



HTML5 Web Component Fundamentals

Introduction

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Web Developers Have Problems

Problem #1: Undescriptive Markup

The screenshot shows a Gmail inbox with three emails. The first email, from 'me, Steve (4)', is highlighted. A tooltip over a link in the email body shows dimensions: 'td.apU.xY 24px x 39px'. The browser developer tool is open, displaying the HTML structure of the email content. The HTML shows a table with a single row and four columns. The first column contains a link to 'SDEC14'. The second column contains the text 'No problem - you can look for Doc's keynote on InfoQ.com/sdec in late December or early in the'. The third column contains the text 'Latest Fiddler ebook draft - Thanks Eric! I just watched the first half of your talk at the Austin User Group. Super! Alr'. The fourth column contains the text 'Follow-up from That Conference - This is fascinating reading. Thanks so much Matt. I really appreciate you taking the'. The developer tool also shows the CSS styles for the selected element, including 'color: #777' and 'white-space: nowrap'.

Google

Gmail

COMPOSE

Inbox (7)

Important

More labels

Primary Social Promotions Updates

me, Steve (4) SDEC14 - No problem - you can look for Doc's keynote on InfoQ.com/sdec in late December or early in the Aug 15

td.apU.xY 24px x 39px Latest Fiddler ebook draft - Thanks Eric! I just watched the first half of your talk at the Austin User Group. Super! Alr Aug 15

Matthew, me (2) Follow-up from That Conference - This is fascinating reading. Thanks so much Matt. I really appreciate you taking the Aug 14

Elements Network Sources Timeline Profiles Resources Audits Console

```
<div class="aKh aPb">...</div>
<div></div>
<div class="aKB afn"></div>
<div class="UI" gh="tl">
  <div class="aDP">
    <div class="ae4 aDM" id=":2n" role="tabpanel" aria-labelledby=":3c">
      <div class="Cp">
        <div>
          <table cellpadding="0" id=":3x" class="F cf zt">
            <colgroup>...</colgroup>
            <tbody>
              <tr class="ZA yO x7" id=":3y" tabindex="0" aria-labelledby=":3z">
                <td class="PF xY PE"></td>
                <td id=":40" class="oZ-x3 xY" style>...</td>
                <td class="apU xY">...</td>
                <td class="WA xY">...</td>
                <td class="yX xY">...</td>
                <td id=":45" tabindex="-1" class="xY a4W">
                  <div class="xS" role="link">
                    <div class="xT">
                      <div class="y6">
                        <span id=":47">SDEC14</span>
                        <span class="y2">...</span>
                      </div>
                    </div>
                  </div>
                </td>
              </tr>
            </tbody>
          </table>
        </div>
      </div>
    </div>
  </div>
</div>
```

Styles Computed Event Listeners

element.style {

.x7 .y2 {

color: #777;

.y2 {

color: #777;

Inherited from div.y6

.yW, .y6, .xS, .as {

white-space: nowrap;

overflow: hidden;

Inherited from div.xI

.xT {

white-space: nowrap;

overflow: hidden;

Inherited from div.xS

.yW, .y6, .xS, .as {

white-space: nowrap;

Find in Styles

html body div div div div div div div div #4 #2 div div div div #2r div div #3x tbody #3y #45 div.xS div.xT div.y6 span.y2

Problem #1: Undescriptive Markup

The screenshot shows a Twitter web interface. The main content area displays a tweet from CoriDrew: "13m: Who knew there were so many great alternatives to jsFiddle? Here's some handy alternatives for UI hacking: buff.ly/1mURPxP". A yellow tooltip points to the tweet content, displaying the text: `div.stream-item-content.clearfix.stream-item-activity...` with dimensions 588px x 98px.

