Development of Accounting Application for MSMEs based on Cloud Computing

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Keywords: information technology, accounting application, cloud computing, rapid application development

Abstract: A good accounting or financial governance is the most important factor in development of Micro, Small and Medium Enterprises (MSMEs). Ability to create a good transaction record produces a strong financial report which is one way of good governance examples done by MSMEs. A good quality financial report contains information that is trustworthy, straightforward, appropriate, reliable, relational, and understandable. They are essential since they will be utilized in making a decision to determine direction of MSMEs development. An efficient accounting application is necessary to assist MSMEs in creating essential financial reports such as accounting journal, general ledger report, balanced list, income statement, and statement of capital changes. Rapid Application Development (RAD) is an application design approach used to build the application. System analysis began with a literature review, followed by creation of designs, prototypes, and collected user input requirements. The application was tested using a Black-Box testing approach and have been developed with Cloud Computing technology. There is a Software-as-a-Service in Cloud Computing technology that has the benefit of being able to be run by multiple customers and without requiring them to purchase extra infrastructure. This is due to features of start-up in the early stage, thus there is no need to invest in an extra infrastructure. Therefore, cloud application development by utilizing Software-as-a-Service technology is the right solution.

1 INTRODUCTION

A good accounting or financial governance is the most important factor in development of Micro, Small and Medium Enterprises (MSMEs). A strong financial governance produces a good quality of financial report based on good transaction records.

A good quality of financial report offers information that is trustworthy, straightforward, appropriate, reliable, relational, and understandable. It is important since it will be used as a basis for decision-making of MSMEs development (Fiesgrald Wungow et al., 2016).

Many MSMEs lack of strong accounting and financial literacy (Supardianto et al., 2019), creating a financial report preparation was challenging. A numerous forms of financial reports that must be produced impede the development of MSMEs.

The use of technology in all MSMEs financial management activities also play a role in their success and growth. Accounting software is one of example on how technology can be used to accomplish many activities. The usage of this software may be a solution towards freshly created MSMEs that do not have an accountant or could not afford for engaging one (Vanessa Dawson, 2016).

Financial statements are data records of an industry in an accounting period that describe the industry's performance. Bankers, creditors, owners, and other interested parties can utilize financial reports to analyze and evaluate financial performance and industry circumstances.

Financial statements are the result of an accounting process that provides financial data of an industry that is useful for interested parties in making economic decisions. The financial statement consists of five various, namely accounting journal, general ledger report, balanced list, income statement, and statement of capital changes.

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2 LITERATURE REVIEW

2.1 Financial Statement

Financial statements are a report of transaction records that occur in a business, such as purchase transactions or sales transactions. Financial reports are records of information about a company's performance during accounting period. Financial statements allow banks, creditors, business owners, and other interested parties to analyse and interpret company's financial performance and condition (Anggraini & Putri, 2021). Financial reports depict company's current economic state over a specific time period. The goal of financial statements is to show current conditions of company's financial situation at a specific date (on the balance sheet) and time period (on the income statement). Balance sheets, income statements, changes in equity, and cash flow reports are examples of financial statements (Ismail & Suhami, 2021)
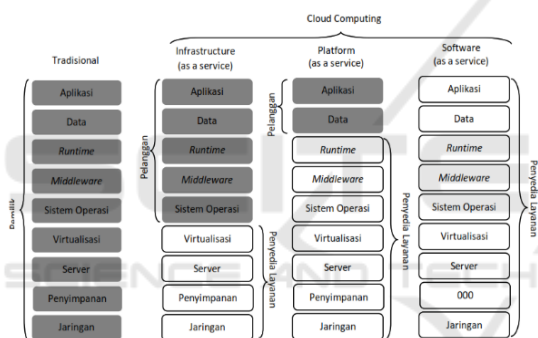

Figure 1: Service on Cloud Computing (T. Chou, 2010)

2.2 Cloud Computing

An application of technology in accounting administration aims to increase number of tax payers and tax income. The usage of this technology allows for improved on automation and data collection (Cotton & Dark, 2017). Cloud Computing technology may be the greatest choice for developing systems that may solve these challenges.

