



Presentation 2023

PROPOSAL IDEA

Product:

ISM - Inventory strategy management



CONTENT

- 01 INTRODUCTION
- 02 PROBLEM STATEMENT
- 03 SOLUTION OVERVIEW
- 04 CORE FUNCTIONALITY
- 05 METHODOLOGIES
- 06 PERFORMANCE METRICS
- 07 TIMELINE AND ROADMAP
- 08 CONCLUSION

INTRODUCTION



- The *meticulous orchestration of time and quantity* in the inventory replenishment process.
- Traditional approaches often fall short, leading to *suboptimal decisions, excess carrying costs, and missed sales opportunities*.
- The intricate dance between supply and demand *demand a more sophisticated solution to enhance efficiency and reduce operational friction*.

INTRODUCTION

Product: ISM - Inventory strategy management

- Our ISM is crafted as a beacon of efficiency in inventory management. It aspires to provide a **comprehensive platform** for decision-makers to not only **visualize historical data** but also **simulate and predict future scenarios**.
- The MVP aims to *empower businesses to make proactive, data-driven decisions regarding the timing and quantity of inventory replenishment.*



INTRODUCTION

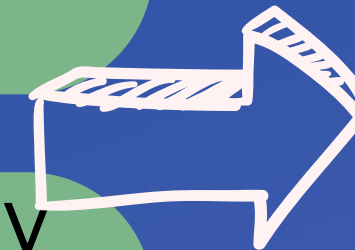
Purpose and Opportunity Addressed by the MVP

1

Bridge the gap between historical insights and strategic decision-making in inventory management

2

Offers decision-makers a unique opportunity
→ Enhance their understanding of past performance, simulate potential adjustments to time and quantity variables, and predict future trends.

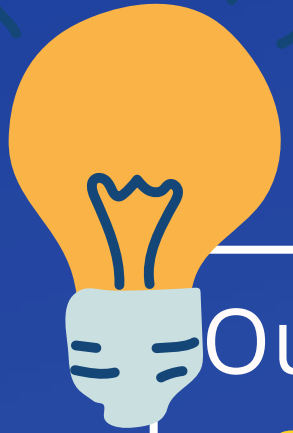


Unlock the potential for streamlined operations, cost savings, and a competitive edge.



INTRODUCTION

Purpose and Opportunity Addressed by the MVP



Our MVP stands ready to **offer a transformative solution**, presenting an opportunity for businesses to **elevate their inventory management practices and thrive in an era where efficiency is paramount.**

