Business Process Modelling

Business process modelling gives organizations a simple way to understand and optimize workflows by creating data-driven visual representations of key business processes.

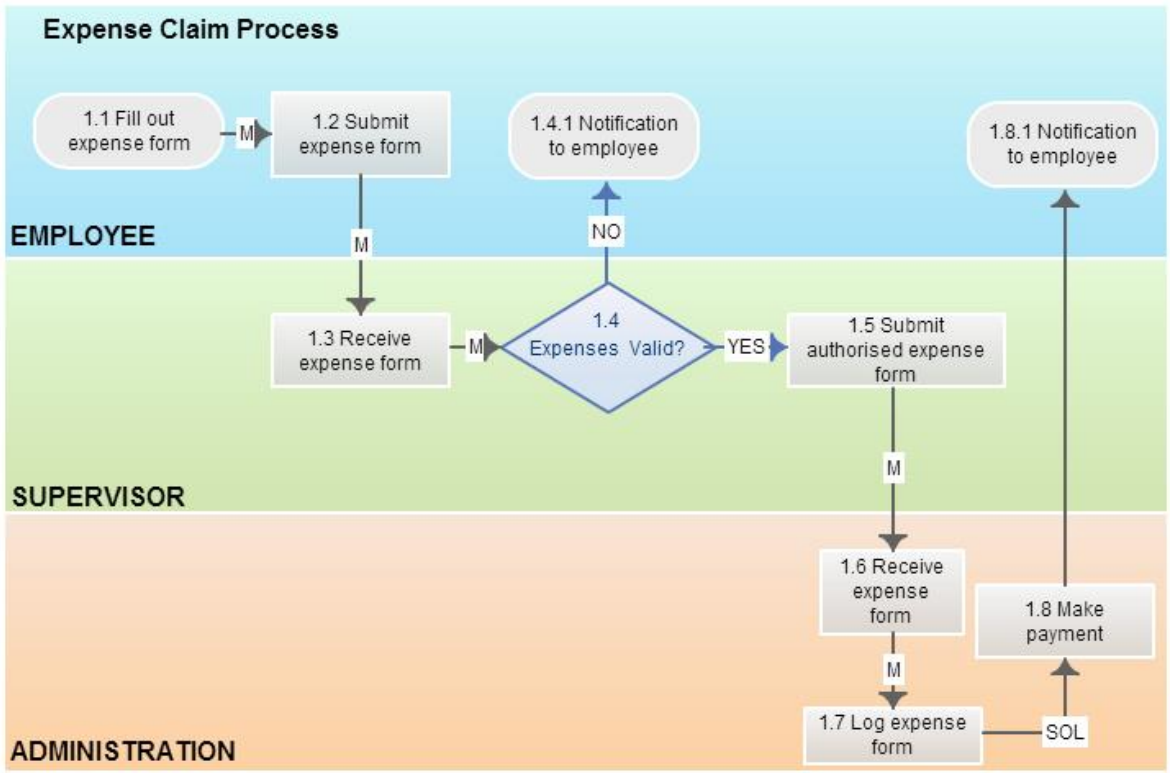
Business analysts can gain end-to-end views of the business process lifecycle through **business process modelling**.

Definition

A business process model is a graphical representation of a business process and its related sub-processes.

Process modelling generates comprehensive, quantitative activity diagrams and flowcharts containing critical insights into the functioning of a given process, including the following:

- Events and activities that occur within a workflow
- Who owns or initiates those events and activities?
- Decision points and the different paths workflows can take based on their outcomes
- Devices involved in the process
- Timelines of the overall process and each step in the process
- Success and failure rates of the process



M - Manual
Sol - Facilitated by Solution

Key aspects of business process modelling

1. Process models are not made manually. They are produced by data-mining algorithms that use the data contained within event logs to construct models of the workflows as they exist.
2. Because process models are based on quantitative data, they offer genuinely objective views of workflows as they exist in practice, including key data, metrics or events that may have otherwise gone unnoticed.
3. Process models are typically rendered using one of two standardized styles of graphical business process notation: Business Process Modeling Notation (BPMN) — also called Business Process Model and Notation — or Unified Modeling Language (UML).
4. An organization may uses UML diagrams or BPMN diagrams, the process model consist of
    - Arrows represent sequence flows
    - Diamonds represent decision points or gateways
    - Ovals represent beginnings and endpoints of processes
    - Rectangles represent specific activities within a workflow
    - Swimlanes are used to identify who owns which components of a process

5. Process maps are based on employee reports, are created manually and provide higher-level views of workflows.
6. Process models are data-driven deep dives that present more objective views of workflows.

