Software Requirements Specification

for

Soccer Live

Version: 2.0

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Contents

Revision History

Name	**Date**	**Reason For Changes**	**Version**
SRS For Soccer Live App	13/11/24	1. Mistakes In Version 1.0 2. Addition of Diagrams	2.0

1. Introduction

1.1 Purpose

This document specifies the software requirements for the **Soccer Live (Version 1.0)**, an online platform designed to stream live soccer matches without region blocks or intrusive advertisements. The platform will focus on enhancing the viewing experience for football fans, especially in underserved regions like Asia and Africa, where access to live matches is often restricted. This SRS covers the complete system and includes all functional and non-functional requirements, user interfaces, and system architecture interactions for the Soccer Live platform. Version 1.0

1.2 Document Conventions

This SRS follows the standard IEEE guidelines for software requirement specifications. All major sections and subsections are numbered for easy reference. Functional requirements are labeled as REQ-1, REQ-2, etc., and non-functional requirements are similarly structured. Bold text is used for major section headers, and italics may be used to emphasize important terms. Each system feature is prioritized as **High**, **Medium**, or **Low**.

1.3 Intended Audience and Reading Suggestions

This document is intended for the following audiences:

- **Developers**: To understand the functional and non-functional requirements needed to implement Soccer Live.

- **Project Managers**: To review the project's requirements and ensure they align with the project goals.

- **Testers**: To use the requirements outlined in this SRS for creating test cases and validation.

- **System Architects**: To design and verify system architecture based on the specified requirements.

- **Maintainers**: To develop maintenance processes based on the system specifications.

Readers are encouraged to begin with the overview sections (1 and 2) to understand the general context of the system. Following that, developers and system architects should focus on Sections 3 and 4 for detailed requirements and system features. Project managers may find it beneficial to review the non-functional requirements in Section 5, while maintainers should refer to the documentation and appendices for insights into ongoing support and management.

1.4 Product Scope

Soccer Live is a mobile and web-based application that enables football fans to stream live soccer matches globally without regional restrictions or intrusive advertisements. The application integrates live feeds from third-party providers and offers a user-friendly interface for selecting matches, viewing statistics and managing notifications. Users can create profiles, customize match alerts, and enjoy a smooth viewing experience, even in low-bandwidth areas. The goal is to expand market reach and enhance customer satisfaction in underserved regions like Asia and Africa, aligning with the company's strategy of broadening access to sports entertainment.

1.5 References

IEEE (1998) *Software Requirements Specification (SRS) Template.* IEEE Standards Association.

Usman, , Houd, & Mutassim (2024) Project Vision Document for Soccer Live, Version 1.0, FAST NUCES CFD, October 2.

Krazytech (2024)Software Requirements Specification document with example. Available at: https://krazytech.com/projects/sample-software-requirements-specificationsrs-report-airline-database (Accessed: 9 October 2024).

Michigan State University (n.d.) SRS Example. Available at: https://www.cse.msu.edu/~cse435/Handouts/SRSExample-webapp.doc (Accessed: 9 October 2024).

2. Overall Description

2.1 Product Perspective

Soccer Live is a new, self-contained mobile application designed specifically for football fans, particularly in underserved regions such as Asia and Africa, where access to live soccer matches is often restricted. This application aims to fill the gap left by existing streaming platforms that impose regional blocks and display intrusive advertisements. Soccer Live provides a seamless streaming experience tailored to user preferences by integrating with third-party live match feeds to deliver real-time content. The application not only focuses on user experience but also aims to enhance fan engagement and accessibility within the global football community.

2.2 Product Functions

The primary functions of the Soccer Live application are summarized as follows:

- **Live Match Streaming**: Allows users to watch live soccer matches without regional restrictions.
- **Real-Time Updates**: Provides live updates and statistics during matches.
- **User Profile Management**: Enables users to create and manage their profiles for a personalized experience.
- **Match Notifications**: Sends alerts for upcoming matches and significant events during games.

2.3 User Classes and Characteristics

The application is designed for two distinct user classes:

- **Regular Users**: Casual football fans who seek easy access to live match streams and updates. They may use the app occasionally to catch important matches. This class requires an intuitive interface and reliable access to content.
- **Administrators**: Platform operators responsible for managing content, ensuring the availability of live feeds, and providing user support. Administrators require advanced functionalities to monitor and maintain the application effectively.

2.4 Operating Environment

Soccer Live is designed to operate in the following environments:

- **Mobile Platforms**: The application will run on Android (version 8.0+) and iOS (version 12.0+) devices, requiring a minimum of 2 GB RAM and a quad-core processor for Android. iOS compatibility includes iPhone 6S and later models.
- **Web Browsers**: The application will be accessible through popular web browsers, including Chrome, Firefox, Safari, and Edge, ensuring compatibility with the latest versions.
- **Internet Connectivity**: A stable internet connection is essential, with 4G LTE recommended for optimal streaming performance.
- **Backend Infrastructure**: The application will utilize cloud servers to ensure scalability and reliability in content delivery.

2.5 Design and Implementation Constraints

- **Region Restrictions:** The application must incorporate mechanisms to bypass regional blocks for soccer streams, ensuring accessibility for users in restricted areas.
- **Low-Bandwidth Support:** The system must include a low-bandwidth mode to provide a functional streaming experience for users in regions with poor internet connectivity.
- **Regulatory Compliance:** The application must adhere to data protection regulations, including the General Data Protection Regulation (GDPR), particularly concerning user data handling and privacy.

2.6 User Documentation

User documentation will include:

- **User Manuals**: Comprehensive guides that help users navigate the app and understand its features. These will be provided in PDF format for easy access.
- **Online Help:** A built-in FAQ section within the app that addresses common user inquiries and troubleshooting tips.

- **Video Tutorials:** Step-by-step instructional videos available on the app and online platforms (e.g., YouTube) demonstrating key functionalities of the app.
- **Quick Start Guides**: Concise guides for new users to get started quickly with essential features.

2.7 Assumptions and Dependencies

- The platform will depend on third-party live match feeds for real-time content delivery. Any changes in the availability or quality of these feeds may significantly impact the application's performance and user satisfaction.
- It is assumed that users will have access to compatible smartphones or computers with stable internet connections to utilize the app effectively.
- The successful functioning of the application is dependent upon the continued availability of cloud infrastructure services for data storage and streaming.

3. External Interface Requirements

3.1 User Interfaces

The Soccer Live application will feature an intuitive user interface designed for streaming live matches, viewing statistics, and managing notifications. It will adhere to established GUI standards, ensuring responsiveness across mobile devices (Android and iOS) and desktop browsers. Standard buttons, such as "Help," "Settings," and "Profile," will be available on all screens, accompanied by user-friendly error messages to guide users in resolving issues. Additional details, including sample screen layouts and any specific constraints, will be documented in a separate user interface specification.

3.2 Hardware Interfaces

Soccer Live will support mobile devices running Android (version 8.0+) and iOS (version 12.0+) with a minimum of 2 GB of RAM for optimal performance. The application will also be accessible via popular desktop web browsers, ensuring compatibility without strict hardware restrictions, although a stable internet connection is necessary. The interactions between the software and hardware will include data transmissions for video streams and user inputs.

