Sistemas OLTP y *Sistemas OLAP*

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2020 jsamos (lsi-ugr)
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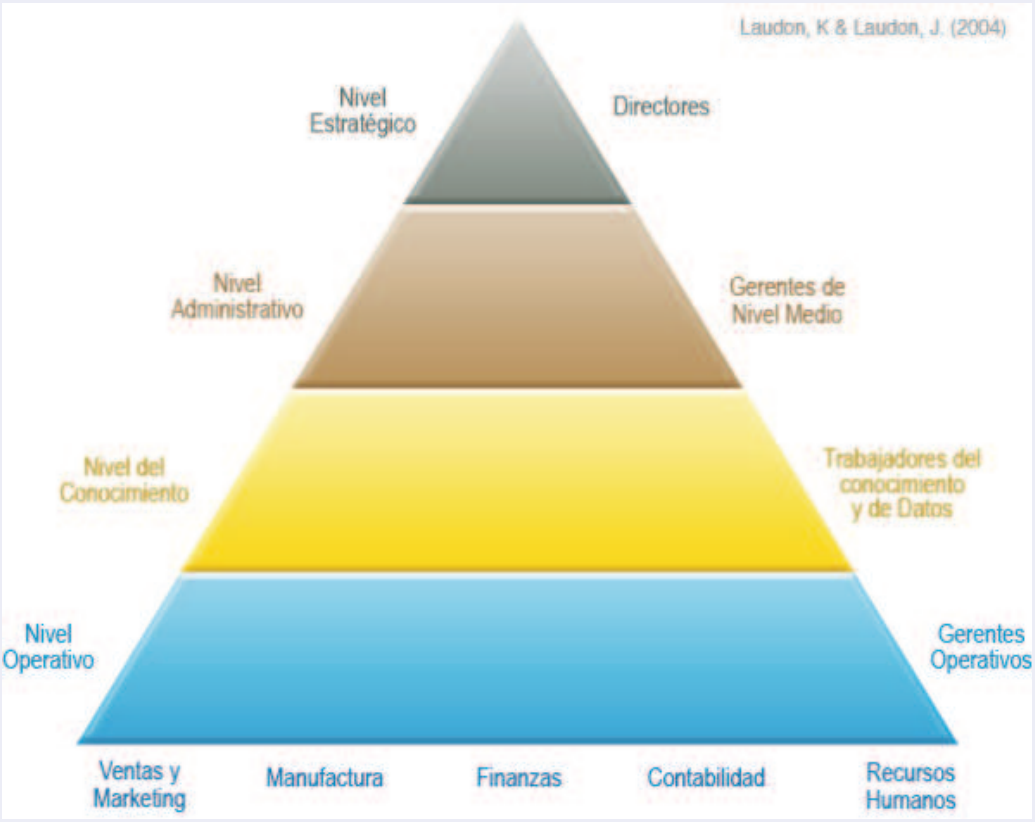
Universidad de Granada

Curso 2019-20

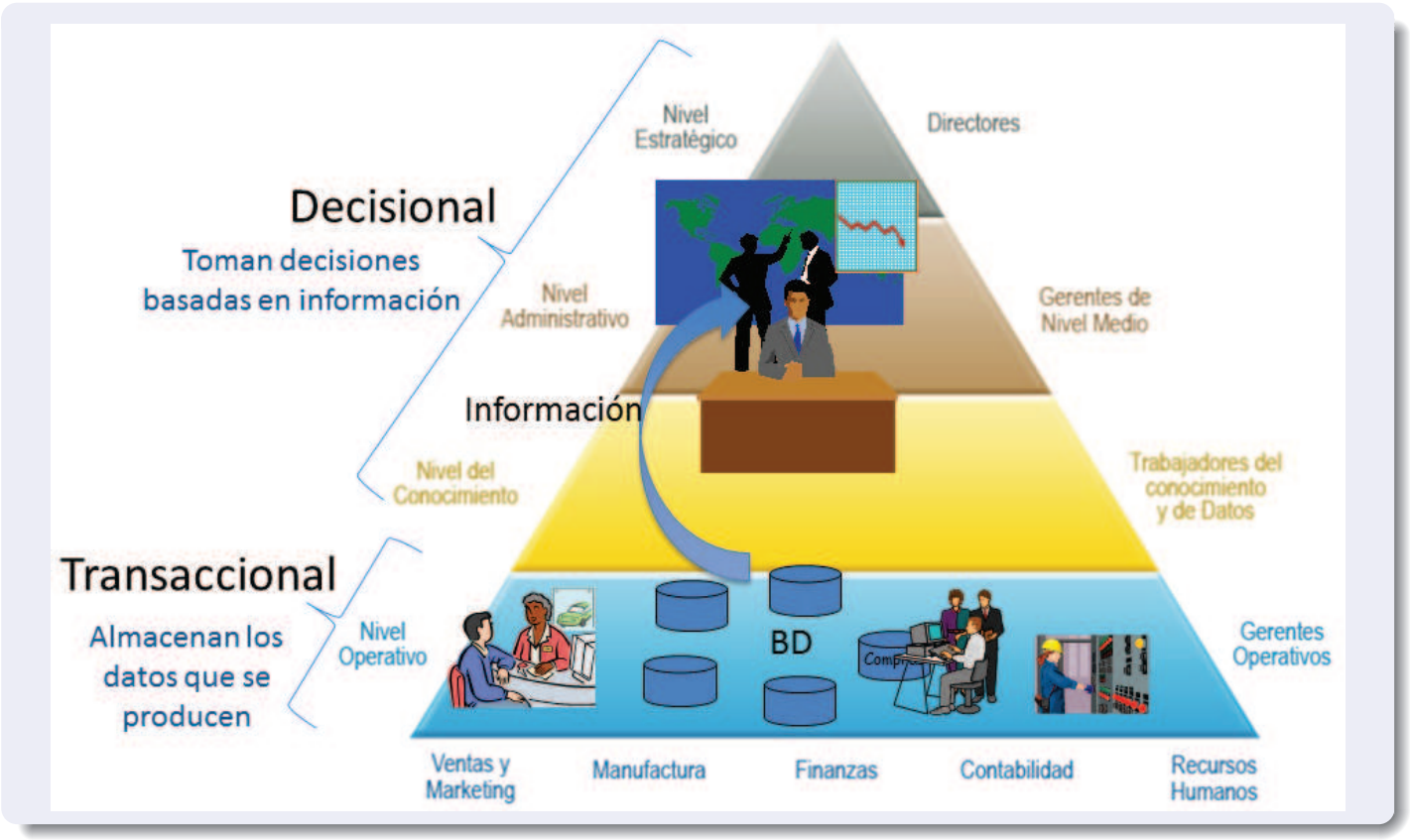
Contenido

Niveles de gestión y sistemas de soporte

Niveles de gestión



Niveles *Transaccional* y *Decisional*



Informes como soporte a la toma de decisiones

Informe de ventas

	Ene	Feb	Mar	TOTALES	Comisión 15%	Reparto
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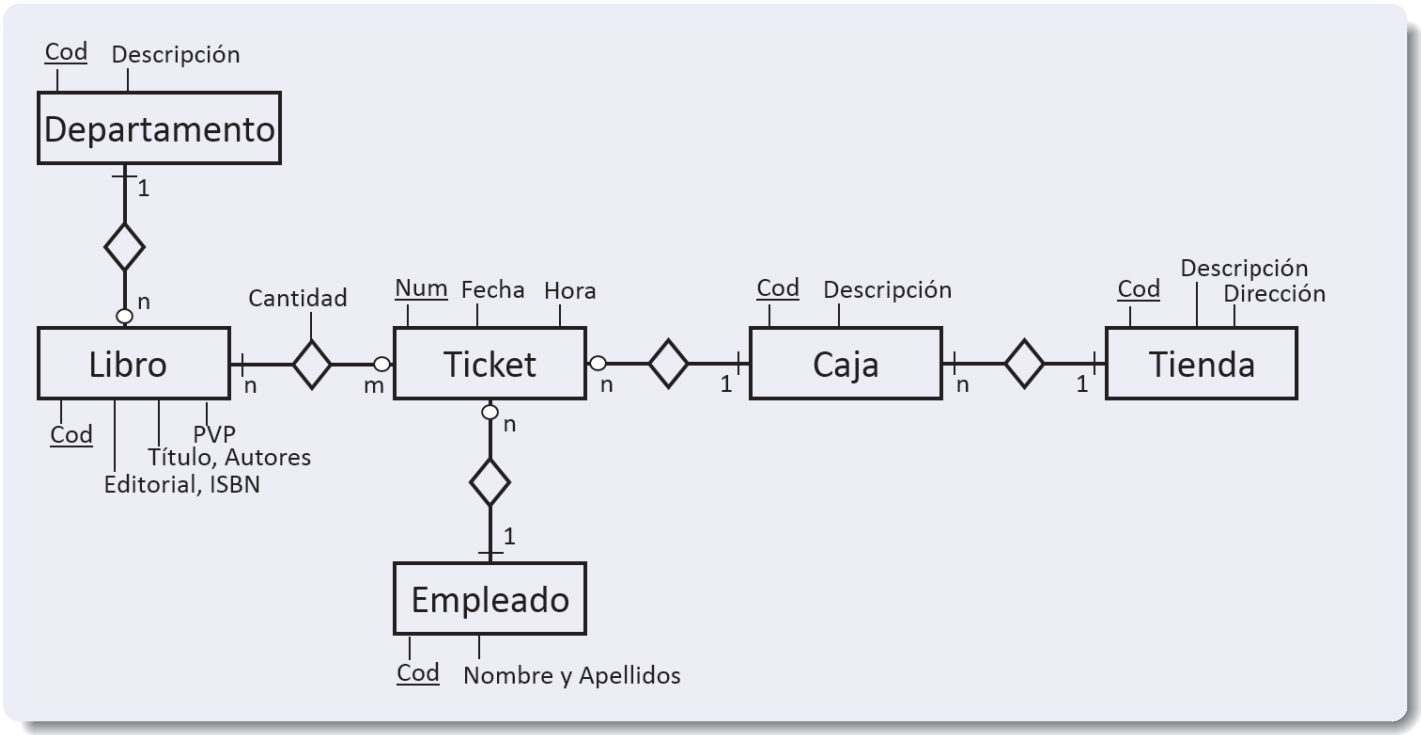
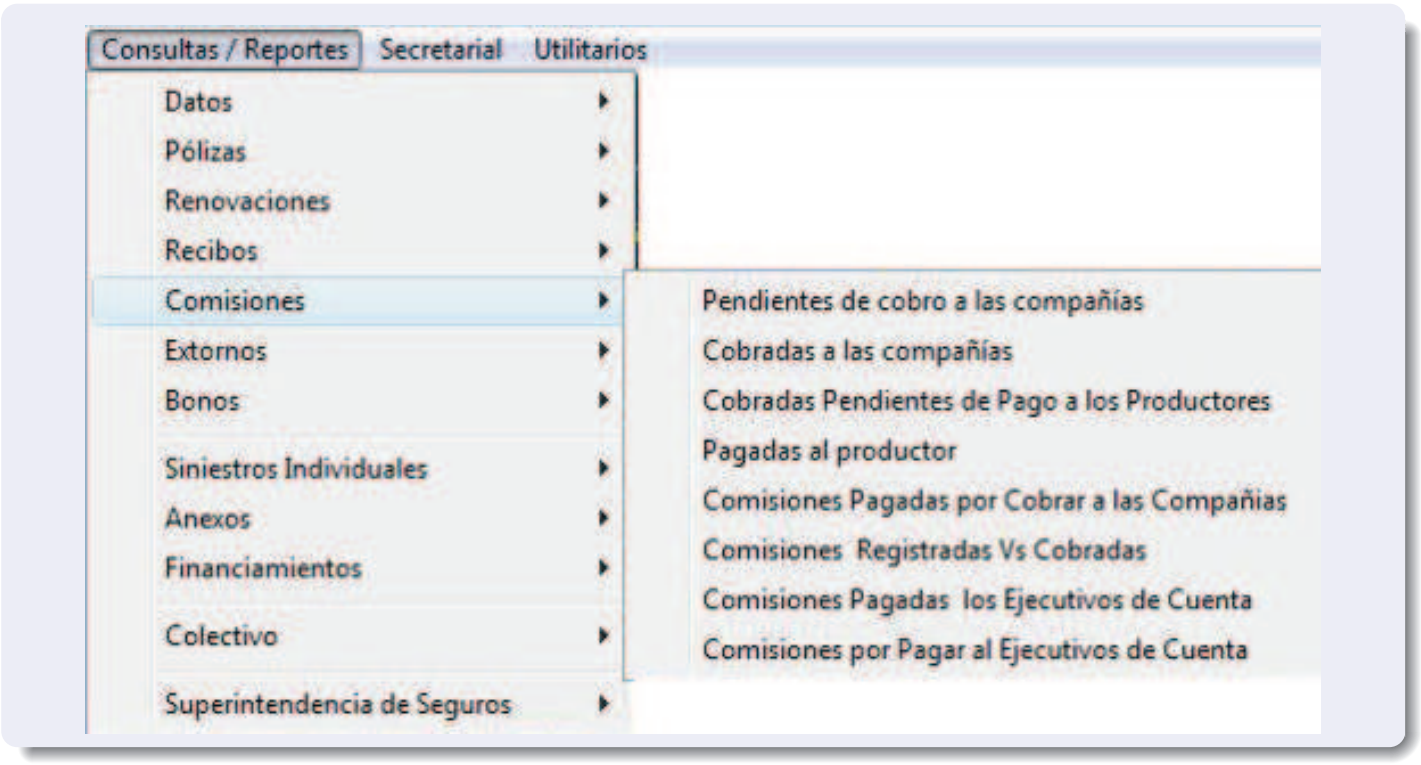
Note: Data includes desk-based PCs, mobile PCs, including mini-notebooks but not media tablets such as the iPad.
Source: Gartner (January 2012)

