

Globalization Testing

WHITE PAPER

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TABLE OF CONTENT

Introduction	2
Types of Globalization Testing	2
Internationalization Testing (I18N)	2
Localization Testing (L10N)	2
Differences b/w Internationalization and Localization Testing	4
Key Focus Areas for Testing	5
a) IP Simulation Testing	5
b) Business Trends Testing	6
c) SSO Testing	6
d) Forms Testing	6
e) Testing Page Not Found, Error Page, Site Maintenance	6
f) Emails Testing	7
g) Events/Campaigns Testing	7
h) Cookie Validation	7
i) Search Validation	7
j) Browser Compatibility Testing	8
k) Fall back Message Testing	8
l) Language Vocabulary	8
m) User Interface	8
n) Date & Time Notation	9
o) Date/Time Correctness	9
p) Currency Format Handling	9
q) Phone Number, Address & Zip Code Format	9
r) Accessibility Testing	9
Test Scenarios for Globalization Testing	10
Challenges with Globalization Testing	11
Conclusion	11

INTRODUCTION

Information technology has rapidly transcended geographical boundaries and revolutionized the global economy. With the growth in internal trade and intense competition in the global marketplace, the demand for software products has increased tremendously. A software product that can be made available in the user's own language will have a huge competitive advantage as compared to a language-specific product. At the same time, the whole purpose of building a globalized product gets defeated, if the product has limitations in terms of acceptability. Hence, globalization testing has gained a lot of prominence and has become an integral part of product delivery. The sole aim of globalization testing is to uncover the potential problems that could hinder the globalization of the app in application design.

TYPES OF GLOBALIZATION TESTING

Globalization testing can be further categorized into Internationalization Testing and Localization Testing.

Internationalization Testing (I18N)

Internationalization or I18N is an engineering exercise focusing on generalizing a product so that it can handle multiple languages, scripts, without the need to redesign. In other words, it is the process in which the code of the software is tailored in such a way that it is independent of any culture and region-specific information. The key target of internationalization testing is to verify if the code can deal with all the international support with no breaking of functionality that may cause data loss or data integrity issues.

I18N Testing mainly focuses on:

- **Language Compatibility Testing:** This involves verifying if the product can behave correctly in a language environment.
- **Functionality Testing:** This involves executing functionality regression tests over different language environments and entering native language strings. This includes testing whether the culture-specific info like currency, date, time is displayed correctly or not.
- **UI Validation:** This tries to identify any visual problems like graphical issues, text overlapping, text truncation, etc.
- **Interoperability Testing:** This involves testing the software over targeted cross platforms, operating systems, app versions, etc.
- **Usability Testing:** It tests the ease of app usage.
- **Installation Testing:** This involves trying to install the app in different native languages and see if all the installation messages are displayed correctly across the language settings.

The Need For Globalization Testing

Most of the tech giants are now keen on circulating their application usage across the globe so that there is minimal or no change from the coding perspective, and yet meeting all the specifications of the locale.

Sample scenarios that can show the need for globalization:

Scenario 1

One of the best examples would be using Facebook. This app has a language setting feature, through which it can be used by several regional and national languages. For Instance, if you are in India, then you have an option to use Facebook in English, Hindi, Marathi, Bangla, Punjabi, Gujarati or whichever language you are comfortable with. A person from South Africa can use Facebook in Afrikaans, from France one can use it in Français and so on. So, based on your country and region across the globe, you can select the language of your choice and use the app accordingly.

However, the features of the app will remain the same. Only the language in which the things get displayed to the user will change. Some other things also come into the picture like, the date & time, currency, depending on your time zone and country.

Scenario 2

In India, the Zipcodes are 6 numeric digits (no alphabets). So, if you have selected your country as India, while entering the pin code of your area, it should only accept the 6-digit code. But, if you select Canada, then the Zipcodes include 6 alphanumeric characters.

In the above case, your application should accept the Zipcode according to the Canadian Zipcode format. Thus, it is very crucial to ensure if the Zipcode functionality is working fine according to each locale. Similarly, many such issues can appear while varying the location and language.

