Warehousing Information System Using RFID Technology At. Bintang Sidoraya

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ABSTRACT

This study titled Warehousing Information System Using RFID Technology at PT. Bintang Sidoraya. PT. Bintang Sidoraya is a company engaged in the distribution of food and beverages. The company receives goods from suppliers such as receiving products Tirta Investama production company, Unilever Indonesia, Eastern Pacific Coconut Utama and PT. Blooms appear. Often problems occur in the PT. Bintang Sidoraya are frequent errors in the handling of data collection items when the process of arrival of the goods from the supplier and the goods out to be sent to the consumer. The purpose of this study was Able to Determine how the role of RFID in data collection in the warehouse PT. Bintang Sidoraya. By using RFID technology to Overcome the problems regarding the collection dapatuntuk goods. With RFID technology, goods collection can be done automatically and can reduce the occurrence of errors in the data is the collection of goods.

Keywords: Information Systems, Bintang Sidoraya, Warehouse, RFID

1 INTRODUCTION

1.1 Background

With the development of information technology is increasingly tight, certainly raises new problems of an increasingly complex and demanding adjustments in order to minimize errors in a resolution. Information technology now makes it all made computerized system. With the system created terkoputerisasi, can make it easier to squeeze as much as possible the costs such as paper costs, operational costs, and can facilitate the archiving of data. Computer-based system is an information system that can facilitate and can be used to improve the efficiency of working time. [1]

PT. Bintang Sidoraya is a company engaged in the distribution of food and beverages. The company receives goods from suppliers such as accepting the company's products Tirta Investama, Unilever Indonesia, Eastern Pacific Coconut Top and Emerging Bloom. Problems often occur frequently in PT Bintang Sidoraya are frequent errors in data collection on goods entering and goods out of the warehouse. Pendatatan and monitoring activities out of the goods in the warehouse are still applying the data collection of goods in and goods out through the card stock. The data collection process will enter the warehouse of goods is done by check and record the items in each supplier to send the goods, then the data checking the goods delivered to the warehouse admin for each item in the data that has been checked by a warehouse clerk. While the process of selling goods, a warehouse clerk to check inventory in the warehouse and then proceed to hand over the data warehouse's stock to the admin in the data returned.

Data entry of goods, the goods admin input data in detail and correct. However, sometimes there is a data error that caused admin slipshod in the input data items, leading to problems where the data items contained in the system with data items in the warehouse is not the same. Errors in inputting the data data- goods by admin resulted deploying process PT. Bintang Sidoraya be disturbed. Therefore, the necessary automation of data readings, in anticipation of an admin error in the input data-data items. And expected in data traffic monitoring goods entering the data items out can be monitored well. In addition, it can help management in decision making planning and control of goods.

Radio Frequency Identification (RFID) is a wireless identification technology that has the advantage of being able to read the data without direct contact with the object and can store the information on the RFID tag in accordance with the storage capacity. With the implementation of automation with RFID warehouse clerk then it can help to minimize errors in inputting the data data- goods entering the warehouse.

From the description above, the authors conducted a study to establish a data collection system of goods in and goods out of data collection in the warehouse using RFID technology at PT. Bintang Sidoraya.

1.2 Research purposes

The objectives of this study are:

1. Can assists officers in the process of data collection goods will enter the warehouse using RFID technology.
2. Can reduce the occurrence of errors in the process of data collection the goods leave the warehouse automatically using RFID technology.

2 THEORETICAL BASIS

2.1 Warehousing Information System Definition

Warehousing information system is a collection of data and procedures are processed process data items to be entered and the goods will leave the warehouse to produce any information that will support decision making and conduct control of the running of the company.

