10 CHALLENGES IN MOBILE TESTING AND THEIR SOLUTIONS

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INTRODUCTION

We've recently seen the desperation expressed by people across the globe, during the few hours of outage of Instagram, Whatsapp and Facebook. The two global disruptions within a week were said to be due to faulty configuration changes. These are social media giants and yet they had to graciously apologize to the millions of ordinary people, because it is these ordinary millions who drive their popularity and business! The truth behind this paradox is that we live in an ever increasing digital world and digital dependence is here to stay.

A recent research from Strategy Analytics reveals that in June 2021, smart phone users stood at close to 4 billion. Yet another source states that there are currently 5.22 billion smart phone users across the world. With a worldwide population of 7.9 billion, it means that more than 50% of the global population is on smartphones! Furthermore, 88% of mobile time is spent on apps!

A few decades ago no one would have imagined that the mobile phone would become such a necessity for people across all strata of society! Technology is a double edged sword. While the rapid digital strides are a boon to businesses and app users, it can pose insurmountable challenges to app developers and testers. Needless to state that in this highly charged digital environment, app testing gains utmost importance because as we have seen, app down-time can be a nightmare to the biggest names in the industry!

Forewarned is forearmed and that's the reason why we've put together 10 challenges and their solutions, to help you as a mobile app tester, to ensure that your app works perfectly under all conditions across the globe.

ABSTRACT

Mobile apps are increasingly gaining importance, with people migrating to digital platforms for various aspects of daily life - be it banking, insurance, investment, shopping, education, entertainment and the list goes on.

In this digital world, apps have to function across different time zones, language, cultures, traits and user preferences. Users' choices can be a myriad of combinations from a matrix of devices, operating systems, browsers, mobile networks, connection types, screen sizes, battery capacities and personalized device settings. Each of these poses challenges that the app tester must necessarily deal with.

The challenges increase considerably, with mobile companies and mobile platforms, constantly offering new features and facilities to users. The frequency of updates and enhancements may sometimes be as recurrent as a fortnight, which means that was tested and approved will need to be retested ever so often with each new update and enhancement!

There will also be technical challenges in terms of test interfaces and the need to choose wisely from a multitude of app testing tools flooding the market. Furthermore, for most part of the software development cycle, testing may have been done on simulators and emulators which will never be a 100% replica of the real-time world.

To counter the challenges, the mobile app tester needs to be aware, updated and prepared. The pages that follow will explore the challenges that you - the mobile app tester will face, and simultaneously offer solutions to forearm you and help you take your app to the real-time world with more confidence.

MOBILE APP TESTING: CHALLENGES AND SOLUTIONS

In this section, 10 challenges that mobile app testers frequently encounter are listed. However, we will not just stop at the challenges but also offer solutions to overcome these challenges.

10 CHALLENGES IN MOBILE APP TESTING WITH SOLUTIONS

01 MULTIPLICITY OF MOBILE APP TYPES

Mobile apps can be of different types: Native Apps, Web Apps and Hybrid Apps. Testing methods and challenges will differ for each type of app. The performance of each type of app from installation to functionality will vary and so will the testing methods and test coverage.

A native App must be installed on the device and is able to store data into the mobile device. These apps also have access to a phone's camera, address book, calendar and other devices. In contrast, a Web-based App is hosted on the web and accessed from a browser on the mobile device. It is unable to store data into the mobile device. A Hybrid App is a combination of both native and web apps. It has the possibility of having its own icon or it can be downloaded from an app store.

To overcome the challenges posed by the varying types of apps, it is important to clearly understand which type of app you are dealing with and plan the test cases and test scenarios accordingly. The purpose of your app also needs to be clearly defined, so that you can plan and chose the most appropriate testing methods and tools right at the start.

02 OPERATING SYSTEM(OS) MULTIPLICITY AND FRAGMENTATION

A mobile operating system is what allows apps and programs to run on mobiles and is therefore extremely important for mobile app testers to understand. There are various mobile operating systems like iOS, Android, Tizen, Windows and Blackberry, to name a few. Each of these are different from the others in their style, purpose and functioning. The mobile app tester has to not just deal with the complexity of these various operating systems but further complexities of the numerous versions which each of these OS systems bring out from time to time. If we just talk about Android, the latest update is OS 11 "R", but prior to this, there were a host of previous versions viz. OS 10, Pie (9.0), Oreo (8.0), Nougat (7.0), Marshmallow (6.0), Lollipop (5.0), KitKat (4.4), Jellybean (4.3, 4.2 and 4.1) etc. Add to this, the fragmentation of the other operating systems and you realize the complexities the mobile app tester has to deal with! Unfortunately, many mobile app users don't upgrade to the latest OS version and therefore the mobile app tester has to ensure that the app works not just on currently popular operating systems, but on the various versions that may still be in use. After all, the customer is king!

Cross-device testing is the solution to overcome these challenges. It is important that the various operating systems and versions in use should be properly represented in the devices selected for testing. There is a choice of online tools available that will make cross-device testing feasible and thus help the mobile app tester overcome the challenges of OS multiplicity and fragmentation.

