ANALYZING BENGKALIS E-GOVERNMENT WEBSITE USING GTMETRIX

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Abstract

Website is an important information and communication media for disseminating information openly and widely throughout the world. In the world of government, websites are very important as a supporting facility for information and communication needs. The purpose of this research is to analyze the performance of the Bengkalis government website, SiPendekar, using evaluation method. The assessment is conducted using the GTmetrix measurement tool, which gauges website performance using various performance metrics. Based on the assessment result, SiPendekar website performance gain 65% or in grade C which means SiPendekar website performance is relatively good. If the website performance is good, it will automatically influence the interest of people in using the website.

1. INTRODUCTION

Internet technology is now extensively utilized across various sectors, including business, healthcare, education, and government. Within the government sector, this utilization of information technology is commonly referred to as electronic government or e-government. Simply put, e-government or digital government entails government activities supported by information technology to deliver services to the public. The significance of e-government encompasses three key aspects: (1) Fostering a government that is responsive to the community's needs and aspirations; (2) Promoting the disclosure and utilization of information; (3) Enhancing public participation in the government's administrative processes [1]. In Indonesia, the implementation of e-government within government administration has been initiated in recent years. Both the central government and regional administrations have adopted e-government practices tailored to the specific requirements of their respective areas. The development of e-government in Indonesia is facilitated by several key regulations, including Presidential Decree No. 3 of 2003 on the National Policy and Strategy for e-Government Development, Law No. 14 of 2008 on Public Information Transparency, and Government Regulation No. 61 of 2010 on the Implementation of the Public Information Transparency Law [2].

As part of Indonesia's bureaucratic reform, e-government plays an increasingly pivotal role in enhancing the quality of public services and facilitating more efficient information dissemination. It is essential to recognize that, according to the provisions of the 1945 Constitution, Article 18, paragraph (2), and Article 34, paragraph (3), the government's primary focus should be on improving public services. These services are considered

fundamental rights of society [1]. The present research endeavors to analyze and assess the implementation of district e-government websites in Indonesia, with a specific focus on Bengkalis Regency. Bengkalis Regency is one of the districts that has successfully implemented an e-government system. This e-government implementation in Bengkalis Regency relies on information technology-based platforms, particularly websites as a means of information dissemination. The government aims to enhance the quality of services to the public and businesses, thereby improving the efficiency and effectiveness of bureaucratic processes to promote good and transparent governance.

It is believed that the use of information technology, specifically websites, can yield several benefits in the implementation of e-government, including: (1) Easy accessibility to public information; (2) Enhanced transparency of government activities, making them readily accessible to the public. The primary motivation for implementing e-government in Bengkalis Regency is the convenience and efficiency offered. The use of website-based information technology helps bridge the information distribution gaps within the government, ensuring that the public has access to comprehensive and up-to-date information [3]. Despite the implementation of website-based information technology in Bengkalis Regency, not all information services have been fully realized. Therefore, it is imperative for website administrators in Bengkalis Regency to conduct periodic evaluations of website performance. This assessment aims to gauge the website's effectiveness and identify areas for improvement. Several tools can be employed to measure website performance, including Load Impact, KeyCDN Website Speed Test, Geek Flare, and GTMetrix.

2. RESEARCH METHODS

The research method employed in this study is evaluation research. Evaluation research involves the collection of data or information for the purpose of comparison with established criteria, leading to the derivation of conclusions. These conclusions constitute the evaluation results [7]. Therefore, the fundamental principle of evaluation research is to make informed decisions by assessing the collected data or information against predefined criteria, standards, or benchmarks used as reference points. In this study, the selected tool for evaluation is GTMetrix. GTMetrix is a tool to test website performance and find out the website speed score based on several metrics. If the website score is considered slow, GTMetrix will pinpoint the website's shortcomings. Then, it will provide recommendations to enhance website speed. GTMetrix can be used for free via an internet search tool by accessing the link https://gtmetrix.com/. GTMetrix will display the results in the form of "GTMetrix Grade" which contains levels from A-E. Apart from that, it also contains the percentage of website performance using the percent unit system (%) and the structural improvements that need to be made. GTMetrix Grade is the overall result of your website's performance. In this section, three metrics are assessed, which are:

1. Overall Score – The overall grade for your website's performance. It is evaluated as a grade (A, B, C, and so on). The higher the grade, the better your website's performance.

