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Global Skill Development Council

Retail Automation Workflow Guide

Using AI to Streamline Order Processing, Returns, Stock Transfers, and Customer Support

A practical guide from the Global Skill Development Council (GSDC) for retail business owners, operations managers, supply chain professionals, e-commerce teams, and technology leaders seeking to automate everyday retail workflows with confidence.

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Introduction to Retail Workflow Automation

Modern retail operations span an ever-growing network of channels – physical stores, e-commerce websites, mobile applications, and third-party marketplaces. Each channel generates its own stream of orders, inventory updates, customer interactions, and fulfilment requirements. As this complexity deepens, the manual effort required to manage these workflows consistently and accurately becomes a significant operational burden.

Retail teams regularly perform repetitive, time-sensitive tasks: checking stock availability, processing refunds, updating delivery statuses, and responding to customer queries. When these tasks rely on disconnected systems – where data does not flow automatically between a POS terminal, an ERP platform, and a warehouse management system – errors accumulate, response times lengthen, and staff capacity is consumed by low-value work.

AI and automation address these challenges by handling defined, rule-based tasks at speed and scale, surfacing exceptions for human review, and enabling faster operational decisions. Rather than replacing experienced retail professionals, automation removes the administrative friction that prevents them from focusing on more strategic priorities.

The following section compares typical manual retail workflows with AI-supported automated equivalents, illustrating where automation delivers the most practical benefit.

Manual Retail Workflows

- Staff manually check stock levels across systems
- Orders are allocated by individual review
- Returns require manual policy lookup and approval
- Customer queries are handled one by one via email
- Inventory discrepancies are discovered in periodic audits
- Dispatch updates are entered manually into systems

AI-Supported Automated Workflows

- Real-time stock visibility across all locations
- AI recommends optimal fulfilment allocation
- Return policies validated automatically at submission
- AI chatbots handle routine queries instantly, 24/7
- Inventory discrepancies flagged in real time
- Dispatch status updated automatically via system integration

Retail Technology Stack for Workflow Automation

Effective retail automation depends on a well-connected technology stack. Each platform in the retail environment captures, processes, and communicates specific types of operational data. When these systems are integrated, information flows automatically between them – eliminating the need for manual re-entry and enabling automation across the full retail operation.

POS Systems

Capture in-store transactions, process payments, and update sales records in real time. The foundation of in-store data capture.

ERP Platforms

Manage business-wide processes including purchasing, finance, and inventory master data. The central source of truth for operational records.

OMS

Track orders across all sales channels – online, mobile, and in-store – from placement through to fulfilment and delivery.

WMS

Manage warehouse inventory, direct picking and packing operations, and coordinate dispatch across fulfilment centres.

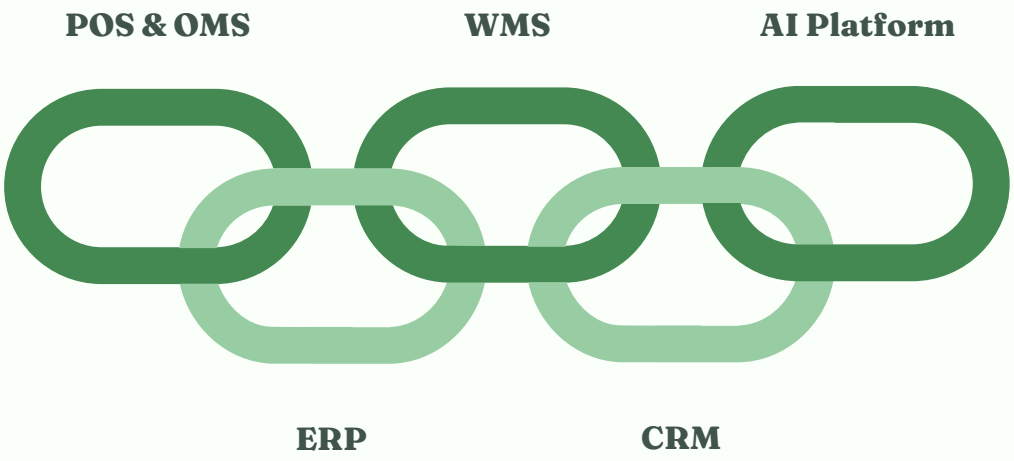
CRM

Maintain customer profiles, interaction histories, and preferences to support personalised service and targeted communications.

