Speed Feeds Business

How JavaScript Tags Affect Performance

SITESPECT

Speed Affects Conversions

When it comes to the overall performance of a website, there is one reliable constant: it's got to be fast.

Leading research shows that visitor behavior is directly related to browsing speed and that conversion rates and overall customer satisfaction drop when pages load slowly.

Research also shows that 80-90% of visitors' time is spent in the web browser itself; server time accounts for only 10-20%.

"Research also shows that 80-90% of visitors' time is spent in the web browser itself (not on the server), where JavaScript code is a key factor."

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Speed Influences User Behavior

- Amazon reports that every 100 milliseconds (0.1 seconds) of delay in page load speed translates to 1% of potential lost sales[1].
- Google has found that adding a mere 500 milliseconds (0.5 seconds) of delay to search results page load results in a 20% loss in traffic[2].
- Yahoo! reports that 400 milliseconds (0.4 seconds) of added delay produces a 5% to 9% increase in the number of visitors who enter the site and bounce (leave the site) rather than continuing to view other pages within the same site[3].
- Microsoft Bing reports a 5% lift in revenue per user for every 2 seconds of speed improvement[4].
- Comparison shopping engine Shopzilla yielded a 12% increase in revenue and a 25% increase in page views for every 5 seconds of speed gained[5].
- Online retailer Wayfair found that reducing page load time by 500 milliseconds (0.5 seconds) also lowered bounce rates by 10%[6].

"According to the Aberdeen Group, a 1-second delay in website performance will result in a 7% loss in conversions, an 11% decrease in page views, and a 16% decrease in customer satisfaction[7]."

[1] *http://highscalability.com/latency-everywhere-and-it-costs-you-sales-how-crush-it*
[2] *http://news.cnet.com/8301-10784_3-9954972-7.html*
[3] *http://www.slideshare.net/stubbornella/designing-fast-websites-presentation*
[4] *http://www.gomez.com/pdfs/wp_why_web_performance_matters.pdf*
[5] *http://velocityconf.com/velocity2009/public/schedule/detail/7709*
[6] *http://torbit.com/insight/case-studies/Wayfair.pdf*
[7] *http://www.gomez.com/wp-content/downloads/Aberdeen_WebApps.pdf*

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Not All Tags are the Same

Most page load time occurs in the browser, where JavaScript code is a key factor. JavaScript tags then have the greatest effect on site speed. However, not all tags influence speed to the same degree. Beacon tags, such as those used by web analytics or ad tracking pixels, are nearly ubiquitous and do not slow the browsing experience. However, tags that change content carry greater weight and actually affect site speed the most.

Tags Compared

Content-swapping tags, the type used by many optimization vendors, come in two common variations: synchronous and asynchronous tags.

Synchronous tags

- Effectively block all content below it from loading until the tag returns content.
- Load slower while retrieving content.

Asynchronous tags

- Continue to load the remainder of the webpage while the browser retrieves content.
- Produce flicker while retrieving and loading the new test version[8].

[8] *https://analyticsdemystified.com/analytics-strategy/tag-management-systems-how-do-i-choose/*

Five Common Ways Tags Impact Speed and User Experience

1. **Page tags load synchronously, blocking the browser's execution flow.** Blocking introduces latency and a "flicker effect" to the user experience. The result introduces noticeable visual hiccups causing delays on desktop browsers, which are even more significant on mobile devices.
2. **Page tags modify on-page content using DOM manipulation, which is slow.** The tag must wait for a page's content to load before it can make changes to the DOM (Document Object Model – the browser's data representation of the web page, not the underlying HTML page source). This introduces visible content swapping, which can be disorienting, and interferes with the test data.
3. **Duplicate images add latency.** If there are test variations that change images, the browser loads both the default and the variation images. This adds latency and additional bandwidth, often by a factor of two for each test image.
4. **Page tags must share the sandbox with other on-page scripts and tags, which can cause errors.** All JavaScript code shares the same execution sandbox in the browser, meaning that any JavaScript error causes all control flow to terminate until the next page is loaded. Thus, errors introduced by the testing tool cause the rest of the page to fail and any errors elsewhere on the page cause the tag to fail[9].
5. **Retrieving code and variations inhibits optimization.** The page tag must open a new network connection to a third-party server to get instructions about how to change the page and swap out content. This additional networking introduces latency for additional DNS lookups and reduces the use of the browser's persistent HTTP connection and pipelining capabilities. In essence, the web browser's inherent performance optimization abilities are inhibited.

[9] *http://www.yottaa.com/blog/bid/267567/Third-Party-JavaScript-Strikes-Again-Facebook-Takes-Down-Web*

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Conclusion: Tags Slow Conversions

"SiteSpect uses a non-intrusive, tagless architecture that is entirely different from any other vendor in the testing and targeting space."

The Impact of JavaScript Tags

JavaScript is widely used on modern web sites. The increased focus on page speed has highlighted many best practices around successful JavaScript programming.

However, using JavaScript with tags often conflicts with many of these best practices. Synchronous JavaScript makes visual changes either during or after the page has fully rendered, resulting in visual artifacts that can influence user behavior (and thus test results) in an uncontrolled manner.

While JavaScript tag-based testing and targeting tools are advertised as easy-to-install (usually by inserting a snippet of code), in reality their implementation requires careful thought and planning around how the tag interacts with the underlying site and its potential effect on speed and conversion.

Test Without Tags

SiteSpect uses a non-intrusive, tagless architecture that is entirely different from any other solution in the testing and targeting space. SiteSpect's reverse-proxy technology is similar to that of leading content delivery networks (CDNs) such as Akamai. The architecture allows more power and flexibility, does not require any page tagging, and thus sidesteps an array of performance issues.

Implementing a site on the SiteSpect Cloud is straightforward, requiring only an adjustment to the site's DNS record. In addition to benefiting from our testing and targeting capabilities, SiteSpect customers typically experience a boost to website performance through the benefit of network and protocol optimizations, which include: edge caching, compression, persistent connections, origin offload, and others.

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ABOUT SITESPECT

SiteSpect is leading the advancement of customer experience optimization solutions for the world's most successful businesses. Only the SiteSpect patented solutions enable customers to optimize the entire digital experience from the front end (client side) to the back end (server side) while centrally managing across channels, business units and product lines. SiteSpect's unique technology sits in the flow of your digital traffic for full visibility of requests and responses allowing for real time business impact. Visit www.sitespect.com to see how top companies such as Sam's Club, Esurance, Eddie Bauer, Staples and Urban Outfitters have leveraged SiteSpect's technology and expertise to grow their businesses.

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