

Whatsapp to The Rescue: Automated Billing Reminders

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Article information

Article history

Submitted : January 31, 2024

Revised : February 09, 2024

Accepted : February 18, 2024

Keywords:

Digital Marketing Service, Rapid Application Development Methodology, Whatsapp API, Web-based System.

Kata Kunci:

Metodologi Rapid Application Development; Penyedia Layanan Pemasaran Digital; Sistem berbasis web; Whatsapp API.

ABSTRACT

This research takes a case study approach to a company that provides digital marketing services. The problems that arise with this company are to difficulties with monitoring client hosting and domain information, as well as repeated delays in collecting payments from consumers. Hence, the company need a system that can efficiently and accurately record and update customer information, while also delivering immediate reminders to customers regarding rental payment deadlines. The proposed system is built utilizing the rapid application development (RAD) methodology. This method enables rapid system development. Furthermore, the RAD technique requires user participation during system development. The system was created using the PHP programming language, the CodeIgniter 3 framework, and MySQL as the database. It also utilizes the PHP Whatsapp Gateway API. The final outcome is a web-based billing tracking system that will send billing information to consumers via WhatsApp and email, as well as a notification of payment.

ABSTRAK

Penelitian ini mengambil studi kasus pada perusahaan penyedia layanan pemasaran digital. Permasalahan yang terjadi pada perusahaan ini yaitu kesulitan dalam melacak informasi hosting dan domain pelanggan serta seringnya terjadi keterlambatan pembayaran dari pelanggan. Oleh karena itu perusahaan membutuhkan sebuah sistem yang mampu menyimpan dan memperbarui informasi pelanggan dengan cepat dan rapi serta mampu memberikan pengingat awal (*reminder*) pada pelanggan tentang batas waktu pembayaran sewa. Sistem yang diusulkan dibangun menggunakan metodologi *Rapid Application Development* (RAD). Metode ini memungkinkan pengembangan sistem yang cepat. Selain itu, teknik RAD membutuhkan partisipasi intens pengguna selama pengembangan sistem. Sistem ini dibuat menggunakan bahasa pemrograman PHP, framework CodeIgniter 3, dan MySQL sebagai database. Sistem juga juga menggunakan PHP *Whatsapp Gateway API*. Hasil akhir dari penelitian ini adalah sistem pelacakan berbasis web yang akan mengirimkan informasi tagihan ke pelanggan melalui WhatsApp dan email, serta pemberitahuan awal mengenai masa pembayaran tagihan.

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INTRODUCTION

Nowadays, many companies are competing to provide the best service to customers because it is still one of the main goals in doing business in the company. Some research result describe that customer satisfaction can be maximally achieved by applying information technology in operational activities (Rosa & Shalahuddin, 2018) (Adithama et al., 2017). The use of information technology can be used as a strategy so that companies can continue to improve their services to customers. Some of the uses of information technology that are currently being widely used by companies are online services and digital marketing. Currently, in relation to digital marketing, the global community is undergoing a paradigm shift regarding conventional marketing environments and is embracing the transformation of the physical world into the virtual realm (Nair, 2015). This is caused by the development of technology that is supported by internet access which is increasingly easy to obtain.

According to a case study derived from a digital service provider and an interview with the company's operational director, several technologically solvable issues were identified. CV. Redim Infotech Solusindo is a corporate specialized in the provision of digital marketing services such as social media management, website development, website upkeep, search engine optimization (SEO) websites, and Google Ads advertising. More than two hundred active clients are currently served by the company, from which they may select a variety of service packages. The company has several difficulties during its operating activities, which require the implementation of a solution. The company faces challenges in finding and maintaining customer information related to their rental services which is caused by the retention of data in spreadsheet format, resulting in time-consuming efforts to verify the expiration of their subscriptions. Undoubtedly, the procedure cannot be continuously optimized due to the difficult nature of searching the file based on customer name or number, as well as the potential for human error during the input of customer information. Furthermore, customers were not informed about the payment deadline of their invoices.

Upon reviewing the previously mentioned difficulties, a possible solution for the company is to build a system that tracks and notifies users about billing and provides reminders. This system also allows customers to conveniently review their service invoices and send timely payment reminders for service fees and subscription costs.

