Display Management System Design

1. Entity-Relationship Diagram

Entities:

- User: id, name, email, password, etc.
- Company: id, name, ownerId (ref to User)
- Display: id, name, location, companyId (ref to Company)
- Role: id, name, permissions[] (defined globally by super admin)
- UserCompanyRole: id, userId, companyId, roleId
- DisplayAssignment: id, userId, displayId, roleId

Relationships:

- A User can belong to multiple companies.
- A Company can have multiple Displays.
- A User can have different roles in different companies.
- A User can be assigned to specific Displays with specific roles.
- Roles are defined globally and assigned per company-user combination.

2. Schema Design

users:

- _id: ObjectId
- name: String
- email: String (unique)
- password: String (hashed)

companies:

- _id: ObjectId

- name: String

- ownerId: ObjectId (ref: users)

displays:

- _id: ObjectId

- name: String

- location: String

- companyId: ObjectId (ref: companies)

roles:

- _id: ObjectId

- name: String

- permissions: [String]

userCompanyRoles:

- _id: ObjectId

- userId: ObjectId (ref: users)

- companyId: ObjectId (ref: companies)

- roleId: ObjectId (ref: roles)

displayAssignments:

- _id: ObjectId

- userId: ObjectId (ref: users)

- displayId: ObjectId (ref: displays)

- roleId: ObjectId (ref: roles)

3. Access Control Enforcement

Example: PATCH /displays/:id

Step 1: Authenticate user (JWT)

Step 2: Find userCompanyRole by userId and companyId of display

Step 3: Check if role.permissions includes "edit_display"

Step 4: Check if a displayAssignment exists for that user and display with that role

Step 5: If both checks pass, allow the update; otherwise, return 403 Forbidden

4. Role Assignment Workflow

Step 1: Super Admin creates a role and assigns permissions.

Step 2: Company admin selects a user and assigns the global role to them via userCompanyRoles.

Step 3: Admin optionally assigns the user to specific displays with that role via displayAssignments.