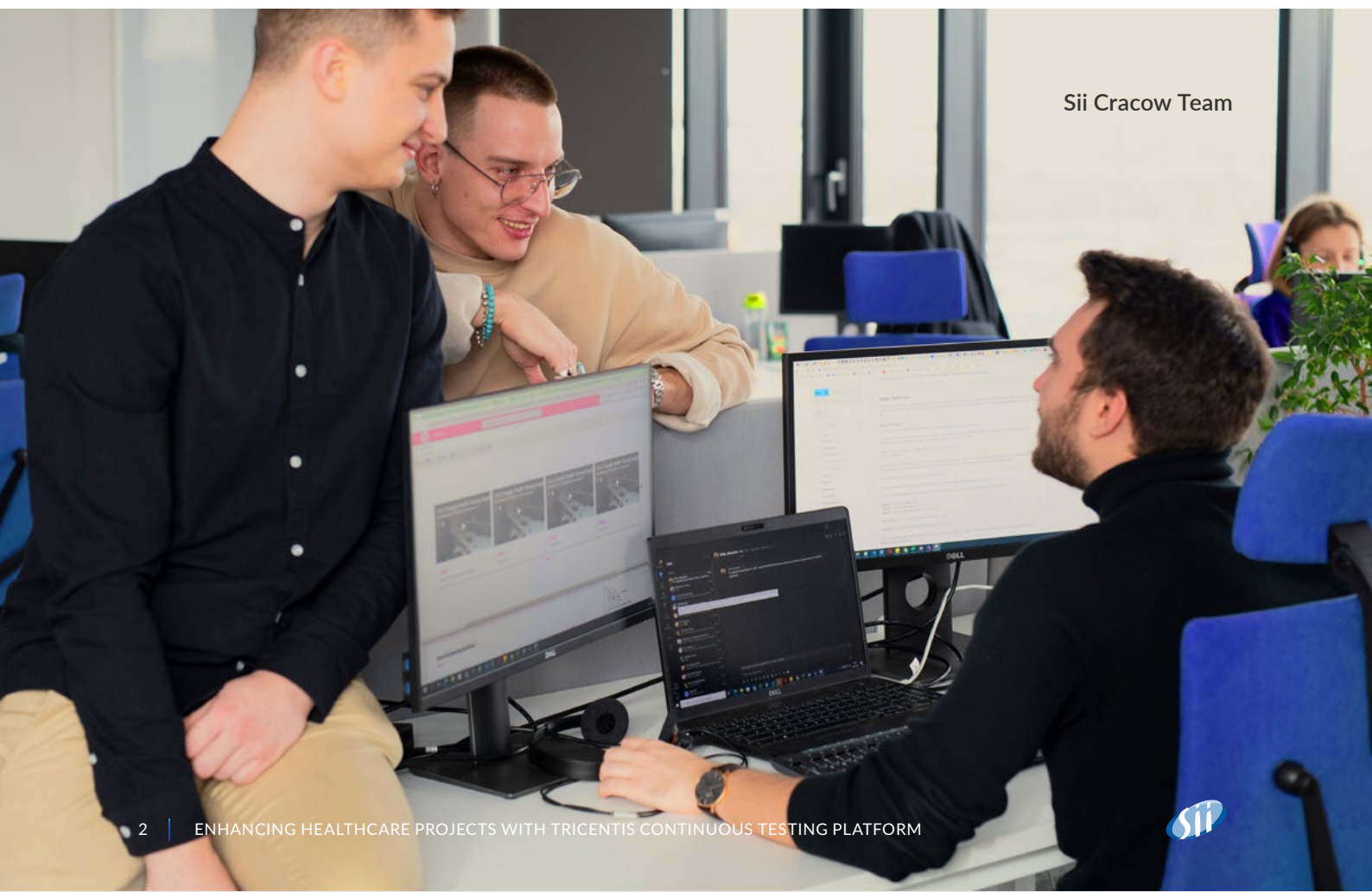




Enhancing Healthcare Projects
with Tricentis Continuous Testing Platform

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1. Introduction: the importance of testing in healthcare

Addressing complexity, compliance, and patient safety through automated testing solutions

The healthcare industry operates within a complex and highly regulated environment, covering a wide range of services and products – from patient care and medical research to pharmaceuticals and medical devices. Managing sensitive patient data, adhering to strict regulatory requirements, and ensuring seamless workflows present significant challenges. Every system and process must function flawlessly, as any failure – whether due to system malfunctions, regulatory non-compliance, or human error – can have serious consequences, including compromised patient safety, legal repercussions, and financial losses.

