

Testbirds

Global Real Device Network

True Remote Testing on Real End-User Devices

Introduction

Together with a variety of technological developments, the Internet has immensely changed our everyday lives. It has affected the ways in which we communicate with each other, how we work, do business and how we purchase and use products and services. The Internet has enabled all kinds of technologies and innovations to create new opportunities and disrupt traditional approaches for businesses across all verticals. For this reason, access to assets is becoming increasingly more important than ownership, especially when it comes down to developing digital products and the testing of software. Crowdsourcing helps mitigate this by bringing device capacity and end-user feedback well within reach. This whitepaper shows how teams developing new technology and software can efficiently make use of the Global Real Device Network: A worldwide distributed network of end-user devices for the execution of functional testing.

Challenges in Software Testing

There are several challenges to be seen in the market concerning software development and testing. A lack of resources is at the basis of many of these challenges. Companies more often than not lack the means to thoroughly and consistently test their digital products. These resources can be physical, such as hardware and devices and immaterial, such as time, knowledge or budget.

If we consider the lack of immaterial resources, we can see that time constraints are progressively problematic, since development cycles are becoming shorter and shorter. Testing also requires a specific know-how and skill set to be properly performed. In that sense, manual testing allows QA teams to examine digital products, which is extremely important to do. However, two large downsides remain inherent to this method. First, manual testing processes are often prone to human error and second, manual testing processes are not particularly cost-efficient.

When looking at the lack of physical resources, we can see that a major challenge in software testing is formed by device and platform diversity. How do you make sure that your app or website works the way it should on all the different device and software versions in the market? This is especially a challenge in the fragmented Android landscape. For instance, consider the number of devices with their own screen size and density in the market today:

	ldpi	mdpi	tvdpi	hdpi	xhdpi	xxhdpi	Total
Small	1.1%						1.1%
Normal		2.5%	0.2%	36.1%	33.6%	16.3%	88.7%
Large	0.1%	3.7%	1.8%	0.4%	0.4%		6.4%
Xlarge		2.6%		0.6%	0.6%		3.8%
Total	1.2%	8.8%	2.0%	37.1%	34.6%	16.3%	

Figure 1 Source: Android Developer Dashboard. Data collected during 7-day period ending March 6, 2017.

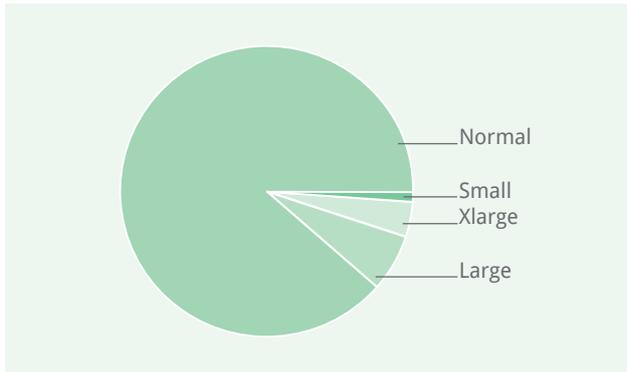


Figure 2.1 Android screen sizes

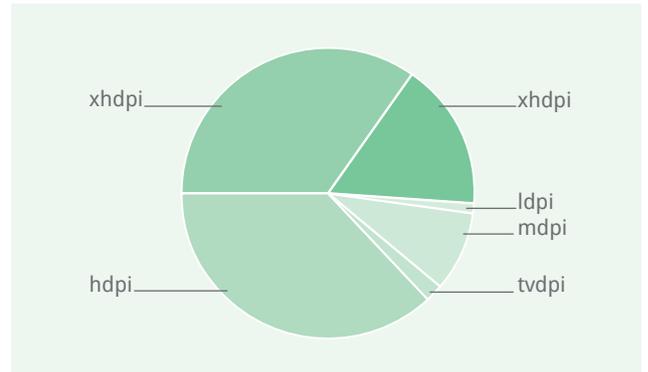


Figure 2.2 Android screen density

And this is just looking at screen size and density on Android devices. One can imagine the complexity of the testing combinations that exist and need to be taken into account when involving hardware, OS versions, software versions, plug-ins and more. All in all, these are some serious obstacles to the software testing process that are not easy to overcome.

