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# Design, Development, and Implementation of a Web and Android-Based Payment Gateway at the Bukit Cinta Tourist Attraction in Semarang Regency

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***Abstract***

*Advances in information and communication technology have brought significant changes to various aspects of life, including the tourism sector. Bukit Cinta Tourist Attraction in Semarang Regency is one of the tourist destinations that continues to strive to improve its services to visitors. One of these efforts is to implement a web-based and Android payment gateway system. This study aims to design and develop a payment gateway system that can facilitate digital payment transactions for visitors to the Bukit Cinta Tourist Attraction. The system is designed to integrate various payment methods, such as bank transfers and digital wallets, thereby simplifying the process of paying for entrance tickets and various services at the tourist site. The research method used is the agile method, which includes planning, design, development, and testing phases. The results of the black-box testing indicate that the application interface functions well as planned. In the stress test, it was found that higher network speed availability improves application performance, and overall, the system can handle request loads effectively. It is hoped that the results of this research will contribute positively to Bukit Cinta Tourist Attraction in Semarang Regency by enabling ticket purchases to be made anywhere and generating accurate transaction data.*

***Keywords : Payment Gateway, Web, Android, Midtrans, Tourist Attractions.***



## INTRODUCTION

Technological progress has significantly transformed various industries, with tourism being one of the most affected sectors. The introduction of digital payment systems has reshaped how transactions are conducted, offering travelers greater convenience, safety, and efficiency. These systems allow payments to be completed without the need for cash, thereby reducing physical contact and enhancing the speed of service. The shift aligns with the global movement toward digitalization in both domestic and international tourism markets. Studies confirm that such innovations contribute to increased operational efficiency and improved visitor satisfaction (Susanto, Hendrayati, Rahtomo, & Prawira, 2022).

Digital payment systems have evolved into essential value-added services that enhance the overall visitor experience. These systems integrate various payment methods such as e-wallets, QR codes, debit and credit cards, as well as mobile and internet banking. Their flexibility allows users to select their preferred mode of payment, ensuring inclusivity for different demographics. In tourism, this capability not only improves convenience but also builds trust between service providers and visitors. Research suggests that the presence of multiple payment options increases the likelihood of customer satisfaction and repeat visits (Susanto et al., 2022).

The ease of use offered by digital payment systems directly influences perceived service quality in the tourism industry. A user-friendly interface can significantly improve visitors' perceptions, leading to higher satisfaction levels and positive word-of-mouth recommendations. This effect becomes even more relevant in destinations with high tourist traffic, where efficiency in transactions is essential. Furthermore, seamless transactions reduce waiting times and allow visitors to maximize their leisure experience. Empirical studies have found a strong correlation between ease of use, service quality, and tourist loyalty (Susanto et al., 2022). Mobile ticketing, a specialized application of digital payment systems, allows tickets to be purchased, stored, and validated entirely through smartphones. This approach eliminates the need for physical tickets, reducing administrative costs and minimizing the risk

of ticket fraud. It also streamlines the entry process, as visitors can simply scan a QR code to gain access. Such innovations have been widely adopted in public transport systems and are increasingly relevant for tourism destinations. The model has proven to be both operationally efficient and environmentally sustainable (Wikipedia, 2024).

Digital ticketing provides multifaceted value, delivering benefits such as operational credibility, enhanced data accuracy, and improved technological functionality. For managers, it enables real-time monitoring of ticket sales and visitor numbers, which can inform decision-making and marketing strategies. From the visitor's perspective, it enhances the perception of professionalism and modernity at the destination. Public transport research shows these advantages are directly transferable to tourism site operations. This suggests that destinations adopting digital ticketing could improve both customer satisfaction and internal management efficiency (Apanasevic & Markendahl, 2023). The tourism industry is experiencing a surge in research and implementation of mobile payment technologies.

Literature reviews highlight an increasing focus on integrating emerging technologies such as biometric authentication, digital currencies, and contactless systems into tourism operations. This shift reflects a growing demand for seamless, secure, and personalized travel experiences. Adopting such technologies also enhances competitiveness by meeting the expectations of tech-savvy travelers. Scholars predict that destinations that fail to adopt digital payment innovations may struggle to maintain market relevance (Wang & Chan, 2025).

Practical examples of successful digital payment adoption can be seen in destinations like Tirupati, India. There, integrated platforms allow visitors to purchase tickets, book accommodations, and process refunds entirely online. Tourists report high levels of satisfaction with the convenience and transparency provided by these systems. The approach has also reduced administrative burdens and improved financial tracking for site managers. These findings highlight the tangible benefits of comprehensive digital payment ecosystems in tourism (Digital Payment Expansion, 2022).

Adoption in developing countries is not without challenges. Factors such as privacy concerns, limited digital literacy, and cultural preferences for cash can slow implementation. A study in Bangladesh found that while perceived ease of use positively influenced adoption, privacy concerns had a negative impact on both attitudes and behavioral intentions. This suggests that system design must address trust and security perceptions to encourage broader adoption. Without such measures, even well-designed payment systems may face resistance from potential users (Rahman et al., 2022).

