

Architecture Design of E-Information System Marketplace with Method Enterprise Architecture Planning

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Abstract

Utilization of a technology indispensable information on SMEs because they develop information technology will be more complete and would affect ongoing business developments. At this time, not a few developments and development of information system technology have failed, this is because it is not following the goals and needs of these business people. One technique that can be used to build/develop information system technology is the existence of Enterprise Architecture Planning, where this technique is a technique used to approach data quality planning by looking at the needs of the SME business in Enterprise Architecture Planning will be explained about applications, data architecture, technology and a roadmap for the implementation plan of the architecture. SMEs cannot be separated from the need that can define business needs and even information architecture so that the direction of business development policy strategies can be well planned. Information technology architecture modeling in SMEs, including application definition, data architecture, technology, and implementation plan mapping. The process when defining information technology architecture is reviewed and refers to processes that are common in the business of implementing E-Marketplace applications, especially in SMEs. The results of the research will produce a mapping of implementation plans that can be used as a reference in the development of an application to support the business functions of SMEs.

Keywords

enterprise architecture planning;
application architecture and
technology architecture; data
architecture; information
systems



I. Introduction

Currently, business competition is getting tougher and in strengthening the business, advertising media can be used to market their wares. The rapid development of technology in the last decade has made the shift of advertising and marketing media to media internet. Internet is one of the main facilities in the world of electronic business. Internet-based electronic media for business people is not a foreign word for business people in the modern era. The development of computer and telecommunications technology today with all the changes in managing the business in the era of globalization has changed the internet as a very promising medium of interaction. Its existence not only offers convenience for business people in carrying out daily business activities but furthermore, it is even able to provide many benefits for the development of the industry where the related business is located. One of the things that can be produced with the internet is the formation of a digital market (e-market). If in the real world buyers and sellers can meet in conventional markets, then in the digital world they meet on the internet. Digital marketing is considered effective to be applied by MSMEs in marketing their products (Gunawan and Sulaeman, 2020). The purpose of using media internet is to help provide a quick and

precise introduction to a product regardless of space or time. At this time, there are many systems emerging e-commerce in Indonesia that make SMEs in Indonesia with minimal capital unable to compete with SMEs that have large capital and can promote their products through their E-Commerce system. Given the price of making E-Commerce which is quite expensive, in this case, we want to create a system that can support all SMEs in Indonesia so that they can sell their wares through electronic media without having them create or have a sales system e-commerce from a store themselves. The system is a system E-Marketplace where every SME as a seller can transact with prospective buyers very easily without having to have their E-Commerce system.

II. Review of Literature

2.1 Architecture

Understanding architecture is not only limited to a general understanding related to conventional construction but also in the business context and architecture for software engineering, here are some definitions related to architecture:

1. Architecture is a component of a system consisting of a structured network, hardware, and software.
2. The design of all types of constructions, both conventional and contextual, real or digital. From this understanding, it can be concluded that architecture can describe the form of a construction system that is embodied in a model that is seen from several points of view.

2.2 Enterprise

There are several meanings of Enterprise, here is the definition of enterprise, namely:

1. Organizations that support the scope of the business and the applied mission.
2. Each set of businesses has a common purpose or principle or a baseline. In this sense, it can be in the form of an entire corporation or a division of the corporation, or a business network with different geographies related to certain goals. From the above definition, it is concluded that the enterprise is not only a profit-oriented business but also a non-profit organization.

2.3 Enterprise Architecture Planning

Enterprise Architecture Planning also known as EAP, is a method where the approach to data quality planning is oriented to business needs and how to implement the architecture in such a way as to support the business cycle and the achievement of information system content and organization. Enterprise Architecture Planning is not to design the business architecture, but to define the business needs of the architecture. In Enterprise Architecture Planning, the architecture there describes the applications, data, and technology needed to support the organization's business. The development stage of Enterprise Architecture Planning is the stage to start and understand the current conditions and the future vision stage, even the stage to draw up a plan to achieve a future vision.

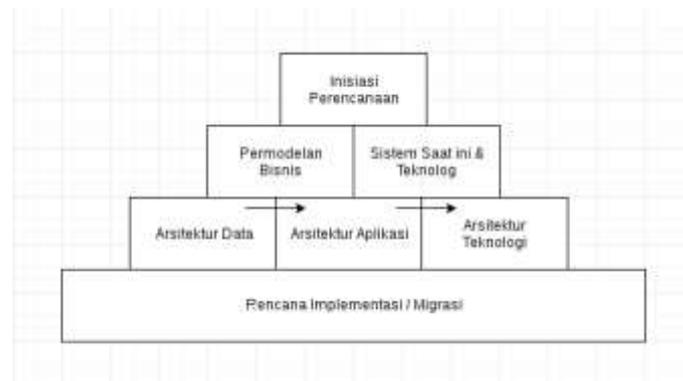


Figure 1. Components of EAP

2.4 Porter's Value Chain Model

Porter's Value chain the business modeling stage using the Porter Value Chain. Business modeling is the process of defining the business itself. The function of Porter's value chain according to Michael E. Porter is to define a way of seeing a business in a series of activities that turn inbound into outbound so that it has value for customers. The chain consists of a series of activities that create and build a value that can result in a difference of added value for the business. The figure below shows the Porter Value Chain, which consists of the main activity or Primary Activity and Support Activity.

