Velocity

A web application performance conference

if it’s worth doing, it’s worth measuring

Real User Monitoring (RUM)

We need more user testing.

Synthetic testing is useful, but real user experience provides the best assessment.

Why should we care?

- Faster load time = faster user action
- Lower page load = more engagement
- In Australia, servers are slower but people are more patient. Canadians are 3x more patient than Americans (user experience is relative)


Bathroom Tablet Stand
for iPad
with Toilet Paper Holder
CTA
Bendable 10" metal gooseneck tube for multi-directional adjustment
Easily adjust iPad to any orientation, angle or position
Elegant chrome pedestal adds style to your bathroom decor
Stable heavyweight base with convenient toilet paper holder
Kitematic
https://kitematic.co

Responsive Web Design (RWD)

Responsive design is the future.

RWD is a tool, not a goal

- users do not scale the browser
- our users have a distinct set of devices for which we can design
- users don’t care if our site is responsive
- users do care if it’s fast

Responsive Image Containers

<picture>

The picture element is a container which provides multiples sources to its contained img element to allow authors to declaratively control or give hints to the user agent about which image resource to use, based on the screen pixel density, viewport size, image format, and other factors. It represents its children.

```
<picture>
    <source media="(min-width: 45em)" srcset="large.jpg">
    <source media..
    <img src=…
</picture>
```


srcset - Images to use in different situations (e.g. high-resolution displays, small monitors, etc), image selection can be viewport-based, art direction-based, image format-based, or device pixel-ratio-based

crossorigin - How the element handles crossorigin requests

usemap - Name of image map to use

ismap - Whether the image is a server-side image map

```
<img src=“other pic.jpg” alt=“blah”
        sizes=“(max-width: 30em) 100vw,
                (max-wdith: 50em) 50vw,
                calc(33vw - 100px)”
        srcset=“pic100.jpg 100w,
                pic200.jpg 200w, …” />
<img src="/uploads/100-marie-lloyd.jpg"
    srcset="/uploads/150-marie-lloyd.jpg 1.5x, /uploads/200-marie-lloyd.jpg 2x"
    alt="" width="100" height="150">
```

User Perception

0.1 seconds is the limit for the user to feel the system is reacting instantaneously

1 second is the limit for user's flow of thought to stay uninterrupted

10 seconds is limit for keeping user's attention focused

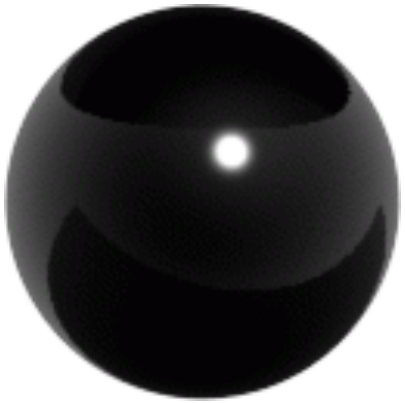
> 10 seconds users will want to perform other tasks while waiting

