

# Functional Specification Document

## 1. Introduction

- **Project Title:** Conference Manager Web Application
- **Date:** 2024.10.16
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- **Approvers:** Professor Tamas Storcz

## 2. Version History

Ver.	Date	Author	Description
0.0	2024.09.30	T. Storcz	Initial template generation
0.1	2024.10.16	Gideon Gamson	Initial draft for functional spec
0.2	2024.11.03	Gideon Gamson	Updated use case diagrams and UI
0.3	2025.01.10	Gideon Gamson	Include user flow diagram to aid visual representation of User Interactions
0.4	2025.01.18	Gideon Gamson	Integrated author presentation uploads, Presentation locking mechanism, Impersonation Features, and invite-based author submission. Updated corresponding use cases, user stories and data models

## 3. Purpose

- **Purpose Statement:** This document outlines the functional specifications for the development of the Conference Manager Web Application. It aims to define the core functionalities and interactions between users and the system, focusing on conference management, scheduling, and attendance tracking via QR codes.
- **Scope:** This application will manage conference parameters, schedules, user registration, and QR-based attendance tracking. Advanced features like payment processing and recommendation systems are excluded.

## 4. Overview

- **System Overview:** The Conference Manager Web Application will allow conference organizers to create and manage conferences, including specifying sections, presentations, and scheduling. It will also enable attendees to register, search schedules, mark presentations as favourites, and check in using QR codes. Additionally, administrators will manage users, monitor attendance, and export reports.
- **Assumptions:**
  - The system assumes stable internet access for real-time QR code scanning.
  - Users will have the necessary devices (smartphones) for scanning QR codes.
  - Users, especially organizers, are familiar with basic conference management workflows.
  - Participants are expected to use the platform's search and schedule navigation features without extensive guidance.
- **Dependencies:**

- The system will depend on third-party libraries like qrcode.js for QR code generation and ZXing for QR code scanning.
- **Technical Constraints:**
  - Integration between the frontend (React.js) and backend (Node.js) may require careful API design to ensure performance.
  - **Node.js and React.js:** To ensure scalability and performance for real-time data handling, caching strategies and database indexing will be implemented. Complex queries will be optimized, and pagination or lazy loading will be employed for large data sets.
  - **Offline Mode for QR Scanning:** A fallback mechanism will allow attendees to check in even if the network is down, logging the data locally and syncing when connectivity is restored.
- **Business Constraints:**
  - Attendance data must be secure and comply with data protection laws, such as GDPR.

