

Continuous Testing

Smart Testing Way Forward



Executive Summary

Emerging technological innovations along with dynamic business needs are shaping industries to set new and modern trends to deal with new-age challenges for Software Development, Testing and Operations Team. These influences include modern-day delivery practices such as DevOps. It is the need of the hour for organizations to release new application features rapidly and continuously to market without compromising on quality.

DevOps came into place with the intention of cutting down the software delivery timeline to deliver better-quality software. To achieve this; Business, Engineering and Operations teams are collaborating and working cohesively as part of the same team to deliver consistently high-quality software. As per Gartner, DevOps is key to Continuous Development & Testing and finally delivering value to production.

Continuous testing helps in testing code rigorously and constantly when tests are automated. This requires testing continuously throughout the entire lifecycle – from the development

to the production phase. Tests are triggered automatically at each stage in the pipeline, giving the development team feedback early to address issues related to code. The faster the defects are found, the faster they can be fixed.

Continuous Testing cuts down the feedback cycle significantly hence benefits in accelerated release cycles. It saves time along with improved test coverage and helps in reducing risk while accelerating development.

As a result, nowadays organizations can have multiple deployments in a day by keeping their deployments small, apply continuous testing and deliver unparalleled results. Releases are more reliable along with higher quality of the resultant product.

This document is an attempt by IGT Solutions (IGT) to introduce our approach towards Continuous Testing that has helped IGT in achieving a higher level of quality for our clients.

Continuous Testing

Continuous testing is the practice of enabling quality through each phase of the software development lifecycle i.e. from planning to development till production and also during operations. Continuous Testing is achieved by testing early, testing often, testing comprehensively by utilizing automation to achieve release goals.

In continuous testing, the testing process is spread out into different DevOps phases and a risk-based strategy is implemented to achieve continuous feedback on quality at each stage:





Continuous Testing: Why is it needed?

While rigorous testing was believed to be a very important function needed to deliver quality software, it remained to be inefficient since traditional testing processes and tools were manual, too slow and were not easy to integrate with deployment. Traditional testing followed a top-down approach where the commencement of a new phase was completely dependent on the completion of the previous phase. The approach inherently made it difficult for development teams to make changes and was time-consuming.

With Agile came a time where a completely altered way of approaching this challenge of software development was redefined. It led organizations to accelerate the process of getting the application to market much faster; allowing them to understand the customer's feedback and make changes quickly to adapt. This gave a pathway for organizations to thrive in challenging situations, strongly facing their market competition and pulling them off from their products being obsolete. Additionally, a faster release cycle also helped to keep up with fast-changing expectations from the business.

Agile itself was not foolproof and had its share of challenges that were realized with time. To address agile constraints like additional developer check-ins, getting releases fast and early into the hands of business and faster feedbacks from customers; it raised the need for an accelerated delivery pipeline now known as DevOps. It also brought the concept of collaboration and realigning development and operations, thereby enabling a pipeline of value all the way from planning, development, testing, and deployment to operations support. It would be right to say in many ways that DevOps complemented Agile to achieve faster delivery with higher quality by extending & leveraging continuous development, continuous integration, continuous testing, continuous deployment and continuous delivery.

One of the key roles played here is Continuous Testing as without it full benefits of DevOps can't be realized. The faster delivery is not feasible if testing is slow and takes time in providing feedback on risks.

The below figure elaborates the complete process of Continuous Testing:

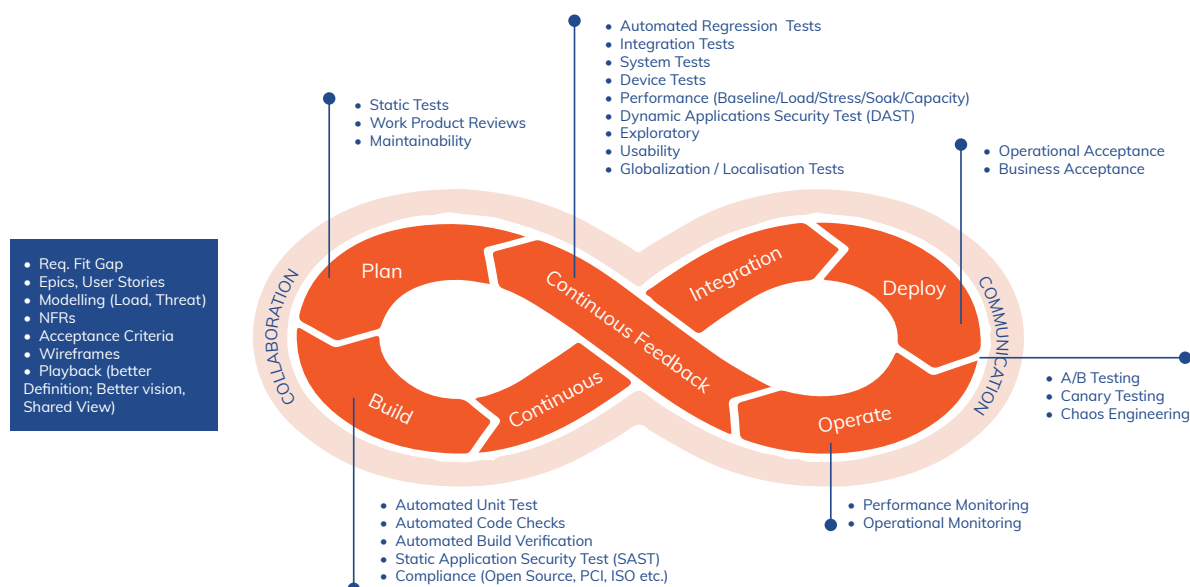


Figure 1 Continuous Testing Across Lifecycle

Continuous Testing Across Lifecycle Leveraging Strong Automation Framework

IGT has established a robust Quality Engineering Practice wherein we've accomplished Continuous Testing successfully with the accelerators across the DevOps cycle. These accelerators enable digital risk assurance from the requirement stage through production and during operations, covering functional, integration, security and performance areas.

Continuous testing effectiveness is at its highest with the implementation of Automation Testing from the beginning i.e. code static analysis, in-sprint automation, performance testing, integration testing, UAT testing.

Following are some of the key salient features of IGT's Continuous Testing framework

- **Test Early, Fail Fast...**
DevOps based operating model where Business, Engineering (Development & QA) & Operations collaborate to ensure First Time Right. This ensures faster mean time to recovery and early bug detection significantly reduces post rectification cost.
- **Deploy, Test & Release on Demand**
Leveraging the continuous testing framework across the lifecycle, including Advanced Automation to establish Continuous Testing & Release pipelines resulting in keeping track of activities running within Sprint cycle hence making it manageable.
- **TestOps**
Understanding the actual operating environment & its challenges and provide continuous feedback to the engineering organization helped in achieving cost-benefit and enable a seamless rollout to production or end customer.
- **Best-practices**
Leveraging industry best practices of DevOps, DevSecOps, Lean principles & TMMi strategically help us in improving a scorecard that leads to overall benefits. Based on statistics from the 2017 State of DevOps report, we know that teams practicing DevOps experience achieve:
 - 24x faster recovery from failures
 - 3x lower change failure rate
 - 22% less time spent on unplanned work and rework
 - 50% less time remediating security issues.
- **Compliance & Security**
Leveraging DevSecOps best practices to ensure end-to-end focus on security and compliances. The DevSecOps solution brings together all the key elements of a compliance framework by embedding compliance best practices, policies, and tools into each phase of the development lifecycle.



Benefits

While addressing the dynamic needs of maintaining quality at pace within DevOps, Continuous Testing automates tests becoming an integral part of the process of developing and delivering a continuous value to the customer.

It helps in assessing if the release under test is ready to progress to the next stage or not and exposes the business risk as early as possible in the lifecycle. The time and effort spent in analyzing and fixing the issue is reduced drastically.

IGT sees a few notable advantages in adopting the Continuous Testing approach in automation for testing:

- Provides a stable user experience
- Actionable feedbacks result in better design decisions
- Testing efficiency gains
- Automated framework provides better coverage
- Accelerated Release Cycles
- Reduces the cost of defects

Challenges in Continuous Testing

Continuous testing has brought a radical shift in the way the testing is performed in current times. As Continuous testing teams work iteratively and in a different manner than other software teams, they must adapt their techniques of working to manage any challenges that might arise. Some challenges usually faced are listed below:

- Quality often comes at the expense of speed, but rapid release cycles need accelerated delivery
- Skill needs against accelerated delivery timelines
- It's difficult to contextualize intent of the test while balancing tools and technology needs
- Applications are dynamically adapting to technology, Automation & Tests unable to keep pace
- Cost of Quality: When to Test & How Much to Test?
- Are we ensuring early verification and validation from a compliance perspective