Test Automation

Market analysts agree that in the near future test automation will continue to become important, while a certain decline in significance concerning manual testing will occur. There is an obvious coherence with the challenges that the lack of resources pose, as described above. Test automation enables QA teams to tackle these challenges. Test automation allows them to execute test scripts on an automated basis, by utilising virtualised test environments. These test environments can consist of VMs, such as a remotely accessible Windows, Linux or OS X-machine, which are installed on a server and initiated once needed. Mobile test environments also exist in this form, often in so-called artificial device farms. By having access to these testing environments, automated tests can be executed through, for example, Jenkins, Selenium and Appium. Even though cost-intensive at first, test automation serves to be more cost-efficient in the long run. It allows developing teams to increase the frequency of testing, which is welcome in times of shorter release cycles. Furthermore, it's highly scalable. Not only are additional testing environment instantly created, test managers are also able to execute tests simultaneously on multiple device and software combinations. By integrating testing directly and continuously into the development process (Continuous Integration) test automation thus forms an extremely powerful, future-ready and cost-efficient approach.

Crowd and Cloud Based Testing

Crowdtesting combines the principle of crowdsourcing with product testing, meaning that a select crowd of testers (consisting of target audience representative end users) gives feedback about, for example, functionality and usability issues. At Testbirds for instance, over 200,000 testers are available in 193 countries. These testers test in their own environment and on their own devices; from smartphones and laptops to smartwear and Internet of Things devices. By doing so, objective but realistic feedback is obtained directly from the end user. From usability studies and bug tests to competitor analysis and localisation tests, with crowdtesting it's possible. Additionally, cloud based testing allows QA managers and test analysts to test digital products by means of virtualisation and emulation. Through an online platform, testing environments can be created that help companies to test on a multitude of OS and software combinations. The process utilises virtual machines to compose the precise combination you require. After this it is possible to install your own software packages and execute either manual or automated tests. For example, it is possible to perform 100 test cases on 10 different desktop PCs overnight, making such a flexible tool highly scalable. Now, the Global Real Device Network finds its strength in the combination of both crowdtesting and cloud based testing principles – allowing you to remotely and directly obtain realistic testing results from your own end user's devices.

Global Real Device Network

The Global Real Device Network (GRDN) is a newly developed testing solution by testing provider Testbirds. The GRDN combines both crowd and cloud based testing principles. (See box Crowd and Cloud Based Testing.) The solution leverages the smart devices in a crowd of 200,000 testers in 193 countries to create remote testing possibilities. By connecting their Android smartphones and tablets, crowdtesters grant access to clients looking to test apps, websites and other software on real world mobile devices. Once connected, the device can be remotely operated for both manual and automated testing purposes. This enables clients to get true insights from the mobile market in the most direct manner possible – without the need to create, own or even access internal or simulated device farms. It offers realistic test results that consider important local factors such as location dependency, language barriers, mobile operability and more.

Own device lab	Global Real Device Network
Artificial environment in device farm or center	Genuine end-user environment
Low device and platform coverage	High device and platform coverage
Device personas	Real-world end-user devices
High costs for device acquisition	No costs for device acquisition
High costs for device maintenance	No costs for device maintenance
Complex set-up ITIL-processes	Part of existing testing infrastructure

Table 1 The Global Real Device Network in comparison with having an own device lab.

The Tester Point-Of-View

With crowdtesting, everyone that owns a smart connected device and has access to the Internet is eligible to become a crowdtester. This results not only in a very diverse pool of testers with different sociodemographic backgrounds and skill sets, the crowd also contains all imaginable connected devices and software versions. The Global Real Device Network leverages the capacity of these devices in the crowd to perform remote testing of apps and software. Testers can submit their in-use or old smartphones and tablets to the testing platform, by installing a dedicated device connector app. Through an installer (for Windows, Mac or Linux), the smart device will be initially set up for the GRDN.