How business process models are made

Most enterprise IT systems maintain event logs. These event logs are digital records that automatically track state changes and activities (i.e., "events") within the system. Anything that happens within a system can be an event.

The following are some common event examples:

- A user logs in
- A user updates a record
- A user submits a form
- Information is transferred between systems

Event logs track both the occurrence of events and information surrounding these events.

Process mining is the application of a data-mining algorithm to all of this event log data. The algorithm identifies trends in the data and uses the results of its analysis to generate a visual representation of the process flow within the system.

This visual representation is the **process model**. Depending on the process targeted for modeling, process-mining algorithms can be applied to a single system, multiple systems or entire technological ecosystems and departments.

Business process modelling use cases

The process models can be leveraged in any scenario that requires analysing business processes.

A single process model can contain a wealth of workflow data, allowing team members to analyse a workflow from multiple perspectives. The various workflow components involved are

- **Control flow:** "Control flow" refers to the order in which steps and commands are executed within a process. A process model depicts a flowchart of a given process so that a team can clearly see what steps are taken and when. This perspective also helps the team identify any dependencies between steps.
- **Organization:** A process model can capture who is involved in a process — including people, teams, systems and devices — and how they interact with each other. This perspective illuminates the connections between people and systems that form the organizational social network.
- **Time:** A process model can record how long a process takes, overall, and how long each step takes, allowing the team to identify delays, slowdowns and bottlenecks within the workflow.
- **Case:** A process model can offer a general view of how a given workflow typically plays out, or it can reflect a particular case – or instance – of a workflow. Teams often use this case perspective to analyse anomalous process outcomes.

Optimizing and standardizing processes

Process models accurately reflect existing workflow inefficiencies, making it easier to identify opportunities for process optimization. Once workflows have been optimized, businesses can use process modelling to standardize workflows across the entire enterprise. The model acts as a template for how processes should play out, ensuring that every team and employee approaches the same process in the same way. This leads to more predictable workflows and outcomes overall.

Assessing new processes

Process models can take the guesswork out of implementing and evaluating new business processes. By creating a model of a new process, business users can get a real-time look at

how that workflow is performing, allowing them to make adjustments as necessary to achieve process optimization.

Analysing resource usage

Process models can help companies track whether money and resource investments produce suitable returns. For example, by creating a model of the standard sales process, an organization can see how sales representatives are utilizing the tools and systems at their disposal.

Communicating processes

Process models transform complex processes into concrete images, making it easier to disseminate and discuss processes throughout the organization. Example - Troubleshooting technical problems

The benefits of business process modelling

Business process modelling arms an enterprise with objective business intelligence that supports more informed decisions for resource allocation, process improvement and overall business strategy.

Enterprise teams can ensure that workflows always drive the desired results. As a result, operating costs are lower, revenue is higher and business outcomes are stronger.

Business process modelling allows companies to do the following:

- **Access and utilize qualitative process data:** Without a process model, teams are limited to discussing and analysing workflows in qualitative and subjective terms.

  With process modelling, teams have access to quantitative workflow data, including success rates and error rates, allowing for a more rigorous analysis of business processes.

- **Streamline and accelerate process automation:** Before a process can be automated, an organization needs a clear understanding of how that process plays out in reality, including the business logic underpinning each decision point.
- A process model illuminates both the way a workflow unfolds and the relationships between events, actors, tools and systems within and between processes. This viewpoint helps a team document the process itself and the business rules that guide its execution. T
- **Keep operation costs down:** Process models provide organizations with an easy way to identify opportunities to optimize existing processes. This makes it easier for the company to ensure that processes consistently produce the desired outcomes. As a result, business processes require less investment to maintain and generate positive outcomes at a lower cost.

Business process modeling and IBM

IBM Blue works Live is a cloud-based business process modelling software designed to help organizations discover business processes and document them in a collaborative fashion across multiple stakeholder groups.

Teams can work together through an intuitive and accessible web interface to document and analyse processes.