Given these inherent challenges, rigorous testing becomes essential in safeguarding patient safety, ensuring compliance, and mitigating operational risks.

This document explores the critical role of testing in healthcare, focusing on how Tricentis' Continuous Testing Platform and Sii's industry expertise provide effective automated solutions. These solutions enhance system reliability, improve compliance, and support digital transformation by addressing key regulatory and operational challenges. Through real-world case studies and best practices, it will demonstrate how end-to-end testing strengthens patient safety, reduces risks, and accelerates innovation in this demanding industry.



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Why is testing essential in healthcare?

Given the life-and-death nature of healthcare, thorough and accurate testing of systems and products is indispensable. Errors, even minor ones, can severely affect patient care and product efficacy.

Examples of errors in healthcare systems:

- **medication errors:** incorrect dosages, wrong medications, or ignoring patient allergies.
- **diagnostic errors:** misdiagnosis or delayed diagnosis leading to inappropriate treatment.
- **procedural errors:** wrong-site surgery or incorrect medical procedures.
- **IT system errors:** electronic health records (EHR) errors or system downtime delaying access to critical information.
- **blood transfusion errors:** administering the wrong blood type.

- **pharmaceutical errors:** contaminated drugs or incorrect labeling.
- **clinical trial errors:** data inconsistencies or protocol deviations.

These errors underscore why rigorous testing is essential in preventing risks before they impact healthcare. Mistakes in medications, diagnostics, procedures, or IT systems can delay treatment and disrupt care, potentially leading to life-threatening situations. Errors in pharmaceuticals or clinical trials not only endanger lives but also lead to costly recalls, legal ramifications, and reputation damage. Automated testing is key in ensuring system reliability and enhancing patient safety by reducing human error.

Given these high stakes, regulatory bodies have established strict guidelines to ensure the safety and integrity of healthcare systems. Compliance with regulations is not just a legal requirement but essential for maintaining patient trust and minimizing risks.

Key regulations include:

- ✓ **HIPAA (Health Insurance Portability and Accountability Act)** – establishes standards for protecting patient data in the U.S.
- ✓ **FDA (Food and Drug Administration)** guidelines – regulate pharmaceuticals and medical devices in the U.S.
- ✓ **GDPR (General Data Protection Regulation)** – governs data privacy in Europe.
- ✓ **MDR (Medical Device Regulation) and IVDR (In Vitro Diagnostic Regulation)** – ensure the safety and performance of medical devices in the EU.

The increasing complexity of healthcare technologies also brings new challenges. As digital solutions advance, ensuring their security, interoperability, and compliance becomes more demanding.

