AMP: Does it Really Make Your Site Faster?

Nigel Heron + Nic Jansma

@querymetrics @nicj

SOASTA

Nigel Heron
@querymetrics

Nic Jansma
@nicj

https://slideshare.net/nicjansma/amp-does-it-really-make-your-site-faster

https://github.com/querymetrics/amp-analytics-demo

What is AMP?

Accelerated Mobile Pages (AMP):

- A way to build websites optimized for performance
- Restricts how you build your pages to achieve this

Components:

- AMP HTML: Similar to HTML5, but with restrictions
- AMP JavaScript: JavaScript library you include
- Google AMP Cache: Free CDN for AMP pages

What is AMP?

What you can include:

- Text (with custom fonts)
- Images
- Video
- Ads
- Third-party embeds (tweets, posts, etc)

What is AMP?

What you can't include:

- External CSS
- JavaScript (except AMP JavaScript library)
- Flash / Java applets
- Forms and Inputs are experimental

Why AMP: Performance

What could performance mean for mobile devices?

- Faster load time
- Less bandwidth usage
- Less memory usage
- Less CPU usage
- Less battery usage
- Better user experience

Why AMP: Performance

AMP enforces a lot of best practices:

- Async script loading
- CSS inline to avoid blocking font downloads
- CSS size limit
- Element dimensions are mandatory

Why AMP: Performance

Built-in performance:

- Prioritized resource loading
- Prerender aware (instant load)
- Caching CDN (HTML, JavaScript, images, fonts)
- JavaScript resources shared by all AMP pages

Why AMP: Business

AMP is smart for businesses:

- Google is prioritizing AMP in web and native app search results on mobile devices
- Support for ads (over 60 vendors)
- High-speed global caching CDN -- free of charge

Why AMP: Developers

AMP pages are easy to develop:

- If you know HTML, you know AMP
- WordPress plugins available that automatically create AMP pages
- Built in validator helps developers reduce bugs
- Good documentation and examples
- Need a new feature? Open a Pull Request

Why AMP: CDN

Free CDN:

- HTTPS (HTTP/2, QUIC or SPDY)
- Supports HTTP or HTTPS origin servers
- Throttled cache revalidation
- Image cache with image optimization for mobile

Why AMP: CDN

Free CDN:

- Font cache (4 whitelisted font providers)
- Rewrite font and image src to point to CDN
- HTML sanitization
- AMP validation

Measuring AMP Performance

How we measure traditional websites doesn't work for AMP:

- Web server logs or APM:
  - Only gives server-side performance
  - Doesn't work with AMP Cache (CDN)
- JavaScript on the page or external JavaScript:
  - Not allowed

Measuring AMP Performance

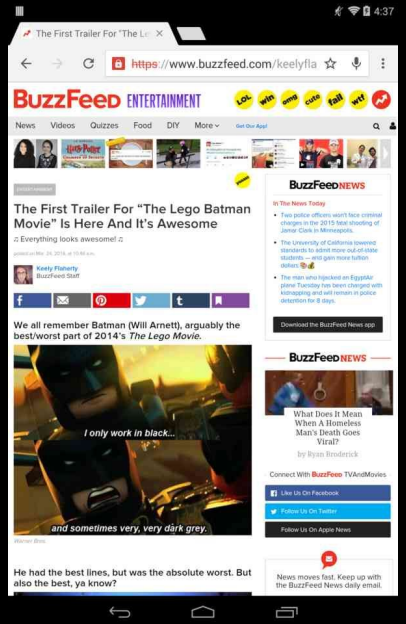
How we measure traditional websites doesn't work for AMP:

- JavaScript in an IFRAME:
  - Sandboxed (RUM data unavailable)
- Synthetic monitoring:
  - Works, but doesn't tell the RUM story

