Business Intelligence

BI – An Introduction

One of the great ironies of information technology is that companies spend a lot of time and money amassing terrific amounts of data, which they then largely under utilize for strategic decision-making purposes …………………..

Learning Outcomes
Business Intelligence (BI)

› Explain the importance of BI to business strategy.

› Describe the major functions of BI systems.

› Explain the types of technologies used in BI systems.

› Discuss the implementation of BI systems and what stages need to be followed.

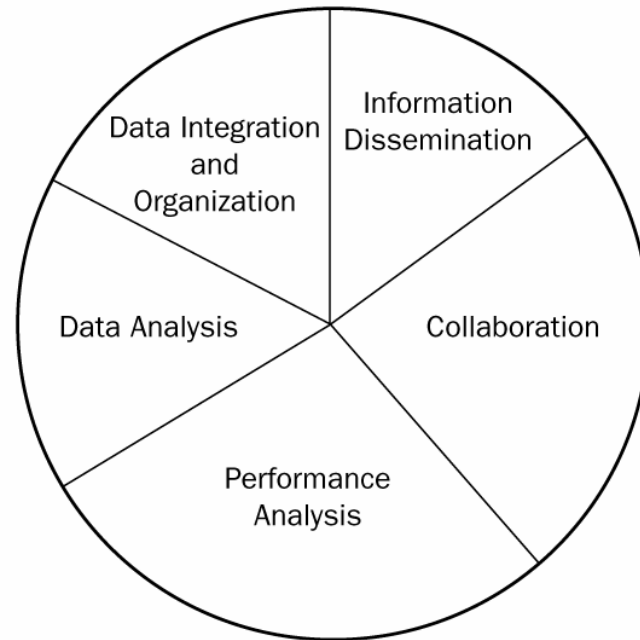› Describe how businesses may use data warehouses and data marts within the BI infrastructure.

