TESTING PROFESSIONALS SPEAK: GETTING TO SUCCESS WITH CONTINUOUS TESTING

PeerPaper Report

BASED ON ACTUAL USER EXPERIENCES & OPINIONS

IT Central Station
Unbiased reviews from the tech community

ABSTRACT

Business applications have become the battleground for customer loyalty. To compete, IT organizations are under pressure to deliver applications faster and with higher quality. Continuous Delivery (CD) of code offers a solution. CD may be paired with DevOps, Agile and other methodologies. However, QA and testing can be an obstacle to CD's rapid development and deployment of high quality code. Testers and developers must engage in Continuous Testing, continuously testing software for performance, quality and user experience as it's being developed. Continuous Testing is not a push button process, though. It requires a comprehensive approach. This paper outlines the common challenges to Continuous Testing and highlights results from real users who have used technology to get to succeed with the Continuous Testing process.

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INTRODUCTION

The digital connection between businesses and their customers grows more critical with the passage of time. The in-person experience is increasingly being replaced by electronic interactions. These may involve mobile apps, web-based software, phone-based IVR, onsite kiosks or an “omnichannel” experience involving all of the above.

Business applications have thus become the battleground for customer loyalty. The IT organization now faces pressure to deliver applications and features faster than ever before. Continuous Delivery (CD) of code using DevOps and various agile methodologies is essential to achieving this goal.

QA and testing can form an obstacle to continuous delivery and deployment of high quality code, however. Testers and developers must continuously test software for performance, quality and user experience as it’s being developed. Continuous Testing, as the process is known, is not a push button process. It requires a comprehensive approach. This paper outlines the common challenges to Continuous Testing and highlights the results from real users who have used technology to overcome them.

Problem: The Need to Deliver Better Apps Faster

Apps have become a vehicle for competitive strategy. Consider the following hypothetical example, which may seem familiar: A company’s customer service operation has evolved from using phone-based reps getting information from mainframe terminals to customer web-based self-service. Competitors have outpaced the firm, however. They now offer a mobile app that enables self-service to customers on the move.

The company can respond by developing its own, better mobile app. The competitor will answer that by adding more features to its app. If the company cannot add better features or updates more quickly, it will fall behind. In this way, fast, high-quality application development and deployment have become essential to competitive success. Rapid application development could even affect survival of a business in the age of digital transformation.

Solution: Continuous Delivery

Continuous Delivery (CD) is an approach to software development and release where teams develop code in short cycles known as sprints and then reliably release to production at any time. Done right, CD reduces the time, cost and risk of rolling out new apps and features by allowing a more incremental approach than a traditional waterfall development process.

Figure 1 captures the basic cycle of CD. CD relies on repeatable processes and automation. A well-organized CD process can quickly react to feedback from automated testing and user acceptance tests, rapidly revising and resubmitting code for acceptance.

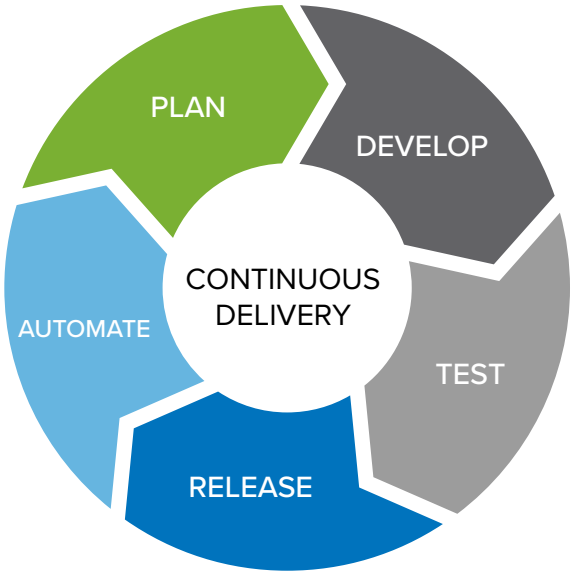

Figure 1: Continuous Delivery workflows.

