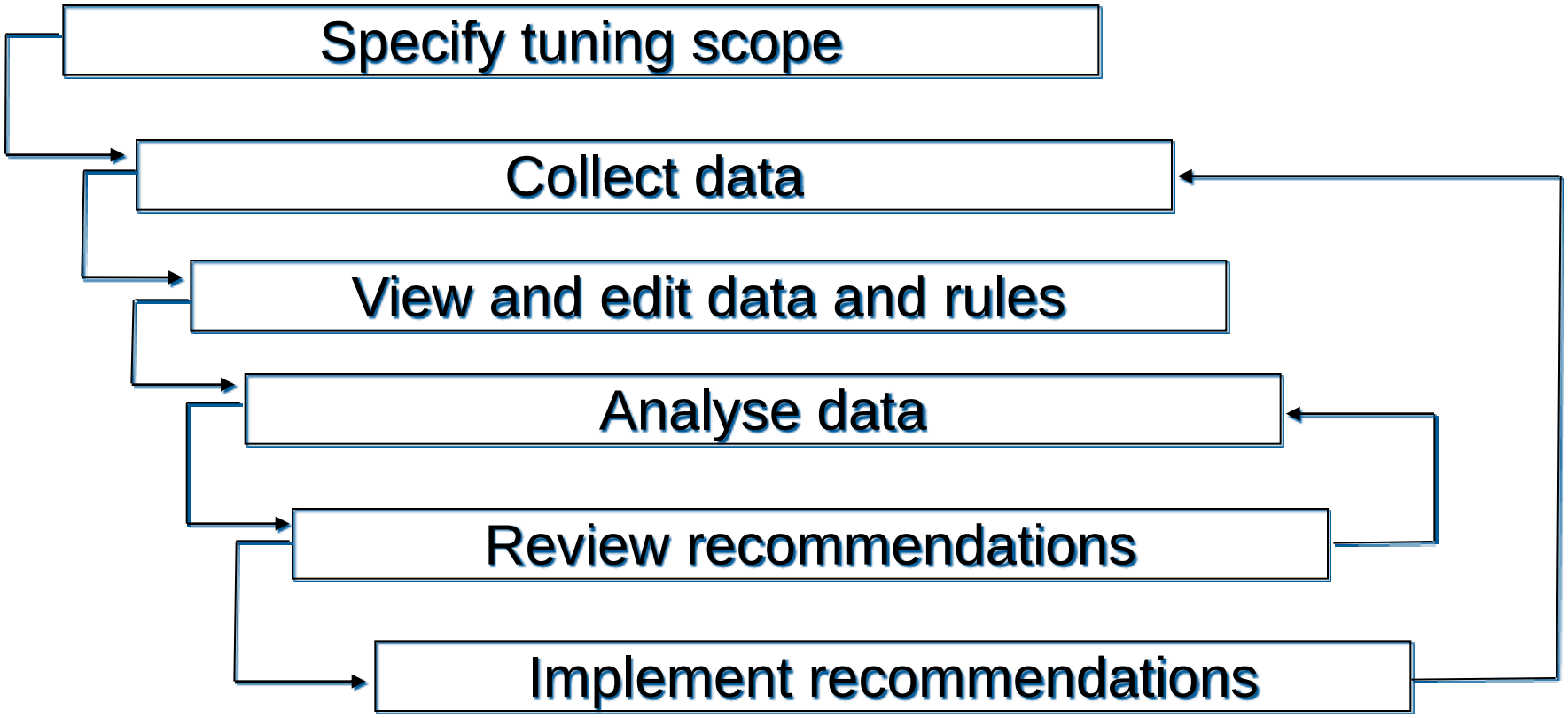
Good Book

- Oracle Wait Interface: A Practical Guide to Performance Diagnostics & Tuning
  - Oracle Press

What tools?

