Data Mining

Ch2. Introduction to Data Warehousing

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DATA CUBES

- We all are familiar with Relational Database
- Relational databases include tables and fields which are joined together by keys.
- Relational databases are great – businesses cannot run without them.
- They are optimized to **store** information into a system in a cohesive manner.
- But, **NOT** optimized for **getting** the information out of the system.
- **Data Cubes** serve for such purpose

DATA CUBES

Example: “How much profit did we make selling Wai Wai Noodles to Iceland last year?”

- In business decision, such query are often too frequent.
- The problem with a relational database, is to answer that type of question, we need to get information that is scattered across many different tables.
- In a typical database, to answer this question we may need to combine data from the:
  - Customer table
  - Country/Region table
  - Item table
  - Sales Invoice Line
  - Sales Credit Memo Line
  - Sales Invoice Header
  - Sales Credit Memo Header
- Finally, mash up and extract the data to get the information that we need.
- **Implications**: slow and resource intensive process.

DATA CUBES

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- Optimal Solution must be **easy** and **quick**: **Data Cubes.**
- Other related question must also be answered with it:
  - Who were these customers?
  - Are sales growing or shrinking?
  - Did sales fluctuate month-over-month?
  - Who was our top salesperson?
  - Could we put that person to a better use?

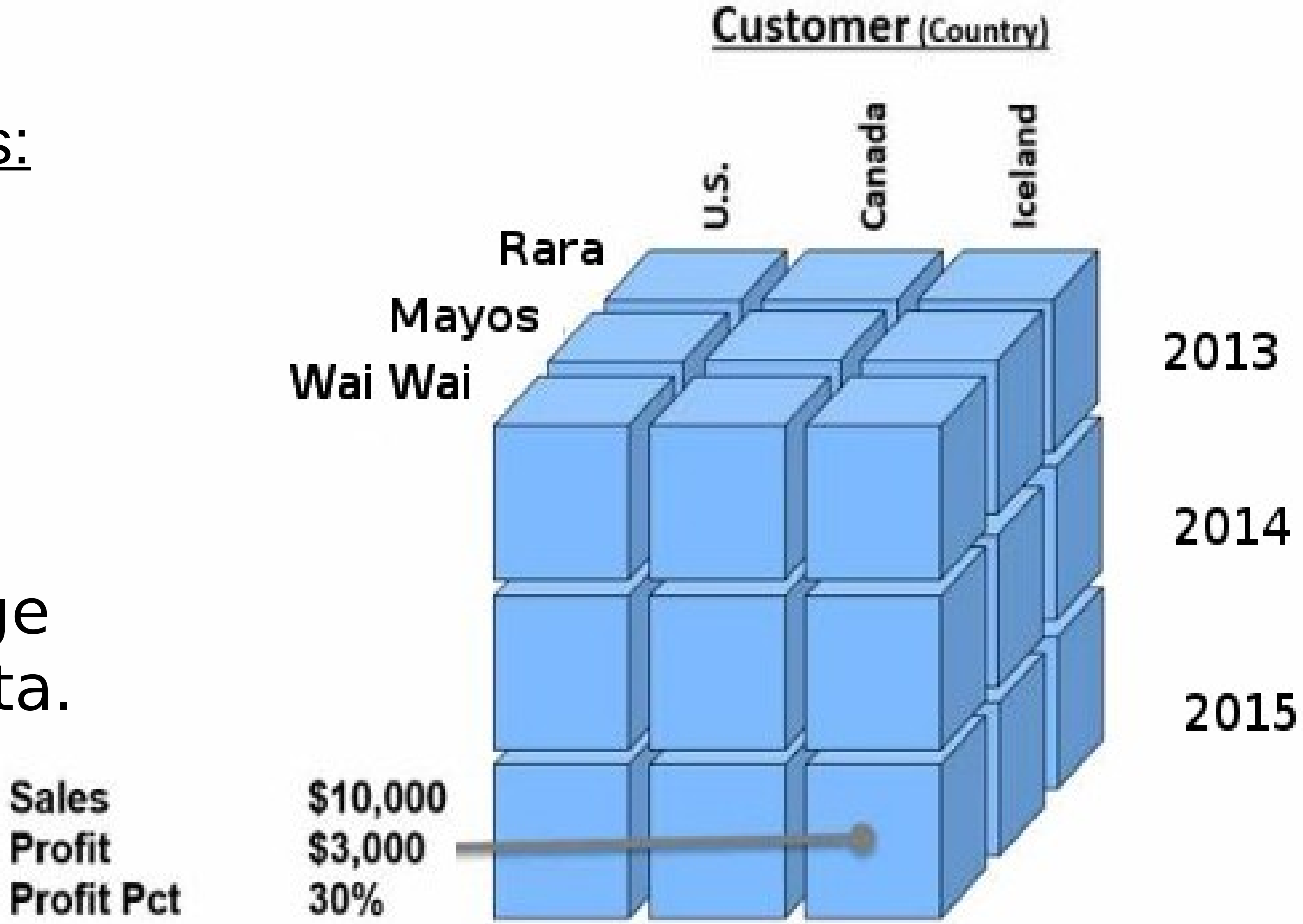
Cubes reorganizes a copy of the data so that such information can be accessed easily and quickly.

DATA CUBES

multi-dimensional way of organizing data

Example

- three dimensions: Products, customers (by country), posting date (year).
- near instant analysis of large amounts of data.



- To see profit for **Wai Wai** in **Iceland** in **2015**, all of that data is put together in the **Cube**

DATA CUBES

Now, more into Data Cubes!

- Data cube is a structure that enable OLAP to achieves the multidimensional functionality.
- The data cube is used to represent data along some measure of interest.
- Data Cubes are an easy way to look at the data (allow us to look at complex data in a simple format).
- Although called a "cube", it can be 2-dimensional, 3-dimensional, or higher-dimensional.

Dimensions And Measures

- data cubes have categories of data called **dimensions** and **measures**.
- **measure**
  - represents some fact (or number) such as cost or units of service.
- **dimension**
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Data Cubes Concepts

- Three important concepts associated with data cubes :
    1. Slicing.
    2. Dicing.
    3. Rotating.

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- Some times called pivoting.
- Rotating changes the dimensional orientation of the report from the cube data.
- For example …
  - rotating may consist of swapping the rows and columns, or moving one of the row dimensions into the column dimension
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