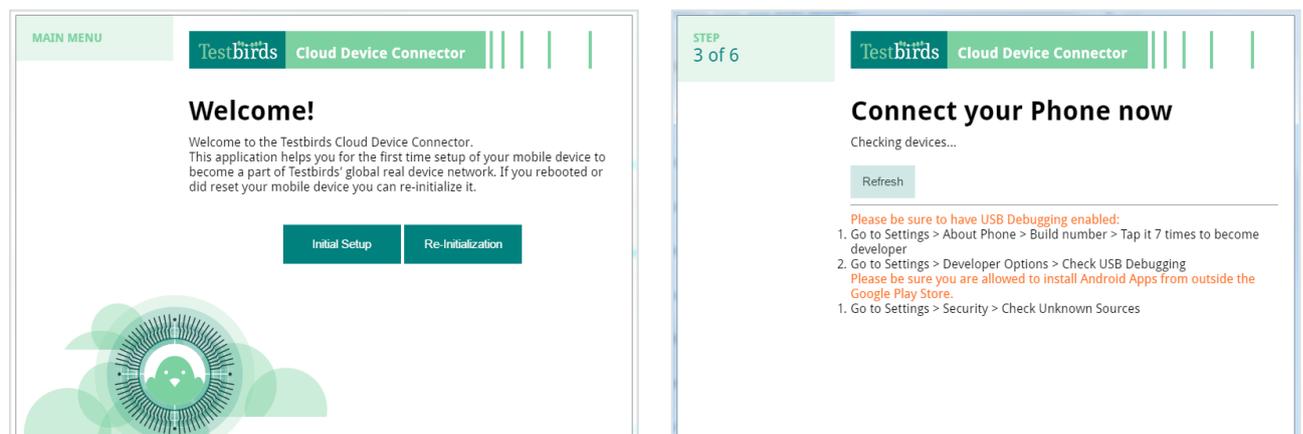


Figure 3 Cloud Device Connector on Windows.

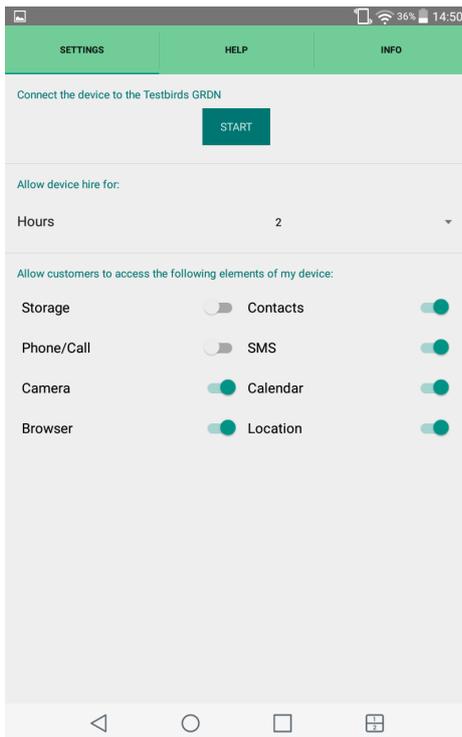


Figure 4 Testbirds Connect-app on Android

Once the initial connection has been established, the tester can grant access to his or her mobile phone or tablet via the newly installed app. Since crowdtesters allow access to their personal devices, data privacy and security are of the utmost importance and are strictly safeguarded. In the app, testers have the option to select which access rights they want to grant. This process is similar to when users install new apps from the Google Play Store and permissions to specific device features need to be granted. When not comfortable with granting certain rights, testers can simply unselect those. If the app in question requires access rights that are not selected by the tester, it simply can't be installed. Once testing access is enabled, the connected device cannot be used while it is being accessed. For providing this valuable testing capacity, crowdtesters receive a financial remuneration each time their connected device is used for testing by a client.

The Client Point-Of-View

Companies and organisations that thoroughly want to test their mobile applications on real devices under real circumstances, can easily make use of the Global Real Device Network. Once logged in to the testing platform, clients can see the list of devices and filter them by *availability*, *used within team*, *offline* or *all*. Clients can also search for the desired device, and in the future filter by location and even specify by installed apps.

