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Event Management to Connect Across Video Conferencing Platforms

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***Abstract*— Managing events across multiple video conferencing platforms poses challenges in coordination, resulting in inefficiencies and fragmented user experiences. To address these issues, this project develops a cross-platform integration solution, creating a unified platform for seamless management, scheduling, and tracking of meetings. Integration techniques, such as authentication mechanisms and request wrappers, are explored to facilitate interaction with major platforms like Zoom, Microsoft Teams, and Google Meet. The project aims to enhance user workflow efficiency across multiple platforms by introducing a suite of integrated components. The cornerstone is a secure User Authentication system with Single Sign-On support, ensuring streamlined access. A Unified Dashboard serves as a centralised hub for managing meetings, eliminating the need for platform-switching. Cross-Platform Scheduling enables seamless meeting arrangement from a single interface, while Real-Time Updates keep users informed of schedule changes. Additionally, the incorporation of Artificial Intelligence-driven chat for meeting scheduling facilitates intuitive, natural language-based interaction. Together, these components optimise user experience, saving time and effort.**

Keywords—Meet, Event Management, Zoom, Integration, video conference

I. INTRODUCTION

At its core, the project envisions a system that enables users to connect effortlessly to meetings hosted on various video conferencing platforms without the need for platform-specific actions. The current landscape often requires users to navigate through multiple interfaces, leading to a disjointed and time-consuming experience. By providing a centralised hub for event management, this solution seeks to eliminate these inefficiencies, offering users a streamlined and user-friendly approach to managing their virtual meetings..

A system that allows users to connect effortlessly to meetings hosted on various video conferencing platforms without the need for platform-specific actions.

Managing events across different video conferencing platforms presents a significant challenge, leading to inefficiencies and a fragmented user experience. This project aims to address this issue by developing a cross-platform integration solution, creating a unified hub for the seamless management, scheduling, and tracking of meetings.

In pursuit of the ambitious goal to create an integrated event management solution that connects seamlessly across diverse video conferencing platforms, the development team is poised to confront several formidable challenges.

Foremost among these challenges is the intricate task of harmonizing the diverse APIs and underlying architectures of major video conferencing platforms like Zoom, Microsoft Teams, and Google Meet. Each platform comes with its unique set of specifications, creating a technical labyrinth that demands careful navigation to ensure a smooth and unified integration.

Authentication mechanisms present another hurdle, requiring meticulous attention to detail. Establishing secure and efficient authentication processes, particularly in the realm of varied mechanisms such as OAuth, is crucial. The safeguarding of user credentials and access tokens will be pivotal to the overall security of the solution.

II. LITERAURE REVIEW

Singh R and Awasthi S (2020) have done comparative examinations of several prominent platforms, including Google Meet, Zoom, Microsoft Teams, Cisco WebEx Teams, and GoToMeeting, with a keen emphasis on discerning their respective strengths and weaknesses. By elucidating the distinctive attributes and limitations of each platform, this study aims to empower stakeholders to make informed choices aligned with their functional requirements and organizational objectives.

Hanas Ulfah Safitri and Peptia Asrining Tyas (2022) signifies students' perceptions of video conferencing as a tool for online English learning and its broader role as a media technology. The research was conducted among 103 students enrolled in the second, fourth, and sixth semesters of the English Language Education Program at Universitas Brawijaya during the academic year 2021/2022. These students actively utilized a video conferencing platform for their English language studies. The outcomes of the study shed light on the instrumental role of video conferencing in facilitating English language learning within the context of online education. The findings underscored that video conferencing solutions significantly contribute to enhancing students' English language skills. Moreover, a notable majority of the participants expressed positive attitudes towards the utilization of video conferencing for online English learning.

