Workshop:
Introduction to Web Components & Polymer

Node+JS Interactive
Wednesday, October 10, 2018 • 11:00am - 12:50pm

John Riviello
@JohnRiv

Chris Lorenzo
@ChiefcI1
Workshop materials are available at:

http://tinyurl.com/nodejsint-polymer-workshop
What Are Web Components?

… a set of web platform APIs that allow you to create new custom, reusable, encapsulated HTML tags to use in web pages and web apps...

Source: https://www.webcomponents.org/introduction
What Are Web Components?

… [built] on the Web Component standards, will work across modern browsers, and can be used with any JavaScript library or framework that works with HTML.

Source: https://www.webcomponents.org/introduction
What Are Web Components?

4 Specs
What Are Web Components?

Custom Elements

Workshop: Introduction to Web Components & Polymer - @JohnRiv @chiefcI - tinyurl.com/nodejsint-polymer-workshop
What Are Web Components?

`paper-tabs` makes it easy to explore and switch between different views or functional aspects of an app, or to browse categorized data sets.

```html
<paper-tabs selected="0" scrollable>
  <paper-tab>The first tab</paper-tab>
  <paper-tab>Tab two</paper-tab>
  <paper-tab>The third tab</paper-tab>
  <paper-tab>Fourth tab</paper-tab>
</paper-tabs>
```

https://www.webcomponents.org/element/PolymerElements/paper-tabs
What Are Web Components?

Custom Elements

• Provides a way for authors to build their own fully-featured DOM elements.

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What Are Web Components?

HTML Imports

<%/>

工委
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https://www.webcomponents.org/element/PolymerElements/paper-tabs
What Are Web Components?

HTML Imports

- Means to import custom elements
  - `<link rel="import" href="paper-tabs.html">`
- Componetize the HTML, CSS & JavaScript
- Built-in deduplication
What Are Web Components?

Templates
What Are Web Components?

```html
class myClass {
  constructor() {
    this.myVariable = 'Hello World!'
  }

  myMethod() {
    console.log(this.myVariable)
  }
}

let myObject = new myClass()
myObject.myMethod()
```
What Are Web Components?

**Templates**

- Used to declare fragments of HTML
  - `<template id="tab">
    <div class="tab-content"></div>
  </template>`

- The element itself renders nothing
- Can be cloned and inserted in the document via JavaScript, which will quickly render the content
What Are Web Components?

Shadow DOM
What Are Web Components?

**paper-tabs** makes it easy to explore and switch between different views or functional aspects of an app, or to browse categorized data sets.

```html
<script src="./webcomponentsjs/webcomponents-lite.js"></script>
<link rel="import" href="paper-tabs.html">
<style>
  body {
    margin: 0;
    display: flex;
    align-items: flex-end;
    height: 80px;
    background: #009688;
    color: white;
  }

  paper-tabs {
    font-family: 'Roboto', 'Noto', sans-serif;
    -webkit-font-smoothing: antialiased;
  }
</style>
```
What Are Web Components?

**Shadow DOM**

- Allows you to take a DOM subtree and hide it from the document scope
- Hides CSS styles as well
- Common examples from HTML5 include:
  
  `<select>`, `<video>`, & `<input type="date">`
Can we even use these things?
<table>
<thead>
<tr>
<th>Browser support</th>
<th>CHROME</th>
<th>FIREFOX</th>
<th>SAFARI</th>
<th>EDGE</th>
<th>IE 11</th>
</tr>
</thead>
<tbody>
<tr>
<td>TEMPLATES</td>
<td>✔️ stable</td>
<td>✔️ stable</td>
<td>✔️ stable</td>
<td>✔️ stable</td>
<td>✔️ polyfill</td>
</tr>
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<td>HTML IMPORTS</td>
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</tr>
<tr>
<td>CUSTOM ELEMENTS V1</td>
<td>✔️ Chrome 54</td>
<td>✔️ Firefox 63</td>
<td>10.1</td>
<td>✔️ polyfill</td>
<td>✔️ polyfill</td>
</tr>
<tr>
<td>SHADOW DOM V1</td>
<td>✔️ Chrome 53</td>
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<td>10.0</td>
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</tr>
</tbody>
</table>

Source: [https://www.webcomponents.org/](https://www.webcomponents.org/)
The status of Custom Elements was changed from "Under Consideration" to "In Development" developer.microsoft.com/en-us/microsoft ...

The status of Shadow DOM was changed from "Under Consideration" to "In Development" developer.microsoft.com/en-us/microsoft ...

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<td>POLYFILL</td>
</tr>
<tr>
<td>HTML IMPORTS</td>
<td>STABLE</td>
<td>POLYFILL</td>
<td>ON HOLD</td>
<td>ON HOLD</td>
<td>POLYFILL</td>
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## Browser support

<table>
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<tr>
<th>Feature</th>
<th>Chrome</th>
<th>Firefox</th>
<th>Safari</th>
<th>Edge</th>
<th>IE 11</th>
</tr>
</thead>
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<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️ POLYFILL&lt;br&gt;No new features</td>
</tr>
<tr>
<td><code>&lt;script type=&quot;module&quot;&gt;</code></td>
<td>✔️ CHROME 61</td>
<td>✔️ FIREFOX 60</td>
<td>✔️ 10.1</td>
<td>✔️ EDGE 16</td>
<td>✔️ TRANSPILE&lt;br&gt;No new features</td>
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</table>
What’s Google Polymer?
Browse collections

51 Collections

pf-elements
2 items
Polymer 2.0 based open source elements

vaadin-core-elements
7 items
An evolving set of free, open source web components for building mobile and desktop web

simpla-elements
3 items
An open catalogue of elements built on the Simpla content system

granite-elements
16 items
A collection of web-components made on the granite coast of Brittany

nodecg-dashboard-elements
6 items
A collection of components for use in NodeCG dashboard panels

nebula-ui-essentials
15 items
Essential web components for web application user interfaces.
iron-elements

Core elements

Basic building blocks for creating an application. Most of the iron elements were previously named the core elements, when compatible with the "Developer Preview" version of the Polymer library.

