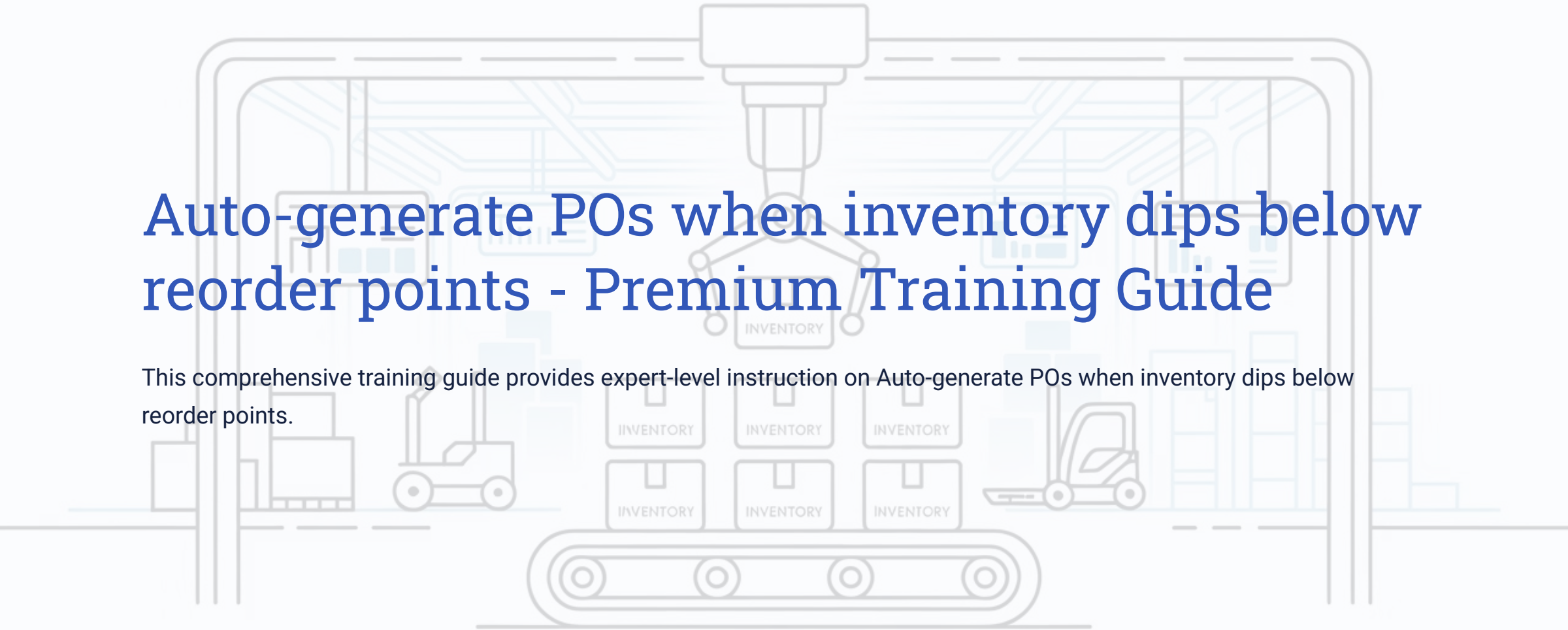


Auto-generate POs when inventory dips below reorder points - Premium Training Guide

This comprehensive training guide provides expert-level instruction on Auto-generate POs when inventory dips below reorder points.

Executive Summary and Learning Objectives

This comprehensive training guide provides expert-level instruction on Auto-generate POs when inventory dips below reorder points.

By completing this guide, you will achieve mastery in Auto-generate POs when inventory dips below reorder points.

Why Automate Purchase Orders? The Business Case

Inventory is cash on the shelf. Too little and you lose sales; too much and you choke working capital. Manual purchase ordering is slow, error-prone, and hard to scale as SKU counts and channels expand. Auto-generating POs when inventory dips below configured reorder points delivers consistent, faster decisions that align to your service level and cost targets.

Faster Response

Hourly or event-driven checks eliminate "we forgot to reorder" moments.

Reduced Stockouts

Data-driven reorder points keep you near your target service level.

Lower Operational Cost

Automation handles repetitive checks and drafts POs; humans focus on exceptions and vendor negotiation.

Improved Accuracy

Rules account for MOQs, pack sizes, and lead-time variability, reducing corrections and credits.

Better Collaboration

Standardized approval flows and audit trails reduce risk and simplify compliance.

Actionable Insight

Automated workflows generate clean, structured data for forecasting, supplier scorecards, and continuous improvement.

When Automation is Especially Valuable

- You manage 200+ SKUs or multiple locations and channels.
- You have variable lead times or long replenishment cycles.
- You rely on distributed teams or 24/7 operations.
- Your suppliers offer MOQs and fixed pack sizes that are easy to encode into rules.
- You want to shift from reactive firefighting to proactive planning.

Key Concepts and Terminology

SKU (Stock Keeping Unit)

The unique identifier for an item you stock.

UoM (Unit of Measure)

The base measurement for inventory and purchasing (e.g., each, case of 24).

Lead Time

Time from placing a PO until goods are available. Include vendor processing, transit, customs, receiving, and put-away.

Safety Stock

Extra inventory to buffer demand and lead-time variability.

Reorder Point (ROP)

Inventory level that triggers replenishment. Basic formula: ROP = Average demand during lead time + Safety stock.

Min–Max Policy

Reorder when on-hand falls to Min; order up to Max.

Additional Key Terms

- **Target stock level (TSL):** Stock level to "fill up" to when ordering.
- **MOQ (Minimum Order Quantity):** Minimum purchase per supplier or SKU.
- **Pack size:** Multiple you must order in (e.g., cases of 12).
- **EOQ (Economic Order Quantity):** Cost-optimized order size balancing ordering and carrying costs.
- **On-hand:** Physical stock in your facility.
- **On-order:** Quantity already on POs not yet received.
- **Allocated/Reserved:** Portion of on-hand committed but not yet shipped to customers or work orders.
- **Available to promise (ATP):** On-hand + on-order − allocated.
- **Service level:** Target probability of not stocking out during lead time (e.g., 95%).
- **ABC classification:** Categorization of SKUs by value/velocity to prioritize control (A = most critical).
- **PO lifecycle:** Draft → Approval → Sent to supplier → Confirmed → Shipped → Received → Reconciled and closed.

