

JOSH CROWTHER

POLYMER WEBCOMPONENTS AND ANGULAR.JS



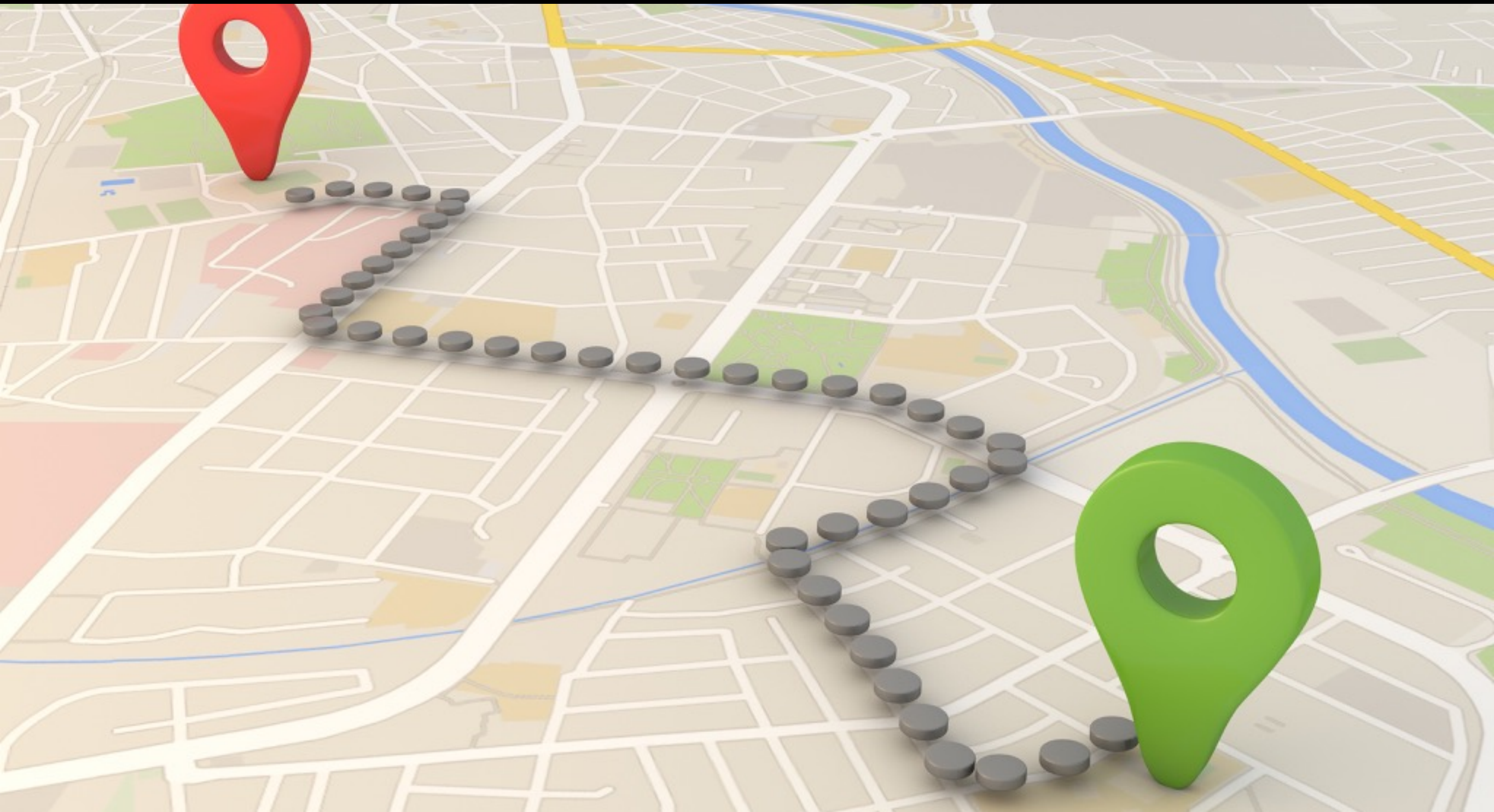
ABOUT ME

JOSH CROWTHER - @JSHCROWTHE

- Tech Lead @ FamilySearch
- Open Source Advocate
 - Node.js
 - Web Components
 - Polymer
- Technology Enthusiast
 - Internet of Things
 - Web



PRESENTATION ROADMAP



TOPICS

- Angular.js
 - What is it?
 - What features does it have?
 - Who uses it?
- Web Components (The Spec)
- Polymer
 - What is it?
 - What features does it have?
 - Who uses it?
 - How does it stack up against Angular.js?
- Web Components/Polymer in Production
 - Tooling
- Angular + Polymer Interop
 - Gotchas
 - Principles for interoperability

“I’m going to be showing a lot of code!”