So, the need for Globalization testing arises in which identifying & fixing the issues may appear due to the change of languages & geographic regions. It also helps you to make sure that there is no hard coding in your application.

Localization Testing (L10N)

Localization or L10N is the process of adapting a product or service to a language, culture, and desired 'look and feel'. Localization is the process of modifying a software product according to each locale (language, territory, code page, etc.) that is to be supported. This involves the translation of the software and its presentation to the end-user. The translation of the program considers icons, graphics, user manuals, help files, documentation, and other cultural specifications. It mainly focuses on the UI and content.

L18N Testing mainly focuses on:

- Date and time formats (including numeric formats)
- Currency used
- Keyboard usage
- Sorting, aligning, and collating data
- Colors schemes, symbols, and icons
- Text and graphics where each culture, may be viewed as sensitive or can be misinterpreted
- Diverse legal requirements

DIFFERENCES B/W INTERNATIONALIZATION AND LOCALIZATION TESTING

Internationalization Testing	Localization Testing
Internationalization is the process of designing and developing a product, application or document content such that it enables localization.	Localization is defined as making a product, application or document content adaptable to meet the cultural, lingual and other requirements of a specific region or a locale.
Internationalization focuses on compatibility testing, functionality testing, interoperability testing, usability testing, installation testing, user interface validation testing.	Localization focuses on online help, GUI context, dialog boxes, error messages, read me/ tutorials, user manuals, release notes, installation guide etc.
Application code is independent of language.	Localization itself means a specific local language for any given region.



KEY FOCUS AREAS FOR TESTING

QA is a very important phase in the development lifecycle. Proper testing of content, UI, and cross locations testing of the application needs to be carried out effectively. Though there are certain challenges like prior domain expertise, cumbersome linguistic process, QA can overcome some of the challenging issues by widely focusing on few prominent areas that will save time and uncover all the major functionalities. Following are some of the important areas of testing during globalization testing:

a) IP Simulation Testing

As part of globalization testing, the application needs to be tested for multiple regions that are supported by the client. It is the responsibility of the testers to validate whether the application behavior, UI, specifications are working as per the location. This can be tested in the following ways:

- **By changing the IP address using any proxy tools** – To test we need to login to the proxy and hit the IP of the locale and check if the application shown is specific to the region.
For example, to know the IP of a region, use <https://whatismyipaddress.com/>, and it will show the IP of the location. Access the application under test with that IP address and check if it is redirected to the desired country.
- **By changing the region from drop-down** – we can select the country code or language from the list of supported countries. Whenever a selection is made, the application should route to the region selected and all the locale-specific changes should happen.
For example, for a customer in India, any application is by default routed to India (EN-IN) app. If the customer wants to check United Kingdom (EN-UK) app, they can select the region drop-down, and the application should navigate to that locale showing all the region-specific features.
- **By default, browser language** – Here we need to test if the application navigation is based on the default browser language.
For example, if the user browser language is (ja-JP) by default and the user navigated to a global site, then in this case, it needs to go to a Japan-based site as the user's default language is JP. Hence, there are multiple combinations and filters based on the requirement we need to test the application. To elaborate more,

Case 1: Browser language is (JP) AND User location IP is (JP) = if both conditions match then it will go to the JP region site.

Case2: Browser language (JP) + User location IP(not JP) = Here few customers prefer based on the IP region and few customers prefer based on the browser language and few of the customers prefer to go to the fallback region.

Case 3: Browser language (not JP) + User location IP(not JP)= then the users will not be redirected to JP region site.

b) Business Trends Testing

As we are aware, every region has its window of promotional offer periods based on that geographical location, seasonal demand, and culture. It is crucial to identify the patterns specific to locale and validate whether the right products are featured on the home page or product pages to attract the customers.

