Section I:
Cover Page

Title: Sports Team Management System
Name: Luai Almaznai
GitHub Username: LuaiMaz

Section II:
Table of Contents

Table of Contents

Section III:
Project Description

The inception of the Sports Team Management System is motivated by the need to simplify and enhance the management of sports teams. The challenges in coordinating various aspects of team activities, such as communication, scheduling, and player well-being, prompted the development of a comprehensive solution. The overarching goal is to create a user-friendly platform that brings efficiency to coaches, players, and team caretakers.

At its core, the Sports Team Management System is envisioned as an accessible tool designed to facilitate seamless communication and streamline the complexities associated with managing sports teams. It acts as a central hub for coaches to organize schedules, monitor player performance, and keep track of team members, ensuring that everyone is on the same page.

Key features of the system include real-time performance tracking, simplifying the process of assessing player development during practices and games. The intuitive scheduling feature allows for easy planning of games and practices, reducing the likelihood of conflicts and enhancing overall coordination. Additionally, the system places a strong emphasis on injury tracking, aiding in the proper rehabilitation of players and ensuring their well-being before returning to play.

The uniqueness of the Sports Team Management System lies in its adaptability to various sports, offering a flexible solution that can cater to the needs of different athletic disciplines. This versatility distinguishes it from existing systems and addresses the diverse requirements of sports teams.

Existing software tools, such as TeamSnap and Microsoft Excel, could benefit significantly from the Sports Team Management System. TeamSnap, a popular team management tool, might find value in the advanced features like real-time performance tracking and enhanced injury management. Microsoft Excel users could leverage the centralized platform to streamline data organization and improve overall efficiency.

In conclusion, the Sports Team Management System emerges as a practical solution to the challenges faced by sports teams in coordination, communication, and performance tracking. Its unique features and adaptability make it a valuable asset for coaches, players, and team administrators, contributing to an improved sports management experience.

Section IV:
Functional Database Requirements

1. User:
    1.1. A user shall be able to register and create an account.
    1.2. A user shall have a profile with personal details.
    1.3. A user can be associated with multiple roles (e.g., coach, player, scheduler).
    1.4. A user shall have the capability to view and edit their team, player, and game-related information.

2. Player:
    2.1. A player shall be able to view their personal performance statistics.
    2.2. A player can request leave for unavailable periods (e.g., vacations, injuries).
    2.3. A player shall receive notifications for upcoming games and practices.

3. Coach:
    3.1. A coach shall be able to create and edit team schedules.
    3.2. A coach shall have access to real-time performance metrics for each player.
    3.3. A coach can assign specific training programs to individual players.

4. Team:
    4.1. A sports team shall have a centralized roster management system.
    4.2. A team shall be able to request changes to game schedules.
    4.3. A team shall have access to historical performance data for strategic planning.

5. Game:
    5.1. A game shall be scheduled with specific details like date, time, and location.
    5.2. A game shall have an attendance tracking feature for players.
    5.3. A game result shall be recorded and associated with individual player statistics.

6. Scheduler/Administrator:
    6.1. A scheduler shall be able to allocate referees for scheduled games.
    6.2. An administrator shall be able to generate reports on team performance.
    6.3. A scheduler shall have the ability to send notifications and announcements to teams.

7. Referee:
    7.1. A referee shall be able to access game details and team rosters before officiating.
    7.2. A referee can enter and submit game scores and any disciplinary actions.
    7.3. A referee shall have the ability to report any issues during a game.

8. Parent/Guardian:
    8.1. A parent/guardian shall receive notifications about their child's team activities.
    8.2. A parent/guardian shall have access to their child's game schedules and performance statistics.
    8.3. A parent/guardian shall be able to grant or deny permission for their child's participation in specific events.

9. Medical Staff:
    9.1. Medical staff shall have access to injury records and rehabilitation plans.
    9.2. Medical staff shall be notified of any new injuries and their severity.
    9.3. Medical staff can update player health information in the system.