## 5. Functional Requirements

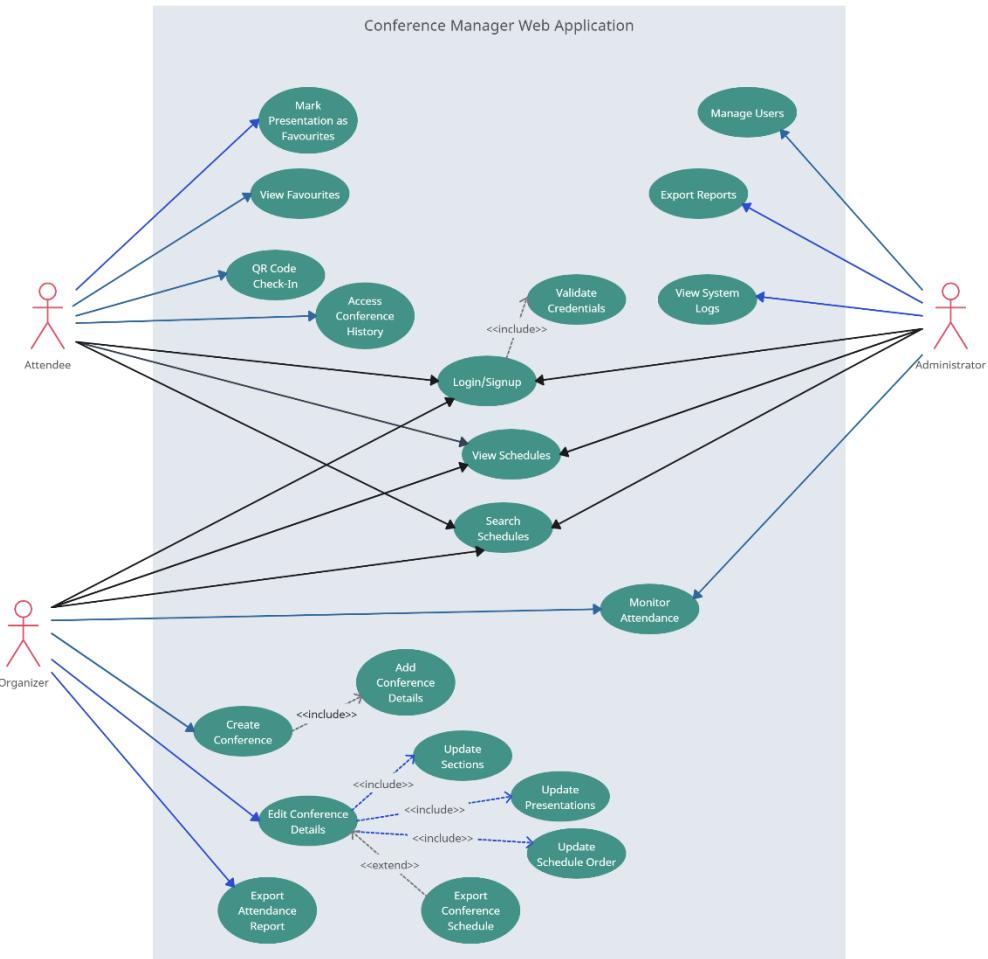
### **Use Case Diagram:**

The system will involve three primary user roles: **Conference Organizer, Attendee, and Administrator.**

- **Conference Organizer** – Manages conference setup, schedules, and sections. Can also **assign authors** to sessions and invite external authors.
- **Attendee** – Registers for conferences, searches schedules, and checks in via QR code. **Some Attendees may also be Authors with upload privileges.**
- **Administrator** – Oversees system functionality, manages users, and can impersonate users for administrative assistance.

**Authors are not a separate account type.** Instead, they can be:

- **Existing Attendees granted Author permissions** (can upload presentations).
- **External Authors invited via email** (receive a secure link for direct submission).
  
  
  
- **Diagram Structure:**



## Use Cases

## Use Case ID: UC-01

- **Title:** Conference Creation
  - **Description:** Organizers create conferences, define sections, and schedule presentations. They can also assign authors to sessions and invite external authors to submit their work.
  - **Actors:** Organizer
  - **Preconditions:**
    1. Organizer is logged in with appropriate privileges.
    2. The conference is open for setup.
  - **Postconditions:**
    1. A new conference is created and available for attendees to view.
    2. Authors assigned to sessions receive notifications.
    3. External Authors receive invite links.
  - **Main Flow:**
    1. Organizer logs in.
    2. Organizer selects "Create Conference."

3. Organizer inputs conference details, including sections and presentations.
  4. Assigns Attendees as Authors or invites external Authors via email.
  5. System sends notifications or invite links.
  6. Conference is confirmed and listed for Attendees.
- **Alternate Flow:**
    1. If an External Author's email is invalid, the system notifies the Organizer.
    2. If an Internal Author is removed from the event, their submission privileges are revoked.
    3. If required fields are missing, the system prompts the organizer to complete them.
    4. If an **invited external** Author does not accept, Organizer can enter presentation manually.
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## Use Case ID: UC-02

- **Title:** Hierarchical Schedule View
  - **Description:** Provides a tree-like (hierarchical) view of the conference schedule to facilitate easy navigation for users by day, section, or presentation.
  - **Actors:** Attendee, Organizer
  - **Preconditions:** The conference schedule and all related data (such as sections, days, and presentations) are available in the system.
  - **Postconditions:** Users are able to view and navigate the conference schedule organized by day, section, and individual presentations.
  - **Main Flow:**
    1. The user logs into the Conference Manager Web Application.
    2. The user navigates to the "Conference Schedule" section.
    3. The system displays the conference schedule in a hierarchical format (organized by day, section, and presentation).
    4. The user can expand or collapse sections to view more detailed information.
    5. The user can select any presentation within a section to view additional details such as abstract, keywords, and presenters.
  - **Alternate Flow:**
    1. If the schedule data is not available, the system displays an error message indicating the issue and prompts the user to try again later or contact support.
  - **Exceptions:**
    1. If the user's permissions do not allow access to the conference schedule, an access denied message will be shown.
    2. If there is an issue loading specific sections or presentations, the system displays an error message and retries to load the content.
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## Use Case ID: UC-03

