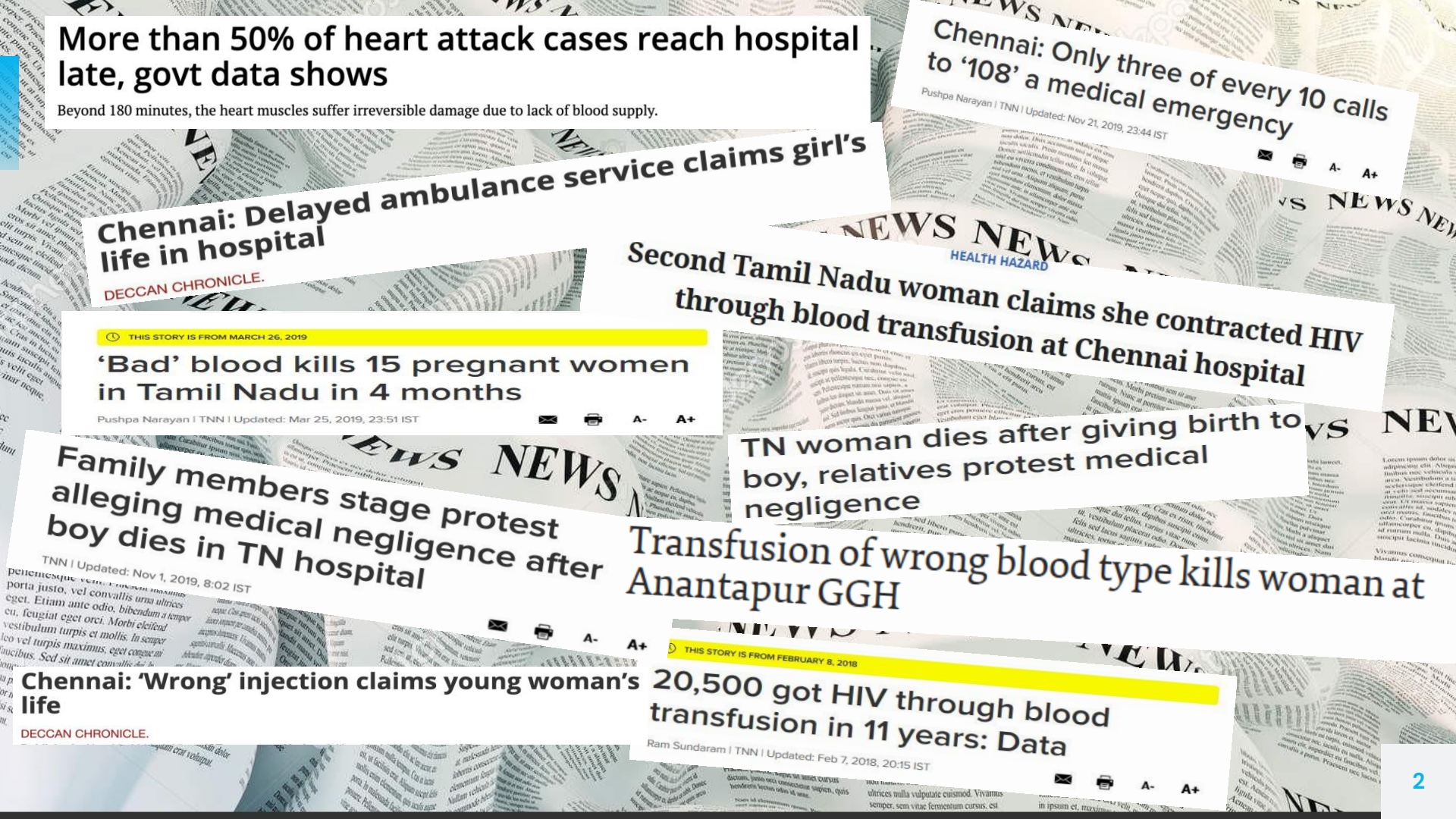
MedSys EcoSystem

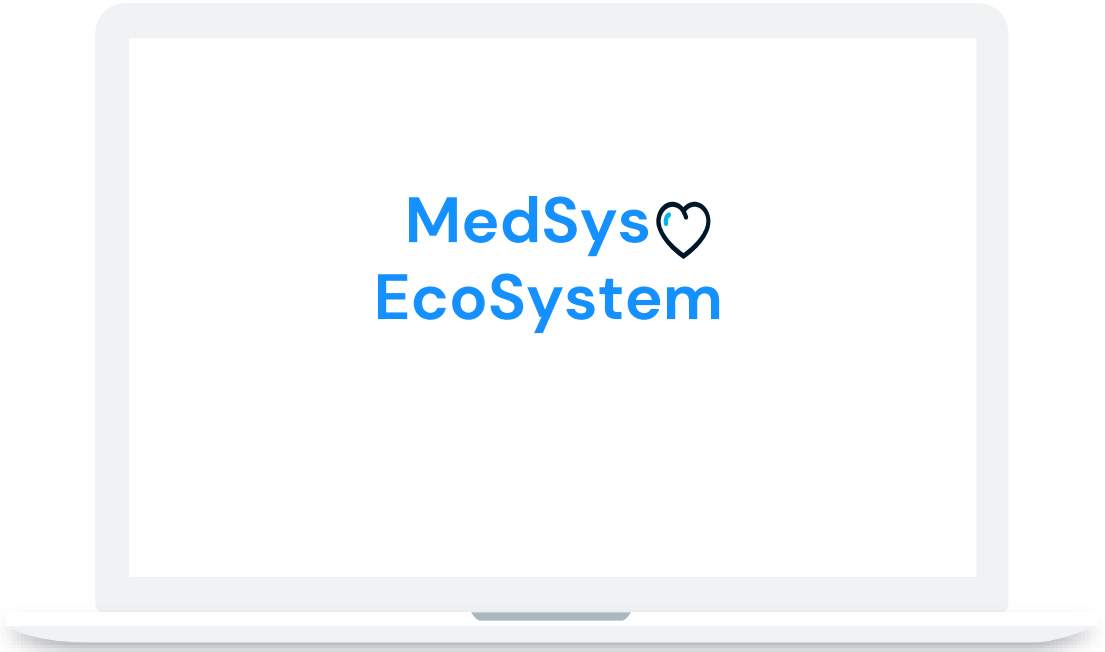
- Saving lives through MedSys


More than 50% of heart attack cases reach hospital late, govt data shows
Beyond 180 minutes, the heart muscles suffer irreversible damage due to lack of blood supply.
Chennai: Only three of every 10 calls to '108' a medical emergency
Pushpa Narayan | TNN | Updated: Nov 21, 2019, 23:44 IST
A- A+
Chennai: Delayed ambulance service claims girl's life in hospital
DECCAN CHRONICLE.
HEALTH HAZARD
Second Tamil Nadu woman claims she contracted HIV through blood transfusion at Chennai hospital
THIS STORY IS FROM MARCH 26, 2019
'Bad' blood kills 15 pregnant women in Tamil Nadu in 4 months
Pushpa Narayan | TNN | Updated: Mar 25, 2019, 23:51 IST
A- A+
TN woman dies after giving birth to boy, relatives protest medical negligence
Family members stage protest alleging medical negligence after boy dies in TN hospital
TNN | Updated: Nov 1, 2019, 8:02 IST
A- A+
Transfusion of wrong blood type kills woman at Anantapur GGH
Chennai: 'Wrong' injection claims young woman's life
DECCAN CHRONICLE.
THIS STORY IS FROM FEBRUARY 8, 2018
20,500 got HIV through blood transfusion in 11 years: Data
Ram Sundaram | TNN | Updated: Feb 7, 2018, 20:15 IST
A- A+

