

OLAP Reporting Overview

What is a CUBE?

- **A multi-dimensional data structure for FAST analysis of large amounts of data**
- **Pre-calculated and stored as pre-aggregated sums**
- **Taken from detailed data in the data warehouse**
- **Sits within or on-top-of the data warehouse**
- **Created and accessed via an OLAP tool**

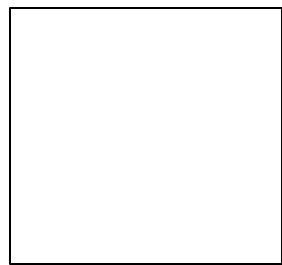
OLAP Reporting Overview

Why use a CUBE?

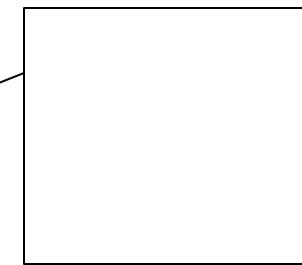
- **Aggregates are calculated during cube refresh**
- **Refresh is typically scheduled to run daily following the daily warehouse ETL process**
- **Avoids calculating the same sums over and over**
- **Pre-calculated sums are based on customer usage of most commonly combined dimensions**
- **Cubes store summed facts at a higher grain than the base, atomic fact tables**
- **THEREFORE: queries against the cube(s) run much faster than queries against the fact tables**

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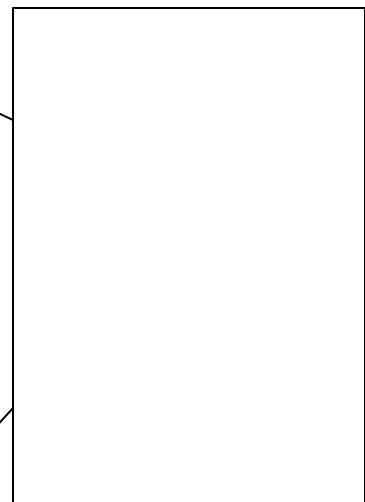
Region Dimension



