

BlinkOn2: DevTools

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Why at BlinkOn?

- Blink DevTools
- WebKit 2009, Web Inspector
- In-process
- JS-wrappers, quarantines
- `window.getMatchedCSSRules`

Agenda

- Mobile

develop for mobile using desktop

- Performance & memory

data that users understand and trust

- Debugging

new platform features, authoring

Agenda

- Where we are
- What's next
- Challenges
- Where we need your help

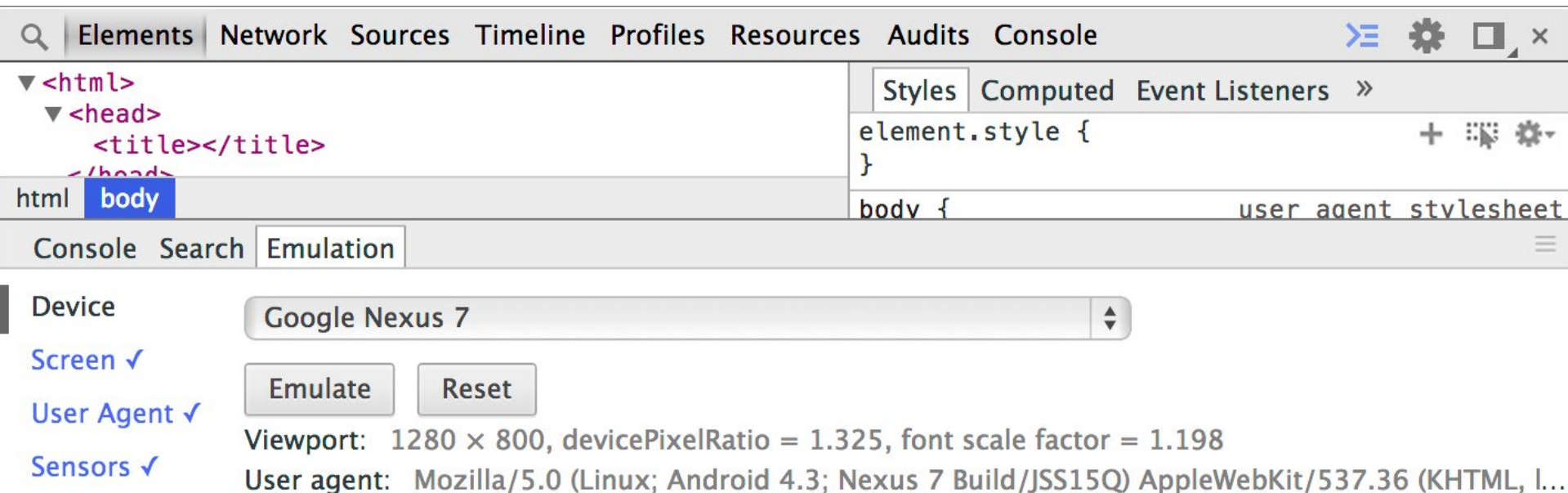
Mobile: emulation & remote debugging

Mobile. Emulation

Where we are:

- Screen resolution
- Device pixel ratio
- Viewport
- Text autosize
- Touch & gestures
- User-Agent
- Accelerometer
- Geolocation

Mobile. Emulation



The screenshot shows the Chrome DevTools interface with the 'Emulation' tab selected. The top toolbar includes tabs for Elements, Network, Sources, Timeline, Profiles, Resources, Audits, and Console. The 'Elements' panel on the left shows a tree view with 'html' and 'body' (highlighted). The 'Styles' panel on the right shows the default 'element.style' and 'body' rules from the 'user agent stylesheet'. The 'Emulation' panel at the bottom features a 'Device' dropdown set to 'Google Nexus 7', 'Screen', 'User Agent', and 'Sensors' checkboxes, and 'Emulate' and 'Reset' buttons. Below these are the viewport dimensions (1280 x 800) and the user agent string.

Elements Network Sources Timeline Profiles Resources Audits Console

▼ <html>
▼ <head>
 <title></title>
 </head>
html body

Styles Computed Event Listeners »

element.style {
}
body { user agent stylesheet

Console Search Emulation

Device Google Nexus 7

Screen ✓
User Agent ✓
Sensors ✓

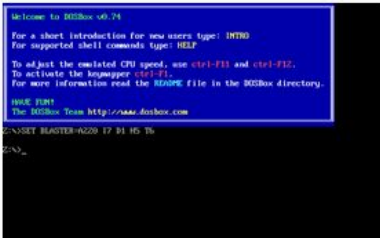
Emulate Reset

Viewport: 1280 × 800, devicePixelRatio = 1.325, font scale factor = 1.198
User agent: Mozilla/5.0 (Linux; Android 4.3; Nexus 7 Build/JSS15Q) AppleWebKit/537.36 (KHTML, l...