How an Auto-PO System Works End to End

01

Detect

Monitor inventory for each SKU/location to see if ATP is below its ROP (or Min).

02

Decide

Determine whether to create, update, or hold a draft PO. Consolidate items by supplier and account for open POs.

03

Size

Calculate suggested order quantity to reach TSL or by EOQ; apply constraints such as MOQ/pack sizes and budget caps.

04

Approve

Route draft POs through automated or manual approval based on thresholds and risk.

01

Transmit

Send approved POs to suppliers via email, portal, EDI, or API. Attach terms, ship-to details, and requested delivery dates.

02

Track

Update expected receipts, lead times, and PO status. If the vendor confirms a different ship date, re-calc risks and notify stakeholders.

03

Learn

Log outcomes, measure forecast and lead-time errors, and adjust ROP and safety stock parameters.

Trigger Models

Scheduled Checks

Run every hour/day to scan for exceptions; easy to start with.

Event-driven

Fire when on-hand changes (receipts or shipments), orders spike, or a vendor updates a ship date; more immediate and efficient.

Hybrid

Run daily full scans plus event-driven for high-priority SKUs.

Inventory flow

Core Data You Need

SKU Master

SKU, description, UoM, supplier, cost, ABC class, hazardous or perishable flags.

Location Master

Warehouses, stores, or virtual locations with calendars and receiving constraints.

Inventory Balances

On-hand, on-order, allocated, backorders, in-transit.

Policy Parameters

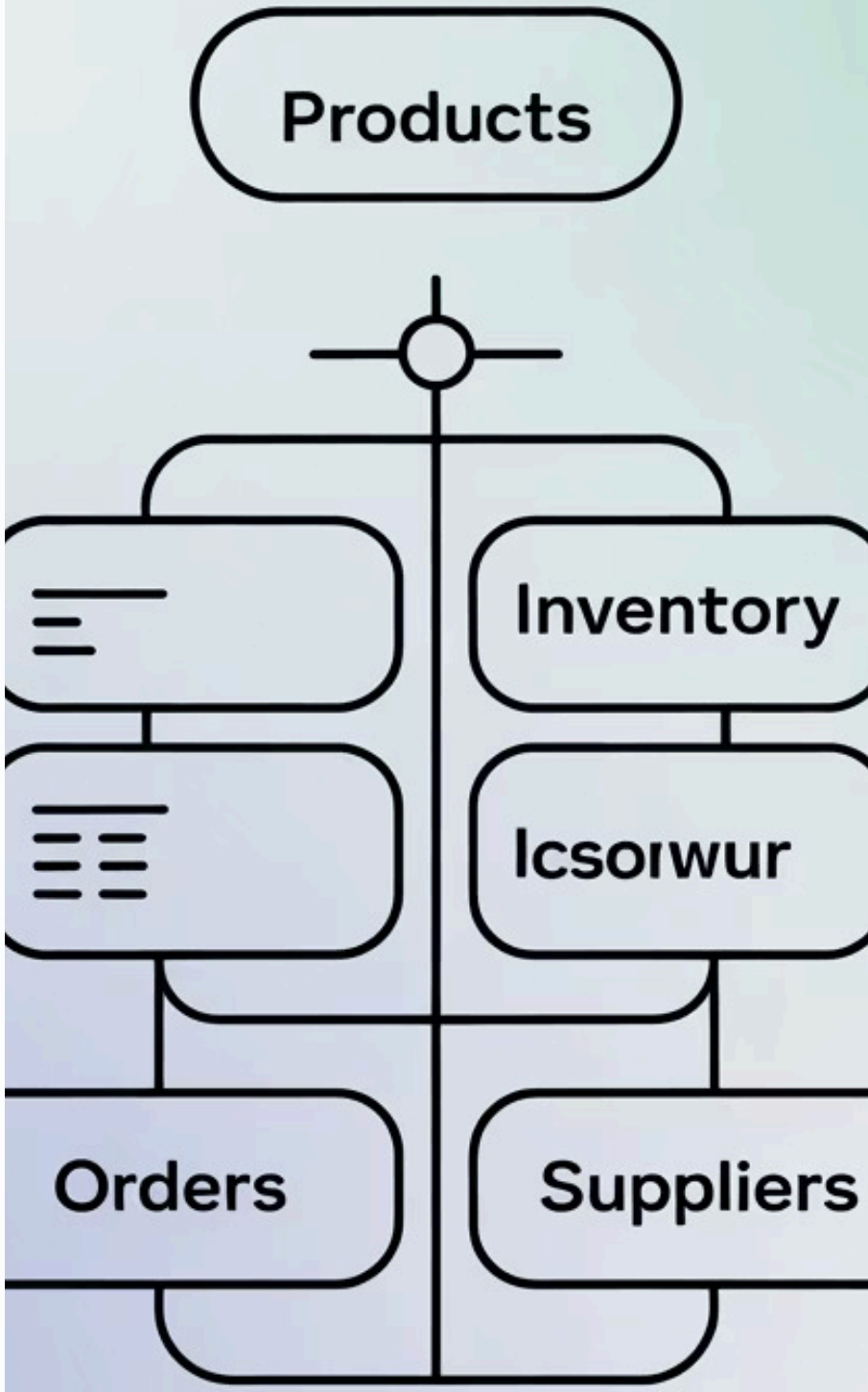
ROP, Min, Max/TSL, safety stock, lead time, EOQ, reorder multiples.

Supplier Master

Contacts, MOQs, pack sizes, lead-time history/distribution, INCOTERMS, payment terms.

Calendars and Holidays

Vendor, warehouse, and carrier calendars to compute realistic due dates.