Mobo F. D (2021) suggests that prevailing policies and teaching methodologies can be recalibrated in response to

the COVID-19 outbreak. Building upon prior research on the efficacy of video conferencing in higher education, platforms such as Zoom and Google Meet have emerged as frontrunners, adeptly meeting the multifaceted challenges inherent in remote learning environments (Khatib, 2020). These platforms offer robust solutions that address the diverse needs of educators and learners, thereby facilitating a seamless transition to online instruction. Embracing video conferencing does not merely represent a pragmatic response to quarantine protocols; rather, it epitomizes a commitment to safeguarding the health and well-being of both students and educators. In the face of unprecedented disruptions, the imperative to embrace innovative technological platforms becomes all the more pronounced. Indeed, the adoption of video conferencing heralds the dawn of a "New Normal" across all sectors, signifying a paradigm shift towards digital transformation and resilience in the face of adversity.

García Revilla R, Martinez Moure O and Einsle C. S (2023) undertook a comprehensive review of mobile applications designed for event management, focusing specifically on those compatible with smartphones operating on the iOS platform. The primary objective of this research is to conduct a thorough analysis of these applications, with an emphasis on offering educational insights and addressing a notable gap in academic literature, given the relatively nascent exploration of this topic. This contributes a deeper understanding of the functionalities and utility of event management mobile applications. By shedding light on the intricacies of these tools, the research expands the existing body of knowledge and offers valuable guidance for both academic inquiry and professional practice within the field of event management.

Hada P. S, YogeshBhupen, Prince (2022) showcases AI-Based Event Management web application that represents an innovative solution for individuals seeking a centralized platform to discover and participate in diverse events seamlessly. This online platform enables users to explore a wide array of events conveniently, from Techfests to cooperative gatherings, webinars, workshops, conferences, seminars, school and college festivals, and more.One of the key features of this web application is its personalized recommendation system, which tailors event suggestions based on users' interests. Through a user-friendly interface, registered users can easily browse through recommended events aligned with their preferences. Additionally, the platform provides users with access to a curated list of their recently viewed events, enhancing user engagement and facilitating event discovery.

Perez (2017) designed a comprehensive web application to streamline the management of events, announcements, and website content. This versatile platform empowers users with the ability to create, delete, update, and view various elements of the system, including events, announcements, and website content. Both the System Manager and Administrator roles are granted privileges to oversee these aspects of the application. The System Manager holds additional authority, being responsible for managing user accounts and accessing the audit trail for comprehensive oversight. On the other hand, the Administrator possesses similar privileges for event, announcement, and content management, but lacks access to user account management and audit trail viewing.

Ronit Nayak (2021) provides insight into the use of these video conferencing platforms in academia, the different platforms being used and their comparison, the various challenges the user interface and feature sets of these platforms bring to the students using it for their everyday coursework, and the different ways in which these platforms can be made more academia-friendly for use in academia.

Elsden (2022) discusses the designing of video-conferencing software for critical interactions and experiences that challenge existing norms and expectations around these platforms. A fundamental aspect of designing video-conferencing software is prioritizing user needs and experiences. This involves conducting thorough user research to understand the diverse needs, preferences, and pain points of different user groups. By incorporating user feedback throughout the design process, developers can create intuitive interfaces and features that enhance usability and promote engagement.

III. METHODOLOGY

A. Platform Integration

Each platform provides its API with authentication mechanisms such as OAuth 2.0 or API keys. The integration must implement secure authentication methods to ensure that only authorised users can access and manipulate event data. Develop a feature-rich scheduling module that allows event organisers to create, edit, and delete events seamlessly across all integrated platforms. Ensure that the scheduling interface is user-friendly and supports various event parameters such as title, description, date, time, duration, and recurrence options.

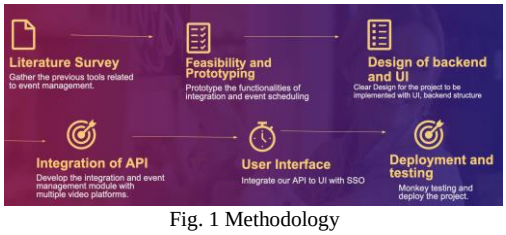

Fig. 1 Methodology

B. Single Sign-on (SSO)

Implement a centralised authentication system where users only need to log in once to gain access to all integrated platforms. This central authentication server, often referred to as the identity provider (IdP), verifies the user's credentials and issues a token that grants access to the various services. Integrate the unified event management system with popular identity providers such as Google, Microsoft, or Okta, which support SSO protocols like OAuth 2.0 or SAML. This allows users to

authenticate using their existing credentials, enhancing convenience and reducing the need for separate login credentials.