- **Title:** Search Conference Schedule

- **Description:** Allows users to search the conference schedule by author, title, section, affiliation, or keyword to quickly locate relevant presentations.
  - **Actors:** Attendee
  - **Preconditions:** Conference schedule data is available, and the user is logged into the system.
  - **Postconditions:** The user can view a list of presentations that match their search criteria.
  - **Main Flow:**
    1. The user navigates to the "Search Schedule" page.
    2. The user enters search criteria (author, title, section, affiliation, or keyword) into the search field.
    3. The system processes the search and returns matching presentations.
    4. The user selects a presentation from the results to view detailed information.
  - **Alternate Flow:**
    1. If no results are found, the system displays a message indicating no matches.
  - **Exceptions:**
    1. If the user's search criteria are invalid (e.g., too short or contain special characters), an error message prompts the user to modify their search.
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## Use Case ID: UC-04

- **Title:** Mark Presentation as Favourite
  - **Description:** Allows users to mark specific presentations as favourites, making them easily accessible from a dedicated list.
  - **Actors:** Attendee
  - **Preconditions:** The user is logged in and viewing the conference schedule.
  - **Postconditions:** The selected presentations appear in the user's favourites list, which can be accessed at any time.
  - **Main Flow:**
    1. The user navigates to the conference schedule and views a list of presentations.
    2. The user selects the "Mark as Favourite" option for a presentation.
    3. The system adds the presentation to the user's favourites list and provides confirmation.
  - **Alternate Flow:**
    1. If the presentation is already marked as a favourite, the system displays a message indicating it has already been added.
  - **Exceptions:**
    1. If the user is not logged in, the system prompts them to log in to save favourites.
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## Use Case ID: UC-05

- **Title:** Attendance Check-In via QR Code
  - **Description:** Attendees check in by scanning a QR code.
  - **Actors:** Attendee
  - **Preconditions:** Attendee is registered for the conference.
  - **Postconditions:** Attendance is logged in the system.
  - **Main Flow:**
    1. Attendee navigates to the QR code scanning page.
    2. Attendee scans the QR code at the entrance.
    3. System logs the attendee's details and marks their attendance.
  - **Alternate Flow:**
    1. If the attendee's QR code is not recognized, the system prompts an error and requests a manual check.
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## Use Case ID: UC-06

- **Title:** User and System Management
- **Description:** The Administrator and Conference Organizer manage user accounts, oversee system activities, and maintain attendance records. Additionally, they can **assign authors, impersonate users, and monitor submission activities** to ensure smooth conference management.
- **Actors:**
  1. Administrator (Full system control)
  2. Organizer (Limited user & author management permissions)
- **Preconditions:**
  1. The Administrator or Organizer is logged in with appropriate privileges.
  2. The system is operational, and data logs are actively recording user actions.
- **Postconditions:**
  1. User accounts, roles, author assignments, and submissions are up-to-date.
  2. System logs track administrative actions.
  3. Attendance data is accurate and available for reporting.
- **Main Flow:**
  1. **Administrator/Organizer logs in** to the system
    - The Administrator logs in with elevated permissions.
    - The Organizer logs in with permissions restricted to conference-related user management.
  2. **Administrator selects "Manage Users & Permissions"** from the admin dashboard.
    - The system displays a list of all registered users, including their roles.
    - The Administrator can modify user roles, including:
      - ✓ Granting or revoking Organizer or Author privileges.
      - ✓ Suspending or reactivating user accounts.
      - ✓ Removing inactive users.
  3. **Assigning & Managing Authors:**
    - Organizer selects "Manage Authors" from the dashboard.
    - The system displays a list of assigned and unassigned authors.
    - **The Organizer can:**
      - ✓ Assign Attendees as Authors for specific presentations.

- ✓ Invite external Authors by email.
- ✓ View assigned presentations for each Author.

#### **4. Viewing and Managing Presentation Submissions:**

- Administrator selects "Presentation Submissions" from the dashboard.
- The system displays all submitted presentations, including:
  - ✓ Title, Authors, Submission Type (Attendee/External), Status (Draft, Submitted, Scheduled, Locked).
  - ✓ Organizer/Admin can modify submission details if necessary.