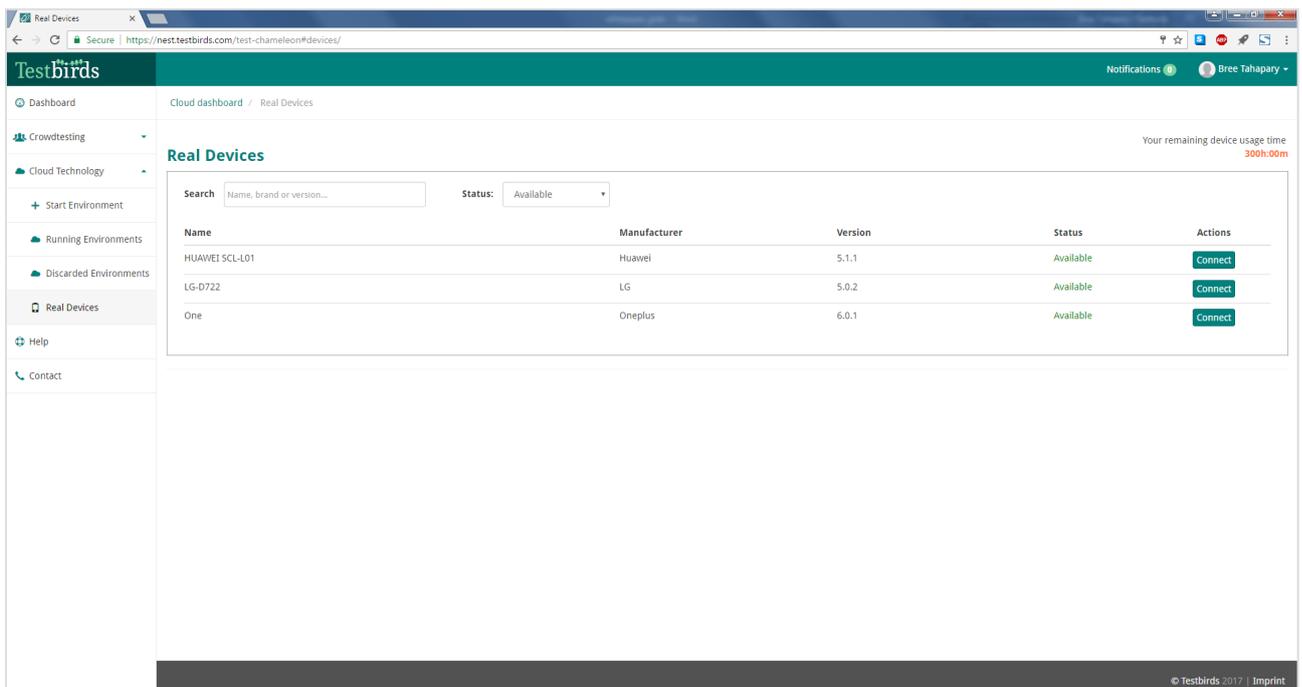


Figure 5 Devices in the Global Real Device Network with status Available. User interface subject to change.