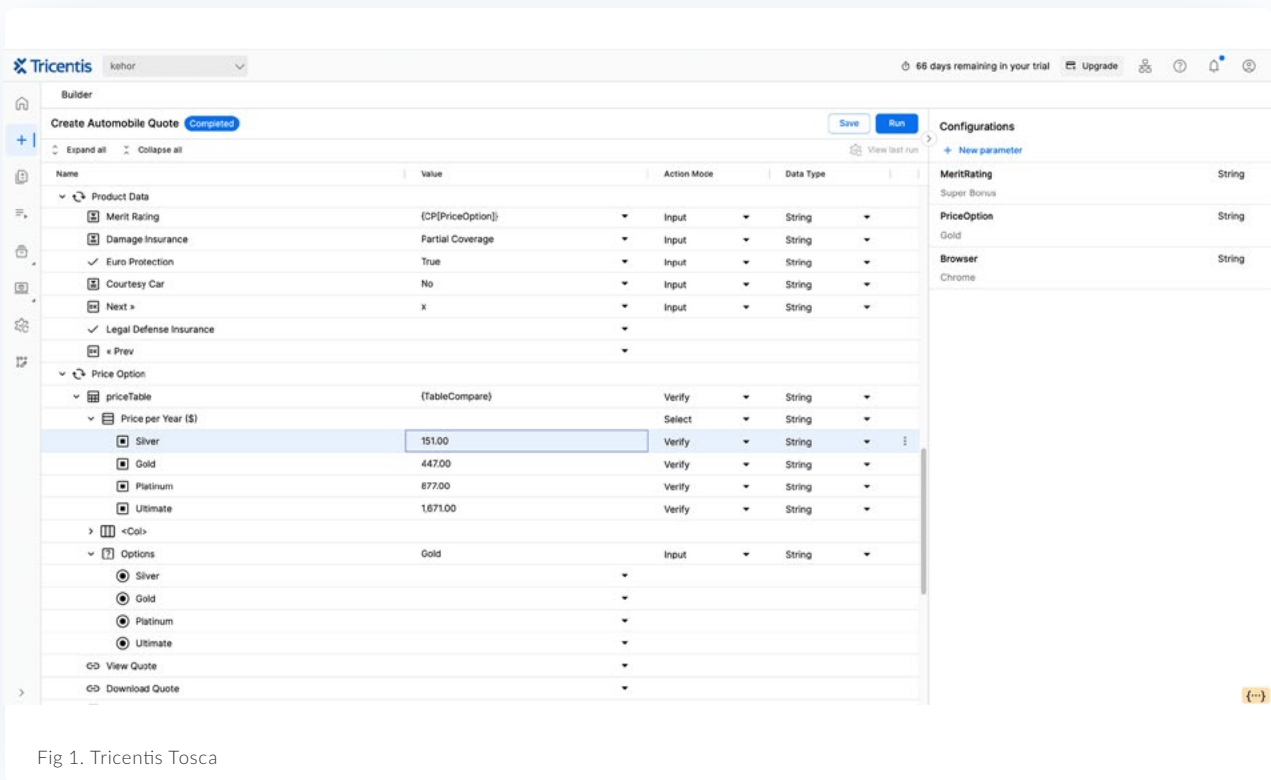


Fig 1. Tricentis Tosca

An overview of the evolution of healthcare technology:

- **Electronic health records (EHRs):** replacing paper records for better data management.
- **Telemedicine 2.0:** enabling remote consultations and monitoring.
- **Health apps and wearables:** empowering patients with real-time health data.
- **AI and machine learning:** enhancing diagnostics, personalized treatment, and predictive analytics.
- **Emerging technologies:** including AR, VR, blockchain, robotics, and digital twin technology, are reshaping healthcare.



The demand for robust and reliable systems grows exponentially as these technologies evolve, making comprehensive testing essential to support this digital transformation. Without it, even the most advanced innovations can introduce risks rather than improvements. To address these challenges, healthcare organizations must adopt effective testing strategies that ensure the reliability and safety of their systems. Below, we outline key testing challenges and the solutions that can help overcome them.

2. Key healthcare testing challenges and solutions

Read about some of the [solutions we have successfully implemented](#) >>>

Healthcare organizations face unique challenges, including integrating complex systems, complying with stringent regulations, and managing large volumes of sensitive data. Tricentis offers comprehensive solutions that address these challenges through automated, end-to-end testing.



Tools like [Tosca](#) focus on functional test automation and ensure system quality seamless integration, [NeoLoad](#) handles performance testing, and [qTest](#) is a test management tool that streamlines continuous testing within Agile teams.

These solutions improve efficiency, reduce errors, and ensure compliance with regulatory standards, helping healthcare organizations maintain reliability and safety.

Integration of complex systems

Challenge

Healthcare organizations use a mix of legacy systems, cloud platforms, and third-party applications, which can lead to integration and compatibility issues.

Tricentis Tosca enables continuous, end-to-end test automation, supporting over 160 technologies and enterprise applications.

