PROJECT REPORT

Submitted by

SHOUNAK CHANDRA (RA2111032010026)

Under the Guidance of

Dr. Prabakeran S

Assistant Professor, Networking and Communications Department

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COLLEGE OF ENGINEERING AND TECHNOLOGY

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KATTANKULATHUR-603203

BONAFIDE CERTIFICATE

Certified that this Project Report titled **"**Calculator Web App**"** is the bonafide work done by Shounak Chandra (RA2111032010026) who completed the project under my supervision. Certified further, that to the best of my knowledge the work reported herein does not form part of any other work.

SIGNATURE
Dr. Prabakeran S
Course Faculty
Assistant Professor
Department of Networking and Communications
SRMIST

SIGNATURE
Dr. Annapurani P. K.
Head of the Department
Department of Networking and Communications
SRMIST

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PROBLEM STATEMENT

Problem Statement: Developing and Deploying a Static Calculator Website Using AWS S3

In the digital age, web applications have become an integral part of our daily lives, providing easy access to tools and information. One such application is a static calculator website, a practical solution for various mathematical and computational needs. This project aims to design, develop, and deploy a static calculator website on Amazon Web Services (AWS) using the Simple Storage Service (S3).

The primary problem addressed in this project is to create a user-friendly, responsive, and efficient calculator website that performs a wide range of mathematical operations. This website will serve as a versatile tool for users to perform basic arithmetic, scientific, and financial calculations, making it a valuable resource for students, professionals, and anyone in need of quick and accurate calculations.

The project's scope involves several interconnected challenges:

1. Design and Development : The first challenge is the creation of an intuitive user interface (UI) that enables seamless interaction with the calculator. Developing the calculator logic, implementing the UI, and ensuring that the website works across various devices and browsers are vital aspects.

2. AWS Integration : To achieve scalability and reliability, the website will be hosted on AWS S3, which offers secure, scalable, and cost-effective static web hosting. The problem includes integrating S3, setting up the necessary configurations, and ensuring data security and availability.

3. Optimization and Performance : The website should load quickly and provide near-instant results for calculations. Optimizing the assets (HTML, CSS, JavaScript) for performance is a key challenge.

4. User Experience : Ensuring that users have a smooth and satisfying experience with the calculator is paramount. Handling user inputs, providing meaningful error messages, and maintaining an attractive and responsive design are part of the user experience challenge.

5. Testing and Deployment : Rigorous testing is required to identify and resolve any bugs or issues. Deployment on S3 should be seamless and automated to ensure that updates and improvements can be quickly rolled out.

By addressing these challenges, this project will deliver a user-friendly, responsive, and efficient static calculator website hosted on AWS S3, providing an accessible tool for a wide audience with diverse mathematical needs. This project is essential not only for practical mathematical calculations but also as a valuable learning and reference resource, contributing to the ever-expanding world of online educational and utility applications.

MODULES OF THE PROJECT

Sections of the Project "Calculator Web App on Amazon S3 Bucket":

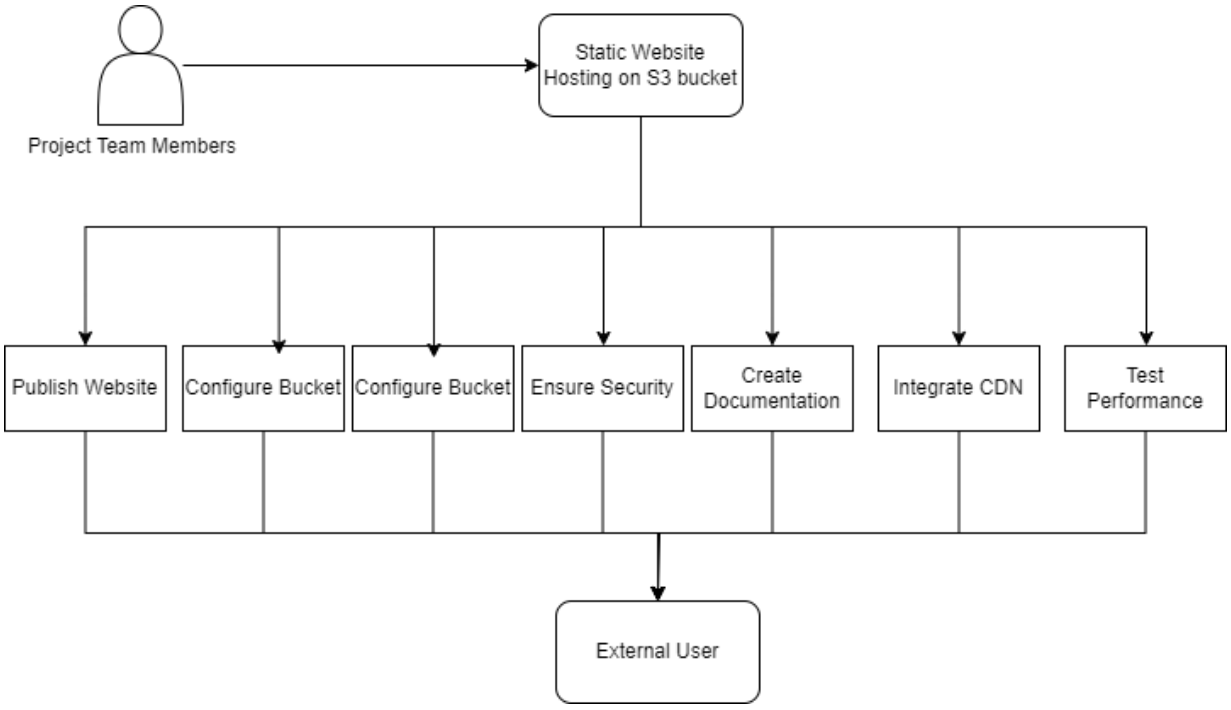
1. Platform Evaluation: Determine whether Amazon S3 is a good choice for hosting static webpages.
2. Website Setup: Assemble and design a static prototype website.
3. Bucket Configuration: Create and configure an Amazon S3 bucket to host a website.
4. Content Upload: Add files from the website to the S3 bucket.
5. Scalability and CDN Integration: To enhance the performance of your website, use Amazon CloudFront.
6. Security Implementation: Encrypt and restrict access to the S3 bucket.
7. Cost Optimization: Keep an eye on and cut your hosting expenses.
8. Performance testing: Check how quickly a website loads and make necessary optimizations.
9. User Guide and Documentation: Write an extensive manual that explains how to duplicate the hosting procedure.

