EduTraker

1. Introduction

This document details the software requirements for EduTraker, a Software-as-a-Service (SaaS) platform designed to ensure educational continuity and administrative efficiency for institutions in crisis-affected regions. The platform aims to mitigate the disruptive impact of conflict on education by enhancing productivity, facilitating communication, and enabling data-driven decision-making. This SRS outlines the functional and non-functional requirements, future features, user stories, scenarios, task specifications, and testing considerations for the EduTraker system.

2. Functional Requirements

2.1. User Management

FR-UM-001: The system shall allow Super Admins to create and manage Workstream Managers. The system shall allow Workstream Managers to create and manage School Managers.
FR-UM-002: The system shall support role-based access control, ensuring users can only access functionalities and data relevant to their assigned role.
FR-UM-003: The system shall allow Secretaries to register new student accounts, capturing essential demographic and enrollment information.
FR-UM-004: The system shall allow Secretaries to register new guardian accounts and link them to specific student accounts.
FR-UM-005: The system shall allow Workstream Managers to create and manage multiple School entities within a Workstream.
FR-UM-006: The system shall allow School Managers to manage operational staff accounts (Teachers, Secretaries) within their assigned school.

2.2. Academic Progress Tracking

FR-APT-001: The system shall provide tools for teachers and guardians to record and assess individual student academic progress and core skills.
FR-APT-002: The system shall enable the identification of knowledge gaps for individual students based on recorded academic progress.
FR-APT-003: The system shall allow Teachers to assign grades to student assignments and exams.
FR-APT-004: The system shall provide personalized dashboards for Students to view their grades, assignments, and attendance.
FR-APT-005: The system shall allow Guardians to monitor their child's academic progress, including grades and assignment status.

FR-APT-006: The system shall allow Teachers to track and record student attendance for their classes.
FR-APT-007: The system shall allow Students to view their attendance records.
FR-APT-008: The system shall allow Guardians to view their child's attendance records.

2.3. Communication

FR-COM-001: The system shall facilitate communication between guardians, teachers, and support organizations.
FR-COM-002: The system shall enable Teachers to communicate with students, parents, and managers.
FR-COM-003: The system shall allow Guardians to communicate with their child's teachers.
FR-COM-004: The system shall provide a mechanism for sending updates and notifications on a student's educational and psychological status.
FR-COM-005: The system shall allow Guardians to receive notifications about their child's attendance, upcoming assignments, or important school announcements.
FR-COM-006: The system shall allow administrators to broadcast notifications to all user types regarding system updates, maintenance activities, or other important announcements.

2.4. Reporting and Analytics

FR-RA-001: The system shall provide clear insights for humanitarian and educational organizations by collecting data on student performance.
FR-RA-002: The system shall allow School Managers to view reports for their specific school, and Workstream Managers to view aggregated performance reports across all schools in their workstream.
FR-RA-003: The system shall allow Managers to monitor the activities and progress of different departments.
FR-RA-004: The system shall allow Managers to conduct staff evaluations (e.g., teacher performance).
FR-RA-005: The system shall allow Administrators to view high-level system analytics (e.g., active users, system performance).
FR-RA-006: The system shall allow Secretaries to generate basic administrative reports (e.g., student lists, attendance summaries).

2.5. Content Management

FR-CM-001: The system shall allow Teachers to create and manage lesson plans.
FR-CM-002: The system shall allow Teachers to upload subject content (e.g., notes, resources) for students.
FR-CM-003: The system shall allow Students to access subject content and learning materials uploaded by their teachers.

2.6. System Configuration

FR-SC-001: The system shall support cascading configurations: Super Admins set global defaults, while School Managers can configure school-specific settings (e.g., local time, bell schedules).

3. Non-Functional Requirements

3.1. Performance

NFR-PERF-001: The system shall display dashboard pages within 2 seconds for 95 % of requests under normal load (≤ 10000 concurrent users).
NFR-PERF-002: The system shall utilize caching mechanisms (e.g., Redis) to enhance data retrieval speed and overall performance.

