



System Design: Data Flow Diagrams of Sales Process, a Case Study of CV. Jatayu Catra Internusa

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Abstract

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This study aims to analyze the flow of sales transaction data. The data flow is modeled using a data flow diagram. The procedure carried out for data flow analysis began by interviews with staff who handle sales, then proceeded to identify entities and documents that go in and out of these entities, then modelled the data flow into data flow diagrams, and taking into account the rules on data flow diagram modeling. The results of this study are data flow diagram modeling of sales transaction that can be used to perform advanced system models such as case modeling, entity relationship diagrams, and others.

Keywords: Data Flow Diagram (DFD), Modeling, Data flow

Abstrak

Penelitian ini bertujuan untuk menganalisis aliran data transaksi penjualan. Aliran data dimodelkan menggunakan diagram aliran data. Prosedur yang dilakukan untuk analisis aliran data dimulai dengan melakukan wawancara dengan staf yang menangani penjualan, kemudian dilanjutkan dengan mengidentifikasi entitas dan dokumen yang masuk dan keluar dari entitas tersebut, kemudian memodelkan aliran data ke dalam diagram alir data, dengan memperhatikan aturan pada pemodelan diagram aliran data. Hasil dari penelitian ini adalah pemodelan diagram alir data transaksi penjualan yang dapat digunakan untuk melakukan pemodelan sistem lanjutan seperti pemodelan use case, diagram relasi entitas, dan lain-lain.

Kata-kata kunci: Data Flow Diagram (DFD), Pemodelan, Aliran data



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1. Introduction

Software development, through several stages commonly referred to as the system development life cycle (SDLC). SDLC is the entire process of developing, implementing, and decommissioning an information system through a multi-step process from start-up, analysis, design, implementation, and maintenance [1]. The life cycle defines the methodology for improving software quality and the overall development process [2]. SDLC is important in system development because it breaks down the entire software life cycle, which facilitates the evaluation of each part of software development[3]. Pressman explains that in any software development, the SDLC guides the software development team through a series of framework activities organized into a process flow that may be linear, incremental, or evolutionary [3]. SDLC consists of analysis, design, implementation, and testing stages. The analysis phase identifies system requirements and refines the process model. It uses a process model to represent processes or activities that are in progress and running in the system and show how data is transferred between processes. Therefore, a process diagram model and a data flow diagram are needed [4].

A consistency diagram context, a flow chart for lower data, is essential in refining in developing a process model of a system [4]. Making Data Flow Diagrams/DFD in software development generates process models during the analysis phase. The process model is crucial in defining the requirements in the graphic display. Therefore, the reliability of the process model is a vital factor in improving the performance of the next stage of software development [4].

Data flow diagrams are structured analysis and design techniques that are visual tools for describing logistics models and revealing the transformation of data in the system. The DFD contains a mechanism for modeling the data flow. It supports decomposition to describe detailed data flows and functions. DFD is not a modeling procedure and cannot provide information about the order of operations [5]. It is interesting for researchers to be able to model the data flow, which can visualize the data flow in a system. In this study, the researchers tried to analyze the sales transactions of a company and model the data flow using data flow diagrams. Several researchers have used DFD in the software development process, including [6], [7], [8], [9], and [10]. The techniques and methods discussed in this modeling provide information to system analysts involved in software development.

2. Method

a. Material

Data flow diagram (DFD) is a process modeling that is widely used in the phase or stages of structured requirements analysis. DFD does not only reflect the system structure visually and naturally, but also supports the gradual improvement of a system [11]. DFD consists of bubbles and flows. Bubbles are drawn as circles and represent one of the processes or procedures. Flows are drawn simply as arrows connecting bubbles and indicating possible paths for data to travel. Therefore, DFD is a trending chart. Flows that enter the bubble are referred to as inflows and outflows [12]. Tiwari et al. (2012) added that DFD is a graphic representation consisting of nodes and directed arcs. A node can be a data store, an additional node, a process, or a terminator that is an input or output of a system. The arc corresponds to the data flow represented by the arrow. Designers need to label knots and arcs [13]. Symbols used in DFD modeling is presented in **Figure 1**.