The Calculator Web App project is organized around these essential modules, which provide a safe, intuitive, and functional application while efficiently leveraging AWS resources for essential features.

DIAGRAMS

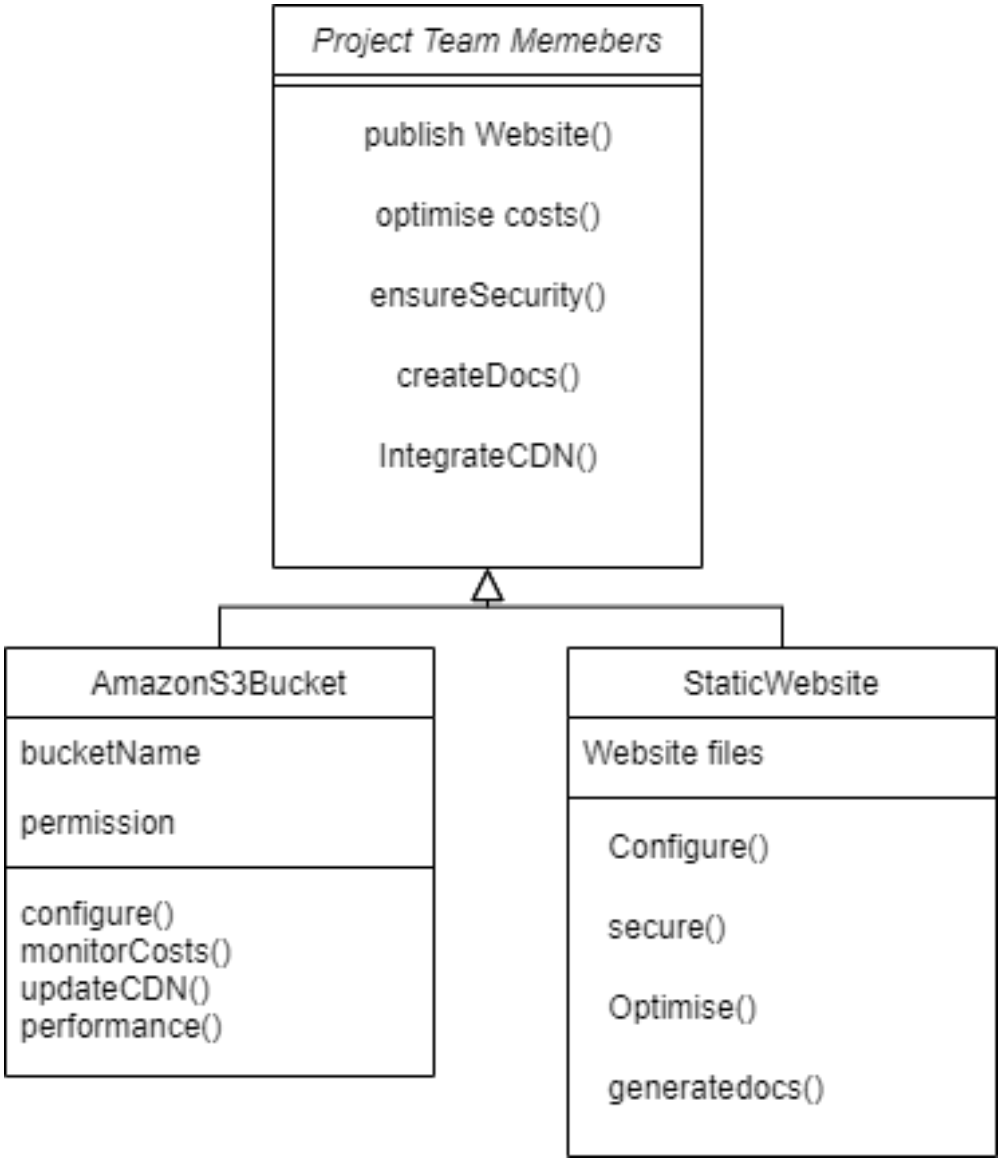
USE CASE DIAGRAM

A use case diagram is a graphical depiction of a user's possible interactions with a system. A use case diagram shows various use cases and different types of users the system has and will often be accompanied by other types of diagrams as well. The use cases are represented by either circles or ellipses. The actors are often shown as stick figures.