2.2 Structured Analysis and Design Methods

2.2.1 Flomap

Flomap is a diagram illustrating the workflow of a system. By using flomap, then the business process applied to an agency or company can be seen clearly, and when the system wants updated, then the process of change in the development of the system can be done more easily. [1]

2.2.2 diagram Context

Context diagram is a simple diagram that illustrates the relationship between external entities, input, and output of the system. Diagram context is represented by a single circle that represents the whole system.[1]

2.2.3 Data Flow Diagrams (DFD)

DFD is a logical model of data or processes created to illustrate where the origin of the data and the data destination where the data out of the system, where data is stored, what processes generate data and interaction between the stored data and processes imposed on the data. [1]

DFD is used in a structured system development methodologies (Structured Analysis and Design). There are two basic techniques commonly used in the manufacture of the technique DFD Gane and Sarson and Yourdon techniques and De Marco.

The advantage of using a data flow diagram is easier for the user or users who are less mastered the field of computers to understand the system that will be done.

2.2.4 Data dictionary

The data dictionary is a collection of elements or symbols used to assist in the delineation of each field or file in the system. [1]

By using the data dictionary, system analysis can provide information on the definition of use of the structure of each element, can define the data flowing in the system completely, can avoid duplication of elements and to avoid conflicts between elements.

So with the data dictionary, the offender can interpret allocation system in detail and organize all the data elements used in the system

2.3 Entity Relationship Diagram (ERD)

Entity Relationship Diagram is one of the tools (eg pictures) in the model database elasional useful for explaining the relationship or relationships between the tables contained in the database. [1]

By designing ERD then an entity analysis can determine what should be used in the construction of the system as well as the relationships between entities can be seen clearly.

2.4 Arduino

Arduino is a microcontroller based electronic prototype device that is flexible and open-source. This device can be used to detect the environment by receiving input from a variety of sensors (eg, light sensors, temperature sensors, infrared sensors, ultrasonic sensors, proximity sensors, pressure sensors, humidity sensors) and can control the surrounding equipment (eg: lamps, various types of motors and other actuator).[2]

Picture 1 Sample Board Aduino

an arduino can be used to control the technical components arduino with the intention that the components can perform commands that have been in the program at arduino board.

2.5 Arduino IDE

Arduino IDE is a single-board micro controller that is open-source. Arduino IDE is a developer device which is used as a sketch on the board arduino program. IDE (Integrated Development Environment) means form an integrated program development tools so that various uses are provided and expressed in the form of a menu-driven interface.

[2]

Picture 2 Arduino IDE

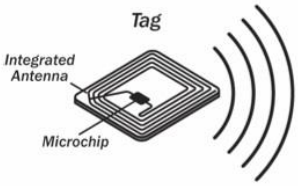
The Arduino IDE is an application that can be used to program the arduino in order to perform a command. The programming language used in arduino programming is a programming language C. With Arduino IDE we can check whether the program that has been made is correct or not and menguppload program into the microcontroller.

2.6 MFRC522

RFID or Radio Frequency Identification technology is becoming a way created to identify people or objects automatically. The most commonly used method is to store a serial number that identifies a person or object, on a microchip that is attached to an antenna (the chip and the antenna is a RFID transponder or an RFID tag). Via antenna, chip shortly reader.Kemudian transmit identification information to the reader to change the reflection of radio waves from the RFID tag into digital information.[3]

Picture 3 module MFRC522

2.7 RFID tag



Picture 4 RFID tag

In an RFID tag or transponder, there are (microchip) and an antenna as shown in Figure 4 microchip itself can be as small as a grain of sand or a size of 0.4 mm. The chip stores a unique serial number or other information depending on the type of memory. The type of memory itself may be read-only, read-write, or write-once readmany. An antenna mounted on a micro-chip sends information from the chip to the reader. Usually the reading range indicated by the size of the antenna. A larger antenna range readings indicate a more jauh.Tag they are attached or embedded in the object to be identified. The tag can be scanned with a moving or stationary reader using radio waves[3]

3 ANALYSIS SYSTEM

3.1 Problem analysis

The problems that were encountered in the PT.Bintang Sidoraya is handling the collection of goods in and goods out of the warehouse where frequent errors caused by admin purchases and sales admin. Mistakes are often made by admin admin purchase and sale is when the data collection process goods in and goods out was a mistake inputting data items resulted in incompatibility of data items stored in the warehouse with the data items in the report.