Mobile. Emulation

Emulator

This article is about emulators in computer science. For a line of digital musical instruments, see *E-mu Emulator*. For the Transformers character, see *Circuit Breaker (comics)#Transformers: Timelines (Shattered Glass)*. For other uses, see *Emulation (disambiguation)*.



DOSBox emulates the command-line interface of DOS.

In computing, an **emulator** is hardware or software or both that duplicates (or *emulates*) the functions of one computer system (the *guest*) in another computer system (the *host*), different from the first one, so that the emulated behavior closely resembles the behavior of the original system.

Elemen... Netw... Sources Timeli... Profiles » 1 ⚙️ 🖨️ ✕

<!DOCTYPE html>
▼ <html lang="en" dir="ltr" class="no-js animations">
 <head>...</head>
 <body class="mediawiki ltr mobile stable skin-mobile">
 <div id="mw-mf-viewport">
 <div id="mw-mf-page-left">
 <div id="mw-mf-page-center">
 <div id="siteNotice">
 <div class="header">
 <script>

mw.mobileFrontend.emulatedLoaded('loaded');
 </script>
 </div>
 <div id="content_wrapper">
 <h1 id="section_0">Emulation</h1>
 <ul id="page-actions">
 hlist

 </div>
 </div>
 </div>
 </div>
 </body>
</html>

Styl... Comput... Event Listen... »
element.style {
 font-style: italic;
 margin-bottom: 0.5em;
}
.rellink, .dablink {
 font-style: italic;
 margin-bottom: 0.5em;
}
.dablink {
 margin-bottom: 10px;
}
html, body, div, span, h1, h2, h3, h4, h5, h6, p, blockquote, pre, a, abbr, acronym, address, big, cite, code, del, ins, em, img, small, strike, strong, sub, sup, tt, b, u, i, center, dl, dt, dd, ol, ul, li, fieldset, form, label, legend, input, textarea, button, select, table, caption, tbody, tfoot, thead, tr, th, td, audio, video {
 margin: 0;
 padding: 0;
}

... div div.dablink
Console Search Emulation
Device Google Nexus 4
Screen ✓
User Agent ✓
Sensors ✓
Emulate Reset
Viewport: 768 x 1280, devicePixelRatio = 2, font scale factor...
User agent: Mozilla/5.0 (Linux; Android 4.2.1; en-us; Nexus ...

Mobile. Emulation



Elements Network Sources Timeline »

```
<body>
  <div id="test"></div>
</body>
</html>
```

html body **div#test**

Styles Properties DOM Breakpoints Event Listeners

width: 200px;
height: 200px;
background-image: -webkit-image-set(url(icon1x.jpg) 1x, url(icon2x.jpg) 2x);
background-image: -moz-image-set(url(icon1x.jpg) 1x, url(icon2x.jpg) 2x);
background-image: image-set(url(icon1x.jpg) 1x, url(icon2x.jpg) 2x);

Show inherited

margin -
border -
padding -
200 x 200

Console Search Emulation

Device ☒ Emulate screen

Screen ✓

User Agent ✓

Sensors ✓

Resolution: 480 ⇌ 80

Device pixel ratio: 2

Mobile. Emulation

What's next:

- Responsive design / multiple screens
- Network conditions / offline
- Platform features

Mobile. Emulation

Challenges:

- Your feature that is not on mobile (yet)
- Your feature that is different on mobile
- Your feature that is not in non-Blink/Chrome
- Your feature that is different on ChromeOS

WebSetting please!

// reload is fine

Mobile. Remote debugging

Where we are:

- Targets
 - Chrome for Android, WebView, Content shell, etc.
- Clients
 - DevTools, Telemetry, WebDriver, Extensions API
- All desktop features
- Port forwarding
- Screencast, automation

Mobile. Remote Debugging

DevTools

Devices

Pages

Extensions

Apps

Shared workers

Other

Devices

☒ Discover USB devices

Port forwarding...

