

Introduction to

Stacey Beard



The HIG Group

- ❖ **Health Informatics Group:**
Initiative started in 2014 by Laurie Hendren, John Kildea, and Tarek Hijal.
- ❖ **Goal:** Patient empowerment through information readily available and relevant to patients.



“No one cares about you as much as you do”

Opal's Guiding Principles

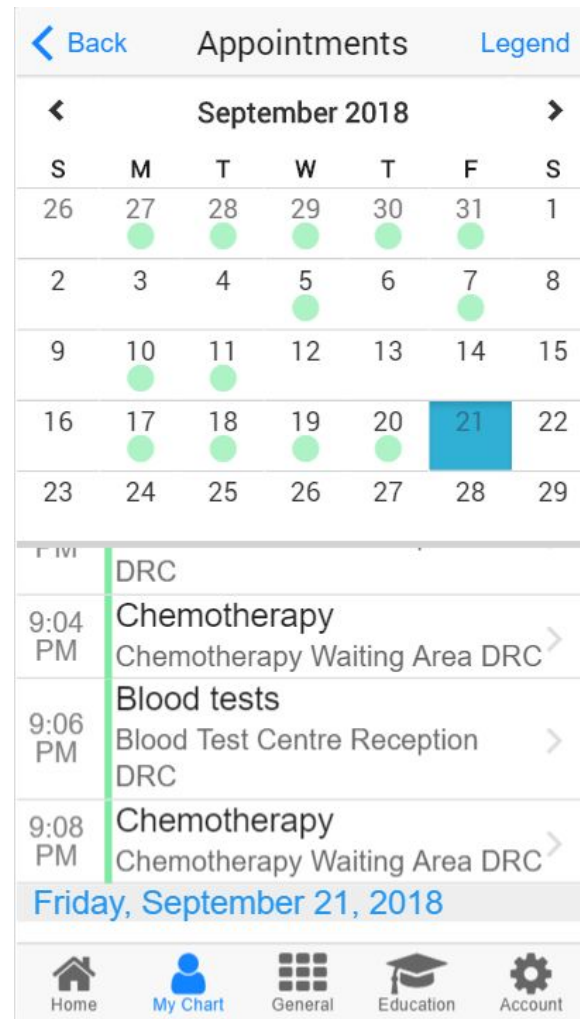
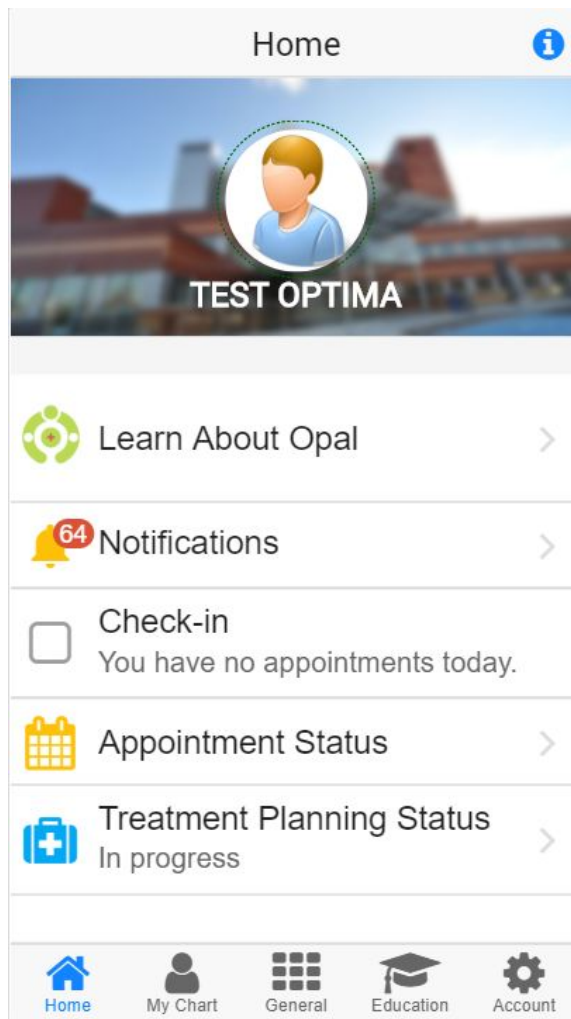
Opal is a mobile application that serves as a hub between the patient and their health.



- ❖ Material is **personalized** according to each individual patient.
- ❖ Data is **contextualized** by attaching educational material. The patient should be able to understand everything they are given.
- ❖ Content is provided **at the right time** it is needed to accompany treatment.

What does Opal offer?

- ❖ Announcements
- ❖ Appointments
- ❖ Checking in
- ❖ Clinical Documents
- ❖ Diagnoses
- ❖ Doctor contact info
- ❖ Patients for Patients



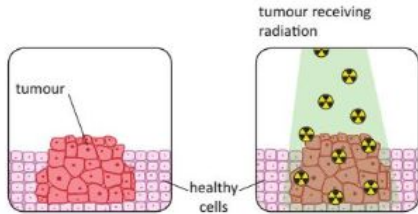
What does Opal offer?

- ❖ Educational Material
- ❖ Notifications
- ❖ Questionnaires
- ❖ Test Results
- ❖ Treatment Planning Status
- ❖ Treatment Team Messages
- ❖ And more...

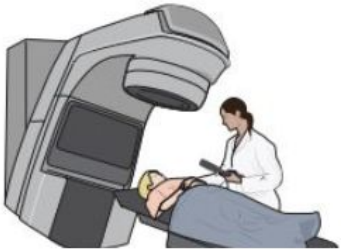
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What is Radiotherapy?