Challenge: QA/Testing Bottleneck to Continuous Delivery

Quality Assurance (QA) and testing have emerged as obstacles to success with CD. As Figure 1 shows, the process depends on fast, effective testing of new code—no matter how frequently the code is checked in. Iteration lengths have shrunk from months or weeks to days or even hours. Traditional testing methods are not usually suited to this kind of speed. Testing limitations that can throttle the pace of CD include the following:

• **Test cases not aligned to business objectives** – CD and agile methodologies disrupt the previously linear flow of gathering business requirements, creating code and then testing against those requirements. By its nature, CD tends to throw new business objectives into the mix unpredictably. As a result, requirements change – a lot, and often. So, test cases may not align, and traditional modes of testing may have trouble keeping up.

• **Test data not available** – Testing needs test data, and creating appropriate data is a constant challenge in a CD testing environment. As a Sr Test Manager at a transportation company with over 500 employees commented on IT Central Station, "Test data creation, for us, was a very manual process. The options were either creating it with hands-on keyboards with people actually having to spend time creating it, and we would also do some things where we would just grab data out of production. That didn't always work for us, because you didn't know what you were going to get when you captured that data."

• **Resources and services hard or costly to acquire** – Testing for CD requires new skillsets and tools. For some IT departments, this is an unexpected challenge and expense. Purpose-built testing solutions for CD can help fill in gaps cost-effectively.

• **Performance testing is an afterthought** – The code produced by the CD process creates a number of performance testing scenarios. The code itself needs to be tested for performance. Then, given the highly integrated nature of today's digital business environments, there will likely be a great deal of legacy integration to test for reliability and performance. The Sr Test Manager at the transportation firm explained, "We have everything from legacy, RPG iSeries type

stuff, all the way up to applications in the cloud, and we needed something that would scale for all of those."

A Senior Specialist at a transportation company with over 1,000 employees added color to this notion, saying, "We knew we needed to invest in a new [testing] solution because our company was dealing with a lot of transformations. Not only do we still have a large root in our legacy systems, that are the iSeries, DB2-type of systems, but we have tons and tons of applications that have been built on a much larger scale in the past 40 years, since the original solutions were rolled out. Not only did we have a legacy transition occurring within our own company, but we also changed the way that our teams were built out. We went from teams that were a waterfall, iterative, top-down approach, to a much more agile shop."

• **Lack of visibility and automation throughout the Software Development Life Cycle (SDLC)** – While the workflows shown in Figure 1 seem clean, the reality of CD can be confusing and opaque. To work as quickly and accurately as needed, testing needs to be infused into the entire release process from planning through production, and testing teams must have visibility into the full scope of testing across the SDLC. This is often missing when traditional testing methods are applied to CD, where testing is siloed, time consuming and lacking fast feedback loops.

Answer: Continuous Testing

Continuous Testing is an evolution of software testing that introduces more frequent testing triggers as well as automated tests throughout the SDLC. The goal is to provide fast feedback on a software release's risks in both the business and IT contexts. The scope of Continuous Testing encompasses the validation of bottom-up requirements and user stories as well as assessing system requirements and related business objectives.

Continuous Testing encompasses the idea of "Shift Left." The phrase refers to conventional placement of testing at the end of the development cycle, on the "right" side of a flow chart. With CD, however, testing needs to take place earlier and more often (as in "Test early. Test often."). Figure 2 captures the "Shift Left" pattern in software development workflow. Testing needs to shift to the left to earlier placement in the software development and deployment processes.