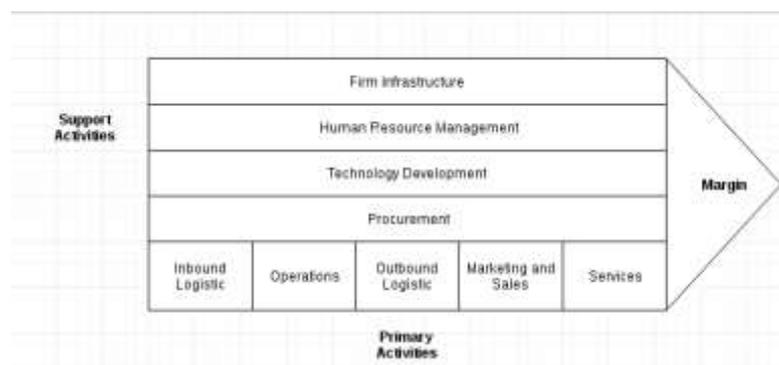


Figure 2. Porter's Value Chain Diagram

2.5 Four Stage Life Cycle Business System Planning

Four Stage Life Cycle is an application that can be used to find derivatives of each business function related to the products or services provided to that business function. Four stage life cycle in BSP can be used at the stage of defining business processes. There are four cycles used, namely:

1. Phase I, Requirements, measurement, planning, and control, namely activities that determine how much product or service is needed, as well as plans to get them and control measurements related to the plan.
2. Phase II, Acquisition Activities that are formed to develop products or services to obtain resources that will be used in development activities.
3. Phase III, Stewardship Activities that can shape, modify, sharpen and maintain support resources and store and track products or services.
4. Stage IV, Retirement / Disposition Activities or final decisions of business responsibility for a product or service that can state the end of the use of resources.

2.6 Internet

Interconnection Networking or commonly known as the internet is an open communication network that connects billions of computer networks with various types of devices. Initially, the internet was developed by the United States Department of Defense in 1969 on a project known as the ARPANET. This mission was initially only for the military, but continues to grow and can be enjoyed by all circles.

2.7 Website

Website is defined as a collection of pages that display various types of data information, text, still or moving images, sound, animation data, video, or a combination of all of them, both static and dynamic which form a series of the same building-related each is linked by a hyperlink.

Types of websites are divided into three types, namely as follows:

1. Static website is a website that has pages that do not change, which means making changes to a page can only be done manually by changing the code that becomes the structure of the website.
2. A dynamic website is a website that is structurally intended to make changes as often as possible which is usually in addition to being accessible by users in general, there is also a backend/administrator page to make changes to the website content.
3. An interactive website is a website that allows users to interact with each other such as a discussion forum on a website.

2.8 Web Service

Web service according to w3.org can define a web service as an application that can be identified at a URL and has an interface that is defined, described, and understood by XML and also supports direct interaction with other applications using XML-based messages via protocols internet. Web service can also be defined as an application that is not affected by the platform, it will provide methods that can be accessed by the network. He also uses XML to exchange data, especially on 2 different business entities. In a simple definition, an XML web service can be defined as an application that can be accessed by other applications. Some people may think that a web service is the same as a website, but no, because there are many differences between a web service and a website. The differences are as follows:

1. The website has a web interface but the web service does not have a good interface.
2. Websites are made to interact directly with users, but web services are made to interact directly with other applications, both with different OS and different concepts.
3. Websites are made to work on web browsers, but web services are made to work on all types of client-side applications/devices.

The characteristics of the web service are as follows:

1. Message-based.
2. Standards-based.
3. Programming language independent
4. Platform neutral

Some of the key standards in web services are XML, SOAP, WSDL, and UDDI.

1. SOAP (Simple Object Access Protocol) is an XML-based markup language to replace messages between applications. SOAP is useful as an envelope that is used to exchange data objects on a network.
2. WSDL (Web Service Description Language) is an XML-based language to describe XML. WSDL provides services that describe service requests using different protocols

and encodings. WSDL facilitates communication between applications. WSDL defines a service as a collection of network endpoints.

3. UDDI (Universal Description Discovery and Integration) is a service registry for web service allocation. UDDI combines SOAP and WSDL to form a registry API for service registration and recognition. UDDI provides a common area for businesses to advertise their presence and services provided (web services).

2.9 API (Application Programming Interface)

Application Programming Interface or commonly called API is a set of functions, commands, and protocols used by programmers when building software for a particular operating system. APIs allow a programmer to use standard functions to interact with other operating systems (Wikipedia).

The advantages of making programs using the API are:

1. Portability, programmers who use the API can run the program on any operating system as long as the API has been installed.
2. Easier to understand, the API uses a language that is structured and easy to understand compared to a system call language. This is important in terms of making changes and developing.

2.10 Web Server

Web Server is an application that provides data-based services and can function to receive HTTP and HTTPS requests on clients known as web browsers and to send back the results in the form of web pages. In general, the page will be in the form of an HTML (Hypertext Markup Language) document. In a simple form, the webserver will send HTML data to the web browser request so that it will produce a website display.

The function of the webserver is to transfer user request files through a communication protocol that has been determined in such away. The requested web consists of files, text, videos, images, files, and others.

