

ClearScale Helps SavvyMoney Optimize Its Successful Financial Platform



Executive Summary

SavvyMoney is a fintech company that provides integrated credit score and personal finance solutions to credit unions and banks. Its innovative platform incorporates credit score analysis, full credit reporting and monitoring, and personalized loan offers in a single dashboard. In addition, analytics provide the financial institution with full visibility to users' credit scores trends, wallet share analysis, and targeted lending campaigns.

ClearScale, which [previously partnered with SavvyMoney](#) to architect a robust, scalable AWS environment to support its platform, helped the company further optimize its solution at the application layer. The project included incorporating a variety of AWS SaaS best practices, development processes, and other components to enable SavvyMoney to better meet customer demands and its own future needs.

The Challenge

SavvyMoney's credit score platform has seen amazing growth over the last 5 1/2 years. The company has signed up over 420 financial institutions across 34 different online and mobile banking platforms. They are expected to add 10-12 new institutions per month and will likely integrate with 10-15 more platforms. Even when working with a specific platform, multiple configurations for the same function were often required.

Additional customers also meant an increase in the number of tenants sharing the SaaS infrastructure and resources, requiring greater scalability to meet demand. The more tenants, the more tenants' native applications SavvyMoney had to deal with — along with platform customization requirements. The platform also integrates seamlessly with the financial institution's Loan Origination Systems (LOS), adding to the complexity.

In addition, greater agility and flexibility were needed to ensure a favorable customer experience as the user base grew and enhancements to the platform were made. Those enhancements would also be integral to the ongoing customer's satisfaction. It was essential to ensure the high availability of the SaaS platform, the ability of SavvyMoney to deliver new functionality fast, and the scalability of resources to meet the growing demand.

To accommodate future needs and changing customer requirements, the SaaS platform also needed to smoothly integrate with different browsers and mobile native applications, as well as with various operating systems.

Meeting these needs required well thought out enhancements to the multi-tenant, SaaS platform, as well as new processes and components to drive greater value. SavvyMoney also wanted to achieve a higher level of data-driven product development, optimize its cost footprint, and increase top-down visibility through metrics on new tenants on-boarded and an average time to value.

“SavvyMoney chose the right partner! ClearScale understood our requirements, our complex integrations and delivered a secure and robust solution. We were impressed with the technical expertise, dedication, and engagement of the entire team.”

Sonali Kurane, SavvyMoney Senior Director – Applications and Security

The ClearScale Solution

Working with SavvyMoney’s team requirements, the ClearScale team rearchitected the multi-tenant SaaS platform to enforce tenant isolation at the application layer and improve cross-tenant management. Key components of the solution included:

CMS for tenant isolation and management in the pooled infrastructure

ClearScale developed tenant management capabilities by creating a new Content Management System (CMS) in the pooled infrastructure. The CMS is a Node.js® application that can update tenants’ artifacts (HTML, JavaScript and CSS). The CMS works by monitoring the AWS CodeCommit repositories where tenant-specific configurations are stored and performs UI updates based on configuration changes.

Each configuration is isolated, but the common tenant configuration structure has hierarchical principles of inheritance and redefinition. Tenant artifacts are rebuilt in the background while previous versions are served. This approach allows for flexible tenant management by abstracting away the SaaS identity and driving the full cycle of the tenant configuration process. This design results in cost efficiency, agility, and ease of customization.

UI platform modernization for better integration and customization

The UI platform was improved and developed as a single-page application (SPA) with the following components (applications/websites available for tenants via the CMS configurations):

- A desktop-responsive SPA website that uses banners/entry-points on target websites for tenants
- A desktop-responsive application for the new user registration/onboarding process
- The main desktop-responsive website with feature-rich pages inside and a responsive UI design
- A specially designed application that’s embedded into native mobile applications
- UI components, such as widgets and product pages, that adapt to tenant integration requirements. They’re easy to embed in both mobile devices and desktop applications.

Advanced application rebuild system

A dynamic application rebuild system—based on tenant configuration changes — allows SavvyMoney to make production releases with minimal impact on application performance and no downtime, including when new tenants are added. The tenant build process can be tracked with granularity. It significantly improves the feedback cycle, allowing SavvyMoney to quickly extend its customer base and drive platform innovations.