Choosing the appropriate SSO protocol based on the requirements and capabilities of the integrated platforms. For example, OAuth 2.0 is commonly used for web-based SSO scenarios, while SAML is prevalent in enterprise environments. Implement the selected protocol to facilitate secure authentication and authorization flows between the identity provider and the service providers. Implement single sign-out functionality to ensure that logging out from one platform automatically logs the user out from all connected platforms. This enhances security and user convenience by preventing unauthorized access to sensitive information after logout.

Manage user sessions securely to maintain authentication state across platforms. Utilize techniques such as session tokens or cookies to keep track of authenticated sessions and enforce session timeouts to mitigate the risk of unauthorized access. Define mappings between user attributes stored in the identity provider and those required by the service providers. This ensures that relevant user information, such as name, email, and role, is accurately propagated to each platform during authentication, enabling personalized experiences and access control. Implement robust security measures to protect SSO transactions and user credentials. Utilize encryption, secure token exchange mechanisms, and strong authentication methods (e.g., multi-factor authentication) to prevent unauthorized access and mitigate the risk of identity theft or session hijacking.

Design the SSO workflow to provide a seamless and intuitive user experience. Minimize user prompts and redirects during the authentication process to reduce friction and enhance usability. Utilize branding customization options to maintain consistency with the user's familiar login experience.

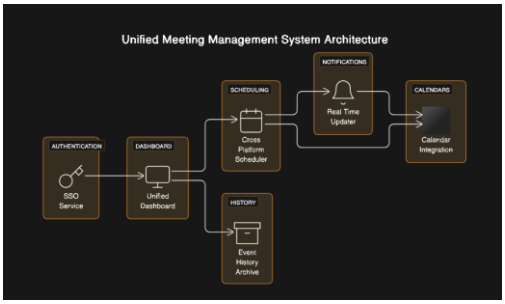

Fig 2. Architecture

IV. METHODOLOGY

A. *User Experience Enhancement*

Adopt a user-centric design approach that prioritizes the needs, preferences, and behaviors of the system's diverse user base. Conduct user research, including surveys, interviews, and usability testing, to gain insights into user requirements and pain points. Create personas representing different user roles, such as event organizers responsible for scheduling and managing events, participants attending events, and administrators overseeing system configurations and user management. Design user interfaces that cater to the specific needs and goals of each persona.

Design intuitive navigation structures that enable users to easily find and access the features and functionalities they need. Organize information hierarchically and use clear labeling and visual cues to guide users through the interface seamlessly. Maintain consistency in design elements, including layout, typography, color schemes, and iconography, across all screens and modules of the system. Consistency fosters familiarity and reduces cognitive load, enhancing usability and user satisfaction. Define a clear information architecture that organizes content and functionality logically. Group related features together, use meaningful categorization, and provide hierarchical navigation paths to help users locate and understand the system's capabilities. Ensure that the user interface is responsive and adapts gracefully to different screen sizes and device types, including desktops, laptops, tablets, and smartphones. Prioritize content and functionality based on screen real estate and user context to optimize the user experience on all devices.

B. *Security and Compliance*

Implemented Authentication mechanisms with secure attention to detail. Establishing secure and efficient authentication processes, particularly in the realm of varied mechanisms such as OAuth, is crucial. The safeguarding of user credentials and access tokens will be pivotal to the overall security of the solution. We ensure secure API calls with access tokens and refresh tokens.

C. *Develop connectors for each video conferencing platform*

Our development approach will involve creating connectors tailored to each platform's APIs. These connectors will serve as the bridge between our Event Management System and the respective video conferencing services, enabling functionalities such as event scheduling, attendee management, and meeting access. Platforms such as Zoom, Microsoft Teams, Google Meet, and others will be considered based on their popularity, features, and developer-friendly APIs. Each connector will be designed to encapsulate the interactions with the corresponding video conferencing platform's API. The architecture will include components for authentication, API request handling, error handling, and data mapping to ensure compatibility with our Event Management System.

