Good Morning

Functional Specification and Management Plan

LARGE Software

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Executive Summary

LARGE Software developers have been given the task of developing a mobile application that intends to assist users in waking up efficiently and gracefully in the morning. This application is called Good Morning. The SoftStart development group has provided LARGE Software with a Detailed Request for Proposal for this application. In this document, SoftStart outlines objectives, constraints and known interactions that they are looking to see in a successful prototype demonstration before the end of March 2016.

This Detailed Request for Proposal has served LARGE developers as a guideline to begin development of the Good Morning application. Given the timeline, and known objectives as well as constraints provided for the application, LARGE developers have been able to identify and research topics that are relevant to developing a minimum application system before the end of March. These topics would include a core alarm, smart assistant, machine learning, and smart technology integration. From this research, developers have been able to begin mock-ups on user interface design and interaction. LARGE developers have also created a Management Plan for the Good Morning application. In this plan, a finalized minimal system has been identified, which will meet SoftStart's specific needs. This plan discusses all known relationships between the application and APIs that will be used during development. Finally this Management Plan outlines which developers will be completing specific tasks in order to deploy a working application before the deadline at the end of March 2016.

Project Summary

The Good Morning application project was proposed by the SoftStart project team. The main functionality of this application is assisting users (a targeted group of young adults or professionals between the ages of 18 and 32) in the process of waking up in the Morning. To do so, this application aims to utilize the following technologies (as outlined by SoftStart in their Detailed RFP):

- **Core Alarm -** a system through which the user's mobile device will reliably and gracefully assist the user in waking up.
- **Smart Assistant -** a summarization of additional information that the user utilizes on their mobile device. Such information would be comprised of missed or unseen instant messages, emails and phone calls as well as notifications on upcoming daily calendar events or weather information for the upcoming day.
- **Machine Learning –** the application should be able to learn from user habits, such as sleep patterns, to be able to adapt or better assist the user throughout the process of waking up through the morning.
- **Smart Technology Integration –** ideally the Good Morning application will allow users to setup and control smart devices such as the *LIFX* wakeup light to assist the process of gracefully waking up in the morning. Integration of smart watches in the application will allow for use of accelerometers on additional devices to detect waking time during REM sleep cycles.

Along with the aforementioned utilized technologies, the Good Morning application will meet the following development constraints in order to meet the prototype demonstration at the end of March:

- The application will be available for users to test for mobile devices that use Android operating systems
- Prototype will be made available in English as a primary language with capability to expand to multiple languages
- The ability to interact with various types of smart technology (Prototype will specifically interact with the *LIFX* wakeup light)

In order to accomplish these tasks the Good Morning application will have to accurately, efficiently and securely utilize APIs of existing applications or technologies. *LARGE* Software developers have completed background research in these fields to provide a framework for the development of the Good Morning application.

Core Alarm

- Market currently saturated with alarm applications available publicly on Github
- Most applications not compatible with Android V4.4 and above
- Researching code base of current highly used applications will allow LARGE developers to focus on refining the UI experience of the alarm
- Developers are looking to potentially integrate the SensorManager API to allow devices to anticipate when to implement an alarm at an appropriate point during a REM sleep cycle

Speech Synthesis

- Voice Notify will be a primary example of how to construct an application that properly synthesizes speech
- Main developer goal is to create an application that requires little to no interaction from the user at first, utilizing speech synthesis to read off displayed information
- Speech synthesis will be synchronized with alarms to ensure that information is given is a slow, steady stream. This will allow for maximum comprehension on the user's end.

LIFX Smart Lights

- LIFX application sets limits to the user by limiting the control of a light's color or brightness, as well as whether or not it is on.
- Good Morning aims to tap into this technology to allow the user to control when and how the light is turned on
- *SoftStart* has stated that a graceful transition to waking up is preferred. This would mean not abruptly turning on lights, but a smooth and slow transition.
- LIFX API is made public, which will allow LARGE developers to apply the aforementioned effects to smart lights used by clients

Google Calendar API

- Google is the standard application base for all Android operating system phones
- LARGE developers main goal is to be able to hook into Google Calendar API to summarize upcoming events in the user's day
- Codebase for Google Calendar is widely used through many applications whose code is made available publicly online

With the provided RFP for the Good Morning application from *SoftStart*, the Software Developers at LARGE Software Inc. have created a plan to effectively engaged the user throughout their morning, delivering relevant information at a suitable pace. This engagement will be done through a well-planned and thoroughly testing User Interface, ensuring it meets the client's needs through product demonstrations. This document will also thoroughly outline the management process that LARGE Software developers plan to follow. This will ensure that the client understands what the developers understand to be a minimal product for demonstration by the end of term, and a complete breakdown of all major features that the developers intend to have working by the time.

