# State of AI applied to Quality Engineering 2021-22
Executive Introduction

AI is becoming essential for Quality Engineering

Over the past few years AI[1] (Artificial Intelligence) has become a reality for most of us. Self-driving cars, facial recognition, chatbots, and deep-fake image production are just a few of today's commonplace examples. The advances in computing power combined with storage cost efficiency is driving more AI developments at increased pace.

Parallel to the growth of AI, the software development industry has been profoundly impacted by the increase in technological sophistication, the reduction of delivery cycle time, and the imperative of the user experience. And the number of potential combinations of digital products has now reached unfathomable proportions. All these competing forces create a chasm in terms of quality engineering. Many of us have turned to Continuous Testing to help close this gap. However, looking forward, we realize this is becoming insufficient.
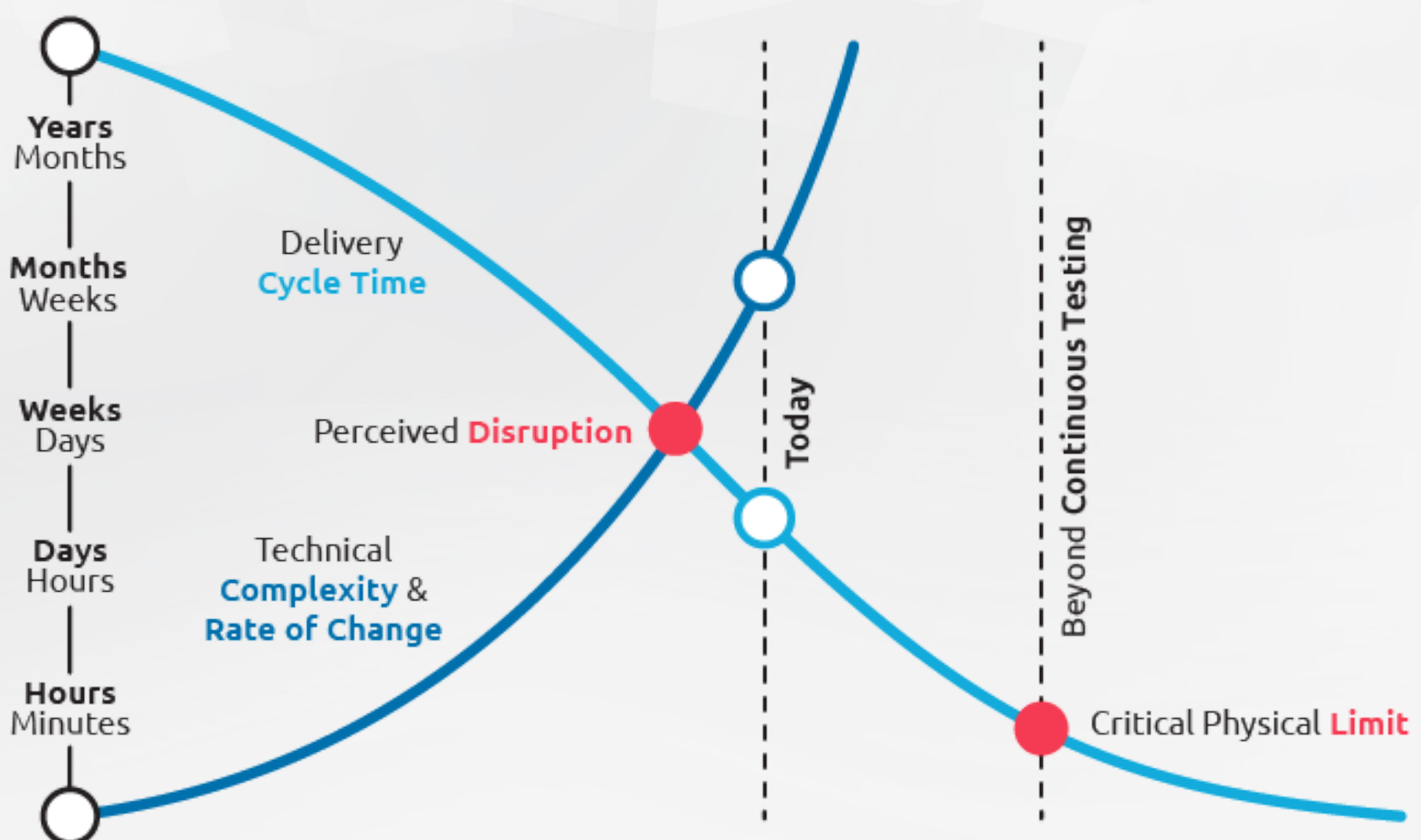
The advancement of artificial intelligence raises two intriguing questions about our discipline:

