VUCE

The platform that enhanced quality and achieved a five-fold increase in delivery speed

Whitepaper

GeneXus™

Uruguay's Single Window for Foreign Trade (VUCE, for its acronym in Spanish) is a platform **connected to 91% of the government and other agencies in Uruguay, and it is used from Argentina, Brazil, Chile, Paraguay, Russia, Mexico, Vietnam, and Israel.** It has led progress in the region, promoting the application of best practices and cross-border interoperability to achieve paperless foreign trade. The technological platform **implements 186 different processes from 29 agencies, currently processing 400,000 procedures per year.** It reduces paper usage, unnecessary transfers and waiting times, while reducing costs and generating greater competitiveness. This article describes the changes that allowed VUCE to **increase the quality and frequency of releases of the platform used by 54,000 users.**

Uruguay's VUCE platform was launched in 2010 as an initiative of the National Customs Department's modernization process and the Inter-Ministerial Commission for Foreign Trade Affairs (CIA-CEX). It aims at promoting the use of information technologies, aiming at process optimization and stakeholder cooperation. The system began development in 2013 after an international public bidding process by an agreement between Concepto, supplier of the National Customs Department's system, and GeneXus Consulting. The VUCE team was partially integrated into the platform development process from the beginning.

As of 2018, VUCE took full command of the development process. In particular, in each release instance, manual testing of the platform used to take 120 hours in the previous week and 40 hours of release stabilization in the following week. During this last phase, users who found errors in their processes would have a negative experience. In turn, this problem negatively impacted the support and development team, because the development of fixes and new requirements would be stopped. In that moment, VUCE identified the need to optimize the testing process and to improve the platform's quality by means of automated testing with GXtest v4.

«Our main problem was that when checking the system, we had to reallocate collaborators from different teams and there wasn't enough time to do regression tests. Without this type of testing, we could not guarantee the application's quality and would be unsure about the releases, which overburdened the support, process and development teams.»

Juan Juncal, Technology manager

Main drivers of change at VUCE to bring a five-fold reduction in delivery times and improve quality for its 54,000 users

Implementation of automated testing

VUCE automated a set of 82 UI flows with GXtest v4 in GeneXus 16, in a separate KB from that of the application due to the fact that the platform was being migrated to the same version. The tests were implemented with the support of GXtest Recorder, a Chrome extension that records the test case and generates GeneXus code. Among the main strengths of the toolkit chosen for automation, the following stood out:

> Simplicity and power of Integration and management of
> test objects in the same KB of the application.

Methodology

The execution of automated regression tests implied a methodological change. VUCE was trained in agile methodologies and, in particular, defined its methodology based on:

> Daily and weekly coordination meetings
> Visibility of the work defined
> Execution of automated tests in each version
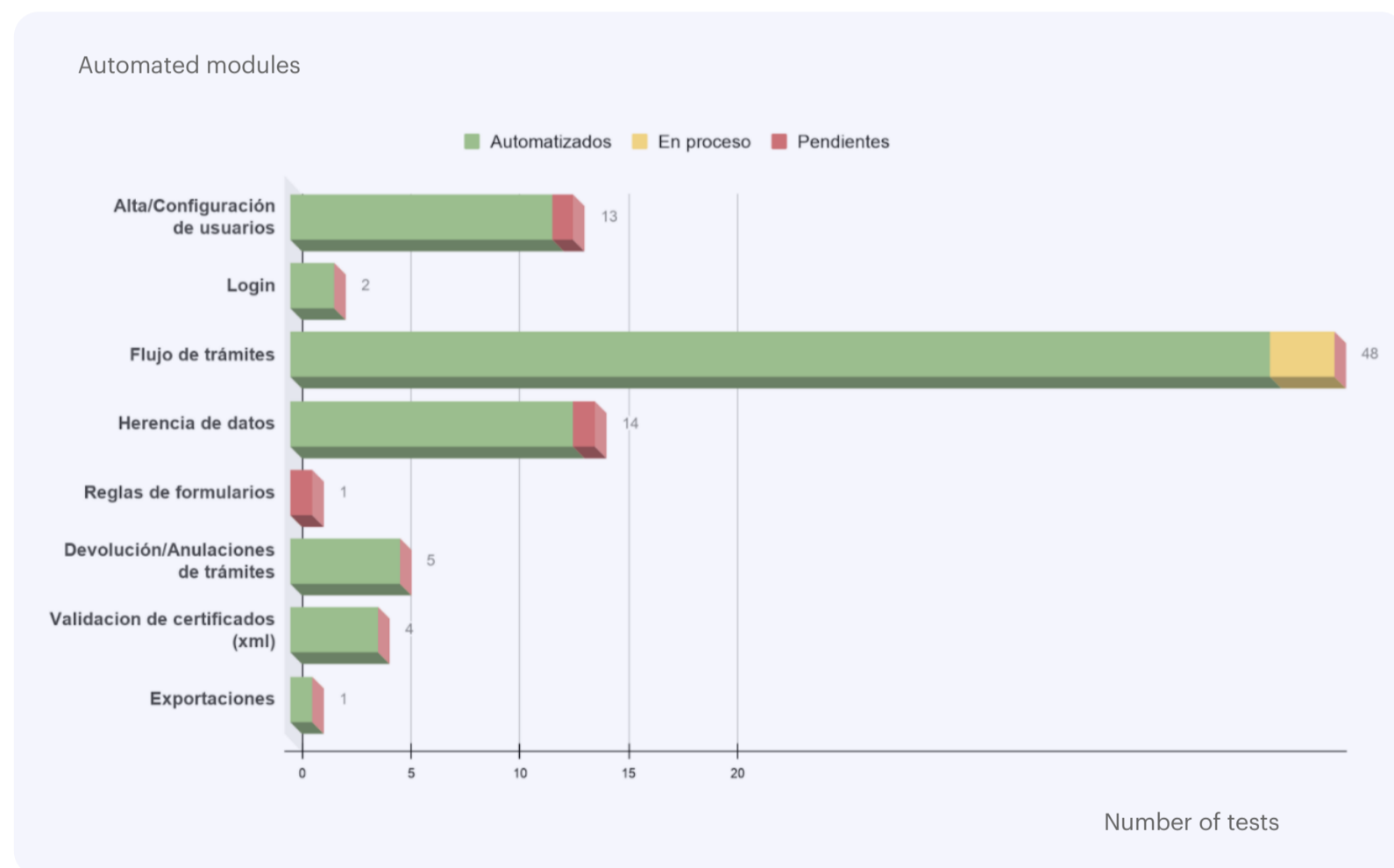> Fixed release dates.