3.2 User analysis

Table 1 user analysis

users	Role
Administrator	A user can access the system as a whole
Admin Purchase	Are users who have access rights to manage purchases of goods
Sales Admin	Are users who have access rights to manage sales data items

3.3 analysis of RFID

3.3.1 Mifare RFID module RC522

Modules reader / writer RFID is used in an electronic circuit using technology MIFARE Type A 13.56MHz (ISO / IEC 14443) A / MIFARE mode released by NXP Semiconductor with a security system based Crypto-1 (series Classic) and Triple-DES / AES (the series DESFire). Mifare RC522 product specifications as follows:

No	Nama	Spesifikasi
1	Chipset	MFRC522 Contactless Reader/Writer IC
2	Frekuensi	13,56 MHz
3	Jarak pembacaan kartu	< 50mm
4	Protokol akses	SPI (Serial Peripheral Interface) @ 10 Mbps
5	Kecepatan transmisi RF	424 kbps (dua arah / bi-directional) / 848 kbps
6	Catu Daya	3,3 Volt
7	Konsumsi Arus	13-26 mA pada saat operasi baca/tulis, < 80µA saat modus siaga
8	Suhu operasional	-20°C s.d. +80°C
9	Dimensi	40 x 50 mm

Picture 5 Mifare specifications RC522

3.3.2 Arduino Uno

Arduino Uno is a microcontroller board based ATmega328. Uno has 14 digital pin input / output (of which 6 can be used as PWM outputs), 6 analog inputs, a ceramic resonator 16 MHz, USB connection, power jack, ICSP header, and a reset button. resources can use USB power (if connected to a computer with a USB cable) and also with adapter or batteries. Arduino Uno product specifications as follows:

No	Nama	Spesifikasi
1	Mikrokontroler	ATmega 328
2	Operasi tegangan	5Volt
3	Input tegangandisarankan	7-11Volt
4	Input tegangan batas	6-20Volt
5	Pin I/O digital	14 (6 bisa untuk PWM)
6	Pin Analog	6
7	Arus DC tiap pin I/O	50mA
8	Arus DC ketika 3.3V	50mA
9	Memori flash	32 KB (ATmega328) dan 0,5 KB digunakan oleh bootloader
10	SRAM	2 KB (ATmega328)
11	EEPROM	1 KB (ATmega328)
12	Kecepatan clock	16 MHz

Picture 6 specifications Arduino Uno

3.3.3 Ethernet Shield W5100

This module serves to connect the Arduino to the internet network. Just connect the module to an Arduino board, connect the RJ45 and do some instruction sederhana.Spesifikasi Ethernet Shield W5100 as follows:

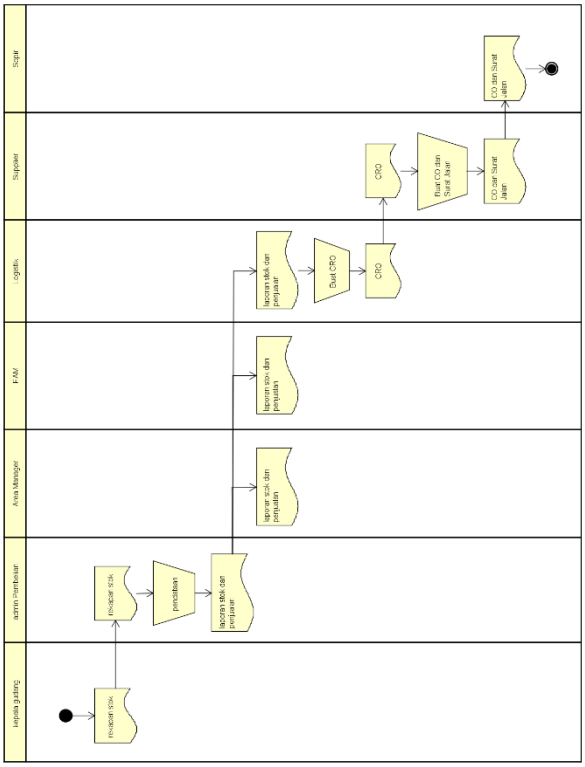
No	Nama	Spesifikasi
1	Tegangan operasi	5V
2	Ethernet Controller	W5100 with internal 16K Buffer
3	Kecepatan koneksi	10/100Mb
4	Port koneksi arduino	SPI

