







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

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)
```

3. DSA Concepts Used in Real Application

Cart Optimization – HashMap

```
// O(1) lookup
let cart = new Map()
function addToCart(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?

- $O(\text{length of word})$ search
 - Scalable for 1M+ products
-

Order Tracking – Queue

Delivery queue:

<aside> 

- Order1 Order2 Order3 </aside>

FIFO system using Queue.

☐ Delivery Route Optimization – Graph + Dijkstra

- Stores and Customers \rightarrow Nodes
 - Roads \rightarrow Edges
 - Use **Dijkstra Algorithm** for shortest path
-

Dynamic Pricing – Heap (Priority Queue)

- Flash sale products
 - Top discount items
 - Use Max Heap / Min Heap
-

Trending Products – Sliding Window + Frequency Map

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

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

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

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