Software Requirements Specification

for

EMPTrack

Prepared by

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Contents

Revisions

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Draft Type and Number	Full Name	Information about the revision. This table does not need to be filled in whenever a document is touched, only when the version is being upgraded.	00/00/00

1 Introduction

<TO DO: Please provide a brief introduction to your project and a brief overview of what the reader will find in this section.>

1.1 Document Purpose

The Software Requirements Specification (SRS) document for EMPTrack – an Employee Management and Monitoring System – defines its functional and non-functional requirements. It provides a detailed overview of the system's features, scope, and intended functionality, ensuring that all stakeholders have a clear understanding of the expected deliverables. EMPTrack is a web-based application designed to help organizations efficiently manage and monitor their employees by offering key functionalities such as attendance tracking, task management, productivity assessment, and performance evaluation. The SRS outlines the system's core components while specifying the technical and user requirements necessary for its successful implementation.

This document covers the complete scope of EMPTrack, including user authentication, attendance tracking, task and project management, productivity analysis, performance reporting, and administrative controls. It also details the technology stack, security protocols, and compliance requirements essential for building a reliable and scalable system. By defining these aspects, the SRS ensures that the system meets organizational needs while maintaining security, efficiency, and user accessibility.

1.2 Product Scope

EMPTrack is an employee management and monitoring system that streamlines workforce management by automating attendance tracking, task management, productivity monitoring, and performance evaluation. It enhances efficiency, transparency, and workforce productivity while reducing manual workload and errors.

With a centralized dashboard, administrators can track employee activities, generate reports, and manage roles securely. Features like real-time tracking, automated reporting, and secure authentication ensure data security and support informed decision-making through insightful analytics, fostering a structured and efficient work environment.

1.3 Intended Audience and Document Overview

This document is intended for various stakeholders, including the client, developers, project managers, testers, and the professor overseeing the project. Each group will find relevant sections that cater to their specific interests and responsibilities.

- **Clients and Professors** will gain a comprehensive understanding of the system's purpose, features, and expected deliverables.
- **Developers** will use the functional and non-functional requirements to guide system design and implementation.
- **Project Managers** will reference this document to ensure project scope, objectives, and milestones are met.
- **Testers** will utilize the documented specifications to create test cases and validate system functionality.

The document is structured as follows:

- **Introduction**: Provides an overview of the system, including its purpose, scope, and intended audience.
- **Overall Description**: Explains the system's functions, user characteristics, and key constraints.
- **Specific Requirements**: Details functional, non-functional, and technical requirements.
- **System Features**: Lists the core features of the EMPTrack system.
- **Other Considerations**: Covers additional aspects such as security, compliance, and scalability.

1.4 Definitions, Acronyms and Abbreviations

Below is a list of key terms, acronyms, and abbreviations used in this document:

- **API** - Application Programming Interface
- **AWS** - Amazon Web Services
- **EMPTrack** - Employee Management and Monitoring System
- **HR** - Human Resources
- **JSON** - JavaScript Object Notation
- **OAuth** - Open Authorization (authentication protocol)
- **REST API** - Representational State Transfer Application Programming Interface
- **SRS** - Software Requirements Specification

- **SSO** - Single Sign-On
- **UI/UX** - User Interface/User Experience
- **Vercel** - Cloud platform for hosting web applications

1.5 Document Conventions

This document adheres to standard IEEE formatting guidelines for Software Requirements Specifications. The following conventions have been used throughout the document:

Formatting Conventions:

- The document uses **Arial** font with a size of **11 or 12** for readability.
- Section and subsection titles follow the numbering format specified in the template.
- Italics are used for comments or notes that require additional explanation.
- Document text is **single-spaced** with **1-inch margins** on all sides for consistency.

Naming Conventions:

- All acronyms are defined in **Section 1.4 Definitions, Acronyms, and Abbreviations**.
- System-related terms are capitalized, such as **EMPTrack**, **Admin Dashboard**, and **Authentication Module**.
- File names and database entities follow a structured naming format to ensure clarity and uniformity.

These conventions ensure that the document remains structured, consistent, and easy to navigate for all stakeholders.