#### **5. Using the Impersonation Feature:**

- Admins/Organizers can impersonate an author to assist with submission.
- The system logs impersonation actions and notifies the author.

#### **6. Viewing Attendance Records:**

- The system shows a summary of attendance records, including check-ins times and user information.
- Admin can track conference check-ins and filter by date, conference, or user.
- View system logs (logins, submissions, impersonation).

#### **7. Administrator reviews "System Logs":**

- The system presents activity logs, including user actions (e.g., logins, check-ins, submissions, impersonation) and system events.

#### **8. Administrator selects "Export Reports":**

- Attendance and user data can be exported in CSV or PDF format for further analysis or reporting.

- **Alternate Flow:**

1. **Restricted Actions:** If an Administrator tries to edit or delete a critical user account (e.g., another Administrator):
  - The system prompts a security confirmation or displays an error if the action is restricted.
2. **Handling Errors:** If attendance or log data is unavailable due to an error:
  - The system shows an error message and prompts the Administrator to refresh or check back later.

## **Use Case ID: UC-07**

- **Title:** Submit Presentation
- **Description:** Authors submit presentations with required details for assigned sessions. Organizers/Admins can assist via impersonation.
- **Actors:** Author (Attendee or External Invitee), Organizer, Administrator
- **Preconditions:**  
Author is either:
  1. An **Attendee assigned** as an Author to a session by an Organizer.
  2. An External Author invited via email by an Organizer with a submission link.
  - ✓ If assigned, the **Attendee sees an "Upload Presentation" button.**
  - ✓ If invited, the **External Author receives an email link for direct submission.**

- **Postconditions:**
  1. The presentation is stored and listed under the assigned event.
  2. Once scheduled, the presentation is locked from further edits.
  3. Only an Administrator can unlock it, and the system logs all unlock actions.
  4. The original author receives a notification if an override occurs.
- **Main Flow:**
  1. **If the Author is an Attendee:**
    - Logs in and navigates to “Submit Presentation.”
  2. **If the Author is External:**
    - Clicks invite link and accesses submission form directly.
  3. **Enters required details:**
    - Title (Mandatory)
    - At least one Author (Mandatory)
    - Affiliations (Each author must have at least one)
    - Keywords (Minimum 5)
  4. Clicks "Submit."
  5. If scheduled, the presentation becomes **locked**.
- **Alternate Flow:**
  1. **If an Organizer/Admin is submitting on behalf of an author:**
    - The system logs the impersonation action.
    - The author receives an email notification.

## User Stories

- **Title:** Conference Search
  - As a conference attendee, I want to search the conference schedule by author, title, section, affiliations or keyword so that I can quickly find presentations relevant to my interests.
- **Title:** Mark Favourite Presentations
  - As a conference attendee, I want to mark presentations as favourites so that I can easily access them later.
- **Title:** Monitor Attendance
  - As an organizer, I want to view real-time attendance so that I can manage participants effectively.
- **Title:** Manage User Access
  - As an administrator, I want to view, edit, and manage user roles so that I can maintain system security and control over user permissions.
- **Title:** Generate Attendance Reports
  - As an administrator, I want to export attendance data so that I can analyse participant engagement and provide reports to stakeholders.
- **Title:** Assigning Authors to a Session
  - As an Organizer, I want to assign Attendees as Authors, so that they can submit presentations for the event.
  - As an Organizer, I want to invite external Authors, so that they can submit their work without full system access.
- **Title:** Flexible Presentation Submission

- As an **Internal Author (Attendee)**, I want to upload a presentation from my dashboard, so that I can contribute to the event without needing a new account.
    - As an **External Author**, I want to submit a presentation via an email link, so that I don't need to register for the platform.
  - **Title:** Impersonation for Administrative Assistance
    - **As an Organizer, I want to impersonate an Author** to assist with submissions.
    - **As an Administrator, I want to impersonate an Author** to complete missing data.
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## Additional Core User Stories

