Coveros Eliminates a Software Bottleneck

by Developing an Automation Strategy for Functional and Security Testing

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CHALLENGES

- A DevOps pipeline with no automation
- Struggles verifying deployments and features
- Manual testing
- Insufficient security testing

SOLUTIONS

- Test automation
- Integration with CI/CD pipelines
- Base suite of API and functional tests
- Security testing strategy

Coveros worked with a software consulting company that provided security, enterprise cloud, big data analytics, financial project management, and strategy consulting solutions. One of the main focuses of the company's work was providing many web applications for different government agencies. The success of the company was dependent on customer satisfaction with regard to the functionality of these web applications.

CHALLENGES

- The company had a DevOps pipeline but no automated tests, leading to unnecessary time spent manually verifying deployments or, even worse, verifying only new features while blindly accepting older features that may have been broken by new development
- Improvements were needed in test process, code coverage, and test data
- Tests were mainly manually executed
- Security tests were performed sparsely and by hand

Without automated testing, many hours were spent regression testing features, cutting into time that could be better spent testing new features. As an application grows, manual testing becomes more and more prone to error, as it becomes almost impossible to regression test all previously implemented features during a sprint. This affects software quality when bugs are introduced by adding new features that may have interactions with older features.

Contributing even more to the testing bottleneck was the fact that there was only one test engineer at the company who performed only manual tests on applications. In an attempt to make up for the lack of test engineers, business analysts without testing expertise were standing in for test engineers to manually test features.

The company needed a means to automate testing for its web applications to support development of new functionality, along with ongoing maintenance and support activities.

SOLUTION

Coveros provided automation expertise to rapidly assess the current development process, then gave automation strategy recommendations, drafted an automated test proof of concept, and created and implemented test automation to support development and production release activities.

Coveros recommended the Selenified testing framework, an open source testing framework that provides traceable reporting for both web and API testing, wraps and extends Selenium calls to more appropriately handle testing errors, and supports testing over multiple browsers locally or in the cloud (Selenium Grid or SauceLabs) in parallel. Coveros quickly integrated the Selenified testing framework into existing build tool configurations to allow any developer to create and run functional tests on web applications as well as web services.

Test engineers at the company were then mentored by Coveros employees, who taught them how to write and maintain automated tests with Selenified. Company employees took ownership of functional testing for an application, creating more than a hundred front-end functional tests.

Next, the automated tests were added to existing CI/CD pipelines and build tool configurations. This gave developers rapid feedback and insight into software quality as they developed new features. The tests also acted as a quality gate, ensuring that all features, new and old, worked as intended before promoting a build to a later environment in the release cycle.

To take full advantage of the CI/CD pipelines already in place, Coveros added security tests. These security tests used OWASP ZAP and sqlmap to actively and passively scan web applications for common vulnerabilities. Including these security tests in the pipeline meant moving them to earlier stages in the development cycle, which allows vulnerabilities to be recognized more quickly, shortening cycle times and reducing the risk of releasing vulnerable software. The new security tests realized vulnerabilities in the software, allowing developers to fix the issues before they could be exploited.

Coveros also developed a SonarQube plugin to report the findings of sqlmap scans and alert developers when they had added code that exposed vulnerabilities.

TECHNOLOGY SOLUTIONS

Test Automation
- Front-end and API testing with Selenified
- Security testing with OWASP ZAP and sqlmap

Continuous Integration
- Customized SecureCI (Trac, Jenkins, Git, Tomcat, Apache)
- sqlmap SonarQube plugin

BUSINESS VALUE

Coveros was able to help the company achieve a number of business benefits, including increased ability to implement system improvements while reducing risk, escaped defects, and test cycle time.

Coveros wrote more than fifty API tests and more than a hundred functional tests across three applications. Having a base suite of API and functional tests allowed the CI system to block code from being added to the project when these tests did not pass. This empowered developers to refactor and improve the codebase, while giving them confidence that existing features remained functional. Including security tests into their CI/CD pipelines also reduced the risk of introducing security vulnerabilities and cut down on expensive rework caused by discovering security vulnerabilities later in the software development lifecycle.