Suggested steps to address challenges

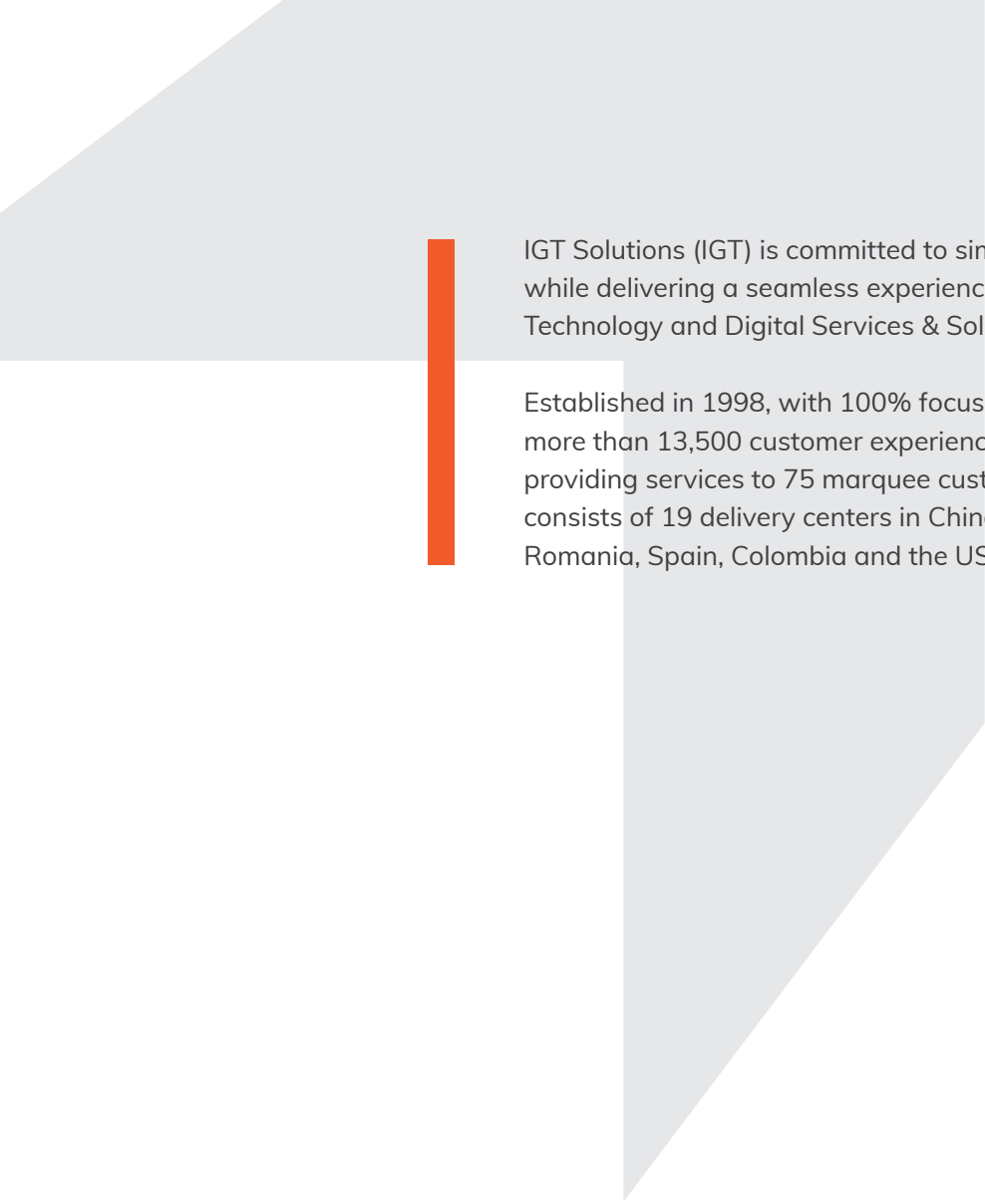
Some measures that address the challenges in Continuous Testing are listed below:

- Automation framework plays a key role in accelerating release cycles within delivery
- Placing Right People in the Right Place to meet the Agility & Quality needs
- Right combination of automation strategies to strike a chord between test run and technology needs
- Technology and Innovation becomes critical in bridging gaps for dynamically adapting applications

Conclusion

Continuous testing is beneficial but requires teams to strategize well on how to keep the testing flow seamless throughout the automated test lifecycle. It enables the delivery of business value effectively and efficiently with higher quality standards. It also equips a business to deliver cost-effective and rapid releases by detecting issues early in the development cycle to optimize development and reduce overall project costs.

To make continuous testing a reality, organizations need to adopt automation testing including automated test design, orchestrations, test executions, etc. It helps testing increase efficiency. Additionally, it helps overcome test environment obstacles by using virtual and cloud-based testing environments with concurrent testing capabilities.



IGT Solutions (IGT) is committed to simplify complex customer interactions while delivering a seamless experience. It provides integrated BPM, Technology and Digital Services & Solutions for clients across industries.

Established in 1998, with 100% focus on customer experience, IGT employs more than 13,500 customer experience and technology specialists providing services to 75 marquee customers globally. IGT's global footprint consists of 19 delivery centers in China, Philippines, Malaysia, India, UAE, Romania, Spain, Colombia and the USA.



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