## A COMPREHENSIVE GUIDE TO TYPES OF MOBILE APP TESTING







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# INTRODUCTION

As smartphones have evolved through the years, so have mobile applications. Gone are the days where the main functions of a mobile application was to tell the time, calculate a math problem, or play a funny video.

Mobile apps today have become an integral part of a person's life, so much so that owning a smartphone is said to be a basic necessity in order to function in a productive manner.

From maintaining our health and fitness, ordering food online, hosting online meetings, and social as well as professional networking, to building a brand's awareness and presence, mobile apps have, quite literally, tapped into each and every aspect of human existence.

The technologies used in mobile apps have transformed at a rapid pace, so have the processes for mobile application testing. This is the main factor leading to the birth of several new methods and types of mobile testing.

We know that mobile application testing plays a key role in deciding whether your mobile application is a success or a failure in the vast ocean of mobile applications present, hence, it is a high priority task in the entire app creation process.

The mobile app must not only be of high standards but also be up-to-date with the modern technology standards and be prepared for further new-age developments.



# ABSTRACT

The world of mobile app testing is a fast-paced environment by design as the creation of great apps in quick time is the need of the hour.

To meet the challenging requirements of this rapidly evolving industry, there has been an introduction of a vast number of testing processes that are developed to keep abreast with industry demands.

Significant developments in the use of apps have seen the birth of new-age testing tools such as automation tools and frameworks like Appium, Detox, Espresso, Calabash, Robotium and many more.

The programming languages that are used in these testing processes have also evolved from C# to Java to the most famous and popular language today, which is Python.

Let us look at the array of mobile testing processes that should be conducted to create an error free mobile app without the implementation of which, user dissatisfaction and app uninstallation is certain.

#### All mobile app tests can be classified into three main categories:





## **OPERATION BASED TESTING**

Here, the mobile testing process deals with basic operations of a mobile app, (whether the app is working or not), testing in real environments and non-functional aspects such as performance of the app.

# 01

### **FUNCTIONAL TESTING**

Functional Testing verifies that the operational execution of a program or mobile app happens according to the technical and business requirements. Only if every feature of a software system works correctly, it can pass a functional test. This type of testing focuses on the main purpose and flow of the app, ensuring that all its features are responsive and meet specifications. It is mainly aimed at, as the name suggests, making sure that the key functions of the app are in order.

Some additional scenarios to keep a track in this testing are:

- The application installation and launch aspect
- Sign-up and login features
- Text boxes and buttons functions
- Push notifications

# 02

### **REAL ENVIRONMENT TESTING**

This type of testing focuses on all the criteria that comes into the picture when the mobile application is running on a real device in the hands of a real end user. This testing enables the mobile testers to get into a real-life scenario and deal with the challenges that present themselves such as poor network, accidental gestures and call or text message interruptions.

Great software and hardware are the pillars on which every successful mobile application is built upon. Ensuring that these two aspects are up-to-the-mark is very important. Below are some of the points that need to be focused upon while conducting the test.



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- Location-based Services (LBS) Location-based services provide real-time information, entertainment or security, Using geo-data from a mobile device. They are also used by consumers to "check in" while going to restaurants or cafes.
- **Biometric** Mobile devices often include biometric sensors that include face recognition, fingerprint and hand geometry, iris recognition, and even DNA or insulin levels.
- NFC payments Near Field Communications (NFC) allows mobile devices to communicate with a payment terminal enabling contactless payments.
- Interruptions Interrupt testing checks the common mobile app interruptions such as loss of battery power, in incoming phone calls or text, notifications, and app updates and ensures the app is running at all times.

### **NON-FUNCTIONAL TESTING**

Non-functional testing checks all the aspects not covered in functional tests. It includes performance, usability, scalability, and reliability of the software. This type of testing mainly deals with gauging the efficiency of the mobile application, once the functional testing has been completed to check whether, mobile testers use this method to check how well the mobile application is performing.





#### A Security Testing

Security is one of the most crucial aspects of any mobile application as studies show that every time a user deletes their app after installation, it is mainly due to security concerns.