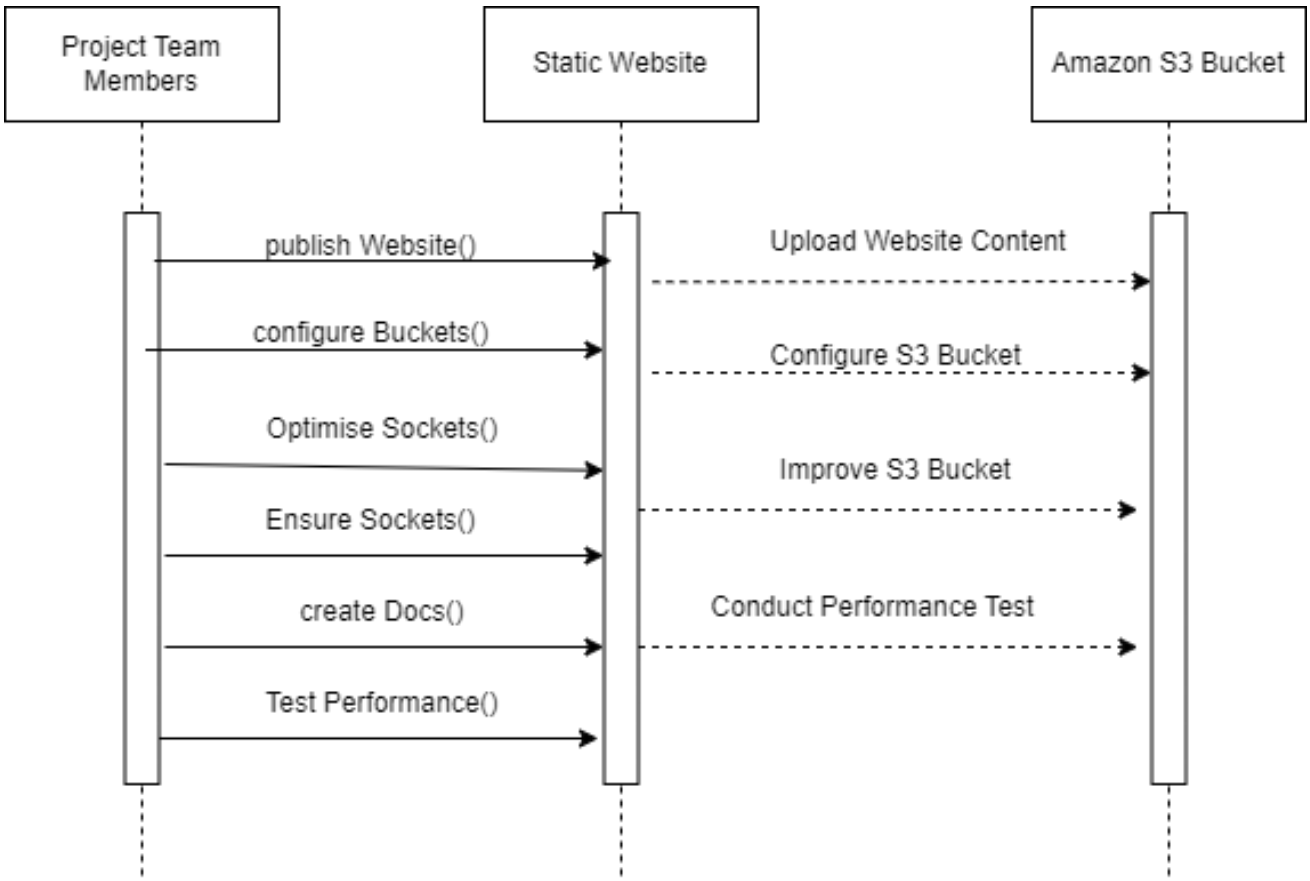
CLASS DIAGRAM

Class diagram is a static diagram. It represents the static view of an application. Class diagram is not only used for visualizing, describing, and documenting different aspects of a system but also for constructing executable code of the software application.



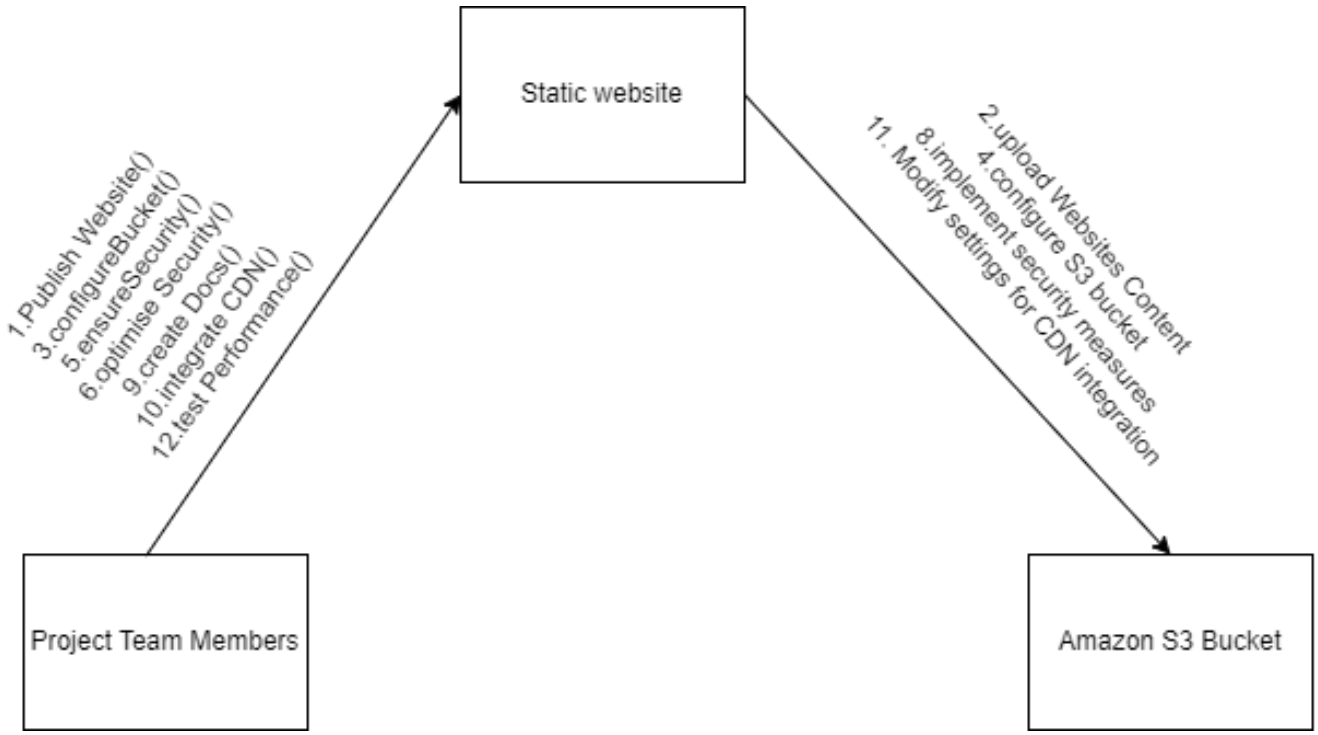
SEQUENCE DIAGRAM

UML Sequence Diagrams are interaction diagrams that detail how operations are carried out. They capture the interaction between objects in the context of a collaboration. Sequence Diagrams are time focus and they show the order of the interaction visually by using the vertical axis of the diagram to represent time what messages are sent and when.



