Technical Architecture Document

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1. Introduction

Pro-XY facilitates real-time monitoring, allowing users to make informed decisions quickly. Visual representation of key metrics, KPIs and relevant data points that will provide insights into the performance of a business.

1.1 Problem Statement

A comprehensive no code data monitoring dashboard which can help various profiles in an organization to monitor their data. organizations face an insistent need for accessible and user-friendly tools to monitor key metrics without requiring extensive coding expertise. Existing data monitoring solutions often demand technical proficiency, limiting the involvement of non-technical stakeholders

1.2 Problem Overview

- The Pro-XY Dashboard is built with a no-code interface, ensuring that users across various departments can actively engage in data monitoring without requiring coding expertise.
- Insightful design allows users to effortlessly create, modify, and customize monitoring dashboards to suit their unique needs.
- Visualize data trends through charts and graphs for quick and intuitive understanding.
- Drill down into detailed views by choosing required column names from the dataset.
- Effortlessly integrate data from various sources, providing a holistic view of organizational performance.
- Ensure reliable and accurate data through seamless integration with databases, APIs, and other relevant sources.

2. Architecture Components Overview

Designing a Data Monitoring Dashboard involves breaking down the system into various architectural components that work together to provide a comprehensive monitoring solution. Overview of Architectural components are stated as follows:

No	Component Name	Description
1	Source of Data	databases, APIs, logs, or streaming data sources will be data source Functionality is to Extract and Transform data into suitable graph visualizations.
2	Data Processing Engine	Data Processing Engine will clean, filter, aggregate and summarize data which will data transforming into a desired visual.
3	Data Visualization	Charting libraries and tailored components are designed for data specific representation.
4	Data Storage	Stores processed data and enables historical data analysis
5	Export data	users to export data and reports in predefined formats.
6	Frontend and Backend operations	Frontend provides interactive, user-friendly interface, customized views and visualizes monitoring data. **Widgets:** Individual components within the dashboard, such as charts, tables, and status indicators **Navigation**: Controls for users to navigate between different views of the dashboard. **Data consistency:** • To maintain normalcy for uniform and accurate analysis. • Backend server that manages data retrieval / processing, Authentication / Authorization and serves as the intermediary between the frontend and data sources. • DB query optimization
7	Admin Control	Administrator can configure and set up the data sources and visualization. Admin also does authorization for Agent user.
8	Non-Functional Requirements	Under security aspect Authentication & Authorization are viable. Pro-XY is availability centric and fault tolerant to provided degraded services.
9	Future Enhancements	Supports API integration for additional data sources through third-party services, Live data flow with load balancing,

3. Design Principle

Pro-XY values communicating information, facilitates informed decision-making, and enhances the overall user experience. Pro-XY is an effective data monitoring dashboard that involves careful consideration of principles which ensures that the information is presented with below values,

1. Clear
2. Actionable and
3. User-friendly manner.

Type of Charts supported by Pro-XY are as follows,

- **Bar Charts**

  A bar chart is a graphical representation of data in which rectangular bars or columns are used to represent the values of different categories. The length or height of each bar corresponds to the quantity it represents. Bar charts are commonly used to display and compare the values of different categories or groups of data.

- **Pie Chart:**

  A pie chart is a circular statistical graphic that is divided into slices to illustrate numerical proportions. Each slice represents a proportionate part of the whole, and the complete pie represents 100%. Pie charts are commonly used to show the distribution of categories in a dataset.

- **Area Charts**

  An area chart is a type of chart that displays quantitative data by plotting the data points and connecting them with lines. The area between the line and the axis is then filled with color to emphasize the magnitude of the values over time or across categories. Area charts are useful for showing the trends and variations in data over a continuous interval.

- **Line Charts**

  A line chart is a type of chart that displays data points over a continuous interval or time span, with the data points connected by straight line segments. Line charts are particularly useful for showing trends, patterns, and variations in data over time. They are commonly used in various fields, including finance, economics, science, and business analysis.

- **Composed Charts**

  Composed charts, sometimes referred to as combination charts, are visualizations that combine two or more different types of charts within a single display. This approach allows you to present and compare multiple sets of data that may have different scales or units. The most common types of composed charts involve combining elements such as bars, lines, and areas.

