

THE AGENTIC SUPPLY CHAIN:

From Reactive Execution to Autonomous Retail Orchestration



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SECTION 1

Introduction

A powerful consensus is forming across the world's leading supply chain thought leaders. From Gartner and the World Economic Forum to IBM, BCG, McKinsey and PwC, an imminent, fundamental shift in how supply chains are designed, operated and optimized is underway.

The supply chain of the near future is not a process to be managed. It is an intelligent system that manages itself within human-defined boundaries.

- Legacy supply chains are trapped in a detect-delay-react loop. Manual analysis, siloed systems and reactive decision-making are structurally mismatched to a world of continuous disruption.
- Agentic AI closes this loop, moving from insight to autonomous execution within governed guardrails and compressing the detect-decide-act cycle from days to seconds.
- The data foundation is the differentiator. The partners in this ecosystem deliver their full value only when operating on clean, governed, unified data, making the Databricks Platform the critical enabler of this transformation.
- The window for advantage is narrow. Gartner predicts 50% of supply chain management solutions will incorporate agentic AI by 2030; early leaders are already reporting 2-point EBITDA gains and 61% higher revenue growth than peers.

SECTION 2

The Convergent Vision: From Chain to Intelligent Network

Across every major consultancy and analyst firm surveyed in the past six months, a coherent thesis is emerging. The shift is not primarily technological; it is architectural and organizational. Three structural changes define it:

1 From Linear Chain to Networked Ecosystem

The “supply chain” is giving way to a dynamic, multi-node network in which partners collaborate in real time, pooling capacity, inventory and risk intelligence. Volatility, uncertainty and ambiguity are no longer temporary conditions but the permanent backdrop. In interconnected networks, plants and nodes collaborate, but each new relationship multiplies planning complexity. Variables like transit times, regional risks, capacity variations and shifting local demand turn decision-making into a multidimensional challenge that exceeds human bandwidth at scale.

IDC documented two structural failure modes from the 2024–2025 disruption cycle:

- **Tier-N Blindspot:** When a climate event incapacitated a Tier 3 supplier, a major automotive manufacturer only discovered the risk when Tier 1 shipments ceased, weeks later.
- **Digital Tower of Babel:** During port congestion, manual handoffs between disparate systems prevented networks from adapting, causing cascading delays.

These structural challenges demand greater visibility and interconnectivity across networked supplier ecosystems.

2 From Human Execution to Agent Orchestration

The defining shift is the move from “AI that informs” to “AI that acts”.

As [Supply Chain Management Review](#) describes it, agentic AI moves beyond chatbot-style assistance to governed, ontology-backed execution systems that autonomously detect, decide and act within defined guardrails. To be transformative, agents must go beyond producing recommendations and have the authority to act: creating tasks, setting holds, re-promising delivery dates, re-tendering loads and routing exceptions.

Bounded autonomy is the scalable model, not full autonomy. For low-confidence or high-impact situations, well-designed agents must escalate a decision package that explains:

- What happened and what is impacted.
- What has already been attempted.
- Available options, with a clear recommendation.

This architecture of graduated authority distinguishes production-grade agentic AI from point-solution automation.

3 From Planner as Firefighter to Planner as Orchestrator

Rather than replacing planners, agentic AI redefines their role. The planner is no longer fighting fires; they are orchestrating competing stakeholder interests, grounded in a rich data foundation. AI automates thousands of routine decisions, from replenishment triggers and carrier selection to exception routing and invoice validation. This frees planners to focus on strategy, innovation and the complex trade-offs where human judgment is irreplaceable.

That is the standard being set: AI as a co-executor of business operations, not just a productivity tool.



AI is great for everyday tasks, like writing emails. But to provide maximum value for business, it needs to tell you which customer deliveries are at risk and take automated action to reroute deliveries and notify logistics partners.

— ALEX RINKE, CEO, CELONIS



SECTION 3

Why 2025–2026 Is the Inflection Point

Three forces are converging to make this transformation commercially imperative right now.

Institutional Demand Has Reached a Tipping Point

Gartner reports a 1,445% increase in multi-agent system inquiries from Q1 2024 to Q2 2025. More than 76% of Chief Supply Chain Officers say AI agents that perform repetitive, impact-based tasks will improve their overall process efficiency.

IBM's research with Oracle and Accelalpha found that organizations with higher AI investment in supply chain operations report revenue growth 61% greater than their peers. And 62% of supply chain leaders recognize that AI agents embedded into operational workflows accelerate speed to action.

The Data Foundation Is Ready, If Built Correctly

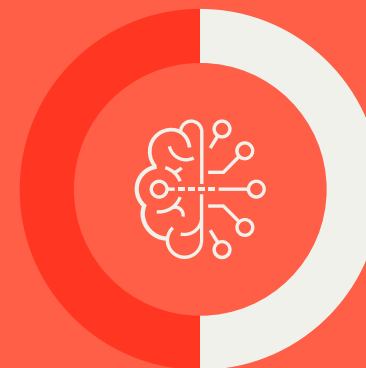
After years of ERP modernization, WMS deployment and cloud data migration, many enterprises now have the raw data substrate required for AI orchestration. What has historically been missing is the layer that unifies, contextualizes and governs that data in real time.

