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The Design of Application Based Webivew Connected to e-Commerce's API

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ABSTRACT

API or Application Programming Interface means the application programming interface. The point is, a set of interfaces (can be in the form of functions, methods or endpoint URLs) that we can use to develop applications, both on one platform and across platforms. The purpose of the API is to speed up the creation of an application because programmers do not need to write code from scratch. The API is also provided by a platform to be able to access the features of that platform. In addition, if the API is available then only need to design the interface performance concept

Key words: API, Design Webview System, Quality Assurance, Testing, Webview.

1. INTRODUCTION

At present, we enter the era of Industry 4.0. where information technology is very influential in the era of industry 4.0 because in the era of Industry 4.0,we relying on information technology in all fields, from economics, education, health, government and others. Because information technology is very easy for humans to produce, process data and disseminate information. The availability of data increase very significant because of the ease of accessing the data and the internet development is increasing year by year [12]. Dissemination of information using various data is felt by everyone [9]. In addition, the availability of data increases very significantly because the ease of accessing data and the development of the internet increases every year [10]. According to [1], the total population of Indonesia (262 million people), more than 50% or approximately 143 million people are connected and use internet media. This sector is becoming an interest in many people nowadays because it can bring huge profits. This sector is referred to as e-Commerce or electronic commerce which is commonly called online stores. According to [12] which was reported in technology.id, buying and selling e-Commerce on a global level has increasing rapidly(figure 1). This is seen from the value of e-Commerce transactions or online stores that are predicted to exceed 230% in 2021 to US $ 4.48 trillion or equivalent to IDR 60,467 trillion. The data can be seen in the graph below.

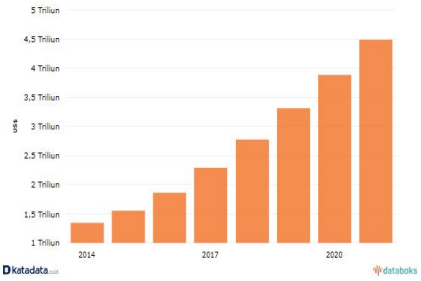

Figure 1: *e-Commerce growth* [12]

Mobile applications are becoming more popular from year to year thanks to advances in computer technology [11].Figure 2 below presents more concrete processed data related to consumer visits to each e-Commerce website.

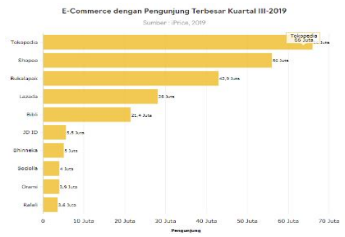

Figure 1: *E-Commerce with the largest visitors quartile III – 2019*[13]

[13] namedTokopedia as e-Commerce in Indonesia with the largest number of monthly web visitors in the third quarter of 2019. The total number of Tokopedia monthly web visitors was 66 million visitors. The next rank was filled by Shopee with 56 million visitors and Bukalapak with 43 million monthly web visitors.

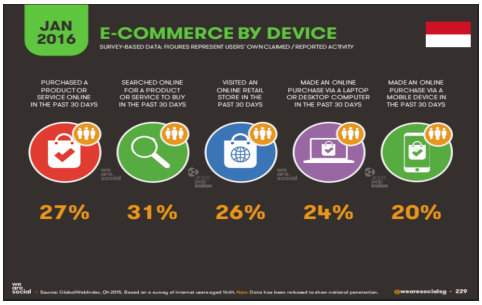

Figure 3:User behavior e-Commerce [2]

From the data above (figure 3) , it can be seen that online business trends will not show a rejection in the near future. In fact, as long as there is internet, online business trends will tend to increase [2].Information Technology-supported systems can provide added value to organizations if they are designed to be effective and efficient information systems. However, measuring or evaluating the quality of an effective information system is difficult [3].Therefore, the system must be connected to one another even though it is different in terms of programming languages, this technology is called the API. Therefore, the existence of Application Programming Interface (API) technology is considered capable of driving information technology-based businesses. Visiting an online store while continuing to shop using a debit or credit card, even ordering an online fleet can find out the location of the vehicle is and has been to the location or not, can occur because of the use of the Application Program Interface (API)[4].Although API is not a new concept because it has been there for a long time. A series of agreement rules between application code and other application code can talk to each other into the basic concept of this API. Digital developers can get maximum benefits from the API because data, services, and business can be connected to consumers, partners, developers, mobile applications, to cloud services at the same time. However, implementing an API requires prerequisites such as data integration. Because company data is usually very complex, it must be checked whether the API is compatible with the application being made. If not, the developer must adjust it first so that the API can be utilized maximally. Therefore, I propose designing an existing mobile application system by adding the application of the webview-based API concept that is connected to the E-Commerce API.