AWS Auto Scaling is used for scaling all applications deployed within the project.

Continuous delivery, integration and deployment

The continuous delivery pipeline is implemented through Docker container deployments to Amazon Elastic Container Service (Amazon ECS) using AWS CloudFormation on multiple environments.

Jenkins, a self-contained, open source automation server, automates the continuous delivery and continuous integration (CD/CI) processes. Each environment has its own Jenkins instance, which interacts only with resources within the same virtual private cloud. A single-click deployment and rollback is also being developed using Jenkins.

Functionality and robustness were added to the CD pipeline. New features include a Redis monitoring system for unique job queues, job results metadata, and failed job error stack traces.

The use of AWS Managed Services in Multi-AZ configurations (i.e. Amazon ElastiCache, Application Load Balancer, and Amazon ECS) and in deployment applications as Auto Scaling Groups in multiple availability zones ensures the SaaS platform's high availability.

In addition, a new test automation framework improves the CI pipeline and speeds up testing and feedback required for deploying new functions that work with the SaaS platform's diverse customer configurations. It's based on Cucumber technology integrated with Selenium. The framework allows for writing test scenarios using high-level language and provides a playback tool for authoring functional tests without learning a test scripting language.

Monitoring Enhancements

An important feature of SavvyMoney's SaaS solution is proactive monitoring of the platform and tenant state. ClearScale incorporated Amazon CloudWatch and CloudTrail for additional metrics monitoring and for integrating the UI platform with New Relic® products to create a metrics-driven model for technical improvements.

Data processing and storage solution

Working with SavvyMoney's architects, ClearScale developed an independent data processing and storage solution to handle credit applications and system events. This provides an easy way to obtain additional data insights for business analysis and leverage a Data Lake to store a massive amount of event etc.

This solution was architected on the application layer as an event-based business intelligence system. Backend services stream all the events describing a user's activities to an Amazon S3-based Data Lake (including raw and unstructured data). A subset of the data is uploaded into the AWS RedShift-based data warehouse for fast query results.

AWS QuickSight was also incorporated to enable visualization of the user's activities via dashboards, and extract data insights powered by the data warehouse. The solution provides SavvyMoney with more data insights, including the trends driving margins and platform features that tenants are using.

ClearScale's solution also incorporated a number of other AWS services according to AWS best practices. They include - Amazon Elastic Compute Cloud (Amazon EC2), Amazon Simple Queue Service (SQS), AWS Identity and Access Management (IAM), Amazon ElastiCache, Amazon Redshift, and others.

The Results

The project generated numerous benefits that meet the needs of SavvyMoney's customers and the company's own requirements for continued success. That includes improved efficiency and simplicity for onboarding of new tenants, easier integration of the SaaS platform with tenants' different online banking platforms, and low or no cross-tenant impacts on the application. Tenants can now be isolated by their configuration settings, the deployment and building processes, and by platform authentication business logic.

In addition, the enhanced solution offers shorter release cycles and deployments, tracking of the correlation between various technical KPIs, and a metrics-driven model for technical improvements of the SaaS solution.

Equally important, the enhancements position SavvyMoney to continue innovating its platform and meet changing customer needs.

"SavvyMoney successfully delivered an application to the market to deliver credit score and corresponding services inside the end-customer's financial institution's overall solution. Like many early stage startups, we found ourselves growing faster than our existing technology would eventually be able to handle. We needed to upgrade the application and platform to take advantage of the full suite of benefits of the AWS cloud and we need to do so without disruption to the business.

Basically, we knew where we wanted to go- full autoscaling platform and application, pure multi-tenant, from monolith to microservices, as AWS-native as possible, highly performant, and easily tenant-customized. We needed a partner who could take us there and do so while we grew the customer base a full order of magnitude.

Clearscale turned out to be the perfect partner. At every point in the AWS stack, Clearscale had the skills and expertise to assist us in designing the solution. Once designed, Clearscale provided high-quality developers who understood the objective and had the experience to deliver the solution with speed and quality.

I am proud of the work we have done together — so is my team. We have an ongoing relationship that both parties' value and intend to maintain for the long term."

Lon Huffman, SavvyMoney CTO/COO