Fundamentos de la Informática I
2022

PARAGUAYO
ALEMANA

22/08/2022

DATA, INFORMATION, DATABASES

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SECTION 6.1 – DATA, INFORMATION, DATABASES

- The Business Benefits of High-Quality Information
- Storing Information Using a Relational Database Management System
- Using a Relational Database for Business Advantages
- Driving Websites with Data

SECTION 6.2 – BUSINESS INTELLIGENCE

- Supporting Decisions with Business Intelligence
- The Business Benefits of Data Warehousing
- The Power of Big Data Analytics

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GREAT BUSINESS DECISIONS
Julius Reuter Uses Carrier Pigeons to Transfer Information

En 1850, nació la idea de que enviar y recibir información podría agregar valor comercial. Julius Reuter comenzó un negocio que cerraba la brecha entre Bélgica y Alemania.

Reuter creó una de las primeras compañías de gestión de la información basada en la premisa de que los clientes estarían preparados para pagar por información que fuera oportuna y precisa.

Business Benefits of High-Quality Information

Reuter utilizó palomas mensajeras para reenviar el mercado de valores y los precios de las materias primas de Bruselas a Alemania.

Los clientes se dieron cuenta rápidamente de que con la recepción temprana de información vital podían hacer fortunas. Aquellos que tenían dinero en juego en el mercado de valores estaban preparados para pagar generosamente la información temprana de una fuente confiable, incluso si era una paloma.

El negocio de Reuter creció de 45 palomas a más de 200 palomas. Finalmente, el telégrafo cerró la brecha entre Bruselas y Alemania, y se cerró el monopolio temporal brillantemente concebido de Reuter.

I. THE BUSINESS BENEFITS OF HIGH-QUALITY INFORMATION

- Information is everywhere in an organization
- Employees must be able to obtain and analyze the many different levels, formats, and granularities of organizational information to make decisions.

Granularity *refers to the extent of detail within the information (fine and detailed or "coarse" and abstract information)*

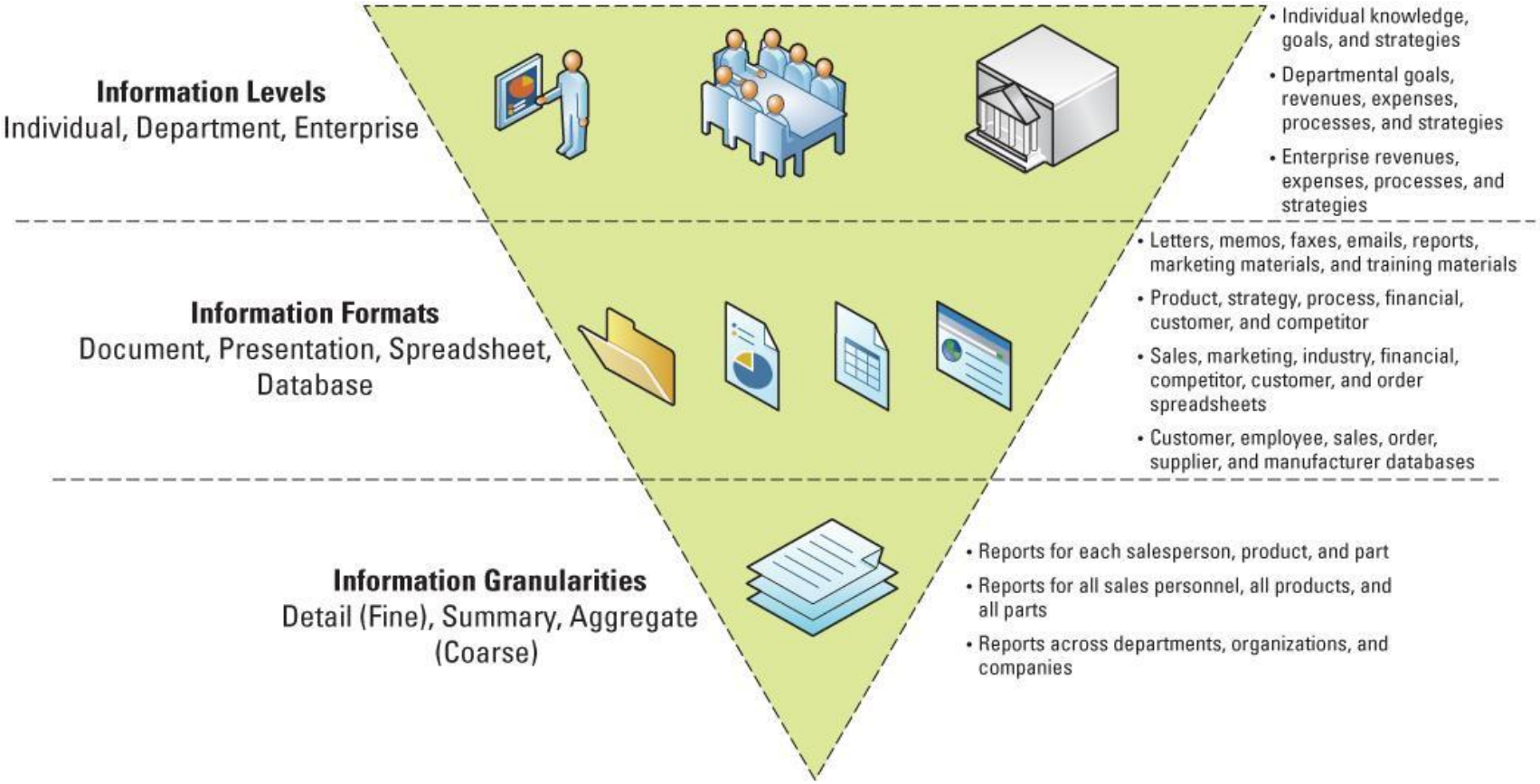
THE BUSINESS BENEFITS OF HIGH-QUALITY INFORMATION

- Successfully collecting, compiling, sorting, and analyzing information can provide tremendous insight into how an organization is performing.

- Taking a hard look at organizational information can yield exciting and unexpected results such as potential new markets, new ways of reaching customers, and even new ways of doing business.

