

## Executive Summary:

Fitbit is a company which designs products (tracker, wrist bands etc.) to track everyday health and fitness, for e.g., the heart rate, glucose level, blood pressure, calories burnt, sleep quality etc. The data collected is then updated wirelessly into the Fitbit application by the user whenever he/she wishes to. The user has the privilege to set goals, update them and see the progress on mobile and online dashboard.



The client for this project required the team at Mindfire to develop a solution so as to integrate their healthcare application with the Fitbit application in order to enable them to pull any patient's Fitbit data at any point in time. This was supposed to act as a value addition for users of the client's EHR/ Patient Portal by making it possible for them to measure their wellness scores using Fitbit.

The manner in which this was to be achieved is as follows:

The patient has to login into the healthcare application and authorize the application to access his/her Fitbit data. Once authorized, the application would directly read or subscribe to read the patient's data. On subscribing, the application was supposed to get an update from Fitbit whenever any data was logged / modified by the patient i.e. the updated data would get fetched by the application.

## Technologies:

LAMP, PHP, HTML5, jQuery, REST API

## About our Client:

Client Name: Confidential | Location: USA | Industry: Healthcare/Fitness

## Solution:

The team at Mindfire Solutions built a solution which integrated the healthcare application with Fitbit REST APIs and extracted relevant information from it. They worked with the client's SME (subject matter expert) - a renowned professor from a famous US university to implement a custom/proprietary algorithm that takes existing patient vitals, diagnosis, allergies, procedures and Fitbit data into account to derive a wellness score for the patients.

The team also implemented backend processes that periodically update patient health records with Fitbit data and an alert system that triggers emails/SMS notifications to relevant patient contacts specified and the corresponding PCPs (Primary care physicians)

## Description:

The Fitbit Tracker uses a three-dimensional accelerometer, similar to that in the Wii Remote, to sense user movement. The Tracker measures steps taken, and combines it with user data to calculate distance walked, calories burned, floors climbed, and activity duration and intensity. It also measures sleep quality: how long it takes the wearer to fall asleep, how often they wake up over the course of the night, and how long they are actually asleep.

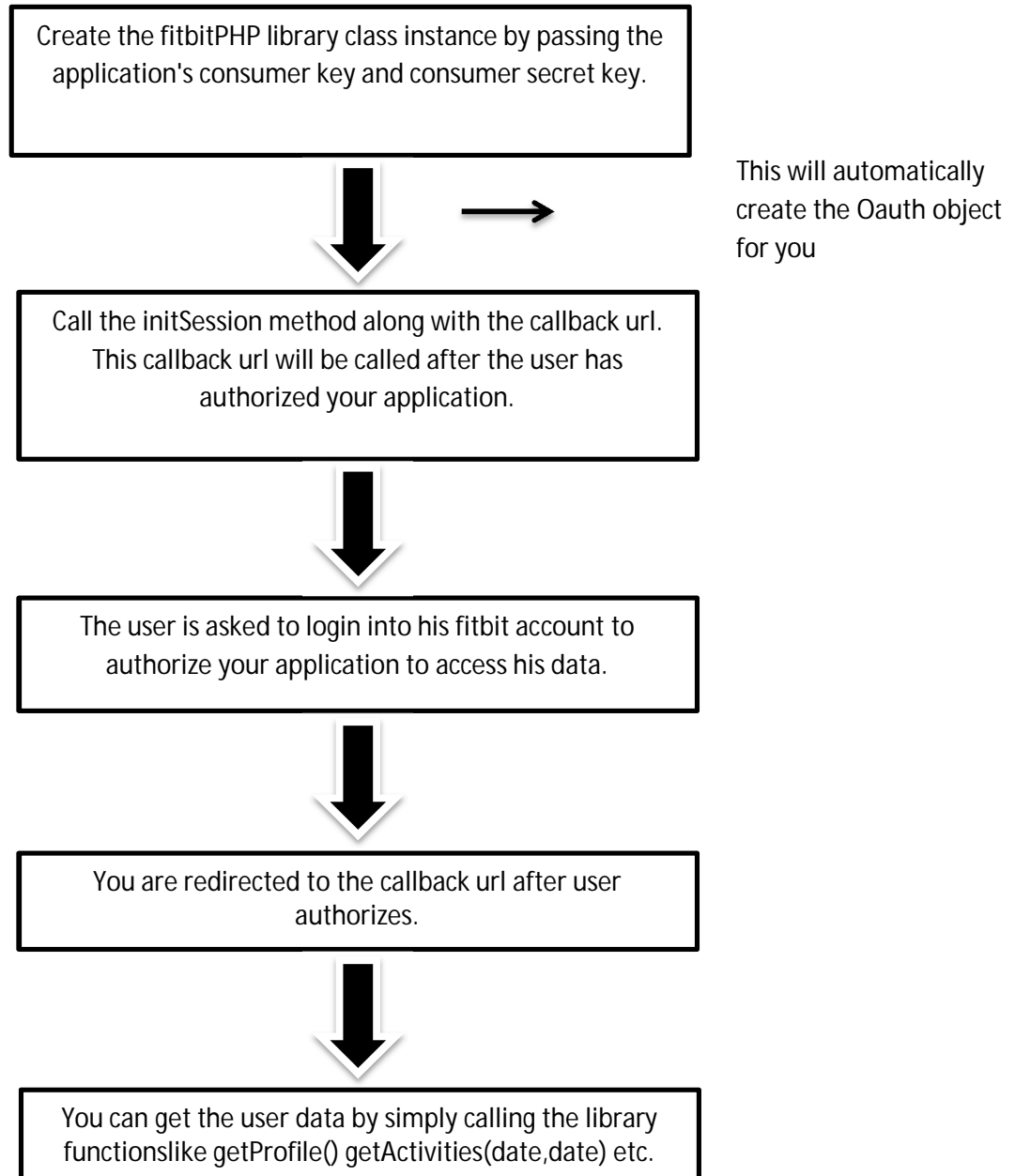
A wireless base station is included to receive data from the Tracker and also charge its battery. When connected to a computer the base station will upload data to the Fitbit website, where a number of features is available: seeing an overview of physical activity, setting and tracking goals, keeping food and activity logs, and interacting with friends. Use of the website is free