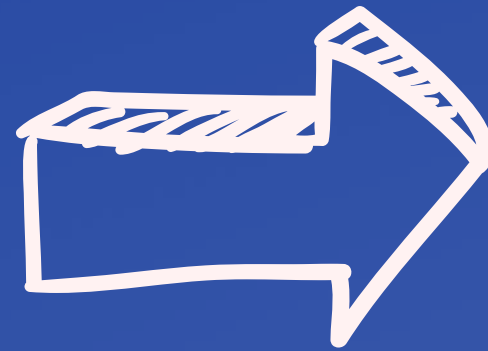


PROBLEM STATEMENT



PROBLEM STATEMENT

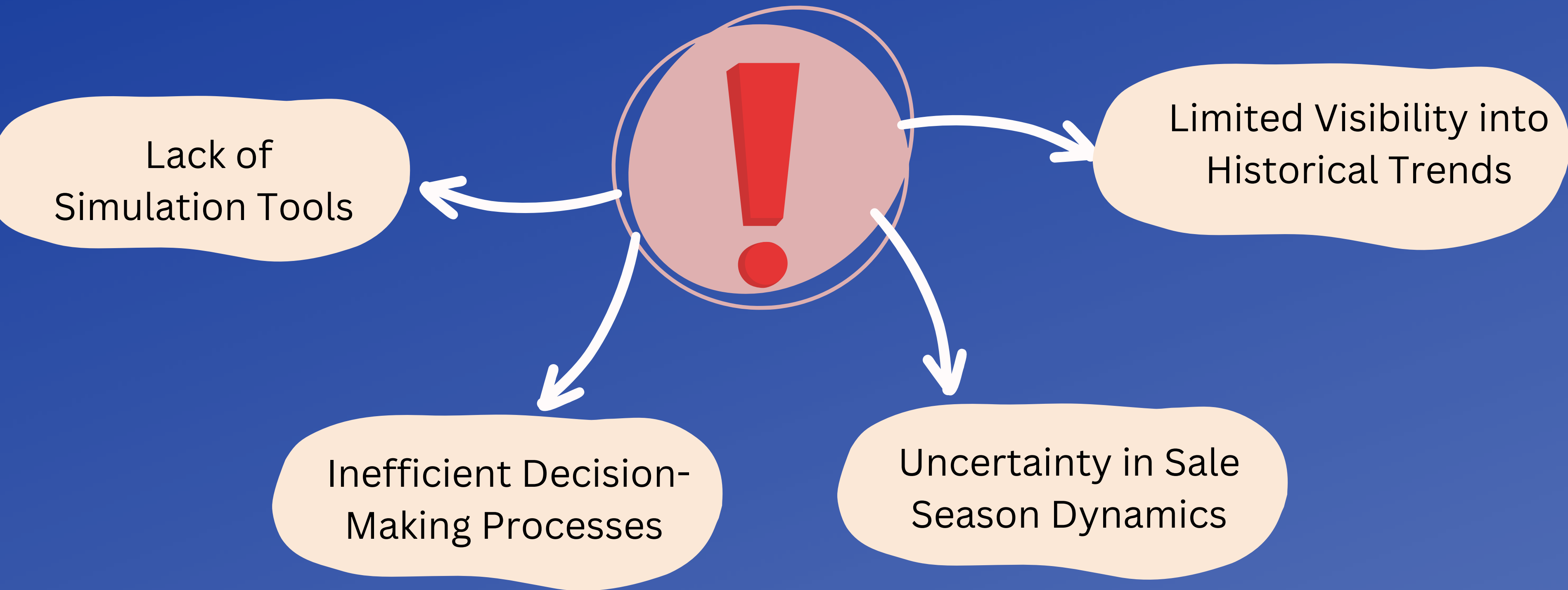
Traditional
approaches



Absence a
comprehensive solution

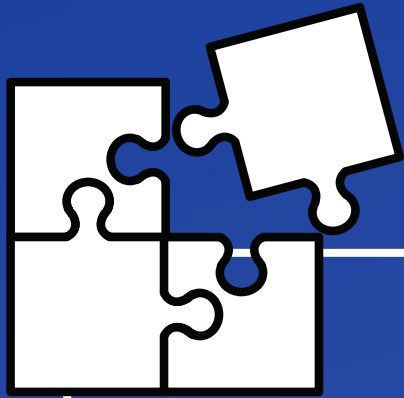


PROBLEM STATEMENT



PROBLEM STATEMENT

Competitor Landscape



The landscape shows a scarcity of **comprehensive solutions** that address the identified challenges. While there may be tools focusing on individual aspects like data visualization or predictive analytics, a holistic platform combining historical analysis, simulation, and AI-driven insights is yet to be widely adopted. Competitors, if any, are likely specialized in specific niches within the data and analytics space.

