

Implementation of Data Warehouse for Food Sales Strategy Using Snowflake Schema Model

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Abstract

Waroenk kids collage is a restaurant that sells various types of food menus and is located in Indonesia, Jakarta. This restaurant has data that accumulates and accumulates without any continuation of that data. This is not supported by the final report. Therefore, it is necessary to build a data warehouse that can be used as information for waroenk restaurant owners for college children. One of the important processes in the operation of the data warehouse is the process of copying data from the operational database. Before the data enters the data warehouse, the ETL (extract, transform, load) process is carried out on the data. This scheme is designed for the data warehouse at Waroenk Anak Kampusan using the Snowflake Schema model. The results of the research show that the Waroenk Anak Kampusan data warehouse has four tables (product table, price table, service table and customer dimensions), has one real table, namely the Sales table. All sales data can be monitored by the owner and can find out the total sales data.

Keywords: Data Warehouse, Sales Strategy, Snowflake Schema, Waroenk kids collage

1. Introduction

Data warehouse is a system that can combine data from various sources into a single data repository, implement and consistently support business analysis [1] From that explanation, several journal references were found, such as, [2] Design and Implementation of sales data warehouse (Case Study: Northwind Sample Database) By M. Firdaus Zulkarnain, Ni Putu Novia Ardiyanti, I Wayan Wijaya K Sandi, I Dewa Ngurah T Hendrawan, Ida Bagus M Mahendra in 2021 resulted in the data warehouse integration process using the ETL concept with the help of Pentaho Data Integration. [3] Implementation of Data Warehouse and Sales Data to Determine Strategic Plan for Batik Sales (Case Study of Batik Mahkota Laweyan) by Fatah Yasin Al Irsyadi in 2014 resulted that all monitoring of data on Batik Mahkota Laweyan products was carried out using a cube browser. [4] The design of a data warehouse to support executive information systems at the Ummu'L Ouro foundation in Depok by Syamsul Bakhri1, Yamin Nuryamin in 2018 the results have that a database and its applications can be carried out to analyze transactional information that occurs in the education unit at the Ummu'l Quro Foundation, Depok, which is used to support the decisionmaking process by the leadership. From some of the references above, a data warehouse is designed that can be used as a good source of information for waroenk owners for college students related to sales strategies for the future with price, taste quality, customer discounts.

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Research methodology is a scientific process or method to obtain data that will be used for research purposes[5].

2.1. Data Collection Method

Data collection in this study used a literature study from several comparison journals, and by searching for data directly from waroenk kids college.



Figure 1. Data warehouse architecture for marketing strategy

In Figure 1 above is the data architecture for marketing strategies for college students where the initial process is to get an operational database, copy the data, how are the results from the data copy, do the ETL process, then the results are finally obtained.

2.2. Transaction Data

The data needed to build a marketing data warehouse is from data sources from restaurants. Based on the results of data collection at Waroenk kids collage, the data obtained is derived from daily, weekly, monthly sales transaction records stored in Microsoft Excel.

