



Welcome to  
**BlinkOn5**  
Nov 2015 • San Francisco

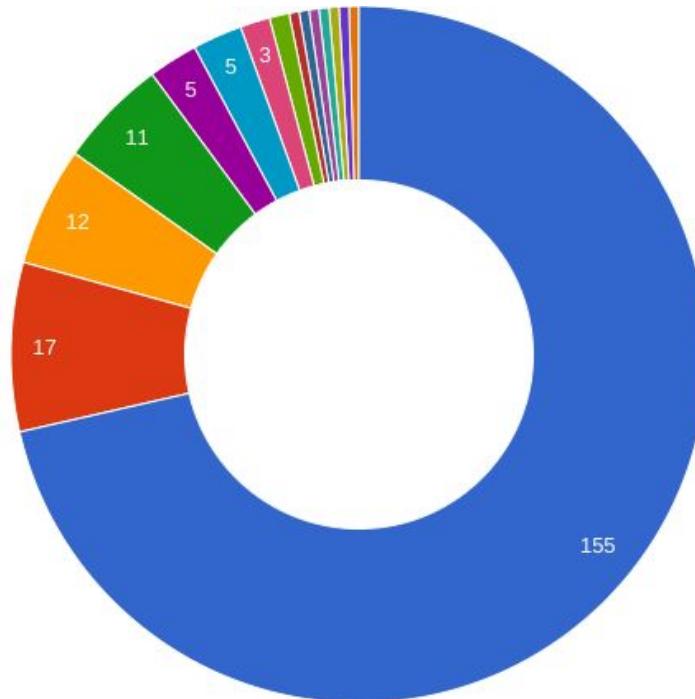
dglazkov@ • skyostil@ • rbyers@

# Who's here?

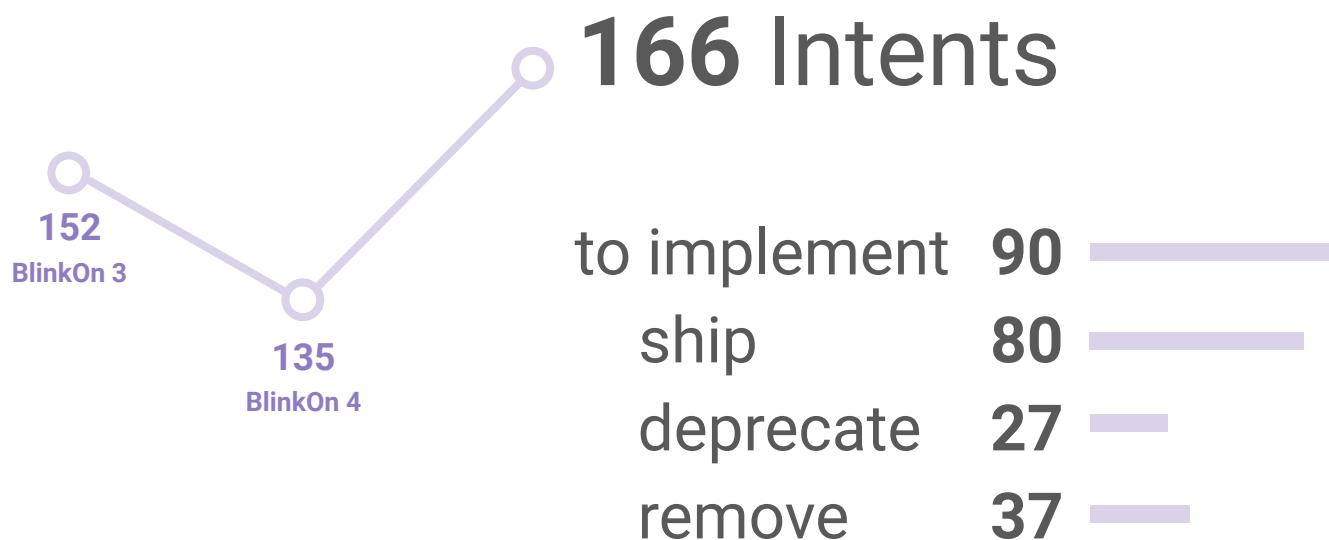
```
$ wc -l blinkon5.txt  
217 blinkon5.txt
```

```
$ cat blinkon5.txt | sort | uniq -c | sort -nr
```

- 155 Google
- 17 Samsung
- 12 LG Electronics
- 11 Opera Software
- 5 Intel
- 5 ARM Inc.
- 3 Naver Corp.
- 2 Microsoft
- 1 UT Austin
- 1 University of Georgia
- 1 Spikes Security
- 1 Mozilla
- 1 Igalia
- 1 Facebook
- 1 Akamai



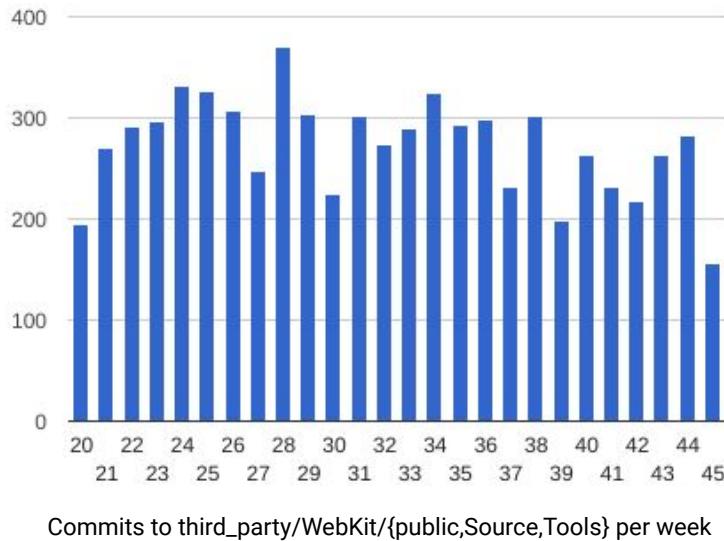
# In the last 6 months



# In the last 6 months

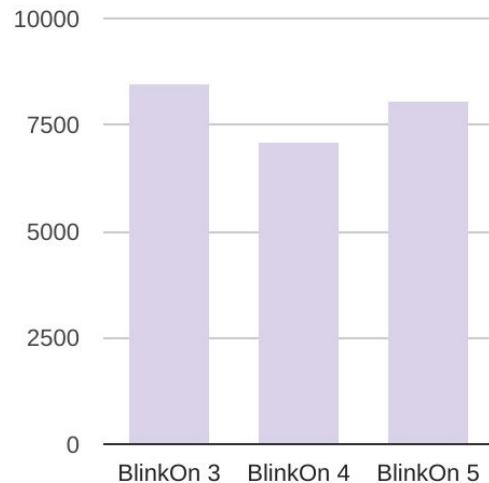
7,095 Commits (**39** per day)

+39K lines of code (**+3.6%**) from  
**413** contributors

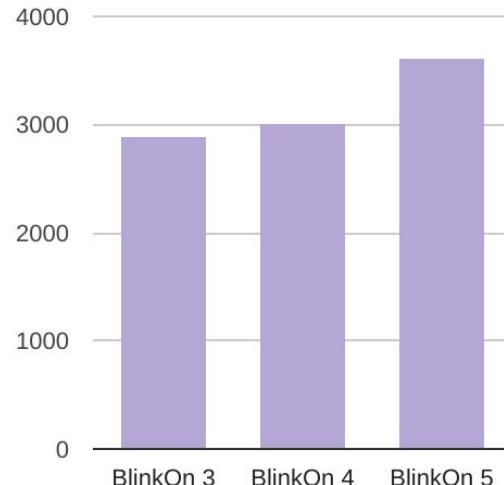


# In the last 6 months

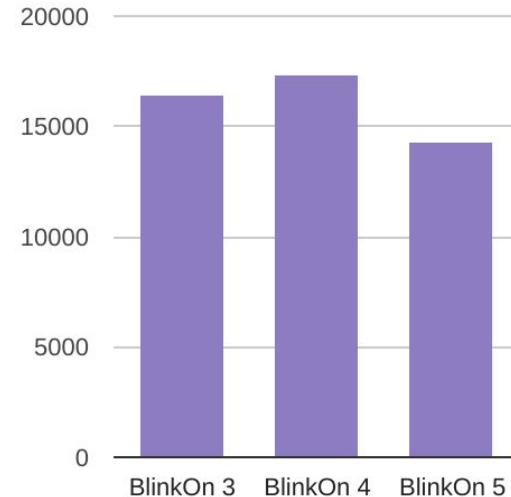
**Filed bugs**



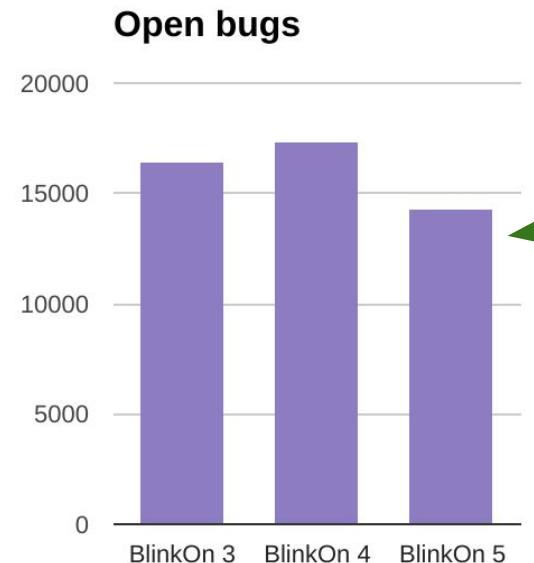
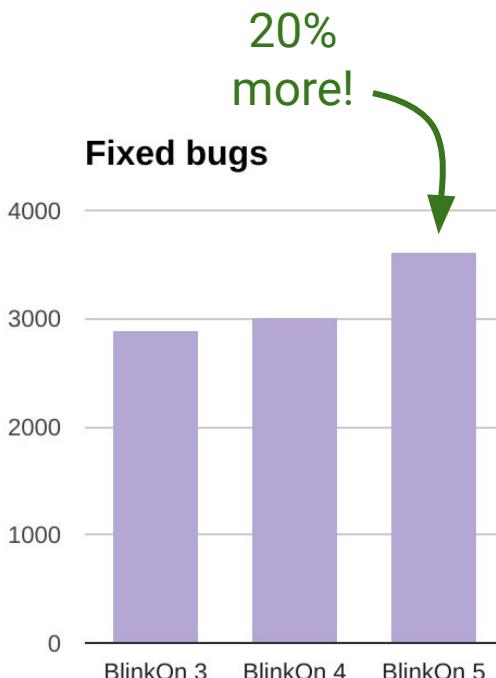
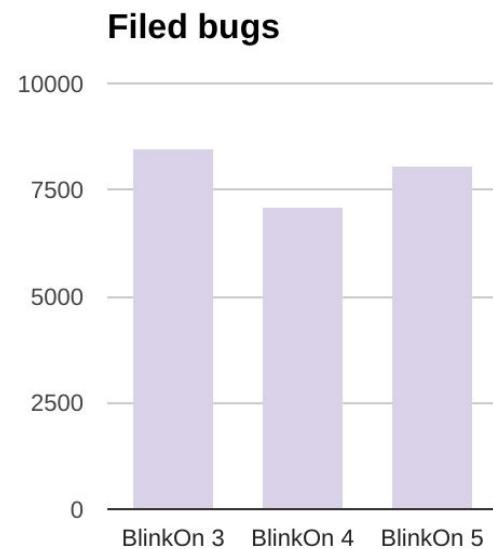
**Fixed bugs**