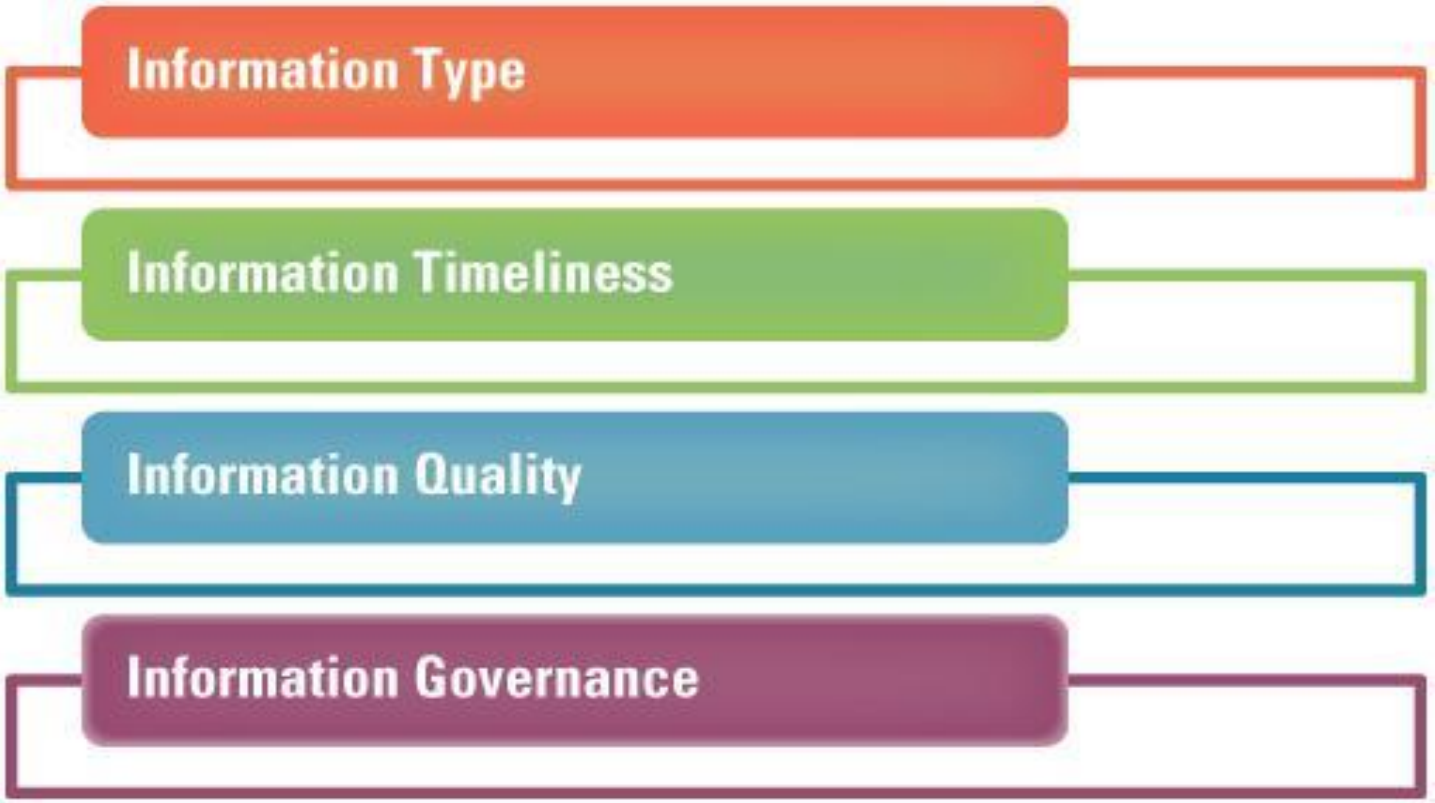
THE BUSINESS BENEFITS OF HIGH-QUALITY INFORMATION

Levels, Formats, and Granularities of Information



THE BUSINESS BENEFITS OF HIGH-QUALITY INFORMATION

Four primary traits of the value of information



traits = rasgos

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1. Information Type: Transactional and Analytical

- **Transactional information** – Encompasses all of the information contained within a single business process or unit of work, and its primary purpose is to support the performing of daily operational tasks.

Organizations capture and store transactional information in databases and use it when performing operational tasks and repetitive decisions such as analyzing daily sales reports and production schedules to determine how much inventory to carry.

Examples include withdrawing cash from an ATM, making an airline reservation, purchasing stocks, daily sales, hourly employee payroll, product orders, shipping an order.

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1. Information Type: Transactional and Analytical

- **Analytical information** – Encompasses all organizational information, and its primary purpose is to support the performing of managerial analysis tasks.

  - Includes transactional information.
  - Also includes external organizational information such as market, industry, and economic conditions.
  - Is used to make ad-hoc decisions.

Examples include trends, sales, product statistics, future growth projections, cost/benefit analysis, sales forecast, market trends, industry trends.

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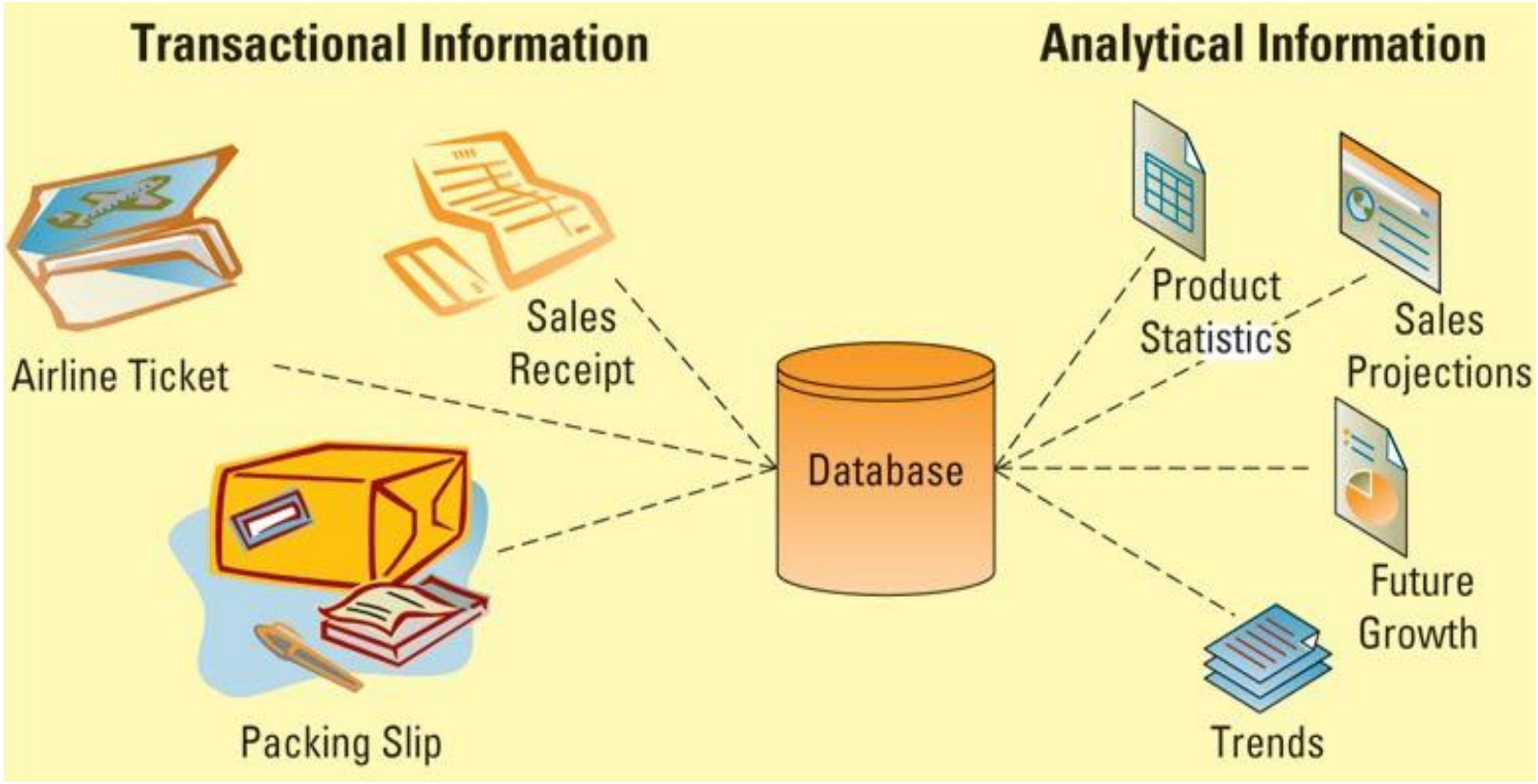
1. Information Type: Transactional and Analytical