Picture 7 specification Ethernet Shield W5100

3.4 Business Process PT. Bintang Sidoraya

3.4.1 Booking Process Goods Log

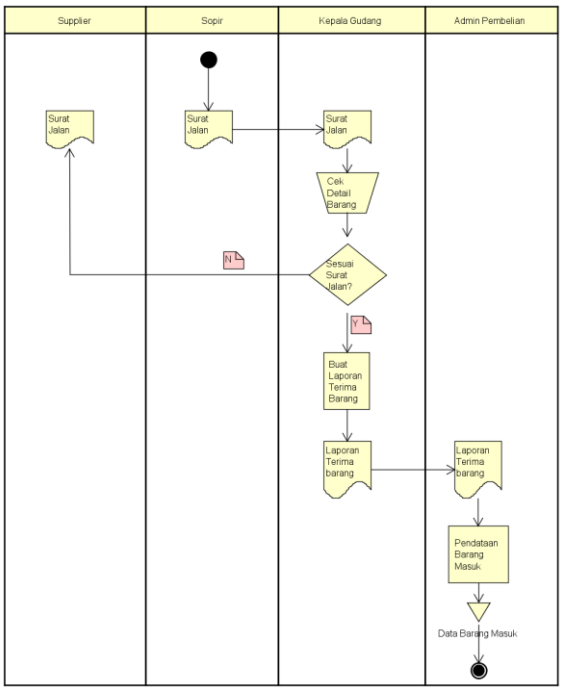
The process of ordering goods in PT. Bintang Sidoraya to the supplier which starts checking the stock of goods in the warehouse by the head of the warehouse. After checking is complete, the head makes recaps warehouse stock data and recaps have been made delivered to admin for in the data warehouse. Once in the data, admin reports inventory and sales reports. The report has been made then submitted to Accounting, FAM, Area Manager and Logistics. In logistics, the reports provided by admin warehouse processed into Collection Returns Order. Collection Returns Order is a file for ordering goods to the supplier. Once Collection Returns Order was made and given to the supplier, Collection Returns Order is processed by the supplier and the supplier to make passes. Letter roads that have been made, and then given to the driver warehouse PT. Bintang Sidoraya.



Picture 8 booking process incoming goods

3.4.2 The process of incoming goods warehouse

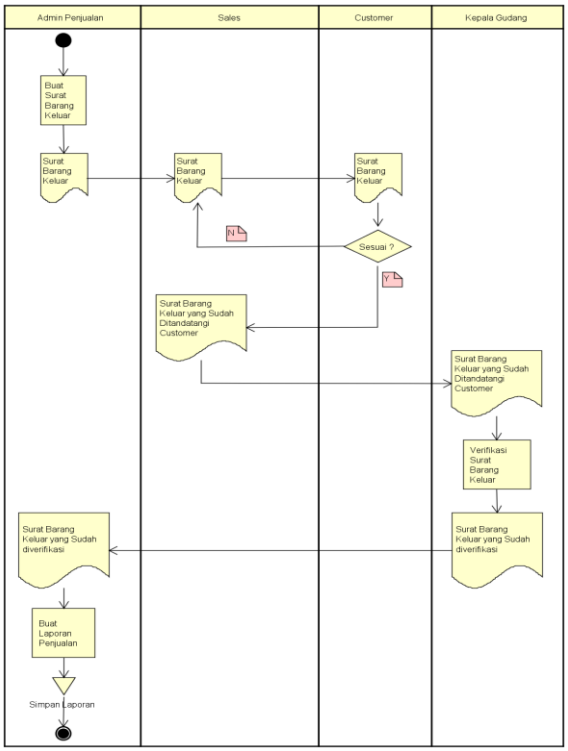
When the goods arrive at the warehouse, then brought the letter given to the driver's head is used as a warehouse for data checking goods. If the goods are dating according to the letter, then the goods can be put into the warehouse. If the goods are not in accordance with the letter of the goods will be returned to the supplier.



