



# Performance Health

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Final Product Presentation - DEC1708

# Project Stakeholders



**Michael Rhodas**  
Team Leader



**Rachel Hartman**  
Communication Lead



**Jacob Johnson**  
Key Idea Holder



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Key Idea Holder



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Website Master



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CEO and Co-Founder



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COO and Co-Founder



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Faculty Advisor

# Outline

- Client Overview
- Problem Statement
- Requirements & Research
- System Overview
- Functional Decomposition
- Design Considerations
- Product Testing
- Challenges & Lessons Learned
- Project Summary

# Performance Livestock Analytics

- Founded in 2015
- Started working with the Ag. Start-Up Engine in late 2016
- PLA wants to bring data science to farmers
- Interested in producing the most reliable solutions for farming
- Working with a start-up demands speed, flexibility, and adaptability



# Market Literature & Survey

- Competitor - CattleMax
  - Client feels their product falls short in important ways and wants to enter into cattle health market
- Demand for food is increasing
  - Driving demand for increasingly economic methods of cattle production
- Internet of Animal Health Things
  - Demand for personal health monitoring as well as smaller and cheaper devices is beginning to make this affordable
- Data storage and consumption issues
  - The devices to create the data exist but systems for organizing and analyzing data aren't available



# Problem Statement

**Original GSA Statement:** We are being tasked to provide information on our tracking system and more detailed information for the animals and facilitate data-driven analysis and decision making from PLA to help our users m



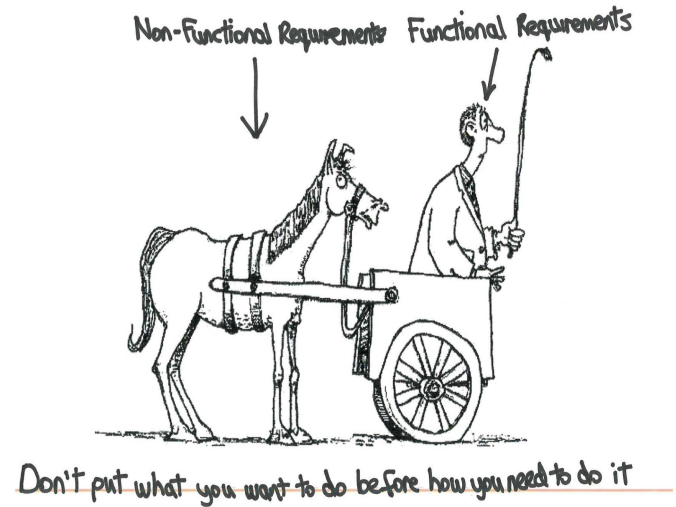
# Risk Identification & Mitigation

- Need to have secure access to data
- Need to ensure data integrity
  - Select existing medication & creating one need to coexist
  - Provide smart suggestions but still support custom strings
  - Manual entries are siloed within the database as well as client stores
  - Client & Server-Side Validation



# Non-Functional Requirements

- Must maintain data integrity & consistency
- No loss of data should ever occur
- Should support many users and accounts interacting with system simultaneously
- Should support multiple synchronous user interactions across devices
- Should be available with SLA of 99%
- User authentication should be securely encrypted from client to server





# Functional Requirements

- Manage “my medications” list
  - A user can add, remove, edit medications from their “my medications” list
  - A user can define medication name, company, price, and quantity metadata to a medication or choose an existing medication
- Manage “my groups” list
  - A user can add, remove, edit groups from their “my groups” list
  - A user can define group name, headcount, and custom string metadata for an existing group
- Administer a medication to a group or subgroup
  - A user can define groups, medications, custom quantities, tag information, and other metadata for storage and later analysis
- View history of medication usage
  - A user can view the history of all medications administered over time on a per application (not per session) basis

