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Objectives and Challenges

Our client, the leading supplier of retail banking software, implemented their original platform on dedicated hardware using a waterfall-style SDLC with manual testing. This approach required costly up-front capital investments and resulted in longer than desired release cycles. Their initial project goal was to shorten the time to deliver new features through higher first-release quality. Implementing an agile SDLC built upon a cloud containerized architecture using RedHat OpenShift and Microsoft Azure would achieve this goal and, in addition, reduce up-front and operational costs.

Elyxor was tasked to demonstrate the value of this new delivery model by deploying one of our client's premier products into a cloud-based elastic infrastructure leveraging continuous deployment and test automation. Our client wanted to deliver the following capabilities within an eight-week timeline.

Digital Agility

- Manage change and release functionality on the timeline of business requirements in day or weeks and not months
- Measure the success of change with Green / Blue Deployments, AB testing, and analytics

Continuous Delivery

- Deploy and run test automation to facilitate rapid change and confidence in quality
- Provide a dashboard with automation test results and environment health status

Elastic Scale

- Deploy a cloud-native component to a hybrid-cloud on RedHat OpenShift and Microsoft Azure
- Dynamically scale the environment based on customer load

Elyxor Approach

The Elyxor team consisted of a project lead, automation architect, automation engineer, and DevOps engineer. This team joined a hybrid team with the client's Tools team, DevOps engineers, and business analysts.

The SDLC followed an agile methodology and lasted three 2-week sprints with daily scrum meetings, a mid-project checkpoint, and culminated with an executive presentation. The project was split into the following workstreams:

1. Functional test automation
2. CI/CD/CT pipelines
3. Operations health dashboard development
4. Performance test automation

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Results

Within this compressed time frame, Elyxor delivered a working test automation infrastructure and workflow that fully integrated into our client's development processes. As a result, our client successfully demonstrated business value at their annual customer conference as outlined below.

Digital Agility

- Improved customer speed-to-market and business investment
- Deepened partnership as a technology enabler to the business

Continuous Delivery

- Improved project speed-to-acceptance for timeline risk reduction
- Delivered automation for increased margin and release quality

Elastic Scale

- Reduced environment setup time and maintenance costs
- Supported future growth and component expansion

Deliverables by Workstream

Functional Test Automation

To accelerate the functional test automation workstream, we integrated our proprietary Elyxor Test Automation Platform (**ETAP**) into the client's process and infrastructure. Depicted in blue within figure 1, **ETAP** provides common services that save time and provide a consistent and easily maintained pattern for test case development and management. Functional test cases were written in Java and used Selenium, to drive UI and headless browser automation. Test data used for inputs and expected result values were managed with externalized JSON files and retrieved by the **ETAP** data services. Test management and reporting was done via REST APIs to the client's TestRail tool instance via **ETAP** test management services.

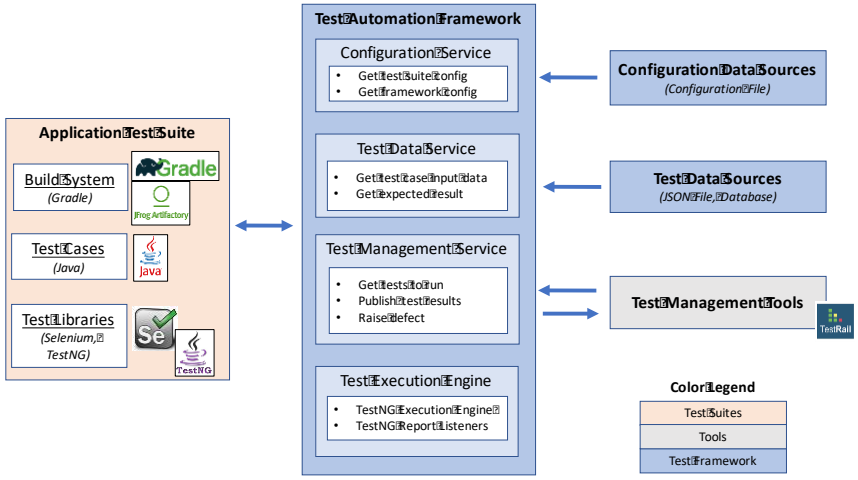

Figure 1. Continuous Automated Testing Framework components

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CI/CD/CT Pipelines

Elyxor developed Jenkins files enabling automated pipelines that triggered test behavior using OpenShift configuration files to enable the deployment of new Docker Images into the OpenShift environment. The process flow that was developed to deploy a new release to OpenShift and run automations tests is depicted in figure 2.

