

# PROJECT PLAN

prepared by:

Jerome Dixon

for:

# Suki

(Precision Medicine Informatics Platform)

## 1. Introduction

This plan provides an outline for the various activities required to facilitate the successful completion and delivery of a patient healthcare analytics platform.

This platform will democratize patient health data by using a "mint.com / iGoogle" model for an integrated architecture designed for the healthcare community. The application will collect patient data, information from electronic medical records, connected health devices, genomics, and user behavior for a data rich research environment. APIs of interest will be collected and integrated via a "mint.com" framework.

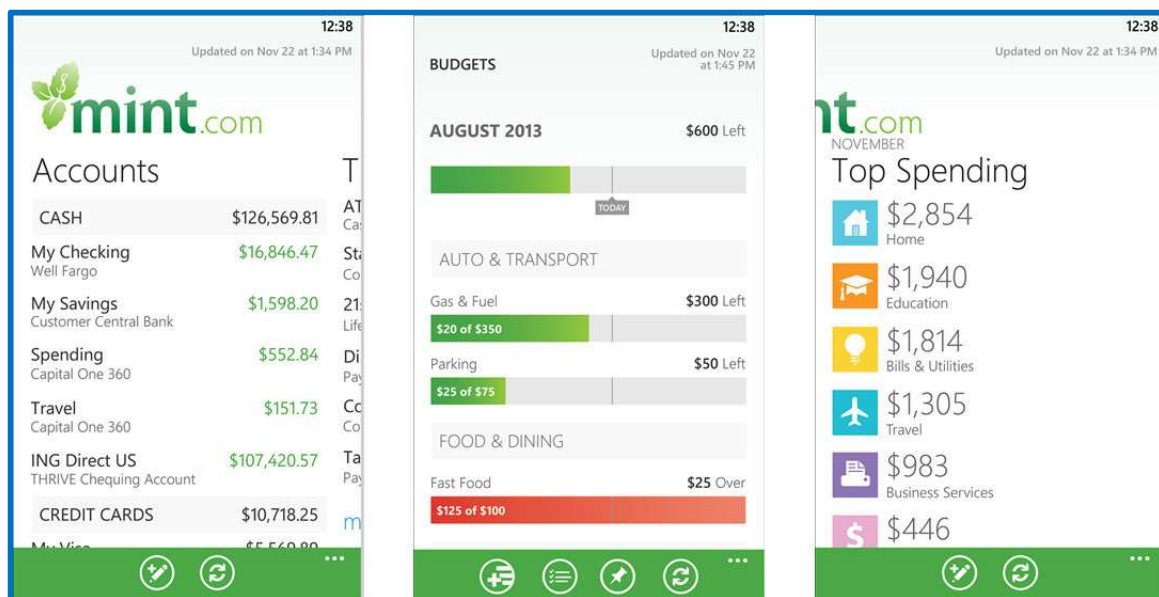


Figure 1. Mint.com Screenshots

Once this data is collected into Suki environment, we can perform analytics and precision medicine informatics.

Our framework consists of three main steps:

Step 1: Root cause analysis and/or Process Modeling

Step 2: Dataframe with Predictive Model (Time Series Forecasting, Decision Tree, Random Forest, Neural Network, others)