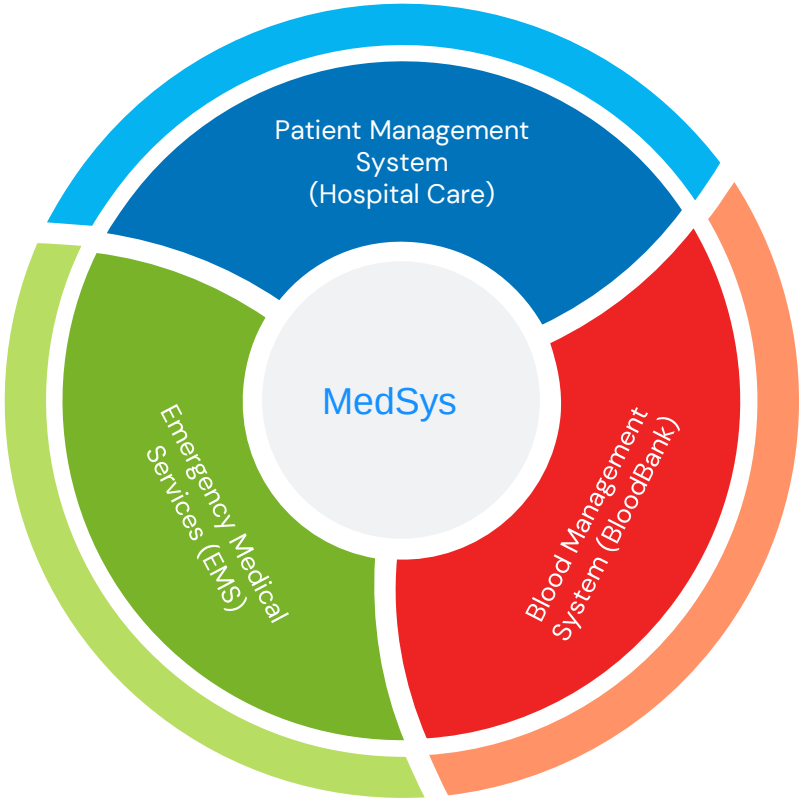
Problem Statement

- People residing in small towns in and around Chennai ,Tamil Nadu, India find it difficult to connect with the emergency services and nearby hospitals or blood banks.
- Emergency Service - In today's time, the patient's life depends on how fast they can be brought under medical supervision and treatment.
- Blood Bank - There are widespread fatal incidents in Tamil Nadu owing to incorrect blood transfusions. Blood banks play a vital role in ensuring that the correct and quality blood components are supplied to the patients.
- Hospital – There have been cases of medical negligence by providing incorrect medications to the patients hence hospital enterprise ensures utmost medical care for the patients.

There is the need for an effective healthcare system with good facilities and pre-arrival notifications. Needless to say that in order to augment the productivity of a patient's treatment in an emerging economy such as India, it is essential to create general awareness about the ecosystem


MedSys
EcoSystem

MedSys EcoSystem

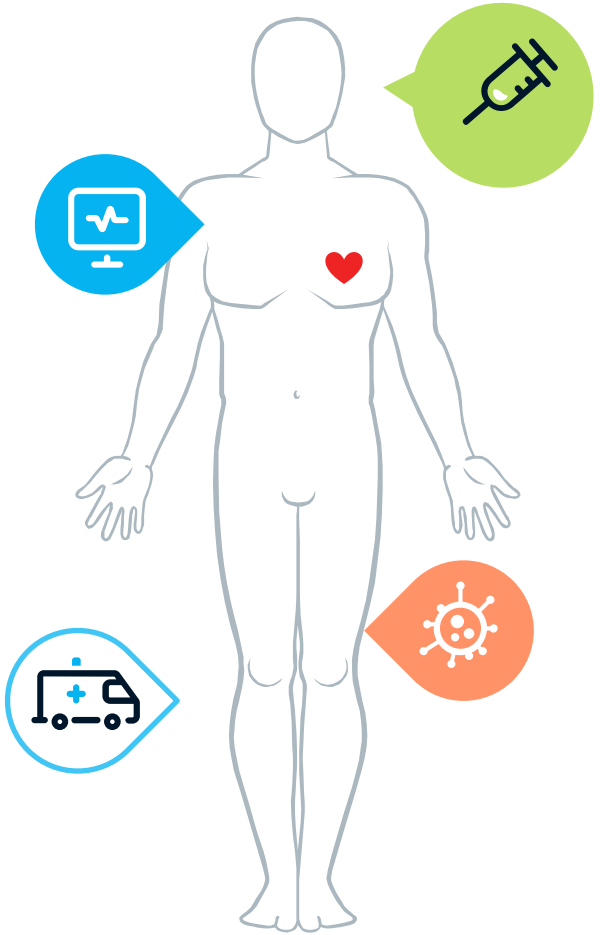


Proposed Solution

- MedSys EcoSystem is an user friendly Java Swing Application which integrates Emergency Services with the Hospital and the Blood Bank for providing efficient and timely medical services to the patients.
- Blood Bank enterprise performs clinical tests on blood and maintains a statistical data on the available blood samples, Hospital enterprise provides prompt warnings when doctor is trying to prescribe a medication which is allergic to the patient, and EMS provides timely response to the patients in case of emergency.
- We believe that adopting a common integrated platform and upgrading healthcare value system would benefit the people living in the outskirts of Chennai.
- Key Features : Offline Distribution Service, Blood Analytics, Substance UI.
- Development Key Features : Junit Testing, Logger, Multithreading, JFreeCharts, Regex.

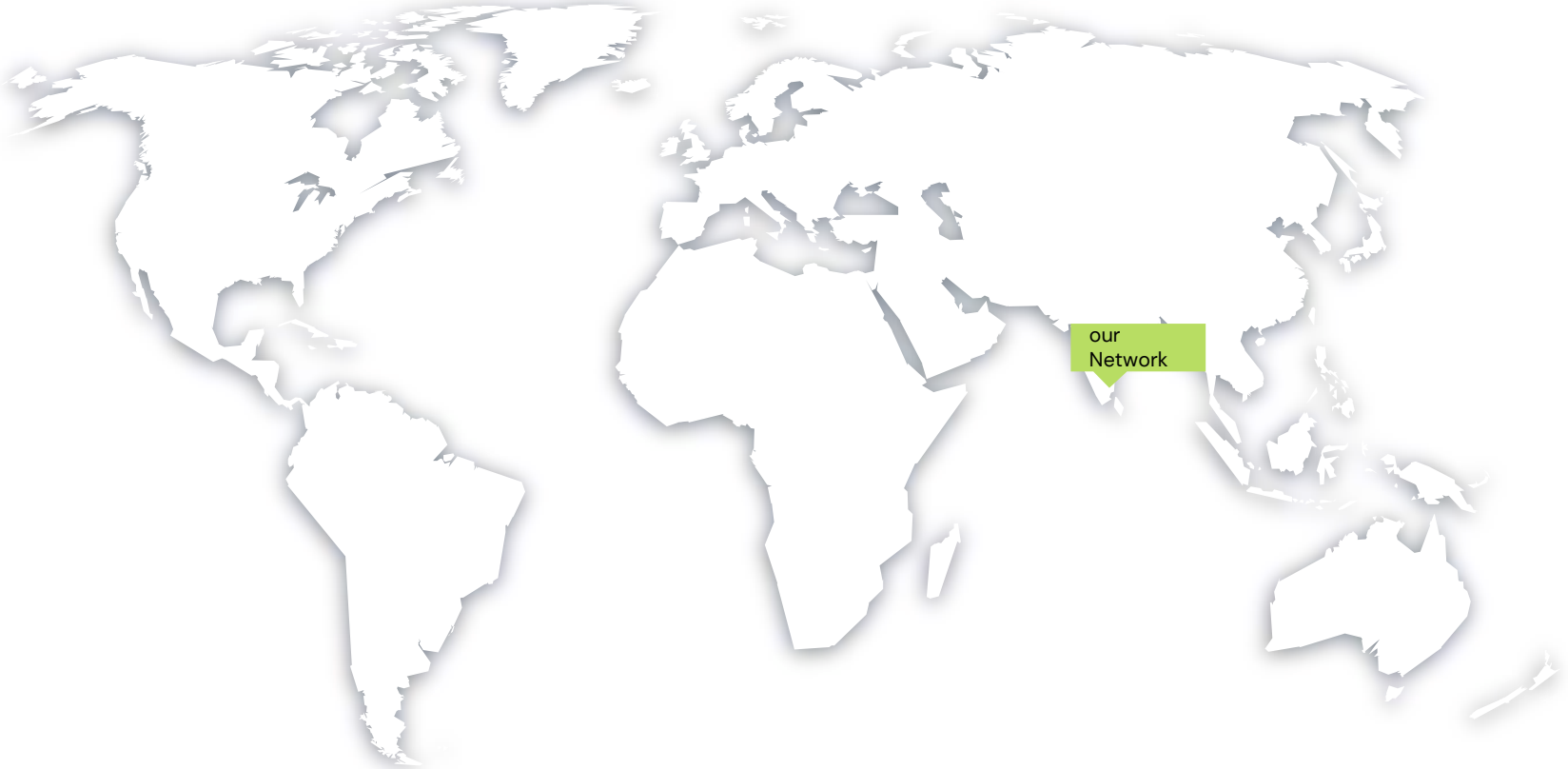
Approach

- Emergency medical providers will help the patient reach the hospital. The hospital and the blood bank will be notified prior time on the patients health and the required blood with the help of emergency caretaker.
- The hospital performs diagnosis and treats the patient until recovery while the blood banks provides the required blood needed for the patient.
- Timely communication between the enterprises to give medical care to the patients in a quick manner.
- Human errors are handled and minimized by the system and notified to the appropriate person in charge.

