Virtual Cardiac Rehabilitation Nurse

Team 4 – The Pioneers

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Agenda:

- Motivations and Purpose
- Scope
- Brief Overview of application
  - Functional Requirements
  - Example Use Case Scenarios
  - Non-Functional Requirements
- Architecture and Deployment Discussion
- Project Summary
  - Problem Areas/Lesson Learned/Future Work
- Q & A

Motivations:

Cardiac rehabilitation
Provides:

- Services for multiple facilities or individuals
- Accessible, low cost care

Reduces:

- Risk factors for heart problems
- Risk of dying from a heart attack and future heart problems
- Need for medicines
- Hospital readmission
- costs to the health care system

Healthcare Industry Problems:

- > 1 million Americans have heart attacks each year
- Less than one in five people receives cardiac rehabilitation services

Project Scope

- **Goal**: Provide virtual nurse services to a patient who has undergone a cardiac or coronary bypass surgery to improve patient care and ensure a successfully recovery.
- **Accessibility**: Patients will have online access to their medical center/hospital website where they had surgery through a secure access system, requiring username and password to login. Plan to create an prototype hospital website, database, and patient data model.
- **Rehabilitation Plan**: When the patient logs in, he/she will see a personal rehabilitation plan which has been designed by the medical professional. The plan includes exercise/activity, medication, diet, and vital signs.
- **Track Progress**: A patient can enter into their daily log their progress as it relates to the rehabilitation plan.
- **Notifications**: Notify the medical professional quickly for any warning signs.

Functional Requirements

Patient	Medical Professional
Login/Logout	Login/Logout
Create Rehabilitation Log	Generate Rehab Plan
View Progress Report	Manage Rehab Plan
	View Rehab Log
	Generate Progress Report
	Notify User

Virtual Cardiac Rehab Nurse – Home Page

Two Different Users: Medical Professional (top) and Patient (bottom)

Medical Professional Rehab Plan

Virtual Cardiac Rehabilitation Nurse

Logged in as smith. Logout

Home View Patient List Create Rehab Plan Template

Manage Rehab Plan For Patient John Smith

Vitals

Lowest Acceptable Pulse:	70
Highest Acceptable Pulse:	100
Lowest Acceptable Blood Pressure:	100/70
Highest Acceptable Blood Pressure:	150/90

Diet

Calorie Goal:	1600
Fat Goal:	51
Sodium Goal:	2500
Cholesterol Goal:	200

Exercise

Exercise Name	Time To Spend	Weight	Repetitions
Walking	30 minutes	N/A	N/A
Yoga	30 Minutes	N/A	N/A

Add New Exercise

Medicine

Medicine Name	Time To Take	Dosage	Type
Warfarin	8am	2.5mg	Anticoagulant
Propranolol	7am, 3 pm, 11 pm	10mg	Antidysrhythmic
Atorvastatin	8am	10mg	Antilipidemic

Add New Medicine

Save Plan

Patient Rehabilitation Log

Virtual Cardiac Rehabilitation Nurse

Logged in as ssmith. Logout

Home | View Rehab Plan | View Report Card | Enter Daily Log

Daily Log For Patient John Smith

Vitals

Pulse:	70
Blood Pressure:	100/70
Weight:	220

Food Intake

Food	Calories	Sodium	Cholesterol	Fat
Onion Bagel	400	300	300	20

Add New Food

Exercise

Exercise Name	Time To Spend	Weight	Repetitions
Walking	30 minutes	N/A	N/A
Yoga	30 Minutes	N/A	N/A

Medicine

Medicine Name	Type	Time(s) Taken	Dosage
Warfarin	Anticoagulant	8am	2.5mg
Propranolol	Antidysrhythmic	7am, 3pm,11pm	10mg
Atorvastatin	Antilipidemic	8am	10mg