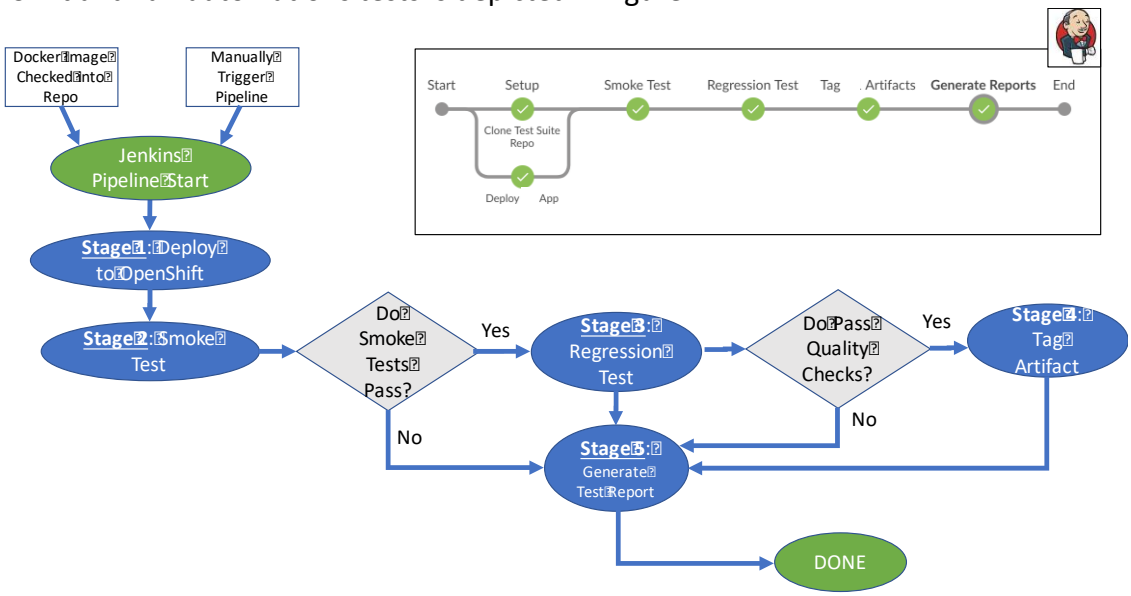

Figure 2. CI/CD/CT Process flow using Jenkins and OpenShift

Performance Test Automation

Elyxor was able to quickly demonstrate performance-based scaling in the OpenShift environment by generating enough volume to trigger the elastic scale rules within OpenShift that auto-provisioned new pod instances. To achieve this, we used Jmeter load test scripts and the on-demand load test infrastructure provided by Blazemeter as depicted in figure 3.

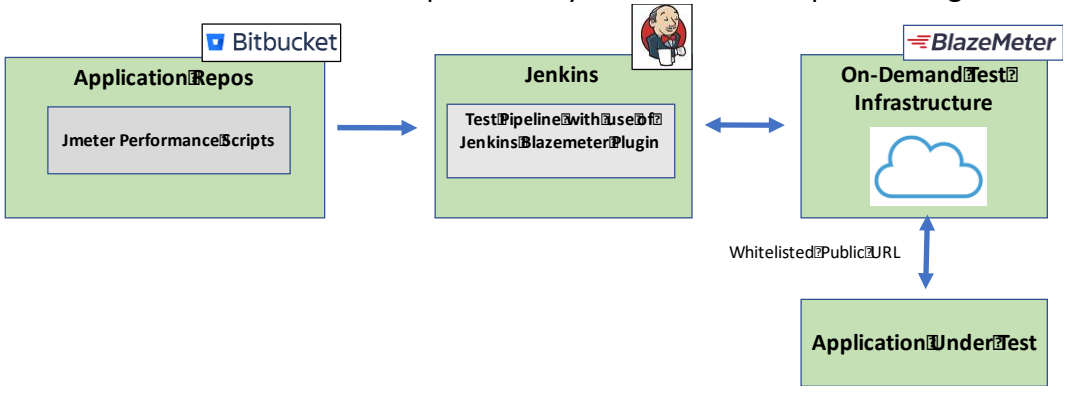

Figure 3. Performance Test Configuration

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Operations health dashboard development

Elyxor developed a web-based dashboard as the central point of information for the project team providing visibility into the following:

- Availability of Test Environment
- Latest Jenkins Pipeline Status
- History of Automation Testing pass/fail test “build” results
- Status and current deployment in the OpenShift environment

The dashboard was developed in Python, built as Docker images, and deployed into OpenShift. The dashboard accessed real-time data via Jenkins and OpenShift API calls.

Tech Stack

- Elyxor Test Automation Platform
- Testrail
- Jenkins
- Bitbucket
- Jira
- Artifactory
- TestNG
- OpenShift
- Java / Gradle
- Microsoft Azure
- Python