Radiotherapy is the use of high-energy x-rays to treat cancer.



Our body is made up of many types of cells. Each cell works in its own way to keep us healthy. Cancer forms when a group of cells start to grow out of control.



Home My Chart General Education Account

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Test Information

Learn About Albumin

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February 27, 2017

Home My Chart General Education Account

Opal Demo



Learn About Opal



Parking & Transport



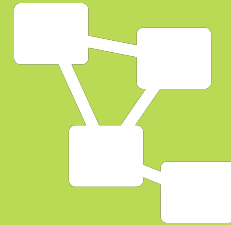
Patient Charter



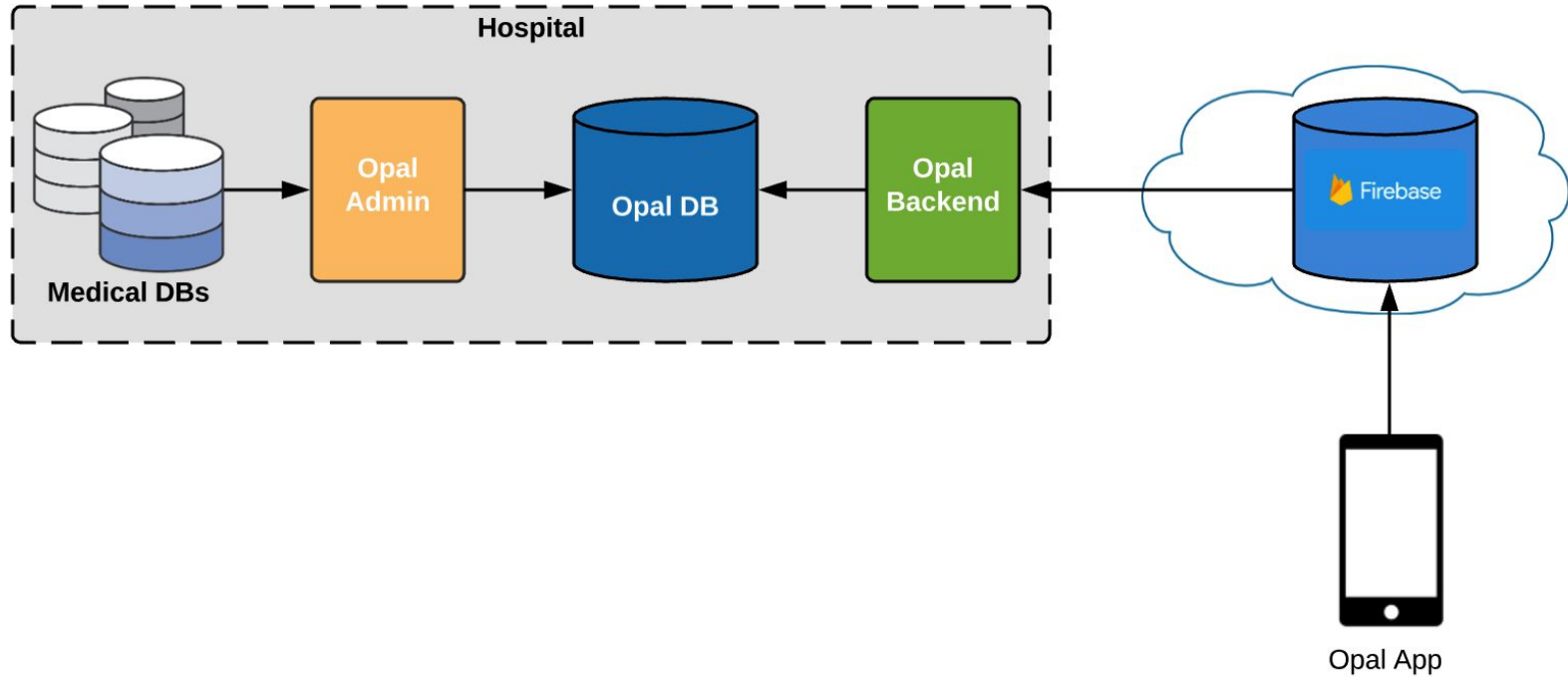
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Sign In

