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1.COMPANY PROFILE

Academy of Skill Development (ASD), formerly known as Ardent Computech Private Limited, is an ISO 9001:2015 certified Software Development and Training Company based in India. Operating independently since 2003, the organization has recently undergone a strategic merger with ASD Technologies, enhancing its global outreach and service offerings.

ASD Technologies

ASD Technologies delivers high-end IT services across the UK, USA, Canada, and India. Its core competencies lie in the development of customized application software, encompassing end-to-end solutions including system analysis, design, development, implementation, and training. The company also provides expert consultancy and electronic security solutions. Its clientele spans educational institutions, entertainment companies, resorts, theme parks, the service industry, telecom operators, media, and diverse business sectors.

ASD Collaborations

ASD Collaborations, the Research, Training, and Development division of ASD, offers professional IT-enabled services and industrial training programs. These are tailored for freshers and professionals from B.Tech, M.Tech, MBA, MCA, BCA, and MSc backgrounds. ASD provides Summer Training, Winter Training, and Industrial Training to eligible candidates.

High-performing students may qualify for stipends, scholarships, and additional benefits based on performance and mentor recommendations.

Associations and Accreditations

ASD is affiliated with the National Council of Vocational Training (NCVT) under the Directorate General of Employment & Training (DGET), Ministry of Labour & Employment, Government of India. The institution upholds strict quality standards under ISO 9001:2015 certification and is dedicated to bridging the gap between academic knowledge and industry skills through innovative training programs.

2.INTRODUCTION

In an era marked by the exponential growth of digital information and the ever-evolving landscape of online presence, effective content management has become a cornerstone for businesses, organizations, and individuals alike. As the volume, variety, and velocity of digital content surge, the necessity for robust, flexible, and user-centric content management systems (CMS) has never been greater. A CMS empowers users to create, edit, organize, and publish digital content with ease, fostering efficient communication, collaboration, and brand representation across the web.

Content Sphere Hub is a modern, scalable, and feature-rich Content Management System developed using the MERN (MongoDB, Express.js, React.js, Node.js) stack. This project was conceived with the aim of addressing the contemporary demands of content creators, website administrators, and digital communities, offering a seamless and powerful platform for managing blogs, multimedia assets, user interactions, and administrative operations.

The rapid proliferation of digital platforms—from personal blogs and portfolios to enterprise-level portals and e-commerce stores—demands a CMS that is not only technically robust but also intuitive for users of all technical backgrounds. Content Sphere Hub was designed to bridge the gap between technical sophistication and user accessibility. It leverages the strengths of the MERN stack to deliver a real-time, responsive, and secure experience, ensuring that both end-users and administrators can perform their tasks efficiently.

Unlike traditional static websites, modern web applications require dynamic content updates, role-based access controls, media handling, analytics, and real-time notifications. Content Sphere Hub integrates all these core functionalities, supporting a diverse range of use cases—from publishing articles, managing categories and tags, moderating comments, to administering user roles and permissions. Its modular architecture allows for easy extensibility and integration with third-party services, making it suitable for both small teams and large organizations.

The importance of content management extends beyond mere information dissemination. In today's interconnected world, digital content is central to marketing strategies, community building, e-learning, corporate communication, and customer engagement. A well-designed CMS can significantly enhance productivity, streamline workflows, maintain brand consistency, and support strategic objectives. Content Sphere Hub recognizes these imperatives, offering a holistic solution that is as versatile as it is reliable.

Throughout this report, we will explore the conceptual foundation, architectural design, system analysis, and detailed implementation of Content Sphere Hub. The report will provide a thorough examination of its features, technical stack, development methodology, and operational

workflows, illustrating how the project achieves its objectives and delivers value to its users. Whether for a solo blogger or an enterprise content team, Content Sphere Hub exemplifies the next generation of content management solutions, tailored to meet the challenges and opportunities of the digital age.

2A.OBJECTIVE

The primary objective of Content Sphere Hub is to create a comprehensive, secure, and user-friendly Content Management System that facilitates the seamless creation, organization, and publication of digital content. In a digital landscape where information is both an asset and a competitive differentiator, the ability to manage content efficiently has become a mission-critical requirement for organizations and individuals alike.

Content Sphere Hub is designed with a focus on versatility, scalability, and ease of use. The platform aims to democratize content management by enabling users of varying technical expertise to create, edit, and publish content without the need for deep coding knowledge. By abstracting the complexities of backend infrastructure and providing an intuitive, modern user interface, the system reduces barriers to entry and accelerates digital adoption.

The objectives of Content Sphere Hub are as follows:

- 1.Simplify Content Creation and Management:** Provide an intuitive editor, robust media handling, and streamlined workflows for authors, editors, and administrators.
- 2.Enable Secure User Authentication and Role-Based Access:** Implement granular access controls to support multiple user roles (admin, editor, contributor, reader) with varying levels of permission.
- 3.Support Modular and Extensible Architecture:** Ensure the CMS can be easily extended with new features, integrations, and customizations as organizational needs evolve.
- 4.Deliver Real-Time Collaboration and Notifications:** Facilitate efficient teamwork and immediate content updates through modern, real-time technologies.
- 5.Optimize Performance and Scalability:** Leverage the MERN stack to ensure high performance, responsiveness, and the ability to handle high volumes of content and concurrent users.
- 6.Integrate Analytics and Reporting:** Provide built-in tools for monitoring site usage, user engagement, and content performance, enabling data-driven decision-making.
- 7.Ensure Security and Data Integrity:** Implement strong authentication, authorization, and validation mechanisms to safeguard user data and prevent unauthorized access.
- 8.Enhance User Experience:** Deliver a responsive, visually appealing interface optimized for accessibility and ease of use across devices.

Ultimately, Content Sphere Hub seeks to empower organizations and individuals to harness the full potential of digital content, fostering innovation, engagement, and growth in an increasingly interconnected world.

2B.SCOPE

Content Sphere Hub is envisioned as a robust, full-stack web application that delivers a comprehensive suite of features tailored to the needs of modern content creators, administrators, and consumers. The scope of the project encompasses both the functional and non-functional aspects of a complete CMS platform, designed with extensibility and adaptability in mind.

Functional Scope:

1. User Registration & Login:

- o Secure authentication using JWT, password hashing, and email verification.
- o Support for multiple user roles (admin, editor, user, guest), each with customized access privileges.

2. Rich Content Editor:

- o WYSIWYG editor for creating and editing articles, blog posts, and multimedia-rich content.
- o Support for embedding images, videos, code snippets, and links.

3. Category and Tag Management:

- o Admin interfaces for creating, updating, and organizing categories and tags.
- o Tag-based content filtering and organization for enhanced discoverability.

4. Post and Media Management:

- o CRUD (Create, Read, Update, Delete) operations for posts, pages, and media files.
- o Secure file uploads (images, documents, multimedia assets) with preview and management capabilities.

5. User Profiles and Dashboard:

- o Personalized user profiles displaying author information, post history, and activity logs.
- o Interactive dashboard for users and admins with analytics, notifications, and quick actions.

6. Admin Panel:

- o Comprehensive admin dashboard for overseeing content, user management, analytics, and site settings.
- o Moderation tools for approving posts, handling reports, and managing user permissions.

7. Commenting System:

- o Threaded comments, moderation, and spam protection.
 - o Real-time updates and notifications for replies and mentions.
8. Search and Filtering:
- o Full-text search across posts, categories, and users.
 - o Advanced filtering and sorting options to enhance user navigation and content discovery.
9. Notifications and Real-Time Features:
- o In-app notifications for content updates, comments, and system alerts.
 - o Real-time updates using technologies such as WebSockets or long-polling.
10. Analytics and Reporting:
- o Built-in analytics for tracking user activity, post engagement, and system health.
 - o Exportable reports and visual dashboards for administrators.
11. API Integration and Extensibility:
- o RESTful API endpoints for all core functionalities.
 - o Support for integration with third-party tools (e.g., social media sharing, external analytics, content import/export).
12. Responsive Design:
- o Fully responsive UI optimized for desktop, tablet, and mobile devices.
 - o Accessible and user-friendly interface adhering to modern design standards.

Non-Functional Scope

- **Performance:** The system is optimized for fast load times, efficient data handling, and high concurrency.
- **Scalability:** The architecture supports horizontal and vertical scaling to accommodate growing user and content demands.
- **Security:** Comprehensive security measures are in place, including secure authentication, authorization, data validation, and regular audits.
- **Maintainability:** Modular codebase with clear documentation, adhering to industry best practices for future extensibility.
- **Usability:** Focus on intuitive navigation, clear workflows, and helpful user guidance.

Out-of-Scope Features

- Native mobile app (unless a progressive web app is implemented).
- Deep integration with proprietary enterprise systems (but APIs may be extended in the future).
- Complex e-commerce or payment features beyond basic subscription models (optional in future releases).

By defining a clear and achievable scope, Content Sphere Hub positions itself as a future-ready CMS solution that can adapt to the evolving needs of its users while maintaining technical excellence and operational stability.

3. SYSTEM ANALYSIS

System analysis serves as a critical foundation for the successful development and deployment of Content Sphere Hub. In this section, we systematically explore the underlying needs, the feasibility and rationale behind system choices, the overall workflow and methodology, an in-depth study of the implemented modules, input/output design, software requirements, and the engineering paradigm adopted. Each aspect is analyzed in the context of the dynamic requirements and expectations of a modern content management system, ensuring a solution that is not only technically sound but also addresses the practical demands of users, administrators, and stakeholders.

3A.IDENTIFICATION OF NEED

The emergence of digital transformation has revolutionized the way information is created, disseminated, and consumed. With the proliferation of websites, blogs, digital publications, and organizational portals, there is an ever-increasing demand for robust content management solutions that empower users to efficiently manage digital content, collaborate in real time, and maintain high standards of security and scalability.

Key needs driving the development of Content Sphere Hub include:

1. **Centralized Content Management:** Organizations and individuals require a unified platform to create, edit, organize, and publish diverse types of content, including articles, images, multimedia, and interactive elements.
2. **User Empowerment and Accessibility:** Non-technical users must be able to manage content without coding knowledge, while administrators need tools for moderation, analytics, and system maintenance.
3. **Scalability and Flexibility:** As content volume and user numbers grow, the system must scale seamlessly, supporting additional features and modules without performance degradation.
4. **Role-Based Access Control:** Different user types (admin, editor, author, reader) require varying levels of access to system features and data, necessitating granular permission management.
5. **Real-Time Collaboration and Updates:** Content teams benefit from real-time notifications, collaborative editing, and instant feedback to maintain workflow efficiency and high-quality outputs.
6. **Security and Data Integrity:** With increasing cyber threats, CMS must ensure robust user authentication, data validation, and secure storage of both user and content data.
7. **Analytics and Decision Support:** Administrators and content strategists need actionable insights on user engagement, content reach, and system performance to make informed decisions.
8. **Seamless Integration and Extensibility:** The platform should easily integrate with external tools, APIs, and services, supporting continuous enhancement and adaptation to emerging technologies.
9. **Optimized User Experience:** Users expect a fast, visually appealing, and intuitive interface that works seamlessly across devices and platforms.

By identifying these core needs, Content Sphere Hub sets out to deliver a comprehensive CMS that not only meets current requirements but is also adaptable to future technological and organizational shifts.

3B.FEASIBILITY STUDY

Before embarking on the development of Content Sphere Hub, a comprehensive feasibility study was undertaken to evaluate the practicality and viability of the project across several critical dimensions: technical, operational, economic, and legal.

1. Technical Feasibility

Content Sphere Hub is built using the MERN stack—MongoDB, Express.js, React.js, and Node.js—offering a proven foundation for scalable, secure, and high-performance web applications. The choice of technologies ensures:

- Asynchronous, non-blocking data handling for high concurrency.
- Modular and maintainable codebases, facilitating rapid feature development and bug fixing.
- Integration of modern UI frameworks (React + Tailwind CSS) for an engaging and accessible user experience.
- Secure, RESTful APIs to support internal and third-party integrations.

2. Operational Feasibility

The system is designed to be intuitive for end-users and easy to maintain for administrators. Key operational considerations include:

- Simple, responsive interface requiring minimal user training.
- Well-documented administrative tools for site management and analytics.
- Modular components, allowing for incremental upgrades and feature additions without system downtime.
- Robust support for role-based access and workflow management, ensuring that users can only access functions relevant to their roles.

3. Economic Feasibility

The MERN stack is open-source, eliminating licensing costs and enabling the use of a wide variety of community-maintained libraries. Hosting solutions for Node.js and MongoDB are widely available and cost-effective, whether deployed on-premise or in the cloud. Potential revenue models—such as premium features, advertising, or SaaS deployment—can provide sustainable income streams.

4. Legal and Compliance Feasibility

Content Sphere Hub is designed to comply with data protection laws such as GDPR and CCPA. User authentication, secure data transmission (via HTTPS), and granular permissions reduce risks of data breaches. The system architecture allows for future enhancements to further strengthen compliance (e.g., audit logs, user consent management).