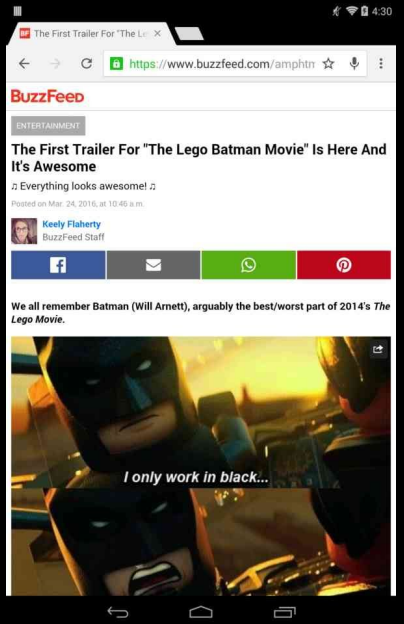
Synthetic Monitoring

Great for A/B comparing AMP vs. non-AMP

Non-AMP

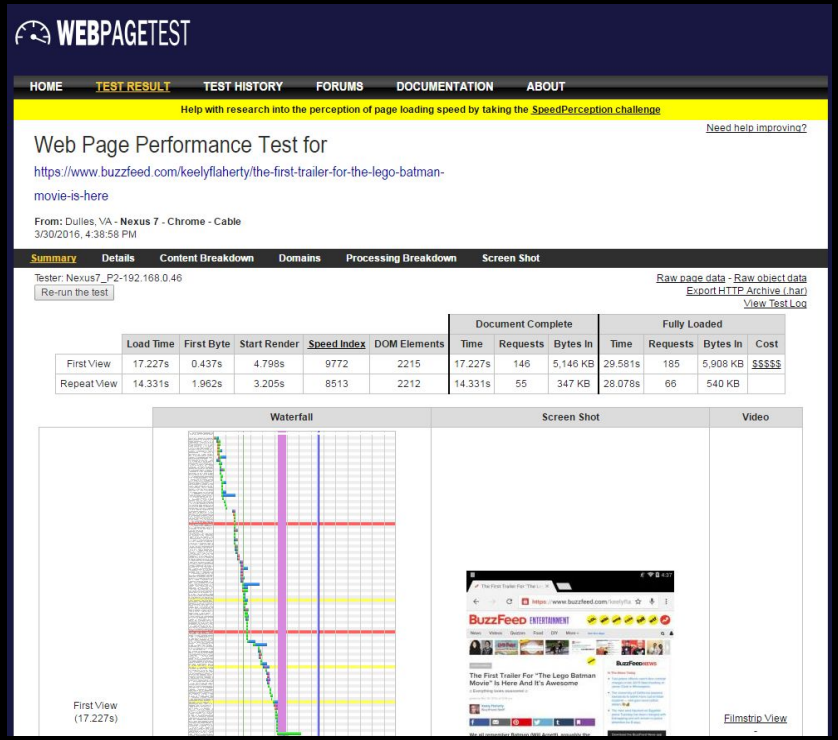


AMP

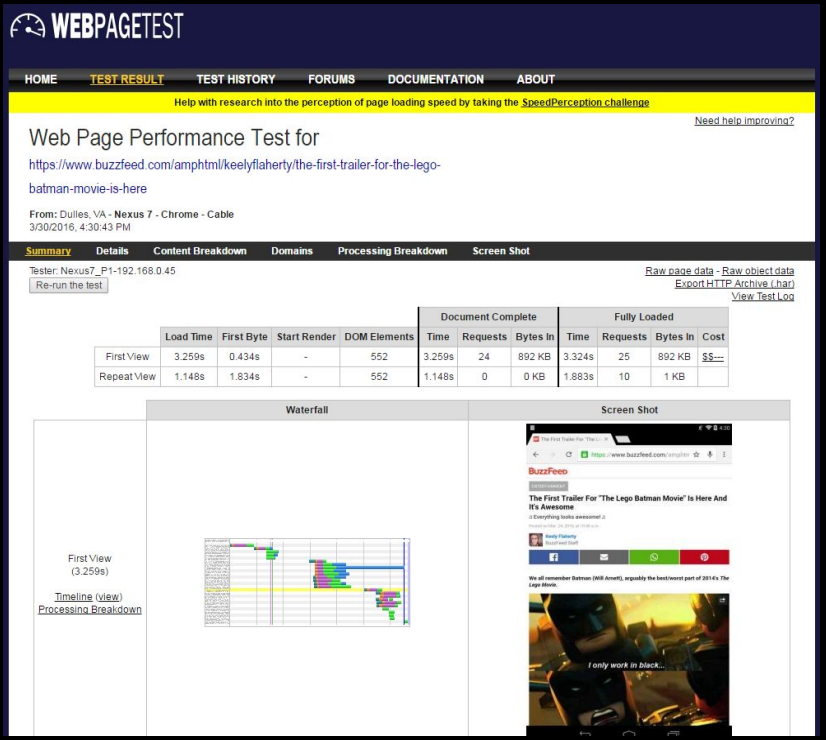


Synthetic Monitoring

Non-AMP



AMP



Synthetic Monitoring

Non-AMP

						Document Complete			Fully Loaded			
	Load Time	First Byte	Start Render	Speed Index	DOM Elements	Time	Requests	Bytes In	Time	Requests	Bytes In	Cost
First View	17.227s	0.437s	4.798s	9772	2215	17.227s	146	5,146 KB	29.581s	185	5,908 KB	$$$$$
Repeat View	14.331s	1.962s	3.205s	8513	2212	14.331s	55	347 KB	28.078s	66	540 KB	

29.5s 5.9mb

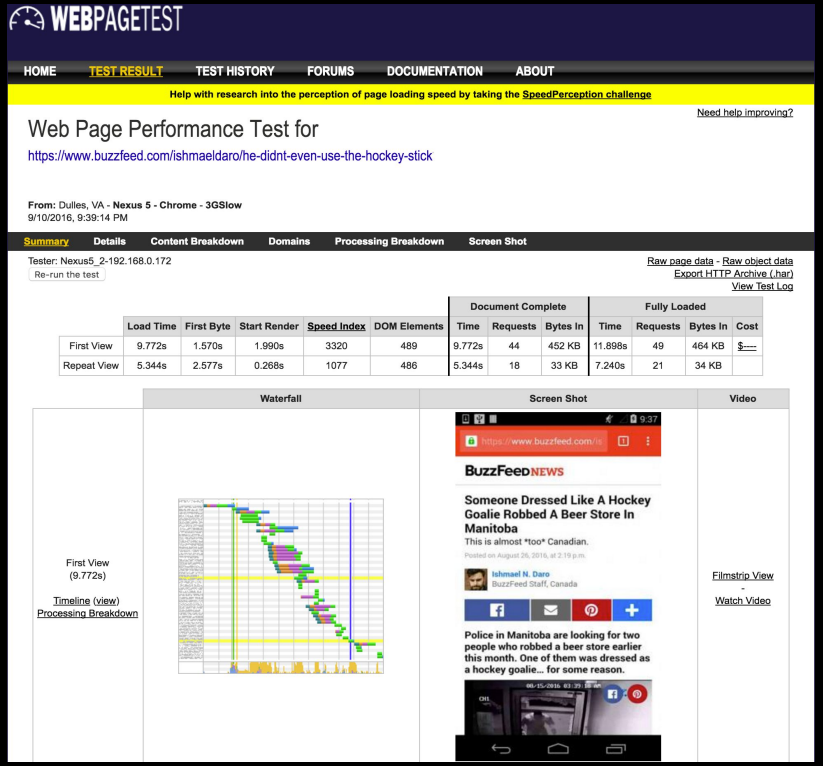
					Document Complete			Fully Loaded			
	Load Time	First Byte	Start Render	DOM Elements	Time	Requests	Bytes In	Time	Requests	Bytes In	Cost
First View	3.259s	0.434s	-	552	3.259s	24	892 KB	3.324s	25	892 KB	$$---
Repeat View	1.148s	1.834s	-	552	1.148s	0	0 KB	1.883s	10	1 KB	

3.3s 0.8mb

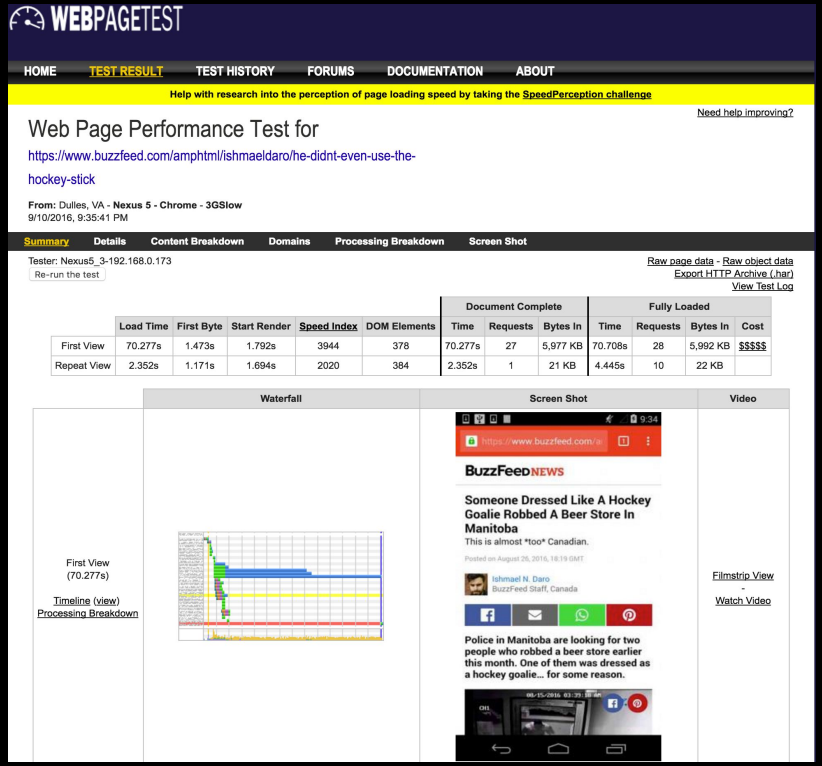
@querymetrics @nicj

Synthetic Monitoring

Non-AMP



AMP

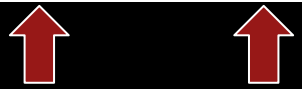


@querymetrics @nicj

Synthetic Monitoring

Non-AMP

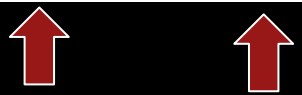
						Document Complete			Fully Loaded			
	Load Time	First Byte	Start Render	Speed Index	DOM Elements	Time	Requests	Bytes In	Time	Requests	Bytes In	Cost
First View	9.772s	1.570s	1.990s	3320	489	9.772s	44	452 KB	11.898s	49	464 KB	$----
Repeat View	5.344s	2.577s	0.268s	1077	486	5.344s	18	33 KB	7.240s	21	34 KB	



11.8s 0.4mb

AMP

						Document Complete			Fully Loaded			
	Load Time	First Byte	Start Render	Speed Index	DOM Elements	Time	Requests	Bytes In	Time	Requests	Bytes In	Cost
First View	70.277s	1.473s	1.792s	3944	378	70.277s	27	5,977 KB	70.708s	28	5,992 KB	$$$$$
Repeat View	2.352s	1.171s	1.694s	2020	384	2.352s	1	21 KB	4.445s	10	22 KB	



70.7s 5.9mb

Synthetic Monitoring

AMP is not a guarantee of performance.

