Designing an Enterprise Architecture Using TOGAF ADM Framework (Case Study: PT Sumber Alfaria Trijaya)

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Informasi Artikel	ABSTRAK

PT Sumber Alfaria Trijaya merupakan perusahaan di Indonesia yang telah menerapkan teknologi informasi pada proses bisnis berbasis aplikasi Electronic Transaction yang digunakan oleh karyawan internal pada setiap gerai Alfamart. Aplikasi ini berhubungan dengan layanan transaksi elektronik. Proses bisnis yang berjalan terdapat kendala seperti jaringan data center dengan partner Alfamart serta server yang mengalami heavy traffic. Solusi yang dapat digunakan untuk mencapai tujuan bisnisnya dengan pendekatan Enterprise Architecture untuk mengidentifikasi arsitektur target saat ini dan yang diharapkan serta melakukan gap analysis. Kesenjangan tersebut dijadikan sebagai rekomendasi yang harus dipenuhi dalam menjawab permasalahan yang ditemukan. Metodologi yang digunakan adalah TOGAF ADM yang berbasis proses dan memberikan fleksibilitas dalam menggunakan artefak sesuai dengan kondisi spesifik perusahaan. Kajian ini menghasilkan model bisnis dan arsitektur enterprise pada aplikasi Electronic Transaction, rekomendasi penguatan area bisnis, rekomendasi penyelarasan rencana TI dengan strategi bisnis, dan rekomendasi penggunaan solusi TI.

Kata Kunci:	***ABSTRACT***

PT Sumber Alfaria Trijaya is a company in Indonesia that has implemented information technology in business processes based on Electronic Transaction applications used by internal employees at every Alfamart outlet. This application is related to electronic transaction services. Business processes running has problems, such as data center networks, Alfamart partners, and servers that experience heavy traffic. A solution that can be used to achieve its business goals with an Enterprise Architecture approach to identify current and expected target architectures and perform a gap analysis. The gap is a recommendation that must be met in answering the problems found. The methodology used is TOGAF ADM which is process based and provides flexibility in using artifacts according to company-specific conditions. This study produces business models and enterprise architectures for Electronic Transaction applications, recommendations for strengthening business areas, aligning IT plans with business strategy, and recommendations for using IT solutions.

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INTRODUCTION

Information Technology is the design, implementation, development, support, and management of computer-based information systems consisting of hardware or software (indah Fianty et al., 2022) . PT Sumber Alfaria Trijaya, Tbk, is a company in Indonesia that has implemented information technology in its business processes. Implementation of application-based information technology called Electronic Transactions. Internal employees at every Alfamart outlet or store use the Electronic Transaction application. This application relates to electronic transaction services, such as purchasing credit, online game vouchers, electricity, and other electronic payments. However, in carrying out its extensive business processes in Indonesia, Alfamart can handle the many daily obstacles or problems it experiences. Alfamart must resolve several related problems. The most frequently occurring Alfamart problem is related to the Electronic Transaction application.

The problems and impacts that there are several elements of the problem in different fields (Sanjaya & Fianty, 2022). Problems in business in electronic transaction applications are network problems from Alfamart stores with Alfamart data centers. Alfamart stores that have long distances and remote areas make it possible to hinder the business processes that are carried out between the store and the customer. This happens due to the need for optimal use of information technology at Alfamart stores, especially in remote areas. Problems with data in electronic transaction applications require data centers to support business processes that are carried out well with Alfamart partners. So it cannot be predicted if there are network problems between the data center and Alfamart partners. The data center's task or function at Alfamart is as a transaction intermediary, in contrast to Alfamart's partners, who provide products. Problems with applications in electronic transaction applications have been able to accommodate business needs effectively and quickly, but the constraints are the network between stores and Alfamart's data center. The problem with technology is that there are servers that experience heavy traffic so that it becomes an obstacle for companies in carrying out electronic transaction business processes.

Based on the explanation of the elements of the problem above, to achieve the optimization of electronic transactions so that they are expected to run smoothly, a corporate architecture needs to be identified (Hesvindrati et al., n.d.). This identification is used to redesign the architecture, which is expected to be more precise and effective (Mastan & Stefanus, 2021). In supporting the architectural redesign of the Electronic Transaction application that will be carried out using the TOGAF Framework, a detailed method framework and a set of supporting tools used to develop Enterprise Architecture (Fernandes Andry et al., 2023). The TOGAF framework provides detailed and precise methods for creating, managing, and implementing corporate architectures and information systems based on the Architecture Development Method (ADM) to make IT architectures faster, more effective, efficient, and integrated with one corporate network (Chanchari et al., 2022).