In terms of computer technology, Cloud Computing has a potential to alter the view on infrastructure investment. Previously, investment in computer technology was seen as an asset; now, Cloud Computing may be regarded as an investment in computing as a service provider (De Paula & De Figueiredo Carneiro, 2016). Cloud Computing technology is a synthesis of technology and business, and it has emerged as a potential commercial computing paradigm. The goal is to make

infrastructure administration less complicated for users.

Cloud Computing is a computer technique that uses dynamic and scalable resources that can be shared electronically and accessed over the internet (Wu et al., 2010). Cloud Computing is a computer approach in which the Internet plays primary role. The cloud may be seen as a shared resource in which programs and information are made available to users on demand. In general, Cloud Computing technology is used to run on Internet application. Since the program is already available on the Internet, common user does not require to install it. Services in Cloud Computing can be seen at Figure 1.

Cloud Computing has three services offered, i.e Software as a Service (SaaS), Platform as a Service (PaaS), and Infrastructure as a Service (IaaS) (Zhang et al., 2010). SaaS is a service that delivers applications so that customers do not need to install and access them over the Internet; consumers also do not need to consider how data is kept or how applications are managed. PaaS is a platform-as-a-service that allows developers to build applications on a customizable platform. IaaS seeks to offer virtual hardware technology to customers, so that they do not need to physically install their gear at workplace, but may be accessed or remotely over the Internet.

SaaS is a service in which software and applications are developed on a platform supplied by the PaaS layer. It is concerned with end-users since end-users may access and employ cloud provider-created applications (E & R, 2013; Katyal & Mishra, 2013). It also enables customer to access applications through cloud infrastructure using thin/thick client interfaces such as Mozilla Firefox and Internet Explorer.

Users do not actively manage or control cloud infrastructure, such as networks, servers, operating systems, and storage media, with the potential of exceptions from restricted circuits of users with particular application settings. This paradigm has a potential to deliver significant benefits to both consumers and providers of Cloud Computing services (Youseff et al., 2008). SaaS services have several advantages, among others (Kulkarni et al., 2012; Mather et al., 2009; Thakral & Singh, 2014):

- Reducing the cost of application software licenses.
- Enables several customers to use the same program at the same time.
- The application provider is in charge of controlling and restricting the application's use.
- SaaS consumers do not need to purchase infrastructure since it provides by the cloud service provider.

3 RESEARCH METHOD

3.1 Research Tools and Materials

The tools used to support this research are as follows:

- Microsoft Visio 2016 is a program for creating UML system models.
- PHP and HTML are computer languages that are used to create web-based applications.
- MySQL is a database management system (DBMS) that is used to manage databases.

3.2 Research Approach

The research was conducted by created an application system with a goal of designed and developed of cloud-based accounting application that has been utilized by MSMEs to easily create financial statements reports.

3.3 Application System Development

A MSMEs accounting application system takes the advantage of Cloud Computing and Software-as-a-Service. The program has been hosted on the cloud for users to access on the Internet through a browser.

The program was used to create financial statements such as an accounting journal, general ledger report, balanced list, income statement, and statement of capital changes. Software Development Life Cycle (SDLC) was used in system development, such as Rapid Application Development (RAD) paradigm. The process includes analysis and rapid design, prototype cycles, testing, and implementation. There were three processes in the prototype cycle stage: construct, showcase, and refine. Flow diagram of the application system development can be seen in Figure 2.
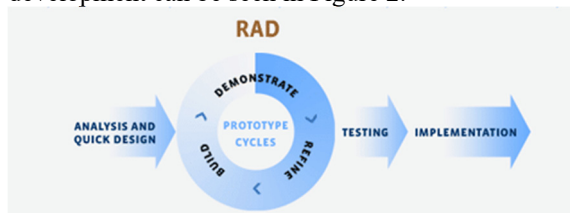

Figure 2: The Flow Diagram of the Application System Development

3.3.1 Analysis and Quick Design Phase

RAD was started through project requirement identification process. At this point, the team must identify which requirements to be satisfied by a project. This preliminary stage is excellent for presenting a high-level overview of the project.

The process continues to design a cloud-based taxation application, among others. Making UML diagrams that consist of use case diagrams, activity diagrams, making database schemes, and designing the interface design of the application that will developed.

3.3.2 Prototyping Cycles Phase

At this stage, developer designs an application prototype with various features and functions. The goal is to evaluate whether the prototype that is produced is consistent with the original concept. This procedure allows for an investigation of any mistakes that may arise later. It is important for error reduction and debugging.