10. System Administrator:
    10.1. The system administrator shall have the ability to add or remove users.
    10.2. The system administrator shall be responsible for system backups and data recovery.
    10.3. The system administrator shall monitor system performance and address technical issues.

11. Financial Officer:
    11.1. A financial officer shall be able to track team expenses and income.
    11.2. The financial officer shall generate financial reports for team budgeting.
    11.3. The financial officer shall have the ability to allocate funds for various team needs.

12. Fan/User Watching the Game:
    12.1. Fans shall be able to access live game scores and commentary.
    12.2. Fans shall have the option to receive notifications about upcoming games.
    12.3. Fans shall be able to purchase tickets or access streaming options for games.

13. Team Staff (e.g., manager, assistant coach):
    13.1. Team staff shall be able to update team news and announcements.
    13.2. Team staff shall have access to training schedules and plans.
    13.3. Team staff shall be able to communicate with players and coaches within the system.

14. Game Statistics Provider :
    14.1. A game statistics provider shall be able to integrate real-time statistics into the system.
    14.2. The provider shall ensure the accuracy and reliability of the statistical data.
    14.3. The system shall display statistics provided by the external provider alongside internal data.

15. Sports League Organizer :
    15.1. The organizer shall be able to manage multiple teams within the league.
    15.2. The organizer shall set up league-wide schedules and tournaments.
    15.3. The system shall provide a platform for inter-team communication within the league.

16. Team Captain:
    16.1. The team captain shall be able to submit the preferred lineup for upcoming games.
    16.2. The team captain shall have access to communication tools for coordinating team activities.
    16.3. The captain shall be able to request additional training sessions for the team.

17. Fan/User Interacting with Players:
    17.1. Fans shall have the option to send messages or shout-outs to players.
    17.2. Players shall receive notifications of fan interactions within the system.
    17.3. The system shall have a moderation feature to manage fan/player interactions.

18. Talent Scout/Recruiter:
    18.1. Talent scouts shall have access to player profiles and performance data.
    18.2. Scouts shall be able to mark potential recruits for further evaluation.
    18.3. The system shall facilitate communication between scouts and players for recruitment discussions.

19. Merchandise Manager:
    19.1. The merchandise manager shall manage an inventory of team merchandise.
    19.2. The manager shall update product listings and prices within the system.
    19.3. The system shall track sales and generate reports for merchandise performance.

20. Player Agent:
    20.1. Player agents shall have access to contract details and negotiations.
    20.2. Agents shall receive notifications of contract renewal or expiration.
    20.3. The system shall provide a secure platform for confidential communication between agents and players.

21. Fan/User Reviewing Games:
    21.1. Fans shall be able to leave reviews and ratings for past games.
    21.2. The system shall display aggregated fan reviews for each game.
    21.3. Fans shall have the option to provide constructive feedback to teams and players.

22. Social Media Manager:
    22.1. The social media manager shall have tools for integrating system updates into social media platforms.
    22.2. The manager shall track social media engagement related to team activities.
    22.3. The system shall provide shareable content for fans to promote team visibility

Section V:
Non-functional Database Requirements

Performance:

Response Time: The system shall provide a response time of less than 5 seconds for user interactions, ensuring a smooth and efficient user experience.

Concurrent User Support: The system should support a minimum of 100 concurrent users during peak usage times to handle simultaneous interactions.

Data Retrieval Speed: The database system shall efficiently retrieve player statistics and game schedules, with data retrieval times not exceeding 5 seconds.

Scoring Calculation: Real-time scoring calculations during live games shall be performed within 1 second to provide accurate and timely updates.

Reporting Generation: The system shall generate performance reports for teams and players within 10 seconds of the request.

Security:

User Authentication: User logins and access to sensitive information shall be protected through robust authentication mechanisms, ensuring secure access only to authorized users.

Data Encryption: All sensitive data, including player and coach information, shall be stored and transmitted using encryption algorithms to prevent unauthorized access.

Role-Based Access Control (RBAC): The system shall implement RBAC to ensure that users have access only to the information and functionalities relevant to their roles (e.g., player, coach, administrator).