3.2. Security

NFR-SEC-001: The system shall ensure secure communication and data transfer, particularly for sensitive student and personal information.
NFR-SEC-002: All data transfer shall occur over HTTPS (TLS 1.2 or higher), and all stored passwords shall use bcrypt hashing with ≥ 12 salt rounds.
NFR-SEC-003: The system shall manage user authentication and permissions, ensuring users can only access authorized data and actions.

3.3. Usability

NFR-USAB-001: The system shall feature a simple, intuitive, and lightweight React-based interface, designed for rapid adoption by users with minimal technical skills.
NFR-USAB-002: The system shall be highly accessible across various devices (web and mobile).
NFR-USAB-003: The system shall provide user-specific dashboards tailored to each role, summarizing relevant information.

3.4. Reliability

NFR-REL-001: System uptime shall be ≥ 99 % per calendar month, excluding scheduled maintenance.
NFR-REL-002: The Progressive Web App (PWA) frontend shall support offline functionality by caching data, allowing users to continue working without a constant internet connection.
NFR-REL-003: The PWA frontend shall synchronize locally stored data with the backend when a connection becomes available.

3.5. Maintainability

NFR-MAINT-001: The system shall be developed with a modern, layered architecture that separates concerns from the user interface to data storage.

3.6. Data Storage

NFR-DS-001: MySQL for primary relational data storage. The schema must support a multi-tenant hierarchy: Workstreams (1:N) -> Schools (1:N) -> Users.

NFR-DS-002: The system shall use a cloud-based storage solution for unstructured data and large files (Assignments, Reports, url for Media).

5. User Stories, Scenarios, and Task Specifications

This section provides detailed user stories, illustrative scenarios, and specific task specifications for each user role within the EduTraker platform, derived from the project proposal and further elaborated for clarity.

5.1. Admin

Key Features: User management, system configuration, high-level analytics, maintaining overall application health.

User Stories

- **US-Admin-001:** As an Admin, I want to create Workstream Managers and assign them to specific Workstreams so that responsibility is delegated.

  Acceptance Criteria

  1. Given I am logged in as Admin, when I go to User Management → Add User, I can pick a role from the predefined list (workstream , manager).
  2. On save, workstream/manager is created and appears in user list.

- **US-Admin-002:** As an Admin, I want to be able to modify existing user roles and permissions so that I can adjust access levels as needed.
- **US-Admin-003:** As an Admin, I want to be able to deactivate or delete user accounts so that I can manage user access and maintain system security.

  Acceptance Criteria

  1. Deactivated users can’t log in.
  2. System shows user as “Inactive”

- **US-Admin-004:** As an Admin, I want to view high-level system analytics (e.g., active users, system performance) so that I can monitor the overall health and usage of the platform.

Scenarios and Task Specifications

- **Scenario: New Workstream Onboarding**
    - **Task:** Create a new workstream account.
    - **Steps:**
        1. Admin logs into the EduTraker system.
        2. Navigates to the "Workstream Management" section.
        3. Clicks on "Add New Workstream " button.
        4. Configures Workstream (capacity ,Workstream's name , etc ..).
        5. Clicks "Save".
        6. Creates an account for user to be manager
        7. Selects "manager" as the role for this worksteam.
        8. Clicks "Save".
    - **Expected Outcome:** A new workstream account is created,connected with manager .

5.2. Workstream Manager

Key Features: School entity management, School Manager assignment, aggregated analytics across schools.

User Stories

US-WSManager-001: As a Workstream Manager, I want to create new School entities within my assigned Workstream so that I can organize educational activities and infrastructure.

Acceptance Criteria

- Given I am logged in as a Workstream Manager, when I go to School Management → Add School,
- I can enter school details (School Name, Location, Capacity).
- On save, the new School is created and appears in the Workstream's school list.

US-WSManager-002: As a Workstream Manager, I want to create School Manager accounts and assign them to specific schools so that each institution has operational leadership.