Based on the background explained there are some problem to solve such as (1) How does the application of information systems help customers check billing payments? (2) How can the information system support the admin's performance in recording and checking customer information? (3) How can the WhatsApp API be utilised to send reminders to consumers regarding billing service costs and membership payments?

RESEARCH METHOD

The objective of this research is to build a web-based system for billing tracking and sending notification reminder to customers. An increasingly popular software development approach applied by many companies nowadays is the agile method. However, after analyzing the company's conditions, particularly the challenges in scheduling meetings with the management, it is determined that the rapid application development (RAD) method is the most appropriate choice. The RAD method places major emphasis on user engagement during the analysis and design phase to effectively address user requirements and enhance overall system user satisfaction (Mishra & Dubey, 2013). In several research, it is explained that RAD methodology also uses prototyping approaches (Altanny & Johan, 2023) (Utami et al, 2023). The following table 1 presents a comparative analysis between the RAD methodology and the agile methodology.

Tabel 1. Comparison of RAD and Agile

Rapid Application Development	Prototype	Agile
To focus more on development than on planning tasks. (Shelly & Rosenblatt, 2012)	The complexity of the system increases because the system can develop beyond the original plan. (Mulyani, 2016)	Emphasize simplicity with the development of repetitive applications. (Arora & Arora, 2016)
Big reduction in development time. (Mulyani, 2016)	Waste of time and money to build prototypes, if the client is not satisfied. (Saranya et al., 2017)	Eliminating a lot of time to do the tasks. (Arora & Arora, 2016)
Progress can be measured. (Kosasi & Yuliani, 2015)	Missing functions are identified early. (Mulyani, 2016)	Its application requires the readiness of human resources and the availability of information technology infrastructure. (Mishra & Dubey, 2013)
Changes to requirements can be accommodated. (Kosasi & Yuliani, 2015)	Can suggest changes and modifications. (Saranya et al., 2017)	<i>Test-based approach to requirements and quality assurance. (Arora & Arora, 2016)</i> Personal interactions with consumers (customers) of the company. (Mishra & Dubey, 2013)
Customer feedback is recommended. (Mulyani, 2016)	Users are actively involved in development. (Mulyani, 2016)	

Table 1 explain about the comparison of several methods in system development. In practice, the agile method eliminates a lot of time working on tasks. The RAD method can also reduce development time. The agile method requires readiness of human resources and the availability of information technology infrastructure, in contrast to the RAD method which does not require the availability of the technology infrastructure. To get quality requirements and guarantees in the agile method one must also use a test based approach. In terms of interactions, the agile method carries out personal interactions with customers in order to get more optimal feedback. The RAD method also recommends getting feedback from customers. Then, there are differences that emphasize that the RAD method with the agile method, namely in terms of the development carried out. In developing the RAD method, the focus is on developing rather than the planning task, while the agile method emphasizes simplicity with repeated applications. Furthermore, it can be seen that the RAD method with the prototype approach is also not too much difference. Starting from the number of interactions with the user, can suggest changes to the requirements and focus more on developing the system. But in the use of the prototype method it is quite wasteful and time-consuming because it needs to make a prototype so that it can be reviewed by the user, if the user is not satisfied it is necessary to make a prototype again. To use the RAD method, there is no need to make a prototype for the user because the user can immediately suggest changes during development.

Multiple techniques have been utilized in the collecting of data for this research. The research data collection methods were conducted through interviews, literature review, and questionnaires.

There are four journal articles used as references in this research. Referring to the first journal (Marcia, 2019), the website-based WhatsApp Gateway was used for a variety of features according to needs, which used the CodeIgniter 3 framework method in building the system. Referring to the second journal (Wulansari, Rahayu, & Riza, 2019) discussed the issue of incoming messages to whatsapp that recorded all activities from booking to delivery. Referring to the third journal (Kurniawan & Parapaga, 2014), the system created on the journal refers to the topic that

provides billing information to customers in the payment of fractions. Referring to the fourth journal (Harli & Fauzi, 2017) discusses the use of RAD methods that are quite good in the development of the system because the existing requirements planning at the beginning can be appropriate and if there are changes to the system, this method can create new requirements.

