




Process Modeling

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An Introduction to process Modeling[1]

- Process modeling is **the graphical representation of business processes or workflows.**
- Like a flow chart, individual steps of the process are drawn out so there is an end-to-end overview of the tasks in the process within the context of the business environment.
- a **pictorial representation of reality**. Just as a picture is worth a thousand words, most models are pictorial representations of reality.

An Introduction to process Modeling[2]

- **Logical model :**

- a nontechnical pictorial representation that depicts what a system is or does. Synonyms are essential model, conceptual model, and business model.
- Logical data models are used to visualize data entities, attributes, keys, and relationships.

- **Physical model :**

- a technical pictorial representation that depicts what a system is or does and how the system is implemented. Synonyms are implementation model and technical model.
- Physical data models are used to visualize the physical structure of databases and data files

An Introduction to process Modeling[3]

Logical Data Model	Physical Data Model
Model that describe the data as much as possible, without regards to how they will be physical implemented in the database	Model that represents how the actual database is build
Defines the data elements and their relationships	Allows developing the actual database
Data Architects and business analyst create logical data model	Database Administrators and developers create physical data model
The objectives of logical data model is to develop a technical map of rules and data structures	The objectives of physical model is to implement the actual the actual database
Simple than the physical data model	Complex that the logical data model

Why Logical System Models

- Logical models remove biases that are the result of the way the system is currently implemented, or the way that any one person thinks the system might be implemented.
- Logical models reduce the risk of missing business requirements because we are too preoccupied with technical results.
- Logical models allow us to communicate with end-users in nontechnical or less technical languages.

System Concept for process modeling

- External Agents
- Data stores
- Process Concepts
- Data Flow

External Agents

External Agents

External agent – an outside person, organization unit, system, or organization that interacts with a system. Also called an *external entity*.

- External agents define the “boundary” or scope of a system being modeled.
- As scope changes, external agents can become processes, and vice versa.
- Almost always one of the following:
 - Office, department, division.
 - An external organization or agency.
 - Another business or another information system.
 - One of your system’s end-users or managers
- Named with descriptive, singular noun



**External
Agent**

Gane and Sarson shape



**External
Agent**

DeMarco/Yourdon shape

Data stores

Data Stores

Data store – stored data intended for later use.

Synonyms are *file* and *database*.

- Frequently implemented as a file or database.
- A data store is “data at rest” compared to a data flow that is “data in motion.”
- Almost always one of the following:
 - Persons (or groups of persons)
 - Places
 - Objects
 - Events (about which data is captured)
 - Concepts (about which data is important)
- Data stores depicted on a DFD store all instances of data entities (depicted on an ERD)
- Named with plural noun



States of digital data examples

Data at rest

Corporate files,
backup data storage,
USB drive data, cloud
storage, file archives

Data in motion

Email attachments,
FTP sites, Wifi and
mobile networks, files
being downloaded,
synced or transferred

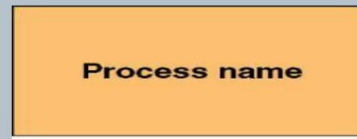
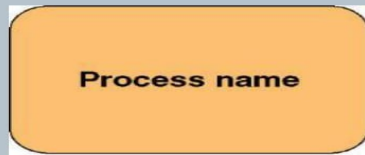
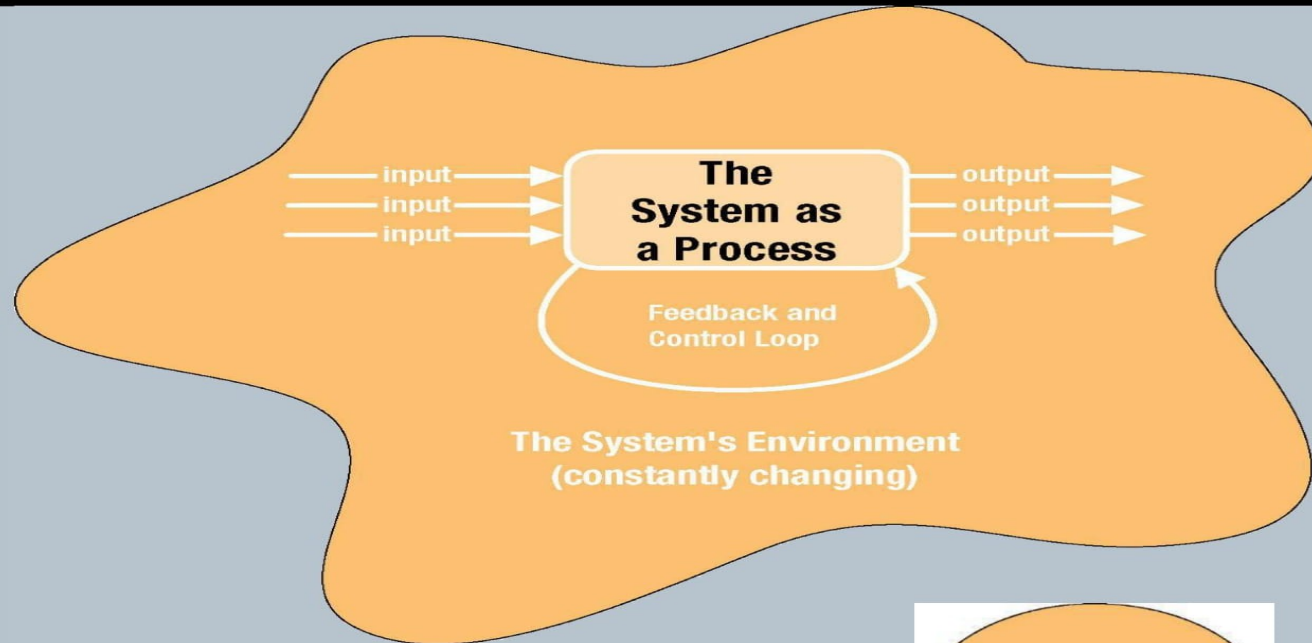
Data in use

