

# DATA ANALYTICS

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# INFORMATION PRESENTATION

- Disseminate the discovered insights to make BI more valuable to concerned users.
- Technologies that support decision making
  - Tactical decisions
  - Strategic decisions
- Online analytical processing (OLAP)
- Visual analytics
- Business Performance Management
- Performance dashboards

# ONLINE ANALYTICAL PROCESSING

- Transactional databases are accessed by online transaction processing (OLTP) applications
- OLAP was coined by Edgar Codd [1970 ]
- OLAP is used essentially to query the DW
- OLAP supports the presentation of data in a multi-dimensional format called a cube
- The numeric facts in the DW known as the measures

# ANALYSIS OF DATA IN DW

- Online analytical processing (OLAP)
  - Data driven activities performed by end users to query the online system and to conduct analyses
  - Data cubes, drill-down / rollup, slice & dice, ...
- OLAP Activities
  - Generating queries (query tools)
  - Requesting ad hoc reports
  - Conducting statistical and other analyses

# ANALYSIS OF DATA STORED IN DW

## OLTP VS. OLAP

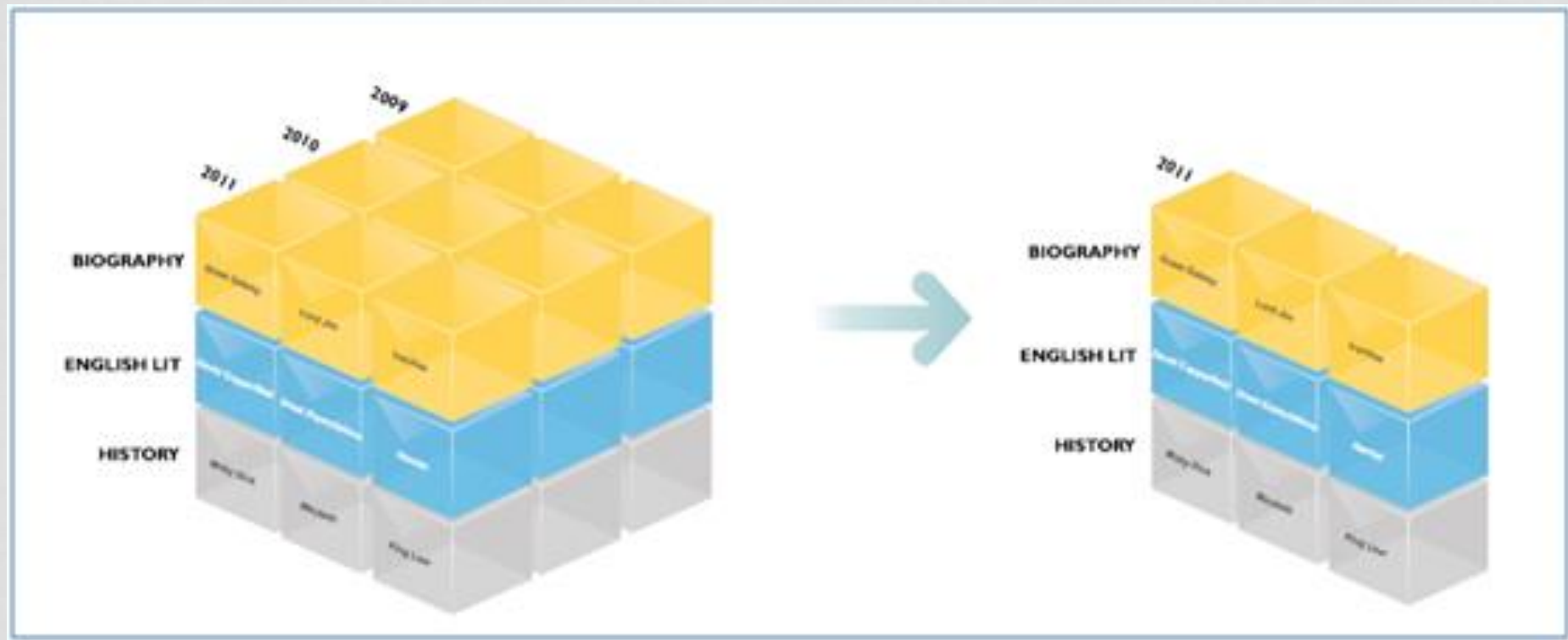
- OLTP (online transaction processing)
  - A system that is primarily responsible for capturing and storing data related to day-to-day business functions such as ERP, CRM, SCM, POS,
  - The main focus is on efficiency of routine tasks
- OLAP (online analytic processing)
  - A system is designed to address the need of information extraction by providing effectively and efficiently ad hoc analysis of organizational data
  - The main focus is on effectiveness