2. Information Timeliness

CASO DE ESTUDIO:

Tres gerentes se reúnen al final del día para discutir un problema de negocios.

Cada gerente ha recopilado información en diferentes momentos del día para crear una imagen de la situación.

¿Qué puede pasar aqui al tomar las decisiones?

Los tomadores de decisiones de negocios deben evaluar la puntualidad de la información para cada decisión.

Las organizaciones no quieren encontrarse usando información en tiempo real para tomar una mala decisión, pero más rápidamente.

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2. Information Timeliness

Oportunidad

Proporcionada en el momento adecuado.

Timeliness is an aspect of information that <u>depends on the situation.</u>

"timely" is relative to each business decision

Real-time information: Immediate, up-to-date information
Real-time system: Provides real-time information in response to requests

Ej: up-to-second information:
Organizations such as 911 centers, stock traders, and banks

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3. Information Quality

- Business decisions are only as good as the quality of the information used to make the decisions.
- You never want to find yourself using technology to help you make a bad decision faster.

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3. Information Quality

Characteristics of High Quality Information

Accurate	• Is there an incorrect value in the information? • Example: Is the name spelled correctly? Is the dollar amount recorded properly?	exacta
Complete	• Is a value missing from the information? • Example: Is the address complete including street, city, state, and zip code?	completa
Consistent	• Is aggregate or summary information in agreement with detailed information? • Example: Do all total columns equal the true total of the individual item?	consistente
Timely	• Is the information current with respect to business needs? • Example: Is information updated weekly, daily, or hourly?	oportuna
Unique	• Is each transaction and event represented only once in the information? • Example: Are there any duplicate customers?	unica

¿Ejemplos?

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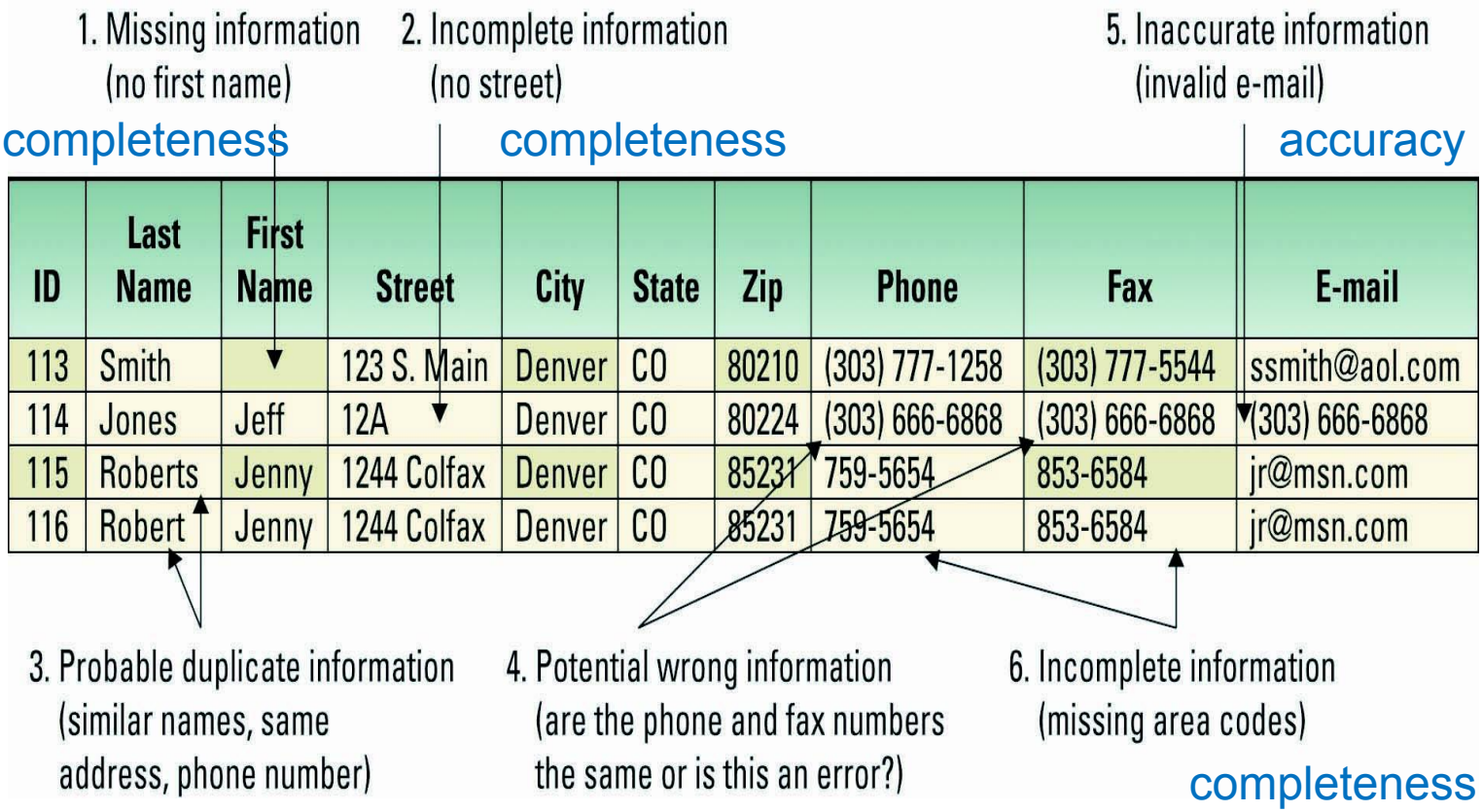
3. Information Quality

