



Software Requirements Specification

for

LA County, Hall of Administration Smart Directory

Version 1.1 approved

**Prepared by Matthew Gerlits, Julius Macalutas, Christopher Ly, Jose Vega,
Chelle Cruz, Cedric Tong**

La County Hall of Administration

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Revision History

Name	Date	Reason For Changes	Version
	12/5/17	Received new information	1.1

1. Introduction

This document will introduce the purpose, intended audience, product scope, definitions and acronyms, a description of the project, requirements, how it works, non-functional requirements and other requirements.

Abstract

The goal of the Hall of Administration Smart Directory (HASD) is to provide a user-friendly interface and showcase of the various rooms and departments of the floor inside the building to people who visit. By creating a web application (ASP.NET Core 2.0) and displaying it through the Industry Weapon software, which is the digital signage brand, various modules such as a map, menus, and search and result box are displayed all in one screen. Data such as employee names, rooms, room numbers will be gathered from a database and handled in the web application. An Amazon Alexa will also be deployed alongside the smart board. Other features may include voice recognition for searching.

1.1 Purpose

The purpose of this document is to demonstrate that different levels of the software. We will cover the few of the functionalities from the technical requirements as well as the not technical requirements. The smart board will have a variety of functionalities like: displaying a map to your “destination, displaying the best information you have requested, and displaying other important information like local events or the current weather. This document will deviate all the technical implementation of all software.

The Amazon Alexa Skill will provide a voice assisted directory experience, similar to the smart board itself. The user can ask for a specific service and the skill will give the location of the service.

1.2 Intended Audience and Reading Suggestions

This SRS will contain the overall scope of the project, external requirements, how it works, non functional requirements, and other requirements.

The overall scope will cover in detail what the project is about, the functions, what users will be using the product, the operating environment, user documentation, assumptions and dependencies.

The external requirements section will cover in detail about the user interface, hardware interface, software interface, and communication interface.

The requirements specifications will cover all the necessary software requirements with enough detail. The functional requirements, external interface requirements, logical database requirements, and design constraints are also listed.

The non-functional requirements will cover in detail the performance, safety, and security requirements.

The other requirement section will cover in detail the requirements that was not listed under a section within the SRS.

1.3 Product Scope

This software will be able to direct constituents to their needed location through an interactive smart board. In addition, there is a voice navigation system where the user will be able to speak to the smart board to get what they need.

This software will not be able to access private information.

Once released, the LA County Hall of Administration will use this software to provide a smart directory for their constituents. The software will include Interactive directories that assists the public to find services like meeting times, new events, lunch menus, and various events and activities happening within the building and County

1.4 Definitions, Acronyms, and Abbreviations

Alexa Skill - Voice-driven applications that run on any Alexa powered device, such as the Amazon Echo or the Echo Dot

Amazon Web Services Lambda (AWS Lambda) - Event-driven computing cloud service from Amazon Web Services that allows developers to provision resources for a programming function on a pay-per-use basis without having to be concerned about what Amazon storage or compute resources will support it.

Alexa Skills Kit (ASK) - A collection of self-service APIs, tools, documentation, and code samples that makes it fast and easy for you to add skills to Alexa. ASK enables designers, developers, and brands to build engaging skills and reach customers through tens of millions of Alexa-enabled devices.

Microsoft Azure - Cloud computing service created by Microsoft for building, testing, deploying, and managing applications and services through a global network of Microsoft-managed data centers.

Azure Cognitive Services - A cluster of self-service APIs using intelligent algorithms to see, hear, speak, understand and interpret the user needs through natural methods of communication.

Bing Speech API - The API can be directed to turn on and recognize audio coming from the microphone in real-time, recognize audio coming from a different real-time audio source, or to recognize audio from within a file. In all cases, real-time streaming is available, so as the audio is being sent to the server, partial recognition results are also being returned as a JSON format.

- ADA - Americans with Disabilities Act
- API - Application Programming Interface
- AI - Artificial Intelligences
- ASK - Alexa Skills Kit
- AWS - Amazon Web Services
- HASD - Hall of Administration Smart Directory
- I/O - Input/output
- GUI - Graphical User Interface
- LA - Los Angeles
- JSON - JavaScript Object Notation

1.5 References

- Azure Cognitive API Services
- Alexa Skills Kit
- LA County Websites
- Unity Engine

2. Overall Description

The Hall of Administration has requested that software be developed for the smart board's that will be replacing their currently out-dated directories. The software will provide a GUI that users can interact with in order to assist them with task such as finding an office, or looking at a list of daily events. The software will be displayed on smart screens at main entrances of several floors of the Hall of Administration building.