03 MULTIPLICITY OF DEVICES

With different operating systems also come a host of different devices - with Android alone having 24000 types of devices way back in 2015! Each device will differ in terms of CPU, memory, screen resolution, OS optimization and hardware.

Apart from this, the popularity of devices differs in different countries, regions, age groups, economic strata etc. Your app will have to cater to various user preferences. Chances are that if your app works perfectly on some devices of a particular brand, it may not work on other devices of the same brand! Obviously then, just brand testing won't do, you need to get down to testing on a host of devices and this brings with it, its own challenges. The mobile app tester has to ensure that the app works not just on currently popular devices but even on legacy devices which fiercely loyal customers may not let go off!

While testing on the maximum number of devices is ideal, there are also huge investments of time, effort and finances. One way to deal with this dichotomy is to thoroughly analyze your app market and narrow down the number of different devices that your app will cater to and then test your app on the well analyzed list of devices.

Cross-device testing is again the solution to this challenge. As mentioned earlier, online tools that will make cross-device testing feasible are available, and will help the mobile app tester overcome the challenges of device multiplicity and fragmentation. If owning a device farm/lab is an unaffordable option, then accessing cloud based device farms / labs could be a viable solution.

04 BROWSER FRAGMENTATION

There are various browsers for smart phones some of which are Chrome, Mozilla Firefox, Opera, Microsoft Edge, Vivaldi, Brave, Flynx etc. Furthermore, some browsers are updated every 10 to 15 days! But as usual, there will be users who will not update the latest version. Hence your app needs to be tested not just on various browsers but also on various versions – past, present and future! Yes, that's right – the future updates too! While your app may have been thoroughly tested on the most recent browser update, it may not work well enough on the newer update that may be released a fortnight later!

The way forward is to create a browser matrix - a combination of the various browsers and their different versions and ensure your app is tested on all the relevant combinations. Furthermore, it is vital that the mobile app tester is abreast of the latest versions and performs frequent mobile app test cycles. Online testing tools can be of great help. A good solution for overcoming this challenge is to use cross-browser testing tools for web based apps and other relevant online tools for native apps.

05 SCREEN SIZES

Larger screen sizes have become increasingly popular as smartphone users are increasingly using their devices for everything from personal communication, to banking, to office related work,to entertainment! Even amidst the trend of increasing screen sizes, some customers will have a preference for smaller screens too. With varying screen sizes come the differences in pixel density. While developers would love to create pixel-perfect interfaces, this may not be feasible with the changing screen sizes that keep entering the market from time to time. It is important that your app's interactive components - whether text, graphs or pictures - are comfortably legible despite the user's screen size.

Apps need to maintain uniformity and ensure that the aspect ratios are good across all screen sizes. Designers will need to create flexible layouts to help the app resize according to the screen and give users superior viewing experiences irrespective of their screen size. The rapidly changing screen size market becomes a challenge for the mobile app tester.

For web-based apps, online cross-device and cross-browser testing tools are a solution that will help testers review the app's receptiveness and rule out any website rendering issues. This will also help testers ensure that the app's display and performance are proper across different screen sizes.

06 MOBILE NETWORK/CONNECTION ISSUES

There are various mobile network companies as well as different connections types. Certain networks function well in some regions but not in other regions. There are also various connection types. While most customers may currently be on 4G networks, there'll be users who have migrated to 5G and others who are stuck on 3G or lower connections. The mobile app tester needs to ensure that the app works on all networks and speeds or at least on 3G, 4G and 5G connections. Dissatisfied customers on any network or connection type, will result in those customers rejecting the app.

There will be challenges in terms of differences in speed, connectivity quality; choices of broadband or mobile data connections; issues related to smooth data transfer between the server and the mobile device; there will be the app's bandwidth issues to deal with and ensure it doesn't guzzle the user's data.

To overcome these challenges, the app tester will need to ensure that testing is done on different mobile networks, different connection types and different bandwidths to ensure response time is within an acceptable range. If the app is too slow on any network or connection type, then it is advisable that the developers are informed, so that further thought can be applied into improving the app in this important area.

07 USER PREFERENCES W.R.T. DEVICE SETTINGS

Customer's tastes and preferences keep changing and mobile manufacturing companies therefore provide a wide variety of settings that the customer can pick and choose from. Users many choose to register on the app in different ways; they may choose to use the app in different modes or use the app in landscape or portrait views; there may be changing preferences in how they browse through the app or there will be a host of different combinations that they choose from the device settings. Moreover, these preferences will keep changing with new experiences that users are constantly being offered from various quarters.

Catering to this myriad of changing user preferences can be a challenge to the tester. The app tester will need to keep abreast of the various options available to users and ensure that the app works under all user preference combinations. The volatility in user preferences poses a further problem as it may involve changes throughout the software development life cycle, necessitating the tester to be constantly involved in the app development process.