2. LITERATURE STUDY

2. 1 Webview

According to [17] with the Web 2.0 and its technology, the web shifted from static content to dynamic content, enabling the emergence of social networks and culminating in the current state of web applications that strive to rival desktop applications that are so developing. In line with this development, other sectors are participating in growth such as smartphones and their sister mobile devices, namely, tablets. Accompanied by this trend, it is evident that there is a shift in consumption of web content from desktop computers to mobile devices. While purely browser-based solutions will have the same benefits, the main advantage of choosing Webview is the efficient integration of device functions. The Webview class is an extension of the Android View class which allows to display web pages as part of the Activity layout (Android Developers, n.d.). According to Apple (2015) UI Webview class to embed web content in the app. To do this, create a UI Webview object, attach it to a window, and send a request to load web content. Developers can also use this class to move back and forward in the history of webpages, even can set some web content properties.

2. 2 Web Services

At this time, to build your own e-Commerce, sometimes the merchant needs expert skill to build the system. Therefore, it is necessary to make e-Commerce services, an application that can help merchants sell products online by utilizing web services technology that is interconnected between different systems of other e-Commerce companies. web services itself is part or component of the API. According to [19] SOA is a concept for software development, while Web Services is a web application that interacts with other web applications for data exchange. Service in SOA is a function or some processing logic or business processing that is well-defined, independent, and does not depend on the context or other service conditions in this case the protocol used in the web service is Simple Object Application Protocol (SOAP), SOAP is a mechanism standardized XML implementation. According to [19], implement in Web Based Learning applications that are built using NuSOAP. NuSOAP is a collection of PHP classes that allow users to send and receive SOAP messages via the HTTP protocol.

2. 3 Web Services VS API

According to [14] API (Application Programing Interface) is a software interface that consists of a collection of instructions stored in a library and explains how a software can interact with other software. The API is able to explain the way a particular task is performed. In procedural programming such as C language, actions are usually carried out with and also media calling functions. Therefore, According to [15].we can conclude, API is an interface that has a set of functions that have access to other applications so that they can use features in other applications without creating more. API is very useful if an application is complex, it will look more efficient in the development process. Also known as the Web API, the API that can be accessed using the HTTP protocol. Meanwhile, to create a Web API, we can use ASP, Java, etc. API better known as the term Web Service, its function is quite similar to the API, which is to bridge the systems in a network that allows interaction between these systems. Both are connecting the system. The difference lies in the Web Service is a type of API itself. According to [16], API provides functions and also commands with a language that is more structured and easier to understand for Programmers when compared to and also System Calls, this is important in the aspects of editing and development, so Programmers are able to develop the system easily.

- *API*Structure
  According to research [18], resources are classified in a pattern based on the path and query string in the URL and the request method in the HTTP request. Resource classifications based on path and query string are divided into three patterns as follows:
  1. *resource*?*query*=*string*which is used for requests to get lists and add data to members of the resource in question.
  2. *resource*/id?*query*=*string*which is used for requests to get details, change and delete resources based on the resource ID number in question.
  3. /parent/id/*resource*?*query*=*string*which is used to request lists and add data to members of the resource based on the intended parent id. While the classification based on the request method is divided into four types as follows:
     - *RequestmethodPOST*which is used to add resources.
     - *RequestmethodGET* which is used to get a list of resource members and details of resource members.
     - *RequestmethodPUT*which is used to change resources.
     - *RequestmethodDELETE*which is used to delete a resource. Then the classification above is mapped to the resources.

Web Service is a method that bridges between 2 different machines or 2 systems to be able to communicate in a network while the API is a collection of libraries or functions in making software to be able to communicate between 2 different software. Here are the points that explain the differences between the two. All web services are APIs while all APIs are not web services;

1) *Web service*may not support all operations while the API can.
2) *Web service* honly uses SOAP, REST, XML-RPC to communicate while the API is all types of communication.
3) *Web service*always requires all networks in operation while the API does not always use the network.
4) *API*facilitating direct interaction between 2 different applications whereas the Web does not, only bridge in a network.

Understanding System Call Interface

This system call interface functions as the link between the API and also the System call that is understood from the operating system. This system call interface will translate commands in the API and also will then call System calls that are needed. This "open ()" command is a command from the API and not a command that is understood directly by the operating system kernel. Therefore, so that the User's expectations can be understood by the operating system, the "open ()" command is translated into the System call by the System call interface.