Nexus 5

#0357177C437DE153

Chrome Beta (35.0.1916.99)

Open tab with url

Open

☐ New tab

chrome-native://newtab/

inspect

focus tab


reload

close

Chrome (34.0.1847.114)

Open tab with url

Open

 Google News


https://news.google.com/news/i/#0

inspect

focus tab

reload

close

 Issue 272193002: DevTools: sort experiments alphabetically, mark some as hidden by default. - Code R...

https://codereview.chromium.org/272193002/


inspect

focus tab


reload

close


WebView in com.devhd.feedly (33.0.0.0)



searchBox.76 about:blank
hidden at (135, 75) size 945 × 180
inspect



store.84 about:blank
hidden at (135, 255) size 945 × 1521
inspect



selectorBottom about:blank
empty at (0, 75)
inspect

Mobile. Remote Debugging

The image displays a mobile browser interface on the left and the Chrome DevTools interface on the right, illustrating remote debugging.

Mobile Browser (Left): The screen shows the Google News app. The top bar includes the Google logo, the word "News", a search icon, and a user profile icon. Below this is a "World" category header. The main content area features three news items:

- Item 1:** A thumbnail image of a protest with the caption "div-g-Bb-Cb-Db 344px x 27px". The headline is "Thai Army Chief Urges Legal Solution to Crisis" from Bloomberg, dated 15 minutes ago. The text below reads: "A Thai anti-government protester waves a large national flag as Thai riot-policemen stand guard at the entrance of a television station...".
- Item 2:** A thumbnail image of a summit with the caption "Firstpost". The headline is "Myanmar hosts summit of Southeast Asian leaders" from Washington Post, dated 20 minutes ago. The text below reads: "NAYPYIDAW, Myanmar - Myanmar hopes its first-ever hosting of a summit of Southeast Asian leaders on Sunday will help showcase progress...".
- Item 3:** A thumbnail image of two men with the caption "RT". The headline is "Tensions roil on eve of secession referendum in eastern Ukraine" from Washington Post, dated 3 minutes ago. The text below reads: "MARIUPOL, Ukraine - The city council here called...".

DevTools (Right): The interface shows the "Elements" panel with a tree view of the DOM. The selected element is a `div` with class `g-Bb-Cb-Db` and id `en_us:w`. The "Styles" panel on the right shows the computed styles for this element, including `font-family: HelveticaNeue, sans-serif, arial;`, `font-size: 20px;`, `line-height: 23px;`, and `padding-top: 4px;`. The "Console" panel at the bottom shows a log entry for the `<top frame>` with a URL and a resource interpreted as an image.

Mobile. Remote debugging

What's next:

- Better UX for remote debugging

Challenges:

- Making users work with physical devices


Performance & memory

Performance

Where we are:


- 100μs sampling in v8
- Flame chart
- Timeline & frame mode
- Dynamic auditing (layout thrashing)
- about:tracing
- Heap profiler, allocation timeline