RESEARCH METHOD

Enterprise Architecture is a management and technology practice aimed at improving company performance by seeing the company as a whole and integrated, following the view of strategic direction, business practices, information flow, and technological resources (Hikmatulloh et al., 2022). Enterprise architecture consists of drawings, diagrams, textual documents, standards or models, and business methods that explain the information system the company needs (van den Berg et al., 2019). Enterprise architecture will be used as a reference for developing information systems because developing a system with good architecture will be easier to achieve maximum results The Open Group Architecture Framework (TOGAF) (Salsabila Di Kusumah et al., n.d.).The stages of TOGAF ADM can be briefly explained as follows (Kwek et al., 2019): Preliminary Phase do the preparatory and initiatory activities needed to meet business objectives for the new company architecture, including an explanation of the organization-specific architecture framework and definition of principles. Besides that, this stage aims to determine the architectural capabilities desired by the company. That way, the architectural design process can

be optimally directed and can convince the company's stakeholders of the success of each architecture to be designed or created (Kwek et al., 2019). Architectural vision the initial phase of the architecture development process (Eko Riwanto & Fernandes Andry, 2019). This includes information about defining spatial boundaries, identifying stakeholders, creating an architectural vision, and getting approval. Business architecture development to support the agreed architecture vision (Ratnasari et al., 2018). Development of business architecture in support of the vision of the agreed architecture. In addition, Business Architecture defines the structure and interaction between business strategy, organization, functions, business processes, and information needs (Siahaan, 2021). The development of information systems architecture for architectural projects, including data architecture and application development (Qurratuaini, 2018). Information system architecture represents the development of information system architecture in support of an agreed architectural vision. The information system architecture is divided into two parts: application architecture and data architecture. Application architecture describes the structure and interactions of applications as groups of capabilities that deliver essential business functions and manage data assets.

The development of architectural technology for architectural projects—a technology architecture development to support the agreed architectural vision (Kotusev, 2018). In addition, the Technology architecture defines the structure and interaction of a service platform, as well as logical and physical technology components. The planning for implementation and identifying delivery vehicles for the architecture specified in the previous phase. An initial implementation plan and identify a delivery vehicle within the architecture defined in the previous phase (Gunawan et al., 2019). Opportunities and Solutions stages, consisting of the results of the Business Architecture, Information System Architecture, and Technology Architecture stages, are consolidated into architectures, needs, and gaps.

RESULTS AND DISCUSSION

Architecture
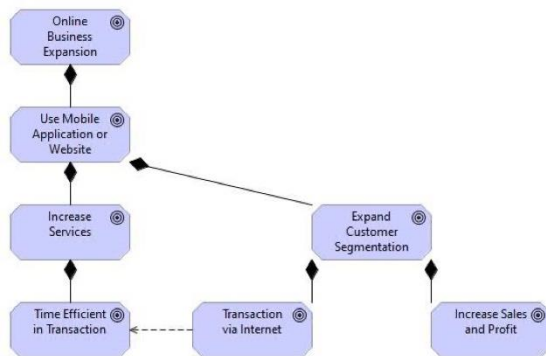
Architekture Vision

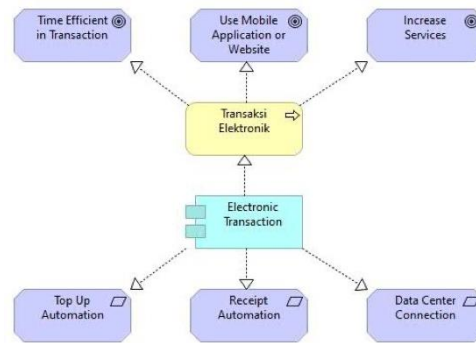**Figure 1. Target diagram**   **Figure 2. Solution Concept Diagram**