AI & Automation

Analyse operational data, generate recommendations, detect exceptions, and execute defined tasks across connected systems.

Connecting these platforms requires robust integration architecture. **APIs** allow systems to exchange data on request, enabling real-time lookups and updates. **Event-driven architecture** broadcasts state changes – such as a new order or a stock update – so downstream systems can react immediately without polling. **Data pipelines** move, transform, and validate information between systems at scale. **AI agents** sit across this infrastructure, using the connected tools to execute multi-step workflows and surface decisions requiring human review.



AI-Powered Order Processing and Fulfilment

Order processing is one of the most time-sensitive workflows in retail. Customers expect fast confirmation, accurate stock allocation, and reliable delivery updates. Automating this workflow reduces manual touchpoints, accelerates fulfilment, and allows teams to focus on exceptions rather than routine processing.

AI contributes additional intelligence beyond simple automation. It can prioritise high-value or time-sensitive orders, recommend the most efficient fulfilment location based on stock availability and delivery proximity, and flag exceptions – such as address mismatches or inventory shortfalls – for immediate human review. This combination of automation and AI-driven decision support significantly reduces the risk of fulfilment errors.

1

1. Order Capture

Collect orders from websites, mobile apps, marketplaces, and physical stores into the OMS.

2

2. Order Validation

Verify payment status, product availability, customer details, and delivery address.

3

3. Inventory Check

Query inventory systems to confirm available stock at connected locations.

4

4. Order Allocation

AI selects the optimal store or warehouse based on stock levels and fulfilment requirements.

5

5. Pick & Pack

Instructions are sent to warehouse teams via WMS. Order preparation progress is tracked.

6

6. Dispatch & Tracking

Carrier details are captured, order status updated, and delivery notifications sent to customers.

Throughout this workflow, exceptions – such as out-of-stock items, failed payment checks, or carrier delays – are automatically flagged and routed to the relevant team member for resolution. Human oversight remains central to managing fulfilment quality and customer experience.

Automating Returns and Refund Management

Returns are a significant operational challenge for retailers. High return volumes, varying product conditions, and complex return policies make manual processing slow and inconsistent. Automation can standardise the returns workflow, reduce processing time, and improve the customer experience – whilst ensuring that refund decisions remain subject to appropriate human oversight.

The automation layer handles the verification, routing, and communication steps. It checks whether a return request is within policy, confirms the original order details, generates return shipping instructions, and updates order records. Refund approval and exception handling are routed to authorised employees, ensuring that sensitive financial decisions are never made autonomously by an automated system.

1 Return Request Submission

Customer submits a return request via website, app, or customer support channel. Request is logged in the OMS and CRM.

2 Order and Purchase Verification

System verifies the original order, purchase date, and product details against order records.

3 Return Policy Validation

Automation checks the return window, product category rules, and applicable policy conditions.

4 Return Authorisation

Return is approved and shipping instructions are generated and communicated to the customer.

5 Product Receipt and Inspection

Returned product is received at the warehouse. Condition is assessed and inventory is updated accordingly.

6 Refund or Replacement Processing

Refund is routed for authorised approval and processed through the payment system. Complex cases are escalated for human review.

Practical Example: A customer requests a return for an online purchase. The system verifies the order, confirms the item is within the return window, generates prepaid return instructions, updates the order status to "Return Initiated," and routes the refund request to an authorised employee for final approval after the product is received and inspected.

Automation can also route different return types based on product category, return reason, and order history – directing high-value items or unusual return patterns for additional review. This ensures business rules are applied consistently without requiring manual intervention for every request.