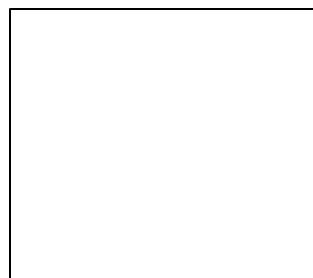
Product Dimension



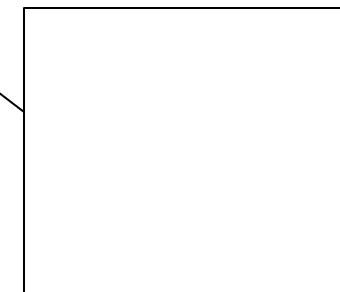
Sales Fact



Product Dimension

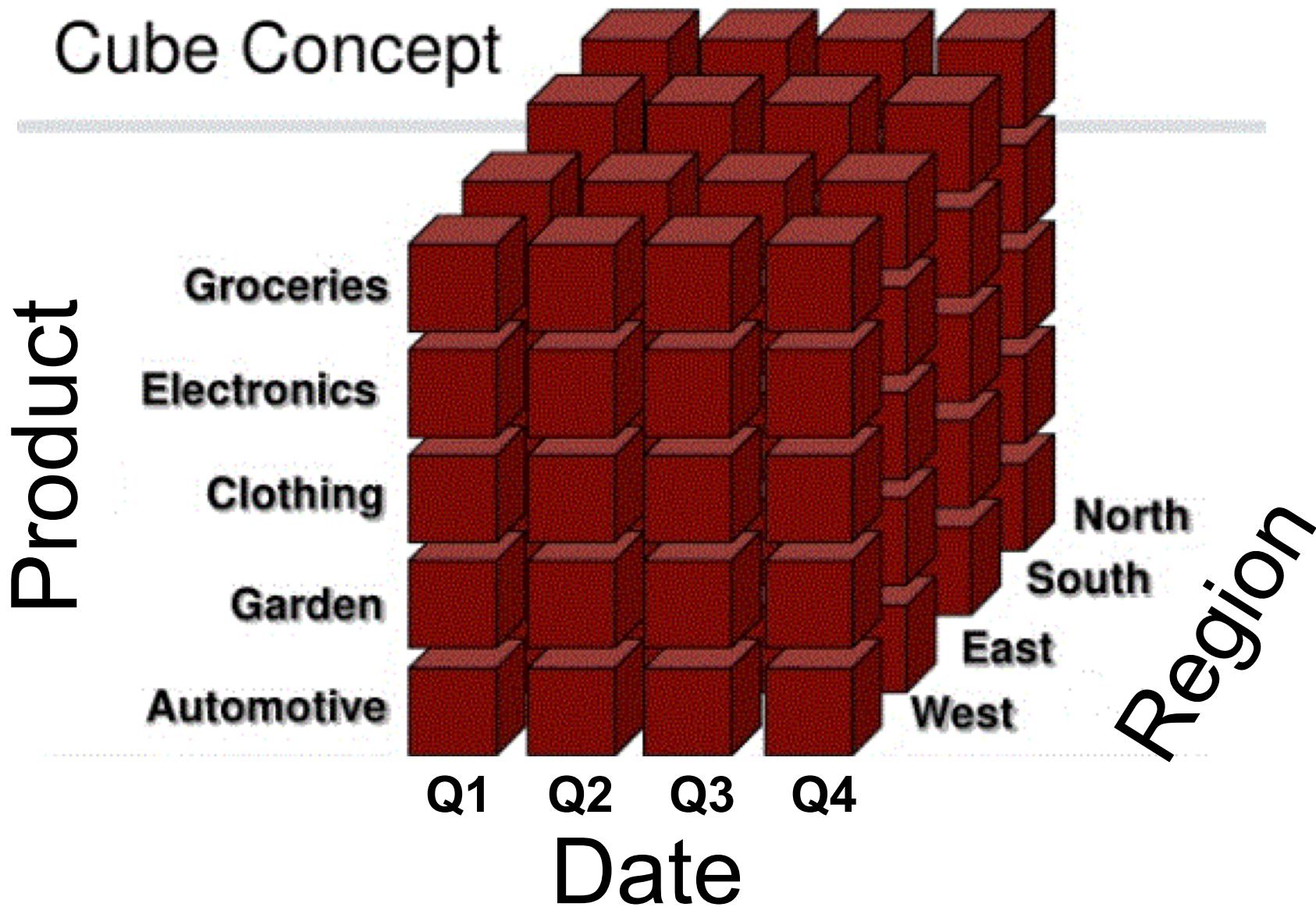


Date Dimension



OLAP Reporting Overview

Cube Concept



OLAP Reporting Overview

Consider (pseudo code)

```
Insert Into DW_Cube values (
```

```
    Select s.productID, s.dateID,  
          s.regionID, sum(sales_amount)
```

```
    From sales_fact s, product_dim p,  
         date_dim d, region_dim r
```

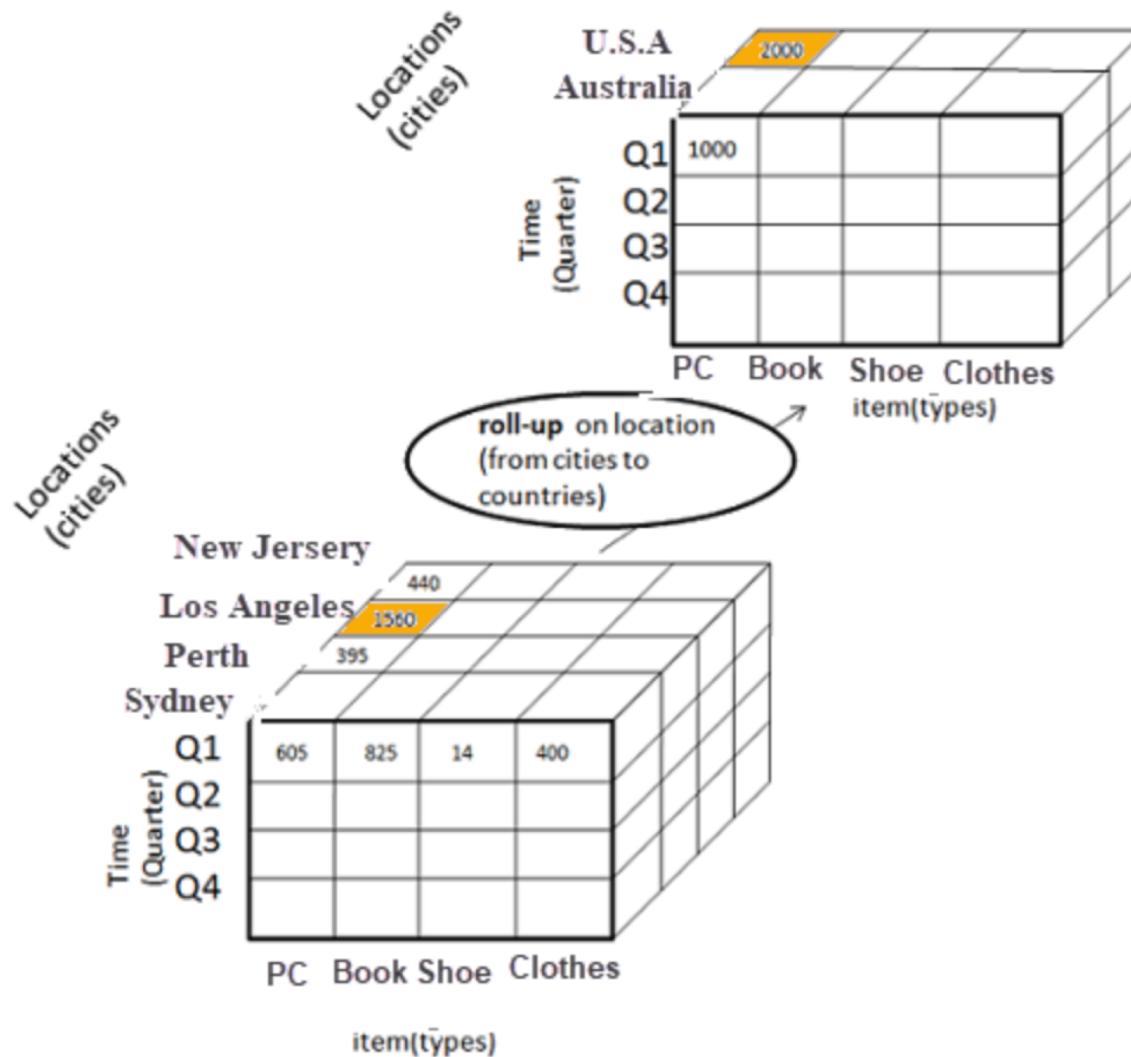
```
    Where s.productID = p.productID and  
          s.dateID = d.dateID and  
          s.regionID = r.regionID
```

```
    Group by s.productID, s.dateID,  
            s.regionID
```