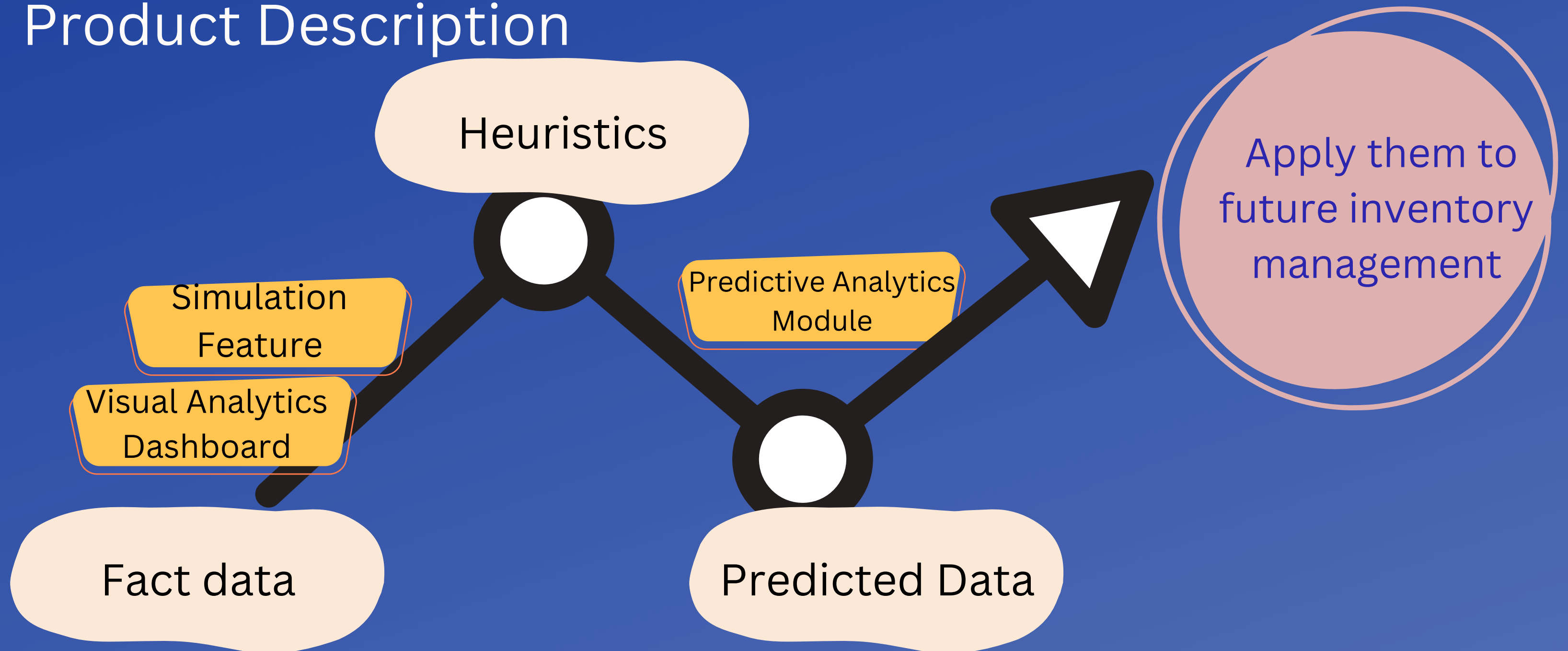


Our MVP

Differentiate itself by providing an all-encompassing solution to the identified problem.

SOLUTION OVERVIEW

Product Name: ISM - Inventory strategy management
Product Description



CORE FUNCTIONALITY

Visual Analytics Dashboard

An intuitive and interactive dashboard that provides users with visually compelling charts

Core functionality

Simulation Feature

A unique simulation capability that enables users to model different scenarios for quantity and timing of stock replenishment

Predictive Analytics Module

Advanced Predictive Analytics module powered by AI models, provides users with accurate forecasts of future sales trends based on historical data. Combined with Data Mining algorithms that drill down into historical sales data to identify common characteristics of the best performing products