McKinsey's 2025 State of AI survey found that 88% of organizations use AI in at least one business function, but only 6% are capturing meaningful enterprise-wide value. The differentiator between those groups is workflow design and data quality, not model capability.

The data gap is particularly acute in supply chains, where AI has long relied on delayed, incomplete, or forecasted data rather than real-world conditions. Effective agentic systems require continuous, reliable signals from the physical world — a shift now scaling across the industry. Wiliot's collaboration with Walmart across more than 90 million pallets is one example of how real-time, item-level visibility is closing this gap and giving AI the grounded data it needs to reason reliably.

The Business Case Is Proven

BCG documented a 2-point EBITDA lift within two years at a global industrial goods company that embedded agentic AI into its daily supply chain workflows. **Pecan AI's** customers have achieved 15% labor cost reductions and 25%+ inventory cost savings from demand forecasting improvements deployed in under 14 days.



Gartner forecasts that **50%** of supply chain management solutions will use intelligent agents by 2030. Competitive advantage relies on whether your organization built the agentic foundation properly before the window closed.

SECTION 4

The Agentic Supply Chain Architecture: A Functional Layer View

Building an agentic supply chain requires a coherent architecture in which specialized functional capabilities stack upon a unified data foundation. Each layer solves a distinct problem.

Gartner describes this as a Data Fabric Architecture. We’ve elected to extend this interoperable data foundation to modern supply chain organizations (Figure 1).

The architecture is deliberately bottom-up. No layer can operate reliably without the one beneath it.

A trade compliance agent cannot reason about supplier dependencies if the semantic context layer has not modeled those relationships. A process orchestration layer cannot coordinate agent actions if the execution layer does not expose real-time state. And every layer fails if the data intelligence platform beneath it does not provide clean, governed, interoperable data.

LAYER	FUNCTIONAL CAPABILITY
8 Sustainability Intelligence	Product-level carbon footprinting, Scope 3 emissions visibility, CSRD/regulatory compliance, climate-resilient sourcing optimization
7 Network Risk & Trade Intelligence	Multi-tier supplier risk monitoring, geopolitical event detection, tariff modeling, forced labor compliance, n-tier network visibility and Product Passports
6 Demand & Predictive Intelligence	AI-powered demand forecasting across hierarchy levels, explainable predictions, SKU-to-category reconciliation, and new product introduction modeling
5 Process Intelligence & Orchestration	Process mining across enterprise systems, real-time operational digital twin, cross-system agent orchestration, and detect-to-act loop closure
4 Supply Chain Planning & Orchestration	AI-native planning spanning demand-to-execution: replenishment, allocation, promotion optimization, assortment, logistics planning, and supplier collaboration
3 Physical Sensing & Item Intelligence	Continuous, scan-free item/case/pallet visibility; physical AI converting real-time location, temperature, humidity, and condition data into operational intelligence and autonomous workflow actions
2 Semantic Context & Knowledge Graph	Operational ontologies encoding supply chain entities, relationships, and constraints; semantic layer enabling multi-hop AI reasoning natively within the lakehouse
1 Data Intelligence Platform	Unified data lakehouse presenting data from across internal and external sources, governed data contracts, real-time feature computation, model lifecycle management, production-grade agent deployment, and orchestration infrastructure

Figure 1. The Agentic Supply Chain: Eight Functional Layers

Layer 1: The Data Intelligence Foundation

Every capability in the stack above is gated by a single question: **Does the organization have clean, governed, unified data that AI agents can reason on with confidence?** Most supply chain organizations today do not. They have data in vast quantities, scattered across ERPs, WMS platforms, TMS systems, supplier portals, IoT endpoints, and demand planning tools. What they lack is a unified substrate that connects these sources, enforces governance, and makes current, trustworthy data available to agents in real time.

The data intelligence platform transforms a fragmented data estate into an AI-ready foundation. Its core functions in the agentic supply chain context are:

- Ingesting and unifying data across structured, semi-structured, and streaming sources.
- Enforcing consistent data governance and lineage across domains and regulatory boundaries.
- Providing a feature store that ensures the same demand signals, inventory positions, and supplier attributes powers both human analytics and agent decision-making.
- Deploying production-grade AI agents built on real operational data through governed model lifecycle management.

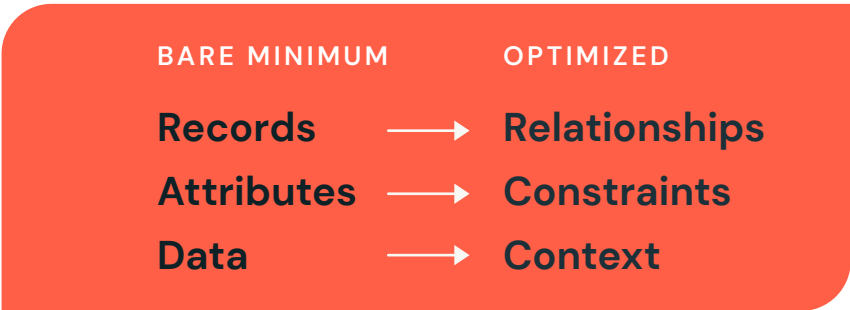
WHY THIS MATTERS:

Without this, every specialized capability above it will eventually fail because its inputs cannot be trusted.



