



regoUniversity 2018

SQL Tuning | Tips and Tricks

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Introductions

- Take 5 Minutes
- Turn to a Person Near You
- Introduce Yourself
- Business Cards



Agenda

- Review Prior Year Topics
- Left Outer Join Misconceptions
- Inline Views vs Subquery
- Investment Level OBS Join and Full Path
- OBS Filtering
- Subquery Factoring / Common Table Expression
- Recursion

Analytic Functions

- Most recent status report

```
SELECT INVI.CODE
, INVI.NAME
, SR.REPORT_DATE
, SR.RNUM

FROM INV_INVESTMENTS INVI
JOIN (SELECT SR.ID
, SR.ODF_PARENT_ID
, SR.COP_REPORT_DATE REPORT_DATE
, ROW_NUMBER() OVER (PARTITION BY SR.ODF_PARENT_ID
ORDER BY SR.COP_REPORT_DATE DESC, SR.CREATED_DATE DESC) RNUM
FROM ODF_CA_COP_PRJ_STATUSRPT SR
WHERE 1=1) SR ON INVI.ID = SR.ODF_PARENT_ID AND SR.RNUM = 1

WHERE 1=1
```

- LAG/LEAD – Finds rows a number of rows from the current row
- FIRST_VALUE/LAST_VALUE – Finds first or last value in an ordered group
- RANK/DENSE_RANK – Rank items in a group
- ROW_NUMBER – Assign a unique sequential value to each row
- SUM – Compute running totals

Double Dipping

- Accessing the same data twice
- Forecast and Budget totals

```
SELECT INVI.CODE
, INVI.NAME
, SUM(CASE WHEN FP.PLAN_TYPE_CODE = 'FORECAST' THEN FP.TOTAL_COST END) FORECAST_COST
, SUM(CASE WHEN FP.PLAN_TYPE_CODE = 'BUDGET' THEN FP.TOTAL_COST END) BUDGET_COST

FROM INV_INVESTMENTS INVI
JOIN FIN_PLANS FP ON INVI.ID = FP.OBJECT_ID AND INVI.ODF_OBJECT_CODE = FP.OBJECT_CODE

WHERE FP.IS_PLAN_OF_RECORD = 1

GROUP BY INVI.CODE
, INVI.NAME
```

- Availability vs Allocation vs ETC vs Actuals

Left Outer Join (OBS Associations)

- What is a Left Outer Join
- How to filter results of a Left Outer Join
- OBS Associations
- Selecting one OBS Type

OBS Association Subquery

- Scalar subquery – can only return one value
- Good chance of using an index

```
SELECT INVI.ID
, INVI.CODE
, INVI.NAME
, (SELECT OBSU.NAME UNIT_NAME
   FROM PRJ_OBS_TYPES OBST
   JOIN PRJ_OBS_UNITS OBSU ON OBST.ID = OBSU.TYPE_ID
   JOIN PRJ_OBS_ASSOCIATIONS OBSA ON OBSU.ID = OBSA.UNIT_ID
   WHERE OBST.UNIQUE_NAME = 'dlm_project_obs'
   AND OBSA.RECORD_ID = INVI.ID
   AND OBSA.TABLE_NAME = 'SRM_PROJECTS') SUBQUERY_UNIT_NAME

FROM INV_INVESTMENTS INVI

WHERE INVI.ID = 5000000
```

OBS Association Inline View

- Inline View – can return multiple values
- Will likely not use an index
- Left Outer Joins will build the entire result set

```
SELECT INVI.ID  
      , INVI.CODE  
      , INVI.NAME  
      , OBS.UNIT_ID  
      , OBS.UNIT_CODE  
      , OBS.UNIT_NAME  
  
FROM INV_INVESTMENTS INVI  
LEFT JOIN (SELECT OBSA.RECORD_ID, OBSU.ID UNIT_ID  
              , OBSU.UNIQUE_NAME UNIT_CODE, OBSU.NAME UNIT_NAME  
            FROM PRJ_OBS_TYPES OBST  
            JOIN PRJ_OBS_UNITS OBSU ON OBST.ID = OBSU.TYPE_ID  
            JOIN PRJ_OBS_ASSOCIATIONS OBSA ON OBSU.ID = OBSA.UNIT_ID  
            WHERE OBST.UNIQUE_NAME = 'dlm_project_obs'  
            AND OBSA.TABLE_NAME = 'SRM_PROJECTS') OBS ON INVI.ID = OBS.RECORD_ID  
  
WHERE INVI.ID = 5000000
```


Investment OBS Association

- OBS Associations Table Names
- OBS Full Path

```

SELECT INVI.ID
, INVI.CODE
, INVI.NAME
, OBS.UNIT_ID
, OBS.UNIT_CODE
, OBS.UNIT_NAME
, OBS_UNIT_FULL_PATH(OBS.UNIT_ID) OBS_PATH

FROM INV_INVESTMENTS INVI
LEFT JOIN (SELECT OBSA.RECORD_ID, O.CODE OBJECT_CODE
, OBSU.ID UNIT_ID, OBSU.UNIQUE_NAME UNIT_CODE, OBSU.NAME UNIT_NAME

FROM PRJ_OBS_TYPES OBST
JOIN PRJ_OBS_UNITS OBSU ON OBST.ID = OBSU.TYPE_ID
JOIN PRJ_OBS_ASSOCIATIONS OBSA ON OBSU.ID = OBSA.UNIT_ID
JOIN ODF_OBJECTS O ON OBSA.TABLE_NAME = O.OBS_CODE
WHERE OBST.UNIQUE_NAME = 'dlm_project_obs') OBS ON INVI.ID = OBS.RECORD_ID
AND INVI.ODF_OBJECT_CODE = OBS.OBJECT_CODE

WHERE INVI.ID = 5000000
  