3.3 Software Interfaces

The application will integrate with external APIs to access third-party match feeds for real-time data and utilize Firebase Cloud Messaging for push notifications regarding match events. User profiles and match data will be securely stored in a cloud-based database, ensuring data integrity and privacy. The data flow will involve incoming live match statistics and outgoing user profile updates, with detailed API specifications documented separately.

3.4 Communications Interfaces

A stable internet connection is required to access match streams and updates, with support for both HTTP and HTTPS protocols to ensure secure data transmission. The application will employ encryption using industry-standard security protocols to maintain user data privacy. Optimized for real-time streaming, it will target a minimum data transfer rate of 2 Mbps for smooth video playback. Standardized error messages will be provided to address any connection issues, enhancing user feedback.

4. System Features

This section outlines the functional requirements for the Soccer Live application, detailing the major services provided to enhance the user experience.

1. Live Match Streaming

- **Description and Priority**: This feature enables users to stream live soccer matches in real-time without regional restrictions. It is the core functionality and has a High priority.
- **Stimulus/Response Sequences**:
  - The user selects a match to watch from the "Live Matches" section.
  - The system retrieves the match data and begins streaming.
  - The user can interact with the stream, pause, resume, or use picture-in-picture mode.
- **Functional Requirements**:
  - REQ-1: The system must provide live soccer streams.
  - REQ-2: The system must allow users to pause, resume, and rewind streams.

  - REQ-3: The system should adjust the stream quality based on the user's bandwidth automatically (low-bandwidth mode).
  - REQ-4: The system must handle high-definition streaming with minimal latency.

2. Match Notifications

- **Description and Priority**: This feature allows users to receive notifications about upcoming matches and important events. It holds Medium priority.
- **Stimulus/Response Sequences**:
  - The user subscribes to notifications for specific teams or matches.
  - The system sends notifications for events like goals or match start times.
- **Functional Requirements**:
  - REQ-1: The system must allow users to customize their notification preferences.
  - REQ-2: The system must send notifications in real-time for subscribed matches.
  - REQ-3: The system should allow users to unsubscribe from notifications at any time.

3. Real-Time Match Updates

- **Description and Priority**: Provides users with real-time match updates, including scores and player statistics. High priority for keeping users informed.
- **Stimulus/Response Sequences**:
  - The user selects a match for updates.
  - The system pushes live updates (e.g., score changes, cards) to the user.
- **Functional Requirements**:
  - REQ-1: The system must display live scores and statistics.
  - REQ-2: The system must update match events in real-time with minimal delay.
  - REQ-3: The system must refresh updates automatically without user intervention.

4. User Profile Management

- **Description and Priority**: This feature allows users to create and manage their profiles, saving preferences for notifications and favorite teams. Medium priority for personalization.
- **Stimulus/Response Sequences**:
  - The user creates or edits their profile information.
  - The system saves the profile and preferences.
- **Functional Requirements**:
  - REQ-1: The system must allow users to create and edit their profiles.
  - REQ-2: The system must save user preferences (e.g., teams, notifications).
  - REQ-3: The system must securely store user profile information.

5. Low-Bandwidth Streaming Mode

- **Description and Priority**: Allows users to stream matches in low-bandwidth mode to optimize performance for slow connections. High priority for regions with poor internet connectivity.
- **Stimulus/Response Sequences**:
  - The user selects low-bandwidth mode.
  - The system adjusts the stream quality to reduce buffering.
- **Functional Requirements**:
  - REQ-1: The system must provide an option for low-bandwidth streaming.
  - REQ-2: The system must automatically adjust the stream quality based on real-time network conditions.

6. Favorites Management

- **Description and Priority**: Users can manage their favorite teams and matches, enhancing engagement by allowing quick access to preferred content. Medium priority.

- **Stimulus/Response Sequences**:
  - The user adds a match or team to their favorites.
  - The system updates the favorites list and allows easy access.
- **Functional Requirements**:
  - REQ-1: The system must allow users to add and remove content from their favorites list.
  - REQ-2: The system must store and display the user's favorites.

7. Authentication

- **Description and Priority**: Provides secure login and sign up for users to access the application. This is a High priority feature.
- **Stimulus/Response Sequences**:
  - The user enters their credentials (username and password).
  - The system authenticates the user and grants access.
- **Functional Requirements**:
  - REQ-1: The system must authenticate users using secure credentials (username and password).
  - REQ-2: The system must allow password reset via email or SMS.
  - REQ-3: The system must implement two-factor authentication for additional security.

8. Watch Match Highlights

- **Description and Priority**: Users can view highlights from completed matches, making it easier to catch up on key events. Medium priority for enhancing user engagement.
- **Stimulus/Response Sequences**:
  - The user selects a match from the completed match list.
  - The system plays the highlights video.

- **Functional Requirements**:
    - REQ-1: The system must allow users to watch highlights of completed matches.
    - REQ-2: The system must enable users to like, share, or comment on highlights.

9. Social Media Sharing

- **Description and Priority**: This feature allows users to share content (e.g., match highlights, articles) on social media platforms. Medium priority for increasing user engagement and app visibility.
- **Stimulus/Response Sequences**:
    - The user selects content to share (e.g., match highlights).
    - The system integrates with social media platforms to post the content.
- **Functional Requirements**:
    - REQ-1: The system must allow users to share content directly to social media platforms.
    - REQ-2: The system must integrate with popular social media platforms like Facebook, Twitter, and Instagram.

10. Chat with Other Fans

- **Description and Priority**: Allows users to engage in real-time chat with other fans during live matches, enhancing the community aspect of the application. High priority for fostering engagement.
- **Stimulus/Response Sequences**:
    - The user enters a chatroom for the selected match or team.
    - The system allows the user to send and receive messages in real time.
- **Functional Requirements**:
    - REQ-1: The system must enable real-time chat functionality for live matches.
    - REQ-2: The system must allow users to mute or block other users in chat.

11. User Support and Feedback

- **Description and Priority**: Provides a means for users to submit feedback or seek support within the application. Medium priority for improving user satisfaction.
- **Stimulus/Response Sequences**:
  - The user submits a feedback or support request.
  - The system logs the request and provides a confirmation.
- **Functional Requirements**:
  - REQ-1: The system must allow users to submit feedback and support requests.
  - REQ-2: The system must notify users when their request has been processed.

12. Content Management (Admin)

- **Description and Priority**: Allows administrators to manage the content on the platform, such as updating match schedules or highlights. High priority for ensuring up-to-date content.
- **Stimulus/Response Sequences**:
  - The admin logs in and selects the content management feature.
  - The system allows the admin to add, edit, or delete content.
- **Functional Requirements**:
  - REQ-1: The system must allow administrators to manage match schedules and content.
  - REQ-2: The system must track changes made by administrators.

13. Manage User Accounts (Admin)

- **Description and Priority**: This feature allows administrators to manage user accounts effectively, including creating, updating, deactivating, and deleting profiles. It is a **Critical priority** feature for ensuring security and data integrity.
- **Stimulus/Response Sequences**:

  - The administrator logs into the user management system and selects the account management feature.
  - The system displays a list of user accounts.
  - The administrator chooses to create, update, deactivate, or delete an account.

- **Functional Requirements**:
  - REQ-1: The system must allow administrators to create new user accounts.
  - REQ-2: The system must allow administrators to update user account information.
  - REQ-3: The system must allow administrators to deactivate or delete user accounts.
  - REQ-4: The system must log all actions taken by administrators regarding user account management for audit purposes.