Layer 2: Semantic Context & Knowledge Graph

AI systems that must reason across complex supply chain environments require structured meaning. The semantic context layer is where data becomes knowledge.



In operational terms, this layer models the supply chain as a graph: products depend on components; components are sourced from facilities; facilities are operated by suppliers in specific geographies; supplier relationships carry constraints around lead times, compliance requirements, and capacity limits.

When an agent decides whether to authorize an alternative sourcing action, it involves more than executing a query. It traverses a graph of relationships, applying rules and constraints encoded by domain experts.

Supply Chain Management Review describes an operational ontology — a structured model of objects, relationships, rules, and constraints — as core infrastructure for agentic AI. The semantic context layer is the mechanism by which governance guardrails are enforced at reasoning time, not just at policy time.

WHY THIS MATTERS:

Without this, agents resort to pattern matching on raw data, producing recommendations that are technically derived but operationally brittle.

Kobai *Semantic Context & Knowledge Graph*

Operational truth model for agentic AI: enabling governed, explainable reasoning at scale

KEY CAPABILITIES

- Provides a Lakehouse-native semantic and knowledge graph layer directly on the Databricks Data Intelligence Platform, with no data movement to external systems and no separate system of record
- Executes semantic queries using Databricks compute, scaling across large, distributed datasets
- Publishes governed semantic models as SQL views and APIs for analytics, AI/ML, and agent workflows
- Transforms supply chain data into a governed, operational model that AI agents can reason over in real time
- Supports collaborative ontology development by domain experts and technical teams
- Encodes enterprise entities, relationships, and constraints to give AI agents a shared, consistent understanding of operations
- Includes pre-built ontology accelerators for supply chain, manufacturing, aerospace, and energy
- Enables multi-hop reasoning across complex networks (e.g. suppliers, plants, products, and logistics flows)
- Maintains version-controlled semantic models with automated impact analysis

PROOF POINT

One customer unified inventory, warehousing, supplier, and fulfillment data across multiple systems into a single trusted semantic model, reducing cycle times by an estimated 30-40%, significantly reducing stockouts caused by inconsistent data, and enabling faster root-cause identification for supply chain disruptions.

Databricks Integration: Saturn knowledge graph runs natively within Databricks Lakehouse using Unity Catalog for governance. The architecture works directly against governed Lakehouse data without requiring a separate graph database or replicated data stores.

Layer 3: Physical Sensing & Item Intelligence

A limitation of legacy supply chain AI is that it operates on outdated data. By the time an agent acts, conditions have already changed. Periodic inventory counts, batch ERP uploads, and demand forecasts built on historical shipment records all share this flaw. The physical sensing layer closes this gap with a **continuous, real-time signal of what is actually happening to goods in motion.**

This layer transforms the physical supply chain into a stream of digital events: a pallet enters a distribution center; a case of perishables experiences a temperature excursion; an asset sits idle beyond its expected dwell time; inventory positions update automatically as goods move. These events feed directly into the AI models and agent decision systems above, ensuring that every recommendation and autonomous action is grounded in reality rather than projected state.

An inventory replenishment agent that triggers on projected stock positions will perform materially worse than one that triggers on actual, continuously updated item counts. A cold chain compliance agent that acts on batch temperature logs will detect excursions hours after the fact, while one that acts on continuous sensor data can intervene before spoilage occurs.

WHY THIS MATTERS:

The economic value scales with the perishability of goods and the velocity of operations, making it especially important for food, CPG, pharma, and fast-fashion supply chains.



Wiliot *Physical Sensing & Item Intelligence*

Physical AI: turning every item in the supply chain into a continuous, intelligent data source

KEY CAPABILITIES

- **Physical AI platform:** AI/ML engine converting raw sensing events into operational intelligence, alerts, and automated workflows
- **IoT Pixels:** Postage-stamp-sized, battery-free Bluetooth sensors that harvest energy from ambient radio waves, generating a continuous stream of data about location, temperature, humidity, light, and other attributes
- **Continuous, scan-free visibility:** Provides real-time, item-level visibility across the supply chain, creating an always-on view of operations.
- **Inventory intelligence:** Delivers real-time inventory visibility (in-store, in-transit, and across assets), improving availability, reducing overstock, and minimizing manual cycle counts
- **Condition & environment monitoring:** Tracks temperature, asset health, and environmental conditions continuously to ensure quality, compliance, and reduced spoilage or loss
- **Workflow automation & optimization:** Enables dock automation, exception handling, FIFO/FEFO compliance, and broader workflow intelligence to reduce manual labor and eliminate inefficiencies
- **End-to-end supply chain accuracy & visibility:** Improves fulfillment accuracy, reduces errors, and provides granular tracking of products throughout facilities and transit

PROOF POINT

Walmart is deploying Wiliot IoT Pixels across its full U.S. supply chain, targeting 90 million pallets across 4,600 Supercenters, Neighborhood Markets, and 40+ distribution centers by the end of 2026. This is the largest Physical AI deployment of passive Bluetooth Low Energy (BLE) in retail history, with Wiliot data feeding directly into Walmart’s AI systems for inventory accuracy, supply chain efficiency, and cold chain compliance.