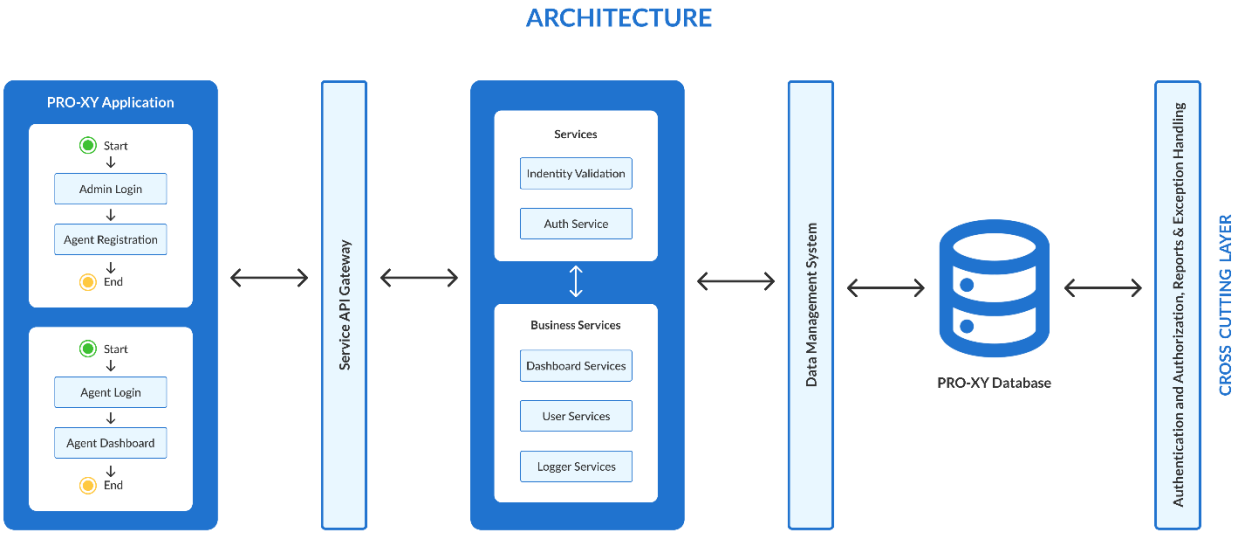
- **Radar Chart**

  A radar chart, also known as a spider chart or web chart, is a graphical method of displaying multivariate data in the form of a two-dimensional chart where three or more quantitative variables are represented on axes starting from the same point. It is named for the resemblance of the chart to the spokes of a bicycle wheel or the lines on a radar screen.

- **Scatter Chart**

  A scatter chart, also known as a scatter plot or scattergram, is a type of chart that displays individual data points on a two-dimensional plane. Each data point represents the values of two variables, and the position of the point is determined by the values of these variables. Scatter charts are useful for visualizing the relationship between two continuous variables and identifying patterns or trends in the data.

4. Architecture



Admin / Agent Login:

- Open a web browser and navigate to the URL of the data monitoring dashboard.
- On the login page, enter the admin username and password in the designated fields.
- After entering the required credentials, click the "Login" button to initiate the authentication process.
- Session timeout feature to automatically log out the admin after a certain period of inactivity.

Agent registration:

- Provided a web link for the registration portal.
- User-friendly registration form to gather new registration details.
- Validation on Password strength requirements for security.
- Clearly defined user roles (e.g., admin, agent etc;) and assigned roles based on job responsibilities.

Agent Dashboard:

- Graphs showing High-level Data in common relevance of any user type.
- Data refreshed date and time will be printed on the screen.
- Options to customize dashboard preferences.

Service API gateway:

- Data monitoring services will register themselves with the API gateway.
- Maintenance of service registry that keeps track of available data sources.
- Identity validation
    - RBAC (Role Based Access control) implemented to ensure that users have appropriate access rights based on their roles within the organization.
    - Roles can be defined and assigned that align with the specific needs of user data monitoring dashboard.
    - Secure session management will control the duration of user sessions which provides session timeout features.
- Authenticator service will allow administrators to manage user accounts, including adding, updating, or deactivating accounts.

