

# BLUEPRINT ENTERPRISE ARCHITECTURE IN DISTRIBUTION COMPANY USING TOGAF

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## ABSTRACT

Current technological developments have become an important role in helping people, especially in activities in the company. The development of this technology has helped many companies in improving the performance and business processes of the main and supporting companies. Information technology in companies is needed to support their business processes. This distribution company is currently not assisted by information technology in carrying out its business activities, therefore some of the company's business processes such as scheduling the delivery of goods that are not well organized due to customer demand, data collection of goods in and out of warehouses that are not recorded, and others. This makes the company requires the development of information technology in helping the company's business processes. Enterprise architecture can help companies in designing the development of information systems in the company. Enterprise architecture has several frameworks that can be used in the design of information systems such as the TOGAF, Zachman Framework, and others. TOGAF framework will be used in this research as a modelling in designing the process of developing enterprise information systems. The results of this study will be in the form of proposed TOGAF method models that have been adapted to business processes and business needs of the company to help improve the company's business processes.

**Keywords:** *Enterprise Architecture, TOGAF, System Information*

## 1. INTRODUCTION

Technology needs and advancements Information and Communication now a day sits development is getting faster and faster, complexity of business needs like technology, systems, processes and communication at government organization starting from the system hardware and software covers integrated and centralized all components from one organization. With the development of technology, every company is always trying to provide the best service to its customers and improve every performance of their company. This distribution company is a company engaged in the field of LED, Videotron which provides a wide range of LED and Videotron products from various brands. This company was established in Indonesia, precisely in the city of Semarang, Central Java. The company has been established since 2012 until now. However, the company does not currently use information technology to help the company's main business processes. This causes some business activities to experience some problems such as unorganized delivery scheduling due to requests

from customers, financial data that still uses paper, data warehouse that is not well organized, and others. This makes the need to align business with information systems becomes one of the important problems for companies and requires an information system design [1].

Enterprise Architecture is now widely used by companies to provide information systems that can be integrated with other systems to support business processes and enterprise information technology. Enterprise Architecture Implementation is a structured methodology for solving several problems related to Enterprise Architecture problems [2].

Enterprise architecture is a planning and management that can help a company to develop by understanding the company's current business conditions in terms of a holistic perspective and interconnected with technology resources, information flow, business processes, and strategy guides [3]. Enterprise architecture to help and optimize company processes to align business with integrated enterprise information systems and be

responsive to changes and support the delivery of corporate business strategies [4]. In designing an Enterprise Architecture, a framework that is appropriate to the shape and needs of the organization itself is needed. The various types and methods commonly used in designing corporate architecture are offered by the Zachman framework, TOGAF, DoDAF [5].

The Framework that will be used in this study is the TOGAF framework. Researchers will conduct observations and interviews with Distribution companies in collecting data and information needed to design enterprise architecture and analyze these data based on the stages that exist in the TOGAF framework. The final results of this study will provide suggestions regarding the application of proposals and the design of new business processes for distribution companies that are expected to be useful in the development of IT / IS in companies to improve company performance and can run in line with the company's vision and mission.

## 2. LITERATURE REVIEW

### 2.1 Previous Research

The author will discuss several previous journals related to research conducted by the author. The following will be some of the results of previous studies relating to the design of enterprise architecture using the TOGAF framework derived from national and international journals.

Based on an international journal entitled "Designing Enterprise Architecture Using Togaf Framework In Meteorological, Climatological, And Geophysical Agency" written by F. E. Gunawan, J. F. Andry, H. Tannady, and R. Meylovsky. A [6], the following conclusions can be drawn are as follows:

a) The equation with this report is related to the development of information technology that uses the principles of enterprise architecture.

b) The difference with this report is that the modeling methodology in this international journal uses the Zachman framework as its enterprise architecture modeling.

c) The strength of this journal is that it focuses on e-commerce system architecture and design models.

d) The weakness of this journal is that it does not have an explanation of the SWOT analysis and discussion of the value chain in the journal

TOGAF provides a complete method for how to build, manage and implement an enterprise architecture and information system called the Architecture Development Method [11].

