wetcon IT SOLUTIONS

Case Study

Automated error scenarios for lab automation software

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Project	**Automated error scenarios for lab automation software**	Technologies	**C#, WCF-Services, RabbitMQ, Azure DevOps**
Customer	**Global producer of laboratory and diagnostic systems**	wetcon Services	**Software engineering, test automation**
Industry	**Healthcare technology / Lab automation**	Period	**2024 - 2025**

Wetcon has created a desktop application designed for the automated simulation and validation of error cases for a prominent international manufacturer of laboratory automation systems.

The solution enables the intentional injection of errors at the robot command level and facilitates the automatic verification of the system's correct response. This capability allows for the reproducible testing of complex error scenarios, resulting in significantly enhanced test coverage, improved software quality, and more stable laboratory processes within production environments.

Initial situation and challenges

The laboratory automation software utilized by the customer manages intricate process chains and must respond dependably, even in extraordinary circumstances. Previously, this could only be tested to a certain degree.

- Up to this point, error cases could only be realistically replicated with significant manual effort, or not at all.
- Critical scenarios at the robot or command level were challenging to replicate and reliant on the specific hardware.
- In the regulated landscape of medical technology, there are significant requirements for the stability, traceability, and documentation of test results.
- There was a necessity for automated, repeatable tests to guarantee software quality and to expedite development and release cycles.

Our approach

Wetcon has created a specialized testing application that introduces both defined and randomized error scenarios into the current laboratory automation software, while also automatically validating their processing.

At the individual robot command level, error states are simulated, anticipated reactions are recorded, and systematically verified – encompassing logging and assessment for development and quality assurance.

Technical Execution

Architecture platform	Desktop application developed on the .NET framework featuring a modular architecture that allows for flexible expansion to incorporate new error scenarios.
Programming language	.NET / C#
Communication	Asynchronous communication through messaging systems for incorporation into the current system environment and for the manageable execution of tests.
Interfaces / Protocols	WCF services and RabbitMQ facilitate the connection of laboratory automation software, enabling the control of test cases and the recording of system responses.
UX/UI focus areas	A clear display of test cases, error conditions, and validation outcomes, along with a user-friendly interface for developers and testers – featuring options for filtering, searching, and assessing test executions.

Outcomes & Benefits

Software quality and reliability were significantly enhanced through automated, reproducible testing of intricate error scenarios at both the system and robot levels.

Significant acceleration of development and release cycles due to decreased manual testing efforts and quicker, automated feedback.

Enhanced transparency and traceability within the regulated environment via organized logging and assessment of test outcomes.

You want to test error scenarios in an automated and reproducible way?

Contact us – we support you in building a tailored test automation solution for your laboratory or medical software.

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