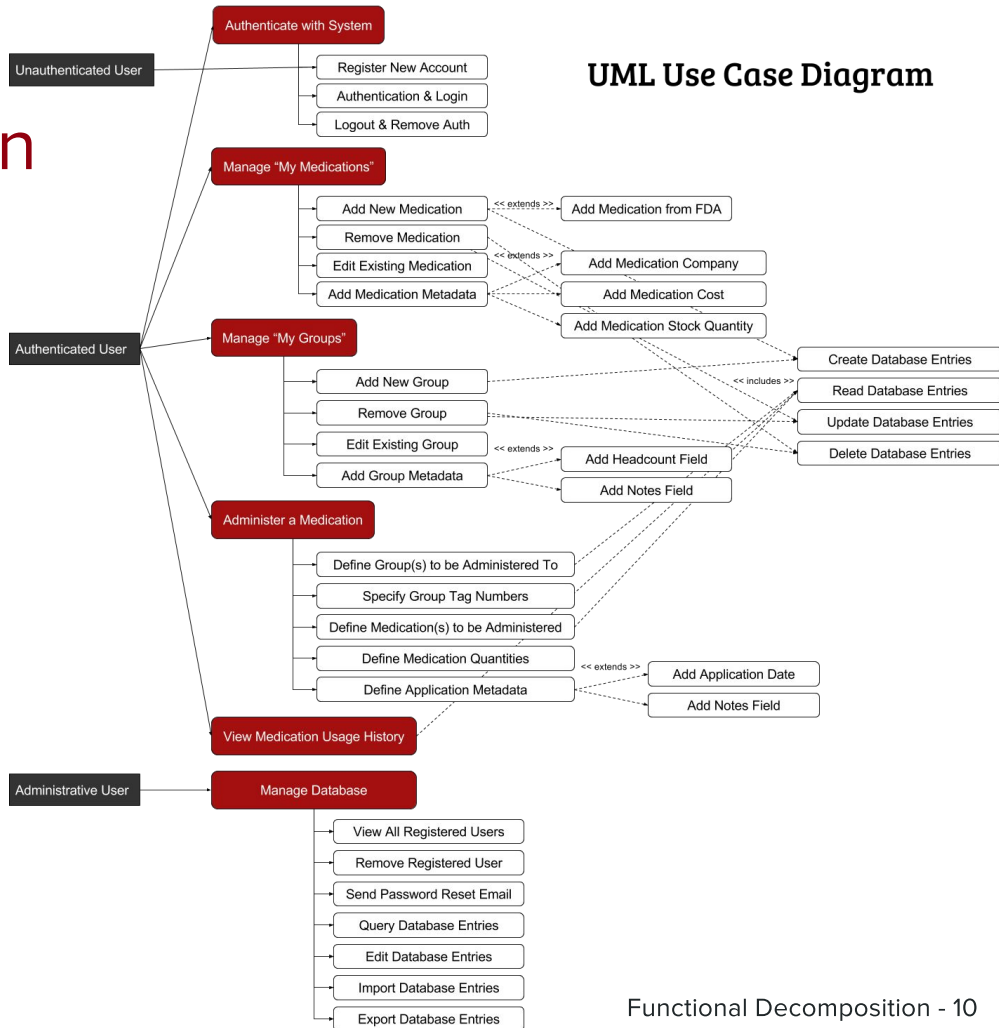
# Functional Decomposition

Four primary user stories:

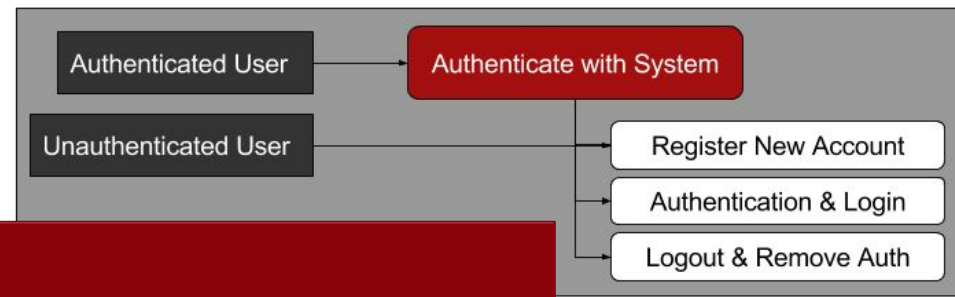
- Manage My Medications
- Manage My Groups
- Administer a Medication
- View Medication Usage History

Other user stories:

- Secure User Authentication
- Database Management

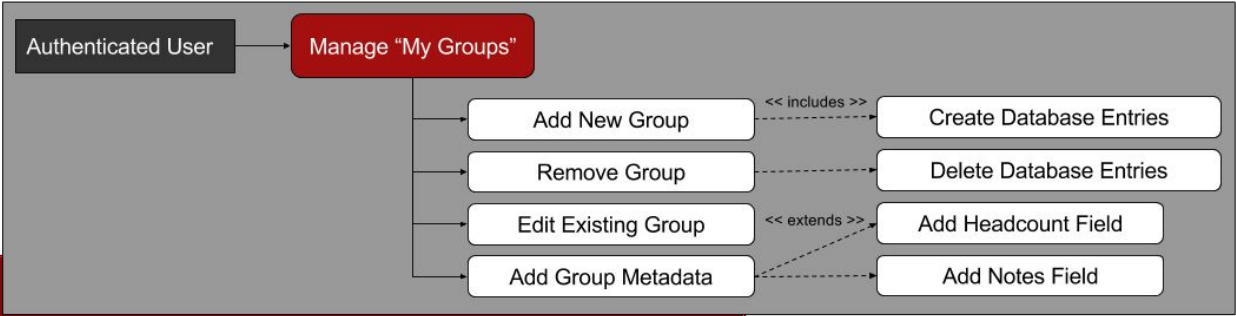



# Login View



**PERFORMANCE**  
LIVESTOCK ANALYTICS

# My Groups View



 Performance Health

History

My Groups

Add Group

Group A

Apply Medications

Group B

Group C

My Medications

Group D

Head Count: 13

Notes: Purchased 07/29/2017, Two Bulls Optional

Edit

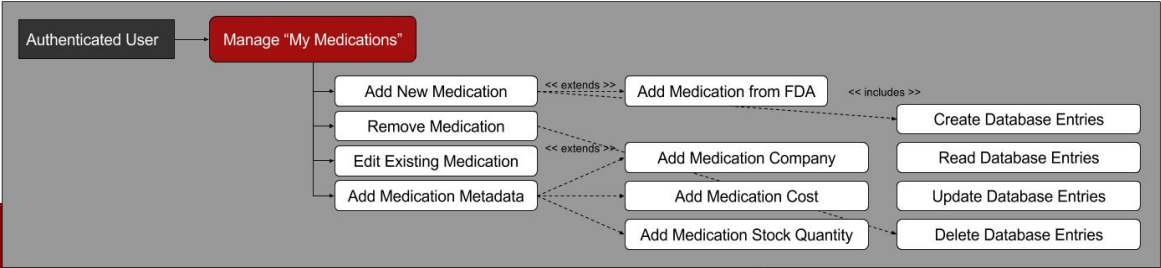
Delete

My Groups

Group E

Help

# My Medications View



History

Apply Medications

My Medications

My Groups

Help

My Medications

Add Medication

Panacur® Paste, Safe-Guard®

Polyotic®

Actogain™ 45 plus Rumensin® plus MGA®

Phenylbutazone 20% Injection

Company: Bayer HealthCare LLC, Animal Health Division

Cost: 99.99

Quantity: 6oz

EditDelete

Robenz®

# Adding a Medication

The screenshot displays a web application interface for 'Performance Health'. The main page, titled 'My Medications', lists several medications: Panacur® Paste, Safe-Guard®, Polyotic®, Actogain™ 45 plus Rumensin®, Phenylbutazone 20% Injection (with company: Bayer HealthCare LLC, Animal Health Division, cost: 99.99, and quantity: 6oz), and Robenz®. A sidebar on the left contains navigation links: History, Apply, Medications, and My Medications. A 'Load From FDA List' dropdown menu is open, showing a search bar and a list of medication options, with '20% Sulfamonomethoxine Sodium Solution' selected. An 'Add Medication' modal is also open, featuring input fields for Drug Name, Company Name, Cost, Total Quantity, and Quantity Label, along with 'Load From FDA', 'Add Medication', and 'Close' buttons.

Performance Health

My Medications

Panacur® Paste, Safe-Guard®

Polyotic®

Actogain™ 45 plus Rumensin®

Phenylbutazone 20% Injection

Company: Bayer HealthCare LLC, Animal Health Division

Cost: 99.99

Quantity: 6oz

Robenz®

History

Apply

Medications

My Medications

Load From FDA List

Select...

20% Sulfamonomethoxine Sodium Solution

25 % S.Q.® Soluble

Actogain™ 45 plus Rumensin®

Anaprim® Ophthalmic Solution

Optaflexx™ and Rumensin™ and Tylan™ and MGA®

Optimmune®

Optiprim® Ophthakote Ophthalmic Solution

Orbax®

Orbax®

Orbenin DC

OroCAM™

Osphos®

Osteum Solution 50 mg

Osuria™

Anaprim® Ophthakote Ophthalmic

Otomax®

Add Medication

Drug Name:

Name

Company Name:

Company

Cost:

Cost

Total Quantity:

Quantity

Quantity Label:

Quantity Unit

Load From FDA

Add Medication

Close

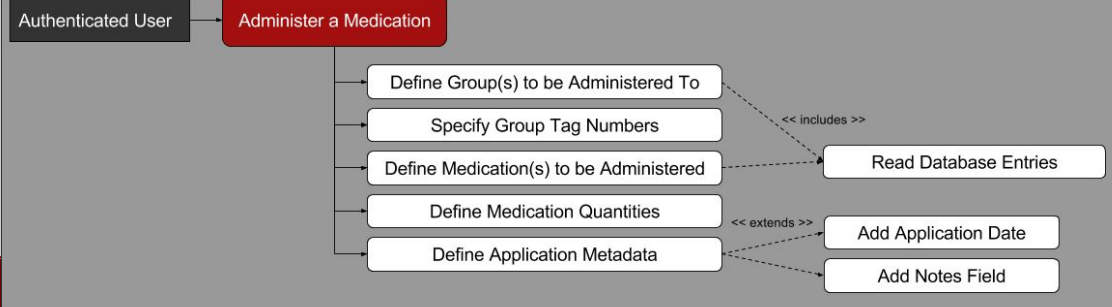
Sign Out

Add Medication

Edit

Delete

# Apply Medication View



Performance Health

History

Apply Medications

My Medications

My Groups

Help

Apply Medications

Apply

Date

12/04/2017

Group

Group A

Group B

Group D

Group E

- Group A

Tag Number(s)

Entire Group

Medication

Optiprime® Opthakote Ophthalmic Solution

Orbax®

Quantity

- Optiprime® Opthakote Ophthalmic Solution

15cc

- Orbax®

2oz

Notes

Next required in 16 weeks.

- Group B

Tag Number(s)

B034, B012, B007

Medication

Panacur® Paste, Safe-Guard®

# History View




 Performance Health

History	Date	Medication used	Quantity	Group	Notes	tag#
Apply Medications	2017-09-10	Oxytetracycline Hydrochloride Injection	20cc	Group A	Next injection required in 16 weeks.	Entire Group
My Medications	2017-09-10	P.L.H. Injectable	15cc	Group B	Worms prevention for thin selection.	A012, A014, B002, B006, B017
My Groups	2017-10-26	Robenz®	2oz	Group A	N/A	Entire Group
Help	2017-10-26	Anaprime® Ophthalmic Solution	4cc	Group A	N/A	Entire Group
	2017-10-26	Robenz®	2oz	Group B	N/A	Entire Group
	2017-10-26	Anaprime® Ophthalmic Solution	4cc	Group B	N/A	Entire Group
	2017-10-26	Petrem®	12cc	Group C	Flea treatment for infected heads.	C002, C014, C015
	2017-10-26	Resflor Gold®	2oz	Group C	Flea treatment for infected heads.	C002, C014, C015
	2017-11-22	Polyotic®	12cc	Group A	Check on A004 for potential infection.	A002, A004, A012
	2017-11-22	Promazine Granules	2oz	Group A	Check on A004 for	A002, A004, A012