14. Use Case: Login

- **Description and Priority**: This feature allows users to securely log in to their accounts by providing valid credentials. It is a **High priority** feature to ensure authorized access and prevent unauthorized users from gaining access to the system. The login process includes the "Authentication" use case to verify the user's identity.

- **Stimulus/Response Sequences**:
  - The user navigates to the login page and enters their credentials (username and password).
  - The system includes the "Authentication" process to verify the credentials against the database.
  - If the credentials are valid, the user is logged in and redirected to their dashboard.
  - If the credentials are invalid, the system notifies the user and prompts them to re-enter their credentials.

- **Functional Requirements**:
  - REQ-1: The system must allow users to enter their username and password on the login page.

- REQ-2: The system must verify the entered credentials through the "Authentication" process.
- REQ-3: The system must redirect the user to their dashboard after successful login.
- REQ-4: The system must notify the user in case of invalid credentials or failed login attempts.
- REQ-5: The system must lock the user's account after a set number of failed login attempts and notify the user of the lockout.
- REQ-6: The system must allow users to reset their password via the "Forgot Password" functionality.

5. Other Nonfunctional Requirements

5.1 Performance Requirements

The Soccer Live system must stream live matches with minimal buffering and support both high-definition (HD) and low-quality streams to accommodate varying internet speeds. The system should maintain a minimum uptime of 95% and handle live feed requests with a response time of less than 2 seconds to ensure real-time engagement. Additionally, the system must scale dynamically to handle peak loads during major matches, ensuring a smooth user experience for all viewers.

5.2 Safety Requirements

User data must be securely stored and protected against unauthorized access. The system must implement safeguards to prevent data loss during transmission, including encryption and secure protocols. Compliance with data protection regulations, such as the General Data Protection Regulation (GDPR), is mandatory to ensure user privacy and safety, along with regular assessments to identify and mitigate potential vulnerabilities.

5.3 Security Requirements

All user data must be encrypted during transmission to protect sensitive information. The system should implement robust user authentication protocols, requiring users to create secure passwords and verify their identities via email or SMS. The platform must conduct regular security audits and penetration testing to identify vulnerabilities and ensure compliance with industry security standards.

5.4 Software Quality Attributes

Key quality attributes include:

- **Usability**: The application must be intuitive and user-friendly, ensuring non-technical users can navigate effortlessly. This includes easy access to features like live match streaming, statistics, and notifications.
- **Scalability**: The system must support up to 10,000 simultaneous streams without performance degradation, accommodating growth in user numbers during peak times, such as major tournaments or high-profile matches.
- **Reliability**: The platform should provide consistent access to live streams, with automated failover mechanisms in place to minimize interruptions during critical viewing periods.

5.5 Business Rules

Only users from non-restricted regions may create an account and access the streaming service. Geolocation checks must be implemented to enforce compliance with licensing agreements and regional broadcasting rights. Furthermore, users must agree to terms of service that outline acceptable usage and community guidelines to foster a respectful environment within the app.

6. Other Requirements

6.1 Database Requirements

The Soccer Live application requires a secure database to manage user profiles, match data, and streaming preferences. It must support historical and real-time data storage and be scalable to accommodate a growing user base.

6.2 Internationalization Requirements

The platform will support multiple languages, including English, French, and Arabic, to enhance accessibility for a diverse user base.

6.3 Legal Requirements

The application must comply with regional broadcasting rights and licensing agreements, implementing geolocation checks to block users from restricted areas. It must also adhere to data protection regulations such as GDPR to ensure user privacy.