Audit Trails: The system shall maintain detailed audit logs, recording user activities and modifications to critical data for accountability and traceability purposes.

Data Integrity: The database system shall enforce referential integrity constraints to maintain the consistency and accuracy of relational data.

Scalability:

Team Growth: The system should easily scale to accommodate the addition of new teams, players, and coaches without compromising performance.

Game Expansion: Scalability measures should allow for the inclusion of new games, tournaments, and events without causing a significant increase in response times.

User Base Increase: The system should be able to handle a 50% increase in user registrations and data entries without degradation in performance.

Data Storage Expansion: The database should support the addition of historical data for teams and players without affecting the system's responsiveness.

Concurrent Game Scheduling: The system shall scale to manage concurrent scheduling requests during peak times, such as tournament planning.

Capability:

Multi-Sport Support: The system should be capable of managing and supporting various sports seamlessly, allowing for the diverse needs of different athletic disciplines.

Integration with External Systems: The system shall integrate with external platforms, such as live scoring providers and social media, to enhance the overall user experience.

Mobile Accessibility: The system shall be accessible through mobile devices, ensuring flexibility for users to manage team activities on the go.

Real-Time Notifications: The capability to send real-time notifications to users for events like game updates, practice schedules, and injury reports.

Language Support: The system should provide multi-language support to cater to diverse user groups, supporting a global audience.

Environmental:

Sustainability: The system's infrastructure and operations should adhere to environmentally friendly practices, minimizing energy consumption and promoting sustainability.

Cross-Browser Compatibility: The system shall be compatible with major web browsers (e.g., Chrome, Firefox, Safari) to accommodate diverse user preferences.

Energy Efficiency: Servers and data storage facilities supporting the system should be designed for optimal energy efficiency, minimizing environmental impact.

Paperless Operations: The system shall promote paperless operations by providing electronic alternatives for tasks like team communication and document sharing.

Cloud Hosting: The system should explore cloud hosting options to leverage scalable resources and reduce physical infrastructure requirements.

Coding Standards:

Consistent Naming Conventions: The system's codebase shall adhere to consistent and clear naming conventions, enhancing code readability and maintainability.

Code Documentation: The codebase shall be thoroughly documented to provide insights into system functionality, aiding future development and troubleshooting.

Modular Design: The system's architecture shall follow a modular design approach, promoting code reusability and easier maintenance.

Error Handling: Robust error-handling mechanisms shall be implemented to gracefully manage unexpected scenarios and prevent system crashes.

Code Reviews: Regular code reviews shall be conducted to ensure compliance with coding standards, identify potential issues, and improve overall code quality.

Media Storage:

File Compression: Multimedia files (e.g., images, videos) shall be compressed to optimize storage space and enhance data retrieval speed.

Scalable Media Storage: The system shall employ scalable media storage solutions to accommodate the growing volume of multimedia content.

Metadata Management: Media files shall be accompanied by metadata, ensuring efficient organization, searchability, and retrieval.

Backup and Recovery: Regular backups of media content shall be performed to prevent data loss, and efficient recovery mechanisms shall be in place.

Streaming Optimization: For live game streaming, the system shall implement optimization techniques to ensure a smooth and uninterrupted viewing experience for users.

Privacy:

User Data Confidentiality: Personal information of users, including players and coaches, shall be kept confidential and accessible only to authorized personnel.