# Help Page View

Performance Health

History

Apply Medications

My Medications

My Groups

Help

Sign Out

Date	Medication	Notes	tag#
2017-09-10	Oral	Next injection required in 16 weeks.	Entire Group
2017-09-10	Pain	Worms prevention for thin selection.	A012, A014, B002, B006, B017
2017-10-26		N/A	Entire Group
2017-10-26	Anap	N/A	Entire Group
2017-10-26		N/A	Entire Group
2017-10-26	Anap	N/A	Entire Group
2017-10-26		Flea treatment for infected heads.	C002, C014, C015
2017-10-26	F	Flea treatment for infected heads.	C002, C014, C015
2017-11-22		Check on A004 for potential infection.	A002, A004, A012
2017-11-22	Promazine Granules	Check on A004 for	A002, A004, A012

Help Page

## History

Transaction history of medications given to cattle groups. Each row in the table is a different transaction. Each transaction consists the date, medication given, quantity of the medication given, the group the medication was given to, the tag numbers of the group and notes.

## Apply Medication

To apply a medication to a group:  
Select a date and then click 1 or more groups from the drop down menu.  
For each group, fill in the input boxes. When finished click the apply button. You will be redirected to the history page.

## My Medications

This is a list of your most frequently used medications. To add a new medication to your list, click the "Add New" button in the upper right corner.  
Now there are two options:  
Choose a existing medication from the FDA list by clicking the "Load From FDA" button. Or create your own custom medication by filling in the input boxes. Once finished click the "Add Medication" Button

## My Groups

This is a list of your cattle groups. To add a new group, click the "Add New" button in the upper right corner.  
Create a group by filling in the input boxes. Once finished click the "Add Group" Button

Close

# Firebase Support

Project Overview

DEVELOP

Authentication

Database

Storage

Hosting

Functions

STABILITY

Crashlytics, Crash Reporting, Perfor...

ANALYTICS

Dashboard, Events, Audiences, Attrib...

GROW

Predictions, Notifications, Remote C...

Spark

Free \$0/month

UPGRADE

se492-dec1708 Database

se492-dec1708

medications

users

C8TLQcfC1XTKs8bQ4QyyGZSQJDG3

my-groups

-L-XZdx1Yo-8lCiQGuj6

GroupName: "Group A"

HeadCount: "14"

Notes: "Purchased 03/12/2017"

-L-XZk-u2J37kWkBe5Dh

-L-XZr\_Ttu1YN-oPTt-S

-L-XZxRmWvV1jsCG3m6l

-L-X\_X6u7LQwRK198UyK

my-medications

-L-XalIn5rQLTQ79M2P

CompanyName: "Intervet, Inc."

Cost: "23.99"

DrugName: "Panacur® Paste, Safe-Guard®"

Quantity: "16"

QuantityUnit: "oz"

-L-Xaz\_wfeiGHDnb-ua5

-L-Xb8G5Hk-SvegnFY2l

-L-XbK0JP29B-nzPLaHm

-L-XbgHc7o\_nWPqSy9g8

my-operations

-L-XcVxybZ3-00U0sysi

Project Overview

DEVELOP

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STABILITY

Crashlytics, Crash Reporting, Perfor...

ANALYTICS

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GROW

Predictions, Notifications, Remote C...

Spark

Free \$0/month

UPGRADE

se492-dec1708

Authentication

USERS

SIGN-IN METHOD

TEMPLATES

USAGE

Go to docs

WEB SETUP

Search by email address, phone number, or user UID

ADD USER

Identifier

Providers

Created

Signed In

User UID

dec1708@pla.com

Dec 4, 2017

Dec 4, 2017

C8TLQcfC1XTKs8bQ4QyyGZSQJD...

test1@pla.com

Dec 4, 2017

Dec 4, 2017

NHRSSIG6f0RZBz9jLGOqpvtWs42

test2@pla.com

Dec 4, 2017

Dec 4, 2017

dc8yfoUqxfoi8uhHNhu6FL2mWf1

test3@pla.com

Dec 4, 2017

Dec 4, 2017

a8TNs0RWCCSMpyXZbTnH71ns9...