Test Test Test!

Synthetic Monitoring

Downsides:

- Doesn’t tell you how things are performing live
- Hard to estimate traffic patterns
- Is not Real User Monitoring (RUM)
- Controlled environment (!= real world / devices)

Measuring AMP Performance

Q: How do we collect RUM data without custom JavaScript?

A: We don’t, it’s built in!

<amp-pixel>: Overview

```
<amp-pixel src="https://[your-url]">
```

- GET query URL
- Substitution variables to gather metrics
- No extra extension download required
- Triggered during page layout
- Because it's not tied to visibility, perf data might not be available

<amp-pixel>: Example

```
<amp-pixel
  src="http://my-server.com/beacon?
    url=${canonicalUrl}&title=${title}">
```

<amp-pixel>: Variable Substitution

Many variable available:

- Document info (URL, canonical URL, title, referer)
- Navigation Timing (TCP, DNS, SSL, page load, etc)
- Navigation type and redirect count
- Persisted Client ID
- Total Engaged Time
- Screen/viewport dimensions

https://github.com/ampproject/amphtml/blob/master/spec/amp-var-substitutions.md

`<amp-pixel>`: User identification

AMP has a Client ID:

- Managed by AMP
- Saved via cookie
- Required because content may be from publisher's domain or AMP Cache
- `amp-[base64 random]`

`<amp-analytics>`: Vendor

If you don't want to roll-your-own, there's `<amp-analytics>`:

- Available as an extension
- Over 25 built in vendor configs
  - Easy to configure
  - Predefined list of metrics is sent to vendor

<amp-analytics>: DIY

```
<amp-analytics>
  <script type="application/json"> [config] </script>
</amp-analytics>
```

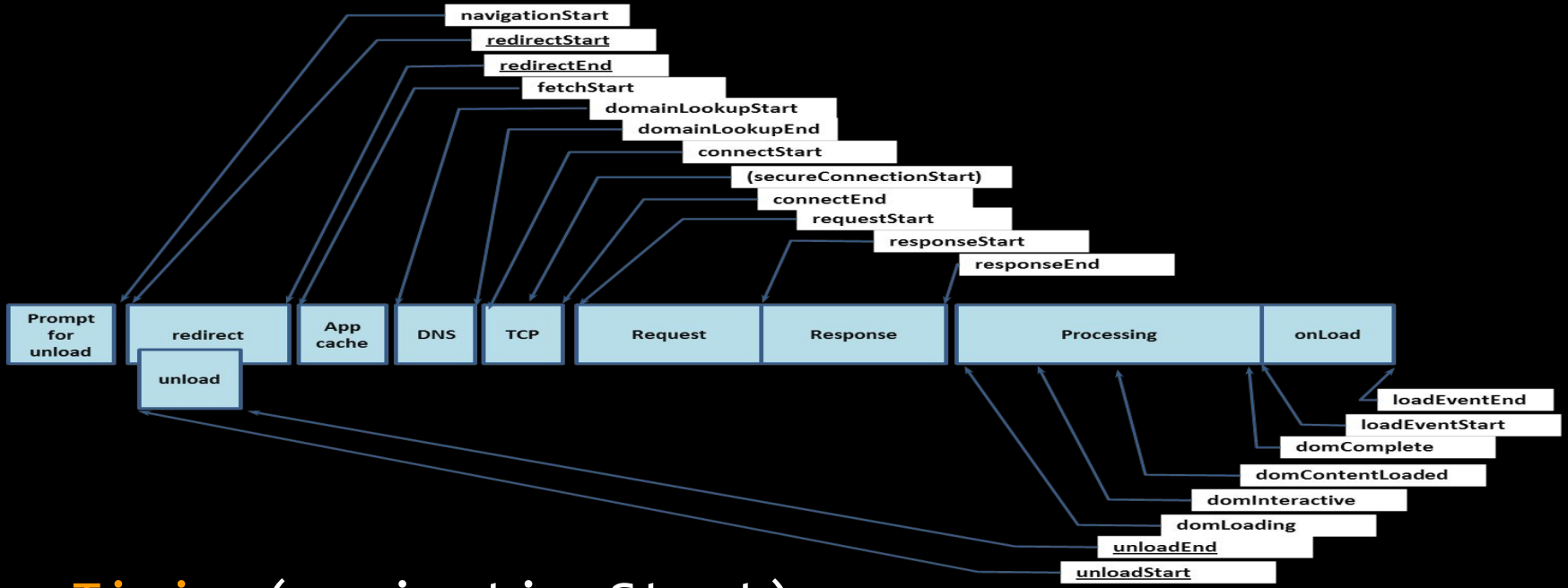
- Harder to configure but customizable
- Can send metrics to your own server
- Variable substitution
- GET or POST
- Configurable trigger events

<amp-analytics>: Triggers

When will a beacon be sent?

- on `visible` / on `hidden`
  - Page
  - AMP element (time, percentage)
- on `click` (CSS selector)
- on `scroll` (horizontal, vertical percentage)
- on `timer` (interval)

Measuring AMP Performance




```
navTiming(navigationStart)
navTiming(responseStart, responseEnd)
```

<amp-analytics>: DIY

```
<amp-analytics>
  <script type="application/json">
{
  "requests": {
    "onvisible":"//my-server.com/beacon?u=${sourceUrl}
                &load=${navTiming(navigationStart,loadEventStart)}"
  },
  "triggers": {
    "onvisible": {
      "on": "visible",
      "request": "onvisible"
    }
  }
}
</script></amp-analytics>
```

