



Technical Writing Report: Zoom Application

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Abstract

This report explores the Zoom video conferencing application, a widely used tool for remote communication in both professional and personal settings. The document follows a phased approach: Phase 1 introduces the background of video conferencing technologies, existing systems, and Zoom's purpose. Phase 2 covers the functional and non-functional requirements, based on analysis of Zoom's usage. Phase 3 focuses on the design, detailing the interface and system architecture. The report also addresses user feedback from surveys, highlighting common issues and proposing potential solutions.

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1 Overview

Zoom provides a communications platform for users to connect via video, audio, phone, and chat. An internet connection and a supported device are necessary for using Zoom. New users typically begin by setting up an account and installing the Zoom Client for Meetings. Alternatively, they can explore the range of solutions available on the Zoom platform and choose the one that suits their requirements best.

Phase 1

2 Background

The roots of modern video conferencing lie in the development of communication technologies, starting from the telegraph and telephone. While early video communication tools like ATT's Picturephone in the 1960s were groundbreaking, they were expensive and impractical for widespread use. The introduction of the internet in the 1990s enabled more affordable and accessible video conferencing, with platforms like Skype leading the way in the early 2000s.

However, challenges such as poor video quality and latency limited these early platforms. The rise of cloud computing and better video compression techniques addressed these issues, enabling high-quality, real-time communication over the internet. Zoom, launched in 2013, took advantage of these advancements to offer a user-friendly, scalable platform, overcoming many of the limitations of earlier tools.

3 Introduction

Video conferencing technologies have become indispensable in today's connected world. With the rise of remote work, online education, and virtual social events, platforms like Zoom, Webex, and Microsoft Teams have transformed how people communicate globally. According to industry data, the global video conferencing market was valued at USD 6.03 billion in 2021, and it is projected to reach USD 13.82 billion by 2028, growing at a compound annual growth rate (CAGR) of 12.6%. These tools are essential for organizations and individuals alike, enabling effective communication regardless of geographical barriers.

3.1 Purpose of Zoom

Zoom is designed to facilitate seamless communication by offering tools for virtual meetings, webinars, and collaboration. Its core features include high-quality video and audio, screen sharing, virtual backgrounds, breakout rooms, and integration with third-party applications such as Google Calendar. With Zoom, users can schedule, join, and manage meetings with ease, making it a powerful tool for both individuals and organizations.

3.2 Survey

We conducted a survey to gather feedback on user experiences with Zoom. Respondents reported several issues, including security concerns, poor video quality, and unexpected activation of the microphone and camera (Figure 1).

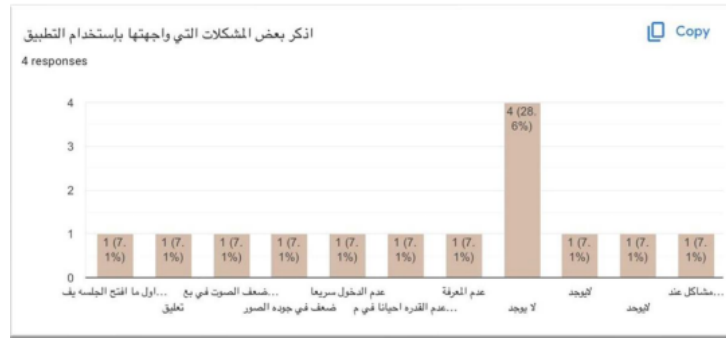


Figure 1: Common issues faced by Zoom users.

We are focusing on enhancing security, improving video and audio quality, and offering better control over microphone and camera settings. Additionally, users have expressed the need for clearer privacy guidelines and troubleshooting tips, which will be provided in future updates (Figure 2).

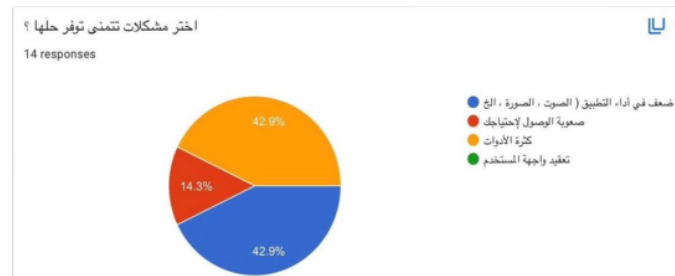


Figure 2: Most common issues users want resolved.

