

# Grocery Delivery SaaS App – Complete Blueprint

## 1. Project Vision

multi-vendor SaaS Grocery Platform :

-  Multiple Store Owners can create their own shop
  -  Admin controls everything
  -  Customers can place Orders
  -  Delivery Partner assignment
  -  Real-time analytics
  -  Online payment + Wallet
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## 2. Full SaaS Architecture (Production Level)

```
Frontend (React + Tailwind)
|
BackendAPI(Node.js + Express)
|
Authentication (JWT + Refresh Tokens)
|
Database (PostgreSQL / MongoDB)
|
Redis (Caching + Rate Limiting)
|
CloudStorage(Product Images)
|
PaymentGateway(Stripe / Razorpay)
|
Deployment (Docker + AWS)
```

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## 3. DSA Concepts Used in Real Application

### Cart Optimization – HashMap

```
// O(1) lookup cartlet cart =newMap()functionaddToCart(productId, qty){if(cart.has(productId)){
    cart.set(productId, cart.get(productId) + qty)
} else {
    cart.set(productId, qty)
}}
```

**Concept Used:** HashMap → O(1) operations

## Search System – Trie Data Structure

Fast product search like:

App-> Apple  
App-> Apple Juice  
App-> Apple Chips

### Why Trie?

- O(length of word) search
  - Scalable for 1M+ products
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## Order Tracking – Queue

Delivery queue:

<aside> 

- Order1 Order2 Order3 </aside>

FIFO system using Queue.

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## Delivery Route Optimization – Graph + Dijkstra

- Stores and Customers → Nodes
  - Roads → Edges
  - Use **Dijkstra Algorithm** for shortest path
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## Dynamic Pricing – Heap (Priority Queue)

- Flash sale products
  - Top discount items
  - Use Max Heap / Min Heap
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## Trending Products – Sliding Window + Frequency Map

- Last 24 hour orders
- Count frequency
- Sort by popularity

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## 4. Core Features (SaaS Level)

### Admin Panel

- Manage users
- Approve stores
- View analytics
- Subscription control

### Store Owner Panel

- Add product CRUD
- Inventory tracking
- Order management
- Revenue dashboard

### Customer

- Signup/Login (JWT)
- Add to cart
- Apply coupon
- Track order
- Wallet system

### Delivery Partner

- Accept order
- Real-time location
- Route tracking

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## 5. Database Design

### Users Table

- id
- name
- email
- password
- role (admin, store, customer, delivery)
- subscription\_plan

## Stores

- id
- owner\_id
- location
- rating

## Products

- id
- store\_id
- name
- price
- stock
- category

## Orders

- id
- user\_id
- store\_id
- status
- total\_amount

## Order\_Items

- order\_id
  - product\_id
  - quantity
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# 6. SaaS Monetization Model

Real Business Idea.

-  Monthly subscription from stores
  -  Commission per order (2–10%)
  -  Payment gateway charge
  -  Featured product ads
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## Advanced Features (Next Level)

- 🔥 AI Recommendation System
  - 🧠 Collaborative Filtering (Matrix Factorization)
  - 📊 Real-time dashboard (WebSockets)
  - 🏰 Microservices Architecture
  - 📁 GST invoice generator
  - ⚡ Geo-fencing
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## Tech Stack :

### ◆ Frontend

- React
- Tailwind
- Redux Toolkit
- React Query

### ◆ Backend

- Node.js
- Express
- PostgreSQL
- Redis

### ◆ DevOps

- Docker
- AWS EC2
- Nginx
- GitHub Actions CI/CD