

Perpendicular Angel Design

Organizing and simplifying, one illumination at a time

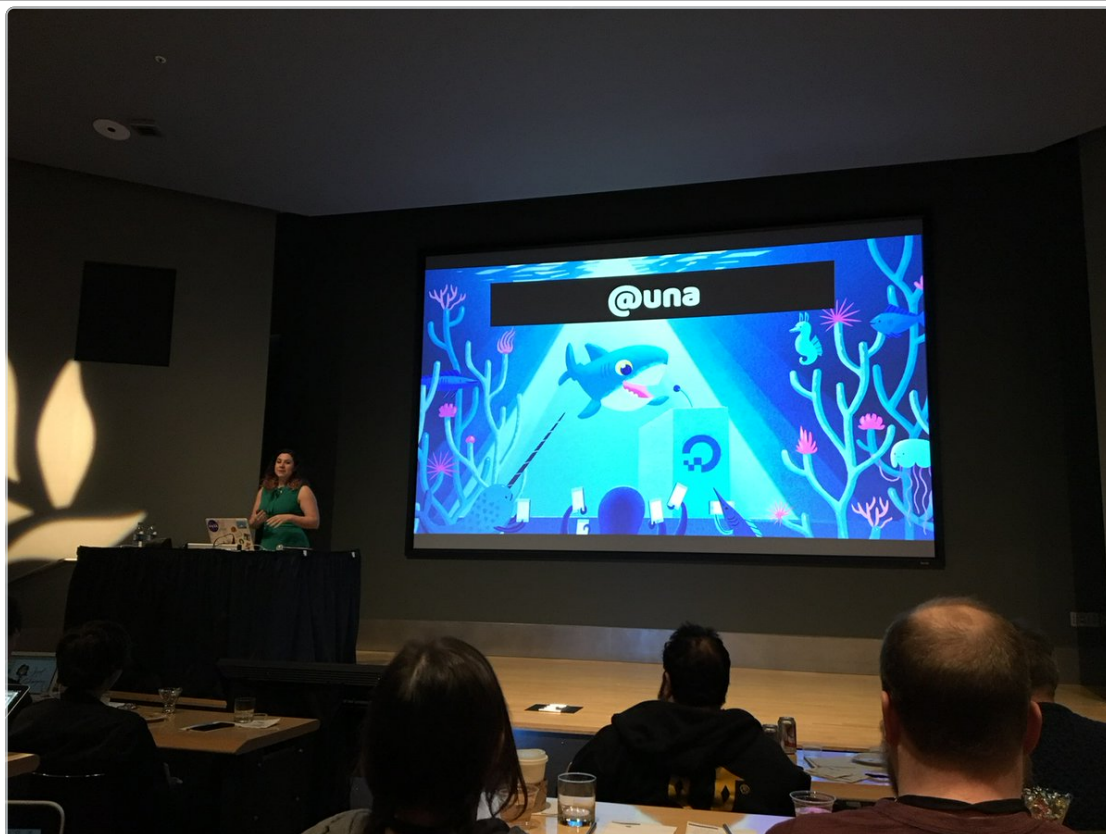
An Event Apart Seattle 2017: The Joy of Optimizing by Una Kravets

Posted on [April 8, 2017](#)

Una's presentation centered around [raster graphics](#) and how they can be better optimized. Though she doesn't go into it in detail, the implications of poorly-optimized raster images are costly: they tend to be large files, costing our users money in data fees (if on a price-per-MB connection) and time (if on a slow connection) as well as storage and other less-concerning issues.

For the application-heavy work that I tend to do in my day job (my wheelhouse is enterprise web app information architecture) I'm better off with SVG [vector images](#) for most uses than raster — iconography is better suited to vector for a number of reasons.

But ooh boy do I have some work to do for my personal WordPress sites.



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The joy of optimizing with @una #aeasea

6:31 PM - 4 Apr 2017



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This talk is about images, the medium, solutions, and examples

#AEASEA

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The technology of cameras really changed over time. Way cheaper to take photos, keep data, and share it [#AEASEA](#)

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Selfie as assigned by [@una](#) [#aeasea](#)

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Cameras we have in the iPhone 7 have 12megapixels of data
[#AEASEA](#)

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One image on your iPhone is 2x as much as we want to send into
the pipes at any given time [#AEASEA](#)

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Petabytes of data - loader spinners! [#aeasea](#) (@una can I have
that cat gif?)