test4@pla.com

Dec 4, 2017

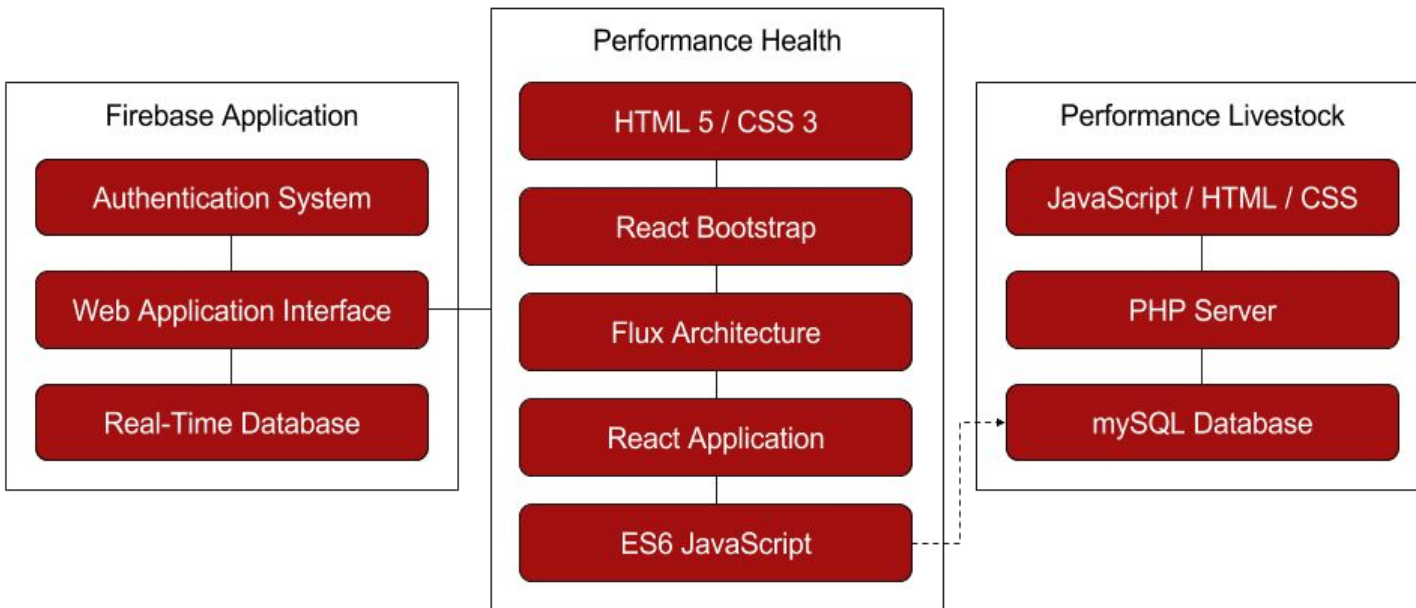
Dec 4, 2017

5H0BUlQhe1WNs/CcvMt9cfqZSGs1

Rows per page: 50

1-5 of 5

# System Overview



# Design Considerations

- Modular Design
  - Organized code into component modules
- Design Tradeoffs & Innovativeness
  - Used modern technologies React, Bootstrap, and Firebase for rapid uniform development
- I/O & User Interface Design
  - Modeled after Performance Beef - PLA's other web based project (layout, design, etc.)
  - Worked closely with client to accommodate design requests and requirements
- Modeling & Simulation
  - Node NPM used for real-time informed development with automatic rebuilds and meaningful debugging information

The image displays the Performance Beef web application interface and its underlying file structure. The application is titled "PERFORMANCE BEEF" and "LIVESTOCK ANALYTICS". It features a sidebar with navigation icons for Overview, Sheets, Delivery, Pens, Feed, and Rations. The main content area shows a table of data for "North pen 12" with columns for Date, Ration Name, Weight, Hay, Silage, Protein, Dry Corn, Wet Corn, and Earlage. The table lists data for various dates from 11-04-2017 to 11-28-2017, all using "Ration 2".

Below the application screenshot, the Node.js and NPM logos are shown, indicating the use of these technologies. To the right, a file explorer view shows the project structure:

- vet-med-app ~/Desktop/se492-dec170
  - node\_modules library root
  - public
  - src
    - actions
    - components
    - constants
    - css
    - dispatcher
    - icons
    - stores
  - App.test.js
  - index.css
  - index.js
  - logo.svg
  - registerServiceWorker.js
  - .gitignore
  - package.json
  - package-lock.json
  - README.md
- External Libraries

# Platform & Technologies

- Backend
  - Firebase Application Support
  - Real-Time Data Synchronization
  - Server-Side Data Validation
  - Server-Side Authentication
- Frontend
  - HTML 5
  - CSS 3
  - ES6 JavaScript
  - React
  - Flux
  - Bootstrap
  - Node.js + NPM



**HTML**



**JS**



**Firebase**

# Testing Methods

- Overview
  - Used Jest testing environment within our react application for component validation and rendering tests
  - Helps improve development focus and speed and prevent regressions
- Test Evaluations
  - Final shipping build successfully passess all implemented tests
- Client Feedback
  - Overwhelmingly positive reviews from our clients and their development team

```
PASS src/tests/ListViews.test.js
  ✓ Sets up properly (2221ms)
  ✓ Groups ListView renders without crashing (17ms)
  ✓ Medication ListView renders without crashing (3ms)

PASS src/tests/ApplyMedication.test.js
  ✓ Sets up properly (713ms)
  ✓ Apply Medication renders without crashing (14ms)

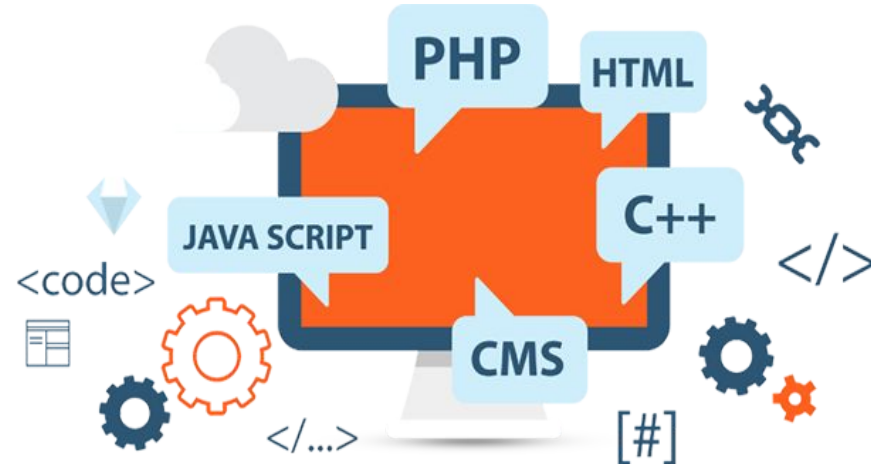
PASS src/tests/App.test.js
  ✓ Signs in properly (688ms)
  ✓ User properly retrieved (1ms)
  ✓ App renders without crashing (12ms)
  ✓ Has window location of /
  ✓ Changes view to History (8ms)
  ✓ Changes view to Apply Medication (10ms)
  ✓ Signs out properly (6ms)
  ✓ Properly clears the user (1ms)

PASS src/tests/History.test.js
  ✓ Sets up properly (667ms)
  ✓ History renders without crashing (4ms)

Test Suites: 4 passed, 4 total
Tests:       15 passed, 15 total
Snapshots:   0 total
Time:        6.439s, estimated 7s
Ran all test suites related to changed files.
```

