

# MODERNISING THE WEB



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# WEB COMPONENTS



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"A tectonic shift in web development"

"The declarative simplicity of using web components will be unparalleled"



REALLY?

A SERIES OF  
TECHNOLOGIES TO MAKE  
IT EASIER TO WRITE  
MODULAR, REUSABLE  
FRONT-END CODE



# WHY?

- Web 1.0

- simple documents. Homepages.

- Web 1.5

- Web bling! Java Applets! Flash!

- Web 2.0

- Modern JS! AJAX! JS Frameworks!JSON!JSONP!
  - Code reuse. Mash-ups!
  - Lots of jQuery plugins!"Designers can code"



# WEB 2.0 ALSO BROUGHT US

- Side effects
- CSS bleeding all over the page
- Bloated code
- Terrible mark-up



```
<div class="widget calendar ui theme-winter">  
  <div class="component-wrapper">  
    <div class="inner-content">  
      (ad nauseam)  
    </div>  
  </div>  
</div>
```

# TERRIBLE MARKUP



```
$("#datepicker")  
    .datepicker($.datepicker.regional["fr"]);  
$("#locale").change(function() {  
    $("#datepicker").datepicker("option",  
        $.datepicker.regional[ $(this).val() ] );  
});
```

THAT'S NOT ALL, FOLKS!



WHAT IF THE BROWSER  
HELPED ME WRITE  
**BETTER CODE?**



WHAT IF I COULD  
**TEACH NEW ELEMENTS**  
TO THE BROWSER?



# WHAT IF?

```
<x-calendar></x-calendar>
```

```
var calendar =  
  document.createElement('x-calendar');
```

```
var calendar =  
  document.querySelector('x-calendar');
```

```
calendar.nextMonth();  
calendar.setLocale('fr');
```



HOW CAN I MAKE THIS  
HAPPEN?



# ENTER WEB COMPONENTS

- Custom Elements
- HTML Templates
- Shadow DOM
- HTML Imports



# CUSTOM ELEMENTS

Teach new elements to the browser

```
document.registerElement(  
  'web-bell',  
  WebBellPrototype  
);
```



# A CUSTOM ELEMENT PROTOTYPE

- at least extends  
`HTMLElement.prototype`
- lifecycle callbacks
- methods
- getters, setters



# WEBBELL PROTOTYPE

```
var WebBellPrototype =  
    Object.create(HTMLElement.prototype);  
  
WebBellPrototype.createdCallback = function() {  
    this.innerHTML = '🔔';  
};
```

```
var bell =  
    document.createElement('web-bell');
```

```
<web-bell></web-bell>
```



# STYLE CUSTOM ELEMENTS LIKE ANY OTHER ELEMENT

```
web-bell {  
  border: 3px solid green;  
}
```



CUSTOM ELEMENTS CAN  
EXTEND EXISTING ELEMENTS  
**BY EXTENDING THEIR PROTOTYPE**



```
var DingButtonProto =  
  Object.create(HTMLButtonElement.prototype);  
DingButtonProto.createdCallback = function() {  
  this.innerHTML = 'ding!';  
};  
document.registerElement('ding-button', {  
  prototype: DingButtonProto,  
  extends: 'button'  
});
```

```
var ding = document.createElement(  
  'button', 'ding-button'  
);
```

```
<button is="ding-button"></button>
```



THIS IS AMAZING FOR  
**ACCESSIBILITY** AND  
**PROGRESSIVE ENHANCEMENT**



**IT MIGHT ALSO BE  
DEPRECATED SOON**



# CUSTOM ELEMENTS SUPPORT

- Firefox
- Chrome
- Opera



# HTML TEMPLATES

Inert HTML chunks not live until I say so

```
<template id="row-template">  
  <tr>  
    <td><input .../></td>  
    <td><button .../></td>  
  </tr>  
</template>
```