In Indonesia, the Quick Response Code Indonesia Standard (QRIS) has emerged as a widely adopted payment solution. This system enables real-time interbank QR payments and has been embraced by merchants in various sectors, including tourism. By 2024, QRIS transactions had surged by over 226%, with 50.5 million users and 32.7 million merchants registered nationwide. Its standardization ensures interoperability between different financial institutions and payment platforms. The success of QRIS demonstrates Indonesia's readiness for further integration of digital payment systems in tourism (Wikipedia, 2025). Bukit Cinta, located in Kebondowo Village, Banyubiru Subdistrict, Semarang Regency, Central Java, is a prime candidate for such technological upgrades.

Known for its panoramic views of Rawa Pening Lake, Mount Merbabu, Mount Telomoyo, and the Gajah Mungkur hills, it attracts large crowds, especially on weekends. Currently, the ticket purchasing process remains manual, requiring visitors to queue at physical counters. This often results in long waiting times and a less enjoyable visitor experience. Transitioning to a digital ticketing system could alleviate these operational bottlenecks and enhance visitor satisfaction. Implementing an Android-based ticketing application at Bukit Cinta would provide both strategic and operational advantages. Visitors could purchase tickets in advance, reducing queues and allowing smoother entry. Administrators would benefit from automatic transaction recording, improving data accuracy and revenue tracking. Such an initiative would align with global smart tourism trends, ensuring that Bukit Cinta remains competitive in an increasingly digital marketplace. Ultimately, this move could transform the site into a model for sustainable and technology-driven tourism development in Indonesia (Susanto et al., 2022).

## RESEARCH METHODS

The method used for this final project is the agile method. Agile Software Development can also be defined as a group of software development methodologies based on the same principles or short-term system development that requires developers to adapt quickly to changes of any kind (Dictio.id.

,2016). One of the characteristics of Agile Software Development is a team that is responsive to change because change is central to software development: changes in software requirements, changes in team members, changes in technology, and so on. Figure 1 shows the stages of the agile method.


**Figure 1. Agile Method**

Planning At the planning stage, the following are carried out: designing the requirements for this final project, such as preparing a work schedule, budget, and recording the software system requirements needed to create this system. System Design This stage involves designing the system to be developed, namely an online payment system based on web and Android platforms at the Bukit Cinta tourist attraction. Figure 2 shows the system design.

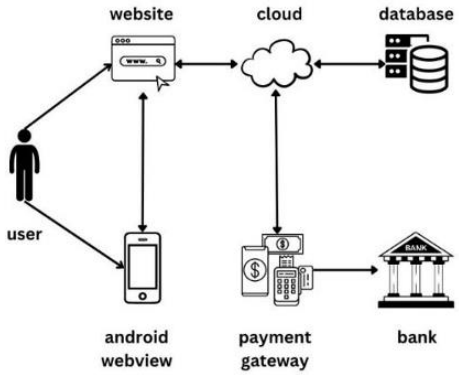


**Figure 2. System Design**

Figure 2 shows the system design. In the system architecture, users act as visitors who can access the system through a website or Android. Because in this system design, the Android used is Android WebView, where the Android display will be the same as the website display, allowing users to interact with the website through the Android application. When users interact with the website or Android app, the application system communicates with the cloud server to handle user requests, which then accesses the database to store and retrieve necessary data, such as user information and transaction history.

When users make a payment transaction, the website or Android app sends transaction details to the payment gateway via the cloud server. The payment gateway is responsible for securely processing the payment and connecting to the bank. The bank then completes the payment transaction and verifies the payment status. Once the payment is successfully verified by the bank, the payment gateway sends a confirmation back to the cloud server, and the payment status can be viewed by the user through the website or Android interface.

Creation or Implementation At this stage, the design from the results of the planning that has been made is created. Implementing the website display design, website content design,

filling in the database, and others that will be uploaded after determining and purchasing hosting.

The testing phase serves to ensure that a system operates properly, is secure, and meets established quality standards. The testing phase includes: 1. Black Box Testing Black box testing is a type of testing conducted to observe the input and output results of software without knowing the software's code structure. This testing is conducted at the end of software development to determine whether the software functions properly. 2. System Performance Testing System performance testing is conducted using the stress testing method. Stress testing is a process to test the limits of a system's resilience and stability and to test how the system or application can recover after a crash under high load conditions. Application performance testing on websites and Android uses different tools. On websites, the tool used for testing is the open source Gatling Enterprise. Meanwhile, on Android, the Android Profiler feature in Android Studio software is used.

## RESULTS AND DISCUSSION

### Results of Interface Implementation on the Website

This stage explains the results of the web interface design, which consists of the implementation of the home page, the implementation of the facilities and activities page, the implementation of the page for selecting the date of the booking, the implementation of the visitor data entry page, the implementation of the booking summary page, the implementation of the payment page, and the implementation of the Bukit Cinta route page. This information system has a homepage featuring several scenic photos of the Bukit Cinta tourist attraction, along with a “Book Tickets” button leading to the ticket booking page. Figure 3 shows the homepage of the website.

