

B101.5 Alexa Skill App Project Plan Document



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1. Introduction

1.1. Purpose

The client, Chuck Archer, has identified a need to diversify the means in which the B101.5 and NewsTalk1230 audiences engage the radio stations' content. The client has asked us to create 'Alexa Skills' which can be implemented into the Amazon Alexa application. These skills allow the end user to listen to the client's radio stations' live streaming content.

This document will contain an overview of the project, client information, user characteristics, project functions, functional/Non-functional requirements, non-requirements, assumptions, project scheduling and various appendices. This document will serve as a record for aspects of the project that will be useful for the implementation team and the client.

1.2. Scope

The client is Chuck Archer, the Operations Manager (or Brand Manager) at WBQB and WFVA radio stations. The client has asked us to create 'Alexa Skills' which can be implemented into the Amazon Alexa application. These skills allow the end user to speak in a natural language with the Alexa A.I. in order to automate routine functions, such as tuning to a radio station's live streaming content. This will allow anyone to download the skill to their personal Alexa device and begin listening to the client's content immediately.

1.3. References

Generic overview of Amazon Alexa Skill development - <https://developer.amazon.com/alexa>

1.4. Overview

The document is divided into six sections: Introduction (1), Project Description (2), Project Schedule (3), and Appendix (4).

The introduction section covers the main purpose of the document, the scope of the project including introducing the client and end users, references to outside material, and document overview.

The Project Description section discusses background information about the project including detailed overview of the system, definition of the client and end users, product functions and use cases.

The Project Schedule section details the implementation approach, and includes a task list of milestones and deliverables. Each milestone also has a justified schedule estimate, and a Gantt chart is included for an additional scheduling overview.

The Appendix includes a glossary containing any terms used in the document, information about the authors, and links to any additional information/ documents.

2. Project Description

This section contains all of the specific requirements of the system, such as a detailed overview of the system, definition of the client and end users, product functions and use cases.

2.1. System overview

Alexa skills are similar to apps. The end user can enable and disable skills by using the Alexa app or a web browser. In the same way the user can install and uninstall apps on their smartphone or tablet. Skills are **voice-driven** Alexa capabilities. The end user can add Alexa skills to their home assistant, phone, etc. to accomplish tasks specific to the particular Alexa Skill. For example, the user could simply say, "Alexa, play B101.5." Alexa would then begin playing the live radio station B101.5. Since, Alexa is always on and listening, users can invoke the skill whenever they wish as long as Alexa can hear them.

2.2. Client characteristics

The client for this project is Chuck Archer, the Operations Manager (or Brand Manager) at WBQB and WFVA radio stations. He researches new

media and helps put together radio playlists as well as maintain their equipment. He has dabbled with creating an Alexa Skill before but, hasn't been able to fully implement it due to lack of coding experience. He is looking for a team with knowledge of the subject and a willingness to learn new things.

2.3. User characteristics

The intended end users for this project will be the general public. Anyone with access to an Alexa device and the internet will be able to access the skill thus, the voice commands will need to be user friendly and intuitive. The users of the skill will expect a certain responsiveness and will value simplicity.

2.4. Functional requirements

ID: FR1

TITLE: Develop B101.5 Alexa Skill

DESC: An end user should be able to speak in a natural language to the Amazon Alexa App. The app should instantly begin streaming content from B101.5.

RAT: To allow the end user to begin streaming radio content with the Alexa Skill.

DEP: This requirement is dependent on the reservation and approval of the phonetic Alexa Skill, 'B101.5' registered with Amazon. The client will ensure the Alexa Skill is active.

Deliverable: The implementation team shall deliver to the client working source code which will run the 'B101.5' Alexa Skill.

Resources: The client shall provide the implementation team with the source URL from WideOrbit in order to stream content from B101.5, and access to the client's Amazon Development environment.

ID: FR2

TITLE: Develop NewsTalk 1230 Alexa Skill

DESC: An end user should be able to speak in a natural language to the Amazon Alexa App. The app should instantly begin streaming content from NewsTalk 1230.

RAT: To allow the user to begin streaming radio content with the Alexa Skill.

DEP: This requirement is dependent on the reservation and approval of the phonetic Alexa Skill, 'NewsTalk 1230' registered with Amazon. The client will ensure the Alexa Skill is active.

Deliverable: The implementation team shall deliver to the client working source code which will run the 'NewsTalk 1230' Alexa Skill.

Resources: The client shall provide the implementation team with the source URL from WideOrbit in order to stream content from NewsTalk 1230, and access to the client's Amazon Development environment.