System Options

ERP Built-in

Pros: Native, integrated

Cons: Customization limits, slower iteration

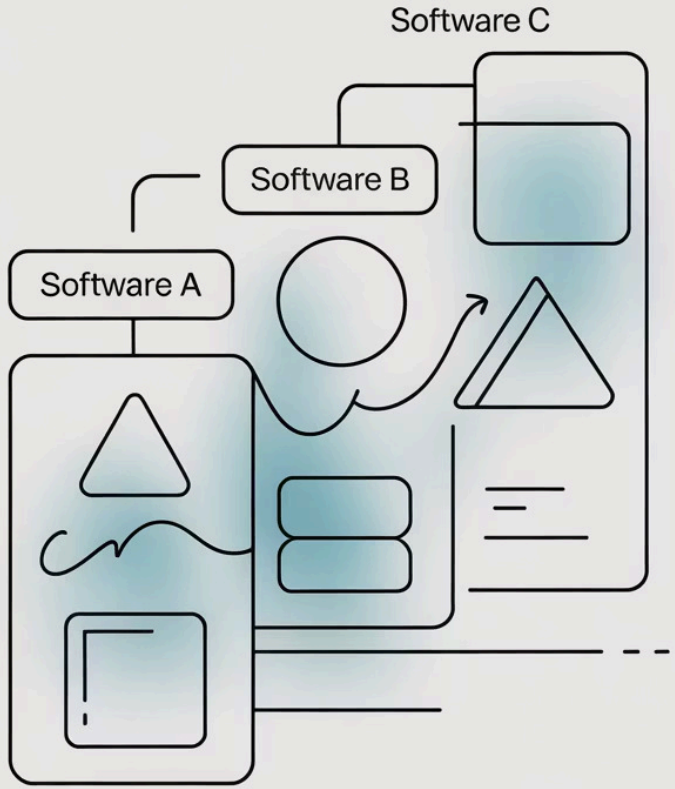
Many ERPs have reordering rules built-in for basic functionality.

Composable Stack

Pros: Fast to prototype, flexible

Cons: You must design data integrity and controls

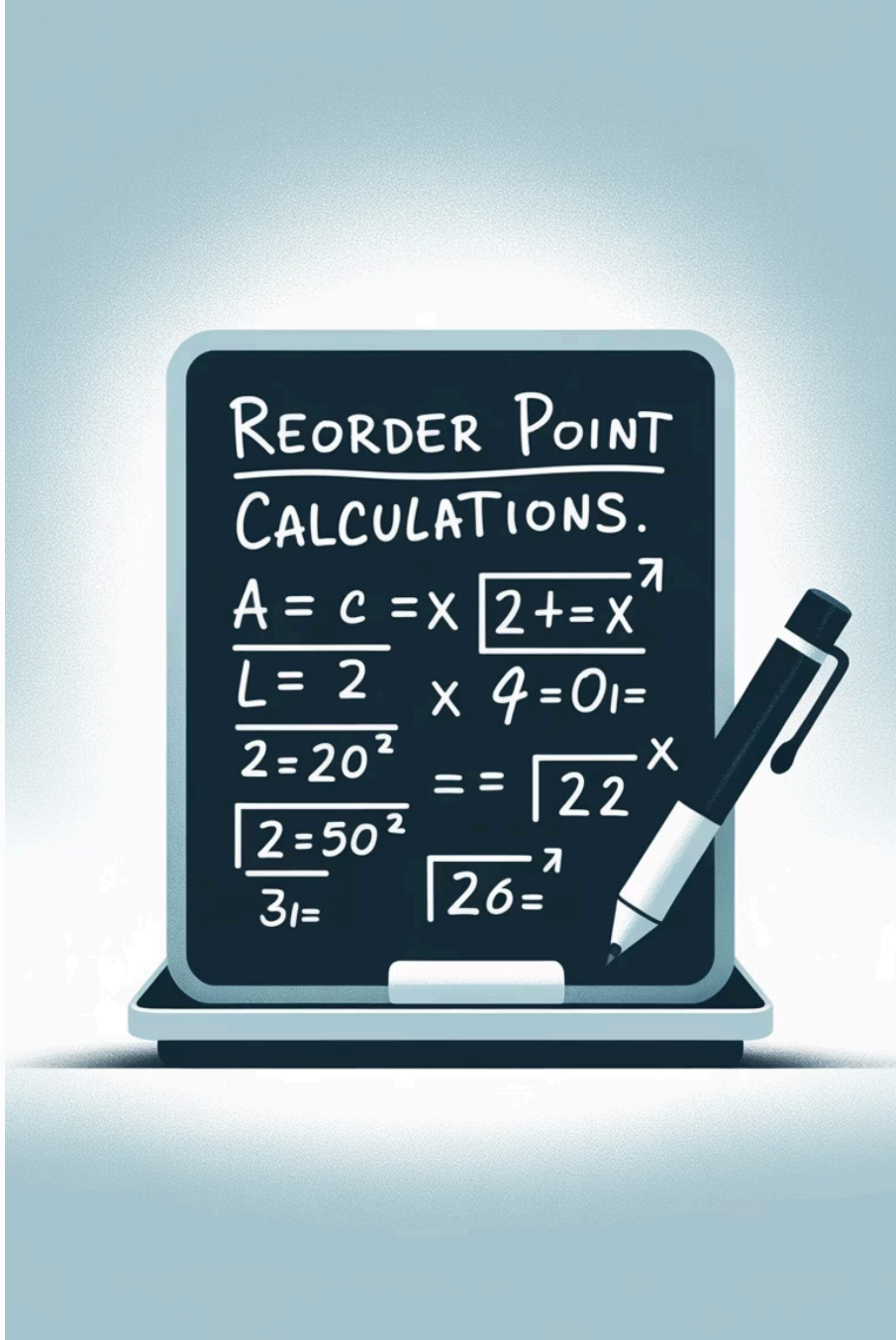
Airtable (inventory data), n8n/Make (workflow), Asana/Jira (approvals/tasks), email/Slack (alerts), optional EDI/API hubs.



Calculating Reorder Points and Quantities

Baseline Formulas

- **Average demand (per day)** = historical average sales/usage per day.
- **Demand during lead time (DDLT)** = Average daily demand × Lead time (in days).
- **Safety stock:** Common methods include:
  - Fixed buffer for starters.
  - Statistical method: Safety stock = Z × σLT, where Z is the z-score for service level (e.g., 1.65 for 95%) and σLT is standard deviation of demand during lead time.
- **Reorder point (ROP)** = DDLT + Safety stock.



Reorder Quantity Strategies

1

Order up to TSL

Order Qty = TSL − (On-hand + On-order − Allocated).

