Project: Lightning

Team: Winners

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Problem Statement

Use Case I: Simulator Validation

The ISO team uses a simulator to forecast prices. Our goal is to **validate the model output** by using the base case(s) provided.

Use Case II: Resource Allocation

The ISO market development team compares the day-ahead base cases with one or more ‘what if’ scenarios when evaluating changes. Our goal is to **generate detailed reports and analysis** and **display it through a dashboard** that is visually appealing.

User Types

- The software development team should be able to **plug-in a different implementation seamlessly** without affecting the user interface.
- The administrators should be able to **manipulate the database** and **control server requests**.
- The market development team should be able to **generate data visualizations** as well as **reports on several ‘what-if’ scenarios** using the GUI.

Main Functions

- Users are presented with a **dashboard that summarizes time series data in a visually appealing way** using charts and graphs.
- Users are presented with an **interactive GUI that facilitates comparison and modeling** of time series data.
- The system encapsulates a **REST API that processes user requests and accesses data** in a secure manner.
- The system includes a **database that stores the data securely and supports operations** such as querying and accessing data.

System Architecture

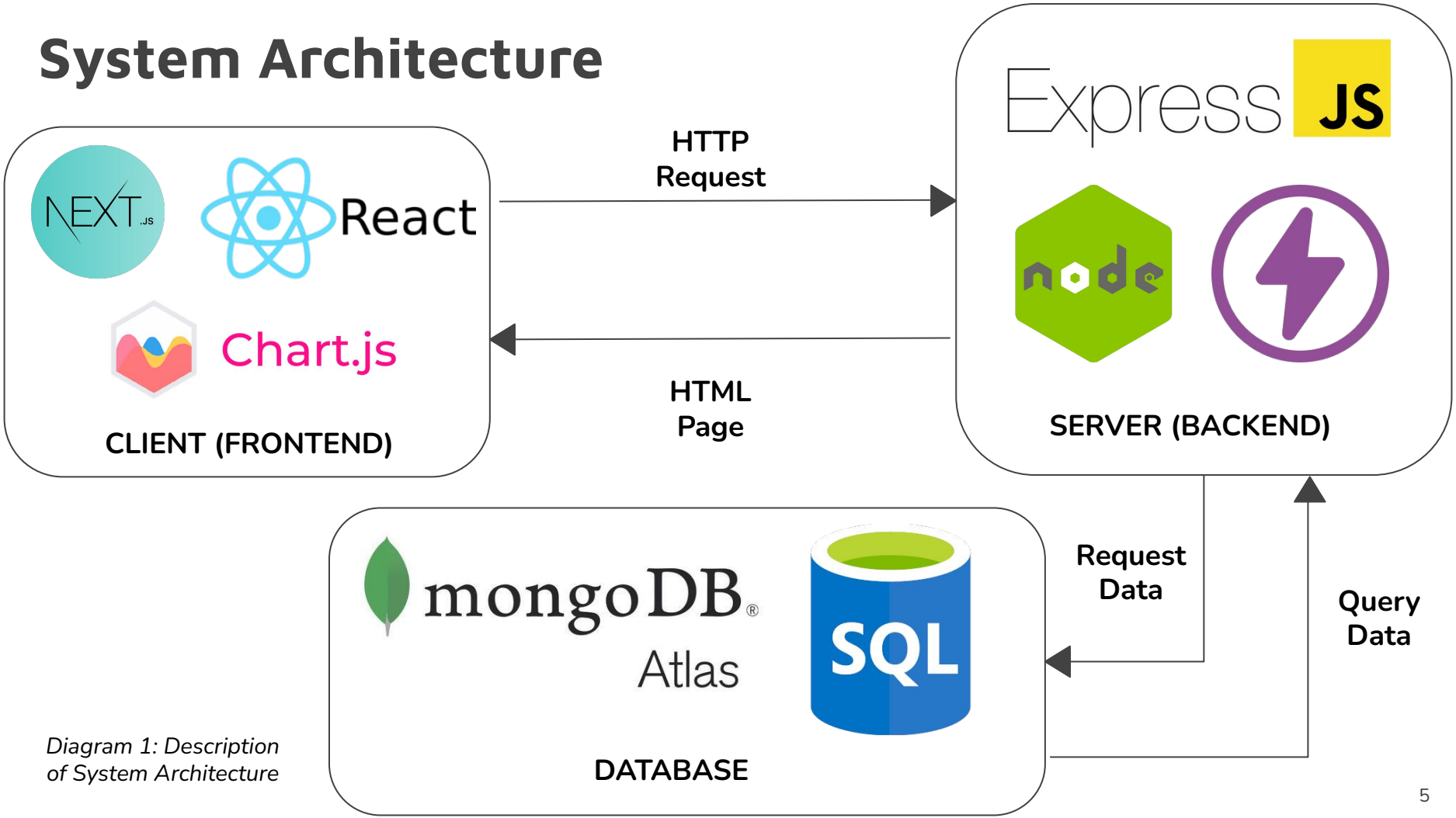


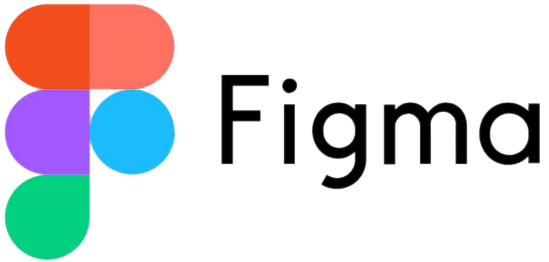
Diagram 1: Description of System Architecture

Productivity

VERSION CONTROL

AGILE & SCRUM

IDE



DESIGN

Diagram 2: Description of Productivity Suite

Potential Candidates for Statistical Analysis

- Measures of **Central Tendency**: Mean, Median, Mode
- Measures of **Variability**: Range, Standard Deviation, Variance
- Measures of **Correlation**: Pearson Coefficient, Spearman Coefficient
- **Graphs and Charts**: Line Graphs, Histograms, Scatter Plots, Pie Charts, Map Charts
- **Time Series Specific** Techniques: Compression, Regression, Regularization, Moving Average, Distance metrics

Team

Frontend Team	Backend Team
Atif Abedeen	Aadit Bhatia
Alan Zheng	Matt May
Nishant Jain	Manan Talwar
Gabe Sussman	Colin Genta

Table 1: Team Division

Concerns

- Real world data can contain **unexpected vulnerabilities**.
- Selecting appropriate **tools and techniques for analysis** of the data.
- Database as well as server can have **security risks**.
- **Integration of the frontend and backend** code may be a potential challenge.

Next Steps

- Conduct **exploratory analysis** on the data.
- **Finalize the tech stack** based on inferences from data analysis.
- **Finalize a detailed system architecture** based on technical analysis.
- **Design the User Interface (UI)**.