RESULTS AND DISCUSSION

Requirements Planning Phase

During the rapid application development stage, the initial stage is to conduct the necessary planning. At the very beginning of this stage, it is essential to do research, identify constraints, and identify the requirements for developing the system. The requirements planning stage commences with an interview with the managing director to outline the required system features to address existing company problems. The users of this proposed system are the Admin and Customers. Several functional requirements are necessary, such as:

- Both admin and customers can login and logout
- Admin able to display total customers, total products, total orders, total bills
- Admin able to create and edit customer account
- Admin able to change password, set profile
- Admin able to manage products and services
- Admin able to manage orders
- Admin able to create and edit bills
- Admin able to send notification to customers
- Admin able to create reports
- Customer able to access information via WhatsApp and email
- Customer able to view profile

System Modelling

Based on the user requirements that were collected, there are some diagrams drawn to describe the system needs. Figure 1 explain a Use Case Diagram that explains all the functions that exist on the system. The functions contained in the admin include: Login, Dashboard, My Profile, Manage Customers, Manage Products, Manage Orders, Manage Bills, Manage Reports, Manage Expenditures and Logout. While the functions contained in the customer include: Login, My Profile, View Bills, and View Orders, See Progress and Logout.

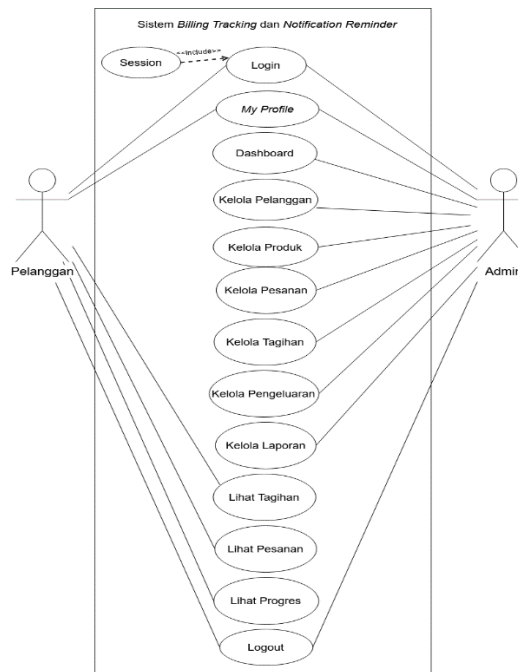


Figure 1. Use Case Diagram of The Proposed System

Figure 2 depicts a class diagram specifically created for the system. There are various classes in the system. These include the ci_session, admin, customer, billing, detailed billing, order, product, expense, and progress classes. The class has characteristics and methods that correspond to the functions that exist on the system.

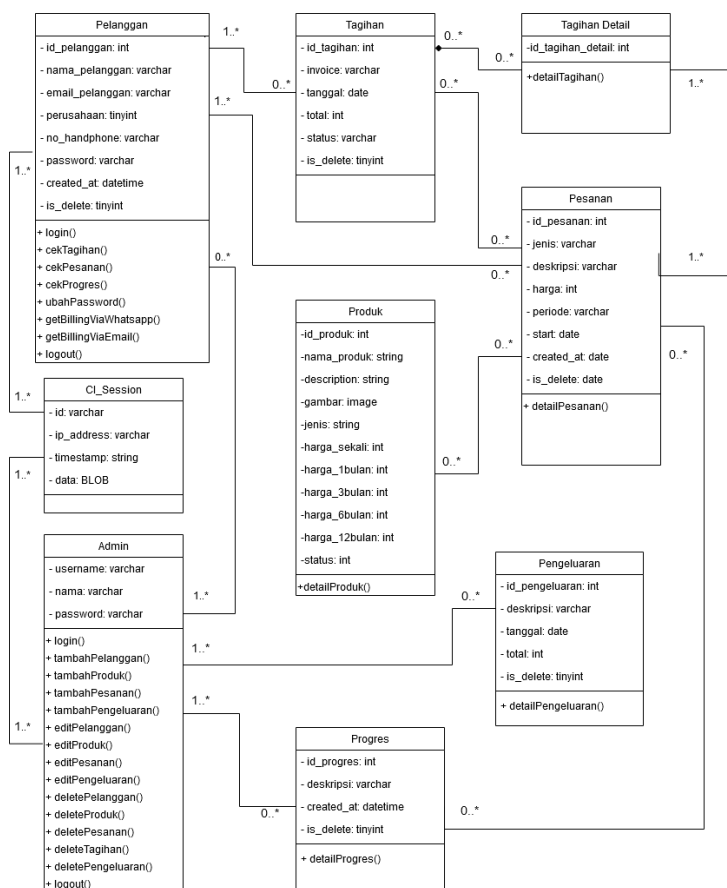


Figure 2. Class Diagram of The Proposed System

System Design

Figure 3 depicts the display added order, where the administrator must enter the customer's name and the type of service available.

