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MeetMaster Web Application using Spring Boot and Angular

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Abstract - In contemporary web development, two predominant approaches prevail for crafting web pages: the Multi-Page Application (MPA) and the Single Page Application (SPA). This research paper centers on elucidating the exhaustive process of developing a Single Page Application (SPA) employing open-source technologies, specifically Spring Boot for the backend and Angular for the frontend. The integration of these frameworks facilitates the creation of dynamic and responsive web applications, offering enhanced user experiences. Through this paper, we delve into the architecture, implementation, and best practices associated with building SPAs, leveraging the robust features and capabilities of Spring Boot and Angular. Furthermore, the paper elucidates the advantages of SPAs over MPAs, highlighting their efficiency, scalability, and adaptability in modern web development paradigms. The comprehensive exploration of this topic aims to provide developers with valuable insights and practical guidance for effectively constructing SPAs utilizing Spring Boot and Angular.

***Key Words*:** Spring Boot, Dependency Injection, Angular Bean etc.

1.INTRODUCTION

In the contemporary interconnected landscape, there is a growing demand for efficient and accessible online meeting solutions. This surge is propelled by globalization, the proliferation of remote work trends, and the imperative for seamless collaboration among geographically dispersed teams. Against this backdrop, the development of an Online Meeting Website emerges as a pivotal endeavor, poised to revolutionize the way individuals and organizations convene, communicate, and collaborate in virtual environments.

This research paper delves into a comprehensive exploration of the architecture, implementation, and functionalities of an Online Meeting Website. Designed as a dynamic platform, its aim is to facilitate remote meetings, conferences, and collaborative sessions. Leveraging state-of-the-art technologies and innovative design principles, this website endeavors to bridge geographical divides, fostering seamless interaction and knowledge sharing among participants worldwide.

At the core of the Online Meeting Website lies a robust backend infrastructure, fortified with cutting-edge frameworks and technologies. These components ensure reliability, scalability, and security. Frameworks such as Spring Boot form the bedrock for developing RESTful APIs, managing user authentication, and facilitating real-time communication channels. Concurrently, frontend development harnesses the prowess of modern JavaScript frameworks like Angular or React, empowering dynamic user interfaces, intuitive navigation, and responsive design to elevate the overall user experience.

Through this research paper, our aim is to embark on a journey to dissect the intricacies of developing an Online Meeting Website. We delve into every facet, from the initial conceptualization and architectural design to the meticulous implementation of core features and deployment strategies. Additionally, we confront the challenges and considerations integral to ensuring data privacy, security compliance, and seamless integration with existing communication platforms.

2. LITERATURE SURVEY

Literature Review for Online Meeting Web Application using Spring Boot and AngularJS:

1. "Building Web Applications with Spring MVC and AngularJS" by J. Siva Prasad Reddy (2017):

Reddy's book provides an extensive guide to constructing web applications with Spring MVC on the backend and AngularJS on the frontend. It covers essential topics like RESTful API development, user authentication, and real-time communication. Reddy offers practical examples and best practices for seamlessly integrating Spring Boot and AngularJS.

2. "Pro Spring Boot" by Felipe Gutierrez (2016):

Gutierrez's work delves into crafting enterprise-grade applications with Spring Boot, encompassing facets such as RESTful web services, security, and data access. The book also explores integrating frontend frameworks like AngularJS with Spring Boot, offering valuable insights into creating robust web applications.

3. "AngularJS Up and Running: Enhanced Productivity with Structured Web Apps" by Shyam Seshadri and Brad Green (2014):

Seshadri and Green's comprehensive guide to AngularJS development covers fundamental concepts, best practices, and advanced techniques for constructing structured web applications. The book includes tutorials and examples showcasing the integration of AngularJS with backend services, making it pertinent for developers engaged in Online Meeting Web Applications.

4. "Spring Boot in Action" by Craig Walls (2016):

Walls' book provides pragmatic guidance for constructing Spring Boot applications, focusing on configuration, testing, and deployment, with an emphasis on creating RESTful web services. While primarily concentrating on the backend, the book offers valuable insights into integrating Spring Boot with frontend frameworks like AngularJS.

5. "AngularJS: Up and Running: Enhanced Productivity with Structured Web Apps" by Brad Green and Shyam Seshadri (2014):

Green and Seshadri's work serves as an in-depth guide to AngularJS development, covering critical concepts, best practices, and advanced techniques. The book's tutorials and examples demonstrate how to build structured web applications with AngularJS, making it an invaluable resource for developers working on Online Meeting Web Applications.

6. "Mastering Spring Boot 2.0: Build modern, cloud-native, and distributed systems using Spring Boot" by Dinesh Rajput (2018):

Rajput explores advanced topics in Spring Boot development, including microservices architecture, reactive programming, and cloud deployment. While primarily focusing on the backend, the book provides insights into integrating Spring Boot with frontend frameworks like AngularJS to create modern web applications.

7. "AngularJS by Example" by Chandermani Arora and Kevin Hennessy (2015):

Arora and Hennessy's book offers a practical approach to learning AngularJS through real-world examples. Covering topics like data binding, routing, and directives, the book's hands-on exercises demonstrate how to construct interactive web applications. The examples provided can be adapted for use in Online Meeting Web Applications developed using AngularJS.