Picture 9 process incoming goods warehouse

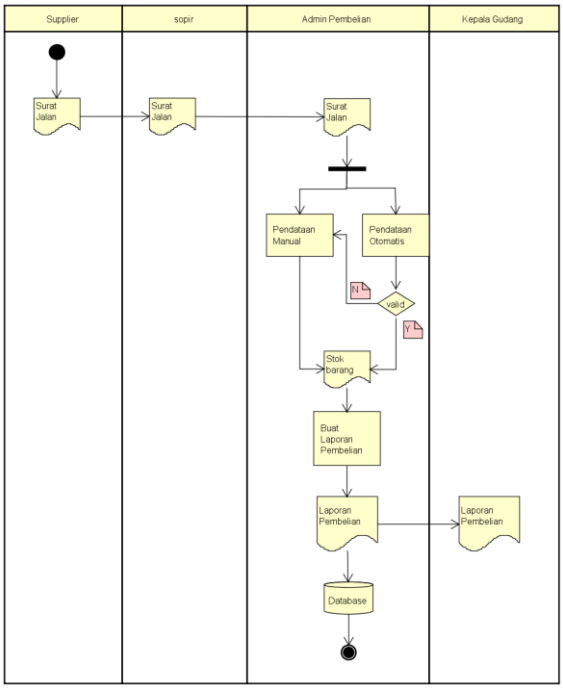
3.4.3 Goods Sales Process

In the process of selling goods to the customer, admin warehouse must make an item out and given to sales. Then sales selling goods to the customer. When the goods arrive at the customer, the customer will check compliance data items sent by mail out items brought in by sales. If appropriate, the customer signed proof of the goods out. However, if the goods do not comply, then the goods will be brought sales back to be brought to the warehouse. Then the data is proof of the goods that have been signed out given to a warehouse clerk. warehouse clerk verifies the data items that have been sold and handed over evidence to the admin stuff out for in the data.



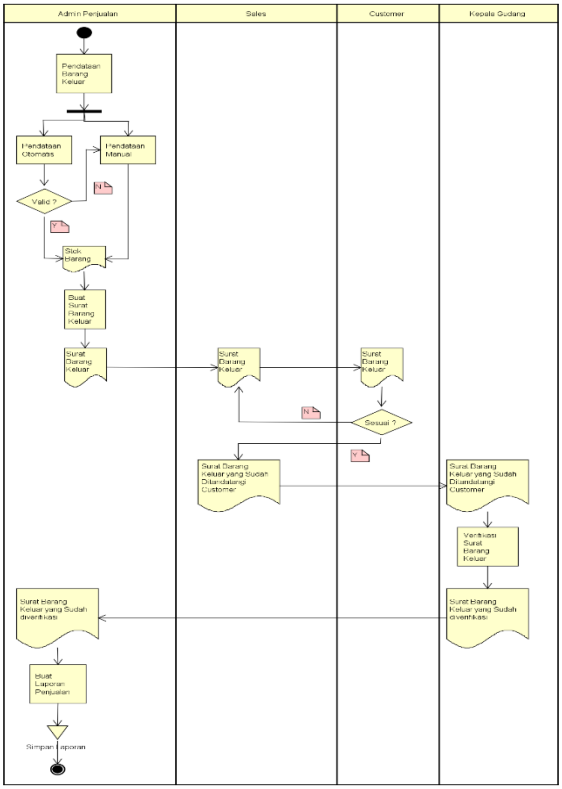
3.5 Documenting Process Goods by Using RFID

