

Sage Feedback: Form and Search

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On my honor as a University Student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments

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ABSTRACT

While the user base of Sage, a call quality platform leveraged by US Card, increases to 16,000+, we must find a way to democratize the ability to give feedback on the application. My solution was creating feedback form and search features for displaying feedback. I developed the front-end using Tailwind, Vue.js, and an internal GUI tool known as Connex. For the back end, I developed two eAPIs using Typescript, AWS Lambda, Node.js, and storing the data in an OpenSearch index. I was able to deploy both the UI and eAPI to QA and received praise from various teams in the Capital One Card Tech Space. Future work would include modeling different statistics from the feedback data and utilizing machine learning algorithms to classify submissions with specific issues and solutions. My final goal would be to deploy both UI and eAPI to Prod after achieving 100% code coverage with testing.

1. INTRODUCTION

To address a significant bottleneck in the Sage platform, which revolved around providing users with an easy and intuitive means to submit their concerns and requests, I took the initiative to develop the Sage Feedback function. This feature was designed with user-friendliness in mind, featuring a straightforward feedback form accessible at the top of every screen. The form included three key elements: a subject dropdown, an area for entering feedback text, and a rating system. This streamlined system not only facilitated ease of use for our users but also ensured that I was able to gather comprehensive and valuable information. Additionally, I extended the functionality by implementing a feedback search feature, allowing for the aggregation of all received feedback and enabling filtering based on various criteria.

To control limited access to this powerful tool, I restricted it to admin-related users. This strategic decision not only ensured data privacy but also gave administrators valuable insights, enabling them to make informed decisions for future enhancements to the Sage application.

2. RELATED WORKS

Electronic feedback tools and systems offer a promising path, ensuring that feedback is readily available at the user's fingertips. This idea aligns closely with the insights from Bakerson, et al. (2012), who highlighted statistics showcasing that accessibility, timeliness, legibility, and quality are key drivers for promoting electronic feedback. Students, for instance, receive feedback faster when electronic, and the data collected is not only more legible but also easily analyzable. This paper analyzed the benefit of electronics over paper and the results were a large factor in the creation of this project under the Capital One Sage software. They invited 644 undergraduate students to take part in this investigation and saw that electronic lead was handwritten in terms of accessibility, legibility, and timeliness, which were three factors we heavily valued for our own feedback form. For each subject that was handwritten versus electronic was tested, there were comments from students. From the accessibility they had, "I prefer electronic feedback because it is easier to keep a record of and less likely to be misplaced." A lot of the results from this paper pointed us in the direction of an electronic feedback form.

Rai and Shah (2022) stated "satisfaction is the most important part of a company's success." Before profits begin rolling in, customer satisfaction should be understood. This paper was centered around the idea that customer feedback is important for any business. You need to build a customer base to even think about gaining a profit. Customer

satisfaction not only lays the foundation of a company but also contributes to its market value. In a business sense, individuals who retrieve goods and services tailored to their needs and desires are the lifeblood of any market. The objective of their thesis was to analyze the relationship between customer pleasure and customer loyalty and review the concept of customer happiness on several levels. They released a survey to analyze these factors, and came to the consensus that “loyal customers are more likely to purchase more [from a] company” and “a lot of the results from this paper pointed us in the direction of an electronic feedback form.” In order to promote customer happiness we must take in feedback through a common platform such as an electronic feedback form. They were able to conclude that customer satisfaction has a positive impact on profitability, the main goal of all companies.

3. PROJECT DESIGN

The project was built on various complex structures working together to present the final view of the feedback form and search.

3.1 Review of System Architecture

This structure was built in full stack development. It starts off with a client looking at the main browser page which points to an NGINX structure that takes in requests from the user and sends them to the code. This leads directly to a set of load balancers which are hosted with Docker machines. These structures allow easy testing and saving of machine states. Within these machines we have a UI (User Interface) that leads to a BFF layer (Backend for the Frontend) that points to The Exchange (a Capital One specific technology for checking valid API connections). This application then points to the eAPI (electronic application program interface) which leads to an AWS OpenSearch index.

3.2 Requirements

In addition to client needs are based around the increased user base of Sage and the limitations are based on the low shard quantity of the index

3.2.1 Client Needs

As the 16,000+ user base of Sage grows, how can one democratize the ability to give feedback? The goal was to develop a method of technology to answer this question. These clients require a common platform to list feedback and get a solidified response from the main company. That is why we started the development of a fully accessible feedback form with a method of analyzing and viewing data.

3.2.2 System Limitations

The Sage platform receives 3,900 assessments per day, 650 coaching sessions per day, 1 billion plus calls ingested, and 16,000+ users. The index also has a limit on the number of “shards,” or amount of data entries from the feedback form, that can be stored. This is currently a capacity but can soon become a minimum once the system receives an influx of feedback data.