For example, during 'Thanksgiving Day' most of the products in various countries such as United States, Canada, etc., provide discounts on multiple goodies, electronic devices and so on. We need to check if the items are highlighted in these locations when we hit the application cart pages or product pages. Also, there might be a few other countries, which may not have the same offers during this period. In this way testing the trending patterns becomes important.

c) SSO Testing

(SSO) technology is very popular now, due to its ability to enhance security and simplify the administration of users and their access rights to various applications. With SSO, a user can log in at one place – a local PC, a web portal, a native application – and get access to various network resources without having to enter a password for each. It is the responsibility of the testers to completely validate the authentication of the pages across the supported regions and confirm that no credentials are malfunctioning or doing more than what it needs to do. Since the security of the user is the most crucial aspect, in-depth testing must be performed in this area.

For example, if there is a feature that is only restricted or targeted towards admin role, such as account creation and authentication, no other users other than the site administrators should have access to read, write or modify.

d) Forms Testing

Testing of forms is another key area while doing the globalization test. Countries have multiple forms such as registration, contact us, job query, get in touch etc., forms with labels specifically stated for regions. All the labels for the fields, supported input formats, disclaimer texts and so on should be validated based on the client document. A comparison of the content must be done using the translator and by cross-checking with the document. As all the countries might not have the same form fields and UI, this is also a major globalization test area that should be tested thoroughly.

e) Testing Page Not Found, Error Page, Site Maintenance

Most of the sites do not redirect their customers to 404 or 503 pages when the site is down or under maintenance. They navigate the customer to their default landing page or quick-links page. And this might also be configured at a global level or locale-specific.

For example, if a customer wants to access a page in China (CH-CN) when the page is under maintenance, they will be redirected to the site's global page or quick links page with similar working links to drive the customer journey till the end.

f) Emails Testing

When the forms are submitted for any region, the respective auto email acknowledgments are triggered to the customer. The subject, language, content, signature, images/logo, phone numbers, zip code, etc., should be generated locale specific to the customer across multiple supported regions.

g) Events/Campaigns Testing

Nowadays, the companies send out notifications to their clients with the invitation to attend the events or campaigns of their interests. The events hosted can be specific to the location and the content, timings, and duration can vary based on each country.

For example, clients residing in Latin American countries might be invited to the event during their noon hours, which might be late at night for people in the Middle East. Also, the participants, presenter details can be different for the locales. Hence, testing events and campaigns across various languages is a mandate.

h) Cookie Validation

Cookies store the details of the customer who visits the application and speed up the process by caching the values from the next visit. It is vital for every global app to provide the user with a hassle-free and smooth experience.

For example, when a user opens an application for the first time, no preferences are stored and the user is shown the default region and products. However, if the customer is from India and changes the location to (EN-IN), the cookie stores the preferences. Thereby, from the second visit, if the customer tries to access the page, they will not redirect them to the default page, instead, they are routed to the India region page.

i) Search Validation

Search is a common functionality across global applications. For an application supported across various geographies, the search functionality, auto suggestions, search criteria should also behave according to the region.

For example, a person residing in France tries to search for a keyword in French, all the auto-suggestions and other results should also be in French but not in other languages.

j) Browser Compatibility Testing

With the support for numerous browsers, versions of the browser's platforms, etc., it is important to test the compatibility of the application.

For example, there might be few regions that do not support IE7 or prior versions. In this case, there has to be a different page rendering for the specific regions which do not support the compatible version and suggest the user use a higher version to view the page.

k) Fallback Message Testing

Not every locale can support every feature. Therefore, they provide a mechanism of fall back message to the user and recommend completing the journey.

For example, while selecting the delivery location of a product in a region, it is obvious that the co-ordinates can be too far from the delivery hub. At this time, the user will be shown with a fallback message to choose a nearby location for delivery drop out rather than an error message. In this way, there can be various scenarios where the fallback messages should work based on locale.

l) Language Vocabulary

A globalized product supports many languages. The more the number of languages it supports, the more is the need for testing. You can use language translators and verify one by one if the application uses the proper vocabulary for each language. You do not need to test thoroughly word by word. However, a quick & crisp look at the application by switching it to each different language is recommended.

m) User Interface

As you know that each language script has a different writing style (most language scripts are written from left to right, while some from right to left) and the space required by the words might vary from one language to another.