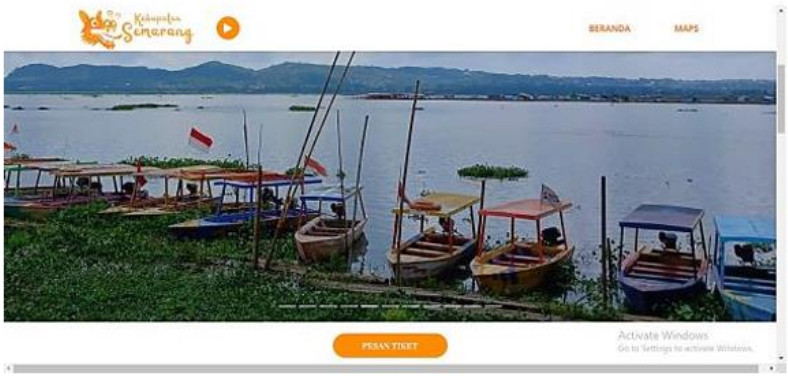


**Figure 3. Homepage Implementation**

The facilities and activities page is located below the home page, which will appear when visitors scroll down and will show several facilities available at Bukit Cinta as well as several activities that are regularly held at the Bukit Cinta Tourist Attraction . Figure 4 shows the facilities page and Figure 5 shows the activities page.

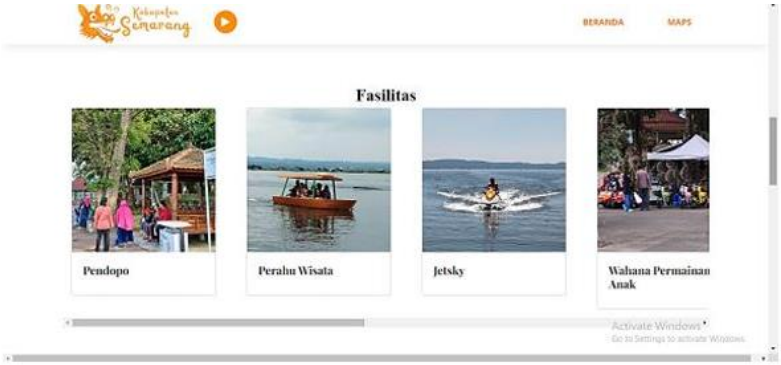

**Figure 4. Implementation of Facilities Page**

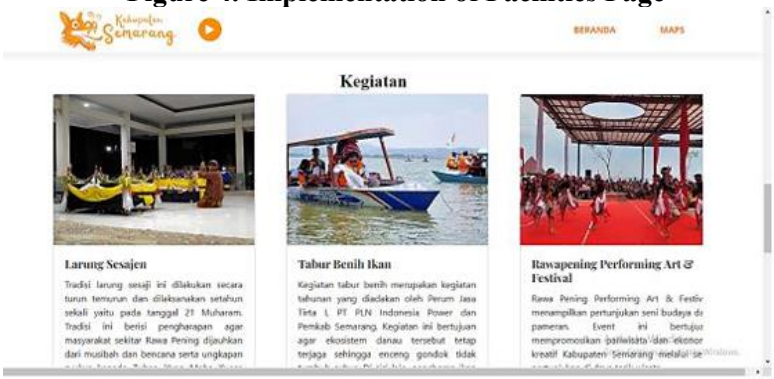


**Figure 5. Implementation of Activity Pages**

On the ticket reservation interface, the date selection page serves as a crucial step that allows visitors to specify the exact date on which their purchased ticket will be utilized. This functionality ensures that bookings are accurately recorded and aligned with the intended visit schedule, thereby preventing potential overlaps or scheduling conflicts. The interface is designed to be intuitive, enabling users to effortlessly navigate the calendar view and select their preferred date with precision. Such a feature is vital in enhancing the overall booking experience, as it offers both convenience and clarity in the reservation process. Figure 6 provides a visual representation of the implemented date selection page, showcasing its user-friendly layout and clear navigational elements. The design integrates an interactive calendar component, making it simple for visitors to view available dates and confirm their selection. This implementation not only supports operational efficiency by streamlining booking management but also improves user satisfaction through its clean, responsive, and accessible design. By offering a seamless date selection process, the system effectively bridges functionality with ease of use, ensuring a smooth transition to subsequent steps in ticket purchasing.

