SOFTWARE REQUIREMENTS SPECIFICATION

FOR

DataPulse

Data Driven Business Solution Software

Version 1.0 Approved

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CSE 417 - Software Engineering & Design Pattern

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1. Introduction

1.1 Purpose

DataPulse is a software tool designed to help businesses understand their data better. It allows companies to collect, organize, and analyze their business information in one place. With this tool, businesses can track their performance, identify patterns, and predict future trends. This helps them make smarter decisions based on real data instead of guessing.

The main goal of this document is to explain everything needed to build **DataPulse**. It describes:

- ✔ **What the software should do** (functional requirements)
- ✔ **How well it should perform** (non-functional requirements)
- ✔ **How different parts of the system will work together** (system interactions)
- ✔ **Who will use it and what they can do** (user roles)
- ✔ **Which other tools or systems it needs to work with** (external dependencies)

This document acts as a guide for developers, designers, and business stakeholders to ensure that DataPulse is built correctly and meets the needs of its users.

1.2 Intended Audience

This document is meant for different types of people who will use, build, or invest in DataPulse. Each group has a different reason for reading it:

✔ Business Owners & Managers

They want to know how DataPulse can help their business. This document explains the features and benefits of the software, helping them decide if it's useful for their company.

✔ Software Developers

These are the people who will create the software. The document provides technical details about how the system should work so that developers can build it correctly.

✔ Quality Assurance (QA) Teams

Their job is to check if the software works as expected. This document helps them understand what to test and how to make sure the final product meets all requirements.

✔ **Investors & Stakeholders**

These are people who may provide funding or have a business interest in DataPulse. They use this document to understand if the project is realistic, profitable, and worth investing in.

1.3 Intended Use

DataPulse will help businesses:

- ✔ Securely store and manage business data.
- ✔ Analyze data to generate useful insights.
- ✔ Display reports and visualizations through dashboards.
- ✔ Use AI-powered forecasting for business growth predictions.
- ✔ Integrate with existing enterprise systems (ERP, CRM, etc.).

1.4 Product Scope

DataPulse is a **cloud-based software solution**, with a future mobile extension, offering:

i. **Real-time business data management –** DataPulse helps businesses collect, store, and manage their data instantly. This means users can see updates as they happen, without any delay.

ii. **Customizable dashboards for reporting and visualization –** Users can create their own dashboards to display important business information in an easy-to-understand way, using charts, graphs, and reports. They can choose what data to see and how it looks.

iii. **AI-driven business trend forecasting –** The software uses Artificial Intelligence to study past business data and predict future trends. This helps companies make better decisions based on expected changes.

iv. **Seamless integration with external business applications –** DataPulse can easily connect with other business tools and software, allowing users to share data between different platforms without extra work.

1.5 Definitions and Acronyms

- **ERP (Enterprise Resource Planning)** - Software that manages core business processes.

- **CRM (Customer Relationship Management)** - Software for managing customer interactions.
- **AI (Artificial Intelligence)** - Technology that helps analyze and predict business trends.
- **GDPR (General Data Protection Regulation)** - Data privacy and security regulations.
- **RBAC (Role-Based Access Control)** - A security mechanism restricting access based on user roles.

1.6 Assumptions and Constraints

i. Businesses will have **existing structured data sources** (databases, Excel, APIs).
ii. The system will be **cloud-hosted** and require internet access for most features.
iii. Compliance with **data protection laws (GDPR, CCPA)** is required.

2. Overall Description

2.1 Product Perspective

DataPulse is an independent business intelligence software that helps companies make sense of their data. While it works on its own, it can also connect with other business tools like accounting software, inventory systems, and customer management platforms.

The software is built using a **modular approach**, meaning businesses can add or customize features based on their needs. This makes DataPulse flexible and adaptable as companies grow or require new functions.

2.2 Product Features

★ **Data Entry & Management** → Businesses can safely input, store, and retrieve their data without worrying about loss or unauthorized access.

★ **Data Analysis & Insights** → The software uses AI to examine data, find patterns, and predict future trends to help businesses make informed decisions.

★ **Visualization & Reporting** → Users can view data through interactive charts, reports, and dashboards to track key business performance indicators (KPIs).

★ **Integration Capabilities** → DataPulse can connect with external business tools like **Enterprise Resource Planning (ERP) systems, Customer Relationship Management (CRM) software, and cloud storage services** for seamless data flow.

2.3 User Classes and Characteristics

Different types of users will interact with **DataPulse**, each with their own needs:

- **Business Owners** - Need an overview of their company's financial health and daily operations to make strategic decisions.
- **Managers & Executives** - Use the platform to analyze performance trends, improve efficiency, and plan future strategies.
- **Data Analysts** - Require detailed reports, charts, and predictive insights to understand trends and support decision-making.
- **Employees** - Have role-based access, meaning they can only manage and interact with the data relevant to their job.