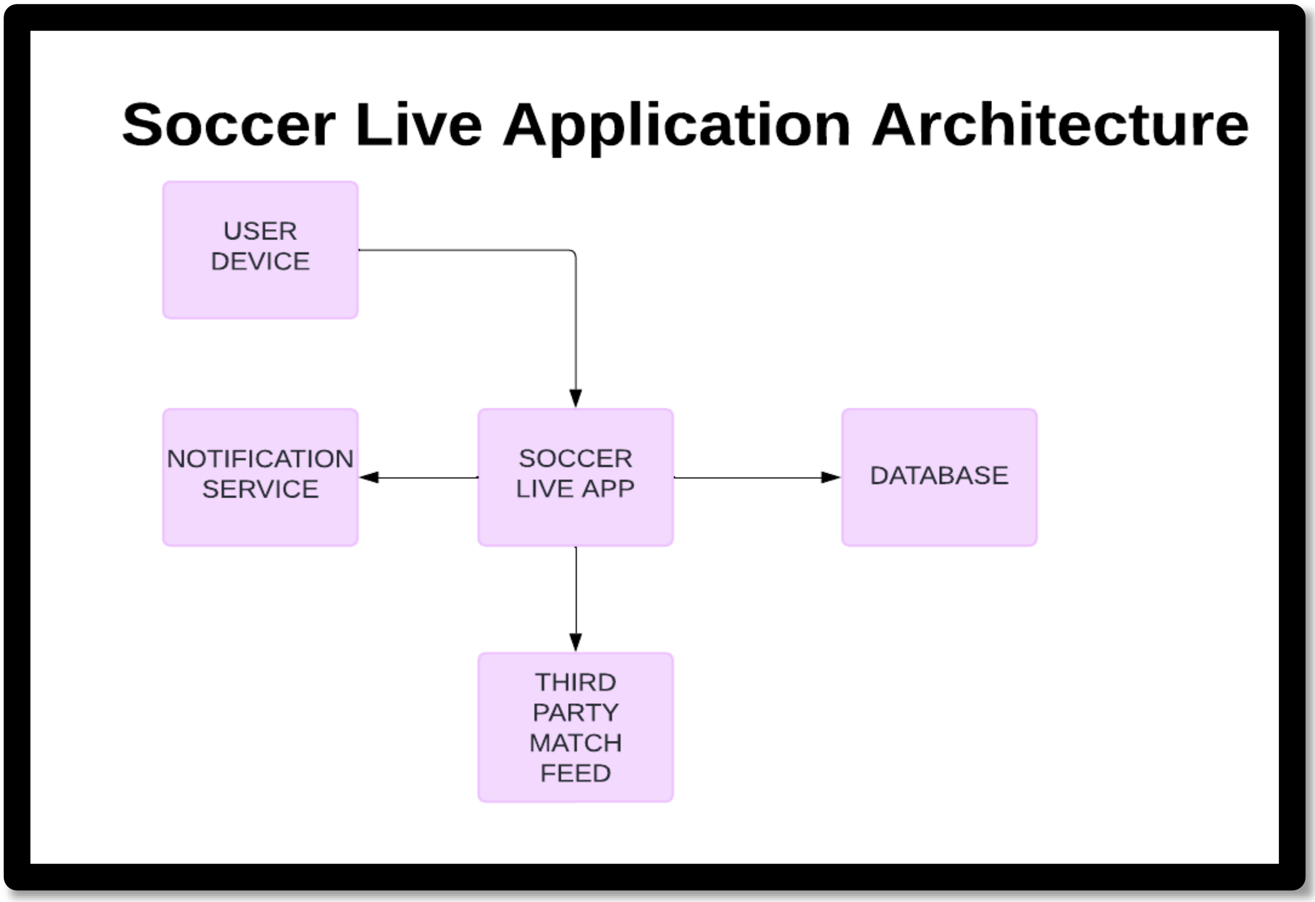
6.4 Reuse Objectives

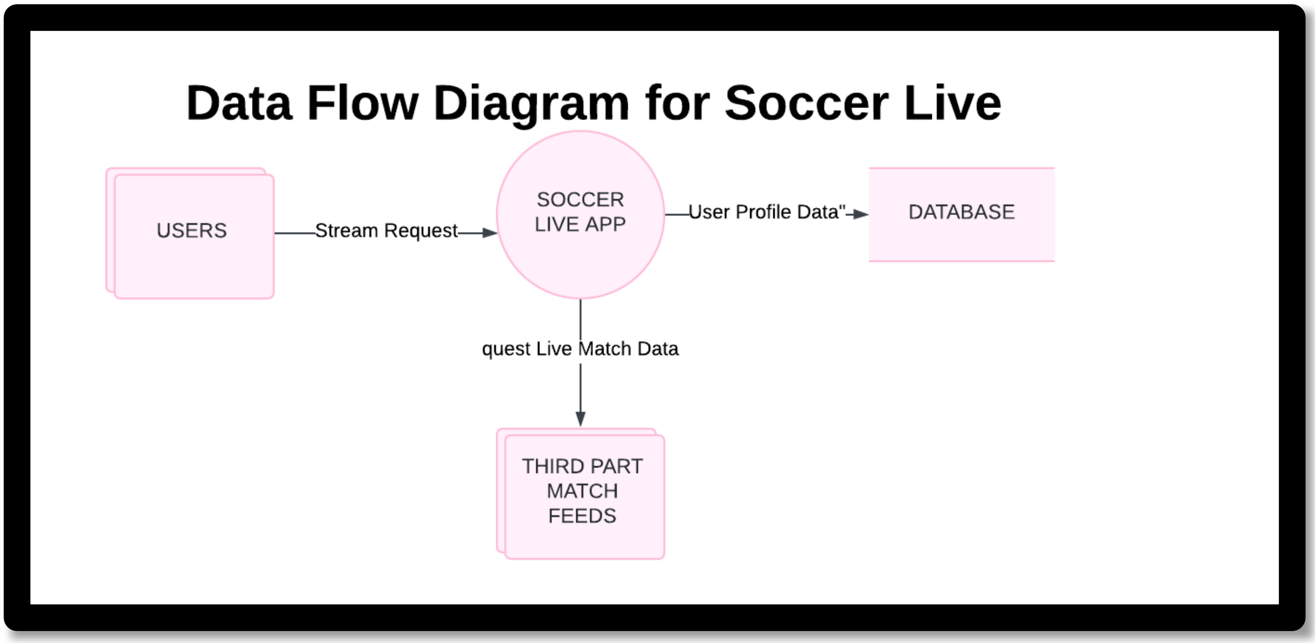
The project aims to utilize existing APIs for live match feeds and notifications while documenting reusable code components for future projects.

Appendix A: Glossary

- **Authentication:** Process of verifying user identity.
- **API**: Application Programming Interface, a set of rules and tools for building software applications that allow different systems to communicate.
- **GDPR**: General Data Protection Regulation, a legal framework for data protection and privacy in the European Union.
- **HD**: High Definition, a video quality standard that provides higher resolution and clarity.
- **Streaming**: The continuous transmission of audio or video files from a server to a client.
- **User Profile**: A personalized account containing user information, preferences, and settings.

Appendix B: Analysis Models


Soccer Live Application Architecture
USER DEVICE
NOTIFICATION SERVICE
SOCCER LIVE APP
DATABASE
THIRD PARTY MATCH FEED


Data Flow Diagram for Soccer Live
USERS
Stream Request
SOCCER LIVE APP
User Profile Data"
DATABASE
quest Live Match Data
THIRD PART MATCH FEEDS

Appendix C: To Be Determined List

- TBD: Final selection of third-party live match feed providers.
- TBD: Detailed security protocols and encryption standards to be implemented.
- TBD: Specific user interface designs and layouts for the application.

Deliverable 2

2.Domain Model:

Assumptions on the Domain Model

1. **User Profile and Preferences**:
   - Each user has one unique profile that includes personal information and preferences, like their preferred language. This allows the application to personalize the user experience based on the stored profile data.
   - The system supports language selection within the user profile, which is assumed to be changeable.
2. **Match Streaming and Updates**:
   - Matches can have multiple real-time updates, such as scores and commentary, which are visible to users who are streaming or following a match.
   - It is assumed that users can start and stop match streaming anytime, and each streaming session is linked to the user, not the match itself.
3. **Notifications**:
   - Notifications are sent to users to inform them about events like match start times, updates, or favorites. These notifications are assumed to be either system-generated or based on the user's preferences.
4. **Favorites and Personalization**:
   - Users can add multiple matches to their favorites, allowing them to receive notifications specifically for those matches.
   - Favorites are linked to individual users, meaning each user's list of favorites is private and unique.
5. **Real-Time Updates**:
   - Real-time updates (like scores and commentary) are generated and linked to matches. It is assumed that updates are automatically streamed to all users following the match.
   - Each update has a timestamp and is associated with only one match, ensuring accurate chronological updates per game.
6. **Chat Functionality**:
   - Chat functionality allows users to communicate during live match streaming. Each message is linked to both the sender and receiver for easy tracking of conversations.
   - It is assumed that chats are stored temporarily and may be purged after a certain time to manage storage efficiently.