### 2.2 Enterprise Architecture

Enterprise architecture is a methodology that discusses the principles, methods, and models used as a design and realization of organizational structures, information systems, business processes, and corporate infrastructure [7]. Enterprise Architecture can help companies achieve business success and effectiveness by using information management strategies and IT resources. This competitive advantage depends on user satisfaction, life cycle processes, allocation and task scheduling, life cycle processes, and cost estimates [8].

According to Osvalds, Enterprise architecture is a description of the mission of the stakeholders in including information, functionality and usability, organizational location and performance parameters. Enterprise architecture describe the plan for develop a system or a set of systems [9].

### 2.3 TOGAF

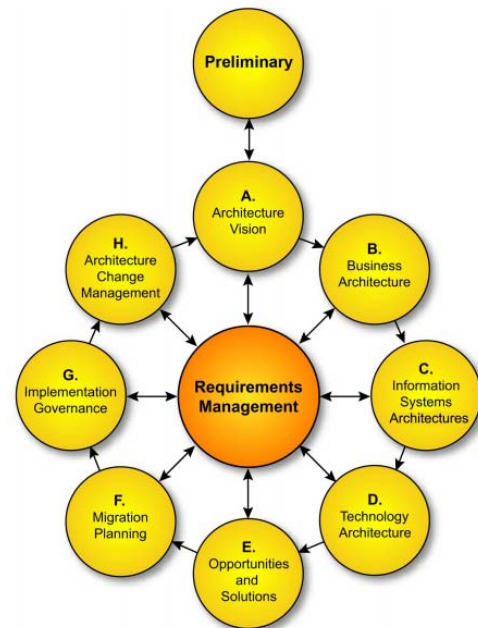


Figure 1 : TOGAF ADM [16]

TOGAF is an enterprise architecture that provides a holistic approach in the process of designing,

planning, implementing and managing enterprise architecture [10].

TOGAF ADM which is a methodology consisting of several steps to develop and maintain the technical architecture of the organization, where ADM forms an iterative cycle for the whole process, between and each phase so that at each iteration a new decision is made that can determine the extent of enterprise scope, level of detail, and the target time to be achieved [12].

ADM is a generic method that contains a set of activities that are presented progressions at each stage of ADM and architectural models are always harmonized with business goals and needs [13]. The essence of ADM is management needs, where business needs, information systems, and technology architecture always aligned with the target business needs [14]. Following are the steps in the TOGAF ADM methodology [15].

From Figure 1 TOGAF AMD, the following is an explanation of each phase in the TOGAF ADM according to The Open Group [17]:

Preliminary Phase is the beginning stage of enterprise architecture design preparation.

Requirements Management is the process of managing architectural requirements throughout the TOGAF ADM phase.

- Phase A: Architecture Vision is defining scope, vision and mapping the overall strategy.
- Phase B: Business Architecture contains the main business strategy, organization and information activities.
- Phase C: Information Systems Architecture, Develop target architecture for data and applications.
- Phase D: Technology Architecture, creating overall architectural goals that will be applied at a later stage.
- Phase E: Opportunities and Solutions develop an overall strategy, determine what to buy, build or reuse, and how to apply the architecture described in phase D.
- Phase F: Migration Planning is the creation of an appropriate implementation and migration plan, in collaboration with the portfolio and project managers.
- Phase G: Implementation Governance the project is implemented as a work plan program and processed in order to achieve the desired architecture.
- Phase H: Architecture Change Management or architecture change management phase the drivers of change will be described and how to

manage these changes, from simple maintenance to architectural redesign.

### 3. RESEARCH METHODOLOGY

In this study, the method used by the author is a descriptive method that conducts case studies in distribution companies led in Semarang. In this study, the authors only use steps from TOGAF such as the initial phase, phase A: Architectural vision, phase B: Business Architecture. In this study, there is a research framework that covers the entire research process. This research begins with the observation and interview stages to the owner of the company and conducts an analysis of the results of each data obtained. The following is Figure 2. Research Methodology as follows.