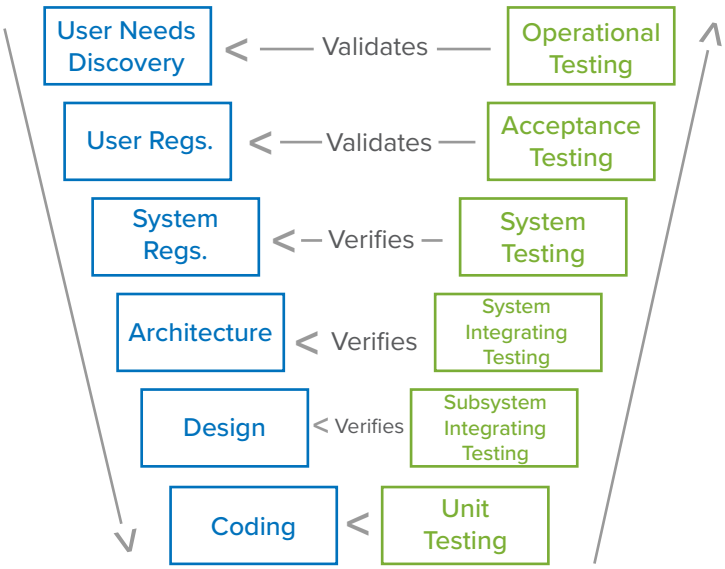

Figure 2: "Shift Left" testing, moving testing up and to the left in the development workflow.

Success Factors for Continuous Testing

Continuous Testing is attainable for most IT departments. Getting there involves adapting processes, rethinking the overall approach to the role of testing and acquiring new tools. Reviews of tools for Continuous Testing on IT Central Station reveal what testers see as success factors for Continuous Testing.

AUTOMATIC TEST CASE GENERATION FROM PLANNING

Manual and unsystematic creation of test cases slows down the testing process. Continuous Testing thus benefits from automated requirements design and test case generation. As an Automation/

Service Virtualisation Manager at a comms service provider with over 1,000 employees explained, "Test Automation enables us to trigger events and automate test cases." A Senior Test Automation Consultant at a tech services company with over 500 employees praised his Testing Tool's "Support to build modular test cases using reusable blocks (called sub-processes in DevTest)."

A Chief Of Architecture & Industrialisation at a major European bank discussed how his continuous testing tools helped his organization by "modeling how the application works, and then getting every use case we can test. Designing the right tests, what are the most critical tests we must do." A Director Of QA at a company with over 1,000 employees explained, "Primarily, we use it [our continuous testing tools] to convert our test process to model-based. It has actually changed our entire process from script-based to model-based."

To put the improvement in perspective, the Director of QA added, "It has been pretty dramatic. We have rolled it out across many of our digital teams. In the first year, we saw about a 70% reduction in our script creation time. So, we went from five days per sprint to one day, one to one and a half days per sprint in the script creation. So, it has been really effective." A QA Group Manager at a financial services firm with over 1,000 employees concurred, noting that his testing tools had cut 75% of the construction time out of testing.

A Senior IT Manager at a manufacturing company with over 1,000 employees concurred. Regarding his testing tool, he said, "The most valuable feature for us is the automatic creation of the test cases, based on the models. And the impact analyzer that shows you where your change is impacting your test cases, and the ability to export that to our TFS [Microsoft Team Foundation Server] Instance." He then added, "There are three major benefits. The first one is there is a time savings. It's much faster to create the model than it is to generate test cases. It's much faster to update the test cases in the model than it is to update them manually."

QUICKLY CREATING TEST DATA

Testing relies on test data, which can be time-consuming to create. As an AVP Quality Assurance at a financial services firm with over 1,000 employees explained, "When you have to generate the amount of loan volume that we need—50 states, various tax laws, etc.—I needed a solution that I can produce quality data that fits the target testing we need; any extra test cases; etc. We're more concentrated on being very succinct in the delivery and the time frame that we need to get the testing done in."

To prove his point, he added, "We have certain aspects of our data that we have to self-generate. The VIN number is one that we have to generate and we have to be able to generate on the fly. CA TDM [Test Data Manager] allows us to generate that VIN number based upon whether it's a truck, car, etc. We're in the car, auto loan business."