Figure 1. the target diagram explains the online business expansion that you want to do with mobile applications and websites. One way to do this is to improve services to be more efficient in transaction time. With the expansion of the online business, consumer segmentation will also expand, thereby increasing the company's sales and profits. Figure 2. the solution concept diagram is to achieve goals following the desired vision, and then the Electronic Transaction becomes a solution for the target that the company wants.
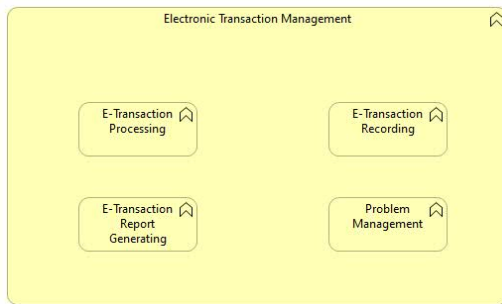
Business architecture

Figure 3. Business Function Decomposition

Figure 4. IT Function Decomposition

Figure 3. diagram of the proposed business function decomposition section will have 4 (four) main functions, which are divided into e-transaction processing (related to the transaction processing function), e-transaction recording (related to the recording function), transactions), preparation of e-transaction reports (related to the function to generate transaction reports each period), and problem management (related to the problem handling function). Figure 4. The proposed IT function decomposition diagram for PT Sumber Alfaria Trijaya, where the IT section will have 15 main functions consisting of IT operations, IT business solutions, IT intelligence, IT business relations, IT infrastructure, IT data warehouse, IT backend, IT project management, IT regional operations, IT data mining, IT operations development, IT requests, IT gateways, IT CMA, and IT documents and training. All functions in the IT department will become more specific and detailed, thus preventing or minimizing the occurrence of multiple tasks and miscommunication.
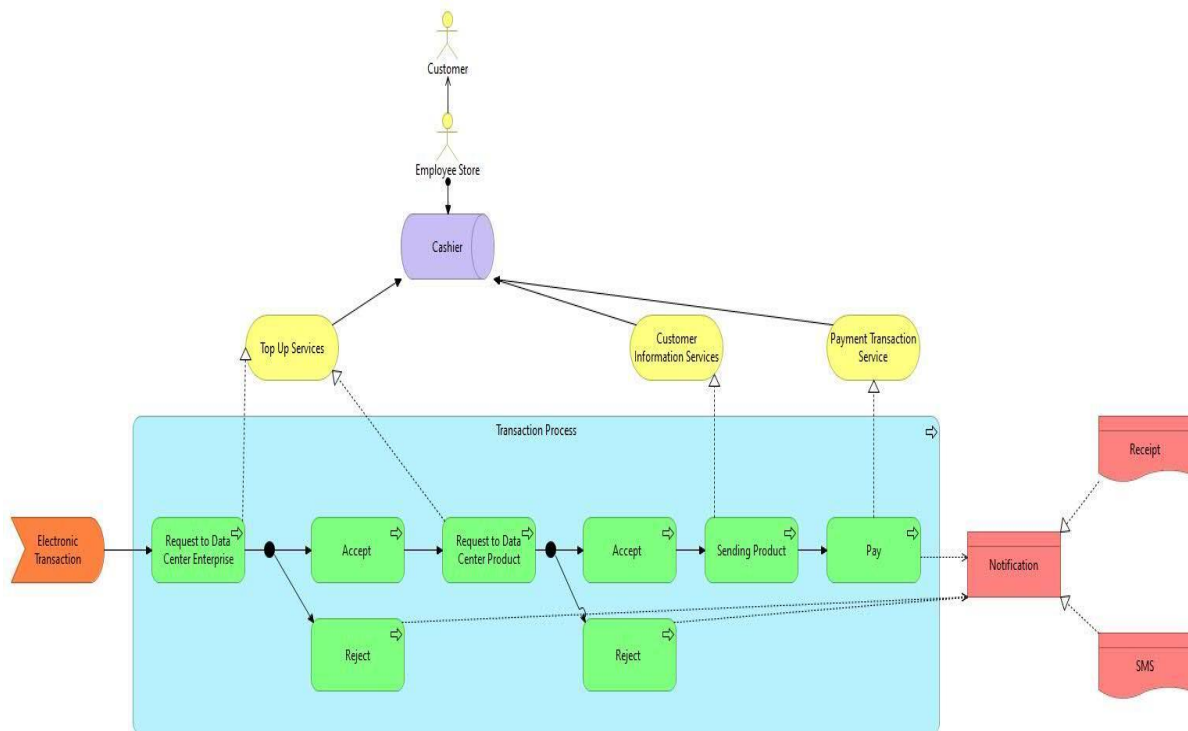