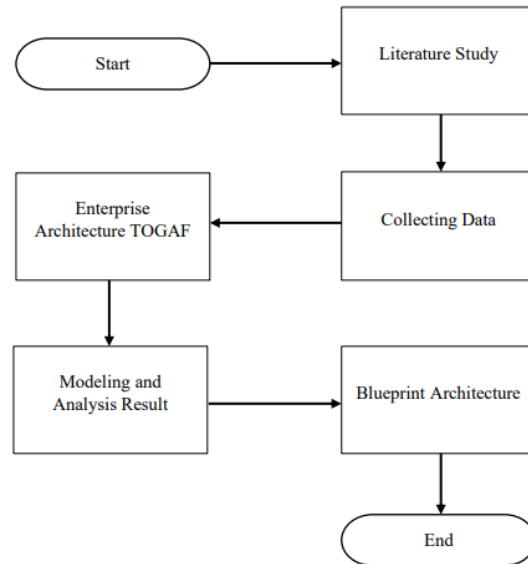


Figure 2 : Research Methodology

Based on the research steps in Figure 2. Research Methodology above, it can be explained as follows:

1. Literature Study. Collection of data from the library as a reference that comes from research journals and other information related to this research. Data collection from library research will contain about enterprise architecture, TOGAF framework, and some things related to this research.
2. Collecting Data. In this study, data collection was done by direct observation of the company and the results of the interview. Interviews were conducted with company owners.

3. Enterprise Architecture TOGAF. This stage will discuss the modelling of the proposed application in this study using the TOGAF framework as a basis. This stage consists of the preliminary phase, architecture vision, business architecture, information system architecture, and technology architecture.
4. Modelling and Analysis Result. At this stage an analysis will be carried out by bringing together the results of the TOGAF modelling and determining which development process will be made.
5. Blueprint Architecture. Discuss the results of development proposals that have been analyzed previously.

## 4. RESULT AND ANALYSIS

### 4.1 Value Chain Analysis

At this point, we will discuss the function of the business model in distribution companies which will be analyzed using Value Chain. Value Chain is a form of strategy used to analyze the company's internal activities. Value chains are used to analyze the main activities and supporting activities of the company. The following Figure 3 Value chain Distribution Company.

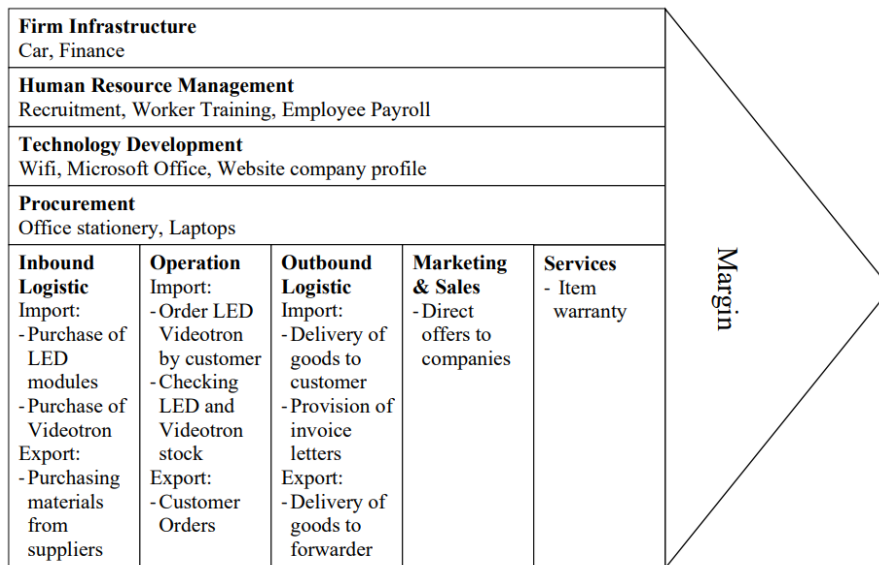


Figure 3 : Value Chain Distribution Company

#### 4.1.1 Primary Activity.

- Inbound Logistic, the import section will purchase official LED modules and videotrons from suppliers. In the export section, material purchases from suppliers will be made.
- Operation, In the import section, in operation after purchasing led modules and videotrons, the goods that have been received will be checked the quantity and condition of the goods, after checking the goods will enter the warehouse and will be stored as goods ready. Afterwards, if there is an order from the customer, it will immediately be checked the stock of goods in the warehouse, if the stock is ready then the goods will be sent directly to the customer, but if not ready, the company will make additional orders to the supplier to be sent to the customer. In the export section, in operation the