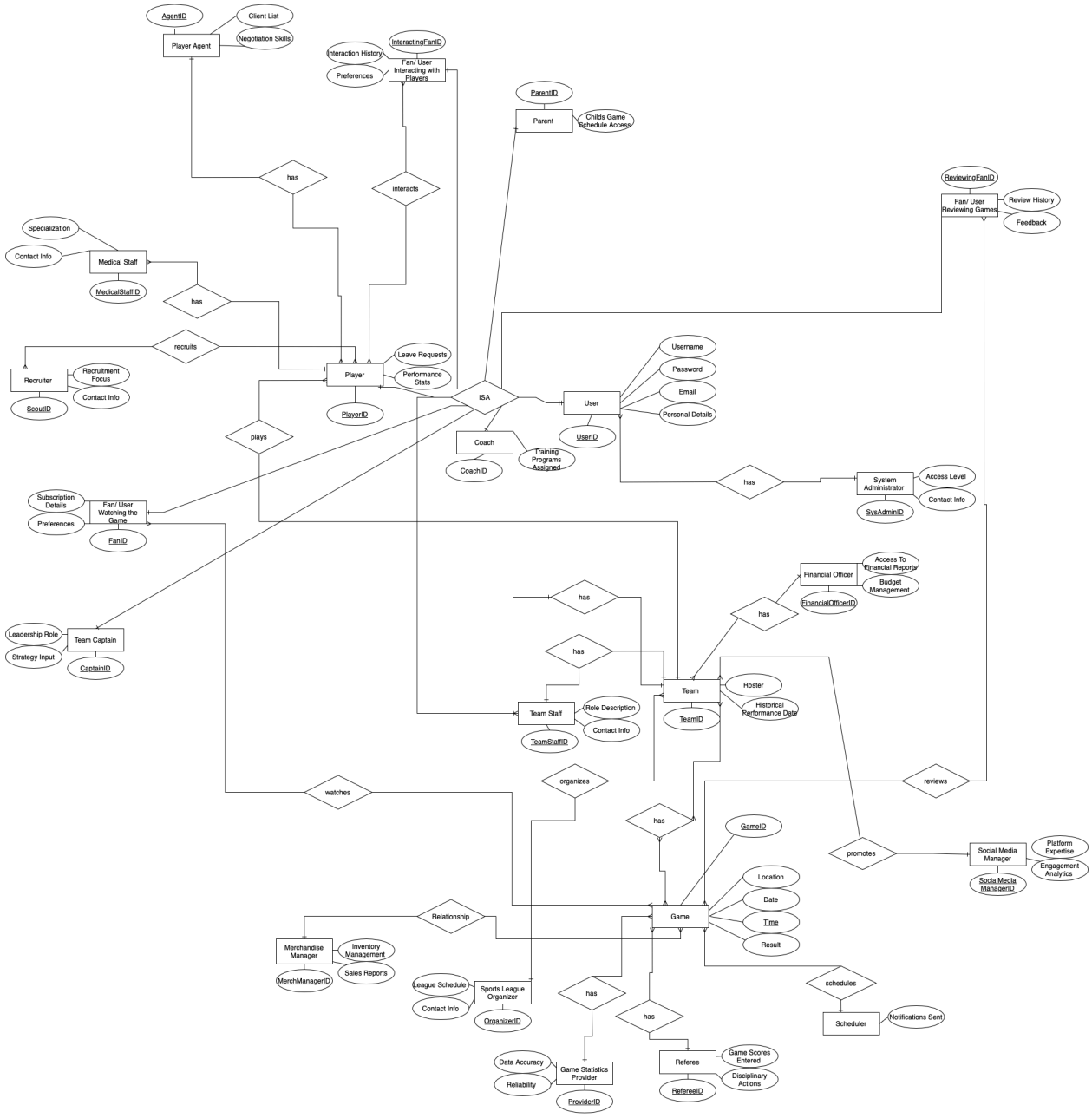
Consent Management: The system shall incorporate features to manage and track user consent for data processing and communication preferences.

Anonymous Data Handling: Non-identifiable data, such as aggregate performance statistics, shall be used for analytics and reporting to protect individual privacy.

Secure Communication: Communication channels within the system, including messaging and notifications, shall be encrypted to safeguard sensitive information.

Data Deletion: The system shall provide mechanisms for users to request and facilitate the deletion of their personal data in compliance with privacy regulations.