They have also requested an Amazon Alexa Skill be developed alongside the smart board, which will also assist with the replacement of their current out-dated directories. This will function similarly to the smart board. It will provide location of the services requested, weather, and will also be displayed alongside the smart board.

2.1 Product Perspective

This software will be standalone, built on a Windows 8/8.1/10 system, and will function using touch screen functionality. The software will need to interact with Active Directory. The software will have a Unity tie in. At this point, no other pieces of software have been used for reference or inspiration.

In addition, the Amazon Alexa Skill will be deployed alongside the smart board. It will be voice activated with the same features the smart board itself will have, but primarily voice based. In combination with the Alexa Skills, there will be a feature on the smart board which will enable the Microsoft Service Being Speech API voice recognition. This voice recognition will translate the input audio to text, which will be used without background processes to invoke commands and pass information of the database.

2.2 Product Functions

The software will need to perform the following functions:

- Provide a map for users to view
- Provide directions on the map to queried locations
- Display schedules of daily activities
- Display information in an advertising format
- Schedule times and dates in which information will be displayed
- Text to speech
- Speech to text

- Provide templates that can be updated with new information
- Provide a portal for tenants to manage database

2.3 User Classes and Characteristics

Constituent: The average user who will be using software. They will be using the software on a non technical level to query and view information.

Tenant: The users that work in the building

Administrator: The user who monitors and updates the data displayed on the smart boards. They will be in charge of making sure the software is functioning properly.

2.4 Operating Environment

The software will exist on a Windows 10 machine. Our software will be using components from Microsoft Azure and Unity, and will need to coexist with active directory.

The Amazon Alexa Skill will exist on the Alexa Skills Kit hosted on their Lambda functions.

The Microsoft Bing Speech API will handle speech data on the Microsoft's servers and the endpoint for the API will be embedded in our software.

2.5 Design and Implementation Constraints

Our only implementation constraint will be that it must be ADA compliant.

2.6 User Documentation

No User documentation exist at this time.

2.7 Assumptions and Dependencies

The voice command requirement is dependent on the noise level of the environments, and quality of the mic controls. If the rooms the smart boards are placed in are too noisy, the voice

recognition will suffer severe accuracy loss. Multiple users interacting with the Microsoft speech API at the same time will provide inaccurate results. Background noise as well will cause inaccurate detections resulting in inaccurate results. The Amazon Alexa Skill will also suffer accuracy loss if it is placed into a noisy room.

2.8 Apportioning of Requirements

Voice commands on the smart boards could potentially be delayed due to time constraints.

3. External Interface Requirements

3.1 User Interfaces

The UI shall consist of a map of the building which will be the main component, a directory displaying room numbers and names (displayed on right), including utilities such as time and weather. Each section (map, directory, events, etc.) may be clicked to display full screen instead of main directory page. (This is how the application will navigate.) Also, other features and information such as events, menus, ads, and feeds may be included depending on liaison's request. A search input will be included as a module that will display search results as a list based on the user's request.

This will be compliant with ADA standards.

The UI will be created as a web page. It will be designed using several front end frameworks such as Bootstrap CSS and React. Templates gathered online are used as references and could be used as a starting point to creating the actual layout of the directory.

The interface will be a general layout for all departments/floors. Content and information can be dynamically displayed by gathering data from the database, so that each floor will have unique content but a similar layout.

3.2 Hardware Interfaces

HASD will require Industry Weapon Digital Signage for displaying directory UI. The smart screen will run on at least Windows 10. Additional devices may include microphone. The UI's main colors will be black, gray, and blue, in compliance with the LA County website.

The Amazon Alexa Skill will require any Alexa powered device to work along with a stable, wireless internet connection.

The Microsoft Cloud Services will require an internet connection in order to communicate with the Microsoft cloud servers.

3.3 Software Interfaces

ASP.NET Core 2.0

Alexa Skills Kit

Azure Cognitive Services: SpeakerRecognitionAPI, SpeechToTextAPI

Microsoft SQL Server

Unity: PathFinderAPI

3.4 Communications Interfaces

HASD shall be run on a web browser since it is a web application.

Amazon Alexa Skill shall be ran on any Alexa powered device.

Bing Speech API shall be run in any platform with a microphone available or a audio stream device.