Nivel Transaccional: *Sistemas OLTP*

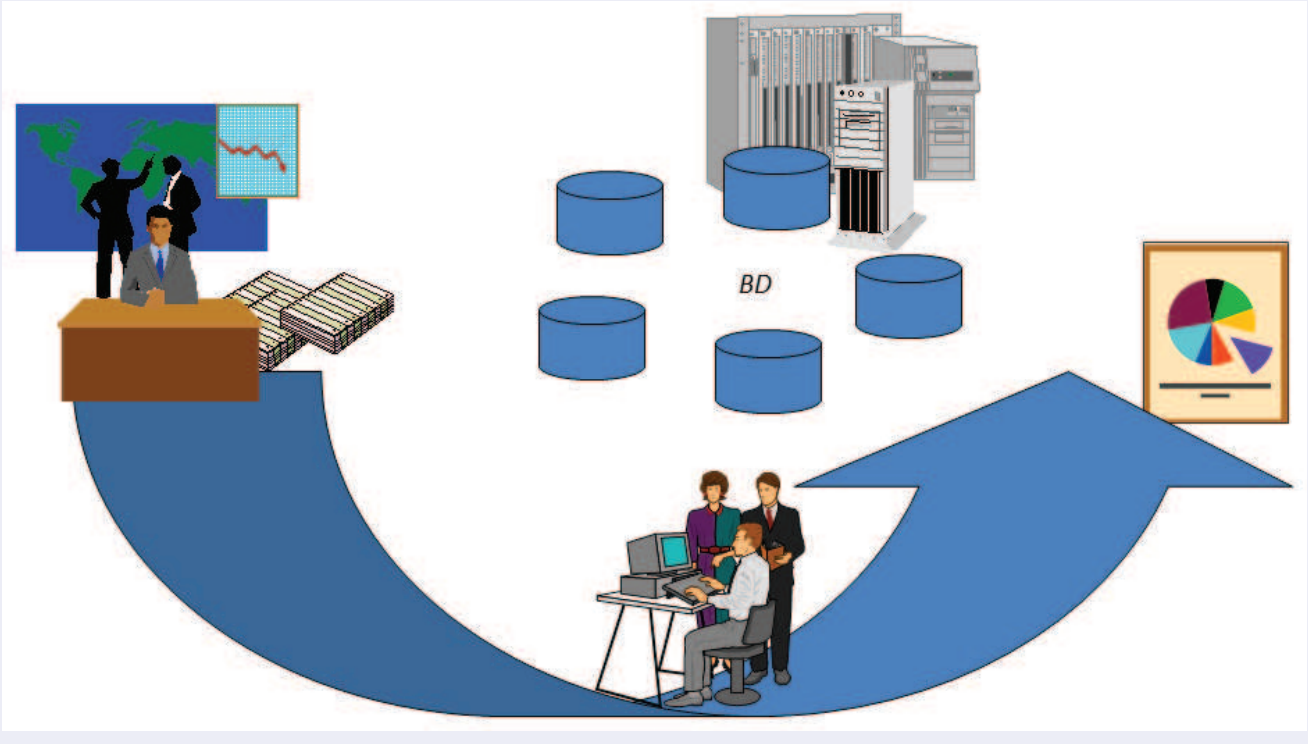
Diagrama Entidad-Relación



Informes "precocinados"

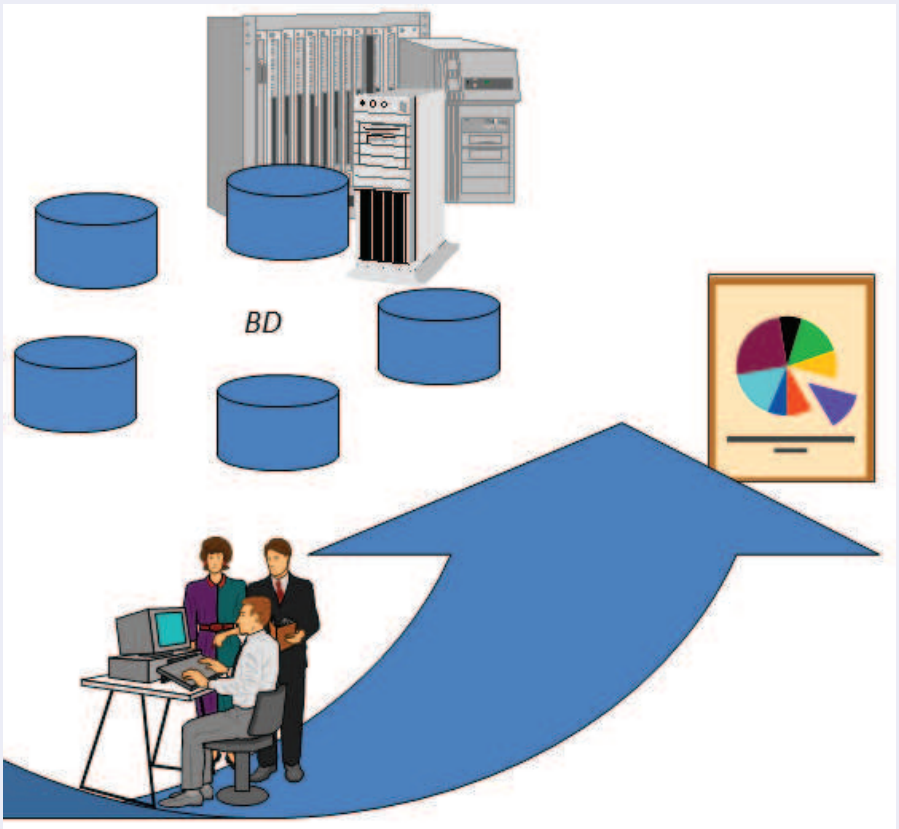


Informes "a medida"

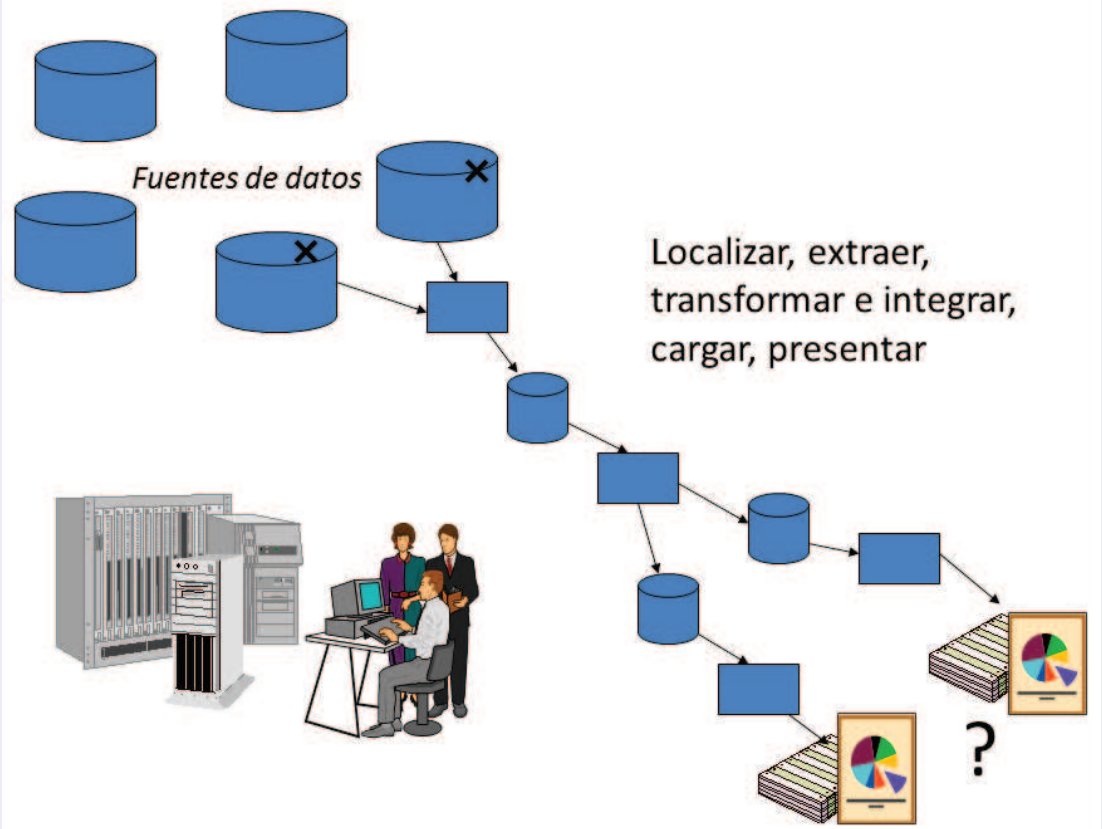


Elaboración de informes “a medida”

