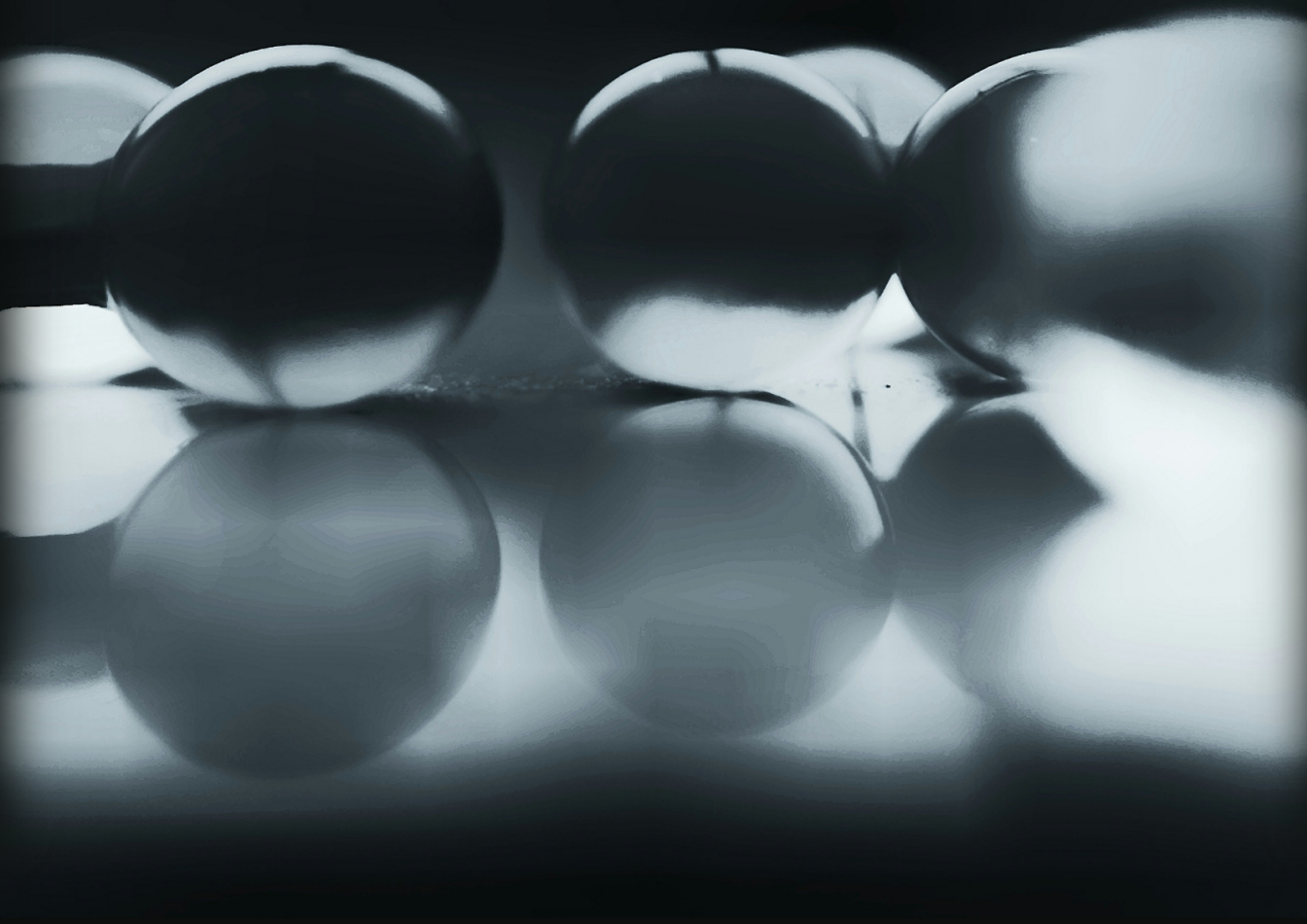
LEAN TESTING

Test Practices for Evolving Software Architectures



Stefan Friese

Lean Testing

Lean Software Test Architecture - Test Practices for Evolving Software Architectures

Stefan Friese

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Introduction

Lean Software Development, rooted in manufacturing principles like the Toyota Production System (TPS) from the late 1940s and early 1950s, was formally introduced to the software world in 2003 with Mary and Tom Poppendieck's book "Lean Software Development: An Agile Toolkit". Why does now, more than twenty years later, a book on Lean Software Testing remains relevant? The software landscape has undergone a remarkable transformation over the last twenty years. We've seen the rise of loosely coupled systems, the widespread adoption of cloud-native applications, the emergence of real-time data processing pipelines, and the integration of AI into various aspects of software development. Also new methodologies and practices emerged: Continuous Integration and Continuous Delivery (CI & CD) has revolutionized how we build and deploy software. DevOps has bridged the gap between development and operations teams, fostering collaboration and efficiency. Site Reliability Engineering (SRE) has redefined how we approach system reliability and scalability. Platform Engineering has emerged as a discipline focused on creating and maintaining the underlying infrastructure that supports modern software applications. As we continue to innovate, these architectural and methodological shifts serve as the foundation for the next wave of advancements in software development.