Performance. 100μs sampling



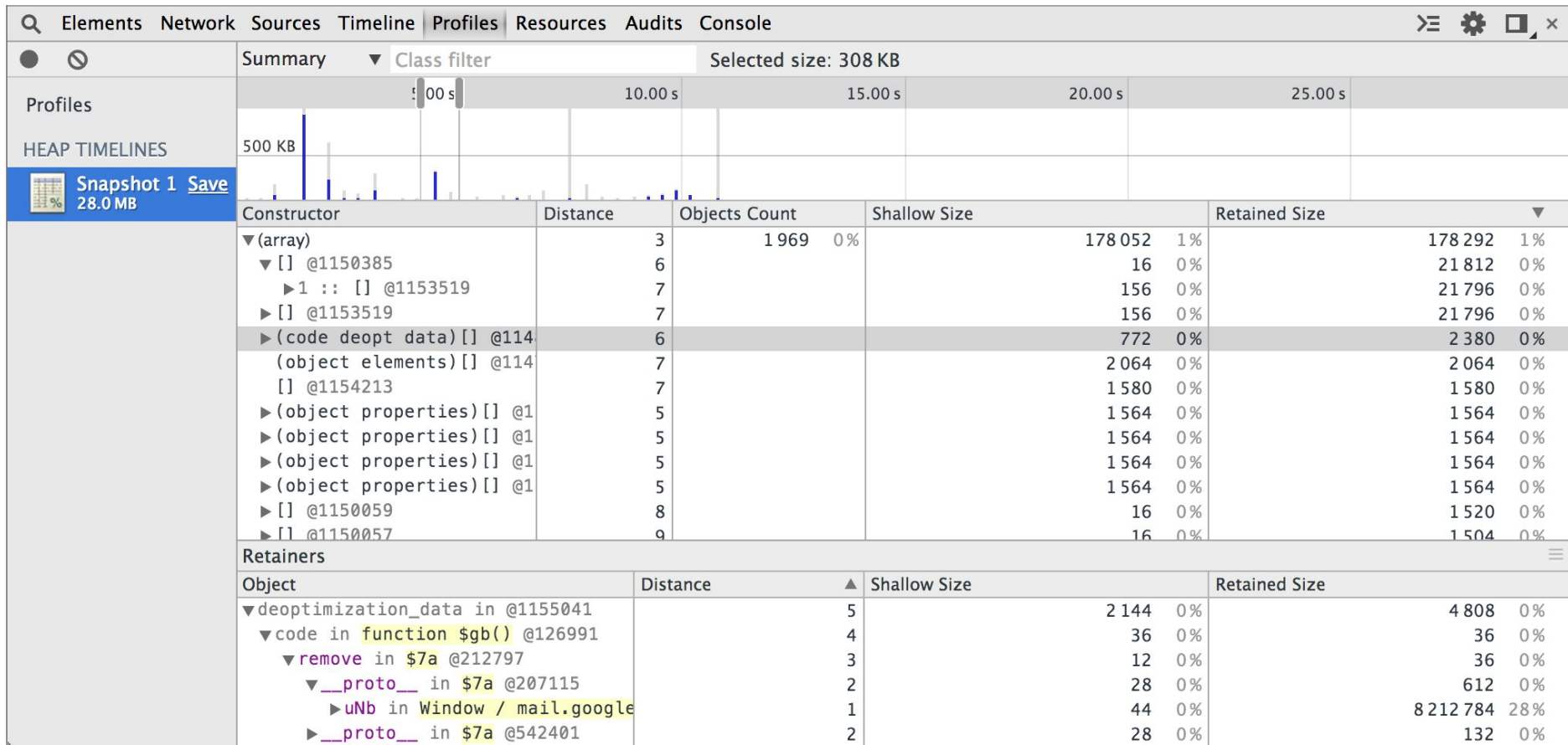
Building blocks for the web

Polymer is a library that uses the latest web technologies to let you create custom HTML elements. Build anything from a button to a complete application as



The screenshot shows the Chrome DevTools Performance tab with a CPU profile. The selected function is `d.parseDeclaration` in `polymer-element.js:146`. The profile shows a single call to this function with a self time of 0 and a total time of 5.6 ms. The aggregated self time is 0.203 ms and the aggregated total time is 39.914 ms. The call stack shows the function being called from `d.parseDeclaration` in `polymer-element.js:146`.

Performance. Allocations



Performance

What's next:

- Making users trust perf data
- Alternative UI representations
- Layers view & paint profiler
- Instrumenting profiler
- Allocation profiler

Performance. Timeline flame chart

CH SCIENCE CULTURE DESIGN BUSINESS

A bitter war between chimps in the 1970s might be explained with social networking software

Josh Lowensohn | May 10, 2014 01:34 am

25



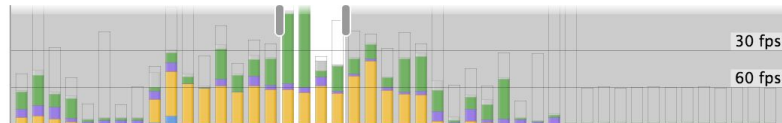
43 years ago, a group of chimpanzees that were once living peacefully in Tanzania's Gombe Stream National Park suddenly split in two — one in the north area of the park, and the other in the south. The members, who once cohabited the same area, eventually became so territorial that those unlucky...

Elements Network Sources Timeline Profiles Resources Audits Console Terminal

● ○ 🔍 🗑️ 📊 📄

☒ Capture stacks

☐ Capture memory



109 ms

31 ms

CPU

Pai...7)

Even...oll)

Func...62)

Paint (382 x 382)

Image Decode

Event...roll)

Func...562)