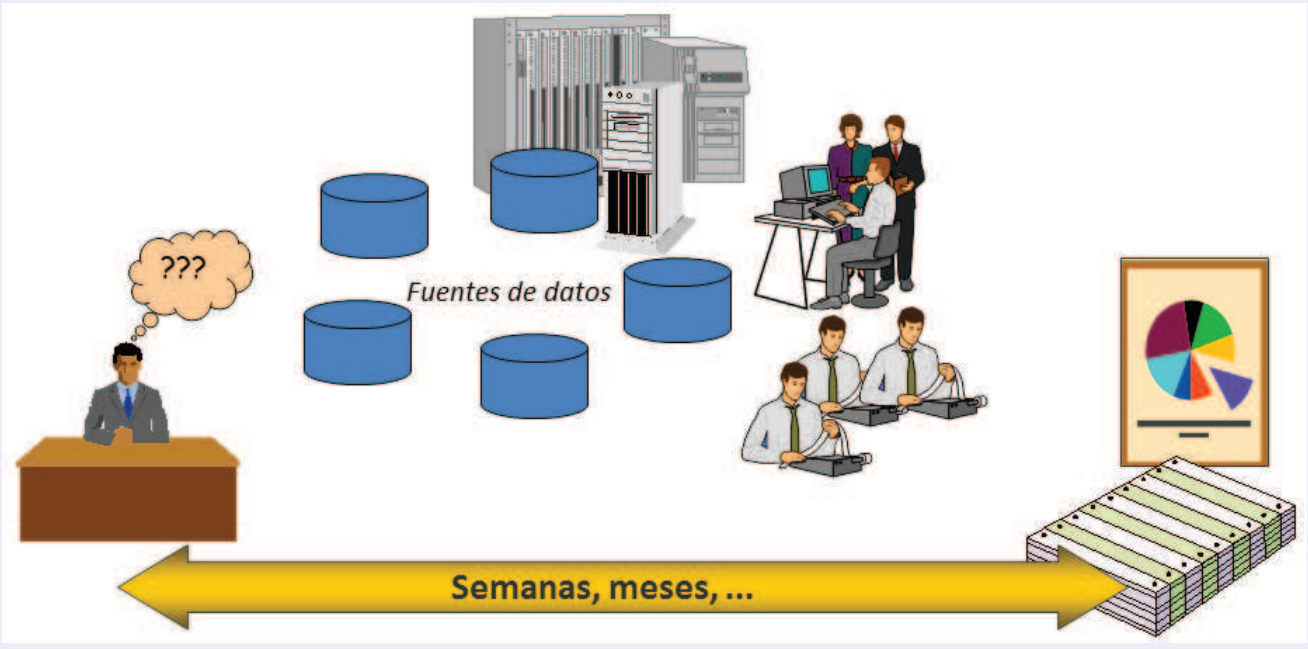
Informes “a medida”



Proceso de elaboración



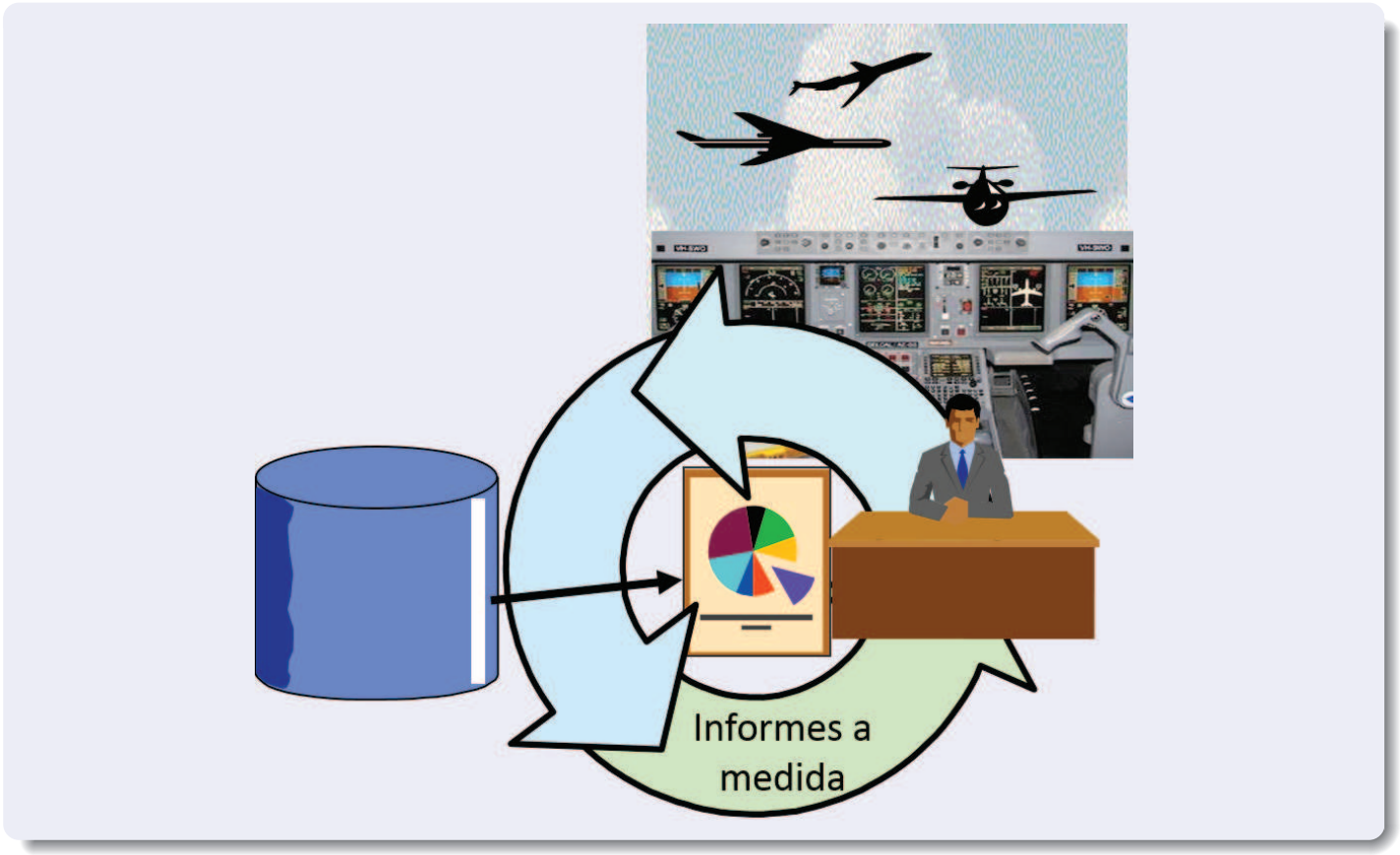
Proceso de validación



Necesidad de información de las organizaciones

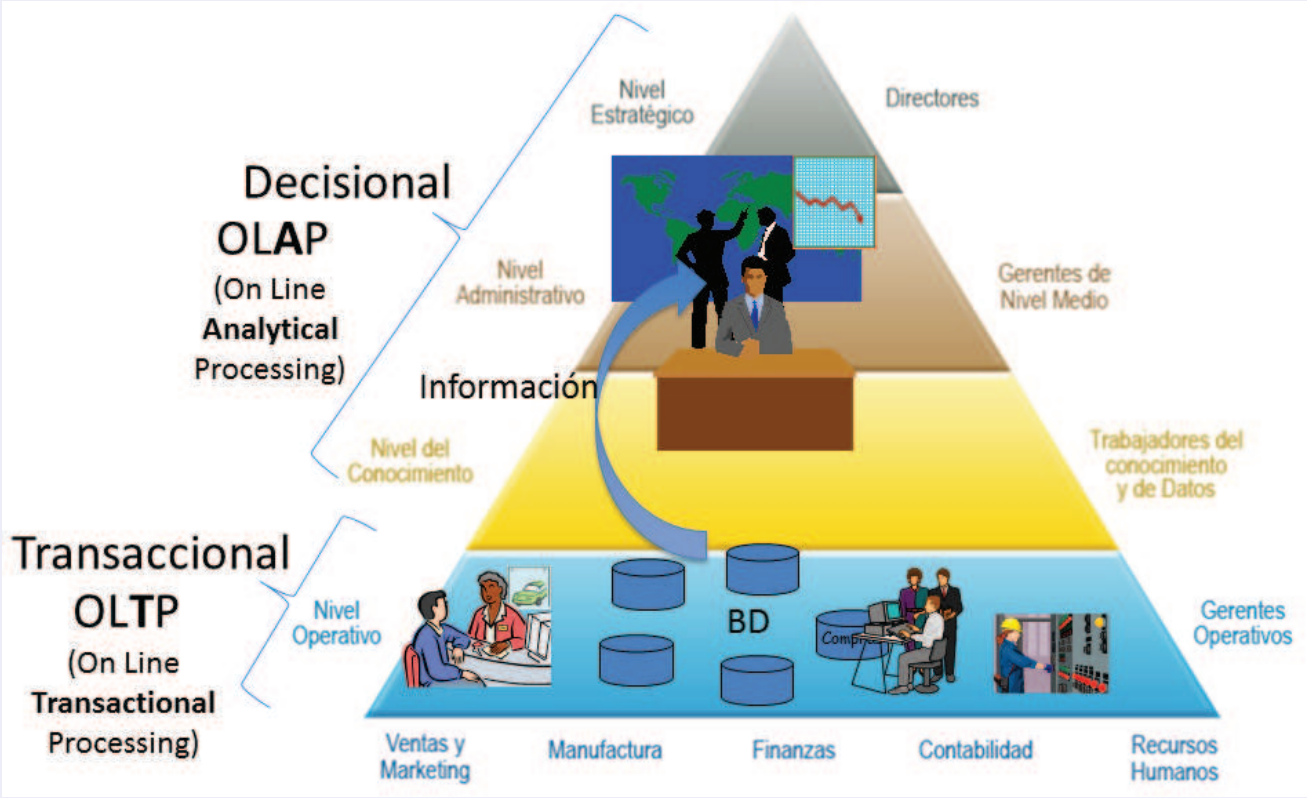
Gestión de organizaciones en la actualidad

