Non-Functional Requirements – Interoperability

Standards compliance

Web Content Accessibility Guidelines (WCAG) created by The World Wide Web Consortium (W3C) are used to assist developers to design their work in an advantageous way which benefits users. These guidelines cover a wide range of areas such as colour or layout of a website. It would be beneficial for us to comply with these guidelines the best we can in order to provide a product that our users have grown used to and have come to expect. Furthermore, when it comes to data sharing and standards which need to upheld, in keeping with these guidelines we will improve our interoperability.

# Date format standardisation

We will be using third party services which will mean we need to adhere to data standards. We will need to store lots of data on specific places in Bath, so we will need to store this properly, using a database. This will help us integrate with different systems. Furthermore, we will likely be using a combination of various third-party sources as well as our own data, this means if we have kept these in the same format it will be less hassle adapting it later.

# High system availability

Our application needs to be available 24 hours a day, to ensure users have continuous access. Any downtime should be forewarned to our users via push notifications. This availability is essential for the sustainability of our application, since if it can’t provide helpful information to our users they could stop using it. Furthermore, there is an obligation to users who may be depending on some of our applications features and may need it urgently.

# Data security

When storing data, it is important to comply with GDPR. Where this applies to interoperability is how this allows for integration with other external systems. If we do not comply here, we would not be able to integrate at all.

# Quick response times

When pulling data from external sources, it needs to load instantly, or near enough for it to be useful. People are willing to wait 8 seconds on average for a page to load. Our response time should be well under this to provide users with the best experience which they are happy with.

Functional Requirements – Interoperability

# Integration with map API.

Our application will need to be connected with some sort of map which will allow us to display our information geographically around Bath. We decided that this would be with the use of OpenStreetMaps.

# Integration with existing information sources.

We will need to connect with different providers for information which we will not be able to gather ourselves, but that would be useful to our users. For example, Google has information on shop opening times, so it would be helpful for us to use that information within our app.

# Single Sign-On (SSO) with identity providers

Our application needs to allow users to continue using it as a “guest”. However, there may be need for users to have their own accounts, particularly further on in development when more features are added. If this is the case, the app needs to integrate with OAuth 2.0, in order to allow users to login using their existing accounts associated with popular technology companies such as Google. SSO sign-on will also help users with cognitive disabilities use our app as even if they do need to make an account, it will be through one they are familiar with.

# Voice and screen reader integration

In order to allow for as many different people as possible to use our app, we will need to integrate it with device-specific technologies which offer different methods to use the application. This can be through voice assistance such as Siri, or screen reading software which will speak out the information on the screen.

# Real-Time communication with emergency services or a carer

People using our app may find themselves in a distressing situation which requires assistance. It would be prudent for us to offer instant communication with someone who can quickly help them encase they are using our app during this time. Emergency service numbers such as “111” should be available for our users. However, connecting with other technologies such as RelayUK, which provides users an intermediary to help with conversations, or BeMyEyes, which uses volunteers to talk visually impaired or blind users through a tricky situation, would be a great addition.

Functional Requirements – Security

# Data Protection and Privacy

The service will allow for users to log in, and therefore will store a basic amount of personal data. Furthermore, we will use preferences for specific parts of the UI to work. For example, a colourblind user may have this as a preference set to active in their settings. This information must be stored anonymously, and the privacy of our users should be respected. Furthermore, where data needs to be communicated between devices, encryption should be used to avoid security breaches. Data storage must comply with GDPR.

# User Authentication and Access Control

Users who log into an account may want to save points of interest and other sensitive forms of partial identification. Therefore, we need to authenticate each login attempt. This can be achieved using two factor authentication. If there is a need for it, systems can log users out automatically after a certain amount of time. This is usually done on applications which have direct management over a user’s finances.

# Abuse Prevention

Registered and logged in users will be able to see their location on the map. This means data is being sent from users to our servers. We need to carry out data integrity checks to ensure this data is safe, and not malicious. The system must validate any inputs, such as these location coordinates, to prevent injection attacks or data tampering.

# Threat Detection and Response

We must have adequate threat detection systems in place to monitor suspicious activity or unauthorised access attempts. These attempts must be logged, and we must be able to respond accordingly to any threats quickly and easily. For accounting and auditing purposes, all actions must be logged. This means our users as well as our administrators.

# API Compliance

We will be using the OpenStreetMaps API to design our application. This means we need t adhere to the secure coding practices when integrating with APIs. This will help us avoid vulnerabilities like attacks or unauthorised access. This also applies to any third-party connection we integrate with. These systems and software’s should be risk assessed, vetted, and researched before they are allowed access.

# Recovery and Backup

Our system must regularly back up user data securely and provide a mechanism for recovery in case of data breaches or corruption. Out system must have recovery measures in place to prevent data loss or downtime due to attacks. Due to the nature of our system, people may start to rely on it to plan, navigate, or express themselves in Bath. This means a downtime could be detrimental to their lives and would seriously tarnish our reputation.

# Links used:

<https://argondigital.com/blog/product-management/non-functional-requirements-interoperability-requirements/>

<https://www.bemyeyes.com/>

<https://www.relayuk.bt.com/>

<https://searchengineland.com/people-wait-website-load-2024-stat-445223>