Final Project Proposal
INFO 5100-Application Engineering Development
Team No: 44

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Problem Statement

The management of the medical supply chain, which includes clinical data, blood products, and medications, presents major issues for the healthcare sector. Patient care can be at risk due to treatment delays, shortages of essential supplies, and ineffective coordination and communication between many stakeholders, including pharmaceutical corporations, healthcare organizations, logistical firms, and blood donation organizations. Tracking inventory levels, managing clinical trials, and successfully responding to emergencies are all made more difficult by the fragmented information that emerges from the absence of a unified system that unifies data across different entities. The goal of this project is to improve cooperation amongst all stakeholders in the healthcare supply chain by establishing an integrated communication ecosystem.

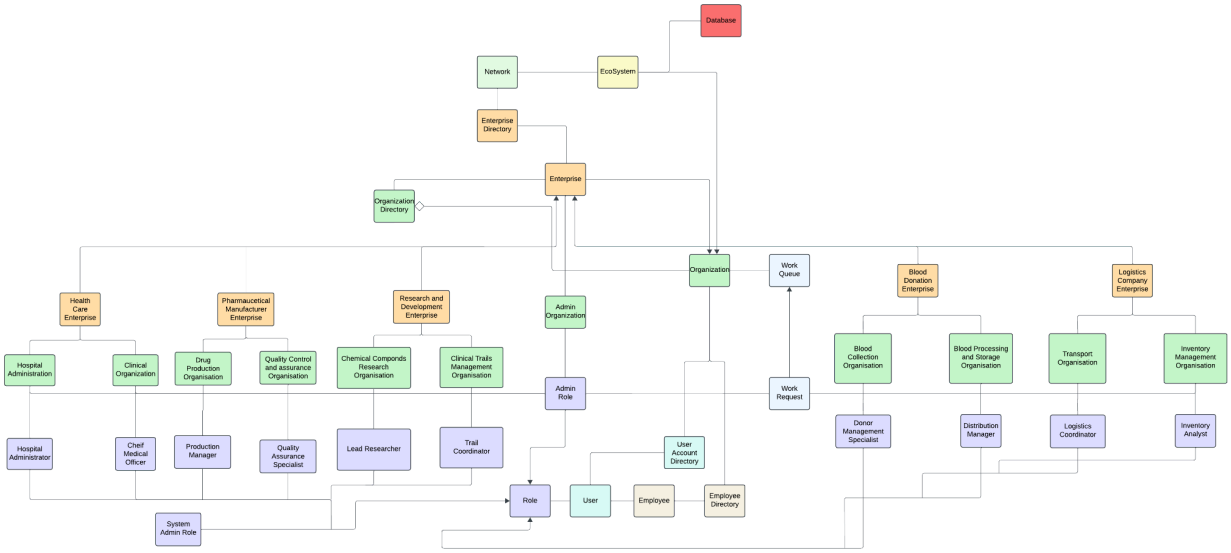
Solution

The proposed solution is an Integrated Healthcare Supply Chain Management System that connects five key enterprises: Pharmaceutical Manufacturer, Logistics Company, Healthcare Organization, Blood Donation Organization, and Research and Development Organisation. This system will enable communication and data sharing among these enterprises to ensure efficient management of medical supplies and enhance patient care.

The system will include a role-based authentication module to ensure secure access for users across all organizations. A reporting module that offers up-to-date information on order statuses, inventory levels, and clinical trial results will be included.

By implementing this integrated system, stakeholders will be able to collaborate more effectively, share critical information in real time, and make decisions that will in return improve operational efficiency and patient care.