customer will place an order to the company; the customer will provide a list of orders to the company containing the number and name of the items to be ordered. After the customer makes an order, the company will order goods to the supplier. When the goods are received by the company, the goods will be stored and reported to the customer that the goods are ready.

- Outbound Logistic, In the import section, after a customer orders an item, it will check the stock of goods and will be sent to the customer via a shipping service or company driver. Whereas in the export section, after the ordered goods arrive from the supplier, the company will report to the customer that the goods are ready, the customer will provide shipping instructions based on the report from the company and will begin sending goods using the shipping service.

- Marketing & Sales, In this section the company does marketing by visiting the company directly and offering it.
- Services, the Company guarantees every product sold if it has damage to the goods

#### 4.1.2 Support Activity.

- Firm Infrastructure. Firm infrastructure is a facility provided by the company. Distribution companies provide car facilities for their employees to do work outside the city; the company also provides finance for employees who have work abroad or outside the city.
- Human Resource Management, Recruiting new employees, providing job training for new employees and employee payroll.
- Technology Development. In the company provides a Wi-Fi device to help the work of employees, Microsoft Office as an application used to do data collection, and the company's website.
- Procurement. The needs of supporting business processes such as office stationery and laptops are provided.

#### 4.2 Enterprise Planning Model Interaction

At this stage will identify and map business functions in the company. There are 6 applications that will be implemented in the company, namely: financial applications, inventory applications, sales applications, scheduling applications, payment applications, and tracking applications, see Figure 4 Enterprise Planning Model Interaction. Implementation of this application will consist of 3 types of terms, namely short term, medium term, and long term. Short-term application implementation is an application that needs to be implemented in a short period of time, medium term is implemented for applications that are not too urgent to complete, and long-term for non-urgent applications.

- Short-Term, in the short term, there are scheduling applications and tracking applications. In this scheduling application will assist companies in arranging the delivery schedule of goods to customers, in this application will contain information about the date of delivery of goods, name of goods, quantity of goods, and other information. In the tracking application, it will track the status of goods that are being sent and the position of goods that are being sent when sending with the driver provided by the company.

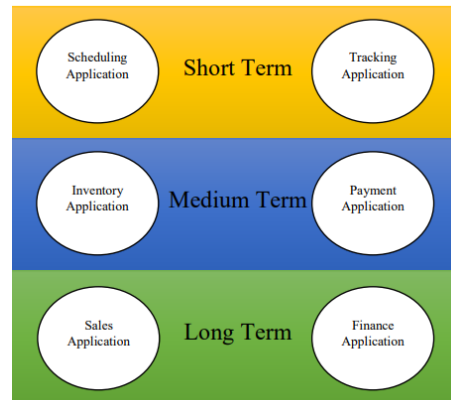


Figure 4 : Enterprise Planning Model Interaction

- Medium-Term, in the medium term, there are inventory applications and payment application. In this inventory application will assist the company in managing the entry and exit of goods in the warehouse. In the payment application will help customers to make online payment.
- Long-Term, in the long run, there are sales applications and finance applications. In this sales application is used to collect data on goods that have been sold along with customer data that makes a purchase. In this finance application can help companies in the calculation and data collection of financial data in and out.

