

Using DFDs in Business Process Reengineering

Data-flow diagrams make a useful tool for modeling processes in business process reengineering (BPR).

DFD is the abbreviation for **Data Flow Diagram**. The flow of data of a system or a process is represented by DFD. It also gives insight into the inputs and outputs of each entity and the process itself. DFD does not have control flow and no loops or decision rules are present. Specific operations depending on the type of data can be explained by a flowchart. Data Flow Diagram can be represented in several ways. The DFD belongs to structured-analysis modeling tools. Data Flow diagrams are very popular because they help us to visualize the major steps and data involved in software-system processes.

Components of DFD

The Data Flow Diagram has 4 components (illustrated in the example below):

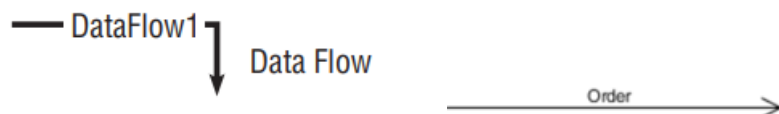
- **Process**

Input to output transformation in a system takes place because of process function. The symbols of a process are rectangular with rounded corners, oval, rectangle or a circle. The process is named a short sentence, in one word or a phrase to express its essence



- **Data Flow**

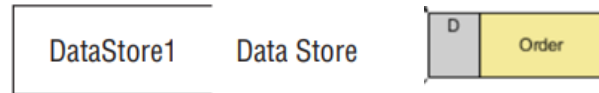
Data flow describes the information transferring between different parts of the systems. The arrow symbol is the symbol of data flow. A relatable name should be given to the flow to determine the information which is being moved. Data flow also represents material along with information that is being moved. Material shifts are modeled in systems that are not merely informative. A given flow should only transfer a single type of information. The direction of flow is represented by the arrow which can also be bi-directional.



Data Flow Diagrams (DFD)

- **Data store [Warehouse]**

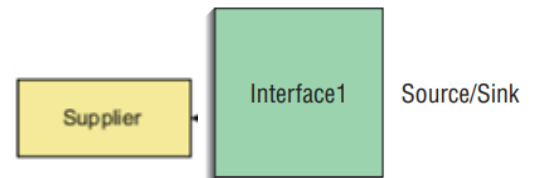
is data at rest. A data store may represent one of many different physical locations for data, including a file folder, one or more computer-based file(s), or a notebook. To understand data movement and handling in a system, the physical configuration is not really important. A data store might contain data about customers, students, customer orders, or supplier invoices.



- **a source/sink**

is the origin and/or destination of the data and its name states what the external agent is, such as customer, teller, Environmental Protection Agency (EPA) office, or inventory control system (for example, a user can be considered as an entity)

Source/sinks are sometimes referred to as *external* entities because they are outside the system. Once processed, data or information leave the system and go to some other place. Because sources and sinks are outside the system we are studying, many of their characteristics are of no interest to us.



Context DFD

A context diagram is a data flow diagram that only shows the top level, otherwise known as Level 0. At this level, there is only one visible process node that represents the functions of a complete system in regards to how it interacts with external entities. Some of the benefits of a Context Diagram are:

1. Shows the overview of the boundaries of a system
2. No technical knowledge is required to understand with the simple notation
3. Simple to draw, amend and elaborate as it is limited notation

The figure below shows a context Data Flow Diagram that is drawn for a Food Ordering System. It contains a process (shape) that represents the system to model, in this case, the "Food Ordering System". It also shows the participants who will interact with the system, called the external entities. In this example, the Supplier, Kitchen, Manager, and Customer are the entities who will interact with the system. In between the process and the external entities, there is data flow (connectors) that indicate the existence of information exchange between the entities and the system.