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(It was an amazing cat gif. Very annoyed cat.)



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There are more people on mobile devices than desktop [#AEASEA](#)

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Average time for load sites is 19 seconds over 3G #AEASEA

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Mobile sites that loaded within 5 seconds vs 19 observed to have 70% longer average sessions #AEASEA

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53% of people leave after 3 second #AEASEA

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Nigeria has more internet users than the UK. India is the 2nd largest market #AEASEA

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Scott Gruber

@scott_gruber

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Internet Live Stats - Internet Usage & Social Media Statistics

[#aeasea internetlivestats.com](#)

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Only 34.8% is online, and they're still the 2nd largest market. What if someone doesn't browse the web the way I do? [#AEASEA](#)

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India's average connection speed is 2.5mbps [#AEASEA](#)

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(In contrast, my home Comcast connection is 255 Mbps.)



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Access to information should be a basic human right. Poor performance inhibits that right [#AEASEA](#)

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Josh Vickerson

@joshvickerson

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“Performance is your user experience. Performance is a core part of your product.” - @Una #aeasea

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8 23



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A slow load time with 2 factor authentication with timeouts = no github, no logins to critical sites #AEASEA

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66% of the web is images, by size of the files. #AEASEA

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The average single jpg is 2.3x bigger than the average javascript file. #AEASEA

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(Una pointed out immediately that this doesn't grant you permission to remove one image from your site and then load a huge javascript file in exchange.)

"You can't be a web performance expert without being an image expert."

— Tobin Titus (ImageCon 2017)



A Brave New

@abravenew

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Right on @Una a reminder about irresponsible imaging #aeasea

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Just emoji alone. Macs vs android vs windows use different formats. #AEASEA

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Different images have pros and cons [#aeasea](#)

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Gif:

256 colors (8-bit)

No transparency

Dithering (noise to reduce distortion) [#AEASEA](#)

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Pattern dithering is slightly smaller, and looks a little cross-stitchy
[#AEASEA](#)

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Dithr

@DithrApp

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Thanks to [@Una](#) for calling out this Dithr photo during her talk on image optimization at [@AnEventApart](#) Seattle! [#aeasea](#) [#dithr](#)
[twitter.com/chrissam42/sta...](https://twitter.com/chrissam42/status/849844444444444444)

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PNG

256 colors (8-bit)

True color (24-bit)

Alpha transparency

Lossless format

Uses delta compression[#AEASEA](#)