2. Performance – The website's performance score indicates how fast your website is when accessed by visitors. It is evaluated as a percentage. The higher the percentage, the faster your website.
3. Structure – The website's structure score shows how well your website is built for optimal performance. Similar to Performance, Structure is also evaluated as a percentage.

1. Loading Performance (45%)

   a. First Contentful Paint (10%)

   b. Speed Index (10%)

   c. Largest Contentful Paint (25%)

2. Interactivity (40%)

   a. Time to Interactive (10%)

   b. Total Blocking Time (30%)

3. Visual Stability (15%)

   a. Cumulative Layout Shift (15%)

Each metric is measured, and a score is calculated, then compared with thresholds and aggregate results (with appropriate weights), forming a final performance score. The structure is a structure score that tells how well a page or website is created for optimal performance. The GTMetrix team has assigned point values based on several factors, including potential savings and importance. Additionally, the GTMetrix team includes its own custom audits that it considers relevant to web performance. This GTMetrix team audit includes:

1. Enable Keep-Alive
2. Combine images using CSS sprites
3. Use a Content Delivery Network (CDN)
4. Avoid CSS @import

3. RESULT AND DISCUSSION
3.1 Electronic Government

According to Diskominfo [7], e-government constitutes an initiative aimed at advancing electronic-based government administration. It involves the organization of management systems and workflows within the government through the optimization of information and communication technology. As noted by A. Akbar and D. I. Ilmuse [8], e-government seeks to enhance the quality of public services by offering services that can be accessed in real-time, anytime, and from anywhere. Essentially, e-government harnesses information technology as a tool to streamline government operations, and it encompasses the utilization of information and communication technology and the internet, which can reshape interactions with citizens, business professionals, and other government entities. The primary objective is to enhance accessibility and provide comprehensive government services that benefit the community,

business personnel, stakeholders, and citizens by ensuring access to information [9]. From these definitions, we can conclude that e-government represents a government initiative that effectively and efficiently employs information technology to provide government services to citizens, business professionals, stakeholders, and other government entities.

3.2. Website

A website is an online platform that provides information accessible worldwide as long as there is an internet connection. It comprises various media types, including text, images, sound, and animations, making the information presented more engaging for visitors [10]. Websites facilitate easy access to both public and government information. However, a website becomes ineffective without an internet connection, as it relies on this network for information dissemination. Websites are created using a variety of programming languages, such as PHP (PHP Hypertext Preprocessor), JavaScript, Python, and rely on markup languages like HTML (Hypertext Markup Language) and CSS (Cascading Style Sheets) to enhance their visual appeal. Given the contemporary presence of a modern government system, often referred to as e-government, and the government's aim to provide accessible information to the public, it is essential to take steps to develop user-friendly websites that are easily understandable by the public.

Table 1. LIST OF GTMETRIX GRADE ASSESSMENT CRITERIA

No	Skor (%)	Grade	Kriteria
1	90 – 100	A	Very good
2	80 < 90	B	Good
3	70 < 80	C	Fairly good
4	60 < 70	D	Not good
5	50 < 60	E	Bad
6	0 < 50	F	Very bad

3.3 Assesment result of Bengkalis e-government Website

A. SiPendekar Website Performance

SiPendekar is a web-based service that can be used by people of Bengkalis Regency to make reports of complaints or aspirations. This service application was created and developed by the Department of Communication, Informatics, and Statistics, starting from the year 2021. The SiPendekar Service Application involves public participation and two-way communication based, serving as a tool for conveying complaints from the public to the government. The public can submit complaints, which will be followed up by the relevant Regional Apparatus, and will be directly monitored by the Regent, Vice Regent, and Secretary of the Region.

The GTmetrix analysis results show that overall SiPendekar website has Grade C, with performance is 65% and website structure is 82%. It means that the website is considered fairly good.

3.4 Web vitals analysis result

Web Vitals are measurements of several core elements of your website. They are used to calculate how long it takes for a website to load. The three metrics evaluated in Web Vitals are:

- Largest Contentful Paint (LCP). The website LCP displays 3.7s which means it exceeded the maximum standard set by GTmetrix of 1.2 seconds

- Total Blocking Time (TBT). The website TBT displays 0ms which means it is below the maximum standard by GTmetrix of 150ms. The results show that it does not take longer for a web page to load when it is accessed by the user

- Content Layout Shift (CLS). The website CLS displays 0.02 which means it is below the maximum standard set by GTmetrix of 0.1.