Importance of BI

> Has emerged as a powerful tool for business

>> Allows capture, analysis, interpretation, and dissemination of information

> BI applications are closely related to CRM strategies

BI Functions

> **Data integration and organization**

> **Data analysis**

> **Performance analysis**

> **Information dissemination**

> **Collaboration**

Figure 10.1 Business Intelligence Functions

The tools of business intelligence can be categorized into data integration and organization, data analysis, performance analysis, information dissemination, and collaboration.
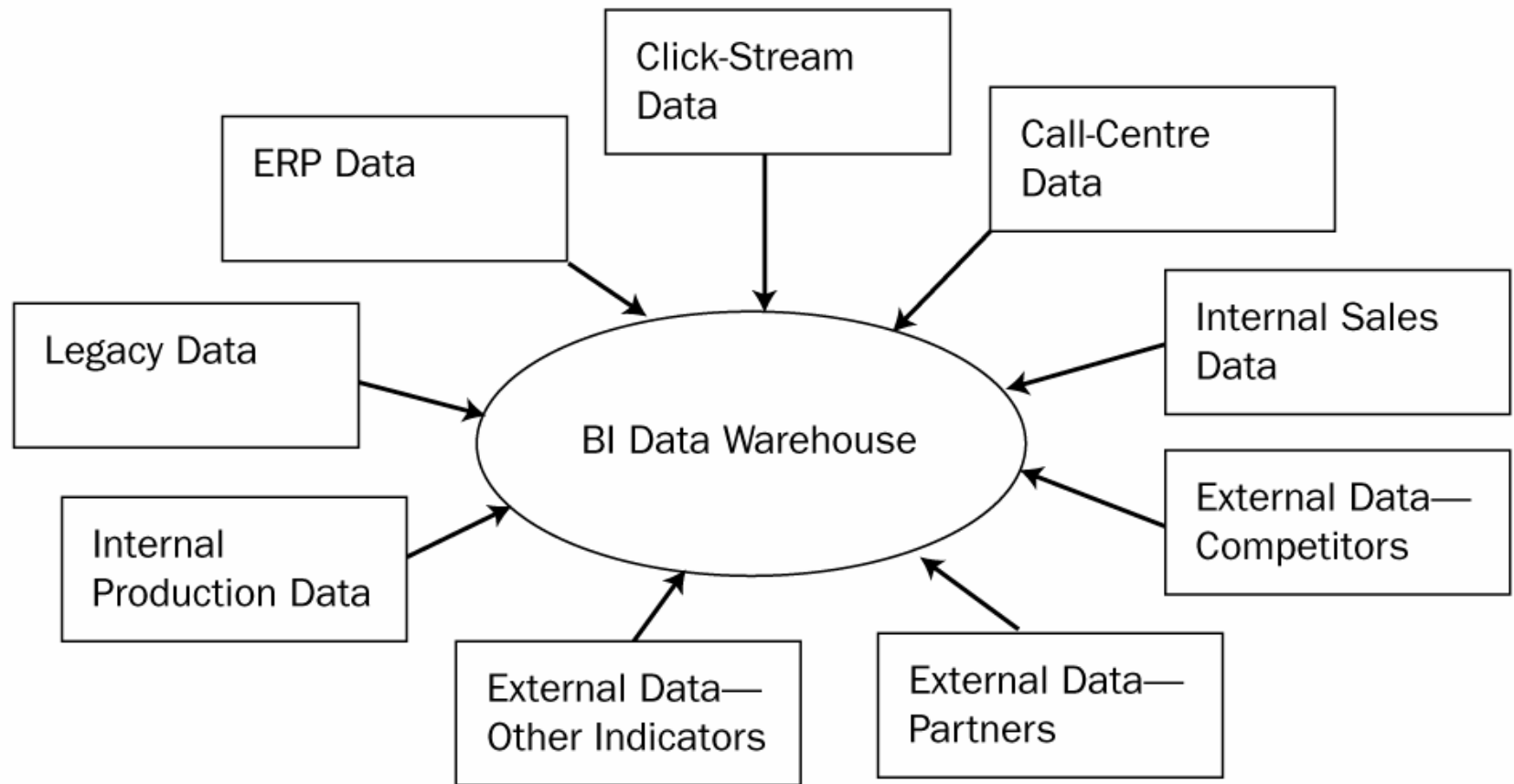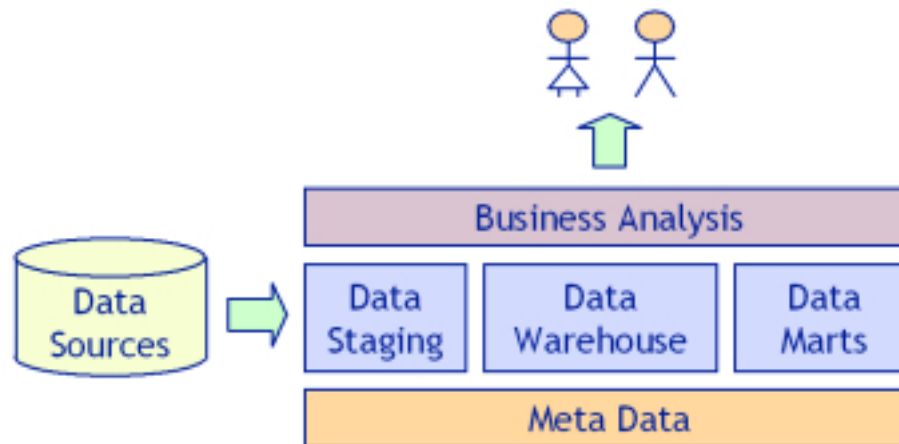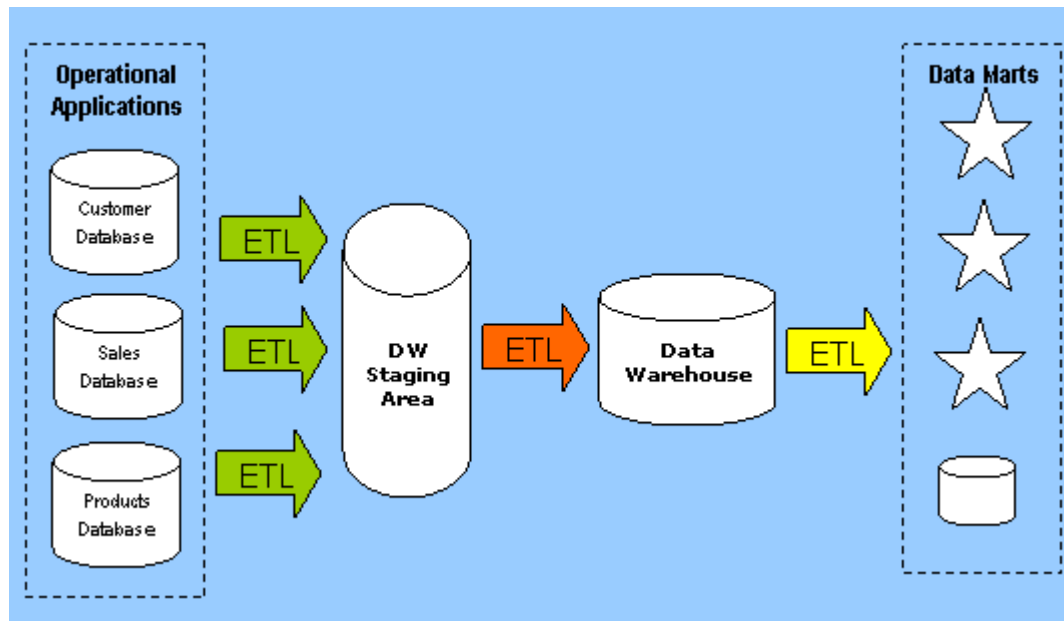
Data Integration & Organization