# Project Challenges

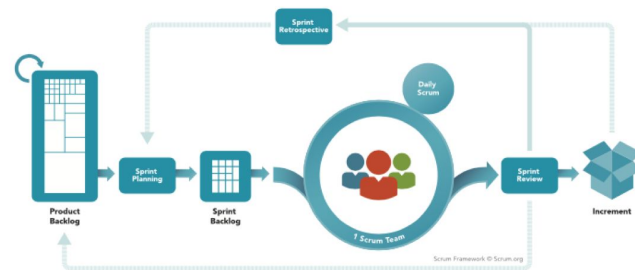
- Challenge Identification and Formulation
  - Time constraints
  - Project scope pivot
  - Learning new technologies
  - Final documentation timeline
- Solutions & Perseverance
  - Knowledge sharing
  - Extensive planning of development schedule
  - Weekly sprints and aggressive timeline
  - Market and technology research
  - Continuous integration strategy
  - Cooperative development and documentation



# Lessons Learned

- Project redesign after break necessitated not only an aggressive development plan but also documentation plan
  - Deadlines need to remain rigid and enforced
  - Code jams and sync-up meetings are not only productive but a necessity in many ways
  - Agile iterative development and Scrum weekly sprints really are the best way to develop
- Graduating semester isn't easy
- Git is your friend, Trello is a better friend

## SCRUM FRAMEWORK





# Project Summary

- Summary of Work
  - Learned & delivered two different platforms - web & iOS
  - Developed an iOS application with most functionality implemented
  - Completed working web application with all requirements satisfied in less than 4 months
  - Worked closely with client to create application design and use cases
  - Architected a modern web application using some of the latest technologies available
  - “Killed it!” - Dustin Balsley, Co-Founder & COO
- Future Work
  - Project control handoff this weekend
  - Full integration of medical data into PLA analytics systems
  - Future integration of emerging loAHT devices

Please join us in the Coover Atrium this  
afternoon.

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# Project Summary

- Summary of Work
  - Learned & delivered two different platforms - web & iOS
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- Future Work
  - Project control handoff this weekend
  - Full integration of medical data into PLA analytics systems
  - Future integration of emerging loAHT devices



# Before, During, After

(Apply medication)

Date \_\_\_\_\_ (date selector)

Group  (drop down)

tag#  (input)

med  (input → Fuzzy. Does not pull from my medications.)

cost  (input)

Notes  (input)

(button)

(Medication ledger)

Date	medication used	cost	group	Notes	tag#

Ledger

### Apply Medication

Date:

Group:

Tag #:

Medication:

Cost:

Notes:

### Medication Ledger

Date:	Medication:	Cost:	Group:	Notes:	Tag #:

Performance Health Sign Out

History ☒ Apply Medications ☐

Date: 12/04/2017

Group:  Group A  Group B  Group C

Tag Number(s):  Group A

Medication:  Oxyprim® Ophthalmic Solution  Oxyprim

Quantity:  Oxyprim® Ophthalmic Solution 15cc  Oxyprim 2oz

Notes:  Next required in 16 weeks.

Tag Number(s):  Group B B034, B012, B017

Medication:  Panacur® Paste, Safe-Guard®

Performance Health Sign Out

History ☒ Apply Medications ☐

Date	Medication used	Quantity	Group	Notes	tag#
2017-09-10	Oxytetracycline Hydrochloride Injection	20cc	Group A	Next injection required in 16 weeks.	Entire Group
2017-09-10	P.L.H. injectable	15cc	Group B	Worms prevention for thin selection.	A012, A014, B002, B006, B017
2017-10-26	Robenz®	2oz	Group A	N/A	Entire Group
2017-10-26	Anaprime® Ophthalmic Solution	4cc	Group A	N/A	Entire Group
2017-10-26	Robenz®	2oz	Group B	N/A	Entire Group
2017-10-26	Anaprime® Ophthalmic Solution	4cc	Group B	N/A	Entire Group
2017-10-26	Petrem®	12cc	Group C	Flea treatment for infected heads.	C002, C014, C015
2017-10-26	Resfor Gold®	2oz	Group C	Flea treatment for infected heads.	C002, C014, C015
2017-11-22	Polyotic®	12cc	Group A	Check on A004 for potential infection.	A002, A004, A012
2017-11-22	Promazine Granules	2oz	Group A	Check on A004 for	A002, A004, A012