User Interaction

Alarm Creation

Create alarms using the Good Morning application to wake you up in the morning. The created alarm will wake the user up at their specified time or within a window of time if smart integrations are used.

At the time the alarm has begun it will present the user with two options, either "snooze" the application for a specified time (usually 10 minutes) or dismiss it. The snoozing input will delay the alarm for a specified time, while then dismiss input will close the alarm. After dismissal of the alarm, notifications which have been specified will be vocally read using the built-in virtual assistant. Once the virtual assistant has finished it will ask the user to verbally confirm that they have received the notifications. If the user gives a negative response the virtual assistant will repeat them, otherwise interactions with the application will be complete.

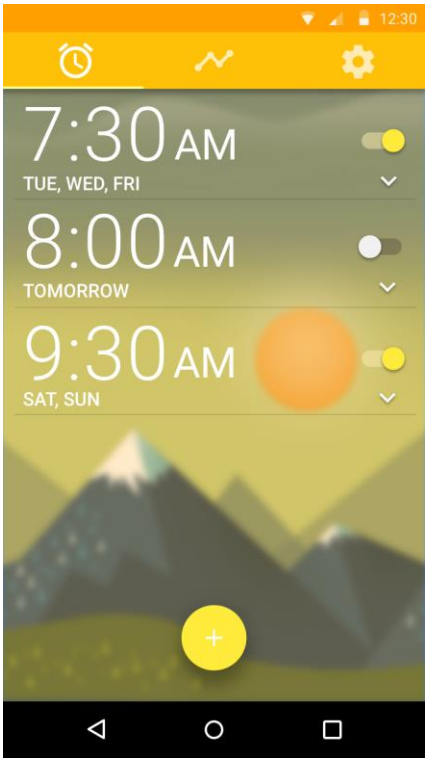

Figure 1: Home Screen

Creation Interaction

Open the Good Morning application. The home screen which shows the user's current alarms and provides access to the configuration screen will be displayed. Press the addition symbol to begin creating the new alarm. The configuration screen allows characteristics of the alarm to be specified such as, time, notifications, and vocals used, and smart integrations will be displayed. Specify the time for the alarm to wake the user up, leaving the default configurations in the additional fields. After confirming that the alarm is configured as the user wants, press the “OK” button at the bottom of the configuration screen finalizing the creation process. You will be presented with an Android Toast which informs the user how long till the created alarm will go off, as well as being returned to the home screen which will now display the user's newly created alarm.

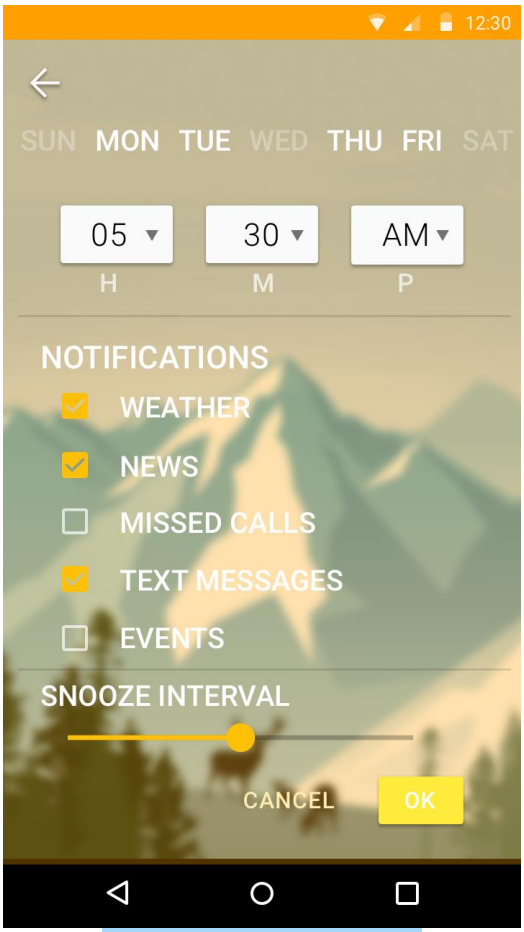

Figure 2: Alarm Creation

Alarm Deletion

The user may want to delete their configured alarms once they are no longer needed or for any other reason. Please keep in mind that alarms can be reconfigured which may be more appropriate compared to deleting an alarm which is an irreversible action.

