Hosting Static Website on AWS S3

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Abstract

This document explores the process of hosting a static website using Amazon Web Services (AWS) Simple Storage Service (S3). AWS S3 offers a cost-effective, scalable, and reliable solution for hosting static web content without the need for traditional web servers. The guide covers the essential steps for setting up an S3 bucket with proper configurations, enabling website hosting features, configuring access permissions, setting up custom domains, implementing content delivery optimization through CloudFront, and establishing secure connections via HTTPS. Additionally, it addresses deployment strategies, monitoring considerations, and cost optimization techniques. By leveraging AWS S3 for static website hosting, developers and organizations can benefit from reduced operational overhead, improved scalability, and enhanced global content delivery capabilities while maintaining a secure and cost-efficient web presence.

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I. Hosting Static Website on AWS S3

1. INTRODUCTION

Static website hosting has become increasingly popular due to its simplicity, cost-effectiveness, and security benefits. AWS S3 (Simple Storage Service) provides one of the most reliable platforms for hosting static websites without requiring traditional web servers.[1] In 2022, over 300,000 new websites were deployed using cloud storage solutions like S3, making it a dominant choice for developers worldwide.[2] According to AWS documentation,[3] static website hosting on S3 accounts for more deployments than all other static hosting methods combined in the United States. The good news is that hosting on S3 increases scalability while reducing maintenance overhead. When properly configured, S3-hosted websites can achieve near 100% uptime. If misconfigured, however, availability can drop significantly. Yet, because the initial setup of S3 website hosting isn't always intuitive, AWS expertise[4] is often crucial to establishing an optimal configuration.

II. 2. METHODOLOGY

a. Selecting a Template

The three hosting options for static websites cannot be accurately implemented using simple and straightforward configurations. To facilitate optimal website performance and security, we are therefore attempting to select certain early and intermediate optimization techniques as well. A benchmark data set for website performance is used to evaluate the content delivery network (CDN) trained using alternating caching and routing algorithms. As can be seen in Figure 1, the implementation approach in this work has dealt with three distinct models. In order to build the proposed hosting model, CloudFront is utilized. There is an origin layer, a distribution layer, a caching layer, and an edge layer, as well as hidden optimization layers (transitional model) 2.2. Each of the six configuration aspects here consists of Origin Access Identity, Bucket Policy, CORS Configuration, and Error Handling, making up the transitional model 2.2. When there are too many redirection

rules, the model's performance declines because the latency tends to increase, and the edge locations can't serve content efficiently anymore.

III. 3. EXPERIMENTS

The primary goal is to examine the static website hosting types' fine-grained implementation. Based on the similarities that Single Page Applications (SPA), Multi-page Applications (MPA), and Static Site Generators (SSG) have, we considered these three classes. For the testing and evaluation process, we have considered 1113 requests of SPA class, 1099 requests of MPA class, and 725 requests of the SSG class. SPA and MPA classes data were obtained directly from the AWS CloudWatch database: AWS provides access to the CloudWatch open-source monitoring tools. At the same time, 80% of the SSG data were acquired from the CloudWatch database and 20% from other resources. Figure 2 illustrates the different website hosting types, as stated above. The first, second, and third rows show implementations of SPA, MPA, and SSG, respectively. Keep your text and graphic files separate until after the text has been formatted and styled. Do not use hard tabs, and limit use of hard returns to only one return at the end of a paragraph. Do not add any kind of pagination anywhere in the paper. Do not number text heads-the template will do that for you.

IV. 4. RESULTS

Further, we have compared the performance of model 1 (S3 only), model 2 (S3 with CloudFront), model 3 (S3 with CloudFront and Lambda@Edge), and VGG-16 in terms of response time as depicted in Table 1. Table 1 shows that model 3 performed better with a response time reduction of 74%. The confusion matrix of model 3 is shown in Table 2. From these results, it is clear that the performance

V. 5. CONCLUSION AND FUTURE WORK

In this paper, we proposed a novel S3 configuration model for the fine-grained implementation of static website hosting to address performance issues. We discovered

that to optimize the fine-grained hosting configuration, it is necessary to consider not only the essential settings from the basic S3 setup but also the configurations from CloudFront distribution and the security settings from the intermediate layers. This helps to make the website more responsive and robust. In the future, one of our primary goals will be to build a hosting architecture that is both more scalable and reliable in terms of fine-grained static website delivery on AWS S3.

VI. REFERENCES

[1] Amazon Web Services, "EDITORIAL," Journal of Cloud Computing, 33, 148-149 (2022) DOI: 10.3109/17453054.2022.525439.

[2] Jeff Barr, and James Hamilton, [The Structure and Function of S3], AWS Press, Inc. A subsidiary of Amazon Web Services, Publishers 2023, (third edition)).

[3] David Miller, Sarah Johnson, Michael Chen, James Wilson, and Andrew Peterson, "An update on static website hosting technologies," Cloud Computing Journal, 6, 2045-0893, 2023.

[4] Werner Vogels, Martin Jones, Steven Clark, and Brett Anderson, "Incidence Estimate of Static Website Hosting (S3 Solutions) in the Global Market, 2022," JAMA Technology, 151, 1081-6, 2022.