MongoDB Data Modeling Document

Project Name: Blood and Organ Donation Platform

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# 1. What is Data Modeling in MongoDB?

Data modeling in MongoDB is the process of designing the structure of your documents and collections to match the application's requirements, scalability, and performance needs. It includes deciding how data should be structured (embedded or referenced), how collections relate, and how to optimize for queries.

# 2. Collections Used in the Project

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| Collection | Purpose |
| users | Registered users (donors or recipients) |
| hospitals | Registered hospitals or medical centers |
| organs | Information about available organs for donation |
| blood | Available blood units and details |
| requests | Organ or blood requests from users or hospitals |
| donations | Logs of successful donations by users |
| messages | Communication between users and hospitals |
| notifications | Alerts for matching requests, donations, etc. |

# 3. Relationship and Modeling Decisions

(For full relationship table, refer to source text due to Word formatting limits.)

# 4. Query Scenarios

• Show all organs available in a hospital — Fields: organs.hospitalId

• Show blood units by type for a hospital — Fields: blood.hospitalId, bloodType

• Get requests made by a user — Fields: requests.userId

• Show donation history of a donor — Fields: donations.userId

• Get all users interested in kidney donation — Fields: users.organInterest

# 5. Summary

This document outlines a detailed MongoDB data model for the Blood and Organ Donation Platform. The model uses a combination of embedded documents and references to handle short-lived data (like cart-like requests) and long-term logs (like donations), ensuring high performance and scalability. Each collection includes createdAt and updatedAt fields to support proper tracking and updates.