Step 3: Interactive visualization or game to interact with patient or user

## Project Plan for Suki

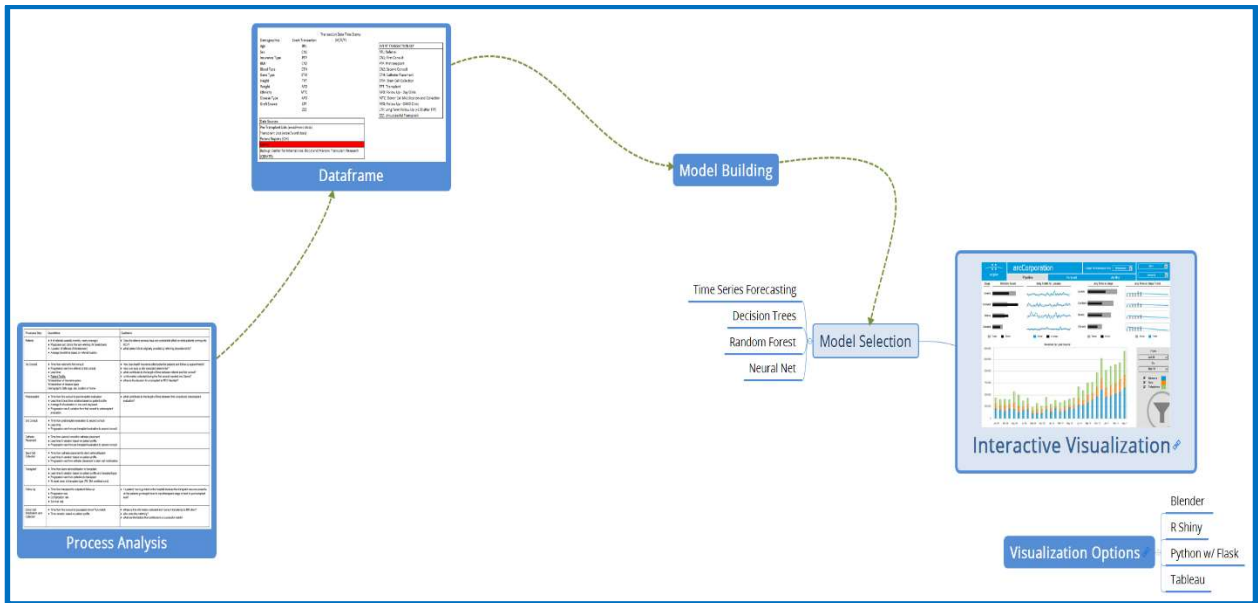


Figure 3. Sample Use Case

The presentation layer will resemble Google's discontinued iGoogle where we have a library of widget applications. The application(s) that are presented to the user will depend on the user's respective demographic and health information.



Figure 2. Google's Discontinued iGoogle web application

The information and insights generated will be used to identify health interventions and drugs best suited for individual patients and personalized medicine. Information generated will also help healthcare organizations improve outcomes and lower health care costs. Patient users of the application will also reach insights into their own health data that may drive better behaviors and lower demands on the U.S. health care system.

Our first prototype application for substance use disorders using this framework will be an application that alerts patient if clinical prescriptions do not match prescribed guidelines based on gene markers and Clinical Pharmacogenetics Implementation Consortium (CPIC) guidelines.

This plan is a living document and shall be updated (as required) to support periodic in-process reviews (frequency to be determined by project manager, but no less than every 3 months).

## **2. Project Plan Summary**

Objectives.

This project is to develop a data integration platform for the healthcare domain similar to what mint.com has produced for the online banking domain. We plan to develop an analytics platform that brings together electronic health record (EHR) data, patient fitness data, patient genetic data, food data, and other environmental information for a highly data rich environment. The goal is to provide users with game changing insights into their health as well as create incentives for patient accountability and improved preventative health measures coordinated with both insurance providers and the pharmaceutical industry.

In addition to documenting project tasks, this project plan will identify key application programming interfaces (APIs), required software development kits (SDKs), and deliverables to satisfy the project objectives.

This project consists of four main requirements:

- Identify the required APIs and mapping requirements
- Map data and make data visible in integrated environment with required relationships
- Create an application library for hosting and presenting micro applications and any visualizations based on user's profile
- Develop user interface with role based security for any PII requirements and/or HIPAA regulations to access application library

The APIs in our first requirement are a high-risk area. If we have open APIs, fairly easy. If not, we will have to develop APIs and mechanisms to load data and ensure timely updates to the data. The Affordable Care Act (ACA) does mandate that

patient data be owned by the patients, but method and manner of access will have to be solidified with source applications.

The second requirement will be our data modeling, data structure, and database implementation. Key considerations will be extraction of data from structured data sets, size of data sets, and required timeliness of updates to data sets.

Our third requirement is developing an application library for hosting and presenting our analytics micro applications and/or any visualizations from the data that apply to the user. We will use the discontinued Google Desktop as our model for this where user demographic and health data will trigger which micro applications and visualizations get called and presented to the user.

Our fourth requirement is finalizing a desktop and mobile presentation layer for the user. The desktop version will be where user configures settings and management of data. Mobile version will be where micro applications and any visualizations get presented to.

## Objectives

The following are the key objectives specific to the Suki platform:

- Integrate genomic, behavioral, and environmental data into one platform for analysis to achieve improved health outcomes and lower health costs
- Allow users to see insights into their health data
- Reduce demands on the health system
- Reduce insurance costs and create incentives for positive patient behaviors
- Improve pharmaceutical outcomes by better matching prescriptions to patient health profiles
- Provide tailored content and actionable intelligence to patients and consumers
- Prevent over prescription of opiates

## Project Tasks.

### **Task 1 – Map the following data formats and APIs to database**

Initial prototype. For first iteration, we will look at the following applications and software development kits for APIs:

- 1) Cerner API. <https://code.cerner.com/millennium>
- 2) EPIC API. <https://open.epic.com/Interface/FHIR>
- 3) FamilyTree23 for genomic data: <https://api.23andme.com/overview/>
- 4) Ancestry.com genomic raw data files (GEDCOM data format)
- 5) Clinical Pharmacogenetics Implementation Consortium guidelines