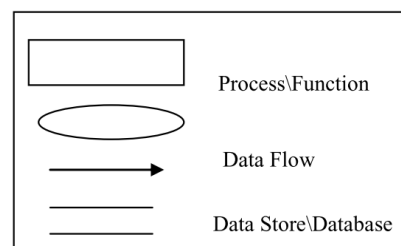


Figure 1. Symbols Used in DFD Modeling [13]

b. Method

In this study, several pieces of literature were reviewed to assist the researchers in modeling the data flow in sales transactions. The literature used is literature that discusses descriptions and provides guidance in the process of modeling data flow diagrams. Information related to the sales transaction process was explored using the interview method with the staff who handle sales transactions. This research began by a literature review on data flow diagrams, then continued with interviews and analysis of business processes desired by the user, and based on user information, the researcher visualized it in the form of data flow diagrams.

3. Results and Discussion

The result of this research is a data flow diagram system design. Data flow diagram (DFD) is a chart that describes the flow of data in a company, which is depicted with a certain number of symbols to show data transfer that occurs in the process of a business system [6].

Based on the information that collected from the staff who handle sales transactions, the researchers conducted the following modeling is presented in **Figure 2**.

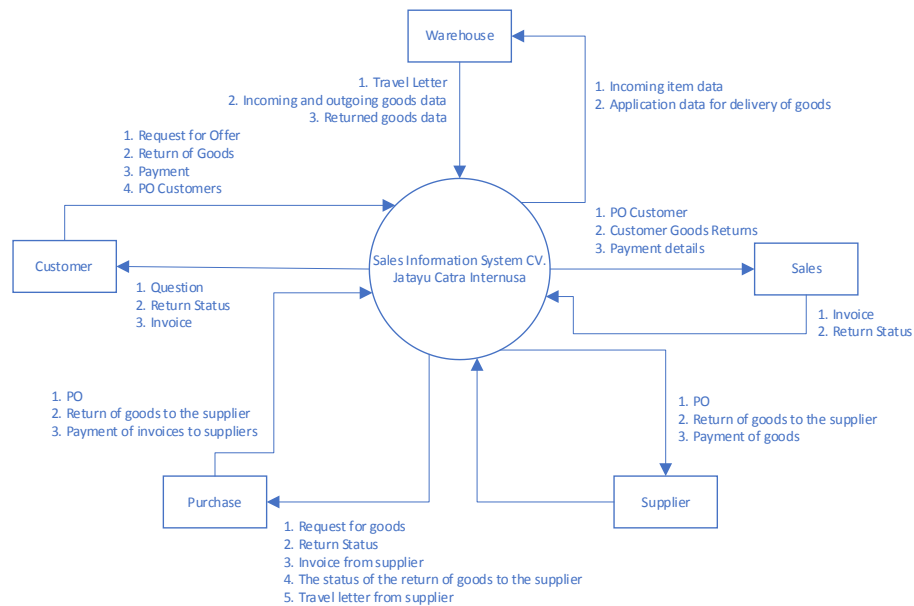


Figure 2. Data Flow Diagram (DFD) level 0

Based on the level 0 data flow diagram above, it can be seen that there are five entities, namely customers, purchases, suppliers, warehouses, and sales. Data or documents flow from each entity to the sales information system. The flow of data can be in the form of activities entering the system or leaving the system. **Table 1** is the flow of data into and out of the system.

Table 1. Data in and out of the system based on DFD level 0

Entity	Data enter the system	System exit data
Customer	<ol style="list-style-type: none"> 1. Request for Offer 2. Return of Goods 3. Payment 4. PO Customers 	<ol style="list-style-type: none"> 1. Quotation 2. Return Status 3. Invoice and Invoice
Warehouse	<ol style="list-style-type: none"> 1. Delivery orders 2. Incoming and outgoing goods data 3. Return item data 	<ol style="list-style-type: none"> 1. Incoming item data 2. Application data for delivery of goods
Purchase	<ol style="list-style-type: none"> 1. PO 2. Return of goods to supplier 3. Payment of invoices to suppliers 	<ol style="list-style-type: none"> 1. Goods Application 2. Return Status 3. Invoice from supplier 4. Item return status to supplier 5. Travel letter from supplier
Supplier	<ol style="list-style-type: none"> 1. Return Status 2. Delivery orders 3. Invoice 	<ol style="list-style-type: none"> 1. PO 2. Return of goods to supplier 3. Payment of goods
Sales	<ol style="list-style-type: none"> 1. Invoice 2. Return Status 	<ol style="list-style-type: none"> 1. PO Customer 2. Customer Goods Returns 3. Payment details

Based on the DFD level 0, the researcher then modeled the level 1 DFD. Here is the level 1 DFD for sales transactions is presented in **Figure 2**.