**Open bugs**

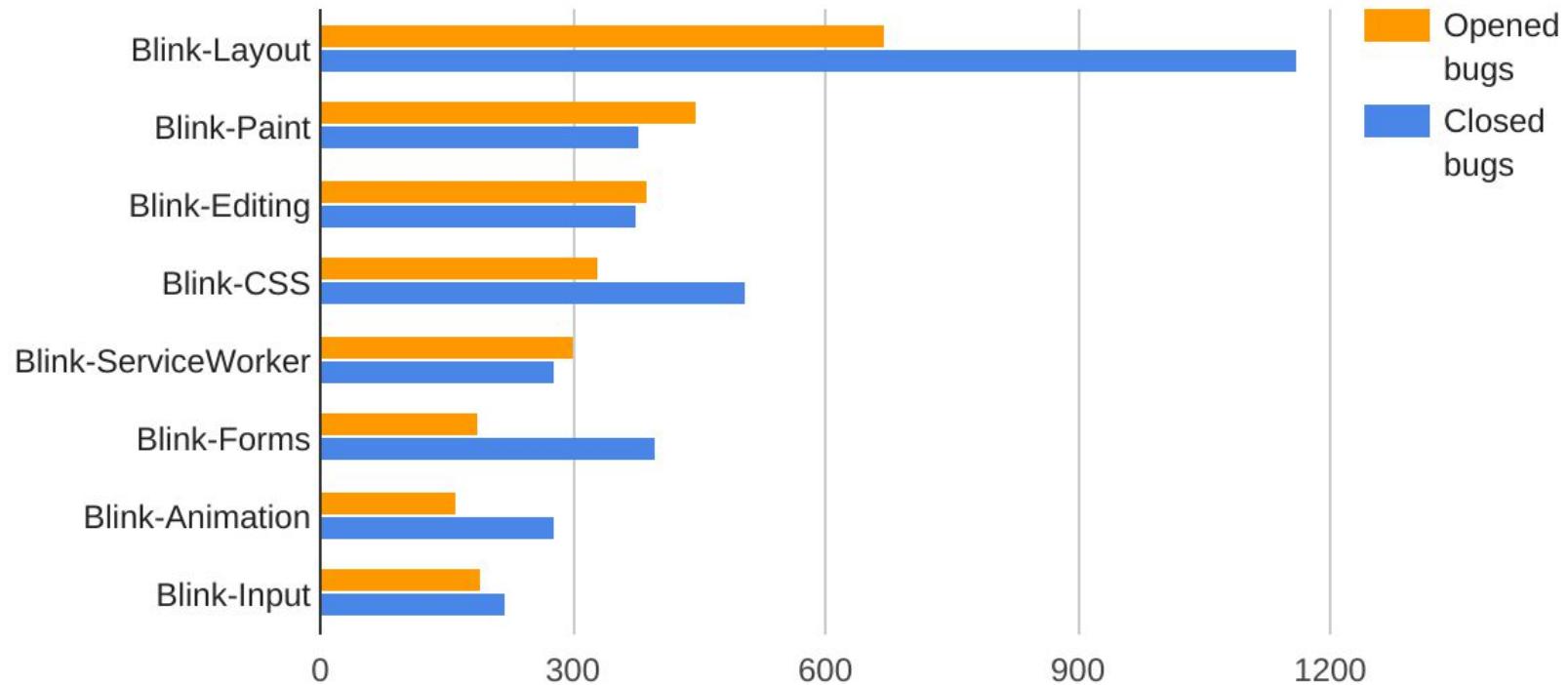


# In the last 6 months



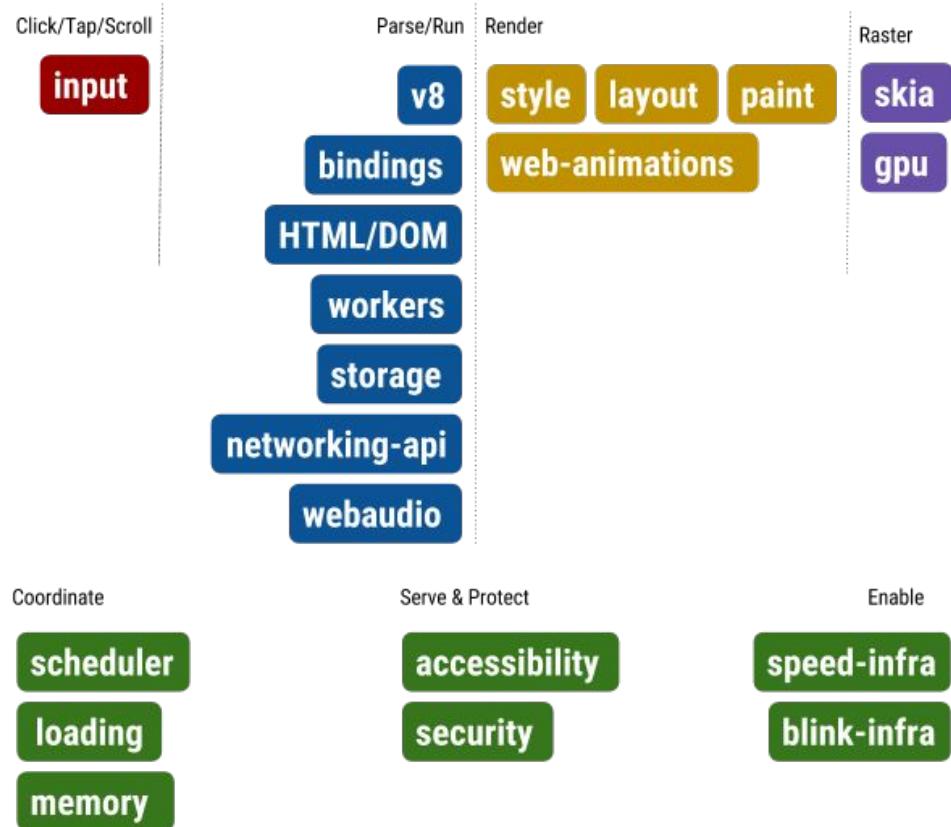
18%  
less!

