



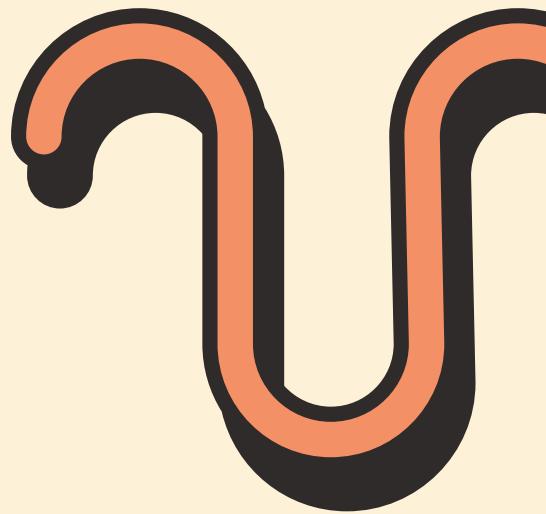
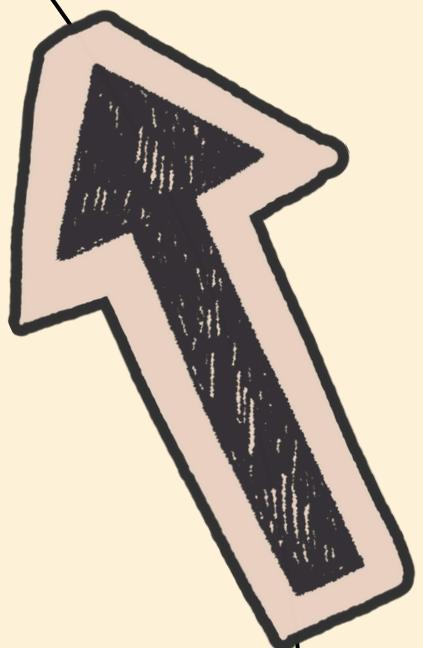
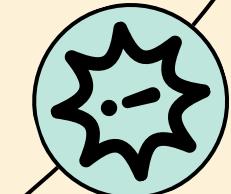
XenberSDU: Real-Time Warehouse Operations Intelligence Dashboard

Sekai Dev Unit

Start Presentation 



Problem Statement & Motivation





Problem

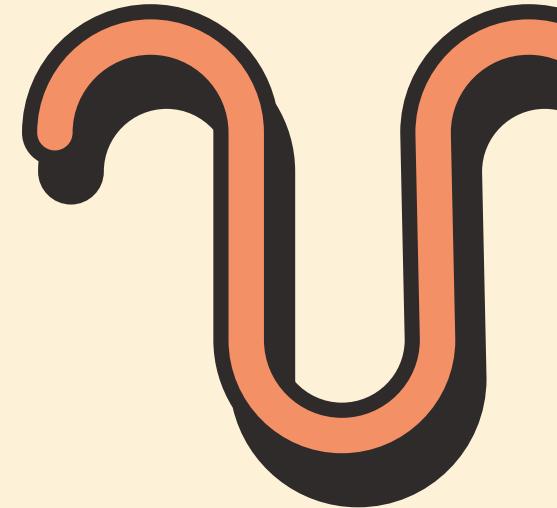
Statement & Motivation



The Problem

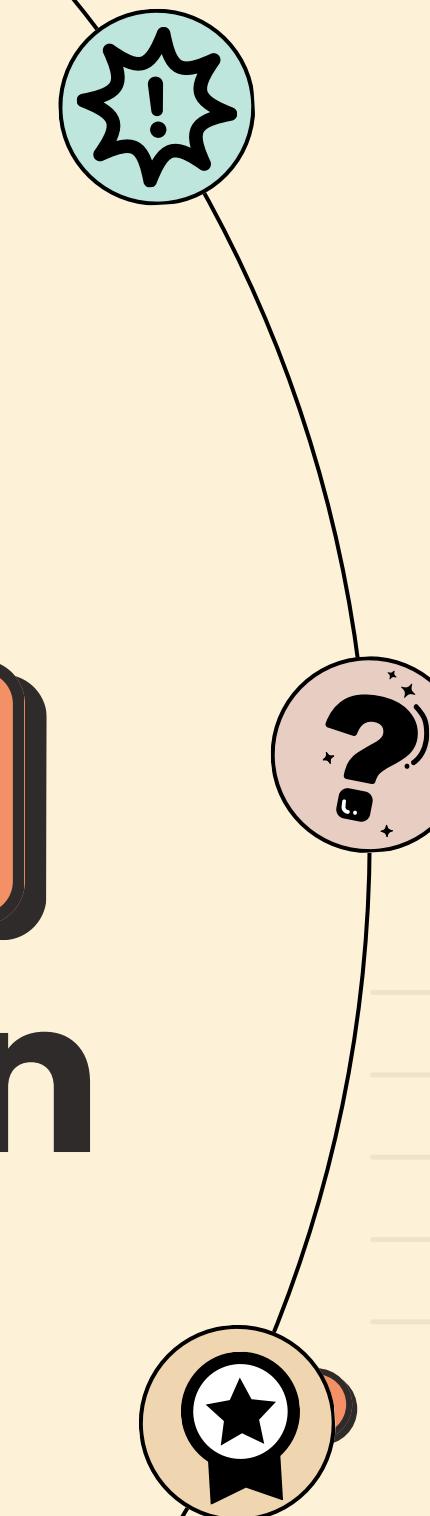
Modern warehouse operations struggle with:

- Delays in identifying KPI drops
- Unpredictable congestion & staff shortages
- Manual monitoring → slow decision-making
- Lack of real-time forecasting or automated recommendations



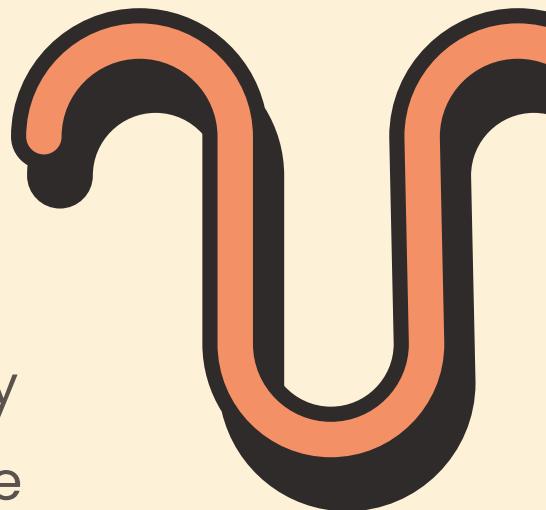


Problem Statement & Motivation



why **This** Matters

- Operational delays → increased cost
- Workforce overload → reduced productivity
- Reactive management instead of proactive

