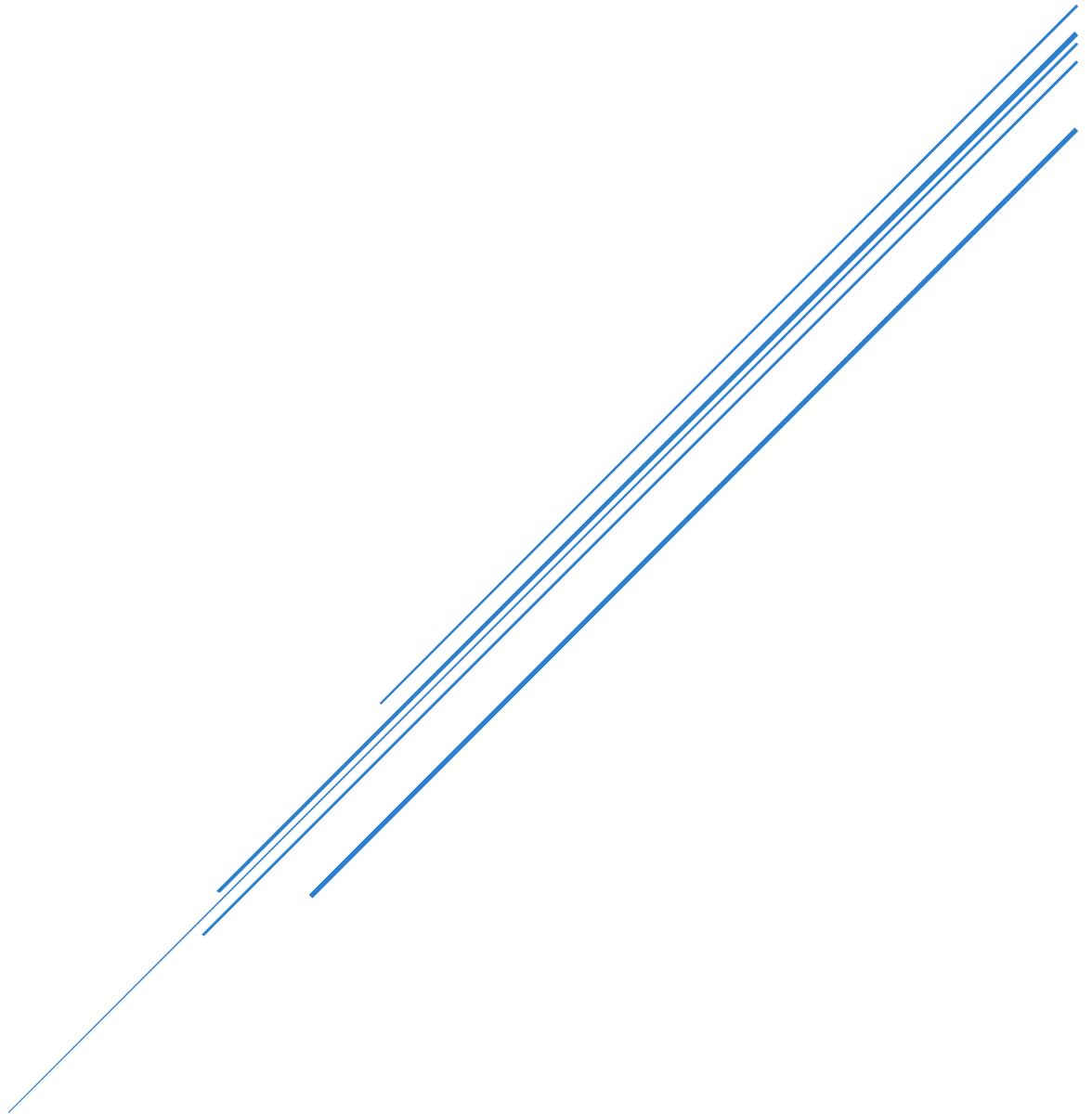


# DISTRIBUTED ONLINE QUIZ PLATFORM



Distribute System and Cloud Computing – INTE 22253  
Project Proposal – Group 08

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## 1. Project Overview

The **Distributed Online Quiz Platform** is a web-based application designed to offer real-time, scalable, and fault-tolerant quiz services for both quiz creators (admins) and participants (users). The platform allows multiple users to participate in quizzes simultaneously while distributing the load across multiple servers, ensuring smooth performance even during peak traffic. Admins can create quizzes, set time limits, and monitor results, while users can attempt quizzes, receive real-time feedback, and view leaderboards. The distributed nature of the system enhances reliability, scalability, and real-time responsiveness, making it suitable for large-scale online quiz events.

## 2. Project Objectives

- **Distributed Quiz Management:** To provide a system where quizzes can be created, distributed, and managed in real-time across multiple servers.
- **Real-Time Participation:** Ensure that users can participate in quizzes concurrently, with real-time updates and time-synchronized across all users.
- **Scalability:** To design a platform capable of handling a high number of concurrent users without performance degradation by distributing requests across multiple nodes.
- **Fault Tolerance:** Ensure the platform remains operational even if one or more servers fail by implementing replication and backup mechanisms.
- **Performance Optimization:** Optimize the system for quick response times, minimal latency, and high availability using distributed databases and load balancing techniques.