Business Services

- Dashboard Service
    - Dashboard service will effectively monitor and manage data-related activities. These are designed to streamline the process of tracking, analyzing, and visualizing data for better decision-making.
    - Allows users to customize the data displayed by applying filters based on specific criteria.
    - Displays KPI with important metrics and performance indicators relevant to the business.
- User Service
    - This service will enhance on user experience, provide valuable insights, and facilitate effective management of data.
    - Users are allowed to personalize their dashboard with widgets and charts relevant to their specific needs.
    - Filters are incorporated that will allow users to focus on specific subsets of data.

- Logger Service
    - Pro-XY is a crucial component that records and stores various events, activities, and relevant information related to the functioning of dashboard and the data it monitors.
    - Logger plays a significant role in troubleshooting, debugging, and maintaining the dashboard application.
    - It records important events and activities within the dashboard, such as user interactions, system alerts, data updates, and errors.

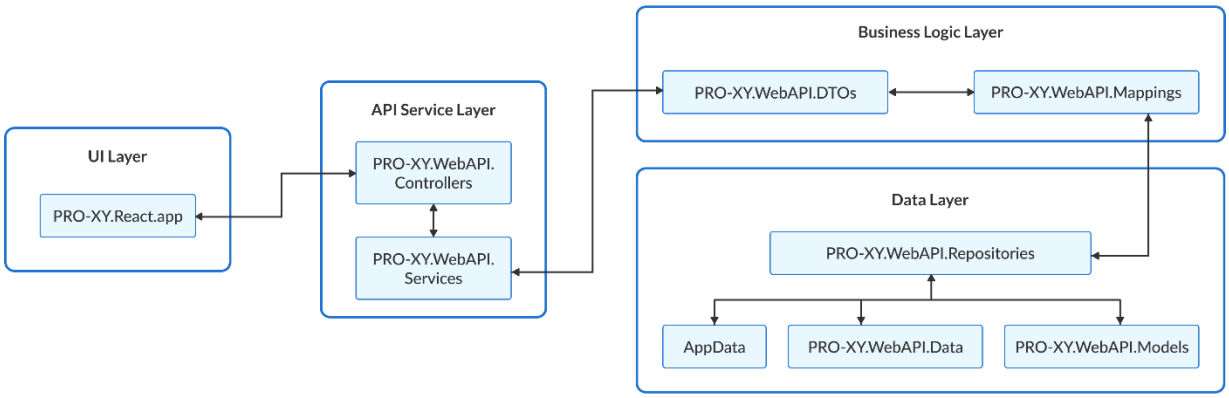
Data management system

- Determines where the data for monitoring dashboard will come from that could be via databases, APIs, logs, or external services.
- Sets the process of ETL (Extract, Transform and Load)