Acceptance Criteria

- I can select a specific School from my list.
- I can create a new user with the role "School Manager" linked to that School ID.
- The assigned School Manager receives credentials to access their specific school dashboard.

US-WSManager-003: As a Workstream Manager, I want to view aggregated performance reports across all schools in my workstream so that I can compare progress and identify struggling institutions.

Scenarios and Task Specifications Scenario: New School Setup

Task: Create a new School and assign a Principal (School Manager). **Steps:**

1. Workstream Manager logs into the EduTraker system.
2. Navigates to the "School Management" section.
3. Clicks on "Add New School" button.
4. Configures School details (School Name: "Hope Academy", Capacity: 500, etc.).
5. Clicks "Save".
6. Navigates to "User Management" or clicks "Assign Manager" on the new school card.
7. Enters details for the new School Manager (Name, Email).
8. Selects "School Manager" as the role.
9. Clicks "Save". **Expected Outcome:** A new School entity is created within the Workstream, and a School Manager account is active and legally linked to that specific school.

5.3. School Manager

Key Features: Academic performance reports, department monitoring, staff evaluations.

User Stories

- **US-Manager-001:** As a Manager, I want to view academic performance reports for students and departments so that I can assess educational outcomes.

  Acceptance Criteria

  1. A daily analysis will be displayed showing the student attendance rate for each class.

- **US-Manager-002:** As a School Manager, I want to monitor the activities and progress of different departments so that I can ensure operational efficiency.
- **US-Manager-003:** As a School Manager, I want to conduct staff evaluations (e.g., teacher performance) so that I can provide feedback and support professional development.

- **US-Manager-004 :** As a School Manager, I want to create Secretary and Teacher accounts linked to my school so that I can staff my specific institution.

Scenarios and Task Specifications

- **Scenario:** Create secretary/ teacher account
  - **Task:** create an secretary account for specific workstream.
  - **Steps:**
    1. Manager logs into the EduTraker system.
    2. Navigates to the "User Management " section.
    3. Selects " Add Secretary Account ".
    4. Add data of user .
    5. Clicks "Save".
  - **Expected Outcome:** Secretary Account added successfully

5.4. Teacher

Key Features: Lesson planning, attendance tracking, grading, communication with students/parents/manager.

User Stories

- **US-Teacher-001:** As a Teacher, I want to create and manage lesson plans so that I can organize my curriculum.
- **US-Teacher-002:** As a Teacher, I want to record student attendance for my classes so that I can track their presence.
- **US-Teacher-003:** As a Teacher, I want to assign grades to student assignments and exams so that I can assess their academic performance.
- **US-Teacher-004:** As a Teacher, I want to communicate with students, parents, and managers so that I can provide updates and address concerns.
- **US-Teacher-005:** As a Teacher, I want to upload subject content (e.g., notes, resources) for my students so that they can access learning materials.

Scenarios and Task Specifications

- **Scenario: Recording Daily Attendance**
  - **Task:** Mark attendance for a 5th-grade English class.
  - **Steps:**
    1. Teacher logs into the EduTraker system.
    2. Navigates to the "Attendance" module.
    3. Selects "5th Grade English" class and today's date.
    4. Marks each student as "Present", "Absent", or "Late".
    5. Clicks "Save Attendance".
  - **Expected Outcome:** Attendance records for the selected class and date are updated and visible in student/guardian portals.

5.5. Student

Key Features: Personalized dashboard for grades, assignments, attendance, subject content, and feedback.

User Stories

- **US-Student-001:** As a Student, I want to view my personalized dashboard so that I can see an overview of my academic progress.
- **US-Student-002:** As a Student, I want to view my grades for all subjects and assignments so that I can track my performance.
- **US-Student-003:** As a Student, I want to view my attendance records so that I can keep track of my presence in classes.
- **US-Student-004:** As a Student, I want to access subject content and learning materials uploaded by my teachers so that I can study effectively.
- **US-Student-005:** As a Student, I want to receive feedback on my assignments so that I can understand areas for improvement.