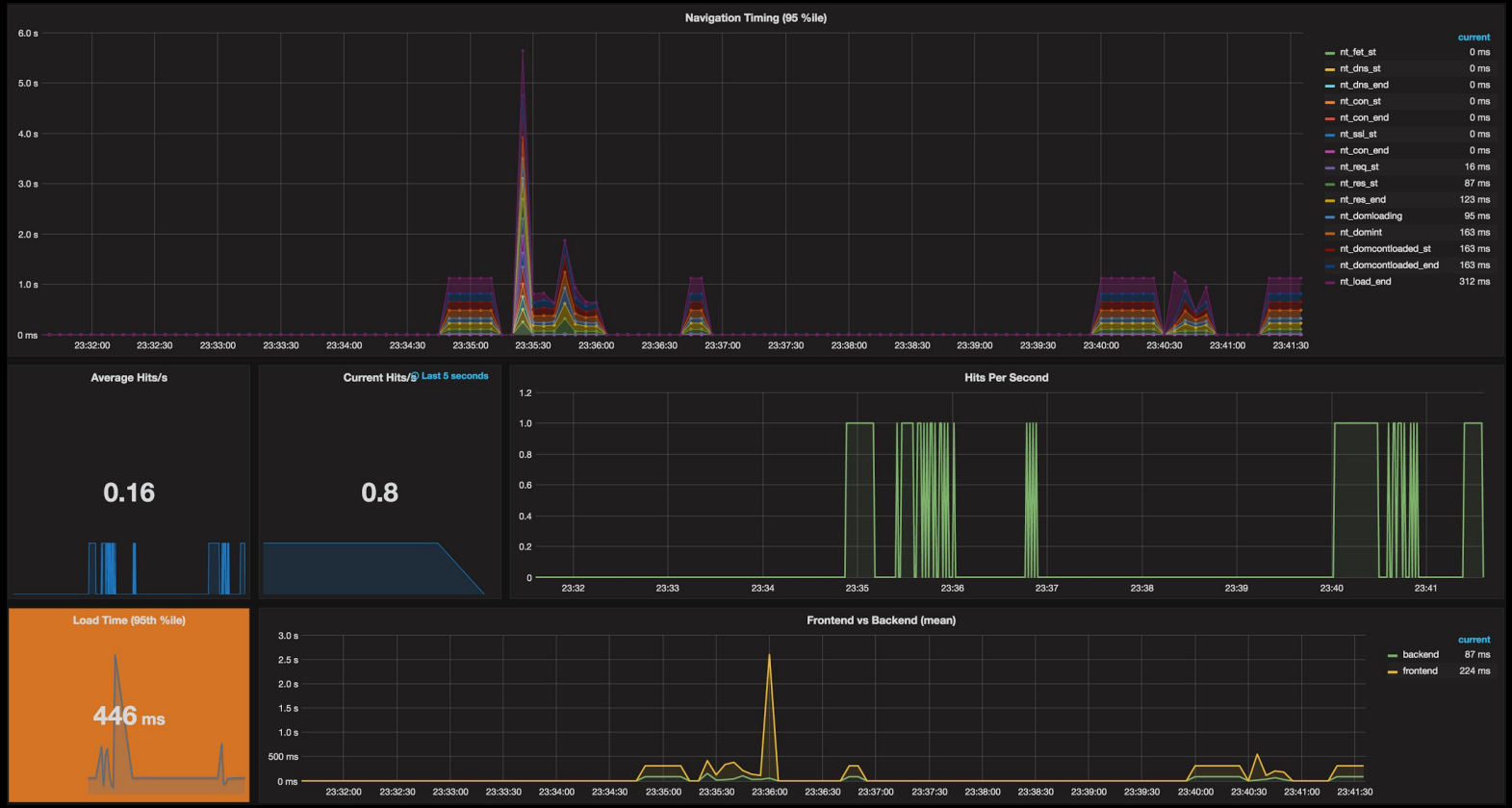
AMP: Live Demo

https://amp.querymetrics.com/

DIY RUM dashboard

- `<amp-analytics>` tag sends beacon from AMP page
- Node.js: Web server receives beacon from AMP page and forwards to DB
- InfluxDB: Time series DB that stores Navigation Timing data from beacon
- Grafana: Dashboard to view aggregated data

AMP: DIY RUM Dashboard

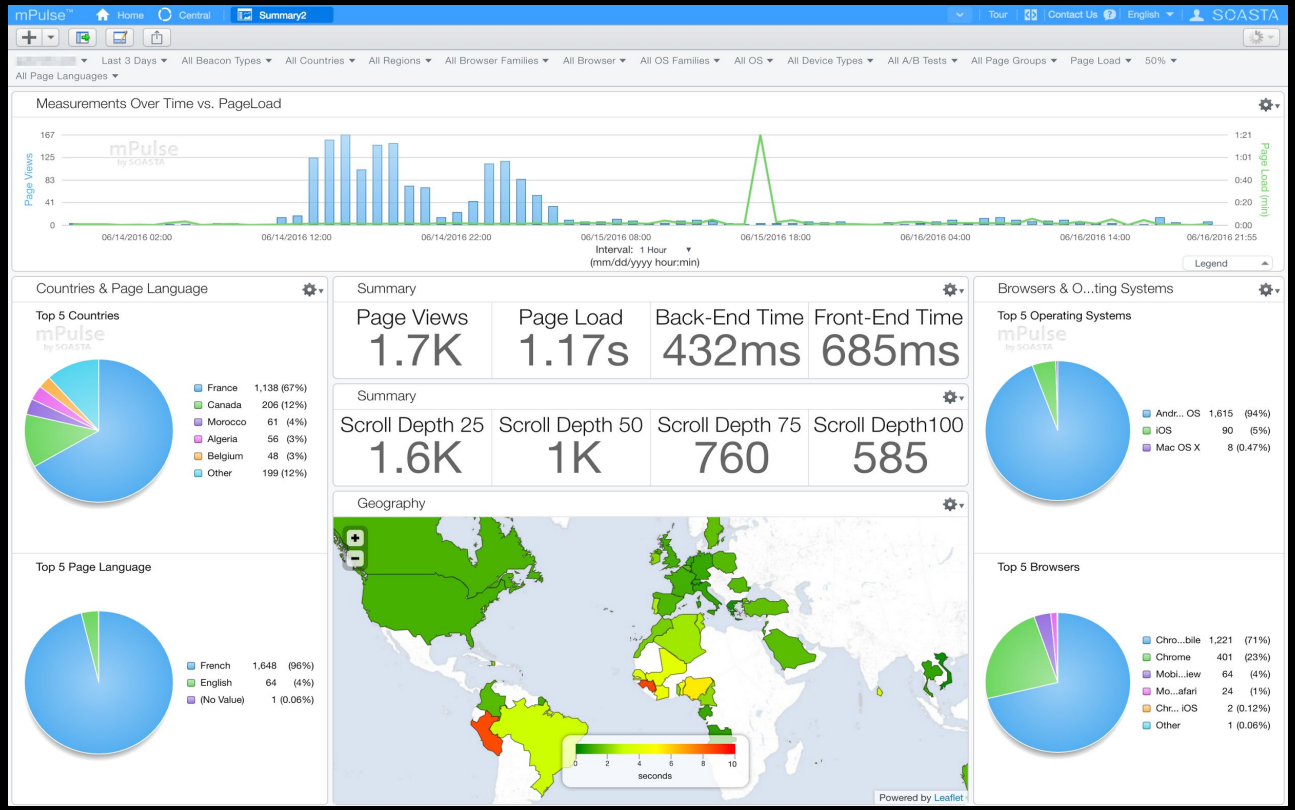


@querymetrics @nicj

AMP Real-World Data

How are AMP pages performing in the real world?

Real-world RUM data



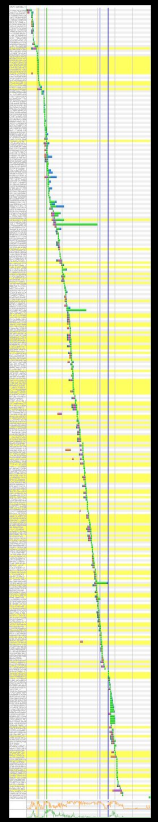
@querymetrics @nicj

Real-World Data

RUM analysis of an AMP-enabled website

- News website with blog / articles
- 30+ days of data
- Thousands of articles with both AMP and non-AMP visitors