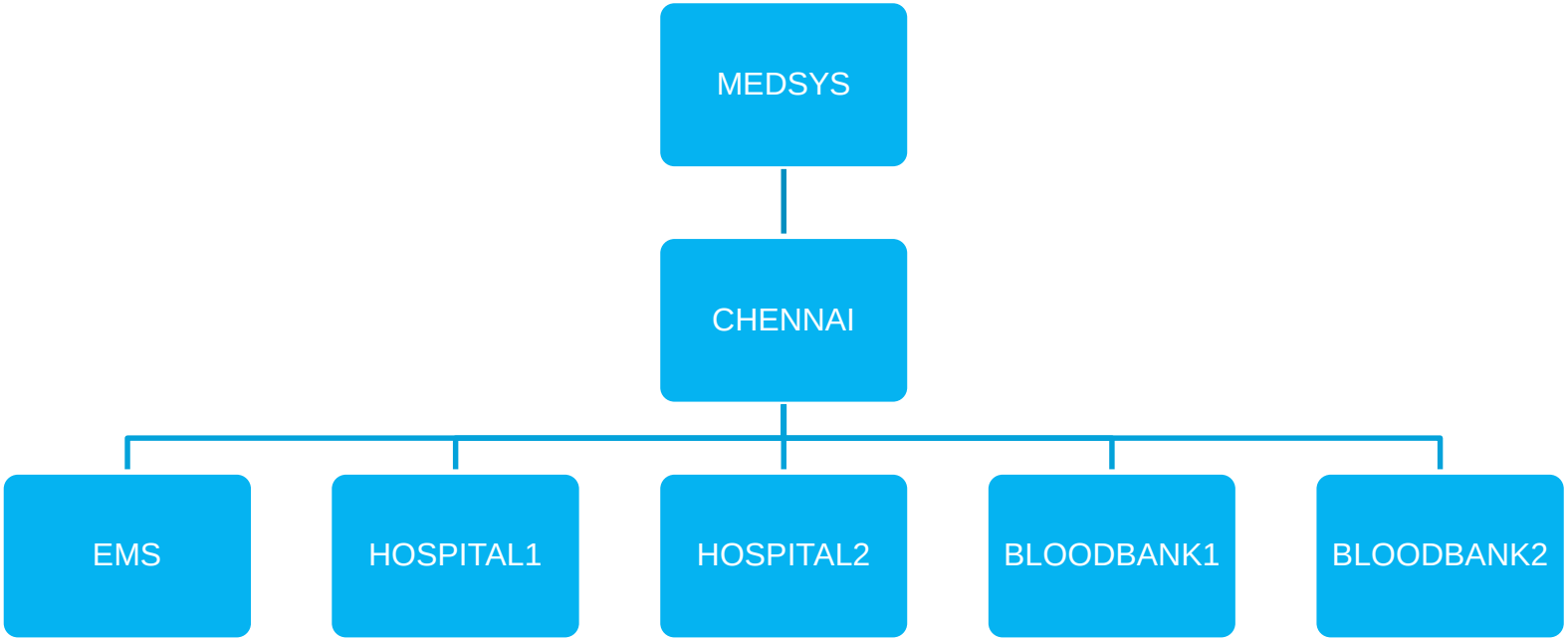


Areas to Focus

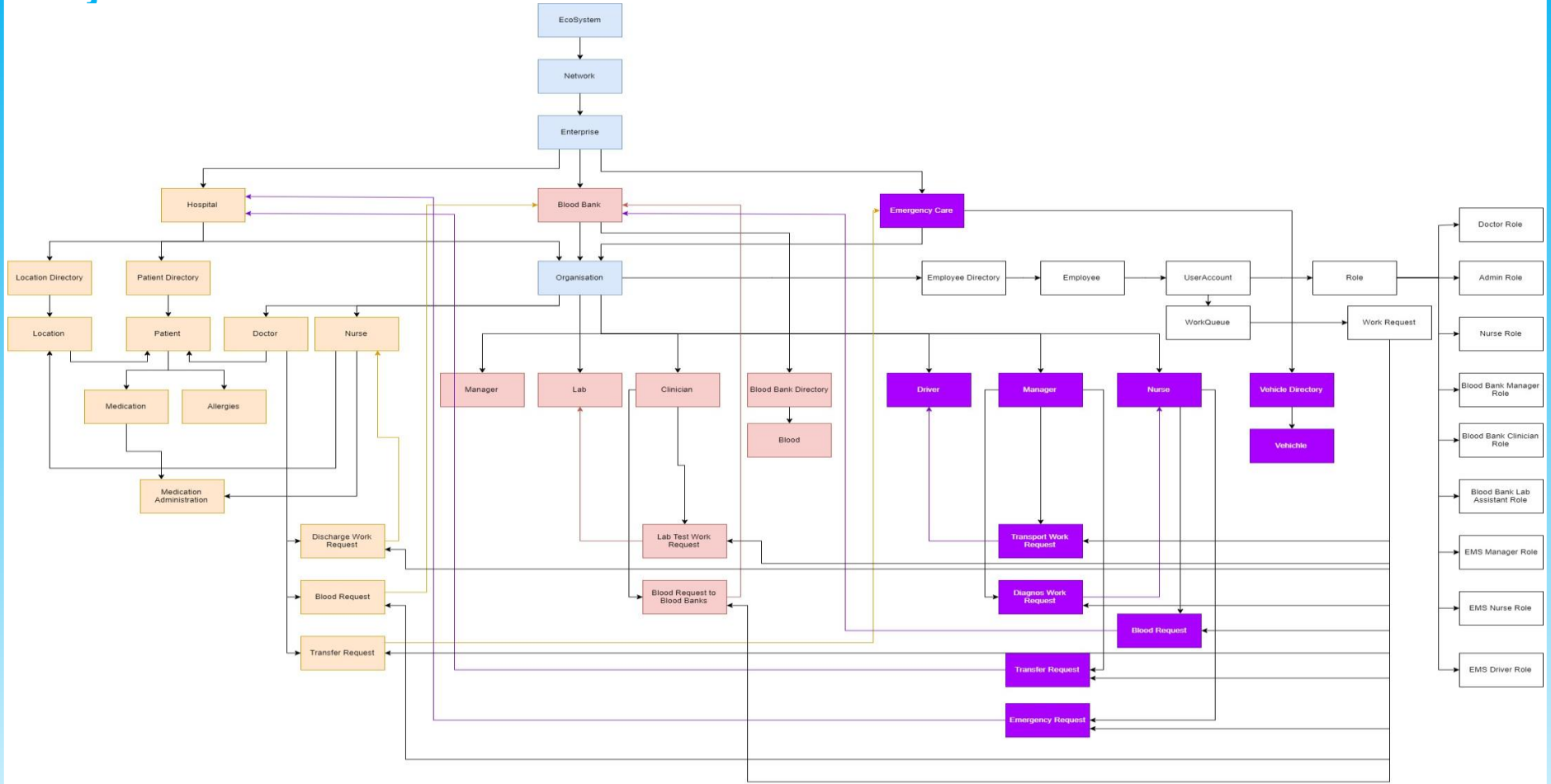
- The application focuses on performing work requests in all phases of healthcare value chain from ems to hospital and blood bank until patient's treatment and recovery.
- Data management
- Procurement – providing A method for inventory tracking
  - Information sharing & collaboration- sending the patient-related information from the ems to the hospital and to the lab and vice versa.
  - Involving blood samples for clinical testing.
- Provide a dashboard for MedSys to view patients medical situation, allergies, view available blood samples, predominant blood group available in a network.