3.3 Existing Systems

Among the most prominent competitors to Zoom are platforms like:.

- **Webex** is known for its robust security features, making it ideal for enterprises with strict data privacy requirements.
- **Microsoft Teams** excels in integrating with productivity tools like Office 365, making it the preferred platform for organizations that heavily use Microsoft's ecosystem.

3.4 Advantages and Disadvantages of Webex

Advantages	Disadvantages
High-Quality Video and Audio: Delivers clear video and audio for virtual meetings.	Cost: Can be expensive, especially when adding premium features.
Simple Interface: User-friendly design makes it accessible to all audiences.	Performance Issues: Users may experience audio/video lag or connectivity issues in areas with poor internet connectivity.

Table 1: Advantages and Disadvantages of Webex

3.5 Advantages and Disadvantages of Microsoft Teams

Advantages	Disadvantages
Integration with Office 365: Seamless collaboration with Microsoft apps like Word, Excel, and OneNote.	Learning Curve: Users unfamiliar with Microsoft products may find it harder to navigate.
Built-in Chat and Collaboration Tools: Excellent for team collaboration with integrated chat, file sharing, and document collaboration.	Limited Personal Use: More geared towards enterprise users, with fewer features available in the free version.

Table 2: Advantages and Disadvantages of Microsoft Teams

3.6 Comparison with Zoom

Zoom has become one of the most popular video conferencing platforms due to its ease of use and superior performance under poor internet conditions. Compared to Webex and Microsoft Teams, Zoom stands out for several reasons:

Key Features of Zoom:

- **Screen Sharing:** Zoom makes it easy to share screens during meetings, enhancing collaboration.
- **Breakout Rooms:** Zoom allows the creation of breakout rooms for smaller group discussions during a meeting.
- **Meeting Recording:** Zoom supports the recording of meetings, allowing users to save and revisit discussions later.
- **Integration:** Zoom integrates with various tools like Google Calendar and Microsoft Outlook, streamlining scheduling and meeting management.
- **Security Features:** Zoom offers encryption and robust participant management, making it a secure choice for meetings.

Comparison Summary:

- **Zoom vs Webex:** While Webex is known for its security, Zoom provides a more user-friendly interface and better performance in low-bandwidth environments, making it a preferred choice for casual users and small businesses.
- **Zoom vs Microsoft Teams:** Microsoft Teams excels in team collaboration due to its deep integration with Office 365, but Zoom offers a simpler, more intuitive interface and is better suited for quick, ad-hoc meetings.

In conclusion, while each platform has its strengths, Zoom has gained widespread popularity due to its ease of use, scalability, and strong performance even in less-than-ideal internet conditions.

Phase 2

4 Functional Requirements

4.1 User Authentication

- **Login/Sign up:** Users should be able to register and log in using an email address or phone number.
- **Password Reset:** Users should have the option to reset their passwords via email or phone number.

4.2 Video and Audio Calls

- **Group Video Calls:** Users should be able to make group video calls with multiple participants.

4.3 Meeting Management

- **Schedule Meetings:** Users should be able to schedule meetings by setting the date, time, and participants.
- **Meeting Invitations:** Users should be able to receive meeting invitations via email or through calendar integrations.
- **Join Meetings:** Users should be able to join a meeting via a shared link or meeting ID, even without an account.
- **Meeting Controls for Hosts:** Hosts should be able to mute/unmute participants, remove participants, lock the meeting, and manage permissions.

4.4 Within-Meeting Functionalities

- **Screen Sharing:** Users should be able to share their screen with other participants.
- **Chat:** Users should be able to engage in text-based conversations during meetings.
- **Whiteboard:** Users should be able to use a digital whiteboard to take notes.

- **File Sharing:** Users should be able to upload and share files during meetings.

5 Non-Functional Requirements

5.1 Performance

- **Effectiveness:** The application should be able to operate 24/7 without interruption.
- **Scalability:** The application should be capable of handling thousands of meetings and concurrent users on a continuous basis.