# OLAP OPERATIONS

- **Slice** – a subset of a multidimensional array
- **Dice** – a slice on more than two dimensions
- **Drill Down/Up** – navigating among levels of data ranging from the most summarized (up) to the most detailed (down)
- **Roll Up** – computing all of the data relationships for one or more dimensions
- **Pivot** – used to change the dimensional orientation of a report or an ad hoc query-page display

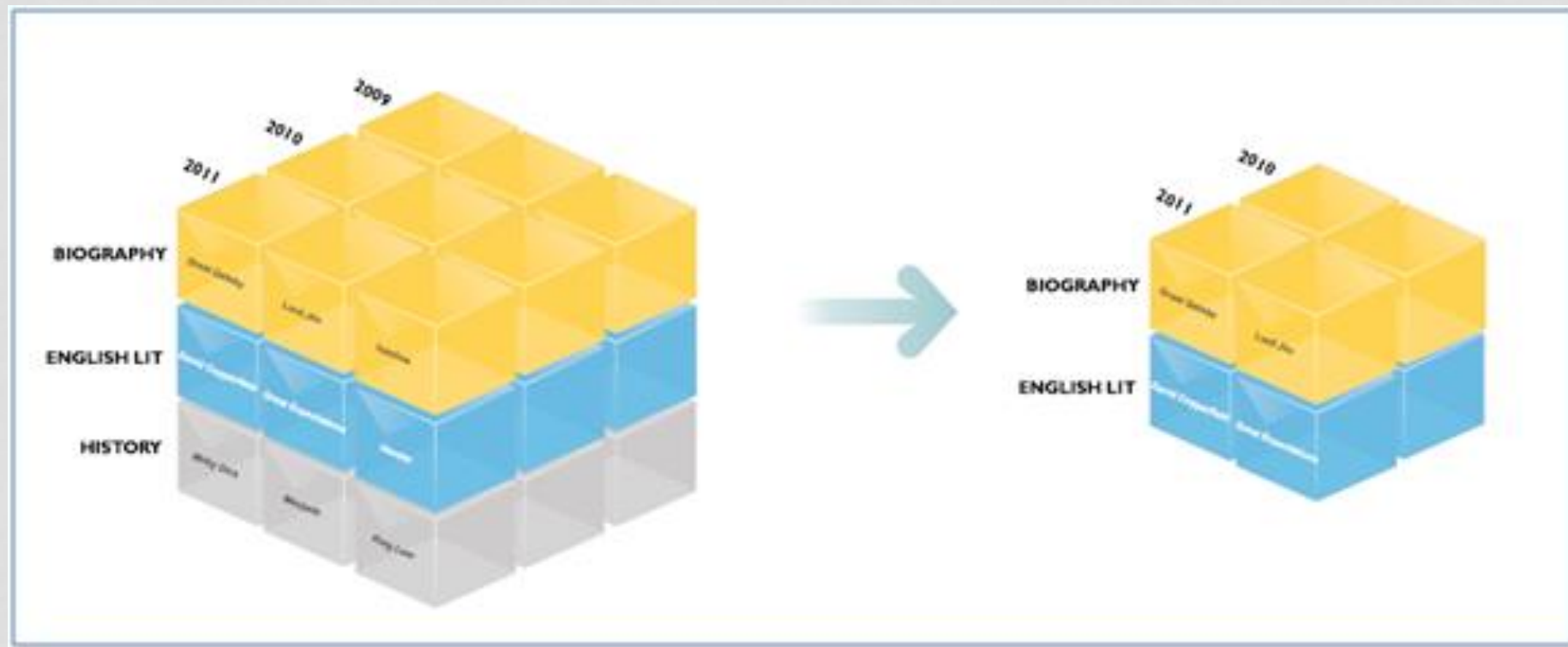
# OLAP

- Slice of one year



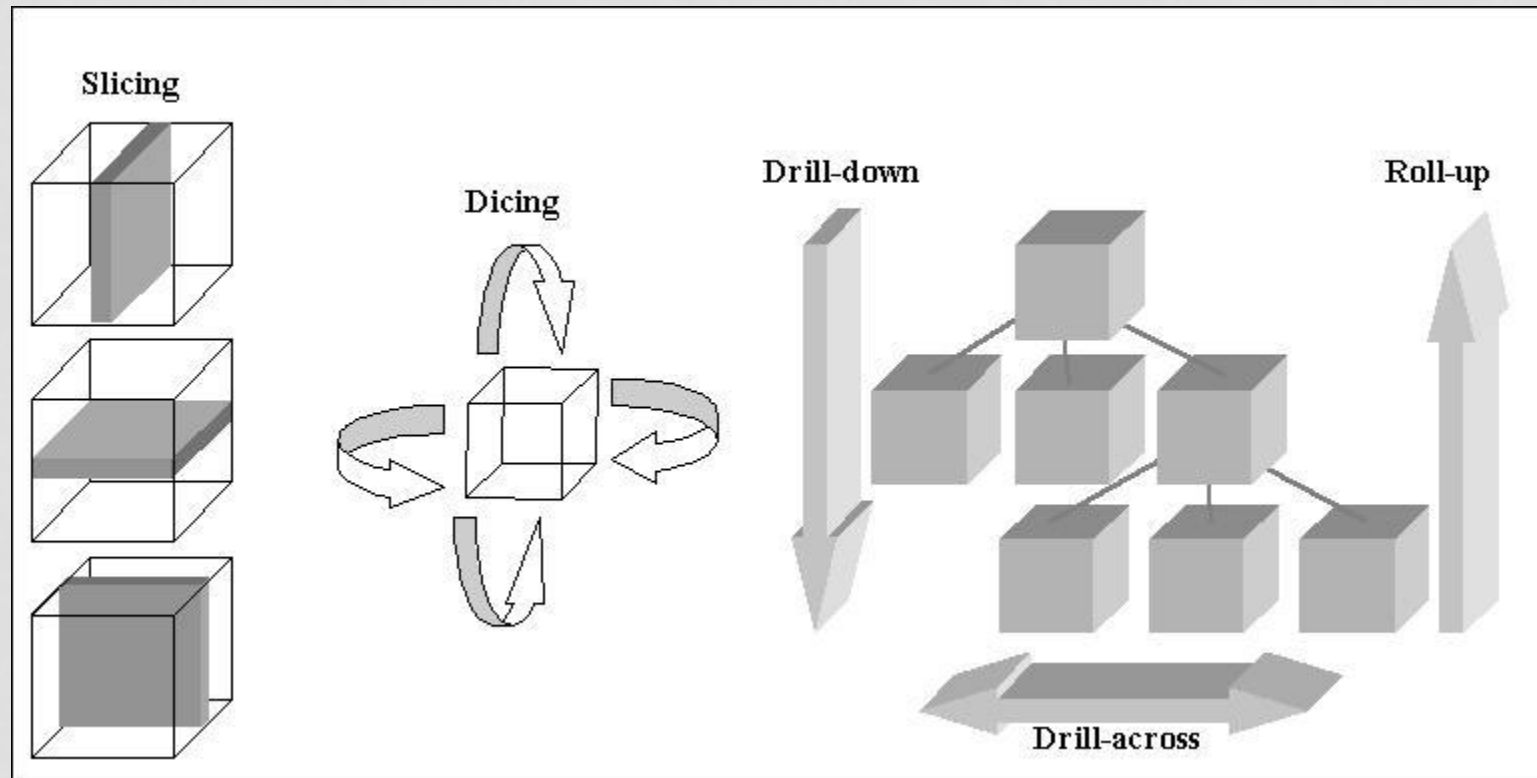
# OLAP

- Slice and dice, 2 dimensions





# OLAP



# BUSINESS REPORTING

## DEFINITIONS AND CONCEPTS

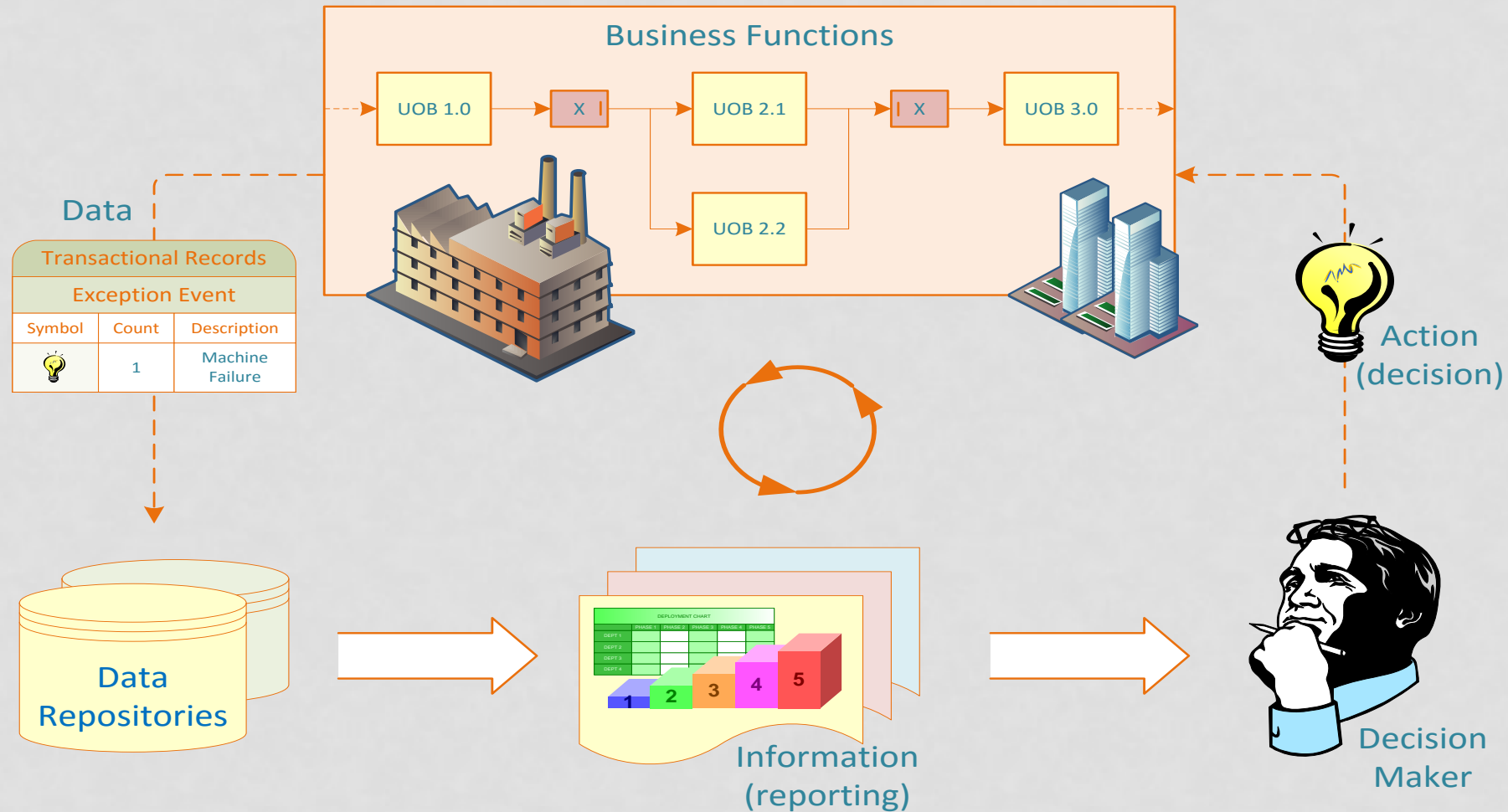
- Report = Information → Decision
- Report?
  - Any communication artifact prepared to convey specific information
- A report can fulfill many functions
  - To ensure proper departmental functioning
  - To provide information
  - To provide the results of an analysis
  - To persuade others to act
  - To create an organizational memory...