1. **Title:** View Detailed Presentation Information
  - **As a conference attendee, I want to** view detailed information about a selected presentation (such as title, abstract, keywords, and presenter), **so that** I can determine if it's relevant to my interests.
  - **Purpose:** Supports the requirement that presentations within sections include detailed information.
2. **Title:** Expand/Collapse Sections in Hierarchical View
  - **As a conference attendee, I want to** expand or collapse sections within the hierarchical conference schedule view, **so that** I can focus on specific parts of the schedule without excessive scrolling.
  - **Purpose:** This supports the tree-like (hierarchical) view requirement, making navigation easier for users.
3. **Title:** Jump to Schedule from Favourites
  - **As a conference attendee, I want to** quickly navigate from a favourite presentation to its location within the conference schedule, **so that** I can easily find where and when it is scheduled.
  - **Purpose:** Ensures that the favourites list functionality includes jump navigation back to the schedule, as specified in the requirements.
4. **Title:** Filter Schedule by Day
  - **As a conference attendee, I want to** filter the conference schedule by specific days, **so that** I can focus on the sessions scheduled on the days I plan to attend.
  - **Purpose:** Enhances navigation by allowing users to narrow down the schedule to specific days.
5. **Title:** View List of Organizers and Presenters
  - **As a conference attendee, I want to** view a list of organizers and presenters for the conference, **so that** I can know who is leading and presenting at the event.
  - **Purpose:** Ensures the list of organizers and presenters is accessible to users, as required by the initial project brief.
6. **Title:** Edit Conference Details (Organizer & Administrator)
  - **As an Organizer or Administrator, I want to** edit details of the conference, such as sections, presentation titles, and times, **so that** I can make adjustments if there are schedule changes.

- **Purpose:** Supports flexibility for organizers to manage the schedule in real-time if necessary.
7. **Title:** Offline Mode for QR Code Check-In
- **As a** conference attendee, **I want to** be able to check in using the QR code even if the internet connection is temporarily unavailable, **so that** my attendance is recorded seamlessly.
  - **Purpose:** Supports offline QR code check-in as part of the technical constraints, ensuring reliable attendance tracking even during network issues.
8. **Title:** Access My Conference History (Attendee)
- **As a** conference attendee, **I want to** view a history of the conferences I've attended, **so that** I can refer back to past events and presentations.
  - **Purpose:** Adds value for users by allowing them to access past conferences, providing continuity and enhanced user experience.
9. **Title:** Export Conference Schedule (Organizer & Administrator)
- **As an** Organizer or Administrator, **I want to** export the conference schedule as a CSV or PDF file, **so that** I can share it with participants or for record-keeping purposes.
  - **Purpose:** Provides organizers with an easy way to distribute and document the schedule.
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## 6. Non-Functional Requirements

- **Performance:** The system should be able to handle real-time QR scanning with a response time of under 2 seconds.
  - **Security:** Users will authenticate via email/password, and data (attendance records, participant details) must be encrypted.
  - **Usability:** The system should be intuitive, with minimal training required for both attendees and organizers.
  - **Reliability:** The system should provide 99% uptime during the conference period.
  - **Scalability:** The system should support large conferences with up to 10,000 participants.
  - **Compliance:** The system must comply with GDPR for data protection.
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## 7. User Interface

### 7.1 Wireframes/Mockups

Visual representations of the user interface screen. Wireframes will be provided in tools like Figma or Sketch and include:

[Figma Link – View Wireframes/Mockups](#)

- **Login/Signup Page:** A unified screen where users authenticate themselves based on email and password. Role-based access will determine the subsequent dashboard.
- **Attendee Dashboard:** Displays the conference schedule, search functionality, and a favourites list.
- **Organizer Dashboard:** Includes options for creating, editing, and managing conferences, as well as an overview of attendance and conference details.

- **Administrator Dashboard:** Provides tools for user management, attendance tracking, and system monitoring, including reports and logs.
- **Conference Schedule (Attendee View):** Hierarchical view of the schedule with options to search, filter, and mark presentations as favourites.
- **Search and Favourites:** Dedicated interface for attendees to search for presentations and manage their favourites.
- **QR Code Check-In:** A camera-enabled page where attendees scan QR codes for attendance.
- **Admin-Specific Features:** Wireframes for user management and data export screens.