Databricks Integration: Wiliot’s Physical AI platform is designed as an AI-ready data source, producing continuous, high-fidelity sensing event streams that feed into Databricks Feature Store for model training and real-time agent decision-making. Avery Dennison has formalized a manufacturing and go-to-market partnership with Wiliot to scale production and deployment globally.

Layer 4: Supply Chain Planning & Orchestration

The execution layer is where agent decisions become physical actions: replenishment orders are generated, inventory is allocated across channels, logistics are scheduled, and promotions are planned against real demand signals. This layer encompasses the full cycle from demand sensing through to operational execution decisions: which stores receive which inventory, in what quantities, on what schedule, and with what promotional support.

The distinction matters architecturally. A conventional WMS or OMS receives instructions and executes them. An AI-native retail planning and execution platform generates those instructions autonomously within defined authority bounds and continuously updates them as demand signals shift. Replenishment agents do not wait for a planner to review an exception report; they detect the imbalance, calculate the optimal order quantity and timing, validate it against supplier constraints, and either execute autonomously or escalate with a complete decision package.

The architecture requirement at this layer is bidirectionality. Execution platforms must both consume agent decisions and produce the operational signals that feed back into the intelligence layers above them. Store-level inventory positions, allocation outcomes, promotion lift actuals, and supplier order confirmations all become inputs to the demand intelligence layer. This feedback loop is what makes the agentic supply chain self-correcting across the full planning and execution cycle.

WHY THIS MATTERS:

This feedback loop is self-correcting rather than merely self-executing.

Algonomy *Retail Supply Chain Planning & Execution*

AI-native retail planning from demand signal to execution order, serving 500+ global brands

KEY CAPABILITIES

- **RetailAI:** AI-native retail supply chain planning and execution suite built natively on Databricks, leveraging Apache Spark, Photon, Mosaic AI, MLflow, Unity Catalog, Agent Bricks, and AI/BI Genie — with secure, scalable data governance throughout
- **Demand sensing via granular AI predictions:** high-fidelity forecasting at the SKU-store-day level, with advanced hierarchical models that capture seasonality and trends blended with SKU-level intelligence for price elasticity, cannibalization, and halo effects
- **Native promotion handling:** pre-built modeling designed specifically to decode the complexity of multi-stacked promotions common in high-velocity categories, including food, health, and beauty
- **End-to-end agentic replenishment:** automated, autonomous order suggestions that bridge store and SKU needs to DC and supplier orders, optimizing the entire network daily within governed authority bounds
- **Dynamic constraint optimization:** a balanced engine that respects static vendor parameters — lead times, pack sizes — while dynamically adjusting for supplier service levels to mitigate both out-of-stocks and overstocks
- **Inventory allocation:** AI-driven allocation of constrained inventory across stores, channels, and fulfillment locations based on demand signals and service level targets
- **Assortment planning:** AI-assisted range rationalization, new product introduction modeling, and planogram compliance
- **Logistics efficiency:** Integrated truck-load and container optimization that maximizes cube utilization without compromising inventory health
- **Vendor Link:** Native integration for real-time supplier visibility and AI-powered collaborative planning across the retailer-supplier network, with SAP Business Data Cloud connectivity running through Databricks
- **Agentic planning interface:** Agent Bricks and AI/BI Genie power conversational and autonomous planning interactions, giving planners governed oversight of AI-driven decisions rather than manual execution of routine ones

PROOF POINT

Algonomy serves 500+ global retail and CPG brands across grocery, fashion, convenience, and specialty retail. Algonomy CBO Ravi Shankar: “Retail Planning is Agentic AI’s #1 use case, where AI delivers the most immediate and measurable success. By building our solution on Databricks, we’ve combined the power of compound AI systems with a robust data foundation to turn complex models into autonomous action.”

Databricks Integration: RetailAI is built natively on Databricks, leveraging the full breadth of the platform’s capabilities to deliver data and AI transformation to retailers. Databricks Head of Partner Ecosystems for Consumer Industries Bryan Smith: “RetailAI gives retailers a powerful platform for driving transformation, combining Algonomy’s deep retail domain expertise with the intelligence and scale of the Databricks Data Intelligence Platform.”

Layer 5: Process Intelligence & Execution Orchestration

Knowing that a customer delivery is at risk is different from **understanding why** it is at risk, and both are different from taking corrective action before it becomes a service failure. This layer occupies the space between signal and response, providing the (1) enterprise-wide operational context that agents need to act effectively and (2) coordination infrastructure required to execute those actions across multiple systems simultaneously.

