

# Genetics Information Company Accelerates DevOps and Improves Product Quality through QA Services



*Our challenges were to reduce defect leakage, meet our growing business needs with constant changes in requirements. The Trigent team learned our domain fast, met our automation needs with minimal training, and stretched QA to a 18x5 cycle. They worked cohesively with our DevOps teams. Our throughput increased by 45%, and production defect leakage reduced to less than 5%. We would gladly recommend Trigent for enterprise QA needs.*



## Industry

Genomics Company

## Business Value

- Improved test coverage by 85% resulted, increasing application quality
- Reduced Test execution time by 80% with distributed and parallel execution strategy
- Adoption of DevOps culture led to 30% cost optimization for feature releases
- Support geographically distributed teams with multiple shifts, covering 18 hours/day

## About the Client

Our client is a leading medical genetics information company, with revenues of over \$200m, with a mission to bring genetic information into routine medical practice to improve the quality of healthcare. They specialize in genetic diagnostics for hereditary disorders and provide affordable & accessible genetic testing to both patients & providers. The client offers three major categories of screenings - Diagnostics, Reproductive Health, and Proactive Health. The screenings include hereditary cancer, neurological & cardiovascular disorders, non-invasive prenatal screening (NIPS), pediatric developmental disorders, and many more.

## Background

The client has an integrated portfolio of laboratory processes, software systems, and informatics capabilities to :

- Manage and maintain test catalogs, with unique workflows
- Collect & process DNA samples
- Test & analyze patient-specific genetic variation
- Generate test reports for clinicians and patient

The software application portfolio consists of :

- A web portal that allowed both patients and clinicians to place orders from a catalog of tests. The selections ranged from curated panels to panels custom built by a genetic counselor. The entire ordering process was transparent, with the ability to track progress.

## Technology Stack

- Sonarqube
- Cypress
- OpenAPI for versioned API schema definitions
- Postman for API test automation
- Pact for HTTP & message API Contract testing
- Selenium Web Driver
- Selenium Grid
- Jenkins, Bamboo & Nexus for CI/CD
- JMeter for performance testing
- SauceLabs & Browserstack for omnichannel experience testing
- Rancher for platform orchestration & for testers to create their own stack and run tests early on it
- Google Analytics for post-deployment traffic analysis
- Splunk for Application Monitoring & Management

- A laboratory information management system (LIMS) that manages and tracks samples, test results, and associated information effectively.
- A clinical reporting function that is designed to support all aspects of clinical genetics workflow. This function provides an interface with relevant patient information and tools for efficient clinical report writing and report generation. A wide range of people, including scientists, genetic counselors, client services, finishing/confirmation, and lab directors, use this function.
- A Dry Lab Operations System, an internal application that automates sample wrangling, wet lab, clinical genomics, client services, and metrics analysis.

## Business Challenges

As the business grew, they put added emphasis on customer experience, which is simple despite the new features. And, this required the applications to work at optimum levels without interruptions during business hours. The individual applications underwent continuous improvements at a fast pace. As the volume of patients & data increased, customer experience could not be compromised, and the entire service had to be comprehensively tested for every change. Not only did the feature updates have to be tested regularly, but thorough regression testing was also required. As the organization acquired new companies, more services were added, and the client anticipated to operate a 24/7 lab very soon. The team had to ensure that the new capabilities were integrated and changes made to existing workflows while existing services continued to operate consistently.

To meet this goal, the client needed agile processes, improved test execution velocity, and high-quality releases.

This was achieved by institutionalizing DevOps, streamlined release processes, sprint planning, environment configuration and tooling coupled with clarity of roles and responsibilities between developers and testers.

We built a DevOps strategy to cover teams distributed across the US west coast, midwest, and eastern Russia and India. The teams were aligned to product lines, and a CI/CD pipeline was implemented. A significant portion of testing and deployment was automated.

The approach included adopting the Software Development Engineer in Test (“SDET”) philosophy and how they think about software quality and testing - especially bringing proficiency at writing code and code for automated testing.

## Trigent Solution

An aggressive growth plan required rapid software delivery, and all teams to work in cohesion. Trigent identified the workflow of all the applications - covering the vital business process flows, user experience, technology integrations, and performance.

To support the geographically distributed development teams, Trigent QA operated in multiple shifts covering about 18 hours a day. This reduced the feedback cycles and increased the sprint velocity.

A sprint cycle of two weeks in the beginning, and rapidly evolving towards a daily release model, ensuring that applications were upgraded continuously. As feature upgrades were developed, automated regression tests were executed using continuous integration tools, and the test results were posted directly to the test management tools.

Test environments were dynamically set up and torn down after testing with AWS instances that allowed execution in a distributed manner. The testing covered complex rules and data validation across applications, also ensured that the applications supported multiple versions of operating systems and browsers. Omni-channel tests for mobile devices and web browser compatibility were run leveraging Sauce Labs' device farms.

Test and test automation became synonymous with exploratory testing complementing the increasing levels of automation to achieve high functional coverage within a short time. In a minimal time of around 2 hours, 600+ automated test scripts were executed.

## Benefits

- Improved patient care, and enhanced patient-provider relationships
- Early detection of regression issues in nightly build ensured that issues are fixed prior to integration build
- Enhanced user experience, optimized clinical workflows, also ensured physicians and patients get all notifications
- High-quality releases with reduced time to market
- Defect leakage to production reduced to 5%
- Functional defects were reduced by 20% through test automation
- Significant reduction in manual regression testing efforts
- Continuous testing at every stage increased the overall application quality
- CI/CD pipeline execution ensured a complete end to end testing in minimal time

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