–JOSH CROWTHER (ME)

ANGULAR.JS



WHAT IS ANGULAR.JS?

“Superheroic Javascript Framework”

–[ANGULARJS.ORG](https://angularjs.org)

“...An extension of HTML”

–W3SCHOOLS (PARAPHRASED)

“Full featured SPA framework”

–DAN WAHLIN (ANGULAR.JS INSTRUCTOR)

“It is a framework with **everything** you need to build an application!”

–JOSH CROWTHER (ME)



WHAT CAN ANGULAR.JS
DO?

WELL KNOWN FEATURES

- Data Binding
- Dependency Injection
- MV* Architecture



<https://www.youtube.com/watch?v=01l9GNnf22o>

FEATURE LIST (NOT COMPREHENSIVE)

- Data Binding
- MVC
- Routing
- Testing
- DOM Access
- Templates
- Factories
- Services
- ViewModel
- Controllers
- Views
- Directives
- Dependency Injection
- XHR
- Accesibility
- Animation
- Cookie Integration
- Sanitization
- Internationalization
- Event Handling
- Watch

Angular does all the things!



APPLICATIONS BUILT
WITH ANGULAR.JS

<https://www.madewithangular.com/>

A great fit for many applications!



WEB COMPONENTS

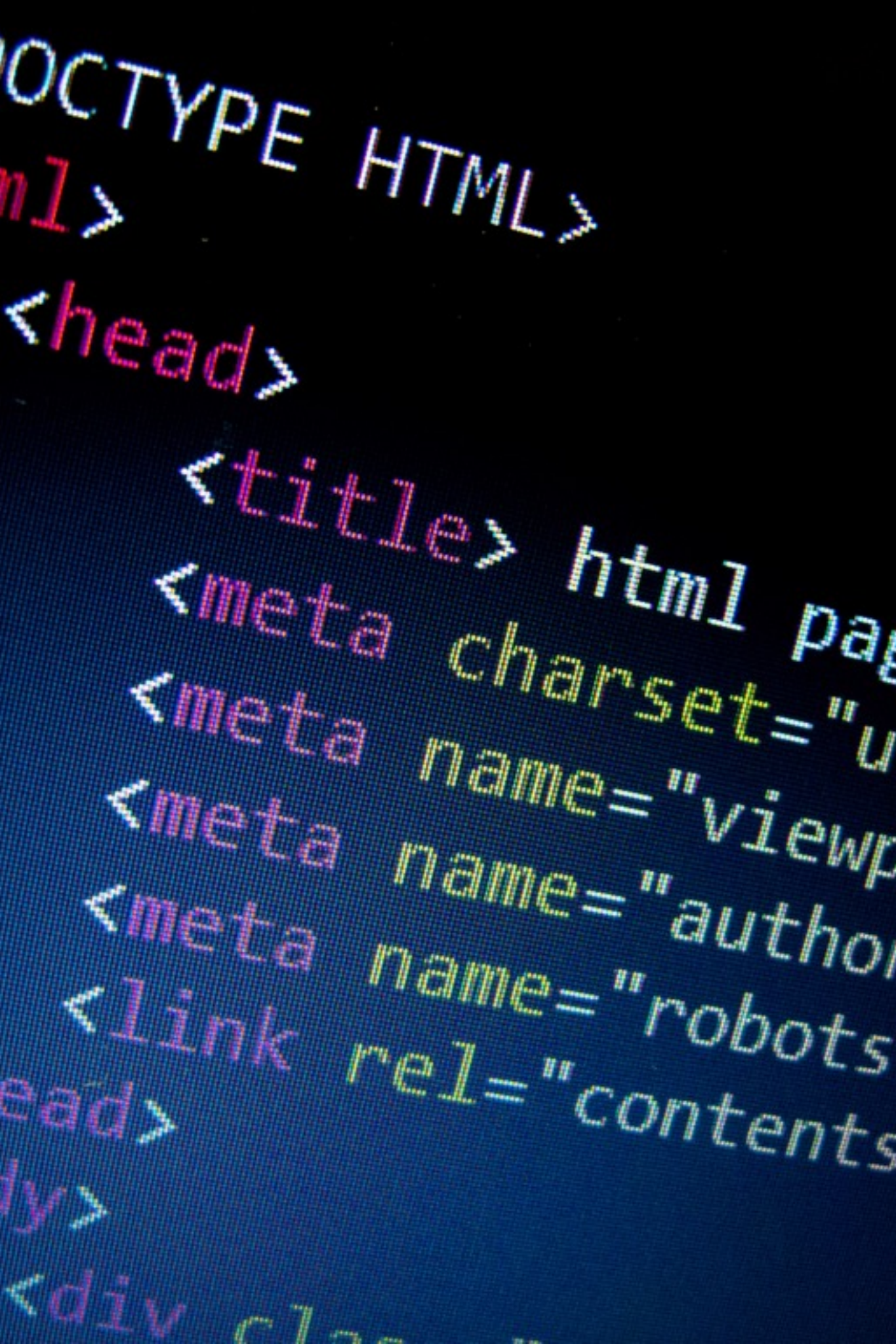


Web Components are part of the DOM spec

PARTS OF THE WEB COMPONENTS SPEC

- Custom Elements
- HTML Imports
- Shadow DOM
- Template Element





CUSTOM ELEMENTS

Enables a developer to define new DOM elements. These elements can have a variety of functions and behavior that are defined by the developer.

The elements can then be used anywhere a normal element could be (HTML/CSS/JS).

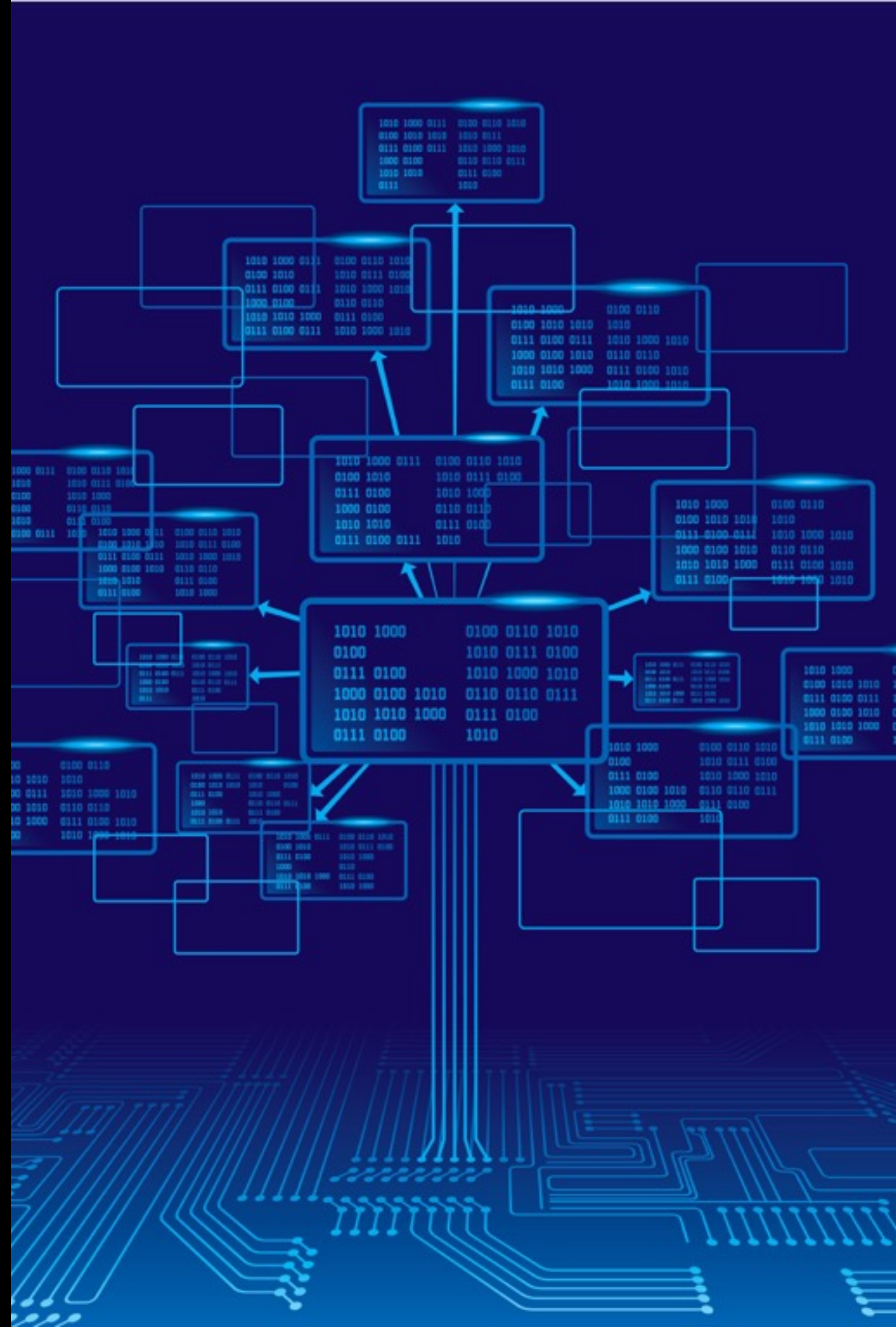

```
class MyElement extends HTMLElement {  
  createdCallback() { ... }  
  attachedCallback() { ... }  
  detachedCallback() { ... }  
  attributeChangedCallback() { ... }  
}  
  
document.registerElement('my-element', MyElement);
```