4. Requirements Specification

4.1 Functional Requirements

Requirements Related to Design Module 4.1: Main Directory Page (MDP)	
Requirement No.	Requirement Description
4.1.1	The MDP shall display directory of rooms and departments.
4.1.2	The MDP shall display a map of the building.
4.1.3	The MDP shall display utilities such as weather and time.
4.1.4	
	2.2.1 Map Submodule (MM)
4.1.5	The MM shall display a 3d representation of a floor.
4.1.6	The MM shall create a path depending on the room destination.
4.1.7	The MM shall.
4.1.8	The MM shall retrieve updated map and enemy boundaries from GLM.
4.1.9	The MM shall send updated information to GIM.
4.1.10	The MM shall classify locations according to categories defined by the HOA
	2.2.2 Events Submodule (EM)
4.1.11	The EM shall receive updated information from the PM.
4.1.12	The EM shall receive game information from the GMM.
4.1.13	The EM shall send game information to the GPM to be processed.
4.1.14	The EM shall send game information to the APM to be processed.
4.1.15	The EM shall store user progress within the current game.
4.1.16	The EM shall send user progress to SQM upon request.
	2.2.3 Directory Submodule (DM)
4.1.17	The DM shall create a compressed data file that stores the current game information.
4.1.18	The DM shall send the compressed data file to the GMM to be stored in the save/load database.
4.1.19	The DM shall manage the database through a portal.
	2.2.4 Utilities Submodule (UM)
4.1.20	The UM shall be displayed on upper-right side on navigation bar.
4.1.21	The UM shall include time.
4.1.22	The UM shall include weather.
4.1.23	The UM shall include list of rooms most searched.
4.1.24	The UM shall include FAQ section.
	2.2.5 Most Popular Searches Submodule (MPSM)
4.1.25	The MPSM shall display the most popular searches of users.

	2.2.6 SQL Database Submodule (SQL)
4.1.26	The SQL shall store tables containing information about the floor/department.
	2.2.7 Alexa Skills Module (ASM)
4.1.27	The ASM shall contain intents that are commonly asked in regards to using other submodules.
	2.2.8 Path Finding Module (PFM)
4.1.28	The PFM shall display a path from the directory's location to the destination based on the user's search request.
	2.2.9 Search Module (SM)
4.1.29	The SM shall display results in a vertical pane depending on user request.
4.1.30	The SM shall include a search input for user in order to get search results.
	2.2.10 Bing Speech Module (BSM)
4.1.31	The BSM shall detect the speech and make the API call.
4.1.32	The BSM shall handle the text received by the API and distribute the text to the corresponding submodules.

4.2 External Interface Requirements

Input shall be received from users who click on various areas of the screen. Input can also be received by text (or speech, if possible). Output will be displayed depending on what the user searches and/or clicks. The content of map and search results will be updated depending on user input.

4.3 Logical Database Requirements

- Possible data entities:
- Room Number
- Room Description
- Employee Name
- Department
- Event Name
- Event Date
- For Map: nodes and edges can represent various rooms and paths of the floor (graph)
- Room Category

4.4 Design Constraints

Interface must be short enough for people with disabilities to reach parts of the screen with little/no effort in compliance with ADA standards. Interface must also fit dimensions of screen width and height.

Application must be able to run within or alongside Industry Weapon's software.

5. Other Nonfunctional Requirements

5.1 Performance Requirements

Numerical / statistical requirements imposed on the software such as:

- The number of terminals to be supported is still being finalized with the Liaison
- There may be one or more user(s) will be using the smart board at one time
- The information being displayed will be the location, department, office and the name based on the inputs of the user

The number of transactions of tasks is based on the user. It depends on if the user knows what he/she is looking. There can be a possibility of a large number of transactions if the user does not know what to look for. During peak times, the number of tasks will be greater than normal workload conditions.

5.2 Safety Requirements

The smart board shall be compliant to all of the ADA complaints.

5.3 Security Requirements

The software shall be resistant against to SQL injections as well as compliant to LA County Hall of Administration network security. The public should only be able to view public information when using the smart board.

Tenants should only be able to access their own database data when using the Directory Management Portal.

5.4 Software Quality Attributes

The database can be dynamically changed when needed. Users of the smart board are allowed to view specific attributes from the database. The smart board shall be voice activated if need be. The device shall be user friendly via touch screen, but not limited to other i/o devices. The smart board is compatible with multiple languages.

5.5 Business Rules

The smart board shall display advertisements dynamically that sponsored by the LA County. The smart board shall display a live stream of the Hall of Administration meetings for the public.

6. Other Requirements

At this time, there is no other requirements.

Appendix A: Glossary

Appendix B: Analysis Models

Appendix C: To Be Determined List