Figure 10.2 Data Sources for Business Intelligence

Numerous data sources contribute to the BI data warehouse, including internal and external sources.
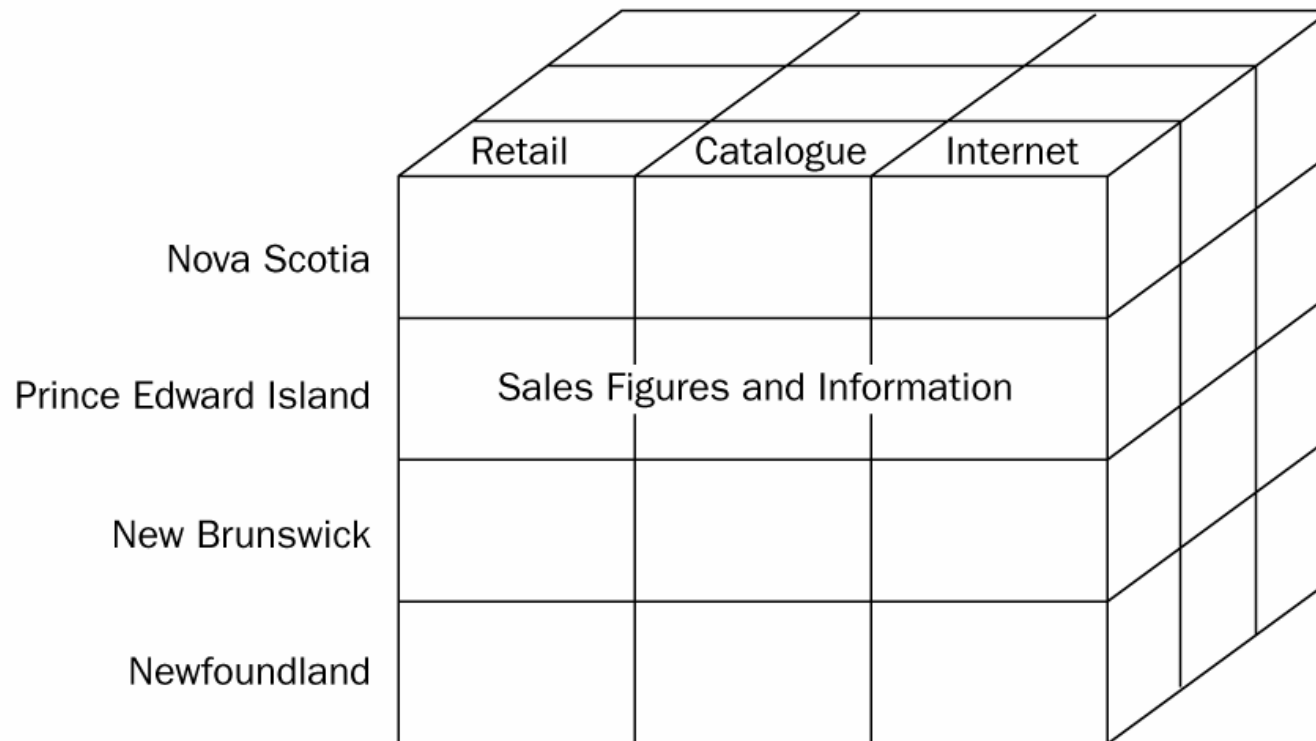
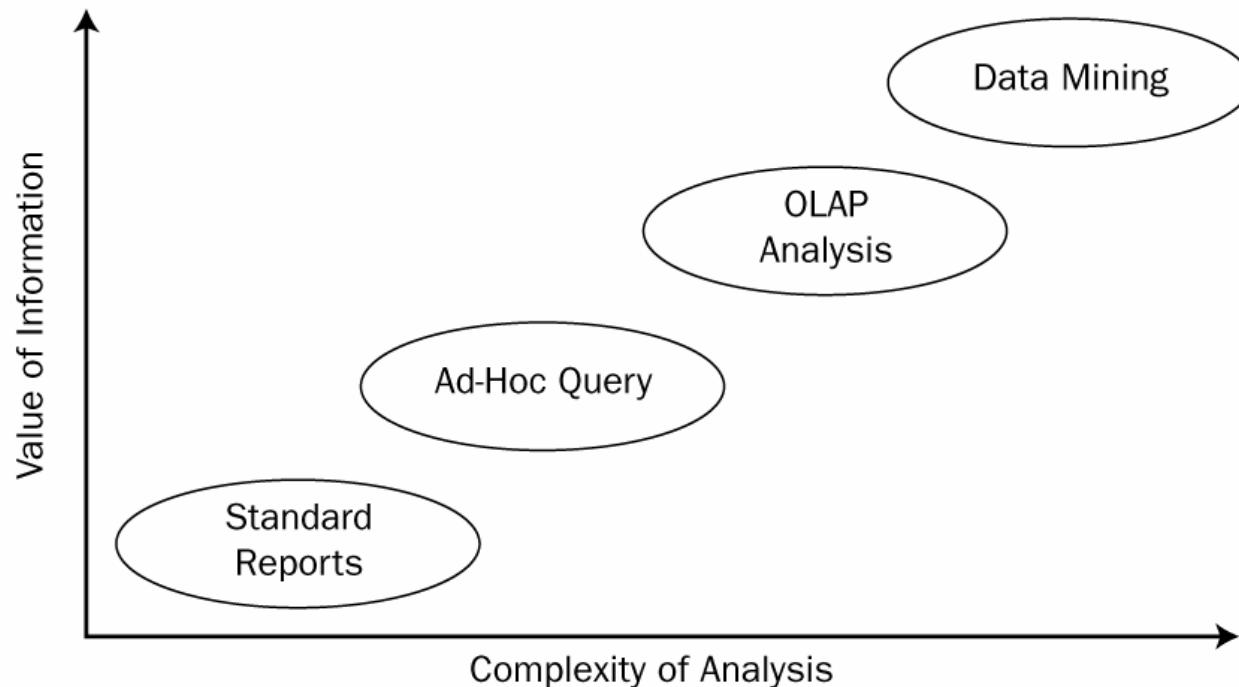# Data Analysis

Figure 10.3   Illustration of a Data Cube

This illustrates how a data cube may structure data for an Atlantic Canadian company selling via different channels to allow drill-down and data analysis in a structured format.

Retail   Catalogue   Internet

Nova Scotia

Prince Edward Island   Sales Figures and Information

New Brunswick

Newfoundland

Data Analysis and Reporting Methods

Figure 10.4   Data Analysis and Reporting Methods

The value of BI increases as the complexity of the level of analysis increases beyond standardized reporting.

OLAP and Data Mining

- OLAP – provides the ability for users to perform detailed, summary, or trend analysis on data and allows for drill-down into that data.