DETAILS: Layout



0.836 ms Rendering

Self Time: 0.836 ms

Start Time: 601 ms

Nodes that need layout: 5

Layout tree size: 3403

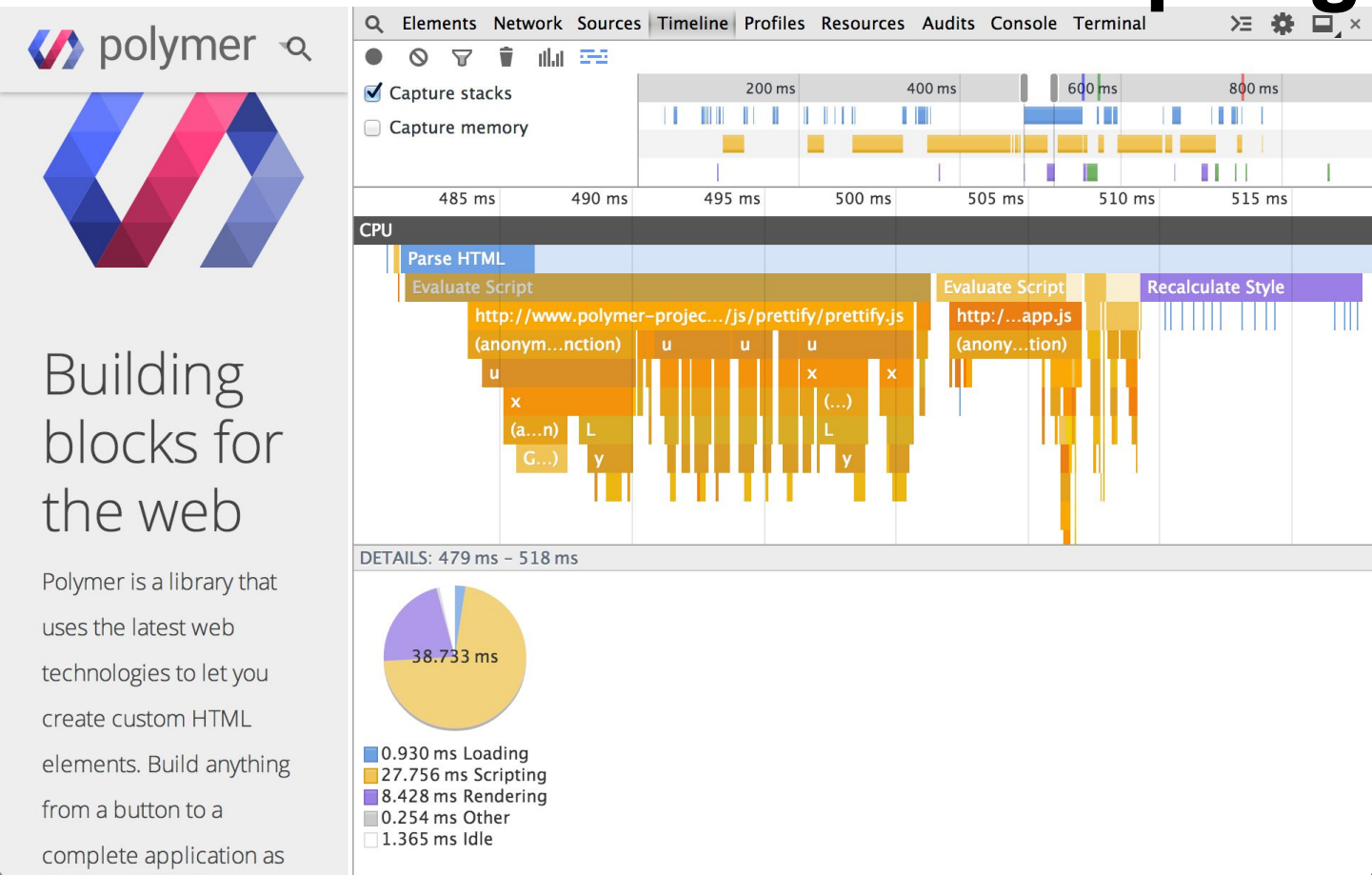
Layout scope: Whole document

Layout root: #document

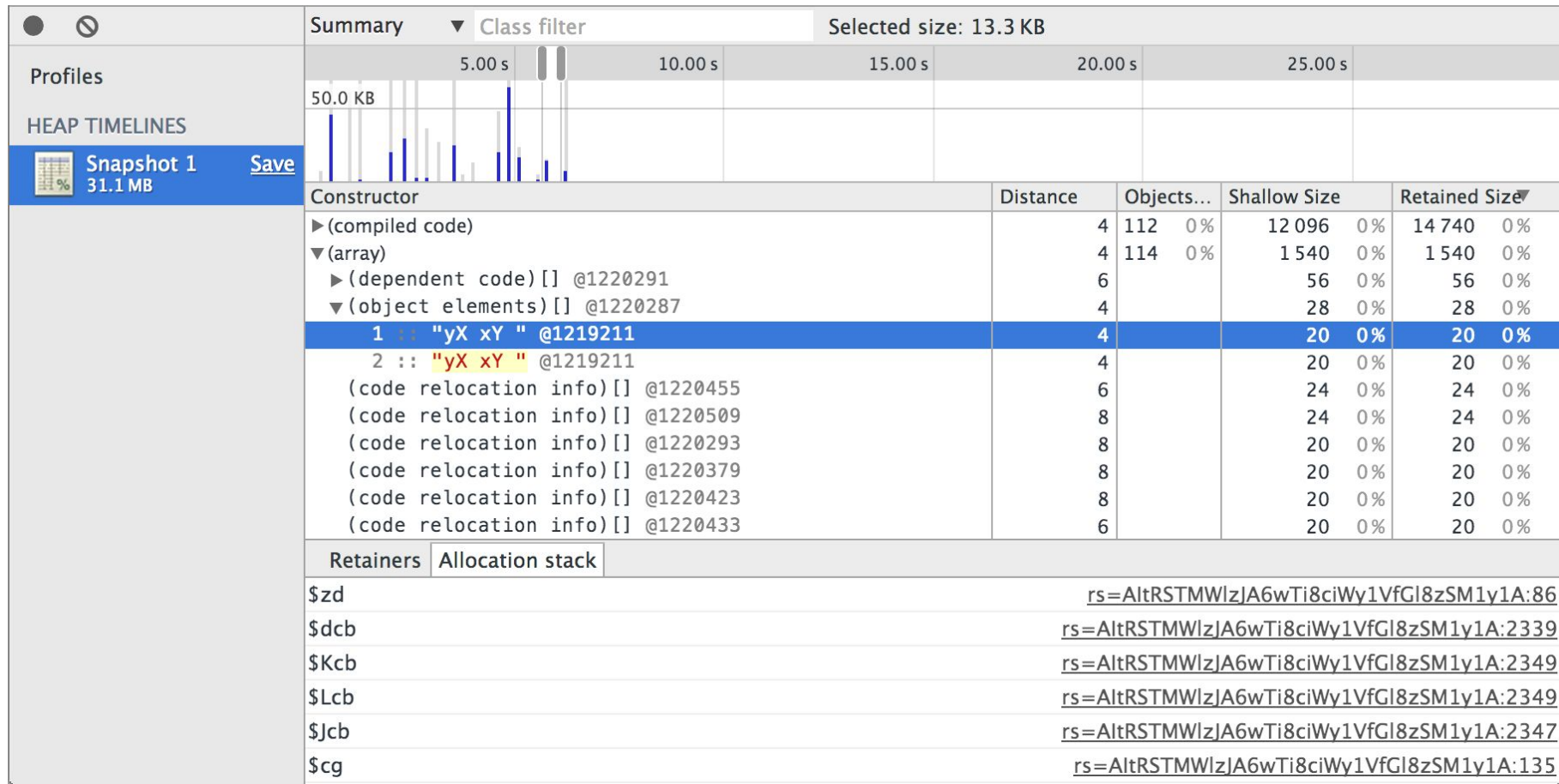
Layout invalidated:

```
x.expr.x.expr.filters.x.expr.filters.hidden @ jquery.js:6693
x.expr.x.expr.filters.x.expr.filters.visible @ jquery.js:6693