2.4 Operating Environment

DataPulse is designed to run on different devices and platforms to ensure easy access:

- **Web Browsers** - Works on **Google Chrome, Mozilla Firefox, Microsoft Edge, and Safari** without needing to install extra software.
- **Operating Systems** - Compatible with **Windows, macOS, and Linux** for both office and personal use.
- **Mobile Devices** - While initially web-based, a mobile app will be developed in the future for **iOS and Android**.

2.5 Design Constraints

- **Security Compliance** - The software must follow global data protection laws like **GDPR (General Data Protection Regulation) and CCPA (California Consumer Privacy Act)** to ensure user privacy and data security.
- **Performance Efficiency** - The system should handle **large amounts of business data** quickly and efficiently, without delays or crashes.
- **Scalability** - As businesses grow and data increases, DataPulse should **expand its capacity** without slowing down or requiring a complete system overhaul.

2.6 User Documentation

To help users understand and use the platform effectively, the following documents will be provided:

- **User Guide** - Simple, step-by-step instructions for navigating and using DataPulse.
- **Admin Guide** - Detailed instructions for **system administrators** on how to set up, configure, and manage the platform.
- **FAQs & Troubleshooting** - A list of **common issues and solutions** to help users resolve problems quickly without needing technical support.

3. Functional Requirements

3.1 Business Data Management

This part of the system lets users **store and manage business data** easily. Users can **add new data, edit existing data, delete unnecessary data, or search for specific data** when needed. To keep everything safe, the system will **securely store and back up data** so no important information gets lost. Users can also **import or export data** in different formats like **CSV, Excel, or through APIs**, making it easy to share with other tools.

3.2 Data Analysis & AI Insights

The system will **use AI (Artificial Intelligence) to study data** and find useful patterns or trends. This helps businesses understand what is happening in their company. Users will be able to **apply filters** to see only the data they are interested in. The AI will also **predict future trends** based on past data, helping businesses make smarter decisions.

3.3 Visualization & Reporting

Users can **create dashboards** where they can see their data in a simple and organized way. They can **customize these dashboards** by adding different types of charts, graphs, or widgets. Reports will be **downloadable in formats like PDF, Excel, or CSV**, making it easy to share with others. The system will also support **real-time data updates**, showing important business metrics (KPIs) and trends as they change.

3.4 Integration with External Systems

The software can **connect with other business tools** like **ERP (Enterprise Resource Planning) and CRM (Customer Relationship Management) systems**. This means users don't have to manually enter data; instead, the system can automatically sync with their existing tools. It will also support **REST APIs**, which allow third-party applications to interact with DataPulse.

3.5 Security & Compliance

To **protect sensitive business data**, the system will use **Role-Based Access Control (RBAC)**, meaning only authorized users can access specific information. It will also have **Multi-Factor Authentication (MFA)** to add an extra layer of security when logging in. All stored data will be **encrypted**, and the system will follow important **security regulations like GDPR**, ensuring data privacy.

4. Non-Functional Requirements

4.1 Performance Requirements

The system should be **fast and responsive**. When a user searches for information or performs an action, the system should **respond within 2 seconds**. If data is updated in real-time (for example, new sales records), the system should **refresh and show the latest data within 5 seconds** so users always see the most up-to-date information.

4.2 Security Requirements

To keep business data **safe from hackers or unauthorized access**, the system will use **end-to-end encryption**. This means that even if someone tries to steal the data, they won't be able to read it. The system will also go through **regular security checks (audits)** to make sure there are no weaknesses or security risks.

