

EGF POS & E-Commerce: Product-Driven Shipping & Split Delivery System

Business Requirements, Use Cases & Implementation Specification

1. Executive Summary & Business Rationale

1.1 The Business Challenge

In modern retail, e-commerce stores carry diverse categories of goods that have fundamentally different logistics, handling, and transit requirements:

1. Perishable / Living Goods (e.g., Live Nursery Plants, Bonsai, Fresh Floral Bouquets, Organic Seedlings):
 - * Cannot survive standard 4–7 day surface transit in dark truck trailers.
 - * Requirement: Must be shipped exclusively via Express Air (1–2 days).
2. Bulky / Heavy / Ground-Only Materials (e.g., 50 lb Soil & Compost bags, River Stones, Retaining Wall Bricks, Liquid Fertilizers):
 - * Prohibitively expensive to air-freight and restricted by aviation safety standards.
 - * Requirement: Must be shipped via Standard Ground Courier or Regional Freight (4–6 days).
3. Flexible General Merchandise (e.g., Pruning Shears, Planter Pots, Gardening Gloves, Seeds, Accessories):
 - * Sturdy, non-perishable goods that can ship by either Standard Ground or Express Air.

1.2 The Failure of Legacy Single-Option Checkouts

- Failure Case 1 (Everything downgraded to Standard): If live plants are forced to travel via 6-day ground transit, they arrive damaged or dead, leading to customer churn, refund losses, and high reverse-logistics costs.
- Failure Case 2 (Express disabled completely): If a customer has an urgent live plant and a bag of soil in their cart, and the system blocks Express delivery completely, the customer abandons the cart to buy the urgent goods elsewhere.

1.3 The Strategic Solution

Implement a Product-Driven Split Delivery Architecture:

- Store Administrators configure the shipping delivery capability (`standard\_only`, `express\_only`, or `both`) at the Category and Product level.
- At Checkout, the system dynamically partitions cart items into separate shipment parcels based on their shipping capabilities, calculates transparent rates and delivery ETAs per parcel, and generates separate carrier shipping labels for warehouse fulfillment.

2. Product Shipping Classification Matrix

Shipping Delivery Type	Characteristic	Business Examples	Transit SLA	Carrier
Transport Mode				
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`express_only`	Expedited / Air Only	• Live Tropical Nursery Plants • Potted Orchids & Bonsai • Fresh Flower Garlands	1–2 Business Days	FedEx 2Day / UPS Next Day Air / Priority Air Courier
`standard_only`	Ground / Freight Only	• 40–50 lb Potting Compost & Soil • Landscaping River Stones & Bricks • Heavy Ceramic Fountains	4–7 Business Days	FedEx Ground / UPS Ground / LTL Regional Freight
`all`	Flexible / Both	• Bypass Hand Pruners & Tools • Seed Variety Packets • Plastic & Resin Planter Pots	1–2 Days (Express) or 4–6 Days (Standard)	Standard Ground or Express Air (Customer choice)

3. End-to-End Real-World Business Scenarios

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| SCENARIO 3: MIXED CART CHECKOUT (SPLIT DELIVERY) |
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| Cart Contents: |
| 1. Fiddle Leaf Fig Live Plant (Express Only) ..... |
| $45.00 |
| 2. Premium Organic Potting Soil 50 lb (Standard Only) ..... |
| $25.00 |
| 3. Heavy-Duty Bypass Pruning Shears (Flexible / Both) ..... |
| $30.00 |
| |
| Automatic System Partitioning: |
| * SHIPMENT 1 (Express Air - Fastest): |
| - Items: Fiddle Leaf Fig Live Plant + Pruning Shears |
| - Estimated Arrival: Tuesday, Sep 15 (2 Business Days) |
| - Shipping Fee: $14.99 |
| |
| * SHIPMENT 2 (Standard Ground - Heavy/Bulky): |
| - Items: Premium Organic Potting Soil 50 lb |
| - Estimated Arrival: Friday, Sep 18 (5 Business Days) |
| - Shipping Fee: $6.99 |
| |
| Total Order Calculation: |
| Subtotal: $100.00 | Shipping (2 Packages): $21.98 | Tax: $8.00 | TOTAL: |
| $129.98 |
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Scenario 1: Pure Express Cart (Perishables)

- Cart: Live Fiddle Leaf Fig Plant + Live Monstera Sapling.
- System Action: 1 Package $\rightarrow$ Express Air only (\$14.99) $\rightarrow$ Delivered in 1–2 days.
- Customer Value: Guaranteed live plant freshness with zero transit mortality.

Scenario 2: Pure Standard Cart (Bulk Landscape Materials)

- Cart: 2 $\times$ 50 lb Potting Soil + 1 $\times$ Concrete Stepping Stone.
- System Action: 1 Package $\rightarrow$ Standard Ground only (\$6.99 / FREE over threshold) $\rightarrow$ Delivered in 4–6 days.
- Customer Value: Economical delivery for heavy materials.

