CROSS BROWSER TESTING

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Abstract: **Cross Browser testing** is a type of non-functional testing that lets you check whether your website works as intended when accessed through

Different Browser-OS combinations i.e., on popular browsers like Firefox, Chrome, Edge, Safari—on any of the popular operating systems like Windows, macOS, iOS and Android.

Different devices i.e., users can view and interact with your website on popular devices—smart phones, tablets, desktops and laptops etc.

Assistive Tools i.e., the website is compatible with assistive technologies like screen readers for individuals who are differently abled

So, cross browser testing is very important now b/c of Compatibility.

Browserbite is a tool for cross-browser testing based on comparison of screenshots with the aim of identifying differences that a user may perceive as incompatibilities. Browserbite is based on segmentation and image comparison techniques adapted from the field of computer vision. The key idea is to first extract web page regions via segmentation and then to match and compare these regions pair wise based on geometry and pixel density distribution. Additional accuracy is achieved by post-processing the output of the region comparison step via supervised machine learning techniques. In this way, compatibility checking is performed based purely on screenshots rather than relying on the Document Object Model (DOM), an alternative that often leads to missed incompatibilities. Detected incompatibilities in Browserbite are overlaid on top of screenshots in order to assist users during cross-browser testing.

Keywords: Cross-browser compatibility testing, image processing, compatibility issue.

1. INTRODUCTION

Browser compatibility or cross-browser testing is a process of evaluating whether the functionality of a web application remains consistent when the end-user visits your web-application from a different browser. It is also used to validate browser compatibility for desktop and web applications.

In cross-browser testing, you will validate the style, font, and other UI elements of your website. All these things should look similar in each browser.

So, Cross Browser Testing is defining as technique of testing compatibility of Web and App applications. In this we check whether the application is suitable for all browsers like (Chrome, Firefox, and Opera Etc.) Means we can run our application in different bowers and in all browser web applications and app works same.

There is no change in Quality font, font style and all.

There should be proper alignment of applications in all browsers.

There is different tools with the help of these we can check Compatibility of web and apps.

Cross browser testing is possible on both web and App but mainly here we research on Web applications. Here we check Compatibility of Web applications on different browser.

1.2 The Importance of Testing in Different Browser Versions

Well, first, not all people are using the same browser.

You can check the latest stats on **<u>Wikipedia</u>** for usage share of all browsers,

Desktop a long time .In some time, they call you back and say that it's hard to navigate.

After several questions, you understand that they are using a different browser and it

Begins a whole new question of how to download another browser — the one that you

Are using. Browsers, mobile browsers, and tablet browsers.

Now let's look at the other scenarios…

You hear about some sales on a product that your parents wanted. You call them

And   recommend checking the online store so that they find some stuff they were

Looking for In this case, the business is just risking losing clients because of one

Browse version

Looking awful. In the 21st century, when you open some web app and it looks bad, you

Just go back to Google and open another one until you find a good-looking web app.

Each part of **HTML**, **CSS**, **JavaScript** is unique in different browsers; some stuff can

Be supported in one browser but not in the other one. By performing this type of

Testing, you are helping the developer to pin-point in which browser and its version

These issues occur.

1.3 What Features Are Analyzed in a Browser Test?

When the testing phase is coming, the product team (most of the time it is QA related work) creates a test specification document in which they specify a list of features to be tested, and in what browsers/versions/platforms in order to meet test scenarios. We can divide this into the sections given below.

1. Basic functionality: To ensure that simple stuff is working on most browser-OS combinations

- All input fields and their validation
- Dialog boxes and menus are working as expected
- Input touch on mobile devices

2. Design: To make sure fonts, styles, images, and layouts are matching requirements that were sent by designers

3. Responsiveness: Verify that design is solid and not broken in some layers after you change the resolution/orientation of a browser

1.4 How To Choose Browsers?

There are two easy ways to choose from all the variety of browsers

1. **Based on popularity:** Choose browsers that can overcome the 5% barrier in global statistics. So, for example, in 2020 you would choose Google Chrome, Safari, Mozilla Firefox, Microsoft Edge, and IE. Regarding IE, it is a bit tricky because there are a lot of versions of this browser. Our recommendation is to support only IE 10, the reason being that IE 8 and 9 are too old and hard to support.

2. Based on the analysis: If you have some analytics tools (Google Analytics, etc.) that are tracking all traffic stats, you will have a full understanding of what your customers are using, and it will be an easy decision to make. If not, you may try to know your customer better by creating some polls, etc. Would it be worth to support all the versions of different browsers? It depends on if you agree that development and testing time will be higher every time. Either way, in the long run, you will have to sacrifice supporting old versions.

The decision on which browsers and platforms to choose depends on the business team and the marketing team.

1.5 How to Plan & Run Tests?

Before planning when and what tests will be executed, you should make sure that these conditions are met:

- Your test cases are up to date.
- Design and mockups are according to requirements.
- You have all the tools and devices that you need for testing.
- You should run regression testing at least one time in each browser. This will give you knowledge about the product and its bottlenecks.

When you are planning, don't forget to mention who will be responsible for what browser/platform combination and assign test cases to be executed to the person responsible.