ID: FR3

TITLE: Develop PodCast Alexa Skill

DESC: An end user should be able to speak in a natural language to the Amazon Alexa App. The app should instantly begin streaming content from a podcast named by the user via RSS feeds.

RAT: To allow the user to begin streaming podcast content with the Alexa Skill.

DEP: None.

Deliverable: The implementation team shall deliver to the client working source code which will play podcasts via the Alexa Skill.

Resources: The client shall provide the implementation team with the source URL from WideOrbit in order to stream content from various podcasts, and access to the client's Amazon Development environment.

2.5. General constraints

ID: NFR1

TITLE: Provide Heavily Documented and Readable Code

DESC: The client wishes to add additional features, maintain, and ultimately understand the implementation team's deliverable source code. Therefore, the source code shall be heavily documented and commented so that it clearly communicates its purpose and intent to personnel who do not

possess a computer science, information technology, or otherwise 'coding' background.

RAT: To allow the client to manage and maintain the source code post production.

DEP: FR1, FR2, FR3.

Deliverable: The implementation team shall deliver to the client working source code for FR1, FR2, and FR3 that meets the documentation standards for the coding languages used, with additional comments where necessary. This documentation shall be included with the source code itself, opposed to an external reference.

Resources: None.

ID: NR2

TITLE: Running on Different Software Architecture

Deliverable: The implementation team will not need to develop the software to compile or run on a different software interface.

RAT: The skill will run only through Alexa hardware thus, it is not necessary to develop it to work with alternate applications.

ID: NR3

TITLE: Creating/ Configuring a Verbal Interface

Deliverable: The implementation team will not need to develop a verbal interface.

3. Project Schedule

3.1. Approach

The development approach consists of five general phases. The first phase is acquiring access to the Amazon Developer Console and AWS account. This phase will be completed by discussing credential details with the client and securely passing it along to each member of the implementation team. Once the implementation team has access to the development environment, the next phase is configuring it.

The second phase is setting up the development environment. This includes, but is not limited to, setting up version control and an online task board. Version control will be setup using a private GitLab repository. An online task board will be created using Trello, an online web service. Other additional points of interest will be configured as they reveal themselves. Once the development environment is deemed satisfactory by the implementation team, the next phase can begin.

The third phase marks the beginning of implementation; the primary goal is to define the intents and utterances for each skill. These will be identified by the requirements detailed in Section 2.4. Once the intents and utterances have been implemented, the only remaining function to implement is the Lambda function for each skill.

The fourth phase is implementing these (Lambda) functions. The functionality detailed in Section 2.4 will be implemented within these functions. Notably, the Lambda functions will be responsible for opening the stream links requested by the user. These links may resolve to the FM radio, AM radio, or any of the station's podcasts. Once this phase is complete, the requirements have been met.

The fifth phase is testing the final product. In theory, all implementation prior to this phase should result in a product that meets requirements. However, it is still important to test the final product to ensure this is actually the case. Once this phase is complete, the product can be delivered in confidence for public use.

3.2. Milestones and deliverables

The milestones for the alexa skill are as follows:

Project plan document completion, Preliminary development environment access, defining intents and utterances for the FM skill, defining intents and utterances for the AM skill, implementing the audio streaming feature for the FM skill, implementing the audio streaming feature for the AM skill, implementing the podcast feature to both skills, and publishing the skills.

Developer environment access includes:

- connecting to the client's Amazon Developer Console and Amazon Web Services account, setting up all group members on

a version control system (GitLab), and making sure each group member has the Alexa Skill Kit installed on their development machines.

Defining intents and utterances for both the FM and AM skill involves:

Using the Amazon Alexa Interaction Model tool to define different intents and Defining sample utterances for each intent that ensures Alexa understands what command is going to be used to activate which feature/intent.

Implementing the Audio playback for both skills involves:

Defining the Lambda function in AWS to fulfill the “play” intent by - linking the Alexa skill to the Lambda function, passing the appropriate streaming link to the Amazon Skills Kit, and ensuring that Alexa properly plays the correct stream. This milestone requires the use of the Alexa Test Simulator.

Implementing the podcast feature includes:

Defining the intent within the lambda function to fulfill the play podcast intent. Determining which streaming link to send to the Alexa Skills kit, Sending the streaming link, and ensuring Alexa properly plays the correct podcast. Once again this milestone requires the use of the Alexa Test Simulator.

