

CASE STUDY

Overview

New Jersey-based medication optimization software is a global leader in providing health care organizations (HCOs) with patient-specific medication optimization software. The startup does this via their cloud-based, data-driven healthcare software solutions and medication risk mitigation technology that enables countless HCOs to optimize medication regimens. This empowers them to improve patient outcomes, reduces hospitalizations and medication errors, lower healthcare costs, and manage risk.

The software platform analyzes multiple drug interactions simultaneously while factoring in each patient's genetic makeup to determine individual drug metabolization speed. While their suite of software and technologies support hundreds of HCOs and countless patient populations, their SaaS-based patient dosing software(DoseMeRx) had outgrown the scalability limitations of its onsite data center architecture. They turned to Techolution as a partner to develop a proof of concept (POC) that would enable major cost savings and increased scalability via app migration to GCP.

Challenges

The tremendous HCO customer growth of medication optimization software had left them facing the challenge of limited horizontal scalability to meet future growth needs. Their medication management application platform, which was a monolithic Java-bound application running in their on-prem data center, exemplified this. Although they had minimally repurposed the app into microservices via Java Spring Boot framework, increasing HCO customer demand made it impossible to get the horizontal scaling they would need for future growth.

In addition, the existing platform could not provide the critical telemetry data visibility for fast and accurate application issue troubleshooting resolution. What they needed was a cost-effective means of automatic, on-demand scalability.

This medication optimization software partnered with Techolution as their digital transformation partner to support their development of a POC demonstration for a two-phase GCP migration project that would meet their goal of unlimited scalability on cloud. The Phase One POC would provide the benchmark for the migration and deployment of two monolithic applications. This would include test results to showcase scalability and high availability, along with Techolution's best practices in setting up the infrastructure. Phase Two would comprise full-scale cloud architecture design and migration of applications and client workloads on GCP.

Techolution met with this medication optimization software CTO to determine how best to develop a cloud-based architecture that would enable on demand application bursting and infinite scalability. This company knew the potential costs for unlimited scaling via GCP architecture. They determined that the growing customer base could amortize these costs while justifying the need to fulfill customer demands. Coupled with the need for telemetry data providing analytics for troubleshooting application performance challenges, their leadership and Techolution moved forward.

Results

As of this writing, the POC architecture is currently running on Techolution's GCP environment as a sample app. By working closely with medication optimization software, engineering leadership and its team, Techolution could meet POC benchmarks including achieving:

- Below 2 Second Application Response Time target
- Less than 2% error rate in Application Throughput:
- 0 resource deadlocks during testing duration
- 5000 transactions per second minimum target

Healthcare is now transitioning to a value-based care model where analytics drive payment and improved patient outcomes. This medication optimization software is now best positioned for this inevitability and its future growth trajectory through effective digital transformation in the cloud. The long-term collaboration partnership Between software and Techolution becomes the catalyst for this transformation. The two partners are now looking to future projects that take advantage of GCP, GKE, containerization, and microservices that deliver real-world operational and cost efficiencies to them.



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Strategy

A fast project timeline and quick turnaround dictated initial meetings starting in October 2020 with the official project start in late November. A redefining of the SOW by the client would break the project into two phases, with the first phase being the setup of a POC architecture.

Phase One results would support stakeholder agreement for the broader Phase Two application migration to an architected GCP environment. Techolution would support the their team and its goals for Phase One and Phase Two by leveraging:

- ✓ Google Kubernetes Engine
- ✓ Cloud SQL
- ✓ Compute Engine
- ✓ Prometheus & Grafana
- ✓ Cloud Logging via Stackdriver

The goal of Phase One was to prove out the infinite scalability possibility while limiting IP exposure with Techolution provisioning and running the sample POC in their own GCP environment. This would enable meeting the faster standup and deployment timeline while showcasing the infinite scalability possibilities for Phase Two approval.

The first step was to Terraform the new medication optimization software architecture on GCP to enable them to easily spin up and recreate the GKE-based containerized application environment for Phase Two. This POC Terraform would provide the blueprint and template that would save time in the Phase Two deployment in their GCP environment, which included: Setting up the network and autoscaling, Infrastructure Setup on the Cloud using Terraform & CICD pipeline as code and Canary deployment.

The Techolution team used a mock cloud SQL relational database running as nanoservices in GCP to increase scalability. While the stated the company goal was infinite horizontal scalability, this medication optimization software and Techolution determined that the resulting GCP compute costs would be out of their cost scope.

Techolution lowered the typical 80 percent horizontal scaling threshold to 35 percent to contain compute cost while meeting POC goals for the ultimate architecture design. This threshold kept compute costs within workable limits while still putting load saturation far out of reach because of the maximized application run speeds achieved.

Techolution deployed the CI/CD pipeline using a combination of Jenkins and Spinnaker via GKE to maximize agility and scalability. They deployed the CD and automation server platforms using custom HELM packages designed around the application framework. This would drive standardization requirements to the upgrade and maintenance process that ensured a uniform deployment process for applications.

Project Accomplishments Sidebar

- ★ Increase application scalability via GCP migration and architecting
- ★ Time to market minimization through automated testing
- ★ Decouple applications to reduce dependencies, technical debt, and large manual release efforts
- ★ Increase governance and security control of pipeline as code build, testing, and release/commit
- ★ Validate business KPIs with a subset of real traffic
- ★ Gated manual or automated switching of features/releases
- ★ The ability to reuse existing platform to run all support/operations/development tools
- ★ The ability to monitor application and platform health prior to running into an outage
- ★ Load and Performance Testing of the application by mocking user traffic to verify response of application during real user load
- ★ Meeting or exceeding previous SLAs for the timing
- ★ Achieving maximum scalability capable of showcasing all applications
- ★ Proving out the monitoring aspects via setup of Grafana and Prometheus for insights and capture of needed telemetry data