Figure 5. Company business process flow chart

Business process flow diagrams carried out at PT. Sumber Alfaria Trijaya Tbk. Figure 5. this diagram explains the business processes when a customer makes an electronic transaction at a store. The customer will ask the Employee Store who has a business role as a cashier (cashier). Cashiers have three roles as business services in this electronic transaction: Top Up Services, Customer Information Services, and Payment Transaction Services. From electronic transactions, requests will be made to enterprise data centers to fulfill the required services. From the data center, it will be received and directed to requests for related product data centers. Once received, the product will be sent to the customer through customer information services. If it has been received, payment will be made (pay). Payment Transaction Service will be provided when the customer has made a payment and will provide a notification in the form of a message. From every request to the data center, both enterprise and product, if there is a rejection, it means that the data center is experiencing a problem and will send a notification in the form of a message.
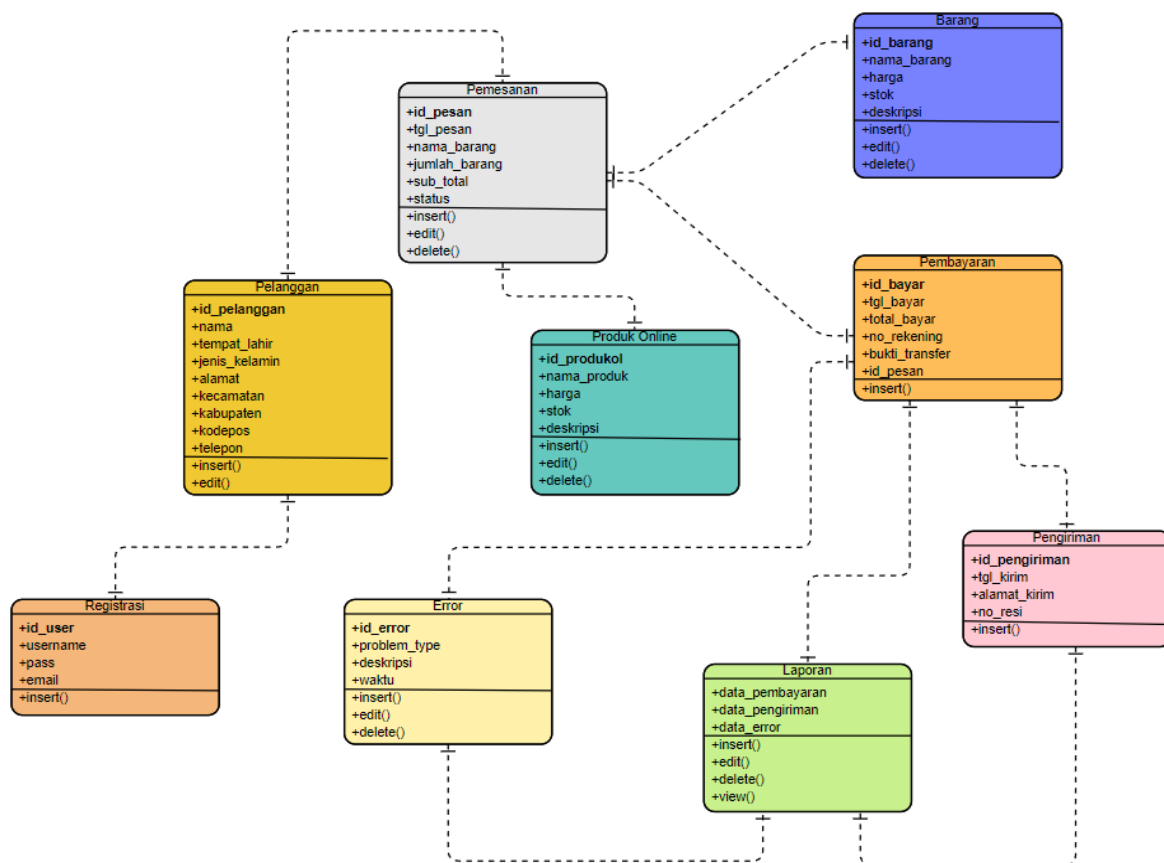
Information systems architectures