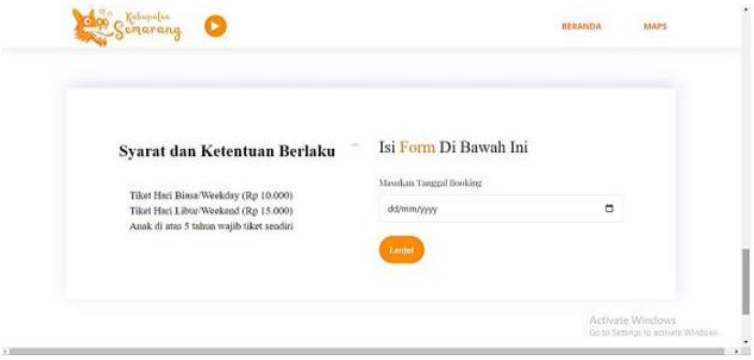


**Figure 6. Implementation of the Election Page Date**

The visitor data entry page is displayed immediately after a booking date has been selected and the ‘Continue’ button has been clicked, serving as a critical stage in finalizing the reservation process. On this page, visitors are prompted to input their personal information along with the details of any accompanying guests in the designated fields, ensuring accurate and complete booking records. Fields marked with a red asterisk in the upper right corner are mandatory, signifying essential data required for ticket validation and operational purposes, whereas the email and phone number fields are optional, allowing flexibility for users who may prefer not to disclose certain contact information. The design prioritizes clarity and usability, guiding users through the process with intuitive visual cues. Figure 7 presents the implementation of this visitor data entry page, highlighting its structured layout and user-friendly interface that facilitates efficient data submission.

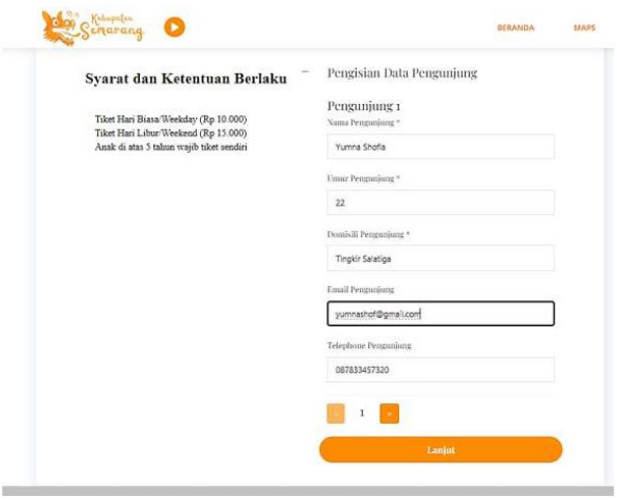


**Figure 7. Implementation of Data Entry Page Visitors**

The payment page serves as a comprehensive confirmation interface, presenting a clear summary of the personal information previously entered by the visitor, along with the total number of tickets reserved and the corresponding payment amount. This stage ensures transparency by allowing users to review and verify their booking details before proceeding with the transaction, thereby minimizing the risk of errors. Additionally, the page offers a selection of available payment methods, enabling visitors to choose the option that best suits their preferences and convenience, whether through digital wallets, bank transfers, or other supported channels. Designed with a clean and intuitive layout, the payment page facilitates a seamless transition from booking to transaction completion. Figure 8 illustrates the implementation of this payment page, showcasing its structured design and user-centric functionality aimed at ensuring a secure and efficient payment experience.

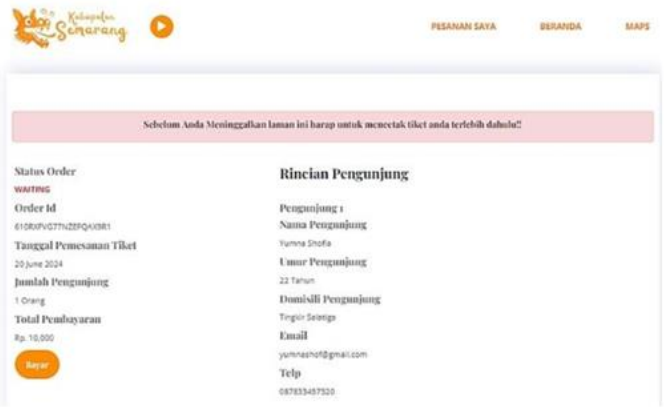


**Figure 8. Payment Page Implementation**

The Bukit Cinta tourist attraction ticket booking website integrates a dedicated map feature designed to assist visitors who may be unfamiliar with the exact location of the destination. This feature provides an interactive and easily navigable visual guide, enabling users to pinpoint the site's position and plan their travel route with greater accuracy and convenience. By offering real-time location data and a clear geographical context, the map not only enhances user experience but also reduces the likelihood of navigation errors, thereby improving accessibility for both local and out-of-town visitors. Figure 9 illustrates the implementation of this map feature, highlighting its role as an essential tool in supporting a smooth and informed journey to Bukit Cinta.


**Figure 9. Implementation of Route Pages**

The login page is an exclusive access point reserved solely for the Bukit Cinta administrative team, ensuring that only authorized personnel can enter the system's management interface. To gain access, the administrator is required to input the designated username and password credentials, which serve as the primary authentication mechanism for system security. Upon successful verification, the admin is automatically redirected to the dashboard page, where essential management tools and operational data are made available. This controlled entry process not only safeguards sensitive information but also upholds the integrity of the platform's administrative functions. Figure 10 illustrates the implementation of the admin login page, showcasing its secure and user-oriented design.