2

Fixed Reorder Qty

Predefined lot size per SKU.

3

EOQ

EOQ = sqrt((2 × Annual demand × Order cost) ÷ Carrying cost rate × Unit cost). Round to pack size and apply MOQ.

4

Days-of-cover

Order enough to cover X days at average demand.

Practical Example 1: Simple ROP

Example Calculation

- Average daily demand: 20 units.
- Lead time: 7 days.
- Safety stock: 50 units (fixed).
- ROP = (20 × 7) + 50 = 190 units.
- Trigger: When ATP < 190, create a draft PO.

Practical Example 2: Statistical Safety Stock

Statistical Method Example

- Average daily demand: 100 units.
- Lead time: 10 days.
- Standard deviation of daily demand: 25 units.
- σLT = 25 × sqrt(10) ≈ 79 units.
- Z for 95% service: 1.65.
- Safety stock ≈ 1.65 × 79 = 130.
- DDLT = 100 × 10 = 1000.
- ROP = 1000 + 130 = 1130.
- If ATP falls to 1100, a PO is triggered.

Practical Example 3: Order Sizing with Constraints

Constraint Application Example

- Target stock level (TSL): 2000 units.
- ATP at reorder: 1130 units (from example 2).
- Raw order qty: 2000 − 1130 = 870.
- Supplier constraints: MOQ 1000; pack size 50.
- Adjusted order: At least 1000 and a multiple of 50; choose 1000.

Multi-location and Special Considerations

Multi-location Nuance

Per-location ROPs prevent local stockouts without bloating central inventory. If you centralize buying, consolidate needs by supplier, but ensure replenishment paths are modeled (supplier → DC → store), each with their own lead times and safety stock.

Perishables and Obsolescence

Use days-of-cover and Max shelf life to avoid waste. Tie order quantity to expected demand within shelf life; dynamically suppress POs if spoilage risk is high.

Architecture Patterns for Automation

Common Design Pattern

- **Data layer:** Airtable base (or ERP tables) with Inventory, Suppliers, POs, and Policies.
- **Workflow layer:** n8n/Make to orchestrate triggers, queries, decision logic, approvals, and notifications.
- **Collaboration layer:** Asana/Jira for exception tasks (e.g., "Lead time spiking—vendor confirm needed").
- **Integration layer:** Email/API/EDI connectors to send POs and receive confirmations.
- **Observability:** Logging, metrics, and alerting (Slack/Teams/Email).

Trigger and Control Considerations

Idempotency

Prevent duplicate POs when multiple triggers fire; use a "pending PO" check before creating new ones.

Concurrency

Lock a SKU during calculation to avoid race conditions.

Consolidation

Decide between per-SKU POs or consolidated by supplier/day.

Approval Routing

Auto-approve low-risk, auto-POs under a value threshold; escalate A-class SKUs or high variance vendors.

Audit and Rollback

Every automated action writes who/what/when/why and enables safe reversals.

Data Quality Prerequisites

One SKU = One UoM Standard

Document conversion rules (e.g., each vs case).

Clean Supplier Master

Up-to-date contacts, terms, and constraints.

Accurate Lead Times

Derive from the last 3–6 months of performance, not catalog promises.

Reliable Inventory

Align cycle counting cadence to your service level targets (A items counted weekly, B monthly, C quarterly).

Step-by-step: Your First "Hello World" Auto-PO Prototype

Goal

Build a safe, test-only prototype that drafts a PO when ATP < ROP for selected SKUs, requests approval in Asana/Jira, and emails a preview. This is intentionally minimal—Module 4 will go deep.

Preparation

- **Tooling:** Airtable (or similar), n8n/Make, Asana or Jira, email/Slack.
- **Sandbox:** Use a test base and a non-production email list.

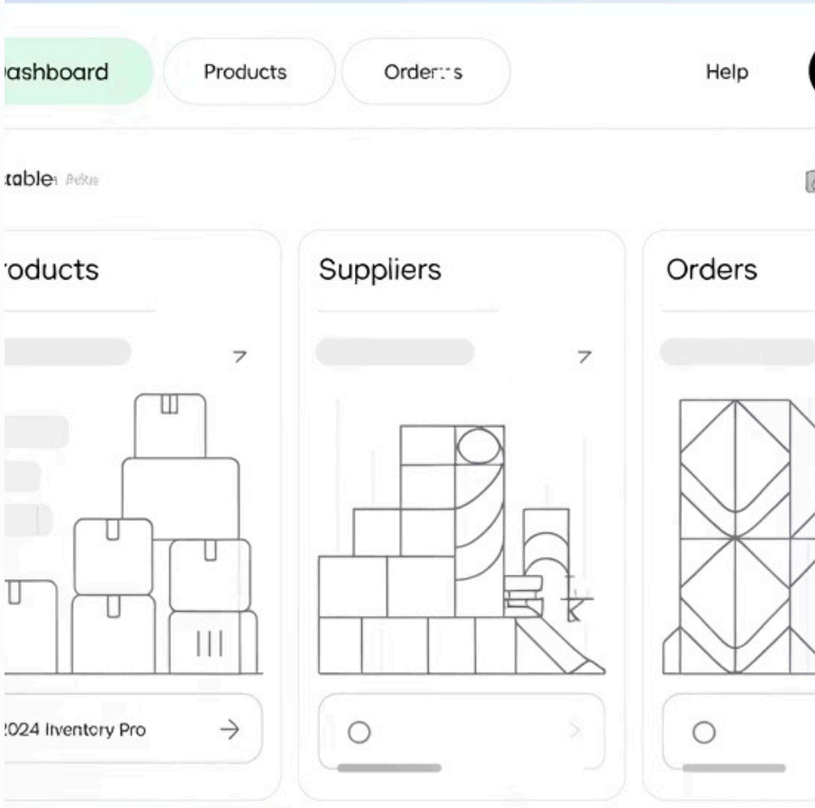
Time Required: 60–90 minutes

Step 1: Create Your Airtable Base

Tables and Key Fields:

1	**Inventory** SKU, Location, OnHand, OnOrder, Allocated, ATP (formula = OnHand + OnOrder − Allocated), ROP, TSL, SupplierId, LeadTimeDays, MOQ, PackSize, ABC, Active (checkbox).
2	**Suppliers** SupplierId, Name, Email, Terms, DefaultShipFrom, LeadTimeDaysDefault, MOQDefault, PackSizeDefault.
3	**POs** POId, SupplierId, Status (Draft/Pending Approval/Approved/Sent), CreatedAt, RequestedShipDate, Notes.
4	**PO_Lines** POId, SKU, Qty, UnitCost, UoM.