- How API Works

The following is a simulation of the API process flow

Figure 4: API working simulation [16]

From the simulation image above (figure 4), the following is the explanation;

a) GET*APIKey*
Most APIs will require you to complete identity verification, such as logging in using your Google account. You will get a unique set of letters and numbers to use when accessing the API.

b) Use*HTTP*Client*Online*
The easiest way to start using the API is to find an HTTP client online, such as REST-Client, Postman, or Paw. This ready-made tool (and often free) helps you structure your request to access an existing API with the API key you received. However, it is still necessary to know and understand some of the syntax of the documentation, but only a small amount of coding knowledge is needed.

c) Get Data From*API*
The next way is to retrieve data from the API by building a URL from the existing API documentation. Examples include how to pull location data from Google Maps via the API, and then use these coordinates to find the closest photo on Instagram.

2.4 API Security

In implementing the API, a Token is needed, which is a small tool used to secure transactions on internet banking that has become mandatory for users. While authentication is verification whether a person is a person who has the rights to the transaction that he wants to do or not [5].OAuth Server is an open protocol that allows users to share their personal resources and carry out the Authentication and Authorization process. Client will get Access Token from OAuth. The server if the Authentication and Authorization process is successful and the Client will access the Resources through the API provided by the Resource Server (Spotify) using the Access Token[6]. Grant Type makes the OAuth 2.0 process very flexible. Grant Types is the process of granting access to resources (data sources) that are protected in a variety of different ways and data security. There are several stages in the Authorization Code Grant Type process[6].

1) Authorization Code
At this stage the Client will request an authorization code using an endpoint named '/ auth'. Endpoint authorization is not all '/ auth', depending on the server resource that provides the endpoint. *Get Token*After having the

Authorization Code, then we need an Access Token to request a Resource. To get access token, we have to request one more endpoint named / token with POST method

2) *Use Token to Access Resources*
The client will access the data by request to one of the endpoints provided by the Resource Server in accordance with the required data. Resource Server gets the token requested by the client. Resource Server does not know whether the token can be valid or not, then the resource server will send the token to the OAuth Server. OAuth Server will check the token sent by the Resource Server whether the token is valid, valid or not. If valid, the Resource Server will send data in the form of information needed in accordance with client requests.
3) *Authorization: Refresh Token*
The access token has an expiration limit, so in a certain time the access token needs to be refreshed. With Refresh token we don't need to re-authorize to get new access_token (figure 5).

```
HTTP/1.1 200 OK
Content-Type: application/json
{
"access_token":"PIHQ32kpVA",
"token_type": "Bearer",
"refresh_token": "1lrSeMtPZ2",
"expires_in": 3600
```

Figure 5: Command *RefreshToken*[6].

3. RESULT AND DISCUSSION

3.1 Current System

Business processes that occur the banking mobile application is generally an application for banking purposes such as, Check Balances, Check Movements, Transfer between Accounts or Banks and Pay Bills. Applications that are running now only focus on the banking business. However, for purchases and direct payments through the application currently not available. Users can only buy products outside the application and then pay for the product through Mobile Banking.

3.2 Identification

Along with technological advances and intense banking business competition, The new functional business process of banking aim to expand its banking business processes, including lose to compete with competitors engaged in the same field, because competitors have already implemented e-Commerce. Competitors take advantage of current technological developments such as e-Commerce to promote services more broadly. Cooperate with third parties to expand its business processes. Customers must open a separate application from mobile banking application to buy something on the e-Commerce application.

3.3 The Solution

Based on the problems experienced by the banking industry, it is better to develop the application currently in use and design a new system as an integrator between e-Commerce's APIs by collaborating with third parties. The concept is to work with third parties as system integrator service providers to connect with e-Commerce services. The Business Analyst team in collaboration with third parties has collected data and conducted an analysis of the development / addition of new features in the mobile banking application. Features to be added by third parties at the request from new banking business process is one of them can purchase tickets via mobile banking application which is connected to the services from e-Commerce Company as one of the ticket sales service providers. The new application development will later merge the two different systems into one mobile application in the form of Webview.

Based on the identification of problems that exist in the company, it is proposed to use a website-based application to solve the problem mobile banking application, So the authors find a few suggestions for solving the problem as follows:

1) Design and develop existing applications by designing systems with third parties as service providers that are connected to API services owned by e-Commerce.Increasing company profit from each transaction.
2) Opening new business opportunities in the e-Commerce field.
3) Become the first company to connect with e-Commerce's (third party) API Services in 1 application.