Low Quality Information Example



ID	Last Name	First Name	Street	City	State	Zip	Phone	Fax	E-mail
113	Smith		123 S. Main	Denver	CO	80210	(303) 777-1258	(303) 777-5544	ssmith@aol.com
114	Jones	Jeff	12A	Denver	CO	80224	(303) 666-6868	(303) 666-6868	(303) 666-6868
115	Roberts	Jenny	1244 Colfax	Denver	CO	85231	759-5654	853-6584	jr@msn.com
116	Robert	Jenny	1244 Colfax	Denver	CO	85231	759-5654	853-6584	jr@msn.com

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Understanding the Costs of Using Low-Quality Information

The four primary sources of low quality information include:

- Customers intentionally enter inaccurate information to protect their privacy
- Different entry standards and formats
- Operators enter abbreviated or erroneous information by accident or to save time
- Third party and external information contains inconsistencies, inaccuracies, and errors

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Understanding the Costs of Using Low-Quality Information

Potential business effects resulting from low quality information include

- Inability to accurately track customers
- Difficulty identifying valuable customers
- Inability to identify selling opportunities
- Marketing to nonexistent customers
- Difficulty tracking revenue
- Inability to build strong customer relationships

Poor information could cause
-> to order too much inventory from a supplier based on inaccurate orders
-> to send an expensive promotional item (such as a fruit basket) to the wrong address of one of its best customers

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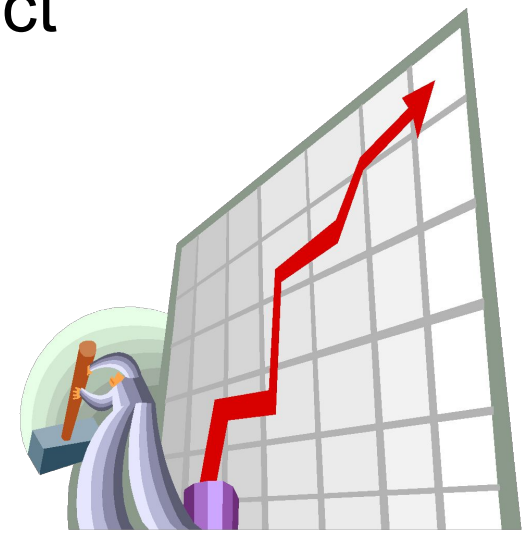
Understanding the Benefits of Good Information

- High quality information can significantly improve the chances of making a good decision
- Good decisions can directly impact an organization's bottom line

High-quality information does not automatically guarantee that every decision made is going to be a good one.

However, such information ensures that the basis of the decisions is accurate.



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4. Information Governance

- Information is a vital resource and users need to be educated on what they can and cannot do with it.
- To ensure a firm manages its information correctly, it will need special policies and procedures establishing rules on how the information is organized, updated, maintained, and accessed.

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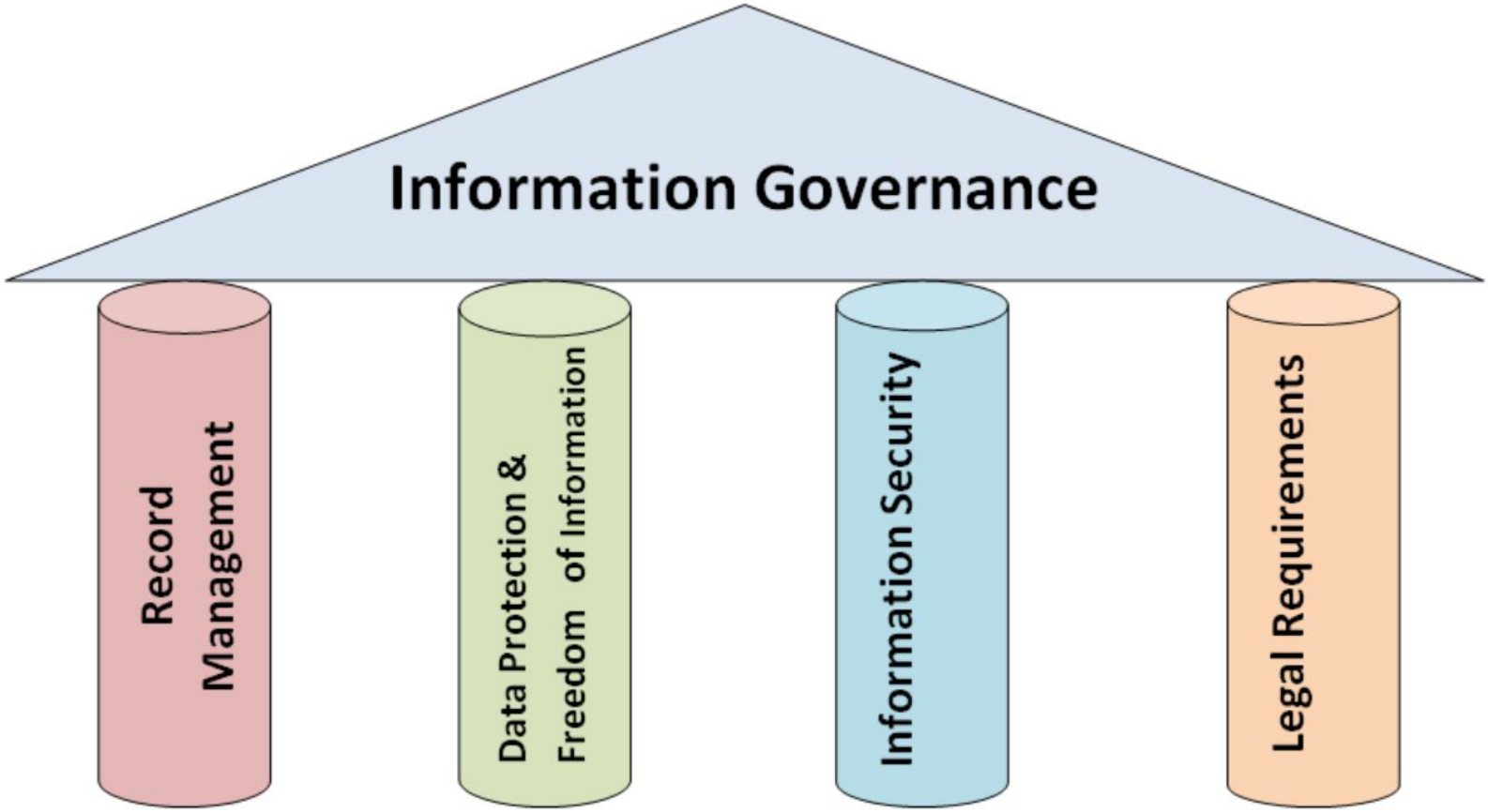
4. Information Governance

Data governance refers to the overall management of the availability, usability, integrity, and security of company data.