1.6 References and Acknowledgments

This document refers to the following sources and supporting documents:

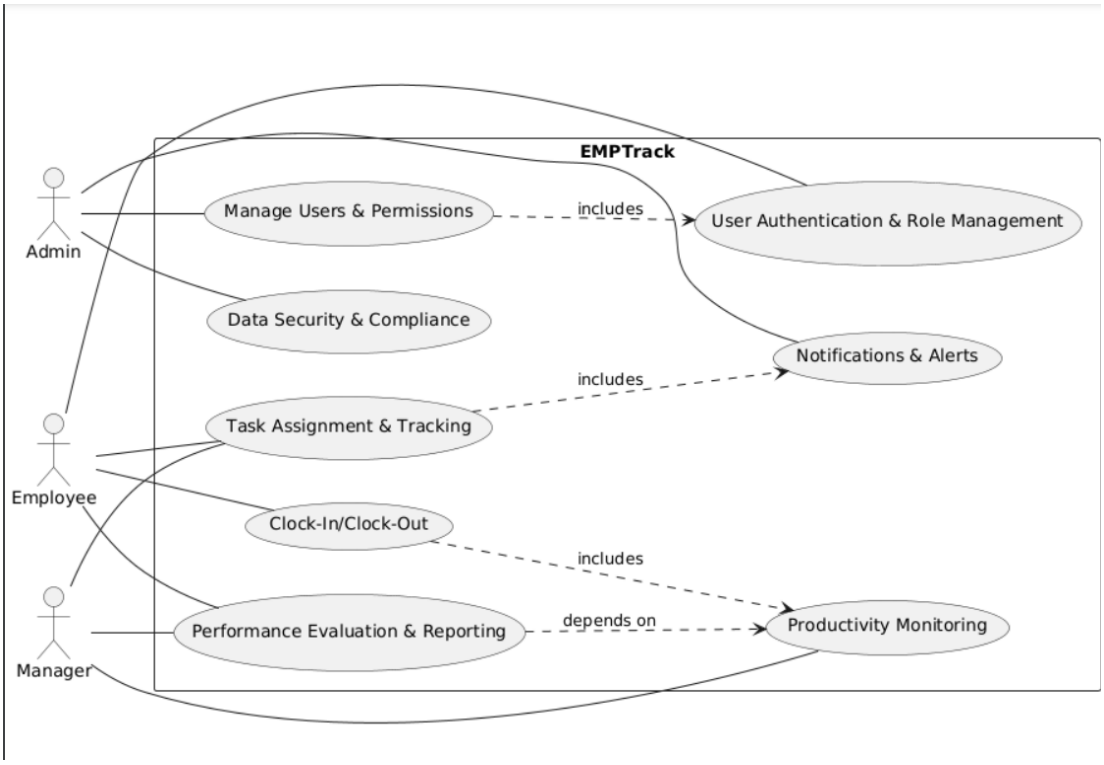
- *IEEE Standard for Software Requirements Specifications (IEEE 830-1998).*
- *EMPTrack Statement of Work (SOW) document.*
- *User Interface Design Guidelines.*
- *Database Schema Documentation.*
- *Relevant online resources and documentation for technologies used (React.js, Node.js, MongoDB, PostgreSQL, AWS, OAuth).*

2 Overall Description

2.1 Product Overview

EMPTrack is a newly developed, self-contained employee management and monitoring system. It is designed to enhance workforce efficiency by providing a structured and automated approach to tracking employee attendance, managing tasks, and evaluating productivity. Unlike traditional manual tracking methods, EMPTrack leverages web technologies to offer real-time insights, ensuring greater transparency and operational efficiency.

The system consists of multiple integrated components, including an authentication module, an admin dashboard, an employee portal, and a reporting system. These modules communicate through a secure backend, ensuring smooth data flow and accessibility.



2.2 Product Functionality

EMPTrack provides the following major functionalities:

- **User Authentication & Role Management**: Secure login for employees, managers, and admins with role-based access control.
- **Employee Attendance Tracking**: Clock-in/clock-out system with timestamps and location verification.

- **Task & Project Management**: Assign, update, and track tasks assigned to employees.
- **Productivity Monitoring**: Measure active and idle time to ensure optimal employee performance.
- **Performance Evaluation & Reports**: Generate detailed reports based on attendance and productivity metrics.
- **Admin Dashboard**: Manage employees, monitor tasks, and access key performance indicators (KPIs).
- **Notifications & Alerts**: Automated alerts for pending tasks, late attendance, or inactivity.
- **Data Privacy & Security**: Encrypted data storage and adherence to privacy regulations.
- **Scalability & Cloud Deployment**: Seamless scalability with cloud-based hosting and integration support.

2.3 Design and Implementation Constraints

The development of EMPTrack is subject to the following constraints:

- **Software Design Methodology**: The system must follow the **COMET method** for software design (COMET Method Reference).
- **Modelling Standards**: UML (Unified Modelling Language) must be used to create system diagrams and document the architecture (UML Reference).
- **Technology Stack**:
    - Frontend: React.js/Next.js
    - Backend: Node.js, Express.js
    - Database: MongoDB/PostgreSQL
    - Authentication: OAuth (Google/Microsoft SSO)
    - Hosting: AWS/Vercel
- **Hardware Limitations**:
    - The system should support cloud deployment with minimal hardware dependency.
    - It should be optimized for both desktop and mobile users.
- **Security Considerations**:
    - Data must be encrypted using industry-standard algorithms.