5.2 Security

- **End-to-end Encryption:** The application should provide end-to-end encryption for video and audio calls to protect participants' privacy and data.
- **Two-factor Authentication:** The application should offer the option of two-factor authentication to enhance security.

5.3 Usability

- **Cross-platform Support:** The application should function effectively across multiple platforms, including Windows, macOS, iOS, Android, and web browsers.
- **User Interface:** The application should feature a user-friendly interface that is easy to use and navigate.
- **Language Support:** The application should support multiple languages to cater to global users.

5.4 Reliability

- **Backup and Recovery:** The application should regularly back up recorded meetings and account data to ensure information can be recovered in case of failure.

Phase 3

6 Database Tables

Here are the database tables for a video conferencing application like Zoom, each with example data for better understanding.

6.1 Users Table

UserID	Username	Email	AccountType
1	NhNh	nhnh@example.com	paid
2	areej	areej@example.com	free
3	ali	ali@example.com	paid
4	ahmed	ahmed@example.com	free

Table 3: Users Table

6.2 Meetings Table

MeetingID	HostID	MeetingTopic	StartTime
1	1	Team Meeting	2023-10-10 10:00 AM
2	2	Project Update	2023-10-11 2:00 PM
3	3	Weekly Sync	2023-10-12 1:00 PM
4	4	Brainstorming	2023-10-13 3:00 PM

Table 4: Meetings Table

6.3 Participants Table

ParticipantID	MeetingID	UserID	Role
1	1	1	host
2	1	2	participant
3	2	3	host
4	2	4	participant

Table 5: Participants Table

6.4 Chat Messages Table

MessageID	MeetingID	SenderID	MessageContent
1	1	1	Hello everyone!
2	1	2	Looking forward to it!
3	2	3	Let's get started!
4	2	4	I have some updates!

Table 6: Chat Messages Table

6.5 Recordings Table

RecordingID	MeetingID	UserID	RecordingLink
1	1	1	url_to_recording1
2	2	3	url_to_recording2
3	3	3	url_to_recording3
4	4	4	url_to_recording4

Table 7: Recordings Table

6.6 Feedback Table

FeedbackID	UserID	MeetingID	Rating	Comments
1	1	1	5	Great session!
2	2	2	4	Good updates!
3	3	3	5	Very productive!
4	4	4	3	Could improve.

Table 8: Feedback Table

6.7 Payment Information Table

PaymentID	UserID	PaymentMethod	Amount	Status
1	1	credit_card	29.99	completed
2	2	paypal	0.00	free
3	3	applepay	29.99	completed
4	4	paypal	0.00	free

Table 9: Payment Information Table

6.8 Notifications Table

NotificationID	UserID	Message	IsRead
1	1	Meeting starts soon!	false
2	2	Don't forget to join!	false
3	3	New message received!	true
4	4	You have a meeting!	false

Table 10: Notifications Table

These tables illustrate the structure and relationships within the Zoom video conferencing application database

7 Programming Languages

Zoom uses a combination of programming languages to power its platform, each serving specific purposes to ensure performance and user experience.

1. **Java:** Zoom's back-end infrastructure is powered by Java, where it manages the core conferencing engine and communication protocols.
2. **C++:** C++ is utilized for tasks that require high performance, such as video encoding, decoding, and display.
3. **JavaScript:** Zoom's web-based client applications are powered by JavaScript, employing frameworks like React.js to create interactive interfaces.
4. **Python:** Python is employed for scripting, automation, and back-end services.
5. **HTML, CSS, and WebRTC:** Web-based video conferencing experiences are enabled by HTML, CSS, and WebRTC, facilitating video, audio, and data communication between browsers.

8 Design

The design phase focuses on Zoom's interface and architecture, including the front-end components and permissions management.

8.1 Login Interface

The login interface offers key features such as: (Figure 3)

- **Automatic Meeting Entry:** Join meetings via room code or shared link.
- **Login Options:** Log in using email/password or Google/Facebook accounts.
- **Account Management:** Create a new account or recover a password.