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4. Information Governance

- **Master data management (MDM)** – The practice of gathering data and ensuring that it is uniform, accurate, consistent, and complete, including such entities as customers, suppliers, products, sales, employees, and other critical entities that are commonly integrated across organizational systems

- **Data validation** – Includes the tests and evaluations used to determine compliance with data governance polices to ensure correctness of data

II. STORING INFORMATION IN A RELATIONAL DATABASE

- Information is everywhere in an organization
- Information is stored in databases

Database – maintains information about various types of objects (inventory), events (transactions), people (employees), and places (warehouses)

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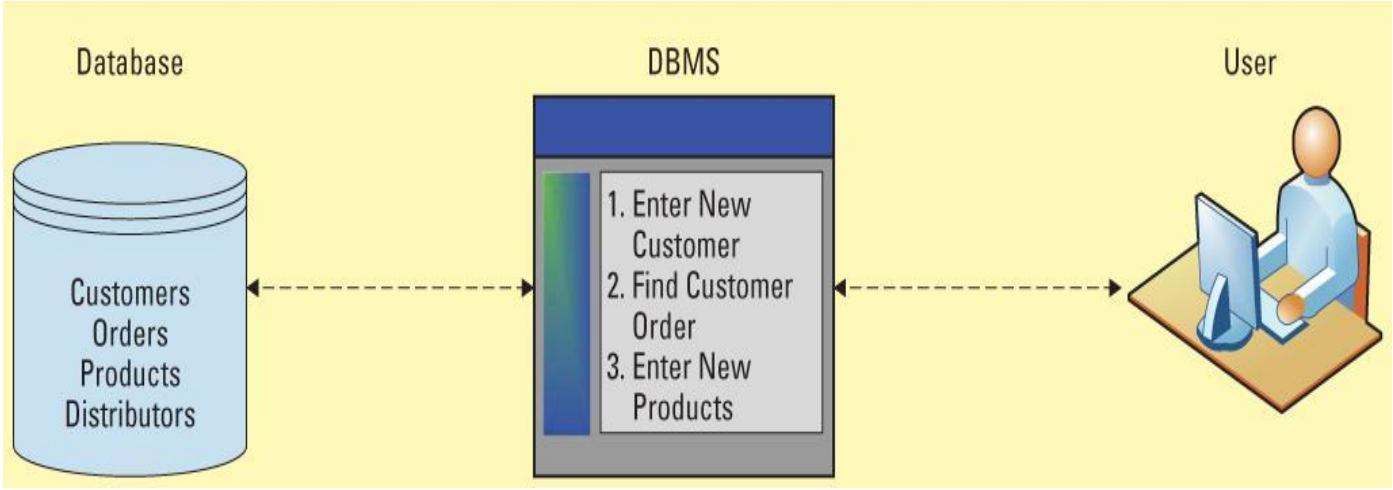
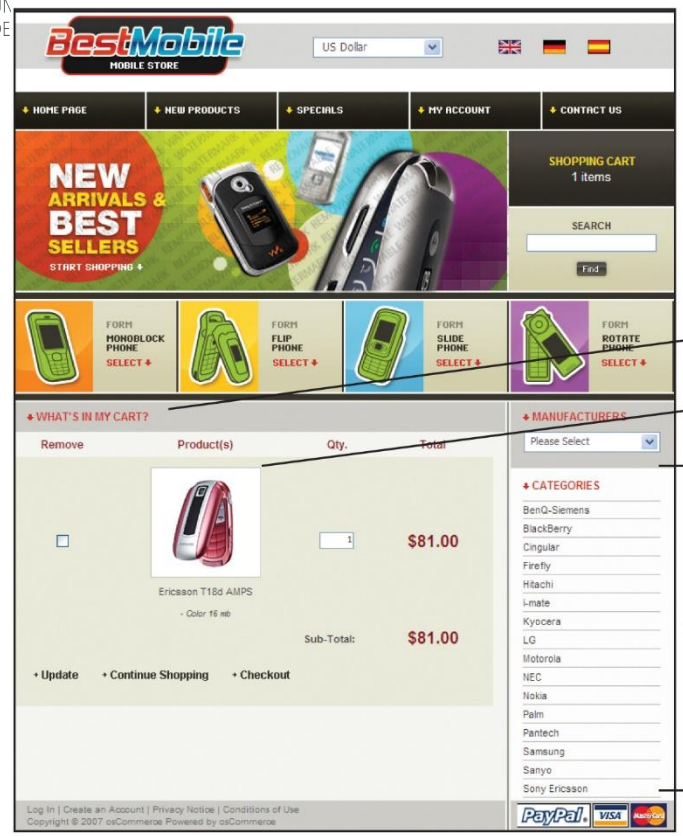
STORING INFORMATION IN A RELATIONAL DATABASE

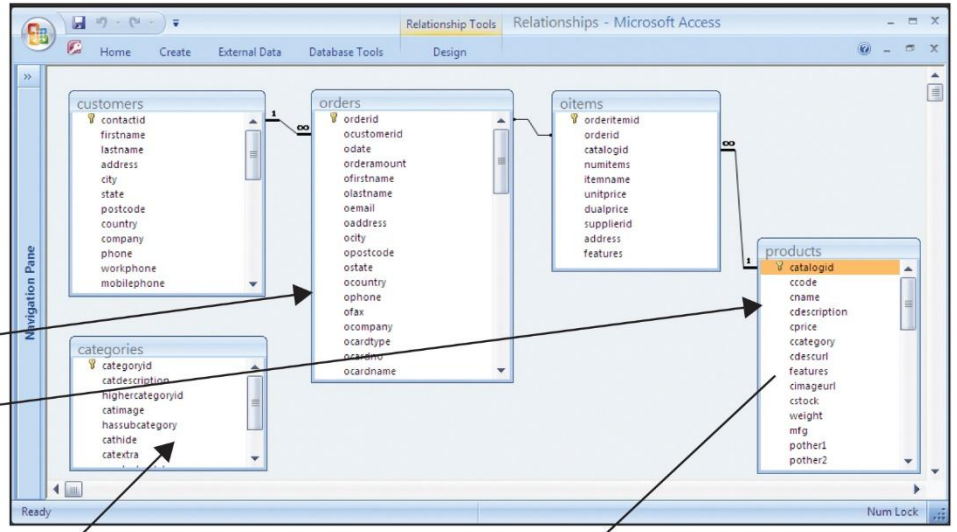
Database management systems (DBMS) –Allows users to create, read, update, and delete data in a relational database, while controlling access and security

MySQL, Microsoft Access, SQL Server, FileMaker, Oracle, and FoxPro.