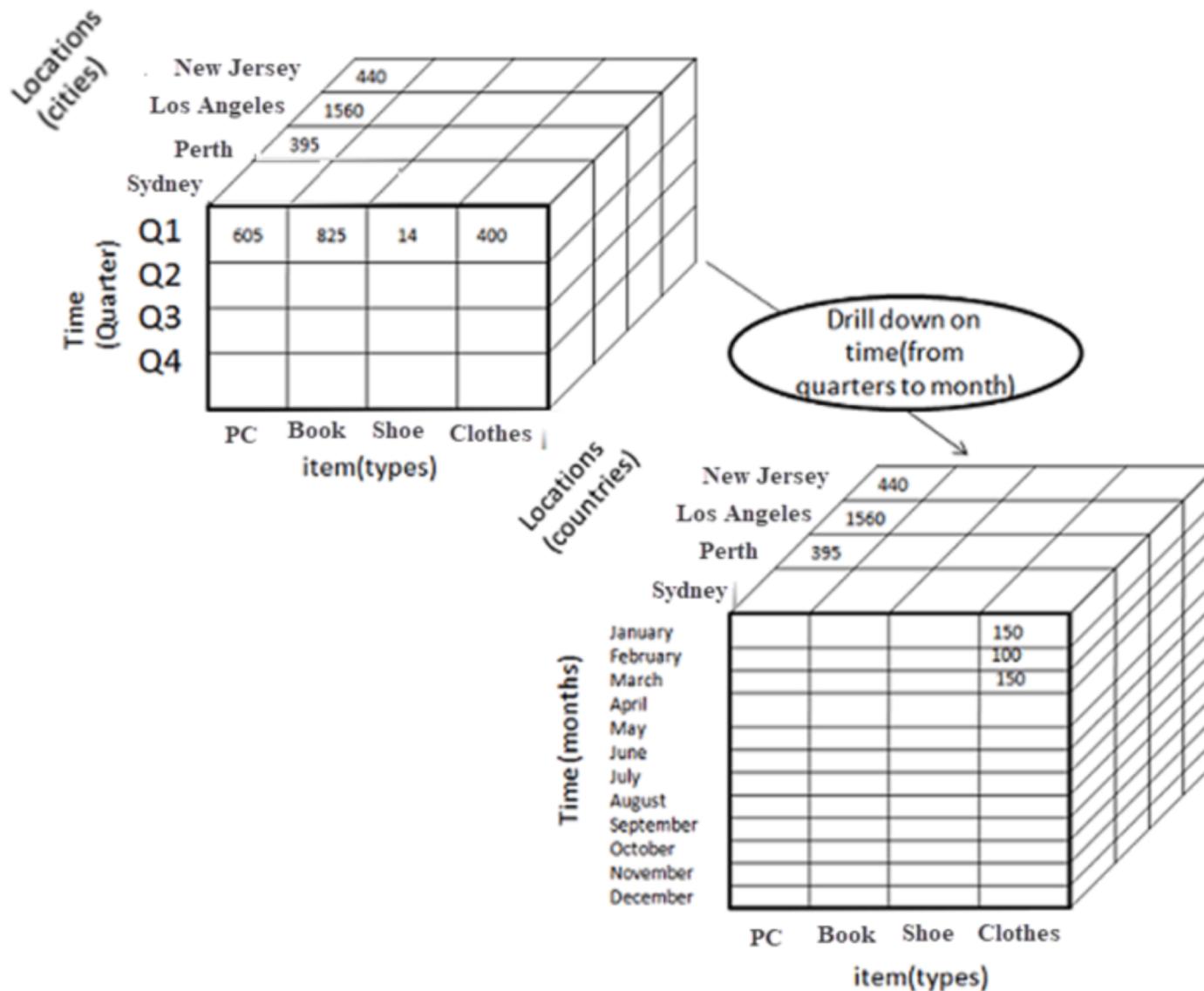
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One Cell in the cube represents the SUM of sales_amount (FACT) rolled up by every combination of the dimensions.

OLAP Reporting Overview - RollUp



OLAP Reporting Overview – Drill-Down



OLAP Reporting Overview

OLAP processing terms

- Cube
- Roll-Up
- Drill-Down
- Slice
- Dice
- Pivot
- Drill-Across
- Drill-Through