- Authentication and authorization must follow OAuth and role-based access control (RBAC).

- **Parallel Operations**:
  - The system should handle concurrent user requests efficiently without performance degradation.

2.4 Assumptions and Dependencies

The development and deployment of EMPTrack rely on the following assumptions and dependencies:

- **Assumptions:**
  - Users will have stable internet access to interact with the system.
  - The system will be deployed on cloud infrastructure with scalable resources.
  - All users will use modern web browsers that support JavaScript and HTML5.
  - Employees will clock in and out honestly without attempting to manipulate attendance records.
- **Dependencies:**
  - The system depends on third-party authentication providers (Google, Microsoft) for OAuth-based login.
  - Cloud hosting services (AWS/Vercel) must be available and operational.
  - External APIs for time-tracking and data analytics must function correctly.
  - Compliance with organizational security policies and data protection regulations.

3 Specific Requirements

3.1 External Interface Requirements

3.1.1 User Interfaces

Web-Based Dashboard

EMPTrack provides a **web-based dashboard** that allows users to interact with the system through a responsive and intuitive UI. The interface is accessible via standard web browsers and is optimized for both desktop and mobile use.

- **Employee Dashboard**: Displays personal attendance records, assigned tasks, and performance statistics.
- **Manager/Admin Panel**: Provides tools for tracking employee performance, task assignments, and generating reports.
- **Notifications & Alerts**: Displays real-time updates on task deadlines, attendance status, and important announcements.
- **Reports & Analytics**: Graphical representations of productivity trends, attendance summaries, and task progress..

3.1.2 Hardware Interfaces

EMPTrack interacts with various hardware devices to facilitate data collection and user authentication. The primary hardware interfaces include:

- **Computer Systems**: Desktop and laptop devices used for accessing the web-based application.
- **Mobile Devices**: Smartphones and tablets for remote access to attendance tracking and task management.
- **Biometric Devices**: Fingerprint scanners and facial recognition cameras for employee authentication.
- **RFID Card Readers**: Used for clock-in/clock-out functionality via employee ID cards.
- **Barcode Scanners**: Integrated for attendance and task tracking where applicable.
- **Cloud Servers**: Hosting the backend database and application logic to ensure smooth operations.

Each of these devices communicates with EMPTrack through secure web-based protocols, ensuring accurate data retrieval and system interactions.

3.1.3 Software Interfaces

EMPTrack interacts with various software components to ensure seamless operations. The key software interfaces include:

- **Mobile Application**: A companion app that allows employees to track attendance, receive notifications, and update task statuses remotely.

- **Authentication Services**: Integration with OAuth providers (Google, Microsoft) for secure login.
- **Database Management Systems**: Utilization of MongoDB/PostgreSQL for data storage and retrieval.
- **Cloud Hosting Platforms**: Integration with AWS/Vercel for deployment and scalability.
- **REST APIs**: Standardized endpoints for data exchange between the frontend and backend systems.

3.2 Functional Requirements

The functional requirements of EMPTrack specify the system's expected behaviors and capabilities. These include:

- **User Authentication & Authorization**
  - Secure login/logout system with role-based access control.
  - Multi-factor authentication (MFA) support.
- **Attendance Tracking**
  - Clock-in/clock-out functionality via web or biometric device.
  - Real-time attendance monitoring and logging.
- **Task & Project Management**
  - Assign and track tasks with deadlines and progress updates.
  - Task notifications and reminders for employees.
- **Productivity Monitoring**
  - Track active/idle time for employees.
  - Generate real-time performance insights.
- **Reporting & Analytics**
  - Generate detailed reports on attendance and productivity.
  - Export reports in multiple formats (CSV, PDF, Excel).

3.2.1 Use Case #1 Employee Clock-In and Clock-Out (U1)

TO DO: Provide a specification for each use case diagram

Author – Identify team member who wrote this use case

Purpose - Allows employees to record their work hours by clocking in and ou

Requirements Traceability – Linked to attendance tracking requirments

Priority - High

Preconditions –

- Employee must have valid login credentials.
- The system must be online and operational.

Post conditions –

- Employee clock-in/clock-out time is recorded.
- Attendance reports are updated.

Actors – Employee, System

Extends – None

Flow of Events

1. **Basic Flow**:
    - Employee logs into the system.
    - Navigates to the clock-in page.
    - Clicks the “Clock-In” button.
    - System records the timestamp.
    - At the end of the shift, the employee clicks “Clock-Out.”
    - System updates attendance records.
2. **Alternative Flow**:
    - If biometric authentication is enabled, the employee uses a fingerprint scanner or facial recognition instead of manually clicking buttons.
3. **Exceptions**:

- System offline: Employee cannot clock in/out.
- Invalid credentials: Employee cannot access the clock-in system.