High level Component Diagram



Ecosystem Hierarchy

1. Network:
   Global Healthcare Supply Network

2. Enterprises (5):
   1. Pharmaceutical Manufacturer Enterprise
   2. Logistics Company Enterprise
   3. Healthcare Enterprise
   4. Blood Donation Enterprise
   5. Research and Development Enterprise

3. Organizations (2 per enterprise):
    1. Pharmaceutical Manufacturer:
        - Drug Production Organization
        - Quality Control and assurance Organization

    2. Logistics Company:
        - Transport Organization
        - Inventory Management Organisation

    3. Healthcare Enterprise:
        - Hospital Administration
        - Clinical Organization

    4. Blood Donation Organization:
        - Blood Collection Organization
        - Blood Processing and storage Organization

    5. Research and Development:
        - Chemical Compound Research Organization
        - Clinical Trials Management Organization

4. Roles (1 per organization):
    1. Drug Production Team: Production Manager

    2. Quality Assurance Team: Quality Analyst

    3. Fleet Management Division: Logistics Coordinator

    4. Inventory Management Division: Inventory Analyst

    5. Patient Services Department: Hospital Administrator

    6. Clinical Organization: Nurse

    7. Blood Collection Centers: Phlebotomist

    8. Blood Processing and storage Centers: Distribution Manager

    9. Chemical Compound Research Team: Chemical Compound Researcher

    10. Clinical Trials Management Team: Trial Coordinator

    11. System Admin Role: Manages all enterprises

12. Admin Organization: Manages all organizations

Use Cases

1. Drug Production Request:

   The Healthcare Organization requests specific drugs from the Pharmaceutical Manufacturer based on patient health needs.

2. Blood Supply Request:

   The Healthcare Organization requests blood products from the Blood Donation Organization for surgeries.

3. Clinical Trial Participation:

   The Research and Development(R&D) team recruit's patients from the Healthcare Organization for new drug trials.

4. Logistics Coordination:

   The Logistics Company coordinates the transportation of drugs from the Pharmaceutical Manufacturer to hospitals.

5. Data Sharing for Research:

   The Blood Donation Organization shares anonymized donor data with R&D for research purposes.

6. Inventory Monitoring:

   The Logistics Company monitors inventory levels at the Healthcare Organization to ensure timely deliveries.

Communication Flow Overview

Communication between enterprises occurs through structured data exchanges that facilitate real-time decision-making:

1. Pharmaceutical Manufacturer to Healthcare Organization:

   The Pharmaceutical Manufacturer sends a notification about drug availability:

   "The requested drug XYZ is available for delivery on 11/25/2024."

2. Healthcare Organization to Blood Donation Organization:

The Hospital Administrator requests blood supplies:

"We require 20 units of Type AB negative blood for surgeries scheduled next week."

3. Blood Donation Organization to Logistics Company:

   The Blood Collection Specialist coordinates delivery:

   "Please schedule delivery of 20 units of Type AB negative blood to City Hospital by 11/24/2024."

4. Logistics Company to R&D:
   The Distribution Coordinator updates drug shipments:

   "Drug shipment XYZ-123 is scheduled for delivery on 11/26/2024."

5. R&D to Healthcare Organization:

   The Clinical Trials Coordinator sends trial protocols:

   "Attached are the protocols for the upcoming clinical trial involving drug XYZ-123.

6. Healthcare Organization to Pharmaceutical Manufacturer:

   The Patient Coordinator provides feedback on drug efficacy:

   "Patients have reported positive outcomes with drug XYZ-123; we request additional supply."

Work Requests List

1. Pharmaceutical Manufacturer ↔ Healthcare Organization:
   - Drug Production Request
   - Drug Availability Notification

2. Healthcare Organization ↔ Blood Donation Organization:
   - Blood Supply Request
   - Urgent Blood Delivery Coordination

3. Blood Donation Organization ↔ Logistics Company:
   - Schedule Blood Delivery
   - Inventory Update Request

4. Logistics Company ↔ R&D:
   - Drug Shipment Update
   - Transportation Coordination Request

5. R&D ↔ Healthcare Organization:
    - Clinical Trial Protocol Submission
    - Patient Data Request

6. Healthcare Organization ↔ Pharmaceutical Manufacturer:
    - Feedback on Drug Efficacy
    - Additional Supply Request

This proposal outlines a comprehensive approach to integrating communication across the healthcare supply chain while ensuring clarity in roles, responsibilities, and workflows within the ecosystem. By establishing effective communication channels and structured workflows, this system aims to enhance collaboration among all stakeholders involved in patient care and medical product management.