The browser's developer tools are open, showing the DOM tree on the left and the Styles pane on the right. The DOM tree highlights the following structure:

```
<script id="swift_loading_indicator">...</script>
<div id="doc" class="route-connect">
  <div class="topbar js-topbar">...</div>
  <div id="page-outer">
    <div id="page-container" class="AppContent wrapper wrapper-connect white">
      ::before
      <div class="dashboard dashboard-left">...</div>
      <div id="trends_dialog" class="trends-dialog modal-container">...</div>
      <div role="main" aria-labelledby="content-main-heading" class="content-main light-inline-actions" id="timeline">
        <div class="content-header">...</div>
        <div class="stream-container" data-max-id="1408201106001" data-since-id="1408217458986">
          <div class="stream-item js-new-items-bar-container">...</div>
          <div class="stream connect-stream">
            <ol class="stream-items js-navigable-stream" id="stream-items-id">
              <li class="js-stream-item stream-item stream-item js-activity js-activity-favorite" data-item-id="500726211954618368" id="stream-item-activity-500726211954618368" data-item-type="activity" data-component-context="favorite_activity">
                ::before
                <div class="stream-item-content clearfix stream-item-activity stream-item-favorite stream-item-activity-me" data-activity-type="favorite" data-activity-min-position="1408206154935" data-activity-max-position="1408217458986" data-component-context="favorite_activity">
                  ::before
                  <div class="stream-item-activity-header">
                    <div class="activity-additional-info">...</div>
                    <div class="stream-item-activity-line js-actionable-user stream-item-activity-line-me">
                      <a class="pretty-link js-user-profile-link js-action-profile-name" href="/coridrew" data-user-id="17105277">...</a>
                        " favorited your Tweets
```

The Styles pane on the right shows the default styles for the selected element, including a list of pseudo-classes and classes like `.btn-link`, `.pretty-link`, and `.stream-item`.

At the bottom of the DOM tree, the breadcrumb path is visible: `... #page-container #timeline div div #stream-items-id #stream-item-activity-500726211954618368 div div div a.pretty-link.js-user-profile-link.js-action-profile-name`.

Problem #1: Undescriptive Markup

The screenshot displays the Stack Overflow website interface. At the top, the navigation bar includes the StackExchange logo, user statistics (5,019 reputation, 5 gold, 32 silver, 59 bronze badges), and links for review and help. The main header features the Stack Overflow logo and navigation tabs for Questions, Tags, Users, Badges, and Unanswered. A prominent 'Ask Question' button is located on the right. Below the header, the 'All Questions' section shows a list of questions. The first question, 'Prestashop Module admin tab controller template', has 0 votes and is described as 'I'm creating module and have problems. How to add template to a module tab. Tab class is in'. To the right of the question list, the total number of questions is displayed as 7,833,061.

The browser's developer tools are open, showing the HTML markup of the page. The 'Elements' panel on the left displays the DOM tree, with the following structure visible:

```
<body class="questions-page new-topbar">
  <noscript><div id="noscript-padding"></div></noscript>
  <div id="notify-container"></div>
  <div id="overlay-header"></div>
  <div id="custom-header"></div>
  <div class="topbar">...</div>
  <script>
    StackExchange.ready(function () { StackExchange.topbar.init(); });
  </script>
  <div class="container">
    <div id="header">...</div>
    <div id="content">
      <div id="mainbar">
        <div class="subheader">...</div>
        <div id="questions">
          <div class="question-summary tagged-interesting" id="question-summary-25343359">
            <div class="statscontainer">...</div>
            <div class="summary">
              <h3>...</h3>
              <div class="excerpt">...</div>
              <div class="tags t-php t-templates t-module t-tabs t-prestashop">...</div>
              <div class="started fr">
                <div class="user-info">
                  <div class="user-action-time">
                    asked "
                      <span title="2014-08-16 19:49:11Z" class="relativetime">2 mins ago</span>
                    </div>
                  <div class="user-avatar">...</div>
                </div>
              </div>
            </div>
          </div>
        </div>
      </div>
    </div>
  </div>
```

The 'Styles' panel on the right shows the CSS rules applied to the selected element, `span relativetime`. The rules include:

- `font-weight: normal;`
- `text-decoration: none;`
- `margin: 0;`
- `padding: 0;`
- `border: 0;`
- `font-size: 100%;`
- `vertical-align: baseline;`
- `background: transparent;`

The 'Inherited from div.user-action-time' section shows the following rules:

- `font-weight: normal;`
- `text-decoration: none;`
- `margin: 0;`
- `padding: 0;`
- `border: 0;`
- `font-size: 100%;`
- `vertical-align: baseline;`
- `background: transparent;`

The breadcrumb at the bottom of the developer tools indicates the path to the selected element: `html > body > div > #content > #mainbar > #questions > #question-summary-25343359 > div.summary > div.started.fr > div.user-info > div.user-action-time > span.relativetime`.

Problem #2: Style Conflicts

Avoiding style conflicts requires highly specific CSS selectors

Use of !important to force styles

No guarantee another style won't conflict



We envision this



But may end up with this



Problem #3: No Native Templates

We slap HTML in `<script type="text/html">`

We store HTML in hidden DOM elements and manually extract

We use `iframe`'s to get separate scope and styling



Problem #4: No Bundling

What if you want to bundle some CSS, JS, and HTML together?

Consider Bootstrap...

```
<script src="jquery.min.js"></script>
<script src="bootstrap.min.js"></script>
<link rel="stylesheet" href="bootstrap.min.css" />
<script src="script.js"></script>
<link rel="stylesheet" href="style.css" />
```