our
Network

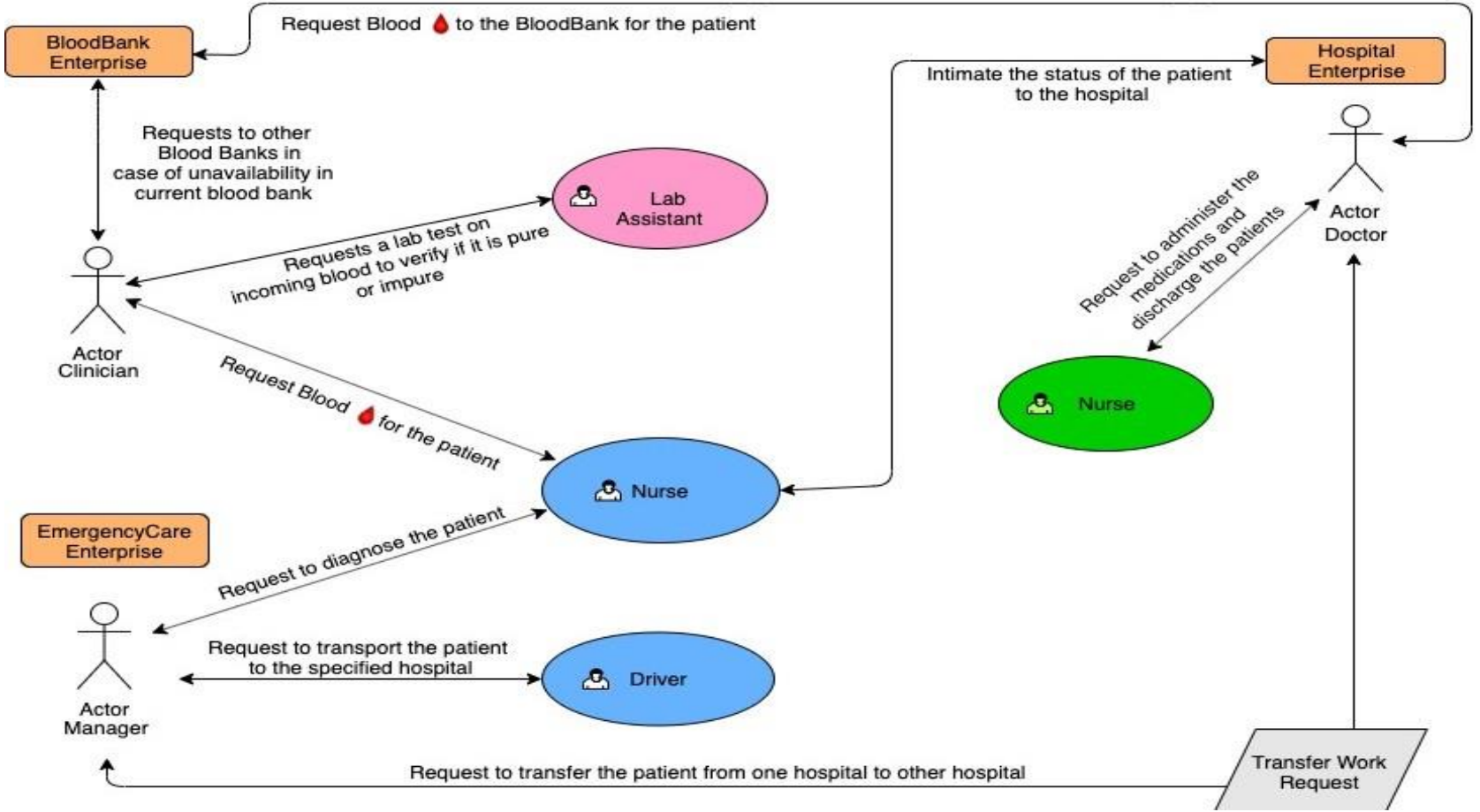
HIERARCHY STRUCTURE



Object Model



Use Case


BloodBank Enterprise
Request Blood to the BloodBank for the patient
Hospital Enterprise
Intimate the status of the patient to the hospital
Requests to other Blood Banks in case of unavailability in current blood bank
Lab Assistant
Requests a lab test on incoming blood to verify if it is pure or impure
Actor Clinician
Actor Doctor
Request to administer the medications and discharge the patients
Nurse
Request Blood for the patient
Nurse
EmergencyCare Enterprise
Request to diagnose the patient
Request to transport the patient to the specified hospital
Driver
Actor Manager
Request to transfer the patient from one hospital to other hospital
Transfer Work Request

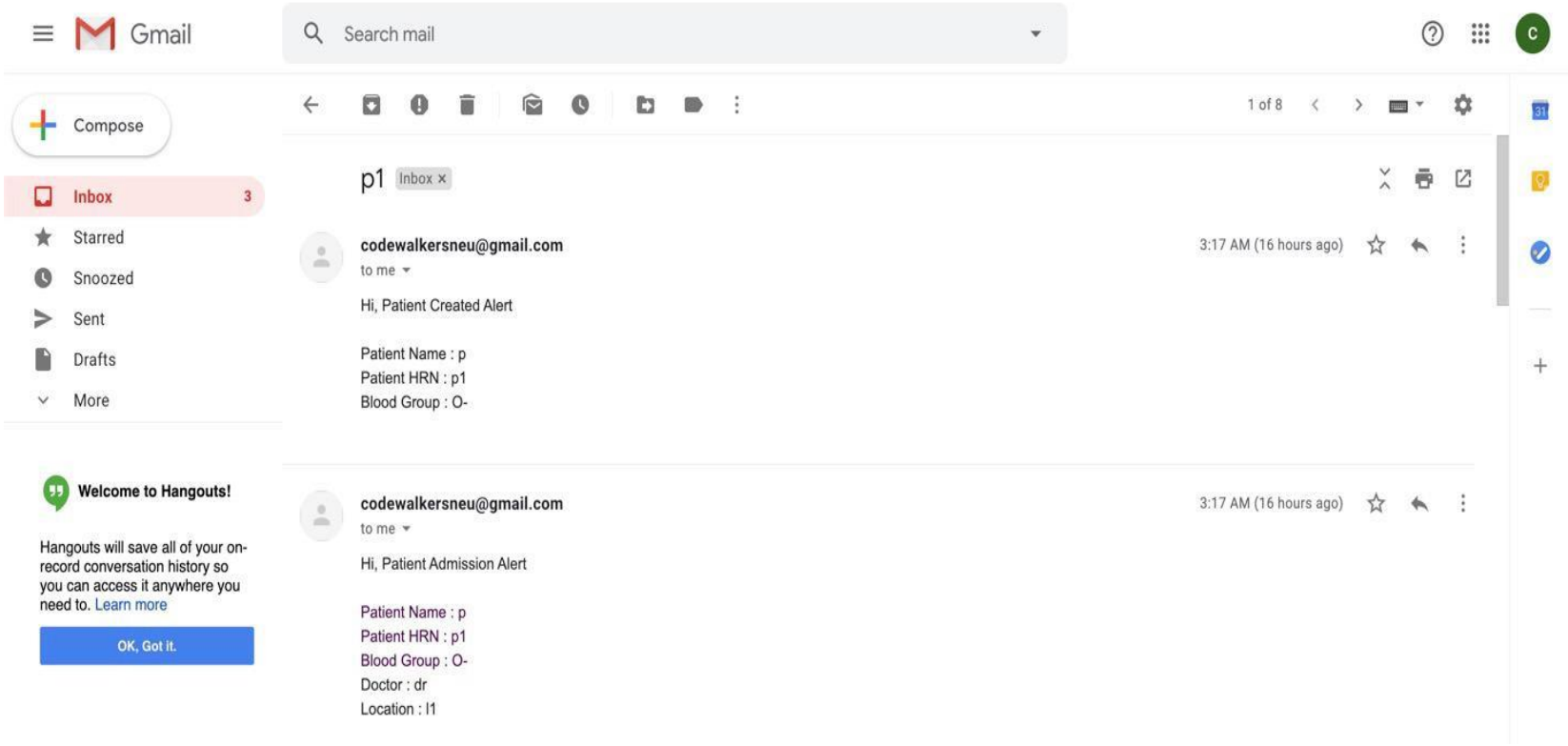
Application User Interface

- We have used Substance UI for the look and feel of the system with minimalist mild colors .
- The reason being the application has to be used in a frequent and consistent manner.
- The users need to feel more comfortable to get things done more quickly.