As video conferencing platforms evolve and introduce new features or API changes, we'll ensure that our connectors remain up-to-date. Versioning strategies will be employed to manage compatibility and facilitate seamless upgrades. Regular maintenance and support will be provided to address issues, incorporate feedback, and enhance the connectors' capabilities over time.

D. *Single Sign-On (SSO) Integration for Seamless Account Connection*

We have evaluated different protocols such as OAuth 2.0 offers unique features and capabilities, and our selection will be based on factors such as compatibility with supported platforms, security requirements, and ease of implementation. At last for this project we arrived at OAuth 2.0 to connect with different platforms.

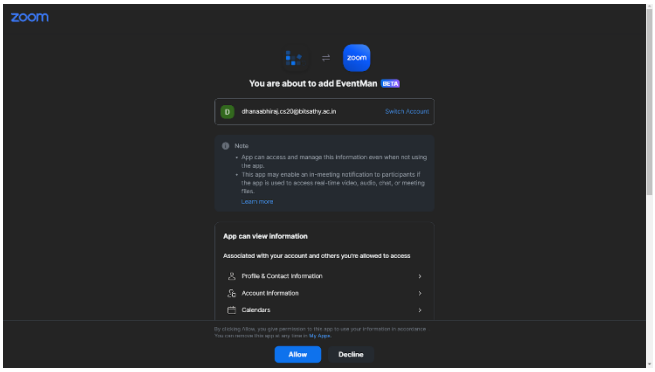

Fig 4.1 OAuth Connection with zoom, meet

E. AI chat for Event Management

The AI-powered meeting scheduling assistant aims to provide users with a unified hub for effortlessly managing, scheduling, and tracking meetings across various video conferencing platforms. With our intelligent system, users can streamline their virtual meeting experiences, eliminating inefficiencies, and enhancing overall productivity. We facilitate cross-platform integration, ensuring compatibility and accessibility, while also offering a centralised dashboard for easy scheduling and tracking. With Single Sign-On (SSO) support and AI bot assistance, users can manage meetings across different platforms from one interface efficiently

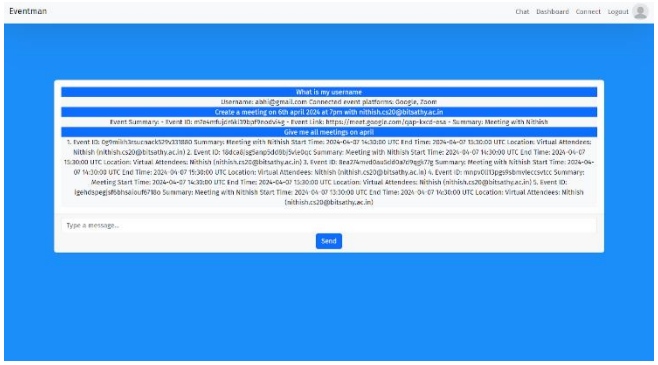

Fig 4.1 AI chat for Event Management

OAuth 2.0 is an industry-standard protocol designed for secure authorization between web applications. It enables users to grant limited access to their resources without sharing their credentials directly. OAuth 2.0 operates through the exchange of tokens, including access tokens for resource access and refresh tokens for token renewal. The EMS will act as the Authorization Server responsible for issuing access tokens and facilitating user authentication. We have configured the EMS to support OAuth 2.0 authorization flows, including Authorization Code Flow, Implicit Flow, and Client Credentials Flow, depending on the requirements of our application and supported platforms. When a user attempts to access our EMS using OAuth 2.0 SSO, they will be redirected to the Authorization Server's login page to authenticate themselves. Upon successful authentication, the user will be prompted to grant consent for the EMS to access their information and perform actions on their behalf. This consent process ensures transparency and user control over data access.

