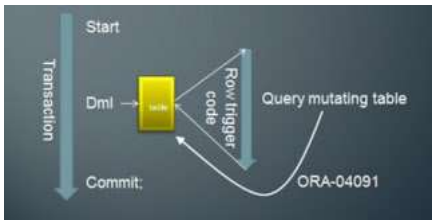
ORACLE DATABASE PL/SQL

MUTATING Table Error and How to Resolve it?

Mutating table Error Occurs when Trigger is Querying or Modifying a "Mutating Table"

Mutating error normally occurs when we are performing some DML operations and we are trying to select the affected record from the same trigger. So basically we are trying to select records in the trigger from the table that owns the trigger. This creates inconsistency and Oracle throws a mutating error.



Let's take an example in which we have to know total number Employees with Active status after any status is updated to 'Active'. We will see it with an example. First let us create a table and then trigger.

Create a table and insert records into that table.

Here is the table definition I have created and inserted some records.

```
SQL> DESC TEST;
 Name                    Null?  Type
 ----------------------------------------- -------- ----------------------------
 ID                              NUMBER
 NAME                             VARCHAR2(10)
 SALARY                           NUMBER(20)
 STATUS                           VARCHAR2(10)
SQL> SELECT * FROM TEST;
    ID  NAME       SALARY STATUS
---------- ---------- ---------- ----------
    102 Ankit      8000   Active
    104 Nikhil     69000  Active
    105 Rajan      18000  InActive
    107 Karan      101000 Active
    110 Sajal      88000  InActive
    101 Ravi       89000  Active
    109 Manu       777000 InActive
7 rows selected.
```

Now, Let's create a Mutating Trigger (Row Level) on Update of Status column of above table.

```
SQL> CREATE OR REPLACE TRIGGER MutatingTrigger  /*Row Level TRIGGER*/
 2 AFTER UPDATE OF STATUS ON TEST
 3 FOR EACH ROW
 4 DECLARE
 5 V_count NUMBER;
 6 BEGIN
 7 Select count(*) Into V_count From TEST
 8 Where STATUS='Active';
 9 DBMS_OUTPUT.PUT_LINE('Total Number of Active Records: '|| V_count);
 10 END;
```

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```
 11 /
Trigger created.
```

Now if we try to change status of any record to "Active", Oracle will throw a **Mutating Table Error** as we are trying to update the records and trigger is trying to select affected records in the same trigger.

```
SQL> UPDATE TEST
 2 SET STATUS='Active' Where ID IN(109,110);
UPDATE TEST
    *
ERROR at line 1:
ORA-04091: table HR.TEST is mutating, trigger/function may not see it
ORA-06512: at "HR.MUTATINGTRIGGER", line 4
ORA-04088: error during execution of trigger 'HR.MUTATINGTRIGGER
```

So, When you encounter an ORA-04091 error, the following error message will appear:

ORA-04091: table name is mutating, trigger/function may not see it

Cause - A statement executed a Trigger or custom PL/SQL Functions. That trigger/function tried to modify or query a table that is currently being modified by the statement that fired the trigger/function.

Now Let's Resolve this error.

Solution 1:
Create Statement Level Trigger instead of Row Level Trigger. Row Level Triggers can't read Mutating tables- Change Row Level Trigger to Statement Level Trigger:

IF we omit the 'For Each Row' clause from above Trigger, it will become statement level Trigger. Let's modify above trigger to statement level trigger.

```
SQL> CREATE OR REPLACE TRIGGER MutatingTrigger  /*Statement Level TRIGGER*/
 2 AFTER UPDATE OF STATUS ON TEST
 3 DECLARE
 4 V_count NUMBER;
 5 BEGIN
 6 Select count(*) Into V_count From TEST
 7 Where STATUS='Active';
 8 DBMS_OUTPUT.PUT_LINE('Total Number of Active Records: '|| V_count);
 9 END;
 10 /
Trigger created.
```

Let's try to fire the same Update statement now and see if you still get Mutating Error.

```
SQL> UPDATE TEST
 2 SET STATUS='Active' Where ID IN(109,110);
Total Number of Active Records: 6
2 rows updated.
SQL> SELECT * From TEST;
    ID NAME      SALARY STATUS
---------- ---------- ---------- ----------
    102 Ankit    8000   Active
    104 Nikhil   69000  Active
    105 Rajan    18000  InActive
    107 Karan    101000 Active
    110 Sajal    88000  Active
    101 Ravi     89000  Active
    109 Manu     777000 Active
7 rows selected.
```

As you can see it works fine with Statement Level Trigger. With 'For Each Row', session cannot query the same table. This restriction applies to all row level triggers and hence we run into mutating table error.

Solution2:
Make the transaction independent using PRAGMA AUTONOMOUS TRANSACTION.

Declare a Row level trigger as an Autonomous Transaction so that it is not in the same scope of the session issuing DML statements.

The **AUTONOMOUS_TRANSACTION** PRAGMA changes the way a subprogram works within a transaction. A subprogram marked with this PRAGMA can do SQL operations and commit or roll back those operations, without committing or rolling back the data in the main transaction. Autonomous transactions allow you to leave the context of the calling transaction, perform an independent transaction, and return to the calling transaction without affecting its state.

Following is the ROW Level Trigger defined as **PRAGMA AUTONOMOUS TRANSACTION**.

