

## Project Synopsis

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Elective	CLOUD COMPUTING
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## Title

### Instagram Clone: A Cloud-Deployed Social Media Platform

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## Problem Statement

Social media platforms have revolutionized the way we communicate, enabling users to share photos, connect with others, and form communities. Nevertheless, constructing a scalable, cloud-based platform that incorporates user authentication, media sharing, and a real-time feed necessitates a strong infrastructure. This project aims to create an Instagram Clone by utilizing AWS cloud services for deployment. The main objective is to establish a scalable and secure platform where users can create their profiles, post content, follow other users, and interact through likes and comments. The system will be designed to guarantee high availability, security, and optimized performance.

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## Goals and Objectives

1. Create a social media platform that includes essential functionalities like user sign-up, profile handling, post creation, and user interactions.
  2. Utilize AWS services for hosting, storage, and database management to ensure both scalability and security.
  3. Deploy the frontend and backend independently to enhance performance and ease of maintenance.
  4. Use AWS CloudFront to optimize content delivery, resulting in quicker image loading times.
  5. Implement secure authentication and authorization measures using JWT tokens along with secure password hashing techniques.
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## Key Features / Expected Results

- 1. User Authentication & Profile Management**
  - A secure login and registration system utilizing JWT authentication.
  - Options for customizing profiles, including updates to username, biography, and profile images.
- 2. Post Creation & Media Sharing**
  - Users are able to upload posts that include images.
  - Integration with cloud storage for effective media management.
- 3. User Engagement Features**

- Functionality for liking and commenting on posts.
- A system for following users and being followed to enhance social interaction.

#### **4. Feed System & Content Discovery**

- Users can view posts from accounts they follow.
- The home feed shows the latest posts in reverse chronological order.

#### **5. Security & Performance Optimizations**

- Connections are encrypted using HTTPS for data protection.
- AWS S3 is used for image storage to guarantee efficient content delivery.
- AWS CloudFront is utilized for caching, ensuring quicker loading of static content.

#### **6. Deployment & Scalability**

- Frontend built with React is hosted on AWS S3 with public access enabled.
  - Node.js backend is deployed on AWS EC2 with secured API endpoints.
  - AWS Route 53 is utilized for domain management and custom URLs.
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### **Preliminary Insights on AWS Services to be Implemented**

In order to ensure scalability, performance, and security, the subsequent AWS services will be implemented:

1. AWS S3 (Simple Storage Service) – Utilized for hosting the frontend (React) and for storing images uploaded by users.
2. AWS EC2 (Elastic Compute Cloud) – Serves as the host for the backend (Node.js/Express + MongoDB), providing necessary compute resources and security.
3. AWS RDS or MongoDB Atlas – Efficiently manages user information, posts, and engagements.
4. AWS CloudFront – Enhances content delivery and accelerates loading times for media.
5. AWS IAM (Identity and Access Management) – Facilitates access control for AWS resources.
6. AWS Route 53 – Handles domain names and custom URLs.
7. AWS Certificate Manager (Optional) – Allows for HTTPS encryption to ensure secure communication.

By utilizing AWS, the Instagram Clone will deliver a highly scalable, secure, and optimized experience, ensuring a smooth user interface while preserving effective backend operations.

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## **Conclusion**

The Instagram Clone project is designed to offer practical experience in full-stack development and cloud deployment utilizing AWS. This project will showcase the capability to construct, launch, and scale an actual social media application within a secure and efficiently optimized cloud setting.