cloudimage

IMAGE ACCELERATION IN THE CLOUD:

Challenges and Solutions

Scaleflex

Paris, August 2018

About Scaleflex SAS

Scaleflex SAS, founded in 2013 between Paris and Munich, builds micro-SaaS services that help developers and product managers accelerate their websites and mobile applications. The first micro-SaaS service, Cloudimage, launched in the beginning of 2015 and acquired 300 customers within the first two years, including leading real estate and e-commerce platforms.

22

Average time in seconds it takes for a mobile landing site to fully load

40%

Percentage of users who abandon a site that takes more than three seconds to load

61%

Percentage of image weight to total page weight (Aug 2018)

Businesses going through digitalization understand that it is no longer enough to compete on products and services—customers expect an end-to-end experience that delivers value as quickly and seamlessly as possible. According to Bain and Company, up to 10% of revenue growth across industries is due to optimizing customer experiences, and companies who excel at customer experiences grow revenues at four to eight percent above the market. This pressure for speed begins with the customer's very first interaction with the company's digital platform, where the page loading time often means the difference between customer engagement and eventual adoption—or customer abandonment and subsequent adoption of a competitor's products and services.

This paper explores current challenges facing web developers and proposes solutions to speed up page loading time through image acceleration in the cloud.

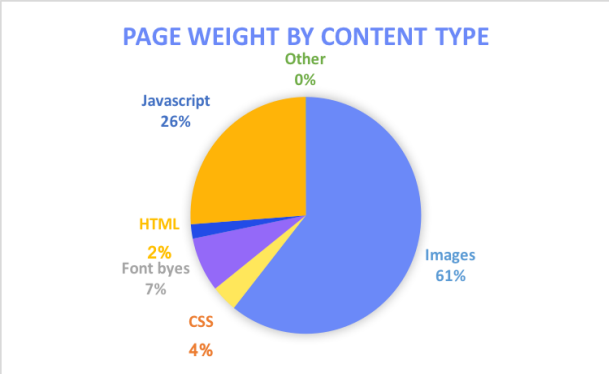
1. **The Trade-off between Site Speed and Visual Content**
2. **Five Benefits of Image Acceleration**
3. **What Would the Ideal Solution Look Like?**
4. **Introducing Cloudimage – the easiest way to optimize and accelerate images for the web**

1. The Challenge Facing Developers: The Trade-off between Page Speed and Visual Content

"If your content includes visuals, your audience can retain information for three days."

Visual content lies at the cornerstone of effective marketing. Making up 93% of human communication, visual content increases user engagement by 650% compared to text-only posts, and increases conversion by up to 86%. Unsurprisingly, the average image weight per web page has more than tripled between 2011 and 2018, increasing from approximately 260 kB to 880 kB, making up more than half of the average web page's total size.

However, big visuals also mean heavy image and video files that slow down the page loading time. If customers leave the page before it fully loads, design components would become meaningless. The challenge for marketers and developers, therefore, is to balance two aspects of the customer experience that seem to be mutually exclusive: speed and visual appeal.



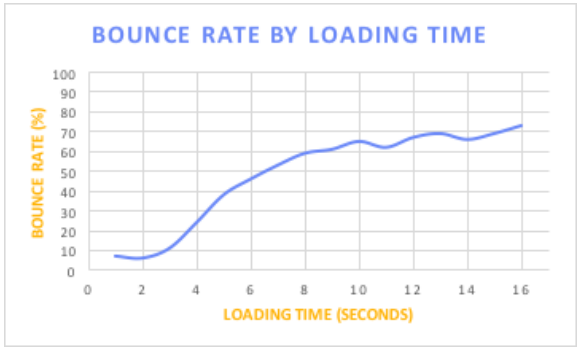
(Source: httparchive.com)

2. Five Benefits of Image Optimization

- **Better user retention**

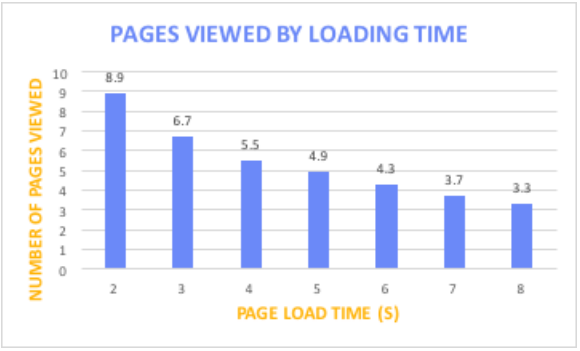
When users have to wait for a page to load, they abandon the page all together. 47% of users expect a website to load in two seconds or less. By the time the average website becomes fully interactive—which is around the eight-second mark—most users will have abandoned the page.