SOLUTION OVERVIEW

3 key steps to success

1



Process the
raw data

2

Reinforcement
Learning



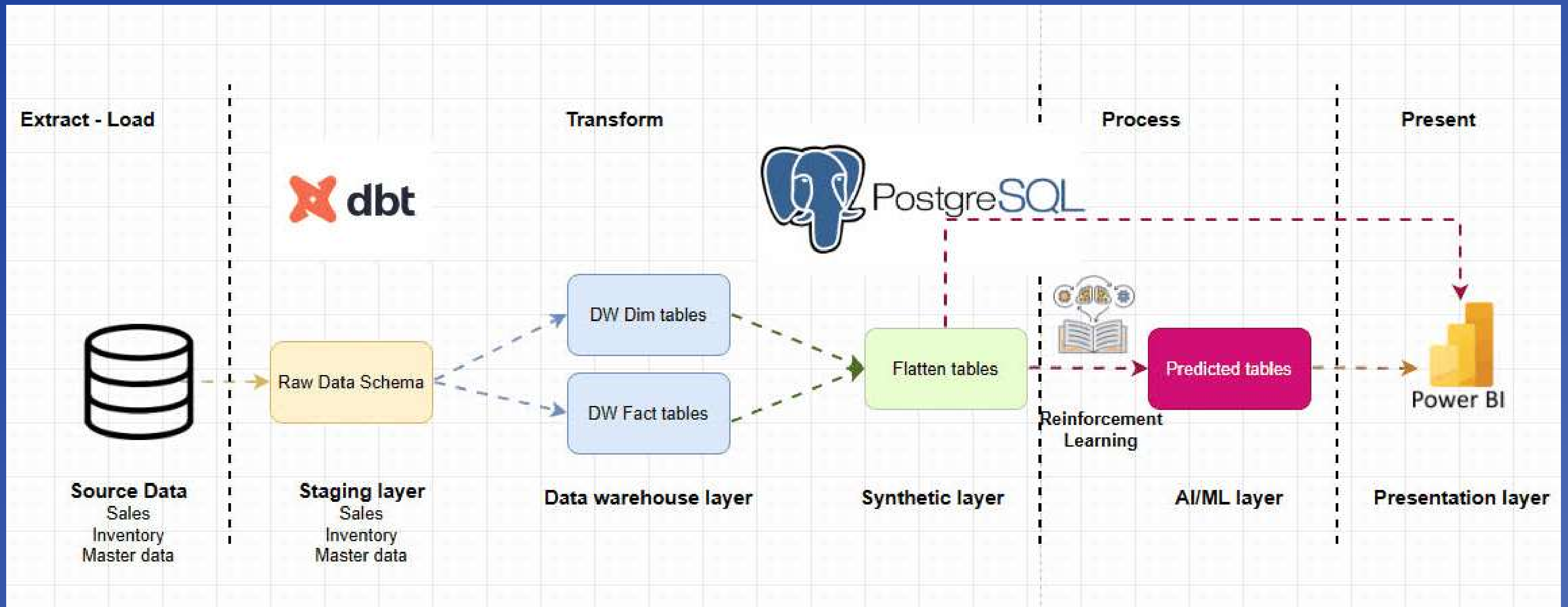
Apply AI/ML model

3



Visualize
Dashboard

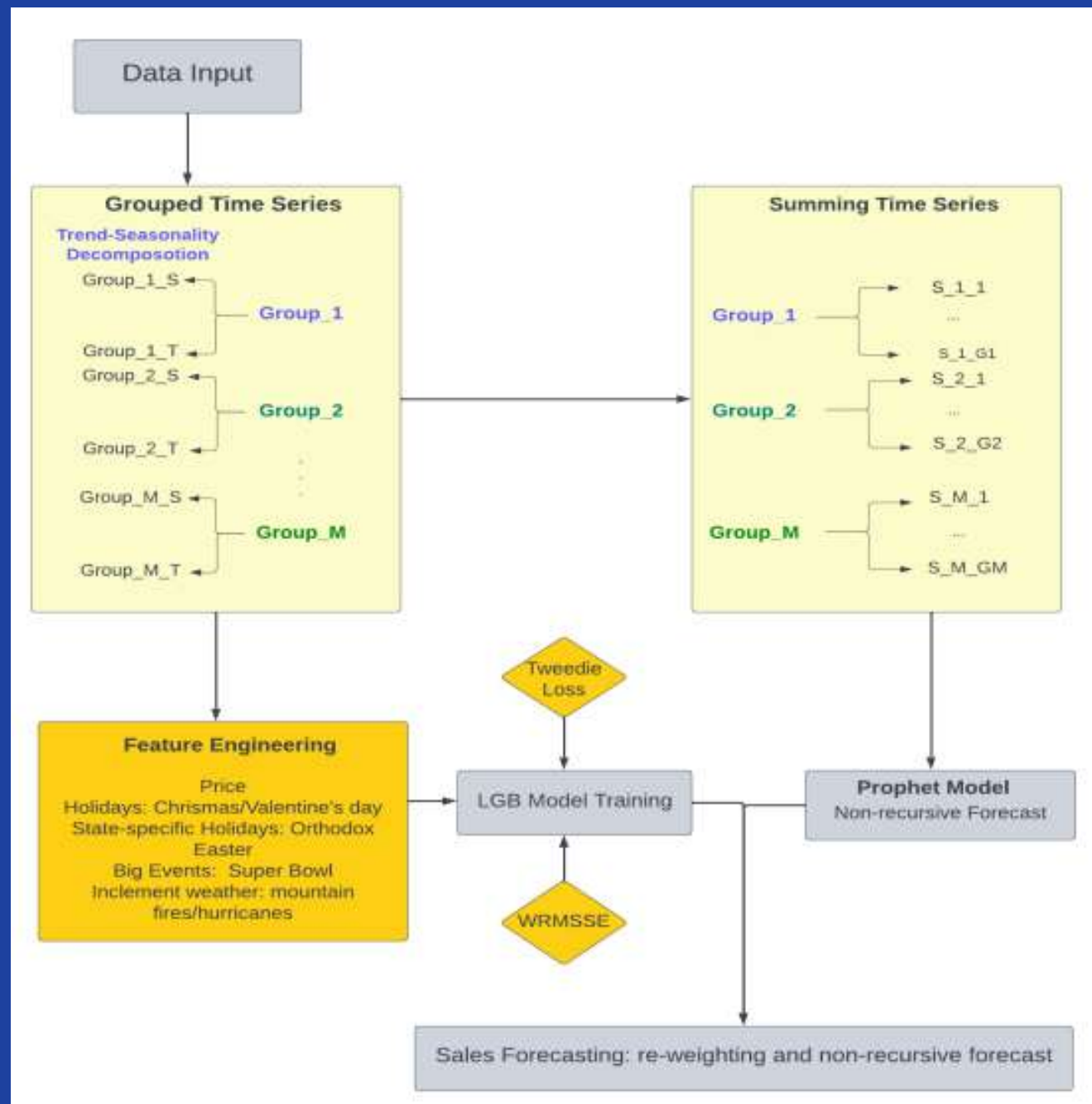
SOLUTION OVERVIEW



Workflow

METHODOLOGIES

1. Forecasting model



The idea is that in the left block, the entire dataset is first be split into different categories based on stores, states, product categories etc.. Then feature engineering is conducted, including adding more features, dataset formatting conversions etc.. Last, LightGBM is used to do forecast on each time series.

METHODOLOGIES

A. LightGBM

- LightGBM (Light Gradient Boosting Machine) is an open source, distributed machine learning library that uses gradient boosting algorithms to train models. This model is particularly good at handling large datasets with many features and detecting nonlinear relationship between features and labels.
- We will use two evaluation metrics for LightGBM such as the **Weighted Root Mean Squared Scaled Error (WRMSSE)** is used as the evaluation metric because it is specifically designed to evaluate the accuracy of hierarchical time series forecasts and **Tweedie-based** loss function to optimize the output of the model.