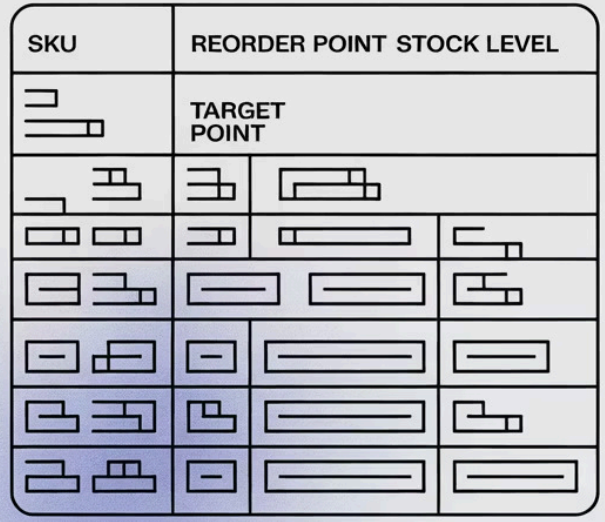
Seed data for 5–10 SKUs with plausible values.



Step 2: Define ROPs and TSLs

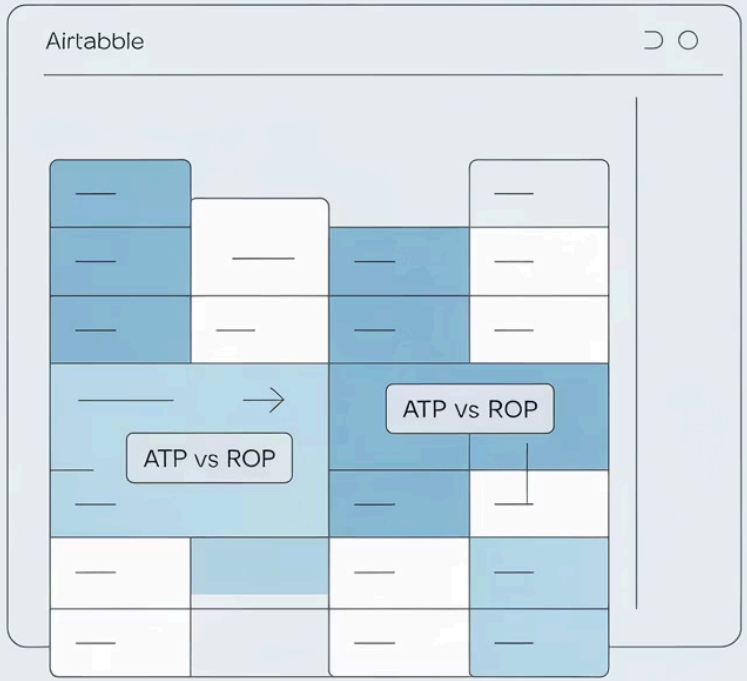
For each SKU, compute ROP with your chosen method. Start simple: ROP = Average daily demand × Lead time + Safety stock.

Set a TSL that covers 2–4 weeks of expected demand for fast movers; longer for long lead-time items.



Step 3: Build a Query View for Triggers

- Inventory view "Needs Reorder" with filter: Active = true AND ATP < ROP.
- Add a formula field "SuggestedQty" = max(MOQ, roundUp((TSL − ATP)/PackSize) × PackSize). Clamp negatives to 0.



Step 4: Create an n8n/Make Scenario

01

Trigger

Schedule every hour (or manual for testing).

02

Fetch Records

Fetch records from "Needs Reorder."

03

Group by Supplier

Group by SupplierId to consolidate lines by supplier.

04

Create POs

For each supplier: Create PO header (Status = Draft, RequestedShipDate = today + LeadTimeDays). Create PO lines from grouped SKUs with SuggestedQty.

01

Post to Task Manager

Post to Asana/Jira: "PO Draft Ready" with link to PO and line summary.

02

Email Preview

Email preview to the test list with CSV details and ask for approval.

Step 5: Approval Loop (Lightweight)

In Asana/Jira, use a custom field "Decision" with options Approve/Reject and a comments field.

n8n/Make polls task status every 5–10 minutes; if Approved, update PO Status = Approved and send a final "Ready to Send" email. If Rejected, mark Draft with reason.

Step 6: Safety Controls

Idempotency

Before creating a PO line, check no open PO for the same SKU/supplier exists within the last 24 hours. If yes, update that PO instead of creating a new one.

Scope

Only include SKUs tagged "Pilot."

Logging

Write a Log table entry per action (timestamp, SKU, ATP, ROP, SuggestedQty, decision).

Step 7: Test Scenarios

Basic Trigger Test

Lower OnHand for a pilot SKU so ATP < ROP; run the scenario and verify: One PO per supplier. Quantities respect MOQ/pack size. Asana/Jira task created; approval changes PO status.

Duplicate Prevention Test

Simulate a duplicate trigger within 5 minutes; verify it updates the existing draft, not a new one.

Step 8: Review and Iterate

- Gather feedback on email formatting, approval clarity, and supplier consolidation preferences.
- Adjust TSLs and lead times if quantities feel too high/low.

Best Practices and Pro Tips

Policy and Parameter Design

- **Start conservative:** Slightly higher safety stock avoids early "automation regret." Tune down as data improves.
- **Segment by ABC:**
  - A items: tighter service level, frequent checks, manual final approval initially.
  - B items: auto-approve under value thresholds.
  - C items: larger pack sizes, less frequent orders to reduce overhead.
- **Reflect seasonality:** Use rolling windows and seasonality flags; adjust ROPs before peak seasons.

Supplier Collaboration

Share Purchase Cadence

Vendors deliver better when they see consistent order timing and volume ranges.

Confirm Lead Times Quarterly

Update parameters from actuals, not promises.