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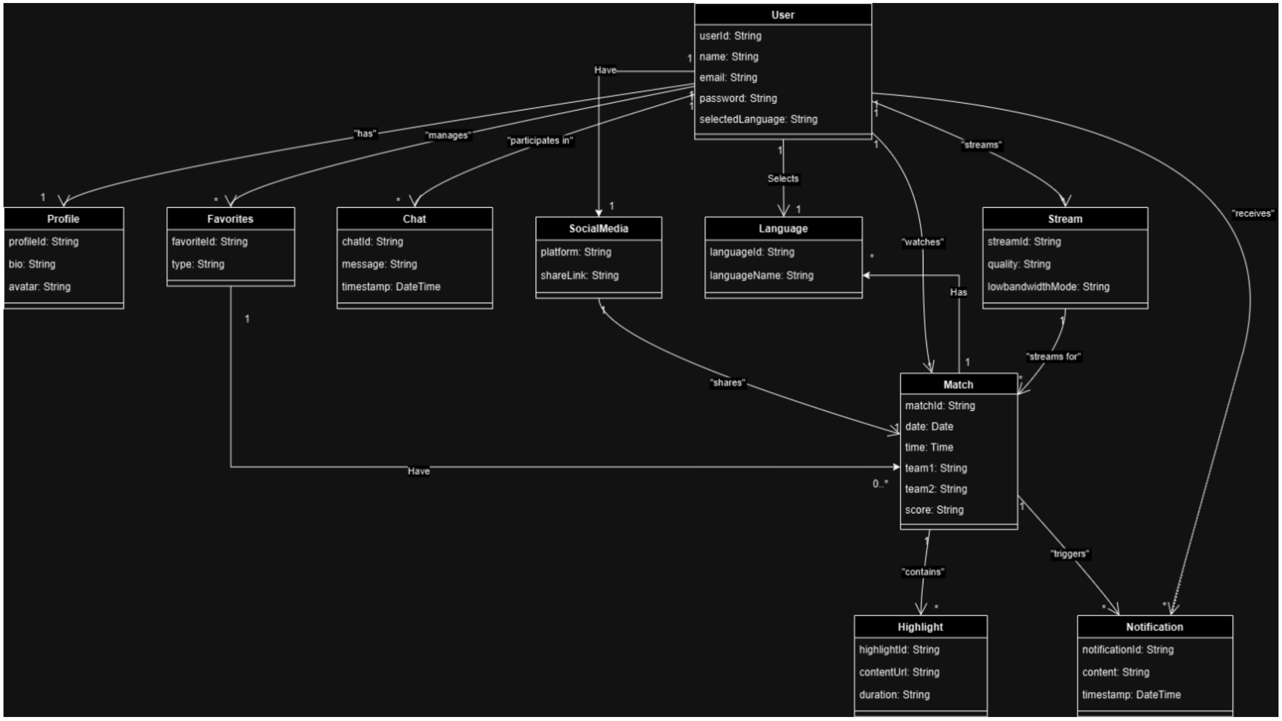
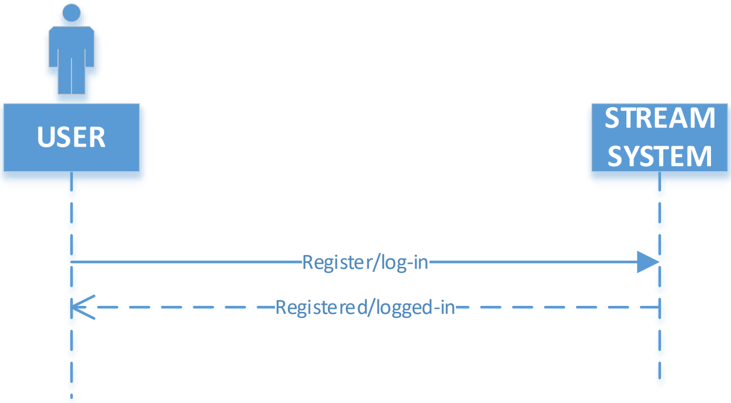
7. **Multiplicity Constraints**:
   - Multiplicities defined (e.g., one-to-many or many-to-many relationships) are based on the assumption of typical user interactions with the app. For instance, a user can have multiple favorites, but each favorite is associated with a single user.
   - Matches are assumed to always include exactly two teams, meaning each match entity links to two team entities without variation.

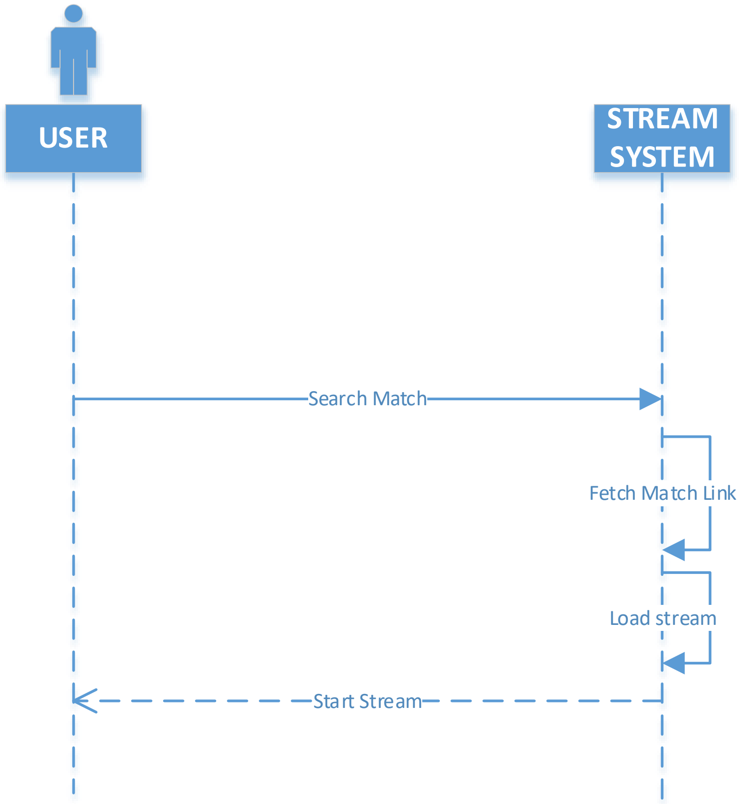


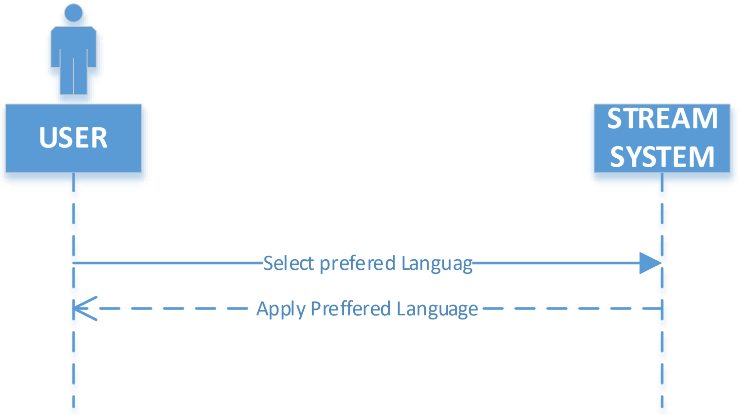
3. Behavioral Modeling (System Sequence Diagram & Activity Diagram):

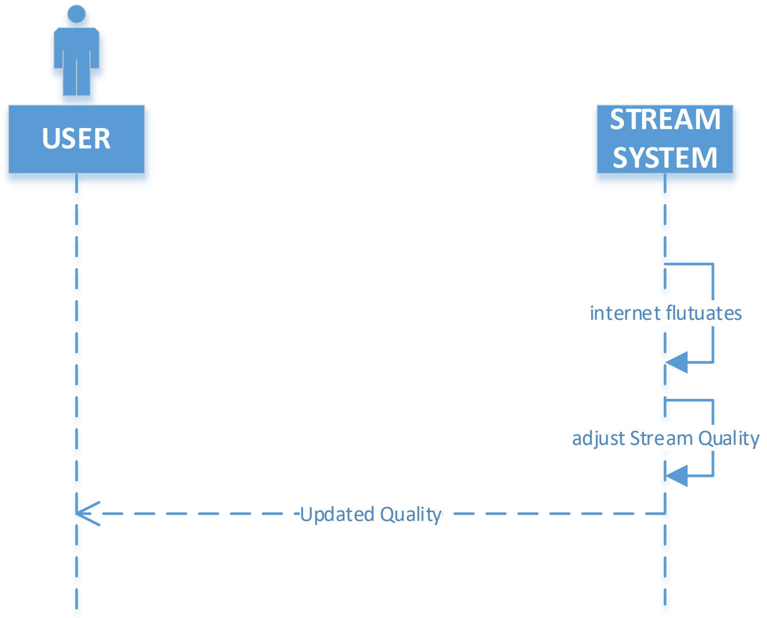
System Sequence Diagram (SSD):