Scenarios and Task Specifications

- **Scenario: Checking Grades**
  - **Task:** View grades for the latest Math assignment.
  - **Steps:**
    1. Student logs into the EduTraker system.
    2. Navigates to the "Grades" section on their dashboard.
    3. Selects the "Math" subject.
    4. Locates the "Algebra Homework 1" assignment.
  - **Expected Outcome:** The student's score and any teacher feedback for "Algebra Homework 1" are displayed.

5.6. Guardian

Key Features: Monitors child’s academic progress, communicates with teachers, receives notifications, actively participates in their child's education.

User Stories

- **US-Guardian-001:** As a Guardian, I want to monitor my child's academic progress (grades, assignments) so that I can stay informed about their performance.
- **US-Guardian-002:** As a Guardian, I want to communicate with my child's teachers so that I can discuss their progress or concerns.
- **US-Guardian-003:** As a Guardian, I want to receive notifications about my child's attendance, upcoming assignments, or important school announcements so that I can stay updated.
- **US-Guardian-004:** As a Guardian, I want to view my child's attendance records so that I can track their presence in school.

Scenarios and Task Specifications

- **Scenario: Reviewing Child's Progress**
  - **Task:** Check child's latest grades and attendance.
  - **Steps:**
    1. Guardian logs into the EduTraker system.
    2. Navigates to their child's dedicated profile/dashboard.
    3. Reviews the summary of grades and attendance records.
  - **Expected Outcome:** The guardian sees an up-to-date overview of their child's academic performance and attendance.

5.7. Secretary

Key Features: Administrative support, student and guardian registration.

User Stories

- **US-Secretary-001:** As a Secretary, I want to register new students so that they can be enrolled in the system.
- **US-Secretary-002:** As a Secretary, I want to register new guardians and link them to their respective students so that they can monitor their child's progress.
- **US-Secretary-003:** As a Secretary, I want to manage student and guardian information (e.g., update contact details) so that records are kept current.
- **US-Secretary-004:** As a Secretary, I want to assist the manager with administrative tasks, such as generating basic reports or managing schedules.