#### 4.3 GAP Analysis Business Architecture

In the discussion of this chapter, it will explain the business gap analysis between current business architecture and business architecture planning in the company. The current business architecture will explain what type of information technology is used in the company today and how much influence it has on the company. While the business architecture planning in the company will explain about information technology planning and which information technology will be implemented in the future. Business gap analysis aims to analyze the current conditions in the company and build a business architecture plan to be implemented in the future. Here is Figure 5. GAP Analysis Business Architecture.

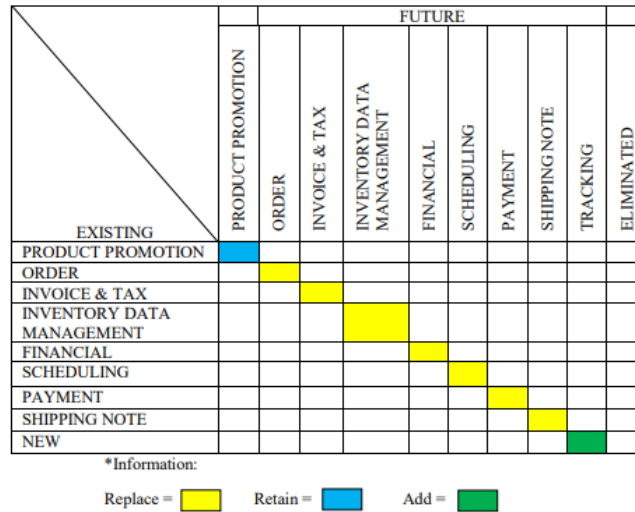


Figure 5 : GAP Analysis Business Architecture

Based on Figure 5. GAP Analysis Business Architecture above, it can be seen that there is two business function that will be retained, namely on product promotion and shipping note. For business functions that will be replaced, namely: order data, invoice data, inventory data management, financial data, delivery schedule data, and payment data.

4.4 Design Business Architecture

At this stage will discuss the business architecture design that is currently running at Distribution Company, here is Figure 6. Current Business Architecture. Based on Figure 6 above it can be seen, marketing & sales will offer products to customers, interested customers will make a purchase request to marketing & sales and a purchase list will be made to the admin, customers who have ordered will make payments through the bank, after which the bank will give a statement to the admin containing the payment report that has been received.

Admin who has received payment reports will provide shipping notes to packing staff and a list of items that will be forwarded to warehouseman, warehouseman will check the existing stock in the warehouse, if there is insufficient stock, warehouseman will provide a report to the purchasing department, purchasing will place an order stock to suppliers that will be delivered directly to the warehouse. This stage will produce architectural principles that are used to convince company leaders in the decision-making process

that involves the success of the architecture in the company that can be seen Table 1. Principles and Goal Design Business Architecture.

Table 1: Principles and Goal Design Business Architecture

Principles	Goal
Architectural decisions that are approved must be in accordance with the objectives, activities and business processes of the company's distribution.	• Support business activities and processes in distribution companies
The architecture developed must be able to support business continuity.	• Improve employee performance and service with customers
The architecture developed must be safe	• Minimize any system disruptions that interfere with business continuity.
Information, data, and systems developed must be well protected	• Minimizing the adverse effects that occur due to disasters and malware and hacker attacks
The application is well integrated	• Protect data, information, and systems from unauthorized parties' access
Data access made easy	• Ease of data processing in order to improve service quality

