

TESTING 4.0

THE NEXT GENERATION OF QUALITY POWERED BY CROWD & CLOUD TECHNOLOGIES



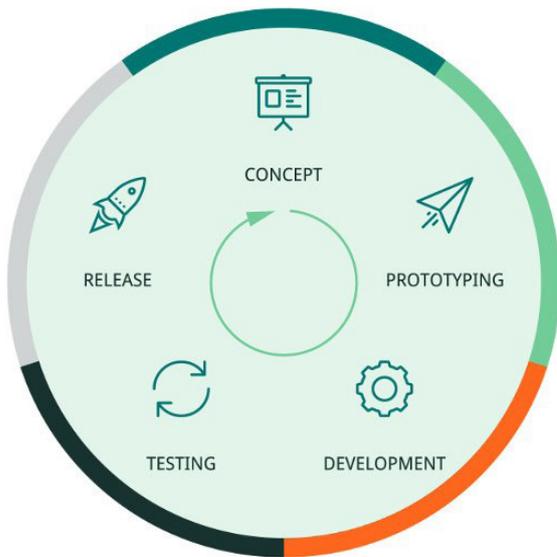
Introduction

Technology is causing massive changes in nearly all aspects of daily life. Everyday objects, such as toothbrushes and vacuum cleaners, are turning into complex systems with the ability to communicate and connect with us and each other. A life without smartphones, tablets and computers is difficult to imagine. Similarly, the working world has undergone a transformation where traditional processes are now being managed by computers. Technology has given rise to new developments, such as crowdsourcing, that are opening up new opportunities and disrupting traditional approaches in business. However, if this new technology is riddled with defects or is unintuitive, there is a real risk of the vast public rejecting it or it creating complications rather than being helpful. Therefore, today's developers of software and digital products need to overcome new obstacles and take more aspects into consideration than ever before.

What is Testing 4.0?

The first industrial revolution evolved our labour force by mobilising the mechanisation of production through water and steam power. The second granted us mass production through electric power and the third brought IT and electronics into the workplace to further automate the production process. In 2011, in Hannover, Germany, the computerisation of manufacturing was demonstrated as the next industrial revolution and dubbed "Industry 4.0". This industrial revolution has already taken place and is continuing to transform the production process. This is where Testing 4.0 finds its inspiration. As technology advances at an astounding rate, it's equally necessary for software testing to evolve alongside it. However, as previously demonstrated, developers are faced with a number of issues due to the versatility of the products they are developing and the various restrictions they are forced to contend with. This is where Testing 4.0 comes into play. It's the next generation of quality that finds its roots in crowd and cloud solutions. It's through innovation and flexibility that Testing 4.0 is able to address the concerns of all developers. Enterprise applications, Internet of Things devices, virtual reality, wearables, websites, Testing 4.0 provides software optimisation solution for all this and much, much more.

The Modern Software Development Landscape



From conception to release, all applications need to be developed and tested. Depending on a number of variables, the overall approach to the development process tends to vary. The two most common methods are the waterfall model (sequential development) and agile (iterative) development. While the waterfall model is suitable for long term projects, where constant updates are difficult to perform, the agile approach allows for short iterations and continuous deployment of new functions. A mixture of the two methods is also often utilised. How software testing fits into each phase and development method depends on a number of factors. However, there is no one size fits all compromise when it comes to optimising the quality of digital products. All applications and development stages have individual characteristics that require a flexible approach to software testing. This is where Testing 4.0 comes in - a solution that takes the quality of software to the next level through flexibility and individualisation.

The Five Challenges of Software Testing

1 THE CHALLENGE: Device Diversity

Updates and new versions of browsers, device types, operating systems and additional software are released on a daily basis. It's hard for developers to keep up with these trends and they are faced with the challenge of ensuring functionality and usability on all kinds of devices - be it smartphones, tablets, wearables or desktop PCs. It's nearly impossible for internal test centres to have as many device types and operating systems as there are on the market at any given moment.

THE SOLUTION: Real devices and Virtual Machines

Depending on the test object and its specific requirements, crowd and cloud based technologies can ensure that testing takes place on all the device types necessary. Crowdtesting, for example, is able to check functionality through an exploratory bug test that is performed using the crowds' own devices. With a crowd of over 100,000, tests are completed under real world conditions and on the most common devices. The international nature of the crowd also allows developers to perform localisation tests. Structured test case execution can examine the functionality of software's core functions by using virtual machines that are able to cover a large combination of devices, operating systems, browsers and custom software. By combining the crowd with virtual machines, developers are able to overcome the challenges of device diversity.