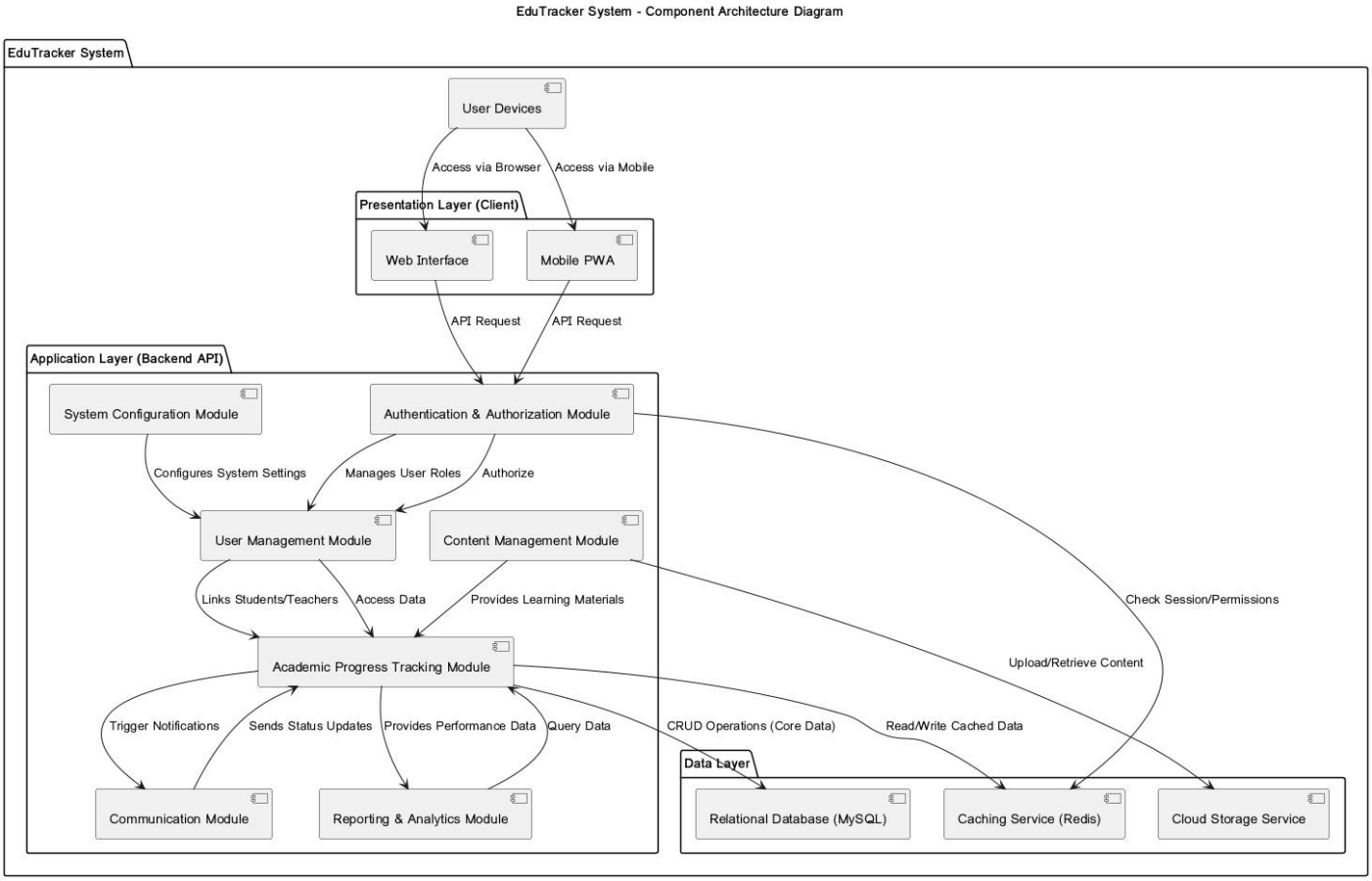
Scenarios and Task Specifications

- **Scenario: Registering a New Student**
  - **Task:** Enroll a new student.
  - **Steps:**
    1. Secretary logs into the EduTraker system.
    2. Navigates to the "Student Registration" module.
    3. Enters the new student's personal details, level, and enrollment date.
    4. Assigns the student to relevant guardians.
    5. Assigns the student to relevant classes.
    6. Clicks "Complete Registration".
  - **Expected Outcome:** A new student profile is created, and the student is enrolled in the system, linked with relevant guardian .

6. System Architicture

6.1. Architectural Overview (Component Diagram)

The system's internal structure is organized into three distinct layers: Presentation, Application, and Data. This separation ensures maintainability and allows for independent scaling of each layer.



Presentation Layer: This layer is the user interface, consisting of a Web Interface and a Mobile PWA (Progressive Web App). The PWA is a critical component, supporting offline functionality by caching data and synchronizing with the backend when a connection is

available (NFR-REL-002, NFR-REL-003). The interface is React-based, designed for simplicity and accessibility (NFR-USAB-001, NFR-USAB-002).