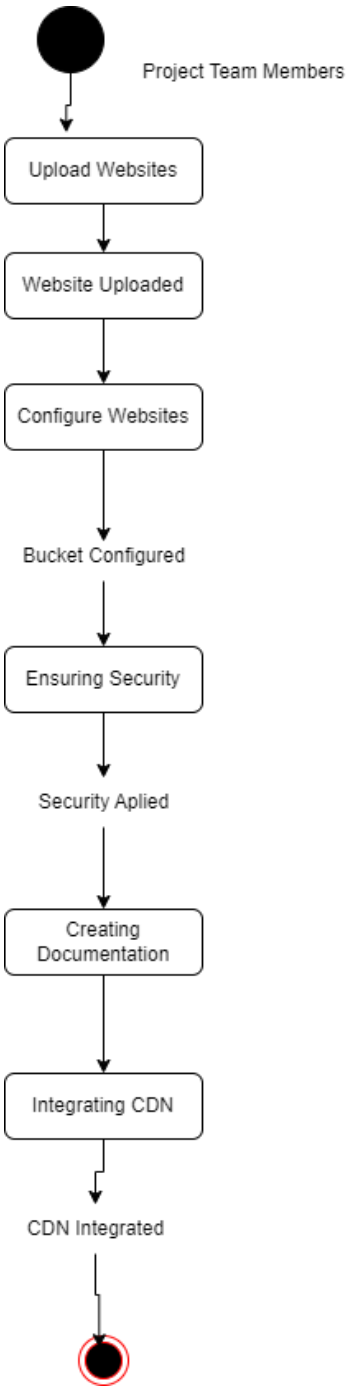
COLLABORATION DIAGRAM

Collaboration diagrams are used to show how objects interact to perform the behaviour of a particular use case, or a part of a use case. Along with sequence diagrams, collaboration is used by designers to define and clarify the roles of the objects that perform a particular flow of events of a use case. They are the primary source of information used to determining class responsibilities and interfaces.



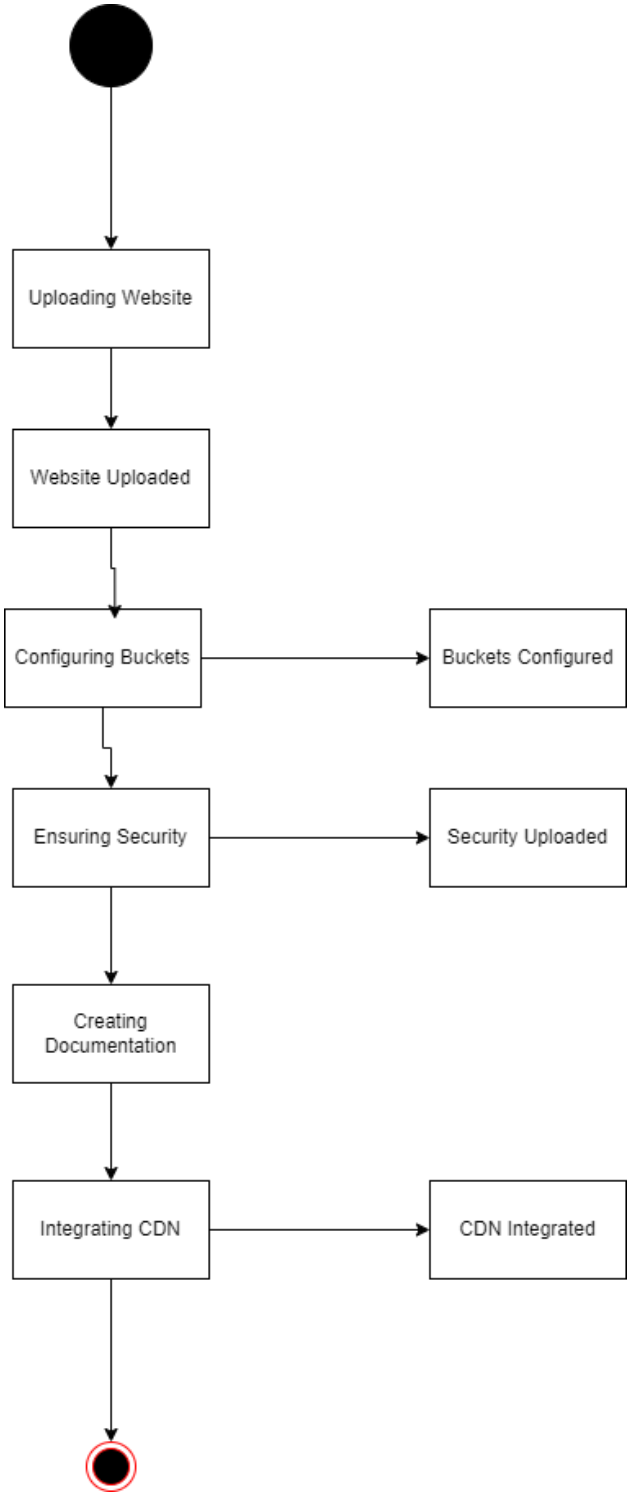
STATE CHART DIAGRAM

A State chart diagram describes a state machine. State machine can be defined as a machine which defines different states of an object and these states are controlled by external or internal events. Activity diagram explained in the next chapter, is a special kind of a state chart diagram.