Process intelligence addresses the gap between what data shows and how work actually flows. An order can be late for many reasons, such as a credit hold in the ERP or a compliance flag in the trade system.

The orchestration function compounds this value. When a process intelligence system surfaces a root cause, it provides not just a diagnosis but an action surface. It knows which systems need to be updated, which workflows need to be triggered, and which stakeholders need to be notified. An orchestration engine can then coordinate these actions simultaneously across ERP, WMS, TMS, and carrier systems, compressing a multi-day manual exception management cycle into a sub-minute automated response.

WHY THIS MATTERS:

An agent operating on structured data alone cannot reliably distinguish root cause from symptom, or determine the correct intervention.



Celonis *Operational Context & Orchestration*

Operationalizing AI by orchestrating agents, humans, systems, and workflows across the enterprise, grounded in real-time operational context

KEY CAPABILITIES

- **Orchestration Engine:** coordinates actions across enterprise systems, AI agents, automations, and human workflows to operationalize end-to-end process execution
- **Celonis Agent Tools (via MCP):** standardized, secure gateway enabling AI agents to discover, retrieve, and act on real-time operational context across systems without brittle custom integrations
- **Open and extensible AI connectivity:** feeds operational context into any agentic platform through MCP, APIs, and OpenAPI-based integrations
- **Process Intelligence Graph:** living digital twin of enterprise operations ingesting data from ERP, WMS, CRM, TMS, and logistics systems in real time — the operational foundation that makes orchestration decisions reliable
- **Object-centric process mining:** tracks entities such as orders, shipments, and suppliers across multiple intersecting processes simultaneously
- **Solution Suites:** packaged supply chain, sustainability, finance, and front-office deployments with pre-built connectors and business logic
- **Celonis Data Core:** zero-copy, bidirectional lakehouse integration for continuous data synchronization with Databricks

PROOF POINT

Vinmar is automating a \$3B business unit’s Order-to-Invoice process using Celonis Orchestration Engine and AI agents powered by Process Intelligence, increasing operational productivity by 20% through coordinated workflows across ERP, logistics, banking, and documentation systems. In a separate deployment, a leading consumer goods company used Celonis to discover thousands of orders being automatically rejected due to minimum order quantity thresholds — bundled and fulfilled once process intelligence surfaced the root cause.

Databricks Integration: Celonis feeds real-time operational context and process intelligence directly into Databricks Agent Bricks through APIs and MCP-based services, enabling production-grade AI agents grounded in live enterprise execution data and governed workflows.expertise with the intelligence and scale of the Databricks Data Intelligence Platform.”

Layer 6: Demand & Predictive Intelligence

Agentic supply chains execute well only on decisions that have been forecasted correctly. Demand intelligence is the upstream variable that drives almost every downstream operation: procurement volumes, production schedules, inventory positioning, transportation capacity, and labor planning all derive from the organization’s best estimate of what customers will want and when. Errors at this layer cascade across the entire system.

IHL Group estimates businesses lose \$1.7 trillion annually to forecasting errors, with retail stockouts and overstocks alone costing over \$1 trillion each year. When supply chains are systematically misaligned with actual demand, organizations hold too much inventory of the wrong things and too little of the right ones.

The demand intelligence layer enables agents throughout the supply chain to act on forward-looking signals rather than backward-looking averages. A replenishment agent with access to accurate, explainable forecasts across all hierarchy levels, from individual SKUs to total category demand reconciled automatically, can **make allocation decisions with genuine confidence**. An agent cannot operate within governance guardrails if neither the agent nor a human supervisor can understand why a particular replenishment quantity was selected.

WHY THIS MATTERS:

Better forecasting is required for handling new product introductions, trend inflections, demand shocks, and the persistent volatility that has characterized global markets since 2020.



Pecan AI *Demand & Predictive Intelligence*

AI-powered demand forecasting for supply chain teams, delivering production-ready, explainable forecasts for faster, more confident planning decisions.

KEY CAPABILITIES

- **DemandForecast.ai:** dedicated demand forecasting platform for medium-to-large enterprises, enabling supply chain teams to generate accurate forecasts without data science overhead
- **Intelligent demand understanding:** identifies unconstrained demand patterns and automatically detects and adjusts for anomalies, outliers, spikes, and data drift
- **Multi-hierarchy forecasting:** SKU, store, region, product family, and total category levels with automatic reconciliation
- **Enterprise integration:** native connectors to Databricks, Snowflake, BigQuery and Redshift; predictions flow into ERP and planning systems
- **Explainable predictions:** every forecast surfaces its drivers and clearly indicates when planners should act or automate decisions
- **Rapid deployment:** most customers build their first model in under a day; full deployment in weeks, not months
- **New product introduction (NPI) modeling:** predicts demand using learned patterns from analogous products when historical data is unavailable

PROOF POINT

Kenvue (formerly J&J Consumer Health, the world’s largest pure-play consumer health CPG) reduced forecast error (MAPE) by 37%, improving inventory balance and enabling planners to focus on higher-impact decisions. Similarly, a large publicly traded automotive aftermarket manufacturer reduced manual data cleansing effort by ~70% across 100K+ SKUs.