5. Time and Resource Feasibility

With agile methodologies, the core system can be built and deployed incrementally, allowing for rapid prototyping and feedback loops. Resource requirements are modest, and the modular structure supports efficient development by small, focused teams.

Conclusion:

The feasibility study confirms that Content Sphere Hub is practical, sustainable, and well-positioned for successful deployment and ongoing improvement in a competitive digital landscape.

3C.WORKFLOW

Content Sphere Hub's development lifecycle adheres to well-established software engineering workflows, ensuring clarity, accountability, and consistent delivery of high-quality software. The project follows a hybrid of the traditional Waterfall and modern Agile methodologies, blending structured planning with iterative improvement.

Software Development Life Cycle (SDLC) Phases:

1. Requirement Gathering and Analysis:

Stakeholder interviews and competitor analysis are conducted to define project goals and requirements.

System specifications are documented, including user stories, use cases, and technical constraints.

2. System Design:

Architecture is planned at both high (overall system, modules, data flow) and low (database schemas, API contracts) levels.

UI/UX mockups are created and iteratively refined based on feedback.

3. Implementation:

The backend and frontend are developed concurrently, leveraging modular design principles.

Feature branches and version control (Git) are used for collaborative, incremental development.

4. Integration and Testing:

Components are integrated and tested using automated unit, integration, and end-to-end tests.

User acceptance testing ensures alignment with project goals and user expectations.

5. Deployment:

The system is deployed on secure, scalable infrastructure (e.g., cloud hosting).

CI/CD pipelines automate builds, tests, and deployments for efficiency and reliability.

6. Maintenance and Iteration:

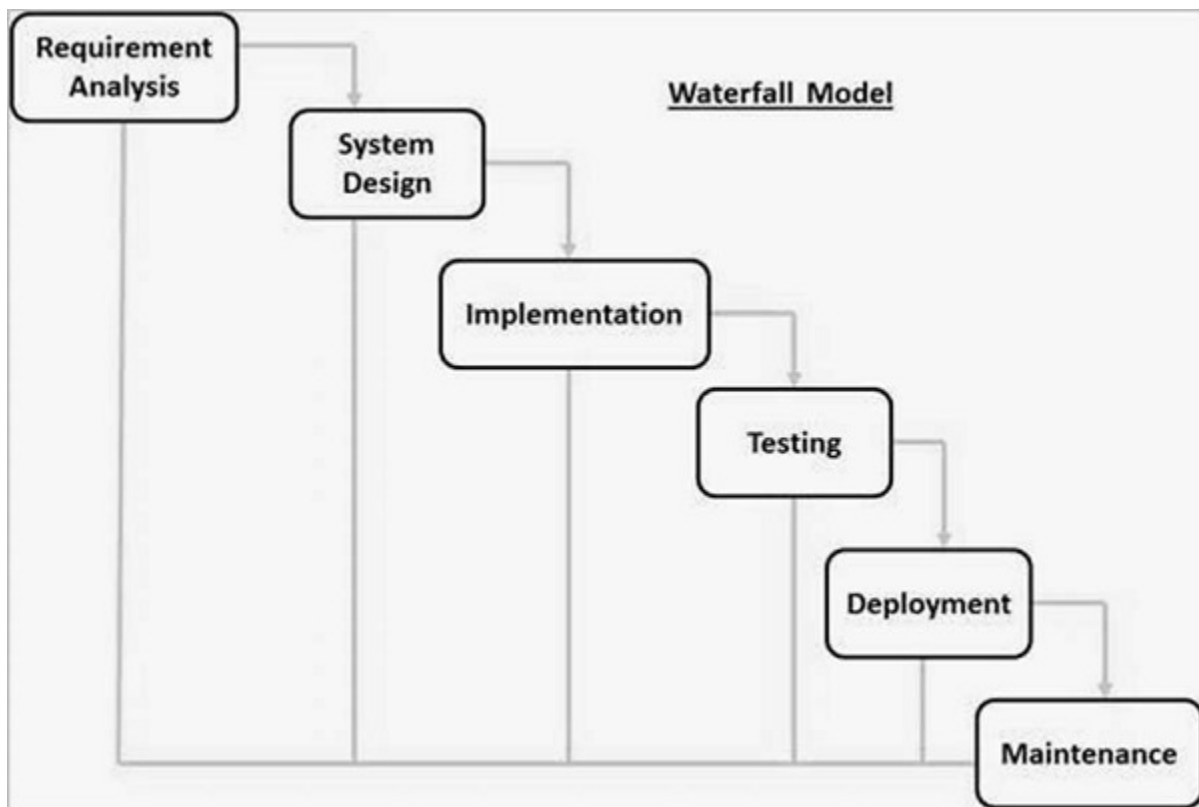
User feedback is continually gathered to identify areas for improvement.

Bug fixes, optimizations, and new features are released in regular cycles.

Workflow Model Applied:

While the Waterfall model is used for overarching planning and documentation, Agile sprints are used for actual development, allowing for:

- Early delivery of core features.
- Regular stakeholder feedback and adaptation.
- Incremental, manageable work packages.
- Continuous improvement and risk mitigation.



- Requirement Gathering and Analysis: All possible requirements of the system to be developed are captured in this phase and documented in a requirement specification doc.
- System Design: The requirement specifications from the first phase are studied in this phase and system design is prepared. System Design helps in specifying hardware and system requirements and also helps in defining overall system architecture.
- Implementation: With inputs from system design, the system is first developed in small programs called units, which are integrated in the next phase. Each unit is developed and tested for its functionality which is referred to as Unit Testing.

- Integration and Testing: All the units developed in the implementation phase are integrated into a system after testing each unit. Post integration of the entire system is tested for any faults and failures.
- Deployment of the system: Once the functional and non-functional testing is done, the product is deployed in the customer environment or released into the market.
- Maintenance: Some issues come up in the client environment. To fix those issues patches are released. Also to enhance the product some better versions are released. Maintenance is done to deliver these changes in the customer environment.

3D .STUDY OF THE SYSTEM

Content Sphere Hub is architected as a modular, full-stack web application that organizes digital content, manages user roles, supports dynamic content delivery, and provides real-time collaboration and analytics. The major system modules and their functionalities are described below.

1. User Management

- **Registration & Authentication:**
Secure signup and login using JWT-based authentication, password hashing, and email verification. Supports multiple user roles (admin, editor, author, reader).
- **Profile Management:**
Users can update their profile details, view activity history, and manage account settings.
- **Role Management:**
Administrators can assign roles, modify permissions, and manage user access across the system.

2. Content Management

- **Post/Article Management:**
Users (with appropriate roles) can create, edit, publish, and delete articles. Posts can include rich media, tags, and categorization.
- **Category and Tag System:**
Content is organized for easy discovery and filtering. Admins can add/edit/remove categories and tags.
- **Media Library:**
Secure file upload system for images, videos, and other digital assets, with management and preview features.

3. Dashboard and Analytics

- **User Dashboard:**
Personalized overview showing authored posts, comments, analytics, and notifications.
- **Admin Dashboard:**
Centralized control panel for managing users, content, system health, analytics, and site settings.

4. Commenting and Feedback

- **Comment System:**
Threaded comments on posts, with moderation, spam filtering, and notification support.

5. Search and Navigation

- **Full-Text Search:**

- Search across articles, categories, and users using efficient indexing.
- **Advanced Filtering:**
Content can be filtered by date, author, popularity, tags, and categories.

6. Real-Time Features

- **Notifications:**
Users receive real-time updates on relevant events (comments, replies, admin actions).
- **Live Editing and Collaboration:**
Supports instant content updates and feedback (planned for future iterations).

7. Security and Compliance

- **Authentication and Authorization:**
Strong access controls ensure only authorized users can perform sensitive actions.
- **Data Validation and Integrity:**
Input is validated server-side and client-side to prevent data corruption and attacks.
- **Audit Logging:**
System logs critical events for troubleshooting and compliance.
-

Module Interactions:

Each module communicates through clearly defined RESTful APIs, ensuring separation of concerns, scalability, and ease of integration with future modules or third-party tools.

3E.INPUT AND OUTPUT

Content Sphere Hub processes various forms of input and generates corresponding outputs to facilitate seamless user interaction, content delivery, and system management.

Inputs:

1. User Credentials:
 - o Login, registration, and password recovery inputs (username/email, password).
2. Content Data:
 - o Article/post content, images, videos, metadata, categories, tags.
3. Profile and Settings Updates:
 - o User-submitted updates to profile information, preferences, and settings.
4. Comments and Feedback:
 - o User-generated comments on posts, feedback forms.
5. Admin Actions:
 - o Admins input configuration changes, approve/reject posts, manage users, update site settings.
6. Search Queries:
 - o User queries for finding posts, categories, or authors.

Outputs:

1. Content Rendering:
 - o Dynamic delivery of posts, images, multimedia, and site pages to users based on permissions.
2. User Notifications:
 - o Real-time alerts for system events (comments, mentions, admin updates).
3. Dashboards:
 - o Interactive dashboards with analytics, recent activity, and system status for users and admins.
4. Reports and Analytics:
 - o Downloadable/exportable reports on content performance, user engagement, and site health.

5. Error and Status Messages:

- o Contextual feedback on user actions (success, failure, validation errors).

The system is designed to provide immediate, intuitive feedback for all user actions, maintaining a smooth and transparent user experience throughout.

3F.SOFTWARE REQUIREMENT SPECIFICATIONS

A detailed Software Requirement Specification (SRS) ensures that Content Sphere Hub is developed in line with user needs, technical constraints, and industry's best practices. The SRS encompasses both functional and non-functional requirements, along with hardware and software prerequisites.

A. Functional Requirements

1. **User Management:**
 - Users can register, verify accounts, login, logout, and reset passwords.
 - Admins can manage user roles and permissions.
2. **Content Creation and Management:**
 - CRUD operations for articles, media, categories, and tags.
 - WYSIWYG editor for rich content creation.
3. **Dashboard and Analytics:**
 - Users and admins have personalized dashboards displaying relevant data and actions.
 - Integrated analytics for tracking content and user activity.
4. **Commenting System:**
 - Users can post, edit, and delete comments on articles.
 - Moderation tools for admins.
5. **Search and Filtering:**
 - Advanced search functionality for posts, users, and categories.
6. **Notifications:**
 - Real-time in-app notifications for key events.
7. **Security:**
 - Secure password storage (hashing/salting), token-based authentication, input validation.
8. **API Integration:**
 - RESTful API endpoints for frontend-backend communication and third-party integrations.

B. Non-Functional Requirements

1. **Performance:**
Fast response times, efficient database queries, and quick content rendering.
2. **Scalability:**
Support for increasing user/content volume and modular expansion.
3. **Security:**
Adherence to best security practices; protection against XSS, CSRF, SQL/NoSQL injection, etc.
4. **Usability:**
Intuitive UI, accessible across devices and browsers.
5. **Maintainability:**

Clean, modular code structure with comprehensive documentation.

6. **Reliability:**

High system uptime, automated backups, and error recovery mechanisms.

C. Hardware Requirements

- **Minimum:**
 - Intel Core i3 Processor or equivalent
 - 8GB RAM
 - SSD storage
- **Recommended:**
 - Intel Core i5 or higher
 - 16GB RAM
 - Cloud-based scalable infrastructure

D. Software Requirements

- **Operating System:** Windows 11, macOS, or Linux
- **Development Tools:** Visual Studio Code or similar IDE
- **Database:** MongoDB (local/Atlas)
- **Server Runtime:** Node.js (LTS version)
- **Frontend:** React.js (latest stable), Tailwind CSS
- **Other Tools:** Git, Postman, Docker (optional for containerization)

3G.SOFTWARE ENGINEERING PARADIGM APPLIED

Content Sphere Hub's development follows a pragmatic blend of classic and contemporary software engineering paradigms, maximizing reliability, maintainability, and adaptability.

1. Modular and Layered Architecture

The system is built around the separation of concerns principle, dividing the codebase into well-defined layers:

- Presentation Layer: React frontend for user interactions.
- Business Logic Layer: Express controllers and middleware for request handling and business rules.
- Data Layer: MongoDB schemas/models for persistent storage.

2. Agile and Iterative Development

Development is structured around Agile sprints:

- Backlog grooming: Features and bugs are organized into prioritized sprints.
- Sprint cycles: Time-boxed development cycles ensure regular delivery of new features and improvements.
- Continuous Integration/Continuous Deployment (CI/CD): Automated pipelines for testing and deployment minimize manual errors and speed up releases.
- Feedback loops: Regular stakeholder reviews enable rapid response to evolving requirements.

3. Error Handling and Fault Tolerance

Multiple levels of reliability are achieved through:

- Error avoidance: Rigorous input validation, code reviews, and automated testing prevent bugs.
- Error detection and correction: Centralized error handling, logging, and graceful recovery ensure uninterrupted operation.
- Error tolerance: Critical failures are isolated, and user-facing components degrade gracefully when issues occur.

4. Adherence to Best Practices

- Documentation: In-line code comments and external documentation aid maintainability and onboarding.
- Version Control: Git-based workflow supports collaboration and change tracking.

- Testing: Unit, integration, and end-to-end tests ensure system stability.
- Security Practices: Authentication, authorization, data validation, and regular security audits are integral.

