Data Model & Entity Relationships - Telecom Mission Control SaaS

# 1. User

Represents an authenticated user of the system, with role-based access control.

|  |  |  |
| --- | --- | --- |
| Field | Type | Description |
| \_id | ObjectId | MongoDB generated ID |
| username | String | Unique username |
| password | String | Hashed password (bcrypt) |
| role | String | `admin`, `user`, or `viewer` |
| refreshToken | String | Token used for silent refresh |

Relationships:  
• Users are linked to Devices via userId  
• Role determines access to Policies, Devices, Towers, Users

# 2. Tower

Represents a communication tower with associated carriers and device types.

|  |  |  |
| --- | --- | --- |
| Field | Type | Description |
| \_id | ObjectId | MongoDB generated ID |
| location | String | Physical or logical location |
| supportedCarriers | [String] | e.g., ["AT&T", "T-Mobile"] |
| supportedDevices | [String] | e.g., ["iOS", "Android"] |

Relationships:  
• Tower has many Devices  
• Referenced by towerId in the Device model

# 3. Device

Represents a user’s device detected at a tower.

|  |  |  |
| --- | --- | --- |
| Field | Type | Description |
| \_id | ObjectId | MongoDB generated ID |
| deviceId | String | Unique device identifier |
| os | String | Operating system: iOS, Android, etc. |
| carrier | String | e.g., Verizon, T-Mobile |
| userId | String | Foreign key reference to User.\_id |
| towerId | ObjectId | Reference to Tower.\_id |

Relationships:  
• Belongs to a User  
• Connected to a Tower

# 4. Policy

Defines allowed or denied actions per role for an application.

|  |  |  |
| --- | --- | --- |
| Field | Type | Description |
| \_id | ObjectId | MongoDB generated ID |
| appName | String | Name of the app (e.g., WhatsApp) |
| role | String | Which user role this policy applies to |
| allowedActions | [String] | Actions explicitly allowed for this role |
| deniedActions | [String] | Actions explicitly denied for this role |

Relationships:  
• Tied to user roles  
• Used to enforce access on device activity by role

# Entity Relationship Summary

User ───< Device >─── Tower  
 ↘  
 Role ─────> Policy

# Example Use Case Flow

1. A User with role "user" logs in  
2. Their Devices are retrieved from the Device collection  
3. Each Device connects to a Tower  
4. Based on the User.role, the system fetches relevant Policies  
5. Allowed/denied actions are enforced based on that policy