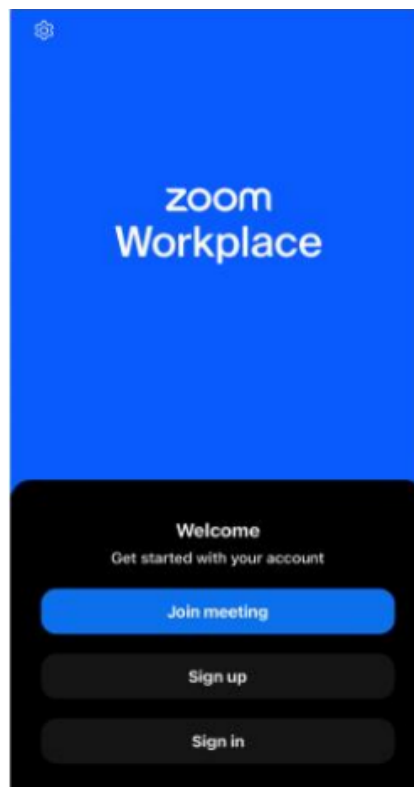


Figure 3: Zoom Login Interface

8.2 App Permissions

The app requires the following permissions to access device resources and provide full functionality: (Figure 4)

8.2.1 Calendar Access

- Sync meetings
- Schedule meetings
- Set reminders

8.2.2 Face ID Access

- Quick login
- Secure authentication

8.2.3 Profile Access

- Change profile picture
- Edit displayed name

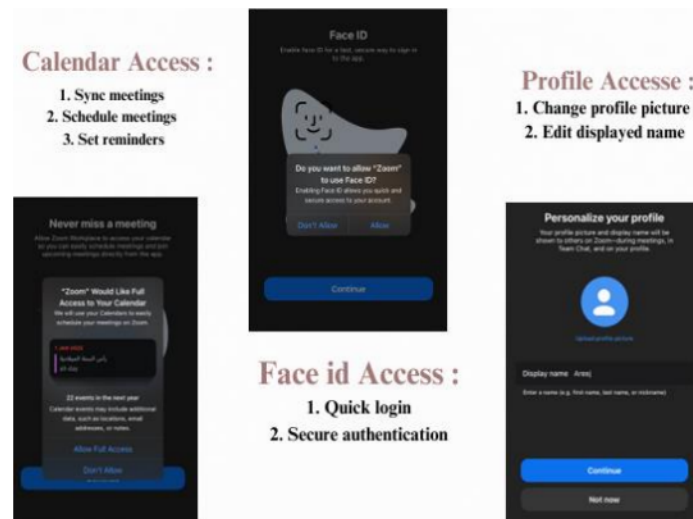


Figure 4: Key permissions required by the app for full functionality.

In addition to these, other necessary permissions include camera, microphone, and storage, which enable the app to deliver its full functionality.

8.3 Home Interface

8.3.1 Meetings Interface

- Create a new meeting.
- Join a meeting created by someone else.
- Schedule meetings and set reminders.
- Share your screen, share files, or open a whiteboard.

8.3.2 Chat Interface

- Share links or files for the meeting.
- Mention someone to facilitate interaction with their personal account.
- Send private messages or messages to everyone in the meeting.
- Ability to bookmark important messages for future reference.

Figure 5 shows the options available in the meeting interface, including creating or joining a meeting, scheduling, screen sharing, and whiteboard features.

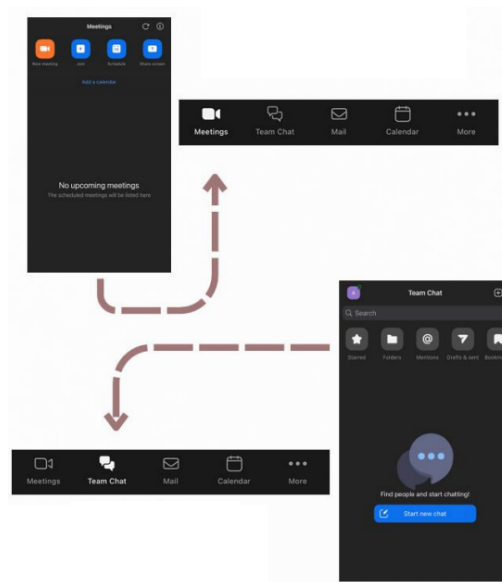


Figure 5: Meeting interface showcasing options to create, join, and schedule meetings, as well as screen sharing and whiteboard features.