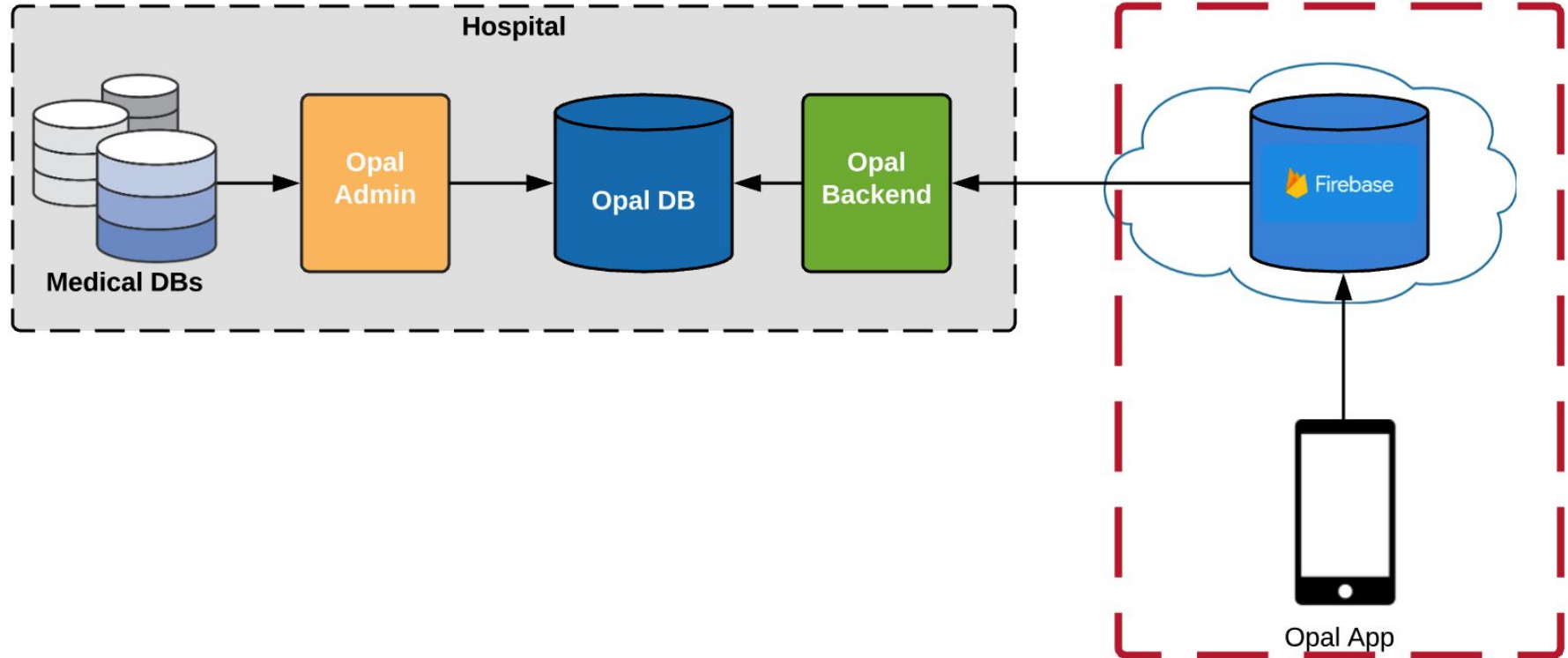
High-Level Architecture



Architecture High-Level

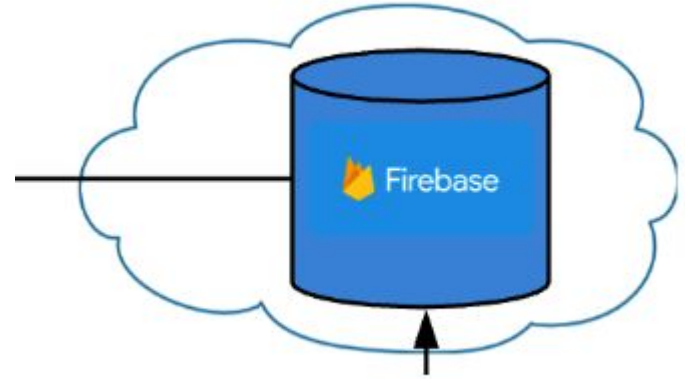


Architecture - Firebase and Opal App



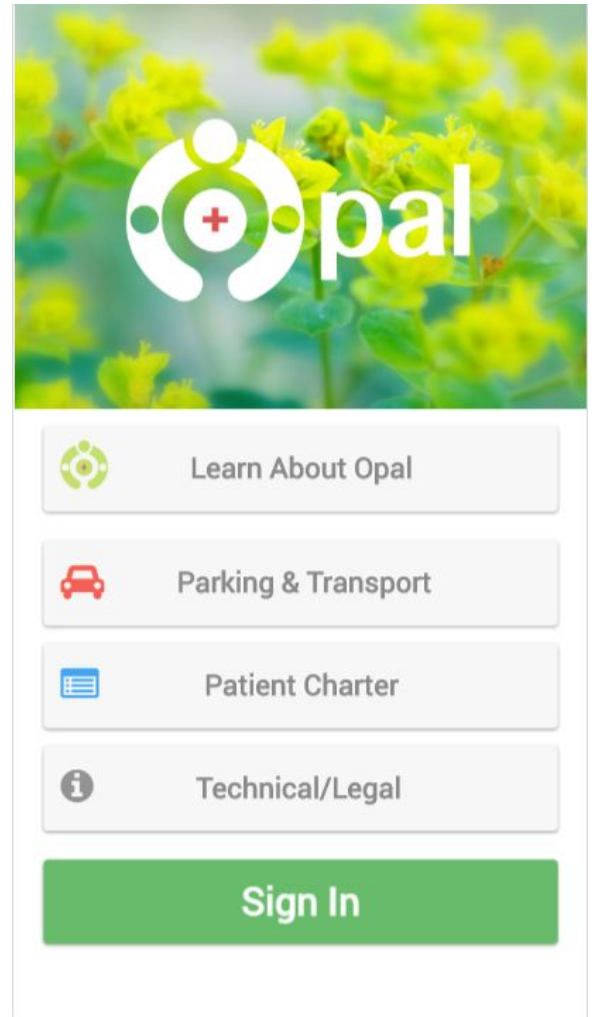
Architecture - Firebase

- ❖ Real-time Cloud Database owned by Google.
- ❖ Use for patient authentication.
- ❖ Provides a secure bridge between the hospital and the app.
- ❖ All data that goes into Firebase is encrypted.
- ❖ Acts as an end-point for both the app and Opal back-end.