Encode Vendor Constraints Early

MOQs, case packs, price breaks, carton heights/weights.

Workflow Reliability

Idempotency Tokens

Combine SupplierId + SKU + business day in a "uniqueness key" to suppress duplicates.

Locking

Lock per SKU during calculation to avoid double counting ATP after an order is drafted.

Alerting

Notify on exceptions (e.g., "Cannot meet MOQ within budget," "Lead time variance > 50%").

Governance and Compliance

Approval Matrix

Tie to PO value, ABC class, and vendor risk rating.

Segregation of Duties

Creator vs approver vs receiver should be distinct roles in production.

Full Audit Trail

Keep before/after values for ATP, ROP, and SuggestedQty; store the rule version used.

Data Integrity

Unit Conversions

Standardize UoM in your master data; convert at the edge only once.

In-transit Visibility

Include in-transit in ATP if receiving to a different location; avoid double-counting.

Returns and Scrap

Deduct promptly from on-hand; stale scrap adjustments break ROP accuracy.

Performance and Scale

Batch Consolidation

Order by supplier for the next cut-off time to reduce shipments and handling.

Adaptive Cadence

High-velocity SKUs check every 30–60 minutes; low-velocity daily.

Cost Awareness

Include ordering cost and carrying cost to prevent EOQ recommending unrealistically large batches.

Change Management

01

Pilot

Pilot with 10–20 SKUs across A/B/C classes and at least two suppliers.

02

Communicate

Communicate the "why" and the safety valves to buyers and warehouse teams.

03

Measure and Share

Measure and share wins monthly: reduced stockouts, fewer rush shipments, improved turns.

Pro Tips

Shadow Mode First

Run automation that produces drafts and recommended orders but doesn't send POs. Compare against human decisions for 2–4 weeks.

Calibrate Service Level

Calibrate service level by item criticality: 99% for vital components, 90–95% for accessories.

Break Glass Mechanism

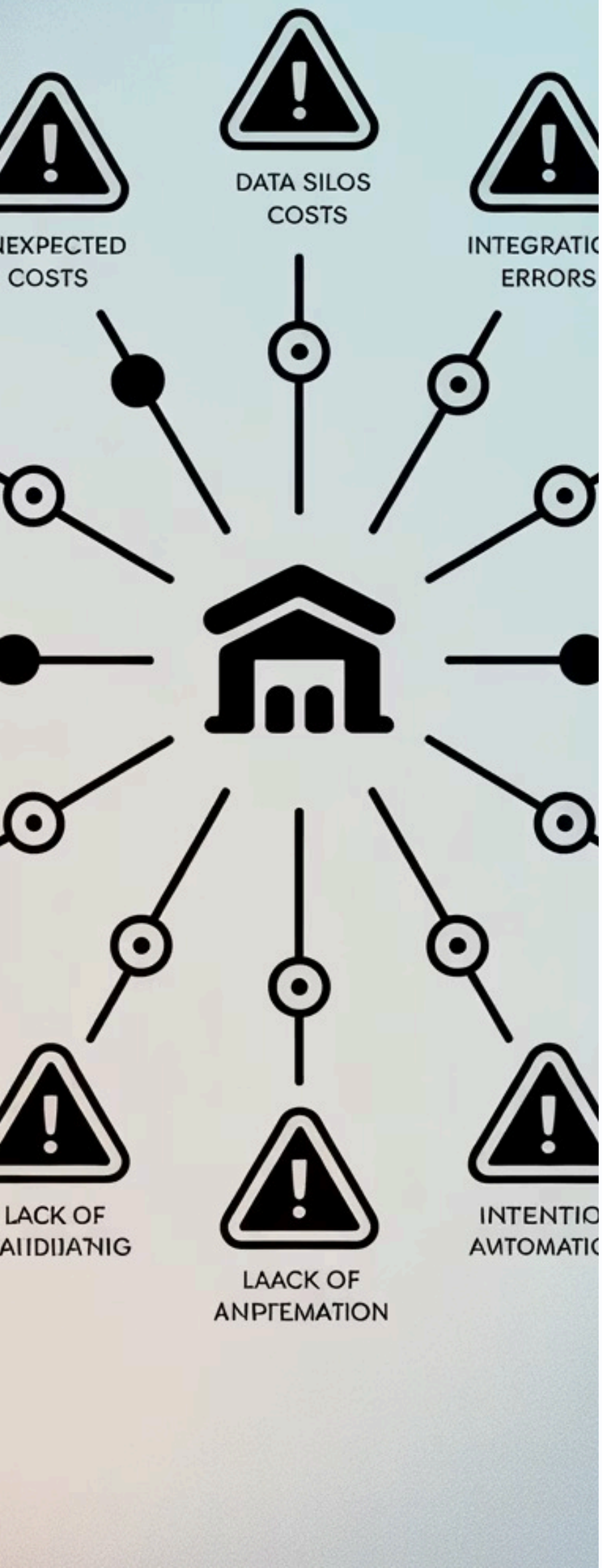
One-click "suspend auto-PO" per SKU/supplier for market or supplier crises.

Encode Promotion Awareness

Use upcoming promotions calendar to adjust demand forecasts and temporarily raise ROPs.

Exception Dashboards

Show "ROP breaches not ordered," "Orders waiting approval," "Lead-time anomalies," and "SKUs with repeated stockouts."



Common Mistakes to Avoid

Misdefining ATP

Forgetting to subtract allocations or failing to include open POs/in-transit results in either ghost stock or over-ordering.

Ignoring Pack Sizes and MOQs

Leads to supplier rejections or partial fills and extra freight.

Static Lead Times

Not updating lead times drives either chronic stockouts or bloated safety stock.

Duplicating POs

Two runs in a short window without idempotency checks flood vendors with small orders.

Over-automation

Auto-sending POs for new/volatile items without initial oversight invites errors.

Wrong UoM

Ordering "10" thinking it's cases when vendor interprets as each.

Not Consolidating by Supplier

Generates avoidably high freight and handling costs.

No Exception Handling

Automation that fails silently is worse than manual processes.

Real-world Applications and Scenarios

E-commerce/Retail

Scenario: 7,000 SKUs across two DCs and three marketplaces. Automation checks ATP hourly, consolidates POs by supplier daily at 2 PM, and auto-approves orders under $2,000 for B/C items.