3.5.1 Documenting Process Goods Log by Using RFID Technology



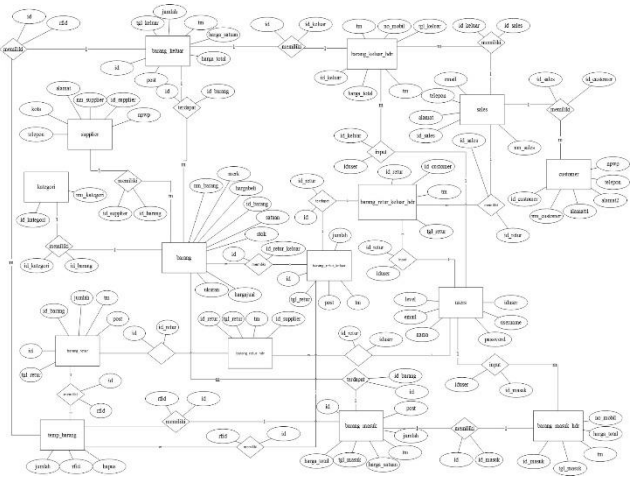
Picture 10 incoming goods data collection using RFID technology

3.5.2 Documenting Process Exit goods by Using RFID Technology



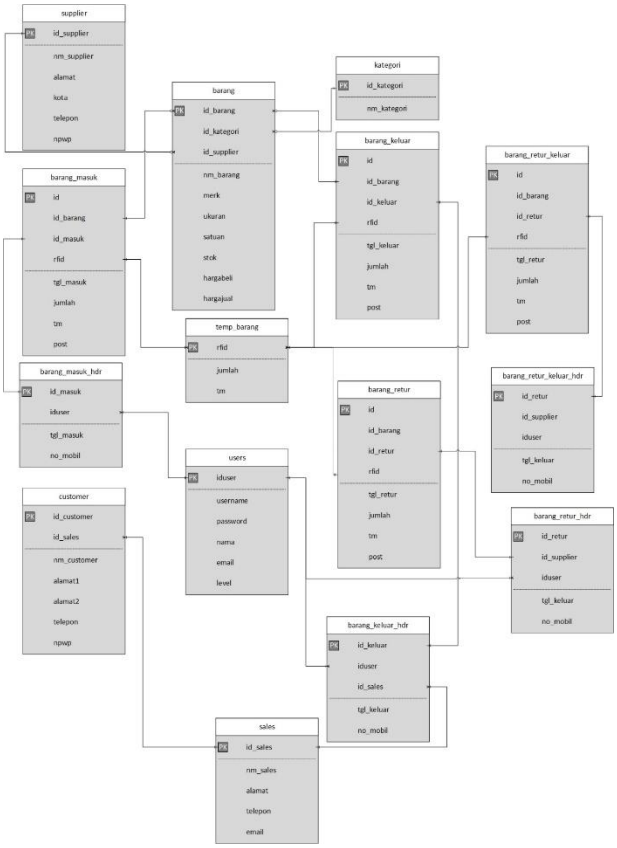
Picture 11 collection goods out using RFID technology