# CREATING ROWS ON THE FLY

```
var tpl =  
    document.getElementById('row-template');  
var table =  
    document.getElementById('form-table');  
  
table.appendChild(tpl.content.cloneNode());
```



# HTML TEMPLATES ARE VERY SIMPLE

- No two way binding
- No string interpolation
- "Does what it says on the tin"



# HTML TEMPLATES SUPPORT

- Firefox
- Chrome
- Opera
- Safari
- and in development in Edge



# SHADOW DOM

Now you see it, now you don't

- Multiple DOM trees in a hierarchy
- Creates a boundary around your element
- Reset and isolate CSS styles, hide mark-up
- Superuseful for things such as players, calendars
- It is still in the same doc context (not an iframe)
- It's complicated

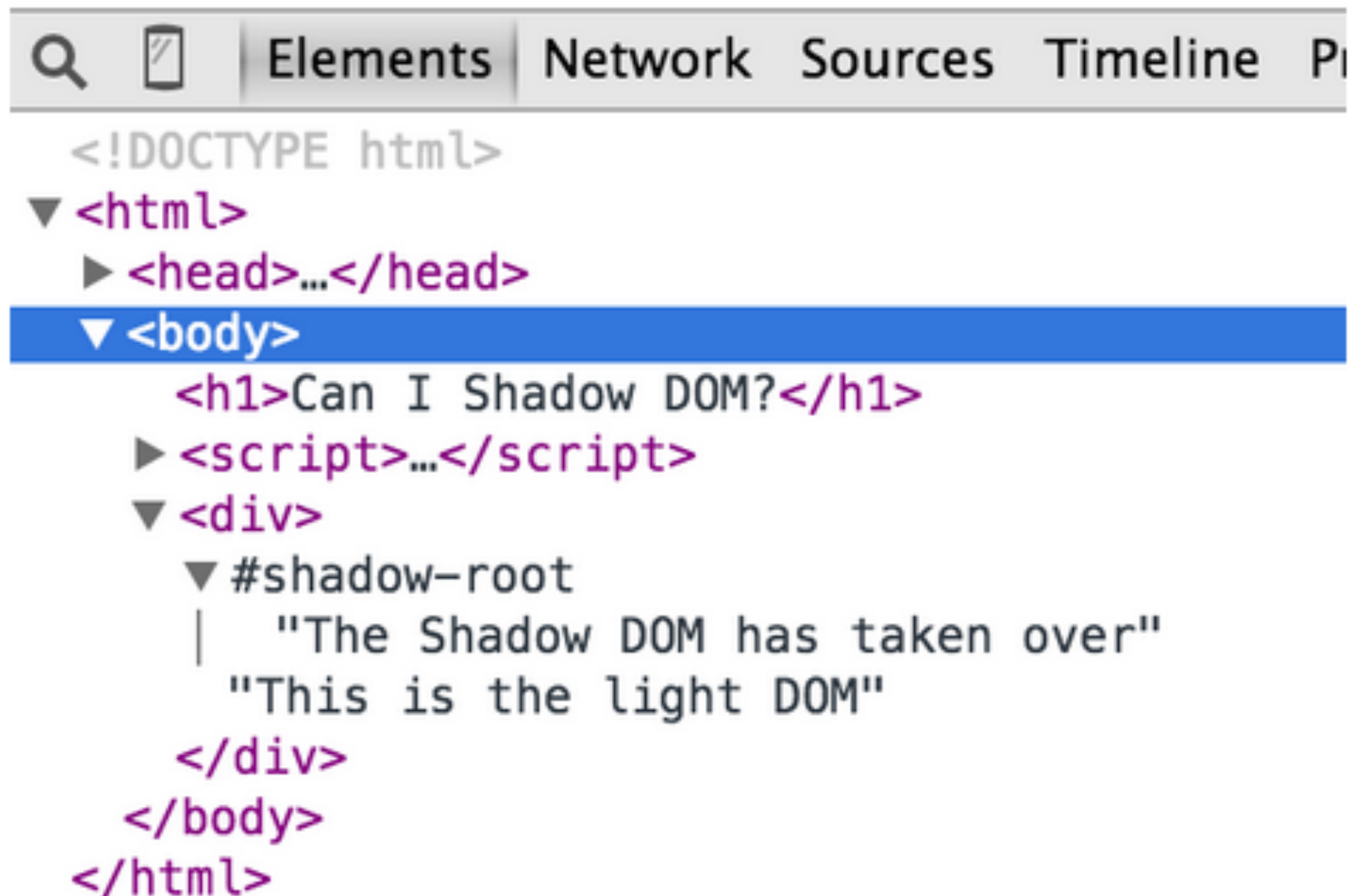


```
node.innerHTML = 'This is the light DOM';  
var shadow = node.createShadowRoot({  
  mode: 'closed'  
});  
shadowRoot.innerHTML =  
  'The Shadow DOM has taken over';
```