Deletion Interaction

Open the Good Morning application. The home screen will be displayed along with all of the user's current alarms. Select the alarm to be deleted. The Alarm will expand to reveal additional operations, "Configure" and "Delete". Selecting Configure will allow the user to reconfigure the alarms current configuration. Selecting "Delete" will permanently and irreversibly remove the alarm. Select the "Delete" option, and a confirmation dialog will appear giving the user two options "Cancel" and "Confirm", selecting the former will return the user to the home screen with the alarm intact while selecting the later will finalize the deletion of the alarm. Select the "Delete" option. The home screen will be displayed and the alarm will be removed from the user's current alarms.

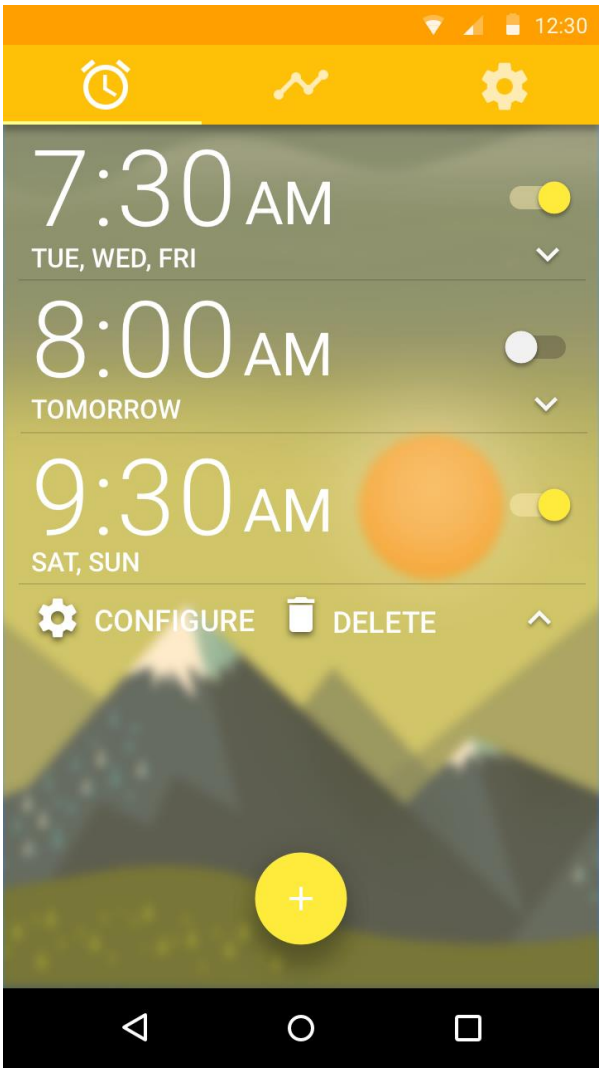

Figure 3: Alarm Deletion

Alarm Snooze/Dismissal

When the user's alarm goes off they will be presented with two choices, either to “Snooze” or “Dismiss”.

Snoozing the alarm will silence the alarm and delay it for a configured period of time until it goes off again, this is set within the configure alarm screen. Snoozing the alarm is good for getting an extra bit of sleep before having to wake up.

Dismissing an alarm will silence it and begin the virtual assistant which vocally reads the user their configured notifications. Dismissal of the alarm is the trigger which begins the key component of the Good Morning application.

Snoozing Interaction

Open the Good Morning application, and the home screen will be displayed along with all of the user’s current alarms. To set the snooze interval, either create a new alarm or configure an old one. Once on the configuration screen of said alarm, select the “Snooze Interval” field and input an integer value ranging between 1 and 59, this value will represent the snoozing interval in minutes. Confirm the configuration of the alarm and select “Done”.

Now when the alarm begins selecting the “Snooze” option will delay the alarm for the specified interval.