Data Flow Diagrams (DFD)

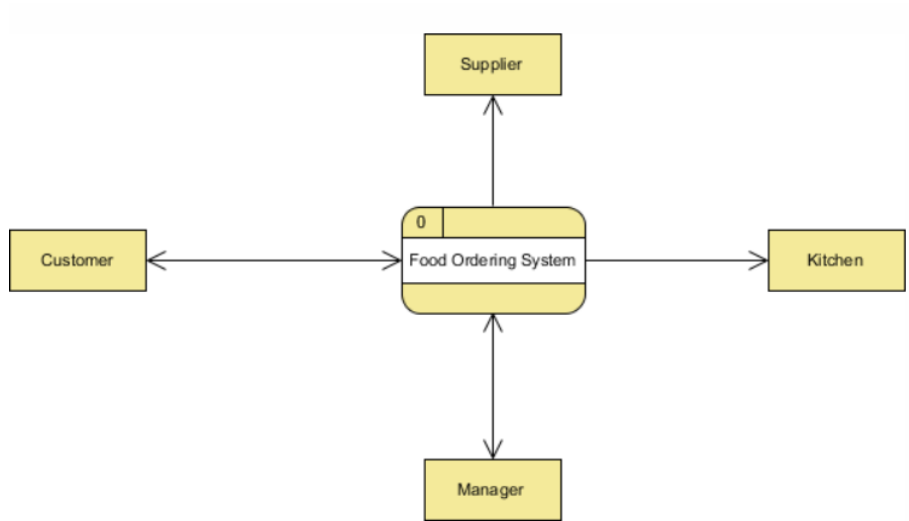


Figure 1 Context diagram for Food Order System

Level 1 DFD

The figure below shows the level 1 DFD, which is the *decomposition* (i.e. break down) of the Food Ordering System process shown in the context DFD. Read through the diagram and then we will introduce some of the key concepts based on this diagram.

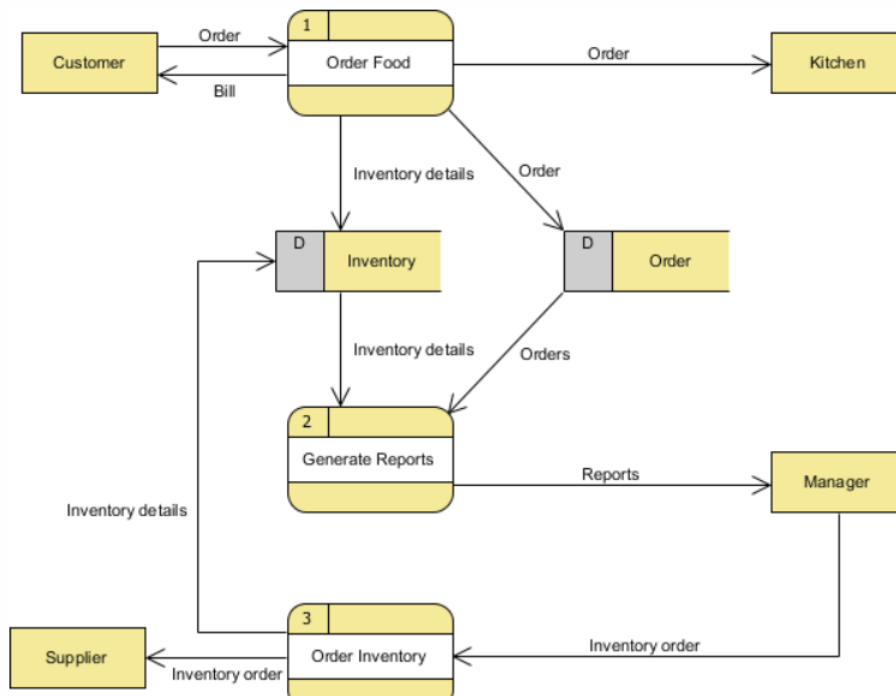


Figure 2 Level 1 diagram for Food Order System

Data Flow Diagrams (DFD)

Explanation of the DFD:

The Food Order System Data Flow Diagram example contains three processes, four entities, and two data stores.

Based on the diagram, we know that a **Customer** can place an Order. The Order Food process receives the Order, forwards it to the Kitchen, store it in the Order data store, and store the updated Inventory details in the Inventory data store. The process also delivers a Bill to the Customer.

The **Manager** can receive Reports through the Generate Reports process, which takes Inventory details and Orders as input from the Inventory and Order data store respectively.

The **Manager** can also initiate the Order Inventory process by providing Inventory order. The process forwards the Inventory order to the Supplier and stores the updated Inventory details in the Inventory data store.

Resources:

1. <https://www.visual-paradigm.com/tutorials/data-flow-diagram-example-food-ordering-system.jsp>
2. <https://www.lucidchart.com/blog/data-flow-diagram-tutorial>
3. <https://www.geeksforgeeks.org/what-is-dfddata-flow-diagram/?ref=lbp>