SUPPLY CHAIN × AI × AUTOMATION

Building an *AI-Powered* Supply Performance Analytics Platform

How I architected an end-to-end data pipeline connecting enterprise ERP data to generative AI analysis and custom-built dashboards — turning hours of weekly manual reporting into a one-click strategic intelligence tool.

70%	$235M	300+	1
REDUCTION IN REPORTING TIME	ANNUAL SPEND UNDER VISIBILITY	PAST-DUE LINES AUTO-CLASSIFIED	SINGLE SOURCE OF TRUTH

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Portfolio Case Study

A supply chain *drowning in data*, starving for insight.

Every Monday morning, the same ritual played out: planners pulling raw exports from the ERP, hand-cleaning spreadsheets, building pivot tables, and assembling the same past-due purchase order report — line by line, supplier by supplier. By the time leadership saw the numbers, they were already days stale.

THE CORE PROBLEM

The organization had visibility into **what** was late — but no clear view of **why**. Manual reports lumped every past-due line into a single bucket, blending true vendor performance issues with system-generated noise. Without separating signal from noise, every Monday devolved into the same conversations with no clear action path.

The hidden cost of manual reporting

01 **Late visibility.** By the time the weekly report was compiled, reviewed, and circulated, the data was already several days old. Decisions were being made on yesterday's reality.

02 **No root-cause separation.** Reports couldn't distinguish between past-due lines caused by MRP system behavior (expedites with less time than vendor lead time) versus genuine supplier performance failures. Leadership couldn't target the right interventions.

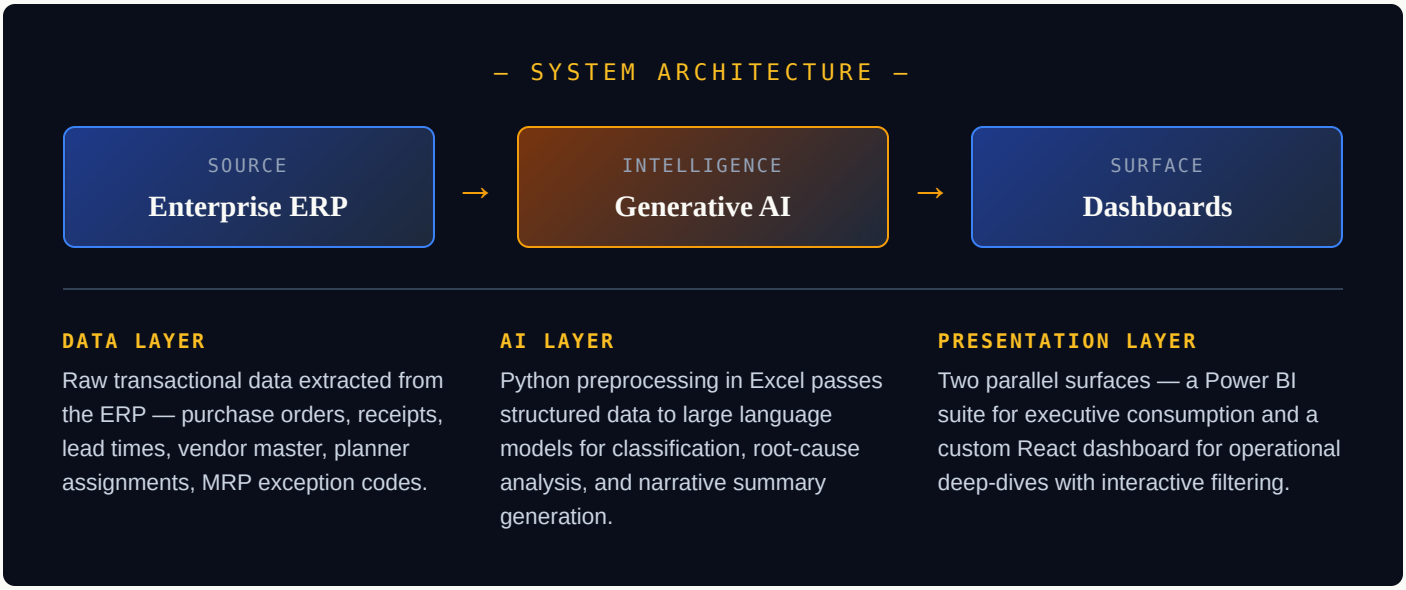
03 **No trending.** Each week's report was a snapshot. Patterns across weeks — emerging supplier issues, recurring expedite concentrations, aging tail risk — were invisible because nobody had time to maintain a longitudinal view.

The team needed a tool that could pull the ERP data, classify each line by its root cause, surface the patterns that mattered, and present it all in a format leadership could act on — without anyone spending half a day in Excel.

THE APPROACH

Connect ERP to AI to *insight*, automatically.

I designed a three-tier architecture that treats each layer as a specialist: the ERP holds the truth, AI does the heavy classification and pattern recognition, and the dashboard layer renders insight in formats tuned to each audience — operational, tactical, and executive.



WHAT IT DOES

Auto-classifies every past-due line as either an MRP-driven expedite or a true vendor late. Aggregates by vendor, buyer, planner, and part family. Surfaces concentrations, aging buckets, and week-over-week mix shifts. Generates a written analytical summary identifying the top action items.