# WHAT IS A BUSINESS REPORT?

- A written document that contains information regarding business matters.
- **Purpose:** to improve managerial decisions
- **Source:** data from inside and outside the organization (via the use of ETL)
- **Format:** text + tables + graphs/charts
- **Distribution:** in-print, email, portal/intranet

Data acquisition → Information generation → Decision making → Process management

# BUSINESS REPORTING



# KEY TO ANY SUCCESSFUL REPORT

- Clarity ...
- Brevity ...
- Completeness ...
- Correctness ...
- Report types (in terms of content and format)
  - Informal – a single letter or a memo
  - Formal – 10-100 pages; cover + summary + text
  - Short report – periodic, informative, investigative

# TYPES OF BUSINESS REPORTS

- Metric Management Reports
  - Help manage business performance through metrics (SLAs for externals; KPIs for internals)
  - Can be used as part of Six Sigma and/or TQM
- Dashboard-Type Reports
  - Graphical presentation of several performance indicators in a single page using dials/gauges
- Balanced Scorecard-Type Reports
  - Include financial, customer, business process, and learning & growth indicators

# COMPONENTS OF BUSINESS REPORTING SYSTEMS

- Common characteristics
  - OLTP (online transaction processing)
    - ERP, POS, SCM, RFID, Sensors, Web, ...
  - Data supply (volume, variety, velocity, ...)
  - ETL
  - Data storage
  - Business logic
  - Publication medium
  - Assurance

# DATA AND INFORMATION VISUALIZATION

“The use of visual representations to explore, make sense of, and communicate data.”

- Data visualization vs. Information visualization
- Information = aggregation, summarization, and contextualization of data
- Related to information graphics, scientific visualization, and statistical graphics
- Often includes charts, graphs, illustrations, ...



# VISUAL ANALYTICS

- Visual analytics refers to the use of computer graphics to create a visual representation of large collections of information
- Purpose of visualization is to enable knowledge discovery
- Importance: visualization helps users see patterns

# THE EMERGENCE OF DATA VISUALIZATION AND VISUAL ANALYTICS

- Emergence of new companies
  - Tableau, Spotfire, QlikView, ...
- Increased focus by the big players
  - MicroStrategy improved Visual Insight
  - SAP launched Visual Intelligence
  - SAS launched Visual Analytics
  - Microsoft bolstered PowerPivot with Power View
  - IBM launched Cognos Insight
  - Oracle acquired Endeca

# VISUAL ANALYTICS

- A recently coined term
  - Information visualization + predictive analytics
- Information visualization
  - Descriptive, backward focused
  - “what happened” “what is happening”
- Predictive analytics
  - Predictive, future focused
  - “what will happen” “why will it happen”
- There is a strong move toward visual analytics