2 Collections

- iron-behaviors-collection
  - 6 items
  - A collection of core Polymer behaviors

- iron-input-elements
  - 7 items
  - A collection of core Polymer input elements

In 1 collection

- elements
  - 9 items
  - A collection of elements made by the Polymer team

26 Elements

- iron-ally-announcer
  - An element that helps with announcing text through screen readers.

- iron-ally-keys
  - A basic element implementation of iron-ally-keys-behavior
Polymer 3.0
https://www.polymer-project.org/3.0/docs/devguide/feature-overview
Let’s code!
Codelab:
Build Google Maps using Web Components & No Code!

tinyurl.com/comcast-polymer-map
Codelab: Build Google Maps using Web Components & No Code!

Codelab URL: tinyurl.com/comcast-polymer-map

Relevant Map Data:

- latitude="49.2892"
- longitude="-123.1169"
- start-address="1055 Canada Place"
- end-address="TELUS Garden"
Takeaways!
Intro to Web Components & Polymer

Framework/Library Sizes (with GZIP compression)

<table>
<thead>
<tr>
<th>Version</th>
<th>Framework/Library</th>
<th>Size (KB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>v3.0.0</td>
<td>ember</td>
<td>113.7</td>
</tr>
<tr>
<td>v1.7.4</td>
<td>A</td>
<td>59.0</td>
</tr>
<tr>
<td>v16.5.2</td>
<td>atom</td>
<td>35.0</td>
</tr>
<tr>
<td>v2.5.17</td>
<td>V</td>
<td>30.4</td>
</tr>
<tr>
<td>v3.3.1</td>
<td>jQuery</td>
<td>29.2</td>
</tr>
<tr>
<td>v3.0.5</td>
<td>Polymer</td>
<td>19.8</td>
</tr>
</tbody>
</table>

Source: [http://minime.stephan-brumme.com](http://minime.stephan-brumme.com)
React’s size is react + react-dom & gzipped via [http://cnvyr.io/online](http://cnvyr.io/online)
Polymer’s size is polymer-element.js bundled, minified & gzipped.
Break
Back early? Try these BONUS challenges!

1. Select “DRIVING” by default
   - Hint: check out the Properties listed at
     www.webcomponents.org/element/PolymerElements/paper-tabs/elements/paper-tabs#properties

2. Improve the styles for the search box
Codelab Part 2: Build a Toast Web Components & With Code!

tinyurl.com/comcast-toast
Let’s code!
Takeaways!
<xc-header>
    tab="myaccount"
    is-authed="[[isAuthed]]"
    login-url="/login"
    sign-out-url="/logout"
    first-name="[[openidData.given_name]]"
    user-name="[[openidData.preferred_username]]"
</xc-header>

<xc-footer></xc-footer>
Framework Components as Custom Elements

VueJS Elements

Angular Elements
Other Frameworks for building Web Components

- Skate JS
- STENCIL
- X-Tag
- aurelia
- Nutmeg
- slim.js
web community project for high-quality web components

Elix is a community-driven collection of high-quality web components for common user interface patterns such as lists, menus, dialogs, carousels, and so on. The modular nature of web components let you easily incorporate them into your web apps, and their standard definition ensures good results across all mainstream browsers.
"Assemblers First, Second"
- Ben Issa, 2016 Polymer Summit

"Puzzle Pieces Jigsaw Piece Concept" is licensed under CC0 1.0 / Color adjusted from original
"Blacksmith Forging Smith Forger" is licensed under CC0 1.0 / Color adjusted from original
Useful Links

• WebComponents.org - webcomponents.org
• Polymer Website - polymer-project.org
• Polymer Slack - polymer-slack.herokuapp.com
• Polymer 2.x Cheat Sheet - https://meowni.ca/posts/polymer-2-cheatsheet/
• How to use Polymer with Webpack - http://robdodson.me/how-to-use-polymer-with-webpack/
• PWAs with Polymer: a checklist - https://meowni.ca/posts/polymer-pwa-checklist/
• Custom Elements Everywhere - https://custom-elements-everywhere.com/
• Polycasts on YouTube -
  https://www.youtube.com/playlist?list=PLOU2XLYxmsII5c3Mgw6fNYCzaWrsM3sMN
• 2018 Google I/O Polymer videos - https://www.polymer-project.org/blog/2018-05-09-polymer-at-io-2018
• 2017 Polymer Summit videos on YouTube -
  https://www.youtube.com/playlist?list=PLNYkxF6rcIDP0PqVajxqNWWIgvoEPzJi
• End-to-End Polymer Apps - 2017 Chrome Dev Summit video - https://youtu.be/Wu2GCRkDecl
• 2017 Google I/O Polymer videos on YouTube -
  https://www.youtube.com/playlist?list=PL_c6rbXV248du6m1VJABo32mP7sXWVb4m
Thank you!

John Riviello  
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Chris Lorenzo  
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