## **Task 2 – Develop Data Structures and Database Model**

1. Create data structures and populate database from APIs and raw data in Task 1.
2. Evaluate hosting solutions and finalize database architecture and environment based on performance, scalability, and user network bandwidth requirements

## **Task 3 – Design and Develop User Interface**

After the completion of Task 1 and Task 2, create user interface that includes the following:

- 1) Analytics dashboard visualizations (widgets, iGoogle)
- 2) User specified analytics
- 3) Ability of user to aggregate family data and analytics
- 4) Role based access for PII, PHI, and HIPAA requirements

## **Task 4 – Testing**

After completion of Task 3,

- 1) Test functionality and data quality metrics
- 2) Test security access for roles and PII, PHI, and HIPAA requirements
- 3) Penetration testing for application layer
- 4) Penetration testing for database layer

Project Team.

**Data Modelers (2) – 6 months**

**Database Developers (2) – 6 months**

**Application Designers (3) – 6 months**

**Operations Research Analyst (1) – 6 months**

### 3. Schedule of Milestones

Here are our major tasks and milestones:

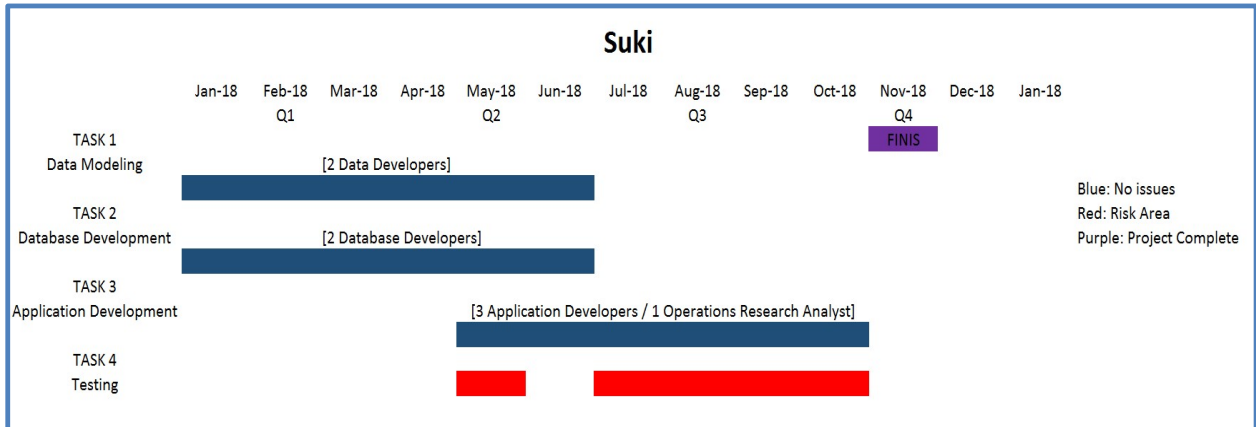


Figure 1: Project Plan

### 5. Funding Obligation & Execution Plan

We need (2) Data Modelers at approximately \$80,000 per year for (6) months.

We need (2) Database Modelers at approximately \$90,000 per year for (6) months.

We need (3) Application Developers at approximately \$90,000 per year for (6) months.

We will stagger application development and our staffing requirements between database and user interface but for May - June 2018, we will have our highest staffing levels with (8) personnel working concurrently.

In Q4, we will also pay an additional \$30,000 for application hosting costs depending on our final database architecture and required environment.

Suki													TOTAL
Jan-18	Feb-18	Mar-18	Apr-18	May-18	Jun-18	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18		
Q1			Q2			Q3			Q4				
28,333	28,333	28,333	28,333	63,333	63,333	35,000	35,000	35,000	35,000	FINIS			
Staffing	\$380,000.00											380,000	
Hosting	\$30,000												
	\$410,000.00												

**Figure 2: Budget and Spend Plan**

## 6. Deliverables

- 1) Functional Suki analytics application with documented code.
- 2) Results of API testing, data quality metrics, functional workflow testing, and security penetration testing for database and application layers.

## 7. Project Risk

Risk relatively low. May require additional funds and service agreements with EHR vendors for use of data via APIs.

## 8. Next Steps

- 1) Text mining, machine learning capability to provide PubMed tailored content to users based on EHR, genomic, and activity data
- 2) Sustainment requirements: 1 database administrator (part-time/\$30K), 1 application administrator (part-time/\$30K), plus hosting services (approx. \$30K/year). Estimated total for sustainment: \$90K/year

## 9. Project Information

Project Manager: Jerome Dixon

Virginia Commonwealth University, [dixonrj@vcu.edu](mailto:dixonrj@vcu.edu), 804.873.3575