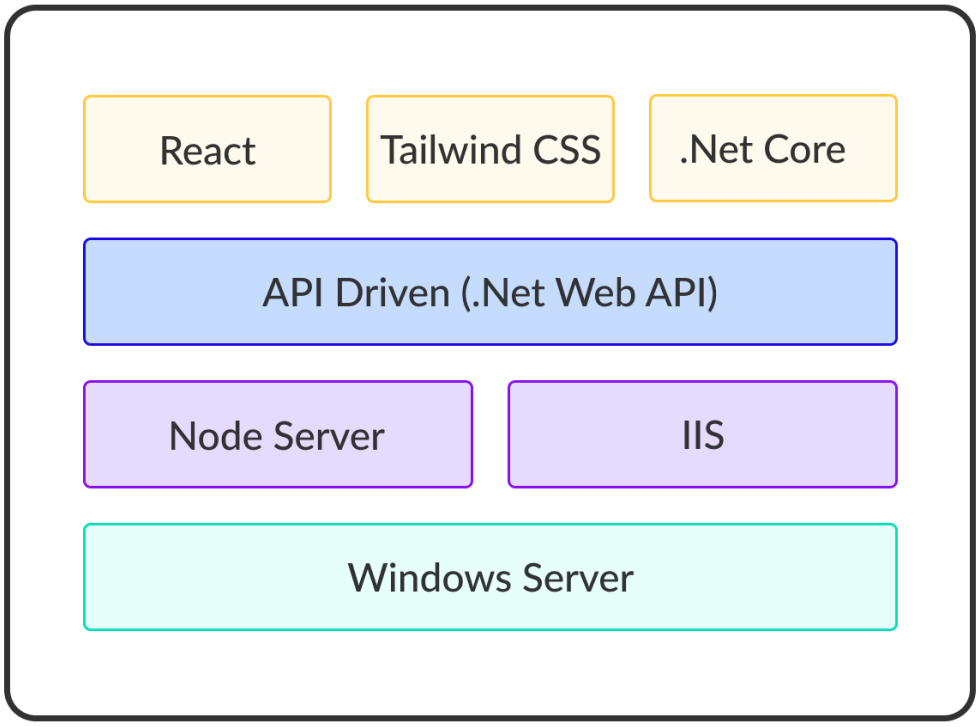
Cross cutting Layer

- Facilitate communication and data sharing between different components or widgets on the dashboard.
- Provides seamless user experience when navigating through graphs and charts.
- Pro-XY as a robust cross-cutting layer helps maintain consistency, security, and efficiency across different parts of the Data Monitoring Dashboard, contributing to a more seamless and effective user experience.