Despite the introduction of new methodologies, earlier practices like Lean have not become obsolete. Instead, they have been integrated into newer approaches, maintaining their relevance. The software industry's focus may shift towards emerging practices, but these new methodologies are often influenced by Lean principles and complement them well.

As the software development landscape continues to evolve, it becomes increasingly crucial to revisit and reflect on the foundational principles that have shaped modern practices. Lean ideas remain significant in today's software development environment, offering valuable insights that can enhance current methodologies and practices. As it gets more and more common that teams transition to daily releases, testing practices must evolve accordingly. The test strategy should be evolving, with tests planned and executed in short iterations. This shift requires a thoughtful evaluation of which test practices

as well as test cases bring the highest value. Even more importantly, it often demands a fundamental cultural change. Lean methodologies can effectively address these various aspects, making Lean Testing particularly relevant in this context.

A book on Lean Software Testing in 2025 would serve to:

1. Reexamine Lean principles in the context of modern software architectures.
2. Explore the application of Lean concepts to emerging testing challenges.
3. Demonstrate the synergy between Lean and newer methodologies.
4. Provide a fresh perspective on optimizing software testing processes.

Testing a system that is evolving is difficult and with loosely coupled systems, agile and continuous delivery, testing must accomplish exactly this. This book provides guidance how to implement Lean Testing practices in such an environment. It covers key concepts including:

- The principles of Lean Software Development and DevOps.
- The role of testing in building software quality.
- Various test approaches and types.
- Positioning tests within Continuous Integration & Continuous Delivery.
- Important test principles like testability, shift left, and shift right.
- Architecture Quality.
- A collaborative test decision making process.
- A Lean Testing capability model.
- Architectural considerations for testing.
- How to approach changes to improve testing.

Traditional test approaches rely on predictability and control, which are becoming increasingly ineffective in the face of rapidly evolving, loosely coupled software systems. This is even more apparent as AI dominates. What does this mean for testing? We must adapt when the systems we test are dynamically evolving and nonlinear. This includes stopping the linear thinking in development, test, and release phases – instead, we must build quality in and embed testing in development and delivery. That the software is evolving means that also testing must evolve.

We will explore how testing can align closely with Lean and DevOps principles and how it can adapt to trends in software development. **Testing, as**

promoted by this book, is a collaborative practice that occurs continuously, focuses on building quality into the product, and uses fast feedback loops to validate our understanding. In this way, testing can support Lean software development and DevOps. The related test practices are often summarized in the term "Continuous Testing".

While this book uses the terms "Lean Testing" and "Continuous Testing" interchangeably, primarily the term "Lean Testing" is used. Lean Testing emphasizes well that testing is not just about continuous execution but also about providing fast, meaningful, and reliable feedback on quality and business risks. This comprehensive view of testing aligns very well with Lean. Lean has a foundational influence on DevOps, Agile, and CI & CD methodologies. These approaches are interconnected and have evolved together over time, but Lean thinking laid the groundwork by focusing on eliminating waste and optimizing processes. Agile built on Lean principles, emphasizing flexibility and customer feedback. CI & CD, as well as DevOps, extended agile concepts to include fast delivery and IT operations aspects.

* * *

Let's begin by defining Lean Testing:

Lean Testing can be defined as a set of practices that understand testing as a cross functional activity that involves the whole team, conducted continuously throughout the development and delivery process to provide fast, meaningful, and reliable feedback on quality and business risks.