2.11 Database

The database consists of 2 words, namely Base and Data. The base can be interpreted as a headquarters or warehouse, a nesting or gathering place. While data is a representation of real-world facts that can represent an object such as humans (students, employees, buyers, customers), goods, concepts, events, circumstances, and so on recorded in the form of symbols, numbers, letters, text, images, sounds or a combination thereof. (Ir, Fatansyah, 1999:2).

2.12 Web Browser

A web browser is a program or application that is used to surf the internet and even to find information from a web that is stored on a computer. Initially, web browsers were text-oriented and could not display images. But now web browsers are capable of displaying images, videos, sounds, files, and others. Web browsers can also send and receive an email, manage HTML as input and make web pages as output. The function of the web browser is to display and interact with documents provided by the webserver between the user and the server.

2.13 E-Marketplace

The marketplace is an-based digital media internet (web-based) as a place to conduct business activities and transactions between buyers and sellers. Buyers can find as many

suppliers as they want, so they get results according to market prices. Meanwhile, suppliers or sellers can find out which businesses need their products or services. The marketPlace is a type of E-Business that deals with sellers and buyers (seller & buyer). MarketPlace in Indonesia is one of the digital media as a driver of the national economy to face the era of globalization. For this reason, it is necessary to develop a fair, regular, and efficient system. In general, an efficient MarketPlace can increase investment in business and make it easier to input and output goods.

III. Research Methods

The methodological approach when compiling enterprise architecture planning and technology architecture is with the following stages:

1. Problem formulation

This stage is important in research because all research flows will be guided by the formulation of this problem, without any problem formulation, the researcher will lose direction.

2. Literature Study

At this stage, the researcher conducts what is called a literature review, namely studying reference books and the results of previous similar studies that have been carried out by previous researchers, the goal is to get a theoretical basis on the problem under study. The theory is a reference for researchers to understand the problem correctly and following the scientific framework.

3. Initiation of planning

This stage consists of determining the methodology used, who will be involved, and what application will be used, the result of the initiation of planning is a work plan for Enterprise Architecture Planning and management's commitment to be able to proceed to the next stage.

4. Business modeling

This stage compiles and builds a knowledge base about a business and the information used by the business today.

5. Making Data Architecture

Stages that describe the data needed for business people.

6. Making Application Architecture

Defines what applications are needed to process data and support business functions.

7. Making Technology Architecture

Defines the technology that should be used to process data and can support business functions.

8. Implementation Plan

Defines application implementation, implementation schedule and proposes migration from the current state to the desired state.

IV. Discussion

The method used in designing this system E-Marketplace is Enterprise Architecture Planning (EAP) which has the following stages:

4.1 Planning Initiation

Following are the stages carried out in the planning initiation phase, namely:

a. Defining the Scope and Goals of EAP

The definition of the scope of EAP work is based on the scope of research, namely the business function of designing E-Marketplace and producing an EA model consisting of model data, applications, and technology.

b. Defining Vision

The vision of creating an E-Marketplace is “To become an E-Marketplace that can protect and become the best SME partner in Indonesia”. Based on this vision, the vision of developing an information system must be able to support the achievement of the vision of making the E-Marketplace. Therefore, the vision of developing an information system is formulated as follows: "Building E-Marketplace an integrated System with the needs of SMEs supported by information technology to support the welfare of Indonesian SMEs".

c. Selection of Planning Methodology Approach

Based on research method in Enterprise Architecture modeling, this research consists of EAP methodology which consists of:

4.2 Business Modeling

4.2.1. Identification of Main Business Areas

Based on the Michael Porter value chain concept, the main functional areas for the business model E-Marketplace can be grouped into its main activities consisting of collecting and listing SME data, selling products from SMEs, and matching sellers and buyers. And the second is supporting activities are company infrastructure, HR management, and financial management.

The main activities can be described as follows:

1. Reception and data collection of SMEs is a process where the system E-Marketplace collects data on SMEs that register on the website automatically. Furthermore, these SMEs can market their products through the website E-Marketplace that we created.
2. Sales of products from SMEs is a process where SMEs who have registered sell products and are included in this website E-Marketplace.
3. Bringing together sellers and buyers where this process is done manually by the buyer, meaning that buyers can easily search for products sold by the seller and suitable according to the buyer.

Supporting activities can be described as:

4.2.1.1. Human resource management is a supporting activity for determining the needs, monitoring, and allocation of human resources.

The human resource requirements for the creation of the system E-Marketplace are as follows:

Table 1. Human Resources

SUMBER DAYA MANUSIA		41
IT	Head IT	1
	Web Administrator	1
	System Administrator	1
	Web Designer	1
	Programmer (PHP, Android, iOS)	6
	Network Engineer	1
	Security	1
	System Analyst	1
	SEO Engineer	1
Marketing	Head Marketing	1
	Partner Relation	6
	Advertising	1
	Ard Director	1
	Artist	4
	Copy Writer	2
Supporting	Customer Service	6
	Admin Officer	2
	Account	1
	Finance	2
	General Affair	1

Job Desk From each human resource are as follows:

Head of IT

1. Manage information technology and computer systems.
2. Responsible for the availability of applications/systems in the company.
3. Planning the manufacture of company support applications.
4. Designing, managing, supervising, and evaluating the operations of information and support systems.
5. Create and implement IT policies and procedures including IT security.
6. Create and oversee IT budgets.
7. Provide information technology solutions.
8. Responsible for providing information technology infrastructure services.
9. Provide recommendations on information technology solutions.
10. Design and create an IT DRP (Disaster Recovery Plan)
11. Provide orientation to new employees about information technology in the company.
12. Provide direction to subordinates regarding the use and solutions of information technology.
13. Supervision and maintenance of information technology.
14. Provide reports to the president's director.