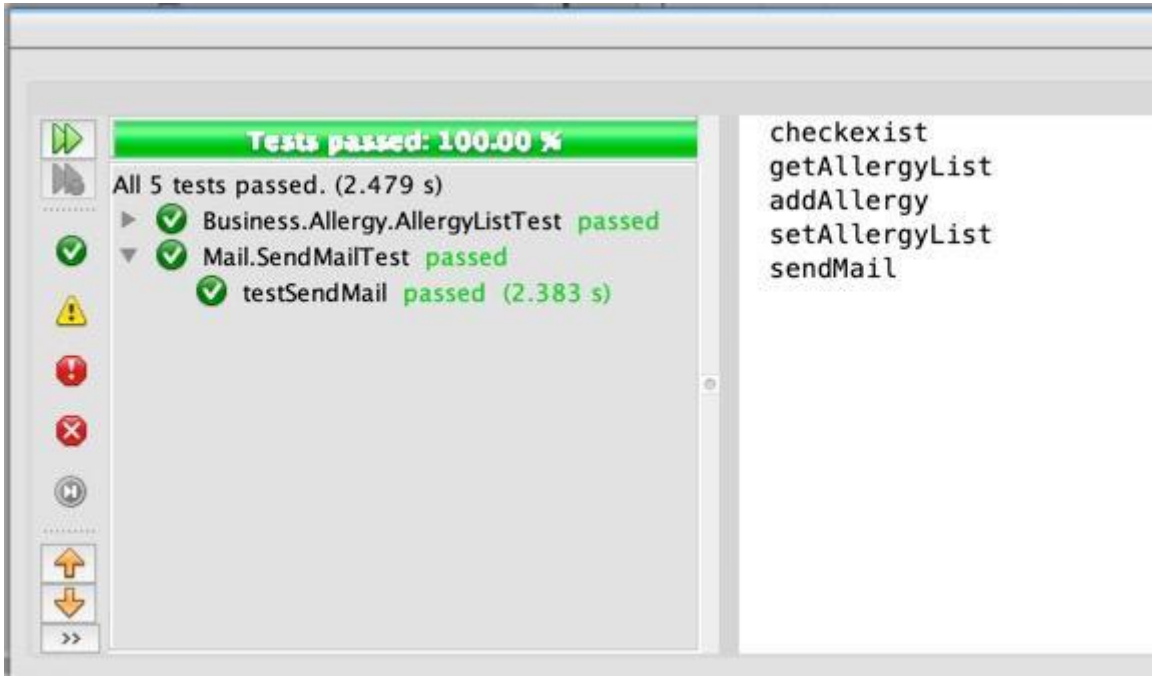
‘The best interfaces are almost invisible to the user’