- Data mining - is the analysis of data for relationships that may not have previously been known. Discovery of information from data mining can be useful within many areas of the business, from customer analysis to production planning and cost control.

Performance Analysis
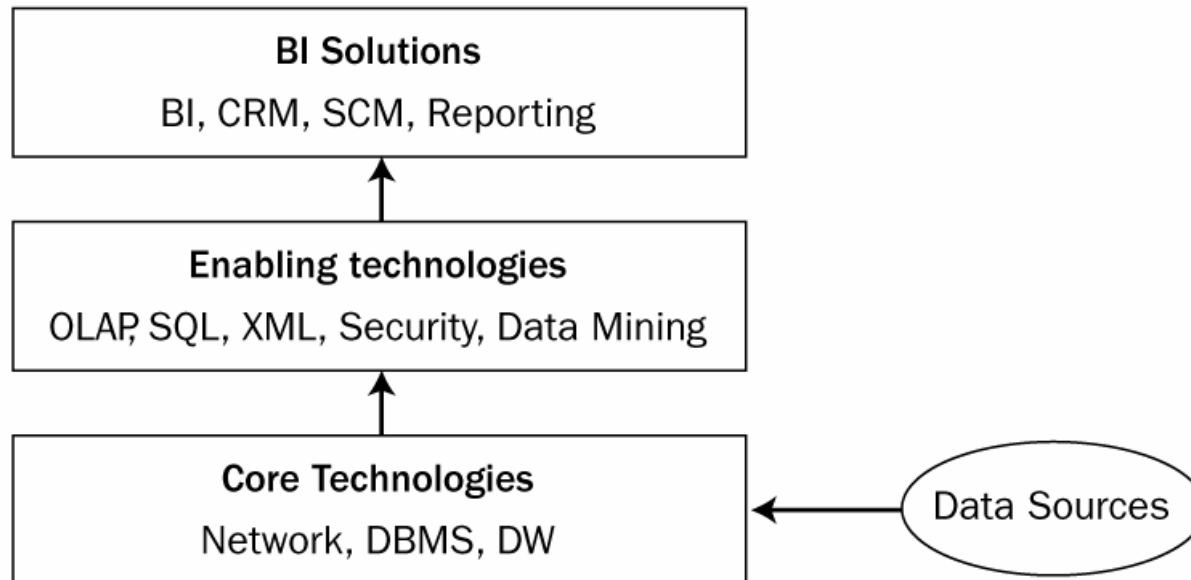
> KPI

> Balanced Scorecard
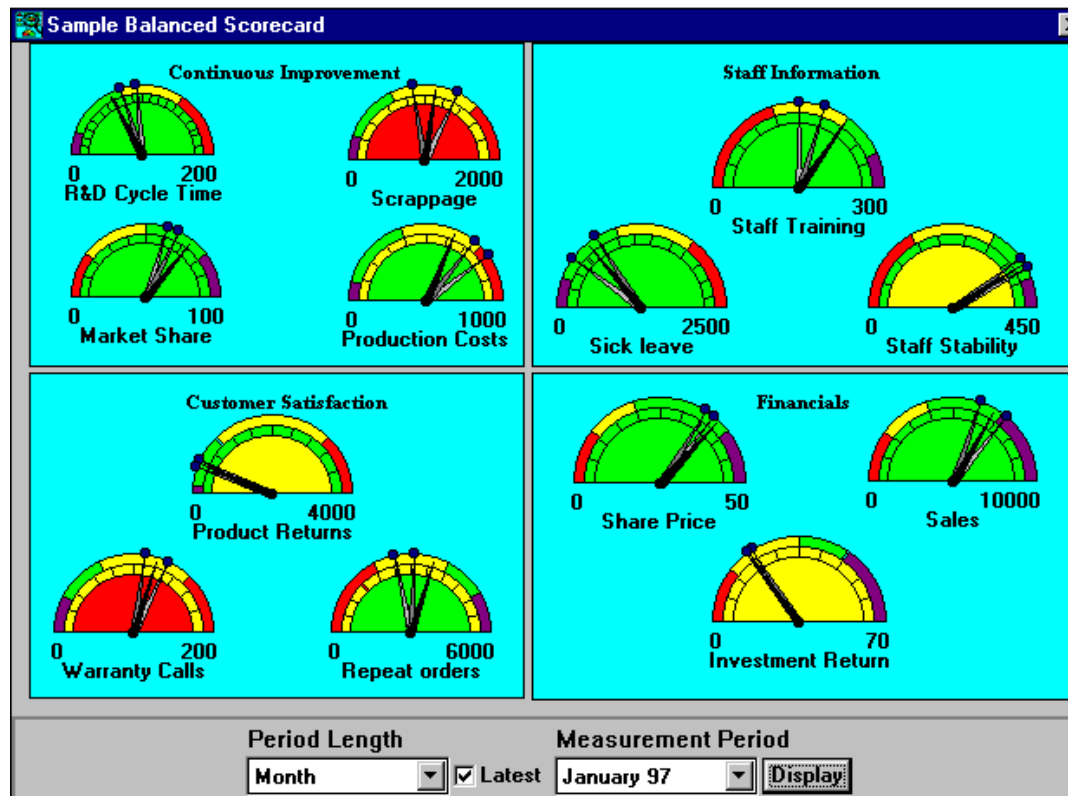
Technologies of BI

Figure 10.5   Business Intelligence Architecture

The business intelligence architecture includes core technologies, enabling technologies, and solutions that allow the transformation of data into valuable information for management.

Core Technologies