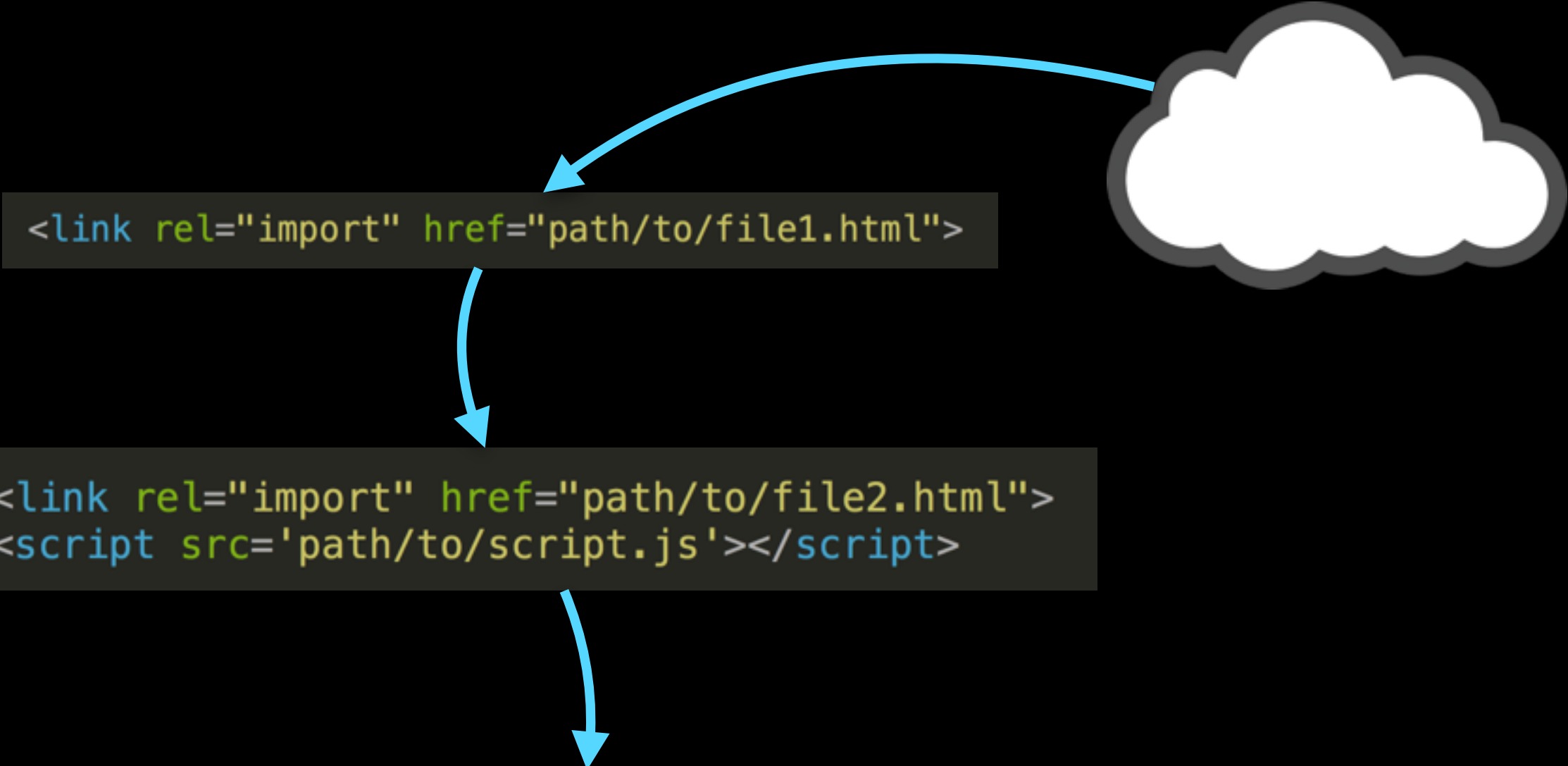
```
var element = document.createElement('my-element');  
document.body.appendChild(element);
```

```
<h1>Custom Element</h1>  
<my-element></my-element>
```