«GXtest prompted us to undertake a methodological change that allowed us to approach the DevOps culture. We had to redefine processes in all work teams to make automation sustainable over time. We realized that the problem was not the people or the tools, but how people managed the tasks.»

Juan Juncal, Technology manager

Impact on quality during implementation

VUCE **defined the regression test suite by high business risk, complex and/or time-consuming cases.** The speed of implementation of the 82 flows was increased by generating GeneXus code obtained through the GXtest Recorder extension. In particular, VUCE flows had an average of 30 screens each, and included multi-user sessions, electronic signatures, and multiple file uploads on the same screen. The following graph shows **the 88% of automated flows implemented in 440 hours,** flows in progress, and flows pending automation for each system module.

Automated modules

Legend: ■ Automatizados ■ En proceso ■ Pendientes

Module	Number of tests
Alta/Configuración de usuarios	13
Login	2
Flujo de trámites	48
Herencia de datos	14
Reglas de formularios	1
Devolución/Anulaciones de trámites	5
Validacion de certificados (xml)	4
Exportaciones	1

Number of tests

During the implementation phase, the system's response time and usability were improved; in particular, the start time of procedures was reduced from 50 seconds to less than 10 seconds.

Increased quality in VUCE for the execution of tests

VUCE ran the UI test suite on Chrome and Firefox in a test environment (production mirror). On each release, **the test suite was manually triggered from the GeneXus IDE for a 15-hour overnight run** to reduce waiting times. After each execution, 20 hours were devoted to the analysis of results, review with development, test maintenance and documentation. This led to a reduction of testing hours by an **86% reduction in the number of hours devoted to testing.** From the fourth version onwards, the return on investment began to be noticeable. As a result, an average of 2 bugs per version were identified in the test environment, preventing them from reaching end users. In addition, **production bug reporting per release was significantly reduced from 8 to 1 bug.** The following table shows the average cost in hours and bugs reported in production per version, as well as the estimated delivery time, before and after automation.

Type of Testing	Cost in hours	Bugs reported	Average delivery time
Manual	160	8	75 days
Automated	20	<1	20 days

«Automation ensures that we can run tests several times and in more than one environment per sprint, without assigned collaborators. They help us to validate that infrastructure changes made were not impacting any functionality.»

Juan Juncal, Technology manager

The new methodology had a major impact on the development team, **allowing them to release 5 times faster and more securely, without introducing known bugs in the platform or changes that affect the most critical system flows.** Additionally, it had a positive impact on the support team as end users reported fewer bugs. The team was able to send better delivery time estimates for new requirements and/or fixes. VUCE's technology team is currently aiming to achieve full coverage of system UI testing. In the short term, VUCE will implement a continuous integration scheme, where changes will be integrated, code will be compiled, and tests will periodically run unattended. In the longer term, VUCE will incorporate automated unit tests from the development stage, in order to ensure that no known or critical bugs are introduced in the logical layer of the application.

<< I like to measure improvements in delivery quality by the number of bugs that make it to production; with automation, the number of bugs decreased considerably. Our plan going forward is to achieve a continuous delivery scheme with a fully automated development cycle. Our vision is to implement testing as early as possible in the development process.>>

Juan Juncal, Technology manager

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do the same for your company.

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