Includes: Authentication Use Case (U2)

Notes/Issues – Ensure time entries are not duplicated

4 Other Non-functional Requirements

4.1 Performance Requirements

The following performance requirements define the expected efficiency and responsiveness of the EMPTrack system:

P1. User Authentication Response Time:

- The system must authenticate users within **2 seconds** of entering valid credentials.

P2. Attendance Tracking Accuracy:

- Clock-in and clock-out timestamps must be recorded with a precision of **±1 second**.

P3. Task Assignment Processing Time:

- Tasks assigned to employees must be updated and reflected in the system within **3 seconds** of submission.

P4. Report Generation Time:

- Attendance and productivity reports must be generated within **5 seconds** for standard queries and **10 seconds** for complex queries with large datasets.

P5. System Uptime Requirement:

- The system must maintain **99.9% uptime**, ensuring continuous availability for users.

P6. Concurrent User Handling:

- The system should be able to support **at least 500 concurrent users** without significant performance degradation.

P7. Notification and Alert Latency:

- Alerts and notifications for attendance issues or pending tasks should be sent within **2 seconds** of triggering the event.

4.2 Safety and Security Requirements

The following safety and security requirements define the necessary safeguards to protect data, prevent unauthorized access, and ensure secure system operations:

S1. Data Encryption:

- All sensitive employee data, including login credentials and attendance records, must be encrypted using **AES-256** encryption.

S2. Secure Authentication:

- The system must implement **OAuth-based authentication** with support for **multi-factor authentication (MFA)**.

S3. Role-Based Access Control (RBAC):

- Users should have access only to functionalities relevant to their role (Employee, Manager, Admin).

S4. Secure Mobile Access:

- The mobile companion app must use **SSL/TLS encryption** for all data transmissions.

S5. Automatic Session Timeout:

- Users must be logged out after **10 minutes** of inactivity.

S6. Audit Logging:

- The system must maintain logs of all user activities, including logins, task updates, and report generation.

S7. Compliance with Data Protection Regulations:

- EMPTrack must comply with **GDPR** and **ISO 27001** security standards.

S8. Intrusion Detection and Prevention:

- The system should implement automated security measures to detect and block suspicious activities.

4.3 Software Quality Attributes

The following quality attributes define essential characteristics of EMPTrack, ensuring a robust and efficient system:

4.3.1 Reliability

- The system must ensure **99.9% uptime**, minimizing downtime to prevent disruption of employee management processes.
- Automated error handling mechanisms will be in place to detect failures and restart critical services within **5 seconds**.
- Redundant database storage with scheduled backups will ensure data integrity in case of failures.

4.3.2 Maintainability

- EMPTrack will follow a **modular architecture**, ensuring that updates or fixes can be applied without affecting the entire system.
- Clear documentation and well-structured code will support easy debugging and future enhancements.
- Logging and monitoring tools will track system performance, making issue diagnosis straightforward.

4.3.3 Usability

- The user interface will be designed with **intuitive navigation**, ensuring that employees and managers can perform tasks with minimal training.
- Accessibility standards (WCAG 2.1) will be followed to ensure usability for all users, including those with disabilities.
- The system will provide **real-time feedback** and error messages to guide users effectively.

4.3.4 Scalability

- The system will support up to **1000 concurrent users** with efficient resource allocation.
- Cloud-based infrastructure (AWS/Vercel) will enable dynamic scaling based on workload demand.
- Load balancing will be implemented to distribute traffic evenly, ensuring smooth system performance

5 Other Requirements

5.1 Database Requirements

- *The system will use **PostgreSQL** or **MongoDB** for structured and unstructured data management.*
- *Database queries should be optimized to ensure **query execution within 2 seconds** for standard operations.*
- *The system must support **automated daily backups** to prevent data loss.*

5.2 Internationalization Requirements

- *The system must support multiple languages, including **English, Spanish, and French**, with dynamic language switching.*
- *All date and currency formats must adapt based on the user's location settings.*

5.3 Legal and Compliance Requirements

- *The system must comply with **GDPR** regulations for handling employee data.*
- *All stored employee records must follow **ISO 27001** security protocols.*
- *The system should include an **audit trail** to maintain accountability and transparency.*

5.4 Reusability and Extensibility

- *The system should support **modular plugin-based architecture**, allowing easy integration of future enhancements.*
- *APIs should be designed following **RESTful principles** to facilitate external system integrations.*

These additional requirements ensure that EMPTrack remains compliant, efficient, and adaptable to evolving business needs.

Appendix A – Data Dictionary

<Data dictionary is used to track all the different variables, states and functional requirements that you described in your document. Make sure to include the complete list of all constants, state variables (and their possible states), inputs and outputs in a table. In the table, include the description of these items as well as all related operations and requirements.>

Appendix B - Group Log

<Please include here all the minutes from your group meetings, your group activities, and any other relevant information that will assist in determining the effort put forth to produce this document>