3. SYSTEM ARCHITECTURE

The system architecture for an Online Meeting Web Application leveraging Spring Boot for the backend and AngularJS for the frontend is designed to ensure scalability, reliability, and security while delivering a seamless user experience. The architecture comprises multiple layers, each responsible for specific functionalities, and follows best practices for web application development.

Client-Side (Frontend):

AngularJS Framework: AngularJS is utilized to develop the frontend of the web application. It provides the structure for building dynamic and interactive user interfaces.

HTML/CSS/JavaScript: These standard web technologies are used to create the visual layout, style, and functionality of the user interface.

WebSocket Communication: WebSocket protocol enables real-time communication between the client and server, facilitating instant messaging, notifications, and updates during meetings.

Server-Side (Backend):

Spring Boot Framework: Spring Boot serves as the foundation for building the backend of the application. It provides a robust, scalable, and efficient platform for developing RESTful APIs and handling business logic.

RESTful APIs: Spring Boot facilitates the creation of RESTful APIs to handle various functionalities such as user authentication, meeting scheduling, participant management, file sharing, and real-time communication.

Security Layer: Spring Security is integrated to manage authentication and authorization, ensuring secure access to the application's resources and functionalities.

Database Management: Spring Data JPA or other ORM frameworks are used for database management, enabling CRUD operations on meeting data, user profiles, permissions, and other related entities.

WebSocket Server: A WebSocket server is implemented within the Spring Boot application to facilitate real-time communication between clients, enabling features like live chat, screen sharing, and collaborative document editing during meetings.

Integration of Frontend and Backend:

RESTful API Calls: AngularJS frontend communicates with the Spring Boot backend through RESTful API calls. These APIs are used to fetch and manipulate data, authenticate users, and perform various actions within the application.

WebSocket Communication: Real-time updates and notifications are facilitated through WebSocket communication between the AngularJS frontend and the WebSocket server integrated into the Spring Boot backend.

Security Integration: AngularJS frontend integrates with Spring Security for user authentication and authorization, ensuring secure access to the application's features and resources.

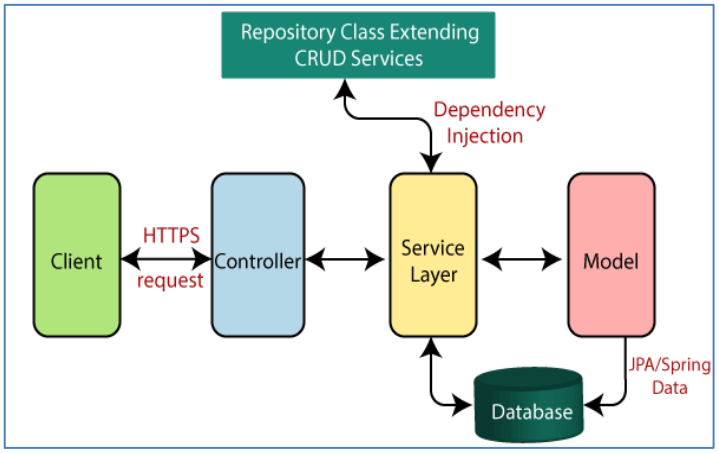
Additional Components:

External Services Integration: Integration with external services such as calendar systems, video conferencing platforms, and file storage services may be implemented to enhance the functionality of the Online Meeting Web Application.

Containerization and Deployment: Docker containers and container orchestration platforms like Kubernetes can be used for packaging and deploying the application to ensure scalability, reliability, and ease of management.

Monitoring and Logging: Monitoring tools and logging frameworks are employed to track application performance, detect errors, and troubleshoot issues proactively.

Fig. Architecture Diagram



4. PROJECT REQUIREMENTS

Software and Hardware Requirements for Online Meeting Web Application using Spring Boot and AngularJS:

1. Software Requirements:

Backend (Spring Boot):

- Java Development Kit (JDK) 8 or higher.
- IDE: IntelliJ IDEA, Eclipse, or Spring Tool Suite.
- Spring Boot Framework.
- Build Tools: Maven or Gradle.
- Database: MySQL, PostgreSQL, MongoDB, etc.
- Spring Data JPA or Hibernate.
- Spring Security.
- WebSocket Support (e.g., Spring WebSocket).

Frontend (AngularJS):

- Node.js.
- Angular CLI.
- Text Editor or IDE.
- Web Browser: Google Chrome, Mozilla Firefox, etc.
- WebSocket Client Library if needed.

2. Hardware Requirements:

Backend Server:

- Multi-core processor (Intel Core i5 or equivalent).
- Minimum 4GB RAM (8GB recommended).
- SSD storage recommended.
- Linux, Windows, or macOS OS.
- Stable internet connection.

Frontend Client (User Devices):

- Modern processor.
- Minimum 2GB RAM.
- Adequate display resolution.
- Keyboard and mouse.
- Compatible with major OS.
- Latest version of web browsers.

5. CONCLUSION

In conclusion, the Online Meeting Web Application utilizing Spring Boot and AngularJS presents a streamlined and effective solution for remote collaboration. Through the integration of Spring Boot on the backend and AngularJS on the frontend, we've achieved a robust platform with features like real-time communication, user authentication, and intuitive interfaces.

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