

# Business Intelligence (BI) and Data Warehousing (DW)

## Data Marts

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# Data mart

- Datamart can be defined as the subset of a data warehouse of an organization which is limited to a specific business unit or group of users. It is a subject-oriented database.
- A data mart is a simple section of the data warehouse that delivers a single functional data set.
- **Example 1:** In a human resources database, we could create data marts for Employees, Benefits, or Payroll to name a few.

## Data mart (Cont.)

- While a data mart is a smaller subset of data, the broader data warehouse is like the mega-mart. It houses ALL of the data. Data marts can be built off of a line of business (for example Finance or Marketing), but you can also build them based on specific departments.
- **Example 2:** Think of a large retail organization. Data marts might exist for the major lines of business, but other marts could be designed for specific products. Examples include seasonal products, lawn and garden, or toys.

# Relationship between Data Mart and Data warehouse

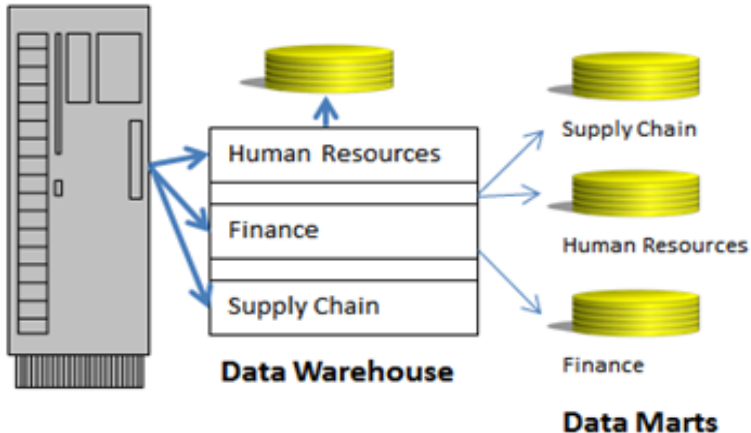


Figure: Relationship between Data Mart and Data warehouse

# Reasons for creating a data mart

- Data Mart helps to enhance user's response time due to reduction in volume of data
- It provides easy access to frequently requested data.
- Data mart are simpler to implement when compared to corporate Data warehouse. At the same time, the cost of implementing Data Mart is certainly lower compared with implementing a full data warehouse.
- Compared to Data Warehouse, a datamart is agile. In case of change in model, datamart can be built quicker due to a smaller size.
- A Datamart is defined by a single Subject Matter Expert. On the contrary data warehouse is defined by interdisciplinary SME from a variety of domains. Hence, Data mart is more open to change compared to Datawarehouse.

# Types of data marts

There are three main types of data marts are:

- **Dependent:** Dependent data marts are created by drawing data directly from an existing enterprise data warehouse.
- **Independent:** Independent data mart is created without the use of a central data warehouse.
- **Hybrid:** This type of data marts can take data from data warehouses or operational systems.

# Dependent data marts

- A dependent data mart allows sourcing organization's data from a single Data Warehouse that is already created. It offers the benefit of centralization. In case you need to develop one or multiple physical data marts, you'll have to build them as dependent data marts to ensure consistency and integration across all data storage systems.
- Dependent data marts can be built in two different ways.
  - In the first approach, enterprise data warehouse, as well as data marts, are built so the operator can access both, whenever needed.
  - In the second approach, also known as the federated approach, the results of ETL process are stored in a temporary storage area such as a common data bus instead of a physical database so the operator can only access the data mart.

# Dependent Data Mart Architecture

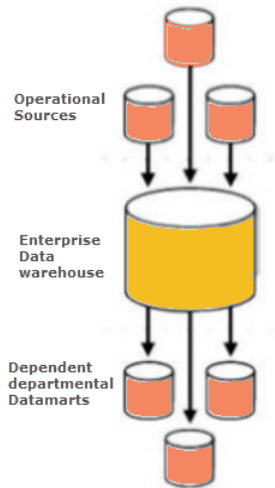


Figure: Dependent Data Mart architecture



# Independent data marts

- An independent data mart is created without the use of central Data warehouse. This kind of Data Mart is an ideal option for smaller groups within an organization.
- An independent data mart has neither a relationship with the enterprise data warehouse nor with any other data mart. In Independent data mart, the data is input separately, and its analyses are also performed independently.
- As more and more independent data marts are constructed, the data redundancy also increases across the organization. This is because every independent data mart needs its own, usually a duplicate copy of the comprehensive business information.
- As these data marts directly access files and/or tables of the operational system, they considerably limit the scalability of the decision support systems (DSS).

# Independent Data Mart Architecture

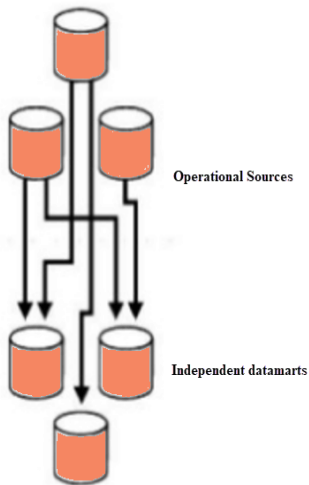


Figure: Independent Data Mart architecture

# Hybrid data marts

- By using a hybrid data mart, you can combine data from several operational source systems in addition to a data warehouse. These data marts are particularly useful when you require ad hoc integration, for instance, after adding a new group or products to the business.
- As the name indicates, a hybrid data mart is a mixture of dependent and independent data marts. It's suitable for businesses that have multiple databases and need quick turnaround.
- A hybrid data mart needs slight data cleaning, supports huge storage structures, and is flexible as it combines the benefits of both dependent and independent data marts.

# Hybrid Data Mart Architecture

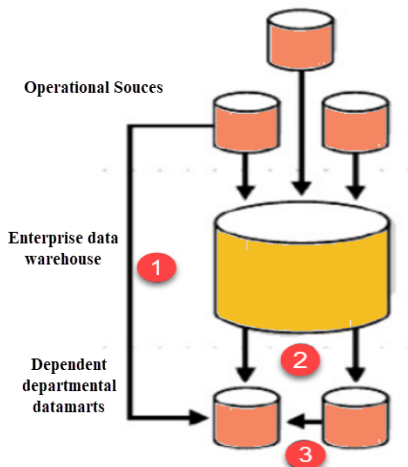


Figure: Hybrid Data Mart architecture

# Questions

- Compare a data warehouse and a data mart using the following parameters: definition, usage, objective, designing, data handling, focus, data type, subject area, data storing, scope and implementation time.
- How is a data warehouse different from a database? How are they similar?

## Questions (Cont.)

- If the ICT unit implements a data warehouse for Kyambogo university:
  - Identify and describe the benefits of a data warehouse to the university.
  - Identify and describe the various data sources that would provide data to the data warehouse of Kyambogo university.
  - Identify and describe possible data marts.
  - Draw an architecture of the data warehouse for Kyambogo university clearly indicating the various data sources, the main data warehouse and various data marts, among other components.