# Project Timeline

Week	Development	Assignments
Week 6 - Sept 25	<ul style="list-style-type: none"> <li>- JS &amp; React Research</li> <li>- Setup Git Repository</li> <li>- Setup Firebase Project</li> <li>- Generate App Boiler Plate</li> <li>- Trello Planning</li> </ul>	- Bi-Weekly Report I
Week 7 - Oct 2	<ul style="list-style-type: none"> <li>- Create Screen Sketches</li> <li>- Finish Boiler Plate App</li> <li>- Bootstrap Integration</li> <li>- Firebase Integration</li> <li>- React Components</li> </ul>	
Week 8 - Oct 9	<ul style="list-style-type: none"> <li>- Authentication System</li> <li>- Firebase System</li> <li>- Finish Login &amp; Home</li> </ul>	- Bi-Weekly Report II
Week 9 - Oct 16	<ul style="list-style-type: none"> <li>- My Medications Story</li> <li>- Create Forms/Views</li> <li>- Generate Backend</li> <li>- Data Persistence</li> </ul>	- Extra Credit I
Week 10 - Oct 23	<ul style="list-style-type: none"> <li>- Apply Medication Story</li> <li>- Create Forms/Views</li> <li>- Generate Backend</li> <li>- Data Persistence</li> </ul>	<ul style="list-style-type: none"> <li>- Bi-Weekly Report III</li> <li>- Extra Credit II</li> <li>- Town Hall Meeting</li> </ul>
Week 11 - Oct 30	<ul style="list-style-type: none"> <li>- History/Analytics Story</li> <li>- Create Forms/Views</li> <li>- Finalize Backend</li> <li>- Filtering/Optimization</li> </ul>	- Setup Meeting with Prof
Week 12 - Nov 6	<ul style="list-style-type: none"> <li>- Application Polishing</li> <li>- Final Report Draft</li> <li>- Final Presentation Draft</li> </ul>	
Week 13 - Nov 14	<ul style="list-style-type: none"> <li>- Application Polishing</li> <li>- Final Report Draft</li> <li>- Final Presentation Draft</li> </ul>	
THANKSGIVING	THANKSGIVING	THANKSGIVING
Week 14 - Nov 27	<ul style="list-style-type: none"> <li>- Finalize Application</li> <li>- Finalize Final Report</li> <li>- Finish Final Presentation</li> </ul>	- Report & Presentation Draft
Week 15 - Dec 4 (Dead)	<ul style="list-style-type: none"> <li>- Final Presentation Prep</li> </ul>	
Week 16 - Dec 11 (Finals)		- Final Report & Presentation

# Project Code

```
1 import ...
27
28 export default class App extends Component {
29
30   constructor() {
31     super();
32
33     this.state = {
34       content: '',
35       user: null,
36       view: VIEWS.LOGIN,
37     };
38
39     this.handleFormChange = this.handleFormChange.bind(this);
40     this.handleClickSignOut = this.handleClickSignOut.bind(this);
41     this.handleChangeView = this.handleChangeView.bind(this);
42     this.onAppContentChanged = this.onAppContentChanged.bind(this);
43     this.getInitialState = this.getInitialState.bind(this);
44   }
45
46   componentWillMount() {
47     AppStore.addChangeListener(AppStore.APP_CONTENT_CHANGED, this.onAppContentChanged);
48     firebase.auth().onAuthStateChanged((user) => {
49       if (user) {
50         let path = window.location.pathname;
51         let view = (path.lastIndexOf('/') !== -1) ? path.substring(path.lastIndexOf('/') + 1, path.length) : VIEWS.HISTORY;
52         this.setState({
53           user: user,
54           view: VIEWS.HISTORY
55         });
56         window.history.pushState('', '', view);
57       } else {
58         this.setState({
59           view: VIEWS.LOGIN,
60         });
61       }
62     });
63   }
64
65   componentWillUnmount() {
66     AppStore.removeChangeListener(AppStore.APP_CONTENT_CHANGED, this.onAppContentChanged);
67   }
68
69   onAppContentChanged(content) {
70     this.setState({
71       content: content,
72     });
73   }
74
75   handleFormChange(e) {
76     if (e.key === 'Enter') AppActions.changeAppContent(e.target.value);
77   }
78
79 }
```

← Boards 🔍

Development ☆ Performance Livestock Free Team Visible

**Backlog**

Finalize Application JM

Finalize Poster 3 RH

Final Presentation 1 RH

Finalize Final Report 1 JM K RH

Rehearse Final Presentation 1 JM K RH

Add a card...

**Current Sprint**

Document Draft 5 JM K

Poster Draft 4 RH

Presentation Draft 3 RH

Applying Medication Reduces Quantity JM

Fix Quantity Units JM

Add Testing JM

Add Test Interface JM

Add a card...

**In Progress**

Navbar Help Page 4 JM RH

Add a card...

**Done**

Redirect to History on Apply JM

Add or Remove Analytics Page (REMOVED) RH

FDA Search JM

Time Stamp Changes ? JM

Support Multiple Quantities JM

Apply Medications can also pull from FDA JM

Fix React/Node Warnings JM

Fix Modal Resize Bug JM

Navbar Button Stays Highlighted JM

Add a card...

**Archive**

Apply Medication Story 3 JM K RH

Submit operations adds to firebase JM

Add Support for Multi-Group dropdown JM

History User Story K

My Groups Drop Down JM

Add All Assignments to Website K

Load Medication from FDA JM

Fix Login Screen Design 3 RH

Analytics Menu Icon JM

Add a card...