WHAT IT DOESN'T DO

Replace human judgment. The platform was built to *elevate* what humans bring — strategic vendor relationships, contextual knowledge, negotiation. It removes the data-wrangling tax so analysts and leaders spend their time on the conversations that move the needle.

> *"The goal was never to remove people from the process. It was to ensure that when people were in the process, they were applying judgment to insight — not pivot tables."*
>
> — PROJECT DESIGN BRIEF

From raw data to *narrative*, in a single pipeline.

The platform runs as a coordinated workflow each week. Raw exports flow in, classification logic runs, the data is reshaped into the formats each consumer needs, and two outputs ship: a static executive PDF and an interactive operational dashboard. Total runtime: minutes, not hours.

The classification engine

The most important technical decision was how to separate expedites from genuine vendor lates. By cross-referencing the original PO release date, vendor lead-time on file, and original need-by date, the system flags each line:

Expedite
PO RELEASED INSIDE LEAD-TIME WINDOW — VENDOR SET UP TO FAIL

Full LT Late
VENDOR HAD FULL LEAD TIME — GENUINE PERFORMANCE ISSUE

Aging Tail
PAST DUE 60+ DAYS — ESCALATION OR ALTERNATE SOURCING TRIGGER

This single classification re-shaped every downstream conversation. Vendors flagged as predominantly expedite-driven became **partnership conversations** — focused on stocking parameters, safety stock, and demand smoothing. Vendors flagged as Full-LT-Late became **escalation conversations** — focused on commitment-date accountability and alternate sourcing.

The dashboards

EXECUTIVE SUITE — POWER BI

Top-line metrics. Week-over-week trending. Aging exposure. Vendor concentration. Designed for the five-minute leadership review — every chart answers a single question: "where do we focus this week?"

OPERATIONAL — CUSTOM REACT

React with hand-coded SVG visualizations (no third-party chart libraries — minimal dependency footprint for reliability). Four tabs: Overview, Box & Whisker by Vendor, Pain Inducers, and Action Plan.

Infor XA (ERP) · Claude AI · Gemini · Microsoft Copilot · Python in Excel · Power Query · Power BI · React · SVG / JS · Claude Code

WHAT THE DATA REVEALED

Insights that *changed* the strategy.

Once the classification engine was running, the data told a story that had been hidden for years. The dashboards weren't just faster reports — they were a lens that surfaced patterns leadership had never been able to see clearly:

01 **Most "past-due lines" weren't vendor failures.** A substantial share originated from MRP-triggered expedites — POs released inside the vendor's lead-time window, where the vendor was set up to be late before the order ever shipped. This re-framed the problem from "vendor management" to "stocking strategy."

02 **The stocking gap was systemic.** The vast majority of past-due items had zero on-hand inventory at the time of the demand signal, and most had no safety stock configured. The system was effectively running make-to-order on consumable parts.

03 **Pain was concentrated, not distributed.** A small subset of vendors and part families accounted for the majority of expedite volume. Targeted attention on a handful of suppliers would address the bulk of the weekly fire-drill.

04 **Mix shifts told a different story than totals.** Some weeks were expedite-heavy (stocking conversations). Others were Full-LT-Late heavy (vendor accountability). The same headline number could mean two completely different things — and the dashboard made the difference visible at a glance.

OUTCOMES

~70%
REDUCTION IN MANUAL REPORTING TIME

Real-Time
VISIBILITY FOR LEADERSHIP REVIEWS

Multi-Layer
AUDIENCE-TUNED DASHBOARDS

Weekly leadership reviews now open with the dashboard's own narrative summary — generated by AI from the week's data — and the conversation jumps straight to action items. The data-wrangling tax is gone. The strategic conversation gets the time it deserves.

WHAT I LEARNED

Building this changed how I think about *supply chain*.

AI augments judgment — it doesn't replace it

The most valuable lesson was the boundary line between what AI does well and what it doesn't. The classification engine, pattern detection, narrative summarization — all enormously powerful. But the strategic decisions about which vendor to escalate, which stocking parameter to change, which buyer to coach — those remained firmly human. The tool gave humans more time and better information for the decisions only they could make.

The right architecture matters more than the right tool

Early in the project, the temptation was to pick a single platform and force everything through it. The actual win came from letting each layer do what it does best: ERP for transactional truth, AI for pattern recognition, Power BI for executive visualization, React for operational interactivity. Decoupling those layers meant each one could evolve independently.

Domain expertise is the unfair advantage

The hardest part wasn't the technical work — it was knowing which questions to ask. Distinguishing expedite-driven lateness from genuine vendor performance required years of operational context. AI accelerated the build; supply chain experience determined whether the build was solving the right problem.

LOOKING FORWARD

The future of supply chain work isn't a choice between operational expertise and technical fluency — it's the combination.

Supply chain professionals who can frame the right problems, build the tools that solve them, and translate output back into decisive action will define the next decade. This platform was the proof of concept. The roadmap from here is bringing that same combination — operational depth + AI fluency + builder mindset — to every corner of the function.

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