Figure 6. Diagram Data Logikal E-Transaction

Figure 6. use the proposed logical data diagram to improve the ERD (entity relationship diagram) system design for e-transactions used by PT Sumber Alfaria Trijaya, which will later be divided into 9 (nine) sections, namely 1) Registration is used to store personal data. 2) Reports store data related to goods, customers, orders, payments, and delivery. 3) Customers are used to storing data on applications. 4) Orders store data on applications related to ordering or purchasing goods. 5) Payment is used to store data in applications related to the activity of paying for goods that have been purchased or ordered. 6) Delivery is used to store data in applications. 7) Items are used to store data in applications. 8) Online products are used to store data in applications. 9) Errors are used to store data in applications related to problems or disturbances that occur.
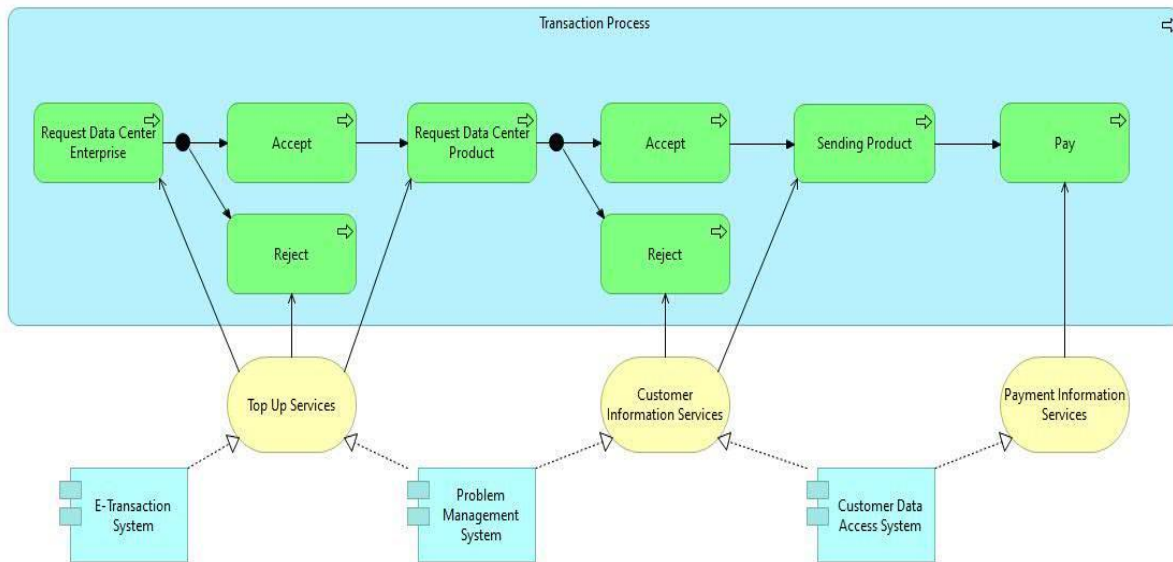
Figure 7. Diagram for transaction processing in e-transactions.

The proposed application usage diagram for processing transactions carried out in e-transactions. Figure 7. the diagram shows applications related to related systems: The E-transaction System, Problem Management System, and Customer Data Access System. Each system stores various types of corresponding data according to the services provided, proposed application usage diagram to support all existing business processes at Alfamart. Enterprise data center requests related to top-up services will then be included in application components related to the e-transaction system. Provide information to consumers when there is a rejection of a transaction made. When a rejection occurs, the application component has a problem management system that accommodates requests for rejection. Payments made will enter the payment transaction services included in the Customer Data Access System application system. The Customer Information Service will perform services related to the receipt of products received by customers, which are recorded in the Customer Data Access application system.
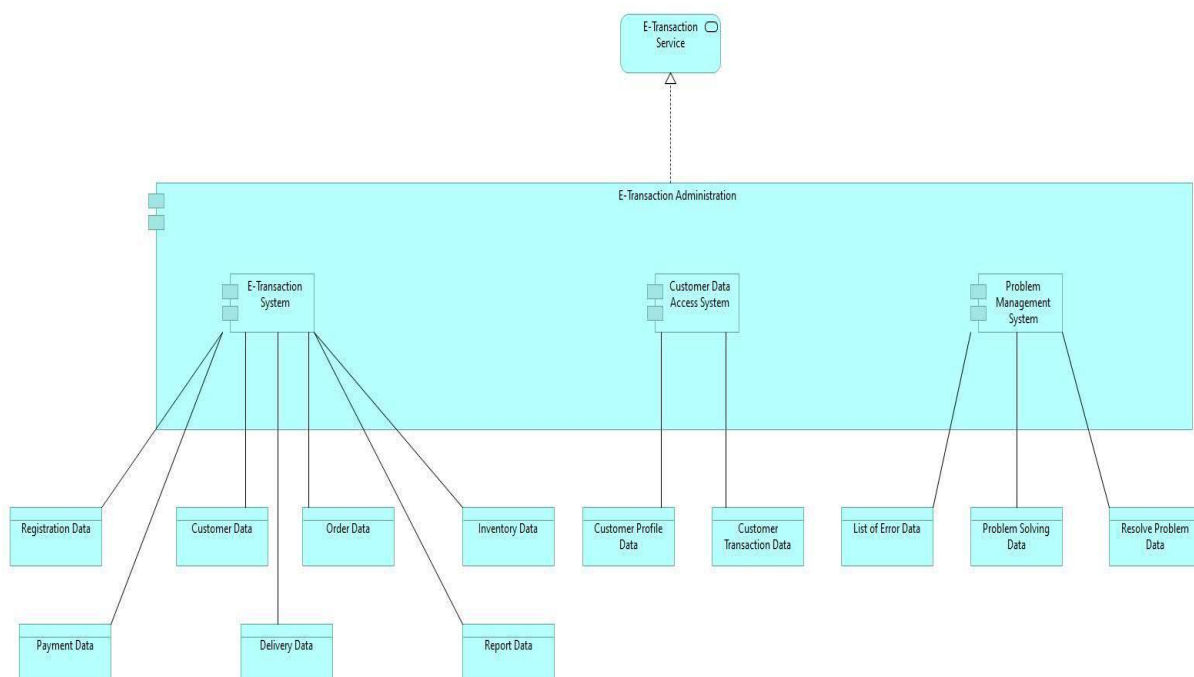