Publishing the skills include:

Ensuring that all previous milestones have been met, and Filling out the Publishing Information Page in the Amazon Developer Console. This Page requires information such as, Testing instructions, Skill Description, Example Phrases, Search Keywords, and large and small Image Icons. The skills should be sent to Chuck as a Beta Test before being published. This milestone is not complete until Chuck approves it, and Amazon publishes it.

3.3. Work breakdown structure

Completing the Project Plan Document must be complete before moving onto actual implementation; thus, it will be complete no later than

02/26/2018. The Project Plan Document is the culmination of API Research and Requirements Verification, so those naturally would be completed before the document is complete.

Preliminary Development Access is necessary for implementation. As such, it must be complete by 02/27/2018 (the date which project planning is over). This milestone will be completed during the Project Planning phase.

Defining intents and utterances for the FM and AM skills is the first portion of implementation. Once development has begun on this milestone, project planning has been far completed. Thus, defining these features should be completed by 03/01/2018, two days after the implementation phase begins. This will allow further implementation to continue.

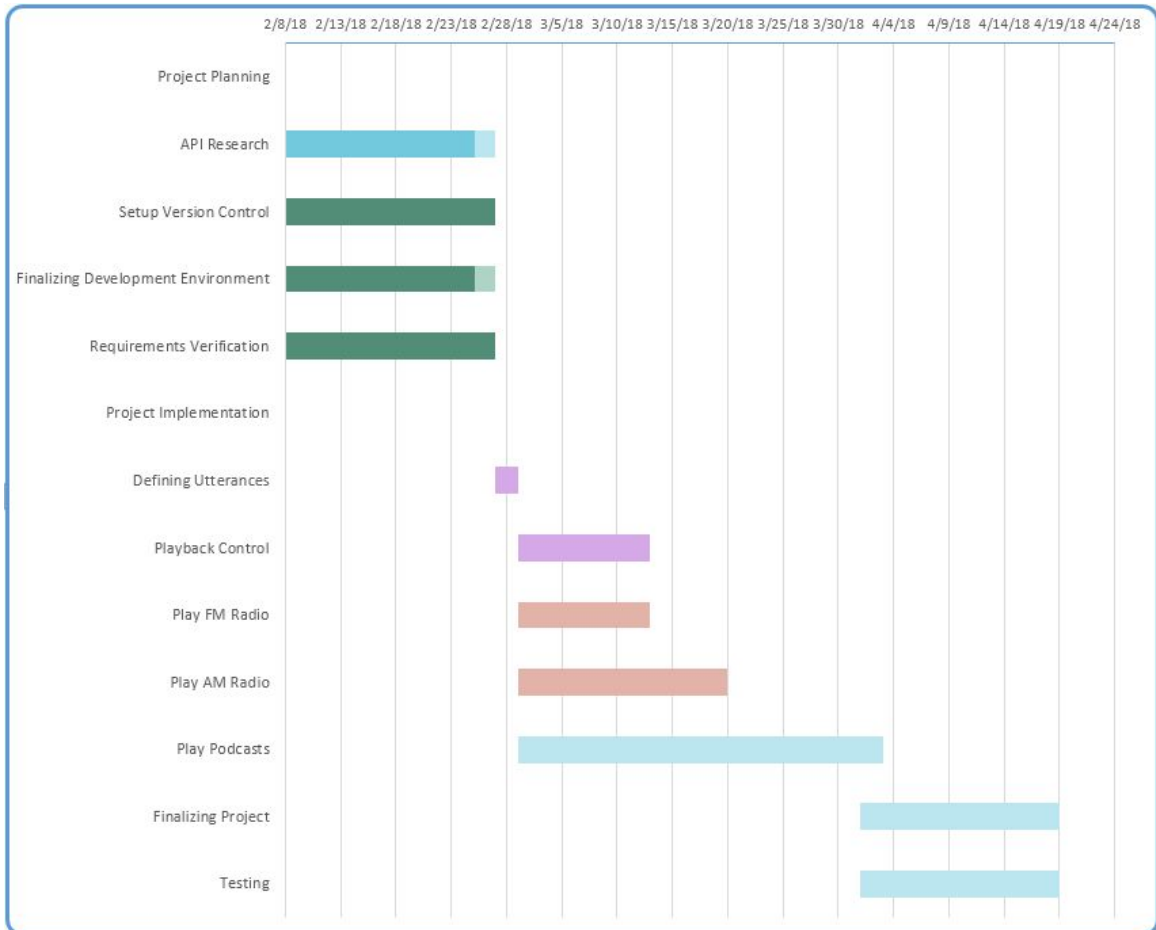
Implementing audio streaming for the FM skill is the primary feature of the project; thus, it will require the most time. This milestone is scheduled to be complete by 03/13/2018, two weeks after the implementation phase begins.