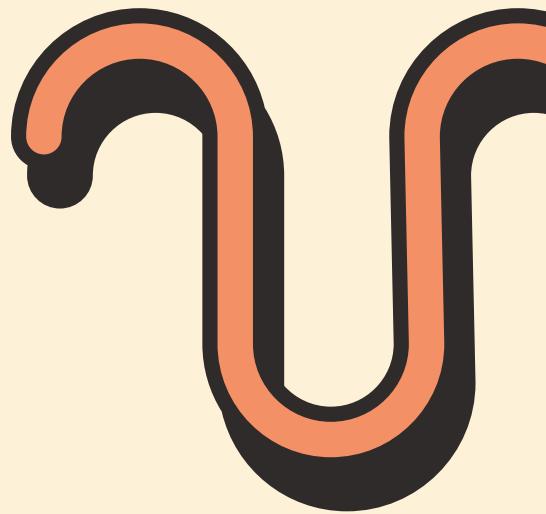




Problem Statement & Motivation

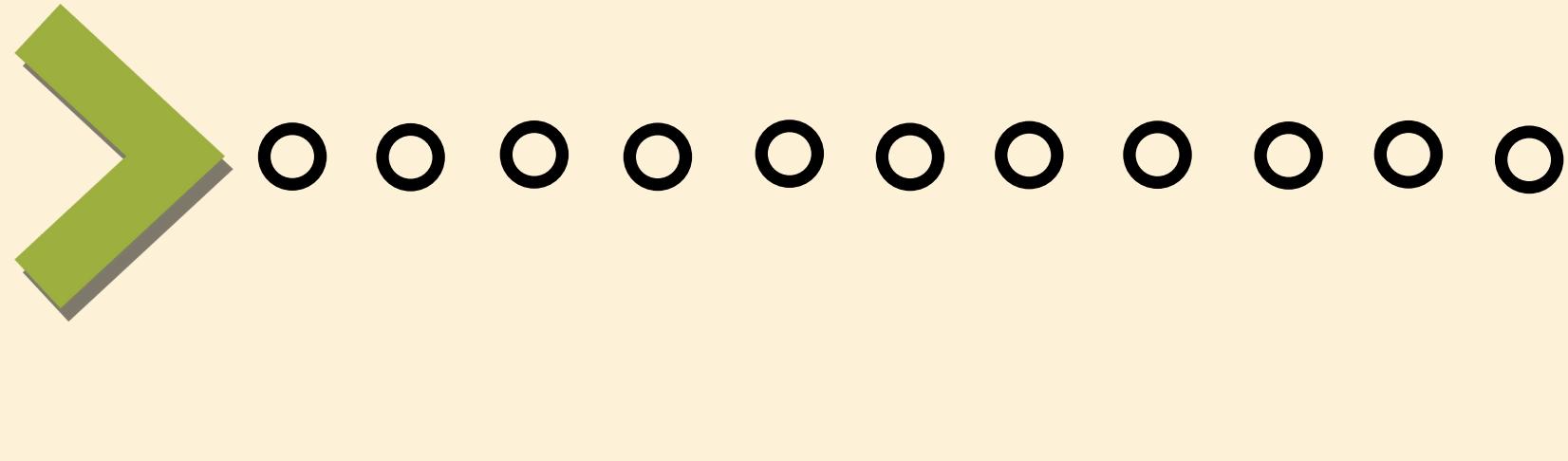
Goal

Create a real-time, intelligent dashboard
that helps warehouse managers act
faster and smarter.





Solution Overview

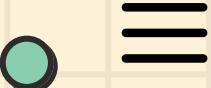


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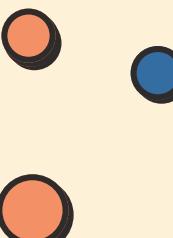


A real-time operational intelligence dashboard that:

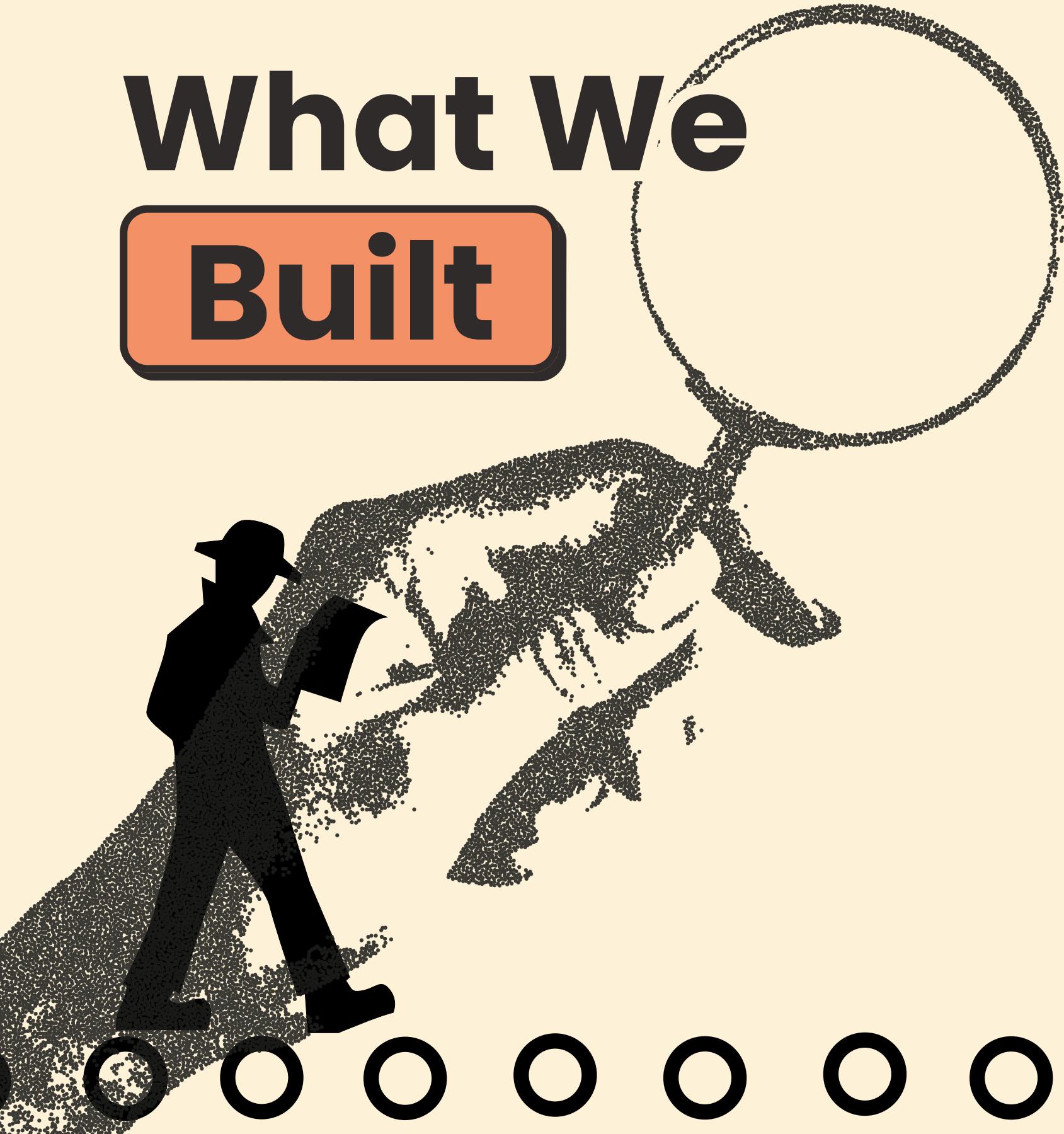
- Auto-generates synthetic warehouse KPI data
- Detects anomalies before issues escalate
- Forecasts the next 1 hour & 24 hours
- Gives actionable recommendations instantly