3.5 Speed Visualization result

Tab Speed Visualization provides a detailed depiction of the loading time range required for your website. Here, it displays when the first content appears and when the website becomes accessible to users. The website displays website speed visualization of TTFB 1.1s, FCP 1.9s, TI 2.1s, LCP 3.7s, Onload Time 3.8s, Fully Loaded Time 4.0s.

3.6 Performance Metrics

Performance Metrics measure website speed using the Lighthouse tools. Some of the evaluated metrics include:

1. First Contentful Paint - How long it takes for the first largest content to appear. The FCP website displays 1.9s which means it exceeded he maximum standard of 0.9 seconds. It tells that it takes longer for the largest content to appear.

2. Speed Index - How quickly your website's content becomes fully visible. The SI website displays 3.5s which means it exceeded the maximum standard of 1.3 seconds.

3. Time to Reactive - How long it takes for your website to become fully usable. The TR website displays 2.1s which means it is below the maximum standard of 2.5 seconds.

3.7 Browser Timings

Browser Timings measure website speed using a web browser. Some of the metrics used are

a. Redirect Duration - The time it takes to redirect the URL before all HTML scripts are displayed. The website result display 0ms which means it comply with the standard.

b. Time to First Byte - The time it takes to request a web page from the respective server. The website result displays 1.1s which means it comply with the standard.

c. DOM Content Loaded Time - The time it takes to process the Document Object Model (DOM) to make it ready for display on the website. The website result displays 2.1s

which means it exceeded the standard of 1.8s.

d. Connection Duration - The total time required to connect to the server after the URL redirect process. The website result displays 870ms which means it is below the standard.

e. First Paint - The time it takes for the browser to render the web page for the first time. The website result displays 1.9s which means it exceeded the standard of 1.7s.

f. Onload Time - The total time required to download and process the web page until everything can be displayed. The website result displays 3.8s which means it exceeded the standard of 3.3s.

g. Backend Duration - The time it takes for the server to process the web page request. The website result displays 232ms which means it is below the standard of 436 ms.

h. DOM Interactive Time - The time required to manipulate the DOM so that it can be fully used on the website. The website result displays 2.1s which means it complies with the standard.

i. Fully Loaded Time - The total time required to process all the above metrics until the website can be used by the user. The website result displays 4.0s which means it does not comply with the standard.

3.8 Structure

Tab Structure displays the results of GTMetrix's audit of your website's front-end structure. Here, you can see what constraints are related to front-end scripts and their impact on your website's performance. The result displays that the website structure does not have high impact but med and med-low. The med impact is on use explicit width and height image elements and the med-low includes serve static asset, use a content delivery network, and avoid CSS @import. These result show that the website does not have the high impact on the speedy of website but just minor impact on the front end that influence the loading time.

3.9 Top Issues dan Page Details

Top Issues is a summary of website constraints from the Structure tab. As for Page Details, this section provides a more concise version of the diagram in the Waterfall tab. The website result displays that the website does not have the high impact on a summary of website constrains. Moreover, the website has med and med-low impact. The med impact includes on use explicit width and height image elements and the med-low includes serve static asset, use a content delivery network, and avoid CSS @import. Although it has med and med-low impact, but it need recommendation for the improvement to upgrade the quality of website performance to achieve very good category.

Table 2. RESULTS OF WEBSITE PERFORMANCE ANALYSIS USING GTMETRIX

No	Website	Grade	Performance (%)	Structure (%)
1	Si Pendekar	C	88	85

Conclusion

The website of SiPendekar as the website that allow people of Bengkalis Regency to submit their complaint and express their aspiration has been through the assessment of GTmetrix tools. The result show that the overaal score of website performance is fairly good. This means that the website need recommendation for improvement to achieve its good category. The performance of website in the grade C does not display many constraints as it just has impact in the level of med and med low. There is no high-level impact found in the assessment result. Although the improvement recommendation is in need if the larger constraint will not happen in the future so people are able to keep submitting their aspirations through the website and have interest in using it as a communication media and disseminating information media.The summary impact for the recommendation improvements includes use explicit width and height image elements, serve static asset, use a content delivery network, and avoid CSS @import. In addition, the problem in browsing timing still need improvement as it is found not all of the metrics comply with the standard set by GTmetrix. Browsing timings is one of the important metric for the website performance indicator as it measure website speed using a web browser.

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