Once audio streaming for the FM skill has been completed, the AM skill capability will follow suit. It is projected that this process will be similar to implementing the FM skill capability, and will take less time. Thus, this milestone should be complete by 03/20/2018, one week after the FM skill capability is complete.

Implementing podcasts comes after the primary functionality. The remaining two weeks will be dedicated toward implementing the podcast streaming functionality for both the FM and AM skills. This milestone is scheduled to be complete by 04/03/2018, two weeks after the FM and AM skills have been completed.

The remaining two weeks will be dedicated toward polishing the existing implementation and publishing the skills. This milestone will be complete by 04/19/2018.

3.4. Gantt chart



| Task Name | Start Date | End Date | Duration (Days) | Days Complete | Days Remaining | Percent Complete |
|------------------------------------|------------|-----------|-----------------|---------------|----------------|------------------|
| Project Planning | | | | | | |
| API Research | 2/8/2018 | 2/27/2018 | 19 | 17.10 | 1.90 | 90% |
| Setup Version Control | 2/8/2018 | 2/27/2018 | 19 | 19.00 | 0.00 | 100% |
| Finalizing Development Environment | 2/8/2018 | 2/27/2018 | 19 | 17.10 | 1.90 | 90% |
| Requirements Verification | 2/8/2018 | 2/27/2018 | 19 | 19.00 | 0.00 | 100% |
| Project Implementation | | | | | | |
| Defining Utterances | 2/27/2018 | 3/1/2018 | 2 | 0.00 | 2.00 | 0% |
| Playback Control | 3/1/2018 | 3/13/2018 | 12 | 0.00 | 12.00 | 0% |
| Play FM Radio | 3/1/2018 | 3/13/2018 | 12 | 0.00 | 12.00 | 0% |
| Play AM Radio | 3/1/2018 | 3/20/2018 | 19 | 0.00 | 19.00 | 0% |
| Play Podcasts | 3/1/2018 | 4/3/2018 | 33 | 0.00 | 33.00 | 0% |
| Finalizing Project | 4/1/2018 | 4/19/2018 | 18 | 0.00 | 18.00 | 0% |
| Testing | 4/1/2018 | 4/19/2018 | 18 | 0.00 | 18.00 | 0% |

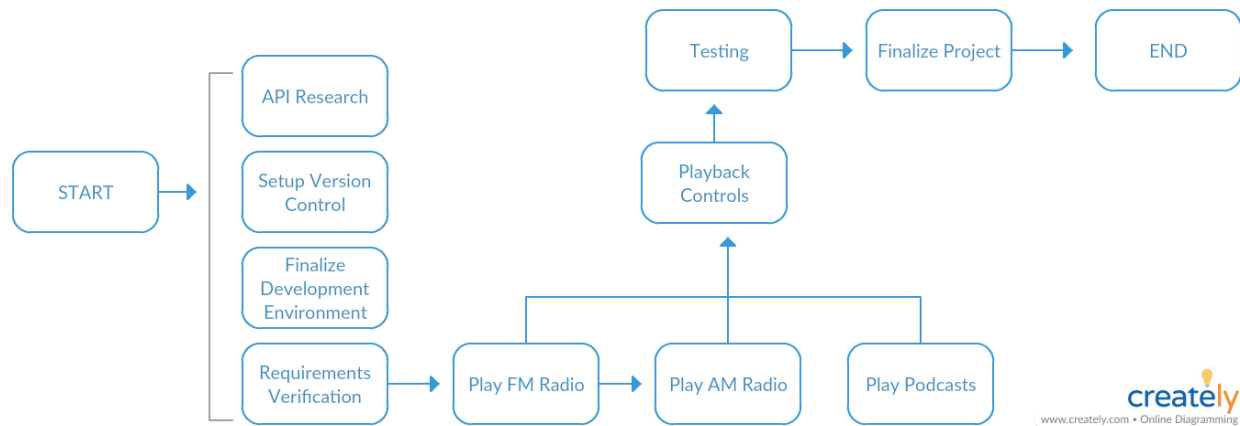
The Gantt chart expresses our intended schedule into two sections: project planning and project implementation. The **Project Planning** header holds four tasks:

1. API Research
 - Preliminary Research; figuring out what kinds of things already exist that the team can utilize.
2. Setup Version Control
 - Setting up a private repository using GitLab and ensuring access to all implementation team members.
3. Finalizing Development Environment
 - Obtaining credentials to AWS and the Amazon Developer Console.
4. Requirements Verification
 - Touching base with the client and ensuring the team and client are on the same page.