Automating Inventory Management and Stock Transfers

Inventory accuracy is fundamental to retail performance. Stockouts lead to missed sales and frustrated customers; overstock ties up capital and increases carrying costs. AI-powered inventory management addresses both risks by providing real-time visibility across all locations, generating demand-based replenishment recommendations, and automating inter-store stock transfer workflows.

For this to function effectively, POS systems, ERP platforms, inventory management tools, and warehouse systems must exchange information continuously. When a sale is recorded at a POS terminal, inventory levels should update instantly across all connected systems. When a warehouse dispatch is completed, stock records should reflect the change without manual entry. This real-time data exchange is the operational foundation of automated inventory management.

1 Detect Low Stock

Inventory system identifies a product falling below the defined minimum threshold at a retail store.

2 Check Availability

System queries stock levels at nearby stores and distribution warehouses.

3 Assess Demand Forecasts

AI compares replenishment requirements against demand forecasts and seasonal trends.

4 Recommend Transfer

AI recommends the most appropriate source location and transfer quantity.

5 Route for Approval

Transfer recommendation is sent to an authorised manager for review and approval where required.

6 Update Records

Inventory records are updated automatically after dispatch and confirmed receipt at the destination.

Beyond stock transfers, AI-powered inventory management supports continuous discrepancy detection – identifying mismatches between system records and physical stock counts and flagging them for investigation. Demand forecasting models analyse historical sales patterns, seasonal variations, and promotional calendars to generate replenishment recommendations that reduce both stockout and overstock risk across the retail network.

AI-Powered Customer Support Automation

Customer support represents one of the highest-volume, most repetitive workloads in retail operations. Order status queries, delivery tracking requests, return status updates, and product availability questions account for a significant proportion of all inbound customer contacts. AI-powered automation can handle these routine interactions consistently and at scale – freeing human agents to focus on complex, high-value, or sensitive customer situations.

What AI Can Handle

- Order status and delivery tracking queries
- Product information and availability checks
- Return and refund status updates
- Store location and opening hours
- Policy and FAQ responses
- Initial query classification and routing

When Human Agents Take Over

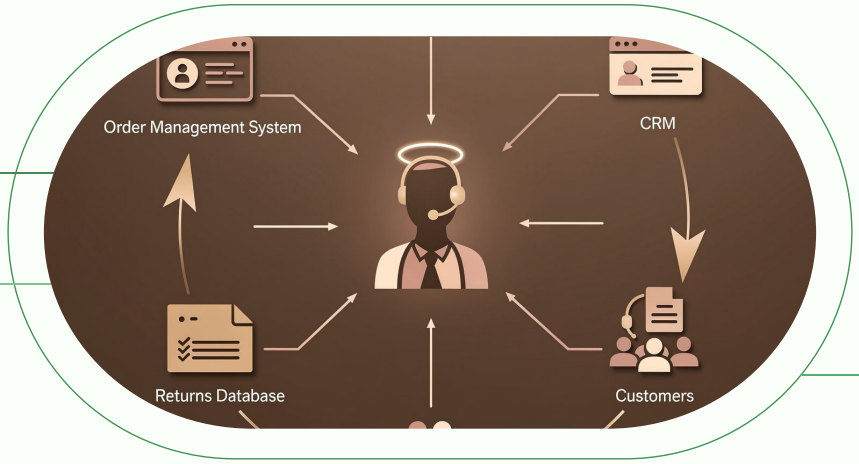
- Complex complaints and disputes
- Requests requiring account verification
- Sensitive or emotionally charged situations
- Exceptions outside automated policy scope
- Authorisation of refunds or high-value actions
- Queries the AI cannot confidently resolve

Retrieval-Augmented Generation (RAG) is a key capability in AI-powered retail support. Rather than relying solely on a language model's trained knowledge, a RAG-enabled assistant retrieves relevant information – from approved product catalogues, live order records, and customer support knowledge bases – before generating a response. This grounds AI outputs in reliable, up-to-date business data and reduces the risk of inaccurate or outdated information reaching customers.