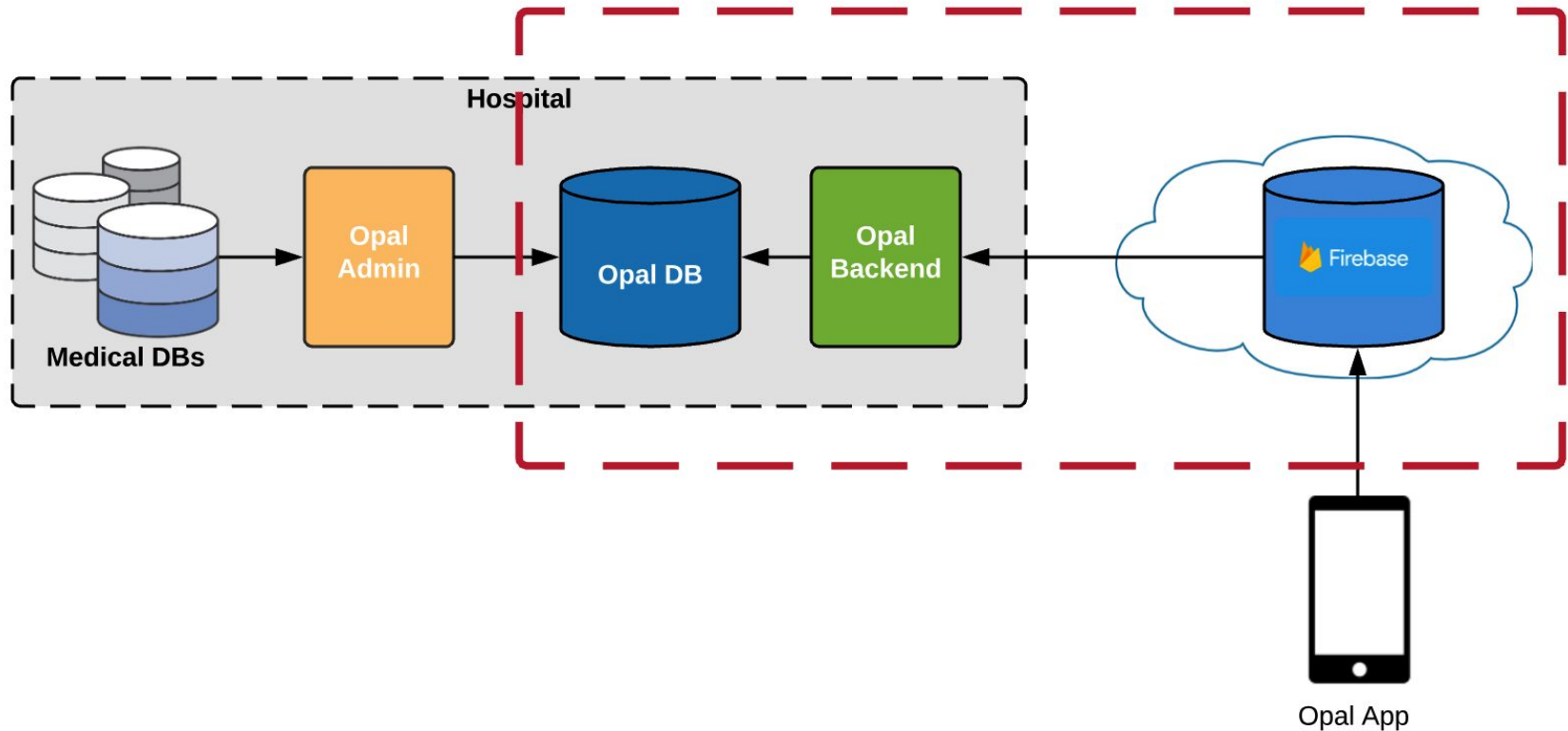


Architecture - Opal App

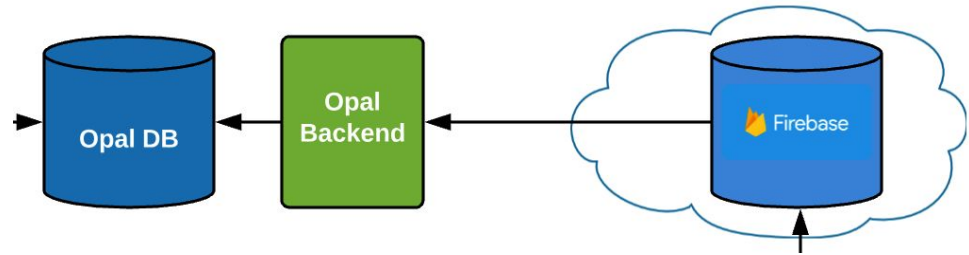
- ❖ Connects with the hospital through Firebase.
- ❖ Sends request to Firebase and waits for response.
- ❖ Sends information to the hospital from patient: i.e. feedback, questionnaire responses, etc.
- ❖ Updates patient of any event such as a new appointment, clinical document, message, etc.