Pecan AI was named a **2025 Gartner Cool Vendor in Cross-Functional Supply Chain Technology** for lowering barriers to advanced analytics.

Databricks Integration: Pecan connects natively to cloud data warehouses, including Databricks as a primary data source, training models on data in place without requiring pipelines or data movement. Predictions are returned as structured outputs that integrate directly into downstream planning systems, agent decision frameworks and BI dashboards.

Layer 7: Network Risk & Trade Intelligence

This layer **extends the supply chain’s perceptual field beyond its own four walls**, into the supplier network, global trade environment, and regulatory landscape that governs how goods can be sourced, manufactured, and moved.

Multi-tier supplier risk intelligence monitors geopolitical events, weather patterns, regulatory changes, and operational disruptions across the full depth of the supply network down to the part-site level. Agents operating in this layer must be able to trace the financial and operational impact of a disruption event through the full dependency chain within minutes of the event occurring.

Global trade intelligence is a continuously updated map of the trade network that supports autonomous compliance management across tariffs, forced labor regulations, country-of-origin rules and sanctions. As trade policy complexity accelerates, with tariff stacking, the UFLPA, Section 232 rules and CSRD all creating intersecting compliance obligations, manual compliance workflows are not scalable. Agents that can autonomously screen shipments, calculate duty exposure, identify alternative sourcing scenarios and pre-validate compliance through digital product passports represent a structural shift in how organizations manage their obligations in global commerce.

WHY THIS MATTERS:

This layer shifts supply chain operations from reactive, discovering problems when shipments stop, to proactive, detecting vulnerabilities before they materialize.

Altana *Agentic AI for global trade compliance, resilience, and value chain intelligence*

The network for trusted trade: product-level visibility and compliance across the entire global value chain

KEY CAPABILITIES

- **Network for trusted trade:** AI-powered network connecting importers, suppliers, logistics providers and regulators around a single, trusted source of product information
- **The world’s largest active map of global supply chains:** 134B+ facility-to-facility connections, ~50% drawn from exclusive first-party data contributed by 100+ enterprises (including BASF, Boston Scientific, Honda, and John Deere) and 7 of the 10 largest global logistics providers. Coverage compounds as more participants join.
- **Product Passports:** verified, shareable digital records of a product’s value chain — used by enterprises to collaborate with suppliers and by U.S. Customs and Border Protection to pre-validate shipments before they reach the border.
- **Agentic trade compliance workflows:** AI that automates HS classification, country-of-origin determination, FTA qualification, Section 232 exposure analysis, and duty calculation across stacking rules — reducing overpayment and underpayment at scale.
- **Continuous compliance across industries:** UFLPA screening, Xinjiang-origin detection and supplier remediation workflows at network scale, National Defense Authorization Act (NDAA), Connected Vehicles Mandate, etc.
- **Disruption scenario modeling:** monitoring supplier network beyond Tier One, identifying hidden concentration risks, single points of failure, China dependency, and more — reducing delays and landed costs
- **FedRAMP High and IC C2E certified,** deployed by U.S. Customs and Border Protection for active trade enforcement and facilitation

PROOF POINT

U.S. Customs and Border Protection uses Altana Product Passports through the Global Business Identifier program, enabling major importers, including BASF and L.L.Bean and logistics providers, including Maersk to pre-validate compliance at the product value chain level before goods ship. CBP expanded its Altana deployment in September 2025 for broader trade enforcement, forced labor and counternarcotics risk detection, customs clearance modernization, and low-dollar e-commerce screening.

Databricks Integration: Altana’s federated architecture lets enterprises connect their proprietary supply chain data to a global network view without centralizing sensitive information. Through integration with Databricks, customers bring Altana’s AI models and network intelligence directly into the data and analytics workflows powering their agentic supply chain — sourcing, compliance, resilience, and beyond.

Layer 8: Sustainability Intelligence

The agentic supply chain of the near future is a values expression system. Regulators are mandating sustainability (CSRD, CSDDD) while retail customers are expecting product carbon footprint disclosure and Scope 3 reporting. Supply chain volatility driven by climate events makes sustainability intelligence commercially strategic as well.

This layer provides product-level environmental visibility; not category-level averages or corporate aggregates, but ingredient-by-ingredient, supplier-by-supplier carbon footprints. These can be computed at scale, updated dynamically as supply chain relationships change, and integrated into sourcing agent decision logic. When an agent evaluates alternative sourcing scenarios, it can **balance cost, availability, lead time, and carbon impact** simultaneously.

The data challenge at this layer is significant. Scope 3 emissions represent 90–97% of food retailers’ total carbon footprint, yet are historically the hardest to measure because they require farm-level data across thousands of supplier relationships. Solving this requires the same architectural foundations as the rest of the agentic supply chain: a digital twin of the product supply chain from ingredient sourcing to shelf, continuously updated and built on governed data that meets audit standards for regulatory reporting.