Tools to Use for Browser Compatibility Testing

- If you don't have an opportunity to have physical devices on your project, you can use some kind of emulator/simulator/virtual machine. For mobile devices consider these options:
    - You can simulate devices using developer tools that are default in Google Chrome or Mozilla Firefox.
    - Fiddler/Android studio/Xcode if you need to debug or reproduce an issue with your mobile device.
- As an example of a VM, you can use a virtual box or anything related that you prefer.
- For different browsers, you can use some paid cloud services that will provide you with a whole variety of browser/platform combinations.

However, don't forget that simulation/emulation is great when you have a limited budget, but nothing will compare to testing on a real physical device.

1.6 Manual v/s Automated Cross-Browser Testing

Let's talk about manual v/+s automated execution.

Manual testing needs human testers to execute scenarios, and it means that there is room for human error. From the beginning of the project, the amount of work for manual testers will only increase, which will, in turn, increase recourses and time.

When there is a scope of tests that are being executed every time, it's better to just automate it. Setting up a full process of automation that would cover most of the tests takes a long time. So, it's good for a long-term project.

In the modern world, most projects have both manual and automation testers in one project. Manual testers are doing exploratory testing to find the pain points in the UX (that is if we are talking only about the FE testing part) and automation guys automate scenarios that are running every time.

1.7 Common Issues While Performing Cross-Browser Testing

1. Internet Explorer: Yes, you read it right! As a separate category, I've put IE. This is the most painful browser to test. Every QA tester knows that when he opens Internet Explorer, he will find a couple of bugs. Everything related to the front end can be broken here. You need to keep this in mind and don't forget to check your application in IE.

2. Layout: This is the most visible issue that you can find. Basically, it's all related to CSS, Canvas, or DOM. various bugs' ranges from wrong text or image position to a small issue like a wrong-looking font. Do not forget about negative testing here as well, like closing a pop-out form by clicking somewhere outside the form.

3. Touches and Clicks: It's not easy to juggle the various types of input, especially now that tablets and phones generate touches that may or may not act as a mouse click.

4. Hovering: If you have a menu that opens by hovering a mouse over it, don't forget to check it as well. Sometimes the hovering never ends, sometimes the hover event links to the wrong item, and sometimes it doesn't open at all.

Bottom Line

- Identify what browsers and platforms you will be testing on.
- Make sure that your test cases and designs are up to date.
- Set up devices/browsers you'll test on.
- Assign test cases to the responsible person. Try not to assign the same person to test the same platform/browser combination a few times in a row.
- Share the document with the test results to people that will be fixing the bugs.

2.1 Why Cross Browser Testing Gaining Importance?

When any web application or software is ready for release there is an expectation that it will be implemented well in all browsers but, it's not the case because every browser is not equal. Some browsers are designed in such a way that it will work with a certain operating system and some have boasting features. Some of the features of the browser functions are limited to features like text to speech and some work only with MAC operating systems. Some of the web browsers who were once considered as only torchbearers in web exploration have now vanished completely. It's like the young generation have never heard   of   that   term. Thus, with so many variables and differences based on which a website behaves and exhibits the web application on different browsers, it is important to perform <u>cross-browser testing</u> when the web application process is finished.

2.2 Now you must be wondering <u>what is cross-browser testing</u>**.**
Well! It is the process of comparing website functionality and its design on various web browsers and platforms to make sure it is consistently functioning well for the user. With the availability of so many browsers, devices, and operating systems, cross-browser testing has become very important in the path of software development. The only purpose of cross-browser testing is to offer constant behavior and familiarity across all devices, platforms, and browsers.

2.3 Key Benefits of Cross Browser Testing
As human beings, browsers also interpret things differently and codes are not interpreted similarly in all browsers. Therefore, with cross-browser testing, the form, as well as the functionality of a website, is tested in varied browsers and devices. For example, the CSS styles will appear differently in Internet Explorer 8 and the recent version of IE. The styling and other effects like shadows, fonts, hover stages, as well as image transparencies all, will vary extensively in different browsers. These differences are mostly not possible to solve, but with cross-browser testing, you can make sure that the users have full access to the content and can implement all minimum task on your website without any kind of issues.

2.4 Some other benefits of Cross-Browser Testing:

- **Identifies which browsers are supporting:** It is very important to know which browsers your website is supporting, as it clarifies the limits for your development and where to focus. It also makes you know the kind of technology as well as characteristics that are possible and not possible with your products.

- **Satisfied customers and fewer bugs:** With cross-browser testing, you are aware of your web functionalities and thus it offers the best possible experience. It might be a difficult task for the development and quality control team, but it helps in covering all browsers and in avoiding any last-minute surprises.

Thus, we can say that with cross-browser testing you are performing vast test coverage, which in turn leads to happy customers, minimum support tickets and more time for you to focus on your product evolution.

CONCLUSION

We conclude that using cross browser testing we can improve compatibility of our website or apps. My website is compatible for all browsers.

It also should not be confused with Cross-Platform testing, which is testing your application in multiple target environments like Windows, Linux, Mac etc. Although sometimes the two have to integrate together as some of the older browser versions might be compatible only with the older versions of the platforms. It is also a continues to process as software environments, browsers and devices are evolving every day and to make sure there are no unpleasant surprises, this browser Testing should be added to the repertoire of regression suites.

As you know, each and every type of testing helps in improving the quality of the application and so does the cross-browser test too. Cross-browser testing helps in creating a good impression on the users by providing them a consistent experience throughout the application irrespective of the browser or Operating system.

Fixing bugs is cost-effective during the early stages of the development lifecycle, and the same applies to the defects found as a part of this testing too.

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