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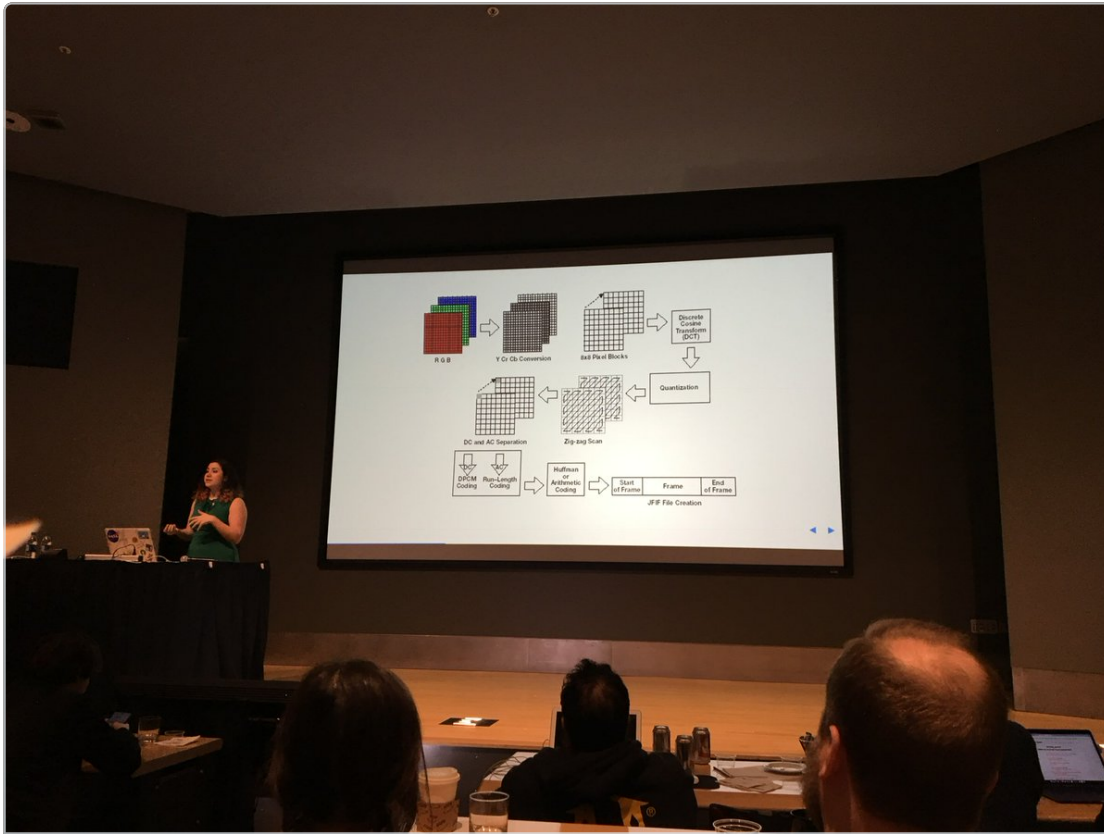
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PNGs don't compress well. JPGs compress really well, but it's a lossy format, so you lose details with each save [#AEASEA](#)

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Even if you save at “Max quality” every time you save a lossy format, the image degrades a little with each save.



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How JPGs work [#aeasea](#)

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Google just released Guetzli Compression - high-quality jpg images compressed 35% smaller than current methods [#AEASEA](#)

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Trade-off is it takes a lot longer to save down and works better on bigger images #AEASEA

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Guetzli is a little sharper and not that much smaller #AEASEA

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While Google says that their compression algorithm is 35% smaller, multiple speakers stated that this was under best possible circumstances and the new algorithm wasn't necessarily going to win you back 35% of your space just by using it. The link in the next tweet was referenced multiple times as well.



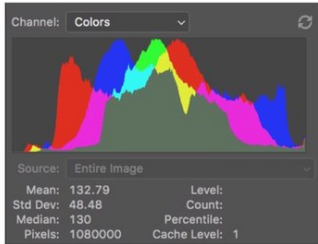
ashleigh 🤖
@ashleigh8

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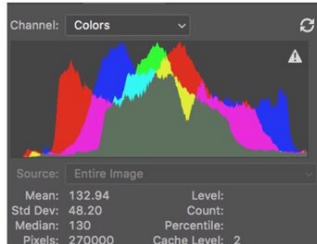
@etportis, @Una just gave you a shootout at #aeasea for your closer look at Guetzli [twitter.com/etportis/statu...](https://twitter.com/etportis/status...)

6:50 PM - 4 Apr 2017

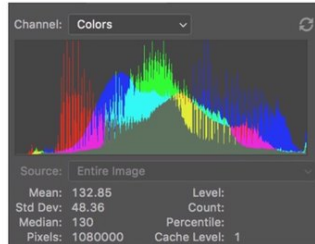
1



100%
264 KB



60%
199 KB



10%
56 KB



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80% quality is probably a good medium level [#AEASEA](#)

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Turns out that histogram thing in Photoshop can be used to show you what's degrading in your image at different save levels! I had no idea!