2 THE CHALLENGE: Target Group Relevance

Nowadays, software is expected to not only function flawless but to also match users' high usability requirements. However, there is often a discrepancy between the target group's expectations and the developers'. To gain detailed insight into what the target group wants and expects from digital products, unbiased feedback from a testing group made up of them is a necessity.

THE SOLUTION: The Crowd Gives Access to the Target Group

Crowdsourcing software testers makes it possible for developers to access their target groups. It's the ideal solution for testing usability and improving overall user experience, which is applicable in almost all stages of software's lifecycle. Whether it's a comparison test, a usability study, or remote usability videos, the crowd is able to give the insights into the end user's mind, which is necessary for digital products to succeed.

3 THE CHALLENGE: Reproducibility and System Dependency of Bugs

While software might be bug free on certain devices, defects can appear on others. For internal testing teams with limited access to multiple devices, it's hard to ensure that their software functions well on all the platforms necessary. Due to time and resource restrictions, it's also difficult for developers to reproduce bugs that have already been found in an efficient manner.

THE SOLUTION: Combining crowdtesting with virtual machines

Through the implementation of cloud technologies into the testing platform, bugs that have been found e.g. in an exploratory crowdtest, can be reproduced using virtual machines with just one click. This way, through virtualisation and emulation developers are able to comprehend, reproduce and trace bugs on the exact device they appeared and get new insights on how to fix them.

4 THE CHALLENGE: Organisational Blindness

When developing software, it's difficult to remain objective. Often times, the way developers approach and use their digital products greatly differs from end users. This bias creates issues with usability of software and often functionality issues go unnoticed since consumers use digital products differently than developers.

THE SOLUTION: An Unbiased Crowd of Testers

Using a crowd of testers with a diverse range of backgrounds and know-how, allows developers to gain objective feedback on user-friendliness of their software. It's equally beneficial for the crowd to create test cases that explore areas that developers have overlooked due to organisational blindness, which can then be executed through virtual machines in order to reveal issues over an endless combination of devices, operating systems and software.

5 THE CHALLENGE: A Lack of Resources

For many companies, software testing is a major weakness in the development process. Time restrictions often cause it to be skipped as teams are under pressure to release software as quickly as possible. Similarly, the cost of testing software is rarely cheap and often developers find that their budgets are stretched too thin. Finally, it's difficult for internal testing centres to have access to all the resources (virtual machines, devices, etc.) necessary to test digital products in a comprehensive and efficient manner.

THE SOLUTION: Outsourcing Testing and Using Crowd and Cloud Technologies

Developers are able to outsource their software testing needs in order to overcome a number of these issues. In addition, the crowd and cloud is available on an ad-hoc basis, as the combination of the two. This assists in alleviating time restrictions as testing is readily available during all stages of the development process. Similarly, budgetary issues are no longer as big of an issue as there are no maintenance costs and all the devices as well as testing platforms are readily available.

Conclusion

Testing 4.0 is about satisfying the software testing requirements of developers in the modern technology landscape. It uses a combination of crowd and cloud services to optimise the user-friendliness and functionality of software. The entire concept is based on enhancing today's digital world. Therefore, as technology advances and new developments occur, Testing 4.0 will continually evolve to provide software testing solutions for all existing and new digital products. For software developers, Testing 4.0 is able to provide a flexible and comprehensive solution that takes focuses primarily on their requirements.

About Testbirds

Testbirds was founded in 2011 by Philipp Benkler, Georg Hansbauer and Markus Steinhauser. Today, the company has over 60 employees. Other than its headquarters in Munich, there are now offices in Amsterdam, London and Stockholm, franchises in Hungary and Slovakia and sales partners in Italy and North America. Under the slogan, "Testing 4.0 – The Next Generation of Quality", Testbirds investigates software for user-friendliness and functionality issues by using crowd and cloud based technologies. With over 100,000 registered testers located in 180 countries, Testbirds is one of the world's leading crowdtesting providers. The company also utilises cloud based technologies to support customers in optimising their digital products. The combination of the two testing methods delivers a unique portfolio that takes the quality of software to the next level.

For its innovative approach to software testing, Testbirds has received many awards. Testbirds is a winner of the start-up competition, "IKT-Innovativ", the Best-of-mobile Awards 2013 and the IT-INNOVATION Award 2014. As BITKOM partner Testbirds actively participates in diverse committees. When founded and during further development of its portfolio, Testbirds was funded by the Federal Ministry of Economics and Energy. The company shows social responsibility through its initiative towards fair working conditions in the crowdsourcing industry. More information about that can be found at www.crowdsourcing-code.com

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