Situación deseable

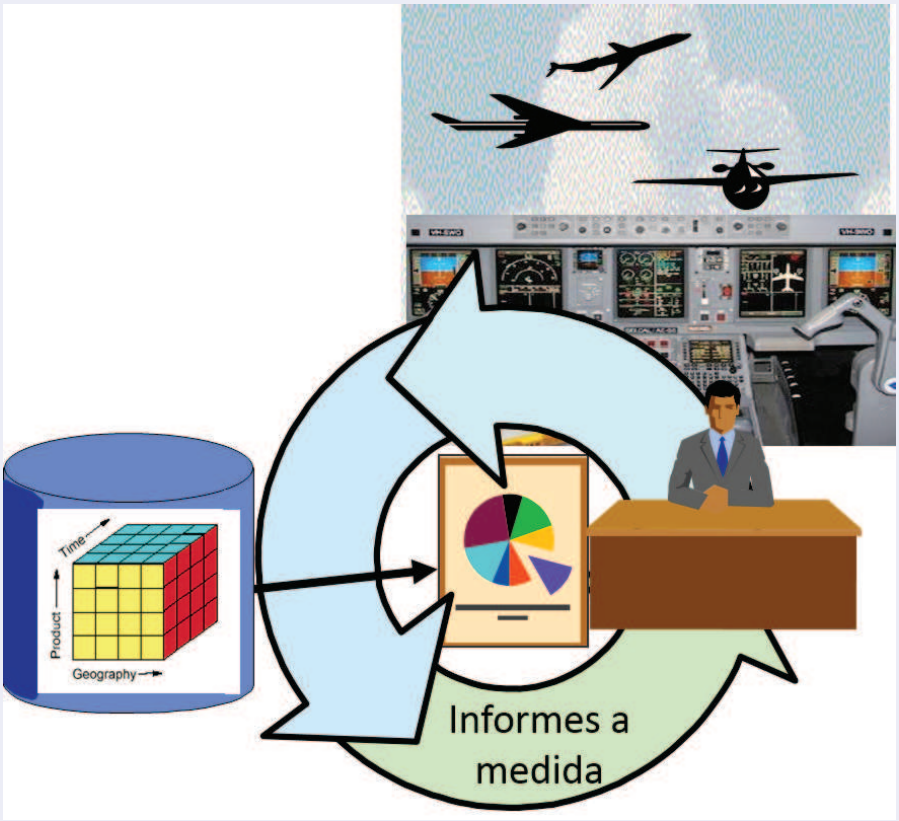


Nivel Decisional: *Sistemas OLAP*

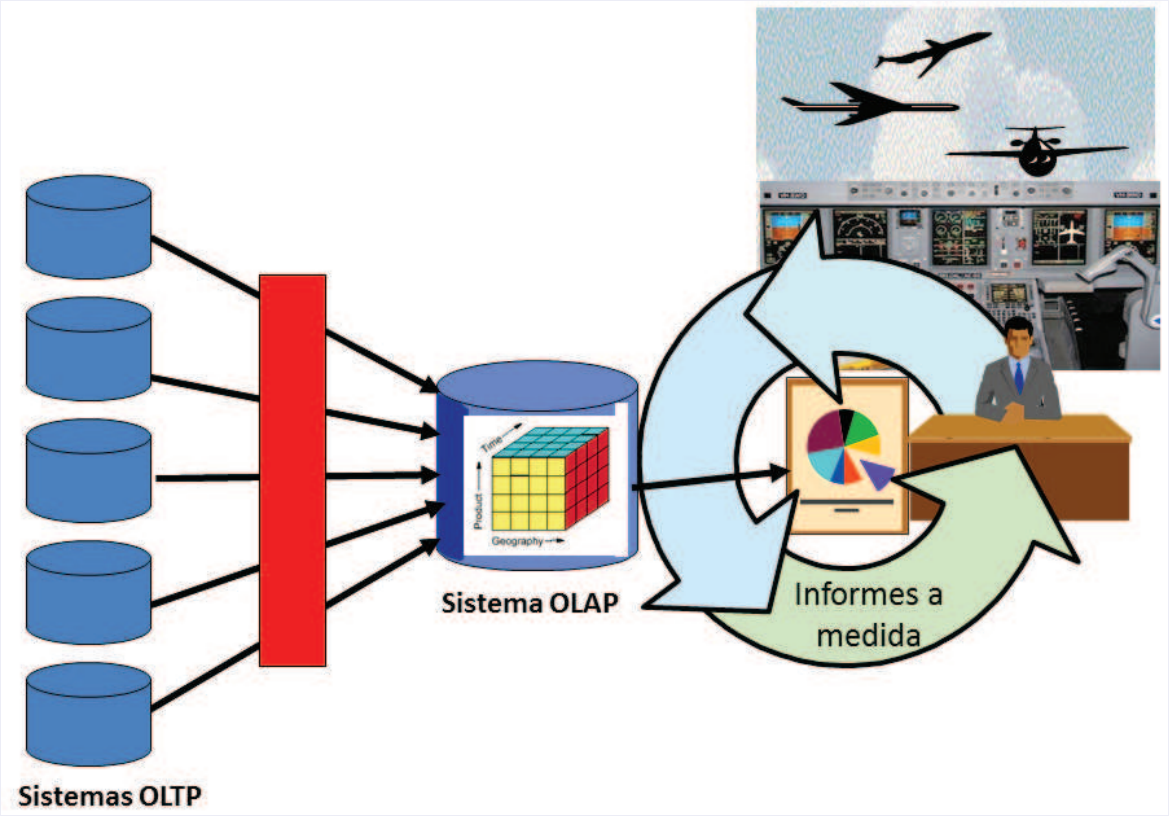
Sistemas de soporte



Sistema OLAP



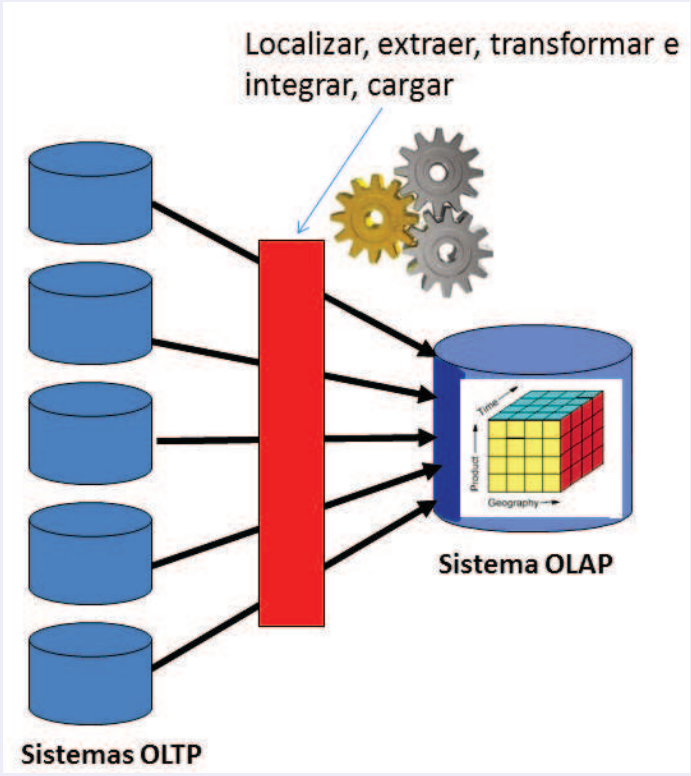
Sistemas OLTP y OLAP



Sistemas OLTP vs. Sistemas OLAP

	Operational System	Analytic System
Purpose	Execution of a business process	Measurement of a business process
Primary Interaction Style	Insert, Update, Query, Delete	Query
Scope of Interaction	Individual transaction	Aggregated transactions
Query Patterns	Predictable and stable	Unpredictable and changing
Temporal Focus	Current	Current and historic
Design Optimization	Update concurrency	High-performance query
Design Principle	Entity-relationship (ER) design in third normal form (3NF)	Dimensional design (Star Schema or Cube)
Also Known As	Transaction System On Line Transaction Processing (OLTP) System Source System	Data Warehouse System Data Mart On-Line Analytical Processing (OLAP) System

Componente ETL



Introducción histórica

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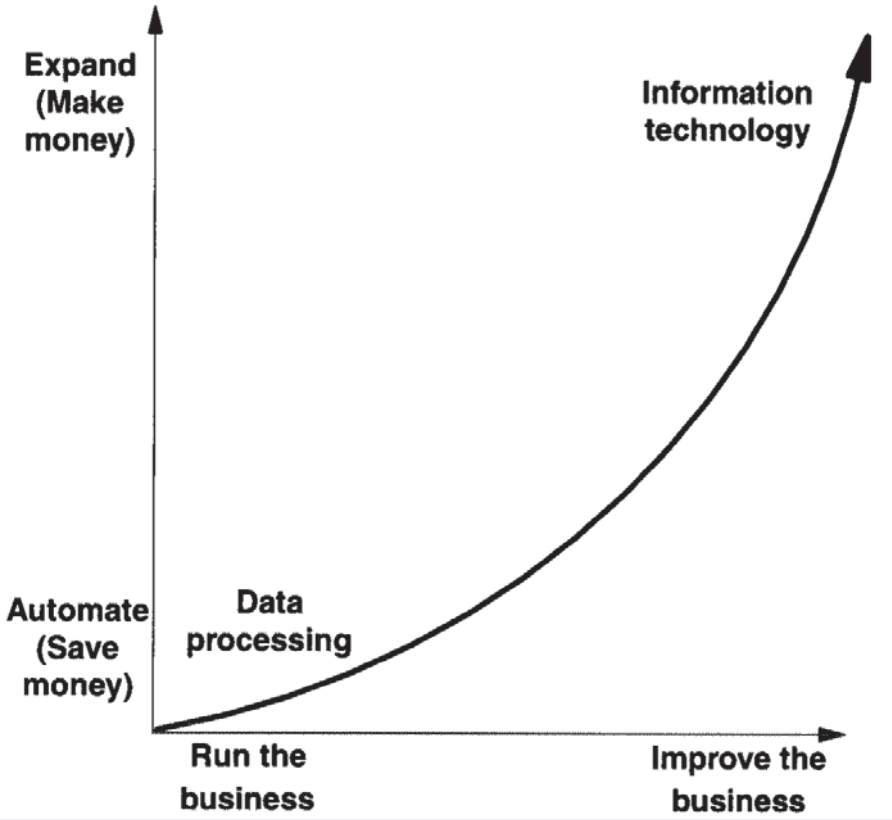
- Sistemas *Batch* (procesamiento por lotes): década de 1950
- Sistemas *OLTP* (procesamiento de transacciones en línea): década de 1960
- Sistemas *OLAP* (procesamiento analítico en línea): década de 1990
- Herramientas *ETL* (extracción, transformación y carga): década de 1990
- Autoservicio de Sistemas OLAP: año 2003
- Autoservicio de Transformación de Datos: año 2013

Repercusión



Terminología

- *OLTP* / *operational*.
- *OLAP* / *decisional* / *warehouse*.
- *ETL*.
- *Data warehouse* (almacén de datos).
- *Data mart* / *multidimensional data mart*.
- *ODS* (*operational data store*).
- *DSS* (*decision support system*).
- *BI* (*business intelligence*).