(anonymous function) @ jquery.min.js:4
Ct.s @ jquery.min.js:4
kt @ jquery.min.js:4
```

Performance. Combined sampling



Performance. Allocation stacks



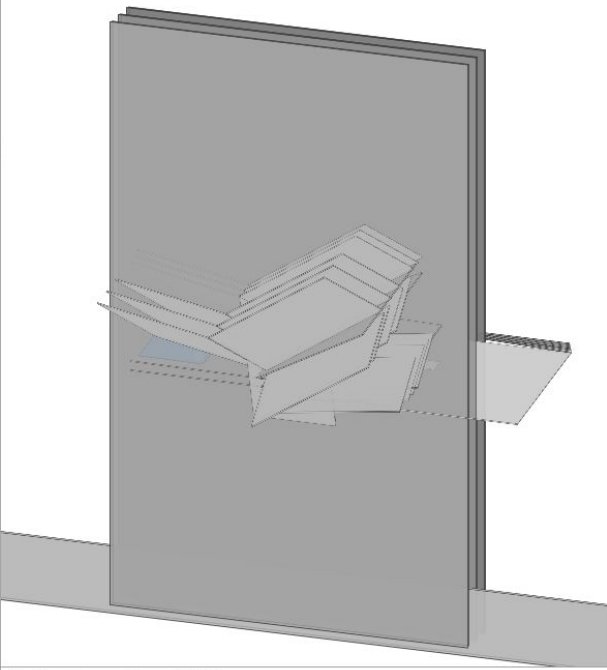

Performance. Layers

Developer Tools - http://2012.beercamp.com/

2012.beercamp.com/

Elements Network Sources Timeline Profiles Resources Audits Console Layers Promises