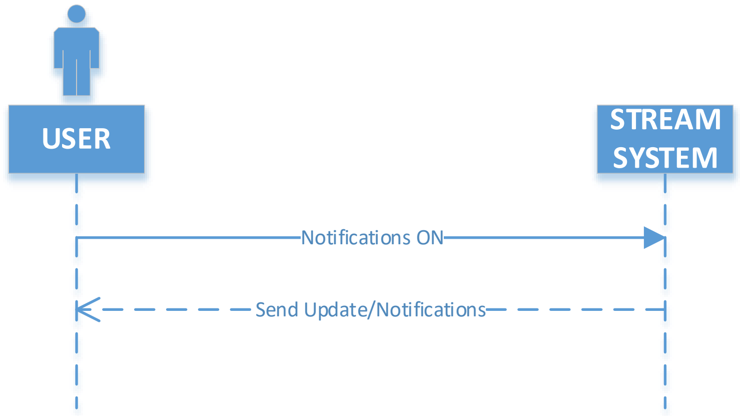
The SSD demonstrates how the *Soccer Live* system responds to user interactions. It shows the sequence of events when a user initiates actions like match streaming, including system responses for setting language preferences and adjusting streaming quality. This diagram focuses on capturing the interactions between the user and the system at each step in a single session.

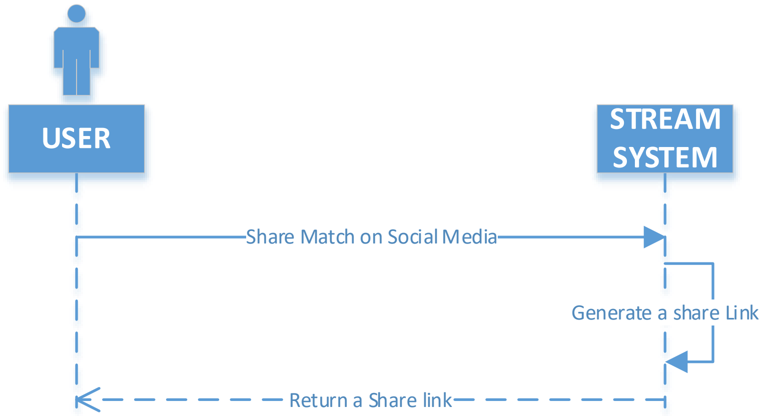



USER
STREAM SYSTEM
Search Match
Fetch Match Link
Load stream
Start Stream


USER
STREAM SYSTEM
Select prefered Languag
Apply Preffered Language

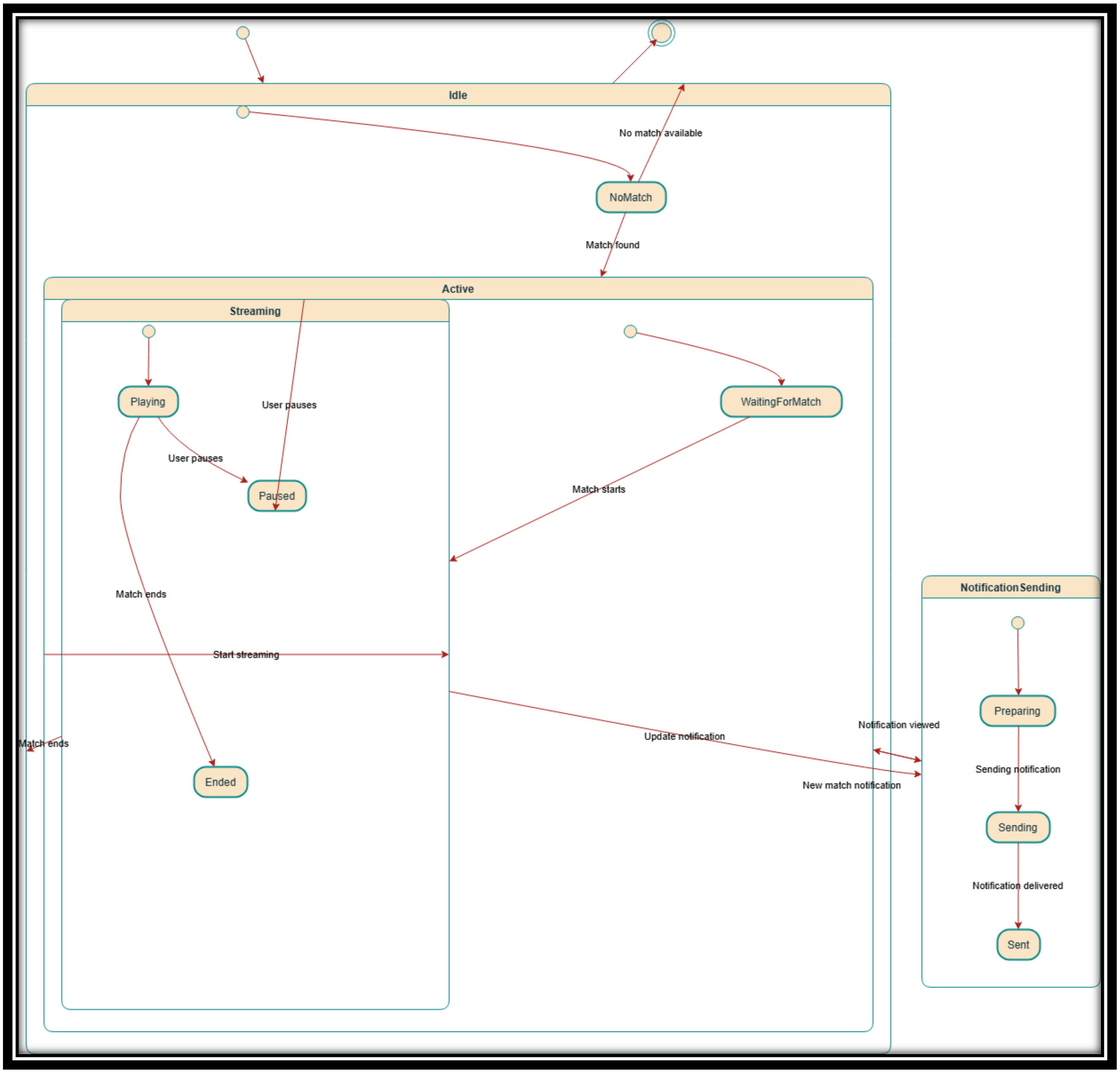






Activity Diagram:
This diagram provides an overview of the various activities involved in the user's interaction with the *Soccer Live* app. It likely outlines the process flow, including initial steps such as logging in or selecting a match, followed by user actions such as choosing language options or adjusting video quality, ending with viewing or closing the stream.

4. Behavioral Modeling (State Machines):



Assumptions:

1. User Availability: The user is actively using the app and has logged in before interacting with the system.
2. Network Connection: A stable internet connection is assumed for streaming matches and sending notifications.
3. Match Availability: Matches are scheduled and their information is available through the app's backend services.
4. Notification Service: The notification system is integrated and operational for delivering updates to users.
5. Language and Quality Services: Language preferences and quality adjustments are handled automatically without user interruption during streaming.
6. User Engagement: The user may pause the stream or interact with notifications during the match.
7. System Reliability: The app's backend services are assumed to be reliable, with minimal downtime for streaming and notifications.