# Can I Shadow DOM?

The Shadow DOM has taken over



```
<!DOCTYPE html>
<html>
  <head>...</head>
  <body>
    <h1>Can I Shadow DOM?</h1>
    <script>...</script>
    <div>
      #shadow-root
      |   "The Shadow DOM has taken over"
      |   "This is the light DOM"
    </div>
  </body>
</html>
```



# SHADOW DOM SUPPORT

- Chrome
- Opera
- Firefox: in development, behind a pref
- Edge: under consideration
- PS: **very unstable**



# HTML IMPORTS

Include HTML documents  
from other HTML documents

`require()` FOR THE WEB

```
<link rel="import" href="my-component.html">
```



# MY-COMPONENT.HTML'S <HEAD>

```
<script src="my-component.js"></script>  
<link rel="stylesheet" href="my-component.css">
```



# HTML IMPORTS SUPPORT

- Chrome
- Opera
- Firefox: sort of available behind a flag, but will be removed



WHY WILL IT BE REMOVED  
FROM FIREFOX?



# CONCERNS REGARDING DUPLICATION OF SIMILAR FEATURES

- Service Workers
- ES6 Modules
- Fetch API



# LET'S DO A SUPPORT RECAP

- Chrome, Opera: everything
- Firefox: behind a flag, everything except HTML Imports
- Safari: Templates
- Edge: they're going to do Templates and Shadow DOM
- also, the **spec is not finalised**



# Are We Componentized Yet?

Tracking the progress of **Web Components** through standardisation, polyfillification<sup>1</sup>, and implementation.

	Spec'ed	Implementation				
		Polyfill	Chrome / Opera	Firefox	Safari	Edge
Templates			Stable	Stable	8	
HTML Imports			Stable	On Hold		Vote
Custom Elements			Stable	Flag		Vote
Shadow DOM			Stable	Flag		Vote



“NOTHING IS A  
**STANDARD** UNTIL THERE’S  
**SEVERAL BROWSERS**  
COMMITTED TO IT”

—ANNE VAN KESTEREN.



BUT, BUT, BUT...

THIS IS JAVASCRIPTLANDIA



# THERE ARE POLYFILLS!

`webcomponents.js`

- polyfills custom elements, HTML imports, Shadow DOM
- also WeakMap and Mutation Observers

`webcomponents-lite.js`

- the full polyfill without Shadow DOM



# A NOTE OF WARNING

## **POLYFILLS ARE NOT FREE**

- They come at a cost (bandwidth, processing)
- The Shadow DOM polyfill is a huge beast
- You might run into issues with Shadow DOM scoped selectors
- Potential inconsistencies with the HTML imports polyfill



EVEN IF PLATFORM SUPPORT  
IS NOT THERE YET

**YOU CAN THINK IN TERMS  
OF COMPONENTS ALREADY**



THANKS!

**@LAKATOS88**