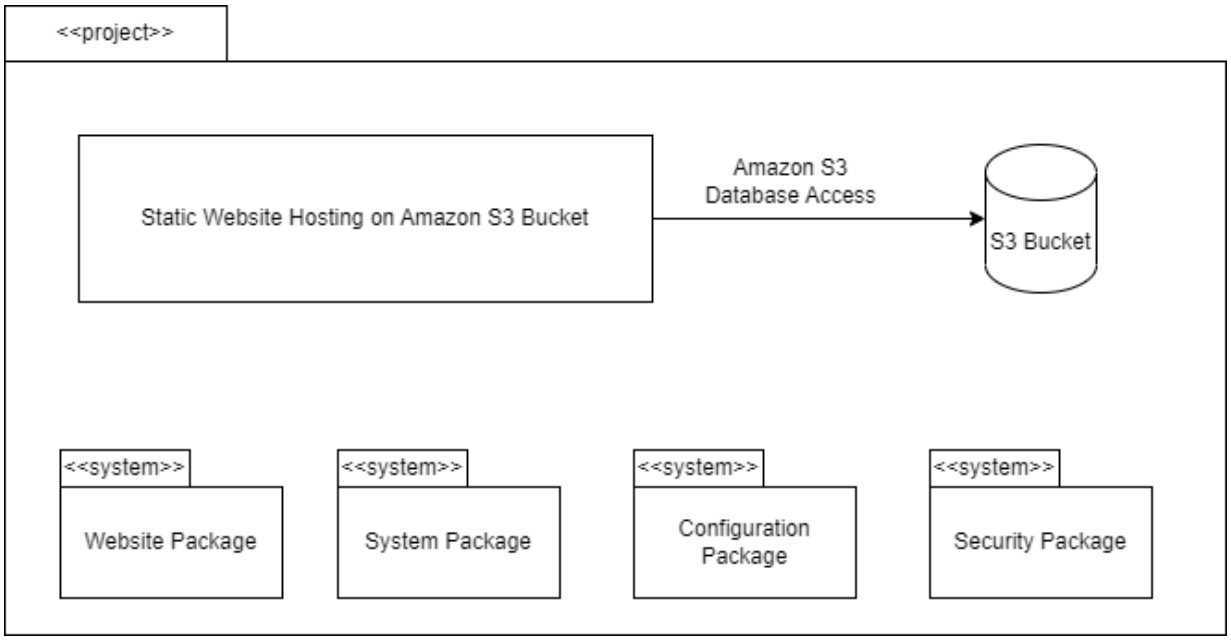
ACTIVITY DIAGRAM

Activity diagram is another important behavioural diagram in UML diagram to describe dynamic aspects of the system. Activity diagram is essentially an advanced version of flow chart that modelling the flow from one activity to another activity.



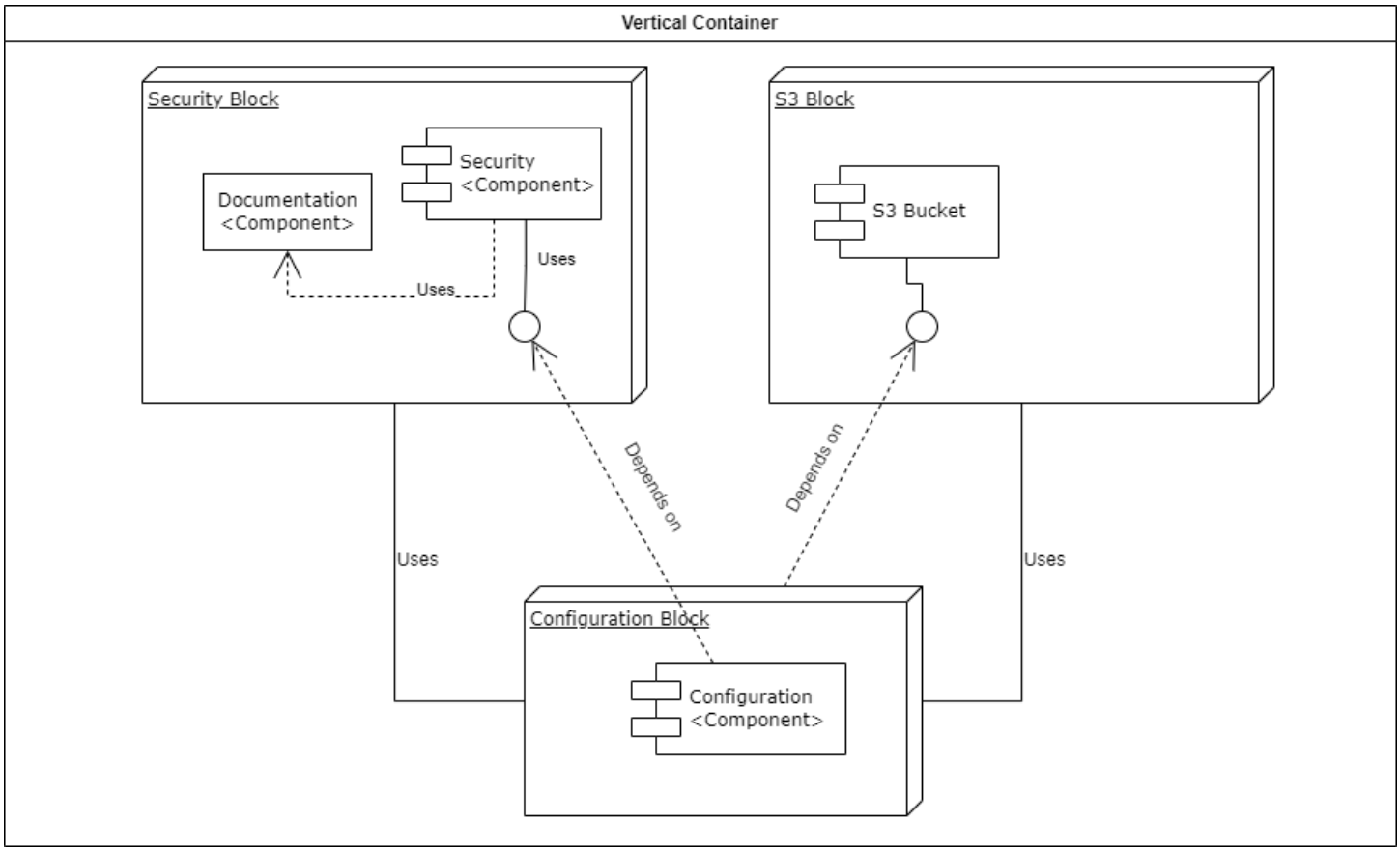
PACKAGE DIAGRAM

Package diagram, a kind of structural diagram, shows the arrangement and organization of model elements in middle to large scale project. Package diagram can show both structure and dependencies between sub-systems or modules, showing different views of a system, for example, as multi-layered (aka multi-tiered) application - multi-layered application model.