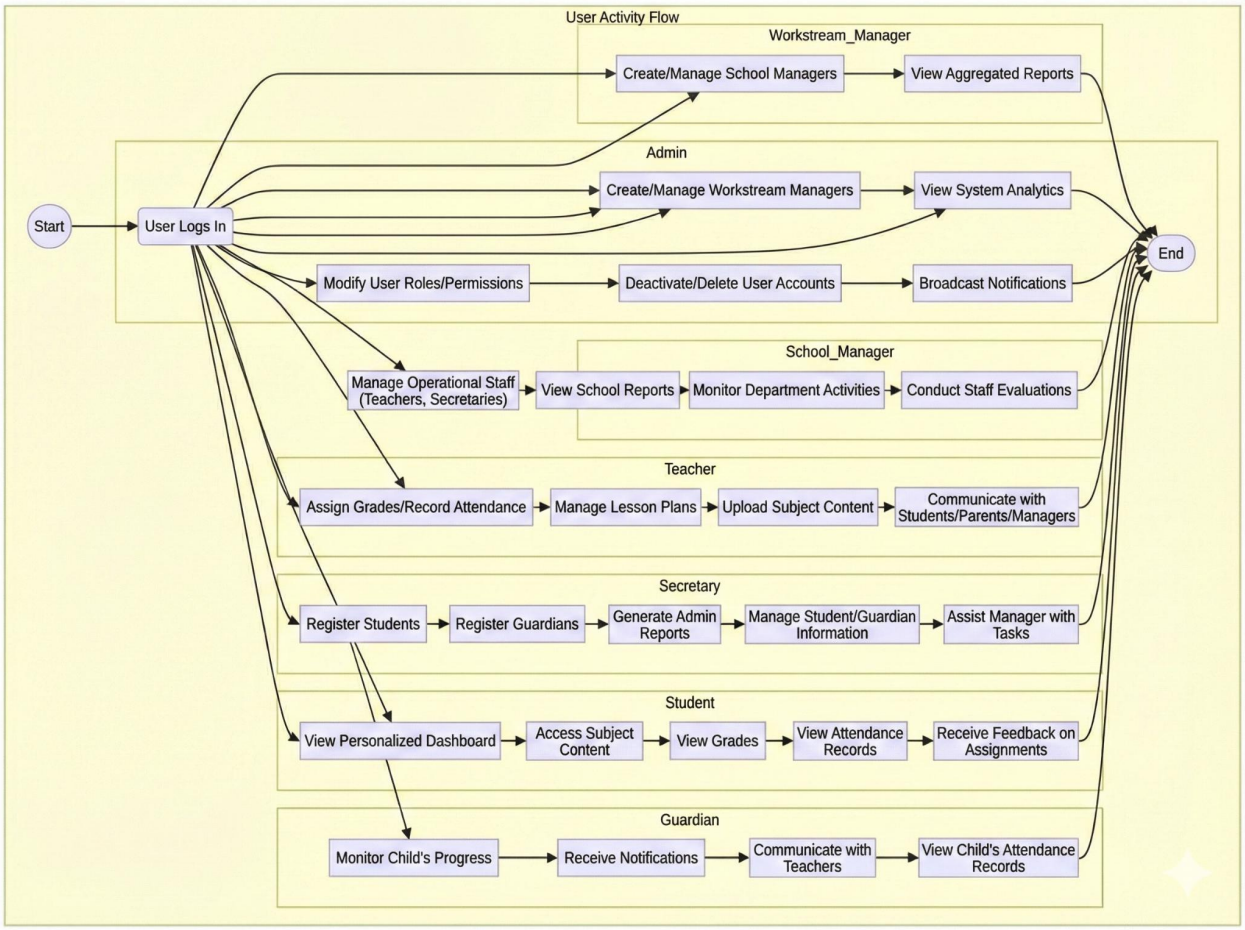
Application Layer (Backend API): This layer hosts the core business logic, implemented as a set of interconnected modules. Key modules include:

- **Authentication & Authorization Module:** Manages secure user access and role-based control (FR-UM-002, NFR-SEC-002).
- **Academic Progress Tracking Module:** Handles grading, attendance, and progress assessment (FR-APT-001 to FR-APT-008).
- **Reporting & Analytics Module:** Processes data for managers and administrators (FR-RA-001 to FR-RA-006).