System Analyst

1. Determine the scope of the system.
2. Gather facts.
3. Analyze the facts.
4. Communicating findings through system analysis reports.
5. Designing a system to be built to support the company's performance.
6. Conduct an audit of the system that has been created.
7. Responsible for system analysis not only on making computer programs but on the whole system.
8. Work in programming is only limited to solving problems in outline.
9. Communicate with everyone not only between programmers but also to system users and managers.

Web Administrator

1. Updating and/or changing website content if necessary.
2. Monitoring website traffic.
3. Perform maintenance on the website if there is a web technical problem.
4. Supervise traffic from customer service and management.
5. Provide solutions for website development.
6. Provide reports to the head of IT.

System Administrator

1. Design and install hardware and software on the server.
2. Define and identify the attributes used by users.
3. Document the server system configuration.
4. Maintain the security level of the server system.
5. Perform server performance tuning.
6. Ensure optimal and good server performance system
7. Perform server software and hardware audits.
8. Monitoring server performance.
9. Back up and restore data on the server.
10. Identify threat problems and respond to issues related to the system.

Web Designer

1. Designing a layout concept.
2. Design the layout visually.
3. Convert the layout to HTML and CSS.
4. Create a Markup (HTML) structure.
5. Create a website design that can be easily accepted by the public.
6. Make design improvements if necessary.
7. Designing banners, advertisements, placing advertisements, placing products, content on the website.

Programming

1. Build and develop applications, especially at the construction stage by coding with the specified language.
2. Implement requirements and business process design to a computer using logic/algorithms and programming languages.
3. Provide training to users if needed.

4. Testing the application if necessary.

Network Technician

1. Perform network monitoring and the threat of problems and increase data traffic significantly.
2. Troubleshoot problems experienced by users.
3. Analyze network traffic.
4. Make planning and network topology to make troubleshooting easier.
5. Apply network security.
6. Make bandwidth management for each division.
7. Remote support and also on-site support.

SEO Engineer

1. Embed links to websites that have high/high traffic.
2. Write original content that is very SEO friendly so that link baiting can be done between one article and another.
3. Searching for keywords, optimizing page content, researching keywords, and looking for link-building strategies.
4. Manage and monitor the performance of the SEO team and optimize the website e-Marketplace.
5. Report the results of keyword research, link building, content, and other SEO strategies.

IT Security

1. Provide an understanding of the security of information systems and networks.
2. Identifying potential security threats to information systems.
3. Perform testing on the security system of an information system.
4. Evaluate and develop solution approaches related to information systems and network security.
5. Implement security system solutions on information systems.

Provide in-depth understanding of the system and network security to network engineers and system administrators.

4.2.1.2. Financial management is a supporting activity related to efforts to provide financial management support for the allocation of operational costs E-Marketplace.

4.2.1.3. Infrastructure management is an activity that starts from planning the needs of facilities and equipment for the management of E-Marketplace.

If described in the Porter Value Chain is as follows:



Figure 3. Porter Value Chain

4.2.2. Business Functions E-Marketplace

To find out the cycle description of each business function, the business functions will be described in more detail using the Four Stage Life Cycle tools, which can be illustrated from the following table:

Table 2. Business Functions E-Marketplace

Fungsi / Stage	Requirement	Acquisition	Stewardship	Retirement
Penelitian dan Pendataan UKM	Perencanaan Strategi pengumpulan dan pendataan UKM	1. Perencanaan pendataan UKM 2. Perencanaan promosi anggaran 3. Penetapan anggaran promosi 4. Penetapan cara promosi 5. Penjadwalan promosi 6. Penetapan strategi promosi 7. Pembuatan laporan UKM Pendistribusian data UKM	1. Pelaksanaan Protokol pendaftaran UKM 2. Penemuan selektif UKM 3. Pelaksanaan seleksi UKM Pelaporan data UKM	Registrasi UKM baru sebagai anggota di E-Marketplace
Perjualan Produk dan/atau barang dari UKM	Perencanaan pengembangan promosi dan kebijakan produk standar penjualan yang harus diterapkan	1. Perencanaan penjualan produk 2. Perencanaan promosi produk 3. Penetapan anggaran promosi produk 4. Penetapan cara promosi produk 5. Penjadwalan promosi produk 6. Penetapan strategi promosi baru untuk proses penjualan dan/atau kebijakan untuk produk yang akan dijual Penetapan produk yang diizinkan untuk dijual	1. Penentuan data produk dari UKM 2. Seleksi data produk UKM 3. Perijinan data produk yang dapat dijual 4. Penetapan data produk ke publik 5. Pelaksanaan promosi produk Pelaporan data produk	1. Penjualan produk 2. Promosi dengan SEO Laporan penjualan Produk
Mempertemukan Penjual dan pembeli	Perencanaan Strategi proses pertemuan penjual dan pembeli	1. Pembuatan form pendaftaran member/pembeli 2. Pelaksanaan penjualan 3. Perencanaan diskon 4. Penetapan ketentuan diskon Penjadwalan pelaksanaan diskon	1. Pelaksanaan diskon 2. Pengembangan kualitas produk 3. Mengetahui penyelesaian produk yang akan diberikan kepada pembeli 4. Pelaksanaan diskon	1. Langgan Trafik E-Marketplace yang tinggi

4.2.3. Business Function Hierarchy Chart the E-Marketplace

Business function hierarchy chart of the E-Marketplace is as follows:

4.2.3.1. SME Reception and Data Collection

This activity focuses on managing SME receipts and data collection until SMEs can be accepted as members and can sell on this system E-Marketplace.