WHY THIS MATTERS:

As buyers across food, retail, and CPG demand sustainability proof, this layer turns sustainability into a live operational variable rather than a periodic reporting exercise.

Mondra *Supply Chain Intelligence for Sustainability*

Product-level supply chain intelligence for food system resilience: carbon as a live operational variable, not a reporting exercise

KEY CAPABILITIES

- **AI-powered product carbon footprinting:** full lifecycle assessments (LCAs) for 60,000+ products and 1M+ ingredients, processed in under 4 hours
- **Supply chain digital twin:** farm-to-shelf visibility into carbon, climate risk and price volatility by ingredient and supplier
- **Sherpa AI copilot:** natural-language interface for sustainability intelligence, answering questions such as “Which of my products has the highest carbon footprint?”
- **CSRD and CSDDD compliance support:** audit-ready Scope 3 data aligned with PACT, SBTi and EU harmonization standards
- **Collaborative supplier platform:** engages suppliers directly in data contribution and carbon reduction planning
- **Climate-resilient sourcing:** models revenue at risk from climate disruption and identifies alternative sourcing strategies
- **Coalition standard:** underpins the British Retail Consortium’s industry-wide Scope 3 measurement standard, now adopted by 85% of UK grocery retailers

PROOF POINT

Mondra’s platform is deployed across major UK grocery retailers, including Tesco, Lidl, Aldi, M&S, Co-op and Ocado Retail. One customer reformulated a product and reduced its production carbon footprint by 18% using Mondra’s ingredient-level optimization intelligence. Mondra raised £10M Series A in October 2025 to expand into Germany, the Netherlands and France.

Databricks Integration: Mondra’s platform integrates with retailer and supplier PLM and ERP systems for automated data ingestion and is built on Microsoft Azure, including Azure OpenAI, Azure SQL and Semantic Kernel. The platform’s supply chain digital twin architecture is designed for integration with data intelligence platforms for cross-system analytics and sourcing agent decision support.

SECTION 5

Transformation Roadmap: From Legacy to Agentic

The research consistently identifies a phased progression from reactive, human-dependent supply chain operations to fully orchestrated, agent-driven networks. The roadmap below maps this progression against specific capabilities, partners, and data platform milestones.

PHASE 0

NOW

**Build the Data Substrate
& Operational Ontology**

THE PREREQUISITE: clean, governed, interoperable data and a structured model of operational truth that agents can reason against. IDC states this plainly: 'Data readiness is now AI readiness.' Start with clean, governed data. Without this foundation, every downstream agent deployment will be brittle and unsafe at scale.

PARTNER ACTIONS: Deploy Kobai's knowledge graph to model supply chain ontology on Databricks (entities, relationships, constraints). Establish Algonomy RetailAI as the foundation for retail planning and execution. Begin Physical AI deployment with Wiliot at key fulfillment nodes. Use AI to predict value chains and connect with suppliers on Altana to map N-tier 1-3 supplier networks centered around actual products. Define governance guardrails and escalation thresholds for future agent authority.

PHASE 1

6-18 MONTHS

**Augmentation:
AI as Co-Pilot**

Agents act as intelligent assistants — surfacing signals, simulating scenarios, and recommending actions — while humans approve execution. The WEF describes agents that “monitor production signals, evaluate external events, and propose adjustments before a human even opens their planning tool.” The goal is to close the insight gap before granting execution authority.

PARTNER ACTIONS: Deploy Pecan AI DemandForecast.ai for demand sensing across hierarchy levels. Enable Celonis Process Intelligence to surface at-risk orders and delivery exceptions. Connect Altana for N-tier visibility and for modeling tariff and disruption exposure across product lines. Expand Wiliot Physical AI sensing for cold chain and inventory accuracy. Activate Algonomy agentic replenishment recommendations.

MEASURE: forecast MAPE improvement, disruption detection latency, planner exception queue reduction.

PHASE 2

18–36 MONTHS

**Bounded Autonomy:
Governed Execution**

Agents move from recommending to acting within defined authority. High-confidence, low-impact decisions execute autonomously; low-confidence or high-impact scenarios escalate to humans. Celonis' Orchestration Engine, Kobai's ontology enforces constraints, and Wiliot's real-time data grounds decisions in physical reality.

PARTNER ACTIONS: Activate autonomous replenishment within Pecan. Coordinate inventory replenishment across stores, distribution centers, and vendors end-to-end with Algomomy. Deploy Celonis Orchestration Engine for cross-system corrective actions. Activate Altana tariff compliance agents for automated duty calculation and country-of-origin screening. Embed Mondra carbon intelligence as a real-time sourcing variable.

MEASURE: touchless resolution rate, decision latency, OTIF improvement, cost-to-serve reduction.

