Module 2
SQL Subtotal Operators

Lesson 3: SQL ROLLUP Operator

Lesson Objectives

- Write SQL SELECT statements using the ROLLUP operator

- Use the UNION operator to demonstrate understanding of the ROLLUP operator

- Perform calculations to demonstrate understanding of the ROLLUP operator

- Reflect on the importance of the ROLLUP operator

ROLLUP Operator Characteristics

Partial set of subtotals

Appropriate for hierarchical dimensions

Order dependent, coarsest to finest

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ROLLUP/GROUP BY Comparison

SELECT Year, Month, SUM(Sales) …
GROUP BY ROLLUP(Year, Month)

Year	Month	SUM(Sales)
2020	Jan	100
2020	Feb	75
2020	Mar	150
2021	Jan	100
2021	Feb	200
2021	Mar	50
2020	-	325
2021	-	350
-	-	675

SELECT Year, Month, SUM(Sales) …
GROUP BY Year, Month

Year	Month	SUM(Sales)
2020	Jan	100
2020	Feb	75
2020	Mar	150
2021	Jan	100
2021	Feb	200
2021	Mar	50

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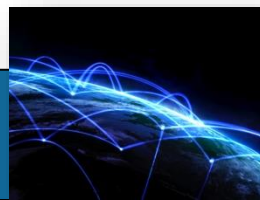
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ROLLUP Example

- Summarize (SUM, COUNT, and MIN) store sales for USA and Canada between 2020 and 2021 by year and month
- Generate partial subtotals for year and month

```
SELECT TimeYear, TimeMonth, SUM(SalesDollar) AS SumSales,
       MIN(SalesDollar) AS MinSales, COUNT(*) AS RowCount
 FROM SSSales, SSStore, SSTimeDim
 WHERE SSSales.StoreId = SSStore.StoreId
   AND SSSales.TimeNo = SSTimeDim.TimeNo
   AND StoreNation IN ( 'USA','Canada')
   AND TimeYear BETWEEN 2020 AND 2021
 GROUP BY ROLLUP(TimeYear, TimeMonth)
 ORDER BY TimeYear, TimeMonth;
```

ROLLUP Calculations

- Two grouping columns
  - N distinct values in outer most column
  - Maximum subtotal rows: $N + 1$
- Three grouping columns
  - ROLLUP (Col1, Col2, Col3) where Col1 has N distinct values, Col2 has M distinct values
  - Maximum subtotal rows: $N \times M + N + 1$
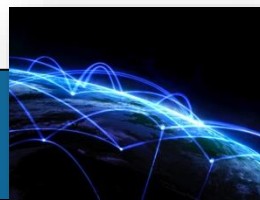- k+1 subtotal groups for k columns

SELECT Statement without ROLLUP

```
SELECT TimeYear,TimeMonth,
       SUM(SalesDollar) AS SumSales

              …

GROUP BY TimeYear, TimeMonth

UNION

SELECT TimeYear, NULL, SUM(SalesDollar) AS
  SumSales

              …

GROUP BY TimeYear

UNION

SELECT NULL, NULL, SUM(SalesDollar) AS SumSales
```

Additional ROLLUP Problems

- SELECT statement with ROLLUP operator
  - Sum store sales for USA and Canada in 2020 and 2021 by year, quarter, and month
  - Sort in a convenient order
  - Partial set of subtotals
- Equivalent SELECT statement without ROLLUP operator
- Documents in module 2 for lesson examples and additional practice problems

Summary

- Support subtotal computations common in pivot tables

- ROLLUP operator for partial subtotals

- Appropriate for hierarchical dimensions

- Not primitive operator but strong advantages over UNION operations