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According to [jpg.org](#) we have a lot of formats of jpg (7 versions).
Only Safari supports JPG 2000, JPG XR is IE [#AEASEA](#)

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WebP is a promising format. Lossy or lossless. Very comparable of jpg, but much smaller. [#AEASEA](#)

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WebP uses predictive coding by looking at the neighbors and then storing differences [#AEASEA](#)

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christopher hincks

@chincks

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Responsible imaging optimizes artwork to make content accessible for slower connections, networks and devices. [#aeasea](#)

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WebP is chrome... and that's about it. [#AEASEA](#) Safari and Firefox are experimenting with it

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Can use a lot of techniques to convert to WebP, including a command line version [#AEASEA](#)

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It's a bit weird to require javascript for users to see your images so a polyfill may not be a great idea [#AEASEA](#)

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The Picture element lets you send different sources to the users so you have fallback [#AEASEA](#)

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 YouTube @YouTube



Zeldman

@zeldman

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Webp: A New Image Format By Google youtube.com/watch?v=NdOqr9... @Una #aeasea

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WebM is a movie format similar to WebP. Savings are even more dramatic than with stills #AEASEA

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Picture and Video tags allowing multiple sources provide progressive enhancement to your users #AEASEA

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Experimental formats: BPG (Better Portable Graphics). Was designed to replace jpg. Gets a bit smoother, plasticky [#AEASEA](#)
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Don't appear to be plans to be support BPG outside of encoding and a polyfill [#AEASEA](#)
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...which means that while it's good to see that there are folks trying to make image formats better all the time and GIF/JPG are not our only options until the end of time, BPG is probably a dead-end in the evolution of images.



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Flif - free lossless image format - makes a lot of promises [#AEASEA](#)
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You could encode different variations of the source file and then make adjustments within the same image [#AEASEA](#)
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Solutions and pro tips:

1. Automation! Image Magick works with many different workflows
[#AEASEA](#)

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Semi-automation: Image Alpha will let you see the changes you're making to decide in the app [#AEASEA](#)

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ImageOptim will change a whole folder at a time [#AEASEA](#)

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Josh Vickerson
@joshvickerson

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"ImageOptim Always and Often. IOAO" - [@Una](#) [#aeasea](#)

Couldn't agree more! Every. Single. Image.

7:00 PM - 4 Apr 2017 · Belltown, Seattle



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Just running 6 images through ImageOptim saved users 9MB
[#AEASEA](#)

7:00 PM - 4 Apr 2017



Josh Vickerson @joshvickerson

4 Apr

“ImageOptim Always and Often. IOAO” - @Una [#aeasea](#)

Couldn't agree more! Every. Single. Image.



Josh Vickerson
@joshvickerson

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Also: there's an issue open for adding Guetzli compression to
[@image_optim](#) cc: @Una [#aeasea](#) [github.com/ImageOptim/lma...](https://github.com/ImageOptim/ImageOptim/issues/1)

7:02 PM - 4 Apr 2017 · Belltown, Seattle

Implement Guetzli lossy compression for JPEG...

Details here about a new Google publication
<https://opensource.googleblog.com/2017/03/guetzli-new-open-source-jpeg-encoder.html?m=1>
[github.com](#)

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SVGOMG lets you optimize SVGs online [#AEASEA](#)

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Manual optimization: if you do hero images / splash screen images, save to 30px, then blur up to take space, then pop in on load

[#aeasea](#)

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Facebook headers are <200 bytes that they can render a blurry small image until the image loads in [#AEASEA](#)

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This is called the “blur up” technique and you can find lots of ways to do it online [#AEASEA](#)

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👑 The "Blur Up" Technique for Loading Background Images @Una
[#aeasea css-tricks.com/the-blur-up-te...](#)

7:05 PM - 4 Apr 2017

The "Blur Up" Technique for Loading Backgrou...

The following is a guest post by Emil Björklund. Filter effects in CSS have been around for a while, and together with things like blend modes, they bring [css-tricks.com](#)

25

102



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Embrace image blur. [#AEASEA](#)

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Black and white photos are smaller than full color, and blend modes can spice them up [#AEASEA](#)

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The next section of the talk was about different blend modes that can be applied to an image. [Sarah Paramenter pointed out](#) that Spotify was using many of these techniques in their image branding during her talk.

I did a lousy job of capturing the details of how blend modes work, so you may want to go read [Blending Modes in CSS: Color Theory and Practical Application by Jonathan Cutrell](#) if the following tweets don't make any sense.



