

ReHAP

Rehabilitation Healthcare Analytics Platform

A Johns Hopkins Technology Innovation Center Project

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Computer Integrated Surgery II

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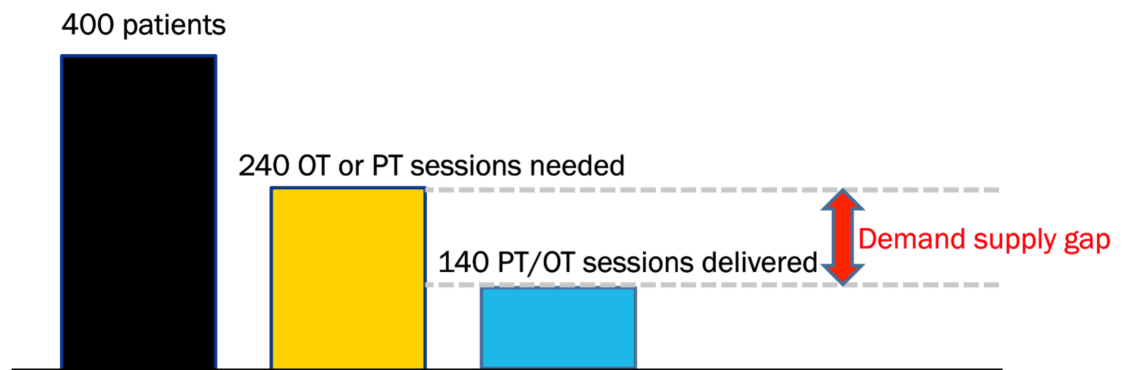
I. Introduction

Summary

ReHAP is a decision support system for patient rehabilitation teams. The software employs algorithms that help physical and occupational therapists use patient prioritization factors to optimize care. The software is intended to be used by therapy teams at Johns Hopkins Bayview, NYU, and other beta testing institutions in the summer of 2016.

Background and Significance

Owing to an aging American population, the demand for rehabilitation therapy services (RTS) is projected to grow by 26 to 30% over the next decade. While access to appropriate RTS is critical for optimum clinical and operational outcomes, the cost of providing RTS will increase by \$7.5 billion (for patients in the hospital) and \$32.3 billion (for patients outside the hospital) over the next decade. I am developing a software tool, ReHAP, with a team at the Johns Hopkins Technology Innovation Center and Johns Hopkins Dr. Krishnaj Gourab that will allow hospitals and healthcare systems to successfully manage the costs associated with this projected increase in demand while still delivering appropriate RTS to patients truly in need of such services.



Specific Aims

- ✓ Web-based tool
- ✓ ReHAP “Priority List” on every therapists’ laptop

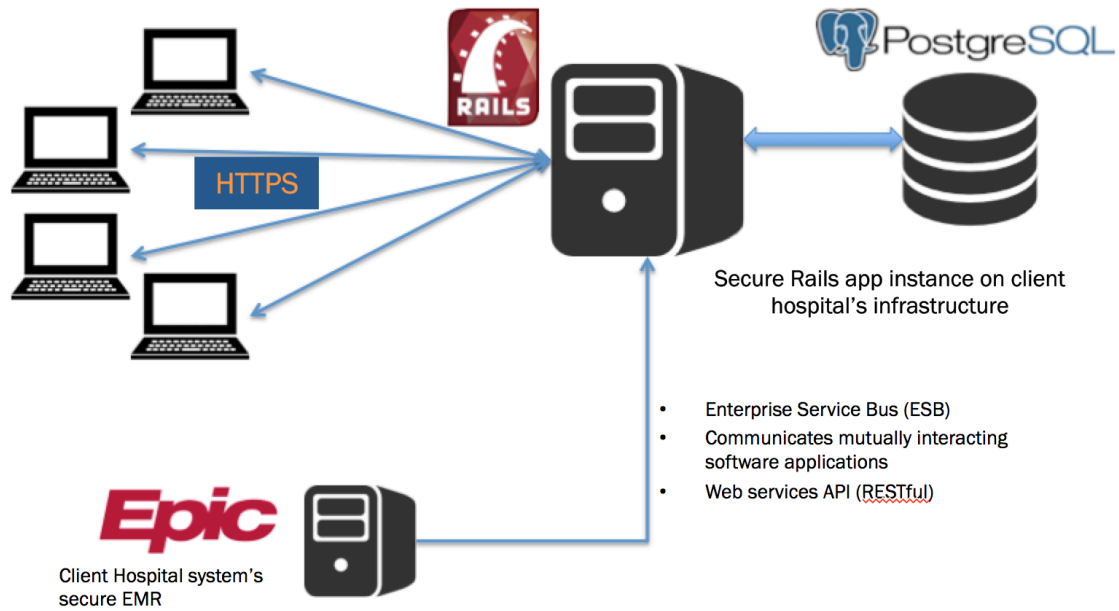
- ✓ Connect to live EMR (EPIC) data
- ✓ Auto refresh every 5 min
- ✓ Modes for PT, OT, Manager, Physician
- ✓ Instance of application to be deployable on-site
- ✓ Simple and seamless to use