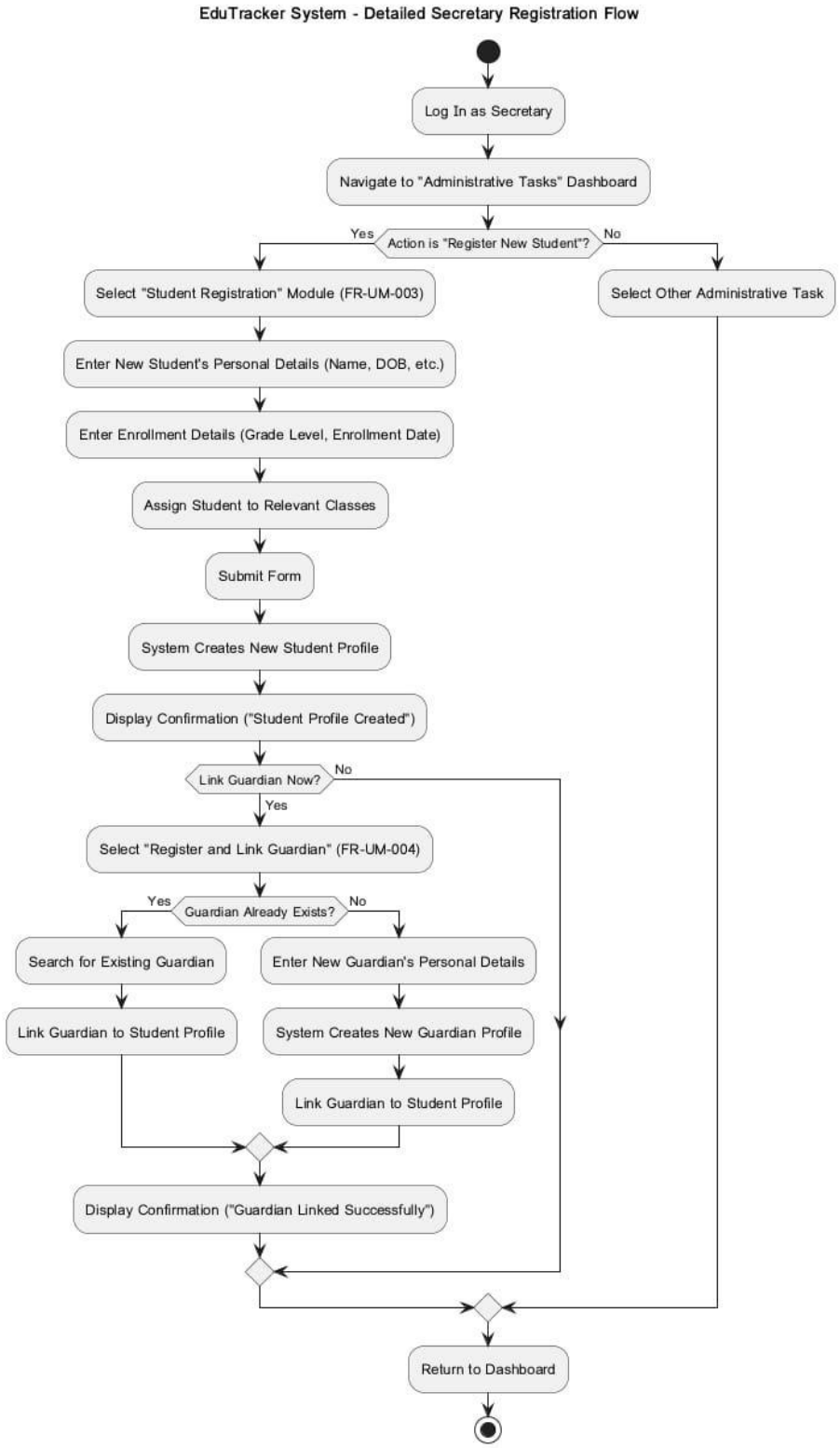
Data Layer: This layer manages all persistent storage and performance enhancements. It includes a **Caching Service (Redis)** for speed (NFR-PERF-002), a **Relational Database (MySQL)** for structured data (NFR-DS-001), and a **Cloud Storage Service** for unstructured files (NFR-DS-002).