By combining these paradigms, Content Sphere Hub achieves a balance between systematic planning and adaptive, user-driven development, ensuring a CMS platform that is robust, user-friendly, and future-ready.

4. SYSTEM DESIGN

System design serves as the blueprint for the construction and implementation of Content Sphere Hub. This phase transforms the functional requirements identified during analysis into technical specifications, diagrams, and structured plans that guide development. The design not only defines the system's architecture and data flows but also sets the foundation for scalability, security, and maintainability.

Content Sphere Hub is designed as a modular, full-stack web application built on the MERN stack, with a clear separation of concerns between frontend, backend, and database layers. The architecture leverages RESTful APIs, a component-based UI, and a scalable data model to ensure the system meets both current and future needs.

The following subsections elaborate on the detailed system design, including data flow diagrams (DFDs), sequence diagrams, use case diagrams, and schema representations, along with notations and explanations.

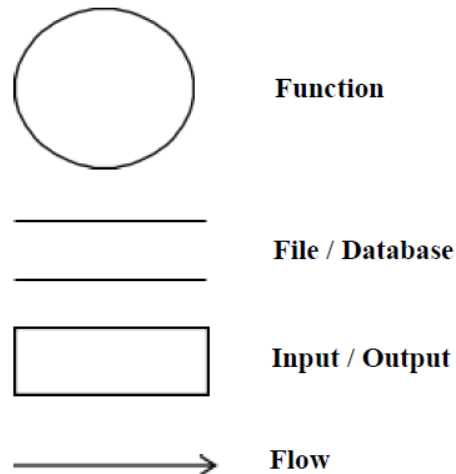
4A. DATA FLOW DIAGRAM

Data Flow Diagrams (DFDs) are essential tools for modeling the movement of data through Content Sphere Hub. They illustrate how information is input, processed, stored, and output within the system. The DFDs developed for Content Sphere Hub are structured across different levels to capture both high-level overviews and detailed sub-processes.

DFD Notation

- Process: Rounded rectangle or circle, represents a transformation of data.
- Data Store: Open-ended rectangle, indicates storage/retrieval of data.
- External Entity: Square/rectangle, denotes users or external systems interacting with the CMS.
- Data Flow: Arrow, shows movement of data between entities, processes, and stores.

DFD Notation:



DFD Example:



Rules for constructing a Data Flow Diagram:

- D Arrows should not cross each other.
- D Squares, Circles, and Files must bear a name.
- D Decomposed data flow squares and circles can have the same names.
- D Draw all data flow around the outside of the diagram.

LEVEL 0 DFD

The Level 0 DFD provides a high-level overview of Content Sphere Hub as a single process, highlighting its interaction with external entities such as users, administrators, and external services.

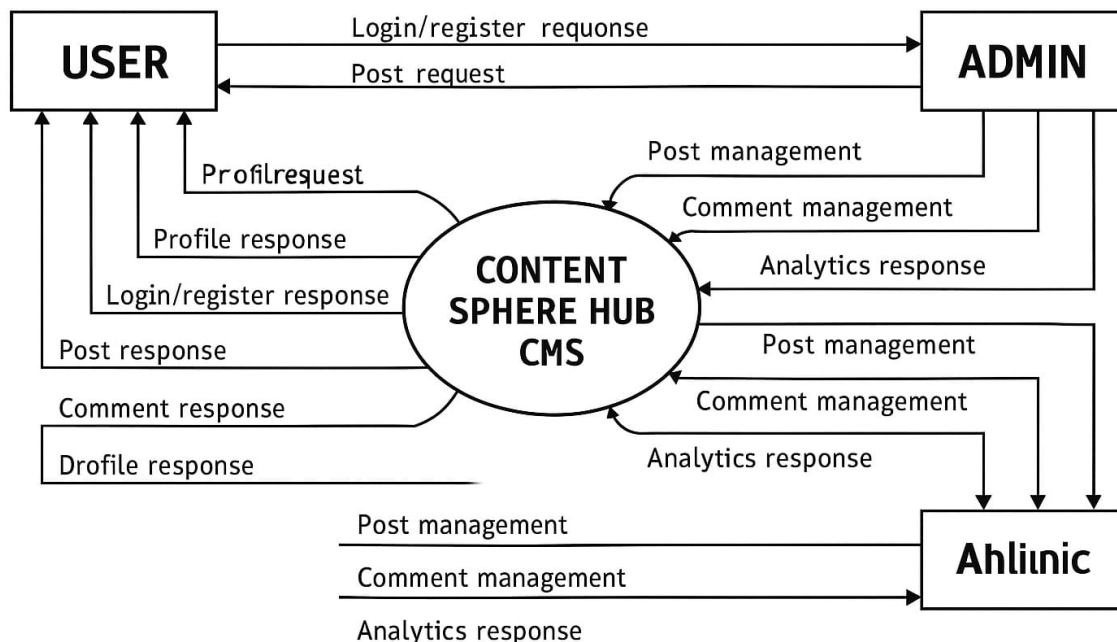
Description:

- External Entities: End-users, administrators, third-party services (e.g., email provider, analytics).
- Main System Process: Content Sphere Hub CMS.

Data Flows:

- o Users submit requests (login, register, create/edit posts, comment).
- o Admins manage users, content, and settings.
- o System outputs responses (rendered pages, notifications, analytics).
- o Integrations handle email, file uploads, and external analytics.

A LEVEL 0 DFD OR CONTEXT DIAGRAM (CONTEXT DIAGRAM)



LEVEL 1 DFD

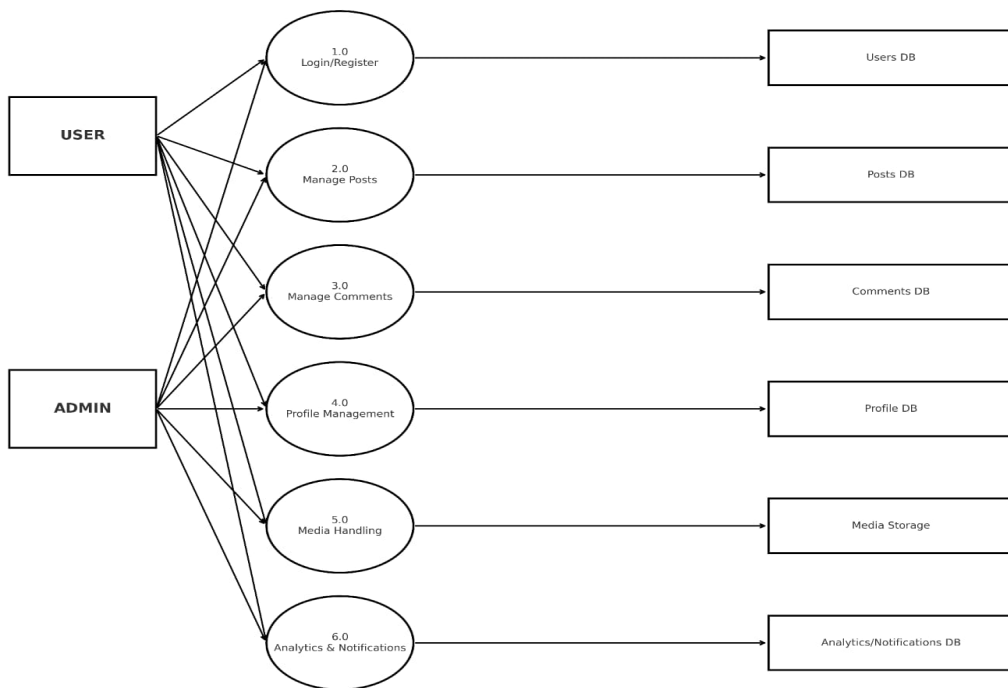
Level 1 DFD decomposes the main system process into core modules, illustrating data flow between user interfaces, backend APIs, and the database.

Modules Illustrated:

- **Authentication Module:** Handles user registration, login, password reset, verification.
- **Content Management Module:** CRUD for posts, media, categories, and tags.
- **Comment System Module:** Handles comment creation, moderation, and notification.
- **Admin Module:** User management, analytics, and system configuration.
- **Search and Analytics Module:** Manages search queries, filters, and analytics reporting.

Typical Data Stores:

- Users Collection
- Posts Collection
- Comments Collection
- Media/Files Storage
- Site Settings/Config

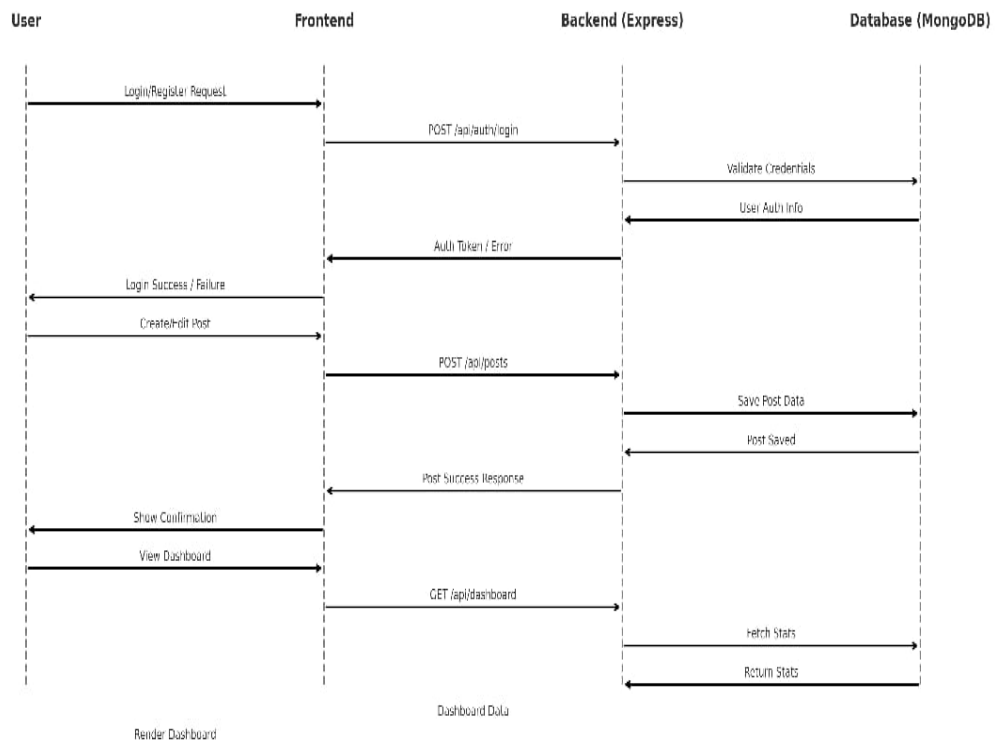


4B.SEQUENCE DIAGRAM

Sequence diagrams visually represent the step-by-step interactions between system components during key workflows. They show how messages are exchanged between users, the frontend, backend controllers, and the database in a time-sequenced order.

Sample Use Case: User Publishes a Blog Post

1. User logs in via the frontend (React).
2. Frontend sends authentication data to the backend (Express/Node.js).
3. Backend validates credentials, issues JWT, and returns session/auth token.
4. User accesses the "Create Post" page, fills out the editor form, and submits a new post.
5. Frontend sends post data to the backend via a RESTful API endpoint.
6. Backend controller receives the data, validates it, and interacts with the database (MongoDB) to save the post.
7. Backend returns success/failure response to the frontend.
8. Frontend updates UI, possibly triggers a real-time notification to admins or users.



Use Case Diagram

To represent the dynamic interactions between users and the system, use case diagrams are used:

- Actors: Users (reader, author, admin), external services (email, analytics).
- Use Cases: Register, login, create post, comment, manage users, view analytics, etc.
- Relationships: Indicate which actors can perform which actions.

How to draw Use Case Diagram?

Use case diagrams are considered for high level requirement analysis of a system. So, when the requirements of a system are analyzed, the functionalities are captured in use cases.

So, we can say that uses cases are nothing but the system functionalities written in an organized manner. Now the second things which are relevant to the use cases are the actors. Actors can be defined as something that interacts with the system.

The actors can be human user, some internal applications or may be some external applications. So, in a brief when we are planning to draw use case diagram, we should have the following items identified.

D Functionalities to be represented as a use case

D Actors

D Relationships among the use cases and actors.

Use case diagrams are drawn to capture the functional requirements of a system. So, after identifying the above items we have to follow the following guidelines to draw an efficient use case diagram.

D The name of a use case is very important. So, the name should be chosen in such a way so that it can identify the functionalities performed.