3.6 Design ERD



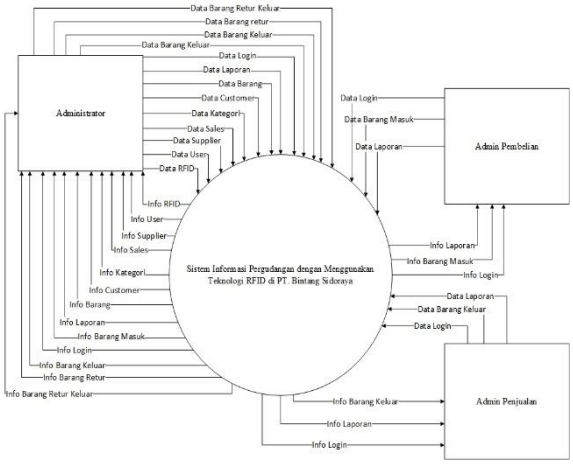
Picture 12 eRD design

3.7 Designing Relation Scheme



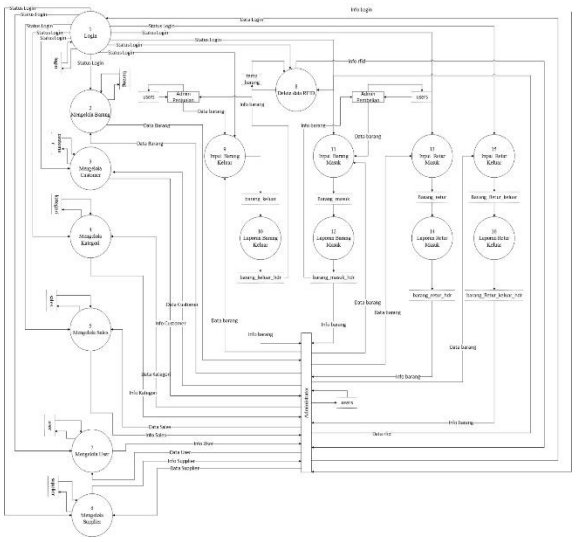
Picture 13 relation schema design

3.8 Peancangan Context Diagram



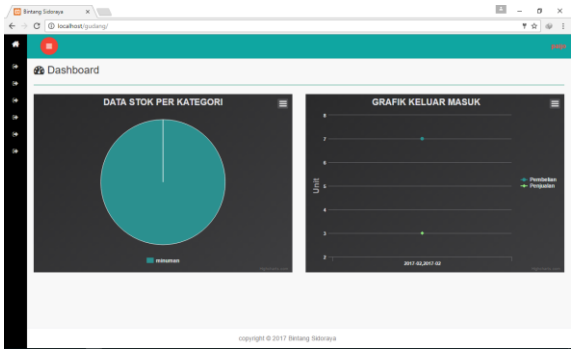
Picture 14 context diagram

3.9 DFD Level 1

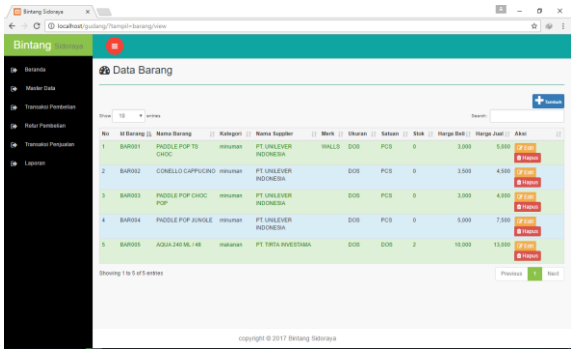


Picture 15 DFD level 1

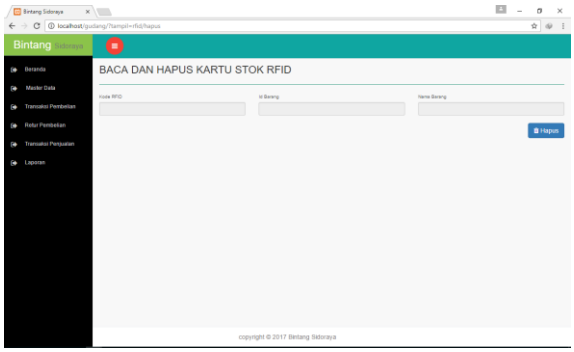
4 TESTING SYSTEMS



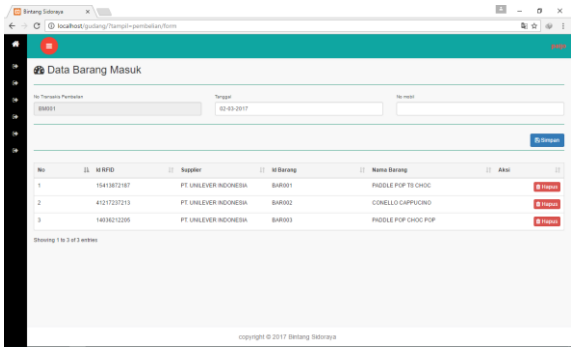
Picture 16 see the homepage of information systems