# In the last 6 months



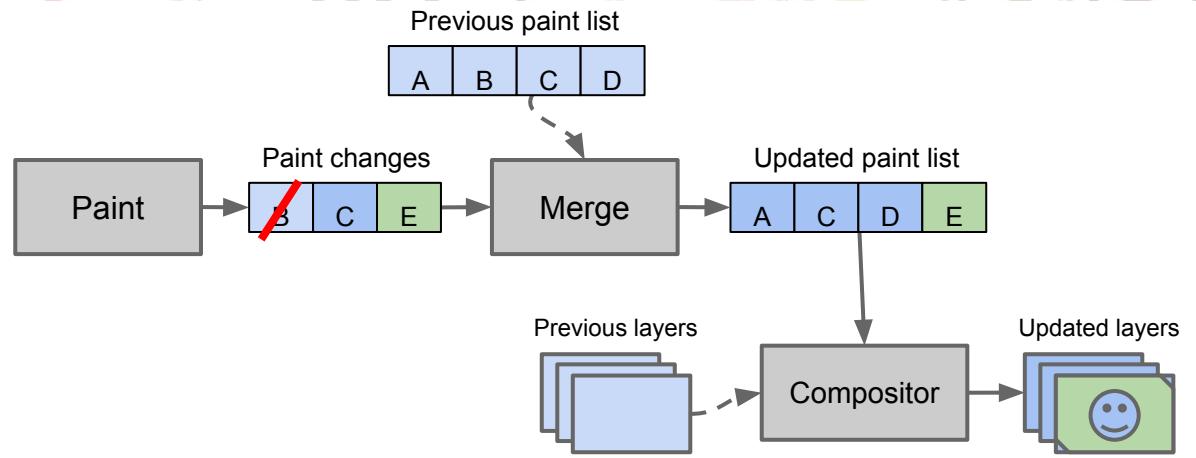
# In the last 6 months

polymer devtools standards





# Slimming Paint



# Oilpan

Timer

fallback

Loading

Network

Image

2D

Hardware

perf

decode

impact

playback

smooth

file

display

pointer

font

interact

DOM

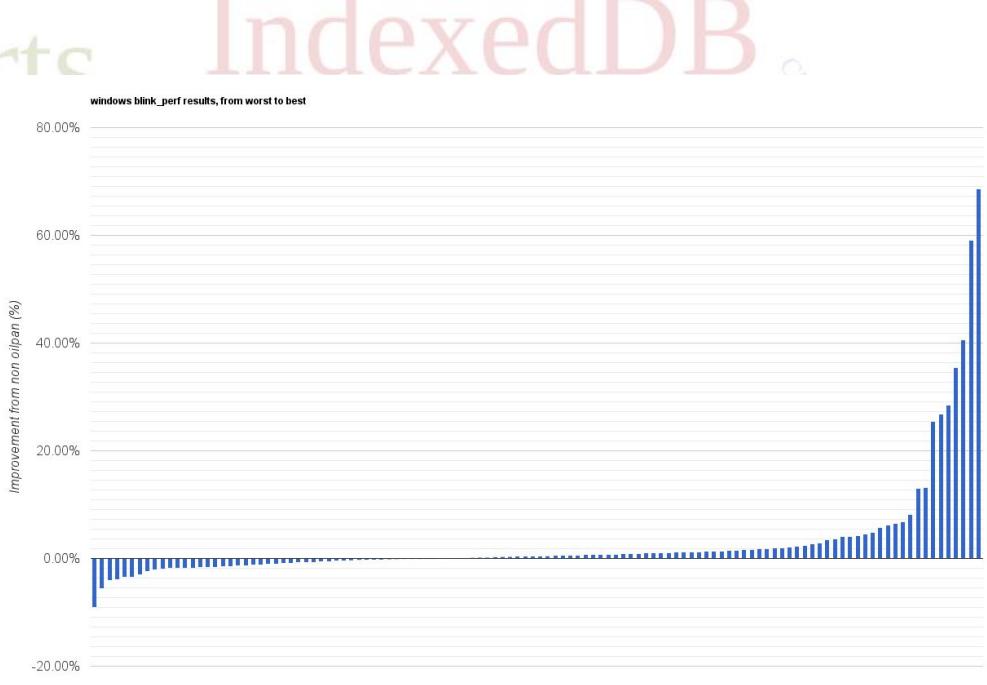
events

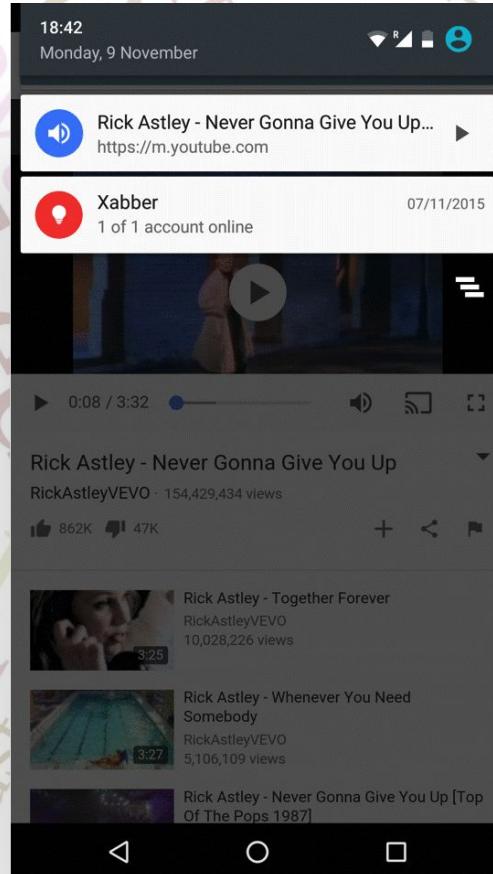
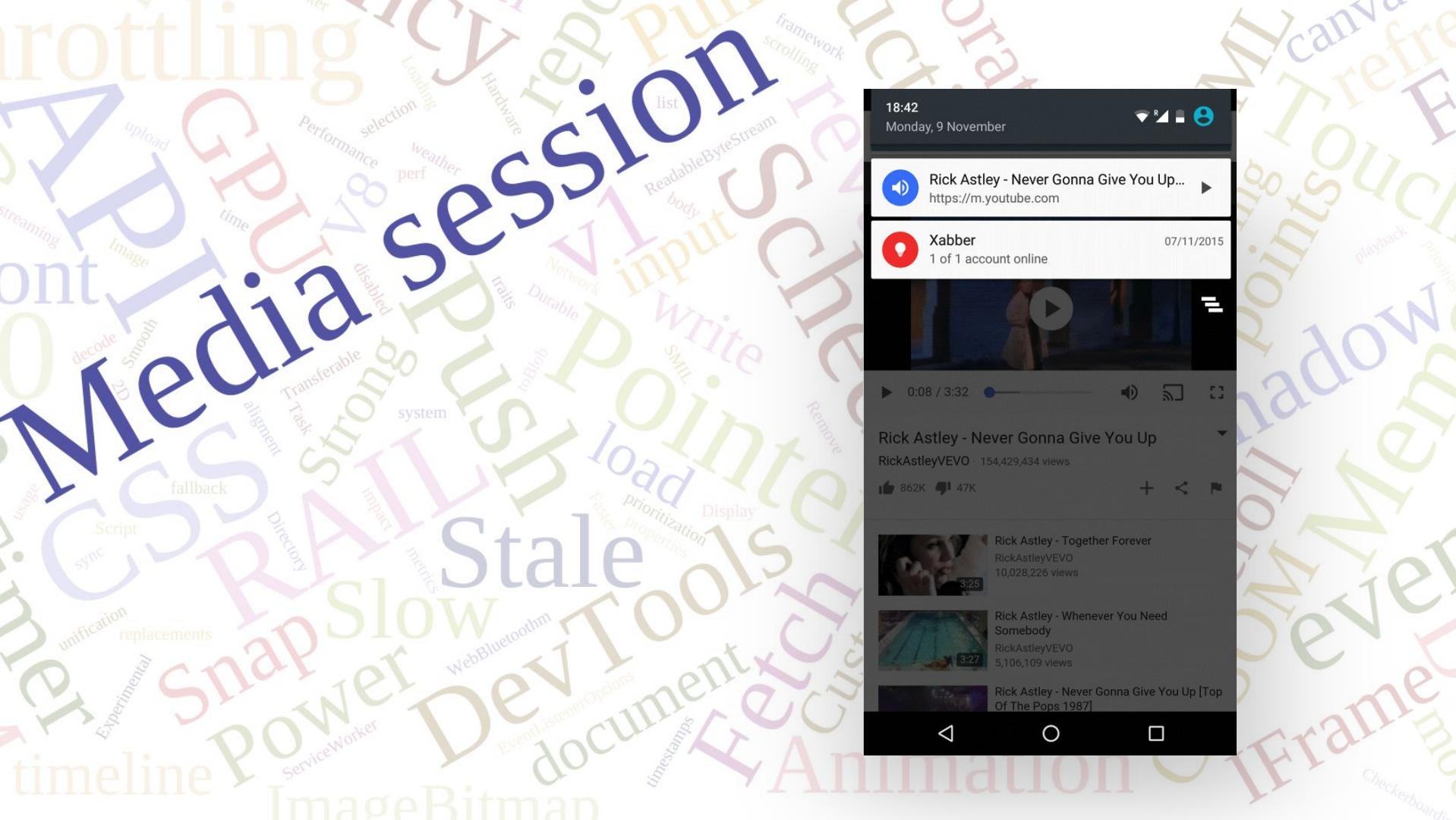
pointer

DOM

slow

frame report latency indexedDB





# CSS multi column

Experimental  
prioritization  
weather body  
Lorem ipsum dolor sit amet, consectetur adipisicing elit, sed do eiusmod tempor incididunt ut labore et dolore magna

V1 load  
upload metrics  
aliqua. Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris nisi ut aliquip ex ea commodo

Smooth  
priorities  
perf  
consequat. Duis aute irure dolor in reprehenderit in voluptate velit esse cillum dolore eu fugiat nulla pariatur.

Hardware  
traits  
disabled  
selection  
impact  
Excepteur sint occaecat cupidatat non proident, sunt in culpa qui officia deserunt mollit anim id est laborum



# Splash screen

# ES6

## Arrow functions

```
let numbers = [1, 2, 3, 4, 5, 6, 7, 8, 9];
let oddNumbers = numbers.filter(number => number % 2);
```

## Spread operator

```
var parts = ['shoulders', 'knees'];
var lyrics = ['head', ...parts, 'and', 'toes'];
```

## Rest operator

```
function(a, b, ...theArgs) {}
```

## new.target

```
class Parent {
  constructor() {
    console.log('I was constructed via new ' +
      new.target.name);
  }
}
```

...and more



Full video: [goo.gl/pYmi3i](http://goo.gl/pYmi3i)

The image shows two side-by-side screenshots of the Google Chrome Task Manager. Both screenshots display a list of tasks with columns for Task, Memory, CPU, and JavaScript memory.

**Left Screenshot (Initial State):**

Task	Memory	CPU	JavaScript memory
• M Tab: Inbox	152,256K	0	80,068K (70,167K live)
• Backgr...	10,156K	0	6,729K (2,485K live)
• Extensi...	15,148K	0	5,737K (2,210K live)
• Browser	57,028K	0	0K (0K live)
• GPU Pr...	22,772K	0	N/A

**Right Screenshot (After Performance Issue):**

Task	Memory	CPU	JavaScript memory
• M Tab: Inbox	210,868K	0	138,491K (92,155K live)
• Backgr...	15,048K	0	6,868K (2,373K live)
• Extension...	14,156K	0	5,876K (2,273K live)
• Browser	42,592K	0	0K (0K live)
• GPU Proc...	20,944K	0	N/A

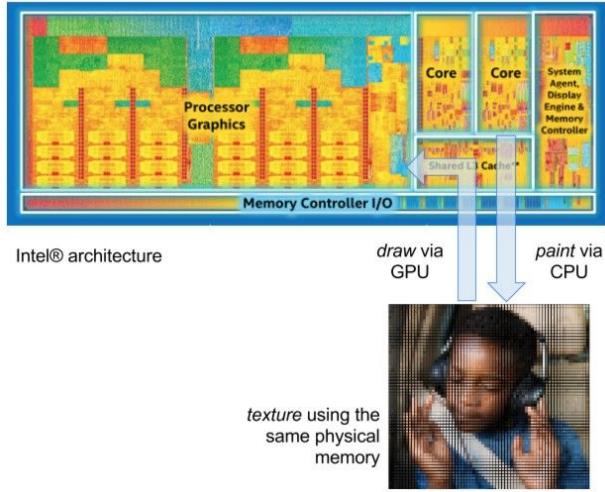
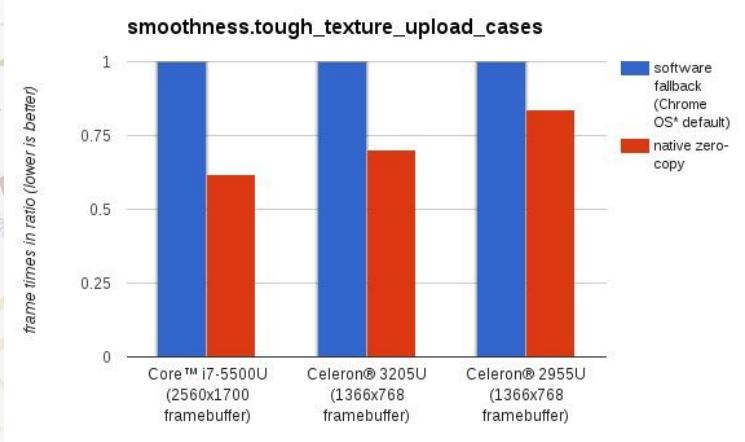
In both screenshots, the 'Tab: Inbox' task is circled in red. In the left screenshot, its memory usage is 152,256K. In the right screenshot, its memory usage has increased to 210,868K. This significant increase in memory usage is what the video is illustrating as a performance issue.