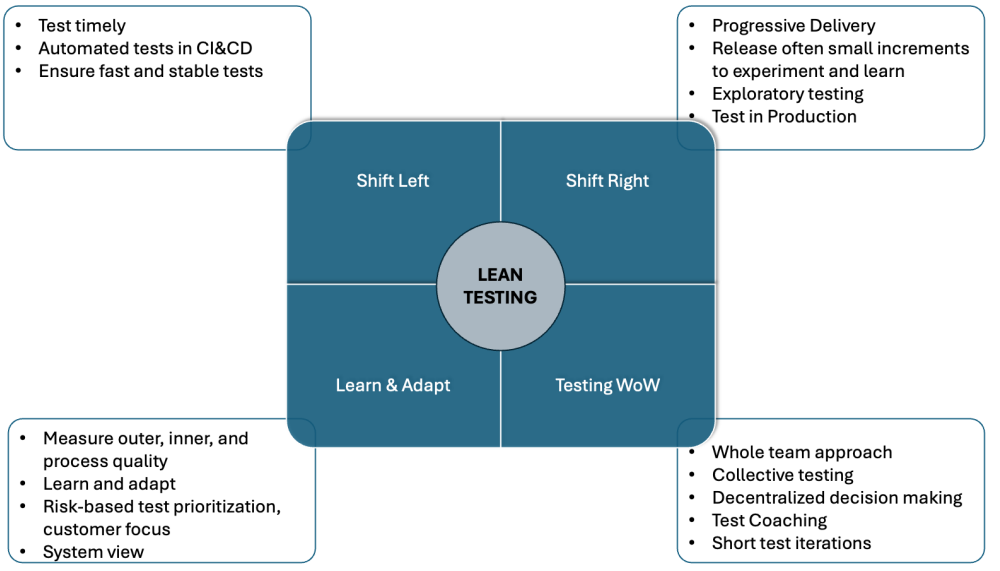

Figure 1. Lean Testing Overview

Lean Testing is about exploration, designing and planning just enough to get started, conduct the most critical tests to get feedback about the quality, gather and analyse the feedback and then pivot in the next cycle.

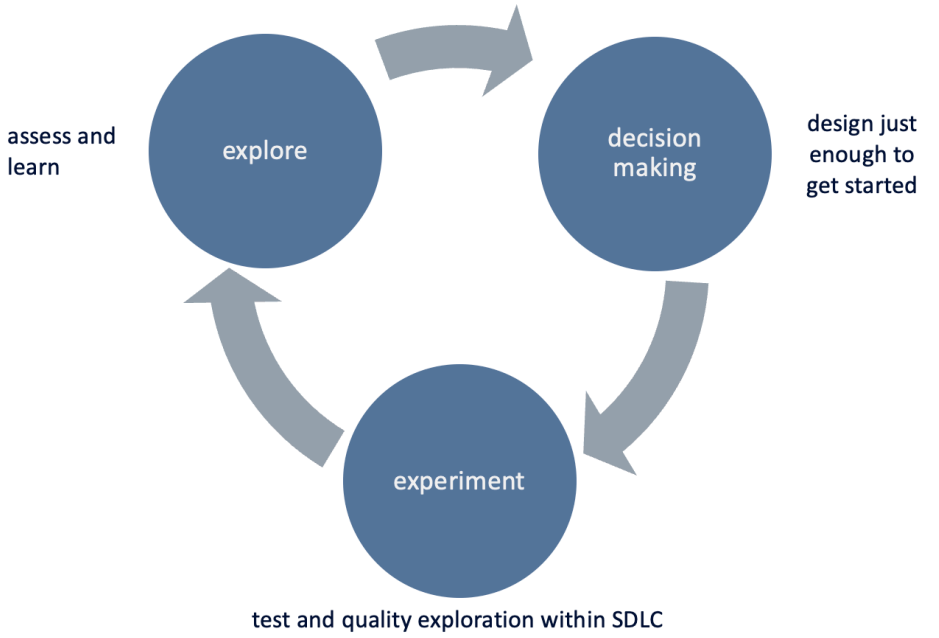

Figure 2. Simplified Lean Testing Feedback Cycle

Start small and start quickly: Smaller test batches are less expensive and provide faster feedback. Making smaller test decisions allows for more frequent test strategy adaptations based on new information or changing circumstances. Small test decisions also allow for more decentralized decision-making, empowering different team members to contribute to the test strategy direction.

The book explains how to include testing in the Software Delivery Cycle (SDLC) - to experiment by utilizing common test practices and learn and adapt. In the 'Conclusion' section, we will revisit the "Lean Testing Feedback Cycle," presenting a more advanced and refined model.

Chapter Summary

This chapter introduces the main ideas of Lean Testing. Key points include:

- Key concepts.
- Definition of Lean Testing as continuous, collaborative practice.
- Emphasis on fast feedback loops and building quality into the product.
- Introduction of the Lean Testing Feedback Cycle.

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