



CASE STUDY

A robotics solution architected in the cloud to help scale the business

The Challenge

Neatleaf's AI-driven application needed capabilities to process the volume and complexity of data and support the anticipated business growth.

The Solution

Opreto developed a custom software architecture in the cloud to power application deployment, data processing, and analytics.

The Benefit

The solution enabled Neatleaf to orchestrate digital operations and automate processes to seamlessly and securely scale the business in the cloud.



Opreto designed and implemented our cloud infrastructure. We showed them where we were heading, and they started working with us to figure out the best solutions—we're relying heavily on their guidance. They built the infrastructure from scratch in an up-to-date, state-of-the-art manner.

**Elmar Mair,
Co-Founder**

Developing the Technology Infrastructure for an AI-based Application

Neatleaf is an autonomous robotic platform that enables agricultural production in indoor and greenhouse cultivation environments. Using data analytics, machine learning, and AI, Neatleaf's core product, Spyder, helps producers sustainably optimize yields at higher quality and lower cost.

Neatleaf developed Spyder as a front-end crop monitoring and cultivation management application. It was driven by a machine-learning pipeline and a back-end data store. Spyder had a hardware infrastructure adequate for prototyping and demonstrations, but it was not ready to process data for meaningful, actionable insights. The system needed a comprehensive cloud-based environment and DevSecOps methodologies to support the company's anticipated growth.

Neatleaf hired Opreto to take its solution to the next level to deliver value to its customers. Opreto would architect and implement new technology to process and manage the vast volume of complex data that would seamlessly scale with the business.

The Need for Cloud DevOps to Securely Scale Production Processes

Neatleaf contracted Opreto to architect their technology infrastructure to support business growth. Opreto had experience in industrial production solutions and expertise in developing cloud-native software and data architecture.

Opreto set out to design the infrastructure to support software deployment, data aggregation, and other digital operations securely through DevSecOps, and at scale, with high-performance in the cloud.

Infrastructure-as-Code in the Cloud

Opreto conducted a deep analysis of Neatleaf's use case. Recognizing the opportunity for scalable growth, Opreto proposed building a cloud-based infrastructure using the robust capabilities of AWS Cloud Development Kit (CDK). This code-first framework enabled Opreto to simplify the overall development and create reusable component templates, allowing efficient system maintenance with limited resources. AWS CDK also equipped Neatleaf with the same programming languages for infrastructure management and the rest of its system.

Opreto identified the need for performant and cost-effective cloud data storage and processing pipelines. Opreto implemented Hasura to serve as a query interface to the PostgreSQL database to enable efficient queries and rapid iteration of custom logic from front-end components. Along the way, Opreto experimented with various storage solutions, including TimescaleDB, to ensure the most fitting and scalable architecture was chosen. Ultimately, separate database clusters were provisioned for development and production, built around a pure PostgreSQL setup.

Throughout the engagement, Opreto provided Neatleaf with technical guidance and solution implementations. These included release management tools for Neatleaf's entire technology stack - the front-end management applications, platform software, and database schema, and automated management of DNS records for those components.

A Business Primed for Growth in the Cloud

The cloud infrastructure that Opreto developed enabled Neatleaf to host its robotics solution with high scalability and availability of services. The architecture allows Neatleaf to provide cultivators with a data-driven AI solution to reduce costs, increase yields, and improve profits.