Section VI: Entity Relationship Diagram (ERD)



Section VII: Entity Description

1. **User (Strong)**

   - *UserID*: key, numeric

   - *Email*: simple, alphanumeric

   - *Roles*: multivalue, alphanumeric (e.g., coach, player, scheduler)

2. **Player (Strong)**

   - *PlayerID*: key, numeric

   - *PerformanceStatistics*: composite, numeric/alphanumeric (e.g., game scores, attendance)

   - *LeaveRequests*: multivalue, timestamp

3. **Coach (Strong)**

   - *CoachID*: key, numeric

   - *TeamSchedules*: composite, alphanumeric (details of team schedules)

   - *TrainingPrograms*: multivalue, alphanumeric

4. **Team (Strong)**

   - *TeamID*: key, numeric

   - *RosterManagementSystem*: composite, alphanumeric (details of players)

- *HistoricalPerformance*: multivalue, numeric

5. **Game (Strong)**

- *GameID*: key, numeric
- *ScheduleDetails*: composite, alphanumeric (date, time, location)
- *AttendanceTracking*: composite, numeric/alphanumeric (player attendance)

6. **Scheduler/Administrator (Strong)**

- *SchedulerID*: key, numeric
- *RefereeAllocation*: composite, alphanumeric (details of referees allocated)
- *Notifications*: multivalue, alphanumeric

d

7. **Referee (Strong)**

- *RefereeID*: key, numeric
- *GameDetailsAccess*: simple, boolean
- *ScoreSubmissions*: composite, numeric/alphanumeric

8. **Parent/Guardian (Strong)**

- *ParentID*: key, numeric
- *Notifications*: multivalue, alphanumeric (notifications received)

- *ChildPerformanceAccess*: simple, boolean

9. **Medical Staff (Strong)**

- *MedicalStaffID*: key, numeric
- *InjuryRecordsAccess*: simple, boolean
- *HealthUpdates*: composite, alphanumeric

10. **System Administrator (Strong)**

- *SysAdminID*: key, numeric
- *UserManagement*: composite, alphanumeric (add/remove users)
- *SystemMonitoring*: composite, alphanumeric (performance, issues)

11. **Financial Officer (Strong)**

- *FinancialOfficerID*: key, numeric
- *ExpenseTracking*: composite, numeric
- *FinancialReports*: composite, alphanumeric

12. **Fan/User Watching the Game (Strong)**

- *FanID*: key, numeric
- *LiveGameAccess*: composite, alphanumeric (scores, commentary)

- *Notifications*: multivalue, alphanumeric

13. **Team Staff (Strong)**
    - *TeamStaffID*: key, numeric
    - *TeamUpdates*: composite, alphanumeric (news, announcements)
    - *TrainingSchedules*: multivalue, timestamp

14. **Game Statistics Provider (Strong)**
    - *ProviderID*: key, numeric
    - *RealTimeStatsIntegration*: simple, boolean
    - *DataAccuracy*: simple, boolean

15. **Sports League Organizer (Strong)**
    - *OrganizerID*: key, numeric
    - *LeagueSchedules*: composite, alphanumeric (schedule details)
    - *TeamManagement*: composite, numeric (team IDs)

16. **Team Captain (Strong)**
    - *CaptainID*: key, numeric
    - *LineupSubmissions*: composite, alphanumeric (preferred lineup)

- *CommunicationToolsAccess*: simple, boolean

17. **Fan/User Interacting with Players (Strong)**
    - *InteractingFanID*: key, numeric
    - *Messages*: multivalue, alphanumeric
    - *ModerationFeatureAccess*: simple, boolean

18. **Talent Scout/Recruiter (Strong)**
    - *ScoutID*: key, numeric
    - *PlayerProfilesAccess*: simple, boolean
    - *PotentialRecruits*: multivalue, numeric (player IDs)

19. **Merchandise Manager (Strong)**
    - *MerchManagerID*: key, numeric
    - *InventoryManagement*: composite, alphanumeric (inventory details)
    - *SalesTracking*: composite, numeric (sales figures)

20. **Player Agent (Strong)**
    - *AgentID*: key, numeric
    - *ContractDetailsAccess*: simple, boolean