Figure 3. Display of Customer Order

Figure 4 shows a notification that the order has been successfully added. The system will automatically communicate billing information to consumers via WhatsApp and email. Furthermore, the status changed to Waiting Payment, which requires the customer to quickly pay the payment.

Figure 4. Order View Successfully Added

Figure 5 depicts an order detail view, which displays extensive information about current customer orders. Additionally, consumers can view their billing history on the billing page.

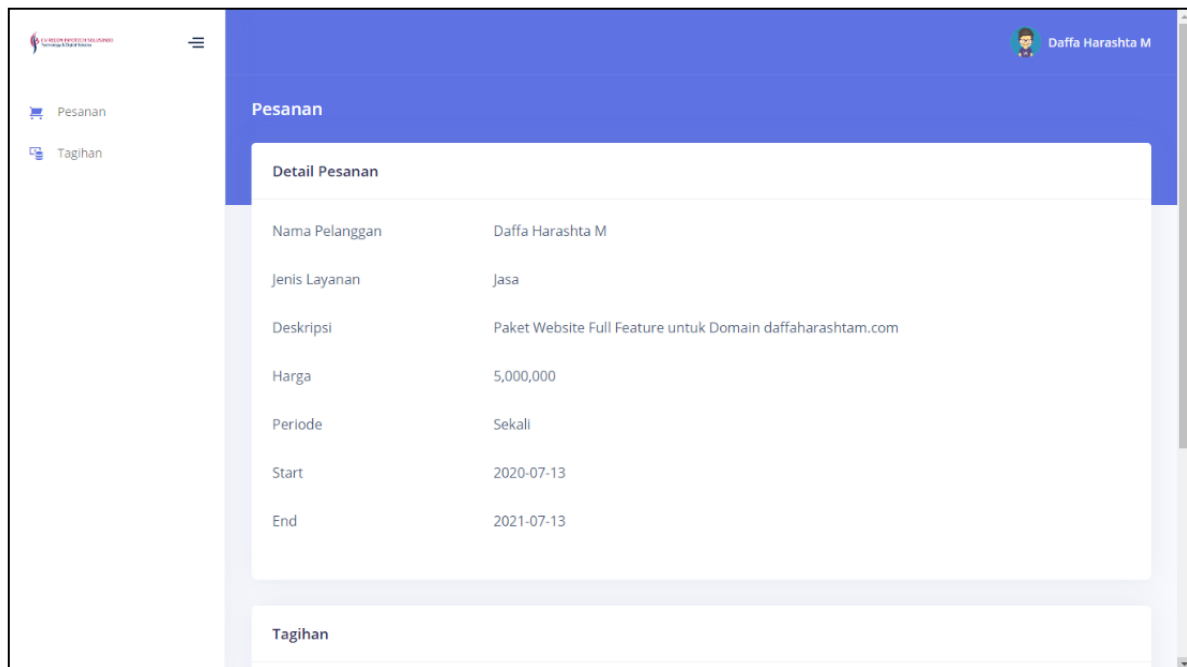


Figure 5. Detail Order in Customer View

Figure 6 shows a WhatsApp notification message that allows customers to view their login details. Customers can log in through the manage.redim.co.id page. Customers receive notifications not only via WhatsApp but also via email.



Figure 6. WhatsApp Message Notification for Customer Access

Figure 7 shows the WhatsApp message notification display, which explains that the consumer has a charge to pay based on the order. In addition to payment billing, users receive a WhatsApp message notification when payment is made.