Solution Overview



what We Built

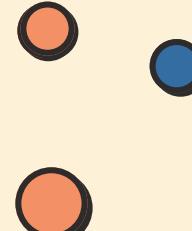


A real-time operational intelligence dashboard that:

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Solution Overview





Target Users



- Warehouse operations managers
- Logistic supervisors
- Distribution center planners

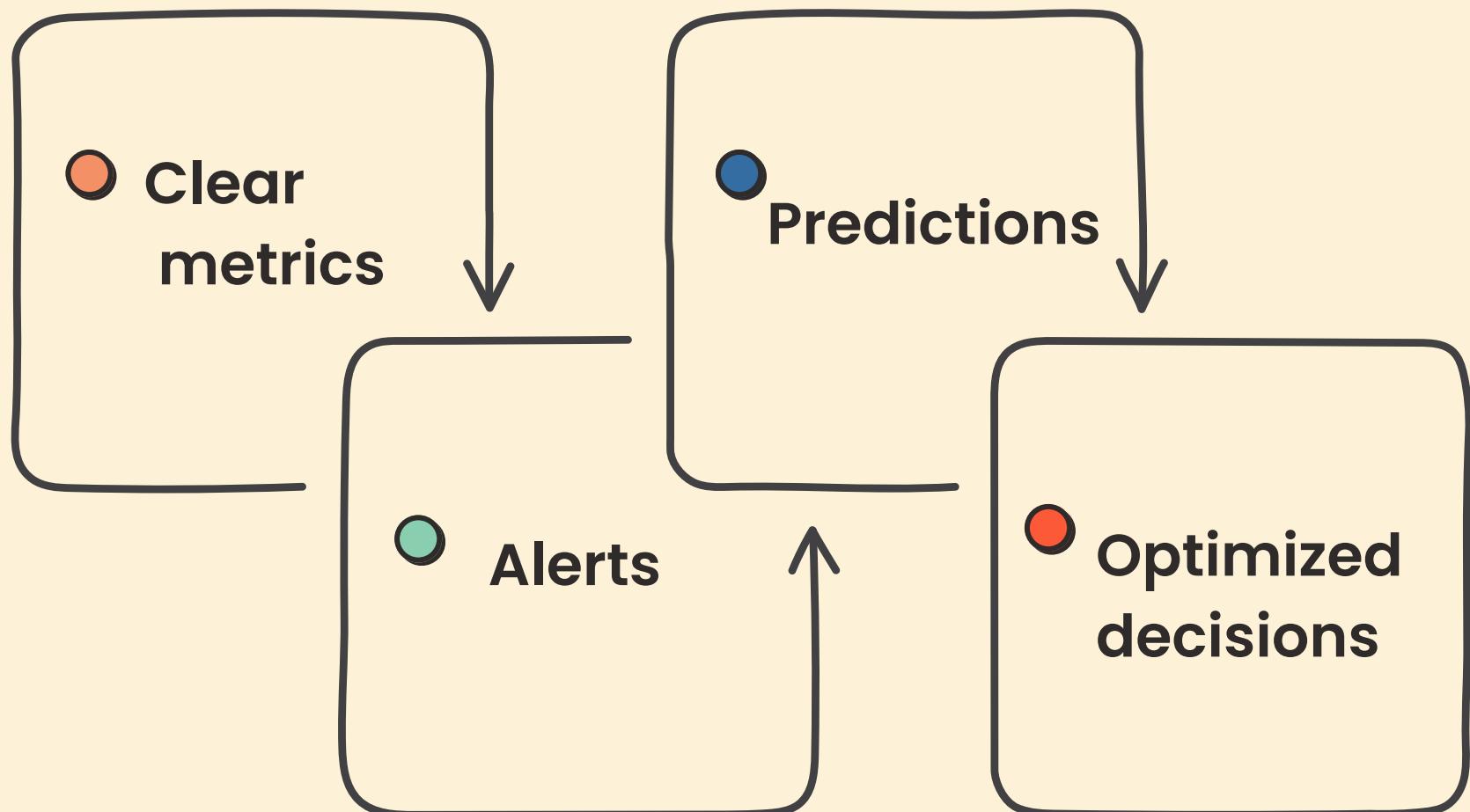


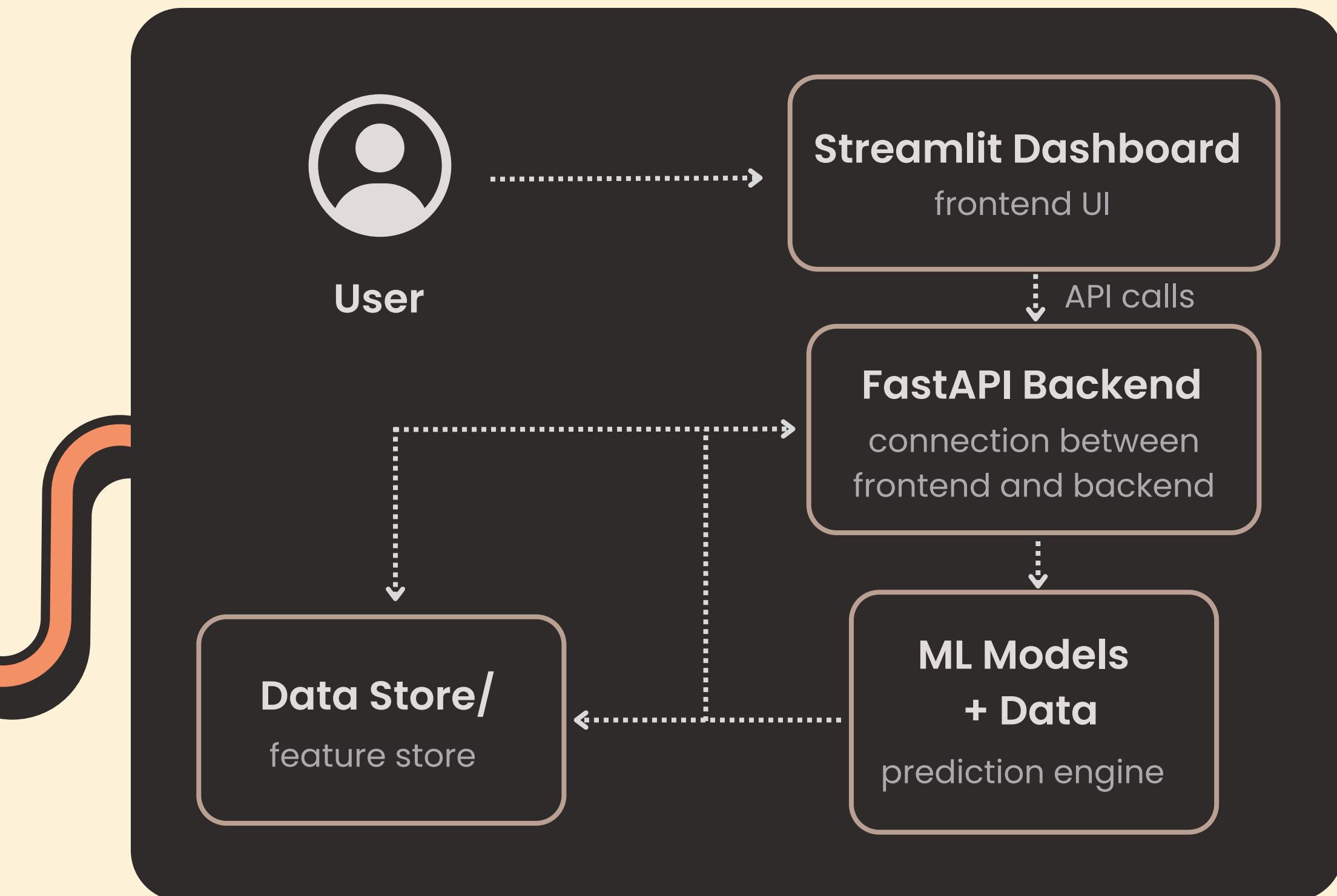
Solution Overview



What **Problem** We Fix

We convert complex, noisy
operations data into:



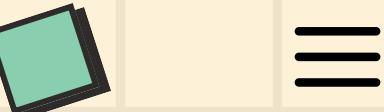


System Architecture

Flow

- Frontend (Streamlit) calls backend endpoints
- Backend (FastAPI) serves predictions, anomalies, optimizations, alerts
- Data flows from models to dashboard in real time

Key Features



01

- **Forecasting engine**

- 1-hour ahead forecast (for optimization)
- 24-hour ahead forecast (trend overview)
- Values fully normalized

02

- **Anomaly Detection**

- Rolling Z-score
- Sensitivity slider
- Highlights abnormal spikes/drops



03

- **Optimization Module**

- Evaluates live KPI health
- Generates readable recommendations
- Detects stable conditions

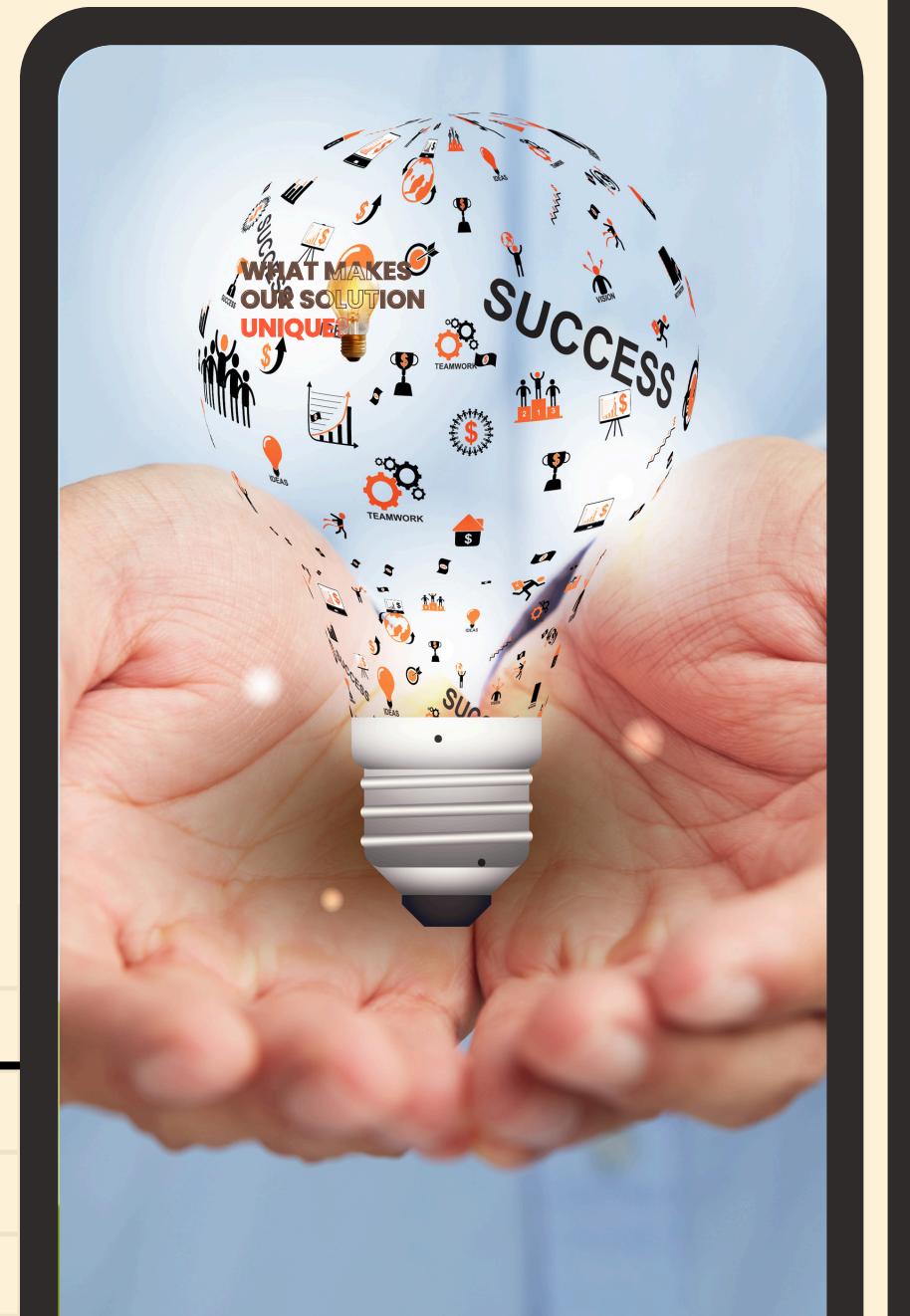
04

- **Live KPIs**

- Sorting Capacity
- Staff Available
- Vehicles Ready
- Congestion Level
- Inbound/Outbound Volume