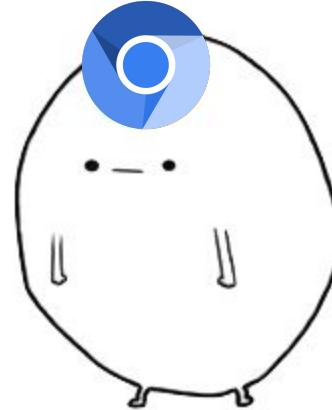
Full video: [goo.gl/7AUmZO](http://goo.gl/7AUmZO)



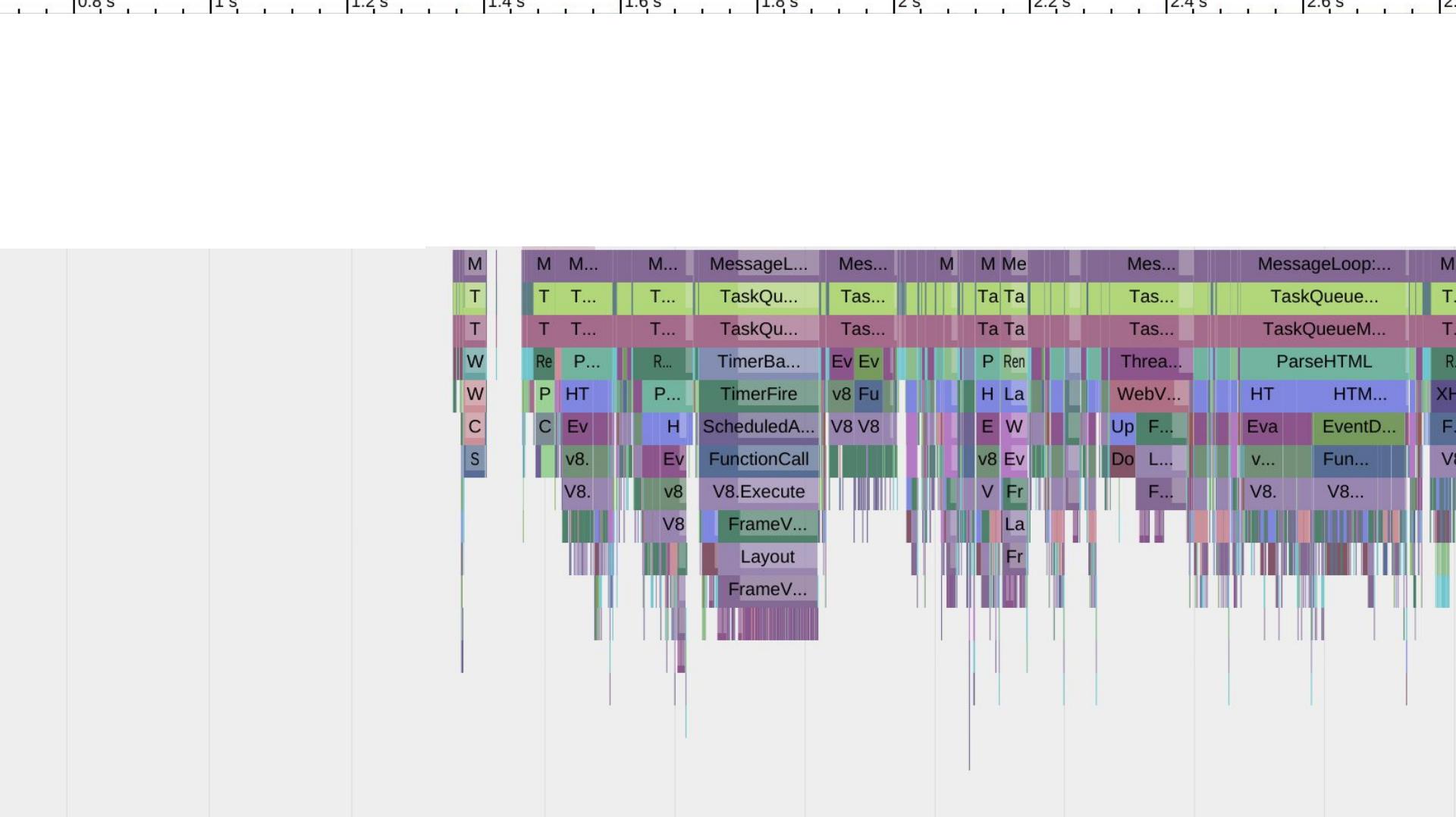
# requestIdleCallback

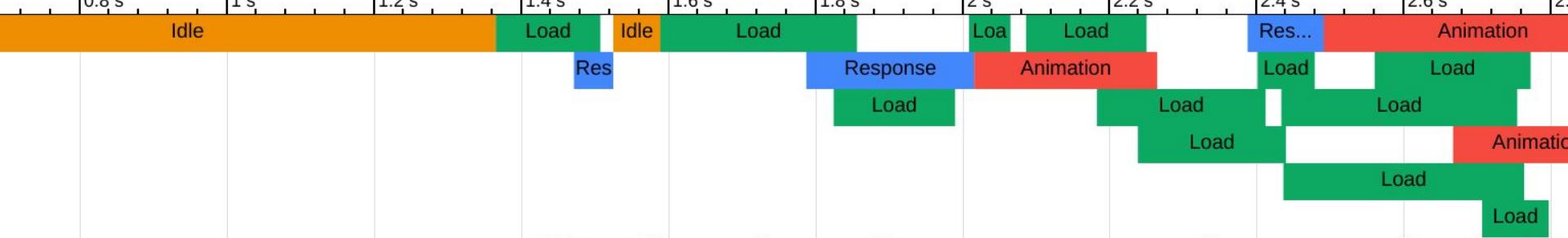
# zero copy upload





# In the pipeline





# R

## Response

# A

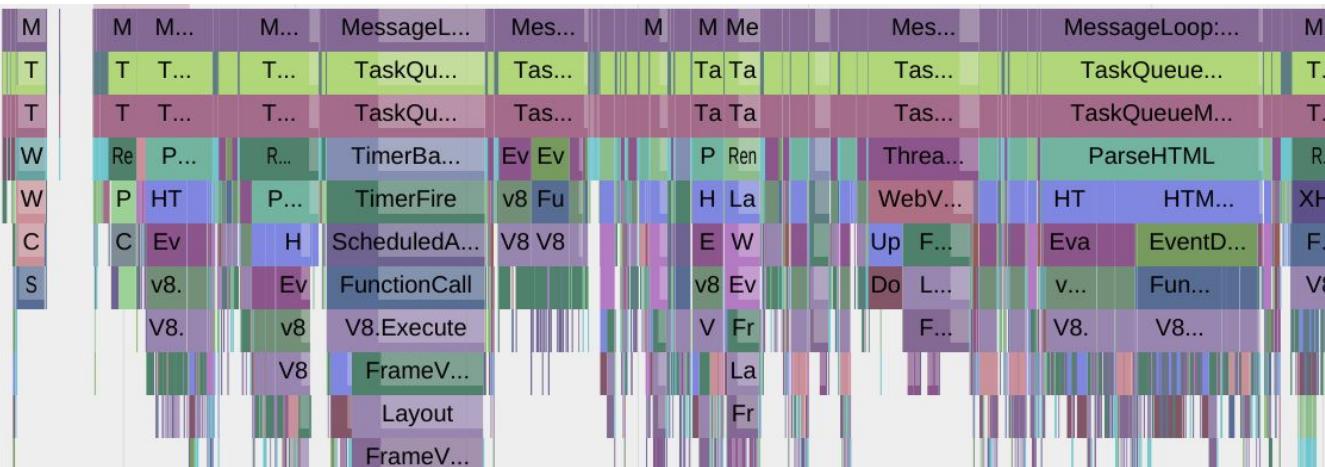
## Animation

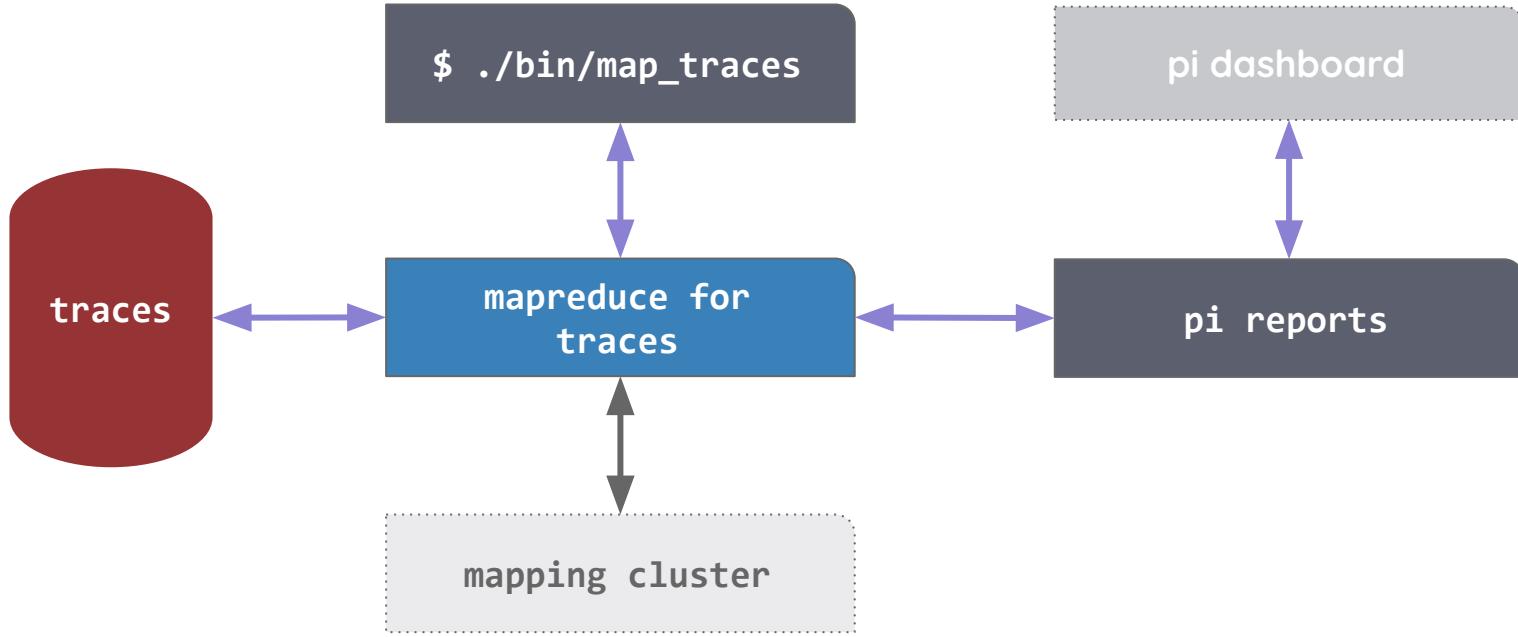
# I

## Idle

# L

## Load





devServerDriver All traces pi-ui-r-slice-cost-report Show raw results

Group by thread name  Group by RAIL Stage  Group by Event Category  Group by Event Title  Group by Domain Category  Group by Domain

Title	Self time	CPU Self time
▶Idle	2,826,350.790 ms	101,159.000 ms
▼Load		
unknown	554,540.012 ms	38,104.000 ms
chrome-extension://noondiphddnnabmjcihcjfbhfklnnep	28,119.000 ms	28,119.000 ms
https://docs.google.com	2,010.000 ms	2,010.000 ms
https://www.google.co.in	1,368.000 ms	1,368.000 ms
file:///	1,046.000 ms	1,046.000 ms
https://ssl.gstatic.com	867.000 ms	867.000 ms
https://cluster-fuzz.appspot.com	853.000 ms	853.000 ms
https://ssl.google-analytics.com	737.000 ms	737.000 ms
http://w.sharethis.com	559.000 ms	559.000 ms
https://apis.google.com	506.000 ms	506.000 ms
https://hangouts.google.com	462.000 ms	462.000 ms
http://www.fox.com	197.000 ms	197.000 ms
https://s.ytimg.com	132.000 ms	132.000 ms
https://www.gstatic.com	117.000 ms	117.000 ms
chrome-extension://abjoigjokreibfhiahiijggogladbmfm	102.000 ms	102.000 ms
https://crash.corp.google.com	96.000 ms	96.000 ms
https://0.talkgadget.google.com	95.000 ms	95.000 ms
https://codereview.chromium.org	86.000 ms	86.000 ms
https://accounts.google.com/AddSession?hl=en-GB&continue=https://mail.google.com	82.000 ms	82.000 ms
http://z-ecx.images-amazon.com	71.000 ms	71.000 ms
chrome-extension://aihpiglmnhnhjdjnghpfnlledckkhja	65.000 ms	65.000 ms
https://mail.google.com	55.000 ms	55.000 ms
chrome-search://most-visited	53.000 ms	53.000 ms
https://code.google.com	45.000 ms	45.000 ms
chrome-extension://noondiphddnnabmjcihcjfbhfklnnep	43.000 ms	43.000 ms