- 1.1. SME Reception and Data Collection Plan
 - 1.1.1. Determination of the SME registration team
 - 1.1.2. Determination of opening registration of SMEs
 - 1.1.3. Creating an SME registration form
 - 1.1.4. Announcement of opening registration of SMEs
- 1.2. Promotion
 - 1.2.1. Market research
 - 1.2.2. Determination of promotion budget
 - 1.2.3. Determination of promotion method
 - 1.2.3.1. Real promotion using banners, billboards, brochures, and other print media.
 - 1.2.3.2. Promotion through cyberspace, using social media advertisements, advertisements on news websites, advertisements on websites with large traffic.
 - 1.2.4. Determination of promotion strategy
 - 1.2.5. Implementation of promotion
- 1.3. Selection of SMEs
 - 1.3.1. Determination of the terms and conditions for becoming a member of SMEs in the E-Marketplace.
 - 1.3.2. SME selection process
- 1.4. SME Registration

4.2.3.2. Sales of Products and/or Goods from SMEs

- 2.1. Promotional development planning and policies on sales standards that must be applied
 - 2.1.1. Determination of terms and/or policies for products to be sold
 - 2.1.2. Determination of products that are permitted to be sold on the E-Marketplace
 - 2.1.3. Licensing product data that can be sold
- 2.2. Product promotion
 - 2.2.1. Product promotion planning
 - 2.2.2. Determination of product promotion budget
 - 2.2.3. Product promotion scheduling
 - 2.2.4. Determination of new promotion strategy for sales system
 - 2.2.5. Implementation of promotion
- 2.3. Product sales
 - 2.3.1. Receipt of product data from SMEs.
 - 2.3.2. Selection of SME product data
 - 2.3.3. Issuance of product data to the public
 - 2.3.4. Implementation of product promotion
 - 2.3.5. Product sales report

4.2.3.3. Bringing Sellers and Buyers Together

- 3.1. The strategic planning process brings together sellers and buyers.
 - 3.1.1. Making member/buyer registration form
 - 3.1.2. Discount planning for certain products
- 3.2. Making discounts
 - 3.2.1. Determination of discount conditions
 - 3.2.2. Scheduling of product discounts

- 3.2.3. Implementation of product discount program
- 3.3. Sales Process
- 3.4. Subscription to E-Marketplace
- 3.5. Traffic E-Marketplace high

4.2.4. Data Architecture

Following are candidate entities for the creation of a system E-Marketplace:

Table 3. Data Architecture

NO	ENTITAS DATA	NO	ENTITAS DATA
Pegguna		Produk	
1	Pegguna	60	Produk
2	Grup pegguna	61	Tambahan produk
3	alamat pegguna	62	Atribut produk
4	ip pegguna	63	Deskripsi produk
Customer / Member		64	Diskon produk
5	Pelanggan	65	Filter produk
6	Aktivitas pelanggan	66	Gambar produk
7	Grup pelanggan	67	Pilihan produk
8	Deskripsi grup pelanggan	68	Deskripsi pilihan produk
9	Ip pelanggan	69	Pertanyaan produk
10	Login pelanggan	70	Relasi produk
11	Pelanggan online	71	Hadiah produk
12	Hadiah pelanggan	72	Produk spesial
13	Transaksi pelanggan	73	Kategori produk
14	Wishlist pelanggan	74	Produk pelanggan
15	Fraud ip pelanggan	75	Berat Produk
16	API pelanggan	76	Deskripsi berat produk
17	API ip pelanggan	77	Statistik produk
18	API session pelanggan	78	Pemasaran produk
19	Kota pelanggan	79	Keyword produk
20	Negara pelanggan	Pembayaran	
21	Toko pelanggan	80	Tujuan pembayaran
22	Deskripsi toko pelanggan	81	Metode pembayaran
23	Alamat toko pelanggan	82	Konfirmasi pembayaran
24	Foto toko pelanggan	83	Pemilihan pembayaran
25	Domain toko pelanggan	84	Mata uang
26	Shipping toko pelanggan	85	Kupon
27	History toko pelanggan	86	Kategori kupon
28	Rekening toko pelanggan	87	Kupon produk
29	Pesan pelanggan	88	Voucher
30	Kategori pesan pelanggan	89	Voucher history
31	Favorit toko pelanggan	90	Tema Voucher
32	Pemberitahuan pelanggan	91	Deskripsi tema voucher
33	Komplain pelanggan	92	Statistik pembayaran
34	Kategori komplain pelanggan	Pemesanan	
35	Chat pelanggan	93	Pemesanan