Architecture - Opal Back-End

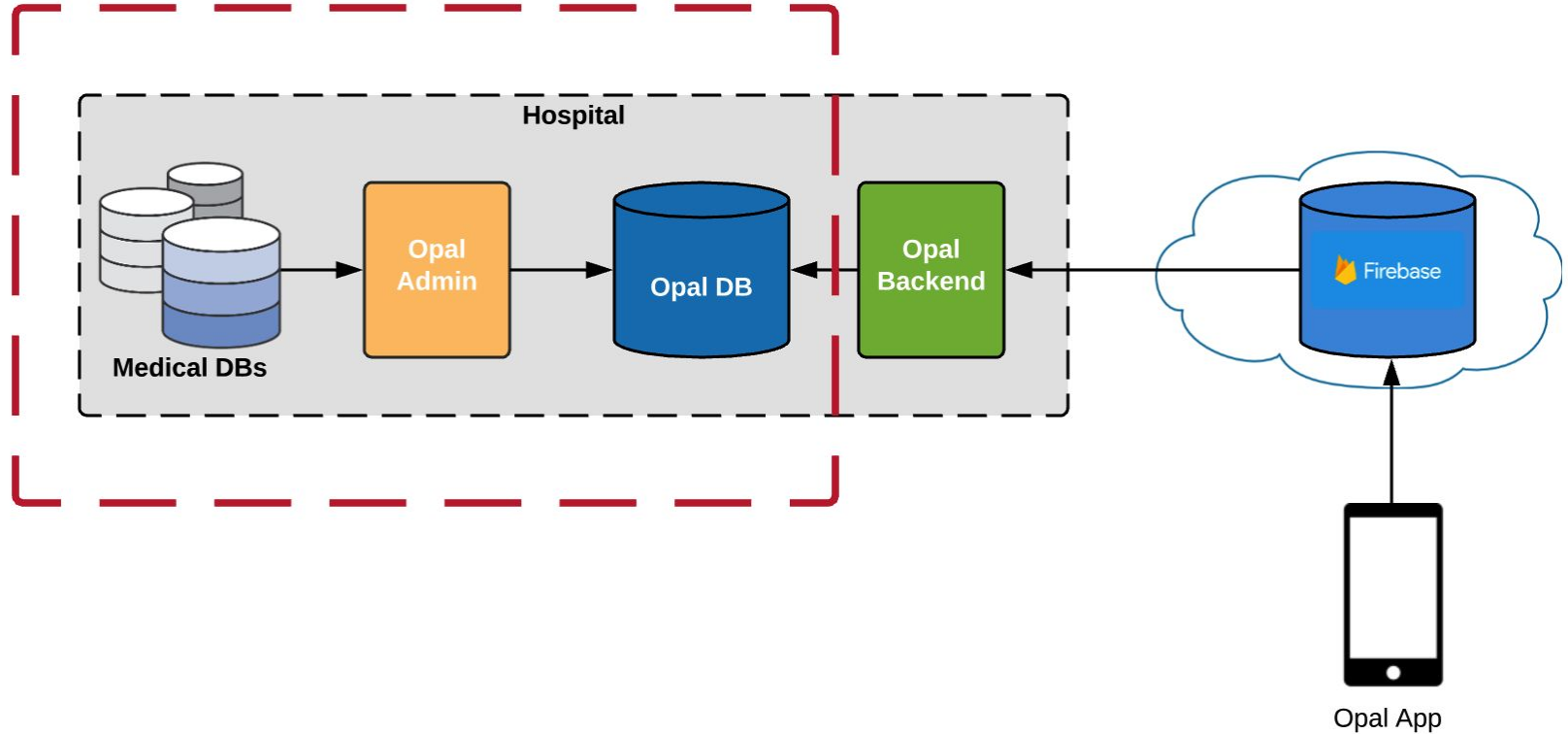


Architecture - Opal Back-End

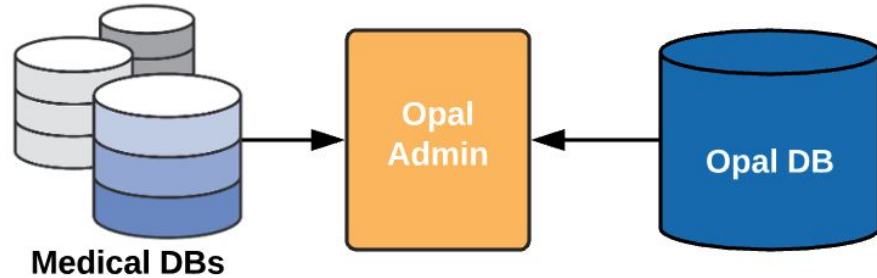


- ❖ Listens to Firebase for patient requests and serves as a back-end for the app.
- ❖ Queries OpalDB to send data to the patient.
- ❖ Updates OpalDB with patient-provided information from the app.

Architecture - OpalAdmin



Architecture - OpalAdmin

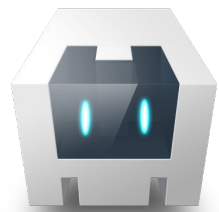


- ❖ Queries the hospital DBs to obtain most up-to-date information.
- ❖ Provides an interface to prepare personalized documents for the patients.
- ❖ Updates OpalDB periodically through a publishing interface.

