

Localization Testing in Mobile World

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In the recent past, there has been tremendous growth of smart phones and tablets. Due to this continuous growth, mobile applications are getting developed in various areas, starting from leisure to delivering business critical tasks. The release of these worldwide applications throughout the world required these applications to be available in language specific to the locale where this application is used. Diversity of mobile devices and platforms, the short development and testing cycles, and the number of languages the application needs to be available in, makes the localization testing of mobile applications challenging and poses the need to implement an effective test strategy to overcome these challenges.

This paper identifies the various challenges associated with localization testing of mobile applications and the elements to be included in an effective test strategy to perform localization testing.

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Abstract

With the continuous increase in growth of smart phones and tables, the mobile applications are becoming more and more popular, and are used to deliver business critical tasks. Mobile applications are getting created for almost every conceivable purpose someone can ever think of. The worldwide use of mobile applications requires these applications should be accessible, useful and contextual for all markets and regions. Localization involves making the application available in a language-specific environment. Mobile localization not just includes translation, but also the user interface, adaptation of graphics based on locale or culture and completeness of application. The testing of the functionality of the application in the language-specific environment is called localization testing.

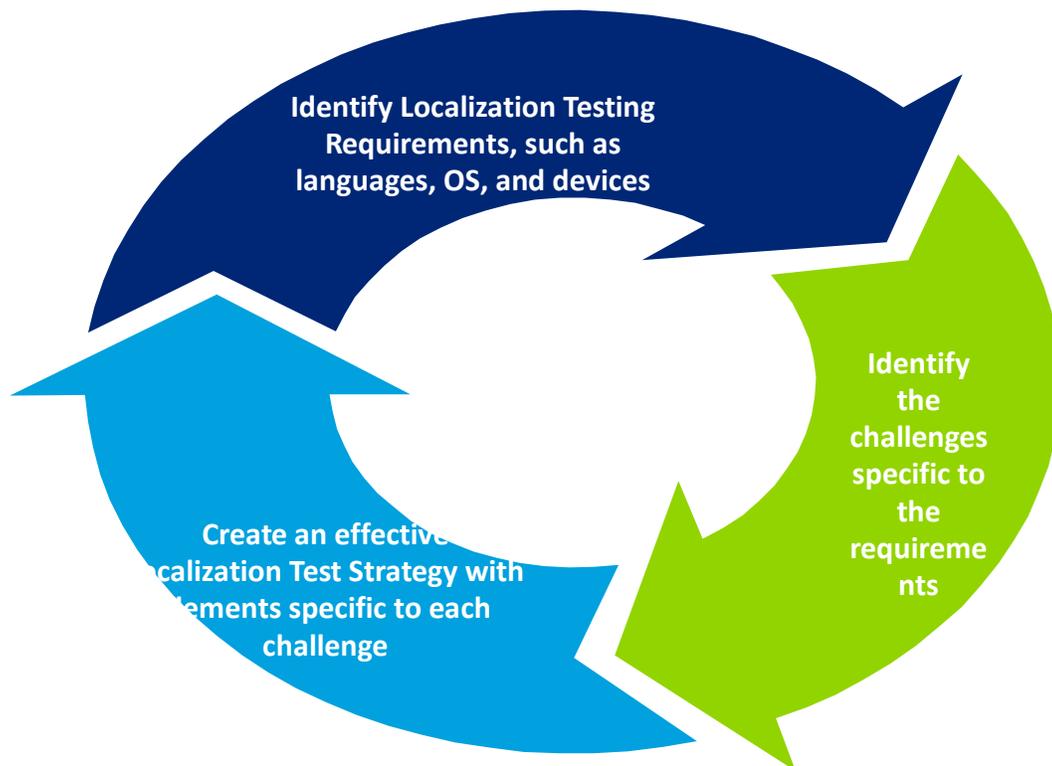


Figure1. Localization Testing Process

The key elements to be considered while designing an effective test strategy for localization testing of mobile applications are:

- Testing of mobile applications is different and complex than testing normal web and desktop applications
- Localization testing needs to be done in different combinations of software platforms and versions, hardware and types of devices. As the number of permutations is high, the strategy should focus on creating an optimal test bed of simulator and physical devices to increase the number of languages in which testing is done.