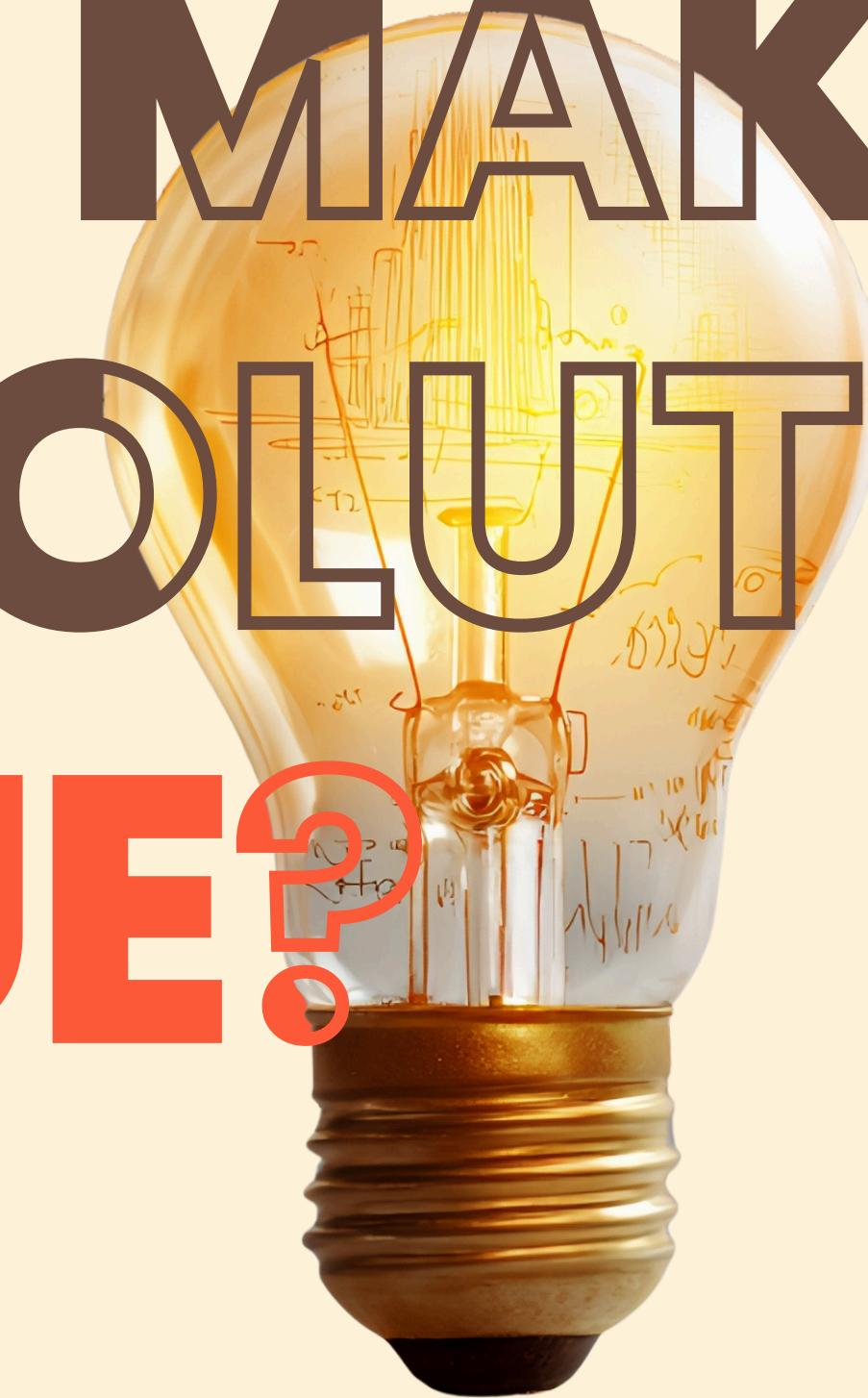


Innovation & Differentiation



SEKAI DEV UNIT

WHAT MAKES OUR SOLUTION UNIQUE?



WHAT MAKES OUR SOLUTION UNIQUE?



Fully real-time auto-refreshing dashboard



01

Unified data model combining live KPIs, anomalies, forecasts & optimization



02

Human-readable, action-oriented recommendations (not raw JSON)



03

Flexible anomaly sensitivity control



04

Clean, modular FastAPI backend with a data simulation engine



05

Rapidly deployable because data remains local (CSV-based)



06



SEKAI DEV UNIT

INNOVATION



SEKAI DEV UNIT

Blending rule-based
operational logic with
ML-inspired forecasting

Transforming raw logistics data
into instant decision

INNOVATION

Minimal dependencies → lightweight but powerful

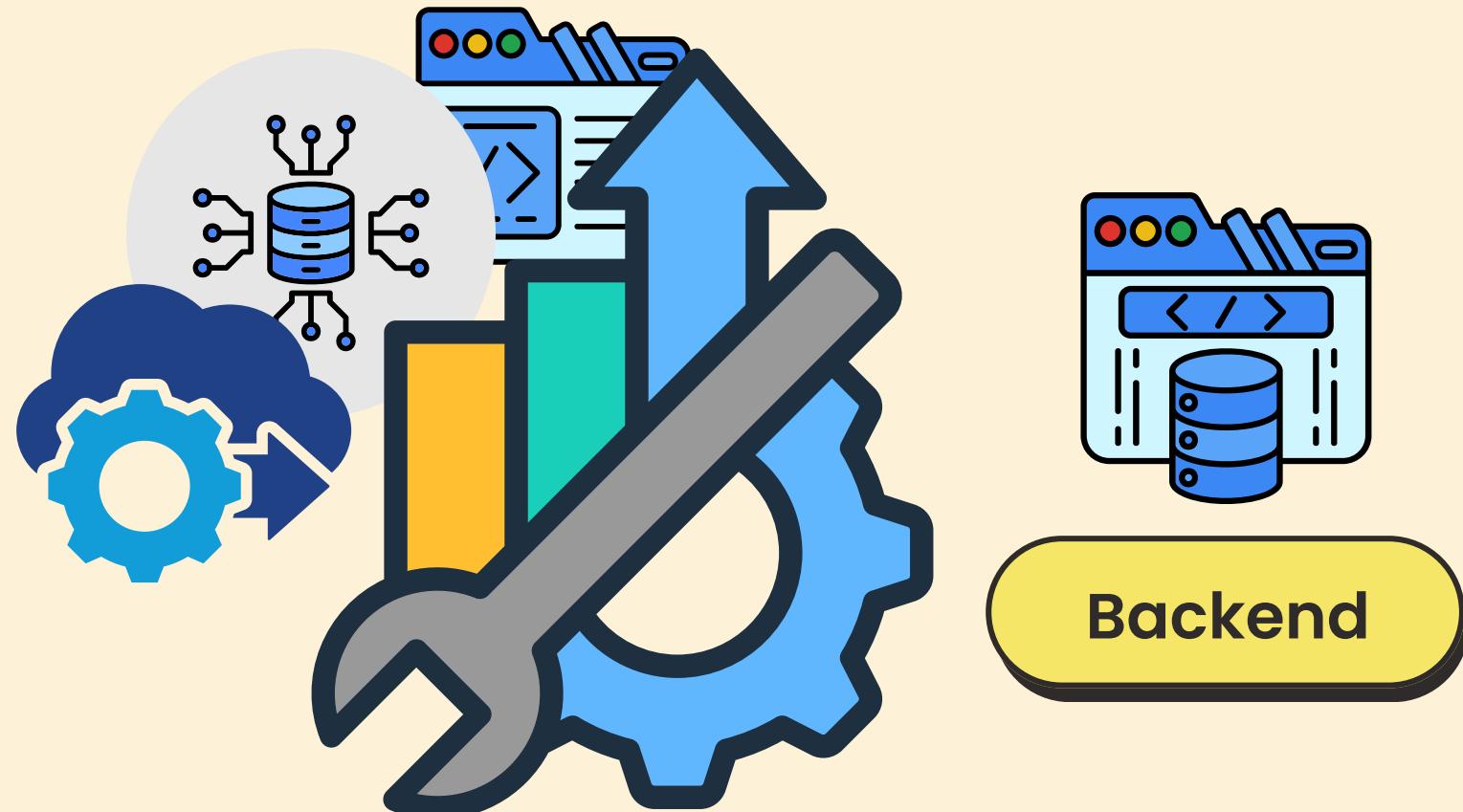


Tech Stack





Tech Stack



- Plotly for charts
- Streamlit
- Scikit-Learn
Linear Regression forecasting
- Pandas
Data transformation
- APScheduler
Background scheduler
- FastAPI
API framework