METHODOLOGIES

B. Prophet

- Prophet is a time series forecasting library developed by Facebook that is designed to make it easy for analysts and developers to create accurate forecasts for time series data. It uses a decomposable model that allows it to capture trends, seasonality, and other time-varying effects in a flexible and scalable way



METHODOLOGIES

C. Forecasting strategy

- We present the final step of sales forecasting. The LightGBM predicts that the sales at time t is p_{1t}, \dots, p_{gt} . Also, suppose the total predicted sales of this group at t using Prophet is G_t , then G_t can be allocated by the weights obtained from the LightGBM, i.e., the ultimate forecast sales for the time series at t is given by

$$\text{Sales}_{jt} = \frac{\hat{p}_{jt}}{\sum_{j=1}^g \hat{p}_{jt}} \cdot G_t, \forall j = 1, \dots, g.$$

METHODOLOGIES

2. Data mining techniques

- **Apriori algorithm** helps to find frequent itemsets in **transactions** and identifies association rules between these items. Next we will use the term of **support** and **confidence** in associate rules to know more about the characteristics of the products every sale season.

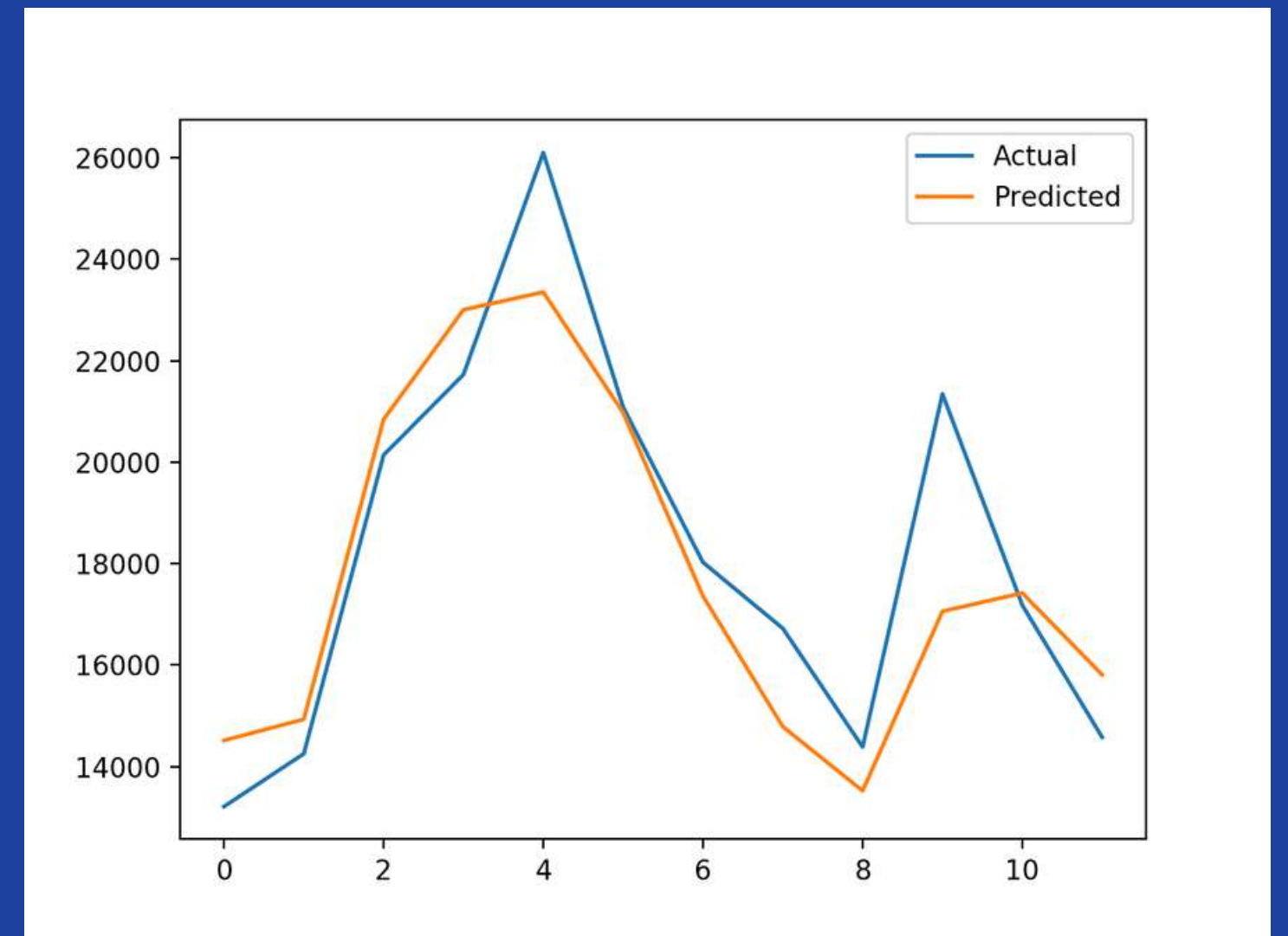




PERFORMANCE METRICS

1. Accuracy of Sales Predictions

- Measure the accuracy of the AI model's sales predictions by using evaluation metrics for model and comparing forecasted sales trends with actual sales data over specific time periods.