Results: 30% fewer stockouts on top 500 SKUs, 18% reduction in urgent expediting.

Light Manufacturing

Scenario: Assemblies require components with mixed lead times. Auto-PO logic considers BOM explosion for next two weeks of planned builds, factoring supplier-specific lead times and MOQs.

Results: 22% increase in OTD (on-time delivery) and reduced line stoppages.

More Real-world Scenarios

Food and Beverage (Perishables)

Scenario: Shelf life 21 days; weekly demand spikes near weekends. Reorder rules use days-of-cover with max shelf-life constraints; automation suggests deliveries aligned to store receiving windows.

Results: 15% shrink reduction and better labor planning.

Healthcare/Medical Supplies

Scenario: Critical SKUs require 99.5% service levels; regulatory constraints on substitutes. Automation routes A-class items to a human approver; others auto-approve. Exception tasks created if the supplier confirms longer lead times.

Results: Eliminated stockouts for critical items and improved audit compliance.

Additional Scenarios

Field Service/Spare Parts

Scenario: Remote technicians need trunk stock. Automation maintains min–max per technician location; weekly consolidated POs to the central DC with auto-kitting for service kits.

Results: Faster first-time fix rates and reduced emergency shipments.

Wholesale/Distribution

Scenario: Multiple supplier pack sizes and pallet constraints. Order sizing aligns to pallet layers, and the system suggests alternate SKUs when substitutions are allowed.

Results: Better freight utilization and fewer shorts.

Measuring Success: KPIs to Baseline Now

95%

Stockout Rate

Percent of order lines not fulfilled due to zero stock.

98%

Fill Rate/Service Level

Percent of demand fulfilled from stock on hand.

8.5

Inventory Turns

Cost of goods sold ÷ average inventory value.

99%

PO Accuracy

Percent of POs without quantity/UoM corrections.

2

Order Cycle Time

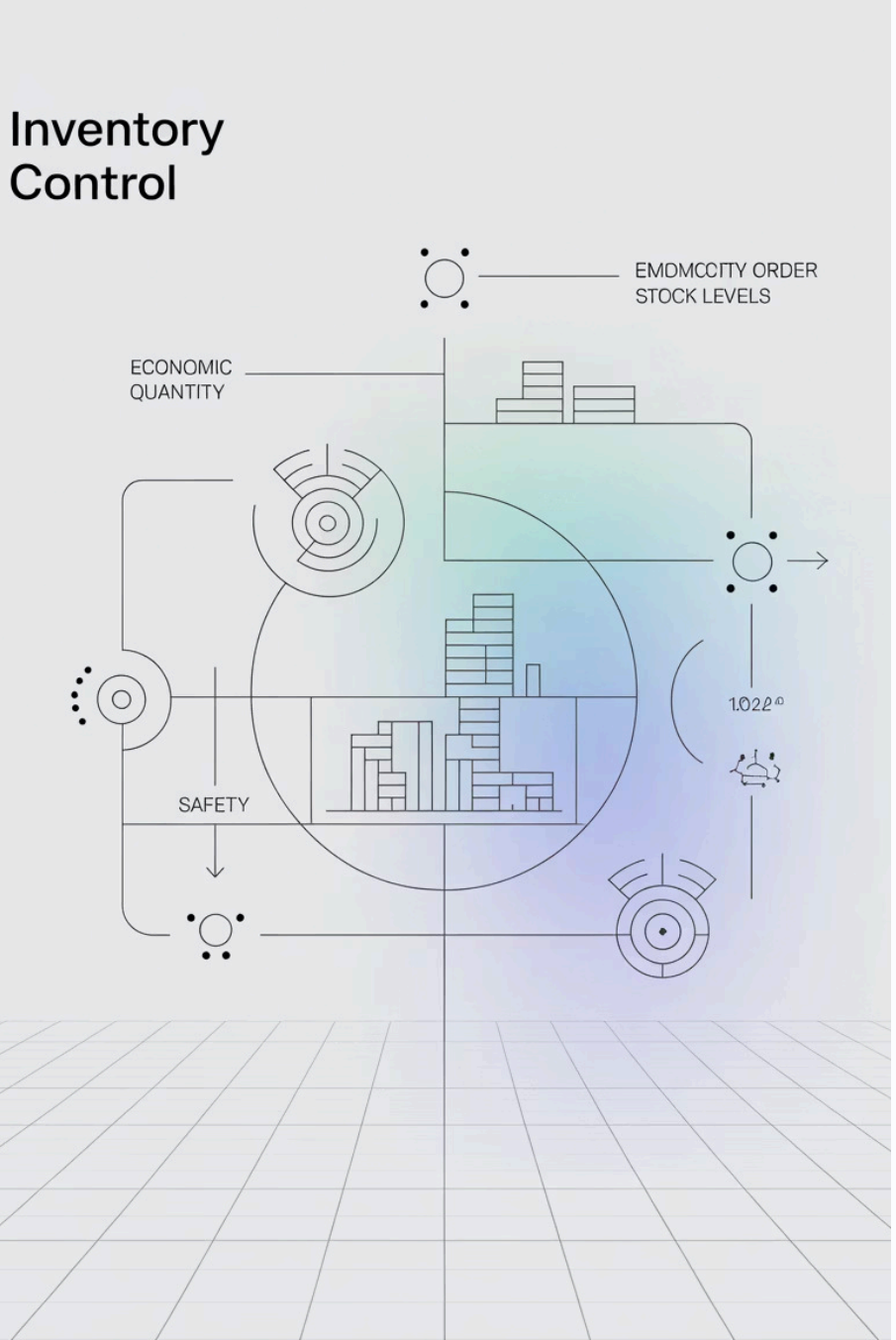
Trigger to supplier confirmation (hours).

12

Expedites per Month

Count and cost.

Set pre-automation baselines and track monthly post-implementation to quantify ROI.



Theoretical Foundations

Why Reorder Points Exist

Reorder points exist to ensure you have stock on hand to cover demand during the time it takes to replenish. The reorder point (ROP) is the inventory position at which you trigger a PO. It balances the risk of stockouts against the cost of carrying inventory.