Save Log

Progress Report

Virtual Cardiac Rehabilitation Nurse

Logged in as ssmith. Logout

Home | View Patient List | Send Notification | Create Rehab Plan Template

Report card for Patient Steve Smith for 10/15/2013
View Full Daily Log

Overall Score: 72.8

Dietary Goals

Calories:	Goal Met
Sodium:	Goal Met
Cholesterol:	Goal Exceeded
Fat:	Goal Met

Exercise Goals

Calories Burned:	Goal Met

Non-Functional Requirements

Product Requirements

- SQL Server Database should handle at least 2 GB of data, scale, and maintain data integrity.
- Application should require no more than 1 hour of training for the typical user to be proficient with the system.
- Once trained user should be able to fill out daily progress report in less than 15 minutes.
- Multiple users should be able to login to the application at one time.
- Percentage of events causing failure should be minimal (<5%)
- The Application and Web Server should be Apache Tomcat version 6.

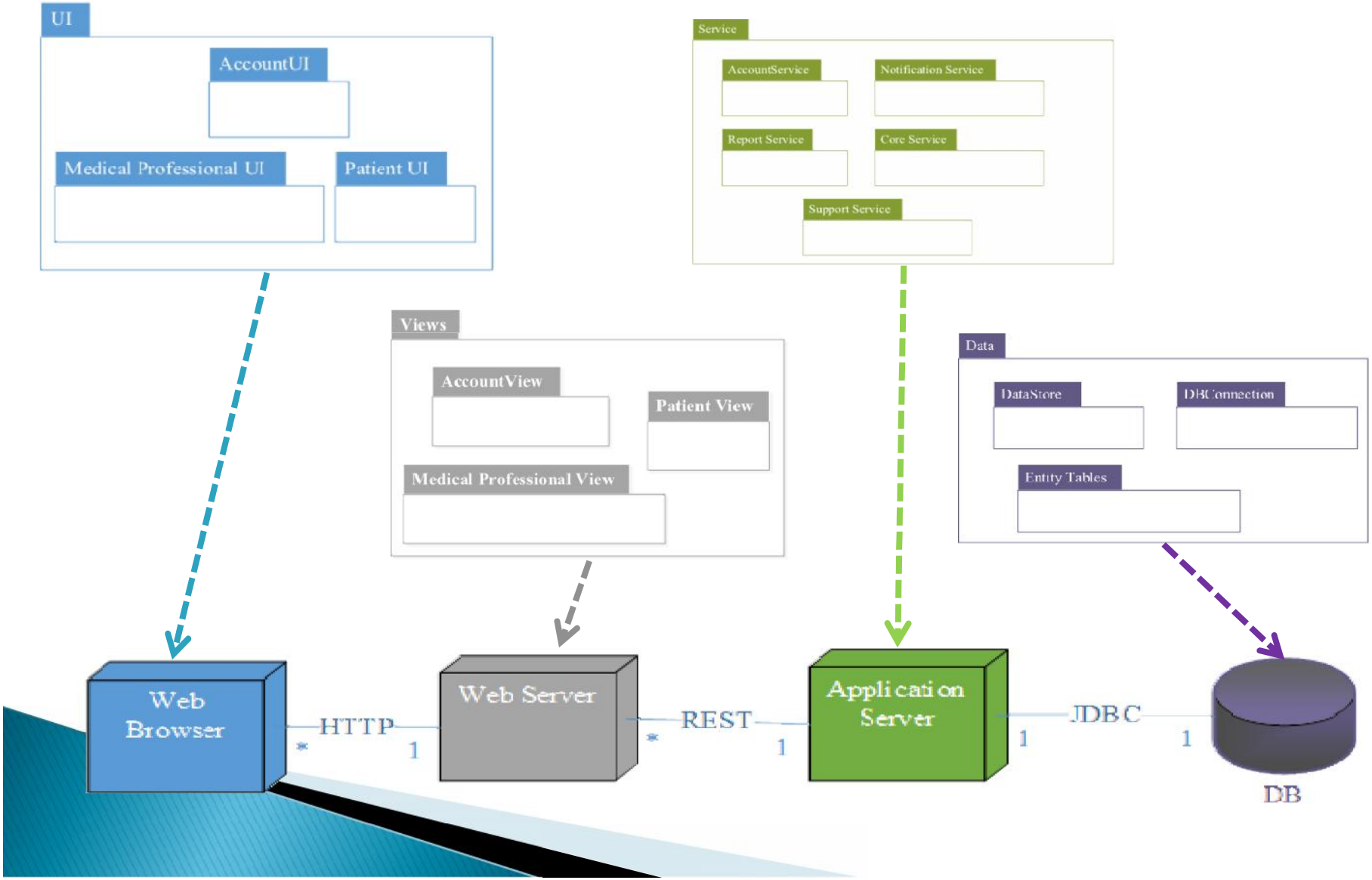
Security Requirements

- The patients record must be visible only to the patient and medical professional.
- The patient should not be able to edit the rehabilitation plan.
- Doctors should have access to edit only their patient's information.
- Strong passwords required (6-10 characters, Upper/Lower Case required, min. 1 number).