II. Technical Approach

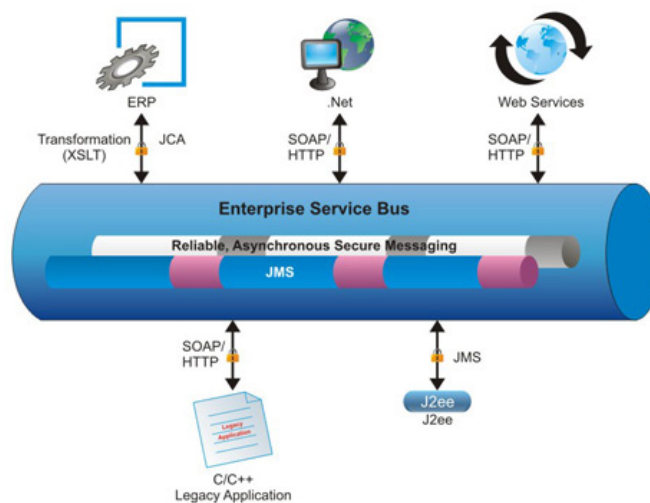
Design

Dr. Krishnaj Gourab has design algorithms that can be tailored by therapy managers to make decision support recommendations for patient prioritization, therapist scheduling, and discharge management. Physical or Occupational therapy includes the cooperation of multiple parties, each playing an important role in the patient's rehabilitation. The nature of the workflow will require that there be critical information available and manageable in the web app by therapists (PT and OT), therapy team managers, and physicians. Thus, a critical component of the design of the system is to have access points and permissions for all of these profiles.

The application will be built using the Ruby on Rails framework. Therapists, therapy managers, and physicians will access private deployments of the system via the browser via a secure connection.



While an initial prototype will be developed by seeding the system with data pulled from EPIC as snapshots, a sustainable system requires a dynamic updating of the database from the EMR system utilized by the institution. EMR systems use a common framework for deploying web applications that utilize the EMR technology stack – namely, the Enterprise Service Bus (ESB). ReHAP will utilize a custom API that will be developed by the Johns Hopkins EPIC Web Services team that will allow <15 minute refresh of data in parallel with the development of the rails app.



The ReHAP Rails application will be built with consideration for a utilization of the Web Services API.

Resources and Dependencies

- Enterprise Service Bus (ESB) integration
- Cooperation between Web Services
- Secure development environment
- SSL into Hopkins server
- Knowledge of Rails
- PostgreSQL
- JIRA + Bitbucket (SCRUM)
- Cooperation with JHBMC PT/OT team for shadowing
- HIPAA compliance (intermediate certification)
- D3.js for visualization
- Possibly DataTables.js + DTEditor.js
- Weekly team meetings Tuesdays on Hangout and at FF East
- Cooperation with Tony Pan (dev partner)

The development is done on a HARB server (TIC development resource) accessed via ssh on the Hopkins network (VPN if off network). All development must be in compliance with HIPAA standards.

III. Deliverables and Timeline

Minimum

- Rails database populated with seed data from EPIC
- Implemented Rails app framework
- PT/OT view and permissions
- Shadow-informed front-end mockups for all users
- Prioritization algorithm implemented in Rails app

Expected

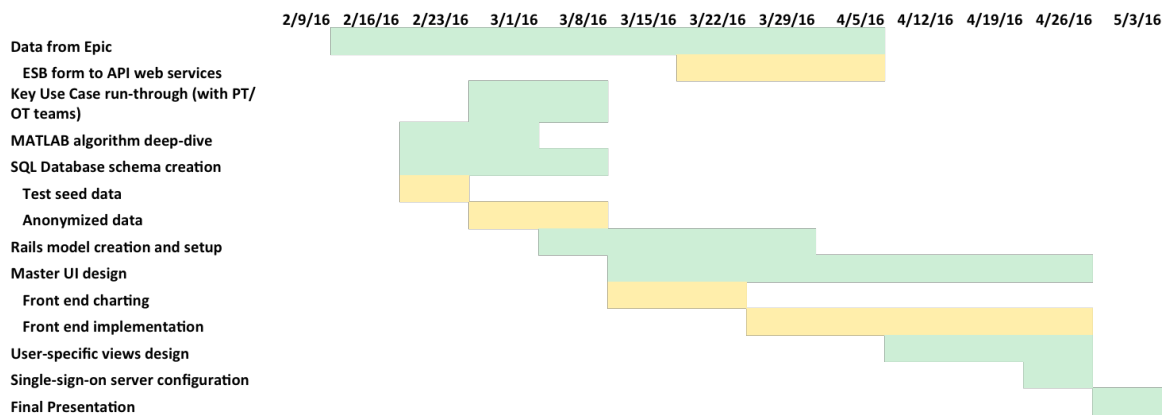
- Manager view + permissions
- ESB set up and integrated with Rails app
 - Refreshing every 5 mins

- Single-sign-on server configuration

Maximum

- Physician view + premissions
- Deployed app at JHBMC
- Testing by PT/OT teams at JHBMC
- Deployed or configured to be deployed instances at non-JH facilities

Milestones and Gantt Chart



IV. Reading List

Relevant literature is broken into three categories demonstrating:

1. Patients deteriorate functionally in hospital, specially elderly patients
2. Appropriate rehab therapy can improve mobility, facilitate early discharge from hospital, with improved clinical and financial outcomes
3. However, you cannot give therapy to every patient in the hospital – who have been referred for therapy because of current demand for therapists , which is going to further increase due to the aging American population.
4. So we are building a decision support tool for therapist which tells them which patients should be seen as a high priority. Decision support is well entrenched for physicians- we are the first ones to build this for rehab therapy services for in –hospital patients.

See color coded references for the above arguments (from ReHAP MII grant)

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