So there is a need to test the UI layout in each language to ensure that the UI is clean and there are no issues like text overlapping, misalignment of text, navigation issues, etc.

n) Date & Time Notation

The date & time display formats will vary from region to region.

For example, the most common date format in the US is MM/DD/YYYY. The most common date format in Europe is DD/MM/YYYY. On the other hand, Canada accepts both DD/MM/YYYY and MM/DD/YYYY. Similarly, few countries use 24-hour notation while others use 12-hour notation. So, it is critical to ensure that the date & time is displayed in the appropriate format when you switch to different regions/countries.

o) Date/Time Correctness

It is not only the format but also the actual date & time that varies from region to region depending upon the time zone.

For example, 11:53 AM Saturday, Indian Standard Time (IST) is 1:23 AM Saturday in Eastern Time (ET). So, it needs to be tested if the correct date and time is displayed in the application on switching to different countries.

p) Currency Format Handling

If your application includes e-commerce, then currency testing becomes crucial. The numerical formats for currencies vary from one country to another. So, you should take care of the formatting. Another important thing is to display the correct symbol for the currency along with the units.

For example, if the price of an item is 100 rupees, but on the app, it is mentioned as just '100' then it might confuse the customer whether it is 100 rupees or 100 dollars. Therefore, the currency denomination must be very clear.

q) Phone Number, Address & Zipcode Format

The order in which the address is displayed varies from one language to another.

For example, In India, the zip code format supports six characters with only digits. Whereas in certain countries, the zip code is 5 characters (USA) or 6 characters (UK) with numeric and alphanumeric combinations. So, the validation rules for these fields should be given by the client before testing.

r) Accessibility Testing

Testing not only focuses on verifying usability, but it ensures that an application can be used by differently-abled people. Many countries worldwide have now made this requirement of accessibility as a mandate for their websites. As every nation has different policies and norms set for the level of accessibility, it is recommended to include this testing as part of globalization.

TEST SCENARIOS FOR GLOBALIZATION TESTING

- Ensure if the required installations are being done to set up the test environment.
- Ensure if the database is Unicode compatible.
- Verify if there are no hard-coded strings in the code.
- Check if the required locale is installed on the client machine.
- Check the resource bundles for all the required language property files available in it.
- Verify if the UI of the application is displayed in the native language of the client's locale.
- Verify if the default display language is English when no specific locale is selected or when the language properties file is not available in the resource bundle.
- Validate if the application can handle wide-ranging data including native language character set, ASCII characters, special characters, etc.
- Verify if the ordering of data on the UI is fine as per the client's locale.
- Verify if the filtering and searching functionality is working fine as per the client's locale.
- Verify if the correct date and time format are displayed across the application.
- Verify if the currencies are displayed in the correct format.
- Verify if the telephone numbers and pin codes are displayed in the correct format.
- Verify if the cursor is aligned to the correct side of the input fields based on the language script direction.
- Check if all the specified customer requirements are being tested.
- Check if all the input/output corresponding to each function is tested.
- Check if all the functionalities based on the native language inputs are being tested.
- Check if the entire database requirements are being tested.
- Check if all the specified UIs are being tested.
- Verify that no characters are overlapping on the screens.
- Verify that no junk characters are displayed on the screens.
- Verify that the graphics are appearing correctly in the UI.
- Verify if the user manuals/help files are displayed in the native language as per the client's locale.

CHALLENGES WITH GLOBALIZATION TESTING

- Localization expert engineers
- Domain expertise
- Hardware and software management
- Cumbersome linguistic process
- Coverage over all types of testing

CONCLUSION

Globalization testing is essential not only to ensure that the end product is delivered with all the desired functionalities but also to validate if it has both local and global appeal. All the key focus areas discussed in this blog, need to be thoroughly tested before the product launch. Without implementing globalization testing techniques, it is impossible to develop a global product that meets the requirements of the target audience and market.



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