	Manufaktur	94	Pemesanan custom
36	Manufaktur	95	History pemesanan
37	Kategori Manufaktur	96	Pilihan pemesanan
38	Alamat Manufaktur	97	Pemesanan produk
39	Manufaktur keyword	98	Pemesanan berulang
	Website	99	Deskripsi pemesanan berulang
40	Shipping	100	Status pemesanan
41	Deskripsi shipping	101	Total pemesanan
42	Rekening Bersama	102	Voucher pemesanan
43	Deskripsi rekening bersama	103	Statistik pemesanan
44	Website URL	104	Keranjang pemesanan
45	seo setting	105	Kota pemesanan
46	website chat	106	Negara pemesanan
	Blog & Banner	107	shipping pemesanan
47	Blog artikel	108	Type pemesanana
48	Deskripsi blog artikel		
49	Banner		
50	Gambar banner		
51	Deskripsi gambar banner		
52	Informasi		
53	Deskripsi informasi		
54	Layout Informasi		
55	Informasi toko		
56	Bahasa		
57	Event		
58	Kategori Event		
59	Deskripsi Event		

4.2.5. Application Architecture

Designing application architecture aims to define the main types of applications needed to manage data and support business functions in an enterprise. The application architecture does not design the system but defines what applications will process the data and provide information to users related to the business. The following is a description of the application candidates that must be formed in the system E-Marketplace:

1. Product and/or goods management application;
2. User management application;
3. Financial management application;
4. Catalog management application;
5. Category management application;
6. Language management application;
7. Banner management application;
8. Ad management application;
9. Search engine optimization management application;

10. Content management applications;
11. Blog management application;
12. Event management application;
13. SME and buyer management applications;
14. Payment management applications;
15. Notification management application;
16. Message management application;
17. Customer service management application (chat/phone);
18. Application for SME registration selection management;
19. Sales application;
20. Application for wholesale sales;
21. Buyer's shopping cart application;
22. Buyer wish list application;
23. SME data report;
24. Product data report;
25. Payment data report;
26. Sales data report;
27. Seller and buyer response reports;
28. Financial reports;
29. Buyer data report;
30. Order report;
31. Goods delivery report;
32. Information system of terms and conditions for registration of sales products, sales products, and registration of SMEs.

4.2.6. Technology Architecture

At this stage, the technology architecture development is carried out to define the main objectives of the technology needed to support applications in handling data. The following is a proposed technology architecture for the development of the system E-Marketplace:

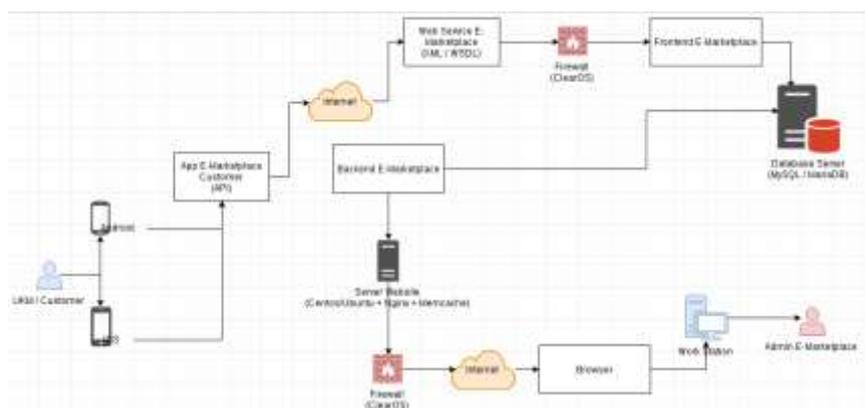


Figure 4. Mobile Application Flow Architecture Candidate

When a customer and/or accesses the E-Marketplace using an application that has been provided by the marketplace, the customer and/or SME will be directed first to a web service that has been created by the programmer. Where the web service is made to make access to the application, -E-Marketplace Android and/or iOS-based can open the frontend page and backend page from the website E-Marketplace. After the customer and/or SMEs

manipulate their data, for example, if the customer makes a purchase transaction, the website will automatically notify the UK that there are goods from the UK who are interested in buying it. The task of the administrator here is to control and/or monitor the process of buying and selling between SMEs and these customers. As well as managing and manipulating all problems on the website E-Marketplace, such as changes to content, changes to terms and conditions, and others.

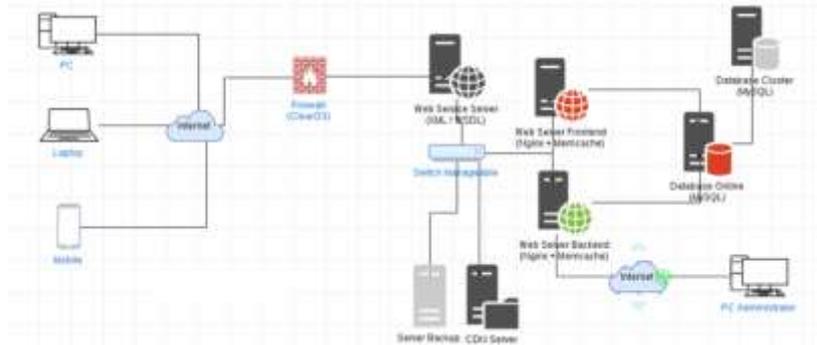


Figure 5. *Technology Architecture Candidates*

Assuming all servers are in the data center and renting a colocation. The infrastructure components above will be explained as follows:

1. Firewall using ClearOS, ClearOS previously named ClarkConnect is a Linux distribution based on the community version of CentOS (Red Hat Enterprise Linux (RHEL)), designed to be used as a network gateway and network server with an interface. Web-based. And now clear is widely used as a Firewall.
2. Web service is used for communication between applications which is usually used for customers and/or SMEs who access the web using a mobile device with an intermediary mobile application. Web services can be adapted to the needs of the mobile application itself, for the Android operating system usually uses XML.
3. For the frontend and backend servers themselves, it is recommended to use CentOS Linux distro for the operating system and use Nginx as the webserver and Memcache as the cache for the frontend and backend servers. If you want to use a paid application, you can use Red Hat as the operating system and Litespeed as the webserver.
4. CDN (Content Delivery Network) can use the paid version of AWS or you can create your own on a server that can still be used.
5. Online databases can use MySQL and/or MariaDB as free databases. All database clusters are formed as local database backups.
6. Server Backup is used for emergencies if the main server is down, all application backups must go to the backup server. So that when the main server is down, the backup server can work immediately and the process E-Marketplace continues to run smoothly.

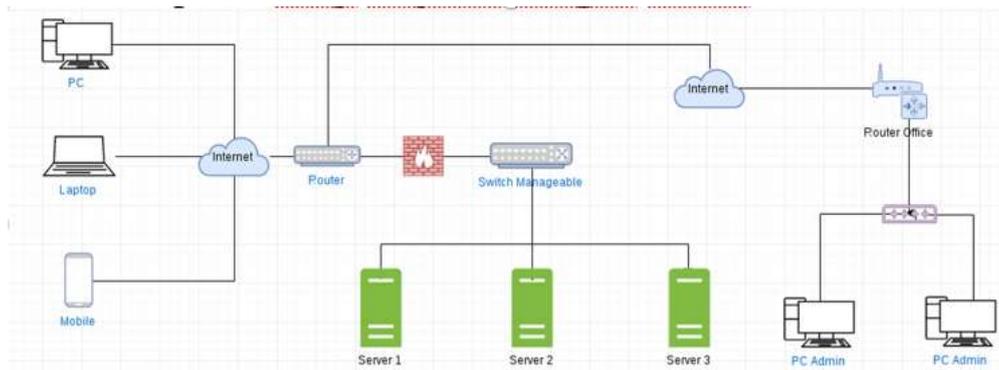


Figure 6. Candidate Network Topology

In this network topology, it is seen that only three servers are used to form a system E-Marketplace. Why three servers, because I see three servers are not being used at this time with a capacity that I think is qualified to be used as a server E-Marketplace. For more details, the roles of each server are as follows:

1. We can virtualize Server 1 as follows:
 - a) Website frontend server E-Marketplace;
 - b) CDN Server website *E-Marketplace*;
 - c) Server web service aplikasi *E-Marketplace*;
2. We can virtualize Server 2 as follows:
 - a) Website backend server E-Marketplace;
 - b) Online database (MySQL and/or MariaDB);
 - c) Email server *E-Marketplace*;
3. Server 3 can be virtualized as follows:
 - a) Database Cluster from online database E-Marketplace as well as database backup
 - b) Server backup from web service, frontend, backend, database, and CDN server.

Based on the infrastructure allocation table above, it can be ascertained that by using three servers that will be used as virtual machines, it can be calculated as follows:

1. Server 1 handles frontend server virtualization, CDN servers, and web services, so server 1 must have 8 core processor specifications that are shared to each virtual, with 64GB RAM and 16TB storage capacity.
2. Server 2 handles backend server virtualization, online database, and email server, so server 2 must have 8 core processor specifications which are shared with each virtual machine, with 24GB RAM and 4TB storage capacity.
3. While server 3 handles backup problems, here server 3 handles backups of all applications and websites as well as database cluster backups which must have 8 processor core specifications with 32GB RAM and 10TB storage capacity.