Model-based test automation eliminates redundancies and reduces maintenance effort.

Risk-based testing prioritizes critical business processes to maximize efficiency.

Service virtualization and CI/CD integration ensure seamless testing across all systems.

Tricentis solution

End-to-end testing

Challenge

Ensuring seamless communication between various healthcare systems requires extensive testing and is time-consuming and complex.

API, UI, and system integration testing across all layers of the healthcare ecosystem.

No-code, model-based test automation with AI capabilities (vision AI, self-healing AI, and copilot for test creation and optimization) adapts to system changes, ensuring efficiency and accuracy.

Parallel execution speeds up test cycles and enables faster time-to-market.

Tricentis solution

Regulatory compliance & validation

Challenge

Healthcare systems must comply with regulations like HIPAA, GDPR, and FDA guidelines, which require rigorous validation and audit trails.

Tricentis solution

Tricentis Vera ensures compliance with built-in e-signature capabilities, audit trails, and approval workflows.

Automated test documentation and reporting simplify and accelerate regulatory validation.

Pre-configured compliance templates help teams meet stringent regulatory requirements.

High volume of data & performance bottlenecks

Challenge

Clinical trials, patient records, and real-time monitoring generate vast datasets, requiring robust performance testing.

Tricentis solution

The transition from manual SQL scripting to scriptless, model-based test automation improves data reliability and prevents inconsistencies.

Tricentis NeoLoad enables automated load testing for cloud-ready applications, micro-services, architectures, mobile and IoT, and enterprise-grade packaged applications.

NeoLoad reuses automation tests created in Tricentis Tosca and supports no-code recording or scripting performance tests.

Scalable load testing ensures systems remain responsive under peak loads.

Cloud-based execution scales your performance tests and enables on-demand testing across major cloud providers and multiple locations.

Continuous updates and agile development

Challenge

Frequent system updates, security patches, and evolving regulatory requirements challenge system stability.

Tricentis solution

qTest enables centralized management of manual and automated tests, supporting their planning, tracking, and reporting in a dynamic environment.

Test automation combined with AI-driven analysis helps adapt tests to changing business requirements.

Enterprise-scale test case management ensures better organization, versioning, and reuse of tests, accelerating testing processes and improving efficiency.

Cost-effective test automation

Challenge

Balancing comprehensive testing with cost efficiency is crucial for healthcare organizations.

Tricentis solution

No-code test automation in Tosca accelerates test creation and reduces the need for specialized expertise.

AI-driven test case optimization minimizes maintenance efforts while maximizing test coverage.

Test data management eliminates duplicate data and streamlines test execution.

The solutions above highlight how Tricentis addresses key healthcare testing challenges, offering a strategic advantage for organizations in the sector.

3. The strategic advantage of Tricentis in healthcare

Tricentis offers end-to-end solutions tailored to the healthcare sector's needs, combining automation, AI-driven optimization, and substantial compliance support. These solutions help improve efficiency, minimize risk, and reduce time to market. By automating testing and leveraging AI, healthcare organizations can maintain high standards of safety, compliance, and adaptability, all while optimizing costs and resources.

✔ Holistic testing across the lifecycle

Tricentis offers a holistic testing solution covering the entire software development lifecycle, from initial development to deployment and beyond. This comprehensive approach reduces risk, ensures compliance, and improves software quality.

✔ Risk-based testing

Tricentis prioritizes business-critical processes of applications, focusing on patient safety and data security, leveraging risk-based testing to ensure that vital functions are thoroughly tested, continuously monitored, and optimized for system stability and regulatory compliance.

✔ Integration with healthcare workflows

Tricentis tools integrate seamlessly with healthcare-specific workflows, simplifying compliance with regulations such as HIPAA, GDPR, and FDA guidelines.

✔ Accelerating time-to-market

Tricentis' continuous testing capabilities accelerate time-to-market for healthcare applications, helping organizations to stay competitive and responsive to evolving healthcare demands.

✔ Cost efficiency

By automating testing processes, Tricentis reduces costs, enhances productivity, and optimizes scope and resource management for healthcare organizations.