▼ #document (384 × 599)
▼ body (384 × 599)
▼ body (384 × 599)
▼ div.scene (384 × 599)
▼ div.book.on-cover (1200 × 6...
div.drag-notice (255 × 64)
▼ ul.spreads (1200 × 0)
▶ li.cover.spread (1200 × 0)
▼ li.intro.spread (1200 × 0)
▼ div.page-left.page (60...
▶ div.hotspot (600 × 4...
div.horns.popup (60...
div.monster-body.po...
div.eyes.popup (600 ...
div.beers.popup (60...
div.beercamp.popup ...
div.beercamp-date.p...
▼ div.page-right.page (6...
div.horns.popup (60...
div.monster-body.po...
div.eyes.popup (600 ...
div.beers.popup (60...
div.beercamp.popup ...
div.beercamp-date.p...
▶ li.location.spread (1200 ...
▶ li.music.spread (1200 × 0)
▶ li.back.spread (1200 × 0)
footer (10119 × 70)



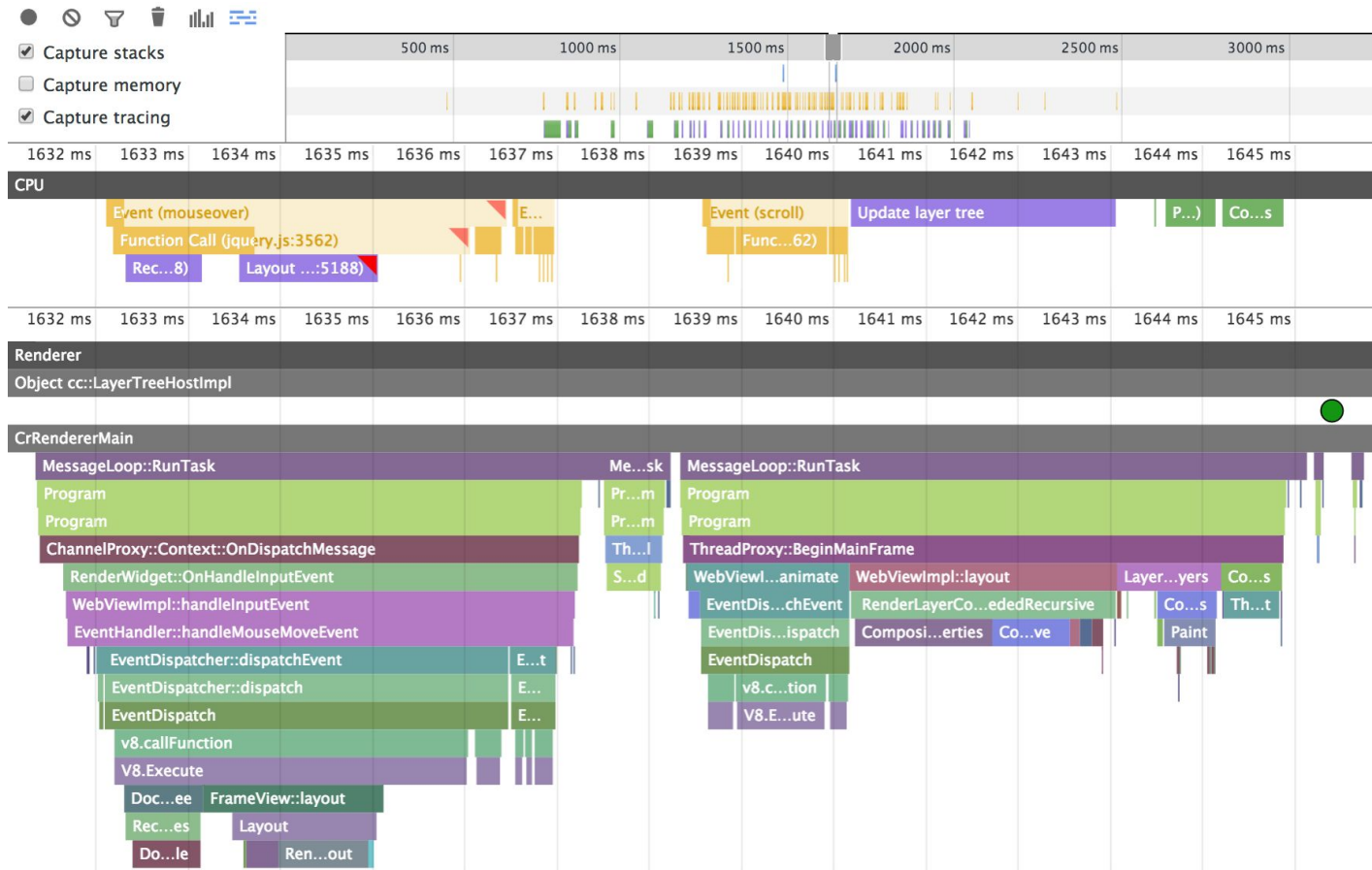
Position in parent: 30,146
Size: 600 × 424
Compositing Reasons: transform3D, transformWithCompositedDescendants, preserve3D
Memory estimate: 994 KB
Paint count: 1