8.4 More Interface

8.4.1 My Profile

- Change personal settings such as username, profile picture, and general settings.
- Review security settings like two-factor authentication and password management.
- Access personal meeting ID for easy meeting organization.
- Attach company data to facilitate collaboration with your team.

8.4.2 Add Features

- A visual collaboration tool for drawing and writing on a virtual board during meetings.
- A virtual event management platform for scheduling and organizing conferences and webinars.
- Integration with productivity and collaboration tools to enhance the meeting experience.
- Manage contacts, add individuals or groups for quick communication.
- Record short clips from meetings and share them easily.
- A tool for taking notes during meetings, saving them for future reference.
- Manage and share documents directly within Zoom during meetings.

8.4.3 Settings

- Enable or disable the waiting room for meetings.
- Adjust default video and audio settings.
- View stored messages and all chat conversations.

8.4.4 Other

- Access help and support, including the help center, frequently asked questions, and educational resources.

Figure 6 provides an overview of the More Interface, showcasing the different sections including profile management, additional features, settings, and help options.

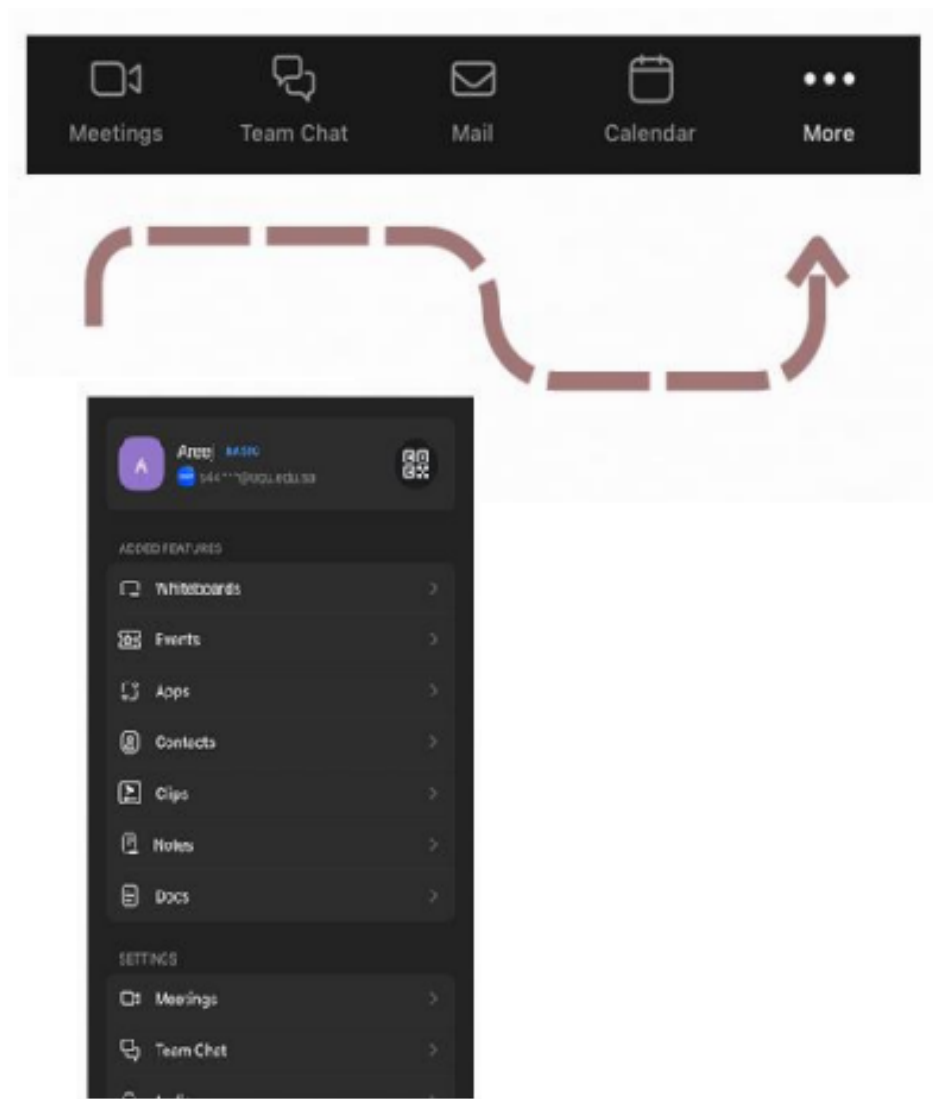


Figure 6: Overview of the More Interface, including profile management, additional features, settings, and help options.