As page load time goes from one second to five seconds, **the probability of bounce increases 90%**.



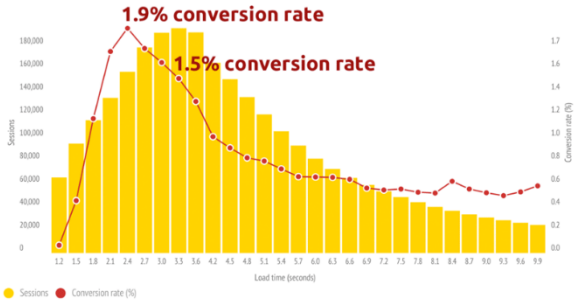
- **Better user engagement**

Happy customers view more pages and engage further with website content. On the other hand, 79% of customers who encounter issues with website performance will not return to the site again.



- **Better conversion rate**

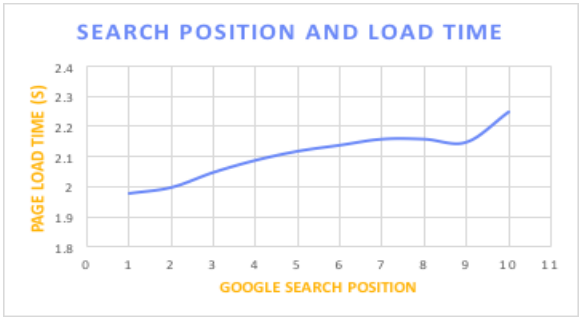
Optimizing page loading time might be the easiest way to increase conversion rate. According to a conversion prediction model built by Google, the number and the byte amount of graphic elements are the single greatest predictor of conversion rate in 93% of the cases. In other words: the heavier the images, the slower the page, the lower the rate of conversion.



- **Better SEO ranking**

In July 2018, Google announced that page speed will become an official ranking factor in both desktop and mobile searches. Websites that show up on the first page of Google search results typically have an average loading time of less than 2.3 seconds and claim up to 95% of all click-through traffic. Even within the top ten results, there is a direct correlation between page speed and search ranking. In turn, pages with higher click-through rates are identified as valuable and are pushed further towards the top, thus reinforcing the importance of optimization.

Top-ranking pages on Google search results have **an average loading time of less than 2.3 seconds** and haul in **95% of all search traffic**



- **Higher revenue**

The above benefits translate directly into a greater revenue: according to an often-quoted statistic, every 100ms improvement in loading time results in a 1% improvement in revenue. This means that if an e-commerce site was making $100,000 a day, a one-second page delay would result in $2.5M of lost sales per year.

While this figure might not hold across the board for websites experiencing different volumes of traffic, page speed still correlates strongly with revenue across various case studies.

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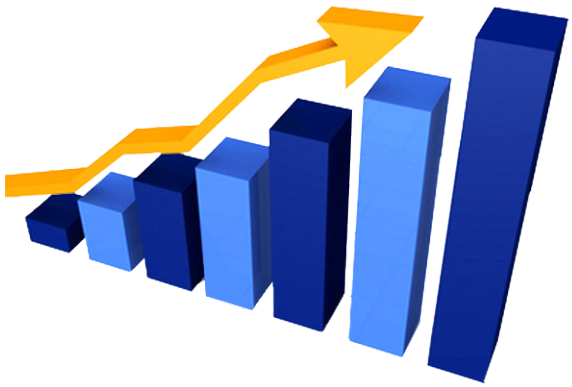
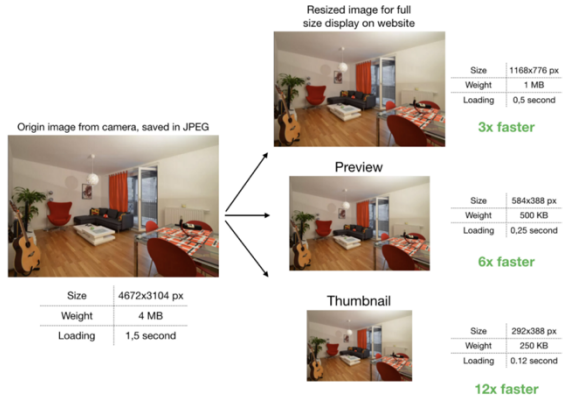


2. Five Solutions to Optimize and Accelerate Images

- **Generate all images server-side and deliver the right image size at the right moment of customers' journey**

There is no point serving a large original image on the client's web browser or mobile application if it's only to create a small thumbnail. Instead, all image sizes (thumbnail, preview, and full size) should be generated server-side and then delivered to the client side accordingly.