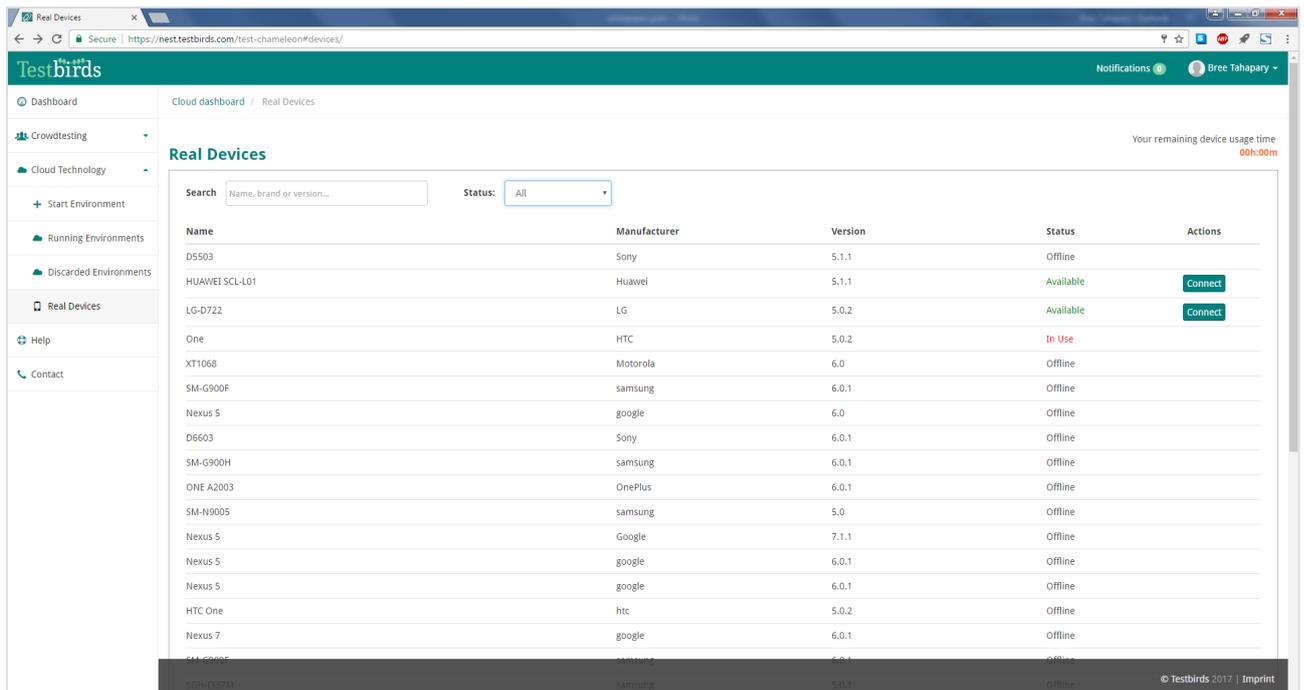


Figure 6 Filtered view of devices by status All. Search is also possible. User interface subject to change.

By clicking *Connect*, the client gets access to the device, is able to install his or her own .apk and can perform manual testing straight from the web view in the browser.

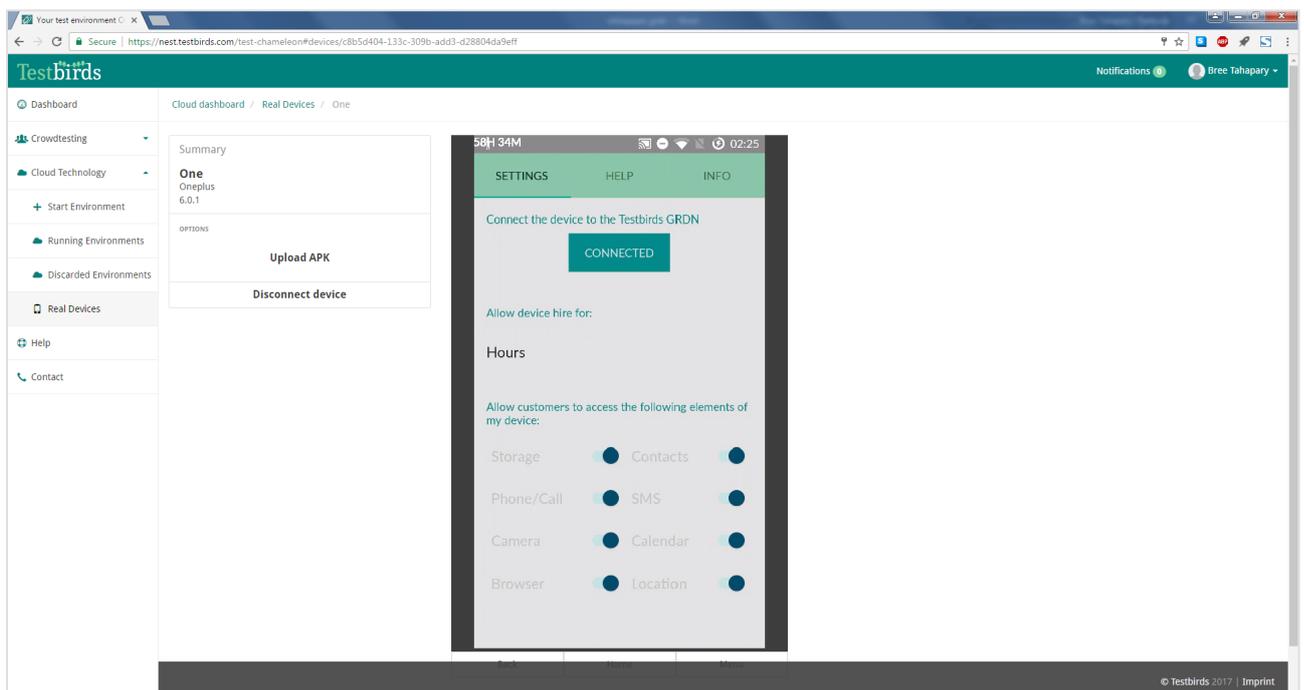
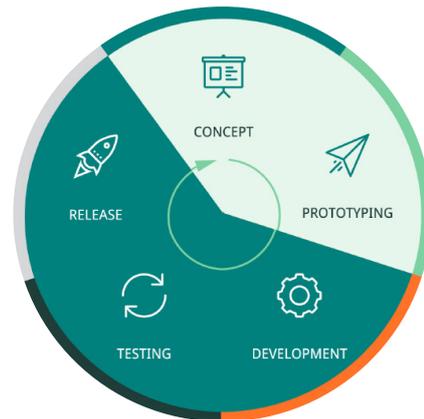