Technology Stack



Technology Stack - Opal Frontend



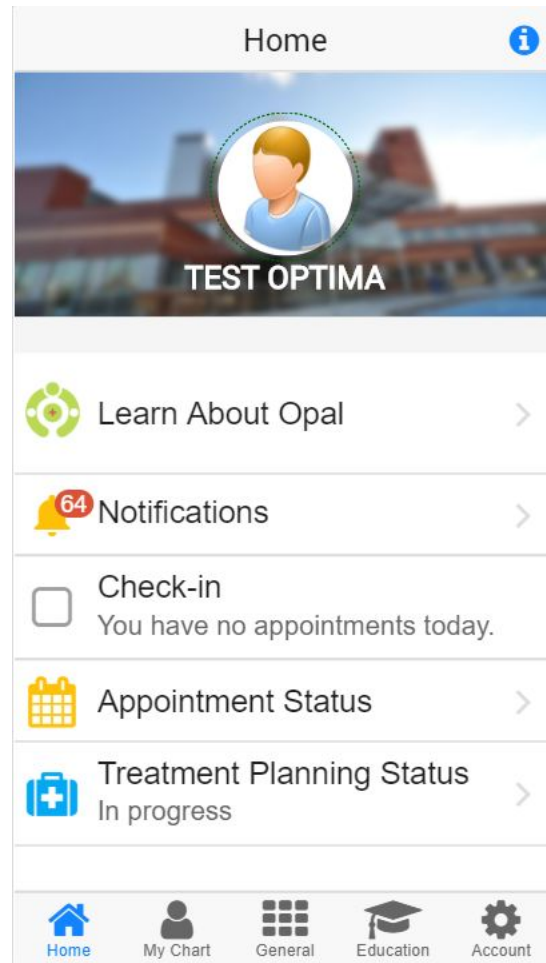
APACHE
CORDOVA™



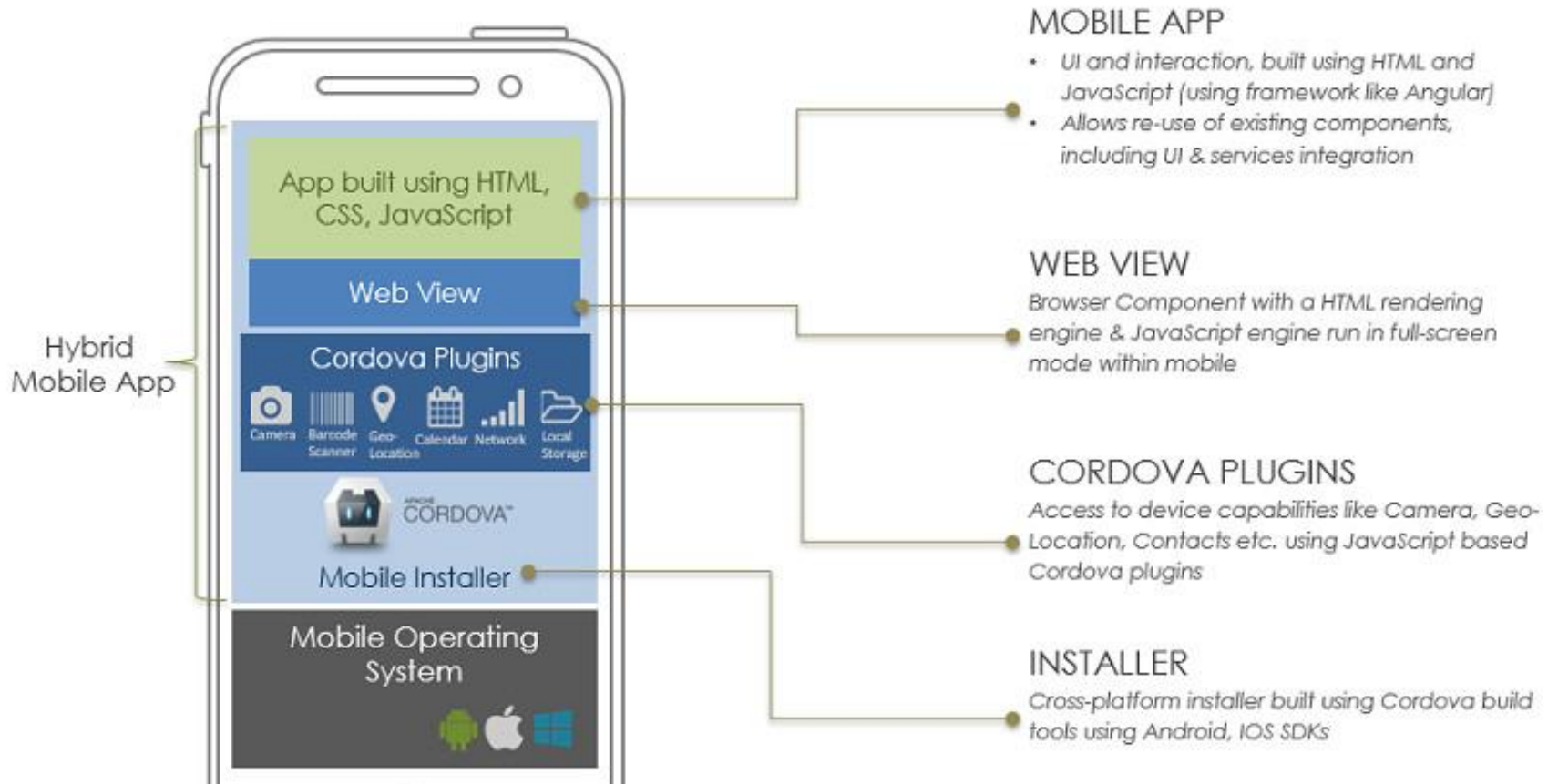
Onsen UI



ANGULARJS
by Google



Technology Stack - Opal Frontend - Cordova



Technology Stack - Opal Frontend - AngularJS

- ❖ **AngularJS**, JavaScript framework by Google.
- ❖ Revolutionized the way web apps were written via two-way binding.
- ❖ Introduced one-page applications.
- ❖ Built on top of the **MVC** design pattern.
- ❖ Current version is v6. AngularJS still quite popular today.