Figure 8. Application structure diagram of e-transaction services

Figure 8. the proposed application structure diagram for an e-transaction system with application components is divided into 2 data objects: customer profile data related to personal information from consumers and customer transaction data related to information about consumer transactions. The problem management system with application components is divided into several data objects, including a list of error data which contains data regarding errors that occur, problem-solving data which contains data regarding how to solve problems that occur), and resolves data problems that occur. It contains data about errors that have been resolved.
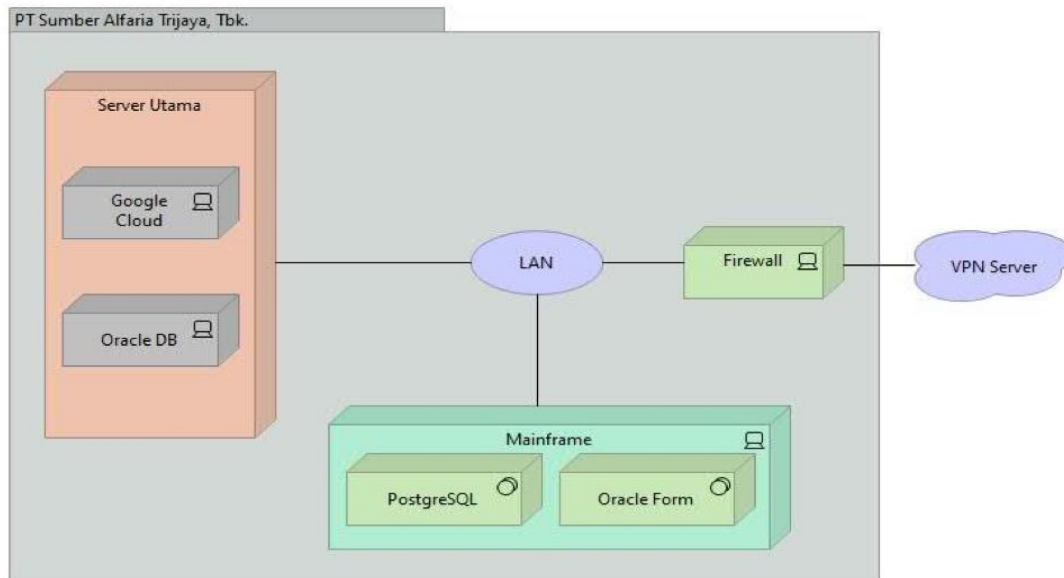
Technology architecture