Sample Regular vs. AMP Page



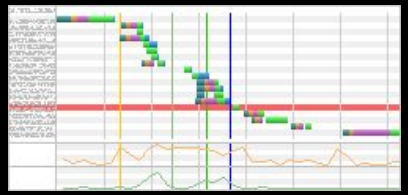
Regular Site

350 Requests
3.2 MB data

1,258ms First Byte

34.9s Page Load

6701 Speed Index



AMP

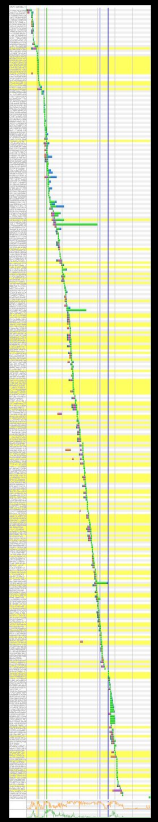
19 Requests
250 KB data

598ms First Byte

3.6s Page Load

1790 Speed Index

Sample Regular vs. AMP Page



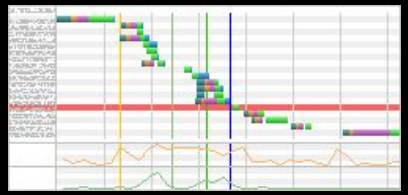
Regular Site

Interactive Nav

High Res Images

Other Content Links

Third Party Content



AMP

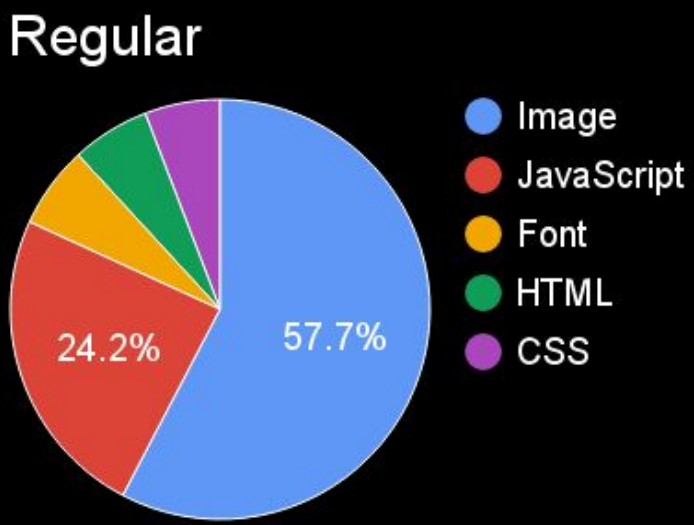
Simple Nav

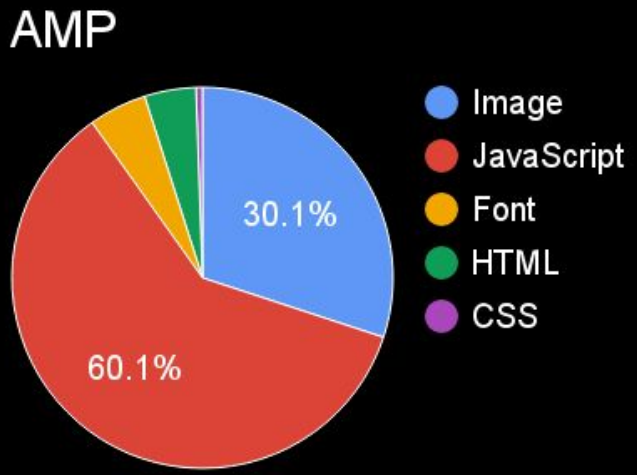
Article Text

Hero Image(s)