The development of application program has been done by using IDE Visual Studio Code software with PHP programming language, Zilla, Putty File software to put the application in the Cloud.

3.3.5 Testing Phase

The application that was developed in the prototype stage has been tested at this step-in order to obtain feedback from users. The procedure has been repeated until the final step, which is the product's implementation and finalization.

Application system testing were done by functional testing of each module section of the program, whether it was running following the functions of system design. Testing using Black-Box testing focuses on logic, functionality, and minimize errors as well as ensure the resulting output is as expected.

3.3.6 Implementation Phase

At this step, developer was verified any flaws discovered throughout program development process who have been resolved. This work includes enhancing the application's steadiness, refining the interface, doing maintenance, and produced documentation.

4 RESULTS AND DISCUSSION

4.1 System Overview

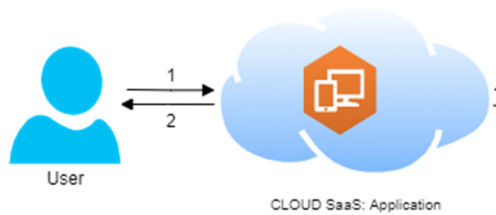System overview design is shown in Figure 3.

Figure 3: System Overview

Note:
1. A user will enter data transaction process. Data transaction process consists of debit and credit transactions. The data will be sent to the application and stored in the database.
2. The application will provide an output report according to data transaction that has been input by user. The application will automatically generate and display a report.

There are two main processes contained in the accounting application i.e.:

- The process of recording transactions.
  The first step taken by the application user is to record the transactions that occur in the business activities. This transaction recording process requires user to provide a number for each transaction that occurs. This number intends to make each transaction have an identity.
- The process of creating a report.
  After calculation has been done and the application calculates per transaction, the application displays financial report such as an accounting journal, general ledger report, balanced list, income statement, and statement of capital changes.

4.2 System Requirements Analysis

4.2.1 Functional Requirements Analysis

Functional requirements analysis identifies the processes that will be carried out by the system. The functional requirements of accounting applications for MSMEs based on cloud-based i.e.:
1. Add transactions.
2. View accounting journal.
3. View ledger report.
4. View balanced list.
5. View income statement.
6. View statement of capital changes.

4.2.1 Non-functional Requirements Analysis

Analysis of non-functional requirements identify behaviour property owned by the system. The needs of non-functional accounting applications for MSMEs were as follows:

- Availability
  System availability is a capacity to offer services to users. Except for system maintenance or system upgrades, the system can function continuously for 24 hours.
  Availability guarantees that users may obtain information and utilize the program at any time.
- Ergonomic
  Ergonomic refers to the interaction of system or application users. The program that is created must be efficient or user friendly. This is due to the fact that application users are ordinary users who are not all familiar with computers.
- Portability
  The applications can be accessed on any platform or operating system capable of running web-based applications. It is designed for consumers to be able to access apps from any devices.
- Security
  To maintain data security, the user's browser must be able to obtain an SSL certificate from the system. It is restricted to the Internet, and trials for offline access are not available.

4.3 Design System

4.3.1 Use Case Diagram

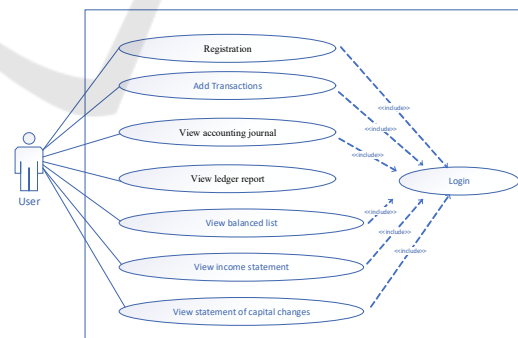The accounting application use-case diagram for cloud-based start-ups can be seen in Figure 4:

Figure 4: Use Case Diagram

4.3.2 Design Table

Database used in development of accounting applications for cloud-based is a MySQL database that consists of several tables as follow:

- TB_User

Table 1 contains user data (MSMEs) that register to be able to use the application.