```

OBS Filtering

- Show all results with no OBS filter is selected
- Accommodate unit only, unit and descendants

```

SELECT INVI.ID INVEST_ID
, INVI.CODE INVEST_CODE
, INVI.NAME INVEST_NAME

FROM INV_INVESTMENTS INVI

WHERE 1=1
AND (
    (:IOBS_ID IS NULL) OR
    (EXISTS (SELECT 1
        FROM OBS_UNITS_FLAT_BY_MODE OBSM
        JOIN PRJ_OBS_ASSOCIATIONS OBSA ON OBSM.LINKED_UNIT_ID = OBSA.UNIT_ID
        JOIN ODF_OBJECTS O ON OBSA.TABLE_NAME = O.OBS_CODE
        WHERE OBSM.UNIT_ID = :IOBS_ID
        AND OBSM.UNIT_MODE = NVL(:IOBS_MODE, 'OBS_UNIT_AND_CHILDREN')
        AND OBSA.RECORD_ID = INVI.ID
        AND O.CODE = INVI.ODF_OBJECT_CODE))
    )

```

Subquery Factoring

- WITH Clause
- Reduce double dipping and code complexity
- Generate a temporary dataset

```

WITH OBS_ASSOC AS (
  SELECT OBSA.ID ASSOC_ID
    , OBSA.RECORD_ID
    , OBSA.TABLE_NAME
    , O.CODE OBJECT_CODE
    , OBSU.ID OBS_ID
    , OBSU.UNIQUE_NAME OBS_CODE
    , OBSU.NAME OBS_NAME
    , OBS_UNIT_FULL_PATH(OBSU.ID) OBS_PATH
  FROM PRJ_OBS_TYPES OBST
  JOIN PRJ_OBS_UNITS OBSU ON OBST.ID = OBSU.TYPE_ID
  JOIN PRJ_OBS_ASSOCIATIONS OBSA ON OBSU.ID = OBSA.UNIT_ID
  JOIN ODF_OBJECTS O ON OBSA.TABLE_NAME = O.OBS_CODE
  WHERE OBST.UNIQUE_NAME = 'dlm_project_obs'
)

SELECT INVI.ID INVEST_ID
  , INVI.CODE INVEST_CODE
  , INVI.NAME INVEST_NAME
  , IOBS.OBS_NAME INVEST_OBS
  , IOBS.OBS_PATH INVEST_OBS_PATH
  , SRMR.ID RESOURCE_ID
  , SRMR.FULL_NAME RESOURCE_NAME
  , ROBS.OBS_NAME RESOURCE_OBS
  , ROBS.OBS_PATH RESOURCE_OBS_PATH
FROM INV_INVESTMENTS INVI
LEFT JOIN OBS_ASSOC IOBS ON INVI.ID = IOBS.RECORD_ID AND INVI.ODF_OBJECT_CODE = IOBS.OBJECT_CODE
JOIN PRTEAM TM ON INVI.ID = TM.PRPROJECTID
JOIN SRM_RESOURCES SRMR ON TM.PRRESOURCEID = SRMR.ID
LEFT JOIN OBS_ASSOC ROBS ON SRMR.ID = ROBS.RECORD_ID AND ROBS.TABLE_NAME = 'SRM_RESOURCES'

WHERE 1=1

```

Recursion

- Using the WITH clause to recurse
- Get OBS Full Path

```
WITH OBS_PATH (ID, TYPE_ID, UNIQUE_NAME, NAME, LVL, OBS_PATH) AS
SELECT OBSU.ID, OBSU.TYPE_ID, OBSU.UNIQUE_NAME, OBSU.NAME, 1 LVL
, '/' || OBSU.NAME OBS_PATH
FROM PRJ_OBS_UNITS OBSU
WHERE OBSU.PARENT_ID IS NULL
UNION ALL
SELECT OBSU.ID, OBSU.TYPE_ID, OBSU.UNIQUE_NAME, OBSU.NAME
, OBS.LVL + 1 LVL, OBS.OBS_PATH || '/' || OBSU.NAME OBS_PATH
FROM PRJ_OBS_UNITS OBSU
JOIN OBS_PATH OBS ON OBSU.PARENT_ID = OBS.ID
WHERE 1=1

SELECT OBST.UNIQUE_NAME OBS_TYPE_CODE
, OBST.NAME OBS_TYPE
, OBSP.UNIQUE_NAME
, OBSP.NAME
, OBSP.LVL
, OBSP.OBS_PATH
FROM PRJ_OBS_TYPES OBST
JOIN OBS_PATH OBSP ON OBST.ID = OBSP.TYPE_ID
WHERE OBST.UNIQUE_NAME = 'd1m_project_obs'
```

Questions?



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Let Rego be your guide.

Thank You For Attending regoUniversity

Instructions for PMI credits

- Access your account at pmi.org
- Click on **Certifications**
- Click on **Maintain My Certification**
- Click on **Visit CCR's** button under the **Report PDU's**
- Click on **Report PDU's**
- Click on **Course or Training**
- Class Name = **regoUniversity**
- Course Number = **Session Number**
- Date Started = **Today's Date**
- Date Completed = **Today's Date**
- Hours Completed = **1 PDU per hour of class time**
- Training classes = **Technical**
- Click on **I agree** and **Submit**



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