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CSS Blend Modes:
Multiply takes luminosity with the background and the image
[#AEASEA](#)

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Screen: does opposite of multiplying lightness values. [#AEASEA](#)

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Darken: looks at rgb values of two layers, looks at darker colors.
Lighten: opposite [#AEASEA](#)

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Difference, Exclusion, color burn, color dodge, soft light combines
screen and multiply, hard light, overlay [#AEASEA](#)

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(I can't keep up with all these colors so look them up online they're awesome) [#AEASEA](#)

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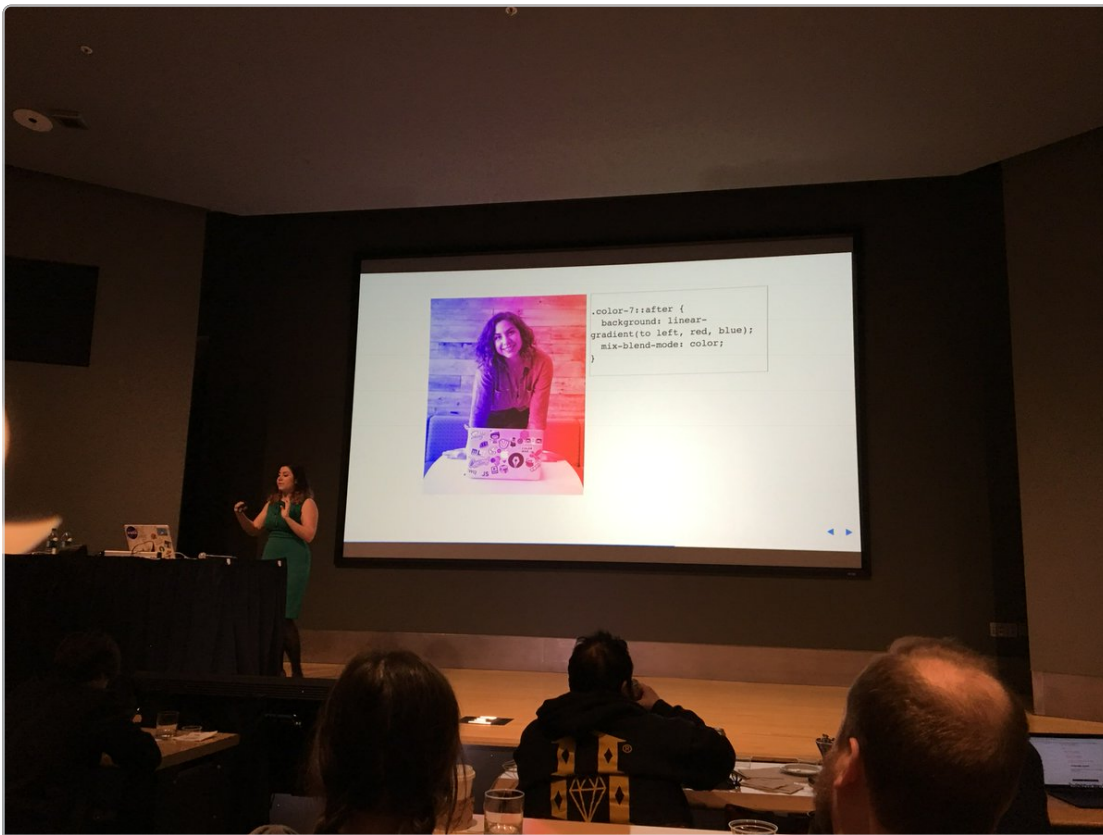
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You can combine gradients and mix-blend-modes to do interesting things [#AEASEA](#)

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Black and white photo with gradients and blend modes [#aeasea](#)

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Put the image on top of the color so that if the blend mode doesn't work the image still displays black and white [#AEASEA](#)

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Support for mix blend mode is still in progress, as is background blend mode [#AEASEA](#)

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Blending will cause a repaint [#AEASEA](#)