> **Core technologies**

>> **DBMS**

>> **data warehouses**

>> **data marts**

Enabling Technologies

> **Enabling technologies**

> > **query processing**

> > **data mining**
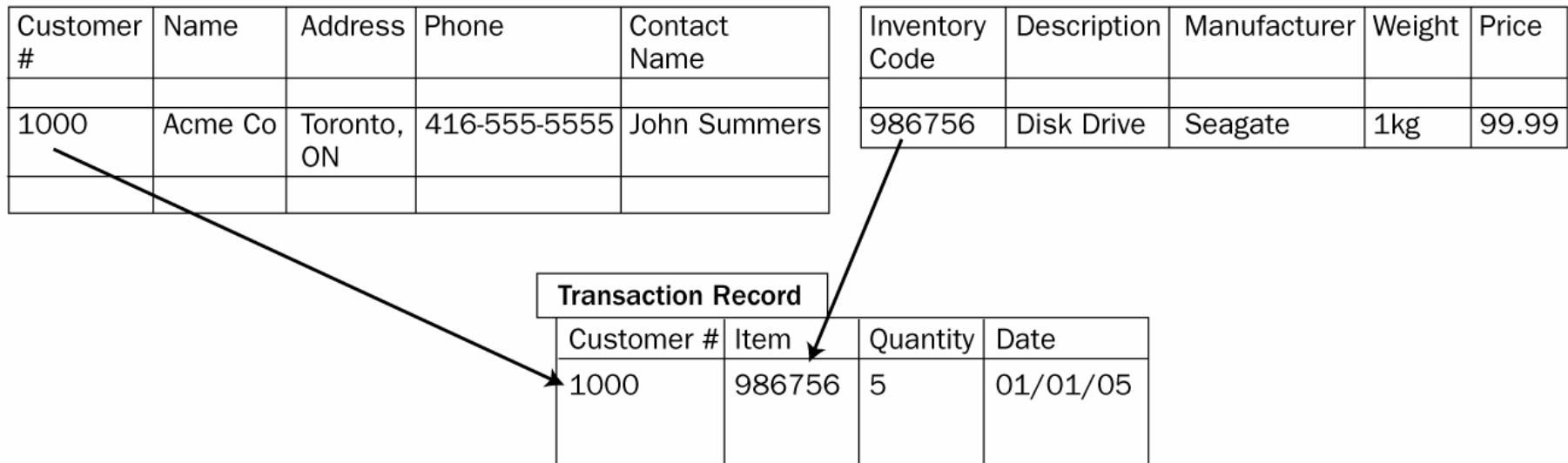
> > **OLAP/ROLAP/MOLAP/HOLAP**

> > **SQL**

> > **XML**

> > **Various integration tools**

Relational Databases

Figure 10.6 Relational Databases

The use of relational databases reduces data redundancy and errors by minimizing duplication and the amount of information that needs to be entered into a system. The database can link to other fields in the customer and inventory tables to get other information necessary, such as price or shipping addresses.