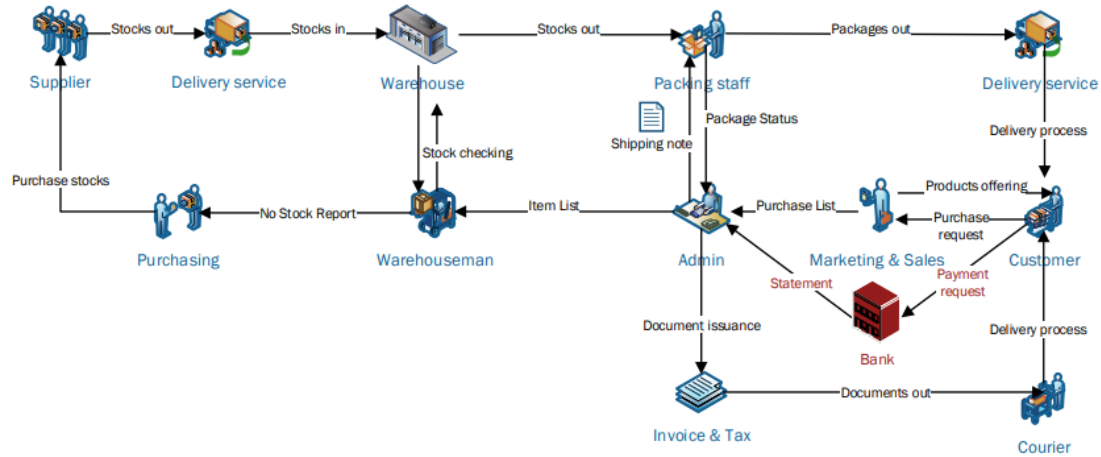


Figure 6 : Current Business Architecture

Table 2: Blueprint Enterprise Architecture

	Rules	Structures	Changes
Business Focused	<p>Considerations Blueprint: Principles, policies, position papers, conceptual data model, architecture strategies. Purpose: Achieve the agreement on basic principles, values, direction and aims Benefits: Improved overall conceptual consistency</p>	<p>Visions Blueprint: Value Chains, context diagram, business reference architecture, business activity model. Purpose: Achieve alignment between IT investment and business outcomes. Benefits: Improve effectiveness of IT investment</p>	<p>Outlines Blueprint: Solutions overviews, initiative summaries, conceptual architecture, Purpose: Estimate the overall business value of specific IT projects. Benefits: Improved efficiency of IT investment</p>
IT Focused	<p>Standards Identified Blueprint: Technology reference models, reference architectures, data models. Typical Purpose: Achieve technical consistency, homogeneity and regulatory compliance Benefits: Reduced cost, risks, and complexity</p>	<p>Landscapes Identified Blueprint: Platform architecture, application portfolios, inventories, integration contexts. Typical Purpose: Rationalize the IT landscape, manage the lifecycle of IT assets and plan IT projects. Benefits: Increased reuse and flexibility, reduced duplication and legacy</p>	<p>Designs Identified Blueprint: Detailed designs, physical designs, solutions design, preliminary solution designs. Typical Purpose: Implement IT projects according to business and architectural requirement Benefits: Improved quality of the project delivery</p>

After the stock has been received, the packing staff will prepare the goods for further delivery to the customer until the customer receives the ordered goods. After that the admin will send an invoice & tax document to the customer.

This business model architecture design aims to display every business process in a led distribution company that suits business needs. In this

application system there will be six applications that will be proposed.

- Sales Application
- Payment Application
- Finance Application
- Inventory Application
- Scheduling Application
- Tracking Application

The information system will be used by several actors, namely customers, marketing & sales, administration, and warehouse owners. The

following is the explanation in Figure 7. Design Business Architecture.