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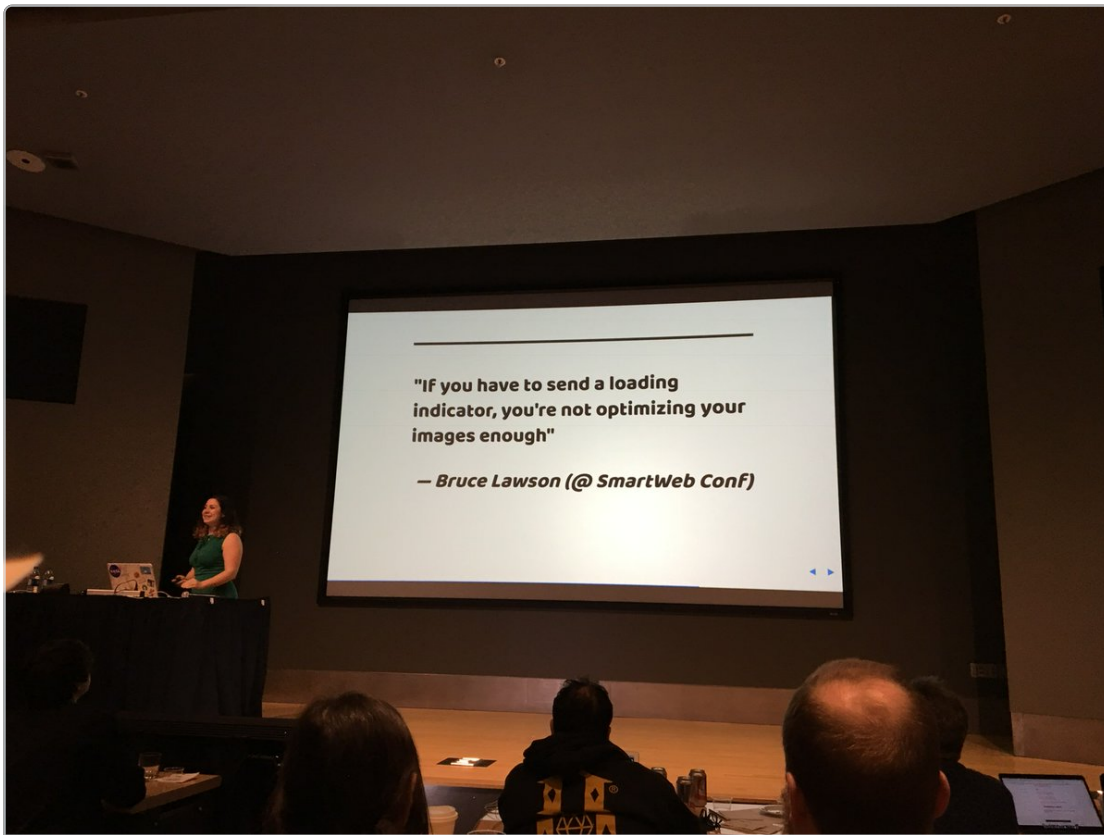
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Still faster to send a black and white image with a pink layer than it is to put the pink layer on photoshop [#AEASEA](#)

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That is, it's faster for the user to download an optimized black and white image that you use CSS to add a pink layer to than it is for the user to download the exact same optimized color image.



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Shout out by @una to @bruce1 who you should follow for his knowledge and horrible puns #aeasea

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For example, this gem:



Bruce Lawson

@bruce1

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Celebrity Fact number 67: If Kenny Loggins is inactive for 10 minutes, he becomes Kenny Loggedout

12:54 PM - 4 Apr 2017

68

110

Anyway, moving on....



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GIFs. Send as few frames as possible, adjust the length of frames instead, format the frames [#AEASEA](#)

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GIFs are soooo big in file size. Gifv - Imgur changing GIFs into video files because the videos are actually smaller [#AEASEA](#)

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Why is video so much better than a gif? GIFs store every frame, but videos only store the differences between frames [#AEASEA](#)

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To improve image performance:

Where's the image the biggest? If we're sending 1560px wide and only showing 780px wide, scale down [#AEASEA](#)

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“Save Retina images at 2x the size” is the advice we give.