```
SQL> CREATE OR REPLACE TRIGGER MutatingTrigger
 2 AFTER UPDATE OF STATUS ON TEST
 3 FOR EACH ROW
 4 DECLARE
 5 V_count NUMBER;
 6 PRAGMA AUTONOMOUS_TRANSACTION;
 7 BEGIN
 8 Select count(*) Into V_count From TEST
 9 Where STATUS='Active';
 10 DBMS_OUTPUT.PUT_LINE('Total Number of Active Records: '|| V_count);
 11 END;
 12 /
Trigger created.
```

Now let's issue the Update statement again and see if now it works with ROW Level Trigger as now we have Created a Trigger with PRAGMA.

```
SQL> Select * From TEST;
    ID NAME      SALARY STATUS
---------- ---------- ---------- ----------
    102 Ankit      8000 Active
    104 Nikhil     69000 Active
    105 Rajan      18000 InActive
    107 Karan     101000 Active
    110 Sajal      88000 InActive
    101 Ravi      89000 Active
    109 Manu      777000 InActive
7 rows selected.
SQL> UPDATE TEST
 2 SET STATUS='Active' Where ID IN(109,110);
Total Number of Active Records: 4
Total Number of Active Records: 4
2 rows updated.
SQL> SELECT * From TEST;
    ID NAME      SALARY STATUS
---------- ---------- ---------- ----------
    102 Ankit      8000 Active
```

By defining Row Level trigger as an AUTONOMOUS TRANSACTION, we got rid of Mutating table error but result is not correct. Updated records are not getting reflected. So one has to be very careful while using this approach.

Solution 3:
Avoid Mutating Error Using Compound Trigger. In Oracle 11g, Oracle has made is much easier by introducing Compound Trigger.

A compound trigger allows code for one or more timing points for a specific object to be combined into a single trigger. The individual timing points can share a single global declaration section, whose state is maintained for the lifetime of the statement. Once a statement ends, due to successful completion or an error, the trigger state is cleaned up.

Let's create a Compound Trigger to resolve Mutating Table Error.

```
SQL> CREATE OR REPLACE TRIGGER MutatingTrigger
 2 FOR UPDATE
 3 ON TEST
 4 COMPOUND TRIGGER
 5 /*Declaration Section*/
 6 V_count NUMBER;
 7
 8 AFTER EACH ROW IS
 9 BEGIN
 10 DBMS_OUTPUT.PUT_LINE('Record Updated');
 11 END AFTER EACH ROW;
 12
 13 AFTER STATEMENT IS
 14 BEGIN
 15 Select count(*) Into V_count
 16 From TEST Where STATUS = 'Active';
 17 DBMS_OUTPUT.PUT_LINE('Total Number of Active Records: '|| V_count);
 18 END AFTER STATEMENT;
 19
 20 END MutatingTrigger;
```


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```
 21 /
Trigger created.
```

Now let's issue the Update statement and see how it works with **Compound Trigger.**

```
SQL> SELECT * From TEST;
    ID NAME      SALARY STATUS
---------- ---------- ---------- ----------
    102 Ankit      8000 Active
    104 Nikhil     69000 Active
    105 Rajan      18000 InActive
    107 Karan     101000 Active
    110 Sajal      88000 InActive
    101 Ravi      89000 Active
    109 Manu      777000 InActive
7 rows selected.
SQL> UPDATE TEST
 2 SET STATUS='Active' Where ID IN(109,110);
Record Updated
Record Updated
Total Number of Active Records: 6
2 rows updated.
SQL> SELECT * From TEST;
    ID NAME      SALARY STATUS
---------- ---------- ---------- ----------
    102 Ankit      8000 Active
    104 Nikhil     69000 Active
    105 Rajan      18000 InActive
    107 Karan     101000 Active
    110 Sajal      88000 Active
    101 Ravi      89000 Active
    109 Manu      777000 Active
7 rows selected.
```

Here we get correct result without getting any Mutating Table error.

There are also other ways to resolve this problem like using Temporary Table. I will update this or post a new blog for the same.

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Anonymous October 17, 2016 at 10:15 AM

nicely explained...

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Ravikant Baluni January 29, 2017 at 4:18 AM

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