Problem #5: No Standard

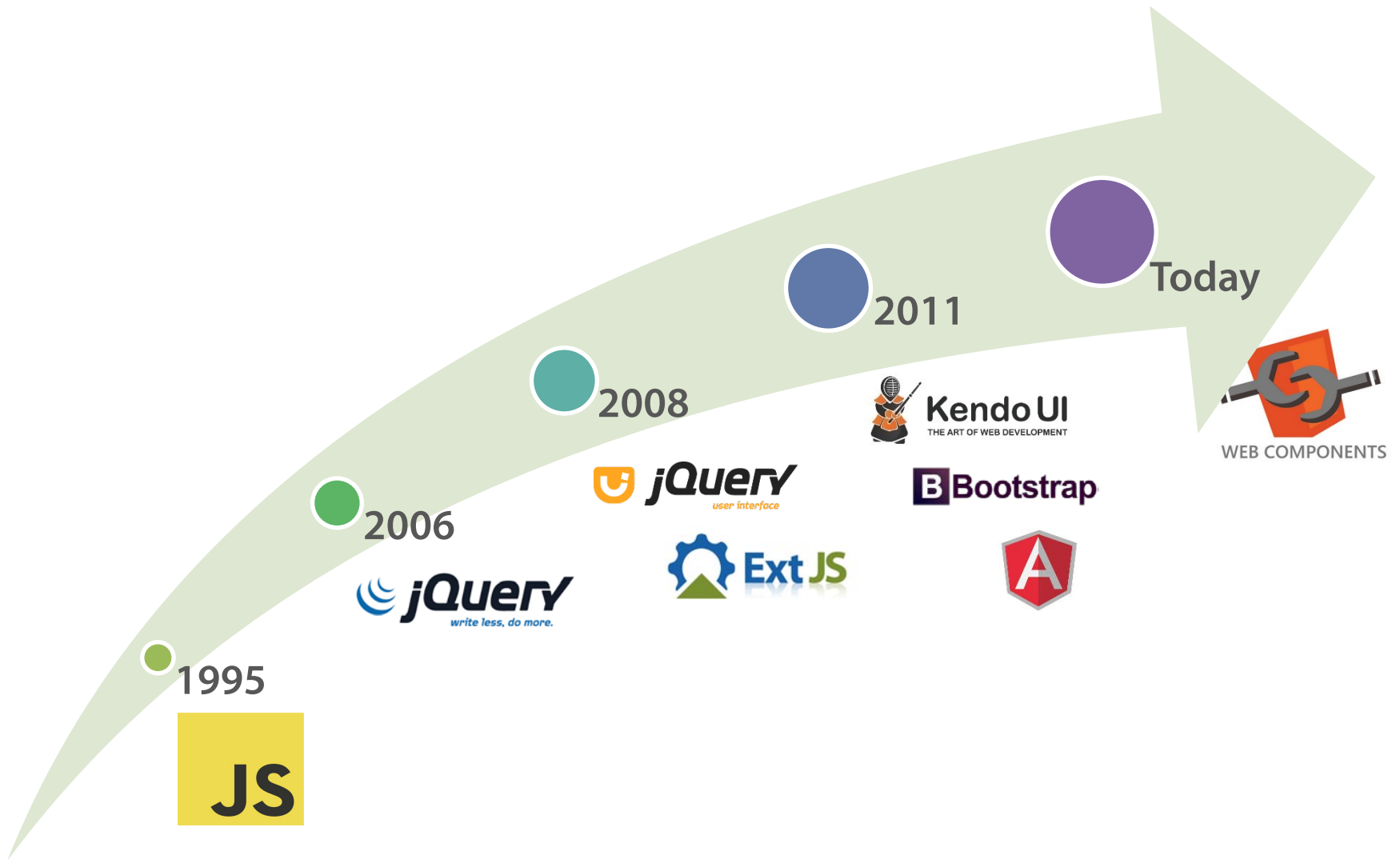


Kendo UI
THE ART OF WEB DEVELOPMENT





A Path to Standard Components





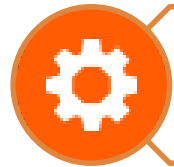
5 Problems

1. Undescriptive markup
2. No component standard
3. Style conflicts
4. No native templates
5. No bundling



The Solution?

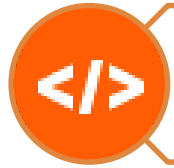




Templates

Inert, reusable markup

[Module 2](#)



Custom Elements

Define our own Elements

[Module 3](#)



Shadow DOM

Encapsulated Markup & Styling

[Modules 4 - 6](#)



Imports

Bundle HTML, JS, & CSS

[Module 7](#)



Prefer demos
that actually work?



Then use this.



Are We Componentized Yet?

Tracking the progress of **Web Components** through standardisation, polyfillification¹, and implementation.

	Documentation		Implementation				
	Explained	Specced	Polyfill	Chrome / Opera	Firefox	Safari	IE
Templates				Stable	Stable	8	
HTML Imports				Stable	Flag		
Custom Elements				Stable	Flag		
Shadow DOM				Stable	Flag		

<http://jonrimmer.github.io/>



Why Learn Native Web Components First?