PERFORMANCE METRICS

2. Decision-Making Impact

- Evaluate the impact of ISM on decision-making processes by measuring the alignment between users' simulated strategies and actual decisions in inventory management





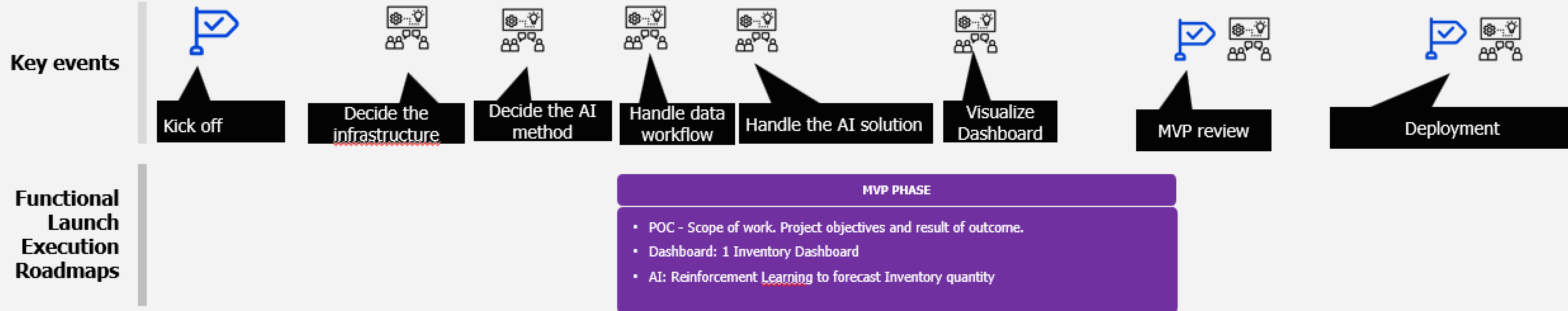
PERFORMANCE METRICS

3. Reduction in Stockouts and Overstock

- Quantify the reduction in instances of stockouts and overstock by comparing historical records with the inventory levels recommended by ISM, showcasing the product's ability to optimize inventory balance.



TIMELINE AND ROADMAP



CONCLUSION

- In summary, our revolutionary solution, ISM (Inventory Strategy Management), tackles the intricate challenges of inventory management by seamlessly integrating visual analytics, simulation capabilities, and advanced AI. As we navigate through the key components and methodologies of ISM, we witness a groundbreaking approach to inventory optimization and decision-making.



KEY POINTS RECAP:

A. Visual Understanding and Simulation

B. AI-Powered Predictions and Data Mining

C. Performance Metrics

VALUE PROPOSITION:

A. Enhance Decision-Making

B. Optimize Operational Efficiency

C. Proactive Strategy Development

POTENTIAL IMPACT AND BENEFITS

A. Proactively Plan for Sale Seasons

B. Maximize Profits

C. Continuous Adaptation