E-Commerce Platform Database Schema

Customer Information

Table: customers

- customer_id (INT, PRIMARY KEY): Unique identifier for each customer
- first_name (VARCHAR(50)): Customer's first name
- last_name (VARCHAR(50)): Customer's last name
- email (VARCHAR(100), UNIQUE): Customer's email address
- phone (VARCHAR(20)): Customer's phone number
- created_at (TIMESTAMP): Account creation timestamp
- last_login (TIMESTAMP): Last login timestamp
- status (ENUM): 'active', 'inactive', 'suspended'
- tier (VARCHAR(20)): Customer tier (e.g., 'standard', 'premium', 'gold')

Address Information

Table: addresses

- address_id (INT, PRIMARY KEY): Unique identifier for each address
- customer_id (INT, FOREIGN KEY): References customers.customer_id
- address_type (ENUM): 'billing', 'shipping', 'both'
- street_address (VARCHAR(100)): Street number and name
- city (VARCHAR(50)): City name
- state (VARCHAR(50)): State or province
- postal_code (VARCHAR(20)): ZIP or postal code
- country (VARCHAR(50)): Country name
- is_default (BOOLEAN): Whether this is the default address for the customer

Product Catalog

Table: products

- product_id (INT, PRIMARY KEY): Unique identifier for each product
- sku (VARCHAR(50), UNIQUE): Stock keeping unit code
- name (VARCHAR(100)): Product name

- description (TEXT): Detailed product description
- category_id (INT, FOREIGN KEY): References categories.category_id
- price (DECIMAL(10,2)): Base retail price
- cost (DECIMAL(10,2)): Acquisition cost
- weight (DECIMAL(8,2)): Product weight in kg
- dimensions (VARCHAR(50)): Product dimensions (LxWxH)
- inventory_count (INT): Current inventory level
- reorder_threshold (INT): Level at which to reorder
- supplier_id (INT, FOREIGN KEY): References suppliers.supplier_id
- is_active (BOOLEAN): Whether the product is active
- created_at (TIMESTAMP): When product was added to catalog
- updated_at (TIMESTAMP): When product was last updated

Product Categories

Table: categories

- category_id (INT, PRIMARY KEY): Unique identifier for each category
- parent_category_id (INT, FOREIGN KEY): Self-reference for hierarchical categories
- name (VARCHAR(50)): Category name
- description (TEXT): Category description
- image_url (VARCHAR(255)): URL for category image

Suppliers

Table: suppliers

- supplier_id (INT, PRIMARY KEY): Unique identifier for each supplier
- company_name (VARCHAR(100)): Supplier company name
- contact_name (VARCHAR(100)): Name of primary contact
- email (VARCHAR(100)): Contact email
- phone (VARCHAR(20)): Contact phone
- address (TEXT): Supplier address
- tax_id (VARCHAR(50)): Tax identification number
- payment_terms (VARCHAR(100)): Payment terms (e.g., "Net 30")

- active_since (DATE): First supplier transaction date
- performance_rating (DECIMAL(3,2)): Supplier rating from 0.00 to 5.00

Orders

Table: orders

- order_id (INT, PRIMARY KEY): Unique identifier for each order
- customer_id (INT, FOREIGN KEY): References customers.customer_id
- order_date (TIMESTAMP): When order was placed
- status (ENUM): 'pending', 'processing', 'shipped', 'delivered', 'cancelled', 'returned'
- shipping_address_id (INT, FOREIGN KEY): References addresses.address_id
- billing_address_id (INT, FOREIGN KEY): References addresses.address_id
- shipping_method (VARCHAR(50)): Selected shipping method
- tracking_number (VARCHAR(100)): Shipment tracking number
- subtotal (DECIMAL(10,2)): Order subtotal before tax/shipping
- tax_amount (DECIMAL(10,2)): Tax amount
- shipping_amount (DECIMAL(10,2)): Shipping cost
- discount_amount (DECIMAL(10,2)): Discount amount applied
- total_amount (DECIMAL(10,2)): Final order total
- payment_method (VARCHAR(50)): Payment method used
- notes (TEXT): Order notes
- source (VARCHAR(50)): Order source (e.g., 'web', 'mobile app', 'phone')