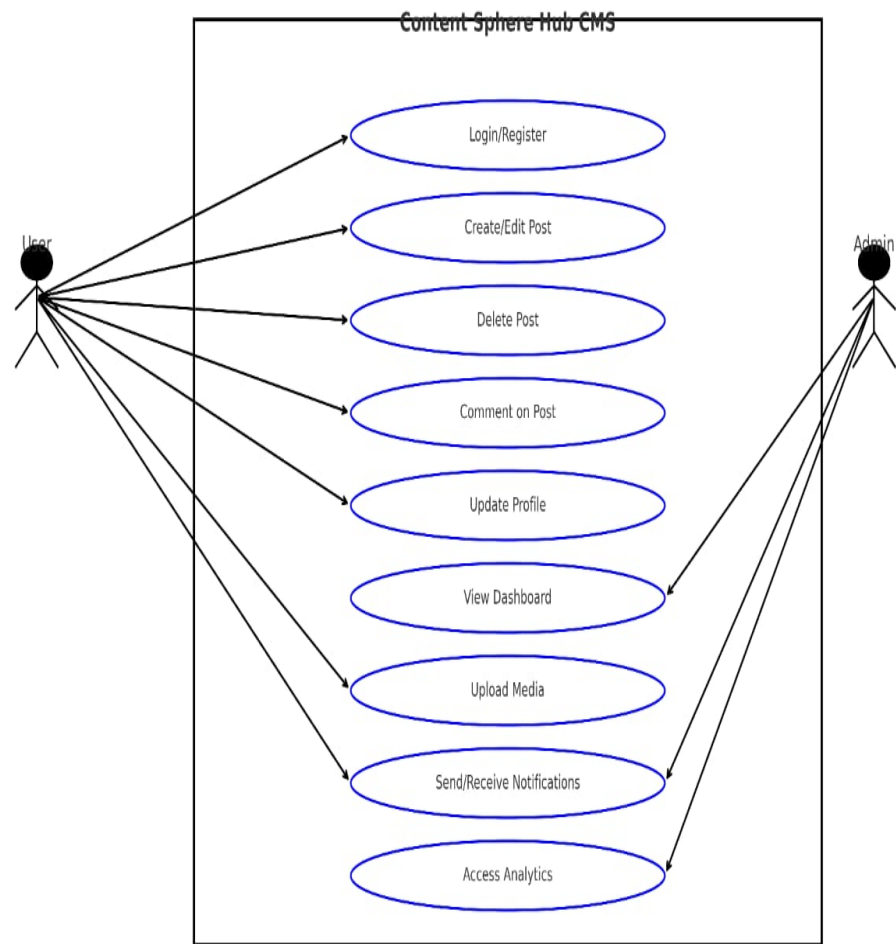
D Give a suitable name for actors.

D Show relationships and dependencies clearly in the diagram.

D Do not try to include all types of relationships. Because the main purpose of the diagram is to identify requirements.

D Use note whenever required to clarify some important point

USE CASE DIAGRAM:



4D.SCHEMA DIAGRAM

Schema diagrams provide a visual and logical representation of how data is structured and related in Content Sphere Hub's database (MongoDB). These diagrams help developers and stakeholders understand how entities are connected, which fields are required, and how relationships are maintained.

Main Database Collections and Relationships

- Users

- o `_id`, username, email, password (hashed), role, profile details, posts[], comments[], created_at, updated_at

- Posts

- o `_id`, title, content, author (ref User), category (ref Category), tags[], comments[], media[], created_at, updated_at, status, views, likes

- Comments

- o `_id`, content, author (ref User), post (ref Post), created_at, status

- Categories

- o `_id`, name, description, posts[]

- Media

- o `_id`, url, uploaded_by (ref User), post (ref Post), type, created_at

Relationships:

- User → Post (1 to many)

- User → Comment (1 to many)

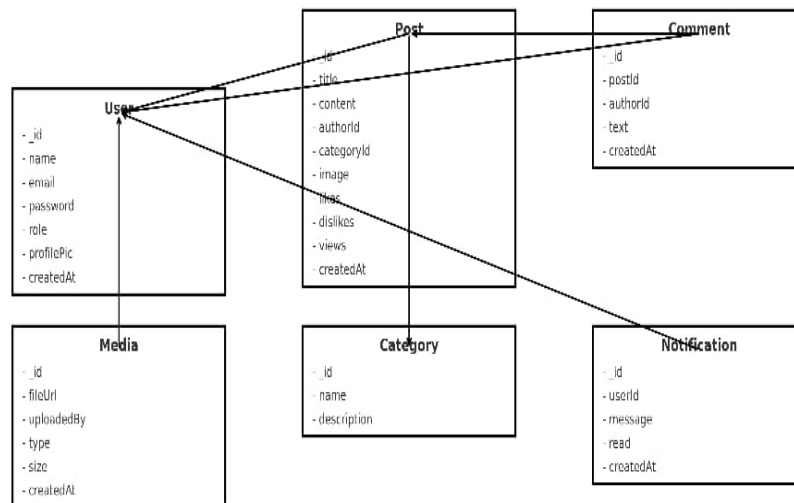
- Post → Comment (1 to many)

- Post → Category (many to 1)

- Post → Media (1 to many)

- Media → User (many to 1)

● SCHEMA DESIGN:



5.UI SNAPSHOT

❖ FRONTEND :-

1) Login Page:

Home Posts Login Register + Add New Post

Login to your account

Enter your details below.

Enter Email

Enter your Password

Login Account

Forgot Password? [Reset Password](#)

✓ CODE:

```
import React, { useEffect, useState } from "react";
import { useDispatch, useSelector } from "react-redux";
import { Link, useNavigate } from "react-router-dom";
import { loginAction } from "../../redux/slices/users/usersSlices";
import LoadingComponent from "../../Alert/LoadingComponent";
import ErrorMsg from "../../Alert/ErrorMsg";
import SuccesMsg from "../../Alert/SuccesMsg";
const Login = () => {
  //! Nvaigation hook
  const navigate = useNavigate();
  //! Dispatch
  const dispatch = useDispatch();
  const [formData, setFormData] = useState({
```

```

    password: "",
    email: "",
  });

  //handle form change
  const handleChange = (e) => {
    setFormData({ ...formData, [e.target.name]: e.target.value });
  };

  //handle form submit
  const handleSubmit = (e) => {
    e.preventDefault();
    //!dispatch
    dispatch(
      loginAction({
        email: formData.email,
        password: formData.password,
      })
    );
    // reset form
    setFormData({
      password: "",
      username: "",
    });
  };

  //store data
  const { userAuth, loading, error, isLogin } = useSelector(
    (state) => state?.users
  );

```

```

//Redirect if token expired
useEffect(() => {
  if (error?.message === "Token expired/Invalid") {
    navigate("/login");
  }
}, [error?.message]);

//! Redirect
useEffect(() => {
  if (
    userAuth?.userInfo?.token &&
    error?.message !== "Token expired/Invalid"
  ) {
    navigate("/user-profile");
  }
}, [userAuth?.userInfo?.token]);

return (
  <section className="py-16 xl:pb-56 bg-white overflow-hidden">
    <div className="container px-4 mx-auto">
      <div className="text-center max-w-md mx-auto">
        <h2 className="mb-4 text-6xl md:text-7xl text-center font-bold font-heading tracking-px-n leading-tight">
          Login to your account
        </h2>
        <p className="mb-12 font-medium text-lg text-gray-600 leading-normal">
          Enter your details below.
        </p>

```

```

    { /* Display error */ }

    { error && <ErrorMsg message={error?.message} /> }

    { /* success message */ }

    { isLogin && <SuccessMsg message="Login Success" /> }

    <form onSubmit={handleSubmit}>

        <label className="block mb-5">

            <input

                className="px-4 py-3.5 w-full text-gray-500 font-medium placeholder-gray-500 bg-
white outline-none border border-gray-300 rounded-lg focus:ring focus:ring-indigo-300"

                id="signUpInput2-1"

                type="text"

                placeholder="Enter Email"

                name="email"

                value={formData.email}

                onChange={handleChange}

            />

        </label>

        <label className="block mb-5">

            <input

                className="px-4 py-3.5 w-full text-gray-500 font-medium placeholder-gray-500 bg-
white outline-none border border-gray-300 rounded-lg focus:ring focus:ring-indigo-300"

                id="signUpInput2-3"

                type="password"

                placeholder="Enter your Password"

                name="password"

                value={formData.password}

                onChange={handleChange}

            />

```

```

</label>

{loading ? (
  <LoadingComponent />
) : (
  <button
    className="mb-8 py-4 px-9 w-full text-white font-semibold border border-indigo-700
rounded-xl shadow-4xl focus:ring focus:ring-indigo-300 bg-indigo-600 hover:bg-indigo-700
transition ease-in-out duration-200"
    type="submit"
  >
    Login Account
  </button>
)}
<p className="font-medium">
  <span className="m-2">Forgot Password?</span>
  <Link
    className="text-indigo-600 hover:text-indigo-700"
    to="/forgot-password"
  >
    Reset Password
  </Link>
</p>
</form>
</div>
</div>
</section>

);};

export default Login;

```

2. Register Page:

Join our community

Discover a world of like-minded individuals who share your interests, passions, and goals

Username

Enter your username

Email

Enter your username

Password

Enter your password

Get Started

Already have an account? [Sign In](#)

Code:

```
React, { useEffect, useState } from "react";
import { useDispatch, useSelector } from "react-redux";
import { Link, useNavigate } from "react-router-dom";
import { registerAction } from "../../redux/slices/users/usersSlices";
import ErrorMsg from "../../Alert/ErrorMsg";
import SuccesMsg from "../../Alert/SuccesMsg";
import LoadingComponent from "../../Alert/LoadingComponent";
```

```
const Register = () => {
  //! Nvaigation hook
  const navigate = useNavigate();

  //! Dispatch
  const dispatch = useDispatch();

  const [formData, setFormData] = useState({
    email: "",
```



```

    password: "",
    username: "",
  });

  //handle form change
  const handleChange = (e) => {
    setFormData({ ...formData, [e.target.name]: e.target.value });
  };

  //handle form submit
  const handleSubmit = (e) => {
    e.preventDefault();
    //!dispatch
    dispatch(
      registerAction({
        username: formData.username,
        password: formData.password,
        email: formData?.email,
      })
    );
    // reset form
    setFormData({
      email: "",
      password: "",
      username: "",
    });
  });

  //store data
  const { user, error, isRegistered, loading } = useSelector(
    (state) => state?.users
  );

```

```

);
//! Redirect
useEffect(() => {
  if (user?.status === "success") {
    navigate("/login");
  }
}, [user?.status]);
return (
  <form onSubmit={handleSubmit} className="w-full pl-2 lg:w-1/2">
    <div className="flex flex-col items-center p-10 xl:px-24 xl:pb-12 bg-white lg:max-w-xl
lg:ml-auto rounded-4xl shadow-2xl">
      <h2 className="mb-4 text-2xl md:text-3xl text-coolGray-900 font-bold text-center">
        Join our community
      </h2>
      {/* Display error */}
      {error && <ErrorMsg message={error?.message} />}
      {/* success message */}
      {isRegistered && <SuccessMsg message="Register Success" />}
      <h3 className="mb-7 text-base md:text-lg text-coolGray-500 font-medium text-center">
        Discover a world of like-minded individuals who share your interests,
        passions, and goals
      </h3>
      <label className="mb-4 flex flex-col w-full">
        <span className="mb-1 text-coolGray-800 font-medium">Username</span>
        <input
          className="py-3 px-3 leading-5 w-full text-coolGray-400 font-normal border border-
coolGray-200 outline-none focus:ring-2 focus:ring-green-500 focus:ring-opacity-50 rounded-lg
shadow-sm"

```

```

    type="text"
    placeholder="Enter your username"
    value={formData.username}
    onChange={handleChange}
    name="username"
  />
</label>
<label className="mb-4 flex flex-col w-full">
  <span className="mb-1 text-coolGray-800 font-medium">Email</span>
  <input
    className="py-3 px-3 leading-5 w-full text-coolGray-400 font-normal border border-coolGray-200 outline-none focus:ring-2 focus:ring-green-500 focus:ring-opacity-50 rounded-lg shadow-sm"
    placeholder="Enter your username"
    type="email"
    name="email"
    value={formData.email}
    onChange={handleChange}
  />
</label>
<label className="mb-4 flex flex-col w-full">
  <span className="mb-1 text-coolGray-800 font-medium">Password</span>
  <input
    className="py-3 px-3 leading-5 w-full text-coolGray-400 font-normal border border-coolGray-200 outline-none focus:ring-2 focus:ring-green-500 focus:ring-opacity-50 rounded-lg shadow-sm"
    type="password"
    placeholder="Enter your password"

```


```


        value={formData.password}
        onChange={handleChange}
        name="password"
      />
    </label>
    {loading ? (
      <LoadingComponent />
    ) : (
      <button
        className="mb-4 inline-block py-3 px-7 w-full leading-6 text-green-50 font-medium
text-center bg-green-500 hover:bg-green-600 focus:ring-2 focus:ring-green-500 focus:ring-
opacity-50 rounded-md"
        type="submit"
      >
        Get Started
      </button>
    )}
    <p className="text-sm text-coolGray-400 font-medium text-center">
      <span>Already have an account?</span>
      <Link className="text-green-500 hover:text-green-600" to="/login">
        Sign In
      </Link>
    </p>
  </div>
</form>
);};

```

```
export default Register;
```

3. Verify Email:

 [Click here to verify your account](#)

 (0)

 Followers (0)