- Jakob Nielsen, Usability Engineering

500ms delay = +26% user frustration

- Radware

Use Preloaders



Disclaimer: for entertainment only; don’t use preloaders in this way

Performance Tools

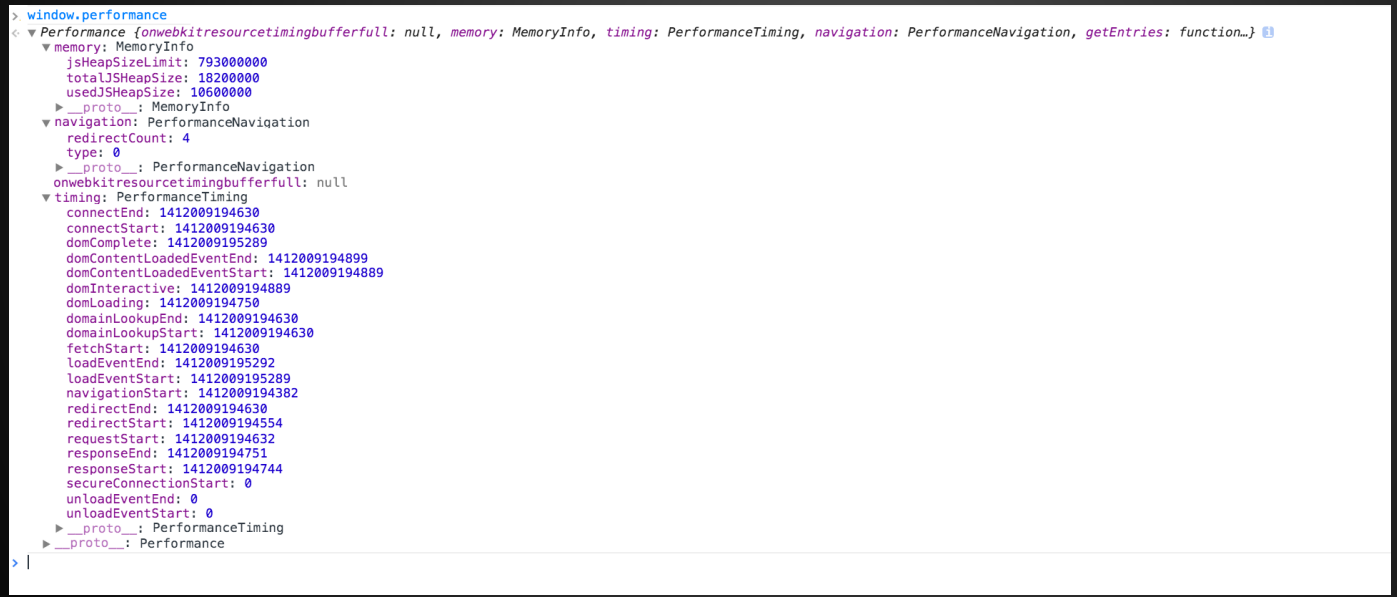
1. Google Developers PageSpeed Insights
2. WebPageTest and Mobitest
   - we would need a public instance of our app (expect to be hacked!)
3. Timing-Allow-Origin: *
   - header setting which allows third party performance tracking

The Physics of Fast Graphics

1. Use less data — right-size images on server, cache when you can
2. Connect fewer times — sprites to reduce # of requests, keep host-count low (reduce DNS)
3. Content on the edge - use CDN’s that make sense
4. Use less memory — lazy load images below the fold, reduce white space in sprites
5. Reduce memory copy — use JPEG and JPEG variants when possible, transcode but be careful
6. Reduce radio usage — download in batches

Introducing window.performance!

Available now on the window object.



window.chrome.loadTimes()

In Chrome, first paint is reported via window.chrome.loadTimes();

User Timing

1. Mock timeline event - begins with page load
2. Measure what happens between two marks

```
window.performance.mark(‘event_start’);
window.performance.mark(‘event_end’);
window.performance.measure(‘event_duration’, ‘event_start’, ‘event_end’);
```

Waterfall

Waterfall - the time and duration of page load events

Here’s a handy bookmarklet for you to use in your browser:

https://github.com/andydavies/waterfall

Waterfall

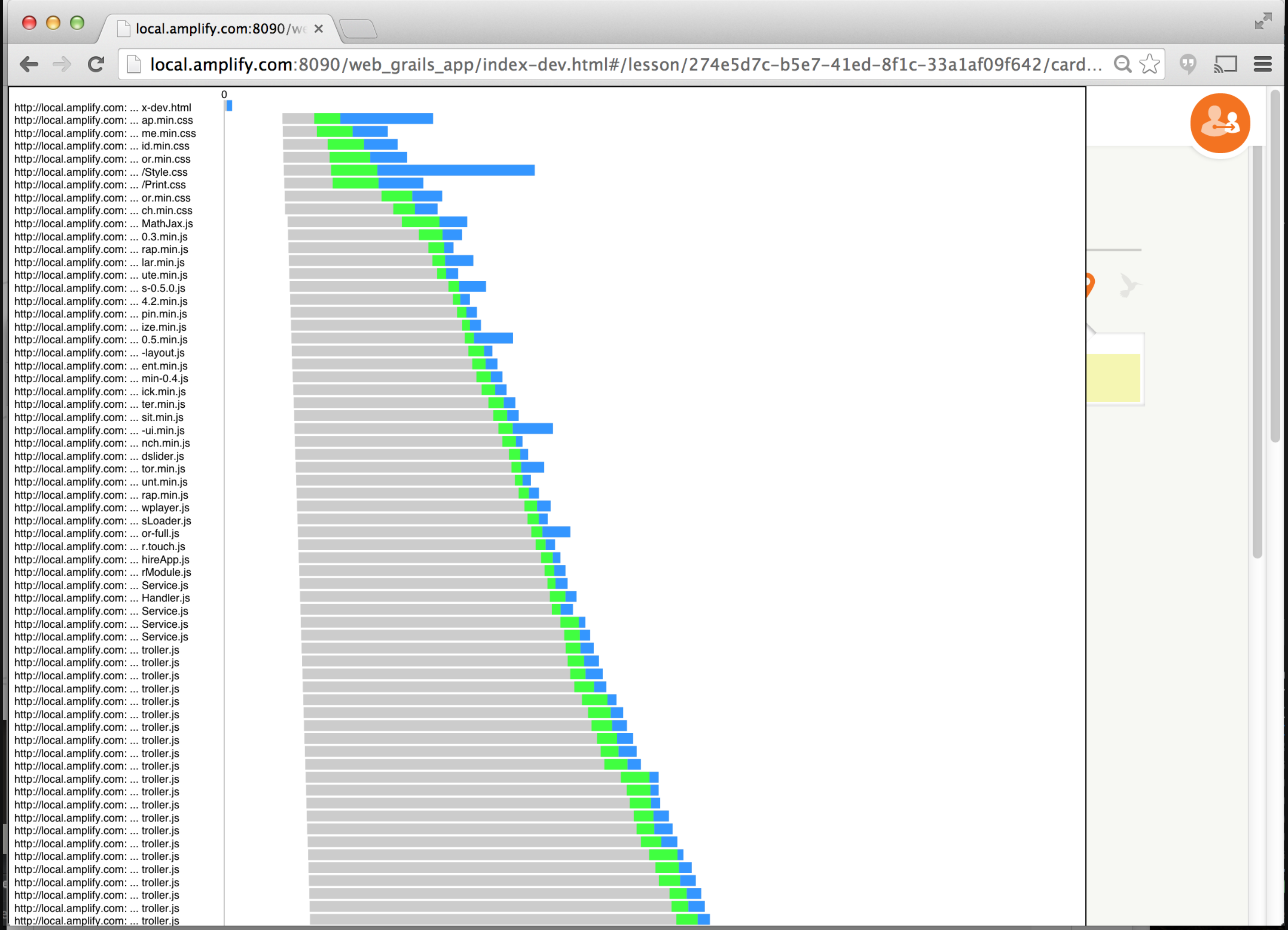
Dark green = DNS lookup

Orange = TCP connection

Bright green = Time to first byte

Blue = Content download

1. As few rows as possible.
2. As few orange bars as possible.
3. Bright green bars that are as few and as short as possible.
4. As little blue as possible.
5. The “start render” and “document complete” vertical lines to occur as early as possible, and be as close together as possible.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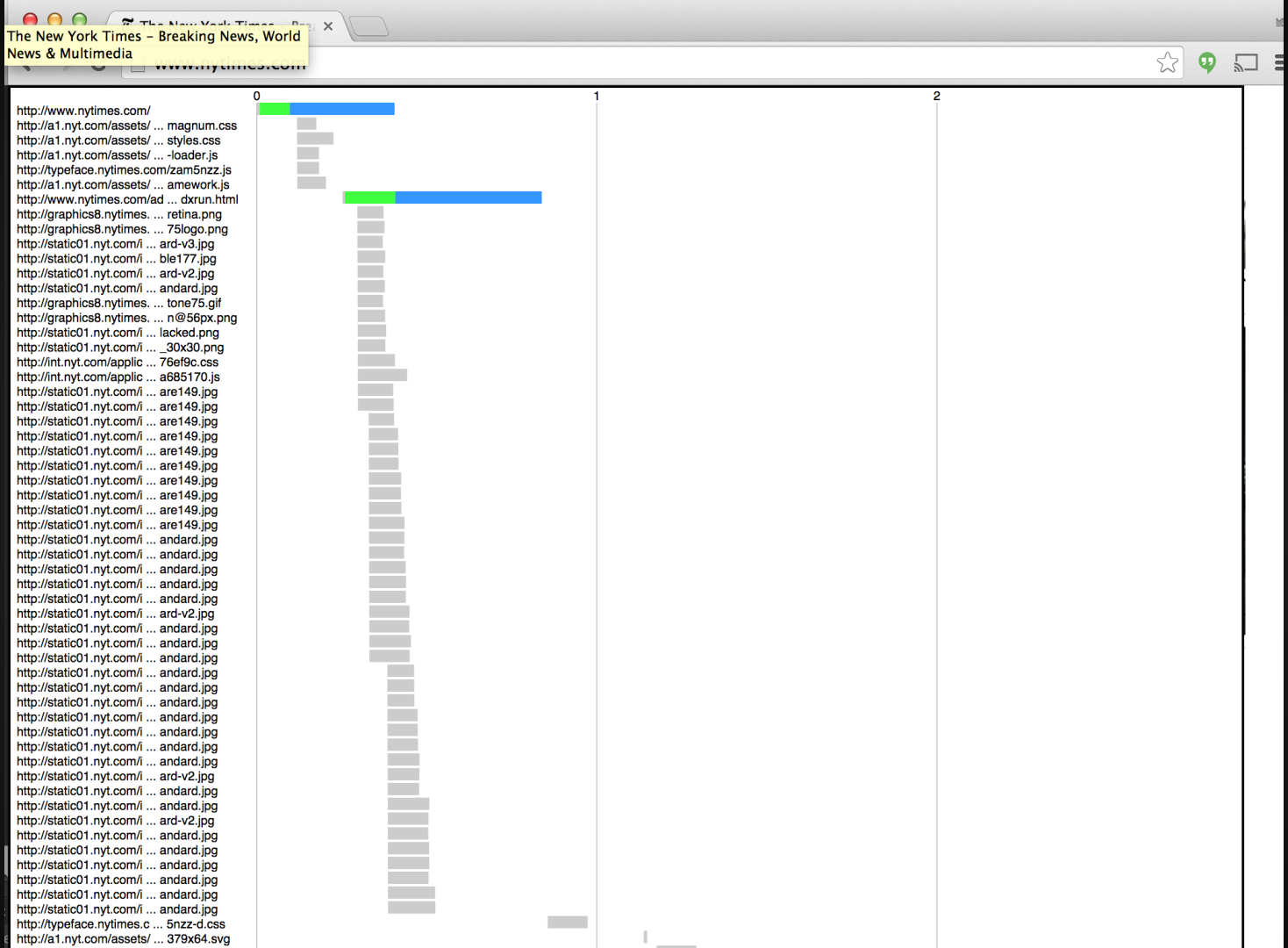
The New York Times - Breaking News, World News & Multimedia
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http://typeface.nytimes.c ... 5nzz-d.css
http://a1.nyt.com/assets/ ... 379x64.svg

JavaScript async

async scripts — to stop blocking of loading

- feature of HTML5

<script src="script.js" async></script>

- downloads javascripts in parallel

<script src="script.js" defer></script>

- waits until the page is loaded to download

HTTP/2

HTTP/2 is a new Hyper Text Transfer Protocol

> “The focus of the protocol is on performance; specifically, end-user perceived latency, network and server resource usage. One major goal is to allow the use of a single connection from browsers to a Web site.”

HTTP/2 uses less connections by a factor of 4x - 8x

http://http2.github.io/

server push

benefits — inline image is an example of server push — avoids round trip between server and client

another example is the use of sprites — are cached

avoid a round trip without sacrificing resource granularity