✔ Support for emerging technologies

Tricentis supports the future of healthcare technology by enabling AI-driven test automation, continuous testing for machine learning models, and validation of telemedicine and blockchain-based solutions, ensuring that healthcare organizations can confidently adopt and scale future innovations.

4. Sii expertise in healthcare testing

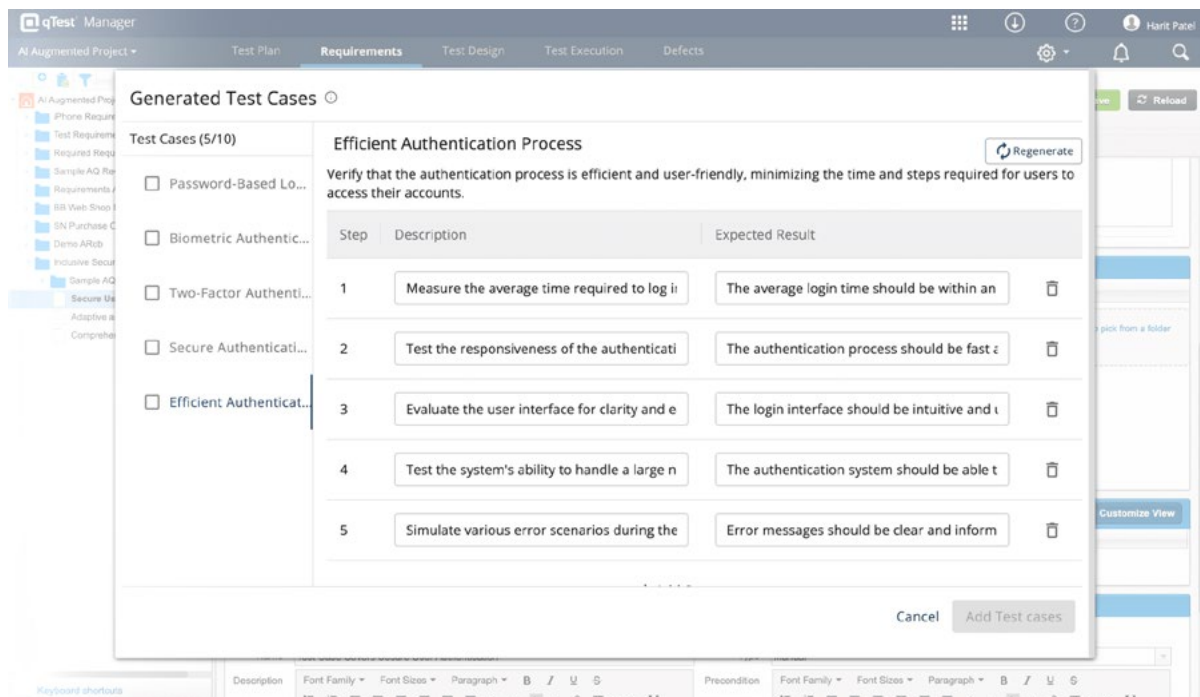


Fig 2. Tricentis qTest

A trusted partner with industry expertise is essential in healthcare, where accuracy is critical. In collaboration with Tricentis, Sii, an IT and engineering services leader, combines deep industry knowledge and cutting-edge testing solutions to deliver reliable, secure, and compliant results for healthcare organizations.

By leveraging the Tricentis platform, Sii:

- Assist with selecting the best solution for your end-to-end testing.
- Prepares and executes tool qualification according to GxP specifications.
- Automates test cases to accelerate testing cycles.

- Improves test coverage for critical functionalities.
- Covers functional and non-functional testing requirements.
- Enhances test data management and provisioning.
- Integrates testing into CI/CD pipelines for seamless development workflows.
- Provides advanced analytics for valuable insights into testing processes.

To showcase the impact of this partnership, we present several real-world case studies demonstrating how Sii and Tricentis have worked together to implement test automation solutions in the healthcare sector, helping clients in biotechnology and pharmaceuticals achieve measurable success.

1. Test Automation Center of Excellence development for a Danish biotechnology company specializing in developing innovative antibody therapeutics.