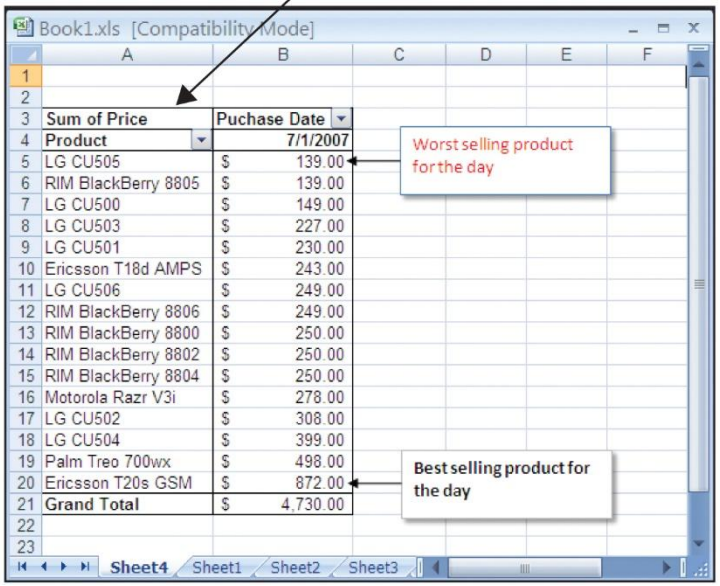


1 Web Page



2 Database

3 PivotTable



STORING INFORMATION IN A RELATIONAL DATABASE

Data element – The smallest or basic unit of information

Data model – Logical data structures that detail the relationships among data elements using graphics or pictures

Metadata – Details about data

Data dictionary – Compiles all of the metadata about the data elements in the data model

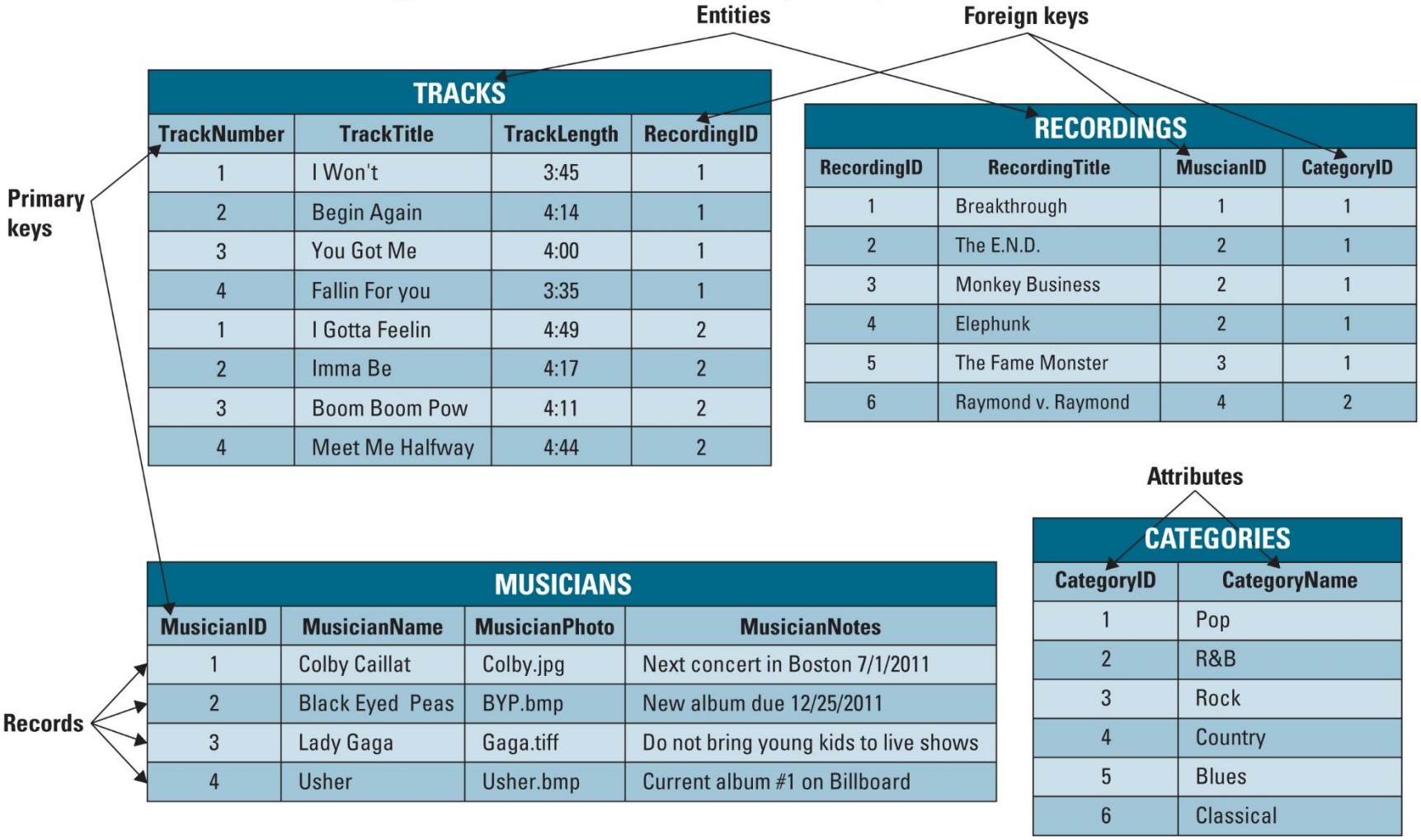
Entity – A person, place, thing, transaction, or event about which information is stored. The rows in a table contain entities
Attribute (field, column) – The data elements associated with an entity
The columns in each table contain the attributes.
Record – A collection of related data elements