The **Project Implementation** header holds the seven remaining tasks:

1. Defining Utterances
 - Defining what the user will say to invoke the features of the product.
2. Playback Control
 - Implementing the ability for the user to navigate through podcasts and stop or start playback for any content.
3. Play FM Radio
 - Implementing the ability for the user to stream B101.5 FM radio.
4. Play AM Radio
 - Implementing the ability for the user to stream NewsTalk 1230 AM radio.
5. Play Podcasts
 - Implementing the ability for the user to play any episode of a selection of podcasts from either skill.
6. Finalizing Project
 - Completing final touch-ups and working with client to demonstrate progress made.
7. Testing
 - Working with the client to ensure that the requirements set forth have been sufficiently met.

3.5. Task dependency diagram



| Task Number | Task | Effort (Person Hours) | Duration (Hours) | Dependencies |
|-------------|----------------------------------|-----------------------|------------------|--------------|
| T1 | API Research | 5 | 5 | - |
| T2 | Setup Version Control | 2 | 2 | - |
| T3 | Finalize Development Environment | 4 | 4 | - |
| T4 | Requirements Verification | 2 | 1 | - |
| T5 | Play FM Radio | 5 | 10 | T4 |
| T6 | Play AM Radio | 5 | 10 | T5 |
| T7 | Play Podcasts | 20 | 20 | - |
| T8 | Playback Controls | 10 | 10 | T5, T6, T7 |
| T9 | Testing | 10 | 10 | T1 - T8 |
| T10 | Finalize Project | 5 | 5 | T9 |

Each task is indicative of some feature required to proceed further toward the goal of a finished, complete product. The task of Playing FM Radio is dependent upon the previous four tasks (T1-T4) being complete. If they are not, completing the task would prove difficult as development would be unorganized and hard to follow.

Due to the similar nature of the Play AM Radio task, it is dependent upon first completing the Play FM Radio task. The only real difference in these tasks is the streaming link to use; the underlying logic is essentially the same.

Across FM, AM, and Podcast Playback, controls must exist to pause, play, skip, or otherwise navigate through the content. The Playback Controls task is dependent on these features existing in order to supplement their usability.

The Testing and Finalize Project tasks obviously require the project requirements to be satisfied, so they are dependent on Tasks T1-T8.

4. Appendix

4.1. Glossary

WBQB - B101.5 Radio Station.

WFVA - NewsTalk 1230 Radio Station.

Alexa - is an intelligent personal assistant developed by Amazon, capable of voice interaction, music playback, making to-do lists, setting alarms, streaming podcasts, playing audiobooks, and providing weather, traffic, and other real-time information, such as news.

Alexa Skill - An application which runs on the Amazon Alexa platform which allows a user to invoke various functionalities with a voice command. Alexa skills can be enabled or disabled by the user in the same way that applications can be installed and uninstalled on a smart-phone. Alexa skills can be viewed and managed on the companion app 'Amazon Alexa' which can be downloaded to the user's phone.

AWS - Amazon Web Services

DESC - Description.

RAT - Rationale.

DEP - Dependency.

Churn - the annual rate, measured as a percentage, at which customers stop subscribing to a service.

Heavily Documented and Readable Code - refers to source code that has been written in a way that clearly communicates a variable or return parameters purpose; a method or API call's intent; and the overall logic behind the use of a module, class, function definition. In short, the code should be easily read and understood by others.

4.2. Author information

Ryan Harris authored Section 1, described Section 3's approach, and performed final formatting adjustments.

Ryan Johnson co-authored Section 2 with Jeffrey Wallhermfechtel, designed Section 3's Gantt chart, and described Section 3.4.

Michael Timpson authored Section 3's work breakdown structure, designed task dependency diagram, and updated Section 4.

Jeffrey Wallhermfechtel co-authored Section 2 with Ryan Johnson, described Section 3's milestones and deliverables, and added the interactive index.

4.3. Additional documents

Generic overview of Amazon Alexa Skill development -

<https://developer.amazon.com/alexa>

Alexa Skill Tutorial -

<https://developer.amazon.com/alexa-skills-kit/tutorials/fact-skill-1>