Customer data protection is a non-negotiable requirement. AI assistants must access only the data they are authorised to retrieve, responses must be grounded in verified business information, and all customer interactions should be logged for audit and quality assurance purposes. Escalation paths to human agents must be clearly defined and reliably triggered when queries exceed the AI system's scope or confidence threshold.

Connected Systems
Order, catalogue, CRM, returns integrated

Routing
Delivers answers or escalates to humans



AI Assistant
Interprets queries and retrieves data

Using AI Agents to Co-ordinate Retail Workflows

AI agents extend automation beyond single-step tasks. An AI agent can interact with multiple connected systems, follow defined business rules, and execute multi-step workflows – pausing to request human approval at designated checkpoints, logging all actions for audit purposes, and handling errors gracefully when a connected system is unavailable or returns an unexpected result.

Tool permissions, validation rules, and audit logs are essential governance controls for any AI agent deployment. Agents must operate within clearly defined boundaries, and human approval must be required for any action with financial, legal, or significant operational consequences.

Order Management Agent

- Checks order details and payment status
- Verifies inventory availability across locations
- Identifies fulfilment exceptions and conflicts
- Recommends next action and routes for review

Inventory Management Agent

- Monitors live stock levels across all locations
- Identifies products below minimum thresholds
- Checks warehouse and supplier availability
- Recommends replenishment or stock transfers

Customer Support Agent

- Classifies incoming customer queries
- Retrieves relevant order and return information
- Provides approved, grounded responses to customers
- Escalates complex cases to human agents

Basic Automated Workflow

A predefined trigger initiates a single action. For example, a low-stock alert triggers a replenishment notification email. There is no further system interaction, no cross-referencing of demand data, and no recommendation – just a single, rule-based output.

AI Agent Coordinated Workflow

The agent detects low stock, queries warehouse availability, analyses demand forecasts, generates a transfer recommendation with supporting rationale, routes it to an authorised manager for approval, and updates inventory records once the transfer is confirmed – all within a single coordinated workflow.

Connecting Retail Systems for End-to-End Automation

Retail automation cannot function in isolation. For workflows to operate across order management, inventory, warehouse, customer support, and payment systems simultaneously, these platforms must be technically integrated through reliable, well-governed connectivity infrastructure. End-to-end automation depends on data flowing accurately and securely between systems in real time.

API Integration

RESTful or GraphQL APIs enable POS, ERP, OMS, WMS, and CRM systems to exchange data on request. APIs must be versioned, authenticated, and monitored for availability and performance.

Event-Driven Architecture

Events such as "Order Placed," "Stock Updated," and "Return Received" are published to an event stream. Downstream systems subscribe and react immediately, without polling.

Apache Kafka

Kafka provides a high-throughput, fault-tolerant messaging platform for distributing retail events across systems – supporting real-time inventory updates, order state changes, and customer notifications at scale.