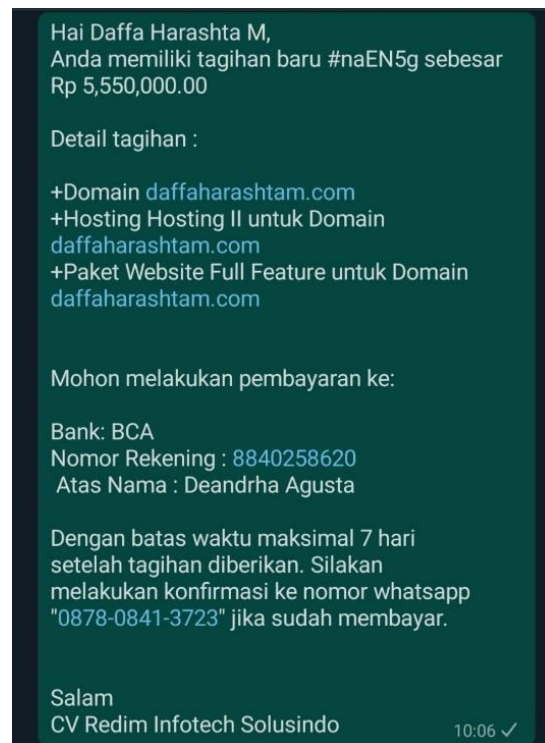


Figure 7. WhatsApp Bill Notification Message Not Paid

Cutover Phase

The last process before implementing the system is system testing. Table 2 describes some of the results from the UAT of admin menu, which totals 22 test descriptions. In the table, we provide eight sample of scenario testing for Admin menu.

Table 2. User Acceptance Test Result for Admin

Testing Description	Expected Result	Result	Result After Test
Login Admin: Admin mengunjungi alamat web manage.redim.co.id/backend , kemudian input username dan password	Admin dapat masuk ke halaman Dashboard	Sesuai	Diterima
Lihat Data Pelanggan: Admin klik sidebar "Pelanggan"	Admin masuk ke halaman Pelanggan	Sesuai	Diterima
Tambah Data Pelanggan: Admin klik tombol Tambah pada halaman Pelanggan, selanjutnya mengisi form yang tersedia untuk menambah data	Data Pelanggan bertambah	Sesuai	Diterima
Edit Data Pelanggan: Admin klik tombol Edit data pada halaman Pelanggan, selanjutnya mengisi form yang tersedia untuk mengubah data	Data Pelanggan berubah	Sesuai	Diterima

Testing Description	Expected Result	Result	Result After Test
Hapus Data Pelanggan: Admin klik tombol Delete Data pada halaman Pelanggan	Data Pelanggan terhapus	Sesuai	Diterima
Lihat Data Produk: Admin klik sidebar "Produk"	Admin masuk ke halaman Produk	Sesuai	Diterima
Tambah Data Produk: Admin klik tombol Tambah pada halaman Produk, selanjutnya mengisi form yang tersedia untuk menambah data Produk	Data Produk bertambah	Sesuai	Diterima
Edit Data Produk: Admin klik tombol Edit data pada halaman Produk, selanjutnya mengisi form yang tersedia untuk mengubah data	Data Produk berubah	Sesuai	Diterima

Table 3 describes the result from the UAT of customer menu, which consists of four scenario testing.

Table 3. User Acceptance Test Result for Customer

Testing Description	Expected Result	Result	Result After Test
Login Pelanggan: Pelanggan mengunjungi halamn web manage.redim.co.id. Pelanggan input username dan password	Pelanggan dapat masuk ke halaman pesanan	Sesuai	Diterima
Edit Profile Pelanggan: Pelanggan klik menu My Profile, lalu mengubah informasi data profil	Data Pelanggan berubah	Sesuai	Diterima
Lihat Menu Pesanan: Pelanggan klik menu Pesanan	Pelanggan masuk ke halaman pesanan	Sesuai	Diterima
Lihat Menu Tagihan: Pelanggan klik menu Tagihan	Pelanggan masuk ke halaman tagihan	Sesuai	Diterima

CONCLUSION AND RECOMMENDATION

Conclusion

The research results indicate that the system can assist customers in accessing information regarding their payment bills and enhance the administrative performance in operational tasks. There are four significant transition points following the completion of the system. First, customers can view the hosting and domain's validity time on the system by logging in. Furthermore, customers can observe the advancement of work in the system by logging in first. The system automatically distributes invoices to consumers over WhatsApp and registered email. The admin records the system data in the database and presents it in a table for quicker data retrieval through sorting and searching.

Recommendation

Several recommendations can be offered to improve the development of this research. (1) Creating financial statement features that represent the company's earnings or losses. (2) Providing order processing progress features which enable clients to track their orders.

ACKNOWLEDGEMENT

We would like to express our gratitude to Universitas Multimedia Nusantara for allowing us to conduct this research.

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