- Upgrade of mobile OS and introduction of new devices is very frequent because the number of organizations entering into mobile world is increasing.
- The release cycles of mobile applications are usually short as customers require continuous upgrades. With the shorter release cycles, the localization testing becomes more difficult because the number of languages in which the mobile applications are released is very high.
- In addition to national languages, the mobile application may also need to support the regional languages.
- Considering the large number of languages and mobile platforms and devices, selecting an effective test automation implementation becomes very important. Test automation can play an important role in covering the large number of languages and reducing the time and cost of testing the application in different languages.

Challenges of Localization Testing of Mobile Applications

With so many applications developed for mobiles, users have a wide choice of applications that can serve the same purpose. The quality of an application and its availability in different languages plays an important role in success of the application. A poor quality application would not only reduce the revenue but will also impact the reputation of an organization. The availability of an application in different languages can play an important factor in increase the coverage and success of the application. Hence, validating the application is working fine in different locales, referred to as localization testing becomes very important. In addition to verifying the functionality, localization testing focuses on verifying user interface, graphics adaptation and documentation for a specific locale.

The localization testing of mobile application is different and more complex than localization testing of traditional web based and desktop applications. Most of the traditional applications are single platform based whereas the mobile applications have to work in multiple operating systems, such as Android and ios. The number of versions of these operating systems further increases the platforms in which mobile applications have to be tested.

Unlike the traditional applications, where keyboard is a standard method of providing input, mobile device contain different input methods, such as touch screen and keypad. The display of different mobile devices can also vary. For instance, tablets and phones have different screen sizes, and screen sizes in phones are also not standard and different companies manufacture mobile devices of varying screen sizes. The display of text in different locales in different screen sizes becomes very important.

The behavior of a mobile application and display of text can further vary based on network speed. The testing of representation of text becomes an important aspect in localization testing of mobile applications.

The localization testing for mobile applications becomes even more challenging as compared to other systems due to constrained memory, slow processors, user interfaces, bandwidth, and connectivity.

The various issues associated with localization testing in mobile applications include:

1. **Limitation of screen size:** An application which works fine in English may not look correct in German or any other language in which the characters require more space. Also, some languages, such as Chinese have less character count but need larger fonts to make character readable. The limited size of screen may make the characters look complex. Therefore, the application needs to be tested in different handsets with different screen sizes and operating systems.
2. **Direction:** All languages are not written in the same direction. Some languages are written left to right, whereas others are right to left.
3. **Different operating systems:** Most of the mobile applications, especially for business tasks are available in all operating systems, such as android and ios.
4. **Input Devices:** Medium to high level handsets have different methods of taking input. From touch screen to keypad, any of the mechanism can be used provide in.
5. **Spelling rules and upper and lower case conversions:** Different languages have different rules based on locale or culture.
6. **Regional Standards:** Mobile application needs to be tested for compatibility with different regional standards, such as date/time, currency format, postal code and phone number. The format for date might differ based on the locale. For example, in different regions date can be represented as December 31 or 31 December.
7. **Data Handling:** An important consideration for all mobile applications is how to handle data. Is the data saved by mobile application stored properly?
8. **Context and Special Characters:** Due to small screen sizes of mobile devices, a lot of shortened phrases and words are used that lack the context. These can lead to errors during the translation process. For example, PM and Kill. In one language, Kill is used to refer killing an application whereas in other language it may have an altogether different meaning. Also, the translation of special characters might differ in different languages.
9. **Collation and Sorting:** During localization, text is translated from English language to other languages, say German. The sorting order in all languages is not same as sorting English alphabets, A-Z. For example, in European languages, accented letters have special sorting rules and languages, such as Chinese do not have any alphabets.
The following table summarizes the various factors and challenges posed by each factor while doing the localization testing of mobile applications:

Aspect	Challenge
Limitation of screen size	Character count and font of characters differ in various languages.
Direction	Some languages are written left to right, whereas others are written right to left.
Different operating systems	Different operating systems available for mobile applications. The frequency of upgrade of versions of mobile operating system is

	high.
Input Devices	Different types of input methods available in mobiles, such as keypad and touch screen.
Spelling rules and upper and lower case conversions	Rules differ based on locale.
Regional Standards	Mobile applications may have to be compatible with not only national languages, but also the regional languages
Data Handling	Different mobile devices may have different data storage and handling mechanisms.
Context and Special Characters	The translation of special characters needs to be handled carefully as different characters may have different meanings in different languages.
Collation And Sorting	Sorting and collation rules differ in various languages.

Mobile Localization Testing Strategies

The different elements to be included in an effective testing strategy for localization testing of a mobile application are mentioned below:

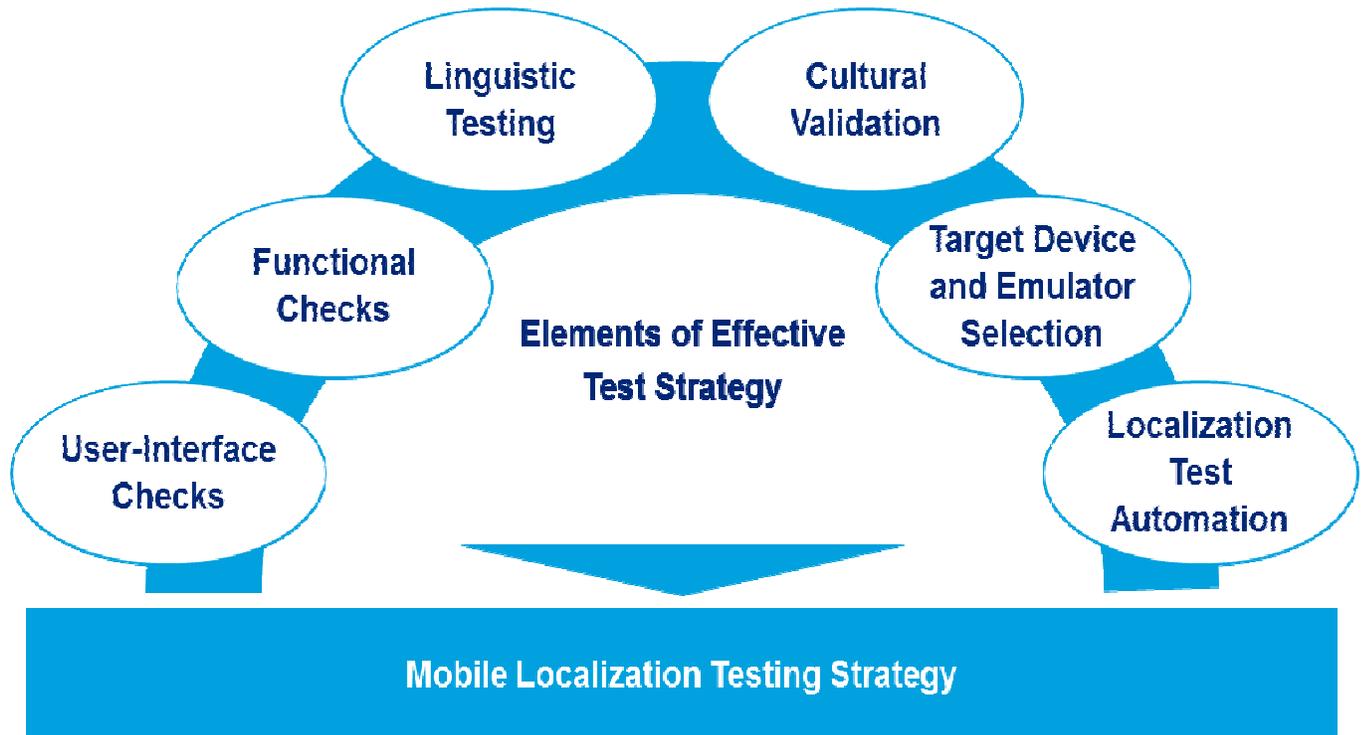


Figure 2: Elements of Mobile Localization Test Strategy

1. UI checks and locale-specific functional checks: Localization of a mobile application includes translating the user interface and graphics specific to the locale. A tester needs to identify the different locale requirements in terms of user interface to display the information properly. The UI checks include verifying the visibility of text in specific language and navigation between screens.

The various factors that need to be considered while doing the user interface testing are:

- Different size and resolution of screens of mobile devices
- Increase and Decrease of space requirement for text: While translating from English to other languages, the size of characters and length of words will change. A tester would need to check if the developer while creating the design of user interface has allowed for change in space requirement to display the text. In cases, where text requires less space after contraction, a good strategy will be to increase the font. Sometimes, the contraction of text leads to addition of white spaces or junk characters. The tester would need to ensure such checks are included in the tests.

2. Linguistic Testing: In-context language verification within UI: The key factors for testing the content of an application are two folds. First factor is to check if all the content associated with the application, including the help files have been translated correctly into the target language. Second factor is to check if the locale specific rules have been implemented while translating the content. For example, upper and lower case conversions, date format and currency.
3. Regional Localization: In addition to testing the text in different national languages, it becomes important to check the text in different regional languages. For example, in India a number of languages are supported. A mobile application that is used to check the status of a train ticket might have to be made available in different regional languages of India. So, the application needs to be tested in regional languages and representation of text in each language will differ.