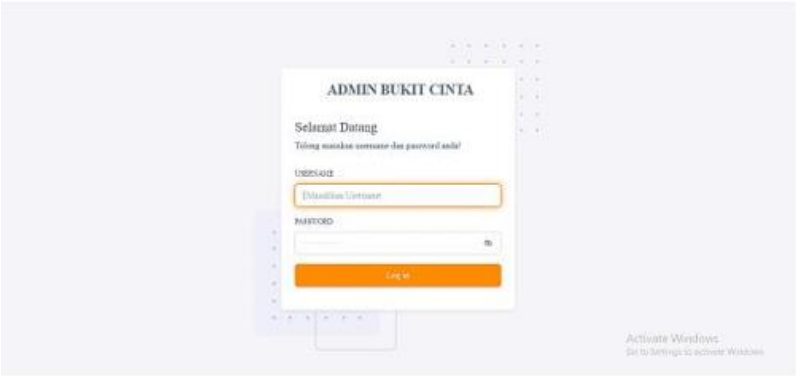


**Figure 10. Implementation of the Admin Login Page**

Upon successfully entering valid username and password credentials, the administrator is granted authorized access to the system and immediately directed to the initial landing page, which prominently displays the transaction history table. This page serves as the core administrative dashboard for overseeing all recorded ticket transactions, providing a structured and intuitive interface for operational management. By centralizing transaction data in a single view, it enables the administrator to monitor and verify the accuracy of each record, ensuring that the booking and payment processes are properly documented. Within the transaction history table page, the administrator is equipped with essential tools to manage and maintain data effectively. These include the ability to view comprehensive transaction details for audit or customer service purposes, remove outdated or erroneous entries to uphold data integrity, and export the table into Excel format for reporting, analysis, or long-term archiving. This combination of features not only streamlines workflow but also enhances accountability and operational efficiency. Figure 11 presents the implementation of this transaction history table page, showcasing its organized design and versatile functionality tailored to administrative needs.

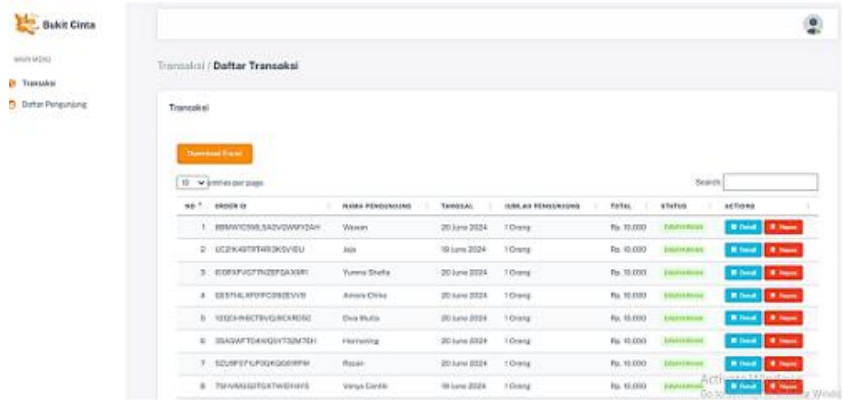


**Figure 11. Implementation of Transaction History Page**

The visitor data menu is positioned directly beneath the transaction history menu within the administrative interface, serving as a dedicated section for managing records related to individual visitors. This page provides the administrator with the capability to efficiently oversee and organize visitor information, ensuring that all data is accurate and up to date. From this interface, the administrator can view detailed records associated with each visitor, enabling thorough verification for operational or reporting purposes. In addition to viewing details, the visitor data menu allows the administrator to delete outdated or incorrect entries, thereby maintaining the integrity and reliability of the database. The layout is designed to be clear and user-friendly, facilitating quick access to relevant information and efficient execution of administrative tasks. Figure 12 illustrates the implementation of the visitor data menu page, highlighting its functional design and its role in supporting effective visitor data management.