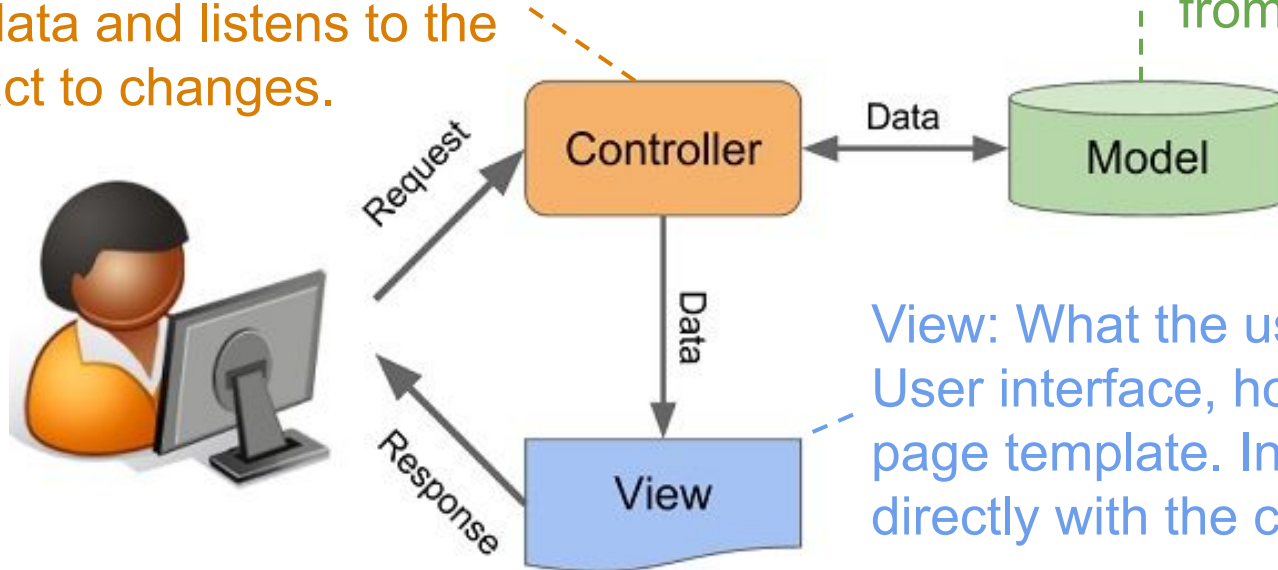


Technology Stack - Opal Frontend - AngularJS

MVC: Model, View, Controller

Controller: Queries the DB directly or through the model. Provides the view with data and listens to the view to react to changes.

Model: Source of truth, maintains state and abstractions. Queries data from the DB.



View: What the user sees. User interface, holds the page template. Interacts directly with the controller.

Technology Stack - Opal Backend

- ❖ OpalDB: **MySQL** database
- ❖ Opal listener:
 - **Node.js** (an asynchronous event driven JavaScript runtime designed to build scalable network applications)
 - **PM2** (a process manager for Node.js)



Learning Opal



Your Primary Resources

- ❖ A coding website such as [W3Schools](#) or [Codecademy](#).
- ❖ The [Opal Teaching Github](#) (contains slides and practice assignments).
- ❖ The [Opal Wiki](#).
- ❖ Me (Stacey), for any questions. Come see me in person or send me an email at staceybeard10@gmail.com.

Languages and Frameworks

- ❖ You will need to learn the following:
- ❖ Frontend
 - Javascript
 - **AngularJS**
 - (Beginner's) HTML and CSS
- ❖ Backend
 - Javascript (Node.JS)
 - (Beginner's) SQL

Javascript

- ❖ Go through a Javascript tutorial, for example on [W3Schools](#) or on [Codecademy](#).
- ❖ Read this [article](#) introducing the idea of asynchronous javascript.
- ❖ Read this [page](#) introducing how callbacks work.

AngularJS

- ❖ AngularJS is based on Javascript. Once you feel confident enough using Javascript, you can move onto AngularJS, which is what Opal is built upon.
- ❖ W3Schools has a good [AngularJS tutorial](#). Make sure to click on the 'Try it Yourself' sections.
- ❖ Once you are familiar with AngularJS, read the [JohnPapa style guide](#). Angular code written in this style looks very different from what you will have learned from W3Schools, but it is **much** cleaner and better organized. You must follow this style guide when writing code in Opal.

HTML and CSS

- ❖ You will need to use HTML and CSS to understand and create the frontend views in the app.
- ❖ We are using components from [OnsenUI](#) (version 1—do not use a later version's components), so you will rarely need to build graphical elements from scratch.
- ❖ Use [W3Schools](#) or [Codecademy](#) to learn how to use basic CSS and HTML tags.

Node.js and SQL

- ❖ The Opal Backend listener uses Node.js, which is based on Javascript. If you know Javascript, you'll be able to understand the listener's code.
- ❖ An important part of the listener's job is to query the OpalDB, using SQL. You will need to understand basic SQL to write new queries. W3Schools has [resources on SQL](#).

Git

- ❖ Opal uses git as its version control tool.
- ❖ If you aren't used to using git, look for a tutorial to follow. The best way to learn is hands-on; look for a tutorial with an applied component.
- ❖ You should be able to make well-commented commits, manage the use of different branches, and merge branches together.

Checklist

- ☐ Javascript
- ☐ AngularJS
- ☐ Git
- ☐ (Beginner's) HTML and CSS
- ☐ (Beginner's) SQL

During bootcamp week, you'll have individual time to learn these languages and frameworks.

Installation



Must have tools

❖ **IntelliJ WebStorm:**

- Most complete IDE for Web Development
- Testing framework integration, database integration
- Managing tasks integration
- Very intelligent IDE with lots of help with code hints
- Free for students

❖ **Sourcetree or other Git GUI:**

- Allows you to see visually the .git branch history and the repository status
- Very important for code reviews to check your code before you push

Installation Steps

- ❖ To develop code for your project, you'll need to install a full local copy of Opal on your laptop.
- ❖ You'll receive an email with an installation file for an OpalDB containing one test patient.
- ❖ Follow the instructions in this document to install Opal: [Opal Installation Guide](#).

OpalCare



Motivation

- ❖ Cancer patients often get support from family members, friends, neighbors, etc. We call these people "personal caregivers".
- ❖ Patients often share information with their caregivers.
- ❖ Patients share different information with each caregiver, because each relationship is different:
 - A patient might share only their appointment schedule with a neighbor who drives them to appointments.
 - A patient might want to share educational material with a family member who helps with everyday care.