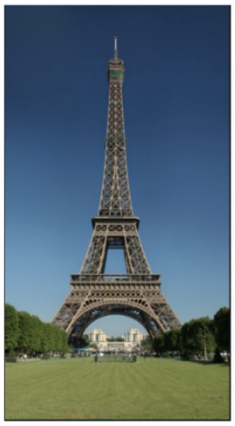


The above example shows an original image weighing 4 MB that has been resized for different types of display on the web. For the average broadband connection, server-side image handling accelerates the loading time by up to 1200%.

For the average broadband connection, server-image upload **accelerates loading time by up to 1200%.**

- **Leverage JPEG compression to reduce image size**

The JPEG image file is the most commonly used format for images on the Web and can be compressed without visible quality loss. While JPEG does downgrade the quality of images in the interest of file weight (in MB), it is often able to reduce the image weight by three or four times without a visible reduction in image quality. The below example shows an image that has been compressed by four times while still maintaining its original quality.



300x555 px
q100 => 41,3 KB

300x555 px
q70 => 12,5 KB

- **Deliver WeBP to compatible browsers, and JPG/PNG to non-compatible browsers**

Developed by Google, WeBP is a modern image format that deliver superior lossless and lossy compression for images on the Web. Compared to PNGs of similar SSIM index quality, WeBP lossless images are 26% smaller in size. Compared to JPEGs of equivalent quality, WeBP lossy images are 25 – 34% smaller. f this sounds too good to be true, there is one caveat: WeBP is only supported by a handful of browsers: Google Chrome 23+, Google Chrome for Android 50+, Opera 12.1+, and native Android browser 4.2+.

The below example shows an image that has been reduced by four times without any loss in quality.

WeBP results in a **77% decrease in page size** compared to JPEG.

JPEG weight: **19.2 KB**

WeBPweight: **5.6 KB**

- **Deliver images via rocket-fast CDNs**

After generating server-side images and compressing them using JPEG or WeBP, the last piece of the puzzle is to deliver the images to the end users via rocket fast content delivery networks (CDNs). A CDN refers to a network of geographically distributed servers which cache a website's static content near the location of visitors. CDNs offer three main benefits:

1. Users located far from the data center where the website or the application is hosted will experience lower latency and faster loading time.

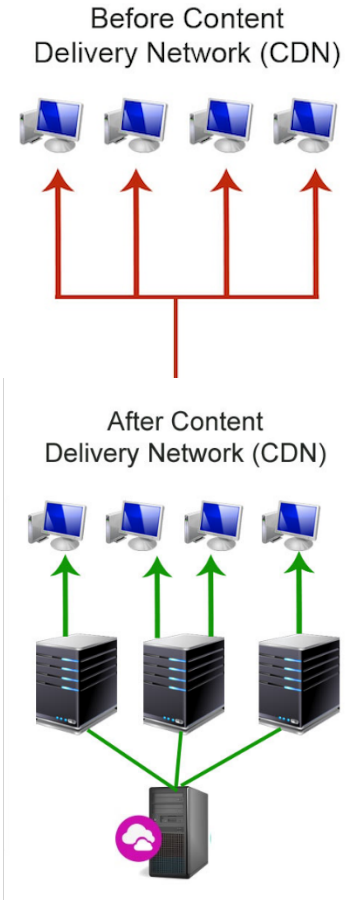
2. CDNs absorb high load during traffic peaks and save money on hosting infrastructures.

3. CDNs keep websites safe by absorbing Denial-of-Service-like attacks.

- **Leverage the HTML5 <picture> element to make images responsive to different screen sizes**

Responsive images allow for an optimal tuser's device type, window size, orientation, or resolution. A responsively designed image does not rely on the default browser resizing to display images on various devices: it would be a huge waste of bandwidth to deliver an image prepared for a 15-inch laptop screen on a low-resolution four-inch smartphone screen. Instead, responsive images are prepared in various resolutions to serve all form factors in an optimal way.

How do CDNs work?



(source:shimonsandler.com)

Introducing Cloudimage – the easiest way to optimize and accelerate images in the cloud

Saves time & effort

- Combines all five solutions to image acceleration into a single, easy-to-use product.
- Replaces the need for an in-house image management solution.
- URL-based transformations require no learning curve. Users can set up and start implementing Cloudimage within an hour.

Saves costs

- Offers the most competitive pricing on the market thanks to a bandwidth-based pricing structure and low internal costs.
- Saves money on hosting infrastructure for image storage and resizing.

Recognizing the need for a cost-effective and easy-to-use tool for cloud-based image management, a team of European developers founded Cloudimage in 2015. Since then, **Cloudimage has optimized and delivered more than 200 billion images to some of the largest sites and mobile apps in the world**.

Learn more @ https://www.cloudimage.io or by contacting hello@cloudimage.io