Order Items

Table: order_items

- order_item_id (INT, PRIMARY KEY): Unique identifier for each order item
- order_id (INT, FOREIGN KEY): References orders.order_id
- product_id (INT, FOREIGN KEY): References products.product_id
- quantity (INT): Number of items ordered
- unit_price (DECIMAL(10,2)): Price at time of order
- discount_percent (DECIMAL(5,2)): Discount percentage applied
- tax_percent (DECIMAL(5,2)): Tax percentage applied

- status (ENUM): 'in_stock', 'backordered', 'shipped', 'returned'

- return_reason (VARCHAR(255)): Reason for return, if applicable

Payment Transactions

Table: payments

- payment_id (INT, PRIMARY KEY): Unique identifier for each payment

- order_id (INT, FOREIGN KEY): References orders.order_id

- payment_date (TIMESTAMP): When payment was processed

- payment_method (VARCHAR(50)): Payment method used

- payment_amount (DECIMAL(10,2)): Amount paid

- payment_status (ENUM): 'pending', 'completed', 'failed', 'refunded'

- transaction_id (VARCHAR(100)): Payment processor transaction ID

- card_last_four (VARCHAR(4)): Last four digits of credit card

- billing_postal_code (VARCHAR(20)): Billing postal code used

Inventory Tracking

Table: inventory_transactions

- transaction_id (INT, PRIMARY KEY): Unique identifier for each inventory transaction

- product_id (INT, FOREIGN KEY): References products.product_id

- transaction_type (ENUM): 'received', 'shipped', 'returned', 'adjusted', 'damaged'

- quantity (INT): Quantity change (positive for additions, negative for removals)

- transaction_date (TIMESTAMP): When transaction occurred

- reference_id (VARCHAR(100)): Reference to order_id, supplier_invoice, etc.

- notes (TEXT): Transaction notes

- location_id (INT, FOREIGN KEY): References warehouse_locations.location_id

- performed_by (INT, FOREIGN KEY): References employees.employee_id

Warehouse Locations

Table: warehouse_locations

- location_id (INT, PRIMARY KEY): Unique identifier for each location

- warehouse_id (INT, FOREIGN KEY): References warehouses.warehouse_id

- section (VARCHAR(20)): Warehouse section identifier

- aisle (VARCHAR(20)): Aisle identifier

- shelf (VARCHAR(20)): Shelf identifier

- bin (VARCHAR(20)): Bin identifier

- max_capacity (INT): Maximum capacity of location

- is_active (BOOLEAN): Whether location is active

Warehouses

Table: warehouses

- warehouse_id (INT, PRIMARY KEY): Unique identifier for each warehouse

- name (VARCHAR(100)): Warehouse name

- address (TEXT): Warehouse address

- manager_id (INT, FOREIGN KEY): References employees.employee_id

- phone (VARCHAR(20)): Warehouse contact phone

- is_active (BOOLEAN): Whether warehouse is active

- square_footage (INT): Size in square feet

Business Rules

1. Customer accounts must have a unique email address

2. Orders are only processed for active customers

3. Inventory is automatically reduced when an order is shipped

4. Reorder notifications are triggered when inventory falls below reorder_threshold

5. Customer tier affects shipping costs and available discounts

6. Returns must be processed within 30 days of delivery

7. Tax calculations are based on shipping address

8. Order status transitions must follow the sequence: pending → processing → shipped → delivered

9. Cancelled orders require manager approval if value exceeds $1000

10. Product prices are updated monthly based on supplier costs and market conditions

11. Customer tier is automatically upgraded based on annual purchase volume

12. Order processing priority is based on customer tier

13. Shipping method availability depends on product weight and dimensions

14. Supplier performance rating is updated quarterly based on delivery times and quality metrics

15. Inventory adjustments require supervisor approval and documented reason