

Adding Time Information into Tablespace Names

Introduction

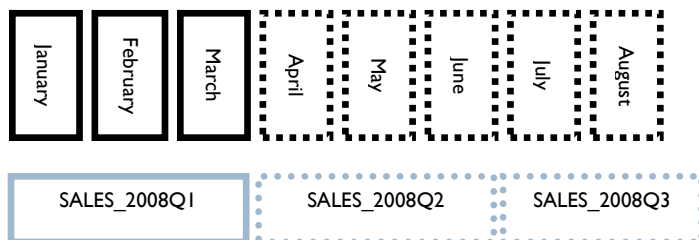
In VLDB databases, there is a common willing in using a tablespace naming convention that includes seasonal information of data within tablespace, such as CHURN_2008M01 or SALE_2008W50. This has various benefits in terms of ILM (Information Life Cycle) management. By just looking the name of a tablespace, the DBA can have a pretty good idea about the tablespace and segments within that tablespace.

Nevertheless, prior to 10g this convention can cause significant degeneration in system catalog performance if data windowing is used. In other words, if you periodically need to drop old tablespaces and add new ones, Oracle catalog starts to blow up.

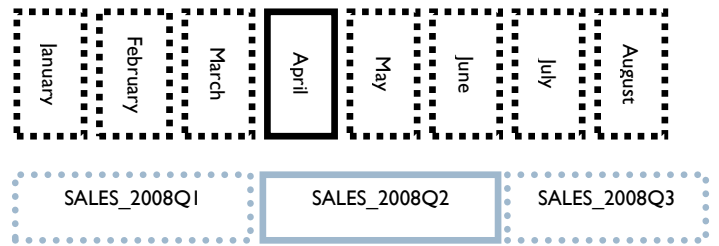
In this paper, you will find a tricky way of solving this problem by Oracle 10g.

Data Windowing and Tablespace Naming

Assume that by business a quarter of sales data is required to be stored. As a design issue sales table is partitioned monthly and each three months (a quarter) is stored in a tablespace named according to our convention. Picture of the first three months is



As the month April comes, January-March partitions would be dropped and SALES_2008Q1 tablespace will also become useless and be dropped.



Although querying `*_tablespaces` or `v$tablespace` views gives the impression that SALES_2008Q1 is removed from database catalog, in reality it is still in catalog. By querying `TS$` table you can see it.

```
SQL> select tablespace_name from dba_tablespaces
where tablespace_name='SALES_2008Q1';

no rows selected

SQL> select name,online$ from sys.ts$ where name =
'SALES_2008Q1';

NAME                                ONLINE$
-----                                -
SALES_2008Q1                          3
```

Therefore, what Oracle actually does in tablespace drops is to set `ONLINE$` column of `TS$` table from one to three (soft delete). When you drop SALES_2008Q1 and create SALES_2008Q2, you just add one more row to that table. In a database consisting of hundreds of tablespaces storing range-partitioned tables, such tablespace rotation will create a real garbage on `TS$` table.

More dramatically `TS$` is an index cluster table (`C_TS#` cluster). It shares the cluster blocks with another table `FET$`.

```
SQL> select table_name,cluster_name from dba_tables t
where cluster_name = 'C_TS#';

TABLE NAME CLUSTER NAME
-----
TS$         C_TS#
FET$        C_TS#
```

If you check the SQLs of catalog views, there are a lot of views build on these two tables. This means as the tablespaces are cycled by drop statement `C_TS#` cluster gets worse and worse.

As a result, many people aware of this fact advise VLDB sites not to use seasonal information in tablespace naming. Obviously, they are right.

Solution to Problem with 10g

In 10g, Oracle introduces a new SQL statement for renaming tablespaces. The statement simply changes the name of a tablespace in Oracle database.

```
SQL> alter tablespace sales_2008q1 rename to
sales_2008q3;
```

What it actually does on the background is important for the solution of our problem. Rename statement just performs two updates on the system catalog that means it does not add a new data into cluster or delete some data under the high-watermark of cluster segment.

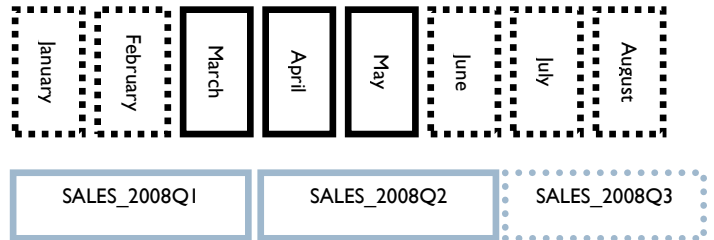
10046 trace shows the data change activities made for the execution of tablespace rename statement. First SQL updates no rows for our permanent tablespace renaming. Second one uses cluster index to access the data and updates columns of the old record.

```
...
alter tablespace sales_2008q2 rename to sales_2008q4
...
update sys.props$ set value$=:1
where
name = 'DEFAULT_TEMP_TABLESPACE' and upper(value$) = upper(:2)
...
update ts$ set name=:2,online$=:3,contents$=:4,undofile#=:5,undoblock#=:6,
blocksize=:7,dflmaxext=:8,dflinit=:9,dflincr=:10,dflextpct=:11,dflminext=:
:12,dflminlen=:13,owner#=:14,scnrwp=:15,scnbas=:16,pitrscnrwp=:17,
pitrscnbas=:18,dflogging=:19,bitmapped=:20,inc#=:21,flags=:22,plugged=:23,
spare1=:24,spare2=:25
where
ts#=:1
...
Rows      Row Source Operation
-----
0  UPDATE  TS$ (cr=4 pr=0 pw=0 time=617 us)
1  TABLE ACCESS CLUSTER TS$ (cr=4 pr=0 pw=0 time=228 us)
1  INDEX UNIQUE SCAN I_TS# (cr=1 pr=0 pw=0 time=37 us) (object id 7)
...

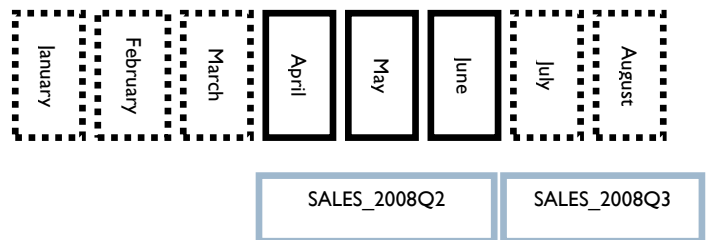
```

It, almost, changes nothing within cluster in a catastrophic way as *drop tablespace & create tablespace* method does.

Therefore, if we go over our first example, until the end of June, *SALES_2008Q3* is not needed.



As March become obsolete, we just rename the *SALES_2008Q1* as *SALES_2008Q3*. Therefore, there is no old record retained in the cluster to degenerate catalog performance. No addition or deletion is performed.



Conclusion

Including seasonal information in tablespace name, bring a number of merits, such as ease of *ILM* management. However prior to Oracle 10g this may cause significant catalog performance problems in VLDB sites by the time database grows.

Fortunately, 10g rename tablespace statement gives a tricky way of overcoming this problem and the capability to use this useful naming convention with peace.