Challenge

The client aimed to establish a Center of Excellence in Test and Quality Assurance by enhancing existing test processes and selecting a new test automation solution. The solution had to cover all technologies used across the organization, fully support end-to-end (E2E) testing scenarios, and ensure thorough coverage of all critical workflows. Additionally, it had to be suitable for GxP purposes and adhere to all regulations related to the CSV process.



Solution

Tool selection

- Assisted the customer in choosing the optimal test automation framework.
- Ensured full compliance with company requirements and the Computerized System Validation (CSV) process.

Implementation & validation

- Established a core team responsible for:
- Implementing the selected solution.
 - Validating the framework before deployment.

Deployment & effectiveness

- Introduced test automation in initial projects.
- Ensured the solution was effective, reliable, and ready for broader adoption.

Benefits

By implementing the validated test automation solution, the customer reduced manual effort significantly and the cost of quality control for their systems.

2. Test automation solution evaluation for a provider of software solutions for pharmaceutical, biotechnology, and medical device companies.

Challenge

The aim was to identify and implement the most suitable test automation solution that seamlessly integrates with the customer's existing technology stack and testing processes. The chosen solution had to comprehensively support end-to-end (E2E) testing scenarios, ensuring thorough coverage of all critical workflows. Additionally, it had to be straightforward, user-friendly, and maintainable, minimizing the need for extensive training and ongoing support.



Solution

Tool selection

We analyzed four leading test automation frameworks: **Selenium, Tricentis Tosca, Playwright, Katalon**

Evaluation criteria

Each framework was assessed based on the following criteria:

- Functionality and capabilities – scope of supported tests and available features.
- Usability – ease of use, learning curve, and technical expertise required.
- Covered technologies – compatibility with different platforms and programming languages.
- Maintainability – complexity of updates and test management.

- Integration possibilities – compatibility with other tools and systems.

Practical testing

After the feature comparison, we developed automated test scripts using each framework.

We measured key performance factors:

- Time required for script creation and execution.
- Script stability – multiple test runs to assess reliability.

Findings & recommendations

- We demonstrated each solution in practice.
- We provided final recommendations covering all evaluation criteria.