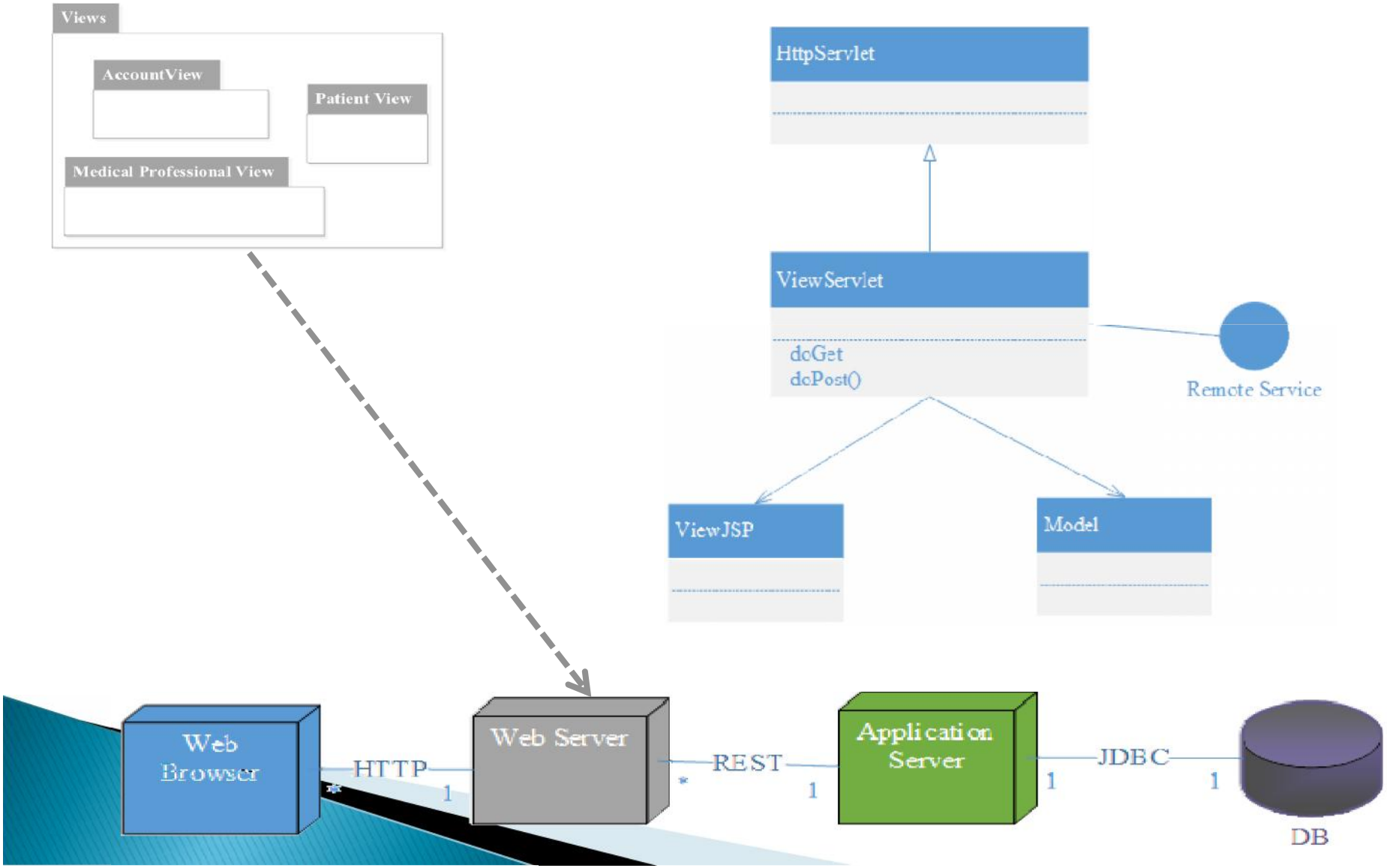
Organizational Requirements

- The deliverables must be in English Language
- The deliverables must be submitted using Moodle.