Modelo de datos Multidimensional

Origen

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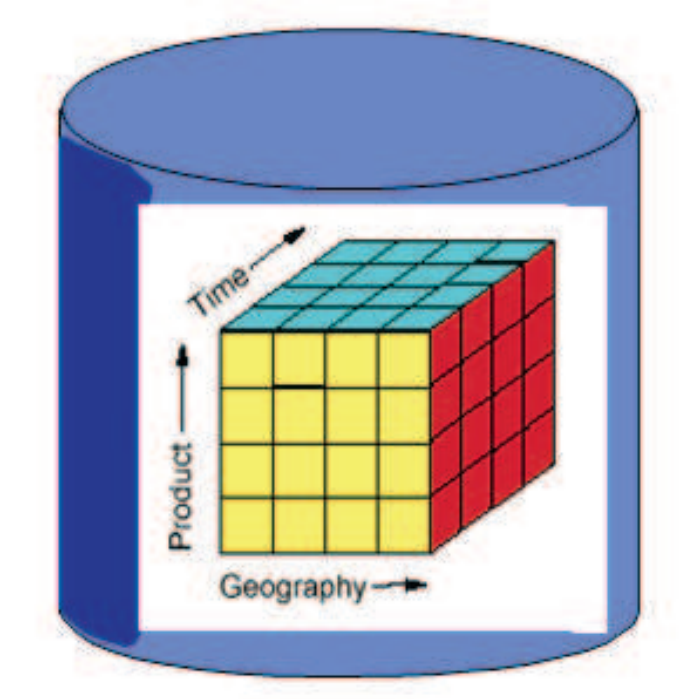
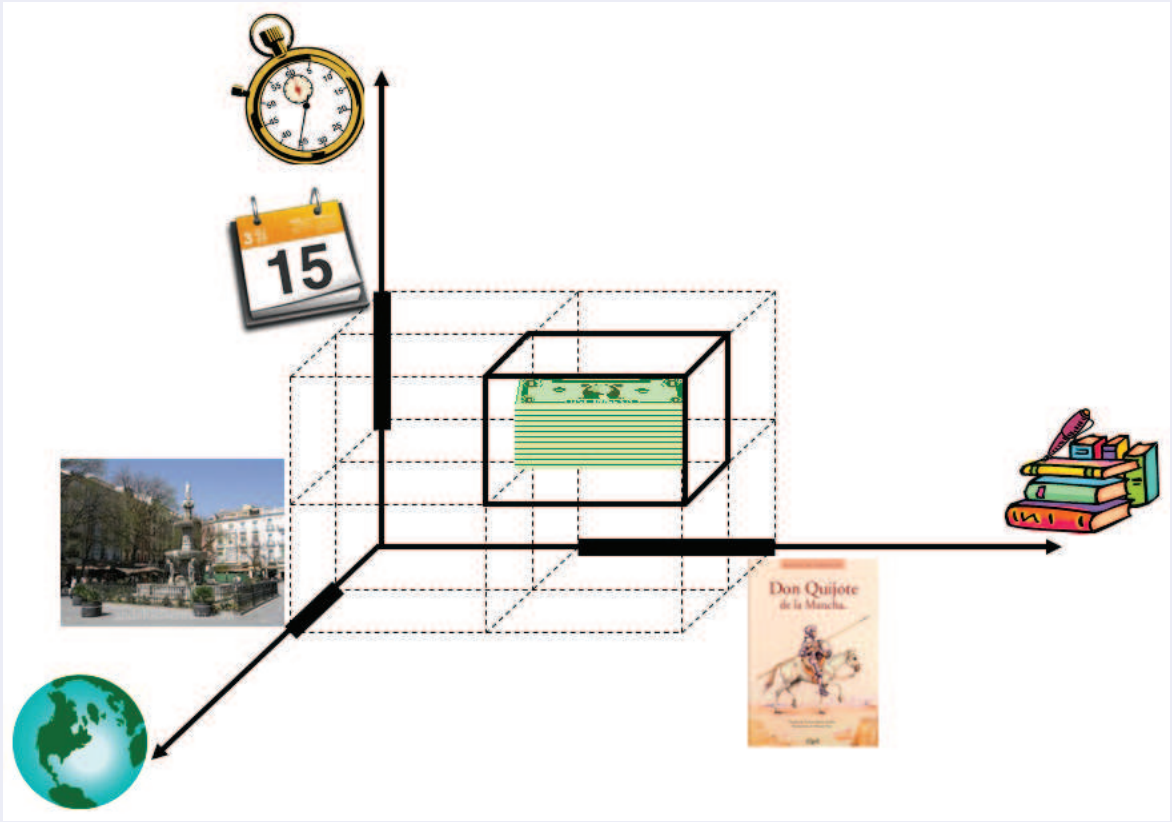
Modelo de Datos Multidimensional