HTML IMPORTS

The “#include for the web,” HTML Imports are a way of including/reusing HTML documents inside of other HTML documents.





```
<link rel="import" href="path/to/file1.html">
```

```
<link rel="import" href="path/to/file2.html">  
<script src='path/to/script.js'></script>
```

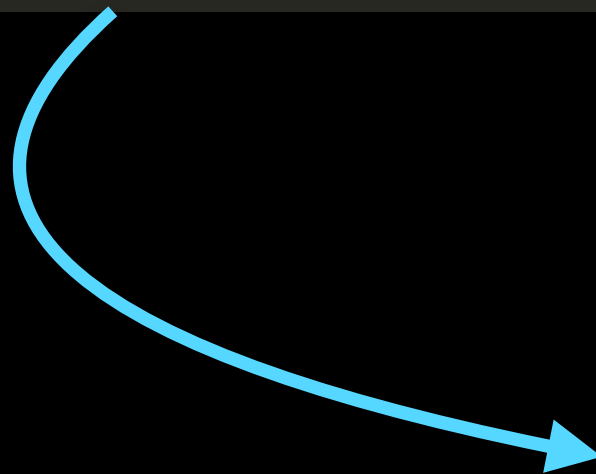
```
<link rel="stylesheet" type="text/css" href="path/to/style.css">
```




SHADOW DOM

A way of nesting multiple DOM trees inside one another while keeping them functionally and stylistically isolate.

```
var el = document.querySelector('custom-el');  
el.createShadowRoot();  
el.shadowRoot.innerHTML = '...';
```



```
▼ <custom-el>  
  ▼ #shadow-root (open)  
    ▼ <div>  
      <h1>Hi!</h1>  
    </div>  
  </custom-el>
```

TEMPLATE ELEMENT

A way to declare a non-parsed, fragment of HTML that can later be used to recreate identical copies of that HTML.




```
<template>
  <h1>Main Header</h1>
  <p>Lorem ipsum dolor sit amet, consectetur
  adipisicing elit, sed do eiusmod...</p>
</template>
```

```
var template = document.querySelector('template');
var clone = document.importNode(template.content, true);
```

```
<h1>Main Header</h1>
<p>Lorem ipsum dolor sit amet, consectetur
adipisicing elit, sed do eiusmod...</p>
```

```
<h1>Main Header</h1>
<p>Lorem ipsum dolor sit amet, consectetur
adipisicing elit, sed do eiusmod...</p>
```

```
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<p>Lorem ipsum dolor sit amet, consectetur
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```

```
<h1>Main Header</h1>
<p>Lorem ipsum dolor sit amet, consectetur
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```

Demo

<http://jsbin.com/hudewo/edit?html,js,output>

BROWSER SUPPORT

Polyfill	IE10	IE11+	Chrome*	Firefox*	Safari 7+*	Chrome Android*	Mobile Safari*
Custom Elements	~	✓	✓	✓	✓	✓	✓
HTML Imports	~	✓	✓	✓	✓	✓	✓
Shadow DOM	✓	✓	✓	✓	✓	✓	✓
Templates	✓	✓	✓	✓	✓	✓	✓

You can do web components today!