Add a list...



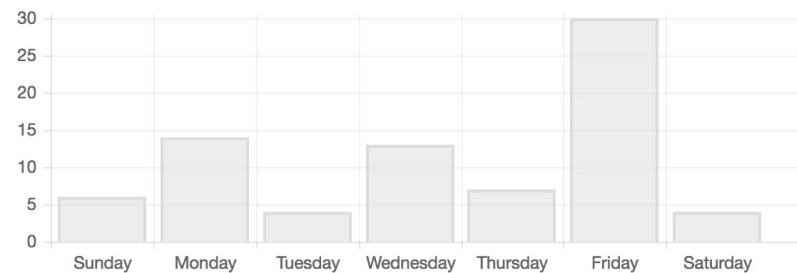
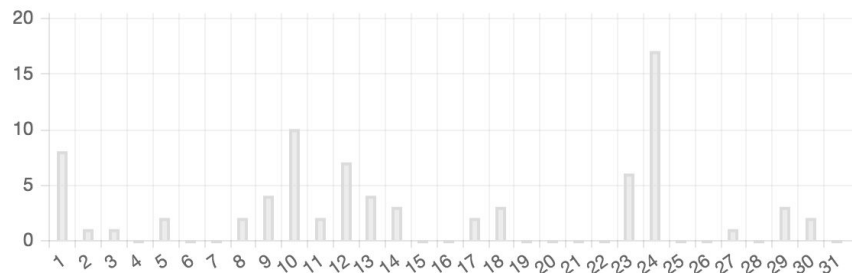
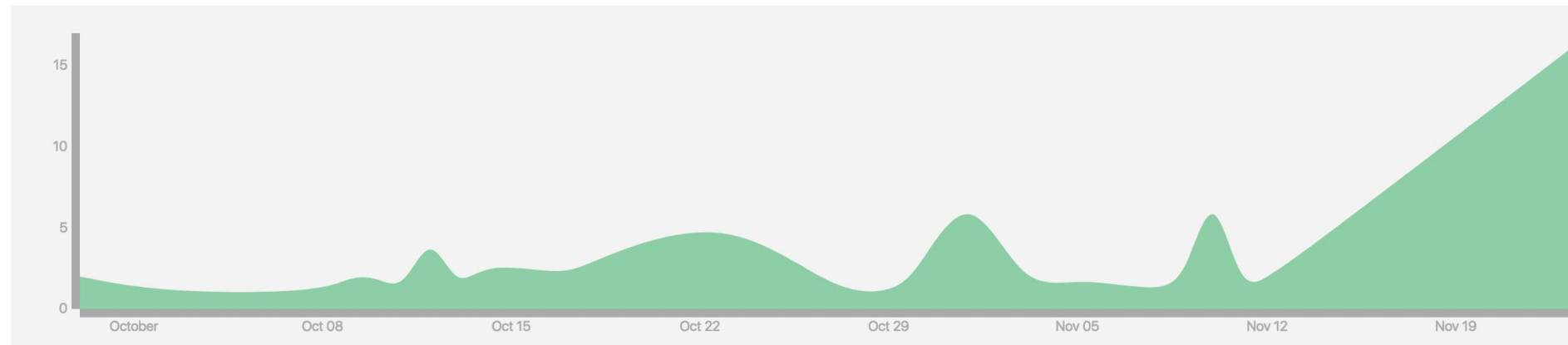
# Contributions

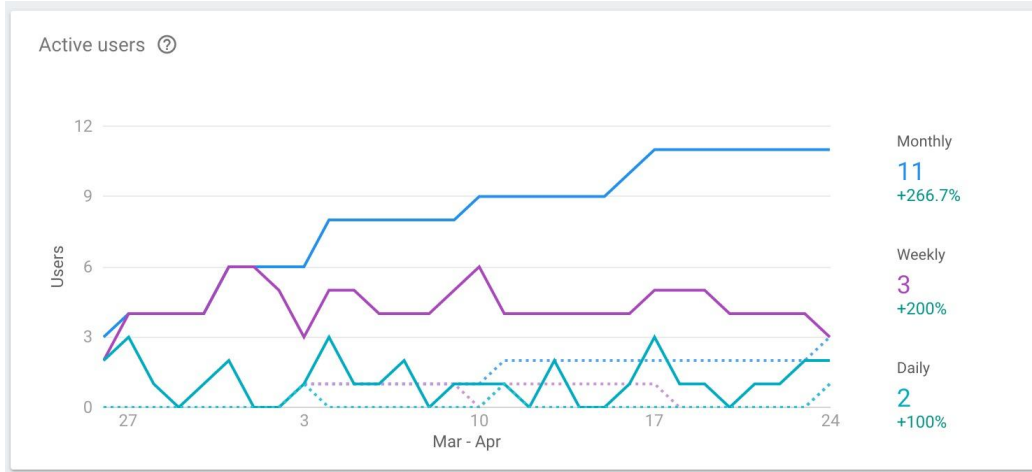


GitLab

September 29 2017 - November 24 2017

Commits to master, excluding merge commits. Limited to 6,000 commits.





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ADD USER



Email	Providers	Created	Signed In	User UID ↑
test@vma.com		Apr 4, 2017	Apr 23, 2017	4RwKtdAvuWZLMHPyX8u7WZqrhc..
testuser@test.com		Apr 23, 2017	Apr 23, 2017	E4bVs2mRiFcqtus26lASbm0OKli2

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