Figure 7 Web view to upload .apk's and to perform manual testing. User interface subject to change.

Keep in mind, that the system environment often is part of the test scope as well (with live monitoring for example). The GRDN offers the most realistic test approach in this respect. Also, crowdtesters are adding new Android devices on a daily basis and support for the addition of other mobile OSs and devices is expected to follow shortly. Additionally, and importantly, automated testing will also be possible by providing a standardised API through, for example, Appium. This creates the possibility to execute test scripts in an automated manner, even simultaneously on multiple devices. By combining with a continuous integration tool such as Jenkins, test automation on already distributed and real mobile devices will become an exciting reality in software testing.

GRDN in the Development Life Cycle

The Global Real Device Network offers developing teams a dynamic and flexible testing approach. With this solution, the quality of mobile digital products can be assured in a comprehensive manner – without the need to acquire or own the desired devices. This allows test managers to thoroughly research functionality issues within their apps. Testing with the GRDN is flexible and is most powerful when embedded in various stages of the development life cycle. For example, during development, testing or release.



True Remote Testing On Real End-User Devices

The GRDN forms an exciting approach in software testing since the method leverages the device capacity of people all around the world. All crowdtesters are eligible to add their Android smartphones and tablets. This results in a globally distributed network of real end-user devices to test on. The solution takes important geo-dependent factors into consideration such as location based dependency, language barriers, mobile operability and more. Companies and organisations seeking to obtain realistic test results can now make use of one of the largest pools of test devices available. This helps them to overcome challenges such as a lack of resources, not having to acquire, store and maintain testing devices within complex ITIL processes. Furthermore, device diversity can also be tackled with the GRDN, which is specifically important within the fragmented device landscape of Google's Android. And with test automation on its way, the Global Real Device Network offers true, future ready and cost-efficient remote testing on real end-user devices.

Testbirds

Testbirds specialises in the testing of software such as apps, websites and Internet of Things applications by using innovative technologies and methods. Under the slogan, "Testing 4.0 – The Next Generation of Quality", Testbirds aims to become the world's leading company for innovative software testing solutions. With over 200,000 testers in 193 countries, Testbirds is now one of the world's leading crowdtesting providers. In addition, the company offers cloud based technologies for the optimisation of digital products. The combination of the two form Testbirds' unique portfolio that promises to take the quality of technology to the next level.

Testbirds was founded in 2011 by Philipp Benkler, Georg Hansbauer and Markus Steinhauser. Today, the company has over 85 employees with offices in Munich (headquarters), Amsterdam, London and Stockholm, franchises in Hungary and Slovakia and sales partners in Italy and North America.

Interested in crowdtesting?
Contact us for a free consultation:
info@testbirds.com



Testbirds GmbH
Radlkoflerstraße 2
81373 München
Germany
Phone: +49 89 8563 3350
www.testbirds.de

Testbirds Ltd.
439 Metal Box Factory
30 Great Guildford Street
London, SE1 0HS, England
Netherlands
Phone: +44 20 3129 5012
www.testbirds.com

Testbirds B.V.
Herengracht 458
1017 CA Amsterdam
Netherlands
Phone: +3120 240 5780
www.testbirds.nl

Testbirds AB
Tobakspinnargatan 7
11736 Stockholm
Sweden
Phone: +46 722 999 999
www.testbirds.se