The design of systems that are interconnected between different platforms requires a rigorous testing phase to avoid defects and are ready for use by users. Every connectivity between services must be tested on the system so that what is displayed on the User's front end is easy to understand. In addition, when the system has been launched, the interconnected services are ready to be used and if one day the service is dead, it can be anticipated (handling) properly so that users do not feel confused.The User Acceptance Test will use the BlackBox method. This type of application testing to find bugs in high-level operations, such as key features, operational profiles, and customer scenarios. Testers can make black box functional tests based on what the system has to do. This involves a detailed understanding of the application domain, the business problems the system solves, and the mission it serves.

3.4 System Framework Design

In this chapter, it will explain about Application-based web connected to e-Commerce’s API Framework Design (figure 6).

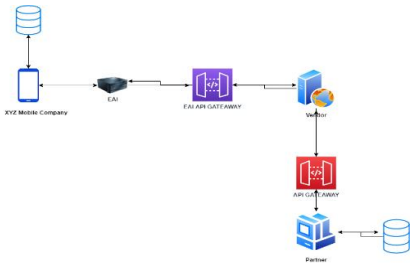

Figure 6: Framework Design

Based on the analysis of problems that occur in the business processes in mobile banking system, the authors propose the development and addition of new features on Mobile banking application where these features are not yet owned by its competitors. The new features offered are the development of an existing system and will work with third parties. The features offered are similar to e-Commerce features, technically the new banking application business process works in collaboration with third parties as a relation between the mobile application system and the e-Commerce service API. Users can buy or view products belonging to various e-Commerce just within the new mobile banking application business process without the need to download the application and payment is directly integrated with mobilebanking.

The Framework includes Databases from each entity (Mobile Banking Company, Vendors, and e-Commerce Partners), Gateaway APIs, and Enterprise Application Integration in mobile banking Companies that connect various databases from other systems. By using EAI data sharing can be done in real time and unlimited business processes between applications and data sources that are interrelated between the Internal Entity and External Entity. The type of EAI architecture at new mobile banking application business process is as a point to point, the system communicates directly with other systems [7].

3.4 System Feature

Use Case Diagrams (figure 7)represent features or interactions carried out by the system to its Users[8]. The following is the picture shows the Use Case diagram e-Commerce menu (figure 7) on the new mobile banking business process.

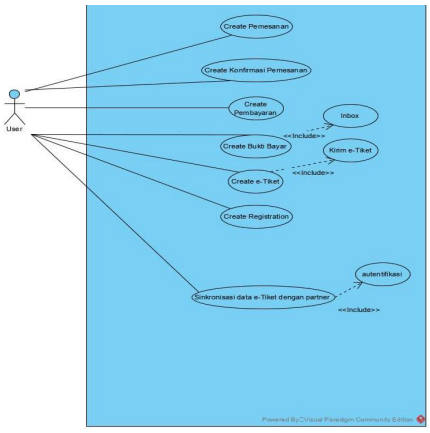

Figure 7:: Use Case Diagram

The business process system is as usual that the User must first log in tomobilebanking application then enter the e-Commerce menu. In the e-Commerce menu there are many features that users can choose from, one of which is the e-ticket purchase. This feature is the same as in general, Example Users can buy Flight Tickets, Hotels, Cinemas or Train API. The user is asked to enter the city of origin, destination city, date of departure and number of passengers then the User can choose the appropriate ticket. After that, the User is asked to confirm a purchase before making a payment. Direct payment is integrated with the new mobile application business process and the user can immediately get the ticket

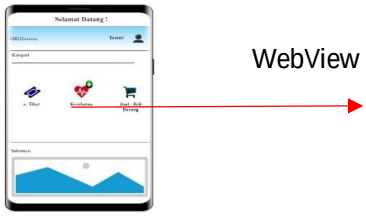

Figure 8: User Interface Webview

4. CONCLUSION

After identifying and studying business processes on the mobile banking application generally, To face problems and business competition between competitors and to increase profits in the company, the Business Team proposes adding one feature that can increase company profits, namely the addition of e-Commerce features. The feature is based on Webview where the contents of the menu are the contents of the e-Commerce application that is available in Indonesia. The system works by connecting between two different systems connected through the API path of each system.

With this design, it is expected that IT (Group Strategic Information Technology) can find out the current conditions of business processes and help to facilitate the design and implementation of these additional features.

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