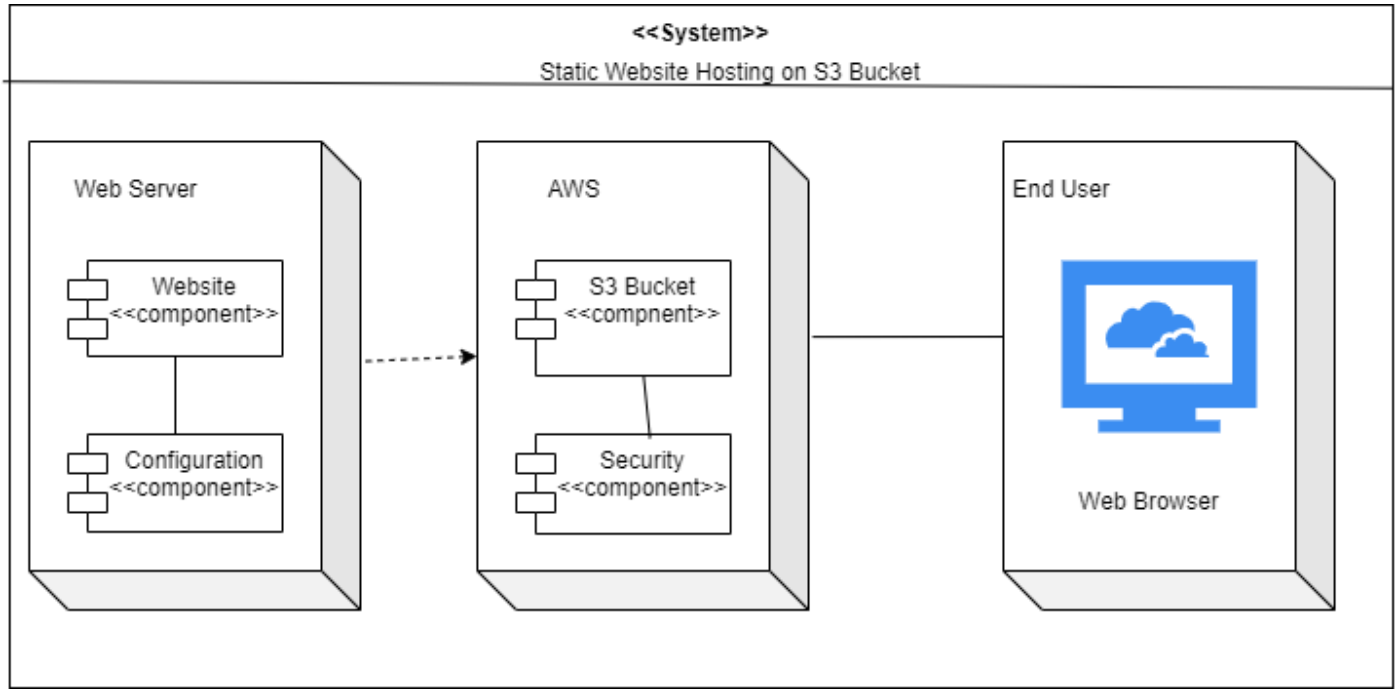
COMPONENT DIAGRAM

UML Component diagrams are used in modelling the physical aspects of object-oriented systems that are used for visualizing, specifying, and documenting component-based systems and also for constructing executable systems through forward and reverse engineering. Component diagrams are essentially class diagrams that focus on a system's components that often used to model the static implementation view of a system.