Date Joined: Sun Jun 29 2025

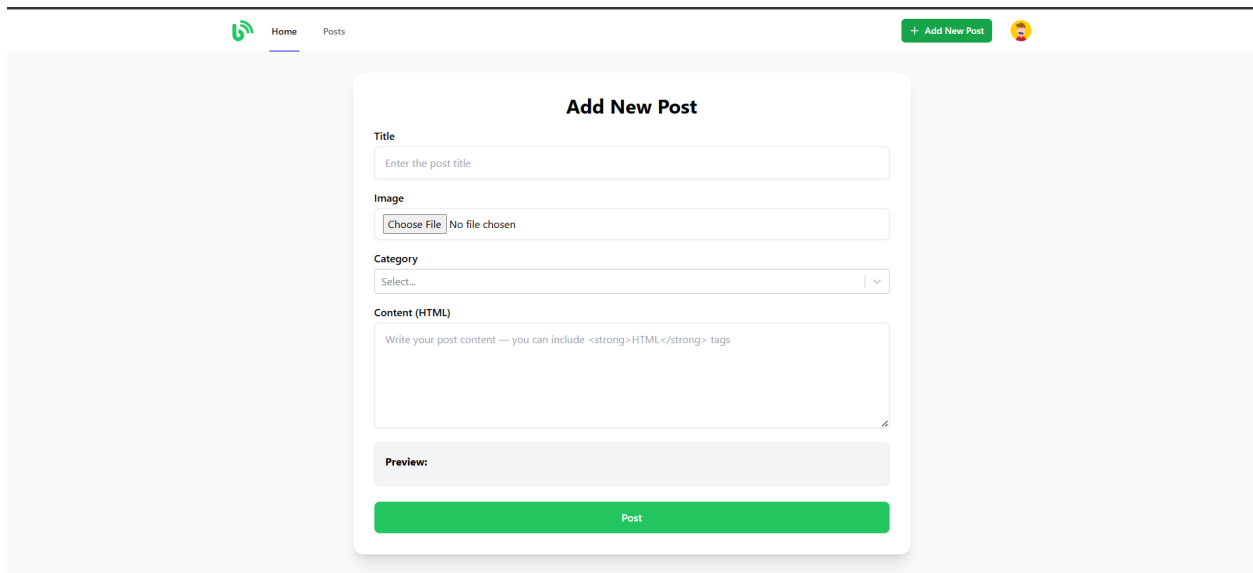


Good Job

Email successfully sent, check your email

OK

4.POST PAGE(for admin and user):



Code:

```
import React from "react";
import { FiCalendar } from "react-icons/fi";
import { Link } from "react-router-dom";
const UserPosts = ({ posts }) => {
  return (
    <section className="relative py-24 bg-white">
      <div
        className="absolute top-0 left-0 w-full h-full"
        style={{
          backgroundImage: 'url("flex-ui-assets/elements/pattern-white.svg")',
          backgroundRepeat: "no-repeat",
          backgroundPosition: "left top",
        }}
      />
      <div className="container relative z-10 px-4 mx-auto">
```

```

<div className="mx-auto mb-8 text-center md:max-w-5xl md:mb-16">

  <span className="inline-block px-2 py-py mb-4 text-xs font-medium leading-5 text-
green-500 uppercase bg-green-100 rounded-full shadow-sm">

    Your Posts

  </span>

  <h3 className="mb-4 text-3xl font-bold leading-tight tracking-tighter md:text-5xl text-
darkCoolGray-900">

    Top Posts [{posts?.length}]

  </h3>

  <p className="mb-10 text-lg font-medium md:text-xl text-coolGray-500">

    With our integrated CMS, you can manage your blogs in one secure platform.

  </p>
</div>

<div className="flex flex-wrap mb-12 -mx-4 md:mb-20">

  {posts?.map((post) => {

    return (

      <div className="w-full px-4 mb-8 md:w-1/2">

        <a className="block mb-6 overflow-hidden rounded-md" href="#">

          <img

            className="w-full"

            src={post?.image}

            alt={post?.tile}

          />

        </a>

        <div className="mb-4">

          <a

```

```

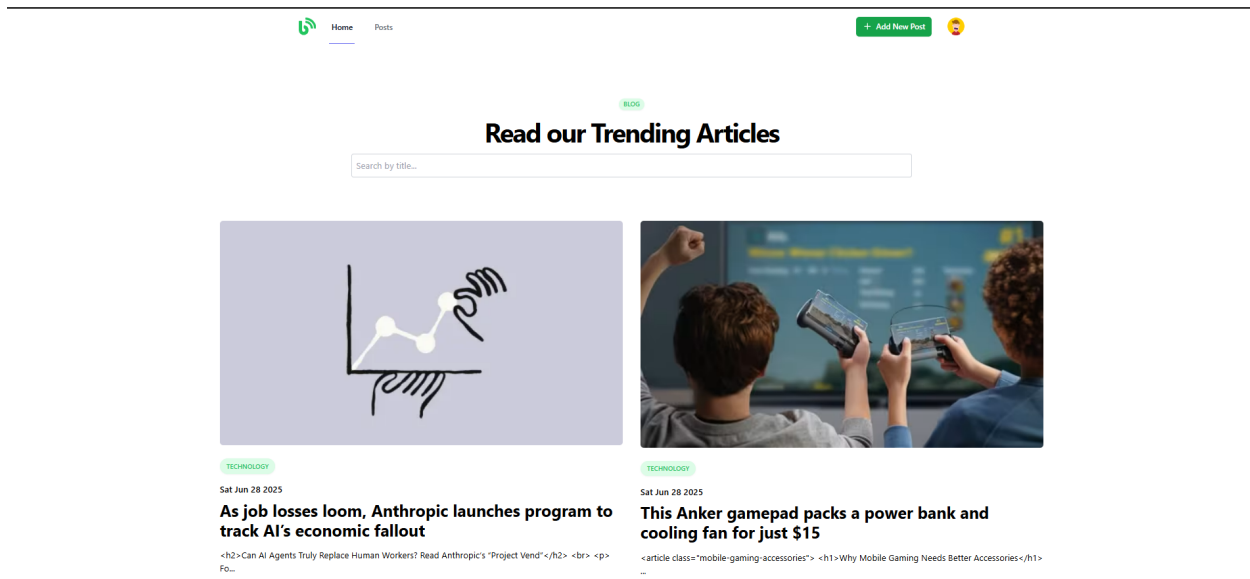
        className="inline-block px-3 py-1 text-xs font-medium leading-5 text-green-500
uppercase bg-green-100 rounded-full shadow-sm hover:text-green-600 hover:bg-green-200"
        href="#"
    >
        {post?.category?.name}
    </a>
    { /* Schedule post link */ }
    <Link
        to={` /posts/schedule/${post?._id}`}
        className="flex w-1/2 items-center px-6 py-1 bg-blue-500 text-white rounded-md
shadow-md hover:bg-blue-700 transition-colors duration-300 ease-in-out"
    >
        <FiCalendar className="mr-2" /> Schedule Post
    </Link>
</div>
<p className="mb-2 font-medium text-coolGray-500">
    {new Date(post?.createdAt).toDateString()}
</p>
<a
    className="inline-block mb-4 text-2xl font-bold leading-tight md:text-3xl text-
coolGray-800 hover:text-coolGray-900 hover:underline"
    href="#"
    >
        {post?.title}
    </a>
    <p className="mb-6 text-lg font-medium text-coolGray-500">
        {post?.content}
    </p>

```



```
    </div>
  </>
);
}}
</div>
</div>
</section>
);
};
export default UserPosts;
```

5.HOME PAGE:



✓ CODE:

```
import React from "react";
import { FaBookOpen } from "react-icons/fa";
import Register from "../Users/Register";
import PublicPosts from "../Posts/PublicPosts";
import { Link } from "react-router-dom";
const Homepage = () => {
  return (
    <div>
      <section className="relative bg-white overflow-hidden">
        <div className="bg-transparent">
          <div className="navbar-menu hidden fixed top-0 left-0 z-50 w-full h-full bg-coolGray-900 bg-opacity-50">
            <div className="fixed top-0 left-0 bottom-0 w-full max-w-xs bg-white">
              <a className="navbar-close absolute top-5 p-4 right-3" href="#">
                <svg
                  width={12}
                  height={12}
                  viewBox="0 0 12 12"
                  fill="none"
                  xmlns="http://www.w3.org/2000/svg"
                >
                <path
                  d="M6.94004 6L11.14 1.80667C11.2656 1.68113 11.3361 1.51087 11.3361"
                />
              </a>
            </div>
          </div>
        </div>
      </section>
    </div>
  );
};
```

1.33333C11.3361 1.1558 11.2656 0.985537 11.14 0.860002C11.0145 0.734466 10.8442 0.66394
10.6667 0.66394C10.4892 0.66394 10.3189 0.734466 10.1934 0.860002L6.00004 5.06L1.80671
0.860002C1.68117 0.734466 1.51091 0.663941 1.33337 0.663941C1.15584 0.663941 0.985576
0.734466 0.860041 0.860002C0.734505 0.985537 0.66398 1.1558 0.66398 1.33333C0.66398
1.51087 0.734505 1.68113 0.860041 1.80667L5.06004 6L0.860041 10.1933C0.797555 10.2553
0.747959 10.329 0.714113 10.4103C0.680267 10.4915 0.662842 10.5787 0.662842
10.6667C0.662842 10.7547 0.680267 10.8418 0.714113 10.9231C0.747959 11.0043 0.797555
11.078 0.860041 11.14C0.922016 11.2025 0.99575 11.2521 1.07699 11.2859C1.15823 11.3198
1.24537 11.3372 1.33337 11.3372C1.42138 11.3372 1.50852 11.3198 1.58976 11.2859C1.671
11.2521 1.74473 11.2025 1.80671 11.14L6.00004 6.94L10.1934 11.14C10.2554 11.2025
10.3291 11.2521 10.4103 11.2859C10.4916 11.3198 10.5787 11.3372 10.6667 11.3372C10.7547
11.3372 10.8419 11.3198 10.9231 11.2859C11.0043 11.2521 11.0781 11.2025 11.14
11.14C11.2025 11.078 11.2521 11.0043 11.286 10.9231C11.3198 10.8418 11.3372 10.7547
11.3372 10.6667C11.3372 10.5787 11.3198 10.4915 11.286 10.4103C11.2521 10.329 11.2025
10.2553 11.14 10.1933L6.94004 6Z"

fill="#556987"

/>

</svg>

</div>

</div>

</div>

<div className="relative py-20 xl:pt-16 xl:pb-24">

<div className="container px-4 mx-auto">

<div className="flex flex-wrap items-center">

<div className="w-full lg:w-1/2 mb-20 lg:mb-0">

Content Sphere Hub

<h1 className="mb-6 text-3xl md:text-5xl lg:text-6xl leading-tight text-coolGray-900 font-bold tracking-tight">

Explore the Future with Content Sphere Hub

</h1>

<p className="mb-8 text-lg md:text-xl leading-7 text-coolGray-500 font-medium"></p>

<li className="mb-6 flex items-center">

<p className="text-lg md:text-xl leading-7 text-coolGray-500 font-medium">
 Unpacking the Latest in Technology and Innovation
</p>

<li className="mb-6 flex items-center">

 <p className="text-lg md:text-xl leading-7 text-coolGray-500 font-medium">
 Perfect for a blog focused on cutting-edge technology and
 trends
 </p>

<li className="flex items-center">

 <p className="text-lg md:text-xl leading-7 text-coolGray-500 font-medium">
 Great if your blog is about sharing innovative and
 accessible recipes.
 </p>

<Link
 to="/posts"
 className="mb-4 mt-9 p-4 inline-block py-3 px-7 w-full leading-6 text-green-50
font-medium text-center bg-gradient-to-r from-green-400 to-blue-600 hover:from-green-500
hover:to-green-700 focus:ring-2 focus:ring-green-500 focus:ring-opacity-50 rounded-md
shadow-lg transform transition-all duration-500 ease-in-out hover:scale-105 flex items-center
justify-center animate-pulse"

```