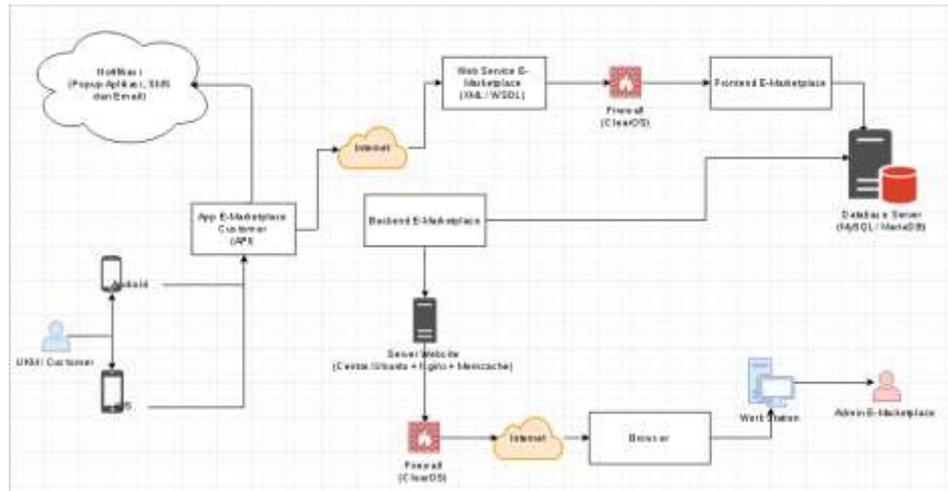


Figure 7. Topology Addendum of Topological Architecture Candidates

1. When an SME owner installs the application E-Marketplace that we have created, the SME owner is automatically required to register as an SME member on our E-Marketplace. After becoming a member of the SME owner, they can easily and easily publish the products they sell on this E-Marketplace. SME owners can easily publish their products through mobile applications that are usually installed on their cellphones by entering some pictures and descriptions of the products they sell. They can also publish their products through the website E-Marketplace using computers, laptops, and other desktop devices. Products that have been uploaded to the website E-Marketplace will be checked first, have complied with the applicable provisions or not, if they are, they will be published on the website by the web administrator, if not, they will be notified to the SME owner. If for example, their products sell well, then they will get notifications via SMS, Email, and from applications installed on their cellphones that require them to immediately send the products sold. After the product sent has been received by the buyer, the buyer is obliged to provide confirmation that the product has been received. This action is so that the money in the system E-Marketplace can be disbursed and/or can be received by the SME owner by transferring it to the SME owner's account.
2. When a buyer installs this application E-Marketplace, the buyer can easily find the product he is looking for to buy without having to become a member and/or member of this E-Marketplace. If the buyer finds the product he is looking for and wants to buy it, then the buyer is required to register first as a member of the E-Marketplace. This membership can be used any time they want to buy products on the E-Marketplace without having to register again. After the buyer places an order for the selected product, and has confirmed the order, and has made payment for the selected product, the system will notify the SME owner in the form of email, SMS, and mobile application that there is an order for the product he has. The obligation of the buyer if the product has been sent and/or has been received by the buyer must confirm that the goods have been received so that the buyer's money in the E-Marketplace can be directly returned to the SME owner.
3. Applications E-Marketplace
Applications E-Marketplace here duty to serve buyers, owners of SMEs, as well as web administrators to manage websites, the products are sold to SMEs as well as transactions between buyers and owners of SMEs and/or sellers. Where this application has several features to support transactions in the E-Marketplace. Broadly speaking, the

feature of which is the sale and purchase transaction, the payment transaction the buyer to the E-Marketplace, payment E-Marketplace for SME owners and/or seller, a list of products that are sold, the member registration, a confirmation of purchase, and sale, messaging between seller and buyer, as well as notification to sellers and buyers.

4. Web service *E-Marketplace*

Web service is a means of communication between the mobile application and the frontend website of the E-Marketplace. Where the web service E-Marketplace is only a bridge so that buyers and sellers can easily make transactions through mobile applications, without having to open the website page of the E-Marketplace.

5. Frontend Website *E-Marketplace*

The function of the frontend of the E-Marketplace and/or the front page for the user is the same as the function of the mobile application. The difference is only in the display design between the two interfaces. If the frontend website interface is usually for desktop models or with laptop devices, computers, notebooks, and others. For mobile applications, it is more to display the interface of mobile phones, tablets, smartphones, and others.

6. Database Server

A database server is a place where we store all data related to E-Marketplace and is a very important part of an information system. All transaction data of sellers and buyers, products, payments, and others are stored in a database server. Based on its very important role, the database server must have several backups and/or backups of other database servers by using the cluster method or by using other methods. The backup server database should be placed on a server that is not connected to the internet, meaning that it is only connected to the server's intranet network. For data management that can be ascertained to be large later, we recommend using a database system from Oracle, but it is possible with the performance of MySQL and/or MariaDB to be able to use the database system.

7. Backend Website *E-Marketplace*.

Backend website E-Marketplace serves as a place to manage all associated with a website. The E-Marketplace Among them are language management, products, product approval, content, display, advertisements, banners, images, payment checks, and others. Usually, the backend of the website is managed by a website administrator who holds full access to the website. There are several other users such as customer service, technical support, finance, directors, and several other users who have different access rights or can be said to have their respective authorities on the website E-Marketplace.

8. Website Server

A website server is a place where the website is stored and can run well according to what we want. In the website server, there are many supporting servers. Among them are, mail server, DNS server, firewall server, file server, CDN server, SMS server, and backup server. The servers above have their respective roles as supporting facilities for the smooth performance of the website E-Marketplace.

V. Conclusion

From the results of defining the E-Marketplace using the approach Enterprise Architecture Planning, the following conclusions can be drawn:

1. The architectural model of the manufacturing system E-Marketplace used is purely based on the concept of Enterprise Architecture Planning.
2. The business model for making E-Marketplace has 2 (two) activities, namely the main activity and the supporting activity. Where the main activities are receiving and collecting data on SMEs, selling products and/or goods from SMEs, and bringing together sellers and buyers. Supporting activities include human resource management, financial management, and infrastructure management.
3. The results of the definition of the plan E-Marketplace resulted in 108 proposed entities, 35 application proposals, and 3 technology architecture proposals.
4. Creating an E-Marketplace for SMEs can be done using the method Enterprise Architecture Planning.

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