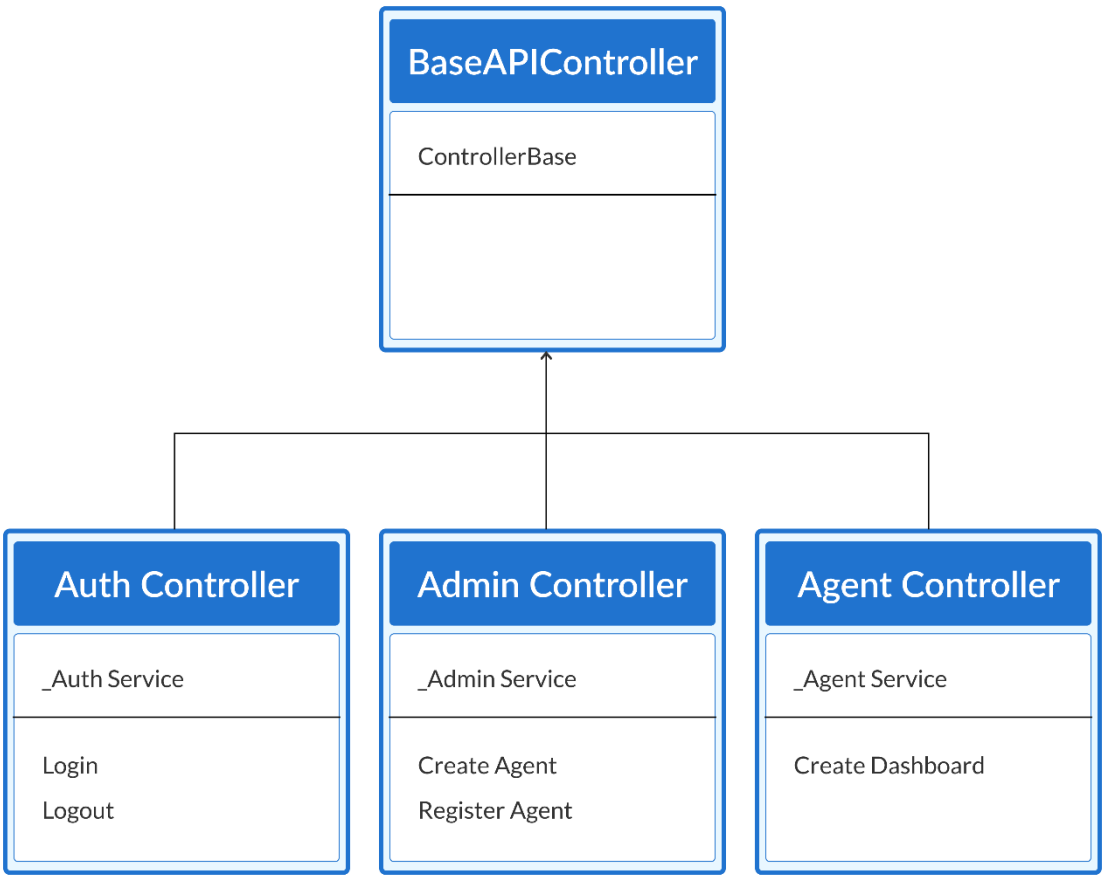
5. Component Level Design



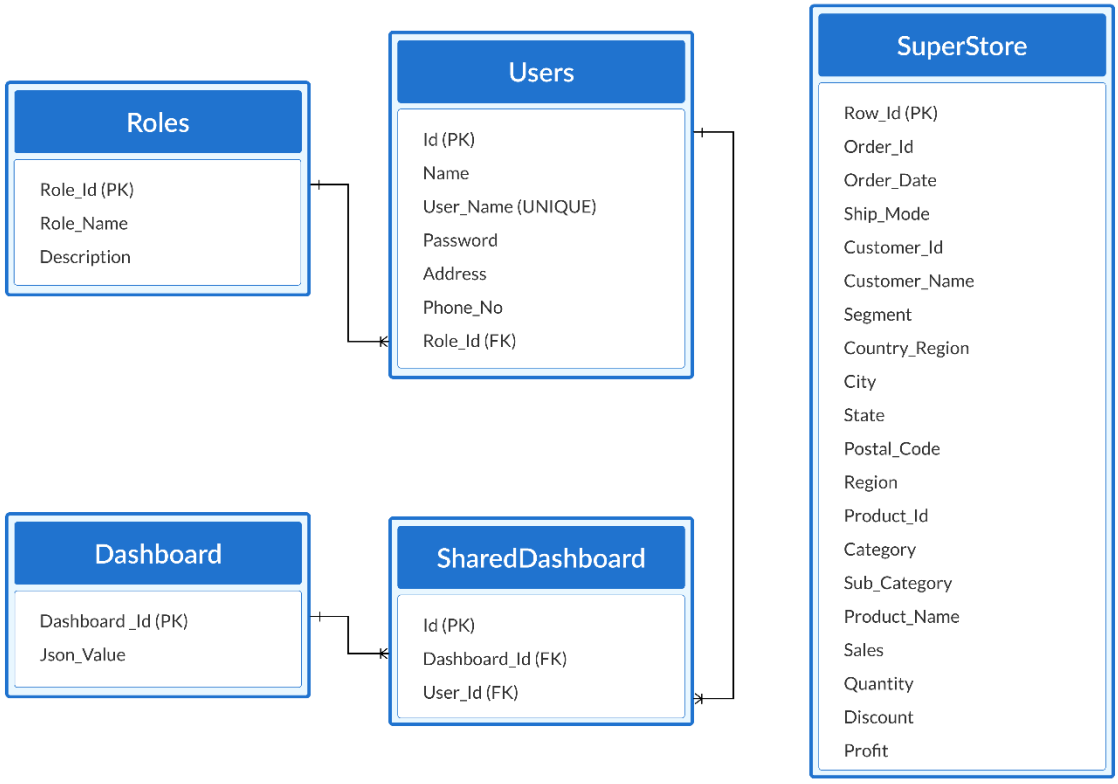
6. Technical Stack Diagram



7.Class Diagram



8. ER Diagram



9. Sample Usecases for PRO-XY

On implementing Pro-XY, the customer will benefit with quicker decision making and below are few sample use cases.

- Visual representation of real-time transaction volume. Breakdown of transactions by type (withdrawals, deposits, transfers). Displaying the geographic locations of transactions. As a no code web component, Pro-XY can be integrated with existing vendor applications and admin user can design role based dashboard in the provided workspace
- An e-commerce company that experiences a high volume of online orders. The efficiency of order fulfillment is crucial to customer satisfaction, and monitoring key metrics in real-time is essential for identifying and resolving issues promptly.
- Real-time display of vital signs such as heart rate, blood pressure, respiratory rate, and temperature for each patient. Color-coded indicators for normal, warning, and critical values. Visual representation of bed occupancy throughout the hospital. Monitoring patient movement from admission to discharge to optimize bed turnover.

10. Key References

Finereport - https://www.finereport.com/en/features/dashboards

DashThis - https://dashthis.com/dashboard-examples/

GenPro - https://genproresearch.com/advanced-analytics/data-visualization/