High Application Performance through Product Engineering
for SaaS Company

Client Overview

The client is a SaaS company operating in the Distribution Analytics industry focused on developing cloud-based analytics products. The client helps end customers extract insights from humongous volumes of complex data.

The Business Situation

The client was poised for rapid growth but was challenged by several roadblocks due to data inconsistencies, lack of application modularity, slow performance, and a business model that was not scalable. Uniform ingestion of unstructured data from multiple sources caused structure and format differences in data that was expected to be homogenous. Data aliasing occurred due to absence of uniqueness in organizational data. The application was not scalable since the architecture did not support multitenancy and code was not modularized. This also resulted in regression issues and edits in multiple places even for minor change requests in architecture or design. Due to short release cycles, the regression issue list was getting increasingly bigger. The presence of two UI frameworks within the same codebase impacted product usability experience as well.

The client required a complete transformation through product engineering and application development to resolve these issues.

The Solution

The GS Lab | GAVS team with vast expertise and experience in product engineering for global customers decided to revamp the entire application architecture by moving to microservices from the monolith backend. The team restructured the application into modules based on key features, with each module getting its own microservice. This reduced regression caused due to code coupling. GitOps was implemented with GitHub for GCP infrastructure, Kubernetes configurations, SSL certificates, and CloudBuild (CI) configurations.

The database was restructured as a tenant and amalgamated database, which provided multi-tenancy support and enhanced performance for data ingestion and data retrieval for UI. StreamSets data pipelines used for data ingestion gave more control on processing incoming data, thus resolving data inconsistency issues. AngularJS UI framework was upgraded to Angular 9 and ExtJS code was completely removed. The usability of the app was enhanced through Clarity framework for UI components. Multi-layered security was provided through Auth0 at Ingress Gateway level and Istio MTLS for the internal network.

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Challenges

- Data inconsistencies and customer escalations due to stoppage of file processing
- Large number and frequency of regression issues
- Slow performance of product
- Poor user experience
- Non scalable business model due to lack of multi-tenancy support

Solution Highlights

- Headless architecture with microservices
- Implementation of GitOps with GitHub
- Restructuring of database to a tenant and amalgamated database
- Removal of traditional pre-processor scripts for data consumption, validation, error handling
- Configurable solution for data inputs using pipelines
- Upgradation of UI framework to support ease of maintainability, scalability, performance
- Security through Auth0 at Ingress Gateway level and Istio MTLS for the internal network

Solution Outcomes

- Faster product deployments resulting in multiple deployments in a week
- Shorter release cycles, MTTR (Mean Time To Recovery) due to service isolation
- Cost reduction to 300$/month for tenant addition (SQL instance) from 900$/month (AWS EC2 + EBS + RDS)
- Single source of truth through GitOps
- Robust security with multiple layers of security