Key Features

- *Offline Distribution System :*



- *Junit Testing :*

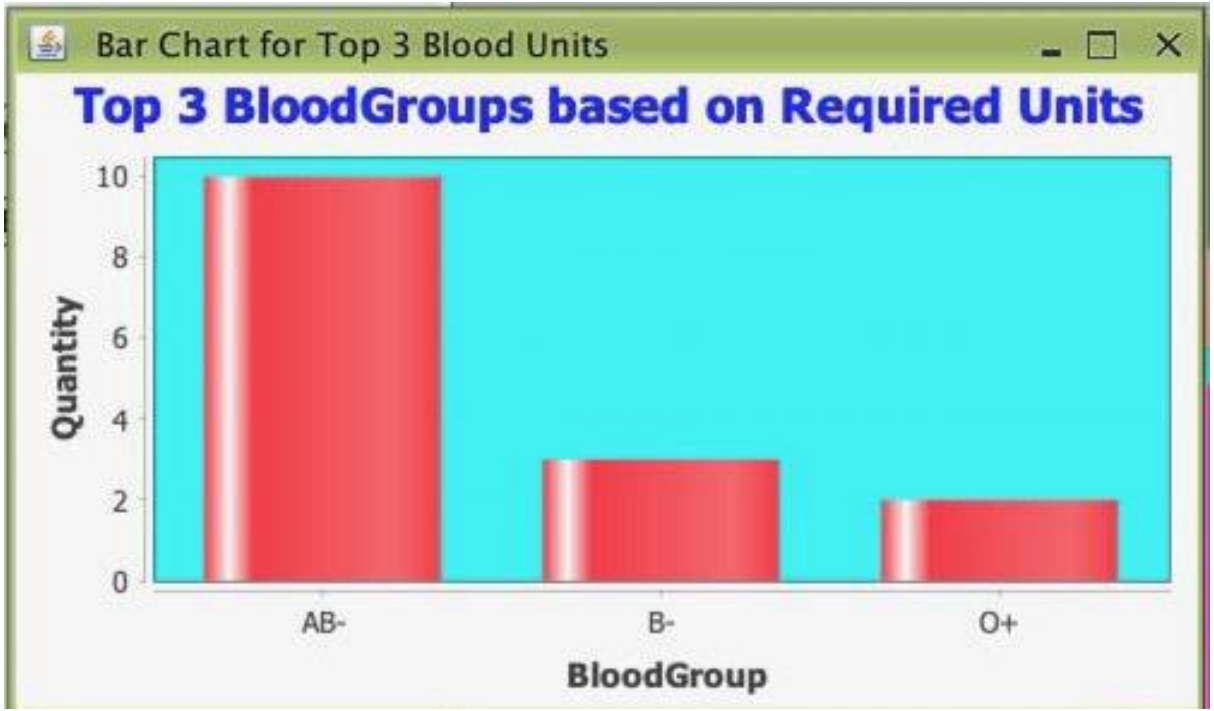


- *Logger :*

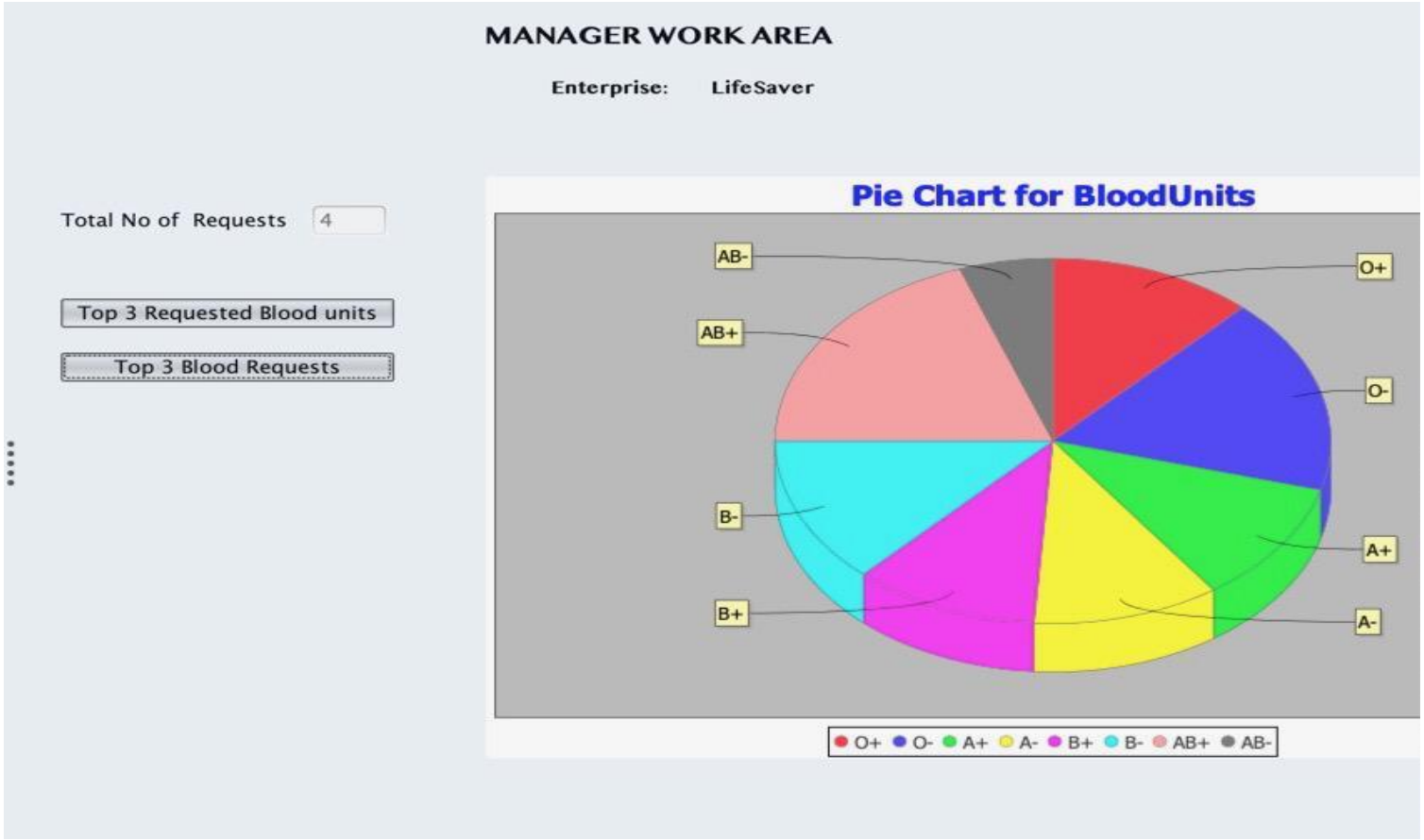
```
Dec 07, 2019 7:52:51 PM userinterface.Bloodbank.ClinicianWorkAreaJPanel populateTable
INFO: populateTable --ClinicianWorkAreaJPanel
Dec 07, 2019 7:53:41 PM userinterface.LabAssistantRole.ProcessWorkRequestJPanel jTextField1KeyTyped
INFO: reqUnitsTextFieldKeyTyped --SendReqJPanel
Dec 07, 2019 7:53:42 PM userinterface.LabAssistantRole.ProcessWorkRequestJPanel jTextField1KeyTyped
INFO: reqUnitsTextFieldKeyTyped --SendReqJPanel
Dec 07, 2019 7:53:45 PM userinterface.LabAssistantRole.ProcessWorkRequestJPanel jTextField1KeyTyped
INFO: reqUnitsTextFieldKeyTyped --SendReqJPanel
Dec 07, 2019 7:55:15 PM userinterface.SystemAdminWorkArea.SystemAdminWorkAreaJPanel <init>
INFO: Sysadmin Started
Dec 07, 2019 7:55:15 PM userinterface.SystemAdminWorkArea.SystemAdminWorkAreaJPanel populateTree
INFO: Populate Tree SysadminWorkArea
Dec 07, 2019 7:55:17 PM userinterface.SystemAdminWorkArea.ManageEnterpriseJPanel <init>
INFO: ManageEnterprise Started
Dec 07, 2019 7:55:17 PM userinterface.SystemAdminWorkArea.ManageEnterpriseJPanel populateTable
INFO: populateTable --ManageEnterprise
Dec 07, 2019 7:55:17 PM userinterface.SystemAdminWorkArea.ManageEnterpriseJPanel populateComboBox
INFO: populateComboBox --ManageEnterprise
Dec 07, 2019 7:55:20 PM userinterface.SystemAdminWorkArea.ManageEnterpriseJPanel btnDeleteActionPerformed
INFO: btnDeleteActionPerformed --ManageEnterprise
Dec 07, 2019 7:55:22 PM userinterface.SystemAdminWorkArea.ManageEnterpriseJPanel populateTable
INFO: populateTable --ManageEnterprise
Dec 07, 2019 7:55:24 PM userinterface.SystemAdminWorkArea.ManageEnterpriseJPanel btnDeleteActionPerformed
INFO: btnDeleteActionPerformed --ManageEnterprise
Dec 07, 2019 7:55:27 PM userinterface.SystemAdminWorkArea.ManageEnterpriseJPanel populateTable
INFO: populateTable --ManageEnterprise
Dec 07, 2019 7:55:47 PM userinterface.SystemAdminWorkArea.ManageEnterpriseJPanel submitJButtonActionPerformed
INFO: submitJButtonActionPerformed --ManageEnterprise
Dec 07, 2019 7:55:51 PM userinterface.SystemAdminWorkArea.ManageEnterpriseJPanel populateTable
INFO: populateTable --ManageEnterprise
Dec 07, 2019 7:56:17 PM userinterface.SystemAdminWorkArea.ManageEnterpriseJPanel submitJButtonActionPerformed
INFO: submitJButtonActionPerformed --ManageEnterprise
Dec 07, 2019 7:56:18 PM userinterface.SystemAdminWorkArea.ManageEnterpriseJPanel populateTable
```

Statistical Analysis

- *Bar Chat :*

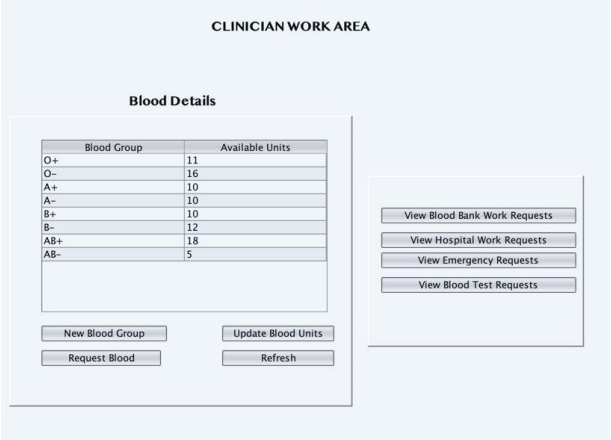


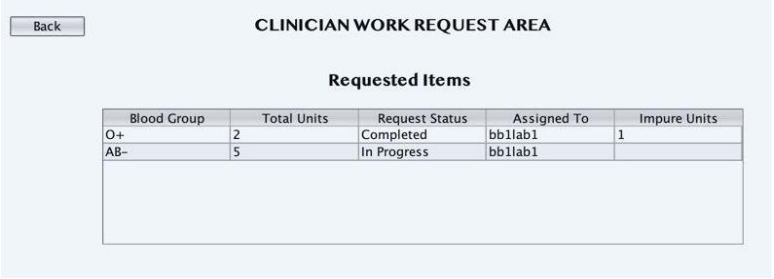
- *Pie Chart :*

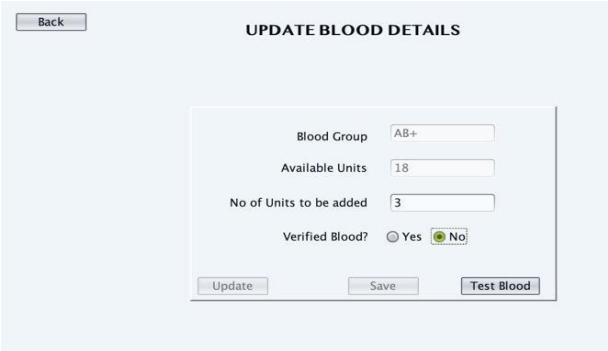

MANAGER WORK AREA
Enterprise: LifeSaver
Total No of Requests
4
Top 3 Requested Blood units
Top 3 Blood Requests
Pie Chart for BloodUnits
AB-
O+
AB+
O-
B-
A+
B+
A-
O+ O- A+ A- B+ B- AB+ AB-