better cache efficiency, reduced parse/blocking, load only what you need

Work Efficiency, a.k.a. Time Management

how to make time for big projects when small stuff keep coming up

interruptions prevent focus time

1. make time for project work
2. record todo items (don't memorize)
3. start every day with a plan
4. organize entire team's work so everyone is effective

common procrastination techniques — solutions

"I'll just do the first steps"

- finds any road blocks

"beat the clock"

- see how much you can get done in 10 minutes

"hurry up and wait" prerequisites

- one minute to order, a week for delivery, a day of installation

HIDE

turn off IM

exit chat rooms

close your email client

sneak off to a conference room

keep 365 lists per year — prevents endless list of doom, allows dopamine response from finishing work

One day personal sprint

personal standup

Grade priorities:

A must be done today

B must be done soon

C everything else

Conclusion

Look closely at common threads at Velocity

- how to improve graphics speed of download and rendering
- can we use a public instance to gather page test feedback?
- window.performance for page testing (and handy waterfall bookmarklet)
- responsive image containers as option for optimization
- real user monitoring - it’s for real!
- always use a preloader
- check out http/2 for more efficient api service

Further reading:

- velocityconf.com/slides
- Jakob Nielsen, Usability Engineering
- http://www.w3.org/html/wg/drafts/html/master/embedded-content.html#the-picture-element
- https://html.spec.whatwg.org/multipage/embedded-content.html#embedded-content