

# CS Capstone Design

## Technical Demo Grading Sheet (100 pts)

### TEAM: **Biosphere**

**Overview:** The main purpose of the “Technical Demos” is to very clearly communicate the extent to which the team has identified key challenges in the project, and has proven solutions to those challenges. Grading is based on how complete/accurate the list of challenges is, , and how convincingly and completely the given demos cover the given challenges.

This template is fleshed out by the team, approved by CS mentor, and brought to demo as a grading sheet.

### Risky technical challenges

Based on our requirements acquisition work and current understanding of the problem and envisioned solution, the following are the key technical challenges that we will need to overcome in implementing our solution:

**C1: AWS S3:** It was determined that AWS’s S3 would be the most reliable solution for holding the data associated with this project. However, this was determined based off of prior experience, and reviews by other developers. In order to confirm the claims that were made in the technical feasibility document the team must have hands on experience with AWS S3.

**C2: Ionic:** In the past couple of client meetings, the team has been asked questions about certain features relating to the ionic framework; the team was unable to answer most of the questions due to the lack of experience. This unfamiliarity with such a crucial technology, could cause unpredictable issues during the development process. In order to curb those possible issues, the team will explore basic features and components of the selected framework / SDK.

**C3: Ionic & GPS Access:** Given that Ionic is not a native approach to mobile application development, it is unclear as to which physical components Ionic has access too. Literature suggests that there are no significant differences between native and PWA development in terms of ionic vs. Swift/Java. This will be addressed in Demonstration#1 in which the team will create a single-page application and attempt to gain access to a simulated device’s GPS location.

**C4: Ionic & AWS:** While documentation exists indicating that AWS and Ionic SDK are compatible, the team has not explored the extent as to how compatible they are. This is a concern because Ionic and AWS function as the primary technologies to work as the front-end and back-end, respectively.

**C5: Javascript Graphs:** A crucial feature of this project involves creating graphs and tables from data, in order to ensure this capability the team will create graphs from data using ionic and javascript. This will solidify the belief that graphs and tables can be generated in Javascript.

**C6: AWS IAMs & Security:** Since the team has claimed that “security will be at the forefront” of development, it was determined that AWS components will be managed with *IAM roles* that are pseudo user accounts that aim to limit access to specific instances and privileges. In order to demonstrate the feasibility of this concept, the team will configure an API Gateway, Lambda, and S3 IAM account in order to limit and allow their interactions with each other.

**C7: AWS API Gateway & Lambda Interaction:** Documentation suggests that Ionic is compatible with AWS via an API gateway, as such an API gateway must be tested for compatibility with AWS Lambda; While they are both technologies under the same domain, due to the lack of hands on experience, the team cannot rightly claim that they are in fact compatible. This will be tested in Demonstration #2 in which the team will create a simple python script that interacts with API Gateway and Lambda function.

**C8: Lambda & S3 Access:** While some members of the team have access with AWS technologies, the team has no experience with fetching data from a serverless function. This will be demonstrated in Demonstration #2 in which the team will fetch and interpret a simple file from S3 using Lambda.

### **Challenges covered by demos:**

In this section, we outline the demonstrations we have prepared, and exactly which of the challenge(s) each one of them proves a solution to.

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#### **Demonstration 1: AWS S3: Manual and Automated Methods**

Challenges addressed: **C1, C6**

##### Flight Plan

1. The team will walk the client and mentor through accessing AWS S3 through the AWS console.
2. The team will demonstrate the ability to both push and pull data using the AWS console.
3. In order to demonstrate the ability to automate this process, the team will demonstrate three primary actions associated with AWS S3: list bucket contents, push a file to the bucket, and pull a file from a bucket.
4. This demonstration will be done using a Jupyter Notebook to easily document and demonstrate the examples.

##### Evaluation:

- ✓ Convincingly demonstrated each of listed challenges?
- ✓ Other evaluative comments:

\*Demonstration #3 will build off of demonstration #2

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## Demonstration 2: 'hello Ionic'

Challenges addressed: C2

### Flight Plan

1. In order to demonstrate the basic abilities of Ionic, the team will create a hello-world application.
2. This application will demonstrate the ability to have a single code base and visualizations on an iOS device, android device, and a web browser.
3. In order to demonstrate the ability to be run on an iOS and android device, the team will be using simulators present in Apple's XCode environment and VSCode's android based environment.

### Evaluation:

- ✓ Convincingly demonstrated each of listed challenges?
- ✓ Other evaluative comments:

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## Demonstration 3: Ionic: Where am I?\*

Challenges addressed: C3

### Flight Plan

4. The team will have an interactive component (either a map or a button) which will allow the user to choose "use my GPS".
5. When this component is selected, a confirmation message will appear. This confirmation will clearly indicate that the user's GPS has been accurately accessed.
6. In order to demonstrate that this is working correctly the GPS location will be verified by using an external application like google maps, or similar pieces of software.

### Evaluation:

- ✓ Convincingly demonstrated each of listed challenges?
- ✓ Other evaluative comments:

\*Demonstration #3 will build off of demonstration #2

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## Demonstration 4: AWS & Ionic Connectivity

Challenges addressed: C4

### Flight Plan

1. In order to demonstrate that AWS and Ionic can connect, the team will gather real examples of ionic and aws in use together.
2. The team will provide hard evidence that Ionic and AWS are being used in that application
3. The team will also note which features and services the application uses if there is any overlap
  - a. This means that if an application is found to use: API Gateway, S3 or Lambda, this will be explicitly mentioned.

### Evaluation:

- ✓ Convincingly demonstrated each of listed challenges?
- ✓ Other evaluative comments:

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## Demonstration 5: Javascript Graphs

Challenges addressed: C5

### Flight Plan

1. Using an Ionic PWA, the team will use javascript to generate basic data tables, bar graphs, and maps.
  - a. Alternative: If time is an issue during this process the team will provide an example of graph generation using javascript as noted in step #1, but it will not be done through a PWA.
  - b. Given that coding a web page and a PWA would be using the exact same language, this would be an appropriate alternative to demonstrate the above mentioned challenge.

### Evaluation:

- ✓ Convincingly demonstrated each of listed challenges?
- ✓ Other evaluative comments:

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## **Demonstration 6: Lambda & S3**

Challenges addressed: C6, C7, C8

### Flight Plan

1. Using the provided (Dr.Doughty's) AWS Account information, we will generate a Lambda function, and S3 instance.
2. The lambda function will be triggered to parse and interpret data from the S3 bucket
3. The lambda function will then return, or print out a confirmation message indicating that it does have the ability to read and interpret the information in an S3 bucket.

### Evaluation:

- ✓ Convincingly demonstrated each of listed challenges?
- ✓ Other evaluative comments:

### **Other challenges recognized by not addressed by demo:**

All challenges discussed in this document are a reflection of challenges outlined by our mentor and client. All challenges presented in this document have been adequately addressed by the team.