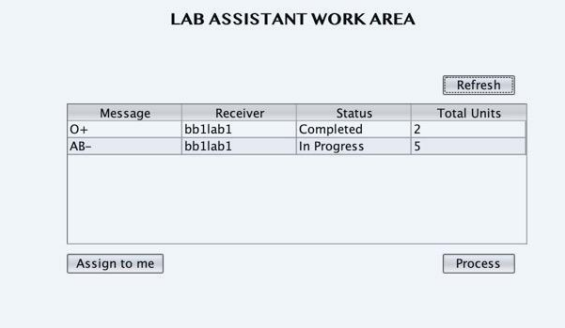
Work Flow

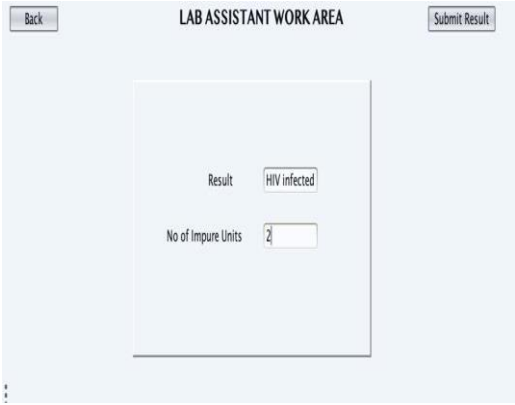
- *Enterprise – Blood Bank*







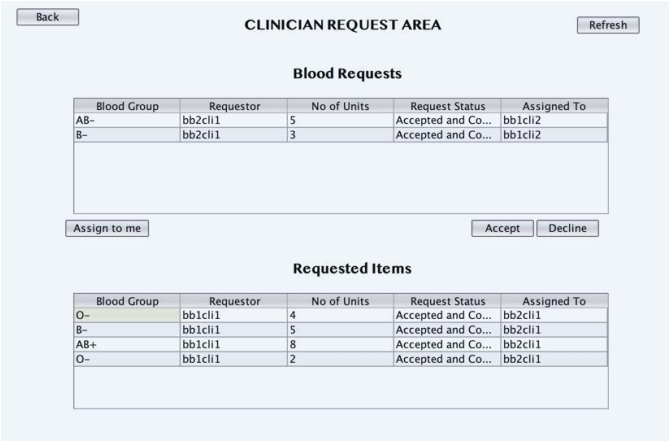




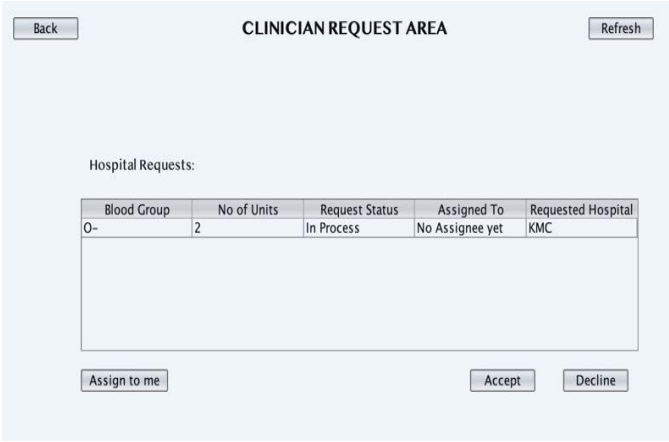
LabTestWorkRequests – To Verify the Blood purity

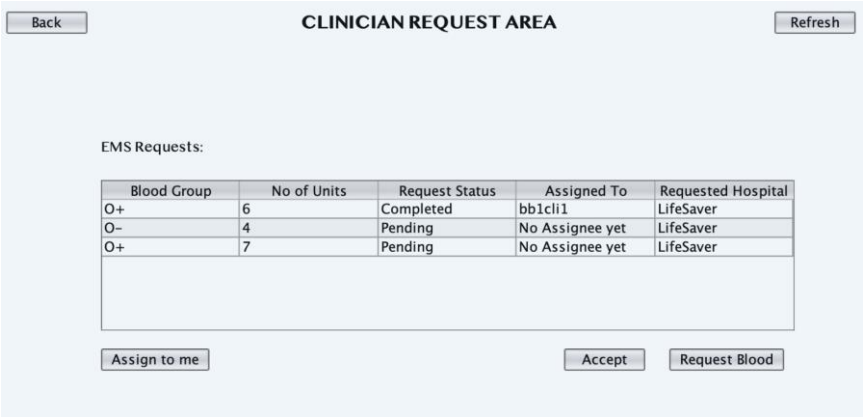
Enterprise – Blood Bank

Blood Requests with other Blood Banks



Blood Requests from Hospitals

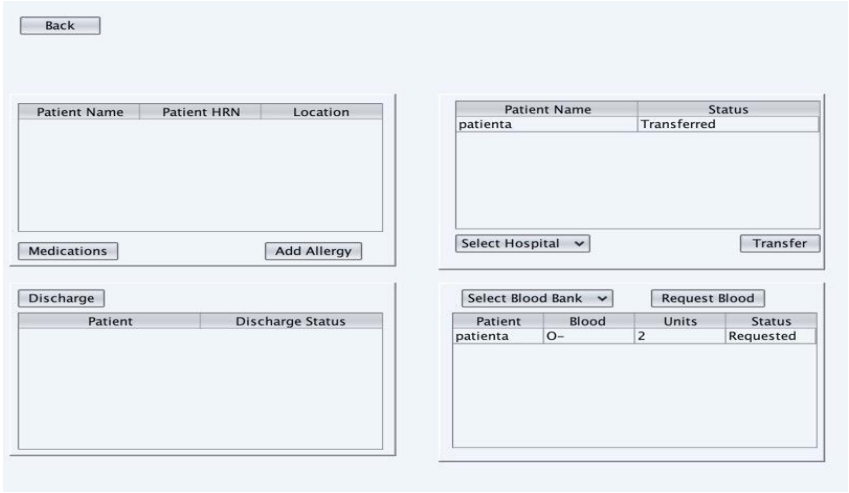


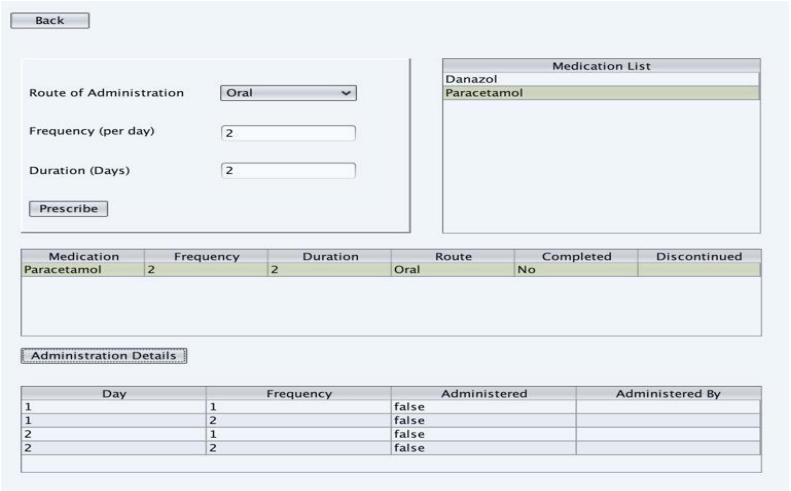


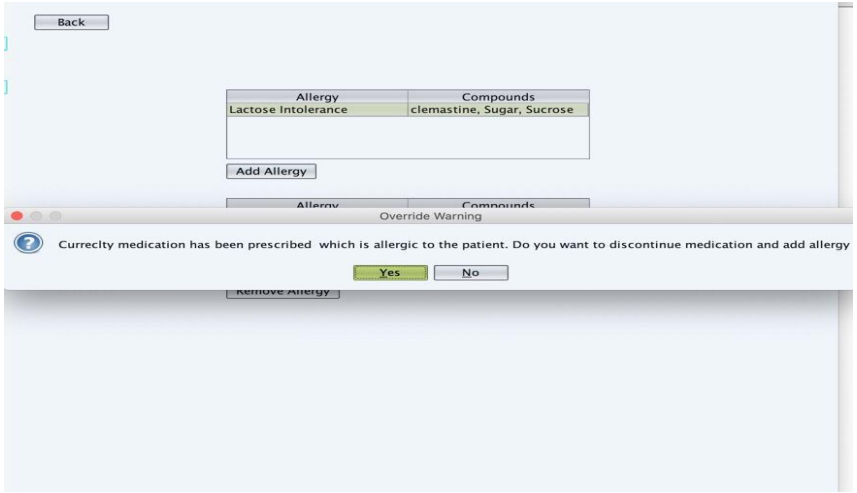
Enterprise - Hospital

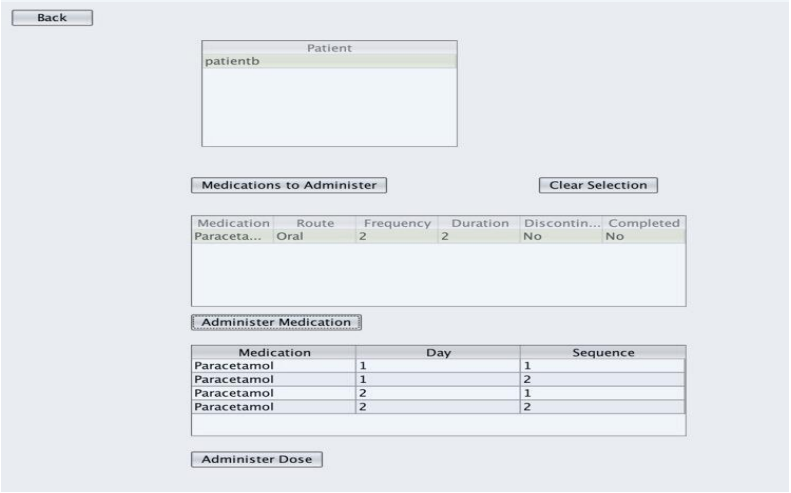
- Admin can add patient, create locations and assign nurses to the locations.
- Appointments are created by the admins which connects the doctor, nurse and the patients.