## 7.2 User Interaction

This section describes how users interact with the system. Descriptions of user interactions with each screen include:

- **Login/Signup Page:**
  - Users enter email and password, then are directed to a dashboard specific to their role (Attendee, Organizer, or Administrator).
  - Forgotten passwords are recoverable via email.
- **Attendee Dashboard:**  
Attendees can:
  - Browse the hierarchical conference schedule, expanding sections for details.
  - Search by title, author, section, or keyword.
  - Mark presentations as favourites.
  - Check in by scanning QR codes at designated locations.
- **Organizer Dashboard:**  
Organizers can:
  - Create and edit conferences, adding sections, presentations, and breaks.
  - View attendance statistics in real-time.
  - Export conference schedules for distribution.
- **Administrator Dashboard:**  
Administrators can:
  - Manage user roles and permissions (edit, suspend, delete users).
  - Monitor attendance and generate reports.
  - Access system logs to identify potential issues.

**User Flow Diagram:** [View User Flow Diagram](#)

## 7.3 Navigation

- **Navigation Flow:**

Users will navigate through the application as follows:

1. **Login/Signup:**

- All users authenticate through the same login screen. Role-based routing determines the appropriate dashboard.

## 2. Role-Based Navigation:

- **Attendee Navigation:** Access to the conference schedule, search, favourites list, and QR code check-in features through a sidebar or top navigation.
- **Organizer Navigation:** Access to tools for managing conferences, viewing attendance, and exporting schedules. Sidebar navigation differentiates these features from attendee options.
- **Administrator Navigation:** Access to user management, attendance logs, and system monitoring features. Clearly separated navigation sections ensure clarity of purpose.

## 3. Common Features:

- All dashboards include a top navigation bar with access to account settings, logout, and notifications.
- A consistent design ensures familiarity across all roles, with distinct colours or icons for role-specific features.

## 4. Optional Feature for Role Switching:

- If some users might have multiple roles (e.g., an Organizer could also attend the conference as an Attendee), we can implement a role-switching feature.
- For example:
  1. After login, a user can select their current role (e.g., "Switch to Attendee Mode").
  2. This allows flexibility without requiring multiple accounts.

## 8. Data Requirements

### • Data Model:

- **Entities:**
  - **Conference:** Holds conference details.
  - **Section:** Contains presentation details and abstracts.
  - **User:** Stores participant and organizer details.
  - **Author Assignment:** Links Authors (Internal or External) to their assigned presentations.
  - **Presentation:** Stores uploaded presentations and related details.
  - **Favourites:** Stores favoured presentations.
  - **Attendance:** Logs the QR-based check-in information.
  - **Impersonation Log:** Records when an Organizer or Administrator impersonates an Author.

**Data Dictionary (Summary Table)**

Entity Name	Fields
<b>Conference</b>	id, name, date, location, created_by
<b>Section</b>	id, conference_id, name, description
<b>User</b>	id, name, email, role (Attendee, Organizer, Administrator)
<b>Author Assignment</b>	id, user_id, external_email, presentation_id, assigned_by, submission_type, secure_submission_link

<b>Presentation</b>	id, title, author_id, affiliations, keywords, status (Draft, Submitted, Scheduled, Locked), locked_by, submission_type
<b>Favourites</b>	id, user_id, presentation_id, created_at
<b>Attendance</b>	id, user_id, section_id, check_in_time
<b>Impersonation Log</b>	id, impersonator_id, impersonated_user_id, action_taken, timestamp

## 9. Integration

- **Integration Points:**
  - The system will integrate with third-party QR code generation (qrcode.js) and scanning (ZXing) libraries.
  - APIs will be designed to support mobile devices for QR code scanning.

## 10. Testing Requirements

### Testing Criteria:

#### Performance:

- QR code scanning should respond within 2 seconds, 95% of the time.
- Schedule and search functionalities should load in under 1 second for standard use cases.

#### Security:

- Authentication tests for all user access points to ensure only authorized users can perform specific actions.
- Data encryption validation for all stored user and attendance data.

#### Usability:

- Intuitive navigation should allow new users to locate main functions within 1 minute.
- Ensure each user role (Organizer, Attendee, Administrator) can perform primary functions without training.

#### Reliability:

- System should maintain 99% uptime, especially during peak conference periods.
- Testing of offline QR scanning mode to ensure data sync accuracy.

#### Test Types:

- **Unit Testing:** To validate individual components (registration, schedule display, QR scanning).

- **Integration Testing:** To confirm smooth functionality between front-end and back-end, especially for search and QR code processing.
- **User Acceptance Testing (UAT):** Allow a small group of target users to validate system functionality and ease of use.