Data Pipelines

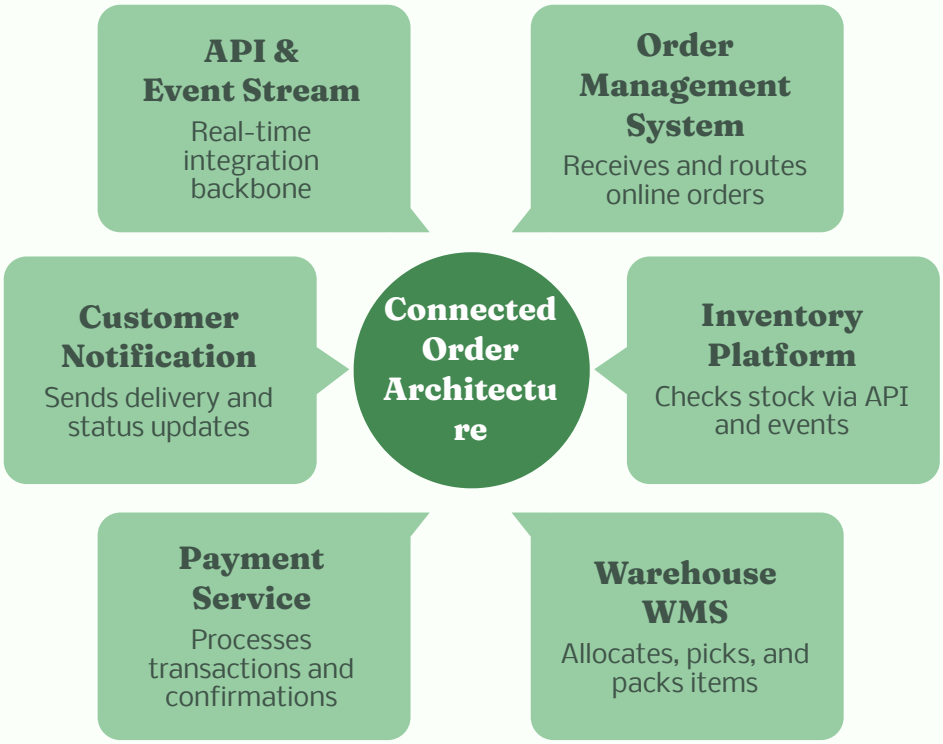
Pipelines move, transform, and validate data between systems – standardising product IDs, SKU codes, order IDs, and customer records so that all platforms share a consistent data model.

Security and Access Controls

Authentication, TLS encryption, and role-based access controls protect data in transit and at rest. Integration credentials must be managed securely and rotated regularly.

Error Handling and Resilience

Integration layers must handle retries, duplicate events, and failed connections gracefully – logging all errors and alerting operations teams when critical integrations require attention.



Practical Case Study – Automating a Retail Order-to-Delivery Workflow

ILLUSTRATIVE EXAMPLE

The following case study is illustrative. It is designed to demonstrate how integrated, AI-supported workflows can address common retail operational challenges. It does not represent a specific organisation or make claims about performance improvements or financial outcomes.

The Scenario

A mid-sized retailer receives orders through its website and mobile application. Its inventory management platform, warehouse management system, and customer support tools operate independently. Staff manually check stock availability, assign orders to warehouses, update delivery records, and respond to customer queries throughout the working day. This creates delays, inconsistencies, and a dependency on individual staff availability to keep orders moving.

The Integrated Workflow

01

Order Enters OMS

An online order is received and logged automatically in the order management system.

02

Payment and Inventory Verified

The system confirms payment authorisation and queries live inventory levels across all warehouses.

03

Order Allocated to Warehouse

AI recommends the optimal fulfilment location based on stock availability and delivery proximity. An authorised manager confirms allocation.

04

Pick and Pack Instructions Dispatched

The WMS sends picking and packing instructions to warehouse staff. Progress is tracked in real time.

05

Dispatch Updated Automatically

Once the order is packed and handed to the carrier, the OMS updates the order status and records tracking information.

06

Customer Notified

Automated notifications are sent to the customer at key milestones: order confirmed, dispatched, and out for delivery.

07

Exceptions Routed for Review

Any fulfilment exceptions – such as stock discrepancies or failed payment checks – are automatically routed to the relevant employee for resolution.

The Role of the Forward Deployed Engineer

In this scenario, a Forward Deployed Engineer (FDE) works alongside the retailer's operations, IT, and warehouse teams to map the existing workflow, identify the integration points between the OMS, inventory platform, WMS, and payment service, and build the API connections and event-driven triggers that make automation possible. The FDE tests each integration against realistic order scenarios, defines exception routing rules, and supports the team through deployment – ensuring the automated workflow operates reliably in the live retail environment.

Retail Automation Implementation Checklist

Use this checklist to assess readiness before implementing workflow automation across your retail operation. Each category addresses a distinct dimension of preparation – from business process clarity through to ongoing monitoring and optimisation.