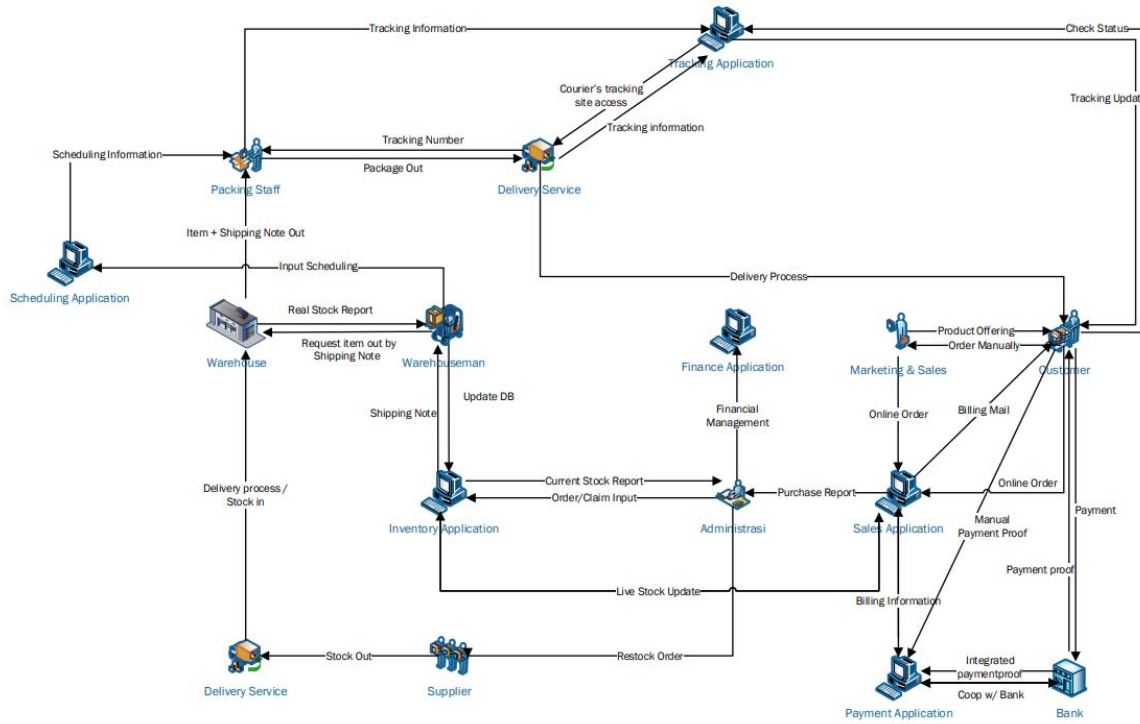


Figure 7 : Design Business Architecture

Based on Figure 7 Design Business Architecture, it can be seen the results of business architecture design from the proposed application. In the proposed application there will be six additional applications namely:

- Sales Application, this application will be used by customers and marketing in inputting goods purchase data, the application will be based on a web browser that requires the internet and LAN to be connected. This application will be created using a PHP web server and will have a database for data storage.
- Payment Application, in this application will be used by customers to make payments online, in these application customers can upload proof of payment from banks that have not cooperated with the company and this application is integrated directly with the sales application, The application will be based on a web browser that requires the internet and

LAN to be connected. This application will be created using a PHP web server and will have a database for data storage.

- Finance Application, in this application will be used by the administration in carrying out financial management of the company both money out and in, The application will be desktop based which requires internet and LAN to be connected. This application will be created using visual studio and will have a database for data storage.
- Inventory Application, this application will be integrated directly with the sales application in displaying the existing stock in the company along with existing goods and will provide stock reports to the administration, The application will be based on a web browser that requires the internet and LAN to be connected. This application will be created using a PHP web server and will have a database for data storage.



- Scheduling Application, in this application serves as scheduling the delivery of goods that have been inputted by warehouseman, this application will contain data on the number of goods, item name, delivery date, recipient address, and other data, The application will be desktop based which requires internet and LAN to be connected. This application will be created using visual studio and will have a database for data storage.
- Tracking Application, in this application will be used by customers in checking the status of goods, The application will be based on a web browser that requires internet and LAN to be connected. This application will be created using a PHP web server and will have a database for data storage

#### 4.5 Blueprint Business Architecture

At this point will discuss about six artifacts of enterprise architecture that are used to identify distribution companies including considerations, visions, outlines, standards, landscapes, and designs. The following are the 6 stages of Blueprint Enterprise Architecture:

a) Considerations, is Business Focused Rules. In the considerations section, this Blueprint enterprise architecture will identify companies that include principles, policies, position papers, conceptual data models, and architecture strategies. The purpose of these considerations is to achieve the agreement on basic principles, values, direction and aims. Benefit from using considerations properly will improve overall conceptual consistency.

b) Visions, is Business Focused Structures. In the visions section, the blueprint enterprise architecture will identify companies that include value chains, context diagrams, business reference architectures, and business activity models. The purpose of this vision is to achieve alignment between IT investment and business outcomes. Benefit from using visions properly will improve the effectiveness of IT investment.

