DBA

INDEX REBUILD
REBUILDING INDEX IN ORACLE

Introduction

Excessive activity within a table can cause Oracle indexes to dynamically reconfigure themselves. This reconfiguration involves three activities:

- **Index splitting** This is when the addition of new table rows cause new index nodes to be created at existing levels.
- **Index spawning** At some point, the Oracle indexes will reach the maximum capacity for the level and the Oracle index will spawn, creating a deeper level structure
- **Index node deletion** As you may know, Oracle index nodes are not physically deleted when table rows are deleted, nor are the entries removed from the index. Rather, Oracle "logically" deletes the index entry and leaves "dead" nodes in the index tree.

Indexes require rebuilding when deleted leaf nodes appear or when the index has spawned into too many levels of depth. While it is tempting to write a script that rebuilds every index in the schema, bear in mind that Oracle contains many thousands of indexes, and a complete rebuild can be very time consuming. Hence, we need to develop a method to identify those indexes that will get improved performance with a rebuild.

View all indexes of a schema

*Select * from user_indexes;*

How to see index statistics

1. Compute index statistics

   analyze index <index_name> compute statistics;

   or

   execute dbms_stats.gather_index_stats('<schema_name>','<index_name>');

2. Validate index structure

   analyze index <index_name> validate structure;

3. See index statistics

   *select * from index_stats;*

When to rebuild index

1. When block gers per access is excessive `(blks_gets_per_access>5)`
2. When deleted leaf nodes comprise more than 20 percent of the index nodes
3. When any index shows depth of 4 or greater `(height >3)`

Rebuild index:

If any of the above criteria is satisfied, then we need to rebuild the index. Index rebuild can be done by following script.

alter index <index_name> rebuild index;

Procedure to rebuild index

```
create or replace PROCEDURE rebuild_index
    AS
BEGIN
    FOR x IN (
        SELECT
            index_name
        FROM
            user_indexes
        WHERE
            index_type = 'NORMAL'
    ) LOOP

-------------------COMPUTE STATISTICS-----------------------------------
        EXECUTE IMMEDIATE 'ANALYZE INDEX '
        || x.index_name
        || ' COMPUTE STATISTICS';
----------------------VALIDATE-------------------------------------------
        EXECUTE IMMEDIATE 'ANALYZE INDEX '
        || x.index_name
        || ' VALIDATE STRUCTURE';
        FOR i IN (
--------------------SELECT CANDIDATE INDEXES ONLY----------------------
            SELECT
                name,
                height,
                lf_rows,
                del_lf_rows,
                blks_gets_per_access,
                round( (del_lf_rows / lf_rows) * 100,2) AS ratio
            FROM
                index_stats
            WHERE
                (
                    lf_rows > 100
                    AND   del_lf_rows > 0
                )
                AND   (
                    height > 3
                    OR    ( ( del_lf_rows / lf_rows ) * 100 ) > 20
                    OR    blks_gets_per_access > 5
                )
        ) LOOP
--------------------------REBUILD STRUCTURE---------------------------
            EXECUTE IMMEDIATE 'ALTER INDEX '
            || i.name
            || ' REBUILD';
        END LOOP;

    END LOOP;
END;
```