1. Business Process Readiness

- ◯ Identify repetitive, rule-based tasks suitable for automation
- ◯ Map existing order, returns, inventory, and support workflows
- ◯ Define clear automation objectives and success criteria
- ◯ Identify which actions require human approval or authorisation
- ◯ Document business rules that will govern automated decisions

2. Data Readiness

- ◯ Assess data availability and completeness across all systems
- ◯ Standardise product identifiers, SKU codes, and order IDs
- ◯ Identify missing, duplicate, or inconsistent records
- ◯ Define data ownership and update responsibilities

3. System Integration

- ◯ Review current POS, ERP, OMS, WMS, and CRM capabilities
- ◯ Identify available APIs and integration documentation
- ◯ Define event and data exchange requirements between systems
- ◯ Plan error handling, retry logic, and system monitoring
- ◯ Confirm authentication, encryption, and access controls

4. AI and Automation Controls

- ◯ Define AI agent tool permissions and operational boundaries
- ◯ Establish human approval steps for sensitive actions
- ◯ Build validation rules for AI-generated recommendations
- ◯ Maintain audit trails for all automated actions and decisions
- ◯ Define escalation paths for exceptions and edge cases

5. Monitoring and Optimisation

- ◯ Establish dashboards to track workflow completion and failures
- ◯ Monitor data quality and integration health continuously
- ◯ Review customer support escalation rates regularly
- ◯ Evaluate automation outcomes against defined objectives
- ◯ Schedule periodic workflow reviews as business requirements evolve
- ◯ Document lessons learned and update automation configurations accordingly

This checklist is a starting point, not a complete implementation plan. Organisations should tailor it to their specific systems, team structures, and regulatory requirements. Engaging a Forward Deployed Engineer early in the process helps ensure that integration architecture and automation logic are designed correctly from the outset.

The Role of Forward Deployed Engineers in Retail Automation

Forward Deployed Engineers (FDEs) bridge the gap between retail business requirements and the technical systems that make automation possible. They work embedded within retail organisations – alongside operations managers, supply chain teams, e-commerce leads, and engineering teams – to understand workflow challenges in practical operational terms and translate them into working technical solutions.

Understand Retail Requirements

FDEs engage directly with retail operations, supply chain, e-commerce, and customer service teams to identify workflow pain points, map existing processes, and define automation requirements in precise, actionable terms.

Connect Business Systems

FDEs design and build the API integrations, event-driven connections, and data pipelines that allow POS, ERP, OMS, WMS, CRM, and other retail applications to exchange information reliably and securely.