c) Outlines, is Business Focused Changes. In the outlines section, the blueprint enterprise architecture will identify companies that include solutions overview, initiative summaries, and conceptual architecture. The purpose of these outlines is to estimate the overall business value of specific IT projects. Benefit from using vision

properly will improve the efficiency of IT investment.

d) Standards are IT Focused Rules. In the standards section, the blueprint enterprise architecture will identify companies that include technology reference models, reference architectures, and data models. The purpose of these standards is to achieve technical consistency, homogeneity and regulatory compliance. Benefit from using standards properly will reduce cost, risk, and complexity.

e) Landscapes, is IT Focused Rules. In the landscapes section, blueprint enterprise architecture will identify companies that include platform architecture, application portfolios, inventories, integration contexts. The purpose of these landscapes is to rationalize the IT landscape, manage the lifecycle of IT assets and plan IT projects. Benefit from using landscapes properly will increase reuse and flexibility, reduced duplication and legacy.

f) Designs, is IT Focused Rules. In the designs section, the blueprint enterprise architecture will identify companies that include detailed designs, physical designs, solution designs, and preliminary solution designs. The purpose of these designs is to implement IT projects according to business and architectural requirements. Benefit from using designs properly will improve the quality of the project delivery

Based on 6 stages of Enterprise Architecture Artifacts, the following is Table 2. Blueprint Enterprise Architecture as follows: IT focused and business focused, included rules, structures and changes from the company.

Currently authors focused IT focused for the company are:

- Technical Reference Model provides technology service references so that technology architecture can be built. It's provides a series of architectures and solutions that will ultimately provide standards for business applications that will provide application services and infrastructure. This model ensures that the company will create consistently and based on a series of agreed elements.
- The reference architecture helps stakeholders include: project managers, software developers, corporate architects, IT managers

and users to coordinate and communicate effectively about the implementation of the project to be run. The reference architecture anticipates all questions and provides the most common answers that occur frequently. As a result, all involved will help the team avoid mistakes and delays that can occur without confrontation and use a set of best practices and approaches to a guaranteed solution.

- Data modeling is a series of processes that provide a data model for data to be stored in database storage. This data model is a conceptual representation of a data entity, the relationship between data objects that are different from the others. Data modeling provides assistance in providing clear data visuals and enforcing business rules on companies, compliance with regulations, and data policies. Data models ensure that consistency in each naming entity, data values, data length semantics, data security ensure data quality.
- Platform architecture, the main purpose of this platform is to increase the level of abstraction of data for the development of workable solutions and create usage scenarios of an application. This allows users to understand from low-level technical concepts to higher-level concepts that are more understandable, which are widely used by experts in the IT / IS and end-users in the field of architecture. Significantly accelerates and can unite the development and support of solutions that can be applied as soon as possible.
- Solution Architecture deals with defining and designing all stages at a very high level on the building blocks for programs and projects. This relates to understanding the current real conditions, and their impact on the overall architecture of the company because of the projects to be run and defining new blocks and designing their interfaces.
- Solution design consists of designing blocks, so this design is called a high-level design because from the start it needs to be set to confirm that all users have complied and can be mapped on the overall Solution Design. High-level designs need to be broken down into detailed designs for the design of the blue print architecture

## 5. CONCLUSION

Based on the results of the discussion discussed earlier, authors got some conclusions from this

research, namely in the business process of the LED distribution company, it was not optimal in the use of information systems and information technology so that in this study the company architecture design was carried out to align business strategies and IT / SI strategies. The architectural design used uses the TOGAF framework and produces blueprints from the main TOGAF architecture, namely business architecture, application architecture, data architecture, and technology architecture. The problem found in the current company problem is that data is not integrated in the led distribution company. Companies can review the implementation of enterprise architecture information systems from the old system to the new system in terms of improving the performance and business processes of the company.

The difference with previous research, namely research at the Deputy IKRJK BMKG is that in the current study there is table 2 Blueprint Enterprise Architecture, where there are described changes that occur such as general overview solutions, summary initiatives, conceptual architecture, which previously were not done.

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