<https://madewithpolymer.com/>

POLYMER



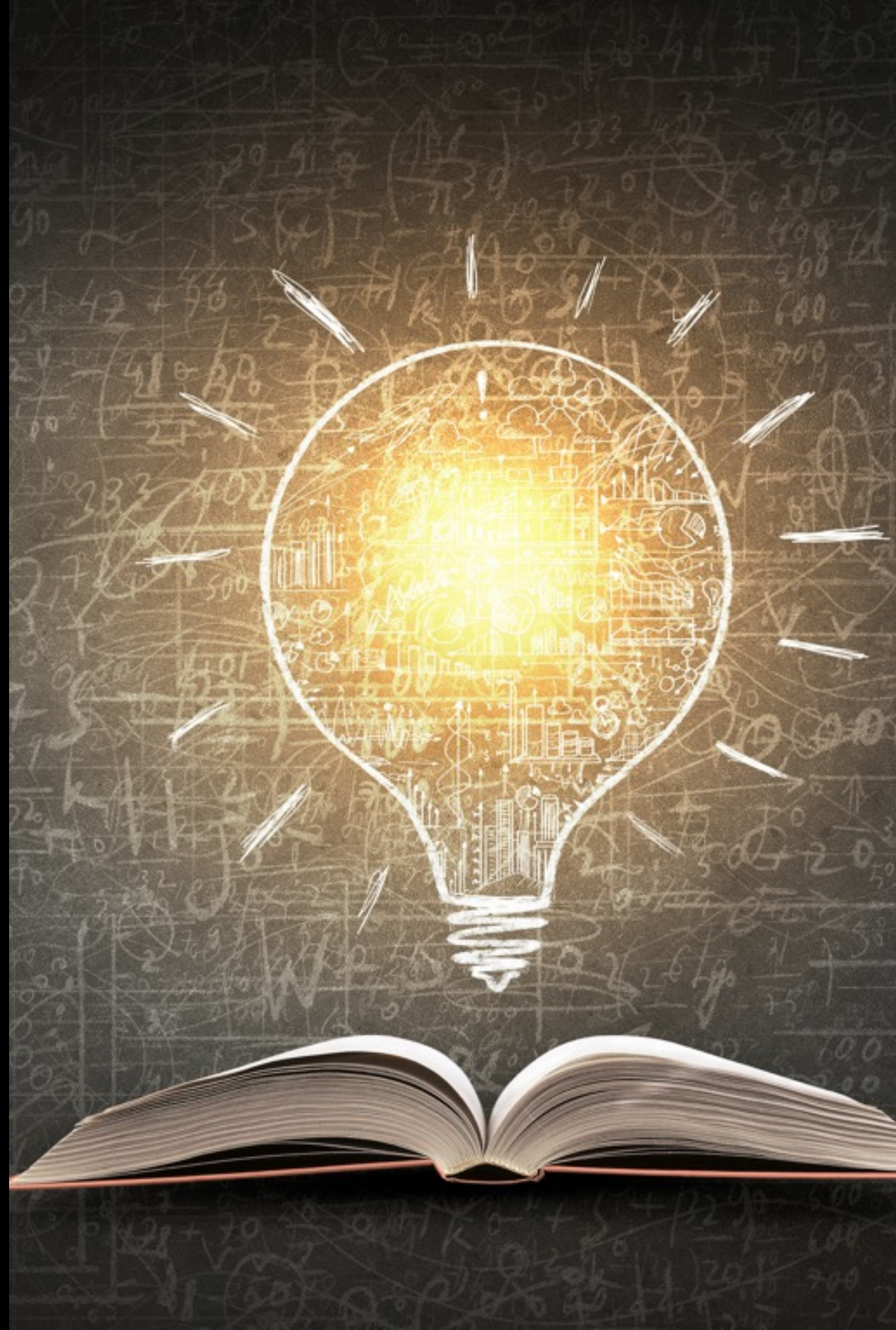
WHAT IS POLYMER?

“Opinionated, web component, library”

–JOSH CROWTHER (ME)

OPINIONATED

Like all Libraries, Polymer has a recommended set of best practices, in addition to certain conventions you should use when building Web Components.