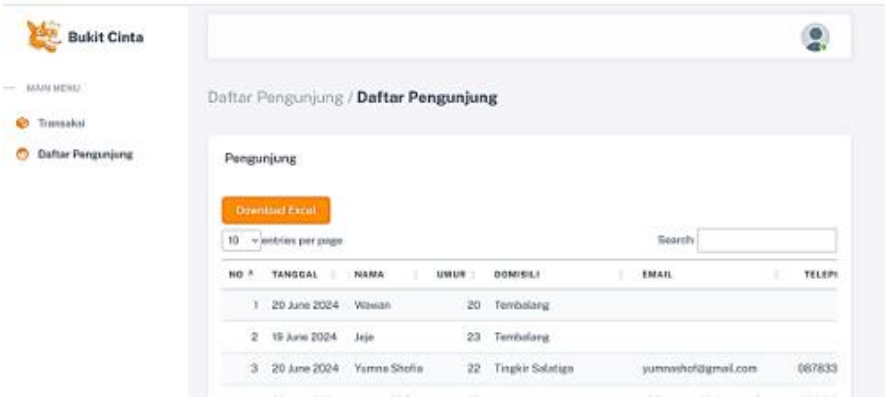


**Figure 12. Data Page Implementation Visitors**

**Results of Interface Implementation on Android**

The implementation of the Android was designed to provide visitors with a seamless and intuitive ticket booking and payment experience. The first screen presented to users is the home page, which serves as the primary entry point for navigating the application. This page features a “Book Ticket” button leading directly to the ticket reservation process, a section showcasing available facilities at Bukit Cinta, and an interactive button for playing background music. Such design elements not only facilitate ease of navigation but also enhance user engagement from the outset, as illustrated in Figure 13. Upon clicking the “Book Ticket” button, visitors are directed to the ticket booking page, which contains the applicable terms and conditions for purchasing entry tickets. This page ensures that users are fully informed about booking policies before proceeding, thereby minimizing disputes or misunderstandings. Additionally, it includes a button to access the ticket date selection feature, guiding users through the reservation process in a structured and transparent manner, as depicted in Figure 14. The date selection page enables visitors to choose the intended date of ticket use, either on the same day or for a future visit. This flexibility accommodates both spontaneous and planned trips, allowing the application to cater to a wider range of visitor preferences.

The interface employs a clear and interactive calendar design, ensuring that users can effortlessly select their preferred date without confusion, as shown in Figure 15. Once the date has been confirmed, visitors are directed to the personal data entry page. Here, they are required to provide essential details such as name, age, place of residence, email address, phone number, and the number of tickets being purchased. This step ensures that bookings are recorded accurately and that necessary visitor information is available for operational and safety purposes. The design prioritizes clarity and logical field arrangement, enabling quick and accurate data input, as illustrated in Figure 16.

After entering the required details, the application displays an order summary page that consolidates all previously entered information for review. This page includes booking date, visitor name, age, domicile, email, and phone number, ensuring that users can verify all details before making a payment. This verification step helps reduce errors and enhances customer confidence in the transaction process, as depicted in Figure 17. When the user proceeds to payment by clicking the "Pay" button, the system redirects to the Midtrans payment gateway interface. At this stage, visitors are presented with multiple payment method options, including Bank Virtual Account, QRIS, and Gopay. This variety ensures inclusivity by accommodating different payment preferences and financial platforms commonly used in Indonesia. Figure 18 demonstrates the design of the payment method selection page.

Upon selecting a preferred payment method, the application transitions to the payment execution page provided by Midtrans. This page offers step-by-step instructions tailored to the chosen payment method, ensuring clarity and minimizing the likelihood of user error. The straightforward design and instructional approach enhance the efficiency and success rate of payment completion, as shown in Figure 19. Following a successful payment, the system updates the booking status to "Settlement" and enables access to the ticket download feature.

Visitors can generate a PDF file containing complete booking details and a barcode, which serves as the key for gate access at Bukit Cinta. This functionality streamlines the check-in process, reduces paper usage, and supports the transition toward digital ticketing systems, as depicted in Figure 20. Finally, the generated PDF ticket includes both the visitor's details and the unique barcode required for entry validation. This integration of personal data with a scannable code not only enhances security but also facilitates efficient crowd management at the venue. The design of the printed ticket, as shown in Figure 21, reflects the system's commitment to combining operational efficiency with user convenience, marking the final stage of the Android-based booking and payment process.

**Black Box Test Results**

The Black Box testing confirms that the system performs all required functionalities accurately and reliably. On the visitor side, the dashboard was tested to ensure that users could access it smoothly, and results showed the page loaded correctly without any navigation or display errors. This initial access point is critical, as it serves as the main gateway for visitors to interact with the system. The consistent "as expected" result indicates a stable foundation for the subsequent features of the platform. Further testing on the map feature demonstrated that users could view location information after selecting the "Maps" navigation option. This function is essential for a tourist attraction, as it enhances visitor orientation and planning before arrival. The system's responsiveness in loading maps ensures that users can effectively locate facilities and points of interest within Bukit Cinta. This contributes not only to convenience but also to the overall visitor experience. The ticket booking process underwent multiple functional verifications, including access to the booking page, date selection, and data form completion.

Visitors were able to select a visit date, input personal details, and proceed through the booking flow without technical issues. The tests showed that after form completion, the system accurately displayed ticket details for confirmation. Such seamless functionality is vital to ensuring user confidence and reducing potential drop-offs during the transaction process. Payment system integration, particularly with the Midtrans payment gateway, was also tested thoroughly. Visitors could select a payment method after clicking "Pay," complete the payment, and receive confirmation of successful transactions.

The results indicate that the payment gateway connection is stable and capable of processing real-time transactions without errors. This functionality is critical, as it directly impacts revenue generation and the trustworthiness of the platform. Post-purchase features were tested to ensure visitors could manage and verify their bookings. The "My Orders" page provided detailed ticket information and

transaction status as expected. Additionally, users were able to download ticket barcodes in PDF format, ensuring ease of access for entry verification at the attraction. This not only supports operational efficiency but also aligns with digital ticketing trends that enhance user convenience. On the administrative side, the login system was tested to verify that administrators could access the dashboard using valid credentials.