Figure 9. Infrastructure diagram of applications and database

The proposed infrastructure diagram to meet application and database needs at PT Sumber Alfaria Trijaya, Tbk. Figure 9. the diagram illustrates the technology at PT Sumber Alfaria Trijaya, Tbk, which consists of three devices: the Main Source, Mainframe, and Firewall. Main Server as a database contains Google Cloud and OracleDB. The mainframe consists of two software systems, namely PostgreSQL and Oracle Form. In addition, there is a Firewall that acts as a server connected by a VPN Server. A LAN network connects all devices in the diagram at PT Sumber Alfaria Trijaya, Tbk.
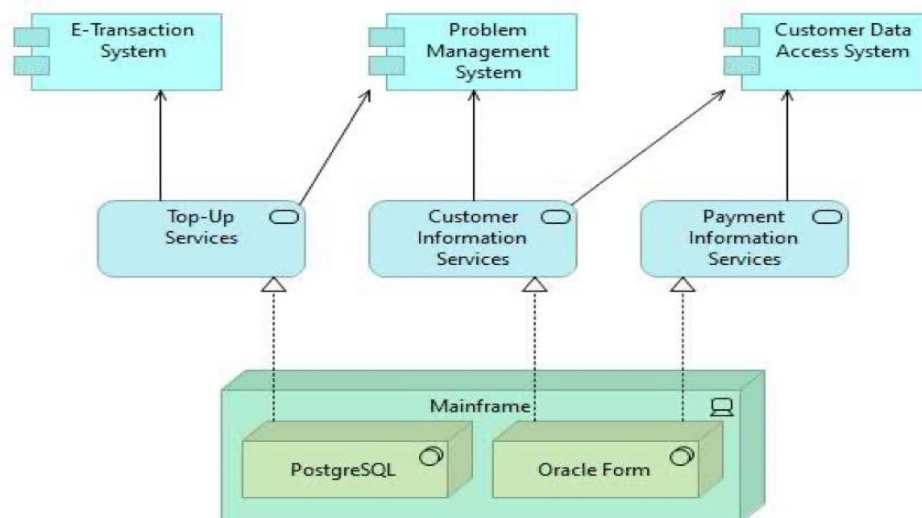

Figure 10. Infrastructure Usage Diagram

It is necessary to use its infrastructure to support the application used at PT Sumber Alfaria Trijaya, Tbk. Figure 10. the proposed infrastructure usage diagram at Alfamart is in the form of an application or information system layer and a technology layer. The diagram's application or information system layer consists of several application components, namely the E-Transaction System, Problem Management System, and Customer Data Access System. Infrastructure services will serve the application components, namely Top-Up Services, Customer Information Services, and Payment Information Services. All components in the service infrastructure will be realized by Mainframe in the form of two software systems consisting of PostgreSQL and Oracle Form.
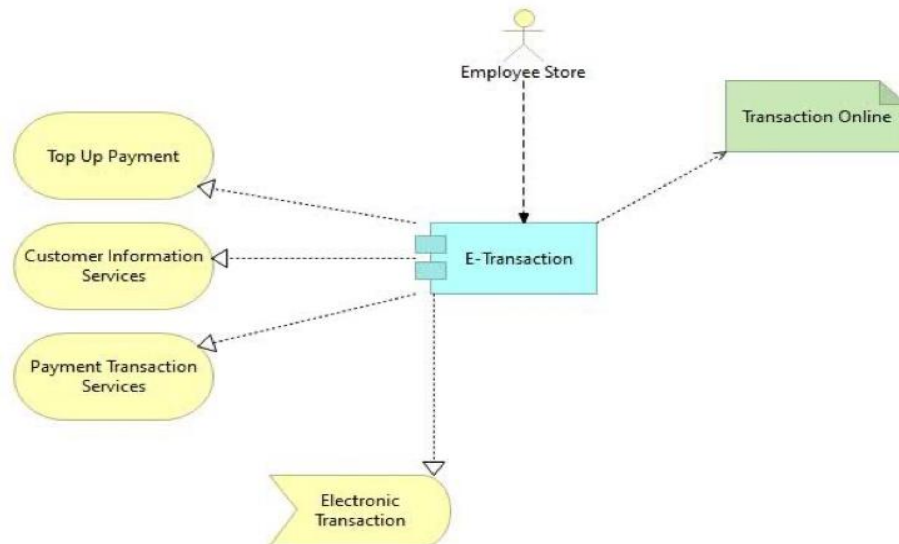
Opportunities and solutions