- Fully modularized backend (forecast anomaly, optimization, storage) ≡

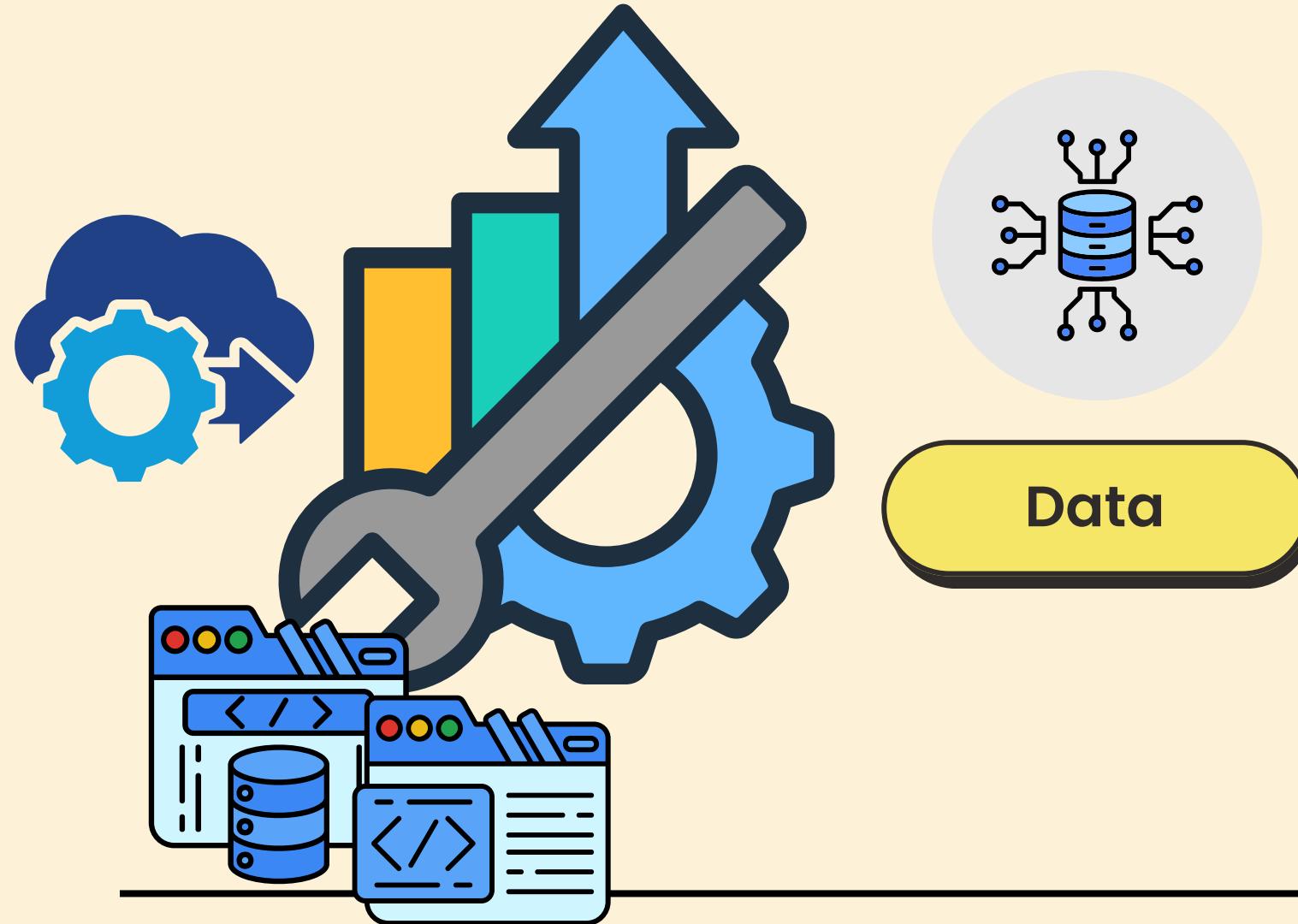
Tech Stack



- Randomized synthetic data generator
- CSV-based historical storage
- Auto-refresh every 5 seconds
- Plotly for charts
- Streamlit
- Scikit-Learn
Linear Regression forecasting
- Pandas
Data transformation

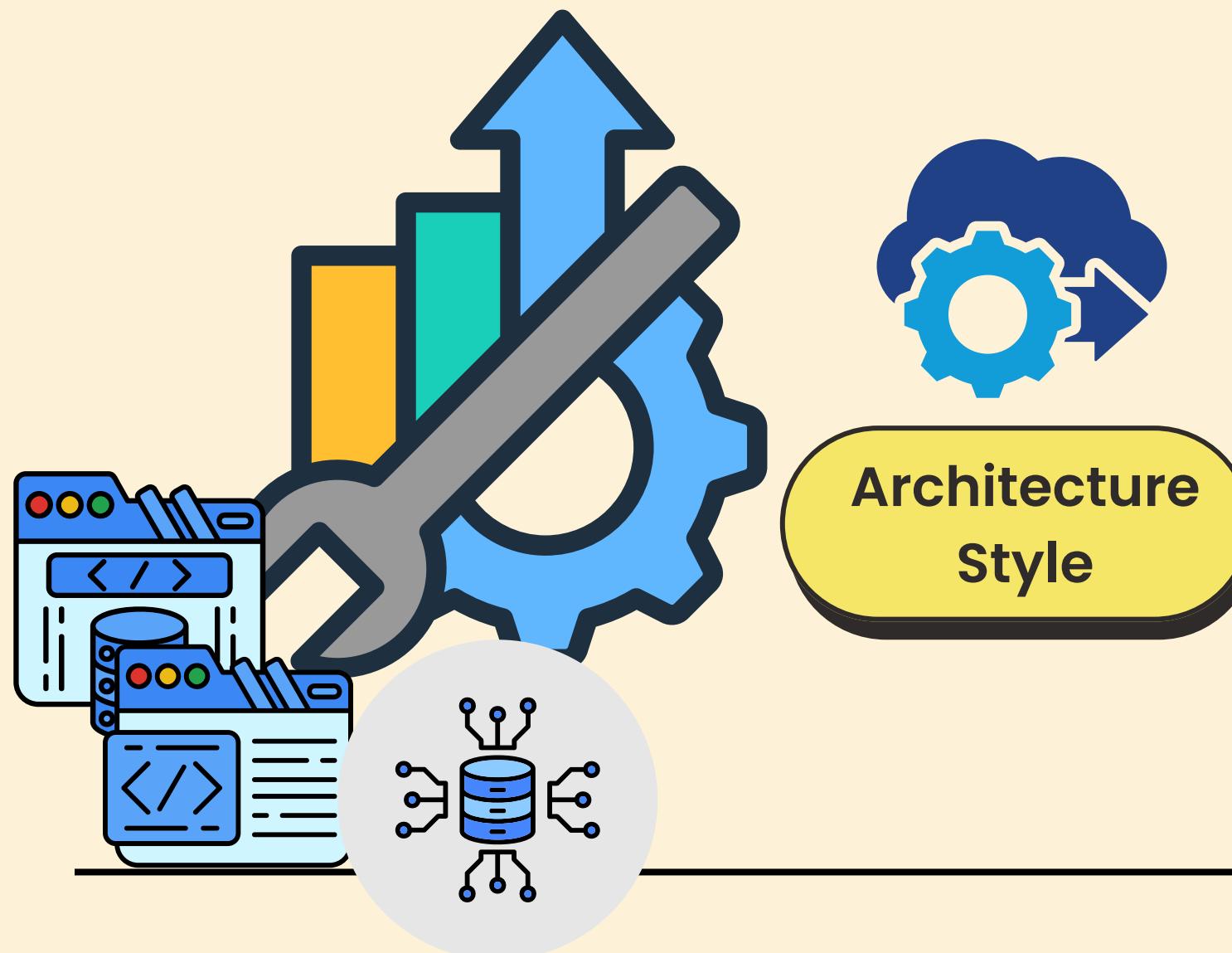


Tech Stack



- REST API microservice
- Fully modularized backend (forecast anomaly, optimization, storage)
- Randomized synthetic data generator
- CSV-based historical storage
- Auto-refresh every 5 seconds
- Plotly for charts
- Streamlit

