DAY 1 DELIVERABLE

Predictive OTIF Management

Moving Supply Chains from Reactive "Firefighting" to Proactive "Forecasting"

DATE

January 29, 2026

FOCUS AREA

Advanced AI & Logistics

> This project proposes a transformative **AI Control Tower** to solve the On-Time, In-Full delivery crisis.

By shifting from reactive descriptive analytics to predictive machine learning, we aim to reduce penalty costs by **20%** and achieve a **98%** OTIF score.

The "Hidden" Upstream Killers

Reactive Operations

Most organizations operate in "firefighting mode," discovering delivery failures only after the truck has arrived late. This reactive approach leads to inevitable penalties and damaged client relationships.

RESULT: HIGH PENALTIES

Inventory Imbalance

Stock often sits in the wrong warehouse due to static, historical-average based planning. Without real-time visibility, upstream inventory misalignment causes downstream OTIF failures.

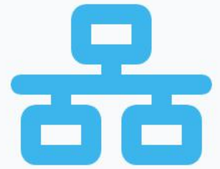
RESULT: STOCKOUTS

AI-Driven Control Tower

A Unified "Digital Twin"

We propose a centralized AI system that acts as a real-time replica of the entire supply chain network.

- **Ingest:** Real-time data from ERP, WMS, and TMS.
- **Predict:** Identify risks weeks in advance.
- **Prescribe:** Recommend stock transfers before failures occur.



Proactive Logic

If Risk Score > 80%

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Trigger Rebalancing

System Data Flow

Tech Stack: Neo4j (Graph DB) • Python (Model Logic) • Docker (Deployment)

The 3-Model Approach

MODEL A

Demand Forecasting

Tech: Transformers

Predicts granular SKU-level demand per location to identify inventory gaps before they become critical.

MODEL B

Risk Classifier

Tech: XGBoost

Assigns a "Failure Probability Score" (0–100%) to every open order based on weather and carrier data.

MODEL C

Network Solver

Tech: Linear Programming

Calculates the optimal corrective action (e.g., "Expedite from Warehouse B") balancing cost vs. speed.

Before vs. After

DIMENSION	CURRENT STATE (REACTIVE)	FUTURE STATE (PREDICTIVE)
Planning	Monthly static plans	Continuous, Real-time dynamic
Visibility	Siloed (Logistics vs. Warehouse)	Unified "Digital Twin" Network
Trigger	Customer Complaint	AI Risk Alert (>80% Prob)
Resolution	Manual firefighting	Automated rebalancing

Execution Roadmap

PHASE 1 (Months 1–3)

Foundation

Data Ingestion, Cleaning, and Graph Database Setup. Building the "Digital Twin" visibility layer.

PHASE 2 (Months 4–6)

Intelligence

Development and training of Demand Forecasting and Risk Classification models. Initial pilot.

PHASE 3 (Months 7–9)

Autonomy

Deployment of Network Solver for prescriptive actions. Integration with ERP for automated execution.

Projected Impact

Key Metrics

OTIF Score — 98% Target

Up from 85% baseline

Penalty Costs — -20% Reduction

Significant cost avoidance

ROI Drivers

- **Revenue Protection:** Preventing lost sales due to stockouts.
- **Cost Avoidance:** Reducing vendor chargebacks.
- **Efficiency:** Reducing "rush" shipping costs.

Thank You

We are ready to answer your questions.

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