4. Test Bed – Combination of mobile devices and emulators: A good start to do the localization testing is to use emulators. The emulators can be effective to test the functionality of the application in different languages. The emulators are also very useful in testing the application functionality in early stages of application development.
In the next and final stage of testing, it is essential to validate the content of the application in the physical device. The import factor that needs to be considered while selecting the target devices is to find out the dominating players in the target market. For example, in Switzerland the three main languages that are spoken are French, German and Italian. The three common operating systems are Android, ios, and blackberry. The three major service providers are Swisscom, Sunrise, and Orange. With three main languages, three main operating systems, and three main service providers, the possible number of test bed combinations will be 27 and localization testing for one country itself will turn into a huge project.
5. Localization Test Automation: Automated testing is very effective when test steps are consistently repeated in same or different environments. With the number of platforms, and operating systems available for mobile devices, it would not be possible to manually test in all permutations. Also, a mobile application will be accessed in several countries and each country may have different locales. Automation can play a key role in saving the manual effort to test the functionality in different language.

For example, let's consider a simple scenario to test the login page of an application that contains three UI controls, username, password, and login button. The localization testing of this page will test if the username, password and login button labels are correctly translated in target language and a user with correct credentials is able to login to the application. An automated tester can create two property files containing the controls of the application in two different languages, and create a script to validate the text of the controls using these property files.

Also, the login functionality should work irrespective of the language, and can be easily tested by using the automated scripts.

Recommendations and Conclusion

- Identifying the challenges and careful designing of test strategy to overcome these challenges can ensure a cost effective solution to perform localization testing of mobile applications.
- An optimal test bed consisting of mobile devices and emulators can provide maximum test coverage. It will help in avoiding testing each and every scenario in an actual physical device.
- Increasing the test automation coverage is an effective method of expediting the testing process, covering maximum locales and languages. A well designed test automation framework can be extended to add more languages, and automatically convert the text internally from one language to other and validate the results.
- Combining the traditional approaches of doing localization testing in web based or desktop applications with mobile specific solution can further help in addressing the challenges of localization testing in mobile world.

References

A Practical Guide to Localization by Arjen-Sjoerd de Vries

<http://www.mobileqazone.com/>