Histogram of values:  
117 samples, average=17.179 ms

Links

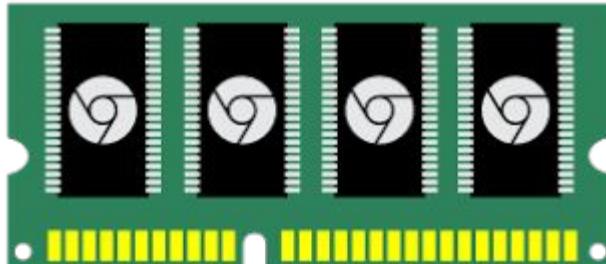
- [/perf\\_insights/test\\_data/2a9d25fe-54b1-4e3b-baaf-0a1d817b79d0.gz](/perf_insights/test_data/2a9d25fe-54b1-4e3b-baaf-0a1d817b79d0.gz)
- [/perf\\_insights/test\\_data/326db430-bb4d-467d-8801-64bf54bc6d8e.gz](/perf_insights/test_data/326db430-bb4d-467d-8801-64bf54bc6d8e.gz)
- [/perf\\_insights/test\\_data/68277be7-5844-4432-8233-9fccd68aaea8.gz](/perf_insights/test_data/68277be7-5844-4432-8233-9fccd68aaea8.gz)
- [/perf\\_insights/test\\_data/ae840442-b97d-4a67-b687-48d4f144937d.gz](/perf_insights/test_data/ae840442-b97d-4a67-b687-48d4f144937d.gz)
- [/perf\\_insights/test\\_data/d00d5d8a-be2d-424d-8ae6-eacb5eebaee9.gz](/perf_insights/test_data/d00d5d8a-be2d-424d-8ae6-eacb5eebaee9.gz)
- [/perf\\_insights/test\\_data/fec41ed8-a633-4195-b7e8-6dfd04a4021a.gz](/perf_insights/test_data/fec41ed8-a633-4195-b7e8-6dfd04a4021a.gz)

## Overview

Process ▾	Total resident ▾	v8 ▾	blink_gc ▾	discardable ▾	partition_alloc ▾
Browser (pid 34716)	121.1 MiB	5.0 MiB			
GPU Process (pid 34719)	89.1 MiB				
Renderer (pid 34720): chrome://tracing	99.1 MiB	19.7 MiB	1.1 MiB	4.0 MiB	5.7 MiB
Renderer (pid 34721)	47.7 MiB	2.1 MiB	512.0 KiB		752.0 KiB
<b>Total</b>	<b>357.0 MiB</b>	<b>26.8 MiB</b>	<b>1.6 MiB</b>	<b>4.0 MiB</b>	<b>6.4 MiB</b>

## Allocator details

Allocator ▾	size ▾	active_size ▾	freeable_size ▾	resident_size ▾	slot_size ▾	num_active ▾	num_decommitted ▾	num_empty ▾
partition_alloc	5.7 MiB	4.8 MiB	0.0 B	5.7 MiB	4.1 MiB	132	137	0
►buffer_partition	4.0 MiB	3.7 MiB	0.0 B	4.0 MiB	4.1 MiB	58	40	0
►fast_malloc_partition	1.1 MiB	820.2 KiB	0.0 B	1.1 MiB				
►object_model_partition	396.0 KiB	283.4 KiB	0.0 B	396.0 KiB				
►rendering_partition	156.0 KiB	41.4 KiB	0.0 B	156.0 KiB				
<b>1 item selected:</b> Global Memory Dump (1)								
<b>Heap details</b>								
<b>Stack frame ▾</b>								
►partition_alloc								Total size ▾
►MessageLoop::RunTask								27.6 MiB
►TaskQueueManager::ProcessTaskFromWorkQueue								23.0 MiB
►TaskQueueManager::RunTask								23.0 MiB
►ResourceDispatcher::OnReceivedData								12.7 MiB
►TimerBase::run								4.7 MiB
►ParseHTML								2.4 MiB
►ThreadProxy::BeginMainFrame								1.4 MiB
►ResourceDispatcher::OnRequestComplete								929.8 KiB
ResourceDispatcher::OnReceivedResponse								382.6 KiB
►ChannelProxy::Context::OnDispatchMessage								193.6 KiB
►RenderWidget::OnHandleInputEvent								164.4 KiB
►HTMLDocumentParser::notifyPendingParsedChunks								13.4 KiB
ResourceDispatcher::OnReceivedRedirect								641.0 B
MajorGC								136.0 B



```
{  
  "children": [ {  
    "name": "html",  
    "value": ""  
  }, {  
    "attributes": {  
      "itemscope": "",  
      "itemtype": "http://schema.org/WebPage",  
      "xmlns": "http://www.w3.org/1999/xhtml"  
    },  
    "bounding_box": {  
      "height": 417,  
      "width": 800,  
      "x": 0,  
      "y": 0  
    },  
    "children": [ {  
      "bounding_box": {  
        "height": 0,  
        "width": 0,  
        "x": 0,  
        "y": 0  
      },  
      "children": [ {  
        "name": "#text",  
        "value": "\n"      }, {  
        "attributes": {  
          "content": "chrome=1",  
          "http-equiv": "X-UA-Compatible"  
        },  
        "bounding_box": {  
          "height": 0,  
          "width": 0,  
          "x": 0,  
          "y": 0  
        },  
        "name": "META",  
        "tag": "META",  
        "value": ""  
      }, {  
        "name": "#text",  
        "value": "\n"      }, {  
        "attributes": {  
          "content": "IE=edge",  
          "http-equiv": "X-UA-Compatible"  
        },  
        "bounding_box": {  
          "height": 0,  
          "width": 0,  
          "x": 0,  
          "y": 0  
        },  
        "name": "META",  
        "tag": "META",  
        "value": ""  
      } ] } ] } ] }
```

# Headless

# And more...

Loading and scheduling intervention experiments  
for offscreen content

Brotli for HTTP accept-encoding

Tooling & Understanding & Reducing Blink's  
memory

Per-thread performance isolation in Oilpan

Instant tab restoration

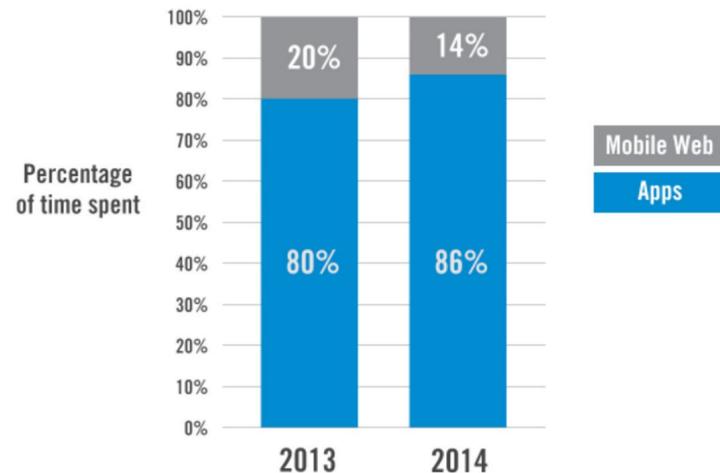
Better prioritization for resource loading

Pointer events  
position: sticky  
Snap points  
IntersectionObserver  
CSS custom properties  
SVG attribute animation  
EventListenerOptions  
Typed CSS OM

# Our impact

# At BlinkOn2

Apps Continue to Dominate the Mobile Web



Source: Flurry Analytics

Source: "the decline of the mobile web", Chris Dixon April '14

"Mobile eats the world"

+

"The decline of the mobile web"

=

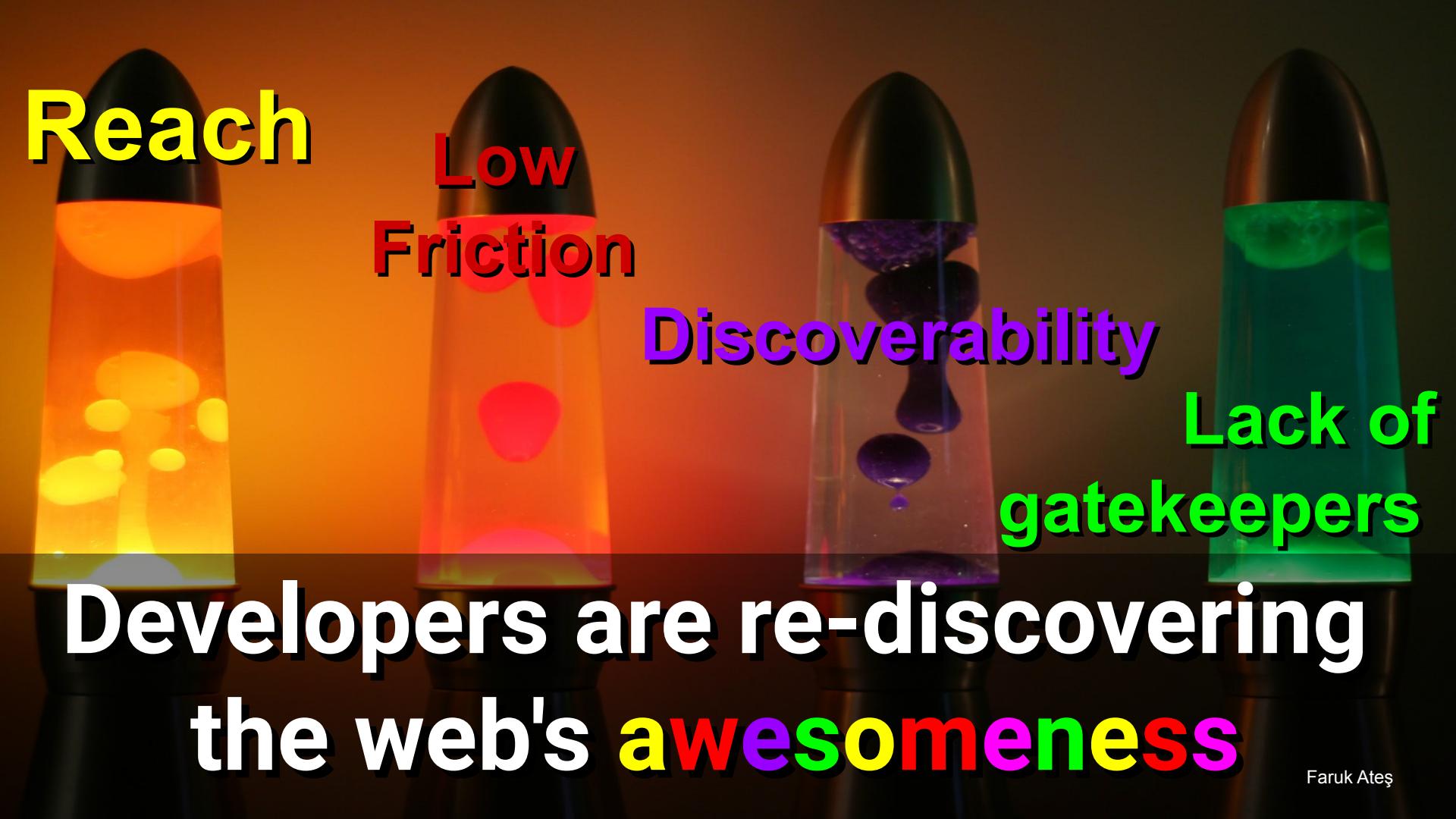
Web becomes irrelevant

# India's Flipkart to shut down website within a year, thanks to popularity of mobile

BY TRICIA DURYEE on April 22, 2015 at 9:07 am



The popularity of mobile phones in India is driving the country's biggest e-commerce company to shut down its web portal within a year.