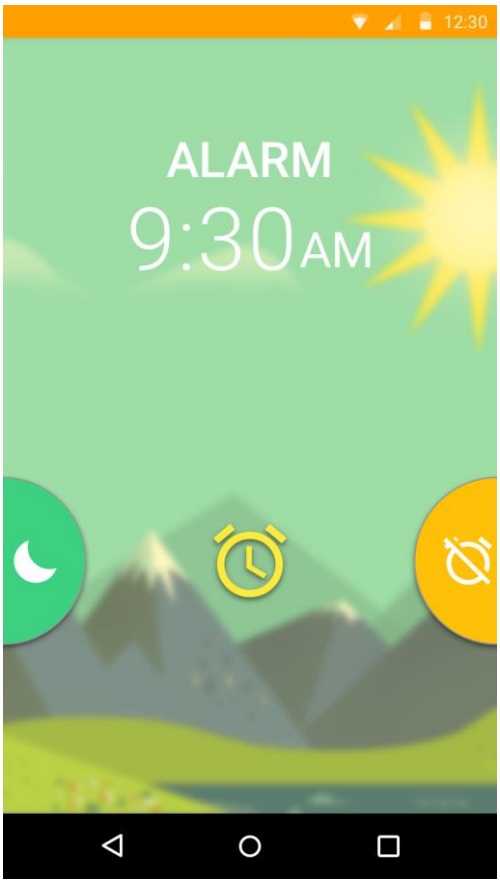

Figure 4: Alarm Snooze/Dismissal

Dismissing Interaction

Once the Alarm begins select the dismiss option. The alarm will silence and the vocal notifications will begin. The vocal notifications will alert the user with the configured information.

Alarm Notifications

Once the alarm has been dismissed it will vocally read the notifications which the user has configured using Google's built in speech capabilities. This will allow the user to receive a concise summary of valuable information of the user's day.

Notification Configuration Interaction

Open the Good Morning application. The home screen will be displayed along with all of the user's current alarms. To set the notifications, either create a new alarm or configure an old one. Once on the configuration screen of said alarm, under the "Notifications" header select the notifications which the user would like to receive (calendar events, missed notifications and calls, weather information, news, etc.). Confirm the configuration of the alarm and select "Done".

Alarm Settings

The Alarm Settings screen will allow the user to configure various core alarm features and smart Internet of Things integrations. It can be accessed by tapping the "Gear" icon or by swiping to the right.

LIFX Light Bulb

The LIFX Light Bulb is a smart lightbulb that can be configured to gently wake up the user with a breathe effect where lights are turned on slowly or with a pulse effect for the heavy sleepers. Turning on the LIFX Light Bulb by pushing the slider automatically discovers and connects to any light bulb that are connected in the same network.

Alarm Clock Sound

Selecting the drop-down menu beside Alarm Tone allows the user to play and select one of the available thirty different alarm clock sounds to wake the user. The tones include nature sounds to gently wake up light sleepers and loud tones for heavy sleepers.

Configure Voice

The user can select any one of five available voices to read them notifications when they wake up by pressing the drop-down menu beside Voice.

Pebble Smartwatch

The Pebble Smartwatch is a smartwatch that can connect via Bluetooth to a smart phone, track motion during sleep and perform simple actions against notifications. Tapping the switch beside Pebble Smartwatch, opens up a Bluetooth pair window that allows the Good Morning app to pair up with the user's Pebble Smartwatch. Enabling the "Track Sleep" option gathers accelerometer data from the Pebble Smartwatch while the user is sleeping and stores it in the Good Morning app so that Sleep Motion Graphs can be generated. Enabling the "Snooze/Dismiss Alarm" option allows the user to dismiss or snooze an alarm from their smartwatch.