A low-angle, upward-looking view of a complex wooden lattice structure against a clear blue sky. The structure is made of many thin, light-colored wooden beams that intersect to form a series of hexagonal and other geometric patterns. The perspective creates a sense of depth and height, with the structure appearing to rise towards the top of the frame.

LIBRARY

Polymer is **not** designed to meet **all** of your app building needs. Polymer wants to be good at one thing, building awesome web components.

HOW DO I BUILD AN APP WITH
JUST WEB COMPONENTS?

Custom elements

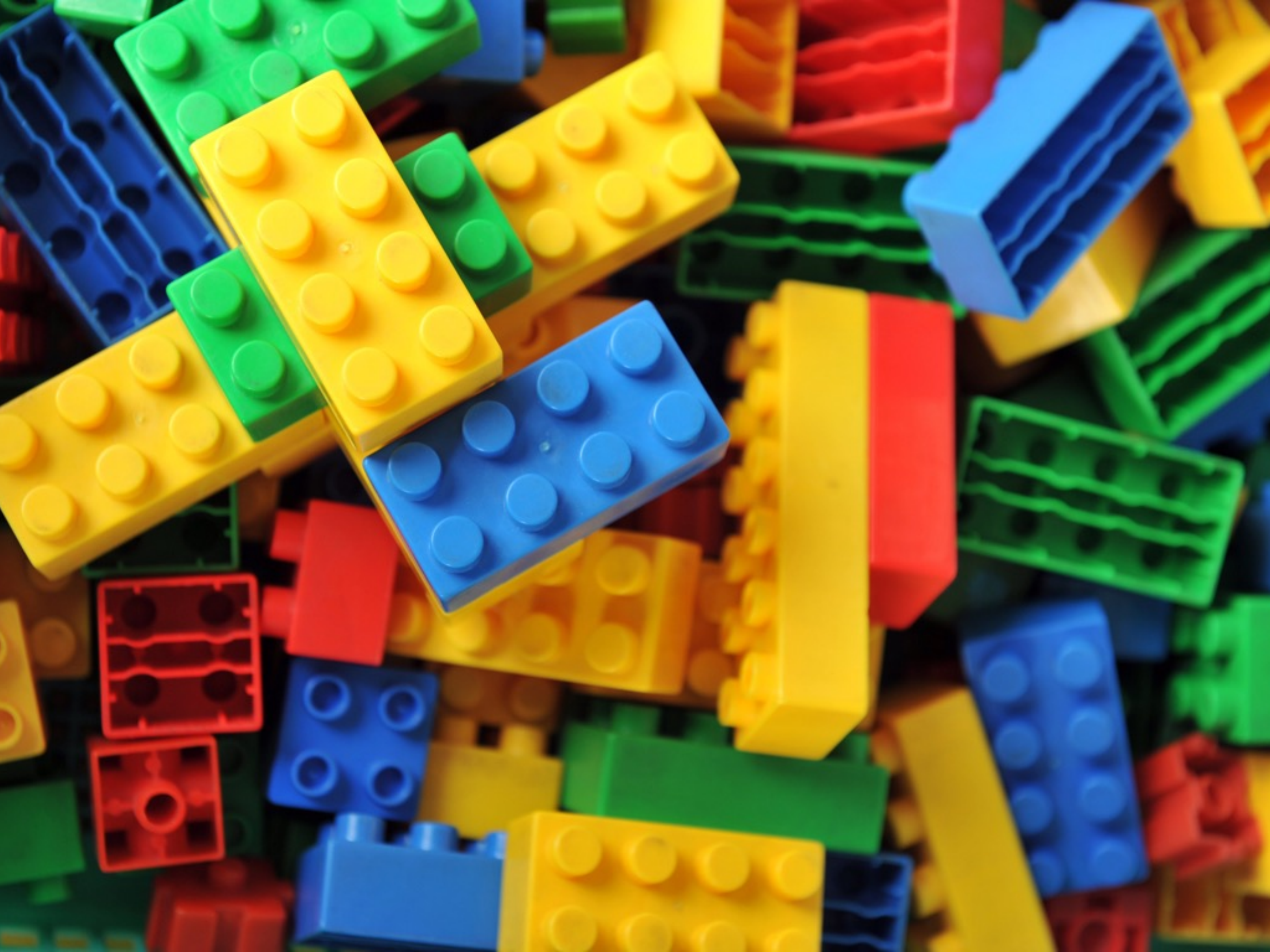
Polymer library

Web components primitives

HOW DOES POLYMER
COMPARE TO ANGULAR.JS?