Goal: to allow patients to share what they have access to in Opal with their caregivers, and to decide what to share with whom.

Work so far

Order	Semester	Contributors	Subject	Link
1	Winter 2017	Qi Chen	Original prototyping	https://github.com/Sable/hig/tree/master/Qi
2	Summer 2017	Michael M. Charbonneau & Zaid Yahya	Implementation	https://drive.google.com/open?id=1Sp5rrCx3QR5P88yknZWAImmqFLyDBN0F
3	Winter 2018	Andy Huang	Ideas for Caregiver enhancements	https://github.com/Sable/hig/tree/master/Andy_Winter_2018
4	Summer 2018	Shihang Zhu	Reworking of UI & code to work with Opal refactoring	https://docs.google.com/document/d/1RmA_WZ7c_6e6xqW_S1eHe3mKDIBVIS9XAJRh_Eku6RME/edit?usp=sharing
5	Fall 2018	Xuer Liang	Educational materials support & UI	https://docs.google.com/document/d/1xX6_CaBz-WVWIpQGBYQAKjKRf1Zm_KVebxyc4hLYChg/edit#bookmark=id.xnfg39cdfu7

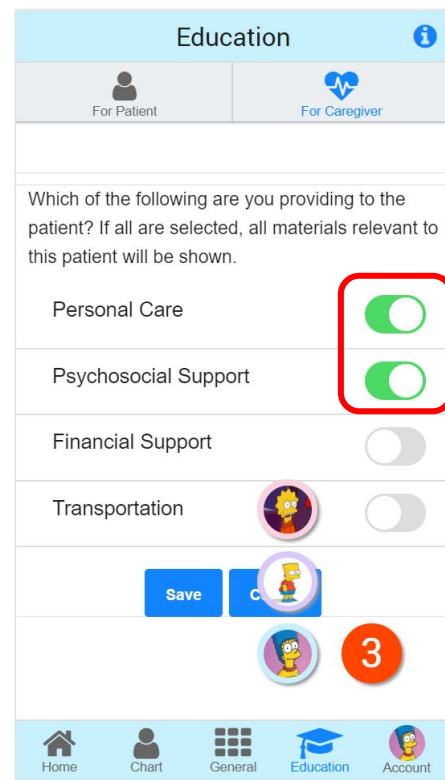
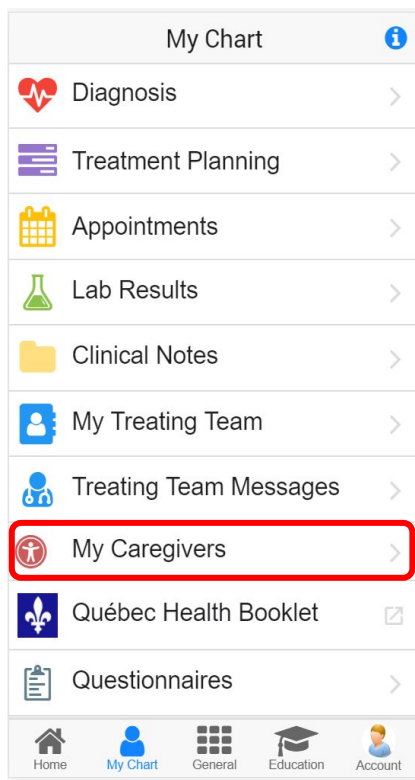
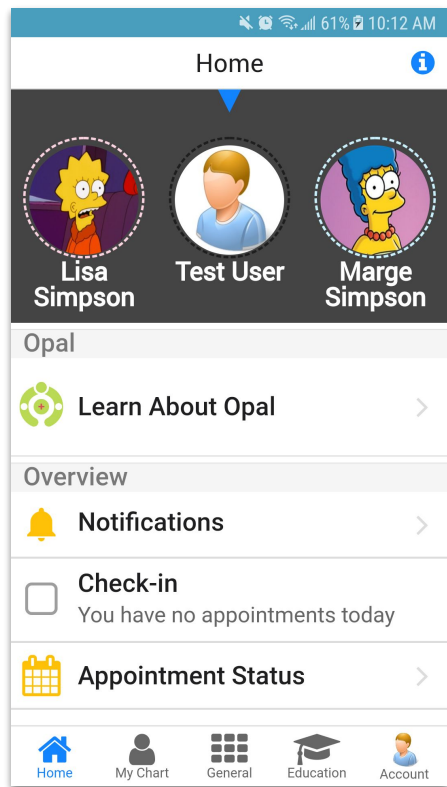
Work so far

Order	Semester	Contributors	Subject	Link
6	Winter 2019	Briana Cabral	Evaluating patient response to OpalCare	https://mcgill-my.sharepoint.com/:w:/g/personal/briana_cabral_mail_mcgill_ca/EXM764JCK5ZCvpBpIZXIBs0BwiGPK04F5RBTwqmkP4n0xg?e=VE9EX6
7	Winter 2019	Xuer Liang	Improvements and enhancements	https://github.com/Sable/hig/tree/master/Xuer/Xuer%20COMP400

Work last term (Winter 2019)

- ❖ Xuer Liang, Briana Cabral and Stacey Beard worked on:
 - Preparing the app to be tested with patients (fixing bugs, filling in missing functionality, building an app demo, etc.)
 - Designing different ways to get patient feedback on OpalCare (a waiting room questionnaire, in-app questionnaire, and in-person interviews)

Interface and Functionality





End of Opal Introduction