Design the dimensional model

Dimensional Modelling (DM) is a data structure technique optimized for data storage in a Data warehouse.

The purpose of dimensional modelling is to optimize the database for faster retrieval of data. The dimensional modelling was developed by Ralph Kimball and consists of "fact" and "dimension" tables.

A dimensional model in data warehouse is designed to read, summarize, analyse numeric information like values, balances, counts, weights, etc. in a data warehouse.

Elements of Dimensional Data Model

1. **Fact**

Facts are the measurements/metrics from your business process. For a sales business process, a measurement would be quarterly sales number

2. **Dimension**

Dimension provides the context surrounding a business process event. In the sales business process, for the fact quarterly sales number, dimensions would be

- Who – Customer Names?
- Where – Location
- What – Product Name

Attributes

The Attributes are the various characteristics of the dimension in dimensional data modelling.

In the Location dimension, the attributes can be

- State
- Country
- Zipcode etc.

Attributes are used to search, filter, or classify facts.

Fact Table

A fact table is a primary table in dimension modelling.

A Fact Table contains

1. Measurements/facts
2. Foreign key to dimension table

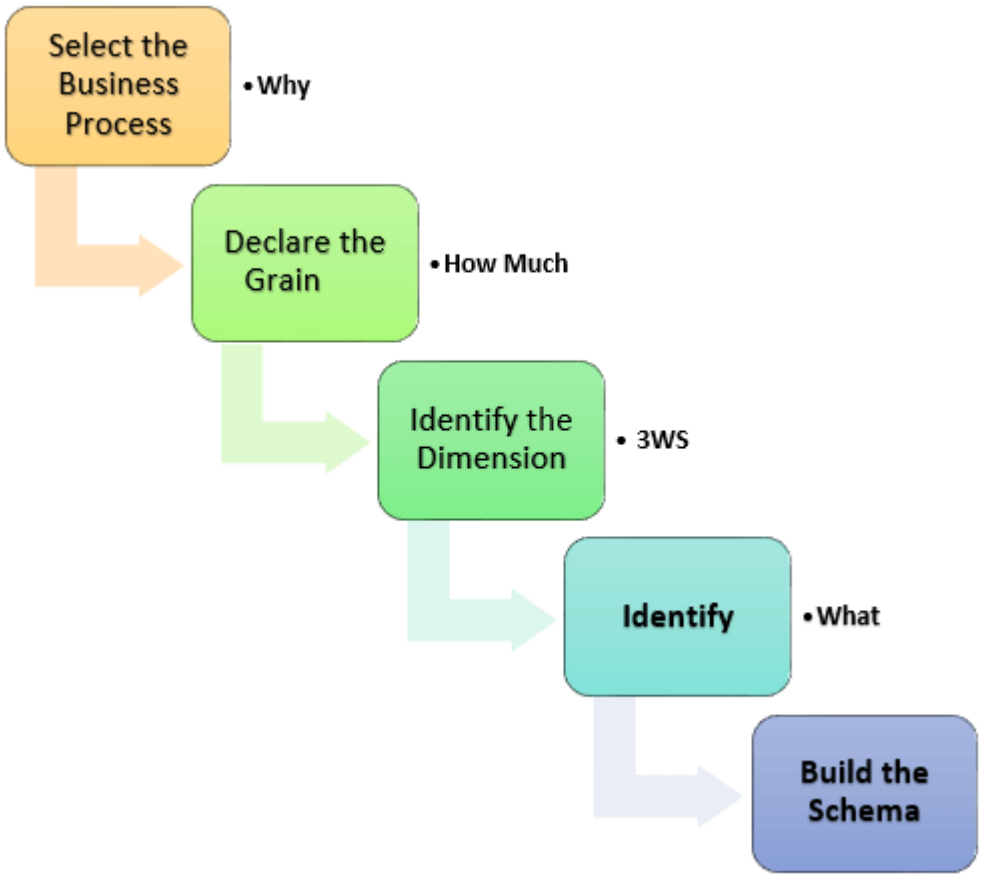
Dimension Table

- A dimension table contains dimensions of a fact
- Dimensions offers descriptive characteristics of the facts with the help of their attributes
- The dimension can also contain one or more hierarchical relationships

Steps of Dimensional Modelling

The various steps of dimensional modelling are

1. Identify the business process
2. Identify the grain
3. Identify the dimensions
4. Identify the facts
5. Build the schema



Step 1) Identify the Business Process

This could be Marketing, Sales, HR, etc. as per the data analysis needs of the organization. The selection of the Business process also depends on the quality of data available for that process.