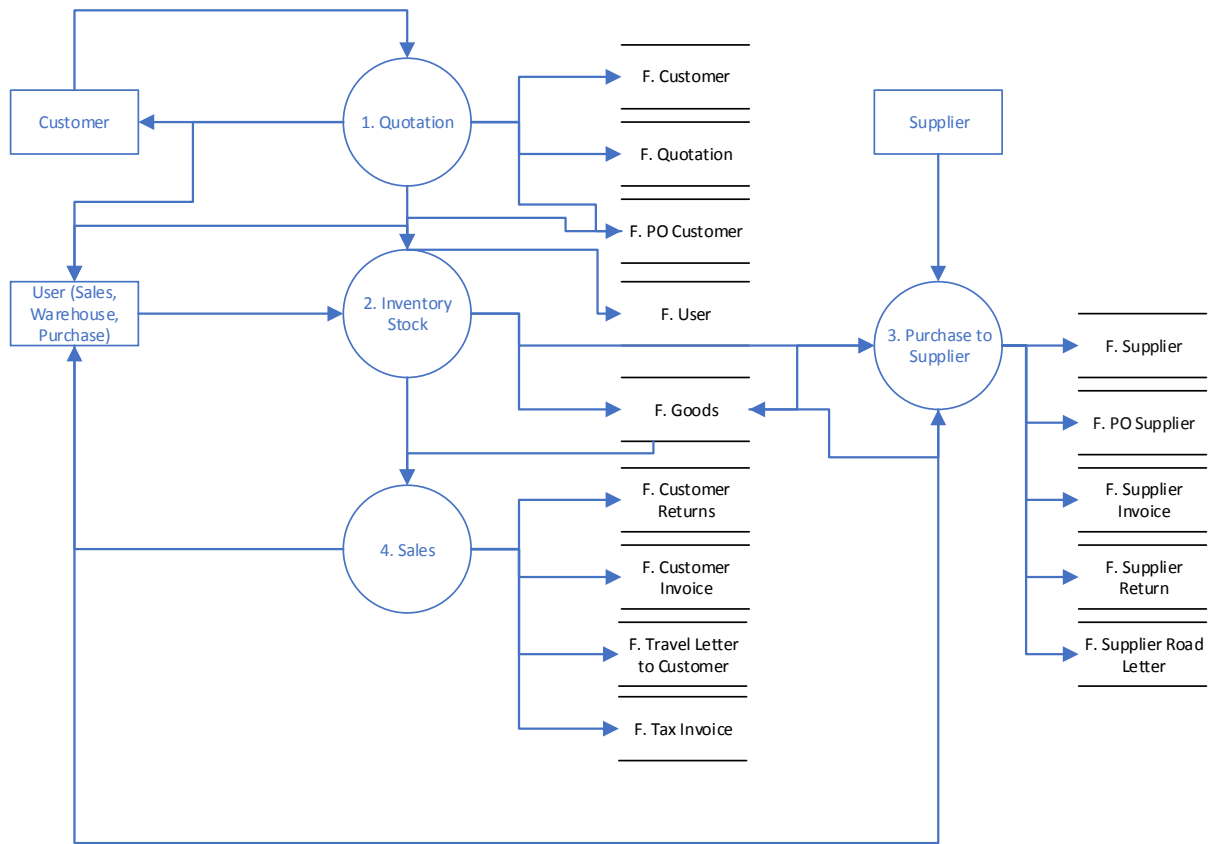


Figure 2. Data Flow Diagram (DFD) level 1

Based on this level 1 data flow diagram, it can be seen that in the sales system are several processes including the quotation process, inventory, purchases to suppliers, and sales. In detail, each process can generate data as follows is presented in **Table 2**.

Table 2. Detail table of DFD level 1

Process	Entities Involved	Generated files
Quotation	Customers and sales	F. Customer, F. Quotation, F. PO Customer, F. User
Stock Inventory	Warehouse and Sales	F. User, F. Barang
Purchase to supplier	Purchase and Supplier	F. Users, F. Suppliers, F. PO Suppliers, F. Supplier Invoices, F. Supplier Returns, F. Supplier Road Letters
Sale	Sales and Customers	F. User, F. Customer Return, F. Customer Invoice, F. Tax Invoice.

4. Conclusion

Based on the modeling results for sales transactions, it can be concluded that the data flow diagram provides an overview of the data flow from entities that enter the system and the flow of data out of the system to the entities. Based on the flow, the data store of each process can be concluded. For further research, an analysis of interaction modeling between the user and the system to be built can be carried out.

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