1. How do we use artificial intelligence to make quality validation smarter?
2. How do we easily and effectively validate AI solutions?

This report aims to assist you in understanding the potential of AI and how it can help improve the quality, velocity, and efficiency of your quality engineering activities. In partnership with leading technology providers, we provide specific suggestions, ideas, and examples that can help you address the first question. We will return to you with answers to the second question in a subsequent series.

We will dive into the different quality assurance practices, illustrating each with specific use cases:

- Section 1 delves into the fundamentals of the QE and AI convergence,
- Section 2 discusses how artificial intelligence can be used to address some of the challenges associated with test design,
- Section 3 looks at ways to improve the decision-making process through 2 sub-sections:
    - Section 3.1 proposes a journey towards smart analytics
    - Section 3.2 demonstrates how we might derive meaningful insights from unstructured data,
- Section 4 examines how to further automate functional testing through 2 sub-sections:
    - Section 4.1 discusses how Computer Vision might help us overcome our test automation issues
    - Section 4.2 dives into how AI helps us reach higher level of reliable automation,
- Section 5 investigates approaches to GUI testing using computer vision,
- Section 6 reviews how AI can be used to address test data challenges,
- Section 7 addresses the role of AI in performance engineering,
- Section 8 focuses on how artificial intelligence can improve security testing,
- Section 9 discusses the role of AI in enhancing IT Operations,
- Section 10 examines how AI and ethics will continue to influence QE.

We wish you an excellent read.
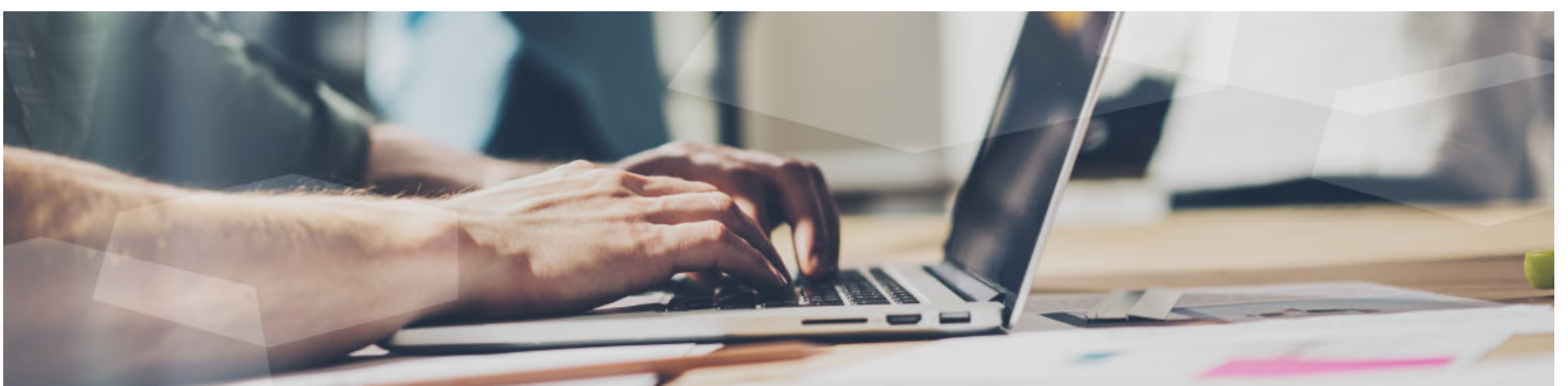
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