3.3 Key Components

I will go into a higher-level technical overview of this project through specifications, challenges, and solutions.

3.3.1 Specifications

The UI uses Connex, Tailwind, Vue.js & Javascript. It includes a Feedback form & Reports search. The documentation for the aforementioned Exchange is on QA and Dev and entitlements for specific users were generated. eAPI built using TypeScript, AWS lambda, Node.js, and has two OpenSearch REST APIs: POST Submit & Search. Testing built with Jest unit tests and Cypress functional tests. I was able to deploy the UI and eAPI to QA, which stands for quality

assurance, a stage before the final to make sure everything is working properly.

Our UI has a dialog box with 3 fields: a select box asking your feedback type, a text box for feedback data, and a ratings field. It also has a feedback reports search with a search/filter feature to access feedback data directly from our OpenSearch index. All the fields including browser data are included and it can all be exported in a CSV.

3.3.2 Challenges

Here are some of the major challenges I had to go through and solve throughout my internship

3.3.2.1 Developing a Capital One Component from Scratch

Since there was no rating component within Capital One's Connex library for components, we had to create one from scratch using existing icons and a click feature to enable/disable them. This took quite a bit of time but we were able to create a component of the level that Capital One could add to their list of Connex tools.

3.3.2.2 Building eAPI from Scratch

Was able to create a baseline eAPI from base foundation within a week and get it working in QA within another week

3.3.3.3 Getting UI and eAPI to deploy QA

Ran into errors with Capital One's OnePipeline (a single source for deploying applications for client access) which has many issues within itself, but it took a while to deploy and only then could we see the errors so it was essentially a big time crunch towards the end of the project. We also had a specific issue with Capital One's entitlement process which was the stem of a significant amount of issues in the pipeline.

3.3.3 Solutions

I had to solve most of the aforementioned challenges myself through an intense debugging process. For the rating system, I was told by our head that the component I created could be helpful for future Capital One software developers. With developing the eAPI, I had to outsource to various other code bases to get an idea of how to convert Javascript to Typescript and understand the structure of the eAPI repository to even begin building it. It took intensive work, but we were able to get it up a little after the end of the sprint. The issue with the entitlement process specifically blocked us from getting our code deployed to QA. I looked through code written by current Capital One employees for numerous hours, found a couple lines of a bug, and patched it. This specific solution enabled us to get our eAPI through to QA.

4. RESULTS

I was able to accomplish a lot at the end of this internship, having a fully working feedback form and search system from front end to back end with minimal issues. I was only able to deploy the code to QA because we did not undergo full testing, but the lead of my project group noted that this was quite an achievement for only a 10-week internship.

5. CONCLUSION

The project, although initially simple, has a vast effect on the entire Sage platform. It provided a consolidated method of speaking to the higher-level administration through an easy-to-access platform. I was able to present the findings of this project to multiple boards within the Capital One space such as the Sage Project Manager team, the immediate administrative team, and also the Intern Leaders team. We got a lot of feedback, generally centering around the idea that this software is important for the future of Capital One and interaction with customers.

The main elements of our solution was the feedback form and feedback search feature where a user could submit feedback with specific fields and admins could analyze this feedback to provide improvements to the platform as a whole. We provided three data fields on the feedback form: feedback type, feedback data, and rating. The search function was able to show this data alongside user session data ranging from user ID to admin roles. This entire structure is anticipated to be extremely helpful for customers, as they now have a simpler method of pointing out flaws or issues through a solution that is not a call center.

The phrase “Time is of the essence” is commonly used and my innovation attacks that directly by providing a solution that uses limited client time. This innovative solution has been met with positive feedback from various teams within the Capital One Card Tech Space, and I look forward to further refining and expanding this solution in the future.

6. FUTURE WORK

There are many future goals for this project, especially because we only coded the bare bones. Our first step involves creating a Sage Feedback AD Group. Capital One software functions by giving different access levels to specific AD groups. This Sage Feedback role would specifically allow users to access the feedback analysis table to use it to analyze information. Next, I want to provide extra information for the dropdown, because the current options are limited and lack even an option for providing more details. We also want to achieve 100% code coverage on our system so we can push past QA into Prod, the final stage of development. I also want to develop charting for the feedback data in order to give analyst an improved surface from which to gain valuable insight.; My last

goal is to develop a machine learning algorithm to build models off feedback description to classify submissions with specific ideas and solutions.

7. ACKNOWLEDGMENTS

My Capital One feedback form project was led by Senior Software Developer Matthew Ford. I also had other group members such as Project Manager Bhargav Satish and Software Developer Daniel Quinn. I worked on this project with my fellow interns Bailey Phillips, Peter Kim, and Chan Park.

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