Integration of Fitbit into a Healthcare Application requires a few pre-requisites which are as follows:

- The Fitbit user has to create a profile in Fitbit by registering at [www.Fitbit.com](http://www.Fitbit.com)
- Register your application (which will be integrating with Fitbit) with Fitbit - [www.dev.Fitbit.com](http://www.dev.Fitbit.com)
- Store the application's consumer key and consumer secret for authenticating it with Fitbit.

- Make sure you have the Oauth library. If not, you may use the PECL Oauth extension,  
Run : `pecl install oauth-0.99.9`  
or : `pear install pecl/oauth-0.99.9` to install it and add the Oauth extension to your `php.ini` file.
- Optionally, you may download the Fitbit PHP Client library, contributed by third party developers, from <https://github.com/heyitspavel/Fitbitphp>. It makes the authorization process and handling the api calls extremely easy.

**Flow Diagram:**



Note:

1. You may store the `$_SESSION['Fitbit_Token']` and `$_SESSION['Fitbit_secret']` to make direct api calls in future without the user having to authorize your application every time.
2. Also, you can subscribe your application to get a notification whenever a user updates any data in Fitbit. All subscription methods are present in the library. You simply need to add a subscription (with user Id as the subscriptionId preferably) by calling `addSubscription` method. Then Fitbit will POST the updates on the endpoint url you specify in your application settings in `dev.Fitbit.com`

Screenshots:

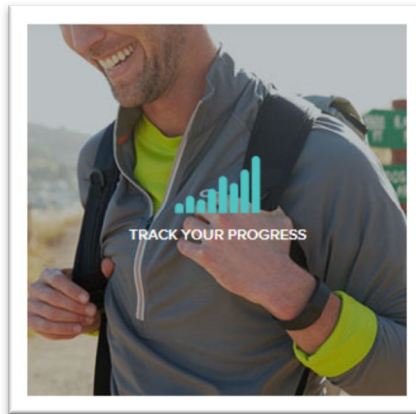
Fitbit



Sleep Tracker



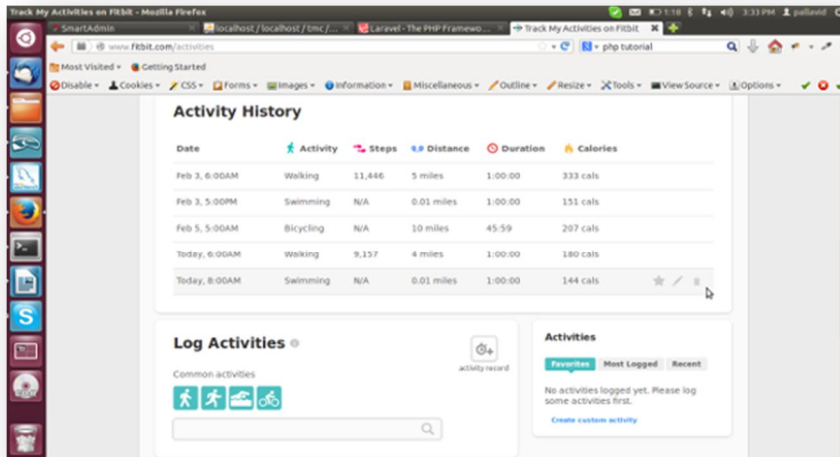
Sleep



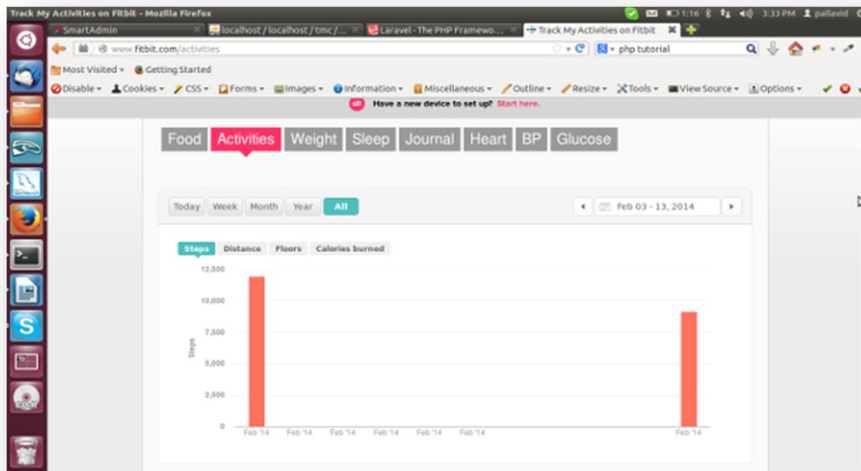
Smart Scale



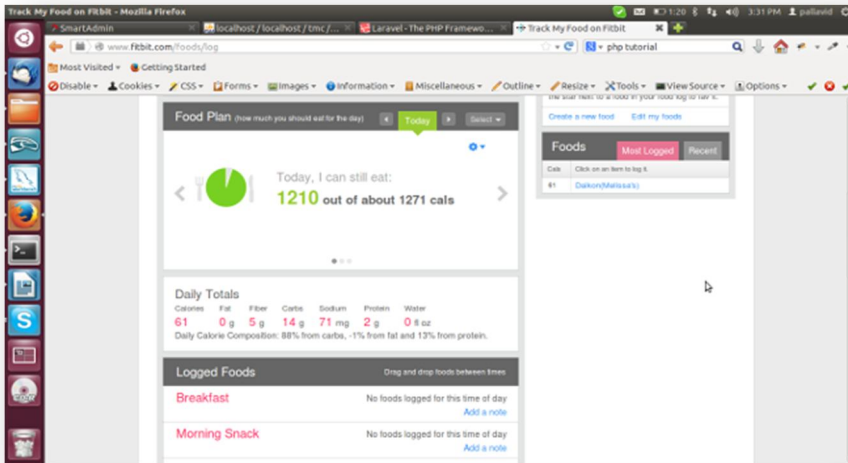
Activity Tracker



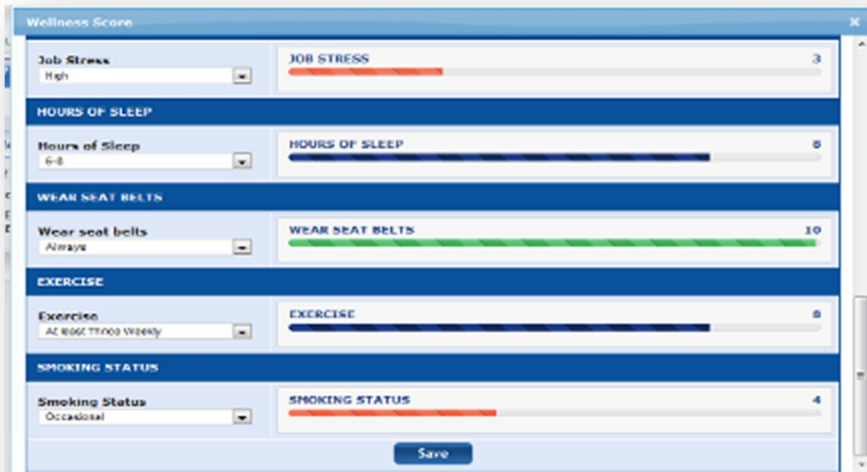
Screen 1: Activity History



Screen 2: Activity Graph



Screen 3: Food Plan Graph



Screen 4: Wellness Score