STORING INFORMATION IN A RELATIONAL DATABASE

Primary keys and foreign keys identify the various entities (tables) in the database

- **Primary key** – A field (or group of fields) that uniquely identifies a given entity in a table
- **Foreign key** – A primary key of one table that appears an attribute in another table and acts to provide a logical relationship among the two tables

EXAMPLE



TRACKS

TrackNumber	TrackTitle	TrackLength	RecordingID
1	I Won't	3:45	1
2	Begin Again	4:14	1
3	You Got Me	4:00	1
4	Fallin For you	3:35	1
1	I Gotta Feelin	4:49	2
2	Imma Be	4:17	2
3	Boom Boom Pow	4:11	2
4	Meet Me Halfway	4:44	2

RECORDINGS

RecordingID	RecordingTitle	MuscianID	CategoryID
1	Breakthrough	1	1
2	The E.N.D.	2	1
3	Monkey Business	2	1
4	Elephunk	2	1
5	The Fame Monster	3	1
6	Raymond v. Raymond	4	2

MUSICIANS

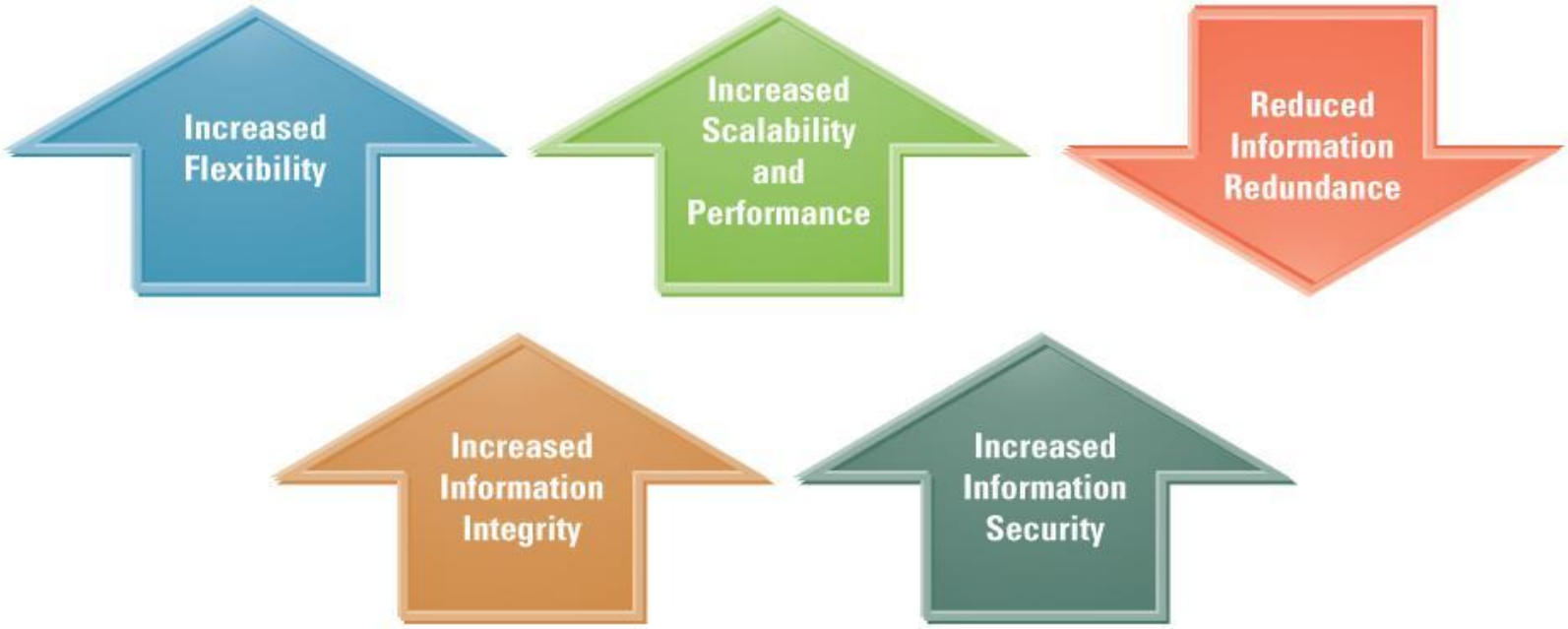
MusicianID	MusicianName	MusicianPhoto	MusicianNotes
1	Colby Caillat	Colby.jpg	Next concert in Boston 7/1/2011
2	Black Eyed Peas	BYP.bmp	New album due 12/25/2011
3	Lady Gaga	Gaga.tiff	Do not bring young kids to live shows
4	Usher	Usher.bmp	Current album #1 on Billboard

CATEGORIES

CategoryID	CategoryName
1	Pop
2	R&B
3	Rock
4	Country
5	Blues
6	Classical

III. USING A RELATIONAL DATABASE FOR BUSINESS ADVANTAGES

Database advantages from a business perspective include



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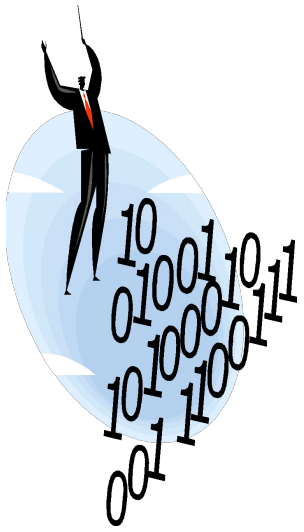
1) Increased Flexibility



A well-designed database should

- Handle changes quickly and easily
- Provide users with different views in whatever way best suits his/her needs.
- Have only one physical view
  - **Physical view –** Deals with the physical storage of information on a storage device.
- Have multiple logical views
  - **Logical view –** Focuses on how individual users logically access information to meet their own particular business needs.

Reflexiona: “Physical view” vs “Logical view”

Entities

Foreign keys

Primary keys

TRACKS

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Attributes

CATEGORIES

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Records

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¿Qué tipos de “vistas” los usuarios podrían solicitar en este ejemplo ?

One physical view can support multiple logical views -> flexibility

2) Increased Scalability and Performance

- Handle massive volumes of information and large numbers of users.
- Perform quickly under heavy use.
- Support hundreds or thousands of users (employees, partners, customers and suppliers)

Amazon, Government (IRS, SET), CNN, etc.

sistemas informáticos exitosos deben poder anticipar el crecimiento futuro!

2) Increased Scalability and Performance

A database must scale to meet increased demand, while maintaining acceptable performance levels

- **Scalability** – Refers to how well a system can adapt to increased demands.
- **Performance** – Measures how quickly a system performs a certain process or transaction.