Implement AI Solutions

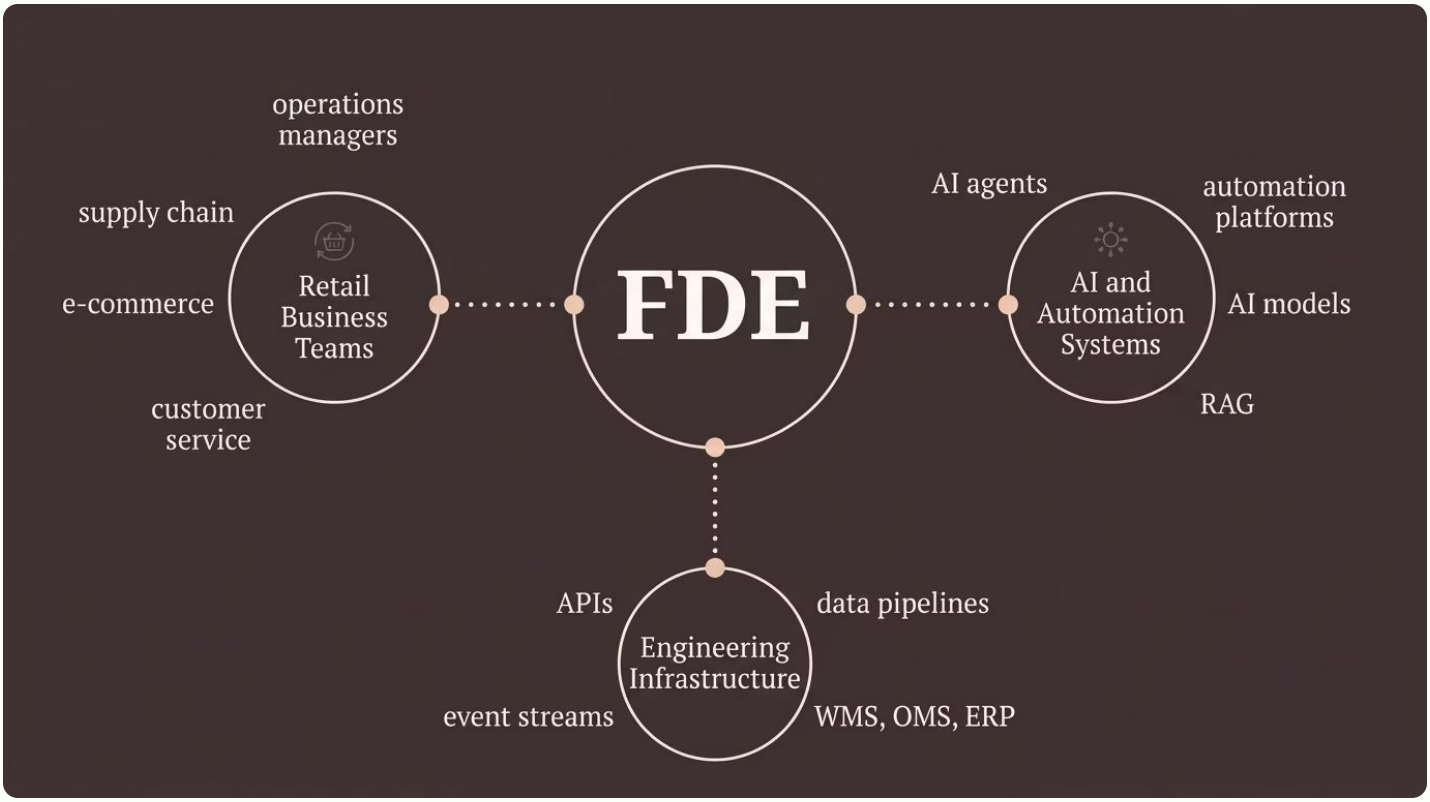
FDEs connect AI models, automation platforms, and AI agents with existing retail systems – ensuring that AI capabilities are grounded in accurate business data and governed by appropriate permissions and oversight controls.

Build Practical Workflows

FDEs translate business rules into tested, deployed workflows covering order processing, returns management, inventory transfers, and customer support – ensuring each workflow handles both expected scenarios and operational exceptions.

Support Deployment and Monitoring

FDEs test integrations under realistic conditions, address implementation issues during deployment, and monitor system performance post-launch – ensuring that automated workflows remain reliable as retail operations evolve.



FDEs work collaboratively with retail stakeholders and engineering teams. They do not replace the business owners, operations managers, or authorised employees responsible for approving important financial, operational, or customer-facing decisions. Their role is to ensure the technical foundation is sound – so that automation delivers consistent, reliable value in production environments.

Build Your Forward Deployed Engineering Knowledge With GSDC

Explore the GSDC Certified Forward Deployed Engineer Certification and develop the technical and operational skills to connect AI, automation, and enterprise systems in real-world retail environments.

Website: **gsdcouncil.org/certified-forward-deployed-engineer**

Explore the Certification

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Certified Forward Deployed Engineer



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- **Gain a strong understanding of Forward Deployed Engineering concepts, roles, tools, technologies, and development practices.**
- **Identify business and customer challenges and design AI-driven solutions aligned with real-world requirements.**
- **Apply modern AI frameworks, APIs, data integration, and deployment practices to build and implement solutions within existing business systems.**
- **Apply testing, evaluation, security, monitoring, and optimization practices to deliver reliable, scalable, and production-ready AI solutions.**

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