Table 1: TB_Business_Identity

No.	Field	Data Type	Note
1	id_user	int(11)	An auto-increment that use as the id of the user
2	nama_usaha	Varchar (50)	The name of the user's business
3	email	Varchar (50)	Full email from user
4	password	Varchar (50)	The password used by the user
5	tahun_berdiri	Int (4)	Years of the user's business stood
6	status_usaha	Varchar (20)	The legal status of the business of the user
7	deskripsi_usaha	text	Description of the user's business

- TB_Faktur
  Table 2 contains invoice data recorded by user in the form of transaction activities of the ongoing business.

Table 2: TB_Transaction

No.	Field	Data Type	Note
1	id_faktur	int(11)	An auto-increment that use as the id of a transaction invoice
2	id_user	int(11)	Foreign key from table TB_business_identity
3	description	Varchar (50)	Invoice number used on each invoice
4	tgl_faktur	Date	The date the invoice transaction occurred
5	file	Varchar (50)	The name of the buyer of the transaction that occurred

- TB_Detail_Transaction
  Table 3 contains detail data from transaction which have been made by users be recorded into the application.

Table 3: TB_Detail_Transaction

No	Field	Data Type	Note
1	id_detail	int(11)	An auto-increment that use as the id of a tax deposit
2	Id_faktur	int(11)	Foreign key the id of a transaction
3	id_user	int(11)	Foreign key from table TB_business_identity
3	account_name	Varchar (50)	Account name
4	amount	Varchar (20)	Amount
5	description	Int (11)	Description transaction
6	State_account	Enum (debit, kredit)	State transaction account

4.4 Implementation System

4.4.1 Register

Figure 5 displays a registration form that allows users to register to be able to use the application.

Figure 5: Register

4.4.2 Login

Figure 6 displays a login form that users can use to enter the application. On the login page, the user will be validated whether the user is registered or not.

Figure 6: Login

4.4.3 Add Transactions

Figure 7 displays an added transaction form. It was used for those who want to record transactions and will be stored in database.

Figure 7: Add Transactions

4.4.6 Accounting Journal Report

Figure 8 displays an accounting journal report. This page display data transaction per date when user add transactions.

Figure 8: Accounting Journal

4.4.7 Ledger Report

Figure 9 contains information about ledger report. This page display data per account name and status account where is debit or credit.

Figure 9: Ledger Report

4.4.8 Balance Book Report

Figure 10 is a page for view balance book. Balance book is a list containing the balances (difference between total debits and total credits) of each account in the general ledger on a certain date. The purpose of making a balance list is to find out the balance of each account and check that the balance of the accounting equation is maintained.

Figure 10: Balance List

4.4.9 Income Statement

Figure 11 displays income statement. Income statements that a company must have after the balance sheet and cash flow. From the report, we can see how much income and expenses are borne by the company in a certain period of time.

Figure 11: Income Statement

4.4.10 Statement of Changes in Capital

Figure 12 displays statement of changes in capital. Statement of Changes in Capital is a financial report of a service company that shows the causes of changes in capital, from initial capital to end of period capital.

In the report on changes in capital, it shows that by calculating the owner's capital at the beginning of the period, adding to the net profit as stated in the profit/loss statement, then subtracting it from the owner's personal take (private), so that the owner's capital at the end of the period is obtained.

Figure 12: Statement of Changes in Capital

4.4.11 Balance Sheet

Figure 13 displays a balance sheet. Balance sheet is a financial statement that presents the total assets, liabilities (debt), and equity (capital) of the company at a certain time period.

Figure 13: Balance Sheet

4.5 System Testing

Functional testing for Accounting Application Cloud Computing-based were performed by using Black-Box testing methods, which involves outcome execution by using data test and evaluated the functionality of the application. Findings on functionality testing demonstrated that the application provides relevant functionality.

4.6 Discussions

Development of accounting application helps MSMEs to record sales transactions. This application also helps MSMEs to generate financial report such as accounting journal, ledger report, balanced list, income statement, and statement of capital changes. The program was used to create financial statements such as an accounting journal, ledger report, balanced list, income statement, and statement of capital changes. This application produces a simple financial report for those MSMEs who do not have an accounting.

5 CONCLUSIONS

Based on the results of development and evaluation of applications that have been carried out, conclusions are as follows:

1. Application can record and stored data transactions to database.
2. Accounting applications that have been built for MSMEs can create financial statement such as accounting journal, ledger report, balanced list, income statement, and statement of capital changes automatically.

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