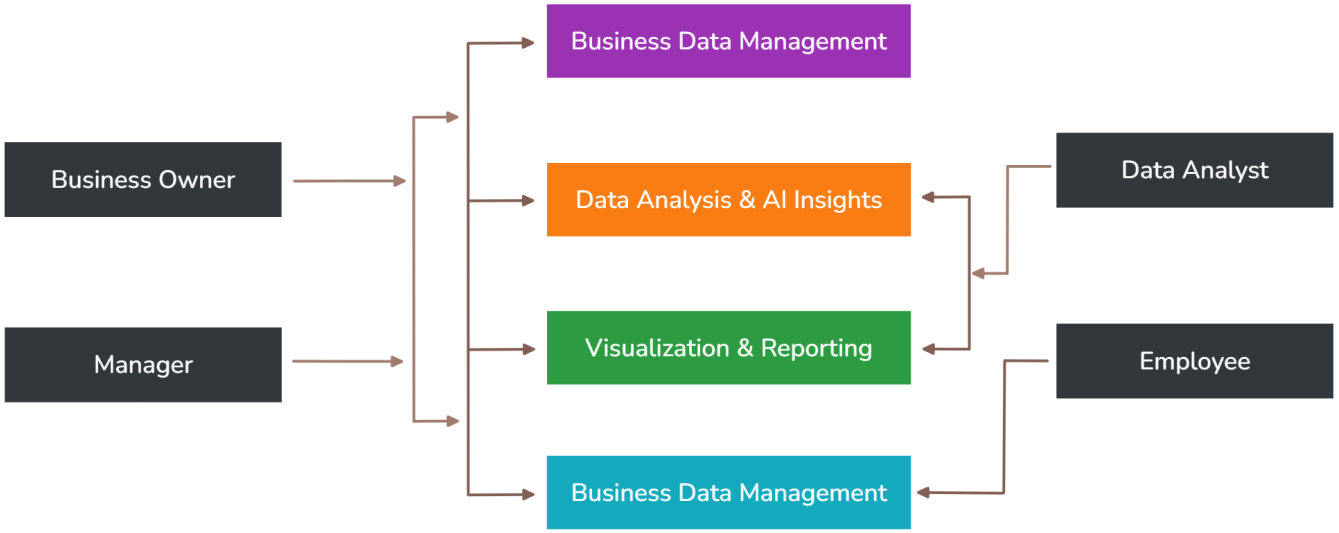
4.3 Usability & Accessibility

The system should be **easy to use**, even for people who are not very tech-savvy. The design should be **simple and clear**, so users can find what they need without confusion. It should also follow **accessibility standards**, meaning it will support users with disabilities, such as those who are visually impaired.

4.4 Scalability & Reliability

The system should be able to handle **thousands of users at the same time** without slowing down or crashing. It should also have **automated backups**, meaning if something goes wrong (like a system failure), data will not be lost, and users can restore it easily.

5. Use Cases



6. Data Requirements

DataPulse must effectively manage structured business data while ensuring security and accessibility for users.

Types of Data Supported:

- **Sales Records:**
  - Stores transaction details, including product/service sold, amount, date, and customer information.
  - Enables tracking of business revenue and identification of trends over time.
- **Expenses Data:**
  - Records business expenditures such as salaries, office supplies, and operational costs.
  - Facilitates financial planning and budget management.
- **Customer Details:**
  - Maintains customer names, contact details, purchase history, and preferences.
  - Enhances customer relationship management and personalized service delivery.

- **Business Performance Data:**
    - Monitors key metrics such as revenue, profit, losses, and employee productivity.
    - Provides insights to support strategic decision-making.

Data Storage & Security:

- **Secure Storage:** Data should be stored in a structured format using relational databases (MySQL, PostgreSQL) or cloud-based solutions.
- **Access Controls:** Role-Based Access Control (RBAC) ensures restricted access to sensitive data.
- **Data Encryption:** Business data must be encrypted to prevent unauthorized access.
- **Backup & Recovery:** Automated backups are required to prevent data loss in case of system failures.

7. System Architecture

DataPulse follows a modular and cloud-based system architecture to ensure high performance, scalability, and ease of maintenance.

Key Architectural Components:

- **Modular Microservices Design:**
    - The system is divided into independent services, each responsible for specific functions (e.g., data processing, reporting, AI insights).
    - Enables seamless updates and scalability.
    - Ensures system reliability by allowing other services to function if one service fails.
- **Cloud-Based Deployment:**
    - Hosted on cloud platforms such as AWS, Google Cloud, or Azure for global accessibility.
    - Allows users to access data via web browsers or mobile applications.
    - Ensures high availability with minimal downtime.
- **Database Management System (DBMS):**
    - Uses relational databases (MySQL, PostgreSQL) for structured business data.
    - NoSQL databases (MongoDB) may be utilized for storing large or unstructured datasets.
- **Security Layer:**
    - **Authentication & Authorization:** Utilizes Multi-Factor Authentication (MFA) for secure logins.
    - **Data Encryption:** Ensures sensitive business data remains protected.
    - **API Security:** Prevents unauthorized access to third-party integrations.

- **Integration Layer:**
    - REST APIs facilitate integration with external business applications such as ERP and CRM systems.
    - Supports third-party analytics tools for advanced data insights.

8. Testing Requirements

Comprehensive testing is required to ensure DataPulse functions effectively, efficiently, and securely. The following types of testing will be conducted:

1. **Unit Testing (Component-Level Testing):**
    - Ensures individual modules function as expected.
    - Verifies that small components such as login, report generation, and data entry operate correctly.
    - *Example:* Testing the data entry module to confirm that sales records are correctly stored.
2. **Performance Testing (Speed & Load Handling):**
    - Measures system responsiveness and ability to handle high data volumes and user traffic.
    - Evaluates system behavior under stress conditions.
    - *Example:* Ensuring the dashboard loads within 2 seconds when accessed by 1,000 users simultaneously.
3. **Security Testing (Data Protection & Access Control):**
    - Identifies vulnerabilities in system security and ensures compliance with GDPR and CCPA regulations.
    - Validates user access control mechanisms, data encryption, and threat prevention measures.
    - *Example:* Conducting penetration testing to simulate hacker attacks and prevent unauthorized data access.

These testing protocols will help maintain system stability, security, and user satisfaction.

9. Appendices

10. References