### 3. Scope of the project

#### ❖ **Admin Functionality:**

- **Quiz Creation and Management:** Admins will have a dedicated section in the platform where they can create quizzes. This includes providing essential information such as the title of the quiz, a brief description, and categorizing it (e.g., general knowledge, science, etc.). Once the quiz is created, admins can modify it, like adding or changing questions, or deleting the quiz altogether. Additionally, admins can decide when a quiz becomes active—whether it's available immediately or at a specific scheduled time. This gives flexibility in managing and organizing quizzes efficiently.
- **Question and Answer Configuration:** In the quiz creation process, admins can configure the questions. They can create different types of questions such as multiple-choice (where participants choose one correct answer from options) or true/false questions. For each question, admins can set possible answer options and mark the correct answer, which will later be used for automatic grading. This configuration ensures that the quiz content is structured and that answers are defined clearly for evaluation.
- **Time-Limit Setting for Quizzes:** Admins will be able to set a total time limit for the quiz, meaning that participants must finish the quiz within a specified duration, like 30 minutes or an hour. There's also an option to set time limits per question if desired, where each question needs to be answered within a set number of seconds or minutes. This feature adds a time management aspect to quizzes, ensuring a consistent experience for all participants.
- **Real-Time Monitoring of User Performance and Results:** During the quiz, admins can monitor the progress of users in real-time. They can view how many participants are actively taking the quiz, how far each user has progressed (e.g., which question they are on), and their current performance. After the quiz is completed, the admin will have immediate access to results, allowing them to see individual scores and compare performances across participants. This real-time insight provides a comprehensive view of the ongoing quiz activity and results.

❖ **User Functionality:**

- **User Registration and Authentication:** Users will need to register an account to participate in quizzes. The registration process allows them to create an account using their email and a password, or they can opt to sign in through third-party services like Google or Facebook for convenience. Once registered, they can log in securely, and their session will be authenticated using secure techniques (e.g., tokens) to ensure data protection.
- **Ability to Participate in Quizzes:** After logging in, users can browse the list of available quizzes on the platform. They can select any quiz they are eligible for and start participating. The platform provides a smooth experience where the user can go through the quiz questions one by one, selecting their answers. The system tracks their participation and ensures that they stay within the quiz time limits.
- **Real-Time Updates During Quiz-Taking:** While users are taking a quiz, they will see a live countdown timer, indicating how much time they have left to complete the entire quiz or each individual question if the quiz is timed that way. Additionally, the system will provide feedback on their progress, such as showing them which question they are currently answering out of the total number of questions (e.g., Question 5 of 10). If the time is running out, users will receive warnings, such as "5 minutes remaining," ensuring they manage their time effectively.
- **View Results and Leaderboards:** Once users complete a quiz, they will instantly receive feedback on their performance, such as their total score and which questions they answered correctly or incorrectly. The platform will also display a leaderboard, ranking users based on their performance compared to others who have taken the same quiz. This competitive element motivates users to improve their scores and participate in more quizzes.

❖ **Technical Scope:**

- **Design and Implementation of Distributed Architecture:** The quiz platform will run on a distributed architecture, meaning that it will be spread across multiple servers or nodes. Each server will handle a portion of the platform's responsibilities, such as managing user requests, handling quiz data, and processing results. This distribution ensures that the system remains efficient and responsive, even if the number of users grows significantly.

For example, one server may handle user authentication, while another manages quiz-related tasks, reducing the workload on any single server.

- **Database Replication and Distributed Storage:** The quiz data, including user profiles, quiz questions, and results, will be stored in a distributed database. This means that the data will not reside on just one server, but instead be replicated across multiple servers or locations. If one server goes offline or encounters an issue, the system can still retrieve the data from another server. This replication also improves performance by allowing users to access data from the closest server, minimizing delays.
- **Load Balancing and Fault Tolerance Mechanisms:** To manage incoming traffic efficiently, the system will use a load balancer, which ensures that requests from users (e.g., starting a quiz or submitting answers) are evenly distributed across multiple servers. This prevents any single server from becoming overloaded. Additionally, fault tolerance mechanisms will be in place to handle server failures. For example, if one server goes down, the system will automatically redirect users to a healthy server without causing any disruption to their quiz experience. This ensures high availability and reliability of the platform.

## 4. Conclusion

The **Distributed Online Quiz Platform** is designed to provide a scalable, real-time, and fault-tolerant quiz system. By leveraging distributed computing principles, the platform will efficiently handle a large number of concurrent users, ensuring a smooth and interactive quiz experience. The project will not only meet the needs of users and admins but also demonstrate important concepts of distributed systems such as fault tolerance, scalability, and real-time data handling.

## 5. Group Members

IM/2021/074 – Chamudi Gunawardhana

IM/2021/078 – Vidushan Assadduma

IM/2021/097 – Gayan Nagasinghe

IM/2021/108 – Miyulakshi Gunawardhane