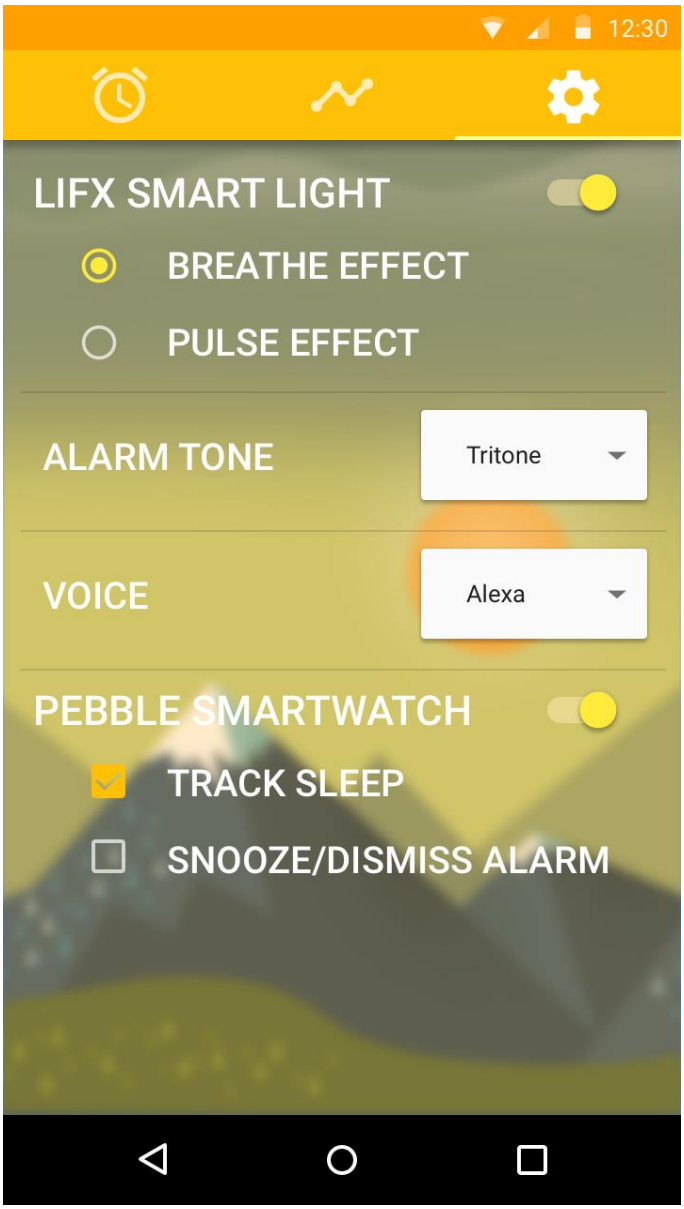

Figure 5: Alarm Settings

Management Plan

Following the provided schedule, a final product demonstration is planned for the end of March 2016. Currently, developers are working on finding the best combination of implementations for the core features to ensure the best experience for all users. For this final demonstration, LARGE developers plan to have the following features available as a minimal system of Good Morning:

- Core Alarm
- Google Calendar
- Core Interactions/Settings Page
- Speech Synthesis

This section of the Management Plan document will discuss in detail, said implementations of core application features. Expanded system features that developers hope to implement on top of the planned minimal Good Morning system given appropriate time and resources are also described.

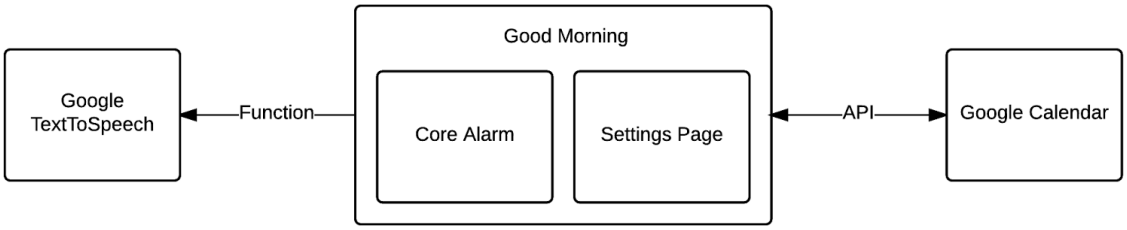

Figure 6: Minimal System Relationship Diagram

Core Alarm

The core alarm may be implemented in a few ways. The first implementation involves creating a proprietary alarm application. This version will integrate the settings page and alarm application together in a single application.

Proprietary Core Alarm

- Utilizes an aesthetically-pleasing user-interface
- When the alarm goes off, the user may choose to dismiss or snooze the alarm
- Displays user-editable clocks for set alarm times

The second implementation uses Android APIs to create, modify, and delete alarms.

Core Alarm using Google Clock

- Settings are separated from the clock functionality
- Alarms are set in settings, but use Google Clock as the UI

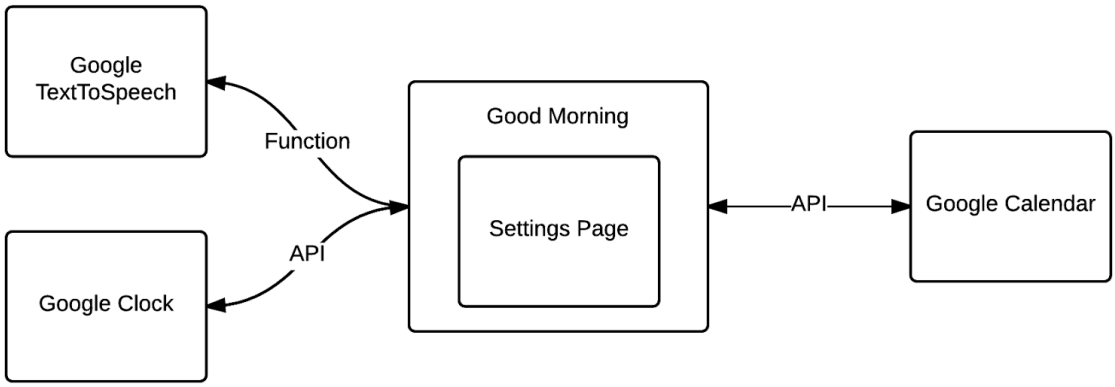

Figure 7: Minimal System Relationship Diagram Utilizing Google Clock

Google Calendar

The Good Morning application is planned to be initially released on the Android platform. The application will access the Google Calendar API, ensuring that users are notified of any events throughout the day. The Good Morning application will do this in the following ways:

- Access upcoming events from Google Calendar and display via Good Morning User Interface
- Ensure that daily events (holidays, birthdays etc.) are interpreted correctly and separately from appointments or scheduled events
- Summarize events in chronological order
- Ensure to notify user of importance of impending events approaching (ex. User wakes up at 7:30am, and has a scheduled event happening within an hour of wake up)
- If implemented with expanded feature speech synthesis, Good Morning should be able to accurately and efficiently convey upcoming events to users without having to be read

Speech Synthesis

The Good Morning application will synthesize the notifications specified by the user to speech output. This output will be read to the user once their alarm has been dismissed, updating them with information useful to their day.

- Uses Google TextToSpeech functionality
- Uses Core Alarm and Settings to know when to activate
- Reads configured notifications and information using phone speakers or connected device

Expanded System

The expanded system includes features that enhance the user experience. These features may potentially be included, but are not guaranteed to be finished for the release product.

LIFX Smart Lights

- Uses LIFX Developer API
- Uses Core Alarm and Settings to know when to activate
- Sends commands to the lights to dim, brighten, change color, or turn on and off

Music Wakeup

- Extension of Core Alarm app
- Uses phone speakers or connected device to play sound
- User may specify what music will wake them up instead of a typical alarm
- User may choose to have the music gradually increase in volume

Machine Learning

- Uses custom algorithms
- Learns when the user wakes up, and their typical daily schedule
- Uses knowledge of the user to set dynamic alarms
- Reminds them of things that they may have forgotten that they
- Use of additional devices such as smart watches (accelerometers specifically) to track wake ups during REM sleep patterns

Relationship between Features

The diagram below demonstrates how the extended functionality would be incorporated with the minimal functionality. In this case, Good Morning may be considered as either the proprietary core alarm, or the core alarm using Google Clock.

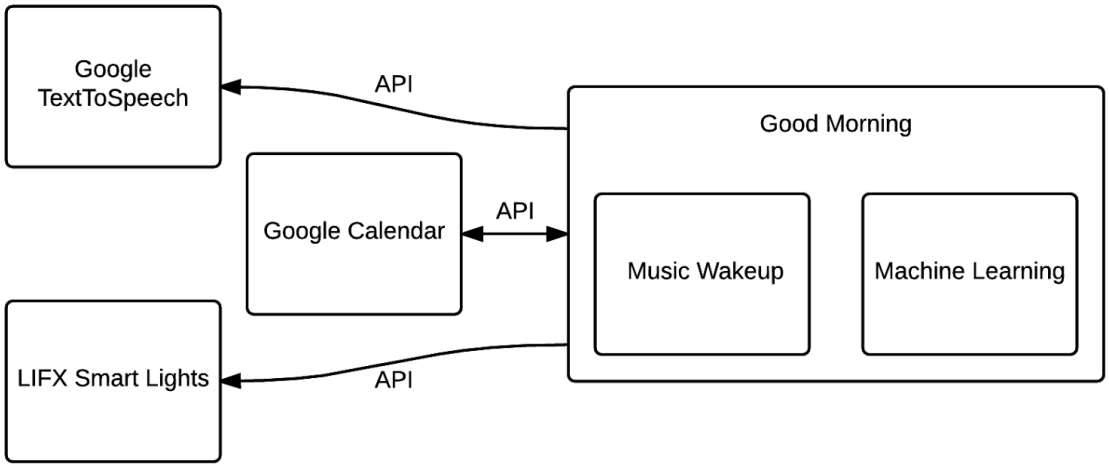

Figure 8: Expanded System Relationship with Core Alarm

Team Planning

Team Member	Team Role	Development Responsibilities
Luke McLaren	Web Master	System Architect
Adam Kroon	Project Lead	Integrations
Rahat Mahbub	Toolsmith	User Interface
Graeme Bates	Documentation Expert	Integrations