

Quality Assurance Test Plan

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A. Overview

1. Software design plan summary

The Problem

The design plan outlined in this document will address the issue from ticket #D480-AEN1. In short, the loan application page is prompting applicants with well established business for the *first* 5 years of historical fiscal data, rather than the *latest* 5 years of fiscal data.

The Design Plan

The plan previously outlined should resolve this issue by examining and if necessary updating the following 3 deliverables:

- The event handler triggered when a loan applicant selects an established business date. This handler processes the date and uses a function to render the input fields for fiscal data
- The function that renders the fiscal input field. This function takes a year as a parameter and uses it to render an input field that prompts the user to input fiscal data for the passed in year
- The razor template itself. This is the .razor file that contains the razor code itself and defines the overall structure of the loan application page

2. Functional requirements objective

The Requirements

The 2 functional requirements to be tested in the design plan are as follows:

- The loan application form needs to request fiscal data from the latest 5 years
- The site back-end needs to generate loan profiles with the latest 5 years' fiscal data

Objective Alignment

These requirements align with the following overall objectives:

- Provide a clear and coherent application process for potential borrowers. The loan application page should be easy to understand and properly guide users to input the correct data
- Create relevant loan profile data. The site needs to generate correct loan profiles that application evaluators can use to assess the viability of a loan

2a. Functional requirements objective metrics

Metrics

The following metrics can be used to observe the effectiveness of the software design implementation:

- Form error rate: we consider a user being prompted for the wrong years for fiscal data as an error. In this way we should directly see a decline in error rate once the fix is implemented



- Form abandonment rate: it is likely that many users are abandoning the loan application form after seeing the incorrect fiscal data being requested. We should see a decrease in this metric once the fix is implemented
- Loan profile data accuracy: we can directly measure the percentage of generated loan profiles with incorrect fiscal data. We should also see this number go down after the fix is implemented

Metric Relevance

These metrics are extremely relevant to the software design solution. If the application is collecting incorrect data, the loan applications can't be used. If the applicants are abandoning the application form, it is an indication that they are going elsewhere to meet their financial needs. A combination of a high error rate and form abandonment rate are also an indication that the applicants have become frustrated with the application process our site provides, or have lost trust in our organization's ability to handle their needs.

3. Non-functional requirements objective

The Requirements

The following non functional requirements outlined in the design plan will be tested:

- The site needs to have proper implementation of authentication and authorization. User data needs to be properly isolated, and administrative access should be restricted to users with the proper permissions from our OIDC user policies
- The site needs to be reasonably performant. All pages on the site should load in under 5 seconds.

Objective Alignment

The requirements align with 2 overall objectives:

- Complying with governmental regulations and industry standards for user privacy and data security. Meeting this objective also has the additional benefit of providing security against malicious actors targeting the site as a vector of attack against the organization.
- Providing a quick and non frustrating overall user experience. The site needs to be responsive and load quickly to avoid putting off potential users.

3a. Non-functional requirements objective metrics

Metrics

We can use the following quality metrics to measure the our application's ability to meet the above non-functional requirements:

- Compliance Audit Score: We can use a third party auditor to check our application's security and data privacy compliance
- Data Breach Incidents: By measuring the number of data breaches, we can see if there is an issue with our authentication and authorization system
- Access Violation Incidents: We can check the logs to see if users are accessing locations on the site that they should not have access to and measure them
- Data Isolation Incidents: We can also check the logs for incidents where users are accessing data that is not associated with their account
- Page Render Time: We can will test the time it takes to fully render a page. This directly ties into our non-functional requirement that the site needs to be reasonably performant and that pages load in under 5 seconds



Metric Relevance

The design plan specifies that the application should have good authorization and authentication practices and reasonable performance, and these metrics are relevant to our design solution because they directly measure our application's compliance and performance requirements.

B. Scope

1. In-scope functional requirements

The two in-scope functional requirements to be tested in this QA plan are as follows:

- The loan application form needs to request the latest 5 years of fiscal data
- The site back-end generates loan profiles with the latest 5 years of fiscal data

After the fix is developed the full loan application process will be tested. The displayed controls on the loan application page will be observed to check if they are prompting for the last 5 years of fiscal data, and the backing methods and event handlers will be stepped through to ensure they're calculating the required fiscal years properly. After the loan application process has been tested and verified correct, the resulting loan profile that gets generated from these inputs will be tested and checked to ensure that the profile contains the fiscal data from the previous 5 years for the business, rather than the first 5 years of the business' history.

These requirements are in scope of the design plan as they are directly related to the functional requirements outlined in the software design plan, as they govern the process of acquiring loan application data and processing it into a loan profile from start to finish.

2. In-scope non-functional requirements

The two in-scope functional requirements to be tested in this QA plan are as follows:

- The site properly limits access to users, both logged in and not yet logged in
- The pages on the site load in less than 5 seconds

Since a user must first log in in order to apply for a loan, we can observe that the authentication and authorization system is working properly. Attempting to apply for a loan before logging in should prompt the user to first log in, and once logged in, and the application should update to display the proper user profile for that user. Furthermore, at no point through the application process should the user have access to internal admin-only portions of the site, and once logged in the user should only have access to their own loan application and saved fiscal data. Finally, throughout the entire testing process, the performance of the site can easily be observed and it can be noted if any page takes longer than 5 seconds to load.

These requirements are in-scope with the previously described non-functional requirements of security and performance. Proper functionality of the log-in process, application access control, and segregation of loan application data is of the utmost importance with regards to organizational security, user privacy, and compliance to governmental regulations and well-established security standards.