National State Nati			Table 1.	Transaction Da	ata	
Naii Goreng Sasfood 18000	1	PRODUK	HARGA	PELAYANAN	PELANGGAN	-
Chicken Stack Mozzardla 25000	2	Nasi Goreng Seafood	18000	Baik	Sari	\neg
Naii Goreng Asafood 18000	3	Chicken Steak Mushroom	25000	Sangat Baile	Fahmi	\neg
Naii Gerent Avam	4	Chicken Steak Mozzarella	25000	Baik	Arom	\neg
Chicken Mushroom	5	Nasi Goreng Seafood	18000	Baik	Loecy Ratih	\neg
Nati Gereng Original 12000	6	Nasi Goreng Ayam	15000	Cukup	Yanty Sukaeni	П
Chickon Steak Single	7	Chicken Mushroom	25000	Baik	Wieke Ratna	П
Nasi Gereng Ayam 15000 Sangar Baik	8	Nasi Goreng Original	12000	Baik	Poppy Rosana	\neg
Nai General Ayarm 15000 Sangar Balk Dicky Sagrough	9	Chicken Steak Single	17000	Baik	Ratna	\neg
Chicken Mozzardla 25000	10	Nasi Goreng Ayam	15000	Sangat Baik	Yauma Alfath	\neg
Naii General Avam 15000 Calop	11	Nasi Goreng Ayam	15000	Sangat Baik	Dicky Saptoaji	\neg
Naii Gereng Muharoom 17000 Baik Hendra G	12	Chicken Mozzarella	25000	Bailc	Slamet Suhandi Parnungkas	\neg
Naii Gereing Original 12000 Sangar Baik Abdullah Achmad	13	Nasi Goreng Ayam	15000	Cukup	Aryo Setyo wibowo	П
Selician Mozzarella 35000 Baile Sylifana	14	Nasi Goreng Mushroom	17000	Baik	Hendra G	\neg
Naii Goreng Basfood 18000 Sangar Baik Resty	15	Nasi Goreng Original	12000	Sangat Baik	Abdullah Achmad	\neg
Nail General Ayarm 15000 Sangar Balk Rostafery	15	Sirloin Mozzarella	35000	Baik	Syilfiana	\neg
Chicken Mezzerlia 25000	17	Nasi Goreng Seafood	18000	Sangat Baik	Resty	\neg
Nai Capeary Sasfood 20000 Karang Baile Haris	18	Nasi Goreng Ayam	15000	Sangat Baik	Rosdafery	\neg
Naii Gerent Mathreem 17000	19	Chicken Mozzarella	25000	Baik	Sarah Nabila	П
22 Nai Goreng Ayam 15000 Sangar Balik Ranga 23 Nai Goreng Safood 20000 Sangar Balik Bu Ida 24 Nai Goreng Safood 18000 Sangar Balik Reity 28 Nai Goreng Safood 18000 Sangar Balik Ridy Pahminarysh 26 Chicken Morgarella 25000 Balik Ipang 27 Nai Goreng Goriginal 12000 Sangar Balik Mohammad Ighal 28 Sirioin Mozarella 35000 Balik Hansm Alharim 29 Nai Goreng Safood 18000 Kerang Balik Du It 30 Nai Coreng Safood 2000 Sangar Balik Sigit Syaputra 31 Nai Capary Safood 2000 Balik Tufuk Soemantri 32 Nai Capary Safood 2000 Balik Farlan Syahadan 34 Nai Capary Safood 2000 Balik Farlan Syahadan 35 Nai Goreng Malhorom 1700 Balik Pal Andi	20	Nasi Capcay Seafood	20000	Kurang Baik	Haris	П
Nai Ayam Bakar 20000 Sangat Baik Bu Ida	21	Nasi Goreng Mushroom	17000	Baik	Joko	П
34 Nau Gereng Basfood 18000 Sangat Balk Retry 25 Nau Gereng Basfood 18000 Sangat Balk Ristry Phuminarysh 26 Chicken Morgaretta 25000 Balk Ipang 27 Nau Gereng Original 12000 Sangat Balk Mohammad Ighat 28 Sitiotin Mozaretta 35000 Balk Harm Alharim 29 Nau Gereng Seafood 18000 Kerang Balk Du It 30 Nai Ayam Bakar + Aki Ayam Bakar 40000 Sangat Balk Sigit Syapetra 31 Nai Capary Seafood 20000 Balk Tufuk Seemantri 32 Nai Capary Seafood 20000 Balk Farlant Synhadan Nai Gereng Muhroom 17000 Balk Palk Andi	22	Nasi Goreng Ayam	15000	Sangat Baik	Rangga	