One way to overcome this challenge is to opt for dynamic app development like Agile, which provides for an incremental approach to design and testing. It allows testing to begin at the start of the project and provides for continuous integration between development and testing. Being a continuous testing approach, it makes incorporation of new features easier through Unit Testing, Continuous Integration and Continuous Delivery tools that are important components of Automated Mobile App Testing.

08 WIDELY RANGING BATTERY CAPACITIES

Your app's target audience will be users with differing battery capacities and hence this is another challenge that the mobile app tester needs to work on. If your app is very heavy and drains the battery quickly, then users may be reluctant to download it. A poorly designed app will use a lot more energy; a video screening app eats into battery life. The mobile app tester needs to take care of these other aspects too - besides testing the app itself. A perfect app which quickly drains the user's battery will definitely not provide that superior digital experience that users are looking for.

As a mobile app tester, you need to ensure that your app is not a battery killer because an app which is an energy guzzler will have very few takers. While testing the app, observe its effect on the device too - especially its battery. Any features of the app that are an unnecessary energy drain, must be taken up for urgent fixing. Check if there are redundant operations that can be cut off; check the possibility of caching downloaded data rather than constantly alerting the radio to re-download data; check if backing up data to the cloud can be deferred till the device is charged. In short, find ways to optimize battery intensive operations on your app.

09 NUMEROUS TEST INTERFACES

Mobile testing is often done on simulators and emulators. While simulators simulate the internal state of an object or device, emulators mimic, as closely as possible, the external behaviour of the object or device. But these will never fully represent the real world which is dynamic and highly volatile. These tools cannot properly represent battery issues, network connectivity issues and other real-time data like GPS, sensors, gestures, touch force etc.In real life the app will have to perform amidst a wide variety of situations that will not be faced on static simulators and emulators. There may be incoming calls and SMSs happening in the middle of a transaction on the app; there maybe unstable network when the app is in use or a disrupting virus or other glitches that affect the app's performance. Frequent regression testing will need to be done to ensure that the newly added codes or programs do not adversely affect approved functionalities that were thoroughly tested. The use of simulators and emulators require frequent test interfaces which is another challenge to the mobile app tester.

Ultimately it is important to test in the app in a real-time environment before it is finally cleared for use. Production testing is one way to overcome these practical issues faced by mobile app testers. In production testing, software is tested in the production environment and feature flags can be used to control who can see the new features before they are released to the end user. Software developers and testers, get to view how the new feature responds in the production environment, but end users will be given access only after all bugs that might show up are fixed. It is necessary to follow this before any new feature is released. For this to be effective, it is vital that thorough testing is done at each of the earlier stages in the software development cycle.

10 MULTITUDE MOBILE APP TESTING TOOLS

Mobile app testing tools aim at making the job of the mobile app tester, quicker, easier and more accurate. With changing trends in the mobile world, the app testing tools also keep progressing. As in any field, it is important for mobile app testers to keep abreast of the latest in technology, to ensure that outdated tools are not being used. With the wide variety of mobile app testing tools to choose from, the tester needs to be familiar with the purpose and functionality of each tool to ensure he chooses the tool or combination of tools that best suit the app and purpose of testing.

Some tools may be specifically for Android apps, others exclusively for iOS apps, still others which can be used for both. Tools will defer for native apps and web-based apps. Your testing requirements also differ at different times in the software development life cycle (SDLC): The requirement may be for Unit Testing, Integration Testing, Regression Testing, Acceptance Testing etc. The purpose of testing also needs to be determined: Is the purpose Functional Testing, Performance Testing, Memory Testing, Interruption Testing, Installation Testing or Usability Testing? It is important to choose the right tool from among the multitude of tools clamoring for attention.

To overcome this challenge, testers need to be clear about what is required to be tested and familiarize themselves with the tools that are available. Since many app testing tools/platforms offer a free trial, it enables the tester to check the suitability before purchasing the tool. BOTm Testing is one such fully automated testing platform that aims at making the life of a mobile app tester stress- free by providing error free mobile app testing across spectrum

CONCLUSION

Mobile app testing is becoming increasingly complex with the rapid changes in the digital world, in the mobile manufacturing industry and in user preferences. The mobile app tester's challenges increase manifold because of the volatile environment in which testing has to be done. The app needs to perform well not just for combinations in the current matrix of user's choices but also for additional combinations that will keep adding to the user preference matrix ever so often.

The age old adage "Customer is King" is more relevant than ever before! Apps need to provide that superior digital experience that users are looking for, irrespective of the combination of choices they make. Furthermore there are also the technical challenges of having to execute numerous interfaces and the issue of choosing the right testing tools, from the multitude that are available.

Thankfully there are automated test solutions that constantly keep abreast of these challenges and present viable solutions. However, it is important for the mobile app tester to always be updated and choose wisely from the many testing tools. A fully automated mobile testing platform that works across spectrum is the best bet for mobile app testers to opt for. After all speed and accuracy are two pillars that the mobile app tester just cannot ignore.

One such platform that fully understands the dynamics of mobile app testing is BOTm Testing, which uses actual devices and not emulators and simulators, giving the tester an added advantage. BOTm offers you a free trial at www.botmtesting.comto help you experience ease in mobile app testing.