Background Scenario:

The "Soccer Live" application provides a platform for football enthusiasts to watch live soccer matches seamlessly. The app addresses common issues faced by users, such as region restrictions and spam advertisements. It focuses on providing a smooth streaming experience, especially for users in Asia and Africa. The app also integrates notification services for match updates and allows users to select their preferred language for the commentary.

When a user opens the app, it initially checks for available matches. If no match is found, the app remains idle. Once a match is available, the user can begin streaming. The system handles transitions such as pausing, ending the stream, or sending notifications for live updates.

Pre-Conditions:

1. **System Pre-Conditions:**
   The app is successfully installed on the user’s device.
   The app’s backend services, including streaming and notification services, are operational.
   The database contains up-to-date match information.

2. **User Pre-Conditions:**
   The user is logged into the app with an active session.
   The user has enabled notifications for live updates.
   The user has an internet connection capable of streaming videos.

3. **Match Pre-Conditions:**
   At least one match is scheduled and available for streaming.
   The match data, including timing and teams, is synchronized with the app’s backend.

4. **Notification Pre-Conditions:**
   The notification service is configured to send alerts for new matches and updates.
   The user has not disabled notifications in the app settings.

5. **Streaming Pre-Conditions:**
   The streaming server is available and can handle incoming stream requests.
   The user’s device supports video playback without restrictions.

These assumptions, background scenario, and pre-conditions set the foundation for understanding the state diagram and how the system transitions between states.

5. Logical Models (Class Diagram):

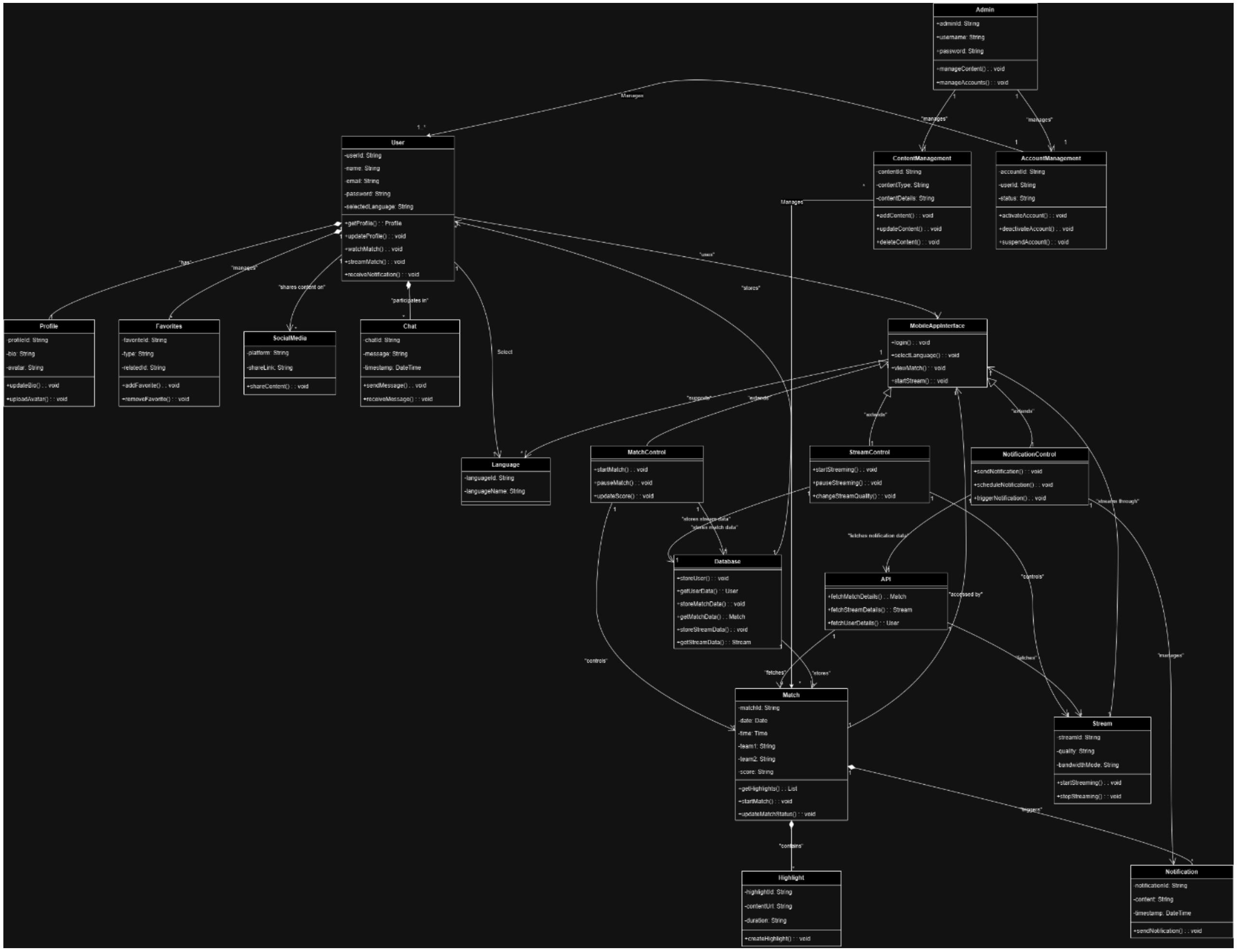
Here are some assumptions based on the provided class diagram. These will help to define the system's behavior and clarify the relationships and responsibilities of each class:

1. **User Registration and Profile Management**:
   - Users are required to register with unique userId, email, and password to access the platform.
   - Each user has a Profile containing information like bio and avatar, which they can manage independently.
   - Users select their preferred Language upon registration or in their settings, which customizes the interface language.
2. **Administrator Roles**:
   - Administrators have unique privileges, allowing them to manage system content, user accounts, matches.
   - Administrators can create, update, and delete content in ContentManagement,
   - Administrators are also responsible for activating, deactivating, or modifying user accounts, ensuring proper access control and account security.
3. **Match Streaming and Quality Control**:

- Users can stream live Match events through the system's streaming service, which offers different quality options (HD, SD, etc.) based on bandwidthMode.
- The StreamControl class handles the logic for stream quality adjustments, such as reducing quality in low-bandwidth mode, to optimize user experience.