Upon successful login, the admin interface loaded the management dashboard, providing access to critical operational tools. This secure entry point ensures that only authorized personnel can manage transaction and visitor records, maintaining data integrity. Administrative functions such as viewing transaction lists, accessing visitor data, deleting records, and downloading reports in Excel format were all tested and confirmed to be functioning correctly. Additionally, the ability to view detailed transaction records was validated, ensuring that administrators have the necessary insights for operational oversight. The system's ability to export data into Excel supports offline analysis and record-keeping, an essential feature for long-term operational management. Finally, the logout feature for administrators was confirmed to work as intended, effectively terminating active sessions and preventing unauthorized access.

Across all tested features, both for visitors and administrators, results consistently matched expected outcomes. This comprehensive success in Black Box testing indicates that the system is robust, user-friendly, and ready for live deployment. The smooth integration of booking, payment, and administrative functions is expected to improve operational efficiency, enhance visitor satisfaction, and support the long-term sustainability of Bukit Cinta's tourism services.

**Website Performance Test Results**

The next test is a stress test on the visitor website. For the stress test on the website, Gatling Enterprise software is used. In this test, several parameters are used for testing, namely error ratio, request response time, maximum number of virtual users, total number of requests, response testing per second, CPU usage, and connection usage in bits/second. The following are the results of the stress test on the visitor website using a speed of 38.19 Mbps. This test resulted in an error ratio of 0% with a total of 100 requests and a maximum of 3 virtual users simultaneously at one time with a response time of 345ms. Figure 22 shows the overall results of the website performance test.


**Figure 13. Website Performance Test Results**


**Figure 14. Test Results for Connection Usage in Bits per Second**

Figure 14 above shows a graph of the results of testing the use of connections in the system in bits/second on the visitor's website using a high-speed network. The X-axis represents the simulation time. Each point on the X-axis represents one second of simulation time, while the Y-axis represents bits per second. Each point on the Y-axis represents the amount of data sent or received per second at a specific time during the simulation. The data rate test is used to monitor how much data is sent and received in bits per second, as shown in the red and blue lines in the graph. The blue line indicates the data rate of sent data (bits/sent at 33,952 bits), while the red line indicates the data rate of received data (bits/received at 608,272 bits). Low bits/sent values and high bits/received values indicate that the server is capable of responding to requests quickly and in large quantities. A smooth and consistent graph shape indicates stability in data transmission and reception rates throughout the testing period.

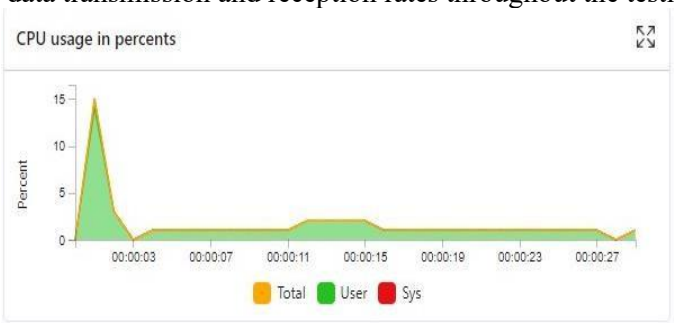


**Figure 15. Hasil Pengujian Penggunaan CPU**

Figure 15 above shows a graph of the results of testing CPU usage on visitor websites in percentage terms (%) with high internet speeds. The X-axis represents simulation time. Each point on the X-axis represents one second of simulation time, while the Y-axis represents the percentage of CPU usage. Each point on the Y-axis represents the percentage of CPU usage at a specific time during the simulation. CPU usage testing is used to monitor how much the system uses the CPU, as shown in the graph. The red line (sys) or system time indicates CPU usage by system application processes. The green line (user) or user time indicates CPU usage by users or clients while the application is being tested. The yellow line indicates total CPU usage. Based on the graph above, it can be seen that there is a spike in CPU usage of up to 14% at the beginning of the test due to initial processing that requires more resources. However, after the initial spike, CPU usage decreases and stabilizes below 5% during the testing process, indicating that after initial processing, the application runs stably and does not significantly burden the CPU.

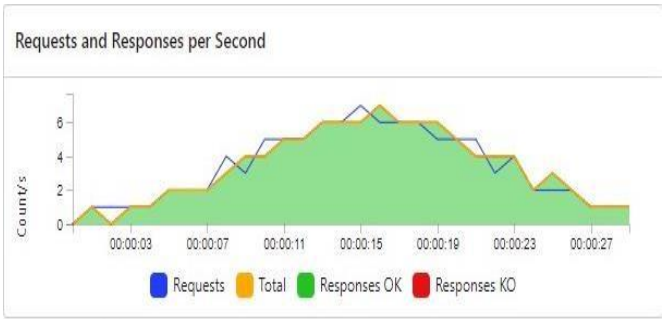


**Figure 16. Results of Response Testing per Second**

Figure 16 shows the relationship between requests and responses in seconds during testing with high internet speeds on the visitor's website. The horizontal axis (X) shows time in minutes and seconds, while the vertical axis (Y) shows the number of requests or responses per second shown in the graph. Based on the graph above, it can be seen that the blue line (Requests) and the green area (Responses OK) are almost parallel throughout the test duration, indicating that almost all requests were successfully handled by the application. The red area (Responses KO or failed responses) is almost non-existent, indicating no failed requests during the test. The graph generated in this test shows that the highest number of successful responses per second was 7 requests sent with 6 successful responses received and no failed responses. When reaching the peak of 7 responses per second, the curve then

slopes downward, indicating that the application is operating stably and there is no significant drop in performance. This indicates that the application is capable of handling request and response loads stably.