BD Multidimensional: *cubo OLAP*

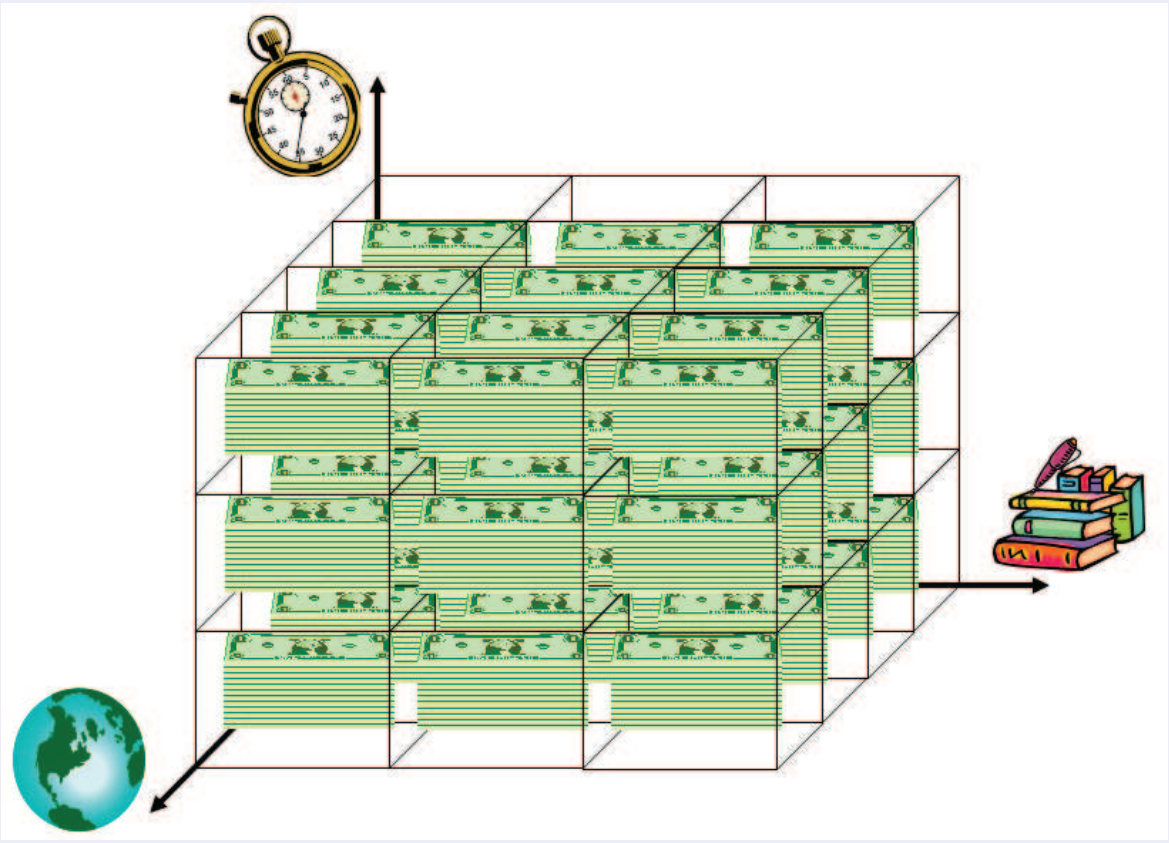


Representación gráfica

Un dato: celda

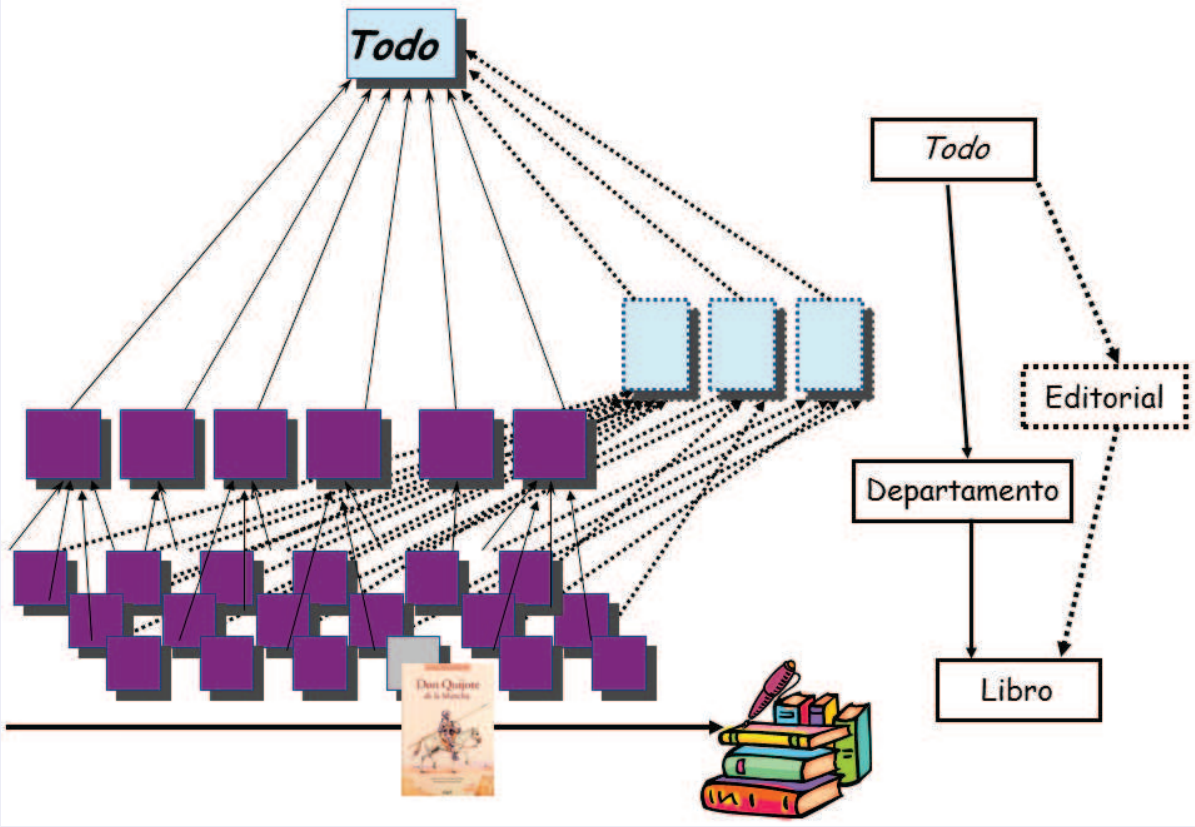


Todos los datos: hipercubo

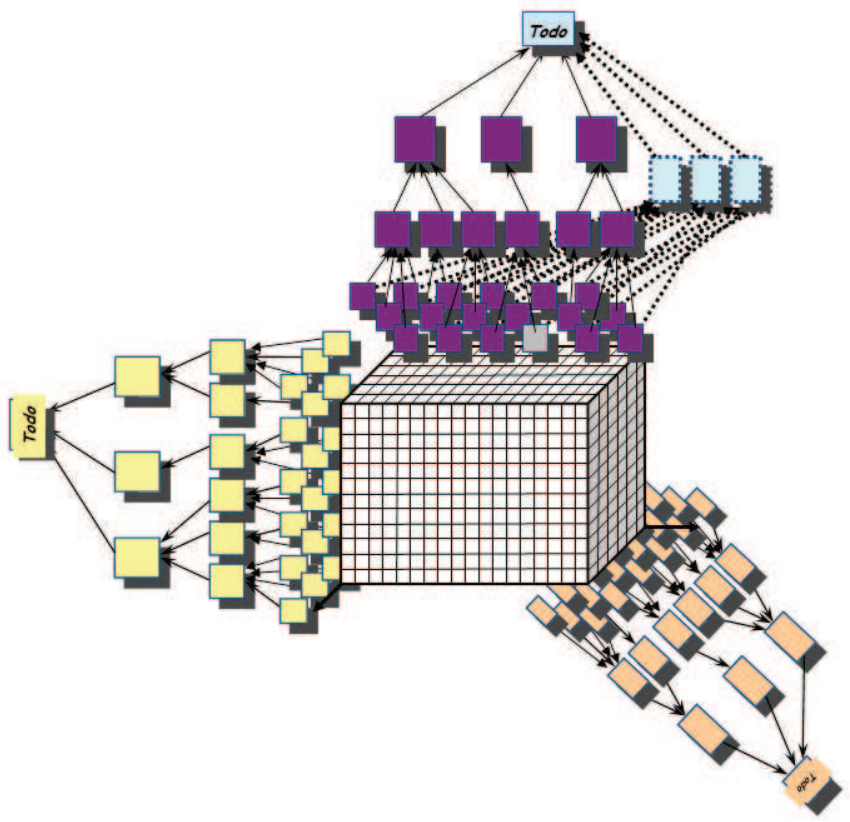


Elementos del modelo

Dimensiones con *Niveles* formando *Jerarquías*

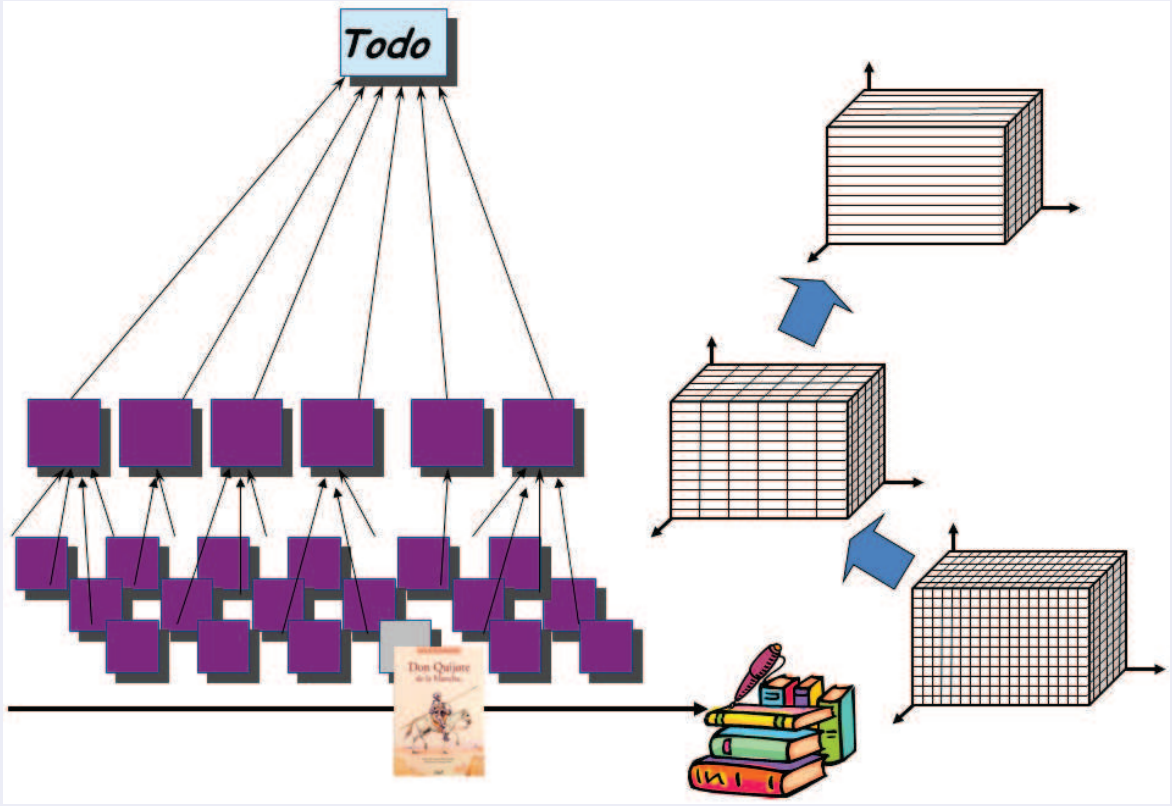


