

Brendan Heal	SmartKeg Industries
V00726340	Smart Beverage Dispensing System
January 7, 2016	1.0

Version	When	Who	What
1.0	January 7, 2016	Brendan Heal	Initial Drafting

Table of Contents

- 1.0 Problem description
- 2.0 Project objectives
- 3.0 Current systems
- 4.0 Intended users and their interaction with the system
- 5.0 Known interaction with other systems within or outside the client organization
- 6.0 Known constraints to development
- 7.0 Project schedule
- 8.0 Project team
- 9.0 Glossary of terms

1.0 Problem description / expression of need

What is the need for improvement in the client organization?

Kegs of beverages are cheaper and generally more enjoyable to drink than other available consumption methods. However, when sharing a keg with other individuals, there are issues determining the amount of beverage being consumed, and who needs to pay for the next keg. There is a need to monitor the consumption and distribution of the beverage, as well as the current quality of the beverage and remaining quantity of it. There is also the security concern of non-paying users stealing the beverage from the container. SmartKeg Industries would like to address these concerns with an all-in-one Smart Beverage Distribution System.

2.0 Project Objectives

Specify the objectives in detail

The smart beverage distribution system is essentially an intelligent keg fridge. The main improvements that would be made would be a means of monitoring the consumption and possibly temperature of the beverage, and providing a security measure to prevent unwanted users from accessing the beverage. Ideally, a mobile web application will be available to view information and alarms from the system. Some required functionality of this web application would include:

- Monitoring individual user's consumption, perhaps a profile displaying some interesting statistics.
- An alarm system if the beverage is reaching a critical temperature or there is not much of the beverage remaining in the keg.
- Able to generate an invoice for the keg payment based on individual user's consumption.
- Possibly alerting users of unauthorized keg access attempts.

3.0 Current System(s)

Current system(s) at the client organization (if any)

A simple keg fridge with a keg and a CO2 tank inside of a fridge. These attach to a tap which exits the door of the fridge and allows for dispensing of the beverage.

4.0 Intended users and their interaction with the system

Any group of individuals interested in sharing a beverage contained in a keg type container. Possible users include student houses, offices, bars, breweries and any other organization looking to provide beverages for their members.

5.0 Known interaction with other systems within or outside the client organization

- Bars
- Breweries
- Offices

6.0 Known constraints to development

- MAXIMUM 500 \$ production cost
- Project deadline April 2016

7.0 Project Schedule

January 21
Informal Requirements Definition
Project Website

February 16
Formal Requirements Definition

March 1
Detailed Requirements Spec

March 3
Prototype demonstration

March 15
Final Requirements Spec

March 22
User Manual

March 31
Final Project Demo

8.0 Project team

Project team member's info and roles

Hardware Engineer(1-2): Design and implement system for monitoring beverage consumption. Possibly use a wireless scale or some sort of flow rate sensor to achieve this. Also design a secure "Login" type system for dispensing beverages to paying users.

Software Engineer (2-3): Design and implement the mobile web application for viewing consumption information and raising alarms as described above. Ideally have experience developping web applications.

Project Manager: Interact with client in order to regine requirements and produce a superb product. Ideally able to work in both hardware and software and able to help out other team members when necessary.

Contact info

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9.0 Glossary of terms

Terms used in RFP

Project Proposal Summary (1 page)

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Sharing beverages that are contained in kegs has economic and social benefits for those involved. However, there are several issues involved by sharing kegs traditionally. It is impossible to measure the amount of beverage consumed by which person, so splitting the costs can be frustrating. Additionally, non-paying members may take some of the beverage, and inflict economic damage on the intended users. Finally, it is difficult to determine when a keg is near empty, and this results in some potential users going thirsty. SmartKeg Industries would like to address these issues by developing a Smart Beverage Dispensing system. The Smart Beverage Dispensing system's core features include a means to restrict beverage consumption to paying users, measure the amount of beverage consumed by the person, create an invoice for payment for each user or automatically charge users, and an alarm system for monitoring and reporting the current contents of the keg. Additional features may include means of monitoring and regulating the beverage temperature, automatically dispensing pre-defined beverage amounts (perhaps remotely) and logging unauthorized keg access attempts.

The Smart Beverage Dispensing system is essentially an improved iteration of a keg fridge. It will keep the keg contained and refrigerated, while providing a tap on the exterior for dispensing of the beverage. The keg should be contained securely, but also be easily removable. It will report to a web application that will store individual user's consumption levels in a database. The web application should include a system for user registration and user authentication. User Authentication will be achieved by some form of access code or biometric input on the exterior of the Smart Beverage Dispensing System. User signup should be secure and regulated by an administrator. The web application will also be used to distribute alarms for a near empty beverage container, perhaps critical temperatures and general issues to users. The web application should be accessible from user's mobile devices. This will ensure that alarms are received promptly and that required payment information is available at any time. The web application should be flexible and allow adding more kegs which will all be individually monitored. Special hardware will be required for monitoring individual user's beverage consumption. Some possible solutions would be a wireless scale that monitors consumption by weight, a machine that dispenses pre-defined amounts of beverage, or a flow rate tracker that tracks the amount of beverage passing through the tube. In order to pump the beverage through the tap, a CO2 canister is also required. This also needs to be easily replacable, but ideally contained in the refrigerator as well.

A basic use case for the system would be as follows:

- User approaches the Smart Beverage Dispensing system
- User logs in using authentication credentials (Keypad or biometric)
- User dispenses beverage (predefined amount or as much as they wish)
- System logs the user's consumption level and stores in web application database
- User enjoys cold and delicious beverage for a cheap price.

My Résumé

Brendan Heal V00726340

Project management experience

- Leadership experience from working in many group projects in the past.
- Skilled at resolving conflicts in group situations and considering all opinions before making a group decision.

Writing experience

- Written a lot of reports over my time in University. Generally high grades in courses requiring report writing
- Consider my level of writing to be above average when it comes to writing technical reports.

Webmaster experience

- Developed small websites using Ruby on Rails, Wordpress, MySQL, MongoDB and AngularJS.
- Worked on a large web application using Java Servlets.
- Relatively little experience with HTML5, CSS, and javascript, but still know the basics.
- Prefer to work on back end.
- Developed a small application using Selenium Web driver.
- Basic knowledge of UX design concepts, but limited experience.

Software tool expert

- Limited experience using Arduino microprocessor to design a small robot.
- Comfortable using various development environments such as Vi and Eclipse.
- Very familiar with Linux and Windows operating system, less experience programming with Apple.

Programming skills

- Experience using Java, Python, Ruby, C, C++, ARM, Visual Basic, Bash
- Prefer to work with Ruby when possible
- Taken many software engineering courses that are relevant to development (late fourth year of undergraduate degree in Software engineering)
- Some notable courses taken recently include Introduction to AI and Combinatorial Algorithms, where some simple AI applications were developed.
- Designed a small prototype application for Android using an emulator

Design experience

- Experience designing a large software project in SENG 299
- Used UML to design an object-oriented web based application for Farmer's Market using AngularJS and MongoDB
- Familiar with design and architectural patterns
- UML diagramming & object-oriented design skills
- Knowledge in user experience domain but limited experience.

Requirements engineering experience

- Know basic concepts of requirements engineering, but yet to put into practice