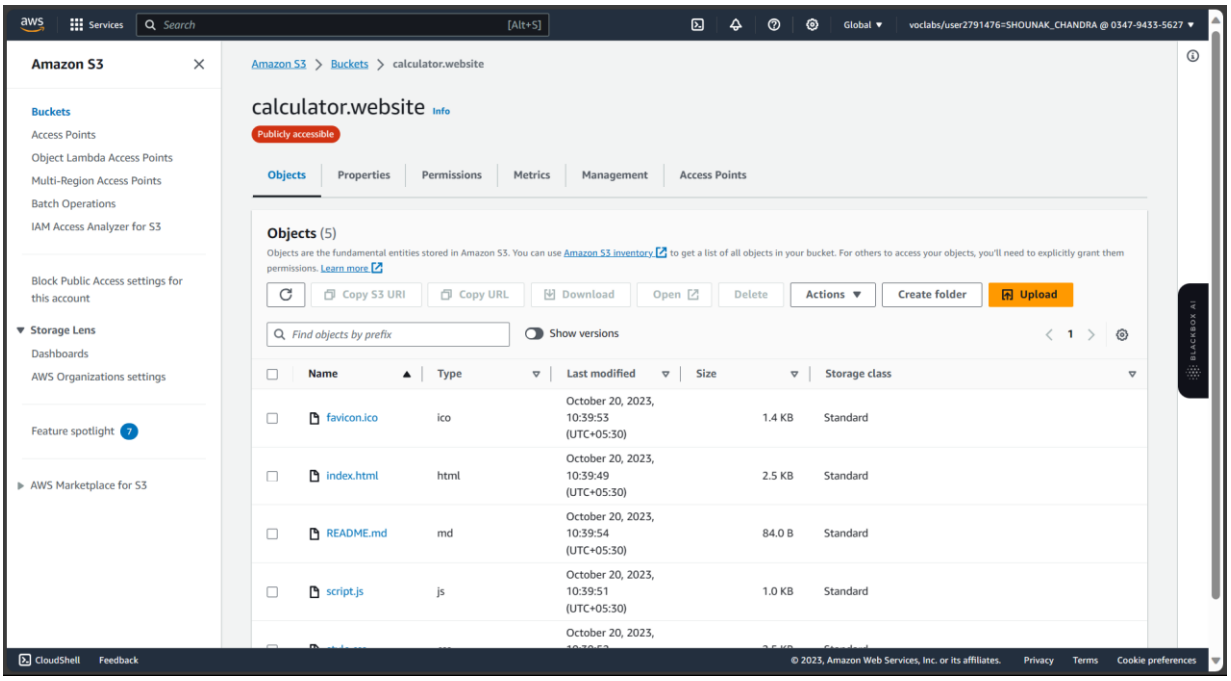
DEPLOYMENT DIAGRAM

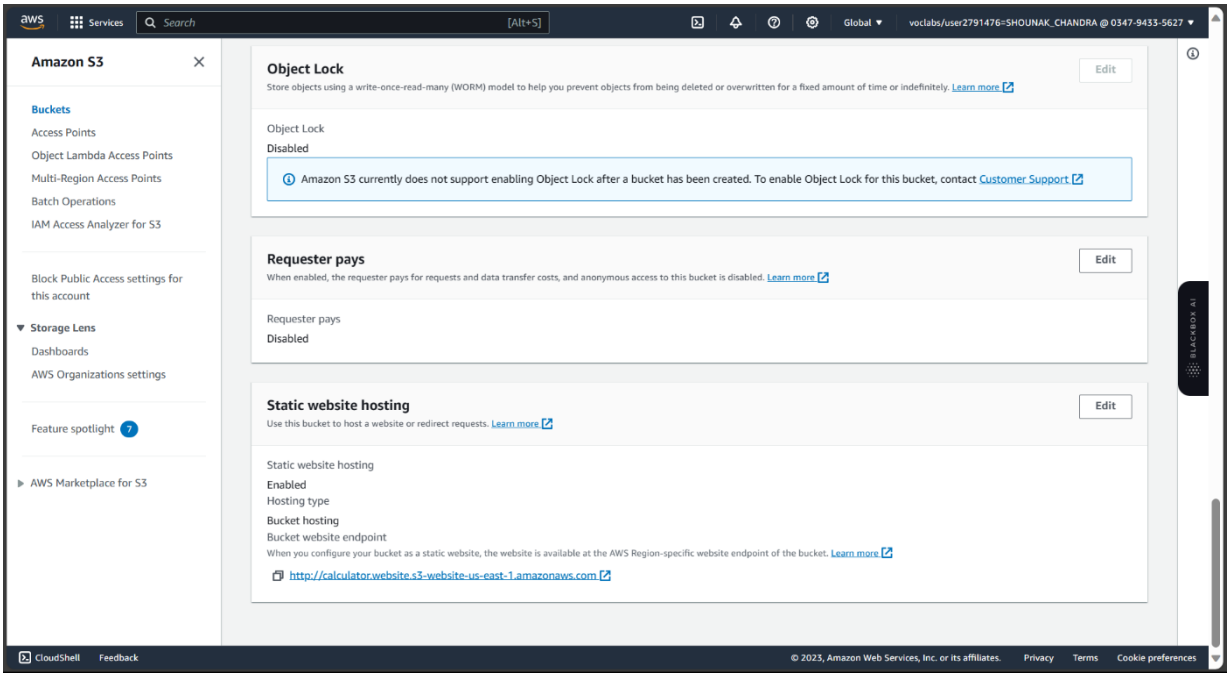
Deployment diagrams are important for visualizing, specifying, and documenting embedded, client/server, and distributed systems and also for managing executable systems through forward and reverse engineering. A deployment diagram is just a special kind of class diagram, which focuses on a system's nodes.