PHASE 3

36–60 MONTHS

**Orchestrated Networks:
Cross-Organizational Agency**

Multi-agent systems extend across organizations. IDC projects that 45% of Global 2000 companies will adopt agentic channel management by 2029, driving 20% revenue uplift and 30% partner satisfaction gains. The supply chain becomes the enterprise AI operating layer, triggering actions across ERP, CRM, finance, and customer systems.

PARTNER ACTIONS: Share and collaborate on Altana Product Passports across the supplier network to enable pre-validated compliance. Embed Mondra carbon intelligence as a supplier performance KPI in sourcing contracts. Activate Kobai cross-organizational semantic federation for shared supply chain context across Tier 1 partners. Algomomy's RetailAI connects planning and execution intelligence across retailer-supplier networks at ecosystem scale.

SECTION 6

The Databricks Platform Imperative

Every partner capability described in this document shares a common dependency: **clean, governed, unified data accessible in real time to both human planners and AI agents**. This is the core value proposition of the Databricks Platform, not as one more tool in the stack, but as the foundational substrate that determines whether all other tools can reach their potential.

Why Partner Capabilities Fail Without the Platform

The pattern holds across every partner: each solves a specific domain problem effectively, but is architecturally dependent on a data platform that can:

1. Unify the full enterprise data estate
2. Govern access across teams and regulatory requirements, and
3. Provide the computational environment where AI agents can be built, tested, and deployed safely.

That is what Databricks delivers through its data intelligence platform:



Delta Lake
for unified storage.



Feature Store for
consistent feature
computation.



Unity Catalog
for governance.



MLflow
for model lifecycle.



Agent Bricks for
production-grade AI
agent deployment.

The Databricks Signal in the Ecosystem

The depth of Databricks integration across this partner ecosystem is notable and accelerating.

Algonomy's RetailAI is built natively on Databricks, leveraging Apache Spark, Photon, Mosaic AI, MLflow, Unity Catalog, and Agent Bricks. Celonis Data Core enables zero-copy bidirectional integration between Celonis Process Intelligence and Databricks, with Celonis explicitly building the bridge between its Process Intelligence Graph and Agent Bricks for production agent creation. Kobai's Saturn knowledge graph is built to run natively within the Databricks Lakehouse, eliminating data movement and enabling in-place semantic querying at lakehouse scale.

These are not peripheral integrations. They reflect deliberate architectural decisions by these companies about where enterprise AI will be built.

The Conversation Entry Point

The most productive entry point is not an individual partner capability; it is the data readiness question that precedes all of them. Before a retailer or CPG company can create and deploy Altana Product Passports, Pecan's demand forecasting models, or Algonomy's autonomous replenishment agents at scale, a foundational question must be answered: **Is your data architecture actually ready to support autonomous decision-making?**

This is a differentiating and defensible conversation. Most conversations with supply chain technology vendors begin with what the agent can do.

The Databricks conversation begins earlier:

- Do you have clean supplier data?
- Is your inventory data current?
- Are your demand signals integrated across channels?
- Can your compliance data be queried in real time?

These questions expose the real gap between where supply chain organizations sit today and where agentic AI requires them to be. They position the data intelligence platform as the foundational enabler rather than an afterthought.

SECTION 7

The Critical Risk: Pilot Purgatory

Gartner found that only 23% of supply chain organizations have a formal AI strategy. The gap between experimentation and transformation is widened by what analysts are calling “Franken-systems”: disconnected AI deployments that solve local problems but **cannot connect** across functions, **cannot share** data reliably and **cannot scale** without rebuilding from scratch.

Companies that build this foundation strategically, treating the supply chain data and AI platform as enterprise infrastructure rather than departmental tooling, will compound advantage rapidly. Those who pursue disconnected pilots will find themselves rebuilding from scratch when they try to scale.

For the partner ecosystem, this means that value conversations must begin at the architectural level before the use case level. The question is not “would demand forecasting AI help you?” (it almost certainly would). Instead ask: “How does demand forecasting AI connect to your risk intelligence, your trade compliance workflows, your physical sensing data and your execution systems? Where does the data live that makes all of that possible?”

That architectural conversation is where durable, enterprise-wide transformation begins and where Databricks and this partner ecosystem have their most distinctive contribution to make.

“

Supply chain is where the enterprise AI operating layer starts, not the boundary of it. The intelligence that drives action across ERP, CRM and finance originates in supply chain data.

— [LOGISTICS VIEWPOINTS, FEBRUARY 2026](#)

SECTION 8

Conclusion: The Architecture of the Agentic Supply Chain

The vision emerging from the global supply chain community is increasingly urgent. The supply chain is transitioning from a reactive, human-executed process into an intelligent, agent-orchestrated network that can:

- Sense the physical world in real time.
- Reason across multi-tier networks and global trade relationships.
- Predict demand with unprecedented accuracy.
- Detect and respond to disruptions before they cascade.
- Execute decisions within governed guardrails.
- Balance commercial, operational, and sustainability objectives simultaneously.

No single technology does all of this. It is an architecture. This curated stack of specialized capabilities solves a specific dimension of the problem, requiring the same underlying foundation: a unified, governed, interoperable data platform that is AI-ready at enterprise scale.

