**Hosting A Sample Website Using AWS S3**

*(13 size) A Project Based Learning Report Submitted in partial fulfilment of the requirements for*

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**CLOUD & SERVERLESS COMPUTING (22CEC3305A)**

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# **Introduction**

This project demonstrates how to host a static website using **Amazon Web Services (AWS) Simple Storage Service (S3)**. AWS S3 provides a highly scalable, cost-efficient, and reliable solution for hosting static websites without the need for traditional web servers.

This project demonstrates how to host a static website using **Amazon Web Services (AWS) Simple Storage Service (S3)**. AWS S3 provides a highly scalable, cost-efficient, and reliable solution for hosting static websites without the need for traditional web servers.

To enhance accessibility and performance, **AWS services such as Amazon CloudFront and AWS Route 53** can be integrated. CloudFront improves content delivery speed by caching website resources globally, while Route 53 provides domain name resolution, allowing users to map custom domain names to their S3-hosted site.

The serverless nature of AWS S3 ensures reduced operational overhead, automatic scaling, and minimal maintenance efforts. By leveraging **AWS Identity and Access Management (IAM) policies and S3 bucket policies**, website access control and security are effectively managed.

This project showcases a streamlined approach to deploying and managing a static website with AWS S3, ensuring a **cost-effective, highly available, and easily maintainable web hosting solution**.

**Literature Review**

The advent of cloud computing has transformed web hosting, offering highly scalable, cost-effective, and secure alternatives to traditional server-based hosting. This literature review explores the foundational technologies, applications, and advancements in static website hosting using Amazon Web Services (AWS) Simple Storage Service (S3).

**1. Introduction to Cloud-Based Web Hosting**

Traditional web hosting involves provisioning physical or virtual servers, managing infrastructure, and scaling resources based on traffic demands. However, cloud-based hosting solutions such as AWS S3 eliminate these challenges by offering serverless object storage, which is cost-efficient, highly available, and globally distributed. AWS introduced S3 Static Website Hosting to enable developers to serve static HTML, CSS, and JavaScript files directly from S3 buckets without provisioning a dedicated web server.

**2. Amazon S3: The Core of Serverless Website Hosting**

Amazon S3 is a highly durable and scalable object storage service designed for storing and retrieving large amounts of data. S3’s static website hosting feature allows users to serve content over HTTP using a publicly accessible bucket.

Advantages of Using S3 for Web Hosting

* Cost-Efficiency: Unlike traditional hosting services, users pay only for the storage and bandwidth used, avoiding fixed server costs.
* Scalability: AWS S3 automatically handles traffic spikes, ensuring high availability without manual intervention.
* Reliability: S3 provides 99.999999999% durability (11 nines) and replicates data across multiple AWS Availability Zones.

According to a 2021 Gartner report, companies adopting S3-based website hosting reduced hosting costs by 60%, while achieving higher availability and simplified management.

**3. Enhancing Website Performance with AWS CloudFront**

While S3 efficiently hosts static websites, Amazon CloudFront, AWS’s Content Delivery Network (CDN), enhances performance by caching website content across edge locations worldwide. This minimizes latency and speeds up content delivery for users across different geographical regions.

Studies indicate that CDN integration reduces webpage load times by 50%, leading to improved user engagement. A 2020 report by Akamai Technologies highlights that websites loading in under 3 seconds experience 35% higher retention rates compared to slower sites.

**4. Domain Management and DNS Routing with AWS Route 53**

For branding and accessibility, businesses often prefer using custom domain names instead of AWS’s default S3 website URLs. AWS Route 53, a highly available Domain Name System (DNS) service, allows users to configure custom domain mappings to their S3-hosted websites.

Benefits of Route 53 for Static Website Hosting:

* Low-latency DNS resolution for faster access.
* Automatic domain failover to ensure high availability.
* Seamless integration with S3, CloudFront, and AWS Certificate Manager for SSL/TLS encryption.

Research by IDC (2022) suggests that integrating Route 53 with CloudFront improved website response times by 30% compared to traditional DNS providers.

**5. Security Considerations in S3 Website Hosting**

Ensuring security in publicly accessible S3 buckets is critical. AWS offers several mechanisms to protect hosted content:

* S3 Bucket Policies & IAM Roles: Restrict access to prevent unauthorized modifications.
* AWS Web Application Firewall (WAF): Mitigates common threats such as DDoS attacks and SQL injection.
* SSL/TLS Encryption: Ensures secure communication between the client and server when integrated with AWS Certificate Manager.

A 2020 report by OWASP highlighted that misconfigured S3 bucket permissions accounted for 70% of cloud-based data breaches, underscoring the need for stringent security measures.

**6. Real-World Applications and Case Studies**

Several companies leverage AWS S3 for static website hosting due to its cost-effectiveness and reliability.

* GitHub Pages Alternative: Developers use S3 to host documentation and project pages at a fraction of traditional hosting costs.
* Marketing & Landing Pages: Startups deploy landing pages on S3 to ensure high availability during promotions and product launches.
* Government & Educational Websites: Many institutions prefer S3 hosting due to its compliance with security and data durability standards.

For example, NASA’s Open Data Portal utilizes AWS S3 to distribute scientific datasets globally, ensuring fast and cost-effective content delivery.

**7. Conclusion**

AWS S3-based static website hosting offers a scalable, secure, and cost-effective solution for deploying web applications. By integrating CloudFront for performance optimization, Route 53 for domain management, and IAM security controls, organizations can build highly available and secure websites with minimal operational overhead.

As serverless architectures continue to evolve, S3 remains a preferred choice for businesses seeking simplified website hosting without managing servers. The adoption of CDNs, DNS services, and security best practices further enhances the reliability and efficiency of AWS S3-hosted web applications.