A Practice Manager (Testing Services) at a at a financial services firm with over 1,000 employees put data creation in terms of the speed to market. He said, "Because we don't manually produce data anymore, we use intelligent profiling techniques and test data matching, we massively reduce the time we spend finding data. We also can produce data on the fly, which turns around test data cycles. In terms of cost, because we're doing it a lot quicker, it's a lot cheaper."

A Practice Leader - DevOps at a tech services company with over 1,000 employees explained his choice test data creation by saying, "One of the reasons we chose CA, aside from the fact that we are CA partners, is due to support for PCI and PHI in terms of faster test data generation. The biggest differentiation was in generating test cases from the

data. CA implemented this for test matching and then integrated it with Agile Requirements Designer. That tipped the scales in favor of CA TDM."

He then added, "The most valuable features for us are masking, data profiling, and creating data subsets. More specifically, we are able to assist our clients with data privacy and the regulatory recommendations that come from the government. We help them to comply with PI, IP, HI and PCI regulations. CA Test Data Manager is enormously helpful to us. We assist our customers by speeding up the application development process using real-time test data and synthetic test data, which mimics the real test data."

VIRTUALIZING SERVICES AND APIs

The ability to virtualize web services and APIs speeds up Continuous Testing, as the Automation/Service Virtualisation Manager at the comms service provider described. He said, "Service Virtualization provides us with the ability to replace real downstream systems with virtual systems. It reduces cost when we can replace expensive downstream systems. It improves speed of testing when systems are not always available." How does it work? According to a Senior Technology Manager - Digital Channel Technology at a financial services firm with over 1,000 employees, service virtualization can "mimic the actual endpoints, which makes it much easier for testing."

> "It helped us to start the performance testing activities much earlier in the testing life cycle. It also reduces overall cost, as we can replace the expensive third-party services with virtual services."

A Programmer Analyst at a tech vendor with over 1,000 employees felt that service virtualization was the most valuable feature of his testing tool. He said, "It helped us to start the performance testing activities much earlier in the testing life cycle. It also reduces overall cost, as we can replace the expensive third-party services with virtual services. It shortens the performance testing period, as there is minimal component-level dependency [and] reduced cost per transaction in case of third-party virtualization." A Manager, Applications Development at a comms service provider with over 1,000 employees agreed, noting, "The most valuable feature is the ability to virtualize almost any web service which allows us to perform testing and speed up our development."

A Sr. SDLC Architect at a tech services company with over 500 employees commented, "Listening to our executives, one of the key difficulties that the development teams were having is the ability to test faster, so they can't deliver content faster to our customers because they can't test fast enough mostly because of these dependencies and the outside suppliers. Having a service virtualization solution gives us the ability to disconnect ourselves from our suppliers and those blocking dependencies, allows us to go faster."

Service Virtualization contributes to return on investment (ROI) for testing and development. A Software Test Lead Contract at a financial services firm with over 1,000 employees stated, "Service virtualization has reduced infrastructure costs by close to 40%. It helps in early problem detection and early fix, leading to early product release."

Sr Development Manager at a comms service provider with over 1,000 employees described how virtualized services help him "shift left." He said, "I'm doing a deployment of an environment / application, it's being configured, and then if I need to I'm going to use virtualized services for some or all. What we've been working on is how we can do a lot of that shift to the left by using service virtualization, so when we deploy we can at least get the development teams testers up and running on the

application. Then we just have them virtualized on the back end. That might be how we would be setting up and configuring ourselves."

AUTOMATING PERFORMANCE TESTING

The automation of performance testing is another step toward Continuous Testing success. A Test Automation Architect at a tech services company with over 1,000 employees praised his testing tool by saying, "Time-to-market has been a lot easier and quicker. QA can start automating from the beginning and developers can do unit testing faster." The Automation/Service Virtualisation Manager at the comms service provider liked his test automation because, "It enables us to trigger events and automate test cases."