- Statspack / AWR / ASH
- Utlbstat/utlestat
- Alert log
  - (ora-600/ora-7445), archive log location full
- Trace files
- tkprof
- Views
  - dba_blockers/dba_waiters/V$Session/V$Session_Wait

Tuning Steps



Quick Checks for Performance

- Alert log for errors
- Unix / Windows system logs for errors
- Vmstat
- perfmon

Session Tracing

- 10046 Event
  - Level 1 Enable SQL Tracing
  - Level 4 Level 1 + bind variable information
  - Level 8 Level 1 + wait event statistics
  - Level 12 Level 1 + bind variable information + wait event statistics
- Alter Session
  - Alter session set events ‘10046 trace name context forever, level 12’;
- DBMS_System
  - exec dbms_system.set_ev(SID,SERIAL#,10046,12,’’);

tkprof

- Used to format trace files
- Can sort trace file by elapsed parsing/executing/fetching
  - Type tkprof to see full list
- Can show explain plan information

- Usage :
  - tkprof dbateam_ora_686.trc allan.txt sys=no

tkprof output

```
Rows     Row Source Operation
-------  ---------------------------------------------------
      1  SORT AGGREGATE (cr=7 pr=0 pw=0 time=222 us)
      1   TABLE ACCESS FULL TEST (cr=7 pr=0 pw=0 time=192 us)

********************************************************************************

select *
from
 test


call     count       cpu    elapsed       disk      query    current        rows
------- ------  -------- ---------- ---------- ---------- ----------  ----------
Parse        1      0.01       0.01          0          2          0           0
Execute      1      0.00       0.00          0          0          0           0
Fetch        2      0.00       0.00          0          7          0           1
------- ------  -------- ---------- ---------- ---------- ----------  ----------
total        4      0.01       0.01          0          9          0           1

Misses in library cache during parse: 1
Optimizer mode: ALL_ROWS
Parsing user id: 78

Rows     Row Source Operation
-------  ---------------------------------------------------
      1  TABLE ACCESS FULL TEST (cr=7 pr=0 pw=0 time=50 us)


Elapsed times include waiting on following events:
  Event waited on                             Times   Max. Wait  Total Waited
  ----------------------------------------   Waited  ----------  ------------
  SQL*Net message to client                       2        0.00          0.00
  SQL*Net message from client                     2        0.00          0.00
```

Why didn’t you may the index

From the plan

```
Rows     Row Source Operation
-------  ---------------------------------------------------
      1  TABLE ACCESS FULL TEST (cr=7 pr=0 pw=0 time=50 us)
```

It is not using an index

But why?

- No where clause
- Stats not up to date
- Cheaper cost to get data back from full table scan then index lookups
- Function around indexed column
  - WHERE UPPER(COL1) = ‘UPPERTEXT’
- Is NULL
- Use of “!=“ or “<>”
- Did you create the index in the correct schema

Bind Variables

- Bind variables are substitution variables used are used in place of literals
- Prepare ONCE execute MANY
- CURSOR_SHARING=SIMILAR/FORCE/EXACT
  - SIMILAR
    - Causes statements that may differ in some literals, but are otherwise identical, to share a cursor, unless the literals affect either the meaning of the statement or the degree to which the plan is optimized
  - FORCE
    - Forces statements to share cursors (in the where clause)
  - EXACT
    - Only statements that are identical can share the cursor
- You can’t substitute object names only literals
  - e.g. you can’t substitute a table name

Bind Variable Example

- No Bind Variables

```
select Col1 from test where Col1='Test1';
COL1
----------
Test1
```

- With Bind Variables

```
variable col1var varchar2(100)
exec :col1var := 'Test1';
select * from test where Col1=:col1var
COL1
----------
Test1
```

Bind Variables Example Continued 1

- PL/SQL by default allows the use of bind variables

```
create procedure test1(pv_bind varchar2)
AS
begin
    update test set col1 = 1
    where col1 = pv_bind;
    commit;
end;
/
```

Bind Variable Example Continued 2

- How to bypass bind variables in PL/SQL
- PL/SQL :-

execute immediate ‘update test set col1 = 1 where col1 = ‘||pv_bind;

- To use bind variables

execute immediate ‘update test set col1 = 1 where col1 = :x1’ using pv_bind;

- Almost all programming languages have the ability to use bind variables, as access to the database is provided through vendor specific API’s… the question is are the developers using them!
- Oracle provide JDBC/ODBC/.Net drivers which support bind variables

- JBDC has a preparedstatement which allows the use of bind variables

Top 10 Issues ….. 1-5

1. Bad Connection Management
2. Bad use of Cursors and Shared pool
3. Bad SQL - Consuming more resources than required
4. Non standard initialisation parameters
5. Getting database I/O wrong

Top 10 Issues ….. 6-10

6. Redo log problems
7. Serialization of data blocks in the buffer cache due to lock of free lists/free list groups/transaction slots
8. Long full table scans
9. High amounts of recursive SQL executed as SYS
10. Deployment / Migration errors

Questions

Any Questions?