Hechos: celdas del *Cubo Base* con *Mediciones*

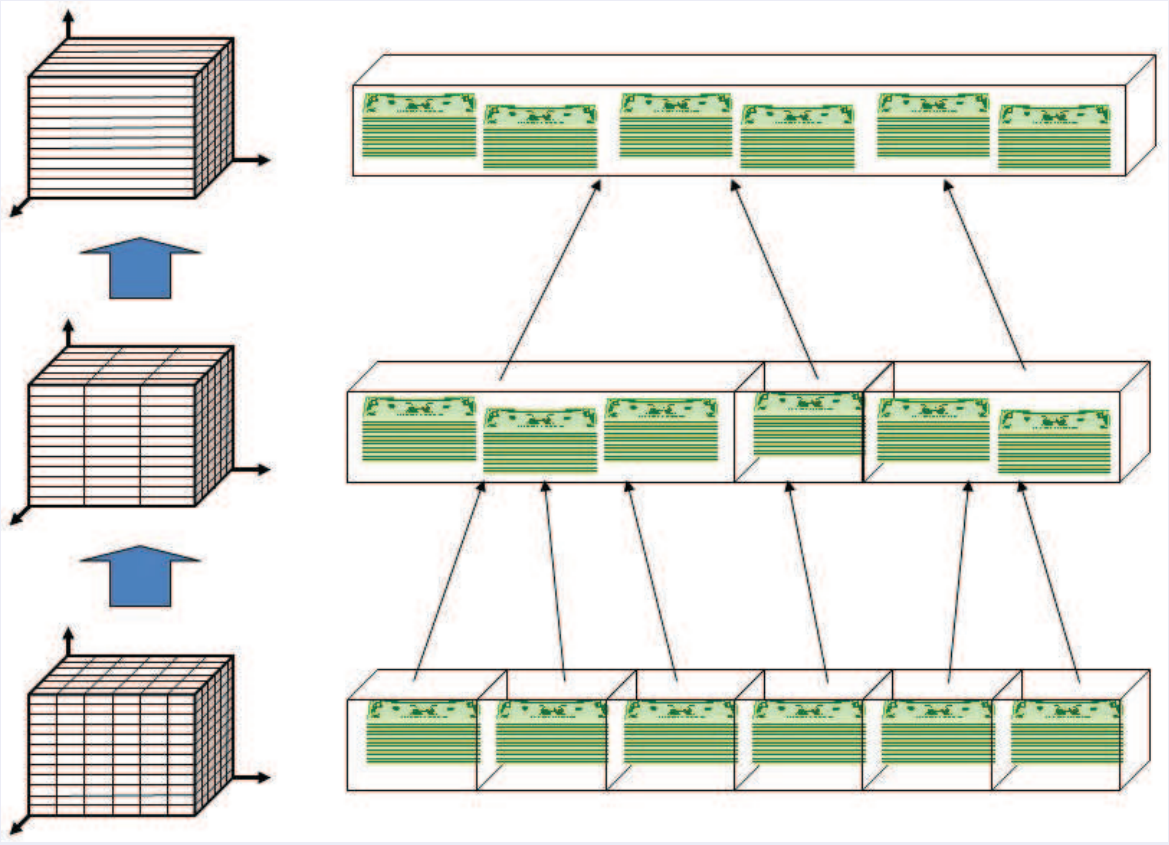


Operaciones

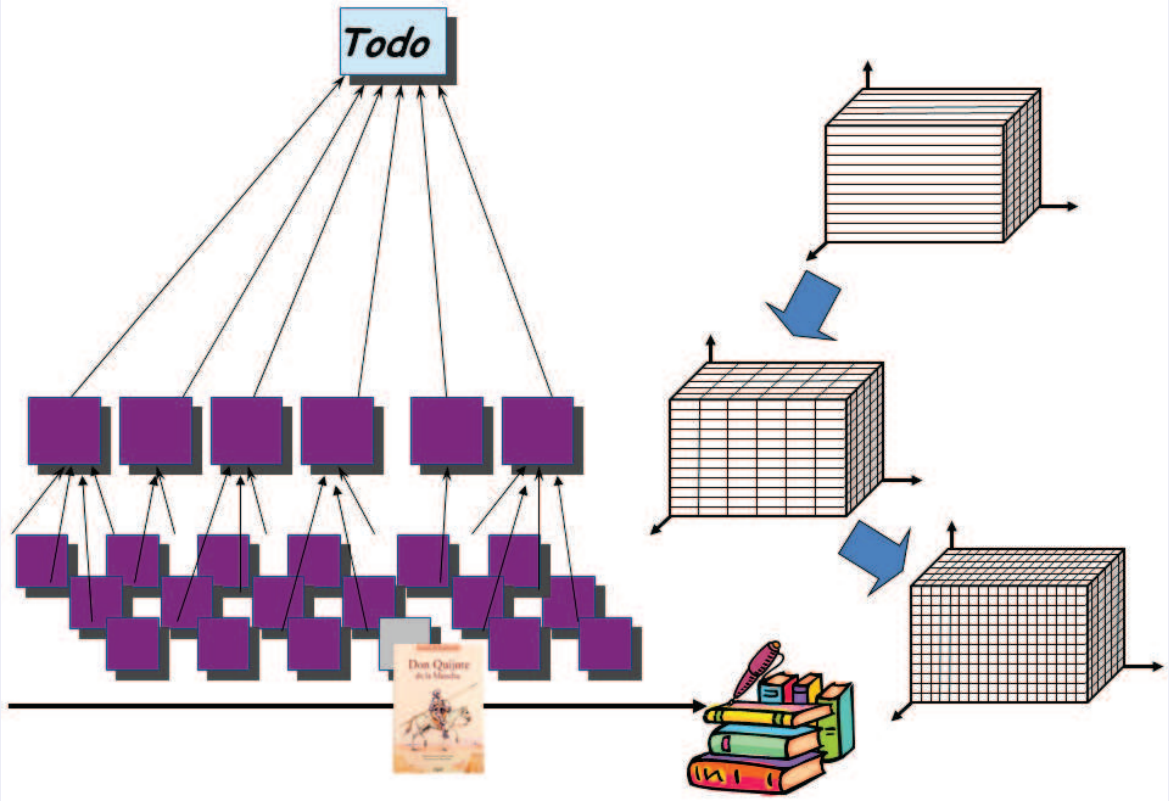
Roll-Up



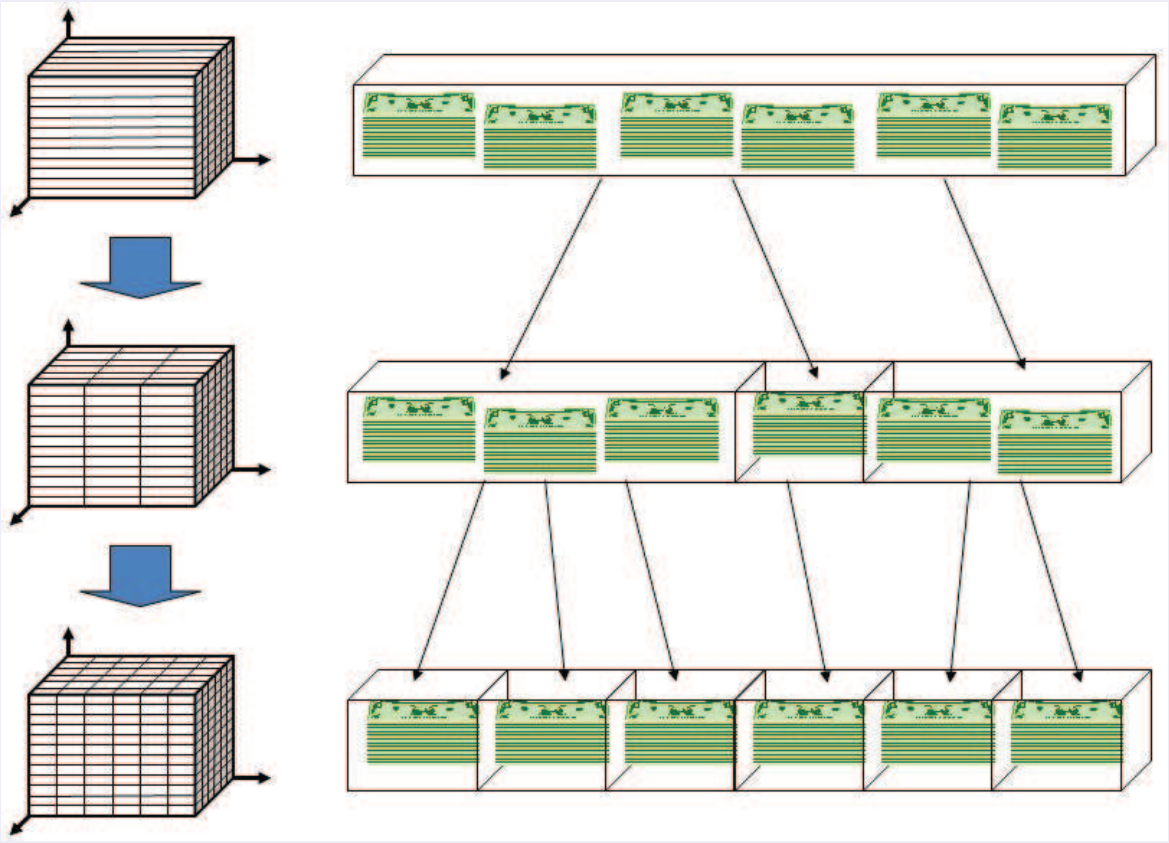
Roll-Up y *aditividad*



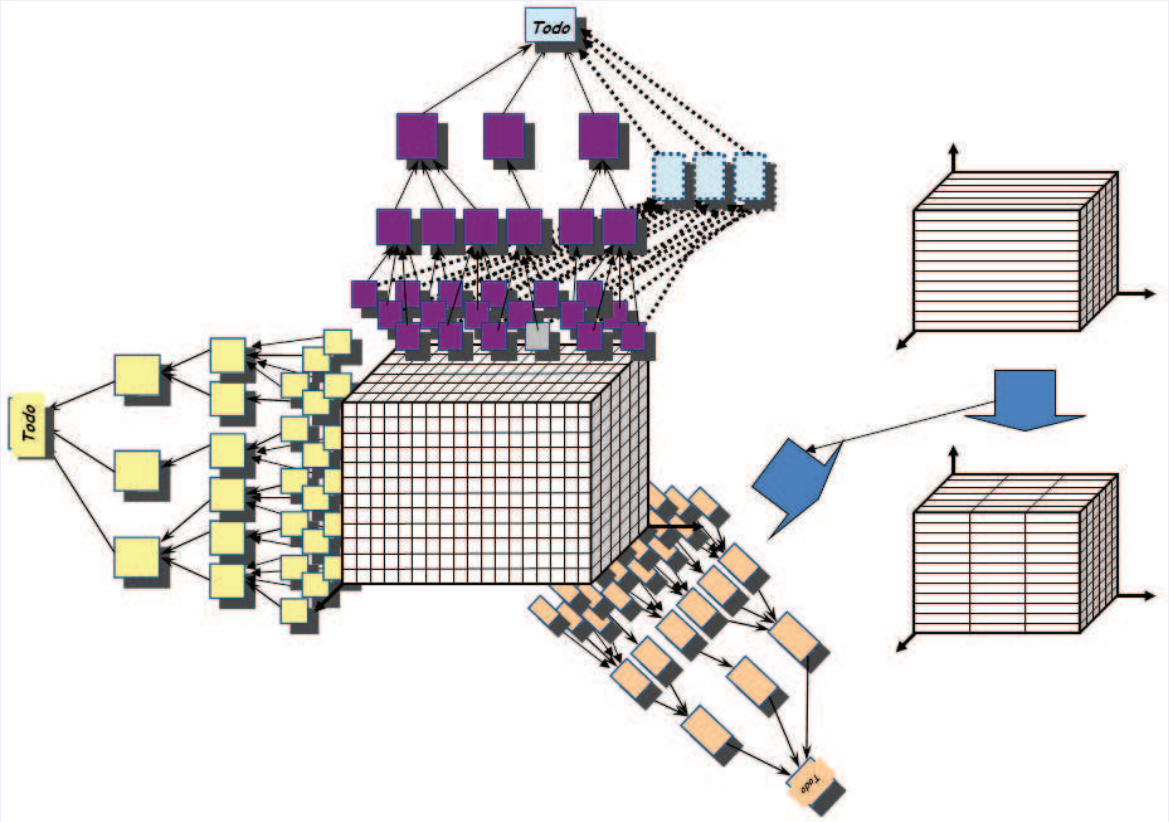
Drill-Down (i)



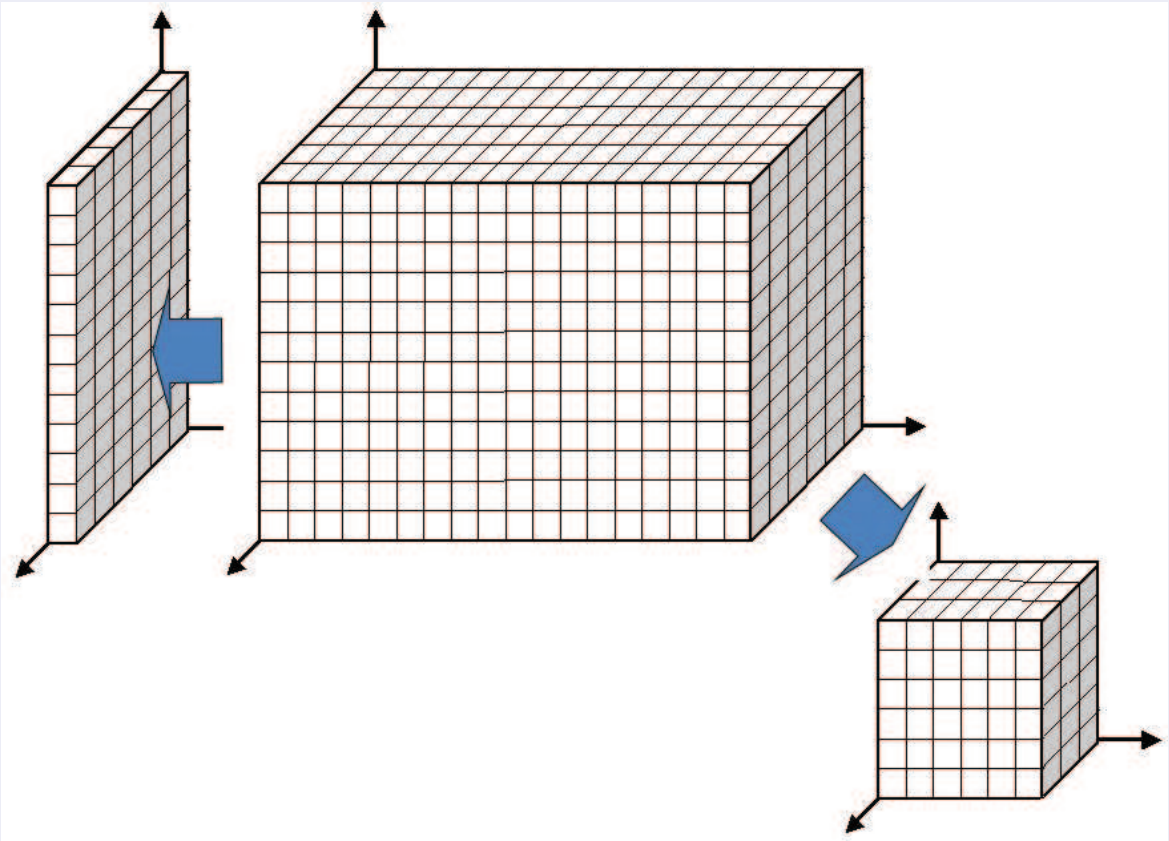
Drill-Down: ¿cómo descomponer una celda?