Files in Office
applications (documents,
PDFs, PowerPoints),
database applications,
CPU data, RAM data

Process Concepts

Process Concepts

Process – work performed by a system in response to incoming data flows or conditions. A synonym is *transform*.



Data Flow

Data Flows & Control Flows

Data flow – data that is input to or output from a process.

- A data flow is data in motion
- A data flow may also be used to represent the creation, reading, deletion, or updating of data in a file or database (called a data store).



Composite data flow – a data flow that consists of other data flows.

Control flow – a condition or nondata event that triggers a process.



- Used sparingly on DFDs.

The Process of Logical Process Modeling

- Strategic Systems Planning
- Process Modeling for Business Process Redesign
- Process Modeling during Systems Analysis
- Looking Ahead to system Design
- Fact-Finding and Information Gathering for Process Modeling
- Computer-Aided Systems Engineering (CASE) for Process Making

Strategic Systems Planning

- Many organizations select application development projects based on strategic information system plans Strategic planning is a separate project that produces an information systems strategy plan that defines an overall vision and architecture for Information systems. This architecture frequently includes an enterprises process model.
- An enterprise process model typically identifies only business areas and functions Business areas and functions are subsequently prioritized Into application development projects
- An enterprise process model is stored in a corporate repository. Subsequently, as application development projects are starred, subsets of the enterprise process model are exported to the project teams to serve as a starting point for building more detailed process models.
- Once the project team completes systems analysis and design, the expanded and refined

Process Modeling for Business Process Redesign

- Business Process Redesign (BPR) projects analyze business processes and then redesign them to eliminate inefficiencies and bureaucracies before any reapplication of information technology. To redesign business processes, we must first study the existing processes. Process models play an integral role on BPR
- Each BPR methodology recommends its own process model notations and documentation. Most of the models are a cross between data flow diagrams and flowcharts.
- BPR data flow diagrams/flowcharts may include new symbols and information to illustrate timing, throughput, delays, costs, and value. Given this additional data, the BPR team then attempts to simplify the processes and data flows in an effort to maximize efficiency and return the most value to the organization.

Process Modeling during Systems Analysis

- In system analysis main focus is on logical process modeling as a part of business requirements analysis. In information system framework, logical process models have a process focus
- Today, most modern structured analysis focus exclusively on the logical model of the target system. This strategy involves following terminologies:
- **Context Data Flow Diagram:**
 - Context data flow diagram is a diagram that shows the system as a "black box" and its main interfaces with its environment.

Process Modeling during Systems Analysis

- **Functional Decomposition Diagram:**

- Functional decomposition diagram is a diagram that partitions the system into logical, subsystems and functions.

- **Event Response Or Use Case List:**

- Event response list is a list of the business events to which the system must provide a response similar to a use-case list.

- **Event Handler:**

- Event handler is a process that handles a given event in the event response list.

Process Modeling during Systems Analysis

- **Event Diagrams:**
 - Event diagram is a data flow diagram for a single event handler and the agents and data stores that provide inputs or receive outputs.
- **System Diagrams Using Event Diagrams:**
 - System diagrams are the data flow diagram that merges event diagrams for the entire system or part of the system.
- **Primitive Diagrams:**
 - Primitive diagrams are the data flow diagram that depicts the elementary processes, data stores, and data flows for a single event.

Looking Ahead to system Design

- During system design, the logical process model will be transformed into a physical process model (called an application schema) for the chosen technical architecture. This model will reflect the technical capabilities and limitations of the chosen technology.

Fact-Finding and Information Gathering for Process Modeling

- Process models cannot be constructed without appropriate facts and information's as supplied by the user community. These facts can be collected through a number of techniques such as sampling of existing forms and files, research of similar systems. surveys of users and management, and interviews of users and management.
- The fastest method of collecting facts and information and simultaneously constructing and verifying the process models is Joint Requirement Planning (JRP). JRP uses a carefully facilitated group meeting to collect the facts build the models, and verify the models usually in one or two full day sessions.

Computer-Aided Systems Engineering (CASE) for Process Making

- Using a CASE product, we can easily create professional, readable process models without using paper, pencil, eraser and templates. The models can be easily modified to reflect corrections and changes suggested by end users
- Also most CASE products provide powerful analytical tools that can check models for mechanical errors, completeness, consistency and flexibility
- CASE Tools Do Have Their Limitations:
 - Not all process model conventions are supported by all CASE products. Therefore, any given CASE product may force the company to adapt its methodology's process modeling symbols or approach so that it is workable within the limitations of its CASE tool.