No Third Parties

Sample Page Content

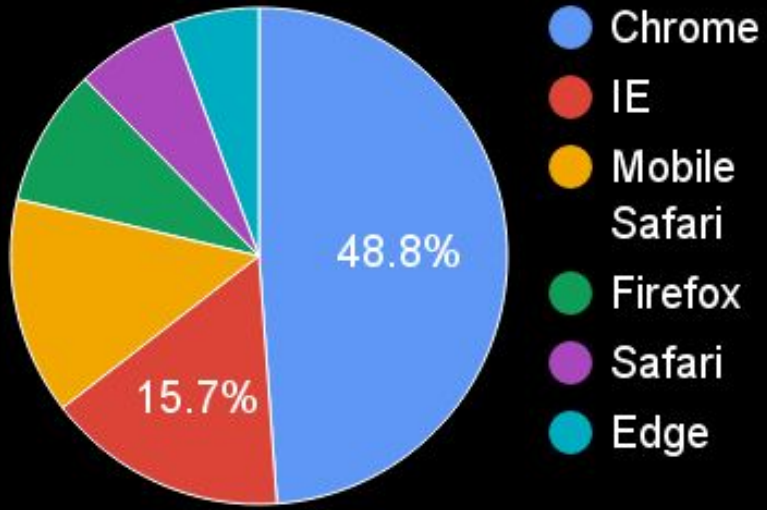




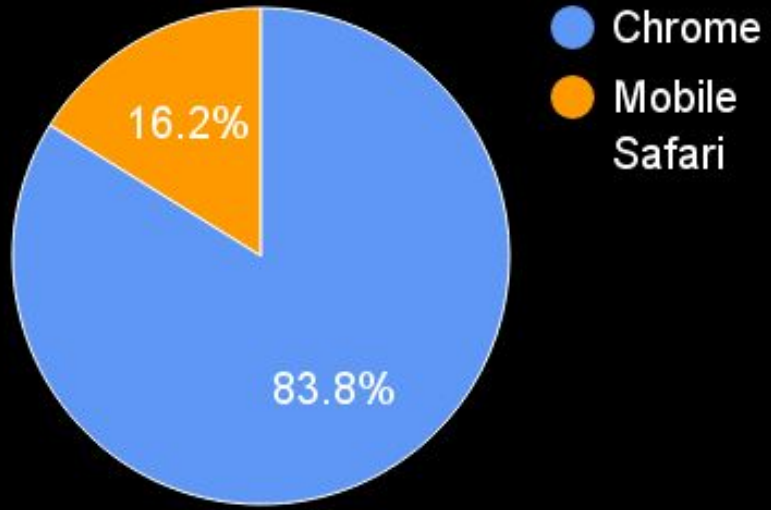
RUM Data

Real-World Data: Browsers

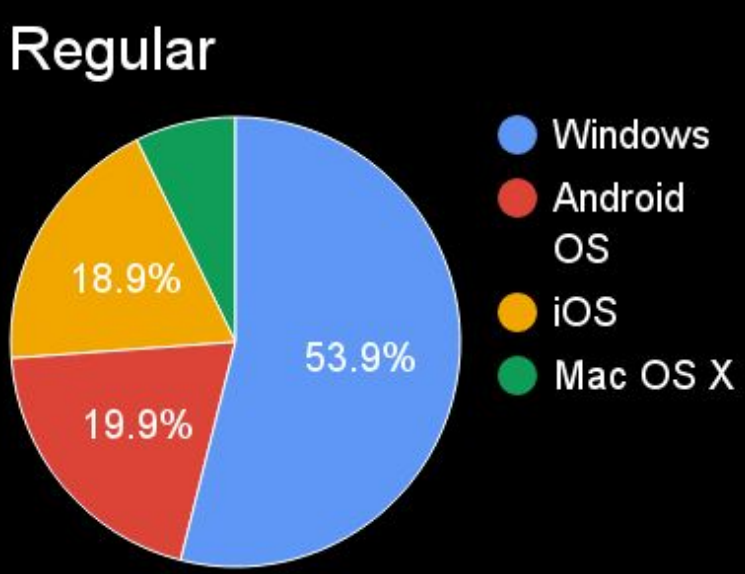
Regular

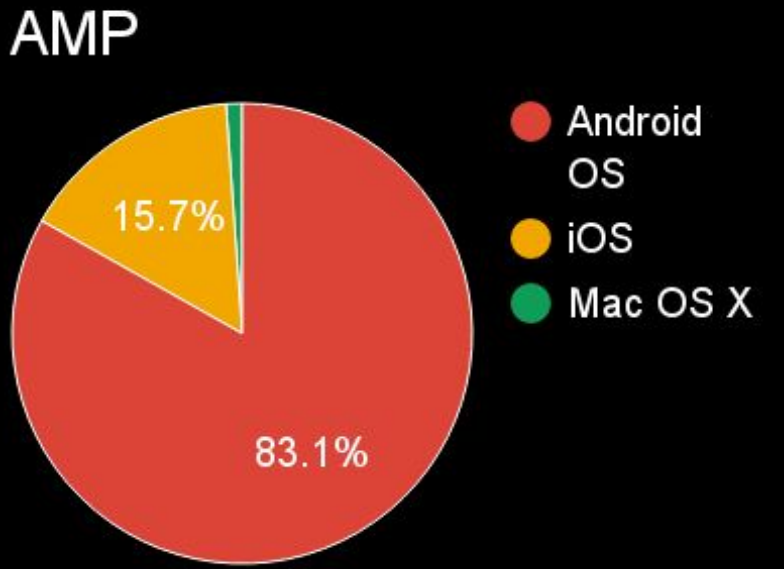


AMP

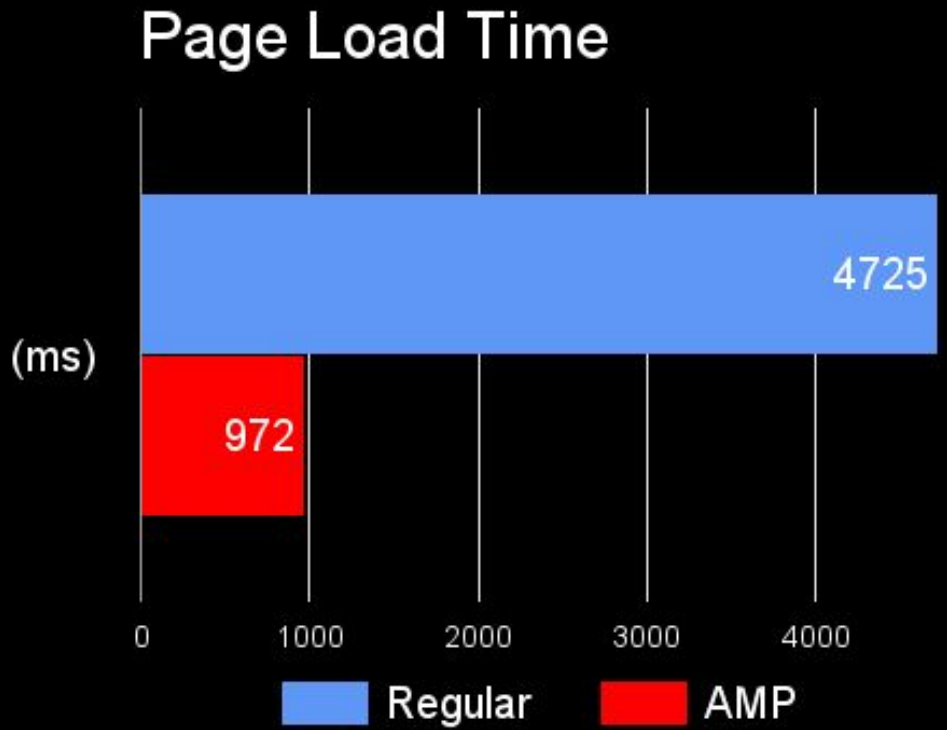


Real-World Data: OS



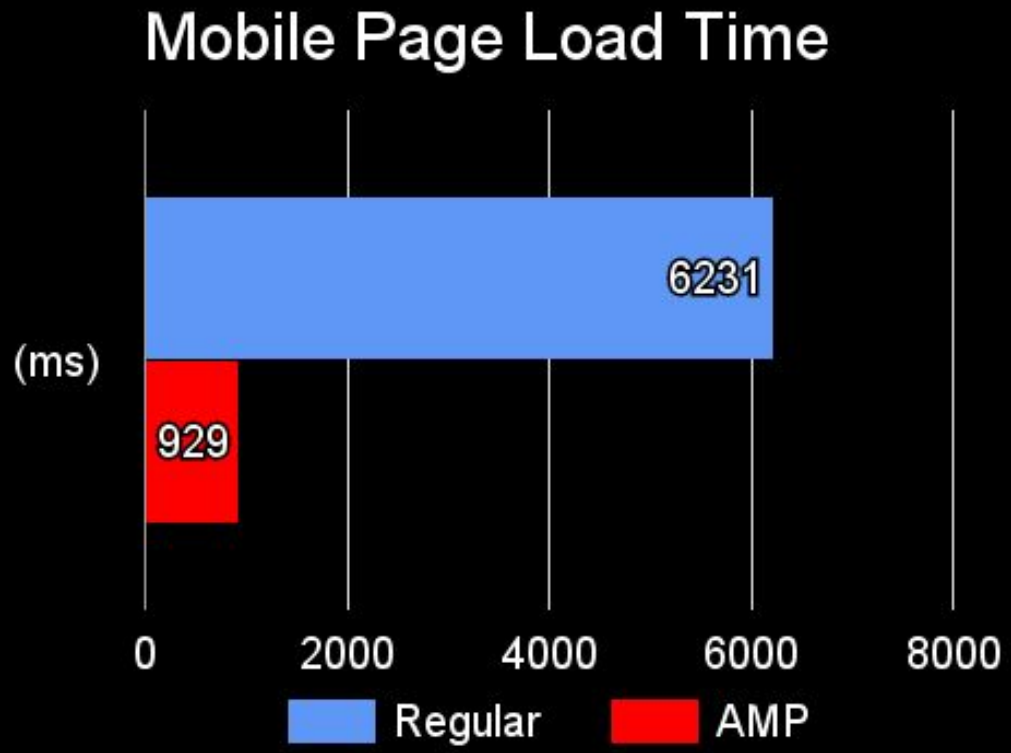


Real-World Data: Page Load Times



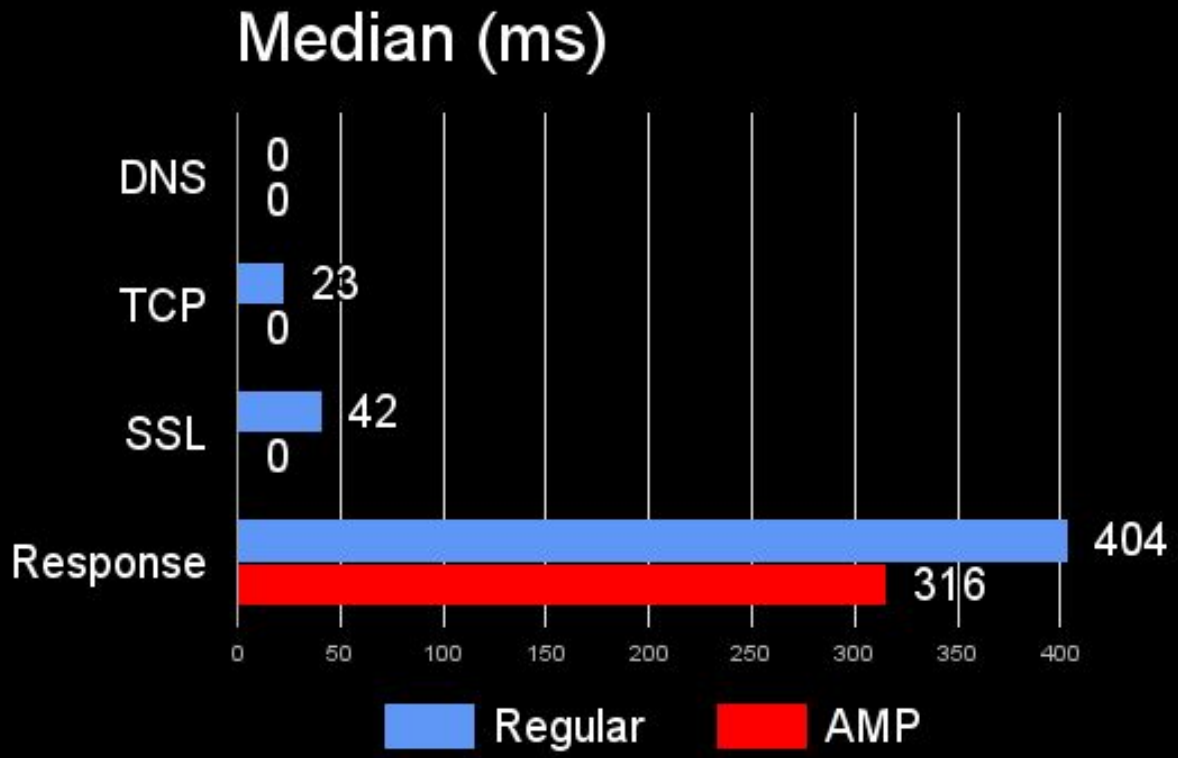
3.8x faster

Real-World Data: Mobile Load Times



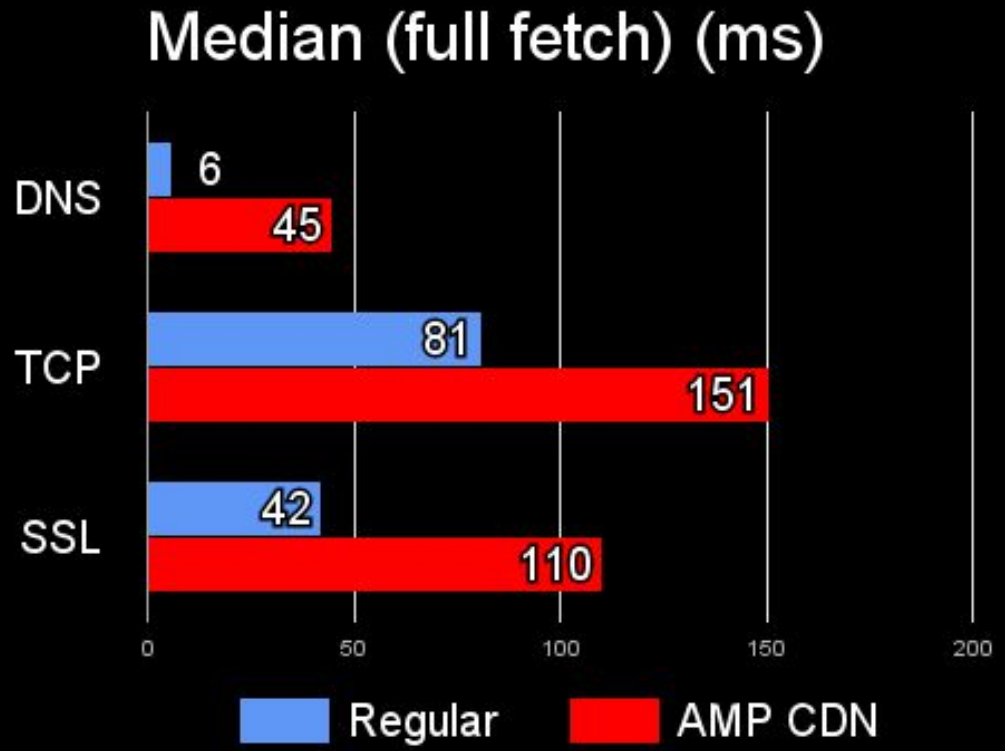
5.7x faster

Real-World Data: Timings

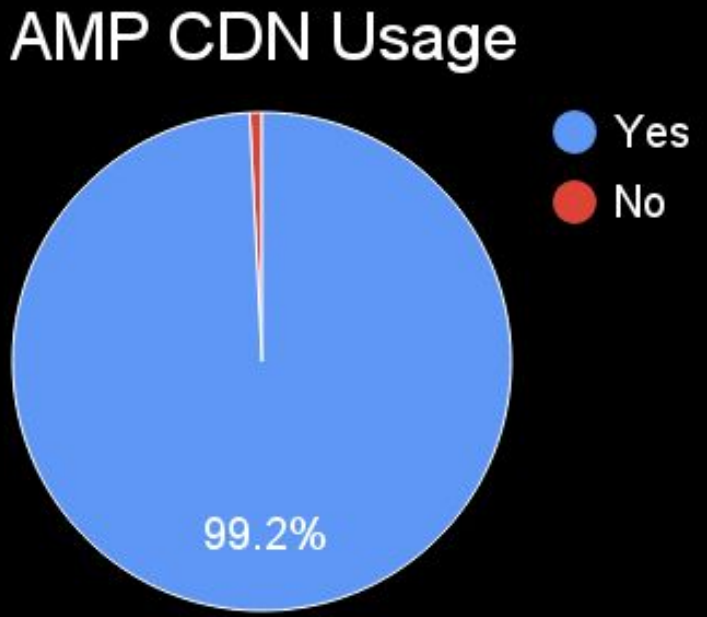


@querymetrics @nicj

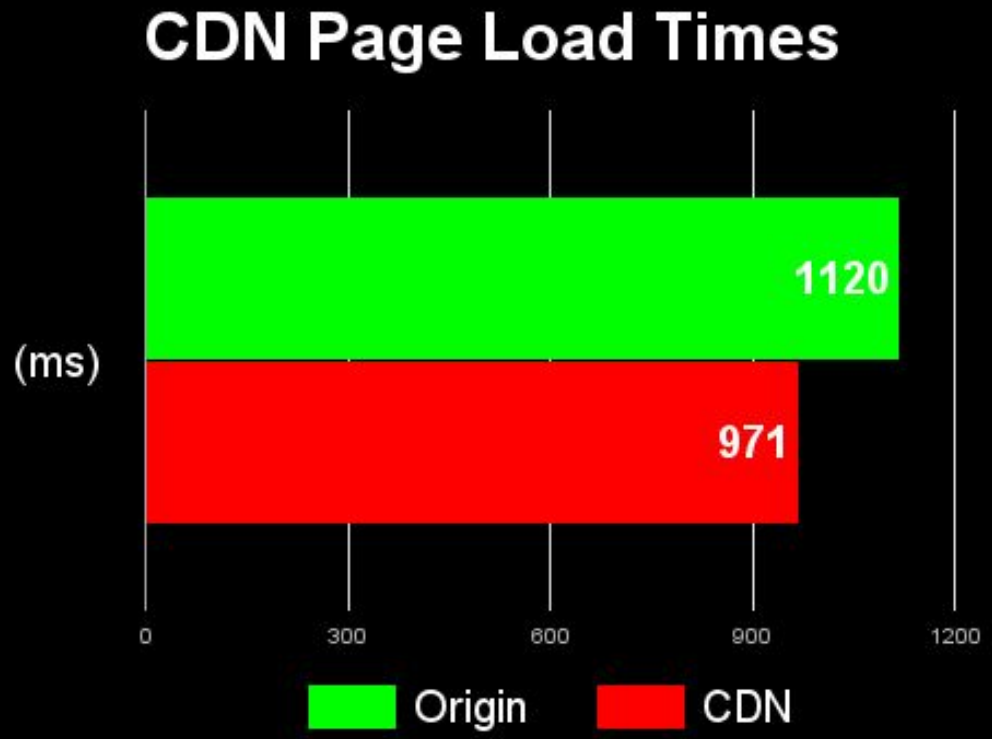