Most application's ask for the user's personal information. This means giving away sensitive information. Testing various permission device schemes must be made a priority as the confidentiality, authenticity, and integrity of the app comes into question.

**PROS**: One of the most crucial types of testing which has a huge impact on building trust with your customer. **CONS**: Security testing can at times utilize unethical means of testing.

### B Compatibility Testing

Ensuring your mobile app works on various operating systems, devices, network environments, and with particular internal hardware specifications is imperative.

#### The specifics that are looked into in this testing are:

- Compatibility with different operating systems and their various versions (iOS, Android, Windows, etc.)
- App performance with varying networks and their parameters (bandwidth, operating speed, etc.)
- Compatibility with different browsers (Google, Firefox, Safari, etc.)
- Compatibility with different devices (screen size, data storage, etc.)

#### Compatibility Testing is further segregated into two types:

- Backwards Testing: Checking the mobile app behavior with older software versions.
- Forwards Testing: Checking the mobile app behavior with new software versions as well as beta versions.

**PROS**: It's a very useful process of testing in order to ensure your mobile app has the widest reach of customers across various OS and browsers.

CONS: Delay in testing is a common occurrence due to its wide scope of criteria to be covered.



#### C Performance and Load Testing

Performance testing checks how well the mobile application performs under a particular workload. These tests are important to ensure your app isn't malfunctioning.

#### The following pointer are a check-list under performance testing:

- Device performance: Start-up time, battery consumption, memory consumption.
- Network performance: Delays or errors in receiving information.
- API / Server performance: The speed & format in which data is transferred.

The app should have built-in back-up and recovery functions that save or recover user data that could be lost under any circumstance.

**PROS**: Performance testing helps you gauge your optimization levels and create a future plan for the mobile app in terms of the load it can sustain.

**CONS**: Testing must be done on various types of mobile devices to achieve best results, which can be timeconsuming.

#### **D** Installation Testing

Installation testing is performed to check if the software is installing and uninstalling properly.

Installation testing ensures updates are also uninterrupted and error-free. This includes learning about scenarios where the user doesn't update an app.

**Factlet**: Installation Testing is generally given for QA outsourcing to check the quality of application at par with standards.

### **E** Localization Testing

It's important to ensure the app is accessible and usable in a wide variety of markets. That's where localization testing comes in. It deals with translating in multiple languages, converting to local currencies and adhering to local regulations and legal requirements,

Consumer's expect the best user experiences that are localized for their needs and preferences. Alps that graphically glitches or UI elements that are misaligned with their culture, language, or device accessibility, will cause users to immediately delete the app.

Factlet: Localization testing is only done on the local versions of the application.



#### **F** Usability Testing

Usability testing focuses on the entire app-driven customer experience with criteria such as the identification of bugs and recommendations for ways to improve the customer experience, both in and out of the app. It is also known as user experience testing in the industry, usability testing checks how user-friendly the app is in terms of ease of use and intuitiveness. It helps if usability testing is done with real people, on real devices in order

to identify and fix usability issues prior to app release.

This type of testing is more art than science and requires skilled usability QA testers to facilitate tests and capture insights that mirror actual users or customers of the app.

#### Key points to check are:

- Good layout and design
- Intuitive
- Response time

#### Best practices:

- Thoughtful setup of usability test scripts and feedback questionnaires.
- Integration of usability questionnaires within test cycles so testers understand the usability testing instructions, can access the online questionnaires and provide feedback as part of their testing tasks.
- Results analysis and feedback summary with actionable insights and recommendations for improving the overall customer experience.



## **METHOD BASED TESTING**

When it comes to the methods used in conducting Mobile Testing, Mobile Testing is divided into two categories Manual & Automated.



### MANUAL TESTING

Manual testing is the **process of manually testing software for defects**. It requires a tester to play the role of an end user whereby they use most of the application's features to ensure correct behavior. Manual testing involves **the tester writing test cases which then are executed manually without using any automated tool**. QA teams use manual testing to ensure that the final product really works as intended. With a specific role to play, manual testing is used to explore use-cases that may be quite niche in nature. This is where expert human testers come in. Working in short intervals, these manual testers can deliver exceptional results.