To describe the business process, you can use plain text or use basic Business Process Modelling Notation (BPMN) or Unified Modelling Language (UML).

Step 2) Identify the Grain

The Grain describes the level of detail for the business problem/solution.

If a table contains sales data for every day, then it should be daily granularity. If a table contains total sales data for each month, then it has monthly granularity.

Example of Grain:

The CEO at an MNC wants to find the sales for specific products in different locations on a daily basis.

So, the grain is "product sale information by location on the specific day."

Step 3) Identify the Dimensions

Dimensions are nouns like date, store, inventory, etc. These dimensions are where all the data should be stored.

For example, the date dimension may contain data like a year, month and weekday.

3WS is a Dispensing System developed by Way ahead for the food, pharmaceutical and nutritional industries.

Example of Dimensions:

The CEO at an MNC wants to find the sales for specific products in different locations on a daily basis.

Dimensions: Product, Location and Time

Attributes: For Product: Product key (Foreign Key), Name, Type, Specifications

Hierarchies: For Location: Country, State, City, Street Address, Name

Step 4) Identify the Fact

This step is co-associated with the business users of the system because this is where they get access to data stored in the data warehouse. Most of the fact table rows are numerical values like price or cost per unit, etc.

Example of Facts:

The CEO at an MNC wants to find the sales for specific products in different locations on a daily basis.

The fact here is Sum of Sales by product by location by time.

Step 5) Build Schema

In this step, you implement the Dimension Model. A schema is nothing but the database structure (arrangement of tables). There are two popular schemas

1. **Star Schema**

The star schema architecture is easy to design. It is called a star schema because diagram resembles a star, with points radiating from a center. The center of the star consists of the fact table, and the points of the star is dimension tables.

The fact tables in a star schema which is third normal form whereas dimensional tables are de-normalized.

2. **Snowflake Schema**

The snowflake schema is an extension of the star schema. In a snowflake schema, each dimension are normalized and connected to more dimension tables.

Benefits of Dimensional Modelling

- Standardization of dimensions allows easy reporting across areas of the business.
- Information is grouped into clear and simple business categories.
- The dimensional model is very understandable by the business. This model is based on business terms, so that the business knows what each fact, dimension, or attribute means.
- Dimensional modelling in data warehouse creates a schema which is optimized for high performance. It means fewer joins and helps with minimized data redundancy.
- The dimensional model also helps to boost query performance. It is more denormalized therefore it is optimized for querying.
- Dimensional models can comfortably accommodate change. Dimension tables can have more columns added to them without affecting existing business intelligence applications using these tables.

Data Stewardship Responsibilities

A data steward is data governance role within an organization, and is responsible for ensuring the quality and fitness for purpose of the organization's data assets, including the metadata

Data stewards are responsible for the subset of data in their charge - Data stewards identify, define and protects data across the organization.

- **Data Access** - Develop policies and procedures to ensure appropriate access rules are in place and access groups are defined and maintained.
- **Data Classification** - Ensure that data is classified as restricted, regulated or public as it relates to the distribution of the data.
- **Data Quality** – Ensure data is deemed fit for purpose by developing data quality rules and regularly auditing data.
- **Data Policies** – Participate in the development of data polices including data retention, data privacy, data use and data regulations.
- **Data Sharing** – Review data sharing requests and approve or reject.
- **Reference and Master Data** - Define and review code values / code lists and identify sources of master data.
- **Metadata** – Define and review business terms and associated attributes including calculations, business rules,
- **Data Stewardship Group Participation** - Attend stewardship group meetings and participate in working groups as needed.
- **Data Certification** – Review reports and visualization to ensure they are performing as expected and meeting the needs of the business ensuring the data is viewed as trusted.
- **Subject Mater Expertise** - Provide guidance, testing support and validation as data assets, dashboards and reports are built for their area to ensure that they conform to business processes.

Data Steward Characteristics

- Broad-based knowledge of the data for which they are a steward. This knowledge should encompass all uses of the data as viewed from the University's perspective.
- Knowledge of how University business processes related to their data.