Real-World Data: Timings



Real-World Data: AMP CDN Usage

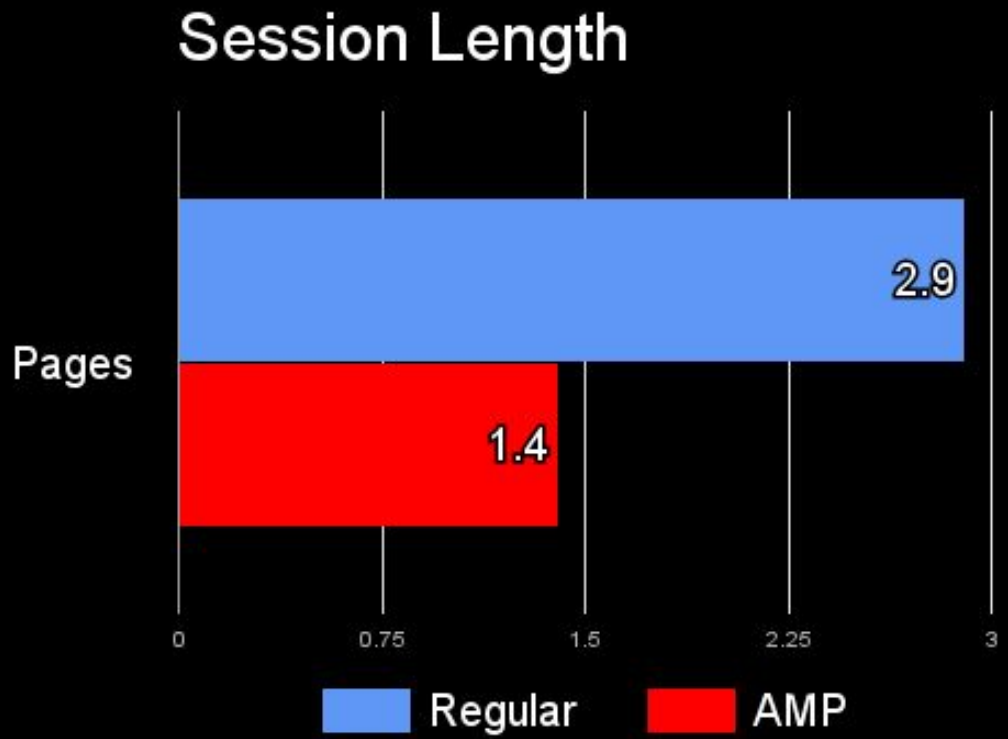


Real-World Data: CDN Load Times



13% faster

Real-World Data: Session Length



48% less pages

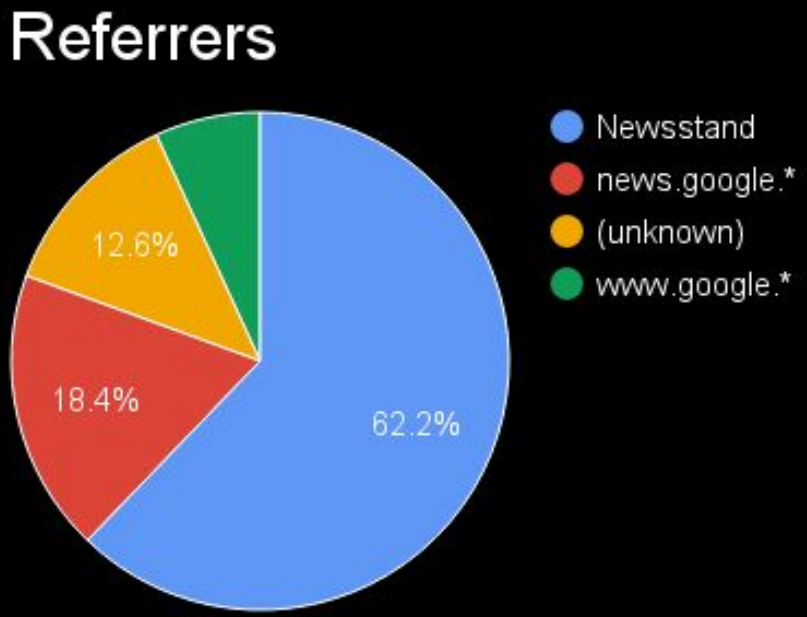
Real-World Data: Bounce Rate

Regular	AMP
58%	82%

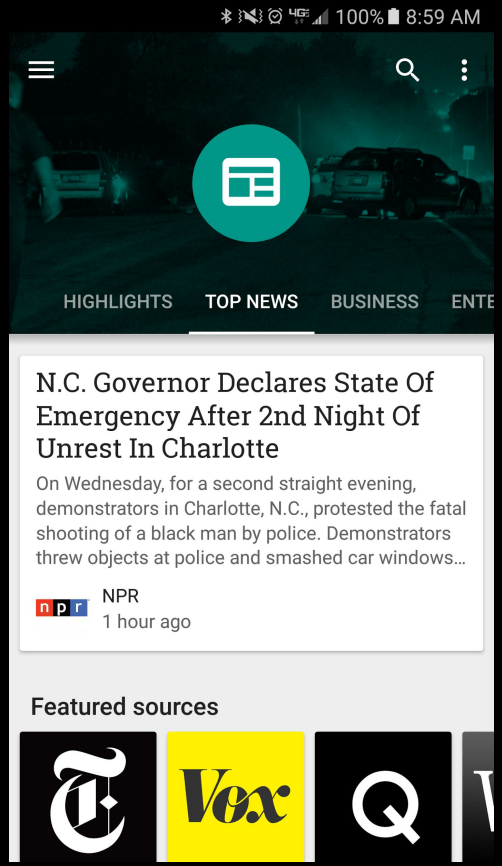
Real-World Data: Transitioning

Only 3% of AMP visitors transitioned to non-AMP URL

Real-World Data: Referrers



Real-World Data: Play Newsstand



Conclusions

- AMP is a forcing function for best practices
- AMP is a great way to get rid of your third-party bloat
- You could get much of the same performance by applying the same optimizations to your own site without AMP
- AMP CDN can give you a free performance boost
- Business / SEO benefits

Do we need AMP?

Downsides:

- Additional development resources to build
- Technical resources to maintain

Hand-Tuning

CPP: https://timkadlec.com/2016/02/a-standardized-alternative-to-amp/

Facebook Instant Articles (analytics sandboxed)

Future

Features we'd like to implement

- Collect ResourceTiming (amphtml PR 3593)
- Trigger / collect UserTiming
- Collect an indication that the page was prerendered and time spent in prerender

Thank You

https://slideshare.net/nicjansma/amp-does-it-really-make-your-site-faster

https://github.com/querymetrics/amp-analytics-demo

@querymetrics @nicj