Benefits

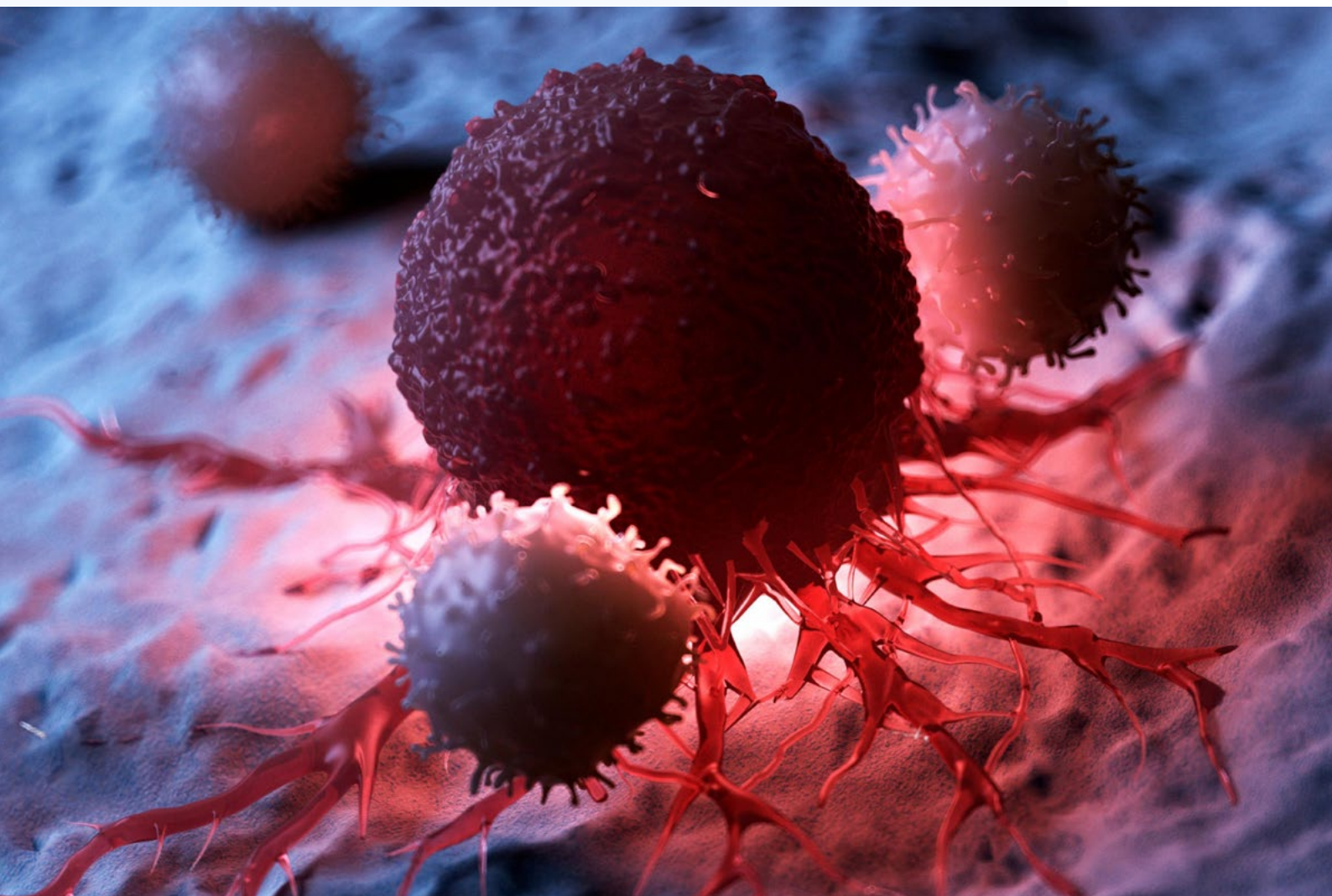
The client has selected Tricentis Tosca for its comprehensive coverage, ease of use, efficiency, reliability, and seamless integration. This choice provided the customer with a scalable, maintainable, and efficient testing solution, enhancing software quality and accelerating delivery.

3. Implementing test automation in several projects as part of Testing Services for a multinational biotech company and a leading provider of cancer treatments globally.



Challenge

The client needed to improve the quality of the existing testing solution and reduce regression and smoke test time in 8 projects. The primary goals of automation were freeing clients' resources to test new functionalities and increasing the number of releases in the project life cycle.



Solution

- Built the optimal scope of automation using the risk-based approach.
- Automated tests in 8 different projects - more than 700 test scripts.
- Implemented test automation both in backend and frontend projects.
- Performed testing and maintaining test automation in a validated GxP environment.
- Implemented test automation in frameworks: Robot, Java Selenium, Tosca, C#.

Benefits

The implementation of test automation allowed manual testers to focus on critical issues or new features, improved the quality of new functionalities due to an increased scope of tests, accelerated time to market, and contributed to overall time savings and cost reduction in testing services.

These case studies demonstrate how strategic test automation implementations can drive efficiency, ensure compliance, and reduce costs. By leveraging advanced automation frameworks, organizations can enhance software quality, accelerate delivery, and more easily maintain regulatory standards.

Remek
Senior Test and
Analysis Engineer



Elevate your healthcare testing with **Sii x Tricentis**

Partnering with Sii and Tricentis allows you to harness the power of Continuous Testing to boost patient safety, speed up time-to-market, ensure compliance, optimize resources, and support innovation. Leverage our experience to significantly streamline your operations and enhance efficiency within your healthcare organization.

Enhance patient safety

Ensure the reliability and efficacy of your systems and products.

Accelerate time-to-market

Streamline testing processes and reduce deployment time.

Mitigate compliance risks

Adhere to stringent regulatory requirements with confidence.

Optimize resource utilization

Maximize testing efficiency and reduce costs.

Foster innovation

Build a strong foundation for future digital transformation.



Do you have questions?
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