



CASE STUDY

How EPAM & Genosity Delivered a Comprehensive Solution to Support End-to-End Lab Processes

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The current IT market for genomics and molecular laboratories only offers isolated solutions to support some business capabilities—there is no comprehensive solution that supports end-to-end lab processes, creating a barrier to entry into the genomics space.

Genosity, a biotechnology company, focuses on providing tools and services for clinical research applications of genomics. The company's overall mission is leveraging precision medicine to improve patient care through a technology platform that advances genomics and facilitates collaborative research.

Since 2017, EPAM and Genosity have worked together on various projects. When Genosity wanted to build a comprehensive solution that would help labs more easily navigate the complicated landscape of molecular informatics, the company turned to its longstanding partner EPAM. Alongside Genosity, EPAM developed and deployed a novel Integrated Genomics Toolkit (IGT), a comprehensive software solution that enables both research and clinical genomic laboratories to generate and leverage next-generation sequencing (NGS) data. Today, this leading, comprehensive research solution is engaged with eminent groups from the healthcare landscape, reducing the obstacles that make it difficult for many labs and health systems to leverage NGS.

OVERCOMING BARRIERS TO ENTRY IN GENOMICS

One of the most valuable assets in the modern world is data, and the task of collecting, integrating, processing and interpreting data has become paramount in science today.

Since there are currently only isolated solutions in the market, labs have had to construct their own solution from disparate building blocks that often don't fit well together. In the genomics field, with its highly specific data tasks, a comprehensive tool becomes an invaluable aid.

Recognizing the need for a truly all-inclusive solution for genomics research, Genosity enlisted EPAM to help develop and deploy its novel IGT solution.

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BUILDING A PLATFORM FOR NGS ANALYSIS

Leveraging its cloud and digital platform engineering expertise, EPAM helped Genosity build and deploy the tools for a comprehensive, cloud-based IGT platform.

The IGT system is specifically built around best practices for NGS analysis with additional professional services offered by Genosity, enabling labs to quickly set up their own NGS workflow without having expertise in informatics or purchasing and integrating multiple expensive solutions that would cost millions of dollars in implementation and integration costs. The resulting IGT platform is comprised of the following integrated modules:

GATEWAY

An ordering and reporting portal that facilitates flow of information between the lab and ordering providers within and across institutions through either direct online portal access or via HL7 interface

LIMS

A Laboratory Information Management System for workflow management with a user-friendly dashboard and widgets, as well as pre-configured commercial and custom assays, sample management with real-time status tracking, and quality management with exception and audit logs (required to meet regulatory requirements)

BIOINFORMATIC PIPELINE

A solution with real-time cloud resource orchestration, hosting multiple pipelines for processing raw sequence data from different types of NGS assays

CASE ANALYZER

A tool integrated with Knowledgebase and third-party databases for variant interpretation, individual case analysis and clinical result report writing across both germline and somatic applications

CORTEX

A data warehouse with genotype-phenotype data to facilitate population-level analysis and cohort identification to support R&D and commercial collaborations

ADMIN PORTAL

A tool for managing user roles and permissions, test catalog configuration, LIMS workflow setup and configuration of all modules

One of the key advantages of the IGT solution is that it offers tightly integrated components and can be deployed in a modular fashion if an end-user has existing systems in place. The IGT solution is built to minimize the need of in-house IT and bioinformatic resources so that labs can deploy and implement new tests without additional IT effort.

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"At Genosity, we had a vision to develop a comprehensive platform to unlock broader adoption of genetic testing. Successfully developing such a solution required bringing together a cross-disciplinary team that leveraged Genosity's clinical experience with EPAM's software development capabilities. The combination of this extensive domain expertise has enabled the development of a platform that is already impacting patient management across the healthcare continuum."

– Bob Daber, PhD, DABMG, President and CTO, Genosity

TECH STACK AT A GLANCE

KUBERNETES	AWS	AMAZON COGNITO
JAVA	SPRING	HIBERNATE
FLYWAY	HIKARICP	JOOQ
JUNIT	MOCKITO	PYTHON
REACT UI	MOBX	WEBPACK
FLOW	BABEL	POSTGRESQL
BLAZEGRAPH DB		

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HARNESSING THE TRUE POWER OF NGS DATA

In the fall of 2019, EPAM and Genosity launched the IGT system, enabling labs to leverage genomic data for the benefit of the whole field. By successfully reducing the obstacles in both cost and access that make it difficult for many labs and health systems to leverage NGS, this solution allows global teams to harness the full power of genomics data. Here are a few key highlights:



The system is now being used by Genosity and several of its clients



Multiple institutions have successfully launched their first NGS tests through the implementation of the IGT system, including academic health systems, commercial labs and large community oncology practices



The Case Analyzer tool provides the ability to issue a result report for a simple case in minutes, saving labs hours each day



IGT's customization options offer pre-configured report layouts, colors, fonts and white labeling, which can take months to implement with other commercial or in-house systems



The pipeline tool not only hosts the pipelines developed and validated by Genosity, but also allows deployment of third-party academic and commercial pipelines, such as GATK and ArcherAnalysis, through its interface, introducing a flexible and efficient cloud-based bioinformatics pipeline orchestration platform

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ABOUT GENOSITY

Genosity is a life science biotechnology company that employs its expertise, novel software solutions and laboratory services for both somatic and germline applications to enable its strategic partners to fully realize the value of precision medicine for both the research and clinical markets. For more information, please visit us at <https://genosity.com>.

ABOUT EPAM

Since 1993, EPAM has leveraged its software engineering expertise to become a leading global product development, digital platform engineering, and top digital and product design agency. We deliver innovative strategies and technology solutions for global life sciences companies across the entire product lifecycle, reducing time-to-market, accelerating research and drug discovery, and optimizing commercial operations to drive top-line growth.

QUESTIONS?

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