3) Reduced Information Redundancy

- Databases reduce information redundancy

  Information redundancy – The duplication of data or storing the same information in multiple places

- Inconsistency is one of the primary problems with redundant information

Low quality information ->
incorrect information cause disruptions to business process and procedures

4) Increase Information Integrity (Quality)

- **Information integrity** – measures the quality of information
- **Integrity constraint** – rules that help ensure the quality of information

DB & DBMS ensures that users can never violate these constrains

4) Increase Information Integrity (Quality)

- **Relational integrity constraint:** rule that enforces basic and fundamental information-based constraints

  Ex: create a order for a nonexistent customer

- **Business-critical integrity constraint:** rule that enforce business rules vital to an organization's success and often require more insight and knowledge than relational integrity constraints.

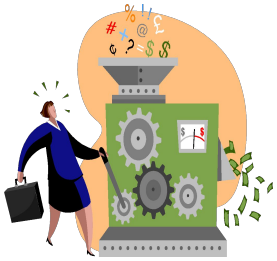
  Ex: product returns policy

Q: ¿Puede definir dos restricciones de integridad relacional para un sistema de pedidos?

5) Increased Information Security

- Information is an organizational asset and must be protected
- Databases offer several security features
  - **Password** – Provides authentication of the user
  - **Access level** – Determines who has access to the different types of information
  - **Access control** – Determines types of user access, such as read-only access

Implementing data governance policies and procedures!



IV. DRIVING WEBSITES WITH DATA

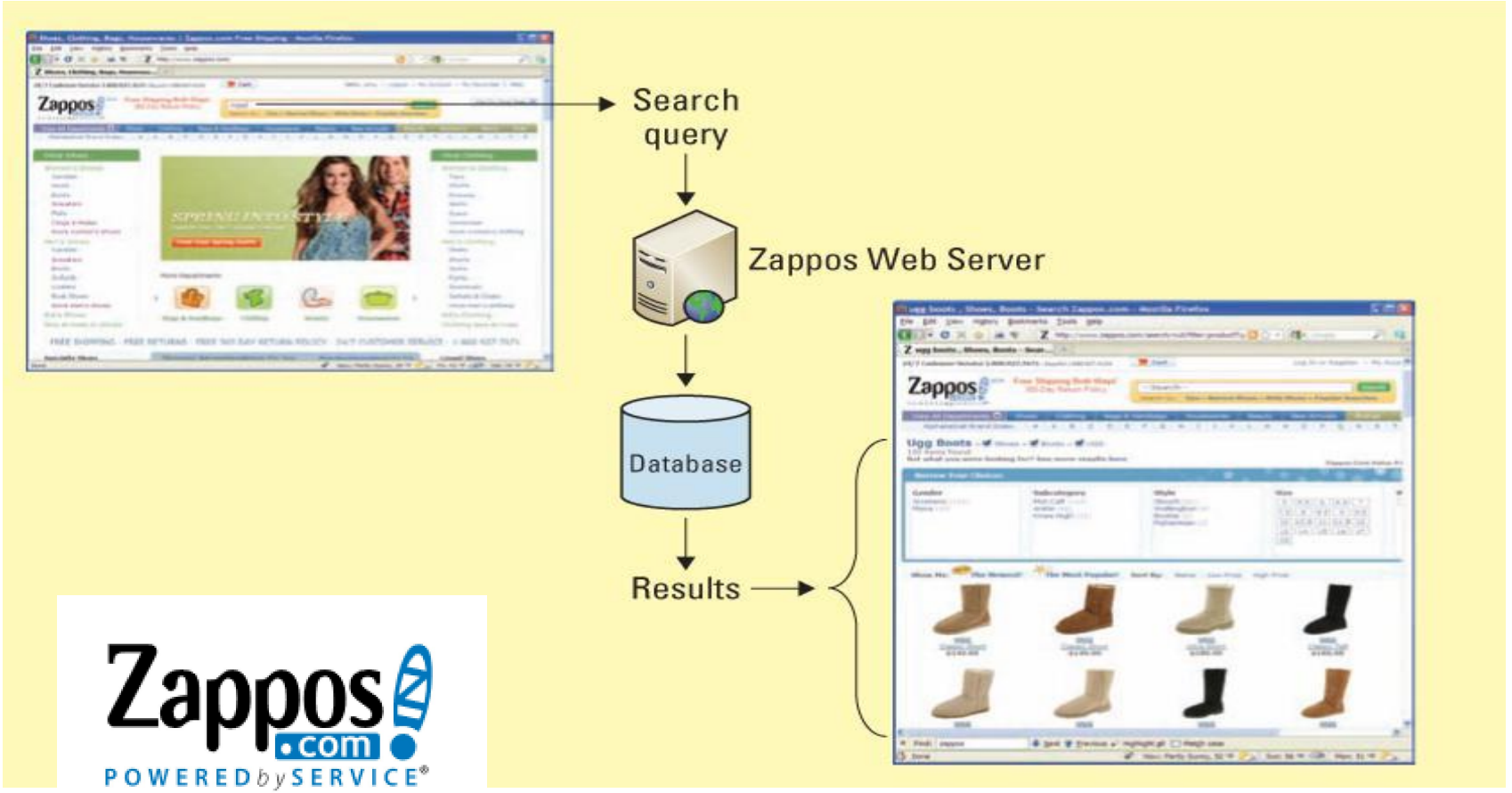
- **Data-driven websites** – An interactive website kept constantly updated and relevant to the needs of its customers using a database.

- Changes information based on user request.

Ex: Movie ticket availability, airlines prices, or restaurant reservations

¿Qué pasaría con un sitio web que no fuera data-driven?

IV DRIVING WEBSITES WITH DATA



IV. DRIVING WEBSITES WITH DATA

Data-driven website advantages

- ✔ **Easy to manage content**: Allows the users to make changes any time—all without having to rely on a developer or knowing HTML programming.
- ✔ **Easy to store large amounts of data**: keep large volumes of information organized. (reliability, scalability and performance)
- ✔ **Easy to eliminate human errors:** trap data-entry errors, eliminating inconsistencies while ensuring all information is entered correctly.

¿PREGUNTAS?

¿Qué aprendimos hoy?

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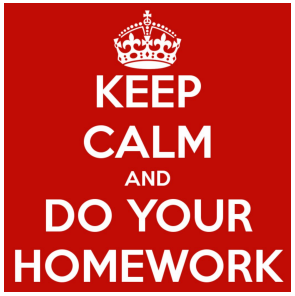
TAREA



TEC#9 - Guía de Trabajo en el Classroom

Individual

Entrega: Lunes 22/08/2021 – 23:59