A Chief Technology Officer at a mid-sized non-profit liked the testing automation capabilities of CA BlazeMeter, noting that it "provided an easy to use tool to measure the performance of our most critical business application." He then said, "We wanted a solution that was easy to interpret and wouldn't require custom tooling beyond building the test. JMeter was the right tool for the job, and BlazeMeter's expertise and easy to use interface allowed us to readily view and compare results without needing to build a custom workflow. BlazeMeter allows us to easily run our existing load testing solutions at massive scale."

A Principal Consultant - Business Analysis at a tech consulting company with over 50 employees found that BlazeMeter was a cost effective way to scale existing JMeter load tests. "All of our consultants can use BlazeMeter. Traditionally our tests were run in JMeter and this was limited to technical users. BlazeMeter allows the use of the same tests but in a more user-friendly environment where all of our consultants can run the tests and access the results."

A Development Manager at a comms service provider with over 50 employees felt BlazeMeter "helped increase quality-of-service (QoS) which in turn leads to customers having a positive experience with the product. That, of course, leads to less churn which is a good thing." A Senior Quality Assurance Automation Engineer / Manager at a non-profit with over 50 Employees likes "the ability to spin up as many load generators as I need, and get statistics on response times and the load generators themselves. BlazeMeter support and flexibility is also hugely valuable."

"The most important criteria while choosing a vendor is primarily its performance track record in the market and the range of solutions they provide across lifecycles."

VISIBILITY THROUGHOUT SDLC

The pace and variety of activities in CD and Continuous Testing makes visibility essential over the entire SDLC. As the Software Development Engineer II at the financial services firm explained, "We were struggling with a lot of gaps in our SDLC and so we decided to do a PoC, and it worked out." A Test Program Manager at a tech services company with over 1,000 employees added, "The most important criteria while choosing a vendor is primarily its performance track record in the market and the range of solutions they provide across lifecycles."

Multiple tools can help with SDLC visibility. An Advisor, App Development at a healthcare company with over 1,000 employees explained how CA Service Virtualization helps in this regard. "In terms of improving the way the organization functions, it gives us lot of visibility into what features are getting released when. It also helps us track across the organization in a much better fashion. I think visibility is the biggest benefit that we got out of implementing CA Service Virtualization."

CA Continuous Delivery Director offers a solution for visibility and management of releases across the SDLC, working with the most popular commercial and open source DevOps solutions to orchestrate the pipeline from planning through production. As such, it can provide a critical missing link to a Continuous Testing strategy. It enables teams to test new code changes in a more efficient and optimized way, helping to identify and resolve issues as early as possible in the cycle. It also delivers metrics on testing performance and release health. CA Continuous Delivery Director is available in a SaaS version, enabling teams to get started quickly on building a Continuous Testing workflow.

CONCLUSION

Rapid delivery of high-quality applications has become a non-negotiable element of competitive strategy at many forward-thinking companies. The capability is an essential factor in digital transformation. Continuous Delivery is one approach to making this happen. The potential of CD can be diminished by challenges in QA and testing. Traditional testing processes invariably can't keep up with the pace and need for flexibility.

Continuous Testing is the answer. With Continuous Testing, it's possible to test software at each stage in the rapid-fire CD workflow. Continuous Testing involves automation of testing functions and of the testing workflow, as well as a rethinking of certain testing procedures.

According to testing professionals on IT Central Station, success with Continuous Testing hinges on several key success factors. These include automatic requirements design and test case generation, and test data creation. Being efficient with these two processes helps speed up testing while making testing more aligned with new and constantly changing business requirements. Service virtualization enables testers to emulate complex systemic end points to expedite testing. Automated performance testing provides a fast trigger for crucial feedback for developers throughout the CD workflow. Ultimately, Continuous test depends on visibility across the SDLC. All of these success factors come together with the CA toolset, enabling development teams to make the transition to CD with the benefit of Continuous Testing.

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