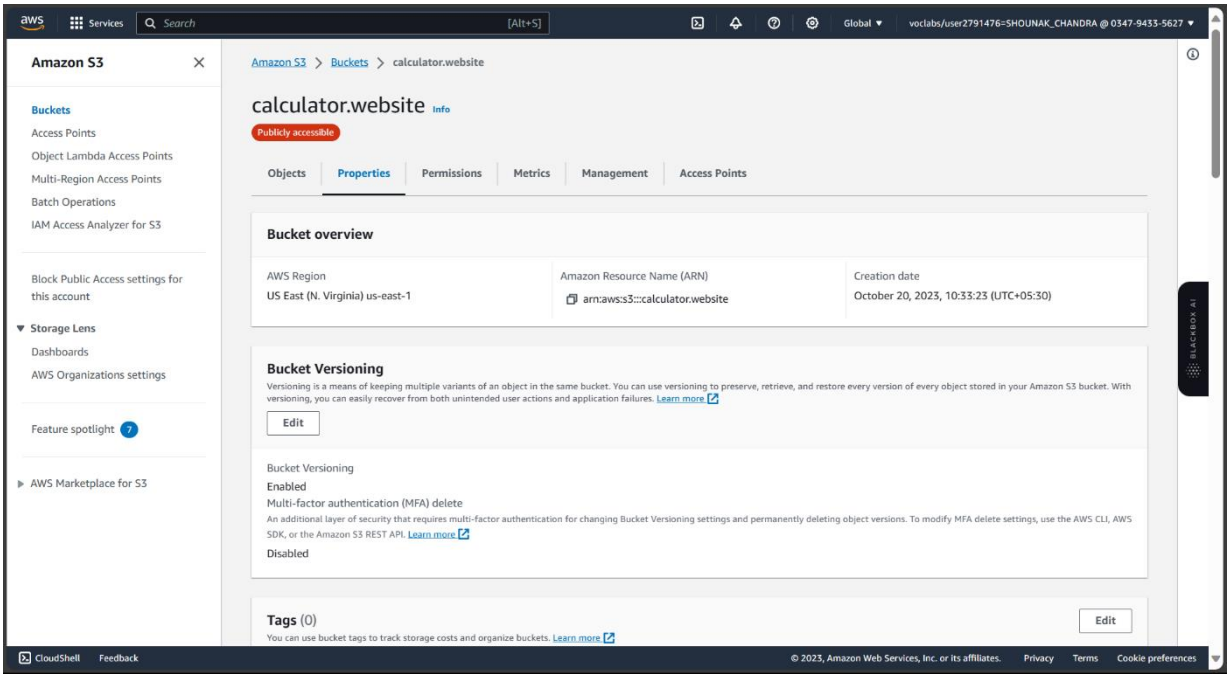


INPUT/OUTPUT SCREENSHOTS

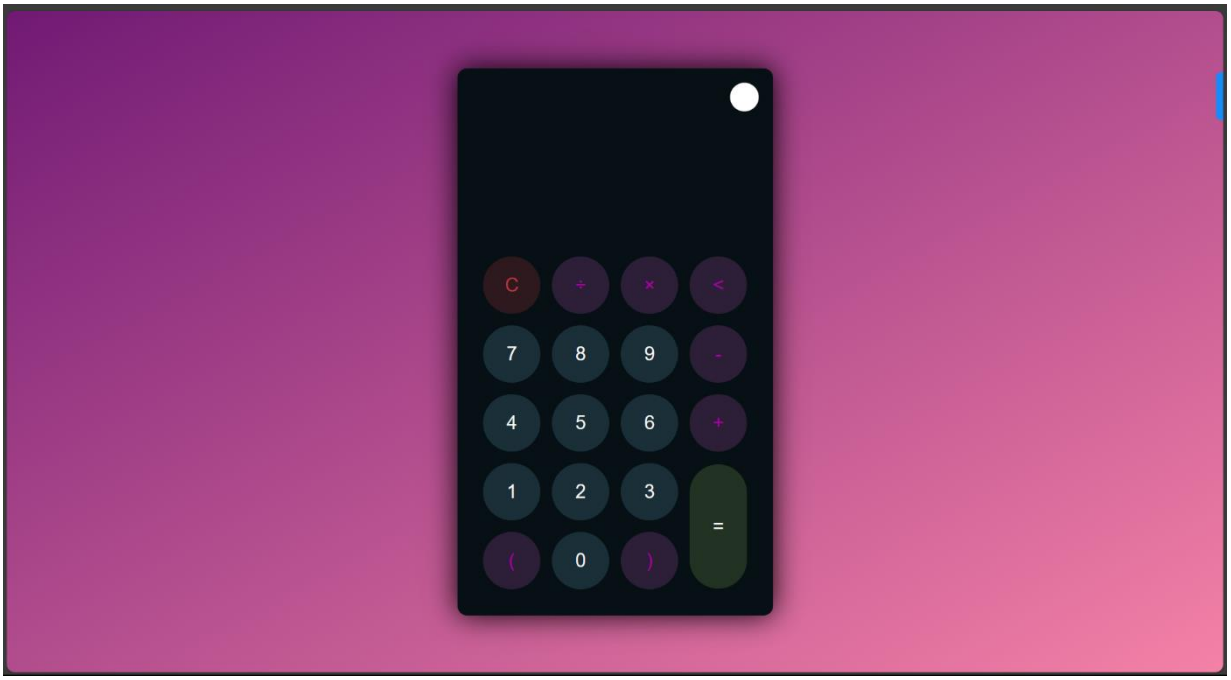
The homepage offers a user-friendly interface for entering vital employee information, including first name, last name, employee ID, primary skills, and location, simplifying data input and management.







This image displays the output of the project, which is your portfolio website, successfully deployed and hosted on [Simple calculator (website.s3-website-us-east-1.amazonaws.com)](http://website.s3-website-us-east-1.amazonaws.com) (AWS domain) through the Amazon S3 bucket. It showcases your professional portfolio, providing viewers with insights into your work, skills, and achievements. The website's appearance and content reflect the culmination of the project's efforts, demonstrating your skills and accomplishments in a visually appealing and accessible manner’s



CONCLUSION AND RESULT

In summary, this project successfully achieved its goal of hosting static websites on Amazon S3 while improving key aspects of performance, scalability, security, and cost-efficiency. Here are the main results:

1. Efficient Hosting: Amazon S3 demonstrated reliability in hosting static websites, offering excellent availability and quick access.

2. Website Setup: We created and organized a sample static website, making it ready for hosting.

3. Bucket Configuration: The Amazon S3 bucket was correctly configured with the right permissions and static website hosting settings.

4. Content Upload: All website files were successfully uploaded to the S3 bucket.

5. Scalability and CDN Integration: We integrated Amazon CloudFront as a Content Delivery Network (CDN), enhancing website performance and user experience.

6. Security Measures: We implemented access controls and encryption to boost the security of the hosted website.

7. Cost Optimization: Effective cost management strategies were applied to ensure cost-efficient hosting.

8. Performance Testing: We conducted thorough performance testing, resulting in an optimized, fast-loading website.

9. Documentation and User Guide: We prepared a comprehensive guide to make it easy for others to replicate the hosting process.

In conclusion, this project met its objective of hosting static websites on Amazon S3, enhancing performance, scalability, security, and cost-effectiveness, while also providing a clear guide for future use.

REFERENCES

[1] "Intellipaat. ' AWS Projects for beginners.' YouTube, Aug. 6, 2020, https://www.youtube.com/watch?v=7Gym2XVcA5A&ab_channel=Intellipaat.

[2] Abdul Rehman "Title of the Article," Cloudways, Aprl. 11, 2023, URL: https://www.cloudways.com/blog/aws-for-beginners/.