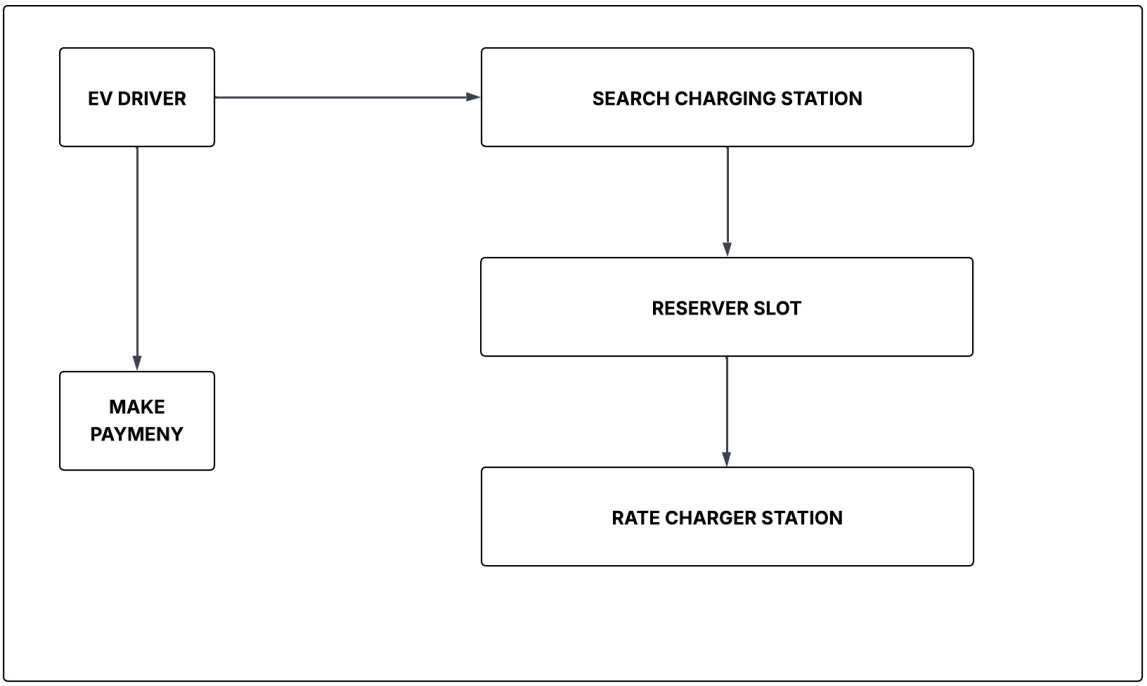
Design Documentation for " EVCharge Hub"

1. Use Cases

1.1 Primary Use Cases

Use Case	Actor	Description
Search Stations	EV Driver	User finds nearby charging stations using filters (connector type, availability, price).
Reserve Slot	EV Driver	User books a charging slot and receives confirmation.
Process Payment	EV Driver	User pays securely via integrated payment gateway.
Update Station	Station Owner	Owner modifies station status (e.g., "Under Maintenance").

1.2 Use Case Diagram



2. User Stories

Role	User Story	Acceptance Criteria
EV Driver	“As a driver, I want to filter stations by fast-charging capability so I can minimize charging time.”	System displays only stations with ≥100kW power.
Station Owner	"As an owner, I want to set dynamic pricing based on demand."	Pricing updates reflect in real-time.
Admin	"As an admin, I need to verify new station registrations to prevent fraud."	New stations are marked "Pending" until approved.

3. User Requirements

3.1 Functional Requirements

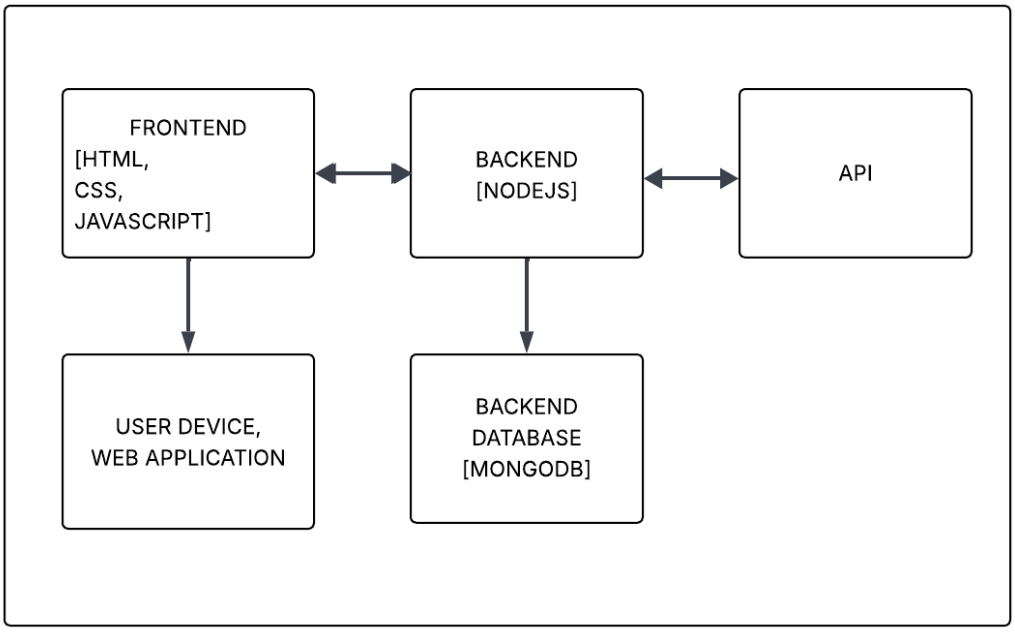
ID	Requirement
FR1	Display real-time station availability on a **Google Maps Platform** (2023).
FR2	Allow payments via Stripe/PayPal (PCI Security Standards Council, 2022).
FR3	Enable station owners to upload photos of their facilities.

3.2 Non-Functional Requirements

ID	Requirement
NFR1	Achieves ≤2s load time using MongoDB Atlas global clusters (W3Schools, 2023).
NFR2	Support 10,000 concurrent users during peak hours.

4. Design Specifications

4.1 System Architecture



4.2 Wireframe (Key Screens)

1. **Map Screen**:
    - Interactive Google Map with station pins (Google Maps Platform, 2023).
    - Floating filters (connector type, price range).
2. **Payment Screen**:
    - Embedded Stripe payment form.
    - Estimated cost based on kWh and duration.

5. References

1. Greeks for geeks (23 JUNE 2025). Use case Diagram https://www.geeksforgeeks.org/system-design/use-case-diagram/

2. Google Maps Platform. (2023). Maps JavaScript API. https://developers.google.com/maps
3. Stripe. (2023). Payment Processing Documentation. https://docs.stripe.com/
4. W3Schools. (2023).HTML Tutorial. https://www.w3schools.com/html/default.asp