Performance. Challenges

Challenges (timeline):

- Skewed timing / disabling agents
- Uninstrumented time
- Multiple threads
- No layers / paint data

Performance. Challenges



Performance. TRACE_EVENT

Meet

```
TRACE_EVENT_INSTANTX(  
    TRACE_DISABLED_BY_DEFAULT(  
        "devtools.timeline"), ...)
```

- You own the instrumentation
- Trace events graduate into timeline
- Advanced timeline mode `_is_` tracing

Performance. TRACE_EVENT

Promotion criteria:

- Categories
 - ■ Loading
 - ■ Scripting
 - ■ Rendering
 - ■ Painting
- Every record needs to be actionable
- Traceability into runtime / source
- Dynamic auditing


**Debugging: platform, frameworks,
authoring**


Debugging. Platform

Where we are:

- IndexedDB, Filesystem, ...
- SPDY
- Shadow DOM, HTML imports
- Live edit
- Async stack traces

Where we are. Shadow DOM

**polymer**



Building blocks for the web

Polymer is a library that uses the latest web technologies to let you create custom HTML elements. Build anything from a button to a complete application as an encapsulated, reusable element that works across desktop and mobile.

[GET POLYMER](#)

Elements Network Sources Timeline Profiles Resources »

```
<content></content>
</polymer-flex-layout>
<a href="/" class="logo" flexbox>
  
</a>
<app-bar theme="dark" class="bar fixed">
  <#shadow-root>
    <style>
      h1,h2,h3,h4,h5{font-weight:300;letter-
    </style>
    <content></content>
    <polymer-ui-icon id="menu" on-click="{
  <#shadow-root>
    <style>
      :host{display:inline-block;vertical
    </style>
    <polymer-ui-iconset id="meta"></polym
    <content></content>
  </polymer-ui-icon>
    <div id="search" on-click="{ toggleSear
    <polymer-ui-icon src="/images/picons/i
  <#shadow-root>
    <style>
      :host{display:inline-block;vertical
    </style>
    <polymer-ui-iconset id="meta"></pol
    <content></content>
    </polymer-ui-icon>
    <input type="search" id="input" on-key
  </div>
  <a href="/docs/start/getting-the-code.html
  <a href="/docs/polymer/polymer.html" class
  <a href="/resources/faq.html" class="paper
  <a href="/discuss.html" class="paper-butto
  <!-- <a href="#" class="paper-button" bord
  </app-bar>
  <polymer-ui-icon id="dropdown-toggle" size=
  <dropdown-panel>...</dropdown-panel>
</site-banner>
<main>...</main>
<footer>...</footer>
```

Styles	Computed
element.style {	
height: 24px;	
width: 24px;	
background-image:	
url(http://www.poly...	
project.org/images/...	
background-size: 24px	
24px;	
background-position:	
50% 50%;	
}	
@media only screen and	
(max-width: 850px)	
:host-context(#welcome)	
#menu {	
display: none;	
}	
@media only screen and	
(max-width: 850px)	
#menu {	
display: inline-block;	
}	
#menu {	
display: none;	
}	
@media only screen and	
(max-width: 850px)	
polymer-ui-icon {	
margin: 0;	
}	
polymer-ui-icon {	
width: 24px!important;	
height: 24px!important;	
background-size:	
48px!important;	
opacity: .6;	
}	

... #shadow-root polymer-ui-icon#menu #shadow-root

Find in Styles

Debugging. Authoring

Where we are:

- Workspaces
 - Scales to chrome-size project
 - Indexed search
- JavaScript
 - SourceMaps
 - Black-boxing
- CSS
 - SourceMaps, SASS

Debugging

What's next:

- Platform
 - ES6 features: promises
 - LiveEdit everywhere (ARM)
 - Your feature here
- Authoring
 - More frameworks support
 - Projects, folders
 - Workers as threads
 - Out of process iframes

Debugging

Challenges:

- Out-of-process iframes
- ES6, web components use cases
- Your feature use cases
- “Debugger” checkbox in the intent to ship

Review

- Mobile
 - Runtime flags
- Performance
 - Trace events
- Debugging
 - Expertise
 - Intent to ship -> debuggability

Thanks!

Home page: developers.google.com/chrome-developer-tools/

Forum: [google-chrome-developer-tools](https://groups.google.com/forum/#!forum/google-chrome-developer-tools)

Q&A