Figure 11. Context diagram of Electronic Transaction application components

Electronic Transaction application components proposed and used by employees of Alfamart stores (internally) to meet the needs of online transactions from customers in figure 11, such as purchasing credit or doing e-wallet top-ups as well as realizing business functions or services for top-up payments, customer information services, and payment transactions services and also realizing business processes from electronic transactions.
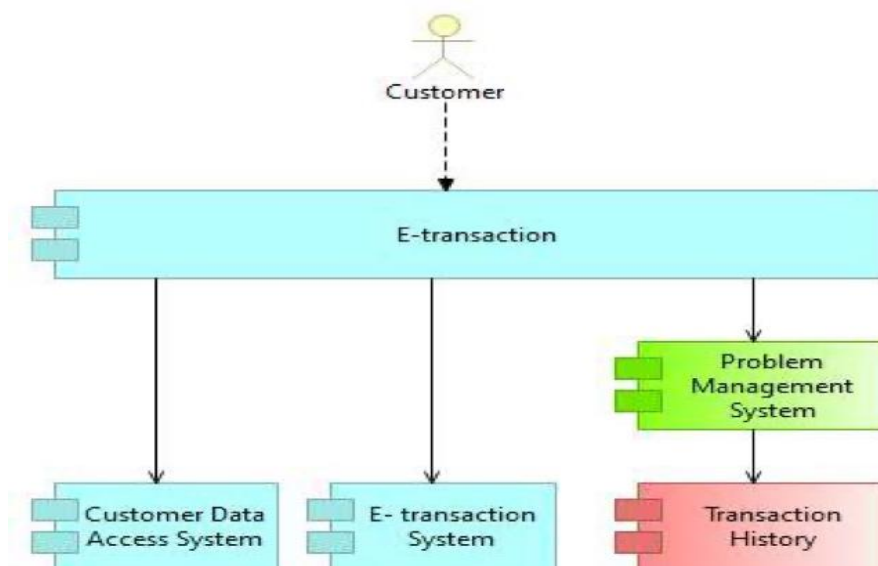

Figure 12. Diagram of benefits of Electronic Transaction application components

The proposed benefit diagram contains components for the Electronic Transaction application. In Figure 12, this component can further develop through 2 additional application components: the problem management system and transaction history.

Gap analysis

The gap analysis results between the initial architecture (baseline architecture) and the architecture to be implemented (target architecture) by PT Sumber Alfaria Trijaya, Tbk, among others, are in table 1.

Table 1. Gap Analysis Results of Initial Architecture and New Architecture

Comparison	Early Architecture	Recommended Architecture
Business	At the end of the transaction using the electronic application, the customer still gets a physical receipt from an employee at an Alfamart store or outlet.	At the end of the transaction using the electronic transaction application, the customer will be able to choose to print a physical receipt or send it in the form of a message (SMS) in the form of an e-receipt.
Application	At the End of the E-Transaction Application Has Features That Can Be Used To Print Receipts (Receipts) In Paper Form.	At the End of the E-Transaction Application, There Are Proposed Additional Features That Can Be Used To Print Receipts (Receipts) In Paper Form And The Form Of Messages (Sms) In The Form Of E-Receipts.
Data	The Electronic Transaction Application Does Not Have A Detailed Detailed Database Structure Related To Electronic Products And Goods And Does Not Have Error Reporting Data.	The Electronic Transaction Application Will Have a Detailed and Detailed Database Structure Due to the Separation Related to Electronic Products and Goods and Will Have Reporting Data for Problem Handling.
Technology	The database applied to Alfamart uses a physical database, which limits the access process to one place.	The proposed database for the future can use Google Cloud, so it can be accessed more easily anywhere and anytime using an internet connection.

CONCLUSION AND RECOMMENDATION

Conclusion

Enterprise Architecture redesign is carried out in terms of business, data, applications, and technology that require recommendations for improvements so that business processes can run more effectively and efficiently and can save in terms of company resources, changes in business processes will be aligned with the technological developments that are implemented. The application architecture of Electronic Transactions can print receipts according to the customer's choice, be it a physical receipt or an e-receipt that can be obtained via message (SMS). Data architecture that will be more detailed and detailed related to online products and also handling problems or errors in a transaction. The technology architecture can adjust the applied database to be more modern and up-to-date using Google Cloud so that it can be accessed flexibly using the internet and will reduce the vulnerability to loss of company-owned data.

Recommendation

Implementing a system that is recommended for improvement to the company as a reference and solution in architectural development and continuing to evaluate the stages of the TOGAF ADM, namely Migration planning, Governance Implementation, Architecture Change Management, and Requirements Management so that it can determine parameters to assess whether recommendations for architectural development in a company

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