**Android Performance Test Results**

Android testing is performed using the Android Profiler feature in the Android Studio application. Android Profiler is a feature within Android Studio that allows developers to monitor and analyze the performance of their applications in real time.

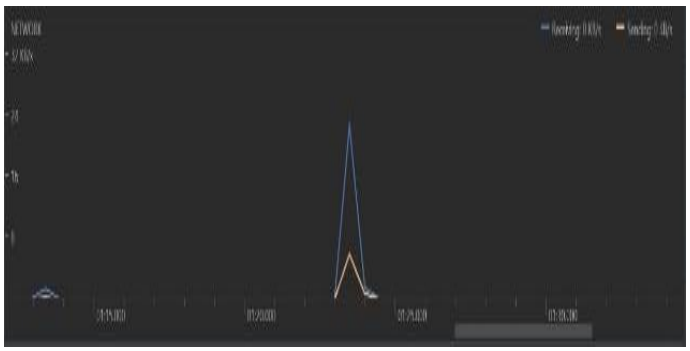

**Figure 17. Results of Android Network Usage Testing**

Figure 17 above shows a graph of the results of testing network usage on the visitor's Android application in KB/s. When the system loads the page, the application shows that the received network usage is 21.8 KB/s, while the sent usage is 5.6 KB/s. The data sent includes images, text, or other data required to display the system page, while the data received consists of HTTP requests to send visitor form data to the server and payment requests to the Midtrans payment gateway. The application loads more received network usage (received) than sent network usage (sent). This is because the system loads many images on the initial system page, and also due to requests to the server to retrieve visitor data, such as name, age, address, email, and phone number, for ticket payment, which is then displayed in the form of a PDF file.

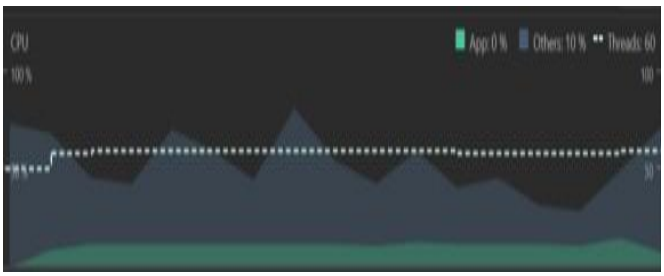


**Figure 18. CPU Usage Results on Android**

Figure 18 presents a graphical illustration of the CPU usage test results for the visitor’s Android application, expressed as a percentage (%). During the initial loading of the home page, CPU utilization reached 12%, reflecting the processing demand required to initialize the interface, load multimedia elements, and prepare interactive components. This peak is considered efficient for an application of this type, as it demonstrates that the processing load during startup remains well within acceptable performance thresholds.

Once the application transitioned into its normal operational state, the average CPU usage consistently dropped to below 10%, indicating effective load management and efficient background processing. This low and stable CPU consumption suggests that the application is optimized to handle user requests smoothly without causing significant strain on device resources. Such performance stability not only ensures responsiveness and fluid navigation but also contributes to prolonged battery life, thereby enhancing the overall user experience on Android devices.

**Figure 19. Memory Usage Results on Android**

Figure 19 illustrates a graphical representation of the memory usage test results for the visitor's Android application, measured in megabytes (MB). During the initial page loading process, memory consumption peaked at approximately 256 MB, reflecting the allocation of resources required to render the primary interface and initialize core application components. However, once the application entered its operational state, memory usage significantly decreased to 95.7 MB, indicating efficient memory release and optimization during runtime. This performance pattern demonstrates that the application maintains low and stable memory utilization throughout its operation, ensuring optimal responsiveness, reduced risk of performance degradation, and enhanced user experience on Android devices.

## CONCLUSION

Based on the results of the design and testing that has been carried out, several conclusions can be drawn regarding the Website and Android-based Ticket Purchase Information System with Midtrans Payment Gateway at Bukit Cinta Tourist Attraction. The following conclusions can be drawn:

1. The online ticket purchasing system utilizing the Midtrans payment gateway has been successfully implemented with 22 visitors participating in the trial.
2. During testing, all data in the visitor application and the admin database application were synchronized.
3. Testing the application using the black box testing method showed that the application interface functions as planned.
4. Application testing using stress testing showed that on a high-speed network (38.19 Mbps), data reception speed was higher (0% error rate with a response time of 345 ms) compared to a low-speed network (1.82 Mbps, 1% error rate with a response time of 7.39 seconds).
5. Performance testing on Android shows the highest network speed of 409.4 KB/s for received data and 22.7 KB/s for sent data. The highest CPU usage is 12% (when loading the initial page) and the highest memory usage reaches 256 MB (when loading the initial page).

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