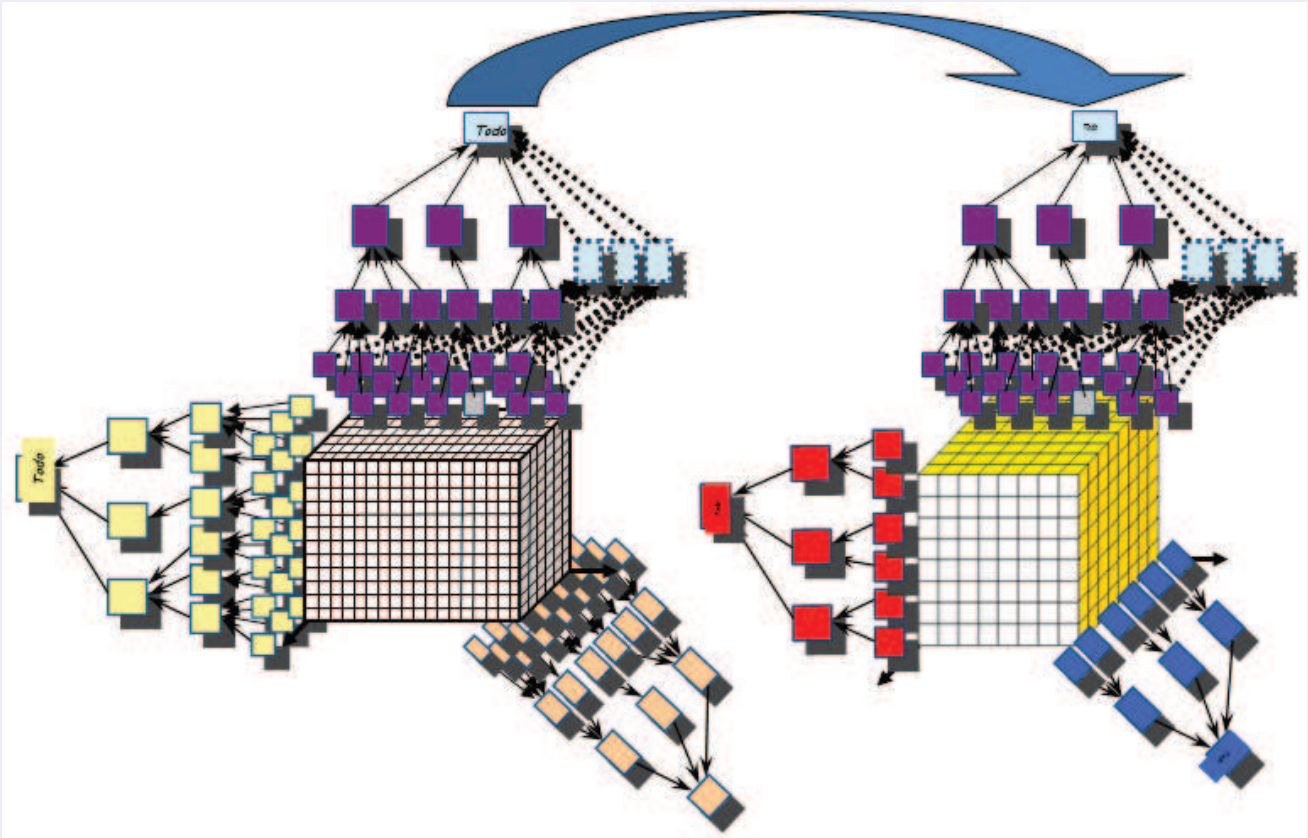
Drill-Down y Roll-Up



Slice&Dice

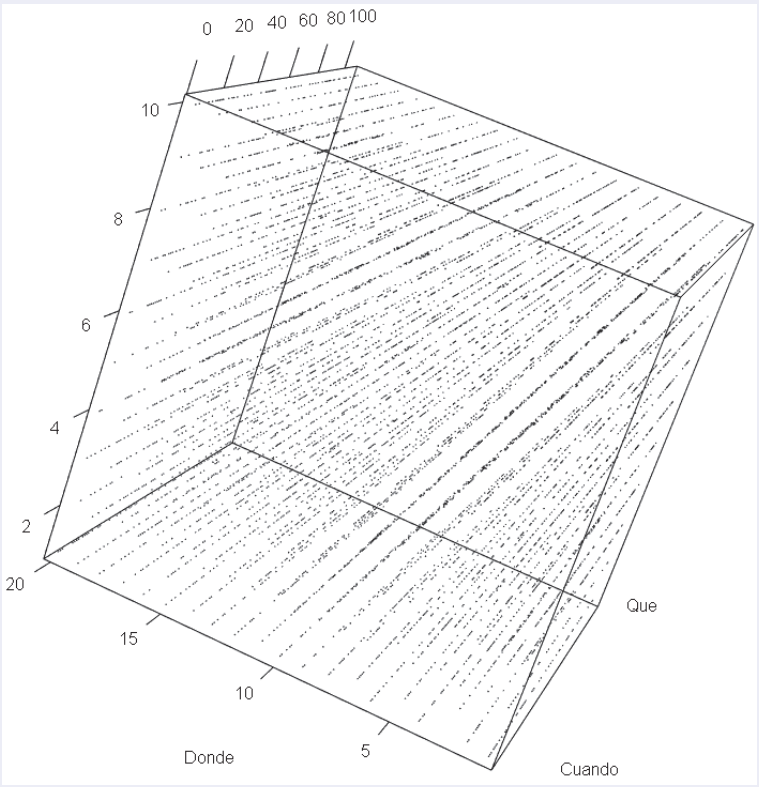


Drill-Across

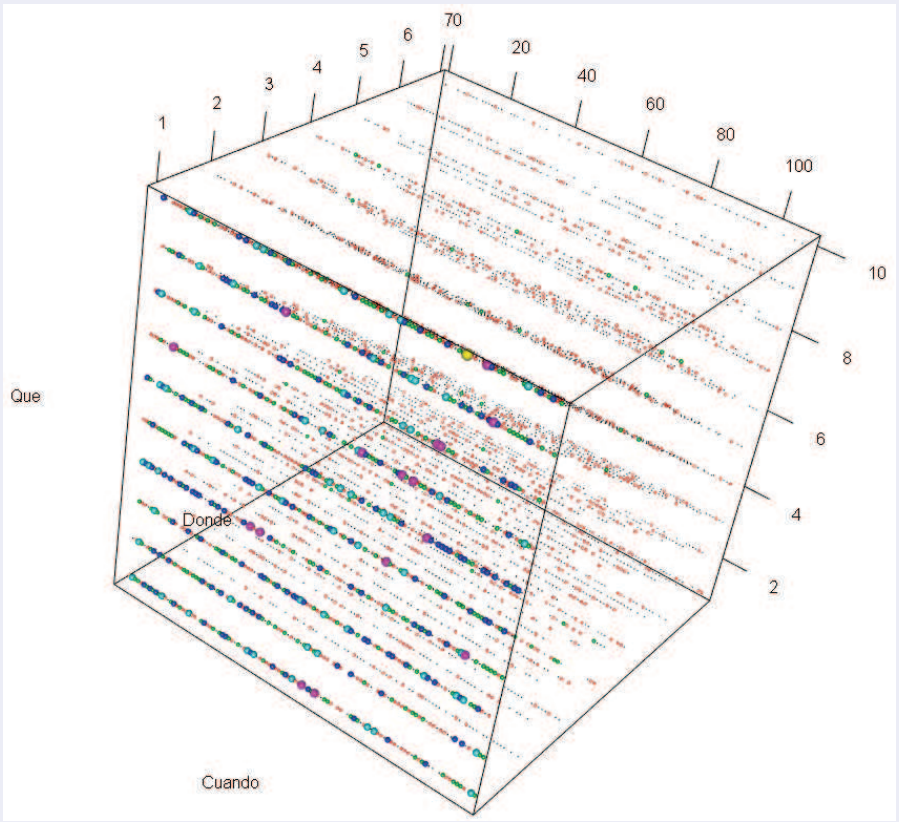


Un ejemplo

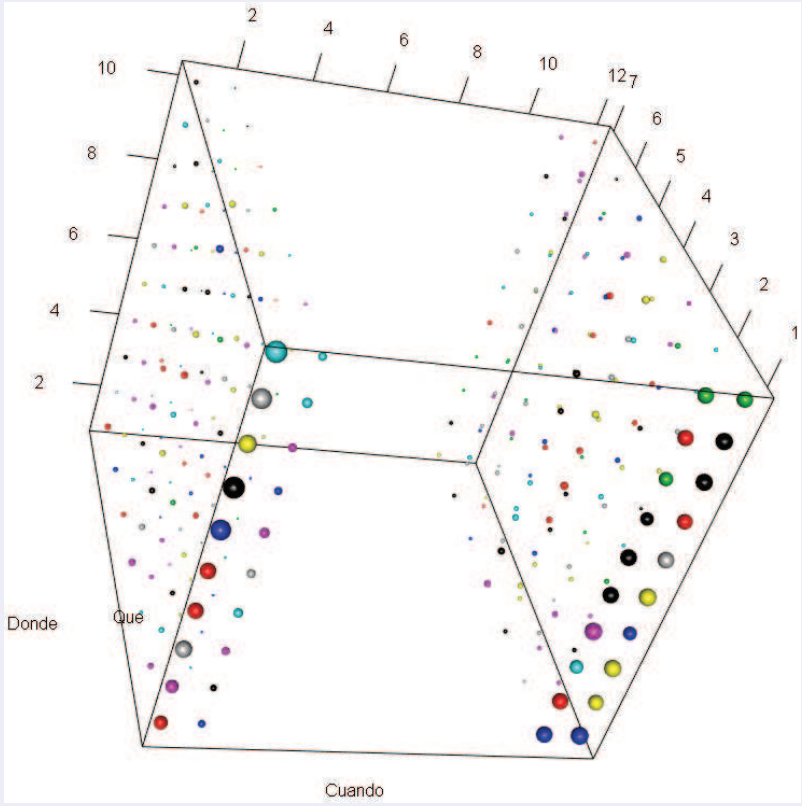
Cubo Base



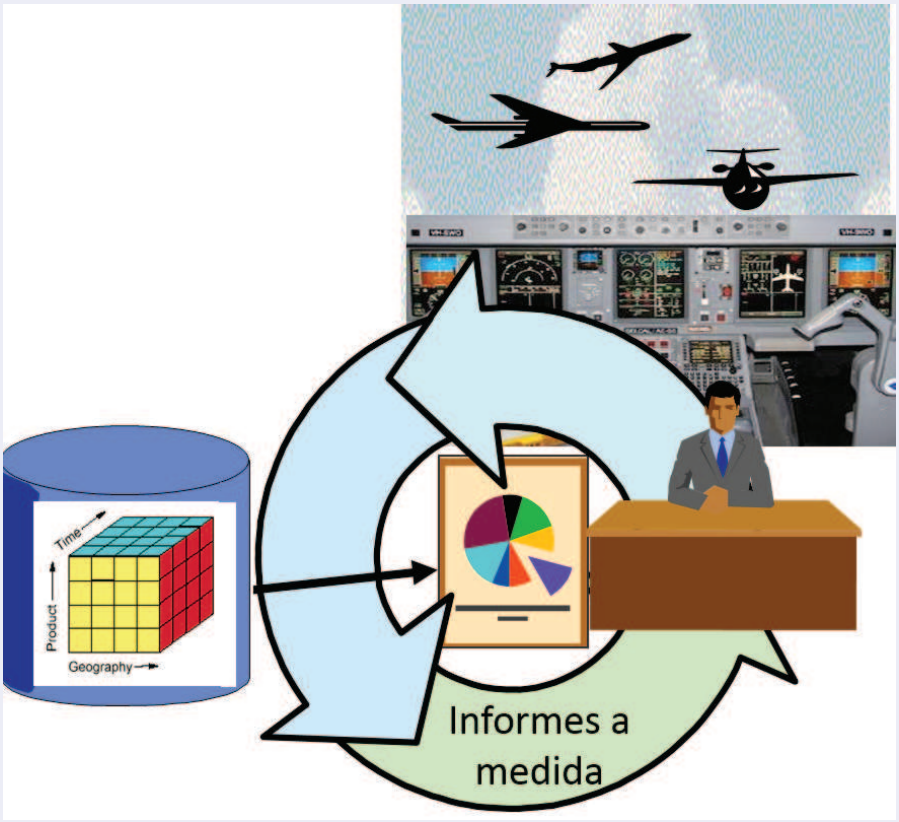
Roll-Up (i)



Roll-Up (y ii)



Funcionamiento



Bibliografía

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CCS93 E. Codd, S. Codd, C. Salley: "Providing OLAP to User-Analysts: An IT Mandate." Arbor Software, Technical Report, 1993.

JPT10 C. Jensen, T. Pedersen, C. Thomsen: *Multidimensional Databases and Data Warehousing*. Morgan & Claypool, 2010.

LL04 K.C. Laudon, J. Laudon: *Essentials of Management Information Systems*. Prentice Hall, 2004.