Customer #	Name	Address	Phone	Contact Name
1000	Acme Co	Toronto, ON	416-555-5555	John Summers

Inventory Code	Description	Manufacturer	Weight	Price
986756	Disk Drive	Seagate	1kg	99.99

Transaction Record

Customer #	Item	Quantity	Date
1000	986756	5	01/01/05

Implementation

Basic structure of an implementation will follow:

> Planning phase
>> The critical success factors for BI include ease of use, scalability, flexibility, performance, and security.

> Architecture design
>> two critical issues include database design and system architecture
>>> whether to use a two-tier or three-tier access design for the data warehouse/data mart.
>>>> Two-tiered structures are simpler and often less costly, but if the number of users is high, performance can easily degrade.
>>>> A three—tier structure allows the servers within the system to balance the load of user requests and is also required for some specific vendor products.

> Execution
>> Top management commitment needs to exist throughout the project to ensure adequate resources are dedicated, and to gain employee buy-in.
>> In addition, a cross-functional team approach to the entire project is necessary to allow departmental input, and evaluation of the project planning and implementation.

Figure 10.7 Two Major Approaches to Security in Data Warehousing

Data warehouse security can be established at the application or database level, with the appropriate design depending on many other factors within the organization.
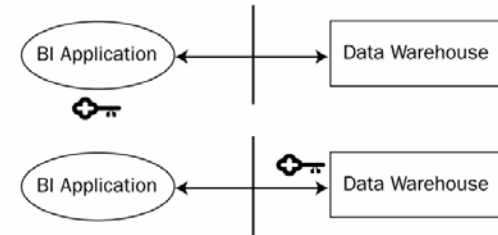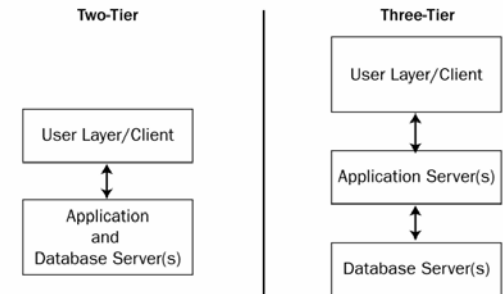
Figure 10.8 Two-Tier and Three-Tier Data Warehouse Structure

Two-tier and three-tier structures for data warehouse design can impact system performance dramatically. The three-tier structure is more easily scaled as the number of users grows.

Examples

- **CRM – Mercedez Benz**
  http://www.cognos.com/company/success/mercedes_b
  b.wmv

- **CRM – web based initiative at Otis**
  - **Problem: tons of critical click stream data (23,000 users a day)**
  - **Needed: insight to their online customer needs and requirements**
  - **Used: Cognos and web analytics from Sane Solutions**
  - **Benefit: strengthen its customer relationships and offer even better service to its clientele**

Examples

● **Reporting – BMW**

- **Problem: had dispersed BI applications in different departments—logistics, production, sales, human resources**

- **Needed: create integrated yet complex product quality and human resources performance reports**

- **Used: Cognos ReportNet**

Examples

- **TQM initiative – Vancouver Hospital**

  - **Needed: application that covered workload, payroll, patient satisfaction, demographics, operating room activities, 4-year trend data, and other performance-related indicators**

  - **Used: Cognos powerplay**

  - **Benefit: reduce patient length-of-stay to better accommodate more patients and reducing costs to the hospital.**

KEY TERMS

- ad hoc query (p.198)
- balanced scorecard (p.200)
- client-side OLAP (p.204)
- data cubes (p.196)
- data mining (p.199)
- extraction, transformation, and loading (ETL) (p.196).
- hybrid OLAP (p.204)
- key performance indicators (KPIs) (p.200)
- metadata (p.195)
- multidimensional OLAP (MOLAP) (p.204)
- online analytical processing (OLAP) (p.198)
- online transaction processing (OLTP) system (p.195)
- relational database (p.202)
- relational OLAP (ROLAP) (p.204)
- scalability (p.206)