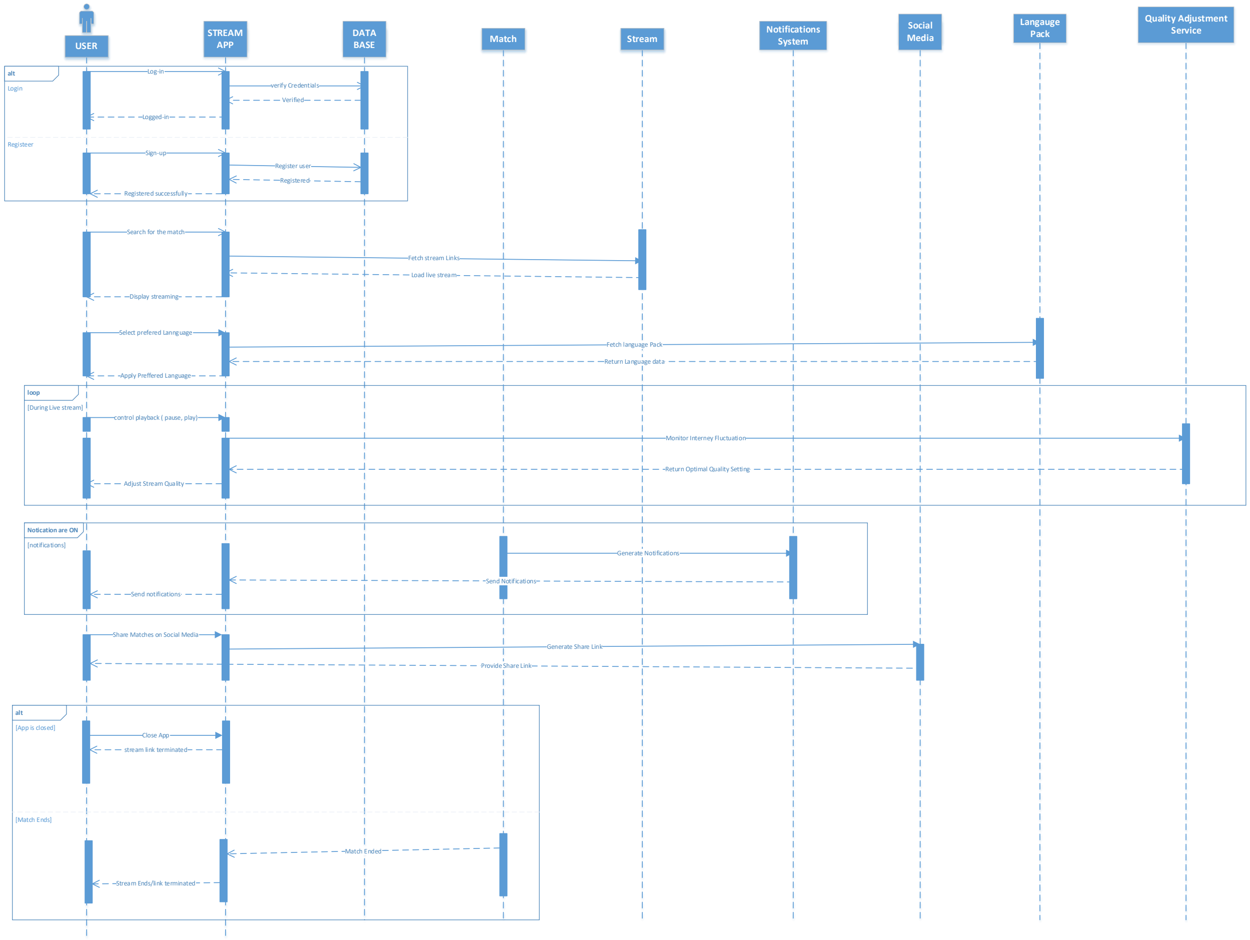
4. **Notifications**:
   - Notifications are generated for various events (e.g., match updates, upcoming matches, administrative announcements).
   - Users receive notifications related to matches they follow or important system updates. These notifications are stored with timestamps and can be marked as read or dismissed by users.
5. **Favorites and Highlights**:
   - Users can add matches, teams, or highlights to their Favorites for quick access, which are specific to the user and do not affect other users.
   - Each Match can contain multiple Highlights (e.g., goal replays), which users can view separately from the live stream.
6. **Data Storage and API Integration**:
   - A Database class is responsible for storing all user, match, and streaming data, ensuring data persistence and accessibility.
   - An external API class may be used to fetch data about matches or live statistics, extending the system's capabilities with third-party integrations.
7. **Language and Multi-Regional Support**:
   - The system supports multiple languages, which can be selected by users to enhance accessibility.
8. **Interface and Control Classes**:
   - The MobileAppInterface serves as the primary user interface, facilitating access to core features like match streaming, chat, and notifications.
   - Control classes (StreamControl, MatchControl, NotificationControl) handle the business logic, managing how users interact with matches, streams, and notifications.

These assumptions form the basis for system functionality, explaining how various classes and entities will interact and operate within the platform.



6. Logical Models (Sequence Diagram):

The SD offers a more detailed view of the processes depicted in the SSD. It elaborates on the order of operations and the flow of messages between different components of the *Soccer Live* system, illustrating how requests are processed, including user verification, media fetching, and quality adjustments during live streaming.



7. Operation Contracts:

1. Operation: Request Match Stream

Field	Details
Name	requestMatchStream()
Responsibility	Start streaming the selected match to the user.
Preconditions	User is logged in and the selected match is available for streaming.
Postconditions	- The match stream is initiated. - Stream data is sent to the user. - User receives a confirmation of the stream start.
Exceptions	- Match not available. - Network issues or connectivity problems. - User not authenticated. - Server overload or downtime.

2. Operation: Start Streaming Match

Field	Details
Name	startStreamingMatch()
Responsibility	Initiate the streaming of the selected match and provide stream

Field	Details
	data.
Preconditions	The requested match is ongoing and the streaming service is operational.
Postconditions	- Stream data is successfully fetched. - Video feed starts with a stable connection. - User receives a video playback interface.
Exceptions	- Match stream unavailable. - Server error or data retrieval failure. - Insufficient user permissions. - Stream quality issues.

3. Operation: Select Preferred Language

Field	Details
Name	selectPreferredLanguage()
Responsibility	Apply the user's preferred language to the match stream.
Preconditions	User has selected a preferred language from the available options.
Postconditions	- Language pack is successfully retrieved. - Stream audio is updated with the selected language. - User receives confirmation of language change.
Exceptions	- Language pack not found. - Invalid language selection by the user. - Language service unavailable. - Language update failure.

4. Operation: Low Bandwidth

Field	Details
Name	LowBandwidthConditions()
Responsibility	Continuously monitor network quality and adjust the stream quality accordingly.
Preconditions	User is actively streaming the match.
Postconditions	- Network quality is assessed periodically. - Optimal stream quality is determined and applied. - User experience is maintained with minimal interruptions.
Exceptions	- Network monitoring service failure. - Unstable network causing frequent fluctuations. - Quality adjustment fails. - User network disconnected.

5. Operation: Generate Live Update Notification

Field	Details
Name	generateLiveUpdate()
Responsibility	Create a live update notification for the ongoing match.
Preconditions	Match is in progress and updates are enabled for the user.
Postconditions	- Notification content is prepared. - User receives a live update notification. - Notification log is updated for tracking.
Exceptions	- Notification service failure. - User has disabled notifications. - Live update data unavailable. - Notification delivery error.

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6. Operation: Share Match on Social Media

Field	Details
Name	shareMatchOnSocialMedia()
Responsibility	Generate a shareable link for the current match and post it to the selected social media platform.
Preconditions	User has opted to share the match and social media integration is active.
Postconditions	- Shareable link is created. - User receives a confirmation of sharing. - Match details are posted to the selected platform.
Exceptions	- Social media service unavailable. - Invalid social media credentials. - Link generation failure. - Sharing action cancelled by user.

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7. Operation: Continue Watching Stream

Field	Details
Name	continueWatchingStream()
Responsibility	Allow the user to continue watching the match stream without interruption.
Preconditions	Stream is ongoing and the user has not exited the stream.
Postconditions	- User view session is maintained. - Stream data continues to flow without interruption. - Playback controls remain available to the user.

Field	Details
Exceptions	- Stream interrupted due to network issues. - User session expired or logged out. - Playback control error. - Stream server disconnected.