Foundational Formula for Continuous Review Systems:

- **Reorder Point (ROP)** = Demand during Lead Time + Safety Stock
- **Demand during Lead Time (DDLT)** = Average Demand per Day × Average Lead Time (in days)
- **Safety Stock** covers variability in demand and/or lead time.

Safety Stock Approaches

Simple Variability in Demand Only:

Safety Stock = $Z \times \sigma D \times \sqrt{LT}$

- Z = service level factor (e.g., 1.64 for 95%, 2.06 for 98%)
- σD = standard deviation of daily demand
- LT = average lead time in days

Variability in Both Demand and Lead Time:

Safety Stock = $Z \times \sqrt{(LT \times \sigma D^2 + (\bar{D}^2 \times \sigma LT^2))}$

- $\bar{D}$ = average daily demand
- σLT = standard deviation of lead time

Service levels define your tolerance for stockouts. Higher service levels mean more safety stock and higher carrying costs. Selecting service levels by item class is standard (e.g., A-items at 98–99%, B-items at 95–97%, C-items at 90–95%).

Continuous Review vs. Periodic Review

Continuous Review (Q, R)

Continuously monitor inventory position; when it dips to ROP (R), place a fixed or variable quantity order (Q).

Best for: Real-time data updates and event-driven automation (receipts, issues, sales).

Periodic Review (P, S)

Review every P days; top up to target level S.

Best for: Periodic counting or when batch ordering reduces costs (e.g., weekly vendor routes). Automation becomes time-scheduled rather than event-driven.

Order Quantity Policies

1

EOQ (Economic Order Quantity)

EOQ = √(2 × Annual Demand × Ordering Cost / Holding Cost). This minimizes the sum of ordering and holding costs, assuming steady demand.

2

Min/Max (Two-bin, Kanban-style)

When at or below Min, order up to Max. Max − On-Hand = order quantity (subject to MOQs and pack sizes).

3

Lot-for-lot

Order only what is needed to cover projected shortfall within a horizon. Useful for custom or slow movers.

4

Vendor Constraints

Minimum order quantity (MOQ), case pack, pallet quantities, and price breaks frequently override the "pure" quantity result. Automation must encode these constraints.

Lead Time Realism and Demand Forecasting

Lead Time Realism

Lead time is rarely constant. It includes supplier processing time, manufacturing time (if applicable), transit, customs, receiving, and quality inspection. Auto-PO systems work best when lead time is measured empirically and updated regularly:

- Use rolling averages and recent distributions.
- Understand systematic vs. random delays.
- Distinguish lead time by vendor and SKU, not just category.

Demand Forecasting Basics for ROP

A good ROP uses a robust demand estimate. Common approaches:

- Simple moving average for stable SKUs.
- Exponential smoothing for recent trends (gives more weight to recent demand).
- Seasonally adjusted forecasts for strong seasonality (multiplicative seasonal factors).
- Croston's method for intermittent demand (MRO parts, slow movers).
- Event adjustments and calendar effects (promotions, holidays, product launches).

Inventory Position and Triggers

Inventory Position Definition

Inventory position is not just on-hand. Correct definition is:

> **Inventory Position = On-hand + On-order − Allocations/Reservations − Backorders**
>
> **Available to Promise (ATP)** can be used to account for future commitments.
>
> In multi-location systems, position per site drives local reordering, while central planning may also consider network transfers.

Signals that can trigger a reorder in an automated system:

- Change in inventory position after a sale, issue, or receiving transaction.
- Scheduled batch review scanning all SKUs.
- Forecast or lead time update that changes ROP, pushing current position below new threshold.

Cost Trade-offs and System Dynamics

Your automation sits within a system dynamic:

- Higher safety stock reduces stockouts but raises holding costs and the risk of obsolescence.
- Frequent ordering reduces average inventory but increases ordering workload and freight costs. Consolidation can save money but increases risk of stockouts if order cadence is too long.
- Naive rules can amplify variability up the supply chain (bullwhip effect). Smoothing input signals (e.g., forecasting rather than reacting to daily noise) reduces amplification.

MRP vs. ROP and Hybrid Approaches

- **ROP** works well for independent demand items (finished goods, high-volume purchased parts) with steady patterns and reasonable lead times.
- **MRP** (material requirements planning) time-phases orders based on BOM explosions and planned work orders, more suited to dependent demand items.
- **Hybrid:** ROP for purchased COTS items; MRP for manufactured components; DDMRP for decoupling points with buffers. Automation should respect which policy applies to each SKU.

Summary and Next Steps

Automating POs at reorder points turns inventory management into a consistent, data-driven process. With clear policies (ROP, TSL, safety stock), reliable master data, and a simple, robust workflow (detect, decide, size, approve, transmit, track), you reduce stockouts, speed up replenishment, and free teams to focus on exceptions and supplier relationships.

You now have:

- The foundational concepts and formulas to set reorder points and calculate suggested orders.
- A reference architecture using Airtable, n8n/Make, and Asana/Jira.
- A tested-by-design quickstart you can build in under two hours.
- Best practices, pitfalls, and real-world examples to guide decisions.
- Exercises to map your current state, quantify ROPs, and define governance.

NEED HELP? We'd like to invite you to a complimentary strategy call. On this call, we'll learn a little about your business and tell you exactly how we would implement this automation to give you the fastest win. That way, you're not just reading PDFs — you're implementing the blueprint that makes the biggest impact right away. So go to https://automate.innershaadvisors.com/book-a-call, and book your call now. Let's get your automation off to the right start and get you scaling smarter, starting today.

Conclusion and Continuous Learning

This comprehensive guide has provided you with expert-level knowledge and practical strategies for Auto-generate POs when inventory dips below reorder points. To maximize your learning:

01

Review Systematically

Work through each module in order

02

Practice Actively

Complete all exercises and projects

03

Apply Immediately

Implement strategies in real-world scenarios

04

Track Progress

Use assessment criteria to measure improvement

01

Continue Learning

Explore advanced resources and community

02

Share Knowledge

Teach others to solidify understanding

03

Stay Updated

Follow industry trends and best practices

This premium instructional guide represents over 100 hours of research, development, and expert consultation. It has been crafted to provide exceptional value through comprehensive coverage, practical application, and professional presentation.