Learn this



Foundation

Before you learn this



Abstraction over foundation



Learn this



Foundation

Before you learn this



Abstraction over foundation



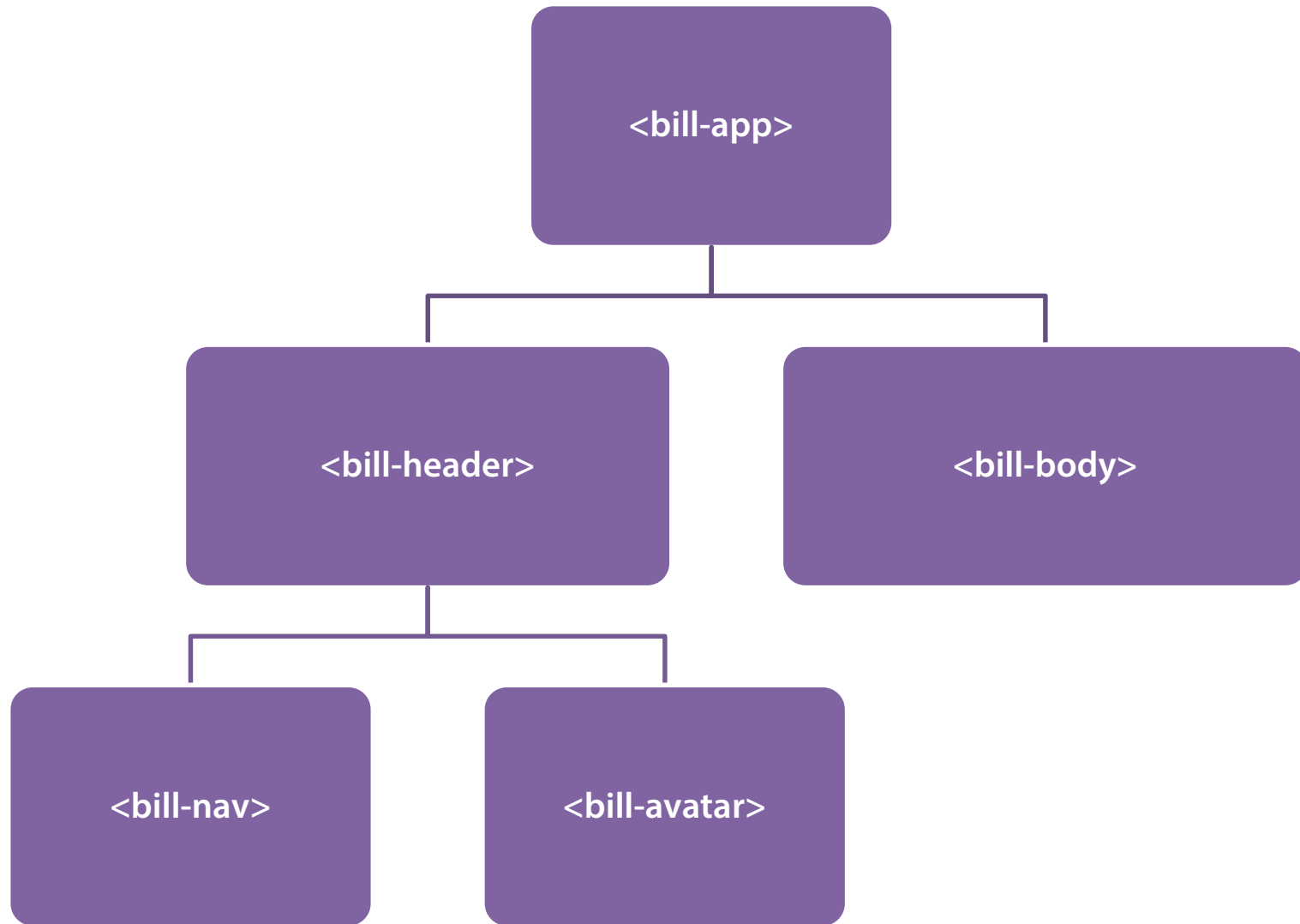
What Level of Abstraction?

Any.

Low Level or Entire App!



What Level of Abstraction?





Cory House



Cory is an independent consultant, INETA speaker, Microsoft MVP, blogger, and software architect with 15 years of experience in software development. As a software architect at VinSolutions, Cory specializes in creating C#, .Net and JavaScript based single page applications for the automotive industry. He regularly speaks on clean code, architecture, and software career development at conferences and user groups across the country. Cory blogs at bitnative.com and is active on Twitter as [@housecor](https://twitter.com/housecor).



Courses by Cory

Architecting Applications for the Real World in .NET

by Cory House

Intermediate 2h 52m 07 Jan 2014



Becoming an Outlier: Reprogramming the Developer Mind

by Cory House

Intermediate 2h 33m 24 Apr 2014



Clean Code: Writing Code for Humans

by Cory House

Intermediate 3h 10m 07 Oct 2013





The Dawn of the Democratic Web

Communities will rally around components
Github will measure interest
Popular components will drive future HTML elements





Why Web Components?