```

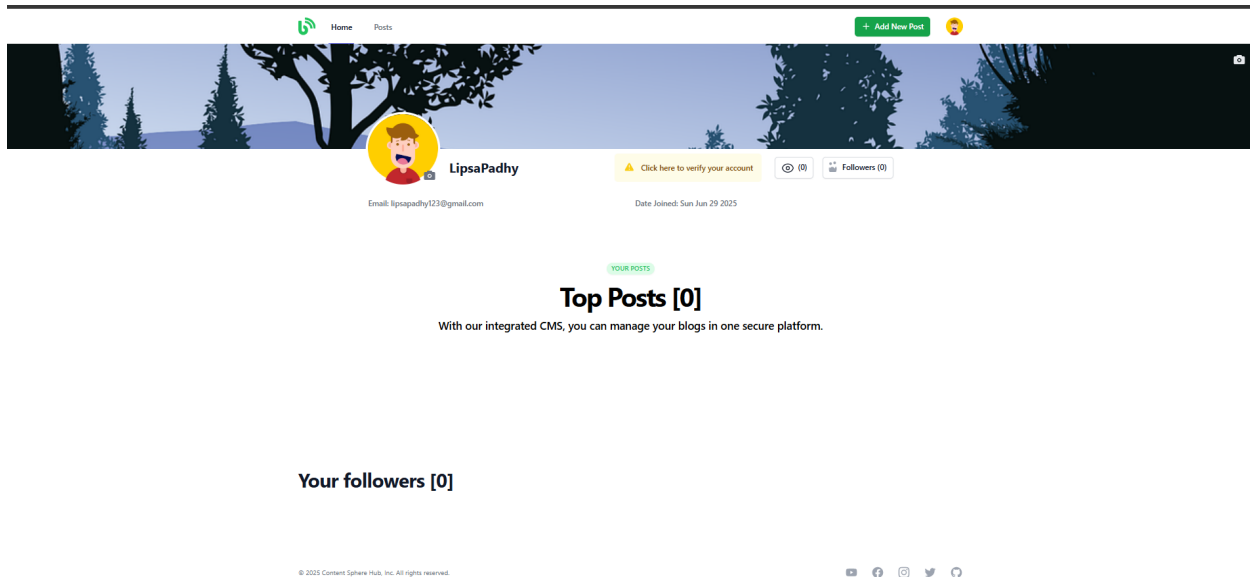
 >
 Explore Now!
 </Link>
</div>
{ /* Promotional Image with Fading Glow */ }
<div className="w-full max-w-xl mx-auto mb-8">

</div>
</div>
</div>
</div>
</section>
{ /* Home posts list */ }
<PublicPosts />
</div>
);
};

export default Homepage;

```

## 6.User Profile:



✓ CODE:

```
import { useEffect } from "react";
import { useDispatch, useSelector } from "react-redux";
import { useParams } from "react-router-dom";
import {
 blockUserAction,
 followUserAction,
 unBlockUserAction,
 unFollowUserAction,
 userPrivateProfileAction,
 userPublicProfileAction,
} from "../redux/slices/users/usersSlices";
import UserPosts from "../UserPosts";
```

```
export default function PublicUserProfile() {
 // Get the id from params
 const { userId } = useParams();
```

```

//! Get data from store
const dispatch = useDispatch();
useEffect(() => {
 dispatch(userPublicProfileAction(userId));
}, [userId, dispatch]);

const { user, loading, error, profile } = useSelector(
 (state) => state?.users
);
//! Get all the users the login user has blocked
const blockedUsers = profile?.user?.blockedUsers;

const hasBlocked = blockedUsers?.some((user) => user?._id === userId);

//! Get all the users the login user has follow
const followedUsers = profile?.user?.following;

const hasfollowed = followedUsers?.some((user) => user?._id === userId);
console.log(hasfollowed);
// get user private profile
useEffect(() => {
 dispatch(userPrivateProfileAction());
}, [userId, dispatch, hasBlocked, hasfollowed]);

//Block user handler
const blockUserHandler = () => {
 dispatch(blockUserAction(userId));
}

```

```
};
```

```
//unBlock user handler
```

```
const unBlockUserHandler = () => {
 dispatch(unBlockUserAction(userId));
};
```

```
//follow user handler
```

```
const followUserHandler = () => {
 dispatch(followUserAction(userId));
};
```

```
//!unfollow user handler
```

```
const unfollowUserHandler = () => {
 dispatch(unFollowUserAction(userId));
};
```

```
return (
```

```
 <
```

```
 <div className="flex h-full">
```

```
 <div className="flex min-w-0 flex-1 flex-col overflow-hidden">
```

```
 <div className="relative z-0 flex flex-1 overflow-hidden">
```

```
 <main className="relative z-0 flex-1 overflow-y-auto focus:outline-none xl:order-last">
```

```
 <article>
```

```
 { /* user header */ }
```

```
 <div>
```

```
 <div>
```



```

<img
 className="h-32 w-full object-cover lg:h-48"
 src={
 profile?.user?.coverImage ||
 "https://cdn.pixabay.com/photo/2020/02/06/15/59/forest-4824759_1280.png"
 }
 alt={profile?.user?.username}
/>
</div>

```

```

<div className="mx-auto max-w-5xl px-4 sm:px-6 lg:px-8">
 <div className="-mt-12 sm:-mt-16 sm:flex sm:items-end sm:space-x-5">
 <div className="flex">
 <img
 className="h-24 w-24 rounded-full ring-4 ring-white sm:h-32 sm:w-32"
 src={
 profile?.user?.profilePicture ||
 "https://cdn.pixabay.com/photo/2016/11/18/23/38/child-1837375_1280.png"
 }
 alt={profile?.user?.username}
 />
 </div>

```

```

 <div className="mt-6 sm:flex sm:min-w-0 sm:flex-1 sm:items-center sm:justify-
end sm:space-x-6 sm:pb-1">
 <div className="mt-6 min-w-0 flex-1 sm:hidden 2xl:block">
 <h1 className="truncate text-2xl font-bold text-gray-900">
 {user?.username}

```

```

 </h1>

 </div>

 <div className="justify-stretch mt-6 flex flex-col space-y-3 sm:flex-row
sm:space-y-0 sm:space-x-4">

 { /* user Views */ }

 <button

 type="button"

 className="inline-flex justify-center gap-x-1.5 rounded-md bg-white px-3 py-
2 text-sm font-semibold text-gray-900 shadow-sm ring-1 ring-inset ring-gray-300 hover:bg-gray-
50"

 >

 <svg

 className="-ml-0.5 h-5 w-5 text-gray-400"

 xmlns="http://www.w3.org/2000/svg"

 fill="none"

 viewBox="0 0 24 24"

 strokeWidth="1.5"

 stroke="currentColor"

 className="w-6 h-6"

 >

 <path

 strokeLinecap="round"

 strokeLinejoin="round"

 d="M2.036 12.322a1.012 1.012 0 010-.639C3.423 7.51 7.36 4.5 12
4.5c4.638 0 8.573 3.007 9.963 7.178.07.207.07.431 0 .639C20.577 16.49 16.64 19.5 12 19.5c-
4.638 0-8.573-3.007-9.963-7.178z"

 />

 <path

 strokeLinecap="round"

```

```

 strokeLinejoin="round"

 d="M15 12a3 3 0 11-6 0 3 3 0 016 0z"

 />

</svg>

20

</button>

{ /* block/unblock */ }

{ hasBlocked ? (

 <button

 onClick={unBlockUserHandler}

 type="button"

 className="inline-flex justify-center gap-x-1.5 rounded-md bg-white px-3
py-2 text-sm font-semibold text-gray-900 shadow-sm ring-1 ring-inset ring-gray-300 hover:bg-
gray-50"

 >

 <svg

 className="-ml-0.5 h-5 w-5 text-gray-400"

 xmlns="http://www.w3.org/2000/svg"

 fill="none"

 viewBox="0 0 24 24"

 strokeWidth="1.5"

 stroke="currentColor"

 className="w-6 h-6"

 >

 <path

 strokeLinecap="round"

 strokeLinejoin="round"

```

```
d="M13.5 10.5V6.75a4.5 4.5 0 119 0v3.75M3.75 21.75h10.5a2.25 2.25 0
002.25-2.25v-6.75a2.25 2.25 0 00-2.25-2.25H3.75a2.25 2.25 0 00-2.25 2.25v6.75a2.25 2.25 0
002.25 2.25z"
```

```
/>
```

```
</svg>
```

```
Unblock
```

```
</button>
```

```
): (
```

```
<button
```

```
onClick={blockUserHandler}
```

```
type="button"
```

```
className="inline-flex justify-center gap-x-1.5 rounded-md bg-white px-3
py-2 text-sm font-semibold text-gray-900 shadow-sm ring-1 ring-inset ring-gray-300 hover:bg-
gray-50"
```

```
>
```

```
<svg
```

```
className="-ml-0.5 h-5 w-5 text-gray-400"
```

```
xmlns="http://www.w3.org/2000/svg"
```

```
fill="none"
```

```
viewBox="0 0 24 24"
```

```
strokeWidth="1.5"
```

```
stroke="currentColor"
```

```
className="w-6 h-6"
```

```
>
```

```
<path
```

```
strokeLinecap="round"
```

```
strokeLinejoin="round"
```

```

d="M16.5 10.5V6.75a4.5 4.5 0 10-9 0v3.75m-.75 11.25h10.5a2.25 2.25 0
002.25-2.25v-6.75a2.25 2.25 0 00-2.25-2.25H6.75a2.25 2.25 0 00-2.25 2.25v6.75a2.25 2.25 0
002.25 2.25z"

```

```

/>

```

```

</svg>

```

```

Block

```

```

</button>

```

```

)}}

```

```

{ /* follow / unfollow */ }

```

```

{hasfollowed ? (

```

```

<button

```

```

onClick={unfollowUserHandler}

```

```

type="button"

```

```

className="inline-flex justify-center gap-x-1.5 rounded-md bg-white px-3
py-2 text-sm font-semibold text-gray-900 shadow-sm ring-1 ring-inset ring-gray-300 hover:bg-
gray-50"

```

```

>

```

```

<svg

```

```

className="-ml-0.5 h-5 w-5 text-gray-400"

```

```

xmlns="http://www.w3.org/2000/svg"

```

```

fill="none"

```

```

viewBox="0 0 24 24"

```

```

strokeWidth="1.5"

```

```

stroke="currentColor"

```

```

className="w-6 h-6"

```

```

>

```

```

<path

```

```

strokeLinecap="round"

```

```

 strokeLinejoin="round"

 d="M22 10.5h-6m-2.25-4.125a3.375 3.375 0 11-6.75 0 3.375 3.375 0
016.75 0zM4 19.235v-.11a6.375 6.375 0 0112.75 0v.109A12.318 12.318 0 0110.374 21c-2.331
0-4.512-.645-6.374-1.766z"

 />

</svg>

Follow

</button>

): (

<button

 onClick={followUserHandler}

 type="button"

 className="inline-flex justify-center gap-x-1.5 rounded-md bg-white px-3
py-2 text-sm font-semibold text-gray-900 shadow-sm ring-1 ring-inset ring-gray-300 hover:bg-
gray-50"

>

<svg

 className="-ml-0.5 h-5 w-5 text-gray-400"

 xmlns="http://www.w3.org/2000/svg"

 fill="none"

 viewBox="0 0 24 24"

 strokeWidth="1.5"

 stroke="currentColor"

 className="w-6 h-6"

>

<path

 strokeLinecap="round"

 strokeLinejoin="round"

```

d="M19 7.5v3m0 0v3m0-3h3m-3 0h-3m-2.25-4.125a3.375 3.375 0 11-6.75  
0 3.375 3.375 0 016.75 0zM4 19.235v-.11a6.375 6.375 0 0112.75 0v.109A12.318 12.318 0  
0110.374 21c-2.331 0-4.512-.645-6.374-1.766z"

/>

</svg>

Follow

</button>

}}

</div>

</div>

</div>

<div className="mt-6 hidden min-w-0 flex-1 sm:block 2xl:hidden">

<h1 className="truncate text-2xl font-bold text-gray-900">

{user?.name}

</h1>

</div>

</div>

</div>

{/\* Description list \*/}

<div className="mx-auto mt-6 max-w-5xl px-4 sm:px-6 lg:px-8">

<dl className="grid grid-cols-1 gap-x-4 gap-y-8 sm:grid-cols-2">

<div className="sm:col-span-1">

<dt className="text-sm font-medium text-gray-500">

Email

</dt>

<dd className="mt-1 text-sm text-gray-900">

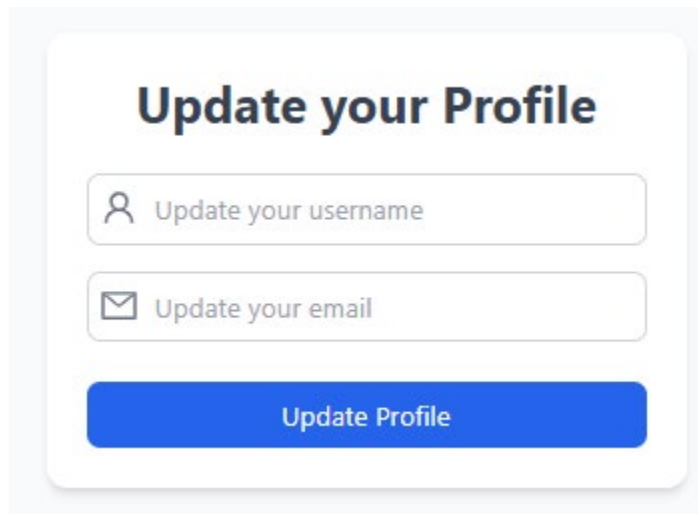
{user?.user?.email}

</dd>

```
 </div>
 </dl>
 </div>
 </article>
</main>
</div>
</div>
</div>
{ /* Users posts */ }
<UserPosts posts={user?.user?.posts} />
</>
);}
```



## 7.Update Your Profile:

A form titled "Update your Profile" with a light blue background. It contains two input fields: the first with a person icon and placeholder text "Update your username", and the second with an envelope icon and placeholder text "Update your email". Below these fields is a solid blue button with the text "Update Profile" in white.

Code:

```
import React, { useEffect, useState } from "react";
import { AiOutlineUser, AiOutlineMail } from "react-icons/ai";
import { useDispatch, useSelector } from "react-redux";
import "tailwindcss/tailwind.css";
import { updateUserProfileAction } from "../../redux/slices/users/usersSlices";
import LoadingComponent from "../../Alert/LoadingComponent";
import ErrorMsg from "../../Alert/ErrorMsg";
import SuccessMsg from "../../Alert/SuccessMsg";
```

```
const UpdateUser = () => {
 //! Dispatch
 const dispatch = useDispatch();
 const [formData, setFormData] = useState({
 email: "",
 username: "",
 });
 //handle form change
 const handleChange = (e) => {
 setFormData({ ...formData, [e.target.name]: e.target.value });
 };
 //handle form submit
 const handleSubmit = (e) => {
 console.log(formData);
 e.preventDefault();
 //!dispatch
```

```

dispatch(
 updateUserProfileAction({
 username: formData.username,
 email: formData.email,
 })
);
// reset form
setFormData({
 username: "",
 email: "",
});
};
//store data
const { loading, error, success, isUpdated } = useSelector(
 (state) => state?.users
);
useEffect(() => {
 if (isUpdated) {
 setTimeout(() => {
 window.location.reload();
 }, 1000);
 }
});
return (
 <form
 onSubmit={handleSubmit}
 className="flex flex-col items-center justify-center min-h-screen bg-gray-50"
 >
 <div className="w-96 p-6 bg-white rounded-xl shadow-md">
 <h1 className="text-3xl font-bold text-gray-700 text-center mb-6">
 Update your Profile
 </h1>
 {error && <ErrorMsg message={error?.message} />}
 {isUpdated && <SuccessMsg message="Profile updated, login back again" />}
 <div className="mb-4 relative">
 <AiOutlineUser className="absolute text-gray-500 text-2xl top-2 left-2" />
 <input
 name="username"
 value={formData.username}
 onChange={handleChange}

```

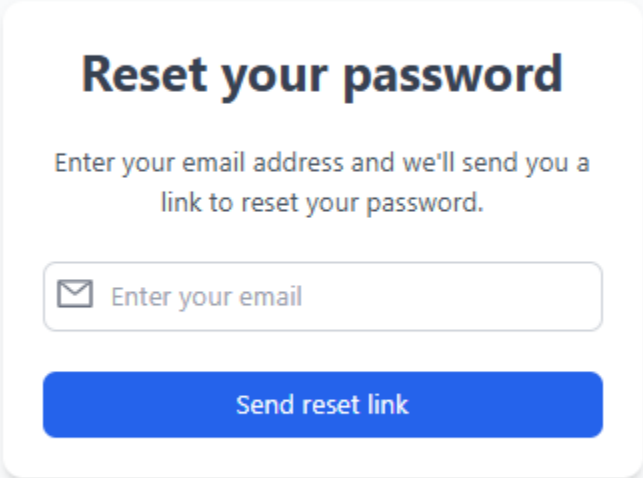
```

 type="text"
 placeholder="Update your username"
 className="pl-10 pr-4 py-2 w-full border border-gray-300 rounded-lg focus:outline-
none focus:border-blue-500"
 />
</div>
<div className="mb-6 relative">
 <AiOutlineMail className="absolute text-gray-500 text-2xl top-2 left-2" />
 <input
 name="email"
 value={formData.password}
 onChange={handleChange}
 type="email"
 placeholder="Update your email"
 className="pl-10 pr-4 py-2 w-full border border-gray-300 rounded-lg focus:outline-
none focus:border-blue-500"
 />
</div>
{loading ? (
 <LoadingComponent />
) : (
 <button
 type="submit"
 className="w-full px-4 py-2 text-white bg-blue-600 rounded-lg hover:bg-blue-700
focus:outline-none"
 >
 Update Profile
 </button>
)}
</div>
</form>
);
};

export default UpdateUser;

```

## 8.Reset Password:



The image shows a 'Reset your password' form. It has a title 'Reset your password' in bold. Below the title is a message: 'Enter your email address and we'll send you a link to reset your password.' There is a text input field with a mail icon and the placeholder text 'Enter your email'. Below the input field is a blue button labeled 'Send reset link'.

✓ CODE:

```
import React, { useState } from "react";
import { AiOutlineMail } from "react-icons/ai";
import { useDispatch, useSelector } from "react-redux";
import { forgotPasswordAction } from "../../redux/slices/users/usersSlices";
import LoadingComponent from "../../Alert/LoadingComponent";
import SuccesMsg from "../../Alert/SuccesMsg";

const PasswordResetRequest = () => {
 //! Dispatch
 const dispatch = useDispatch();
 const [formData, setFormData] = useState({
 email: "",
 });
};
```

```

//handle form change
const handleChange = (e) => {
 setFormData({ ...formData, [e.target.name]: e.target.value });
};

//handle form submit
const handleSubmit = (e) => {
 e.preventDefault();
 //!dispatch
 dispatch(
 forgotPasswordAction({
 email: formData.email,
 })
);
 // reset form
 setFormData({
 email: "",
 });
};

//store data
const { loading, error, isEmailSent, emailMessage } = useSelector(
 (state) => state?.users
);

return (
 <form
 onSubmit={handleSubmit}
 className="flex flex-col items-center justify-center min-h-screen bg-gray-50"
 >

```

```

<div className="w-96 p-6 bg-white rounded-xl shadow-md">
 <h1 className="text-3xl font-bold text-gray-700 text-center mb-6">
 Reset your password
 </h1>
 <p className="text-gray-600 text-center mb-6">
 Enter your email address and we'll send you a link to reset your
 password.
 </p>
 {error && (
 <p className="text-red-600 text-center mb-6">{error?.message}</p>
)}
 {/* show success message */}
 {isEmailSent && (
 <p className="text-green-600 text-center mb-6">
 {emailMessage?.message}
 </p>
)}
 <div className="mb-6 relative">
 <AiOutlineMail className="absolute text-gray-500 text-2xl top-2 left-2" />
 <input
 name="email"
 value={formData.email}
 onChange={handleChange}
 type="email"
 placeholder="Enter your email"
 className="pl-10 pr-4 py-2 w-full border border-gray-300 rounded-lg focus:outline-
 none focus:border-blue-500"

```

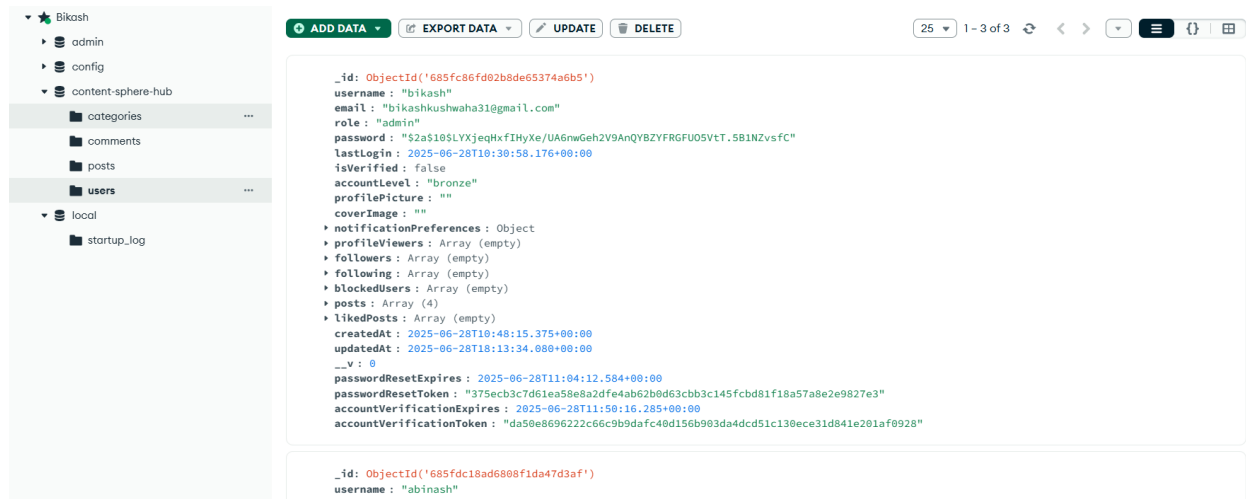
```

 />
 </div>
 {loading ? (
 <LoadingComponent />
) : (
 <button className="w-full px-4 py-2 text-white bg-blue-600 rounded-lg hover:bg-blue-
700 focus:outline-none">
 Send reset link
 </button>
)}
</div>
</form>
);
};
export default PasswordResetRequest;

```

## ❖ BACKEND:-

### 1) USER AND ADMIN DATA:



#### ● User .js

```
const mongoose = require("mongoose");
```

```
const crypto = require("crypto");
```

```
//schema
```

```
const userSchema = new mongoose.Schema(
```

```
{
```

```
 username: {
```

```
 type: String,
```

```
 required: true,
```

```
 },
```

```
 email: {
```

```
 type: String,
```

```
 required: true,
```

```
 },
```

```
 role: {
```

```
 type: String,
```



```
 required: true,
 enum: ["user", "admin"],
 default: "user",
 },
 password: {
 type: String,
 required: true,
 },
 lastLogin: {
 type: Date,
 default: Date.now(),
 },
 isVerified: {
 type: Boolean,
 default: false,
 },
 accountLevel: {
 type: String,
 enum: ["bronze", "silver", "gold"],
 default: "bronze",
 },
 profilePicture: {
 type: String,
 default: "",
 },
 coverImage: {
 type: String,
```

```

 default: "",
 },
 bio: {
 type: String,
 },
 location: {
 type: String,
 },
 notificationPreferences: {
 email: { type: String, default: true },
 //..other notifications (sms)
 },
 gender: {
 type: String,
 enum: ["male", "female", "prefer not to say", "non-binary"],
 },
 profileViewers: [{ type: mongoose.Schema.Types.ObjectId, ref: "User" }],
 followers: [{ type: mongoose.Schema.Types.ObjectId, ref: "User" }],
 following: [{ type: mongoose.Schema.Types.ObjectId, ref: "User" }],
 blockedUsers: [{ type: mongoose.Schema.Types.ObjectId, ref: "User" }],
 posts: [{ type: mongoose.Schema.Types.ObjectId, ref: "Post" }],
 likedPosts: [{ type: mongoose.Schema.Types.ObjectId, ref: "Post" }],
 passwordResetToken: {
 type: String,
 },
 passwordResetExpires: {
 type: Date,

```

```

 },
 accountVerificationToken: {
 type: String,
 },
 accountVerificationExpires: {
 type: Date,
 },
 },
 {
 timestamps: true,
 toJSON: {
 virtuals: true,
 },
 toObject: {
 virtuals: true,
 },
 }
);

```

```

//! Generate password reset token
userSchema.methods.generatePasswordResetToken = function () {
 //generate token
 const resetToken = crypto.randomBytes(20).toString("hex");
 //Assign the token to passwordResetToken field
 this.passwordResetToken = crypto
 .createHash("sha256")
 .update(resetToken)

```

```

 .digest("hex");

 //Update the passwordResetExpires and when to expire
 this.passwordResetExpires = Date.now() + 10 * 60 * 1000; //! 10 minutes
 return resetToken;
};

//! Generate token for account verification
userSchema.methods.generateAccVerificationToken = function () {
 //generate token
 const resetToken = crypto.randomBytes(20).toString("hex");
 //Assign the token to accountVerificationToken field
 this.accountVerificationToken = crypto
 .createHash("sha256")
 .update(resetToken)
 .digest("hex");

 //Update the accountVerificationExpires and when to expire
 this.accountVerificationExpires = Date.now() + 10 * 60 * 1000; //! 10 minutes
 return resetToken;
};

//compile schema to model
const User = mongoose.model("User", userSchema);

module.exports = User;

```

## 2. POST DATA:

The screenshot shows the MongoDB Compass interface. On the left, the 'CONNECTIONS' sidebar lists the database 'Bikosh' and its collections: 'admin', 'config', 'content-sphere-hub' (with sub-collections 'categories', 'comments', 'posts', 'users'), 'local', and 'startup\_log'. The 'posts' collection is selected. The main area shows a list of documents. The first document has a title 'This Anker gamepad packs a power bank and cooling fan for just \$15' and content '<article class="mobile-gaming-accessories"><h1>Why Mobile Gaming N...'. The second document has a title 'As job losses loom, Anthropic launches program to track AI's economic ...' and content '<h2>Can AI Agents Truly Replace Human Workers? Read Anthropic's "Proje...'.

### ● Post.js :-

```
const mongoose = require("mongoose");
```

```
//schema
```

```
const postSchema = new mongoose.Schema(
```

```
{
```

```
 title: {
```

```
 type: String,
```

```
 required: true,
```

```
 },
```

```
 image: {
```

```
 type: String,
```

```
 required: true,
```

```
 },
```

```
 claps: {
```

```
 type: Number,
```

```
 default: 0,
```

```
 },
```

```
content: {
 type: String,
 required: true,
},
author: {
 type: mongoose.Schema.Types.ObjectId,
 required: true,
 ref: "User",
},
shares: {
 type: Number,
 default: 0,
},

postViews: [
 {
 type: mongoose.Schema.Types.ObjectId,
 ref: "User",
 },
],

category: {
 type: mongoose.Schema.Types.ObjectId,
 required: true,
 ref: "Category",
},
shedduledPublished: {
```