V. RESULT AND DISCUSSION

The integration of Event Management System with various video conferencing platforms has yielded significant benefits for both event organizers and participants. By allowing users to create and join meetings directly from the EMS interface, we have significantly improved convenience, streamlining the event management process and reducing the time and effort required to coordinate virtual events. This integration has also enhanced collaboration among event participants, enabling real-time communication and knowledge sharing, leading to more interactive and engaging virtual events. Moreover, EMS has facilitated the expansion of event reach by connecting across different platforms, attracting a wider audience and increasing attendance.

The inclusion of an event calendar within EMS provides users with a centralized hub for managing all their events and meetings, simplifying event management tasks and improving organization. Additionally, the integration offers opportunities for data-driven insights, allowing organizers to track attendance rates, engagement, and other key metrics for informed decision-making. In conclusion, the integration of EMS with video conferencing platforms has proven to be a valuable addition to the event management process, enhancing convenience, collaboration, reach, and centralized management, while providing opportunities for data-driven insights and continuous improvement of future events.
The result of the project enhanced the user workflow between multiple platforms to create events and manage all the events at one place. Users can view and manage meetings across platforms without switching between different tools. Single sign-on reduces the need for multiple logins, saving time and effort for users. Allows users to schedule meetings on different platforms without switching between multiple interfaces.

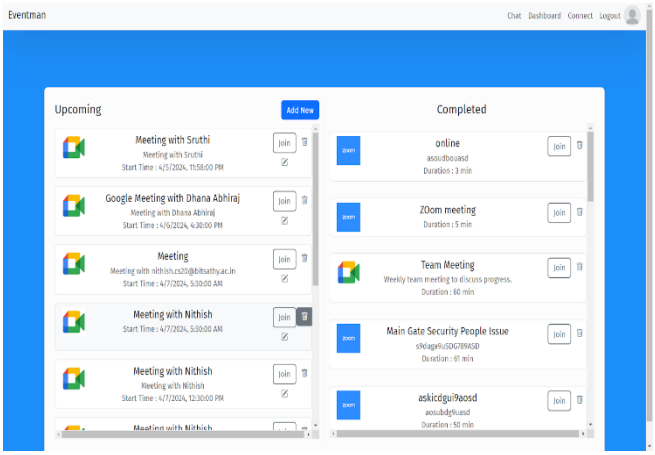

Fig 5.2 Dashboard

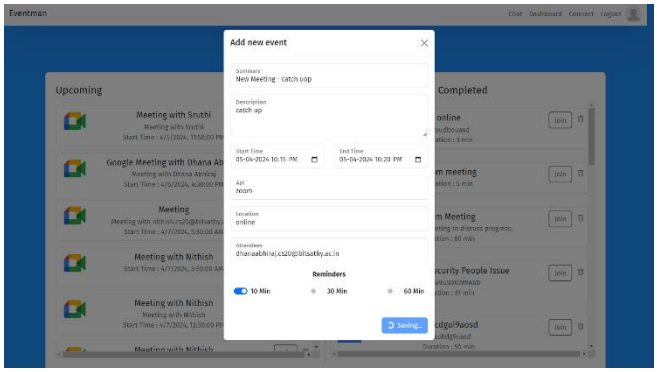

Fig 5.3 Add new event

By integrating major video conferencing platforms, providing users with a unified interface for both hosting and participating in events.

CONCLUSION

The integration of event management systems with various video conferencing platforms represents a significant advancement in virtual event organization and participation. This integration streamlines the process of scheduling and joining meetings, enhancing convenience for both organizers and attendees. It fosters improved collaboration by enabling real-time communication and interaction, ultimately leading to more engaging and productive virtual events.

FUTURE WORK

. In future iterations, our project will extend its reach by incorporating additional video conferencing platforms, ensuring comprehensive integration with both established services and emerging solutions. Furthermore, we aim to enhance user engagement by integrating AI-driven chat interfaces capable of delivering personalised recommendations tailored to individual preferences and meeting requirements. Rigorous testing of integration points with external dependencies, such as APIs for Zoom, Google Meet, and Microsoft Teams, ensures seamless communication and interoperability. Additionally, we will refine notification systems to deliver timely updates and actionable insights, optimising user experience and productivity. Through these endeavours, we continually evolve and improve our platform to meet the evolving needs of users in the dynamic landscape of virtual collaboration..

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