Reach

Low  
Friction

Discoverability

Lack of  
gatekeepers

Developers are re-discovering  
the web's awesomeness

# November 2015 - Flipkart re-launches mobile web app

ENGINEERING

## PROGRESSIVE WEB APP: A NEW WAY TO EXPERIENCE MOBILE

NOVEMBER 9, 2015 · AMAR NAGARAM



"There have been a few turning points in the history of the web platform that radically changed how web apps were built, deployed and experienced."

"Mobile Engineering team at Flipkart discovered that with right set of capabilities in a browser, a mobile web app can be as performant as a native app."

"We believe more browser companies and developers will start thinking in these lines and make web apps even better. The web is truly what you make of it, and we have only just begun."



Suraj Thapar @tunetosuraj · 5h

@Flipkart 's new #FlipkartLite (Mobile) web app is the fastest web application I have ever seen. It is even faster than their native app!



Santosh Navlani @santoshn · 3h

#FlipkartLite. wow! what an experience man. awesome job. finally some web app that delivers as great as an experience as native app. 🙌 work!

## Morgan Stanley: No, Apps Aren't Winning. The Mobile Browser Is.

Mobile browser audiences are 2X larger than app audiences and growing faster.

Morgan Stanley

September 24, 2015

**Google**

There's an App for that...the Browser

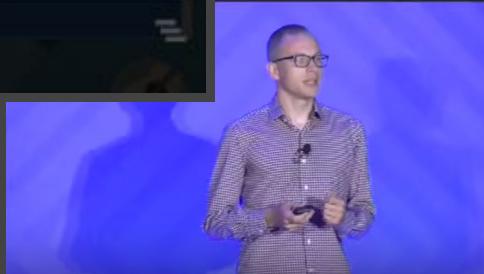
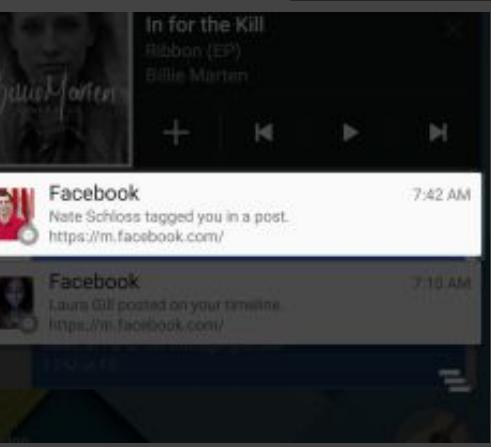
Counter to the GOOGL "app bear case" we find mobile browser traffic is 2X larger than app traffic, growing 1.2X faster. Traffic in 3 of

## Goodbye, Native Mobile Apps

Why Atavist is betting on the web

**Evan Ratliff & Jefferson Rabb**

When we concocted the ideas that would become [Atavist](#) and [The Atavist Magazine](#), in 2010, we did so amidst a frenzy of optimism and speculation around new devices, and the apps that would live on them. The iPad didn't actually exist when we started hashing out our idea for a new outlet for longform stories, and was less than a year old by the time we launched in early 2011.

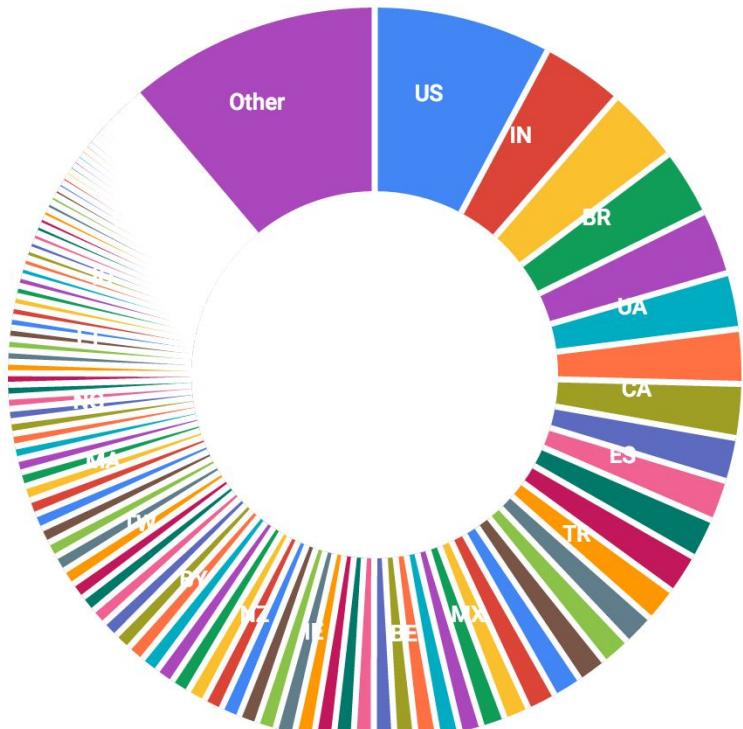


## Mobile Web Matters

Mobile First cannot mean Native Only

Facebook presenting at @Scale

# Push notifications are working!



## Key insights

**52%**

of total users are mobile web

**26%**

is the average increase  
in spend that occurred by  
members who visited via push

**20%**

click through rate from  
push notifications

**72%**

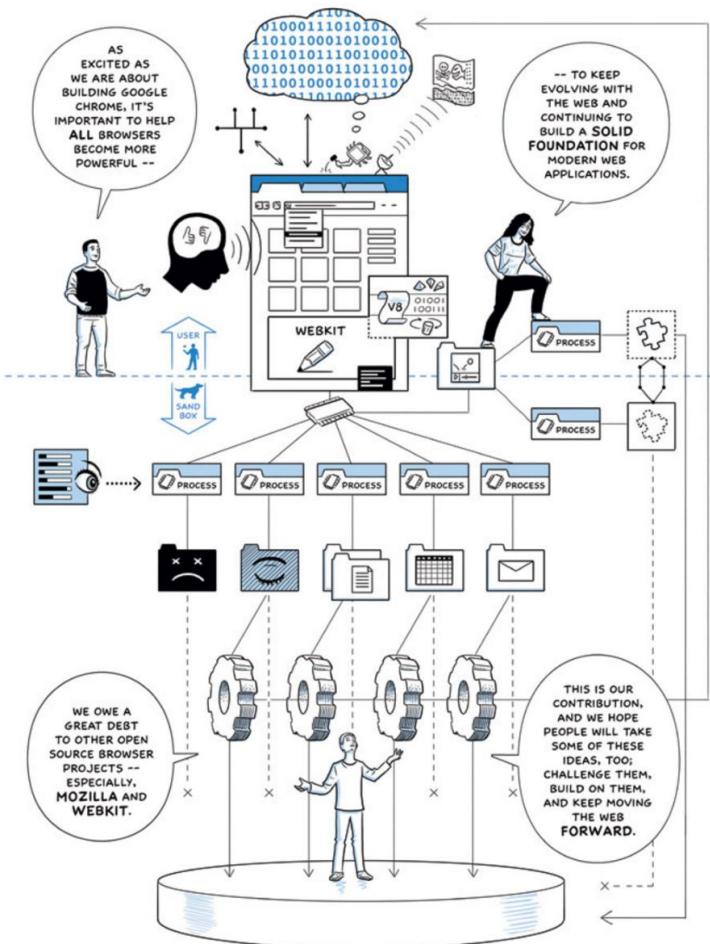
more time spent on the site  
per visit from members who  
visited via push notifications

# Chromium exists to advance the web

(not altruism but enlightened long-term self interest)

## Our customers are **WEB** developers

## Our product is the **web** platform, not just Blink





# Surfin' Safari

Steve Faulkner  
@stevefaulkner

Follow

Let's reach consensus on Shadow DOM -  
Shadow DOM: Contentious Bits  
[github.com/w3c/webcomponents...](https://github.com/w3c/webcomponents) by  
@dglazkov #webcomponents  
#webstandards

RETWEETS 2 FAVORITES 6



1:06 AM - 7 Feb 2015



Wilson Page @wilsonpage · Apr 24  
Today Google, Mozilla, Apple and Microsoft meet to reach consensus and push @Web\_Components forward.



← 68 ⏪ 49 ⏩ ...

Testing  
Regression Testing  
Leak Hunting  
Writing New Tests

<< ES6 in WebKit

## Introducing Shadow DOM API

Posted by Ryosuke Niwa on Monday, October 26th, 2015 at 7:00 am

We're pleased to announce that basic support for the new slot-based shadow DOM API we proposed in April is now available in the [nightly builds of WebKit](#) after r190680.

Shadow DOM is a part of Web Components, a set of specifications that were initially proposed by Google to enable the creation of reusable widgets and components on the Web. Shadow DOM, in particular, provides a lightweight encapsulation for DOM trees by allowing a creation of a parallel tree on an element called a "shadow tree" that replaces the rendering of the element without modifying the underlying DOM tree. Because a shadow tree is not an ordinary child of the "host" element to which it is attached, users of components cannot accidentally poke into it. Style rules are also scoped, meaning that CSS rules defined outside of a shadow tree do not apply to elements inside the shadow tree and rules defined inside the shadow tree do not apply to elements outside of it.