```

 type: Date,
 default: null,
 },

 likes: [
 {
 type: mongoose.Schema.Types.ObjectId,
 ref: "User",
 },
],

 dislikes: [
 {
 type: mongoose.Schema.Types.ObjectId,
 ref: "User",
 },
],

 comments: [
 {
 type: mongoose.Schema.Types.ObjectId,
 ref: "Comment",
 },
],
},
{
 timestamps: true,
 toJSON: {

```

```
 virtuals: true,
 },
 toObject: {
 virtuals: true,
 },
}
);

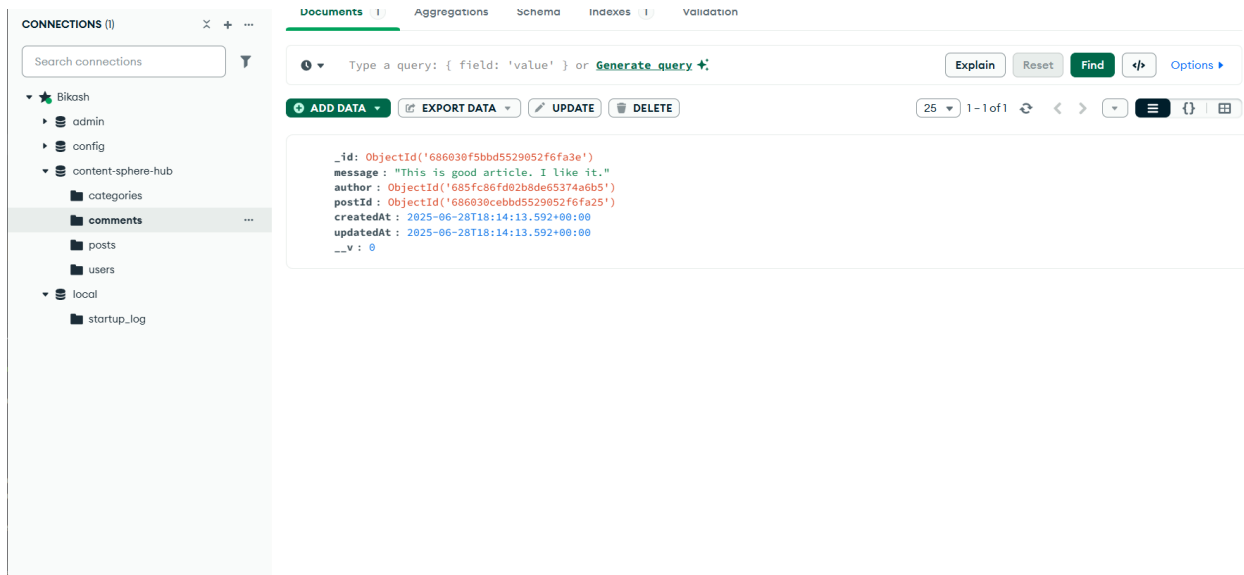
//compile schema to model

const Post = mongoose.model("Post", postSchema);

module.exports = Post;
```



### 3. COMMENT DATA:



- Comment.js :-

```
const mongoose = require("mongoose");
```

```
//schema
```

```
const commentSchema = new mongoose.Schema({
```

```
{
```

```
 message: {
```

```
 type: String,
```

```
 required: true,
```

```
 },
```

```
 author: {
```

```
 type: mongoose.Schema.Types.ObjectId,
```

```
 required: true,
```

```
 ref: "User",
```

```
 },
```

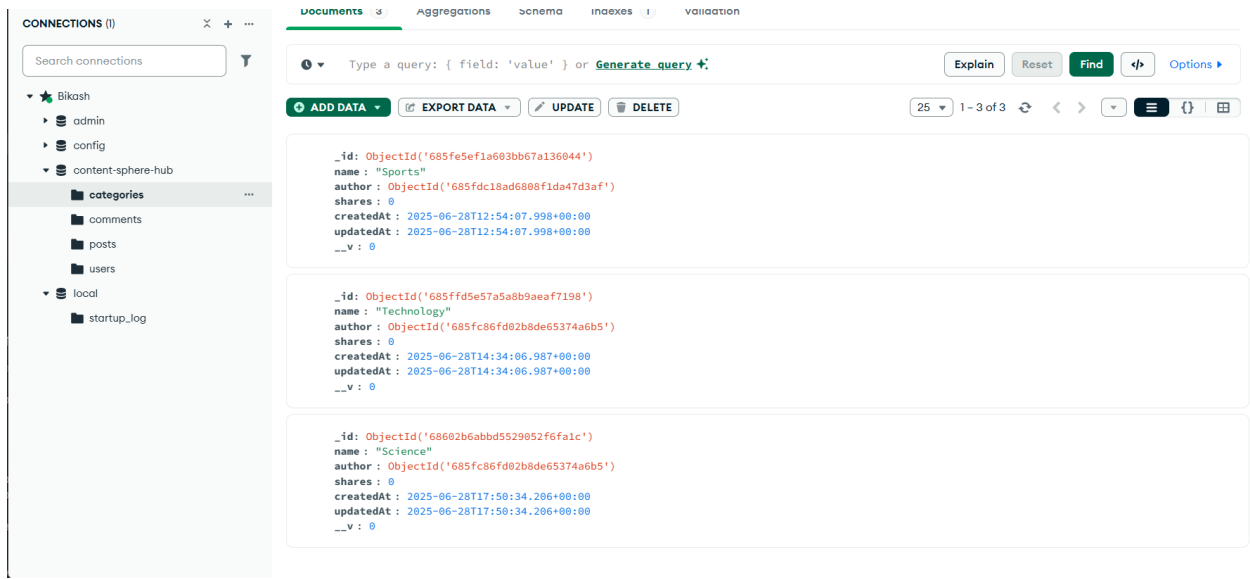
```
 postId: {
```

```
 type: mongoose.Schema.Types.ObjectId,
```

```
 ref: "Post",
 required: true,
 },
},
{
 timestamps: true,
}
);

//compile schema to model
const Comment = mongoose.model("Comment", commentSchema);
module.exports = Comment;
```

## 4. Categories Data:



### ● Categories.js :-

```
const mongoose = require("mongoose");

//schema

const categorySchema = new mongoose.Schema(
 {
 name: {
 type: String,
 required: true,
 },
 author: {
 type: mongoose.Schema.Types.ObjectId,
 required: true,
 ref: "User",
 },
 },

```

```

 shares: {
 type: Number,
 default: 0,
 },

 posts: {
 type: mongoose.Schema.Types.ObjectId,
 ref: "Post",
 },
 },
 {
 timestamps: true,
 toJSON: {
 virtuals: true,
 },
 toObject: {
 virtuals: true,
 },
 }
);

//compile schema to model
const Category = mongoose.model("Category", categorySchema);
module.exports = Category;

```

## **6.CONCLUSION**

The development of Content Sphere Hub marks a significant step forward in the evolution of content management systems, combining the power and flexibility of the MERN stack with a user-centric design philosophy. This project was conceived in response to the growing demand for platforms capable of handling dynamic, multimedia-rich digital content while ensuring ease of use, security, and scalability for a diverse range of users.

Throughout its lifecycle, Content Sphere Hub has demonstrated the efficacy of modern web technologies in solving real-world challenges associated with content creation, management, and distribution. The system's architecture—spanning robust backend logic, modular frontend components, and a scalable NoSQL database—enables seamless integration of new features, efficient data management, and rapid response to changing user needs.

Key highlights of Content Sphere Hub include:

- **Modular Full-Stack Architecture:** The separation of frontend, backend, and database ensures maintainability, scalability, and ease of debugging and extension.
- **Role-Based Access and Security:** Robust authentication and granular role-based permissions empower administrators and protect user data.
- **Rich Content Management Features:** Advanced WYSIWYG editors, multimedia upload, category/tag management, and threaded commenting enhance the user experience.
- **Analytics and Dashboarding:** Built-in analytics and customizable dashboards offer insights to both users and administrators for informed decision-making.
- **API-First Approach:** RESTful APIs and modular backend logic support both frontend consumption and potential future integrations with third-party services.
- **Real-Time Notifications and Collaboration:** The use of modern asynchronous technologies ensures that users receive immediate feedback and updates, fostering collaboration.

The systematic application of software engineering best practices, from requirements gathering and analysis to deployment and testing, has ensured that Content Sphere Hub is robust, user-friendly, and future-ready. The platform's adaptability means that it can be customized for specific use cases—from personal blogging and educational platforms to corporate intranets and community portals.

In summary, Content Sphere Hub not only addresses the core requirements of a modern CMS but also lays the foundation for ongoing enhancement and scalability. The project stands as a testament to the potential of the MERN stack and agile methodologies in delivering high-impact, maintainable software solutions.

## **7.FUTURE SCOPE & FURTHER ENHANCEMENTS**

### **❖ Future scope:-**

● While Content Sphere Hub is already a robust and feature-rich content management platform, the landscape of digital content is continually evolving. To remain competitive and valuable, future iterations of the system should consider the following enhancements and expansion opportunities:

#### **1. Native Mobile Applications**

● Development of native Android and iOS applications would extend accessibility, allowing users to create, manage, and consume content on the go, with features like push notifications, offline access, and device-specific optimizations.

#### **2. Real-Time Collaboration and Editing**

● Implementing collaborative editing features—where multiple users can edit a document simultaneously, similar to Google Docs—would significantly enhance teamwork, especially for editorial teams and multi-author publications.

#### **3. AI-Driven Content Assistance**

- Integrating artificial intelligence modules for:
- Automatic tagging and categorization of content.
- Grammar, style, and SEO suggestions.
- Content summarization, translation, or plagiarism detection.

#### **4. Advanced Media Handling**

● Expanding the media management subsystem to support video streaming, image editing, audio libraries, and third-party integrations (e.g., YouTube, SoundCloud).

#### **5. Plugin and Theme Marketplace**

● Establishing a marketplace for plugins and themes would enable users and developers to extend the CMS with custom features and visual styles, fostering a community-driven ecosystem.

#### **6. Enhanced Analytics and Personalization**

● Incorporating deeper analytics, heatmaps, A/B testing, and machine learning-based recommendations to provide personalized content feeds and actionable insights for administrators.

## 7. Multi-Language and Localization Support

- Adding full multi-language support and easy localization would broaden the platform's reach to global audiences and diverse user bases.

## 8. Improved Accessibility (A11Y) Compliance

Ensuring all components meet and exceed accessibility standards (WCAG), supporting users with disabilities and ensuring legal compliance.

## 9. Advanced Workflow and Automation

- Workflow automation for editorial review, scheduled publishing, content approval, and notifications to streamline content pipelines and reduce manual effort.

## 10. Integration with Emerging Technologies

- Blockchain-based content validation and proof of authorship.
- Integration with decentralized storage solutions.
- VR/AR content delivery modules for immersive experiences.

## 11. Security Enhancements

- Regular penetration testing, bug bounty programs, and advanced threat monitoring should be adopted as standard practices to maintain system integrity and protect user data.

## 12. Scalability for Enterprise Use

- Optimizing for horizontal scaling, distributed deployments, microservices, and high-availability setups to support extremely high traffic and enterprise-level deployments.
- In conclusion, Content Sphere Hub's architecture and open-source foundations position it well for future growth. By embracing user feedback and technological advances, the system can continuously evolve, adding new value for users, organizations, and developers alike.

## **8.BIBLIOGRAPHY**

The successful development of Content Sphere Hub and the preparation of this report were informed by a diverse array of scholarly works, technical manuals, and online resources related to software engineering, web development, and content management systems. Key references include:

### 1. Technical References

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- MongoDB Inc., MongoDB Documentation, <https://docs.mongodb.com/>
- Express.js, Express Web Framework Documentation, <https://expressjs.com/>
- React Team, React Official Documentation, <https://reactjs.org/>
- Node.js Foundation, Node.js Documentation, <https://nodejs.org/en/docs/>
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### 2. Scholarly Articles & Books

- C.M. Krishna, K. Gopinath, Resource Management in Real-Time Systems and Networks, MIT Press, ISBN: 9780262633684.
- James McGovern et al., Enterprise Java Development on a Budget, Springer, ISBN: 9781484202764.
- O'Reilly Media, Designing Web APIs, Brenda Jin, Saurabh Sahni, Amir Shevat, ISBN: 9781492026925.

### 3. Online Tutorials & Blogs

- FreeCodeCamp, How to Build a Content Management System Using the MERN Stack, <https://www.freecodecamp.org/>
- DigitalOcean, How To Build Modern Web Applications with the MERN Stack, <https://www.digitalocean.com/community/tutorials/>

### 4. Tools & Platforms

- GitHub, for open-source packages and code samples.
- Stack Overflow, for technical community support.