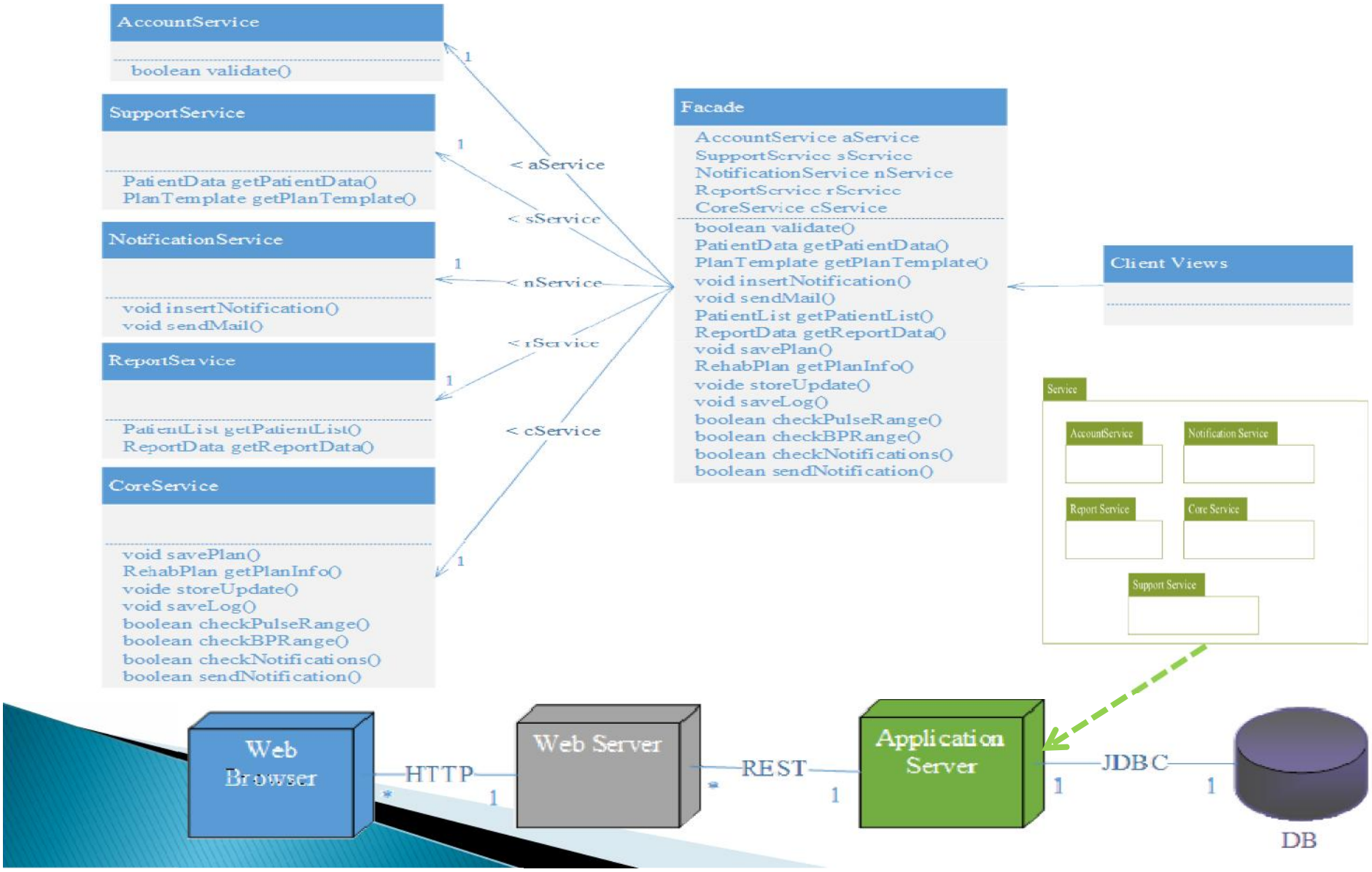
Architecture & Deployment



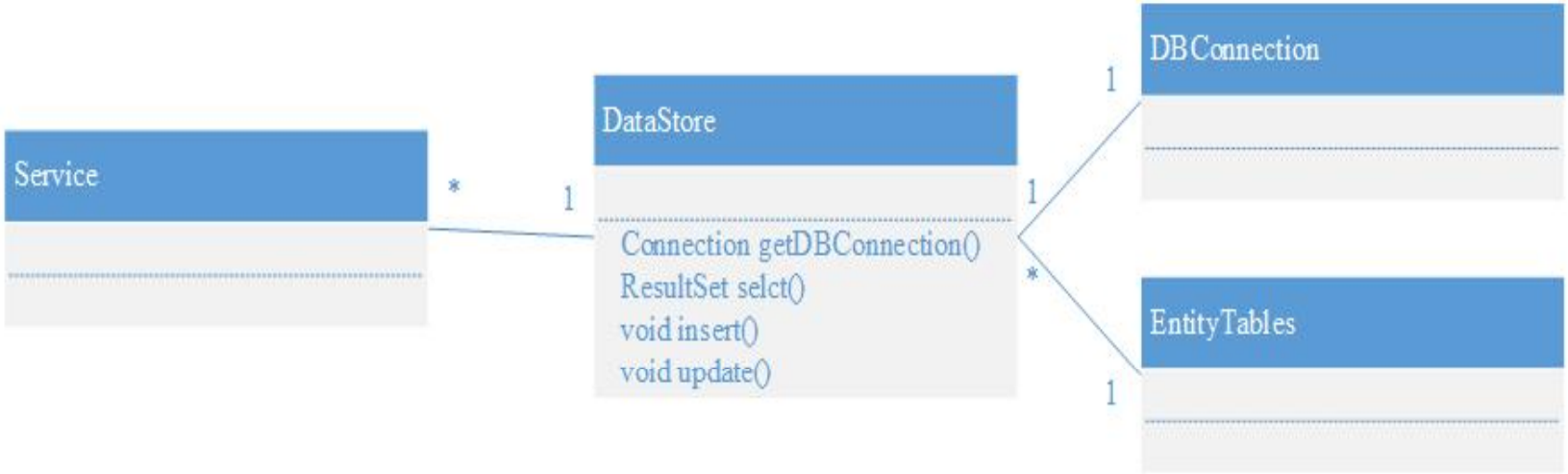
Design Pattern – Page Controller

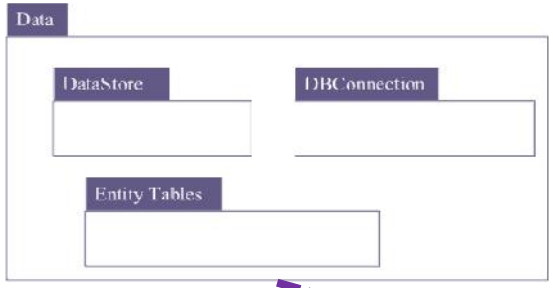


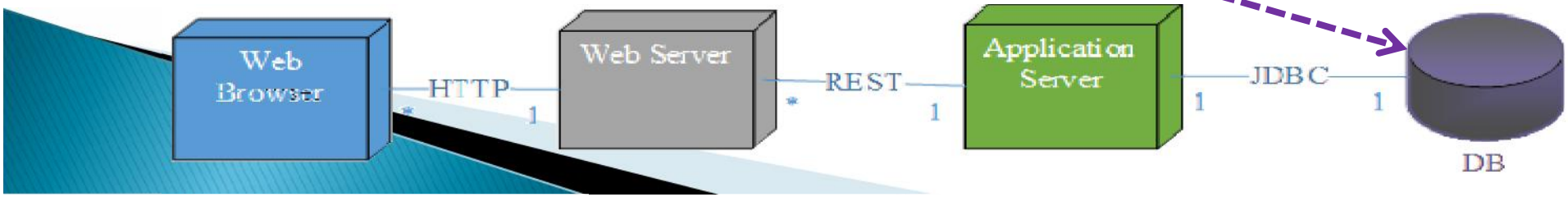
Design Pattern – Facade



Design Pattern – Table Data Gateway

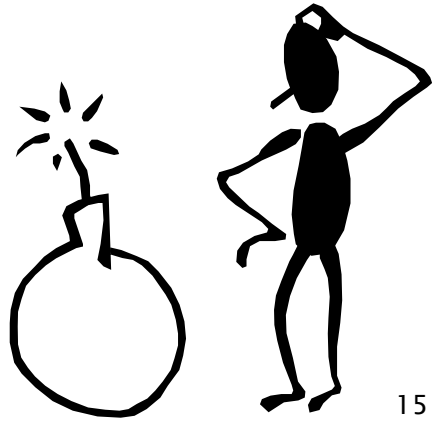






Problem Areas

- **Time Constraints** – Tight deadlines along with other priorities such as work, other classes, and home life made it very difficult to find a time to meet and coordinate (Risk 3, 7, 8)
- **Lack of knowledge in Healthcare domain** – Our team only had 1 SME with experience in the healthcare industry. Therefore, the risks associated with creating an application around healthcare increased drastically especially when it came to knowing what data points to capture and utilize (Risk 2).
- **A team member dropped the course late in the design phase** (Risk 9).
- **Managing Scope Creep** – We had lots of ideas and things we wanted to implement which added complexity to the application (Risk 6, 8).



Lessons Learned

- **Communication is key** – Using other technologies such as WhatsApp and setting up a standing weekly meeting on Sunday helped us keep on pace and overcome time constraints.
- **Teamwork = Success**
- **Keep it Simple**
- **Different phases in the project lifecycle and best practices related to design and documentation of software.**

Future Work

- Additional data related to other types of surgeries and operations can be added to the application to track a patients progress for all their health related issues.
- Additional functionality such as analyze rehab log, more complex reporting, and an online nurse you can chat with instantly could be implemented.
- Advanced Data Mining Techniques can be used as patient data is collected to determine what types of medicine or plans work best for more personalized care.

Summary

- Motivation and Purpose
- Scope of Project
- Provided a Brief overview of the application with example use cases
- Explained our Architecture Design and Decisions
- Problem Areas/Lessons Learned/Future Work
- Status:
  - We are 90% Complete with the project and currently working on implementation of our design.

Questions