23 Nau Goreng Sasfood 18000 Sangat Balk Risky Fahmiansysh 46 Chicken Mezzavella 25000 Balk Ipang 77 Nau Goreng Original 12000 Sangat Balk Mahmmad Iqbal 28 Sérioin Mozzavella 35000 Balk Hamm Alharim 29 Nau Goreng Sasfood 18000 Kerang Balk Bu It 30 Nau Goreng Balcod 40000 Sangat Balk Sight Syapotra 31 Nau Gapey Sasfood 20000 Balk Tarufic Soermatrit 32 Nau Gapey Sasfood 20000 Balk Farlan Syahadan Nau Gereng Malaroom 17000 Balk Palc Andi	23	Nasi Ayam Bakar	20000	Sangat Baik	Bu Ida	\neg
26 Chicken Mezzerlia 25000 Baik Ipang 27 Nais Greeng Original 12000 Sangat Baik Muhammad Ighal 28 Sitionin Mozzarella 35000 Baik Hamm Alharim 28 Nais Greeng Basfood 18000 Kerang Baik Ibu Iti 30 Nais Ayam Bakar + Aki Ayam Bakar 40000 Sangat Baik Sigit Syapetra 31 Nai Capary Sasfood 20000 Baik Tufuk Seemantri 32 Nai Capary Sasfood 20000 Baik Farlan Syahadan 3 Nais Greeng Muhroom 17000 Baik Pak Andi	24	Nasi Goreng Seafood	18000	Sangat Baik	Resty	\neg
27 Nai Goreng Original 12000 Sangat Baik Muhammad Ighal 18 Sidoin Mozzarella 35000 Baik Hannen Alharien 29 Nain Goreng Baidood 18000 Korang Baik Ibu li 50 Nain Ayam Bakar + Ait Ayam Bakar 40000 Sangat Baik Sight Syapotra 31 Nain Capery Saifood 20000 Baik Truffic Soormatrit 32 Nain Capery Saifood 20000 Baik Farhan Syahadan 34 Nain Goreng Malaroom 17000 Baik Paik Andi	25	Nasi Goreng Seafood	18000	Sangat Baik	Rizky Fahmiansyah	П
28 Sirioin Mozararila 35000 Balk Hannen Alharim 29 Nai Coreng Basfood 18000 Kwrang Balk Ibu bi i 30 Nai Ayam Bakar + Aki Ayam Bakar 40000 Sangat Balk Sgirt Syapetra 31 Nai Capary Sacfood 20000 Balk Tufuk Soemantri 32 Nai Capary Sacfood 20000 Balk Farlan Syahadan 38 Nai Generg Muhroom 17000 Balk Palk Andi	26	Chicken Mozzarella		Baik	Ipang	\neg
29 Nau Goreng Saufood 18000 Karang Baik Ibu Iti 50 Naai Ayam Bakar + Ati Ayam Bakar 40000 Sangat Baik Sight Syapetra 12 Nau Capcay Saufood 20000 Baik Taufik Soemantri 32 Nau Capcay Saufood 20000 Baik Farhan Syahadan 33 Nau Genega Mashroom 17000 Baik Pak Andi	27	Nasi Goreng Original	12000	Sangat Baik	Muhammad Iqbal	
Nai Ayam Bakar + Ait Ayam Bakar 40000 Sanget Balk Sjeft Syapetra 1s Naic Qapary Saefoed 20000 Balk Tuffick Soemantri 2s Naic Qapary Saefoed 20000 Balk Farlum Synhadan Nai General Multroom 17000 Balk Palk Andi	28	Sirloin Mozzarella	35000	Baik	Hanum Alharim	П
31 Nasi Capcay Sasfood 20000 Baik Taufik Soemantri 32 Nasi Capcay Sasfood 20000 Baik Farhan Syahadan 33 Nasi Generg Multroom 17000 Baik Palk Andi	29	Nasi Goreng Seafood	18000	Kurang Baik	Ibu Iti	\neg
32 Nat Capery Seafood 2000 Baik Farhan Synhafan 35 Nasi Generaj Muhroren 17000 Baik Pak And Puk And Pak And Pak And	30	Nasi Ayam Bakar + Ati Ayam Bakar	40000	Sangat Baik	Sigit Syaputra	_
Nasi Goreng Mushroom 17000 Baik Pak Andi	31	Nasi Capcay Seafood	20000	Baik	Taufik Soemantri	
	32	Nasi Capcay Seafood			Farhan Syahadan	
34 Nasi Goreng Ayam 15000 Sangat Baik Achmad	33	Nasi Goreng Mushroom	17000	Baik	Pak Andi	
	34	Nasi Goreng Ayam	15000	Sangat Baik	Achmad	