Hospital Work Flow (contd)

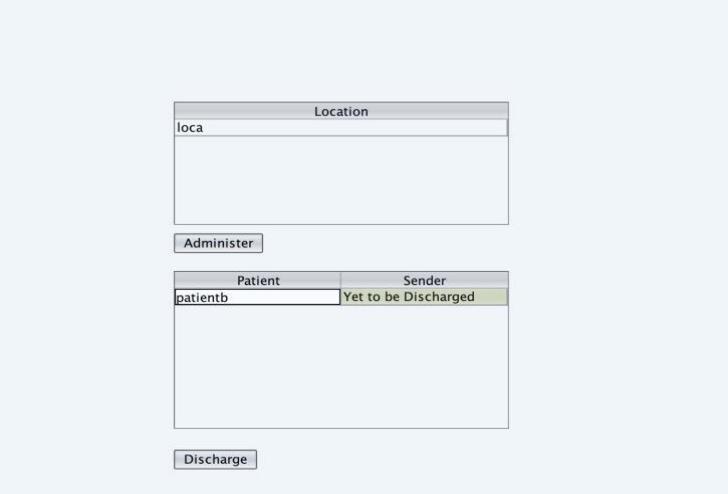




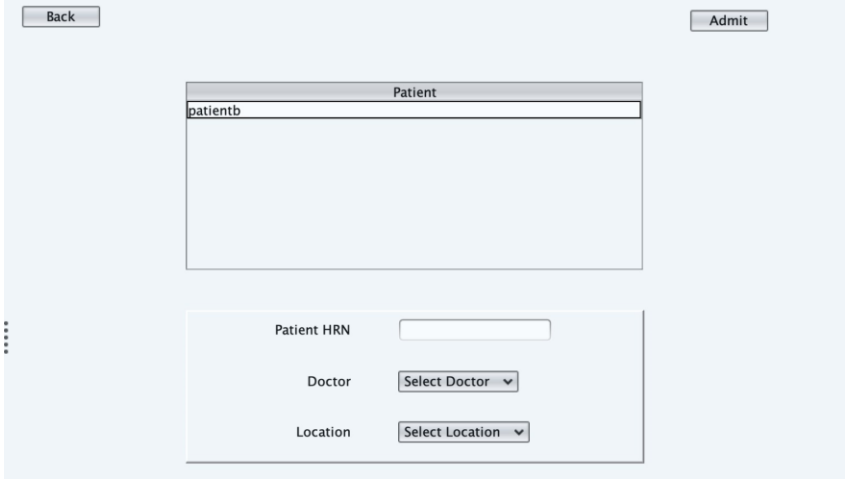




Hospital Work Flow (contd)



Discharge Requests



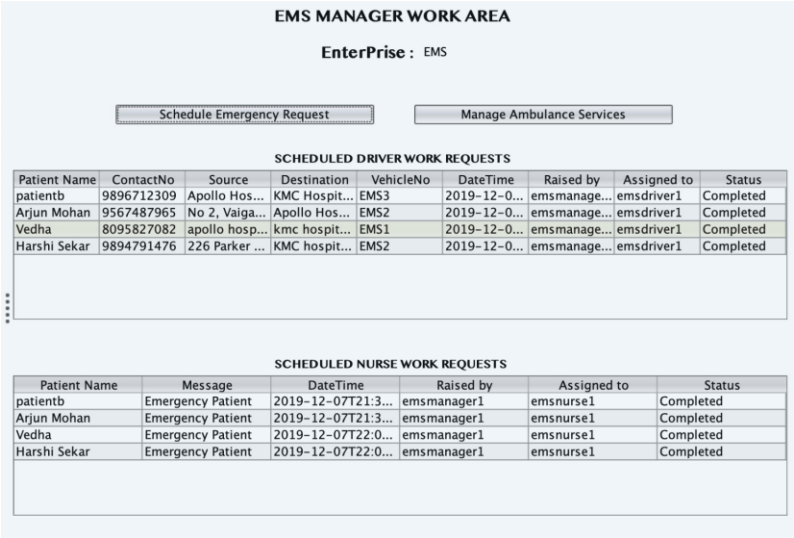
Transfer Requests

Emergency Requests

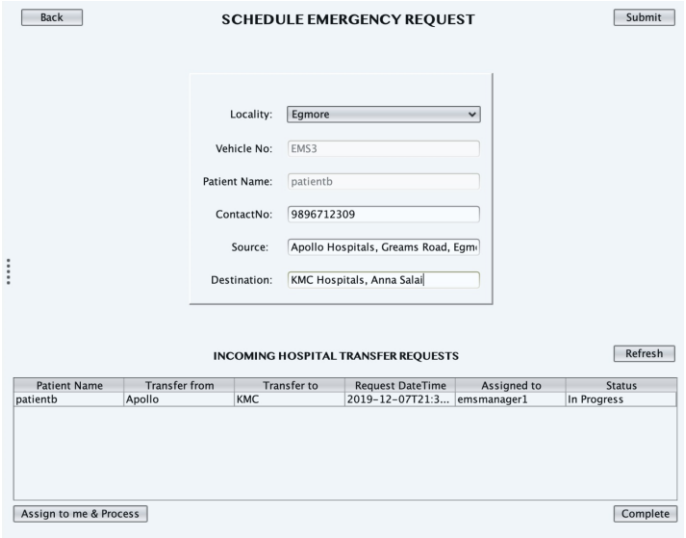
Work Flow

- *Enterprise – EMS*

EMSManager Scheduled work requests to EMSDriver and EMSNurse



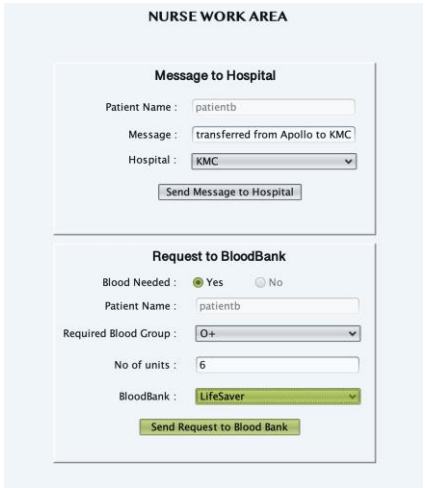
EMSManager Scheduling a transfer work request to EMSDriver and EMSNurse



Enterprise – EMS

Driver Work Requests

Nurse Work Requests



Nurse Process Work Request Area

Future Scope

- We will predict the medications to be given to the patient based on the medications that has been given to diagnose allergies.
- Automated request to the blood banks when the threshold is met.
- Ability for the enterprise to extend medical services such as mobile hospital feature, increasing hubs around the country
- We can integrate this application with mobile apps such as swiggy, ubereats and we can provide a warning to the users to avoid certain foods.
- Using the barcode reader to avoid administration of incorrect medications.
- Based on a patient's gene and medical history, predict the possibility of a disease to occur.

Benefits

- We believe that adopting a common integrated healthcare value system would benefit patients with a improved medical care.
- safer and cost effective healthcare can be provided to millions of patients across the country.
- Keeping track of inventory across multiple enterprises helps in prompt treatment to patients.

Special Thanks to Dr.Kal Bugrara for his valuable knowledge and guidance.

Special Thanks to Mr.Kinnar and all the other TA's for helping us throughout this semester.

Thanks!