Observing the overall site performance throughout the log-in and loan application process directly aligns with the need for the web application to provide a smooth and non-aggravating experience.



While it is not currently an issue, it is something that is easy to keep an eye on and we should always be on the lookout for unexpected slow performance, and 5 seconds is a very lenient requirement for such a simple form to be loaded.

3. Out-of-scope functionalities

The following functionalities are considered out of scope and will not be addressed during this QA process:

- Automatic fiscal performance projection for businesses established inside of the past 5 years
- Redesigning the look and feel of the loan application form

3a. Out-of-scope functionalities explanation

Automatic fiscal performance projection for newly established business could be a very attractive feature, and could draw in more business for the organization. It could provide guidance for newer entrepreneurs, and help develop long term business relationships where both the customer and our organization could thrive together.

However, fixing the actual application process has a much higher priority, and requires much less development time. Trying to implement a brand-new feature while such an urgent and easily fixed bug would not be an efficient use of our time.

Upgrading the look and feel of the loan application form is also directly related to the loan application process. Having an interface that implements the newest technologies, and has the nicest UX features presents a professional face to our clients. Furthermore, making sure to implement things like accessibility features for differently abled users could even open up our business to clients that we would otherwise miss out on.

However, our UX is already built on a relatively modern tech stack, and usability testing of the application in general has been very positive. Again, the scope of this fix is very narrow, we simply need to address the bug affecting the loan application form. Deployment of this fix is high priority and does not require a lot of time develop. Delaying this fix to redesign the UX doesn't make sense in this scenario, as the development time and priority do not align.



C. Test Strategy

1. Testing overview

Test Case Table				
Test Type	Description of Test	Objective	Test Owner	Environment
Usability	<p>The loan application page will be examined and checked to see if it asks for the correct fiscal data as the established business date changes.</p> <p>Sample inputs: Est. date 2014, est. date 2022</p> <p>Expected results: Application requests fiscal data for the 2019-2023, application page requests fiscal data for 2022-2023 and projections for 2024-2026</p>	To test the site's ability to gather the correct fiscal data when users apply for loans.	QA Tester	Any modern web browser with access to the deployed testing site.
Usability	<p>Loan profiles will be checked to see if they have the correct fiscal data.</p> <p>Sample inputs: A loan profile for a business est. in 2014, a loan profile for a business est. in 2022.</p> <p>Expected results: The loan profile shows fiscal data from 2019-2023, the loan profile shows fiscal data from 2022-2023 and fiscal projections for 2024-2026</p>	To test the site's ability to generate correct loan profiles from submitted loan applications	QA Tester	Any modern web browser with access to the deployed testing site
Usability	<p>User authentication, access control, and segregation of data will be checked.</p> <p>Sample input: User logs in with a client account</p> <p>Expected results: Only loan applications / profiles for the logged in user are displayed. User can't see or directly access any admin pages on the site.</p>	To test the site's authentication and authorization implementations	QA Tester	Any modern web browser with access to the deployed testing site
Usability	<p>General performance of the site will be checked.</p> <p>Sample input: User loads the FAQ page</p> <p>Expected result: Page loads within 5 seconds</p>	To test the overall performance and speed of the site.	QA Tester	Any modern web browser with access to the deployed testing site and a non-degraded internet connection (20 Mbps or more)



2. Sequence of testing

All 4 tests can be accomplished in a single streamlined, repeatable process. Throughout the process, any page that takes longer than 5 seconds the performance test should be considered a failure.

Test process

1. Clear all stored browser data for the site to clear any previous login sessions
2. Load the deployed testing site and click around on a few pages of your choosing
3. Try to access admin pages on the site (via visually searching the site for links to admin pages, and via direct admin page URLs, which will be provided). If any admin pages are accessible, the authorization and authentication test fails.
4. Attempt to access loan data and loan applications
5. Log in to the site
6. Repeat step 3
7. Go to the loan application form and begin filling out a loan application
8. Select a random year before 2018 to simulate a well-established business and put it into the form for business established date. If the form does not request fiscal data from 2019-2023 at minimum the loan application test fails. Continue to fill out and submit the loan application. Additional historical business data can be included if the tester chooses, but it is not necessary.
9. Select a random year after 2018 to simulate a newly established business and put it into the form for business established date. If the form does not request fiscal data from 2022-2023 and projections for 2024-2026 the loan application test fails. Continue to fill out and submit the loan application.
10. Load the loan profiles page. If loan profiles for any other user are shown the authentication and authorization test fails.
11. Check the loan profile for the 2014 business. If the profile does not have fiscal data from years 2019-2023 at minimum the loan profile generation test fails
12. Check the loan profile for the 2022 business. If the loan profile does not have the fiscal data from 2022-2023 as well as the projections for 2024-2026, the loan profile generation test fails.
13. Any tests that have not failed at this point should be considered a pass

Justification

The above process is easily repeatable and leverages the overlapping scope of the requirements outlined in the software design process to make it streamlined and efficient. Performance of the site can be observed and tested throughout the testing of the loan application and loan profile generation, as can the segregation of user data.

If simplicity and speed of testing are of the utmost concern, specifically testing the restriction of admin functions on the site can be removed by omitting steps 3 and 6. However, this is not recommended as the additional tasks do not take a long time and it is important to not only test user data segregation, but also site authentication for admin functions. Unintended access to these admin functions can also lead to user data breaches and compromised site integrity.