FEATURE LIST (NOT COMPREHENSIVE)

- Data Binding
- Templates
- Event Handling
- DOM Access
- Directives (Partially)
- ViewModel
- ~~MVC~~
- Routing
- Testing
- Factories
- Services
- ~~Controllers~~
- ~~Views~~
- ~~Dependency Injection~~
- ~~XHR~~
- ~~Accessibility~~
- ~~Animation~~
- ~~Cookie Integration~~
- ~~Sanitization~~
- ~~Internationalization~~
- ~~Watch~~



DEVELOPING
WITH POLYMER



“Everything is an element”

–THE POLYMER PHILOSOPHY

"EVERYTHING IS AN ELEMENT"

```
<my-app>
```

```
<!-- `<app-data>` component handles  
interaction with API's and all my service-type interactions -->  
<app-data list='{{list}}' gallery='{{gallery}}'></app-data>
```

```
<!-- `<items-list>` component with output a  
list based on input -->  
<items-list list='[[list]]'></items-list>
```

```
<!-- `<item-gallery>` component will output a  
gallery of items based on input -->  
<item-gallery gallery='[[gallery]]'></item-gallery>
```

```
</my-app>
```




ELEMENTS FOR EVERYTHING!

- AJAX Calls
- Service Layers
- Layout
- Theming
- Data virtualization
- ... the list goes on and on

Live Coding Demo

POLYMER DEMO (LIVE CODING)

- Polymer Data Binding
- Stylistic Isolation
- Passing data to components

<https://jsbin.com/wurotu/edit?html,output>

COMMUNITY COMPONENTS

<https://elements.polymer-project.org>

<https://customelements.io/>

PREPARING WEB COMPONENTS FOR PRODUCTION





TOOLING

- Node/NPM (to get the rest of these tools)
- Bower
- Polyserve/Polymer CLI
- Vulcanize

BOWER



“A package manager for the web”

- [BOWER.IO](http://bower.io)

[https://elements.polymer-project.org/elements/
paper-button](https://elements.polymer-project.org/elements/paper-button)

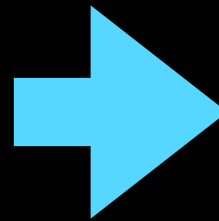
Demo

POLYSERVE



FOLDERS

- github-user
 - bower_components
 - .gitignore
 - bower.json
 - github-user.html
 - index.html
 - style.css



- components
 - github-user
 - iron-ajax
 - iron-flex-layout/classes
 - iron-image
 - layout
 - polymer
 - promise-polyfill

Demo

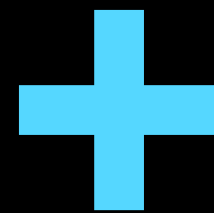
VULCANIZE



BADLY NEEDED IF YOU
DON'T HAVE HTTP/2

Demo

POLYMER +
ANGULAR
INTEROP



<github-user>

MAKING WEB COMPONENTS
WORK WITH ANGULAR.JS

As long as the framework/library interfaces with
the DOM, it's easy!

Demo

GOTCHAS

POLYMER -> ANGULAR 1.X - DATA BINDING PROPAGATION

<https://plnkr.co/edit/dHiWackwY1Z44JOKFND6?p=preview>

<https://github.com/robdodson/angular-custom-elements/>

<http://jcrowther.io/2015/05/26/using-polymer-webcomponents-with-angular-js/>

ANGULAR 1.X - NGTRANSCCLUDE

<http://plnkr.co/edit/YLjTgiXxtlrE7hWs6mFP?p=preview>

<https://github.com/angular/angular.js/issues/12410>

PRINCIPLES FOR STABLE INTEROP



PRINCIPLES

- Make your Web Components entirely self contained
- Don't try to include and write angular inside of a Polymer component.
- Don't try to utilize polymer template functions inside of an angular app (dom-if, dom-bind, dom-repeat)
- Remember that Polymer and Angular represent two different app writing methodologies. You can accomplish just about anything using just one. Just because you can use them together doesn't mean you should!

QUESTIONS?



@JSHCROWTHE

BLOG POST

<http://tinyurl.com/zdq2qd9>

SLIDE DECK

<https://speakerdeck.com/jshcrowthe>