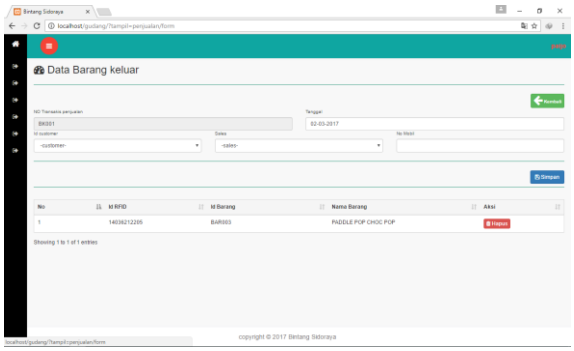
Picture 17 see page master data



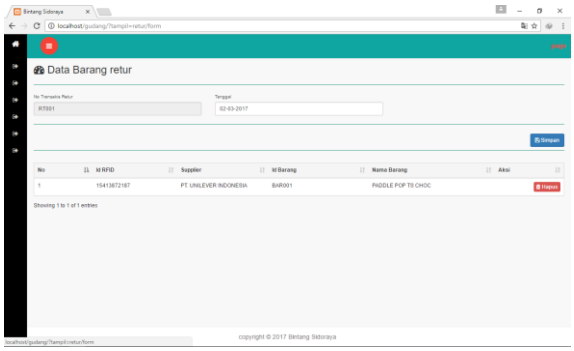
Picture 18 see page read and delete data from RFID



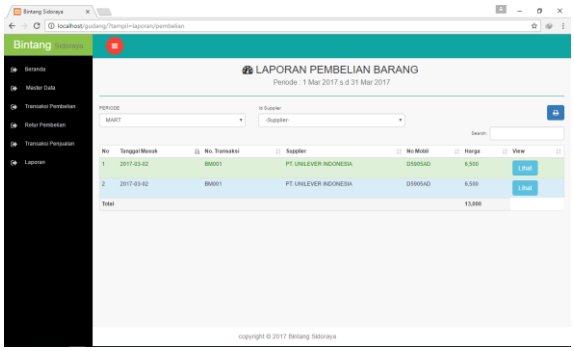
Picture 19 page display incoming goods



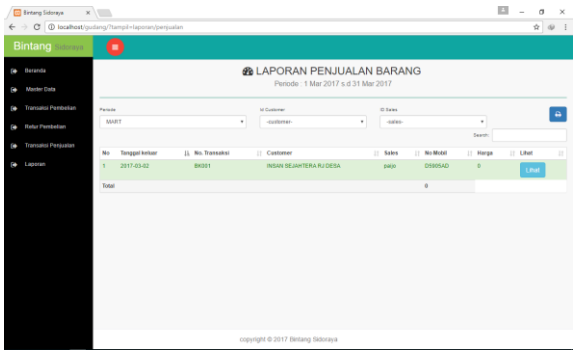
Picture 20 page views goods out



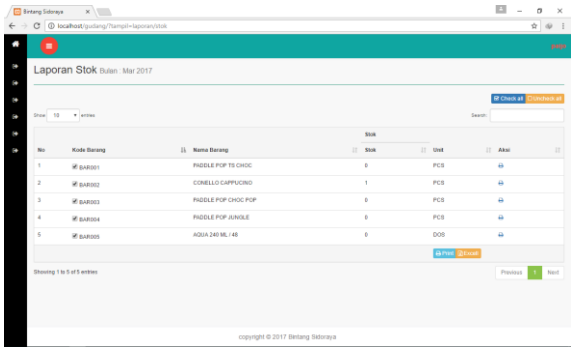
Picture 21 page views return of goods



Picture 22 see page report purchases of goods



Picture 23 page views goods sales report



Picture 24 see page inventory report

5 FINALITY

5.1 Conclusion

Conclusions in the construction of warehousing information system using RFID technology at PT. Bintang Sidoraya are:

1. The system can collect data of incoming goods using RFID technology.
2. The system can perform data collection goods out automatically using RFID technology.

5.2 Suggestion

For the development of further research, it is hoped the system can perform data collection on some goods out of the warehouse at once or besamaan in one process.

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