- *CommunicationPlatformAccess*: simple, boolean

21. **Fan/User Reviewing Games (Strong)**

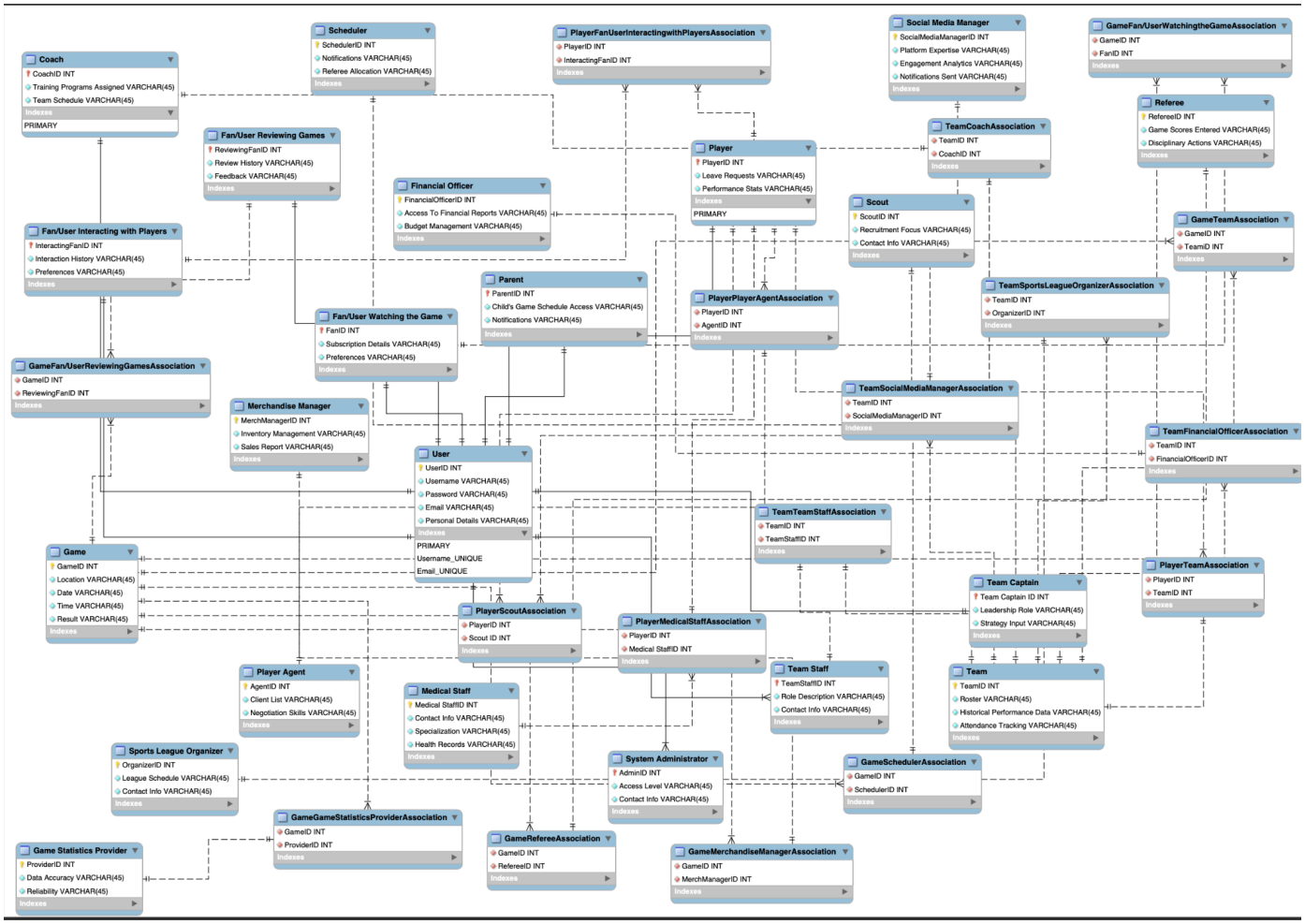
- *ReviewingFanID*: key, numeric
- *GameReviews*: multivalue, alphanumeric (reviews and ratings)
- *FeedbackSubmission*: simple, boolean