There are a few special kind of tests that need to be strictly manually tested, they are:

- Physical interface testing
- Complex testing
- Exploratory testing

**PROS**: The most popular type of mobile testing since measuring user-friendliness and customer satisfaction is easier as testing is done by humans. Customized testing of apps is possible with Manual testing.

**CONS:** It is very time consuming therefore quite expensive as well. Duplicated efforts, repeated efforts, writing separate test cases causes a hassle to build the app and therefore causes huge delays for the Go-to-Market of mobile apps.





### 02

### **AUTOMATED TESTING**

Another software testing method is automation testing, which uses some specific tools to execute the test scripts without any human interference. In automated testing, tests are executed without human assistance, oftentimes via test automation frameworks, along with other tools and software. There exists certain kinds of QA tests that are either too tedious or too complex for human testers. Automated testing, backed with the power of Artificial Intelligence and Machine Learning, combined with manual tests assure quality, speed and a definite increase in productivity.

#### A few automated testing best practices and challenges include:

- The thoughtful design, build, and maintenance of accurate test scripts.
- The alignment and integration of existing engineering workflows with your automated testing process.
- The creation and maintenance of your test automation framework, including infrastructure.
- The management of test runs and setups.
- Rigorous reviews to validate test results and defects.
- Careful monitoring and rapid response to noise and flakey tests.

**PROS**: The fastest and absolutely error-free method of testing that results in faster go-to-market time. With the help of an automation testing tool, one can easily approach the test data, without writing test cases, handle the test implementation, and compare the actual output against the expected outcome. Also allows a tester to execute repetitive tasks and other related tasks without duplication efforts or errors.

**CONS**: A number of organizations who are not yet aware of Automated Testing platforms and frameworks or those manual testers who still prefer being the end user cum assessor vouching for manual testing.





## **MEDIUM BASED TESTING**

Mobile App Testing can also be segregated based upon running mediums to test the actual mobile device.

They are:

### 01 VIRTUAL TESTING

Virtual testing devices are basically software programs that mimic the functions of an actual mobile device, mainly implemented by companies to get an idea about the performance of an app, in cases where testing on an actual smartphone device is not feasible. Virtual Testing is further divided into Emulator Testing and Simulator Testing.

**Emulator Testing takes** place in a computer where the software program mimics the software and hardware aspects of the smartphone.

**Simulator Testing** is more specific in nature as it deals with representing the characteristics of Operating Systems such as Android or iOS, for example: iOS Simulators.

**PROS**: Mobile testers will be able to create unlimited number of user configurations through various user profiles **CONS**: Virtual testing requires additional hardware resources and a physical host at all times

# 02

### **REAL DEVICE TESTING**

Testing done with the use of an actual mobile device, preferably two devices each that support leading OS such Android or iOS. It helps QA testers to get an accurate grasp on how the mobile application would function in the real world environment, completely elimination "False Negatives" as well as ' False Positives"

**PROS**: There is nothing else that quite matches the true results achieved through testing on a mobile device in order to get into the user's mind and their experience.

**CONS**: Procurement, logistics and managing costs of real devices can prove to be quite expensive. Not a feasible approach for all organizations.





# CONCLUSION

With the rapid change in technology that has been observed in the recent past, it is certain that there are many more groundbreaking innovations in the pipeline. Which means that many more new ways of testing a mobile application are bound to appear in the industry.

For a beginner who is just about to begin their journey in the world of mobile testing, it may appear daunting to go through each and every type that exists. Further to that, going through these testing processes can be timeconsuming as well as expensive.

This is where Automated Testing comes to the rescue as it proves to be a one-stop shop for the above-mentioned types of testing, being just as effective, if not more. It provides an opportunity for the inexperienced to safely and productively play the role of a full-stack tester, without having to face the hassle of conducting each and every test, covering the result, process and device based approaches in a smooth and efficient manner.

### GET IN TOUCH

**()** 022 4050 8200

🖂 sales@botmtesting.com | 🌐 www.botmtesting.com