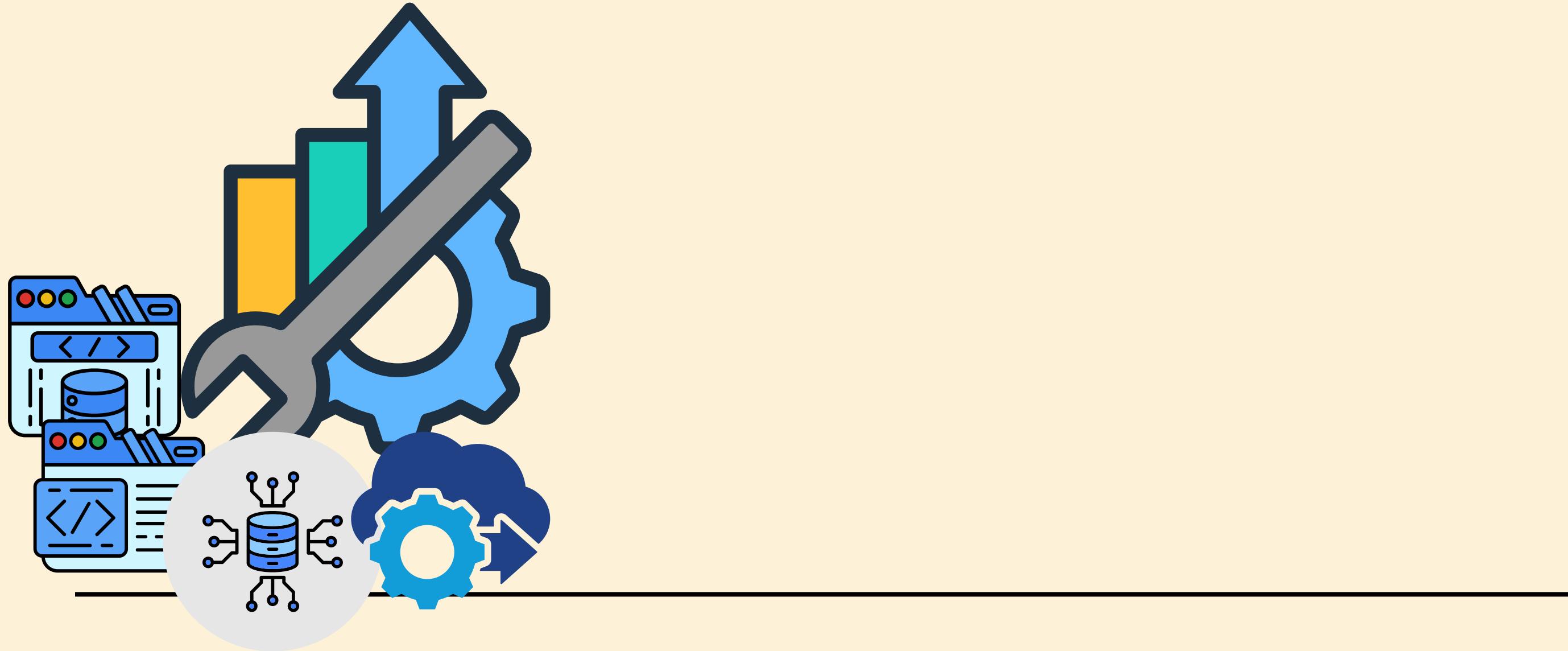
Tech Stack



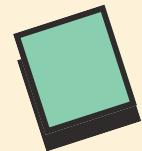
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Tech Stack



SEKAI DEV UNIT



User Journey & Demo Screen

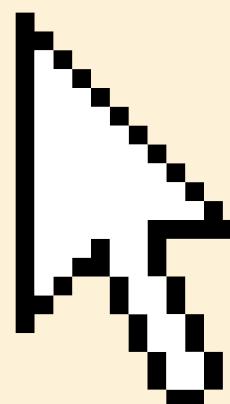




Impact

**Ready for
Deployment**

Conclusion

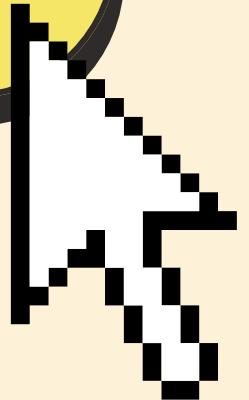




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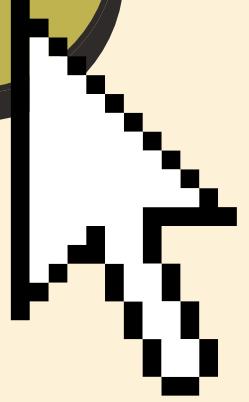
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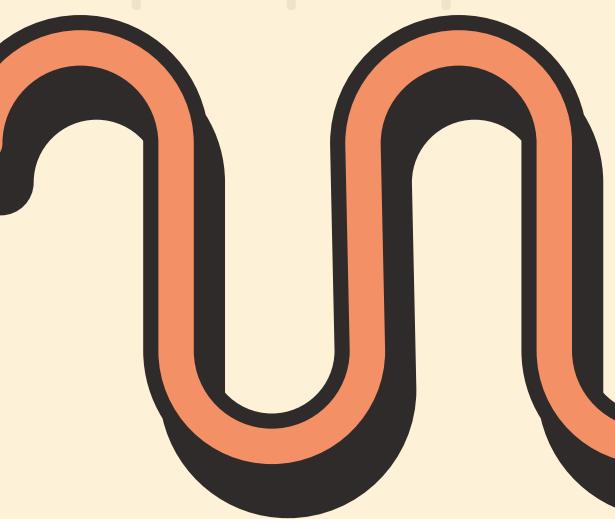