8.5 Meeting Interface

The bottom toolbar in the meeting interface provides several key controls:

- **Mute/Unmute Audio:** Allows users to toggle their microphone on or off.
- **Turn Camera On/Off:** Allows users to toggle their video on or off.
- **Share Screen:** Enables users to share their screen with meeting attendees.
- **Chat:** Opens a chat window to communicate with other participants.
- **Participants:** Displays the list of participants, allowing hosts to manage permissions, mute, or remove participants.
- **Interactive Reactions:** Participants can raise a hand or send emojis as interactive feedback during the meeting.
- **Video Window:** Displays the video of the speaker or other participants in the meeting.

Figure 7 shows the Zoom meeting interface, including the toolbar, where users can manage participants, share screens, and use interactive reactions.



Figure 7: Zoom meeting interface showing participants, toolbar, and controls for managing meetings.

9 Activity Diagram

The activity diagram below illustrates the process flow for setting up and managing a Zoom meeting, from logging in to ending the meeting (Figure 8).

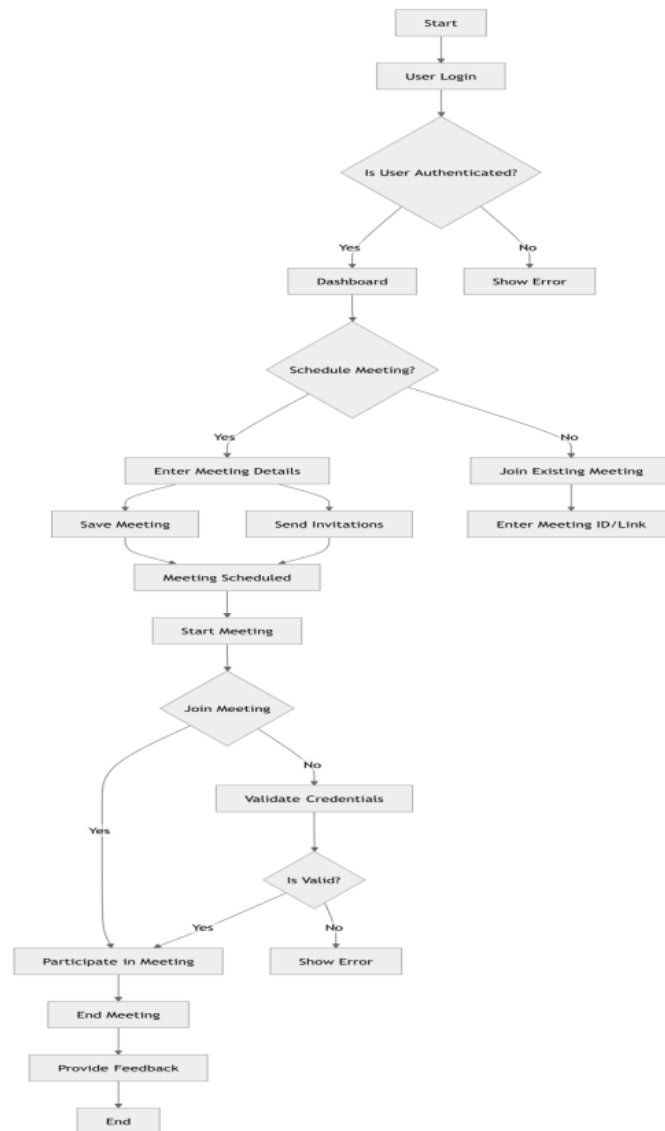


Figure 8: Activity diagram for creating, managing, and participating in a Zoom meeting.

10 Conclusion

In this article, we discussed Zoom, a leading virtual communication app that allows users to easily create and manage meetings. Zoom stands out for its user-friendly interface, stability even in poor connectivity conditions, and low cost. With features such as screen sharing, it is well-suited for remote meetings and education, serving both individuals and organizations by saving time and facilitating global communication.

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