Table 1 is sales transaction data made in Ms Excel carried out by Waroenk kids collage for 1 year starting in early 2020 until the end of 2021

2.3. Understanding the Snowflake Schema

Snowflake schema is a multidimensional database in a data warehouse, this schema is composed of a fact table or fact table in the middle. This table is related to various dimensions which are also grouped in the table [6].

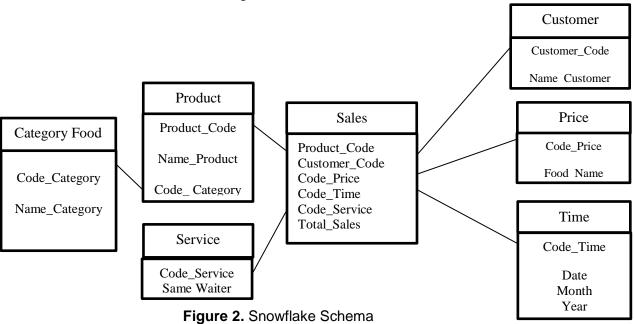




The scheme that has been designed for data warehouse development at Waroenk. Anak Kampusan is using the Snowflake Schema model. This model is used to provide information that the restaurant owner wants to find and obtain easily and quickly if the transactional database is difficult to obtain.

3.1 Snowflake Schema Design Results

Based on the results of the determination of the transactional table, it is in the form of the Snowflake Schema which is shown in Figure 2 below:



In the picture above, the sales table has product code, customer code, price code, time code and total sales, in each sub category there is time, price, customer, product and type category.

3.2. ETL (Extract, Transform and Load)

Extract Transform Load is a data integration process that combines data from various sources into one consistent storage and is loaded in a data warehouse [7].

3.3. How Works Extract Transform Load

- a) Data Extraction: Data must be extracted from the source before being moved to another place [7].
- b) Transformation: The ETL transformation is cleaning and preparing the aggregation for analysis [7].
- c) Load: ETL loading, transformation into a new record in the data warehouse. Full load is useful for generating exponentially growing and difficult to manage data sets [7].

3.4. Process Extract Transform Load

The ETL process is used to move transactional data from the data source table to the data warehouse [3]. Then the ETL process is needed so that the data entered in the data warehouse is in accordance with the snowflake schema that was designed at the beginning.



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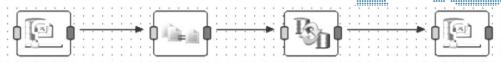


Figure 3. ETL process in products ...

In Figure 3 above is the ETL process where the results of the ETL process are in the form of a product table

Table 2. Slice of Product Table

Code Product	Name Product
NG_001	Fried rice
ST_001	Steak
RB_001	Toast
ID_001	Indomie

From Table 2 above, you can see a snippet of the contents of the product table

Table 3. Category Table Cuts

Code Product	Name Product
NG_002	Fried Rice
NG_003	Chicken Fried Rice
NG_004	Beef Fried Rice
ST_001	Steak
ST_002	Chiken Steak
ST_003	Sirloin Steak
RB_001	Toast
RB_002	Cheese toast
RB_003	Chocolate toast
RB_004	Peanut toast
MG_001	Noodle
MG_002	Chicken Noodle Ayam
MG_003	Beef Noodle

From Table 3 above, it can be seen a snippet of the contents of the category table

Table 4. Discounted Price Table

Code Product	Price
NG_002	Rp. 23000
NG_003	Rp. 30000
NG_004	Rp. 25000
ST_001	Rp. 25000
ST_002	Rp. 25000
ST_003	Rp. 30000
RB_001	Rp. 18000
RB_002	Rp. 20000
RB_003	Rp. 21000
RB_004	Rp. 18000
MG_001	Rp. 18000
MG_002	Rp. 20000
MG_003	Rp. 25000

From Table 4 above, you can see a cut from the contents of the price table

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Table 3. All pieces of data from the sales trainsaction						
Fact	Time	Kode	Code	Price	Amount	Total Sales
Code	Code	Product	Customer			
		Category				
1	10100	NG_002	P_001	23000	10	230.000
2	10101	NG_003	P_002	23000	10	230.000
3	10102	NG_004	P_003	25000	9	225.000
4	10103	ST_001	P_004	25000	7	175.000
5	10104	ST_002	P_005	25000	10	230.000
6	10105	ST_003	P_006	30000	5	150.000
200	11000	MG_001	P_200	18000	12	216.000
201	11001	MG_002	P_201	20000	8	160.000
202	11002	MG 003	P 202	25000	5	125.000

Table 5. All pieces of data from the sales transaction

From Table 5, we get entire data snippet from the sales transaction table after converted into a Sales Facts table.

4. Conclusion

The data warehouse for Waroenk kids collage has a product table, a price table, a time table, a service table, and a customer table. It has subtables, namely food categories and one fact table, namely sales facts. All monitoring of data in the sale of food products at Waroenk kids collage has been integrated and has been well systemized so that data is not lost.

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