## Style Isolation

One major benefit of using shadow DOM is style isolation. To see how, let's say we want to create a custom progress bar. We can use two nested div's to show the bar and another div with the text to show the percentage as follows:

```
<style>
.progress { position: relative; border: solid 1px #000; padding: 1px; }
.progress > .bar { background: #9cf; height: 100%; }
.progress > .label { position: absolute; top: 0; left: 0; width: 100%; text-align: center; font-size: 0.8rem; line-height: 1.1rem; }
</style>
<template id="progress-bar-template">
    <div class="progress" role="progressbar" aria-valuenow="0" aria-valuemin="0" aria-valuemax="100">
        <div class="bar"></div>
        <div class="label">0%</div>
    </div>
</template>
```

A photograph of a middle-aged man with a mustache, wearing a dark suit, white shirt, and striped tie. He is smiling and has his right hand raised in a waving gesture. The background is a bright, glowing green with radial light effects emanating from behind him.

**IT'S**

**HAPPENING**

# Challenges



# Powerful properties

- Easy access to billions of users
- Friction-free competition between millions of businesses
- Very low costs, enabling low-revenue business models
- Rich composition



## Slow load times are killing publishers in mobile

Ricardo Bilton @rbilton May 21, 2015

1017

Publishers are more at home tweaking headlines and ledes than the backend performance of their webpages. But the rise of mobile is forcing them to shuffle their priorities.

# Declaring performance bankruptcy

Written by Dan Chilton, May 6, 2015

TWEET (271)

SHARE

Over the last four years, Vox Media has made a name for itself by building big beautiful sites and filling them with high-quality, feature-rich content. We've spun up six completely custom properties, redesigned our largest community (SB Nation), and refactored The Verge to be fully responsive. During that stretch, our workflow could best be described as "launch mode," where our main priority was to ship first and iterate later. However, with the limited number of people on our Product Team, we often had to move on to the next big project before we had time to fully polish and optimize our latest release, leading us to accumulate a rather significant amount of performance debt.

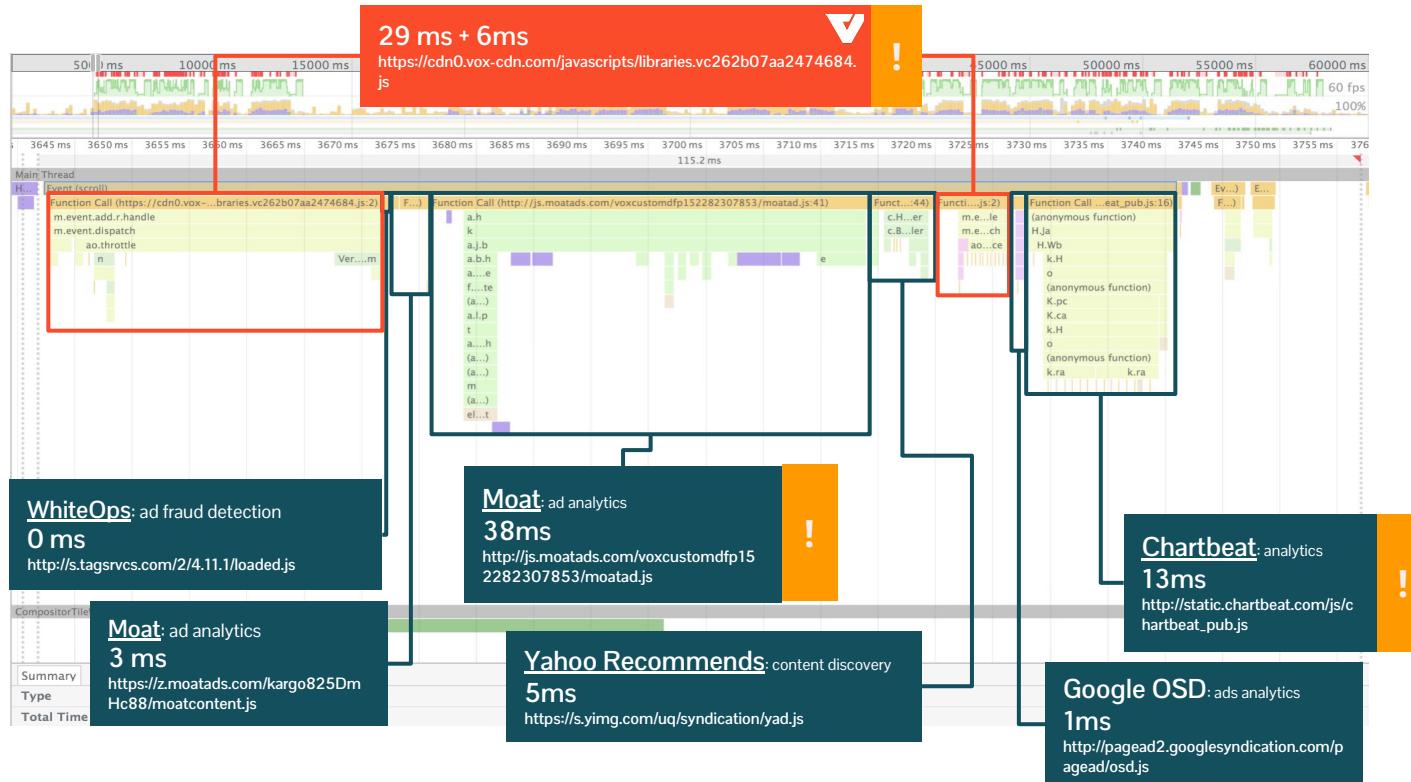
Look, we know our sites aren't as performant as they could be... I mean, let's cut to the chase here... our sites are friggin' slow, okay! Performance metric tools often use our render time to show off the upper limits of their graphs!

ALL SITES AND ALL TEMPLATES IN ALL BROWSERS IN ALL REGIONS LAST 30 DAYS ▾

MEDIAN BACKEND | START RENDER | PAGE LOAD | FULLY LOADED | SPEEDINDEX | PAGESPEED

Guardian Beta	Huffington	Mashable	NY Times	ReadWrite	Smashing	TechCrunch	The Verge
<b>1.1s</b> #3	<b>2s</b> #5 - 82%	<b>1.5s</b> #4 - 36%	<b>2.6s</b> #7 - 136%	<b>0.8s</b> #1 - 27%	<b>0.9s</b> #2 - 18%	<b>2.5s</b> #6 - 127%	<b>6.4s</b> #8 - 482%

# The modern web: More script than content



# iOS 9 content blocking will transform the mobile Web: I've tried it

by OWEN WILLIAMS   Tweet — 24 Aug, 02:31pm  
in APPLE



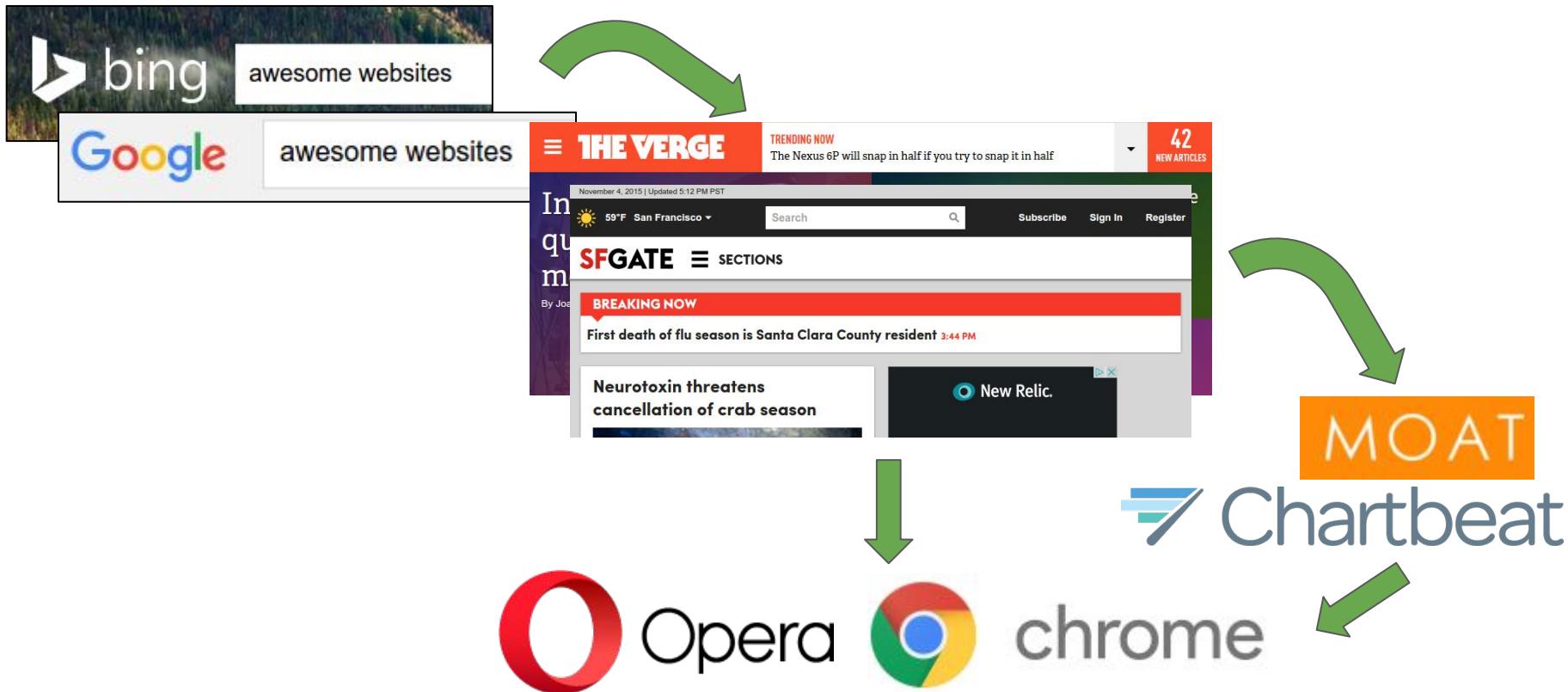
The rise of ad-blocking could herald the end of the free internet  
**John Naughton**

More and more people are using software to turn off irritating website advertisements - but without them, smaller sites might go under