6.2. User Activity Flow (Activity Diagram)

The activity diagram provides a high–level, comprehensive view of all possible user activities, organized by role.


User Activity Flow
Workstream_Manager
Create/Manage School Managers
View Aggregated Reports
Admin
Create/Manage Workstream Managers
View System Analytics
Start
User Logs In
End
Modify User Roles/Permissions
Deactivate/Delete User Accounts
Broadcast Notifications
School_Manager
Manage Operational Staff (Teachers, Secretaries)
View School Reports
Monitor Department Activities
Conduct Staff Evaluations
Teacher
Assign Grades/Record Attendance
Manage Lesson Plans
Upload Subject Content
Communicate with Students/Parents/Managers
Secretary
Register Students
Register Guardians
Generate Admin Reports
Manage Student/Guardian Information
Assist Manager with Tasks
Student
View Personalized Dashboard
Access Subject Content
View Grades
View Attendance Records
Receive Feedback on Assignments
Guardian
Monitor Child's Progress
Receive Notifications
Communicate with Teachers
View Child's Attendance Records

6.3. Student Registration Activity Flow (Activity Diagram)



7. Testing Plan

7.1. Test Objectives

- To verify that all functional requirements are implemented correctly and meet user expectations.
- To ensure the system's non-functional attributes (performance, security, usability, reliability, scalability, maintainability, accessibility) meet the defined standards.
- To identify and document any defects or deviations from the specified requirements.
- To confirm that the system operates correctly across all supported devices and network conditions.

7.2. Test Types

- **Unit Testing:** Individual components or modules of the software will be tested in isolation to ensure they function as designed.
- **Integration Testing:** Different modules or services will be combined and tested as a group to ensure they interact correctly.
- **System Testing:** The complete and integrated software system will be tested to evaluate its compliance with the specified requirements.
- **User Acceptance Testing (UAT):** End-users (e.g., Admins, Teachers, Students, Guardians, Secretaries) will test the system in a realistic environment to confirm it meets their business needs.
- **Performance Testing:** The system will be tested under various load conditions to assess its responsiveness, stability, and scalability.
- **Security Testing:** Vulnerability assessments and penetration testing will be conducted to identify and mitigate security risks.
- **Usability Testing:** User interfaces will be evaluated for ease of use, intuitiveness, and overall user experience.
- **Compatibility Testing:** The system will be tested across different browsers, operating systems, and devices to ensure consistent functionality.

7.3. Test Environment

Testing will be conducted in a dedicated environment that closely mirrors the production environment, including:

- **Hardware:** Cloud-based servers (AWS, Azure, or GCP) configured with Docker and Kubernetes.
- **Software:** Python with Django REST Framework, React.js frontend, MySQL database, Redis for caching.
- **Network:** Simulated varying internet connectivity conditions, including limited bandwidth.

- **Data:** A comprehensive set of test data, including various user roles, student records, academic data, and communication logs.

7.4. Test Cases and Procedures

Test cases will be derived from the functional requirements and user stories, detailing specific steps, expected results, and pass/fail criteria. The previously generated "EduTraker_User_Stories_and_Testing_Specifications.md" document will serve as a foundation for detailed test case development.

- **Example Test Case Structure:**
  - **Test Case ID:** TC-UM-001
  - **Requirement(s) Covered:** FR-UM-001, US-Admin-001
  - **Test Objective:** Verify that an Admin can successfully create a new Teacher account.
  - **Preconditions:** Admin user account exists and is logged in.
  - **Test Steps:**
    1. Navigate to User Management section.
    2. Click "Add New User".
    3. Select "Teacher" role.
    4. Enter valid Name, Email, and temporary Password.
    5. Click "Save".
  - **Expected Result:** A confirmation message is displayed, and the new Teacher account appears in the user list. The Teacher can log in with the provided credentials.
  - **Pass/Fail Criteria:** The new account is created, and the Teacher can successfully log in.