22. **Social Media Manager (Strong)

**

- *SocialMediaManagerID*: key, numeric
- *PlatformIntegration*: composite, alphanumeric (social media platforms)
- *EngagementTracking*: composite, numeric (engagement metrics)

Section VIII: Entity Establishment Relationship Diagram (EER)



Section IX: Constraints Description

Table	FK	ON DELETE	ON UPDATE	Comment
User	role	Set null	On cascade	If a role is deleted, the user that was holding that role can't be deleted because this user may hold more than one role.
Scheduler	None	None	None	No fk constraints
Coach	None	None	None	No fk constraints
Fan/User Interacting with Players	None	None	None	No fk constraints
Player	TeamID	Set null	On cascade	If a team is deleted, the player’s team association is set to NULL.
Fan/User Reviewing Games	None	None	None	No fk constraints
Fan/User Watching the Game	None	None	None	No fk constraints
Financial Officer	None	None	None	No fk constraints
Game	None	None	None	No fk

Statistics Provider				constraints
Medical Staff	None	None	None	No fk constraints
Parent	None	None	None	No fk constraints
Referee	None	None	None	No fk constraints
Player Agent	None	None	None	No fk constraints
Scout	None	None	None	No fk constraints
Social Media Manager	None	None	None	No fk constraints
Sports League Organizer	None	None	None	No fk constraints
System Administrator	None	None	None	No fk constraints
Team	CoachID	Set null	On cascade	If a coach is deleted, the team's coach association is set to NULL.
Team Captain	None	None	None	No fk constraints
Team Staff	None	None	None	No fk constraints
Merchandise Manager	None	None	None	No fk constraints
PlayerFanUser Interactingwith PlayersAssociation	PlayerID	On cascade	On cascade	If a player is deleted, the association with fans interacting with players is also

				deleted.
PlayerPlayerAgentAssociation	PlayerID	On cascade	On cascade	If a player is deleted, the association with the player's agent is also deleted.
PlayerMedicalStaffAssociation	PlayerID	On cascade	On cascade	If a player is deleted, the association with medical staff is also deleted.
PlayerScoutAssociation	PlayerID	On cascade	On cascade	If a player is deleted, the association with scouts is also deleted.
PlayerTeamAssociation	PlayerID	On cascade	On cascade	If a player is deleted, the association with the team is also deleted.
Game	TeamID	On cascade	On cascade	If a team is deleted or updated, all related game records are updated accordingly.
GameTeamAssociation	GameID	On cascade	On cascade	If a game is deleted, the association with the team is also deleted.

GameFan/UserWatchingtheGameAssociation	GameID	On cascade	On cascade	If a game is deleted, the association with fans watching the game is also deleted.
GameGameStatisticsProviderAssociation	GameID	On cascade	On cascade	If a game is deleted, the association with the statistics provider is also deleted.
GameMerchandiseManagerAssociation	GameID	On cascade	On cascade	If a game is deleted, the association with the merchandise manager is also deleted.
GameRefereeAssociation	GameID	On cascade	On cascade	If a game is deleted, the association with referees is also deleted.
GameSchedulerAssociation	GameID	On cascade	On cascade	If a game is deleted, the association with the scheduler is also deleted.
GameFan/UserReviewingGamesAssociation	GameID	On cascade	On cascade	If a game is deleted, the association with fans reviewing the game is also deleted.
TeamTeamStaffAssociation	TeamID	On cascade	On cascade	If a team is deleted, the

				association with team staff is also deleted.
TeamCoachAssociation	TeamID	On cascade	On cascade	If a team is deleted, the association with coaches is also deleted.
TeamSportsLeagueOrganizerAssociation	TeamID	On cascade	On cascade	If a team is deleted, the association with the league organizer is also deleted.
TeamSocialMediaManagerAssociation	TeamID	On cascade	On cascade	If a team is deleted, the association with social media managers is also deleted.
TeamFinancialOfficerAssociation	TeamID	On cascade	On cascade	If a team is deleted, the association with financial officers is also deleted.