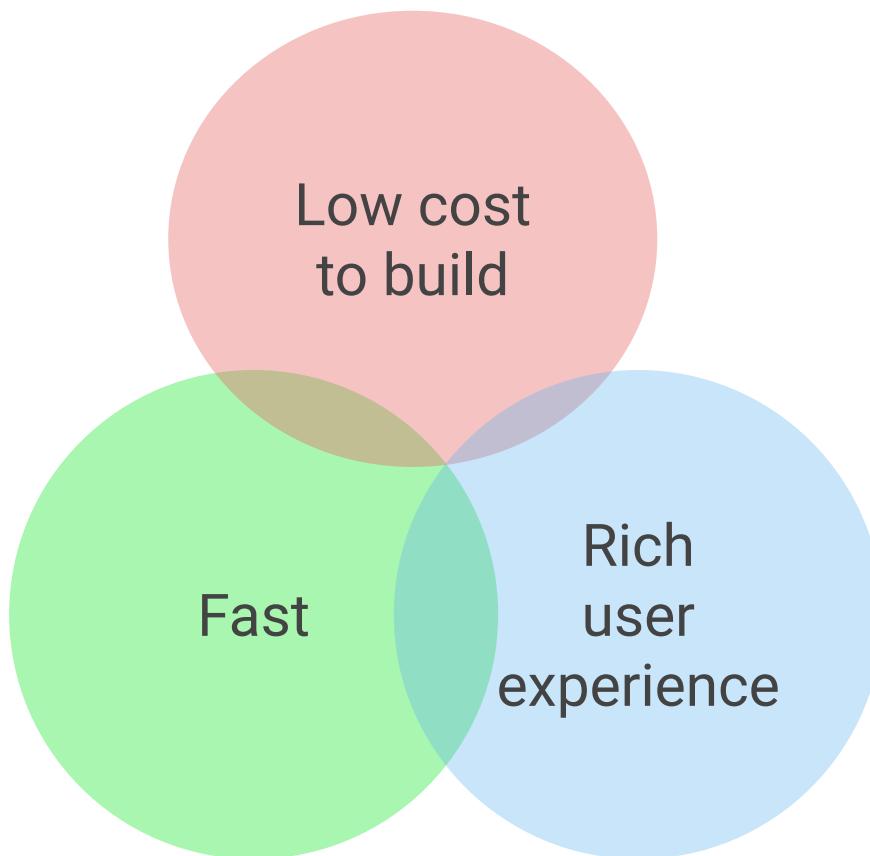


 Internet browsers are increasingly opting to suppress the annoying adverts that for years have been the unspoken cost of reading websites for free. Photograph: Dominic Lipinski/PA

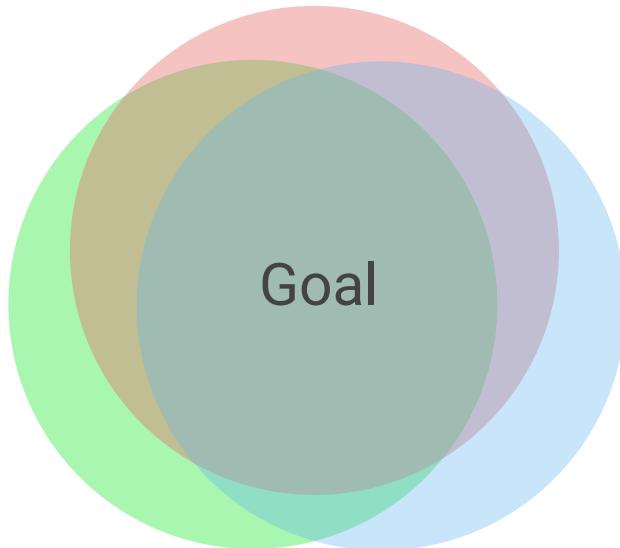
# Lack of performance feedback channels



# Perf is hard... Especially if you need to eat



# Perf is hard... Especially if you need to eat



# The Good news?



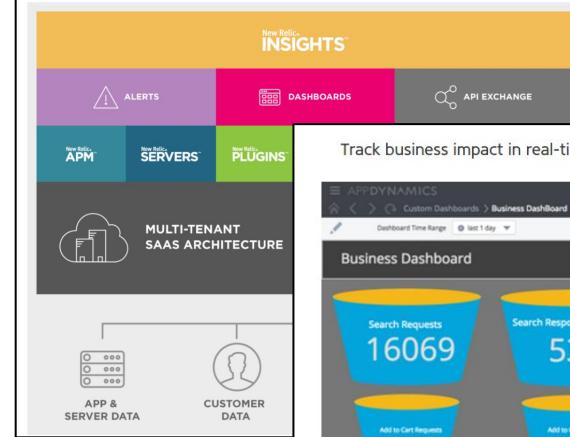
AND blink is in a position to make a BIG difference!

Analyze your software. Awesome-ize your business.

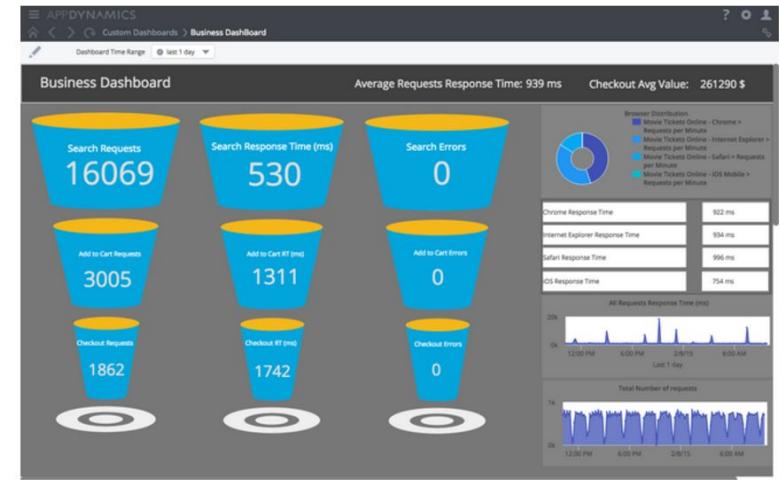
Built by people who deeply understand the challenges in running a modern software business, our SaaS Platform collects your data wherever it lives. All our products and capabilities fully integrate, giving you real-time information on every aspect of your software. So you can take action—instantly and intelligently.

[Request a Demo](#)

[Download the Datasheet](#)



Track business impact in real-time and know how your KPIs are affected by browser performance





Plenty of other big challenges

# Building developer confidence

**THE ARTILLERY BLOG**

**Beyond the Browser:  
Artillery's Native Game Client**



by Ian Langworth  
on 08 September 2015

[!\[\]\(c1300bad4a5dd8188e475deb1a3e2eef\_img.jpg\)](#) [!\[\]\(63dcb051e4aaad98190f01684baabdfd\_img.jpg\)](#) [!\[\]\(fe75b901c2e01152e0a3cf1d87837f3d\_img.jpg\)](#)

We're well overdue for an update on [Project Atlas](#), so let's fix that now. In the coming weeks we'll be posting more information about the game design, but today we're announcing an important change: Project Atlas will be delivered as a native PC and Mac application.

- That issues they raise will be taken seriously
- That browser's won't keep breaking their stuff
- That user experience quality will remain high

# Navigating tough tradeoffs



- Improving performance AND predictability
- Fast progress AND interoperability
- Understanding real-world behavior WITH privacy

# Increasing Application Richness



- Match user demand for capabilities
- Enable new business models (foster innovation)
- Retroactively explaining the platform

# 2016

## Looking Ahead

# R

## Response

### Key metric

Input latency (from tap to paint)  
< 100ms

### User actions

User taps on an icon or button (e.g., opening the nav menu, tapping Compose)

# A

## Animation

### Key metric

Each frame's work (JS to paint) completes < 16ms

User scrolls the page or sees an animation

# I

## Idle

### Key metric

Main thread JS work chunked no larger than 50ms

User isn't interacting with the page, but main thread should be available enough to handle the next user input

# L

## Load

### Key metric

Page considered ready to use in 1000ms

User loads the page and sees the critical path content

Memory  
Battery      Emerging Markets

**Great User Experience is Not Just RAIL**

Security      Connectivity Resilience

*Annoyance*

**RAIL++**

# User Happiness Index?

(name TBD)

an app-like user experience that  
is low friction and is built using  
modern web capabilities

# Progressive Web Apps

= maximizes RAIL++



# Move the Web Toward That

A photograph of a man with long hair and a red t-shirt climbing a tall, wooden A-frame structure, likely part of an obstacle course. He is gripping the top board with both hands and pushing himself upwards. The structure is made of weathered wood and is set against a backdrop of a cloudy sky and a grassy field. In the background, there are several people watching from the side and a soccer goal net. The overall atmosphere is outdoors and active.

# What's in the Developer's Way?

## The obstacle course

# Bad Things We Do

- Performance/memory bugs
- Lapses of product excellence
- Interop/compat/conformance bugs
  - (Not just Blink -- applies to all browsers)



# Missing Parts

- features and primitives, missing from the platform
- .. and the **geological time scale** of adding those things.



# **It's Hard to Do**

- How do I build a great app?
- What are the good parts?
- What are the bad parts?
- What will keep me on track?
- How do I know if I am making good choices?



3

# The Legacy

- Technical/organizational debt, misaligned publisher incentives, inertia
- **Massive scale** of the Web corpus



4



1

2

3

4

**Our Job: Make these obstacles trivial**





# Make Our Yardstick

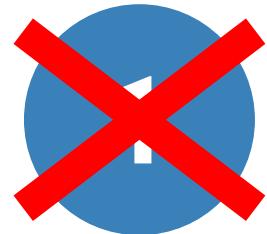
- Define and iterate on the user happiness metrics
- Learn to measure the user happiness at scale (as we are learning with RAIL)

# **Focus on execution, excellence, long-term health**

- plain old perf work
- interop/compat/conformance
- regression/bug SLA

prove that we listen to developers on  
[crbug.com](http://crbug.com)

Bugs



Features



Guides



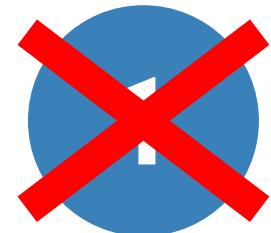
Legacy



# Supply the missing parts

- Use user happiness metrics to drive discovery, prioritization, and development of new primitives
- Learn to experiment safely and quantify results
  - Experimental Framework
- Continue our pursuit of the layered platform
  - while recognizing the need for "pit of success" solutions

Bugs



Features



Guides



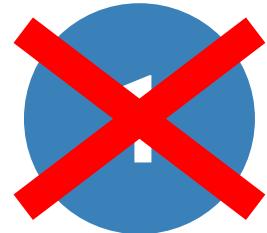
Legacy



# Close the feedback loop

- Communicate user happiness to developers
- Both ahead of deployment
  - DevTools,
  - docs,
  - etc.
- ... And after deployment
  - RUM
  - User Agent Intervention

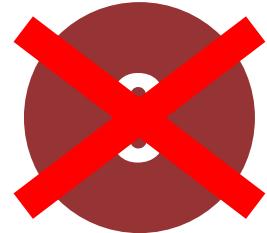
Bugs



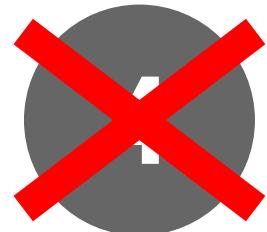
Features



Guides



Legacy



\o/

The background image shows a panoramic view of the Marienplatz in Munich, Germany. The Marienplatz is a large square with the New Town Hall (Neues Rathaus) on the right, characterized by its Gothic Revival architecture and a tall spire topped with a golden statue. To the left is the Frauenkirche, a Lutheran church with two prominent green copper domes. The square is filled with people and outdoor cafe tables under umbrellas. The surrounding buildings are a mix of traditional and modern architecture, with many red-tiled roofs. The sky is blue with scattered white clouds.

# BlinkOn6

## Europe • 2016

\o/

Questions? Comments?