Scenario 3: Mixed Cart with Split Shipment (Live Plant + Heavy Soil + Tool)

- Cart: Live Plant (``express_only``, \$45) + 50 lb Soil (``standard_only``, \$25) + Pruning Shears (``all``, \$30).
- System Action: Automatically splits into 2 Shipments:
- * Shipment 1 (Express Air): Live Plant + Pruning Shears $\rightarrow$ Arrives Tuesday (2 Days) $\rightarrow$ \$14.99.
- * Shipment 2 (Standard Ground): 50 lb Soil $\rightarrow$ Arrives Friday (5 Days) $\rightarrow$ \$6.99.
- Combined Shipping Charge: $\$14.99 + \$6.99 = \mathbf{\$21.98}$.
- Customer Value: Customer receives urgent live plant and tool first without waiting for slow ground freight.

Scenario 4: Split Cart with Free Shipping Promotion Applied

- Company Rule: Free Standard Shipping on orders over \$75\$.
- Cart: Subtotal \$120.00\$ (Meets Free Shipping threshold).
- System Action:

- * Shipment 2 (Standard Ground) fee (\$6.99) is discounted to \$0.00 (FREE).
- * Shipment 1 (Express Air) fee is charged at \$14.99.
- * Total Shipping: $\$14.99 + \$0.00 = \mathbf{\$14.99}$.
- Customer Value: Customer receives free shipping on heavy ground goods while paying only the express air premium for urgent perishables.

4. Customer-Facing UI & Checkout Presentation

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Ø=Üæ YOUR SHIPMENT BREAKDOWN (2 Packages)	
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&j SHIPMENT 1: Express Air Delivery (Fastest)	\$14.99
Estimated delivery: Tuesday, Sep 15 (1–2 Business Days)	
• Fiddle Leaf Fig Live Plant × 1 (Express Only — Perishable)	
• Heavy-Duty Bypass Pruning Shears × 1	
Ø=ÞŠ SHIPMENT 2: Standard Ground Delivery	\$6.99
Estimated delivery: Friday, Sep 18 (4–6 Business Days)	
• Premium Organic Potting Soil 50lb Bag × 1 (Standard Ground Only)	

Ø=Üµ ORDER SUMMARY	
Items Subtotal (3 items):	\$100.00
Shipping (2 Separate Shipments):	\$21.98
Estimated Sales Tax:	\$8.00

Total Order Amount:	\$129.98
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Post-Purchase Multi-Tracking Portal

- On the Customer Order Details Page, each shipment displays its own independent tracking progress bar:
- Package 1 (Express): FedEx Air Tracking `#781234567890` \$→\$ `Out for Delivery (Tuesday)`
 - Package 2 (Standard): FedEx Ground Tracking `#987654321012` \$→\$ `In Transit (Friday)`

5. Warehouse Fulfillment & Operational Workflow

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ORDER #1042 FULFILLMENT ROUTING	
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[PACKAGE 1 - EXPRESS AIR]	[PACKAGE 2 - STANDARD GROUND]
- Priority: HIGH (Urgent Air)	- Priority: REGULAR (Ground)
- Items: Live Plant + Shears	- Items: 50 lb Soil Bag
- Box: Insulated Plant Box (14x12x8 in)	- Box: Heavy Poly Bag (24x16x6 in)
- Label: FedEx 2Day Air Label	- Label: FedEx Ground Label
- Carrier Handover: Morning Express Pickup	- Carrier Handover: EOD Ground Hub
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1. Pick & Pack Optimization:
 - * Warehouse staff receive 2 separate pick/pack tickets grouped by destination container.
 - * Package 1 (Express) is flagged for temperature-controlled packing and morning carrier dispatch.
 - * Package 2 (Standard) is staged in standard pallet bays.
2. Independent Label Purchasing:
 - * Admin Shipping Labels module generates 2 distinct carrier shipping labels with exact box weights.
3. Automated Customer Dispatch Notifications:
 - * Customer receives automated SMS/email alerts with both tracking numbers.

6. Phased Implementation Roadmap

PHASE 1: ADMIN & CATALOG CONFIGURATION
• Configure Allowed Shipping Methods in Category Presets (Standard / Express / Both) • 1-Click Sync to propagate presets to active category products • Verify SKU-level overrides in Product Create/Edit forms
PHASE 2: CHECKOUT CART PARTITIONING & RATING
• Implement dynamic cart partitioner into Express & Standard buckets • Calculate itemized shipping fees & ETAs per package • Present multi-package breakdown cards in Checkout Step 2
PHASE 3: WAREHOUSE MULTI-LABEL DISPATCH & TRACKING
• Enable multi-package label creation in Admin Order Management • Render separate parcel tracking timelines on Customer Order Details page

7. Expected Business Value & ROI

1. Elimination of Cart Abandonment: Customers are never blocked from receiving urgent goods quickly.
2. Zero Transit Mortality for Living Goods: Delicate plants are strictly safeguarded in 1–2 day air transit.
3. Transparent Logistics & Higher Conversion: Customers clearly see arrival dates for each item, eliminating customer support inquiries about mixed delivery schedules.