#AEASEA

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.@una is challenging that advice - make transformations and test them and see what savings you can get #AEASEA

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195% improvement in image sizes just by looking for the largest natural size that shows and sizing down to it #AEASEA

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You literally cost your users money in data fees when you're sending too-big images. #AEASEA

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Use srcset to check for pixel density if you really need to have the high res image [#AEASEA](#)

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2. Convert JPG to WebP and a polyfill, can save much size [#AEASEA](#)

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Use picture element or media queries to send the right size image for the right device [#AEASEA](#)

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If you're not concerned about performance around the world, you still need to consider mobile performance [#AEASEA](#)

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American users are more likely to shop on mobile devices and we're impatient #AEASEA

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Step 4: profit. Literally. 1s slowdown cost Amazon \$1.6 billion in sales each year #AEASEA

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Image optimization tips:

Don't send an imag larger than it needs to be #AEASEA

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Be aware of emerging image formats, pros and cos #AEASEA

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(that's "cons")



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The picture element is your friend! #AEASEA

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Compress your images to low qualities, especially small #AEASEA

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Always run images through an optimizer #AEASEA

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Small improvements are still improvements #AEASEA

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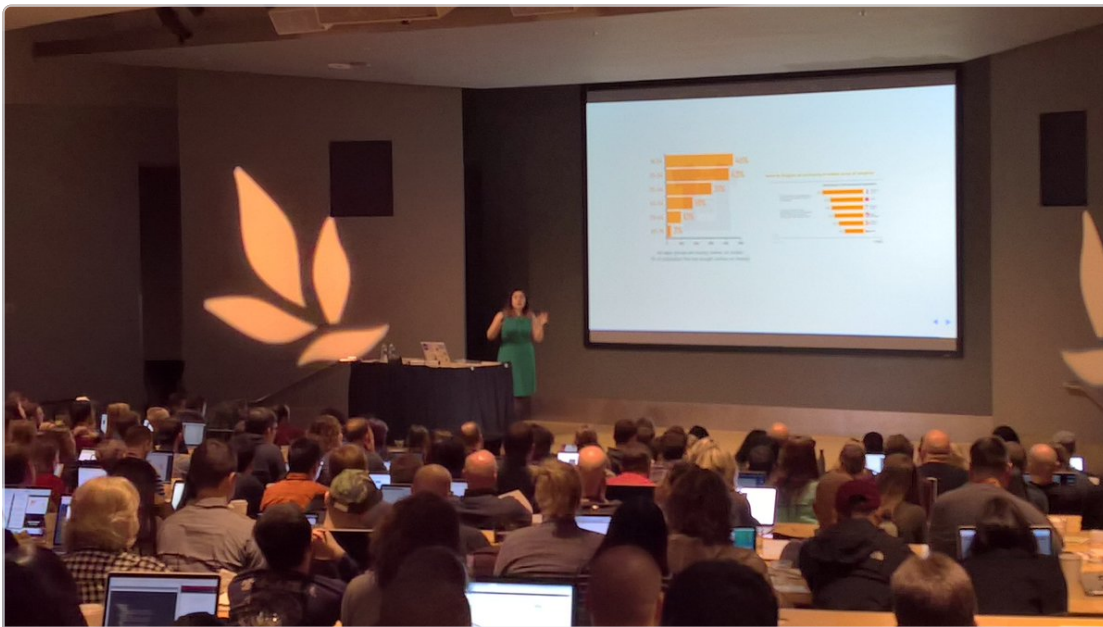


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Educate the entire team #AEASEA

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Greg Whitworth
@gregwhitworth

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.@Una dropping the image perf knowledge and practical reasons why you should care #perfmatters #aeasea

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Build a better web, faster, more accessible, small incremental changes with a big impact overall #aeasea

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Hard proof that optimizing images is critical: when Una asked us all to take selfies, our phones immediately backed up the full-size images across the network to our various cloud services and DDOS'd the conference wifi.



Una Kravets 
@Una

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I made everyone at [#aeasea](#) take selfies and it broke the wifi 😜
oops [#selfielove](#) + [#perfmatters](#) [twitter.com/romkey/status/...](https://twitter.com/romkey/status/852844444444444444)

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