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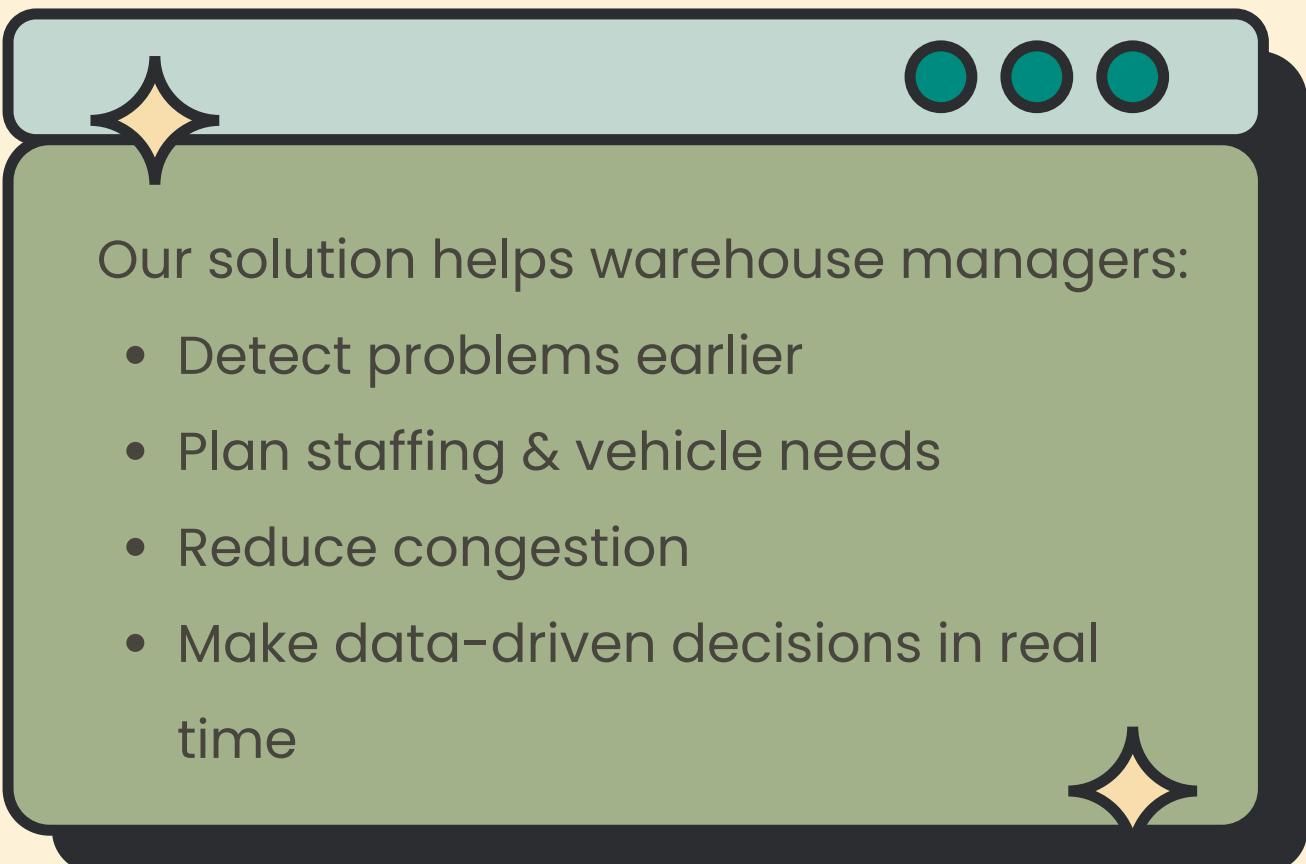
**Ready for
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Conclusion





Impact



Our solution helps warehouse managers:

- Detect problems earlier
- Plan staffing & vehicle needs
- Reduce congestion
- Make data-driven decisions in real time

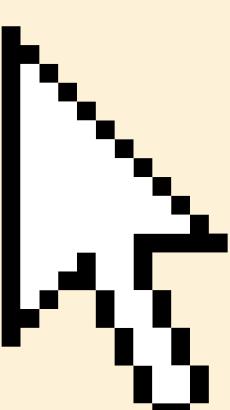
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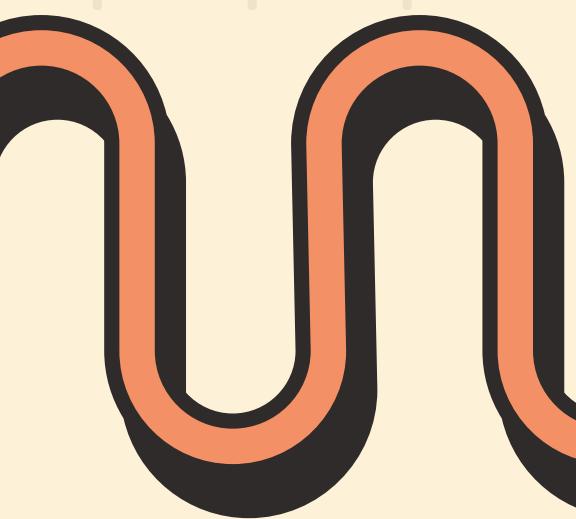


Impact

**Ready for
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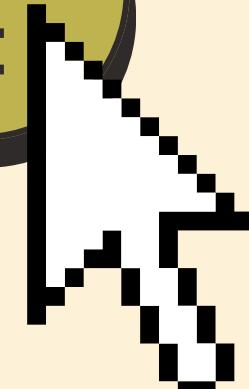
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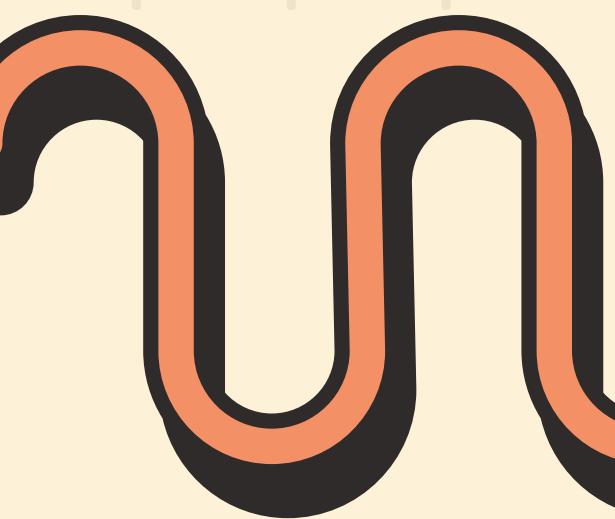


Impact

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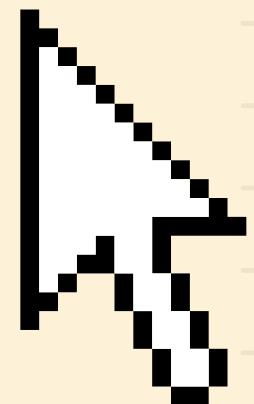
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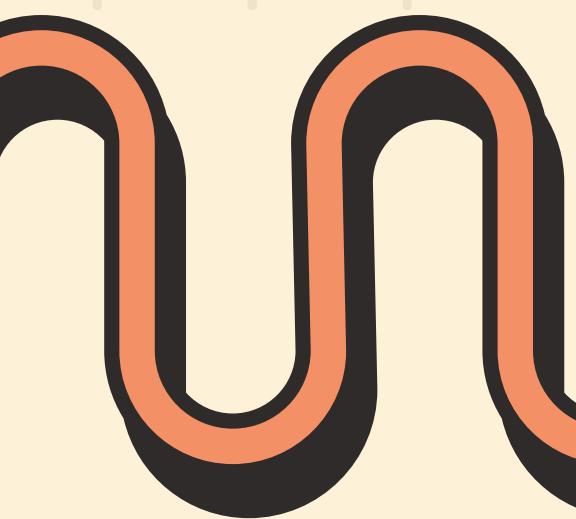


- Lightweight
- Expandable
- Can connect to real sensor or
BigQuery

**Ready for
Deployment**



Conclusion





- Lightweight
- Expandable
- Can connect to real sensor or
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**Ready for
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Conclusion



Thank You

End Presentation

